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How to Use the Catalog

Product name

Drawing

Unit：mm
Surface roughness：
Ra（arithmetic average roughness）

Material Hardness

Quantity discount rate

☞ P.13

Delivery

☞ P.15

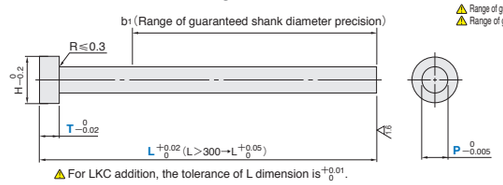
Precision Straight Ejector Pins

L Dimension Designated Type

RoHS

Material	Hardness	Code
SKH51	59～61HRC	EPHL

⚠ Range of guaranteed shank diameter precision:b₁ ☞ P.28
⚠ Range of guaranteed base material hardness ☞ P.29



⚠ For LKC addition, the tolerance of L dimension is $^{+0.01}_{0}$.

Specification

Select blue letters and figures from left to right to specify order codes.
The numerals in blue-shaded boxes are not required when ordering.

Code	Code No. P	L (H) 0.01	T	H
EPHL	0.2	30.00～ 60.00	4	2
	0.3	30.00～ 60.00		
	0.4	30.00～100.00		3
	0.5	40.00～100.00		
	0.6 0.7 0.8 0.9	40.00～150.00		
	1 1.1 1.2 1.3 1.4	40.00～200.00		
	1.5 1.6	40.00～250.00		4
	1.7 1.8 1.9	40.00～200.00		
	2	40.00～300.00		
	2.1	40.00～250.00		5
	2.2 2.3 2.4	40.00～200.00		
	2.5	40.00～300.00		
	2.6	40.00～250.00		6
	2.7 2.8 2.9	40.00～200.00		
	3	40.00～350.00		
	3.1	40.00～250.00		
	3.2 3.3 3.4	40.00～200.00	4・6	7
	(3.5)	40.00～350.00		
	3.6	40.00～250.00		
	3.7 3.8 3.9	40.00～200.00		
	(4)	40.00～350.00		
	4.1	40.00～250.00		
	4.2	40.00～200.00	4	9
	4.3	40.00～200.00	4・6	
	4.4	40.00～200.00	4	
	(4.5)	40.00～350.00	4・6	
	4.6	40.00～250.00		
	4.7 4.8 4.9	40.00～200.00	4	
	5	40.00～350.00		
	5.1	40.00～250.00	4・6	10
	5.5	40.00～350.00		
	5.6	40.00～250.00		
	6	40.00～350.00		
	6.1	40.00～250.00		
	6.5	40.00～350.00	4・8	11
	6.6	40.00～250.00		
	7	40.00～350.00		
	7.1	40.00～250.00		13
	7.5 7.6	40.00～250.00		
	8	40.00～350.00		14
	8.1	40.00～250.00		
	8.5 8.6	40.00～250.00		
	9	40.00～350.00		15
	9.1	40.00～250.00		
	9.5 9.6	40.00～250.00		
	10	40.00～350.00		16
	10.1	40.00～250.00		
	10.5 10.6	40.00～250.00		
	11	40.00～300.00		17
	11.1	40.00～250.00		
	11.5	40.00～250.00		
	11.6	40.00～250.00		
	12	40.00～350.00		
	12.1	40.00～250.00		

⚠ P dimension in ( ) is for Lmax.=300.

How to order

Please specify order codes and dimensions according to ordering example
☞ P.13

ORDER | Code No. | L | T
EPHL2 — 148.21 — T4

DELIVERY 3 Days ☞ P.15
⚠ For P=0.2, please enquire.

Delivery

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～30	31～50	51～100	101～
100%	95%	90%	Enquiry

Code	P	@/P(1～30P) L 30.00～100.00	L 100.01～150.00	L 150.01～200.00	L 200.01～250.00	L 250.01～300.00	L 300.01～350.00
EPHL	0.2	24.2	–	–	–	–	–
	0.3	5.49	–	–	–	–	–
	0.4	4.55	–	–	–	–	–
	0.5	3.61	–	–	–	–	–
	0.6 0.7	1.80	2.86	–	–	–	–
	0.8 0.9	1.64	1.98	–	–	–	–
	1 1.1	1.32	1.48	2.20	–	–	–
	1.2 1.3 1.4	1.26	1.37	1.98	–	–	–
	1.5	1.26	1.37	1.58	2.64	–	–
	1.6 1.7 1.8 1.9	1.26	1.37	1.42	3.56	–	–
	2	1.26	1.37	1.37	2.08	2.99	–
	2.1 2.2 2.3 2.4	1.32	1.42	1.53	3.45	–	–
	2.5	1.32	1.42	1.53	2.14	3.05	–
	2.6 2.7 2.8 2.9	1.32	1.42	1.53	3.67	–	–
	3	1.37	1.48	1.58	2.36	3.34	10.8
	3.1 3.2 3.3 3.4	1.70	1.70	1.80	3.50	–	–
	3.5	1.70	1.70	1.80	2.64	3.67	12.0
	3.6 3.7 3.8 3.9	1.70	1.80	1.98	3.73	–	–
	4	1.70	1.80	1.98	2.80	4.00	12.5
	4.1	3.02	3.49	3.75	4.49	–	–
	4.2 4.3 4.4	3.34	3.42	3.68	–	–	–
	4.5	2.42	2.42	2.61	3.75	5.36	13.2
	4.6	3.49	3.68	3.95	5.30	–	–
	4.7 4.8 4.9	3.93	4.15	4.42	–	–	–

Code	P	@/P(1～30P) L 40.00～100.00	L 100.01～150.00	L 150.01～200.00	L 200.01～250.00	L 250.01～300.00	L 300.01～350.00
EPHL	5	2.42	2.53	2.68	4.02	5.71	13.9
	5.1	3.49	3.68	3.95	5.36	–	–
	5.5	2.61	2.68	2.87	4.15	5.77	14.4
	5.6	3.68	3.89	4.23	5.98	–	–
	6	2.61	2.68	2.87	4.42	6.31	14.9
	6.1	4.02	4.15	4.49	6.31	–	–
	6.5	2.87	3.08	3.28	5.30	6.84	18.0
	6.6	4.15	4.49	4.90	7.39	–	–
	7	2.87	3.08	3.34	5.71	7.39	18.4
	7.1	4.15	4.49	4.90	7.39	–	–
	7.5	4.83	4.83	5.23	8.31	–	–
	7.6	6.78	6.78	7.05	8.75	–	–
	8	3.89	3.89	4.23	5.77	8.20	20.2
	8.1	5.56	5.83	6.43	7.71	–	–
	8.5 8.6	6.78	7.45	7.86	9.39	–	–
	9	4.23	4.36	4.64	6.58	9.12	21.7
	9.1	6.78	7.45	7.86	9.33	–	–
	9.5 9.6	7.71	7.71	8.05	9.55	–	–
	10	4.49	4.49	4.90	6.84	9.65	23.0
	10.1	6.64	7.05	7.86	8.78	–	–
	10.5 10.6	8.78	8.78	9.12	12.2	–	–
	11	8.78	8.78	9.12	12.2	13.7	–
	11.1 11.5 11.6	9.12	9.12	10.1	12.5	–	–
	12	6.03	6.03	6.64	9.65	12.9	28.7
	12.1	9.12	9.12	10.1	12.5	–	–

Price list

Prices indicated in the catalog are based on one piece.

ADDITION

Addition details ☞ P.18

Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting	KC (0.5)	Designated-angled two flats cutting	KGC (1.4)
0.1 P/2≤KC<H/2		KGC: 0.1 AG: 1 P/2≤KGC<H/2 0<AG<360	
Parallel flats cutting	WKC (0.9)	Three flats cutting at 120°	KTC (1.8)
0.1 P/2≤WKC<H/2		0.1 P/2≤KTC<H/2	
Parallel flats cutting	KAC (1.4) KBC (1.4)	Dowel hole boring	NN (0.9)
0.1 P/2≤KAC,KBC<H/2			
Right-angled two flats cutting	RKC (0.9)	Dowel hole+Spring pin	NC (0.9)
0.1 P/2≤RKC<H/2			
Right-angled three flats cutting	DKC (1.4)	H dimension alteration	HC (0.6)
0.1 P/2≤DKC<H/2		0.1 t<1→H−1≤HC<H t≥1→P+1≤HC<H	
Square flats cutting	SKC (1.8)	H dimension alteration (precision)	HCC (1.8)
0.1 P/2≤SKC<H/2		0.1 P+1≤HCC<H−0.3	

Add.	Code (@/P)	Add.	Code (@/P)
T dimension alteration	TC (0.6)	Point chamfering	HGC (0.9)
0.1 2.0≤TC<T T−TC≤Lmax.−L		0.1 0.2≤HGC<P/2	
Tapping (P 8～9.6 4; 10～11.6 5; 12・12.1 6; M×1) ⚠ T=8 is available only	MC (1.4)	L dimension tolerance alteration	LKC (0.9)
Vent machining (P 3～4.9 0.3; 5～9.6 0.4; 12～12.1 0.5) 0.1 S・B≤10 S+5≤B≤30	GVC (3.7)	Engraving on the head (1character→2<H 2characters→5≤H 3characters→7≤H 4characters→7≤H)	NHC 1,2characters (0.2) 3,4characters (0.5)
Vent machining (P 3～4.9 0.3; 5～9.6 0.4; 12～12.1 0.5) 0.1 1≤GS≤10 GS+2≤GB≤30 GB<GC≤L−T	GVD (4.8)	Engraving on the head (1character→2<H 2characters→5≤H 3characters→7≤H 4characters→7≤H)	NHN 1,2characters (0.2) 3,4characters (0.5)
Point R processing 0.1 0.2≤HRC<P/2	HRC (0.9)	Lapping on the point face P≤6→0.05Ra P>6→0.1Ra ⊠ L>200.00 is not available.	TMC (4.8)

Alteration dimensions

Indication of alteration range, condition and price.

ORDER | Code No. | L | T | KC・WKC…etc.
EPHL2 — 148.21 — T4 — TC3.1

Product unit price+Addition unit price.
Price discount is also available for addition.

☞ P.14

Alteration

Alteration are based on codes.

Page

Guide for Marks

How to use

For convenient use, each items are replaced by marks, the meaning is as follow.

MARK	MEANING	EXAMPLE
T	TOLERANCE	T Tolerance D +0.005 0 ・It is expressed by mark and characters.
in	SPECIFY INDICATION	in 0.1 ・The dimension can be designated in 0.1mm.
⚠	NOTE / NOTICE	⚠ L≧200→ +0.05 0 ・Indication of warning notes.
☒	NOT AVAILABLE	☒ P≦8 is not available. ・Indicates hat D3～8 is not available. ・No such size or cannot produce etc. ・Indicates that sizes or items are not available for alteration.
☞	REFER TO CATALOG PAGE	☞ P.25 ・「Refer to P.25」
①②③	UNIT No.	①②③…… ・Reference number applied to each component of a set.
ORDER	HOW TO ORDER	ORDER | Code No. | L | T | EPH2 — 150 — 4 ・Please specify order codes and dimensions based on ordering example.
DELIVERY (Next In stock working day / 1 Day / 3 Days)	DELIVERY Shipping on / working days （Guide of delivery ☞ P.15）	Products can be ship on next working day. Production time is 1st working day. Production time is 3rd working day.
$ PRICE Without tax	PRICE（Yen）	・Prices indicated in the catalog are based on one piece （one piece or one set）
@	A UNIT PRICE	@／P …A UNIT PRICE（Yen） @／Set …（Set Price）
ADDITION	ALTERATION	| Code No. | L | T | KC・WKC…etc. | EPH2 — 150 — T4 — TC3.1 ・Alterations can be designated without drawings. ・Please specify order codes and dimensions based on ordering example.

How to Order

How to order (products on the catalog/special ordered products)

Ordering starts from one piece product.

Time of ordering →for details refer to「company business hour introduction」☞ P.15

Basically it is from Monday to Saturday（including rest day）9:00～17:00.

『Express service』(Quick) can be used →for details refer to Guide of Express Service System（quick） ☞ P.15

Delivery time can be changed according to ordering time.

Alteration・cancel・return goods →for details refer to「Alteration・cancel・return goods」☞ P.15

Ordering price introduction

Standard products

・Refer to specific page ordering example.

・Prices based on quantity discount rate.

Quantity discount rate

・For one or more pieces of the same code and dimension, prices are discounted based on how many you order.

・For **quantity discount rate**, refer to specific page.

Guide for alteration →「Guide for Alteration」☞ P.14

・Please specify alteration codes based on example on each page.

Method of calculating price (include tax)

Ordering example 1 standard products／punches（EPHL2－180－N30.0－A15）for ordering 2pcs. @360 each.

@$10.4 × 2 = @$20.80

Ordering example 2 standard products／punches（EPHL2－180－N30.0－A15）for ordering 15pcs. @360 each.

@$10.4 × 0.95（5%off） × 15 = @$148.20

Ordering example 3 Alteration product／punches（EPHL2－180－N30.0－A15）for @$10.4 each ADDITION 2pcs. of KC

（@$10.4＋ ADDITION TC@$1.4） × 2 = @$23.60

Ordering example 4 Alteration product／punches（EPHL2－180－N30.0－A15）for @$10.4 each ADDITION 30pcs. of KC

（@$10.4＋ ADDITION TC@$1.4） × 0.85（15%off） × 30 = @$300.90

Currency: USD

Incoterms: Fob Dalian is referred. We can do every incoterm according to your inquiry.

Guide for Alteration

Alteration

Alteration is a process for a designated item which doesn't require drawings

Alteration only changes dimension and tolerance of standard product in one part.
Alterations can be specified by adding the ordering code without drawings and one or more codes are available.

Alteration usage example

Quantity discount rate is available for alteration too.

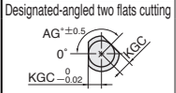
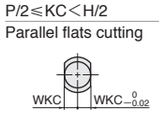
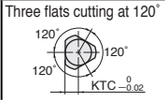
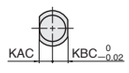
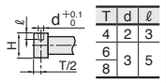
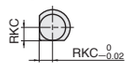
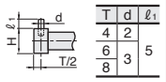
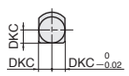
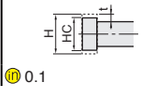
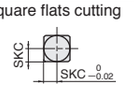
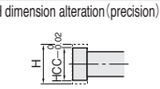
Straight ejector pins

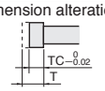
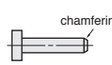
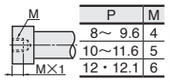
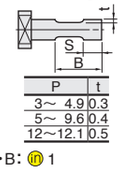
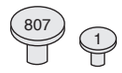
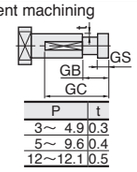
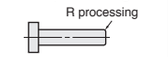
punches **EPHL2—148.00—T4—KC—TC3.5—LKC** When ordering ten pieces

Ordering code	**EPHL2—148.00—T4—KC—TC3.5—LKC**	
Price calculation example	**EPHL2** Unit price	@$1.37
	Alteration KC unit price	@$0.5
	Alteration TC unit price	@$0.6

$3.37 × 0.95 × 10 = $32.015

Addition details ☞ P.18

Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting  in 0.1 P/2≦KC＜H/2	KC (0.5)	Designated-angled two flats cutting  KGC: in 0.1 AG: in 1 P/2≦KGC＜H/2 0＜AG＜360	KGC (1.4)
Parallel flats cutting  in 0.1 P/2≦WKC＜H/2	WKC (0.9)	Three flats cutting at 120°  in 0.1 P/2≦KTC＜H/2	KTC (1.8)
Parallel flats cutting  in 0.1 P/2≦KAC,KBC＜H/2	KAC (1.4) KBC (1.4)	Dowel hole boring  T d ℓ 4 2 3 6 3 5 8	NN (0.9)
Right-angled two flats cutting  in 0.1 P/2≦RKC＜H/2	RKC (0.9)	Dowel hole＋Spring pin  T d ℓ1 4 2 6 3 5 8	NC (0.9)
Right-angled three flats cutting  in 0.1 P/2≦DKC＜H/2	DKC (1.4)	H dimension alteration  in 0.1 t＜1→H−1≦HC＜H t≧1→P＋1≦HC＜H	HC (0.6)
Square flats cutting  in 0.1 P/2≦SKC＜H/2	SKC (1.8)	H dimension alteration (precision)  in 0.1 P＋1≦HCC＜H−0.3	HCC (1.8)

Add.	Code (@/P)	Add.	Code (@/P)
T dimension alteration  in 0.1 2.0≦TC＜T T−TC≦Lmax.−L	TC (0.6)	Point chamfering  in 0.1 0.2≦HGC＜P/2	HGC (0.9)
Tapping  P M 8～ 9.6 4 10～11.6 5 12・12.1 6 ⚠ T=8 is available only	MC (1.4)	L dimension tolerance alteration  $L^{+0.02}_{0} \rightarrow L^{+0.01}_{0}$	LKC (0.9)
Vent machining  P t 3～ 4.9 0.3 5～ 9.6 0.4 12～12.1 0.5 S・B: in 1 2≦S≦10 S＋5≦B≦30	GVC (3.7)	Engraving on the head  1character→2≦H 2characters→5≦H 3characters→7≦H 4characters→7≦H	NHC 1,2characters (0.2) 3,4characters (0.5)
Vent machining  P t 3～ 4.9 0.3 5～ 9.6 0.4 12～12.1 0.5 in 0.1 1≦GS≦10 GS＋2≦GB≦30 GB＜GC≦L−T	GVD (4.8)	Engraving on the head  1character→2≦H 2characters→5≦H 3characters→7≦H 4characters→7≦H	NHN 1,2characters (0.2) 3,4characters (0.5)
Point R processing  in 0.1 0.2≦HRC＜P/2	HRC (0.9)	Lapping on the point face  P≦6→0.05Ra P＞6→0.1Ra ☒ L＞200.00 is not available.	TMC (4.8)

Code No. | L | T | KC・WKC…etc.
EPHL2 — 148.21 — T4 — TC3.1

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Alteration・Cancel・Return Goods

Alteration・cancelling

alteration・cancelling for ordering are treated differently according to different delivery.

In stock (refer to those that are always kept in storage and can be delivered quickly for ordering product)

Alteration・cancelling should be available before 16:00 on the day before delivery.
Intraday delivery is not available for alteration・cancelling.

※Table for un-stock product cancelling

Delivery / Delivery date is the working days from the order receipt	Products of ordinary delivery									
	1 Day	3 Days	4 Days	5 Days	6 Days	7 Days	8 Days	9 Days	10 Days	12 Days
Intraday (17:00)	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
1st working day	×	Paid	Free	Free	Free	Free	Free	Free	Free	Free
2nd working day	Ship on	×	Paid	Paid	Paid	Free	Free	Free	Free	Free
3rd working day		×	×	Paid	Paid	Paid	Paid	Paid	Free	Free
4th working day		Ship on	×	×	Paid	Paid	Paid	Paid	Paid	Free
5th working day			Ship on	×	×	Paid	Paid	Paid	Paid	Paid
6th working day				Ship on	×	×	Paid	Paid	Paid	Paid
7th working day					Ship on	×	×	Paid	Paid	Paid
8th working day						Ship on	×	×	Paid	Paid
9th working day							Ship on	×	×	Paid
10th working day								Ship on	×	Paid
11th working day									Ship on	×
12th working day										×
13th working day										Ship on

Return goods

In stock	Please contact with the sales staff for return goods.
Time of delivery is 1st working day	For return goods, sales staff will give specific introduction. For return goods due to customer's arrangement, the cost of return goods should be paid by customers.
Time of delivery is after 2nd working day	Product delivered after 2nd working day is based on customer's designation. It isn't available for other products, and can not return goods.
Wrong-sent products	If product you receive is not what you order, please contact sales staff in time so we can replace it with the correct product as soon as possible.

Delivery and Shipping

Delivery

For deatils of working day,
refer to the specific page please.

Delivery day	Delivery
Next working day (In stock)	Next working day
1 Days	Next working day
3 Days	3rd working day
4 Days	4th working day
5 Days	5th working day
6 Days	6th working day
7 Days	7th working day
8 Days	8th working day
9 Days	9th working day
10 Days	10th working day
12 Days	12th working day

How to calculate working day

5 Days 5 working days
Order is made on the 1st day (Saturday) and products are delivered on the 7th (Friday)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1 Ordering day
2	3	4	5	6	7	8
	1st working day	2nd	3rd	4th	5th working day	

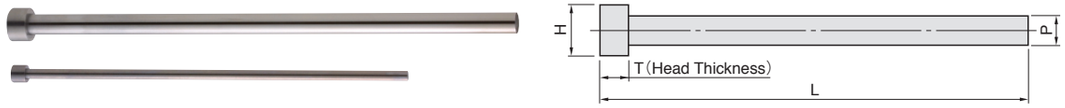
⚠ For quantities more than listed, please inquire the unit price ad delivery day.

▶Quantity discount rate

1～9	10～29	30～99	100～200	201～
100%	95%	90%	85%	Enquiry

STRAIGHT EJECTOR PINS

Guide for Straight Ejector Pins



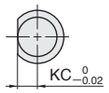
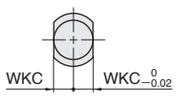
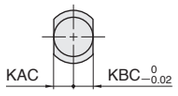
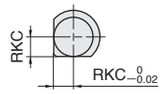
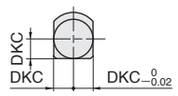
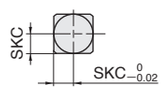
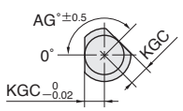
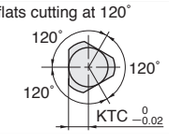
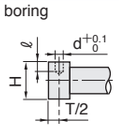
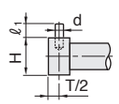
Material	Shank Diameter		Type	Head Thickness	Code	Overall Length(L)		Shank Diameter(P)	Delivery	Page
	Precision	Tolerance				Dimension	Tolerance	Dimension		
SKH51	Precision	$^{0}_{-0.005}$	General type	4・6・8	EPH	50～ 350	$^{+5}_{+0.1}$	0.2～12.1	In stock	20
			L dimension designated type	4・6・8	EPHL	30～ 350	$^{+0.02}_{0}$ ※1	0.2～12.1	3	22
	Standard	$^{-0.01}_{-0.02}$	General type	4・6・8	EPS	60～ 350	$^{+5}_{+0.1}$	0.2～12	In stock	24
			L dimension designated type	4・6・8	EPSL	30～ 350	$^{+0.02}_{0}$ ※1	0.2～12	3	26
SKD61	Standard	$^{-0.01}_{-0.02}$ ※2	General type	4	EP4N	100～ 500	$^{+5}_{+0.1}$	2 ～16	In stock	28
				6・8	EPJN	100～1000		3.6～25		

⚠ ※1 L＞300→L$^{+0.05}_{0}$.

⚠ ※2 The tolerance values for shank diameter are representative ones.For details, refer to the catalog page of each product.

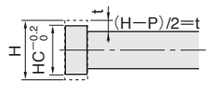
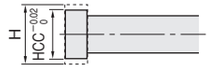
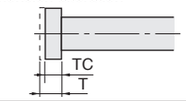
Guide for Straight Ejector Pins Addition

Head alteration

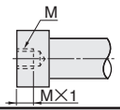
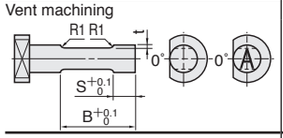
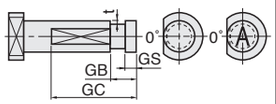
Add.	Code @/P	Spec.
Single flat cutting 	KC(0.5)	●Add a single flat on the head. Range of designation P/2≦KC＜H/2 Unit of designation (in) 0.1 For KC=P/2, the unit is designated in(designated unit of P dimension/2.) Free flange Range of designation D/2+0.1≦KC＜H/2 Unit of designation (in) 0.1 KC1.4,KC0.75
Symmetry parallel flats cutting 	WKC(0.9)	●Add symmetry parallel flats on the head. Range of designation P/2≦WKC＜H/2 Unit of designation (in) 0.1 For WKC=P/2, the unit is designated in(designated unit of P dimension/2.) Free flange Range of designation D/2+0.1≦WKC＜H/2 Unit of designation (in) 0.1 WKC1.4,WKC0.75
Varied width parallel flats cutting 	KAC(1.4) KBC(1.4)	●Add varied width parallel flats on the head. Range of designation P/2≦KAC,KBC＜H/2 Unit of designation (in) 0.1 For KAC,KBC=P/2, the unit is designated in(designated unit of P dimension/2.) Free flange ☒KAC≠KBC Range of designation D/2+0.1≦KAC,KBC＜H/2 Unit of designation (in) 0.1 KAC1.4−KBC1.6
Right-angled two flats cutting 	RKC(0.9)	●Add two right-angled flats on the head. Range of designation P/2≦RKC＜H/2 Unit of designation (in) 0.1 For RKC=P/2, the unit is designated in(designated unit of P dimension/2.) Free flange Range of designation D/2+0.1≦RKC＜H/2 Unit of designation (in) 0.1 RKC1.4,RKC0.75
Right-angled three flats cutting 	DKC(1.4)	●Add three right-angled flats on the head. Range of designation P/2≦DKC＜H/2 Unit of designation (in) 0.1 For DKC=P/2, the unit is designated in(designated unit of P dimension/2.) Free flange Range of designation D/2+0.1≦DKC＜H/2 Unit of designation (in) 0.1 DKC1.4,DKC0.75
Square flats cutting 	SKC(1.8)	●Add a square(four flats) on the head. Range of designation P/2≦SKC＜H/2 Unit of designation (in) 0.1 For SKC=P/2, the unit is designated in(designated unit of P dimension/2.) Free flange Range of designation D/2+0.1≦SKC＜H/2 Unit of designation (in) 0.1 SKC1.4,SKC0.75
Designated-angled two flats cutting 	KGC(1.4)	●Add a flats at the standard (0°), and another at the designated angle. Range of designation P/2≦KGC＜H/2 0＜AG＜360 Unit of designation KGC: (in) 0.1 For KGC=P/2, the unit is designated in(designated unit of P dimension/2.) AG: (in) 1 Free flange Range of designation D/2+0.1≦KGC＜H/2 0＜AG＜360 Unit of designation KGC: (in) 0.1 AG: (in) 1 KGC1.4−AG135
Three flats cutting at 120° 	KTC(1.8)	●Add three flats at 120° on the head. Range of designation P/2≦KTC＜H/2 Unit of designation (in) 0.1 For KTC=P/2, the unit is designated in(designated unit of P dimension/2.) Free flange Range of designation D/2+0.1≦KTC＜H/2 Unit of designation (in) 0.1 KTC1.4,KTC0.75
Dowel hole boring 	NN(0.9)	●Add a dowel hole on the head. ☒H＜4 is not available. ☒Combined with other than NHC･NHN･LKC･TMC･GVC･GVD are not available. NN T d ℓ: 4 2 3; 6 3 5; 8 3 5
Dowel hole+Spring pin 	NC(0.9)	●Add a dowel hole on the head. ☒H＜4 is not available. ☒Combined with other than NHC･NHN･LKC･TMC･GVC･GVD are not available. NC T d ℓ1: 4 2 5; 6 3 5; 8 3 5

☒Flat cutting combined using are not available.

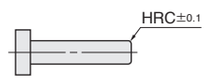
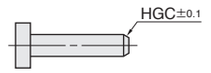
Dimension Alteration

Add.	Code @/P	Spec.
H dimension alteration 	HC(0.6)	●Reduce the head diameter H. Range of designation t＜1:H−1≦HC＜H t≧1:P+1≦HC＜H Unit of designation (in) 0.1 ☒P≦0.6 is not available. HC5.5
H dimension alteration(precision) 	HCC(1.8)	●Reduce the head diameter H(precision). Range of designation P+1≦HCC＜H−0.3 Unit of designation (in) 0.1 ☒P＜1.5 is not available. HCC5.5
T dimension alteration 	TC(0.6)	●Reduce the head thickness Range of designation 2≦TC＜T T−TC≦Lmax.−L Unit of designation (in) 0.1 ⚠L dimension is shortened according to (T−TC)(except L dimension designated type). ☒P≦0.6 is not available. TC3.5

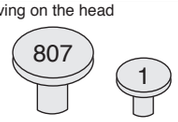
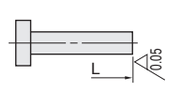
Shape Alteration

Add.	Code @/P	Spec.
Tapping 	MC(1.4)	●Create a tap on the head. ⚠P≧8 is available. ⚠T=8 is available only. ☒Combined with NN･NC･HC･HCC･NHC･NHN are not available. MC P: 8.00～9.99 M4; 10.00～11.99 M5; 12.00～15.99 M6; 16.00～25.99 M8
Vent machining 	GVC(3.7)	●Vent machining Range of designation 2≦S≦10 S+5≦B≦30 Unit of designation (in) 0.1 ☒P＜3 is not available. GVC−S3−B15 P: 3.00～4.99 t0.3; 5.00～9.99 t0.4; 10.00～12.10 t0.5
Vent machining 	GVD(4.8)	●Vent machining Range of designation 1≦GS≦10 GS+2≦GB≦30 GB＜GC≦L−T Unit of designation (in) 0.1 ☒P＜3 is not available. For GVD addition, add one day for delivery. GVD−GS3−GB5−GC30 P: 3.00～4.99 t0.3; 5.00～9.99 t0.4; 10.00～12.10 t0.5

Shape alteration

Add.	Code @/P	Spec.
Point R processing 	HRC(0.9)	●R processing on the point. Range of designation 0.2≦HRC＜P/2 Unit of designation (in) 0.1 ☒P＜0.8 is not available. ☒General & P dimension designated type are not available. ☒Combined with HGC is not available. ⚠No nitrogen treatment on the processed point part for nitriding products. HRC0.3
Point chamfering 	HGC(0.9)	●Chamfering on the point. Range of designation 0.1≦HGC＜P/2 Unit of designation (in) 0.1 ☒P＜0.5 is not available. ☒General & P dimension designated type are not available. ☒Combined with HRC is not available. ⚠No nitrogen treatment on the processed point part for nitriding products. HGC0.2

Others

Add.	Code @/P	Spec.
Engraving on the head 	NHC 1,2 characters (0.2) 3,4 characters (0.5)	●Engrave numbers or characters on the head. Range of application 1 character →2≦H ⚠For 2～4 characters,only the first character may be an alphabet. 2 characters →5≦H ☒H＜2 is not available. 3,4 characters→7≦H ☒Combined with SKC･MC are not available. Character of designated Number 0～9, English letter A～Z. NHC−8
Engraving on the head 	NHN 1,2 characters (0.2) 3,4 characters (0.5)	●Engrave on the head(Add a sequential number on the head of each ejector pin when two or more pieces of identical size are ordered) Range of application 1 character →2≦H ⚠For 2～4 characters,only the first character may be an alphabet. 2 characters →5≦H ☒H＜2 is not available. 3,4 characters→7≦H ☒Combined with SKC･MC are not available. Character of designated Number 0～9, English letter A～Z. For ordering 3 pieces with NHN-5, sequential number started from 5 is added on the head on each piece.
Lapping on the point face 	TMC(4.8)	●Alter the roughness on the point face. Range of application P≦6:1.6Ra→0.05Ra P＞6:1.6Ra→0.1Ra ☒P＜0.6 is not available. ☒L＞200 is not available. TMC

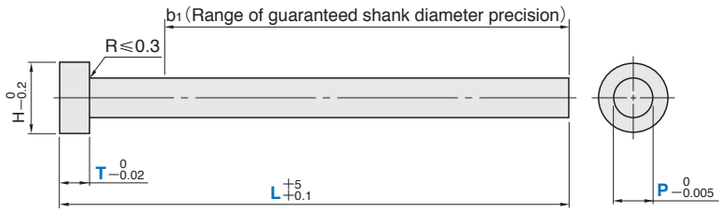
Precision Straight Ejector Pins

General Type

In stock

Material	Hardness	Code
SKH51	59～61HRC	EPH

⚠ Range of guaranteed shank diameter precision:b1 ≈LX2/3 ☞ P.240
⚠ Range of guaranteed base material hardness ☞ P.241



Code No. Code	P	L	T	H
EPH	0.2	50 60	4	2
	0.3	50 60		
	0.4	50 60 100		3
	0.5	60 100		
	0.6 0.7 0.8 0.9	100 150		
	1 1.1 1.2 1.3 1.4	100 150 200		4
	1.5 1.6	100 150 200 250		
	1.7 1.8 1.9	100 150 200		
	2	100 150 200 250 300		5
	2.1	100 150 200 250		
	2.2 2.3 2.4	100 150 200		
	2.5	100 150 200 250 300		6
	2.6	100 150 200 250		
	2.7 2.8 2.9	100 150 200		
	3	100 150 200 250 300 350		
	3.1	100 150 200 250		7
	3.2 3.3 3.4	100 150 200	4・6	
	3.5	100 150 200 250 300 (350)		
	3.6	100 150 200 250		
	3.7 3.8 3.9	100 150 200		9
	4	100 150 200 250 300 (350)		
	4.1	100 150 200 250		
	4.2	100 150 200	4	
	4.3	100 150 200	4・6	
	4.4	100 150 200	4	
	4.5	100 150 200 250 300 (350)	4・6	
	4.6	100 150 200 250		
	4.7 4.8 4.9	100 150 200	4	
	5	100 150 200 250 300 350		
	5.1	100 150 200 250		10
	5.5	100 150 200 250 300 350	4・6	
	5.6	100 150 200 250		
	6	100 150 200 250 300 350		
	6.1	100 150 200 250		
	6.5	100 150 200 250 300 350		11
	6.6	100 150 200 250		
	7	100 150 200 250 300 350		13
	7.1	100 150 200 250		
	7.5 7.6	100 150 200 250		
	8	100 150 200 250 300 350		14
	8.1	100 150 200 250		
	8.5 8.6	(100) 150 200 250		
	9	100 150 200 250 300 350		15
	9.1	100 150 200 250	4・8	
	9.5 9.6	(100) 150 200 (250)		
	10	100 150 200 250 300 350		16
	10.1	100 150 200 250		
	10.5 10.6	100 150 200 250		
	11	100 150 200 250 300		17
	11.1	100 150 200 250		
	11.5	(100) 150 200 250		
	11.6	(100) 150 200 (250)		
	12	100 150 200 250 300 350		
	12.1	150 200 250		

⚠ L dimension in ( ) is for T=4 only.

ORDER

Code No.	L	T
EPH2 —	150 —	4

DELIVERY Next In stock working day ☞ P.15

⚠ For P＜1.0, 3 days; For P=0.2, please enquire.

