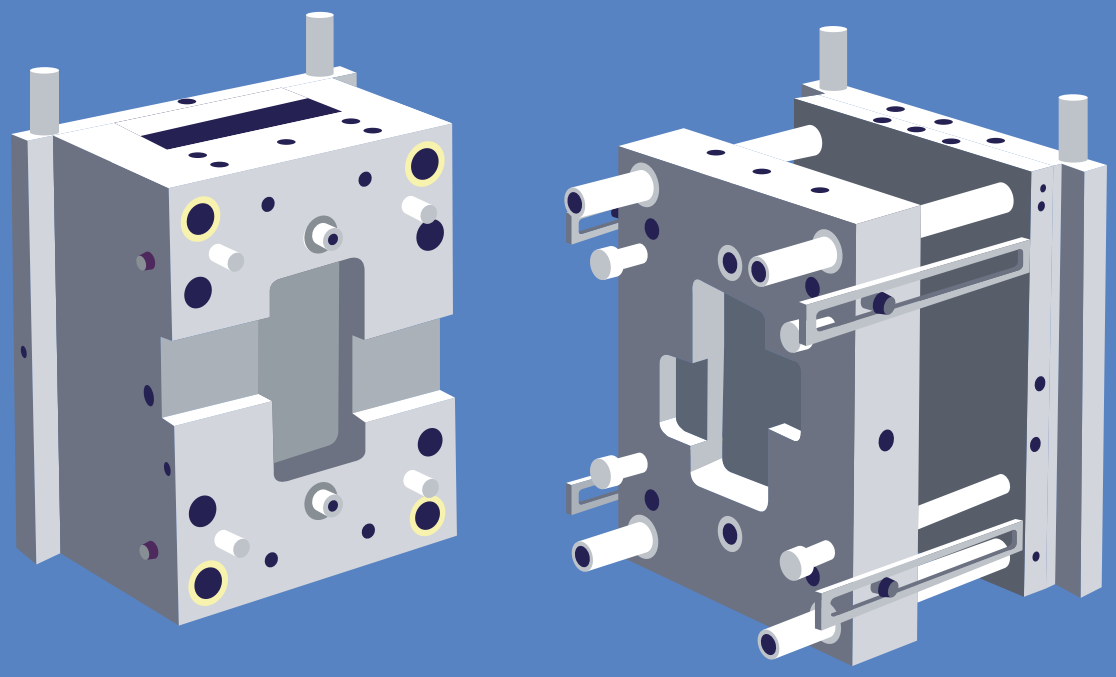
Futaba

BLUE BOOK

Additional Mold Base Processing & Mold Parts Edition VOL.1

Futaba Standard

Plastic Mold Compornent



A proposal for reducing man-hours while ensuring quick delivery in mold des

We are able to fulfill a wide variety of your requirements fo

Mold base

An extensive product lineup is available in various sizes and types. We fulfill customer requests with short delivery times by changing standard mold base specifications.

Additional machining

In order to meet diversified customer requirements, we offer a broad menu of additional machining and parts installation.

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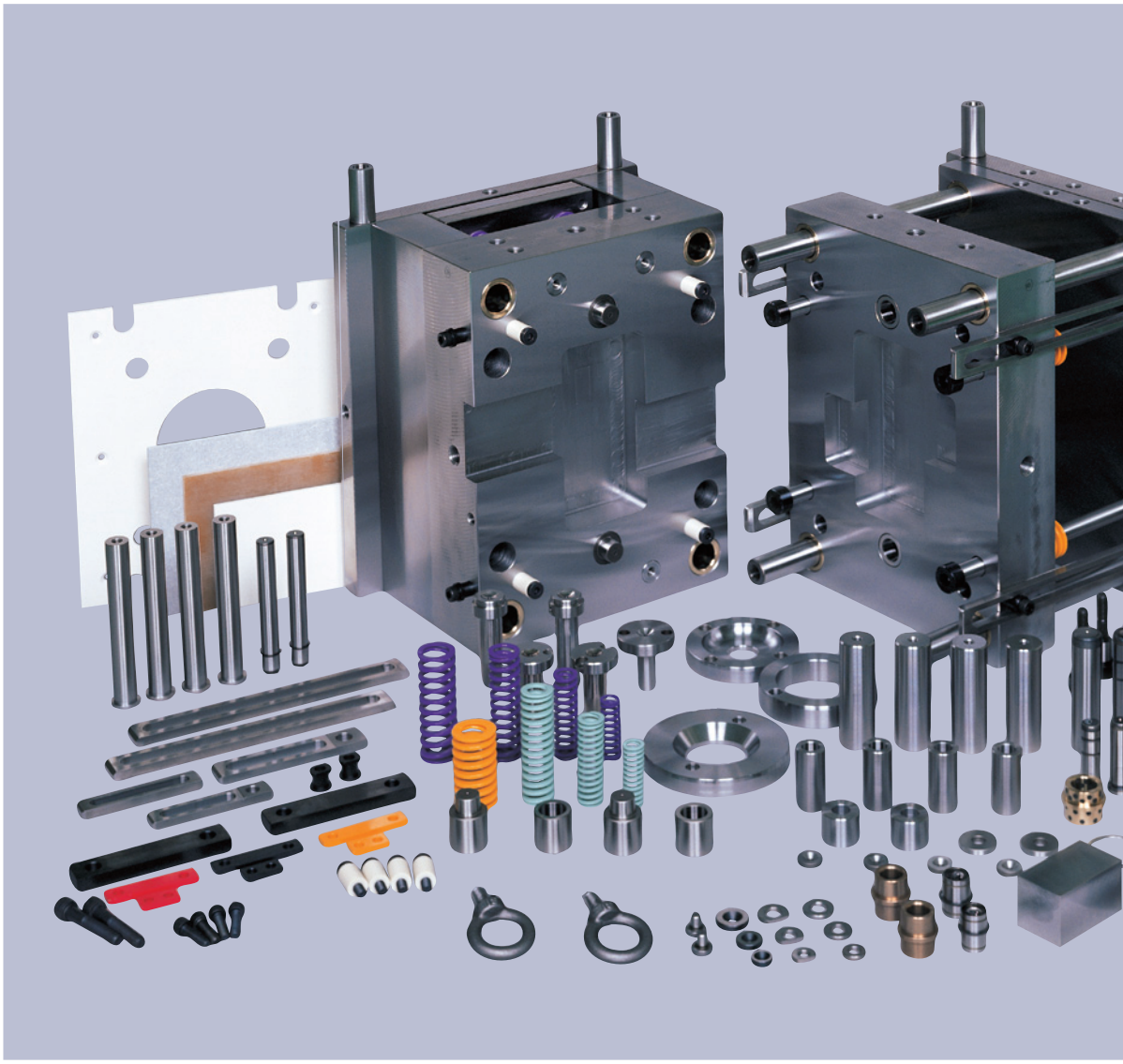


sign, production and manufacturing

r "mold bases and parts" !!

Mold parts

esponse to a wide range of needs, we offer a ad menu of mold parts which can be installed mold bases.

We provide customers with total solutions:

MoldZukan® P.3

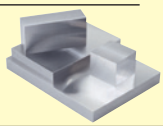
The software that helps customers to speed up the total process from the design to ordering to shorten their lead time!

Easy operation enables users to select mold bases and instruct us additional machining and parts installation.

Insert blocks & plates P.259

Customers can order by specifying the material and size from the options that meet a broad range of applications. We deliver high-precision finished plates with short delivery times!

The chamfer size can also be specified. We boast superior accuracy in any of dimensions, squareness and surface roughness.



System for molding resin pressure/ temperature inside molds (Mold Marshalling System) P.458

Visualize the inside of the mold

A measuring system that realizes quality improvement and cost reduction of injection molding. This system can be used for various purposes such as setting of optimal molding conditions, automatic selection of defective products, evaluation of molds, etc.

Mold base

An "BLUE BOOK Plastic Mold Components" catalog for mold bases is also available. Contact your nearest Futaba sales office to get your copy.

Table of Contents

⚠ Safety Precautions

- Check the weight of the mold base and plates and take necessary safety measures before performing operations. The weight of the merchandize is indicated on the address label placed on the top surface of the carton. When transporting or moving heavy goods, only qualified personnel who have completed the required skill training courses such as those for "crane operations", "slinging operation" and "forklift operations" should operate suspension equipment, and perform slinging and forklift operations in accordance with the Industrial Safety and Health Act.
- When disassembling or assembling mold bases and cavity retainer sets, etc., care must be taken not to get your hand or finger caught between the parting surfaces. Also, adequate precautions should be taken to prevent mold bases or cavity retainer sets fom falling off from the parting line, resulting in an injury or accident.
- Some merchandizes may have sharp edges depending on the contents of order (specifications and structure). Please use extreme care when handling these merchandizes.

How to use catalogs

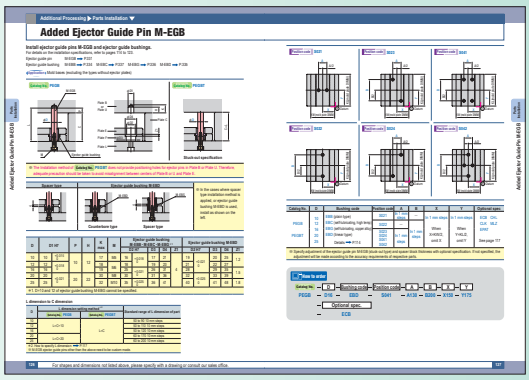
This catalog contains additional processing specifications of mold bases and mold components along with their respective codes. Please use this catalog combined with BLUE BOOK Plastic Mold Components VOL.1 as illustrated below as an aid while designing plastic molds.

※ **Note that specifications and prices of mold parts shown in the BLUE BOOK Plastic Mold Components VOL.1 have been changed to those shown in this catalog. Please select mold parts from this catalog.**

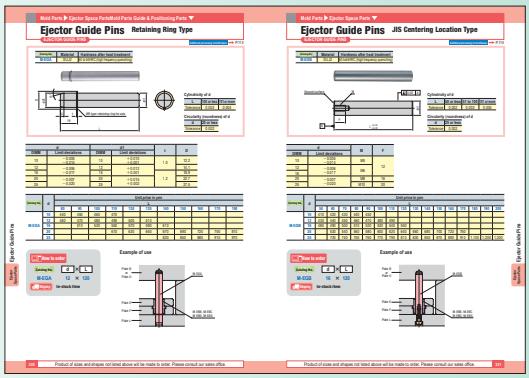
BLUE BOOK
Additional Mold Base Processing & Mold Parts Edition Vol.1

BLUE BOOK
Plastic Mold Components VOL.1

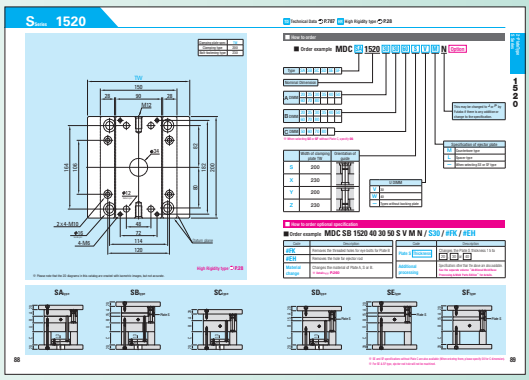
Specify additional processings of mold base



Select mold parts



Select standard mold bases

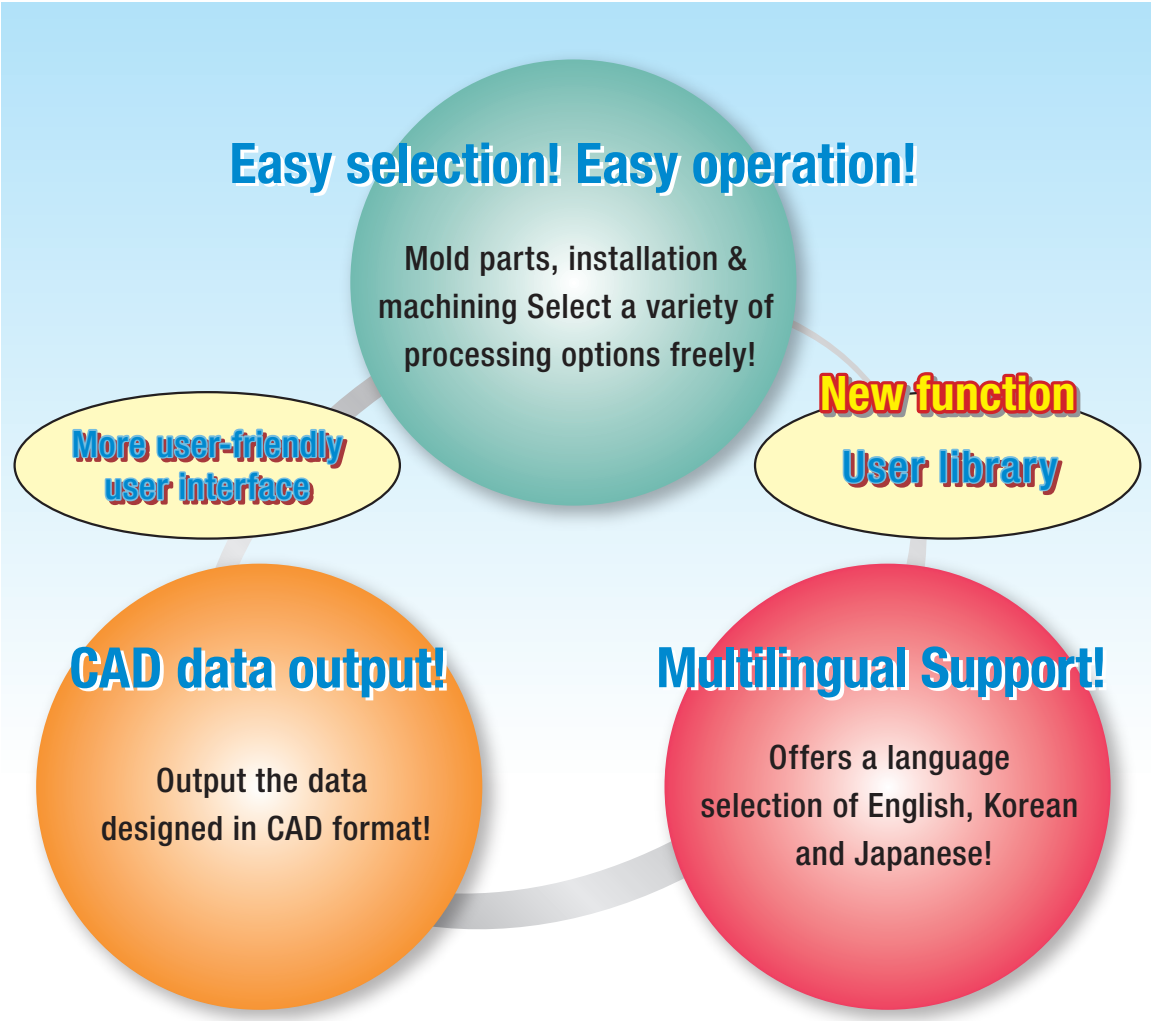


MoldZukan®

MoldZukan® Overview

Software that provides comprehensive supports during process from design to ordering

MoldZukan® helps users to increase design efficiency, speed up the procurement of mold bases and parts and shorten the delivery time of mold products.



Purchase & inquiry

To purchase or inquire further about **MoldZukan®**, please contact **your nearest Futaba sales office or branch office** listed at the end of this catalog, or **Machinery & Tooling Marketing & Sales Group shown** below.

Machinery & Tooling Marketing & Sales Group

Chosei Machinery & Tooling Technology Center, 1080 Yabutsuka, Chosei-mura, Chosei-gun, Chiba 299-4395, Japan TEL: +81-475-30-0809 FAX: +81-475-30-0818

Technical inquiry

Machinery & Tooling Technology Group

Chosei Machinery & Tooling Technology Center, 1080 Yabutsuka, Chosei-mura, Chosei-gun, Chiba 299-4395, Japan TEL: +81-475-32-6062 FAX: +81-475-32-3244

Export Control

If you export **MoldZukan®** overseas, the export might be regulated under the Foreign Exchange and Foreign Trade Act, depending on the use of the software (is or is likely to be used or diverted for developing weapons). Before exporting **MoldZukan®**, you should make sure whether or not the export is subject to regulations in accordance with the act and take necessary procedures such as obtaining a license, etc.

Realizing increased design efficiency, simplified ordering and shortened procurement period

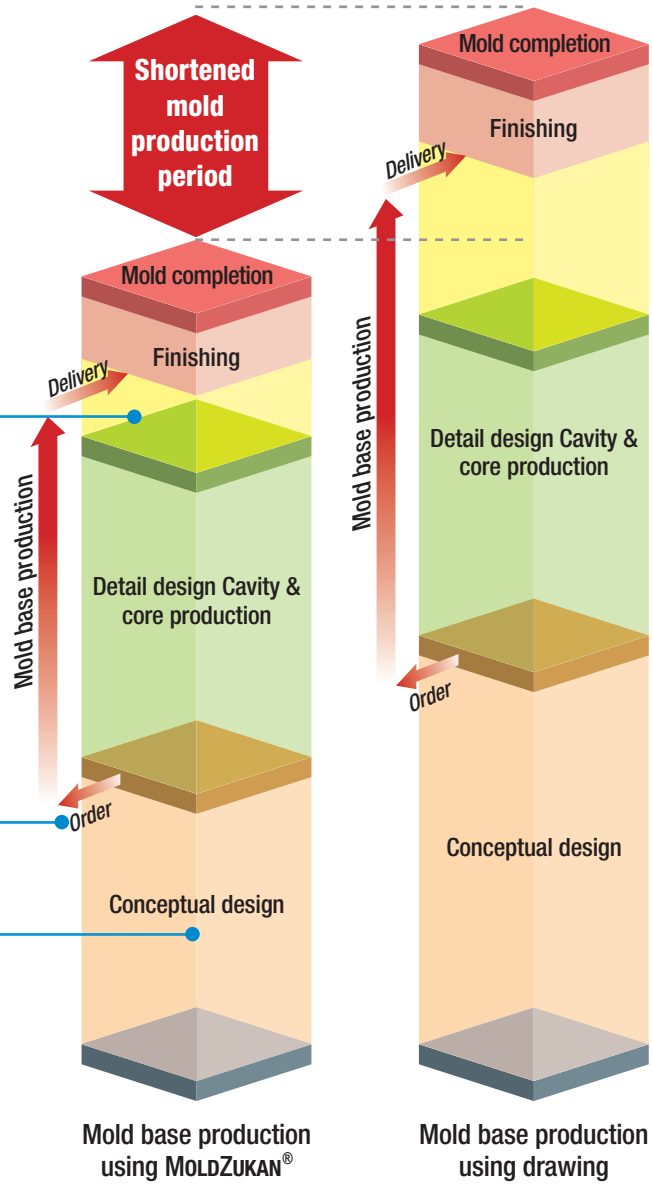
MoldZukan® saves users the efforts of outputting procurement drawings and making phone calls and allows them to placing orders quickly and paperless.
Also, Futaba has built a system that automates the process from procurement of materials to the processing of them each time an order is placed, thereby delivering mold bases in a short period of time.

Benefit 3
Shortened procurement period of mold bases

Benefit 2
Simplified ordering

Allows users to concentrate on cavity & core production!!

Benefit 1
Increased efficiency of mold conceptual design



Comparison of mold production periods

MOLDZUKAN®

Mold conceptual design, mold base procurement, mold parts procurement and business support software

MOLDZUKAN®

Contributes to shortening mold lead time by increasing efficiency of mold conceptual design and speeding up mold base procurement

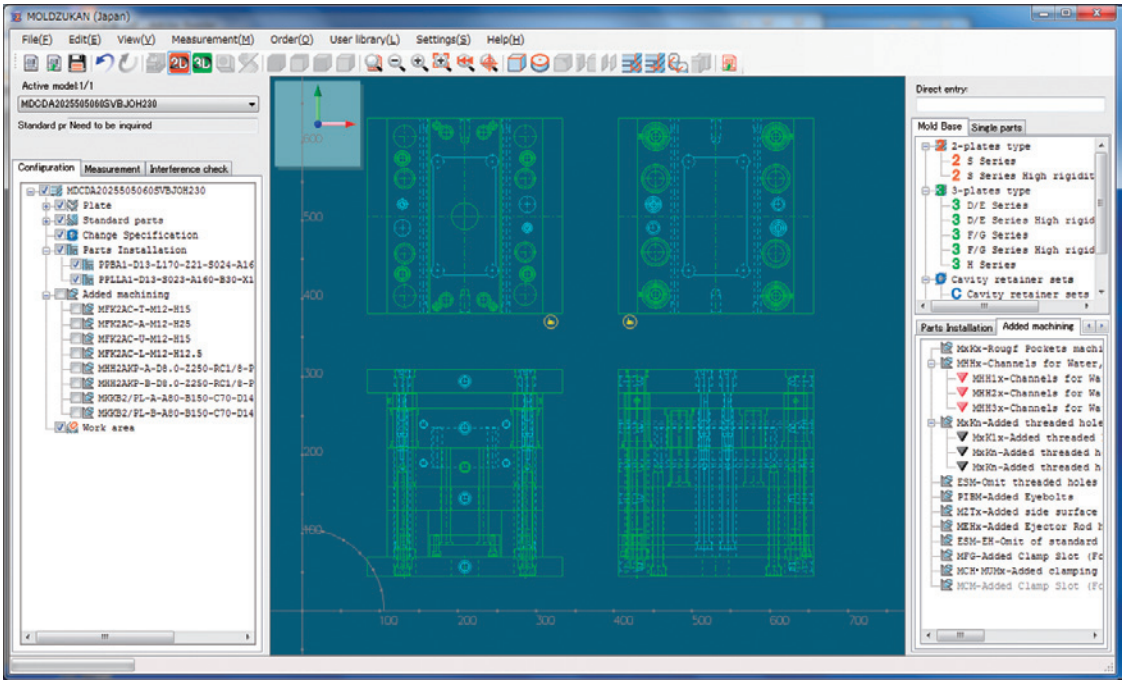
Standard price

Category	Specifications	Price
3D Mode Version	Can be used by switching between 3D and 2D modes.	39,800 yen
2D Mode Version	For exclusive use in 2D mode.	4,980 yen

Operating environment

OS	Microsoft Windows XP (32bit) Microsoft Windows Vista (32bit, 64bit) Microsoft Windows 7 (32bit, 64bit) ※ OS must support Japanese.
CPU	Core2Duo 2.0GHz or more is recommended.
Required memory capacity	2.0GB or more is recommended.
Required hard disk space	250MB or more is recommended.
Others	① Microsoft .NET Framework 3.5 SP1 must be installed. ② The Microsoft Visual C++ 2008 Redistributable must be installed.

MOLDZUKAN® 2D Mode Version

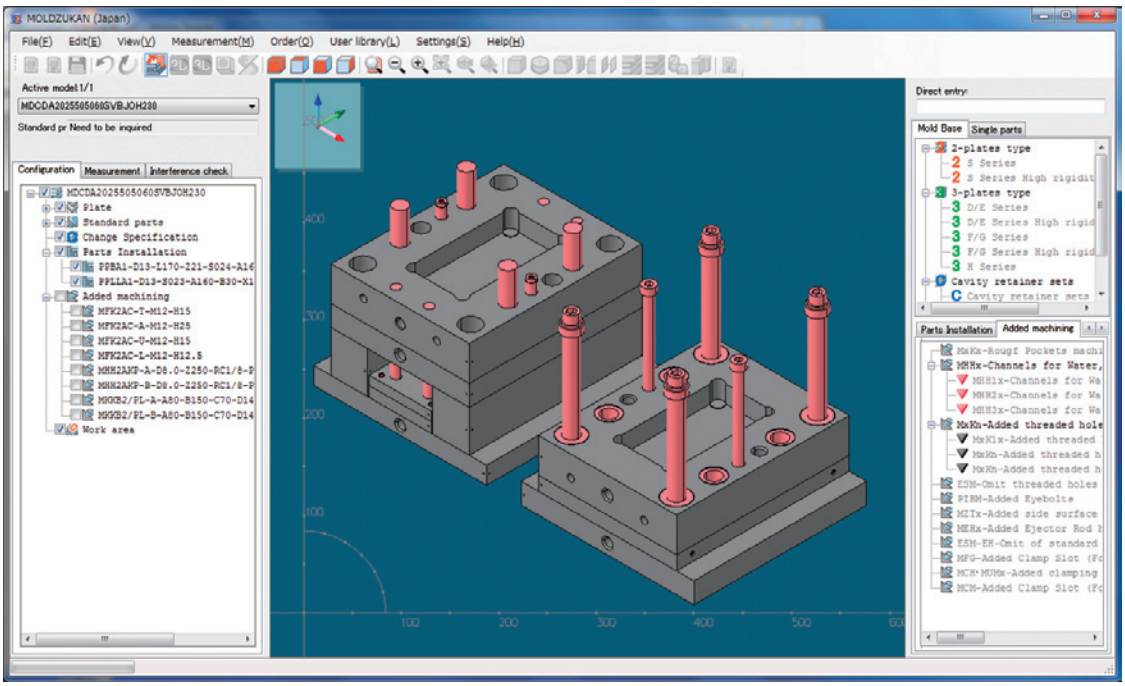


Main functions

Category	Function	3D Mode Version	2D Mode Version
Data generation	Generating data of standard mold bases, parts and plates	○	○
Edit	Undo	○	○
	Redo	○	○
	Setting work area	○	—
	Opening channel (Boolean operation)	○	—
Display	Switching between 3D & 2D	○	—
	Switching direction of projection	○	—
	Multi-view	○	—
	Perspective view	○	—
	Zooming(full, zoom-in, zoom-out)	○	○
	Un-hiding/hiding channels	○	—
	Opening/closing of fixed sides	○	—
Measurement	Length of line segment edge	○	○
	Diameter of circle and circular arc edge	○	○
	Angle of line segment edge	○	—
	Shortest distance between bodies	○	—
	Shortest distance between plates	○	—
	Shortest distance between lines and edges	○	○
	Distance between parallel lines and parallel edges	○	○
	Shortest distance between channels	○	○
	Interference check	○	—

Category	Function	3D Mode Version	2D Mode Version
Data output	Outputting CAD data (3D)	IGES STL	—
	Outputting CAD data (2D)	DXF	DXF
	Outputting parts list (CSV format)	○	○
	Outputting added machining specification list (CSV format)	○	○
Print	Printing drawing area	○	○
	Hard copy of drawing area	○	○
Ordering	Prepare order/quotation request	○	○
Registration	User library	○	○
Setting	Setting CAD data layer	○	○
	Setting color for models	○	—
	Displaying product name for tree title	○	○
	Un-hiding/hiding of reference plate signs	○	○
	Un-hiding/hiding compass	○	○
	Un-hiding/hiding ruler	○	○
	Online update function	○	○
	Using large fonts for tree	○	○
	Translucent view	○	—
	Adjust transparency	○	—
Help	Catalog (Blue book, Red book)	○	○
	Manual (Function/Operation)	○	○

MoldZukan® 3D Mode Version



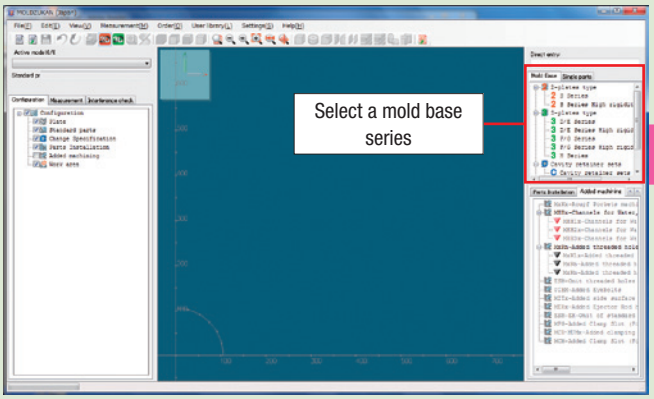
◆ The software is subject to updates without notice. For latest information on the operating environment and prices, contact your nearest Futaba sales office.

Flow to Order

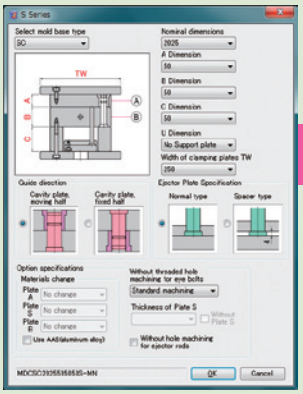
Select Futaba standard parts for mold

- ◆ Select a mold base from product size.
- ◆ Select a catalog code by following on-screen directions.
- ◆ Order data can be reused.

On the [right tree] → [Mold Base tab], select a mold base series.



Specify the specifications of the mold base and then click [OK] button.



Output as CAD data

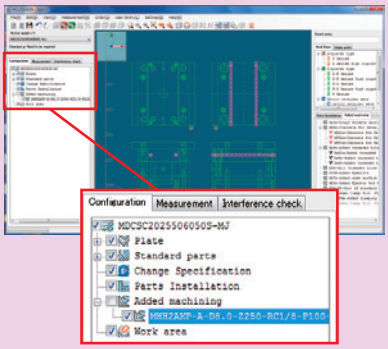
- ◆ The data can be retrieved into your CAD software.

3D Edition	Output 3D CAD data	Output 2D CAD data
	IGES・STL	DXF

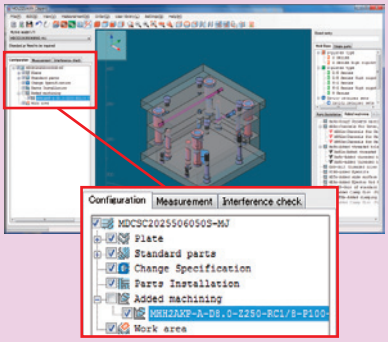
2D Edition	Output 2D CAD data
	DXF

- On the [left tree] → [Configuration tab] → [Additional machining], the specified additional machining code will be displayed.
- The 2D drawing or 3D model is displayed with temperature control channel reflected.

2D model

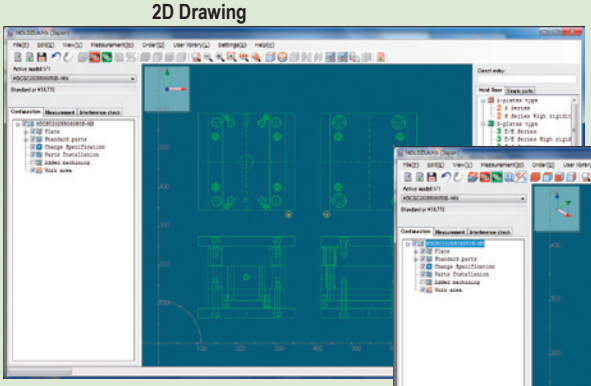


3D model

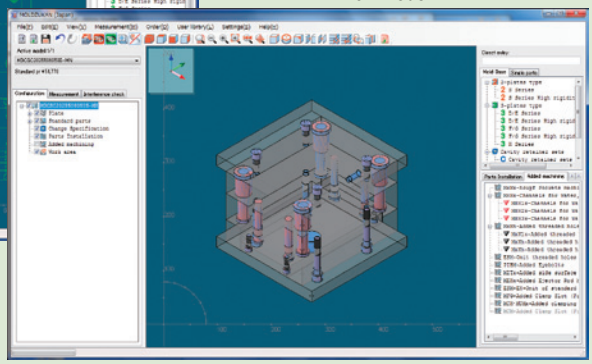


2D drawing or 3D model will be displayed on the [Drawing Area].

2D Drawing

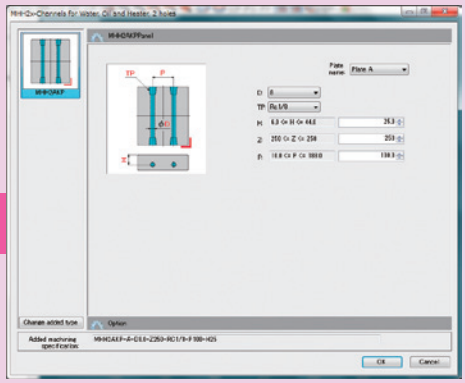


3D Model

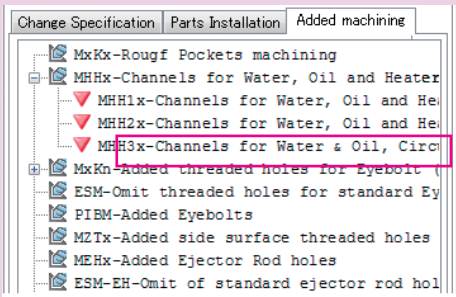


An example of additional machining of temperature control channel

Enter each parameter and click [OK] button.



On the [right tree] → [Additional machining tab], double-click [MHH2xx water/oil/heater channel (at two places)]. A dialog box opens.



Enter the specifications of additional machining

- Select the additional machining by following on-screen directions.
- Reflect the machining specifications on the mold base drawn.
- This function helps reduce mold design errors.

Q & A Here we answer to some frequently asked questions

Q How do I update to the latest version?

A With online update function via the Internet, you can easily update to the latest version of software.

Q I' m currently using the 2D Mode Version. Can I change it to the 3D Mode Version?

A Yes. Please purchase the 3D Mode Version of the software.

Q Is MoldZukan® available only in Japanese?

A On the Environment Setting menu, you can switch the language to the English, Korean or Chinese.

Q Can I use MoldZukan® on a trial basis?

A We offer the trial version of the software. Please feel free to contact your nearest sales office.

Q Is MoldZukan® CAD software?

A No. You cannot create shapes freely with the software like you do with CAD software. However, you can create shapes by selecting our catalog codes on an interactive basis. The created shapes can be output as CAD data. The data can also be retrieved into your CAD software in IGES, DXF or other format.

Q Can I reuse the product specification data created by MoldZukan®?

A Yes. You can retrieve the data you want to edit into MoldZukan® to modify or add machining to it.

Additional Processing Overview

Additional Processing Overview

What is additional processing?

This is a term we use to describe a number of common processes additionally made to standard mold bases, the specifications of which are set in place with simple codes assigned to them so that customers can order required alternation or modification of standard mold bases easily with the codes. Additional processing includes machining of water channels, heater holes and other temperature control channels, as well as installation of puller bolts, ejector guide pins and other parts. Minor changes of standard mold bases due to the changes in specifications of molds or molding machines can also be specified by using the codes.

Category	1st digit of catalog No.	Major specifications
Specification change/addition	C E S	Plate thickness change Plate material change Part length change Part pitch change
Parts Installation	P	Puller bolt installation Ejector guide installation Locating ring installation Coil Spring Installation
Machining	M	Water channel, oil channel heater hole machining Pocket milling Eye bolt threaded hole machining Ejector rod hole machining

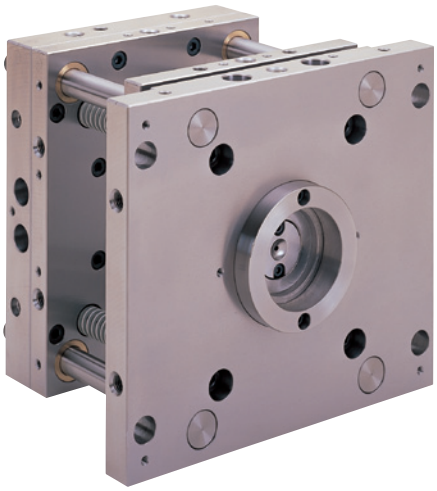
How to order

Please order “additional processing specifications” by specifying mold base item name and additional processing specifications using codes as shown in the order example below. Write the additional specifications by beginning a new line for each specification.

【Order example】

Mold base model ——— MDCDA2025354060XVBJOH210

Additional processing specifications
- MKKB2/PL — B — A85 — B140 — C75 — D130 — R8 — RD — Z25 — X55 — Y55
- MKKMD/PL — B — B56 — Z15 — X140 — Y97 — M60
- MHH2AKP — U — D8.0 — Z250 — RC1/8 — P90 — H15 — ZHC — E20 — G20
- MFK2AC — T — M12 — H15
- PLRC — D100 — G70 — T20 — Z5 — S022 — X100 — Y125 — MNZ/E60/J12
- The rest is omitted



Price

We will be pleased to provide you with a preliminary price quotation. Please request a quotation from our sales office.

Delivery date

Delivery dates will vary depending on the contents and volume of “Additional Processing Specifications”.
Please inquire with our sales office.

Specifications not listed in this catalog

“Additional processing specifications” are commonly used specifications that are set in place with codes assigned to them. We also accept orders for products of specifications not shown in our catalog. Please advise us on your application requirements with a drawing, etc. or consult our sales office.

Using MoldZukan®

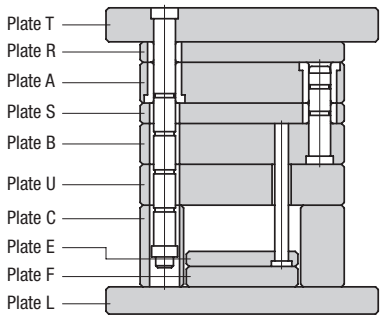
MoldZukan® is software that supports selection of additional processing specifications and issuance of purchase orders. MoldZukan® allows customers to more easily select additional processing specifications and issue purchase orders. For details, refer to page 3.

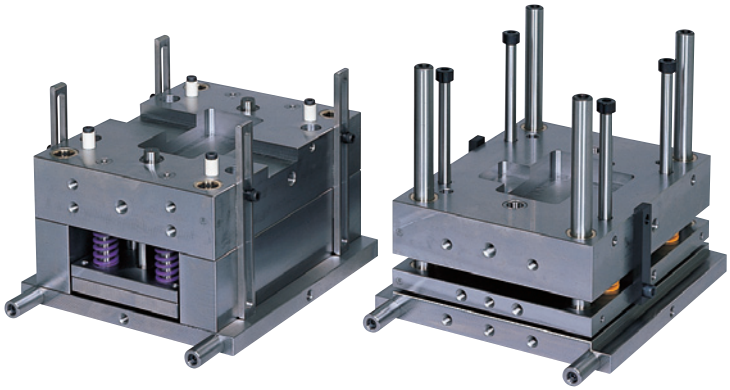
Liability note

“Additional processing specifications” are provided to show customers how to order additional processings. When designing molds, various conditions such as strength and accuracy need to be taken into account. Therefore, we shall not be responsible or liable for any loss or damage of any kind incurred as a result of, or in connection with your use of additional processing specifications or selection of mold bases.

Mold base plate name

The name of the plates in the mold base overall view charts as well as in the text herein are shown with abbreviated form of the names as listed below:

Reference diagram	Plate abbreviated name	Plate name
	Plate T	Top clamping plate
	Plate R	Runner plate
	Plate A	Cavity plate (fixed half)
	Plate S	Stripper plate
	Plate B	Cavity plate (moving half)
	Plate U	Backing plate
	Plate C	Spacer block
	Plate E	Ejector retainer plate
	Plate F	Ejector base plate
	Plate L	Bottom clamping plate



Additional Processing Overview – Specification Change/Addition

The basic specifications of standard mold bases can be changed, added or deleted as shown below:

Specification Change/Addition on Plates

Specification Change/Addition on Parts

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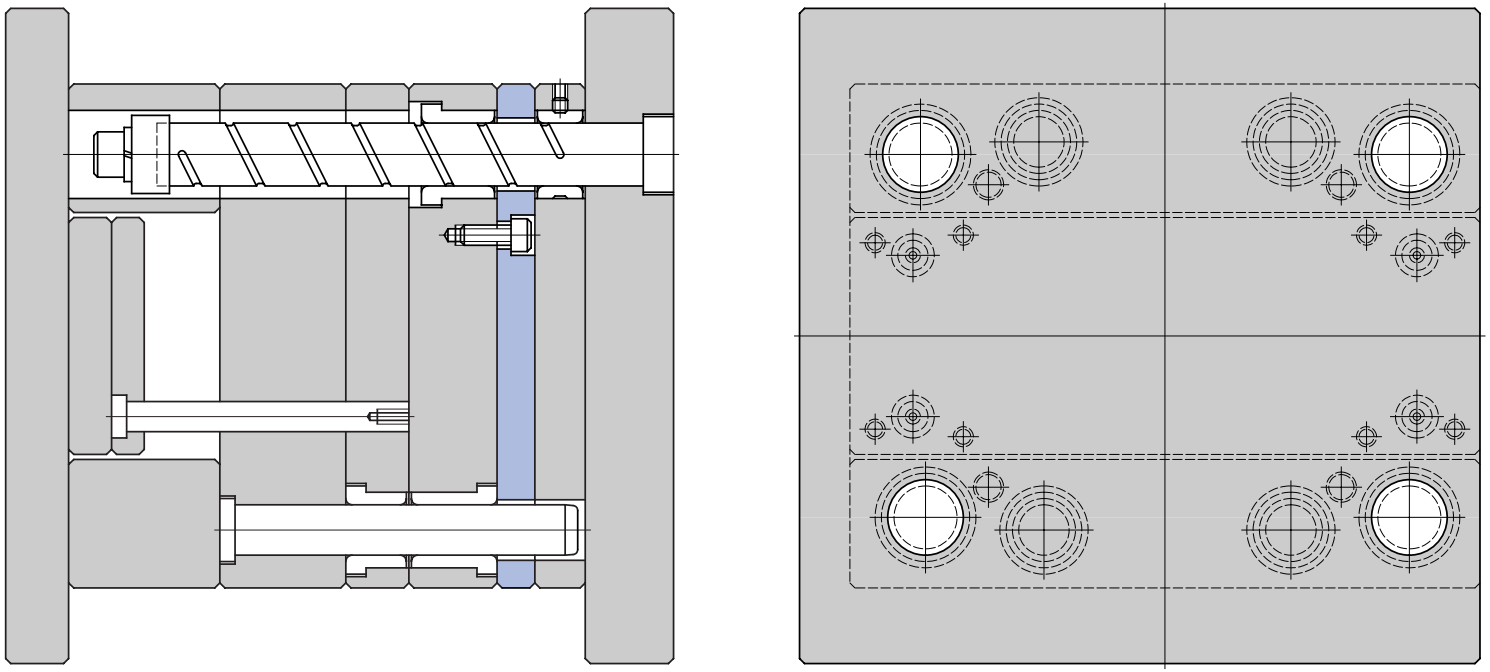
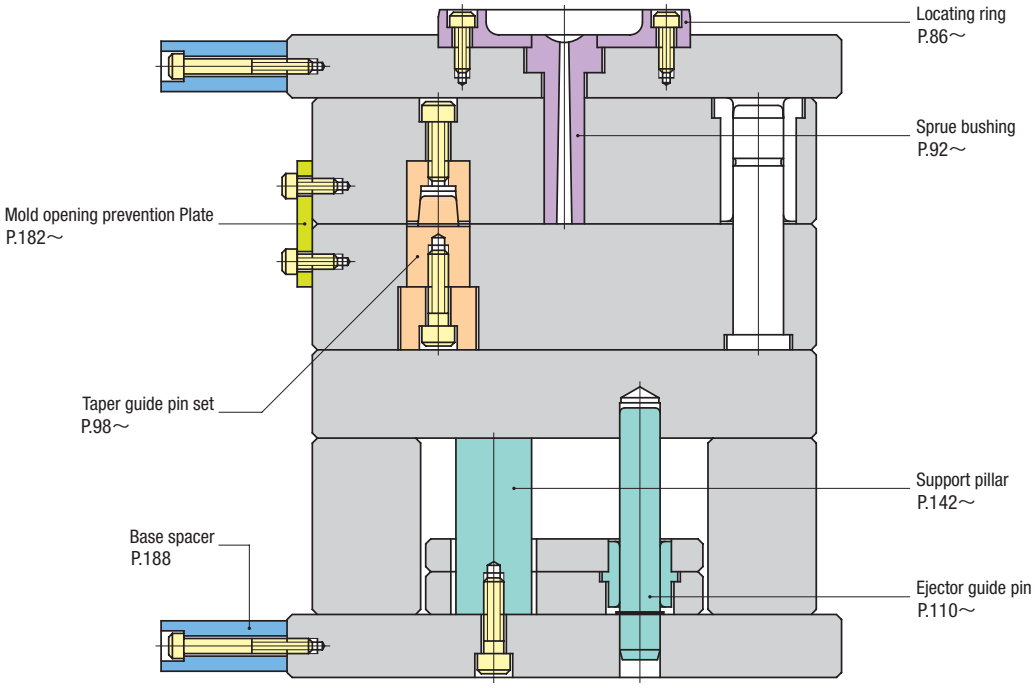


Additional Processing Overview — Parts Installation



Locating Ring Addition

Sprue Bushing Addition

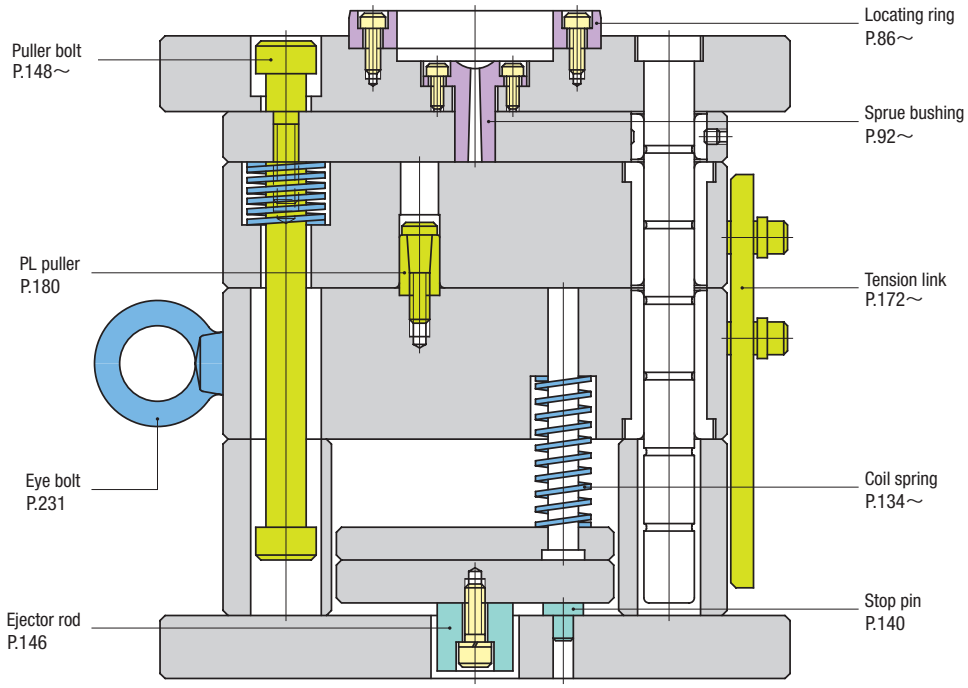
Taper Guide pin Addition

Ejector Guide Pin Addition

Base Spacer Addition

Support Pillar Addition

Mold Opening Prevention Plate Addition



Puller Bolt Addition

PL Puller Addition

Ejector Rod Addition

Tension Link Addition

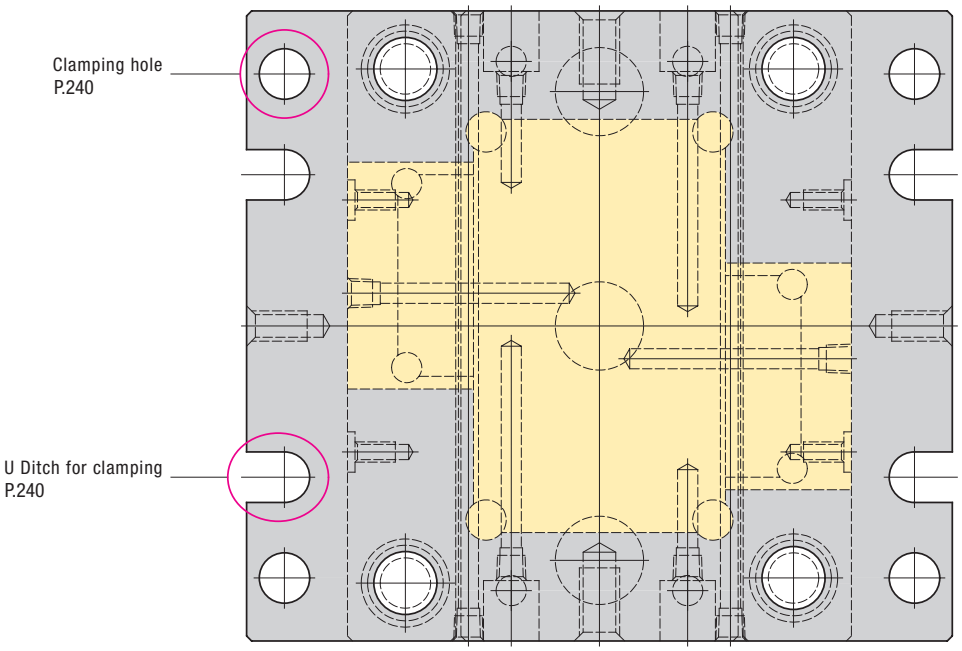
Spring Addition

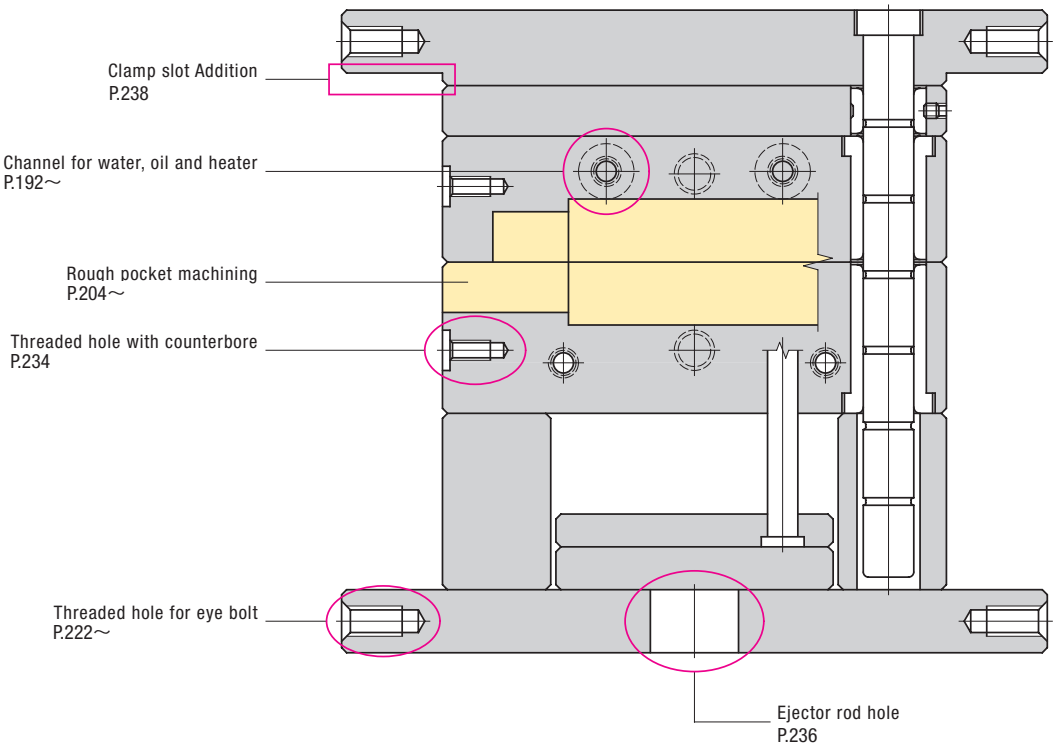
Addition of Stop Pin or Stop Ring

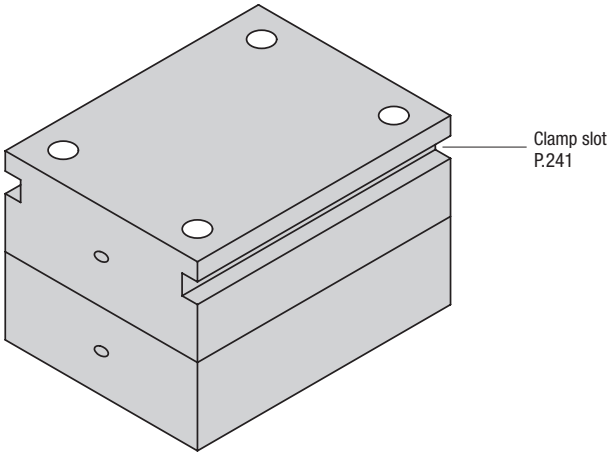
Eye Bolt Addition

! "Additional processing specifications" are provided to show customers how to order additional processing. When designing molds, various conditions such as strength and accuracy need to be taken into account. Therefore, we shall not be responsible or liable for any loss or damage of any kind incurred as a result of, or in connection with your use of additional processing specifications or selection of mold bases.

Additional Processing Overview — Machining







Channels for Water, Oil and Heater

Rough Pockets Machining

Threaded Holes for Eyebolt (Side Surface Threaded Holes)

Ejector Rod Hole Addition or Omission

Clamp Slot Addition (For Clamping Plate)

Addition of Clamping Hole or U Ditch for Clamping

Clamp Slot Addition (For A-Plate or B-Plate)

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Specification Change/Addition

Specification Change/Addition on Plats

Specification Change/Addition on Parts

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Change Dimension and/or Installation Method of Clamping Plates

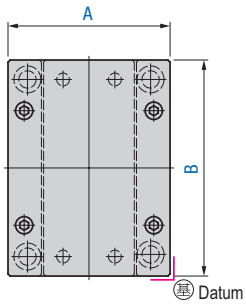
Change the dimensions and/or installation method of clamping plates.

When changing the dimensions of clamping plates, take into account the strength, etc.

Application Mold Bases

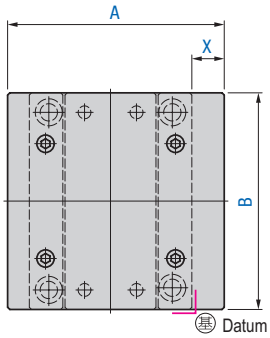
No protrusion (clamping and mold plates are same dimension)

Catalog No. CIS1

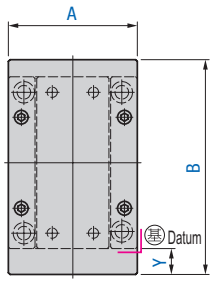


2-direction protrusion

Catalog No. CIS2

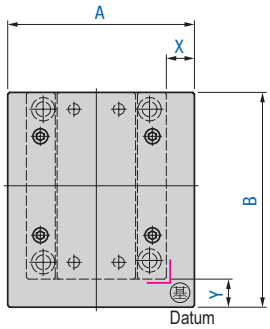


Catalog No. CIS3

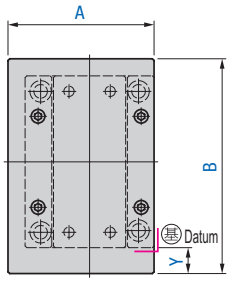


3-direction protrusion

Catalog No. CIS4

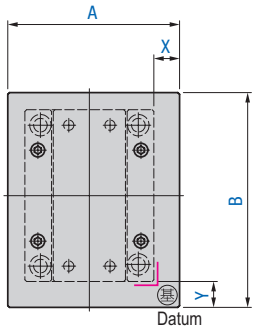


Catalog No. CIS5

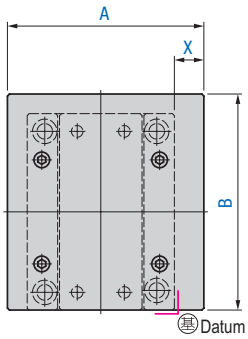


4-direction protrusion

Catalog No. CIS8



Catalog No. CIS6



Catalog No. CIS7

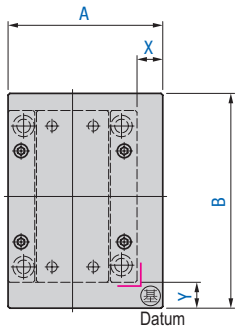
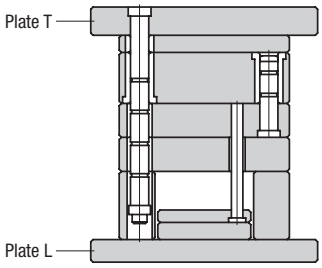


Plate code of clamping plate



For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Catalog No.	Plate code	A (width)	B (length)	T (thickness)	X *1	Y *1
CIS1～CIS8	T (Plate T) L (Plate L)	Select from the Plate General Catalog Red Book. (Product of sizes other than shown in the plate catalog will be made to order)			In 1 mm steps	In 1 mm steps

※ If any plate thickness change of Catalog No. CIT is specified, re-specify it by using Catalog No. CIS.
Mixed use of CIS and CIT is not allowed.

*1. Specify X dimension and Y dimension as follows:

Protrusion spec.	Catalog No.	X	Y	Remarks
No protrusion	CIS1	No need to specify	No need to specify	
2-direction protrusion	CIS2	Need to specify	No need to specify	No need to specify if amount of protrusion X on right and left is the same.
	CIS3	No need to specify	Need to specify	No need to specify if amount of protrusion Y on top and bottom is the same.
3-direction protrusion	CIS4	Need to specify	Need to specify	
	CIS5	Specify X0	Need to specify	
	CIS6	Need to specify	Specify Y0	
	CIS7	Need to specify	Need to specify	
4-direction	CIS8	Need to specify	Need to specify	No need to specify if protrusion X on right and left is the same, and protrusion Y on top and bottom is the same.

How to order

	Catalog No.	—	Plate code	—	A	—	B	—	T	—	X	—	Y
Plate **T** change	CIS4	—	T	—	A300	—	B350	—	T25	—	X25	—	Y30
Plate **L** change	CIS8	—	L	—	A250	—	B280	—	T20	—	X30	—	Y20

※ Changing clamping plate thickness results in changes in length of installation parts as described below:

Part name	Applicable series	Handling of dimensions
Assembly screw	S series	Increase or decrease the screw length by the amount of increase or decrease in clamping plate thickness. (However, the last digit must be rounded down to the nearest unit of 5 mm)
	D·E series	
	F·G series	
	H series	
Support pin	D·E series	Specify the length of the support pins in the mold base item name.
	F·G series	
	H series	
Puller bolt	H series	① Specify the length of puller bolt M-PBA in the mold base item name. ② For length of puller bolt M-PBC, see P.80

Regarding mold base item name

When changing dimension and installation method of clamping plates, please note:
In addition to the above mentioned instruction codes, please specify the mold base item name with codes as described below:
For standard mold bases item name, specify the width of clamping plate and orientation of the guide with S, X, Y or Z. When changing the dimension and installation method of clamping plates, specify the code of the mold base item name with S (when installing guide pins in the cavity plate (moving half)) or Y (when installing guide pins in the cavity plate (fixed half)). For F G series, specify S as the code.
※ If the nominal dimension is 1113, 1313 or 1315, then:
Specify the code of the mold base item name with X (when installing guide pins in the cavity plate (moving half)) or Z (when installing guide pins in the cavity plate (fixed half)). For F G series, specify X as the code.

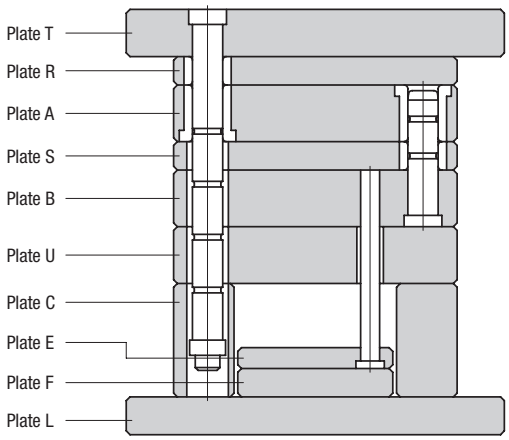
Change Plates Thickness — ①

Change the plate thickness to the values other than the standard plate thickness.

Changing Dimension and Installation Method of clamping Plate ➡ P.22

When changing plate thickness, take into account the strength, etc.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



Catalog No.	Plate code	T (plate thickness)
CIT	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) C (Plate C) E (Plate E) F (Plate F) L (Plate L)	① Select from the standard sizes shown in Plate General Catalog Red Book. ② Product of sizes other than shown in the plate general catalog will be made to order.

※ If any clamping plate dimension and installation method change of Catalog No. CIS is specified, Plate T and Plate L cannot be specified. Mixed use of CIS and CIT is not allowed.

How to order

Catalog No.	—	Plate code	—	T
CIT	—	U	—	T50

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Regarding mold base item name

※ When changing thickness of Plate A, B or C, please note:

In addition to the instruction codes on the left page, please specify the mold base item name with codes as described below:

Mold base item name: MDC | Type | Nominal dimension | Plate A thickness | Plate B thickness | Plate C thickness | Other spec.

Specify the thickness of Plate A, B or C with 2-digitis numbers.
If the thickness is over 100, indicate the number in 2 digits（e.g. 100 → 10、220 → 22）

Instruction example

If changing the specifications of a mold base to SA Type, nominal dimension 1520, Plate A thickness 90, Plate C thickness 100, specify the mold base item name as follows:

Mold base item name	MDC SA 1520 90 30 10 S V M J
Additional processing instruction code	CIT — A — T90
Additional processing instruction code	CIT — C — T100

Note: Changing thickness of Plate A, B or C requires specifying both the mold base item name and additional processing instruction codes.

※ When changing the thickness of Plate U:

In addition to the instruction codes shown on the left page, specify the mold base item name as follows:
For the standard mold base item name, specify the Plate U dimension with V or W code. When changing the thickness of the U dimension, specify V as the code of the model base item name.

Length of supplied parts

Changing plate thickness results in changes in part length as described below:

Part name	Handling of dimensions
Return pin	Increase or decrease the return pin length by the amount of increase or decrease in plate thickness.
Assembly Screw bolt	Increase or decrease the screw length by the amount of increase or decrease in plate thickness.
Guide bushing	The length is determined by the setting shown in page 26.
Guide pin	The length is determined by the setting shown below.
Support pin	Specify the length of support pins in the mold base item name.

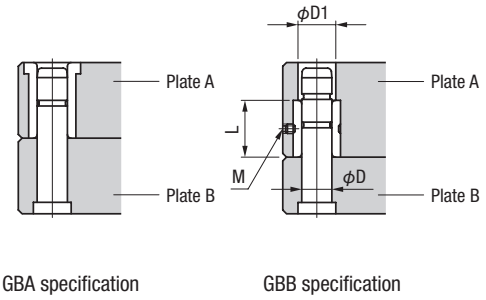
Setting of Guide Pin Length

Guide pin diameter	Thickness of Plate A or Plate B (Thickness of plates in which to install guide bushing)		Guide pin length	
	Mold base Plastic main mold	Die cast main mold		
12	20≦Thickness≦60	—	Determined based on our setting standards. Mold base, cavity retainer sets See page 439 Cavity retainer sets for die cast See the Blue Book Dimension Diagram	For the thickness other than listed on the left, specify the length of the guide pin. Details on how to specify: P.44
16	20≦Thickness≦80	40≦Thickness≦60		
20	20≦Thickness≦100	50≦Thickness≦80		
25	25≦Thickness≦120	60≦Thickness≦100		
30	30≦Thickness≦130	70≦Thickness≦140		
35	40≦Thickness≦150	100≦Thickness≦150		
40	40≦Thickness≦150	110≦Thickness≦160		
50	50≦Thickness≦250	—		
60	100≦Thickness≦250	—		
70		—		

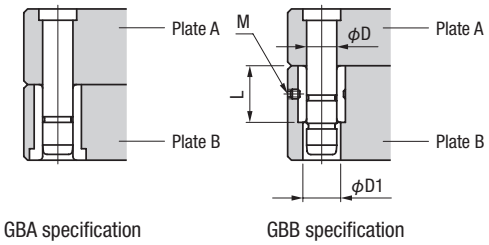
Change Plates Thickness — ②

Depending on the thickness, install guide bushings in Plate A and Plate B as illustrated below:

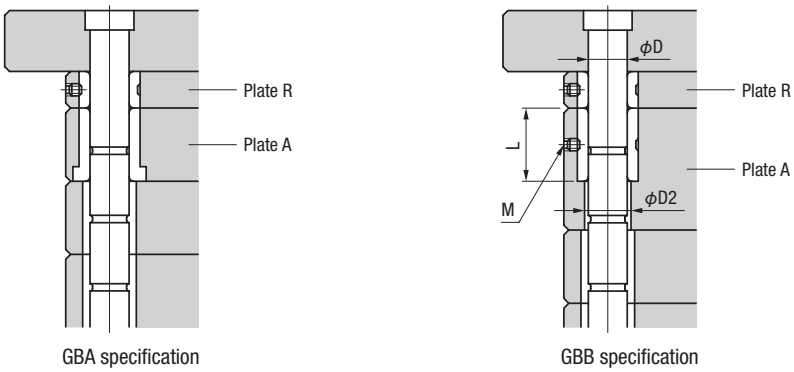
Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



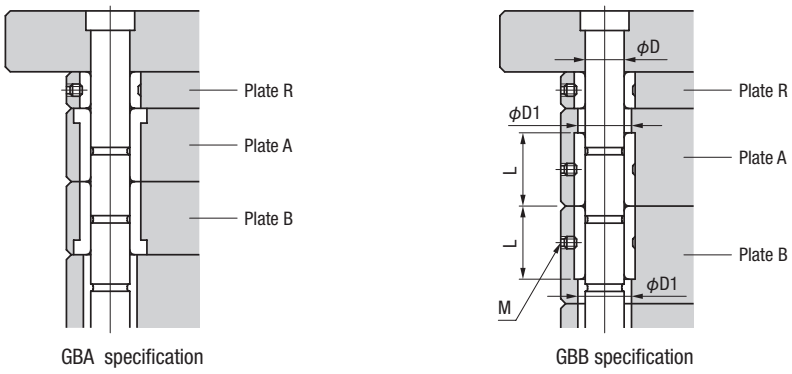
Guide bushing specification of Plate A guide pins



Guide bushing specification of Plate B guide pins



Guide bushing specification of D, E and H series Plate A support pins



Guide bushing specification of F and G series Plate A and Plate B support pins

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Thickness of Plate A & B (Thickness of plates in which to install guide bushings) and guide bushing specifications

D	GBA spec.	GBB spec.					Remarks
	Thickness of Plate A or B	Thickness of Plate A or B	L *1	D1	D2	M	
12	20≦Thickness≦60	60＜Thickness	30	14～17	14	M4	
16	20≦Thickness≦80	80＜Thickness	50	18～24	18	M5	
20	20≦Thickness≦100	100＜Thickness	70	24～29	22	M6	
25	25≦Thickness≦120	120＜Thickness	80	29～34	27	M8	
30	30≦Thickness≦150	150＜Thickness	100	34～41	32		
35	40≦Thickness≦150			39～47	37		
40	40≦Thickness≦160	160＜Thickness		45～54	42		
50	50≦Thickness≦160			54～69		M10	
60	100≦Thickness≦200	200＜Thickness	130	65～79			When thickness is 140, 170 or 190, GBB specification is used.
70				75～89			

*1. Guide bushing length＝L-1
※ The above table shows installation specification of guide bushings, thickness of which can be specified in 10 mm steps (When D is 12, 16, 20 or 25 and plate thickness is 25 or 35, and when D is 30 and plate thickness is 35, GBA specification is used.)
※ If different type of guide bushings are used, settings other than the above may be used. ➡ P.44
※ Installation methods other than those shown on the left page ➡ P.48

Guide bushing specifications for Plate S and Plate R

For Plate S and Plate R, M-GBB is installed as shown in the charts on the left page.
Guide bushing length ＝ plate thickness － 1

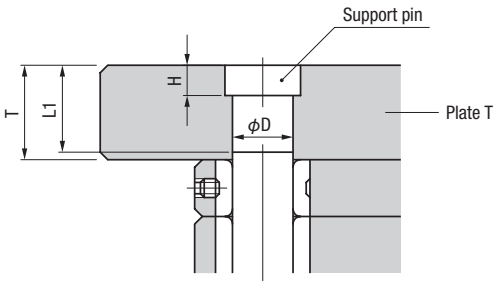
D	Thickness of Plate S and Plate R													
	10	15	20	25	30	35	40	45	50	60	70	80	90	100
12	○	○	○	○	○	○								
16		○	○	○	○	○	○	○	○					
20		○	○	○	○	○	○	○	○	○	○			
25		○	○	○	○	○	○	○	○	○	○	○		
30			○	○	○	○	○	○	○	○	○	○	○	○
35			○	○	○	○	○		○	○	○	○	○	○
40				○	○	○	○		○	○	○	○	○	○
50					○		○		○	○	○	○	○	○
60										○	○			
70											○			

※ For plate thickness dimensions other than the above, guide bushing needs to be custom-made.
※ If different type of guide bushings are used, settings other than the above may be used. ➡ P.44
※ Installation methods other than those shown on the left page ➡ P.48

Support pin specifications change according to the change in the thickness of the 3-plate type Plate T

Changing Plate T thickness requires change in head thickness of support pin as follows:

As the Plate T becomes thinner, the support force of the pin decreases. Therefore, when changing the plate thickness, take into account the strength, etc.



D	Standard Plate T thickness			Change in Plate T thickness		
	T	H	L1	T	H	L1
12	25	6	24	T＜20	5	※ When T＜ Standard Plate T thickness, L1＝T-1 ※ When Standard Plate T thickness＜ T, L1＝L1 dimensions shown in the left table
				20≦T	6	
16	25	8	24	T＜20	6	
				20≦T	8	
20	30	10	29	T＜25	6	
				25≦T	10	
25	35	12	34	T＜30	8	
				30≦T	12	
30	45	14	44	T＜40	8	
				40≦T	14	
35	50	16	49	T＜45	8	
				45≦T	16	
40	60	18	59	T＜55	10	
				55≦T	18	

Change Width of Spacer Blocks and Ejector Plates

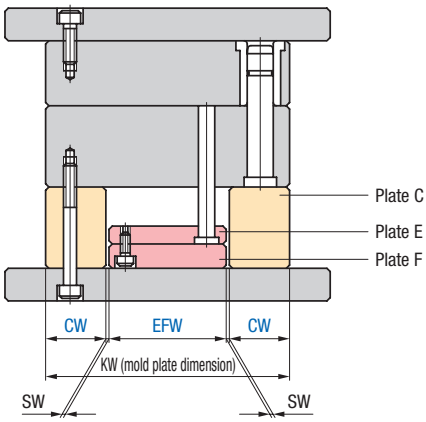
Change the width dimensions of spacer blocks and ejector plates.

When changing the width dimensions of spacer blocks and ejector plates, consider the following:
① When changing the width dimensions of spacer blocks and ejector plates, take into account the strength, etc.
② Changing the plate width may result in difficulties in installation of parts such as return pin, etc.
Please specify the change in pitch between parts.

Changing position of parts ➡ P.72
Changing position and the number of assembly screws ➡ P.74

Application Mold bases

Catalog No. CISCEF



【Setting conditions】
KW＝2×CW＋EFW＋2×SW　　Provided SW≧1
※ When SW＝1, because of the gap between bolt and bolt hole, plate may get closer, result in inability to secure sufficient space. Assemble molds so that sufficient space is secured between plates.

Catalog No.	CW	EFW	Remarks
CISCEF	1 mm steps CW≧20	1 mm steps EFW≧40	If the last digit of CW dimension is 3 or 8 and the last digit of EFW dimension is 0, standard precision plate may be available for your review. E.g. CW=43 EFW=110

※ For mold base types without supplied ejector plates, specify only CW.

How to order

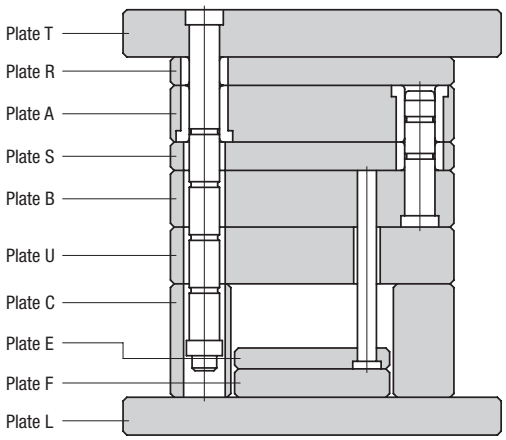
Catalog No.	—	CW	—	EFW
CISCEF	—	CW63	—	EFW100

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Change Plate Materials

Change the materials of plate.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



Catalog No.	Plate code	Material name
CIMA	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) C (Plate C) E (PlateE) F (Plate F) L (Plate L) Additional Plate N (Plate N) O (Plate O) Q (Plate Q) V (Plate V) W (Plate W) X (Plate X) Y (Plate Y) Additional plate specification ↓ P.38	① Select from the standard sizes shown in Plate General Catalog Red Book. ② Product of other materials will be made to order.

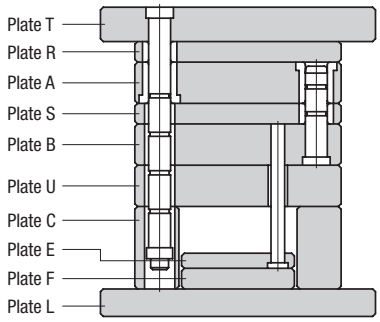
How to order

Catalog No.	–	Plate code	–	< Material name >
CIMA	–	A	–	< HPM1 >
CIMA	–	B	–	< NAK55 >

Change Tolerance of Plate Thickness

Change the dimensional limit deviations of plate thickness.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



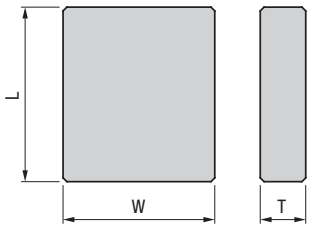
Applicable dimensional range

L dimensional range (W≦L)	Tolerance
L≦300	Specify tolerance of 0.01or more
300＜L≦600	Specify tolerance of 0.02 or more.
600＜L≦1000	Specify tolerance of 0.03 or more.

Tolerance＝Upper deviation － lower deviation

E.g. If the deviations are 30 ± 0.02, then the tolerance is 0.04.
If the deviations are 30 $^{0}_{-0.02}$, then the tolerance is 0.02.
If the deviations are 30 $^{+0.03}_{0}$, then the tolerance is 0.03.

※ For grinding, rotary grinding is used. Depending on tolerance, however, surface grinding (reciprocating grinding) may be used. If surface grinding is preferred, specify it as shown on the right page.



Catalog No.	Plate code	Upper deviations	Lower deviations
CILI	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) C (Plate C) E (Plate E) F (Plate F) L (Plate L) Additional Plate N (Plate N) O (Plate O) Q (Plate Q) V (Plate V) W (Plate W) X (Plate X) Y (Plate Y) Additional plate specification P.38	In 0.005 mm steps	In 0.005 mm steps

How to order

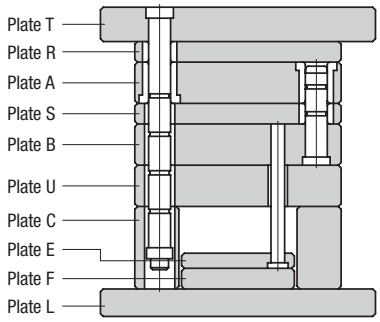
Catalog No.	–	Plate code	–	T	<	Upper deviations	/	Lower deviations	>
CILI	–	A	–	T	<	+0.15	/	+0.05	>
CILI	–	B	–	T	<	−0.01	/	−0.03	>
CILI	–	C	–	T	<	+0.1	/	−0.1	>

To specify specification limits not listed above, consult our sales office.

Surface Grind

Change the plate surface grinding method to surface grinding (reciprocating grinding).

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast

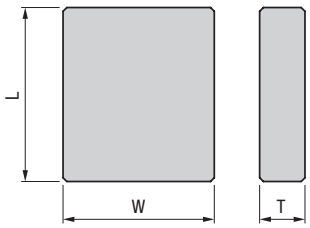


Surface grinding applicable dimensional range

L dimensional range (W≦L)	Tolerance
L≦300	Specify tolerance of 0.01or more.
300＜L≦600	Specify tolerance of 0.02 or more.
600＜L≦1000	Specify tolerance of 0.03 or more.

Tolerance＝Upper deviation – lower deviation

E.g. If the deviations are 30 ± 0.02, then the tolerance is 0.04.
If the deviations are 30 $^{0}_{-0.02}$, then the tolerance is 0.02.
If the deviations are 30 $^{+0.03}_{0}$, then the tolerance is 0.03.



Catalog No.	Plate code		Upper deviation	Lower deviation
CISG	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (PlateU) C (Plate C) E (Plate E) F (Plate F) L (Plate L)	Additional Plate N (Plate N) O (Plate O) Q (Plate Q) V (Plate V) W (Plate W) X (Plate X) Y (Plate Y) Additional plate specification P.38	In 0.005 mm steps F: Do not specify limit deviations. *1	In 0.005 mm steps F: Do not specify limit deviations. *1

*1. If limit deviations are not specified, the deviations will be set to around ±0.2. If you do not specify particular limit deviations tolerances, please specify F for both the upper and lower deviations.

How to order

Catalog No.	–	Plate code	–	T	<	Upper deviation	/	Lower deviation	>
CISG	–	A	–	T	<	+0.01	/	−0.01	>
CISG	–	B	–	T	<	F	/	F	>
CISG	–	F	–	T	<	+0.02	/	0	>

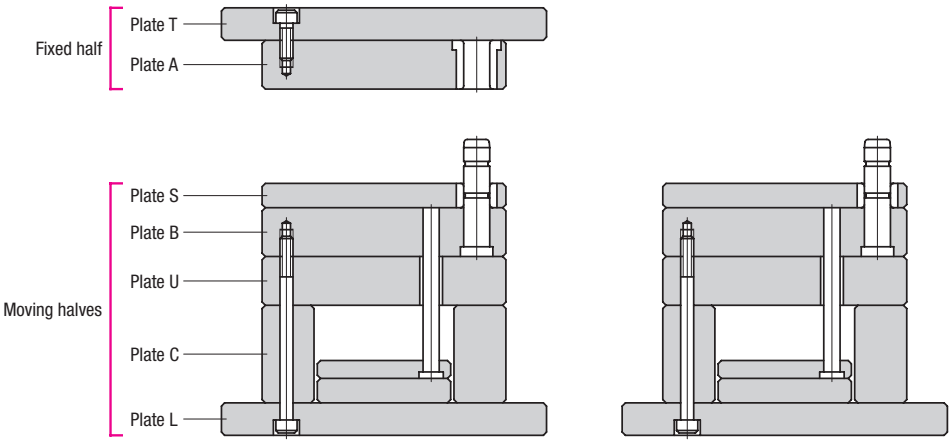
Mold Base for Insert Molding

Use this as mold base specifications for insert molding.

We deliver one fixed half and two moving halves of a mold base in sets after machining datum plane.
The order quantity of the mold base will be one. If you order two or more mold bases, we carry out machining work by the unit of one fixed half and two moving halves for the respective mold bases.

Application Mold bases

Catalog No. SIMB



Catalog No.
SIMB

How to order

Catalog No.

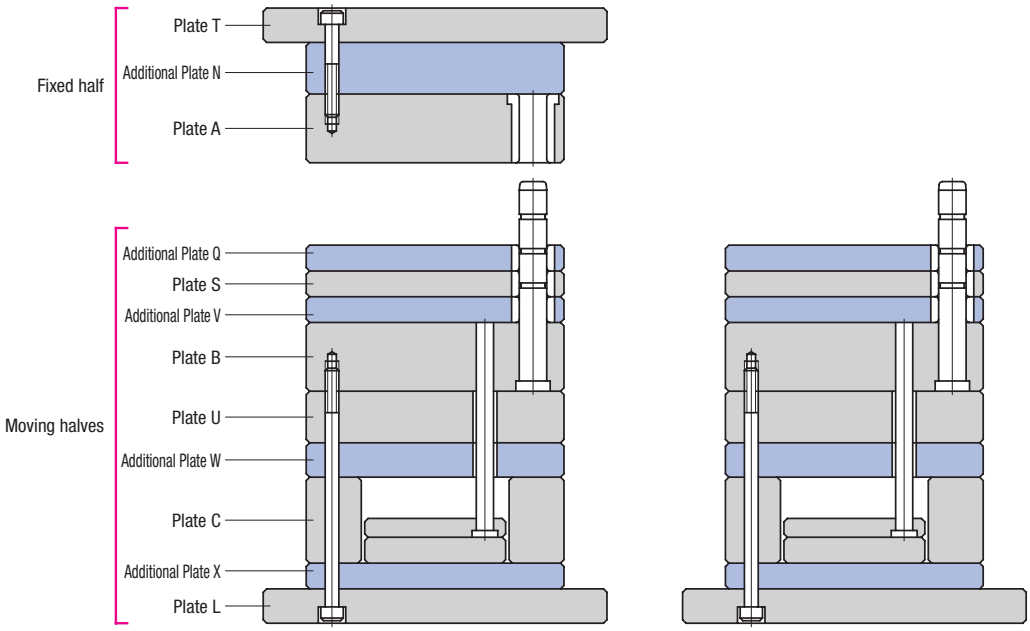
SIMB

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

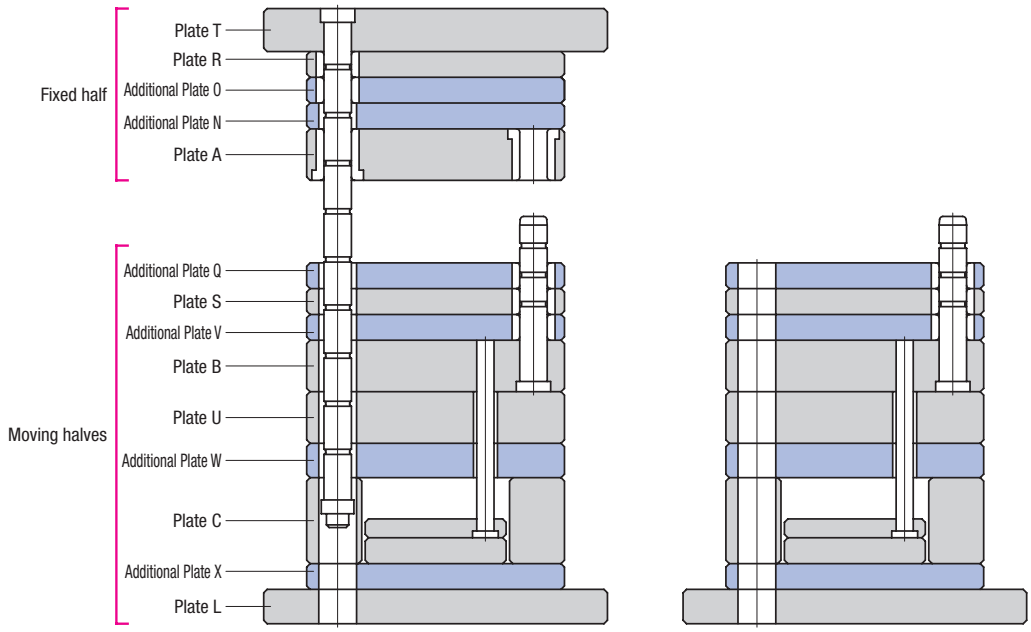
When installing additional plates, categorize plates the fixed half and moving halves as shown below:

Additional plate specification ➡ P.38

In the case of S series:



In the case of 3-plate type (The chart below shows the D·E series as an example, but other series have the same configuration)

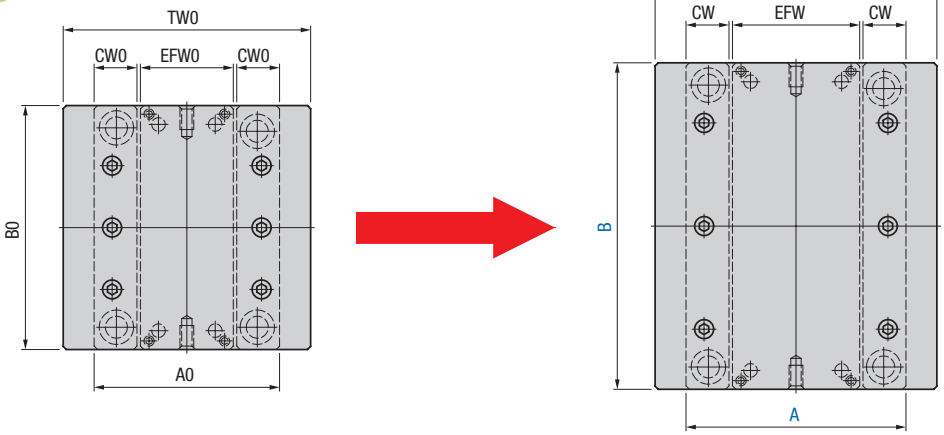


Change Nominal Base Size

Change B dimension (length direction) and A dimension (width direction) of mold plate external dimensions to extended or reduced dimension.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast

Catalog No. CSET



Basic mold base

Extended sized mold base

Constraint conditions on setting of A and B dimensions

Dimension	Constraint condition
A dimension	① 110≦A≦700 ② A≦A0＋200 ③ When reducing the size, the shortest distance of the head diameter must be 10 or more. If no ejector plate is installed, then A≧A0/2
B dimension	① If A×3≦1400, then B0－50≦B≦A×3 ② If 1400≦A×, then B0－50≦B≦1400

How to set each dimension

If you specify A and B dimensions, we set each dimension as shown in the table below. Please review each dimension for mold design strength etc. and separately specify changes in dimensions and specifications.

Item	Setting method
Width of clamping plate (TW)	TW＝TW0＋(A－A0)
Width of spacer block (CW)	CW＝CW0
Width of ejector plate (EFW)	EFW＝EFW0＋(A－A0)
Thickness of plates	The same dimensions as those of basic mold base
Pitch of respective parts	When extending the size, the pitch of respective parts is calculated by adding the extended dimension (A－A0), (B－B0).When reducing the size, it is calculated by subtracting the reduced dimension.
Diameter and quantity of respective parts	The same diameter and quantity as those of basic mold base.
Tapped hole diameter for eye bolts	The same tapped hole diameter as that of basic mold base.

Specification of tapped holes for eye bolts:
Size extended mold base gets heavier than basic mold base. Specify appropriate tapped holes for eye bolts.

Diameter and quantity of parts and thickness of plates:
The diameter and quantity of parts and thickness of plates are the same as those of basic mold base. Please review each dimension for mold design strength etc. and separately specify changes in dimensions and specifications.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Catalog No.	B	Name of basic item	A
CSET	In 10 mm steps	Name of item as the basis for extension and reduction (Specify type and nominal dimension)	In 10 mm steps

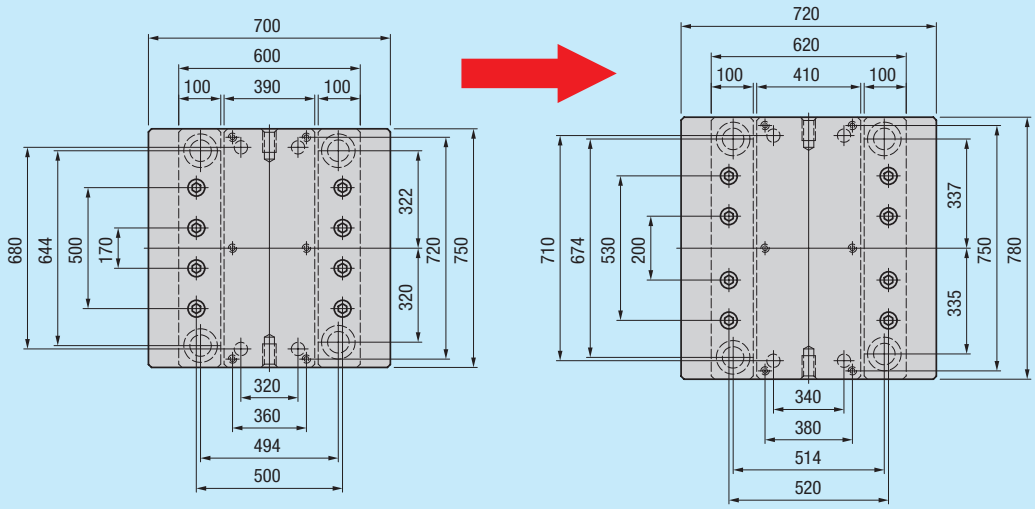
※ For mold base order item name, specify the name of item of size to be made. Specify the nominal dimensions of the item name with the first 2 digits of A and B dimensions.
E.g. If A dimension is 320 and B dimension is 430, then the nominal dimension of the item name will be 3243.

How to order

Catalog No.	–	B	– <	Basic item	> –	A
CSET	–	B650	– <	MDCSC3060	> –	A320
CSET	–	B230	– <	MDCSC2525	> –	A250

※ For mold base order item name, specify the item of nominal dimensions to be made → MDCSC3265507080S-MN

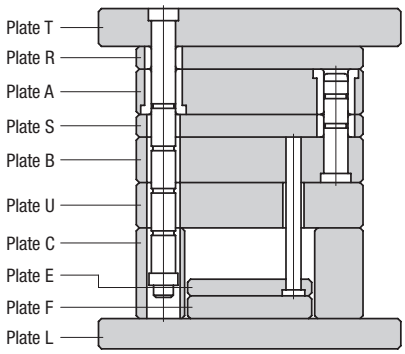
The drawing below shows an example of extending the size of SC type 6075 by 30 mm in the length direction and by 20 mm in the width direction.



Omit Standard Plates

Omit standard plates of a mold base.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



Catalog No.	Plate codes		
ESI	T (Plate T)	U (Plate U)	※ Be sure to specify the thickness of Plate A, B and C in the mold base item name. We set the length of parts by using the thickness values specified. ※ If omitting any plates with guide bushings attached, the guide bushing will also be eliminated together with the plate.
	R (Plate R)	C (Plate C)	
	A (Plate A)	E (Plate E)	
	S (Plate S)	F (Plate F)	
	B (Plate B)	L (Plate L)	

Cases where the omission of Plate S can be specified

※ The omission of Plate S can be specified only when the mold base is of SE, SF, DE, DF, EE, EF, FE, FF, GE or GF type. For other types, Plate S cannot be omitted.
※ The guide pins get shorter by the amount of thickness of Plate S.
※ A clearance hole for a support pin should be machined to the plate with which the support pin does not interfere with Plate S eliminated.

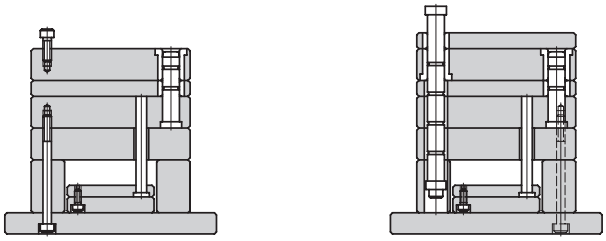
How to order

Catalog No.	–	Plate code
ESI	–	T

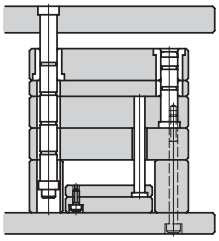
The charts below show the configurations of mold bases when specifying the omission of respective plates.

These are typical examples. The similar configurations will be applied to other types as well.

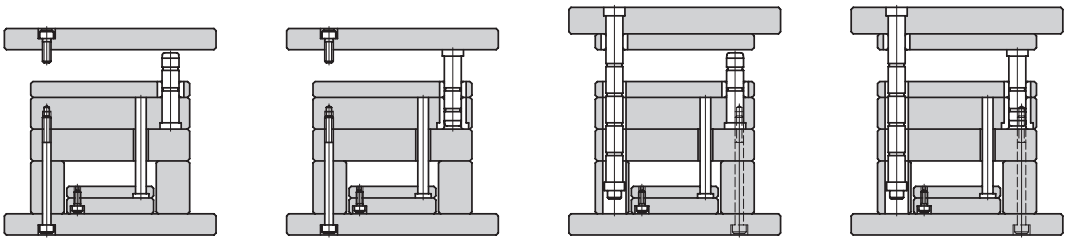
Omit Plate T



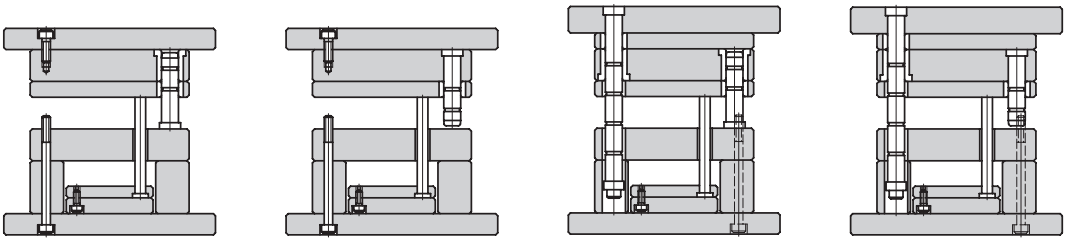
Omit Plate R



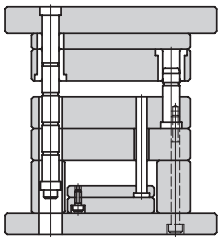
Omit Plate A



Omit Plate B

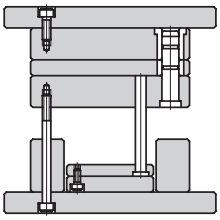


Omit Plate S

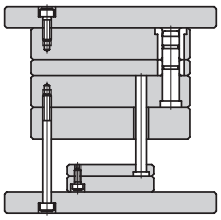


※ The guide pins get shorter by the amount of thickness of Plate S.

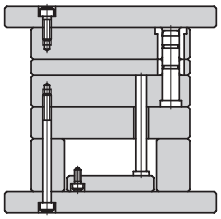
Omit Plate U



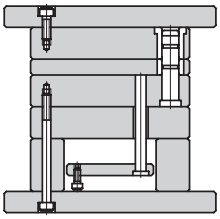
Omit Plate C



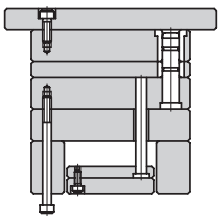
Omit Plate E



Omit Plate F



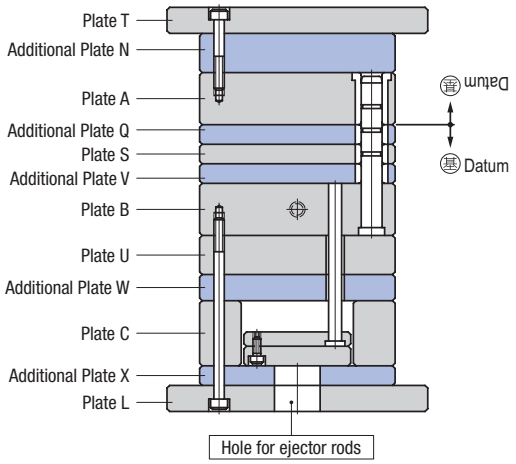
Omit Plate L



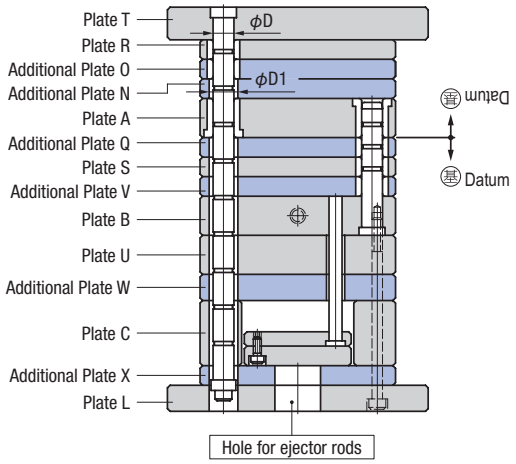
Added Plates

Add plates to standard mold bases.

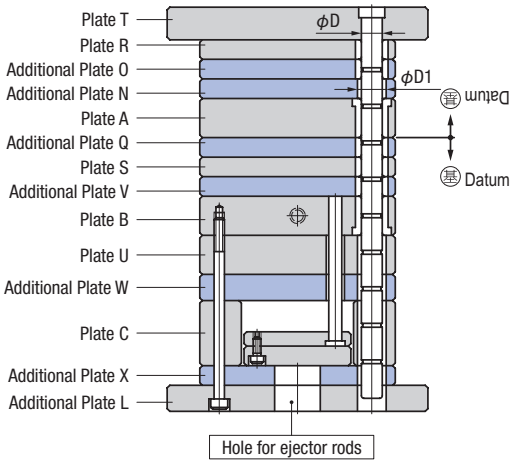
Application Mold bases



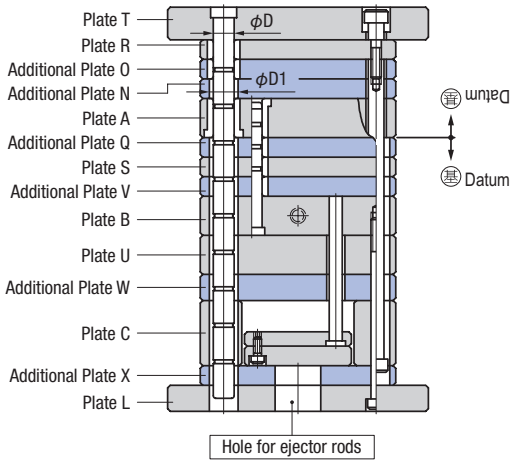
Configuration of adding plates to S series



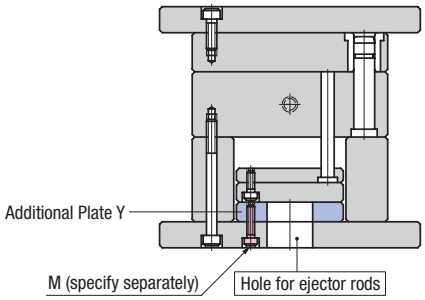
Configuration of adding plate to D·E series



Configuration of adding plates to F·G series



Configuration of adding plates to H series



Configuration of adding plates common to all series

※ Guide pins, return pins and other parts for additional plates, which are installed in each series of standard mold bases are shown in the charts.
※ The specification of additional plate Y is common to all series.
※ Additional Plate X and Plate Y are alternative options, either of which can be specified. If you want to add the both, please specify them with drawings, etc. attached.
※ Assembly Screw (M) for additional Plate Y are to be separately specified. Be sure to specify them.
Added assembly Screws ➡ P.76
※ Diameter ϕ D1 of holes machined on additional Plate N

D	12	16	20	25	30	35	40
D1	14	18	24	29	34	39	45

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Plate addition determination table by mold base type

○ : Mold base type for which additional plate can be specified

Type	Plate codes of additional plates						
	Plate N	Plate O	Plate Q	Plate V	Plate W	Plate X	Plate Y
SA	○				○	○	○
SB	○		○	○	○	○	○
SC	○					○	○
SD	○		○	○		○	○
SE	○		○	○	○	○	
SF	○		○	○		○	
DA	○	○			○	○	○
DB	○	○	○	○	○	○	○
DC	○	○				○	○
DD	○	○	○	○		○	○
DE	○	○	○	○	○	○	
DF	○	○	○	○		○	
EA	○				○	○	○
EB	○		○	○	○	○	○
EC	○					○	○
ED	○		○	○		○	○
EE	○		○	○	○	○	
EF	○		○	○		○	

Type	Plate codes of additional plates						
	Plate N	Plate O	Plate Q	Plate V	Plate W	Plate X	Plate Y
FA	○	○			○	○	○
FB	○	○	○	○	○	○	○
FC	○	○				○	○
FD	○	○	○	○		○	○
FE	○	○	○	○	○	○	
FF	○	○	○	○		○	
GA	○				○	○	○
GB	○		○	○	○	○	○
GC	○					○	○
GD	○		○	○		○	○
GE	○		○	○	○	○	
GF	○		○	○		○	
HA	○	○			○	○	○
HB	○	○	○	○	○	○	○
HC	○	○				○	○
HD	○	○	○	○		○	○

※ Additional plate X and Plate Y are alternative options, either of which can be specified. If you want to specify the both, please specify them with drawings, etc. attached.

Catalog No.	Plate code of additional plates	T (thickness of additional plate)
SADDP	N (Additional Plate N) O (Additional Plate O) Q (Additional Plate Q) V (Additional Plate V) W (Additional Plate W) X (Additional Plate X) Y (Additional Plate Y)	Select from Plate General Catalog Red Book. (Product of thickness other than shown in the plate general catalog will be made to order.)

Length of installation parts

① Guide pins, guide bushings, return pins and assembly screws get longer by the amount of thickness of added plates.

② Please specify the length of support pin and puller bolts.

How to order

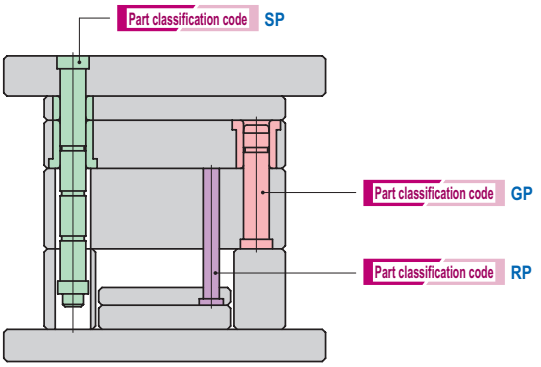
Catalog No.	—	Plate code	—	T
SADDP	—	N	—	T30

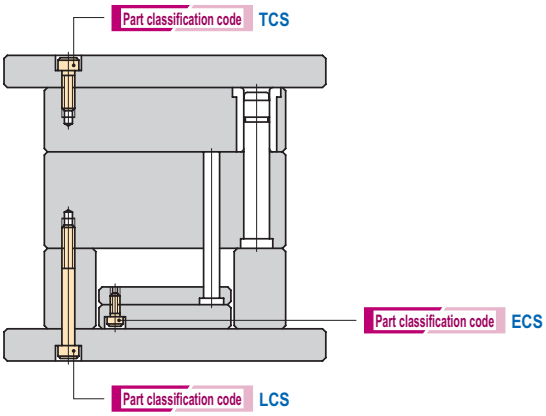
Change Parts Diameter

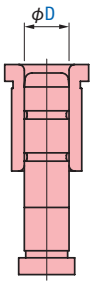
Change the diameter of guide pins, support pins, return pins, and assembly screws and related hole dimensions.

When changing diameter of parts, consider the following:
① When changing diameter of parts, take into account the strength, etc.
② Changing diameter of a part may result in interference with other parts.
Consider the positions, etc.

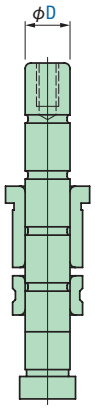
Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



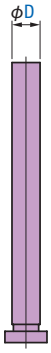




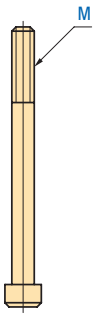
Part classification code GP



Part classification code SP



Part classification code RP



Part classification code TCS
Part classification code LCS
Part classification code ECS

※ Changing diameter of guide pins and support pins also requires changes in diameter of guide bushings that will fit them.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Part name	Catalog No.	Part classification code	D or M
Guide pins and guide bushings	CPD	GP	12 16 20 25 30 35 40 50 60 70
Support pins and guide bushings		SP	12 16 20 25 30 35 40
Return pins		RP	10 12 15 20 25 30
Fixed side assembly screws		TCS	M8 M10 M12 M14 M16 M20 M24
Moving side assembly screws		LCS	M8 M10 M12 M14 M16 M20 M24
Ejector plate assembly screws		ECS	M5 M6 M8 M10 M12 M14 M16

How to order

	Catalog No.	—	Part classification	—	D or M
Change the diameter of guide pins and guide bushings	CPD	—	GP	—	D25
Change the diameter of support pins and guide bushings	CPD	—	SP	—	D40
Change the diameter of return pins	CPD	—	RP	—	D12
Change the diameter of fixed side assembly screws	CPD	—	TCS	—	M16
Change the diameter of movable side assembly screws	CPD	—	LCS	—	M12
Change the diameter of ejector plate assembly screws	CPD	—	ECS	—	M8

Regarding use of MoldZukan®

When entering specification changes of standard installation parts (guide pins and support pins, etc.) by using MoldZukan®, you need to follow a certain entry sequence defined according to the contents of changes as shown below. If entered in incorrect sequence, MoldZukan® may not function properly.

● Entry sequence of standard installation parts specification changes

Special form of guide
↓
Part diameter change
↓
Precision guide pin and guide bushing installation
↓
Guide pin type and length change
↓
Support pin type and length change
↓
Guide bushing installation specification change and addition
↓
Enter each item only if there is any change in the item.
If no change, then skip the item and move to the next one.
After entering the above items, you can enter other items in any sequence.

Change Precision Guide Pins and Guide Bushings

Install precision guide pins and precision guide bushings in standard mold bases.

If installing precision guide pins and guide bushings, please specify the details by following the steps below:

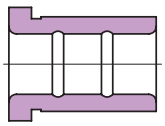
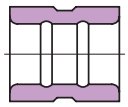
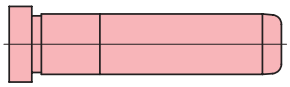
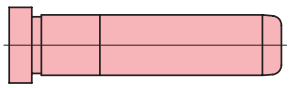
① For plates in which precision guide pins and precision guide bushing are installed, surface grinding will be used.
The limit deviations of plate thickness are required.
Please specify them.
How to specify surface grinding ➡ P.31

② To maintain the accuracy of holes in plates, we also recommend rough machining of pockets and slide core grooves, etc.
How to specify machining of pockets and slide core grooves ➡ P.204 - 221

③ As the clearance between the guide pin and guide bushing is small, we recommend to provide an air vent.

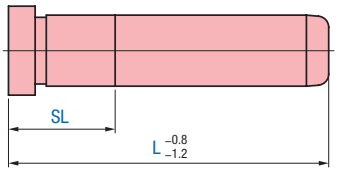
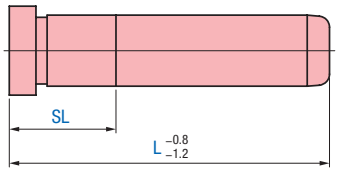
Precaution for use of precision guide pins and guide bushings ➡ P.272

Application: Mold bases S series, D and E series, cavity retainer sets

Precision guide bushing / Precision guide pin	Precision guide bushing M-GBHF	Precision guide bushing M-GBSF
		
	■ Nominal diameter 12 16 20 25 ■ Part details ➡ P.288	■ Nominal diameter 12 16 20 25 ■ Part details ➡ P.289
Precision guide pin M-GPH ■ Nominal diameter 12  ■ Part details ➡ P.278	Combination code GPP1 ■ Nominal diameter of parts that can be combined: 12	
Precision guide pin M-GPHF ■ Nominal diameter 12 16 20 25  ■ Part details ➡ P.279	Combination code GPP2 ■ Nominal diameter of parts that can be combined: 12 16 20 25	

※ The length of guide bushing is the same as that before change. Depending on the type of guide bushing, however, appropriate length may not be available. Refer to "Guide Bushing Installation Specification Change and Addition" in ➡ P.48 for review.

Guide pin specifications

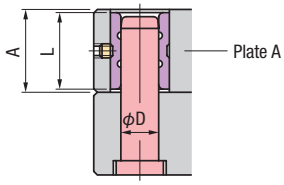
Precision guide pin M-GPH	Precision guide pin M-GPHF
Corresponds to Combination code GPP1	Corresponds to Combination code GPP2
	

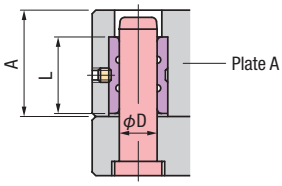
For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Guide bushing installation specifications for D and E series

When installing precision guide bushing in the D and E series, differentiate the use of guide bushings to install in various plates as shown below.

When installing precision guide bushing in Plate A:
Install straight type precision bushing in Plate A with specifications as shown below.

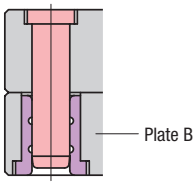




D	A	L
12 16	20 25 30 35 40	L=A−1
20	20 25 30 35 40 50	
25	25 30 35 40 50	

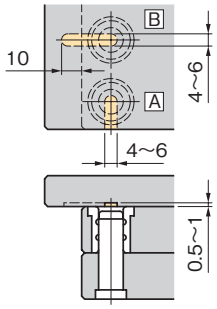
D	A	L
12 16	A>40	L=39
20	A>50	L=49
25	A>50	L=49

When installing precision guide bushing in Plate B:



Install shoulder type precision guide bushing in Plate B. Depending on thickness of the plate, however, appropriate length may not be available.

Optional specifications (specify only when necessary)

Option code	Specifications
AC	 Provide an air vent in the plate adjacent to the guide bushing. The shape of the air vent will be either A or B depending on the position of the guide pin. ■ **How to specify:** Specify **AC**

Catalog No.	Combination code	Guide pin specifications		Optional specification
		L	SL	
CGPGBS	GPP1	Select from page 278	Select from page 278	AC
	GPP2	In 5 mm steps See page 279	In 1 mm steps See page 279	

※ Even when the guide pin is longer than the mold plate, the clearance hole of the guide pin will not be machined.
Added Clearance Holes for Guide Pin ➡ P.54

How to order

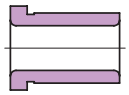
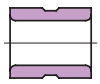
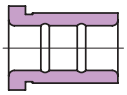
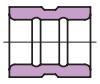
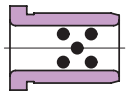
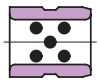
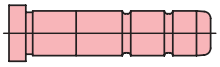
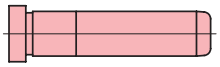
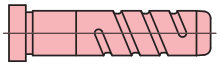
Catalog No.	Combination code	L	SL	Optional specification
CGPGBS	GPP1	L60	SL24	AC
CGPGBS	GPP2	L120	SL39	AC

Regarding use of MoldZukan®
When entering specification changes of standard installation parts (guide pins and support pins, etc.) by using MoldZukan®, you need to follow a certain entry sequence defined according to the contents of changes.
If entered in incorrect sequence, MoldZukan® may not function properly.
MoldZukan® operation procedure details ➡ P.41

Change Type and Length of Guide Pins — ①

Change guide pins and guide bushings for standard mold base to difference types of guide pins and guide bushings. Change the length of guide pins for standard mold bases.

Application: Mold bases, cavity retainer sets, cavity retainer sets for die cast

Guide pin \ Guide bushing	■ No oil groove ■ Nominal diameter: 12 16 20 25 30 35 40 50 60 70 ■ Part details ➡ P.286		■ With oil groove ■ Nominal diameter: 12 16 20 25 30 35 40 50 ■ Part details ➡ P.290		■ Self lubricating, copper alloy type ■ Nominal diameter: 16 20 25 30 35 40 50 ■ Part details ➡ P.292	
						
	Guide bushing M-GBA	Guide bushing M-GBB	Guide bushing M-GBGF	Guide bushing M-GBRF	Guide bushing M-GBGDF	Guide bushing M-GBRDF
Guide pin M-GPA ■ With oil groove ■ Nominal diameter: 12 16 20 25 30 35 40 50 60 70  ■ Part details ➡ P.274	Combination code GPH0 ※ This is a combination for standard mold base. ※ If not specified, this combination will be used.					
Guide pin M-GPH ■ No oil groove ■ Nominal diameter: 12  ■ Part details ➡ P.278			Combination code GPH1 ■ Nominal diameter of parts that can be combined: 12			
Guide pin M-GPHF ■ No oil groove ■ Nominal diameter: 12 16 20 25 30 35 40 50  ■ Part details ➡ P.279			Combination code GPH2 ■ Nominal diameter of parts that can be combined: 12 16 20 25 30 35 40 50		Combination code GPH3 ■ Nominal diameter of parts that can be combined: 16 20 25 30 35 40 50	
Guide pin M-GPHFS ■ With spiral oil groove ■ Nominal diameter: 12 16 20 25 30 35 40 50  ■ Part details ➡ P.280	Combination code GPH4 ■ Nominal diameter of parts that can be combined: 12 16 20 25 30 35 40 50					

※ The length of guide bushing is the same as that before change. Depending on the type of guide bushing, however, appropriate length may not be available. Refer to "Guide Bushing Installation Specification Change and Addition" in ➡ P.48 for review.

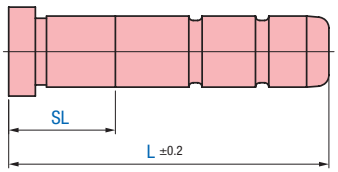
※ The combinations of guide pins and guide bushings shown in the above charts are standard combinations. The combinations in the blank columns cannot be specified with additional processing codes. If specifying them, please provide drawings, etc.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Guide pin specification

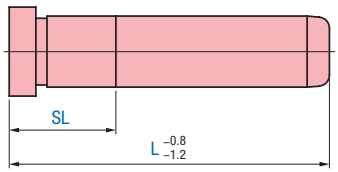
Guide pin M-GPA

Fits Combination code GPH0



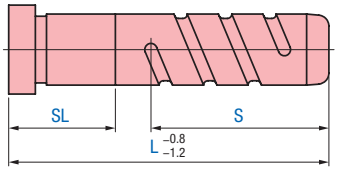
Guide pin M-GPH

Fits Combination code GPH1



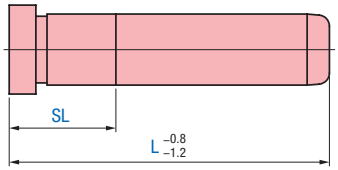
Guide pin M-GPHFS

Fits Combination code GPH4



Guide pin M-GPHF

Fits Combination code GPH2、GPH3



Catalog No.	Combination code	Guide pin specification		
		L	SL	S
CGPGB1	GPH0 *1	Select from P.274	Select from P.274	—
	GPH1	Select from P.278	Select from P.278	
	GPH2 GPH3	In 5 mm steps See page 279	In 1 mm steps See page 279	
	GPH4	In 5 mm steps See page 280	In 1 mm steps See page 280	In 1 mm steps See page 280

*1. If the SL dimension of Combination code GPH0 is not specified, we will set the dimension. Specify the SL dimension only when necessary.

※ For Combination code GPH1 – GPH4, the specification of SL dimension cannot be omitted.

※ Even when the guide pin is longer than the retainer plate, the clearance hole of the guide pin will not be machined.

Machining Clearance Holes for Guide Pins ➡ P.54

How to order

Catalog No. — Combination code — L — SL — S

CGPGB1 — GPH0 — L97 — SL29
CGPGB1 — GPH2 — L60 — SL24
CGPGB1 — GPH4 — L120 — SL39 — S60

Regarding use of MoldZukan®

When entering specification changes of standard installation parts (guide pins and support pins, etc.) by using MoldZukan®, you need to follow a certain entry sequence defined according to the contents of changes.

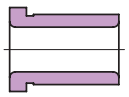
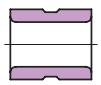
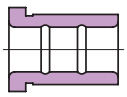
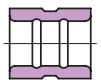
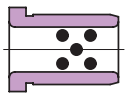
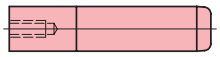
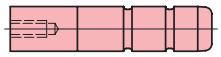
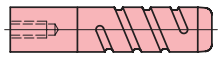
If entered in incorrect sequence, MoldZukan® may not function properly.

MoldZukan® operation procedure details ➡ P.41

Change Type and Length of Guide Pins — ②

Change the guide pins and guide bushings for standard mold bases to different types of straight guide pins and guide bushings.

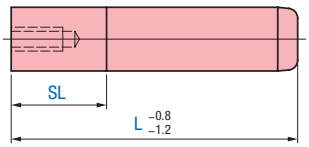
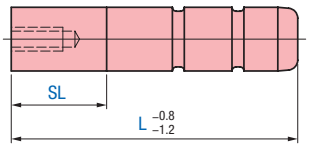
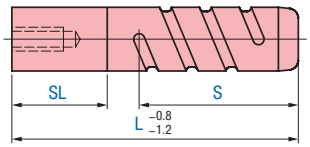
Application: Mold bases, cavity retainer sets, cavity retainer sets for die cast

Guide pin \ Guide bushing	Guide bushing M-GBA	Guide bushing M-GBB	Guide bushing M-GBGF	Guide bushing M-GBRF	Guide bushing M-GBGDF	Guide bushing M-GBRDF
	■ No oil groove ■ Nominal diameter: 12 16 20 25 30 35 40 50 60 70 ■ Part details ➡ P.286		■ With oil groove ■ Nominal diameter: 12 16 20 25 30 35 40 50 ■ Part details ➡ P.290		■ Self lubricating, copper alloy type ■ Nominal diameter: 16 20 25 30 35 40 50 ■ Part details ➡ P.292	
						
Guide pin M-GPSF ■ No oil groove ■ Nominal diameter: 25 30 35 40 50  ■ Part details ➡ P.282			Combination code GPS1 ■ Nominal diameter of parts that can be combined: 25 30 35 40 50		Combination code GPS2 ■ Nominal diameter of parts that can be combined: 25 30 35 40 50	
Guide pin M-GPSFR ■ With oil groove ■ Nominal diameter: 25 30 35 40 50  ■ Part details ➡ P.283	Combination code GPS3 ■ Nominal diameter of parts that can be combined: 25 30 35 40 50					
Guide pin M-GPSFS ■ With spiral oil groove ■ Nominal diameter: 25 30 35 40 50  ■ Part details ➡ P.284	Combination code GPS4 ■ Nominal diameter of parts that can be combined: 25 30 35 40 50					

※ The length of guide bushing is the same as that before change. Depending on the type of guide bushing, however, appropriate length may not be available. Refer to "Change Installation of Guide Bushings and/or Added Guide Bushing Specification" in ➡ P.48 for review.

※ The combinations of guide pins and guide bushing shown in the above charts are standard combinations. The combinations in the blank columns cannot be specified with additional processing codes. If specifying them, please provide drawings, etc.

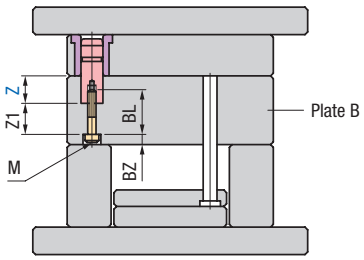
Guide pin specification

Guide pin M-GPSF	Guide pin M-GPSFR	Guide pin M-GPSFS
Fits Combination code GPS1、GPS2	Fits Combination code GPS3	Fits Combination code GPS4
		

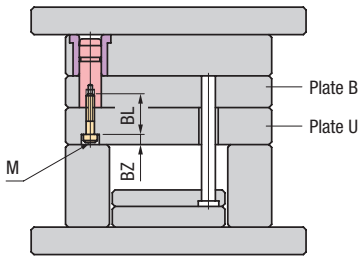
For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Guide pin installation specification

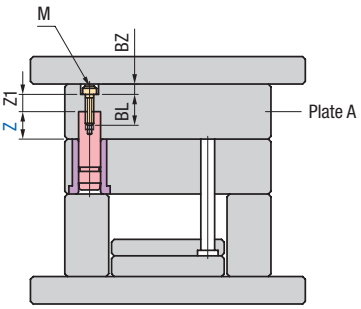
Installation code SZ



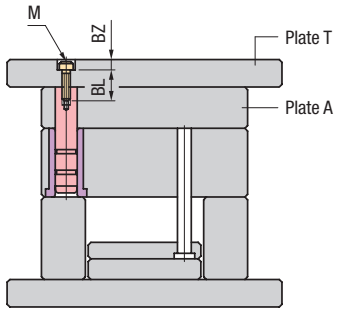
Installation code SS



Installation code YZ



Installation code YS



Guide pin dia.			25	30	35	40	50
Z			Z≦120	Z≦130	Z≦150	Z≦200	
M			M12		M16		
BZ			13		17		
BL	Combination code	SZ	BL=Plate B thickness −Z−BZ+20		BL=Plate B thickness −Z−BZ+26		
		SS	BL=Plate U thickness −BZ+20		BL=Plate U thickness −BZ+26		
		YZ	BL=Plate A thickness −Z−BZ+20		BL=Plate A thickness −Z−BZ+26		
		YS	BL=Plate T thickness −BZ+20		BL=Plate T thickness −BZ+26		
			Round down the last digit of calculation result, 0-4 to 0 and 5-9 to 5				
Z1			Z1≧5 This formula is not a guarantee of strength.				

Installation code YS is not applied to mold bases of 3 plate types and with additional Plate N.

Catalog No.	Combination code	Installation code	Z	Guide pin specification L	SL	Q(# of grooves)	S	Optional Specification
CGPGB2	GPS1 GPS2	SZ SS YZ YS	In 1 mm steps **Installation code** No need to specify for SS and YS	In 5 mm steps See page 282	In 1 mm steps See page 282	—	—	DKC *1
	GPS3			In 5 mm steps See page 283	In 1 mm steps See page 283	In 1 line steps See page 283	—	
	GPS4			In 5 mm steps See page 284	In 1 mm steps See page 284	—	In 1 mm steps See page 284	

*1. The dimensional limit deviations of press fit section of the guide pin will be in between +0.005 to 0.
※ Even when the guide pin is longer than the mold plate, the clearance hole for the guide pin will not be machined.
Added Clearance Holes for Guide Pins ➡ P.54

How to order

Catalog No.	Combination code	Installation code	Z	L	SL	Q	S	Optional spec.
CGPGB2	GPS1	SZ	Z50	L150	SL39			
CGPGB2	GPS3	SZ	Z70	L180	SL59	Q3		
CGPGB2	GPS4	YZ	Z60	L160	SL59		S80	DKC

Regarding use of MoldZukan®

When entering specification changes of standard installation parts (guide pins and support pins, etc.) by using MoldZukan®, you need to follow a certain entry sequence defined according to the contents of changes.
If entered in incorrect sequence, MoldZukan® may not function properly.
MoldZukan® operation procedure details ➡ P.41

Change Installation of Guide Bushings and/or Added Guide Bushings Specification – Overview

Change the installation specifications of guide bushings that fit the guide pins and support pins for standard mold bases.

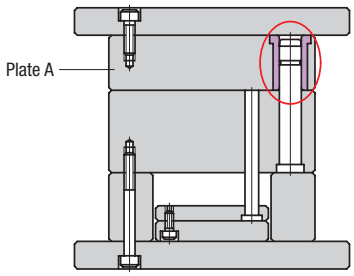
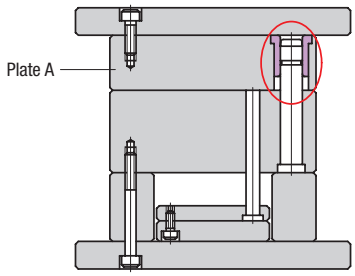
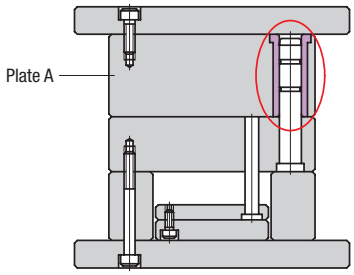
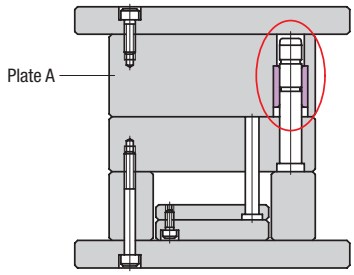
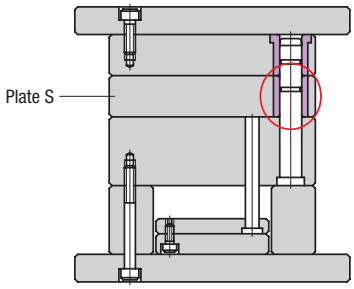
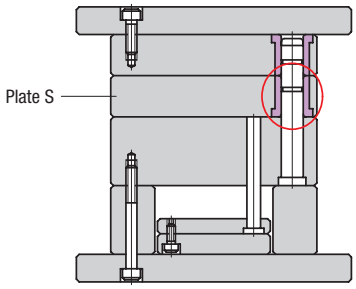
This additional processing specification allows users to order 3 types of change or addition to the standard mold base installation specifications:

① Changes in length of guide bushings of standard installation specifications

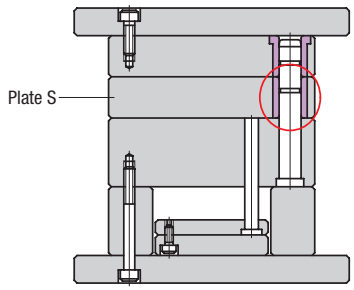
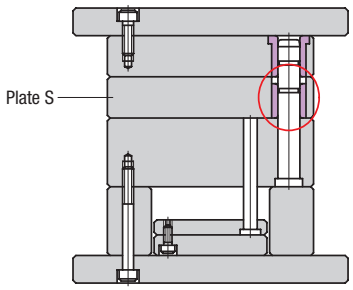
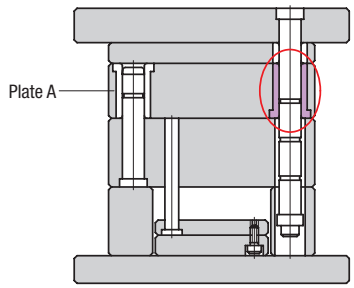
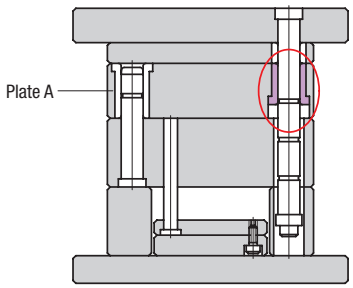
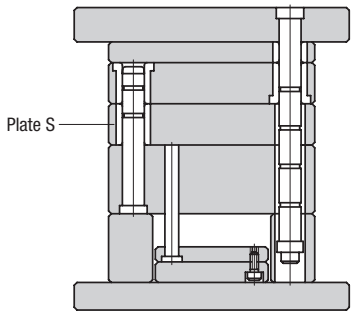
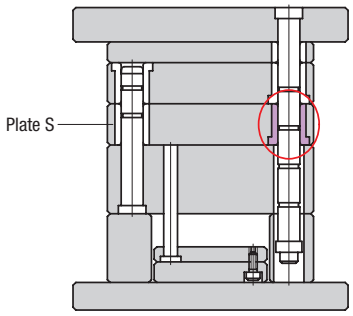
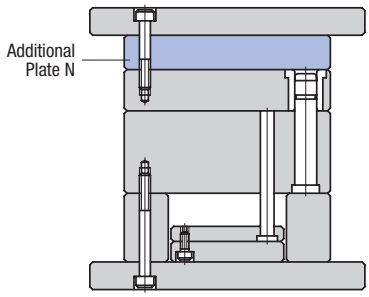
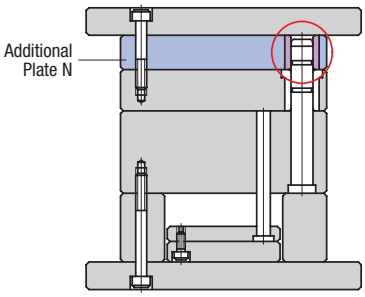
② Changes in guide bushing installation specifications of standard mold bases

③ Installation of guide bushings in the plates with no guide bushing installed in the standard mold bases.

The charts below show examples of changing guide bushing installation specifications of standard mold bases.

Before ordering the changes in guide bushing installation specifications	After ordering the changes in guide bushing installation specifications	Examples of orders for changes in guide bushing installation specifications
		When changing the length of a guide bushing for Plate A: **【Order example】** **CPHGBN－GP－A－GBT1－L59** **Details on how to order:** Shoulder type ➡ P.50 Straight type ➡ P.52
		When changing a guide bushing for Plate A from shoulder type to straight type and move it closer to the one end: **【Order example】** **CPHGBN－GP－A－GBI9－L69－Z18** **Details on how to order:** Shoulder type ➡ P.50 Straight type ➡ P.52
		When changing a guide bushing for Plate S from the straight type to the shoulder type and move it closer to the one end: **【Order example】** **CPHGBN－GP－S－GBT2－L29** **Details on how to order:** Shoulder type ➡ P.50 Straight type ➡ P.52

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Before ordering the changes in guide bushing installation specifications	After ordering the changes in guide bushing installation specifications	Examples of orders for changes in guide bushing installation specifications
		When moving the guide bushing for Plate S closer to the one end: **【Order example】** **CPHGBN－GP－S－GBI4－L24** **Details on how to order:** Shoulder type ➡ P.50 Straight type ➡ P.52
		When making the counterbore machined for the guide bushing on the Plate A deeper: **【Order example】** **CPHGBN－SP－A－GBT4－L59－Z20** **Details on how to order:** Shoulder type ➡ P.50 Straight type ➡ P.52
		When adding a guide bushing to Plate S: **【Order example】** **CPHGBN－SP－S－GBT2－L29** **Details on how to order:** Shoulder type ➡ P.50 Straight type ➡ P.52
		When adding a guide bushing to an additional plate, Plate N. **【Order example】** **SADDP－N－T30** (Order of adding a plate) **CPHGBN－GP－N－GBI1－L29** **CGPGB1－GPH0－L107－SL29** (Order of changing guide pin length) ※ An order of changing the length of guide pin is required. **Details on how to order:** Shoulder type ➡ P.50 Straight type ➡ P.52

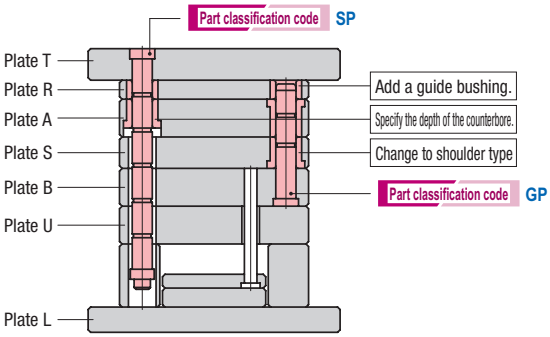
Change Installation of Guide Bushings and/or Added Guide Bushings Specification – ①

Change the installation specifications of guide bushings that fit the guide pins and support pins for standard mold bases.

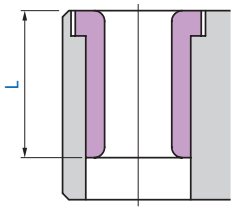
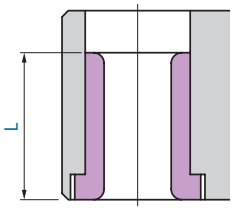
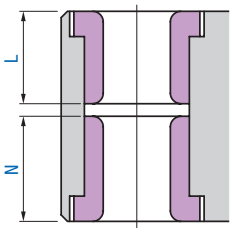
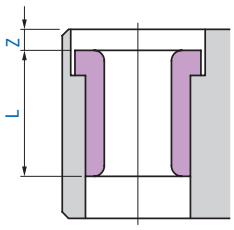
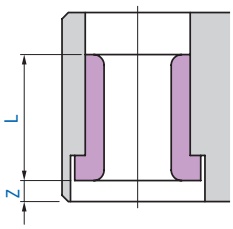
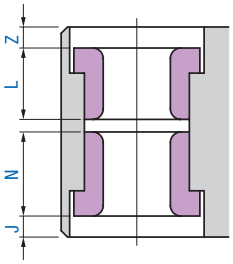
This additional processing specification allows users to order 3 types of change or addition to the standard mold base installation specifications:

① Changes in length of guide bushings of standard installation specifications
② Changes in guide bushing installation specifications of standard mold bases
③ Installation of guide bushings in the plates with no guide bushing installed in the standard mold bases.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast

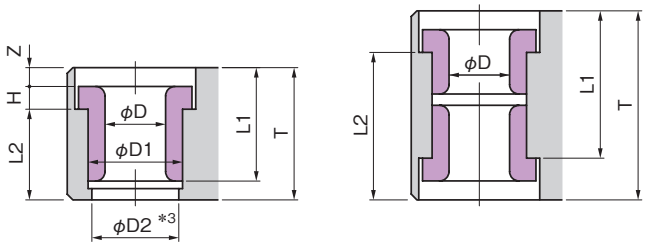


【The length of guide pin in the case of adding an guide bushing】
The length of the guide pin is the same as that before adding the guide bushing. When changing the length of the guide pin, specify it separately.
Change the length of guide pins ➡ P.44
Change the type of guide pins and guide bushings ➡ P.44

	Head up*1	Head down*1	Install two guide bushings
Flushness of guide bushing	Installation code GBT1 	Installation code GBT2 	Installation code GBT5 
Specify the depth of counterbore	Installation code GBT3 	Installation code GBT4 	Installation code GBT6  ※ When making either of Z or J side flush with the guide bushing, specify the depth of the side as 0.

*1. Specifying "Head up" will install the guide bushing with its head facing the top clamping plate (Plate T) while specifying "Head down" will install it with its head facing the bottom clamping plate (Plate L).
※ The length of the guide bushing can be specified, even when it is longer than the thickness of the plate, with the exception of Installation code GBT5, GBT6.

Guide bushing Installation specifications



D	D1	H	Z	L1 or L2 *2
12	18	5	Z≦45	L1 or L2≦80
16	25	6	Z≦55	L1 or L2≦120
20	30	8	Z≦60	L1 or L2≦130
25	35	8	Z≦65	L1 or L2≦150
30	42	10	Z≦65	L1 or L2≦200
35	48	10	Z≦70	L1 or L2≦200
40	55	10	Z≦70	L1 or L2≦200
50	70	12	Z≦70	L1 or L2≦200
60	80	15	Z≦70	L1 or L2≦200
70	90	15	Z≦70	L1 or L2≦200

*2. Either of L1 or L2 condition must be met.
*3. When T≧L1 (Maximum value in the above table), a clearance hole of D2=D1- (1 ～ 2) may be used.
※ Depending on the balance with other additional specifications, different specification may be used. In that case, we will notify you.

Catalog No.	Part classification code	Plate code *4		Guide bushing installation specification				
				Installation code	L	Z	N	J
CPHGBN	GP SP	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) L (Plate L)	Additional plate N (Plate N) O (Plate O) Q (Plate Q) V (Plate V) W (Plate W) X (Plate X) Additional plate specifications P.38	GBT1 GBT2	See table below	—	—	—
				GBT3 GBT4		In 1 mm steps		
				GBT5		—	See table below	
				GBT6		In 1 mm steps		In 1 mm steps

*4. Please specify the plate codes of the plates to which to specify changes in installation specification or addition of guide bushings.

Variations in types of shoulder guide bushings

Guide bushing installed in standard mold bases	If installing these types of guide bushings, the type of the guide bushing need to be changed. ➡ P.44		
Guide bushing M-GBA ➡ P.286	Guide bushing M-GBHF ➡ P.288	Guide bushing M-GBGF ➡ P.290	Guide bushing M-GBGDF ➡ P.292
■ No oil groove ■ Precision: Standard	■ With oil groove ■ Precision: High	■ With oil groove ■ Precision: Standard	■ Self lubricating, copper alloy type ■ Precision: Standard

How to order

Catalog No. — Part classification code — Plate code — Installation code — L — Z — N — J

CPHGBN — GP — S — GBT2 — L39
CPHGBN — SP — A — GBT6 — L59 — Z10 — N49 — J15

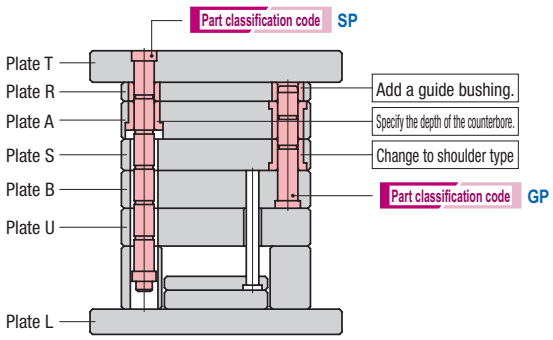
Change Installation of Guide Bushings and/or Added Guide Bushings Specification – ②

Change the installation specifications of guide bushings that fit the guide pins and support pins for standard mold bases.

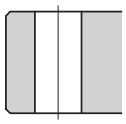
This additional processing specification allows users to order 3 types of specification change or addition to the standard mold base installation specifications:

① Changes in length of guide bushings of standard installation specifications
② Changes in guide bushing installation specifications of standard mold bases
③ Installation of guide bushings in the plates with no guide bushing installed in the standard mold bases.

Application: Mold bases, cavity retainer sets, cavity retainer sets for die cast

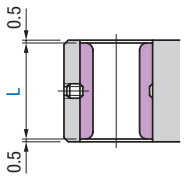


Installation code GBI0*2

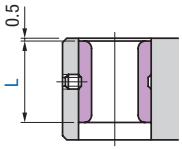
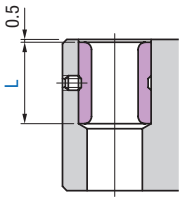
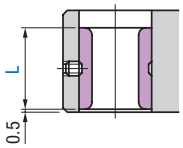
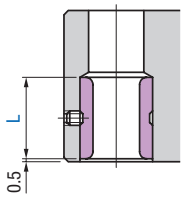
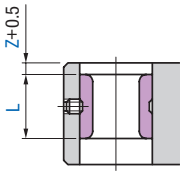
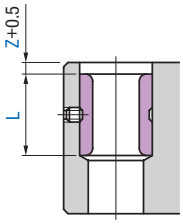
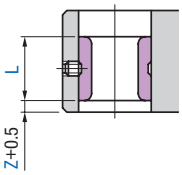
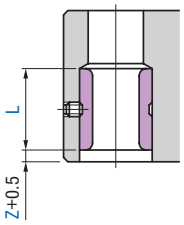


※ The hole dia. is the same as the guide pin dia.

Installation code GBI1



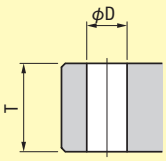
※ Applied when thickness =L+1

	Move to upper side*1		Move to lower side*1	
Flushness of guide bushing	**Installation code GBI2** 【Through-hole boring】 	**Installation code GBI3** 	**Installation code GBI4** 【Through-hole boring】 	**Installation code GBI5** 
Specify the depth of counterbore	**Installation code GBI6** 【Through-hole boring】 	**Installation code GBI7** 	**Installation code GBI8** 【Through-hole boring】 	**Installation code GBI9** 

*1. Specifying "Move to upper side" will install the guide bushing from the top clamping plate (Plate T) while specifying "Move to lower side" will install guide bushing from the bottom clamping plate (Plate L).

*2. The hole dimension of **Installation code GBI0** will be as follows:

	DIMM.	12	16	20	25	30	35	40	50	60	70
D	Deviation H6	+0.011 0		+0.013 0			+0.016 0			+0.019 0	
	T	T≦60	T≦80	T≦100	T≦120	T≦130	T≦150	T≦200	T≦200	T≦200	T≦200

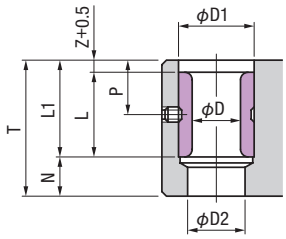


※ The **Installation code GBI2, GBI4, GBI6, GBI8** can be specified even when the length of the guide bushing is longer than the thickness of the plate.

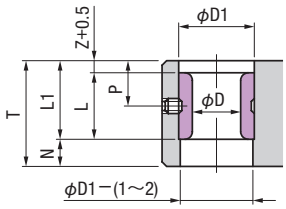
Guide bushing installation specifications

If selecting an installation code **GBI3**, **GBI5**, **GBI7** or **GBI9**, then the installation hole of the guide bushing will be any one of Type 1 to Type 3 shown in the following charts depending on the Plate N dimension:

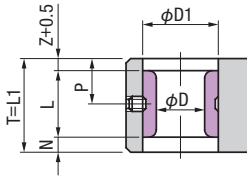
Type1



Type2



Type3



D		12	16	20	25	30	35	40	50	60	70
D1		18	25	30	35	42	48	55	70	80	90
D2 *2		14	18	24	29	34	39	45	54	65	75
N	Type1	N≧12	N≧14	N≧15	N≧17	N≧21	N≧24	N≧27	N≧33	N≧36	N≧39
	Type2	6≦N＜12	6≦N＜14	6≦N＜15	6≦N＜17	6≦N＜21	6≦N＜24	6≦N＜27	6≦N＜33	6≦N＜36	6≦N＜39
	Type3	N＜6	※ The specifications of Type 3 are the same as those of installation code GBI2, GBI4, GBI6 and GBI8. When specifying Type 3, use installation code GBI2, GBI4, GBI6 or GBI8.								
L1		L1≦80	L1≦120	L1≦130	L1≦150	L1≦200	L1≦200	L1≦200	L1≦200	L1≦200	L1≦200
P		$P=\frac{L}{2}+Z+0.5$									

*2. The guide bushing hole for D·E series and H series support pins is D2=D+2.
※ Depending on the balance with other additional specifications, different specification may be used. In that case, we will notify you.

Catalog No.	Part classification code	Plate code *3	Guide bushing installation specification		
			Installation code	L	Z
CPHGBN	GP SP	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) L (Plate L) Additional Plates N (Plate N) O (Plate O) Q (Plate Q) V (Plate V) W (Plate W) X (Plate X) Additional plate specifications P.38	GBI0 GBI1	—	—
			GBI2 GBI3 GBI4 GBI5	See table below	
			GBI6 GBI7 GBI8 GBI9		In 0.5 mm steps

*3. Please specify the plate codes of the plates to which to specify changes in installation specification or addition of guide bushings.

Variations in types of straight guide bushings			
Guide bushing installed in standard mold bases	If installing these types of guide bushings, the type of the guide bushing need to be changed. ➡ P.44		
Guide bushing M-GBB ➡ P.287	Guide bushing M-GBSF ➡ P.289	Guide bushing M-GBRF ➡ P.291	Guide bushing M-GBRDF ➡ P.293
■ No oil groove ■ Precision: standard	■ With oil groove ■ Precision: High	■ With oil groove ■ Precision: standard	■ Self lubricating, copper alloy type ■ Precision: standard

How to order

Catalog No. — Part classification code — Plate code — Installation code — L — Z

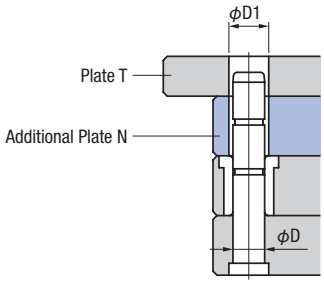
CPHGBN — GP — A — GBI1
CPHGBN — SP — B — GBI7 — L69 — Z10

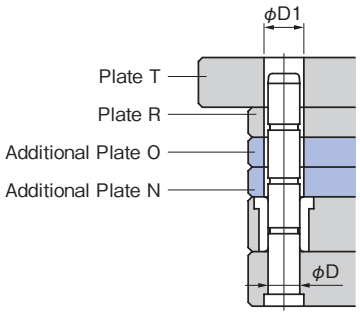
Added Clearance Holes for Guide Pin

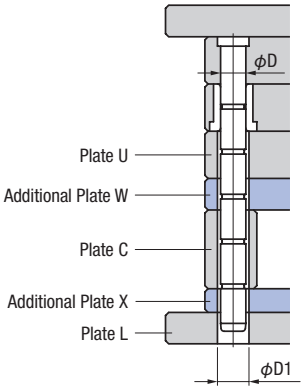
Perform additional machining of clearance holes for guide pins.

Application Mold bases (excluding F and G series)

Install guide pins in the moving side		Install guide pins in the fixed side
Application S series	Application D·E series, H series	Application S series, D·E series, H series

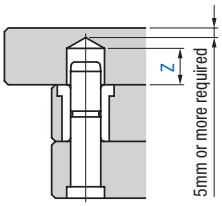






D	12	16	20	25	30	35	40	50	60	70
D1	14	18	24	29	34	39	45	54	65	75

Optional specification (specify only when necessary)

Option code	Specification
MHD	 Machine a clearance hole for guide pin as a blind hole in the plates specified. ■ **How to specify:** MHD/Z Z dimension [E.g.] MHD/Z30

Orientation of guide	Catalog No.	Plate code *1		Optional spec.
Install the guide pins in the moving side.	MGPHN	T (Plate T) R (Plate R)	N (Additional plate N) *2 O (Additional plate O) *2	MHD
Install the guide pins in the fixed side.		U (Plate U) C (Plate C) L (Plate L)	W (Additional plate W) *2 X (Additional plate X) *2	

*1. The clearance holes for guide pins will be machined through to the plate specified with a plate code.
*2. Additional plate specifications ➡ P.38

How to order

Catalog No. — Plate code — Optional specification

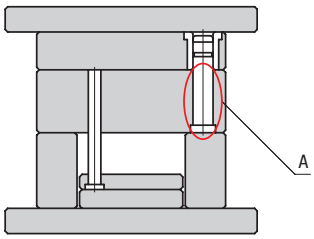
MGPHN — T
MGPHN — C — MHD/Z25

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

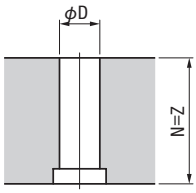
Change Specification of Guide Pin Holes

Change specifications of holes for guide pins.

Application: Mold bases (excluding F and G series), cavity retainer sets, cavity retainer sets for die cast
This change cannot be specified for straight type guide pins.

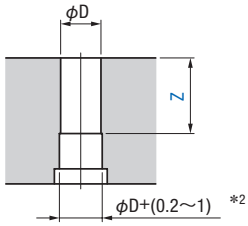


Basic holes for guide pins installed in the standard mold bases are through-boring holes as shown in the chart below:*1

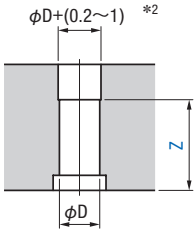


A section specification

Specification code **PLB**



Specification code **PLD**



*1. If the nominal dimension for a mold base is 5555 to 7080 and the thickness of the plate is over 200, the specifications of holes for guide pins need to be specified.
*2. The ϕD and ϕD+(0.2～1) holes are not concentric to each other.
※ Please specify the length of press fit section of the guide pin.
Specify length of press fit section of guide pin ➡ P.44
※ If the thickness of the plate in which the guide pins are installed exceeds Z dimension, the specifications of the holes for guide pins need to be specified.

D	12	16	20	25	30	35	40	50	60	70
Z	Z≦60	Z≦80	Z≦100	Z≦120	Z≦130	Z≦150	Z≦200	Z≦200	Z≦200	Z≦200

Catalog No.	Specification code	Z
CGPH	PLB PLD	In 1 mm steps

How to order

Catalog No. — Specification code — Z

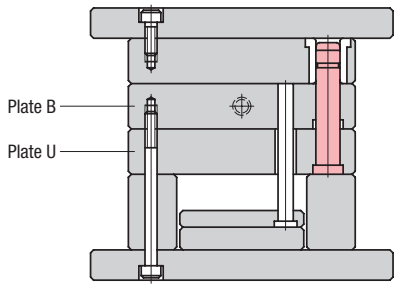
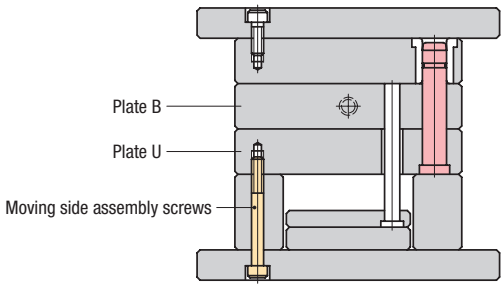
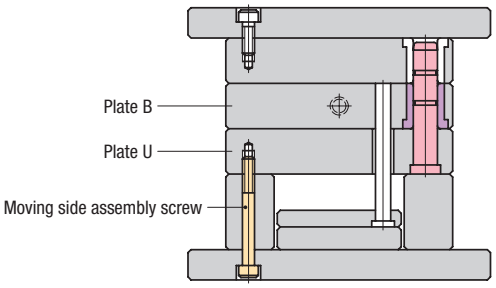
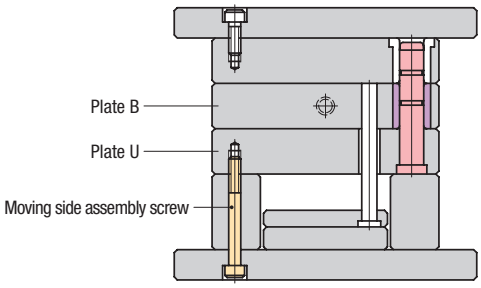
CGPH — PLB — Z50
CGPH — PLD — Z60

Install Guide Pins

Installing guide pins from Plate U

Install guide pins from Plate U.

Application Mold bases S series, D·E series and H series (excluding the types without Plate U)

Install guide pins from Plate U	Install guide pins from Plate U and install moving side assembly screws through to Plate U
Catalog No. SGPU1	Catalog No. SGPU2
	
Install guide pins from Plate U and install moving side assembly screws through to Plate U. Then, install guide bushings in Plate B	**Install guide pins from Plate U and install moving side assembly screws through to Plate U. Install straight guide bushings in Plate B.**
Catalog No. SGPU3	Catalog No. SGPU4
	

※ The guide pin gets longer by the amount of thickness of Plate U (the length of press fit section will be set by Futaba).
Change the length of guide pins ➡ P.44

※ For guide bushing installation specifications, depending on the thickness of Plate B, appropriate length of guide bushing may not be available. Refer to "Change Installation of Guide Bushings and/or added Guide Bushings Specification" (➡ P.48) to review guide bushing installation method.

※ For Catalog No. SGPU1 , counterbore holes for guide pins may be left in Plate B.

Catalog No.
SGPU1
SGPU2
SGPU3
SGPU4

How to order

Catalog No.

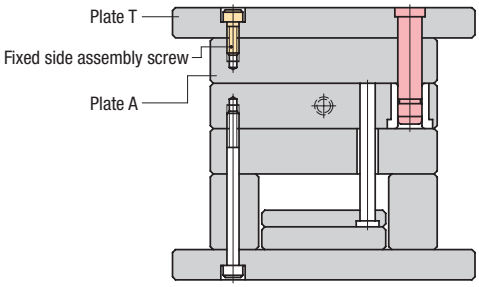
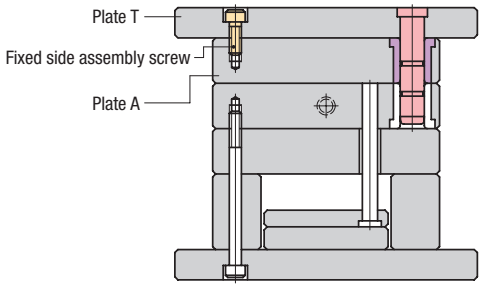
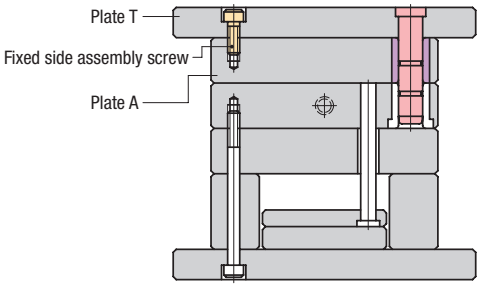
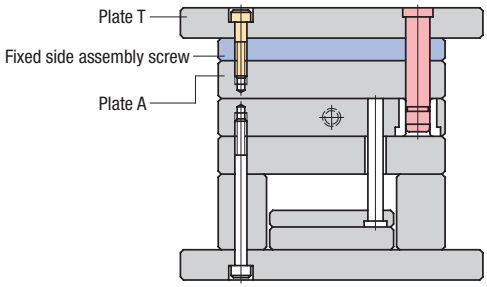
SGPU1

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Installing guide pins from Plate T

Install guide pins from Plate T.

Application Mold bases S series

Install guide pins from Plate T	Install guide pins from Plate T and guide bushings in Plate A
Catalog No. SGPT1	Catalog No. SGPT2
	
Install guide pins from Plate T and straight type guide bushings in Plate A	**When installing additional plate, Plate N**
Catalog No. SGPT3	
	

※ Boring holes are machined in the additional Plate N.
※ Installing guide bushings in the additional Plate N ➡ P.48

※ The guide pin gets longer by the amount of thickness of Plate T (the length of press fit section will be set by Futaba). Change the length of guide pins ➡ P.44
※ For guide bushing installation specifications, depending on the thickness of Plate A, appropriate length of guide bushing may not be available. Refer to "Change Installation of Guide Bushings and/or added Guide Bushings Specification" in (➡ P.48) to review guide bushing installation.

Catalog No.	Fixed side assembly screw *1
SGPT1 SGPT2 SGPT3	Fixed side assembly screw not installed ESPH/TCS

*1. Specify this option when fixed side fastening bolts are unnecessary. Both the holes for bolts and screws will be eliminated.

How to order

Catalog No. — Fixed side assembly screw

SGPT1
SGPT2 — ESPH/TCS

Regarding use of MoldZukan®

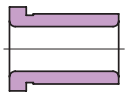
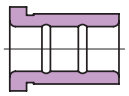
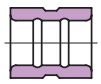
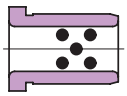
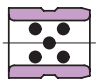
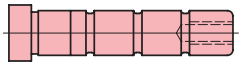
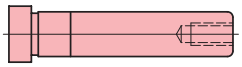
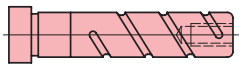
When entering specification changes of standard installation parts (guide pins and support pins, etc.) by using MoldZukan®, you need to follow a certain entry sequence defined according to the contents of changes.
If entered in incorrect sequence, MoldZukan® may not function properly.

MoldZukan® operation procedure details ➡ P.41

Change Type and Length of Support Pins

Change the support pins and guide bushings for standard mold bases to different types of support pins and guide bushings.
Change the length of support pins for standard mold bases.

Application Mold bases (excluding S series)

Support pin \ Guide bushing	■ No oil groove ■ Nominal diameter: 12 16 20 25 30 35 40 ■ Part details ➡ P.286		■ With oil groove ■ Nominal diameter: 12 16 20 25 30 35 40 ■ Part details ➡ P.290		■ Self lubricating, copper alloy type ■ Nominal diameter: 16 20 25 30 35 40 ■ Part details ➡ P.292	
						
	Guide bushing M-GBA	Guide bushing M-GBB	Guide bushing M-GBGF	Guide bushing M-GBRF	Guide bushing M-GBGDF	Guide bushing M-GBRDF
Support pin M-SPN ■ With oil groove ■ Nominal diameter 12 16 20 25 30 35 40  ■ Part details ➡ P.294	Combination code SPH0 ※ This is a combination for standard mold base. ※ If not specified, this combination will be used					
Support pin M-SPHF ■ No oil groove ■ Nominal diameter 12 16 20 25 30 35 40  ■ Part details ➡ P.295			Combination code SPH1 ■ Nominal diameter of parts that can be combined: 12 16 20 25 30 35 40		Combination code SPH2 ■ Nominal diameter of parts that can be combined: 16 20 25 30 35 40	
Support pin M-SPHFS ■ With spiral oil groove ■ Nominal diameter 12 16 20 25 30 35 40  ■ Part details ➡ P.296	Combination code SPH3 ■ Nominal diameter of parts that can be combined: 12 16 20 25 30 35 40					

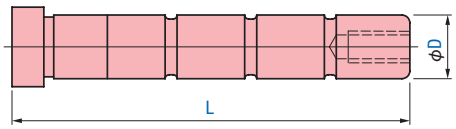
※ The length of guide bushing is the same as that before change. Depending on the type of guide bushing, however, appropriate length may not be available. Refer to "Change Installation of Guide Bushings and/or added Guide Bushings Specification" in ➡ P.48 for review.
※ The combinations of guide pins and guide bushings shown in the above charts are standard combinations. The combinations in the blank columns cannot be specified with additional processing codes. If specifying them, please provide drawings, etc.

Check
Calculating support pin deflection ➡ P.445

Support pin specifications

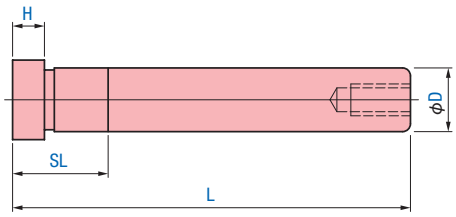
Support pin M-SPN

Corresponds to Combination code SPH0



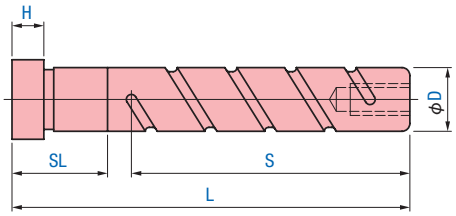
Support pin M-SPHF

Corresponds to Combination code SPH1,SPH2



Support pin M-SPHFS

Corresponds to Combination code SPH3



The H dimensions for Combination code SPH1 to SPH3 is available in two levels:

D	12	16	20	25	30	35	40
H	6 5	8 6	10 6	12 8	14 8	16 8	18 10

Catalog No.	Combination code	Support pin specification			
		L	SL	H	S
CSPGB	SPH0	Select from page 294	—	—	—
	SPH1 SPH2	In 5 mm steps See page 295	In 1 mm steps See page 295	Select from the above table	
	SPH3	In 5 mm steps See page 296	In 1 mm steps See page 296		In 1 mm steps See page 296

How to order

Catalog No. — Combination code — L — SL — H — S

CSPGB — SPH0 — L150
CSPGB — SPH1 — L150 — SL24 — H8
CSPGB — SPH3 — L250 — SL34 — H12 — S180

Regarding use of MoldZukan®

When entering specification changes of standard installation parts (guide pins and support pins, etc.) by using MoldZukan®, you need to follow a certain entry sequence defined according to the contents of changes.
If entered in incorrect sequence, MoldZukan® may not function properly.

MoldZukan® operation procedure details ➡ P.41

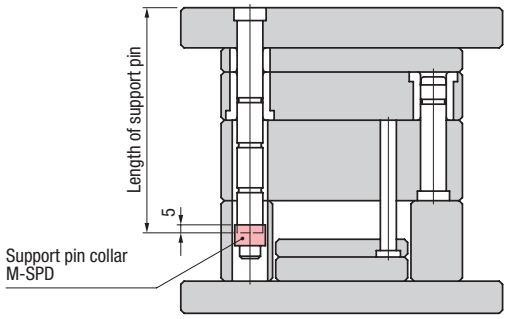
Change Support Pin Collars (Type M-SPD)

Installing support pin collar M-SPD

Change the support pin collar to M-SPD. This will help reduce mold opening amount by 5 mm.

Support pin collar M-SPD ➡ P.297

Application Mold bases D and E series



Catalog No.
CPSPD

How to order

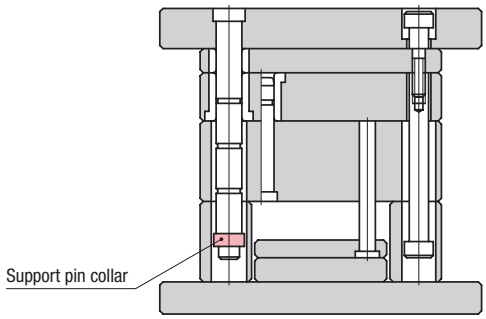
Catalog No.

CPSPD

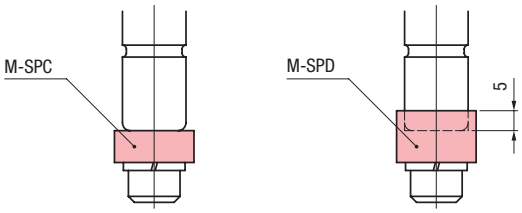
Installing H series support pin collars

Install support pin collars for H series mold bases.

Application Mold bases H series



Type of support pin collars



Code: SPC **Code: SPD**

Catalog No.	Types of support pin collars
CPHSP	SPC SPD

How to order

Catalog No. — Type of support pin collars

CPHSP — SPC

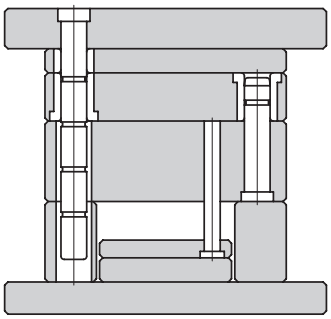
For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Deleting support pin collars

Change the standard specification to the one that does not install support pin collars.

※ If not installing support pin collars, no stopper of the cavity plate (fixed half) (Plate A) is provided. Therefore, adequate precaution should be taken to prevent the fixed side retainer plate from failing off the mold base when transporting or disassembling it.

Application Mold bases D and E series



Catalog No.	Part code
ESP	SPC

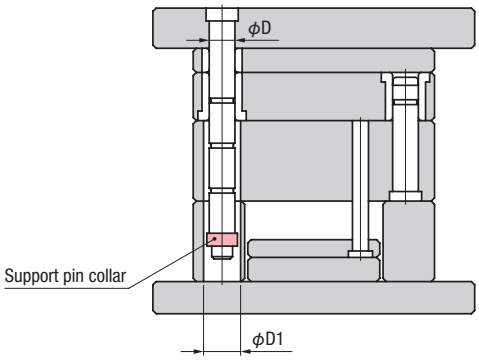
How to order

Catalog No. – Part code

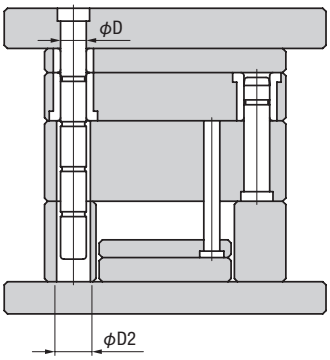
ESP – SPC

Support pin collar specifications

For D·E and H series mold bases, the diameter of the clearance holes for support pins is determined according to whether or not the support pin collar is installed.



With a support pin collar



Without a support pin collar

Support pin	D	12	16	20	25	30	35	40
With support pin collar	D1	18	22	28	33	40	45	50
Without support pin collar	D2	14	18	24	29	34	39	45

Change Clearance Holes for Support Pin

The plates in which to machine clearance holes for support pins are determined according to the length of the support pins. Machine clearance holes for support pins in the specified plates that are not configured to have clearance holes by the standard specifications.

Application: Mold base D·E series, F·G series and H series

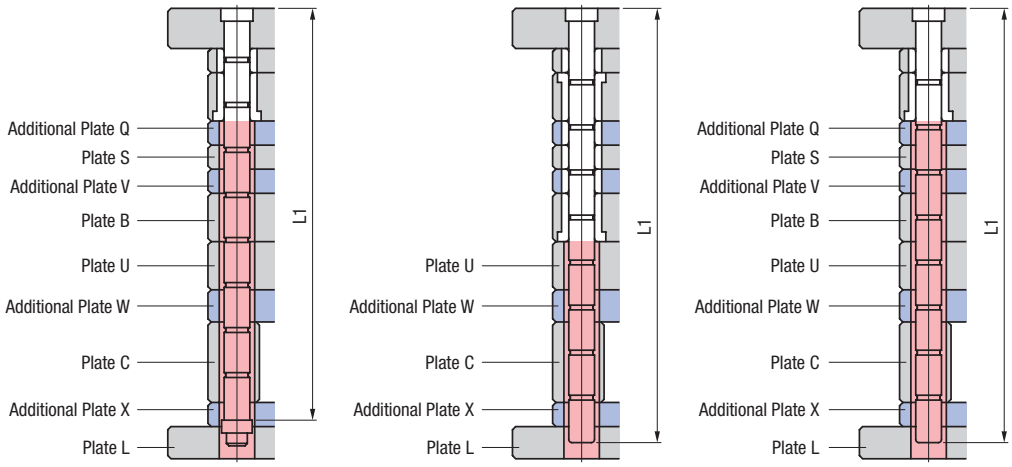
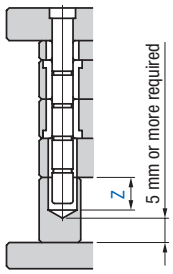


Plate code for D·E series | **Plate code for F·G series** | **Plate code for H series**

represents the clearance holes support pins

Optional specification (specify only when necessary)

Option code	Specification
MHD	 Machine clearance holes for support pins as a blind hole in the plates specified. ■ **How to specify:** MHD/Z Z dimension [e.g.] MHD/Z30

Catalog No.	Plate code *1	Optional spec.
CIHSPN	S (Plate S) Q (Additional Plate Q) *2 B (Plate B) V (Additional Plate V) *2 U (Plate U) W (Additional Plate W) *2 C (Plate C) X (Additional Plate X) *2 L (Plate L) No clearance hole for support pin: ALN	MHD

*1. Clearance holes for support pins are machined through to the plate of which plate code is specified.
*2. Additional plate specifications ➡ P.38

How to order

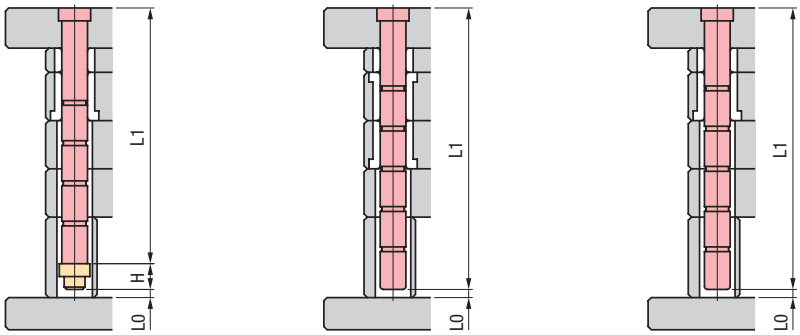
Catalog No.	—	Plate code	—	Option code
CIHSPN	—	L		
CIHSPN	—	C	—	MHD/Z45

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Standard setting for support pin clearance holes

The plates in which to machine clearance holes for support pins are determined based on the following conditions:

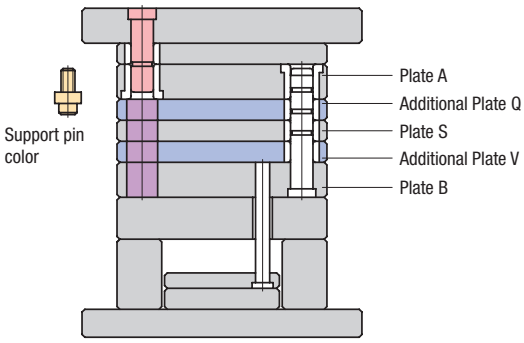
Please order additional machining work of adding or eliminating support pin clearance holes shown on the left page only when your application does not fall under the conditions.