PRICE Without tax

▶Quantity discount rate ☞ P.15

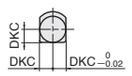
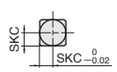
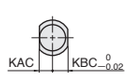
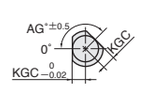
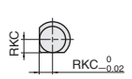
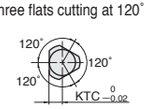
1～49	50～100	101～
100%	95%	Enquiry

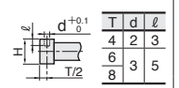
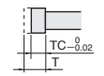
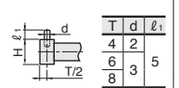
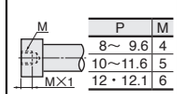
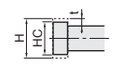
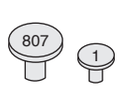
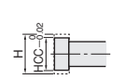
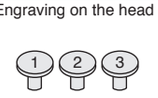
Code No. Code	P	@/P(1～49P) L50	L60	L100	L150	L200	L250	L300	L350
EPH	0.2	17.4	17.4	—	—	—	—	—	—
	0.3	4.80	4.80	—	—	—	—	—	—
	0.4	3.80	3.80	4.03	—	—	—	—	—
	0.5	—	1.42	1.59	—	—	—	—	—
	0.6	—	—	1.22	1.37	—	—	—	—
	0.7	—	—	1.04	1.17	—	—	—	—
	0.8 0.9	—	—	1.00	1.09	—	—	—	—
	1 1.1	—	—	0.95	1.06	1.23	—	—	—
	1.2 1.3 1.4	—	—	0.77	0.87	1.14	—	—	—
	1.5	—	—	0.77	0.87	1.11	1.99	—	—
	1.6 1.7 1.8 1.9	—	—	0.77	0.87	1.03	2.09	—	—
	2	—	—	0.77	0.87	1.03	1.68	2.24	—
	2.1 2.2 2.3 2.4	—	—	0.87	1.03	1.07	2.18	—	—
	2.5	—	—	0.87	1.03	1.07	1.74	2.30	—
	2.6 2.7 2.8 2.9	—	—	0.87	1.07	1.17	2.30	—	—
	3	—	—	0.87	1.07	1.23	2.05	2.67	9.11
	3.1 3.2 3.3 3.4	—	—	1.17	1.38	1.48	2.24	—	—
	3.5	—	—	1.17	1.38	1.48	2.20	2.92	9.78
	3.6 3.7 3.8 3.9	—	—	1.28	1.48	1.58	2.40	—	—
	4	—	—	1.28	1.48	1.58	2.34	3.02	10.3
	4.1	—	—	2.11	2.53	2.70	3.36	—	—
	4.2 4.3 4.4	—	—	2.21	2.25	2.48	—	—	—
	4.5	—	—	1.55	1.61	1.75	2.89	3.64	11.2
	4.6	—	—	2.56	2.67	2.90	3.99	—	—

Code No. Code	P	@/P(1～49P) L100	L150	L200	L250	L300	L350
EPH	4.7 4.8 4.9	2.64	2.81	3.03	—	—	—
	5	1.58	1.64	1.80	2.95	3.81	11.4
	5.1	2.53	2.64	2.87	3.95	—	—
	5.5	1.64	1.74	1.96	3.11	4.09	11.9
	5.6	2.64	2.81	3.08	4.55	—	—
	6	1.62	1.73	1.95	3.30	4.21	12.3
	6.1	2.64	2.81	3.08	4.55	—	—
	6.5	1.74	1.96	2.12	3.61	4.59	15.3
	6.6	2.81	3.08	3.45	5.40	—	—
	7	1.74	1.96	2.12	3.87	5.02	15.8
	7.1	2.81	3.08	3.45	5.40	—	—
	7.5	3.15	3.08	3.40	5.68	—	—
	7.6	4.58	4.92	5.18	5.90	—	—
	8	2.46	2.56	2.89	4.39	5.46	17.7
	8.1	3.95	4.21	4.65	5.68	—	—
	8.5 8.6	5.40	5.52	5.89	6.75	—	—
	9	2.78	2.84	3.17	4.86	6.50	18.4
	9.1	5.02	5.50	5.89	7.11	—	—
	9.5 9.6	5.56	5.84	6.11	6.90	—	—
	10	3.06	3.27	3.65	5.14	7.43	20.2
	10.1	4.81	5.18	5.78	6.61	—	—
	10.5 10.6 11 11.1	5.90	6.56	6.89	8.80	8.86	—
	11.5 11.6	6.45	6.81	7.62	9.03	—	—
	12	4.02	4.27	4.75	7.14	9.78	27.1
	12.1	—	6.92	7.62	9.03	—	—

ADDITION

Addition details ☞ P.18

Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting  in 0.1 P/2≤KC＜H/2	KC (0.5)	Right-angled three flats cutting  in 0.1 P/2≤DKC＜H/2	DKC (1.4)
Parallel flats cutting  in 0.1 P/2≤WKC＜H/2	WKC (0.9)	Square flats cutting  in 0.1 P/2≤SKC＜H/2	SKC (1.8)
Parallel flats cutting  in 0.1 P/2≤KAC,KBC＜H/2	KAC (1.4) KBC (1.4)	Designated-angled two flats cutting  KGC: in 0.1 AG: in 1 P/2≤KGC＜H/2 0＜AG＜360°	KGC (1.4)
Right-angled two flats cutting  in 0.1 P/2≤RKC＜H/2	RKC (0.9)	Three flats cutting at 120°  in 0.1 P/2≤KTC＜H/2	KTC (1.8)

Add.	Code (@/P)	Add.	Code (@/P)
Dowel hole boring 	NN (0.9)	T dimension alteration  in 0.1 2.0≤TC＜T T−TC≤Lmax.−L	TC (0.6)
Dowel hole＋Spring pin 	NC (0.9)	Tapping  ⚠ T=8 is available only	MC (1.4)
H dimension alteration  in 0.1 t＜1→H−1≤HC＜H t≥1→P＋1≤HC＜H	HC (0.6)	Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
H dimension alteration (precision)  in 0.1 P＋1≤HCC＜H−0.3	HCC (1.8)	Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHN 1,2characters (0.2) 3,4characters (0.5)

Code No.	L	T	KC・WKC・・・etc.
EPH2 —	150 —	T4 —	TC3.1

3 Days ☞ P.15

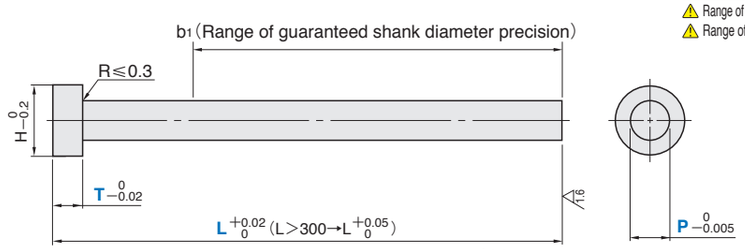
Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Precision Straight Ejector Pins

L Dimension Designated Type

Material	Hardness	Code
SKH51	59～61HRC	EPHL

⚠ Range of guaranteed shank diameter precision: b_1 ☞ P.240
⚠ Range of guaranteed base material hardness ☞ P.241



⚠ For LKC addition, the tolerance of L dimension is $^{+0.01}_{0}$.

Code No. Code	P	L ㎜ 0.01	T	H
EPHL	0.2	30.00～ 60.00	4	2
	0.3	30.00～ 60.00		
	0.4	30.00～100.00		3
	0.5	40.00～100.00		
	0.6 0.7 0.8 0.9	40.00～150.00		
	1 1.1 1.2 1.3 1.4	40.00～200.00		
	1.5 1.6	40.00～250.00		
	1.7 1.8 1.9	40.00～200.00		4
	2	40.00～300.00		
	2.1	40.00～250.00		
	2.2 2.3 2.4	40.00～200.00		5
	2.5	40.00～300.00		
	2.6	40.00～250.00		
	2.7 2.8 2.9	40.00～200.00		
	3	40.00～350.00		6
	3.1	40.00～250.00		
	3.2 3.3 3.4	40.00～200.00	4・6	7
	(3.5)	40.00～350.00		
	3.6	40.00～250.00		
	3.7 3.8 3.9	40.00～200.00		
	(4)	40.00～350.00		
	4.1	40.00～250.00		
	4.2	40.00～200.00	4	9
	4.3	40.00～200.00	4・6	
	4.4	40.00～200.00	4	
	(4.5)	40.00～350.00	4・6	
	4.6	40.00～250.00		
	4.7 4.8 4.9	40.00～200.00	4	
	5	40.00～350.00	4・6	10
	5.1	40.00～250.00		
	5.5	40.00～350.00		
	5.6	40.00～250.00		
	6	40.00～350.00		
	6.1	40.00～250.00		
	6.5	40.00～350.00	4・8	11
	6.6	40.00～250.00		
	7	40.00～350.00		
	7.1	40.00～250.00		
	7.5 7.6	40.00～250.00		13
	8	40.00～350.00		
	8.1	40.00～250.00		
	8.5 8.6	40.00～250.00		14
	9	40.00～350.00		
	9.1	40.00～250.00		
	9.5 9.6	40.00～250.00		15
	10	40.00～350.00		
	10.1	40.00～250.00		
	10.5 10.6	40.00～250.00		16
	11	40.00～300.00		
	11.1	40.00～250.00		
	11.5	40.00～250.00		17
	11.6	40.00～250.00		
	12	40.00～350.00		
	12.1	40.00～250.00		

⚠ P dimension in ( ) is for Lmax.=300.

ORDER

Code No.	L	T
EPHL2 —	148.21 —	T4

DELIVERY 3 Days ☞ P.15

⚠ For P=0.2, please enquire.

PRICE Without tax

▶Quantity discount rate ☞ P.15

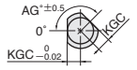
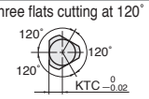
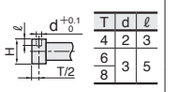
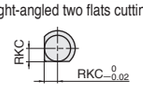
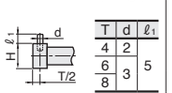
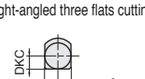
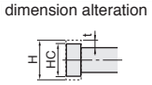
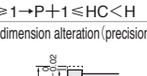
1～30	31～50	51～100	101～
100%	95%	90%	Enquiry

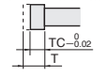
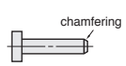
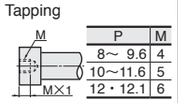
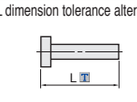
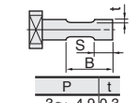
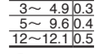
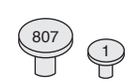
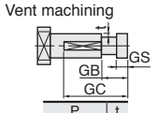
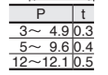
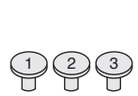
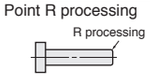
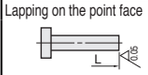
Code No. Code	P	@/P(1～30P) L 30.00 ～100.00	L 100.01 ～150.00	L 150.01 ～200.00	L 200.01 ～250.00	L 250.01 ～300.00	L 300.01 ～350.00
EPHL	0.2	24.2	–	–	–	–	–
	0.3	5.49	–	–	–	–	–
	0.4	4.55	–	–	–	–	–
	0.5	3.61	–	–	–	–	–
	0.6 0.7	1.80	2.86	–	–	–	–
	0.8 0.9	1.64	1.98	–	–	–	–
	1 1.1	1.32	1.48	2.20	–	–	–
	1.2 1.3 1.4	1.26	1.37	1.98	–	–	–
	1.5	1.26	1.37	1.58	2.64	–	–
	1.6 1.7 1.8 1.9	1.26	1.37	1.42	3.56	–	–
	2	1.26	1.37	1.37	2.08	2.99	–
	2.1 2.2 2.3 2.4	1.32	1.42	1.53	3.45	–	–
	2.5	1.32	1.42	1.53	2.14	3.05	–
	2.6 2.7 2.8 2.9	1.32	1.42	1.53	3.67	–	–
	3	1.37	1.48	1.58	2.36	3.34	10.8
	3.1 3.2 3.3 3.4	1.70	1.70	1.80	3.50	–	–
	3.5	1.70	1.70	1.80	2.64	3.67	12.0
	3.6 3.7 3.8 3.9	1.70	1.80	1.98	3.73	–	–
	4	1.70	1.80	1.98	2.80	4.00	12.5
	4.1	3.02	3.49	3.75	4.49	–	–
	4.2 4.3 4.4	3.34	3.42	3.68	–	–	–
	4.5	2.42	2.42	2.61	3.75	5.36	13.2
	4.6	3.49	3.68	3.95	5.30	–	–
	4.7 4.8 4.9	3.93	4.15	4.42	–	–	–

Code No. Code	P	@/P(1～30P) L 40.00 ～100.00	L 100.01 ～150.00	L 150.01 ～200.00	L 200.01 ～250.00	L 250.01 ～300.00	L 300.01 ～350.00
EPHL	5	2.42	2.53	2.68	4.02	5.71	13.9
	5.1	3.49	3.68	3.95	5.36	–	–
	5.5	2.61	2.68	2.87	4.15	5.77	14.4
	5.6	3.68	3.89	4.23	5.98	–	–
	6	2.61	2.68	2.87	4.42	6.31	14.9
	6.1	4.02	4.15	4.49	6.31	–	–
	6.5	2.87	3.08	3.28	5.30	6.84	18.0
	6.6	4.15	4.49	4.90	7.39	–	–
	7	2.87	3.08	3.34	5.71	7.39	18.4
	7.1	4.15	4.49	4.90	7.39	–	–
	7.5	4.83	4.83	5.23	8.31	–	–
	7.6	6.78	6.78	7.05	8.75	–	–
	8	3.89	3.89	4.23	5.77	8.20	20.2
	8.1	5.56	5.83	6.43	7.71	–	–
	8.5 8.6	6.78	7.45	7.86	9.39	–	–
	9	4.23	4.36	4.64	6.58	9.12	21.7
	9.1	6.78	7.45	7.86	9.33	–	–
	9.5 9.6	7.71	7.71	8.05	9.55	–	–
	10	4.49	4.49	4.90	6.84	9.65	23.0
	10.1	6.64	7.05	7.86	8.78	–	–
	10.5 10.6	8.78	8.78	9.12	12.2	–	–
	11	8.78	8.78	9.12	12.2	13.7	–
	11.1 11.5 11.6	9.12	9.12	10.1	12.5	–	–
	12	6.03	6.03	6.64	9.65	12.9	28.7
	12.1	9.12	9.12	10.1	12.5	–	–

ADDITION

Addition details ☞ P.18

Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting  ㎜ 0.1 P/2≤KC<H/2	KC (0.5)	Designated-angled two flats cutting  KGC: ㎜ 0.1 AG: ㎜ 1 P/2≤KGC<H/2 0<AG<360	KGC (1.4)
Parallel flats cutting  ㎜ 0.1 P/2≤WKC<H/2	WKC (0.9)	Three flats cutting at 120°  ㎜ 0.1 P/2≤KTC<H/2	KTC (1.8)
Parallel flats cutting  ㎜ 0.1 P/2≤KAC,KBC<H/2	KAC (1.4) KBC (1.4)	Dowel hole boring 	NN (0.9)
Right-angled two flats cutting  ㎜ 0.1 P/2≤RKC<H/2	RKC (0.9)	Dowel hole+Spring pin 	NC (0.9)
Right-angled three flats cutting  ㎜ 0.1 P/2≤DKC<H/2	DKC (1.4)	H dimension alteration  ㎜ 0.1 t<1→H−1≤HC<H t≥1→P+1≤HC<H	HC (0.6)
Square flats cutting  ㎜ 0.1 P/2≤SKC<H/2	SKC (1.8)	H dimension alteration (precision)  ㎜ 0.1 P+1≤HCC<H−0.3	HCC (1.8)

Add.	Code (@/P)	Add.	Code (@/P)
T dimension alteration  ㎜ 0.1 2.0≤TC<T T−TC≤Lmax.−L	TC (0.6)	Point chamfering  ㎜ 0.1 0.1≤HGC<P/2	HGC (0.9)
Tapping  ⚠ T=8 is available only	MC (1.4)	L dimension tolerance alteration 	LKC (0.9)
Vent machining   S・B: ㎜ 1 2≤S≤10 S+5≤B≤30	GVC (3.7)	Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
Vent machining   ㎜ 0.1 1≤GS≤10 GS+2≤GB≤30 GB<GC≤L−T	GVD (4.8)	Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHN 1,2characters (0.2) 3,4characters (0.5)
Point R processing  ㎜ 0.1 0.2≤HRC<P/2	HRC (0.9)	Lapping on the point face  P≤6→0.05Ra P>6→0.1Ra ☒ L>200.00 is not available.	TMC (4.8)

Code No.	L	T	KC・WKC…etc.
EPHL2 —	148.21 —	T4 —	TC3.1

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

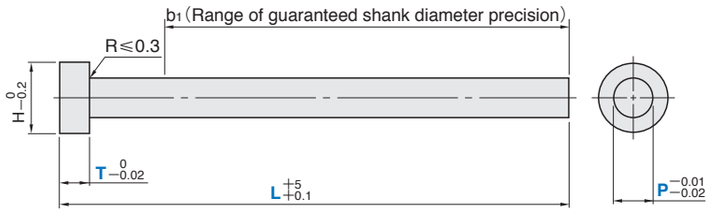
Standard Straight Ejector Pins

General Type

In stock

Material	Hardness	Code
SKH51	59～61HRC	EPS

⚠ Range of guaranteed shank diameter precision:b1 ≈LX2/3 ☞P.240
⚠ Range of guaranteed base material hardness ☞P.241



Code No. Code	P	L	T	H
EPS	0.2 0.3	60	4	2
	0.4	60 100		
	0.5	60 100		3
	0.6 0.7 0.8 0.9	100 150		
	1 1.1 1.2 1.3 1.4	100 150 200		
	1.5 1.6	100 150 200 250		
	1.7 1.8 1.9	100 150 200		4
	2	100 150 200 250 300		
	2.1	100 150 200 250		
	2.2 2.3 2.4	100 150 200		5
	2.5	100 150 200 250 300		
	2.6	100 150 200 250		
	2.7 2.8 2.9	100 150 200		6
	3	100 150 200 250 300 350		
	3.1	100 150 200 250		
	3.2 3.3 3.4	100 150 200		7
	3.5	100 150 200 250 300 (350)	4・6	
	3.6	100 150 200 250	4	
	3.7 3.8 3.9	100 150 200		
	4	100 150 200 250 300 (350)	4・6	
	4.1	100 150 200 250		
	4.2	100 150 200	4	9
	4.3 4.4	100 150 200		
	4.5	100 150 200 250 300 (350)	4・6	
	4.6	100 150 200 250	4	
	4.7 4.8 4.9	100 150 200		
	5	100 150 200 250 300 350	4・6	
	5.1	100 150 200 250	4	
	5.5	100 150 200 250 300 350	4・6	10
	5.6	100 150 200 250	4	
	6	100 150 200 250 300 350	4・6	
	6.1	100 150 200 250	4	
	6.5	100 150 200 250 300 350	4・8	11
	6.6	100 150 200 250	4	
	7	100 150 200 250 300 350	4・8	
	7.1	100 150 200 250	4	
	7.5	100 150 200 250	4・8	13
	7.6	100 150 200 250	4	
	8	100 150 200 250 300 350	4・8	
	8.1	100 150 200 250	4	
	8.5	(100) 150 200 250	4・8	14
	8.6	100 150 200 250	4	
	9	100 150 200 250 300 350	4・8	
	9.1	100 150 200 250	4	
	9.5 9.6	100 150 200 250		15
	10	100 150 200 250 300 350	4・8	
	10.1	100 150 200 250	4	
	10.5	100 150 200 250	4・8	16
	10.6	100 150 200 250	4	
	11	100 150 200 250 300	4・8	
	11.1	100 150 200 250	4	
	11.5 11.6	100 150 200 250		17
	12	150 200 250 300 350	4・8	

⚠ L dimension in ( ) is for T=4 only.

ORDER

Code No.	L	T
EPS2 —	150 —	T4

DELIVERY Next In stock working day ☞P.15

⚠ For P<1.0, 3 days; For P=0.2, please enquire.

PRICE Without tax

▶Quantity discount rate ☞P.15

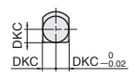
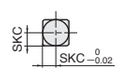
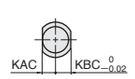
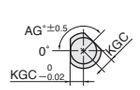
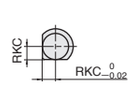
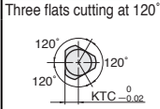
1～49	50～100	101～
100%	95%	Enquiry

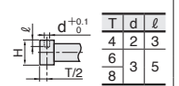
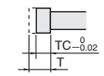
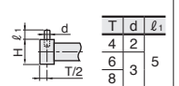
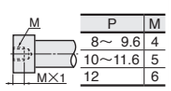
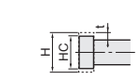
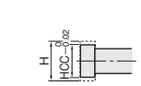
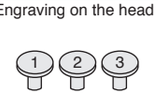
Code No. Code	P	@/P(1～49P) L60	L100	L150	L200	L250	L300	L350
EPS	0.2	17.3	—	—	—	—	—	—
	0.3	4.80	—	—	—	—	—	—
	0.4	3.80	4.03	—	—	—	—	—
	0.5	1.42	1.59	—	—	—	—	—
	0.6	—	1.22	1.43	—	—	—	—
	0.7	—	1.04	1.17	—	—	—	—
	0.8	—	1.00	1.09	—	—	—	—
	0.9	—	1.03	1.17	—	—	—	—
	1 1.1	—	0.95	1.06	1.23	—	—	—
	1.2 1.3 1.4	—	0.77	0.87	1.28	—	—	—
	1.5	—	0.77	0.87	1.23	1.99	—	—
	1.6 1.7 1.8 1.9	—	0.77	0.87	1.03	2.09	—	—
	2	—	0.77	0.87	1.03	1.68	2.24	
	2.1 2.2 2.3 2.4	—	0.87	1.03	1.07	2.18	—	—
	2.5	—	0.87	1.03	1.07	1.74	2.30	
	2.6 2.7 2.8 2.9	—	0.87	1.07	1.17	2.30	—	—
	3	—	0.87	1.07	1.23	2.05	2.67	9.11
	3.1 3.2 3.3 3.4	—	1.17	1.38	1.48	2.24	—	—
	3.5	—	1.17	1.33	1.48	2.20	2.92	9.78
	3.6 3.7 3.8 3.9	—	1.28	1.48	1.58	2.40	—	—
	4	—	1.23	1.44	1.53	2.34	3.02	10.3
	4.1	—	2.11	2.53	2.70	3.36	—	—
	4.2 4.3 4.4	—	2.17	2.28	2.50	—	—	—
	4.5	—	1.56	1.56	1.73	2.92	3.68	11.2
	4.6	—	2.56	2.67	2.90	3.99	—	—

Code No. Code	P	@/P(1～49P) L100	L150	L200	L250	L300	L350
EPS	4.7 4.8 4.9	2.64	2.81	3.03	—	—	—
	5	1.52	1.58	1.74	2.95	3.81	11.4
	5.1	2.53	2.64	2.87	3.95	—	—
	5.5	1.62	1.68	1.89	3.08	4.05	11.9
	5.6	2.64	2.81	3.08	4.55	—	—
	6	1.58	1.70	1.90	3.33	4.25	12.3
	6.1	2.64	2.81	3.08	4.55	—	—
	6.5	1.74	1.90	2.06	3.61	4.59	15.3
	6.6	2.81	3.08	3.45	5.40	—	—
	7	1.73	1.89	2.05	3.83	4.98	15.8
	7.1	2.81	3.08	3.45	5.40	—	—
	7.5	2.87	3.09	3.42	5.52	—	—
	7.6	4.58	4.90	5.18	5.90	—	—
	8	2.49	2.53	2.87	4.43	5.40	17.7
	8.1	3.95	4.21	4.65	5.68	—	—
	8.5	5.24	5.36	5.74	6.68	—	—
	8.6	5.24	5.36	5.74	6.68	—	—
	9	2.75	2.81	3.14	4.81	6.43	18.4
	9.1	4.37	4.67	5.12	6.21	—	—
	9.5 9.6	5.56	5.68	6.06	6.90	—	—
	10	3.06	3.21	3.61	5.14	7.27	20.2
	10.1	4.81	5.18	5.78	6.61	—	—
	10.5 10.6 11 11.1	5.98	6.30	6.62	8.45	8.56	—
	11.5 11.6	6.45	6.78	7.28	8.73	—	—
	12	—	4.25	4.81	6.99	9.59	27.1

ADDITION

Addition details ☞P.18

Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting	KC(0.5)	Right-angled three flats cutting	DKC(1.4)
			
ⓘ 0.1 P/2≤KC<H/2		ⓘ 0.1 P/2≤DKC<H/2	
Parallel flats cutting	WKC(0.9)	Square flats cutting	SKC(1.8)
			
ⓘ 0.1 P/2≤WKC<H/2		ⓘ 0.1 P/2≤SKC<H/2	
Parallel flats cutting	KAC(1.4) KBC(1.4)	Designated-angled two flats cutting	KGC(1.4)
			
ⓘ 0.1 P/2≤KAC,KBC<H/2		KGC: ⓘ 0.1 AG: ⓘ 1 P/2≤KGC<H/2 0<AG<360	
Right-angled two flats cutting	RKC(0.9)	Three flats cutting at 120°	KTC(1.8)
			
ⓘ 0.1 P/2≤RKC<H/2		ⓘ 0.1 P/2≤KTC<H/2	

Add.	Code(@/P)	Add.	Code(@/P)
Dowel hole boring	NN(0.9)	T dimension alteration	TC(0.6)
			
ⓘ 0.1 t<1→H−1≤HC<H t≥1→P+1≤HC<H		ⓘ 0.1 2.0≤TC<T T−TC≤Lmax.−L	
Dowel hole+Spring pin	NC(0.9)	Tapping	MC(1.4)
			
		⚠ T=8 is available only	
H dimension alteration	HC(0.6)	Engraving on the head	NHC 1,2characters (0.2) 3,4characters (0.5)
			
ⓘ 0.1 t<1→H−1≤HC<H t≥1→P+1≤HC<H		1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	
H dimension alteration(precision)	HCC(1.8)	Engraving on the head	NHN 1,2characters (0.2) 3,4characters (0.5)
			
ⓘ 0.1 P+1≤HCC<H−0.3		1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	

ORDER

Code No.	L	T	KC・WKC・・・etc.
EPS2 —	150 —	T4 —	TC3.1

3 Days ☞P.15

Product unit price+Addition unit price.
Price discount is also available for addition. ☞P.14

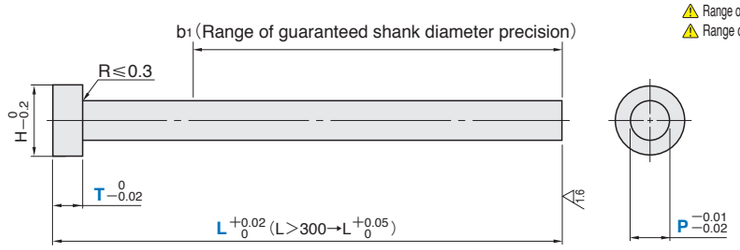
Straight Ejector Pins

Standard Straight Ejector Pins

L Dimension Designated Type

Material	Hardness	Code
SKH51	59～61HRC	EPSL

⚠ Range of guaranteed shank diameter precision: b_1 ☞ P.240
⚠ Range of guaranteed base material hardness ☞ P.241



⚠ For LKC addition the tolerance of L dimension is $^{+0.01}_{0}$.

Code	Code No. P	L ㎜ 0.01	T	H
EPSL	0.2 0.3	30.00～ 60.00	4	2
	0.4	30.00～100.00		
	0.5	40.00～100.00		3
	0.6 0.7 0.8 0.9	40.00～150.00		
	1 1.1 1.2 1.3 1.4	40.00～200.00		
	1.5 1.6	40.00～250.00		
	1.7 1.8 1.9	40.00～200.00		4
	2	40.00～300.00		
	2.1	40.00～250.00		
	2.2 2.3 2.4	40.00～200.00		5
	2.5	40.00～300.00		
	2.6	40.00～250.00		
	2.7 2.8 2.9	40.00～200.00		6
	3	40.00～350.00		
	3.1	40.00～250.00		
	3.2 3.3 3.4	40.00～200.00		7
	3.5	40.00～350.00	4・6	
	3.6	40.00～250.00	4	
	3.7 3.8 3.9	40.00～200.00		
	4	40.00～350.00	4・6	
	4.1	40.00～250.00	4	
	4.2	40.00～200.00		9
	4.3 4.4	40.00～200.00		
	4.5	40.00～350.00	4・6	
	4.6	40.00～250.00	4	
	4.7 4.8 4.9	40.00～200.00		
	5	40.00～350.00	4・6	
	5.1	40.00～250.00	4	
	5.5	40.00～350.00	4・6	10
	5.6	40.00～250.00	4	
	6	40.00～350.00	4・6	
	6.1	40.00～250.00	4	
	6.5	40.00～350.00	4・8	11
	6.6	40.00～250.00	4	
	7	40.00～350.00	4・8	
	7.1	40.00～250.00	4	
	7.5	40.00～250.00	4・8	13
	7.6	40.00～250.00	4	
	8	40.00～350.00	4・8	
	8.1	40.00～250.00	4	
	8.5	40.00～250.00	4・8	14
	8.6	40.00～250.00	4	
	9	40.00～350.00	4・8	
	9.1	40.00～250.00	4	
	9.5 9.6	40.00～250.00		15
	10	40.00～350.00	4・8	
	10.1	40.00～250.00	4	
	10.5	40.00～250.00	4・8	16
	10.6	40.00～250.00	4	
	11	40.00～300.00	4・8	
	11.1	40.00～250.00	4	
	11.5 11.6	40.00～250.00		17
	12	40.00～350.00	4・8	

⚠ P4.5 is for Lmax.=300.

ORDER

Code No.	L	T
EPSL2 —	148.21 —	T4

DELIVERY 3 Days ☞ P.15

⚠ For P=0.2 Please enquire.