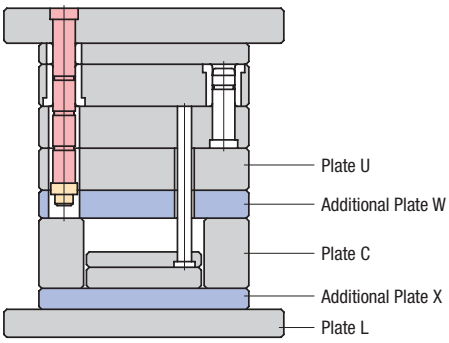
D・E series　　F・G series　　H series

Support pin	12	16	20	25	30	35	40
H	12.5	20.5	25	29.5	34	36	38

※ When the distance from a support pin to the next plate is L0＜3, a through hole will be machined in the next plate as well.



※ For D・E series and H series, even when the support pin is short, a clearance hole for the support pin will be machined in Plate S, Plate B, additional Plate Q, and additional Plate V.



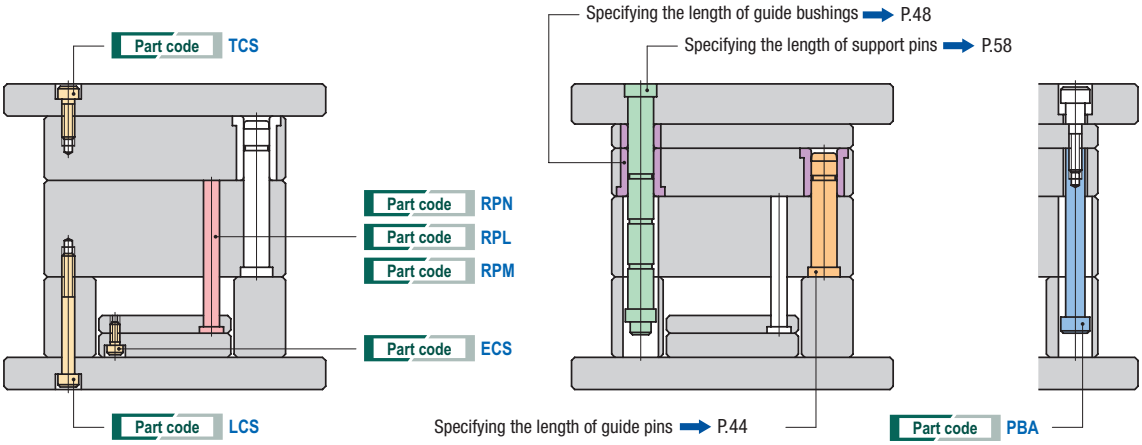
※ The plates between Plate U and Plate L will be machined depending on the length of the support pin.

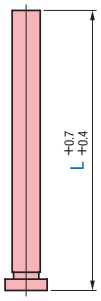
Change Length of Return Pins, Assembly Screws, Puller Bolts

Change the length of return pins, assembly screws and puller bolts.

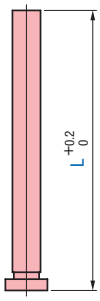
The machining of holes in plates is the same as that of standard specifications. Only the length of the part needs to be specified. For puller bolts, however, clearance holes will be machined according to the length of the bolts.

Application Mold bases

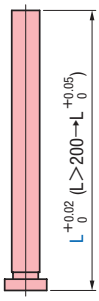




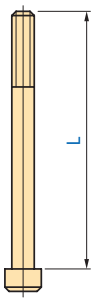
Part code RPN



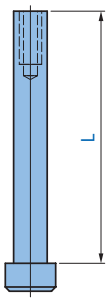
Part code RPL



Part code RPM



Part code TCS
Part code LCS
Part code ECS



Part code PBA

※ The changing puller bolt length process applies to H series mold bases.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Part name	Part code	Handling of part length
Return pins (in 1 mm steps)	RPN	Return pin M-RPN (head thick 4 mm) ➡ Select from P.338 Return pin M-RP8N (head thick 8 mm) ➡ Select from P.338 When the desired length of return pins is not listed herein, specify it in 1 mm steps.
Return pins (in 0.1 mm steps)	RPL	Return pin M-RPL (head thick 4 mm) ➡ Select from P.340 Return pin M-RP8L (head thick 8 mm) ➡ Select from P.340
Return pins (in 0.01 mm steps)	RPM	Return pin M-RPM (head thick 4 mm) ➡ Select from P.340 Return pin M-RP8M (head thick 8 mm) ➡ Select from P.340
Assembly screws	TCS LCS ECS	Specify the length in 5 mm steps.
Puller bolts	PBA	Puller bolt M-PBA ➡ Select P.313
Guide pins	—	Specifying the length of guide pins ➡ P.44
Guide bushings	—	Specifying the length of guide bushings ➡ P.48
Support pins	—	Specifying the length of support pins ➡ P.58

Part name	Catalog No.	Part code	L
Return pins (in 1 mm steps)	CPL	RPN	See above table
Return pins (in 0.1 mm steps)		RPL	
Return pins (0.01 mm steps)		RPM	
Fixed side assembly screws		TCS	
Moving side assembly screws		LCS	
Ejector plate assembly screws		ECS	
Puller bolts		PBA	

※ Some parts may be delivered not assembled in the mold base if the assembly is difficult because of their length.

How to order

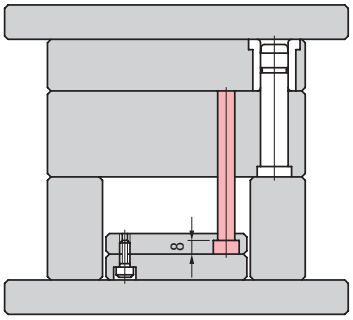
	Catalog No.	—	Part code	—	L
Change the length of return pins (in 1 mm steps)	CPL	—	RPN	—	L150
Change the length of return pins (in 0.1 mm steps)	CPL	—	RPL	—	L120.2
Change the length of return pins (in 0.01 mm steps)	CPL	—	RPM	—	L109.99
Change the length of fixed side assembly screws	CPL	—	TCS	—	L30
Change the length of puller bolts	CPL	—	PBA	—	L200

Change Return Pin Collars Thickness to 8 mm

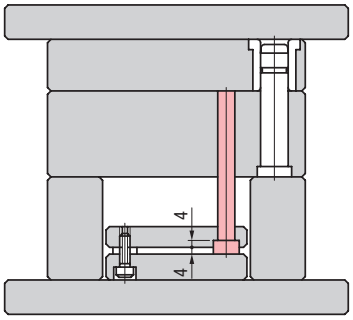
Standard mold bases include 4 mm thick head type return pins. Change the pins to 8 mm thick head type return pins.

Depending on the ejector plate specifications of the mold base, the depth of the counterbore for the ejector plate will be as follows:

Application Mold bases



Counterbore type



Spacer type

Catalog No.
CPHRP8

How to order

Catalog No.

CPHRP8

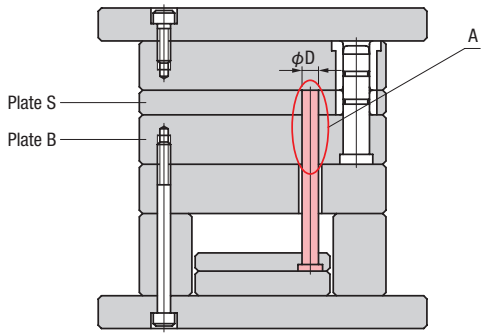
For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Added Machining Return Pin Holes on S-Plate

Perform additional machining of return pin holes in Plate S.

Application: Mold bases (applies to SB, SD, DB, DD, EB, ED, FB, FD, GB, GD, HB and HD types)

Catalog No. SRPS



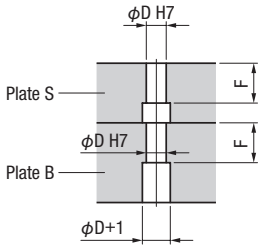
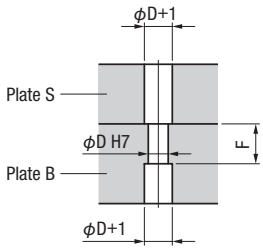
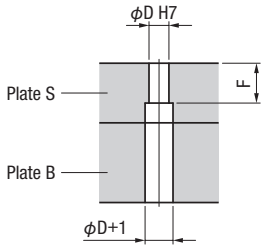
When installing additional Plate Q or Plate V:
If installing either of Plate Q or Plate V, ordering with this code is not allowed.

How to order for addition of return pin holes to Plate S when installing Plate Q or Plate V ➡ P.68

Return pin hole specifications

Select desired return pin specifications for Plate S and Plate B from the following 3 types:

How to order hole diameter not shown in the chart below ➡ P.68

Specification code	BH	DH	FH
A section specification			

Catalog No.	Specification code	D H7		F	
SRPS	BH DH FH	10	+0.015 0	35	If plate thickness≦F, then F= plate thickness
		12	+0.018 0	50	
		15		60	
		20	+0.021 0	80	
		25		100	
		30		120	

※ The return pin gets longer by the amount of thickness of Plate S.
※ F dimensions shown in this table are minimum values. F dimensions may be set to values larger than them.

How to order

Catalog No. — Specification code

SRPS — BH

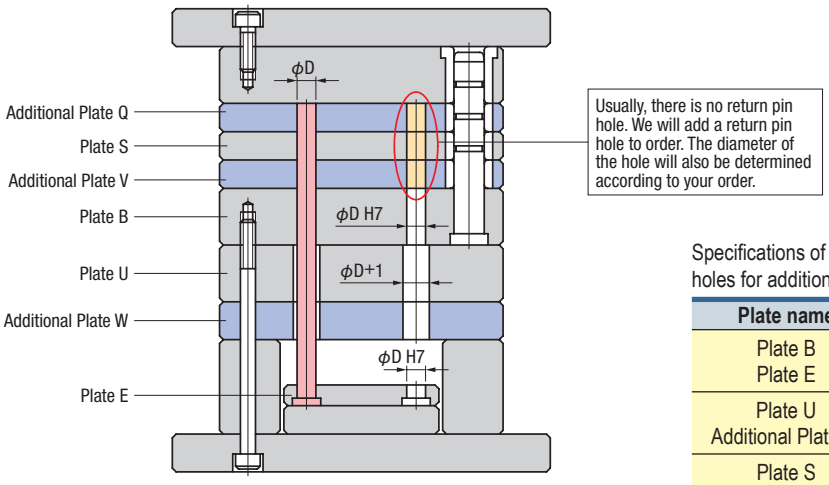
Added Return Pin Holes and/or Change Return Pin Holes Diameter

Change the return pin hole specifications.

① Perform additional machining of return pin holes in Plate S, additional Plate Q and additional Plate V.

② Change the diameter of the return pin holes and provide more clearance than our standard "H7 tolerance" to the hole.

Application Mold bases (excluding the types without ejector plates)

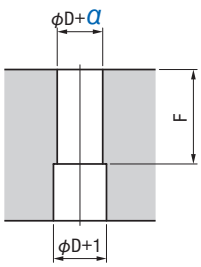


Specifications of standard mold base and return pin holes for additional plates are as follows:

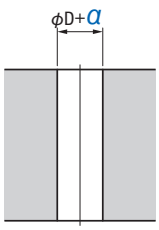
Plate name	Hole diameter
Plate B Plate E	H7 hole
Plate U Additional Plate W	Return pin dia. +1
Plate S Additional plate Q Additional Plate V	No return pin hole machined

Return pin hole specifications

When changing the diameter of return pin holes, select from the specifications below:



When α : H7, α≦0.2



When α≧0.5

α	Machining method
H7 hole	Boring hole
0.1	
0.2	
0.5	Drill hole
1	
2	

D H7		F	
10	+0.015 0	35	When plate thickness≦F, F= plate thickness
12	+0.018 0	50	
15		60	
20	+0.021 0	80	
25		100	
30		120	

※ Also, when α=0.1, α=0.2, the same F dimension as that of H7 hole will be applied.

※ F dimensions shown in this table are minimum values. F dimensions may be set to values larger than them.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Catalog No.	Code of the plate for which return pin hole diameter is to be changed and the diameter *1						
	Plate Q / α*2	Plate S / α*2	Plate V / α*2	Plate B / α	Plate U / α	Plate W / α	Plate E / α
CIHRPN	Q/H7	S/H7	V/H7	B/H7	U/H7	W/H7	E/H7
	Q/0.1	S/0.1	V/0.1	B/0.1	U/0.1	W/0.1	E/0.1
	Q/0.2	S/0.2	V/0.2	B/0.2	U/0.2	W/0.2	E/0.2
	Q/0.5	S/0.5	V/0.5	B/0.5	U/0.5	W/0.5	E/0.5
	Q/1	S/1	V/1	B/1	U/1	W/1	E/1
	Q/2	S/2	V/2	B/2	U/2	W/2	E/2

*1. Specify all the plates for which to change the return pin hole diameter. If the desired diameter is the same as that of the standard mold base, no need to specify it.
*2. There is no hole in Plate S, additional Plate Q and additional Plate V. If the diameter of return pin holes for these plates is specified, return pin holes will be machined in the plates.
The return pin gets longer by the amount of thickness of the added plates.
How to order the addition of return pin hole to Plate S only (when not installing Plate Q, and Plate V) ➡ P.67
※ How to order spring holes for Plate B, Plate U and additional Plate W ➡ P.134

How to order

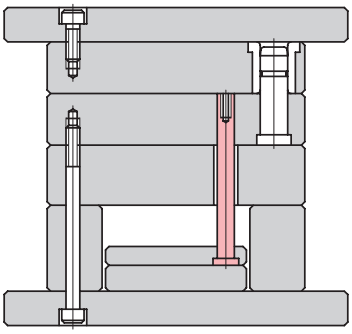
Catalog No.	Plate Q/ α	Plate S/ α	Plate V/ α	Plate B/ α	Plate U/ α	Plate W/ α	Plate E/ α
CIHRPN		S/H7		B/1			E/0.5
CIHRPN	Q/1	S/0.5		B/H7			

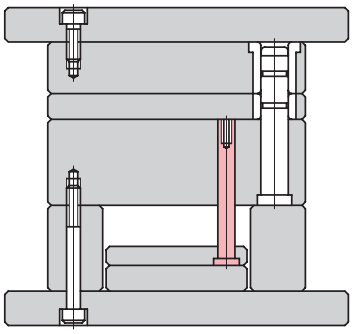
Change Return Pin with Thread Holes

Installing return pin with a thread hole — ①

Machine a thread hole in the end of each return pin.

Application Mold bases (excluding the types without ejector plates)

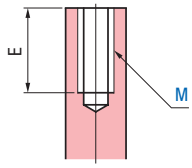




Return pin dia.	Catalog No.	M (thread dia.)	N (# of pins) *1
10	CPRPT	M4 M5	2 4
12		M4 M5 M6	
15		M5 M6 M8	
20		M6 M8 M10	
25		M8 M10 M12	
30			

*1. If specifying N2, a threaded hole is machined in the end of two out of 4 pins. Please install these pins at the appropriate locations. If specifying N4, threaded holes will be machined in all the four pins.

Threaded portion details



M	E
M4	10
M5	12.5
M6	15
M8	16
M10	20
M12	24

How to order

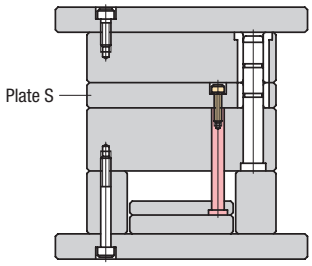
Catalog No.	—	M	—	N
CPRPT	—	M6	—	N4

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

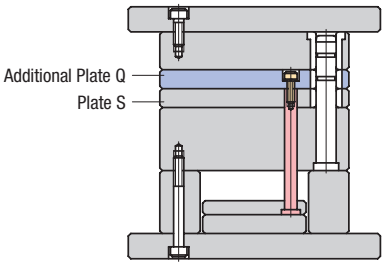
Installing return pin with a thread hole — ②

Machine a threaded hole in the end of each return pin and secure the return pins and plates with bolts.

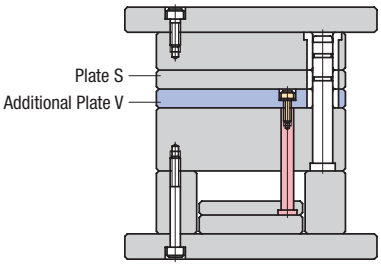
Application Mold bases (applies to SB, SD, DB, DD, EB, ED, FB, FD, GB, GD, HB and HD types)



Counterbore for bolts — Plate S

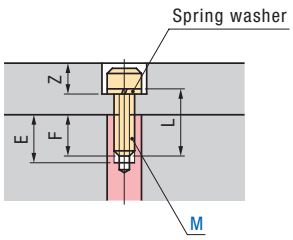


Counterbore for bolts — additional Plate Q



Counterbore for bolts — additional Plate V

※ Specify the code of plates in which to machine the counterbores for bolts.
※ Return pin holes must be machined through to the plate adjacent to the plate in which to machine counterbore holes(the plate beneath the counterbores). If there is no return pin holes on the adjacent plate, then ordering for additional machining is necessary.
Adding return pins ➡ P.68
※ The all the four return pins will be secured with bolts. Securing two pins only cannot be specified.

Threaded portion details	M	Thickness of plate in which to machine counterbore	Z	F	E	C	L
	M4	Thickness≧10	5.5	9.5	10	1	L=Thickness *1 -Z+F+C *2 *1. Plate in which to machine counterbores *2. Compensation values
	M5	Thickness≧15	7.5	11	12.5	1.5	
	M6		8.5	12	15		
	M8	Thickness≧20	11	14	16	2	
	M10	Thickness≧25	13.5	16	20	2.5	
	M12		15.5	23	24		

Return pin dia.	Catalog No.	M (thread dia.)	Code of plate in which to machine counterbore	Optional specification (Specify only when necessary)
10	MRPTZ	M4 M5	S (Plate S), Q (Additional Plate Q), V (Additional Plate V)	EPAT ※ Return pins, bolts and spring washers are not supplied. Machining of holes only.
12		M4 M5 M6		
15		M5 M6 M8		
20		M6 M8 M10		
25		M8 M10 M12		
30				

How to order

Catalog No. — M — Code of plate in which to machine counterbores — Optional spec.

MRPTZ — M8 — S

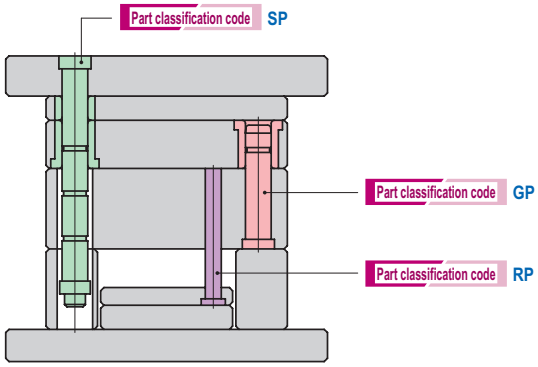
Change Position of Parts

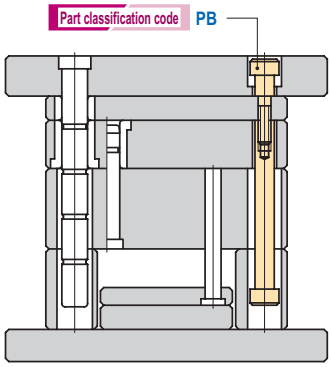
Change pitch of guide pins, support pins, return pins and puller bolts.

Changing pitch of assembly screws ➡ P.74

When changing the pitch of parts, consider the following:
※ Changing the pitch of parts may result in interference with other parts.
Take into account the positions, etc.

Application: Mold bases, cavity retainer sets, cavity retainer sets for die cast





Part name	Catalog No.	Part classification code	A	B	With/Without offset *1
Return pins	CPP	RP	In 1 mm steps	In 1 mm steps	–
Puller bolts *2		PB			
Guide pins and guide bushings		GP			With offset: A
Support pins and guide bushings		SP			Without offset: N

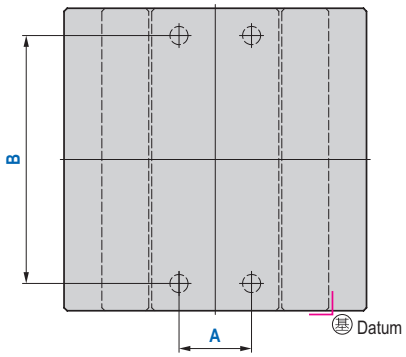
*1. When specifying offset, the pin on the same datum plane as the Futaba standard (lower right) will be placed inward from the datum plane. If not using offset, care should be taken not to mishandle the fixed side and the moving side.
*2. Changing puller bolt pitch option applies to H series mold bases.

How to order

	Catalog No.	–	Part classification code	–	A	–	B	–	With or without offset
Change the pitch of return pins	CPP	–	RP	–	A60	–	B180		
Change the pitch of puller bolts	CPP	–	PB	–	A180	–	B330		
Change the pitch of guide pins and bushings	CPP	–	GP	–	A194	–	B234	–	A
Change the pitch of support pins and bushings	CPP	–	SP	–	A234	–	B214	–	N

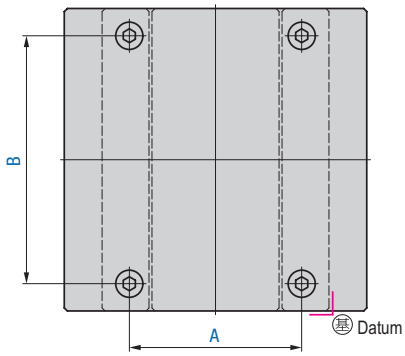
For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Part classification code **RP**



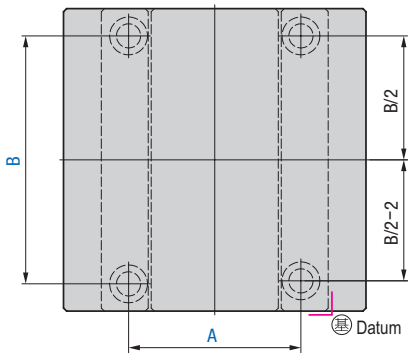
Change pitch of return pins

Part classification code **PB**



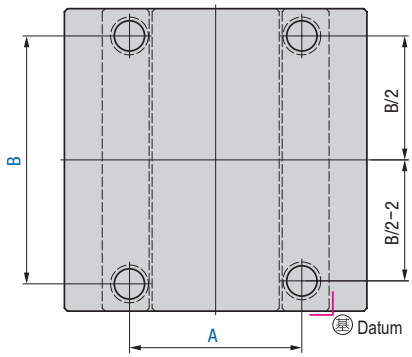
Change pitch of puller bolts

Part classification code **GP**



Change pitch of guide pins

Part classification code **SP**



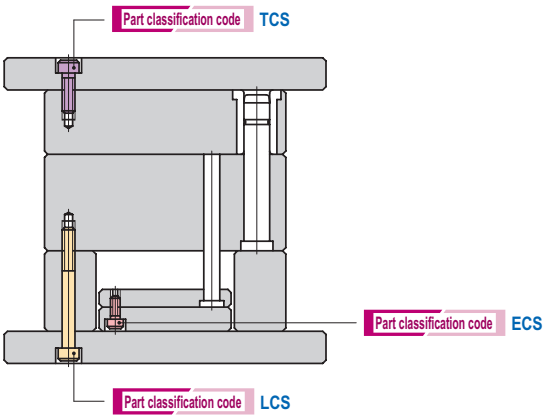
Change pitch of support pins

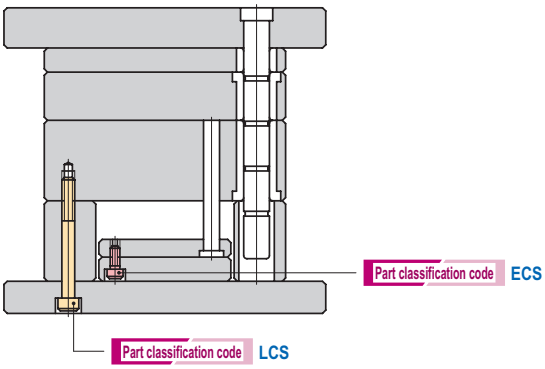
Change Position and the Number of Assembly Screws

Change the pitch and the number of assembly screws.

When changing the pitch and the number of assembly screws, consider the following:
① When changing the number of assembly screws, take into account the strength, etc.
② Changing the pitch of assembly screws may result in interference with other parts.
Consider the positional relationship.

Application Mold bases





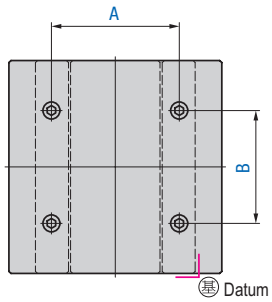
# of bolts	Catalog No.	Part classification code	Position code	A	B	C	D
4-bolt fastening	CPNP	TCS LCS ECS	S041	In 1 mm steps	In 1 mm steps	–	–
6-bolt fastening			S061				
			S064			In 1 mm steps	
			S065				
			S066				
8-bolt fastening			S081				
10-bolt fastening			S101				
12-bolt fastening			S121				In 1 mm steps

How to order

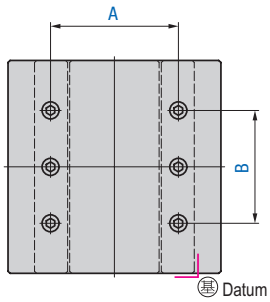
Catalog No.	Part classification code	Position code	A	B	C	D
CPNP	TCS	S041	A185	B128		
CPNP	LCS	S065	A200	B230	C30	
CPNP	ECS	S121	A320	B870	C500	D170

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

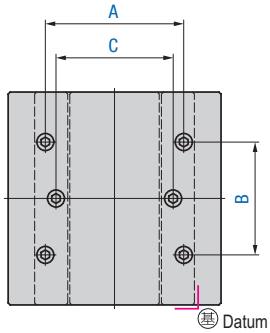
Position code S041



Position code S061

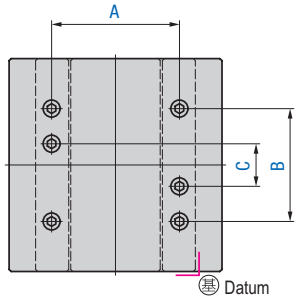


Position code S064

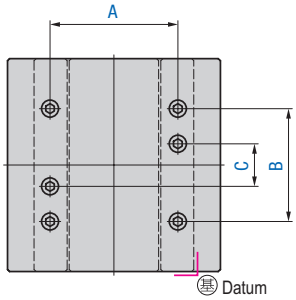


※ If A＜C, or A＞C, order with **Position code** S064.
If A＝C, order with **Position code** S061.

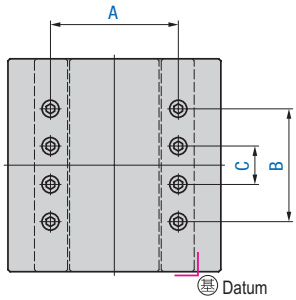
Position code S065



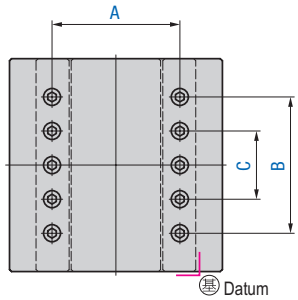
Position code S066



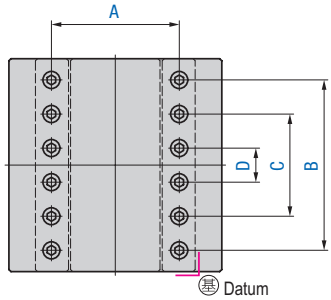
Position code S081



Position code S101



Position code S121

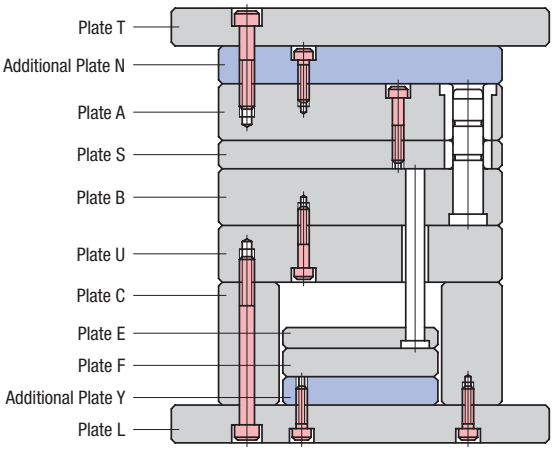


※ Each chart shows **Part classification code** **TCS**. The dimensions of **LCS** and **ECS** are also shown with **A** - **D** codes likewise.

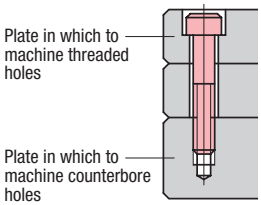
Added Assembly Screws

Adding assembly screws to fasten the plates.

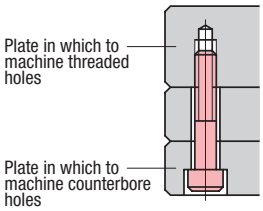
Application Mold bases



Catalog No. PCSMS

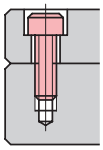


Catalog No. PCSMU



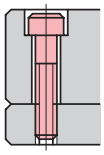
※ To order the addition of assembly screws, specify "the plate in which to machine counterbore holes" and "the plate in which to machine thread holes". Then, clearance holes for the bolts will be machined through the all the plates in between.

Screw code TA



Blind hole

Screw code TTA



Through hole

Catalog No No.	M	Plate in which to machine counterbores			Plate in which to machine threaded holes			Position code	A *1 (X)	B *1 (Y)	C
		Counterbore code	Plate code		Thread hole	Plate code					
PCSMS PCSMU	M4 M5 M6 M8 M10 M12 M14 M16 M20 M24	MZ	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) C (Plate C) E (Plate E) F (Plate F) L (Plate L)	Additional plate N (Plate N) O (Plate O) Q (Plate Q) V (Plate V) W (Plate W) X (Plate X) Y (Plate Y) Additional plate specifications P.38	TA TTA Details P.78	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) C (Plate C) E (Plate E) F (Plate F) L (Plate L)	Additional plate N (Plate N) O (Plate O) Q (Plate Q) V (Plate V) W (Plate W) X (Plate X) Y (Plate Y) Additional plate specifications P.38	S011	In 0.5 mm steps	In 0.5 mm steps	—
								S021	In 1 mm steps	—	
								S022	—	In 1 mm steps	
								S023	In 1 mm steps		
								S024			
								S041			
								S042			
								S061			
								S062			
								S064			In 1 mm steps
								S065			
								S066			

*1. For Position code S011 only, please specify X or Y.

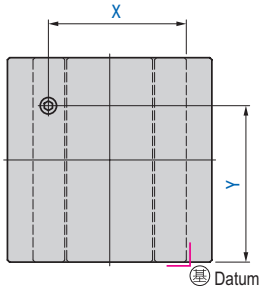
How to order

Catalog No.	M	Plate in which to machine counterbores Counterbore code / Plate code	Plate in which to machine thread holes Thread code / Plate code
PCSMS	M10	MZ/T	TA/N
PCSMU	M12	MZ/L	TTA/U

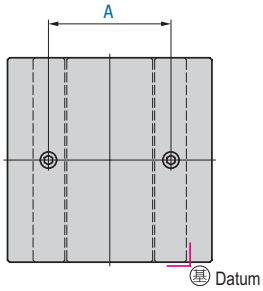
Position code	A	B	C
S041	A120	B80	
S064	A160	B230	C140

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

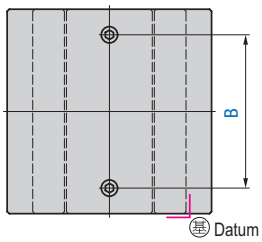
Position code S011



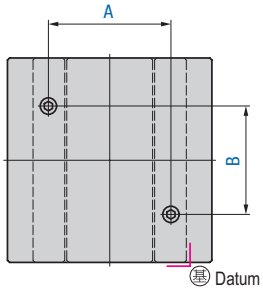
Position code S021



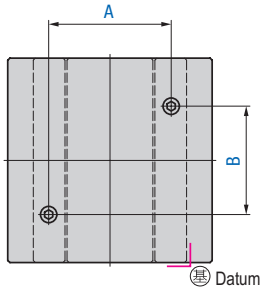
Position code S022



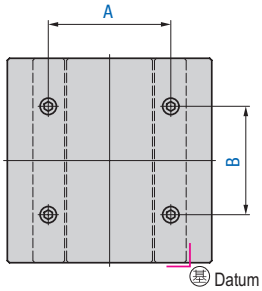
Position code S023



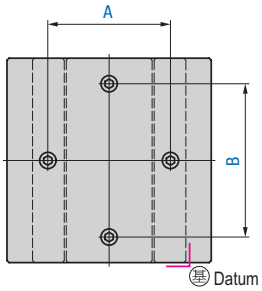
Position code S024



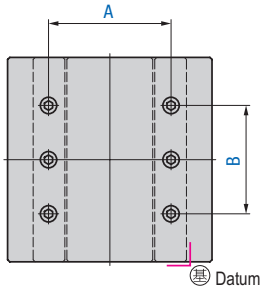
Position code S041



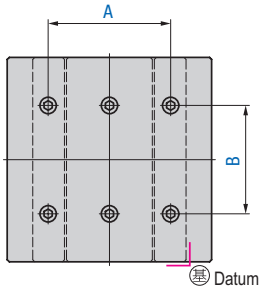
Position code S042



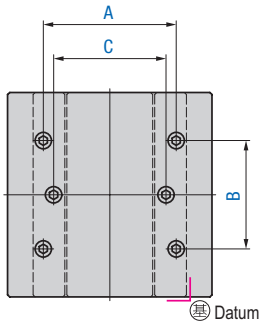
Position code S061



Position code S062

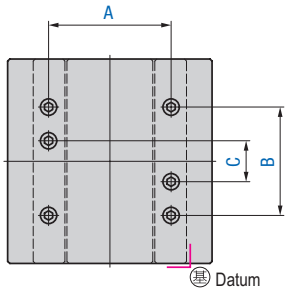


Position code S064

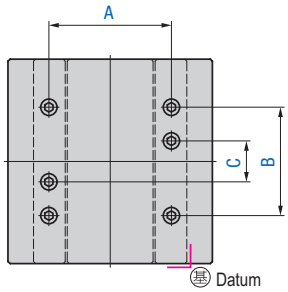


※ If A＜C or A＞C, order with **Position code** S064.
If A＝C, order with **Position code** S061.

Position code S065



Position code S066

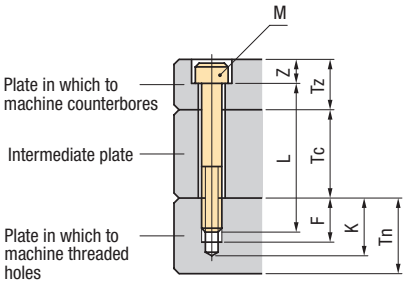


※ For positions not shown above, please order with additional specifications of assembly screws.

Specifications of Thread Holes for Assembly Screws

The thread-hole specification of the assembly screws listed in page 76 to 77 are shown below. Refer to the table below to select the through-hole and blind-hole specifications.

Blind hole specification



M	M4	M5	M6	M8	M10	M12	M14	M16	M20	M24
Z	4.5	5.5	7	9	11	13	15	17	21	25
Tn min	Tn≧19	Tn≧21	Tn≧20	Tn≧20	Tn≧20	Tn≧20	Tn≧25	Tn≧35	Tn≧49	Tn≧55

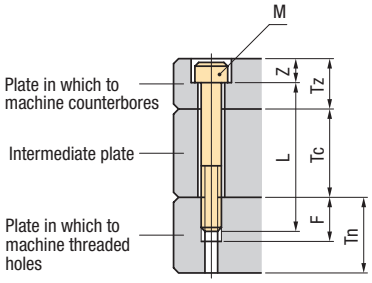
Threaded hole specification and bolt length

Threaded-hole specifications of blind holes are determined depending on Tn dimension as follows:

Tn	Tn≧19	Tn≧21	Tn≧23	Tn≧24	Tn≧28	Tn≧31	Tn≧34	Tn≧37	Tn≧49	Tn≧55
F	10	12	13	15	17	19	21	23	33	37
K max	16	18	20	21	25	28	31	34	46	52
Screw coefficient	9.5	11.5	12	14	16	18	20	22	32	36
Tn			20≦Tn<23	20≦Tn<24	25≦Tn<28	30≦Tn<31	30≦Tn<34	35≦Tn<37		
F			8	10	16	19	20	22		
K max			15	17	Tn−3	Tn−3	Tn−3	Tn−3		
Bolt coefficient			7	9	16	18	19	22		
Tn					20≦Tn<25	25≦Tn<30	25≦Tn<30			
F					11	14	15			
K max					Tn−3	Tn−3	Tn−3			
Bolt coefficient					11	13	15			
Tn						20≦Tn<25				
F						13				
K max						Tn−2				
Bolt coefficient						13				
L	L＝Tz−Z+Tc+ bolt coefficient Tc: The total amount of thickness of intermediate plates through which the bolts pass must be added. 【Rounding of calculation results】 Round down the last digit of calculation result, 0-4 to 0 and 5-9 to 5.									

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Through hole specification



M	M4	M5	M6	M8	M10	M12	M14	M16	M20	M24
Z	4.5	5.5	7	9	11	13	15	17	21	25
Tn	5≦Tn≦20	5≦Tn≦25	6≦Tn≦25	8≦Tn≦30	10≦Tn≦40	12≦Tn≦45	14≦Tn≦50	16≦Tn≦50	20≦Tn≦50	24≦Tn≦60

Threaded hole specification and bolt length

Threaded-hole specifications of through holes are determined depending on Tn dimension as follows:

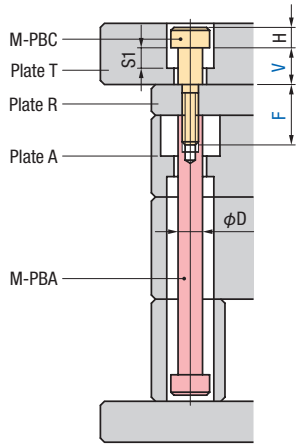
Tn	11≦Tn≦20	13≦Tn≦25	14≦Tn≦25	16≦Tn≦30	18≦Tn≦40	20≦Tn≦45	22≦Tn≦50	24≦Tn≦50	34≦Tn≦50	38≦Tn≦60
F	10	12	13	15	17	19	21	23	33	37
Bolt coefficient	9.5	11.5	12	14	16	18	20	22	32	36
Tn	Tn＜11	Tn＜13	Tn＜14	Tn＜16	Tn＜18	Tn＜20	Tn＜22	Tn＜24	Tn＜34	Tn＜38
	Minimum value of Tn M≦L-Tz+Z-Tc≦Tn ※L＝values calculated and rounded down as shown below									
F	F＝Tn									
Bolt coefficient	F−0.5		F−1							
L	L＝Tz-Z+Tc+ bolt coefficient Tc: The total amount of thickness of intermediate plates through which the bolts pass must be added. 【Rounding of calculation results】 Round down the last digit of calculation result, 0-4 to 0 and 5-9 to 5.									

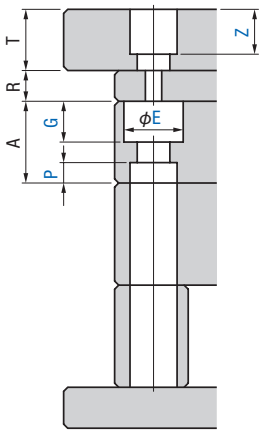
Change Puller Bolt Specification of H Series

Change the puller bolt specifications for H series mold bases.

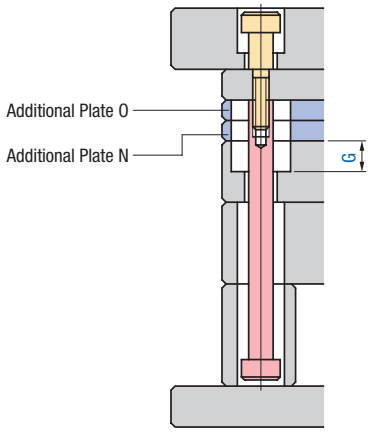
Add counterbore holes for spring and those for adjusting stroke. Change the depth of counterbore (Z) in Plate T to adjust the mold opening stroke (S1).

Application Mold bases H series





When installing additional Plate O and N



※ Through holes of ϕ E will be provided in additional plats, Plate O and Plate N.

Puller bolt installation specification of Standard mold base (H series)								
Nominal dimension of mold base	T	R	D	S1	Z	H	V	F
2540 2545 2550 2740 2750	35	20	20	10	25	14	20	45
		25						
3045 3050 3055 3060 3350	45	25					30	50
		30						
3550 3555 3560 4060 4070	50	30	25		29	18	31	60
		35						

D	Z *1	P *1	E *1			G *1
				Recommended value	Max. value*2	
20	T−Z≧5 *3	P≦80	25 to 60 in 1 mm steps provided E≧D+5	34	E≦37	See table below
25		P≦90		41 52	E≦54	

*1. Specify Z, P, E or G as necessary. P+G+5≦A (This formula is not a guarantee of strength)
*2. If E dimension exceeds this value, the counterbore may interfere with guide bushing holes, etc. Change the position of the puller bolt holes, etc.
*3. This formula is not a guarantee of strength.

Relation of counterbore dia. (E) and depth (G)

E	G max
25 to 27	G≦60
28 to 34	G≦80
35 to 44	G≦90
45 to 60	G≦100

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Specification	Catalog No.	P	E	G
Machine counterbore hole for spring and counterbore hole for adjusting stroke	CPPZ	In 1 mm steps See left page No need to specify if not machining them	In 1 mm steps See left page No need to specify if not machining them	In 1 mm steps See left page No need to specify if not machining them

How to order

Catalog No. — P — E — G

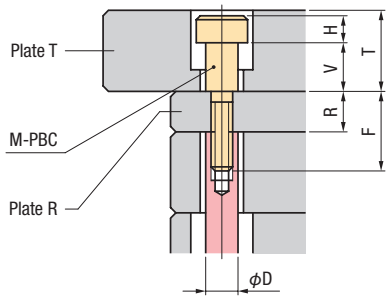
CPPZ — P10 — E34 — G30

Specification	Catalog No.	Z	V	F
Change the counterbore depth (Z) in Plate T	CPZL	In 1 mm steps See left page	Select from the table below Specify only when changing thickness of Plate T	Select from the table below Specify only when changing thickness of Plate T

Select puller bolt

If changing the thickness of Plate T, select a puller bolt M-PBC.

The puller bolt M-PBC that fits is determined according to the thickness of Plate T and Plate R.



T	R	Puller bolt that fits	D	H	V	F
T≧35	20 25	M-PBC20×20×45	20	14	20	45
T≧45	25 30	M-PBC20×30×50			30	50
	35	M-PBC20×30×55				55
T≧50	30 35	M-PBC20×35×55			35	
	30 35	M-PBC25×31×60	25	18	31	60
T≧60	35 40	M-PBC25×41×65			41	65

How to order

Catalog No. — Z — V*4 — F*4

CPZL — Z20 — V30 — F50

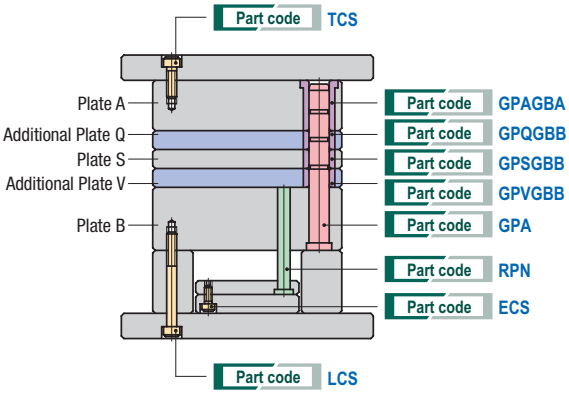
*4. If changing the thickness of Plate T, be sure to specify V and F.
If not, omit specifying them.

Omit Standard Parts and Holes

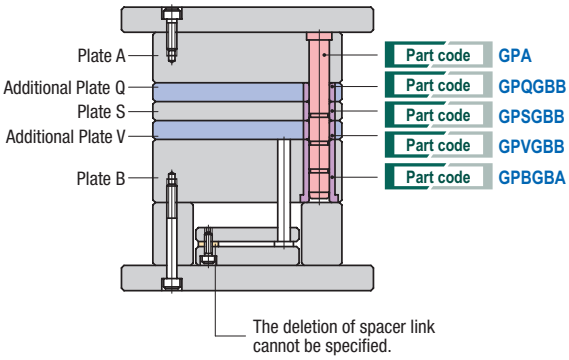
Omit standard parts and installation holes for standard mold bases.

Application: Mold bases, cavity retainer sets, cavity retainer sets for die cast

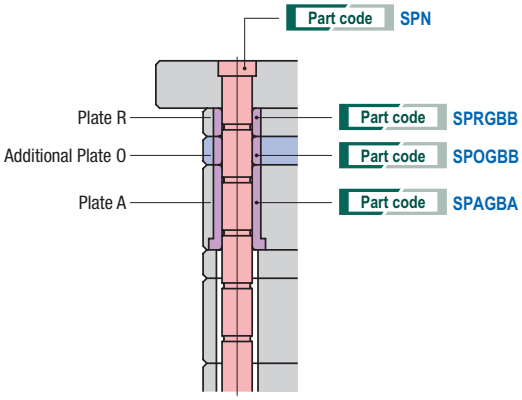
Deletion spec.	Delete parts	Specified parts that are configured for the standard mold base will be eliminated.
	Delete installation holes	Specified installation holes that is configured for the standard mold base will be eliminated.
	Delete parts and installation holes	Specified parts and installation holes that are configured for the standard mold base will eliminated.



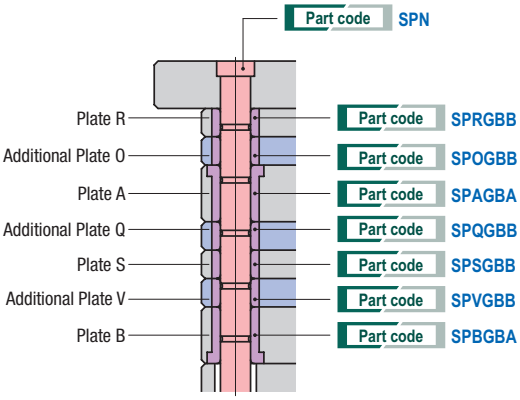
Specification of installing guide pins on the cavity plate (moving half)



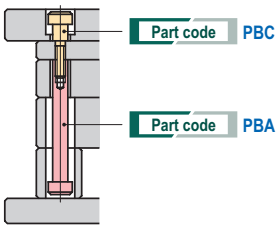
Specification of installing guide pins on the cavity plate (fixed half)



Support pin related part codes (for D·E series, H series)



Support pin related part codes (for F·G series)



Puller bolt related part codes for H series

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Delete parts

Part code	Description
RPN	∗If the ejector plate specification is spacer type, spacer ring will also be eliminated.
SPN	∗The plate in which to machine clearance holes for support pins is determined depending on the length of the pins. ∗Support pin collars and their accessory parts will also be eliminated. ∗Deleting support pin callars ➡ P.60
Other part codes	∗Specified parts will be eliminated.

Delete installation holes

Part code	Description
GPA	∗The installation holes for guide pins will be eliminated. ∗The installation holes for guide bushings will be provided. Guide bushings will also be installed.
SPN	∗The installation holes for support pins in Plate T will be eliminated. ∗The installation holes for guide bushings in Plate R, Plate A, Plate S and Plate B will be provided. Guide bushings will also be installed. For support pin specifications ON and IN, installation holes in Plate R and Plate A will be also provided likewise. ∗The clearance holes for support pins will be eliminated.
Other part codes	∗The installation holes specified with the part code will be eliminated.

Delete parts and installation holes

Part code	Description
GPA	∗The guide pins and the installation holes for guide pins will be eliminated. ∗The installation holes for guide bushings will be provided. Guide bushings will also be installed.
RPN	∗If the ejector plate specification is spacer type, spacer ring will also be eliminated.
SPN	∗The installation holes for support pins in Plate T will be eliminated. ∗Support pins, support pin collars and their accessory parts will also be eliminated. ∗The installation holes for guide bushings in Plate R, Plate A, Plate S and Plate B will be provided. Guide bushings will also be installed. For support pin specifications ON and IN, installation holes in Plate R and Plate A will be also provided likewise. ∗The clearance holes for support pins will be eliminated.
Other part code	∗Parts and installation holes specified with the part code will be eliminated.

Catalog No.	Part codes			
ESP (Delete parts) ESH (Delete installation holes) ESPH (Delete parts and installation holes)	GPA RPN SPN TCS LCS ECS	GPAGBA GPBGBA GPSGBB SPRGBB SPAGBA SPSGBB SPBGBA	GPQGBB GPVGBB SPOGBB SPQGBB SPVGBB	PBC PBA

How to order

	Catalog No.	—	Part code
Delete parts	ESP	—	RPN
Delete installation holes	ESH	—	RPN
Delete parts and installation holes	ESPH	—	RPN

Parts Installation

Locating Ring Addition

Sprue Bushing Addition

Taper Guide Pin Set Addition

Ejector Guide Pin Addition

Coil Spring Addition

Addition of Stop Pin or Stop Ring

Added Support Pillars

Ejector Rod Addition

Puller Bolt Addition

Tension Link Addition

PL Puller Addition

Mold Opening Prevention Plate Addition

Base Spacer Addition

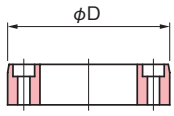
! "Additional processing specifications" are provided to show customers how to order us on additional processing. When designing molds, various conditions such as strength and accuracy need to be taken into account. Therefore, we shall not be responsible or liable for any loss or damage of any kind incurred as a result of, or in connection with your use of additional processing specifications or selection of mold bases.

Added Locating Rings — Overview

Type of Locating Rings

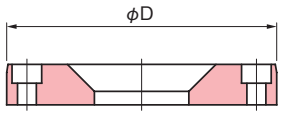
The following 9 types of locating rings can be installed in the mold bases:

Catalog No. PLRA Locating ring M-LRA



D
60

Catalog No. PLRB Locating ring M-LRB

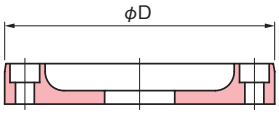


D
100 120

Catalog No. PLRC Locating ring M-LRC

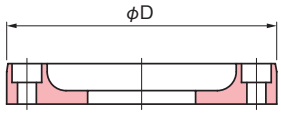
D
60 100 110 120 150

Catalog No. PLRD Locating ring M-LRD



D
60 100 110 120 150

Catalog No. PLRE Locating ring M-LRE



D
100 120

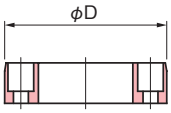
Catalog No. PLRF Locating ring M-LRF

D
100 120

Catalog No. PLRG Locating ring M-LRG

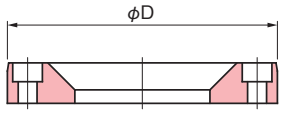
D
100 120

Catalog No. PLRH Locating ring M-LRH



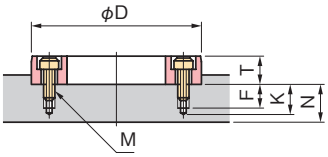
D
60

Catalog No. PLRJ Locating ring M-LRJ

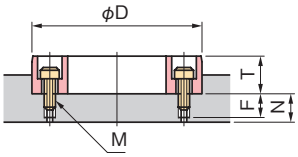


D
100 120 150

Bolt specification of Locating Rings



Blind-hole spec.



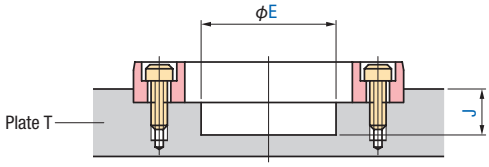
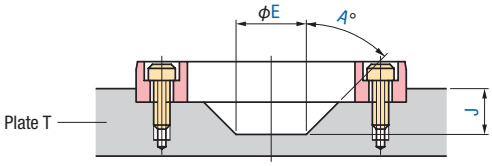
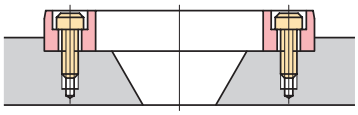
Through-hole spec.

Threaded hole specification				
M	F	K max	Blind-hole spec	Through-hole spec
M4	10	16	N≧19	N＜19
M5	12	18	N≧21	N＜21
M6	13	20	N≧23	N＜23
M8	15	21	N≧24	N＜24

Catalog No.	D	T	Bolt length	Remarks
PLRA	60	15	N≧10 → M4×20	
PLRB	100 120	15	10≦N＜13 → M6×15 N≧13 → M6×20	
PLRC	60	10 15 20 25	10≦N＜12 → M5×12 N≧12 → M5×15	
	100 110 120	10	10≦N＜13 → M6×12 N≧13 → M6×15	T=30 is only available when D=100 T=25 is unavailable when D=110
		15 20 25 30	10≦N＜13 → M6×15 N≧13 → M6×20	
	150	15 20 25	10≦N＜15 → M8×15 N≧15 → M8×20	
PLRD	60	10 15 20 25	10≦N＜12 → M5×12 N≧12 → M5×15	
	100 110 120	10	10≦N＜13 → M6×12 N≧13 → M6×15	T=10, 30, 35 are only available when D=100.
		15 20 25 30 35	10≦N＜13 → M6×15 N≧13 → M6×20	
	150	15 20 25	10≦N＜15 → M8×15 N≧15 → M8×20	
PLRE	100 120	15 20	10≦N＜13 → M6×15 N≧13 → M6×20	
		35 40 45	N≧10 → M6×30	
PLRF	100 120	—	10≦N＜13 → M6×12 N≧13 → M6×15	
PLRG	100	—	10≦N＜12 → M5×12 N≧12 → M5×15	
	120	—	10≦N＜13 → M6×15 N≧13 → M6×20	
PLRH	60	15	10≦N＜12 → M5×12 N≧12 → M5×15	
PLRJ	100 120	15 20 25	10≦N＜13 → M6×15 N≧13 → M6×20	T=25 is only available when D=100.
	150	15 20	10≦N＜15 → M8×15 N≧15 → M8×20	

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Optional specification (Specify only when necessary)

Option code	Specification	
MNZ	 ※ J dimension is J≦Plate T thickness − 5 This formula is not a guarantee of strength.  ※ If J＝T, through-holes are provided.	Machine a counterbore hole for allowing clearance around the nozzle in Plate T. ■ **Applicable items** Catalog No. **PLRC** (Excluding when D＝60) Catalog No. **PLRF** Catalog No. **PLRG** (Excluding when D＝100) ■ **How to specify:** **MNZ/E** DIMM. **/J** DIMM ※ E, J → Specify in 1 mm steps. ※ Sprue bushing counterbore dia. ≦E≦Locating ring ID (Internal diameter) ※ Combined use with MNT is not allowed. [E.g.] MNZ/E70/J15
MNT	 ※ J dimension is J≦Plate T thickenss − 5. This formula is not a guarantee of strength.  ※ When J＝T, through hole are provided.	Machine a taper hole for allowing clearance around the nozzle in Plate T. ■ **Applicable items** Catalog No. **PLRC** (Excluding when D＝60) Catalog No. **PLRF** Catalog No. **PLRG** (Excluding when D＝100) ■ **How to specify:** **MNZ/E** DIMM. **/J** DIMM. **/A** DIMM. ※ E, J → Specify in 1 mm steps. ※ E＝Sprue bushing counterbore holes ※ A＝Select 30° or 45°. ※ Combined use with MNZ is not allowed. [E.g.] MNT/E41/J15/A45
EPAT		Only holes for installing locating rings are provided.

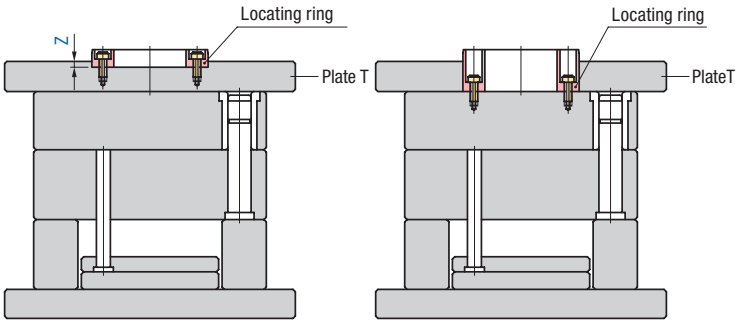
Added Locating Rings — ①

Add locating rings M-LRA - M-LRE, M-LRH, M-LRJ.

For details on installation specifications, refer to page 86 and 87.

Locating rings M-LRA –M-LRE, M-LRH, M-LRJ ➡ P.352 to 357

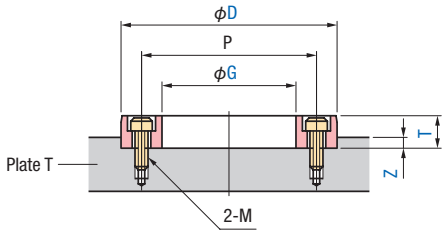
Application Mold bases



Depth of counterbore for locating ring

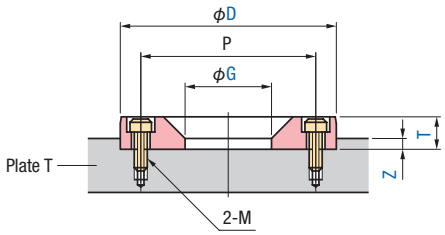
※ Z≦Plate T thickness −10
This formula is not a guarantee of strength.
※ When Z=0, there is no counterbore.
※ When Z=T, there are through-holes in the Plate T and locating rings are installed as shown on the left.

Catalog No. **PLRA** Install M-LRA locating ring
Catalog No. **PLRH** Install M-LRH locating ring
Catalog No. **PLRC** Install M-LRC locating ring



Catalog No.	D	G	T	P	M
PLRA	60	36	15	48	M4
PLRH	60	35	15	48	M5
PLRC	60	40	10 15 20 25	50	M5
	100	70	10 15 20 25 30	85	M6
	110	80	10 15 20	95	
	120	90	10 15 20 25	105	
	150	110	15 20 25	130	M8

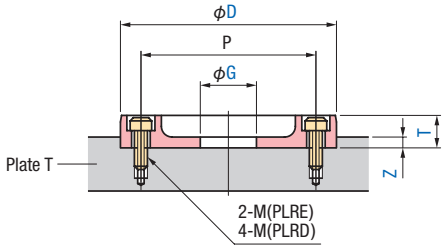
Catalog No. **PLRB** Install M-LRB locating ring
Catalog No. **PLRJ** Install M-LRJ locating ring



Catalog No.	D	G	T	P	M
PLRB	100	36	15	85	M6
	120				
PLRJ	100	35	15 20 25		
	120	40	15 20		
	150	50 *1		100	M8

*1. When D=100, T=25, this option cannot specified.

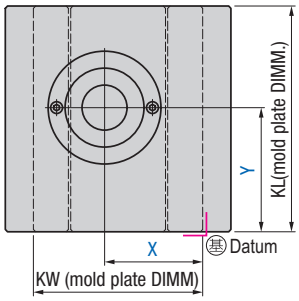
Catalog No. **PLRE** Install M-LRE locating ring
Catalog No. **PLRD** Install M-LRD locating ring



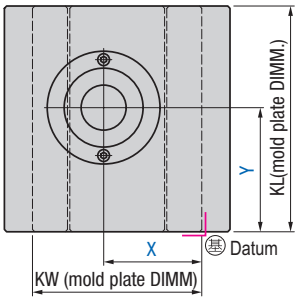
Catalog No.	D	G	T	P	M
PLRE	100	40	15 20 35 40 45	85	M6
	120			105	
PLRD	60	26	10 15 20 25	50	M5
	100		10 15 20 25 30 35	85	M6
	110		15 20 25	95	
	120			105	
	150			130	M8

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

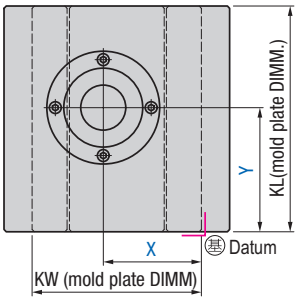
Bolt position code S021



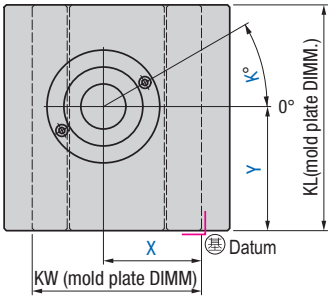
Bolt position code S022



Bolt position code S042

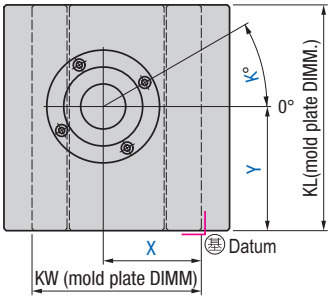


Bolt position code S02R



K → in 1° steps
1°≦K≦89°
91°≦K≦179°

Bolt position code S04R



K → in 1° steps
1°≦K≦89°

Catalog No.	D	G	T	Z	Bolt position code		X	Y	Optional spec.
					Code	K			
PLRA PLRH PLRC PLRB PLRJ PLRE PLRD	Select from left page	Select from left page	Select from left page	In 1 mm steps	S021 *2 S022 *2 S02R *2 S042 *3 S04R *3 S000 *4	Specify in 1° steps for S02R or S04R	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	MNZ MNT EPAT *5 See page 87

*2. Catalog No. PLRD, bolt holes for locating rings remain at four places. Only the thread holes machined in the plate will be changed to 2 places.
*3. Can be applied to Catalog No. PLRD.
*4. This is a design with no thread hole for locating rings machined in the plate. Bolts are supplied.
*5. When specifying EPAT, no need to specify G and T dimensions.

How to order

Catalog No. – D – G – T – Z – Bolt position code – X – Y

PLRC – D100 – G70 – T15 – Z5 – S02R/K45 – X100 – Y125

– Optional spec.

– MNZ/E70/J15

Added Locating Rings — ②

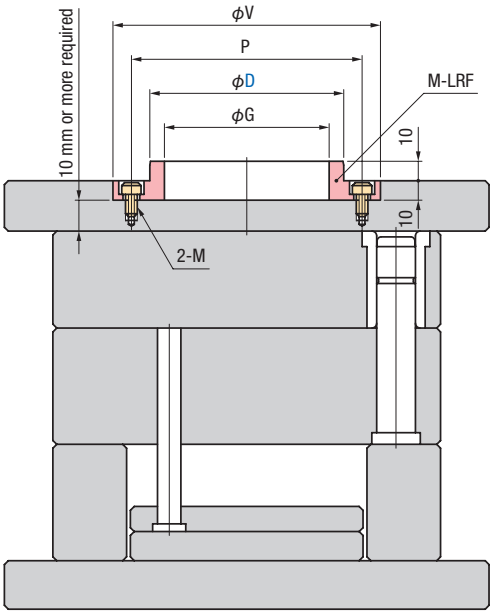
Add locating ring M-LRF, M-LRG.

For details on installation specifications, refer to page 86 and 87.

Locating ring M-LRF ➡ P.356 M-LRG ➡ P.354

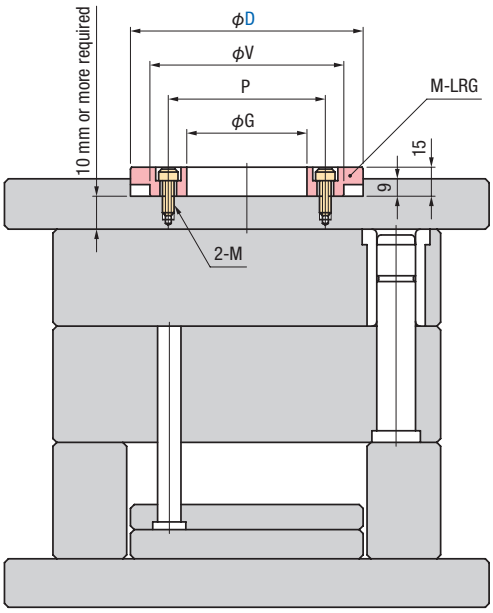
Application Mold bases

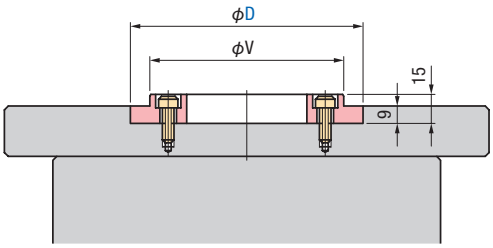
Catalog No. **PLRF** Add M-LRF locating ring



Catalog No.	D	V	G	P	M
PLRF	100	130	85	115	M6
	120	150	105	135	

Catalog No. **PLRG** Add M-LRG locating ring



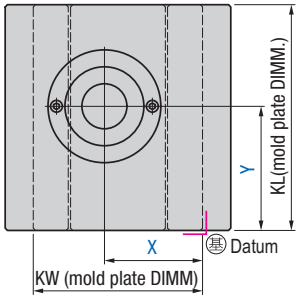


※ M-LRG locating ring is reversible type that can be added from both its front and back sides.

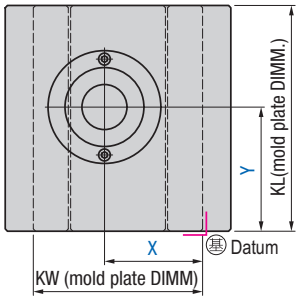
Catalog No.	D	V	G	P	M
PLRG	100	60	40	50	M5
	120	100	70	85	M6

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

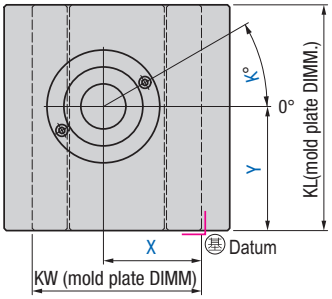
Bolt position code S021



Bolt position code S022



Bolt position code S02R



K → in 1° steps
1° ≦ K ≦ 89°
91° ≦ K ≦ 179°

Catalog No.	D	Bolt position code		X	Y	Optional spec.
		Code	K			
PLRF PLRG	100 120	S021 S022 S02R S000 *1	Specify in 1° steps for S02R	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	MNZ MNT EPAT See page 87

*1. This is a design with no thread hole for locating rings machined in the plate. Bolts are supplied.

How to order

Catalog No.	D	Bolt position code	X	Y	Optional spec.
PLRF	D100	S02R/K30	X150	Y200	MNT/E41/J15/A45

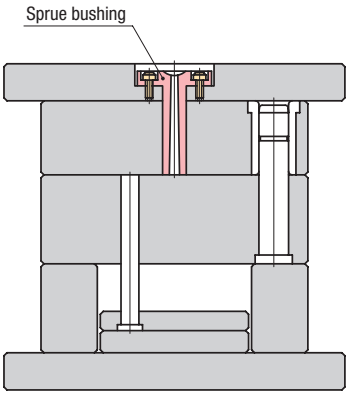
Added Sprue Bushings — Overview

Type of sprue bushings

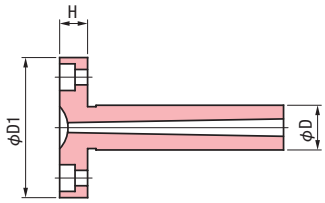
Bolt type and shoulder type sprue bushings can be installed in mold bases.

For information on dimensions and accuracy of each part, refer to page 372 to 385.

Sprue bushings (bolt type)

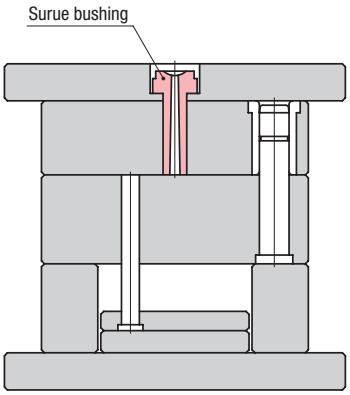


How to order ➡ P.94

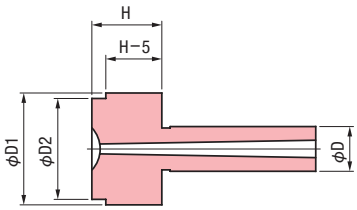


Product code	D1	D	H	Material	Details
M-SBA	50	16 20	10	SK3 (no heat treatment)	P.372
M-SBC	36	13	10	SKD61 (hardness 48HRC or more)	P.372
	50	16 20			
M-SBG□	40	10 13 16 20	10	HPM1 (hardness 37-41HRC) SKD61 (hardness 48HRC or more) SKD11 modified steel (hardness 58HRC or more)	P.380
M-SBI□	50	16 20 25	15	HPM1 (hardness 37-41HRC) SKD61 (hardness 48HRC or more)	P.382
M-SAG□	40	10 13 16	10	HPM1 (hardness 37-41HRC) SKD61 (hardness 48HRC or more) SKD11 modified steel (hardness 58HRC or more)	P.378
M-SJA□	35	10 13	10	S45C HPM1 (hardness 37-41HRC) SKD61 (hardness 48HRC or more)	P.374
	50	16 20			

Sprue bushings (shoulder type)



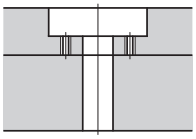
How to order ➡ P.96



Product code	D1	D2	D	H	Material	Details
M-SBB	40	36	16 20	25 30	SK3 (no heat treatment)	P.373
M-SBD	40	36	16 20	25 30	SKD61 (hardness 48HRC or more)	P.373
M-SBE□	30	26	10 13 16 20 25	15	HPM1 (hardness 37-41HRC) SKD61 (hardness 48HRC or more) SKD11 modified steel (hardness 58HRC or more)	P.384
M-SJC□	40	35	10 13 16 20	25 30	S45C HPM1 (hardness 37-41HRC) SKD61 (hardness 48HRC or more)	P.376

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

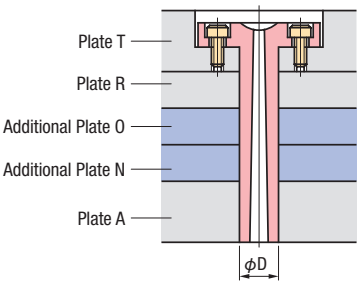
Optional specification (specify only when necessary)

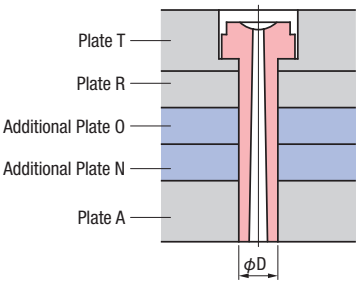
Option code	Specification
EPAT	 Only the holes for installing sprue bushings are provided.

Sprue bushing hole specifications

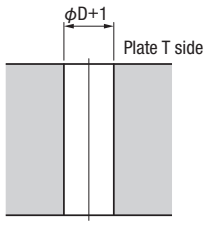
Sprue bushings can be installed in Plate T, Plate R, additional Plate O, additional Plate N and Plate A.

For the holes at the ϕ D section in the sprue bushing, either clearance hole or H7 hole specifications can be selected. For H7 specifications, there is an option whether to machine a clearance hole on the Plate T or Plate B side.

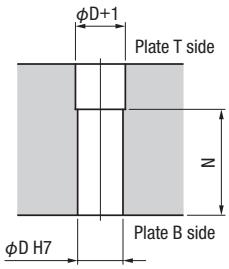




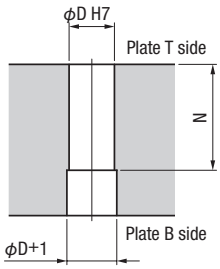
ϕ D section hole specification



ϕD-section clearance hole spec.



ϕD-section H7 hole spec.

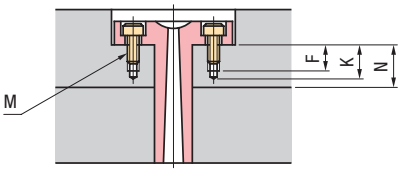


ϕD-section H7 hole spec.

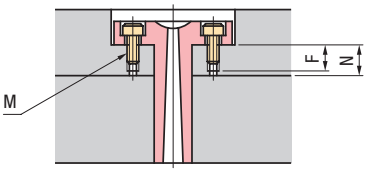
D H7	10	13	16	20	25
	+0.015 0	+0.018 0		+0.021 0	
N max	35	50	60	80	100

※ If thickness of the plate exceeds N dimension, a hole of ϕD+1 will be machined.

Bolt specification of sprue bushings



Blind-hole specification



Through-hole specification

Threaded hole specification				
M	F	K max	Blind hole spec.	Trough hole spec.
M5	10	16	N≧19	N＜19
M6	10	17	N≧20	N＜20

Bolt specification		
Product code	N	Bolt length
M-SBA M-SBG□ M-SBC M-SAG□ M-SJA□	5≦N＜6	M5×8
	6≦N＜8	M5×10
	N≧8	M5×12
M-SBI□	5≦N＜7	M6×12
	N≧7	M6×15

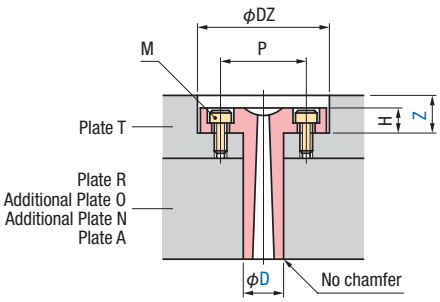
Added Sprue Bushings — Bolt Type

Install sprue bushings. For details on installation specifications, refer to page 92 to 93.

Sprue bushing M-SBA - M-SJA□ ➡ P.372 - 383

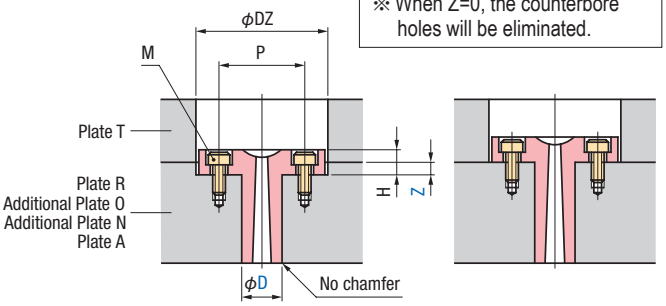
Application Mold bases

Catalog No. **PSB1N**



Catalog No. **PSB1Z**

※ When Z=0, the counterbore holes will be eliminated.



Sprue bushing hole specifications

Select the sprue bushing hole specification from the chart below.

Specify hole specifications of all the plates in which to machine holes for sprue bushing. Sprue bushing holes can be specified in Plate T, Plate R, additional Plate O, additional Plate N and Plate A.

Hole specifications for Plate T

Plate T hole spec. **TD**

ϕD-section clearance hole spec.

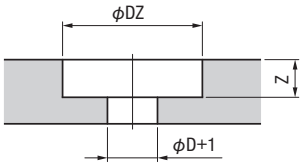
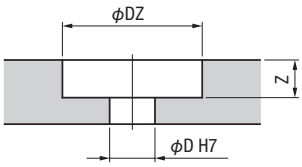


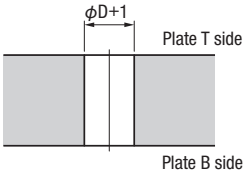
Plate T hole spec. **TB**

ϕD-section clearance hole spec.



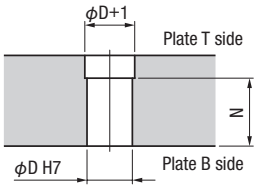
Hole specifications for Plate R, Plate N, Plate O, Plate A

Plate R hole spec. **RD** Plate N hole spec. **ND** Plate O hole spec. **OD** Plate A hole spec. **AD**



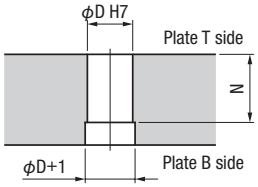
ϕD-section clearance hole spec.

Plate R hole spec. **RB** Plate N hole spec. **NB** Plate O hole spec. **OB** Plate A hole spec. **AB**



ϕD-section H7 hole spec

Plate R hole spec. **RR** Plate N hole spec. **NR** Plate O hole spec. **OR** Plate A hole spec. **AR**



ϕD-section H7 hole spec

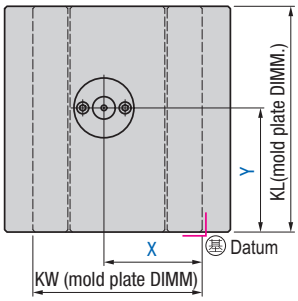
※ The counterbore hole dimension Z for Catalog No. **PSB1Z** is taken from the plate adjacent to Plate T (beneath Plate T).

Product code	Processing code	D	DZ	P	M	Z	H
M-SBA	SBA	16 20	51	36	M5	Thickness -Z≧5 ※ This value is not a guarantee of strength.	10
M-SBC	SBC	13	37	26			
		16 20	51	36			
M-SBG□	SBG	10 13 16 20	41	30			
M-SBI□	SBI	16 20 25	51	38	M6		15
M-SAG□	SAG	10 13 16	41	30	M5		10
M-SJA□	SJA	10 13	36	25			
		16 20	51	36			

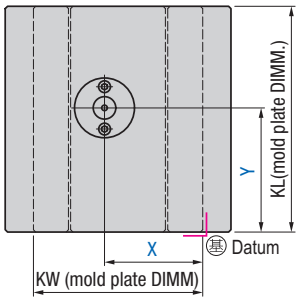
D	N max
10	35
13	50
16	60
20	80
25	100

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

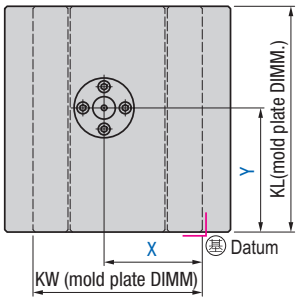
Bolt position code S021



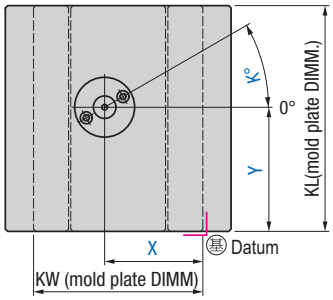
Bolt position code S022



Bolt position code S042

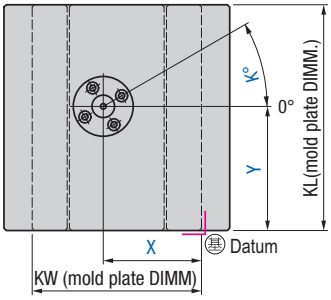


Bolt position code S02R



K → in 1° steps
1° ≦ K ≦ 89°
91° ≦ K ≦ 179°

Bolt position code S04R



K → in 1° steps
1° ≦ K ≦ 89°

Catalog No.	Processing code	D	Z	Sprue bushing hole specification *1	Bolt position code Code	Bolt position code K	X	Y	Sprue bushing item name	Option spec.
PSB1N PSB1Z	SBA	16 20	In 1 mm steps	Plate T hole spec.: TD TB (For PSB1Z, TD is applied.) Plate R hole spec.: RD RB RR Plate N hole spec.: ND NB NR Plate O hole spec.: OD OB OR Plate A hole spec.: AD AB AR	S021 S022 S02R S042 S04R S000 *2	Specify in 1° steps for S02R S04R	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	Select from page 372 to 383	EPAT See page 93
	SBC	13 16 20								
	SBG	10 13 16 20								
	SBI	16 20 25								
	SAG	10 13 16								
	SJA	10 13 16 20								

*1. Specify hole specifications of all the plates in which to machine holes for sprue bushing.
*2. This is a design with no threaded hole for sprue bushings machined in the plate. Bolts are supplied.

How to order

Catalog No. — Processing code — D — Z — Sprue bushing hole specification — Bolt position code

PSB1Z — SBA — D16 — Z10 — TD/ND/AB — S02R/K30

— X — Y — Sprue bushing item name *3 — Optional spec.

— X100 — Y125 — SBA16×50×10A

*3. Specify sprue bushing item names by omitting the preceding M-. (e.g.: M-SBA → SBA)

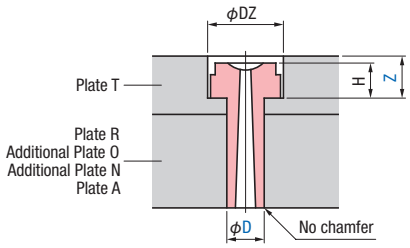
Added Sprue Bushings — Shoulder Type

Install sprue bushings. For details on installation specifications, refer to page 92 to 93.

Sprue bushing M-SBB - M-SJB□ ➡ P.373 - 385

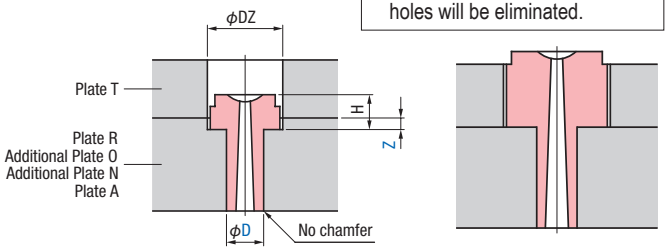
Application Mold bases

Catalog No. **PSB2N**



Catalog No. **PSB2Z**

※ When Z=0, the counterbore holes will be eliminated.



Sprue bushing hole specifications

Select the sprue bushing hole specification from the chart below.

Specify hole specifications of all the plates in which to machine holes for sprue bushing. Sprue bushing holes can be specified in Plate T, Plate R, additional Plate O, additional Plate N and Plate A.

Hole specifications for Plate T

Plate T hole spec. **TD**

ϕD-section clearance hole spec

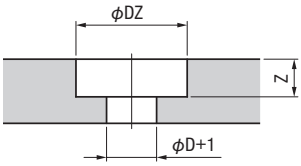
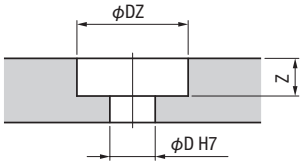


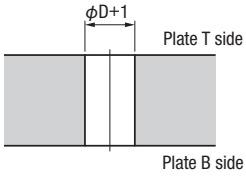
Plate T hole spec. **TB**

ϕD-section H7 hole spec



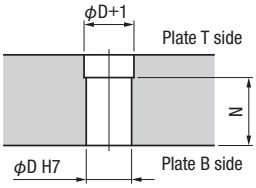
Hole specifications for Plate R, Plate N, Plate O, Plate A

Plate R hole spec. **RD** Plate N hole spec. **ND** Plate O hole spec. **OD** Plate A hole spec. **AD**



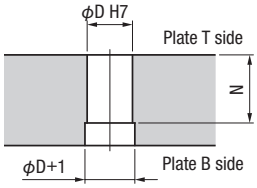
ϕD-section clearance hole spec.

Plate R hole spec. **RB** Plate N hole spec. **NB** Plate O hole spec. **OB** Plate A hole spec. **AB**



ϕD-section H7 hole spec

Plate R hole spec. **RR** Plate N hole spec. **NR** Plate O hole spec. **OR** Plate A hole spec. **AR**



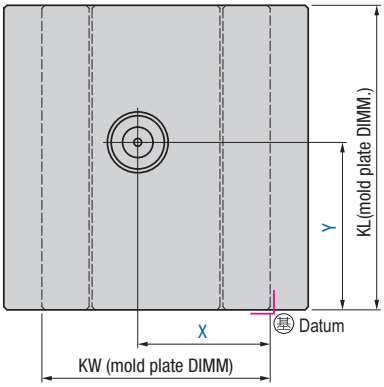
ϕD-section H7 hole spec

※ The counterbore hole dimension Z for Catalog No. **PSB2Z** is taken from the plate adjacent to Plate T (beneath Plate T).

Product code	Processing code	D	DZ	Z	H
M-SBB	SBB	16 20	41	Thickness -Z≧5 ※ This value is not a guarantee of strength.	25 30
M-SBD	SBD	16 20	41		25 30
M-SBE□	SBE	10 13 16 20 25	31		15
M-SJC□	SJC	10 13 16 20	41		25 30

D	N max
10	35
13	50
16	60
20	80
25	100

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.



Catalog No.	Processing code	D	Z	Sprue bushing hole specification *1	X	Y	Sprue bushing item name	Optional spec.
PSB2N PSB2Z	SBB	16 20	In 1 mm steps	Plate T hole spec.: TD TB (For PSB2Z, TD is applied.) Plate R hole spec.: RD RB RR Plate N hole spec.: ND NB NR Plate O hole spec.: OD OB OR Plate A hole spec.: AD AB AR	In 1 mm steps When X=KW/2, omit X	In 1 mm Steps When Y=KL/2, omit Y	Select from pages 373 to 385	EPAT See page 93
	SBD	16 20						
	SBE	10 13 16 20 25						
	SJC	10 13 16 20						

*1. Specify hole specifications of all the plates in which to machine holes for sprue bushing.

How to order

Catalog No. — Processing code — D — Z — Sprue bushing hole specification — X — Y

PSB2Z — SBB — D16 — Z5 — TD/ND/AD — X100 — Y150

— Sprue bushing item name *2 — Optional spec.

— SBB16×70×30A

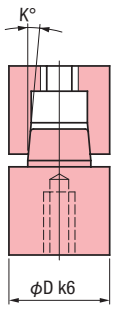
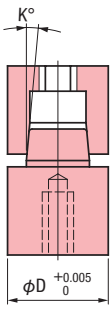
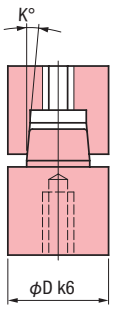
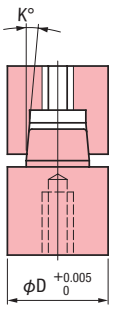
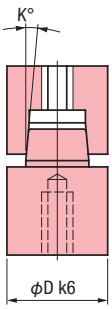
*2. Specify sprue bushing item names by omitting the preceding M-. (e.g. M-SBB → SBB)

Added Taper Guide Pin Sets — Overview ①

Type of taper guide pin sets

The following 5 types of taper guide pin sets can be installed in mold bases.

For dimension and accuracy of each part, refer to pages 298 to 300.

Taper guide pin set M-TLCS Precision type	Taper guide pin set M-TLDS Super precision type	Taper guide pin set M-TLGS Precision type	Taper guide pin set M-TLHS Super precision type	Taper guide pin set M-TLBS Precision type
				
D 16 20 25 30	D 16 20 25 30	D 16 20 25 30	D 16 20 25 30	D 13 16 20 25 32 40 50
K 1 3 5	K 1 3 5	K 1 3 5	K 1 3 5	K 10
How to order ➡ P.104	How to orde ➡ P.104	How to order ➡ P.106	How to order ➡ P.106	How to order ➡ P.108

Installation specification of taper guide pin sets

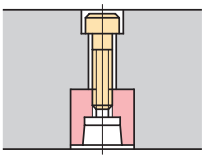
For taper guide pin set installation specifications, the specifications of bushings and pins are separately set shown below. This allows users to select optimal specifications of bushings and pins respectively.

For details on each specification, refer to pages 100 to 103.

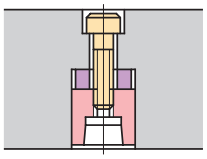
Bushing installation specification

【Applied item】
M-TLGS
M-TLHS
M-TLBS

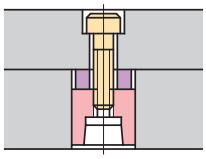
Bushing code BS1



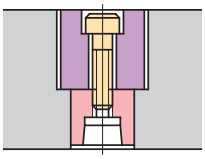
Bushing code BS2



Bushing code BS3

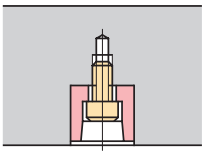


Bushing code BS4

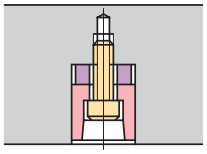


【Applied item】
M-TLCS
M-TLDS

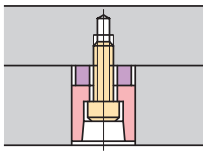
Bushing code BS5



Bushing code BS6



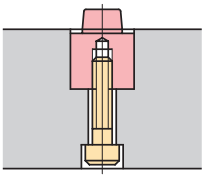
Bushing code BS7



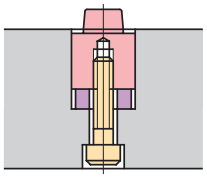
Pin installation specification

【Applied item】
M-TLCS
M-TLDS
M-TLGS
M-TLHS
M-TLBS

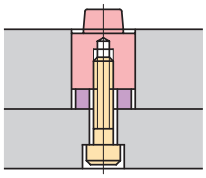
Pin code PN1



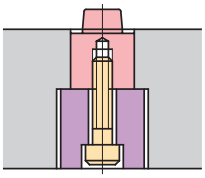
Pin code PN2



Pin code PN3



Pin code PN4

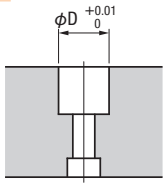


For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

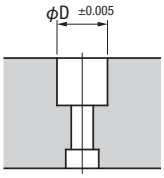
Hole diameter limit deviation specification

The limit deviation specifications of taper guide pin set installation holes are available in the following three types:

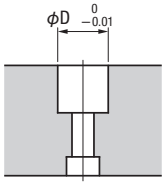
Hole code **HC1**



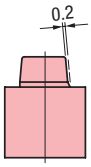
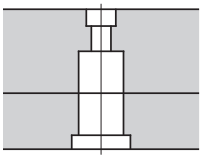
Hole code **HC2**



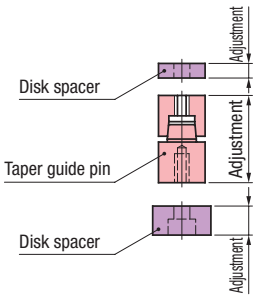
Hole code **HC3**



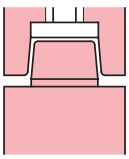
Optional specification (Specify only when necessary)

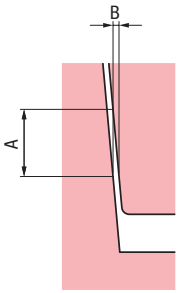
Option code		Specification
AC		Machine an air vent on the taper guide pin set. ※ A 0.2 mm deep flat chamfer is produced on the tapered section of the pin side in parallel to the taper angle. ※ Air vents cannot be added to taper guide pin M-TLBS.
EPAT		Only the holes for installing taper guide pin sets will be machined.

Adjustment of taper guide pin set installation



Taper guide pin sets are delivered with no adjustment made. Please measure the actual depth of the holes, and adjust the thickness of the plates, length of taper guide pin, thickness of disc spacers, etc. to properly install the taper guide pins. Taper guide pins are supplied with the mold bases but not assembled to them.





Tapered section enlarged view

When installing a taper guide pin set, there are some cases where the height of the pin and bushing need to be adjusted to fit them more tightly. Also, if the taper angle is 1° and 3°, it is necessary to consider possible seizure of the pin in the bushing. This seizure can be avoided by setting them slightly spaced from each other. If the angle is small, the deviation of B to that of A is also small, the positioning performance is not compromised.

Deviation of B to that of A

Angle	A		
	0.1	0.3	0.5
1°	0.0018	0.005	0.009
3°	0.005	0.016	0.026

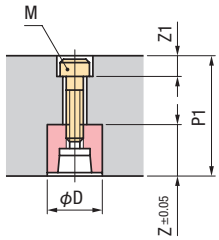
※ The Values in the above table are B.

Added Taper Guide Pin Sets — Overview ②

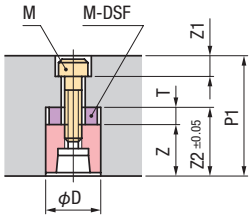
Taper guide pin set installation specification — ①

Application This applies to installation of the taper guide pin sets "M-TLGS", "M-TLHS", "pin of M-TLCS", "pin of M-TLDS".

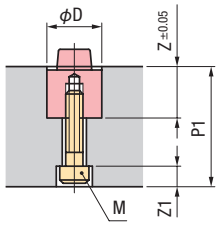
Bushing code BS1



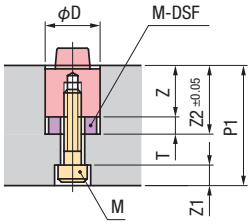
Bushing code BS2



Pin code PN1



Pin code PN2



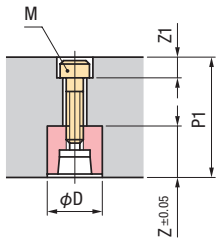
D	Z	Z2	T	M	Z1	P1		Bolt length coefficient	
						BS1, PN1	BS2, PN2	Bushing side	Pin side
16	15	20	5	M5	7	P1≧27	P1≧32	7	9
20	20	25	5	M6	8	P1≧33	P1≧38	9	11
25	25	30	5	M8	9	P1≧39	P1≧44	11	15
30	30	35	5	M10	11	P1≧46	P1≧51	13	19

※ Calculation of bolt length
For BS1, PN1, bolt length =P1−Z−Z1+ bolt length coefficient
For BS2, PN2, bolt length =P1−Z2−Z1+T+ bolt length coefficient
※ Round down the last digit of calculation result, 0-4 to 0 and 5-9 to 5.

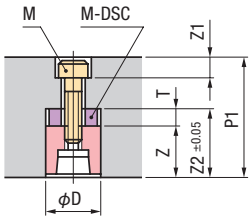
Taper guide pin set installation specification — ②

Application This specification applies to the installation of taper guide pin set M-TLBS.

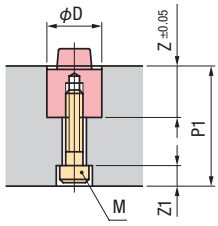
Bushing code BS1



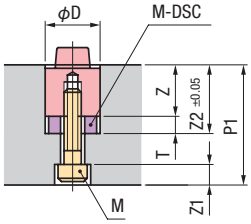
Bushing code BS2



Pin code PN1



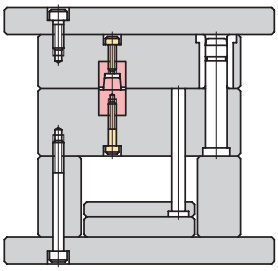
Pin code PN2

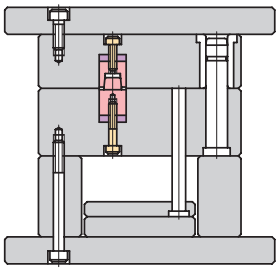


D	Z	Z2	T	M	Z1	P1		Bolt length coefficient	
						BS1, PN1	BS2, PN2	Bushing side	Pin side
13	16	20	4	M4	6	P1≧27	P1≧31	8	10
16	16	20	4	M5	7	P1≧28	P1≧32	8	10
20	20	25	5	M6	8	P1≧33	P1≧38	7	11
25	25	30	5	M6	8	P1≧38	P1≧43	12	14
32	30	35	5	M8	9	P1≧44	P1≧49	11	17
40	40	50	10	M8	9	P1≧54	P1≧64	15	17
50	50	60	10	M10	11	P1≧66	P1≧76	20	19

※ Calculation of bolt length
For BS1, PN1, bolt length =P1−Z−Z1+ bolt length coefficient
For BS2, PN2, bolt length =P1−Z2−Z1+T+ bolt length coefficient
※ Round down the last digit of calculation result, 0-4 to 0 and 5-9 to 5.

Example of use



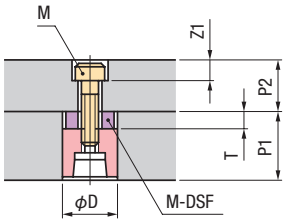


For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Taper guide pin set installation specification — ③

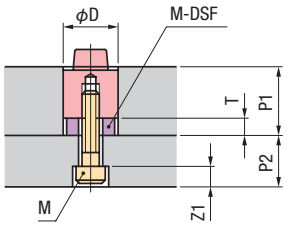
Application This applies to installation of the taper guide pin sets, “M-TLGS”, “M-TLHS”, “pin of M-TLCS”, “pin of M-TLDS”.

Bushing code BS3



P2≧Z1+5

Pin code PN3



P2≧Z1+5

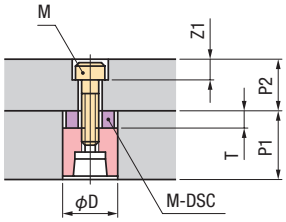
D	T									M	Z1	Bolt length coefficient	
	P1=20	P1=25	P1=30	P1=35	P1=40	P1=50	P1=60	P1=70	P1=80			Bushing side	Pin side
16	5	10	15	20	25					M5	7	7	9
20	◎	5	10	15	20	30	40			M6	8	9	11
25		◎	5	10	15	25	35	45	55	M8	9	11	15
30			◎	5	10	20	30	40	50	M10	11	13	19

For the installation marked with ◎, install taper guide pins directly without installing disc spacers.
※ Calculation of bolt length bolt length =P2−Z1+T+ bolt length coefficient ※ Round down the last digit of calculation result, 0-4 to 0 and 5-9 to 5.

Taper guide pin set installation specification — ④

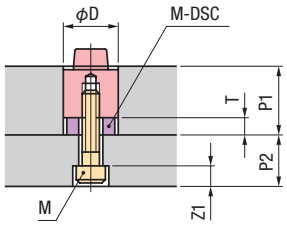
Application This specification applies to the installation of taper guide pin set M-TLBS.

Bushing code BS3



P2≧Z1+5

Pin code PN3

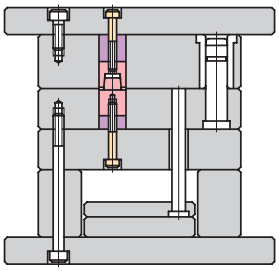


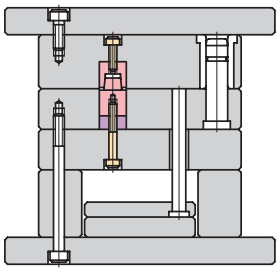
P2≧Z1+5

D	T											M	Z1	Bolt length coefficient	
	P1=20	P1=25	P1=30	P1=35	P1=40	P1=50	P1=60	P1=70	P1=80	P1=90	P1=100			Bushing side	Pin side
13	4	9	14									M4	6	8	10
16	4	9	14	19	24	34						M5	7	8	10
20	◎	5	10	15	20	30	40	50				M6	8	7	11
25		◎	5	10	15	25	35	45				M6	8	12	14
32			◎	5	10	20	30	40				M8	9	11	17
40					◎	10	20	30	40			M8	9	15	17
50						◎	10	20	30	40	50	M10	11	20	19

For the installation marked with ◎, install taper guide pins directly without installing disc spacers.
※ Calculation of bolt length bolt length =P2−Z1+T+ bolt length coefficient ※ Round down the last digit of calculation result, 0-4 to 0 and 5-9 to 5.

Example of use



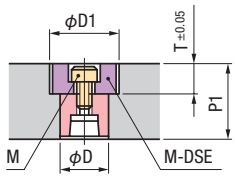


Added Taper Guide Pin Sets — Overview ③

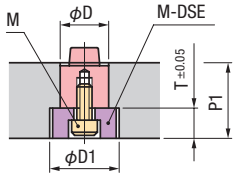
Taper guide pin set installation specification — ⑤

Application This applies to installation of the taper guide pin sets, “M-TLGS”, “M-TLHS”, “pin of M-TLCS”, “pin of M-TLDS”.

Bushing code BS4



Pin code PN4



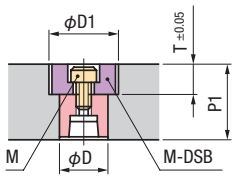
Code	D	D1	P1	T	Bolt	D	D1	P1	T	Bolt
	16	21	20	5	M5×12 *1	25	31	30	5	M8×15 *1
			25	10	M5×16 *1			35	10	M8×20 *1
			30	15	M5×15			40	15	M8×15
			35	20	M5×20			50	25	M8×25
			40	25	M5×25			60	35	M8×35
			50	35	M5×35			70	45	M8×45
	20	26	25	5	M6×12 *1			80	55	M8×55
			30	10	M6×16 *1	30	36	40	10	M10×20 *1
			35	15	M6×15			50	20	M10×20
			40	20	M6×20			60	30	M10×30
			50	30	M6×30			70	40	M10×40
			60	40	M6×40			80	50	M10×50
			70	50	M6×50					

*1. The disc spacers and bolts to use are M-DSD and hexagon socket flat head bolts respectively.

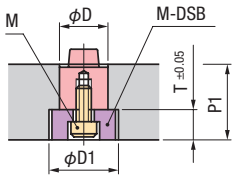
Taper guide pin set installation specification — ⑥

Application This specification applies to the installation of taper guide pin set M-TLBS.

Bushing code BS4



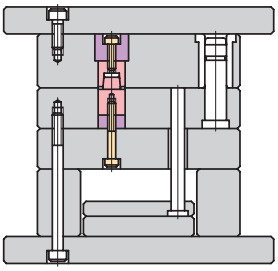
Pin code PN4

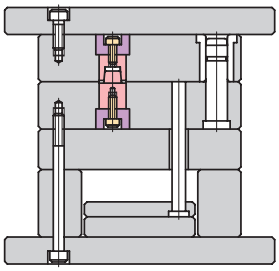


Code	D	D1	P1	T	Bolt	D	D1	P1	T	Bolt
	13	18	20	4	M4×10 *1	32	39	40	10	M8×20*1
			25	9	M4×10			50	20	M8×20*2
			30	14	M4×15			60	30	M8×30*2
	16	21	20	4	M5×10 *1	40	46	50	10	M8×20*1
			25	9	M5×10			60	20	M8×25
			30	14	M5×15			70	30	M8×35
	20	26	25	5	M6×12 *1	50	59	70	20	M10×25
			30	10	M6×10			80	30	M10×35
			35	15	M6×15					
	25	31	30	5	M6×12 *1					
			35	10	M6×15					
			40	15	M6×20					

*1. The disc spacers and bolts to use are M-DSA and hexagon socket flat head bolts respectively.
*2. For pins, use the bolts longer than those for bushings by 5 mm.

Example of use



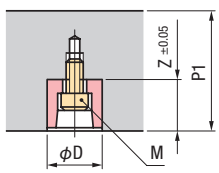


For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

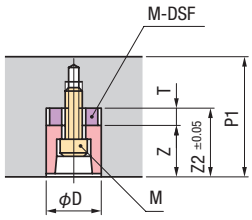
Taper guide pin set installation specification — ⑦

Application This applies to the installation of taper guide pin sets, “bushing of M-TLCS” and “bushing of M-TLDS”.

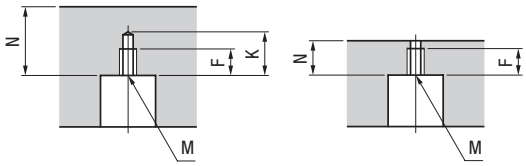
Bushing code BS5



Bushing code BS6



Threaded hole specification.



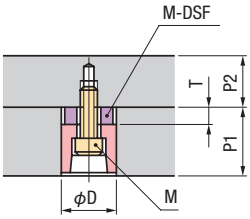
Blind hole spec. Through hole spec.

D	Z	Z2	T	Thread hole specification					P1		Bolt length	
				M	F	K max	Blind hole	Through hole	BS5	BS6	BS5	BS6
16	15	20	5	M5	12	18	N≧21	N＜21	P1≧24	P1≧27	P1＜27 → M5×12 P1≧27 → M5×15	P1＜32 → M5×15 P1≧32 → M5×20
20	20	25	5	M6	13	20	N≧23	N＜23	P1≧28	P1≧31	P1＜31 → M6×12 P1≧31 → M6×15	P1＜36 → M6×15 P1≧36 → M6×20
25	25	30	5	M8	15	21	N≧24	N＜24	P1≧36	P1≧41	P1≧36 → M8×15	P1≧41 → M8×20
30	30	35	5	M10	17	25	N≧28	N＜28	P1≧41	P1≧46	P1＜46 → M10×15 P1≧46 → M10×20	P1＜51 → M10×20 P1≧51 → M10×25

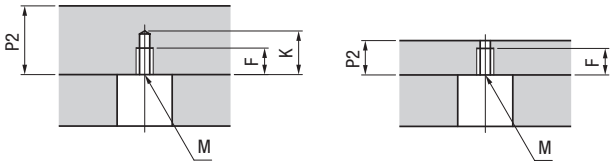
Taper guide pin set installation specification — ⑧

Application This applies to the installation of taper guide pin sets, “bushing of M-TLCS” and “bushing of M-TLDS”

Bushing code BS7



Threaded hole specification.

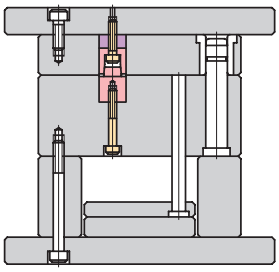


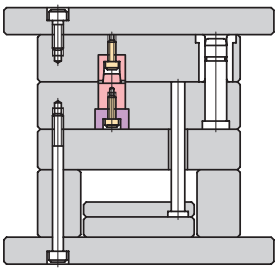
Blind hole spec. Through hole spec.

D	T									Thread hole specification					Bolt length coefficient	P2
	P1=20	P1=25	P1=30	P1=35	P1=40	P1=50	P1=60	P1=70	P1=80	M	F	K max	Blind hole	Through hole		
16	5	10	15	20	25					M5	12	18	P2≧21	P2＜21	15	P2≧12
20	◎	5	10	15	20	30	40			M6	13	20	P2≧23	P2＜23	17	P2≧13
25		◎	5	10	15	25	35	45	55	M8	15	21	P2≧24	P2＜24	19	P2≧15
30			◎	5	10	20	30	40	50	M10	17	25	P2≧28	P2＜28	21	P2≧20

For the installation marked with ◎, install taper guide pins directly without installing disc spacers.
※ Calculation of bolt length Bolt length =T+ bolt length coefficient ※ Round down the last digit of calculation result, 0-4 to 0 and 5-9 to 5

Example of use





Added Taper Guide Pin Sets M-TLCS and M-TLDS

Install taper guide pin sets M-TLCS and M-TLDS.

For details on the installation specifications, refer to pages 98 to 103.

Taper guide pin sets M-TLCS ➡ P.298, M-TLDS ➡ P.298

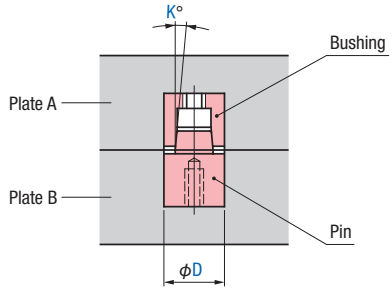
Application Mold bases (excluding the types with Plate S supplied and those for insert molding)

Orientation and angle of taper guide pin sets installation

Fixed-side bushing & moving-side pin type

Catalog No. PTLC1 Install taper guide pin set M-TLCS (precision)

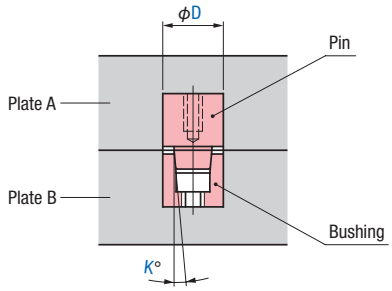
Catalog No. PTLD1 Install taper guide pin set M-TLDS (super precision)



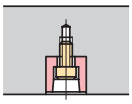
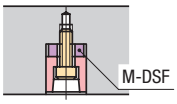
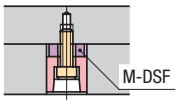
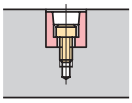
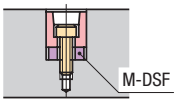
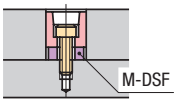
Fixed-side pin and moving-side bushing type

Catalog No. PTLC2 Install taper guide pin set M-TLCS (precision)

Catalog No. PTLD2 Install taper guide pin set M-TLDS (super precision)

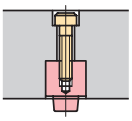
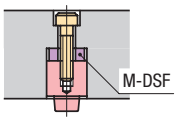
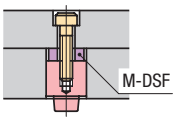
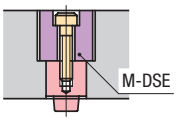
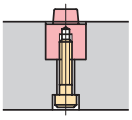
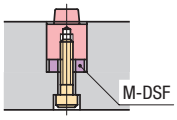
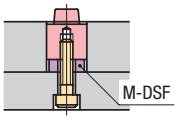
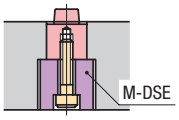


Bushing installation methods

Bushing code	Bushing code BS5	Bushing code BS6	Bushing code BS7
Install bushings on the fixed side			
Install bushings on the moving side			

※ Regardless of whether to install bushings on the fixed side or moving side, the bushing code is the same.
※ For details on each installation method, refer to pages 100 to 103.
※ If installing Bushing code BS7 on the fixed side, changes to 3-plate type mold bases cannot be specified.
If installing it on the moving side, changes to the types without backing plate cannot be specified.

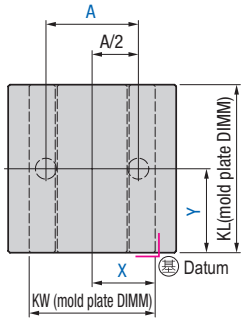
Pin installation method

Pin code	Pin code PN1	Pin code PN2	Pin code PN3	Pin code PN4
Install pin on the fixed side				
Install pin on the moving side				

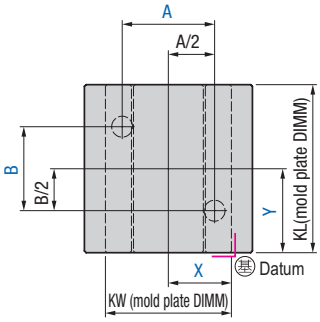
※ Regardless of whether to install pins on the fixed side or moving side, the pin code is the same.
※ For details on each installation method, refer to pages 100 to 103.
※ If installing Pin code PN3 on the fixed side, changes to 3-plate type mold bases cannot be specified.
If installing it on the moving side, changes to the types without backing plate cannot be specified.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

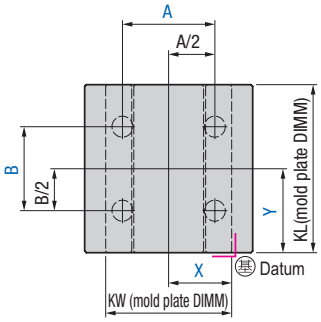
Position code S021



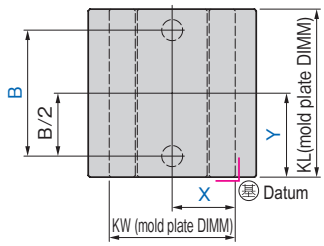
Position code S023



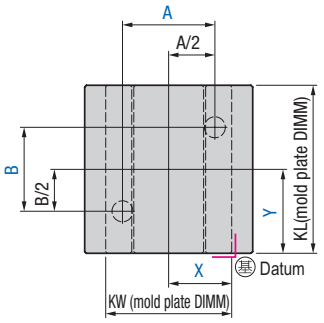
Position code S041



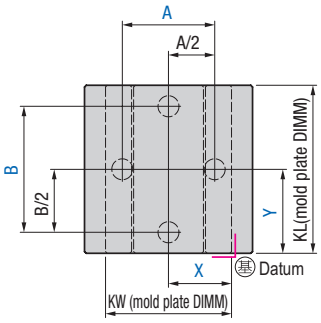
Position code S022



Position code S024



Position code S042



If installing taper guide pin sets, advise us on the specifications by following the steps below:

①For Plate A and Plate B in which to install taper guide pin sets, surface grind will be used. The limit deviations of Plate A and Plate B thickness are required. Please specify them.
How to specify surface grind ➡ P.31

②To maintain the accuracy of holes for taper guide pin sets, we also recommend rough machining of pockets and slide core grooves, etc.
How to specify machining of pockets and slide core grooves ➡ P.204 - 221

Catalog No.	D	K	Bushing code	Pin code	Hole code	Position code	A	B	X	Y	Optional spec.
PTLC1 PTLC2 PTLD1 PTLD2	16 20 25 30	1 3 5	BS5 BS6 BS7	PN1 PN2 PN3 PN4	HC1 HC2 HC3 See page 99	S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, Omit X	In 1 mm steps When Y=KL/2, Omit Y	AC EPAT See page 99
						S022	—	In 1 mm steps			
						S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No. — D — K — Bushing code — Pin code — Hole code — Position code

PTLC1 — D20 — K3 — BS5 — PN3 — HC1 — S024

— A — B — X — Y — Optional spec.

— A160 — B50 — X100 — Y125 — AC

Added Taper Guide Pin Sets M-TLGS and M-TLHS

Install taper guide pin sets M-TLGS, M-TLHS.

For details on the installation specifications, refer to pages 98 to 103

Taper guide pin set M-TLGS ➡ P.299, M-TLHS ➡ P.299

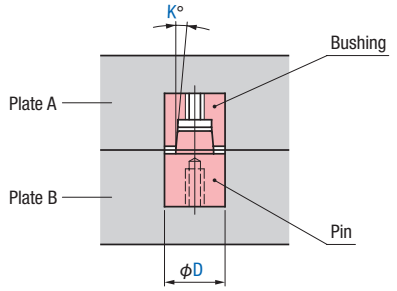
Application Mold bases (excluding the types with Plate S supplied and those for insert molding)

Orientation and angle of taper guide pin sets installation

Fixed-side bushing & moving-side pin type

Catalog No. **PTLG1** Install taper guide pin set M-TLGS (precision)

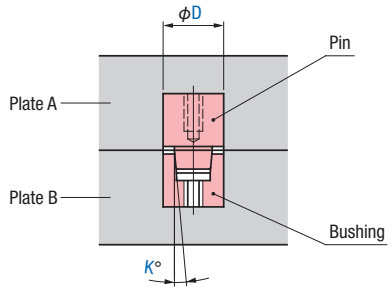
Catalog No. **PTLH1** Install taper guide pin set M-TLHS (super precision)



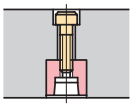
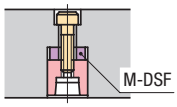
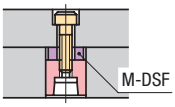
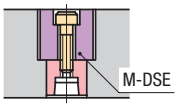
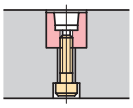
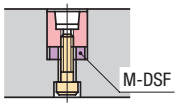
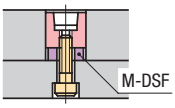
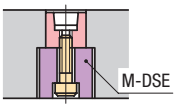
Fixed-side pin & moving-side bushing type

Catalog No. **PTLG2** Install taper guide pin set M-TLGS (precision)

Catalog No. **PTLH2** Install taper guide pin set M-TLHS (super precision)

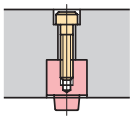
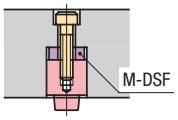
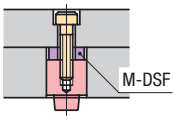
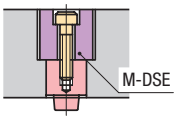
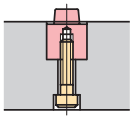
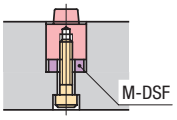
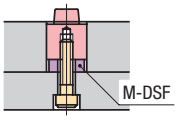
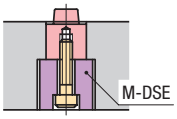


Bushing installation methods

Bushing code	Bushing code BS1	Bushing code BS2	Bushing code BS3	Bushing code BS4
Install bushings on the fixed side				
Install bushings on the moving side				

※ Regardless of whether to install bushings on the fixed side or moving side, the bushing code is the same.
※ For details on each installation method, refer to pages 100 to 103.
※ If installing Bushing code BS3 on the fixed side, changes to 3-plate type mold bases cannot be specified.
If installing it on the moving side, changes to the types without backing plate cannot be specified.

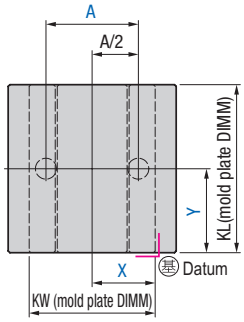
Pin installation method

Pin code	Pin code PN1	Pin code PN2	Pin code PN3	Pin code PN4
Install pin on the fixed side				
Install pin on the moving side				

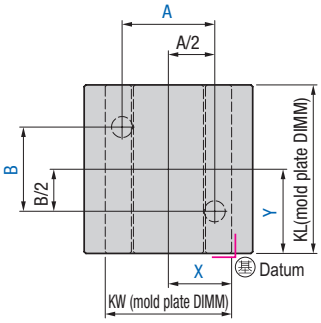
※ Regardless of whether to install pins on the fixed side or moving side, the pin code is the same.
※ For details on each installation method, refer to pages 100 to 103.
※ If installing Pin code PN3 on the fixed side, changes to 3-plate type mold bases cannot be specified.
If installing it on the moving side, changes to the types without backing plate cannot be specified.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

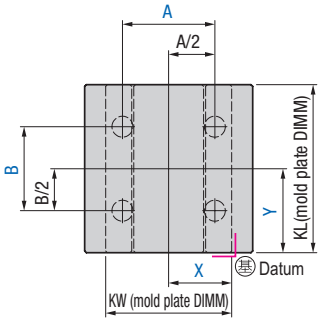
Position code S021



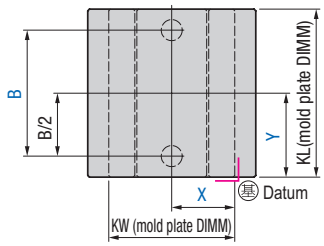
Position code S023



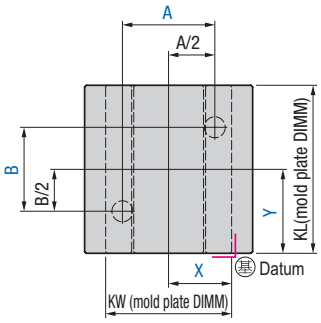
Position code S041



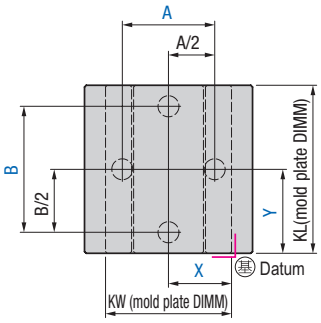
Position code S022



Position code S024



Position code S042



If installing taper guide pin sets, advise us on the specifications by following the steps below:

①For Plate A and Plate B in which to install taper guide pin sets, surface grind will be used. The limit deviations of Plate A and Plate B thickness are required. Please specify them.
How to specify surface grind ➡ P.31

②To maintain the accuracy of holes for taper guide pin sets, we also recommend rough machining of pockets and slide core grooves, etc.
How to specify machining of pockets and slide core grooves ➡ P.204 - 221

Catalog No.	D	K	Bushing code	Pin code	Hole code	Position code	A	B	X	Y	Optional spec.
PTLG1 PTLG2 PTLH1 PTLH2	16 20 25 30	1 3 5	BS1 BS2 BS3 BS4	PN1 PN2 PN3 PN4	HC1 HC2 HC3 See page 99	S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, Omit X	In 1 mm steps When Y=KL/2, Omit Y	AC EPAT See page 99
						S022	—	In 1 mm steps			
						S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No.	—	D	—	K	—	Bushing code	—	Pin code	—	Hole code	—	Position code
PTLH1	—	D25	—	K1	—	BS2	—	PN3	—	HC2	—	S024

—	A	—	B	—	X	—	Y	—	Optional spec.
—	A200	—	B80	—	X125	—	Y200	—	AC

Added Taper Guide Pin Set M-TLBS

Install taper guide pin set M-TLBS.

For details on the installation specification, refer to pages 98 to 103.

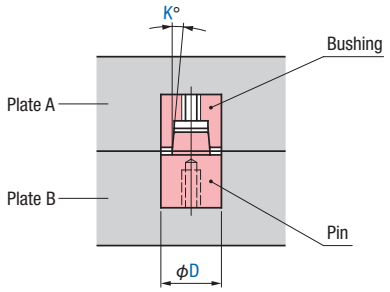
Taper guide pin M-TLBS ➡ P.300

Application Mold bases (excluding the types with Plate S supplied and those for insert molding)

Orientation and angle of taper guide pin sets installation

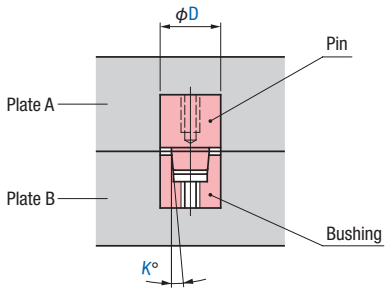
Fixed-side bushing & moving-side pin type

Catalog No. PTLB1 Install taper guide pin set M-TLBS (precision)

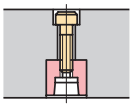
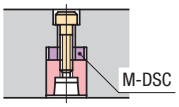
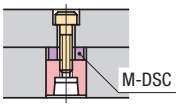
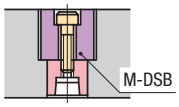
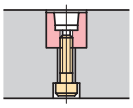
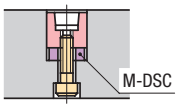
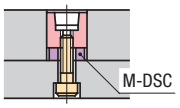
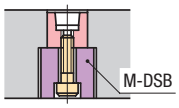


Fixed-side pin & moving-side bushing type

Catalog No. PTLB2 Install taper guide pin set M-TLBS (precision)

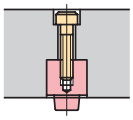
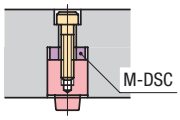
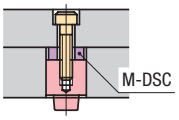
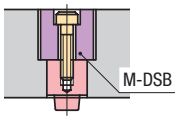
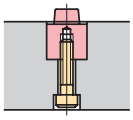
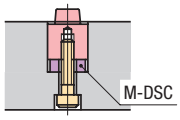
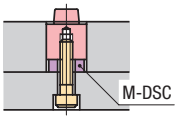
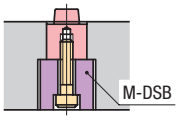


Bushing installation method

Bushing code	Bushing code BS1	Bushing code BS2	Bushing code BS3	Bushing code BS4
Install bushings on the fixed side				
Install bushings on the moving side				

※ Regardless of whether to install bushings on the fixed side or moving side, the bushing code is the same.
※ For details on each installation method, refer to pages 100 to 103.
※ If installing Bushing code BS3 on the fixed side, changes to 3-plate type mold bases cannot be specified.
If installing it on the moving side, changes to the types without backing plate cannot be specified.

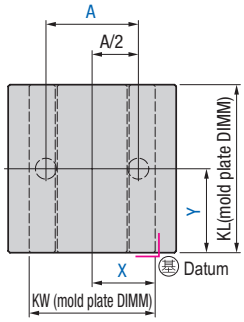
Pin installation method

Pin code	Pin code PN1	Pin code PN2	Pin code PN3	Pin code PN4
Install pin on the fixed side				
Install pin on the moving side				

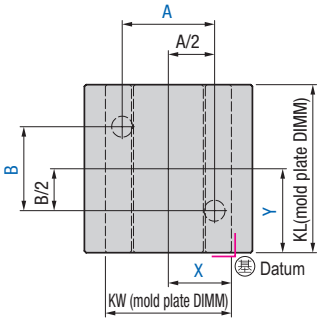
※ Regardless of whether to install pins on the fixed side or moving side, the pin code is the same.
※ For details on each installation method, refer to pages 100 to 103.
※ If installing Pin code PN3 on the fixed side, changes to 3-plate type mold bases cannot be specified.
If installing it on the moving side, changes to the types without backing plate cannot be specified.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

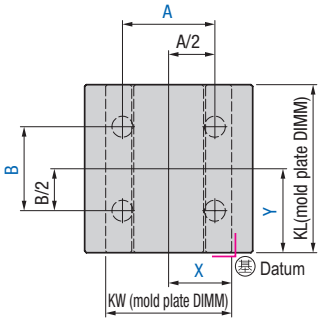
Position code S021



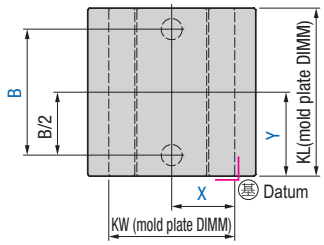
Position code S023



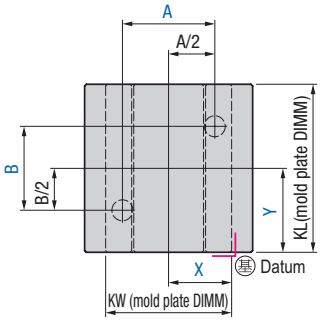
Position code S041



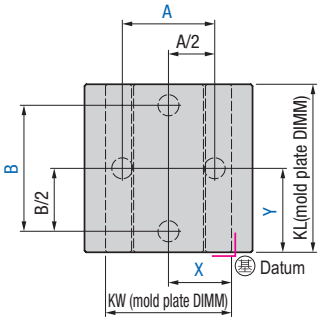
Position code S022



Position code S024



Position code S042



If installing taper guide pin sets, advise us on the specifications by following the steps below:

①For Plate A and Plate B in which to install taper guide pin sets, surface grind will be used. The limit deviations of Plate A and Plate B thickness are required. Please specify them.
How to specify surface grind ➡ P.31

②To maintain the accuracy of holes for taper guide pin sets, we also recommend rough machining of pockets and slide core grooves, etc.
How to specify machining of pockets and slide core grooves ➡ P.204 - 221

Catalog No.	D	K	Bushing code	Pin code	Hole code	Position code	A	B	X	Y	Optional spec.
PTLB1 PTLB2	13 16 20 25 32 40 50	10	BS1 BS2 BS3 BS4	PN1 PN2 PN3 PN4	HC1 HC2 HC3 See page 99	S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, Omit X	In 1 mm steps When Y=KL/2, Omit Y	EPAT See page 99
						S022	—	In 1 mm steps			
						S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No. — D — K — Bushing code — Pin code — Hole code — Position code

PTLB1 — D32 — K10 — BS1 — PN1 — HC1 — S023

— A — B — X — Y — Optional spec.

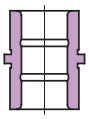
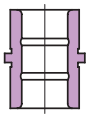
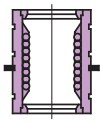
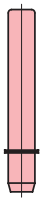
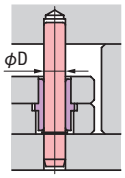
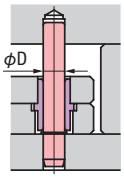
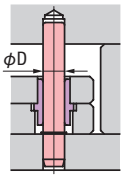
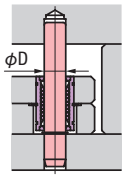
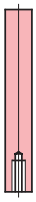
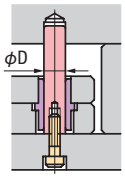
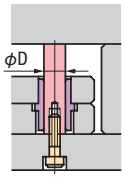
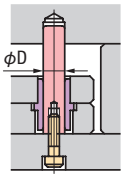
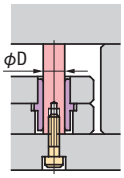
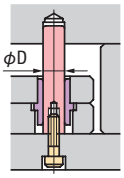
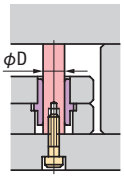
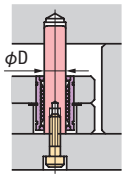
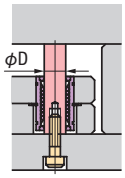
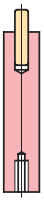
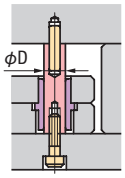
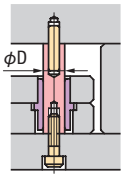
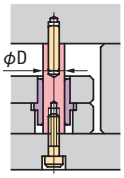
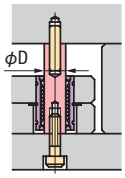
— A200 — B70 — X125 — Y150

Added Guide Pins and Bushings — Overview ①

Types and installation methods of guide pins and bushings — ①

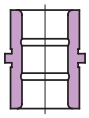
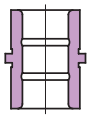
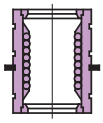
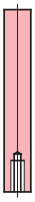
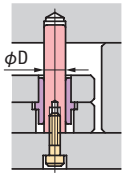
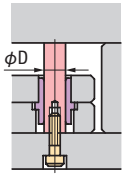
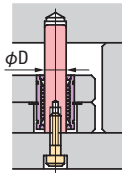
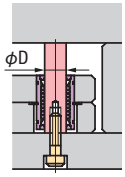
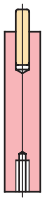
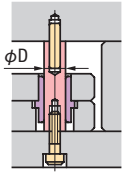
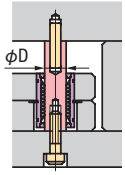
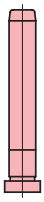
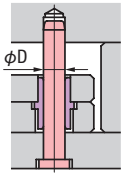
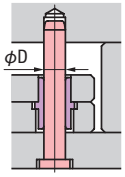
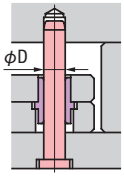
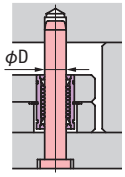
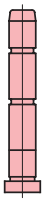
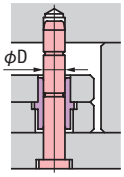
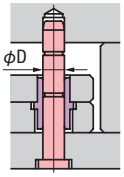
Seven types of ejector guide pins and five types of ejector guide bushings can be combined to install in mold bases.

※ The combinations of guide pins and guide bushings shown in the charts below are standard combinations. The combinations in the blank columns cannot be specified with additional processing codes. If specifying them, please provide drawings, etc.

	Plain type		Self lubricating, high temp. type	Self lubricating, copper alloy type	Linear type
	Ejector guide bushing M-EBB	Ejector guide bushing M-EBBM	Ejector guide bushing M-EBC	Ejector guide bushing M-EBG	Ejector guide bushing M-EBD
Ejector guide pin	Bushing code EBB 	Bushing code EBBM 	Bushing code EBC 	Bushing code EBG 	Bushing code EBD 
Ejector guide pin M-EGA	Catalog No. PEGA ➡ P.120				
	 D=10 12 16 20 25		 D=10 12 16 20 25	 D=16 20 25	 D=10 12 16 20 25
Ejector guide pin M-EGB	Catalog No. PEGB, PEGBT ➡ P.122				
	  D=10 12 16 20 25		  D=10 12 16 20 25	  D=16 20 25	  D=10 12 16 20 25
Ejector guide pin M-EGC	Catalog No. PEGC ➡ P.124				
	 D=20 25 30 40 50		 D=20 25 30	 D=20 25 30 40 50	 D=20 25

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

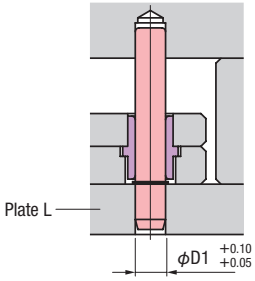
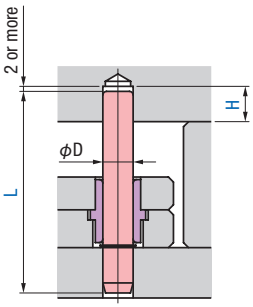
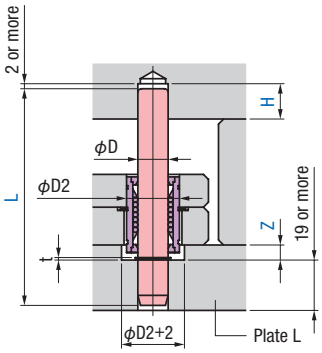
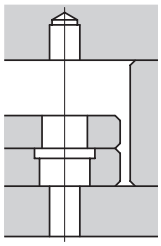
Types and installation methods of guide pins and bushings — ②

	Plain type		Self lubricating, high temp. type	Self lubricating, copper alloy type	Linear type
	Ejector guide bushing M-EBB	Ejector guide bushing M-EBBM	Ejector guide bushing M-EBC	Ejector guide bushing M-EBG	Ejector guide bushing M-EBD
Ejector guide pin	Bushing code EBB 	Bushing code EBBM 	Bushing code EBC 	Bushing code EBG 	Bushing code EBD 
Ejector guide pin M-EGBM	Catalog No. PEGBM, PEGBMT ➡ P.126				
		  D=10 13 16 20 25 30			  D=10 16 20 25
Ejector guide pin M-EGCM	Catalog No. PEGCM ➡ P.128				
		 D=16 20 25 30 35 40 50			 D=16 20 25
Ejector guide pin M-GPHF *1	Catalog No. PEGPHF ➡ P.130				
	 D=10 12 16 20 25 30		 D=10 12 16 20 25 30	 D=16 20 25 30	 D=10 12 16 20 25
Ejector guide pin M-GPA *2	Catalog No. PEGPA ➡ P.130				
	 D=12 16 20 25 30		 D=12 16 20 25 30		

*1. Guide pin M-GPHF is used as ejector guide pin. When D=10, M-GPH is used.
*2. Guide pin M-GPA is used as ejector guide pin.

Added Guide Pins and Bushings — Overview ②

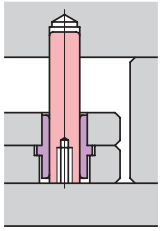
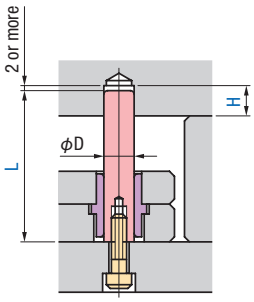
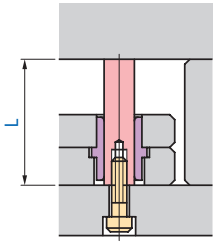
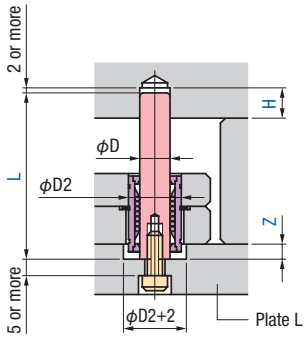
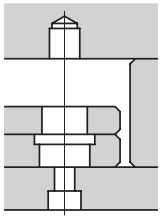
Optional specifications for Catalog No. PEGA (specify only when necessary)

Option code		Specification
CDK		Change limit deviations of ϕD1 hole dimension in Plate L. ■ **How to specify:** CDK
CHL		Change ejector guide pin hole H dimension and ejector guide pin length L dimension. ■ **How to specify:** CHL/H DIMM /L DIMM ※H → Specify in 1 mm steps. 10≦H≦4×D When H=plate thickness, through holes are machined. ※L → Specify in 1 mm steps (Product of length not listed herein needs to be custom-made.) [E.g.] CHL/H25/L120
MLZ		Machine clearance holes for ejector guide bushing M-EBD in Plate L. ■ **How to specify:** MLZ/H DIMM /L DIMM /Z DIMM ※H → Specify in 1 mm steps 10≦H≦4×D When H=plate thickness, through holes will be machined ※L → Specify in 1 mm steps (Product of length not listed herein needs to be custom-made.) ※Z → Specify in 1 mm steps ※When installing additional Plate X or Plate Y, clearance holes will be machined in each plate. [E.g.] MLZ/H20/L110/Z5
EPAT		Only holes for installing ejector guide pins are machined.

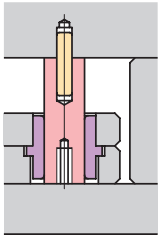
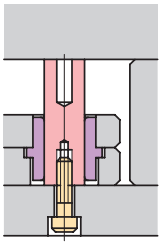
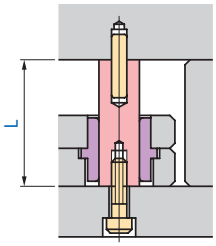
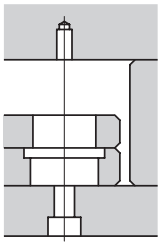
D	10	12	16	20	25
t	1		1.2		

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Optional specifications for catalog No. PEGB, PEGBT, PEGBM, PEGBMT (specify only when necessary)

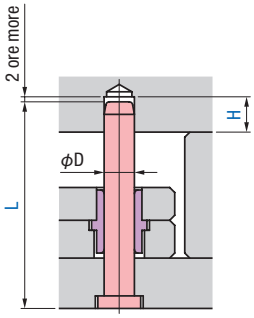
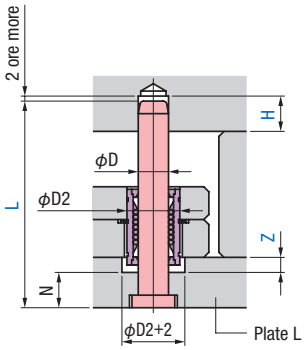
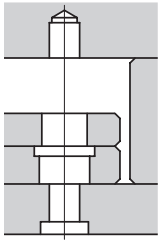
Option code	Specification
ECB	 Bolt holes will not be machined, nor will bolts be supplied. ■ **Applicable items:** Catalog No. PEGB, PEGBT, PEGBM, PEGBMT ■ **How to specify:** ECB
CHL	 Change ejector guide pin hole H dimension and ejector guide pin length L dimension. ■ **Applicable items:** Catalog No. PEGB, PEGBM ■ **How to specify:** CHL/H DIMM /L DIMM ※ H → Specify in 1 mm steps. 10≦H≦4×D When H＝plate thickness, through holes will be machined. ※ L → In 1 mm steps (Length not listed herein is to be custom ordered) [E.g.] CHL/H23/L130
CLK	 Change the limit deviations of ejector guide pin L dimension. ■ **Applicable items:** Catalog No. PEGBT, PEGBMT ■ **How to specify:** CLK＜upper deviation / lower deviation＞ ※ Limit deviations: in 0.01 mm steps ※ Tolerance: 0.02 mm or more Tolerance ＝ upper deviation － lower deviation [E.g.] CLK＜+0.01/－0.01＞
MLZ	 Machine clearance holes for ejector guide bushing M-EBD in Plate L. ■ **Applicable items:** Catalog No. PEGB, PEGBM ■ **How to specify:** MLZ/H DIMM /L DIMM /Z DIMM ※ H → Specify in 1 mm steps. 10≦H≦4×D When H＝plate thickness, through holes will be machined. ※ L → Specify in 1 mm steps. (Product of length not listed herein needs to be custom-made) ※ Z → Specify in 1 mm steps. ※ When installing additional Plate X or Plate Y, clearance holes will be machined in each plate. [E.g.] MLZ/H20/L100/Z7
EPAT	 Only holes for installing ejector guide pins are machined. ■ **Applicable items:** Catalog No. PEGB, PEGBT, PEGBM, PEGBMT

Added Guide Pins and Bushings — Overview ③

Optional specifications for catalog No. PEGC and PEGCM (specify only when necessary)		
Option code		Specification
ECB		Bolt holes will not be machined nor will bolts be supplied. ■ **Applicable items:** Catalog No. PEGC, PEGCM ■ **How to specify:** ECB
ENP		Knock pin holes will not be machined, will knock pins be supplied. ■ **Applicable items:** Catalog No. PEGC, PEGCM ■ **How to specify:** ENP
CLK		Change the limit deviations of ejector guide pin L dimension. ■ **Applicable items:** Catalog No. PEGC ■ **How to specify:** CLK＜upper deviation / lower deviation＞ ※ Limit deviations: in 0.01 mm steps ※ Tolerance: 0.02 mm or more Tolerance ＝ upper deviation – lower deviation [E.g.] CLK＜+0.01/-0.01＞
EPAT		Only holes for installing ejector guide pins are machined. ■ **Applicable items:** Catalog No. PEGC, PEGCM

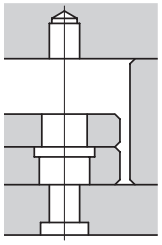
For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Optional specifications for catalog No. PEGPHF and PEGPA (specify only when necessary)

Option code	Specification
CHL	 Change ejector guide pin hole H dimension and ejector guide pin length L dimension. ■ **Applicable items:** Catalog No. PEGPHF, PEGPA ■ **How to specify:** CHL/H DIMM /L DIMM ※H → Specify in 1 mm steps. 10≦H≦4×D When H＝plate thickness, through holes will be machined. ※L → In 1 mm steps (Length not listed herein is to be custom ordered) [E.g.] CHL/H28/L127
MLZ	 Machine clearance holes for ejector guide bushing M-EBD in Plate L. ■ **Applicable items:** Catalog No. PEGPHF ■ **How to specify:** MLZ/H DIMM /L DIMM /Z DIMM ※H → Specify in 1 mm steps. 10≦H≦4×D When H＝plate thickness, through holes will be machined. ※L → Specify in 1 mm steps. (Product of length not listed herein needs to be custom-made) ※Z → Specify in 1 mm steps. ※When installing additional Plate X or Plate Y, clearance holes will be machined in each plate. [E.g.] MLZ/H25/L150/Z5
EPAT	 Only holes for installing ejector guide pins are machined. ■ **Applicable items:** Catalog No. PEGPHF, PEGPA

D	10	12~20	25
N	N≧14	N≧19	N≧24

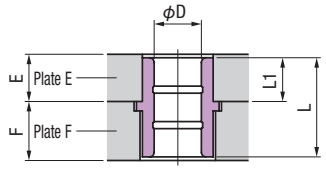
Optional specifications for catalog No. PEGAS, PEGBS, PEGBTS, PEGBMS and PEGBMTS (specify only when necessary)

Option code	Specification
EPAT	 Only holes for installing ejector guide pins are machined.

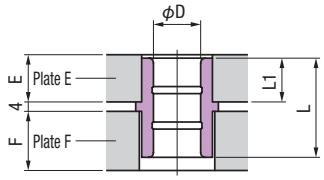
Added Guide Pins and Bushings — Overview ④

Set the length of ejector guide bushings — ①

The length of ejector guide bushings is determined by the thickness of ejector plates.



Counterbore type



Spacer type

※ The range of thickness of ejector plates is the same regardless of whether the specification of the ejector plates is counterbore type or spacer type.

Ejector guide bushing M-EBB (plain type)

E	F	D=10		D=12		D=16		D=20		D=25		D=30		D=40		D=50	
		L	L1	L	L1	L	L1	L	L1	L	L1	L	L1	L	L1	L	L1
13≦E＜15	13≦F＜15	23	12														
	15≦F	23	12	25	12	25	12	25	12	25	12						
15	15≦F＜20	23	12	25	12	25	12	25	12	25	12						
	20≦F	23	12	32	14	32	14	32	14	32	14	32	14				
15＜E＜20	20≦F			32	14	32	14	32	14	32	14	32	14				
20	20≦F＜25			32	14	32	14	32	14	32	14	32	14				
	25≦F			32	14	42	19	42	19	42	19	42	19	42	19		
20＜E＜25	25≦F					42	19	42	19	42	19	42	19	42	19		
25	25≦F＜30					42	19	42	19	42	19	42	19	42	19		
	30≦F					42	19	52	24	52	24	52	24	52	24	52	24
25＜E≦30	30≦F							52	24	52	24	52	24	52	24	52	24

Ejector guide bushing M-EBBM (plain type)

E	F	D=10		D=13		D=16		D=20		D=25		D=30		D=35		D=40		D=50	
		L	L1	L	L1	L	L1	L	L1	L	L1	L	L1	L	L1	L	L1	L	L1
10≦E＜13	13≦F	22	10																
13≦E＜15	13≦F	25 *1	13																
	15≦F	25 *1	13	27	13	27	13	27	13	27	13								
15≦E＜20	15≦F			29	15	29	15	29	15	29	15								
	20≦F			29	15	29	15	29	15	29	15	34	15						
20≦E＜25	15≦F					34	20	34	20	34	20								
	20≦F					34	20	34	20	34	20	39	20						
	25≦F					34	20	34	20	34	20	39	20	44	20	44	20		
25≦E＜30	15≦F							39	25	39	25								
	20≦F							39	25	39	25	44	25						
	25≦F							39	25	39	25	44	25	49	25	49	25	49	25
30≦E≦35	15≦F									44	30								
	20≦F									44	30	49	30						
	25≦F									44	30	49	30	54	30	54	30	54	30

*1. Can be installed even when E=15.
※ L and L1 dimensions of ejector guide bushing M-EBBM are nominal dimensions The dimensions of the actual product are smaller than values shown in this table.

Ejector guide bushing M-EBC (self lubricating, high temperature type)

E	F	D=10		D=12		D=16		D=20		D=25		D=30	
		L	L1	L	L1	L	L1	L	L1	L	L1	L	L1
13≦E＜15	13≦F＜15	23	12										
	15≦F	23	12	25	12	25	12	25	12	25	12		
15	15≦F＜20	23	12	25	12	25	12	25	12	25	12		
	20≦F	23	12	32	14	32	14	32	14	32	14	32	14
15＜E＜20	20≦F			32	14	32	14	32	14	32	14	32	14
20	20≦F＜25			32	14	32	14	32	14	32	14	32	14
	25≦F			32	14	42	19	42	19	42	19	42	19
20＜E≦25	25≦F					42	19	42	19	42	19	42	19

Ejector guide bushing M-EBG (self lubricating copper alloy type)

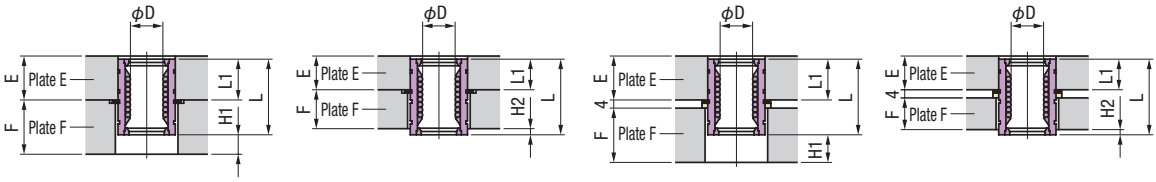
E	F	D=16		D=20		D=25		D=30		D=40		D=50	
		L	L1	L	L1	L	L1	L	L1	L	L1	L	L1
13≦E＜15	15≦F	26	12	26	12	26	12						
15≦E＜20	15≦F	28	14	28	14	28	14						
	20≦F	28	14	28	14	28	14	33	14				
20≦E＜25	15≦F	33	19	33	19	33	19						
	20≦F	33	19	33	19	33	19	38	19				
25≦E≦30	15≦F	33*2	19*2	38	24	38	24						
	20≦F	33*2	19*2	38	24	38	24	43	24				
	25≦F	33*2	19*2	38	24	38	24	43	24	48	24	48	24

*2. Can be applied only when E=25.

Set the length of ejector guide bushings — ②

The overall length of the ejector guide bushing M-EBD is determined by the D dimension. Therefore, when installing it in the mold bases, the length of the guide bushing M-EBD may longer than the thickness of the ejector plates. Secure the space by installing stop pins or providing counterbore in the mounting plate.

Installing stop pins ➡ P.140, Adding counterbore ➡ P. 112 - 115



Counterbore type

Spacer type

Ejector plate specification: counterbore type

E	F	D									
		10 (L=29)		12 (L=30)		16 (L=37)		20 (L=42)		25 (L=59)	
		H1orH2	L1	H1orH2	L1	H1orH2	L1	H1orH2	L1	H1orH2	L1
13	13	H2=3	13								
13	15	H2=1	13	H2=2	13						
15	20	H1=4	13	H1=3	13	H2=2	15				
20	25					H1=8	20	H1=3	20	H2=14	20
25	30					H1=13	20	H1=13	25	H2=4	25

Ejector plate specification: spacer type

E	F	D									
		10 (L=29)		12 (L=30)		16 (L=37)		20 (L=42)		25 (L=59)	
		H1orH2	L1	H1orH2	L1	H1orH2	L1	H1orH2	L1	H1orH2	L1
13	13	H1=1 *2	13								
13	15	H1=3	13	H1=2	13						
15	20	H1=8	13	H1=7	13	H1=2	15				
20	25					H1=12	20	H1=7	20	H2=10	20
25	30					H1=17	20	H1=17	25	H1=0 *1	25

※ The values written in red above are the cases where the L dimension of ejector guide bushing M-EBD is longer than the thickness of ejector plates (E+F). Secure the space by installing stop pins or providing counterbore in the mounting plate.
Installing stop pins ➡ P.140, Adding counterbore ➡ P.112 - 115

*1. When H1=0, the value may be slightly larger than the thickness of ejector plates. Secure the space by installing Stop pins or providing counterbore in the mounting plate.

*2. When combining with ejector guide pin M-EGA, secure space by installing stop pins or providing counterbores in the mounting plate.

※ The combinations shown above are the ejector plate combinations for standard mold bases. For combinations other than the above, calculate H1 and H2 dimensions by referring to the table below to determine the installation specifications.

D	L	E	F	L1	H1or H2
10	29	13≦E≦15	F≧13	13	For counterbore type: H1or H2=L−L1−F For spacer type: H1or H2=L−L1−F−4 ※F: thickness of Plate F ※If the calculated result is a negative value, H1 dimension will be used. If it is a positive value, H2 dimension will be used.
12	30	13≦E≦15		13	
16	37	15≦E≦20	F≧15	15	
		20≦E≦25		20	
20	42	20≦E≦25		20	
		25≦E≦30		25	
25	59	20≦E≦25	F≧25	20	
		25≦E≦30	F≧20	25	

Added Guide Pins and Bushings — Overview ⑤

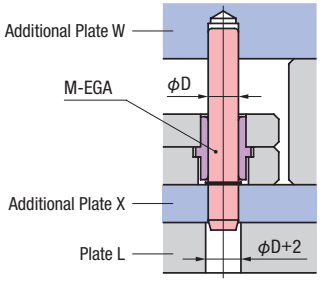
Installation method when installing additional plates

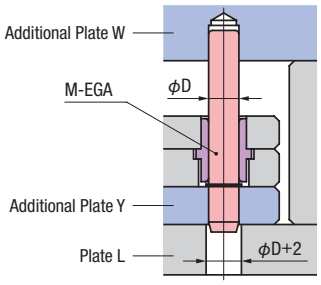
If installing additional plates, Plate W, Plate X or Plate Y, the installation specification shown below can be used. For installation specification not listed below, specify with a drawing, etc.

The thickness of additional plate X and Plate Y must be 15 or more.

Additional plate specifications ➡ P.38

Catalog No. PEGA

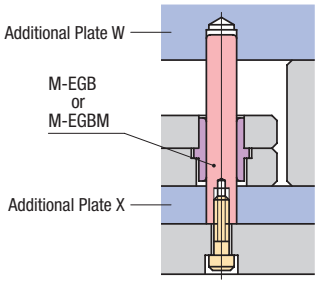


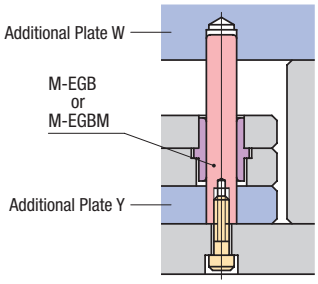


※ If the ejector guide pin does not reach Plate L, then clearance holes is not provided in the Plate L.

Catalog No. PEGB

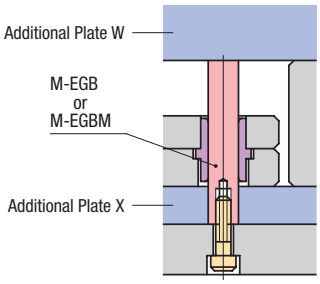
Catalog No. PEGBM

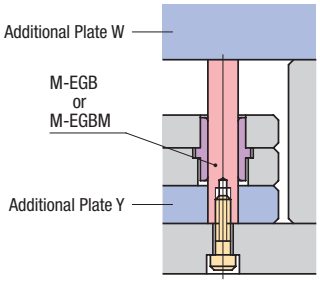




Catalog No. PEGBT

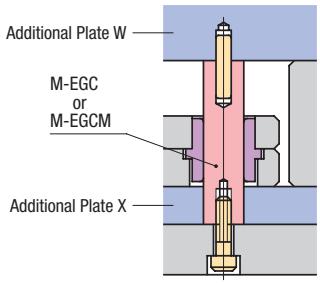
Catalog No. PEGBMT

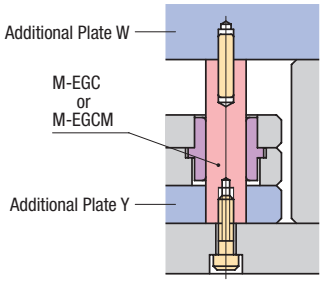




Catalog No. PEGC

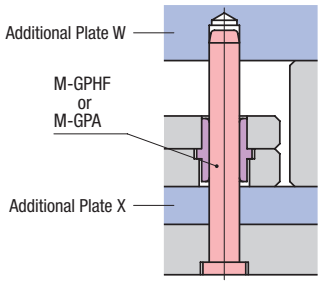
Catalog No. PEGCM

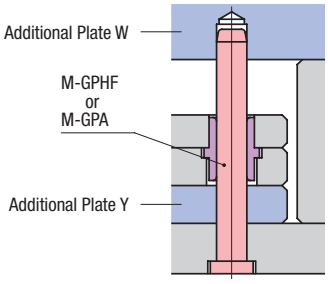




Catalog No. PEGPHF

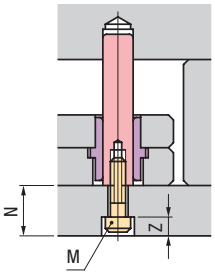
Catalog No. PEGPA

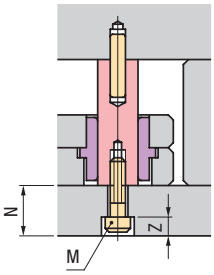




For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Bolt specification of ejector guide pins



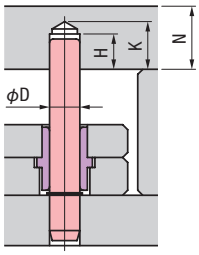


Bolt length		
M	Z	Bolt length coefficient
M5	5.5	11
M6	7	12
M8	9	15
M10	11	19

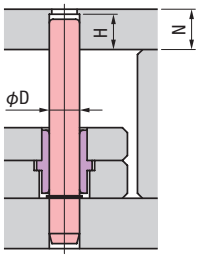
※ Calculation of bolt length
Bolt length =N−Z+ bolt length coefficient
Round down the last digit of calculation result, 0-4 to 0 and 5-9 to 5.

Hole specification of ejector guide pins

The pin insert holes for ejector guide pin in the mold plate will be blind holes or through holes depending on N dimension.



Blind hole



Through hole

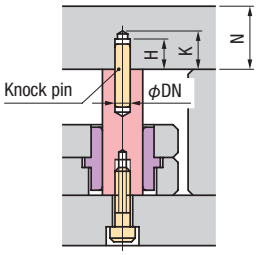
■ **Applicable item**

Catalog No. PEGA, PEGB, PEGBM, PEGPHF, PEGPA

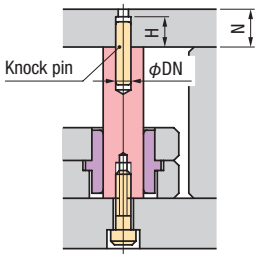
D	K max	Blind hole	Through hole
10	K=H+5	N≧K+3	H≦N＜K+3
12	K=H+6		
13	K=H+6		
16	K=H+7		
20	K=H+8		
25	K=H+10		
30	K=H+11		

※ For H dimensions, refer to each installation specification page.

※ Shown in the charts are Catalog No. PEGA, but similar specifications can also be applied to other ejector guide pins.



Blind hole



Through hole

■ **Applicable item**

Catalog No. PEGC, PEGCM

DN	K max	Blind hole	Through hole
6	K=H+4	N≧K+3	H≦N＜K+3
8	K=H+5		
10	K=H+5		
13	K=H+6		
16	K=H+7		

※ For H dimensions, refer to each installation specification page.

Added Ejector Guide Pin M-EGA

Install ejector guide pins M-EGA and ejector guide bushings.

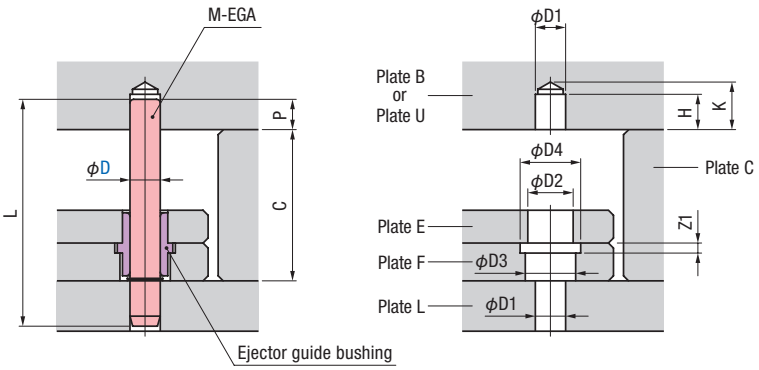
For details on installation specifications, refer to pages 110 to 119.

Ejector guide pin M-EGA ➡ P.326

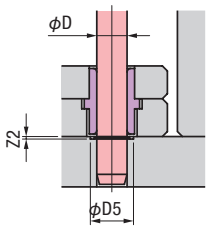
Ejector guide bushing M-EBB ➡ P.330 M-EBC ➡ P.333 M-EBG ➡ P.332 M-EBD ➡ P.331

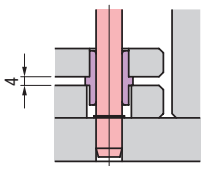
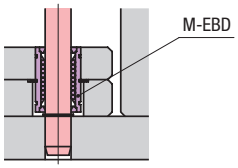
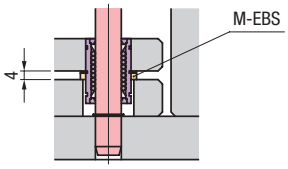
Application Mold bases (excluding the types without ejector plates)

Catalog No. PEGA



Installation of ejector guide bushing M-EBG:
If the thickness of Plate F is 15, machine the counterbores for guide pins M-EGA in the Plate L. In the case of spacer type installation method, the counterbores are not provided in Plate L.



Spacer type	Ejector guide bushing M-EBD		
			※ In the cases where spacer type installation method is applied, or ejector guide bushing M-EBD is used, install as shown on the left.
	Counterbore type	Spacer type	

D	D1 H7		P	H	D5	Z2	K max	Ejector guide bushing M-EBB・M-EBC・M-EBG *1					Ejector guide bushing M-EBD				
								D2 H7		D3	D4	Z1	D2 H7		D3	D4	Z1
10	10	+0.015 0	12	14	—	—	19	16	+0.018 0	17	21	4	19	+0.021 0	20	25	1.2
12	12	+0.018 0					20	18		19	23		21		22	27	
16	16				20	1.2	21	25	+0.021 0	26	31		28		29	35	1.5
20	20	+0.021 0	22	24	24		32	30		31	36		32	+0.025 0	33	39	
25	25				29		34	35	+0.025 0	36	41		40		41	48	1.8

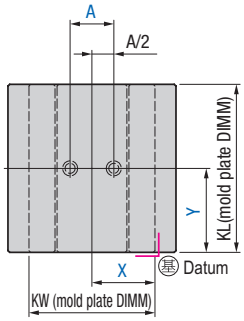
*1. D=10 and 12 of ejector guide bushing M-EBG cannot be specified.
※ Thickness of Plate L ≧ 20

L dimension to C dimension

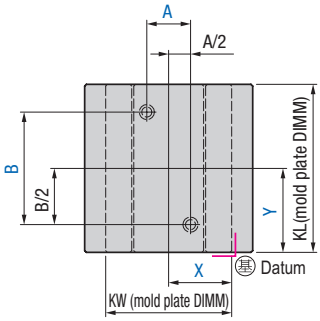
D	L dimension setting method *2	Standard range of L dimension of part
10	L=C+30	80 to 110 in 10 mm steps
12		80 to 130 in 10 mm steps
16		90 to 140 in10 mm steps
20	L=C+40	110 to 190 in 10mm steps (180 is not available)
25		110 to 190 in 10mm steps (180 is not available)

*2. To specify L dimension: ➡ P.112
※ M-EGA ejector guide pins other than the above need to be custom made.

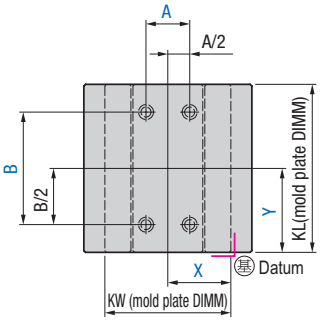
Position code S021



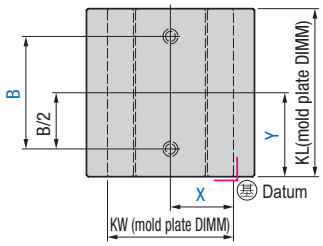
Position code S023



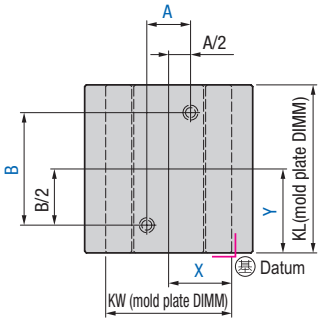
Position code S041



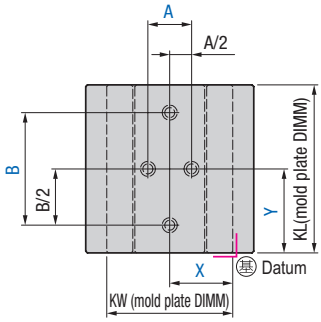
Position code S022



Position code S024



Position code S042



Catalog No.	D	Bushing code	Position code	A	B	X	Y	Optional spec
PEGA	10 12 16 20 25	EBB (plain type) EBC (self-lubricating, high temp) EBG (self-lubricating, copper alloy) EBD (linear type) Details ➡ P.110	S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	CDK CHL MLZ EPAT See page 112
			S022	—	In 1 mm steps			
			S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No. — D — Bushing code — Position code — A — B — X — Y

PEGA — D16 — EBC — S024 — A40 — B250 — X125 — Y150

— Optional spec.

— CHL/H25/L120

Added Ejector Guide Pin M-EGB

Install ejector guide pins M-EGB and ejector guide bushings.

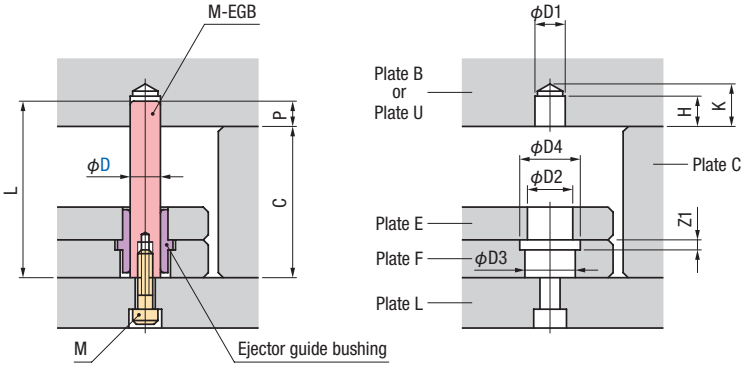
For details on the installation specifications, refer to pages 110 to 119.

Ejector guide pin M-EGB ➡ P.327

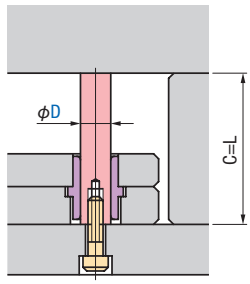
Ejector guide bushing M-EBB ➡ P.330 M-EBC ➡ P.333 M-EBG ➡ P.332 M-EBD ➡ P.331

Application Mold bases (excluding the types without ejector plates)

Catalog No. PEGB



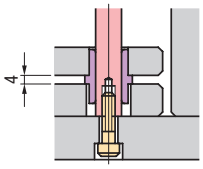
Catalog No. PEGBT



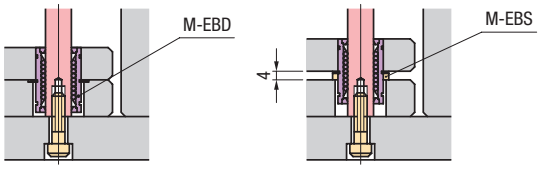
Stuck-out specification

※ The Installation method of Catalog No. PEGBT does not provide positioning holes for ejector pins in Plate B or Plate U. Therefore, adequate precaution should be taken to avoid misalignment between centers of Plate B or U and Plate E.

Spacer type



Ejector guide bushing M-EBD



Counterbore type Spacer type

※ In the cases where spacer type installation method is applied, or ejector guide bushing M-EBD is used, install as shown on the left.

D	D1 H7		P	H	K max	M	Ejector guide bushing M-EBB・M-EBC・M-EBG *1					Ejector guide bushing M-EBD				
							D2 H7		D3	D4	Z1	D2 H7		D3	D4	Z1
10	10	+0.015 0	10	12	17	M5	16	+0.018 0	17	21	4	19	+0.021 0	20	25	1.2
12	12	+0.018 0			18	M6	18		19	23		21		22	27	
16	16				19		25	+0.021 0	26	31		28		29	35	1.5
20	20	+0.021 0	20	22	30	M8	30		31	36		32	+0.025 0	33	39	
25	25				32	M10	35	+0.025 0	36	41		40		41	48	1.8

*1. D=10 and 12 of ejector guide bushing M-EBG cannot be specified.

L dimension to C dimension

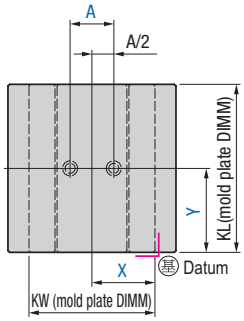
D	L dimension setting method *2		Standard range of L dimension of part
	Catalog No. PEGB	Catalog No. PEGBT	
10	L=C+10	L=C	50 to 90 10 mm steps
12			50 to 110 10 mm steps
16			50 to 120 10 mm steps
20	L=C+20		60 to 170 10 mm steps
25			60 to 200 10 mm steps

*2. How to specify L dimension: ➡ P.113

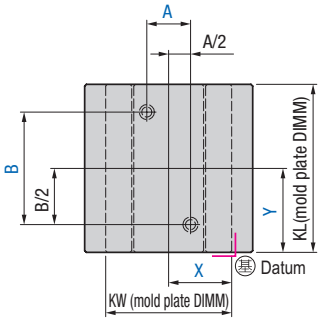
※ M-EGB ejector guide pins other than the above need to be custom made.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

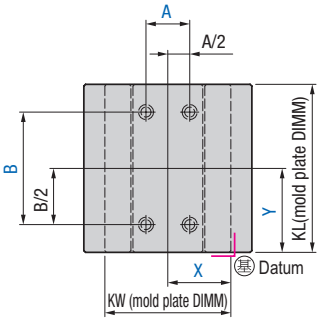
Position code S021



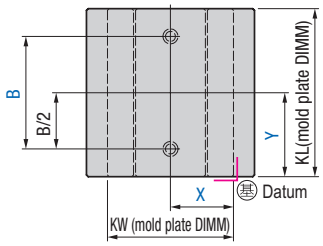
Position code S023



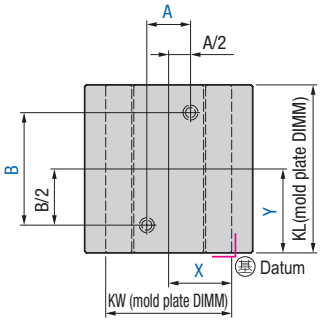
Position code S041



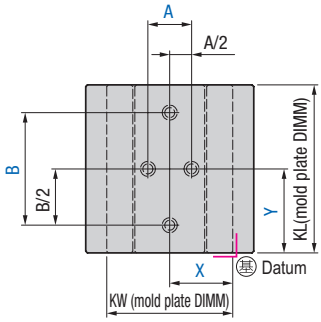
Position code S022



Position code S024



Position code S042



Catalog No.	D	Bushing code	Position code	A	B	X	Y	Optional spec
PEGB PEGBT	10 12 16 20 25	EBB (plain type) EBC (self-lubricating, high temp) EBG (self-lubricating, copper alloy) EBD (linear type) Details ➡ P.110	S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	ECB CHL CLK MLZ EPAT See page 113
			S022	—	In 1 mm steps			
			S023 S024 S041 S042	In 1 mm steps				

※ Specify adjustment of the ejector guide pin M-EGB (stuck-out type) and spacer block thickness with optional specification. If not specified, the adjustment will be made according to the accuracy requirements of respective parts.

How to order

Catalog No. — D — Bushing code — Position code — A — B — X — Y

PEGB — D16 — EBD — S041 — A130 — B200 — X150 — Y175

— Optional spec.

— ECB

Added Ejector Guide Pin M-EGC

Install ejector guide pins M-EGC and ejector guide bushings.

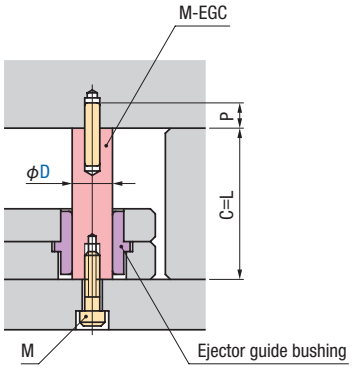
For details on the installation specifications, refer to pages 110 to 119.

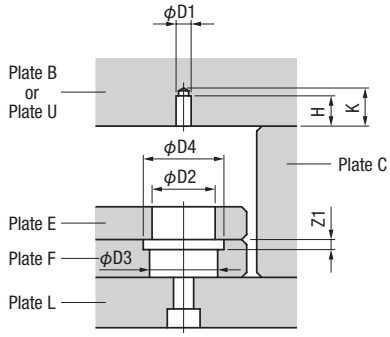
Ejector guide pin M-EGC ➡ P.328

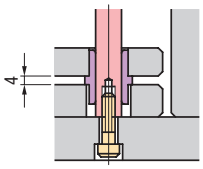
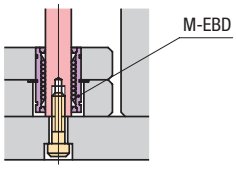
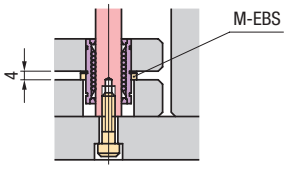
Ejector guide bushing M-EBB ➡ P.330 M-EBC ➡ P.333 M-EBG ➡ P.332 M-EBD ➡ P.331

Application Mold bases (excluding the types without ejector plates)

Catalog No. PEGC





Spacer type	Ejector guide bushing M-EBD		
			※ In the cases where spacer type installation method is applied, or ejector guide bushing M-EBD is used, install as shown on the left.
	Counterbore type	Spacer type	

D	D1 H7		P	H	K max	M	Ejector guide bushing M-EBB・M-EBC *1・M-EBG *2 D2 H7		D3	D4	Z1	Ejector guide bushing M-EBD *3 D2 H7		D3	D4	Z1
20	8	+0.015 0	15	17	22	M8	30	+0.021 0	31	36	4	32	+0.025 0	33	39	1.5
25	10					M10	35	+0.025 0	36	41		40		41	48	1.8
30							40		41	46		—	—	—	—	—
40							50 (52)		51 (53)	56 (58)						
50							60 (62)	+0.030 0	61 (63)	67 (68)						

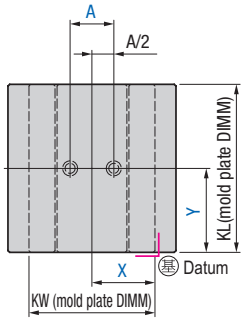
*1. D=40 and 50 of ejector guide bushing M-EBC cannot be specified.
*2. The hole dimensions of D=40 and 50 of ejector guide bushing M-EBG are values in parentheses ( ).
*3. D=30 to 50 of ejector guide bushing M-EBD cannot be specified.

L dimension to C dimension

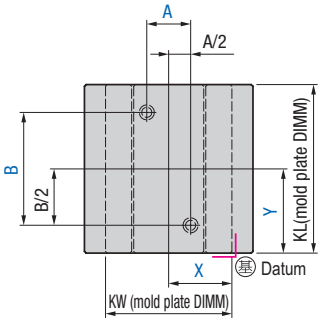
D	L dimension setting method	Standard range of L dimension of part
20	L=C	50～100 in 10 mm steps
25		50～120 in 10 mm steps
30		50～150 in 10 mm steps
40		80～170 in 10 mm steps
50		80～200 In 10 mm steps (190 is not available)

※ M-EGC ejector guide pins other than the above need to be custom made.

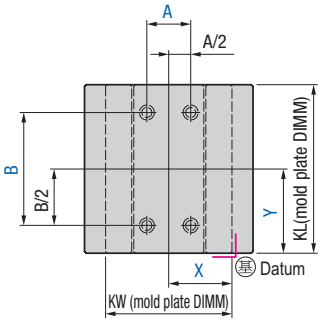
Position code S021



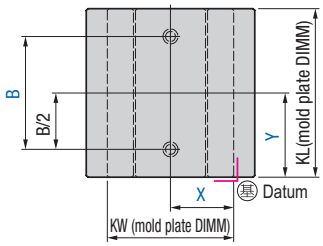
Position code S023



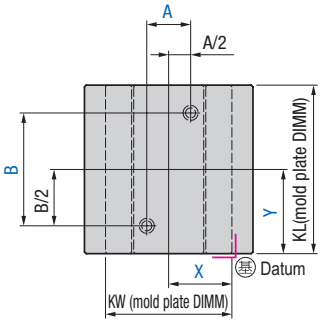
Position code S041



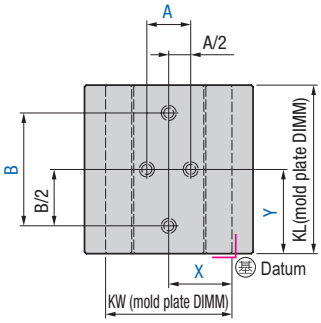
Position code S022



Position code S024



Position code S042



Catalog No.	D	Bushing code	Position	A	B	X	Y	Optional spec
PEGC	20 25 30 40 50	EBB (plain type) EBC (self-lubricating, high temp) EBG (self-lubricating, copper alloy) EBD (linear type) Details ➡ P.110	S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	ECB ENP CLK EPAT See page 114
			S022	—	In 1 mm steps			
			S023 S024 S041 S042	In 1 mm steps				

※ Specify adjustment of the ejector guide pin M-EGC and spacer block thickness with optional specification. If not specified, the adjustment will be made according to the accuracy requirements of respective parts.

How to order

Catalog No. — D — Bushing code — Position code — A — B — X — Y

PEGC — D30 — EBB — S041 — A120 — B240 — X150 — Y200

— Optional spec.

— CLK<+0.01/−0.01>

Added Ejector Guide Pin M-EGBM

Install ejector guide pins M-EGBM and ejector guide bushings.

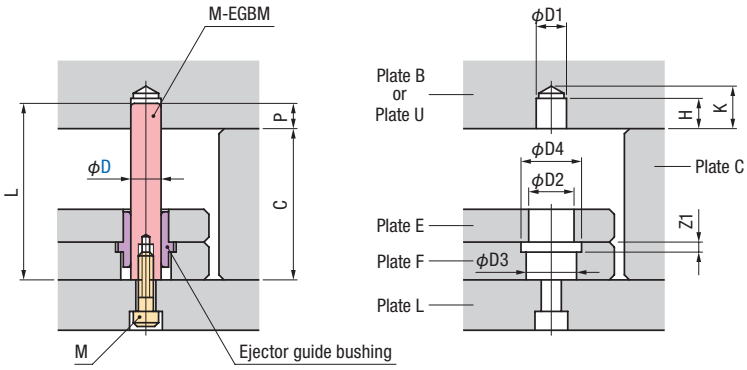
For details on the installation specifications, refer to pages 110 to 119.

Ejector guide pins M-EGBM ➡ P.334

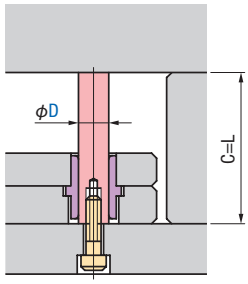
Ejector guide bushings M-EBBM ➡ P.336 M-EBD ➡ P.331

Application Mold bases (excluding the types without ejector plates)

Catalog No. PEGBM



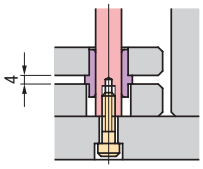
Catalog No. PEGBMT



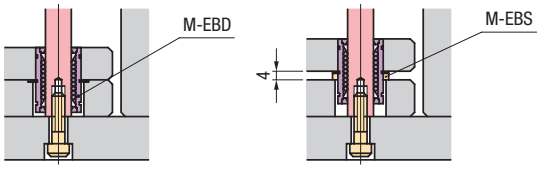
Sturck-out specification

※ The Installation method of Catalog No. PEGBMT does not provide positioning holes for ejector pins in Plate B or Plate U. Therefore, adequate precaution should be taken to avoid misalignment between centers of Plate B or U and Plate E.

Spacer type



Ejector guide bushing M-EBD



Counterbore type Spacer type

※ In the cases where spacer type installation method is applied, or ejector guide bushing M-EBD is used, install as shown on the left.

D	D1 H7		P	H	K max	M	Ejector guide bushing M-EBBM					Ejector guide bushing M-EBD *1				
							D2 H7		D3	D4	Z1	D2 H7		D3	D4	Z1
10	10	+0.015 0	10	12	17	M5	18	+0.018 0	19	22	4	19	+0.021 0	20	25	1.2
13	13	+0.018 0			18	M6	22	+0.021 0	23	26		—		—	—	—
16	16				19		25		26	29		28		29	35	1.5
20	20	+0.021 0	20	22	30	M8	30		31	34		32	+0.025 0	33	39	
25	25				32		35	+0.025 0	36	39		40		41	48	1.8
30	30		30	32	43	M10	40		41	44		—	—	—	—	—

*1. D=13 and 30 of ejector guide bushing M-EBD cannot be specified.

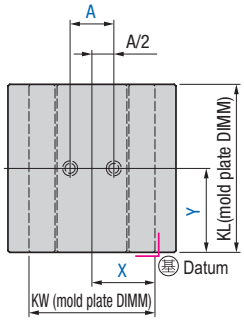
L dimension to C dimension

D	L dimension setting method *2			D	L dimension setting method *2		
	Catalog No. PEGBM	Catalog No. PEGBMT	Standard range of L dimension of part		Catalog No. PEGBM	Catalog No. PEGBMT	Standard range of L dimension of part
10	L=C+10	L=C	50 to 100 in 10 mm steps	20	L=C+20	L=C	60 to 170 in 10 mm steps
13			50 to 110 in 10 mm steps	25			60 to 220 in 10 mm steps
16			50 to 120 in 10 mm steps	30	L=C+30		100 to 220 in 10 mm steps

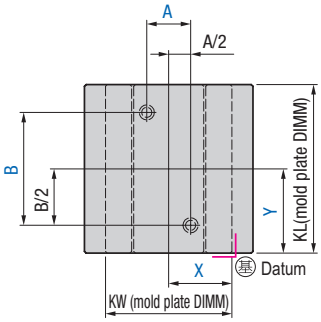
*2. How to specify L dimension: ➡ P.113

※ M-EGBM ejector guide pins other than the above need to be custom made.

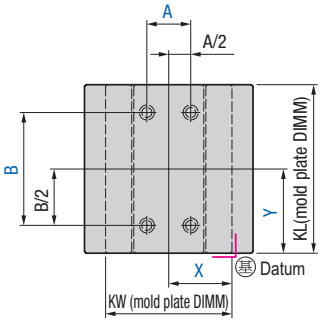
Position code S021



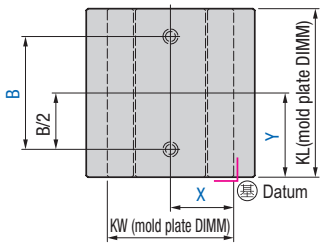
Position code S023



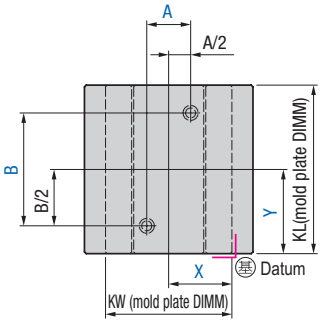
Position code S041



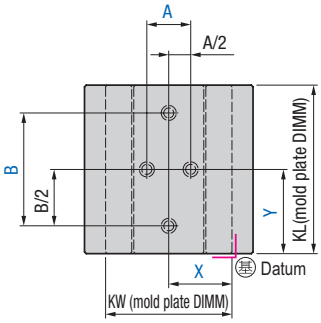
Position code S022



Position code S024



Position code S042



Catalog No.	D	Bushing code	Position code	A	B	X	Y	Optional spec
PEGBM PEGBMT	10 13 16 20 25 30	EBBM (plain type) EBD (linear type) Details ➡ P.110	S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	ECB CHL CLK MLZ EPAT See page 113
			S022	—	In 1 mm steps			
			S023 S024 S041 S042	In 1 mm steps				

※ Specify adjustment of the ejector guide pin M-EGBM (stuck-out type) and spacer block thickness with optional specification. If not specified, the adjustment will be made according to the accuracy requirements of respective parts.

How to order

Catalog No. — D — Bushing code — Position code — A — B — X — Y

PEGBMT — D16 — EBBM — S041 — A80 — B180 — X100 — Y175

— Optional spec.

— CLK＜+0.03/+0.01＞

Added Ejector Guide Pin M-EGCM

Install ejector guide pins M-EGCM and ejector guide bushings.

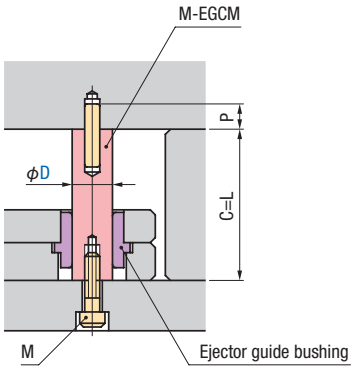
For details on the installation specifications, refer to pages 110 to 119.

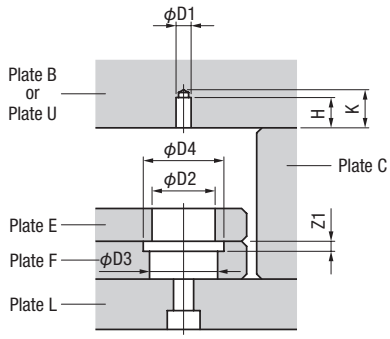
Ejector guide pin M-EGCM ➡ P.335

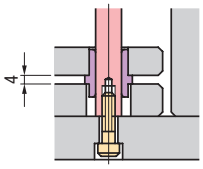
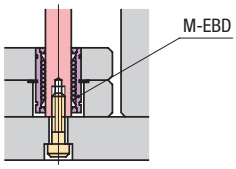
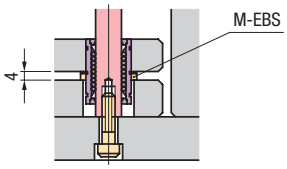
Ejector guide bushing M-EBBM ➡ P.336 M-EBD ➡ P.331

Application Mold bases (excluding the types without ejector plates)

Catalog No. PEGCM





Spacer type	Ejector guide bushing M-EBD		
			※ In the cases where spacer type installation method is applied, or ejector guide bushing M-EBD is used, install as shown on the left.
	Counterbore type	Spacer type	

D	D1 H7		P	H	K max	M	Ejector guide bushing M-EBBM D2 H7		D3	D4	Z1	Ejector guide bushing M-EBD *1 D2 H7		D3	D4	Z1
16	6	+0.012 0	15	17	21	M6	25	+0.021 0	26	29	4	28	+0.021 0	29	35	1.5
20	8	+0.015 0	20	22	27	M8	30		31	34		32	+0.025 0	33	39	
25	10						35	+0.025 0	36	39		40		41	48	1.8
30	13	+0.018 0	25	27	33	M10	40		41	44		—	—	—	—	—
35	16				34		45		46	49						
40							52	+0.030 0	53	56						
50							62		63	66						

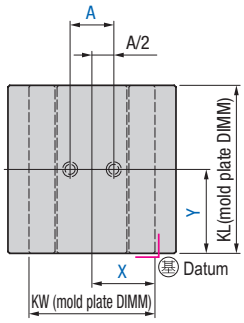
*1. D=30 to 50 of ejector guide bushing M-EBD cannot be specified.

L dimension to C dimension

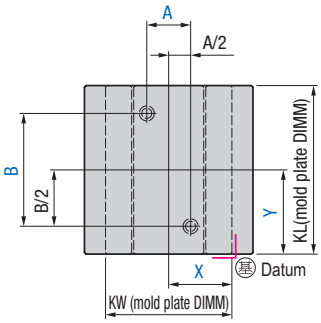
D	L dimension setting method	Standard range of L dimension of part
16	L=C	50 to 100 in 10 mm steps
20		50 to 130 In 10 mm steps
25		50 to 200 In 10 mm steps
30		
35		80 to 200 In 10 mm steps
40		
50		

※ M-EGCM ejector guide pins other than the above need to be custom made.

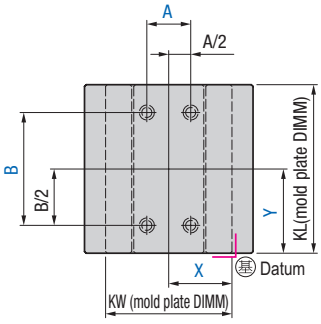
Position code S021



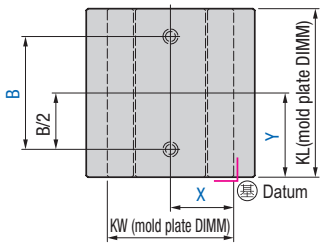
Position code S023



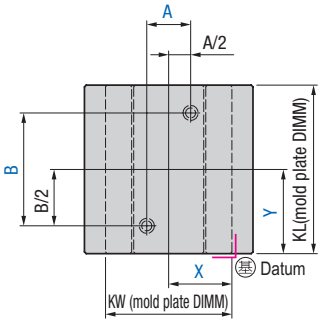
Position code S041



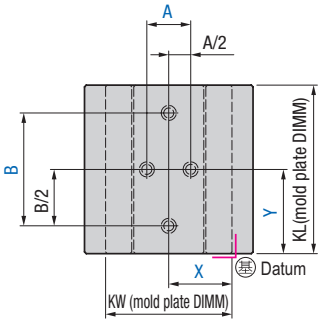
Position code S022



Position code S024



Position code S042



Catalog No.	D	Bushing code	Position code	A	B	X	Y	Optional spec
PEGCM	16 20 25 30 35 40 50	EBBM (plain type) EBD (linear type) Details ➡ P.110	S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	ECB ENP EPAT See page 114
			S022	—	In 1 mm step			
			S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No.	D	Bushing code	Position code	A	B	X	Y
PEGCM	D40	EBBM	S041	A150	B340	X200	Y300

Optional spec.

ECB

Added Ejector Guide Pins M-GPHF and M-GPA

Use M-GPHF and M-GPA as ejector guide pins to install the ejector guide pins and ejector guide bushings.

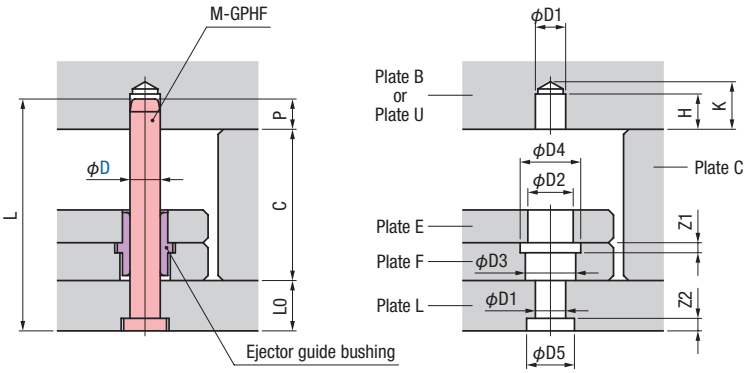
For details on the installation specifications, refer to pages 110 to 119.

Ejector guide pin M-GPHF ➡ P.279 M-GPA ➡ P.274

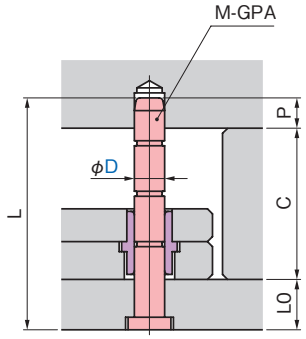
Ejector guide bushing M-EBB ➡ P.330 M-EBC ➡ P.333 M-EBG ➡ P.332 M-EBD ➡ P.331

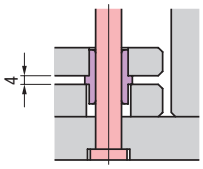
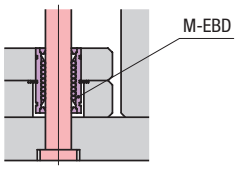
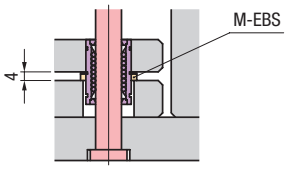
Application Mold bases (excluding the types without ejector plates)

Catalog No. PEGPHF



Catalog No. PEGPA



Spacer type	Ejector guide bushing M-EBD	
	 Counterbore type	 Spacer type

※ In the cases where spacer type installation method is applied, or ejector guide bushing M-EBD is used, install as shown on the left.

D *1	D1 H7		P *2	H *2	K *2 max	D5	Z2	Ejector guide bushing M-EBB・M-EBC・M-EBG *3 D2 H7		D3	D4	Z1	Ejector guide bushing M-EBD *4 D2 H7		D3	D4	Z1
10	10	+0.015 0	14	16	21	14	5	16	+0.018 0	17	21	4	19	+0.021 0	20	25	1.2
12	12	+0.018 0	14(12)	16(14)	22(20)	18		18		19	23		21		22	27	
16	16				23(21)	21	6	25	+0.021 0	26	31		28		29	35	1.5
20	20	+0.021 0	24(22)	26(24)	34(32)	26		30		31	36		32	+0.025 0	33	39	
25	25				36(34)	31	8	35	+0.025 0	36	41		40		41	48	1.8
30	30		29(27)	31(29)	42(40)	36		40		41	46		—	—	—	—	—

*1. D=10 of the Catalog No. PEGPA cannot be specified.

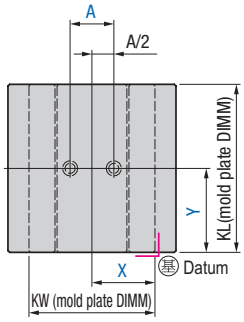
*2. The dimensions of Catalog No. PEGPA are those in parentheses ( ).

*3. D=10 and 12 of ejector guide bushing M-EBG cannot be specified.
For Catalog No. PEGPA, ejector guide bushing M-EBG cannot be specified.

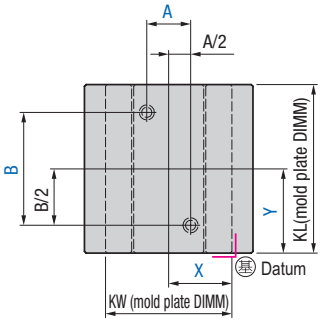
*4. For Catalog No. PEGPA, ejector guide bushing M-EBD cannot be specified.
For Catalog No. PEGPHF, ϕ 30 cannot be specified.

※ L=L0+C+P
Adjust the length of press-fit section of the guide pin so that "The length of press-fit section of the pin ≦ thickness of Plate L" is ensured. For this reason ,in some cases guide pins may need to be custom-made.
The L dimension for Catalog No. PEGPHF calculated in the above +1 mm will be the nominal dimension of ejector guide pin M-GPHF.
For Catalog No. PEGPHF, when D=10, guide pin M-GPH is used. M-GPH ➡ P.278

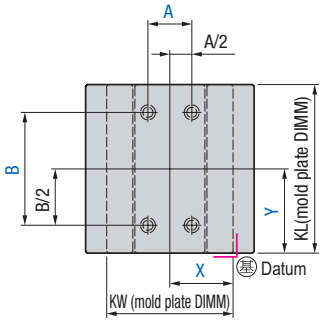
Position code S021



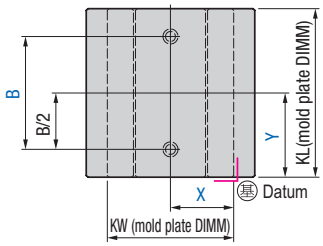
Position code S023



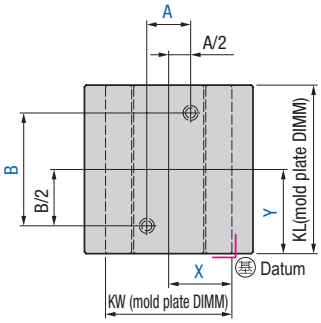
Position code S041



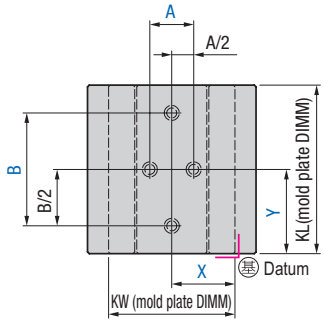
Position code S022



Position code S024



Position code S042



Catalog No.	D	Bushing code	Position code	A	B	X	Y	Optional spec
PEGPHF PEGPA	10 12 16 20 25 30	EBB (plain type) EBC (self-lubricating, high temperature) EBG (self-lubricating, copper alloy) EBD (linear type) Details ➡ P.110	S021	In 1 mm step	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	CHL MLZ EPAT See page 115
			S022	—	In 1 mm steps			
			S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No. — D — Bushing code — Position code — A — B — X — Y

PEGPHF — D16 — EBB — S041 — A100 — B280 — X125 — Y200

— Optional spec.

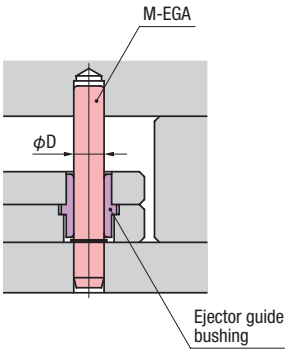
— CHL/H28/L120

Added Guide Pins and Bushings — Standard Position

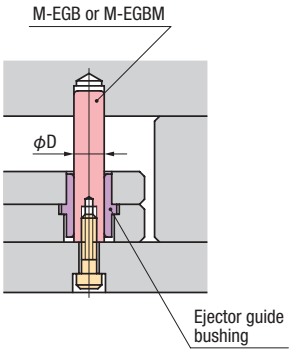
Specifications of ejector guide pins for standard mold bases have been now established.
For details on the installation specifications, refer to pages 110 to 119.

Application Mold bases (excluding the types without ejector plates)

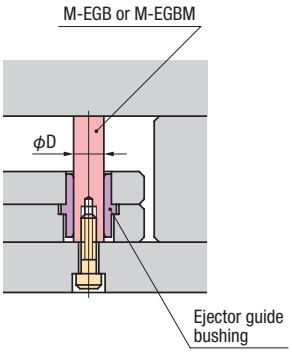
Catalog No. **PEGAS** (M-EGA spec.)



Catalog No. **PEGBS** (M-EGB spec.)
Catalog No. **PEGBMS** (M-EGBM spec.)

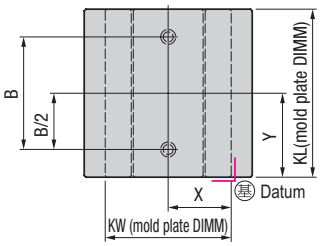


Catalog No. **PEGBTS** (M-EGB spec.)
Catalog No. **PEGBMTS** (M-EGBM spec.)

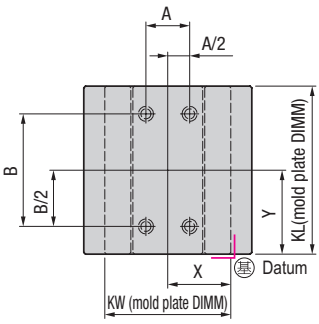


Stuck-out specification

2-guide specification



4-guide specification



※X=KW/2, Y=KL/2

Catalog No.	Bushing code *1	Option code
PEGAS PEGBS PEGBMS PEGBTS PEGBMTS	EBB (Plain type) EBBM (Plain type) EBC (self-lubricating, high temp. type) EBG (self-lubricating, copper alloy type) Details ➡ P.110	EPAT See page 115

*1. The combinations marked with ○ in the table below are supported.

Bushing code	Catalog No.				
	PEGAS	PEGBS	PEGBMS	PEGBTS	PEGBMTS
EBB	○	○		○	
EBBM			○		○
EBC	○	○		○	
EBG	D=16, 20, 25 supported	D=16, 20, 25 supported		D=16, 20, 25 supported	

How to order

Catalog No. — Bushing code — Optional spec.

PEGAS — EBB

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Application Mold base S series (excluding SE · SF types)
Mold base D · E series (excluding DE · DF · EE · EF types)
Mold base F · G series (excluding FE · FF · GE · GF types)

Nominal dimm.	D *2	Pitch of ejector guide pins				Nominal dimm.	D	Pitch of ejector guide pins			
		Traditional type mold bases		High rigidity type mold base				Traditional type mold bases		High-rigidity type mold bases	
		A *3	B	A *3	B			A *3	B	A *3	B
1515	10	2-guide	114	2-guide	80	2930	16	134	172	—	—
1518			144		110	2935			222		
1520			164		130	2940			272		
1523			194		160	3030			172	100	190
1525			214		180	3032			192	—	—
1530		48	216	—	—	3035			222	100	240
1818		2-guide	138	2-guide	144	3040			272		290
1820			158		164	3045	20	128	308	—	—
1823			188		194	3050			358		
1825			208		214	3055			408		
1830		68	210	48	216	3060			458		
1835			260	—	—	3335		154	208		
2020	12 (13)	2-guide	150	2-guide	164	3340			258		
2023			180		194	3345			308		
2025			200		214	3350			358		
2030		80	194	48	212	3535		164	208		
2035			244	—	—	3540			258		
2040			294			3545			308		
2045			344			3550		152	358		
2323		2-guide	180	2-guide	188	3555			408		
2325			200		208	3560			458		
2327			220	—	—	4040	25	198	252		
2330		106	194	68	206	4045			302		
2335			244		256	4050			352		
2340			294	—	—	4055			402		
2525	16	2-guide	200	2-guide	200	4060			452		
2527			220	—	—	4070			552		
2530		110	190	80	190	4545		226	286		
2535		102	230		240	4550			336		
2540			280		290	4555			386		
2545			330	—	—	4560			436		
2550			380			5050		256	336		
2730		114	172	90	190	5060			436		
2735			222		240	5070			536		
2740			272	—	—						
2750			372								

*2. The dimensions of Catalog No. PEGBMS, PEGBMTS are those in parenthesis ( ).
*3. 2-guide means 2-guide specification and the numbers show A dimension of 4-guide specification.

Application Mold base H series

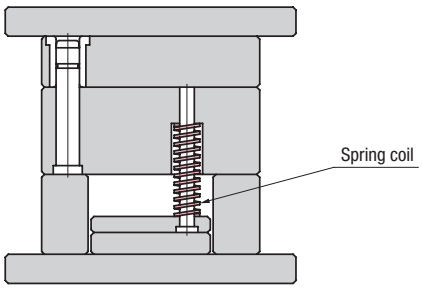
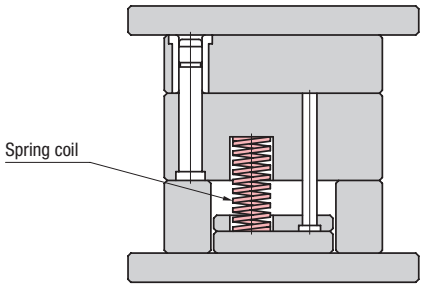
Nominal dimm.	D	Pitch of ejector guide pins	
		A	B
2540	16	110	236
2545			286
2550			336
2740		120	236
2750			336
3045	20	136	284
3050			334
3055			384
3060			434
3350		166	334
3550		176	286
3555			336
3560			386
4060	25	210	388
4070			488

※ 4-guide specification is applied to all of H series mold bases.

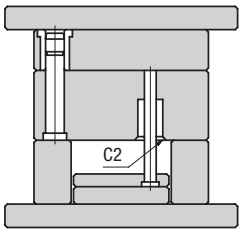
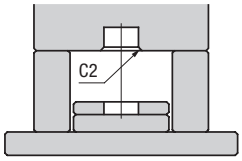
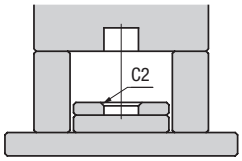
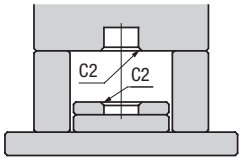
Added Springs — Overview

Spring coils installation method

Spring coils for returning ejector plates can be installed in mold bases using two different installation methods.

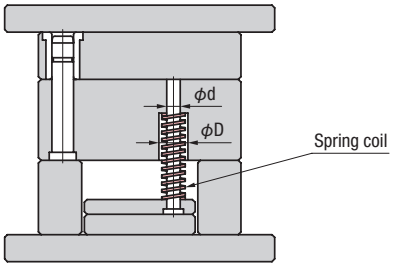
Specification for installing spring coil over return pin section	Specification for installing spring coil on other locations
	
How to order: ➡ P.136	How to order: ➡ P.138

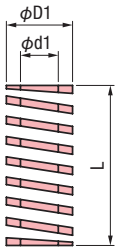
Optional specification (Specify only when necessary)

Option code	Specification
CCD	 Produce chamfers of C2 in spring holes. ※ This is not applied when the depth of counterbore is less than 5 mm. ■ **Applicable item:** Catalog No. PSH1N, PSH2N, PSH3N, PSH4N, PSH5N MSH1, MSH2, MSH3, MSH4, MSH5 ■ **How to specify:** CCD
CCW	 Produce chamfers of C2 on the mold plate side in spring holes. ※ This is not applied when the depth of counterbore is less than 5 mm. ■ **Applicable item:** Catalog No. PSHF, MSHF ■ **How to specify:** CCW
CCE	 Produce chamfers of C2 on the ejector plate in spring holes. ※ This is not applied when the depth of counterbore is less than 5 mm. ■ **Applicable item:** Catalog No. PSHF, MSHF ■ **How to specify:** CCE
CCR	 Produce chamfers of C2 on the ejector plate and mold plate in spring holes. ※ This is not applied when the depth of counterbore is less than 5 mm. ■ **Applicable item:** Catalog No. PSHF, MSHF ■ **How to specify:** CCR

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Spring coil specification for installing over return pin section





Depending on the diameter of return pins, four types of spring coils and diameter of holes are available.

■ **How to specify coil spring:**

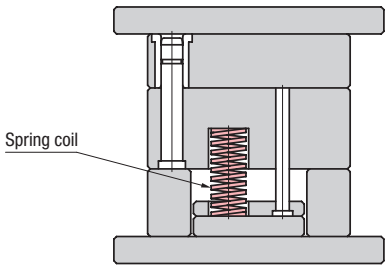
Part code/L L DIMM.

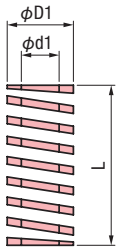
[E.g.] FSB12/L50

Spring coil length and constant ➡ P.396 - 405

Type	Spring coil M-FSB				Spring coil M-TY				Spring coil M-TR				Spring coil P-TF			
Color	Light green				Purple				Ivory				Yellow			
d	Part code	D	D1	d1	Part code	D	D1	d1	Part code	D	D1	d1	Part code	D	D1	d1
10	FSB10	19	17.5	10.5	TY17	19	17	11	TR17	19	17	11	TF20	22	20	11
													TF22	24	22	11
12	FSB12	23	21.5	13.2	TY21	23	21	13	TR21	23	21	13	TF25	27	25	13.5
													TF27	29	27	13.5
15	FSB15	28	26.5	15.5	TY26	28	26	16.5	TR26	28	26	16.5	TF30	32	30	16
20	FSB20	34	32.5	20.5	TY32	34	32	21	TR32	34	32	21	TF40	42	40	22
25	FSB25	41	39.5	25.5	TY39	41	39	26	TR39	41	39	26	TF50	52	50	27.5
30	FSB30	47	45.5	30.5	TY46	48	46	32	TR46	48	46	32	TF60	62	60	33

Specification for installing spring coil on other locations





Four types of coils are available for choice.

■ **How to specify spring coil:**

Part code/L L DIMM.

[E.g.] TF25/L60

Spring coil length and constant ➡ P.396 - 405

Type	Spring coil M-FSB			Spring coil M-TY			Spring coil M-TR			Spring coil P-TF		
Color	Light green			Purple			Ivory			Yellow		
Spring coil specification	Part code	D1	d1	Part code	D1	d1	Part code	D1	d1	Part code	D1	d1
	FSB10	17.5	10.5	TY15	14.5	9	TR15	14.5	9	TF14	14	7
	FSB12	21.5	13.2	TY17	17	11	TR17	17	11	TF16	16	8
	FSB15	26.5	15.5	TY21	21	13	TR21	21	13	TF18	18	9
	FSB20	32.5	20.5	TY26	26	16.5	TR26	26	16.5	TF20	20	11
	FSB25	39.5	25.5	TY32	32	21	TR32	32	21	TF22	22	11
	FSB30	45.5	30.5	TY39	39	26	TR39	39	26	TF25	25	13.5
				TY46	46	32	TR46	46	32	TF27	27	13.5
										TF30	30	16
										TF35	35	19
										TF40	40	22
										TF50	50	27.5
										TF60	60	33

Added Springs — ①

Install spring coils for returning ejector plates over return pins.

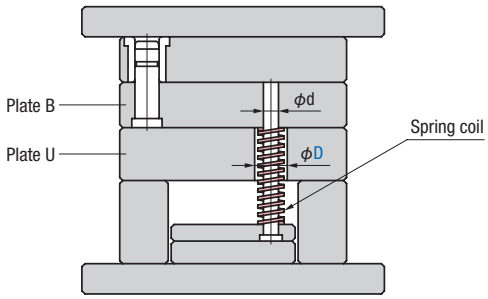
For details on the installation specifications, refer to pages 134 to 135.

Sring M-FSB M-FSB ➡ P.396 M-TY ➡ P.398 M-TR ➡ P.400 P-TF ➡ P.402

Application Mold bases (excluding the types without ejector plates)–

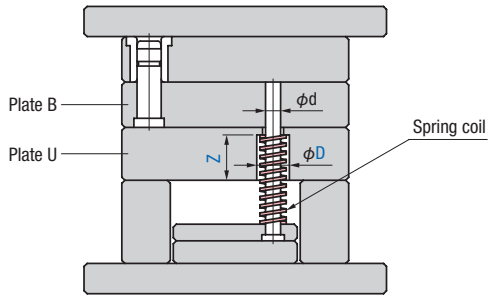
Catalog No. PSH1N
Catalog No. MSH1

Apply to types with Plate U



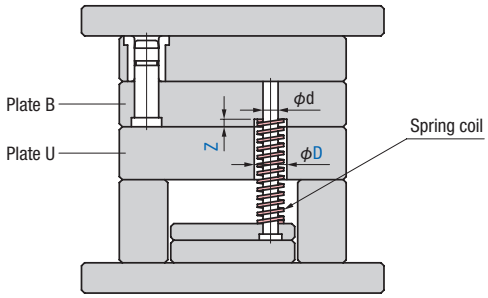
Catalog No. PSH2N
Catalog No. MSH2

Apply to types with Plate U



Catalog No. PSH3N
Catalog No. MSH3

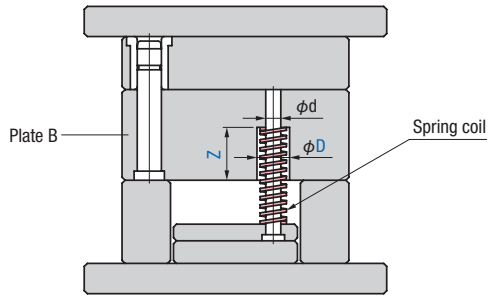
Apply to types with Plate U



When Z=B, through hole is provided

Catalog No. PSH4N
Catalog No. MSH4

Apply to types without Plate U

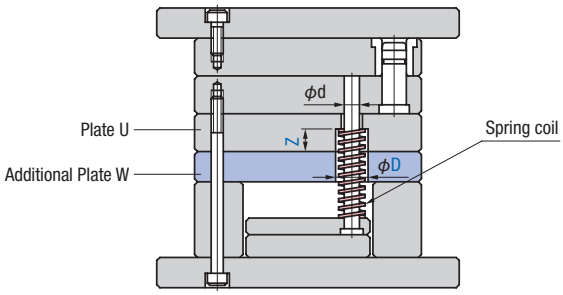


When Z=B, through hole is provided

If installing additional Plate W

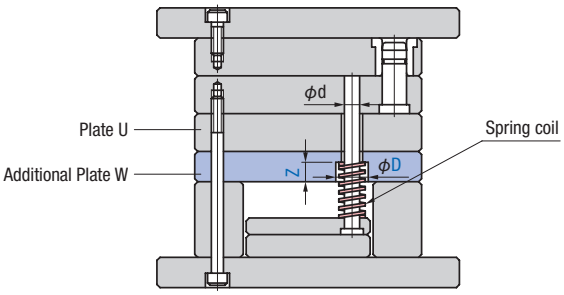
Catalog No. PSH1N, PSH2N, PSH3N, MSH1, MSH2, MSH3,

through holes will be machined in Plate W as spring holes.



Catalog No. PSH5N
Catalog No. MSH5

Applies when spring holes in Plate W are counterbore.



When Z=thickness of plate W, through plates are provided.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Specifications for installing spring coils

Depending on the diameter of return pins, four types of spring coils and diameter of holes are available.

Details on spring coil specifications ➡ P.396 - 405

d	Spring coil M-FSB		Spring coil M-TY		Spring coil M-TR		Spring coil P-TF	
	Part code	D	Part code	D	Part code	D	Part code	D
10	FSB10	19	TY17	19	TR17	19	TF20	22
							TF22	24
12	FSB12	23	TY21	23	TR21	23	TF25	27
							TF27	29
15	FSB15	28	TY26	28	TR26	28	TF30	32
20	FSB20	34	TY32	34	TR32	34	TF40	42
25	FSB25	41	TY39	41	TR39	41	TF50	52
30	FSB30	47	TY46	48	TR46	48	TF60	62

Catalog No.	Z *1 *2	Part code	Spring coil length L	Optional spec.
PSH1N PSH2N PSH3N PSH4N PSH5N	In 1 mm steps For Z max, See table below	Select from the above table	Select from pages 396 to 405	CCD See page 134

*1. For Catalog No. PSH1N, no need to specify Z dimension.

*2. For Catalog No. PSH2N, PSH4N, PSH5N, when Z=0, spring holes φD will not be provided. Only spring coils are installed.

How to order

Catalog No. — Z — Part code / L — Optional spec.

PSH4N — Z20 — FSB12 / L45 — CCD

PSH1N — TF25 / L60

Specification for spring hole only

d	Catalog No.	D	Recommended value	Z *3	Optional spec.
10	MSH1 MSH2 MSH3 MSH4 MSH5	15 to 65 in 1 mm steps Provided D≧d+5	19 22 24	In 1 mm steps See table on the right	CCD See page 134
12			23 27 29		
15			28 32		
20			34 42		
25			41 52		
30			47 48 62		

*3. For Catalog No. MSH1, no need to specify Z dimension.

Relation of hole diameter & counterbore depth

D	Z max
15 to 19	Z≦50
20 to 27	Z≦60
28 to 34	Z≦80
35 to 44	Z≦90
45 to 65	Z≦100

How to order

Catalog No. — D — Z — Optional spec.

MSH4 — D42 — Z45 — CCD

Added Springs — ②

Install spring coils for returning ejector plates.

For details on the installation specification, refer to pages 134 to 135.

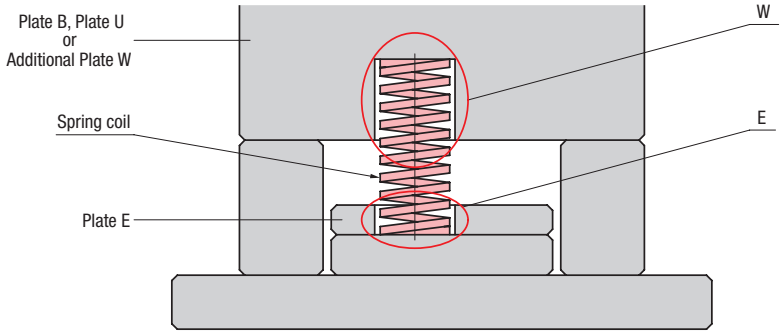
Spring coil M-FSB ➡ P.396 M-TY ➡ P.398 M-TR ➡ P.400 P-TF ➡ P.402

When compressed, spring coils may be deformed (side deflection) so as to jump out of place from its intended position. Secure sufficient depth of counterbores in spring holes.

Application Mold bases (excluding types without ejector plates)

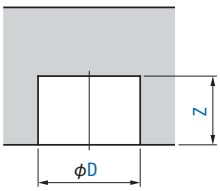
Catalog No. **PSHF** with spring coil

Catalog No. **MSHF** without spring coil

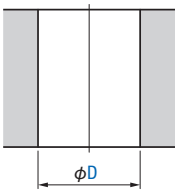


W section specification code

W section spec code **WZ** Z DIMM

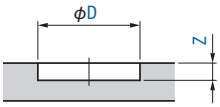


W section spec code **WK**

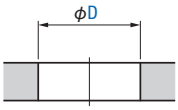


E section specification code

E section spec code **EZ** Z DIMM



E section spec code **EK**



Relation of hole diameter and counterbore depth

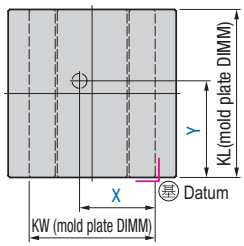
D	Z max
15～19	Z≦50
20～27	Z≦60
28～34	Z≦80
35～44	Z≦90
45～65	Z≦100

※ Z≦thickness−5
This formula is not a guarantee of strength.

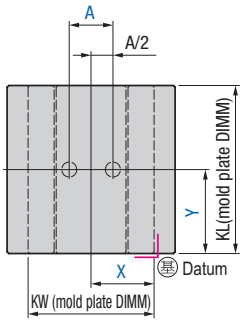
Catalog No.	D	W section specification code	E section specification code	Position code	A	B	X	Y	Spring coil	Optional spec.
PSHF MSHF	In 1 mm steps 15 ～ 65	WZ Z DIMM WK Z DIMM. In 1 mm steps	EZ Z DIMM EK Z DIMM In 1 mm steps	S011	—	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, Omit Y	Select from pages 396 to 405 No need to specify for MSHF	CCW CCE CCR See page 134
				S021	In 1 mm steps					
				S022	—	In 1 mm steps				
				S023 S024 S041 S042	In 1 mm steps					

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

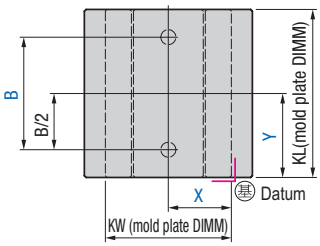
Position code S011



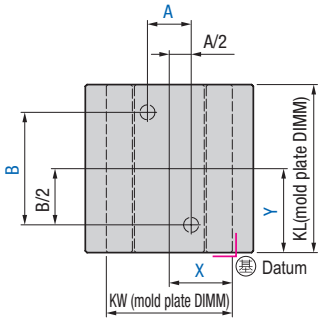
Position code S021



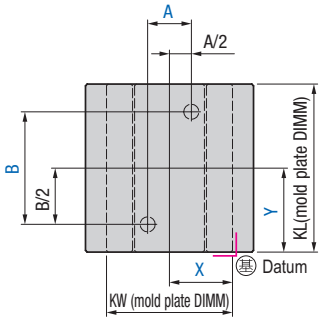
Position code S022



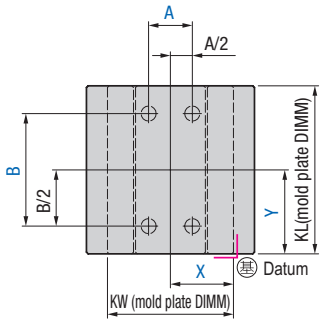
Position code S023



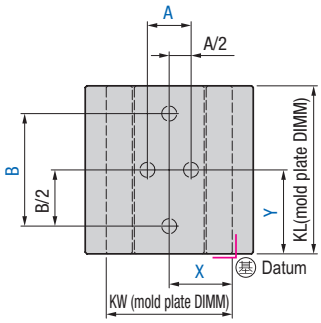
Position code S024



Position code S041



Position code S042



How to order

Catalog No.	D	W section spec code	E section spec code	Position code	A	B
PSHF	D24	WZ22	EZ3	S041	A80	B130
MSHF	D28	WK	EK	S022		B250

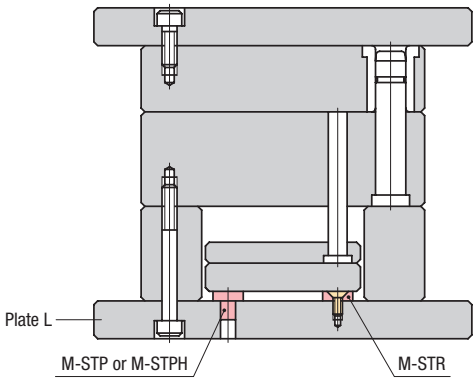
X	Y	Spring coil	Optional spec.
X100	Y125	FSB12/L70	CCW
X115	Y150		CCR

Added Stop Pins or Stop Rings

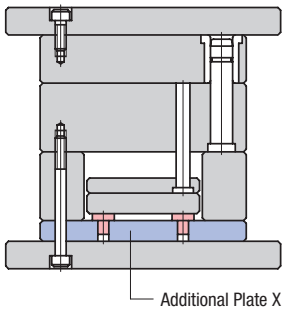
Install stop pins or stop rings.

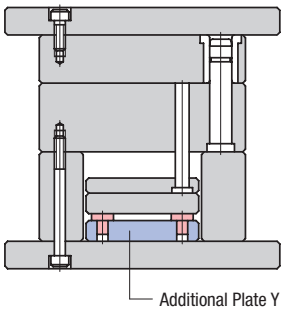
Stop pin, stop ring M-STP, M-STPH, M-STR ➡ P.345

Application Mold bases (excluding the types without ejector plates)



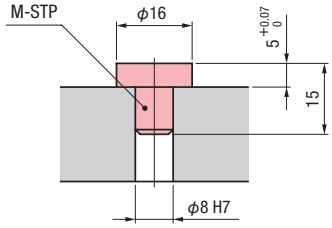
If installing additional Plate X or Plate Y, Additional plate specification ➡ P.38
Install stop pins or stop rings in Plate X or Plate Y.



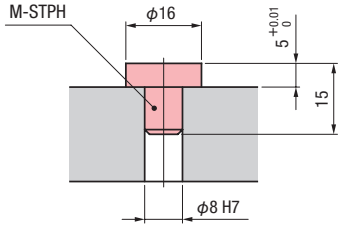


Stop pin, stop ring installation specification

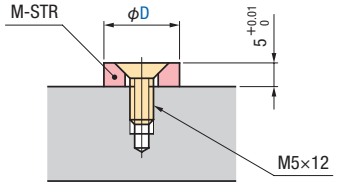
Catalog No. PSTP



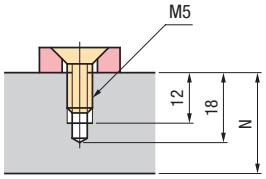
Catalog No. PSTPH



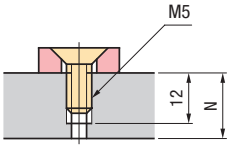
Catalog No. PSTR



Stop ring threaded hole specification



Blind hole spec.



Through hole spec.

The threaded holes for stop ring are blind holes or through hole depending on the N dimension.

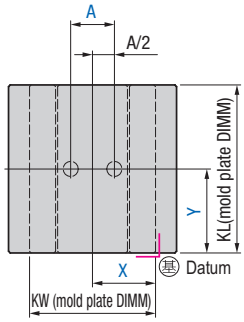
Blind hole specification	N≧21
Through hole specification	N＜21

Catalog No.	D *1	Position code	A	B	X	Y	Optional spec
PSTP PSTPH PSTR	16 20 25	S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	EPAT
		S022	—	In 1 mm steps			
		S023 S024 S041 S042 S061	In 1 mm steps				

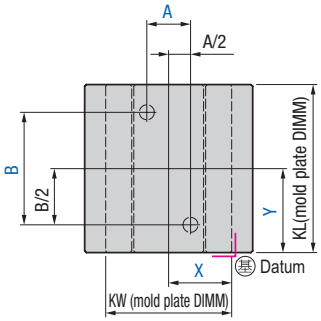
*1. Specify this for Catalog No. PSTR.
※ Install return pins that are shorter by the amount of thickness of stop pins or stop rings (5mm).
※ Place stop pins or stop rings at four places or more. Use two Position code to specify stops pins or stop rings multiple times. This allows you to make various layout.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

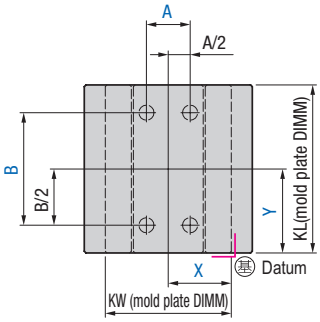
Position code S021



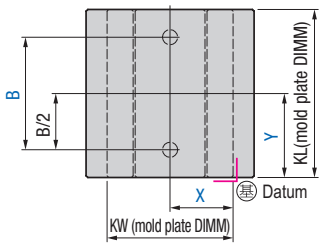
Position code S023



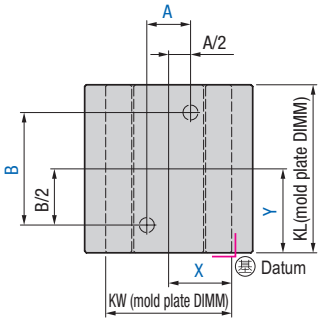
Position code S041



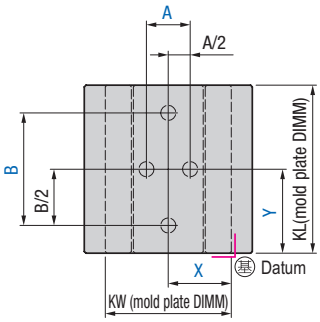
Position code S022



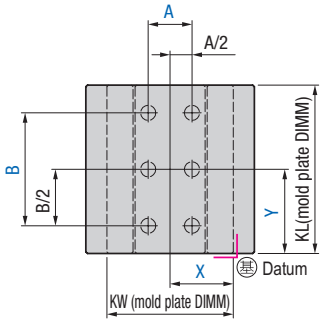
Position code S024



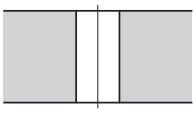
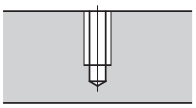
Position code S042



Position code S061



Optional specification (specify only when necessary)

Option code	Specification
EPAT	Only the holes for installing stop pins and stop rings will be machined.  Holes for stop pins  Holes for stop rings

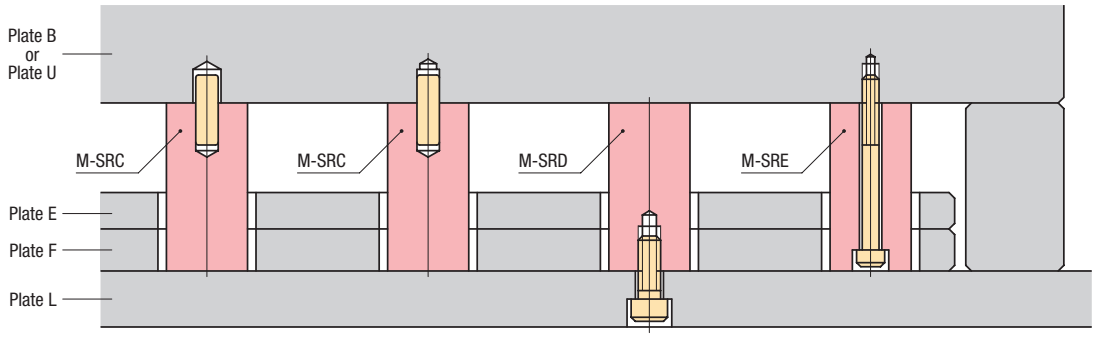
How to order

Catalog No.	–	D	–	Position code	–	A	–	B	–	X	–	Y	–	Optional spec.
PSTPH			–	S041	–	A48	–	B144	–	X75	–	Y90		
PSTR	–	D20	–	S061	–	A80	–	B250	–	X100	–	Y150		

Added Support Pillars — Overview

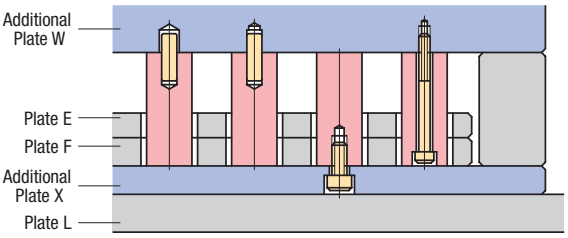
Types and installation methods of support pillars

Three types of support pillars can be installed in mold bases using four different installation methods.

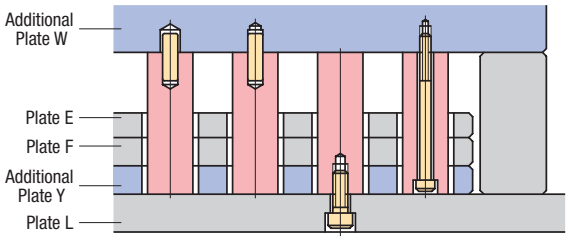


Catalog No. PSRC1 Catalog No. PSRC2 Catalog No. PSRD1 Catalog No. PSRE1

Installation specification in the case of installing additional Plate W, Plate X or Pate Y



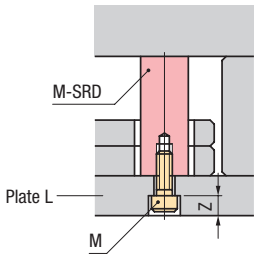
Installation specification in the case of installing additional Plate W and Plate X



Installation specification in the case of installing additional Plate W and Plate Y

Bolt specification of support pillars

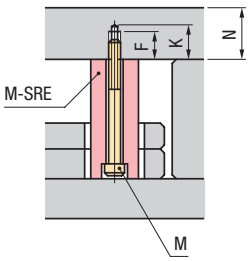
Bolt specification of support pillar M-SRD



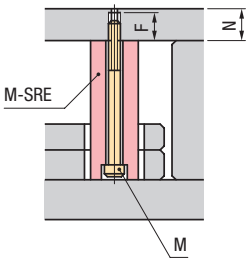
M	Z	Bolt length coefficient
M6	7	12
M8	9	15
M12	13	22

※ Calculation of bolt length
Bolt length=Plate L thickness−Z+bolt length coefficient Round down the last digit of calculation result, 0-4 to 0 and 5-9 to 5.

Bolt specification of support pillar M-SRE



Blind hole spec.



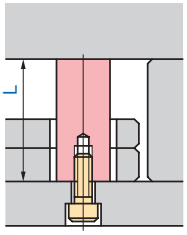
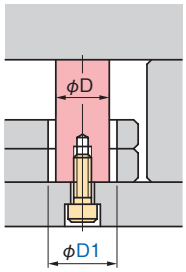
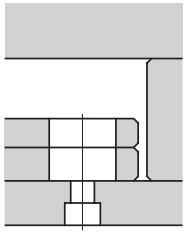
Through hole spec.

M	F	K max	Blind hole spec.	Through hole spec	Bolt length coefficient	N
M6	13	20	N≧23	N＜23	5	N≧13
M8	15	21	N≧24	N＜24	5	N≧15
M10	17	25	N≧28	N＜28	3	N≧17
M12	19	28	N≧31	N＜31	3	N≧19
M16	23	34	N≧37	N＜37	3	N≧23

※ Calculation of bolt length
Bolt length=support pillar length+bolt length coefficient Round down the last digit of calculation result, 0-4 to 0 and 5-9 to 5.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

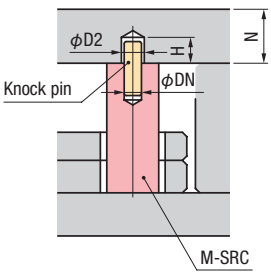
Optional specification (specify only when necessary)

Option code	Specification	
CLK		Change the limit deviation of support pillar L dimension. ■ **How to specify:** **CLK＜Upper deviation / Lower deviation＞** ※ Specify limit deviation in 0.01 mm steps ※ Tolerance: 0.02 mm or more Tolerance＝Upper deviation – lower deviation [E.g.] CLK ＜＋0.01/ －0.01 ＞
CDA		Change the ejector plate D1 dimension. ■ **How to specify:** **CDA** D1 DIMM ※ Specify D1 dimension in 1 mm steps D1 ≧ D ＋ 2 [E.g.] CDA45
EPAT		Only holes for installing support pillar will be machined.

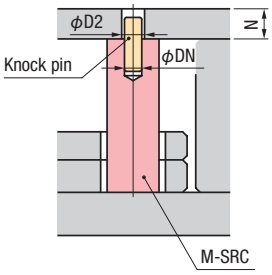
※ Shown in the chart are support pillar M-SRD, but similar applications can also applied to M-SRC and M-SRE.

Knock pin hole specification of support pillars

Catalog No. PSRC1



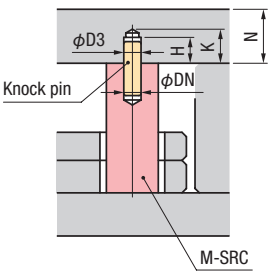
Blind hole spec.



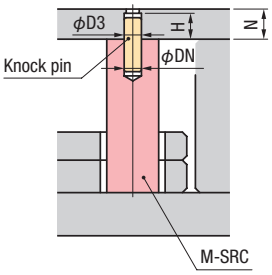
Through hole spec.

DN	D2	H	Blind hole spec	Through hole spec
8	8.2	17	N≧22	17≦N＜22
10	10.2	17	N≧23	17≦N＜23
16	16.2	22	N≧30	22≦N＜30

Catalog No. PSRC2



Blind hole spec.



Through hole spec

DN	D3 H7	H	K max	Blind hole spec	Through hole spec
8	8	17	22	N≧24	17≦N＜24
10	10	17	22	N≧25	17≦N＜25
16	16	22	29	N≧32	22≦N＜32

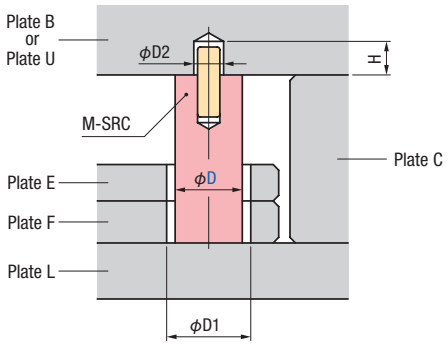
Added Support Pillars

Install support pillars. For details on installation specifications, refer to pages 142 to 143.

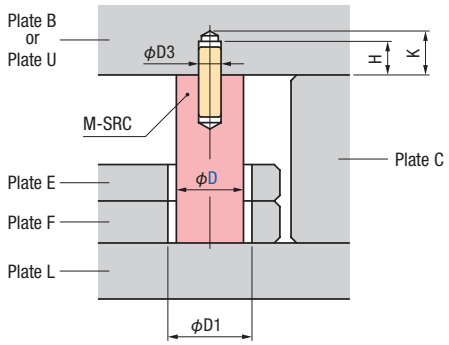
Support pillars M-SRC ➡ P.343 M-SRD ➡ P.342 M-SRE ➡ P.344

Application Mold bases

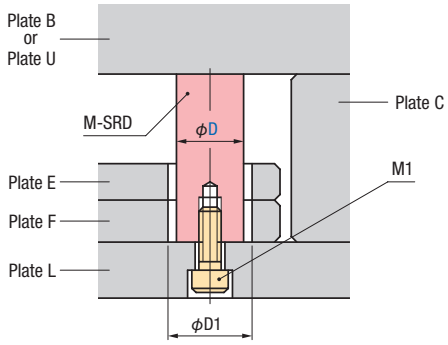
Catalog No. **PSRC1**



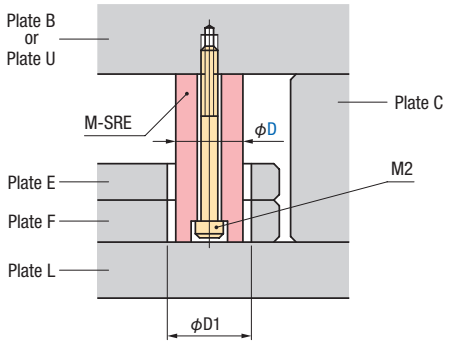
Catalog No. **PSRC2**



Catalog No. **PSRD1**



Catalog No. **PSRE1**

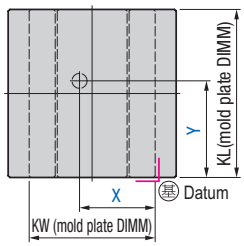


D	D1	D2	D3 H7		H	K max	M1	M2
20	22	8.2	8	+0.015 0	17	22	M6	M6
25	27	10.2	10				M8	M8
30	32							
35	37							M10
40	42							M12
50	52							M16
60	63	16.2	16	+0.018 0	22	29	M12	
80	83							

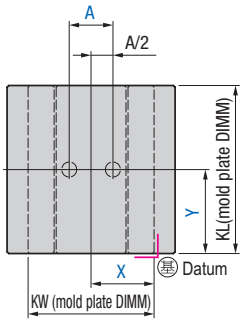
Catalog No.	D	Position code	A	B	X	Y	Optional spec.
PSRC1 PSRC2 PSRD1 PSRE1	20 25 30 35 40 50 60 80	S011	—	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	CLK CDA EPAT See page 143
		S021	In 1 mm steps				
		S022	—	In 1 mm steps			
		S023 S024 S041 S042	In 1 mm steps				

※ Specify adjustments of the support pillars and spacer block thickness with optional specification.
If not specified, the adjustment will be made according to the accuracy requirements of respective parts.

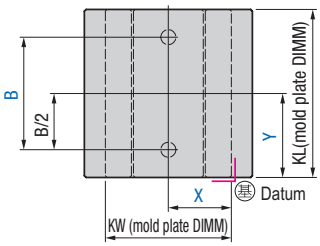
Position code S011



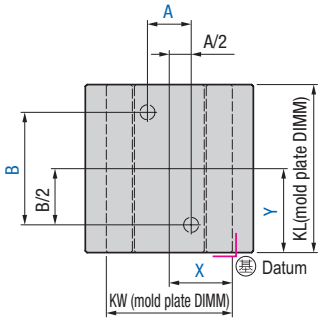
Position code S021



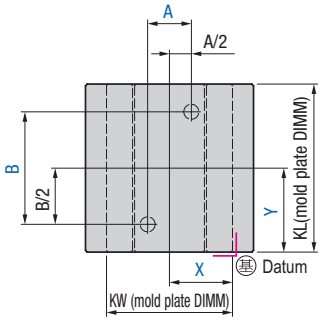
Position code S022



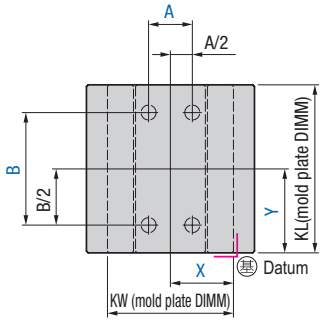
Position code S023



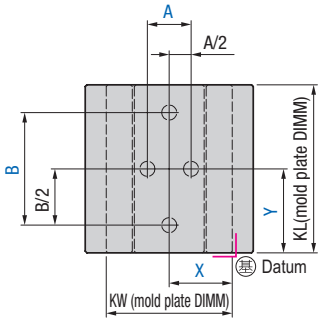
Position code S024



Position code S041



Position code S042



How to order

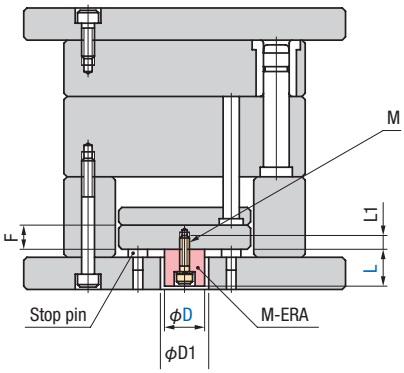
Catalog No.	D	Position code	A	B	X	Y	Optional spec.
PSRD1	D30	S041	A100	B180	X150	Y175	CLK<+0.03/+0.01>

Added Ejector Rods

Install ejector rods.

Ejector rods M-ERA ➡ P.346, Machining only holes for ejector rods ➡ P.236

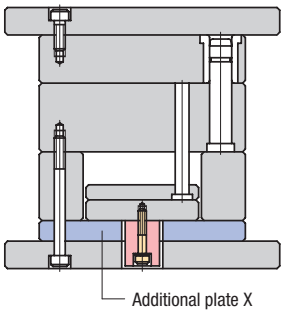
Application Mold bases (excluding the types without ejector plates)

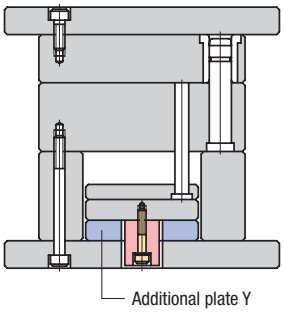


※ Installing stops pins ➡ P.140

If installing additional Plate X or Plate Y: Additional plate specification ➡ P.38

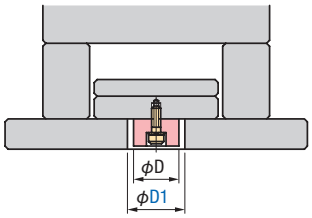
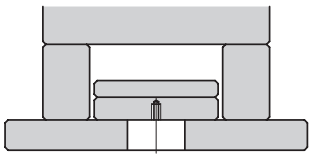
The holes for ejector rods will be machined in Plate X and Plate Y.





D	D1	M	L1					L
			13≦F<15	15≦F<20	20≦F<25	25≦F<30	30≦F	
20	24	M6	7	7	7	12	12	15 20 25 30 35 40
25	29	M8	Installation not allowed	9	9	14	14	20 25 30 35 40
30	34							20 25 30 35 40 50
35	40							25 30 35 40 50
40	45	M10	Installation not allowed	Installation not allowed	Installation not allowed	11	16	25 30 35 40 50
50	55							30 35 40 50 60

Optional specification (specify only when necessary)

Option code	Specification	
CDA		Change D1 dimension. ■ **How to specify** CDA [D1 DIMM.] ※ Specify D1 dimension in 1 mm steps D1 ≧ D + 2 [E.g.] CDA45
EPAT		Only holes for installing ejector rods will be machined.

Catalog No.	D	L	X	Y	Optional spec.
PERA1 PERA2 *1 PERA3 PERA4A PERA4B *1 PERA5A PERA5B PERA7 PERA9	20 25 30 35 40 50	Select from above table	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	CDA EPAT *2

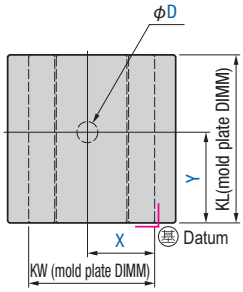
*1. The mold bases with nominal dimension range from 1113 through 2550 have holes for installing standard ejector rods at the center. If specifying PERA2 or PERA4B, the holes will be eliminated.

*2. If selecting EPAT, it is not necessary to specify L dimension.

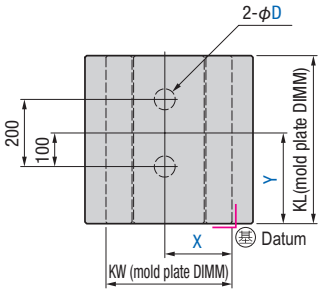
※ The mold bases with nominal dimension range form from 1113 through 2550 have holes for installing standard ejector rods at the center. If specifying to install any ejector rods, the standard diameter will change to the specified diameter.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

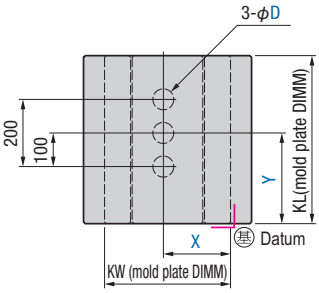
Catalog No. PERA1



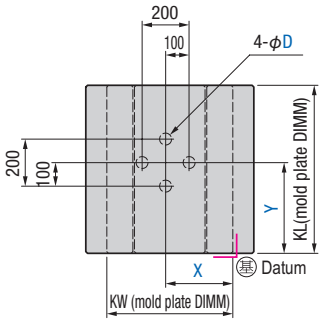
Catalog No. PERA2



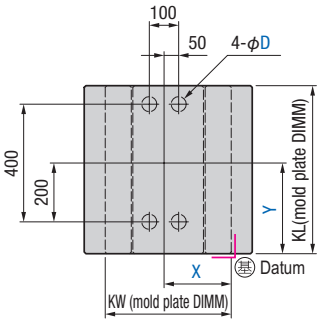
Catalog No. PERA3



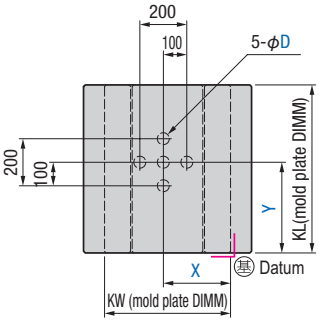
Catalog No. PERA4A



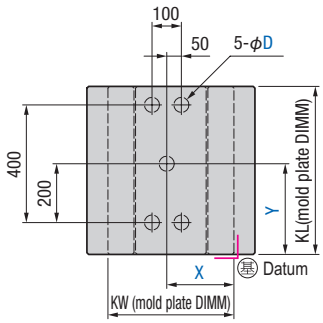
Catalog No. PERA4B



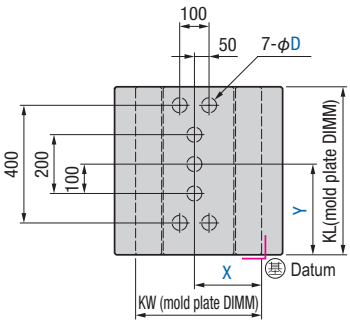
Catalog No. PERA5A



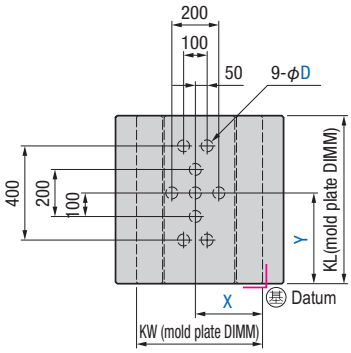
Catalog No. PERA5B



Catalog No. PERA7



Catalog No. PERA9



How to order

Catalog No.	—	D	—	L	—	X	—	Y	—	Optional spec.
PERA3	—	D30	—	L25	—	X80	—	Y150	—	CDA40

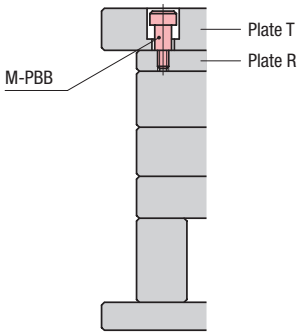
Added Puller Bolts — Overview ①

Puller bolt installation method

Puller bolts can be installed in mold bases in nine different ways of installation methods:

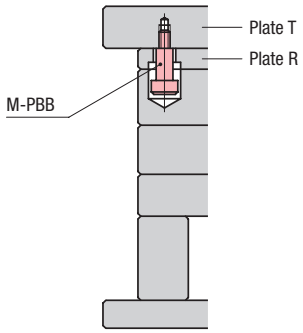
Mold opening control of Plate T and Plate R

Catalog No. PPBB1



How to order ➡ P.154

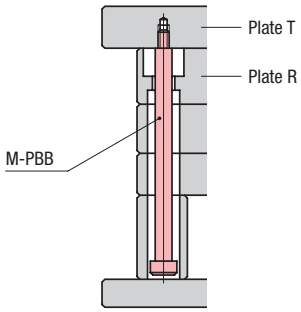
Catalog No. PPBB2



How to order ➡ P.156

Mold opening control of Plate T and Plate A

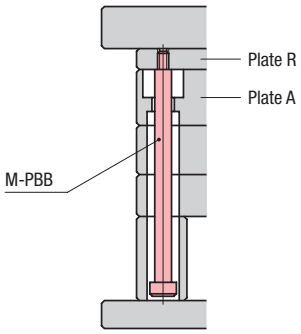
Catalog No. PPBB4



How to order ➡ P.160

Mold opening control of Plate A and R

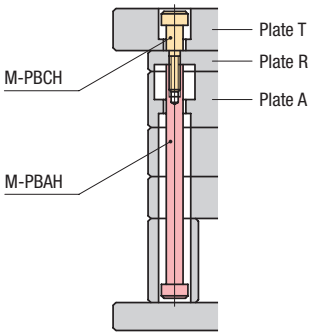
Catalog No. PPBB3



How to order ➡ P.158

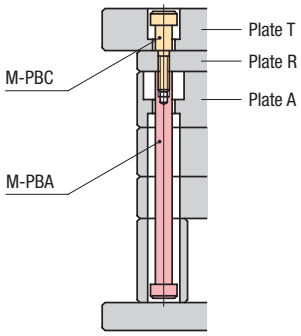
Mold opening control of Plate T & R, and R &A

Catalog No. PPBAH1 Ground shank type



How to order ➡ P.164

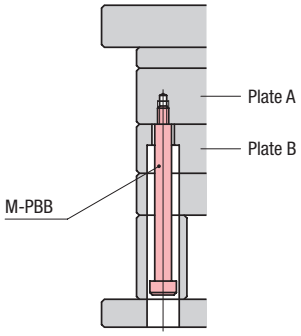
Catalog No. PPBA1



How to order ➡ P.166

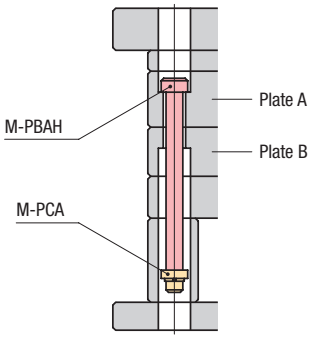
Mold opening control of Plate A and B

Catalog No. PPBB5



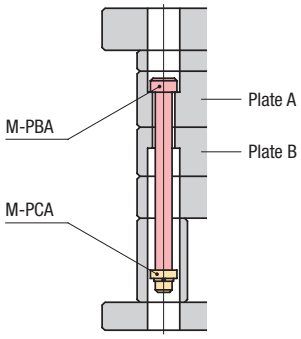
How to order ➡ P.162

Catalog No. PPBAH2 Ground shank type



How to order ➡ P.168

Catalog No. PPBA2



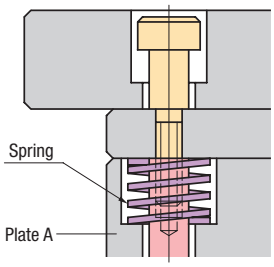
How to order ➡ P.168

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

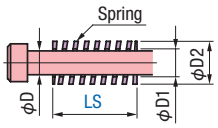
Optional Specification (specify only when necessary)

Option code	Specification

PSR



Spring specification



Depending on the diameter of puller bolts, four types of springs that fit are available.

*1. If M-TY or M-TR coil springs for D1=13 are finished to lower deviation, the bolt may not go through the spring.

Spring length and constant ➡ P.392

Type	Spring M-FSB			Spring M-TY			Spring M-TR			Spring P-TF		
Color	Light green			Yellow			Ivory			Yellow		
D	Part code	D1	D2	Part code	D1	D2	Part code	D1	D2	Part code	D1	D2
10	FSB10	10.5	17.5	TY17	11	17	TR17	11	17	TF20	11	20
										TF22	11	22
13	FSB12	13.2	21.5	TY21	13 *1	21	TR21	13 *1	21	TF25	13.5	25
										TF27	13.5	27
16	—	—	—	TY26	16.5	26	TR26	16.5	26	TF35	19	35
20	FSB20	20.5	32.5	TY32	21	32	TR32	21	32	TF40	22	40
25	FSB25	25.5	39.5	TY39	26	39	TR39	26	39	TF50	27.5	50

Install springs into the spring holes in Plate A.

■ **Applicable item**

Catalog No. PPBB3, PPBB4, PPBAH1, PPBA1

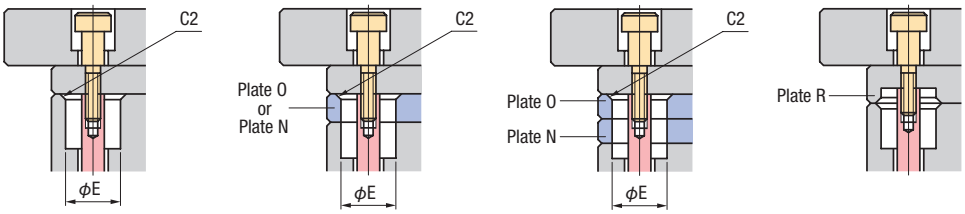
※ Combined use with EPAT is not allowed.

■ **How to specify:**

PSR/part code/LS LS DIMM

[e.g.] PSR/FSB10/LS50

CCE



When installing additional Plate O or N

When installing additional Plate O and N

When counterbores are provided in Plate R

Produce chamfers of C2 in the ϕE holes. If installing Plate O or/and Plate N, the configuration will be as shown In the above charts. If machining counterbores in Plate R. produce chamfers in the Plate R as well.

※ This does not apply when the depth of the spot-faces is less than 5 mm.

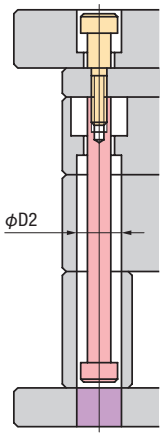
■ **Applicable item:**

Catalog No. PPBB3, PPBB4, PPBAH1, PPBA1

■ **How to specify:**

CCE

EHD



Machine ϕ D2 holes through to the plate specified. All the holes machined are through holes.

■ **Applicable item:**

Catalog No. PPBB3, PPBB4, PPBB5, PPBAH1, PPBA1 PPBAH2, PPBA2, PPBAHS, PPBAS

■ **How to specify:**

EHD/plate code

※ Plate codes ➡ P.13

※ If the ϕ D2 holes pass through Plate C, Plate E, Plate F and additional Plate Y, specify the plate code as shown below:

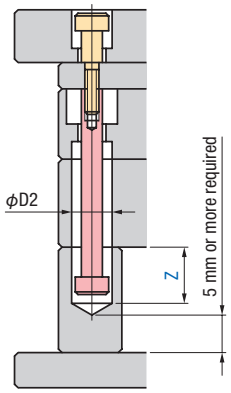
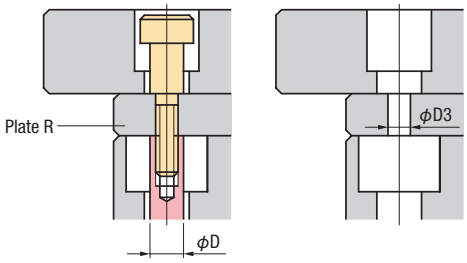
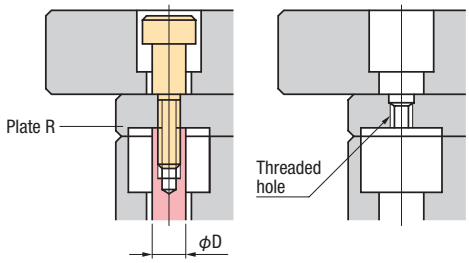
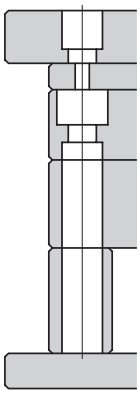
Plates in which to machine ϕD2 holes	Plate code
Machine ϕD2 holes only in Plate C	C
Machine ϕD2 holes in Plate C and E	C/E
Machine ϕD2 holes in Plate C, E, and F.	C/E/F
Machine ϕD2 holes in Plate C, E, F and Y	C/E/F/Y

※ Combined use with MHD is not allowed.

[e.g.] EHD/L

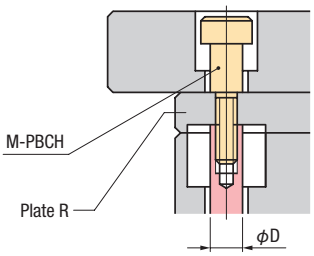
Added Puller Bolts — Overview ②

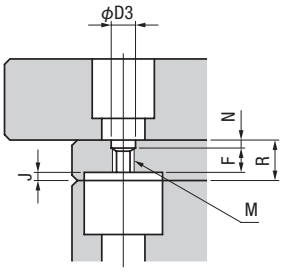
Optional specification (specify only when necessary)

Option code	Specification
MHD	 Machine ϕ D holes in the plate specified as blind holes. ■ **Applicable item:** Catalog No. PPBB3, PPBB4, PPBB5, PPBAH1, PPBA1, PPBAH2, PPBA2, PPBAHS, PPBAS ■ **Not applicable:** ① If the ϕD2 holes pass through Plate C, E, F and additional Plate Y, the Plate C cannot be specified. ② Plate E, F and additional Plate Y cannot be specified. ■ **Not applicable:** MHD/plate code/Z Z DIMM ※ Plate codes ➡ P.13 ※ Combined use of EHD is not allowed. [e.g.] MHD/C/Z30
CRD	 Change the diameter of holes (ϕD3) for puller bolts in Plate R. D: 10, 13, 16, 20, 25 D3: 6.2, 8.2, 10.2, 12.2, 16.2 ■ **Applicable item:** Catalog No. PPBAH1, PPBA1, PPBAHS, PPBAS ■ **How to specify:** CRD ※ Combined use with CRM is not allowed.
CRM	 Change the puller bolt holes to threaded holes. For details on the shape & dimensions of the threaded holes, see the right page. ■ **Applicable item:** Catalog No. PPBAH1, PPBAHS ■ **How to specify:** CRM ※ Combined use with CRD is not allowed.
EPAT	 Only holes for installing puller bots are provided. ■ **Applicable item:** Catalog No. PPBB1, PPBB2, PPBB3, PPBB4, PPBB5, PPBAH1, PPBA1, PPBAH2, PPBA2, PPBAHS, PPBAS

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Option code CRM detailed dimensions



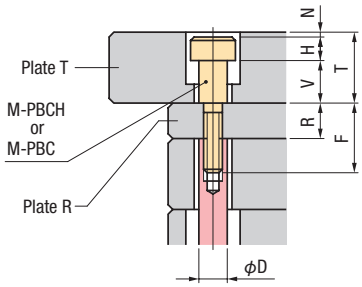


D	M	D3	J	N R=10	N R=15	N R=20	N R=25	N R=30	N R=35	N R=40	N R=50	F (F=R-N-J)
10	M6	7	0	4	4	4	9					6≦F≦16
			1	×			8					
			2				7					
			3				6					
			4				5					
			5				4					
			6		×							
			7									
13	M8	9	0	×	5	5	5	10	15			8≦F≦20
			1					9	14			
			2					8	13			
			3		×			7	12			
			4					6	11			
			5					5	10			
			6						9			
			7						8			
16	M10	11	0		×	6	6	6	11	16		10≦F≦24
			1						10	15		
			2						9	14		
			3						8	13		
			4						7	12		
			5			×			6	11		
			6							10		
			7							9		
20	M12	13	0			7	7	7	7	12		12≦F≦28
			1							11		
			2			×				10		
			3							9		
			4							8		
			5							7		
			6									
			7				×					
25	M16	17	0			×	8	8	8	8	18	16≦F≦32
			1								17	
			2				×				16	
			3								15	
			4								14	
			5								13	
			6								12	
			7					×			11	

※ The columns with × denote the combinations to which CRM cannot be specified. The blank columns show no M-PBCH puller bolts is available for application.

Added Puller Bolts — Overview ③

Select Puller bolt M-PBCH, M-PBC



The size of puller bolts M-PBCH and M-PBC are set according to the thickness of Plate T and Plate R. The combinations not listed herein cannot be specified with additional processing codes. Please specify us with drawing, etc.

Selection table of puller bolt M-PBCH (ground shank type)

D	T	V	H	N	F R=10	F R=15	F R=20	F R=25	F R=30	F R=35	F R=40	F R=50
10	20	10	8	2	19	24						
	25	15					29					
	30	20						34				
13	20	10	8		22	27						
	25	15					32	37				
	30	20							42			
	35	25								47		
	40	30										
	45	35										
16	25	10	13			30	35					
	30	15						40				
	35	20							45			
	40	25								50	55	
	45	30										
	50	35										
20	30	15	13				38	43				
	35	20							48			
	40	25								53		
	45	30									58	
	50	35										
	60	45										
25	35	15	18				44	49				
	40	20							54	59		
	45	25									64	
	50	30										
	60	40										74

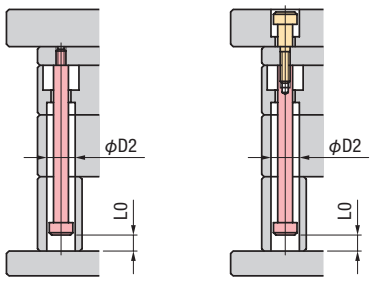
Selection table of puller bolt M-PBC

D	T	V	H	N	F R=10	F R=15	F R=20	F R=25	F R=30	F R=35	F R=40
10	25	16	8	1	22	27					
	30	21									
13	25	14	10		30	30					
	30	19				35	35				
	35	24					40	40			
16	30	15	14			35	35				
	35	20					40	40			
	45	30						45	45	50	
20	35	20	14				45	45			
	45	30						50	50	55	
	50	35							55		
25	50	31	18						60	60	
	60	41								65	65

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Clearance hole specification for puller bolts

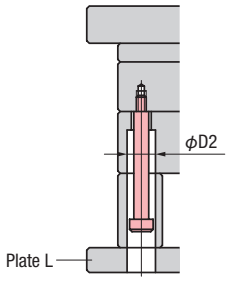
Depending on the length of puller bolts and installation methods, clearance hole ϕD2 will be as follows:



When the distance from the head of the puller bolt to the next plate is L0＜1, the through hole of ϕD2 is machined in the next plate as well.

■ **Applicable item:**

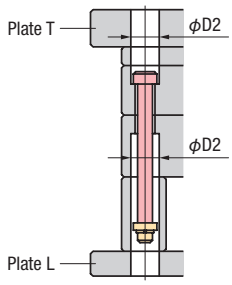
Catalog No. PPBB3, PPBB4, PPBAH1, PPBA1, PBAHS, PPBAS



Regardless of the length of puller bolts, ϕD2 hole will be machined through to Plate L.

■ **Applicable item:**

Catalog No. PPBB5



Regardless of the length of puller bolts, ϕD2 hole will be machined through to Plate L, T.

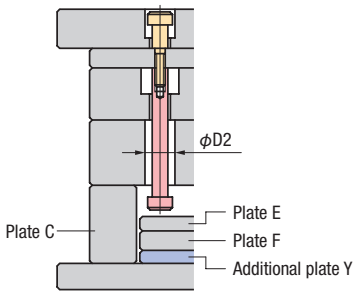
■ **Applicable item**

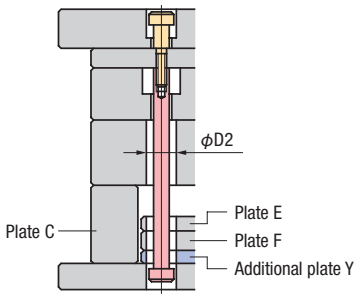
Catalog No. PPBAH2, PBBA2

Clearance hole specification when puller bolt passes through Plate C, E, F and Y

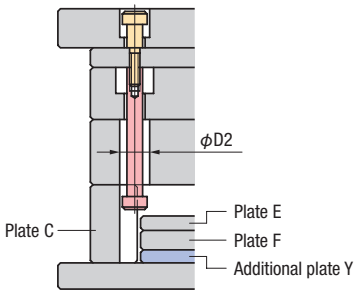
If the puller bolt passes through Plate C, Plate E, Plate F or additional Plate Y, depending on the length of the puller bolt, the ϕD2 hole will be machined through to Plate E, Plate F, or additional Plate Y.

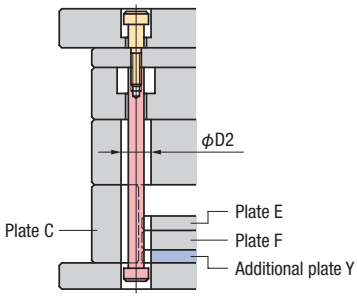
When the puller bolt is at the position which is inner side than Plate C



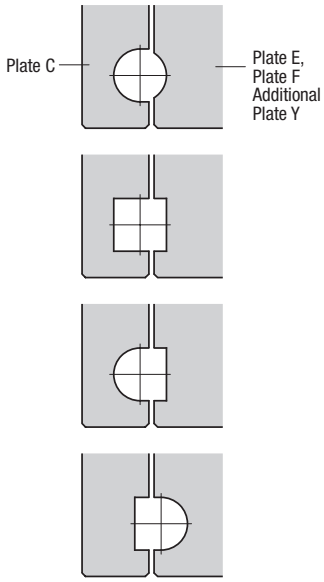


When the puller bolt passes through Plate C, E, F and Y





Shape of clearance hole



When the clearance hole ϕD2 for the puller bolt passes through Plate C, E, F and Y, the hole will be any of the shapes shown above.
On MOLDZUKAN, holes are drawn to the circular shape (at the top of the list above). Note that the hole shape shown on the MOLDZUKAN may be different from the actual shape.

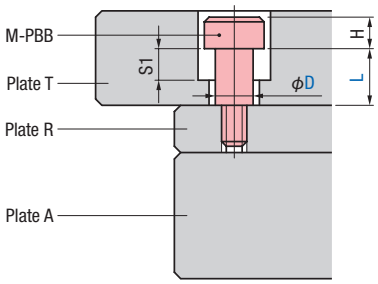
Added Puller Bolt — B1

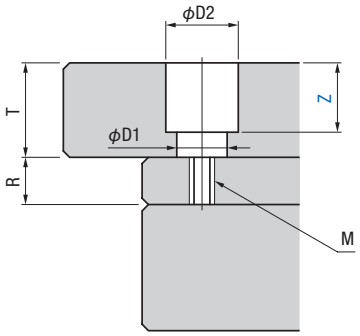
Install puller bolt M-PBB. For details on installation specifications, see pages 148 to 153.

Puller bolts M-PBB ➡ P.314

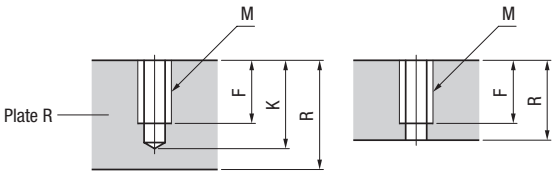
Application Mold bases D series and F series

Catalog No. PPBB1





Threaded hole specification



Blind-hole spec. **Through-hole spec.**

The threaded holes for puller bolts will be blind holes or through holes depending on the thickness of Plate R.

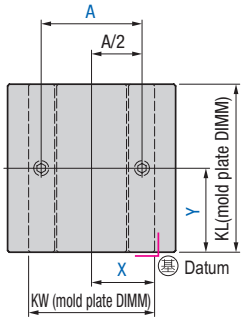
D	M	F	K max	Blind hole spec	Through hole spec.
10	M8	15	21	R≧26	R<26
13	M10	16	24	R≧31	R<31
16	M12	20	29	R≧36	R<36
20	M16	26	37	R≧41	R<41
25	M20	30	43	R≧46	R<46

D	D1	D2	Z	M	H	L	T	R
10	11	19	T−Z≧5 *1 If D=10 or 13, then T−Z≧4 *1	M8	8	16	T≧25	R≧15
						21	T≧30	
						26	T≧35	
						31	T≧40	
13	14	21		M10	10	14	T≧25	R≧15
						19	T≧30	
						24	T≧35	
						29	T≧40	
16	17	27		M12	14	15	T≧30	R≧20
						20	T≧35	
						25	T≧40	
						30	T≧45	
						35	T≧50	
20	21	31		M16	14	20	T≧35	R≧25
						25	T≧40	
						30	T≧45	
						35	T≧50	
						45	T≧60	
25	26	36		M20	18	31	T≧50	R≧30
						41	T≧60	

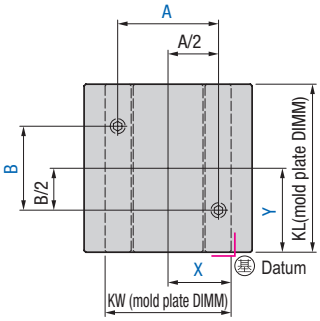
*1. This formula is not a guarantee of strength.
※ Mold opening stroke between Plate T and Plate R
S1=Z+L−T Z=T+S1−L L=T+S1−Z

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

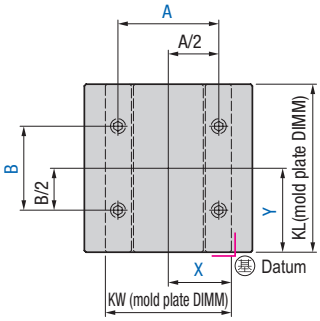
Position code S021



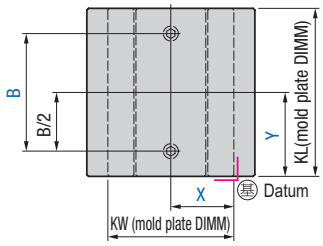
Position code S023



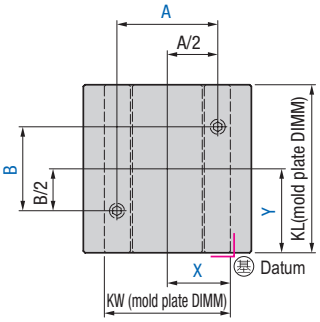
Position code S041



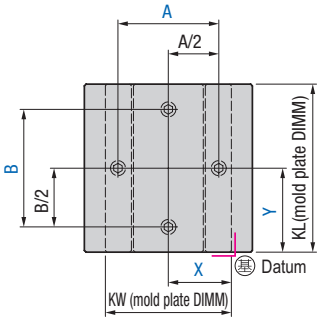
Position code S022



Position code S024



Position code S042



Catalog No.	D	L	Z	Position code	A	B	X	Y	Optional spec.
PPBB1	10 13 16 20 25	Select from left table	In 1 mm steps See Left table	S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	EPAT See page 150
				S022	—	In 1 mm steps			
				S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No. — D — L — Z — Position code — A — B — X — Y

PPBB1 — D13 — L19 — Z16 — S041 — A140 — B200 — X90 — Y125

— Optional spec.

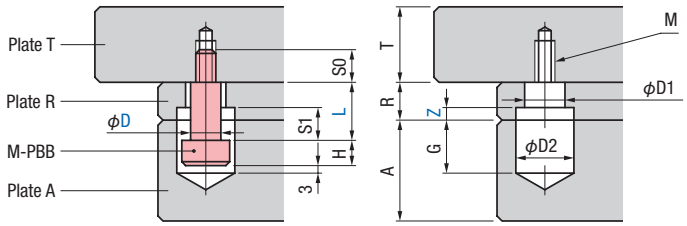
Added Puller Bolts — B2

Install puller bolt M-PBB. For details on the installation specifications, see pages 148 to 153.

Puller bolt M-PBB ➡ P.314

Application Mold bases D series and F series

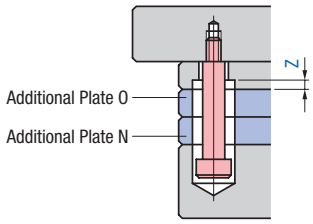
Catalog No. PPBB2



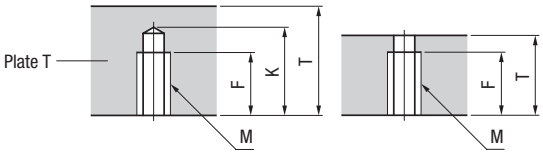
If installing additional Plate O, Plate N:

Additional plate specifications ➡ P.38

The through holes as shown below will be machined in the additional Plate O and N.



Threaded hole specification



Blind-hole spec. **Through-hole spec.**

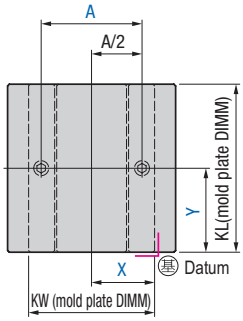
The threaded holes for puller bolts will be blind holes or through holes depending on the thickness of Plate T.

D	M	F	K max	Blind hole spec	Through hole spec
10	M8	15	21	T≧26	T<26
13	M10	16	24	T≧31	T<31
16	M12	20	29	T≧36	T<36
20	M16	26	37	T≧41	T<41
25	M20	30	43	T≧46	T<46

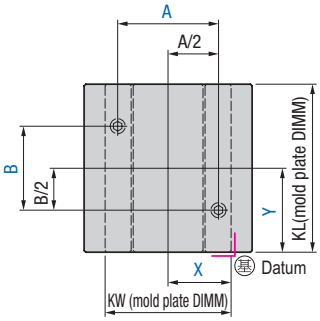
D	D1	D2	Z	M	G *2 *3	S0	H	L	R+A *2
10	11	19	R−Z≧5 *1	M8	If G=L−R−(O+N)+11 and G≧A−10, then through hole is provided	13	8	13	R+A+(O+N)≧22
								16	R+A+(O+N)≧25
								21	R+A+(O+N)≧30
								26	R+A+(O+N)≧35
								31	R+A+(O+N)≧40
13	14	21		M10	If G=L−R−(O+N)+13 and G≧A−11, then through hole is provided	14	10	13	R+A+(O+N)≧24
								14	R+A+(O+N)≧25
								19	R+A+(O+N)≧30
								24	R+A+(O+N)≧35
								29	R+A+(O+N)≧40
16	17	27		M12	If G=L−R−(O+N)+17 and G≧A−12, then through hole is provided	18	14	13	R+A+(O+N)≧28
								15	R+A+(O+N)≧30
								20	R+A+(O+N)≧35
								25	R+A+(O+N)≧40
								30	R+A+(O+N)≧45
								35	R+A+(O+N)≧50
20	21	31		M16	If G=L−R−(O+N)+17 and G≧A−14, through hole is provided	24	14	16	R+A+(O+N)≧31
								20	R+A+(O+N)≧35
								25	R+A+(O+N)≧40
								30	R+A+(O+N)≧45
								35	R+A+(O+N)≧50
								45	R+A+(O+N)≧60
25	26	36		M20	If G=L−R−(O+N)+21 and G≧A−15 then, through hole is provided	28	18	31	R+A+(O+N)≧50
								41	R+A+(O+N)≧60

*1. This formula is not a guarantee of strength.
*2. If installing additional Plate O and N, add the thickness of Plate O and N.
*3. If G is negative value, the hole of ϕD2 will not be provided in Plate A.
※ Mold opening stroke between Plate T and Plate R
S1=Z+L−R Z=R+S1−L L=R+S1−Z

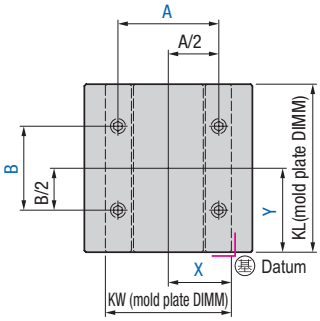
Position code S021



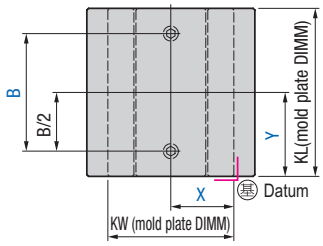
Position code S023



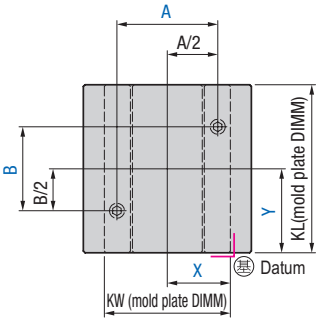
Position code S041



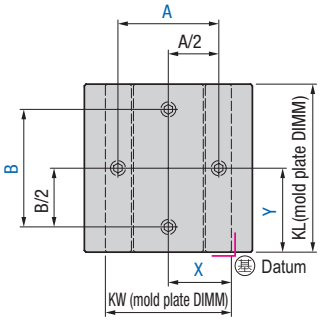
Position code S022



Position code S024



Position code S042



Catalog No.	D	L	Z	Position code	A	B	X	Y	Optional spec.
PPBB2	10 13 16 20 25	Select from left table	In 1 mm steps See left table	S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	EPAT See page 150
				S022	—	In 1 mm steps			
				S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No. — D — L — Z — Position code — A — B — X — Y

PPBB2 — D16 — L20 — Z15 — S041 — A200 — B250 — X125 — Y150

— Optional spec.

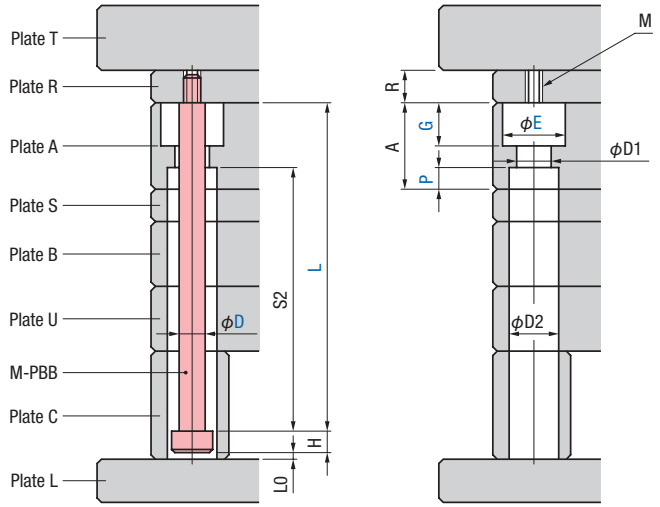
Added Puller Bolts — B3

Install puller bolt M-PBB. For details on installation specifications, see pages 148 to 153.

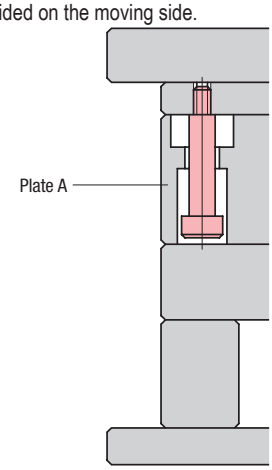
Puller bolt M-PBB ➡ P.314

Application Mold bases D series and F series

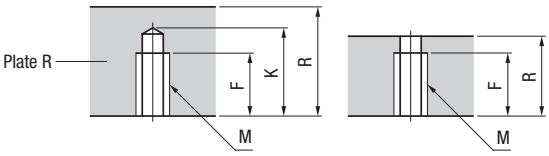
Catalog No. PPBB3



If puller bolts are shorter than the thickness of Plate A, the clearance hole will not be provided on the moving side.



Threaded hole specification



Blind-hole spec. **Through-hole spec.**

The threaded holes for puller bolts will be blind holes or through holes depending on the thickness of Plate R.

D	M	F	K max	Blind hole spec	Through hole spec
10	M8	15	21	R≧26	R<26
13	M10	16	24	R≧31	R<31
16	M12	20	29	R≧36	R<36
20	M16	26	37	R≧41	R<41
25	M20	30	43	R≧46	R<46

Diameter in the case of installing additional plates: Additional plate specification ➡ P.38

Diameter of Plate O and N → φD1 If E dimension is specified, however, φE is used.
Diameter of Plate Q, Plate V, Plate W and Plate X → φD2

※ If installing either or both of additional Plate O or/ and Plate N, specifying E dimension and G=0, the counterbore holes in Plate A will be eliminated and φE through hole will be provided in Plate O or N.

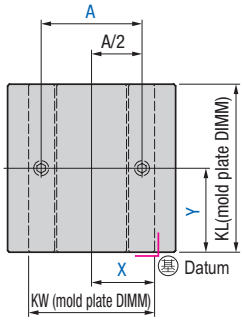
D	D1	D2	P *1	E *1	Recommended value	G *1	M	H	R
10	11	19	P≦ 80	15 to 60	19 22 24	See table below	M8	8	R≧15
13	14	21	P≦100	In 1 mm	23 27 29		M10	10	R≧15
16	17	27	P≦110	steps	28 37		M12	14	R≧20
20	21	31	P≦130	Provided	34 42		M16	14	R≧25
25	26	36	P≦140	E≧D+5	41 52		M20	18	R≧30

*1. Specify P, E and G as necessary.
P+G+5≦A (This formula is not a guarantee of strength.)
※ Mold opening stroke between Plate R and Plate A
S2=L−A+P P=S2+A−L L=S2+A−P
※ If the distance from the head of puller bolt to the next plate is L0<1, φD2 through hole is provided in the next plate as well.

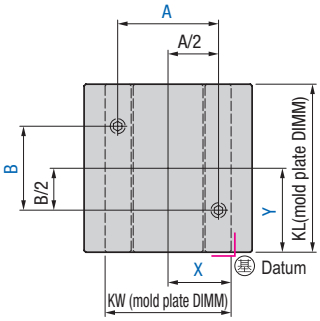
Relation of counterbore diameter E and depth G

E	G max
15 to 19	G≦50
20 to 27	G≦60
28 to 34	G≦80
35 to 44	G≦90
45 to 60	G≦100

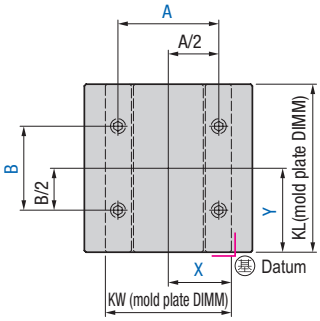
Position code S021



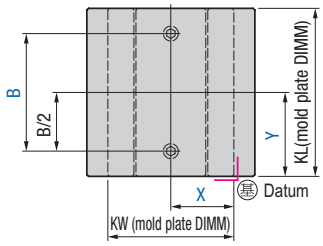
Position code S023



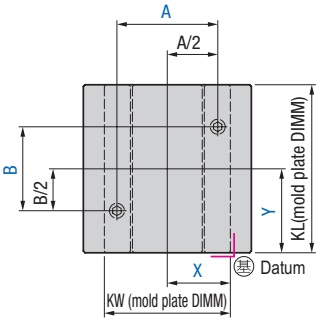
Position code S041



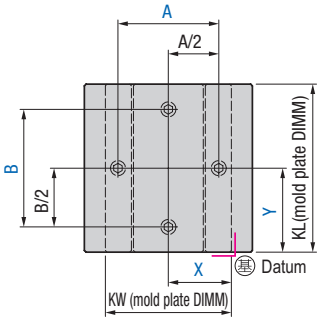
Position code S022



Position code S024



Position code S042



L dimension of puller bolt M-PBB

D	L																							
10	13	16	21	26	31		60	70	80	90	100	110	120	130	140	150	160							
13	13	14	19	24	29			70	80	90	100	110	120	130	140	150	160	170	180					
16	13	15	20	25	30	35			80	90	100	110	120	130	140	150	160	170	180	190	200			
20	16	20	25	30	35	45					100	110	120	130	140	150	160	170	180	190	200	220	240	
25	31	41														150	160	170	180	190	200	220	240	260

Catalog No.	D	L	P	E	G	Position code	A	B	X	Y	Optional spec.
PPBB3	10 13 16 20 25	Select from above table	In 1 mm steps See left table Omit this if unnecessary			S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	PSR CCE EHD MHD EPAT See page 149
						S022	—	In 1 mm steps			
						S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No. — D — L — P — E — G — Position code — A — B

PPBB3 — D20 — L200 — P5 — E34 — G30 — S024 — A240 — B200

— X — Y — Optional spec.

— X150 — Y200 — PSR/FSB20/LS50

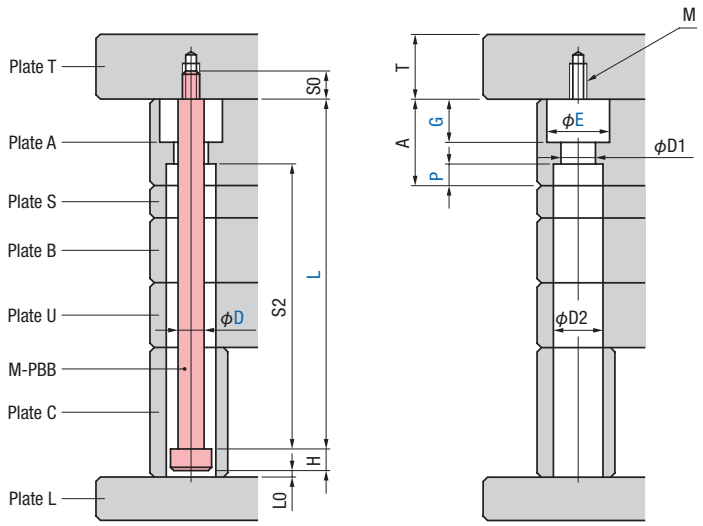
Added Puller Bolts — B4

Install puller bolt M-PBB. For details on the installation specifications, see pages 148 to 153.

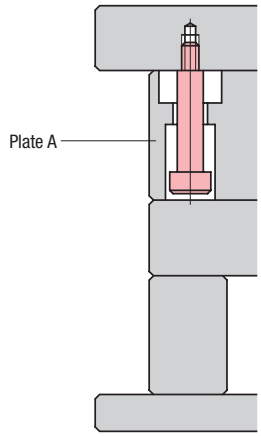
Puller bolt M-PBB ➡ P.314

Application Mold bases E series and G series

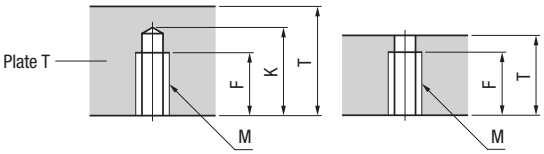
Catalog No. PPBB4



If puller bolts are shorter than the thickness of Plate A, the clearance hole will not be provided on the moving side.



Threaded hole specification



Blind-hole spec. **Through-hole spec.**

The threaded holes for puller bolts will be blind holes or through holes depending on the thickness of Plate T.

D	M	F	K max	Blind hole spec	Through hole spec
10	M8	15	21	T≧26	T<26
13	M10	16	24	T≧31	T<31
16	M12	20	29	T≧36	T<36
20	M16	26	37	T≧41	T<41
25	M20	30	43	T≧46	T<46

Diameter in the case of installing additional plates: Additional plate specification ➡ P.38

Diameter of Plate N → ϕD1 If E dimension is specified, however, ϕE is used.
Diameter of Plate Q, Plate V, Plate W and Plate X → ϕD2.

※ If installing additional Plate N, specifying E dimension and G=0, the counterbore hoels in Plate A will be eliminated and ϕE through hole will be provided in Plate N.

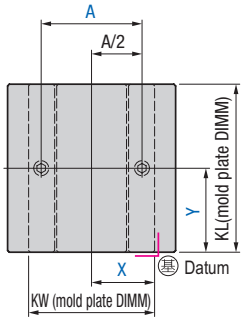
D	D1	D2	P *1	E *1	Recommended value	G *1	M	S0	H
10	11	19	P≦80	15 to 60	19 22 24	See table below	M8	13	8
13	14	21	P≦100	In 1 mm	23 27 29		M10	14	10
16	17	27	P≦110	steps	28 37		M12	18	14
20	21	31	P≦130	Provided	34 42		M16	24	14
25	26	36	P≦140	E≧D+5	41 52		M20	28	18

*1. Specify P, E and G as necessary.
P+G+5≦A (This formula is not a guarantee of strength.)
※ Mold opening stroke between Plate T and Plate A
S2=L−A+P P=S2+A−L L=S2+A−P
※ If the distance from the head of puller bolt to the next plate is L0<1, ϕD2 through hole will be provided in the next plate as well.

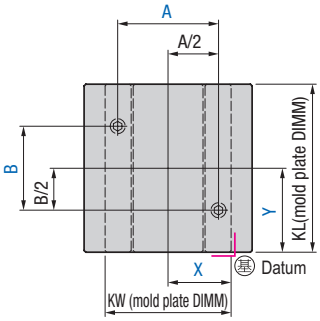
Relation of counterbore diameter E and depth G

E	G max
15 to 19	G≦50
20 to 27	G≦60
28 to 34	G≦80
35 to 44	G≦90
45 to 60	G≦100

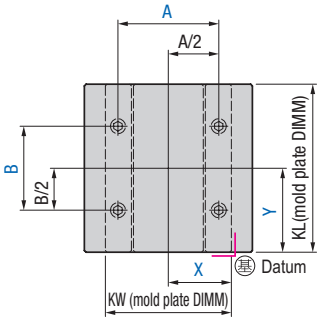
Position code S021



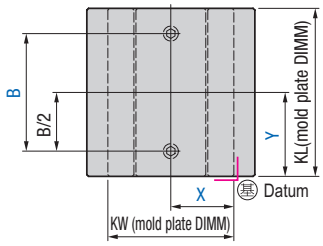
Position code S023



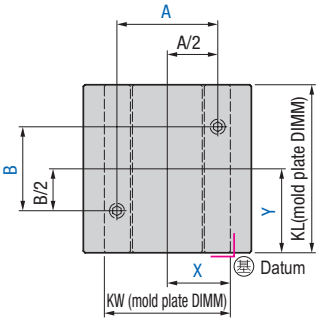
Position code S041



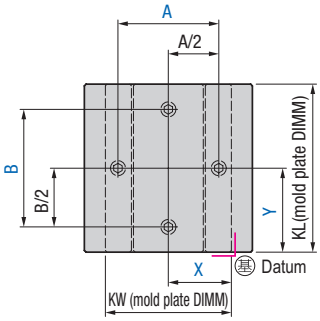
Position code S022



Position code S024



Position code S042



L dimension of puller bolt M-PBB

D	L																							
10	13	16	21	26	31		60	70	80	90	100	110	120	130	140	150	160							
13	13	14	19	24	29			70	80	90	100	110	120	130	140	150	160	170	180					
16	13	15	20	25	30	35			80	90	100	110	120	130	140	150	160	170	180	190	200			
20	16	20	25	30	35	45					100	110	120	130	140	150	160	170	180	190	200	220	240	
25	31	41														150	160	170	180	190	200	220	240	260

Catalog No.	D	L	P	E	G	Position code	A	B	X	Y	Optional spec.
PPBB4	10 13 16 20 25	Select from above table	In 1 mm steps See left table Omit this if unnecessary			S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	PSR CCE EHD MHD EPAT See page 149
						S022	—	In 1 mm steps			
						S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No. — D — L — P — E — G — Position code — A — B

PPBB4 — D20 — L200 — P5 — E34 — G30 — S023 — A200 — B150

— X — Y — Optional spec.

— X125 — Y150 — PSR/FSB20/LS50

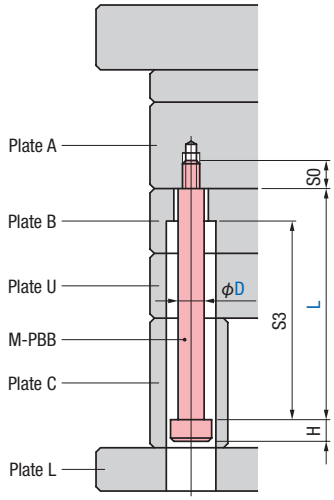
Added Puller Bolts — B5

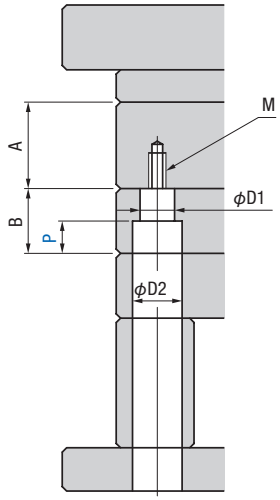
Install puller bolt M-PBB. For details on installation specifications, see pages 148 to 153.

Puller bolts M-PBB ➡ P.314

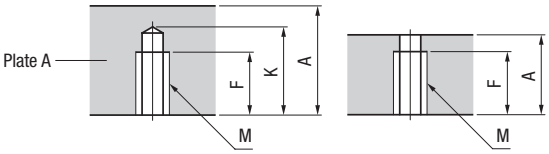
Application Mold bases D·E series, F·G series, H series (excluding the types with Plate S from each series)

Catalog No. PPBB5





Threaded hole specification



Blind-hole spec. **Through-hole spec.**

The threaded holes for puller bolts will be blind holes or through holes depending on the thickness of Plate A.

D	M	F	K max	Blind hole spec	Through hole spec
10	M8	15	21	A≧24	A<24
13	M10	16	24	A≧27	A<27
16	M12	20	29	A≧32	A<32
20	M16	26	37	A≧40	A<40
25	M20	30	43	A≧46	A<46

Diameter in the case of installing additional plates: Additional plate specification ➡ P.38

Diameter of Plate W and Plate X → ϕD2

If installing either of additional plates of Plate Q or Plate V, order with additional processing codes is not allowed. Please order with drawings, etc.

D	D1	D2	P *1	M	S0	H	A
10	11	19	P≦50	M8	13	8	A≧15
13	14	21	P≦60	M10	14	10	A≧15
16	17	27	P≦60	M12	18	14	A≧20
20	21	31	P≦80	M16	24	14	A≧25
25	26	36	P≦90	M20	28	18	A≧30

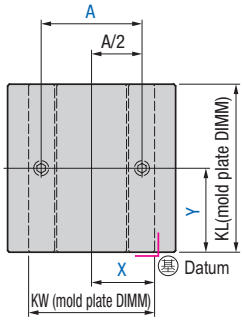
*1. Specify P as necessary.
P+5≦B (This formula is not a guarantee of strength.)

※ Regardless of the length of the puller bolt, the ϕD2 hole will be machined through to the Plate L.

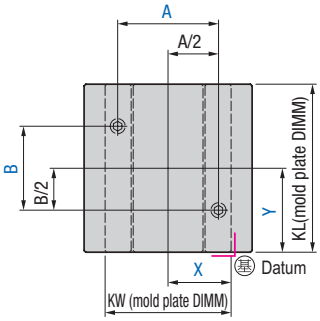
※ Mold opening stroke between Plate A and Plate B
S3=L+P−B P=S3+B−L L=S3+B−P

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

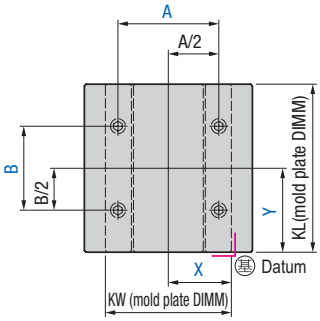
Position code S021



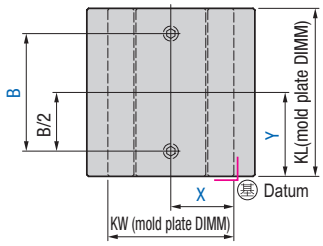
Position code S023



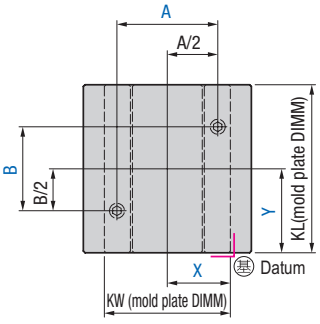
Position code S041



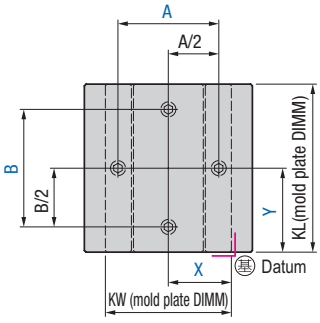
Position code S022



Position code S024



Position code S042



L dimension of puller bolt M-PBB

D	L																							
10	13	16	21	26	31		60	70	80	90	100	110	120	130	140	150	160							
13	13	14	19	24	29			70	80	90	100	110	120	130	140	150	160	170	180					
16	13	15	20	25	30	35			80	90	100	110	120	130	140	150	160	170	180	190	200			
20	16	20	25	30	35	45					100	110	120	130	140	150	160	170	180	190	200	220	240	
25	31	41														150	160	170	180	190	200	220	240	260

Catalog No.	D	L	P	Position code	A	B	X	Y	Optional spec.
PPBB5	10 13 16 20 25	Select from above table	In 1 mm steps See left table Omit this if unnecessary	S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	EHD MHD EPAT See page 149
				S022	—	In 1 mm steps			
				S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No. — D — L — P — Position code — A — B — X — Y

PPBB5 — D16 — L150 — P30 — S023 — A160 — B140 — X100 — Y150

— Optional spec.

— MHD/C/Z50

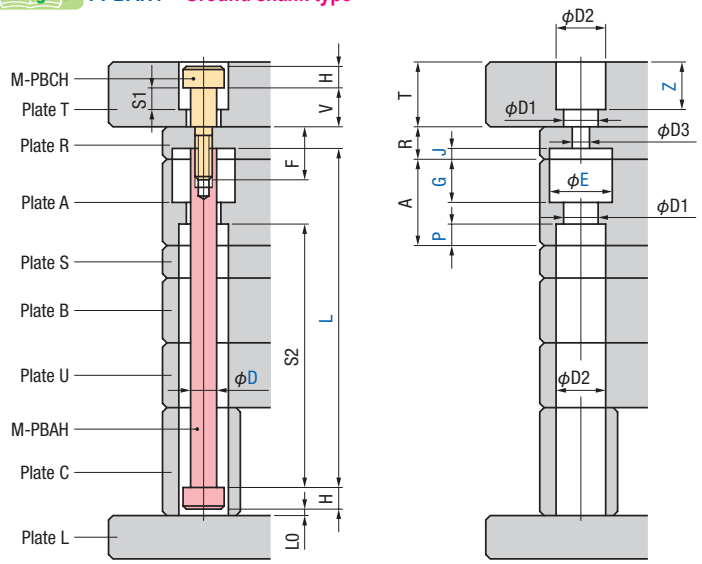
Added Puller Bolts — AH1

Install puller bolts M-PBAH and M-PBCH. For details on the installation specifications, see pages 148 to 153.

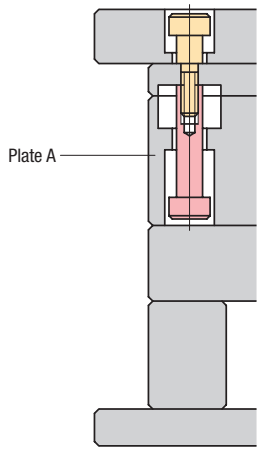
Puller bolt M-PBAH ➡ P.310 M-PBCH ➡ P.308

Application Mold bases D series and F series

Catalog No. **PPBAH1** **Ground shank type**



If puller bolts are shorter than the thickness of Plate A, the clearance hole will not be provided only on the movable side.



Diameter in the case of installing additional plates: Additional plate specification ➡ P.38

Diameter of Plate O and N → ϕD1 If E dimension is specified, however, ϕE is used.
Diameter of Plate Q, Plate V, Plate W and Plate X → ϕD2.

※ If installing either or both of additional Plate O or/ and Plate N, specifying E dimension and G=0, counterbore holes in Plate A will be eliminated and ϕ E through hole will be provided.

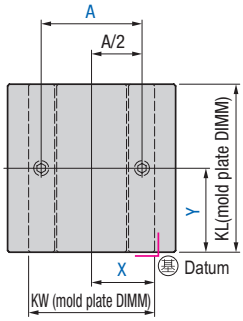
D	D1	D2	D3	Z	P *1	E *1	Reccomended value	G *1	J *1	H	T	R	V	F
10	11	19	7	T−Z≧5 *2	P≦80	15 to 60	19 22 24	See table below	When J≦7 R=10, J≦5	8	See page 152			
13	14	21	9	When D=10, 13 T−Z≧4 *2	P≦100	In 1 mm steps provided E≧D+5	23 27 29			8				
16	17	27	11		P≦110		28 37			13				
20	21	31	13		P≦130		34 42			13				
25	26	36	17		P≦140		41 52			18				

*1. Specify P, E, G, J as necessary.
P+G+5≦A (this formula is not a guarantee of strength).
*2. This formula is not a guarantee of strength.
※ Mold opening stroke between Plate T and Plate R
S1=Z+V−T Z=T+S1−V V=T+S1−Z
※ Mold opening stroke between Plate R and Plate A
S2=L−A+P−J P=S2+A+J−L L=S2+A+J−P J=L+P−S2−A
※ If the distance from the head of puller bolt to the next plate is L0＜1, ϕD2 through hole will be provided in the next plate as well.

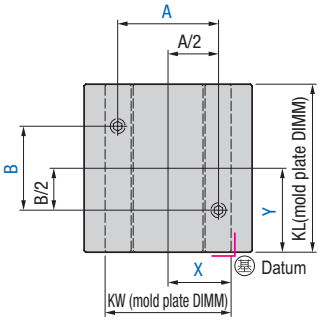
Relation of counterbore diameter E and depth G

E	G max
15 to 19	G≦50
20 to 27	G≦60
28 to 34	G≦80
35 to 44	G≦90
45 to 60	G≦100

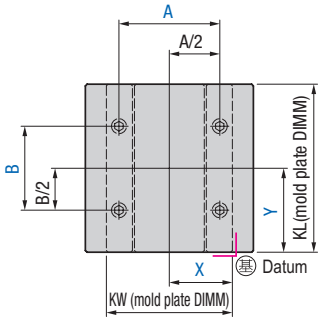
Position code S021



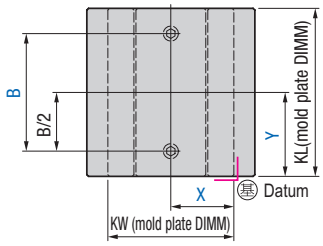
Position code S023



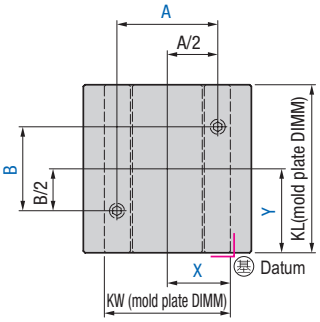
Position code S041



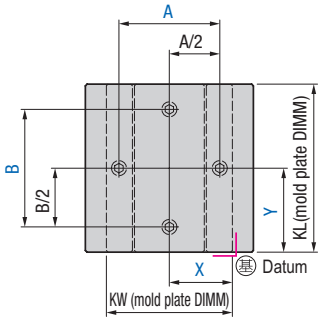
Position code S022



Position code S024



Position code S042



L dimention of Puller bolt M-PBAH

D	L																								
10	50	60	70	80	90	100	110	120	130	140	150	160	170	180											
13		60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	280		
16						100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	280	300	
20								120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	280	300	350
25													170	180	190	200	210	220	230	240	250	260	280	300	350

Catalog No.	D	L	Z	P	E	G	J	Position code	A	B	X	Y	Optional spec.
PPBAH1	10 13 16 20 25	Select from above table	In 1 mm steps See Left table	In 1 mm steps See left table Omit this if unnecessary				S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	PSR CCE EHD MHD CRD CRM EPAT See page 149
								S022	—	In 1 mm steps			
								S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No. — D — L — Z — P — E — G — J — Position code

PPBAH1 — D13 — L180 — Z21 — P15 — E29 — G30 — J3 — S041

— A — B — X — Y — Optional spec.

— A185 — B100 — X115 — Y125 — PSR/TF25/LS50

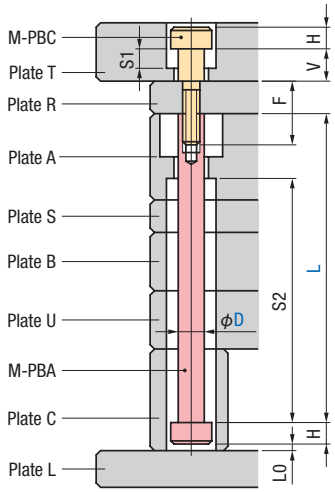
Added Puller Bolts — A1

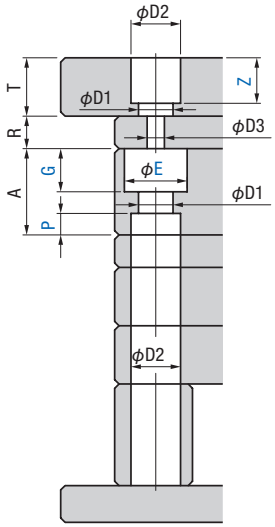
Install puller bolt M-PBA and M-PBC. For details on installation specifications, see pages 148 to 153.

Puller bolt M-PBA ➡ P.313 M-PBC ➡ P.312

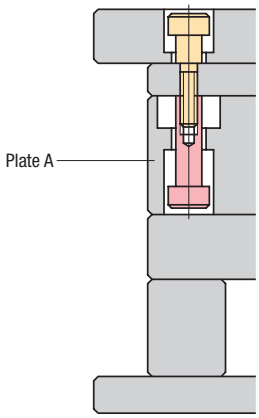
Application Mold bases D series and F series

Catalog No. PPBA1





If puller bolts are shorter than the thickness of Plate A, the clearance hole will not be provided on the moving side.



Diameter in the case of installing additional plates: Additional plate specification ➡ P.38

Diameter of Plate O and N → ϕD1 If E dimension is specified, however, ϕE is used.
Diameter of Plate Q, Plate V, Plate W and Plate X → ϕD2.

※ If installing either or both of additional Plate O or/ and Plate N, specifying E dimension and G=0, counterbore holes in Plate A will be eliminated and ϕ E through hole will be provided.

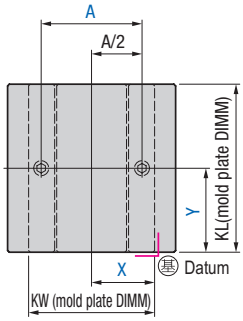
D	D1	D2	D3	Z	P*1	E*1	Reccomended value	G*1	H	T	R	V	F
10	11	19	7	T−Z≧5*2 When D=10, 13 T−Z≧4*2	P≦ 80	15 to 60 in 1 mm steps provided E≧D+5	19 22 24	See table below	8	25	10	16	22
										25	15	16	27
										30	15	21	27
13	14	21	9		P≦100		23 27 29		10	25	10 15	14	30
										30	15 20	19	35
										35	20 25	24	40
16	17	27	11		P≦110		28 37		14	30	15 20	15	35
										35	20 25	20	40
										45	25 30	30	45
										45	35	30	50
20	21	31	13		P≦130		34 42		14	35	20 25	20	45
										45	25 30	30	50
										45	35	30	55
										50	30 35	35	55
25	26	36	17		P≦140		41 52		18	50	30 35	31	60
										60	35 40	41	65

*1. Specify P, E and G as necessary.
P+G+5≦A (this formula is not a guarantee of strength)
*2. This formula is not a guarantee of strength.
※ Mold opening stroke between Plate T and Plate R
S1=Z+V−T Z=T+S1−V V=T+S1−Z
※ Mold opening stroke between Plate R and Plate A
S2=L−A+P P=S2+A−L L=S2+A−P
※ If the distance from the head of puller bolt to the next plate is L0＜1, the ϕD2 through holes will be provided in the next plate as well.

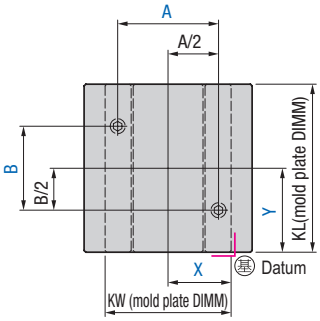
Relation of counterbore diameter E and depth G

E	G max
15 to 19	G≦50
20 to 27	G≦60
28 to 34	G≦80
35 to 44	G≦90
45 to 60	G≦100

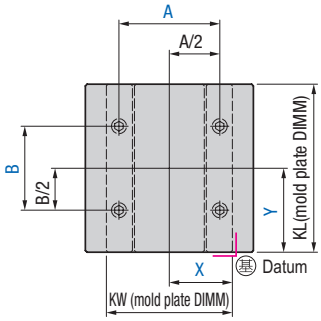
Position code S021



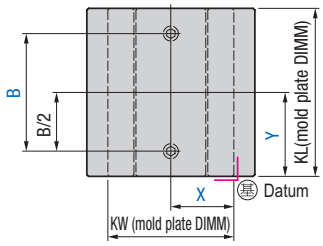
Position code S023



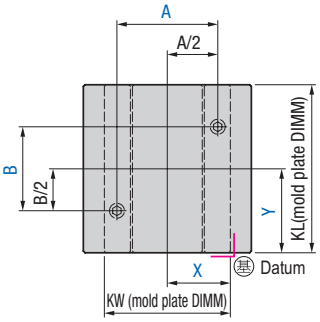
Position code S041



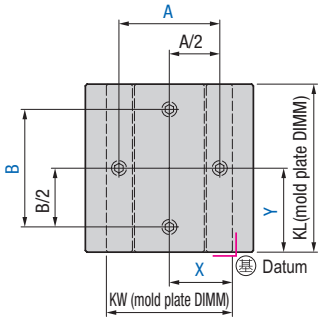
Position code S022



Position code S024



Position code S042



L dimension of puller bolt M-PBA

D	L																		
10	80	90	100	110	120	130	140	150	160		180								
13	80	90	100	110	120	130	140	150	160	170	180		200						
16			100	110	120	130	140	150	160	170	180	190	200						
20						130	140	150	160	170	180	190	200	220	240	260	280	300	350
25								150	160	170	180	190	200	220	240	260	280	300	350

Catalog No.	D	L	Z	P	E	G	Position code	A	B	X	Y	Optional spec.
PPBA1	10 13 16 20 25	Select from above table	In 1 mm steps See left table	In 1 mm steps See left table Omit this if unnecessary			S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	PSR CCE EHD MHD CRD EPAT See page 149
							S022	—	In 1 mm steps			
							S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No. — D — L — Z — P — E — G — Position code

PPBA1 — D13 — L200 — Z21 — P5 — E29 — G30 — S041

— A — B — X — Y — Optional spec.

— A160 — B140 — X100 — Y150 — PSR/TF25/LS45

Added Puller Bolts — AH2/A2

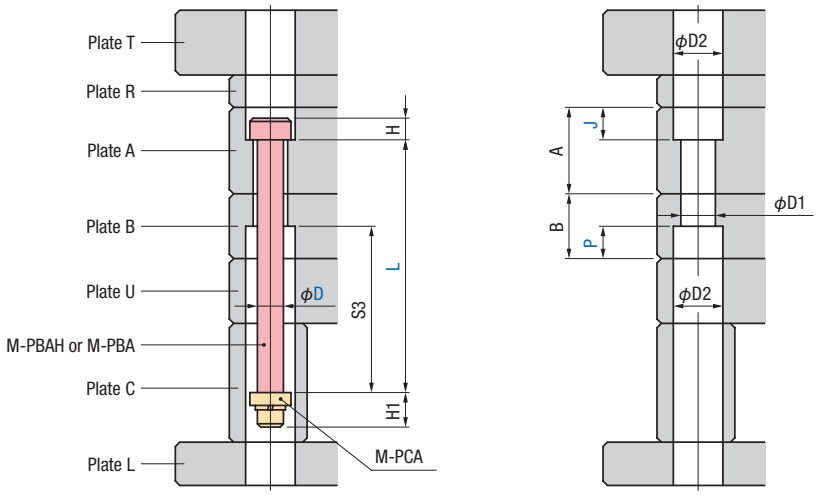
Install M-PBAH and M-PBA . For details on installation specifications, see pages 148 to 153.

Puller bolts M-PBAH ➡ P.310, M-PBA ➡ P.313

Application Mold bases D·E series, F·G series, H series (excluding the types with Plate S from each series)

Catalog No. **PPBAH2** Install M-PBAH **Ground shank type**

Catalog No. **PPBA2** Install M-PBA



Diameter in the case of installing additional plates: Additional plate specification ➡ P.38

Diameter of Plate O, Plate N, Plate W and Plate X → ϕD2

If installing either of additional plates of Plate Q or Plate V, order with additional processing codes is not allowed. Please order with drawings, etc.

D	D1	D2	J *1	P *1	H		H1
					Catalog No. PPBAH2	Catalog No. PPBA2	
10	11	19	J≦50	P≦50	8	8	12.5
13	14	21	J≦60	P≦60	8	10	16
16	17	27	J≦60	P≦60	13	14	20.5
20	21	31	J≦80	P≦80	13	14	25
25	26	36	J≦90	P≦90	18	18	32

*1. Specify J and P as necessary.
J+5≦A P+5≦B (this formula is not a guarantee of strength)

※ Regardless of the length of puller bolts, ϕD2 holes through to Plate T, Plate L will be provided.

※ Mold opening stroke between Plate A and Plate B
S3=L+J+P−A−B L=S3+A+B−J−P J=S3+A+B−L−P P=S3+A+B−L−J

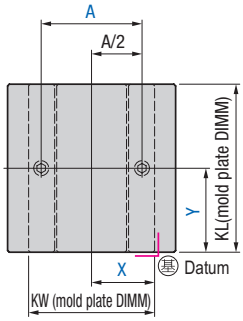
L dimension of puller bolts

D	L																								
10	50	60	70	80	90	100	110	120	130	140	150	160	170	180											
13		60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	280		
16						100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	280	300	
20								120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	280	300	350
25											150	160	170	180	190	200	210	220	230	240	250	260	280	300	350

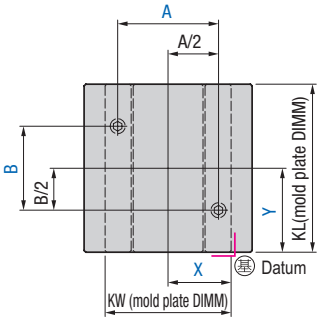
※ The dimensions written in red are applied to Catalog No. **PPBAH2** only.

※ The dimensions written in blue are applied to Catalog No. **PPBA2** only.

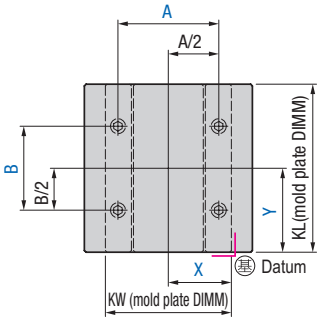
Position code S021



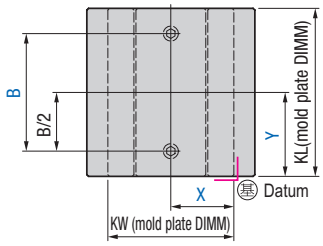
Position code S023



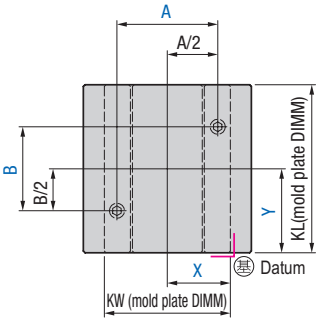
Position code S041



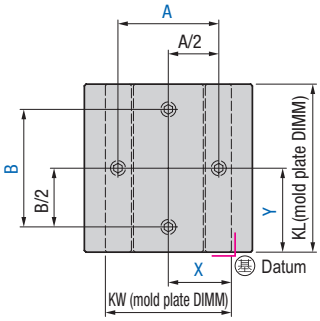
Position code S022



Position code S024



Position code S042



Catalog No.	D	L	J	P	Position code	A	B	X	Y	Optional spec.
PPBAH2 PPBA2	10 13 16 20 25	Select from left table	In 1 mm steps See left table Omit this if unnecessary		S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	EHD MHD EPAT See page 149
					S022	—	In 1 mm steps			
					S023 S024 S041 S042	In 1 mm steps				

How to order

Catalog No. – D – L – J – P – Position code – A – B – X – Y

PPBAH2 – D16 – L160 – J15 – P30 – S041 – A200 – B170 – X125 – Y175

– Optional spec.

– MHD/C/Z50

Added Puller Bolts — Standard Position

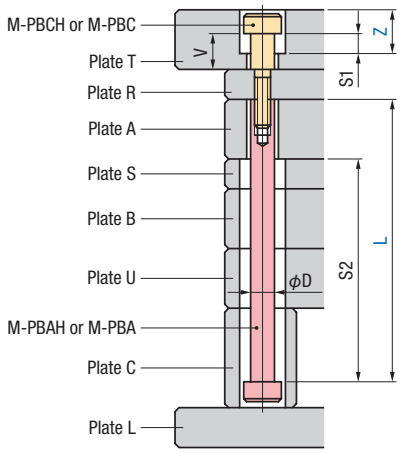
The puller bolt specification of standard F series mold base has been now established.

For details on the installation specifications, see pages 148 to 153.

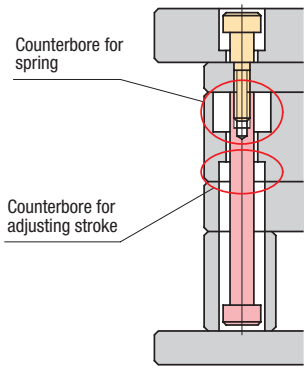
Application F series mold bases
(The use of this specification is not allowed when changing thickness of Plate T and Plate R (see pages ➡ P.164 to 167)

Catalog No. **PPBAHS** Install puller bolt M-PBAH and M-PBCH **Ground shank type**

Catalog No. **PPBAS** Install puller bolt M-PBA and M-PBC



When providing counterbore holes for springs and those for adjusting stroke, specify them by using the instruction method shown in pages 164 to 167.



Diameter in the case of installing additional plates: Additional plate specifications ➡ P.38

Diameter of Plate O and Plate N → φD1 shown in the chart on P.164
Diameter of Plate Q, Plate V, Plate W and Plate X → φD2 shown in the chart on P.164.

L dimension of puller bolts																										
D	L																									
10	50	60	70	80	90	100	110	120	130	140	150	160	170	180												
13		60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	280			
16						100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	280	300		
20								120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	280	300	350	
25											150	160	170	180	190	200	210	220	230	240	250	260	280	300	350	

※ The dimensions written in red are applied to Catalog No. **PPBAHS** only.

※ The dimensions written in blue are applied to Catalog No. **PPBAS** only.

Catalog No.	L	Z	Optional spec.	Remarks
PPBAHS PPBAS	Select from above table	In 1 mm steps Thickness of plate T −Z≧5 *1 When D=10 or 13, Thickness of Plate T −Z≧4 *1	EHD MHD CRD CRM *2 EPAT See page 149	*1. This formula is not a guarantee of strength. *2. Applies to Catalog No. PPBAHS. ※ Mold opening stroke between Plate T and R S1=Z+V−Thickness of Plate T Z=thickness of Plate T +S1−V V=thickness of Plate T+S1−Z ※ Mold opening stroke between Plate R and A S2=L−thickness of Plate A, L=S2+thickness of Plate A

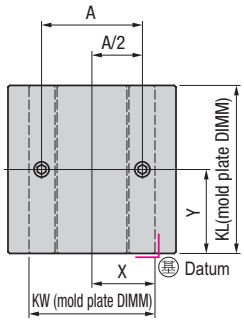
How to order

Catalog No. — L — Z — Optional spec.

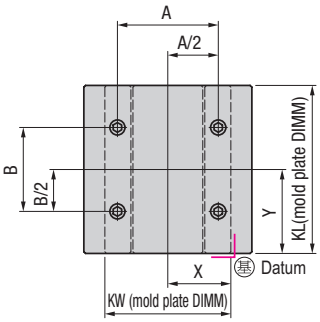
PPBAHS — L180 — Z25 — EHD/L

Puller bolt standard position specification

Two-piece spec.



Four-piece spec.



※ X=KW/2, Y=KL/2

Nominal dimension	2-piece spec. A	4-piece spec. A	4-piece spec. B	D	Plate T thickness	Plate R thickness	V *3
1113	86	—	—	10	25	10	15 (16)
1313	106						
1315							
1515	120			13		15	15 (14)
1518	—	120	48				
1520			68				
1523			98				
1525			118				
1530			168				
1818	145	—	—		30		20 (19)
1820	—	145	48				
1823			78				
1825			98				
1830			148				
1835			198				
2020		160	42	16		20	15 (15)
2023			72				
2025			92				
2030			142				
2035			192				
2040			242				
2045			292				
2323		185	72				
2325			92				
2327			106				
2330			136				
2335			186				
2340			236				
2525		200	70		35	20	20 (20)
2527			90				
2530			120				
2535			170				
2540			216	20		25	
2545			266				
2550			316				

Nominal dimension	4-piece spec. A	4-piece spec. B	D	Plate T thickness	Plate R thickness	V *3
2730	215	116	20	35	20	20 (20)
2735		166				
2740		216				
2750		316			25	
2930	235	116				
2935		166				
2940		216				
3030	240	100		45	25	30 (30)
3032		120				
3035		150			30	
3040		200				
3045		244				
3050		294				
3335	270	150				
3340		200				
3345		244				
3535	285	144			30	
3540		194				
3545		244				
3550		272	25	50	35	30 (31)
3555		322				
4040	330	172				
4045		222				
4050		272				
4055		322				
4545	370	204		60	35	40 (41)
4550		254				
4555		304				
4560		354				
5050	410	254			40	
5060		354				
5070		454				

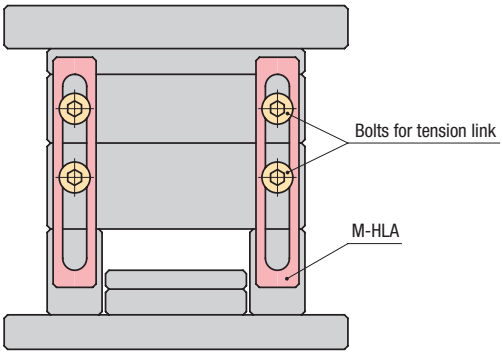
*3. The dimensions in parentheses ( ) are applied to Catalog No. PPBAS.

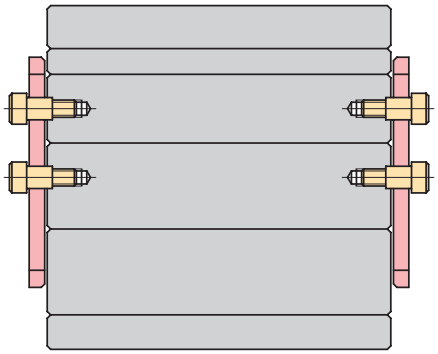
Added Tension Links — Overview ①

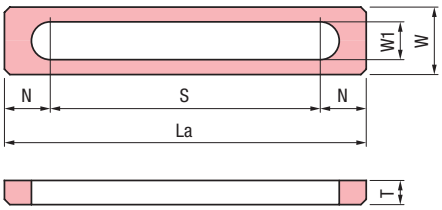
Tension link installation method

Two types of tensions links can be installed in mold bases.

Tension link M-HLA

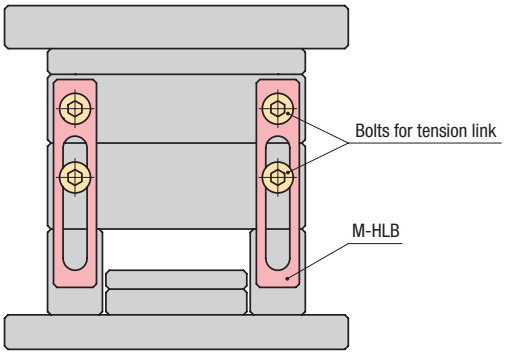


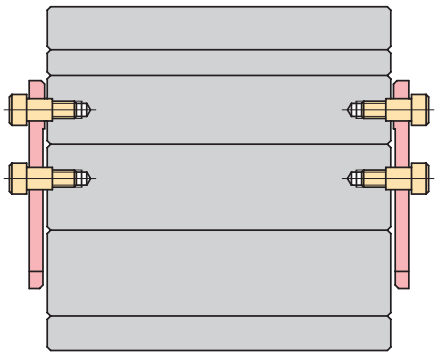


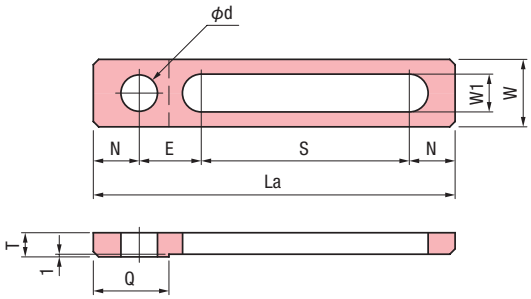


W	19	25	32	38
W1	11	14	17	21
T	9	9	9	12
S	60 to 200 In 10 mm steps	80 to 250 In 10 mm steps	100 to 300 In 10 mm steps	100 to 300 In 10 mm steps
N	14.5	17	18.5	20.5
La	S+29	S+34	S+37	S+41

Tension link M-HLB







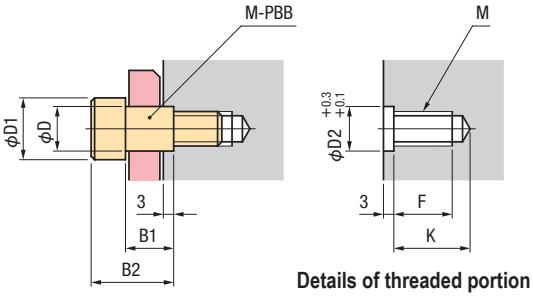
W	19	25	32	38
W1	11	14	17	21
T	9	9	9	12
S	50 to 170 In 10 mm steps	50 to 200 In 10 mm steps	80 to 200 In 10 mm steps	100 to 200 In 10 mm steps
N	14.5	17	18.5	20.5
E	20	23	30	33
Q	24	28	32	38
d	10.5	13.5	16.5	20.5
La	S+49	S+57	S+67	S+74

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Specification of Bolts for Tension Link

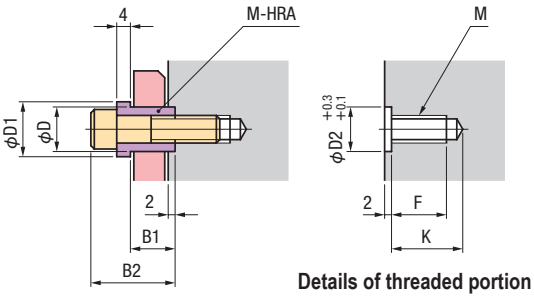
Bolts for tension links are available in three types shown in the chart below:

Bolt code BT1



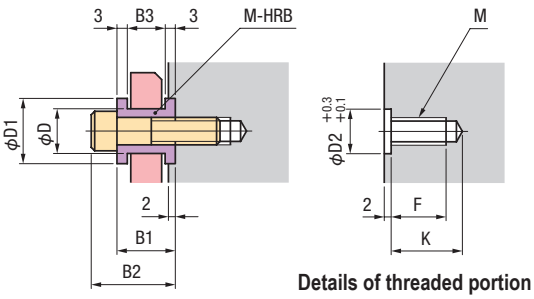
Link W DIMM	19	25	32	38
D	10	13	16	20
D1	16	18	24	28
B1	13	13	13	16
B2	21	23	27	30
D2	10	13	16	20
M	M8	M10	M12	M16
F	15	16	20	26
K max	22	24	29	36
M-PBB	10×13	13×13	16×13	20×16

Bolt code BT2



Link W DIMM	19	25	32	38
D	10	13	16	20
D1	13	16	19	23
B1	12	12	12	15
B2	22	24	26	31
D2	10	13	16	20
M	M6	M8	M10	M12
F	11	16	16	23
K max	19	23	24	32
Bolt	M6×25	M8×30	M10×30	M12×40
M-HRA	10	13	16	20

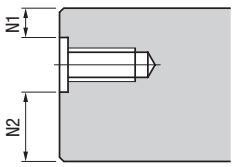
Bolt code BT3



Link W DIMM	19	25	32	38
D	10	13	16	20
D1	16	19	22	26
B1	17	17	17	20
B2	23	25	27	32
B3	11	11	11	14
D2	16	19	22	26
M	M6	M8	M10	M12
F	15	20	20	22
K max	23	27	28	31
Bolt	M6×30	M8×35	M10×35	M12×40
M-HRB	10	13	16	20

※ This bolt cannot be used for tension link M-HLB.

Request for setting for bolt position



Please set the position of the bolt hole so that the N1 and N2 dimensions shown in the left chart become 1.5 mm or more.

N1≧1.5

N2≧1.5

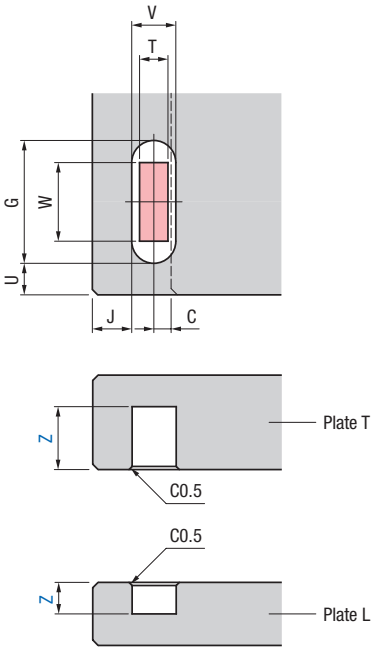
※ This value is not a guarantee of strength.

Added Tension Links — Overview ②

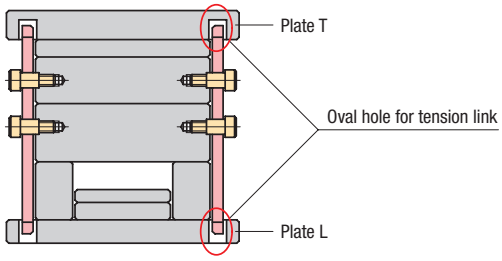
Optional specification (specify only when necessary)

Option code	Specification

MTZ (T 板に加工)



Produce oval holes in Plate T and Plate L for allowing clearance around the tension link.



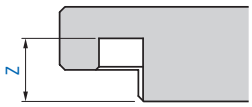
W		19	25	32	38
G		32	38	45	54
T		9	9	9	12
V		13	13	13	16
C	Bolt code BT1, BT2	5	5	5	6.5
	Bolt code BT3	6.5	6.5	6.5	8
Z		Z≦55			Z≦65
		※Z → Specify in 1 mm steps ※Z≦Thickness −5 If Z=thickness, however, through holes are provided.			

※ The dimensions of U≧5, J≧5 are required.

■ **How to specify:**

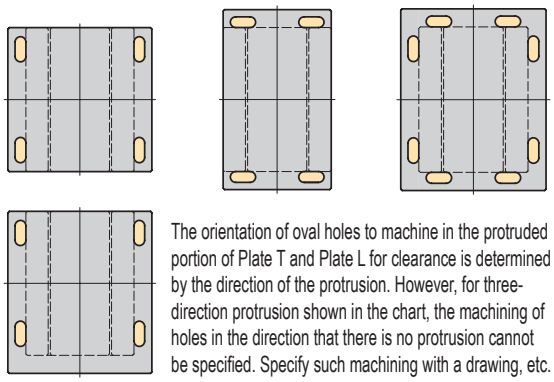
For Plate T: **MTZ** Z DIMM
[e.g.] MTZ18
For Plate L: **MLZ** Z DIMM
[e.g.] MLZ10

MLZ (L 板に加工)



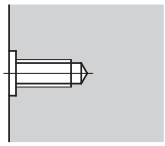
If the clamping plate is machined, Z dimension of the plate must be measured from the surface.
Clamp machining ➡ P.238

Relation of protrusion of Plate T and L and oval holes for clearance



The orientation of oval holes to machine in the protruded portion of Plate T and Plate L for clearance is determined by the direction of the protrusion. However, for three-direction protrusion shown in the chart, the machining of holes in the direction that there is no protrusion cannot be specified. Specify such machining with a drawing, etc.

EPAT

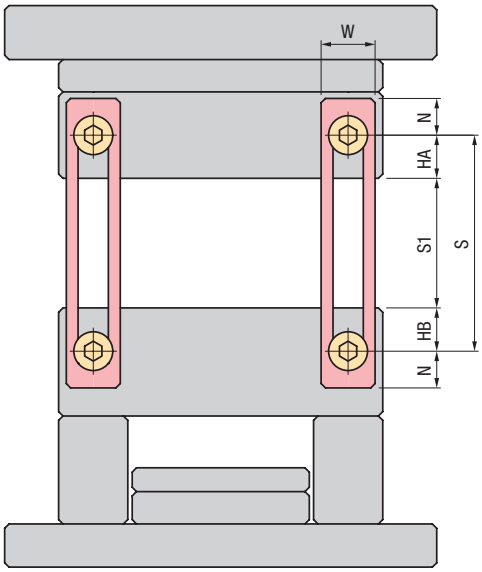


Only the holes for installing tension links are provided.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Mold opening stroke of tension link

In the case of using tension link M-HLA



Mold opening stroke S1

S1=S−HA−HB+α

α : The radius (R) of tension link's long hole and the radius of the bolt for the tension link are different in size. Thus, the difference in radius affects the amount of the mold opening

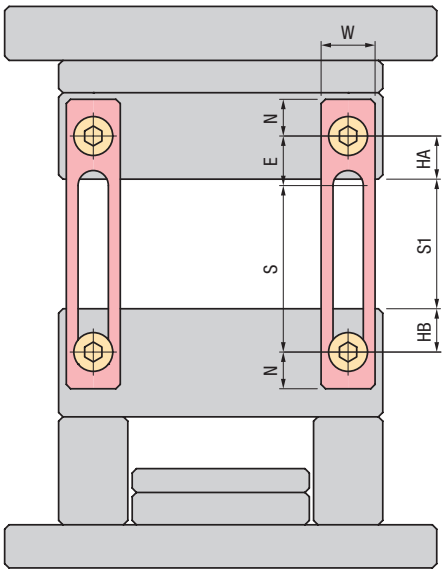
W	19	25	32	38
N	14.5	17	18.5	20.5

Features

① Supports the molds with larger mold opening stroke
② Operating noise is slightly high.
③ Does not allow increasing the mold opening and closing speed very much.