PRICE Without tax

▶Quantity discount rate ☞ P.15

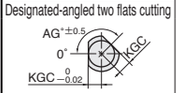
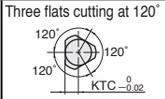
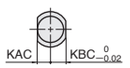
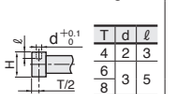
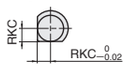
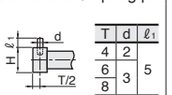
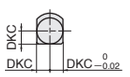
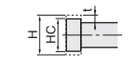
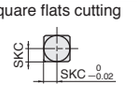
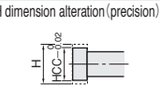
1～30	31～50	51～100	101～
100%	95%	90%	Enquiry

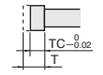
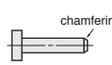
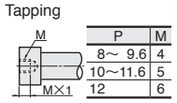
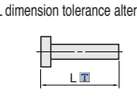
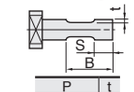
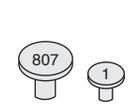
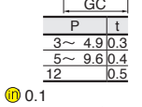
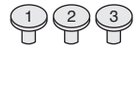
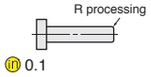
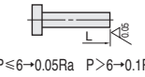
Code	Code No. P	@/P(1～30P) L 30.00～100.00	L 100.01～150.00	L 150.01～200.00	L 200.01～250.00	L 250.01～300.00	L 300.01～350.00
EPSL	0.2	20.3	—	—	—	—	—
	0.3	5.49	—	—	—	—	—
	0.4	4.55	—	—	—	—	—
	0.5	3.61	—	—	—	—	—
	0.6 0.7	1.80	2.80	—	—	—	—
	0.8 0.9	1.64	1.98	—	—	—	—
	1 1.1	1.32	1.48	2.20	—	—	—
	1.2 1.3 1.4	1.26	1.37	1.98	—	—	—
	1.5	1.26	1.37	1.53	2.64	—	—
	1.6 1.7 1.8 1.9	1.26	1.37	1.42	2.83	—	—
	2	1.26	1.37	1.37	2.08	2.99	—
	2.1 2.2 2.3 2.4	1.32	1.42	1.53	3.40	—	—
	2.5	1.32	1.42	1.53	2.14	3.05	—
	2.6 2.7 2.8 2.9	1.32	1.42	1.53	3.17	—	—
	3	1.37	1.48	1.58	2.36	3.34	10.8
	3.1 3.2 3.3 3.4	1.70	1.70	1.80	3.11	—	—
	3.5	1.70	1.70	1.80	2.64	3.67	12.0
	3.6 3.7 3.8 3.9	1.70	1.80	1.98	3.05	—	—
	4	1.70	1.80	1.98	2.80	4.00	12.5
	4.1	3.02	3.49	3.75	4.49	—	—
	4.2 4.3 4.4	3.45	3.52	3.80	—	—	—
	4.5	2.42	2.42	2.61	3.75	5.36	13.2
	4.6	3.49	3.68	3.95	5.30	—	—
	4.7 4.8 4.9	3.93	4.15	4.42	—	—	—

Code	Code No. P	@/P(1～30P) L 40.00～100.00	L 100.01～150.00	L 150.01～200.00	L 200.01～250.00	L 250.01～300.00	L 300.01～350.00
EPHL	5	2.42	2.53	2.68	4.02	5.71	13.9
	5.1	3.49	3.68	3.95	5.36	—	—
	5.5	2.61	2.68	2.87	4.15	5.77	14.4
	5.6	3.68	3.89	4.23	5.98	—	—
	6	2.61	2.68	2.87	4.42	6.31	14.9
	6.1	4.02	4.15	4.49	6.31	—	—
	6.5	2.87	3.08	3.28	5.30	6.84	18.0
	6.6	4.15	4.49	4.90	7.39	—	—
	7	2.87	3.08	3.34	5.71	7.39	18.4
	7.1	4.15	4.49	4.90	7.39	—	—
	7.5	3.89	3.89	4.23	7.89	—	—
	7.6	6.43	6.78	7.06	8.30	—	—
	8	3.89	3.89	4.23	5.77	8.20	20.2
	8.1	5.56	5.83	6.43	7.71	—	—
	8.5 8.6	6.78	7.12	7.45	8.92	—	—
	9	4.23	4.36	4.64	6.58	9.12	21.7
	9.1	6.30	7.12	7.27	8.64	—	—
	9.5 9.6	7.12	7.33	7.75	8.84	—	—
	10	4.49	4.49	4.90	6.84	9.65	23.0
	10.1	6.64	7.05	7.86	8.78	—	—
	10.5 10.6	8.39	8.39	8.73	11.6	—	—
	11	8.39	8.39	8.73	11.6	13.0	—
	11.1 11.5 11.6	8.43	8.58	9.33	11.5	—	—
	12	6.03	6.03	6.64	9.46	12.9	28.7

ADDITION

Addition details ☞ P.18

Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting  ㎜ 0.1 P/2≤KC<H/2	KC (0.5)	Designated-angled two flats cutting  KGC: ㎜ 0.1 AG: ㎜ 1 P/2≤KGC<H/2 0<AG<360	KGC (1.4)
Parallel flats cutting  ㎜ 0.1 P/2≤WKC<H/2	WKC (0.9)	Three flats cutting at 120°  ㎜ 0.1 P/2≤KTC<H/2	KTC (1.8)
Parallel flats cutting  ㎜ 0.1 P/2≤KAC,KBC<H/2	KAC (1.4) KBC (1.4)	Dowel hole boring  T d ℓ: 4 2 3; 6 8 3 5	NN (0.9)
Right-angled two flats cutting  ㎜ 0.1 P/2≤RKC<H/2	RKC (0.9)	Dowel hole+Spring pin  T d ℓ1: 4 2; 6 8 3 5	NC (0.9)
Right-angled three flats cutting  ㎜ 0.1 P/2≤DKC<H/2	DKC (1.4)	H dimension alteration  ㎜ 0.1 t<1→H−1≤HC<H t≥1→P+1≤HC<H	HC (0.6)
Square flats cutting  ㎜ 0.1 P/2≤SKC<H/2	SKC (1.8)	H dimension alteration (precision)  ㎜ 0.1 P+1≤HCC<H−0.3	HCC (1.8)

Add.	Code (@/P)	Add.	Code (@/P)
T dimension alteration  ㎜ 0.1 2.0≤TC<T T−TC≤Lmax.−L	TC (0.6)	Point chamfering  ㎜ 0.1 0.1≤HGC<P/2	HGC (0.9)
Tapping  P M: 8～9.6 4; 10～11.6 5; 12 6 ⚠ T=8 is available only	MC (1.4)	L dimension tolerance alteration  $L^{+0.02}_{0} \rightarrow L^{+0.01}_{0}$	LKC (0.9)
Vent machining  P t: 3～4.9 0.3; 5～9.6 0.4; 12 0.5 S・B: ㎜ 1 2≤S≤10 S+5≤B≤30	GVC (3.7)	Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
Vent machining  P t: 3～4.9 0.3; 5～9.6 0.4; 12 0.5 ㎜ 0.1 1≤GS≤10 GS+2≤GB≤30 GB<GC≤L−T	GVD (4.8)	Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHN 1,2characters (0.2) 3,4characters (0.5)
Point R processing  ㎜ 0.1 0.2≤HRC<P/2	HRC (0.9)	Lapping on the point face  P≤6→0.05Ra P>6→0.1Ra ☒ L>200.00 is not available.	TMC (4.8)

ORDER

Code No.	L	T	KC・WKC…etc.
EPSL2 —	148.21 —	T4 —	TC3.1

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

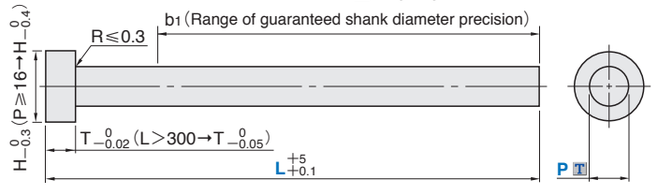
Straight Ejector Pins

General Type

In stock

Material	Hardness	Head Thickness(T)	Code
SKD61	(Nitriding) Surface:900HV～ Interior:40～45HRC	4	EP4N
		6・8	EPJN

⚠ Range of guaranteed shank diameter precision:$b_1 \approx L \times 2/3$ ☞ P.240
⚠ Range of guaranteed base material hardness ☞ P.241
⚠ Range of guaranteed surface hardness for nitriding ☞ P.241



T P Tolerance

L \ P	2～13	15～20	25
L≤500	−0.01 −0.02	−0.01 −0.03	−0.01 −0.04
L≥600	−0.01 −0.03	−0.01 −0.03	−0.01 −0.05

Code No. Code	P	L	T	H
EP4N	2	100 150 200 250 300 350 400	4	4
	2.1	100 150 200 250 300		
	2.2 2.3 2.4	100 150 200 250 300		5
	2.5	100 150 200 250 300 350 400		
	2.6	100 150 200 250 300		
	2.7 2.8 2.9	100 150 200 250 300		6
	3	100 150 200 250 300 350 400 450 500		
	3.1 3.2 3.3 3.4	100 150 200 250 300 350 400		7
	3.5	100 150 200 250 300 350 400 450 500		
	3.6 3.7 3.8 3.9	100 150 200 250 300 350 400		
	4	100 150 200 250 300 350 400		8
	4.1 4.2 4.3 4.4	100 150 200 250 300 350 400		
	4.5	100 150 200 250 300 350 400		
	4.6 4.7 4.8 4.9	100 150 200 250 300 350 400		
	5	100 150 200 250 300 350 400 500		9
	5.1 5.2 5.3 5.4	100 150 200 250 300 350 400		
	5.5	100 150 200 250 300 350 400 500		
	5.6 5.7 5.8 5.9	100 150 200 250 300 350 400		
	6	100 150 200 250 300 350 400 500		10
	6.1 6.2 6.3 6.4	100 150 200 250 300 350 400		
	6.5 7	100 150 200 250 300 350 400 500		
	8	100 150 200 250 300 350 400 450 500		11
	10	100 150 200 250 300 350 400 450 500		15
	12	100 150 200 250 300 350 400 450 500		17
	13	100 150 200 250 300 350 400 500		18
	15	100 150 200 250 300 350 400 450 500		20
	16	100 150 200 250 300 350 400 500		21
EPJN	3.6 3.7 3.8 3.9	150 200 250 300 400	6	8
	4	100 150 200 250 300 350 400 450 500		
	4.1 4.2 4.3 4.4	200 300 400		9
	4.5	100 150 200 250 300 350 400 500		
	4.6 4.7 4.8 4.9	200 300 400		
	5	100 150 200 250 300 350 400 450 500 600		
	5.1 5.2 5.3 5.4	200 300 400		10
	5.5	100 150 200 250 300 350 400 500		
	5.6 5.7 5.8 5.9	200 300 400		
	6	100 150 200 250 300 350 400 450 500 600 700		11
	6.1 6.2 6.3 6.4	200 300 400		
	6.5	100 150 200 250 300 350 400 500 600 700		
	7	100 150 200 250 300 350 400 450 500 600 700 800		
	8	100 150 200 250 300 350 400 450 500 600 700 800 1000	8	13
	10	100 150 200 250 300 350 400 450 500 600 700 800 1000		15
	12	100 150 200 250 300 350 400 450 500 600 700 800 900 1000		17
	15	100 150 200 250 300 350 400 450 500 600 700 800 900 1000		20
	16	100 150 200 250 300 350 400 450 500 600 700 800 900 1000		21
	20	150 200 250 300 400 500 600 700 800 900 1000		25
	25	200 300 400 500 600 700 800 900 1000		30

⚠ For P＜2, please select high speed steel ejector pins.

ORDER

Code No.	L
EP4N4 —	150

DELIVERY Next In stock working day ☞ P.15

PRICE Without tax

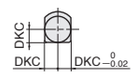
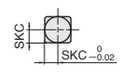
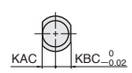
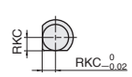
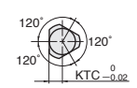
▶Quantity discount rate ☞ P.15

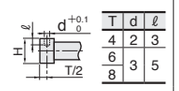
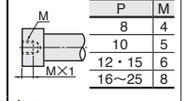
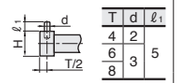
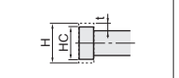
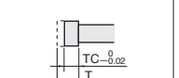
1～49	50～100	101～
100%	95%	Enquiry

Code No. Code	P	@/P(1～49P) L100	L150	L200	L250	L300	L350	L400	L450	L500	L600	L700	L800	L900	L1000
EP4N EPJN	2	0.96	1.09	1.23	1.37	1.98	2.67	2.93	—	—	—	—	—	—	—
	2.1 2.2 2.3 2.4	0.96	1.03	1.37	1.77	3.83	—	—	—	—	—	—	—	—	—
	2.5	0.96	1.03	1.17	1.30	1.56	2.53	2.67	—	—	—	—	—	—	—
	2.6 2.7 2.8 2.9	0.96	1.03	1.44	1.77	3.83	—	—	—	—	—	—	—	—	—
	3	0.96	1.03	1.09	1.23	1.50	2.12	2.39	2.93	3.75	—	—	—	—	—
	3.1 3.2 3.3 3.4	1.37	1.71	1.84	3.49	3.90	3.87	4.99	—	—	—	—	—	—	—
	3.5	0.96	1.03	1.17	1.30	1.50	2.12	2.46	3.90	4.30	—	—	—	—	—
	3.6 3.7 3.8 3.9	1.37	1.71	1.84	3.49	3.90	3.87	4.99	—	—	—	—	—	—	—
	4	0.96	1.03	1.17	1.30	1.50	2.12	2.46	3.28	3.34	—	—	—	—	—
	4.1 4.2 4.3 4.4	1.03	1.17	1.98	3.49	4.03	3.87	5.12	—	—	—	—	—	—	—
	4.5	1.03	1.17	1.37	1.50	1.64	2.25	2.53	—	3.55	—	—	—	—	—
	4.6 4.7 4.8 4.9	1.03	1.17	1.98	3.49	4.09	4.30	5.40	—	—	—	—	—	—	—
	5	1.03	1.17	1.37	1.50	1.64	1.84	2.25	3.42	3.49	4.99	—	—	—	—
	5.1 5.2 5.3 5.4	1.30	1.44	2.25	3.49	4.65	4.65	5.74	—	—	—	—	—	—	—
	5.5	1.30	1.44	1.64	1.92	2.05	2.39	2.67	—	3.96	—	—	—	—	—
	5.6 5.7 5.8 5.9	1.30	1.44	2.25	3.49	4.65	5.08	5.74	—	—	—	—	—	—	—
	6	1.30	1.44	1.64	1.92	2.05	2.39	2.67	3.90	3.96	5.87	7.18	—	—	—
	6.1 6.2 6.3 6.4	1.44	1.71	2.73	3.92	5.46	5.08	6.43	—	—	—	—	—	—	—
	6.5 7	1.44	1.77	2.05	2.46	2.80	3.21	3.34	4.09	4.58	6.77	8.20	9.92	—	—
	8	1.87	2.39	2.73	3.24	3.67	4.09	4.61	5.73	6.24	9.23	10.7	15.0	—	24.3
	10	3.27	3.65	4.23	4.52	5.09	5.77	6.73	7.40	8.17	12.2	13.8	20.0	—	32.0
	12	4.17	4.70	5.55	6.52	7.27	8.23	9.08	10.2	10.9	15.9	17.5	26.4	34.5	42.5
	13	4.96	5.30	5.90	6.83	7.77	9.14	10.2	—	11.0	—	—	—	—	—
	15	5.77	6.28	7.43	8.59	9.74	11.1	12.2	13.9	14.7	25.0	28.4	42.1	57.1	70.0
	16	7.70	8.20	8.98	10.5	11.8	14.1	15.9	20.0	20.0	28.0	31.7	46.7	63.4	77.8
	20	—	12.6	13.6	14.1	15.5	—	18.6	—	32.4	38.1	43.4	64.2	86.8	105
	25	—	—	23.3	—	30.2	—	38.0	—	46.7	55.9	65.0	74.5	83.6	93.0

ADDITION

Addition details ☞ P.18

Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting  (in) 0.1 P/2≤KC＜H/2	KC(0.5)	Right-angled three flats cutting  (in) 0.1 P/2≤DKC＜H/2	DKC(1.4)
Parallel flats cutting  (in) 0.1 P/2≤WKC＜H/2	WKC(0.9)	Square flats cutting  (in) 0.1 P/2≤SKC＜H/2	SKC(1.8)
Parallel flats cutting  (in) 0.1 P/2≤KAC,KBC＜H/2	KAC(1.4) KBC(1.4)	Designated-angled two flats cutting  KGC: (in) 0.1 AG: (in) 1 P/2≤KGC＜H/2 0＜AG＜360	KGC(1.4)
Right-angled two flats cutting  (in) 0.1 P/2≤RKC＜H/2	RKC(0.9)	Three flats cutting at 120°  (in) 0.1 P/2≤KTC＜H/2	KTC(1.8)

Add.	Code(@/P)	Add.	Code(@/P)
Dowel hole boring 	NN(0.9)	Tapping 	MC(1.4)
Dowel hole＋Spring pin 	NC(0.9)	Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
H dimension alteration  (in) 0.1 t＜1→H−1≤HC＜H t≥1→P＋1≤HC＜H	HC(0.6)	Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHN 1,2characters (0.2) 3,4characters (0.5)
T dimension alteration  (in) 0.1 2.0≤TC＜T T−TC≤Lmax.−L	TC(0.6)		

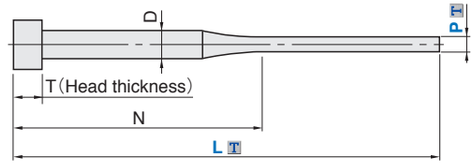
Code No.	L	KC・WKC…etc.
EP4N4 —	150 —	TC3.1

3 Days ☞ P.15

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

STEPPED EJECTOR PINS

Guide for Stepped Ejector Pins



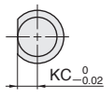
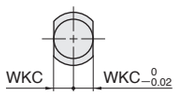
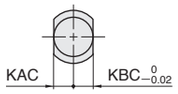
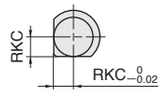
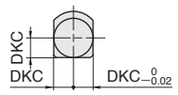
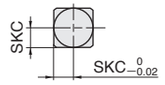
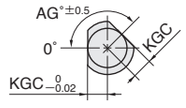
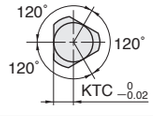
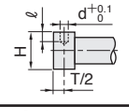
Material	Shank Diameter		Type	Head Thickness	Code	Overall Length(L)		Shank Diameter(P)	Delivery	Page
	Precision	Tolerance				Dimension	Tolerance	Dimension		
SKH51	Precision	$^{0}_{-0.005}$	General type	4・6	ESH	50～250	$^{+5}_{+0.1}$	0.3～ 3	3	34
			L dimension designated type	4・6	ESHL	25～250	$^{+0.02}_{0}$ ※1	0.3～ 3		36
			P・N dimension designated type	4・6	ESHN	50～250	$^{+5}_{+0.1}$	0.3～ 4.9		38
			L・P dimension designated type	4・6・8	ESHS	40～350	$^{+0.02}_{0}$ ※1	0.3～11.9		40
	Standard	$^{-0.01}_{-0.02}$	General type	4・6	ESS	60～300	$^{+5}_{+0.1}$	0.6～ 3	3	42
			L dimension designated type	4・6	ESSL	30～300	$^{+0.02}_{0}$ ※1	0.6～ 3		44
			P・N dimension designated type	4・6	ESSN	60～300	$^{+5}_{+0.1}$	0.6～ 4.9		46
			L・P dimension designated type	4・6・8	ESSS	40～350	$^{+0.02}_{0}$ ※1	0.6～11.9		48
SKD61	Standard	$^{-0.01}_{-0.02}$ ※2	General type	4	ESD4N	100～200	$^{+5}_{+0.1}$	2.5～ 2.5	6	50
				6	ESDJN	150～250		2.0～ 4		
			L dimension designated type	4	ESD4NS	50～200	$^{+0.02}_{0}$ ※1	2.5～ 2.5		52
				6	ESDJNS	100～250		2.0～ 4		

⚠ ※1 200＜L≦500→ $^{+0.05}_{0}$, L＞500→ $^{+0.5}_{0}$.

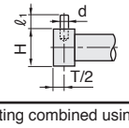
⚠ ※2 The tolerance values for shank diameter are representative ones. For details, refer to catalog page of each product.

Guide for Stepped Ejector Pins Addition

Head Alteration

Add.	Code @/P	Spec.
Single flat cutting 	KC(0.5)	●Add a single flat on the head. Range of designation D/2≤KC<H/2 Unit of designation (if) 0.1 For KC=D/2, (if) 0.05. Free flange Range of designation D/2+0.1≤KC<H/2 Unit of designation (if) 0.1 KC1.4,KC0.75
Symmetry parallel flats cutting 	WKC(0.9)	●Add symmetry parallel flats on the head. Range of designation D/2≤WKC<H/2 Unit of designation (if) 0.1 For WKC=D/2, (if) 0.05. Free flange Range of designation D/2+0.1≤WKC<H/2 Unit of designation (if) 0.1 WKC1.4,WKC0.75
Varied width parallel flats cutting 	KAC(1.4) KBC(1.4)	●Add varied width parallel flats on the head. Range of designation D/2≤KAC,KBC<H/2 Unit of designation (if) 0.1 For KAC,KBC=D/2, (if) 0.05. Free flange Range of designation D/2+0.1≤KAC,KBC<H/2 Unit of designation (if) 0.1 KAC1.4−KBC1.6
Right-angled two flats cutting 	RKC(0.9)	●Add two right-angled flats on the head . Range of designation D/2≤RKC<H/2 Unit of designation (if) 0.1 For RKC=D/2, (if) 0.05. Free flange Range of designation D/2+0.1≤RKC<H/2 Unit of designation (if) 0.1 RKC1.4,RKC0.75
Right-angled three flats cutting 	DKC(1.4)	●Add three right-angled flats on the head. Range of designation D/2≤DKC<H/2 Unit of designation (if) 0.1 For DKC=D/2, (if) 0.05. Free flange Range of designation D/2+0.1≤DKC<H/2 Unit of designation (if) 0.1 DKC1.4,DKC0.75
Square flats cutting 	SKC(1.8)	●Add a square (four flats) on the head. Range of designation D/2≤SKC<H/2 Unit of designation (if) 0.1 For SKC=D/2, (if) 0.05. Free flange Range of designation D/2+0.1≤SKC<H/2 Unit of designation (if) 0.1 SKC1.4,SKC0.75
Designated-angled two flats cutting 	KGC(1.4)	●Add a flats at the standard (0°), and another at the designated angle. Range of designation D/2≤KGC<H/2 0<AG<360 Unit of designation KGC: (if) 0.1 For KGC=D/2, (if) 0.05. AG: (if) 1 Free flange Range of designation D/2+0.1≤KGC<H/2 0<AG<360 Unit of designation KGC: (if) 0.1 AG: (if) 1 KGC1.4−AG135
Three flats cutting at 120° 	KTC(1.8)	●Add three flats at 120° on the head. Range of designation D/2≤KTC<H/2 Unit of designation (if) 0.1 For KTC=D/2, (if) 0.05. Free flange Range of designation D/2+0.1≤KTC<H/2 Unit of designation (if) 0.1 KTC1.4,KTC0.75
Dowel hole boring 	NN(0.9)	●Add a dowel hole on the head. ☒H<4 is not available. ☒Combined with other than NHC・NHN・LKC・TMC・GVC・GVD are not available. NN

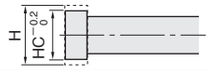
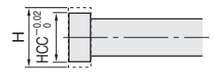
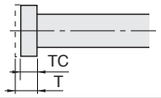
T	d	ℓ
4	2	3
6 8	3	5

Dowel hole+Spring pin 	NC(0.9)	●Add a dowel hole on the head. ☒H<4 is not available. ☒Combined with other than NHC・NHN・LKC・TMC・GVC・GVD are not available. NC

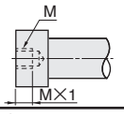
T	d	ℓ1
4	2	
6 8	3	5

☒Flat cutting combined using are not available.

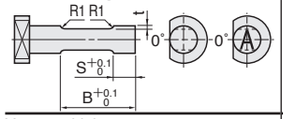
Dimension Alteration

Add.	Code@/P	Spec.
H dimension alteration 	HC(0.6)	●Reduce the head diameter H. Range of designation D<2:H−1≤HC<H D≥2:D+1≤HC<H Unit of designation (if) 0.1 ☒P≤0.6 is not available. HC5.5
H dimension alteration(precision) 	HCC(1.8)	●Reduce the head diameter H (precision). Range of designation D+1≤HCC<H−0.3 Unit of designation (if) 0.1 ☒P<1.5 is not available. HCC5.5
T dimension alteration 	TC(0.6)	●Reduce the head thickness. Range of designation 2≤TC<T T−TC≤Lmax.−L Unit of designation (if) 0.1 ⚠L dimension is shortened according to (T−TC) (except L dimension). ☒P≤0.6 is not available. TC3.5

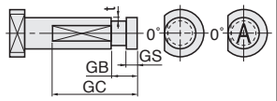
Shape Alteration

Add.	Code@/P	Spec.
Tapping 	MC(1.4)	●Create a tap on the head. ⚠P≥8 is available. ⚠T=8 is available only. ☒Combined with NN・NC・HC・HCC・NHC・NHN are not available. MC

D	M
8・9	4
10	5
12・15	6
16・20	8

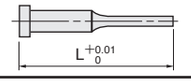
Vent machining 	GVC(3.7)	●Vent machining Range of designation 2≤S≤10 S+5≤B≤30 Unit of designation (if) 0.1 ☒P<3 is not available. GVC−S3−B15

P	t
3.00～ 4.99	0.3
5.00～ 9.99	0.4
10.00～11.90	0.5

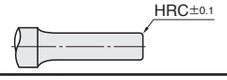
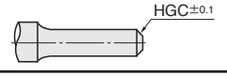
Vent machining 	GVD(4.8)	●Vent machining Range of designation 1≤GS≤10 GS+2≤GB≤30 GB<GC≤L−T Unit of designation (if) 0.1 ☒P<3 is not available. For GVD addition, add one day for delivery. GVD−GS3−GB5−GC30

P	t
3.00～ 4.99	0.3
5.00～ 9.99	0.4
10.00～11.90	0.5

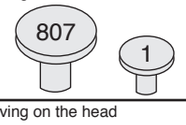
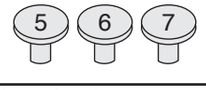
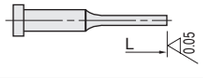
Tolerance alteration

Add.	Code@/P	Spec.
L dimension tolerance alteration 	LKC(0.9)	●Alter the L dimension tolerance. Alteration content L$^{+0.02}_{0}$→L$^{+0.01}_{0}$ ☒L>200 is not available. LKC

Shape alteration

Add.	Code@/P	Spec.
Point R processing 	HRC(0.9)	●R processing on the point. Range of designation 0.2≤HRC<P/2 ☒P<0.8 is not available. Unit of designation (if) 0.1 ☒General & P dimension designated types are not available. ☒Combined with HGC is not available. HRC0.3
Point chamfering 	HGC(0.9)	●Chamfering on the point. Range of designation 0.1≤HGC<P/2 ☒P<0.5 is not available. Unit of designation (if) 0.1 ☒General & P dimension designated types are not available. ☒Combined with HRC is not available. HGC0.2

Others

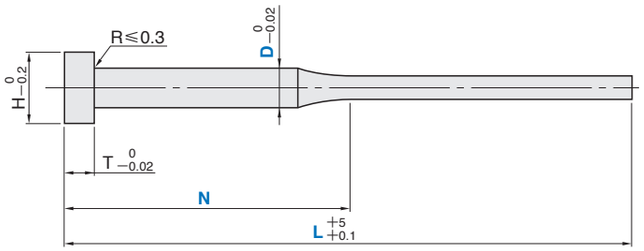
Add.	Code@/P	Spec.
Engraving on the head 	NHC 1,2 characters (0.2) 3,4 characters (0.5)	●Engrave numbers or characters on the head. Range of application 1 character →2≤H ⚠For 2～4 characters,only the first character may be an alphabet. 2 characters →5≤H ☒H<2 is not available. 3,4 characters→7≤H ☒Combined with SKC・MC are not available. Character of designation Number 0～9, English letter A～Z. NHC−8
Engraving on the head 	NHN 1,2 characters (0.2) 3,4 characters (0.5)	●Engrave on the head (Add a sequential number on the head of each ejector pin when two or more pieces of identical size are ordered) Range of application 1 character →2≤H ⚠For 2～4 characters,only the first character may be an alphabet. 2 characters →5≤H ☒H<2 is not available. 3,4 characters→7≤H ☒Combined with SKC・MC are not available. Character of designation Number 0～9, English letter A～Z. For ordering 3 pieces with NHN-5, sequential number started from 5 is added on the head on each piece.
Lapping on the point face 	TMC(4.8)	●Alter the roughness on the point face. Range of application P≤6:1.6Ra→0.05Ra P>6:1.6Ra→0.1Ra ☒P<0.6 is not available. ☒L>200 is not available. TMC

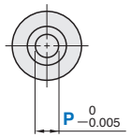
Precision Stepped Ejector Pins

General Type

Material	Hardness	Code
SKH51	59～61HRC	ESH

⚠ Range of guaranteed base material hardness ☞ P.241





Code No. Code	D	L	P (in) 0.1	N	T	H
ESH	1	50	0.3～0.6	15	4	2
		60	0.3～0.8	20 35		
		100	0.3～0.8	40 50 60		
	1.5	60	0.3～0.5	20 35		3
		100	0.3～1.0	40 50 60		
		150	0.5～1.0	50 70 90		
		200	0.6～1.0	70 100		
	2	100	0.7～1.6	(25) 40 50 60		4
		150	0.7～1.6	40 50 70 90		
		200	0.7～1.6	70 80 100		
	2.5	150	0.8～2.1	50 70 90		5
		200	0.8～2.1	70 80 100		
	3	150	1.0～2.6	50 70 90		6
		200	1.0～2.6	70 80 100		
		250	2.4～2.6	105		
D		L	P	N	T	H
4		150	2.0 2.5 3.0	50 70	6	7
		200	2.0 2.5 3.0	70 100		
		250	2.0 2.5 3.0	100 125		
4.5		150	2.0 2.5	50 70		9
		200	2.0 2.5	70 100		
		250	2.0 2.5	100 125		
5		150	3.0	50 70		
		200	3.0	70 100		
		250	3.0	100 125		

☒ For D2, N25, P0.7 is not available.

ORDER

Code No.	L	P	N
ESH2 —	150 —	0.7 —	50

DELIVERY **3** Days ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

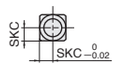
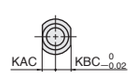
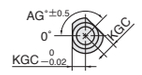
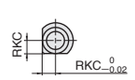
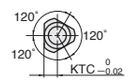
1～49	50～100	101～
100%	95%	Enquiry

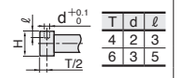
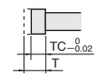
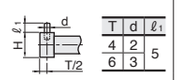
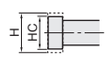
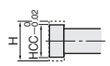
Code No. Code	D	P	@/P(1～49P) L50	L60	L100	L150	L200
ESH	1	0.3	7.34	7.86	7.98	—	—
		0.4	6.83	7.28	7.28	—	—
		0.5	2.68	2.68	2.68	—	—
		0.6	2.68	2.68	2.68	—	—
		0.7 0.8	—	2.68	2.68	—	—
	1.5	0.3	—	2.90	3.06	—	—
		0.4	—	2.84	3.02	—	—
		0.5	—	1.93	1.93	2.05	—
		0.6	—	—	1.93	2.05	2.50
		0.7	—	—	1.93	2.05	2.50
		0.8	—	—	1.93	2.05	2.50
		0.9	—	—	1.93	2.05	2.50
		1.0	—	—	1.93	2.05	2.50
	2	0.7	—	—	1.59	1.65	1.77
		0.8	—	—	1.59	1.65	1.77
		0.9	—	—	1.59	1.65	1.77
		1	—	—	1.59	1.65	1.77
		1.1	—	—	1.59	1.65	1.77
		1.2	—	—	1.59	1.65	1.77
		1.3 1.4	—	—	1.59	1.65	1.77
		1.5	—	—	1.59	1.65	1.77
		1.6	—	—	1.59	1.65	1.77

Code No. Code	D	P	@/P(1～49P) L150	L200	L250
ESH	2.5	0.8	1.65	1.77	—
		0.9	1.65	1.77	—
		1	1.65	1.77	—
		1.1	1.65	1.77	—
		1.2	1.65	1.77	—
		1.3	1.65	1.77	—
		1.4	1.65	1.77	—
		1.5	1.65	1.77	—
		1.6 1.7	1.65	1.77	—
		1.8	1.65	1.77	—
		1.9	1.65	1.77	—
		2	1.65	1.77	—
		2.1	1.65	1.77	—
	3	1.0 1.1	1.77	1.93	—
		1.2	1.77	1.93	—
		1.3 1.4	1.77	1.93	—
		1.5	1.77	1.93	—
		1.6 1.7	1.77	1.93	—
		1.8	1.77	1.93	—
		1.9	1.77	1.93	—
		2	1.77	1.93	—
		2.1 2.2 2.3	1.77	1.93	—
		2.4 2.5 2.6	1.77	1.93	3.06
	4	2.0 2.5 3.0	2.62	2.73	3.53
	4.5	2.0 2.5	2.96	3.12	3.53
	5	3.0	3.30	3.59	4.73

ADDITION

Addition details ☞ P.32

Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting  (in) 0.1 D/2≦KC＜H/2	KC(0.5)	Right-angled three flats cutting  (in) 0.1 D/2≦DKC＜H/2	DKC(1.4)
Parallel flats cutting  (in) 0.1 D/2≦WKC＜H/2	WKC(0.9)	Square flats cutting  (in) 0.1 D/2≦SKC＜H/2	SKC(1.8)
Parallel flats cutting  (in) 0.1 D/2≦KAC,KBC＜H/2	KAC(1.4) KBC(1.4)	Designated-angled two flats cutting  KGC：(in) 0.1 AG：(in) 1 D/2≦KGC＜H/2 0＜AG＜360	KGC(1.4)
Right-angled two flats cutting  (in) 0.1 D/2≦RKC＜H/2	RKC(0.9)	Three flats cutting at 120°  (in) 0.1 D/2≦KTC＜H/2	KTC(1.8)

Add.	Code(@/P)	Add.	Code(@/P)
Dowel hole boring 	NN(0.9)	T dimension alteration  (in) 0.1 2.0≦TC＜T T−TC≦Lmax.−L	TC(0.6)
Dowel hole＋Spring pin 	NC(0.9)	Engraving on the head  1character→2≦H 2characters→5≦H 3characters→7≦H 4characters→7≦H	NHC 1,2characters (0.2) 3,4characters (0.5)
H dimension alteration  (in) 0.1 D＜2→H−1≦HC＜H D≧2→D＋1≦HC＜H	HC(0.6)	Engraving on the head  1character→2≦H 2characters→5≦H 3characters→7≦H 4characters→7≦H	NHN 1,2characters (0.2) 3,4characters (0.5)
H dimension alteration (precision)  (in) 0.1 D＋1≦HCC＜H−0.3	HCC(1.8)		

Code No.	L	P	N	KC・WKC…etc.
ESH2 —	150 —	P0.7 —	N50 —	TC3.1

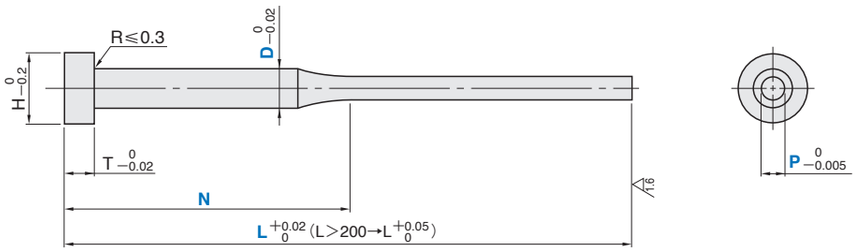
Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Precision Straight Ejector Pins

L Dimension Designated Type

Material	Hardness	Code
SKH51	59～61HRC	ESHL

⚠ Range of guaranteed base material hardness ☞ P.241



⚠ For LKC addition, the tolerance of L dimension is $^{+0.01}_{0}$.

Code No. Code	D	L (in) 0.01	P (in) 0.1	N	T	H
ESHL	1	25.00～ 50.00	0.3～0.6	15	4	2
		30.00～ 60.00	0.3～0.8	20 35		
		50.00～100.00	0.3～0.8	40 50 60		
	1.5	30.00～ 60.00	0.3～0.5	20 35		3
		50.00～100.00	0.3～1.0	40 50 60		
		60.00～150.00	0.5～1.0	50 70 90		
		80.00～200.00	0.6～1.0	70 100		
	2	35.00～100.00	0.7～1.6	(25) 40 50 60		4
		50.00～150.00	0.7～1.6	40 50 70 90		
		80.00～200.00	0.7～1.6	70 80 100		
	2.5	60.00～150.00	0.8～2.1	50 70 90		5
		80.00～200.00	0.8～2.1	70 80 100		
	3	60.00～150.00	1.0～2.6	50 70 90		6
		80.00～200.00	1.0～2.6	70 80 100		
		115.00～250.00	2.4～2.6	105		

D	L (in) 0.01	P	N	T	H
4	60.00～150.00	2.0 2.5 3.0	50 70	6	7
	80.00～200.00	2.0 2.5 3.0	70 100		
	110.00～250.00	2.0 2.5 3.0	100 125		
4.5	60.00～150.00	2.0 2.5	50 70		9
	80.00～200.00	2.0 2.5	70 100		
	110.00～250.00	2.0 2.5	100 125		
5	60.00～150.00	3.0	50 70		
	80.00～200.00	3.0	70 100		
	110.00～250.00	3.0	100 125		

⚠ L−N≥10 ☒ N25 in D2,P0.7 is not available.