Reference: Yuichi Fukushima, "Comprehensible plastic injection molding design" The Nikkan Kogyo Shinbunsya

In the case of using tension link M-HLB



Mold opening stroke S1

S1=S+E−HA−HB+α

α : The radius (R) of tension link's long hole and the radius of the bolt for the tension link are different in size. Thus, the difference in radius affects the amount of the mold opening

W	19	25	32	38
E	20	23	30	33
N	14.5	17	18.5	20.5

Features

① One end of the link is secured with bolt, thereby ensuring reliable operations.
② Not suited for molds with larger mold opening stroke
③ Operating noise is low.
④ Realizes increased mold opening and closing speed.

Reference: Yuichi Fukushima, "Comprehensible plastic injection molding design" The Nikkan Kogyo Shinbunsya

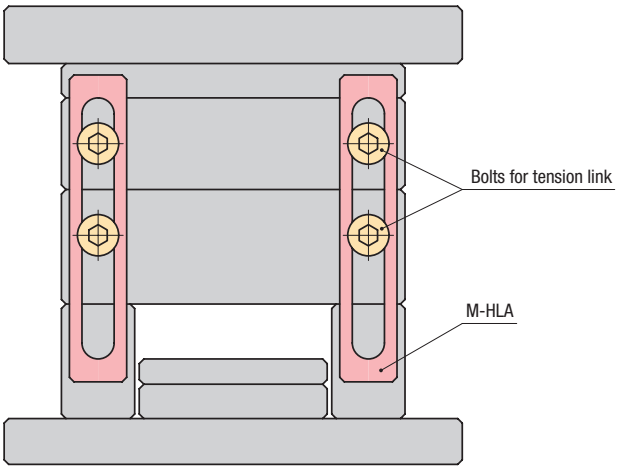
Added Tension Link M-HLA

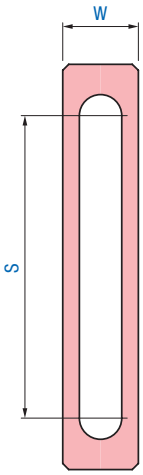
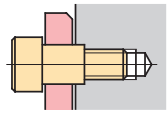
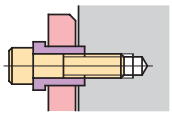
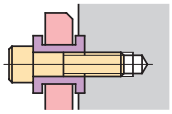
Install tension link M-HLA. For details on the installation specifications, see pages 172 to 175.

Tension link M-HLA ➡ P.316

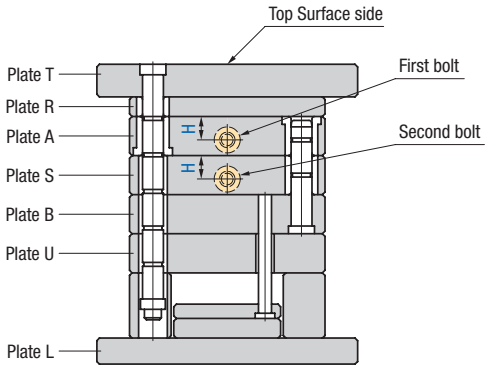
Application Mold bases

Catalog No. PHLA



Tension link	Bolt code
	Bolt code BT1  Bolt code BT2  Bolt code BT3 

Position of bolt holes for tension link

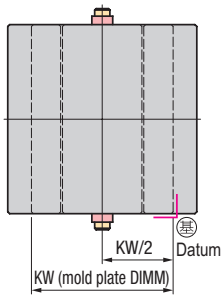


※ For bolt holes for tension link, specify the code of plates in which to machine bolt holes and H dimensions that locate the position of the holes from the top surface side.

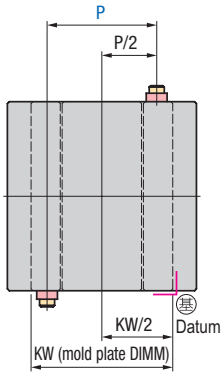
※ The first bolt and the second bolt are of the same type.

Catalog No.	Tension link. W	Tension link. S	Bolt code	Position code	P	First bolt Plate code	First bolt H	Second bolt Plate code	Second bolt H	Optional spec.
PHLA	19 25 32 38	Select from page 172	BT1 BT2 BT3	SS02AC SS02BD	—	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) L (Plate L) Additional plate: N (Plate N), O (Plate O), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X), Additional plate specifications ➡ P.38	In 0.5 mm steps	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) L (Plate L) Additional plate: N (Plate N), O (Plate O), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X), Additional plate specifications ➡ P.38	In 0.5 mm steps	MTZ MLZ EPAT See page 174
				SS02ACL SS02ACR SS02BDL SS02BDR SS04ACP SS04BDP	In 1 mm steps					

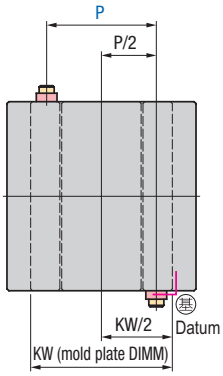
Position code SS02AC



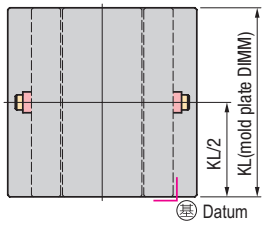
Position code SS02ACL



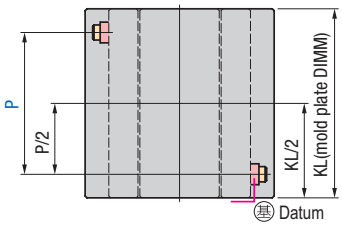
Position code SS02ACR



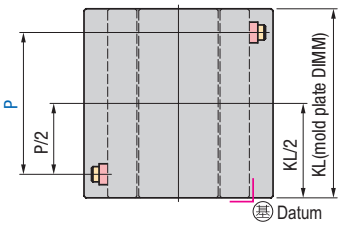
Position code SS02BD



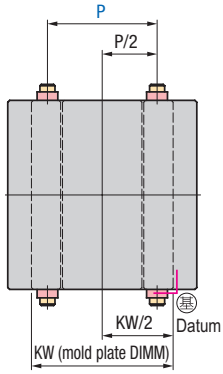
Position code SS02BDL



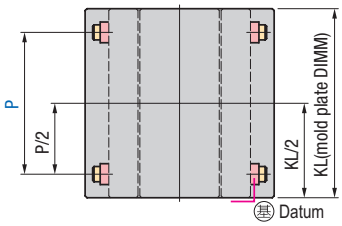
Position code SS02BDR



Position code SS04ACP



Position code SS04BDP



How to order

Catalog No.	W	S	Bolt code	Position code	P
PHLA	W25	S150	BT2	SS04BDP	P170

First bolt Plate code/H	Second bolt Plate code/H	Optional spec.
A/H20	B/H15	MTZ15

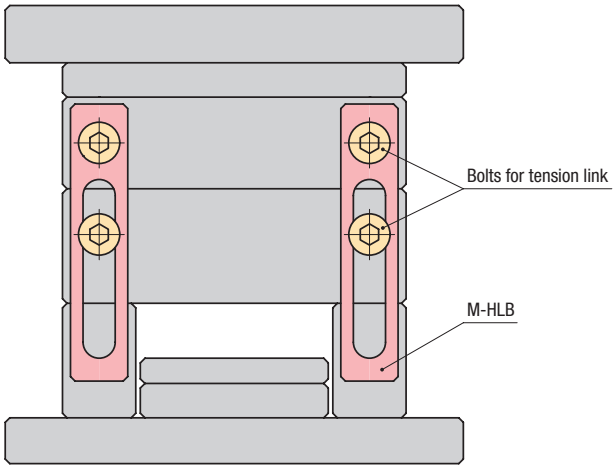
Added Tension Link M-HLB

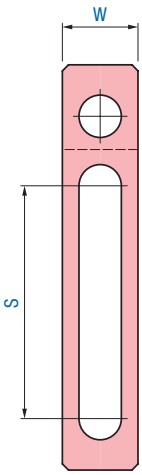
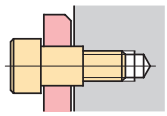
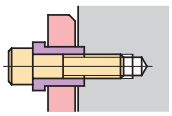
Install tension link M-HLB. For details of the installation specifications, see pages 172 to 175.

Tension Link M-HLB ➡ P.317

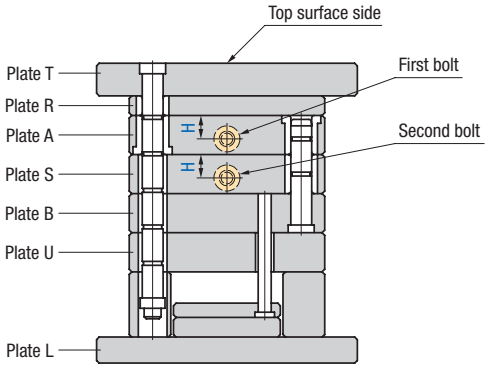
Application Mold bases

Catalog No. PHLB



Tension link	Bolt code
	Bolt code BT1  Bolt code BT2 

Position of bolt holes for tension link

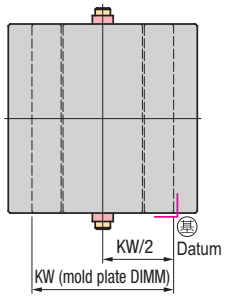


※ For bolt holes for tension link, specify the code of plates in which to machine bolt holes and H dimensions that locate the position of the holes from the top surface side.

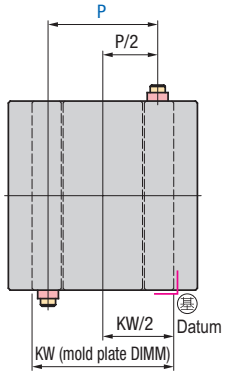
※ The first bolt and the second bolt are of the same type.

Catalog No.	Tension link. W	Tension link. S	Bolt code	Position code	P	First bolt Plate code	First bolt H	Second bolt Plate code	Second bolt H	Optional spec.
PHLB	19 25 32 38	Select from page 172	BT1 BT2	SS02AC SS02BD	—	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) L (Plate L) Additional plate: N (Plate N), O (Plate O), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X), Additional plate specifications ⬇ P.38	In 0.5 mm steps	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) L (Plate L) Additional plate: N (Plate N), O (Plate O), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X), Additional plate specifications ⬇ P.38	In 0.5 mm steps	MTZ MLZ EPAT See page 174
				SS02ACL SS02ACR SS02BDL SS02BDR SS04ACP SS04BDP	In 1 mm steps					

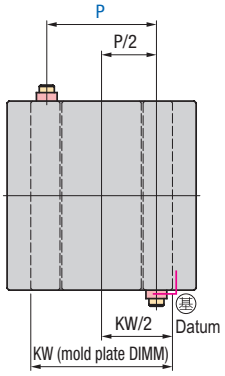
Position code SS02AC



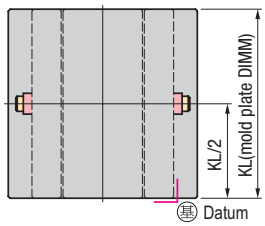
Position code SS02ACL



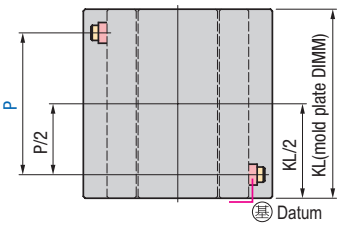
Position code SS02ACR



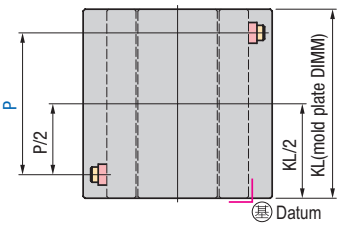
Position code SS02BD



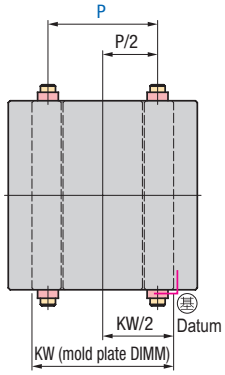
Position code SS02BDL



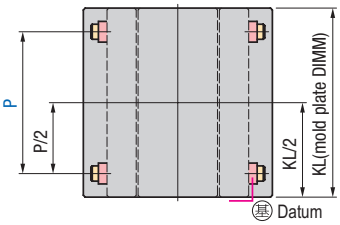
Position code SS02BDR



Position code SS04ACP



Position code SS04BDP



How to order

Catalog No.	W	S	Bolt code	Position code	P
PHLB	W19	S100	BT1	SS02BDL	P120

First bolt Plate code/H	Second bolt Plate code/H	Optional spec.
A/H15	B/H20	MLZ15

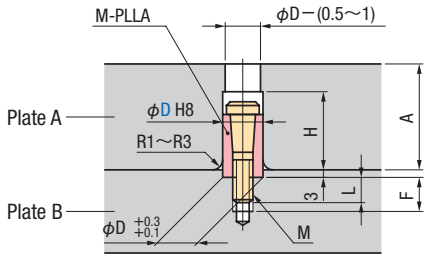
Added PL Pullers

Install PL Pullers.

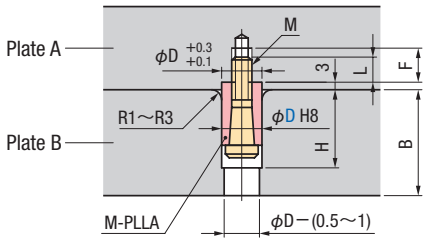
PL Pullers M-PLLA ➡ P.320

Application Mold bases D · E series, F · G series, H series (excluding the types with Plate S from the all the series)

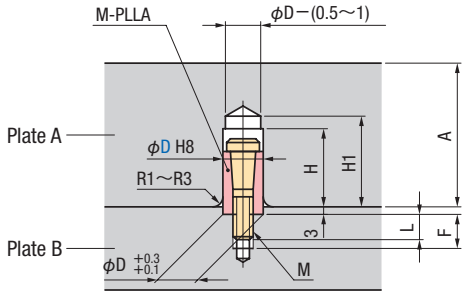
Catalog No. **PPLLA1**



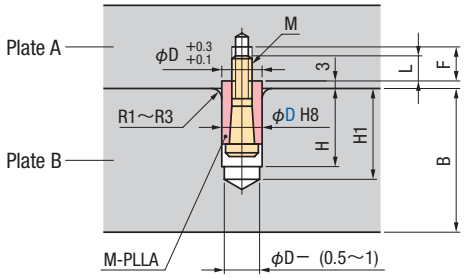
Catalog No. **PPLLA2**



Catalog No. **PPLLA3**



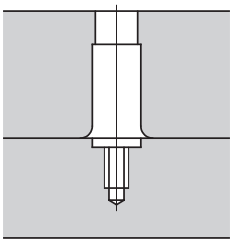
Catalog No. **PPLLA4**



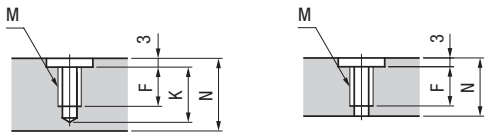
D	H min	H1	M	L	F	Scope of application			
						PPLLA1	PPLLA2	PPLLA3	PPLLA4
10	20	25	M5	7	12	20≦A≦60	20≦B≦60	A≧35	B≧35
12	22 *1	27	M6	12	17	20≦A≦80	20≦B≦80	A≧40	B≧40
13									
16	29 *2	34	M8	11.5	16	30≦A≦100	30≦B≦100	A≧50	B≧50

*1. When A or B=20, H=20
*2. When A or B=30, H=30
※ For D, boring is used.

Optional spec (specify only when necessary)

Option code	Specification
EPAT	Only holes for installing PL Pullers are machined. 

Threaded hole specification



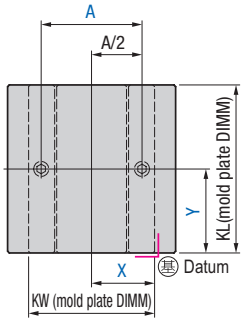
Blind hole spec. Through hole spec.

The threaded hole for PL Pullers will be blind hole or through hole depending on N dimension.

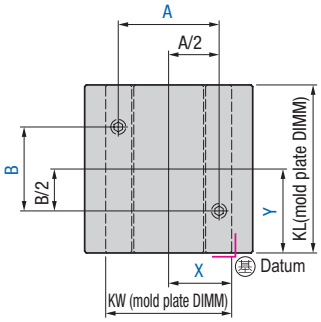
M	F	K max	Blind hole spec	Through hole spec.
M5	12	18	N≧24	N＜24
M6	17	24	N≧30	N＜30
M8	16	22	N≧28	N＜28

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

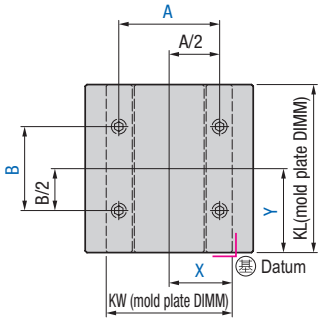
Position code S021



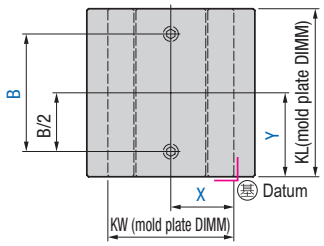
Position code S023



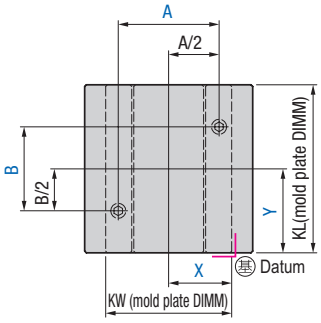
Position code S041



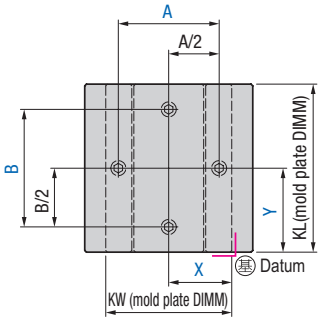
Position code S022



Position code S024



Position code S042



Catalog No.	D	Position code	A	B	X	Y	Optional spec.
PPLLA1 PPLLA2 PPLLA3 PPLLA4	10 12 13 16	S021	In 1 mm steps	—	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y	EPAT
		S022	—	In 1 mm steps			
		S023 S024 S041 S042	In 1 mm steps				

How to order

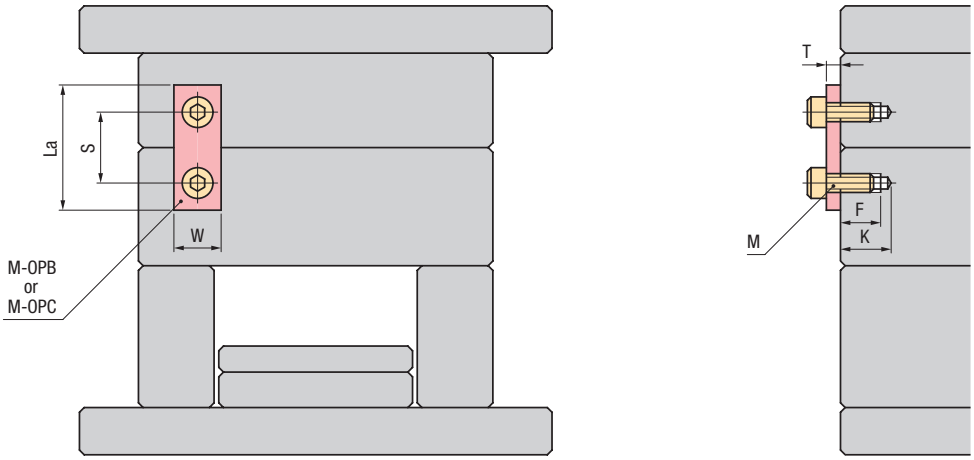
Catalog No. — D — Position code — A — B — X — Y — Optional spec.

PPLLA1 — D16 — S041 — A200 — B180 — X125 — Y150

Added Mold Opening Prevention Plates — Overview

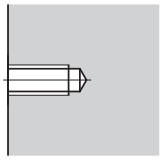
Mold opening prevention plate installation specification

Install mold opening prevention plate in mold bases so that the mold does not open during transportation or storage.



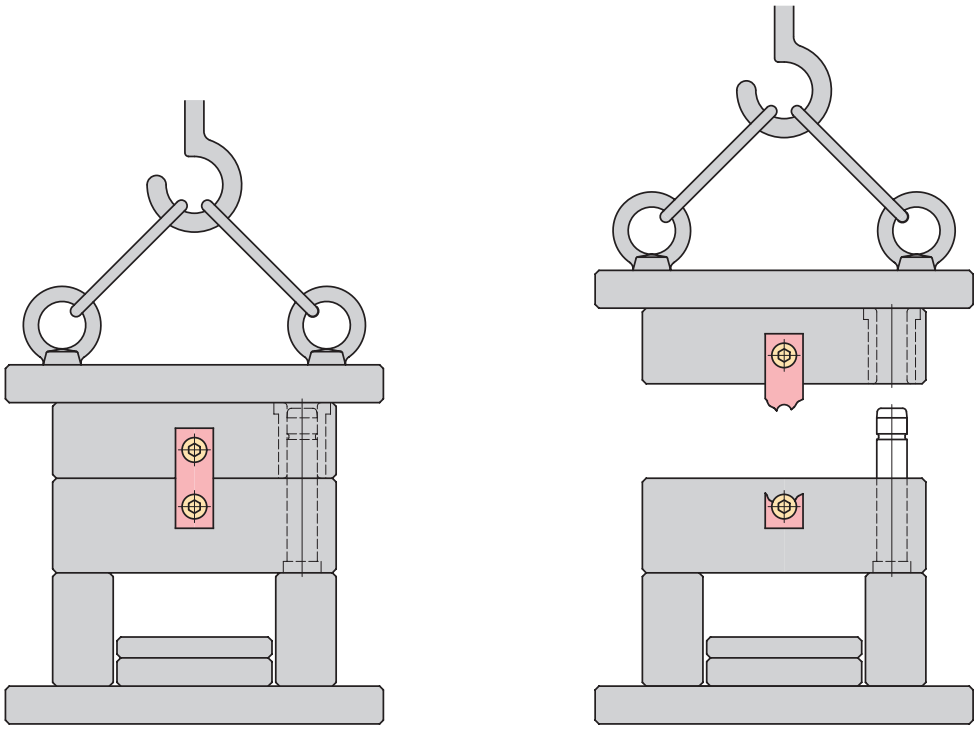
Mold opening prevention plate M-OPB					Mold opening prevention plate M-OPC		
W	16	22	25	38	W	16	20
S	20 30 40 50 60	20 30 40 50 60 70	30 50 70 90	40 60 80 100	S	15 20 30 40 50 60 70	80 90 100
La	S+20	S+30	S+30	S+40	La	S+20 (When S=15, La=30)	S+20
T	6	9	12	12	T	5	5
M	M6	M8	M10	M12	M	M6	M8
F	12	16	20	24	F	12	16
K max	20	23	28	33	K max	20	23
Bolt	M6×15	M8×20	M10×30	M12×35	Bolt	M6×15	M8×20
Safety color	Black				Safety color	Red, yellow and black	
How to order ➡ P.184					How to order ➡ P.184		

Optional specification (specify only when necessary)

Option code	Specification
EPAT	 Only holes for installing mold opening prevention plate are machined.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Handling Precautions



Suspending a mold as shown above is dangerous. Doing so causes the mold opening prevention plate to be subjected to an excessive load of the mold and may lead to a breakage or injury. Never use the product in such a condition.

Added Mold Opening Prevention Plate (at One Place)

Install mold opening prevention plate M-OPB, M-OPC.

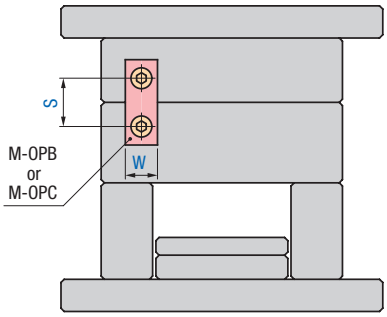
For details on the installation specification, see pages 182 to 183.

M-OPB ➡ P.321 M-OPC ➡ P.321

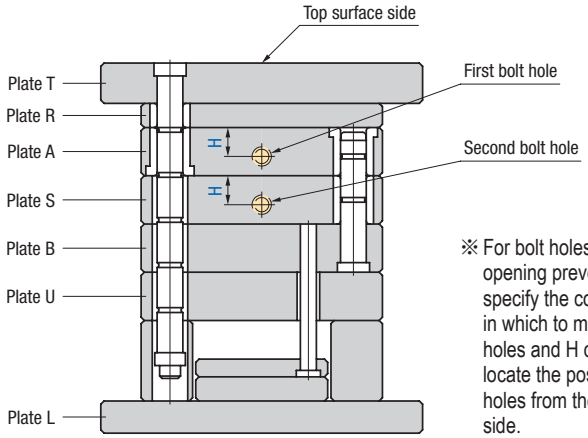
Application Mold bases, cavity retainer sets, cavity retainer sets for die cast

Catalog No. **POPB** Install M-OPB

Catalog No. **POPC** Install M-OPC



Position of bolt holes for mold opening prevention plate



※ For bolt holes for mold opening prevention plate, specify the code of plates in which to machine bolt holes and H dimensions that locate the position of the holes from the top surface side.

Catalog No.	Mold opening prevention plate W *1	Mold opening prevention plate S	Mold opening prevention plate Safety color *2	Position code	L or R	First bolt Plate code	First bolt H	Second bolt Plate code	Second bolt H	Optional spec.
POPB (M-OPB) POPC (M-OPC)	16 20 22 25 38	Select from page 182	R (Red) Y (yellow) N (Black)	SS01A SS01B SS01C SS01D	—	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) L (Plate L) Additional plate: N (Plate N), O (Plate O), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X) Additional plate specifications ⬇ P.38	In 0.5 mm steps	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) L (Plate L) Additional plate: N (Plate N), O (Plate O), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X) Additional plate specifications ⬇ P.38	In 0.5 mm steps	EPAT See page 182
				SS01AL SS01BL SS01CL SS01DL SS01AR SS01BR SS01CR SS01DR	In 1 mm steps					

*1. Catalog No. **POPB** is available in W=16, 22, 25, 38. Catalog No. **POPC** is available in W=16, 20.

*2. The safety color available for Catalog No. **POPB** is **N** (Black) only.

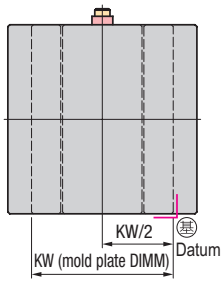
How to order

Catalog No.	W	S	Safety color	Position code	L or R
POPC	W16	S40	R	SS01AL	L70

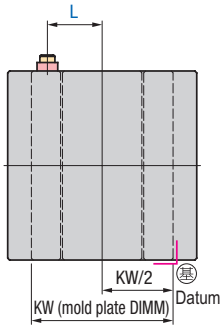
First bolt Plate code/H	Second bolt Plate code/H	Optional spec.
A/H30	B/H20	

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

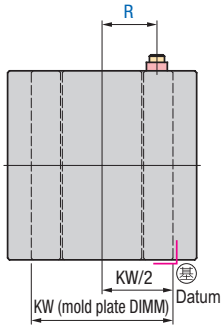
Position code SS01A



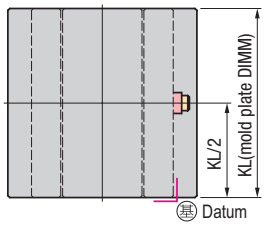
Position code SS01AL



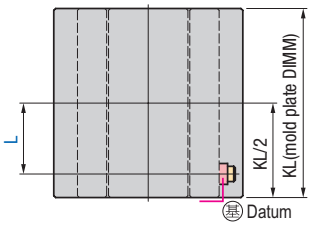
Position code SS01AR



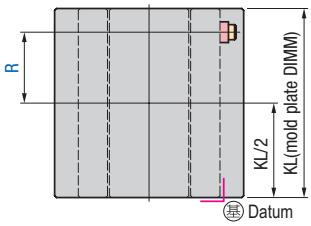
Position code SS01B



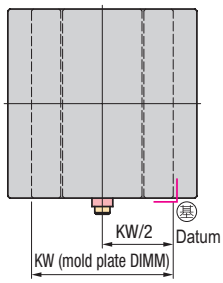
Position code SS01BL



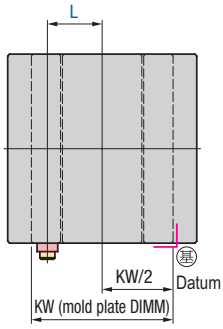
Position code SS01BR



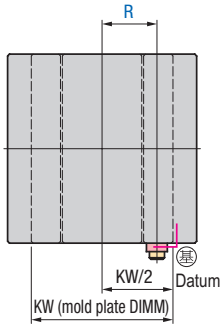
Position code SS01C



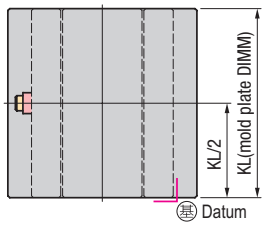
Position code SS01CL



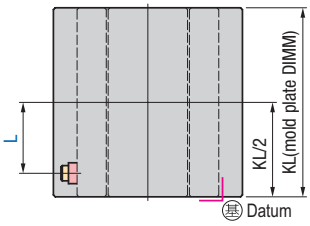
Position code SS01CR



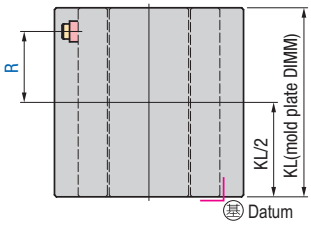
Position code SS01D



Position code SS01DL



Position code SS01DR



Added Mold Opening Prevention Plates (at Two or Four Place)

Install mold opening prevention plate M-OPB, M-OPC .

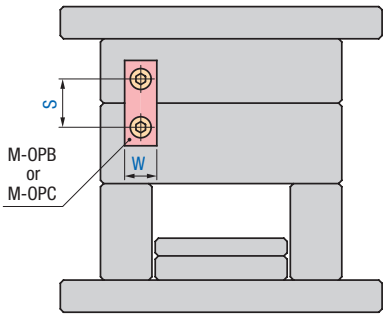
For detailed specifications, see pages 182 to 183

Mold opening prevention plate M-OPB ➡ P.321 M-OPC ➡ P.321

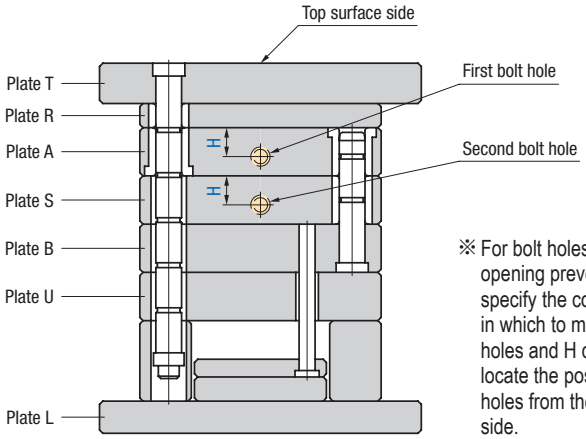
Application Mold bases, cavity retainer sets, cavity retainer sets for die cast

Catalog No. **POPB** Install M-OPB

Catalog No. **POPC** Install M-OPB



Position of bolt holes for mold opening prevention plate



※ For bolt holes for mold opening prevention plate, specify the code of plates in which to machine bolt holes and H dimensions that locate the position of the holes from the top surface side.

Catalog No.	Mold opening prevention plate W *1	S	Safety color *2	Position code	P	First bolt Plate code	First bolt H	Second bolt Plate code	Second bolt H	Optional spec.
POPB (M-OPB) POPC (M-OPC)	16 20 22 25 38	Select from page 182	R (Red) Y (yellow) N (Black)	SS02AC SS02BD SS04	—	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) L (Plate L) Additional plate N (Plate N) O (Plate O) Q (Plate Q) V (Plate V) W (Plate W) X (Plate X) Additional plate specifications ⬇ P.38	In 0.5 mm steps	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) L (Plate L) Additional plate N (Plate N) O (Plate O) Q (Plate Q) V (Plate V) W (Plate W) X (Plate X) Additional plate specifications ⬇ P.38	In 0.5 mm steps	EPAT See page 182
				SS02ACL SS02ACR SS02BDL SS02BDR SS04ACP SS04BDP	In 1 mm steps					

*1. Catalog No. **POPB** is available in W=16, 22, 25, 38. Catalog No. **POPC** is available in W=16, 20.

*2. The safety color available for Catalog No. **POPB** is **N** (Black) only.

How to order

Catalog No. — W — S — Safety color — Position code — P

POPC — W16 — S40 — R — SS02ACL — P200

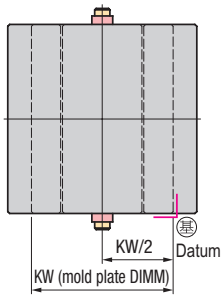
— First bolt Plate code/H — Second bolt Plate code/H — Optional spec.

— A/H30 — B/H20

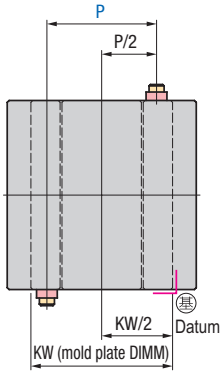
For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Added Mold Opening Prevention Plates (at Two or Four Places)

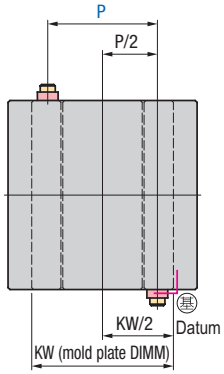
Position code SS02AC



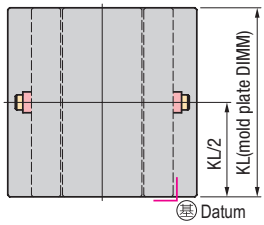
Position code SS02ACL



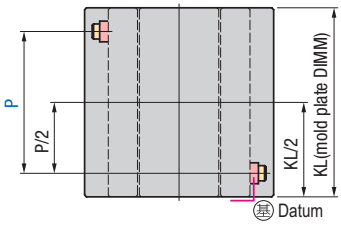
Position code SS02ACR



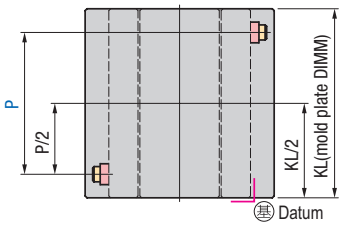
Position code SS02BD



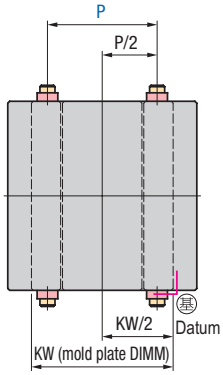
Position code SS02BDL



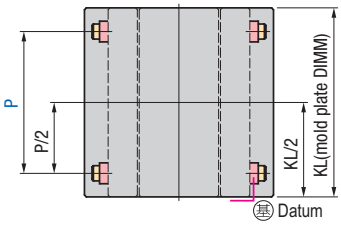
Position code SS02BDR



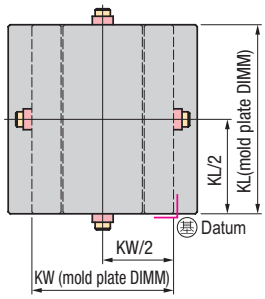
Position code SS04ACP



Position code SS04BDP



Position code SS04



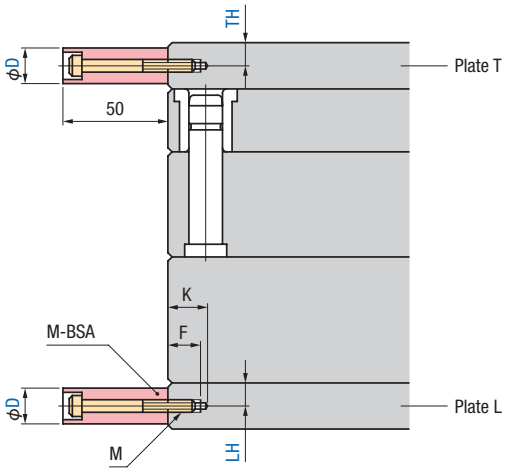
Added Base Spacers®

Install base spacers.

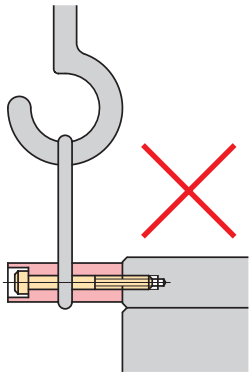
Base spacer M-BSA ➡ P.394

Application Mold bases

Catalog No. PBSA



Base spacers are not designed to suspend molds. Never use the product in the way shown in the chart below.



※ Base spacers are installed in Plate T and Plate L.
※ The order on the installation can be made separately for either Plate T or Plate L, or together for both of them at a time.

D	M	F	K max	Mounting bolt
19	M6	12	20	M6×50
24	M8	16	23	M8×50
29	M10	20	28	M10×50
34	M12	24	33	M12×50

Catalog No.	Plate code	D	Position code	P	L	R	TH *1	LH *1	Optional spec.
PBSA	T (Plate T) L (Plate L) TL (Plate T, Plate L)	19 24 29 34	SS02AP SS02BP SS02CP SS02DP	In 1 mm steps	—	—	In 0.5 mm steps	In 0.5 mm steps	EPAT *2
			SS02AZ SS02BZ SS02CZ SS02DZ	—	In 1 mm steps	In 1 mm steps			

*1. When specifying Plate code T, specify the TH dimension as well. No need to specify LH. When specifying plate code L, specify the LH dimension as well. No need to specify TH. When specifying Plate code TL, specify both TH and LH.
*2. Specify this option when you specify on only machining of holes with no installation of parts.

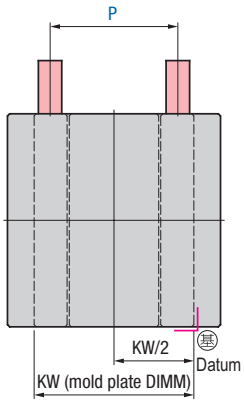
How to order

Catalog No.	Plate code	D	Position code	P	L	R	TH	LH
PBSA	TL	D19	SS02CP	P150			TH10	LH10
PBSA	L	D24	SS02CZ		L100	R120		LH15

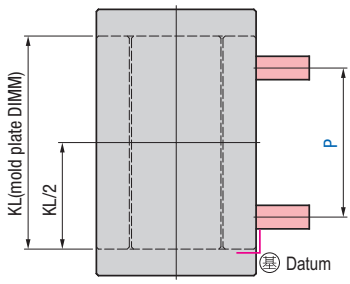
— Optional spec.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

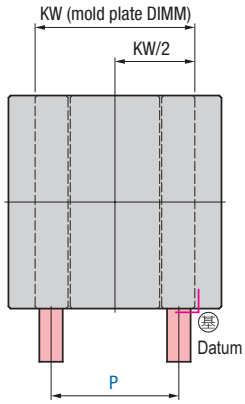
Position code SS02AP



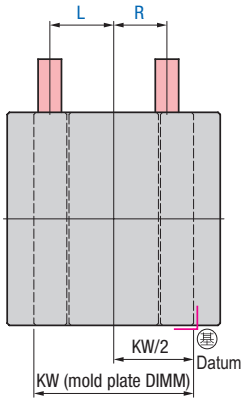
Position code SS02BP



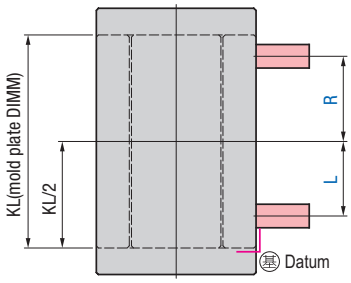
Position code SS02CP



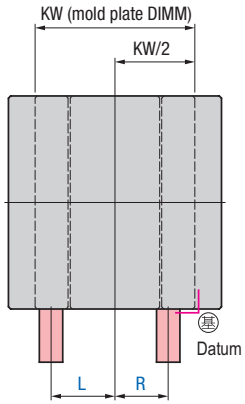
Position code SS02AZ



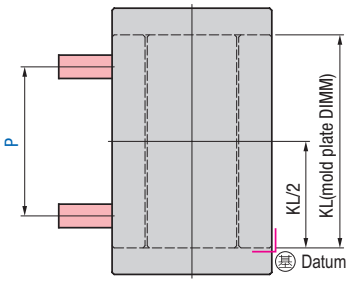
Position code SS02BZ



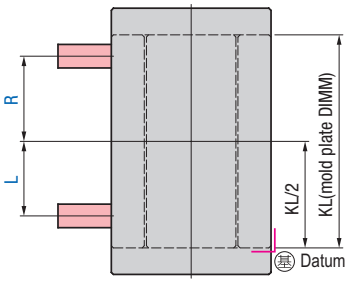
Position code SS02CZ



Position code SS02DP



Position code SS02DZ



※ Base Spacer is a registered trademark of Futaba Corporation.

Machining

Channels for Water, Oil and Heater

Rough Pockets Machining

Threaded Holes for Eyebolt (Side Surface Threaded Holes)

Ejector Rod Holes Addition or Omission

Clamp Slot Addition (For Clamping Plate)

Addition of Clamping Hole or U Ditch for Clamping

Clamp Slot Addition (For A-Plate or B-Plate)

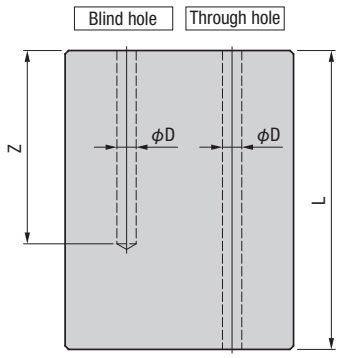
! "Additional processing specifications" are provided to show customers how to advise us on additional processing. When designing molds, various conditions such as strength and accuracy need to be taken into account. Therefore, we shall not be responsible or liable for any loss or damage of any kind incurred as a result of, or in connection with your use of additional processing specifications or selection of mold bases.

Channels for Water, Oil and Heater — Overview

We perform deep-hole drilling of temperature control holes such as water channels, oil channels and cartridge heater insertion holes, etc. using special machines and tools.

※ Channels for Water, Oil and Heater ➡ How to order P.194 - 199

Hole diameter and drilling depth

Column 1 *1			Column 2 *1			Reference diagram
Hole dia. D	Machining limit of blind hole Z	Machining limit of through hole L *2	Hole dia. D	Machining limit of blind hole Z	Machining limit of through hole L *2	
6.0	Z≦600	L≦1200	3.5	Z≦300	L≦600	
6.4			5.0			
7.0			5.1			
8.0			5.2			
8.1			5.5	Z≦600	L≦1200	
8.2			6.3			
8.3			9.5			
8.5			9.8			
9.6			10.3	Z≦1000	L≦1500	
10.0	Z≦1000	L≦1500	11.3	Z≦600	L≦1200	
10.1	Z≦600	L≦1200	12.0	Z≦1000	L≦1500	
10.2			12.5	Z≦600	L≦1200	
10.5			13.0	Z≦1000	L≦1500	
11.0	Z≦1000	L≦1500	13.1			
11.5	Z≦600	L≦1200	13.5	Z≦600	L≦1200	
12.1	Z≦1000	L≦1500	14.5			
12.2			15.3	Z≦1000	L≦1500	
12.3			16.0			
12.7			16.5	Z≦600	L≦1200	
14.0			18.0	Z≦1000	L≦1500	
14.2			20.3	Z≦600	L≦1200	
15.1						
16.1						

*1. Select hole diameter from Column 1. Select from Column 2 as necessary. For hole diameter not listed above, consult our sales office.

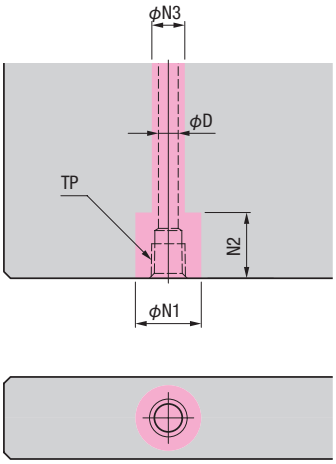
*2. The machining limits of through holes are calculated supposing that the holes are drilled from both sides and connected through in the center. Through hole can be drilled from both sides or from one side. If drilling from one side is desired, consult our sales office.

※ The shape of the bottom of the blind hole may not be isosceles triangle shown in the above diagram.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Machining region of channels for water, oil and heater

To prevent the interference of channels for water, oil and heater with other holes machined, we have set a machining region only as a guide as shown in the table below.
Please take into account when designing molds. These values are provided only as a guide and do not represent a guarantee of influence on accuracy and strength.



Do not perform other machining work within the area.

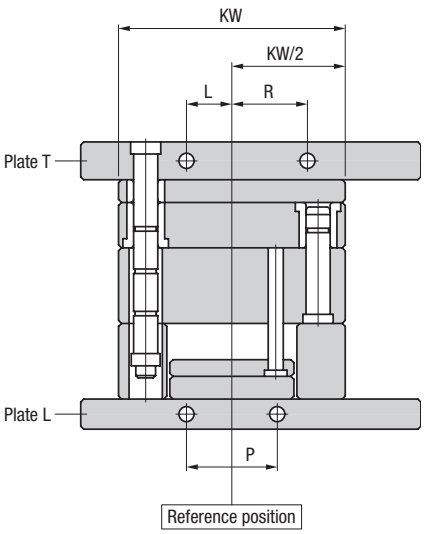
Machining region of channels for water, oil and heater

TP	N1	N2	N3
Rc1/8 Rp1/8	15	20	D+4
Rc1/4 Rp1/4	19	20	
Rc3/8 Rp3/8	22	25	

Relation of hole diameter D and pipe threads

TP	D max
Rc1/8 Rp1/8	8.5
Rc1/4 Rp1/4	11.5
Rc3/8 Rp3/8	14.5

Matters to be noted when protrusion amount of clamping plate is not even (For how to specify, see pages 198 to 203)



The reference position of L and R dimensions is set at the center of mold plate as shown in the left chart.

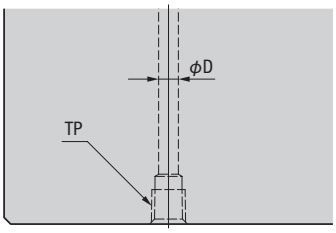
※ If L=R and P=L+R, then specify with P.

Channels for Water, Oil and Heater — 1 Hole

Drill temperature control holes such as water channels, oil channels and cartridge heater insertion holes, etc.

Use this option to specify a temperature control hole at one place at a time.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



Frequently used diameter of water channel and oil channel

Water & oil hole dia. (D)	8	8.5	10	11.5
Pipe thread to use (TP)	Rc1/8 Rc1/4 Rp1/8 Rp1/4		Rc1/4 Rp1/4	

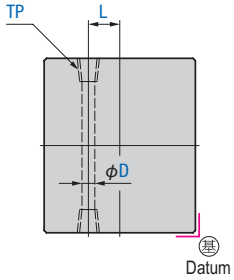
※ Other hole diameter, pipe thread ➡ P.192

Frequently used diameter of heater hole

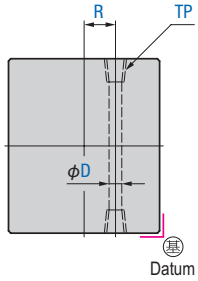
Heater hole dia. (D)	8.1	8.2	10.1	10.2	12.1	12.2

※ Other hole diameter ➡ P.192

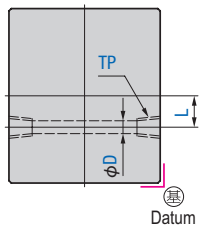
Catalog No. MHH1AKL



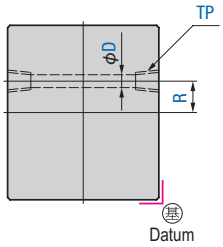
Catalog No. MHH1AKR



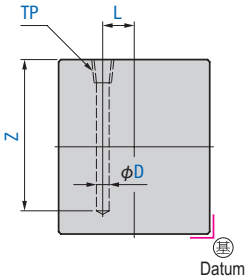
Catalog No. MHH1BKL



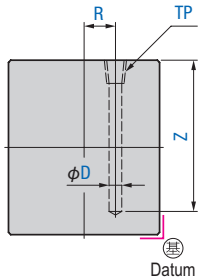
Catalog No. MHH1BKR



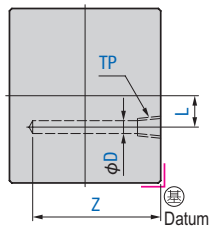
Catalog No. MHH1ATL



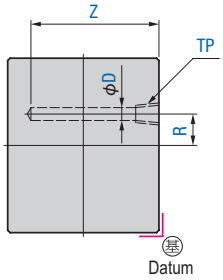
Catalog No. MHH1ATR



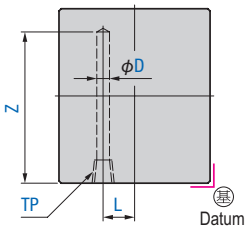
Catalog No. MHH1BTL



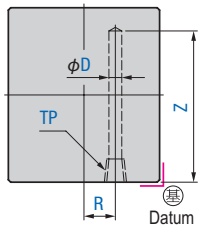
Catalog No. MHH1BTR



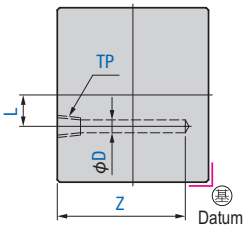
Catalog No. MHH1CTL



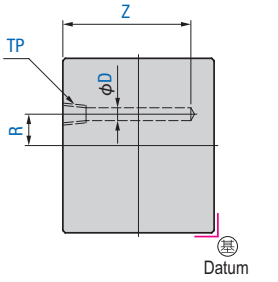
Catalog No. MHH1CTR



Catalog No. MHH1DTL

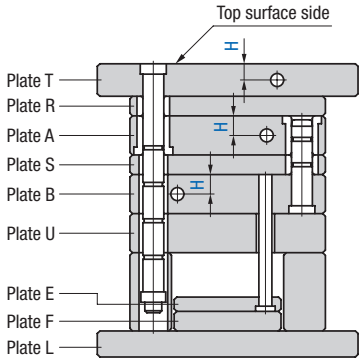


Catalog No. MHH1DTR

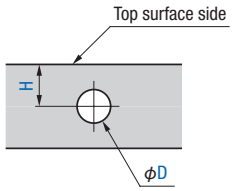


For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Specifying dimensions in thickness direction



Position of H dimension



※ H dimension must be specified with a dimension from top surface side direction.

Temp. Control hole	Catalog No.	Plate code	D	Z	Thread code *1 (TP)	L or R *2	H
Through hole	MHH1AKL MHH1AKR MHH1BKL MHH1BKR	T (Plate T) U (Plate U) R (Plate R) E (Plate E) A (Plate A) F (Plate F) S (Plate S) L (Plate L) B (Plate B)	Frequently used diameter of water & oil hole 8 8.5 10 11.5	Specify plate length Machining depth limit ➡ P.192	RC1/8 RC1/4 RC3/8 RP1/8 RP1/4 RP3/8	In 1 mm steps	In 0.5 mm steps
Blind hole	MHH1ATL MHH1ATR MHH1BTL MHH1BTR MHH1CTL MHH1CTR MHH1DTL MHH1DTR	Additional plate N (Plate N) V (Plate V) O (Plate O) W (Plate W) Q (Plate Q) X (Plate X) Y (Plate Y) Additional plate spec. ➡ P.38	Frequently used diameter of heater hole 8.1 8.2 10.1 10.2 12.1 12.2 Other diameter of hole ➡ P.192	In 1 mm steps Machining depth limit ➡ P.192	Omit if no pipe thread is necessary		

*1. Although PT and PS codes are conventionally used for the nominal dimensions of pipe threads, we use codes defined based on JIS Rc and Rp for our additional processing specification. The relation of our thread codes for additional processing specifications, JIS standard nominal codes and conventional nominal size code are as follows:

Type of pipe thread	Our thread code for additional machining spec.	JIS standard nominal code	Conventional nominal code
Pipe taper internal thread	RC	Rc	PT
Pipe parallel internal thread (parallel internal thread for pipe taper external thread)	RP	Rp	PS

*2. When placing one hole at the center, specify L0 for L or R

※ Detailed specification of channels for water, oil and heater ➡ P.192

※ How to specify when protrusion amount is not even ➡ P.193 ※ Pipe thread specification ➡ P.440

How to order

	Catalog No.	Plate code	D	Z	Thread code *3 (TP)	L or R	H
If specifying pipe thread	MHH1AKL	A	D8.5	Z250	RC1/8	L50	H15
If not specifying pipe thread	MHH1BTR	B	D11.5	Z150		R90	H23

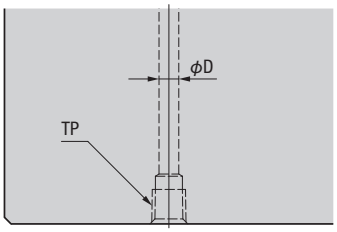
*3. Omit if no pipe thread is necessary. ※ Entrance counterbore hole ➡ P.200 ※ One-side pipe threaded hole ➡ P.202

Channels for Water, Oil and Heater — 2 Holes

Drill temperature control holes such as water channels, oil channels and cartridge heater insertion holes, etc.

Use this option to specify temperature control holes at two places at the same time.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



Frequently used diameter of water channel and oil channel

Water & oil hole dia. (D)	8	8.5	10	11.5
Pipe thread to use (TP)	Rc1/8 Rc1/4 Rp1/8 Rp1/4		Rc1/4 Rp1/4	

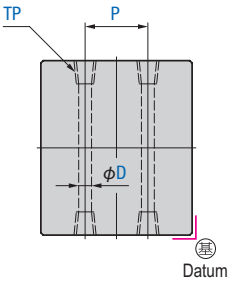
※ Other hole diameter, pipe thread ➡ P.192

Frequently used diameter of heater hole

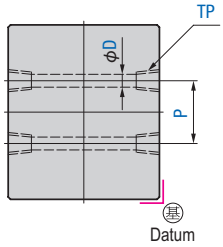
Heater hole dia. (D)	8.1	8.2	10.1	10.2	12.1	12.2

※ Other hole diameter ➡ P.192

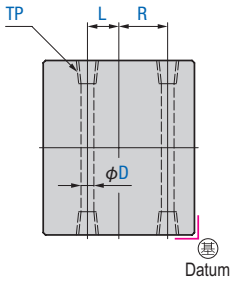
Catalog No. MHH2AKP



Catalog No. MHH2BKP



Catalog No. MHH2AKZ



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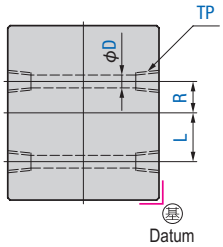
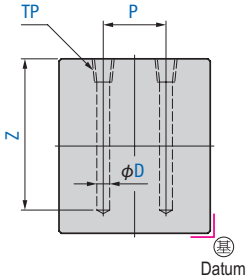
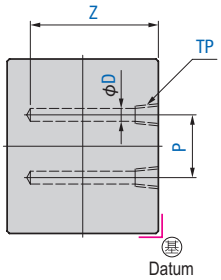


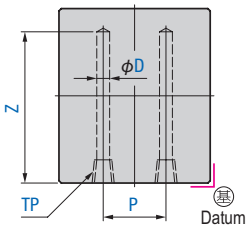
Catalog No. MHH2ATP



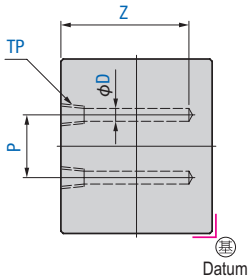
Catalog No. MHH2BTP



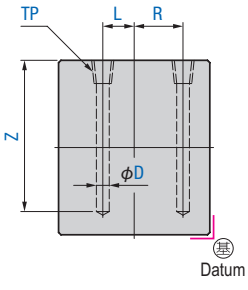
Catalog No. MHH2CTP



Catalog No. MHH2DTP



Catalog No. MHH2ATZ



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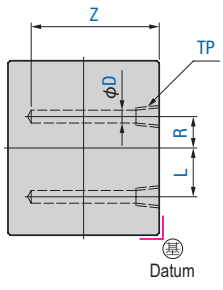

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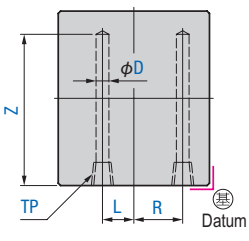
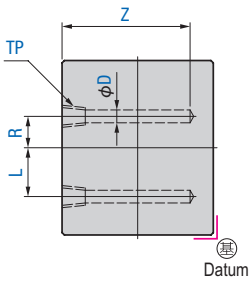
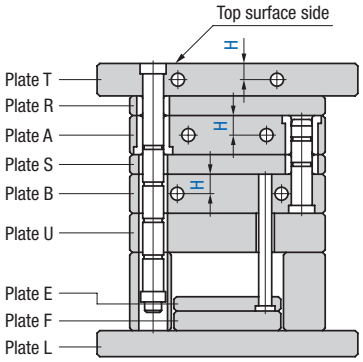


Catalog No. MHH2DTZ

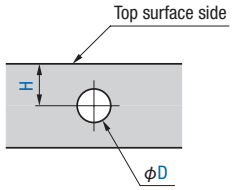


For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Specifying dimensions in plate thickness direction



Position of H dimension



※ H dimension must be specified with a dimension from top surface side direction.

Temp. Control hole	Catalog No.	Plate code	D	Z	Thread code *1 (TP)	P	L	R	H
Through hole	MHH2AKP MHH2BKP	T (Plate T) U (Plate U) R (Plate R) E (Plate E) A (Plate A) F (Plate F) S (Plate S) L (Plate L) B (Plate B) Additional plate N (Plate N) V (Plate V) O (Plate O) W (Plate W) Q (Plate Q) X (Plate X) Y (Plate Y) Additional plate spec. ➡ P.38	Frequently used diameter of water & oil hole 8 8.5 10 11.5 Frequently used diameter of heater hole 8.1 8.2 10.1 10.2 12.1 12.2 Other diameter of hole ➡ P.192	Specify plate length Machining depth limit ➡ P.192	RC1/8 RC1/4 RC3/8 RP1/8 RP1/4 RP3/8 Omit if no pipe thread is necessary	In 1 mm steps	—	—	In 0.5 mm steps
	MHH2AKZ MHH2BKZ					—	In 1 mm steps	In 1 mm steps	
Blind hole	MHH2ATP MHH2BTP MHH2CTP MHH2DTP			In 1 mm steps Machining depth limit ➡ P.192		In 1 mm steps	—	—	
	MHH2ATZ MHH2BTZ MHH2CTZ MHH2DTZ					—	In 1 mm steps	In 1 mm steps	

*1. Although PT and PS codes are conventionally used for the nominal dimensions of pipe threads, we use codes defined based on JIS Rc and Rp for our additional processing specification. The relation of our thread codes for additional processing specifications, JIS standard nominal codes and conventional nominal size code are as follows:

Type of pipe thread	Our thread code for additional machining spec.	JIS standard nominal code	Conventional nominal code
Pipe taper internal thread	RC	Rc	PT
Pipe parallel internal thread (parallel internal thread for pipe taper external thread)	RP	Rp	PS

※ Detailed specification of channels for water, oil and heater ➡ P.192
※ How to specify when protrusion amount is not even ➡ P.193 ※ Pipe thread specification ➡ P.440

How to order

Catalog No. — Plate code — D — Z — Thread code *2 (TP) — P — L

If specifying pipe thread: MHH2AKP — A — D8.5 — Z250 — RC1/8 — P110

If not specifying pipe thread: MHH2BTZ — B — D11.5 — Z150 — L60

— R — H

— H15

— R40 — H23

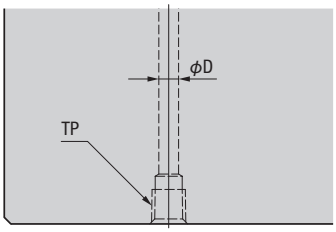
*2. Omit if no pipe thread is necessary. ※ Entrance counterbore hole ➡ P.200 ※ One-side pipe thread hole ➡ P.202

Channels for Water & Oil — Circulation Type

Drill temperature control holes such as water channels, oil channels and cartridge heater insertion holes, etc.

Use this option to specify temperature control holes of circulation type.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast

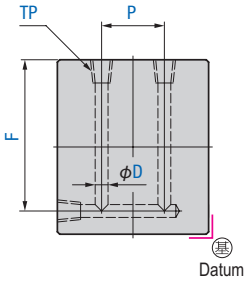


Frequently used diameter of water channel and oil channel

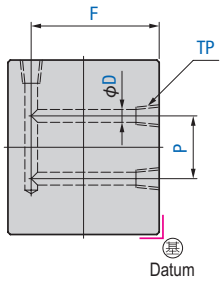
Water & oil hole dia. (D)	8	8.5	10	11.5
Pipe thread to use (TP)	Rc1/8 Rc1/4 Rp1/8 Rp1/4		Rc1/4 Rp1/4	

※ Other hole diameter, pipe thread ➡ P.192

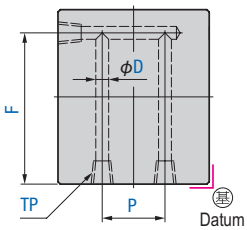
Catalog No. MHH3AZP



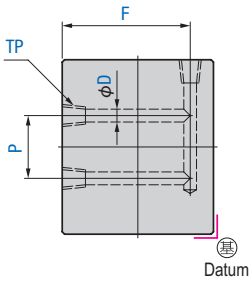
Catalog No. MHH3BZP



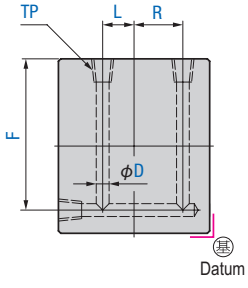
Catalog No. MHH3CZP



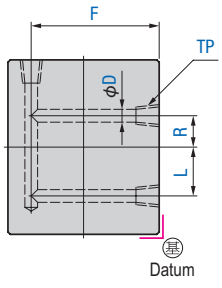
Catalog No. MHH3DZP



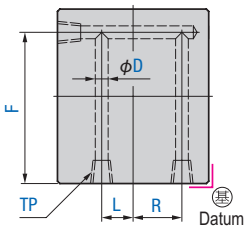
Catalog No. MHH3AZZ



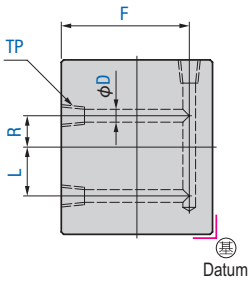
Catalog No. MHH3BZZ



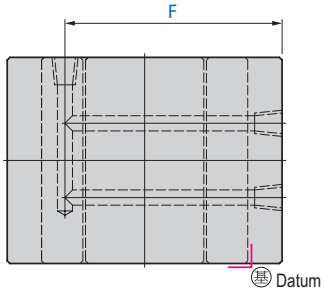
Catalog No. MHH3CZZ



Catalog No. MHH3DZZ

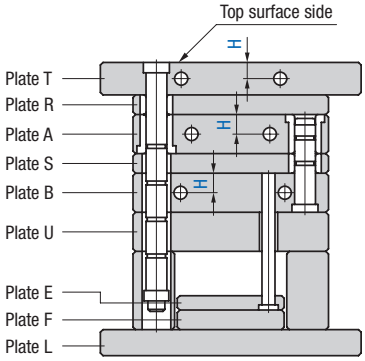


※ When specifying F code for clamping plates, use the dimension from the end surface of the plate as shown below.

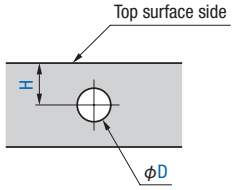


For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Specifying dimensions in plate thickness direction



Position of H dimension



※ H dimension must be specified with a dimension from top surface side direction.

Catalog No.	Plate code	D	Thread code *1 (TP)	P	L	R	F	H
MHH3AZP MHH3BZP MHH3CZP MHH3DZP	T (Plate T) U (Plate U) R (Plate R) E (Plate E) A (Plate A) F (Plate F) S (Plate S) L (Plate L) B (Plate B) Additional plate N (Plate N) V (Plate V) O (Plate O) W (Plate W) Q (Plate Q) X (Plate X) Y (Plate Y) Additional plate spec. ➡ P.38	Frequently used diameter of water & oil hole 8 8.5 10 11.5	RC1/8 RC1/4 RC3/8 RP1/8 RP1/4 RP3/8	In 1 mm steps	–	–	In 1 mm steps	In 0.5 mm steps
MHH3AZZ MHH3BZZ MHH3CZZ MHH3DZZ		Other diameter of hole ➡ P.192	Omit if no pipe thread is necessary	–	In 1 mm steps	In 1 mm steps		

*1. Although PT and PS codes are conventionally used for the nominal dimensions of pipe threads, we use codes defined based on JIS Rc and Rp for our additional processing specification. The relation of our thread codes for additional processing specifications, JIS standard nominal codes and conventional nominal size code are as follows:

Type of pipe thread	Our thread code for additional machining spec.	JIS standard nominal code	Conventional nominal code
Pipe taper internal thread	RC	Rc	PT
Pipe parallel internal thread (parallel internal thread for pipe taper external thread)	RP	Rp	PS

※ Detailed specification of channels for water, oil and heater ➡ P.192
※ Machining depth limit ➡ P.192
※ How to specify when protrusion amount is not even ➡ P.193 ※ Pipe thread specification ➡ P.440

How to order

Catalog No. – Plate code – D – Thread code*2 (TP) – P – L – R

If spcifying pipe thread: MHH3AZP – A – D8.5 – RC1/8 – P110

If not specifying pipe thread: MHH3BZZ – B – D11.5 – L60 – R40

– F – H

– F150 – H15

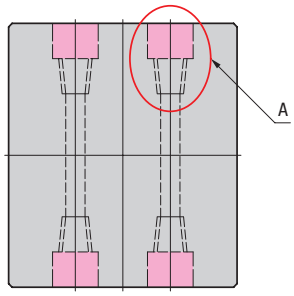
– F130 – H23

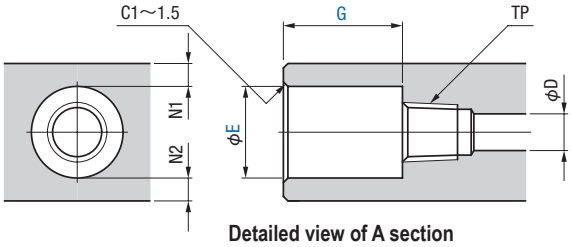
*2. Omit if no pipe thread is necessary. ※ Entrance counterbore hole ➡ P.200

Channels for Water, Oil and Heater – Entrance Counterbore Holes

Produce counterbore holes at the entrance of water channel, oil channel and heater holes as shown below:

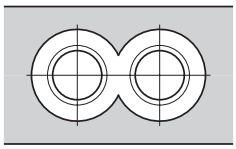
Application Mold bases, cavity retainer sets, cavity retainer sets for die cast





Detailed view of A section

※ Provide N1 and N2 dimensions of 1.5 mm or more. This value is not a guarantee of strength.



If the interval of counterbore holes is small, they are overlapped.

TP	E	G
Rc (PT) 1/8 Rp (PS) 1/8	13≦E≦30	5≦G≦30
Rc (PT) 1/4 Rp (PS) 1/4	16≦E≦30	5≦G≦30
Rc (PT) 3/8 Rp (PS) 3/8	20≦E≦30	5≦G≦30
No pipe thread hole	13≦E≦30 provided E ≧ D+2	5≦G≦30

Form of temperature control hole		Specify water, oil and heater channel specifications	Entrance counterbore spec. code	E	G	Counterbore position code (see right page)
Through hole	Both side counterbore	Specify as shown in pages 194 to 197.	ZHC	In 1mm steps See above table	In 1mm steps See above table	–
	One side counterbore					AH BH CH DH
Blind hole	–					–
Circulation type hole	–	Specify as shown in pages 198 to 199.				–

How to order

Specify water, oil and heater channel specifications (See pages 194 to 199)	–	Entrance counterbore hole spec. code	–	E	–	G	–	Counterbore position code
MHH2AKP-A-D8.5-Z250-RC1/8-P110-H15	–	ZHC	–	E22	–	G20		
MHH2BKP-B-D8.5-Z300-RC1/8-P150-H30	–	ZHC	–	E24	–	G25	–	BH

How to order when combining the above with one side pipe thread hole

(One side pipe thread hole spec. ➡ P.202)

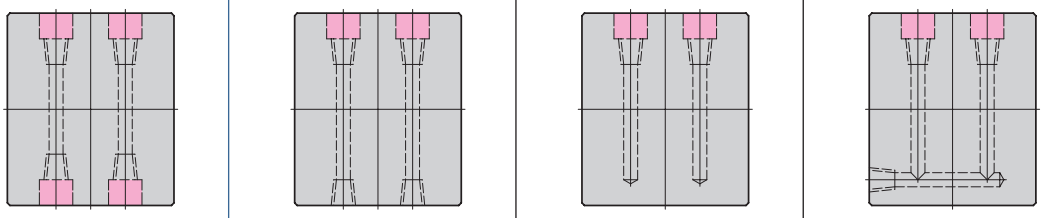
Specify water, oil and heater channel specifications (See pages 194 to 197)	–	Specify entrance counterbore hole specification	–	Specify one side pipe thread hole specification (See pages 202)
MHH2AKP-A-D8.5-Z250-RC1/8-P110-H15	–	ZHC-E22-G20-AH	–	TAP-AH

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Entrance counterbore specifications

Depending on the specifications of channels for water, oil and heater, counterbores are produced as shown below.

Through hole		Blind hole	Circulation type hole
Counterbores are produced on both sides of the holes.	Cunterbores are produced on one side of holes.	Counterbores are produced at the entrance of the holes.	Counterbores are produced on two-hole side. No counterbore is provided on one-hole side.



When producing counterbores on one side of through holes, please specify as follows:

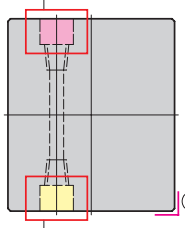
One-side counterbore specifications

When producing entrance counterbores on one side of channels for water, oil and heater, specify the counterbore position code of the side on which to produce counterbores from among AH, BH, CH and DH (the following eight combinations are available).

1 hole

Catalog No. MHH1AKL

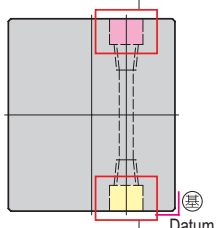
Counterbore position code: AH



Counterbore position code: CH

Catalog No. MHH1AKR

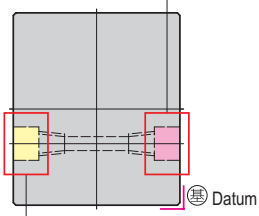
Counterbore position code: AH



Counterbore position code: CH

Catalog No. MHH1BKL

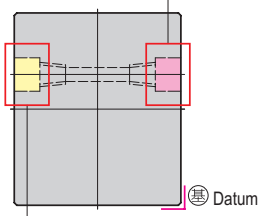
Counterbore position code: BH



Counterbore position code: DH

Catalog No. MHH1BKR

Counterbore position code: BH

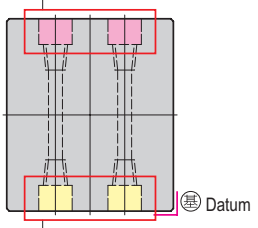


Counterbore position code: DH

2 holes

Catalog No. MHH2AKP

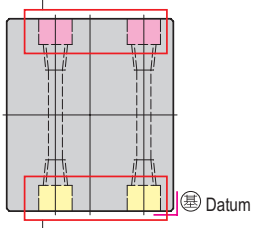
Counterbore position code: AH



Counterbore position code: CH

Catalog No. MHH2AKZ

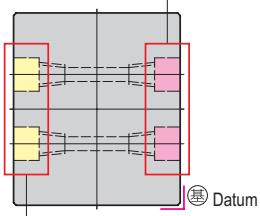
Counterbore position code: AH



Counterbore position code: CH

Catalog No. MHH2BKP

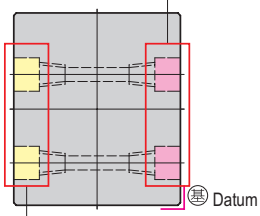
Counterbore position code: BH



Counterbore position code: DH

Catalog No. MHH2BKZ

Counterbore position code: BH

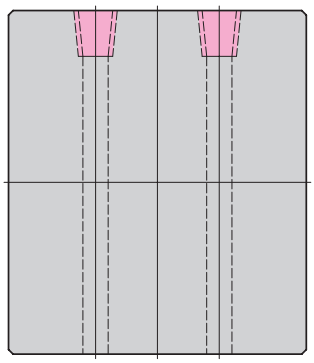


Counterbore position code: DH

Channels for Water, Oil and Heater – One Side Pipe Thread Holes

Produce pipe thread holes of channels for water, oil and heater only on one side as shown below:

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



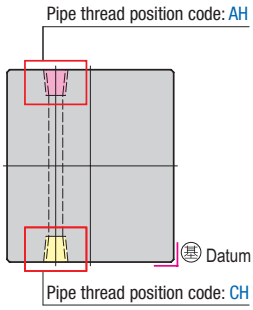
【Applicable specifications】
One side pipe thread hole specification can be applied only to through holes of channels for water, oil and heater.

One side pipe thread hole specifications

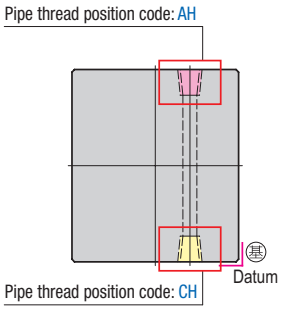
When producing pipe thread hole only on one side of channels for water, oil and heater, specify the thread position code of the side on which to produce pipe thread holes from among AH, BH, CH and DH (the following eight combinations are available).

1 hole

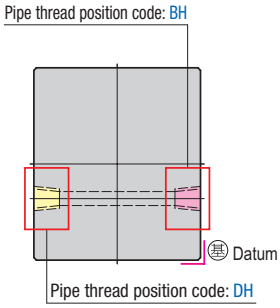
Catalog No. MHH1AKL



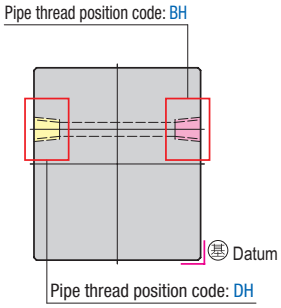
Catalog No. MHH1AKR



Catalog No. MHH1BKL

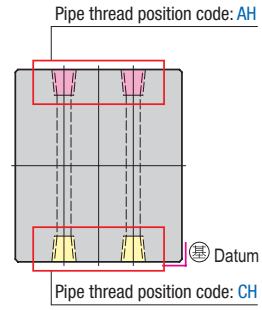


Catalog No. MHH1BKR

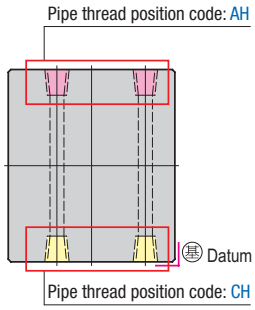


2 holes

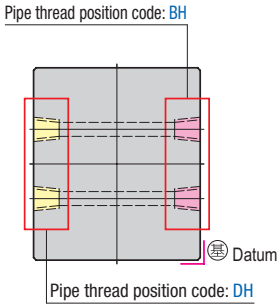
Catalog No. MHH2AKP



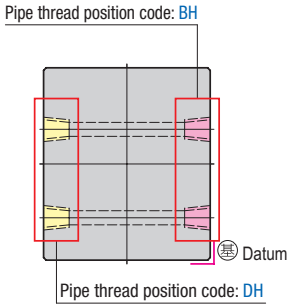
Catalog No. MHH2AKZ



Catalog No. MHH2BKP



Catalog No. MHH2BKZ



For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Temperature control hole	Catalog No.	Specify water, oil and heater channel specifications	One side pipe thread hole specification code	Thread position code
1 hole	MHH1AKL	Specify as shown in pages 194 to 195.	TAP	AH CH
	MHH1AKR			
	MHH1BKL			BH DH
	MHH1BKR			
2 holes	MHH2AKP	Specify as shown in pages 196 to 197.		AH CH
	MHH2AKZ			
	MHH2BKP			BH DH
	MHH2BKZ			

How to order

Specify water, oil and heater channel specifications (See pages 194 to 197)	—	One side pipe thread hole specification code	—	Thread position code
MHH1AKL–A–D8.5–Z250–RC1/8–L50–H15	—	TAP	—	AH
MHH2BKP–B–D8.5–Z300–RC1/8–P150–H30	—	TAP	—	BH

How to order when combining the above with entrance counterbore holes

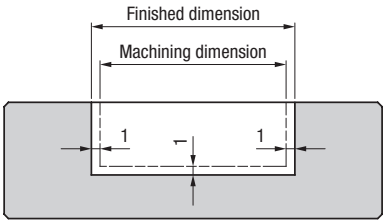
(entrance counterbore spec. ➡ P.200)

Specify water, oil and heater channel specifications (See pages 194 to 197)	—	Specify entrance counterbore hole spec. (see page 200)	—	Specify one side pipe thread hole specification
MHH2AKP–A–D8.5–Z250–RC1/8–P110–H15	—	ZHC–E22–G20–AH	—	TAP–AH

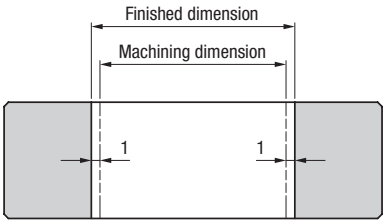
Rough Pockets Machining — Overview

About our rough pocket machining

Our rough pocket machining is rough machining, leaving a finishing allowance of approx. 1 mm. We produce blind pockets and through pockets with a finishing allowance being left as shown below. Please advise us on the pocket dimensions with their finished dimensions. The finishing allowance for pocket gas cutting is set by plate thickness (see page 212).

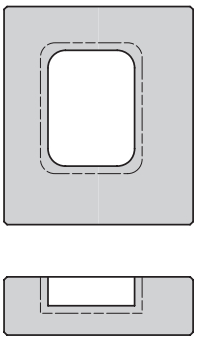
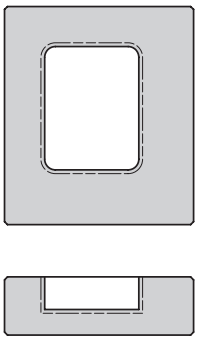
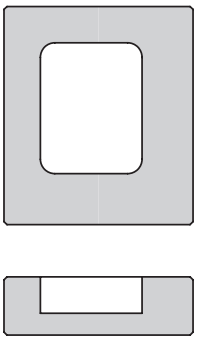


Blind pocket

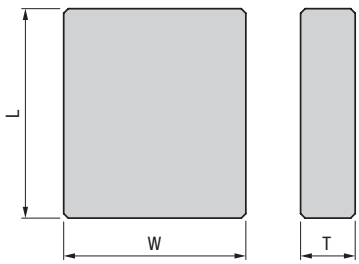


Through pocket

【Reference】 Common machining procedures for pocket machining

Rough machining	Semi-finish machining	Finish machining
This is an initial process of pocket machining. During rough machining, a part is milled roughly to a general shape of final model, leaving a finishing allowance of a few millimeters. As this is a rough processing, the finishing allowance is not uniform.	A process following rough machining. At the semi-finishing stage, the part is milled to a nearer shape of the model, leaving extremely small amount of finishing allowance of generally 0.1 to 0.2 mm.	This is a final process of pocket machining. The part is milled to a specified limit deviation tolerance and surface roughness.
		

Limit deviations of thickness of plates with pocket machining		
L dimension range (W≦L)	Limit deviations of T	
	Upper deviation	Lower deviation
L≦ 300	+0.2	+0.05
300＜L≦ 600	+0.25	+0.05
600＜L≦1000	+0.3	+0.05

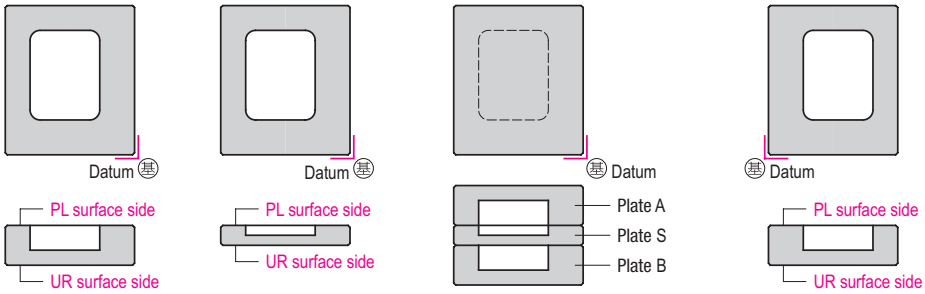


For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Points to be noted when specifying pocket machining

The charts shown in each page illustrate the states viewed when cavity plates on both the fixed and moving sides are open (status viewed from the parting line surface).

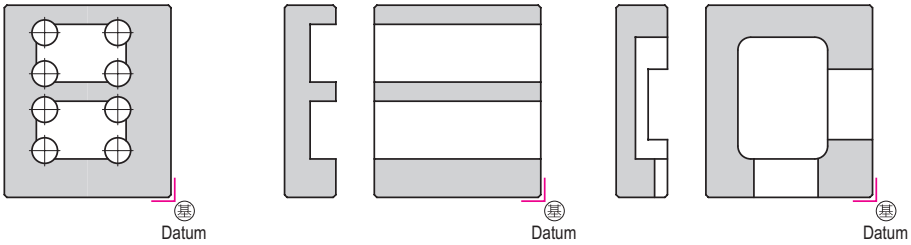
Ensure that the datum plane of the plate is aligned with the datum plane of the mold base.



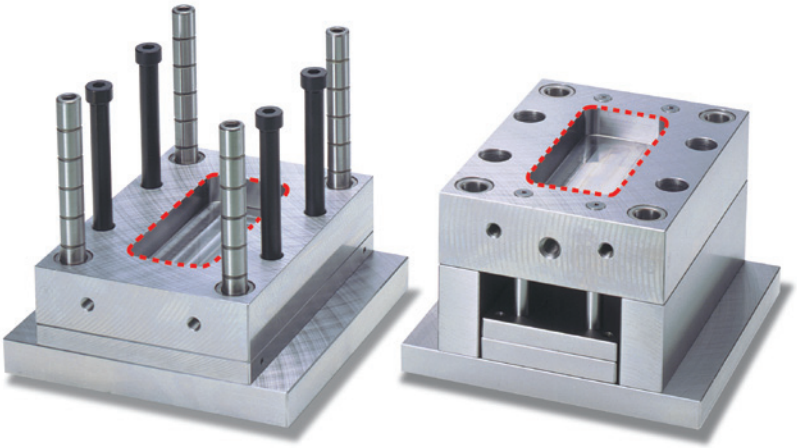
State of plate B being open | **State of Plate S being open** | **State of Plate A, Plate B and Plate S being assembled.** | **State of Plate A being open**

Combination of multiple pocket machining and grooving

By repeatedly specifying machining, you can specify multiple pocket machining and grooving as shown below. Also, combined use of different shapes of pocket machining in a mold base is also possible.



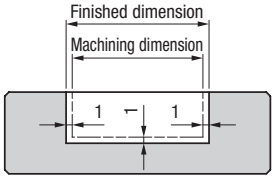
Rectangle corner outside radius | **Through groove** | **Slide core groove**



Rough Pockets Machining – Rectangular with Rounded Corners (Inside Corner R)

Mill rectangular pockets with rounded corners (inside corner R) in mold plates.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



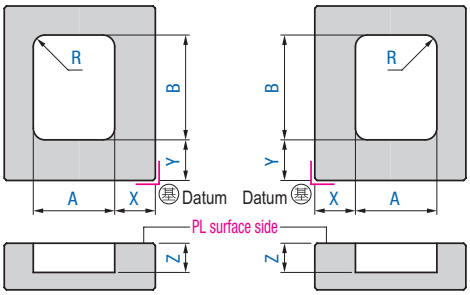
※ We machine pockets leaving a finishing allowance of approximately 1 mm with respect to the finished dimension.
Please specify the dimension of pockets with their finished dimensions.
※ The table below shows our specifications of pocket corner R.

Pocket corner radius and pocket depth

Pocket corner radius R	R5	R6	R8	R10	R12.5	R15	R20	R25
Pocket depth Z	Z≦45	Z≦55	Z≦65	Z≦90	Z≦110	Z≦120	Z≦130	Z≦150

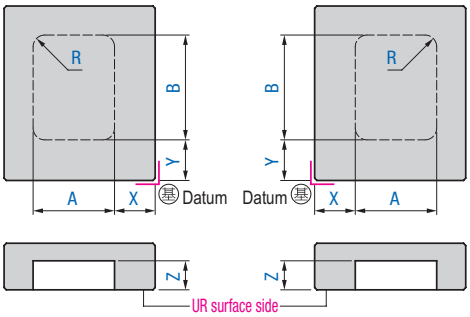
※ The maximum machining depth of pocket depth Z varies depending on the radius of rounded corners.
※ For pocket depth or corner radius not shown in the above table, consult our sales office.

Catalog No. **MKKB1/PL** (Machine pockets on PL surface side)



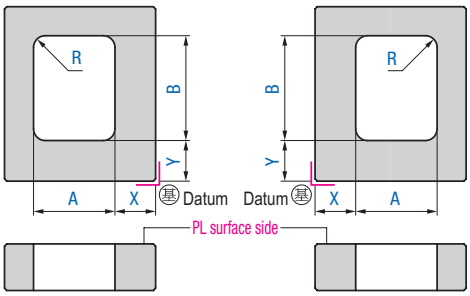
Applicable to Plate Q, S, V, B, U, W and X Applicable to Plate R, O, N and A

Catalog No. **MKKB1/UR** (Machine pockets on UR surface side)



Applicable to Plate Q, S, V, B, U, W and X Applicable to Plate R, O, N and A

Catalog No. **MOKB1/PL**



Applicable to Plate Q, S, V, B, U, W and X Applicable to Plate R, O, N and A

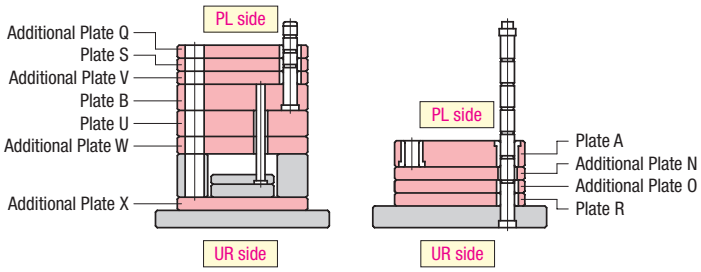
※ Specify through pockets from PL surface side.
Specifying them from UR surface side is not allowed.

※ The position of the datum plane is that viewed at the time when cavity plates on both the fixed and moving sides are open (position viewed from the parting line surface).

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Pocket machining applicable plates

The PL surface side and UR surface side of each plate are as follows:



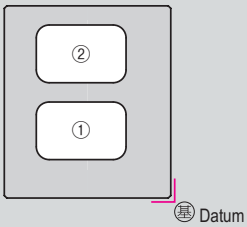
※ For plates not shown the above, specify with a drawing, etc.

Shape	Catalog No.	Plate code	A	B	R	Z	X	Y
Blind pocket	MKKB1/PL MKKB1/UR	R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) Additional plate: O (Plate O), N (Plate N), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X) Additional plate spec. ➡ P.38	In 0.1 mm steps	In 0.1 mm steps	R5 R6 R8 R10 R12.5 R15 R20 R25	In 0.1 mm steps	In 0.1 mm steps Omit X and Y if pockets are machined at the center of the plate.	
Through pocket	MOKB1/PL					—		

※ Pocket machining details ➡ P.204
※ Adding slide core groove, blind grove ➡ P.216 ～ 221

How to order

	Catalog No.	—	Plate code	—	A	—	B	—	R	—	Z	—	X	—	Y
Blind pocket (Machining on PL side)	MKKB1/PL	—	A	—	A80	—	B100	—	R10	—	Z50	—	X30	—	Y40
Blind pocket (Machining on UR side)	MKKB1/UR	—	A	—	A90	—	B110	—	R8	—	Z10	—	X50	—	Y60
Through pocket	MOKB1/PL	—	B	—	A100	—	B150	—	R8			—	X40	—	Y50

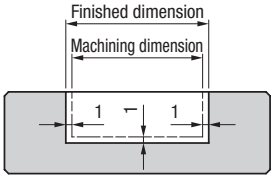


※ If creating two pockets as shown on the left, repeat specifying twice.
If creating three or more pockets, repeat it multiple times accordingly.
An example of order:
Specify ① MKKB1/PL—B—A80—B50—R8—Z20—X50—Y40
Specify ② MKKB1/PL—B—A80—B50—R8—Z20—X50—Y110

Rough Pockets Machining – Rectangular with Rounded Corners (Outside Corner R)

Machine rectangular pockets with rounded corners (outside corner R) in mold plates.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



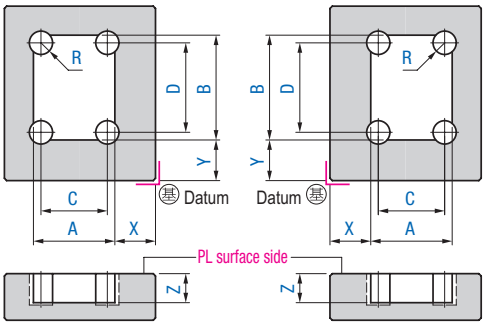
※ We machine pockets leaving a finishing allowance of approximately 1 mm with respect to the finished dimension.
Please specify the dimension of pockets with their finished dimensions.
※ The table below shows our specifications of pocket corner R.

Pocket corner and pocket depth

Pocket corner R	R5	R6	R8	R10	R12.5	R15
Pocket depth Z	Z≦45	Z≦55	Z≦65	Z≦90	Z≦110	Z≦120

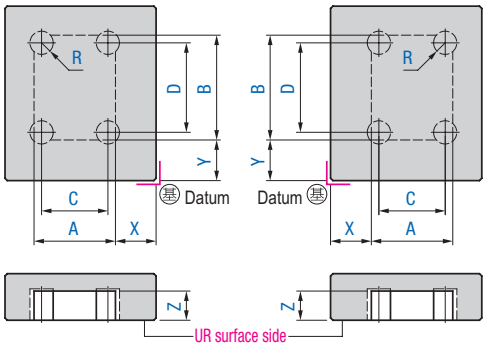
※ The maximum machining depth of pocket depth Z varies depending on the radius of rounded corners.
※ For pocket depth or corner R not shown in the above table, consult our sales office.

Catalog No. **MKKB2/PL** (Machine pockets on PL surface side)



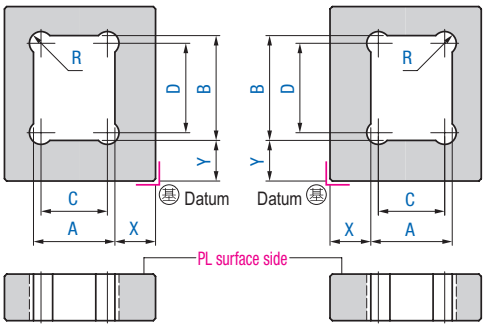
Applicable to Plate Q, S, V, B, U, W and X Applicable to Plate R, O, N and A

Catalog No. **MKKB2/UR** (Machine pockets on UR surface side)



Applicable to Plate Q, S, V, B, U, W and X Applicable to Plate R, O, N and A

Catalog No. **MOKB2/PL**

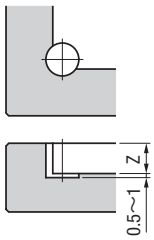
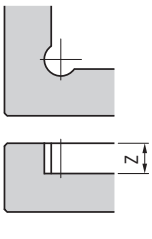
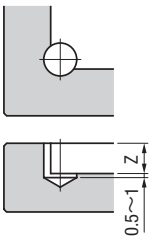


Applicable to Plate Q, S, V, B, U, W and X Applicable to Plate R, O, N and A

※ Specify through pockets from the PL surface side.
Specifying them from the UR surface side is not allowed.

For blind pocket, specify the corner R specification:

Corner R specification

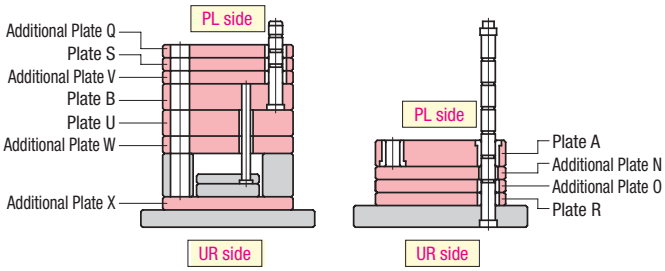
R code: RD	R code: RF	R code: RK
		
The depth of corner R will be larger than the finished dimension of the pocket Z by 0.5 to 1 mm.	The corner R will be cut, leaving a finish allowance of 1mm with respect to the finished dimension Z.	The depth of corner R will be larger than the finished dimension of the pocket Z by 0.5 to 1 mm.

※ RK form may be substituted by RD form due to production conditions.

※ The position of the datum plane is that viewed at the time when mold plates on both the fixed and moving sides are open (position viewed from the parting line surface).

Pocket milling applicable plate

The PL side and the UR side of each plate are as follows:



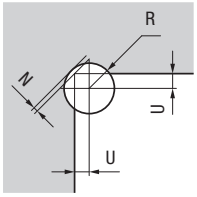
※ For plates not shown the above, specify with a drawing, etc.

Corner radius dimension

【Reference】Pocket corner R section

The values shown in the table below are reference values to set corner R.

Corner of sizes other than shown below will be machined to order.



R	U	N (Ref. value)
R5	3	0.8
R6	3.5	1.1
R8	5	0.9
R10	6.5	0.8
R12.5	8	1.2
R15	10	0.9

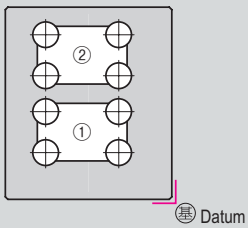
※ N is calculated value.

Shape	Catalog No.	Plate code	A	B	C *1	D *1	R	R code	Z	X	Y
Blind pocket	MKKB2/PL MKKB2/UR	R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) Additional plate: O (Plate O), N (Plate N), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X) Additional plate spec. ➡ P.38	In 0.1 mm steps	In 0.1 mm steps	In 0.1 mm steps	In 0.1 mm steps	R5 R6 R8 R10 R12.5 R15	RD RF RK	In 0.1 mm steps	In 0.1 mm steps Omit X and Y if pockets are machined at the center of the plate.	
Through pocket	MOKB2/PL							—	—		

*1. C and D dimensions are allocated to A and B as follows for machining.
C＝A－2×U
D＝B－2×U
※ Pocket machining details ➡ P.204
※ Adding slide core groove, blind grove ➡ P.216 ～ 221

How to order

	Catalog No.	Plate code	A	B	C	D	R	R code	Z	X	Y
Blind pocket (PL side machining)	MKKB2/PL	A	A80	B100	C67	D87	R10	RD			
Blind pocket (UR side machining)	MKKB2/UR	A	A100	B120	C90	D110	R8	RD			
Through pocket	MOKB2/PL	B	A100	B150	C90	D140	R8				
									Z50	X30	Y40
									Z20	X40	Y50
										X40	Y50

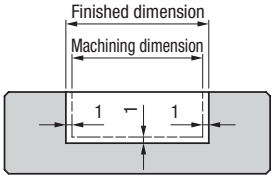


※ If creating two pockets as shown on the left, repeat the specifying twice.
If creating three or more pockets, repeat it multiple times accordingly.
An example of order:
specify ① MKKB2/PL－B－A80－B50－C70－D40－R8－RD－Z20－X50－Y40
specify ② MKKB2/PL－B－A80－B50－C70－D40－R8－RD－Z20－X50－Y110

Rough Pockets Machining — Circular Pocket

Machine circular pockets in mold plates.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



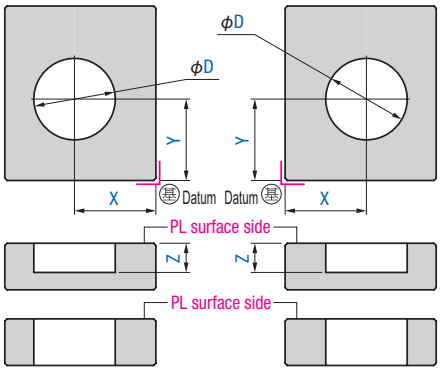
※ We machine pockets leaving a finishing allowance of approximately 1 mm with respect to the finished dimension.
Please specify the dimension of pockets with their finished dimensions.

Hole diameter and depth

Hole diameter	10≦D<42	42≦D<55	55≦D
Hole depth Z	Z≦D×3	Z≦130	Z≦150

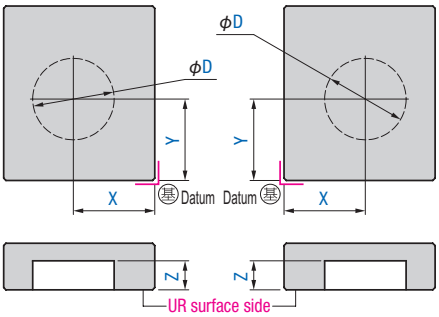
※ The maximum machining depth of hole depth Z varies depending on the hole diameter.
※ For hole depth not shown in the above table, consult our sales office.

Catalog No. **MKKC1/PL** (Machine blind pockets on PL surface side)
Catalog No. **MOKC1/PL** (Machine through pockets)



Applicable to Plate Q, S, V, B, U, W and X Applicable to Plate R, O, N and A

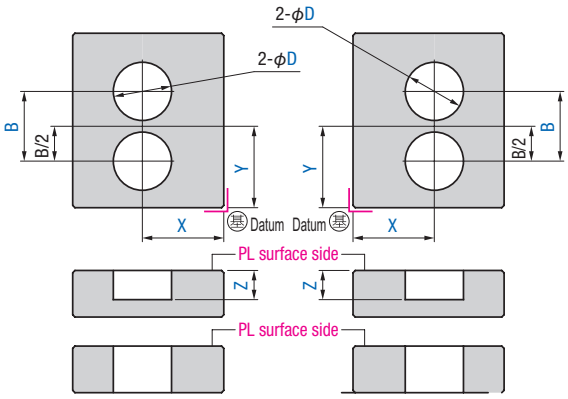
Catalog No. **MKKC1/UR** (Machine blind pockets on UR surface side)



Applicable to Plate Q, S, V, B, U, W and X Applicable to Plate R, O, N and A

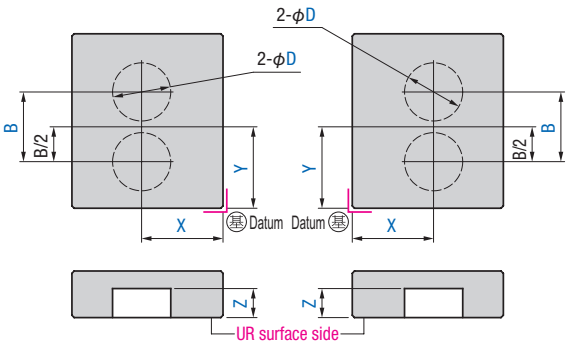
※ Specify through circular pockets from the PL surface side.
Specifying them from the UR surface side is not allowed.

Catalog No. **MKKC2/PL** (Machine blind pockets on PL surface side)
Catalog No. **MOKC2/PL** (Machine through pockets)



Applicable to Plate Q, S, V, B, U, W and X Applicable to Plate R, O, N and A

Catalog No. **MKKC2/UR** (Machine blind pockets on UR surface side)

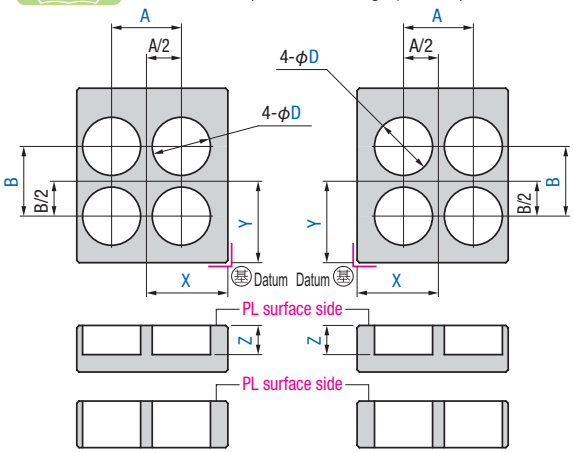


Applicable to Plate Q, S, V, B, U, W and X Applicable to Plate R, O, N and A

※ Specify through circular pockets from the PL surface side.
Specifying them from the UR surface side is not allowed.

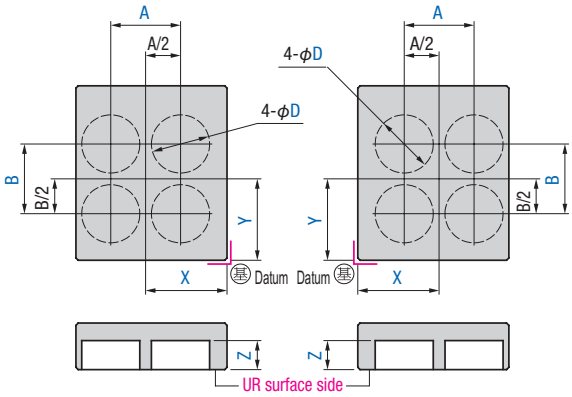
※ The position of the datum plane is that viewed at the time when mold plates on both the fixed and moving sides are open (position viewed from the parting line surface).

Catalog No. **MKKC4/PL** (Machine blind pockets on PL surface side)
Catalog No. **MOKC4/PL** (Machine through pockets)



Applicable to Plate Q, S, V, B, U, W and X Applicable to Plate R, O, N and A

Catalog No. **MKKC4/UR** (Machine blind pockets on UR surface side)

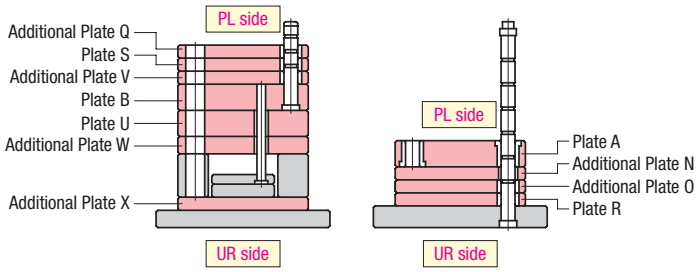


Applicable to Plate Q, S, V, B, U, W and X Applicable to Plate R, O, N and A

※ Specify through circular pockets from the PL surface side.
Specifying them from the UR surface side is not allowed.

Pocket machining applicable plates

The PL surface side and the UR surface side of each plate are as follows:



※ For plates not shown the above, specify with a drawing, etc.

Shape	Catalog No.	Plate code	D	Z	A	B	X	Y
Circular blind pocket	MKKC1/PL MKKC1/UR	R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) Additional plate: O (Plate O), N (Plate N), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X) Additional plate spec. ➡ P.38	In 0.1 mm steps	In 0.1 mm steps	—	—	In 0.1 mm steps Omit X and Y if pockets are machined at the center of the plate.	
	MKKC2/PL MKKC2/UR					In 0.1 mm steps		
	MKKC4/PL MKKC4/UR				In 0.1 mm steps			
Circular through pocket	MOKC1/PL MOKC2/PL			—	—	—		
	MOKC4/PL				In 0.1 mm steps	In 0.1 mm steps		

※ Pocket machining details ➡ P.204
※ Adding slide core groove, blind grove ➡ P.216 ～ 221

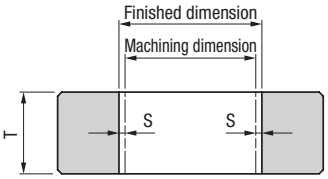
How to order

	Catalog No.	Plate code	D	Z	A	B	X	Y
Circular blind hole (PL side machining)	MKKC2/PL	A	D80	Z30		B100	X100	Y150
Circular through hole	MOKC4/PL	B	D60		A80	B80	X150	Y180

Pocket Gas Cutting – Rectangular & Circular Pockets

Gas cut through pockets in mold plates.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



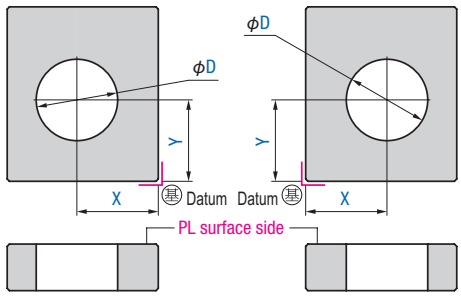
※ We machine pockets leaving finishing allowances shown in the table below. Please specify the dimension of pockets with their finished dimensions.

※ The gas cutting of pockets are applicable to materials of F-S55C (F-S50C if plate thickness is 25 mm or less) and F-SS400. This cutting method cannot be specified for other materials.

Plate thickness and finishing allowance

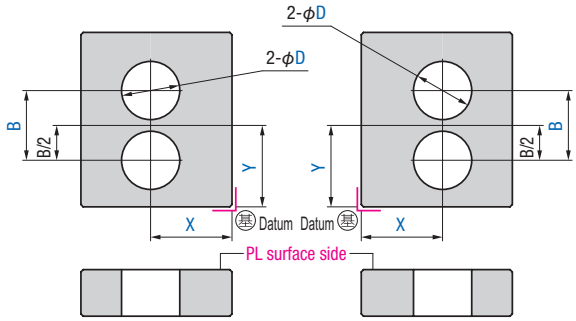
Plate thickness (T)	T≦100	100＜T≦170
Finishing allowance (S)	5	8
Corner radius R	R10 or more	

Catalog No. **MYKC1/PL** (Specify from the PL surface side.)



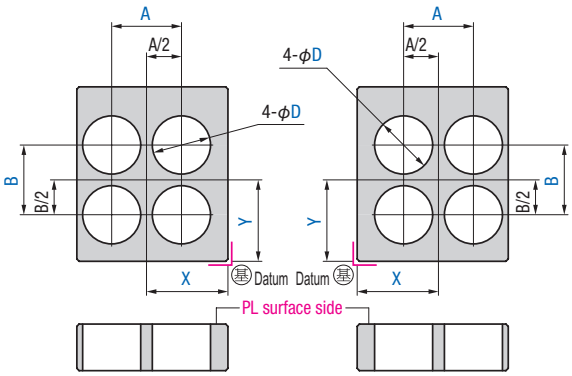
Applicable to Plate Q, S, V, B, U, W and X　Applicable to Plate R, O, N and A

Catalog No. **MYKC2/PL** (Specify from the PL surface side.)



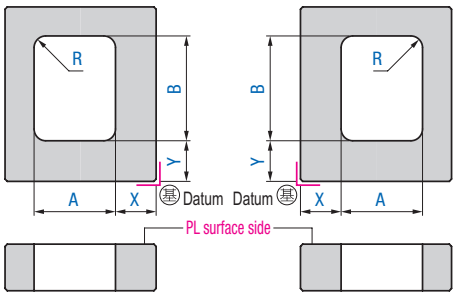
Applicable to Plate Q, S, V, B, U, W and X　Applicable to Plate R, O, N and A

Catalog No. **MYKC4/PL** (Specify from the PL surface side.)



Applicable to Plate Q, S, V, B, U, W and X　Applicable to Plate R, O, N and A

Catalog No. **MYKB1/PL** (Specify from the PL surface side.)



Applicable to Plate Q, S, V, B, U, W and X　Applicable to Plate R, O, N and A

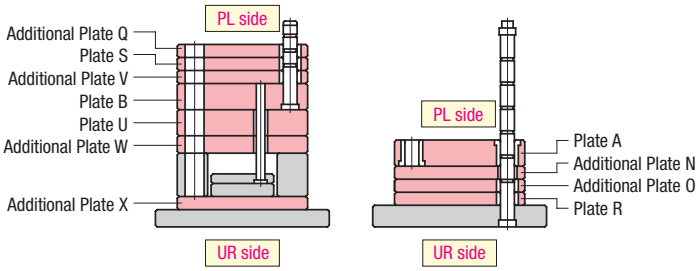
※ The position of the datum plane is that viewed at the time when mold plates on both the fixed and moving sides are open (position viewed from the parting line surface).

※ The gas cutting of pockets cannot be specified from the UR surface side. Please specify with a drawing, etc.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Pocket gas cutting applicable plates

The PL side and the UR surface side of each plate are as follows:



※ For plates not shown the above, specify with a drawing, etc.

Shape	Catalog No.	Plate code	D	A	B	R	X	Y
Circular	MYKC1/PL	R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) Additional plate: O (Plate O), N (Plate N), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X) Additional plate spec. ➡ P.38	In 1 mm steps	—	—	—	In 1 mm steps Omit X and Y if pockets are machined at the center of the plate.	
Circular	MYKC2/PL				In 1 mm steps			
Circular	MYKC4/PL			In 1 mm steps				
Rectangular	MYKB1/PL		—	In 1 mm steps	In 1 mm steps	In 1 mm steps R≧10		

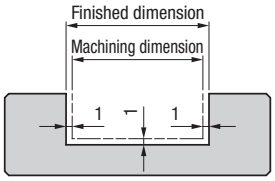
How to order

	Catalog No.	Plate code	D	A	B	R	X	Y
Circular	MYKC2/PL	B	D80		B100		X100	Y150
Rectangular	MYKB1/PL	A		A200	B300	R20	X120	Y100

Rough Pockets Machining — Through Groove

Machine through groove shaped pockets in mold plates.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



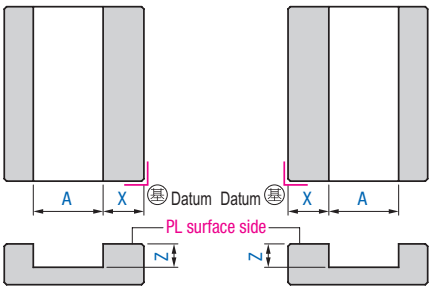
※ We machine pockets leaving a finishing allowance of approximately 1 mm with respect to the finished dimension.
Please specify the dimension of pockets with their finished dimensions.

Groove width and depth

Groove width (A or B DIMM shown below)	10≦(A or B)<42	42≦(A or B)<55	55≦(A or B)
Groove depth Z	Z≦(A or B)×3	Z≦130	Z≦150

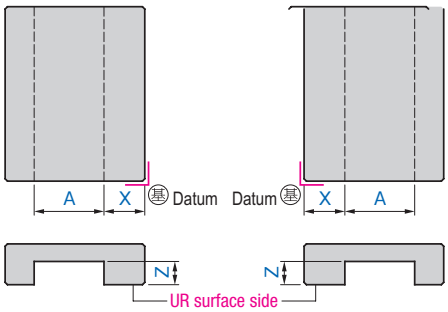
※ The maximum machining depth of groove depth Z varies depending on the width of the groove.
※ For groove depth not shown in the above table, consult our sales office.

Catalog No. MKKS1/PL (Machine pockets on PL surface side)



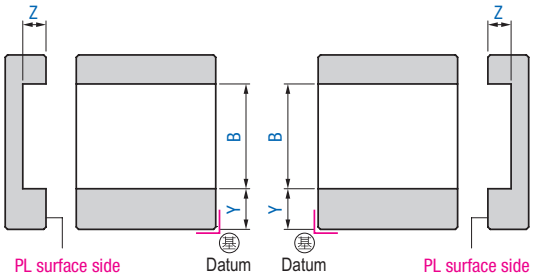
Applicable to Plate Q, S, V, B, U, W and X　　Applicable to Plate R, O, N and A

Catalog No. MKKS1/UR (Machine pockets on UR surface side)



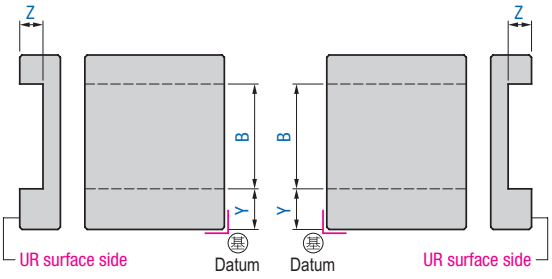
Applicable to Plate Q, S, V, B, U, W and X　　Applicable to Plate R, O, N and A

Catalog No. MKKS2/PL (Machine pockets on PL surface side)



Applicable to Plate Q, S, V, B, U, W and X　　Applicable to Plate R, O, N and A

Catalog No. MKKS2/UR (Machine pockets on UR surface side)



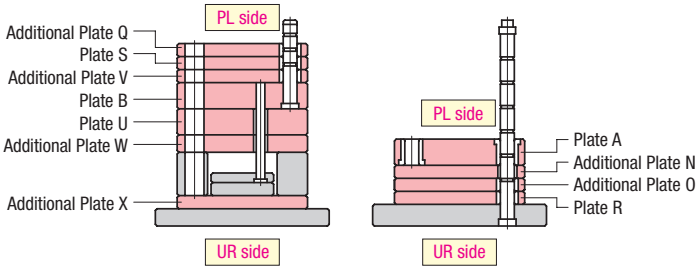
Applicable to Plate Q, S, V, B, U, W and X　　Applicable to Plate R, O, N and A

※ The position of the datum plane is that viewed at the time when mold plates on both the fixed and moving sides are open (position viewed from the parting line surface).

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Pocket machining applicable plates

The PL side and the UR surface side of each plate are as follows:



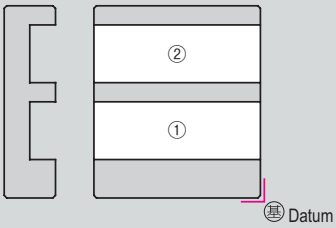
※ For plates not shown the above, specify with a drawing, etc.

Catalog No.	Plate code	A	B	Z	X *1	Y *1
MKKS1/PL MKKS1/UR	R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) Additional plate: O (Plate O), N (Plate N), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X) Additional plate spec. ➡ P.38	In 0.1 mm steps	—	In 0.1 mm steps	In 0.1 mm steps	—
MKKS2/PL MKKS2/UR		—	In 0.1 mm steps		—	In 0.1 mm steps

*1. Omit X and Y if grooves are machined at the center of the plate.
※ Pocket machining details ➡ P.204

How to order

	Catalog No.	—	Plate code	—	A	—	B	—	Z	—	X	—	Y
Machining on the PL side	MKKS1/PL	—	A	—	A80			—	Z50	—	X30		
Machining on the UR side	MKKS2/UR	—	B			—	B150	—	Z30			—	Y50

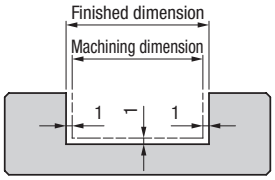


※ If creating two grooves as shown on the left, repeat the specifying twice.
If creating three or more grooves, repeat it multiple times accordingly.
An example of order:
Specify ① MKKS2/PL—B—B50—Z20—Y40
Specify ② MKKS2/PL—B—B50—Z20—Y110

Rough Pockets Machining — Slide Core Groove

Machine slide-core shaped pockets in mold plates.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



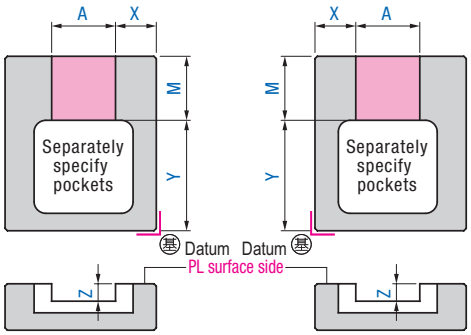
※ We machine pockets leaving a finishing allowance of approximately 1 mm with respect to the finished dimension.
Please specify the dimension of pockets with their finished dimensions.

Groove width and depth

Groove width (A or B DIMM shown below)	10≦(A or B)<42	42≦(A or B)<55	55≦(A or B)
Groove depth Z	Z≦(A or B)×3	Z≦130	Z≦150

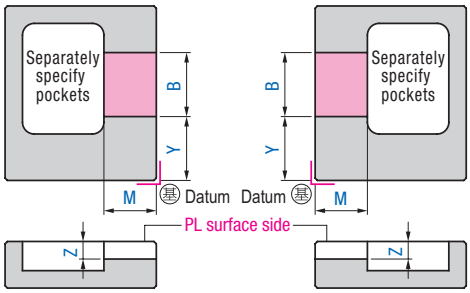
※ The maximum machining depth of groove depth Z varies depending on the width of the groove.
※ For groove depth not shown in the above table, consult our sales office.

Catalog No. MKKMA/PL (Machine grooves on PL surface side)



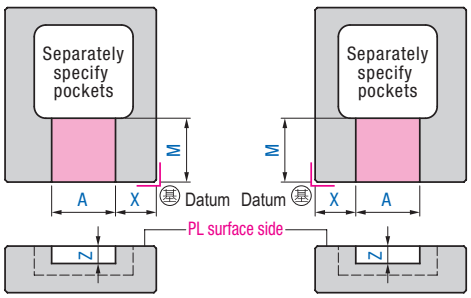
Applicable to Plate Q, S, V, B, U, W and X　Applicable to Plate R, O, N and A

Catalog No. MKKMB/PL (Machine grooves on PL surface side)



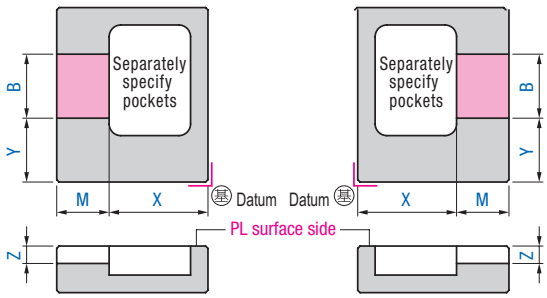
Applicable to Plate Q, S, V, B, U, W and X　Applicable to Plate R, O, N and A

Catalog No. MKKMC/PL (Machine grooves on PL surface side)



Applicable to Plate Q, S, V, B, U, W and X　Applicable to Plate R, O, N and A

Catalog No. MKKMD/PL (Machine grooves on PL surface side)



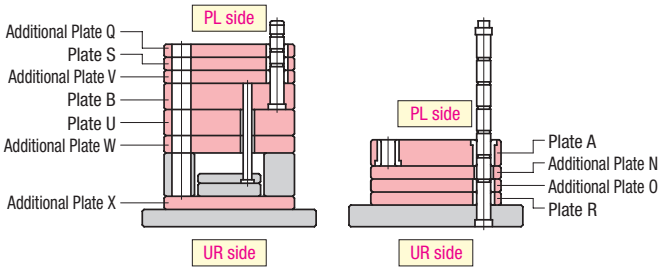
Applicable to Plate Q, S, V, B, U, W and X　Applicable to Plate R, O, N and A

※ The position of the datum plane is that viewed at the time when mold plates on both the fixed and moving sides are open (position viewed from the parting line surface).
※ The slide core grooves cannot be specified from the UR surface side. Please specify with a drawing, etc.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

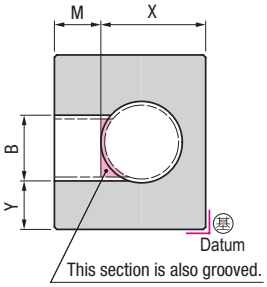
Pocket machining applicable plates

The PL side and the UR side of each plate are as follows:



※ For plates not shown the above, specify with a drawing, etc.

Machining specification of circular pockets



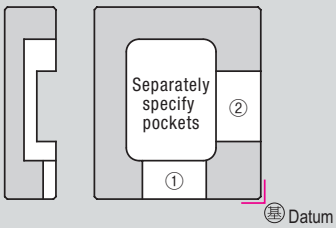
For circular pocket, M is a dimension to the contact point with the circular hole as shown on the left.
In the cases where the groove is located on the top, bottom or right, M is also measured to the contact point with the hole likewise.

Catalog No.	Plate code	A	B	Z *1	X	Y	M *2
MKKMA/PL	R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) Additional plate: O (Plate O), N (Plate N), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X) Additional plate spec. ➡ P.38	In 0.1 mm steps	—	In 0.1 mm steps	In 0.1 mm steps	In 0.1 mm steps	In 0.1 mm steps
MKKMB/PL		—	In 0.1 mm steps		—		
MKKMC/PL		In 0.1 mm steps	—		In 0.1 mm steps	—	
MKKMD/PL		—	In 0.1 mm steps			In 0.1 mm steps	

*1. Z ≦ depth of pocket to be specified separately (For through pockets, Z≦plate thickness – 5)
*2. This is a through groove to a pocket. Specifying blind grooves extending halfway is not allowed with this option.
※ Be sure to specify pockets separately. Specifying slide core grooves only is not allowed.
※ Pocket machining details ➡ P.204
※ Pocket machining to be specified separately ➡ P.206 ～ 213

How to order

Catalog No.	—	Plate code	—	A	—	B	—	Z	—	X	—	Y	—	M
MKKMA/PL	—	B	—	A80			—	Z15	—	X70	—	Y200	—	M60

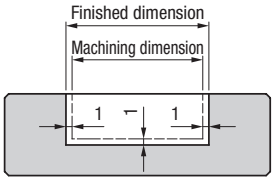


※ If creating two grooves as shown on the left, repeat the specifying twice.
If creating three or more grooves, repeat it multiple times accordingly.
An example of order:
Specify ① MKKMC/PL—B—A40—Z15—X55—M40
Specify ② MKKMB/PL—B—B80—Z20—Y60—M40

Rough Pockets Machining – Blind Groove (Inside Corner R)

Machine blind groove (inside corner R) shaped pockets in mold plates.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



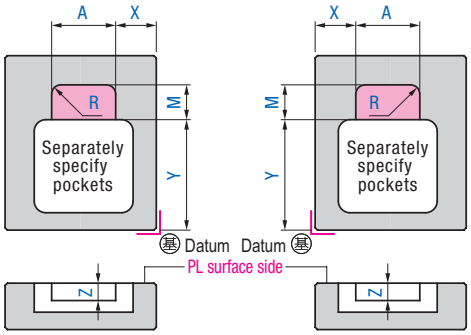
※ We machine pockets leaving a finishing allowance of approximately 1 mm with respect to the finished dimension.
Please specify the dimension of pockets with their finished dimensions.
※ The table below shows our specifications of blind groove corner R.

Corner R and depth of blind groove

Blind groove corner R	R5	R6	R8	R10	R12.5	R15	R20	R25
Blind groove depth Z	Z≦45	Z≦55	Z≦65	Z≦90	Z≦110	Z≦120	Z≦130	Z≦150

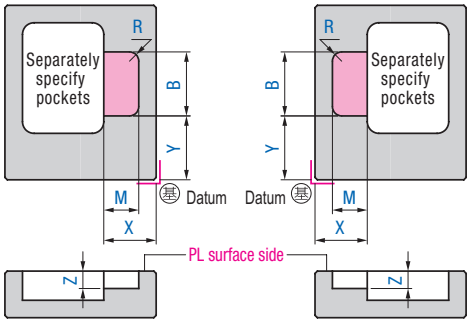
※ The maximum machining depth of blind groove depth Z varies depending on the width of the groove.
※ For groove depth and corner R not shown in the above table, consult our sales office.

Catalog No. MKKRA/PL (Machine grooves on PL surface side)



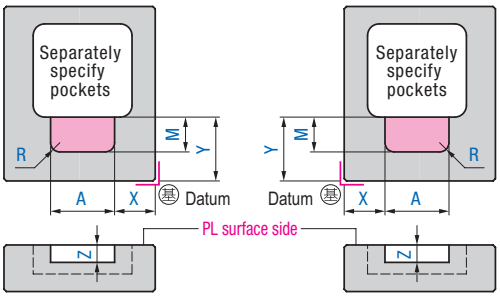
Applicable to Plate Q, S, V, B, U, W and X　　Applicable to Plate R, O, N and A

Catalog No. MKKRB/PL (Machine grooves on PL surface side)



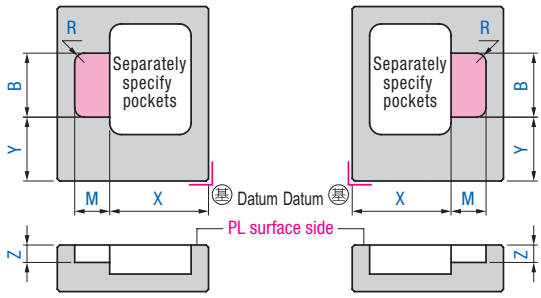
Applicable to Plate Q, S, V, B, U, W and X　　Applicable to Plate R, O, N and A

Catalog No. MKKRC/PL (Machine grooves on PL surface side)



Applicable to Plate Q, S, V, B, U, W and X　　Applicable to Plate R, O, N and A

Catalog No. MKKRD/PL (Machine grooves on PL surface side)

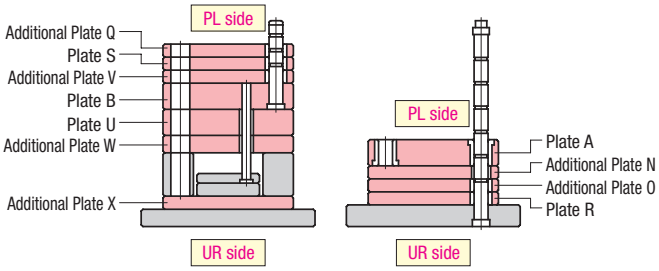


Applicable to Plate Q, S, V, B, U, W and X　　Applicable to Plate R, O, N and A

※ The position of the datum plane is that viewed at the time when mold plates on both the fixed and moving sides are open (position viewed from the parting line surface).
※ The blind grooves cannot be specified from the UR surface side. Please specify with a drawing, etc.

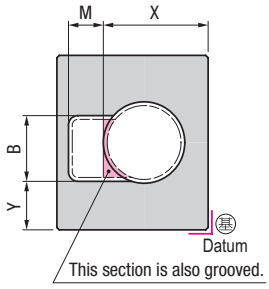
Pocket machining applicable plates

The PL side and the UR side of each plate are as follows:



※ For plates not shown the above, specify with a drawing, etc.

Machining specifications of circular pockets



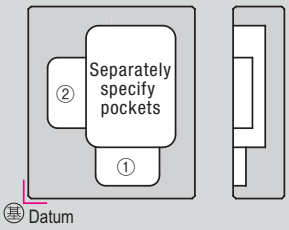
For circular pocket, M is a dimension to the contact point with the circular hole as shown on the left.
In the cases where the groove is located on the top, bottom or right, M is also measured to the contact point with the hole likewise.

Catalog No.	Plate code	A	B	R	Z*1	X	Y	M
MKKRA/PL	R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) Additional plate: O (Plate O), N (Plate N), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X) Additional plate spec. ➡ P.38	In 0.1 mm steps	—	R5 R6 R8 R10 R12.5 R15 R20 R25	In 0.1 mm steps When Z= thickness, the groove passes through the plate.	In 0.1 mm steps	In 0.1 mm steps	In 0.1 mm steps
MKKRB/PL		—	In 0.1 mm steps					
MKKRC/PL		In 0.1 mm steps	—					
MKKRD/PL		—	In 0.1 mm steps					

*1. Z ≦ depth of pocket to be specified separately
※ Be sure to specify pockets separately. Specifying blind grooves only is not allowed.
※ Pocket machining details ➡ P.204
※ Pocket machining to be specified separately ➡ P.206 ～ 213

How to order

Catalog No.	Plate code	A	B	R	Z	X	Y	M
MKKRA/PL	A	A80		R8	Z15	X70	Y160	M30

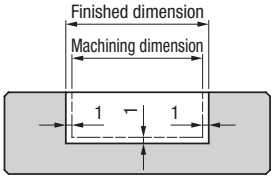


※ If creating two grooves as shown on the left, repeat the specifying twice.
If creating three or more grooves, repeat it multiple times accordingly.
An example of order:
Specify ① MKKRC/PL－A－A60－R8－Z15－X70－Y80－M40
Specify ② MKKRB/PL－A－B80－R8－Z20－X60－Y95－M30

Rough Pockets Machining – Blind Groove (Outside Corner R)

Machine blind groove (outside corner R) shaped pockets in mold plates.

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



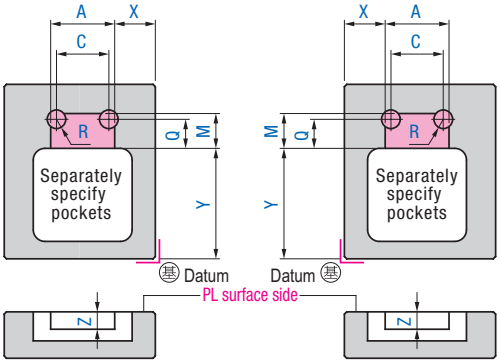
※ We machine pockets leaving a finishing allowance of approximately 1 mm with respect to the finished dimension.
Please specify the dimension of pockets with their finished dimensions.
※ The table below shows our specifications of blind groove corner R.

Corner R and depth of blind groove

Blind groove corner R	R5	R6	R8	R10	R12.5	R15
Blind groove depth Z	Z≦45	Z≦55	Z≦65	Z≦90	Z≦110	Z≦120

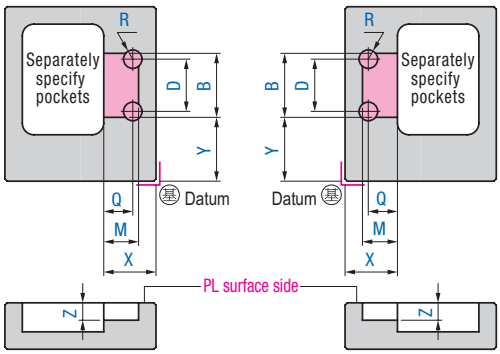
※ The maximum machining depth of blind groove depth Z varies depending on the width of the groove.
※ For groove depth and corner R not shown in the above table, consult our sales office.

Catalog No. **MKKJA/PL** (Machine grooves on PL surface side)



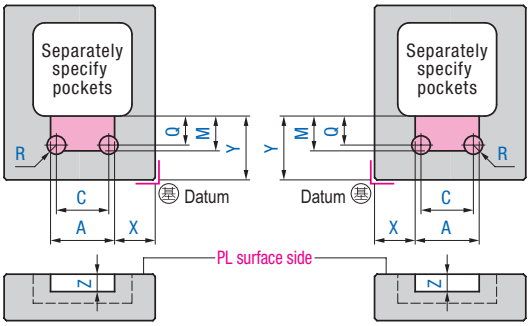
Applicable to Plate Q, S, V, B, U, W and X　　Applicable to Plate R, O, N and A

Catalog No. **MKKJB/PL** (Machine grooves on PL surface side)



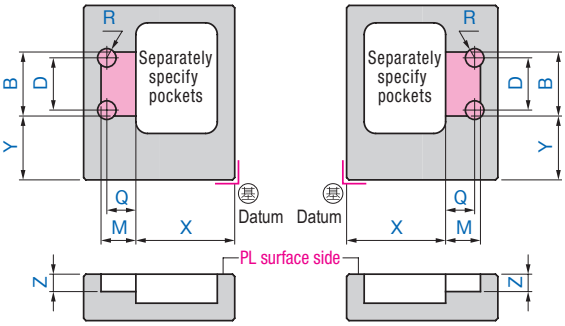
Applicable to Plate Q, S, V, B, U, W and X　　Applicable to Plate R, O, N and A

Catalog No. **MKKJC/PL** (Machine grooves on PL surface side)



Applicable to Plate Q, S, V, B, U, W and X　　Applicable to Plate R, O, N and A

Catalog No. **MKKJD/PL** (Machine grooves on PL surface side)

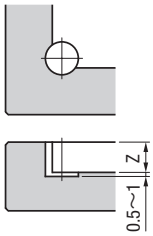
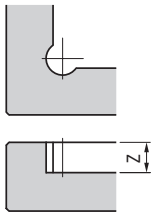
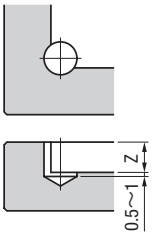


Applicable to Plate Q, S, V, B, U, W and X　　Applicable to Plate R, O, N and A

※ The position of the datum plane is that viewed at the time when mold plates on both the fixed and moving sides are open (position viewed from the parting line surface).
※ The blind grooves cannot be specified from the UR surface side. Please specify with a drawing, etc.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

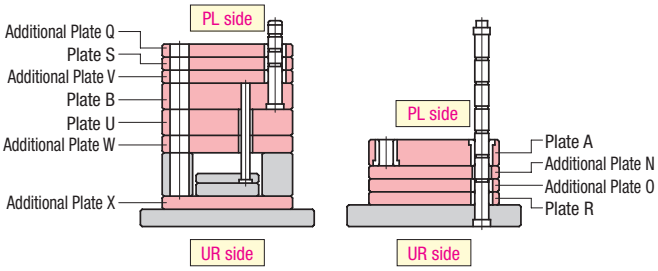
Corner R specifications

R code: RD	R code: RF	R code: RK
 The depth of corner R will be larger than the finished dimension of the pocket Z by 0.5 to 1 mm.	 The corner R will be cut, leaving a finish allowance of 1mm with respect to the finished dimension Z.	 The depth of corner R will be larger than the finished dimension of the pocket Z by 0.5 to 1 mm.

※ RK form may be substituted by RD form due to production conditions.

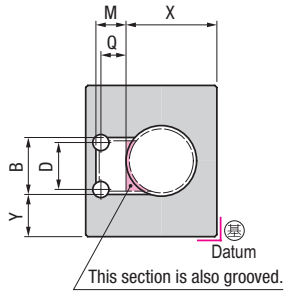
Pocket machining applicable plates

The PL side and the UR side of each plate are as follows:



※ For plates not shown the above, specify with a drawing, etc.

Machining specifications of circular pockets



For circular pocket, M is a dimension to the contact point with the circular hole as shown on the left.
In the cases where the groove is located on the top, bottom or right, M is also measured to the contact point with the hole likewise.

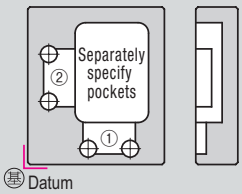
Catalog No.	Plate code	A	B	C	D	R	R code	Z*1	X	Y	M	Q
MKKJA/PL	R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) Additional plate: O (Plate O), N (Plate N), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X) Additional plate spec. ➡ P.38	In 0.1 mm steps	—	In 0.1 mm steps	—	R5 R6 R8 R10 R12.5 R15	RD RF RK Omit for through holes	In 0.1 mm steps When Z= thickness, the groove passes through the plate.	In 0.1 mm steps			
MKKJB/PL		—	In 0.1 mm steps	—	In 0.1 mm steps							
MKKJC/PL		In 0.1 mm steps	—	In 0.1 mm steps	—							
MKKJD/PL		—	In 0.1 mm steps	—	In 0.1 mm steps							

*1. Z ≦ depth of pocket to be specified separately
※ Be sure to specify pockets separately. Specifying blind grooves only is not allowed.
※ Pocket machining details ➡ P.204
※ Pocket machining to be specified separately ➡ P.206 ～ 213

How to order

Catalog No.	Plate code	A	B	C	D	R	R code
MKKJA/PL	A	A80		C70		R8	RD

Z	X	Y	M	Q
Z15	X70	Y160	M30	Q25



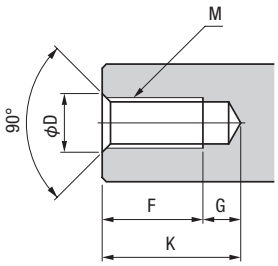
※ If creating two grooves as shown on the left, repeat the specifying twice.
If creating three or more grooves, repeat it multiple times accordingly.
An example of order:
Specify ① MKKJC/PL—A—A60—C50—R8—RD—Z15—X70—Y80—M40—Q35
Specify ② MKKJB/PL—A—B80—D70—R8—RD—Z20—X60—Y95—M30—Q25

Added Threaded Holes for Eyebolt (Side Surface Threaded Holes) – Overview

Machine threaded holes for installing eye bolts or other parts on side surfaces (outer circumference).

Three types of specifications, “Standard specification of thread holes for eye bolts”, “Thread depth designation specification” and “Prepared hole depth designation specification” are available. Use them according to your application requirement.

Specifications of threaded holes for eye bolt (side surface threaded holes)

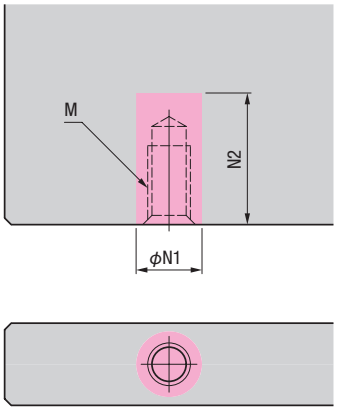


M	F dimension designation range *1		G	D Ref. value	Standard specification		Thread depth designation spec.		Prepared hole designation spec.	
	max	min			F	K	F	K	F	K
M3	7	3	6	3.6	6	12	Specified value	K=F+G	F=K−G	Specified value
M4	10	4	7	4.8	8	15				
M5	12	5	7	6	10	17				
M6	15	6	8	7	12	20				
M8	20	8	7	11	16	23				
M10	25	10	8	13	20	28				
M12	28	12	9	16	24	33				
M14	32	14	10	18	26	36				
M16	32	16	10	20	29	39				
M20	40	20	13	24	33	46				
M24	50	24	15	28	41	56				
M30	60	30	18	35	49	67				
M36	72	36	23	41	59	82				
M42	75	42	25	47	70	95				
M48	80	48	28	54	75	103				

*1. Set F dimensions of “Thread depth designation specification” and “Prepared hole designation specification” within this range.
※ M8-M48 (excluding M14) of standard specification are threaded hole specification for eye bolts.

Machining region of threaded holes for eye bolts (side surface threaded holes)

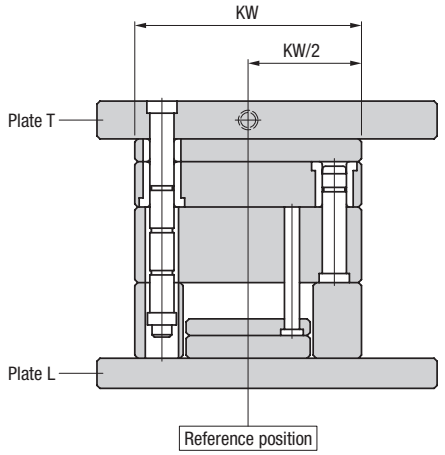
To prevent the interference of threaded holes for eye bolts and side surfaces with other holes machined, we have set a machining region only as a guide as shown in the table below. Please take into account when designing molds.
These values are provided only as a guide and do not represent a guarantee of influence on accuracy and strength.

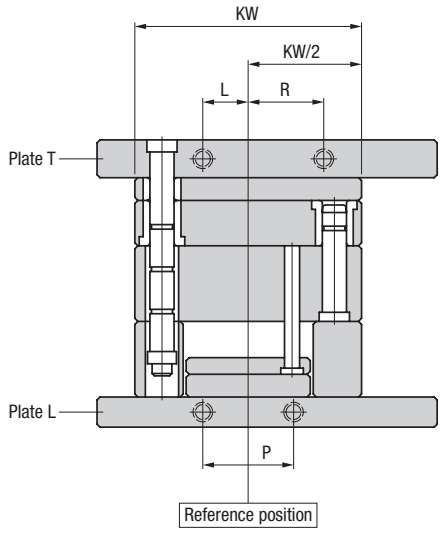


Do not perform other machining work within the area.

M	N1	N2
M3	6	N2＝K＋2
M4	7	
M5	8	
M6	9	
M8	13	N2＝K＋3
M10	15	
M12	18	
M14	20	
M16	22	
M20	26	
M24	30	
M30	37	N2＝K＋4
M36	43	
M42	49	
M48	56	

Matters to be noted when protrusion amount of clamping plate is not even (For how to specify, see pages 224 to 227)

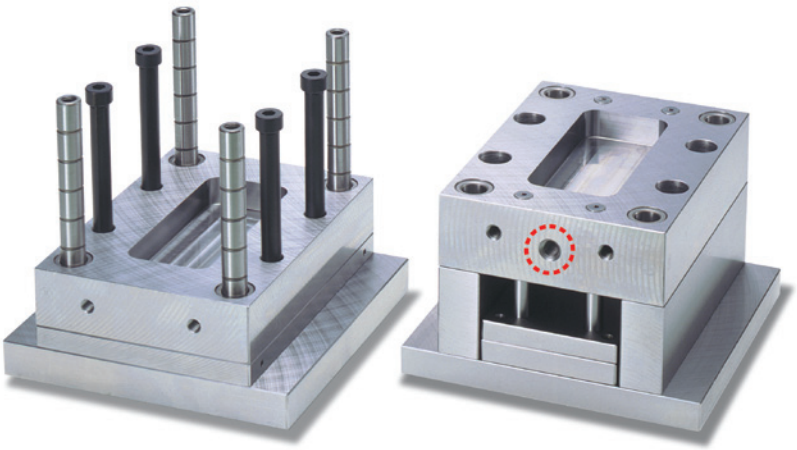




The reference position of thread hole is set at the center of the mold plate as shown in the above chart, not at the center of width of the clamping plate.

The reference position of L and R dimensions is set at the center of the mold plate as shown in the above chart.

※ If L=R and P=L+R, then specify with P.

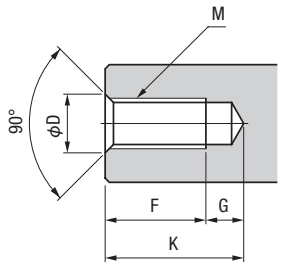


Added Threaded Holes for Eyebolt (Side Surface Threaded Holes) – 1 Hole

Machine threaded holes for installing eye bolts or other parts on side surfaces (outer circumference).

Use this option to specify a threaded hole at a time.

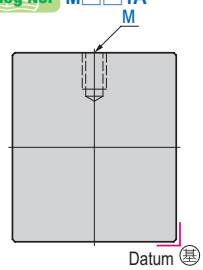
Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



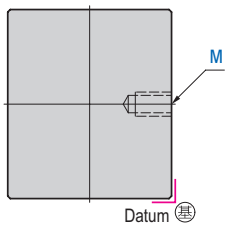
M	F dimension designation range *1		G	D Ref. value	Standard specification		Thread depth designation spec.		Prepared hole designation spec.	
	max	min			F	K	F	K	F	K
M3	7	3	6	3.6	6	12	Specified value	K=F+G	F=K-G	Specified value
M4	10	4	7	4.8	8	15				
M5	12	5	7	6	10	17				
M6	15	6	8	7	12	20				
M8	20	8	7	11	16	23				
M10	25	10	8	13	20	28				
M12	28	12	9	16	24	33				
M14	32	14	10	18	26	36				
M16	32	16	10	20	29	39				
M20	40	20	13	24	33	46				
M24	50	24	15	28	41	56				
M30	60	30	18	35	49	67				
M36	72	36	23	41	59	82				
M42	75	42	25	47	70	95				
M48	80	48	28	54	75	103				

*1. Set F dimensions of "Thread depth designation specification" and "Prepared hole designation specification" within this range.
※ M8-M48 (excluding M14) of standard specification are threaded hole specification for eye bolts.

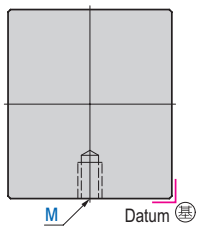
Catalog No. M□□1A



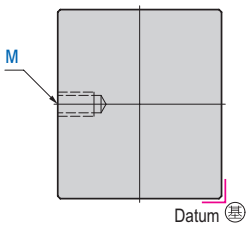
Catalog No. M□□1B



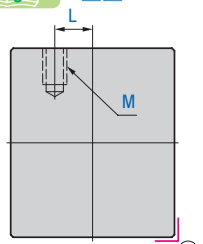
Catalog No. M□□1C



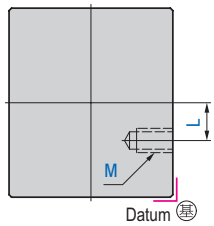
Catalog No. M□□1D



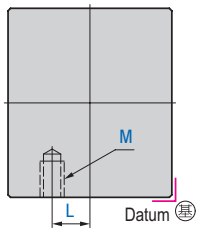
Catalog No. M□□1AL



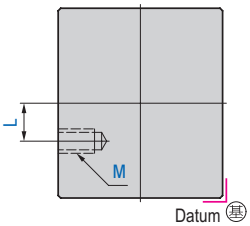
Catalog No. M□□1BL



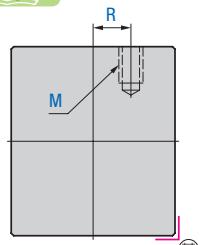
Catalog No. M□□1CL



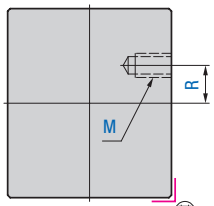
Catalog No. M□□1DL



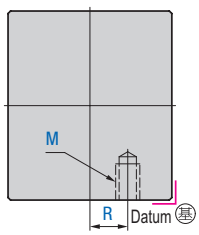
Catalog No. M□□1AR



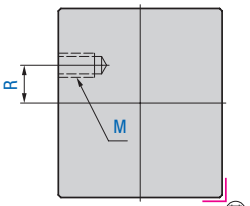
Catalog No. M□□1BR



Catalog No. M□□1CR

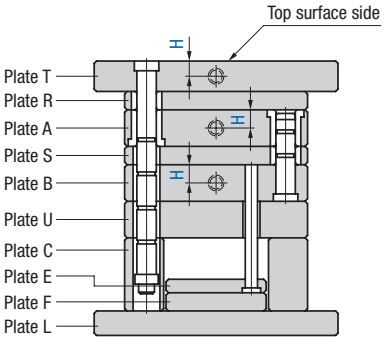


Catalog No. M□□1DR

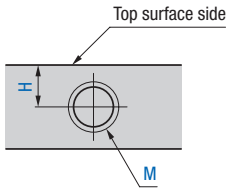


For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Specifying threaded holes in plate thickness direction



Position of H dimension



※ H dimension must be specified with a dimension from top surface side direction.

Catalog No.			Plate code		M	F	K	L or R	H
Standard spec.	Thread depth designation spec.	Prepared hole designation spec.							
MFK1A	MGK1A	MHK1A	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) E (Plate E) F (Plate F) L (Plate L)	Additional plate N (Plate N) O (Plate O) Q (Plate Q) V (Plate V) W (Plate W) X (Plate X) Y (Plate Y) Additional plate spec. P.38	M3 M4 M5 M6 M8 M10 M12 M14 M16 M20 M24 M30 M36 M42 M48	In 1 mm steps Specify only for Catalog No. MGK1□□	In 1 mm steps Specify only for Catalog No. MHK1□□	—	In 0.5 mm steps
MFK1B	MGK1B	MHK1B							
MFK1C	MGK1C	MHK1C							
MFK1D	MGK1D	MHK1D							
MFK1AL	MGK1AL	MHK1AL						In 1 mm steps	
MFK1BL	MGK1BL	MHK1BL							
MFK1CL	MGK1CL	MHK1CL							
MFK1DL	MGK1DL	MHK1DL							
MFK1AR	MGK1AR	MHK1AR							
MFK1BR	MGK1BR	MHK1BR							
MFK1CR	MGK1CR	MHK1CR							
MFK1DR	MGK1DR	MHK1DR							

※ How to specify threaded holes for Plate C ➡ P.228
※ Standard threaded hole for eye bolts for mold bases, cavity retainer sets and cavity retainer sets for die cast are machined.
If standard thread holes for eye bolts are not necessary, refer to page 232.
※ How to instruct when protrusion amount of a mounting plate is not even. ➡ P.223
※ Detailed specification of threaded holes for eye bolts and side surfaces ➡ P.222

How to order

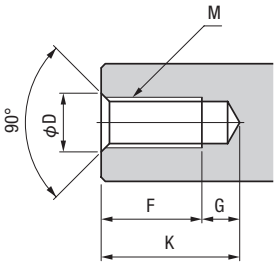
	Catalog No.	—	Plate code	—	M	—	F	—	K	—	L or R	—	H
Standard specification	MFK1A	—	A	—	M12							—	H15
Thread depth designation spec.	MGK1BL	—	T	—	M6	—	F10			—	L50	—	H10
Prepared hole designation spec.	MHK1C	—	U	—	M10			—	K25			—	H20

Added Threaded Holes for Eyebolt (Side Surface Threaded Holes) – 2 Holes or 4 Holes

Machine threaded holes for installing eye bolts or other parts on side surfaces (outer circumference).

Use this option to specify threaded holes at two or four places at the same time.

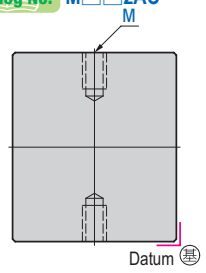
Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



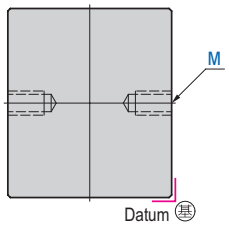
M	F dimension designation range *1		G	D Ref. value	Standard specification		Thread depth designation spec.		Prepared hole designation spec.	
	max	min			F	K	F	K	F	K
M3	7	3	6	3.6	6	12	Specified value	K=F+G	F=K-G	Specified value
M4	10	4	7	4.8	8	15				
M5	12	5	7	6	10	17				
M6	15	6	8	7	12	20				
M8	20	8	7	11	16	23				
M10	25	10	8	13	20	28				
M12	28	12	9	16	24	33				
M14	32	14	10	18	26	36				
M16	32	16	10	20	29	39				
M20	40	20	13	24	33	46				
M24	50	24	15	28	41	56				
M30	60	30	18	35	49	67				
M36	72	36	23	41	59	82				
M42	75	42	25	47	70	95				
M48	80	48	28	54	75	103				

*1. Set F dimensions of "Thread depth designation specification" and "Prepared hole designation specification" within this range.
※ M8-M48 (excluding M14) of standard specification are threaded hole specification for eye bolts.

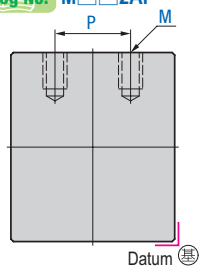
Catalog No. M□□2AC



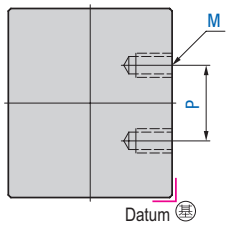
Catalog No. M□□2BD



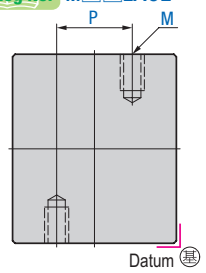
Catalog No. M□□2AP



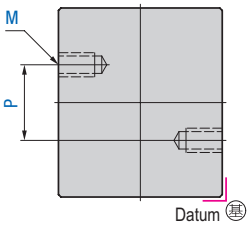
Catalog No. M□□2BP



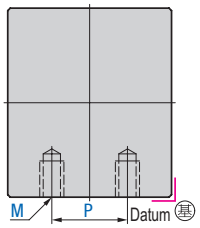
Catalog No. M□□2ACL



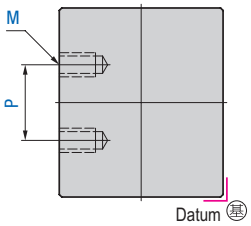
Catalog No. M□□2BDL



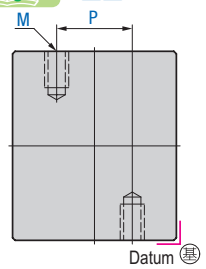
Catalog No. M□□2CP



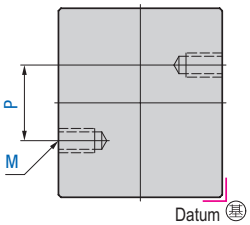
Catalog No. M□□2DP



Catalog No. M□□2ACR

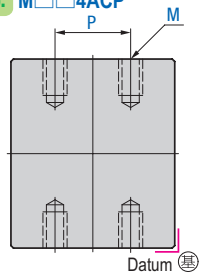


Catalog No. M□□2BDR

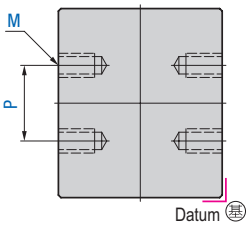


For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

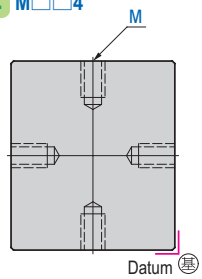
Catalog No. M□□4ACP



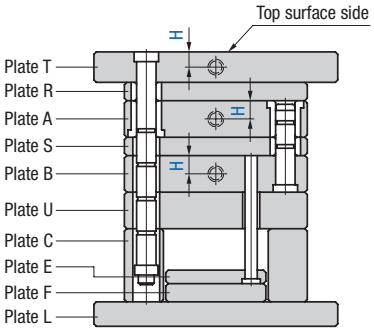
Catalog No. M□□4BDP



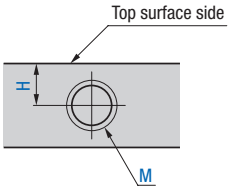
Catalog No. M□□4



Specifying threaded holes in plate thickness direction



Position of H dimension



※ H dimension must be specified with a dimension from top surface side direction.

Catalog No. Standard spec.	Catalog No. Thread depth designation spec.	Catalog No. Prepared hole designation spec.	Plate code	M	F	K	P	H
MFK2AC	MGK2AC	MHK2AC	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) E (Plate E) F (Plate F) L (Plate L) Additional plate N (Plate N) O (Plate O) Q (Plate Q) V (Plate V) W (Plate W) X (Plate X) Y (Plate Y) Additional plate spec. P.38	M3 M4 M5 M6 M8 M10 M12 M14 M16 M20 M24 M30 M36 M42 M48	In 1 mm steps Specify only for Catalog No. MGK□□□□	In 1 mm steps Specify only for Catalog No. MHK□□□□	—	In 0.5 mm steps
MFK2BD	MGK2BD	MHK2BD						
MFK2ACL	MGK2ACL	MHK2ACL					In 1 mm steps	
MFK2ACR	MGK2ACR	MHK2ACR						
MFK2BDL	MGK2BDL	MHK2BDL						
MFK2BDR	MGK2BDR	MHK2BDR						
MFK2AP	MGK2AP	MHK2AP						
MFK2BP	MGK2BP	MHK2BP						
MFK2CP	MGK2CP	MHK2CP						
MFK2DP	MGK2DP	MHK2DP						
MFK4ACP	MGK4ACP	MHK4ACP						
MFK4BDP	MGK4BDP	MHK4BDP						
MFK4	MGK4	MHK4					—	

※ How to instruct on thread holes for Plate C ➡ P.228
※ Standard threaded hole for eye bolts for mold bases, cavity retainer sets and cavity retainer sets for die cast are machined.
If standard thread holes for eye bolts are not necessary, refer to page 232.
※ How to instruct when protrusion amount of a mounting plate is not even. ➡ P.223
※ Detailed specification of threaded holes for eye bolts and side surfaces ➡ P.222

How to order

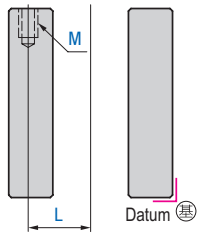
	Catalog No.	Plate code	M	F	K	P	H
Standard specification	MFK2AC	A	M20				H50
Thread depth designation spec.	MGK4ACP	T	M6	F10		P150	H15
Prepared hole designation spec.	MHK2BDR	U	M10		K25	P200	H20

Added Threaded Holes for Eyebolt (Side Surface Threaded Holes) (For C-Plate)

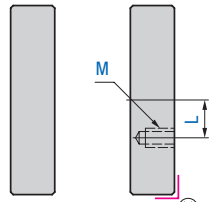
Please specify threaded holes for eye bolts (side surface threaded holes) for Plate C in pairs as shown below. The specifications of the threaded holes (thread depth, chamfering method, etc.) are the same as those of other plates.

Application Mold bases

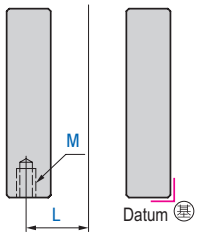
Catalog No. M□□1AL



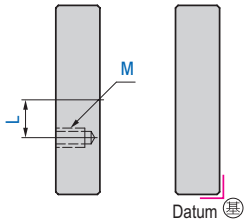
Catalog No. M□□1BL



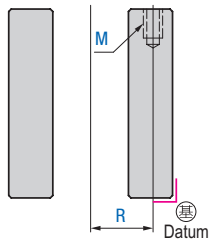
Catalog No. M□□1CL



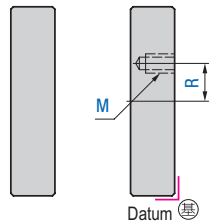
Catalog No. M□□1DL



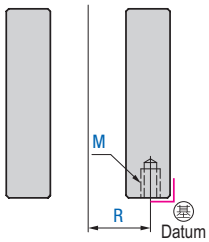
Catalog No. M□□1AR



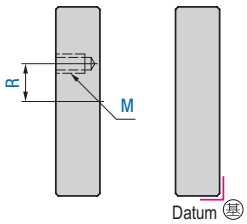
Catalog No. M□□1BR



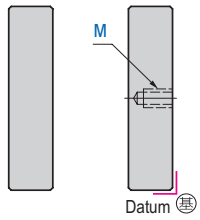
Catalog No. M□□1CR



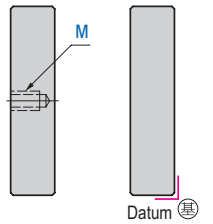
Catalog No. M□□1DR



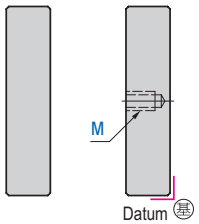
Catalog No. M□□1B



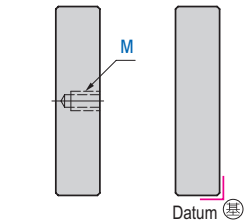
Catalog No. M□□1D



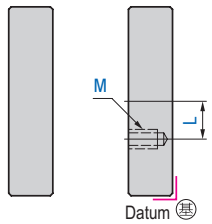
Catalog No. M□□1M



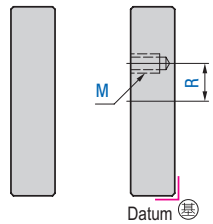
Catalog No. M□□1H



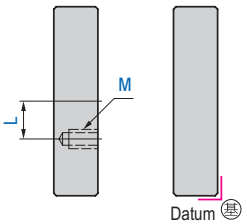
Catalog No. M□□1ML



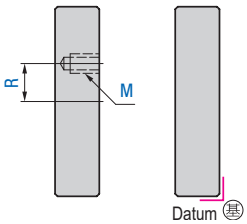
Catalog No. M□□1MR



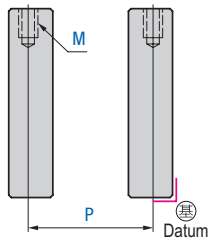
Catalog No. M□□1HL



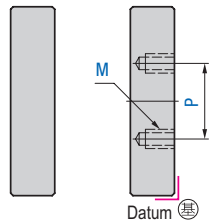
Catalog No. M□□1HR



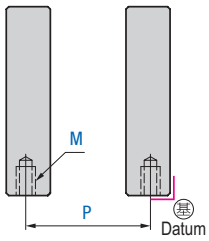
Catalog No. M□□2AP



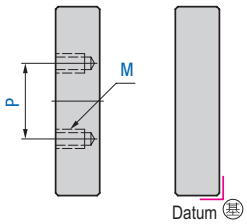
Catalog No. M□□2BP



Catalog No. M□□2CP

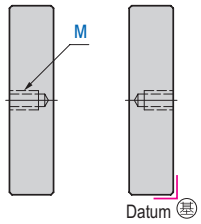


Catalog No. M□□2DP

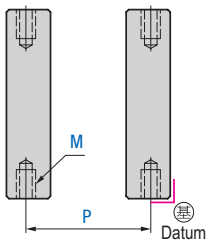


For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

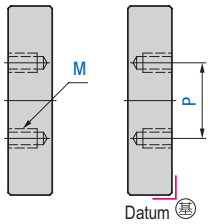
Catalog No. M□□2BD



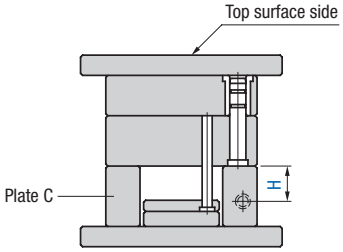
Catalog No. M□□4ACP



Catalog No. M□□4BDP



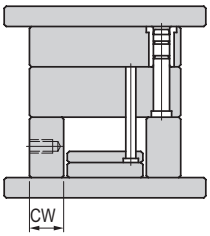
Specify threaded hole in thickness direction

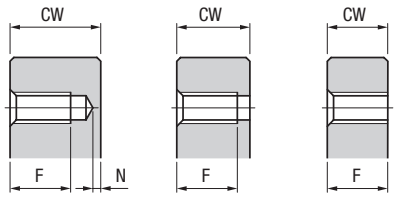


※ H dimension must be specified with a dimension from top surface side direction.

Shape of threaded hole

The shape of threaded hole will be as shown below, depending on Plate C width dimension (CW) and thread depth (F).





Catalog No.			Plate code	M	F	K	P, L, R	H
Standard spec.	Thread depth designation spec.	Prepared hole designation spec.						
MFK1AL	MGK1AL	MHK1AL	C (Plate C)	M3 M4 M5 M6 M8 M10 M12 M14 M16 M20 M24 M30 M36 M42 M48	In 1 mm steps Specify only for Catalog No. MGK□□□□	In 1 mm steps Specify only for Catalog No. MHK□□□□	In 0.5 mm steps	In 0.5 mm steps
MFK1BL	MGK1BL	MHK1BL						
MFK1CL	MGK1CL	MHK1CL						
MFK1DL	MGK1DL	MHK1DL						
MFK1AR	MGK1AR	MHK1AR						
MFK1BR	MGK1BR	MHK1BR						
MFK1CR	MGK1CR	MHK1CR						
MFK1DR	MGK1DR	MHK1DR						
MFK1B	MGK1B	MHK1B					—	
MFK1D	MGK1D	MHK1D						
MFK1M	MGK1M	MHK1M						
MFK1H	MGK1H	MHK1H						
MFK1ML	MGK1ML	MHK1ML					In 0.5 mm steps	
MFK1MR	MGK1MR	MHK1MR						
MFK1HL	MGK1HL	MHK1HL						
MFK1HR	MGK1HR	MHK1HR						
MFK2AP	MGK2AP	MHK2AP						
MFK2BP	MGK2BP	MHK2BP						
MFK2CP	MGK2CP	MHK2CP						
MFK2DP	MGK2DP	MHK2DP						
MFK2BD	MGK2BD	MHK2BD					—	
MFK4ACP	MGK4ACP	MHK4ACP					In 0.5 mm steps	
MFK4BDP	MGK4BDP	MHK4BDP						

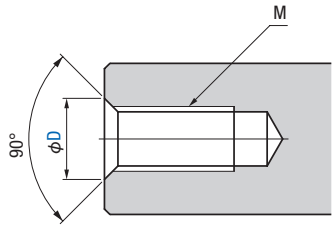
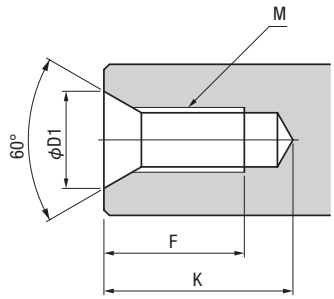
How to order

	Catalog No.	—	Plate code	—	M	—	F	—	K	—	P, L, R	—	H
Standard specification	MFK1B	—	C	—	M12							—	H35
Thread depth designation spec.	MGK2DP	—	C	—	M8	—	F12			—	P30	—	H20
Prepared hole designation spec.	MHK1AL	—	C	—	M10			—	K25	—	L100	—	H30

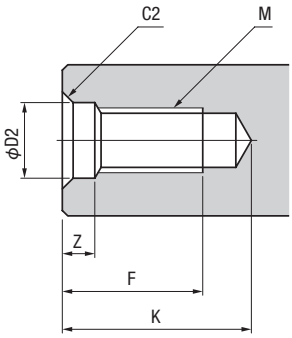
Added Threaded Holes for Eyebolt (Side Surface Threaded Holes) - Chamfering

Chamfer threaded holes for eye bolts (side surface threaded holes) as shown below:

Application: Mold bases, cavity retainer sets, cavity retainer sets for die cast

Option code	Specification	
CC		Change the chamfering dimensions of threaded holes. ■ **How to specify:** CC/D DIMM ※D → Specify in 1mm steps M + 1 ≦ D ≦ M + 10 [e.g.] CC/D20
CHN		Change the dimensions of thread depth and shape of chamfer. If specifying "Thread depth designation" or "Prepared hole depth designation", only the dimension of chamfering section will be applied. ■ **How to specify:** CHN [e.g.] CHN

M	M10	M12	M16	M20	M24	M30	M36
D1	15	18	23	27	35	42	50
F	22	26	32	40	50	60	72
K max	30	35	42	53	65	78	95

CHZ		Change the dimensions of thread depth and shape of chamfer. If specifying "Thread depth designation" or "Prepared hole depth designation", only the dimension of chamfering section will be applied. ■ **How to specify:** CHZ [e.g.] CHZ

M	M10	M12	M16	M20	M24	M30	M36
D2	12	14	18	22	28	34	40
Z	5	6	6	6	8	9	11
F	22	26	32	40	50	60	72
K max	30	35	42	53	65	78	95

How to order

Specify threaded holes for eye bolts (side surface threaded holes)	—	Option code
MFK2AC — A — M20 — H50	—	CC/D28
MFK4ACP — B — M16 — P150 — H30	—	CHZ

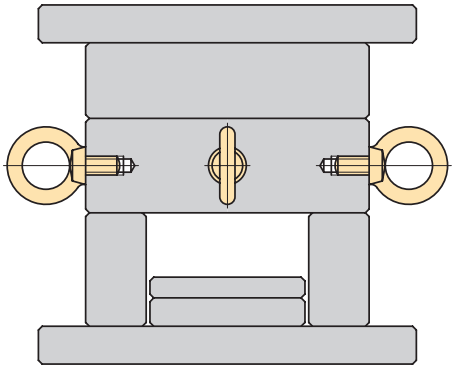
For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Added Eye Bolts

Install eye bolts in the thread holes for eye bolts.

Eye bolts ➡ P.395

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



Thread diameter for eye bolts
M8 M10 M12 M16 M20 M24 M30 M36 M42 M48

Eye bolts are supplied with mold bases, not installed in them.

When installing eye bolts in standard threaded holes for eye bolts

If installing eye bolts in the threaded holes provided as standard, specify it as follows:

Catalog No.	Code of plates in which to install eye bolts *1	Number of eye bolts *2
PIBM	T (Plate T) A (Plate A) S (Plate S) B (Plate B) U (Plate U) C (Plate C) E (Plate E) F (Plate F) L (Plate L)	In 1 piece steps

*1. For plates in which standard threaded holes for eye bolts are provided, refer to page 232.
*2. The number of threaded holes for eye bolts and the number of eye bolts can be different.

How to order

Catalog No.	—	Code of plates in which to install eye bolts	/	Number of eye bolts
PIBM	—	B	/	2

When installing eye bolts in separately specified threaded holes for eye bolt

If installing eye bolts in the threaded holes you have separately specified using a method shown in pages 224 to 227, specify it as follows:

Specify threaded holes for eye bolts	Eye bolt installation code	Number of eye bolts *3
Specify it using a method shown in pages 224 to 227.	PIBM	In 1 piece steps

*3. The number of threaded holes for eye bolts and the number of eye bolts can be different.

How to order

Specify threaded holes for eye bolts	—	Code of plates in which to install eye	/	Number of eye bolts
MFK2AC—A—M12—H20	—	PIBM	/	2

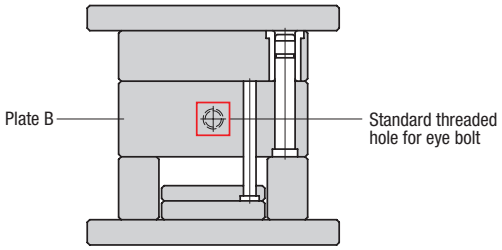
Omit Threaded Holes for Standard Eyebolt

Omit standard threaded holes for eye bolts from mold bases, etc.

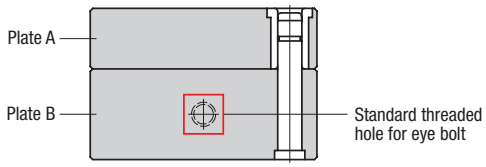
Application: Mold bases, cavity retainer sets, cavity retainer sets for die cast

Standard threaded hole specification for eye bolts

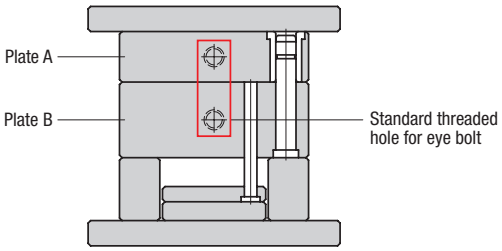
Standard threaded holes for eye bolts are provided as shown in the charts below.
Please specify the codes of plates in which standard threaded holes for eye bolts are unnecessary.



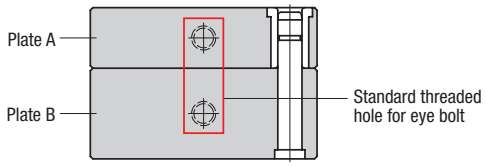
Name of plate in which standard threaded hole for eye bolts are provided	Applied product
Plate B	Mold bases nominal dimensions 1515 to 3560



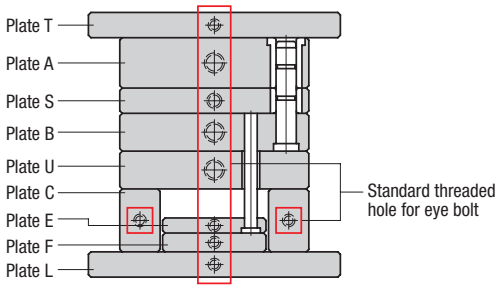
Name of plate in which standard threaded hole for eye bolts are provided	Applied product
Plate B	Plastic main molds nominal dimensions 1515 to 3560



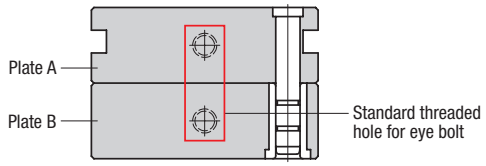
Name of plate in which standard threaded hole for eye bolts are provided	Applied product
Plate A, Plate B	Mold bases nominal dimensions 4040 to 5070



Name of plate in which standard threaded hole for eye bolts are provided	Applied product
Plate A, Plate B	Plastic main molds nominal dimensions 4040 to 6070



Name of plate in which standard threaded hole for eye bolts are provided	Applied product
All plates	Mold bases nominal dimensions 5555 to 7080



Name of plate in which standard threaded hole for eye bolts are provided	Applied product
Plate A, Plate B	Die cast main molds nominal dimensions 1518 to 5065

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Catalog No.	Codes of plates in which to delete threaded holes for eye bolts	Machining code
ESM	T (Plate T) A (Plate A) S (Plate S) B (Plate B) U (Plate U) C (Plate C) E (Plate E) F (Plate F) L (Plate L)	FK

How to order

Catalog No.	–	Codes of plates in which to omit threaded holes for eye bolts	–	Machining code
ESM	–	B	–	FK

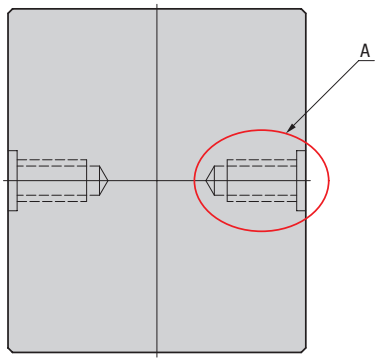
The threaded holes for eye bolts can also be omitted by following procedures using optional Specification shown in each page for mold bases, cavity retainer sets, and cavity retainer sets for die cast sections of BLUE BOOK Futaba Standard Plastic Mold Components VOL. 1.

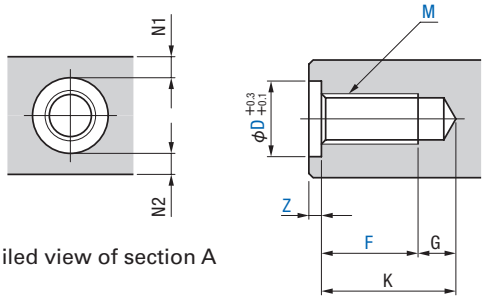
E.g. MDCSC2530407070S-MN/#FK

Added Side Surface Threaded Holes with Counterbore

Machine threaded holes with a counterbore on the side surfaces of plates as shown below:

Application Mold bases, cavity retainer sets, cavity retainer sets for die cast



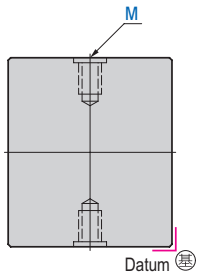


Detailed view of section A

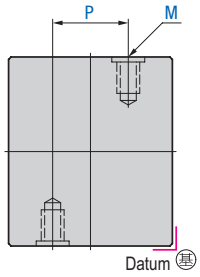
※ Ensure that N1 and , N2 dimensions are 1.5 mm or more.
However, this value is not a guarantee of strength.

M		M6	M8	M10	M12	M16
F dimension designation range	max	15	20	25	28	32
	min	6	8	10	12	16
G		8	7	8	9	10
K (max)		K=F+G				
D		10≦D≦30 provided D≧M+2				
Z		2≦Z≦5				

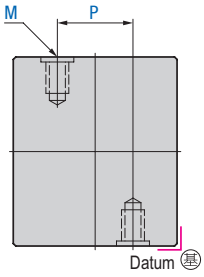
Catalog No. MZT2AC



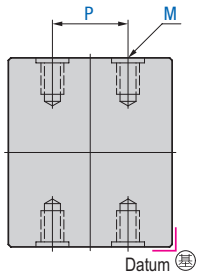
Catalog No. MZT2ACL



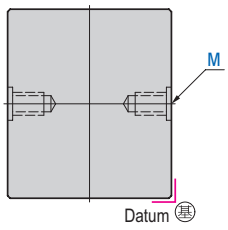
Catalog No. MZT2ACR



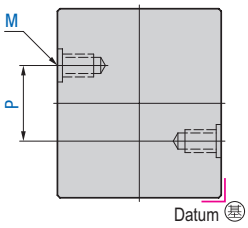
Catalog No. MZT4ACP



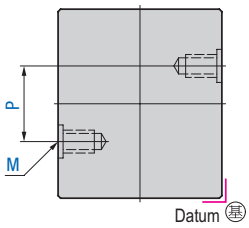
Catalog No. MZT2BD



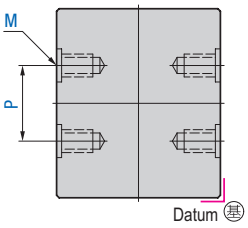
Catalog No. MZT2BDL



Catalog No. MZT2BDR

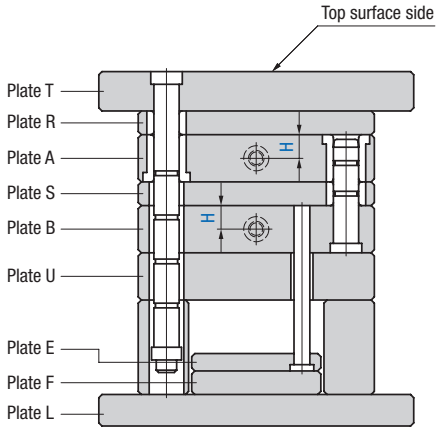


Catalog No. MZT4BDP

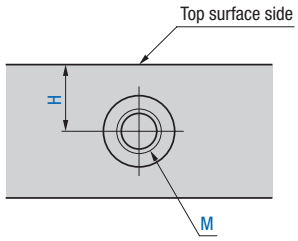


For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Specifying threaded holes in plate thickness direction



Position of H dimension



※ H dimension must be specified with a dimension from top surface side direction.

Catalog No.	Plate code	M	F	D	Z	P	H
MZT2AC MZT2BD MZT2ACL MZT2ACR MZT2BDL MZT2BDR MZT4ACP MZT4BDP	T (Plate T) R (Plate R) A (Plate A) S (Plate S) B (Plate B) U (Plate U) E (Plate E) F (Plate F) L (Plate L) Additional plate: N (Plate N), O (Plate O), Q (Plate Q), V (Plate V), W (Plate W), X (Plate X), Y (Plate Y), Additional plate spec. ➡ P.38	M6 M8 M10 M12 M16	In 1 mm steps See left table	In 1 mm steps 10～30 provided D≧M+2	In 1 mm steps 2≦Z≦5	— In 1 mm steps	In 0.5 mm steps

※ How to specify when protrusion amount of a mounting plate is not even. ➡ P.223
※ Detailed specification of thread holes for eye bolts and side surfaces ➡ P.222

How to order

Catalog No.	Plate code	M	F	D	Z	P	H
MZT2BD	A	M8	F12	D10	Z3		H15
MZT4BDP	B	M10	F15	D16	Z2	P150	H20

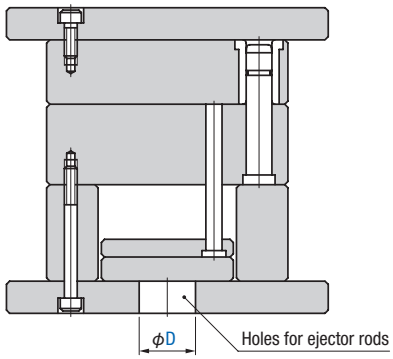
Added or Omitted Ejector Rod Holes

Adding holes for ejector rods

Machine holes for ejector rods on the bottom clamping plate.

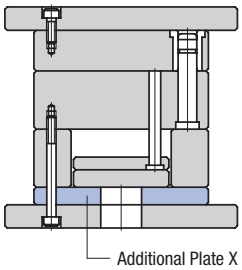
Ejector rods are not supplied with mold bases. ➡ P.146

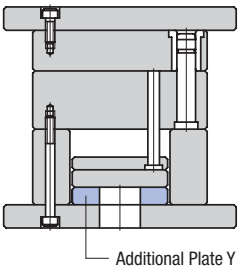
Application Mold bases (this process can be specified for SE · SF · DE · DF · EE · EF · FE · FF · GE · GF types as well)



If adding additional Plate X or Plate Y: Additional plate spec. ➡ P.38

The hole will also pass through the Plate X or Plate Y.





Catalog No.	D		X	Y
	Recommended value	Free dimension		
MEH1 MEH2 *1 MEH3 MEH4A MEH4B *1 MEH5A MEH5B MEH7 MEH9	24 29 34 40 45 50 55	In 1 mm steps 15 ～ 60	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y

*1. The mold bases of nominal dimension 1113 to 2550 have holes for standard ejector rods at the center. If specifying MEH2 or MEH4B, the holes will be eliminated.

※ The mold bases of nominal dimension 1113 to 2550 have holes for ejector rods at the center. If specifying the processing of the holes for ejector rods, the standard diameter of the holes will be replaced by the specified diameter.

How to order

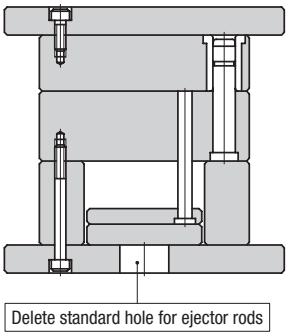
Catalog No. — D — X — Y

MEH3 — D34 — X80 — Y100

Omitting standard holes for ejector rods

Delete the standard holes provided in mold bases for ejector rods.

Application Mold bases (nominal dimension: 1113 to 2550)



Catalog No.	Machining code
ESM	EH

※ The holes for ejector rods can also be deleted by following procedures using optional specification shown in each page of mold bases.
E.g. MDCSA2025404060SVMN/#EH

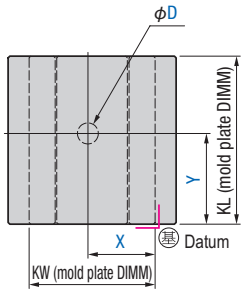
How to order

Catalog No. — Machining code

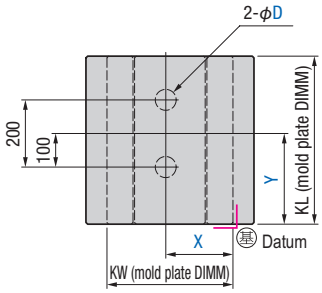
ESM — EH

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

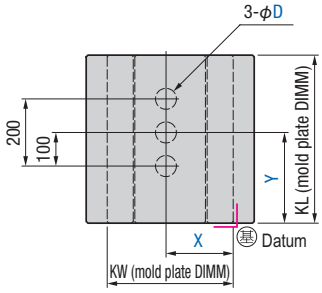
Catalog No. MEH1



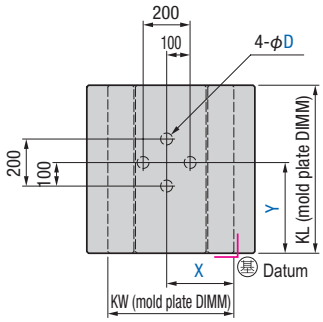
Catalog No. MEH2



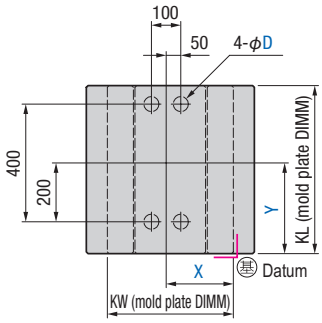
Catalog No. MEH3



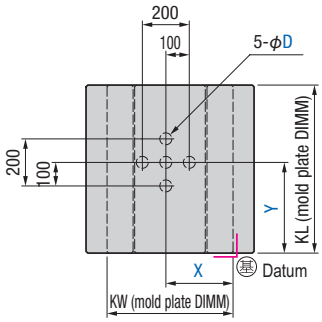
Catalog No. MEH4A



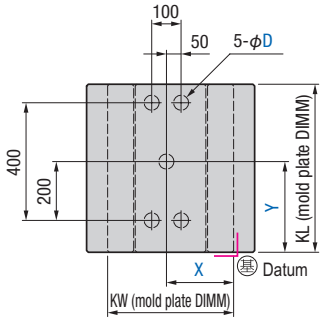
Catalog No. MEH4B



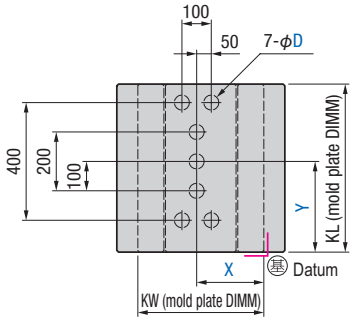
Catalog No. MEH5A



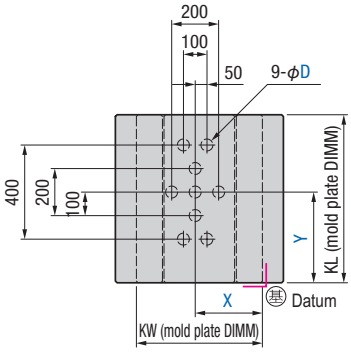
Catalog No. MEH5B



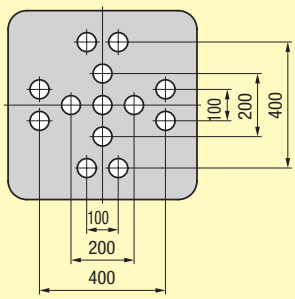
Catalog No. MEH7



Catalog No. MEH9



Reference: Positions of ejector rod holes (an excerpt from JIS B 6701-1992 dimensions relating to molds for plastic injection molding machines)



The position and the number of ejector rod holes may differ from the chart on the left depending on injection molding machines. Refer to the catalog or instruction manual of your particular injector molding machine for such information.

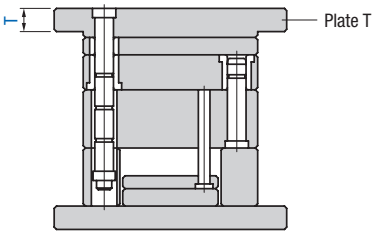
Added Clamp Slot (For Clamping Plate)

Mill the protrusion of clamping plate as shown below to reduce thickness of the clamp section.

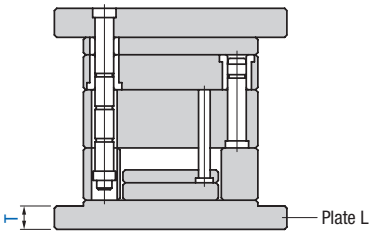
Changing dimension and installation method of clamping plate ➡ P.22

Application Mold bases

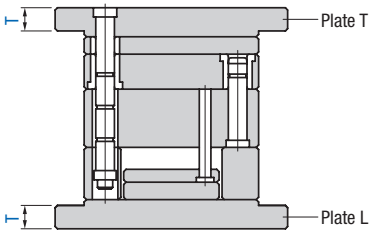
Catalog No. **MFG**



Add clamp slot only on Plate T



Add clamp slot only on Plate L



Add clamp slots both on Plate T and Plate L

Protrusion direction	Catalog No.	Plate code	T *1	Clamp code
2-direction protrusion	MFG	T (Plate T)	In 1 mm steps	AL
3-direction protrusion		L (Plate L)		AL MH US
4-direction protrusion		TL (Plate T, Plate L)		AL MH US

*1. If the dimensions of Plate T and Plate L are different, specifying with plate code TL is not allowed.
Specify the milling of Plate T and Plate L separately.

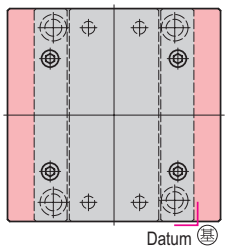
How to order

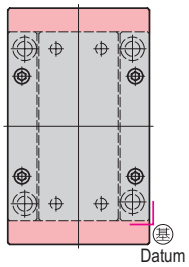
	Catalog No.	—	Plate code	—	T	—	Clamp code
Add clamp slot on Plate T	MFG	—	T	—	T20	—	AL
Add clamp slot on Plate L	MFG	—	L	—	T25	—	AL
Add clamp slots on Plate T & L	MFG	—	TL	—	T20	—	AL

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

2 -direction protrusion (areas are the protrusion sections that will be milled for clamping)

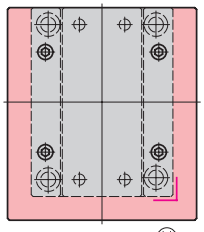
Clamp code **AL** Mill 2-direction protrusion sections for clamping

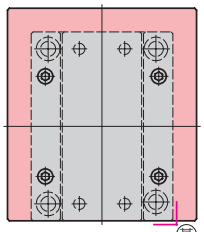


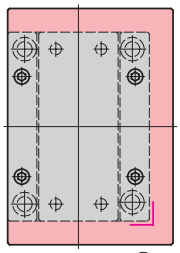


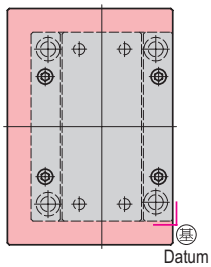
3-direction protrusion (areas are the protrusion sections that will be milled for clamping)

Clamp code **AL** Mill 3-direction protrusion sections for clamping

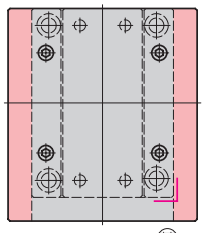


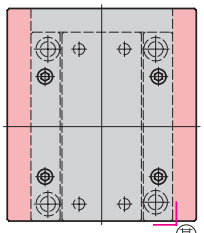




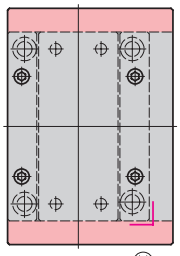


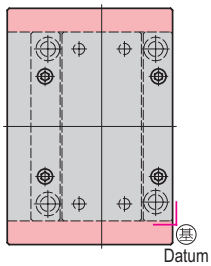
Clamp code **MH** Mill the right and left direction protrusion sections for clamping





Clamp code **US** Mill top and bottom direction protrusion sections for clamping

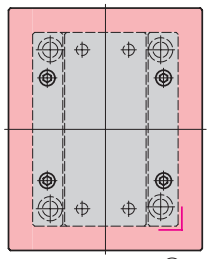




4-direction protrusion (areas are the protrusion sections that will be milled for clamping)

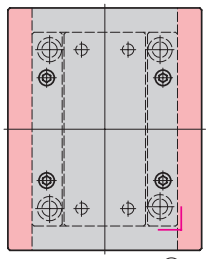
Clamp code **AL**

Mill the 4-direction protrusion sections for clamping



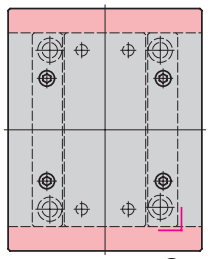
Clamp code **MH**

Mill the right and left direction protrusion sections for clamping



Clamp code **US**

Mill the top and bottom direction protrusion sections for clamping

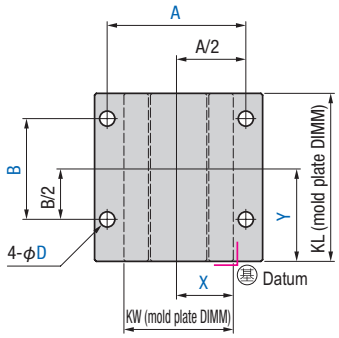


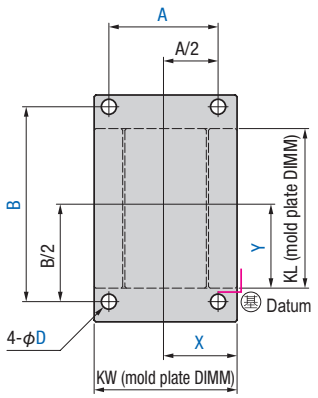
Added Clamping Holes or U Ditch for Clamping

Machine clamping holes and U-ditch for installing molding machine on the top and bottom clamping plates.

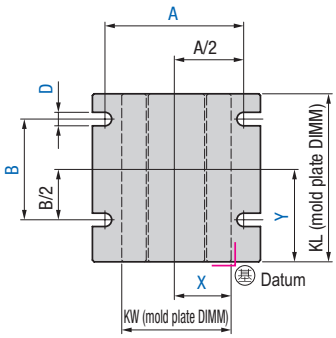
Application Mold bases

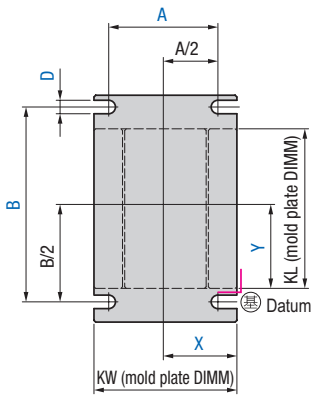
Catalog No. **MCH**



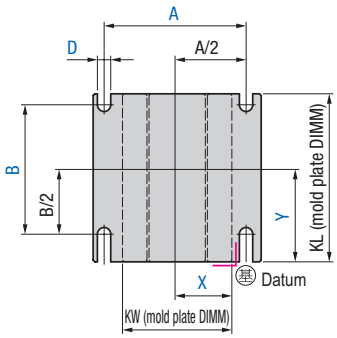


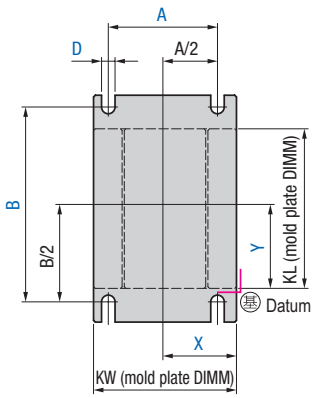
Catalog No. **MUM1**





Catalog No. **MUM2**





※ Machining is performed at the same position on the top and bottom clamping plates.
※ U-ditch can be specified in different variations up to half circles.

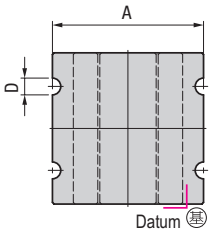
Catalog No.	D	A	B	X	Y
MCH MUM1 MUM2	In 1 mm steps 9 ～ 30	In 1 mm steps	In 1 mm steps	In 1 mm steps When X=KW/2, omit X	In 1 mm steps When Y=KL/2, omit Y

How to order

Catalog No. — D — A — B — X — Y

MCH — D18 — A500 — B350 — X270 — Y180
MUM1 — D20 — A350 — B250 — X150 — Y150

※ If placing 8 or 12 holes (in multiples of 4), specify the process multiple times.
E.g. In the case of 8 holes
MCH — D18 — A500 — B350 — X270 — Y180
MCH — D18 — A500 — B250 — X270 — Y180



If external dimension of the clamping plate aligns with the center of the rounded grooves, the grooves will be half circles.

■ **Applicable items**

Catalog No. MUM1、MUM2

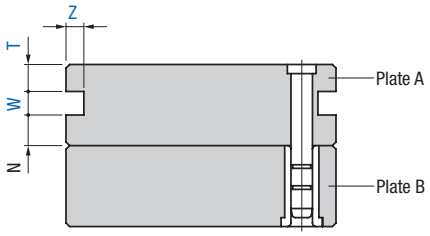
For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Added Clamp Slot (For A-Plate or B-Plate)

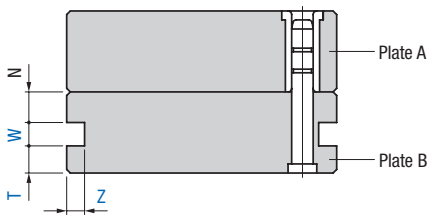
Machine clamp slots on cavity retainer sets and cavity retainer sets for die cast.

Application Cavity retainer sets, cavity retainer sets for die cast

Catalog No. **MCM**



Machine clamp slots on Plate A

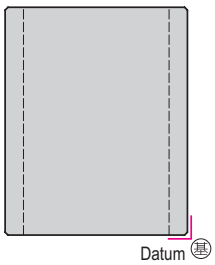


Machine clamp slots on Plate B

※ N dimension of 10 or more is required.

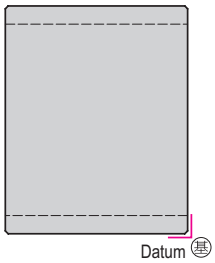
Clamp code

Clamp code **MH**



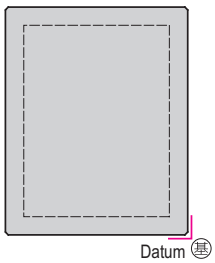
Machine right and left direction clamp slots on Plate A

Clamp code **US**



Machine top and bottom direction clamp slots on Plate A

Clamp code **AL**



Machine 4-direction clamp slot on Plate A

Catalog No.	Plate code	W	Z	T	Clamp code
MCM	A (Plate A) B (Plate B)	15 20 25 30 35 40	In.1 mm steps 10 ～ 40	In.1 mm steps 15 ～ 40	MH US AL

How to order

Catalog No.	—	Plate code	—	W	—	Z	—	T	—	Clamp code
MCM	—	A	—	W20	—	Z15	—	T20	—	MH

※ The standard clamp slot for die cast main mold will be replaced with specified clamp slot.
※ When placing clamp slot in the die cast main molds, specify T dimension of the die cast main mold as 00.
E.g. MDE-A3035 100 100 S N : 00

Additional Plate Processing

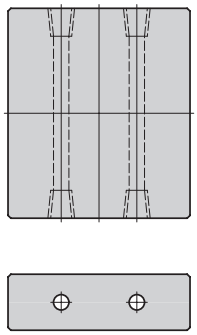
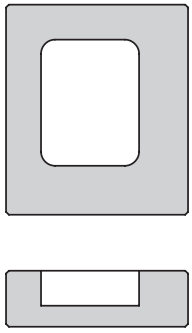
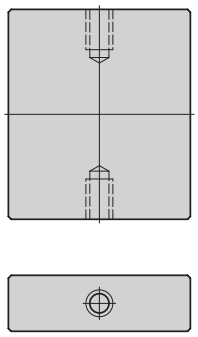
"Additional processing specifications" are provided to show customers how to instruct us on additional processing. When designing molds, various conditions such as strength and accuracy need to be taken into account. Therefore, we shall not be responsible or liable for any loss or damage of any kind incurred as a result of, or in connection with your use of additional processing specifications or selection of mold bases.

Additional Plate Processing — Overview

What is additional plate processing?

This is a term we use to describe a number of common processing additionally made to precision plates for use in building new mold bases or in adding plates to standard mold bases, the specifications of which are set in place with simple codes assigned to them so that customers can order required alternation or modification of plates easily with the codes without drawings. Additional plate processing includes machining of water & oil channels, heater holes and pockets as well as threaded holes for eye bolts and side surfaces, etc.

Additional Plate Processing Specifications

Channels for water, oil and heater ➡ P.246	Rough pocket machining ➡ P.248	Threaded holes for eye bolts (side surface threaded holes) ➡ P.250
		

Additionally processing plate item names

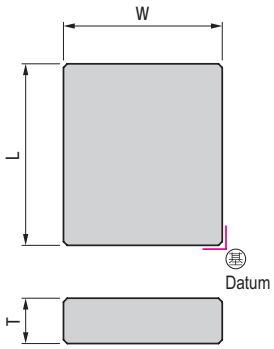
Precision plate material name	Additionally processing plate item name					
F-S55C *1	MPPSC	W	×	L	×	T
F-S55C Block materials	MPKSC	W	×	L	×	T
F-SS400	MPPSS	W	×	L	×	T
F-SS400 Block materials	MPKSS	W	×	L	×	T
HPM1	MPPHPM	W	×	L	×	T
NAK55	MPP55N	W	×	L	×	T
NAK80	MPP80N	W	×	L	×	T
A7075	MPFAAS	W	×	L	×	T

*1. When T dimension is 25 mm or less, F-S50C is used.

※ For precision of plates, refer to Plate General Catalog Red Book.

※ The precision of NAK55 and NAK80 plates are the same as that of F-S55C.

Reference diagram



※ The relation of W and L shall be W≦L.

For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

How to order

Please order “additional processing specifications” by specifying additionally processing plate name and additional processing specifications with codes as shown in the order example below. Write the additional specifications by beginning a new line for each specification.

【Order example】

Additionally processing plate name ———— MPPSC 200 × 300 × 50

Additional processing specification
- MHH2AKP－D8.5－Z300－RC1/8－P80－H35
- MKKB1/PL－A100－B210－R10－Z25－X50－Y45
- MFK2AC－M12－H25

Price

We will be pleased to provide you with a preliminary price quotation. Please request a quotation from our sales office.

Delivery date

Delivery dates will vary depending on the contents and volume of “Additional Processing Specifications”.

Please inquire with our sales office.

Specifications not listed in this catalog

“Additional processing specifications” are commonly used specifications that are set in place with codes assigned to them.

We also accept orders for processing or machining of plates not shown in our catalog. Please advise us on your application requirements with a drawing, etc. or consult our sales office. Plates of materials, sizes or precision not listed in the left table will also be made to order. Consult our sales office.

Using MoldZukan®

MoldZukan® is software that supports selection of additional processing specifications and issuance of purchase orders. Using MoldZukan® allows customers to more easily select additional processing specifications and issue purchase orders. For details, refer to page 3.

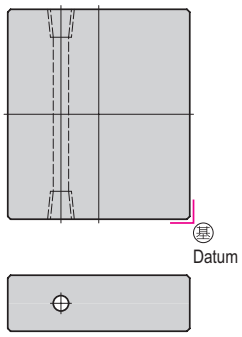
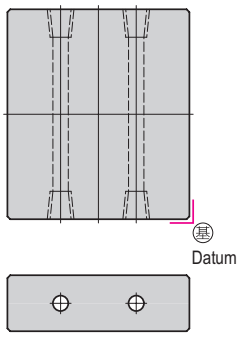
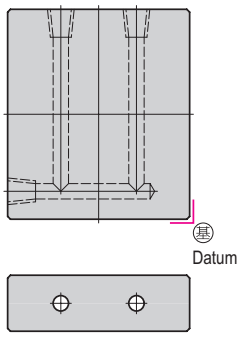
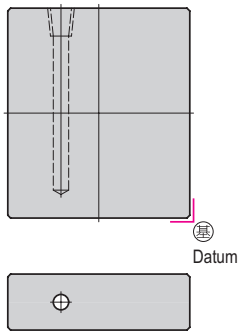
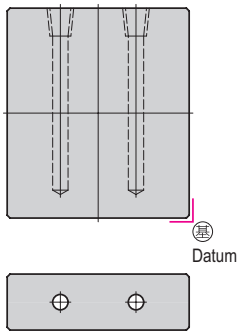
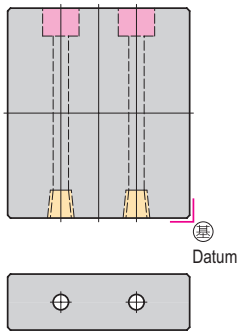
Liability note

“Additional processing specifications” are provided to show customers how to order additional processings. When designing molds, various conditions such as strength and accuracy need to be taken into account. Therefore, we shall not be responsible or liable for any loss or damage of any kind incurred as a result of, or in connection with your use of additional processing specifications or selection of mold bases.

Machining Channels for Water, Oil and Heater

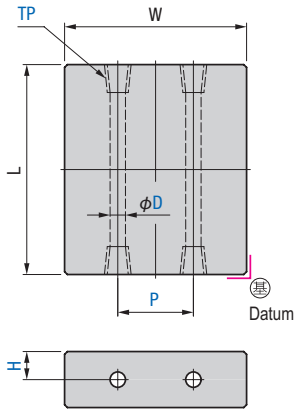
Machine channels for water, oil and heater in plates as shown below:

For details on the machining of channels for water, oil and heater, refer to each page shown below:

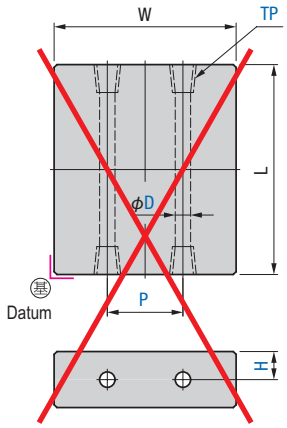
Through hole (1 Hole) ➡ P.194	Through holes (2 Holes) ➡ P.250	Through holes (circulation type) ➡ P.198
		
Blind hole (1 Hole) ➡ P.194	**Blind holes (2 Holes) ➡ P.196**	**Entrance counterbore ➡ P.200 One side pipe threaded hole ➡ P.202**
		

Datum of specifying dimension

Please advise us on the dimensions of water, oil and heater channel machining with the datum at the right lower corner as shown in the right chart.



Proper way of specifying



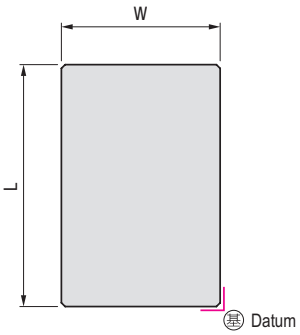
Improper way of specifying

※ The relation of W and L shall be W≦L.

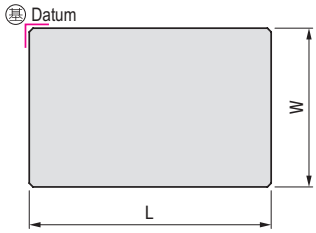
For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Datum plane positions for additionally processing plates and precision plates

When ordering additional processing of plates, specify dimensions by aligning the datum plane position of the precision plates to be processed with the datum plane position for additionally processing plates as shown below.



Datum plane position for additionally processing plates



Position of the datum plane of a precision plate

How to order

※ The catalog numbers used when ordering additional processing of plates are the same as those used when ordering additional processing of mold bases. When ordering additional processing plates, however, omit specifying plate codes as shown below:

● How to order additional processing of plates

E.g. Machining Through Hole (1 Hole)

Catalog No.	D	Z	Thread code (TP)	L or R	Y
MHH1AKL	D8.5	Z250	RC1/8	L50	H15

● How to order additional processing of mold bases

E.g. Machining Through Hole (1 Hole)

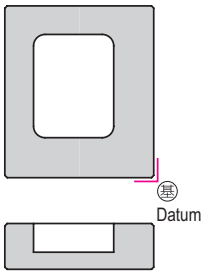
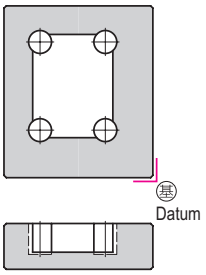
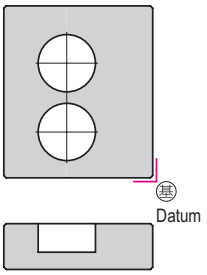
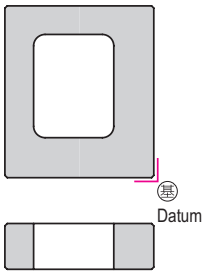
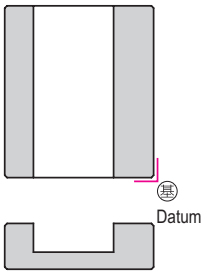
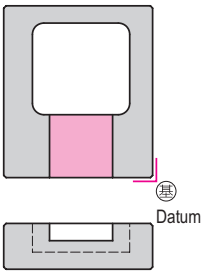
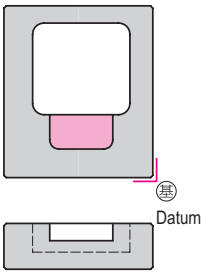
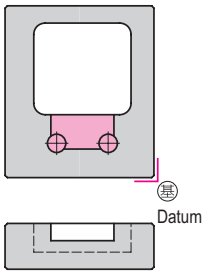
Catalog No.	Plate code	D	Z	Thread code (TP)	L or R	H
MHH1AKL	A	D8.5	Z250	RC1/8	L50	H15

When ordering additional processing of plates, omit specifying plate codes.

Rough Pockets Machining

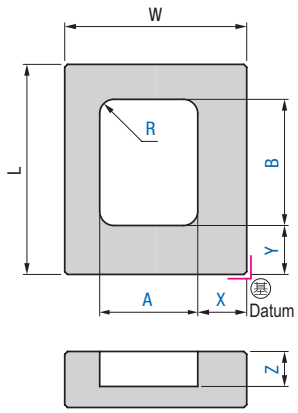
Mill pockets in plates as shown in charts below:

For more information on rough pocket machining, see the respective pages shown below:

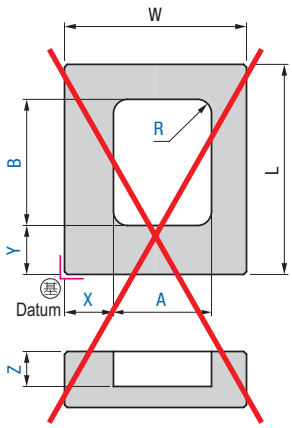
Rectangular pocket (inside corner R) ➡ P.206	Rectangular pocket (outside corner R) ➡ P.208	Circular pocket ➡ P.210	Pocket gas cutting ➡ P.212
			
Through grooves ➡ P.214	**Slide core grooves ➡ P.216**	**Blind grooves (Inside corner R) ➡ P.218**	**Blind grooves (Outside corner R) ➡ P.220**
			

Datum of dimension instruction

Please advise us on the dimensions of pocket milling with the datum at the right lower corner as shown in the right chart.



Proper way of specifying dimension



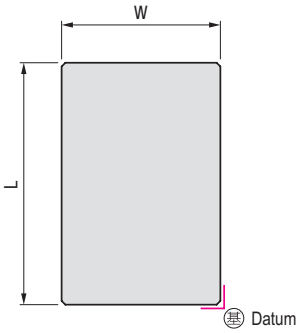
Improper way of specifying dimension

※ Relation of W and L shall be W≦L

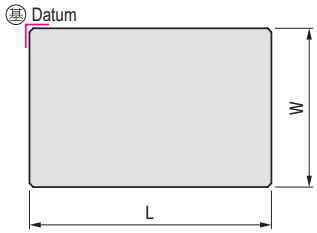
For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Datum plane positions for additionally processing plates and precision plates

When ordering additional processing of plates, specify dimensions by aligning the datum plane position of the precision plates to be processed with the datum plane position for additionally processing plates as shown below.



Datum plane position for additionally processing plates



Position of the datum plane of a precision plate

How to order

※ The catalog numbers used when ordering additional processing of plates are the same as those used when ordering additional processing of mold bases. When ordering additional processing plates, however, omit specifying plate codes as shown below:

● How to order additional processing of plates

E.g. Rectangular pocket with rounded corners (inside corner R)

Catalog No.	A	B	R	Z	X	Y
MKKB1/PL	A80	B100	R10	Z50	X30	Y40

● How to order additional processing of mold bases

E.g. Rectangular pocket with rounded corners (inside corner R)

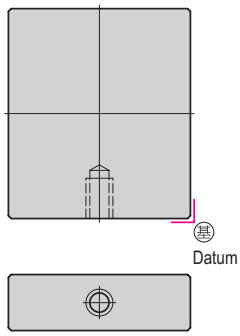
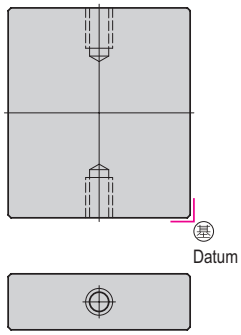
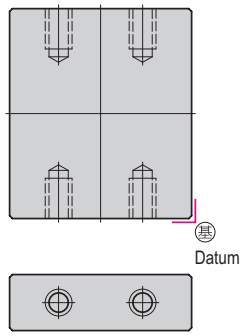
Catalog No.	Plate code	A	B	R	Z	X	Y
MKKB1/PL	A	A80	B100	R10	Z50	X30	Y40

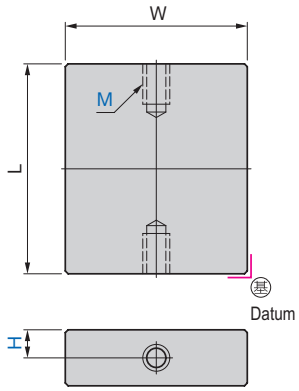
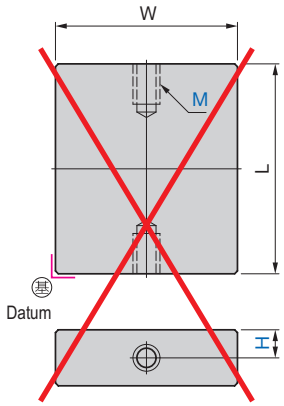
When ordering additional processing of plates, omit specifying plate codes.

Machining Threaded Holes for Eyebolt (Side Surface Threaded Holes)

Machine threaded holes for eye bolts and side surfaces in plates as shown in charts below:

For more information on threaded hoes for eye bolts and side surfaces, see the respective pages shown below:

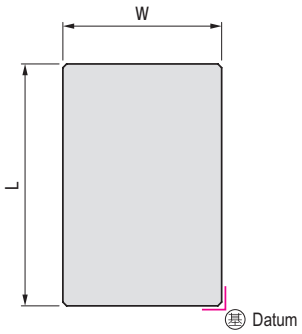
1 Hole ➡ P.224	2 Holes ➡ P.226	4 Holes ➡ P.226
		

Datum of dimension instruction		
Please advise us on the dimensions of threaded holes for eye bolts and side surfaces with the datum at the right lower corner as shown in the right chart.	 **Proper way of specifying dimension**	 **Improper way of specifying dimension**
	※ Relation of W and L shall be W≦L	

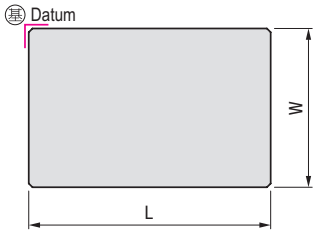
For shapes and dimensions not listed above, please specify with a drawing or consult our sales office.

Datum plane positions for additionally processing plates and precision plates

When ordering additional processing of plates, specify dimensions by aligning the datum plane position of the precision plates to be processed with the datum plane position for additionally processing plates as shown below.



Datum plane position for additionally processing plates



Position of the datum plane of a precision plate

How to order

※ The catalog numbers used when ordering additional processing of plates are the same as those used when ordering additional processing of mold bases. When ordering additional processing plates, however, omit specifying plate codes as shown below:

● How to order additional processing of plates

E.g. Threaded hole (1 Hole)

Catalog No. — M — L or R — H

MFK1A — M12 — H15

● How to order additional processing of mold bases

E.g. Threaded hole (1 hole)

Catalog No. — Plate code — M — L or R — H

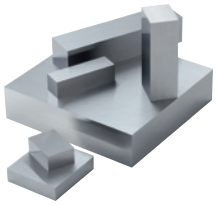
MFK1A — A — M12 — H15

When ordering additional processing of plates, omit specifying plate codes.

Mold Parts
General Table of Contents

General Table of Contents 1

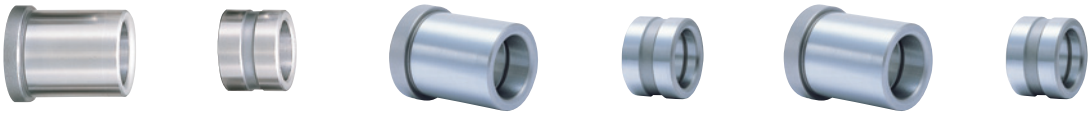
Insert Blocks & Plates



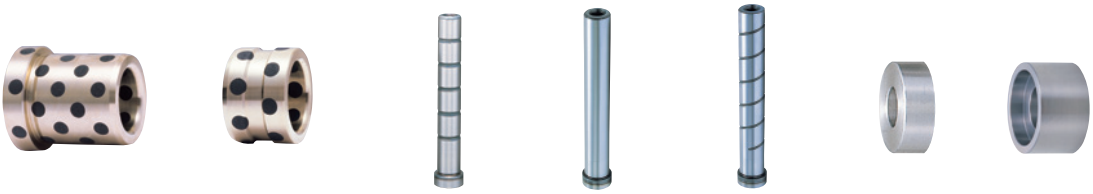
Product name	High-precision plates	
	High-precision milling finish	High-precision grinding finish
Catalog No.	HF	HG
Page	P.262	P.264

Guide & Positioning Parts

Product name	Guide pins -head type-				Straight guide pins		
	With oil groove	No oil groove	Press-fit length designation type (no oil groove)	Press-fit length designation type (with spiral oil groove)	Press-fit length designation type (no oil groove)	Press-fit length designation type (with oil groove)	Press-fit length designation type (with spiral oil groove)
Catalog No.	M-GPA	M-GPH	M-GPHF	M-GPHFS	M-GPSF	M-GPSFR	M-GPSFS
Page	P.274	P.278	P.279	P.280	P.282	P.283	P.284



Guide bushings		Precision guide bushings		Guide bushings	
Shoulder type (no oil groove)	Straight type (no oil groove)	Shoulder type (With oil groove)	Straight type (With oil groove)	Shoulder type (With oil groove)	Straight type (With oil groove)
M-GBA	M-GBB	M-GBHF	M-GBSF	M-GBGF	M-GBRF
P.286	P.287	P.288	P.289	P.290	P.291



Guide bushing self lubricating, copperalloy type		Support pins				
	Straight type	Head type (With oil groove)	Head, press-fit length designation type (no oil groove)	Head, press-fit length designation type (with spiral oil groove)	Support pin collars	Support pin collars (for setting 5mm)
M-GBGDF	M-GBRDF	M-SPN	M-SPHF	M-SPHFS	M-SPC	M-SPD
P.292	P.293	P.294	P.295	P.296	P.297	

Tapered Lock Pins -bolt PL Installation type-		Tapered Lock Pins -basic type-		Tapered Lock Pins
Precision type	Super precision type	Precision type	Super precision type	Precision JIS type
M-TLC□	M-TLD□	M-TLG□	M-TLH□	M-TLB□
P.298		P.299		P.300


Mold opening control parts

Disc spacers					
For M-TLBS					
M-DSA	M-DSB	M-DSC	M-DSD	M-DSE	M-DSF
P.301			P.302		

Angular pins
M-AGA
P.303

Product name
Catalog No.
Page

Ground puller bolts	
M-PBCH	M-PBAH
P.308	P.310

Puller bolts				
			Puller bolt collars	
M-PBC	M-PBA	M-PBB	M-PCA	M-PCB
P.312	P.313	P.314	P.315	

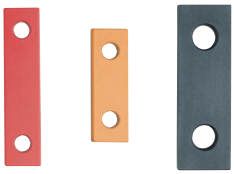
Tension links
M-HLA
P.316

Tension links
M-HLB
P.317

Bolts/retainers for tension link		
M-PBB	M-HRA	M-HRB
P.318		

PL Pullers
M-PLL□
P.320

Mold opening prevention plates
M-OPB
P.321



Ejector, space parts

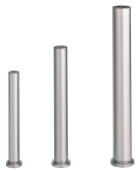
Mold opening prevention plates
M-OPC
P.321

Product name
Catalog No.
Page

Ejector guide pins		
Retaining ring type	JIS centering location type	JIS stuck-out type
M-EGA	M-EGB	M-EGC
P.326	P.327	P.328

Ejector guide bushings			
JIS type	Linear motion bearing type	Self lubricating, copper alloy type	Self lubricating, heat-resisting type
M-EBB	M-EBD	M-EBG	M-EBC
P.330	P.331	P.332	P.333

General Table of Contents 2



Ejector guide pins 5 μm range type		
Centering location type	Stuck-out type	Bushings
M-EGBM	M-EGCM	M-EBBM
P.334	P.335	P.336

Return pins						
Head thick 8mm type	L dimension designation type (Unit 1 mm)		L dimension designation type (Unit 0.1 mm)		L dimension designation type (Unit 0.01 mm)	
M-RP8B	M-RPN	M-RP8N	M-RPL	M-RP8L	M-RPM	M-RP8M
P.337	P.338		P.340			

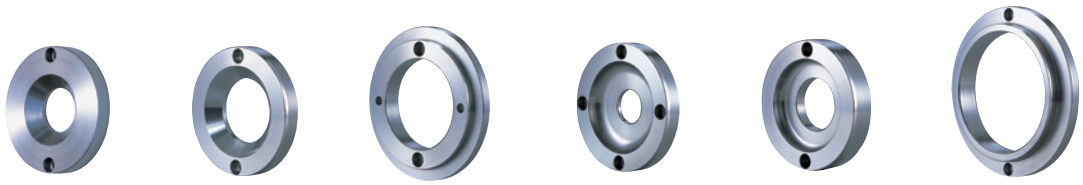
Support pillars		
Screw hole type	Dowel hole type	Bolt hole type
M-SRD	M-SRC	M-SRE
P.342	P.343	P.344

Spacer rings	
D-cut type	Circle type
M-SPR	M-SPR□B
P.345	

Stop pins	
	Heat treated type
M-STP	M-STPH
P.345	

Locating ring, Sprue bushing, runner & gate parts

Stop rings	Ejector rods	Product name	Locating rings		
M-STR	M-ERA	Catalog No.	M-LRA	M-LRH	M-LRC
P.345	P.346	Page	P.352		



Locating rings		
M-LRB	M-LRJ	M-LRG
P.354		

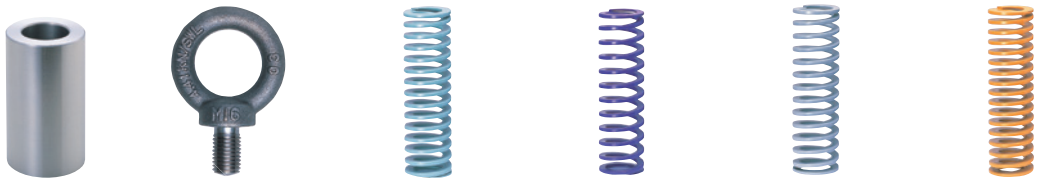
Locating rings		
M-LRD	M-LRE	M-LRF
P.356		

Sprue bushings									
Miniature hot type	Cooling channel type	Bolt hole, straight type (Futaba original)		Shoulder, straight type(Futaba original)		Bolt hole, straight type (JIS)		Shoulder, straight type (JIS) type	
H-HSB	M-SBLH	M-SBA	M-SBC	M-SBB	M-SBD	M-SJA□	M-SJB□	M-SJC□	M-SJD□
P.358	P.362	P.372		P.373		P.374		P.376	

Sprue bushings blank	Sprue bushings			
Bolt hole type	Bolt hole, straight, head thick 10 mm type		Bolt hole, straight, head thick 15 mm type	
M-SAG□	M-SBG□	M-SBH□	M-SBI□	M-SBJ□
P.378	P.380		P.382	

Screw, coil spring parts

Sprue bushings		Runner lock pins	Pin-point gate bushings		Product name
Shoulder, straight type					Catalog No.
M-SBE□	M-SBF□	M-RLA	M-PGBA	M-PGBB	Page
P.384		P.387	P.388		



Base spacers	Eye bolts	Coil springs			
		High deflection FSB type	High deflection TY type	High deflection TR type	Strong coil spring TF type
M-BSA	M-IBM	M-FSB	M-TY	M-TR	P-TF
P.394	P.395	P.396	P.398	P.400	P.402

Heat insulator sheet

Product name	Heat insulator sheets					
	Bakelite paper	Bakelite cloth	Basic grade	Heat resisting grade	High strength grade	High temperature resisting grade
Catalog No.	M-DNAP	M-DNAC	M-DNBR	M-DNHR	M-DNSR	M-DNLR
Page	P.410	P.412	P.414	P.416	P.418	P.420

Insert Blocks & Plates

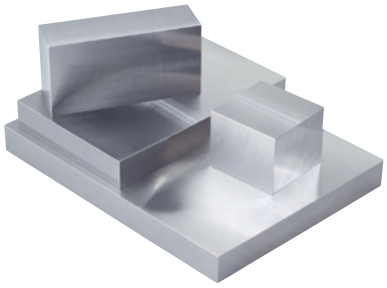
Material

Category	Material name
Carbon steel	SS400 S50C (for plates with a thickness of 25 mm or less) S55C (for plates with a thickness of over 25 mm)
pre-hardened steel	HPM7 PX5 HPM1 NAK55 NAK80 CENA1® DH2F FDAC HPM38 STAVAX ESR®
Quenched and tempered steel	SK3 SKS3 SKD11 ARK1® HPM31 PD613 SKD61 HPM38 STAVAX ESR®

Insert Blocks & Plate — Overview

CAVITY INSERT BLOCKS

High precision plates



① These plates have steel grade and precision grade that are best suited for applications such as insert blocks, etc.
② Industry's top level high-precision milling finish type (Catalog No. HF) and high-precision grinding finish type (Catalog No. HG) are available.
③ High-quality finishes and squareness will help customers significantly increase the efficiency and effectiveness of their subsequent additional machining work.
④ Product will be made to orders in the external dimensions specified in 0.01 mm units.

Catalog No. HF High-precision plate milling finish type

Dimensional limit deviations of X, Y and Z

Dimensional limit deviations can be changed according to the customer requirements.
Please specify desired values with tolerances shown in the charts below as limits.
Tolerance＝upper deviation– lower deviation
Dimensional limit deviations can be specified at minimum in 0.01 mm steps.

Catalog No.	Shortest dimension of X, Y and Z (thickness)	Largest dimension of X, Y and Z (length)		
		20 or more and 200 or less	More than 200 and 300 or less	More than 300 and 500 or less
HF	10 or more and less than 20	Tolerance 0.02 mm at minimum	—	—
	20 or more and 100 or less		Tolerance 0.03 mm at minimum	Tolerance 0.04 mm at minimum
	More than 100 and 200 or less			

Squareness

Catalog No.	Shortest dimension of X, Y and Z (thickness)	Largest dimension of X, Y and Z (length)		
		20 or more and 200 or less	More than 200 and 300 or less	More than 300 and 500 or less
HF	10 or more and less than 20	0.01 mm	—	—
	20 or more and 100 or less		0.015 mm	0.02 mm
	More than 100 and 200 or less			

Shipping & delivery

Catalog No.	Shipment		
		Order reception time	Exceptional cases
HF	One business day shipping	AM9:00～PM4:00	If an order is placed in the afternoon, and the size of the order is 200×200 to 300×500 mm square by 100 mm or less thick: ➡ Two business day shipping
			For sizes exceeding the above, please inquire your nearest Futaba dealer or sale office

※ Depending on its material and size, your order may be shipped in two business days or later.
※ Depending on the time that the order is received and delivery location, delivery times may vary slightly.

Catalog No. HG High-precision plates grinding finish type

Dimensional limit deviations of X, Y and Z

Tolerance 0.01 mm at minimum

Dimensional limit deviations can be changed according to the customer requirements. Please specify desired values with tolerances shown in the charts below as limits.
Tolerance＝upper deviation – lower deviation
Dimensional limit deviations can be specified at minimum in 0.005 mm steps.

Squareness··· within 0.005 or less

Shipping & delivery

Catalog No.	Shipment	
		Order reception time
HG	One business day shipping	AM9:00～PM4:00

※ Depending on its material and size, your order may be shipped in two budiness days or later.
※ Depending on the time that the order is received and delivery location, delivery times may vary slightly.

High-precision plate materials

Category	Material name	Hardness at delivery *4		Hardness for use *4	
		HRC	HB	HRC	HB
Carbon steel	SS400	—	116～150	—	116～150
	S50C *1 S55C *2	—	170～240	—	170～240
Pre-hardend steel	HPM7	29～33	(279～311)	29～33	(279～311)
	PX5	30～33	(286～311)	30～33	(286～311)
	HPM1	37～41	(344～381)	37～41	(344～381)
	NAK55	37～43	(344～400)	37～43	(344～400)
	NAK80	37～43	(344～400)	37～43	(344～400)
	CENA1®	37～42	(344～390)	37～42	(344～390)
	DH2F	38～42	(353～390)	38～42	(353～390)
	FDAC	38～42	(353～390)	38～42	(353～390)
	HPM38 *3	29～33	(279～311)	29～33	(279～311)
	STAVAX ESR® *3	27～35	(264～327)	27～35	(264～327)
Quenched and tempered steel	SK3	—	212 or less	58～63	—
	SKS3	—	217 or less	60～62	—
	SKD11	—	248 or less	58～63	—
	ARK1®	—	248 or less	58～62	—
	HPM31	—	248 or less	55～60	—
	PD613	—	248 or less	56～61	—
	SKD61	—	229 or less	53 or less	—
	HPM38 *3	29～33	(279～311)	50～55	—
	STAVAX ESR® *3	27～35	(264～327)	50～55	—

*1. S50C is used when the smallest dimension (thickness) of X, Y and Z of the plate is 25 mm or less.

*2. S55C is used when the smallest dimension (thickness) of X, Y and Z of the plate is over 25 mm.

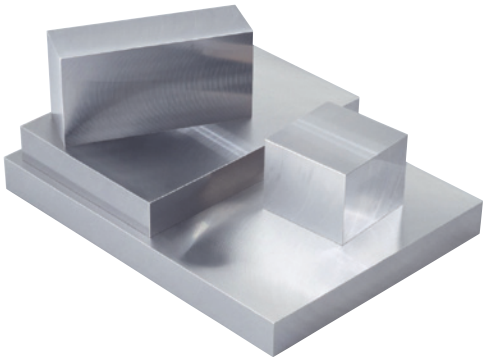
*3. HPM38 and STAVAX ESR® are prehardened steel. We recommend to perform quenching and tempering to obtain appropriate hardness of 50 to 54 HRC before use if you apply mirror finish or precision texture to the surfaces. Although the hardness of 50 to 54 HRC is obtained at any quenching temperature below 500°C, the lower the quenching temperature is, the more superior corrosion resistant property can be achieved.

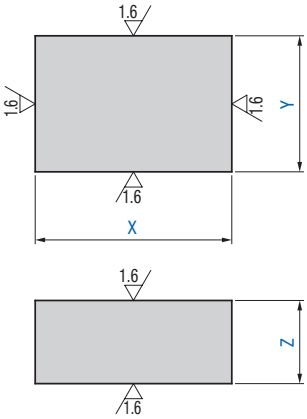
*4. The above material property (hardness) data is subject to change without notice due to improvement by the material manufacturers. Use the data only as reference (the values in the above table are as of September 2005). The hardness values in parentheses are those converted from hardness test values that are managed in the manufacturing process.

High Precision Plates High-Precision Milling Finish

CAVITY INSERT BLOCKS

Catalog No.	Material
HF	See right page





※ The surface roughness symbols in the above chart denote calculated average roughness (Ra)

Dimensional limit deviations of X, Y and Z

Dimensional limit deviations can be changed according to the customer requirements.
Please specify your desired values with the tolerances shown in the charts below as limits.
Tolerance ＝ upper deviation – lower deviation
Dimensional limit deviations can be specified at minimum in 0.01 mm steps.

Shortest dimension of X, Y and Z (thickness)	Largest dimension of X, Y and Z (length)		
	20 or more and 200 or less	More than 200 and 300 or less	More than 300 and 500 or less
10 or more and less than 20	Tolerance 0.02 mm at minimum	—	—
20 or more and 100 or less		Tolerance 0.03 mm at minimum	Tolerance 0.04 mm at minimum
More than 100 and 200 or less			

Squareness

Shortest dimension of X, Y and Z (thickness)	Largest dimension of X, Y and Z (length)		
	20 or more and 200 or less	More than 200 and 300 or less	More than 300 and 500 or less
10 or more and less than 20	0.01 mm	—	—
20 or more and 100 or less		0.015 mm	0.02 mm
More than 100 and 200 or less			

※ Datum plane for squareness shall be the one with a larger surface area of the two planes that form a right angle.

Chamfering around the entire circumference

Chamfer dimension
C0 C0.2 C0.5 C1 C2 ※ If not specified, C0.2 is used.

Production size

20×20×10～200×200×100～400×500×200

※ The dimension can be specified at minimum in 0.01 mm units.
※ Depending on material or size, we may not be able to accept your order. Inquire your nearest Futaba dealers or sales office.

The product of materials not listed above will be made to order. Consult our sales office.

Material

Category	Material name
Carbon steel	SS400 S50C (for plates with a thickness of 25 mm or less) S55C (for plates with a thickness of over 25 mm)
Prehardened steel	HPM7, PX5, HPM1, NAK55, NAK80, CENA1® DH2F, FDAC, HPM38 *2, STAVAX ESR® *2
Quenched and tempered steel	SK3, SKS3, SKD11, ARK1® HPM31 *1, PD613, SKD61, HPM38 *2, STAVAX ESR® *2

※ The materials indicated in red are used for production of plates with a size of up to 200×200×100.

*1. HPM31 is used when the smallest dimension of X, Y and Z (thickness) of plates is 50 mm or less.

*2. One point advice: HPM38 and STAVAX ESR® are prehardened steel. We recommend to perform quenching and tempering treatment to obtain appropriate hardness of 50 to 54 HRC before use if you apply mirror finish or precision texture to the surfaces. Although the hardness of 50 to 54 HRC is obtained at any quenching temperature below 500°C, the lower the quenching temperature is, the more superior corrosion resistant property can be achieved.

How to order

Product will be made to orders in the external dimensions specified in 0.01 mm units.

Catalog No.	–	Material name	–	X Upper deviation Lower deviation	×	Y Upper deviation Lower deviation	×	Z Upper deviation Lower deviation	–	Chamfering specification
HF	–	HPM1	–	$150.01^{0}_{-0.02}$	×	$99.98^{+0.02}_{0}$	×	60.00 ± 0.01		
HF	–	S55C	–	$88.00^{+0.1}_{0}$	×	$77.00^{+0.1}_{0}$	×	$66.00^{0}_{-0.2}$	–	C1

Shipping

	Order reception time	Exceptional cases
One business day shipping	AM9:00～PM4:00	If an order is placed in the afternoon, and the size of the order is 200×200 to 300×500 mm square by 100 mm or less thick: → Two business day shipping
		For sizes exceeding the above, please inquire your nearest Futaba dealer or sale office

※ Depending on its material and size, your order may be shipped in two business days or later.

※ Depending on the time that the order is received and delivery location, delivery times may vary slightly.

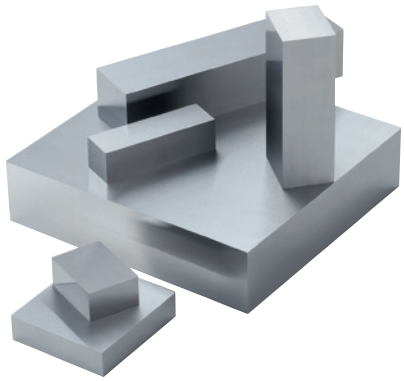
Price

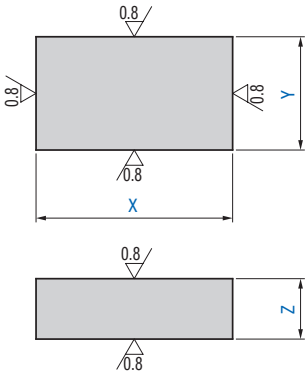
Contact your nearest Futaba dealer or sales office.

High-Precision Plates High-precision grinding finish

CAVITY INSERT BLOCKS

Catalog No.	Material
HG	See right page





※ The surface roughness symbols in the above chart denote calculated average roughness (Ra)

Dimensional limit deviations of X, Y and Z

Tolerance 0.01 mm at minimum

Dimensional limit deviation tolerance can be changed according to the customer requirements.
Tolerance ＝ upper deviation – lower deviation
Dimensional limit deviations can be specified at minimum in 0.005 mm steps.

Squareness

Within 0.005 or less

※ Datum plane for squareness shall be the one with a larger surface area of the two planes that form a right angle.

Chamfering around the entire circumference.

Chamfer dimension
C0 C0.2 C0.5 C1 C2
※ If not specified, C0 is used.

Production size

20×20×10～200×200×100

※ The dimension can be specified at minimum in 0.01 mm units.
※ Depending on material or size, we may not be able to accept your order.
Inquire your nearest Futaba dealers or sales office.

Material

Category	Material name
Carbon steel	SS400 S50C (for plates with a thickness of 25 mm or less) S55C (for plates with a thickness of over 25 mm)
Prehardened steel	HPM7, PX5, HPM1, NAK55, NAK80, CENA1® DH2F, FDAC, HPM38 *2, STAVAX ESR® *2
Quenched and tempered steel	SK3, SKS3, SKD11, ARK1® HPM31 *1, PD613, SKD61, HPM38 *2, STAVAX ESR® *2

*1. HPM31 is used when the smallest dimension of X, Y and Z (thickness) of plates is 50 mm or less.
*2. One point advice: HPM38 and STAVAX ESR® are prehardened steel. We recommend to perform quenching and tempering treatment to obtain appropriate hardness of 50 to 54 HRC before use if you apply mirror finish or precision texture to the surfaces. Although the hardness of 50 to 54 HRC is obtained at any quenching temperature below 500°C, the lower the quenching temperature is, the more superior corrosion resistant property can be achieved.

How to order

Product will be made to orders in the external dimensions specified in 0.01 mm units.

Catalog No.	–	Material name	–	X Upper deviation Lower deviation	×	Y Upper deviation Lower deviation	×	Z Upper deviation Lower deviation	–	Chamfering specification
HG	–	HPM1	–	$120^{0}_{-0.01}$	×	$60^{0}_{-0.01}$	×	40 ± 0.005		
HG	–	STAVAX ESR	–	$40^{0}_{-0.02}$	×	$30^{0}_{-0.02}$	×	$39.99^{+0.01}_{0}$	–	C0.2

Shipping

One business day shipping	Order reception time
	AM9:00～PM4:00

※ Depending on its material and size, your order may be shipped in two business days or later.
※ Depending on the time that the order is received and delivery location, delivery times may vary slightly.

Price

Contact your nearest Futaba dealer or sales office.

Guide & Positioning Parts

Guide & Positioning Parts Overview 1

Guide pins –head type-

Additional processing to MDC

Catalog No.	M-GPA
Type	With oil groove
Shipping	In-stock item
Page	P.274

Additional processing to MDC

Catalog No.	M-GPH
Type	No oil groove
Shipping	In-stock item
Page	P.278

Additional processing to MDC

Press-fit length designation type

Catalog No.	M-GPHF
Type	No oil groove
Shipping	In 3-5 days
Page	P.279

Additional processing to MDC

Press-fit length designation type

Catalog No.	M-GPHFS
Type	With spiral oil groove
Shipping	In 5 days
Page	P.280

Straight guide pins

Additional processing to MDC

Press-fit length designation type

Catalog No.	M-GPSF
Type	No oil groove
Shipping	d25 - 40 In 3 days d50 In 5 days
Page	P.282

Additional processing to MDC

Press-fit length designation type

Catalog No.	M-GPSFR
Type	With oil groove
Shipping	In 5 days
Page	P.283

Additional processing to MDC

Press-fit length designation type

Catalog No.	M-GPSFS
Type	With spiral oil groove
Shipping	In 5 days
Page	P.284

Guide bushings

Additional processing to MDC

Shoulder type

Catalog No.	M-GBA
Type	No oil groove
Shipping	In-stock item
Page	P.286

Additional processing to MDC

Straight type

Catalog No.	M-GBB
Type	No oil groove
Shipping	In-stock item
Page	P.287

Precision guide bushings

Additional processing to MDC

Shoulder type

Catalog No.	M-GBHF
Type	With oil groove
Shipping	In-stock item
Page	P.288

Additional processing to MDC

Straight type

Catalog No.	M-GBSF
Type	With oil groove
Shipping	In-stock item
Page	P.289

Guide bushings

Additional processing to MDC

Shoulder type

Catalog No.	M-GBGF
Type	With oil groove
Shipping	In-stock item
Page	P.290

Additional processing to MDC

Straight type

Catalog No.	M-GBRF
Type	With oil groove
Shipping	In-stock item
Page	P.291

Guide bushings self lubricating copper alloy type

Additional processing to MDC

Shoulder type

Catalog No.	M-GBGDF
Type	Copper alloy (with solid lubricant)
Shipping	In 3 days
Page	P.292

Additional processing to MDC

Straight type

Catalog No.	M-GBRDF
Type	Copper alloy (with solid lubricant)
Shipping	In 3 days
Page	P.293

Additional processing to MDC denotes the parts that support additional processing to mold bases.
Shipping schedules are shown in business days (excluding the day of order).

Support pins

Additional processing to MDC
Press-fit length designation type

Catalog No.	M-SPN
Type	With oil groove
Shipping	In-stock item
Page	P.294

Additional processing to MDC
Press-fit length designation type

Catalog No.	M-SPHF
Type	No oil groove
Shipping	L≦450 In 3 days L>450 In 5 days
Page	P.295

Additional processing to MDC
Press-fit length designation type

Catalog No.	M-SPHFS
Type	With spiral oil groove
Shipping	In 5 days
Page	P.296

Support pin callars

Additional processing to MDC

Catalog No.	M-SPC
Shipping	In-stock item
Page	P.297

Additional processing to MDC

Catalog No.	M-SPD
Type	For setting 5mm
Shipping	In-stock item
Page	P.297

Tapered Lock Pins PL installation type

Additional processing to MDC

Catalog No.	M-TLC□	M-TLD□
Type	Precision type	Super precision type
Shipping	In-stock item	
Page	P.298	

Tapered Lock Pins basic type

Additional processing to MDC

Catalog No.	M-TLG□	M-TLH□
Type	Precision type	Super precision type
Shipping	In-stock item	
Page	P.299	

Tapered Lock Pins JIS type (precision)

Additional processing to MDC

Catalog No.	M-TLB□
Type	JIS type (precision)
Shipping	In-stock item
Page	P.300

Disc spacers

Additional processing to MDC

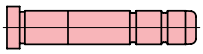
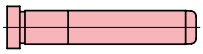
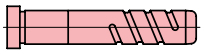
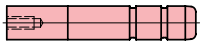
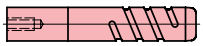
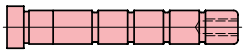
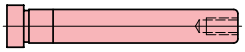
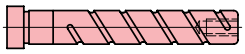
Catalog No.	M-DSA	M-DSD	M-DSB	M-DSE	M-DSC	M-DSF
Type	For M-TLBS		For M-TLBS		For M-TLBS	
Shipping	In-stock item					
Page	P.301	P.302	P.301	P.302	P.301	P.302

Angular pins

Catalog No.	M-AGA
Shipping	In-stock item
Page	P.303

Guide & Positioning Parts Overview 2

Guide pin, support pin and guide bushing combination table

Guide pins / Support pins \ Guide bushings	No oil groove		Precision, with oil groove		With oil groove		Self lubricating, copper alloy type	
								
	M-GBA ➡ P.286	M-GBB ➡ P.287	M-GBHF ➡ P.288	M-GBSF ➡ P.289	M-GBGF ➡ P.290	M-GBRF ➡ P.291	M-GBGDF ➡ P.292	M-GBRDF ➡ P.293
Guide pin M-GPA With ring oil groove ➡ P.274 	Combination used for standard mold bases							
Guide pin M-GPH No oil groove ➡ P.278 			Recommended combination		Recommended combination			
Guide pin M-GPHF No oil groove ➡ P.279 			Recommended combination		Recommended combination		Recommended combination	
Guide pin M-GPHFS With spiral oil groove ➡ P.280 	Recommended combination							
Guide pin M-GPSF No oil groove ➡ P.282 			Recommended combination		Recommended combination		Recommended combination	
Guide pin M-GPSFR With oil groove ➡ P.283 	Recommended combination							
Guide pin M-GPSFS With spiral oil groove ➡ P.284 	Recommended combination							
Support pin M-SPN With oil groove ➡ P.294 	Combination used for standard mold bases							
Support pin M-SPHF No oil groove ➡ P.295 			Combining these parts is not allowed.		Recommended combination		Recommended combination	
Support pin M-SPHFS With spiral oil groove ➡ P.296 	Recommended combination							

Clearance of guide pin, support pin and guide bushing combinations

Clearance table by type for combinations of guide pin with oil groove and guide bushings without oil grooves

(Unit: mm)

Guide pin			Guide bushing		Guide pin				Guide bushing	
Dia.	M-GPA With oil groove	Limit deviations of sliding section	M-GBA M-GBB No oil groove: Limit deviations of ID	Clearance of the combination	M-GPHFS With spiral oil groove	M-GPSFR With ring oil groove	M-GPSFS With spiral oil groove	Limit deviations of sliding section	M-GBA M-GBB Without oil groove: Limit deviations of ID	Clearance of the combination
12	○	−0.016 −0.027	+0.017 +0.006	0.022 to 0.044	○			−0.020 −0.025	+0.017 +0.006	0.026 to 0.042
16	○				○					
20	○	−0.020 −0.033	+0.020 +0.007	0.027 to 0.053	○			−0.025 −0.030	+0.020 +0.007	0.032 to 0.050
25	○				○	○	○			
30	○				○	○	○			
35	○	−0.025 −0.041	+0.025 +0.009	0.034 to 0.066	○	○	○	−0.030 −0.035	+0.025 +0.009	0.039 to 0.060
40	○				○	○	○	−0.030 −0.040		0.039 to 0.065
50	○				○	○	○			
60	○	−0.040 −0.055		0.049 to 0.080						
70	○									

Clearance table by type for combinations of guide pins without oil groove and self-lubricating guide bushings with oil groove

(Unit: mm)

Guide pin					Precision guide bushing		Guide bushing		Guide bushing	
Dia.	M-GPH No oil groove	M-GPHF No oil groove	M-GPSF No oil groove	Limit deviations of sliding section	M-GBHF M-GBSF With oil groove: Limit deviations of ID	Clearance of the combination	M-GBGF M-GBRF With oil groove: Limit deviations of ID	Clearance of the combination	M-GBGDF M-GBRDF Self lubricating copper alloy: Limit deviation tolerance of ID	Clearance of the combination
8	○			−0.015 −0.020	0 −0.005	0.010 ~0.020	+0.014 +0.005	0.020 ~0.034		
10	○									
12	○	○		−0.020 −0.025	−0.005 −0.010		+0.017 +0.006	0.026 ~0.042		
16		○							+0.017 +0.006	0.026 ~ 0.042
20		○		−0.025 −0.030	−0.010 −0.015		+0.020 +0.007	0.032 ~0.050	+0.020 +0.007	0.032 ~ 0.050
25		○	○							
30		○	○							
35		○	○	−0.030 −0.035			+0.025 +0.009	0.039 ~0.060	+0.025 +0.009	0.039 ~ 0.060
40		○	○	−0.030 −0.040				0.039 ~0.065		0.039 ~ 0.065
50		○	○							

Clearance table by type for combinations of support pins and guide bushings

(Unit: mm)

Support pin		Guide bushing		Support pin	Guide bushing		Support pin	Guide bushing		Support pin	Guide bushing	
Dia.	M-SPN With ring oil groove: Limit deviations of sliding section	M-GBA M-GBB No oil groove: Limit deviations of ID	Clearance of the combination	M-SPHFS With spiral oil groove: Limit deviations of sliding section	M-GBA M-GBB Without oil groove: Limit deviations of ID	Clearance of the combination	M-SPHF No oil groove: Limit deviations of sliding section	M-GBGF M-GBRF With oil groove: Limit deviations of ID	Clearance of the combination	M-SPHF No oil groove: Limit deviations of sliding section	M-GBGDF M-GBRDF Self lubricating copper alloy: Limit deviations of ID	Clearance of the combination
12	−0.016 −0.027	+0.017 +0.006	0.022 ~0.044	−0.020 −0.025	+0.017 +0.006	0.026 ~0.042	−0.020 −0.025	+0.017 +0.006	0.026 ~0.042	−0.020 −0.025		
16											+0.017 +0.006	0.026 ~0.042
20	−0.020 −0.033	+0.020 +0.007	0.027 ~0.053	−0.025 −0.030	+0.020 +0.007	0.032 ~0.050	−0.025 −0.030	+0.020 +0.007	0.032 ~0.050	−0.025 −0.030	+0.020 +0.007	0.032 ~0.050
25												
30												
35	−0.025 −0.041	+0.025 +0.009	0.034 ~0.066	−0.030 −0.035	+0.025 +0.009	0.039 ~0.060	−0.030 −0.035	+0.025 +0.009	0.039 ~0.060	−0.030 −0.035	+0.025 +0.009	0.039 ~0.060
40				−0.030 −0.040		0.039 ~0.065	−0.030 −0.040		0.039 ~0.065	−0.030 −0.040		0.039 ~0.065

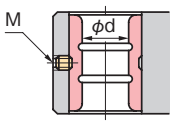
Guide & Positioning Parts Overview 3

About use of guide pins (no oil groove) & precision guide bushings

Clearance table for combinations of guide pins (no oil groove) and precision guide bushings (Unit: mm)

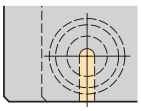
Guide pin (no oil groove)					Precision guide bushing	Clearance of the combination
Dia	M-GPH	M-GPHF	M-GPSF	Limit deviations of sliding section	M-GBHF M-GBSF Limit deviations of ID	
8	○			−0.015 −0.020	0 −0.005	0.010 ~0.020
10	○					
12	○	○		−0.020 −0.025	−0.005 −0.010	
16		○				
20		○		−0.025 −0.030	−0.010 −0.015	
25		○	○			

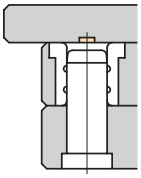
Pull-out prevention measure for guide bushing



d	M
8 10 12	M4
16	M5
20	M6
25	M8

Air vent





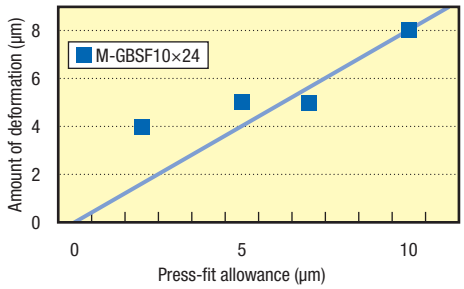
When using guide pins without oil grooves M-GPH, M-GPHF and M-GPSF in combination with precision guide bushings M-GBHF and M-GBSF, the clearance between a pin and a bushing is small as shown in the above table. Therefore, please take the following matters into account in designing:

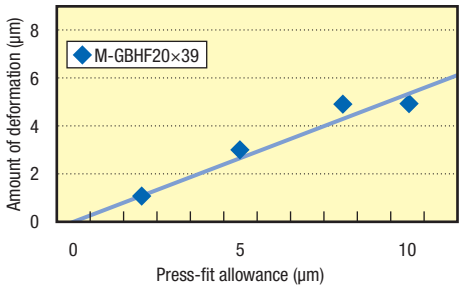
① As the press-fit allowance becomes larger as shown in the graph below, the inside diameter (ID) of the guide bushing will be deformed and the clearance becomes even smaller. As a small clearance could cause scuffing, install the guide bushing in a light press-fit to prevent it. Also, take a pull-out prevention measure such as retaining the guide bushing with a screw from the side as shown in the above chart.

② As the clearance between a guide pin and a guide bushing is small, we recommend to provide an air vent as shown in the above chart.

③ Ensure to eliminate the difference in temperature of retainer plates in which guide pins and guide bushing bushings are installed respectively during the molding operations. Differential expansion of both plates due to the temperature difference could compromise the pitches between the guide pin holes and the guide bushing holes, resulting in scuffing.

Press-fit allowance and inside diameter deformation amount of precision guide bushings:





※ The values indicated above are an example of measurements and not guaranteed values.
※ The amount of deformation is also affected by the size of guide bushing (diameter, length and thickness) and the precision of guide bushing and installation hole.

How to order installation of guide pins without oil groove and precision guide bushings in the mold bases ➡ P.42

① Advise us on the details via MoldZukan® or with a drawing, etc.

② For plates in which to install guide pins and precision guide bushing, surface grinidng will be applied. The limit deviations of plate thickness is required. Please specify it.

③ To maintain the accuracy of holes in plates, we also recommend rough machining of pockets and slide core grooves, etc.

④ We recommend to provide an air vent in the plate in which to install guide bushings.

Calculation of thermal expansion of retainer plates

In order to obtain good molded parts, the temperature control of molds is important. If a difference in temperature occurs between the retainer plate with guide pins installed and the retainer plate with guide bushings installed, differential thermal expansion of the plates can change the positions of guide pins and guide bushings and may cause insufficient motions or scuffing.

Dimensional change due to thermal expansion can be calculated by using a formula shown below:

$\lambda = \alpha \times Lo \times (t - to)$

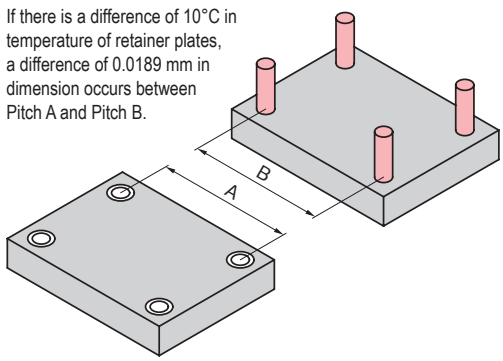
- λ : increase in length (mm)
- α : expansion coefficient (/℃)
- L_0 : original length (mm)
- t : final temperature (℃)
- t_0 : original temperature (℃)

Calculation example

Supposing that there is a difference of 10 ℃ in temperature between the retainer plate in which guide pins are installed and the plate in which the guide bushings are installed, and the pitch of guide pins is 150 mm, calculate how much difference occurs between the pitch of pins and that of guide bushings.
For this example, we will assume the material used is S55C, and thermal expansion coefficient is 12.6×10^{-6}/℃.

- α : thermal expansion coefficient (/℃) → 12.6×10^{-6}/℃
- Lo : original length (mm) → 150 mm
- t−to : difference in temperature (℃) → 10℃

$$\lambda = \alpha \times Lo \times (t - to)$$
$$= 12.6 \times 10^{-6} \times 150 \times 10$$
$$= 0.0189\text{mm}$$



Thermal expansion coefficients of main steel materials used for mold bases

Material	Thermal expansion coefficient $\times 10^{-6}$/°C
S55C	12.6 (25 to 200°C)
PX5	12.7 (30 to 200°C)
HPM1	11.8 (20 to 200°C)
NAK55	12.5 (20 to 200°C)
NAK80	12.5 (20 to 200°C)

※ Thermal expansion coefficients other than the above → P.448

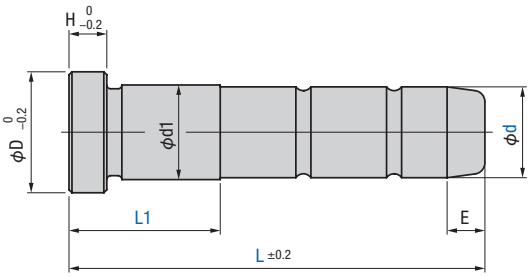
Reference: Michio Komatsu “Plastic injection molding design manual”, The Nikkan Kogyo Shinbunsya

Guide Pins Head Type (With Oil Groove)

GUIDE PINS

Additional processing to mold bases → P.44

Catalog No.	Material	Hardness after heat treatment
M-GPA	SUJ2	60 to 64HRC (high frequency quenching)



Cylindricity of d

L	50 or less	51 to 100	101 or more
Tolerance	0.002	0.003	0.004

Circularity (roundness) of d

d	30 or less	31 or more
Tolerance	0.002	0.0025

Catalog No.	d		d1		D	H	E
	Dimension	Limit deviations	Dimension	Limit deviations			
M-GPA	12	−0.016 −0.027	12	+0.018 +0.007	17	5	5
	16		16		20	6	
	20	−0.020 −0.033	20	+0.021 +0.008	25		
	25		25		30	8	8
	30		30		35		
	35	−0.025 −0.041	35	+0.025 +0.009	40		10
	40		40		45	10	
	50		50		56	12	12
	60	−0.040 −0.055	60		66	15	15
	70		70		76		

How to order

Catalog No.	d	×	L	×	L1
M-GPA	16	×	47	×	19

Shipping **In-stock item**

Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

L1 dimension d12 to 30

L \ d	12			16			20			25			30		
37	19			19			19								
42	19			19			19								
47	19			19			19			24					
52	19			19			19			24					
57	19	29		19	29		19	34		24			29		
62	19	29		19	29		19	34		24			29		
67	19	29		19	29		19	34		24			29		
72	19	29		19	29		19	39		24			34		
77	19	29	39	19	29		19	39		24			29		
82	19	29		19	29		19	39		24	49		34		
87	19	29		19	29	34	19	39		24	39		29	49	
92	29			19	29	34	19	39		24	49		29	49	
97	29			19	29	39	19	39		24	49		29	49	
102	29			29	39		19	39	49	29	39		34	49	
107	29			19	29	39	19	39	49	24	39		29	49	
112				39			19	39	49	29	59		34	59	
117	29			24	29	39	19	39	49	24	49		29	59	
122				39			29	39	49	24	49	59	34	59	
127	29			29	39		19	39	49	24	49	59	29	49	
132				29			29	49		24	49	59	34	49	
137				39			19	39	49	24	49	59	29	59	69
142				29			49			49	59		34	59	69
147				39			29	49		24	49	59	29	59	69
152				39			49			49	59		34	59	69
157				39			49			24	49	59	29	59	69
162							39			59			59	69	
167				39			49			24	49	59	29	59	69
172										59			59		
177							49			49	59		29	59	69
182										59			59		
187							49			59			29	59	69
192										59			69		
197							49			59			39	69	
202										59			69		
207							49			59			59	69	
212										59			69		
217										59			69		
222													69		
227										59			69		
232													59		
237										59			69		
242															
247										59			69		
252															
257													69		
262															
267													69		
272															
277													69		

Guide Pins Head Type (With Oil Groove)

GUIDE PINS

L1 dimension d35 to 70

L \ d	35			40			50			60			70		
77	39			39											
82															
87	39			39											
92															
97	39			39			49								
102															
107	39	59		39			49								
112	39														
117	39	59		39			49								
122	39														
127	39	59		39	59		49	59							
132	39														
137	39	59		39	59		49	69							
142	39	59													
147	39	69		39	69		49	79							
152	39	59													
157	39	69		39	69		49	69	89						
162	39	59													
167	39	59	69	39	69	79	49	89							
172	39	59													
177	39	59	69	39	69	79	49	89							
182	59														
187	39	69	79	39	69	79	49	99							
192	59														
197	39	59	79	39	59	79	49	99		99			99		
202	69														
207	39	59	79	39	59	79	59	99		99			99		
212	69														
217	49	69		49	69		59	99		99			99		
222	69														
227	59	79		59	79		59	99		99			99		
232	69														
237	69	79		59	79		69	99		99			99		
242	69														
247	69			69			69	99		99			99		
252	69														
257	69			69			79	119		99			99		
262	69														
267	79			69			89	119		99			99		
272	69														
277	79			69			99	119		99			99		
287	79			69			99	119		99			99		
297	79			69			119			99			99		
307	79			79			119			99			99		
317	79			79			119			99			99		
327							119			99			99		
337							119			99			99		
347							119			99			99		
357							119			99			99		

Price list Unit price in yen

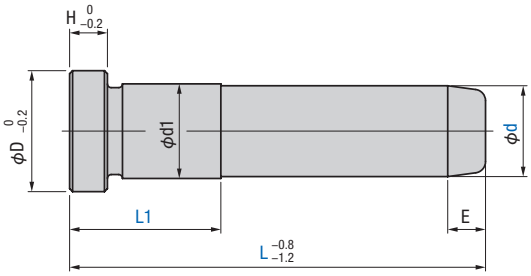
L \ d	12	16	20	25	30	35	40	50	60	70
37	290	310	360							
42	290	310	360							
47	290	310	370	450						
52	310	340	380	470						
57	320	340	380	490	600					
62	320	350	390	500	620					
67	320	350	400	520	620					
72	330	370	420	540	640					
77	340	380	440	570	670	890	1,660			
82	350	390	450	590	680					
87	360	400	460	620	700	940	1,710			
92	370	400	470	630	740					
97	390	420	480	640	770	970	1,750	3,040		
102	410	460	530	660	810					
107	420	460	530	690	850	1,000	1,800	3,180		
112		470	540	720	860	1,020				
117	440	470	540	740	880	1,050	1,850	3,310		
122		480	570	750	910	1,070				
127	460	480	590	760	920	1,100	1,900	3,450		
132		500	610	780	940	1,110				
137		500	630	790	970	1,130	1,950	3,580		
142		600	660	820	1,000	1,150				
147		620	690	860	1,050	1,170	2,000	3,720		
152		640	730	880	1,070	1,200				
157		690	780	900	1,100	1,240	2,050	3,860		
162			830	920	1,120	1,260				
167		780	900	950	1,130	1,280	2,110	3,990		
172				990	1,160	1,330				
177			970	1,050	1,170	1,350	2,170	4,130		
182				1,090	1,210	1,370				
187			1,020	1,160	1,240	1,390	2,230	4,260		
192				1,180	1,260	1,430				
197			1,080	1,190	1,290	1,450	2,300	4,400	5,530	6,930
202				1,250	1,320	1,480				
207			1,130	1,330	1,330	1,510	2,370	4,530	5,730	7,190
212				1,350	1,380	1,590				
217				1,360	1,450	1,660	2,580	4,670	5,930	7,460
222					1,460	1,670				
227				1,450	1,500	1,690	2,650	4,800	6,110	7,720
232					1,500	1,690				
237				1,650	1,690	1,750	2,780	4,940	6,310	7,990
242						1,870				
247				1,760	1,800	1,890	3,090	5,080	6,510	8,260
252						1,920				
257					1,870	1,950	3,210	5,210	6,710	8,520
262						1,970				
267					1,940	2,000	3,420	5,350	6,900	8,790
272						2,030				
277					2,000	2,050	3,750	5,480	7,100	9,050
287						2,110	3,850	5,620	7,290	9,310
297						2,160	4,020	5,750	7,480	9,580
307						2,210	4,190	5,890	7,690	9,840
317						2,280	4,370	6,030	7,880	10,120
327								6,160	8,070	10,380
337								6,300	8,270	10,640
347								6,430	8,460	10,920
357								6,570	8,660	11,180

Precision Guide Pins Head Type (No Oil Groove)

GUIDE PINS

Additional processing to mold bases → P.42 & 44

Catalog No.	Material	Hardness after heat treatment
M-GPH	SUJ2	60 to 64HRC (high frequency quenching)



d DIMM	d Limit deviations	d1 DIMM	d1 Limit deviations	D	H	E
8	−0.015 −0.020	8	+0.015 +0.006	11	5	4
10		10		13		
12	−0.020 −0.025	12	+0.018 +0.007	17		5

Cylindricity of d

L	50 or less	51 to 100	101 or more
Tolerance	0.002	0.003	0.004

Circularity (roundness) of d

d	12 or less
Tolerance	0.002

Catalog No.	d	L	L1	Unit price in yen
M-GPH	8	30 35 40 45	14	380
		50 55 60	19	
	10	30 35 40 45	14	380
		50 55 60	19	
		65 70	24	
		75	24	400
		80	14 24	
		90 100 110 120	14	500
	12	30 35 40 45	14	400
		50 55 60	19	
		65 70 75	24	
		80	19 24	
		85	24	600
		90	19 24	
		100 110 120	19	
		130 140 150	19	700

How to order

Catalog No.	d	×	L	×	L1
M-GPH	10	×	80	×	24

Shipping **In-stock item**

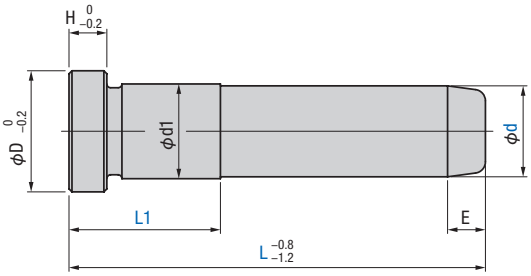
Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Precision Guide Pins Head, Press-Fit Length Designation Type (No Oil Groove)

GUIDE PINS

Additional processing to mold bases → P.42 & 44

Catalog No.	Material	Hardness after heat treatment
M-GPHF	SUJ2	60 to 64HRC (high frequency quenching)



d DIMM	d Limit deviations	d1 DIMM	d1 Limit deviations	D	H	E
12	−0.020	12	+0.018	17	5	5
16	−0.025	16	+0.007	20	6	
20	−0.025	20	+0.021	25		
25	−0.030	25	+0.008	30	8	8
30		30		35		
35	−0.030 −0.035	35	+0.025	40		10
40	−0.030	40	+0.009	45	10	
50	−0.040	50		56	12	12

Cylindricity of d

L	50 or less	51 to 100	101 or more
Tolerance	0.002	0.003	0.004

Circularity (roundness) of d

d	30 or less	31 or more
Tolerance	0.002	0.0025

Catalog No.	d	L In 5mm steps	L1 *1 In 1mm steps	Unit price in yen
M-GPHF	12	30～ 40	10≦L1≦L×0.6	630
		45～ 80		720
		85～120		840
		125～160		990
	16	30～ 40	11≦L1≦L×0.6	780
		45～ 80		900
		85～120		1,040
		125～160		1,200
		165～200		1,430
	20	30～ 50	11≦L1≦L×0.6	910
		55～ 90		1,040
		95～150		1,240
		155～200		1,480
		205～240		2,030
	25	40～ 60	13≦L1≦L×0.7	1,030
		65～110		1,300
		115～160		1,560
		165～200		1,940
		205～260		2,570
		265～300		3,260
		305～350		3,500

*1. If press-fit (L1) section is not required, specify L1＝0.

Catalog No.	d	L In 5mm steps	L1 *1 In 1mm steps	Unit price in yen
M-GPHF	30	50～ 60	13≦L1≦L×0.7	1,280
		65～100		1,510
		105～160		1,740
		165～200		2,200
		205～260		2,800
		265～300		3,500
		305～350		3,700
		355～400		4,100
	35	60～100	13≦L1≦L×0.7	1,530
		105～160		1,850
		165～200		2,300
		205～260		2,900
		265～330		3,800
		335～400		4,500
		405～450		5,000
		455～460		6,000
	40	80～140	15≦L1≦L×0.7	2,500
		145～190		2,800
		195～240		3,500
		245～300		4,500
		305～380		5,800
		385～450		6,500
		455～500		7,200
	50	100～150	17≦L1≦L×0.7	3,800
		155～190		4,400
		195～240		5,500
		245～300		6,200
		305～360		7,000
		365～400		8,500
		405～460		10,000
		465～500		12,000
		505～550		13,500

How to order

Catalog No.	d	×	L	×	L1
M-GPHF	25	×	180	×	79

Shipping

If d12 to 40 and L≦450:
Shipped out in 3 business days (excluding the day of order)

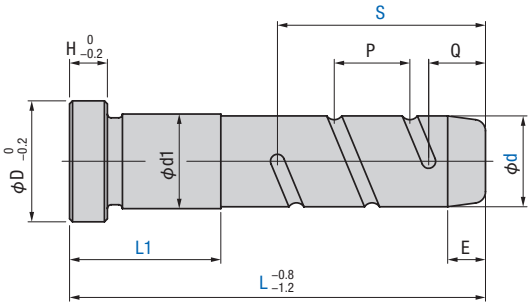
If d50 and L>450:
Shipped out in 5 business days (excluding the day of order)

Precision Guide Pins Head, Press-Fit Length Designation Type (With Spiral Oil Groove)

GUIDE PINS

Additional processing to mold bases → P.44

Catalog No.	Material	Hardness after heat treatment
M-GPHFS	SUJ2	60 to 64HRC (high frequency quenching)



d DIMM	d Limit deviations	d1 DIMM	d1 Limit deviations	D	H	E	Q
12	−0.020	12	+0.018	17	5	5	10
16	−0.025	16	+0.007	20	6		
20	−0.025	20	+0.021	25			
25	−0.030	25	+0.008	30	8	8	13
30		30		35			
35	−0.030 −0.035	35	+0.025 +0.009	40		10	15
40	−0.030	40		45	10		
50	−0.040	50		56	12	12	17

Cylindricity of d

L	50 or less	51 to 100	101 or more
Tolerance	0.002	0.003	0.004

Circularity (roundness) of d

d	30 or less	31 or more
Tolerance	0.002	0.0025

Catalog No.	d	L In 5mm steps	L1 *1 In 1mm steps	S *2 In 1mm steps	Unit price in yen	P
M-GPHFS	12	50～ 70	10≦L1≦(L−30)	25≦S≦L−(L1+5)	1,420	10
		75～ 80	10≦L1≦(L−38)	33≦S≦L−(L1+5)	1,420	15
		85～120			1,540	
		125～160	10≦L1≦(L−45)	40≦S≦L−(L1+5)	1,690	20
		165～180			1,980	
		185～200	10≦L1≦(L−53)	48≦S≦L−(L1+5)	1,980	25
	16	50～ 70	11≦L1≦(L−30)	25≦S≦L−(L1+5)	1,600	10
		75～ 80	11≦L1≦(L−38)	33≦S≦L−(L1+5)	1,600	15
		85～120			1,740	
		125～160	11≦L1≦(L−45)	40≦S≦L−(L1+5)	1,900	20
		165～180			2,130	
		185～200	11≦L1≦(L−53)	48≦S≦L−(L1+5)	2,130	25
		205～250			2,470	
	20	50	11≦L1≦(L−30)	25≦S≦L−(L1+5)	1,610	10
		55～ 70			1,740	
		75～ 90	11≦L1≦(L−38)	33≦S≦L−(L1+5)	1,740	15
		95～120			1,940	
		125～150	11≦L1≦(L−45)	40≦S≦L−(L1+5)	1,940	20
		155～180			2,180	
		185～200	11≦L1≦(L−53)	48≦S≦L−(L1+5)	2,180	25
		205～260			2,730	
		265～300			3,350	

How to order

Catalog No.	d	×	L	×	L1	N	S
M-GPHFS	30	×	300	×	119	N	150

Shipping Orders will be shipped out in 5 business days (excluding the day of order).

Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Catalog No.	d	L In 5mm steps	L1 *1 In 1mm steps	S *2 In 1mm steps	Unit price in yen	P
M-GPHFS	25	50～ 60	13≦L1≦(L−33)	28≦S≦L−(L1+5)	1,730	10
		65～ 70			2,000	
		75～110	13≦L1≦(L−41)	36≦S≦L−(L1+5)	2,000	15
		115～120			2,260	
		125～160	13≦L1≦(L−48)	43≦S≦L−(L1+5)	2,260	20
		165～180			2,640	
		185～200	13≦L1≦(L−56)	51≦S≦L−(L1+5)	2,640	25
		205～260			3,270	
		265～300			3,960	
		305～350	13≦L1≦(L−63)	58≦S≦L−(L1+5)	4,200	30
	30	50～ 60	13≦L1≦(L−33)	28≦S≦L−(L1+5)	1,980	10
		65～ 70			2,210	
		75～100	13≦L1≦(L−41)	36≦S≦L−(L1+5)	2,210	15
		105～120			2,440	
		125～160	13≦L1≦(L−48)	43≦S≦L−(L1+5)	2,440	20
		165～180			2,900	
		185～200	13≦L1≦(L−56)	51≦S≦L−(L1+5)	2,900	25
		205～260			3,500	
		265～300			4,200	
		305～350	13≦L1≦(L−63)	58≦S≦L−(L1+5)	4,400	30
		355～400			4,800	
	35	60～ 70	13≦L1≦(L−35)	30≦S≦L−(L1+5)	2,530	10
		75～100	13≦L1≦(L−43)	38≦S≦L−(L1+5)	2,530	15
		105～120			2,850	
		125～160	13≦L1≦(L−50)	45≦S≦L−(L1+5)	2,850	20
		165～180			3,300	
		185～200	13≦L1≦(L−58)	53≦S≦L−(L1+5)	3,300	25
		205～260			3,900	
		265～300			4,800	
		305～330	13≦L1≦(L−65)	60≦S≦L−(L1+5)	4,800	30
		335～400			5,500	
		405～450			6,000	
		455～460			7,000	
	40	80～120	15≦L1≦(L−43)	38≦S≦L−(L1+5)	3,500	15
		125～140	15≦L1≦(L−50)	45≦S≦L−(L1+5)	3,500	20
		145～180			3,800	
		185～190	15≦L1≦(L−58)	53≦S≦L−(L1+5)	3,800	25
		195～240			4,500	
		245～300			5,500	
		305～380	15≦L1≦(L−65)	60≦S≦L−(L1+5)	6,800	30
		385～450			7,500	
		455～500			8,200	
	50	100～120	17≦L1≦(L−45)	40≦S≦L−(L1+5)	4,800	15
		125～150	17≦L1≦(L−52)	47≦S≦L−(L1+5)	4,800	20
		155～180			5,400	
		185～190	17≦L1≦(L−60)	55≦S≦L−(L1+5)	5,400	25
		195～240			6,500	
		245～300			7,200	
		305～360	17≦L1≦(L−67)	62≦S≦L−(L1+5)	8,000	30
		365～400			9,500	
		405～460			11,000	
		465～500			13,000	
		505～550			14,500	

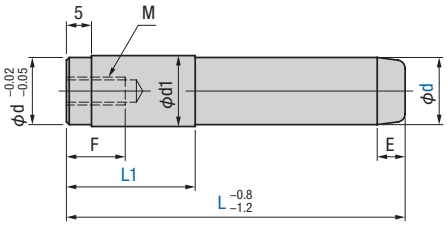
*1. If press-fit (L1) section is not required, specify L1＝0.
*2. The number of turns of spiral grooves is set so that they make at minimum one and a half turns.
When L1＝0 is specified, the range of S dimension that can be specified is the range derived by assigning the minimum value of L1 dimension designation range to L1 portion of each S dimension calculation formula shown above.

Precision Guide Pins Straight, Press-Fit Length Designation Type (No Oil Groove)

GUIDE PINS

Additional processing to mold bases ➡ P.46

Catalog No.	Material	Hardness after heat treatment
M-GPSF	SUJ2	60 to 64HRC (high frequency quenching)



d DIMM	d Limit deviations	d1 DIMM	d1 Limit deviations	M	F	E
25	−0.025	25	+0.017	M12	24	8
30	−0.030	30	+0.008			
35	−0.030 −0.035	35	+0.020 +0.009	M16	32	10
40	−0.030	40				
50	−0.040	50				12

Cylindricity of d

L	60 to 100	101 or more
Tolerance	0.003	0.004

Circularity (roundness) of d

d	30 or less	31 or more
Tolerance	0.002	0.0025

Catalog No.	d	L In 5mm steps	L1 *1 In 1mm steps	Unit price in yen
M-GPSF	25	60～110	10≦L1≦L×0.6	1,300
		115～160		1,500
		165～200		1,800
		205～260		2,300
	30	70～100		1,400
		105～160		1,700
		165～200		2,000
		205～260		2,600
	35	100～140		2,800
		145～190		3,100
		195～240		3,800
		245～300		4,800
	40	100～140		2,800
		145～190		3,100
		195～240		3,800
		245～300		4,800
	50	100～150		4,100
		155～190		4,700
		195～240		5,800
		245～300		6,500
		305～360		7,300
		365～400		8,800

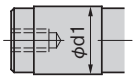
*1. If press-fit (L1) section is not required, specify L1＝0.
If L1＝0 is specified, press-fit lead section will not be machined.

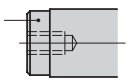
How to order

Catalog No.	d	×	L	×	L1	N +	Optional processing
M-GPSF	40	×	240	×	79		
M-GPSF	25	×	190	×	59	N +	DKC

Shipping
d25～40: shipped out in 3 business days (excluding the day of order).
d50: shipped out in 5 business days (excluding the day of order).

Optional processing

Code	Specification	Unit price in yen d30 or less	Unit price in yen d35 or more
DKC	 Change the limit deviations of press-fit lead section d1 to d1 $^{+0.005}_{0}$	300	500

Code	Specification	Unit price in yen
DN	Eliminate press-fit lead section  Eliminate the processing of press-fit lead section	−300

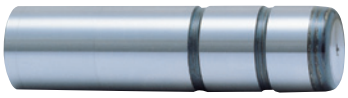
Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

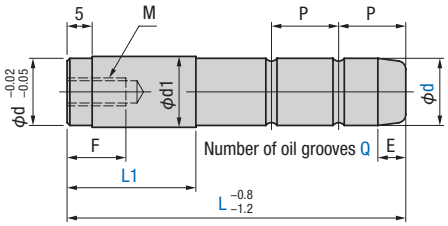
Precision Guide Pins Straight, Press-Fit Length Designation Type (With Oil Groove)

GUIDE PINS

Additional processing to mold bases → P.46

Catalog No.	Material	Hardness after heat treatment
M-GPSFR	SUJ2	60 to 64HRC (high frequency quenching)





d DIMM	d Limit deviations	d1 DIMM	d1 Limit deviations	M	F	E
25	−0.025	25	+0.017	M12	24	8
30	−0.030	30	+0.008			
35	−0.030 −0.035	35	+0.020 +0.009	M16	32	10
40	−0.030	40				
50	−0.040	50				12

Cylindricity of d

L	60 to 100	101 or more
Tolerance	0.003	0.004

Circularity (roundness) of d

d	30 or less	31 or more
Tolerance	0.002	0.0025

Catalog No.	d	L In 5mm steps	L1*1	Q	Unit price in yen	P
M-GPSFR	25	60～ 70	Specify in 1 mm steps See lower right	Specify number of oil grooves See lower right	1,600	15
		75～110				20
		115～160			1,800	
		165～180			2,100	
		185～200				25
		205～260			2,600	
	30	70			1,700	15
		75～100				20
		105～120			2,000	
		125～160				25
		165～200			2,300	
		205～260			2,900	
	35	100～140			3,300	25
		145～180			3,600	
		185～190				30
		195～240			4,300	
		245～300			5,300	

*1. If press-fit (L1) section is not required, specify L1＝0.
If L1＝0 is specified, press-fit lead section will not be machined.

Catalog No.	d	L In 5mm steps	L1*1	Q	Unit price in yen	P
M-GPSFR	40	100～140	Specify in 1 mm steps See below	Specify number of oil grooves See below	3,300	25
		145～180			3,600	
		185～190				30
		195～240			4,300	
		245～300			5,300	
	50	100～120			4,600	25
		125～150				30
		155～180			5,200	
		185～190				35
		195～240			6,300	
		245～300			7,000	
		305～360			7,800	40
		365～400			9,300	

L1 designation range	10≦L1≦L×0.6

d	Designation range of the number of oil grooves Q *2
25	1≦Q≦(L−L1−9)/P
30	1≦Q≦(L−L1−10)/P
35 40 50	1≦Q≦(L−L1−11)/P

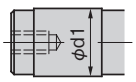
*2. When L1＝0 is specified, the designation range of the number of oil grooves Q is the range derived by assigning 10 to the L1 portion of each formula for calculating the number of oil grooves shown above.

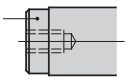
How to order

Catalog No.	d	×	L	×	L1	N	Q	+	Optional processing
M-GPSFR	40	×	290	×	149	N	4		
M-GPSFR	30	×	240	×	119	N	3	+	DKC

Shipping Orders will be shipped out in 5 business days (excluding the day of order).

Optional processing

Code	Specification	Unit price in yen d30 or less	Unit price in yen d35 or more
DKC	 Change the limit deviation tolerance of press-fit lead section d1 to d1 $^{+0.005}_{0}$	300	500

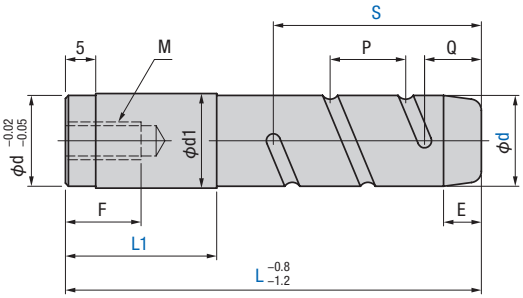
Code	Specification	Unit price in yen
DN	Eliminate press-fit lead section  Eliminate the processing of press-fit lead section	−300

Precision Guide Pins Straight, Press-Fit Length Designation Type (With Spiral Oil Groove)

GUIDE PINS

Additional processing to mold bases → P.46

Catalog No.	Material	Hardness after heat treatment
M-GPSFS	SUJ2	60 to 64HRC (high frequency quenching)



d DIMM	d Limit deviations	d1 DIMM	d1 Limit deviations	M	F	E	Q
25	−0.025 −0.030	25	+0.017 +0.008	M12	24	8	13
30		30					
35	−0.030 −0.035	35	+0.020 +0.009	M16	32	10	15
40	−0.030 −0.040	40					
50		50				12	17

Cylindricity of d

L	60 to 100	101 or more
Tolerance	0.003	0.004

Circularity (roundness) of d

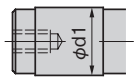
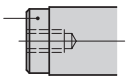
d	30 or less	31 or more
Tolerance	0.002	0.0025

How to order

Catalog No.	d	×	L	×	L1	N	S	+	Optional processing
M-GPSFS	30	×	240	×	119	N	100		
M-GPSFS	50	×	380	×	149	N	200	+	DKC

Shipping Orders will be shipped out in 5 business days (excluding the day of order).

Optional processing

Option code	Specification		Unit price in yen	
			d30 or less	d35 or more
DKC		Change the limit deviations of press-fit lead section d1 to d1 $^{+0.005}_{0}$	300	500
DN	Eliminate press-fit lead section 	Eliminate the processing of press-fit lead section	−300	

Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Catalog No.	d	L In 5mm steps	L1 *1 In 1mm steps	S *2 In 1mm steps	Unit price in yen	P
M-GPSFS	25	60～ 70	10≦L1≦(L−33)	28≦S≦L−(L1+5)	2,000	10
		75～110	10≦L1≦(L−41)	36≦S≦L−(L1+5)		15
		115～120			2,200	
		125～160	10≦L1≦(L−48)	43≦S≦L−(L1+5)		20
		165～180			2,500	
		185～200	10≦L1≦(L−56)	51≦S≦L−(L1+5)		25
		205～260			3,000	
	30	70	10≦L1≦(L−33)	28≦S≦L−(L1+5)	2,100	10
		75～100	10≦L1≦(L−41)	36≦S≦L−(L1+5)		15
		105～120			2,400	
		125～160	10≦L1≦(L−48)	43≦S≦L−(L1+5)		20
		165～180			2,700	
		185～200	10≦L1≦(L−56)	51≦S≦L−(L1+5)		25
		205～260			3,300	
	35	100～120	10≦L1≦(L−43)	38≦S≦L−(L1+5)	3,800	15
		125～140	10≦L1≦(L−50)	45≦S≦L−(L1+5)		20
		145～180			4,100	
		185～190	10≦L1≦(L−58)	53≦S≦L−(L1+5)		25
		195～240			4,800	
		245～300			5,800	
	40	100～120	10≦L1≦(L−43)	38≦S≦L−(L1+5)	3,800	15
		125～140	10≦L1≦(L−50)	45≦S≦L−(L1+5)		20
		145～180			4,100	
		185～190	10≦L1≦(L−58)	53≦S≦L−(L1+5)		25
		195～240			4,800	
		245～300			5,800	
	50	100～120	10≦L1≦(L−45)	40≦S≦L−(L1+5)	5,100	15
		125～150	10≦L1≦(L−52)	47≦S≦L−(L1+5)		20
		155～180			5,700	
		185～190	10≦L1≦(L−60)	55≦S≦L−(L1+5)		25
		195～240			6,800	
		245～300			7,500	
		305～360	10≦L1≦(L−67)	62≦S≦L−(L1+5)	8,300	30
		365～400			9,800	

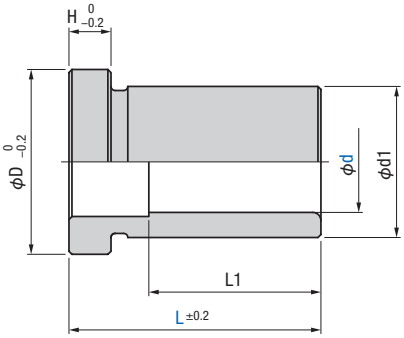
*1. If press-fit (L1) section is not required, specify L1＝0.
*2. The number of turns of spiral grooves is set so that they make at minimum one and a half turns.
When L1＝0 is specified, the range of S dimension that can be specified is the range derived by assigning the minimum value of L1 dimension designation range to L1 portion of each S dimension calculation formula shown above.

Guide Bushings No Oil Groove

GUIDE BUSHES

Additional processing to mold bases → P.44

Catalog No.	Material	Hardness after heat treatment
M-GBA	SUJ2	58 to 62HRC



Cylindricity of d

L	30 or less	31 to 50	51 or more
Tolerance	0.003	0.0035	0.004

Circularity (roundness) of d

d	30 or less	31 to 40	41 or more
Tolerance	0.0025	0.003	0.0035

Catalog No.	d	Unit price in yen L 19	24	29	34	39
M-GBA	12	400	430	460	550	640
	16	430	460	500	530	620
	20	480	510	560	610	670
	25		630	680	730	800
	30		800	800	870	960
	35			1,110	1,110	1,110
	40			1,450		1,450
	50					
	60					
	70					

d DIMM	d Limit deviations	d1 DIMM	d1 Limit deviations	D	H	L1
12	+0.017 +0.006	18	+0.018 +0.007	22	5	L≦29→L1=L L≧34→L1=29
16		25	+0.021 +0.008	30	6	L≦39→L1=L L≧44→L1=35
20	+0.020 +0.007	30		35	8	L≦49→L1=L L≧54→L1=40
25		35	+0.025 +0.009	40		L≦59→L1=L L≧64→L1=50
30		42		47	10	L≦69→L1=L L≧74→L1=60
35	+0.025 +0.009	48		54		L≦79→L1=L L≧89→L1=70
40		55	+0.030 +0.011	61		L≦89→L1=L L≧99→L1=80
50		70		76	12	L≦99→L1=L L≧109→L1=100
60		80		86	15	L≦129→L1=L L≧149→L1=140
70		90		96		L≦129→L1=L L≧149→L1=140

d	Unit price in yen L 44	49	54	59	64	69	74	79	89	99	109	119	129	139	149	159	179	199
12		840		1,110														
16	730	730	790	790		910		1,210										
20	770	770	860	860	960	960	1,220	1,220	1,360	1,470								
25	910	910	1,040	1,040	1,180	1,180	1,310	1,310	1,540	1,660	2,000	2,240						
30	1,120	1,120	1,280	1,280	1,450	1,450	1,640	1,640	1,770	1,920	2,140	2,420	2,760	2,940	3,250			
35	1,250	1,250	1,440	1,440		1,670		1,910	2,090	2,280	2,450	2,580	2,890	3,230	3,550			
40		1,530		1,730		1,990		2,290	2,520	2,760	3,010	3,250	3,550	3,840	4,030	4,220		
50		3,420		4,100		4,780		5,470	6,150	6,840	7,520	8,200	8,890	9,570	10,260	10,940		
60										8,110	8,940	9,770	10,600		12,250	13,080	14,740	16,400
70										9,330	10,280	11,230	12,180		14,070	15,020	16,910	18,880

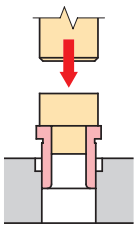
How to order

Catalog No.	d	×	L
M-GBA	25	×	24

Shipping **In-stock item**

How to install guide bushings

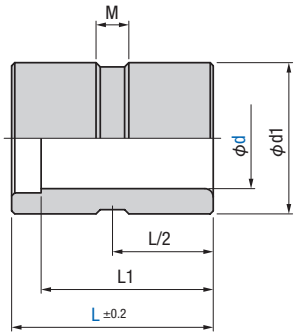
When installing guide bushings, apply some press-fitting oil in the hole and the surface of the guide bushing, and then install it straightly by applying even force using a tool shown on right or pad. Uneven force or tilting may lead to insufficient precision or damage.



Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Additional processing to mold bases → P.44

Catalog No.	Material	Hardness after heat treatment
M-GBB	SUJ2	58 to 62HRC



Cylindricity of d

L	30 or less	31 to 50	51 or more
Tolerance	0.003	0.0035	0.004

Circularity (roundness) of d

d	30 or less	31 to 40	41 or more
Tolerance	0.0025	0.003	0.0035

d		d1		M	L1
DIMM	Limit deviations	DIMM	Limit deviations		
12	+0.017 +0.006	18	+0.018 +0.007	4	L≦29→L1=L L≧34→L1=29
16		25	+0.021 +0.008	L≦19 → M=4 L≧24 → M=6	L≦49→L1=L
20	+0.020 +0.007	30			L≦69→L1=L
25		35	+0.025 +0.009	8 (For M-GBB25×14, M=6)	L≦79→L1=L
30		42			L≦99→L1=L
35	+0.025 +0.009	48			L≦99→L1=L
40		55	+0.030 +0.011		L≦99→L1=L
50		70		10	L≦99→L1=L
60		80			L≦129→L1=L
70		90			L≦129→L1=L

Catalog No.	d	Unit price in yen														
		L														
		9	14	19	24	29	34	39	44	49	59	69	79	89	99	129
M-GBB	12	290	340	360	400	440	550									
	16		340	360	400	440	550	580	700	700						
	20		360	380	450	480	550	620	730	730	850	970				
	25		520	530	540	580	640	710	810	810	930	1,050	1,170			
	30			690	700	720	780	860	1,010	1,010	1,140	1,370	1,550	1,700	1,850	
	35			790	800	810	890	980		1,130	1,320	1,510	1,730	1,880	2,030	
	40				1,060	1,080	1,100	1,140		1,310	1,490	1,700	1,890	2,080	2,250	
	50					3,100		3,100		3,210	3,560	3,910	4,250	4,600	4,950	
	60										4,150	4,490				6,510
	70											4,820				7,130

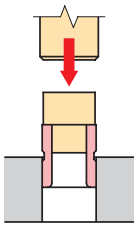
How to order

Catalog No.	d	×	L
M-GBB	16	×	19

Shipping **In-stock items**

How to install guide bushings

When installing guide bushings, apply some press-fitting oil in the hole and the surface of the guide bushing, and then install it straightly by applying even force using a tool shown on right or pad. Uneven force or tilting may lead to insufficient precision or damage.

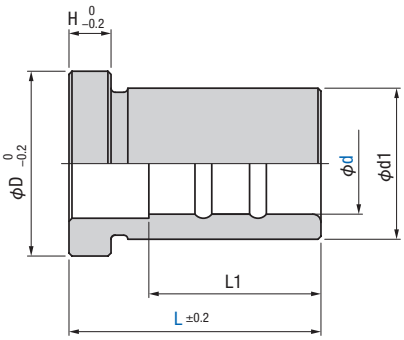


Precision Guide Bushings With Oil Groove

GUIDE BUSHES

Additional processing to mold bases ➡ P.42

Catalog No.	Material	Hardness after heat treatment
M-GBHF	SUJ2	58 to 62HRC



Cylindricity of d

L	30 or less	31 to 50	51 or more
Tolerance	0.003	0.0035	0.004

Circularity (roundness) of d

d	25 or less
Tolerance	0.0025

d		d1		D	H	L1
DIMM	Limit deviations	DIMM	Limit deviations			
8	0 −0.005	12	+0.010 +0.005	14	5	L=14→L1=L L≧19→L1=15
10		14		16		L≦19→L1=L L≧24→L1=20
12	−0.005 −0.010	18		22		L≦24→L1=L L≧29→L1=25
16		25		30	6	L≦34→L1=L L≧39→L1=30
20	−0.010 −0.015	30		35	8	L≦39→L1=L L≧49→L1=40
25		35		40		L≦49→L1=L L≧59→L1=50

Catalog No.	d	Unit price in yen										
		L										
		14	19	24	29	34	39	44	49	59	69	79
M-GBHF	8	740	740	830								
	10	740	740	830	830	980	980					
	12	780	780	780	880	880	880	1,030	1,030			
	16		800	800	800	900	900		1,050			
	20		950	950	950	950	1,100		1,100	1,250	1,250	
	25			1,200	1,200	1,200	1,200		1,350	1,350	1,600	1,600

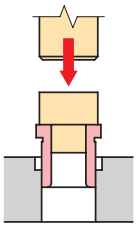
How to order

Catalog No.	d	×	L
M-GBHF	16	×	39

Shipping **In-stock item**

How to install guide bushings

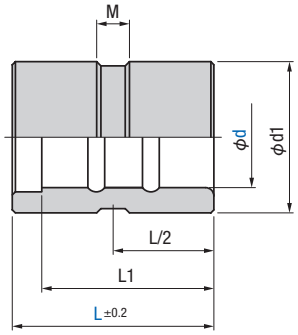
When installing guide bushings, apply some press-fitting oil in the hole and the surface of the guide bushing, and then install it straightly by applying even force using a tool shown on right or pad. Uneven force or tilting may lead to insufficient precision or damage.



Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Additional processing to mold bases → P.42

Catalog No.	Material	Hardness after heat treatment
M-GBSF	SUJ2	58 to 62HRC



Cylindricity of d

L	30 or less	31 to 50
Tolerance	0.003	0.0035

Circularity (roundness) of d

d	25 or less
Tolerance	0.0025

d		d1		M	L1
DIMM	Limit deviations	DIMM	Limit deviations		
8	0 −0.005	12	+0.010 +0.005	3	L≦14→L1=L L≧19→L1=15
10		14			L≦19→L1=L L≧24→L1=20
12	−0.005 −0.010	18		4	L≦24→L1=L L≧29→L1=25
16		25		L≦19→M=4	L≦34→L1=L L≧39→L1=30
20	−0.010 −0.015	30		L≧24→M=6	L≦39→L1=L L≧49→L1=40
25		35		8	L≦49→L1=L

Catalog No.	d	Unit price in yen							
		L							
		9	14	19	24	29	34	39	49
M-GBSF	8	650	650	650	700				
	10	650	650	650	700	700	800	800	
	12	680	680	680	730	730	830	830	
	16		700	700	700	750	750	850	
	20		800	800	800	800	950	950	950
	25			950	950	950	950	1,150	1,150

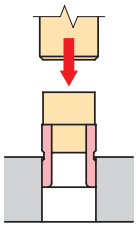
How to order

Catalog No.	d	×	L
M-GBSF	20	×	34

Shipping **In-stock item**

How to install guide bushings

When installing guide bushings, apply some press-fitting oil in the hole and the surface of the guide bushing, and then install it straightly by applying even force using a tool shown on right or pad. Uneven force or tilting may lead to insufficient precision or damage.

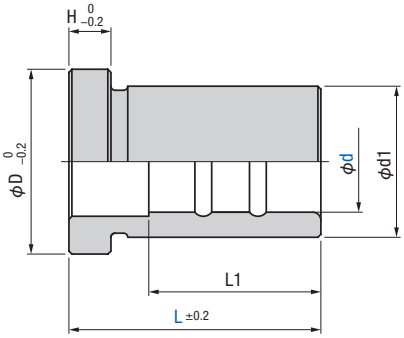


Guide Bushings With Oil Groove

GUIDE BUSHES

Additional processing to mold bases → P.44

Catalog No.	Material	Hardness after heat treatment
M-GBGF	SUJ2	58 to 62HRC



Cylindricity of d

L	30 or less	31 to 50	51 or more
Tolerance	0.003	0.0035	0.004

Circularity (roundness) of d

d	30 or less	31 to 40	41 or more
Tolerance	0.0025	0.003	0.0035

Catalog No.	d	Unit price in yen L 14	19	24
M-GBGF	8	720	720	770
	10	460	460	560
	12	460	460	460
	16		480	480
	20		550	550
	25			680
	30			
	35			
	40			
	50			

d DIMM	d Limit deviations	d1 DIMM	d1 Limit deviations	D	H	L1
8	+0.014 +0.005	12	+0.018 +0.007	14	5	L=14→L1=L L≧19→L1=15
10		14		16		L≦19→L1=L L≧24→L1=20
12	+0.017 +0.006	18		22		L≦24→L1=L L≧29→L1=25
16		25	+0.021 +0.008	30	6	L≦34→L1=L L≧39→L1=30
20	+0.020 +0.007	30		35	8	L≦39→L1=L L≧49→L1=40
25		35	+0.025 +0.009	40		L≦49→L1=L L≧59→L1=50
30		42		47	10	L≦59→L1=L L≧69→L1=60
35	+0.025 +0.009	48		54		L≦69→L1=L L≧79→L1=70
40		55	+0.030 +0.011	61		L≦79→L1=L L≧89→L1=80
50		70		76	12	L≦99→L1=L L≧109→L1=100

d	Unit price in yen L 29	34	39	44	49	59	69	79	89	99	109	119	129	139	149	159
8																
10	560	590	590													
12	590	590	590	650	650	900										
16	480	590	590		700	950	950	1,300								
20	550	550	720		720	1,010	1,010	1,010	1,500	1,500						
25	680	680	680		940	940	1,500	1,500	1,500	1,500	2,110	2,110				
30	1,250	1,250	1,250		1,510	1,510	1,820	1,820	1,820	1,820	2,630	2,630	2,630			
35			1,370		1,370	1,760	1,760	1,890	1,890	3,330	3,330	3,330	3,330	3,700	3,700	
40			1,400		1,830	1,830	2,780	2,780	2,780	2,780	3,790	3,790	3,790	4,500	4,500	
50						4,300	4,300	4,300	4,300	6,370	6,370	6,370	8,720		8,720	11,000

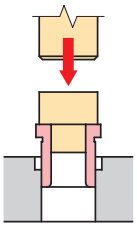
How to order

Catalog No.	d	×	L
M-GBGF	25	×	49

Shipping **In-stock item**

How to install guide bushings

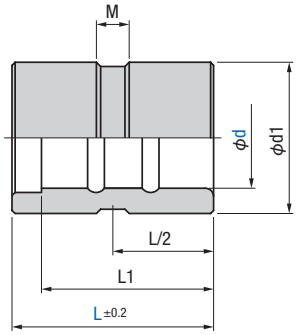
When installing guide bushings, apply some press-fitting oil in the hole and the surface of the guide bushing, and then install it straightly by applying even force using a tool shown on right or pad. Uneven force or tilting may lead to insufficient precision or damage.



Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Additional processing to mold bases → P.44

Catalog No.	Material	Hardness after heat treatment
M-GBRF	SUJ2	58 to 62HRC



Cylindricity of d

L	30 or less	31 to 50	51 or more
Tolerance	0.003	0.0035	0.004

Circularity (roundness) of d

d	30 or less	31 to 40	41 or more
Tolerance	0.0025	0.003	0.0035

d		d1		M	L1
DIMM	Limit deviations	DIMM	Limit deviations		
8	+0.014	12	+0.018	3	L≦14→L1=L L≧19→L1=15
10	+0.005	14	+0.007		L≦19→L1=L L≧24→L1=20
12	+0.017	18		4	L≦24→L1=L L≧29→L1=25
16	+0.006	25	+0.021	L≦19→M=4	L≦34→L1=L L≧39→L1=30
20	+0.020	30	+0.008	L≧24→M=6	L≦39→L1=L L=49→L1=40
25	+0.007	35	+0.025	8	L1=L
30		42	+0.009		
35	+0.025	48			
40	+0.009	55	+0.030		
50		70	+0.011	10	

Catalog No.	d	Unit price in yen												
		L												
		9	14	19	24	29	34	39	49	59	69	79	89	99
M-GBRF	8	420	420	420	500									
	10	350	350	350	420	420	480	480						
	12	350	350	350	420	420	480	480						
	16		350	350	350	440	440	560						
	20		430	430	430	430	580	580	580					
	25			550	550	550	550	790	790					
	30				1,170	1,170	1,170	1,170	1,420	1,420				
	35					1,190	1,190	1,190	1,370	1,370	1,670			
	40					1,210	1,210	1,210	1,680	1,680	2,210	2,210		
	50							1,900	2,820	2,820	4,080	4,080	4,080	5,300

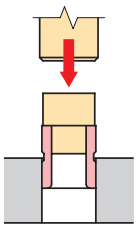
How to order

Catalog No.	d	×	L
M-GBRF	16	×	39

Shipping **In-stock item**

How to install guide bushings

When installing guide bushings, apply some press-fitting oil in the hole and the surface of the guide bushing, and then install it straightly by applying even force using a tool shown on right or pad. Uneven force or tilting may lead to insufficient precision or damage.

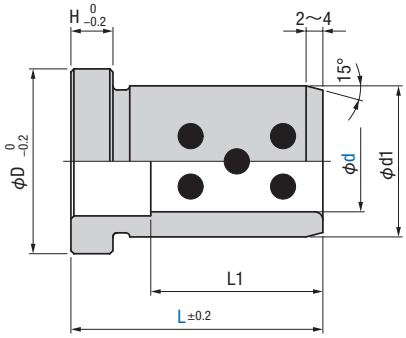


Guide Bushings Self lubricating Copper Alloy Type

GUIDE BUSHES

Additional processing to mold bases ➡ P.44

Catalog No.	Material
M-GBGDF	Copper alloy (with solid lubricant)



d		d1		D	H	L1
DIMM	Limit deviations	DIMM	Limit deviations			
16	+0.017 +0.006	25	+0.021 +0.008	30	6	L≦29→L1=L L≧34→L1=30
20	+0.020 +0.007	30		35	8	L≦39→L1=L L≧49→L1=40
25		35	+0.025 +0.009	40		L≦49→L1=L L≧59→L1=50
30		42		47	10	L≦59→L1=L L≧69→L1=60
35	+0.025 +0.009	48		54		L≦69→L1=L L≧79→L1=70
40		55	+0.030 +0.011	61		L≦79→L1=L L≧89→L1=80
50		70		76	12	L≦89→L1=L L≧99→L1=90

Catalog No.	d	Unit price in yen												
		L												
		19	24	29	34	39	49	59	69	79	89	99	109	119
M-GBGDF	16	2,100	2,100	2,100	2,550	2,550	2,800							
	20	2,350	2,350	2,350	2,350	2,850	2,850	3,400						
	25		2,750	2,750	2,750	2,750	3,600	3,600	4,300					
	30			3,100	3,100	3,100	4,000	4,000	5,000	5,000				
	35					4,300	4,300	5,300	5,300	6,200	6,200	7,700		
	40					4,500	5,400	5,400	7,200	7,200	7,200	7,200	9,200	
	50						7,900	7,900	7,900	7,900	10,400	10,400	12,400	12,400

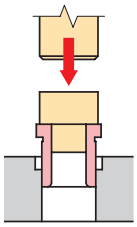
How to order

Catalog No.	d	×	L
M-GBGDF	30	×	59

Shipping Orders will be shipped out in 3 business days. (excluding the day of order)

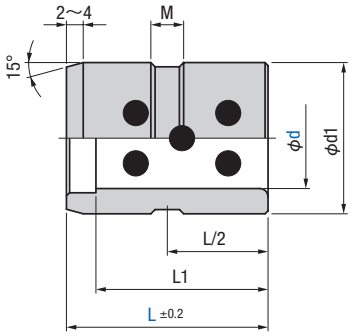
How to install guide bushings

When installing guide bushings, apply some press-fitting oil in the hole and the surface of the guide bushing, and then install it straightly by applying even force using a tool shown on right or pad. Uneven force or tilting may lead to insufficient precision or damage.



Additional processing to mold bases → P.44

Catalog No.	Material
M-GBRDF	Copper alloy (with solid lubricant)



d		d1		M	L1
DIMM	Limit deviations	DIMM	Limit deviations		
16	+0.017 +0.006	25	+0.021 +0.008	L≦19 → M=4 L≧24 → M=6	L≦34→L1=L L=39→L1=35
20	+0.020 +0.007	30			L≦39→L1=L L=49→L1=40
25		35	+0.025 +0.009	8	L≦49→L1=L L=59→L1=50
30		42			L≦59→L1=L L≧69→L1=60
35	+0.025 +0.009	48			L≦69→L1=L L=79→L1=70
40		55	+0.030 +0.011	10	L≦79→L1=L L=89→L1=80
50		70			L≦89→L1=L L=99→L1=90

Catalog No.	d	Unit price in yen											
		L											
		14	19	24	29	34	39	49	59	69	79	89	99
M-GBRDF	16	1,500	1,500	1,500	1,800	1,800	2,000						
	20	1,700	1,700	1,700	1,700	2,000	2,000	2,300					
	25			1,900	1,900	2,300	2,300	2,300	3,200				
	30				2,600	3,200	3,200	3,200	4,800	4,800	4,800		
	35				3,000	3,000	3,000	3,600	3,600	5,500	5,500		
	40						3,200	4,400	4,400	5,700	5,700	7,200	
	50							5,500	5,500	7,000	7,000	9,000	9,000

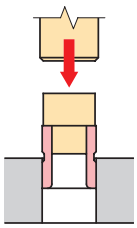
How to order

Catalog No.	d	×	L
M-GBRDF	50	×	69

Shipping Orders will be shipped out in 3 business days. (excluding the day of order)

How to install guide bushings

When installing guide bushings, apply some press-fitting oil in the hole and the surface of the guide bushing, and then install it straightly by applying even force using a tool shown on right or pad. Uneven force or tilting may lead to insufficient precision or damage.



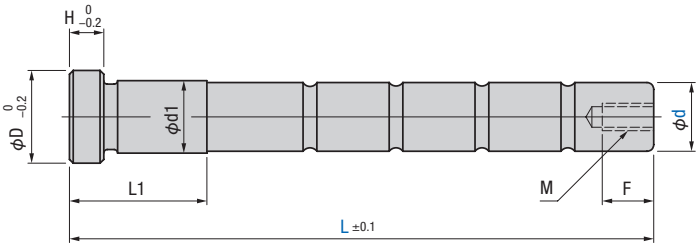
Support Pins Head Type (With Oil Groove)

SUPPORT PINS

Additional processing to mold bases → P.58

Catalog No.	Material	Hardness after heat treatment
M-SPN	SUJ2	60 to 64HRC (high frequency quenching)

d DIMM	d Limit deviations	d1 DIMM	d1 Limit deviations	D	H	L1	M	F
12	−0.016 −0.027	12	+0.018 +0.007	17	6	24	M6	12
16		16		20	8		M10	20
20	−0.020 −0.033	20	+0.021 +0.008	25	10	29	M12	25
25		25		30	12	34	M14	30
30		30		35	14	44	M16	35
35	−0.025 −0.041	35	+0.025 +0.009	40	16	49		
40		40		45	18	59		



Cylindricity of d

L	51 to 100	101 or more
Tolerance	0.003	0.004

Circularity (roundness) of d

d	30 or less	31 or more
Tolerance	0.002	0.0025

Catalog No.	d	Unit price in yen L 60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230
M-SPN	12	420	440	450	490	520	540	580			660								
	16			450	480	520	580	630	680	740	800	900	950	990	1,040	1,100	1,150	1,200	
	20				510	630	660	700	790	840	920	1,000	1,060	1,100	1,180	1,290	1,450	1,600	1,690
	25					840	910	950	1,000	1,050	1,100	1,160	1,210	1,280	1,360	1,430	1,510	1,570	1,690
	30								1,170	1,290	1,410	1,540	1,660	1,710	1,820	2,020	2,160	2,280	2,400
	35											1,980	2,210	2,450	2,680	2,920	3,150	3,370	3,600
	40															3,630	3,870	4,100	4,350

d	Unit price in yen L 240	250	260	270	280	290	300	310	320	330	340	350	360	380	400	420	440	460
20	1,780	1,930	2,090	2,250	2,400													
25	1,840	1,970	2,400	2,580	2,790	2,990	3,190		3,590									
30	2,510	2,640	2,760	2,990	3,230	3,470	3,700	4,150	4,370	4,580	4,800	5,020	5,250	5,500	5,750			
35	3,830	4,070	4,300	4,580	4,770	4,990	5,240	5,480	5,710	5,940	6,170	6,400	6,620	7,080	7,540	8,000	8,500	9,000
40	4,590	4,830	5,070	5,380	5,560	5,790	6,030	7,410	7,690	7,960	8,240	8,390	8,630	9,110	9,600	10,100	10,600	11,100

How to order

Catalog No.	d	×	L	N +	Optional processing
M-SPN	20	×	200		
M-SPN	30	×	260	N +	WKC

Shipping **In-stock item**

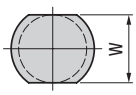
Orders requiring optional processing will be shipped out in 3 business days. (excluding the day of order)

Check

Support pin deflection calculation

→ Technical reference in P.445

Optional processing

Option code	Specification	Unit price in yen
WKC	 d: 12, 16, 20, 25, 30, 35, 40 / W: 13, 17, 22, 27, 30, 36, 41 — Adds two parallel flats on the head as shown on the left.	800

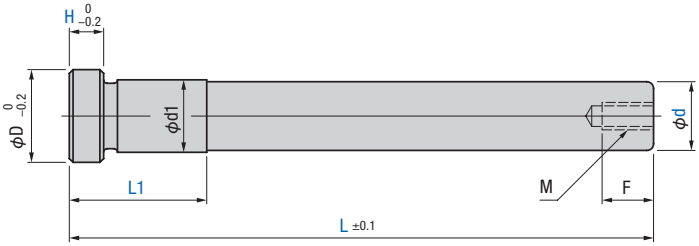
Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Precision Support Pins Head, Press-Fit Length Designation Type (No Oil Groove)

SUPPORT PINS

Additional processing to mold bases → P.58

Catalog No.	Material	Hardness after heat treatment
M-SPHF	SUJ2	60 to 64HRC (high frequency quenching)



d DIMM	d Limit deviations	d1 DIMM	d1 Limit deviations	D	M	F
12	−0.020 −0.025	12	+0.018 +0.007	17	M6	12
16		16		20	M10	20
20	−0.025 −0.030	20	+0.021 +0.008	25	M12	25
25		25		30	M14	30
30		30		35	M16	35
35	−0.030 −0.035	35	+0.025 +0.009	40		
40	−0.030 −0.040	40		45		

Cylindricity of d

L	50 to 100	101 or more
Tolerance	0.003	0.004

Circularity (roundness) of d

d	30 or less	31 or more
Tolerance	0.002	0.0025

Catalog No.	d	L In 5 mm steps	L1 *1 In 1 mm steps	H (Thickness option) DIMM	H (Thickness option) Code	Unit price in yen
M-SPHF	12	50～ 80	11≦L1≦L×0.4	6	A	920
		85～120				1,040
		125～160		5	B	1,190
		165～200				1,480
	16	50～ 80	13≦L1≦L×0.4	8	A	1,100
		85～120				1,240
		125～160		6	B	1,400
		165～200				1,630
		205～250				1,970
	20	80～ 90	15≦L1≦L×0.4	10	A	1,240
		95～150				1,440
		155～200		6	B	1,680
		205～260				2,230
		265～300				2,850
	25	80～110	17≦L1≦L×0.4	12	A	1,500
		115～160				1,760
		165～200		8	B	2,140
		205～260				2,770
		265～300				3,460
		305～350				3,700

Catalog No.	d	L In 5 mm steps	L1 *1 In 1 mm steps	H (Thickness option) DIMM	H (Thickness option) Code	Unit price in yen
M-SPHF	30	100	19≦L1≦L×0.4	14	A	1,710
		105～160				1,940
		165～200		8	B	2,400
		205～260				3,000
		265～300				3,700
		305～350				3,900
		355～400				4,300
	35	130～160	21≦L1≦L×0.4	16	A	2,250
		165～200				2,700
		205～260		8	B	3,300
		265～330				4,200
		335～400				4,900
		405～450				5,400
		455～460				6,400
	40	150～190	23≦L1≦L×0.4	18	A	3,200
		195～240				3,900
		245～300		10	B	4,900
		305～380				6,200
		385～450				6,900
		455～500				7,600

*1. If press-fit (L1) section is not reuired, specify L1＝0.

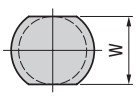
How to order

Catalog No.	d	×	L	×	L1	H	N +	Optional processing
M-SPHF	25	×	215	×	49	A		
M-SPHF	20	×	180	×	39	B	N +	WKC

Shipping
L ≦ 450 shipped in 3 business days (excluding the day of order).
L > 450 shipped in 5 business days (excluding the day of order).

Check
Support pin deflection calculation
→ Technical reference in P.445

Optional processing

Option code	Specification	Unit price in yen
WKC		800

d	12	16	20	25	30	35	40
W	13	17	22	27	30	36	41

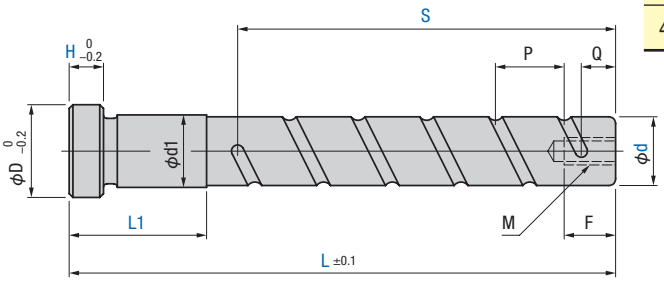
Adds two parallel flats on the head as shown on the left.

Precision Support Pins Head, Press-Fit Length Designation Type (With Spiral Oil Groove)

SUPPORT PINS

Additional processing to mold bases → P.58

Catalog No.	Material	Hardness after heat treatment
M-SPHFS	SUJ2	60 to 64HRC (high frequency quenching)



d DIMM	d Limit deviations	d1 DIMM	d1 Limit deviations	D	M	F	Q
12	−0.020 −0.025	12	+0.018 +0.007	17	M6	12	10
16		16		20	M10	20	
20	−0.025 −0.030	20	+0.021 +0.008	25	M12	25	
25		25		30	M14	30	13
30		30		35	M16	35	
35	−0.030 −0.035	35	+0.025 +0.009	40			15
40	−0.030 −0.040	40		45			

Cylindricity of d

L	50 to 100	101 or more
Tolerance	0.003	0.004

Circularity (roundness) of d

d	30 or less	31 or more
Tolerance	0.002	0.0025

Catalog No.	d	L In 5 mm steps	L1 *1 In 1 mm steps	S *2 In 1 mm steps	H (Thickness option) DIMM	Code	Unit price in yen	P
M-SPHFS	12	50～ 70	11≦L1≦(L−30)	25≦S≦L−(L1+5)	6 → 5 →	A B	1,620	10
		75～ 80	11≦L1≦(L−38)	33≦S≦L−(L1+5)			1,620	15
		85～120					1,740	
		125～160	11≦L1≦(L−45)	40≦S≦L−(L1+5)			1,890	20
		165～180					2,180	
		185～200	11≦L1≦(L−53)	48≦S≦L−(L1+5)			2,180	25
	16	50～ 70	13≦L1≦(L−30)	25≦S≦L−(L1+5)	8 → 6 →	A B	1,800	10
		75～ 80	13≦L1≦(L−38)	33≦S≦L−(L1+5)			1,800	15
		85～120					1,940	
		125～160	13≦L1≦(L−45)	40≦S≦L−(L1+5)			2,100	20
		165～180					2,330	
		185～200	13≦L1≦(L−53)	48≦S≦L−(L1+5)			2,330	25
		205～250					2,670	
	20	80～ 90	15≦L1≦(L−38)	33≦S≦L−(L1+5)	10 → 6 →	A B	1,940	15
		95～120					2,140	
		125～150	15≦L1≦(L−45)	40≦S≦L−(L1+5)			2,140	20
		155～180					2,380	
		185～200	15≦L1≦(L−53)	48≦S≦L−(L1+5)			2,380	25
		205～260					2,930	
		265～300					3,550	
	25	80～110	17≦L1≦(L−41)	36≦S≦L−(L1+5)	12 → 8 →	A B	2,200	15
		115～120					2,460	
		125～160	17≦L1≦(L−48)	43≦S≦L−(L1+5)			2,460	20
		165～180					2,840	
		185～200	17≦L1≦(L−56)	51≦S≦L−(L1+5)			2,840	25
		205～260					3,470	
		265～300					4,160	
		305～350	17≦L1≦(L−63)	58≦S≦L−(L1+5)			4,400	30

How to order

Catalog No.	d	×	L	×	L1	H	N	S	+	Optional processing
M-SPHFS	25	×	180	×	59	B	N	100		
M-SPHFS	35	×	400	×	79	A	N	250	+	WKC

Shipping **Orders will be shipped out in 5 business days (excluding the day of order).**

Check

Support pin deflection calculation

→ Technical reference in P.445

Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

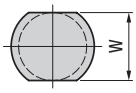
Precision Support Pins & Support Pin Collars

SUPPORT PIN COLLARS

Catalog No.	d	L In 5 mm steps	L1 *1 In 1 mm steps	S *2 In 1 mm steps	H (Thickness option) DIMM	H (Thickness option) Code	Unit price in yen	P
M-SPHFS	30	100	19≦L1≦(L−41)	36≦S≦L−(L1+5)	14 → 8	A → B	2,410	15
		105～120					2,640	
		125～160	19≦L1≦(L−48)	43≦S≦L−(L1+5)			2,640	20
		165～180					3,100	
		185～200	19≦L1≦(L−56)	51≦S≦L−(L1+5)			3,100	25
		205～260					3,700	
		265～300					4,400	
		305～350	19≦L1≦(L−63)	58≦S≦L−(L1+5)			4,600	30
		355～400					5,000	
	35	130～160	21≦L1≦(L−50)	45≦S≦L−(L1+5)	16 → 8	A → B	3,250	20
		165～180					3,700	
		185～200	21≦L1≦(L−58)	53≦S≦L−(L1+5)			3,700	25
		205～260					4,300	
		265～300					5,200	
		305～330	21≦L1≦(L−65)	60≦S≦L−(L1+5)			5,200	30
		335～400					5,900	
		405～450					6,400	
		455～460					7,400	
	40	150～180	23≦L1≦(L−50)	45≦S≦L−(L1+5)	18 → 10	A → B	4,200	20
		185～190	23≦L1≦(L−58)	53≦S≦L−(L1+5)			4,200	25
		195～240					4,900	
		245～300					5,900	
		305～380	23≦L1≦(L−65)	60≦S≦L−(L1+5)			7,200	30
		385～450					7,900	
		455～500					8,600	

*1. If press-fit (L1) section is not required, specify L1＝0.
*2. The number of turns of spiral grooves is set so that they make at minimum one and a half turns.
When L1＝0 is specified, the range of S dimension that can be specified is the range derived by assigning the minimum value of L1 dimension designation range to L1 portion of each S dimension calculation formula shown above.

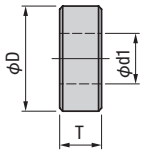
Optional Processing

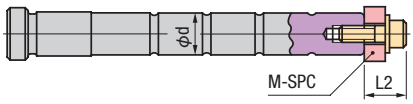
Option code	Specification	Unit price in yen
WKC		800

d	12	16	20	25	30	35	40
W	13	17	22	27	30	36	41

Adds two parallel flats on the head as shown on the left.

Catalog No.	Material
M-SPC	S45C

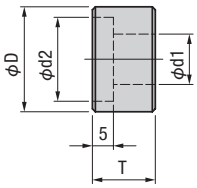


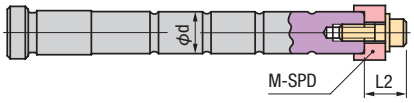


Catalog No.	Applicable support pin d	Unit price in yen	T	D	d1	L2
M-SPC	12	140	5	16	6.1	12.5
	16	150	8	20	10.1	20.5
	20	180	10	26	12.1	25
	25	230	12	31	14.1	29.5
	30	280	14	38	16.1	34
	35	340	16	43		36
	40	400	18	48		38

Hexagon socket head cap screws with spring washer

Catalog No.	Material	Application
M-SPD	S45C	For setting 5 mm





Catalog No.	Applicable support pin d	Unit price in yen	T	D	d1	d2	L2
M-SPD	12	190	10	16	6.5	12.1	12.5
	16	200	13	20	10.5	16.1	20.5
	20	230	15	26	12.5	20.1	25
	25	280	17	31	14.5	25.1	29.5
	30	330	19	38	16.5	30.1	34
	35	390	21	43		35.1	36
	40	450	23	48		40.1	38

Hexagon socket head cap screws with spring washer

How to order

Catalog No.	Applicable support pin d
M-SPC	20
M-SPD	30

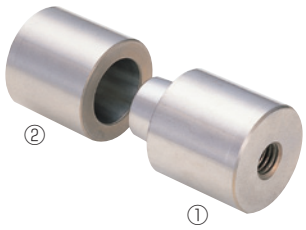
Shipping In-stock item

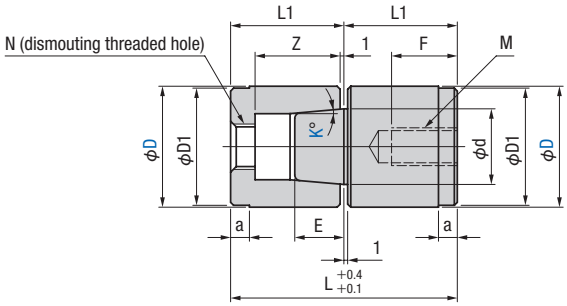
Tapered Lock Pins Bolt PL Installation Type

TAPERED LOCK PINS

Additional processing to mold bases ➡ P.98

Catalog No. Set	Pin only	Bushing only	D Limit deviations	Material	Hardness after heat treatment	Concentricity of tapered section to the diameter of pin or bushing
M-TLCS	M-TLCP	M-TLCB	Dk6	SKS3	58 to 62HRC	0.005 or less
M-TLDS	M-TLDP	M-TLDB	D $^{+0.005}_{0}$			0.003 or less





Precision M-TLC□ D DIMM	Limit deviations	Super Precision M-TLD□ D DIMM	Limit deviations	D1 DIMM	Limit deviations	d	Z	E	M	F	N	a	L1	L
16	+0.012 +0.001	16	+0.005 0	16	−0.01 −0.03	10	10.3	5	M5	10	M6	3	15	30
20	+0.015 +0.002	20		20		13	14	6	M6	12	M8	4	20	40
25		25		25		16	19	9	M8	16	M10		25	50
30		30		30		20	24	12	M10	20	M12		30	60

Precision type Catalog No.	D	K	Unit price in yen M-TLCS ①+②	M-TLCP ①	M-TLCB ②
M-TLCS (①+② set) M-TLCP (① pin) M-TLCB (② bushing)	16	1 3 5	4,700	2,000	2,700
	20		5,000	2,100	2,900
	25		5,200	2,200	3,000
	30		5,900	2,600	3,300

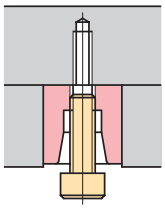
Super precision type Catalog No.	D	K	Unit price in yen M-TLDS ①+②	M-TLDP ①	M-TLDB ②
M-TLDS (①+② set) M-TLDP (① pin) M-TLDB (② bushing)	16	1 3 5	9,400	4,700	4,700
	20		10,200	5,100	5,100
	25		10,800	5,400	5,400
	30		11,900	5,950	5,950

How to order

	Catalog No.	D	×	K	N +	Optional processing
(①+② set)	M-TLCS	16	×	1		
(①+② set)	M-TLDS	20	×	1	N +	AC
(① pin only)	M-TLCP	25	×	3		
(① pin only)	M-TLDP	16	×	1		
(② bushing only)	M-TLCB	30	×	5		
(② bushing only)	M-TLDB	25	×	3		

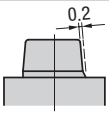
Shipping **In-stock item**
Order requiring optional processing will be shipped in 3 business days (excluding the day of order).

How to remove bushings



As shown in the above chart, the bushing can be easily removed by screwing a bolt into its thread and extracting it.

Optional Processing

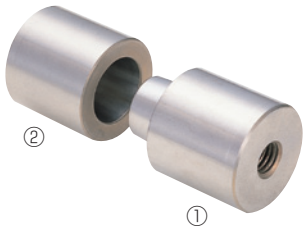
Option code	Specification	U/price (yen)
AC	 Adds an air vent (single). A 0.2 mm deep flat chamfer is produced in parallel to the taper angle.	200

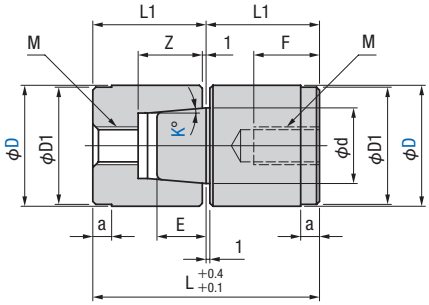
Tapered Lock Pins Basic Type

TAPERED LOCK PINS

Additional processing to mold bases ➡ P.98

Catalog No.			D	Material	Hardness after heat treatment	Concentricity of tapered section to the diameter of pin or bushing
Set	Pin only	Bushing only	Limit deviations			
M-TLGS	M-TLGP	M-TLGB	Dk6	SKS3	58 to 62HRC	0.005 or less
M-TLHS	M-TLHP	M-TLHB	D $^{+0.005}_{0}$			0.003 or less





Precision M-TLG□		Super Precision M-TLH□		D1		d	Z	E	M	F	a	L1	L
D		D											
DIMM	Limit deviations	DIMM	Limit deviations	DIMM	Limit deviations								
16	+0.012 +0.001	16	+0.005 0	16	−0.01 −0.03	10	8	5	M5	10	3	15	30
20	+0.015 +0.002	20		20		13	11	8	M6	12	4	20	40
25		25		25		16	14	11	M8	16		25	50
30		30		30		20	17	14	M10	20		30	60

Precision type Catalog No.	D	K	Unit price in yen M-TLGS ①+②	M-TLGP ①	M-TLGB ②
M-TLGS (①+② set) M-TLGP (① pin) M-TLGB (② bushing)	16	1 3 5	4,700	2,000	2,700
	20		5,000	2,100	2,900
	25		5,200	2,200	3,000
	30		5,900	2,600	3,300

Super precision type Catalog No.	D	K	Unit price in yen M-TLHS ①+②	M-TLHP ①	M-TLHB ②
M-TLHS (①+② set) M-TLHP (① pin) M-TLHB (② bushing)	16	1 3 5	9,400	4,700	4,700
	20		10,200	5,100	5,100
	25		10,800	5,400	5,400
	30		11,900	5,950	5,950

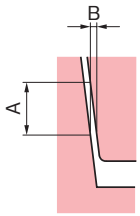
How to order

	Catalog No.	D	×	K	N +	Optional processing
(①+② set)	M-TLGS	16	×	1		
(①+② set)	M-TLHS	20	×	3		
(① pin only)	M-TLGP	25	×	1	N +	AC
(① pin only)	M-TLHP	16	×	1		
(② bushing only)	M-TLGB	30	×	5		
(② bushing only)	M-TLHB	20	×	3		

Shipping **In-stock item**

Orders requiring optional processing will be shipped in 3 business days (excluding the day of order).

Installation of tapered lock pins

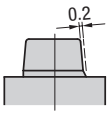


When the matching taper angle is 1° or 3°, it is necessary to consider possible seizure of the pin and bushing. Even if setting them slightly spaced from each other to avoid this seizure, the positioning performance is not compromised, because when the angle is small, the deviation of B to that of A is also small.

Deviation of B to that of A

Angle \ A	0.1	0.3	0.5
1°	0.0018	0.005	0.009
3°	0.005	0.016	0.026

Optional processing

Option code	Specification	U/price (yen)
AC	 Adds an air vent (single). A 0.2 mm deep flat chamfering is performed in parallel to the taper angle.	200

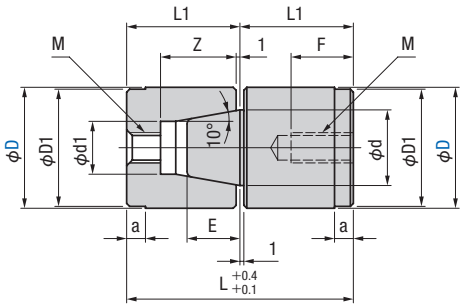
Tapered Lock Pins Sets JIS Type (Precision)

TAPERED LOCK PIN

Additional processing to mold bases ➡ P.98

Catalog No.			Material	Hardness after heat treatment	Concentricity of tapered section to the diameter of pin or bushing
Set	Pin only	Bushing only			
M-TLBS	M-TLBP	M-TLBB	SKS3	58 to 62HRC	0.005 or less

①　②



D		D1		d	d1	Z	E	M	F	a	L1	L
DIMM	Limit deviations	DIMM	Limit deviations									
13	+0.012 +0.001	13	−0.032 −0.050	7	5.0	8	5	M4	11	3	16	32
16		16		10	8.0		6	M5				
20	+0.015 +0.002	20	−0.040 −0.061	12	8.6	13	9	M6	12	4	20	40
25		25		16	12.3		10		15		25	50
32	+0.018 +0.002	32	−0.050 −0.075	20	15.3	20	14	M8	18	5	30	60
40		40		25	19.0	25	18				40	80
50		50		32	25.0	30	20	M10	20		50	100

※ The old catalog No, M-TLB has been changed to M-TLBS due to a change in its standard.