ORDER

Code No.	L	P	N
ESHL2 —	148.55 —	P0.7 —	N50

DELIVERY **3** Days ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

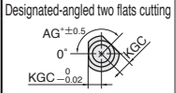
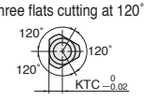
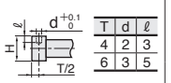
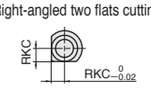
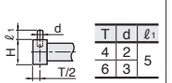
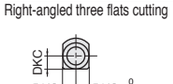
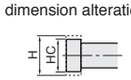
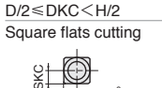
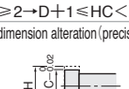
1～30	31～50	51～100	101～
100%	95%	90%	Enquiry

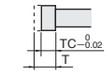
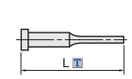
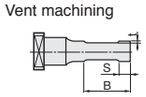
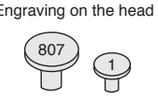
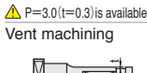
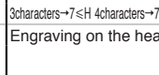
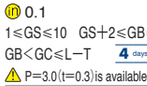
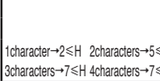
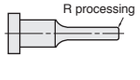
Code No. Code	D	P	@/P(1～30P) L 25.00～50.00	L 50.01～100.00	L 100.01～150.00	L 150.01～200.00
ESHL	1	0.3	9.18	10.2	—	—
		0.4	8.53	9.46	—	—
		0.5	6.77	7.55	—	—
		0.6	3.48	3.48	—	—
		0.7 0.8	3.48	3.48	—	—
	1.5	0.3	3.05	3.34	—	—
		0.4	2.92	3.20	—	—
		0.5	2.77	3.05	3.20	—
		0.6	2.42	2.70	2.77	3.40
		0.7	2.42	2.70	2.77	3.40
		0.8	2.42	2.70	2.77	3.40
		0.9	2.42	2.70	2.77	3.40
		1.0	2.42	2.70	2.77	3.40
	2	0.7	1.83	2.14	2.21	2.56
		0.8	1.83	2.14	2.21	2.56
		0.9	1.83	2.14	2.21	2.56
		1.0	1.83	2.14	2.21	2.56
		1.1	1.83	2.14	2.21	2.56
		1.2	1.83	2.14	2.21	2.56
		1.3 1.4	1.83	2.14	2.21	2.56
		1.5	1.83	2.14	2.21	2.56
		1.6	1.83	2.14	2.21	2.56
	2.5	0.8 0.9	—	2.21	2.21	2.56

Code No. Code	D	P	@/P(1～30P) L 60.00～100.00	L 100.01～150.00	L 150.01～200.00	L 200.01～250.00
ESHL	2.5	1	2.21	2.21	2.56	—
		1.1	2.21	2.21	2.56	—
		1.2	2.21	2.21	2.56	—
		1.3 1.4	2.21	2.21	2.56	—
		1.5	2.21	2.21	2.56	—
		1.6 1.7	2.21	2.21	2.56	—
		1.8	2.21	2.21	2.56	—
		1.9	2.21	2.21	2.56	—
		2	2.21	2.21	2.56	—
		2.1	2.21	2.21	2.56	—
	3	1.0 1.1	2.49	2.49	2.70	—
		1.2	2.49	2.49	2.70	—
		1.3 1.4	2.49	2.49	2.70	—
		1.5	2.49	2.49	2.70	—
		1.6 1.7	2.49	2.49	2.70	—
		1.8	2.49	2.49	2.70	—
		1.9	2.49	2.49	2.70	—
		2	2.49	2.49	2.70	—
		2.1 2.2 2.3	2.49	2.49	2.70	—
		2.4 2.5 2.6	2.49	2.49	2.70	4.27
	4	2.0 2.5 3.0	3.48	3.48	3.70	4.70
	4.5	2.0 2.5	3.98	3.98	4.20	4.70
	5	3.0	4.42	4.42	4.77	6.11

ADDITION

Addition details ☞ P.32

Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting  (in) 0.1 D/2≤KC<H/2	KC (0.5)	Designated-angled two flats cutting  KGC: (in) 0.1 AG: (in) 1 D/2≤KGC<H/2 0<AG<360	KGC (1.4)
Parallel flats cutting  (in) 0.1 D/2≤WKC<H/2	WKC (0.9)	Three flats cutting at 120°  (in) 0.1 D/2≤KTC<H/2	KTC (1.8)
Parallel flats cutting  (in) 0.1 D/2≤KAC,KBC<H/2	KAC (1.4) KBC (1.4)	Dowel hole boring  T d ℓ 4 2 3 6 3 5	NN (0.9)
Right-angled two flats cutting  (in) 0.1 D/2≤RKC<H/2	RKC (0.9)	Dowel hole+Spring pin  T d ℓ1 4 2 6 3 5	NC (0.9)
Right-angled three flats cutting  (in) 0.1 D/2≤DKC<H/2	DKC (1.4)	H dimension alteration  (in) 0.1 D<2→H−1≤HC<H D≥2→D+1≤HC<H	HC (0.6)
Square flats cutting  (in) 0.1 D/2≤SKC<H/2	SKC (1.8)	H dimension alteration (precision)  (in) 0.1 D+1≤HCC<H−0.3	HCC (1.8)

Add.	Code (@/P)	Add.	Code (@/P)
T dimension alteration  (in) 0.1 2.0≤TC<T T−TC≤Lmax.−L	TC (0.6)	L dimension tolerance alteration  L +0.02 0 → L +0.01 0	LKC (0.9)
Vent machining  S·B: (in) 1 2≤S≤10 S+5≤B≤30 ⚠ P=3.0(t=0.3)is available only.	GVC (3.7)	Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
Vent machining  (in) 0.1 1≤GS≤10 GS+2≤GB≤30 GB<GC≤L−T 4 days ⚠ P=3.0(t=0.3)is available only.	GVD (4.8)	Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHN 1,2characters (0.2) 3,4characters (0.5)
Point R processing  (in) 0.1 0.2≤HRC<P/2	HRC (0.9)	Lapping on the point face  1.6Ra→0.05Ra ☒ L>200.00 is not available.	TMC (4.8)
Point chamfering  (in) 0.1 0.1≤HGC<P/2	HGC (0.9)		

Code No.	L	P	N	KC·WKC···etc.
ESHL2 —	148.55 —	P0.7 —	N50 —	TC3.1

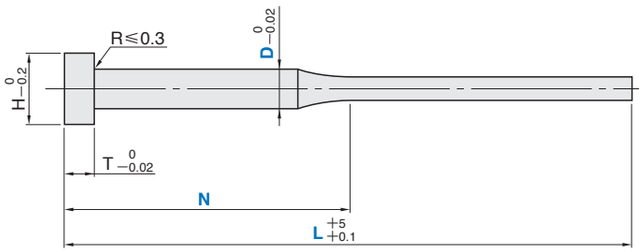
Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

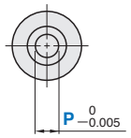
Precision Stepped Ejector Pins

P·N Dimension Designated Type

Material	Hardness	Code
SKH51	59～61HRC	ESHN

⚠ Range of guaranteed base material hardness ☞ P.241





Code No. Code	D	L	P (in) 0.01	N (in) 1	T	H
ESHN	1	50	0.30～0.90	N≥10 and 10≤(L−N)≤150	4	3
		60				
		100				4
	1.5	60	0.60～1.40			
		100				
		150				
		200				5
	2	100	0.80～1.90			
		150				
		200				6
	2.5	150	0.80～2.40	N≥10 and 10≤(L−N)≤200	6	
		200				7
	3	150	1.00～2.90			
		200				
		250				9
	4	150	1.50～3.90			
		200				
		250				
	4.5	150	2.50～4.40			
		200				
		250				
	5	150	3.00～4.90			
		200				
		250				

ORDER

Code No.	L	P	N
ESHN1 —	100 —	P0.46 —	N50

DELIVERY **3** Days ☞ P.15

PRICE Without tax

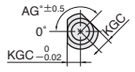
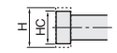
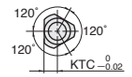
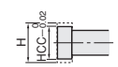
▶Quantity discount rate ☞ P.15

1～30	31～50	51～100	101～
100%	95%	90%	Enquiry

Code No. Code	D		@/P(1～30P) L50	L60	L100	L150	L200	L250
ESHN	1	P0.30～0.39	10.4	10.4	10.4	—	—	—
		P0.40～0.49	9.68	9.68	9.68	—	—	—
		P0.50～0.59	7.83	7.83	7.83	—	—	—
		P0.60～0.90	3.48	3.48	3.48	—	—	—
	1.5		—	3.27	3.27	3.48	3.98	—
	2		—	—	3.27	3.40	3.55	—
	2.5		—	—	—	3.34	3.48	—
	3		—	—	—	3.34	3.48	4.42
	4		—	—	—	4.12	4.34	5.40
	4.5		—	—	—	4.77	4.98	6.18
	5		—	—	—	5.12	5.48	6.90

ADDITION

Addition details ☞ P.32

Add.	Code (@/P)	Add.	Code (@/P)	Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting (in) 0.1 D/2≤KC<H/2	KC (0.5)	Right-angled three flats cutting (in) 0.1 D/2≤DKC<H/2	DKC (1.4)	Dowel hole boring T d ℓ 4 2 3 6 3 5	NN (0.9)	T dimension alteration (in) 0.1 2.0≤TC<T T−TC≤Lmax.−L	TC (0.6)
Parallel flats cutting (in) 0.1 D/2≤WKC<H/2	WKC (0.9)	Square flats cutting (in) 0.1 D/2≤SKC<H/2	SKC (1.8)	Dowel hole＋Spring pin T d ℓ1 4 2 5 6 3	NC (0.9)	Engraving on the head 1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
Parallel flats cutting  (in) 0.1 D/2≤KAC,KBC<H/2	KAC (1.4) KBC (1.4)	Designated-angled two flats cutting  KGC: (in) 0.1 AG: (in) 1 D/2≤KGC<H/2 0<AG<360	KGC (1.4)	H dimension alteration  (in) 0.1 D<2→H−1≤HC<H D≥2→D＋1≤HC<H	HC (0.6)	Engraving on the head 	NHN 1,2characters (0.2) 3,4characters (0.5)
Right-angled two flats cutting  (in) 0.1 D/2≤RKC<H/2	RKC (0.9)	Three flats cutting at 120°  (in) 0.1 D/2≤KTC<H/2	KTC (1.8)	H dimension alteration (precision)  (in) 0.1 D＋1≤HCC<H−0.3	HCC (1.8)	1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	

Code No.	L	P	N	KC・WKC…etc.
ESHN1 —	100 —	P0.46 —	N50 —	TC3.1

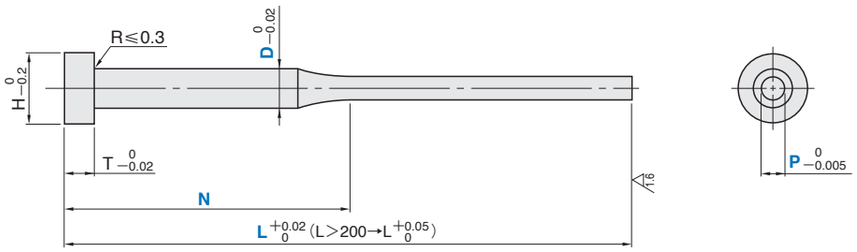
Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Precision Stepped Ejector Pins

L・P Dimension Designated Type

Material	Hardness	Code
SKH51	59～61HRC	ESHS

⚠ Range of guaranteed base material hardness ☞ P.241



⚠ For LKC addition, the tolerance of L dimension is $^{+0.01}_{0}$.

Code No.		L	P	N	T	H
Code	D	㏌ 0.01		㏌ 1		
ESHS	1	40.00～100.00	0.30～ 0.90	N≥10 and 10≤(L−N)≤150	4	3
		100.00～150.00	0.60～ 0.90			
	1.1	40.00～200.00	0.60～ 1.00			
	1.2		0.60～ 1.10			
	1.3		0.60～ 1.20			
	1.4		0.60～ 1.30			
	1.5		0.60～ 1.40			
	1.6	40.00～250.00	0.80～ 1.50			4
	1.7		0.80～ 1.60			
	1.8		0.80～ 1.70			
	1.9		0.80～ 1.80			
	2		0.80～ 1.90			
	2.5		0.80～ 2.40			5
	3	40.00～300.00	1.00～ 2.90	N≥10 and 10≤(L−N)≤200	4・6	6
	3.5		1.50～ 3.40			7
	4		1.50～ 3.90			
	4.5		2.50～ 4.40			9
	5	40.00～350.00	3.00～ 4.90			
	5.5		3.50～ 5.40			10
	6		4.00～ 5.90			
	6.5		4.50～ 6.40		4・8	11
	7		4.90～ 6.90			
	8		5.90～ 7.90			13
	9		6.90～ 8.90			14
	10		7.50～ 9.90			15
	12		8.90～11.90			17

ORDER

Code No.	L	P	N	T
ESHS1 —	148.21 —	P0.78 —	N45 —	T4

DELIVERY **3** Days ☞ P.15

PRICE Without tax

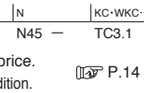
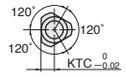
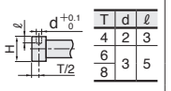
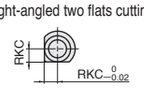
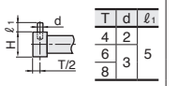
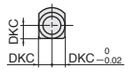
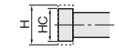
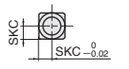
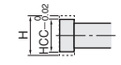
▶Quantity discount rate ☞ P.15

1～30	31～50	51～100	101～
100%	95%	90%	Enquiry

Code No.		@/P(1～30P)					
Code	D	L 40.00 ～100.00	L 100.01 ～150.00	L 150.01 ～200.00	L 200.01 ～250.00	L 250.01 ～300.00	L 300.01 ～350.00
ESHS	1 P0.30～0.39	10.9	–	–	–	–	–
	1 P0.40～0.49	10.2	–	–	–	–	–
	1 P0.50～0.59	8.25	–	–	–	–	–
	1 P0.60～0.90	3.70	4.12	–	–	–	–
	1.1 1.2 1.3 1.4	3.40	3.77	4.27	–	–	–
	1.5	3.40	3.77	4.27	–	–	–
	1.6 1.7 1.8 1.9	3.40	3.62	3.83	4.98	–	–
	2	3.40	3.62	3.83	4.98	–	–
	2.5	3.40	3.48	3.77	4.70	–	–
	3	3.40	3.48	3.77	4.70	5.83	–
	3.5	3.98	4.27	4.49	5.48	6.90	–
	4	4.20	4.42	4.62	5.75	7.05	–
	4.5	4.84	5.12	5.33	6.62	8.33	–
	5	5.20	5.48	5.83	7.33	8.98	21.4
	5.5	5.55	5.83	6.11	7.68	9.40	22.3
	6	5.98	6.18	6.48	8.11	10.2	23.0
	6.5	6.40	6.62	6.98	8.53	10.7	28.0
	7	6.83	7.05	7.33	8.90	11.7	29.0
	8	7.12	7.33	7.61	10.2	12.3	31.8
	9	8.33	8.61	8.98	11.9	14.3	33.1
	10	8.83	9.11	9.53	12.7	15.0	36.1
	12	10.6	11.0	11.5	15.0	18.1	45.9

ADDITION

Addition details ☞ P.32

Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting  ㏌ 0.1 D/2≤KC<H/2	KC(0.5)	Designated-angled two flats cutting  KGC: ㏌ 0.1 AG: ㏌ 1 D/2≤KGC<H/2 0<AG<360	KGC(1.4)
Parallel flats cutting  ㏌ 0.1 D/2≤WKC<H/2	WKC(0.9)	Three flats cutting at 120°  ㏌ 0.1 D/2≤KTC<H/2	KTC(1.8)
Parallel flats cutting  ㏌ 0.1 D/2≤KAC,KBC<H/2	KAC(1.4) KBC(1.4)	Dowel hole boring 	NN(0.9)
Right-angled two flats cutting  ㏌ 0.1 D/2≤RKC<H/2	RKC(0.9)	Dowel hole+Spring pin 	NC(0.9)
Right-angled three flats cutting  ㏌ 0.1 D/2≤DKC<H/2	DKC(1.4)	H dimension alteration  ㏌ 0.1 D<2→H−1≤HC<H D≥2→D+1≤HC<H	HC(0.6)
Square flats cutting  ㏌ 0.1 D/2≤SKC<H/2	SKC(1.8)	H dimension alteration(precision)  ㏌ 0.1 D+1≤HCC<H−0.3	HCC(1.8)

Add.	Code(@/P)	Add.	Code(@/P)
Tapping ⚠ T=8 is available only.	MC(1.4)	Point chamfering ㏌ 0.1 0.1≤HGC<P/2	HGC(0.9)
T dimension alteration ㏌ 0.1 2.0≤TC<T T−TC≤Lmax.−L	TC(0.6)	L dimension tolerance alteration L +0.02 0 → L +0.01 0	LKC(0.9)
Vent machining S・B: ㏌ 1 2≤S≤10 S+5≤B≤30	GVC(3.7)	Engraving on the head 1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
Vent machining ㏌ 0.1 1≤GS≤10 GS+2≤GB≤30 GB<GC≤L−T 4 days	GVD(4.8)	Engraving on the head 1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHN 1,2characters (0.2) 3,4characters (0.5)
Point R processing ㏌ 0.1 0.2≤HRC<P/2	HRC(0.9)	Lapping on the point face P≤6→0.05Ra P>6→0.1Ra ☒ L>200.00 is not available.	TMC(4.8)

Code No.	L	P	N	KC・WKC…etc.
ESHS1 —	148.21 —	P0.78 —	N45 —	TC3.1

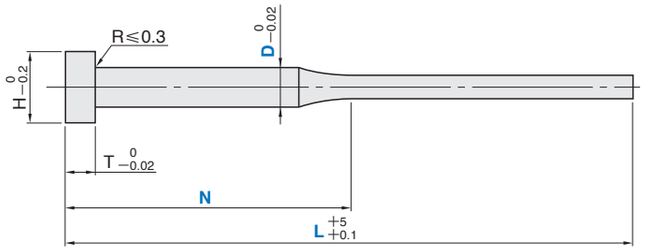
Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

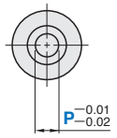
Standard Stepped Ejector Pins

General Type

Material	Hardness	Code
SKH51	59～61HRC	ESS

⚠ Range of guaranteed base material hardness ☞ P.241





Code No. Code	D	L	P	N	T	H
ESS	1	60	0.6 0.7 0.8	20 35	4	3
		100	0.6 0.7 0.8	40 50 60		
	1.5	100	0.6 0.7 0.8 0.9 1.0	40 50 60		
		150	0.6 0.7 0.8 1.0	50 70		
		150	0.9	50 70 90		
	2	100	0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6	40 50 60		4
		150	0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6	40 50 70 90		
		200	0.8 1.0 1.2 1.5	70 100		
		200	0.7 0.9 1.1 1.3 1.4 1.6	70 80 100		
	2.5	150	0.8 1.0 1.2 1.5	50 70		5
		150	0.9 1.1 1.3 1.4 1.6 1.7 1.8 1.9 2.0 2.1	50 70 90		
		200	0.8 1.0 1.2 1.5	70 100		
		200	0.9 1.1 1.3 1.4 1.6 1.7 1.8 1.9 2.0 2.1	70 80 100		
	3	150	1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6	50 70 90		6
		200	1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6	70 80 100		
		250	1.0 1.2 1.3 1.4 1.5	105		
		300	1.0 1.2 1.3 1.4 1.5	155		
	4	150	2.0 2.5 3.0	50 70	6	7
		200	2.0 2.5 3.0	70 100		
		250	2.0 2.5 3.0	100 125		
	4.5	150	2.0 2.5	50 70		9
		200	2.0 2.5	70 100		
		250	2.0 2.5	100 125		
	5	150	3.0	50 70		
		200	3.0	70 100		
		250	3.0	100 125		

ORDER

Code No.	L	P	N
ESS2 —	150 —	0.7 —	50

DELIVERY **3** Days ☞ P.15

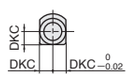
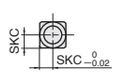
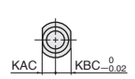
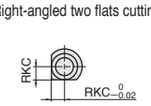
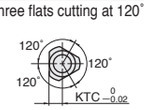
PRICE Without tax

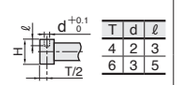
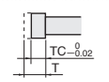
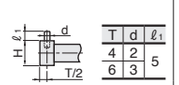
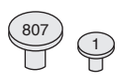
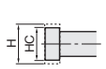
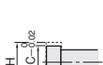
▶Quantity discount rate ☞ P.15

1～49	50～100	101～
100%	95%	Enquiry

Code No. Code	D	P	@/P(1～30P) L60	L100	L150	L200	L250	L300
ESS	1	0.6 0.7 0.8	2.68	2.68	–	–	–	–
	1.5	0.6 0.7 0.8	–	1.93	2.05	–	–	–
		0.9	–	1.93	2.05	–	–	–
		1.0	–	1.93	2.05	–	–	–
	2	0.7	–	1.59	1.59	1.77	–	–
		0.8	–	1.59	1.59	1.77	–	–
		0.9	–	1.59	1.59	1.77	–	–
		1.0	–	1.59	1.59	1.77	–	–
		1.1	–	1.59	1.59	1.77	–	–
		1.2	–	1.59	1.59	1.77	–	–
		1.3 1.4	–	1.59	1.59	1.77	–	–
		1.5	–	1.59	1.59	1.77	–	–
		1.6	–	1.59	1.59	1.77	–	–
	2.5	0.8	–	–	1.59	1.77	–	–
		0.9	–	–	1.59	1.77	–	–
		1.0	–	–	1.59	1.77	–	–
		1.1	–	–	1.59	1.77	–	–
		1.2	–	–	1.59	1.77	–	–
		1.3 1.4	–	–	1.59	1.77	–	–
		1.5	–	–	1.59	1.77	–	–
		1.6 1.7 1.8 1.9	–	–	1.59	1.77	–	–
		2.0	–	–	1.59	1.77	–	–
		2.1	–	–	1.59	1.77	–	–
	3	1.0	–	–	1.77	1.93	2.78	3.70
		1.1	–	–	1.77	1.93	–	–
		1.2	–	–	1.77	1.93	2.78	3.70
		1.3 1.4	–	–	1.77	1.93	2.78	3.70
		1.5	–	–	1.77	1.93	2.78	3.70
		1.6 1.7	–	–	1.77	1.93	–	–
		1.8	–	–	1.77	1.93	–	–
		1.9	–	–	1.77	1.93	–	–
		2.0	–	–	1.77	1.93	–	–
		2.1 2.2 2.3 2.4 2.5 2.6	–	–	1.77	1.93	–	–
	4	2.0 2.5 3.0	–	–	2.62	2.73	3.53	–
	4.5	2.0 2.5	–	–	2.96	3.12	3.53	–
	5	3.0	–	–	3.30	3.59	4.73	–

ADDITION Addition details ☞ P.32

Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting  in 0.1 D/2≦KC＜H/2	KC(0.5)	Right-angled three flats cutting  in 0.1 D/2≦DKC＜H/2	DKC(1.4)
Parallel flats cutting  in 0.1 D/2≦WKC＜H/2	WKC(0.9)	Square flats cutting  in 0.1 D/2≦SKC＜H/2	SKC(1.8)
Parallel flats cutting  in 0.1 D/2≦KAC,KBC＜H/2	KAC(1.4) KBC(1.4)	Designated-angled two flats cutting  KGC: in 0.1 AG: in 1 D/2≦KGC＜H/2 0＜AG＜360	KGC(1.4)
Right-angled two flats cutting  in 0.1 D/2≦RKC＜H/2	RKC(0.9)	Three flats cutting at 120°  in 0.1 D/2≦KTC＜H/2	KTC(1.8)

Add.	Code(@/P)	Add.	Code(@/P)
Dowel hole boring  T d ℓ 4 2 3 6 3 5	NN(0.9)	T dimension alteration  in 0.1 2.0≦TC＜T T−TC≦Lmax.−L	TC(0.6)
Dowel hole+Spring pin  T d ℓ1 4 2 6 3 5	NC(0.9)	Engraving on the head  1character→2≦H 2characters→5≦H 3characters→7≦H 4characters→7≦H	NHC 1,2characters (0.2) 3,4characters (0.5)
H dimension alteration  in 0.1 D＜2→H−1≦HC＜H D≧2→D+1≦HC＜H	HC(0.6)	Engraving on the head  	NHN 1,2characters (0.2) 3,4characters (0.5)
H dimension alteration(precision)  in 0.1 D+1≦HCC＜H−0.3	HCC(1.8)	1character→2≦H 2characters→5≦H 3characters→7≦H 4characters→7≦H	

Code No.	L	P	N	KC・WKC…etc.
ESHN1 —	100 —	P0.46 —	N50 —	TC3.1

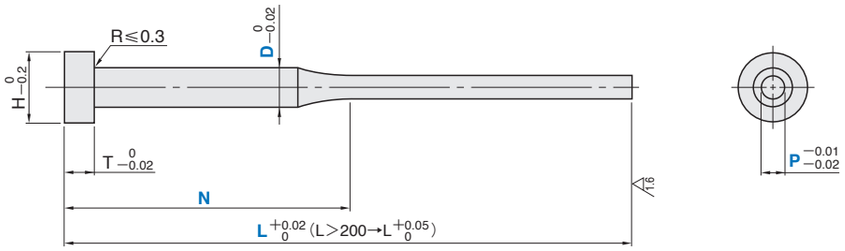
Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

Standard Stepped Ejector Pins

L Dimension Designated Type

Material	Hardness	Code
SKH51	59～61HRC	ESSL

⚠ Range of guaranteed base material hardness ☞ P.241



⚠ For LKC addition, the tolerance of L dimension is $^{+0.01}_{0}$.

Code No. Code	D	L (in) 0.01	P (in) 0.1	N	T	H
ESSL	1	30.00～ 60.00	0.6～0.8	20 35	4	3
		50.00～100.00	0.6～0.8	40 50 60		
	1.5	50.00～100.00	0.6～1.0	40 50 60 (70)		
		60.00～150.00	0.6～1.0	50 70 90		
	2	50.00～100.00	0.7～1.6	40 50 60		4
		50.00～150.00	0.7～1.6	40 50 70 90		
		80.00～200.00	0.7～1.6	70 80 100		
	2.5	60.00～150.00	0.8～2.1	50 70 90		5
		80.00～200.00	0.8～2.1	70 80 100		
	3	60.00～150.00	1.0～2.6	50 70 90		6
		80.00～200.00	1.0～2.6	70 80 100		
		115.00～250.00	1.0～1.5	105		
		165.00～300.00	1.0～1.5	155		
	D	L (in) 0.01	P	N	T	H
	4	60.00～150.00	2.0 2.5 3.0	50 70	6	7
		80.00～200.00	2.0 2.5 3.0	70 100		
		110.00～250.00	2.0 2.5 3.0	100 125		
	4.5	60.00～150.00	2.0 2.5	50 70		9
		80.00～200.00	2.0 2.5	70 100		
		110.00～250.00	2.0 2.5	100 125		
	5	60.00～150.00	3.0	50 70		
		80.00～200.00	3.0	70 100		
		110.00～250.00	3.0	100 125		

⚠ L−N≥10 ☒ P0.6・P0.9 are not for N dimension in ( ).

ORDER

Code No.	L	P	N
ESSL 2 —	148.55 —	P0.8 —	N50

DELIVERY **3** Days ☞ P.15

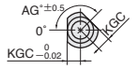
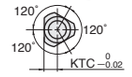
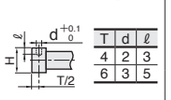
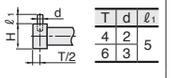
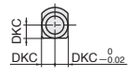
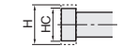
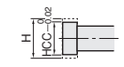
PRICE Without tax

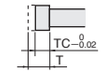
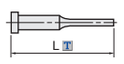
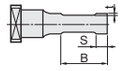
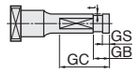
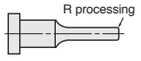
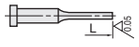
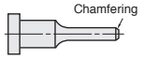
▶Quantity discount rate ☞ P.15

1～30	31～50	51～100	101～
100%	95%	90%	Enquiry

Code No. Code	D	P	@/P(1～30P) L30.00～100.00	L100.01～150.00	L150.01～200.00	L200.01～300.00
ESSL	1	0.6 0.7 0.8	3.40	–	–	–
	1.5	0.6 0.7 0.8	2.70	2.77	–	–
		0.9	2.70	2.77	–	–
		1.0	2.70	2.77	–	–
	2	0.7	2.06	2.21	2.49	–
		0.8	2.06	2.21	2.49	–
		0.9	2.06	2.21	2.49	–
		1.0	2.06	2.21	2.49	–
		1.1	2.06	2.21	2.49	–
		1.2	2.06	2.21	2.49	–
		1.3 1.4	2.06	2.21	2.49	–
		1.5	2.06	2.21	2.49	–
		1.6	2.06	2.21	2.49	–
	2.5	0.8 0.9	2.21	2.21	2.49	–
		1.0	2.21	2.21	2.49	–
		1.1	2.21	2.21	2.49	–
		1.2	2.21	2.21	2.49	–
		1.3 1.4	2.21	2.21	2.49	–
		1.5	2.21	2.21	2.49	–
		1.6 1.7 1.8 1.9	2.21	2.21	2.49	–
		2.0	2.21	2.21	2.49	–
		2.1	2.21	2.21	2.49	–
	3	1.0	2.49	2.49	2.70	3.77
		1.1	2.49	2.49	2.70	3.77
		1.2	2.49	2.49	2.70	3.77
		1.3 1.4	2.49	2.49	2.70	3.77
		1.5	2.49	2.49	2.70	3.77
		1.6 1.7	2.49	2.49	2.70	–
		1.8	2.49	2.49	2.70	–
		1.9	2.49	2.49	2.70	–
		2.0	2.49	2.49	2.70	–
		2.1 2.2 2.3 2.4 2.5 2.6	2.49	2.49	2.70	–
	4	2.0 2.5 3.0	3.48	3.48	3.70	4.70
	4.5	2.0 2.5	3.98	3.98	4.20	4.70
	5	3.0	4.42	4.42	4.77	6.11

ADDITION Addition details ☞ P.32

Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting  (in) 0.1 D/2≤KC<H/2	KC (0.5)	Designated-angled two flats cutting  KGC: (in) 0.1 AG: (in) 1 D/2≤KGC<H/2 0<AG<360	KGC (1.4)
Parallel flats cutting  (in) 0.1 D/2≤WKC<H/2	WKC (0.9)	Three flats cutting at 120°  (in) 0.1 D/2≤KTC<H/2	KTC (1.8)
Parallel flats cutting  (in) 0.1 D/2≤KAC,KBC<H/2	KAC (1.4) KBC (1.4)	Dowel hole boring 	NN (0.9)
Right-angled two flats cutting  (in) 0.1 D/2≤RKC<H/2	RKC (0.9)	Dowel hole+Spring pin 	NC (0.9)
Right-angled three flats cutting  (in) 0.1 D/2≤DKC<H/2	DKC (1.4)	H dimension alteration  (in) 0.1 D<2→H−1≤HC<H D≥2→D+1≤HC<H	HC (0.6)
Square flats cutting  (in) 0.1 D/2≤SKC<H/2	SKC (1.8)	H dimension alteration (precision)  (in) 0.1 D+1≤HCC<H−0.3	HCC (1.8)

Add.	Code (@/P)	Add.	Code (@/P)
T dimension alteration  (in) 0.1 2.0≤TC<T T−TC≤Lmax.−L	TC (0.6)	L dimension tolerance alteration  $L^{+0.02}_{0}$→$L^{+0.01}_{0}$	LKC (0.9)
Vent machining  S・B: (in) 1 2≤S≤10 S+5≤B≤30 ⚠ P=3.0(t=0.3)is available only.	GVC (3.7)	Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
Vent machining  (in) 0.1 1≤GS≤10 GS+2≤GB≤30 GB<GC≤L−T ⚠ P=3.0(t=0.3)is available only.	GVD (4.8)	Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHN 1,2characters (0.2) 3,4characters (0.5)
Point R processing  (in) 0.1 0.2≤HRC<P/2	HRC (0.9)	Lapping on the point face  1.6Ra→0.05Ra ☒ L>200.00 is not available.	TMC (4.8)
Point chamfering  (in) 0.1 0.1≤HGC<P/2	HGC (0.9)		

Code No.	L	P	N	KC・WKC…etc.
ESSL2 —	148.55 —	P0.8 —	N50 —	TC3.1

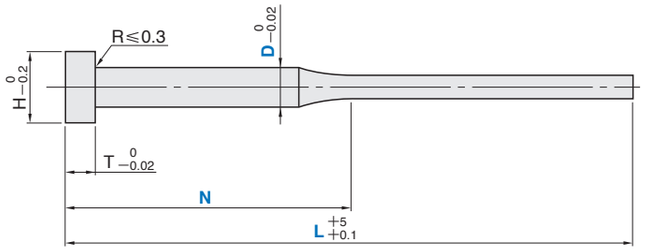
$ Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

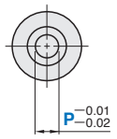
Standard Stepped Ejector Pins

P·N Dimension Designated Type

Material	Hardness	Code
SKH51	59～61HRC	ESSN

⚠ Range of guaranteed base material hardness ☞ P.241





Code No. Code	D	L	P (in) 0.01	N (in) 1	T	H
ESSN	1	60	0.60～0.90	N≥10 and 10≤(L−N)≤150	4	3
		100				
	1.5	60	0.60～1.40			
		100				
		150				
	2	100	0.80～1.90			4
		150				
		200				
	2.5	150	0.80～2.40			5
		200				
	3	150	1.00～2.90			6
		200				
		250				
		300				
	4	150	1.50～3.90	N≥10 and 10≤(L−N)≤200	6	7
		200				
		250				
	4.5	150	2.50～4.40			9
		200				
		250				
	5	150	3.00～4.90			
		200				
		250				

ORDER

Code No.	L	P	N
ESSN1.5 —	150 —	P0.78 —	N50

DELIVERY **3** Days ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～30	31～50	51～100	101～
100%	95%	90%	Enquiry

Code No. Code	D	@/P(1～30P) L60	L100	L150	L200	L250	L300
ESSN	1	3.40	3.40	—	—	—	—
	1.5	3.12	3.12	3.40	—	—	—
	2	—	3.27	3.40	3.48	—	—
	2.5	—	—	3.34	3.40	—	—
	3	—	—	3.34	3.40	4.27	5.48
	4	—	—	4.12	4.20	5.40	—
	4.5	—	—	4.77	4.98	6.11	—
	5	—	—	5.12	5.48	6.83	—

ADDITION

Addition details ☞ P.32

Add.	Code (@/P)	Add.	Code (@/P)	Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting (in) 0.1 D/2≤KC<H/2	KC (0.5)	Right-angled three flats cutting (in) 0.1 D/2≤DKC<H/2	DKC (1.4)	Dowel hole boring T d ℓ 4 2 3 6 3 5	NN (0.9)	T dimension alteration (in) 0.1 2.0≤TC<T T−TC≤Lmax.−L	TC (0.6)
Parallel flats cutting (in) 0.1 D/2≤WKC<H/2	WKC (0.9)	Square flats cutting (in) 0.1 D/2≤SKC<H/2	SKC (1.8)	Dowel hole+Spring pin T d ℓ1 4 2 6 3 5	NC (0.9)	Engraving on the head 1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
Parallel flats cutting (in) 0.1 D/2≤KAC,KBC<H/2	KAC (1.4) KBC (1.4)	Designated-angled two flats cutting KGC: (in) 0.1 AG: (in) 1 D/2≤KGC<H/2 0<AG<360	KGC (1.4)	H dimension alteration (in) 0.1 D<2→H−1≤HC<H D≥2→D+1≤HC<H	HC (0.6)	Engraving on the head 	NHN 1,2characters (0.2) 3,4characters (0.5)
Right-angled two flats cutting (in) 0.1 D/2≤RKC<H/2	RKC (0.9)	Three flats cutting at 120° (in) 0.1 D/2≤KTC<H/2	KTC (1.8)	H dimension alteration (precision) (in) 0.1 D+1≤HCC<H−0.3	HCC (1.8)	1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	

Code No.	L	P	N	KC・WKC…etc.
ESSN1.5 —	150 —	P0.78 —	N50 —	TC3.1

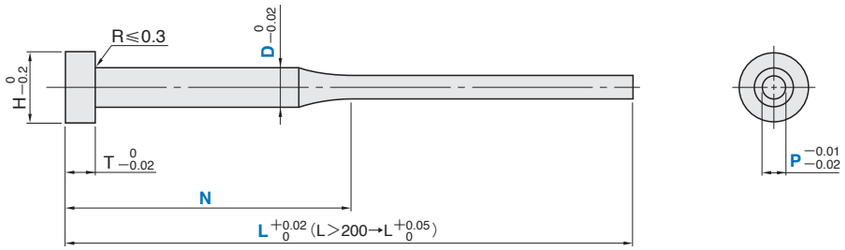
Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

Standard Stepped Ejector Pins

L·P Dimension Designated Type

Material	Hardness	Code
SKH51	59～61HRC	ESSS

⚠ Range of guaranteed base material hardness ☞ P.241



⚠ For LKC addition, the tolerance of L dimension is $^{+0.01}_{0}$.