How to order

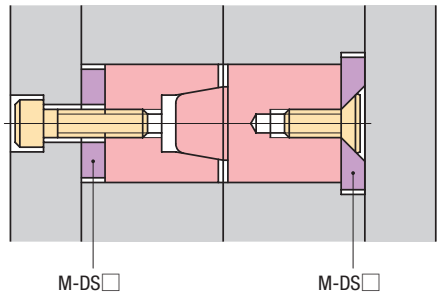
	Catalog No.	D
(①+② set)	M-TLBS	25
(① pin only)	M-TLBP	25
(② bushing only)	M-TLBB	25

Shipping　**In-stock item**

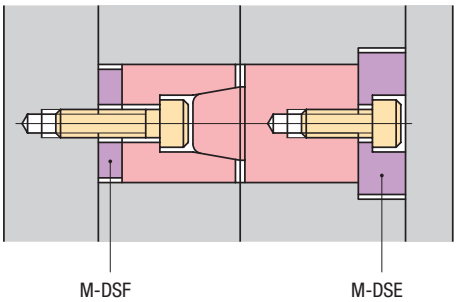
Catalog No.	D	Unit price in yen M-TLBS ①+②	M-TLBP ①	M-TLBB ②
M-TLBS (①+② set) M-TLBP (① pin) M-TLBB (② bushing)	13	5,950	2,600	3,350
	16	6,000	2,620	3,380
	20	6,500	2,800	3,700
	25	7,000	3,000	4,000
	32	7,500	3,200	4,300
	40	8,500	3,650	4,850
	50	10,000	4,300	5,700

Usage example:

Example of M-TLGS, M-TLHS and M-TLBS usage



Example of M-TLCS and M-TLDS



Tapered lock pin	Applicable disc spacers
M-TLCS、M-TLDS M-TLGS、M-TLHS	M-DSD、M-DSE、M-DSF ➡ P.302
M-TLBS	M-DSA、M-DSB、M-DSC ➡ P.301

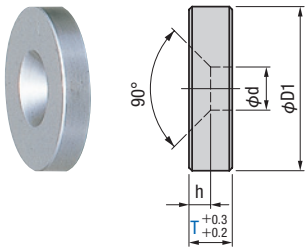
Disc Spacers For M-TLBS

DISC SPACER

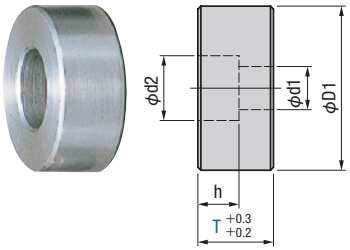
Additional processing to mold bases → P.98

Material	Hardness after heat treatment
SK3	48 to 52HRC

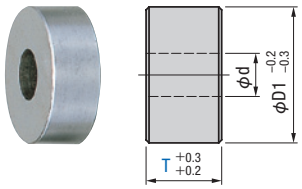
M-DSA



M-DSB



M-DSC



Supplied with hexagon socket flat head cap screw

Catalog No.	Applicable Tapered lock pin D	T	Unit price in yen	D1	d	h	Thickness of retainer plate
M-DSA	13	4	500	17	4.5	2.7	20
	16		650	20	5.5	3	20
	20	5	700	25	6.6	3.8	25
	25		800	30			30
	32	10	940	38	9	4.8	40
	40		1,060	45			50

Catalog No.	Applicable Tapered lock pin D	T	U/price (yen)	D1	d1	d2	h	Thickness of mold plate
M-DSB	13	9	600	17	4.5	8	4.8	25
		14	660					30
	16	9	670	20	5.5	9.5	5.8	25
		14	700					30
	20	10	730	25	6.6	11	7	30
		15	780					35
	25	10	820	30				35
		15	890					40
	32	20	1,090	38	9	14	9	50
		30	1,230					60
	40	20	1,220	45				60
		30	1,340					70
	50	20	1,340	58	11	17.5	11.3	70
		30	1,560					80

Catalog No.	Applicable Tapered lock pin D	T	Unit price in yen	D1	d	Thickness of mold plate
M-DSC	13	4	490	13	4.5	20
		9	510			25
		14	530			30
	16	4	540	16	5.5	20
		9	580			25
		14	610			30
		19	660			35
		24	710			40
		34	750			50
	20	5	610	20	6.6	25
		10	640			30
		15	670			35
		20	760			40
		30	800			50
		40	880			60
		50	930			70
	25	5	650	25		30
		10	740			35
		15	810			40
		20	860			45
		25	1,000			50
		35	1,120			60
		45	1,250			70
	32	5	740	32	9	35
		10	820			40
		20	940			50
		30	1,130			60
		40	1,260			70
	40	10	890	40		50
		20	1,000			60
		30	1,120			70
		40	1,300			80
	50	10	1,100	50	11	60
		20	1,300			70
		30	1,430			80
		40	1,530			90
		50	1,740			100

How to order

Catalog No.	Applicable Tapered Lock Pin D	×	T
M-DSA	20	×	5
M-DSB	25	×	15
M-DSC	25	×	25

Shipping **In-stock item**

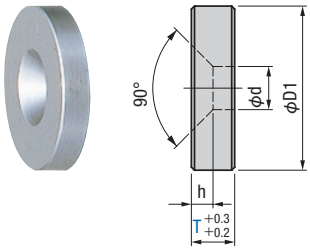
Disc Spacers For M-TLBS

DISC SPACER

Additional processing to mold bases → P.98

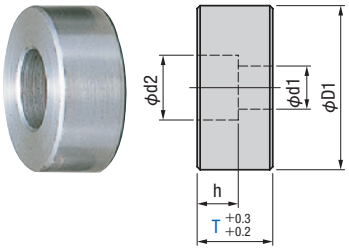
Material	Hardness after heat treatment
SCM435	45 to 51HRC

M-DSD



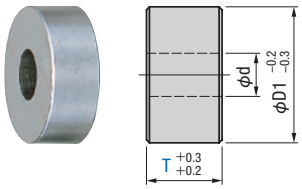
Supplied with hexagon socket flat head cap screw

M-DSE



Supplied with hexagon socket head cap screw

M-DSF



Catalog No.	Applicable Tapered lock pin D	T	Unit price in yen	D1	d	h	Thickness of mold plate
M-DSD	16	5	160	20	5.5	3	20
		10	190				25
	20	5	200	25	6.5	4	25
		10	260				30
	25	5	290	30	8.5	4.4	30
		10	340				35
	30	10	410	35	10.5	7.5	40

Catalog No.	Applicable Tapered lock pin D	T	U/price (yen)	D1	d1	d2	h	Thickness of mold plate
M-DSE	16	15	270	20	5.5	9.5	7	30
		20	290					35
		25	320					40
		35	360					50
	20	15	330	25	6.5	11	9	35
		20	360					40
		30	420					50
		40	490					60
		50	550					70
	25	15	420	30	8.5	14	10	40
		25	520					50
		35	610					60
		45	710					70
		55	800					80
	30	20	580	35	10.5	17.5	12	50
		30	710					60
		40	830					70
		50	960					80

Catalog No.	Applicable Tapered lock pin D	T	Unit price in yen	D1	d	Thickness of mold plate
M-DSF	16	5	180	16	5.5	20
		10	200			25
		15	230			30
		20	260			35
		25	290			40
	20	5	230	20	6.5	25
		10	260			30
		15	290			35
		20	310			40
		30	340			50
		40	380			60
	25	5	290	25	8.5	30
		10	320			35
		15	350			40
		25	380			50
		35	440			60
		45	520			70
		55	600			80
	30	5	380	30	10.5	35
		10	410			40
		20	500			50
		30	600			60
		40	670			70
		50	770			80

How to order

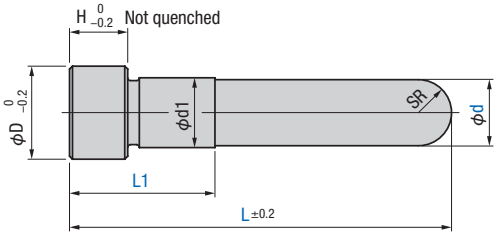
Catalog No.	Applicable Tapered Lock Pin D	×	T
M-DSD	16	×	5
M-DSE	20	×	20
M-DSF	25	×	45

Shipping **In-stock item**

Angular Pins

ANGULAR PINS

Catalog No.	Material	Hardness after heat treatment
M-AGA	SUJ2	60 to 64HRC (high frequency quenching)



d		d1		D	H	L1
DIMM	Limit deviations	DIMM	Limit deviations			
10	−0.013 −0.022	10	+0.015 +0.006	13	8	19
13	−0.016 −0.027	13	+0.018 +0.007	17	10	24
16		16		20	12	29
20	−0.020 −0.033	20	+0.021 +0.008	25	15	39
25		25		30		49

Catalog No.	d	Unit price in yen												
		L												
		40	50	60	70	80	90	100	110	120	130	140	150	160
M-AGA	10	390	400	430	470	500	540	570						
	13		440	470	510	550	580	620	660	700	740	780	810	
	16			550	590	620	660	700	730	760	790	820	850	870
	20					760	810	850	900	940	980	1,020	1,060	1,100
	25							950	1,000	1,050	1,100	1,150	1,200	1,250

d	Unit price in yen													
	L													
	170	180	190	200	210	220	230	240	250	260	270	280	290	300
10														
13														
16	900	930	960	990										
20	1,150	1,190	1,240	1,280	1,320	1,370	1,410	1,450	1,500					
25	1,300	1,350	1,400	1,450	1,500	1,550	1,590	1,640	1,690	1,740	1,790	1,840	1,890	1,940

How to order

Catalog No.	d	×	L	×	L1
M-AGA	10	×	70	×	19

Shipping **In-stock item**

Mold Opening Control Parts

Mold Opening Control Parts Overview

Ground puller bolts

Additional processing to MDC

Catalog No.	M-PBCH
Hardness after heat treatment	33HRC or more
Shipping	1 day
Page	P.308

Additional processing to MDC

Catalog No.	M-PBAH
Hardness after heat treatment	33HRC or more
Shipping	1 day
Page	P.310

Puller Bolts

Additional processing to MDC

Catalog No.	M-PBC
Hardness after heat treatment	39 to 44HRC
Shipping	In-stock item
Page	P.312

Additional processing to MDC

Catalog No.	M-PBA
Hardness after heat treatment	39 to 44HRC
Shipping	In-stock item
Page	P.313

Additional processing to MDC

Catalog No.	M-PBB
Hardness after heat treatment	39 to 44HRC
Shipping	In-stock item
Page	P.314

Puller bolt collars

Catalog No.	M-PCA
Shipping	In-stock item
Page	P.315

Catalog No.	M-PCB
Shipping	In-stock item
Page	P.315

Additional processing to MDC denotes the parts that support additional processing to mold bases.
Shipping times are shown in business days (excluding the day of order).

Tension links

Additional processing to MDC

Catalog No.	M-HLA
Shipping	In-stock item
Page	P.316

Additional processing to MDC

Catalog No.	M-HLB
Shipping	In-stock item
Page	P.317

Bolts/retainers for tension link

Additional processing to MDC

Catalog No.	M-PBB
Hardness after heat treatment	39 to 44HRC
Shipping	In-stock item
Page	P.318

Additional processing to MDC

Catalog No.	M-HRA
Hardness after heat treatment	38 to 43HRC
Shipping	In-stock item
Page	P.318

Additional processing to MDC

Catalog No.	M-HRB
Hardness after heat treatment	38 to 43HRC
Shipping	In-stock item
Page	P.318

PL Pullers

Additional processing to MDC

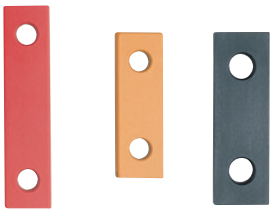
Catalog No.	M-PLL□
Sleeve material	PAR
Shipping	In-stock item
Page	P.320

Mold opening prevention plates

Additional processing to MDC

Catalog No.	M-OPB
Safety color	Black
Shipping	In-stock item
Page	P.321

Additional processing to MDC



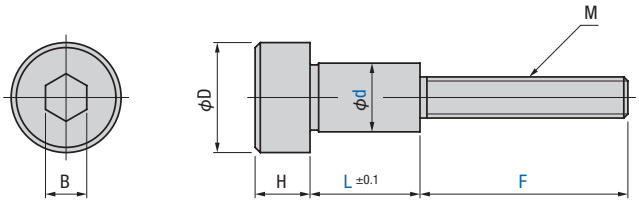
Catalog No.	M-OPC
Safety color	Red, yellow, black
Shipping	In-stock item
Page	P.321

Ground Puller Bolts

PULLER BOLTS

Additional processing to mold bases ➡ P.148

Catalog No.	Material	Hardness after heat treatment
M-PBCH	SCM435	33HRC or more



Catalog No.	d	L	F	Unit price in yen	d DIMM	d Limit deviations	D	H	M	B
M-PBCH	10	10	19 24	190	10	−0.025 −0.083	16	8	M6×full thread	6
		15	19 24 29	200						
		20	19 24 29 34	200						
	13	10	22 27	220	13	−0.032 −0.102	18		M8×full thread	8
		15	22 27 32 37	220						
		20	22 27 32 37 42	220						
		25	27 32 37 42	250						
		30	27 32 37 42 47	260						
		35	37 42 47	270						
	16	10	30 35	300	16		24	13	M10×full thread	10
		15	30 35 40	330						
		20	30 35 40 45	340						
		25	30 35 40 45	350						
		30	35 40 45 50 55	370						
		35	45 50 55	400						
	20	15	38 43	400	20	−0.040 −0.124	27		M12×full thread	14
		20	38 43 48	420						
		25	38 43 48 53	440						
		30	43 48 53 58	470						
		35	48 53 58	500						
		45	53 58	530						
	25	15	44 49	800	25		33	18	M16×full thread	17
		20	49 54 59	800						
		25	49 54 59	850						
		30	49 54 59 64	900						
		40	54 59 64 74	1,000						

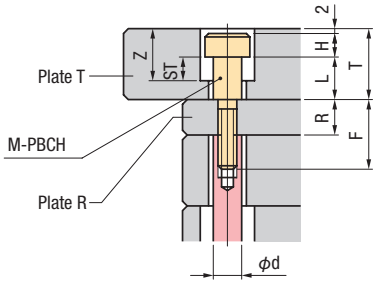
※ The imcomplete threaded section of full thread is 3-pitch long at maximum.

How to order

Catalog No.	d	×	L	×	F
M-PBCH	16	×	30	×	40

Shipping **Orders will be shipped out in 1 business day (excluding the day of order).**

Grounded puller bolt selection



The size of grounded puller bolts is set according to the thickness of Plate T and Plate R.

Relationship between the “mold opening stroke of Plate T and Plate R (ST)” and the “depth of counterbore machined in the Plate T (Z)” is:

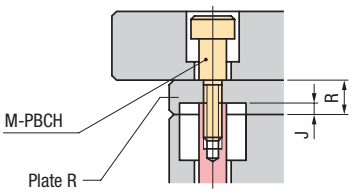
ST＝Z＋L－T　Z＝T＋ST－L　L＝T＋ST－Z

d	T	L	H	F							
				R＝10	R＝15	R＝20	R＝25	R＝30	R＝35	R＝40	R＝50
10	20	10	8	19	24						
	25	15				29					
	30	20					34				
13	20	10	8	22	27						
	25	15				32	37				
	30	20						42			
	35	25							47		
	40	30									
	45	35									
16	25	10	13		30	35					
	30	15					40				
	35	20						45			
	40	25									
	45	30							50	55	
	50	35									
20	30	15	13			38	43				
	35	20						48			
	40	25							53		
	45	30								58	
	50	35									
	60	45									
25	35	15	18			44	49				
	40	20						54	59		
	45	25									
	50	30								64	
	60	40									74

How to use this product:

As this product is full threaded, it can be used as follows:

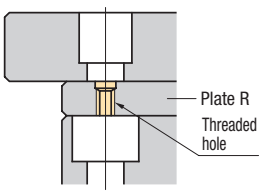
(1) Counterbore for springs



A counterbore to be machined in Plate R can be selected.

J≦7mm
However,
if R＝10mm,
J≦5mm

(2) Horizontal deviation prevention



Cut a thread in the through hole of Plate R and use it to prevent horizontal deviation

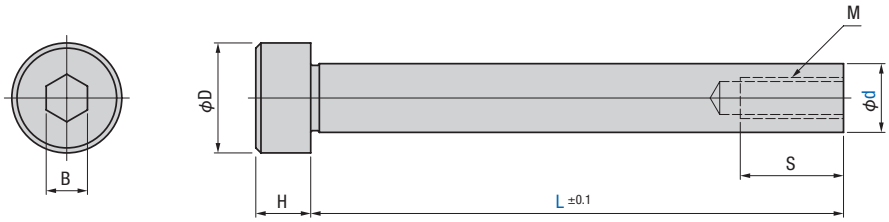
※ For details, see option code CRM of , additional mold base processing in page 150

Ground Puller Bolts

PULLER BOLTS

Additional processing to mold bases → P.148

Catalog No.	Material	Hardness after heat treatment
M-PBAH	SCM435	33HRC or more

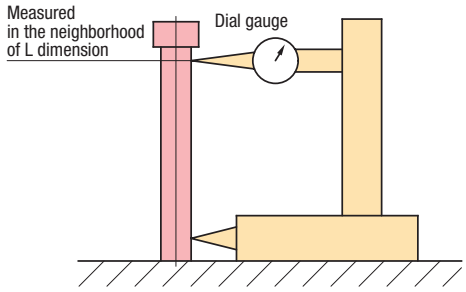


Catalog No.	d	L	Unit price in yen	d DIMM	d Limit deviations	D	H	M	S	B
M-PBAH	10	50 60 70	350	10	−0.025 −0.083	16	8	M6	17	6
		80 90	400							
		100 110 120	480							
		130 140 150	530							
		160 170 180	630							
	13	60 70	380	13	−0.032 −0.102	18		M8	20	8
		80 90	420							
		100 110 120	530							
		130 140 150	600							
		160 170 180	800							
		190 200 210	920							
		220 230 240 250 260	1,370							
		280	1,680							
	16	100 110 120	640	16		24	13	M10	23	10
		130 140 150	720							
		160 170 180	940							
		190 200 210	1,070							
		220 230 240 250 260	1,560							
		280 300	2,000							
	20	120 130 140 150	1,050	20	−0.040 −0.124	27		M12	26	14
		160 170 180	1,250							
		190 200 210	1,390							
		220 230 240 250 260	1,880							
		280 300	2,300							
		350	3,200							
	25	170 180	1,600	25		33	18	M16	32	17
		190 200	1,730							
		210 220	2,030							
		230 240	2,180							
		250 260	2,430							
		280 300	2,800							
		350	3,800							

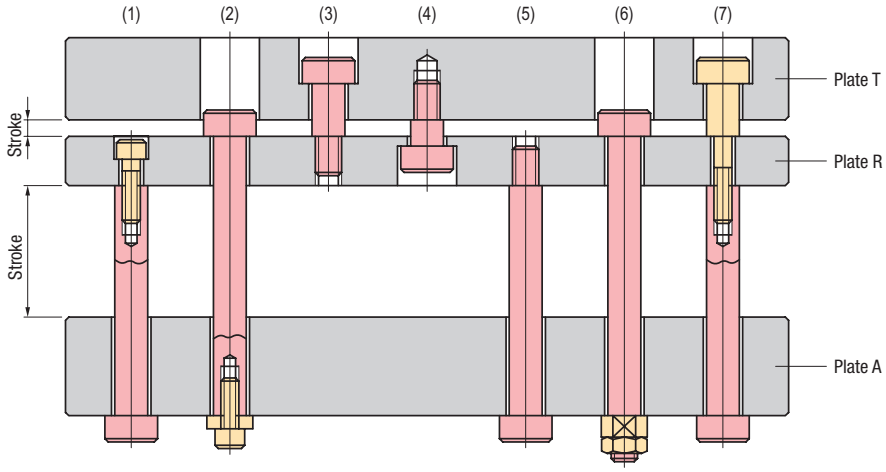
How to order

Catalog No.	d	×	L
M-PBAH	16	×	180

Shipping **Orders will be shipped out in 1 business day (excluding the day of order).**

Precision type	Measurement method (simplified diagram)	Precision standard
Squareness of end face and axis		Squareness of L dimension (full length) is within 0.4 mm.

Usage example



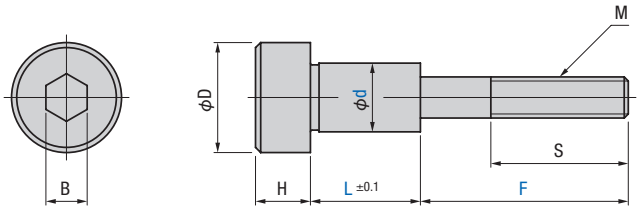
(1) Puller bolt M-PBAH or M-PBA and hexagon socket head cap screw
(2) Puller bolt M-PBAH or M-PBA and puller bolt collar M-PCA
(3) Puller bolt M-PBB
(4) Puller bolt M-PBB
(5) Puller bolt M-PBB
(6) Puller bolt M-PBB and puller bolt collar M-PCB
(7) Puller bolt M-PBAH and Puller Bolt M-PBCH or
Puller bolt M-PBA and puller bolt M-PBC

Puller Bolts

PULLER BOLTS

Additional processing to mold bases → P.148

Catalog No.	Material	Hardness after heat treatment
M-PBC	SCM435	39 to 44HRC



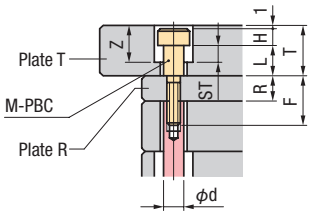
Catalog No.	d	L	F	Unit price in yen	d DIMM	d Limit deviations	D	H	M	S	B
M-PBC	10	16	22	200	10	0 −0.15	16	8	M6	18	6
		16	27	200							
		21	27	200							
	13	14	30	200	13		18	10	M8	24	8
		19	35	220							
		24	40	240							
	16	15	35	300	16		24	14	M10	26	10
		20	40	320							
		30	45	340							
		30	50	340							
	20	20	45	450	20	0 −0.20	28		M12	30	14
		30	50	470							
		30	55	480							
		35	55	490							
	25	31	60	1,200	25		33	18	M16	38	17
		41	65	1,300							

How to order

Catalog No.	d	×	L	×	F
M-PBC	10	×	16	×	27

Shipping **In-stock item**

Puller bolt M-PBC selection



Relationship between the "mold opening stroke of Plate T and Plate R (ST)" and the "depth of counterbore machined in the Plate T (Z)" is:

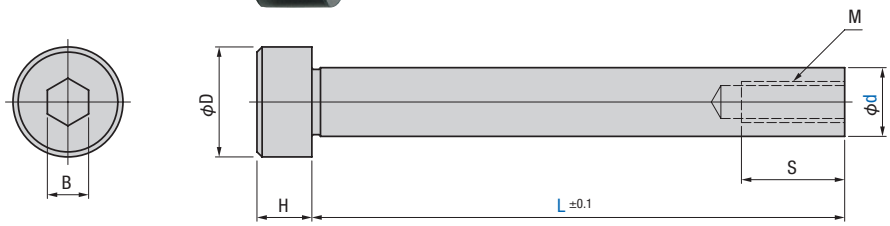
ST=Z+L−T
Z=T+ST−L
L=T+ST−Z

The size of M-PBC is set according to the thickness of Plate T and Plate R.

d	T	L	H	F R=10	F R=15	F R=20	F R=25	F R=30	F R=35	F R=40
10	25	16	8	22	27					
	30	21								
13	25	14	10	30	30					
	30	19			35	35				
	35	24				40	40			
16	30	15	14		35	35				
	35	20				40	40			
	45	30					45	45	50	
20	35	20	14			45	45			
	45	30					50	50	55	
	50	35						55		
25	50	31	18					60	60	
	60	41							65	65

Additional processing to mold bases → P.148

Catalog No.	Material	Hardness after heat treatment
M-PBA	SCM435	39 to 44HRC



d DIMM	d Limit deviations	D	H	M	S	B
10	0 −0.15	16	8	M6	12	6
13		18	10	M8	23	8
16		24	14	M10	25	10
20	0 −0.20	28		M12	30	14
25		33	18	M16	35	17

Catalog No.	d	Unit price in yen								
		L								
		80	90	100	110	120	130	140	150	160
M-PBA	10	290	310	320	340	370	380	400	410	500
	13	360	380	400	420	440	460	480	540	600
	16			480	510	540	560	580	600	700
	20						660	690	720	1,020
	25								1,440	1,490

d	Unit price in yen									
	L									
	170	180	190	200	220	240	260	280	300	350
10		550								
13	650	700		890						
16	750	800	850	900						
20	1,060	1,100	1,140	1,180	1,320	1,460	2,310	2,450	2,600	3,220
25	1,530	1,590	1,640	1,690	1,810	1,900	2,550	3,380	3,670	4,000

How to order

Catalog No.	d	×	L
M-PBA	20	×	300

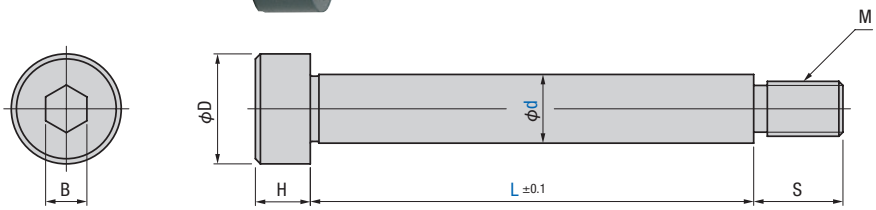
Shipping **In-stock item**

Puller Bolts

PULLER BOLTS

Additional processing to mold bases → P.148

Catalog No.	Material	Hardness after heat treatment
M-PBB	SCM435	39 to 44HRC



d DIMM	d Limit deviations	D	H	M	S	B
10	0 −0.15	16	8	M8	13	6
13		18	10	M10	14	8
16		24	14	M12	18	10
20	0 −0.20	28		M16	24	14
25		33	18	M20	28	17

Catalog No.	d	Unit price in yen															
		L															
		13	14	15	16	19	20	21	24	25	26	29	30	31	35	41	45
M-PBB	10	100			100			110			110			120			
	13	130	150			160			170			170					
	16	240		250			260			260			270		270		
	20				370		400			410			420		440		460
	25													1,120		1,190	

d	Unit price in yen																	
	L																	
	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	220	240	260
10	130	140	150	170	190	210	230	250	270	290	350							
13		190	200	220	240	260	280	300	320	340	360	380	400					
16			290	300	320	350	380	410	440	470	530	560	590	620	650			
20					480	500	530	550	600	650	700	750	800	850	1,280	1,410	1,500	
25										1,510	1,660	1,710	1,810	1,880	1,930	2,090	2,230	2,490

How to order

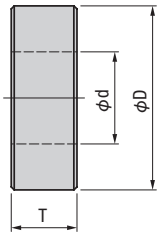
Catalog No.	d	×	L
M-PBB	16	×	90

Shipping **In-stock item**

Puller Bolt Collars

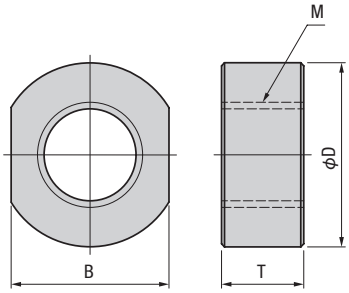
PULLER BOLT COLLARS

Catalog No.	Material	Application
M-PCA	S45C	Applied to M-PBAH M-PBA



Supplied with a hexagon socket head cap screw and spring washer

Catalog No.	Material	Application
M-PCB	S45C	Applied to M-PBB



Supplied with a hexagon nut

Catalog No.	Applicable puller bolt d	Unit price in yen	T	D	d
M-PCA	10	130	5	16	6.1
	13	140	6	18	8.1
	16	160	8	24	10.1
	20	190	10	28	12.1
	25	250	12	33	16.1

Catalog No.	Applicable puller bolt d	Unit price in yen	T	D	M	B
M-PCB	10	270	6.5	16	M8	14
	13	300	8	18	M10	14
	16	320	10	24	M12	19
	20	400	13	28	M16	24
	25	500	16	33	M20	30

How to order

Catalog No.	Applicable puller bolt d
M-PCA	10
M-PCB	13

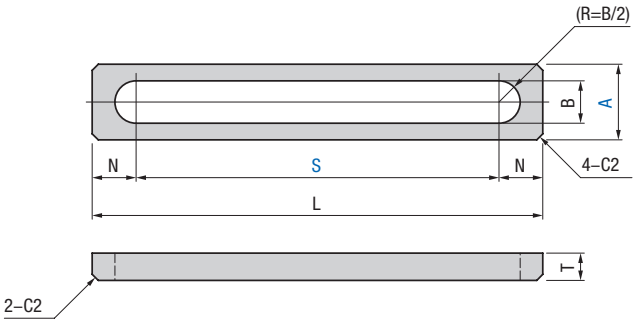
Shipping **In-stock item**

Tension Links

TENSION LINKS

Additional processing to mold bases → P.172

Catalog No.	Material
M-HLA	S45C



A	B	N	L	T
19	11	14.5	29＋S	9
25	14	17	34＋S	
32	17	18.5	37＋S	
38	21	20.5	41＋S	12

Catalog No.	A	Unit price in yen											
		S											
		60	70	80	90	100	110	120	130	140	150	160	170
M-HLA	19	700	700	750	750	800	800	850	850	900	900	950	950
	25			800	800	850	850	900	900	950	950	1,000	1,000
	32					1,000	1,000	1,050	1,050	1,100	1,100	1,150	1,150
	38					1,150	1,150	1,200	1,200	1,250	1,250	1,300	1,300

A	Unit price in yen												
	S												
	180	190	200	210	220	230	240	250	260	270	280	290	300
19	1,000	1,000	1,050										
25	1,050	1,050	1,100	1,150	1,200	1,250	1,300	1,350					
32	1,200	1,200	1,250	1,300	1,350	1,400	1,450	1,500	1,550	1,600	1,650	1,700	1,750
38	1,350	1,350	1,400	1,450	1,500	1,550	1,600	1,650	1,700	1,750	1,800	1,850	1,900

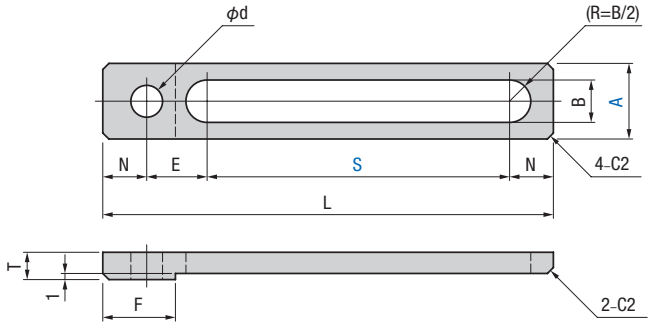
How to order

Catalog No.	A	×	S
M-HLA	19	×	200

Shipping **In-stock item**

Additional processing to mold bases → P.172

Catalog No.	Material
M-HLB	S45C



A	B	F	E	N	L	d	T
19	11	24	20	14.5	49＋S	10.5	9
25	14	28	23	17	57＋S	13.5	
32	17	32	30	18.5	67＋S	16.5	
38	21	38	33	20.5	74＋S	20.5	12

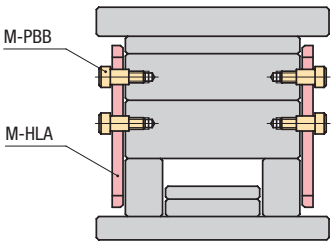
Catalog No.	A	Unit price in yen															
		S															
		50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
M-HLB	19	900	900	950	950	1,000	1,000	1,050	1,050	1,100	1,100	1,150	1,150	1,200			
	25	950	950	1,000	1,000	1,050	1,050	1,100	1,100	1,150	1,150	1,200	1,200	1,250	1,250	1,300	1,300
	32				1,200	1,250	1,250	1,300	1,300	1,350	1,350	1,400	1,400	1,450	1,450	1,500	1,500
	38						1,450	1,500	1,500	1,550	1,550	1,600	1,600	1,650	1,650	1,700	1,700

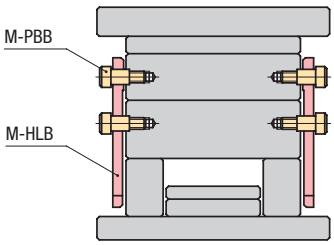
How to order

Catalog No.	A	×	S
M-HLB	25	×	180

Shipping **In-stock item**

Example of use



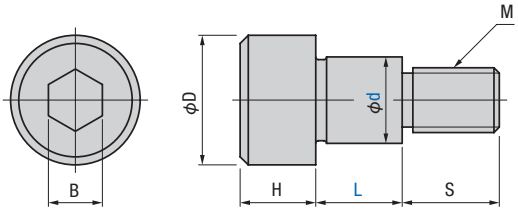


Bolts/Retainers for Tension Link

TENSION LINKS

Additional processing to mold bases → P.172

Catalog No.	Material	Hardness after heat treatment	Surface treatment
M-PBB	SCM435	39 to 44HRC	Alkaline blackening



Catalog No.	d	L	Unit price in yen	d DIMM	d Limit deviations	D	H	M	S	B	Applicable tension link M-HLA M-HLB
M-PBB	10	13	100	10	0 −0.15	16	8	M8	13	6	Width 19
	13		130	13		18	10	M10	14	8	Width 25
	16		240	16		24	14	M12	18	10	Width 32
	20	16	370	20	0 −0.20	28		M16	24	14	Width 38

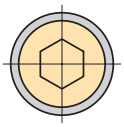
How to order

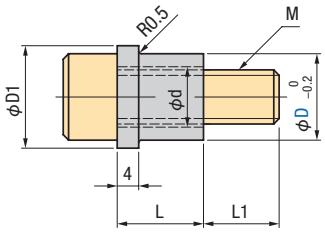
Catalog No.	d	×	L
M-PBB	13	×	13

Shipping: **In-stock item**

Catalog No.	Retainer Material	Retainer Hardness after heat treatment	Retainer Surface treatment
M-HRA	SCM435	38 to 43HRC	Alkaline blackening

Supplied with hexagon socket head cap screw





Catalog No.	D	Unit price in yen	L	M Bolt	L1	D1	d	Applicable tension link M-HLA M-HLB
M-HRA	10	150	16	M6×25	9	13	6.5	Width 19
	13	200		M8×30	14	16	9	Width 25
	16	250		M10×30		19	11	Width 32
	20	300	19	M12×40	21	23	13	Width 38

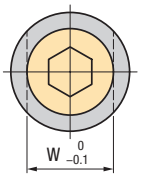
How to order

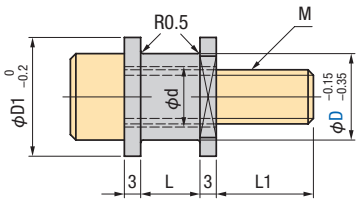
Catalog No.	D
M-HRA	10

Shipping: **In-stock item**

Catalog No.	Retainer Material	Retainer Hardness after heat treatment	Retainer Surface treatment
M-HRB	SCM435	38 to 43HRC	Alkaline blackening

Supplied with hexagon socket head cap screw





Catalog No.	D	Unit price in yen	L	M Bolt	L1	D1	W	d	Applicable tension link M-HLA
M-HRB	10	200	11	M6×30	13	16	10	6.5	Width 19
	13	250		M8×35	18	19	13	9	Width 25
	16	300		M10×35		22	16	11	Width 32
	20	350	14	M12×40	20	26	20	13	Width 38

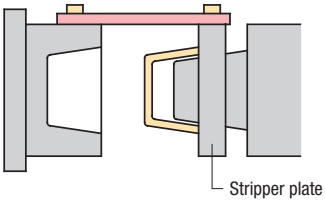
How to order

Catalog No.	D
M-HRB	13

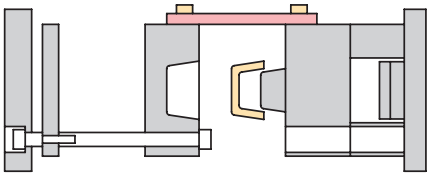
Shipping: **In-stock item**

Example of tension link usage

Usage example of stripper plate type



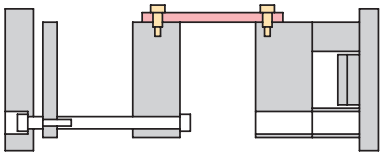
Usage example of three-plate type



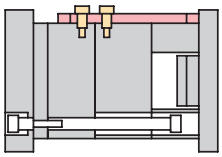
Feature of tension links

Feature of tension link M-HLA

When the mold is opened

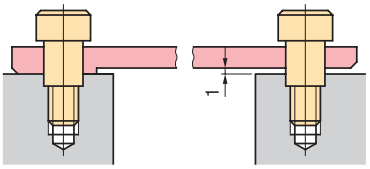


When the mold is closed



As the tension links are not fixed with bolts, they become in a state shown in the left chart when the mold is closed. This allows to increase the amount of stroke and reduce the height of the mold.

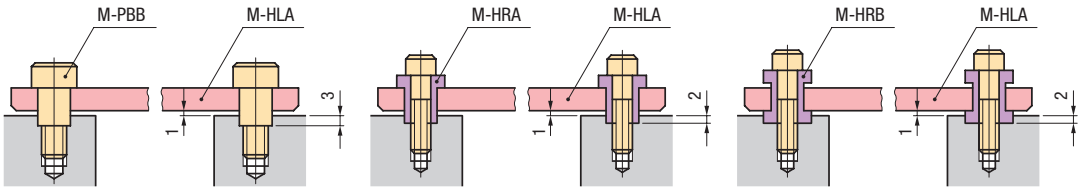
Feature of tension link M-HLB



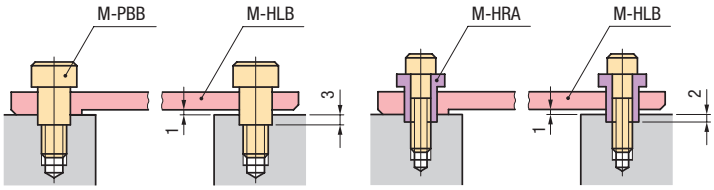
A 1 mm clearance is provided at the sliding section of the tension links to allow the mold to be opened or closed without coming in contact with the plate.

How to install tension links

Installing tension link M-HLA



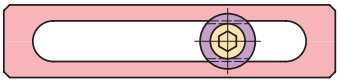
Installing tension link M-HLB



※ Install the special bolts and retainers by creating counterbores on the retainer plate.
※ Tension link M-HLB and retainer M-HRB can not be combined.

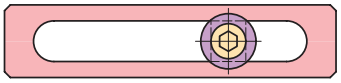
How to install special retainer M-HRB

①



Insert the retainer by aligning its flat head side with the long hole width.

②



Turn the retainer by 90 degree and then fix it with a bolt.

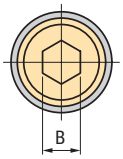
Features
The head section of retainer functions as a step of 1 mm and mold can be opened and closed without having link and plate in contact.

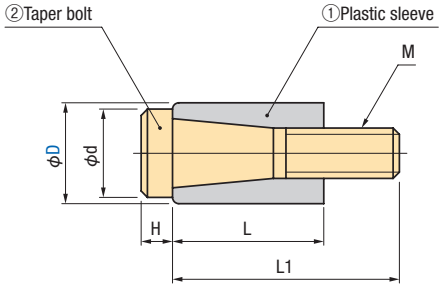
PL Pullers

PL PULLERS

Additional processing to mold bases ➡ P.180

Catalog No.	Product	Material
M-PLLA	①+② set	
M-PLLS	① Plastic sleeve	PAR
M-PLLM	② Taper bolt	SCM435





Catalog No.	D	Unit price in yen M-PLLA ①+②	Unit price in yen M-PLLS ①	d	M	B	H	L	L1
M-PLLA (①+②) M-PLLS (①)	10	600	200	8.5	M5	4	2	17	24
	12	630	300	11.5	M6	5	4	18	30
	13								
	16	790	350	15	M8	6	5	23.5	35

Catalog No.	M	Unit price in yen	Applicable D
M-PLLM (②)	5	400	10
	6	330	12
			13
	8	440	16

How to order **Shipping** **In-stock item**

	Catalog No.	D
①+②	M-PLLA	12
①	M-PLLS	12

	Catalog No.	M
②	M-PLLM	6

Features

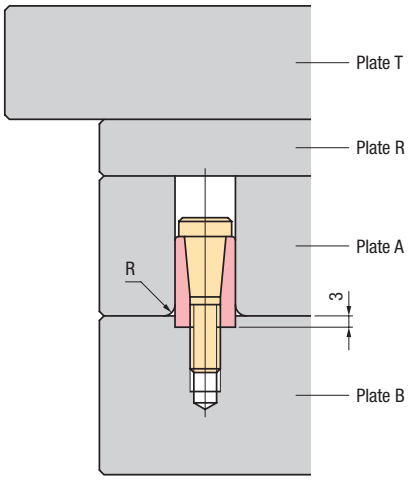
Allows adjustment of friction between the retainer plates and plastic sleeve by tightening the tapered bolt.

How to install

- ◆ Create a hole on the fixed side retainer plate and finish it to an H8 tolerance. Also, make sure to R-chamfer the inlet edge to prevent scuffing of the plastic sleeve.
- ◆ Embed the plastic sleeve about 3 mm in the Plate B (movable side retainer plate).
- ◆ The required tension can be obtained by adjusting the amount of tightening of the lock's taper bolt.

(Note) Do not lubricate this PL Puller as lubrication reduces its friction force.

Example of use



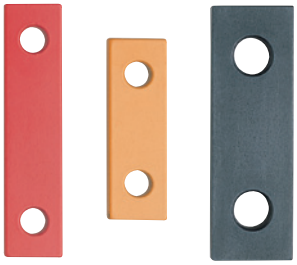
Mold Opening Prevention Plates

Green procurement compliant
Price reviced

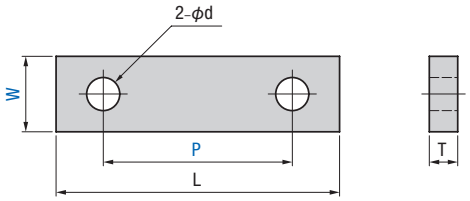
MOLD OPENING PROTECTION PLATES

Additional processing to mold bases → P.182

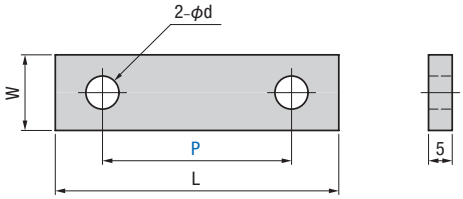
Catalog No.	Safety coloring	Material
M-OPB	Black	S45C
M-OPC	Red, yellow, black	



M-OPB



M-OPC



Catalog No.	W	P	Unit price in yen	L	T	d	Safety coloring
M-OPB	16	20	300	40	6	7	Black
		30		50			
		40		60			
		50	350	70			
		60		80			
	22	20	400	50	9	9	
		30		60			
		40	450	70			
		50		80			
		60	500	90			
		70		100			
	25	30	800	60	12	11	
		50	900	80			
		70	1,000	100			
		90	1,100	120			
	38	40	1,000	80		14	
		60	1,100	100			
		80	1,200	120			
		100	1,300	140			

※ The old catalog No, M-OPA has been changed to M-OPB due to a change in its standard.

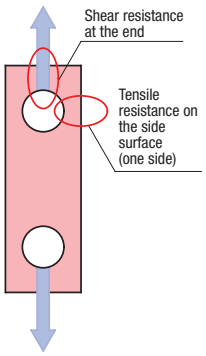
Catalog No.	P	Safety coloring Color	Safety coloring Code	Unit price in yen	W	L	d
M-OPC	15	Red Yellow Black	R Y N	Red→590 Yellow→590 Black→190	16	30	7
	20					40	
	30					50	
	40					60	
	50			Red→610 Yellow→610 Black→210		70	
	60					80	
	70					90	
	80			Red→640 Yellow→640 Black→240	20	100	9
	90					110	
	100					120	

How to order

Catalog No.	d	×	L
M-OPB	16	×	50

Catalog No.	P	Safety coloring
M-OPC	50	R

Shipping: In-stock item



Allowable load (reference value)

(kgf)

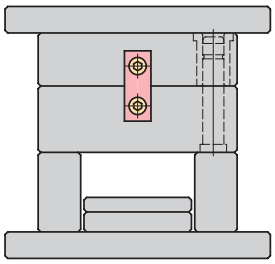
Catalog No.	W	Tensile stress on the side surface (one side) Shear load	Tensile stress on the side surface (one side) Allowable load	Shear stress at the end Shear load	Shear stress at the end Allowable load
M-OPB	16	1,750	430	1,770	440
	22	3,800	950	4,300	1,070
	25	5,460	1,360	5,180	1,290
	38	9,360	2,340	7,090	1,770

(kgf)

Catalog No.	P	Tensile stress on the side surface (one side) Shear load	Tensile stress on the side surface (one side) Allowable load	Shear stress at the end Shear load	Shear stress at the end Allowable load
M-OPC	15	1,460	360	910	220
	20 to 70			1,470	370
	80 to 100	1,780	440	1,250	310

※ Allowable load is calculated by assuming safety factor = 4.
※ Shear stress is derived by multiplying the tensile strength by 0.7.

Example of use



Ejector Space Parts

Ejector Space Parts Overview

Ejector guide pins

Additional processing to MDC

Catalog No.	M-EGA
Type	Retaining ring type
Shipping	In-stock item
Page	P.326

Additional processing to MDC

Catalog No.	M-EGB
Type	JIS centering location type
Shipping	In-stock item
Page	P.327

Additional processing to MDC

Catalog No.	M-EGC
Type	JIS stuck out type
Shipping	In-stock item
Page	P.328

Ejector guide bushings

Additional processing to MDC

Catalog No.	M-EBB
Type	JIS Type
Shipping	In-stock item
Page	P.330

Additional processing to MDC

Catalog No.	M-EBD
Type	Linear motion bearing type
Shipping	In-stock item
Page	P.331

Additional processing to MDC

Catalog No.	M-EBG
Type	Copper Alloy (Solid lubricant)
Shipping	3 days
Page	P.332

Additional processing to MDC

Catalog No.	M-EBC
Type	Sintered copper powder
Shipping	In-stock item
Page	P.333

Ejector guide pins & bushings 5 μm range type

Additional processing to MDC

Catalog No.	M-EGBM
Type	Centering location type
Shipping	In-stock item
Page	P.334

Additional processing to MDC

Catalog No.	M-EGCM
Type	Stuck out type
Shipping	In-stock item
Page	P.335

Additional processing to MDC

Catalog No.	M-EBBM
Shipping	In-stock item
Page	P.336

Return pins

Additional processing to MDC

Catalog No.	M-RP8B
Type	Head thick 8 mm
Shipping	In-stock item
Page	P.337

Additional processing to MDC

Catalog No.	M-RPN	M-RP8N
Type	L dimension designation type (in 1 mm units)	
Shipping	In-stock item	2 days
Page	P.338	

Additional processing to MDC

Catalog No.	M-RPL	M-RP8L
Type	L dimension designation type (in 0.1 mm units)	
Shipping	2 days	
Page	P.340	

Additional processing to MDC

Catalog No.	M-RPM	M-RP8M
Type	L dimension designation type (in 0.01 mm units)	
Shipping	3 days	
Page	P.340	

Additional processing to MDC denotes the parts that support additional processing to mold bases.
Shipping times are shown in business days (excluding the day of order).

Support pillars

Additional processing to MDC

Catalog No.	M-SRD
Type	Screw hole type
Shipping	In-stock item
Page	P.342

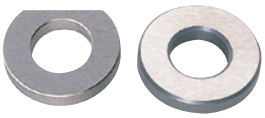
Additional processing to MDC

Catalog No.	M-SRC
Type	Dowel hole type
Shipping	In-stock item
Page	P.343

Additional processing to MDC

Catalog No.	M-SRE
Type	Bolt hole type
Shipping	In-stock item
Page	P.344

Spacer rings



Catalog No.	M-SPR	M-SPR□B
Type	D-cut type	Circle type
Shipping	In-stock item	
Page	P.345	

Stop pins

Additional processing to MDC

Catalog No.	M-STP	M-STPH
Material	S45C	SCM435
Hardness after heat treatment	—	45 to 51HRC
Shipping	In-stock item	
Page	P.345	

Stop rings

Additional processing to MDC

Catalog No.	M-STR
Material	SCM435
Hardness after heat treatment	45 to 51HRC
Shipping	In-stock item
Page	P.345

Ejector rods

Additional processing to MDC

Catalog No.	M-ERA
Shipping	In-stock item
Page	P.346

About ejector guide pins & bushings

Ejector guide pins & bushings are available in two types:

Basic type ····· **a type combining a pin that has a sliding-section diameter tolerance of g6 and a bushing that has an inside diameter tolerance of G6.**

5 μm range type ····· **a type combining a pin that has a sliding-section tolerance of 5 μm and a bushing that has an inside diameter tolerance of 5 μm.**

Clearance range of combinations of ejector pins and bushings by type

(unit: mm)

Basic type							5 μm range type					
Ejector guide pin					Bushing		Ejector guide pin				Bushing	
Dia.	M-EGA Retaining ring type	M-EGB Centering location type	M-EGC Stuck-out type	Sliding-section diameter tolerance	M-EBB Inside diameter tolerance	Combination clearance	Dia.	M-EGBM Retaining ring type	M-EGCM Centering location type	Sliding-section tolerance	M-EBBM Inside diameter tolerance	Combination clearance
							8	○		−0.015 −0.020	+0.015 +0.010	0.025 ~0.035
10	○	○		−0.005 −0.014	+0.014 +0.005	0.010 ~0.028	10	○				
12	○	○		−0.006 −0.017	+0.017 +0.006	0.012 ~0.034	13	○		−0.020 −0.025		0.030 ~0.040
16	○	○					16	○	○			
20	○	○	○	−0.007 −0.020	+0.020 +0.007	0.014 ~0.040	20	○	○	−0.025 −0.030		0.035 ~0.045
25	○	○	○				25	○	○			
30			○				30	○	○			
							35		○			
40			○	−0.009 −0.025	+0.025 +0.009	0.018 ~0.050	40		○			
50			○				50		○			

※ Self-lubricating type ejector guide bushings M-EBG and M-EBC are applicable to basic type ejector guide pins.

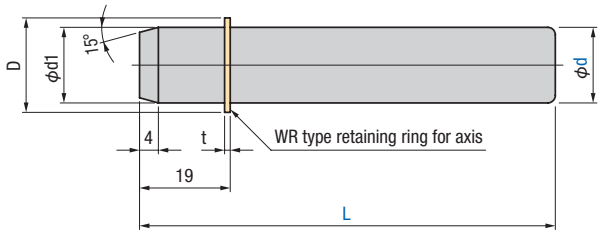
※ Linear motion bearing type ejector guide bushing M-EBD is applicable to basic type and 5 μm type ejector guide pins.

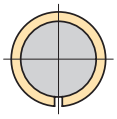
Ejector Guide Pins Retaining Ring Type

EJECTOR GUIDE PINS

Additional processing to mold bases ➡ P.110

Catalog No.	Material	Hardness after heat treatment
M-EGA	SUJ2	60 to 64HRC (high frequency quenching)





Cylindricity of d

L	100 or less	101 or more
Tolerance	0.003	0.004

Circularity (roundness) of d

d	25 or less
Tolerance	0.002

d		d1		t	D
DIMM	Limit deviations	DIMM	Limit deviations		
10	−0.005 −0.014	10	+0.010 +0.001	1.0	12.2
12	−0.006 −0.017	12	+0.012 +0.001		14.1
16		16		1.2	18.9
20	−0.007 −0.020	20	+0.015 +0.002		22.7
25		25			27.5

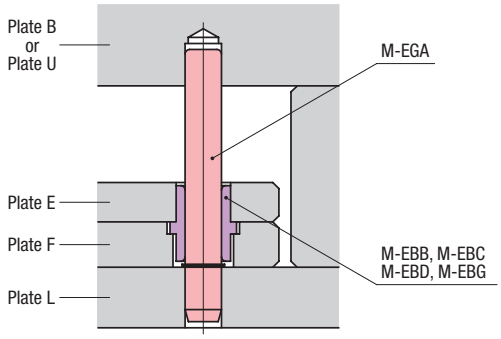
Catalog No.	d	Unit price in yen										
		L										
		80	90	100	110	120	130	140	150	160	170	190
M-EGA	10	440	450	460	470							
	12	460	470	480	490	500	510					
	16		510	530	550	570	590	610				
	20				610	630	650	670	690	720	750	810
	25							820	850	880	910	970

How to order

Catalog No.	d	×	L
M-EGA	12	×	120

Shipping **In-stock item**

Example of use



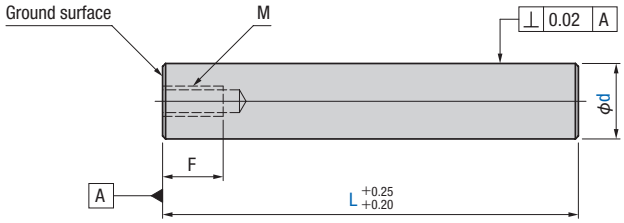
Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Ejector Guide Pins JIS Centering Location Type

EJECTOR GUIDE PINS

Additional processing to mold bases ➡ P.110

Catalog No.	Material	Hardness after heat treatment
M-EGB	SUJ2	60 to64HRC (high frequency quenching)



Cylindricity of d

L	50 or less	51 to 100	101 or more
Tolerance	0.002	0.003	0.004

Circularity (roundness) of d

d	25 or less
Tolerance	0.002

d DIMM	d Limit deviations	M	F
10	−0.005 −0.014	M5	12
12	−0.006 −0.017	M6	
16			
20	−0.007 −0.020	M8	16
25		M10	20

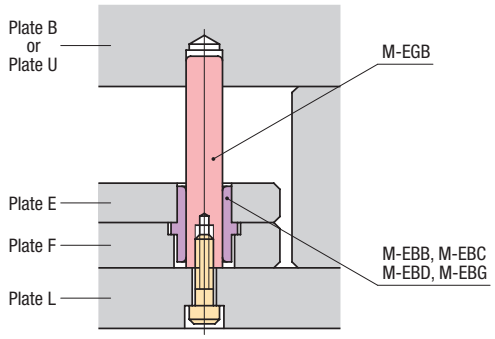
Catalog No.	d	Unit price in yen															
		L															
		50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
M-EGB	10	410	420	430	440	450											
	12	430	440	450	460	470	480	490									
	16	480	490	500	510	520	530	540	550								
	20		530	540	560	580	600	620	640	660	680	700	720	750			
	25		730	740	750	760	770	790	810	830	850	870	890	910	1,100	1,200	1,300

How to order

Catalog No.	d	×	L
M-EGB	16	×	120

Shipping **In-stock item**

Example of use

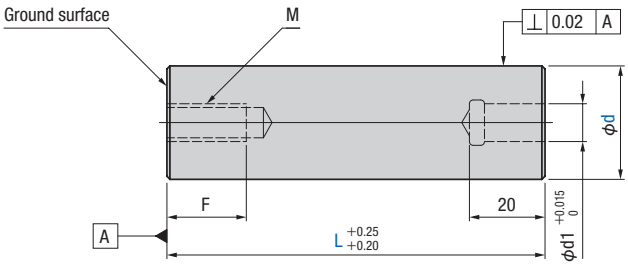


Ejector Guide Pins JIS Struck-Out Type

EJECTOR GUIDE PINS

Additional processing to mold bases → P.110

Catalog No.	Material	Hardness after heat treatment
M-EGC	SUJ2	60 to64HRC (high frequency quenching)



Cylindricity of d

L	50 or less	51 to 100	101 or more
Tolerance	0.002	0.003	0.004

Circularity (roundness) of d

d	30 or less	31 or more
Tolerance	0.002	0.0025

d		d1	M	F	Supplies with a threaded dowel pin
DIMM	Limit deviations				
20	−0.007 −0.020	8	M8	16	φ8h7×35
25		10	M10	20	φ10h7×35
30					
40	−0.009 −0.025				
50					

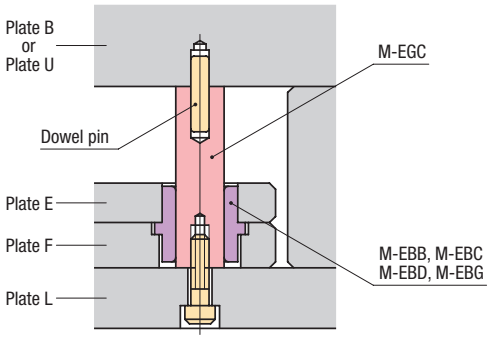
Catalog No.	d	Unit price in yen														
		L														
		50	60	70	80	90	100	110	120	130	140	150	160	170	180	200
M-EGC	20	1,100	1,120	1,140	1,160	1,180	1,200									
	25	1,120	1,140	1,160	1,180	1,200	1,220	1,260	1,300							
	30	1,840	1,860	1,880	1,900	1,920	1,940	1,960	1,980	2,000	2,050	2,100				
	40				2,300	2,350	2,400	2,450	2,500	2,550	2,600	2,650	2,700	2,750		
	50				3,150	3,200	3,250	3,300	3,400	3,600	3,700	3,800	3,900	4,000	4,100	4,200

How to order

Catalog No.	d	×	L
M-EGC	30	×	120

Shipping **In-stock item**

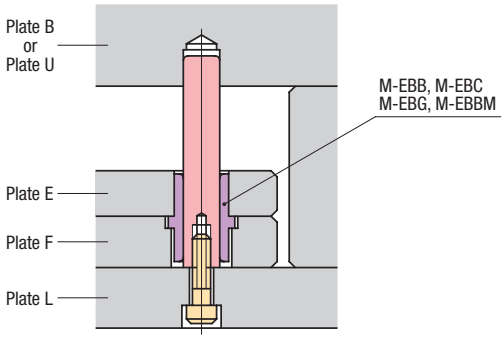
Example of use



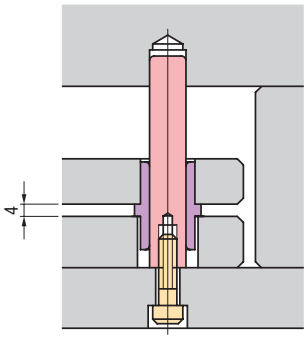
Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Ejector Guide Bushing Usage Examples

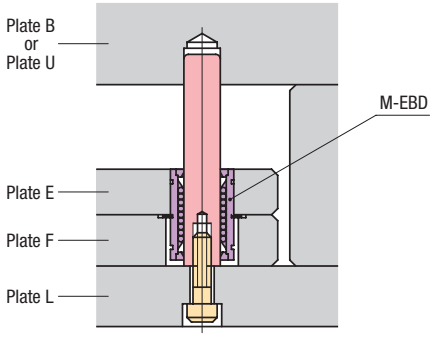
EJECTOR GUIDE BUSHES



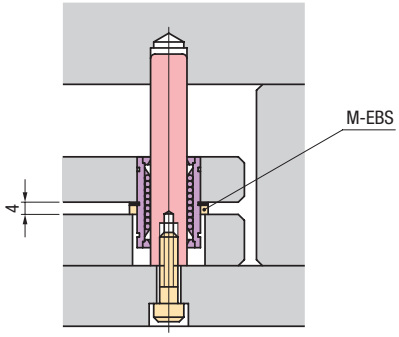
Counterbore type



Spacer type



Counterbore type



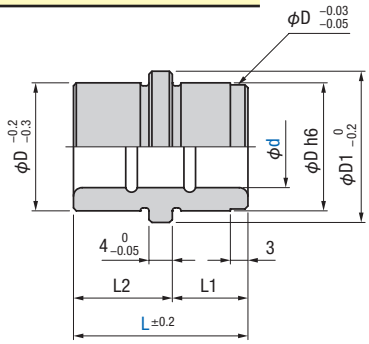
Spacer type

Ejector Guide Bushings JIS Type

EJECTOR GUIDE BUSHES

Additional processing to mold bases → P.110

Catalog No.	Material	Hardness after heat treatment
M-EBB	SUJ2	58 to 62HRC



Cylindricity of d

L	30 or less	31 to 50	51 or more
Tolerance	0.003	0.0035	0.004

Circularity (roundness) of d

d	30 or less	31 to 40	41 or more
Tolerance	0.0025	0.003	0.0035

Catalog No.	d	L	Unit price in yen	d DIMM	d Limit deviations	D h6 DIMM	D h6 Limit deviations	D1	L1	L2
M-EBB	10	23	750	10	+0.014 +0.005	16	0 −0.011	20	12	11
	12	25	780	12	+0.017 +0.006	18		22		13
		32	820						14	18
	16	25	880	16		25	0 −0.013	30	12	13
		32	900						14	18
		42	950						19	23
	20	25	980	20	+0.020 +0.007	30		35	12	13
		32	1,000						14	18
		42	1,070						19	23
		52	1,150						24	28
	25	25	1,100	25		35	0 −0.016	40	12	13
		32	1,150						14	18
		42	1,250						19	23
		52	1,350						24	28
	30	32	1,450	30		40		45	14	18
		42	1,550						19	23
		52	1,650						24	28
	40	42	1,950	40	+0.025 +0.009	50		55	19	23
		52	2,000						24	28
	50	52	2,600	50		60	0 −0.019	66	24	28

How to order

Catalog No.	d	×	L
M-EBB	30	×	42

Shipping **In-stock item**

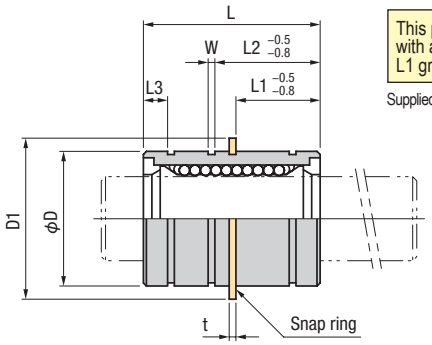
Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Ejector Guide Bushings Linear Motion Bearing Type

EJECTOR GUIDE BUSHES

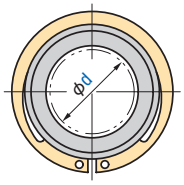
Additional processing to mold bases ➡ P.110

Catalog No.	Material	Hardness after heat treatment
M-EBD	SUJ2 (bush body, ball)	58HRC to



This product is delivered with a snap ring set in the L1 groove.

Supplied with a snap ring (1pc.)

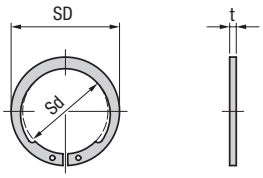


Ball retainer	Steel

Features

- ◆ A linear type bushing developed for use with ejector guides.
- ◆ The snap ring is set in the L1 groove upon delivery. Relocating the ring to the L2 position allows it to be used with ejector plate of a different thickness.
- ◆ If the ejector plate is spacer type, use ejector guide bush spacer M-EBS.

Snap ring for M-EBD



d	SD	Sd	t
10	23.1	17.5	1.2
12	25.5	19.5	
16	33.1	25.9	1.5
20	37.4	29.6	
25	46.2	37.0	1.75

Catalog No.	d	Unit price in yen	d		D		D1	L		L1	L2	L3	t	W
			DIMM	Limit deviations	DIMM	Limit deviations								
M-EBD	10	1,400	10	0 −0.009	19	0 −0.013	23.6	29	0 −0.2	13	—	3.5	1.2	1.3
	12	1,400	12		21		26.0	30		13	—	3.5		
	16	1,800	16		28		34.2	37		15	20	5.25	1.5	1.6
	20	2,300	20	0 −0.010	32	0 −0.016	38.3	42		20	25	5.75		
	25	3,200	25		40		47.2	59	0 −0.3	20	25	9	1.75	1.85

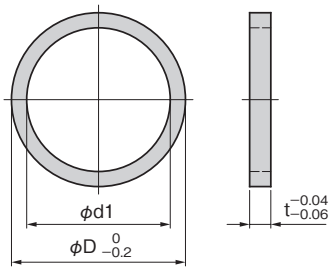
How to order

Catalog No.	d
M-EBB	16

Shipping **In-stock item**

Ejector guide bush spacer

Catalog No.	Material
M-EBS	S45C



Catalog No.	Applicable guide diameter d	Unit price in yen	D	d1	t
M-EBS	10	280	23	19	2.8
	12	310	26	21	
	16	370	34	28	2.5
	20	460	38	32	
	25	680	46	40	2.25

How to order

Catalog No.	Applicable guide diameter d
M-EBS	16

Shipping **In-stock item**

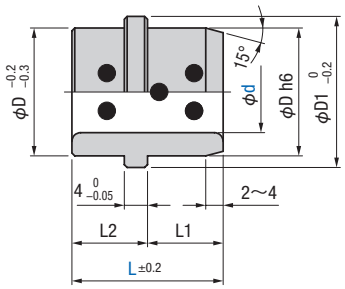
M-EBD and M-EBS Application example ➡ P.329

Ejector Guide Bushings Self Lubricating Copper Alloy Type

EJECTOR GUIDE BUSHES

Additional processing to mold bases ➡ P.110

Catalog No.	Material
M-EBG	Copper alloy (Solid lubricant embedded)



Catalog No.	d	L	Unit price in yen	d DIMM	d Limit deviations	D h6 DIMM	D h6 Limit deviations	D1	L1	L2
M-EBG	16	26	2,500	16	+0.017 +0.006	25	0 −0.013	30	12	14
		28							14	
		33	2,600						19	
	20	26	2,800	20	+0.020 +0.007	30		35	12	
		28							14	
		33	3,000						19	
		38	3,300						24	
	25	26	3,000	25		35	0 −0.016	40	12	
		28							14	
		33	3,300						19	
		38							24	
	30	33	3,500	30		40		45	14	19
		38							19	
		43	3,700						24	
	40	48	5,400	40	+0.025 +0.009	52	0 −0.019	57	24	24
	50	48	6,200	50		62		67		

How to order

Catalog No.	d	×	L
M-EBG	16	×	28

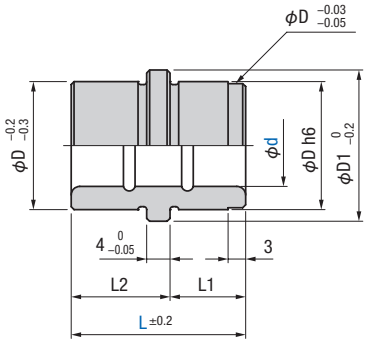
Shipping Orders will be shipped out in 3 business days (excluding the day of order).

Ejector Guide Bushings Self Lubricating Heat Resisting Type

EJECTOR GUIDE BUSHES

Additional processing to mold bases ➡ P.110

Catalog No.	Material
M-EBC	Sintered copper power



Catalog No.	d	L	Unit price in yen	d DIMM	d Limit deviations	D h6 DIMM	D h6 Limit deviations	D1	L1	L2
M-EBC	10	23	2,100	10	+0.022 +0.013	16	0 −0.011	20	12	11
	12	25	2,300	12	+0.027 +0.016	18		22		13
		32	2,500						14	18
	16	25	2,600	16		25	0 −0.013	30	12	13
		32	2,800						14	18
		42	3,100						19	23
	20	25	3,000	20	+0.033 +0.020	30		35	12	13
		32	3,300						14	18
		42	3,600						19	23
	25	25	3,100	25		35	0 −0.016	40	12	13
		32	3,400						14	18
		42	3,700						19	23
	30	32	3,700	30		40		45	14	18
		42	4,200						19	23

How to order

Catalog No.	d	×	L
M-EBC	16	×	32

Shipping: **In-stock item**

Ejector guide bushing M-EBC

This self-lubricating type bushing M-EBC is made of mainly copper with solid lubricant such as hexagonal boron nitride (h-BN) and black lead, etc. evenly distributed and sintered. Further, a solid lubricant with a superior sliding property is applied in the porous area (holes) of the sintered material.
It is especially excellent in heat resisting and provides good friction resistance at high temperature range.

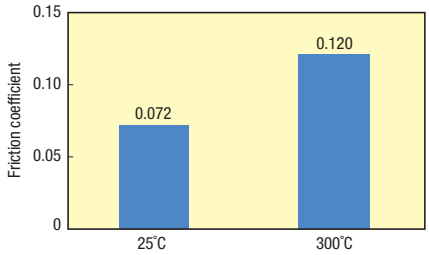
Features

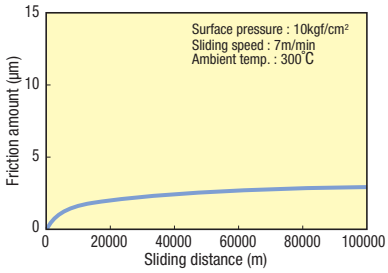
1. Can be used without lubrication at high-temperature range.
2. Low/middle load. Delivers high performance at mid-speed range.
3. Less trouble such as scuffing or seizing, etc. compared to steel bushings.
4. Has excellent heat resistance and there is no worries about occurrence of deformation or cracking even under the repeated high temperature.
5. Has superior friction resistance and the amount of friction is small compared to other bearings in the high temperature environment.

Range of application

Allowable max. load	Allowable max. sliding speed	Allowable max. PV value	Recommend operating temperature
N/mm² (kgf/cm²)	m/sec (m/min)	N/mm²·m/sec (kgf/cm²·m/min)	°C
10 (100)	0.33 (20)	0.75 (450)	350 or less

Sliding property





Notes for use

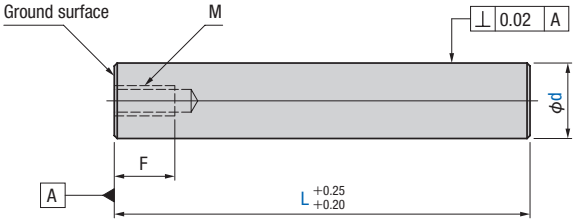
This product is delivered with a solid lubricant with an excellent sliding property applied on the surface. If not desired, however, the lubricant can be wiped off with a waste cloth, etc.

Ejector Guide Pins Centering Location Type (in 5 μm range)

EJECTOR GUIDE PINS

Additional processing to mold bases → P.110

Catalog No.	Material	Hardness after heat treatment
M-EGBM	SUJ2	60 to 64HRC (high frequency quenching)



Cylindricity of d

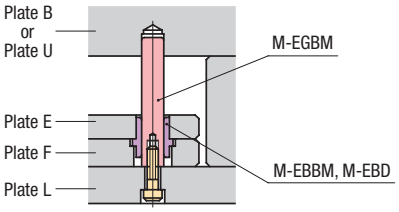
L	50 or less	51 to 100	101 or more
Tolerance	0.002	0.003	0.004

Circularity (roundness) of d

L	30 or less
Tolerance	0.002

d DIMM	d Limit deviations	M	F
8	−0.015 −0.020	M5	12
10			
13	−0.020 −0.025	M6	13
16			
20	−0.025 −0.030	M8	16
25			
30		M10	20

Example of use



Catalog No.	d	Unit price in yen L 50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220
M-EGBM	8	340	340	340	390														
	10	370	370	370	420	420	420												
	13	430	430	430	480	480	480	530											
	16	480	480	480	540	540	540	600	600										
	20		540	540	580	580	630	630	700	700	780	780	860	860					
	25		680	680	740	740	780	780	860	860	980	980	1,100	1,100	1,220	1,220	1,220	1,360	1,360
	30						1,160	1,160	1,250	1,250	1,340	1,340	1,480	1,480	1,630	1,630	1,630	1,690	1,690

How to order

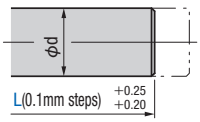
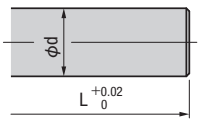
Catalog No. | d × L N + Optional processing

M-EGBM 16 × 120
M-EGBM 20 × 148.8 N + LC
M-EGBM 25 × 200 N + LKC

Shipping

In-stock item
Orders will be shipped out in 3 business days (excluding the day of order).

Optional processing

Option code		Specification	Unit price (yen)
LC		Changes the full length to a designated dimension. (in 0.1 mm steps) ※ Designate L dimension directly. L min≦designated L value<L max ※ It will be machined to an upper size closest to the designated L value.	200
LKC		Changes the limit deviations of full length. $L^{+0.25}_{+0.20} \rightarrow L^{+0.02}_{0}$ ※ When combined with LC, specify in 0.1 mm steps. L min≦designated L value<L max	400

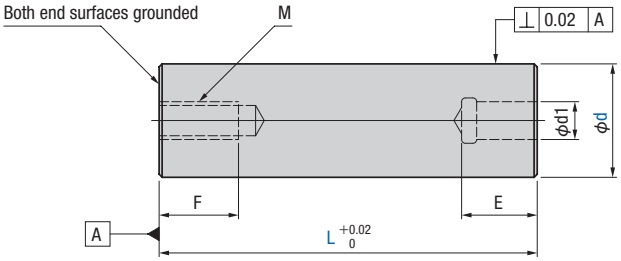
Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Ejector Guide Pins Stuck-Out Type (in 5 μm Range)

EJECTOR GUIDE PINS

Additional processing to mold bases → P.110

Catalog No.	Material	Hardness after heat treatment
M-EGCM	SUJ2	60 to 64HRC (high frequency quenching)



Cylindricity of d

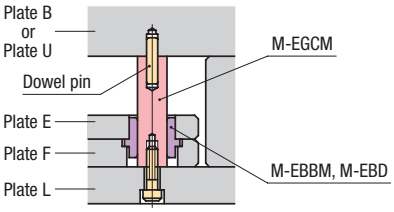
L	50 or less	51 to 100	101 or more
Tolerance	0.002	0.003	0.004

Circularity (roundness) of d

d	30 or less	31 or more
Tolerance	0.002	0.0025

d DIMM	d Limit deviations	M	F	d1 DIMM	d1 Limit deviations	E	Supplies with a threaded dowel pin
16	−0.020 −0.025	M6	13	6	+0.012 0	15	φ6h7×30
20	−0.025 −0.030	M8	16	8	+0.015 0	20	φ8h7×40
25				10			φ10h7×40
30		M10	20	13	+0.018 0	25	φ13h7×50
35				16			φ16h7×50
40							
50							

Example of use



Catalog No.	d	Unit price in yen L 50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
M-EGCM	16	980	980	980	1,030	1,030	1,030										
	20	1,130	1,130	1,130	1,130	1,130	1,190	1,190	1,190	1,330							
	25	1,200	1,200	1,200	1,200	1,200	1,380	1,380	1,380	1,530	1,530	1,530	1,680	1,680	1,680	1,680	1,680
	30	1,840	1,840	1,840	1,840	1,840	1,960	1,960	1,960	2,140	2,140	2,140	2,430	2,430	2,430	2,430	2,430
	35				2,500	2,500	2,500	2,500	2,500	2,690	2,690	2,690	3,000	3,000	3,000	3,000	3,000
	40				2,700	2,700	2,700	2,700	2,700	2,860	2,860	2,860	3,590	3,590	3,590	3,590	3,590
	50				3,620	3,620	3,620	3,620	3,620	3,940	3,940	3,940	5,000	5,000	5,000	5,000	5,000

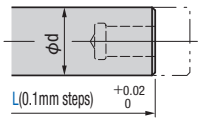
How to order

Catalog No.	d	×	L	N	+	Optional processing
M-EGCM	26	×	120			
M-EGCM	50	×	172.3	N	+	LC

Shipping

In-stock item
Orders will be shipped out in 3 business days (excluding the day of order).

Optional processing

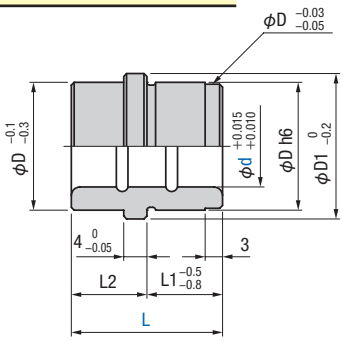
Option code	Specification	Unit price in yen d30 or less	d35 or more
LC	 Changes the full length to a designated dimension (in 0.1 mm steps). ※ Designate L dimension directly. L min≦designated L value＜L max (d30 or less) *1 L min≦0designated L value＜175 (d35 or more) *2 ＊1. It will be machined to an upper size closest to the designated L value. ＊2. It will be machined to an upper size closest to the designated L value ＋25.	500	1,000

Ejector Guide Bushings 5 μm Range Type

EJECTOR GUIDE BUSHES

Additional processing to mold bases → P.110

Catalog No.	Material	Hardness after heat treatment
M-EBBM	SUJ2	58 to 62HRC



Cylindricity of d

L	30 or less	31 to 50	51 or more
Tolerance	0.003	0.0035	0.004

Circularity (roundness) of d

d	30 or less	31 to 40	41 or more
Tolerance	0.0025	0.003	0.0035

Catalog No.	d	L	Unit price in yen	D h6 DIMM	D h6 Limit deviations	D1	L1	L2
M-EBBM	8	22	770	16	0 −0.011	19	10	12
		25					13	
	10	22	820	18		21	10	
		25					13	
	13	27	870	22	0 −0.013	25	13	14
		29					15	
	16	27	990	25		28	13	
		29					15	
		34	1,110				20	
	20	27	1,110	30		33	13	
		29					15	
		34	1,280				20	
		39					25	
	25	27	1,280	35	0 −0.016	38	13	
		29					15	
		34	1,450				20	
		39					25	
		44					30	
	30	34	1,690	40		43	15	19
		39					20	
		44					25	
		49					30	
	35	44	1,860	45		48	20	24
		49					25	
		54					30	
	40	44	2,330	52	0 −0.019	55	20	
		49					25	
		54					30	
	50	49	2,900	62		65	25	
		54					30	

How to order

Catalog No.	d	×	L
M-EBBM	16	×	34

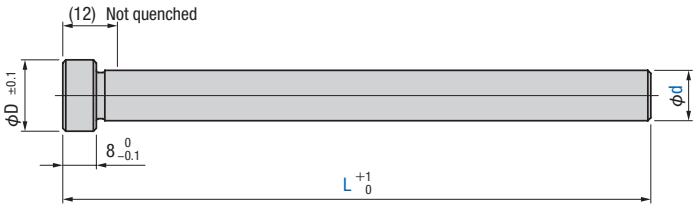
Shipping **In-stock item**

Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Return Pins Head Thick 8 mm Type

RETURN PINS

Catalog No.	Material	Hardness after heat treatment
M-RP8B	SUJ2	60 to 64HRC (high frequency quenching)



Catalog No.	d	Unit price in yen L 127	152	202	252	302	352	402	452	502	d DIMM	d Limit deviations	D
M-RP8B	10	550									10	−0.013 −0.022	15
	12		620	800							12	−0.016 −0.027	17
	15		630	820	1,250						15		20
	20		720	900	1,510	1,760	2,060				20	−0.020 −0.033	25
	25		900	1,150	1,600	2,040	2,200	2,550			25		30
	30		1,100	1,400	1,740	2,320	3,050	3,510	4,000	4,600	30		35

How to order

Catalog No.	d	×	L
M-RP8B	12	×	202

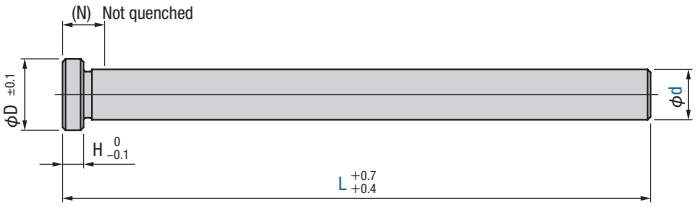
Shipping **In-stock item**

Return Pins L Dimensional Designation Type (Unit 1mm)

RETURN PINS

Additional processing to mold bases ➡ P.64 & P.66

Catalog No.	Material	Hardness after heat treatment	H	N
M-RPN	SUJ2	60 to 64HRC (High frequency quenching)	4	8
M-RP8N			8	12



d DIMM	d Limit deviations	D
8	−0.013 −0.022	12
10		15
12	−0.016 −0.027	17
15		20
20	−0.020 −0.033	25
25		30
30		35
35		40

M-RPN Price list

L	Unit price in yen d 8	10	12	15	20	25	30	35
47	220	220						
50				320				
52	220	220						
55			270	320				
57	240	240						
60			280	320				
62	260	260						
65			280	320	410			
67	260	260						
70			290	330	420			
72	260	270						
75			290	330	430			
77		280						
80			300	350	440	590		
82		280						
85			300	360	460	600		
87		290						
90			310	360	480	620		
92		290						
95			310	370	500	630		
97		300						
100			330	390	520	650		
102		300						
105			350	410	530	660		
107		310						
110			350	410	540	670	780	
112		310						
115			360	420	540	680		
117		350						
120			400	420	550	720	830	
122		380						
125			400	440	550	720		
127		420						
130			410	460	560	740	860	
135			410	470	560	740		
140			470	480	600	800	920	
145			470	480	600	810		

L	Unit price in yen d 8	10	12	15	20	25	30	35
150			520	510	620	830	970	
155			540	560	650	850		
160				630	680	890	1,020	
165			600	630	700	890		
170				640	720	900	1,060	
175			620	660	740	940		
180				680	750	970	1,110	
185			670	700	760	1,000		
190				720	780	1,020	1,170	
195			690	750	790	1,040		
200				780	800	1,050	1,220	
205			710	800	850	1,070		
210				840	870	1,080	1,340	
215			750	920	880	1,100		
220				950	1,050	1,120	1,350	
225				960	1,070	1,140		
230				1,050	1,120	1,160	1,370	
235				1,070	1,130	1,300		
240				1,150	1,320	1,390	1,450	
245					1,400	1,500		
250				1,250	1,510	1,600	1,740	2,480
255					1,590	1,660		
260					1,660	1,720	1,870	
265					1,700	1,800		
270						1,850	1,950	
275					1,760	1,880		
280						1,890	2,070	
290						1,960	2,230	
300						2,040	2,320	3,300
310						2,120	2,410	
320						2,200	2,500	
330							2,590	
380							3,050	4,620
430							3,510	
480							4,000	
530							4,420	
580							4,870	
630							5,330	

※ To specify L dimensions in 1 mm steps, use optional processings.
To specify L dimensions in 0.1 mm or 0.01 mm steps, use M-RPL, M-RPM in page 340.

M-RP8N Price list

L In 1mm steps	Unit price in yen					
	d					
	10	12	15	20	25	30
30～125	950	1,020	1,030	1,170	1,350	1,600
126～150		1,020	1,030	1,170	1,350	1,600
151～200		1,200	1,220	1,350	1,600	1,900
201～250			1,650	1,960	2,050	2,240
251～300				2,210	2,490	2,820
301～350				2,510	2,650	3,550
351～400					3,000	4,010
401～450						4,500
451～500						5,100

※ To specify L dimensions in 0.1 mm or 0.01 mm steps, use M-RP8L, M-RP8M in page 340.

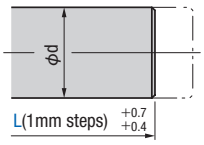
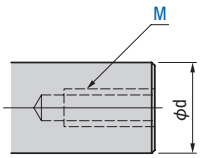
How to order

Catalog No.	d	×	L	N	+	Optional processing
M-RPN	20	×	150			
M-RPN	25	×	187			
M-RPN	15	×	115	N	+	M6
M-RP8N	20	×	160			
M-RP8N	12	×	154			
M-RP8N	15	×	180	N	+	M5

Shipping

M-RPN: In-stock item
M-RP8N: Shipped in 2 business day (excluding the day of order).
However, orders requiring optional processing will be shipped in 2 business days (excluding the day of order)

Optional processing

Option code	Specification			Unit price in yen
Applicable to M-RPN Designate L dimensions directly		d / L dimention designation range 8: 30～ 72 10: 30～127 12: 30～215 15: 30～250 20: 30～275 25: 30～320 30: 30～630 35: 30～380	Changes the full length of M-RPN to a designated dimension (in 1 mm steps). ※ Designate L dimensions directly. ※ It will be machined to an upper size closest to the designated L value.	d / U/price (yen) d≦15: 400 20 25: 450 30 35: 500
M		d / M (options) 10: 4 5 12: 4 5 6 15: 5 6 8 20: 6 8 10 25: 8 10 12 30: 8 10 12 35: 8 10 12	Creates a threaded hole on the end face. ※ This option cannot be specified when d=8. Thread depth M4～M6＝M diameter×2.5 M8～M12＝M diameter×2	M / U/Price (yen) M4 M5 M6: 400 M8 M10 M12: 600

Return Pins L Dimensional Designation Type (Unit 0.1mm and 0.01mm)

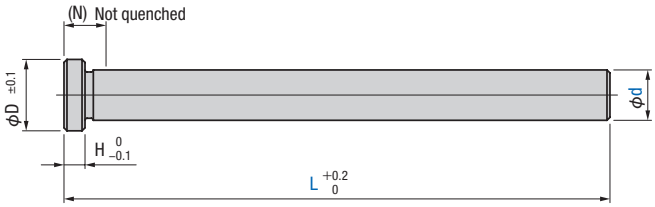
RETURN PINS

Additional processing to mold bases ➡ P.64 & P.66

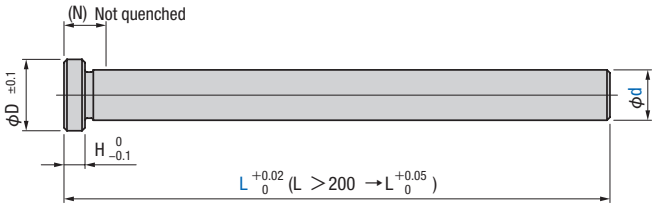
Catalog No.	Material	Hardness after heat treatment	H	N	Limit deviations
M-RPL	SUJ2	60 to 64HRC (High-frequency quenching)	4	8	$^{+0.2}_{0}$
M-RP8L			8	12	
M-RPM			4	8	L≦200 → $^{+0.02}_{0}$
M-RP8M			8	12	L＞200 → $^{+0.05}_{0}$

d DIMM	d Limit deviations	D
8	−0.013 −0.022	12
10		15
12	−0.016 −0.027	17
15		20
20	−0.020 −0.033	25
25		30
30		35
35		40

M-RPL
M-RP8L



M-RPM
M-RP8M



M-RPL Price list

L In 0.1mm steps	U/price (yen) d 8	d 10
30.0～ 52.0	620	620
52.1～ 57.0	640	640
57.1～ 67.0	660	660
67.1～ 72.0	660	670
72.1～ 82.0		680
82.1～ 92.0		690
92.1～102.0		700
102.1～112.0		710
112.1～117.0		750
117.1～122.0		780
122.1～127.0		820

L In 0.1mm steps	Unit price in yen d 12	d 15	d 20	d 25	d 30	d 35
30.0～ 55.0	670	720	860	1,040	1,280	2,980
55.1～ 65.0	680	720	860	1,040	1,280	2,980
65.1～ 70.0	690	730	870	1,040	1,280	2,980
70.1～ 75.0	690	730	880	1,040	1,280	2,980
75.1～ 80.0	700	750	890	1,040	1,280	2,980
80.1～ 85.0	700	760	910	1,050	1,280	2,980
85.1～ 90.0	710	760	930	1,070	1,280	2,980
90.1～ 95.0	710	770	950	1,080	1,280	2,980
95.1～100.0	730	790	970	1,100	1,280	2,980
100.1～105.0	750	810	980	1,110	1,280	2,980
105.1～110.0	750	810	990	1,120	1,280	2,980
110.1～115.0	760	820	990	1,130	1,330	2,980
115.1～120.0	800	820	1,000	1,170	1,330	2,980
120.1～125.0	800	840	1,000	1,170	1,360	2,980
125.1～130.0	810	860	1,010	1,190	1,360	2,980
130.1～135.0	810	870	1,010	1,190	1,420	2,980
135.1～140.0	870	880	1,050	1,250	1,420	2,980
140.1～145.0	870	880	1,050	1,260	1,470	2,980
145.1～150.0	920	910	1,070	1,280	1,470	2,980
150.1～155.0	940	960	1,100	1,300	1,520	2,980
155.1～160.0	1,000	1,030	1,130	1,340	1,520	2,980
160.1～165.0	1,000	1,030	1,150	1,340	1,560	2,980
165.1～170.0	1,020	1,040	1,170	1,350	1,560	2,980
170.1～175.0	1,020	1,060	1,190	1,390	1,610	2,980
175.1～180.0	1,070	1,080	1,200	1,420	1,610	2,980
180.1～185.0	1,070	1,100	1,210	1,450	1,670	2,980
185.1～190.0	1,090	1,120	1,230	1,470	1,670	2,980
190.1～195.0	1,090	1,150	1,240	1,490	1,720	2,980

L In 0.1mm steps	Unit price in yen d 12	d 15	d 20	d 25	d 30	d 35
195.1～200.0	1,110	1,180	1,250	1,500	1,720	2,980
200.1～205.0	1,110	1,200	1,300	1,520	1,840	2,980
205.1～210.0	1,150	1,240	1,320	1,530	1,840	2,980
210.1～215.0	1,150	1,320	1,330	1,550	1,850	2,980
215.1～220.0		1,350	1,500	1,570	1,850	2,980
220.1～225.0		1,360	1,520	1,590	1,870	2,980
225.1～230.0		1,450	1,570	1,610	1,870	2,980
230.1～235.0		1,470	1,580	1,750	1,950	2,980
235.1～240.0		1,550	1,770	1,840	1,950	2,980
240.1～245.0		1,650	1,850	1,950	2,240	2,980
245.1～250.0		1,650	1,960	2,050	2,240	2,980
250.1～255.0			2,040	2,110	2,370	3,800
255.1～260.0			2,110	2,170	2,370	3,800
260.1～265.0			2,150	2,250	2,450	3,800
265.1～270.0			2,210	2,300	2,450	3,800
270.1～275.0			2,210	2,330	2,570	3,800
275.1～280.0				2,340	2,570	3,800
280.1～290.0				2,410	2,730	3,800
290.1～300.0				2,490	2,820	3,800
300.1～310.0				2,570	2,910	5,120
310.1～320.0				2,650	3,000	5,120
320.1～330.0					3,090	5,120
330.1～380.0					3,550	5,120
380.1～430.0					4,010	
430.1～480.0					4,500	
480.1～530.0					4,920	
530.1～580.0					5,370	
580.1～630.0					5,830	

Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

M-RP8L Price list

L In 0.1 mm steps	Unit price in yen					
	d					
	10	12	15	20	25	30
30.0～125.0	950	1,020	1,030	1,170	1,350	1,600
125.1～150.0		1,020	1,030	1,170	1,350	1,600
150.1～200.0		1,200	1,220	1,350	1,600	1,900
200.1～250.0			1,650	1,960	2,050	2,240
250.1～300.0				2,210	2,490	2,820
300.1～350.0				2,510	2,650	3,550
350.1～400.0					3,000	4,010
400.1～450.0						4,500
450.1～500.0						5,100

M-RPM、M-RP8M Price list

L In 0.01 mm steps	M-RPM Unit price in yen						M-RP8M Unit price in yen					
	d						d					
	10	12	15	20	25	30	10	12	15	20	25	30
30.00～125.00	1,570	1,650	1,670	1,790	2,000	2,230	1,570	1,650	1,670	1,790	2,000	2,230
125.01～150.00		1,650	1,670	1,790	2,000	2,230		1,650	1,670	1,790	2,000	2,230
150.01～200.00		1,830	1,860	1,970	2,250	2,530		1,830	1,860	1,970	2,250	2,530
200.01～250.00				2,580	2,700	2,870			2,290	2,580	2,700	2,870
250.01～300.00					3,140	3,450				2,830	3,140	3,450
300.01～350.00						4,180				3,130	3,300	4,180
350.01～400.00						4,640					3,650	4,640
400.01～450.00						5,130						5,130

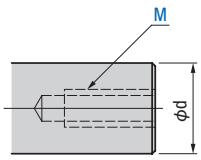
How to order

Catalog No.	d	×	L	N	+	Optional processing
M-RPL	10	×	100.0			
M-RP8L	15	×	220.1	N	+	M5
M-RPM	20	×	240.00	N	+	M8
M-RP8M	30	×	349.95			

Shipping

M-RPL & M-RP8L: shipped in 2 business days (excluding the day of order)
M-RPM & M-RP8M: shipped in 3 business days (excluding the day of order)

Optional processing

Option code	Specification	U/ price in yen
M		

d	M options
10	4 5
12	4 5 6
15	5 6 8
20	6 8 10
25	8 10 12
30	
35	

Creates a threaded hole on the end face.
※ This option cannot be specified when d=8.
Thread depth
M4～M6＝M diameter×2.5
M8～M12＝M diameter×2

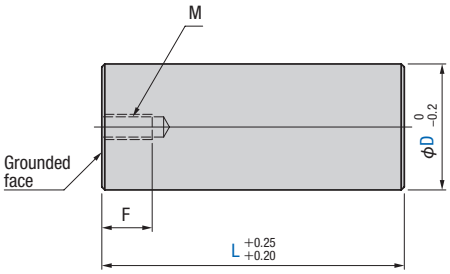
M	U/price (yen)
M4 M5 M6	400
M8 M10 M12	600

Support Pillars Screw Hole Type

SUPPORT PILLARS

Additional processing to mold bases → P.142

Catalog No.	Material
M-SRD	S45C



Catalog No.	D	Unit price in yen															M	F
		L																
		50	60	70	80	90	100	110	120	130	140	150	160	170	180	200		
M-SRD	20	350	360	370	380	390	400										M6	13
	25	450	460	480	490	500	520										M8	16
	30	600	620	640	650	670	690	720	750									
	35		670	690	710	730	750	780	830	880	930	980						
	40			740	760	790	810	840	870	1,030	1,060	1,090						
	50				1,210	1,240	1,470	1,510	1,540	1,580	1,620	1,660	1,880	2,100	2,160	2,220		
	60						1,710	1,830	1,940	2,080	2,180	2,270	2,320	2,370	2,450	2,530	M12	24
	80						2,380	2,550	2,630	2,720	2,810	2,890	2,980	3,070	3,200	3,320		

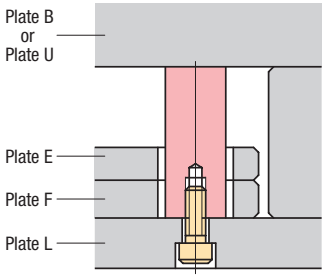
How to order

Catalog No.	D	×	L	N +	Optional processing
M-SRD	50	×	200		
M-SRD	40	×	144		
M-SRD	80	×	185.95	N +	LKC

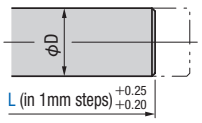
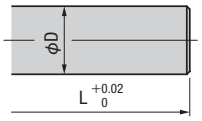
Shipping

In-stock item
Orders requiring optional processing will be shipped in 3 business days (excluding the day of order)

Example of use



Optional processing

Option code	Specification		Unit price in yen	
Designate L dimensions directly		Changes the full length to a designated dimension. (in 1 mm steps) ※ Designate L dimension directly. L min≦designated L value＜L max ※ It will be machined to an upper size closest to the designated L value.	D50 or less	D60 or more
			200	400
LKC		Changes the limit deviations of full length. L +0.25 +0.20 → L +0.02 0 ※ When combined with full length designation, specify in 0.01 mm steps. L min≦designated L value＜L max	D50 or less	D60 or more
			400	600

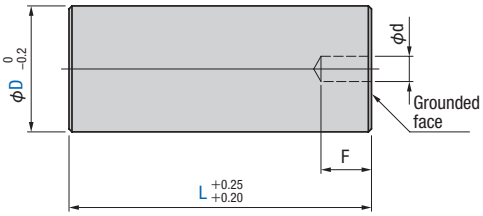
Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Support Pillars Dowel Hole Type

SUPPORT PILLARS

Additional processing to mold bases → P.142

Catalog No.	Material
M-SRC	S45C



※ The ground face has been changed from left end face to right end face.
Please note that the products of old and new specifications may be delivered mixed during the stock replacement period.

D	d H7		F	Supplies with a threaded dowel pin
20	8	+0.015 0	15	φ8h7×30
25	10		20	φ10h7×35
30				
35				
40				
50				
60	16	+0.018 0	30	φ16h7×50
80				

Catalog No.	D	Unit price in yen														
		L														
		50	60	70	80	90	100	110	120	130	140	150	160	170	180	200
M-SRC	20	470	490	500	510	530	540									
	25	570	590	600	610	630	640									
	30	730	750	770	790	800	820	850	880							
	35		810	830	850	880	910	930	960	1,140	1,170	1,190				
	40			880	900	930	960	980	1,010	1,190	1,220	1,240				
	50				1,380	1,410	1,650	1,700	1,730	1,770	1,810	1,850	2,090	2,320	2,380	2,440
	60						2,030	2,150	2,270	2,410	2,500	2,590	2,640	2,690	2,770	2,850
	80						2,780	2,860	2,950	3,040	3,130	3,210	3,300	3,380	3,510	3,640

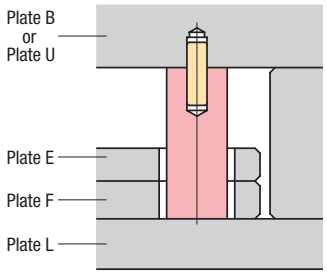
How to order

Catalog No.	D	×	L	N +	Optional processing
M-SRC	50	×	120		
M-SRC	60	×	165		
M-SRC	25	×	98.95	N +	LKC

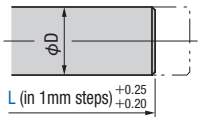
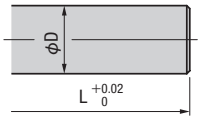
Shipping

In-stock item
Orders requiring optional processing will be shipped in 3 business days (excluding the day of order).

Example of use



Optional processing

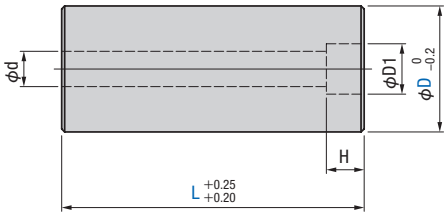
Option code	Specification		Unit price in yen	
Designate L dimensions directly		Changes the full length to a designated dimension. (in 1 mm steps) ※ Designate L dimension directly. L min≦designated L value＜L max ※ It will be machined to an upper size closest to the designated L value.	D50 or less	D60 or more
			200	400
LKC		Changes the limit deviations of full length. L +0.25 +0.20 → L +0.02 0 ※ When combined with full length designation, specify in 0.01 mm steps. L min≦designated L value＜L max	D50 or less	D60 or more
			400	600

Support Pillars Bolt Hole Type

SUPPORT PILLARS

Additional processing to mold bases → P.142

Catalog No.	Material
M-SRE	S45C



D	Applicable bolts	d	D1	H
20	M6	7	11	7
25	M8	9	14	9
30				
35	M10	11	18	13
40	M12	14	20	15
50	M16	18	26	19
60				
80				

Catalog No.	D	Unit Price in yen L										
		50	60	70	80	90	100	110	120	130	140	150
M-SRE	20	490	590	590	590	590	590					
	25	610	730	730	730	730	730					
	30	720	840	840	840	840	840	1,000	1,000			
	35		1,040	1,040	1,040	1,040	1,040	1,260	1,260	1,260	1,260	1,260
	40			1,290	1,290	1,290	1,290	1,670	1,670	1,670	1,670	1,670
	50				2,050	2,050	2,050	2,090	2,090	2,090	2,090	2,090
	60						2,780	3,490	3,490	3,490	3,490	3,490
	80						4,800	5,500	5,500	5,500	5,500	5,500

How to order

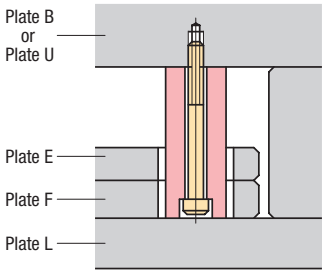
Catalog No. | D | × | L | N + | Optional processing

M-SRE 50 × 150
M-SRE 40 × 144
M-SRE 35 × 120.95 N + LKC

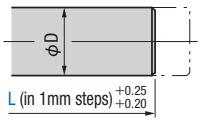
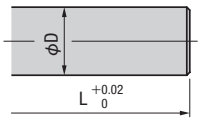
Shipping

In-stock item
Orders requiring optional processing will be shipped in 3 business days (excluding the day of order).

Example of use



Optional processing

Option code	Specification		Unit price in yen	
Designate L dimensions directly		Changes the full length to a designated dimension. (in 1 mm steps) ※ Designate L dimension directly. L min≦designated L value＜L max ※ It will be machined to an upper size closest to the designated L value.	D50 or less	D60 or more
			200	400
LKC		Changes the limit deviations of full length. L +0.25 +0.20 → L +0.02 0 ※ When combined with full length designation, specify in 0.01 mm steps. L min≦designated L value＜L max	D50 or less	D60 or more
			400	600

Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

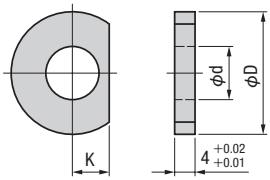
Spacer Rings/Stop Pins/Stop Rings

SPACER RINGS/STOP RINGS/STOP PINS

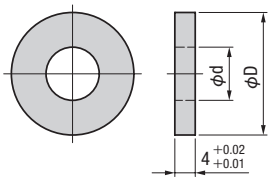
Spacer rings

Catalog No.	Material	Specification
M-SPR	S45C	D-cut type
M-SPR□B		Circle type

M-SPR



M-SPR□B



Catalog No.	Applicable bolt diameter	Unit price in yen	D	d	K
M-SPR D-cut type	5	150	13	5.5	5
	6		14	6.5	6
	8		18	8.5	
	10		22	10.5	7
	12		24	12.5	9

Catalog No.	Applicable bolt diameter	Unit price in yen	D	d
M-SPR□B Circle type	5	100	13	5.5
	6		14	6.5
	8		18	8.5
	10	140	22	10.5
	12		24	12.5

How to order

Catalog No.	Applicable bolt diameter
M-SPR	8
M-SPR	10 B

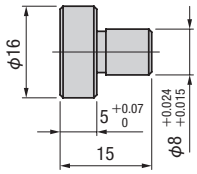
Shipping: **In-stock item**

Stop pins

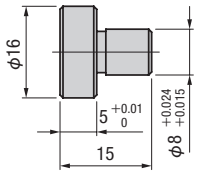
Additional processing to mold bases ➡ P.140

Catalog No.	Material	Hardness after heat treatment
M-STP	S45C	—
M-STPH	SCM435	45 to 51HRC

M-STP



M-STPH



Catalog No.	Unit price in yen
M-STP	100
M-STPH	250

How to order

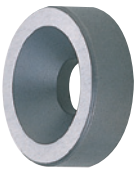
Catalog No.
M-STP
M-STPH

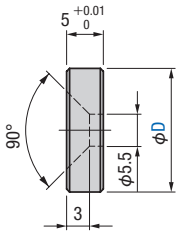
Shipping: **In-stock item**

Stop rings

Additional processing to mold bases ➡ P.140

Catalog No.	Material	Hardness after heat treatment
M-STR	SCM435	45 to 51HRC





Supplied with Hexagon socket flat head cap screw M5 ×12

Catalog No.	D	Unit price in yen
M-STR	16	150
	20	200
	25	250

How to order

Catalog No.	D
M-STR	20

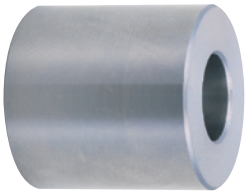
Shipping: **In-stock item**

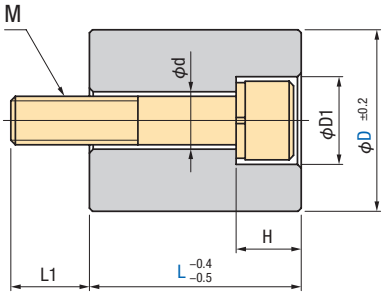
Ejector Rods

EJECTOR RODS

Additional processing to mold bases → P.146

Catalog No.	Material
M-ERA	S45C (body)





Supplied with hexagon socket head cap screw and spring washer

Catalog No.	D	L	L1 DIMM	L1 Code	Unit price in yen	M	d	D1	H
M-ERA	20	15 20 25 30 35 40	7 → 12 →	A B	320	M6	7	11	8.6
	25	20 25	9 → 14 →	A B	390	M8	9	14	11
		30 35 40			470				
	30	20 25			430				
		30 35 40			520				
		50			630				
	35	25			470				
		30 35 40			580				
		50			720				
	40	25 30 35 40	11 → 16 →	A B	670	M10	11	17	13.5
		50			890				
	50	30 35 40			1,060				
		50 60			1,290				

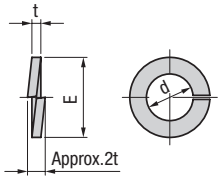
How to order

Catalog No.	D	×	L	L1
M-ERA	35	×	25	B

Shipping **In-stock item**

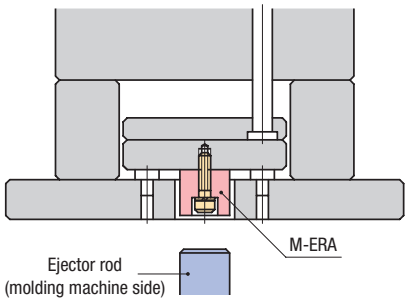
Product of sizes and shapes not listed above will be made to order. Please consult our sales office.

Spring washers for ejector rods



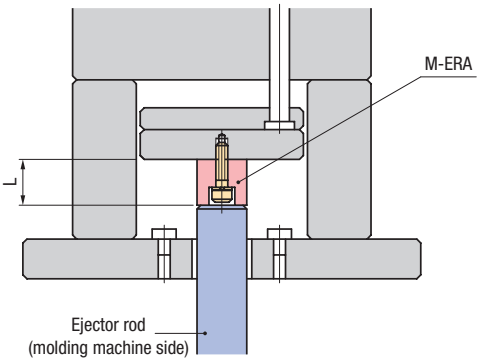
Applicable bolts	d		E	t
M6	6.1	+0.5 / 0	10.0	1.6
M8	8.2		13.0	2.0
M10	10.2		16.0	2.5

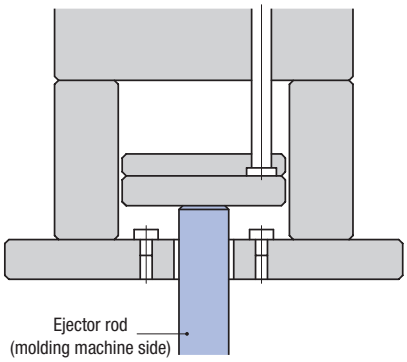
Example of use



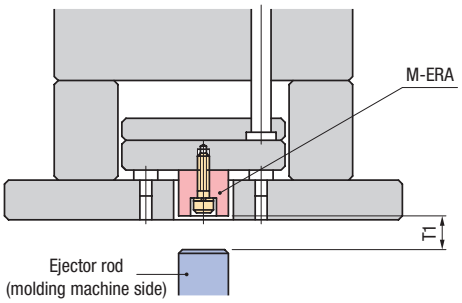
Features of ejector rods

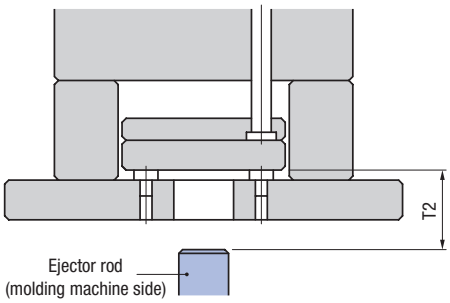
Allows lengthening the ejection stroke by L dimension





Allows shortening ejection time by T2－T1





Locating Rings, Sprue Bushings, Runner & Gate Parts

Locating Rings, Sprue Bushings, Runner & Gate Parts Overview

Locating rings

Additional processing to MDC

Catalog No.	M-LRA
Shipping	In-stock item
Page	P.352

Additional processing to MDC

Catalog No.	M-LRH
Shipping	In-stock item
Page	P.352

Additional processing to MDC

Catalog No.	M-LRC
Shipping	In-stock item
Page	P.352

Locating rings

Additional processing to MDC

Catalog No.	M-LRB
Shipping	In-stock item
Page	P.354

Additional processing to MDC

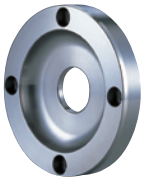
Catalog No.	M-LRJ
Shipping	In-stock item
Page	P.354

Additional processing to MDC

Catalog No.	M-LRG
Type	Reversible type
Shipping	In-stock item
Page	P.354

Locating rings

Additional processing to MDC



Catalog No.	M-LRD
Shipping	In-stock item
Page	P.356

Additional processing to MDC

Catalog No.	M-LRE
Shipping	In-stock item
Page	P.356

Additional processing to MDC

Catalog No.	M-LRF
Type	Large bore type
Shipping	In-stock item
Page	P.356

Miniature hot sprue bushings

Catalog No.	H-HSB
Type	Bolt hole type
Shipping	In-stock item
Page	P.358

Sprue bushings (cooling channel type)

Catalog No.	M-SBLH
Type	Bolt hole type
Shipping	In-stock item
Page	P.362

Sprue bushings (Futaba original)

Additional processing to MDC

Catalog No.	M-SBA	M-SBC
Type	Bolt hole type	
Shipping	In-stock item	
Page	P.372	

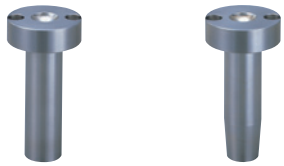
Additional processing to MDC

Catalog No.	M-SBB	M-SBD
Type	Shoulder type	
Shipping	In-stock item	
Page	P.373	

Additional processing to MDC denotes the parts that support additional processing to mold bases.
Shipping times are shown in business days (excluding the day of order).

Sprue bushings JIS type

Additional processing to MDC



Catalog No.	M-SJA□	M-SJB□
Type	Bolt hole type	
Shipping	5 days	
Page	P.374	

Additional processing to MDC

Catalog No.	M-SJC□	M-SJD□
Type	Shoulder type	
Shipping	5 days	
Page	P.376	

Sprue bushings

Additional processing to MDC

Catalog No.	M-SAG□
Type	Bolt hole type
Shipping	3 days
Page	P.378

Sprue bushings bolt hole type

Additional processing to MDC

Catalog No.	M-SBG□	M-SBH□
Type	Bolt hole, head thick 10 mm type	
Shipping	5 days	
Page	P.380	

Sprue bushings bolt hole type

Additional processing to MDC

Catalog No.	M-SBI□	M-SBJ□
Type	Bolt hole, head thick 15 mm type	
Shipping	5 days	
Page	P.382	

Sprue bushing shoulder type

Additional processing to MDC

Catalog No.	M-SBE□	M-SBF□
Type	Shoulder type	
Shipping	5 days	
Page	P.384	

Runner lock pins

Catalog No.	M-RLA
Material	SKS3
Shipping	In-stock item
Page	P.387

Pin-point gate bushings

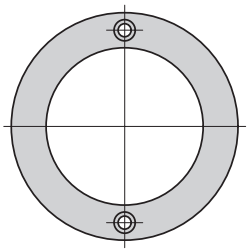
Catalog No.	M-PGBA	M-PGBB
Material	SKH51	
Shipping	8 days	
Page	P.388	

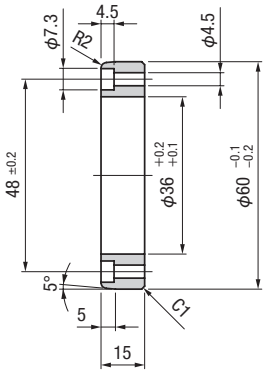
Locating Rings

LOCATING RINGS

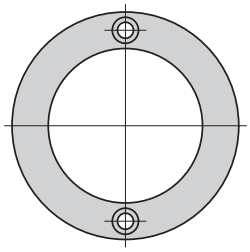
Additional processing to mold bases ➡ P.86

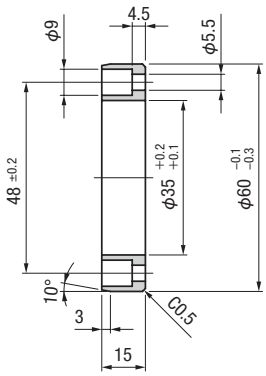
Catalog No.	Material
M-LRA60×36	S45C



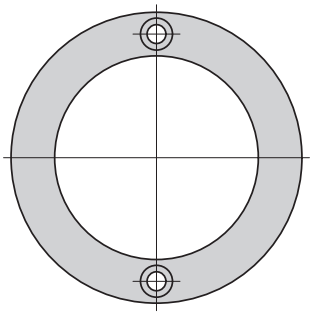


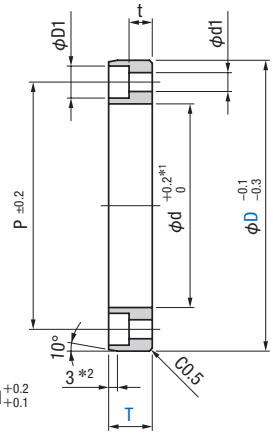
Catalog No.	Material
M-LRH60×15	S45C





Catalog No.	Material
M-LRC	S45C





*1. Only when D=60, $\phi d^{+0.2}_{+0.1}$
*2. When T=10, 2

Product of sizes and shapes not listed above will be made to order. Please consult our sales office

Unit price 700 yen

How to order

Catalog No.

M-LRA60 × 36

Shipping In-stock item

Unit price 700 yen

How to order

Catalog No.

M-LRH60 × 15

Shipping In-stock item

Catalog No.	D	T	Unit price in yen	d	P	Bolt hole d1	Bolt hole D1	Bolt hole t	Applicable bolt
M-LRC	60	10	460	40	50	5.5	9	4.5	M5
		15	490						
		20	530						
		25	570						
	100	10	530	70	85	6.5	11	3.5	M6
		15	570					8	
		20	610						
		25	680						
		30	760						
	110	10	570	80	95			3.5	
		15	610					8	
		20	680						
	120	10	650	90	105			3.5	
		15	680					8	
		20	760						
		25	910						
	150	15	910	110	130	9	14	6	M8
		20	1,060						
		25	1,120						

How to order

Catalog No. D × T

M-LRC 100 × 20

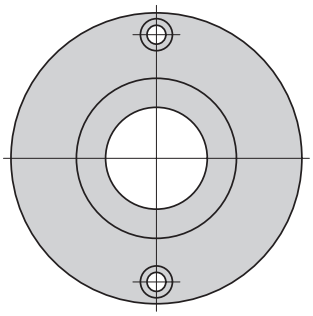
Shipping In-stock item

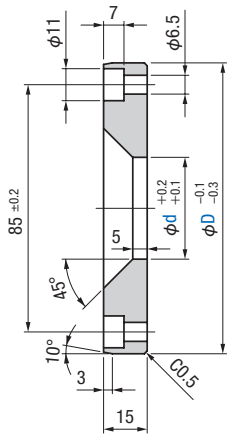
Locating Rings

LOCATING RINGS

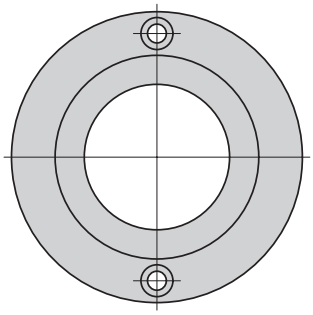
Additional processing to mold bases ➡ P.86

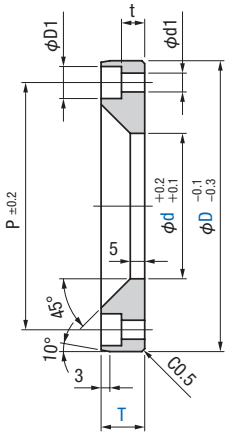
Catalog No.	Material
M-LRB	S45C



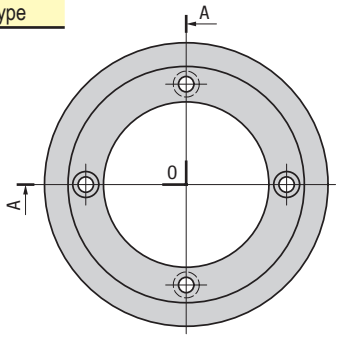


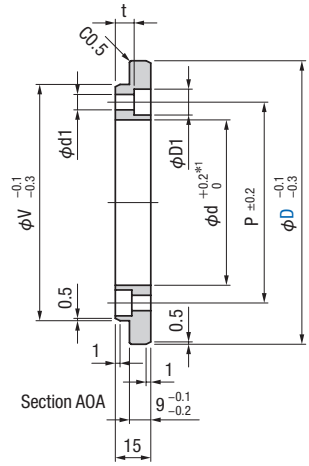
Catalog No.	Material
M-LRJ	S45C





Catalog No.	Material	Type
M-LRG	S45C	Reversible type





*1. Only when d=40, $\phi d^{+0.2}_{+0.1}$

Product of sizes and shapes not listed above will be made to order. Please consult our sales office

Catalog No.	D	d	Unit price in yen	Applicable bolt
M-LRB	100	36	760	M6
	120		960	

The catalog numbers of the following products have been changed as shown below:
Former M-LRB100 × 50 → new M-LRJ100×15×50
Former M-LRB120 × 50 → new M-LRJ120×15×50

How to order

Catalog No.	D	×	d
M-LRB	100	×	36

Shipping **In-stock item**

Catalog No.	D	T	d	Unit price in yen	P	Bolt hole d1	Bolt hole D1	Bolt hole t	Applicable bolt
M-LRJ	100	15	35 40 50	720	85	6.5	11	8	M6
		20		800					
		25	35 40	870					
	120	15	35 40 50	910					
		20		1,030					
	150	15	35 40 50	1,140	100	9	14	6	M8
		20		1,220					

How to order

Catalog No.	D	×	T	×	d
M-LRJ	100	×	15	×	40

Shipping **In-stock item**

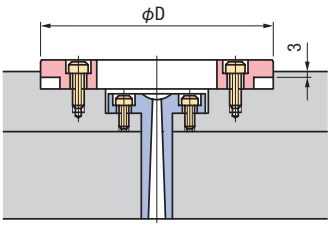
Catalog No.	D	Unit price in yen	V	d	P	Bolt hole d1	Bolt hole D1	Bolt hole t	Applicable bolt
M-LRG	100	950	60	40	50	5.5	9	4.5	M5
	120	980	100	70	85	6.5	11	8	M6

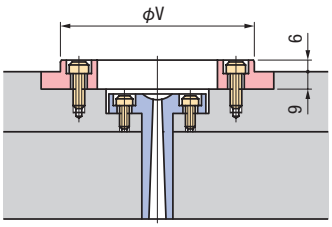
How to order

Catalog No.	D
M-LRG	100

Shipping **In-stock item**

Example of use





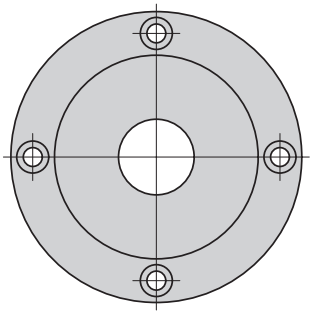
※ Locate ring M-LRG is reversible type. It can be installed from both the front and back sides.

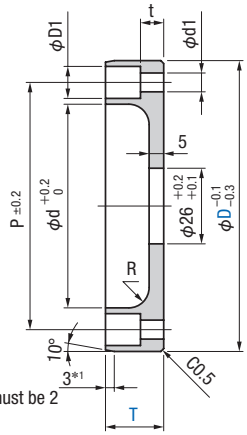
Locating Rings

LOCATING RINGS

Additional processing to mold bases ➡ P.86

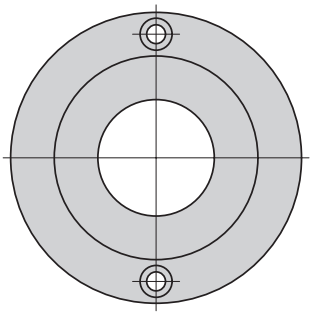
Catalog No.	Material
M-LRD	S45C

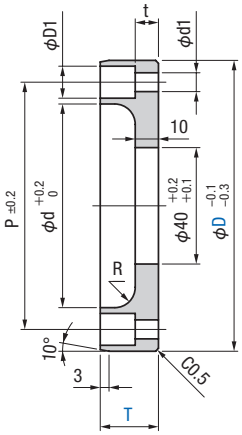




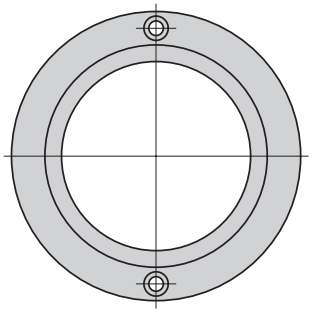
*1. When T=10, it must be 2

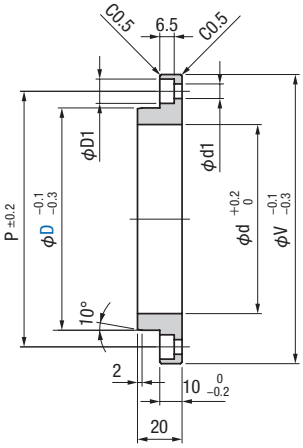
Catalog No.	Material
M-LRE	S45C





Catalog No.	Material	Type
M-LRF	S45C	Large bore type





Product of sizes and shapes not listed above will be made to order. Please consult our sales office

Catalog No.	D	T	Unit price in yen	d	P	Bolt hole d1	Bolt hole D1	Bolt hole t	R	Applicable bolt
M-LRD	60	10	630	40	50	5.5	9	4.5	5	M5
		15	650							
		20	680							
		25	720							
	100	10	700	70	85	6.5	11	3.5	10	M6
		15	720					8		
		20	800							
		25	870							
		30	950							
		35	1,030							
	110	15	760	80	95					
		20	840							
		25	910							
	120	15	910	90	105					
		20	1,030							
		25	1,140							
	150	15	1,140	110	130	9	14	6		M8
		20	1,220							
		25	1,440							

How to order

Catalog No.	D	×	T
M-LRD	100	×	30

Shipping **In-stock item**

Catalog No.	D	T	Unit price in yen	d	P	Bolt hole d1	Bolt hole D1	Bolt hole t	R	Applicable bolt
M-LRE	100	15	1,150	70	85	6.5	11	8	5	M6
		20	1,200							
		35	1,240					20	10	
		40	1,400							
		45	1,560							
	120	15	1,350	90	105			8	5	
		20	1,400							
		35	1,480					20	10	
		40	1,680							
		45	1,880							

How to order

Catalog No.	D	×	T
M-LRE	100	×	20

Shipping **In-stock item**

Catalog No.	D	Unit price in yen	V	d	P	Bolt hole d1	Bolt hole D1	Applicable bolt
M-LRF	100	1,200	130	85	115	6.5	11	M6
	120	1,400	150	105	135			

How to order

Catalog No.	D
M-LRF	100

Shipping **In-stock item**

Miniature Hot Sprue Bushings

SPRUE BUSHINGS

Features of Miniature Hot Sprue Bushing

In the plastic injection molding, the cooling process takes the longest time in a molding cycle. A commonly used way to shorten the cooling time is to use the temperature control channels created on the mold plate. Attempts to increase cooling efficiency, however, may sometimes lead to poor flow of resin, resulting in adverse affects on the quality of molded products.

A hot sprue bushing provides the ability to maintain the flow of resin by heating the sprue section with a heater. This allows the mold temperature to be set lower than its normal temperature, thereby reducing the cooling time and increasing the productivity of molding process.

This Miniature hot sprue bushing has been specifically developed for use in molds mounted on molding machines with a nozzle touch force of 20kN or less by adopting highly efficient small-diameter heater.

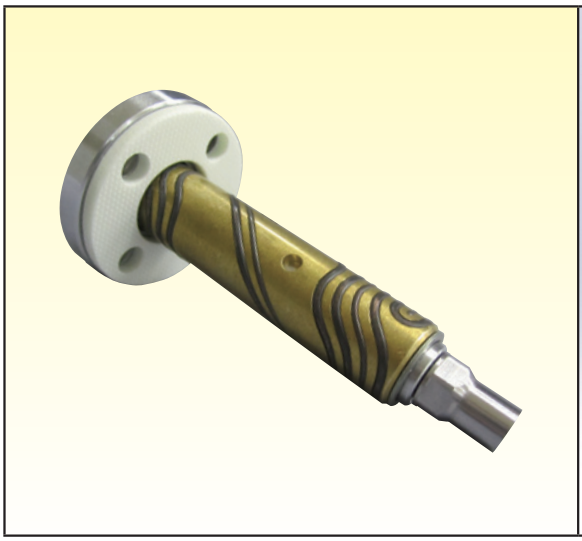
< Features >

- **Compact design**
  Adopting a highly efficient small-diameter heater that has an outer diameter of 13.5 mm and inner diameter of 10 mm, this hot sprue bushing is specifically designed for molding small products.

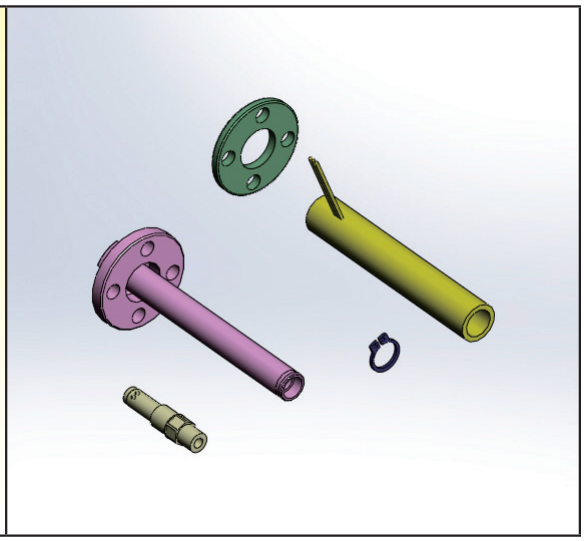
- **Simple and easy installation**
  This product complies with Futaba sprue bush (M-SJAD) standard and fits the Futaba standard mold bases. It can be installed even on a cold runner mold in use with a simple alternation and easily realize a hot runner system.

- **Ease of maintenance**
  Easy to wear tip portion can endure continuous use by replacing its retainer tip.

Miniature hot sprue bushing



Components of Miniature hot sprue bushing



Effects of Miniature hot sprue bushings

Increased productivity

As the Miniature hot sprue bushing allows the mold temperature to be set lower compared to cold runner molds, the cooling time is reduced. This enables high-cycle molding, realizing increased efficiency in mass production, lower energy consumption and reduced production costs.

Effect verification example

<Molding conditions>

Molding material : LCP (liquid crystal polymer)
Molded product : wiring cover (2 pieces/shot)
Size of molded product : 30×30×1 (mm)

Reduced molding cycle time

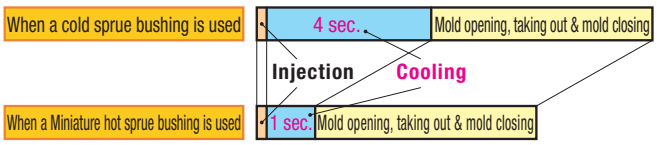
When a cold sprue bushings is used: 16 sec./pc.
When a Miniature hot sprue bushing is used: 13 sec./pc.

The molding cycle time is reduced by 3 seconds per shot.

In the case of 100,000 shots, 3 sec./shot × 100,000 shots = 300,000 seconds ... **molding cycle time can be reduced by approx. 84 hours**
If assuming that the molding costs are 2,000 yen per hour, 84 hours × 2,000 yen /h = **168,000 yen ... a significant cost reduction is achieved!**

Type of sprue bushing	Cooling time
When a cold sprue bushing is used	4 seconds
When a Miniature hot sprue bushing is used	Can be reduced to 1 second

Molding cycle model



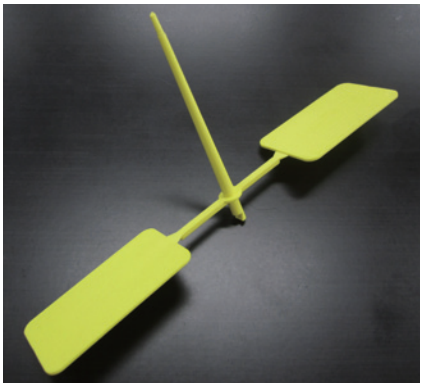
Saved material costs

When a cold sprue bushings is used: 5.08 g / pc.
When a Miniature hot sprue bushing is used: 4.48 g / pc.

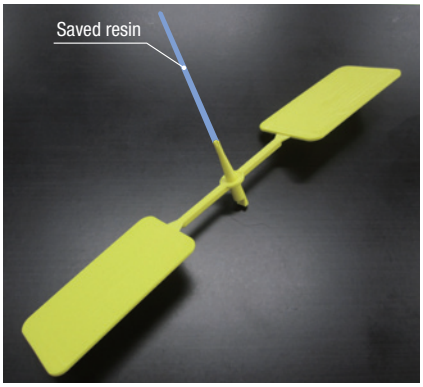
→ 0.34 g / pc. resin is saved.

In the case of 100,000 shots, 0.60g/pc. × 100,000 shots = approx. 60 kg ... **approx. 11% of resin is saved!**
If assuming that the resin material cost is 2,000 yen / kg, ... **a cost reduction of 120,000 yen is achieved!!**

When a cold sprue bushing is used



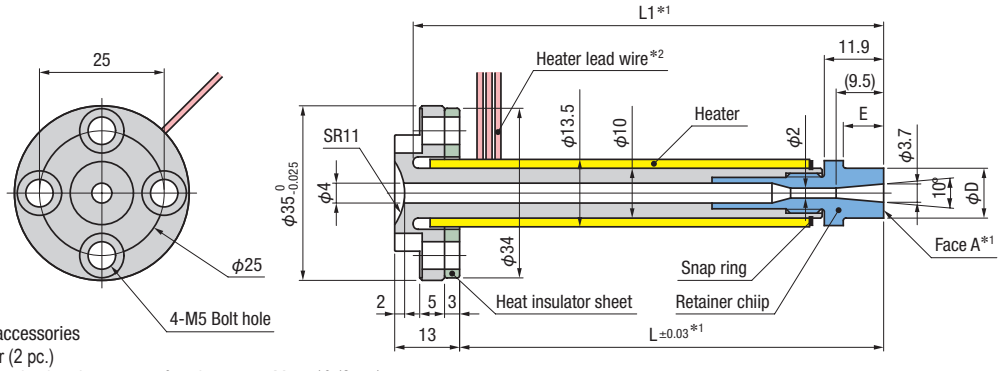
When a Miniature hot sprue bushing is used



Miniature Hot Sprue Bushings

SPRUE BUSHINGS

Specification of Miniature hot sprue bushing



Supplied accessories
Wire cover (2 pc.)
Hexagon socket head cap screw for wire covers M5×10 (2 pc.)
Hexagon socket head cap screw for hot sprue bushing M5×15 (4 pc.)

Part name	Material	Hardness after heat treatment
Nozzle	SKD61	48 to 52HRC
Retainer chip (φ7)	TZM (molybdenum alloy)	30 to 33HRC
Retainer chip (φ10)	SKD61	48 to 52HRC
Heater	Copper alloy	—
Heat insulator sheet	Silicate binder	—

Catalog No.	L	D		L1	E	Heater capacity (230V) W
		DIMM	Limit deviation tolerance			
H-HSB	45	7	-0.005 -0.011	53.3	6.7	165
		10			8.1	
	65	7		73.3	6.7	220
		10			8.1	
	85	7		93.3	6.7	250
		10			8.1	

*1. Adjust the length at the Face A of the retainer chip.
The thermal expansion of the length dimension should be calculated using L1 DIMM.
<Thermal expansion calculation example>
Thermal expansion amount=L1×1.25 ×10^{-5}×(molding resin temperature − 20°C)

*2. Temperature sensor IC (J) type is used.

How to order

Catalog No.	L	S	D
H-HSB	45	S	10

Price 89,000 yen

Shipping Shipped in 5 business days (Excluding the day of order)

Peripheral equipment

< Terminal mounting box >

Supplied accessories
Hexagon socket head cap screw
M6×15 (2pc.)

Shipping Shipped in 5 business days (Excluding the day of order)

Part name	Unit price in yen	Item name
Terminal mounting box	14,500	H-HSB-TB1G

< Temperature controller >

Specification
Single-phase AC: 180 – 240V, 10A
Max. setting temperature : 500°C
External dimension: (height×width×depth)
55×164×220

Supplied accessories
Power cable (6m)
Terminal mounting box connection cable (3m)

H-HSB-CTA-01A- [Intallation spec. code]

Shipping Shipped in 5 business days (Excluding the day of order)

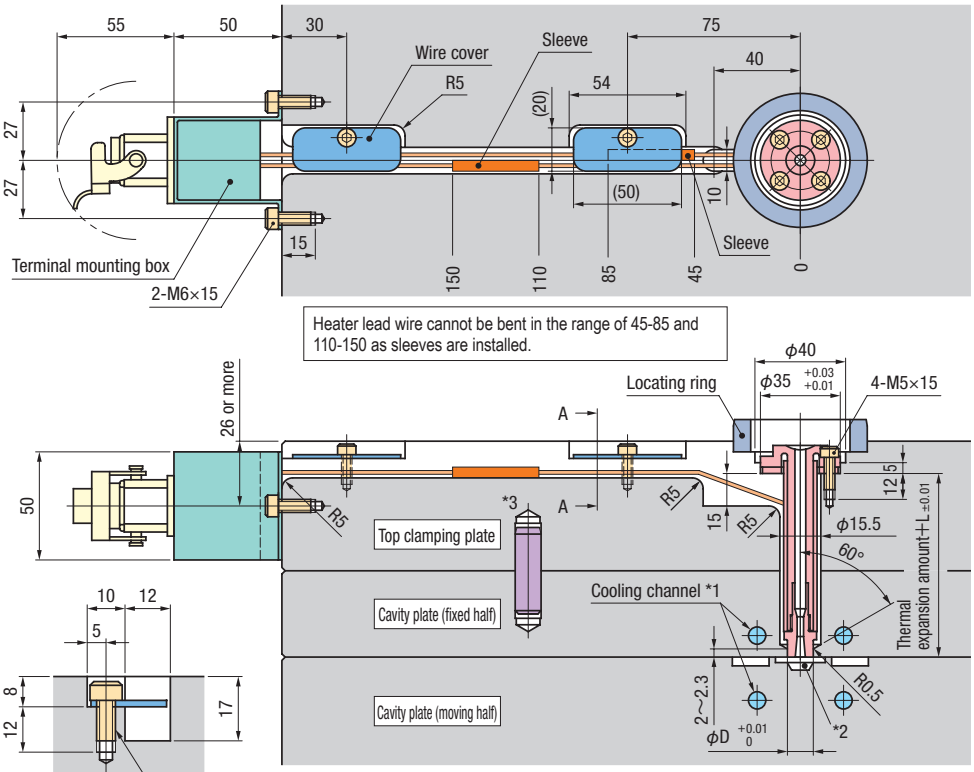
Installation specification		Unit price in yen
Code	Type	
FT	Standard type (horizontal mount type)	115,000 yen
MT	Wall-mount type (cable outlet on top surface)	120,000 yen
MB	Wall-mount type (cable outlet on bottom surface)	120,000 yen

Miniature hot sprue bushing set

Part name	Unit price in yen			Item name
	Temperature controller installation specification			
	Code	Type	Price	
Miniature hot sprue bushing Terminal mounting box temperature controller	FT	Standard type (horizontal mount type)	178,000	H-HSB [L] S [D] SAA- [Temperature controller installation spec. code]
	MT	Wall-mount type (cable outlet on top surface)	183,000	
	MB	Wall-mount type (cable outlet on bottom surface)	183,000	
Miniature hot sprue bushing Terminal mounting box	98,000			H-HSB [L] S [D] SB

Shipping Shipped in 5 business days (Excluding the day of order)

Example of installation & machining



*1. Provide cooling circuits around the gate separately from the cooling circuit of the product.
*2. Add a cold slug well to prevent the tip of the gate chip from coming in contact with the cavity plate (moving half).
*3. Add a dowel pin to prevent the displacement of plates and resultant damage to the hot sprue bushing.

Range of application

< List of resins supported >

Abbreviation	Name of resin	Support
TPE	Thermoplastic elastomer	○
TPU	Thermoplastic polyurethane	○
PE	Polyethylene	○
PS	Polystyrene	○
AS	Acrylonitrile styrene	○
TPO	Aolefinic elastomer	○
PP	Polypropylene	○
ABS	Acrylonitrile styrene	○
PMMA	Metacrylate resin	○
POM	Polyacetal	○
PA	Polyamide	○
PPE	Polyphenylene ether	○
PBT	Polybutylene terephthalate	○
PET	Polyethylene terephthalate	○
PC	Polycarbonate	○

Abbreviation	Name of resin	Support
PPS	Poly phenylene Sulfide	△※1
PSU	Polysulfone	△※1
LCP	Liquid Crystal Polymer	△※1
PEI	Polyetherimide	△※1
PEEK	Polyether ether keton	×
PVC	Polyvinyl chloride	×

*1. To be inquired.

< A rough guide of resin amount > ※2

Melt flow index	g / shot less
Low viscosity（>16）	40
Middle viscosity（7-16）	30
High viscosity（< 7）	20

*2. The values are provided only as a reference and not a guarantee of effects.

Cooling Channel Type

SPRUE BUSHINGS

Features of cooling channel type sprue bushings

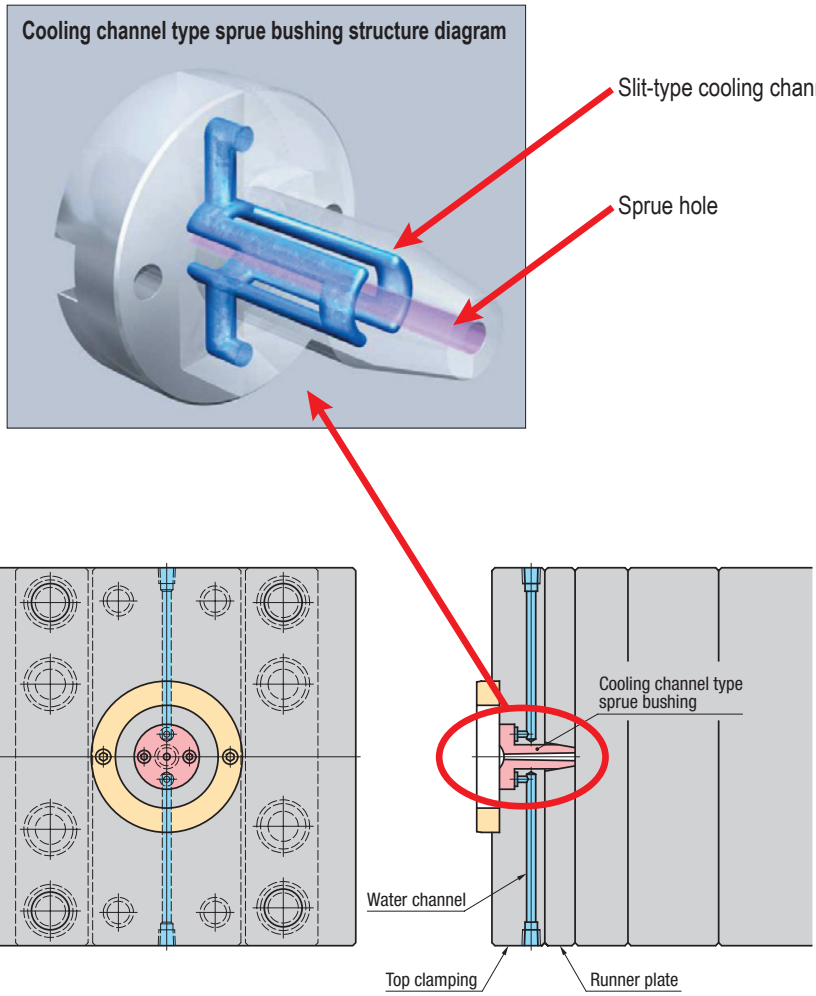
In the plastic injection molding, the cooling process takes the longest time in a molding cycle. A sprue is one of the sections that require longer time to solidify because of its thickness. A commonly used way to cool the sprue section is to use the temperature control channels created on the mold plate. However, the efficiency of heat exchange of the sprue section may be low, because these channels are mainly used to cool the molded product section.
This cooling channel type sprue bushing has a cooling channel inside itself and cools the sprue section directly, thereby increasing the cooling efficiency and molding productivity.

- **Increases molding productivity**
  ① Realizes high-cycle molding by reducing cooling time
  ② Reduces costs through high-cycle molding (Increases mass-production efficiency and lowers power consumption)
  ③ Prevents molding troubles and increases the service life of molds by keeping the mold temperature from rising excessively and preventing stringing.

- **Using the latest "Milling-Combined Laser Metal Sintering Method" technology, we developed a small-diameter sprue bushing that has a slit-type cooling channel structure. As the cooling channel is integrated in the bushing, there is no worry about leaks.**

- **We standardized a sprue bushing for exclusive use with 3-plate type, which fits Futaba standard mold bases.**

Cooling channel type sprue bushing structure diagram



Effects of cooling channel type sprue bushing

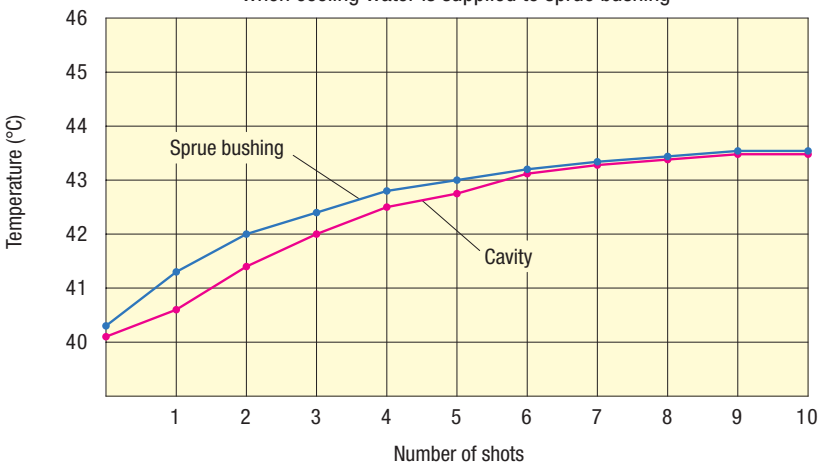
Stable molding quality

In the plastic injection molding, the temperature of molds has the greatest influence on the influence on product quality. Therefore, it is necessary to control temperature inside the mold that fluctuates between day and night or seasons. This cooling channel type sprue bushing provides the ability to control otherwise difficult-to-control temperature of sprue bushings and enables the production of molded products of stable quality.

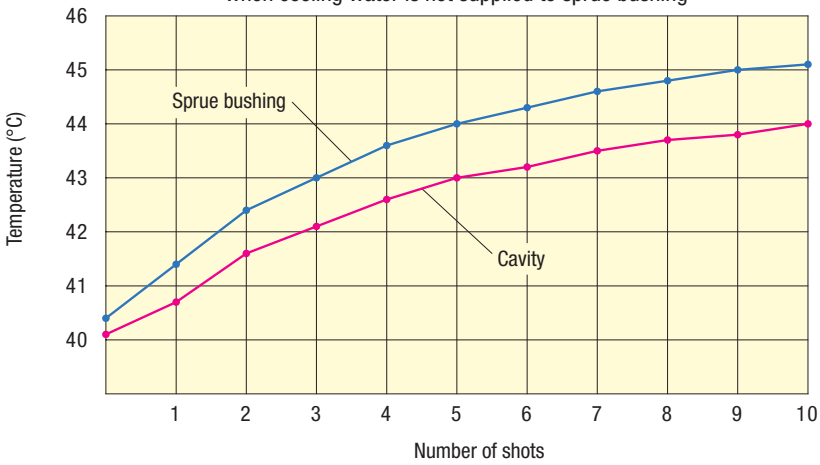
Transition to stable molding in a short period of time

At the beginning of plastic injection molding, trial molding is required until the temperature of the mold is stabilized. By using this cooling channel type sprue bushing, stable molding can be achieved in a short period of time.
The charts below show the differences depending on whether or not to supply water to the sprue bushing. When not supplying water to the sprue bushing, temperature differences occur between the cavity and the sprue bushing sections, but the differences have been narrowed when supplying water to the sprue bushing.

Temperature transition in continuous molding of 10 shots
when cooling water is supplied to sprue bushing



Temperature transition in continuous molding of 10 shots
when cooling water is not supplied to sprue bushing



Molding condition
Molding resin: polypropylene Resin temperature: 190°C molding cycle: 22 sec.
Temperature of temperature-control media: 40°C (both mold and sprue bushing)
Temperature measurement: thermocouple Mold structure: two plate type

Cooling Channel Type

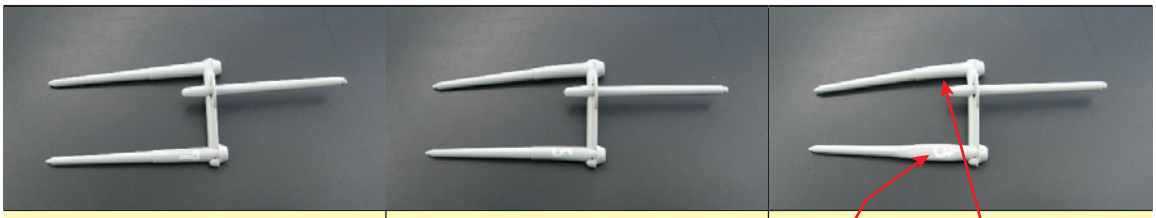
SPRUE BUSHINGS

Effects of cooling channel type sprue bushing

We verified the states of plastic generation at the sprue & runner sections when supplying and when not supplying cooling water to the sprue bushing under the same molding conditions (resin temperature and holding pressure, etc.) and observed the differences in results as shown below depending on whether or not supplying cooling water to the sprue bushing.

When cooling water is supplied to sprue bushing

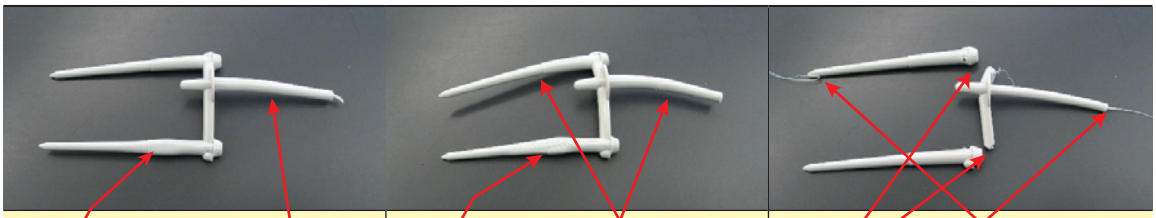
Molding resin: polycarbonate



A plastic of sufficient quality for continuous molding was formed at the sprue and runner sections. Cooling time of sprue section: 7 sec. Molding is possible.	A plastic of sufficient quality for continuous molding was formed at the sprue and runner sections. Cooling time of sprue section: 5 sec. Molding is possible.	The plastic at the second sprue section was deformed (a small bend ocurred). The plastic was not solidified and deformed (mashed) by the take-out chuck. Cooling time of sprue section: 3 sec. Molding is not possible (risky state).

When cooling water is not supplied to sprue bushing

Molding resin: polycarbonate

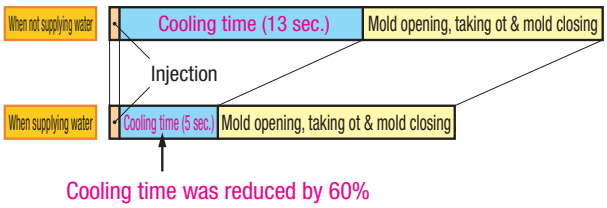


The plastic at the sprue section was deformed (a small bend ocurred). The plastic was not solidified and deformed (mashed) by the take-out chuck. Cooling time of sprue section: 8 sec. A sign of risk for poor molding quality is observed.	The plastic at the sprue and second sprue sections was deformed (a large bend ocurred). The plastic was not solidified and deformed (mashed) by the take-out chuck. Cooling time of sprue section: 5 sec. Molding is impossible (risky state)	Stringing occurred. The plastic at the second sprue section was cut off. Cooling time of sprue section: 3 sec. Molding is impossible (risky state)

※ When not supplying cooling water to the sprue bushing, a plastic of sufficient quality for molding was formed after cooling of approx. 13 seconds.

With or without the supply of water to sprue bushing	Cooling time of sprue bushing
When not supplying cooling water	13 seconds
When supplying cooling water	Can be reduced to 5 seconds.

Molding cycle model



Cooling time of the sprue section is shortened by approx. 60% by supplying cooling water to sprue bushing

※ This verification results are only an example of verifying solidification states at the sprue and runner sections and not a guarantee of effects on the solidification or reduction of cooling time at the molded product section.

Notes for molding

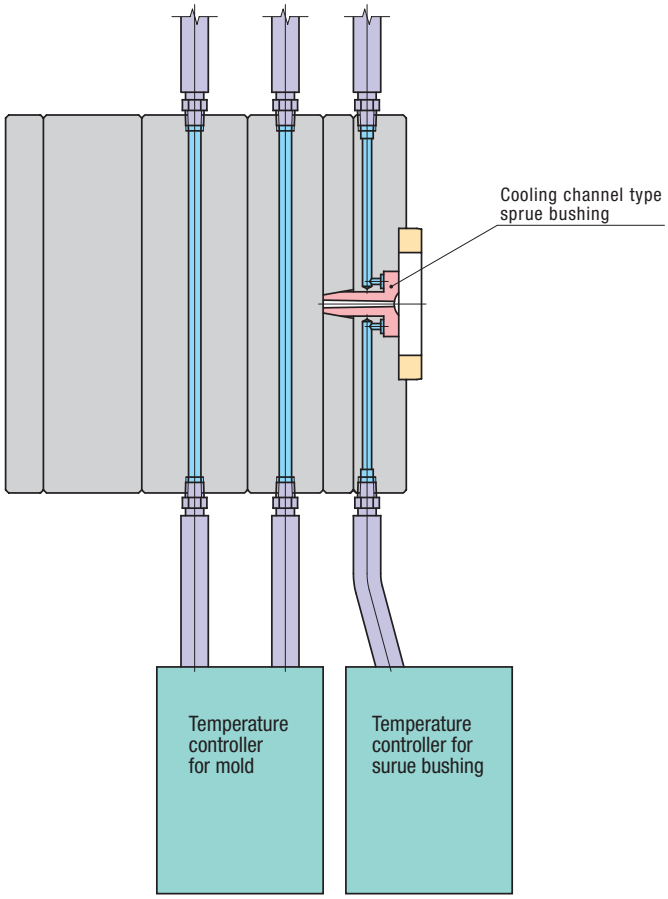
About temperature controls

1. Temperature control media applicable to sprue bushing
The temperature control media that can be used for sprue bushing are water and air. Do not use oil or steam, etc.

2. Installation of temperature controllers
Install temperature controllers for molds and sprue bushings separately. This makes temperature controls easy.

3. Circulation water
Use the water that does not contain dust and sludge have been removed.

4. When not using molds
Remove water from the cooling channel and take anti-corrosion measures to prevent rust or corrosion from progressing in it.



About setting of molding conditions

When setting molding conditions, set the temperature controllers for molds and sprue bushings to the same temperature. After appropriate molding conditions are found, gradually lower the temperature of the controller for sprue bushings.
This allows you to find appropriate molding conditions easier, rather than the setting of molding conditions with different temperatures from the beginning.

Effect of increasing production volume

An increase in production volume when cooling channel type sprue bushing is used.

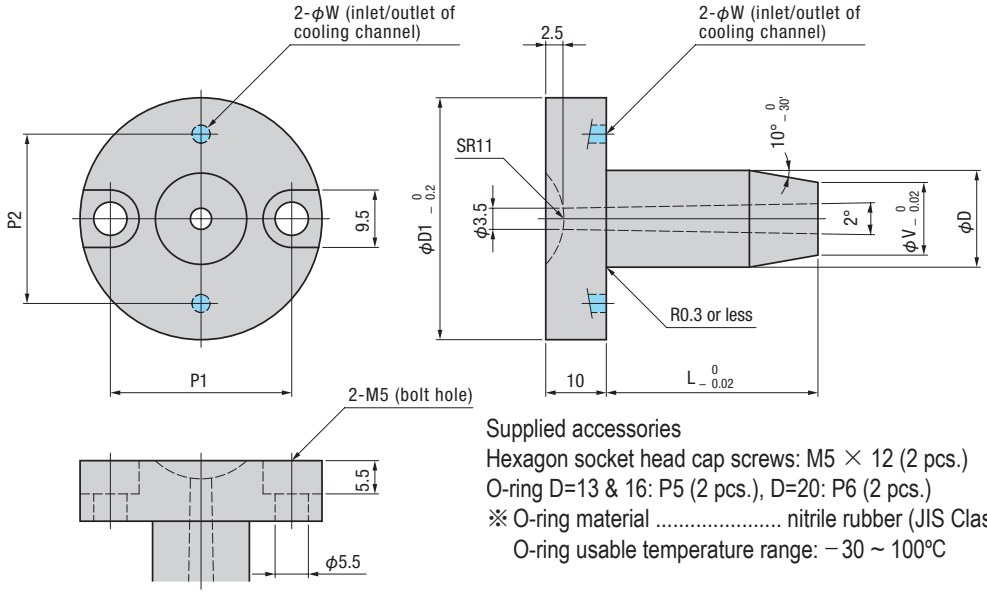
With or without the use of cooling channel type sprue bushings	Reduced cooling time (sec.)	Number of shots per hour	Trial calculation based on the assumption that the molding cycle time (X) is 30 sec. when the cooling channel type sprue bushing is not used			
			Number of shots per hour	Number of shots per 24 hours	Number of increase in shots per 24 hours	Rate of increase in shots
When used	0	3,600÷X*1	120	2,880	—	—
When not used	1	3,600÷(X−1)	124	2,979	99	3 %
	2	3,600÷(X−2)	128	3,085	205	7 %
	3	3,600÷(X−3)	133	3,200	320	11 %
	4	3,600÷(X−4)	138	3,323	443	15 %
	5	3,600÷(X−5)	144	3,456	576	20 %

*1. X is molding cycle time.

Cooling Channel Type

SPRUE BUSHINGS

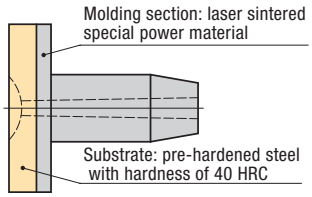
Specification of cooling channel type sprue bushing



Supplied accessories
Hexagon socket head cap screws: M5 × 12 (2 pcs.)
O-ring D=13 & 16: P5 (2 pcs.), D=20: P6 (2 pcs.)
※ O-ring material ..... nitrile rubber (JIS Class 1A)
O-ring usable temperature range: −30 ~ 100ºC

※ Turning finish is used for the body section.

The cooling channel type sprue bushing is composed of a substrate with hardness of HRC40 and a molding section, which has been build by sintering special powers by laser using Milling -Combined Laser Metal Sintering Method. The interface between the substrate and the molding section is completely fused and free from leaks.



Sprue hole nitrided

D		V	D1	L	P1	P2	W	Item name
DIMM	Limit deviations							
13	0 −0.011	10	40	30	30	28	3	M-SBLH13×30
16		12		35				M-SBLH16×35
20	0 −0.013	14	50	45	36	35	4	M-SBLH20×45

Shipping 1 business day (excl. the day of order) Price To be quoted.

Cooling media for sprue bushing

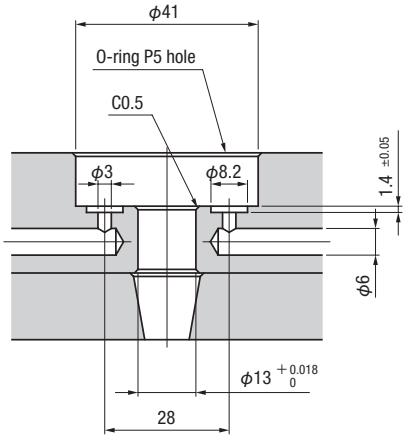
The cooling media that can be used for this sprue bushing is water and air.
Do not use oil, steam or other cooling media, which is likely to become high temperature or high pressure.
If using oil under low pressure at temperature of 100°C or less, be sure to use the oil with low viscosity. After use, clean the product so that the oil does not stick or stay inside the product.

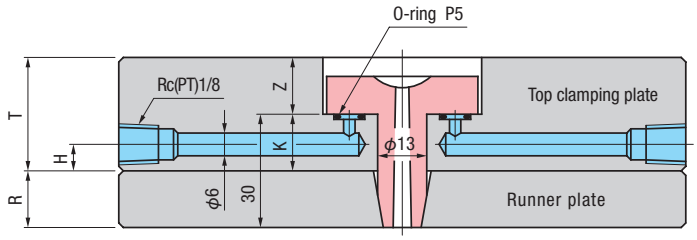
Notes for use ..... See page 370
Special orders ..... See page 371

Installation specification of cooling channel type sprue bushings

Detailed view at the entrance of the cooling channel	Thickness of top clamping plate and runner plate applied

Stem diameter ϕ 13



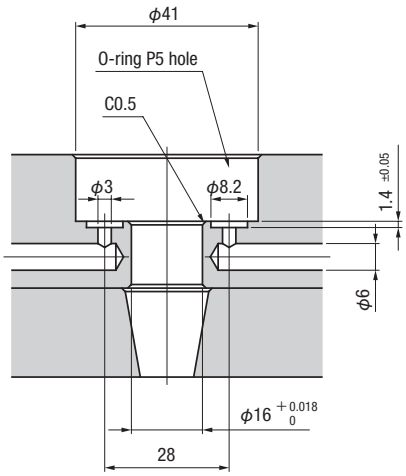


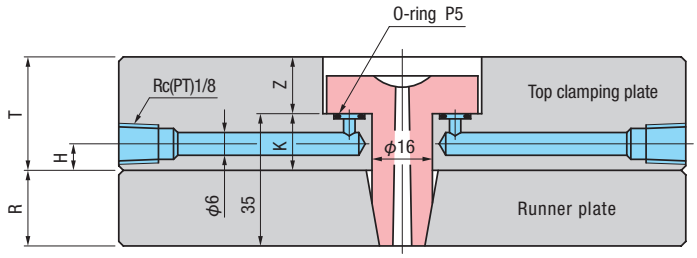
Main installation dimensions

※ For dimensions not listed below, see the next page.

T	R	K	Z	H
25	15	15	10	7
30	15	15	15	7

Stem diameter ϕ 16



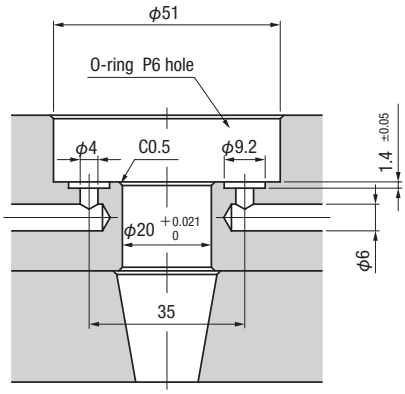


Main installation dimensions

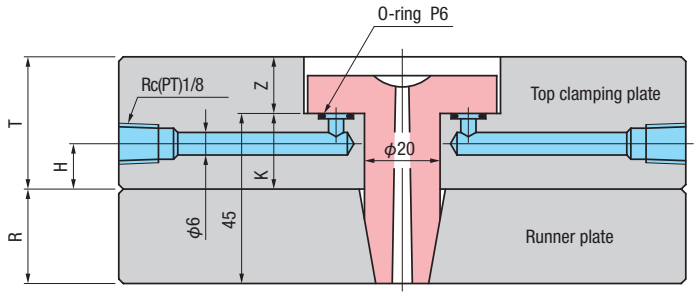
※ For dimensions not listed below, see the next page.

T	R	K	Z	H
30	15	20	10	7 ～ 12 (Rec.12)
30	20	15	15	7
35	20	15	20	7

Stem diameter ϕ 20



※ The dimension of O-ring groove is based on JIS B 2406: 1991 O-rings housings -- Design criteria.



Main installation dimensions

※ For dimensions not listed below, see the next page.

T	R	K	Z	H
35	20	25	10	7 ～ 17 (Rec.17)
35	25	20	15	7 ～ 12 (Rec.12)
45	25	20	25	7 ～ 12 (Rec.12)
45	30	15	30	7
50	30	15	35	7

Cooling Channel Type

SPRUE BUSHINGS

Cooling channel type sprue bushing installation steps

1. Set the thickness of plate and the length of sprue bushing

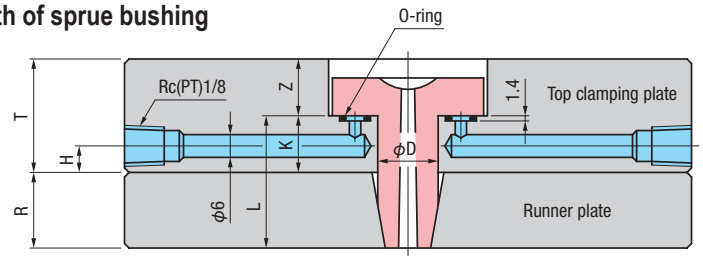
K≧L−R·····(formula 1)

K: 15 mm or more required
L: Sprue bushing length

Select sprue bushing from the following table.

D	13	16	20
L	30	35	45

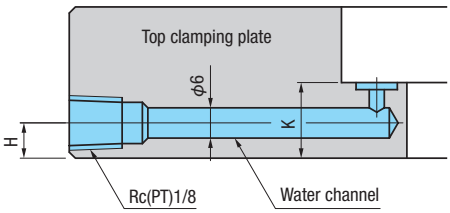
R: Runner stripper plate thickness



2. Set the position of water channel (ϕ6), H dimension.

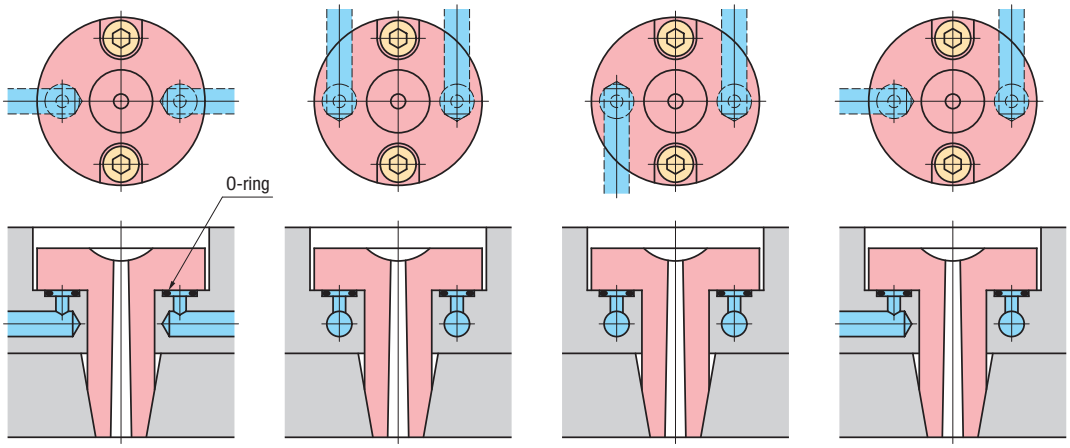
To secure the space for creating the Rc(PT)1/8 threaded hole, H dimension of 7 mm or more is required.

H dimension adapted to K dimension			
K	15	20	25
H	7	7 ～ 12 (Rec. 12)	7 ～ 17 (Rec. 17)



3. Place water channels

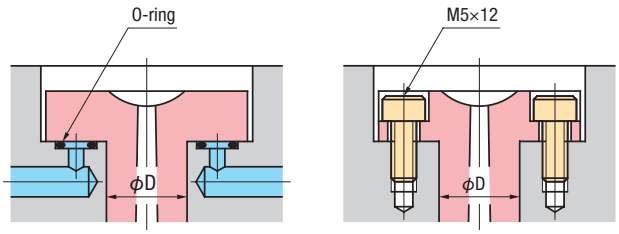
The charts below show examples of placement of water channels on the top clamping plate.
Design so that the machining regions for the water channels do not interfere with those for other holes.



4. Install O-ring and assembly screw

Be sure to install O-ring.

D	13	16	20
O-ring	P5	P5	P6
Assembly screw	M5×12		

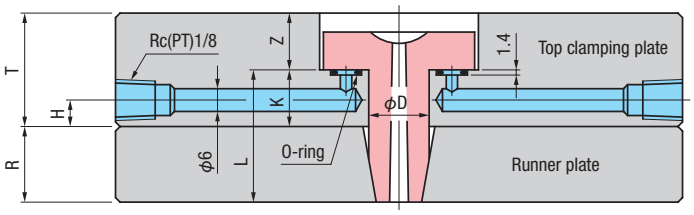


Installation specification to mold bases

The table below shows cooling channel type sprue bushings that fit Futaba standard mold bases. Please use this table to select cooling channel type sprue bushings while designing molds.

【Applicable mold bases】 D series, F series and H series 3-plate type mold bases

※ The D and L dimensions of sprue bushings are determined by T and R dimensions.

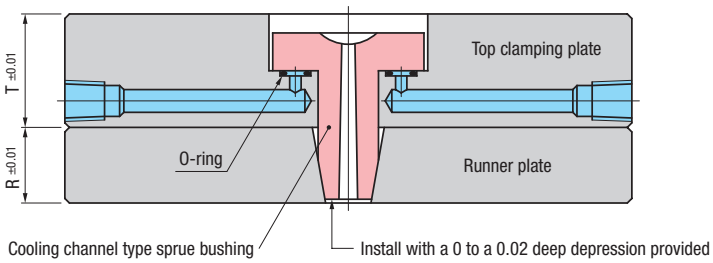


Nominal dimensions of mold base	T	R	D	L	K	Z	H	Applicable sprue bushings
1515 1518 1520 1523 1525 1530	25	15	13	30	15	10	7	M-SBLH13×30
1818 1820 1823 1825 1830 1835	30	15	13	30	15	15	7	M-SBLH13×30
			16	35	20	10	12	M-SBLH16×35
2020 2023 2025 2030 2035 2040 2045 2323 2325 2327 2330 2335 2340	30	20	16	35	15	15	7	M-SBLH16×35
2525 2527 2530 2535 2540 2545 2550 2730 2735 2740 2750 2930 2935 2940	35	25	20	45	20	15	12	M-SBLH20×45
		20	16	35	15	20	7	M-SBLH16×35
			20	45	25	10	17	M-SBLH20×45
3030 3032 3035 3040 3045 3050 3055 3060 3335 3340 3345 3350	45	30	20	45	15	30	7	M-SBLH20×45
		25	20	45	20	25	12	M-SBLH20×45
3535 3540 3545	45	30	20	45	15	30	7	M-SBLH20×45
3550 3555 3560 4040 4045 4050 4055 4060 4070	50	30	20	45	15	35	7	M-SBLH20×45

※ Nominal dimension 3535 to 4070 are applicable when R=30.

When ordering the installation of cooling channel type sprue bushings in mold bases, please advise us on your specification requirements with a drawing.

◆ Example of the installation of a cooling channel type sprue bushing.



Cooling Channel Type

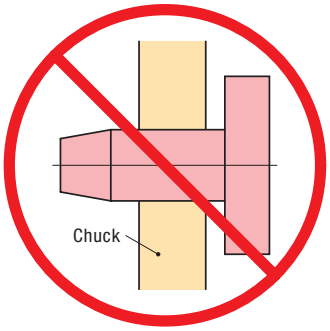
SPRUE BUSHINGS

Notes for use

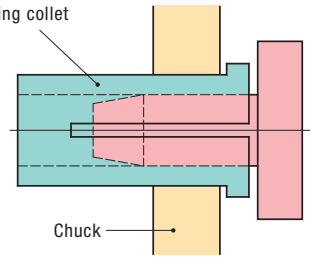
We recommend to install cooling channel type sprue bushings as they are after purchase. In the cases that any alternation is required, however, please note the followings:

Chucking the body section is forbidden

This sprue bushing has holes for water channel inside its body. Tightening the body with a chuck such as lathe, etc. may cause a crack in the body or damage the internal structure of the bushing. When chucking the sprue bushing, do not chuck it directly and use a spring collet, etc. to distribute the tightening force exerted on the body.



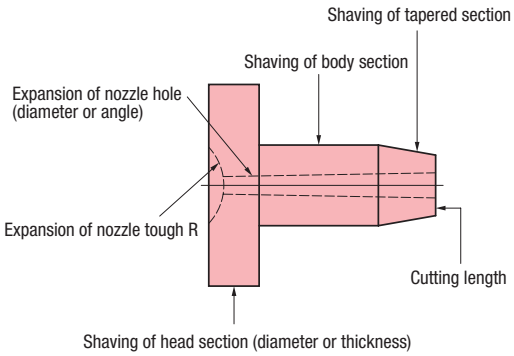
◆ Avoid chucking sprue bushing directly.



◆ Use spring collet, etc. and lightly chuck the body.

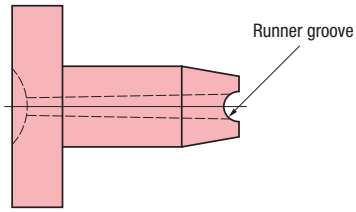
Machining outer shape or holes is forbidden

Do not perform the machining as shown on the right as it may interfere with cooling channels, etc. in the body.



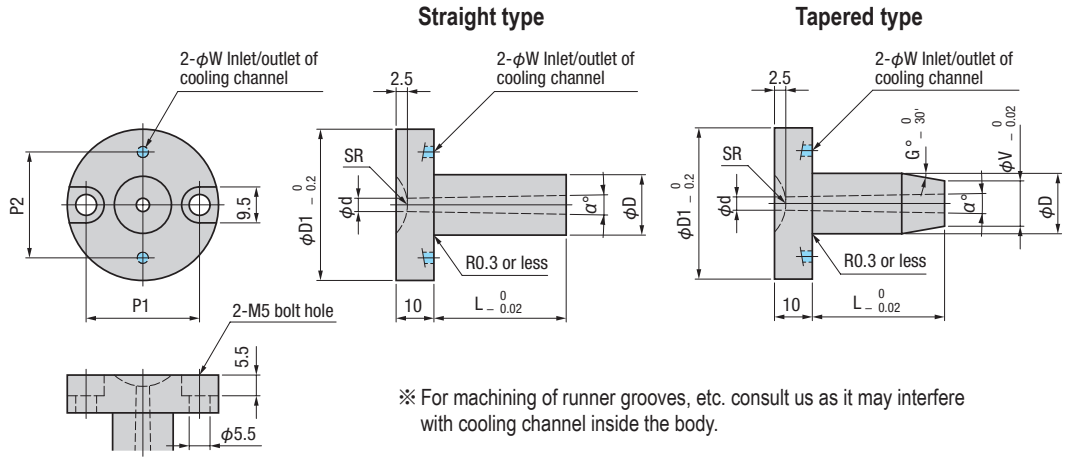
Additional machining

For machining of runner grooves, etc. consult us as it may interfere with cooling channel inside the body.



About special orders for cooling channel sprue bushing

The cooling channel of this sprue bushing is formed through "milling -combined laser metal sintering method". Due to the various conditions imposed on this technology, special orders for production of cooling channel type sprue bushings not listed in this catalog are restricted to the range shown below:
Also, depending on the respective combinations of dimensions, the production may not be allowed.



※ For machining of runner grooves, etc. consult us as it may interfere with cooling channel inside the body.

※ The material and hardness are the same as standard products (see page 366).
※ The supplied accessories such as hexagon socket head cap screw and O-rings are the same as standard products (see page 366).
※ Products of specification without nitriding treatment will be made to order.

D DIMM	D Limit deviations	D1	P1	P2	W	SR	d	α	G
13	0 −0.011	40	30	28	3	10.5 11 12 13 16 20	2.5 3 3.5	1 2	5 10
16									
20	0 −0.013	50	36	35	4				

Applicable to straight type

D	L In 0.01 mm steps
13	31.50 ～ 40.00
16	34.00 ～ 45.00
20	38.00 ～ 55.00

Applicable to tapered type

D	V	G	L In 0.01 mm steps	Restrictions
13	8	5	Production not allowed	
		10	36≦L≦40	d=2.5, α=1 only acceptable
	9	5	Production not allowed	
		10	33≦L≦40	If d≧3 and α=2, production not allowed.
	10	5	39≦L≦40	
		10	30≦L≦40	
	11	5	34≦L≦40	
		10	28≦L≦40	
16	10	5	Production not allowed	
		10	41≦L≦45	
	11	5	Production not allowed	
		10	39≦L≦45	
	12	5	Production not allowed	
		10	35≦L≦45	
	13	5	42≦L≦45	
		10	33≦L≦45	
	14	5	36≦L≦45	
		10	30≦L≦45	

D	V	G	L In 0.01 mm steps
20	12	5	Production not allowed
		10	51≦L≦55
	13	5	Production not allowed
		10	48≦L≦55
	14	5	Production not allowed
		10	45≦L≦55
	15	5	Production not allowed
		10	42≦L≦55
	16	5	51≦L≦55
		10	40≦L≦55
	17	5	46≦L≦55
		10	37≦L≦55
	18	5	40≦L≦55
		10	35≦L≦55

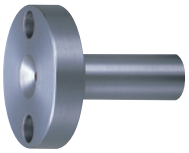
Shipping to be quoted. Unit price to be quoted.

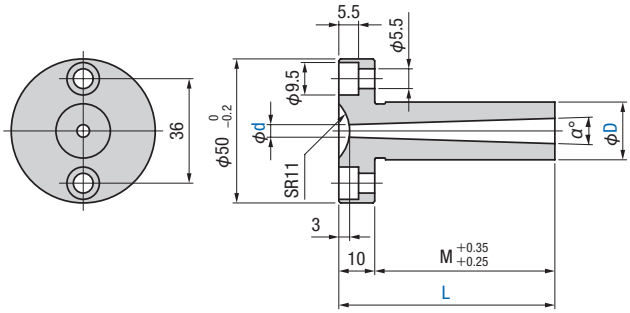
Sprue Bushings Bolt Hole, Straight Type (Futaba Original)

SPRUE BUSHINGS

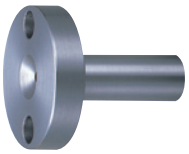
Additional processing to mold bases → P.92

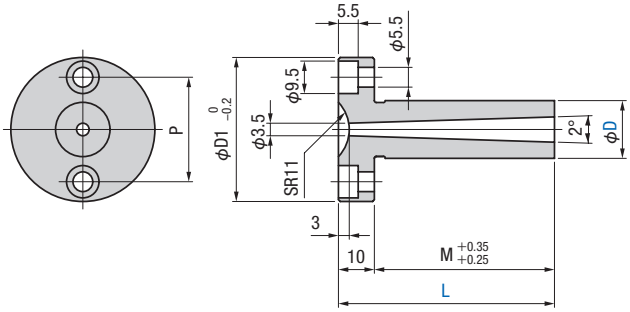
Catalog No.	Material	Hardness after heat treatment
M-SBA	SK3	Not heat treated





Catalog No.	Material	Hardness after heat treatment
M-SBC	SKD61	48 HRC or more





Catalog No.	D	L	d DIMM	d Limit deviations	Unit price in yen	D DIMM	D Limit deviations	M	α
M-SBA	16	50	3.5 → A		2,900	16	0 −0.011	40	3
		70			3,400			60	2
		90			3,800			80	
		130			4,400			120	
	20	50	4.5 → B		2,900	20	0 −0.013	40	3
		70			3,400			60	2
		90			3,800			80	
		130			4,400			120	

Catalog No.	D	L	Unit price in yen	D DIMM	D Limit deviations	D1	P	M
M-SBC	13	50	6,300	13	0 −0.011	36	26	40
		70	8,000					60
	16	50	6,300	16		50	36	40
		70	8,000					60
		90	10,000					80
	20	50	6,300	20	0 −0.013			40
		70	8,000					60
		90	10,000					80

How to order

Catalog No.	D	×	L	× 10	d
M-SBA	16	×	70	× 10	A

Shipping: In-stock item

How to order

Catalog No.	D	×	L	× 10A
M-SBC	13	×	70	× 10A

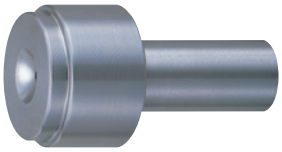
Shipping: In-stock item

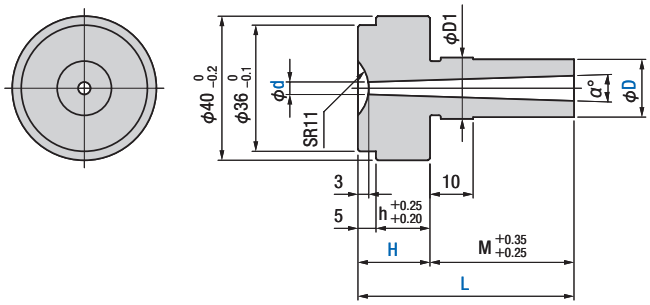
Sprue Bushings Shoulder, Straight Type (Futaba Original)

SPRUE BUSHINGS

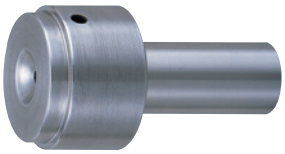
Additional processing to mold bases ➡ P.92

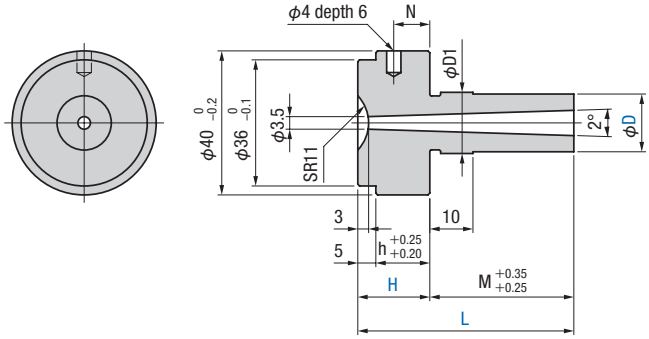
Catalog No.	Material	Hardness after heat treatment
M-SBB	SK3	Not heat treated





Catalog No.	Material	Hardness after heat treatment
M-SBD	SKD61	48 HRC or more





Catalog No.	D	L	H	d DIMM	d Code	Unit price in yen	D1 DIMM	D1 Limit deviations	D DIMM	D Limit deviations	M	α	h
M-SBB	16	65	25	3.5	→ A	2,400	16	+0.018 +0.007	16	0 −0.011	40	3	20
		105				3,400					80	2	
		145				4,400					120		
		70	30			2,400					40	3	25
		110				3,400					80	2	
		150				4,400					120		
	20	65	25	4.5	→ B	2,400	20	+0.021 +0.008	20	0 −0.013	40	3	20
		105				3,400					80	2	
		145				4,400					120		
		70	30			2,400					40	3	25
		110				3,400					80	2	
		150				4,400					120		

Catalog No.	D	L	H	Unit price in yen	D1 DIMM	D1 Limit deviations	D DIMM	D Limit deviations	M	h	N
M-SBD	16	65	25	6,000	16	+0.009 +0.001	16	0 −0.011	40	20	15
		85		7,500					60		
		105		9,000					80		
		70	30	6,000					40	25	20
		90		7,500					60		
		110		9,000					80		
	20	65	25	6,000	20	+0.011 +0.002	20	0 −0.013	40	20	15
		85		7,500					60		
		105		9,000					80		
		70	30	6,000					40	25	20
		90		7,500					60		
		110		9,000					80		

How to order

Catalog No.	D	×	L	×	H	d
M-SBB	16	×	105	×	25	B

Shipping: In-stock item

How to order

Catalog No.	D	×	L	×	H	A
M-SBD	16	×	85	×	25	A

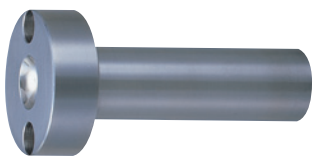
Shipping: In-stock item

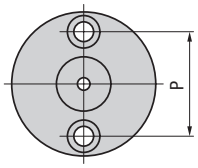
Sprue Bushings Bolt Hole Type (JIS)

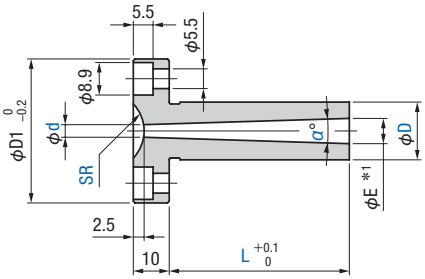
SPRUE BUSHINGS

Additional processing to mold bases ➡ P.92

Catalog No.	Material	Hardness after heat treatment
M-SJAC	S45C	Not heat treated
M-SJAF	HPM1	37 to 41HRC
M-SJAD	SKD61	48 HRC or more

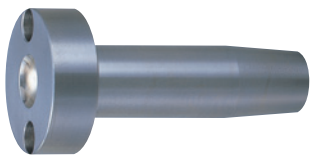


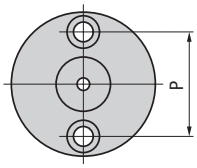


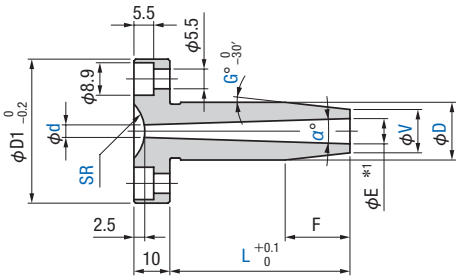


Supplied with hexagon socket head cap screw M5×12 (2 pcs.)

Catalog No.	Material	Hardness after heat treatment
M-SJBF	HPM1	37 to 41HRC
M-SJBD	SKD61	48 HRC or more







Supplied with hexagon socket head cap screw M5×12 (2 pcs.)

Catalog No.	D	L *2 In 0.1 mm steps	SR DIMM	SR Code	d DIMM	d Code	α	V In 0.1 mm steps	G In 1° steps DIMM	G Code	D DIMM	D Limit deviations	D1	P
Straight type M-SJAC (S45C) M-SJAF (HPM1) M-SJAD (SKD61)	10	10.0 ~ 100.0	0 10.5 11 12 13	→Z →Y →A →B →C	2 *3 2.5 *3 3 *3 3.5 4 4.5 5	→A →B →C →D →E →F →G	1 *3 2 3 4	Specify only for tapered type D>V≧E+2	Specify only for tapered type 1 2 3 4 5 6 7 8 9 10	→1 →2 →3 →4 →5 →6 →7 →8 →9 →A	10	0 −0.009	35	25
	13										13	0 −0.011		
Tapered type M-SJBF (HPM1) M-SJBD (SKD61)	16		0 10.5 11 12 13 16	→Z →Y →A →B →C →F							16		50	36
	20										20	0 −0.013		

*1. E dimension is set in accordance with L dimension.
*2. L dimension is restricted by d, V and α. Also, G is restricted by L dimension.
*4. When SR=0, the value is +10.

*3. L dimension limits

α \ d	2	2.5	3
1	50	50	85
2 3 4	85	85	L max

Working limit details ➡ P.386
Straight type D−E≧2
Tapered type V−E≧2
When G≧6, L−F≧3
When G<6, L−F≧$\frac{0.15}{\tan G}$ +1.5

Calculation of E
$E=d+2\{L+(U)\overset{*4}{+7.5}\}\tan(\alpha/2)$
U: when additional processing of ZC is specified

Calculation of F $F=\frac{D-V}{2\tan(G-0.25)}$

※0.25 is a value that takes G tolerance into account.

How to order

Catalog No.	D	×	L	SR	d	α	N	V	−	G	+	Optional processing
M-SJAC	10	×	62.5	A	C	1						
M-SJBF	13	×	48.0	A	E	2	N	10.0	−	5	+	LKC

Shipping **Orders are shipped out in 5 business days (excluding the day of order).**

Price list

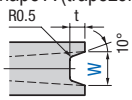
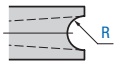
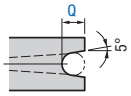
Straight type

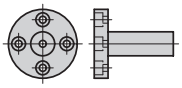
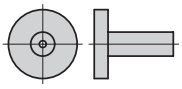
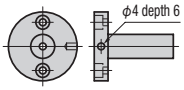
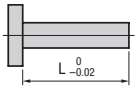
Catalog No. / L \ D	Unit price in yen					
	M-SJAC		M-SJAF		M-SJAD	
	10・13	16・20	10・13	16・20	10・13	16・20
10.0 ～ 20.0	2,820	3,100	3,200	3,480	3,670	3,850
20.1 ～ 40.0	2,820	3,100	4,230	4,700	4,790	5,260
40.1 ～ 60.0	3,290	3,670	5,550	6,110	6,200	6,770
60.1 ～ 80.0	3,850	4,040	7,240	7,990	8,080	8,840
80.1 ～ 100.0	5,450	5,920	9,680	10,620	10,620	11,660

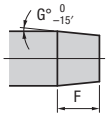
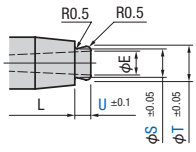
Tapered type

Catalog No. / L \ D	Unit price in yen			
	M-SJBF		M-SJBD	
	10・13	16・20	10・13	16・20
10.0 ～ 20.0	3,670	3,950	4,140	4,320
20.1 ～ 40.0	4,790	5,260	5,360	5,830
40.1 ～ 60.0	6,110	6,670	6,770	7,330
60.1 ～ 80.0	7,900	8,650	8,740	9,490
80.1 ～ 100.0	10,430	11,370	11,370	12,410

Optional processing

Specification	Code	Shape	Code	Shape	Code	Shape	Dimension option	Unit price in yen		
Runner groove machining										
Shape A (trapezoid)  ◆ **Working limits for** A (T, J, L or P) W: (E-0.4) ≧W Combination with ZC is not available	AIW		AHW		AXW		**W dimension options** (W / t: 3 / 2.5; 4 / 3; 5 / 3.5; 6 / 4; 8 / 5.5; 10 / 7) How to specify: **AIW5**	AIW AHW	1,000
	ATW		AJW		+ Bolt hole position ◔ Whirl-stop pin hole position			AXW	1,800
								ATW AJW	2,000
	ALW		APW					ALW APW	1,500
Shape B (semicircle)  ◆ **Working limits for** B (T, J, L or P) R: (E-0.4) ≧2×R Combination with ZC is not available	BIR		BHR		BXR		**R dimension options** (1; 1.25; 1.5; 1.75; 2; 2.5; 3; 4) How to specify: **BXR3**	BIR BHR	1,000
	BTR		BJR		+ Bolt hole position ◔ Whirl-stop pin hole position			BXR	1,800
								BTR BJR	2,000
	BLR		BPR					BLR BPR	1,500
Shape C (Arc+Tangent)  ◆ **Working limits for** C (T, J, L or P) Q: (E-0.4) ≧Q×1.09 Combination with ZC is not available	CIQ		CHQ		CXQ		**Q dimension options** (2; 2.5; 3; 3.5; 4; 5; 6; 8) How to specify: **CTQ4**	CIQ CHQ	1,000
	CTQ		CJQ		+ Bolt hole position ◔ Whirl-stop pin hole position			CXQ	1,800
								CTQ CJQ	2,000
	CLQ		CPQ					CLQ CPQ	1,500

Code	Specification	U/price (yen)
BC	 Increases the number of bolt holes # of bots holes 2 → 4 (Supplied bots: 4) ※ Combination with NC is not available.	500
BN	 Decreases the number of bolt holes # of bots holes 2 → 0 (Supplied bots: 0) Available for material S45C, HPM1.	−500
NC	 Creates a whirl-stop pin hole on the head.	200
LKC	 L dimension can be directly specified in 0.01 mm steps. $L^{+0.1}_{0} \rightarrow L^{0}_{-0.02}$ ※ Combination with ZC is not available.	600

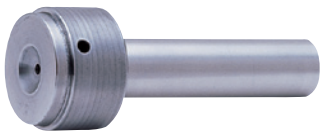
Code	Specification	U/price (yen)
GKC	 Changes G tolerance. $G^{\circ}{}^{0}_{-30'} \rightarrow G^{\circ}{}^{0}_{-15'}$ Available for taper type when F≦15 and (L-F) ≧10 ※ Combination with ZC is not available.	1,800
ZC	 S, T and U can be specified in 0.1 mm steps. ◆ **Working limits** ➡ P.386 S≧E+2 Straight type E+2≦T≦D Tapered type E+2≦T≦V−2UtanG 2≦U≦5 Specification Lmax≧L+U How to specify: **ZC-S3.5-T4.0-U2.0**	1,000

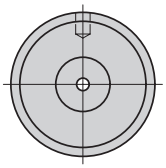
Sprue Bushings Shoulder Type (JIS)

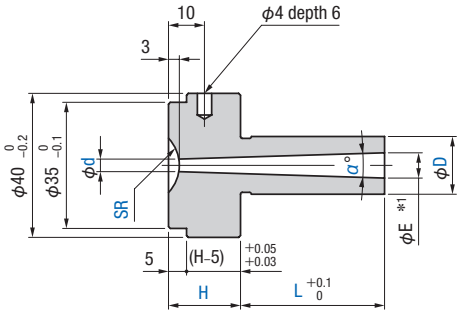
SPRUE BUSHINGS

Additional processing to mold bases ➡ P.92

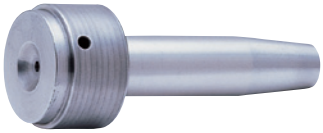
Catalog No.	Material	Hardness after heat treatment
M-SJCC	S45C	Not heat treated
M-SJCF	HPM1	37 to 41 HRC
M-SJCD	SKD61	48 HRC or more

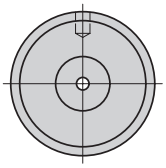


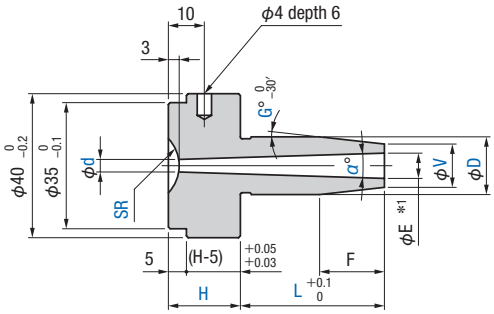




Catalog No.	Material	Hardness after heat treatment
M-SJDF	HPM1	37 to 41 HRC
M-SJDD	SKD61	48 HRC or more







Catalog No.	D	H DIMM	H Code	L *2 In 0.1 mm steps	SR DIMM	SR Code	d DIMM	d Code	α	V In 0.1 mm steps	G In 1° steps DIMM	G In 1° steps Code	D DIMM	D Limit deviations
Straight type M-SJCC (S45C) M-SJCF (HPM1) M-SJCD (SKD61) / Tapered type M-SJDF (HPM1) M-SJDD (SKD61)	10	25	A	10.0 ~ 100.0	0	Z	2 *3	A	1 *3	Specify only for tapered type	Specify only for tapered type 1	1	10	0 −0.009
		30	B		11	A	2.5 *3	B	2		2	2		
	13	25	A		12	B	3 *3	C	3		3	3	13	0 −0.011
		30	B		13	C	3.5	D	4	D>V≧E+2	4	4		
	16	25	A		16	E	4	E			5	5	16	
		30	B		20	J	4.5	F			6	6		
	20	25	A		21	K	5	G			7	7	20	0 −0.013
		30	B								8	8		
											9	9		
											10	A		

*1. E dimension is set in accordance with L dimension.
*2. L dimension is restricted by d, V and α. Also, G is restricted by L dimension.
*4. When SR=0, the value is -0.

*3. L dimension limits

α \ d	2	2.5	3
1	50	50	85
2 3 4	85	85	L max

Working limit ➡ P.386
Straight type D−E≧2
Tapered type V−E≧2
When G≧6, L−F≧3
When G<6, $L-F \geqq \frac{0.15}{\tan G}+1.5$

Calculation of E
$E=d+2\{L+(U)+H\underline{-3}^{*4}\}\tan(\alpha/2)$
U: when additional processing of ZC is specified

Calculation of F $F=\frac{D-V}{2\tan(G-0.25)}$

※ 0.25 is a value that takes G tolerance into account.

How to order

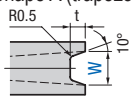
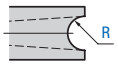
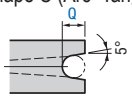
Catalog No.	D	H	L	SR	d	α	N	V	−	G	+	Optional processing
M-SJCC	16	A	72.0	A	E	2						
M-SJDD	20	B	56.2	A	C	2	N	18.0	−	5	+	KC

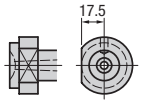
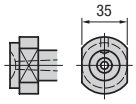
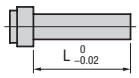
Shipping **Orders are shipped out in 5 business days (excluding the day of order).**

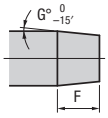
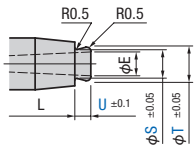
Price list

Catalog No. / L	Unit price in yen				
	Straight type			Tapered type	
	M-SJCC	M-SJCF	M-SJCD	M-SJDF	M-SJDD
10.0 ～ 20.0	2,630	3,570	3,950	4,140	4,510
20.1 ～ 40.0	2,630	4,700	5,080	5,260	5,640
40.1 ～ 60.0	3,100	6,110	6,490	6,770	7,140
60.1 ～ 80.0	3,670	7,800	8,180	8,460	8,840
80.1 ～ 100.0	5,450	10,150	10,530	10,900	11,280

Optional processing

Specification	Code	Code	Code	Code	Code	Code	Code	Code	Dimension option	Unit price in yen		
Runner groove machining												
Shape A (trapezoid)  ◆ **Working limits for** A (T, J, K, E, L, P, U or C) W: (E-0.4) ≧W Combination with ZC is not available	AIW	AHW	AXW	Whirl-stop pin hole position / KC position					W dimension option: W / t — 3 / 2.5; 4 / 3; 5 / 3.5; 6 / 4; 8 / 5.5; 10 / 7. How to specify: **AIW5**	AIW AHW		1,000
	ATW	AJW	AKW	AEW						AXW		1,800
	ALW	APW	AUW	ACW						ATW AJW AKW AEW		2,000
										ALW APW AUW ACW		1,500
Shape B (semicircle)  ◆ **Working limits for** B (T, J, K, E, L, P, U or C) R: (E-0.4) ≧2×R Combination with ZC is not available	BIR	BHR	BXR	Whirl-stop pin hole position / KC position					R dimension option: 1; 1.25; 1.5; 1.75; 2; 2.5; 3; 4. How to specify: **BXR3**	BIR BHR		1,000
	BTR	BJR	BKR	BER						BXR		1,800
										BTR BJR BKR BER		2,000
	BLR	BPR	BUR	BCR						BLR BPR BUR BCR		1,500
Shape C (Arc+Tangent)  ◆ **Working limits for** C (T, J, K, E, L, P, U or C) Q: (E-0.4) ≧Q×1.09 Combination with ZC is not available	CIQ	CHQ	CXQ	Whirl-stop pin hole position / KC position					Q dimension option: 2; 2.5; 3; 3.5; 4; 5; 6; 8. How to specify: **CTQ4**	CIQ CHQ		1,000
	CTQ	CJQ	CKQ	CEQ						CXQ		1,800
										CTQ CJQ CKQ CEQ		2,000
	CLQ	CPQ	CUQ	CCQ						CLQ CPQ CUQ CCQ		1,500

Code	Specification	U/price (yen)
KC	 Single head cutting	200
WKC	 Two head cutting	400
LKC	 L dimension can be specified directly in 0.01 mm steps. $L^{+0.1}_{0} \rightarrow L^{0}_{-0.02}$ ※ Combination with ZC is not available.	600

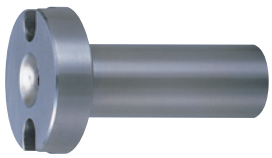
Code	Specification	U/price (yen)
GKC	 Changes G tolerance. $G°^{0}_{-30'} \rightarrow G°^{0}_{-15'}$ Available for taper type when F≦15 and (L-F) ≧10 ※ Combination with ZC is not available.	1,800
ZC	 S, T and U can be specified in 0.1 mm steps. ◆ **Working limits** ➡ P.386 S≧E+2 Straight type E+2≦T≦D Tapered type E+2≦T≦V−2UtanG 2≦U≦5 Specification Lmax≧L+U How to specify: **ZC-S3.5-T4.0-U2.0**	1,000

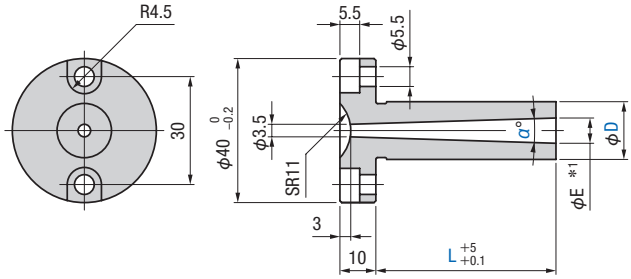
Sprue Bushings Bolt Hole Type

SPRUE BUSHINGS

Additional processing to mold bases ➡ P.92

Catalog No.	Material	Hardness after heat treatment
M-SAGF	HPM1	37 to 41 HRC
M-SAGD	SKD61	48 HRC or more
M-SAGS	SKD11 (Improved steel)	58 HRC or more





Supplied with hexagon socket head cap screw M5×12 (2 pcs.)

Catalog No.	D	L	α	D DIMM	D Limit deviations
Straight type M-SAGF (HPM1) M-SAGD (SKD61) M-SAGS (SKD11 Improved steel)	10	40 60 80	2 3	10	0 −0.009
	13			13	0 −0.011
	16			16	

*1. Calculation of E E=3.5+2 (L+7) tan (α/2)

How to order

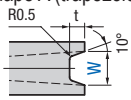
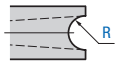
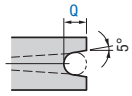
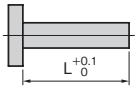
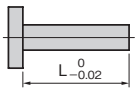
Catalog No.	D	×	L	A D	α	N +	Optional processing
M-SAGS	16	×	80	A D	2		
M-SAGD	13	×	60	A D	3	N +	AIW4

Shipping **Orders are shipped out in 3 business days (excluding the day of order).**

Price list

L \ Catalog No.	Unit price in yen		
	M-SAGF	M-SAGD	M-SAGS
40	4,500	5,000	6,500
60	5,900	6,200	8,200
80	7,700	7,900	10,400

Optional processing

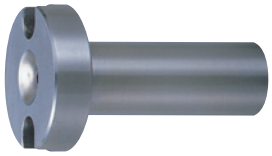
	Specification	Code	Shape	Code	Shape	Code	Shape	Dimension option	Unit price in yen		
Runner groove machining	Shape A (trapezoid)  Only available when LC or LKC is specified ◆ **Working limits for** A (T, J, L or P) W: (E-0.4) ≧W	AIW		AHW		AXW		**W dimension option** W / t 3 / 2.5 4 / 3 5 / 3.5 6 / 4 8 / 5.5 10 / 7 How to specify: **AIW5**	AIW	AHW	1,000
		ATW		AJW		┼ Bolt hole position			AXW		1,800
		ALW		APW					ATW	AJW	2,000
									ALW	APW	1,500
	Shape B (semicircle)  Only available when LC or LKC is specified ◆ **Working limits for** B (T, J, L or P) R: (E-0.4) ≧2×R	BIR		BHR		BXR		**R dimension option** 1 1.25 1.5 1.75 2 2.5 3 4 How to specify: **BXR3**	BIR	BHR	1,000
		BTR		BJR		┼ Bolt hole position			BXR		1,800
		BLR		BPR					BTR	BJR	2,000
									BLR	BPR	1,500
	Shape C (Arc+Tangent)  Only available when LC or LKC is specified ◆ **Working limits for** C (T, J, L or P) Q: (E-0.4) ≧Q×1.09	CIQ		CHQ		CXQ		**Q dimension option** 2 2.5 3 3.5 4 5 6 8 How to specify: **CTQ4**	CIQ	CHQ	1,000
		CTQ		CJQ		┼ Bolt hole position			CXQ		1,800
		CLQ		CPQ					CTQ	CJQ	2,000
									CLQ	CPQ	1,500
Length change	 	LC	Specify L dimension directly in 0.1 mm steps. When combined with LKC, specify it in 0.01 mm steps. 40≦LC≦80 When LC is used, $L^{+5}_{+0.1} \rightarrow L^{+0.1}_{0}$						200		
Length tolerance change	 	LKC	$L^{+5}_{+0.1} \rightarrow L^{0}_{-0.02}$ When L40, L60 or L80 is selected, no need to specify LC.						600		

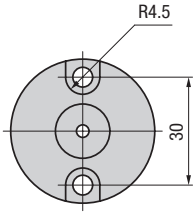
Sprue Bushings Bolt Hole, Head Thick 10 mm Type

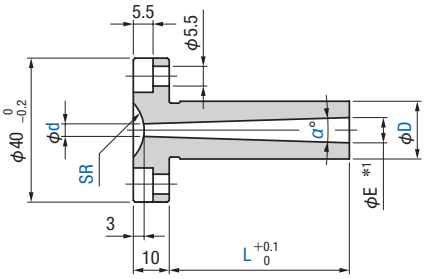
SPRUE BUSHINGS

Additional processing to mold bases ➡ P.92

Catalog No.	Material	Hardness after heat treatment
M-SBGF	HPM1	37 to 41 HRC
M-SBGD	SKD61	48 HRC or more
M-SBGS	SKD11 (improved steel)	58 HRC or more

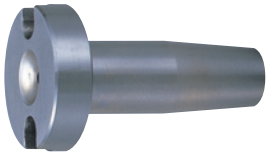


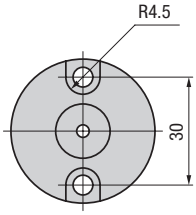


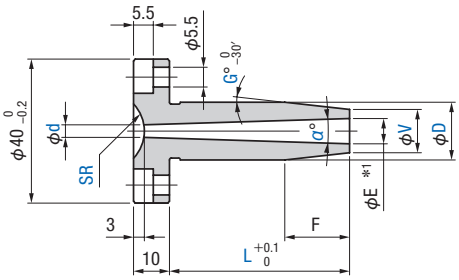


Supplied with hexagon socket head cap screw M5×12 (2 pcs.)

Catalog No.	Material	Hardness after heat treatment
M-SBHF	HPM1	37 to 41 HRC
M-SBHD	SKD61	48 HRC or more
M-SBHS	SKD11 (improved steel)	58 HRC or more







Supplied with hexagon socket head cap screw M5×12 (2 pcs.)

Catalog No.	D	L *2	SR		d		α	V	G		D	
		In 0.1 mm steps	DIMM	Code	DIMM	Code		In 0.1 mm steps	In 1° steps DIMM	Code	DIMM	Limit deviations
Straight type M-SBGF (HPM1) M-SBGD (SKD61) M-SBGS (SKD11 improved steel) Tapered type M-SBHF (HPM1) M-SBHD (SKD61) M-SBHS (SKD11 improved steel)	10	10.0 ～ 100.0	0	→ Z	2 *3	→ A	1*3	Specify only for tapered type	Specify only for tapered type 1	→ 1	10	0 −0.009
	13		11	→ A	2.5 *3	→ B	2		2	→ 2	13	0 −0.011
			12	→ B	3 *3	→ C	3		3	→ 3		
			13	→ C	3.5	→ D	4	D>V≧E+2	4	→ 4		
	16		16	→ F	4	→ E			5	→ 5	16	
			20	→ J	4.5	→ F			6	→ 6		
	20 *4	10.0 ～ 150.0			5	→ G			7	→ 7	20	0 −0.013
					5.5	→ H			8	→ 8		
					6	→ I			9	→ 9		
					6.5	→ J			10	→ A		
					7	→ K						
					8	→ M						

*1. E dimension is set in accordance with L dimension.
*2. L dimension is restricted by d, V and α. Also, G is restricted by L dimension.
*4. D 20 for MBGS and M-SBHS is not available.
*5. When SR=0, the value is +10.

*3. L dimension limits

α \ d	2	2.5	3
1	50	50	85
2 3 4	85	85	L max

Working limit ➡ P.386
Straight type D−E≧2
Tapered type V−E≧2
When G≧6, L−F≧3
When G<6, L−F≧$\frac{0.15}{\tan G}$+1.5

Calculation of E
$E=d+2\{L+(U)\overset{*5}{+7}\}\tan(\alpha/2)$
U: when additional processing of ZC is specified

Calculation of F $F=\frac{D-V}{2\tan(G-0.25)}$
※0.25 is a value that takes G tolerance into account.

How to order

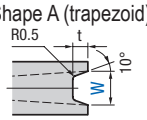
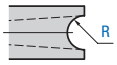
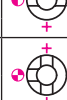
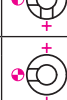
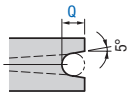
Catalog No.	D	×	L	SR	d	α	N	V	−	G	+	Optional processing
M-SBGF	16	×	60.1	A	D	2						
M-SBHF	20	×	58.0	A	C	3	N	14.0	−	5	+	AIW5

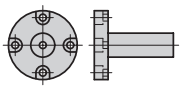
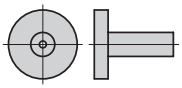
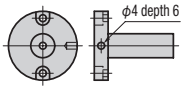
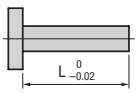
Shipping **Orders are shipped out in 5 business days (excluding the day of order).**

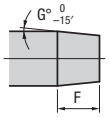
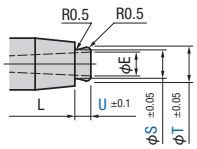
Price list

Catalog No. / L	Unit price in yen					
	Straight type			Tapered type		
	M-SBGF	M-SBGD	M-SBGS	M-SBHF	M-SBHD	M-SBHS
10.0 ～ 20.0	3,600	4,200	5,600	4,200	4,800	6,400
20.1 ～ 40.0	4,900	5,500	7,200	5,500	6,100	7,900
40.1 ～ 60.0	6,500	7,100	9,100	7,200	7,800	10,000
60.1 ～ 80.0	8,500	9,100	11,500	9,200	9,800	12,400
80.1 ～ 100.0	9,690	11,900	14,900	10,370	12,700	15,800
100.1 ～ 120.0	11,140	13,700		11,990	14,700	
120.1 ～ 140.0	14,110	17,300		15,050	18,600	
140.1 ～ 150.0	16,320	19,500		16,580	20,500	

Optional processing

	Specification	Code	Shape	Code	Shape	Code	Shape	Dimension option	Unit price in yen		
Runner groove machining	Shape A (trapezoid)  ◆ **Working limits for** A (T, J, L or P) W: (E-0.4) ≧W Combination with ZC is not available	AIW		AHW		AXW		**W dimension option** (W / t: 3 / 2.5; 4 / 3; 5 / 3.5; 6 / 4; 8 / 5.5; 10 / 7) How to specify: **AIW5**	AIW	AHW	1,000
		ATW		AJW		+ Bolt hole position ◔ Whirl-stop pin hole position			AXW		1,800
									ATW	AJW	2,000
		ALW		APW					ALW	APW	1,500
	Shape B (semicircle)  ◆ **Working limits for** B (T, J, L or P) R: (E-0.4) ≧2×R Combination with ZC is not available	BIR		BHR		BXR		**R dimension option** (1; 1.25; 1.5; 1.75; 2; 2.5; 3; 4) How to specify: **BXR3**	BIR	BHR	1,000
		BTR		BJR		+ Bolt hole position ◔ Whirl-stop pin hole position			BXR		1,800
									BTR	BJR	2,000
		BLR		BPR					BLR	BPR	1,500
	Shape C (Arc+Tangent)  ◆ **Working limits for** C (T, J, L or P) Q: (E-0.4) ≧Q×1.09 Combination with ZC is not available	CIQ		CHQ		CXQ		**Q dimension option** (2; 2.5; 3; 3.5; 4; 5; 6; 8) How to specify: **CTQ4**	CIQ	CHQ	1,000
		CTQ		CJQ		+ Bolt hole position ◔ Whirl-stop pin hole position			CXQ		1,800
									CTQ	CJQ	2,000
		CLQ		CPQ					CLQ	CPQ	1,500

Code	Specification	U/price (yen)
BC	 Increases the number of bolt holes # of bots holes 2 → 4 (Supplied bots: 4) ※ Combination with NC is not available.	500
BN	 Decreases the number of bolt holes # of bots holes 2 → 0 (Supplied bots: 0) Available for material HPM1.	−500
NC	 Creates a whirl-stop pin hole on the head.	200
LKC	 L dimension can be directly specified in 0.01 mm steps. $L^{+0.1}_{0} \rightarrow L^{0}_{-0.02}$ ※ Combination with ZC is not available.	600

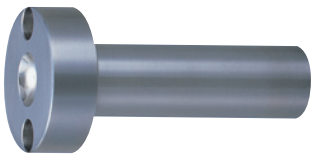
Code	Specification	U/price (yen)
GKC	 Changes G tolerance. $G^{\circ}{}^{0}_{-30'} \rightarrow G^{\circ}{}^{0}_{-15'}$ Available for taper type when F≦15 and (L-F) ≧10 ※ Combination with ZC is not available.	1,800
ZC	 S, T and U can be specified in 0.1 mm steps. ◆ **Working limits** ➡ **P.386** S≧E+2 Straight type E+2≦T≦D Tapered type E+2≦T≦V−2UtanG 2≦U≦5 Specification Lmax≧L+U How to specify: **ZC-S3.5-T4.0-U2.0**	1,000

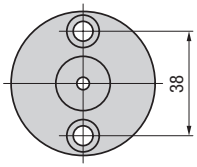
Sprue Bushings Bolt Hole, Head Thick 15 mm Type

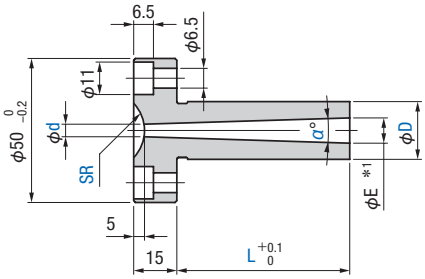
SPRUE BUSHINGS

Additional processing to mold bases ➡ P.92

Catalog No.	Material	Hardness after heat treatment
M-SBIF	HPM1	37 to 41 HRC
M-SBID	SKD61	48 HRC or more

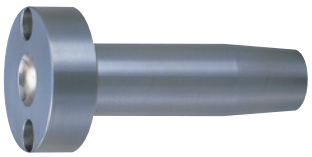


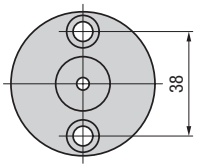


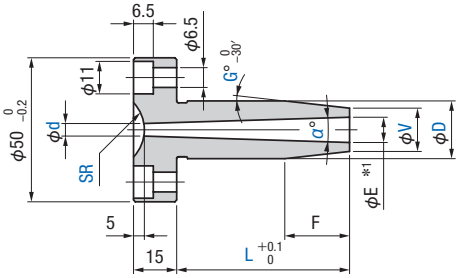


Supplied with hexagon socket head cap screw M6×15 (2 pcs.)

Catalog No.	Material	Hardness after heat treatment
M-SBJF	HPM1	37 to 41 HRC
M-SBJD	SKD61	48 HRC or more







Supplied with hexagon socket head cap screw M6×15 (2 pcs.)

Catalog No.	D	L *2	SR		d		α	V	G In 1° steps		D	
		In 0.1 mm steps	DIMM	Code	DIMM	Code		In 0.1 mm steps	DIMM	Code	DIMM	Limit deviations
Straight type M-SBIF (HPM1) M-SBID (SKD61) Tapered type M-SBJF (HPM1) M-SBJD (SKD61)	16	30.0 ~ 100.0	0 11 12 13 16 20 21 23	→Z →A →B →C →F →J →K →M	2 *3 2.5 *3 3 *3 3.5 4 4.5 5 5.5 6 6.5 7 8	→A →B →C →D →E →F →G →H →I →J →K →M	1 *3 2 3 4	Specify only for tapered type D>V≧E+2	Specify only for tapered type 1 2 3 4 5 6 7 8 9 10	→1 →2 →3 →4 →5 →6 →7 →8 →9 →A	16	0 −0.011
	20	30.0 ~ 150.0									20	0 −0.013
	25										25	

*1. E dimension is set in accordance with L dimension.
*2. L dimension is restricted by d, V and α. Also, G is restricted by L dimension.
*4. When SR=0, the value is +15.

*3. L dimension limits

α \ d	2	2.5	3
1	50	50	85
2 3 4	85	85	L max

Working limit ➡ P.386
Straight type D−E≧2
Tapered type V−E≧2
When G≧6, L−F≧3
When G<6, $L-F \geqq \frac{0.15}{\tan G}+1.5$

Calculation of E
$E=d+2\{L+(U)\pm 10\}\tan(\alpha/2)$ *4
U: when additional processing of ZC is specified

Calculation of F $F=\frac{D-V}{2\tan(G-0.25)}$
※0.25 is a value that takes G tolerance into account.

How to order

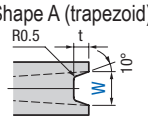
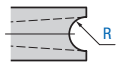
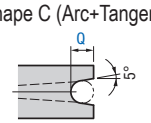
Catalog No.	D	×	L	SR	d	α	N	V	−	G	+	Optional processing
M-SBID	25	×	110.0	J	G	3						
M-SBJF	20	×	66.4	F	D	2	N	18.0	−	5	+	AIW5

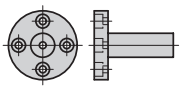
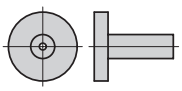
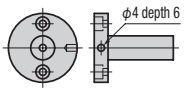
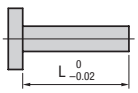
Shipping **Orders are shipped out in 5 business days (excluding the day of order).**

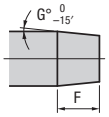
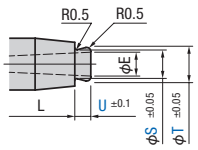
Price list

Catalog No. / L	Unit price in yen			
	Straight type		Tapered type	
	M-SBIF	M-SBID	M-SBJF	M-SBJD
30.0 ～ 60.0	9,700	10,700	10,900	12,000
60.1 ～ 80.0	11,000	12,100	12,200	13,400
80.1 ～ 100.0	14,200	15,600	15,300	16,800
100.1 ～ 120.0	16,200	17,800	17,400	19,100
120.1 ～ 140.0	19,300	21,200	20,500	22,600
140.1 ～ 150.0	24,200	26,600	25,500	28,100

Optional processing

Specification	Code	Shape	Code	Shape	Code	Shape	Dimension option	Unit price in yen		
Runner groove machining										
Shape A (trapezoid)  ◆ **Working limits for** A (T, J, L or P) W: (E-0.4) ≧W Combination with ZC is not available	AIW		AHW		AXW		**W dimension option** (W / t: 3 / 2.5; 4 / 3; 5 / 3.5; 6 / 4; 8 / 5.5; 10 / 7) How to specify: **AIW5**	AIW	AHW	1,000
	ATW		AJW		+ Bolt hole position ◔ Whirl-stop pin hole position			AXW		1,800
								ATW	AJW	2,000
	ALW		APW					ALW	APW	1,500
Shape B (semicircle)  ◆ **Working limits for** B (T, J, L or P) R: (E-0.4) ≧2×R Combination with ZC is not available	BIR		BHR		BXR		**R dimension option** (1; 1.25; 1.5; 1.75; 2; 2.5; 3; 4) How to specify: **BXR3**	BIR	BHR	1,000
	BTR		BJR		+ Bolt hole position ◔ Whirl-stop pin hole position			BXR		1,800
								BTR	BJR	2,000
	BLR		BPR					BLR	BPR	1,500
Shape C (Arc+Tangent)  ◆ **Working limits for** C (T, J, L or P) Q: (E-0.4) ≧Q×1.09 Combination with ZC is not available	CIQ		CHQ		CXQ		**Q dimension option** (2; 2.5; 3; 3.5; 4; 5; 6; 8) How to specify: **CTQ4**	CIQ	CHQ	1,000
	CTQ		CJQ		+ Bolt hole position ◔ Whirl-stop pin hole position			CXQ		1,800
								CTQ	CJQ	2,000
	CLQ		CPQ					CLQ	CPQ	1,500

Code	Specification	U/price (yen)
BC	 Increases the number of bolt holes # of bots holes 2 → 4 (Supplied bots: 4) ※ Combination with NC is not available.	500
BN	 Decreases the number of bolt holes # of bots holes 2 → 0 (Supplied bots: 0) Available for material HPM1.	−500
NC	 Creates a whirl-stop pin hole on the head.	200
LKC	 L dimension can be directly specified in 0.01 mm steps. $L^{+0.1}_{0} \rightarrow L^{0}_{-0.02}$ ※ Combination with ZC is not available.	600

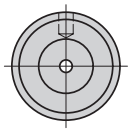
Code	Specification	U/price (yen)
GKC	 Changes G tolerance. $G^{\circ}_{-30'}^{0} \rightarrow G^{\circ}_{-15'}^{0}$ Available for taper type when F≦15 and (L-F) ≧10 ※ Combination with ZC is not available.	1,800
ZC	 S, T and U can be specified in 0.1 mm steps. ◆ **Working limits** ➡ **P.386** S≧E+2 Straight type E+2≦T≦D Tapered type E+2≦T≦V−2UtanG 2≦U≦5 Specification Lmax≧L+U How to specify: **ZC-S3.5-T4.0-U2.0**	1,000

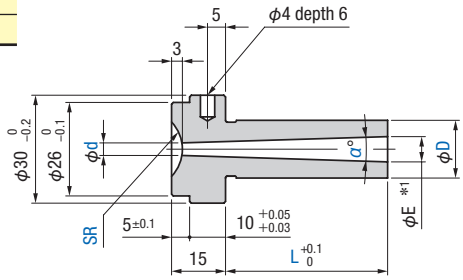
Sprue Bushings Shoulder Type

SPRUE BUSHINGS

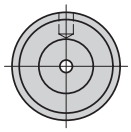
Additional processing to mold bases ➡ P.92

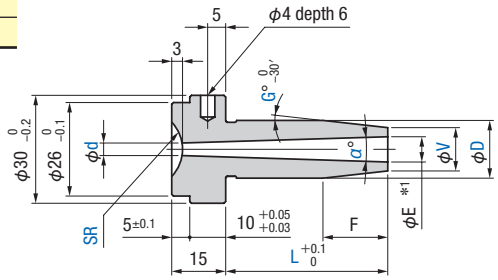
Catalog No.	Material	Hardness after heat treatment
M-SBEF	HPM1	37 to 41 HRC
M-SBED	SKD61	48 HRC or more
M-SBES	SKD11 (Improved steel)	58 HRC or more





Catalog No.	Material	Hardness after heat treatment
M-SBFF	HPM1	37 to 41 HRC
M-SBFD	SKD61	48 HRC or more
M-SBFS	SKD11 (Improved steel)	58 HRC or more





Catalog No.	D	L *2 In 0.1 mm steps	SR DIMM	SR Code	d DIMM	d Code	α	V In 0.1 mm steps	G In 1° steps DIMM	G Code	D DIMM	D Limit deviations
Straight type M-SBEF (HPM1) M-SBED (SKD61) M-SBES (SKD11 improved steel) Tapered type M-SBFF (HPM1) M-SBFD (SKD61) M-SBFS (SKD11 improved steel)	10	10.0 ~ 100.0	0	→ Z	2 *3	→ A	1 *3	Specify only for tapered type	Specify only for tapered type		10	0 −0.009
			11	→ A	2.5 *3	→ B	2		1	→ 1	13	0 −0.011
	13		12	→ B	3 *3	→ C	3		2	→ 2		
			13	→ C	3.5	→ D	4		3	→ 3		
	16		16	→ F	4	→ E			4	→ 4	16	
			20	→ J	4.5	→ F		D>V≧E+2	5	→ 5		
	20 *4	10.0 ~ 150.0	21	→ K	5	→ G			6	→ 6	20	0 −0.013
			23	→ M	5.5	→ H			7	→ 7		
	25 *4				6	→ I			8	→ 8	25	
					6.5	→ J			9	→ 9		
					7	→ K			10	→ A		
					8	→ M						

*1. E dimension is set in accordance with L dimension.
*2. L dimension is restricted by d, V and α. Also, G is restricted by L dimension.
*4. D 20 and 25 for M-SBES and M-SBFS is not available.
*5. When SR=0, the value is +15.

*3. L dimension limits

α \ d	2	2.5	3
1	50	50	85
2 3 4	85	85	L max

Working limits ➡ P.386
Straight type D−E≧2
Tapered type V−E≧2
When G≧6, L−F≧3
When G<6, L−F≧ $\frac{0.15}{\tan G}$ +1.5

Calculation of E
$E=d+2\{L+(U)\pm 12\}\tan(\alpha/2)$ *5
U: when additional processing of ZC is specified

Calculation of F $F=\frac{D-V}{2\tan(G-0.25)}$
※0.25 is a value that takes G tolerance into account.

How to order

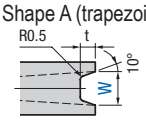
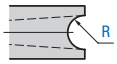
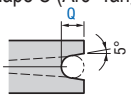
Catalog No.	D	×	L	SR	d	α	N	V	−	G	+	Optional processing
M-SBED	16	×	72.2	A	C	3						
M-SBFF	20	×	58.5	A	D	2	N	18.0	−	5	+	AIW6

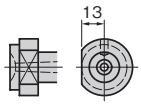
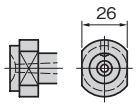
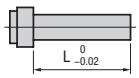
Shipping **Orders are shipped out in 5 business days (excluding the day of order).**

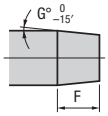
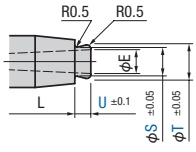
Price list

Catalog No. / L	Unit price in yen					
	Straight type			Tapered type		
	M-SBEF	M-SBED	M-SBES	M-SBFF	M-SBFD	M-SBFS
10.0 ～ 20.0	3,700	4,200	5,000	4,300	4,800	5,800
20.1 ～ 40.0	4,900	5,400	6,500	5,500	6,000	7,200
40.1 ～ 60.0	6,400	6,900	8,300	7,100	7,600	9,100
60.1 ～ 80.0	8,200	8,700	10,400	8,900	9,400	11,300
80.1 ～ 100.0	9,180	11,200	13,400	9,860	12,000	14,400
100.1 ～ 120.0	10,710	13,200		11,560	14,200	
120.1 ～ 140.0	13,430	16,500		14,450	17,700	
140.1 ～ 150.0	15,470	19,100		16,660	20,000	

Optional processing

Specification	Code	Shape	Code	Shape	Code	Shape	Code	Shape	Dimension option	Unit price in yen		
Runner groove machining												
Shape A (trapezoid)  ◆ **Working limits for** A (T, J, K, E, L, P, U or C) W: (E-0.4) ≧W Combination with ZC is not available	AIW		AHW		AXW		Whirl-stop pin hole position KC position		W dimension option (W / t): 3 / 2.5; 4 / 3; 5 / 3.5; 6 / 4; 8 / 5.5; 10 / 7 — How to specify: **AIW5**	AIW	AHW	1,000
	ATW		AJW		AKW		AEW			AXW		1,800
	ALW		APW		AUW		ACW			ATW AKW	AJW AEW	2,000
										ALW AUW	APW ACW	1,500
Shape B (semicircle)  ◆ **Working limits for** B (T, J, K, E, L, P, U or C) R: (E-0.4) ≧2×R Combination with ZC is not available	BIR		BHR		BXR		Whirl-stop pin hole position KC position		R dimension option: 1; 1.25; 1.5; 1.75; 2; 2.5; 3; 4 — How to specify: **BXR3**	BIR	BHR	1,000
	BTR		BJR		BKR		BER			BXR		1,800
	BLR		BPR		BUR		BCR			BTR BKR	BJR BER	2,000
										BLR BUR	BPR BCR	1,500
Shape C (Arc+Tangent)  ◆ **Working limits for** C (T, J, K, E, L, P, U or C) Q: (E-0.4) ≧Q×1.09 Combination with ZC is not available	CIQ		CHQ		CXQ		Whirl-stop pin hole position KC position		Q dimension option: 2; 2.5; 3; 3.5; 4; 5; 6; 8 — How to specify: **CTQ4**	CIQ	CHQ	1,000
	CTQ		CJQ		CKQ		CEQ			CXQ		1,800
	CLQ		CPQ		CUQ		CCQ			CTQ CKQ	CJQ CEQ	2,000
										CLQ CUQ	CPQ CCQ	1,500

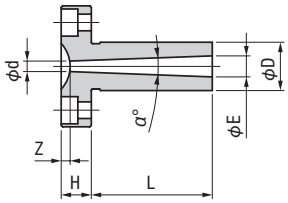
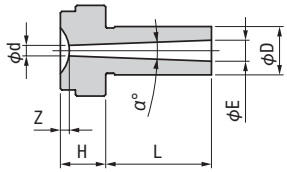
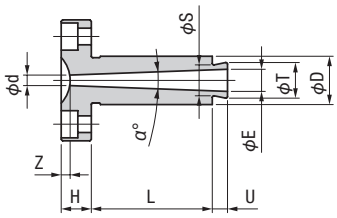
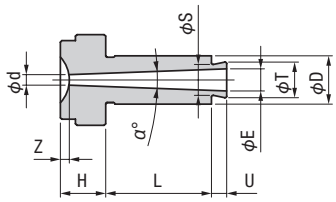
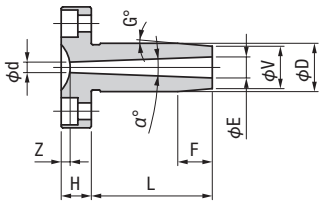
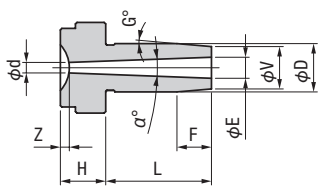
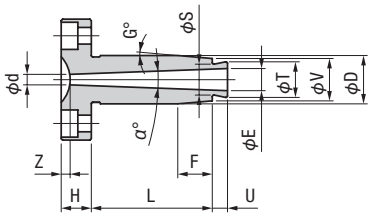
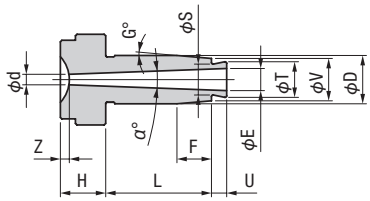
Code	Specification	U/price (yen)
KC	 Single head cutting	200
WKC	 Two head cutting	400
LKC	 L dimension can be specified directly in 0.01 mm steps. $L^{+0.1}_{0} \rightarrow L^{0}_{-0.02}$ ※ Combination with ZC is not available.	600

Code	Specification	U/price (yen)
GKC	 Changes G tolerance. $G°^{\,0}_{-30'} \rightarrow G°^{\,0}_{-15'}$ Available for taper type when F≦15 and (L-F) ≧10 ※ Combination with ZC is not available.	1,800
ZC	 S, T and U can be specified in 0.1 mm steps. ◆ **Working limits** ➡ **P.386** S≧E+2 Straight type E+2≦T≦D Tapered type E+2≦T≦V−2UtanG 2≦U≦5 Specification Lmax≧L+U How to instruct: **ZC-S3.5-T4.0-U2.0**	1,000

Working Limits for Sprue Bushings

SPRUE BUSHINGS

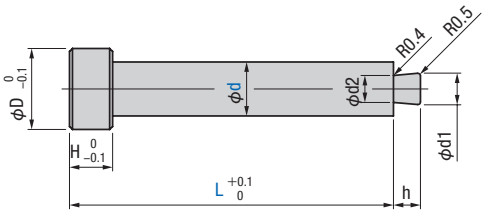
The sprue bushings shown in pages 374 to 377 and pages 380 to 385 are produced on the following conditions.
Each dimension differs depending on the type of sprue bushing. For details, refer to respective pages.

Bolt hole type	Shoulder type	Working limits
		**Working limits** $D-E \geqq 2$ Calculation of E: $E=d+2\{L+H-Z\}\tan(\alpha/2)$
		**Working limits** $S \geqq E+2$ $E+2 \leqq T \leqq D$ Calculation of E : $E=d+2\{L+U+H-Z\}\tan(\alpha/2)$
		**Working limits** $V-E \geqq 2$ When $G \geqq 6$, $L-F \geqq 3$ When $G<6$, $L-F \geqq \frac{0.15}{\tan G}+1.5$ Calculation of E $E=d+2\{L+H-Z\}\tan(\alpha/2)$ Calculation of F $F=\frac{D-V}{2\tan(G-0.25)}$ ※ 0.25 is a value that takes G tolerance into account.
		**Working limits** $S \geqq E+2$ $E+2 \leqq T \leqq V-2U\tan G$ When $G \geqq 6$, $L-F \geqq 3$ When $G<6$, $L-F \geqq \frac{0.15}{\tan G}+1.5$ Calculation of E $E=d+2\{L+U+H-Z\}\tan(\alpha/2)$ Calculation of F $F=\frac{D-V}{2\tan(G-0.25)}$ ※ 0.25 is a value that takes G tolerance into account.

Runner Lock Pins

PULLER PINS

Catalog No.	Material	Hardness after heat treatment
M-RLA	SKS3	58 to 62 HRC



Catalog No.	d	Unit price in yen L 24	29	30	35	40	45	50	60	70	80	d DIMM	d Limit deviations	D	H	d1	d2	h
M-RLA	4	590	600		610	620	630	640	650			4	−0.010 −0.022	6	4	2.8	2.3	2.5
	5			690	700	710	720	730	740	750		5		7		3.3	2.8	3
	6					720		740	760	780	800	6		8	6	3.8	3.0	
	8							750	770	790	810	8	−0.013 −0.028	10	8	4.8	4.0	4
	10								850	870	890	10		13		6.0	4.8	5

How to order

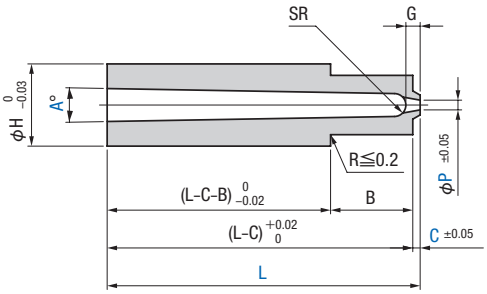
Catalog No.	d	×	L
M-RLA	5	×	30

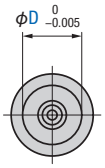
Shipping **In-stock item**

Pin-Point Gate Bushings

SPRUE BUSHINGS

Catalog No.	Material	Hardness after heat treatment
M-PGBA	SKH51	59 to 61 HRC

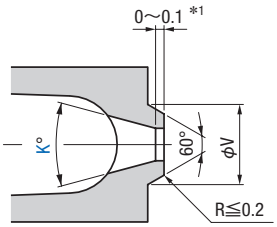




(Electro discharge finish is provided on the SR area)

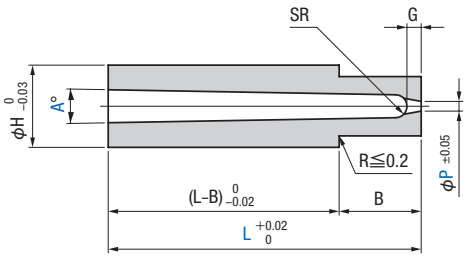
Enlarged view of the tip

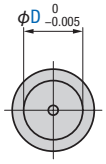
∗1. This bushing has a flat area of 0 to 0.1 on the tip (P dimension).



Eccentricity between D and P is 0.05 or less.
Eccentricity between D and V is 0.05 or less.

Catalog No.	Material	Hardness after heat treatment
M-PGBB	SKH51	59 to 61 HRC

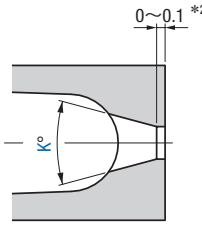




(Electro discharge finish is provided on the SR area)

Enlarged view of the tip

∗2. This bushing has a flat area of 0 to 0.1 on the tip (P dimension).



Eccentricity between D and P is 0.05 or less.

Catalog No.	D	L In 0.01 mm steps	P	A	K	C (M-PGBA only) In 0.1 mm steps	H	G	V	B	SR
M-PGBA / M-PGBB	2	6.00 ~ 20.00	0.3 0.4	1 / 2 / 3	20 / 30	0.2 ~ 0.4	3	0.7	1.3	3	0.60
	2.5	8.00 ~ 25.00	0.3 0.4 0.5			0.2 ~ 0.5	4	1.0	1.5	4	0.75
	3	10.00 ~ 40.00	0.5 0.6 0.8			0.3 ~ 0.8	5	1.2	2.0	6	1.00
	4		0.6				6		2.5		1.00
			0.8 1.0								1.25
	5	15.00 ~ 60.00	0.8 1.0			0.5 ~ 1.5	8	1.5	3.5	10	1.25
			1.2								1.50
	6		1.0				9		4.0		1.25
			1.2 1.4								1.50
	8		1.2 1.4				11		4.5		1.50
			1.6								2.00

How to order

Catalog No.	D	×	L	×	P	N	A	×	K	×	C
M-PGBA	4	×	24.10	×	0.8	N	2	×	20	×	0.5
M-PGBB	5	×	38.20	×	1.0	N	1	×	20		

Shipping Orders are shipped out in 8 business days (excluding the day of order).

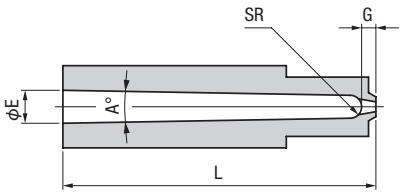
Price list

Catalog No.	D	L	Unit price in yen
M-PGBA	2	6.00 ～ 20.00	18,520
	2.5	8.00 ～ 25.00	18,520
	3	10.00 ～ 25.00	12,970
		25.01 ～ 40.00	13,910
	4	10.00 ～ 25.00	13,250
		25.01 ～ 40.00	14,010
	5	15.00 ～ 25.00	12,690
		25.01 ～ 40.00	13,250
		40.01 ～ 60.00	14,010
	6	15.00 ～ 25.00	12,690
		25.01 ～ 40.00	13,250
		40.01 ～ 60.00	14,010
	8	15.00 ～ 25.00	12,880
		25.01 ～ 40.00	13,540
		40.01 ～ 60.00	14,380

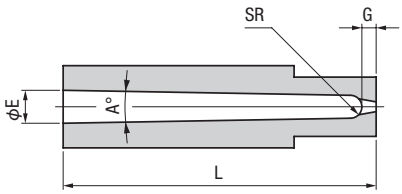
Catalog No.	D	L	Unit price in yen
M-PGBB	2	6.00 ～ 20.00	17,110
	2.5	8.00 ～ 25.00	17,110
	3	10.00 ～ 25.00	11,560
		25.01 ～ 40.00	12,500
	4	10.00 ～ 25.00	11,840
		25.01 ～ 40.00	12,600
	5	15.00 ～ 25.00	11,280
		25.01 ～ 40.00	11,840
		40.01 ～ 60.00	12,600
	6	15.00 ～ 25.00	11,280
		25.01 ～ 40.00	11,840
		40.01 ～ 60.00	12,600
	8	15.00 ～ 25.00	11,470
		25.01 ～ 40.00	12,130
		40.01 ～ 60.00	12,970

Calculation of the inlet diameter E $E = 2SR + 2(L - G - SR)\tan\frac{A}{2}$

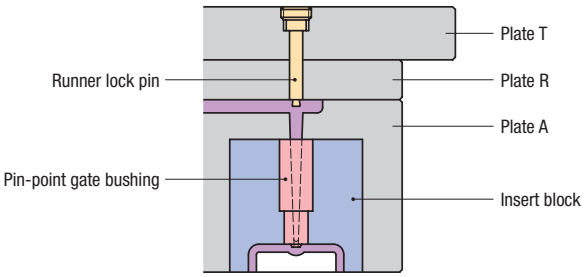
M-PGBA



M-PGBB



Example of use

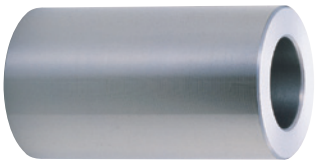


Screws, Coil Springs and Other Parts

Screws, Coil Springs and Other Parts Overview

Base spacers

Additional processing to MDC



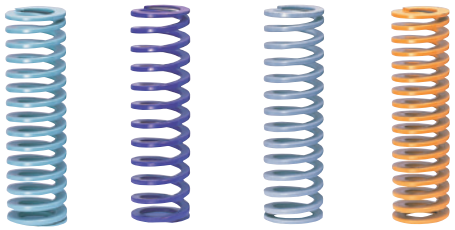
Catalog No.	M-BSA
Material	S45C
Shipping	In-stock item
Page	P.394

Eye bolts

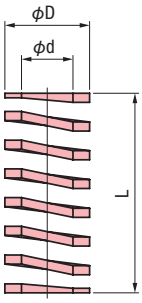
Additional processing to MDC

Catalog No.	M-IBM
Material	SS400
Shipping	In-stock item
Page	P.395

Coil springs



Additional processing to MDC



Catalog No.	M-FSB	M-TY	M-TR	P-TF
Shipping	In-stock item	3 days		
Page	P.396	P.398	P.400	P.402

Pin dia.	Catalog No. M-FSB		Catalog No. M-TY M-TR		Catalog No. P-TF		Load N {kgf} L × 40%				Load N {kgf} L × 45%				Load N {kgf} L × 50%			
	D	d	D	d	D	d	M-FSB	M-TY	M-TR	P-TF	M-FSB	M-TY	M-TR	P-TF	M-FSB	M-TY	M-TR	P-TF
8	—	—	14.5	9	18	9	—	147.1 {15.0}	88.3 {9.0}	206 {21.0}	—	166.7 {17.0}	98.1 {10.0}	226 {23.0}	—	186.3 {19.0}	107.9 {11.0}	255 {26.0}
10	17.5	10.5	17	11	20	11	216 {22}	215.7 {22.0}	147.1 {15.0}	255 {26.0}	235 {24}	245.2 {25.0}	166.7 {17.0}	284 {29.0}	265 {27}	274.6 {28.0}	186.3 {19.0}	314 {32.0}
					22	11				314 {32.0}				353 {36.0}				392 {40.0}
12	21.5	13.2	21	13	25	13.5	255 {26}	284.4 {29.0}	166.7 {17.0}	392 {40.0}	284 {29}	313.8 {32.0}	186.3 {19.0}	441 {45.0}	314 {32}	353.0 {36.0}	205.9 {21.0}	490 {50.0}
					27	13.5				471 {48.0}				530 {54.0}				588 {60.0}
15	26.5	15.5	26	16.5	30	16	451 {46}	411.9 {42.0}	323.6 {33.0}	569 {58.0}	500 {51}	470.7 {48.0}	362.8 {37.0}	637 {65.0}	559 {57}	519.8 {53.0}	402.1 {41.0}	706 {72.0}
20	32.5	20.5	32	21	40	22	628 {64}	559.0 {57.0}	402.1 {41.0}	1,000 {102.0}	706 {72}	627.6 {64.0}	451.1 {46.0}	1,128 {115.0}	785 {80}	696.3 {71.0}	500.1 {51.0}	1,255 {128.0}
25	39.5	25.5	39	26	50	27.5	981 {100}	725.7 {74.0}	431.5 {44.0}	1,569 {160.0}	1,108 {113}	823.8 {84.0}	490.3 {50.0}	1,765 {180.0}	1,226 {125}	912.0 {93.0}	539.4 {55.0}	1,961 {200.0}
30	45.5	30.5	46	32	60	33	1,295 {132}	970.9 {99.0}	490.3 {50.0}	2,260 {230.5}	1,461 {149}	1,098 {112.0}	549.2 {56.0}	2,540 {259.0}	1,618 {165}	1,216 {124.0}	608.0 {62.0}	2,820 {287.6}
	M-FSB ➡ P.396		M-TY ➡ P.398 M-TR ➡ P.400		P-TF ➡ P.402													

※ Pin diameter represents the diameter of return pin used.
※ For details, see the respective pages of the springs.

Additional processing to MDC denotes the parts that support additional processing to mold bases.
Shipping times are shown in business days (excluding the day of order).

Precautions for use of coil springs

Load

◆About spring constant:
Spring constant is a rough guide used to calculate the load required to cause a specific amount of deflection.

◆About load:
The actual load may be lower than the value calculated using the spring constant at the beginning of deflection and may become higher as the deflection approaches the maximum deflection (maximum allowable deflection). Thus, the actual load may deviate from the range specified with limit deviation tolerance.

Condition of use

◆Surface flaws
Any flaw on the surface of a coil spring will lead to early breakage. If any flaw is caused by dropping, etc. it is recommended to replace the spring.

◆Operating environment
Do not use springs in a corrosive environment. If rust started, replace the spring with a new one as it will cause early breakage. Even if rust-proof cutting oil is applied on coil springs, rust may start over a long period of time.

◆Operating temperature

Item name	Operating temperature
M-FSB	130°C or less
M-TY	−30°C to 150°C
M-TR	−30°C to 150°C
P-TF	−30°C to 150°C

◆Setting condition (initial load)
When setting a coil spring, it is recommended to apply an initial load (set up an initial deflection). Otherwise, the spring receives an impact force or uneven load that will cause early breakage.

◆Keep mounting and loading faces parallel (see Figure 1)
Coil spring should be mounted properly with the mounting face and the loading face parallel to each other throughout the entire stoke of the spring. If loaded in a tilted state, the spring receives uneven load that will damage it.

◆Use of multiple springs (see Figure 2)
Use of multiple springs on the same plane. In this case, it is essential to use same type of coil springs. If use of multiple types or a large number of coil springs is inevitable, be sure to consider the overall load balance and allowable deflection amount of respective springs.

◆Prohibition of use of coil springs in series (see Figure 3)
Do not use coil springs in series vertically as it causes a damage to the springs.

◆Prohibition of coaxial use of two coil springs (see Figure 4)
Do not use two coil springs coaxially by putting a spring in a larger diameter spring. Doing so may result in the coils of one spring being sandwiched between the coils of the other spring, when they contact, resulting in a damage of the springs.

◆Avoid entrapment of debris foreign matter
Foreign matter caught between the coils may cause uneven loading and impact loading, eventually causing it to break. Be careful not to allow foreign matter to clog the coils.

◆Allowable deflection
Please select coil springs so as not to use them in excess of the allowable deflection.

◆Solid height (solid length)
This is the height when a coil spring is compressed until the coils come in contact with each other. The use of coil springs by compressing them until the colils are in close contact with each other is not allowed.

◆Friction of load-applying portions on coil springs
The coil springs are made of hard steel. Because of the characteristics of steel, the load-applying portions of the coil spring may be cut due to the friction. If it is not allowed for your application, please take appropriate protection or reinforcement measure.

◆Buckling
When compressed, coil springs may be deformed (buckling or lateral deflection) so as to jump out of place from its intended position, which is dangerous. Also, the deformation of springs may cause it to come in contact with surrounding devices. It is necessary to take a workaround measure such as putting a pin through the spring, etc.

Measured point

◆About outside diameter & inside diameter of coil springs
Outside and inside diameters are dimensions of the first to second turns of the coils.

Handling

◆Application
The coil springs are designed for compression and cannot be used for other applications, such as torsion or tension. Improper use of the coil springs will cause breakage, settling or deformation. Using the springs for other purposes such as a hammer or weight may lead to an unexpected accident.rposes such as a hammer or weight may lead to an unexpected accident.

◆Periodical inspection and storage
Replace the coil springs as necessary. Coil springs settle as the frequency of use increases. Avoid leaving the coil springs in locations where they may be exposed to high temperature and humidity and store them in a safe location.

◆Disposal
As the coil springs are made of low-alloy steel, they can be disposed as regular metal waste.

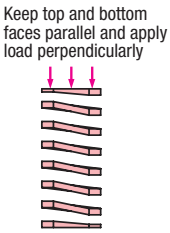


Figure 1

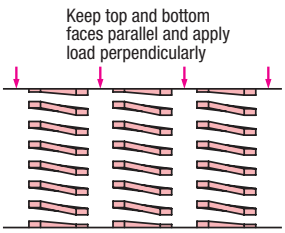


Figure 2

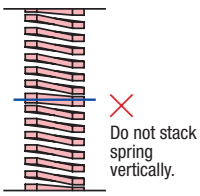


Figure 3

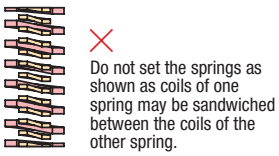


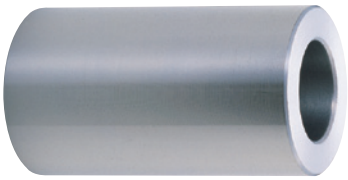
Figure 4

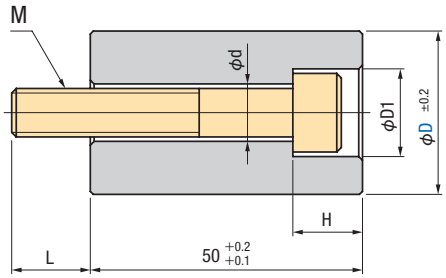
Base Spacers®

BASE SPACER

Additional processing to mold bases → P.188

Catalog No.	Material
M-BSA	S45C (body)





Supplied with hexagon socket head cap screw

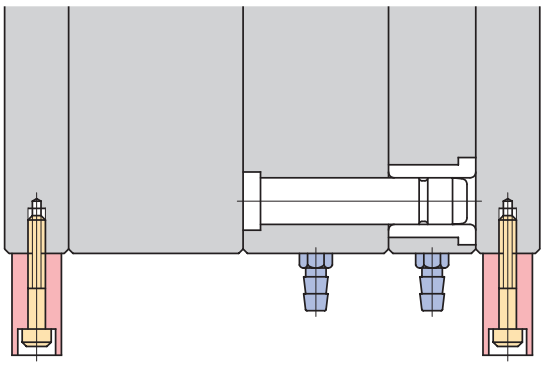
Catalog No.	D	Unit price in yen	d	D1	H	L	Supplied screw
M-BSA	19	340	7	11	9	9	M6×50
	24	430	9	14	12	12	M8×50
	29	550	11	17	15	15	M10×50
	34	690	13	19	18	18	M12×50

How to order

Catalog No.	D
M-BSA	24

Shipping **In-stock item**

Example of use



Please use the base spacers as the legs of molds when they are mounted on the floor or for the purpose of protection of devices.

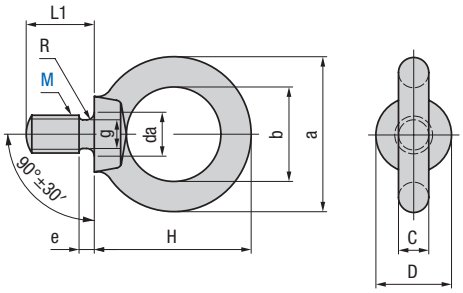
Base spacer is a registered trade mark of Futaba Corporation.

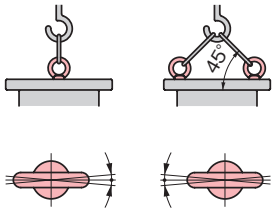
Eye Bolts With Liability Insurance

EYE BOLTS

Additional processing to mold bases → P.231

Catalog No.	Material
M-IBM	SS400





When using a pair of eye bolts for lifting, mount them in alignment as shown.

Catalog No.	M	¥ U/price	M	Pitch	a	b	C	D	H	L1	e	g	R	da	A Type kN/1P	A Type {kgf/1P}	B Type kN/2P	B Type {kgf/2P}
M-IBM	8	85	M8	P1.25	32.6	20	6.3	16	33.3	15	3	6	1	9.2	0.785	{80}	0.785	{80}
	10	90	M10	P1.5	41	25	8	20	41.5	18	4	7.7	1.2	11.2	1.47	{150}	1.47	{150}
	12	100	M12	P1.75	50	30	10	25	51	22	5	9.4	1.4	14.2	2.16	{220}	2.16	{220}
	16	145	M16	P2.0	60	35	12.5	30	60	27	5	13	1.6	18.2	4.41	{450}	4.41	{450}
	20	220	M20	P2.5	72	40	16	35	71	30	6	16.4	2	22.4	6.18	{630}	6.18	{630}
	24	440	M24	P3.0	90	50	20	45	90	38	8	19.6	2.5	26.4	9.32	{950}	9.32	{950}
	30	830	M30	P3.5	110	60	25	60	110	45	8	25	3	33.4	14.7	{1,500}	14.7	{1,500}
	36	1,600	M36	P4.0	133	70	31.5	70	131.5	55	10	30.3	3	39.4	22.6	{2,305}	22.6	{2,305}
	42	3,000	M42	P4.5	151	80	35.5	80	150.5	65	12	35.6	3.5	45.6	33.3	{3,396}	33.3	{3,396}
	48	5,300	M48	P5.0	170	90	40	90	170	70	12	41	4	52.6	44.1	{4,497}	44.1	{4,497}
															Applied load			

How to order

Catalog No.	M
M-IBM	16

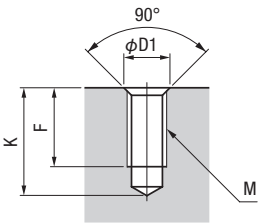
Shipping: **In-stock item**

Precaution for use

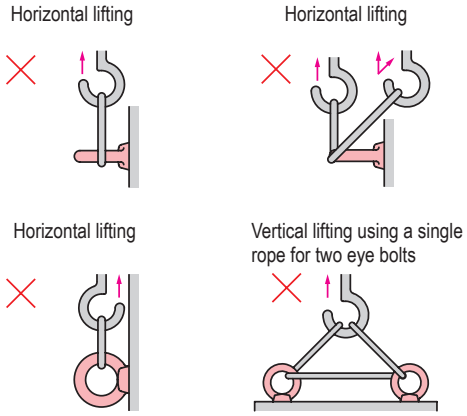
(1) Do not use the eye bolt in excess of maximum allowable load value.
Please note that the maximum allowable load values are the same for all the cases of one-piece lifting, two-piece lifting and four-piece lifting regardless of the number of eye bolts used.
(2) Do not use the eye bolts for horizontal lifting.
(3) When lifting a load, lift it slowly and avoid sudden movement in up and down or left and right directions.
(4) When using a pair of eye bolts for lifting, mount them in alignment as shown above.
(5) When using a pair of eye bolts for lifting, be sure to use one rope and one chain for each eye bolt. Do not lift a load vertically using a single rope for 2 eye bolts. Doing so may cause the slackening of rope or an excessive tightening torque, which is dangerous.
(6) When any deformation or crack or flaw is caused on the eye bolt, immediately stop using it.

Specification of eye bolt holes (mold base machining standard)

M	D1	F	K
M8	11	16	23
M10	13	20	28
M12	16	24	33
M16	20	29	39
M20	24	33	46
M24	28	41	56
M30	35	49	67
M36	41	59	82
M42	47	70	95
M48	54	75	103



Bad example



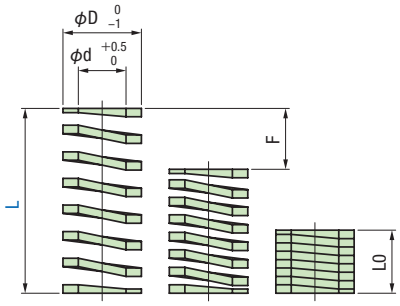
How to mount:
Fasten the eye bolt lightly by hand until its seat firmly sits on the plate.

Coil Springs High Deflection FSB Type

SPRINGS

Additional processing to mold bases → P.134

Catalog No.	L		Load	Winding direction	Material	Color
	L≦50	L≧55				
M-FSB	±0.5	±2%	±10%	Right	SWOSC-V	Light green



How to order

Catalog No.	Nominal dimension	×	L
M-FSB	15	×	70

Shipping **In-stock item**

Catalog No.	Nominal dimension	L	U/price in yen	D	d	Solid length (Ref. value) L0	Spring constant N/mm {kgf/mm}	F=L×40% F mm	F=L×40% Load N {kgf}	F=L×45% F mm	F=L×45% Load N {kgf}	F=L×50% F mm	F=L×50% Load N {kgf}
M-FSB	10	35	210	17.5	10.5	17.5	15.10 {1.54}	14.0	216 {22}	15.8	235 {24}	17.5	265 {27}
		40	220			20.0	13.24 {1.35}	16.0		18.0		20.0	
		45	230			22.5	11.77 {1.20}	18.0		20.3		22.5	
		50	260			24.5	10.59 {1.08}	20.0		22.5		25.0	
		55	265			26.5	9.61 {0.98}	22.0		24.8		27.5	
		60	270			28.5	8.83 {0.90}	24.0		27.0		30.0	
		65	280			30.0	8.14 {0.83}	26.0		29.3		32.5	
		70	290			32.5	7.55 {0.77}	28.0		31.5		35.0	
		75	295			35.0	7.06 {0.72}	30.0		33.8		37.5	
		80	300			36.5	6.67 {0.68}	32.0		36.0		40.0	
	12	30	260	21.5	13.2	15.0	20.89 {2.13}	12.0	255 {26}	13.5	284 {29}	15.0	314 {32}
		35	270			17.5	17.95 {1.83}	14.0		15.8		17.5	
		40	280			20.0	15.69 {1.60}	16.0		18.0		20.0	
		45	290			22.0	13.93 {1.42}	18.0		20.3		22.5	
		50	300			24.0	12.55 {1.28}	20.0		22.5		25.0	
		55	305			26.0	11.38 {1.16}	22.0		24.8		27.5	
		60	310			28.0	10.49 {1.07}	24.0		27.0		30.0	
		65	315			30.0	9.71 {0.99}	26.0		29.3		32.5	
		70	320			32.0	8.92 {0.91}	28.0		31.5		35.0	
		75	330			34.0	8.34 {0.85}	30.0		33.8		37.5	
		80	340			36.0	7.85 {0.80}	32.0		36.0		40.0	
		85	350			38.5	7.35 {0.75}	34.0		38.3		42.5	
		90	360			41.0	6.96 {0.71}	36.0		40.5		45.0	
		100	370			45.5	6.28 {0.64}	40.0		45.0		50.0	
		110	380			48.0	5.69 {0.58}	44.0		49.5		55.0	
						Standard operation frequency (reference value)		500,000 times or more					

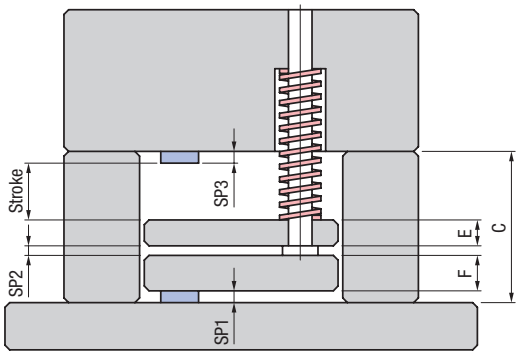
※ When installing a coil spring, apply an initial load.

※ Load calculation method: load (N) = Spring constant (N/mm) × Deflection (mm)
kgf=N×0.101972

Catalog No.	Nominal dimension	L	U/price (in yen)	D	d	Solid length (ref. value) L0	Spring constant N/mm {kgf/mm}	F=L×40% F mm	F=L×40% Load N {kgf}	F=L×45% F mm	F=L×45% Load N {kgf}	F=L×50% F mm	F=L×50% Load N {kgf}
M-FSB	15	35	320	26.5	15.5	19.0	34.91 {3.56}	14.0	490 {50}	15.8	549 {56}	—	—
		40	330			20.0	27.95 {2.85}	16.0	451 {46}	18.0	500 {51}	20.0	559 {57}
		45	340			22.5	24.81 {2.53}	18.0		20.3		22.5	
		50	360			25.0	22.36 {2.28}	20.0		22.5		25.0	
		55	370			27.5	20.30 {2.07}	22.0		24.8		27.5	
		60	380			29.5	18.63 {1.90}	24.0		27.0		30.0	
		65	385			31.5	17.16 {1.75}	26.0		29.3		32.5	
		70	390			33.5	15.98 {1.63}	28.0		31.5		35.0	
		75	400			35.5	14.91 {1.52}	30.0		33.8		37.5	
		80	420			37.5	14.02 {1.43}	32.0		36.0		40.0	
		85	430			39.5	13.14 {1.34}	34.0		38.3		42.5	
		90	440			41.0	12.45 {1.27}	36.0		40.5		45.0	
		100	470			46.0	11.18 {1.14}	40.0		45.0		50.0	
		110	500			51.0	10.20 {1.04}	44.0		49.5		55.0	
		120	520			56.0	9.32 {0.95}	48.0		54.0		60.0	
		130	540			61.0	8.63 {0.88}	52.0		58.5		65.0	
	20	40	370	32.5	20.5	20.0	39.23 {4.00}	16.0	628 {64}	18.0	706 {72}	20.0	785 {80}
		50	400			25.0	31.38 {3.20}	20.0		22.5		25.0	
		60	430			29.5	26.18 {2.67}	24.0		27.0		30.0	
		70	460			34.0	22.46 {2.29}	28.0		31.5		35.0	
		80	490			38.0	19.61 {2.00}	32.0		36.0		40.0	
		90	530			41.0	17.46 {1.78}	36.0		40.5		45.0	
		100	550			44.5	15.69 {1.60}	40.0		45.0		50.0	
		110	580			50.0	14.22 {1.45}	44.0		49.5		55.0	
		120	600			55.0	13.04 {1.33}	48.0		54.0		60.0	
		130	620			58.0	12.06 {1.23}	52.0		58.5		65.0	
	25	50	530	39.5	25.5	27.0	53.45 {5.45}	20.0	1,069 {109}	22.5	1,206 {123}	—	—
		60	560			30.0	40.89 {4.17}	24.0	981 {100}	27.0	1,108 {113}	30.0	1,226 {125}
		70	590			35.0	35.01 {3.57}	28.0		31.5		35.0	
		80	630			40.0	30.69 {3.13}	32.0		36.0		40.0	
		90	680			45.0	27.26 {2.78}	36.0		40.5		45.0	
		100	700			49.5	24.52 {2.50}	40.0		45.0		50.0	
		110	740			54.5	22.26 {2.27}	44.0		49.5		55.0	
		120	770			59.0	20.40 {2.08}	48.0		54.0		60.0	
		130	800			64.0	18.83 {1.92}	52.0		58.5		65.0	
		140	830			69.0	17.55 {1.79}	56.0		63.0		70.0	
		150	870			74.0	16.38 {1.67}	60.0		67.5		75.0	
	30	80	760	45.5	30.5	40.0	40.50 {4.13}	32.0	1,295 {132}	36.0	1,461 {149}	40.0	1,618 {165}
		90	780			45.0	35.99 {3.67}	36.0		40.5		45.0	
		100	810			50.0	32.36 {3.30}	40.0		45.0		50.0	
		110	840			55.0	29.42 {3.00}	44.0		49.5		55.0	
		120	900			60.0	26.97 {2.75}	48.0		54.0		60.0	
		130	940			65.0	24.91 {2.54}	52.0		58.5		65.0	
		140	980			70.0	23.14 {2.36}	56.0		63.0		70.0	
		150	1,020			75.0	21.57 {2.20}	60.0		67.5		75.0	
						Standard operation frequency (reference value)		500,000 times or more					

※ When installing a coil spring, apply an initial load.

※ Load calculation method: Load (N) = Spring constant (N/mm) × deflection (mm)
kgf=N×0.101972



Calculation example of spring length

L = (Stroke + Initial load) ÷ Deflection rate

L: Free length of Spring

Stroke=C − E − F − SP1 − SP2 − SP3

Initial load: 5 to 10 mm or L× (5 to 10) %

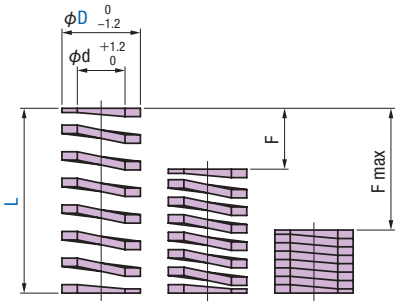
Deflection rate: 40 to 50%

Coil Springs High Deflection TY Type

SPRINGS

Additional processing to mold bases → P.134

Catalog No.	L		Load	Winding direction	Maximum deflection F max (Ref. value)	Material	Color
	L≦50	L≧55					
M-TY	±0.5	±2%	±10%	Right	L×0.6	Chrome silicon spring steel	Purple



How to order

Catalog No.	D	×	L
M-TY	21	×	70

※ When D=14.5, specify 15. 〔e.g.〕M-TY15×80

Shipping **Orders are shipped out in 3 business days (excluding the day of order).**

Catalog No.	D	L	Unit price (in yen) 1-19 pcs.	20-49 pcs.	50 pcs.	d	Spring constant N/mm {kgf/mm}	F=L×40% F mm	Load N {kgf}	F=L×45% F mm	Load N {kgf}	F=L×50% F mm	Load N {kgf}
M-TY	14.5	20	183	165	146	9	18.52 {1.89}	8.0	147.1 {15.0}	9.0	166.7 {17.0}	10.0	186.3 {19.0}
		25	189	170	151		14.82 {1.51}	10.0		11.3		12.5	
		30	198	178	158		12.35 {1.26}	12.0		13.5		15.0	
		35	204	184	163		10.58 {1.08}	14.0		15.8		17.5	
		40	218	196	174		9.26 {0.94}	16.0		18.0		20.0	
		45	224	202	179		8.23 {0.84}	18.0		20.3		22.5	
		50	239	215	191		7.41 {0.76}	20.0		22.5		25.0	
		55	260	234	208		6.74 {0.69}	22.0		24.8		27.5	
		60	266	239	213		6.17 {0.63}	24.0		27.0		30.0	
		65	288	259	230		5.70 {0.58}	26.0		29.3		32.5	
		70	295	266	236		5.29 {0.54}	28.0		31.5		35.0	
		75	309	278	247		4.94 {0.50}	30.0		33.8		37.5	
		80	324	292	259		4.63 {0.47}	32.0		36.0		40.0	
		90	351	316	281		4.12 {0.42}	36.0		40.5		45.0	
		100	373	336	298		3.70 {0.38}	40.0		45.0		50.0	
		125	406	365	325		2.96 {0.30}	50.0		56.3		62.5	
	17	25	198	178	158	11	21.80 {2.22}	10.0	215.7 {22.0}	11.3	245.2 {25.0}	12.5	274.6 {28.0}
		30	211	190	169		18.16 {1.85}	12.0		13.5		15.0	
		35	218	196	174		15.57 {1.59}	14.0		15.8		17.5	
		40	224	202	179		13.62 {1.39}	16.0		18.0		20.0	
		45	231	208	185		12.11 {1.23}	18.0		20.3		22.5	
		50	253	228	202		10.90 {1.11}	20.0		22.5		25.0	
		55	260	234	208		9.91 {1.01}	22.0		24.8		27.5	
		60	266	239	213		9.08 {0.93}	24.0		27.0		30.0	
		65	288	259	230		8.38 {0.85}	26.0		29.3		32.5	
		70	295	266	236		7.78 {0.79}	28.0		31.5		35.0	
		75	309	278	247		7.27 {0.74}	30.0		33.8		37.5	
		80	324	292	259		6.81 {0.69}	32.0		36.0		40.0	
		90	351	316	281		6.05 {0.62}	36.0		40.5		45.0	
		100	373	336	298		5.45 {0.56}	40.0		45.0		50.0	
		125	406	365	325		4.36 {0.44}	50.0		56.3		62.5	
		150	449	404	359		3.63 {0.37}	60.0		67.5		75.0	
						Standard operation frequency (reference value)		1000,000 times		500,000 times		300,000 times	

※ Do not use the spring exceeding the deflection of L × 50%.
※ When installing a coil spring, apply an initial load.

※ Load calculation method: Load (N) = Spring constant (N/mm) × deflection (mm)
kgf=N×0.101972

Catalog No.	D	L	U/price (in yen) 1-19 pcs.	20-49 pcs.	50 pcs.	d	Spring constant N/mm {kgf/mm}	F=L×40% F mm	Load N {kgf}	F=L×45% F mm	Load N {kgf}	F=L×50% F mm	Load N {kgf}
M-TY	21	30	253	228	202	13	23.24 {2.37}	12.0	284.4 {29.0}	13.5	313.8 {32.0}	15.0	353.0 {36.0}
		35	260	234	208		19.92 {2.03}	14.0		15.8		17.5	
		40	266	239	213		17.43 {1.78}	16.0		18.0		20.0	
		45	274	247	219		15.50 {1.58}	18.0		20.3		22.5	
		50	281	253	225		13.95 {1.42}	20.0		22.5		25.0	
		55	288	259	230		12.68 {1.29}	22.0		24.8		27.5	
		60	288	259	230		11.62 {1.19}	24.0		27.0		30.0	
		65	301	271	241		10.73 {1.09}	26.0		29.3		32.5	
		70	309	278	247		9.96 {1.02}	28.0		31.5		35.0	
		75	315	284	252		9.30 {0.95}	30.0		33.8		37.5	
		80	324	292	259		8.72 {0.89}	32.0		36.0		40.0	
		90	344	310	275		7.75 {0.79}	36.0		40.5		45.0	
		100	358	322	286		6.97 {0.71}	40.0		45.0		50.0	
		125	393	354	314		5.58 {0.57}	50.0		56.3		62.5	
		150	428	385	342		4.65 {0.47}	60.0		67.5		75.0	
	26	30	266	239	213	16.5	34.87 {3.56}	12.0	411.9 {42.0}	13.5	470.7 {48.0}	15.0	519.8 {53.0}
		35	288	259	230		29.89 {3.05}	14.0		15.8		17.5	
		40	301	271	241		26.15 {2.67}	16.0		18.0		20.0	
		45	315	284	252		23.24 {2.37}	18.0		20.3		22.5	
		50	330	297	264		20.92 {2.13}	20.0		22.5		25.0	
		55	338	304	270		19.02 {1.94}	22.0		24.8		27.5	
		60	351	316	281		17.43 {1.78}	24.0		27.0		30.0	
		65	351	316	281		16.09 {1.64}	26.0		29.3		32.5	
		70	364	328	291		14.94 {1.52}	28.0		31.5		35.0	
		75	379	341	303		13.95 {1.42}	30.0		33.8		37.5	
		80	393	354	314		13.08 {1.33}	32.0		36.0		40.0	
		90	406	365	325		11.62 {1.19}	36.0		40.5		45.0	
		100	435	392	348		10.46 {1.07}	40.0		45.0		50.0	
		110	464	418	371		9.51 {0.97}	44.0		49.5		55.0	
		125	499	449	399		8.37 {0.85}	50.0		56.3		62.5	
		150	548	493	438		6.97 {0.71}	60.0		67.5		75.0	
		175	583	525	466		5.98 {0.61}	70.0		78.8		87.5	
		200	633	570	506		5.23 {0.53}	80.0		90.0		100.0	
	32	40	330	297	264	21	34.87 {3.56}	16.0	559.0 {57.0}	18.0	627.6 {64.0}	20.0	696.3 {71.0}
		45	351	316	281		30.99 {3.16}	18.0		20.3		22.5	
		50	373	336	298		27.89 {2.84}	20.0		22.5		25.0	
		60	415	374	332		23.24 {2.37}	24.0		27.0		30.0	
		70	441	397	353		19.92 {2.03}	28.0		31.5		35.0	
		80	484	436	387		17.43 {1.78}	32.0		36.0		40.0	
		90	526	473	421		15.50 {1.58}	36.0		40.5		45.0	
		100	541	487	433		13.95 {1.42}	40.0		45.0		50.0	
		110	569	512	455		12.68 {1.29}	44.0		49.5		55.0	
		125	590	531	472		11.16 {1.14}	50.0		56.3		62.5	
		150	604	544	483		9.30 {0.95}	60.0		67.5		75.0	
		175	639	575	511		7.97 {0.81}	70.0		78.8		87.5	
		200	695	626	556		6.97 {0.71}	80.0		90.0		100.0	
		250	800	720	640		5.58 {0.57}	100.0		112.5		125.0	
		300	899	809	719		4.65 {0.47}	120.0		135.0		150.0	
	39	40	415	374	332	26	45.77 {4.67}	16.0	725.7 {74.0}	18.0	823.8 {84.0}	20.0	912.0 {93.0}
		45	441	397	353		40.68 {4.15}	18.0		20.3		22.5	
		50	464	418	371		36.61 {3.73}	20.0		22.5		25.0	
		60	491	442	393		30.51 {3.11}	24.0		27.0		30.0	
		70	505	455	404		26.15 {2.67}	28.0		31.5		35.0	
		80	526	473	421		22.88 {2.33}	32.0		36.0		40.0	
		90	541	487	433		20.34 {2.07}	36.0		40.5		45.0	
		100	568	511	454		18.31 {1.87}	40.0		45.0		50.0	
		110	583	525	466		16.64 {1.70}	44.0		49.5		55.0	
		125	610	549	488		14.65 {1.49}	50.0		56.3		62.5	
		150	633	570	506		12.20 {1.24}	60.0		67.5		75.0	
		175	645	581	516		10.46 {1.07}	70.0		78.8		87.5	
		200	681	613	545		9.15 {0.93}	80.0		90.0		100.0	
		250	821	739	657		7.32 {0.75}	100.0		112.5		125.0	
		300	934	841	747		6.10 {0.62}	120.0		135.0		150.0	
	46	50	526	473	421	32	48.81 {4.98}	20.0	970.9 {99.0}	22.5	1,098 {112.0}	25.0	1,216 {124.0}
		60	541	487	433		40.68 {4.15}	24.0		27.0		30.0	
		70	548	493	438		34.87 {3.56}	28.0		31.5		35.0	
		80	568	511	454		30.51 {3.11}	32.0		36.0		40.0	
		90	583	525	466		27.12 {2.77}	36.0		40.5		45.0	
		100	596	536	477		24.41 {2.49}	40.0		45.0		50.0	
		110	618	556	494		22.19 {2.26}	44.0		49.5		55.0	
		125	639	575	511		19.53 {1.99}	50.0		56.3		62.5	
		150	668	601	534		16.27 {1.66}	60.0		67.5		75.0	
		175	701	631	561		13.95 {1.42}	70.0		78.8		87.5	
		200	730	657	584		12.20 {1.24}	80.0		90.0		100.0	
		250	828	745	662		9.76 {1.00}	100.0		112.5		125.0	
		300	969	872	775		8.14 {0.83}	120.0		135.0		150.0	
						Standard operation frequency (reference value)		1000,000 times		500,000 times		300,000 times	

※ Do not use the spring exceeding the deflection of L × 50%.
※ When installing a coil spring, apply an initial load.

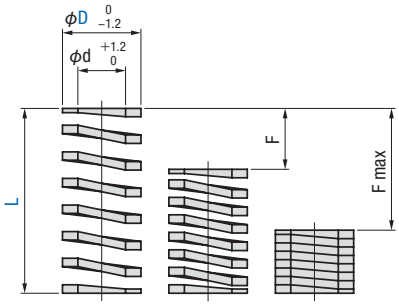
※ Load calculation method: Load (N) = Spring constant (N/mm) × deflection (mm)
kgf=N×0.101972

Coil Springs High Deflection TR Type

SPRINGS

Additional processing to mold bases ➡ P.134

Catalog No.	L		Load	Winding direction	Maximum deflection F max (Ref. value)	Material	Color
	L≦50	L≧55					
M-TR	±0.5	±2%	±10%	Right	L×0.6	Chrome silicon spring steel	Ivory



How to order

Catalog No.	D	×	L
M-TR	32	×	80

※ When D=14.5, specify 15. 〔E.g.〕 M-TR15×60

Shipping **Orders are shipped out in 3 business days (excluding the day of order).**

Catalog No.	D	L	U/price (in yen) 1-19 pcs.	20-49 pcs.	50 pcs.	d	Spring constant N/mm {kgf/mm}	F=L×40% F mm	Load N {kgf}	F=L×45% F mm	Load N {kgf}	F=L×50% F mm	Load N {kgf}
M-TR	14.5	20	168	151	134	9	10.90 {1.11}	8.0	88.3 {9.0}	9.0	98.1 {10.0}	10.0	107.9 {11.0}
		25	173	156	139		8.72 {0.89}	10.0		11.3		12.5	
		30	189	170	151		7.27 {0.74}	12.0		13.5		15.0	
		35	194	175	155		6.23 {0.64}	14.0		15.8		17.5	
		40	200	180	160		5.45 {0.56}	16.0		18.0		20.0	
		45	210	189	168		4.84 {0.49}	18.0		20.3		22.5	
		50	226	203	181		4.36 {0.44}	20.0		22.5		25.0	
		55	242	217	193		3.96 {0.40}	22.0		24.8		27.5	
		60	252	227	202		3.63 {0.37}	24.0		27.0		30.0	
		65	268	241	214		3.35 {0.34}	26.0		29.3		32.5	
		70	278	250	223		3.11 {0.32}	28.0		31.5		35.0	
		75	289	260	231		2.91 {0.30}	30.0		33.8		37.5	
		80	299	269	239		2.73 {0.28}	32.0		36.0		40.0	
		90	326	293	260		2.42 {0.25}	36.0		40.5		45.0	
		100	347	312	277		2.18 {0.22}	40.0		45.0		50.0	
		125	383	345	307		1.74 {0.18}	50.0		56.3		62.5	
	17	25	189	170	151	11	14.82 {1.51}	10.0	147.1 {15.0}	11.3	166.7 {17.0}	12.5	186.3 {19.0}
		30	194	175	155		12.35 {1.26}	12.0		13.5		15.0	
		35	200	180	160		10.58 {1.08}	14.0		15.8		17.5	
		40	210	189	168		9.26 {0.94}	16.0		18.0		20.0	
		45	215	194	172		8.23 {0.84}	18.0		20.3		22.5	
		50	231	208	185		7.41 {0.76}	20.0		22.5		25.0	
		55	242	217	193		6.74 {0.69}	22.0		24.8		27.5	
		60	247	222	197		6.17 {0.63}	24.0		27.0		30.0	
		65	268	241	214		5.70 {0.58}	26.0		29.3		32.5	
		70	278	250	223		5.29 {0.54}	28.0		31.5		35.0	
		75	289	260	231		4.94 {0.50}	30.0		33.8		37.5	
		80	299	269	239		4.63 {0.47}	32.0		36.0		40.0	
		90	326	293	260		4.12 {0.42}	36.0		40.5		45.0	
		100	347	312	277		3.70 {0.38}	40.0		45.0		50.0	
		125	383	345	307		2.96 {0.30}	50.0		56.3		62.5	
		150	420	378	336		2.47 {0.25}	60.0		67.5		75.0	
						Standard operation frequency (reference value)		1000,000 times		500,000 times		300,000 times	

※ Do not use the spring exceeding the deflection of L × 50%.
※ When installing a coil spring, apply an initial load.

※ Load calculation method: Load (N) = Spring constant (N/mm) × deflection (mm)
kgf=N×0.101972

Catalog No.	D	L	U/price (in yen) 1-19 pcs.	20-49 pcs.	50 pcs.	d	Spring constant N/mm {kgf/mm}	F=L×40% F mm	Load N {kgf}	F=L×45% F mm	Load N {kgf}	F=L×50% F mm	Load N {kgf}
M-TR	21	30	231	208	185	13	13.80 {1.41}	12.0	166.7 {17.0}	13.5	186.3 {19.0}	15.0	205.9 {21.0}
		35	236	213	189		11.83 {1.21}	14.0		15.8		17.5	
		40	247	222	197		10.35 {1.06}	16.0		18.0		20.0	
		45	257	232	206		9.20 {0.94}	18.0		20.3		22.5	
		50	263	236	210		8.28 {0.84}	20.0		22.5		25.0	
		55	268	241	214		7.53 {0.77}	22.0		24.8		27.5	
		60	273	246	218		6.90 {0.70}	24.0		27.0		30.0	
		65	284	255	227		6.37 {0.65}	26.0		29.3		32.5	
		70	289	260	231		5.91 {0.60}	28.0		31.5		35.0	
		75	294	265	235		5.52 {0.56}	30.0		33.8		37.5	
		80	299	269	239		5.18 {0.53}	32.0		36.0		40.0	
		90	320	288	256		4.60 {0.47}	36.0		40.5		45.0	
		100	331	298	265		4.14 {0.42}	40.0		45.0		50.0	
		125	368	331	294		3.31 {0.34}	50.0		56.3		62.5	
		150	399	359	319		2.76 {0.28}	60.0		67.5		75.0	
	26	30	252	227	202	16.5	26.87 {2.74}	12.0	323.6 {33.0}	13.5	362.8 {37.0}	15.0	402.1 {41.0}
		35	268	241	214		23.03 {2.35}	14.0		15.8		17.5	
		40	278	250	223		20.16 {2.06}	16.0		18.0		20.0	
		45	294	265	235		17.92 {1.83}	18.0		20.3		22.5	
		50	310	279	248		16.12 {1.64}	20.0		22.5		25.0	
		55	315	284	252		14.66 {1.49}	22.0		24.8		27.5	
		60	320	288	256		13.44 {1.37}	24.0		27.0		30.0	
		65	331	298	265		12.40 {1.26}	26.0		29.3		32.5	
		70	341	307	273		11.52 {1.17}	28.0		31.5		35.0	
		75	352	317	281		10.75 {1.10}	30.0		33.8		37.5	
		80	362	326	290		10.08 {1.03}	32.0		36.0		40.0	
		90	378	340	302		8.96 {0.91}	36.0		40.5		45.0	
		100	404	364	323		8.06 {0.82}	40.0		45.0		50.0	
		110	436	392	349		7.33 {0.75}	44.0		49.5		55.0	
		125	467	421	374		6.45 {0.66}	50.0		56.3		62.5	
		150	509	458	407		5.37 {0.55}	60.0		67.5		75.0	
		175	546	491	437		4.61 {0.47}	70.0		78.8		87.5	
		200	588	529	470		4.03 {0.41}	80.0		90.0		100.0	
	32	40	310	279	248	21	25.06 {2.56}	16.0	402.1 {41.0}	18.0	451.1 {46.0}	20.0	500.1 {51.0}
		45	326	293	260		22.28 {2.27}	18.0		20.3		22.5	
		50	347	312	277		20.05 {2.04}	20.0		22.5		25.0	
		60	383	345	307		16.71 {1.70}	24.0		27.0		30.0	
		70	415	373	332		14.32 {1.46}	28.0		31.5		35.0	
		80	446	402	357		12.53 {1.28}	32.0		36.0		40.0	
		90	483	435	386		11.14 {1.14}	36.0		40.5		45.0	
		100	504	454	403		10.02 {1.02}	40.0		45.0		50.0	
		110	530	477	424		9.11 {0.93}	44.0		49.5		55.0	
		125	546	491	437		8.02 {0.82}	50.0		56.3		62.5	
		150	572	515	458		6.68 {0.68}	60.0		67.5		75.0	
		175	599	539	479		5.73 {0.58}	70.0		78.8		87.5	
		200	651	586	521		5.01 {0.51}	80.0		90.0		100.0	
		250	746	671	596		4.01 {0.41}	100.0		112.5		125.0	
		300	840	756	672		3.34 {0.34}	120.0		135.0		150.0	
	39	40	389	350	311	26	27.24 {2.78}	16.0	431.5 {44.0}	18.0	490.3 {50.0}	20.0	539.4 {55.0}
		45	410	369	328		24.21 {2.47}	18.0		20.3		22.5	
		50	436	392	349		21.79 {2.22}	20.0		22.5		25.0	
		60	457	411	365		18.16 {1.85}	24.0		27.0		30.0	
		70	473	425	378		15.57 {1.59}	28.0		31.5		35.0	
		80	483	435	386		13.62 {1.39}	32.0		36.0		40.0	
		90	504	454	403		12.11 {1.23}	36.0		40.5		45.0	
		100	530	477	424		10.90 {1.11}	40.0		45.0		50.0	
		110	541	487	433		9.91 {1.01}	44.0		49.5		55.0	
		125	567	510	454		8.72 {0.89}	50.0		56.3		62.5	
		150	593	534	475		7.26 {0.74}	60.0		67.5		75.0	
		175	604	543	483		6.23 {0.63}	70.0		78.8		87.5	
		200	635	572	508		5.45 {0.56}	80.0		90.0		100.0	
		250	767	690	613		4.36 {0.44}	100.0		112.5		125.0	
		300	872	784	697		3.63 {0.37}	120.0		135.0		150.0	
	46	50	483	435	386	32	24.41 {2.49}	20.0	490.3 {50.0}	22.5	549.2 {56.0}	25.0	608.0 {62.0}
		60	504	454	403		20.34 {2.07}	24.0		27.0		30.0	
		70	509	458	407		17.43 {1.78}	28.0		31.5		35.0	
		80	530	477	424		15.26 {1.56}	32.0		36.0		40.0	
		90	541	487	433		13.56 {1.38}	36.0		40.5		45.0	
		100	562	506	449		12.20 {1.24}	40.0		45.0		50.0	
		110	572	515	458		11.09 {1.13}	44.0		49.5		55.0	
		125	599	539	479		9.76 {1.00}	50.0		56.3		62.5	
		150	620	558	496		8.14 {0.83}	60.0		67.5		75.0	
		175	651	586	521		6.97 {0.71}	70.0		78.8		87.5	
		200	683	614	546		6.10 {0.62}	80.0		90.0		100.0	
		250	772	695	617		4.88 {0.50}	100.0		112.5		125.0	
		300	903	813	722		4.07 {0.41}	120.0		135.0		150.0	
						Standard operation frequency (reference value)		1000,000 times		500,000 times		300,000 times	

※ Do not use the spring exceeding the deflection of L × 50%.
※ When installing a coil spring, apply an initial load.

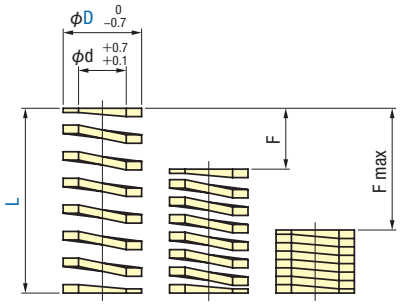
※ Load calculation method: Load (N) = Spring constant (N/mm) × deflection (mm)
kgf=N×0.101972

Coil Springs Strong Coil TF Type

SPRINGS

Additional processing to mold bases → P.134

Catalog No.	L		Load	Winding direction	Maximum deflection F max (Ref. value)	Material	Color
	L≦50	L≧55					
P-TF	±0.5	±1%	±10%	Right	L×0.53	Chrome silicon spring steel	Yellow



How to order

Catalog No.	D	×	L
P-TF	20	×	50

Shipping **Orders are shipped out in 3 business days (excluding the day of order).**

Catalog No.	D	L	U/price (in yen) 1-19 pcs.	20-49 pcs.	50 pcs.	d	Spring constant N/mm {kgf/mm}	F=L×40% F mm	Load N {kgf}	F=L×45% F mm	Load N {kgf}	F=L×50% F mm	Load N {kgf}
P-TF	8	10	90	85	81	4	15.24 {1.55}	4.0	58.8 {6.0}	4.5	68.6 {7.0}	5.0	78.5 {8.0}
		15	94	89	84		10.16 {1.04}	6.0		6.8		7.5	
		20	105	100	94		7.62 {0.78}	8.0		9.0		10.0	
		25	127	120	114		6.10 {0.62}	10.0		11.3		12.5	
		30	127	120	114		5.08 {0.52}	12.0		13.5		15.0	
		35	138	131	124		4.36 {0.44}	14.0		15.8		17.5	
		40	149	141	134		3.81 {0.39}	16.0		18.0		20.0	
		45	160	152	144		3.39 {0.35}	18.0		20.3		22.5	
		50	171	162	154		3.05 {0.31}	20.0		22.5		25.0	
		55	182	172	163		2.77 {0.28}	22.0		24.8		27.5	
		60	193	183	173		2.54 {0.26}	24.0		27.0		30.0	
		65	204	194	184		2.35 {0.24}	26.0		29.3		32.5	
		70	215	204	194		2.18 {0.22}	28.0		31.5		35.0	
		75	226	215	203		2.03 {0.21}	30.0		33.8		37.5	
		80	237	225	213		1.91 {0.19}	32.0		36.0		40.0	
	10	20	130	123	117	5	9.81 {1.00}	8.0	78.5 {8.0}	9.0	88.3 {9.0}	10.0	98.1 {10.0}
		25	130	123	117		7.85 {0.80}	10.0		11.3		12.5	
		30	130	123	117		6.54 {0.67}	12.0		13.5		15.0	
		35	130	123	117		5.61 {0.57}	14.0		15.8		17.5	
		40	145	137	130		4.91 {0.50}	16.0		18.0		20.0	
		45	155	147	139		4.36 {0.44}	18.0		20.3		22.5	
		50	170	161	153		3.92 {0.40}	20.0		22.5		25.0	
		55	180	171	162		3.57 {0.36}	22.0		24.8		27.5	
		60	195	185	175		3.27 {0.33}	24.0		27.0		30.0	
		65	209	199	189		3.02 {0.31}	26.0		29.3		32.5	
		70	209	199	189		2.80 {0.29}	28.0		31.5		35.0	
		75	234	223	211		2.62 {0.27}	30.0		33.8		37.5	
		80	259	246	233		2.45 {0.25}	32.0		36.0		40.0	
		90	309	294	278		2.18 {0.22}	36.0		40.5		45.0	
						Standard operation frequency (reference value)		1000,000 times		500,000 times		300,000 times	

※ Do not use the spring exceeding the deflection of L × 50%.
※ When installing a coil spring, apply an initial load.

※ Load calculation method: Load (N) = Spring constant (N/mm) × deflection (mm)
kgf=N×0.101972

Catalog No.	D	L	U/price (in yen) 1-19 pcs.	20-49 pcs.	50 pcs.	d	Spring constant N/mm {kgf/mm}	F=L×40% F mm	Load N {kgf}	F=L×45% F mm	Load N {kgf}	F=L×50% F mm	Load N {kgf}
P-TF	12	20	145	137	130	6	13.62 {1.39}	8.0	107.9 {11.0}	9.0	122.6 {12.5}	10.0	137.3 {14.0}
		25	155	147	139		10.90 {1.11}	10.0		11.3		12.5	
		30	170	161	153		9.08 {0.93}	12.0		13.5		15.0	
		35	170	161	153		7.78 {0.79}	14.0		15.8		17.5	
		40	180	171	162		6.81 {0.69}	16.0		18.0		20.0	
		45	195	185	175		6.05 {0.62}	18.0		20.3		22.5	
		50	209	199	189		5.45 {0.56}	20.0		22.5		25.0	
		55	219	208	198		4.95 {0.51}	22.0		24.8		27.5	
		60	234	223	211		4.54 {0.46}	24.0		27.0		30.0	
		65	244	232	220		4.19 {0.43}	26.0		29.3		32.5	
		70	259	246	233		3.89 {0.40}	28.0		31.5		35.0	
		75	274	261	247		3.63 {0.37}	30.0		33.8		37.5	
		80	299	284	269		3.41 {0.35}	32.0		36.0		40.0	
		90	339	322	305		3.03 {0.31}	36.0		40.5		45.0	
	14	25	190	180	171	7	13.95 {1.42}	10.0	142.2 {14.5}	11.3	156.9 {16.0}	12.5	176.5 {18.0}
		30	200	190	180		11.62 {1.19}	12.0		13.5		15.0	
		35	209	199	189		9.96 {1.02}	14.0		15.8		17.5	
		40	224	213	202		8.72 {0.89}	16.0		18.0		20.0	
		45	234	223	211		7.75 {0.79}	18.0		20.3		22.5	
		50	239	227	215		6.97 {0.71}	20.0		22.5		25.0	
		55	249	237	224		6.34 {0.65}	22.0		24.8		27.5	
		60	259	246	233		5.81 {0.59}	24.0		27.0		30.0	
		65	269	256	242		5.36 {0.55}	26.0		29.3		32.5	
		70	279	265	251		4.98 {0.51}	28.0		31.5		35.0	
		75	289	275	260		4.65 {0.47}	30.0		33.8		37.5	
		80	299	284	269		4.36 {0.44}	32.0		36.0		40.0	
		90	324	308	292		3.87 {0.40}	36.0		40.5		45.0	
		100	349	332	314		3.49 {0.36}	40.0		45.0		50.0	
	16	25	209	199	189	8	16.56 {1.69}	10.0	166.7 {17.0}	11.3	186.3 {19.0}	12.5	206 {21.0}
		30	219	208	198		13.80 {1.41}	12.0		13.5		15.0	
		35	229	218	206		11.83 {1.21}	14.0		15.8		17.5	
		40	249	237	224		10.35 {1.06}	16.0		18.0		20.0	
		45	259	246	233		9.20 {0.94}	18.0		20.3		22.5	
		50	264	251	238		8.28 {0.84}	20.0		22.5		25.0	
		55	279	265	251		7.53 {0.77}	22.0		24.8		27.5	
		60	289	275	260		6.90 {0.70}	24.0		27.0		30.0	
		65	299	284	269		6.37 {0.65}	26.0		29.3		32.5	
		70	309	294	278		5.91 {0.60}	28.0		31.5		35.0	
		75	319	303	287		5.52 {0.56}	30.0		33.8		37.5	
		80	329	313	296		5.18 {0.53}	32.0		36.0		40.0	
		90	349	332	314		4.60 {0.47}	36.0		40.5		45.0	
		100	379	360	341		4.14 {0.42}	40.0		45.0		50.0	
		125	439	417	395		3.31 {0.34}	50.0		56.3		62.5	
	18	25	209	199	189	9	20.09 {2.05}	10.0	206 {21.0}	11.3	226 {23.0}	12.5	255 {26.0}
		30	219	208	198		16.74 {1.71}	12.0		13.5		15.0	
		35	229	218	206		14.35 {1.46}	14.0		15.8		17.5	
		40	249	237	224		12.56 {1.28}	16.0		18.0		20.0	
		45	259	246	233		11.16 {1.14}	18.0		20.3		22.5	
		50	264	251	238		10.04 {1.02}	20.0		22.5		25.0	
		55	279	265	251		9.13 {0.93}	22.0		24.8		27.5	
		60	289	275	260		8.37 {0.85}	24.0		27.0		30.0	
		65	299	284	269		7.73 {0.79}	26.0		29.3		32.5	
		70	309	294	278		7.17 {0.73}	28.0		31.5		35.0	
		75	319	303	287		6.70 {0.68}	30.0		33.8		37.5	
		80	329	313	296		6.28 {0.64}	32.0		36.0		40.0	
		90	349	332	314		5.58 {0.57}	36.0		40.5		45.0	
		100	384	365	346		5.02 {0.51}	40.0		45.0		50.0	
		125	449	427	404		4.02 {0.41}	50.0		56.3		62.5	
	20	25	209	199	189	11	25.24 {2.57}	10.0	255 {26.0}	11.3	284 {29.0}	12.5	314 {32.0}
		30	219	208	198		21.04 {2.15}	12.0		13.5		15.0	
		35	229	218	206		18.03 {1.84}	14.0		15.8		17.5	
		40	249	237	224		15.78 {1.61}	16.0		18.0		20.0	
		45	259	246	233		14.02 {1.43}	18.0		20.3		22.5	
		50	264	251	238		12.62 {1.29}	20.0		22.5		25.0	
		55	279	265	251		11.47 {1.17}	22.0		24.8		27.5	
		60	289	275	260		10.52 {1.07}	24.0		27.0		30.0	
		65	299	284	269		9.71 {0.99}	26.0		29.3		32.5	
		70	309	294	278		9.02 {0.92}	28.0		31.5		35.0	
		75	319	303	287		8.41 {0.86}	30.0		33.8		37.5	
		80	329	313	296		7.89 {0.80}	32.0		36.0		40.0	
		90	349	332	314		7.01 {0.72}	36.0		40.5		45.0	
		100	369	351	332		6.31 {0.64}	40.0		45.0		50.0	
		125	399	379	359		5.05 {0.51}	50.0		56.3		62.5	
		150	429	407	386		4.21 {0.43}	60.0		67.5		75.0	
						Standard operation frequency (reference value)		1000,000 times		500,000 times		300,000 times	

※ Do not use the spring exceeding the deflection of L × 50%.
※ When installing a coil spring, apply an initial load.

※ Load calculation method: Load (N) = Spring constant (N/mm) × deflection (mm)
kgf=N×0.101972

Coil Springs Strong Coil TF Type

SPRINGS

Catalog No.	D	L	U/price (in yen) 1-19 pcs.	20-49 pcs.	50 pcs.	d	Spring constant N/mm {kgf/mm}	F=L×40% F mm	Load N {kgf}	F=L×45% F mm	Load N {kgf}	F=L×50% F mm	Load N {kgf}
P-TF	22	25	214	204	193	11	31.38 {3.20}	10.0	314 {32.0}	11.3	353 {36.0}	12.5	392 {40.0}
		30	224	213	202		26.15 {2.67}	12.0		13.5		15.0	
		35	234	223	211		22.41 {2.29}	14.0		15.8		17.5	
		40	249	237	224		19.61 {2.00}	16.0		18.0		20.0	
		45	259	246	233		17.43 {1.78}	18.0		20.3		22.5	
		50	269	256	242		15.69 {1.60}	20.0		22.5		25.0	
		55	284	270	256		14.26 {1.45}	22.0		24.8		27.5	
		60	294	280	265		13.07 {1.33}	24.0		27.0		30.0	
		65	304	289	274		12.07 {1.23}	26.0		29.3		32.5	
		70	314	299	283		11.21 {1.14}	28.0		31.5		35.0	
		75	324	308	292		10.46 {1.07}	30.0		33.8		37.5	
		80	334	317	301		9.81 {1.00}	32.0		36.0		40.0	
		90	354	336	319		8.72 {0.89}	36.0		40.5		45.0	
		100	379	360	341		7.84 {0.80}	40.0		45.0		50.0	
		125	414	393	373		6.28 {0.64}	50.0		56.3		62.5	
		150	459	436	413		5.23 {0.53}	60.0		67.5		75.0	
	25	25	219	208	198	13.5	39.20 {4.00}	10.0	392 {40.0}	11.3	441 {45.0}	12.5	490 {50.0}
		30	224	213	202		32.67 {3.33}	12.0		13.5		15.0	
		35	239	227	215		28.00 {2.86}	14.0		15.8		17.5	
		40	249	237	224		24.50 {2.50}	16.0		18.0		20.0	
		45	259	246	233		21.78 {2.22}	18.0		20.3		22.5	
		50	269	256	242		19.60 {2.00}	20.0		22.5		25.0	
		55	289	275	260		17.82 {1.82}	22.0		24.8		27.5	
		60	299	284	269		16.33 {1.67}	24.0		27.0		30.0	
		65	309	294	278		15.08 {1.54}	26.0		29.3		32.5	
		70	319	303	287		14.00 {1.43}	28.0		31.5		35.0	
		75	329	313	296		13.07 {1.33}	30.0		33.8		37.5	
		80	339	322	305		12.25 {1.25}	32.0		36.0		40.0	
		90	359	341	323		10.89 {1.11}	36.0		40.5		45.0	
		100	389	370	350		9.80 {1.00}	40.0		45.0		50.0	
		125	429	407	386		7.84 {0.80}	50.0		56.3		62.5	
		150	494	469	444		6.53 {0.67}	60.0		67.5		75.0	
		175	549	521	494		5.60 {0.57}	70.0		78.8		87.5	
		200	604	574	544		4.90 {0.50}	80.0		90.0		100.0	
	27	25	219	208	198	13.5	47.11 {4.80}	10.0	471 {48.0}	11.3	530 {54.0}	12.5	588 {60.0}
		30	224	213	202		39.26 {4.00}	12.0		13.5		15.0	
		35	239	227	215		33.65 {3.43}	14.0		15.8		17.5	
		40	249	237	224		29.44 {3.00}	16.0		18.0		20.0	
		45	259	246	233		26.17 {2.67}	18.0		20.3		22.5	
		50	269	256	242		23.56 {2.40}	20.0		22.5		25.0	
		55	289	275	260		21.41 {2.18}	22.0		24.8		27.5	
		60	299	284	269		19.63 {2.00}	24.0		27.0		30.0	
		65	309	294	278		18.12 {1.85}	26.0		29.3		32.5	
		70	319	303	287		16.83 {1.72}	28.0		31.5		35.0	
		75	329	313	296		15.70 {1.60}	30.0		33.8		37.5	
		80	339	322	305		14.72 {1.50}	32.0		36.0		40.0	
		90	359	341	323		13.09 {1.33}	36.0		40.5		45.0	
		100	389	370	350		11.78 {1.20}	40.0		45.0		50.0	
		125	434	412	391		9.42 {0.96}	50.0		56.3		62.5	
		150	504	479	453		7.85 {0.80}	60.0		67.5		75.0	
		175	579	550	521		6.73 {0.69}	70.0		78.8		87.5	
		200	654	621	589		5.89 {0.60}	80.0		90.0		100.0	
	30	25	209	199	189	16	56.62 {5.77}	10.0	569 {58.0}	11.3	637 {65.0}	12.5	706 {72.0}
		30	219	208	198		47.19 {4.81}	12.0		13.5		15.0	
		35	224	213	202		40.44 {4.12}	14.0		15.8		17.5	
		40	229	218	206		35.39 {3.61}	16.0		18.0		20.0	
		45	249	237	224		31.46 {3.21}	18.0		20.3		22.5	
		50	259	246	233		28.31 {2.89}	20.0		22.5		25.0	
		55	279	265	251		25.74 {2.62}	22.0		24.8		27.5	
		60	289	275	260		23.59 {2.41}	24.0		27.0		30.0	
		65	299	284	269		21.78 {2.22}	26.0		29.3		32.5	
		70	309	294	278		20.22 {2.06}	28.0		31.5		35.0	
		75	319	303	287		18.87 {1.92}	30.0		33.8		37.5	
		80	329	313	296		17.69 {1.80}	32.0		36.0		40.0	
		90	349	332	314		15.73 {1.60}	36.0		40.5		45.0	
		100	379	360	341		14.16 {1.44}	40.0		45.0		50.0	
		125	439	417	395		11.32 {1.15}	50.0		56.3		62.5	
		150	509	483	458		9.44 {0.96}	60.0		67.5		75.0	
		175	584	554	525		8.09 {0.82}	70.0		78.8		87.5	
		200	638	606	575		7.08 {0.72}	80.0		90.0		100.0	
						Standard operation frequency (reference value)		1000,000 times		500,000 times		300,000 times	

※ Do not use the spring exceeding the deflection of L × 50%.
※ When installing a coil spring, apply an initial load.

※ Load calculation method: Load (N) = Spring constant (N/mm) × deflection (mm)
kgf=N×0.101972

Catalog No.	D	L	U/price (in yen) 1-19 pcs.	20-49 pcs.	50 pcs.	d	Spring constant N/mm {kgf/mm}	F=L×40% F mm	Load N {kgf}	F=L×45% F mm	Load N {kgf}	F=L×50% F mm	Load N {kgf}
P-TF	35	40	259	246	233	19	47.94 {4.89}	16.0	765 {78.0}	18.0	863 {88.0}	20.0	961 {98.0}
		45	269	256	242		42.62 {4.35}	18.0		20.3		22.5	
		50	289	275	260		38.36 {3.91}	20.0		22.5		25.0	
		55	299	284	269		34.87 {3.56}	22.0		24.8		27.5	
		60	319	303	287		31.96 {3.26}	24.0		27.0		30.0	
		65	334	317	301		29.50 {3.01}	26.0		29.3		32.5	
		70	349	332	314		27.40 {2.79}	28.0		31.5		35.0	
		75	369	351	332		25.57 {2.61}	30.0		33.8		37.5	
		80	389	370	350		23.97 {2.44}	32.0		36.0		40.0	
		90	429	407	386		21.31 {2.17}	36.0		40.5		45.0	
		100	469	445	422		19.18 {1.96}	40.0		45.0		50.0	
		125	569	540	512		15.34 {1.56}	50.0		56.3		62.5	
		150	658	625	593		12.79 {1.30}	60.0		67.5		75.0	
		175	758	720	682		10.96 {1.12}	70.0		78.8		87.5	
		200	838	796	754		9.59 {0.98}	80.0		90.0		100.0	
	40	40	309	294	278	22	62.67 {6.39}	16.0	1,000 {102.0}	18.0	1,128 {115.0}	20.0	1,255 {128.0}
		45	319	303	287		55.70 {5.68}	18.0		20.3		22.5	
		50	329	313	296		50.13 {5.11}	20.0		22.5		25.0	
		55	359	341	323		45.58 {4.65}	22.0		24.8		27.5	
		60	389	370	350		41.78 {4.26}	24.0		27.0		30.0	
		65	414	393	373		38.56 {3.93}	26.0		29.3		32.5	
		70	439	417	395		35.81 {3.65}	28.0		31.5		35.0	
		75	469	446	422		33.42 {3.41}	30.0		33.8		37.5	
		80	499	474	449		31.33 {3.20}	32.0		36.0		40.0	
		90	549	521	494		27.85 {2.84}	36.0		40.5		45.0	
		100	599	569	539		25.07 {2.56}	40.0		45.0		50.0	
		125	708	673	637		20.05 {2.04}	50.0		56.3		62.5	
		150	828	787	745		16.71 {1.70}	60.0		67.5		75.0	
		175	948	900	853		14.32 {1.46}	70.0		78.8		87.5	
		200	1,077	1,023	970		12.53 {1.28}	80.0		90.0		100.0	
		225	1,190	1,131	1,071		11.14 {1.14}	90.0		101.3		112.5	
		250	1,302	1,237	1,172		10.03 {1.02}	100.0		112.5		125.0	
		275	1,414	1,343	1,273		9.12 {0.93}	110.0		123.8		137.5	
		300	1,526	1,450	1,373		8.36 {0.85}	120.0		135.0		150.0	
	50	50	549	521	494	27.5	78.44 {8.00}	20.0	1,569 {160.0}	22.5	1,765 {180.0}	25.0	1,961 {200.0}
		55	567	539	510		71.31 {7.27}	22.0		24.8		27.5	
		60	584	554	525		65.37 {6.67}	24.0		27.0		30.0	
		65	621	590	559		60.34 {6.15}	26.0		29.3		32.5	
		70	658	625	593		56.03 {5.71}	28.0		31.5		35.0	
		75	703	668	633		52.30 {5.33}	30.0		33.8		37.5	
		80	748	711	673		49.03 {5.00}	32.0		36.0		40.0	
		90	808	768	727		43.58 {4.44}	36.0		40.5		45.0	
		100	888	843	799		39.22 {4.00}	40.0		45.0		50.0	
		125	1,067	1,014	961		31.38 {3.20}	50.0		56.3		62.5	
		150	1,237	1,175	1,113		26.15 {2.67}	60.0		67.5		75.0	
		175	1,406	1,336	1,266		22.41 {2.29}	70.0		78.8		87.5	
		200	1,571	1,493	1,414		19.61 {2.00}	80.0		90.0		100.0	
		225	1,738	1,651	1,564		17.43 {1.78}	90.0		101.3		112.5	
		250	1,905	1,810	1,715		15.69 {1.60}	100.0		112.5		125.0	
		275	2,085	1,981	1,877		14.26 {1.45}	110.0		123.8		137.5	
		300	2,264	2,151	2,038		13.07 {1.33}	120.0		135.0		150.0	
		350	2,643	2,511	2,379		11.21 {1.14}	140.0		157.5		175.0	
		400	2,993	2,843	2,693		9.81 {1.00}	160.0		180.0		200.0	
		450	3,342	3,175	3,007		8.72 {0.89}	180.0		202.5		225.0	
		500	3,691	3,506	3,322		7.84 {0.80}	200.0		225.0		250.0	
	60	60	918	872	826	33	94.07 {9.59}	24.0	2,260 {230.5}	27.0	2,540 {259.0}	30.0	2,820 {287.6}
		70	968	919	871		80.63 {8.22}	28.0		31.5		35.0	
		80	1,017	967	916		70.56 {7.19}	32.0		36.0		40.0	
		90	1,087	1,033	979		62.72 {6.40}	36.0		40.5		45.0	
		100	1,217	1,156	1,095		56.44 {5.76}	40.0		45.0		50.0	
		125	1,446	1,374	1,302		45.16 {4.60}	50.0		56.3		62.5	
		150	1,661	1,578	1,495		37.63 {3.84}	60.0		67.5		75.0	
		175	1,885	1,791	1,697		32.25 {3.29}	70.0		78.8		87.5	
		200	2,175	2,066	1,957		28.22 {2.88}	80.0		90.0		100.0	
		225	2,404	2,284	2,164		25.09 {2.56}	90.0		101.3		112.5	
		250	2,633	2,502	2,370		22.58 {2.30}	100.0		112.5		125.0	
		275	2,878	2,734	2,590		20.53 {2.09}	110.0		123.8		137.5	
		300	3,122	2,966	2,810		18.81 {1.92}	120.0		135.0		150.0	
		350	3,641	3,459	3,277		16.13 {1.64}	140.0		157.5		175.0	
		400	4,140	3,933	3,726		14.11 {1.44}	160.0		180.0		200.0	
		450	4,638	4,406	4,175		12.54 {1.28}	180.0		202.5		225.0	
		500	5,137	4,880	4,623		11.29 {1.15}	200.0		225.0		250.0	
						Standard operation frequency (reference value)		1000,000 times		500,000 times		300,000 times	

※ Do not use the spring exceeding the deflection of L × 50%.
※ When installing a coil spring, apply an initial load.

※ Load calculation method: Load (N) = Spring constant (N/mm) × deflection (mm)
kgf=N×0.101972

Heat Insulator Sheets

Heat Insulator Sheets Overview

Heat insulator sheets

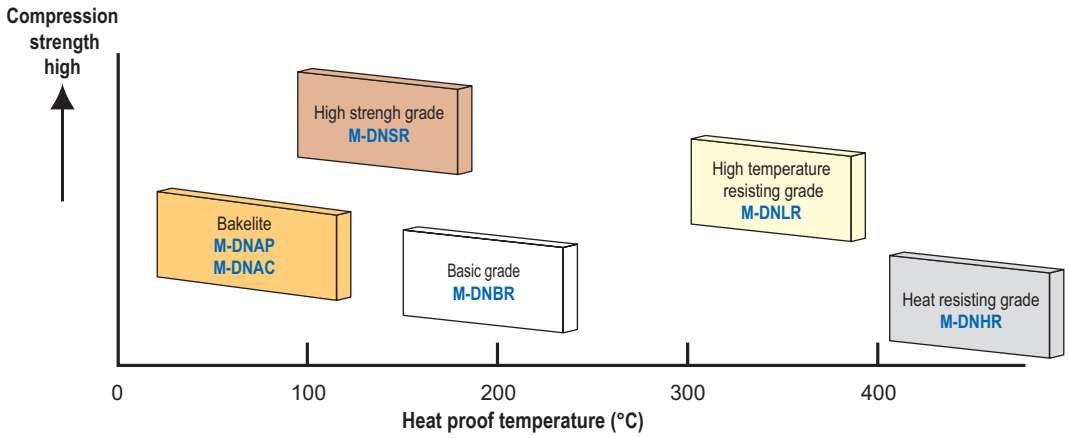

Grade	Bakelite paper	Bakelite cloth
Catalog No.	M-DNAP	M-DNAC
Shipping	3 days	
Page	P.410	P.412

Shipping times are shown in business days (excluding the day of order).



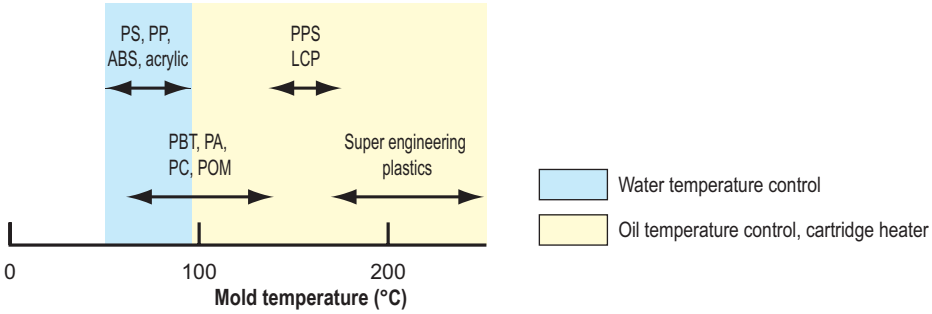

Grade	Basic grade	Heat resisting grade	High strength grade	High temperature resisting grade
Catalog No.	M-DNBR	M-DNHR	M-DNSR	M-DNLR
Shipping	3 days			
Page	P.414	P.416	P.418	P.420

Heat insulator sheet physical property image diagram



Reference diagram

◆Main plastic material and mold temperature



Notes for use

Effects of heat insulator sheets

◆Reduce heat loses from molds and save energy.
◆Shorten the time required for the temperature to rise at the initial stage of molding.
◆Restrict heat transfer and stabilize the temperature distribution on molds.

Precautions for handing

◆When installing a heat insulator sheet, do not tighten the bolts too hard. Doing so may break the sheet.
◆Do not use in areas where water and other liquid may come in.
◆Care should be taken during storage to prevent moisture absorption.

Precautions and conditions for machining

◆When machining, dust must be suck up into a dust collector so that it may not scatter.
◆If dust attaches to the machine, its accuracy may diminish.
◆When drilling holes, care should be taken so as not to cause cracks upon removal of the tool.

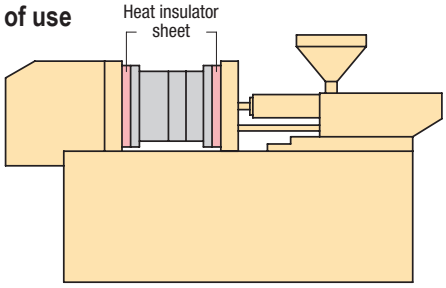
Machining conditions

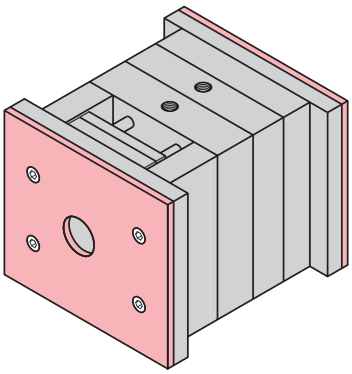
Machining	Lathe turning	Milling	Drilling
Tool material	Ultra-molecular (K10)	Ultra-molecular (K10)	Ultra-molecular (K10)
Revolutions (r/min)	Blade large ～ small 50 ～ 1000	Blade large ～ small 300 ～ 1000	φ2 gimlet 1000 ～ 1500 φ5 gimlet 500 ～ 1000
Cutting depth (mm)	0.5 ～ 3.0	0.5 ～ 2.0	—
Feed (mm/revolution)	0.1 ～ 0.2	0.1 ～ 0.2	0.1 ～ 0.5

(Note) The above values are for reference only.

Examples of use and additional processing

Example of use



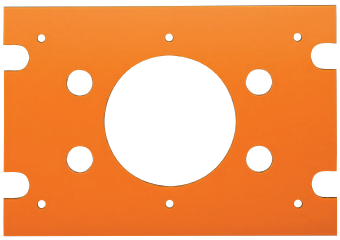


Handling of products not listed in this catalog

We are also dealing with heat insulator sheets of the following specifications upon request. Please feel free to consult us.

◆Products other than the grades shown in this catalog that are manufactured by domestic and overseas brands
◆Products of size not listed in this catalog
◆Heat insulator sheets that have a thickness with a increased tolerance accuracy
◆Additional machining with tools such as drills and end-mills

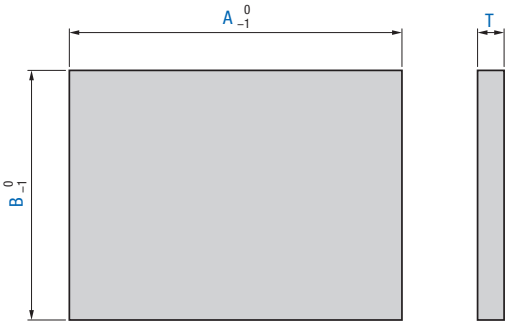
Example of additional machining



Heat Insulator Sheets Bakelite Paper

HIGH TEMPERATURE INSULATOR SHEETS

Catalog No.	Main material	Main base material
M-DNAP	Phenol resin	Craft paper



Dimension of T	3	5	10	15
Limit deviations of T	±0.20	±0.30	±0.45	±0.55

※ The catalog No. of former M-DNA has been changed to M-DNAP due to a specification change.

Features

This is a low-priced standard laminated sheet used as a heat insulator sheet for resin forming molds.

Heat-proof temperature (°C)	Specific gravity	Water absorption rate (%)	Izot impact strength (parallel to layer) J/cm	Compression strength MPa	Thermal conductivity W/(m·K)	Expansion coefficient 1/℃
130	1.3 ～ 1.4	0.2 ～ 0.8	0.29 ～ 0.39	245 ～ 300	0.25	4×10^{-5}

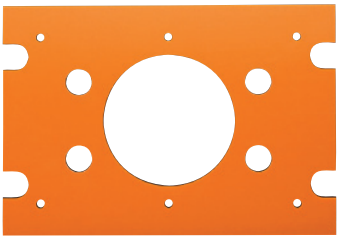
※ The above values are only an example and not a guarantee.

The products of sizes other than those shown in the right table and additional machining with tools such as drills and end mills are also available upon request. Please feel free to consult us.
The maximum production size is 2,000 mm×1,200 mm. In addition to the thickness options listed in the right table, 4, 6, 8, 12, 20 and 25 mm are also available. The accuracy level of thickness tolerance can be further increased by special machining.

How to order

Catalog No.	A	×	B	×	T
M-DNAP	250	×	200	×	5

Shipping: Shipped in 3 business day (excl. the day of order)



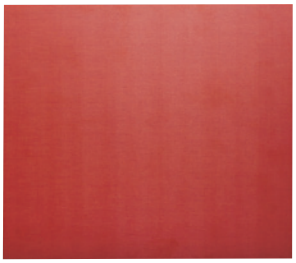
Price list

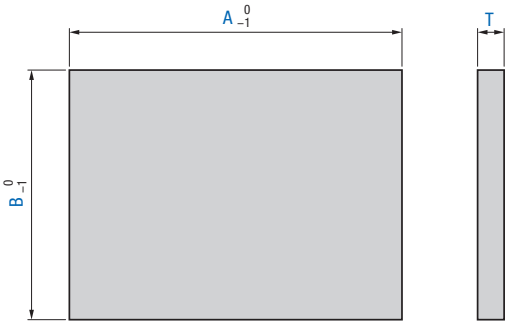
Catalog No.	T	A In 1mm steps	Unit price in yen B in 1mm steps											
			20～50	51～100	101～150	151～200	201～250	251～300	301～350	351～400	401～450	451～500	501～550	551～600
M-DNAP	3	20 ～ 50	120											
		51 ～ 100	230	250										
		101 ～ 150	250	270	570									
		151 ～ 200	320	360	720	750								
		201 ～ 250	400	500	870	920	1,310							
		251 ～ 300	450	590	1,040	1,090	1,550	1,870						
		301 ～ 350	500	680	1,190	1,250	1,780	2,160	2,180					
		351 ～ 400	560	760	1,340	1,410	2,030	2,460	2,480	2,850				
		401 ～ 450	620	850	1,490	1,580	2,270	2,750	2,760	3,060	3,200			
		451 ～ 500	680	930	1,650	1,760	2,510	3,040	3,070	3,380	3,530	3,850		
		501 ～ 550	760	1,050	1,880	2,010	2,880	3,490	3,510	4,060	4,450	4,640	4,820	
		551 ～ 600	820	1,140	2,030	2,160	3,110	3,690	3,780	4,400	4,830	5,040	5,220	7,560
		601 ～ 650	870	1,220	2,200	2,330	3,350	4,080	4,100	4,750	5,220	5,400	5,640	8,150
		651 ～ 700	930	1,310	2,350	2,430	3,600	4,390	4,430	5,080	5,580	5,850	6,030	8,740
		701 ～ 750	990	1,400	2,500	2,670	3,840	4,680	4,730	5,430	5,970	6,210	6,470	9,350
		751 ～ 800	1,040	1,480	2,660	2,700	4,050	4,980	5,020	5,770	6,350	6,570	6,750	9,900
	5	20 ～ 50	170											
		51 ～ 100	320	430										
		101 ～ 150	390	540	810									
		151 ～ 200	470	720	1,040	1,260								
		201 ～ 250	550	860	1,250	1,540	1,930							
		251 ～ 300	620	1,010	1,480	1,820	2,290	2,970						
		301 ～ 350	700	1,080	1,700	2,100	2,650	3,150	3,850					
		351 ～ 400	770	1,310	1,920	2,230	3,020	4,270	4,370	5,450				
		401 ～ 450	810	1,440	1,980	2,300	3,290	4,780	4,890	6,080	6,200			
		451 ～ 500	940	1,580	2,190	2,560	3,650	5,300	5,410	6,740	6,870	7,520		
		501 ～ 550	1,050	1,810	2,690	2,970	4,260	6,070	6,200	7,750	7,870	8,620	8,690	
		551 ～ 600	1,130	1,940	2,700	3,150	4,500	6,590	6,750	8,380	8,530	9,370	9,420	10,160
		601 ～ 650	1,210	2,100	3,140	3,920	4,960	7,100	7,270	8,730	9,190	10,120	10,170	10,940
		651 ～ 700	1,280	2,240	3,350	4,050	5,330	7,590	7,650	9,000	9,890	10,440	10,800	11,700
		701 ～ 750	1,360	2,390	3,590	4,480	5,680	8,010	8,310	9,810	10,560	10,800	11,650	12,550
		751 ～ 800	1,440	2,530	3,800	4,760	6,030	8,190	8,550	10,170	10,800	11,250	11,700	12,600
	10	20 ～ 50	310											
		51 ～ 100	580	810										
		101 ～ 150	720	1,080	1,950									
		151 ～ 200	860	1,350	2,480	2,970								
		201 ～ 250	1,010	1,620	2,970	3,600	4,500							
		251 ～ 300	1,150	1,890	3,550	4,400	5,420	6,950						
		301 ～ 350	1,260	1,980	4,090	5,080	6,260	8,040	8,200					
		351 ～ 400	1,350	2,210	4,620	5,750	7,110	9,140	9,320	12,510				
		401 ～ 450	1,440	2,340	5,150	6,430	7,960	10,230	10,450	14,020	14,040			
		451 ～ 500	1,620	2,700	5,690	7,110	8,800	11,330	11,570	15,540	15,570	16,350		
		501 ～ 550	1,940	3,380	6,490	7,560	8,910	12,980	13,260	16,650	17,810	18,770	18,880	
		551 ～ 600	2,080	3,650	7,020	7,920	9,810	13,500	14,380	19,280	19,330	20,380	20,500	21,830
		601 ～ 650	2,220	3,920	7,550	8,510	10,350	14,220	14,490	20,800	20,850	21,980	22,110	23,550
		651 ～ 700	2,370	4,190	7,880	8,910	10,980	14,400	15,210	21,600	21,960	22,590	23,130	24,210
		701 ～ 750	2,510	4,460	8,010	9,000	11,700	14,850	15,930	21,960	22,230	23,220	23,400	24,660
		751 ～ 800	2,660	4,730	8,100	9,900	12,600	15,750	16,650	22,230	22,470	23,580	23,850	25,200
	15	20 ～ 50	310											
		51 ～ 100	580	1,130										
		101 ～ 150	720	1,500	2,430									
		151 ～ 200	860	1,870	3,090	3,600								
		201 ～ 250	1,010	2,250	3,750	4,410	5,850							
		251 ～ 300	1,150	2,630	4,230	5,450	6,840	8,100						
		301 ～ 350	1,290	2,700	4,410	5,850	7,200	8,460	9,000					
		351 ～ 400	1,430	3,380	5,720	7,130	10,170	12,470	12,560	17,170				
		401 ～ 450	1,580	3,510	6,390	7,970	11,410	13,950	14,070	18,000	19,220			
		451 ～ 500	1,720	3,780	7,050	8,780	12,600	15,440	15,550	20,250	21,290	22,680		
		501 ～ 550	1,940	4,710	8,050	10,070	14,430	17,710	17,830	24,210	24,430	26,070	26,910	
		551 ～ 600	2,080	5,070	8,710	10,880	15,670	19,200	19,340	25,470	26,530	28,300	29,230	30,160
		601 ～ 650	2,220	5,430	9,370	11,730	16,860	20,680	20,860	26,100	28,610	30,530	31,550	32,560
		651 ～ 700	2,370	5,820	10,030	12,570	18,090	22,180	22,370	29,700	30,680	32,750	33,300	34,940
		701 ～ 750	2,510	6,180	10,680	13,420	19,290	23,710	23,900	32,400	32,800	33,570	34,290	35,730
		751 ～ 800	2,660	6,580	11,380	14,270	20,520	25,190	25,200	33,030	33,300	34,200	35,100	36,900

Heat Insulator Sheets Bakelite Cloth

HIGH TEMPERATURE INSULATOR SHEETS

Catalog No.	Main material	Main base material
M-DNAC	Phenol resin	Cotton cloth





Dimension of T	3	5	10	15
Limit deviations of T	±0.30	±0.40	±0.65	±0.80

Features

Use this grade when more mechanical strength than bakelite paper heat insulator sheet is required.

Heat-proof temperature (°C)	Specific gravity	Water absorption rate (%)	Izot impact strength (parallel to layer) J/cm	Compression strength MPa	Thermal conductivity W/(m·K)	Expansion coefficient 1/°C
130	1.3 ～ 1.4	0.7 ～ 1.3	0.6 ～ 1.1	255 ～ 323	0.33	2×10^{-5}

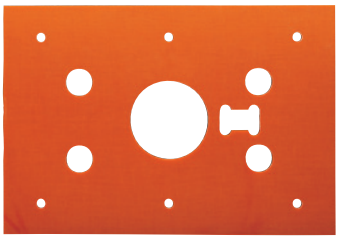
※ The above values are only an example and not a guarantee.

The products of sizes other than those shown in the right table and additional machining with tools such as drills and end mills are also available upon request. Please feel free to consult us.
The maximum production size is 2,000 mm × 1,000 mm. The accuracy level of thickness tolerance can be further increased by special machining.

How to order

Catalog No.	A	×	B	×	T
M-DNAC	250	×	250	×	5

Shipping: Shipped in 3 business day (excl. the day of order)



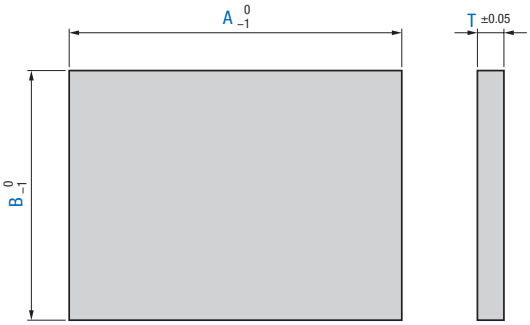
Price list

Catalog No.	T	A In 1 mm steps	Unit price in yen B In 1 mm steps											
			20～50	51～100	101～150	151～200	201～250	251～300	301～350	351～400	401～450	451～500	501～550	551～600
M-DNAC	3	20 ～ 50	180											
		51 ～ 100	340	380										
		101 ～ 150	380	410	860									
		151 ～ 200	480	540	1,080	1,130								
		201 ～ 250	590	760	1,310	1,380	1,960							
		251 ～ 300	680	890	1,560	1,640	2,320	2,810						
		301 ～ 350	760	1,020	1,780	1,880	2,670	3,240	3,270					
		351 ～ 400	840	1,130	2,020	2,120	3,040	3,690	3,720	4,280				
		401 ～ 450	940	1,270	2,240	2,380	3,400	4,130	4,150	4,590	4,800			
		451 ～ 500	1,020	1,400	2,480	2,640	3,770	4,560	4,610	5,070	5,290	5,780		
		501 ～ 550	1,130	1,580	2,830	3,020	4,320	5,240	5,270	6,090	6,670	6,960	7,230	
		551 ～ 600	1,230	1,720	3,050	3,240	4,670	5,540	5,670	6,610	7,250	7,560	7,830	11,340
		601 ～ 650	1,310	1,840	3,290	3,500	5,020	6,120	6,160	7,130	7,830	8,100	8,470	12,220
		651 ～ 700	1,400	1,960	3,530	3,650	5,400	6,590	6,640	7,610	8,370	8,780	9,050	13,110
		701 ～ 750	1,490	2,100	3,750	4,010	5,770	7,020	7,090	8,150	8,960	9,320	9,710	14,030
		751 ～ 800	1,570	2,210	3,990	4,050	6,080	7,470	7,530	8,660	9,530	9,860	10,130	14,850
	5	20 ～ 50	260											
		51 ～ 100	480	650										
		101 ～ 150	590	810	1,220									
		151 ～ 200	700	1,080	1,560	1,890								
		201 ～ 250	830	1,300	1,880	2,310	2,890							
		251 ～ 300	940	1,510	2,210	2,730	3,430	4,460						
		301 ～ 350	1,050	1,620	2,560	3,150	3,970	4,730	5,780					
		351 ～ 400	1,160	1,960	2,880	3,350	4,530	6,400	6,550	8,170				
		401 ～ 450	1,220	2,160	2,970	3,460	4,930	7,170	7,340	9,120	9,310			
		451 ～ 500	1,400	2,380	3,290	3,830	5,470	7,960	8,120	10,120	10,310	11,280		
		501 ～ 550	1,580	2,720	4,040	4,460	6,390	9,100	9,310	11,630	11,800	12,930	13,030	
		551 ～ 600	1,690	2,920	4,050	4,730	6,750	9,880	10,130	12,570	12,800	14,060	14,140	15,250
		601 ～ 650	1,810	3,150	4,720	5,880	7,440	10,660	10,910	13,100	13,790	15,170	15,260	16,420
		651 ～ 700	1,920	3,370	5,020	6,080	7,990	11,390	11,480	13,500	14,840	15,660	16,200	17,550
		701 ～ 750	2,040	3,580	5,390	6,720	8,520	12,020	12,470	14,720	15,840	16,200	17,470	18,820
		751 ～ 800	2,160	3,800	5,700	7,150	9,050	12,290	12,830	15,260	16,200	16,880	17,550	18,900
	10	20 ～ 50	460											
		51 ～ 100	860	1,220										
		101 ～ 150	1,080	1,620	2,930									
		151 ～ 200	1,300	2,030	3,730	4,460								
		201 ～ 250	1,510	2,430	4,460	5,400	6,750							
		251 ～ 300	1,730	2,840	5,320	6,610	8,130	10,420						
		301 ～ 350	1,890	2,970	6,130	7,610	9,400	12,060	12,300					
		351 ～ 400	2,030	3,310	6,930	8,630	10,670	13,710	13,990	18,770				
		401 ～ 450	2,160	3,510	7,720	9,640	11,930	15,350	15,680	21,030	21,060			
		451 ～ 500	2,430	4,050	8,530	10,670	13,200	17,000	17,360	23,320	23,360	24,530		
		501 ～ 550	2,910	5,080	9,740	11,340	13,370	19,470	19,890	24,980	26,720	28,150	28,320	
		551 ～ 600	3,120	5,480	10,530	11,880	14,720	20,250	21,570	28,920	29,000	30,560	30,750	32,740
		601 ～ 650	3,340	5,890	11,330	12,760	15,530	21,330	21,740	31,200	31,280	32,970	33,170	35,330
		651 ～ 700	3,560	6,290	11,820	13,370	16,470	21,600	22,820	32,400	33,120	33,890	34,470	36,320
		701 ～ 750	3,770	6,700	12,020	13,500	17,550	22,280	23,900	32,940	33,350	34,830	35,100	36,990
		751 ～ 800	3,990	7,100	12,150	14,850	18,900	23,630	24,980	33,350	33,710	35,370	35,780	37,800
	15	20 ～ 50	460											
		51 ～ 100	860	1,690										
		101 ～ 150	1,080	2,260	3,650									
		151 ～ 200	1,300	2,810	4,640	5,400								
		201 ～ 250	1,510	3,380	5,630	6,620	8,780							
		251 ～ 300	1,730	3,940	6,350	8,170	10,260	12,150						
		301 ～ 350	1,940	4,050	6,620	8,780	10,800	12,690	13,500					
		351 ～ 400	2,150	5,080	8,590	10,690	15,260	18,700	18,840	25,760				
		401 ～ 450	2,370	5,270	9,590	11,960	17,120	20,930	21,110	27,000	28,840			
		451 ～ 500	2,580	5,670	10,580	13,180	18,900	23,160	23,330	30,380	31,940	34,020		
		501 ～ 550	2,910	7,070	12,070	15,110	21,650	26,570	26,750	36,320	36,640	39,110	40,370	
		551 ～ 600	3,120	7,610	13,070	16,330	23,510	28,800	29,020	38,210	39,800	42,440	43,850	45,240
		601 ～ 650	3,340	8,150	14,060	17,600	25,290	31,020	31,290	39,150	42,920	45,790	47,320	48,840
		651 ～ 700	3,560	8,740	15,040	18,860	27,140	33,260	33,560	44,550	46,030	49,130	49,950	52,410
		701 ～ 750	3,770	9,280	16,030	20,130	28,940	35,560	35,850	48,600	49,190	50,360	51,440	53,600
		751 ～ 800	3,990	9,870	17,060	21,400	30,780	37,790	37,800	49,550	49,950	51,300	52,650	55,350

Heat Insulator Sheets Basic Grade

HIGH TEMPERATURE INSULATOR SHEETS

Catalog No.	Main material	Main base material
M-DNBR	Borate type binder	Glass mat



※ The catalog No. of former M-DNB has been changed to M-DNBR due to a specification change.

Features

This is a heat resisting grade heat insulator sheet for resin forming molds, which provides both benefits of heat proof property and cost economy.

Heat-proof temperature (°C)	Specific gravity	Water absorption rate (%)	Izot impact strength (parallel to layer) J/cm	Compression strength MPa	Thermal conductivity W/(m·K)	Expansion coefficient 1/°C
250	2.0 ～ 2.2	2 ～ 5	1.5	150 ～ 200	0.3	6.6×10^{-6}

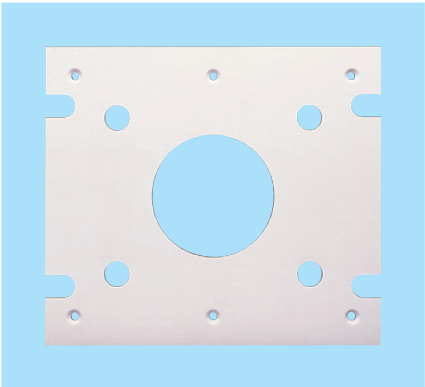
※ The above values are only an example and not a guarantee.

The products of sizes other than those shown in the right table and additional machining with tools such as drills and end mills are also available upon request. Please feel free to consult us.
The maximum production size is 1,000 mm × 1,000 mm. In addition to the thickness options listed in the right table, 1, 2, 6, 8, 20, 25, 30*1 and 35*1 mm are also available. The accuracy level of thickness tolerance can be further increased by special machining.
*1. The maximum production size is 900 mm × 900 mm.