Code No. Code	D	L (in) 0.01	P (in) 0.01	N (in) 1	T	H
ESSS	1	40.00～100.00	0.30～ 0.90	N≥10 and 10≤(L−N)≤150	4	3
		100.00～150.00	0.60～ 0.90			
	1.1	40.00～200.00	0.60～ 1.00			
	1.2		0.60～ 1.10			
	1.3		0.60～ 1.20			
	1.4		0.60～ 1.30			
	1.5		0.60～ 1.40			
	1.6	40.00～250.00	0.80～ 1.50			4
	1.7		0.80～ 1.60			
	1.8		0.80～ 1.70			
	1.9		0.80～ 1.80			
	2		0.80～ 1.90			
	2.5		0.80～ 2.40			5
	3	40.00～300.00	1.00～ 2.90	N≥10 and 10≤(L−N)≤200	4·6	6
	3.5		1.50～ 3.40			7
	4		1.50～ 3.90			
	4.5		2.50～ 4.40			9
	5	40.00～350.00	3.00～ 4.90			
	5.5		3.50～ 5.40			10
	6		4.00～ 5.90			
	6.5		4.50～ 6.40		4·8	11
	7		4.90～ 6.90			
	8		5.90～ 7.90			13
	9		6.90～ 8.90			14
	10		7.50～ 9.90			15
	12		8.90～11.90			17

ORDER

Code No.	L	P	N	T
ESSS1 —	148.21 —	P0.78 —	N45 —	T4

DELIVERY **3** Days ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～30	31～50	51～100	101～
100%	95%	90%	Enquiry

Code No. Code	D	@/P(1～30P) L 40.00 ～100.00	L 100.01 ～150.00	L 150.01 ～200.00	L 200.01 ～250.00	L 250.01 ～300.00	L 300.01 ～350.00
ESSS	1 P0.30～0.39	10.9	–	–	–	–	–
	1 P0.40～0.49	10.2	–	–	–	–	–
	1 P0.50～0.59	8.25	–	–	–	–	–
	1 P0.60～0.90	3.70	4.12	–	–	–	–
	1.1 1.2 1.3 1.4	3.27	3.55	4.27	–	–	–
	1.5	3.27	3.55	4.27	–	–	–
	1.6 1.7 1.8 1.9	3.27	3.40	3.62	4.98	–	–
	2	3.27	3.40	3.62	4.98	–	–
	2.5	3.27	3.34	3.55	4.70	–	–
	3	3.27	3.34	3.55	4.49	5.83	–
	3.5	3.77	4.05	4.27	5.20	6.90	–
	4	3.98	4.20	4.42	5.48	7.05	–
	4.5	4.62	4.84	5.05	6.25	8.33	–
	5	4.92	5.20	5.55	6.98	8.98	21.4
	5.5	5.55	5.83	6.11	7.68	9.40	22.3
	6	5.68	5.90	6.11	7.68	10.2	23.0
	6.5	6.40	6.62	6.98	8.46	10.7	28.0
	7	6.48	6.70	6.98	8.46	11.7	29.0
	8	6.77	6.98	7.25	9.61	12.3	31.8
	9	8.33	8.61	8.98	11.9	14.3	33.1
	10	8.39	8.68	9.05	12.1	15.0	36.1
	12	10.6	11.0	11.5	15.0	18.1	45.9

ADDITION

Addition details ☞ P.32

Add.	Code(@/P)	Add.	Code(@/P)	Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting KC −0.02 (in) 0.1 D/2≤KC<H/2	KC(0.5)	Designated-angled two flats cutting AG +±0.5 0° KGC −0.02 KGC: (in) 0.1 AG: (in) 1 D/2≤KGC<H/2 0<AG<360	KGC(1.4)	Tapping M×1 D: 8～9 M: 4; 10 5; 12 6 ⚠ T=8 is available only.	MC(1.4)	Point chamfering chamfering (in) 0.1 0.1≤HGC<P/2	HGC(0.9)
Parallel flats cutting WKC −0.02 (in) 0.1 D/2≤WKC<H/2	WKC(0.9)	Three flats cutting at 120° 120° 120° 120° KTC −0.02 (in) 0.1 D/2≤KTC<H/2	KTC(1.8)	T dimension alteration TC −0.02 (in) 0.1 2.0≤TC<T T−TC≤Lmax.−L	TC(0.6)	L dimension tolerance alteration L T L +0.02 0→L +0.01 0	LKC(0.9)
Parallel flats cutting KAC KBC −0.02 (in) 0.1 D/2≤KAC,KBC<H/2	KAC(1.4) KBC(1.4)	Dowel hole boring d +0.1 0 T: 4 d: 2 ℓ: 3; 6 8 d: 3 ℓ: 5 T/2	NN(0.9)	Vent machining S B P: 3.00～4.99 t: 0.3; 5.00～9.99 0.4; 10.00～11.90 0.5 S·B: (in) 1 2≤S≤10 S+5≤B≤30	GVC(3.7)	Engraving on the head 807 1 1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
Right-angled two flats cutting RKC −0.02 (in) 0.1 D/2≤RKC<H/2	RKC(0.9)	Dowel hole+Spring pin T: 4 d: 2; 6 8 d: 3 ℓ1: 5 T/2	NC(0.9)	Vent machining GS GB GC P: 3.00～4.99 t: 0.3; 5.00～9.99 0.4; 10.00～11.90 0.5 (in) 0.1 1≤GS≤10 GS+2≤GB≤30 GB<GC≤L−T 4 days	GVD(4.8)	Engraving on the head 1 2 3 1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHN 1,2characters (0.2) 3,4characters (0.5)
Right-angled three flats cutting DKC DKC −0.02 (in) 0.1 D/2≤DKC<H/2	DKC(1.4)	H dimension alteration H HC (in) 0.1 D<2→H−1≤HC<H D≥2→D+1≤HC<H	HC(0.6)				
Square flats cutting SKC SKC −0.02 (in) 0.1 D/2≤SKC<H/2	SKC(1.8)	H dimension alteration (precision) H HCC −0.02 (in) 0.1 D+1≤HCC<H−0.3	HCC(1.8)	Point R processing R processing (in) 0.1 0.2≤HRC<P/2	HRC(0.9)	Lapping on the point face L 45° P≤6→0.05Ra P>6→0.1Ra ☒ L>200.00 is not available.	TMC(4.8)

Code No.	L	P	N	KC·WKC···etc.
ESSS1 —	148.21 —	P0.78 —	N45 —	TC3.1

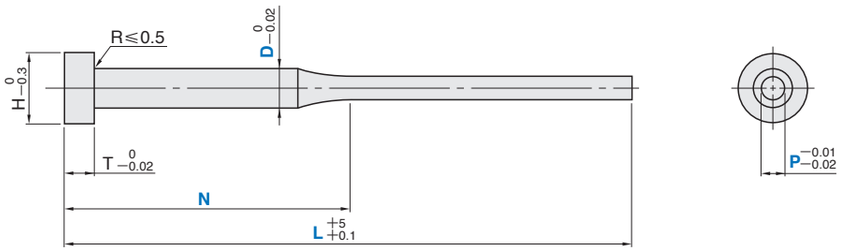
Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

Stepped Ejector Pins

General Type

Material	Hardness	Head Thickness(T)	Code
SKD61	(Nitriding) Surface:900HV～ Interior:40～45HRC	4	ESD4N
		6	ESDJN

⚠ Range of guaranteed base material hardness ☞ P.241
⚠ Range of guaranteed surface hardness for nitriding ☞ P.241



Code No. Code	D	L	P	N	T	H
ESD4N (T=4mm)	2.5	100	2.0	40 50 60	4	5
		150		40 50 60 70 80 90		
		200		70 80 90 100		
	3	100	2.0 2.5	40 50 60		6
		150		40 50 60 70		
		200		70 80 90 100		
ESDJN (T=6mm)	4	150	2.0 2.5 3.0	40 50	6	8
		200		70 80 90 100		
		250		100 125		
	5	150	3.0 3.5 4.0	40 50		9
		200		70 80 90 100		
		250		100 125		
	6	150	4.0	40 50		10
		200		70 80 90 100		
		250		100 125		

⚠ For P＜2.0, please select high speed steel ejector pins.

ORDER

Code No.	L	P	N
ESD4N2.5 —	150 —	2.0 —	50
ESDJN4 —	150 —	2.0 —	50

DELIVERY 6 Days ☞ P.15

PRICE Without tax

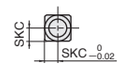
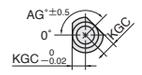
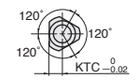
▶Quantity discount rate ☞ P.15

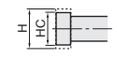
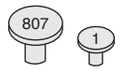
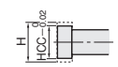
1～49	50～100	101～
100%	95%	Enquiry

Code No. Code	D	@/P(1～49P) L100	L150	L200	L250
ESD4N	2.5	2.30	2.30	2.30	—
	3	2.48	2.48	2.48	—
ESDJN	4	—	3.17	3.84	4.61
	5	—	3.67	4.27	5.12
	6	—	4.18	4.87	5.98

ADDITION

Addition details ☞ P.32

Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting  in 0.1 D/2≤KC＜H/2	KC(0.5)	Right-angled three flats cutting  in 0.1 D/2≤DKC＜H/2	DKC(1.4)
Parallel flats cutting  in 0.1 D/2≤WKC＜H/2	WKC(0.9)	Square flats cutting  in 0.1 D/2≤SKC＜H/2	SKC(1.8)
Parallel flats cutting  in 0.1 D/2≤KAC,KBC＜H/2	KAC(1.4) KBC(1.4)	Designated-angled two flats cutting  KGC: in 0.1 AG: in 1 D/2≤KGC＜H/2 0＜AG＜360	KGC(1.4)
Right-angled two flats cutting  in 0.1 D/2≤RKC＜H/2	RKC(0.9)	Three flats cutting at 120°  in 0.1 D/2≤KTC＜H/2	KTC(1.8)

H dimension alteration	Code(@/P)	Add.	Code(@/P)
 in 0.1 D＜2→H−1≤HC＜H D≥2→D+1≤HC＜H	HC(0.6)	Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
H dimension alteration(precision)  in 0.1 D+1≤HCC＜H−0.3	HCC(1.8)	Engraving on the head 	NHN 1,2characters (0.2) 3,4characters (0.5)
T dimension alteration  in 0.1 2.0≤TC＜T T−TC≤Lmax.−L	TC(0.6)	1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	

Code No.	L	P	N	KC・WKC…etc.
ED4N2.5 —	150 —	P2.0 —	N50 —	TC3.1

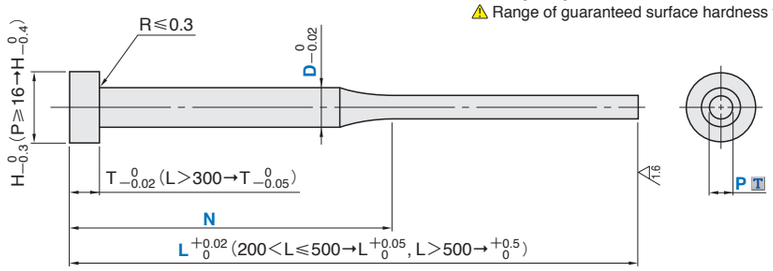
Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Stepped Ejector Pins

L·P Dimension Designated Type

Material	Hardness	Head Thickness(T)	Code
SKD61	(Nitriding) Surface:900HV～ Interior:40～45HRC	4	ESD4NS
		6·8	ESDJNS

⚠ Range of guaranteed base material hardness ☞ P.241
⚠ Range of guaranteed surface hardness for nitriding ☞ P.241



T P Tolerance

L \ P	2.00～11.99	12.00～19.90
L≤500	−0.01 −0.02	−0.01 −0.03
L>600	−0.01 −0.03	−0.01 −0.04

Code No. Code	D	L (in) 0.01	P	N (in) 1	T ESD4NS	T ESDJNS	H
ESD4NS (T=4mm)	2.5	40.00～300.00	2.00～ 2.40	N≥10 and 20≤(L−N)≤200	4	—	5
	3	40.00～400.00	2.00～ 2.90				6
	3.5		2.00～ 3.40				7
	4	40.00～500.00	2.00～ 3.90			6	8
	4.5		2.00～ 4.40				
	5	40.00～600.00(500.00)	3.00～ 4.90				9
	5.5	40.00～500.00	3.00～ 5.40				
	6	40.00～700.00(500.00)	3.00～ 5.90				10
ESDJNS (T=6·8mm)	6.5		3.50～ 6.40	For L>500 N≥L/3 and L−N≥10			11
	7	40.00～800.00(500.00)	3.50～ 6.90			8	
	8		4.00～ 7.90				13
	10		5.00～ 9.90				15
	12		6.00～11.90				17
	15		10.90～14.90		6		20
	16		11.90～15.90				21
	20		15.90～19.90				25

⚠ Lmax.=500 for ESD4NS. ⚠ L>500:(in) 0.1. ⚠ For P<2.00, please select high speed steel ejector pins.

ORDER

Code No.	L	P	N
ESD4NS3 —	150.00 —	P2.00 —	N50

DELIVERY 6 Days ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～4	5～12	13～49	50～100	101～
100%	95%	90%	80%	Enquiry

Code No. Code	D	@/P(1～4P) L 40.00 ～100.00	L 100.01 ～150.00	L 150.01 ～200.00	L 200.01 ～250.00	L 250.01 ～300.00	L 300.01 ～350.00	L 350.01 ～400.00	L 400.01 ～500.00	L 500.1 ～600.0	L 600.1 ～700.0	L 700.1 ～800.0
ESD4NS ESDJNS	2.5	5.03	5.30	5.46	6.24	7.61	—	—	—	—	—	—
	3	5.03	5.30	5.55	6.58	8.12	11.6	13.7	—	—	—	—
	3.5	5.30	5.55	5.73	7.18	8.98	12.3	14.1	—	—	—	—
	4	5.55	5.90	6.06	7.95	9.40	12.4	14.1	16.4	—	—	—
	4.5	5.98	6.15	6.40	8.37	10.0	11.9	13.9	16.4	—	—	—
	5	6.24	6.75	7.00	8.98	10.8	11.9	13.9	16.4	21.8	—	—
	5.5	6.49	7.34	7.61	9.56	11.5	12.8	14.5	18.7	—	—	—
	6	6.49	7.34	7.61	9.56	11.5	12.8	14.5	18.7	23.4	28.6	—
	6.5	6.92	8.28	8.64	10.1	12.7	14.0	15.8	18.3	25.9	32.1	—
	7	6.92	8.28	8.64	10.1	12.7	14.0	15.8	18.3	24.6	30.0	35.9
	8	7.00	8.64	8.98	11.5	12.9	14.2	16.4	19.0	25.6	30.6	39.0
	10	8.80	10.5	11.8	13.0	14.4	15.8	18.7	21.1	28.1	32.3	42.0
	12	11.0	11.0	12.7	14.3	15.8	17.5	20.2	22.7	31.4	35.2	46.7
	15	12.3	12.3	14.1	15.6	17.4	19.2	22.0	25.5	38.1	43.4	58.0
	16	15.6	15.6	17.5	19.8	22.3	25.2	29.2	34.5	41.4	46.7	62.4
	20	22.5	22.5	24.9	26.4	29.3	31.4	35.9	53.1	63.1	71.5	99.0

ADDITION

Addition details ☞ P.32

Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting (in) 0.1 D/2≤KC<H/2	KC(0.5)	Right-angled three flats cutting (in) 0.1 D/2≤DKC<H/2	DKC(1.4)
Parallel flats cutting (in) 0.1 D/2≤WKC<H/2	WKC(0.9)	Square flats cutting (in) 0.1 D/2≤SKC<H/2	SKC(1.8)
Parallel flats cutting (in) 0.1 D/2≤KAC,KBC<H/2	KAC(1.4) KBC(1.4)	Designated-angled two flats cutting KGC: (in) 0.1 AG: (in) 1 D/2≤KGC<H/2 0<AG<360	KGC(1.4)
Right-angled two flats cutting (in) 0.1 D/2≤RKC<H/2	RKC(0.9)	Three flats cutting at 120° (in) 0.1 D/2≤KTC<H/2	KTC(1.8)

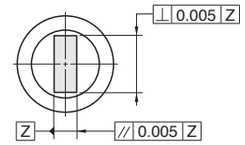
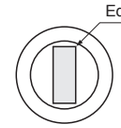
Dowel hole boring	Code(@/P)	Add.	Code(@/P)
(in) 0.1 0.2≤HRC<P/2	NN(0.9)	Point R processing	HRC(0.9)
Dowel hole+Spring pin (in) 0.1 0.1≤HGC<P/2	NC(0.9)	Point chamfering	HGC(0.9)
H dimension alteration (in) 0.1 D<2→H−1≤HC<H D≥2→D+1≤HC<H	HC(0.6)	Engraving on the head 1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
T dimension alteration (in) 0.1 2.0≤TC<T T−TC≤Lmax.−L	TC(0.6)	Engraving on the head 1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHN 1,2characters (0.2) 3,4characters (0.5)

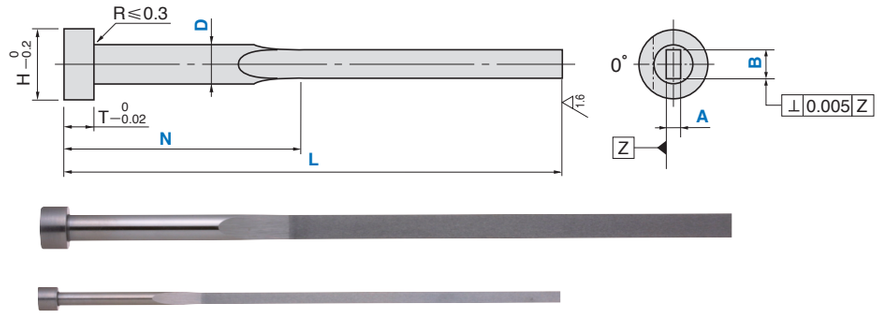
Code No.	L	P	N	KC·WKC···etc.
ESD4NS3 —	150.00 —	P2.00 —	N50 —	TC3.1

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

RECTANGULAR EJECTOR PINS

Guide for Rectangular Ejector Pins

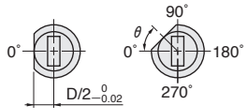
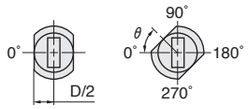
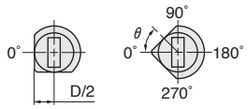
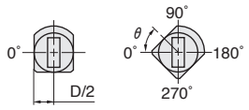
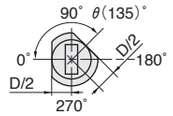
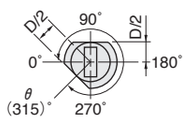
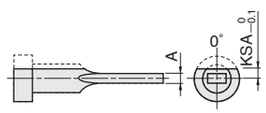
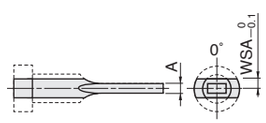
Precision standard and the precision for the rectangular part shapes.	Precision for the rectangular part shape.	The edge for the rectangular part
		 Reserve the grinded acute angle on the edge, refinish it when assembling.



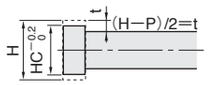
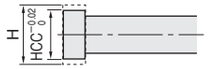
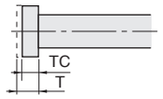
Material	Rectangular Part A・B		Type	Head Thickness	Code	Overall Length(L)		Rectangular Part		Delivery	Page
	Precision	Tolerance				Dimension	Tolerance	A Dimension	B Dimension		
SKH51	Precision	0 −0.005	General type	4・6	ERH	100～300	+5 +0.1	0.3～5.5	0.8～10.0	3	58
			L dimension designated type	4・6・8	ERHL	50～300	+0.02 0 ※1				60
			Rectangular part dimension designated	4・6・8	ERHS	40～350		Amin.0.2	0.3～14.80		62
	Standard	−0.01 −0.02 ※2	General type	4・6・8	ERS	100～300	+5 +0.1	0.3～2.5	0.8～10.0	3	64
			L dimension designated type	4・6・8	ERSL	50～300	+0.02 0 ※1	0.3～2.5	0.8～10.0		66
			Rectangular part dimension designated	4・6・8	ERSS	40～350		Amin.0.30	0.6～14.80		68

Guide for Rectangular Ejector Pins Addition

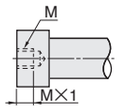
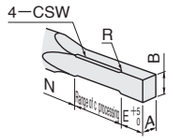
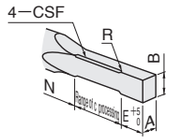
Head Flat Alteration

Add.	Code @/P	Spec.
Designated-angled single flat cutting 	HKC(0.9)	●Change the flat position (standard:0°) clockwise in 1° increments. Range of designation 0≤HKC<360 Unit of designation (if) 1 Combined with KSA・WSA can be (if) 90. ⚠ For free flange position, D/2→D/2+0.1. HKC40
Designated-angled parallel flats cutting 	HWC(1.4)	●Add two parallel flats at the standard (0°) position, or at the designated angle (clockwise in 1° increments from the standard position). Range of designation 0≤HWC<360 Unit of designation (if) 1 Combined with KSA・WSA can be (if) 90. ⚠ For free flange position, D/2→D/2+0.1. HWC40
Designated right-angled flats cutting 	HRC(1.4)	●Add two right-angled flats at the standard (0°) position, or at the designated angle (clockwise in 1° increments from the standard position). Range of designation 0≤HRC<360 Unit of designation (if) 1 Combined with KSA・WSA can be (if) 90. ⚠ For free flange position, D/2→D/2+0.1. HRC40
Designated right-angled three flats cutting 	HTC(1.8)	●Add three right-angled and parallel flats at the standard (0°) position, or at the designated angle (clockwise in 1° increments from the standard position). Range of designation 0≤HTC<360 Unit of designation (if) 1 Combined with KSA・WSA can be (if) 90. ⚠ For free flange position, D/2→D/2+0.1. HTC40
Designated-angled two flats cutting 	HAC(1.4)	●Add a flat at the standard (0°) position and another at the designated angle (clockwise in 1° increments from the standard position). Range of designation 0≤HAC<360 Unit of designation (if) 1 ⚠ For free flange position, D/2→D/2+0.1. HAC135
Designated-angled two flats cutting 	HBC(1.4)	●Add a flat at the standard (0°~90°) position, and another at the designated angle (clockwise in 1° increments from the standard position). Range of designation 0≤HBC<360 Unit of designation (if) 1 ⚠ For free flange position, D/2→D/2+0.1. ☒ Designated 90° is not available. HBC315
A flat cutting on the shank 	KSA(2.8)	●Cut a flat on the shank. Range of designation A/2+0.1≤KSA≤D/2−0.1 0.1≤KSA≤D/2−0.1 (rectangular ejector pins with semicircle) ⚠ For combined with HKC・HWC・HRC・HTC, 90° and 270° was designed→B/2+0.1≤KSA≤D/2−0.1. Unit of designation (if) 0.1 ☒ D<1.5 is not available. KSA3.5
Paralle flats cutting on the shank 	WSA(5.6)	●Cut parallel flats on the shank. Range of designation A/2+0.1≤WSA≤D/2−0.1 0.1≤WSA≤D/2−0.1 (rectangular ejector pins with semicircle) ⚠ For combined with HKC・HWC・HRC・HTC, 90° and 270° was designed →B/2+0.1≤WSA≤D/2−0.1. Unit of designation (if) 0.1 ☒ D<1.5 is not available. WSA20

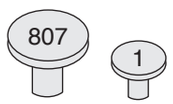
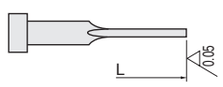
Dimension Alteration

Add.	Code @/P	Spec.
H dimension alteration 	HC(0.6)	●Reduce the head diameter H. Range of designation D+1≤HC<H D1~1.5:2≤HC<H Unit of designation (if) 0.1 HC5.5
H dimension alteration (precision) 	HCC(1.8)	●Reduce the head diameter H (precision). Range of designation D+1≤HCC<H−0.3 Unit of designation (if) 0.1 ☒ P<1.5 is not available. HCC5.5
T dimension alteration 	TC(0.6)	●Reduce the head thickness. Range of designation 2≤TC<T T−TC≤Lmax.−L Unit of designation (if) 0.1 ⚠ L (N) dimension is shortened according to (T−TC) (except L (N) dimension designated type). TC3.5

Shape Alteration

Add.	Code @/P	Spec.
Tapping 	MC(1.4)	●Tap on the head. ⚠ D≥8 is available. ⚠ T=8 is available only. ☒ Combined with HKC・HWC・HRC・HTC・HAC・HBC・KSA・WSA・HC・HCC・NHC・NHN are not available. MC D / M: 8~9 / 4; 10~11.5 / 5; 12~15 / 6; 16・20 / 8
Edges chamfering 	CSW(1.8)	●Chamfering on two edges (except the tip). Range of designation 0.3≤CSW<1.5, 5≤E≤(L−N)−20 CSW≤0.5, 3≤E≤(L−N)−20 (blade type) Unit of designation CSW: (if) 0.1, E: (if) 1 ⚠ A≤B→CSW≤A/2−0.05, A>B→CSW≥B/2−0.05 (blade type). ⚠ B≥1.5 and A≥0.8 are available (except the blade type). ⚠ R≤CSW ⚠ For CSW addition, add one day for delivery. CSW0.5−E3
Edges chamfering 	CSF(3.7)	●Chamfering on four edges (except the tip). Range of designation 0.3≤CSF<1.5, 5≤E≤(L−N)−20 CSF≤0.5, 3≤E≤(L−N)−20 (blade type) Unit of designation CSF: (if) 0.1, E: (if) 1 ⚠ A≤B→CSF≤A/2−0.05, A>B→CSF≥B/2−0.05 (blade type) ⚠ B≥1.5 and A≥0.8 are available (except the blade type). ⚠ R≤CSF ⚠ For CSF addition, add one day for delivery. CSF0.5−E3

Others

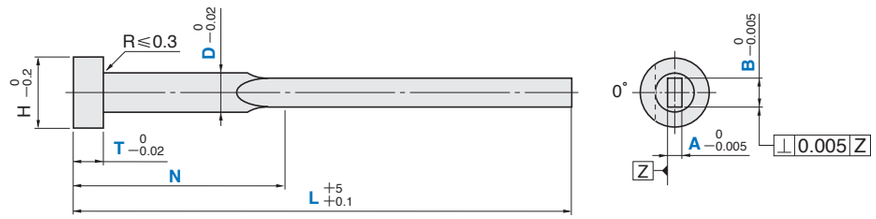
Add.	Code @/P	Spec.
Engraving on the head 	NHC 1,2 characters (0.2) 3,4 characters (0.5)	●Engrave numbers or characters on the head. Range of application 1 character →2≤H 2 characters →5≤H 3,4 characters→7≤H ⚠ For 2~4 characters,only the first character may be an alphabet. ☒ Combined with MC is not available. Character of designation Number 0~9, English letter A~Z. NHC−8,NHC−87,NHC−A12
Engraving on the head 	NHN 1,2 characters (0.2) 3,4 characters (0.5)	●Engrave on the head (Add a sequential number on the head of each ejector pin when two or more pieces of identical size are ordered) Range of application 1 character →2≤H 2 characters →5≤H 3,4 characters→7≤H ⚠ For 2~4 characters,only the first character may be an alphabet. ☒ Combined with SKC・MC are not available. Character of designation Number 0~9, English letter A~Z. For ordering 3 pieces with NHN-5, sequential number started from 5 is added on the head on each piece.
Lapping on the point face 	TMC(4.8)	●Alter the roughness on the point face. Range of application P≤6:1.6Ra→0.05Ra P>6:1.6Ra→0.1Ra ☒ P<0.6 is not available. ☒ L>200 is not available. TMC

Precision Rectangular Ejector Pins

General Type

Material	Hardness	Code
SKH51	59～61HRC	ERH

⚠ Range of guaranteed base material hardness ☞ P.241



ORDER

Code No.	A	B	L	N	T
ERH1.5 —	0.3 —	0.8 —	100 —	50 —	4

DELIVERY **3** Days ☞ P.15

ADDITION

Addition details ☞ P.56

Add.	Code (@/P)
Designated-angled single flat cutting	HKC (0.9)
㎜ 1 0≤HKC＜360	
Designated-angled parallel flats cutting	HWC (1.4)
㎜ 1 0≤HWC＜360	
Designated right-angled two flats cutting	HRC (1.4)
㎜ 1 0≤HRC＜360	
Designated right-angled three flats cutting	HTC (1.8)
㎜ 1 0≤HTC＜360	
Designated-angled two flats cutting	HAC (1.4)
㎜ 1 0＜HAC＜360	
Designated-angled two flats cutting	HBC (1.4)
㎜ 1 0≤HBC＜360	
One flat cutting on the shank	KSA (2.8)
㎜ 1 A/2+0.1≤KSA≤D/2−0.1	
Paralle flats cutting on the shank	WSA (5.6)
㎜ 1 A/2+0.1≤WSA≤D/2−0.1	

Add.	Code (@/P)
H dimension alteration	HC (0.6)
㎜ 0.1 D+1≤HC＜H For D1.5, 2≤HC＜H.	
H dimension alteration (precision)	HCC (1.8)
㎜ 0.1 D+1≤HCC＜H−0.3	
T dimension alteration	TC (0.6)
㎜ 0.1 2≤TC＜T T−TC≤Lmax.−L	

Add.	Code (@/P)
Tapping	MC (1.4)
Engraving on the head	NHC 1,2characters (0.2) 3,4characters (0.5)
Engraving on the head	NHN 1,2characters (0.2) 3,4characters (0.5)

M	D	M
M×1	8・8.5	4
	10・10.5	5
	12	6

1character→2≤H 2characters→5≤H
3characters→7≤H 4characters→7≤H

Code No.	A	B	L	N	T	HKC・HWC…etc.
ERH1.5 —	0.3 —	0.8 —	100 —	N50 —	T4 —	HKC45—TC3.1

⚠ Letter (N・T) need to be colded for addtion.

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～49	50～100	101～
100%	95%	Enquiry

Code No.		@/P (1～49P)				
Code	D	L100	L150	L200	L250	L300
ERH	1.5	4.74	5.00	—	—	—
	2・2.5	4.90	5.24	7.08	—	—
	3・3.5	5.12	5.46	7.08	7.68	—
	4	5.81	6.33	7.39	7.90	—
	4.5	7.05	7.95	9.02	9.56	—
	5	—	8.40	9.46	10.2	—
	5.5	7.43	8.40	9.46	10.2	—
	6	—	8.99	10.2	—	—
	6.5	8.37	9.37	10.5	11.3	—
	7.5・8・8.5	9.56	10.9	12.1	13.0	14.8
	10・10.5	—	12.8	14.2	15.3	17.4
	12	—	—	17.4	19.3	20.8

Code No.		A	B	N					T	H
Code	D			100	150	200		250	300		
				L							
ERH	1.5	0.3 0.4 0.5 0.6 0.7	0.8	40 50	(50)					4	3
		0.4 0.5	1.0	40 50	50						
		0.4 0.5	1.2	40 50	50						
	2	0.3	1.0	40 50							4
		0.4 0.5 0.6 0.7		40 50	40 50	75					
		0.8		40 50	40 50		75				
		1.0		40 50	40 50						
		0.3	1.2	40 50							
		0.4 0.5 0.6 (0.7)		40 50	40 50	60 75					
		0.8 1.0		40 50	40 50		75				
		0.4 0.5 0.6 (0.7)	1.5	40 50	40 50	60 75					
		0.8 1.0		40 50	40 50		75				
	2.5	1.2	1.5	40	40	90		75 90			
		(0.4) 0.5		40 50	40 50	60 75	70				
		0.6 0.7	2.0	40 50	40 50	60 75 90	70	90			5
		0.8 (1.0)		40 50	40 50	60 90	70	75 90			
	3	1.2			50						
		1.2	2.0	40	40	90		75 90			
		1.5			40	90		75 90	120		
		0.4 0.5		40 50	40 50	75					6
		(0.6) 0.7	2.5	40 50	40 50	60 75 90	70	90			
		0.8 (1.0)		40 50	40 50	60 90	70	75 90			
		1.2		40	40	90		75 90			
	3.5	0.4 0.5 0.6 0.7 0.8		40	50					4	7
		1.0 1.2	2.5	40	50						
		1.5		40	40 50	90		75 90	120		
		2.0		40	40 50			75	120		
		0.4 0.5		40 50	40 50	75					
		0.6 0.7	3.0	40 50	40 50	75 90		90			
		0.8 1.0		40 50	40 50	60 90	70	75 90			
		1.2		40	40 50	90		75 90			
		1.5		40	40 50	90		75 90	120		
	4	0.6	3.0	40	50						
		2.0		40	40 50			75	120		
		0.4 0.5	3.5	40 50	40 50						
		0.6 0.7		40 50	40 50	90		90			
		(0.8) 1.0		40 50	40 50	60 90	60 70	75 90			
		1.2		40	40	90		75 90		4・6	
		1.5			40	90		75 90	120		
	4.5	1.8	3.5		40			75			
		2.0			40			75	120		
		0.6 0.7	4.0	40 50	40 50	90		90			
		0.8 1.0		40 50	40 50	60 90	60 70	75 90			9
		1.2		40	40	90		75 90			
		1.5			40	90		75 90	120		
	5	0.5 0.8 1.0	4.0		50 60			100			
		1.8			40		75				
		2.0			40		75		120		
	5.5	2.0	4.5		40		75		120		
		0.8 1.0	5.0	40 50	40 50		75				
		1.2		40	40		75				
		1.5			40		75		120		10
		1.8			40		75				
		2.0			40		75		120		
	6	1.0 1.2	5.0		50 60			100			
	6.5	0.8 1.0	6.0	40 50	40 50		75			4・8	
		1.2		40	40		75				
		1.5 1.8			40		75		120		11
		2.0			40		75		120		
	7.5	1.2	7.0	40	40		75				
		1.5 2.0			40		75		120		
	8	1.2	7.5	40	40		75	100	150	120 130	13
		1.5			40		75	100	120 150	120 130	
		2.0			40		75		120		
	8.5	1.2	8.0	40	40		75				
		1.5 1.8			40		75		120		14
		2.0			40		75		120		
	10	1.5 5.0 5.5	8.0					80 100	120	120 150	15
		2.0	9.5		40		75		120		
	10.5	2.0	10.0		40		75		120		16
	12	2.5 3.0 3.5	10.0					100	120 150	150	17

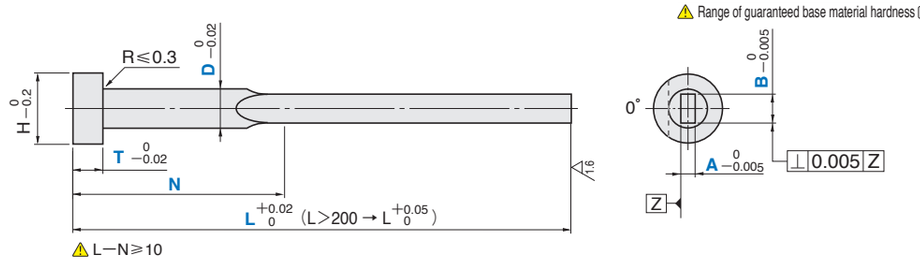
⚠ For D1.5, N dimension in ( ) are for A 0.4・0.5 only. ⚠ For N60・70, A dimension in ( ) are not available.

Precision Rectangular Ejector Pins

L Dimension Designated Type

Material	Hardness	Code
SKH51	59～61HRC	ERHL

⚠ Range of guaranteed base material hardness ☞ P.241



⚠ L−N≥10

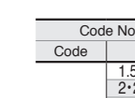
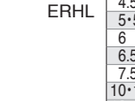
ORDER

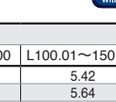
Code No.	A	B	L	N	T
ERHL5.5 —	2.0 —	4.5 —	130.53 —	N50 —	T4

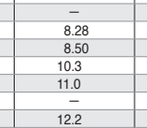
DELIVERY **3** Days ☞ P.15

ADDITION

Addition details ☞ P.56

Add.	Code (@/P)
Designated-angled single flat cutting ㎜ 1 0≤HKC<360	HKC (0.9)
Designated-angled parallel flats cutting ㎜ 1 0≤HWC<360	HKC (1.4)
Designated right-angled two flats cutting ㎜ 1 0≤HRC<360	HRC (1.4)
Designated right-angled three flats cutting ㎜ 1 0≤HTC<360	HTC (1.8)
Designated-angled two flats cutting  ㎜ 1 0<HAC<360	HAC (1.4)
Designated-angled two flats cutting  ㎜ 1 0≤HBC<360	HBC (1.4)
One flat cutting on the shank ㎜ 1 A/2+0.1≤KSA≤D/2−0.1	KSA (2.8)
Paralle flats cutting on the shank ㎜ 1 A/2+0.1≤WSA≤D/2−0.1	WSA (5.6)

Add.	Code (@/P)
H dimension alteration  ㎜ 0.1 D+1≤HC<H For D1.5, 2≤HC<H.	HC (0.6)
H dimension alteration (precision)  ㎜ 0.1 D+1≤HCC<H−0.3	HCC (1.8)
T dimension alteration ㎜ 0.1 2≤TC<T T−TC≤Lmax.−L	TC (0.6)
Tapping	D / M: 8・9 / 4; 10～11.5 / 5; 12 / 6 — MC (1.4)
Edges chamfering ㎜ 1 4 days	CSW (1.8)

Add.	Code (@/P)
Edges chamfering  ㎜ 1 4 days	CSF (3.7)
Engraving on the head 1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
Engraving on the head 1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHN 1,2characters (0.2) 3,4characters (0.5)
Lapping on the point face	TMC (4.8)
☒ L>200.00 is not available.	

Code No. | A | B | L | N | T | HKC・HWC…etc.
ERHL5.5 — 2.0 — 4.5 — 130.53 — N40 — T4 — TC3.1

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

PRICE Without tax ▶Quantity discount rate ☞ P.15

1～30	31～50	51～100	101～
100%	95%	90%	Enquiry

Code No.		@/P (1～30P)				
Code	D	L50.00～100.00	L100.01～150.00	L150.01～200.00	L200.01～250.00	L250.01～300.00
ERHL	1.5	5.08	5.42	–	–	–
	2・2.5	5.30	5.64	7.65	–	–
	3・3.5	5.50	5.89	7.65	8.28	–
	4	6.23	6.78	7.95	8.50	–
	4.5	7.55	8.53	9.65	10.3	–
	5・5.5	7.99	9.05	10.2	11.0	–
	6	–	9.74	11.0	–	–
	6.5	9.02	10.2	11.3	12.2	–
	7.5・8・8.5	10.3	11.7	13.0	14.0	15.9
	10・10.5	12.3	13.7	15.2	16.4	18.6
	12	–		18.6	20.6	22.0

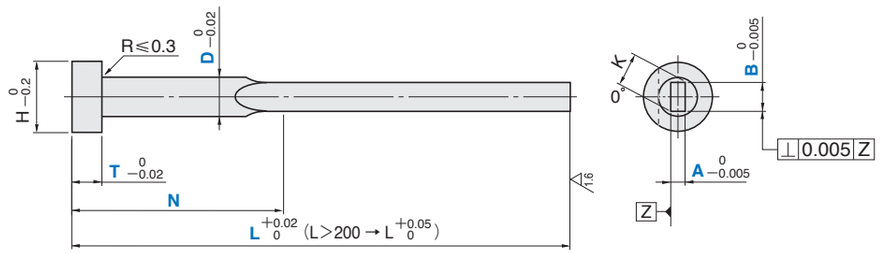
Code No.		A	B	N L 50.00～100.00	N L 100.01～150.00	N L 150.01～200.00	N L 200.01～250.00	N L 250.01～300.00	T	H
Code	D			㎜ 0.01						
ERHL	1.5	0.3	0.8	40 50					4	3
		0.4 0.5		40 50	50					
		0.6 0.7		40 50						
		0.4 0.5	1.0	40	50					
		0.4 0.5	1.2	40	50					
	2	0.3	1.0	40 50						4
		0.4 0.5 0.6 0.7		40 50	40 50 60 75					
		0.8		40 50	40 50 60 75	75				
		1.0		40 50	50 60					
		0.3	1.2	40 50						
		0.4 0.5 0.6 0.7		40 50	40 50 60 75					
		0.8 1.0		40 50	40 50 60 75	75				
		0.4 0.5 0.6 0.7	1.5	40 50	40 50 60 75					
		0.8 1.0		40 50	40 50 60 75	75				
	2.5	1.2	1.5	40	40 75 90	75 90				5
		0.4	2.0	40 50	40 50 60 75					
		0.5		40 50	40 50 60 75					
		0.6 0.7		40 50	40 50 60 75 90	90				
		0.8		40 50	40 50 60 75 90	75 90				
		1.0		40 50	40 50 60 75 90	75 90				
		1.2		40	50 60					
	3	1.2	2.0	40	40 75 90	75 90				6
		1.5			40 75 90	75 90	120			
		0.4 0.5	2.5	40 50	40 50 60 75					
		0.6		40 50	40 50 60 75 90	90				
		0.7		40 50	40 50 60 75 90	70 90				
		0.8 1.0		40 50	40 50 60 75 90	70 75 90				
		1.2		40	40 50 60 75 90	75 90				
	3.5	0.4 0.5 0.6 0.7	2.5	40	50				4・6	7
		0.8 1.0 1.2		40	50					
		1.5		40	40 50 75 90	75 90	120			
		2.0		40	40 50 75	75	120			
		0.4 0.5	3.0	40 50	40 50 60 75					
		0.6 0.7		40 50	40 50 60 75 90	90				
		0.8 1.0		40 50	40 50 60 75 90	70 75 90				
		1.2		40	40 50 60 75 90	75 90				
		1.5		40	40 50 60 75 90	75 90	120			
	4	0.6	3.0	40	50					
		2.0		40	40 50 75	75	120			
		0.4 0.5		40 50	40 50					
		0.6		40 50	40 50 60 90	90				
		0.7		40 50	40 50 90	90				
		0.8	3.5	40 50	40 50 75 90	75 90				
		1.0		40 50	40 50 60 75 90	60 70 75 90				
		1.2		40	40 75 90	75 90				
		1.5		40	40 75 90	75 90	120			
	4.5	1.8	3.5	40	40 75	75				9
		2.0		40	40 75	75	120			
		0.6 0.7		40 50	40 50 90	90				
		0.8 1.0	4.0	40 50	40 50 60 75 90	60 70 75 90				
		1.2		40	40 75 90	75 90				
		1.5		40	40 75 90	75 90	120			
	5	0.5 0.8 1	4.0		50 60	100				
		1.8		40	40 75	75				
		2.0		40	40 75	75	120			
	5.5	2.0	4.5	40	40 75	75	120			10
		0.8 1.0	5.0	40 50	40 50 75	75				
		1.2		40	40 75	75				
		1.5		40	40 75	75	120			
		1.8		40	40 75	75				
		2.0		40	40 75	75	120			
	6	1.0 1.2	5.0		50 60	100				
	6.5	0.8 1.0	6.0	40 50	40 50 75	75			4・8	11
		1.2		40	40 75	75				
		1.5 1.8		40	40 75	75	120			
		2.0		40	40 75	75	120			
	7.5	1.2	7.0	40	40 75	75				13
		1.5 2.0		40	40 75	75	120			
	8	1.2	7.5	40	40 75	75	100	150	120 130	
		1.5		40	40 75	75	100	120 150	120 130	
		2.0		40	40 75	75	120			
	8.5	1.2	8.0	40	40 75	75				14
		1.5 1.8		40	40 75	75	120			
		2.0		40	40 75	75	120			
	10	1.5 5.0 5.5	8.0			80 100		120 150		15
		2.0	9.5	40	40 75	75	120			
	10.5	2.0	10.0	40	40 75	75	120			16
	12	2.5 3.0 5	10.0			100	120 150	150		17

Precision Rectangular Ejector Pins

A·B·L·N Dimensions Designated Type

Material	Hardness	Code
SKH51	59～61HRC	ERHS

⚠ Range of guaranteed base material hardness ☞ P.241



⚠ L−N≥10

⚠ A≤B

⚠ K=$\sqrt{A^2+B^2}$

Code No.		㎜ 0.01			㎜ 1		T	H	Kmax.
Code	D	Amin.	B	L	N	Nmin.			
ERHS	0.8	0.20	0.30～ 0.60	40.00～150.00	10≤(L−N)≤250		4	3	0.70
	1		0.30～ 0.80						0.90
	1.1		0.40～ 0.90	40.00～200.00					1.00
	1.2		0.30～ 1.00						1.10
	1.3		0.40～ 1.10						1.20
	1.4		0.40～ 1.20						1.30
	1.5	0.30	0.60～ 1.30	40.00～250.00		23			1.40
	2		0.80～ 1.80	40.00～300.00				4	1.90
	2.5		0.80～ 2.30			26		5	2.40
	3		0.80～ 2.80			27		6	2.90
	3.5		1.00～ 3.30				4·6	7	3.40
	4		1.00～ 3.80	40.00～350.00		29			3.90
	4.5	0.40	1.20～ 4.30					9	4.40
	5		1.50～ 4.80	50.00～350.00		31			4.90
	5.5	0.50	1.80～ 5.30					10	5.40
	6		2.00～ 5.80			33			5.90
	6.5		2.00～ 6.30			40	4·8	11	6.40
	7		2.50～ 6.80						6.90
	7.5		2.50～ 7.30					13	7.40
	8		2.30～ 7.80						7.90
	8.5		2.50～ 8.30					14	8.40
	10		3.00～ 9.80					15	9.90
	10.5	0.80	3.00～10.30					16	10.40
	11		3.50～10.80						10.90
	11.5		3.50～11.30					17	11.40
	12		3.50～11.80						11.90
	15	1.50	3.50～14.80				8	20	14.90

⚠ For D4 and T4, Lmax.=300.00. ⚠ For D7.5·8.5·10.5·11·11.5, Lmax.=300.00.

ORDER

Code No.	A	B	L	N	T
ERHS1.5 —	0.30 —	1.30 —	98.56 —	N50 —	T4

DELIVERY **3** Days ☞ P.15

PRICE Without tax

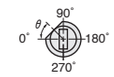
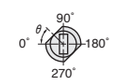
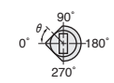
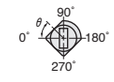
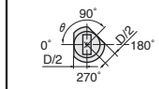
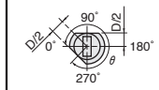
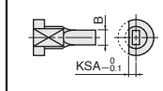
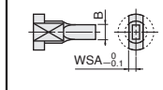
▶Quantity discount rate ☞ P.15

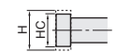
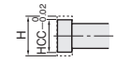
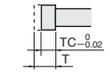
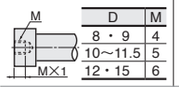
1～30	31～50	51～100	101～
100%	95%	90%	Enquiry

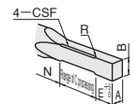
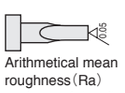
Code No.		@/P(1～30P)					
Code	D	L40.00～100.00	L100.01～150.00	L150.01～200.00	L200.01～250.00	L250.01～300.00	L300.01～350.00
ERHS	0.8	11.9	13.1	–	–	–	–
	1	11.3	12.4	–	–	–	–
	1.1	9.56	10.5	11.6	–	–	–
	1.2·1.3·1.4	8.90	9.74	10.9	–	–	–
	1.5	7.05	7.95	9.05	10.5	–	–
	2·2.5	6.53	7.48	8.50	9.83	13.0	–
	3·3.5	6.53	7.48	8.50	9.20	11.8	–
	4	6.92	7.81	8.84	9.37	13.2	25.6
	4.5	8.40	9.46	10.8	11.5	15.9	30.3
	5·5.5	8.89	10.1	11.4	12.2	16.8	32.0
	6	9.37	10.6	11.8	12.8	17.7	33.1
	6.5	10.0	11.3	12.6	13.5	18.7	37.0
	7	11.0	12.4	13.7	14.8	19.9	38.9
	7.5·8·8.5	11.5	13.0	14.5	15.5	21.5	42.7
	10·10.5	13.7	15.2	17.0	18.3	23.7	47.3
	11·11.5	16.8	18.4	19.8	21.4	25.2	–
	12	18.4	20.3	22.5	24.3	27.3	57.1
	15	26.2	30.3	32.8	34.5	41.5	81.7

ADDITION

Addition details ☞ P.56

Add.	Code(@/P)
Designated-angled single flat cutting  ㎜ 1 0≤HKC<360	HKC(0.9)
Designated-angled parallel flats cutting  ㎜ 1 0≤HWC<360	HKC(1.4)
Designated right-angled two flats cutting  ㎜ 1 0≤HRC<360	HRC(1.4)
Designated right-angled three flats cutting  ㎜ 1 0≤HTC<360	HTC(1.8)
Designated-angled two flats cutting  ㎜ 1 0<HAC<360	HAC(1.4)
Designated-angled two flats cutting  ㎜ 1 0≤HBC<360	HBC(1.4)
One flat cutting on the shank  ㎜ 1 A/2+0.1≤KSA≤D/2−0.1	KSA(2.8)
Paralle flats cutting on the shank  ㎜ 1 A/2+0.1≤WSA≤D/2−0.1	WSA(5.6)

Add.	Code(@/P)
H dimension alteration  ㎜ 0.1 D+1≤HC<H For D1.5, 2≤HC<H.	HC(0.6)
H dimension alteration(precision)  ㎜ 0.1 D+1≤HCC<H−0.3 ☒ D<1.5 is not available.	HCC(1.8)
T dimension alteration  ㎜ 0.1 2≤TC<T T−TC≤Lmax.−L	TC(0.6)
Tapping  M / D / M: 8・9 / 4; 10～11.5 / 5; 12・15 / 6; M×1	MC(1.4)
Edges chamfering  ㎜ 1 4 days	CSW(1.8)

Add.	Code(@/P)
Edges chamfering  ㎜ 1 4 days	CSF(3.7)
Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
Engraving on the head  1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHN 1,2characters (0.2) 3,4characters (0.5)
Lapping on the point face  Arithmetical mean roughness(Ra) 1.6 → 0.05 / 0.1 ☒ L>200.00 is not available.	TMC(4.8)

ORDER

Code No.	A	B	L	N	T	HKC·HWC···etc.
ERHS1.5 —	0.30 —	1.30 —	98.56 —	N50 —	T4 —	HKC45

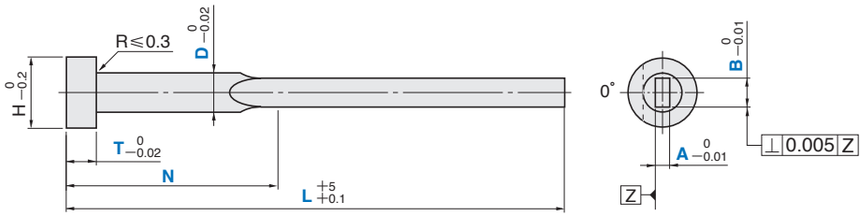
Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

Standard Rectangular Ejector Pins

General Type

Material	Hardness	Code
SKH51	59～61HRC	ERS

⚠ Range of guaranteed base material hardness ☞ P.241



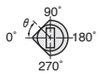
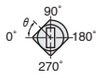
ORDER

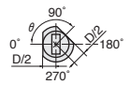
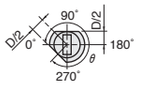
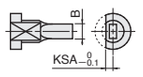
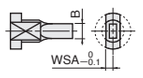
Code No.	A	B	L	N	T
ERS1.5 —	0.3 —	0.8 —	100 —	50 —	4

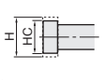
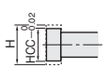
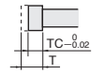
DELIVERY **3** Days ☞ P.15

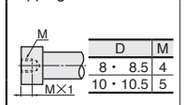
ADDITION

Addition details ☞ P.56

Add.	Code (@/P)
Designated-angled single flat cutting 	HKC (0.9)
(in) 1 0≤HKC＜360	
Designated-angled parallel flats cutting 	HKC (1.4)
(in) 1 0≤HWC＜360	
Designated right-angled two flats cutting 	HRC (1.4)
(in) 1 0≤HRC＜360	
Designated right-angled three flats cutting 	HTC (1.8)
(in) 1 0≤HTC＜360	

Add.	Code (@/P)
Designated-angled two flats cutting 	HAC (1.4)
(in) 1 0＜HAC＜360	
Designated-angled two flats cutting 	HBC (1.4)
(in) 1 0≤HBC＜360	
One flat cutting on the shank 	KSA (2.8)
(in) 1 A/2+0.1≤KSA≤D/2−0.1	
Paralle flats cutting on the shank 	WSA (5.6)
(in) 1 A/2+0.1≤WSA≤D/2−0.1	

Add.	Code (@/P)
H dimension alteration 	HC (0.6)
(in) 0.1 D+1≤HC＜H For D1.5, 2≤HC＜H.	
H dimension alteration (precision) 	HCC (1.8)
(in) 0.1 D+1≤HCC＜H−0.3	
T dimension alteration 	TC (0.6)
(in) 0.1 2≤TC＜T T−TC≤Lmax.−L	

Add.	Code (@/P)
Tapping 	MC (1.4)
Engraving on the head 	NHC 1,2characters (0.2) 3,4characters (0.5)
1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	
Engraving on the head 	NHN 1,2characters (0.2) 3,4characters (0.5)
1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	

M	D	M
	8・8.5	4
M×1	10・10.5	5

Code No.	A	B	L	N	T	HKC・HWC…etc.
ERS1.5 —	0.3 —	0.8 —	100 —	N50 —	T4 —	HKC45−TC3.1

⚠ Letter (N・T) need to be colded for addtion.

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～49	50～100	101～
100%	95%	Enquiry

Code No. Code	D	@/P (1～49P) L100	L120	L150	L175	L200	L250	L300
ERS	1.5	4.65	—	4.86	—	—	—	—
	2・2.5・3	4.70	—	4.70	—	7.08	7.65	—
	3.5	4.70	—	4.70	—	5.12	7.65	—
	4	4.31	4.75	4.31	—	5.37	7.86	—
	4.5	5.24	5.21	5.24	5.67	7.14	9.56	—
	5・5.5	5.81	5.80	5.81	6.30	6.27	10.2	—
	6・6.5	6.20	6.20	6.20	7.55	7.59	10.4	—
	7・7.5	7.18	7.15	7.18	8.31	8.37	10.4	11.2
	8・8.5	8.06	8.05	8.06	9.08	9.09	10.9	11.8
	10・10.5	8.98	8.95	8.98	10.1	10.1	12.6	13.9

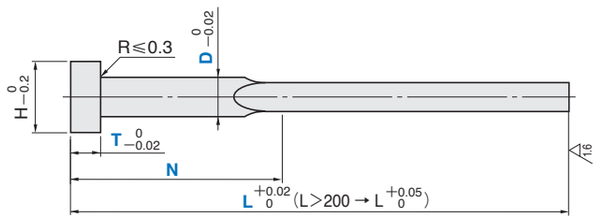
Code No. Code	D	A	B	N L 100	120	150	175	200	250	300	T	H
ERS	1.5	0.3 0.4 0.5 0.6 0.7	0.8	40 50							4	3
		0.4 0.5	1.0	40 50		50 70						
	2	0.3	1.0	40 50								4
		0.4 0.5 0.6 0.7		40 50		40 50 75						
		0.8		40 50		40 50		75				
		1.0		20								
		0.3	1.2	40 50								
		0.4 0.5 0.6 0.7		40 50		40 50 75						
		0.8		40 50		40 50		75				
		1.0		20 40 50		40 50		75				
		0.4 0.5 0.6 0.7	1.5	20 40 50		40 50 70 75		70 80				
		0.8 1.0		20 40 50		40 50 70		70 75 80				
	2.5	1.2	1.5	20 40		40 90		75 90				5
		1.5		20								
		0.4 0.5	2.0	20 40 50		40 50 70 75		70 80				
		0.6 0.7		20 40 50		40 50 70 75 90		70 80 90				
		0.8 1.0		20 40 50		40 50 70 90		70 75 80 90				
		1.2		40 50		40 50		70 80				
	3	1.2	2.0	20 40		40 90		75 90	120			6
		1.5		20		40 90		75 90				
		2.0		20								
		0.4	2.5	40 50		40 50 70 75		70 80				
		0.5		20 40 50		40 50 70 75		70 80				
		0.6 0.7		20 40 50		40 50 70 75 90		70 80 90				
		0.8 1.0		20 40 50		40 50 70 90		70 75 80 90				
		1.2		20 40 50		40 50 70 90		70 75 80 90				
	3.5	1.5	2.5	20		40 90		75 90	120			7
		2.0				40		75	120			
		0.4	3.0	40 50		40 50 70 75		70 80	80 100			
		0.5		20 40 50		40 50 70 75		70 80	80 100			
		0.6 0.7		20 40 50		40 50 70 75 90		70 80 90	80 100			
		0.8		20 40 50		40 50 70 90		70 75 80 90	80 100			
		0.9		40 50		40 50 70		70 80	80 100			
		1.0		20 40 50		40 50 70 90		70 75 80 90	80 100			
		1.2		20 40		40 50 70 90		70 75 80 90	80 100			
		1.5		20		40 50 70 90		70 75 80 90	80 100 120			
	4	0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.2 1.5	3.0	40 50	40 50 60 70	40 50 60 70		70 80	80 100			
		2.0		20 40 50	40 50 60 70	40 50 60 70		70 75 80	80 100 120			
		0.4 0.5	3.5	40 50	40 50 60 70	40 50 60 70		70 80	80 100			
		0.6		40 50	40 50 60 70	40 50 60 70 90		70 80 90	80 100			
		0.7		20 40 50	40 50 60 70	40 50 60 70 90		70 80 90	80 100			
		0.8		20 40 50	40 50 60 70	40 50 60 70 90		70 75 80 90	80 100			
		0.9		40 50	40 50 60 70	40 50 60 70		70 80	80 100			
		1.0		40 50	40 50 60 70	40 50 60 70 90		70 75 80 90	80 100			
		1.2		40 50	40 50 60 70	40 50 60 70 90		70 75 80 90	80 100			
		1.5		40 50	40 50 60 70	40 50 60 70 90		70 75 80 90	80 100 120			
	4.5	0.6 0.7 0.8 0.9 1.0 1.2 1.5	3.5	40 50	40 50 60	50 60		70 80	100 120		4・6	9
		1.8		40 50	40 50 60	40 50 60		70 75 80	100 120			
		2.0		40 50	40 50 60	40 50 60		70 75 80	100 120			
		2.5		40 50	40 50 60	50 60		70 80	100 120			
		0.6 0.7	4.0	40 50		40 50 60 90		70 80 90	100 120			
		0.8		40 50		40 50 60 90		70 75 80 90	100 120			
		0.9		40 50	40 50 60	50 60		70 80	100 120			
		1.0		40 50		40 50 60 90		70 75 80 90	100 120			
		1.2		40 50	40 50 60	40 50 60 90		70 80 90	100 120			
		1.5		40 50	40 50 60	40 50 60 90		70 75 80 90	100 120			
		1.8		40 50	40 50 60	50 60		70 80	100 120			
	5	0.8 0.9 1.0 1.2 1.5	4.0	40 50	40 50 60	50 60	60 70	70 80	100 120			
		1.8		40 50	40 50 60	40 50 60	60 70	70 75 80	100 120			
		2.0		40 50	40 50 60	40 50 60	60 70	70 75 80	100 120			
		2.5		40 50	40 50 60	50 60 70	60 70	70 80	100 120			
	5.5	0.8 0.9 1.0 1.2 1.5 1.8	4.5	40 50	40 50 60	50 60	60 70	70 80	100 120			
		2.0		40 50	40 50 60	40 50 60	60 70	70 75 80	100 120			
		2.5		40 50	40 50 60	50 60	60 70	70 80	100 120			
		0.8		40 50		40 50		75				10
		1.0		40 50		40 50		75				
		1.2	5.0	40		40		75				
		1.5				40		75	120			
		1.8				40		75				
		2.0				40		75	120			
	6	0.8 0.9 1.0 1.2 1.5 1.8 2.0 2.5	5.0		40 50 60	50 60 70	60 70	80 100				
	6.5	0.8	6.0	40 50		40 50		75 80	100		4・8	11
		0.9				40 50		80	100			
		1.0		40 50		40 50		75 80	100			
		1.2		40		40 50		75 80	100			
		1.5 1.8 2.0				40 50		75 80	100 120			
	7	0.8 0.9 1.0 1.2 1.5 1.8 2.0 2.5	6.0		40 50 60	50 60	60 70	80 100	100	150 180		
	7.5	1.2	7.0	40		40		75				13
		1.5 2.0				40		75	120			
	8	0.8 0.9 1.0 1.2 1.5 1.8 2.0 2.5	6.0		40 50 60	50 60	60 70	80 100	100	150 180		
		1.2	7.5	40		40		75				
		1.5 2.0				40		75	120			
	8.5	0.8 0.9 1.0 1.2 1.5 1.8 2.0 2.5	7.0			40 50		80 100	100	150 180		14
		1.2	8.0			40		75				
		1.5 1.8 2.0				40		75	120			
	10	0.8	8.0		40 50 60	50 60	60 70	80 100				
		1.0 1.2 1.5 1.8 2.0 2.5			40 50 60	50 60	60 70	80 100	100 120 130 160	120 150 180		15
		2.0	9.5	40		40		75	120			
	10.5	1.2 1.5	10.0			40 50		80 100	100	150 200		16
		2.0		40		40		75	120			

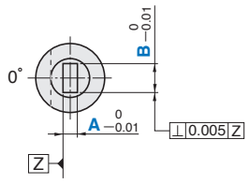
Standard Rectangular Ejector Pins

L Dimension Designated Type

Material	Hardness	Code
SKH51	59～61HRC	ERSL

⚠ Range of guaranteed base material hardness ☞ P.241





⚠ L−N≥10

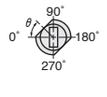
ORDER

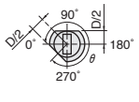
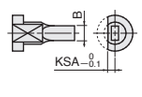
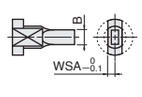
Code No.	A	B	L	N	T
ERSL1.5 —	0.3 —	0.8 —	98.20 —	N50 —	T4

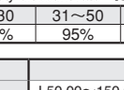
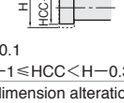
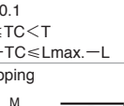
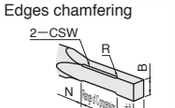
DELIVERY **3** Days ☞ P.15

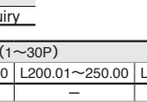
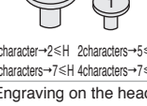
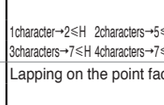
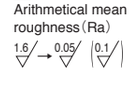
ADDITION

Addition details ☞ P.56

Add.	Code (@/P)
Designated-angled single flat cutting	HKC (0.9)
ⓜ 1 0≤HKC<360	
Designated-angled parallel flats cutting	HKC (1.4)
	
ⓜ 1 0≤HWC<360	
Designated right-angled two flats cutting	HRC (1.4)
	
ⓜ 1 0≤HRC<360	
Designated right-angled three flats cutting	HTC (1.8)
	
ⓜ 1 0≤HTC<360	

Add.	Code (@/P)
Designated-angled two flats cutting	HAC (1.4)
ⓜ 1 0<HAC<360	
Designated-angled two flats cutting	HBC (1.4)
	
ⓜ 1 0≤HBC<360	
One flat cutting on the shank	KSA (2.8)
	
ⓜ 1 A/2+0.1≤KSA≤D/2−0.1	
Paralle flats cutting on the shank	WSA (5.6)
	
ⓜ 1 A/2+0.1≤WSA≤D/2−0.1	

Add.	Code (@/P)
H dimension alteration	HC (0.6)
	
ⓜ 0.1 D+1≤HC<H For D1.5, 2≤HC<H.	
H dimension alteration (precision)	HCC (1.8)
	
ⓜ 0.1 D+1≤HCC<H−0.3	
T dimension alteration	TC (0.6)
	
ⓜ 0.1 2≤TC<T T−TC≤Lmax.−L	
Tapping	MC (1.4)
	
D: 8・9 / 10～11.5 — M: 4 / 5	
Edges chamfering	CSW (1.8)
ⓜ 1 4 days	

Add.	Code (@/P)
Edges chamfering	CSF (3.7)
	
ⓜ 1 4 days	
Engraving on the head	NHC 1,2characters (0.2) 3,4characters (0.5)
	
1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	
Engraving on the head	NHN 1,2characters (0.2) 3,4characters (0.5)
	
1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	
Lapping on the point face	TMC (4.8)
	
☒ L>200.00 is not available.	