How to order

Catalog No.	A	×	B	×	T
M-DNBR	280	×	230	×	5

Shipping: Shipped in 3 business day (excl. the day of order)



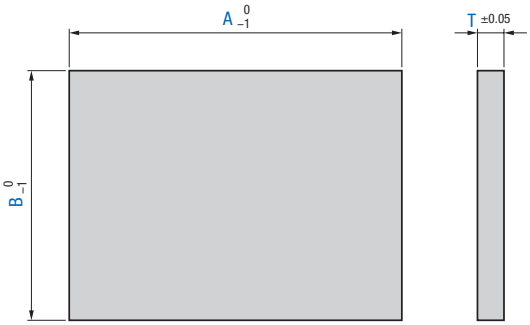
Price list

Catalog No.	T	A In 1 mm steps	Unit price in yen B in 1 mm steps 20~50	51~100	101~150	151~200	201~250	251~300	301~350	351~400	401~450	451~500	501~550	551~600
M-DNBR	3	20 ~ 50	350											
		51 ~ 100	650	990										
		101 ~ 150	820	1,310	1,800									
		151 ~ 200	990	1,640	2,290	2,950								
		201 ~ 250	1,140	1,960	2,780	3,600	4,420							
		251 ~ 300	1,310	2,290	3,270	4,260	5,240	6,220						
		301 ~ 350	1,470	2,620	3,770	4,910	6,050	7,200	8,350					
		351 ~ 400	1,640	2,950	4,260	5,560	6,870	8,180	9,500	10,820				
		401 ~ 450	1,800	3,270	4,740	6,220	7,690	9,150	10,650	12,140	13,550			
		451 ~ 500	1,960	3,600	5,240	6,870	8,510	10,120	11,790	13,460	15,050	16,720		
		501 ~ 550	2,210	4,090	5,980	7,860	9,770	11,620	13,460	15,400	17,250	19,180	21,030	
		551 ~ 600	2,380	4,420	6,470	8,510	10,560	12,580	14,610	16,720	18,740	20,770	22,790	24,900
		601 ~ 650	2,530	4,740	6,960	9,150	11,350	13,550	15,750	18,040	20,240	22,440	24,640	26,840
		651 ~ 700	2,700	5,080	7,440	9,860	12,230	14,610	16,980	19,270	21,650	24,020	26,400	28,780
		701 ~ 750	2,870	5,400	7,940	10,470	13,020	15,580	18,130	20,590	23,140	25,700	28,250	30,800
		751 ~ 800	3,030	5,730	8,430	11,090	13,820	16,540	19,270	21,910	24,640	27,370	30,010	32,740
	5	20 ~ 50	470											
		51 ~ 100	870	1,300										
		101 ~ 150	1,080	1,730	2,380									
		151 ~ 200	1,300	2,160	3,040	3,910								
		201 ~ 250	1,520	2,600	3,690	4,770	5,850							
		251 ~ 300	1,730	3,040	4,340	5,640	6,940	8,250						
		301 ~ 350	1,950	3,470	4,990	6,500	8,030	9,500	11,090					
		351 ~ 400	2,160	3,910	5,640	7,370	9,150	10,820	12,580	14,340				
		401 ~ 450	2,380	4,340	6,290	8,250	10,210	12,140	14,080	16,020	18,040			
		451 ~ 500	2,600	4,770	6,940	9,150	11,260	13,460	15,580	17,780	19,980	22,090		
		501 ~ 550	2,930	5,420	7,920	10,380	12,940	15,400	17,860	20,420	22,880	25,340	27,900	
		551 ~ 600	3,140	5,850	8,560	11,260	13,990	16,720	19,450	22,090	24,820	27,540	30,270	33,000
		601 ~ 650	3,360	6,290	9,240	12,140	15,050	18,040	20,940	23,850	26,750	29,740	32,650	35,550
		651 ~ 700	3,580	6,720	9,860	13,020	16,190	19,270	22,440	25,610	28,780	31,860	35,020	38,190
		701 ~ 750	3,790	7,150	10,560	13,900	17,250	20,590	23,940	27,370	30,710	34,060	37,400	40,740
		751 ~ 800	4,010	7,590	11,180	14,780	18,300	21,910	25,520	29,040	32,650	36,260	39,780	43,380
	10	20 ~ 50	750											
		51 ~ 100	1,410	2,110										
		101 ~ 150	1,760	2,820	3,860									
		151 ~ 200	2,110	3,520	4,920	6,330								
		201 ~ 250	2,460	4,220	5,980	7,740	9,500							
		251 ~ 300	2,820	4,920	7,030	9,150	11,260	13,380						
		301 ~ 350	3,170	5,620	8,090	10,560	13,020	15,490	17,950					
		351 ~ 400	3,520	6,330	9,150	11,970	14,780	17,600	20,420	23,230				
		401 ~ 450	3,860	7,030	10,210	13,380	16,540	19,710	22,880	26,050	29,220			
		451 ~ 500	4,220	7,740	11,260	14,780	18,300	21,820	25,340	28,860	32,380	35,820		
		501 ~ 550	4,740	8,790	12,850	16,900	20,940	24,990	29,040	33,090	37,050	41,100	45,140	
		551 ~ 600	5,100	9,500	13,900	18,300	22,700	27,100	31,500	35,820	40,220	44,620	49,020	53,420
		601 ~ 650	5,450	10,210	14,960	19,710	24,460	29,220	33,970	38,630	43,380	48,140	52,890	57,640
		651 ~ 700	5,800	10,910	16,020	21,120	26,220	31,330	36,340	41,450	46,550	51,660	56,760	61,860
		701 ~ 750	6,150	11,620	17,070	22,530	27,980	33,440	38,810	44,260	49,720	55,180	60,630	66,090
		751 ~ 800	6,500	12,320	18,130	23,940	29,740	35,460	41,270	47,080	52,890	58,700	64,500	70,310
	15	20 ~ 50	1,060											
		51 ~ 100	2,010	3,010										
		101 ~ 150	2,510	4,010	5,520									
		151 ~ 200	3,010	5,020	7,020	9,060								
		201 ~ 250	3,510	6,020	8,530	11,000	13,550							
		251 ~ 300	4,010	7,020	10,030	13,020	16,020	19,100						
		301 ~ 350	4,510	8,030	11,530	15,050	18,570	22,090	25,610					
		351 ~ 400	5,020	9,060	13,020	17,070	21,030	25,080	29,130	33,090				
		401 ~ 450	5,520	10,030	14,520	19,100	23,580	28,070	32,650	37,140	41,620			
		451 ~ 500	6,020	11,000	16,020	21,030	26,050	31,060	36,080	41,100	46,110	51,130		
		501 ~ 550	6,780	12,580	18,300	24,110	29,830	35,640	41,360	47,170	52,890	58,700	64,420	
		551 ~ 600	7,280	13,550	19,800	26,050	32,380	38,630	44,880	51,130	57,460	63,710	69,960	76,210
		601 ~ 650	7,780	14,520	21,300	28,070	34,850	41,620	48,400	55,180	61,950	68,730	75,500	82,280
		651 ~ 700	8,280	15,580	22,790	30,100	37,400	44,620	51,920	59,220	66,440	73,740	81,050	88,260
		701 ~ 750	8,780	16,540	24,290	32,120	39,860	47,700	55,440	63,180	71,020	78,760	86,500	94,340
		751 ~ 800	9,240	17,600	25,870	34,140	42,420	50,690	58,960	67,230	75,500	83,780	92,050	100,320

Heat Insulator Sheets Heat Resisting Grade

HIGH TEMPERATURE INSULATOR SHEETS

Catalog No.	Main material	Main base material
M-DNHR	Phosphate type binder	Glass mat



Features

This is a heat resisting grade heat insulator sheet that can be used for the high-temperature side surface panels of IC plastic molds, etc.

Heat-proof temperature (°C)	Specific gravity	Water absorption rate (%)	Izot impact strength (parallel to layer) J/cm	Compression strength MPa	Thermal conductivity W/(m·K)	Expansion coefficient 1/°C
500	2.0 ～ 2.2	4 ～ 6	1.1	120 ～ 150	0.3	9.0×10^{-6}

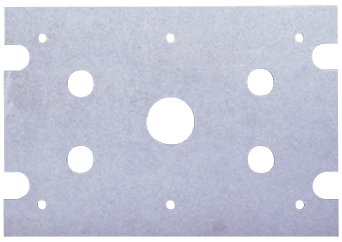
※ The above values are only an example and not a guarantee.

The products of sizes other than those shown in the right table and additional machining with tools such as drills and end mills are also available upon request. Please feel free to contact us.
The maximum production size is 1,000mm×1,000 mm. In addition to the thickness options listed in the right table, 6, 8, 12, 20, 25 and 30 mm are also available. The accuracy level of thickness tolerance can be further increased by special machining.

How to order

Catalog No.	A	×	B	×	T
M-DNHR	350	×	300	×	10

Shipping: Shipped in 3 business day (excl. the day of order)



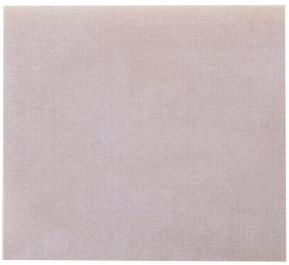
Price list

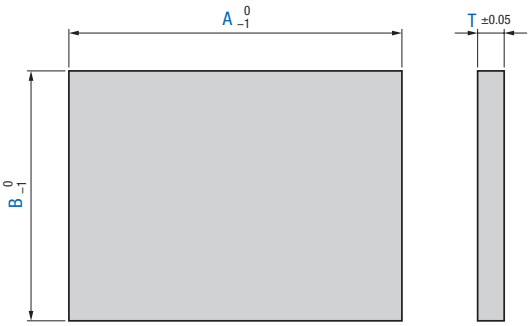
Catalog No.	T	A In 1 mm steps	Unit price in yen B In 1 mm steps 20~50	51~100	101~150	151~200	201~250	251~300	301~350	351~400	401~450	451~500	501~550	551~600
M-DNHR	3	20 ~ 50	280											
		51 ~ 100	520	790										
		101 ~ 150	650	1,050	1,440									
		151 ~ 200	790	1,310	1,830	2,360								
		201 ~ 250	920	1,570	2,230	2,880	3,540							
		251 ~ 300	1,050	1,830	2,620	3,410	4,190	4,980						
		301 ~ 350	1,180	2,090	3,010	3,920	4,840	5,760	6,680					
		351 ~ 400	1,310	2,360	3,410	4,450	5,500	6,550	7,600	8,660				
		401 ~ 450	1,440	2,620	3,790	4,980	6,150	7,320	8,520	9,720	10,840			
		451 ~ 500	1,570	2,880	4,190	5,500	6,810	8,100	9,430	10,770	12,040	13,380		
		501 ~ 550	1,770	3,270	4,780	6,280	7,810	9,290	10,770	12,320	13,800	15,350	16,830	
		551 ~ 600	1,900	3,540	5,170	6,810	8,450	10,070	11,690	13,380	15,000	16,610	18,230	19,920
		601 ~ 650	2,020	3,790	5,570	7,320	9,080	10,840	12,600	14,430	16,190	17,950	19,710	21,470
		651 ~ 700	2,160	4,070	5,960	7,880	9,790	11,690	13,590	15,420	17,320	19,220	21,120	23,020
		701 ~ 750	2,300	4,320	6,350	8,380	10,420	12,460	14,500	16,470	18,520	20,560	22,600	24,640
		751 ~ 800	2,420	4,580	6,740	8,870	11,050	13,240	15,420	17,530	19,710	21,890	24,010	26,190
	5	20 ~ 50	370											
		51 ~ 100	700	1,040										
		101 ~ 150	860	1,390	1,910									
		151 ~ 200	1,040	1,730	2,430	3,120								
		201 ~ 250	1,210	2,090	2,950	3,820	4,680							
		251 ~ 300	1,390	2,430	3,470	4,510	5,550	6,600						
		301 ~ 350	1,570	2,770	4,000	5,200	6,420	7,600	8,870					
		351 ~ 400	1,730	3,120	4,510	5,900	7,320	8,660	10,070	11,480				
		401 ~ 450	1,910	3,470	5,030	6,600	8,170	9,720	11,260	12,810	14,430			
		451 ~ 500	2,090	3,820	5,550	7,320	9,010	10,770	12,460	14,220	15,980	17,670		
		501 ~ 550	2,340	4,340	6,340	8,310	10,350	12,320	14,290	16,330	18,300	20,280	22,320	
		551 ~ 600	2,520	4,680	6,850	9,010	11,190	13,380	15,560	17,670	19,850	22,040	24,220	26,400
		601 ~ 650	2,690	5,030	7,390	9,720	12,040	14,430	16,760	19,080	21,400	23,800	26,120	28,440
		651 ~ 700	2,870	5,380	7,880	10,420	12,950	15,420	17,950	20,490	23,020	25,480	28,020	30,550
		701 ~ 750	3,040	5,720	8,450	11,120	13,800	16,470	19,150	21,890	24,570	27,240	29,920	32,600
		751 ~ 800	3,210	6,070	8,940	11,830	14,640	17,530	20,420	23,230	26,120	29,000	31,820	34,710
	10	20 ~ 50	600											
		51 ~ 100	1,130	1,690										
		101 ~ 150	1,410	2,250	3,090									
		151 ~ 200	1,690	2,820	3,930	5,060								
		201 ~ 250	1,970	3,370	4,780	6,190	7,600							
		251 ~ 300	2,250	3,930	5,620	7,320	9,010	10,700						
		301 ~ 350	2,530	4,500	6,470	8,450	10,420	12,390	14,360					
		351 ~ 400	2,820	5,060	7,320	9,570	11,830	14,080	16,330	18,590				
		401 ~ 450	3,090	5,620	8,170	10,700	13,240	15,770	18,300	20,840	23,370			
		451 ~ 500	3,370	6,190	9,010	11,830	14,640	17,460	20,280	23,090	25,910	28,650		
		501 ~ 550	3,790	7,030	10,280	13,520	16,760	19,990	23,230	26,470	29,640	32,880	36,120	
		551 ~ 600	4,070	7,600	11,120	14,640	18,160	21,680	25,200	28,650	32,170	35,690	39,210	42,730
		601 ~ 650	4,360	8,170	11,970	15,770	19,570	23,370	27,170	30,910	34,710	38,510	42,310	46,110
		651 ~ 700	4,640	8,730	12,810	16,900	20,980	25,060	29,080	33,160	37,240	41,320	45,410	49,490
		701 ~ 750	4,920	9,290	13,660	18,020	22,390	26,750	31,050	35,410	39,780	44,140	48,510	52,870
		751 ~ 800	5,200	9,860	14,500	19,150	23,800	28,370	33,020	37,660	42,310	46,960	51,600	56,250
	15	20 ~ 50	840											
		51 ~ 100	1,600	2,410										
		101 ~ 150	2,010	3,210	4,420									
		151 ~ 200	2,410	4,010	5,610	7,250								
		201 ~ 250	2,810	4,810	6,820	8,800	10,840							
		251 ~ 300	3,210	5,610	8,030	10,420	12,810	15,280						
		301 ~ 350	3,610	6,420	9,220	12,040	14,850	17,670	20,490					
		351 ~ 400	4,010	7,250	10,420	13,660	16,830	20,060	23,300	26,470				
		401 ~ 450	4,420	8,030	11,620	15,280	18,870	22,460	26,120	29,710	33,300			
		451 ~ 500	4,810	8,800	12,810	16,830	20,840	24,850	28,860	32,880	36,890	40,900		
		501 ~ 550	5,420	10,070	14,640	19,290	23,870	28,510	33,090	37,730	42,310	46,960	51,530	
		551 ~ 600	5,830	10,840	15,840	20,840	25,910	30,910	35,900	40,900	45,970	50,970	55,970	60,970
		601 ~ 650	6,220	11,620	17,040	22,460	27,880	33,300	38,720	44,140	49,560	54,980	60,400	65,820
		651 ~ 700	6,630	12,460	18,230	24,080	29,920	35,690	41,540	47,380	53,150	59,000	64,840	70,610
		701 ~ 750	7,020	13,240	19,430	25,700	31,890	38,160	44,350	50,550	56,810	63,010	69,200	75,470
		751 ~ 800	7,390	14,080	20,700	27,320	33,930	40,550	47,170	53,790	60,400	67,020	73,640	80,260

Heat Insulator Sheets High Strength Grade

HIGH TEMPERATURE INSULATOR SHEETS

Catalog No.	Main material	Main base material
M-DNSR	Super heat proof epoxy resin	Glass cloth





Features

This grade has an enhanced mechanical strength and thus more resistance to the deformation due to the clamping force during molding.

Heat-proof temperature (°C)	Specific gravity	Water absorption rate (%)	Izot impact strength (parallel to layer) J/cm	Compression strength MPa	Thermal conductivity W/(m·K)	Expansion coefficient 1/°C
200	1.8 ～ 1.9	0.05	4.5	500 ～ 580	0.3	6.5×10^{-5}

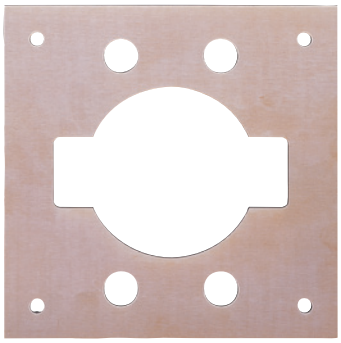
※ The above values are only an example and not a guarantee.

The products of sizes other than those shown in the right table and additional machining with tools such as drills and end mills are also available upon request. Please feel free to contult us.
The maximum production size is 2,000 mm×1,000 mm. In addition to the thickness options listed in the right table, 20 mm is also available.
The accuracy level of thickness tolerance can be further increased by special machining.
＊1. The maximum production size for thickness 15 and 20 mm is 1,000 mm×1,000 mm.

How to order

Catalog No.	A	×	B	×	T
M-DNSR	400	×	300	×	10

Shipping Shipped in 3 business day (excl. the day of order)



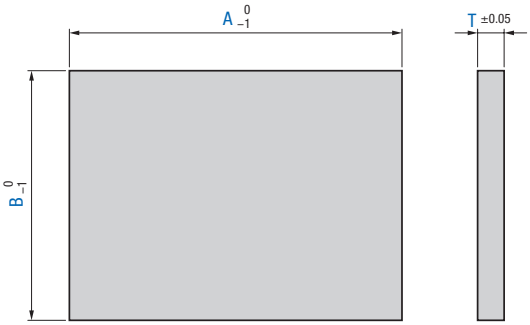
Price list

Catalog No.	T	A In 1 mm steps	Unit price in yen B In 1 mm steps 20~50	51~100	101~150	151~200	201~250	251~300	301~350	351~400	401~450	451~500	501~550	551~600
M-DNSR	3	20 ~ 50	630											
		51 ~ 100	1,170	1,780										
		101 ~ 150	1,470	2,360	3,250									
		151 ~ 200	1,780	2,950	4,120	5,310								
		201 ~ 250	2,060	3,530	5,010	6,480	7,960							
		251 ~ 300	2,360	4,120	5,900	7,660	9,420	11,200						
		301 ~ 350	2,650	4,720	6,780	8,840	10,890	12,950	15,030					
		351 ~ 400	2,950	5,310	7,660	10,010	12,370	14,730	17,110	19,480				
		401 ~ 450	3,250	5,900	8,540	11,200	13,840	16,470	19,170	21,860	24,390			
		451 ~ 500	3,530	6,480	9,420	12,370	15,320	18,220	21,230	24,240	27,090	30,100		
		501 ~ 550	3,980	7,370	10,750	14,140	17,580	20,910	24,240	27,720	31,050	34,530	37,860	
		551 ~ 600	4,280	7,960	11,640	15,320	19,010	22,650	26,290	30,100	33,740	37,380	41,030	44,830
		601 ~ 650	4,560	8,540	12,530	16,470	20,430	24,390	28,350	32,470	36,430	40,390	44,350	48,310
		651 ~ 700	4,870	9,140	13,400	17,740	22,020	26,290	30,570	34,690	38,970	43,240	47,520	51,800
		701 ~ 750	5,170	9,720	14,290	18,850	23,440	28,040	32,630	37,070	41,660	46,250	50,850	55,440
		751 ~ 800	5,450	10,310	15,170	19,960	24,870	29,780	34,690	39,440	44,350	49,260	54,010	58,920
	5	20 ~ 50	840											
		51 ~ 100	1,570	2,340										
		101 ~ 150	1,940	3,120	4,290									
		151 ~ 200	2,340	3,900	5,460	7,030								
		201 ~ 250	2,740	4,690	6,640	8,590	10,530							
		251 ~ 300	3,120	5,460	7,810	10,160	12,500	14,850						
		301 ~ 350	3,520	6,240	8,980	11,700	14,450	17,110	19,960					
		351 ~ 400	3,900	7,030	10,160	13,270	16,470	19,480	22,650	25,820				
		401 ~ 450	4,290	7,810	11,330	14,850	18,370	21,860	25,340	28,830	32,470			
		451 ~ 500	4,690	8,590	12,500	16,470	20,280	24,240	28,040	32,000	35,960	39,760		
		501 ~ 550	5,270	9,760	14,260	18,690	23,280	27,720	32,160	36,750	41,180	45,620	50,210	
		551 ~ 600	5,660	10,530	15,410	20,280	25,190	30,100	35,010	39,760	44,670	49,580	54,490	59,400
		601 ~ 650	6,050	11,330	16,630	21,860	27,090	32,470	37,700	42,930	48,150	53,540	58,770	63,990
		651 ~ 700	6,450	12,100	17,740	23,440	29,150	34,690	40,390	46,090	51,800	57,340	63,040	68,750
		701 ~ 750	6,830	12,870	19,010	25,030	31,050	37,070	43,080	49,260	55,280	61,300	67,320	73,340
		751 ~ 800	7,220	13,670	20,120	26,610	32,950	39,440	45,940	52,270	58,770	65,260	71,600	78,090
	10	20 ~ 50	1,350											
		51 ~ 100	2,530	3,800										
		101 ~ 150	3,170	5,070	6,950									
		151 ~ 200	3,800	6,340	8,850	11,390								
		201 ~ 250	4,440	7,590	10,750	13,920	17,110							
		251 ~ 300	5,070	8,850	12,650	16,470	20,280	24,080						
		301 ~ 350	5,700	10,120	14,560	19,010	23,440	27,880	32,310					
		351 ~ 400	6,340	11,390	16,470	21,540	26,610	31,680	36,750	41,820				
		401 ~ 450	6,950	12,650	18,370	24,080	29,780	35,480	41,180	46,890	52,590			
		451 ~ 500	7,590	13,920	20,280	26,610	32,950	39,280	45,620	51,960	58,290	64,470		
		501 ~ 550	8,540	15,820	23,130	30,410	37,700	44,990	52,270	59,560	66,690	73,970	81,260	
		551 ~ 600	9,170	17,110	25,030	32,950	40,870	48,790	56,710	64,470	72,390	80,310	88,230	96,150
		601 ~ 650	9,800	18,370	26,930	35,480	44,040	52,590	61,140	69,540	78,090	86,640	95,200	103,750
		651 ~ 700	10,440	19,640	28,830	38,020	47,200	56,390	65,420	74,610	83,790	92,980	102,170	111,360
		701 ~ 750	11,070	20,910	30,730	40,550	50,370	60,190	69,850	79,680	89,500	99,320	109,140	118,960
		751 ~ 800	11,700	22,180	32,630	43,080	53,540	63,840	74,290	84,740	95,200	105,650	116,110	126,560
	15	20 ~ 50	1,900											
		51 ~ 100	3,610	5,420										
		101 ~ 150	4,510	7,220	9,940									
		151 ~ 200	5,420	9,030	12,640	16,320								
		201 ~ 250	6,320	10,830	15,350	19,800	24,390							
		251 ~ 300	7,220	12,640	18,060	23,440	28,830	34,370						
		301 ~ 350	8,120	14,450	20,750	27,090	33,420	39,760	46,090					
		351 ~ 400	9,030	16,320	23,440	30,730	37,860	45,140	52,430	59,560				
		401 ~ 450	9,940	18,060	26,140	34,370	42,450	50,530	58,770	66,840	74,920			
		451 ~ 500	10,830	19,800	28,830	37,860	46,890	55,920	64,940	73,970	83,000	92,030		
		501 ~ 550	12,200	22,650	32,950	43,400	53,700	64,150	74,450	84,900	95,200	105,650	115,950	
		551 ~ 600	13,100	24,390	35,640	46,890	58,290	69,540	80,780	92,030	103,440	114,680	125,930	137,170
		601 ~ 650	14,000	26,140	38,330	50,530	62,730	74,920	87,120	99,320	111,510	123,710	135,910	148,100
		651 ~ 700	14,910	28,040	41,030	54,170	67,320	80,310	93,460	106,600	119,590	132,740	145,890	158,880
		701 ~ 750	15,800	29,780	43,720	57,820	71,760	85,850	99,790	113,730	127,830	141,770	155,710	169,800
		751 ~ 800	16,630	31,680	46,570	61,460	76,350	91,240	106,130	121,020	135,910	150,800	165,690	180,580

Heat Insulator Sheets High Temperature Resisting Grade

HIGH TEMPERATURE INSULATOR SHEETS

Catalog No.	Main material	Main base material
M-DNLR	Silicic acid base binder	Glass cloth



Features

This is a reliable grade that has the highest heat proof property, mechanical strength and dimensional stability among the series.

Heat-proof temperature (°C)	Specific gravity	Water absorption rate (%)	Izot impact strength (parallel to layer) J/cm	Compression strength MPa	Thermal conductivity W/(m·K)	Expansion coefficient 1/°C
400	2.0 ～ 2.1	0.1	2.5	420 ～ 480	0.3	2.3×10^{-5}

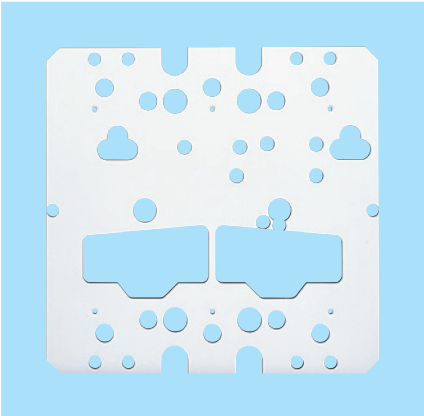
※ The above values are only an example and not a guarantee.

The products of sizes other than those shown in the right table and additional machining with tools such as drills and end mills are also available upon request. Please feel free to consult us.
The maximum production size is 1,000 mm × 1,000 mm.
The accuracy level of thickness tolerance can be further increased by special machining.

How to order

Catalog No.	A	×	B	×	T
M-DNLR	230	×	200	×	5

Shipping: Shipped in 3 business day (excl. the day of order)

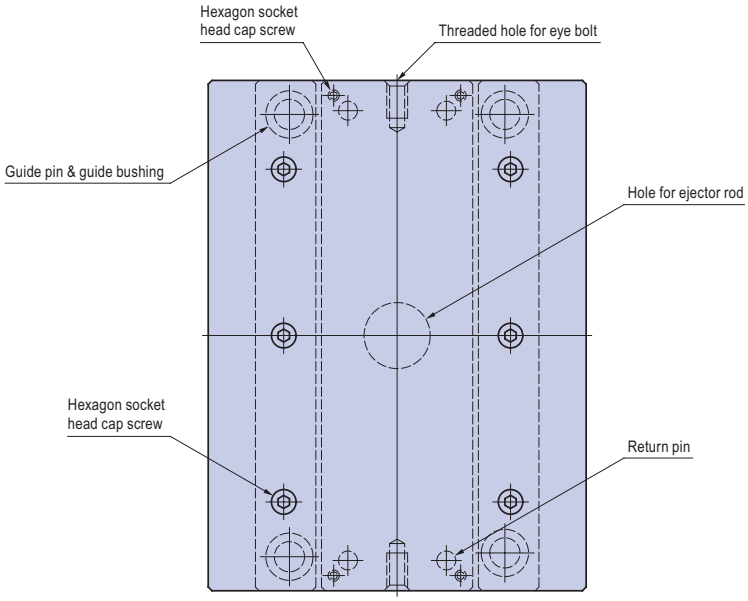


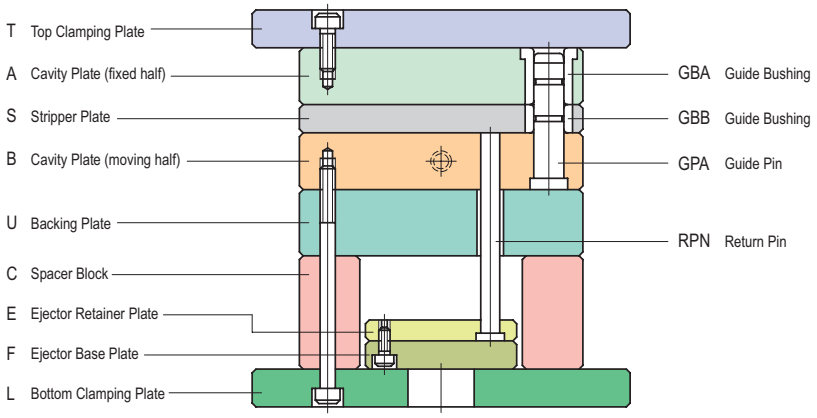
Price list

Catalog No.	T	A In 1mm steps	Unit price in yen B In 1mm steps											
			20～50	51～100	101～150	151～200	201～250	251～300	301～350	351～400	401～450	451～500	501～550	551～600
M-DNLR	3	20 ～ 50	840											
		51 ～ 100	1,570	2,370										
		101 ～ 150	1,960	3,150	4,330									
		151 ～ 200	2,370	3,920	5,490	7,080								
		201 ～ 250	2,750	4,710	6,670	8,640	10,600							
		251 ～ 300	3,150	5,490	7,860	10,230	12,570	14,930						
		301 ～ 350	3,530	5,530	8,280	11,780	14,530	17,270	20,050					
		351 ～ 400	3,920	5,800	10,230	13,350	16,490	19,640	22,810	25,980				
		401 ～ 450	4,330	6,060	11,040	14,930	18,460	21,960	25,560	29,150	32,520			
		451 ～ 500	4,710	6,890	12,570	16,490	20,420	24,290	28,300	32,310	36,120	40,130		
		501 ～ 550	5,300	9,820	14,340	18,860	23,440	27,880	32,310	36,960	41,400	46,040	50,480	
		551 ～ 600	5,700	10,600	15,520	20,420	25,340	30,200	35,060	40,130	44,990	49,840	54,700	59,770
		601 ～ 650	6,080	11,390	16,700	21,960	27,240	32,520	37,800	43,300	48,580	53,860	59,140	64,420
		651 ～ 700	6,490	12,190	17,860	23,650	29,360	35,060	40,760	46,250	51,960	57,660	63,360	69,060
		701 ～ 750	6,880	12,970	19,050	25,130	31,260	37,380	43,510	49,420	55,550	61,670	67,800	73,920
		751 ～ 800	7,270	13,750	20,230	26,610	33,160	39,710	46,250	52,590	59,140	65,680	72,020	78,570
	5	20 ～ 50	1,120											
		51 ～ 100	2,090	3,120										
		101 ～ 150	2,600	4,160	5,720									
		151 ～ 200	3,120	5,190	7,290	9,380								
		201 ～ 250	3,650	6,250	8,850	11,450	14,040							
		251 ～ 300	4,160	6,910	10,410	13,530	16,670	19,790						
		301 ～ 350	4,690	7,170	11,980	15,610	19,260	22,810	26,610					
		351 ～ 400	5,190	7,840	13,530	17,700	21,960	25,980	30,200	34,430				
		401 ～ 450	5,720	8,280	15,100	19,790	24,500	29,150	33,790	38,440	43,300			
		451 ～ 500	6,250	9,640	16,670	21,960	27,030	32,310	37,380	42,660	47,940	53,010		
		501 ～ 550	7,030	13,010	19,010	24,920	31,050	36,960	42,870	49,000	54,910	60,830	66,950	
		551 ～ 600	7,540	14,040	20,550	27,030	33,580	40,130	46,680	53,010	59,560	66,110	72,650	79,200
		601 ～ 650	8,070	15,100	22,180	29,150	36,120	43,300	50,270	57,240	64,200	71,390	78,360	85,320
		651 ～ 700	8,600	16,140	23,650	31,260	38,860	46,250	53,860	61,460	69,060	76,450	84,060	91,660
		701 ～ 750	9,100	17,170	25,340	33,370	41,400	49,420	57,450	65,680	73,710	81,730	89,760	97,790
		751 ～ 800	9,630	18,220	26,820	35,480	43,930	52,590	61,250	69,700	78,360	87,010	95,460	104,120
	10	20 ～ 50	1,800											
		51 ～ 100	3,380	5,070										
		101 ～ 150	4,220	6,760	9,280									
		151 ～ 200	5,070	7,440	11,040	15,190								
		201 ～ 250	5,910	9,640	13,790	18,570	22,810							
		251 ～ 300	6,760	10,510	15,680	21,960	27,030	32,100						
		301 ～ 350	7,440	11,040	16,560	24,820	31,260	37,170	43,080					
		351 ～ 400	7,840	11,800	19,360	28,720	35,480	42,240	49,000	55,760				
		401 ～ 450	8,280	12,420	20,680	31,770	39,710	47,310	54,910	62,520	70,120			
		451 ～ 500	9,640	13,790	24,820	35,480	43,930	52,380	60,830	69,270	77,720	85,960		
		501 ～ 550	11,390	21,100	30,840	40,550	50,270	59,980	69,700	79,410	88,920	98,630	108,350	
		551 ～ 600	12,230	22,810	33,370	43,930	54,490	65,050	75,610	85,960	96,520	107,080	117,640	128,200
		601 ～ 650	13,080	24,500	35,900	47,310	58,710	70,120	81,520	92,720	104,120	115,530	126,930	138,340
		651 ～ 700	13,920	26,190	38,440	50,690	62,940	75,190	87,230	99,480	111,720	123,970	136,220	148,470
		701 ～ 750	14,770	27,880	40,970	54,070	67,160	80,260	93,140	106,230	119,330	132,420	145,520	158,610
		751 ～ 800	15,610	29,570	43,510	57,450	71,390	85,110	99,050	112,990	126,930	140,870	154,810	168,750
	15	20 ～ 50	3,190											
		51 ～ 100	5,760	8,710										
		101 ～ 150	7,370	11,670	15,950									
		151 ～ 200	8,710	12,870	18,970	26,000								
		201 ～ 250	10,260	16,420	23,590	31,770	39,000							
		251 ～ 300	11,670	18,030	26,670	37,400	46,110	54,680						
		301 ～ 350	12,870	19,030	28,280	42,490	53,350	63,400	73,450					
		351 ～ 400	13,680	20,370	33,110	49,060	60,450	72,110	83,500	95,030				
		401 ～ 450	14,340	21,310	35,380	54,290	67,820	80,560	93,420	106,420	119,420			
		451 ～ 500	16,490	23,460	42,490	60,450	74,790	89,130	95,430	117,810	132,150	146,360		
		501 ～ 550	19,440	36,050	52,680	69,160	85,780	102,130	118,750	135,240	151,320	167,800	184,420	
		551 ～ 600	21,050	39,000	56,830	74,790	92,750	110,840	128,810	146,360	164,310	182,140	200,100	218,060
		601 ～ 650	22,390	41,820	61,120	80,560	100,120	119,420	138,860	157,750	177,050	196,490	216,050	235,490
		651 ～ 700	23,720	44,770	65,410	86,450	107,090	127,860	148,370	169,410	190,050	211,090	231,730	252,510
		701 ～ 750	25,340	47,710	69,830	92,070	114,460	136,580	158,420	180,800	202,650	225,430	247,540	269,790
		751 ～ 800	26,670	50,400	74,120	97,840	121,560	145,020	168,610	192,330	216,050	239,910	263,230	287,080

Product Data / Technical Data

Mold Base Structure and Component Name S Series





This diagram shows **SB** type as a representative example.

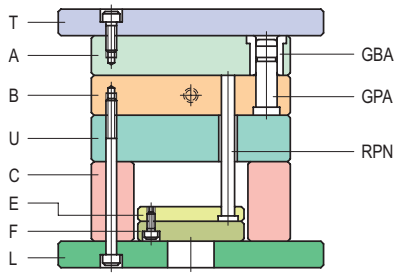
The following mold base specifications are not shown in the Bluebook Plastic Mold Component Vol 1, but can be made to order in the same way as standard products. Please advise us on your specification requirements as follows:

Type name	Specification	Order example
SE type Option #S	A specification option defined by eliminating the stripper plate from SE type	**MDC SE 2025 40 30 50 S V – N / #S** *1
SF type Option #S	A specification option defined by eliminating the stripper plate from SF type	**MDC SF 2025 40 60 50 S – – N / #S** *1

*1. When specifying these specifications, please add #S to the respective order codes of SE and SF types.

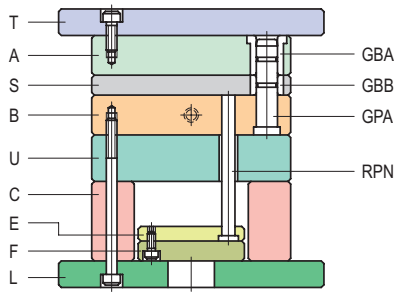
SA Type

Ejector pin ejection type



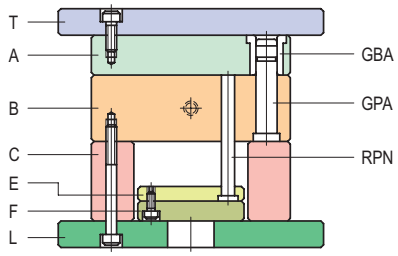
SB Type

Stripper plate ejection type



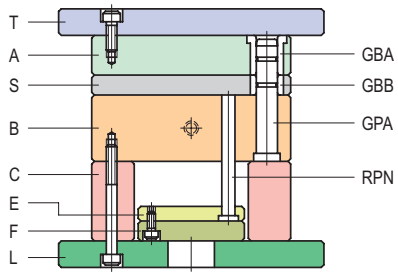
SC Type

Ejector pin ejection type without backing plate



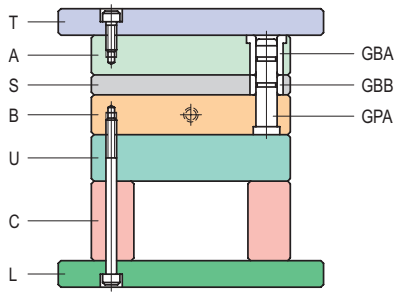
SD Type

Stripper plate ejection type without backing plate



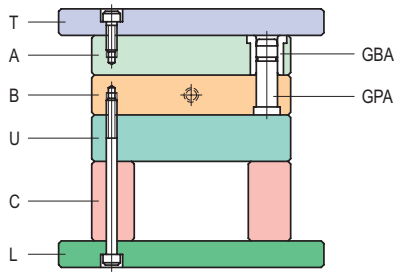
SE Type

Stripper plate ejection type, which is actuated by mold opening behavior



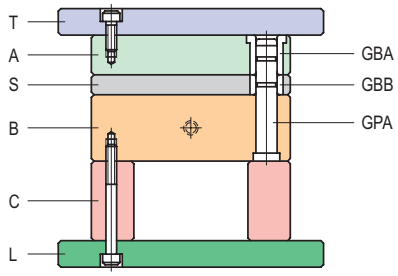
SE Type
Option #S

An option defined by eliminating stripper plate from SE type



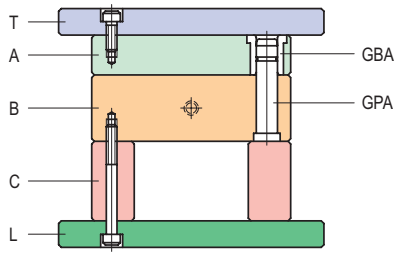
SF Type

Stripper plate ejection type, which is actuated by mold opening behaviour, without backing plate

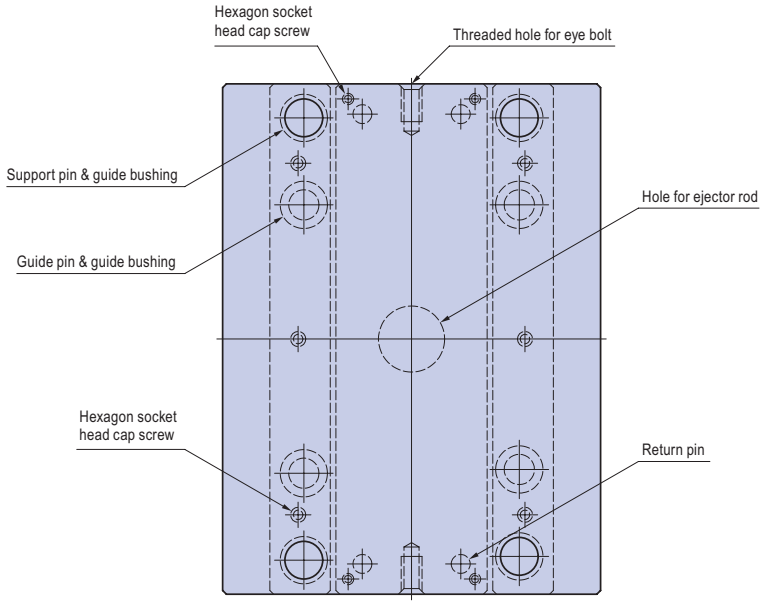


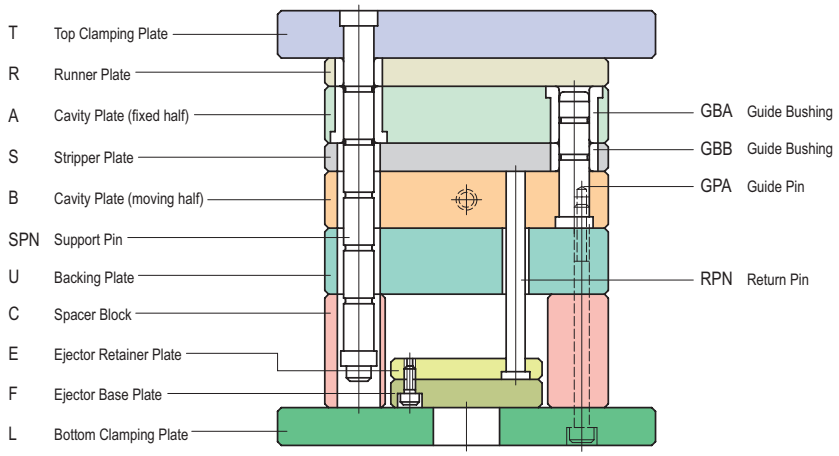
SF Type
Option #S

An option defined by eliminating stripper plate from SF type



Mold Base Structure and Component Name D Series





This diagram shows **DB** type as a representative example.

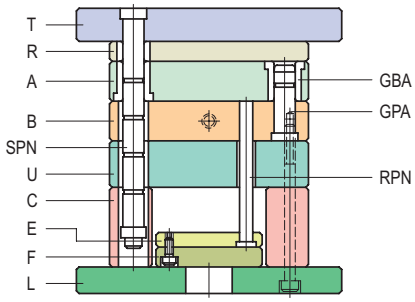
The following mold base specifications are not shown in the Bluebook Plastic Mold Component Vol 1, but can be made to order in the same way as standard products. Please advise us on your specification requirements as follows:

Type name	Specification	Order example
DE type Option #S	A specification option defined by eliminating the stripper plate from DE type	**MDC DE 2025 40 30 50 S V – N OH 180 / #S** *1
DF type Option #S	A specification option defined by eliminating the stripper plate from DF type	**MDC DF 2025 40 60 50 S – – N OH 180 / #S** *1

*1. When specifying these specifications, please add #S to the respective order codes of DE and DF types.

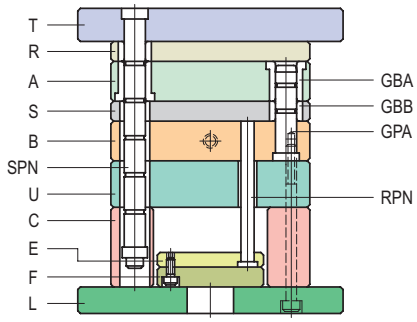
DA Type

Ejector pin ejection type



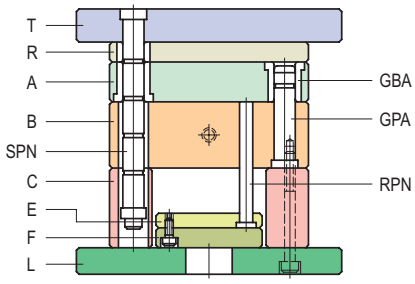
DB Type

Stripper plate ejection type



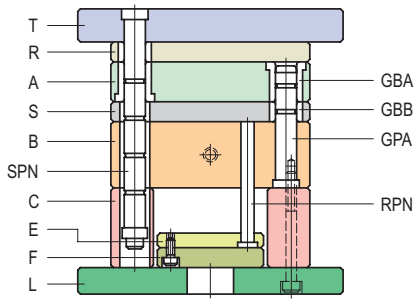
DC Type

Ejector pin ejection type without Backing plate



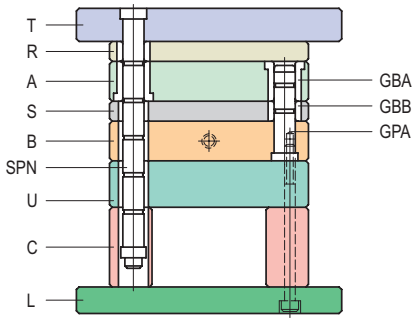
DD Type

Stripper plate ejection type without Backing plate



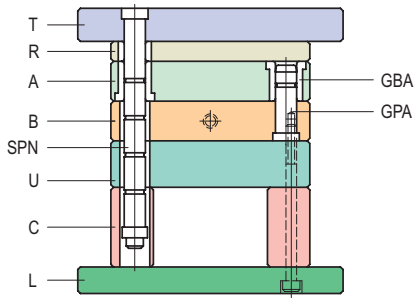
DE Type

Stripper plate ejection type, which is actuated by mold opening behavior



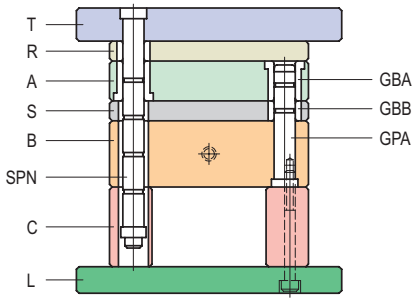
DE Type
Option #S

An option defined by eliminating stripper plate from DE type



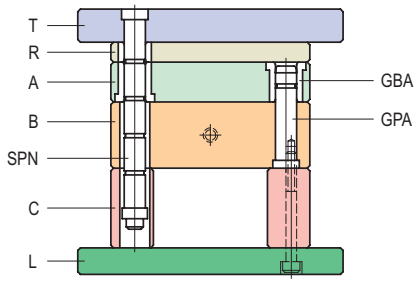
DF Type

Stripper plate ejection type, which is actuated by mold opening behaviour, without Backing plate

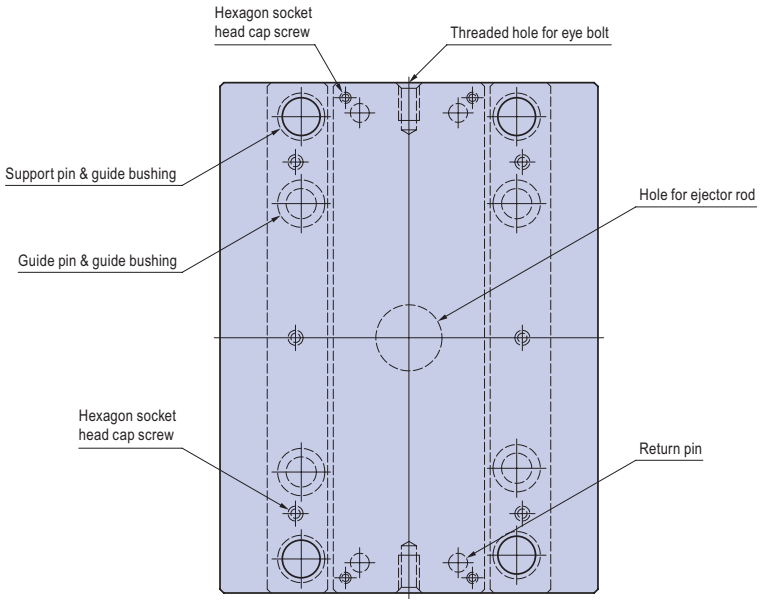


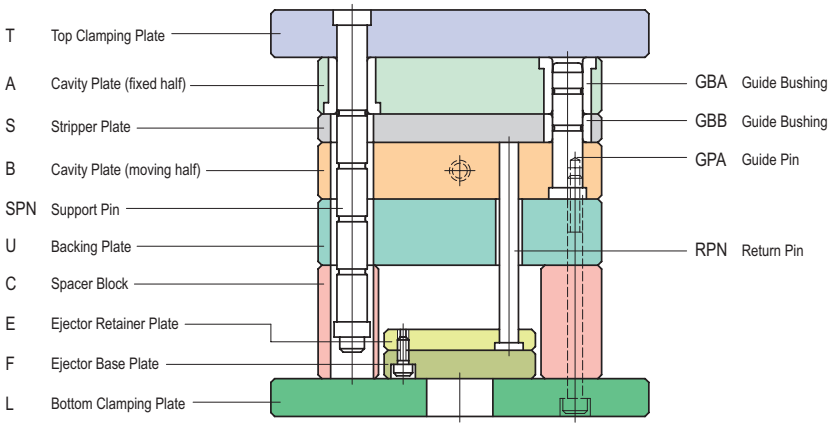
DF Type
Option #S

An option defined by eliminating stripper plate from DF type



Mold Base Structure and Component Name E Series





This diagram shows **EB** type as a representative example.

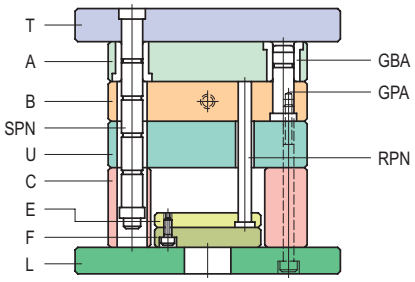
The following mold base specifications are not shown in the Bluebook Plastic Mold Component Vol 1, but can be made to order in the same way as standard products. Please advise us on your specification requirements as follows:

Type name	Specification	Order example
EE type	A specification defined by eliminating the runner stripper plate from DE type	MDC EE 2025 40 30 50 S V – N OH 180 *1
EF type	A specification defined by eliminating the runner stripper plate from DF type	MDC EF 2025 40 60 50 S – – N OH 180 *1
EE type Option #S	A specification option defined by eliminating the stripper plate from EE type	MDC EE 2025 40 30 50 S V – N OH 160 / #S *2
EF type Option #S	A specification option defined by eliminating the stripper plate from EF type	MDC EF 2025 40 60 50 S – – N OH 160 / #S *2

*1. The type names of these specificatiions change to EE and EF types respectively.
*2. When specifying these specifications, please add #S to the respective order codes of EE and EF types.

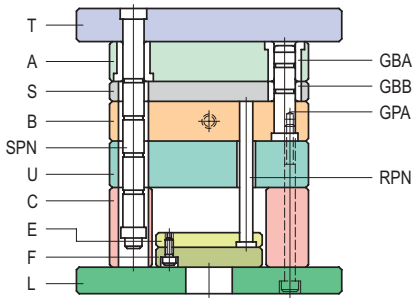
EA Type

Ejector pin ejection type



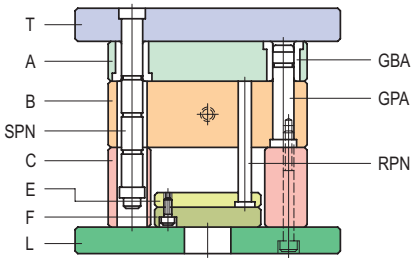
EB Type

Stripper plate ejection type



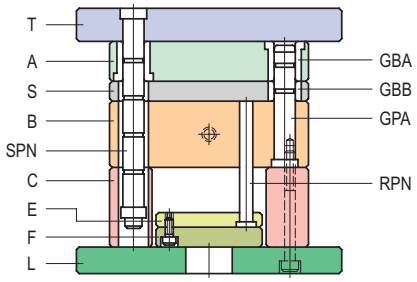
EC Type

Ejector pin ejection type without Backing plate



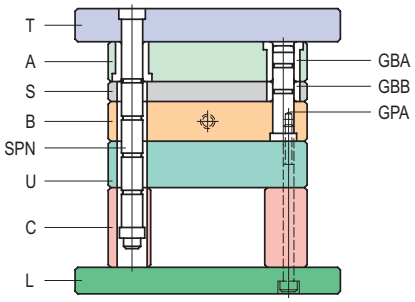
ED Type

Stripper plate ejection type without Backing plate



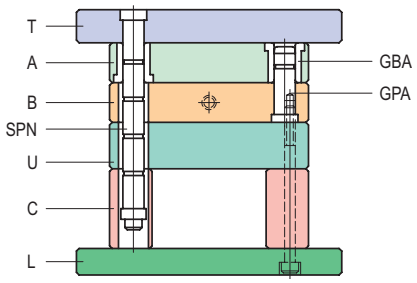
EE Type

Stripper plate ejection type, which is actuated by mold opening behavior



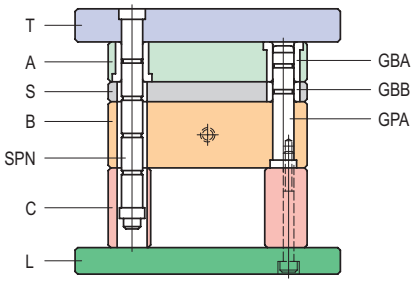
EE Type
Option #S

An option defined by eliminating stripper plate from EE type



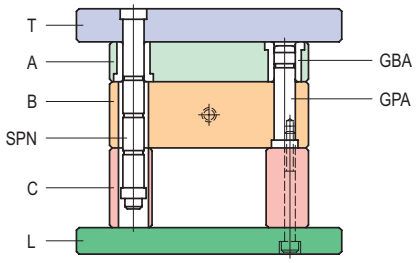
EF Type

Stripper plate ejection type, which is actuated by mold opening behavior, without Backing plate

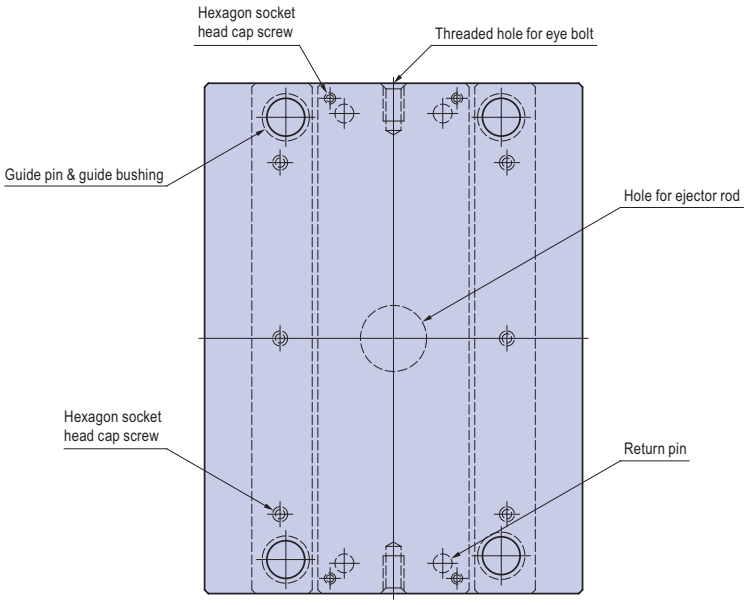


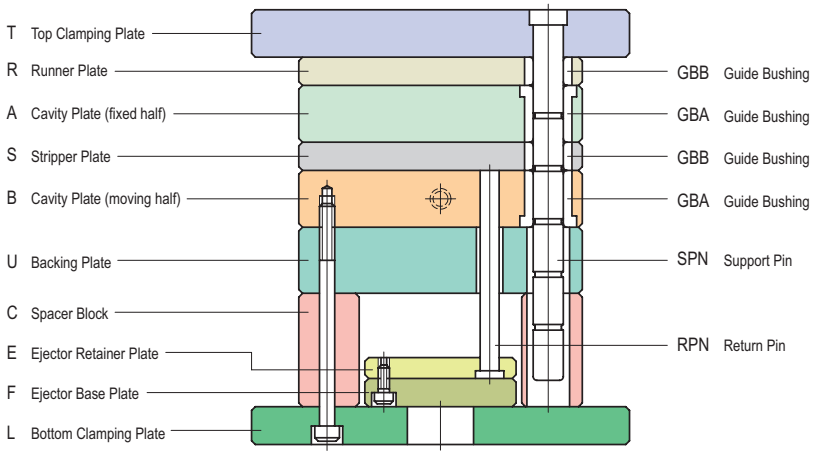
EF Type
Option #S

An option defined by eliminating stripper plate from EF type



Mold Base Structure and Component Name F Series





This diagram shows **FB** type as a representative example.

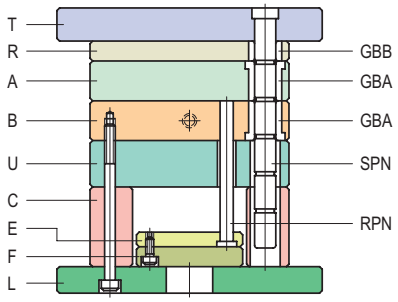
The following mold base specifications are not shown in the Bluebook Plastic Mold Component Vol 1, but can be made to order in the same way as standard products. Please advise us on your specification requirements as follows:

Type name	Specification	Order example
FB type	A specification defined by adding stripper plate to FA type	**MDC FB 2025 40 30 50 S V M N OH 210** *1
FD type	A specification defined by adding stripper plate to FC type	**MDC FD 2025 40 60 50 S – M N OH 210** *1
FE type **Option #S**	A specification option defined by eliminating the stripper plate from FE type	**MDC FE 2025 40 30 50 S V – N OH 190 / #S** *2
FF type **Option #S**	A specification option defined by eliminating the stripper plate from FF type	**MDC FF 2025 40 60 50 S – – N OH 190 / #S** *2

*1. The type names of these specificatiions change to **FB** and **FD types** respectively.
*2. When specifying these specifications, please add **#S** to the respective order codes of FE and FF types.

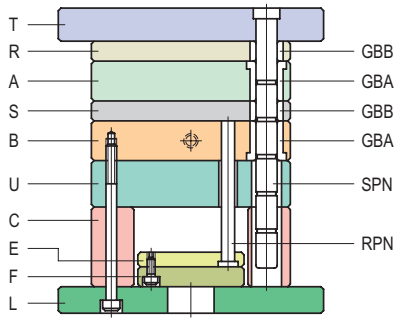
FA Type

Ejector pin ejection type



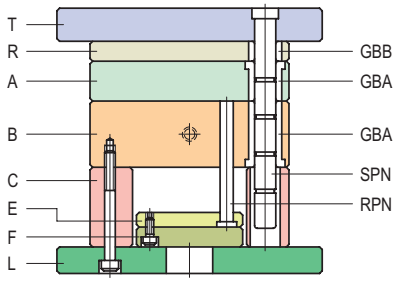
FB Type

A type defined by adding a Stripper plate to FA type



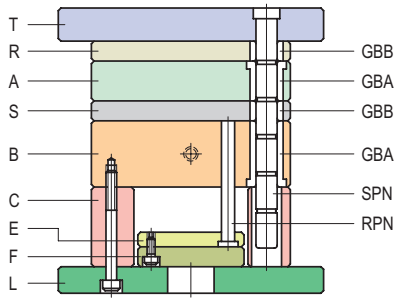
FC Type

Ejector pin ejection type without Backing plate



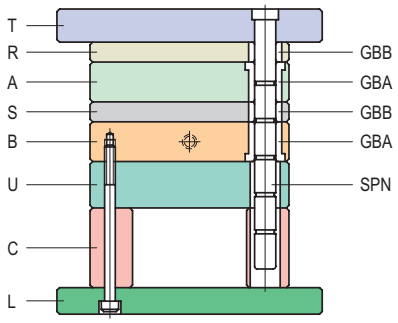
FD Type

A type defined by adding a Stripper plate to FC type



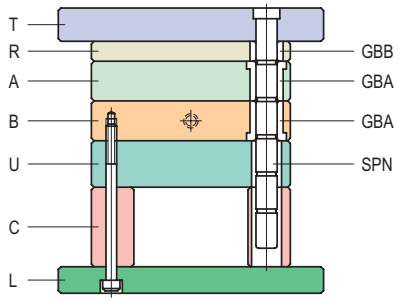
FE Type

Stripper plate ejection type, which is actuated by mold opening behavior



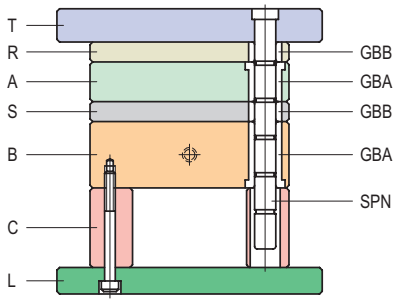
FE Type
Option #S

An option defined by eliminating stripper plate from FE type



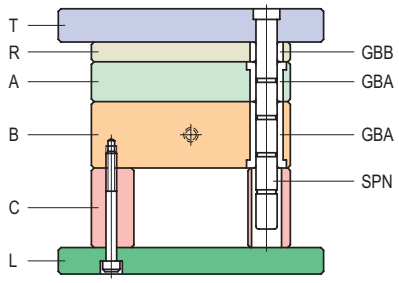
FF Type

Stripper plate ejection type, which is actuated by mold opening behavior, without Backing plate

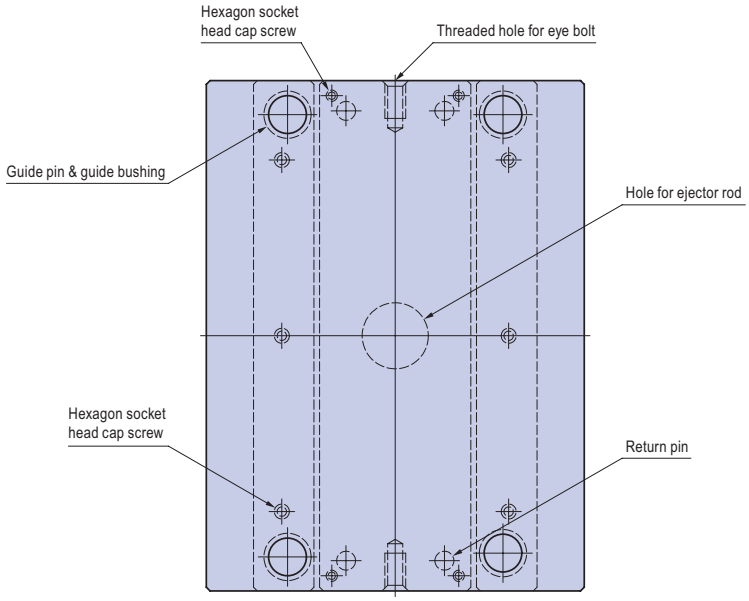


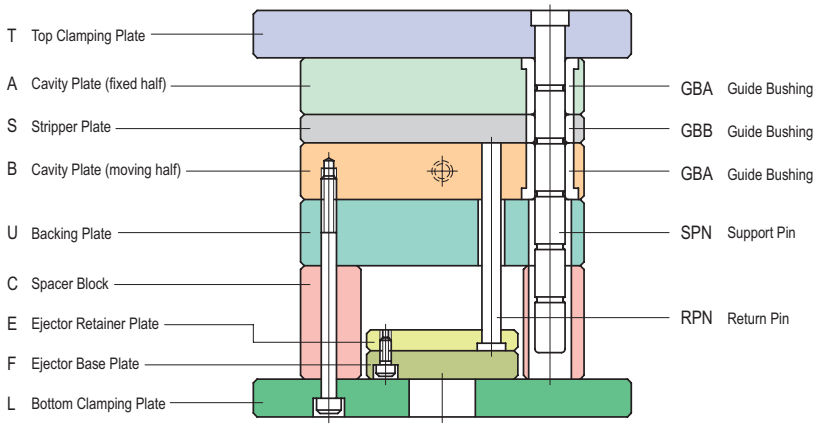
FF Type
Option #S

An option defined by eliminating stripper plate from FF type



Mold Base Structure and Component Name G Series





This diagram shows **GB** type as a representative example.

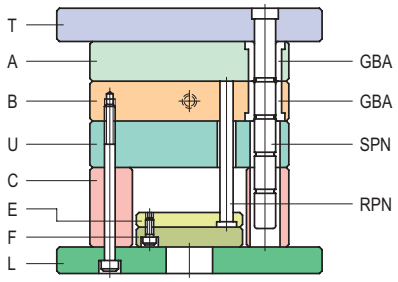
The following mold base specifications are not shown in the Bluebook Plastic Mold Component Vol 1, but can be made to order in the same way as standard products. Please advise us on your specification requirements as follows:

Type name	Specification	Order example
GB type	A specification defined by adding stripper plate to GA type	**MDC GB 2025 40 30 50 S V M N OH 190** *1
GD type	A specification defined by adding stripper plate to GC type	**MDC GD 2025 40 60 50 S – M N OH 190** *1
GE type	A specification defined by eliminating runner stripper plate from FE type	**MDC GE 2025 40 30 50 S V – N OH 190** *1
GF type	A specification defined by eliminating runner stripper plate from FF type	**MDC GF 2025 40 60 50 S – – N OH 190** *1
GE type Option #S	A specification option defined by eliminating the stripper plate from GE type	**MDC GE 2025 40 30 50 S V – N OH 170 / #S** *2
GF type Option #S	A specification option defined by eliminating the stripper plate from GF type	**MDC GF 2025 40 60 50 S – – N OH 170 / #S** *2

*1. The type names of these specifications change to **GB**, **GD**, **GE**, **GF types** respectively.
*2. When specifying these specifications, please add **#S** to the respective order codes of GE and GF types.

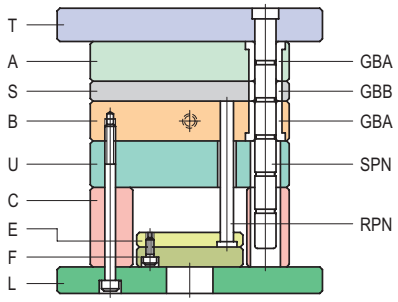
GA Type

Ejector pin ejection type



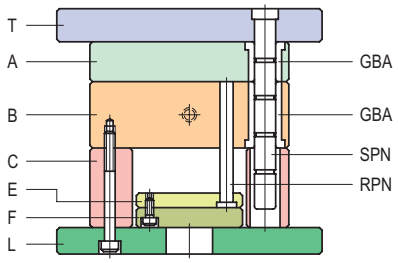
GB Type

A type defined by adding a Stripper plate to GA type



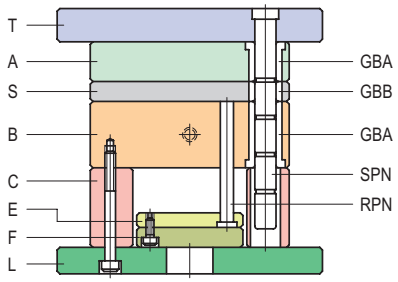
GC Type

Ejector pin ejection type without Backing plate



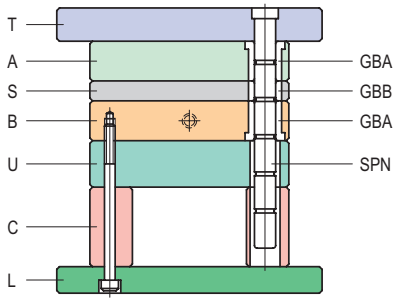
GD Type

A type defined by adding a Stripper plate to GC type



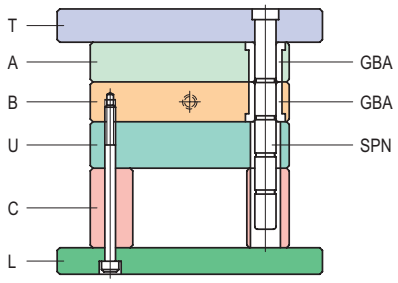
GE Type

Stripper plate ejection type, which is actuated by mold opening behavior



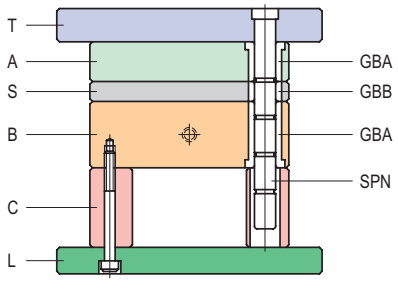
GE Type
Option #S

An option defined by eliminating the stripper plate from GE type



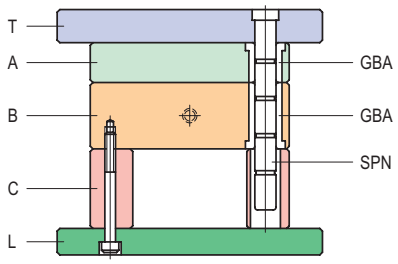
GF Type

Stripper plate ejection type, which is actuated by mold opening behavior, without Backing plate

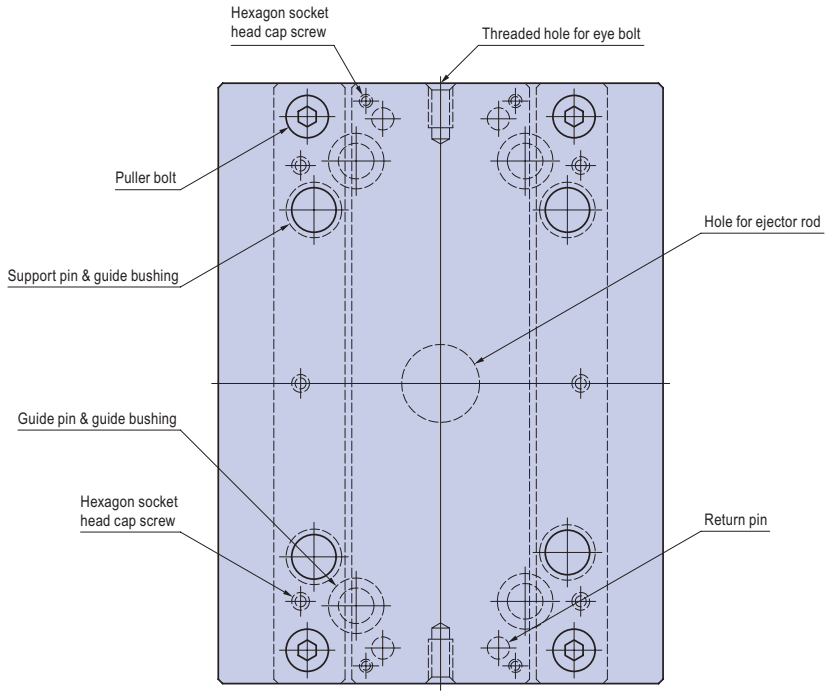


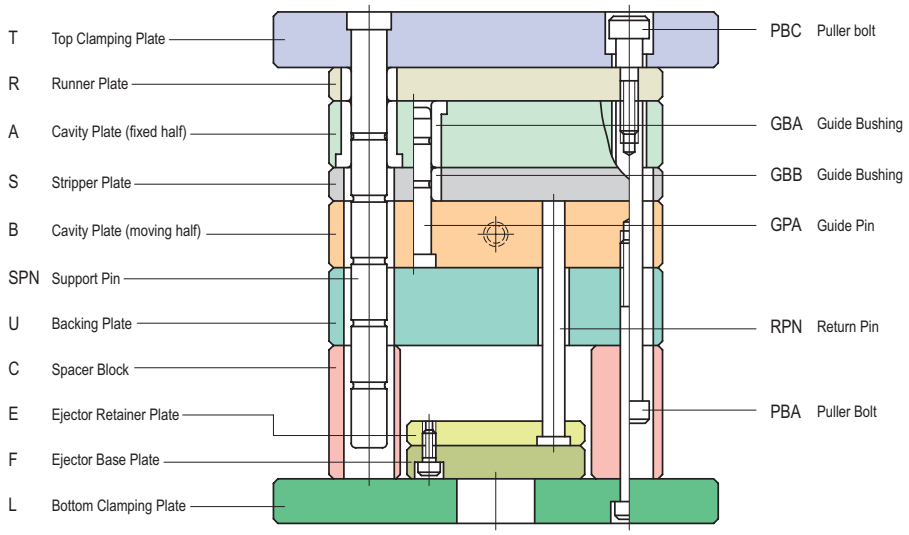
GF Type
Option #S

An option defined by eliminating the stripper plate from GF type



Mold Base Structure and Component Name H Series

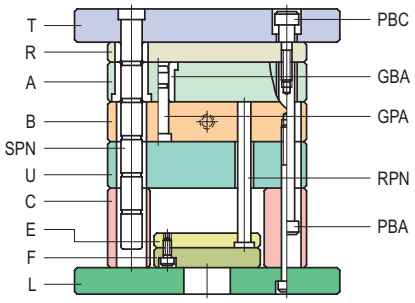




This diagram shows **HB** type as a representative example.

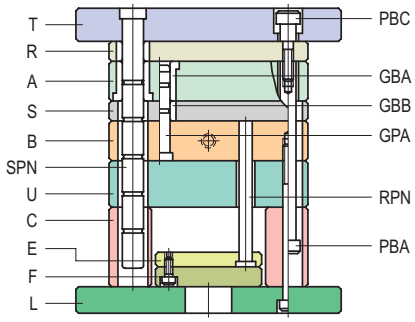
HA Type

Ejector pin ejection type



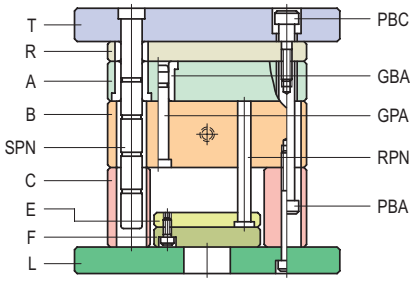
HB Type

Stripper plate ejection type



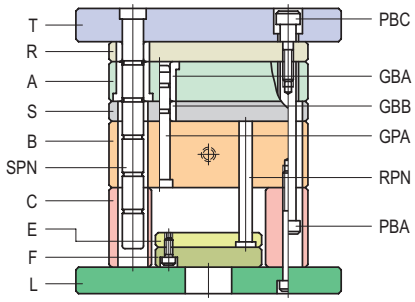
HC Type

Ejector pin ejection type without Backing plate



HD Type

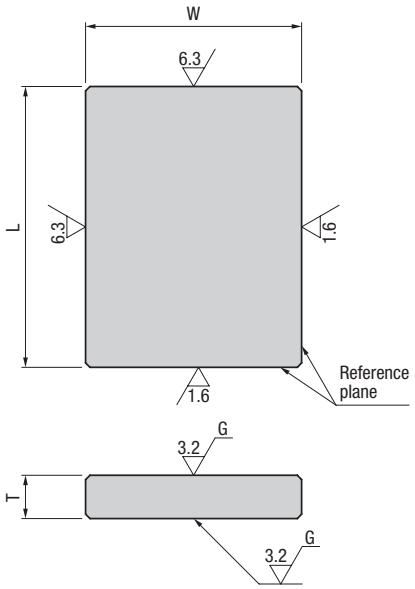
Stripper plate ejection type without Backing plate



Precision of Mold Base Plates

The precision specification of standard mold bases is defined as follows:

Mold plates, ejector plates and other plates



※ The surface roughness symbols shown in the above chart are arithmetic average roughness (Ra).

Material	F-S50C (thickness 25 or less) F-S55C (thickness 30 or more)
Limit deviations of T	

L dimension	Limit deviations of T
300 or less	+0.1 ～+0.2
Over 300 and 600 or less	+0.15～+0.25
Over 600 and 1150 or less	+0.2 ～+0.3

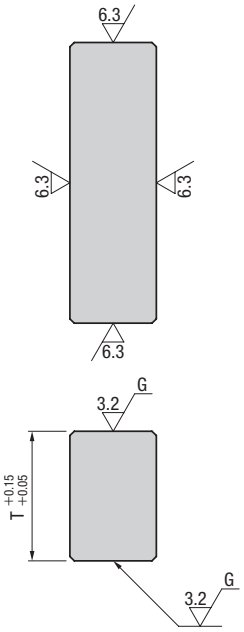
Uniformity of thickness (T)	0.008 per 100 mm
Flatness of both surfaces of T	

T dimension \ L dimension	300 or less	Over 300 and 1150 or less
Over 5 and 10 or less	0.020	0.040
Over 10 and 20 or less	0.015	0.020
Over 20 and 40 or less	0.010	0.015
Over 40 and 350 or less	0.008	0.010

※ Values per 100 mm

Squreness of reference plane	0.008 per 100 mm

Spacer blocks

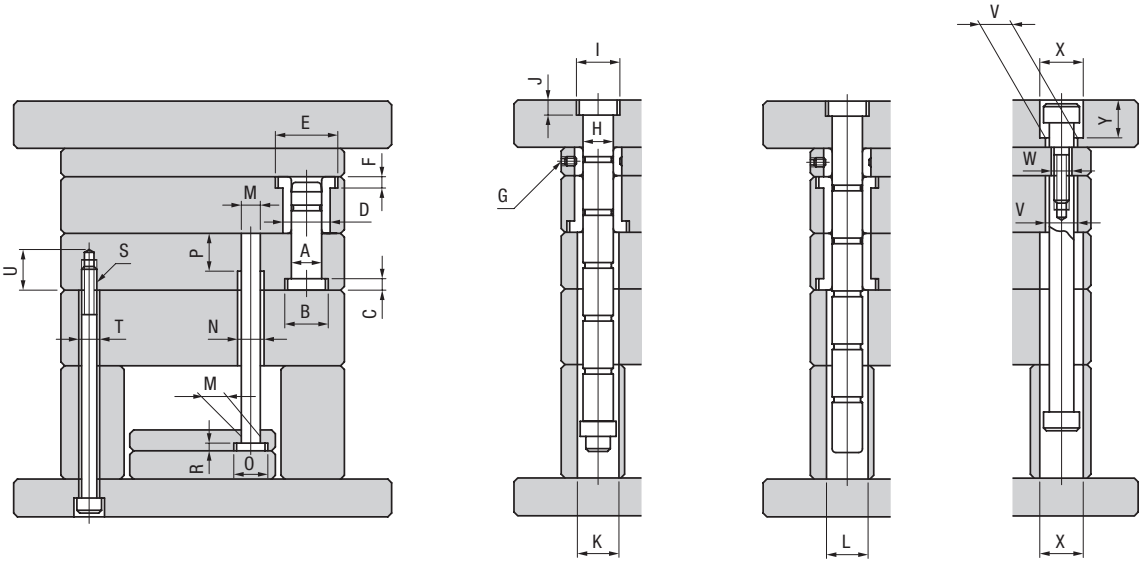


※ The surface roughness symbols shown in the above chart are arithmetic average roughness (Ra).

Material	F-SS400 or equivalent or higher
Uniformity of thickness (T)	0.008 per 100 mm
Variation of T in a pair of plates	0.02

Hole Dimensions of Parts Installed in Mold Bases

The hole dimension specifications of guide pins, support pins and other parts installed in standard mold bases are as follows:



A type of pin supplied with a support pin collar

A type of pin not supplied with a support pin collar

Hole dimensions of guide pins, guide bushings and support pins

Nominal dimension	Guide pin hole			Guide bushing hole				Support pin hole				
	A	B	C	D	E	F	G	H	I	J	K	L
12	12	18	5	18	23	5	M4	12	18	6	18	14
16	16	21	6	25	31	6	M5	16	21	8	22	18
20	20	26		30	36	8	M6	20	26	10	28	24
25	25	31	8	35	41		M8	25	31	12	33	29
30	30	36		42	48	10		30	36	14	40	34
35	35	41		48	55			35	41	16	45	39
40	40	46	10	55	62			40	46	18	50	45
50	50	57	12	70	77	12	M10	—	—	—	—	—
60	60	67	15	80	87	15		—	—	—	—	—
70	70	77		90	97			—	—	—	—	—

Hole dimensions of return pins

Nominal dimension	Return pin hole				
	M	N	O	P *2 *3	R
10	10	11	16	35	4
12	12	13	18	50	
15	15	16	21	60	
20	20	21	26	80	
25	25	26	31	100	
30	30	31	36	120	
35	35	36	41	130	

*2. The P dimensions in the above table are minimum values. The P dimensions can be larger than these values.

*3. When thickness ≦ P, P = thickness.

Hole dimensions of hexagon socket head cap screws

Nominal dimension	Hexagon socket head cap screw		
	S	T	U
M8	M8	9	21
M10	M10	11	24
M12	M12	14	28
M14	M14	16	31
M16	M16	18	34
M20	M20	22	46
M24	M24	26	56

Hole dimensions of puller bolts

Nominal dimension	Puller bolts			
	V	W	X	Y *1
20	21	13	31	25
25	26	17	36	29

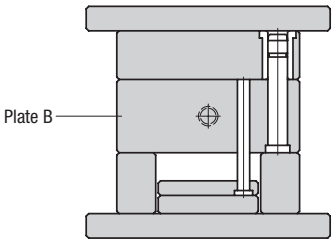
*1. These are dimensions of H series.

Threaded Holes for Eye Bolts on Mold bases

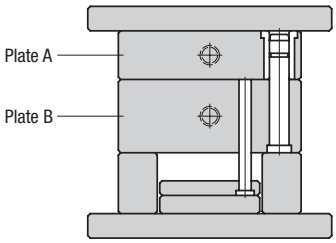
On the mold bases, threaded holes for eye bolts are provided for securing safety and convenience of persons transporting and handling them. The plates on which to create threaded holes are determined based on the size of the mold base as shown below. The thread size is determined based on the maximum weight of the mold base.

Adding threaded holes for eye bolts ➡ P.222

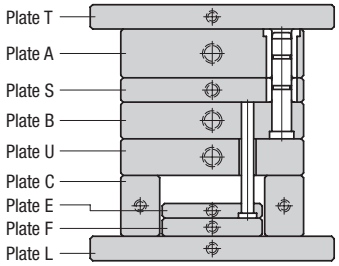
Plates on which to create threaded holes for eye bolts



Name of the plate on which to create threaded holes for eye bolts	Applicable mold base
Plate B	Nominal dimension 1515 to 3560

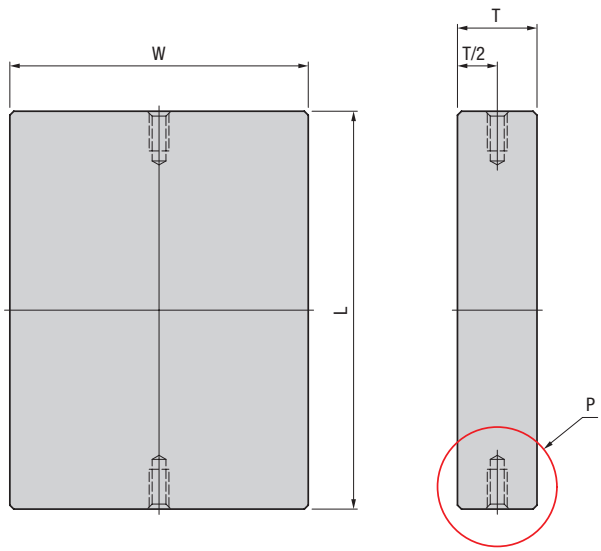


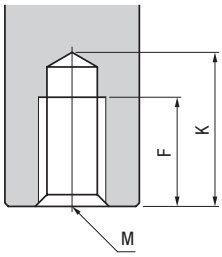
Name of the plate on which to create threaded holes for eye bolts	Applicable mold base
Plate A Plate B	Nominal dimension 4040 to 5070



Name of the plate on which to create threaded holes for eye bolts	Applicable mold base
All plates	Nominal dimension 5555 to 7080

Specification of threaded holes for eye bolts





Detailed view of P

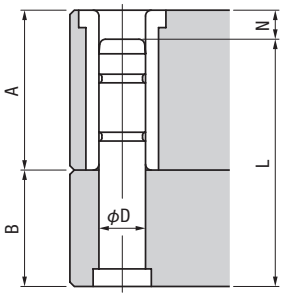
M	F	K
M12	24	33
M16	29	39
M20	33	46
M24	41	56
M30	49	67
M36	59	82
M42	70	95
M48	75	103

Length of Guide Pins for Mold Bases

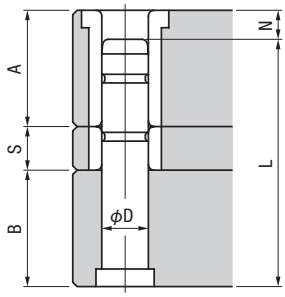
Length of guide pins

When setting the length of guide pins for a standard mold base, N dimension is determined by the thickness of the plate in which to install guide bushings, and the length of the guide pin is determined based on the N dimension. Depending on the thickness of plates, N dimension is provided as a range, so guide pins with a length within the range is installed in the mold base.

How to specify length of guide pins ➡ P.44



Mold base without stripper plate



Mold base with stripper plate

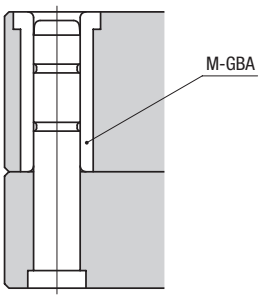
N dimension

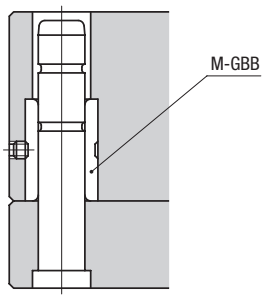
D	A										
	20 ～ 50	60	70	80	90	100	110	120	130	140	150
12	3	3 ～ 8									
16	3	3	3 ～ 8	3 ～ 8							
20	3	3	3	3 ～ 8	3 ～ 13	3 ～ 13					
25	3	3	3	3 ～ 8	3 ～ 13	3 ～ 13	3 ～ 13	3 ～ 18			
30	3	3	3	3 ～ 8	3 ～ 13	3 ～ 13	3 ～ 13	3 ～ 18	3 ～ 18		
35	3	3	3	3	3	3 ～ 13	3 ～ 13	3 ～ 18	3 ～ 18	3 ～ 18	3 ～ 23
40	3	3	3	3	3	3 ～ 13	3 ～ 13	3 ～ 18	3 ～ 18	3 ～ 18	3 ～ 23

D	A						
	50 ～ 130	150	160	180	200	220	250
50	3	3 ～ 23	3 ～ 23	3 ～ 33	3 ～ 43	3 ～ 53	3 ～ 63
60	3	3 ～ 23	3 ～ 23	3 ～ 33	3 ～ 43	3 ～ 53	3 ～ 63

How to differentiate the use of guide bushing M-GBA and M-GBB

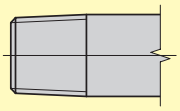
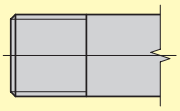
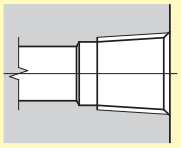
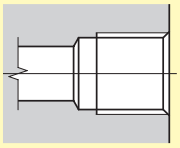
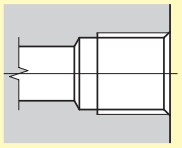
If the plate in which to install guide bushing is thin, use M-GBA and if it is thick, use M-GBB. For details on the classification of length of guide bushings and thickness of plates, see page 27.





Specification of Pipe Threads

Type of pipe thread (abstract of JIS B 0202, 0203：1999)

	Thread name	Taper pipe thread		Parallel pipe thread
External thread	Name of external thread	Taper external pipe thread		Parallel external pipe thread
External thread	Nominal code	R (former nominal code PT)		G (former nominal code PF)
External thread	Appearance of external thread			
Internal thread	Name of internal thread	Taper Internal pipe thread	Parallel internal pipe thread (Parallel internal thread that fits taper external pipe thread)	Parallel internal pipe thread (Parallel internal thread that fits parallel external pipe thread)
Internal thread	Nominal code	Rc (former nominal code: PT)	Rp (former nominal code: PS)	G (former nominal code: PF)
Internal thread	Appearance of internal thread			
Scope		Applicable to threads used mainly for pressure-tight joints on the threads for joining pipes, pipefittings, fluid machinery, etc.		Applicable to threads used mainly for mechanical joints for joining pipes, pipefittings, fluid machinery, etc.
Remarks		① In addition to the former PT, PS and PF pipe threads, Rc, Rp and G pipe threads, which are based on ISO Standard, are now prescribed in the JIS Standard. Rc, Rp and G are in the main body of the standard. PT, PS and PF are in the Annex, and are planned to be abolished in the future. ② For the 1/16 to 1 pipe threads that are mainly used for molds, "Rc and PT", "Rp and PS" and "G and PF" are equivalent pipe threads respectively. For 1/16, however, PT, PS, and PF pipe threads are not available		

Thread codes used additional processing specifications

In general, taper pipe threads are used for water and oil channels on molds. Although PT and PS codes are conventionally used for the nominal dimensions of pipe threads, we use codes defined based on JIS Rc and Rp for our additional processing specification. The relation of our thread codes for additional processing specifications, JIS standard nominal codes and conventional nominal size code are as follows:

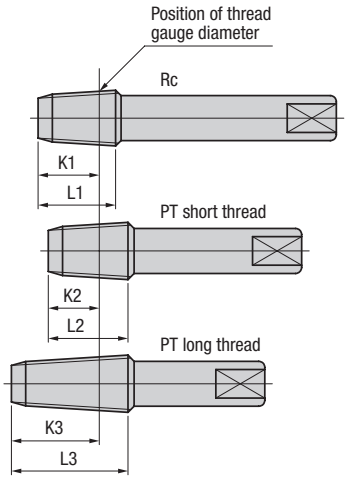
Type of pipe thread	Our thread codes for additional machining spec.	JIS standard nominal codes	Conventional nominal codes
Taper internal pipe thread	RC	Rc	PT
Parallel internal pipe thread (parallel internal thead for taper external pipe thread)	RP	Rp	PS

Definitions of technical terms used in taper pipe threads (JIS B 0203：1999)

Technical term	Definition
gauge diameter	Measure diameter of the thread, whether external or internal, at the gauge plane.
major cone	Imaginary cone which just touches the crests a taper external thread or the roots of a taper internal thread.
gauge plane	Plane perpendicular to the axis of the taper thread, at which the major cone has the gauge diameter. Remarks: For external threads the gauge plane is located at a distance equal to the nominal gauge length from the small end of the thread. For internal threads the gauge plane is located at the end face of the threaded part.
gauge length	The distance from the gauge planne of an external thread to the small end of the thread.
reference plane	Visible surface of each of the internally and externally threaded parts, which facilitates the reading of the gauge when the thread is inspected.
complete thread	The part of thread which is fully formed at both crest and root. Remarks: When there is a chamfer at the start of the thread not exceeding one pitch in length, this is included in the length of complete thread.
imcompleted thread	The part of the thread which is fully formed at the root, but truncated at the crest by its intersection with cylindrical surface of the product
washout thread; vanish thread	That part of the thread which is not fully formed at the root. Remarks: The washout thread is produced by the bevel at the start of the threading tool.
useful thread	The distance from the gauge plane of an external thread to the small end of the thread.
fitting allowance	Length of useful thread beyond the gauge plane of an external thread required to provide for assembly with an internal thread at the upper limit of the tolerance. Remarks: Internally threaded parts will have a sufficient length to accommodate the fitting allowance, except when they have a free run-out.
Wrenching allowance	Length of useful thread which is provided to accommodate the relative movement between the end of the externally threaded part and the internally threaded part required for wrenching beyond the position of hand-tight engagement.

Taps for taper internal pipe threads (abstruct of JIS B 4446：1998)

For taps used for machining internal pipe threads, following three types are currently commercially available. Since the taper pipe threads are tapered shape, it is important to manage the position of the gauge diameter to ensure the proper fitting of external and internal pipe threads. As the position of gauge diameter differs depending on the type of tap, be sure to check the tap to use when machining internal threads.



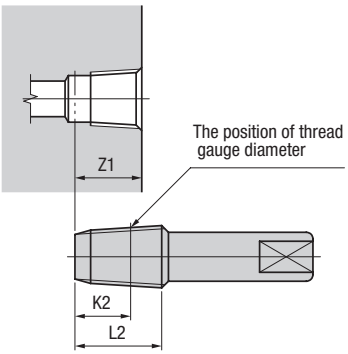
Nominal of thread	Rc			PT short thread				PT long thread			
	L1		K1	L2		K2		L3		K3	
	Gauge length	Limit deviations	Max. DIMM	Gauge length	Limit deviations	Gauge length	Limit deviations	Gauge length	Limit deviations	Gauge length	Limit deviations
1/16	14	+2 −1	10.1	—	—	—	—	—	—	—	—
1/8	15		10.1	16.5	±1	10.5	+0.5 −1.0	19	±1	13	±0.91
1/4	19		15.0	19.5		12.5		28	±1.5	21	±1.34
3/8	21		15.4	21		14		28		21	
1/2	26		20.5	27	±1.5	17	+0.5 −1.5	35		25	±1.81
3/4	28		21.8	29		19		35		25	
1	33		26.0	35		22		45	±2	32	±2.31

※ Rc denotes a tap that is prescribed in the main body of JIS B 4446：1998. For Rc1/16, the dimensions of commercially available taps may slightly differ depending on tool manufacturers.
※ PT short thread and PT long thread denote the taps that are prescribed in the annex of JIS B 4446：1998.
※ Shown on the left are schematic views of 1/4 taps.

Specification of internal pipe thread

The table below shows our standard for machining internal threads.
The "position of gauge diameter" and the "length of thread" of our nipples and plugs for coupler with a taper pipe thread vary depending on production companies. Also, the depth of screwing external thread can change depending on the thickness of applying seal agent and length of winding sealing materials.

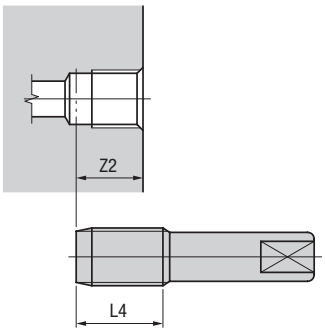
Taper internal pipe thread Nominal code Rc (PT)



Nominal of thread Rc (PT)	Z1 (Approx.)	L2	K2
1/16	12.5	16.5	10.5
1/8	12.5	16.5	10.5
1/4	15	19.5	12.5
3/8	17	21	14
1/2	20	27	17
3/4	22	29	19
1	25	35	22

※ We use taps that meet PT short thread prescribed in the annex of JIS B 4446: 1998. For 1/16 tap, we use taps that meet Rc specified in the main body of JIS B 4446 1998

Parallel internal pipe thread Nominal code Rp (PS)

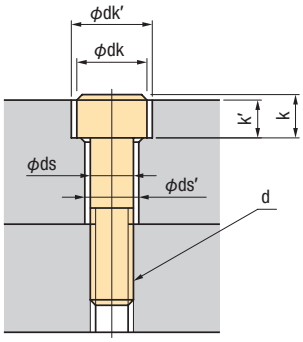


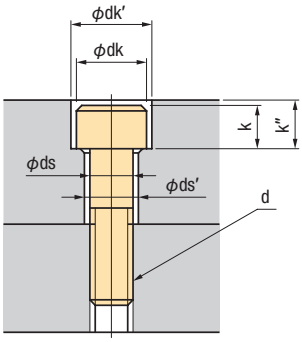
Nominal size Rp (PS)	Z2 (Approx.)	L4	
1/16	12.5	19	
1/8	12.5	19	
1/4	15	28	
3/8	17	28	
1/2	20	35	
3/4	22	35	
1	25	45	

※ We use taps that meet PS prescribed in the annex of JIS B 4446: 1998. For 1/16 tap, we use taps that meet Rp specified in the main body of JIS B 4446 1998

Hexagon Socket Head Cap Screws [Excerpt from JIS B 1176 (2000) Excerpt from JIS B 1176 (1974)]

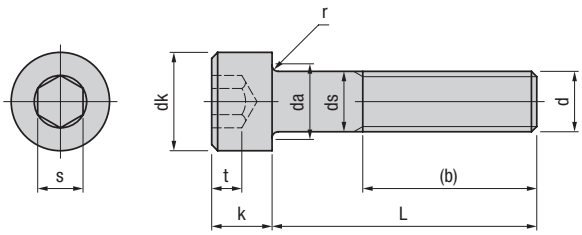
Dimension of couterbore and bolt holes for hexagon socket head cap screws (reference)





Nominal of thread (d)	M3	M4	M5	M6	M8	M10	M12	M14	M16	M20	M24	M30
ds	3	4	5	6	8	10	12	14	16	20	24	30
ds'	3.4	4.5	5.5	6.6	9	11	14	16	18	22	26	33
dk	5.5	7	8.5	10	13	16	18	21	24	30	36	45
dk'	6.5	8	9.5	11	14	17.5	20	23	26	32	39	48
k	3	4	5	6	8	10	12	14	16	20	24	30
k'	2.7	3.6	4.6	5.5	7.4	9.2	11	12.8	14.5	18.5	22.5	28
k"	3.3	4.4	5.4	6.5	8.6	10.8	13	15.2	17.5	21.5	25.5	32

Dimension of hexagon socket head cap screws

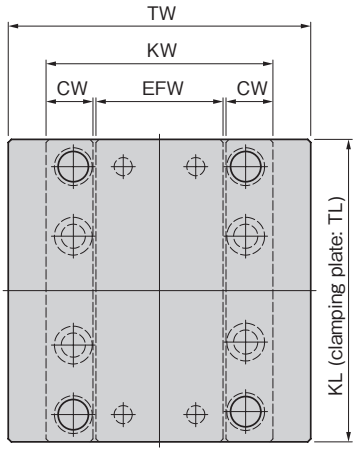


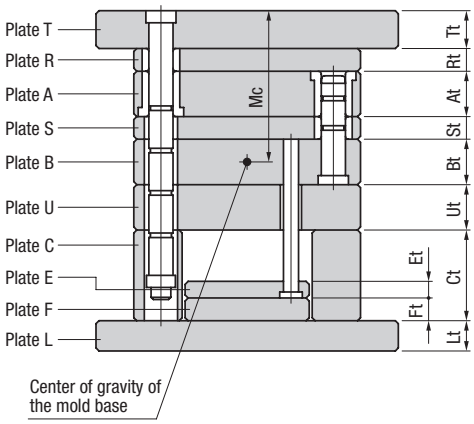
Nominal of thread (d)		M3	M4	M5	M6	M8	M10	M12	(M14)	M16	M20	M24	M30
Pitch of thread (P)		0.5	0.7	0.8	1	1.25	1.5	1.75	2	2	2.5	3	3.5
b	Reference	18	20	22	24	28	32	36	40	44	52	60	72
dk	Max. *1	5.50	7.00	8.50	10.00	13.00	16.00	18.00	21.00	24.00	30.00	36.00	45.00
	Max. *2	5.68	7.22	8.72	10.22	13.27	16.27	18.27	21.33	24.33	30.33	36.39	45.39
	Min.	5.32	6.78	8.28	9.78	12.73	15.73	17.73	20.67	23.67	29.67	35.61	44.61
da	Max.	3.6	4.7	5.7	6.8	9.2	11.2	13.7	15.7	17.7	22.4	26.4	33.4
ds	Max.	3.00	4.00	5.00	6.00	8.00	10.00	12.00	14.00	16.00	20.00	24.00	30.00
	Min.	2.86	3.82	4.82	5.82	7.78	9.78	11.73	13.73	15.73	19.67	23.67	29.67
k	Max.	3.00	4.00	5.00	6.00	8.00	10.00	12.00	14.00	16.00	20.00	24.00	30.00
	Min.	2.86	3.82	4.82	5.7	7.64	9.64	11.57	13.57	15.57	19.48	23.48	29.48
r	Min.	0.1	0.2	0.2	0.25	0.4	0.4	0.6	0.6	0.6	0.8	0.8	1
s	Nominal	2.5	3	4	5	6	8	10	12	14	17	19	22
	Max *3	2.56	3.071	4.084	5.084	6.095	8.115	10.115	12.142	14.142	17.23	19.275	22.275
	Max *4	2.58	3.080	4.095	5.140	6.140	8.175	10.175	12.212	14.212			
	Min.	2.52	3.020	4.020	5.020	6.020	8.025	10.025	12.032	14.032	17.05	19.065	22.065
t	Min.	1.3	2	2.5	3	4	5	6	7	8	10	12	15.5

※ The above table shows main dimensions excerpt from JIS B1176: 2000. For details, refer to the standard.
*1. This should be applied to the heads without no knurled pattern.
*2. This should be applied to the heads with no knurled pattern.
*3. This should be applied to strength class 12.9.
*4. This should be applied to other strength classes.

Calculation of Gravity Center of a Mold Base

Calculating the center of gravity of a mold base is not an easy task because various parts are installed on a mold base and different alternations are made to it. Shown below is a simple formula for calculating center of gravity of a mold base with plates assembled.





$$Mc = \frac{\text{Sum of the moment of each plate}}{\text{Weight of mold base}}$$

$$= \frac{(Tm+Rm+Am+Sm+Bm+Um+Cm+Em+Fm+Lm)}{(Tw+Rw+Aw+Sw+Bw+Uw+Cw+Ew+Fw+Lw)}$$

Mc: Center of gravity position from the top surface of Plate T

Tm ～ Lm: moment of each plate with the top surface of clamping plate as a reference (omit if there is no plate)

Tw ～ Lw: weight of each plate (omit if there is no plate)

※ Protrusion amount of the clamping plate is assumed to be even.

※ The width of the right and left side spacer blocks is assumed to be the same.

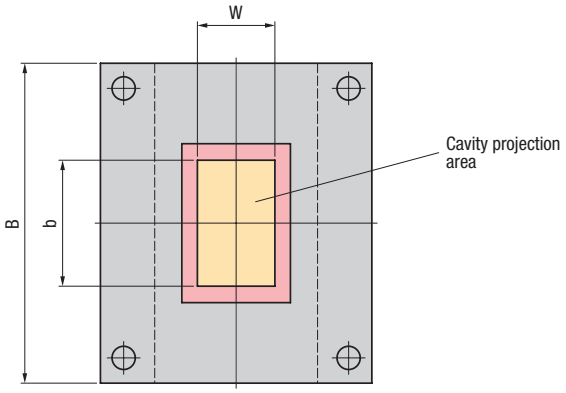
Plate code	Calculation of weight of each plate	Calculation of moment of each plate
Plate T	Tw＝TW×TL×Tt×specific weight	Tm＝Tw×Tt／2
Plate R	Rw＝KW×KL×Rt×specific weight	Rm＝Rw×（Tt＋Rt／2）
Plate A	Aw＝KW×KL×At×specific weight	Am＝Aw×（Tt＋Rt＋At／2）
Plate S	Sw＝KW×KL×St×specific weight	Sm＝Sw×（Tt＋Rt＋At＋St／2）
Plate B	Bw＝KW×KL×Bt×specific weight	Bm＝Bw×（Tt＋Rt＋At＋St＋Bt／2）
Plate U	Uw＝KW×KL×Ut×specific weight	Um＝Uw×（Tt＋Rt＋At＋St＋Bt＋Ut／2）
Plate C	Cw＝CW×KL×Ct×2×specific weight	Cm＝Cw×（Tt＋Rt＋At＋St＋Bt＋Ut＋Ct／2）
Plate E	Ew＝EFW×KL×Et×specific weight	Em＝Ew×｛Tt＋Rt＋At＋St＋Bt＋Ut＋Ct－Ft－（4*1）－Et／2｝
Plate F	Fw＝EFW×KL×Ft×specific weight	Fm＝Fw×（Tt＋Rt＋At＋St＋Bt＋Ut＋Ct－Ft／2）
Plate L	Lw＝TW×TL×Lt×specific weight	Lm＝Lw×（Tt＋Rt＋At＋St＋Bt＋Ut＋Ct＋Lt／2）

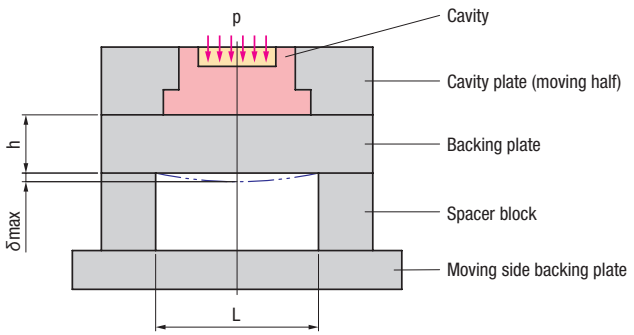
*1. Applied if the specification of the ejector plates is spacer type. No need if it is counterbore type.

Reference: Yuichi Fukusima, "Comprehensible Plastic Injection Molding Design" Nikkan Kogyo Shinbunsya

Calculation of the Deflection of Cavity Plate (Moving Half)

The injection pressure applied by the injection molding machine acts on the projection plane inside the cavity and causes a deflection of the cavity plate (moving half). If the deflection is large, it may result in a change in thickness or flash on the molded products or other problems. Therefore, it is necessary to check possible deflection by using a formula for cantilever. As shown in the formula below, the deflection increases in proportion to the cube of thickness of backing plate (h) and to the forth power of the spacing on the inside of the spacer block. Thus, it is more effective in decreasing the deflection to narrow the spacing on the inside of the spacer block. Increasing the thickness of the backing plate or width of the spacer block has a limit due to the restrictions on the height of the mold and effective space of the ejector plate. Reinforcement with support pillars, etc. is also another option that can be used to reduce deflection.





B : Width of cavity plate (mm)
L : Spacing (mm) on the inside of the spacer block
h : Thickness of backing plate (mm)
W : Length (mm) of the part receiving the cavity internal injection pressure P
b : Width (mm) of the part receiving the cavity internal injection pressure P
p : Cavity internal injection pressure (kgf/cm^2)
E : modules of longitudinal elasticity (Young's modules) of the material (kgf/cm^2)
δ_{max}: maximum deflection of the backing plate (mm)

[When assuming W=L for simplifying the calculation]

$$\delta_{max} = \frac{5 \cdot p \cdot b \cdot L^4}{32 \cdot E \cdot B \cdot h^3}$$

$$h = \sqrt[3]{\frac{5 \cdot p \cdot b \cdot L^4}{32 \cdot E \cdot B \cdot \delta_{max}}}$$

E values

Material	E (kgf/cm^2)
Soft steel	210×10^4
Pre-harden steel (SCM440 series)	203×10^4
Cast iron	$(75 \sim 105) \times 10^4$
Ultra duralumin ALQUEEN 300	73×10^4

Rough guides of cavity internal injection pressure P (ref. value)

Molding condition	p (kgf/cm^2)
Lower injection pressure	200 ~ 400
Higher injection pressure	400 ~ 600

(Note) In practice, it is desirable to measure the actual values using a pressure sensor ➡ (P 458)

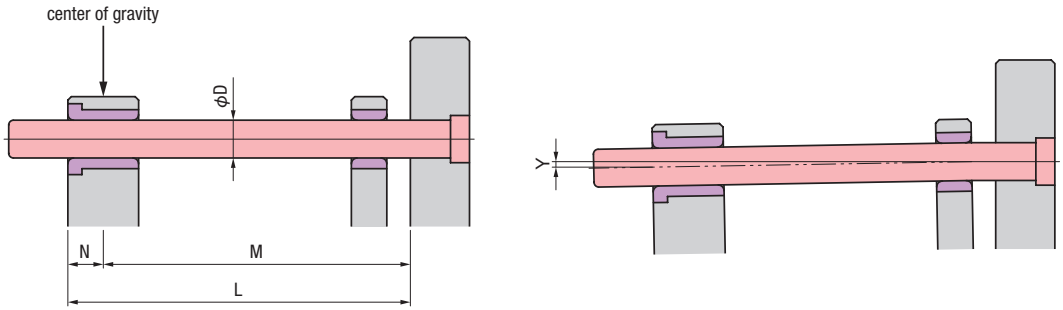
Rough guides of maximum allowable deflection that takes parting line flash into account (reference value)

Molding material, etc.	Maximum allowable deflection δ_{max} (mm)
Materials with high flow (PA, PP, etc.)	0.025 or less
Materials with regular flow	0.03 ~ 0.05
Molded product that allows flash	0.1 ~ 0.2

Reference: Michio Komatsu, "Plastic Injection Molding Design Manual" Nikkan Kogyo Shinbunsya

Calculation of the Deflection of Support Pin

In addition to the parting line for taking out molded products, three-plate mold has one more parting line for taking runner out. Therefore, three-plate mold makes a larger mold opening stroke to take out runner, and thus the support pin that guides and supports the opening and closing of cavity plate (fixed half) is subject to a bending moment that is a product of weight of cavity plate (fixed half) and distance to the fully open position resulting in a deflection. It is necessary to check possible deflection by using a formula for cantilever.



W : Load applied per support pin (kgf)
E : modules of longitudinal elasticity (Young's modules) 21,000kgf/mm^2
I : Cross sectional secondary moment $I = \pi (D-1)^4 / 64$
※ Oil groove is assumed here and (D−1) is used as diameter.

Deflection Y in L area

$$Y = \frac{W \cdot M^3}{3 \cdot E \cdot I}\left(1 + \frac{3 \cdot N}{2 \cdot M}\right)$$

As shown in the above, the deflection increases in proportion to the load applied to the support pin (W) and to the cube of mold opening distance (M). Therefore, it significantly changes depending on the mold base used and the mold opening distance required. If the deflection becomes larger than the clearance of the pin and bushing, they will slide with interference, making a squeak noise, which will cause binding, etc.

In reality, however, the clearance between the pin and bushing is only 0.03 mm, and keeping all the molds smaller than this value requires the use of pins with a larger diameter, and is thus difficult from the perspective of effective space and costs.

It would be better to use such a measure when necessary for quality reason, etc.

For allowable deflection, 0.3 to 0.4 mm or less values are used in many applications, but the values are generally determined on a case by case basis as they change according to the level of precision required for the molded products, appearance and mold. Calculating deflection is suggested to evaluate the precision of the molds that have been produced in the past to evaluate their level of precision, including potential of binding and other troubles in planning a new design, or establish and maintain an internal design standard.

Reference: Kazunobu Uchida, "Mold Technology" April, 1987, Nikkan Kogyo Shinbunsya

Mold Steel Brands Comparison Table

Plastic Mold Steel Brands Comparison Table

Classification	Hardness for use (HRC)	Applicable standards				Futaba standard product	Material manufacturer								
		JIS	AISI	DIN			Kobe Steel	Hitachi Metals	Daido Steel	Bohla Uddeholm	Aichi Steel	Nihon Kosyuha Steel	Nippon steel & sumitomo metal	Sanyo special steel	Nachi -Fujikoshi
				Name	Material No.										
As rolled steel	13	SC Series	1055 1050	CK55 C55	1.1203 1.0535	F-S55C F-S50C	S55C S50C								
Pre hardened steel	13						KTSM21 KTSM2A KTSM22				AUK1	KPM1 KPMAX	SD17 SD18T	PC55	
	28	SCM Series	4140	42CrMo4	1.7225		KTSM31		PDS3		AUK11		SD61		
	33	SCM (Improved)	P20	<Supeior weldability>		HPM7 PXA30		HPM7	PXA30			KPM30			
	33	SCM (Improved)	P20	35CrMo4	1.2330		KTSM3M			PLAMAX M238 IMPAX HH (35～40HRC)			SD70 SD100		
	40	SCM (Improved)	P20Ni Series			HPM-MAGIC		HPM-MAGIC		NIMAX					
		pre-cipitation hardening	P21	<Free-machining>		HPM1 NAK55		HPM1	NAK55			KAP65		PCM40	
				<Mirror finishing property>		NAK80 HPM-PRO		HPM-PRO	NAK80			KAP88		PCM40S	
			P21	<Rust - prevention property>		CENA1		CENA1							
		SKD61 (Improved)	(H13)	(X40CrMoV51)	(1.2344)	FDAC DH2F		FDAC	DH2F			KAP90F			
Quenched and tempered steel	50	SKD61 Series	H13	X40CrMoV51	1.2344	F-SKD61		DAC	DHA DHA1	ORVAR-2M W302	SKD61	KDA		QD61	
	56～62	SKD11	(D2)	(X155CrVMo121)	(1.2379)	F-SKD11		SLD	DC11		SKD11	KD11		QC11	CDS11
		SKD11 (Improved)				HPM31 PD613		HPM31	PD613 DC53	CALDIE	AUD11	KD21		QCM8	
		SKD12	A2			RIGOR			DC12	RIGOR		KD12			
Stainless steel (Pre hardened)	33	SUS Series 420J2	420	(X38Cr13)	(1.4031)	HPM38 STAVAX		HPM38	S-STAR	STAVAX M303		420M			PROVA-400
		SUS Series (free-machining)						HPM77	G-STAR	RoyAlloy					
	35	SUS Series 630	S17400					PSL	NAK101			U630		QSH6	
	40	SUS Series								EDRO400 M303-HH					
Stainless steel	52	SUS Series 420J2	420	(X38Cr13)	(1.4031)	HPM38 STAVAX		HPM38 HPM38S	S-STAR D-STAR	STAVAX M333					PROVA-400
	57	SUS Series 440C	440C	X105CrMo17	1.4125			SUS440C	SUS440C	M340 ELMAX (Power metall)				QPD5 SPC5 (Power metall)	440C PROVA-500 (Power metall)
Age hardened steel	50 or more	Maraging steel						YAG	MAS1C			KMS18-20			EXEO-M21
	40	Non-magunetic steel						HPM75				NMS1			
Copper Alloy steel								(HIT71 HIT72 HIT75)		MOLDMAX HH/LH/XL/V					

Reference: Special Steel Vol.56 No.6 2007

Stamping Die Steel Brands Comparison Table

Classification	Hardness for use (HRC)	Applicable standards: equivalent JIS	equivalent AISI	DIN Name	DIN Material No.	Futaba standard product	Material manufacturer: Hitachi Metals	Daido Steel	Bohla Uddeholm	Nihon Kosyuha Steel	Sanyo special steel	Aichi Steel	Nachi -Fujikoshi
Carbon tool steel	53 ～ 61	SK105	W1-10	C105W1	1.1645			YK3			QK3	SK3	
Alloy tool steel	56 ～ 62	SKS93	(W5)			F-SK3	YCS3	YK30		K3M	QK3M	SK301	
		SKS3	(O1)	100MnCrW4	1.2510	F-SKS3	SGT	GOA		KS3	QKS3	SKS3	
		SKD1	D3	X210Cr12	1.2080		CRD	DC1		KD1	QC1	SKD1	
		SKD11	(D2)	(X155CrVMo121)	(1.2379)	F-SKD11	SLD	DC11	K110	KD11	QC11	SKD11	CDS11
		SKD 11 (Improved)	High hardness	For 8% cr high temp. tempering			SLD8	DC53	K340	KD21	QCM7 QCM8	AUD15 AUD11	MDS9
				Free machining & low quenching strain & coated long life		SLD-MAGIC	SLD-MAGIC						
			Free-machining							KD11S			
				Matrix Series	Middle Cr SKD	ARK1	ARK1						
								DCMX	CALDIE				
			Others							NOGA		SXACE AUD11X	
		Powder dies steel							VANADIS4E				
		Nitriding power steel							VANCRON40				
		SKD12	A2	X100CrMoV51	1.2363	RIGOR		DC12	RIGOR	KD12			
		Flame hardening steel					HMD5	GO5		FH5 KRCX	QF3	SX105V SX4	
		Low temperature air-cooled quenching				ACD37	ACD37	GO4		KSM			
		High impact steel					YSM	GS5		KTV5	QF1	AKS4	
Pre hardened steel	33	SCM (Improved)	P20	<Supeior weldability>		HPM7 PXA30	HPM7	PXA30		KPM30			
	37	SCM (Improved)	P20	35CrMo4	1.2330				IMPAX HH (35 ～ 40HRC)				
	40	SCM (Improved)	P20	<Free-machining>				GO40F					
		Precipitation hardening	P21	<Free-machining>		HPM1 NAK55	HPM1	NAK55		KAP65	PCM40		
				<Mirror finishing property>		NAK80 HPM-PRO	HPM-PRO	NAK80		KAP88	PCM40S		
			P21	<Rust - prevention property>		CENA1	CENA1						
High-speed tool steel	55 ～ 68	SKH51	M2	S6-5-2	1.3343		YXM1	MH51	S600	H51	QH51		SKH9
		SKH55 Series	M35	S6-2-5	1.3243		YXM4	MH55	S705	HM35			HM35 HS53M
		SKH57 Series		S10-4-3-10	1.3207		XVC5	MH8		MV10			HS93R DURO-SP
		Matrix Series High-speed					YXR3 YXR33 YXR7	DRM1 DRM2 DRM3	W360	KMX1 KMX2 KMX3	QHZ		DURO-F1, F3, F7 DURO-V2, V5
Powder metal high-speed tool steel	58 ～ 70	SKH40			1.3244		HAP40	DEX40	VANADIS30				FAX38
			M3:2			ASP23	HAP10	DEX20	VANADIS23		ASP23		FAX31
							HAP50 HAP72	DEX60	VANADIS60 Super Clean		ASP30 ASP60 SPMR8		FAX55 FAXG2
		Matrix Series powder metal high-speed					HAP5R	DEX-M1 DEX-M3					

Reference: Special Steel Vol.56 No.6 2007

Material Property Data List

The table below shows main material properties of the plates shown in the RED BOOK.
For detailed information on each property, see the RED BOOK (RED BOOK is a name of our plate general catalog).

Property values shown in International system of unit (SI unit)

Classification		Material	Hardness for use		Tensile property		Physical property	
			HRC	HB	0.2% proof stress N/mm²	Tensile strength N/mm²	Thermal expansion coefficient ×10⁻⁶/°C 〔20 ～ 200°C〕	Thermal conductivity coefficient W/(m・°C) 〔20°C〕
Carbon tool steel		F-SS400	—	116 ～ 150	275 (Yield point)	450	13.1 〔0 ～ 300°C〕	58.6 〔0°C〕
Carbon tool steel		F-S55C	6 ～ 22	170 ～ 240	366	749	12.6 〔25 ～ 200°C〕	46.0 〔50°C〕
Pre hardened steel		HPM7	29 ～ 33	279 ～ 311	853	973	12.2	34.3
Pre hardened steel		PXA30	30 ～ 33	286 ～ 311	845	980	12.7 〔30 ～ 200°C〕	34.7
Pre hardened steel		HPM-MAGIC	37 ～ 41	344 ～ 381	1,020	1,200	12.3 〔30 ～ 200°C〕	31.4
Pre hardened steel		HPM1	37 ～ 41	344 ～ 381	1,010	1,216	11.8	32.7
Pre hardened steel		NAK55	37 ～ 43	344 ～ 400	981	1,255	12.5	38.9
Pre hardened steel		NAK80	37 ～ 43	344 ～ 400	981	1,255		
Pre hardened steel		HPM-PRO	37 ～ 41	344 ～ 381	1,020	1,200	13.0 〔30 ～ 200℃〕	28.3
Pre hardened steel		CENA1	37 ～ 42	344 ～ 390	1,150	1,225	11.4	28.1
Pre hardened steel		DH2F	38 ～ 42	353 ～ 390	1,100	1,330	10.8	25.5
Pre hardened steel		FDAC	38 ～ 42	353 ～ 390	1,060	1,240	11.7 〔20 ～ 100°C〕	30.5
Quenched and tempered steel	Stainless	HPM38	50 ～ 55	—	1,618	1,912	11.9	25.1
Quenched and tempered steel	Stainless	HPM38	29 ～ 33HRC (pre-hardened state)		〈52HRC〉		〈53HRC〉	
Quenched and tempered steel	Stainless	STAVAX ESR	50 ～ 55	—	1,610	2,050	11.0	16.0
Quenched and tempered steel	Stainless	STAVAX ESR	27 ～ 35HRC (pre-hardened state)		〈55HRC〉		〈50HRC〉	
Quenched and tempered steel	※1	F-SKD61	53 or less	—	1,070	1,250	12.5	30.5
Quenched and tempered steel	※1	F-SKD61			〈40HRC〉		〈45HRC〉	
Quenched and tempered steel	※2	HPM31	55 ～ 60	—	1,490	2,120	12.3	28.5
Quenched and tempered steel	※2	HPM31			〈61HRC〉		〈60HRC〉	
Quenched and tempered steel	※2	PD613	56 ～ 61	—	1,815	2,280	11.7 〔30 ～ 200°C〕	28.5 〈60HRC〉
Quenched and tempered steel	※2	PD613			〈59HRC〉			
Quenched and tempered steel	※2	RIGOR	54 ～ 59	—	—	—	11.6	26.0
Quenched and tempered steel	※2	RIGOR					〈62HRC〉	
Quenched and tempered steel	Cold work tool seel	F-SK3	58 ～ 63	—	—	1,670	11.3	45.2
Quenched and tempered steel	Cold work tool seel	F-SK3			〈60HRC〉		〈197HB: annealed state〉	
Quenched and tempered steel	Cold work tool seel	F-SKS3	60 ～ 62	—	—	1,370	12.4	34.7
Quenched and tempered steel	Cold work tool seel	F-SKS3			〈60HRC〉		〈62HRC〉	
Quenched and tempered steel	Cold work tool seel	F-SKD11	58 ～ 63	—	1,570	1,810	12.5	29.3
Quenched and tempered steel	Cold work tool seel	F-SKD11			〈60HRC〉		〈60HRC〉	
Quenched and tempered steel	Cold work tool seel	SLD-MAGIC	60 ～ 62	—	1,780	1,890	12.3	28.9
Quenched and tempered steel	Cold work tool seel	SLD-MAGIC			〈60HRC〉			
Quenched and tempered steel	Cold work tool seel	ARK1	58 ～ 62	—	—	1,690	12.4	29.5
Quenched and tempered steel	Cold work tool seel	ARK1			〈60HRC〉		〈59HRC〉	
Quenched and tempered steel	Cold work tool seel	ACD37	58 ～ 62	—	—	—	13.1	46.0 〔100°C〕
Quenched and tempered steel	Cold work tool seel	ACD37					〈60HRC〉	
Quenched and tempered steel	Cold work tool seel	ASP23	56 ～ 65	—	—	—	11.7	23.9
Quenched and tempered steel	Cold work tool seel	ASP23					〈62HRC〉	
Alluminium alloy		AAG	—	59	100	200	23.8	138
Alluminium alloy		AAS	—	150	420	520	23.6	130

※1. Hot work tool steel ※2. Die steel for plastic mold

Property values shown in traditional unit systems (CGS and MKS units)

Classification		Material	Hardness for use		Tensile property		Physical property	
			HRC	HB	0.2% proof stress kgf/mm²	Tensile strength kgf/mm²	Thermal expansion coefficient ×10⁻⁶/°C 〔20 ～ 200°C〕	Thermal conductivity coefficient cal/（cm·s·°C） 〔20°C〕
Carbon tool steel		F-SS400	—	116 ～ 150	28 (Yield point)	46	13.1 〔0 ～ 300°C〕	0.14 〔0°C〕
Carbon tool steel		F-S55C	6 ～ 22	170 ～ 240	37.3	76.4	12.6 〔25 ～ 200°C〕	0.110 〔50°C〕
Pre hardened steel		HPM7	29 ～ 33	279 ～ 311	87.0	99.2	12.2	0.082
Pre hardened steel		PXA30	30 ～ 33	286 ～ 311	86	100	12.7 〔30 ～ 200°C〕	0.083
Pre hardened steel		HPM-MAGIC	37 ～ 41	344 ～ 381	104	122	12.3 〔30 ～ 200°C〕	0.075
Pre hardened steel		HPM1	37 ～ 41	344 ～ 381	103	124	11.8	0.078
Pre hardened steel		NAK55	37 ～ 43	344 ～ 400	100	128	12.5	0.093
Pre hardened steel		NAK80	37 ～ 43	344 ～ 400	100	128		
Pre hardened steel		HPM-PRO	37 ～ 41	344 ～ 381	104	122	13.0 〔30 ～ 200℃〕	0.068
Pre hardened steel		CENA1	37 ～ 42	344 ～ 390	117	125	11.4	0.067
Pre hardened steel		DH2F	38 ～ 42	353 ～ 390	112	136	10.8	0.061
Pre hardened steel		FDAC	38 ～ 42	353 ～ 390	108	126	11.7 〔20 ～ 100°C〕	0.073
Quenched and tempered steel	Stainless	HPM38	50 ～ 55	—	165	195	11.9	0.060
Quenched and tempered steel	Stainless	HPM38	29 ～ 33HRC（pre-hardened state）		〈52HRC〉		〈53HRC〉	
Quenched and tempered steel	Stainless	STAVAX ESR	50 ～ 55	—	164	209	11.0	0.038
Quenched and tempered steel	Stainless	STAVAX ESR	27 ～ 35HRC（pre-hardened stae）		〈55HRC〉		〈50HRC〉	
Quenched and tempered steel	※1	F-SKD61	53 or less	—	109	127	12.5	0.073
Quenched and tempered steel	※1	F-SKD61			〈40HRC〉		〈45HRC〉	
Quenched and tempered steel	※2	HPM31	55 ～ 60	—	152	216	12.3	0.068
Quenched and tempered steel	※2	HPM31			〈61HRC〉		〈60HRC〉	
Quenched and tempered steel	※2	PD613	56 ～ 61	—	185	233	11.7 〔30 ～ 200°C〕	0.068 〈60HRC〉
Quenched and tempered steel	※2	PD613			〈59HRC〉			
Quenched and tempered steel	※2	RIGOR	54 ～ 59	—	—	—	11.6	0.062
Quenched and tempered steel	※2	RIGOR					〈62HRC〉	
Quenched and tempered steel	Cold work tool seel	F-SK3	58 ～ 63	—	—	170	11.3	0.108
Quenched and tempered steel	Cold work tool seel	F-SK3			〈60HRC〉		〈197HB: annealed state〉	
Quenched and tempered steel	Cold work tool seel	F-SKS3	60 ～ 62	—	—	140	12.4	0.083
Quenched and tempered steel	Cold work tool seel	F-SKS3			〈60HRC〉		〈62HRC〉	
Quenched and tempered steel	Cold work tool seel	F-SKD11	58 ～ 63	—	160	185	12.5	0.070
Quenched and tempered steel	Cold work tool seel	F-SKD11			〈60HRC〉		〈60HRC〉	
Quenched and tempered steel	Cold work tool seel	SLD-MAGIC	60 ～ 62	—	182	193	12.3	0.069
Quenched and tempered steel	Cold work tool seel	SLD-MAGIC			〈60HRC〉			
Quenched and tempered steel	Cold work tool seel	ARK1	58 ～ 62	—	—	172	12.4	0.070
Quenched and tempered steel	Cold work tool seel	ARK1			〈60HRC〉		〈59HRC〉	
Quenched and tempered steel	Cold work tool seel	ACD37	58 ～ 62	—	—	—	13.1	0.11 〔100°C〕
Quenched and tempered steel	Cold work tool seel	ACD37					〈60HRC〉	
Quenched and tempered steel	Cold work tool seel	ASP23	56 ～ 65	—	—	—	11.7	0.057
Quenched and tempered steel	Cold work tool seel	ASP23					〈62HRC〉	
Alluminium alloy		AAG	—	59	10	20	23.8	0.33
Alluminium alloy		AAS	—	150	43	53	23.6	0.31

※ 1. Hot work tool steel　※ 2. Die steel for plastic mold

Limit Deviations for Fits Used Frequently (Holes)

Limit deviations for frequently used fits of holes

Classification of basic size (mm)		Tolerance class of hole																
Over	Or less	B10	C9	C10	D8	D9	D10	E7	E8	E9	F6	F7	F8	G6	G7	H6	H7	H8
—	3	+180 +140	+85 +60	+100 +60	+34 +20	+45 +20	+60 +20	+24 +14	+28 +14	+39 +14	+12 +6	+16 +6	+20 +6	+8 +2	+12 +2	+6 0	+10 0	+14 0
3	6	+188 +140	+100 +70	+118 +70	+48 +30	+60 +30	+78 +30	+32 +20	+38 +20	+50 +20	+18 +10	+22 +10	+28 +10	+12 +4	+16 +4	+8 0	+12 0	+18 0
6	10	+208 +150	+116 +80	+138 +80	+62 +40	+76 +40	+98 +40	+40 +25	+47 +25	+61 +25	+22 +13	+28 +13	+35 +13	+14 +5	+20 +5	+9 0	+15 0	+22 0
10	14	+220 +150	+138 +95	+165 +95	+77 +50	+93 +50	+120 +50	+50 +32	+59 +32	+75 +32	+27 +16	+34 +16	+43 +16	+17 +6	+24 +6	+11 0	+18 0	+27 0
14	18																	
18	24	+244 +160	+162 +110	+194 +110	+98 +65	+117 +65	+149 +65	+61 +40	+73 +40	+92 +40	+33 +20	+41 +20	+53 +20	+20 +7	+28 +7	+13 0	+21 0	+33 0
24	30																	
30	40	+270 +170	+182 +120	+220 +120	+119 +80	+142 +80	+180 +80	+75 +50	+89 +50	+112 +50	+41 +25	+50 +25	+64 +25	+25 +9	+34 +9	+16 0	+25 0	+39 0
40	50	+280 +180	+192 +130	+230 +130														
50	65	+310 +190	+214 +140	+260 +140	+146 +100	+174 +100	+220 +100	+90 +60	+106 +60	+134 +60	+49 +30	+60 +30	+76 +30	+29 +10	+40 +10	+19 0	+30 0	+46 0
65	80	+320 +200	+224 +150	+270 +150														
80	100	+360 +220	+257 +170	+310 +170	+174 +120	+207 +120	+260 +120	+107 +72	+126 +72	+159 +72	+58 +36	+71 +36	+90 +36	+34 +12	+47 +12	+22 0	+35 0	+54 0
100	120	+380 +240	+267 +180	+320 +180														
120	140	+420 +260	+300 +200	+360 +200	+208 +145	+245 +145	+305 +145	+125 +85	+148 +85	+185 +85	+68 +43	+83 +43	+106 +43	+39 +14	+54 +14	+25 0	+40 0	+63 0
140	160	+440 +280	+310 +210	+370 +210														
160	180	+470 +310	+330 +230	+390 +230														
180	200	+525 +340	+355 +240	+425 +240	+242 +170	+285 +170	+355 +170	+146 +100	+172 +100	+215 +100	+79 +50	+96 +50	+122 +50	+44 +15	+61 +15	+29 0	+46 0	+72 0
200	225	+565 +380	+375 +260	+445 +260														
225	250	+605 +420	+395 +280	+465 +280														
250	280	+690 +480	+430 +300	+510 +300	+271 +190	+320 +190	+400 +190	+162 +110	+191 +110	+240 +110	+88 +56	+108 +56	+137 +56	+49 +17	+69 +17	+32 0	+52 0	+81 0
280	315	+750 +540	+460 +330	+540 +330														
315	355	+830 +600	+500 +360	+590 +360	+299 +210	+350 +210	+440 +210	+182 +125	+214 +125	+265 +125	+98 +62	+119 +62	+151 +62	+54 +18	+75 +18	+36 0	+57 0	+89 0
355	400	+910 +680	+540 +400	+630 +400														
400	450	+1010 +760	+595 +440	+690 +440	+327 +230	+385 +230	+480 +230	+198 +135	+232 +135	+290 +135	+108 +68	+131 +68	+165 +68	+60 +20	+83 +20	+40 0	+63 0	+97 0
450	500	+1090 +840	+635 +480	+730 +480														

Remarks: In each row of the above table, upper values represent upper deviations and lower values represent lower deviations.

[Excerpt from JIS B 0401-2 (1998)]

Unit: μm

Range of basic size (mm)		Tolerance class of hole																
Over	Or less	H9	H10	JS6	JS7	K6	K7	M6	M7	N6	N7	P6	P7	R7	S7	T7	U7	X7
—	3	+25 0	+40 0	±3	±5	0 −6	0 −10	−2 −8	−2 −12	−4 −10	−4 −14	−6 −12	−6 −16	−10 −20	−14 −24	—	−18 −28	−20 −30
3	6	+30 0	+48 0	±4	±6	+2 −6	+3 −9	−1 −9	0 −12	−5 −13	−4 −16	−9 −17	−8 −20	−11 −23	−15 −27	—	−19 −31	−24 −36
6	10	+36 0	+58 0	±4.5	±7.5	+2 −7	+5 −10	−3 −12	0 −15	−7 −16	−4 −19	−12 −21	−9 −24	−13 −28	−17 −32	—	−22 −37	−28 −43
10	14	+43 0	+70 0	±5.5	±9	+2 −9	+6 −12	−4 −15	0 −18	−9 −20	−5 −23	−15 −26	−11 −29	−16 −34	−21 −39	—	−26 −44	−33 −51
14	18																	−38 −56
18	24	+52 0	+84 0	±6.5	±10.5	+2 −11	+6 −15	−4 −17	0 −21	−11 −24	−7 −28	−18 −31	−14 −35	−20 −41	−27 −48	—	−33 −54	−46 −67
24	30															−33 −54	−40 −61	−56 −77
30	40	+62 0	+100 0	±8	±12.5	+3 −13	+7 −18	−4 −20	0 −25	−12 −28	−8 −33	−21 −37	−17 −42	−25 −50	−34 −59	−39 −64	−51 −76	−71 −96
40	50															−45 −70	−61 −86	−88 −113
50	65	+74 0	+120 0	±9.5	±15	+4 −15	+9 −21	−5 −24	0 −30	−14 −33	−9 −39	−26 −45	−21 −51	−30 −60	−42 −72	−55 −85	−76 −106	−111 −141
65	80													−32 −62	−48 −78	−64 −94	−91 −121	−135 −165
80	100	+87 0	+140 0	±11	±17.5	+4 −18	+10 −25	−6 −28	0 −35	−16 −38	−10 −45	−30 −52	−24 −59	−38 −73	−58 −93	−78 −113	−111 −146	−165 −200
100	120													−41 −76	−66 −101	−91 −126	−131 −166	−197 −232
120	140	+100 0	+160 0	±12.5	±20	+4 −21	+12 −28	−8 −33	0 −40	−20 −45	−12 −52	−36 −61	−28 −68	−48 −88	−77 −117	−107 −147	−155 −195	−233 −273
140	160													−50 −90	−85 −125	−119 −159	−175 −215	−265 −305
160	180													−53 −93	−93 −133	−131 −171	−195 −235	−295 −335
180	200	+115 0	+185 0	±14.5	±23	+5 −24	+13 −33	−8 −37	0 −46	−22 −51	−14 −60	−41 −70	−33 −79	−60 −106	−105 −151	−149 −195	−219 −265	−333 −379
200	225													−63 −109	−113 −159	−163 −209	−241 −287	−368 −414
225	250													−67 −113	−123 −169	−179 −225	−267 −313	−408 −454
250	280	+130 0	+210 0	±16	±26	+5 −27	+16 −36	−9 −41	0 −52	−25 −57	−14 −66	−47 −79	−36 −88	−74 −126	−138 −190	−198 −250	−295 −347	−455 −507
280	315													−78 −130	−150 −202	−220 −272	−330 −382	−505 −557
315	355	+140 0	+230 0	±18	±28.5	+7 −29	+17 −40	−10 −46	0 −57	−26 −62	−16 −73	−51 −87	−41 −98	−87 −144	−169 −226	−247 −304	−369 −426	−569 −626
355	400													−93 −150	−187 −244	−273 −330	−414 −471	−639 −696
400	450	+155 0	+250 0	±20	±31.5	+8 −32	+18 −45	−10 −50	0 −63	−27 −67	−17 −80	−55 −95	−45 −108	−103 −166	−209 −272	−307 −370	−467 −530	−717 −780
450	500													−109 −172	−229 −292	−337 −400	−517 −580	−797 −860

Limit Deviations for Fits Used Frequently (Shaft)

Limit deviations for frequently used fits of shafts

Range of basic size (mm)		Tolerance class of shaft														
Over	Or less	b9	c9	d8	d9	e7	e8	e9	f6	f7	f8	g5	g6	h5	h6	h7
—	3	−140 −165	−60 −85	−20 −34	−20 −45	−14 −24	−14 −28	−14 −39	−6 −12	−6 −16	−6 −20	−2 −6	−2 −8	0 −4	0 −6	0 −10
3	6	−140 −170	−70 −100	−30 −48	−30 −60	−20 −32	−20 −38	−20 −50	−10 −18	−10 −22	−10 −28	−4 −9	−4 −12	0 −5	0 −8	0 −12
6	10	−150 −186	−80 −116	−40 −62	−40 −76	−25 −40	−25 −47	−25 −61	−13 −22	−13 −28	−13 −35	−5 −11	−5 −14	0 −6	0 −9	0 −15
10	14	−150 −193	−95 −138	−50 −77	−50 −93	−32 −50	−32 −59	−32 −75	−16 −27	−16 −34	−16 −43	−6 −14	−6 −17	0 −8	0 −11	0 −18
14	18															
18	24	−160 −212	−110 −162	−65 −98	−65 −117	−40 −61	−40 −73	−40 −92	−20 −33	−20 −41	−20 −53	−7 −16	−7 −20	0 −9	0 −13	0 −21
24	30															
30	40	−170 −232	−120 −182	−80 −119	−80 −142	−50 −75	−50 −89	−50 −112	−25 −41	−25 −50	−25 −64	−9 −20	−9 −25	0 −11	0 −16	0 −25
40	50	−180 −242	−130 −192													
50	65	−190 −264	−140 −214	−100 −146	−100 −174	−60 −90	−60 −106	−60 −134	−30 −49	−30 −60	−30 −76	−10 −23	−10 −29	0 −13	0 −19	0 −30
65	80	−200 −274	−150 −224													
80	100	−220 −307	−170 −257	−120 −174	−120 −207	−72 −107	−72 −126	−72 −159	−36 −58	−36 −71	−36 −90	−12 −27	−12 −34	0 −15	0 −22	0 −35
100	120	−240 −327	−180 −267													
120	140	−260 −360	−200 −300	−145 −208	−145 −245	−85 −125	−85 −148	−85 −185	−43 −68	−43 −83	−43 −106	−14 −32	−14 −39	0 −18	0 −25	0 −40
140	160	−280 −380	−210 −310													
160	180	−310 −410	−230 −330													
180	200	−340 −455	−240 −355	−170 −242	−170 −285	−100 −146	−100 −172	−100 −215	−50 −79	−50 −96	−50 −122	−15 −35	−15 −44	0 −20	0 −29	0 −46
200	225	−380 −495	−260 −375													
225	250	−420 −535	−280 −395													
250	280	−480 −610	−300 −430	−190 −271	−190 −320	−110 −162	−110 −191	−110 −240	−56 −88	−56 −108	−56 −137	−17 −40	−17 −49	0 −23	0 −32	0 −52
280	315	−540 −670	−330 −460													
315	355	−600 −740	−360 −500	−210 −299	−210 −350	−125 −182	−125 −214	−125 −265	−62 −98	−62 −119	−62 −151	−18 −43	−18 −54	0 −25	0 −36	0 −57
355	400	−680 −820	−400 −540													
400	450	−760 −915	−440 −595	−230 −327	−230 −385	−135 −198	−135 −232	−135 −290	−68 −108	−68 −131	−68 −165	−20 −47	−20 −60	0 −27	0 −40	0 −63
450	500	−840 −995	−480 −635													

Remarks: In each row of the above table, upper values represent upper deviations and lower values represent lower deviations.

[Excerpt from JIS B 0401-2 (1998)]

Unit: μm

Range of basic size (mm)		Tolerance class of shaft															
Over	Or less	h8	h9	js5	js6	js7	k5	k6	m5	m6	n6	p6	r6	s6	t6	u6	x6
—	3	0 −14	0 −25	±2	±3	±5	+4 0	+6 0	+6 +2	+8 +2	+10 +4	+12 +6	+16 +10	+20 +14	—	+24 +18	+26 +20
3	6	0 −18	0 −30	±2.5	±4	±6	+6 +1	+9 +1	+9 +4	+12 +4	+16 +8	+20 +12	+23 +15	+27 +19	—	+31 +23	+36 +28
6	10	0 −22	0 −36	±3	±4.5	±7.5	+7 +1	+10 +1	+12 +6	+15 +6	+19 +10	+24 +15	+28 +19	+32 +23	—	+37 +28	+43 +34
10	14	0 −27	0 −43	±4	±5.5	±9	+9 +1	+12 +1	+15 +7	+18 +7	+23 +12	+29 +18	+34 +23	+39 +28	—	+44 +33	+51 +40
14	18																+56 +45
18	24	0 −33	0 −52	±4.5	±6.5	±10.5	+11 +2	+15 +2	+17 +8	+21 +8	+28 +15	+35 +22	+41 +28	+48 +35	—	+54 +41	+67 +54
24	30														+54 +41	+61 +48	+77 +64
30	40	0 −39	0 −62	±5.5	±8	±12.5	+13 +2	+18 +2	+20 +9	+25 +9	+33 +17	+42 +26	+50 +34	+59 +43	+64 +48	+76 +60	+96 +80
40	50														+70 +54	+86 +70	+113 +97
50	65	0 −46	0 −74	±6.5	±9.5	±15	+15 +2	+21 +2	+24 +11	+30 +11	+39 +20	+51 +32	+60 +41	+72 +53	+85 +66	+106 +87	+141 +122
65	80												+62 +43	+78 +59	+94 +75	+121 +102	+165 +146
80	100	0 −54	0 −87	±7.5	±11	±17.5	+18 +3	+25 +3	+28 +13	+35 +13	+45 +23	+59 +37	+73 +51	+93 +71	+113 +91	+146 +124	+200 +178
100	120												+76 +54	+101 +79	+126 +104	+166 +144	+232 +210
120	140	0 −63	0 −100	±9	±12.5	±20	+21 +3	+28 +3	+33 +15	+40 +15	+52 +27	+68 +43	+88 +63	+117 +92	+147 +122	+195 +170	+273 +248
140	160												+90 +65	+125 +100	+159 +134	+215 +190	+305 +280
160	180												+93 +68	+133 +108	+171 +146	+235 +210	+335 +310
180	200	0 −72	0 −115	±10	±14.5	±23	+24 +4	+33 +4	+37 +17	+46 +17	+60 +31	+79 +50	+106 +77	+151 +122	+195 +166	+265 +236	+379 +350
200	225												+109 +80	+159 +130	+209 +180	+287 +258	+414 +385
225	250												+113 +84	+169 +140	+225 +196	+313 +284	+454 +425
250	280	0 −81	0 −130	±11.5	±16	±26	+27 +4	+36 +4	+43 +20	+52 +20	+66 +34	+88 +56	+126 +94	+190 +158	+250 +218	+347 +315	+507 +475
280	315												+130 +98	+202 +170	+272 +240	+382 +350	+557 +525
315	355	0 −89	0 −140	±12.5	±18	±28.5	+29 +4	+40 +4	+46 +21	+57 +21	+73 +37	+98 +62	+144 +108	+226 +190	+304 +268	+426 +390	+626 +590
355	400												+150 +114	+244 +208	+330 +294	+471 +435	+696 +660
400	450	0 −97	0 −155	±13.5	±20	±31.5	+32 +5	+45 +5	+50 +23	+63 +23	+80 +40	+108 +68	+166 +126	+272 +232	+370 +330	+530 +490	+780 +740
450	500												+172 +132	+292 +252	+400 +360	+580 +540	+860 +820

Hardness Conversion Table [SAE J 417] Revised in 1983

Approximate Conversion Values for Rockwell C Hardness Values of Steel (1)

Rockwell C scale Hardness(3)	Vickers hardness	Brinnell hardness 10 mm ball Load 3000 kgf		Rockweel hardness(3)			Rockweel superficial hardness Diamond conical indenter			Shore hardness	Tesile strength (approximate value) Mpa {kgf/mm²} (2)	Rockwell C scale Hardness(3)
		Standard ball	Tungsten carbide ball	A scale Load 60 kgf Diamond conical indenter	B scale Load 100 kgf Dia. 1.6 mm (1/16 in.) ball	D scale Load 100 kgf Diamond conical indenter	15-N scale Load 15 kgf	30-N scale Load 30 kgf	45-N scale Load 45 kgf			
HRC	HV	HBS	HBW	HRA	HRB	HRD	HR15N	HR30N	HR45N	HS	—	HRC
68	940	—	—	85.6	—	76.9	93.2	84.4	75.4	97	—	68
67	900	—	—	85.0	—	76.1	92.9	83.6	74.2	95	—	67
66	865	—	—	84.5	—	75.4	92.5	82.8	73.3	92	—	66
65	832	—	(739)	83.9	—	74.5	92.2	81.9	72.0	91	—	65
64	800	—	(722)	83.4	—	73.8	91.8	81.1	71.0	88	—	64
63	772	—	(705)	82.8	—	73.0	91.4	80.1	69.9	87	—	63
62	746	—	(688)	82.3	—	72.2	91.1	79.3	68.8	85	—	62
61	720	—	(670)	81.8	—	71.5	90.7	78.4	67.7	83	—	61
60	697	—	(654)	81.2	—	70.7	90.2	77.5	66.6	81	—	60
59	674	—	(634)	80.7	—	69.9	89.8	76.6	65.5	80	—	59
58	653	—	615	80.1	—	69.2	89.3	75.7	64.3	78	—	58
57	633	—	595	79.6	—	68.5	88.9	74.8	63.2	76	—	57
56	613	—	577	79.0	—	67.7	88.3	73.9	62.0	75	—	56
55	595	—	560	78.5	—	66.9	87.9	73.0	60.9	74	2075 {212}	55
54	577	—	543	78.0	—	66.1	87.4	72.0	59.8	72	2015 {205}	54
53	560	—	525	77.4	—	65.4	86.9	71.2	58.6	71	1950 {199}	53
52	544	(500)	512	76.8	—	64.6	86.4	70.2	57.4	69	1880 {192}	52
51	528	(487)	496	76.3	—	63.8	85.9	69.4	56.1	68	1820 {186}	51
50	513	(475)	481	75.9	—	63.1	85.5	68.5	55.0	67	1760 {179}	50
49	498	(464)	469	75.2	—	62.1	85.0	67.6	53.8	66	1695 {173}	49
48	484	451	455	74.7	—	61.4	84.5	66.7	52.5	64	1635 {167}	48
47	471	442	443	74.1	—	60.8	83.9	65.8	51.4	63	1580 {161}	47
46	458	432	432	73.6	—	60.0	83.5	64.8	50.3	62	1530 {156}	46
45	446	421	421	73.1	—	59.2	83.0	64.0	49.0	60	1480 {151}	45
44	434	409	409	72.5	—	58.5	82.5	63.1	47.8	58	1435 {146}	44
43	423	400	400	72.0	—	57.7	82.0	62.2	46.7	57	1385 {141}	43
42	412	390	390	71.5	—	56.9	81.5	61.3	45.5	56	1340 {136}	42
41	402	381	381	70.9	—	56.2	80.9	60.4	44.3	55	1295 {132}	41
40	392	371	371	70.4	—	55.4	80.4	59.5	43.1	54	1250 {127}	40
39	382	362	362	69.9	—	54.6	79.9	58.6	41.9	52	1215 {124}	39
38	372	353	353	69.4	—	53.8	79.4	57.7	40.8	51	1180 {120}	38
37	363	344	344	68.9	—	53.1	78.8	56.8	39.6	50	1160 {118}	37
36	354	336	336	68.4	(109.0)	52.3	78.3	55.9	38.4	49	1115 {114}	36
35	345	327	327	67.9	(108.5)	51.5	77.7	55.0	37.2	48	1080 {110}	35
34	336	319	319	67.4	(108.0)	50.8	77.2	54.2	36.1	47	1055 {108}	34
33	327	311	311	66.8	(107.5)	50.0	76.6	53.3	34.9	46	1025 {105}	33
32	318	301	301	66.3	(107.0)	49.2	76.1	52.1	33.7	44	1000 {102}	32
31	310	294	294	65.8	(106.0)	48.4	75.6	51.3	32.5	43	980 {100}	31
30	302	286	286	65.3	(105.5)	47.7	75.0	50.4	31.3	42	950 { 97}	30
29	294	279	279	64.7	(104.5)	47.0	74.5	49.5	30.1	41	930 { 95}	29
28	286	271	271	64.3	(104.0)	46.1	73.9	48.6	28.9	41	910 { 93}	28
27	279	264	264	63.8	(103.0)	45.2	73.3	47.7	27.8	40	880 { 90}	27
26	272	258	258	63.3	(102.5)	44.6	72.8	46.8	26.7	38	860 { 88}	26
25	266	253	253	62.8	(101.5)	43.8	72.2	45.9	25.5	38	840 { 86}	25
24	260	247	247	62.4	(101.0)	43.1	71.6	45.0	24.3	37	825 { 84}	24
23	254	243	243	62.0	100.0	42.1	71.0	44.0	23.1	36	805 { 82}	23
22	248	237	237	61.5	99.0	41.6	70.5	43.2	22.0	35	785 { 80}	22
21	243	231	231	61.0	98.5	40.9	69.9	42.3	20.7	35	770 { 79}	21
20	238	226	226	60.5	97.8	40.1	69.4	41.5	19.6	34	760 { 77}	20
(18)	230	219	219	—	96.7	—	—	—	—	33	730 { 75}	(18)
(16)	222	212	212	—	95.5	—	—	—	—	32	705 { 72}	(16)
(14)	213	203	203	—	93.9	—	—	—	—	31	675 { 69}	(14)
(12)	204	194	194	—	92.3	—	—	—	—	29	650 { 66}	(12)
(10)	196	187	187	—	90.7	—	—	—	—	28	620 { 63}	(10)
(8)	188	179	179	—	89.5	—	—	—	—	27	600 { 61}	(8)
(6)	180	171	171	—	87.1	—	—	—	—	26	580 { 59}	(6)
(4)	173	165	165	—	85.5	—	—	—	—	25	550 { 56}	(4)
(2)	166	158	158	—	83.5	—	—	—	—	24	530 { 54}	(2)
(0)	160	152	152	—	81.7	—	—	—	—	24	515 { 53}	(0)

Note (1) Figures in blue are based on ASTM E 140, Table 1 (jointly prepared by SAE, ASM and ASTM).
(2) The units and figures shown in parentheses { } following the listed values are the results of conversion from psi figures by reference to JIS Z 8413 and Z8438 conversion tables. For your reference, 1MPa＝1N/mm²
(3) The firegures in parentheses ( ) are in ranges not frequently used. They are given as reference data.

SI Unit Conversion Table / Weight & Measure Conversion table [Excerpt from JIS Handbook]

Conversion rate of JIS units upon switchover to SI units (units in red are SI Units)

Pressure

Pa	bar	kgf/cm^2	atm	mmH$_2$O	mmHg 又は Torr
1	1×10^{-5}	$1.019\,72\times10^{-5}$	$9.869\,23\times10^{-6}$	$1.019\,72\times10^{-1}$	$7.500\,62\times10^{-3}$
1×10^{5}	1	1.019 72	$9.869\,23\times10^{-1}$	$1.019\,72\times10^{4}$	$7.500\,62\times10^{2}$
$9.806\,65\times10^{4}$	$9.806\,65\times10^{-1}$	1	$9.678\,41\times10^{-1}$	1×10^{4}	$7.355\,59\times10^{2}$
$1.013\,25\times10^{5}$	1.013 25	1.033 23	1	$1.033\,23\times10^{4}$	$7.600\,00\times10^{2}$
9.806 65	$9.806\,65\times10^{-5}$	1×10^{-4}	$9.678\,41\times10^{-5}$	1	$7.355\,59\times10^{-2}$
$1.333\,22\times10^{2}$	$1.333\,22\times10^{-3}$	$1.359\,51\times10^{-3}$	$1.315\,79\times10^{-3}$	$1.359\,51\times10$	1

Note: 1Pa＝1N/m^2

Specific heat

J/(kg･K)	kcal/(kg･°C), cal/(g･°C)
1	$2.388\,89\times10^{-4}$
$4.186\,05\times10^{3}$	1

Note: 1cal＝4.186 05J (by Measurement Act)

Coefficient of heat trasfer

W/(m^2･K)	kcal/(h･m^2･°C)
1	$8.600\,0\times10^{-1}$
1.162 79	1

Note: 1cal＝4.186 05J (by Measurement Act)

Power (process rate, power), heat flow rate

kW	kgf･m/s	PS	kcal/h
1	$1.019\,72\times10^{2}$	1.359 62	$8.600\,0\times10^{2}$
$9.806\,65\times10^{-3}$	1	$1.333\,33\times10^{-2}$	8.433 71
7.355×10^{-1}	7.5×10	1	$6.325\,29\times10^{2}$
$1.162\,79\times10^{-3}$	$1.185\,72\times10^{-1}$	$1.580\,95\times10^{-3}$	1

Note: 1W＝1J/s, PS: Frenvh hourse power
1PS＝0.735 5kW (by Act for Enforcement of Measurement Act)
1cal＝4.186 05J (in accordance with Measurement Act)

Stress

Pa	MPa 又は N/mm^2	kgf/mm^2	kgf/cm^2
1	1×10^{-6}	$1.019\,72\times10^{-7}$	$1.019\,72\times10^{-5}$
1×10^{6}	1	$1.019\,72\times10^{-1}$	$1.019\,72\times10$
$9.806\,65\times10^{6}$	9.806 65	1	1×10^{2}
$9.806\,65\times10^{4}$	$9.806\,65\times10^{-2}$	1×10^{-2}	1

Work, enery & quantity of heat

J	kW･h	kgf･m	kcal
1	$2.777\,78\times10^{-7}$	$1.019\,72\times10^{-1}$	$2.388\,89\times10^{-4}$
3.600×10^{6}	1	$3.670\,98\times10^{5}$	$8.600\,0\times10^{2}$
9.806 65	$2.724\,07\times10^{-6}$	1	$2.342\,70\times10^{-3}$
$4.186\,05\times10^{3}$	$1.162\,79\times10^{-3}$	$4.268\,58\times10^{2}$	1

Note: 1J＝1W･s, 1J=1N･m
1cal＝4.186 05J (by Measurement Act)

Weight & Measure Conversion Table

Measure comparison table

Shaku	Kan	Meter	Inch	Feet	Yard
1	0.166667	0.30303	11.9303	0.994194	0.33140
6	1	1.81818	71.5819	5.96516	1.98839
3.3	0.55	1	39.3701	3.28084	1.09361
0.08382	0.01397	0.0254	1	0.08333	0.02778
1.00584	0.16764	0.3048	12	1	0.33333
3.01752	0.50292	0.9144	36	3	1

Volume comparison table

Go	Cubic centimeter	Liter	Gallon (UK)	Gallon (US)	Cubic inch
1	180.39	0.18039	0.03968	0.04765	11.01
0.00554	1	0.001	0.00022	0.00026	0.06102
5.5435	1000	1	0.21997	0.26417	61.024
25.2	4546.09	4.54609	1	1.20095	277.42
20.98	3785.41	3.78541	0.833	1	231
0.0908	16.3871	0.01639	0.0036	0.0043	1

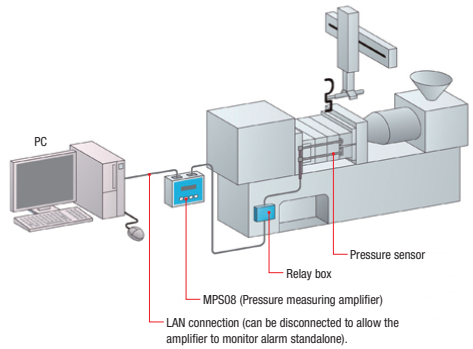
Weight comparison table

Kan	Kin	Gram	Ton (UK)	Ton (US)	Ounce	Pound
1	6.25	3750	0.003691	0.004134	132.277	8.26733
0.16	1	600	0.000591	0.000661	21.1644	1.32277
0.000267	0.001667	1	0.00000098	0.0000011	0.035274	0.0022046
262.4543	1640.339	1016050	1	1.12	35840	2240
241.916	1511.975	907185	0.892857	1	32000	2000
0.007569	0.047249	28.3495	0.000028	0.000031	1	0.0625
0.120958	0.755987	453.5924	0.000446	0.0005	16	1

Customer Guide

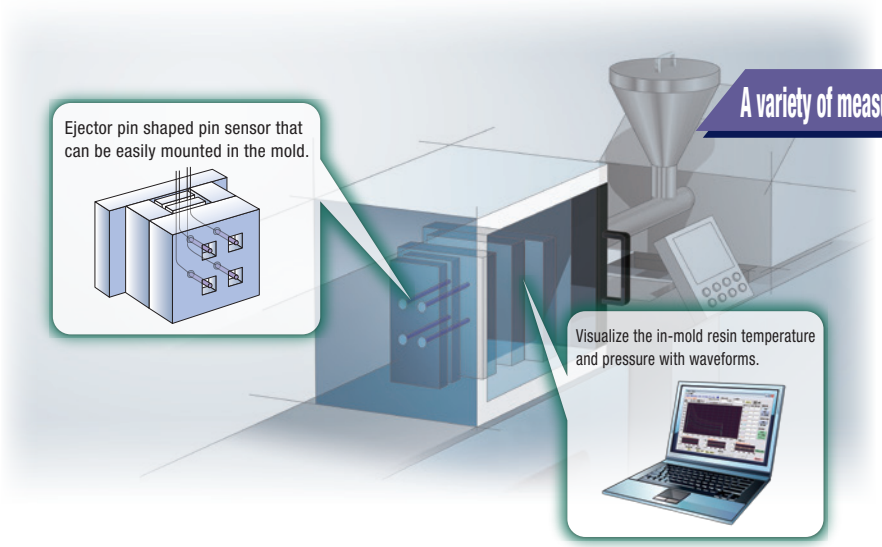
Mold Marshalling System

What is Mold Marshalling System?



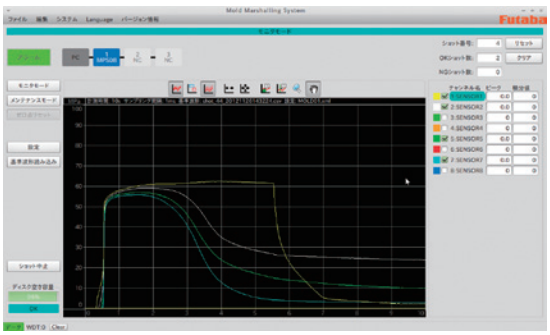
Mold marshalling system is a measuring sysytem for injection molding that visualizes resin behavior inside the mold, which has been a black box so far.
It uses a sensor mounted inside the mold and a special amplifier installed outside to measure in-mold resin temperatue and pressure, convert them into electrical signals or voltages and output the data on the PC or various measuring devices. Quatified data can be used for various purposes such as automated selection of defective products, quality control, evaluation of molds, etc.

Feartures

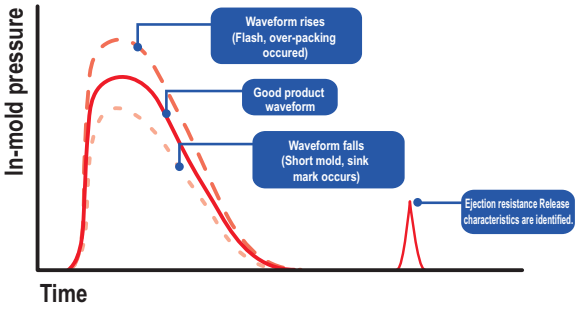


- A variety of measurement & monitoring functions
- Low cost
- Easy to use
- Functional
- Compact

An example of measurement screen



Examples of molding defects that can be determined from in-mold pressure values.



A New Proposal for In-Mold Resin Pressure / Temperature Measurement

Benefits of in-mold resin pressure measurements

Detection of defective products	• Alarm signals triggered by fluctuations in waveform with respect to a reference waveform notify the occurrence of molding defects such as short shots and over packing, etc.
Setting of molding conditions according to changes in molding machine or environment	• By saving a waveform when a good product has been produced and performing molding operations with the waveform, the same quality of molded products can be produced.
Analysis of mold structure and resin flow	• By analysing the time required until the resin reaches the sensor and the pressure during the period, products of uniform quality can be achieved at the time of multi-cavity molding.
Identification of relations of in-mod pressure and molding defects	• The type of potential defects can be projected by checking the pressure waveform agaist the good product waveform (reference waveform).

Benefits of in-mold resin temperature measurement

Actual measurement of resin temperature	• Accurate grasp of in-mold temperature is now possible. Fast 8 ms response time for high-speed actual measurement. Contactless temperature measurement system (optical fiber infrared system)
Detection of defective products	• Alarm signals triggered by fluctuations in waveform with respect to a reference waveform notify the occurrence of molding defects such as short shots, sink marks, and gas burning, etc.
Optimization of molding conditions	• Molding conditions can be optimized through resin temperature controls
Comparison with CAE Analysis	• By comparing the CAE comparison results with the actual measurement, the data can be effectively utilized to improve the accuracy of CAE analysis.

Company Profile

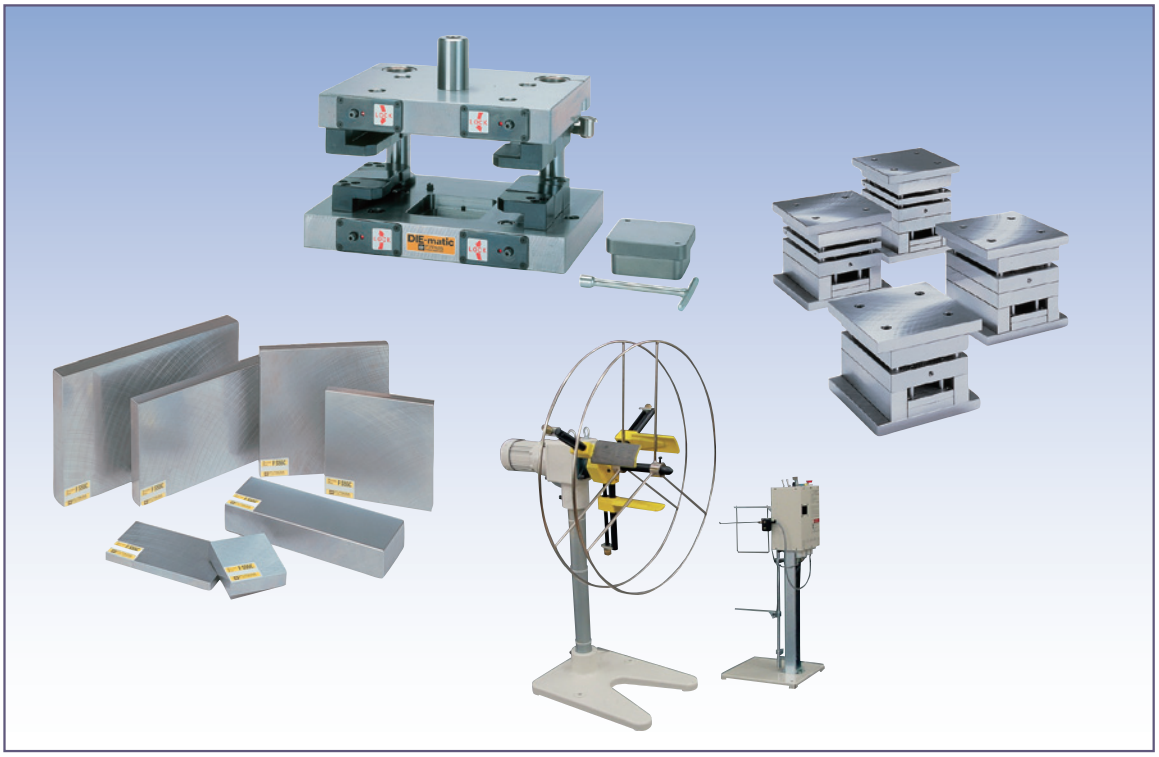
Futaba's high technology connects dreams and future of people and society

Modern society is progressing rapidly and its needs becoming increasingly diversified. To respond to these needs, and helps the society develop further and achieve more in the future, advanced technologies are required. By utilizing its accumulated advanced technologies and experiences, Futaba is dedicated to developing new products that are needed and useful in every aspect of life, thereby contributing to dreams and future of people and society.

"Supports Manufacturing"

Machinery & tooling Division

Provides a wide variety of components and equipments that realize streamlining production of molds, which become the source of every product



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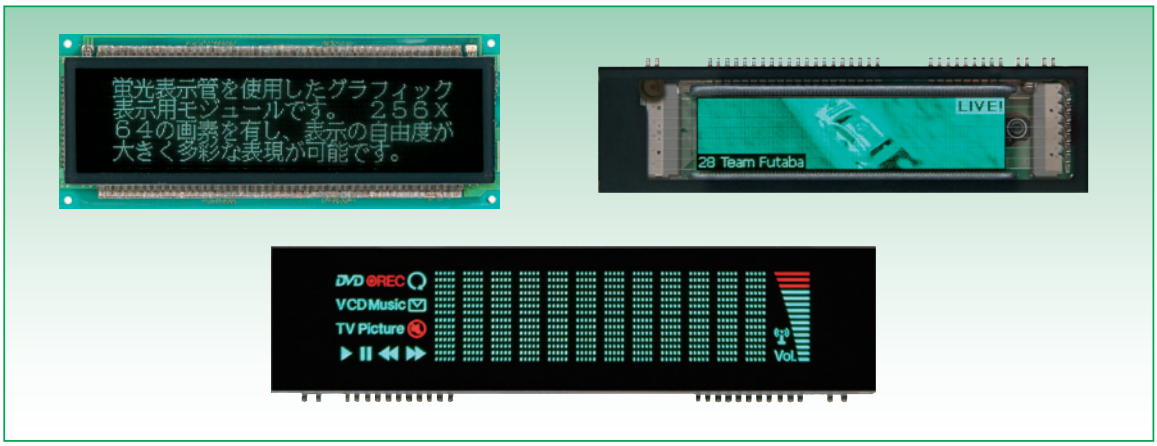

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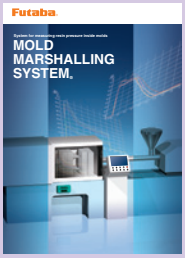
Red Book Plate general catalog for Equipment

For in-mold resin pressure & temp. measuring system



Mold Marshalling Sysmtem

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Index

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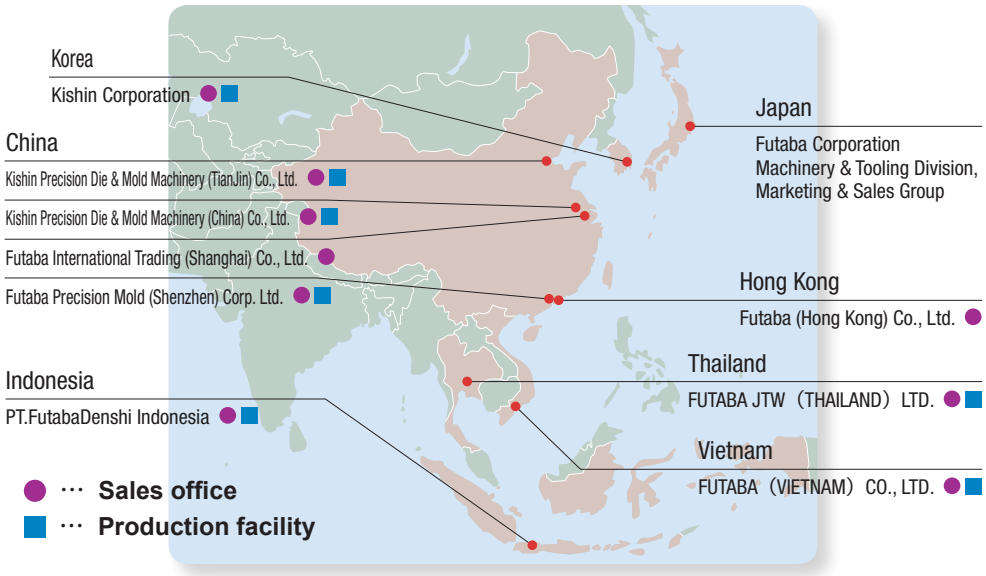

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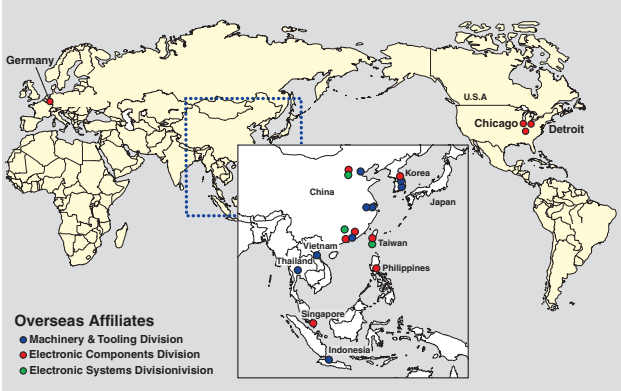

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