Code No. | A | B | L | N | T | HKC・HWC…etc.
ERSL1.5 — 0.3 — 0.8 — 98.20 — N50 — T4 — HKC45−TC3.1

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

PRICE Without tax ▶Quantity discount rate ☞ P.15

1～30	31～50	51～100	101～
100%	95%	90%	Enquiry

Code No.		@/P (1～30P)			
Code	D	L50.00～150.00	L150.01～200.00	L200.01～250.00	L250.01～300.00
ERSL	1.5	5.03	—	—	—
	2・2.5・3	5.08	7.59	8.24	—
	3.5	5.08	5.46	8.24	—
	4	5.34	5.75	8.46	—
	4.5	6.45	7.68	10.3	—
	5・5.5	7.08	7.68	11.0	—
	6・6.5	7.73	8.28	12.0	—
	7・7.5	8.80	9.93	12.0	13.8
	8・8.5	9.74	10.9	12.4	15.2
	10・10.5	10.9	11.9	13.5	16.7

Code No.		A	B	N					T	H
Code	D			L 50.00～100.00	L 100.01～150.00	L 150.01～200.00	L 200.01～250.00	L 250.01～300.00		
				ⓜ 0.01						
ERSL	1.5	0.3 0.4 0.5 0.6 0.7	0.8	40 50					4	3
		0.4 0.5	1.0	40 50	50 70					
	2	0.3	1.0	40 50						4
		0.4 0.5 0.6 0.7		40 50	40 50 75					
		0.8		40 50	40 50 75	75				
		1.0		20						
		0.3	1.2	40 50						
		0.4 0.5 0.6 0.7		40 50	40 50 75					
		0.8		40 50	40 50 75	75				
		1.0		20 40 50	40 50 75	75				
		0.4 0.5 0.6 0.7	1.5	20 40 50	40 50 70 75	70 80				
		0.8 1.0		20 40 50	40 50 70 75	70 75 80				
	2.5	1.2	1.5	20 40	40 75 90	75 90			4	5
		1.5		20						
		0.4 0.5	2.0	20 40 50	40 50 70 75	70 80				
		0.6 0.7		20 40 50	40 50 70 75 90	70 80 90				
		0.8 1.0		20 40 50	40 50 70 75 90	70 75 80 90				
		1.2		40 50	40 50 70	70 80				
	3	1.2	2.0	20 40	40 75 90	75 90 120	120			6
		1.5		20 40	40 75 90	75 90				
		2.0		20						
		0.4	2.5	40 50	40 50 70 75	70 80				
		0.5		20 40 50	40 50 70 75	70 80				
		0.6 0.7		20 40 50	40 50 70 75 90	70 80 90				
		0.8 1.0 1.2		20 40 50	40 50 70 75 90	70 75 80 90				
	3.5	1.5	2.5	20 40	40 75 90	75 90 120	120			7
		2.0		40	40 75	75 120	120			
		0.4	3.0	40 50	40 50 70 75	70 80	80 100			
		0.5		20 40 50	40 50 70 75	70 80	80 100			
		0.6 0.7		20 40 50	40 50 70 75 90	70 80 90	80 100			
		0.8		20 40 50	40 50 70 75 90	70 75 80 90	80 100			
		0.9		40 50	40 50 70	70 80	80 100			
		1.0 1.2		20 40 50	40 50 70 75 90	70 75 80 90	80 100			
		1.5		20 40 50	40 50 70 75 90	70 75 80 90 120	80 100 120			
	4	0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.2 1.5	3.0	40 50 60	40 50 60 70	70 80	80 100			
		2.0		20 40 50 60	40 50 60 70 75	70 75 80 120	80 100 120			
		0.4 0.5	3.5	40 50 60	40 50 60 70	70 80	80 100			
		0.6		40 50 60	40 50 60 70 90	70 80 90	80 100			
		0.7		20 40 50 60	40 50 60 70 90	70 80 90	80 100			
		0.8		20 40 50 60	40 50 60 70 75 90	70 75 80 90	80 100			
		0.9		40 50 60	40 50 60 70	70 80	80 100			
		1.0 1.2		40 50 60	40 50 60 70 75 90	70 75 80 90	80 100			
		1.5		40 50 60	40 50 60 70 75 90	70 75 80 90 120	80 100 120			
	4.5	0.6 0.7 0.8 0.9 1.0 1.2 1.5	3.5	40 50 60	40 50 60		100 120		4・6	9
		1.8		40 50 60	40 50 60 75	75	100 120			
		2.0		40 50 60	40 50 60 75	75 120	100 120			
		2.5		40 50 60	40 50 60		100 120			
		0.6 0.7	4.0	40 50 60	40 50 60 90	70 80 90	100 120			
		0.8		40 50 60	40 50 60 75 90	70 75 80 90	100 120			
		0.9		40 50 60	40 50 60	70 80	100 120			
		1.0 1.2		40 50 60	40 50 60 75 90	70 75 80 90	100 120			
		1.5		40 50 60	40 50 60 75 90	70 75 80 90 120	100 120			
		1.8		40 50 60	40 50 60	70 80	100 120			
	5	0.6 0.7 0.8 0.9 1.0 1.2 1.5	4.0	40 50 60	40 50 60 70	60 70 80	100 120			
		1.8		40 50 60	40 50 60 70 75	60 70 75 80	100 120			
		2.0		40 50 60	40 50 60 70 75	60 70 75 80 120	100 120			
		2.5		40 50 60	40 50 60 70	60 70 80	100 120			
	5.5	0.8 0.9 1.0 1.2 1.5 1.8	4.5	40 50 60	40 50 60	60 70 80	100 120			
		2.0		40 50 60	40 50 60 75	60 70 75 80 120	100 120			
		2.5		40 50 60	40 50 60	60 70 80	100 120			
		0.8	5.0	40 50 60	40 50 60 75	60 70 75 80	100 120			
		0.9		40 50 60	40 50 60	60 70 80	100 120			
		1.0 1.2		40 50 60	40 50 60 75	60 70 75 80	100 120			
		1.5		40 50 60	40 50 60 75	60 70 75 80 120	100 120			
		1.8		40 50 60	40 50 60 75	60 70 75 80	100 120			
		2.0		40 50 60	40 50 60 75	60 70 75 80 120	100 120			
	6	0.8 0.9 1.0 1.2 1.5 1.8 2.0 2.5	5.0	40 50 60 70	40 50 60 70	60 70 80 100				
	6.5	0.8	6.0	40 50	40 50 75	75 80	100		4・8	11
		0.9		40 50	40 50	80	100			
		1.0 1.2		40 50	40 50 75	75 80	100			
		1.5 1.8 2.0		40 50	40 50 75	75 80 120	100 120			
	7	0.8 0.9 1.0 1.2 1.5 1.8 2.0 2.5	6.0	40 50 60	40 50 60	60 70 80 100	100 120 160	150 180		
	7.5	1.2	7.0	40	40 75	75				13
		1.5 2.0		40	40 75	75 120	120			
	8	0.8 0.9 1.0 1.2 1.5 1.8 2.0 2.5	6.0	40 50 60	40 50 60	60 70 80 100	100 120 130 160			
		1.2	7.5	40	40 75	75				
		1.5 2.0		40	40 75	75 120	120			
	8.5	0.8 0.9 1.0 1.2 1.5 1.8 2.0 2.5	7.0	40 50	40 50	80 100	100	150 180		14
		1.2	8.0	40	40 75	75				
		1.5 1.8 2.0		40	40 75	75 120	120			
	10	0.8	8.0	40 50 60	40 50 60 80	60 70 80 100				15
		1.0 1.2 1.5 1.8 2.0 2.5		40 50 60	40 50 60 80	60 70 80 100	100 120 130 160	120 150 180		
		2.0	9.5	40	40 75	75 120				
	10.5	1.2 1.5	10.0	40 50	40 50	80 100	100	150 200		16
		2.0		40	40 75	75 120	120			

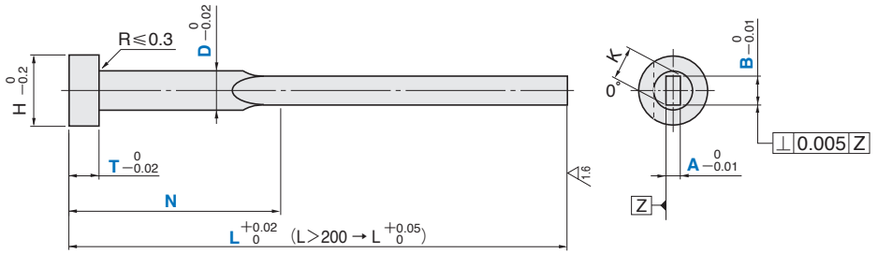
⚠ For T=4, Lmax.=250

Standard Rectangular Ejector Pins

A·B·L·N Dimension Designated Type

Material	Hardness	Code
SKH51	59～61HRC	ERSS

⚠ Range of guaranteed base material hardness ☞ P.241



⚠ L−N≥10

⚠ A≤B
⚠ K=$\sqrt{A^2+B^2}$

Code No.		Amin.	B	L	N		T	H	Kmax.
Code	D		㊟0.01		㊟1	Nmin.			
ERSS	1.5	0.30	0.60～ 1.30	40.00～250.00	10≤(L−N)≤250	23	4	3	1.40
	2		0.80～ 1.80	40.00～300.00				4	1.90
	2.5		0.80～ 2.30			26		5	2.40
	3		0.80～ 2.80	40.00～350.00		27		6	2.90
	3.5		1.00～ 3.30				4·6	7	3.40
	4		1.00～ 3.80			29			3.90
	4.5	0.40	1.20～ 4.30					9	4.40
	5		1.50～ 4.80			31			4.90
	5.5	0.50	1.80～ 5.30	50.00～350.00				10	5.40
	6		2.00～ 5.80			33			5.90
	6.5		2.00～ 6.30			40	4·8	11	6.40
	7		2.30～ 6.80						6.90
	7.5		2.50～ 7.30					13	7.40
	8		2.30～ 7.80						7.90
	8.5		2.30～ 8.30					14	8.40
	10		3.00～ 9.80					15	9.90
	10.5		3.00～10.30					16	10.40
	11	0.80	3.50～10.80						10.90
	11.5		3.50～11.30					17	11.40
	12		3.50～11.80						11.90
	15	1.50	3.50～14.80				8	20	14.90

⚠ For D7.5·11·11.5, Lmax.=300.00.

ORDER

Code No.	A	B	L	N	T
ERSS1.5	0.30	1.30	98.97	N50	T4

DELIVERY **3** Days ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～30	31～50	51～100	101～
100%	95%	90%	Enquiry

Code No.		@/P(1～30P)					
Code	D	L40.00～100.00	L100.01～150.00	L150.01～200.00	L200.01～250.00	L250.01～300.00	L300.01～350.00
ERSS	1.5	6.78	7.65	8.53	9.56	—	—
	2·2.5	6.11	7.08	7.90	9.20	11.6	—
	3·3.5	6.11	7.08	7.90	8.53	10.7	21.5
	4	6.49	7.30	8.28	8.84	12.3	24.3
	4.5	7.86	8.89	10.1	10.7	14.9	28.9
	5·5.5	8.33	9.37	10.7	11.3	15.6	30.3
	6	8.80	9.93	11.1	12.0	16.5	31.7
	6.5	9.28	10.5	11.7	12.6	17.4	35.3
	7	10.2	11.5	12.8	13.8	18.6	37.0
	7.5·8·8.5	10.7	12.1	13.5	14.5	20.2	40.6
	10·10.5	12.6	14.3	15.8	17.1	22.1	45.0
	11·11.5	15.6	17.3	18.7	20.2	24.3	—
	12	17.3	19.0	21.1	22.7	25.3	54.6
	15	24.6	28.3	30.6	32.1	38.7	79.2

ADDITION

Addition details ☞ P.56

Add.	Code(@/P)
Designated-angled single flat cutting ㊟1 0≤HKC<360	HKC(0.9)
Designated-angled parallel flats cutting ㊟1 0≤HWC<360	HKC(1.4)
Designated right-angled two flats cutting ㊟1 0≤HRC<360	HRC(1.4)
Designated right-angled three flats cutting ㊟1 0≤HTC<360	HTC(1.8)
Designated-angled two flats cutting ㊟1 0<HAC<360	HAC(1.4)
Designated-angled two flats cutting ㊟1 0≤HBC<360	HBC(1.4)
One flat cutting on the shank ㊟1 A/2+0.1≤KSA≤D/2−0.1	KSA(2.8)
Paralle flats cutting on the shank ㊟1 A/2+0.1≤WSA≤D/2−0.1	WSA(5.6)

Add.	Code(@/P)
H dimension alteration ㊟0.1 D+1≤HC<H For D1.5, 2≤HC<H.	HC(0.6)
H dimension alteration(precision) ㊟0.1 D+1≤HCC<H−0.3	HCC(1.8)
T dimension alteration ㊟0.1 2≤TC<T T−TC≤Lmax.−L	TC(0.6)
Tapping	MC(1.4)
Edges chamfering ㊟1 4 days	CSW(1.8)

Add.	Code(@/P)
Edges chamfering ㊟1 4 days	CSF(3.7)
Engraving on the head 1character→2≤H 2characters→5≤H 3characters→7≤H 4characters→7≤H	NHC 1,2characters (0.2) 3,4characters (0.5)
Engraving on the head	NHN 1,2characters (0.2) 3,4characters (0.5)
Lapping on the point face Arithmetical mean roughness(Ra) 1.6 → 0.05 (0.1) ⊠L>200.00 is not available.	TMC(4.8)

ORDER

Code No.	A	B	L	N	T	HKC·HWC···etc.
ERSS1.5	0.30	1.30	98.97	N50	T4	HKC45−TC3.1

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

EJECTOR SLEEVES

Guide for Ejector Sleeves

▶ Precision Ejector Sleeves

Material	Type	Code	Overall Length(L)		Shank Diameter D or P		Hole Diameter S		Coaxiality	Delivery	Page
			Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance			
SKH51 59～61HRC	Stepped ejector sleeves thin wall・Coaxiality 0.003	ELVH	40～200	$^{+0.02}_{0}$	1.90～7.95	$^{0}_{-0.005}$	1.10～7.15	$^{+0.005}_{0}$	ϕ0.003	3	74
	Straight ejector sleeves・Coaxiality 0.003	ELPHX	20～100		2.50～8.00		1.10～7.20				76
	Quill straight ejector sleeves・Coaxiality 0.003	ELPSY	40～100		1.70～5.00		0.5 ～3.8		ϕ0.005		77

▶ Straight Ejector Sleeves

Material	Type	Code	Overall Length(L)		Shank Diameter D or P		Hole Diameter S		Coaxiality	Delivery	Page
			Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance			
SKH51 59～61HRC	Shank diameter fixed type	ELPHE	40～250	$^{+0.02}_{0}$	4～15	$^{0}_{-0.005}$	0.80～13.80	$^{+0.005}_{0}$	ϕ0.005	3	78
	Shank diameter fixed type	ELPSE						$^{+0.01}_{0}$	ϕ0.01		
	Shank diameter designated type	ELPH	40～250	$^{+0.02}_{0}$	3.20～15.00	$^{0}_{-0.005}$	0.50～12.50	$^{+0.005}_{0}$	ϕ0.005		80
	Shank diameter designated type	ELPS						$^{+0.01}_{0}$	ϕ0.01		

▶ Stepped Ejector Sleeves

Material	Type	Code	Overall Length(L)		Shank Diameter D or P		Hole Diameter S		Coaxiality	Delivery	Page
			Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance			
SKH51 59～61HRC	D dimension fixed type	ELSHE	40～250	$^{+0.02}_{0}$	D4～15 P3.00～14.90	$^{0}_{-0.005}$	0.80～13.70	$^{+0.005}_{0}$	ϕ0.005	5	82
	D dimension fixed type	ELSSE						$^{+0.01}_{0}$	ϕ0.01		
	D dimension designated type	ELSH			D3.1～14.9 P3.00～14.80		0.80～13.60	$^{+0.005}_{0}$	ϕ0.005	3	84
	D dimension designated type	ELSS						$^{+0.01}_{0}$	ϕ0.01		

▶ Straight Ejector Sleeves

Material	Type	Code	Overall Length(L)		Shank Diameter D or P		Hole Diameter S		Coaxiality	Delivery	Page
			Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance			
SKD61 Nitriding	4mm head・General type	ELNP	75～300	$^{+5}_{+0.1}$	4～16	$^{-0.01}_{-0.02}$ ※2	1.5～12	H7	ϕ0.06	3	86
	L dimensiom designated type	ELNPL	50～300	$^{+0.02}_{0}$ ※1							
	JIS head・General type	ELJNP	100～500	$^{+5}_{+0.1}$	4～20	$^{-0.01}_{-0.02}$ ※2	1.5～15	H7	ϕ0.06	3	88
	JIS head・L dimensiom designated type	ELJNPL	80～500	$^{+0.05}_{0}$	4～20	$^{-0.01}_{-0.02}$ ※2	1.5～15	H7	ϕ0.06	3	90

▶ Stepped Ejector Sleeves

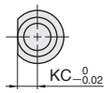
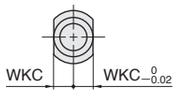
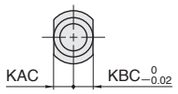
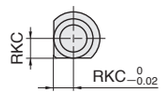
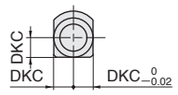
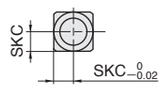
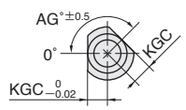
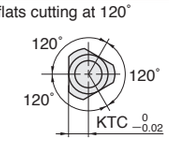
Material	Type	Code	Overall Length(L)		Shank Diameter D or P		Hole Diameter S		Coaxiality	Delivery	Page
			Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance			
SKD61 Nitriding	4mm head type	ELNSS	50～300	$^{+0.02}_{0}$ ※1	3.50～15.95	$^{-0.01}_{-0.02}$	2.0～13.0	H7	ϕ0.06	3	92
	JIS head type	ELJNSS	50～800	$^{+0.05}_{0}$ ※2	3.50～19.95	$^{-0.01}_{-0.02}$ ※2	2.0～16.0	H7	ϕ0.06	3	94

⚠ ※1 L＞200→L$^{+0.05}_{0}$ ⚠ ※2 L＞500→L$^{+0.5}_{0}$

⚠ ※2 The values of tolerance for shaft diameter are representative ones. For detalis, refer to the catalog page of each product.

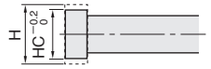
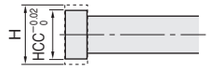
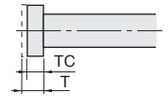
Guide for Ejector Sleeves Addition

Head Flat Alteration

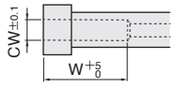
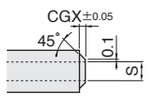
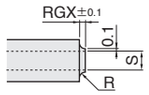
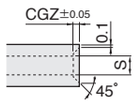
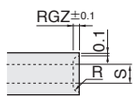
Add.	Code @/P	Spec.
Single flat cutting 	KC(0.5)	●Add single flat on the head. Range of designation D/2(P/2)≤KC<H/2 Unit of designation (if) 0.1 For KC=P/2, the unit is designated in(designated unit of P dimension/2.) KC1.4,KC5.25,KC3.125
Parallel flats cutting 	WKC(0.9)	●Add symmetry parallel flats on the head. Range of designation D/2(P/2)≤WKC<H/2 Unit of designation (if) 0.1 For WKC=P/2, the unit is designated in(designated unit of P dimension/2.) WKC1.4,WKC5.25,WKC3.125
Parallel flats cutting 	KAC(1.4)	●Add varied width parallel flats on the head. Range of designation D/2(P/2)≤KAC,KBC<H/2 Unit of designation (if) 0.1 For KAC,KBC=P/2, the unit is designated in(designated unit of P dimension/2.) ☒KAC≠KBC KAC5.2−KBC5.5,KAC5.2−KBC5.15,KAC5.2−KBC3.125
Right-angled two flats cutting 	RKC(0.9)	●Add two right-angled flats on the head. Range of designation D/2(P/2)≤RKC<H/2 Unit of designation (if) 0.1 For RKC=P/2, the unit is designated in(designated unit of P dimension/2.) RKC4.2,RKC5.25,RKC3.125
Right-angled three flats cutting 	DKC(1.4)	●Add three right-angled flats on the head. Range of designation D/2(P/2)≤DKC<H/2 Unit of designation (if) 0.1 For DKC=P/2, the unit is designated in(designated unit of P dimension/2.) DKC4.2,DKC5.25,DKC3.125
Square flats cutting 	SKC(1.8)	●Add a square (four flats) on the head. Range of designation D/2(P/2)≤SKC<H/2 Unit of designation (if) 0.1 For SKC=P/2, the unit is designated in(designated unit of P dimension/2.) SKC4.2,SKC5.25,SKC3.125
Designated-angled two flats cutting 	KGC(1.4)	●Add a flats at the standard (0°), and another at the designated angle. Range of designation D/2(P/2)≤KGC<H/2 0<AG<360 Unit of designation KGC: (if) 0.1 For KGC=P/2, the unit is designated in(designated unit of P dimension/2.) AG: (if) 1 KGC4.2−AG135,KGC5.25−AG135,KGC3.125−AG135
Three flats cutting at 120° 	KTC(1.8)	●Add three flats at 120° on the head. Range of designation D/2(P/2)≤KTC<H/2 Unit of designation (if) 0.1 For KTC=P/2, the unit is designated in(designated unit of P dimension/2.) KTC4.2,KTC5.25,KTC3.125

☒Flat cutting combined using are not available.

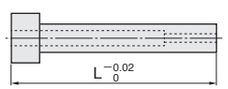
Dimension Alteration

Add.	Code @/P	Spec.
H dimension alteration 	HC(0.6)	●Reduce the head diameter H. Range of designation D(P)≤HC<H Unit of designation (if) 0.1 ⚠In relation to the head diameter tolerance, alteration may create a straight piece with little diameter difference between the head and shank. HC5.5
H dimension alteration(precision) 	HCC(1.8)	●Reduce the head diameter H (precision). Range of designation D(P)+1≤HCC<H−0.3 Unit of designation (if) 0.1 HCC5.5
T dimension alteration 	TC(0.6)	●Reduce the head thickness. Range of designation SKH51→2≤TC<8 SKD61→T/2≤TC<T Unit of designation (if) 0.1 TC3.5

Shape Alteration

Add.	Code @/P	Spec.
Two-step recessing 	CW(4.16)	●Enlarges the recess C by adding a step. Range of designation D(P)≤12→S+1≤CW≤D(P)−1.5 D(P)>12→S+1≤CW≤D(P)−2.0 Step:10≤W≤L−B−10,10≤W≤N−20,W≤200 Unit of designation CW: (if) 0.1 W: (if) 5 CW3.5−W25
Point chamfering 	CGX(7.0)	●Chamfer processing on the point. Range of designation 0.2≤CGX≤1.5 CGX≤[D(P)−S]/2−0.1 Unit of designation (if) 0.1 CGX0.3 ☒For L>300 is not available. ☒Combined with RGX・CGZ・RGZ are not available.
Point R processing 	RGX(9.5)	●R processing on the point. Range of designation 0.3≤RGX≤1.5 RGX≤[D(P)−S]/2−0.1 Unit of designation (if) 0.1 RGX0.4 ☒For L>300 is not available. ☒Combined with RGX・CGZ・RGZ are not available.
C-boring on the point 	CGZ(11.8)	●Perform C-boring on the point. Range of designation 0.2≤CGZ≤1.0 CGZ≤[D(P)−S]/2−0.1 Unit of designation (if) 0.1 CGZ0.3 ☒For L>300 is not available. ☒Combined with CGX・RGZ・RGZ are not available.
R-boring on the point 	RGZ(14.2)	●Perform R-boring on the point. Range of designation 0.5≤RGZ≤1.0 RGZ≤[D(P)−S]/2−0.1 Unit of designation (if) 0.1 RGZ0.3 ☒For L>300 is not available. ☒Combined with CGX・RGZ・RGZ are not available.

Others

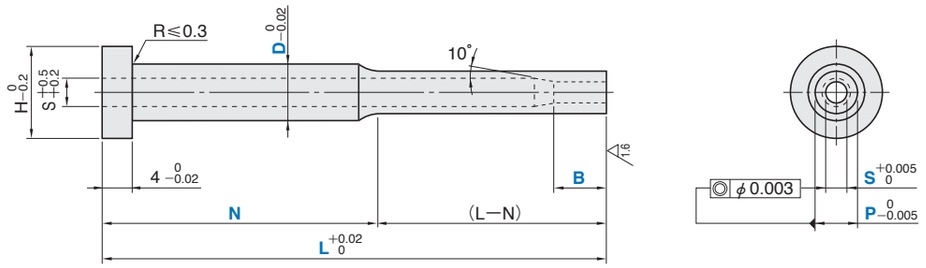
Add.	Code @/P	Spec.
L dimension tolerance alteration 	LKC(0.9)	●Alter the L dimension tolerance. Alteration content L $^{+0.02}_{0}$→L $^{+0.01}_{0}$ LKC

Precision Stepped Ejector Sleeves

Thin-Wall・Coaxiality 0.003 Type

Material	Hardness	S T	Code
SKH51	59～61HRC	S $^{+0.005}_{0}$	ELVH

⚠ Range of guaranteed base material hardness ☞ P.243



⚠ For LKC addition, the tolerance of L dimension is $^{+0.01}_{0}$.

Code No.		L	P	N	S	B	H
Code	D	in 0.01		in 1	in 0.01	in 0.5	
ELVH	3	40.00～100.00	1.90～2.95	20≤N and L/3≤N and L−N≥10	1.10≤S and S≤P−0.8	1.0≤B and B≤S×3	6
		40.00～150.00	2.40～2.95				
	4	40.00～100.00	1.90～3.95				7
		40.00～150.00	2.40～3.95				
	4.5		2.40～4.45				8
	5		2.40～4.95				
	5.5		2.60～5.45				9
	6	40.00～200.00	2.60～5.95				
	6.5		2.60～6.45				10
	7		3.00～6.95				
	7.5		3.00～7.45				11
	8		3.00～7.95				

ORDER

Code No.	L	P	N	S	B
ELVH4 —	100.00 —	P3.00 —	N50 —	S1.50 —	B4.0

DELIVERY **3** Days ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～4	5～12	13～19	20～50	51～
100%	95%	90%	80%	Enquiry

Code No.		@/P(1～4P)		
Code	D	L40.00～100.00	L100.01～150.00	L150.01～200.00
ELVH	3	110	133	—
	4	110	133	—
	4.5	110	133	—
	5	110	133	—
	5.5	110	133	—
	6	110	133	150
	6.5	118	143	159
	7	118	143	159
	7.5	118	143	159
	8	118	143	159

ADDITION

Addition details ☞ P.72

Add.	Code (@/P)	Add.	Code (@/P)	Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting in 0.1 D/2≤KC<H/2	KC (0.5)	Right-angled two flats cutting in 0.1 D/2≤RKC<H/2	RKC (0.9)	Designated-angled two flats cutting KGC: in 0.1 AG: in 1 D/2≤KGC<H/2 0<AG<360	KGC (1.4)	H dimension alteration (precision) in 0.1 D+1≤HCC<H−0.3	HCC (1.8)
Parallel flats cutting in 0.1 D/2≤WKC<H/2	WKC (0.9)	Right-angled three flats cutting in 0.1 D/2≤DKC<H/2	DKC (1.4)	Three flats cutting at 120° in 0.1 D/2≤KTC<H/2	KTC (1.8)	T dimension alteration in 0.1 2≤TC<4	TC (0.6)
Parallel flats cutting in 0.1 D/2≤KAC,KBC<H/2	KAC (1.4) KBC (1.4)	Square flats cutting in 0.1 D/2≤SKC<H/2	SKC (1.8)	H dimension alteration in 0.1 D≤HC<H	HC (0.6)	L dimension tolerance alteration	LKC (0.9)

Code No.	L	P	N	S	B	KC・WKC…etc.
ELVH4 —	100.00 —	P3.00 —	N50 —	S1.50 —	B4.0 —	KC2.0

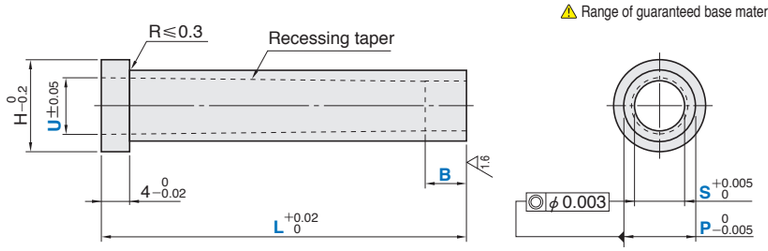
Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Precision Straight Ejector Sleeves

Coaxiality 0.003 Type

Material	Hardness	S T	Code
SKH51	59～61HRC	S +0.005 0	ELPHX

⚠ Range of guaranteed shank diameter precision ☞ P.242
⚠ Range of guaranteed base material hardness ☞ P.243



⚠ For LKC addition, the tolerance of L dimension is +0.01 0.

Code No. Code	No.	L	P (in) 0.01	S	B (in) 0.1	U (in) 0.01	H	@/P(1～4P)
ELPHX	3	20.00～ 50.00	2.50～2.60	1.10≤S and S≤P−0.8	1.0≤B and B≤S×3	S<U and U≤P−0.40	6	76.4
		20.00～ 75.00	2.61～3.00					76.4
	4	20.00～ 50.00	3.01～3.60				7	78.0
		20.00～ 75.00	3.61～4.00					78.0
	5	20.00～100.00	4.01～5.00				8	79.5
	6		5.01～6.00				9	81.2
	7		6.01～7.00				10	82.8
	8		7.01～8.00				11	85.5

ORDER

Code No.	L	P	S	B	U
ELPHX4 —	50.00 —	P3.20 —	S2.00 —	B4.0 —	U2.50

DELIVERY 3 Days ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～4	5～12	13～19	20～50	51～
100%	95%	90%	80%	Enquiry

ADDITION

Addition details ☞ P.72

Add.	Code(@/P)	Add.	Code(@/P)	Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting	KC(0.5)	Right-angled two flats cutting	RKC(0.9)	Designated-angled two flats cutting	KGC(1.4)	H dimension alteration(precision)	HCC(1.8)
(in) 0.1 P/2≤KC<H/2		(in) 0.1 P/2≤RKC<H/2		KGC: (in) 0.1 AG: (in) 1 P/2≤KGC<H/2 0<AG<360		(in) 0.1 P+1≤HCC<H−0.3	
Parallel flats cutting	WKC(0.9)	Right-angled three flats cutting	DKC(1.4)	Three flats cutting at 120°	KTC(1.8)	T dimension alteration	TC(0.6)
(in) 0.1 P/2≤WKC<H/2		(in) 0.1 P/2≤DKC<H/2		(in) 0.1 P/2≤KTC<H/2		(in) 0.1 2≤TC<4	
Parallel flats cutting	KAC(1.4) KBC(1.4)	Square flats cutting	SKC(1.8)	H dimension alteration	HC(0.6)	L dimension tolerance alteration	LKC(0.9)
(in) 0.1 P/2≤KAC,KBC<H/2		(in) 0.1 P/2≤SKC<H/2		(in) 0.1 P≤HC<H			

Code No.	L	P	S	B	U	KC･WKC…etc.
ELPHX4 —	50.00 —	P3.20 —	S2.00 —	B4.0 —	U2.50 —	KC2

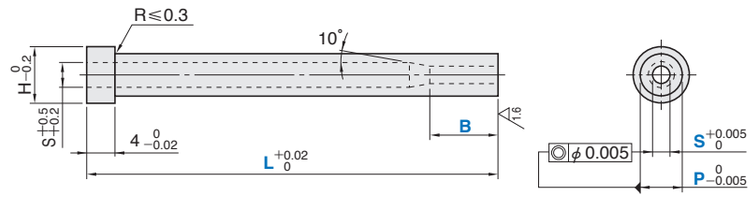
Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Precision Quill Straight Ejector Sleeves

Coaxiality 0.003 Type

Material	Hardness	S T	Code
SKH51	59～61HRC	S +0.005 0	ELPSY

⚠ Range of guaranteed shank diameter precision ☞ P.242
⚠ Range of guaranteed base material hardness ☞ P.243



⚠ For LKC addition, the tolerance of L dimension is +0.01 0.

Code No. Code	No.	L	P (in) 0.01	S	B (in) 0.1	H	@/P(1～4P)
ELPSY	2	40.00～100.00	1.70 ～ 2.00	0.5≤S and S≤P−1.2	1.0～10.0 and B≤S×5	5	77.5
		100.01～150.00					85.6
		150.01～200.00					88.7
	3	40.00～100.00	2.01 ～ 3.00			6	76.1
		100.01～150.00					83.9
		150.01～200.00					87.0
	4	40.00～100.00	3.01 ～ 4.00			7	74.6
		100.01～150.00					82.3
		150.01～200.00					85.3
	5	40.00～100.00	4.01 ～ 5.00			8	73.0
		100.01～150.00					80.5
		150.01～200.00					83.6

ORDER

Code No.	L	P	S	B
ELPSY3 —	100.00 —	P2.80 —	S1.40 —	B5.0

DELIVERY 3 Days ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～4	5～12	13～19	20～50	51～
100%	95%	90%	80%	Enquiry

ADDITION

Addition details ☞ P.72

Add.	Code(@/P)	Add.	Code(@/P)	Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting	KC(0.5)	Right-angled two flats cutting	RKC(0.9)	Designated-angled two flats cutting	KGC(1.4)	H dimension alteration(precision)	HCC(1.8)
(in) 0.1 P/2≤KC<H/2		(in) 0.1 P/2≤RKC<H/2		KGC: (in) 0.1 AG: (in) 1 P/2≤KGC<H/2 0<AG<360		(in) 0.1 P+1≤HCC<H−0.3	
Parallel flats cutting	WKC(0.9)	Right-angled three flats cutting	DKC(1.4)	Three flats cutting at 120°	KTC(1.8)	T dimension alteration	TC(0.6)
(in) 0.1 P/2≤WKC<H/2		(in) 0.1 P/2≤DKC<H/2		(in) 0.1 P/2≤KTC<H/2		(in) 0.1 2≤TC<4	
Parallel flats cutting	KAC(1.4) KBC(1.4)	Square flats cutting	SKC(1.8)	H dimension alteration	HC(0.6)	L dimension tolerance alteration	LKC(0.9)
(in) 0.1 P/2≤KAC,KBC<H/2		(in) 0.1 P/2≤SKC<H/2		(in) 0.1 P≤HC<H			

Code No.	L	P	S	B	KC･WKC…etc.
ELPSY3 —	100.00 —	P2.80 —	S1.40 —	B5.0 —	KC1.5

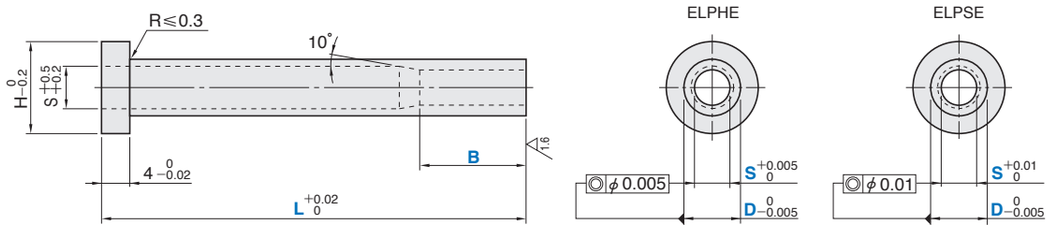
Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Straight Ejector Sleeves

Shank Diameter Fixed Type

Material	Hardness	S T	Code
SKH51	59～61HRC	$S^{+0.005}_{0}$	ELPHE
		$S^{+0.01}_{0}$	ELPSE

⚠ Range of guaranteed shank diameter precision ☞ P.242
⚠ Range of guaranteed base material hardness ☞ P.243



⚠ For LKC addition, the tolerance of L dimension is $^{+0.01}_{0}$.

Precision	Code No. Code	D	L (㎜) 0.01	S	B (㎜) 0.5	H
$S^{+0.005}_{0}$	ELPHE	4	40.00～200.00	0.80～ 2.80	1.0～25.0 and B≤S×3	8
		5		0.80～ 3.80		9
		6		0.80～ 4.80		10
		7		0.80～ 5.80		11
		8	40.00～250.00	2.00～ 6.80		13
		9		2.00～ 7.80		14
		10		2.00～ 8.80		15
		11		2.00～ 9.80		16
		12		2.00～10.80		17
		13		2.00～11.80		18
		14		2.00～12.80		19
		15		2.00～13.80		20

Precision	Code No. Code	D	L (㎜) 0.01	S	B (㎜) 0.5	H
$S^{+0.01}_{0}$	ELPSE	4	40.00～200.00	0.80～ 2.80	1.0～25.0 and B≤S×5	8
		5		0.80～ 3.80		9
		6		0.80～ 4.80		10
		7		0.80～ 5.80		11
		8	40.00～250.00	2.00～ 6.80		13
		9		2.00～ 7.80		14
		10		2.00～ 8.80		15
		11		2.00～ 9.80		16
		12		2.00～10.80		17
		13		2.00～11.80		18
		14		2.00～12.80		19
		15		2.00～13.80		20

ORDER

Code No.	L	S	B
ELPHE4 —	100.00 —	S1.00 —	B3.0

DELIVERY 3 Days ☞ P.15

PRICE Without tax ▶Quantity discount rate ☞ P.15

1～4	5～12	13～19	20～50	51～
100%	95%	90%	80%	Enquiry

Code No. Code	D	@/P(1～4P) L40.00～100.00	L100.01～150.00	L150.01～200.00	L200.01～250.00
$S^{+0.005}_{0}$ ELPHE $S^{+0.01}_{0}$ ELPSE	4	54.3	62.8	78.3	—
	5	44.3	53.7	67.3	—
	6	42.8	52.0	64.9	—
	7	44.2	53.3	66.5	—
	8	44.3	53.7	67.3	97.1
	9	45.2	55.2	67.3	91.1
	10	46.1	56.5	67.8	93.6
	11	46.7	57.1	68.1	95.0
	12	48.0	57.7	68.1	96.4
	13	48.0	58.3	68.1	97.3
	14	54.0	68.0	78.9	106
	15	58.4	75.3	87.4	116

ADDITION Addition details ☞ P.72

Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting KC −0.02 0.1 D/2≤KC＜H/2	KC (0.5)	Right-angled three flats cutting DKC DKC −0.02 0.1 D/2≤DKC＜H/2	DKC (1.4)
Parallel flats cutting WKC WKC −0.02 0.1 D/2≤WKC＜H/2	WKC (0.9)	Square flats cutting SKC SKC −0.02 0.1 D/2≤SKC＜H/2	SKC (1.8)
Parallel flats cutting KAC KBC −0.02 0.1 D/2≤KAC,KBC＜H/2	KAC (1.4) KBC (1.4)	Designated-angled two flats cutting AG°±0.5 0° KGC KGC −0.02 KGC: 0.1 AG: 1 D/2≤KGC＜H/2 0＜AG＜360	KGC (1.4)
Right-angled two flats cutting RKC RKC −0.02 0.1 D/2≤RKC＜H/2	RKC (0.9)	Three flats cutting at 120° 120° 120° 120° KTC −0.02 0.1 D/2≤KTC＜H/2	KTC (1.8)

Add.	Code (@/P)	Add.	Code (@/P)
H dimension alteration H HC 0.1 D≤HC＜H	HC (0.6)	Point chamfering CGX±0.05 S 45° 0.1 0.2≤CGX≤1.5 CGX≤(D−S)/2−0.1	CGX (7.0)
H dimension alteration (precision) H HCC 0.1 D+1≤HCC＜H−0.3	HCC (1.8)	Point R processing CGX±0.05 S R 0.1 0.3≤RGX≤1.5 RGX≤(D−S)/2−0.1	RGX (9.5)
T dimension alteration TC −0.02 4 0.1 2≤TC＜4	TC (0.6)	C-boring on the point CGZ±0.05 S 45° 0.1 0.2≤CGZ≤1.0 CGZ≤(D−S)/2−0.1	CGZ (11.8)
L dimension tolerance alteration L +0.01 0 0.1 0.5≤RGZ≤1.0 RGZ≤(D−S)/2−0.1	LKC (0.9)	R-boring on the point RGZ±0.1 R S	RGZ (14.2)

Code No.	L	S	B	KC・WKC…etc.
ELPHE4 —	100.00 —	S1.00 —	B3.0 —	KC2.6

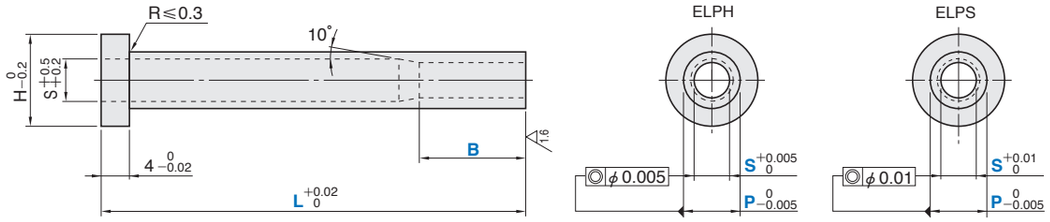
Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Straight Ejector Sleeves

Shank Diameter Designated Type

Material	Hardness	S T	Code
SKH51	59～61HRC	$S^{+0.005}_{0}$	ELPH
		$S^{+0.01}_{0}$	ELPS

⚠ Range of guaranteed shank diameter precision ☞ P.242
⚠ Range of guaranteed base material hardness ☞ P.243



⚠ For LKC addition, the tolerance of L dimension is $^{+0.01}_{0}$.

Precision	Code No. Code	No.	L	P (㎜ 0.01)	S	B (㎜ 0.5)	H
$S^{+0.005}_{0}$	ELPH	4	40.00～200.00	3.20～ 4.00	0.50≤S≤P−1.20	1.0～25.0 and B≤S×3	8
		5		4.01～ 5.00			9
		6		5.01～ 6.00			10
		7		6.01～ 7.00			11
		8	40.00～250.00	7.01～ 8.00	2.00≤S≤P−1.80		13
		9		8.01～ 9.00			14
		10		9.01～10.00			15
		11		10.01～11.00			16
		12		11.01～12.00			17
		13		12.01～13.00			18
		14		13.01～14.00			19
		15		14.01～15.00	3.00≤S≤P−2.50		20

Precision	Code No. Code	No.	L	P (㎜ 0.01)	S	B (㎜ 0.5)	H
$S^{+0.01}_{0}$	ELPS	4	40.00～200.00	3.20～ 4.00	0.50≤S≤P−1.20	1.0～25.0 and B≤S×5	8
		5		4.01～ 5.00			9
		6		5.01～ 6.00			10
		7		6.01～ 7.00			11
		8	40.00～250.00	7.01～ 8.00	2.00≤S≤P−1.80		13
		9		8.01～ 9.00			14
		10		9.01～10.00			15
		11		10.01～11.00			16
		12		11.01～12.00			17
		13		12.01～13.00			18
		14		13.01～14.00			19
		15		14.01～15.00	3.00≤S≤P−2.50		20

ORDER

Code No.	L	P	S	B
ELPH4 —	100.00 —	P3.20 —	S1.00 —	B3.0

DELIVERY 3 Days ☞ P.15

PRICE Without tax

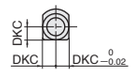
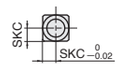
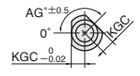
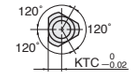
▶Quantity discount rate ☞ P.15

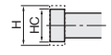
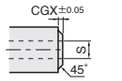
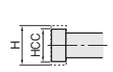
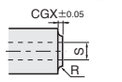
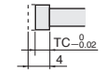
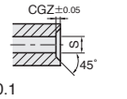
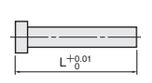
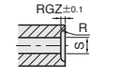
1～4	5～12	13～19	20～50	51～
100%	95%	90%	80%	Enquiry

Code No. Code	D	@/P(1～4P) L40.00～100.00	L100.01～150.00	L150.01～200.00	L200.01～250.00
$S^{+0.005}_{0}$ ELPH $S^{+0.01}_{0}$ ELPS	4	56.5	63.9	73.3	—
	5	45.6	57.0	65.3	—
	6	44.3	55.2	63.4	—
	7	46.4	57.7	66.4	—
	8	46.5	58.0	66.8	102
	9	49.2	61.2	70.3	95.0
	10	49.9	62.1	72.1	97.5
	11	51.2	64.3	74.6	99.2
	12	51.2	64.3	75.3	103
	13	51.7	64.3	75.3	102
	14	54.6	68.6	79.6	111
	15	59.6	75.0	87.1	117

ADDITION

Addition details ☞ P.72

Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting  ㎜ 0.1 P/2≤KC＜H/2	KC(0.5)	Right-angled three flats cutting  ㎜ 0.1 P/2≤DKC＜H/2	DKC(1.4)
Parallel flats cutting  ㎜ 0.1 P/2≤WKC＜H/2	WKC(0.9)	Square flats cutting  ㎜ 0.1 P/2≤SKC＜H/2	SKC(1.8)
Parallel flats cutting  ㎜ 0.1 P/2≤KAC,KBC＜H/2	KAC(1.4) KBC(1.4)	Designated-angled two flats cutting  KGC: ㎜ 0.1 AG: ㎜ 1 P/2≤KGC＜H/2 0＜AG＜360	KGC(1.4)
Right-angled two flats cutting  ㎜ 0.1 P/2≤RKC＜H/2	RKC(0.9)	Three flats cutting at 120°  ㎜ 0.1 P/2≤KTC＜H/2	KTC(1.8)

H dimension alteration	Code(@/P)	Add.	Code(@/P)
 ㎜ 0.1 P≤HC＜H	HC(0.6)	Point chamfering  ㎜ 0.1 0.2≤CGX≤1.5 CGX≤(P−S)/2−0.1	CGX(7.0)
H dimension alteration (precision)  ㎜ 0.1 P＋1≤HCC＜H−0.3	HCC(1.8)	Point R processing  ㎜ 0.1 0.3≤RGX≤1.5 RGX≤(P−S)/2−0.1	RGX(9.5)
T dimension alteration  ㎜ 0.1 2≤TC＜4	TC(0.6)	C-boring on the point  ㎜ 0.1 0.2≤CGZ≤1.0 CGZ≤(P−S)/2−0.1	CGZ(11.8)
L dimension tolerance alteration 	LKC(0.9)	R-boring on the point  ㎜ 0.1 0.5≤RGZ≤1.0 RGZ≤(P−S)/2−0.1	RGZ(14.2)

Code No.	L	P	S	B	KC･WKC…etc.
ELPH4 —	100.00 —	P3.20 —	S1.00 —	B3.0 —	KC1.6

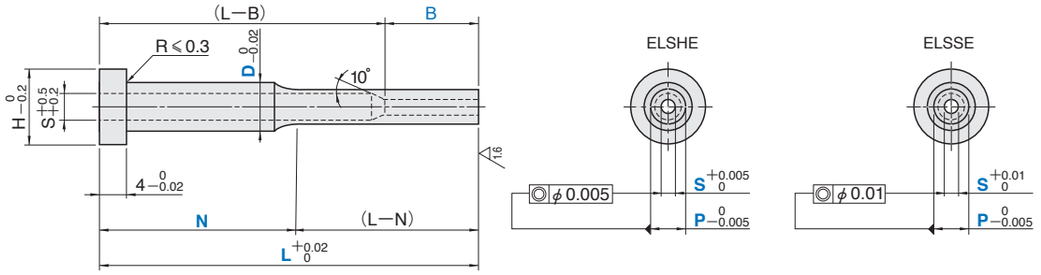
Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Stepped Ejector Sleeves

D Dimension Fixed Type

Material	Hardness	S T	Code
SKH51	59～61HRC	$S^{+0.005}_{0}$	ELSHE
		$S^{+0.01}_{0}$	ELSSE

⚠ Range of guaranteed base material hardness ☞ P.243



⚠ For LKC addition, the tolerance of L dimension is $^{+0.01}_{0}$.

Precision	Code No. Code	D	L	P	N	S	B	H
			in 0.01		in 1	in 0.01	in 0.5	
$S^{+0.005}_{0}$	ELSHE	4	40.00～200.00	3.00～ 3.90	N≥L/3 and 20≤N≤L−10	0.80≤S and S≤P−1.2	1.0～25.0 and B≤S×3	8
		5		3.20～ 4.90				9
		6		3.20～ 5.90				10
		7		3.20～ 6.90				11
		8	40.00～250.00	3.20～ 7.90				13
		9		3.20～ 8.90				14
		10		3.20～ 9.90				15
		11		3.20～10.90				16
		12		3.20～11.90				17
		13		3.20～12.90				18
		14		3.20～13.90				19
		15		3.20～14.90				20

Precision	Code No. Code	D	L	P	N	S	B	H
			in 0.01		in 1	in 0.01	in 0.5	
$S^{+0.01}_{0}$	ELSSE	4	40.00～200.00	3.00～ 3.90	N≥L/3 and 20≤N≤L−10	0.80≤S and S≤P−1.2	1.0～25.0 and B≤S×5	8
		5		3.20～ 4.90				9
		6		3.20～ 5.90				10
		7		3.20～ 6.90				11
		8	40.00～250.00	3.20～ 7.90				13
		9		3.20～ 8.90				14
		10		3.20～ 9.90				15
		11		3.20～10.90				16
		12		3.20～11.90				17
		13		3.20～12.90				18
		14		3.20～13.90				19
		15		3.20～14.90				20

ORDER

Code No.	L	P	N	S	B
ELSHE4 —	100.00 —	P3.20 —	N40 —	S1.00 —	B3.0

DELIVERY 5 Days ☞ P.15

PRICE Without tax

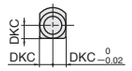
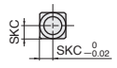
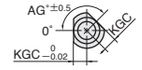
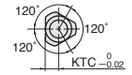
▶Quantity discount rate ☞ P.15

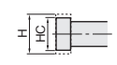
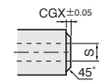
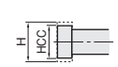
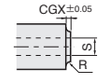
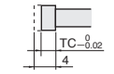
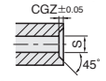
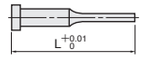
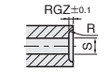
1～4	5～12	13～19	20～50	51～
100%	95%	90%	80%	Enquiry

Code No. Code	D	@/P(1～4P) L40.00～100.00	L100.01～150.00	L150.01～200.00	L200.01～250.00
$S^{+0.005}_{0}$ ELSHE	4	43.7	49.5	57.5	—
	5	35.0	43.9	50.9	—
	6	33.9	42.4	49.3	—
	7	34.8	43.4	50.5	—
	8	35.5	44.3	51.2	57.7
	9	36.7	45.6	53.1	58.1
	10	37.7	47.0	54.6	60.5
	11	38.1	47.5	55.2	62.3
	12	38.6	48.3	55.9	63.0
	13	38.9	48.9	56.8	63.9
	14	39.9	50.0	58.1	65.5
	15	40.9	51.4	59.6	67.1

Code No. Code	D	@/P(1～4P) L40.00～100.00	L100.01～150.00	L150.01～200.00	L200.01～250.00
$S^{+0.01}_{0}$ ELSSE	4	42.1	47.3	54.9	—
	5	33.3	41.7	48.4	—
	6	32.3	40.3	47.0	—
	7	33.0	41.4	48.0	—
	8	33.7	42.3	48.6	55.2
	9	34.9	43.4	50.5	57.7
	10	35.9	44.6	51.8	59.2
	11	36.2	45.2	52.5	59.9
	12	36.7	45.8	53.3	60.6
	13	37.1	46.5	54.0	61.5
	14	37.8	47.5	55.2	63.0
	15	38.9	48.9	56.7	64.8

ADDITION Addition details ☞ P.72

Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting  in 0.1 D/2≤KC<H/2	KC(0.5)	Right-angled three flats cutting  in 0.1 D/2≤DKC<H/2	DKC(1.4)
Parallel flats cutting  in 0.1 D/2≤WKC<H/2	WKC(0.9)	Square flats cutting  in 0.1 D/2≤SKC<H/2	SKC(1.8)
Parallel flats cutting  in 0.1 D/2≤KAC,KBC<H/2	KAC(1.4) KBC(1.4)	Designated-angled two flats cutting  KGC: in 0.1 AG: in 1 D/2≤KGC<H/2 0<AG<360	KGC(1.4)
Right-angled two flats cutting  in 0.1 D/2≤RKC<H/2	RKC(0.9)	Three flats cutting at 120°  in 0.1 D/2≤KTC<H/2	KTC(1.8)

Add.	Code(@/P)	Add.	Code(@/P)
H dimension alteration  in 0.1 D≤HC<H	HC(0.6)	Point chamfering  in 0.1 0.2≤CGX≤1.5 CGX≤(P−S)/2−0.1	CGX(7.0)
H dimension alteration (precision)  in 0.1 D+1≤HCC<H−0.3	HCC(1.8)	Point R processing  in 0.1 0.3≤RGX≤1.5 RGX≤(P−S)/2−0.1	RGX(9.5)
T dimension alteration  in 0.1 2≤TC<4	TC(0.6)	C-boring on the point  in 0.1 0.2≤CGZ≤1.0 CGZ≤(P−S)/2−0.1	CGZ(11.8)
L dimension tolerance alteration 	LKC(0.9)	R-boring on the point  in 0.1 0.5≤RGZ≤1.0 RGZ≤(P−S)/2−0.1	RGZ(14.2)

Code No.	L	P	N	S	B	KC・WKC…etc.
ELSHE4 —	100.00 —	P3.20 —	N40 —	S1.00 —	B3.0 —	KC2.0

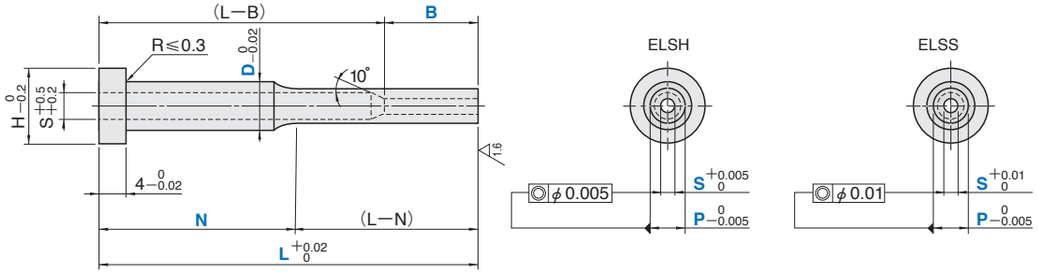
Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

Stepped Ejector Sleeves

D Dimension Designation Type

Material	Hardness	S T	Code
SKH51	59～61HRC	$S^{+0.005}_{0}$	ELSH
		$S^{+0.01}_{0}$	ELSS

⚠ Range of guaranteed base material hardness ☞ P.243



⚠ For LKC addition, the tolerance of L dimension is $^{+0.01}_{0}$.

⚠ P≤D—0.1

Precision	Code	D	L	P	N	S	B	H
		(in) 0.1	(in) 0.01		(in) 1	(in) 0.01	(in) 0.5	
$S^{+0.005}_{0}$	ELSH	3.1～ 3.9	40.00～200.00	3.00～ 3.80	N≥L/3 and 20≤N≤L—10	0.80≤S and S≤P—1.2	1.0～25.0 and B≤S×3	8
		4.1～ 4.9		3.20～ 4.80				9
		5.1～ 5.9		3.20～ 5.80				10
		6.1～ 6.9		3.20～ 6.80				11
		7.1～ 7.9	40.00～250.00	3.20～ 7.80				13
		8.1～ 8.9		3.20～ 8.80				14
		9.1～ 9.9		3.20～ 9.80				15
		10.1～10.9		3.20～10.80				16
		11.1～11.9		3.20～11.80				17
		12.1～12.9		3.20～12.80				18
		13.1～13.9		3.20～13.80				19
		14.1～14.9		3.20～14.80				20

Precision	Code No.		L	P	N	S	B	H
	Code	D	(in) 0.01		(in) 1	(in) 0.01	(in) 0.5	
$S^{+0.01}_{0}$	ELSS	3.1～ 3.9	40.00～200.00	3.00～ 3.80	N≥L/3 and 20≤N≤L—10	0.80≤S and S≤P—1.2	1.0～25.0 and B≤S×5	8
		4.1～ 4.9		3.20～ 4.80				9
		5.1～ 5.9		3.20～ 5.80				10
		6.1～ 6.9		3.20～ 6.80				11
		7.1～ 7.9	40.00～250.00	3.20～ 7.80				13
		8.1～ 8.9		3.20～ 8.80				14
		9.1～ 9.9		3.20～ 9.80				15
		10.1～10.9		3.20～10.80				16
		11.1～11.9		3.20～11.80				17
		12.1～12.9		3.20～12.80				18
		13.1～13.9		3.20～13.80				19
		14.1～14.9		3.20～14.80				20

ORDER

Code No.	D	L	P	N	S	B
ELSH —	4.1 —	100.00 —	P3.20 —	N35 —	S1.00 —	B3.0

DELIVERY

3 Days

Head diameter space-saving type

5 Days ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

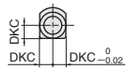
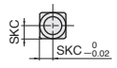
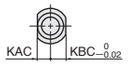
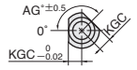
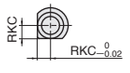
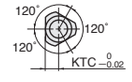
1～4	5～12	13～19	20～50	51～
100%	95%	90%	80%	Enquiry

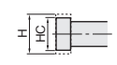
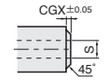
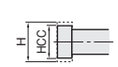
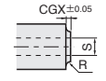
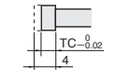
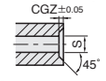
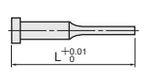
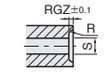
Code No.		@/P(1～4P)			
Code	D	L40.00～100.00	L100.01～150.00	L150.01～200.00	L200.01～250.00
$S^{+0.005}_{0}$ ELSH	3.1～ 3.9	54.2	61.2	71.2	—
	4.1～ 4.9	43.3	54.3	63.7	—
	5.1～ 5.9	42.0	52.7	61.8	—
	6.1～ 6.9	43.0	53.9	62.5	—
	7.1～ 7.9	44.0	54.9	63.4	71.4
	8.1～ 8.9	45.3	56.5	65.8	72.0
	9.1～ 9.9	46.7	58.1	67.5	74.9
	10.1～10.9	47.3	59.0	68.6	77.1
	11.1～11.9	47.7	59.8	69.3	78.0
	12.1～12.9	48.1	60.5	70.3	79.0
	13.1～13.9	52.7	66.2	77.0	86.2
	14.1～14.9	53.4	67.1	78.0	87.4

Code No.		@/P(1～4P)			
Code	D	L40.00～100.00	L100.01～150.00	L150.01～200.00	L200.01～250.00
$S^{+0.01}_{0}$ ELSS	3.1～ 3.9	47.0	52.7	61.2	—
	4.1～ 4.9	37.3	46.7	54.3	—
	5.1～ 5.9	36.2	45.3	52.8	—
	6.1～ 6.9	37.1	46.4	54.0	—
	7.1～ 7.9	38.0	47.4	55.2	62.1
	8.1～ 8.9	39.3	48.9	57.0	64.9
	9.1～ 9.9	40.5	50.3	58.6	66.7
	10.1～10.9	41.2	51.4	59.8	67.5
	11.1～11.9	42.0	52.5	60.9	68.4
	12.1～12.9	42.7	53.6	62.3	69.3
	13.1～13.9	44.6	56.1	65.2	74.2
	14.1～14.9	45.3	57.0	66.1	75.2

ADDITION

Addition details ☞ P.72

Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting  (in) 0.1 P/2≤KC<H/2	KC(0.5)	Right-angled three flats cutting  (in) 0.1 P/2≤DKC<H/2	DKC(1.4)
Parallel flats cutting  (in) 0.1 P/2≤WKC<H/2	WKC(0.9)	Square flats cutting  (in) 0.1 P/2≤SKC<H/2	SKC(1.8)
Parallel flats cutting  (in) 0.1 P/2≤KAC,KBC<H/2	KAC(1.4) KBC(1.4)	Designated-angled two flats cutting  KGC: (in) 0.1 AG: (in) 1 P/2≤KGC<H/2 0<AG<360	KGC(1.4)
Right-angled two flats cutting  (in) 0.1 P/2≤RKC<H/2	RKC(0.9)	Three flats cutting at 120°  (in) 0.1 P/2≤KTC<H/2	KTC(1.8)

Add.	Code(@/P)	Add.	Code(@/P)
H dimension alteration  (in) 0.1 P≤HC<H	HC(0.6)	Point chamfering  (in) 0.1 0.2≤CGX≤1.5 CGX≤(P—S)/2—0.1	CGX(7.0)
H dimension alteration (precision)  (in) 0.1 D+1≤HCC<H—0.3	HCC(1.8)	Point R processing  (in) 0.1 0.3≤RGX≤1.5 RGX≤(P—S)/2—0.1	RGX(9.5)
T dimension alteration  (in) 0.1 2≤TC<4	TC(0.6)	C-boring on the point  (in) 0.1 0.2≤CGZ≤1.0 CGZ≤(P—S)/2—0.1	CGZ(11.8)
L dimension tolerance alteration 	LKC(0.9)	R-boring on the point  (in) 0.1 0.5≤RGZ≤1.0 RGZ≤(P—S)/2—0.1	RGZ(14.2)

Code No.	D	L	P	N	S	B	KC・WKC…etc.
ELSH —	4.1 —	100.00 —	P3.20 —	N35 —	S1.00 —	B3.0 —	KC2.0

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

Straight Ejector Sleeves

4mm Head·General Type / L Dimension Designated Type

T SH7 Tolerance

S≤3.0	3.5≤S≤6.0	6.5≤S≤10.0	S≥11.0
$^{+0.010}_{0}$	$^{+0.012}_{0}$	$^{+0.015}_{0}$	$^{+0.018}_{0}$

T D Tolerance

D≤10	D≥12
$^{-0.01}_{-0.02}$	$^{-0.01}_{-0.03}$

Material	Hardness	Applicable center pin shank diameter tolerance	Code	
			General type	L dimension designated type
SKD61	(Nitriding) Surface:900HV～ Interior:38～42HRC	−0.01 −0.02	ELNP	ELNPL

⚠ Range of guaranteed shank diameter precision ☞ P.242
⚠ Range of guaranteed base material hardness ☞ P.243
⚠ Range of guaranteed surface hardness for nitriding ☞ P.243

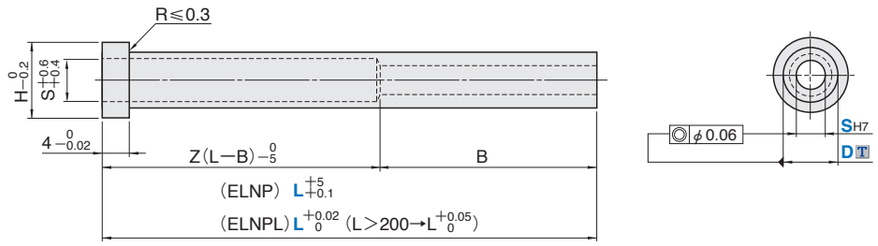
ELNP

L	75	100	125	150	175	200	250	300
B	40	50		60		80		90

⚠ B dimension depends on the designated L dimension. B=L−Z

ELNPL

L	50.00～75.00	75.01～100.00	100.01～125.00	125.01～150.00	150.01～175.00	175.01～200.00	200.01～250.00	250.01～300.00
Z	35	50	75	90	115	120	170	210



▶ General type

Code No. Code	D	L	S	H
ELNP	4	75 100 125 150	1.5	7
		75 100 125 150 175 200	2 2.5	
	4.5	75 100 125 150	1.5	8
		75 100 125 150 175 200	2 2.5	
	5	75 100 125 150 175 200	2 2.5 3	
	5.5	75 100 125 150 175 200	2 2.5 3 3.5	9
	6	75 100 125 150 175 200 250	2.5 3 3.5 4	
	6.5	75 100 125 150 175 200 250	2.5 3 3.5 4	10
	7	75 100 125 150 175 200 250	2.5 3 3.5 4 4.5 5	
	7.5	75 100 125 150 175 200 250	2.5 3 3.5 4 4.5 5	11
	8	75 100 125 150 175 200 250	4 4.5 5	
		100 125 150 175 200 250	5.5 6	
	9	100 125 150 175 200 250 300	6 6.5 7	14
	10	100 125 150 175 200 250 300	6 7 8	15
	13	100 125 150 175 200 250 300	8 9 10	18
	16	100 125 150 175 200 250 300	10 11 12	21

▶ L dimension designated type

Code No. Code	D	L (in 0.01)	S	H
ELNPL	4	50.00～150.00	1.5	7
		50.00～200.00	2 2.5	
	4.5	50.00～150.00	1.5	8
		50.00～200.00	2 2.5	
	5	50.00～200.00	2 2.5 3	
	5.5	50.00～200.00	2 2.5 3 3.5	9
	6	50.00～250.00	2.5 3 3.5 4	
	6.5	50.00～250.00	2.5 3 3.5 4	10
	7	50.00～250.00	2.5 3 3.5 4 4.5 5	
	7.5	50.00～250.00	3 3.5 4 4.5 5	11
	8	50.00～250.00	4 4.5 5 5.5 6	
	9	75.00～300.00	6 6.5 7	14
	10	75.00～300.00	6 7 8	15
	13	75.00～300.00	8 9 10	18
	16	75.00～300.00	10 11 12	21

ORDER

Code No.	L	S
ELNP4 —	100 —	2
ELNPL4 —	100.00	S2

DELIVERY 3 Days ☞ P.15

PRICE Without tax

▶ Quantity discount rate ☞ P.15

1～4	5～12	13～19	20～50	51～
100%	95%	90%	80%	Enquiry

▶ General type

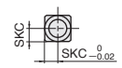
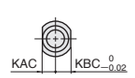
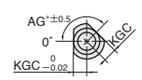
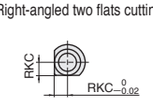
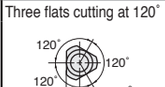
Code No. Code	D	@/P(1～4P) L75	L100	L125	L150	L175	L200	L250	L300
ELNP	4 S1.5	17.0	17.1	19.6	20.9	–	–	–	–
	S2・2.5	8.73	8.92	11.1	13.3	15.8	18.3	–	–
	4.5 S1.5	17.0	17.1	19.6	20.9	–	–	–	–
	S2・2.5	8.73	8.92	11.1	13.3	15.8	18.3	–	–
	5	8.61	8.73	9.89	11.0	13.0	14.9	–	–
	5.5	8.61	8.73	9.89	11.0	13.0	14.9	–	–
	6	8.30	8.49	9.64	10.8	12.6	14.4	17.1	–
	6.5	8.30	8.49	9.64	10.8	12.6	14.4	17.1	–
	7	8.61	8.73	9.89	11.1	13.5	15.8	18.0	–
	7.5	8.61	8.73	9.89	11.1	13.5	15.8	18.0	–
	8	8.98	9.15	10.4	11.5	13.9	16.2	19.2	–
	9	–	9.15	10.4	11.5	13.9	16.2	19.2	22.0
	10	–	9.89	11.2	12.4	14.8	17.3	20.8	22.8
	13	–	10.8	12.3	13.7	16.2	18.9	21.7	23.9
	16	–	12.6	14.4	15.9	19.9	23.7	27.0	29.2

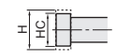
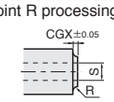
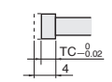
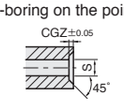
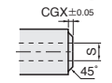
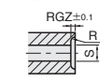
▶ L dimension designated type

Code No. Code	D	@/P(1～4P) L50.00～100.00	L100.01～125.00	L125.01～150.00	L150.01～175.00	L 175.01～200.00	L 200.01～250.00	L 250.01～300.00
ELNPL	4 S1.5	18.3	20.8	22.1	–	–	–	–
	S2・2.5	10.2	12.3	14.5	17.0	19.6	–	–
	4.5 S1.5	18.3	20.8	22.1	–	–	–	–
	S2・2.5	10.2	12.3	14.5	17.0	19.6	–	–
	5	10.0	11.2	12.3	14.2	16.1	–	–
	5.5	10.0	11.2	12.3	14.2	16.1	–	–
	6	9.71	10.9	12.1	13.8	15.6	18.3	–
	6.5	9.71	10.9	12.1	13.8	15.6	18.3	–
	7	10.0	11.2	12.3	14.7	17.0	19.2	–
	7.5	10.0	11.2	12.3	14.7	17.0	19.2	–
	8	10.4	11.6	12.7	15.0	17.4	20.3	–
	9	10.4	11.6	12.7	15.0	17.4	20.3	23.1
	10	11.2	12.4	13.6	16.1	18.4	22.0	24.0
	13	12.0	13.5	14.9	17.5	20.0	23.0	25.0
	16	13.8	15.5	17.3	21.1	25.0	28.1	30.3

ADDITION

Addition details ☞ P.72

Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting	KC (0.5)	Right-angled three flats cutting	DKC (1.4)
			
in 0.1 D/2≤KC<H/2		in 0.1 D/2≤DKC<H/2	
Parallel flats cutting	WKC (0.9)	Square flats cutting	SKC (1.8)
			
in 0.1 D/2≤WKC<H/2		in 0.1 D/2≤SKC<H/2	
Parallel flats cutting	KAC (1.4) KBC (1.4)	Designated-angled two flats cutting	KGC (1.4)
			
in 0.1 D/2≤KAC,KBC<H/2		KGC: in 0.1 AG: in 1 D/2≤KGC<H/2 0<AG<360	
Right-angled two flats cutting	RKC (0.9)	Three flats cutting at 120°	KTC (1.8)
			
in 0.1 D/2≤RKC<H/2		in 0.1 D/2≤KTC<H/2	

Add.	Code (@/P)	Add.	Code (@/P)
H dimension alteration	HC (0.6)	Point R processing	RGX (9.5)
			
in 0.1 D≤HC<H		in 0.1 0.3≤RGX≤1.5 RGX≤(D−S)/2−0.1	
T dimension alteration	TC (0.6)	C-boring on the point	CGZ (11.8)
			
in 0.1 2≤TC<4		in 0.1 0.2≤CGZ≤1.0 CGZ≤(D−S)/2−0.1	
Point chamfering	CGX (7.0)	R-boring on the point	RGZ (14.2)
			
in 0.1 0.2≤CGX≤1.5 CGX≤(D−S)/2−0.1		in 0.1 0.5≤RGZ≤1.0 RGZ≤(D−S)/2−0.1	

Code No.	L	S	KC・WKC…etc.
ELNPL4 —	100.00 —	S2 —	KC3.0

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

Straight Ejector Sleeves

JIS Head・General Type

T SH7 Tolerance

S≤3.0	3.5≤S≤6.0	6.5≤S≤10.0	S≥12.0
$^{+0.010}_{0}$	$^{+0.012}_{0}$	$^{+0.015}_{0}$	$^{+0.018}_{0}$

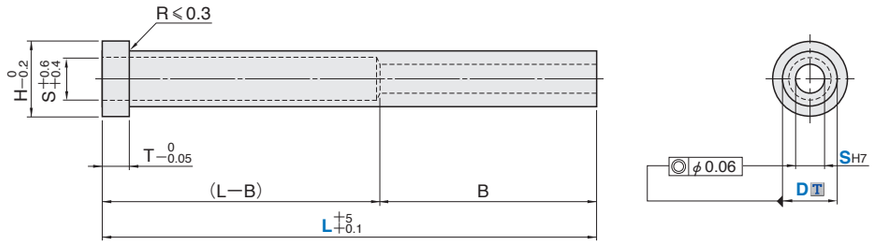
T D Tolerance

D≤10	D≥12
$^{-0.01}_{-0.02}$	$^{-0.01}_{-0.03}$

Material	Hardness	Applicable center pin shank diameter tolerance	Code
SKD61	(Nitriding) Surface:900HV～ Interior:38～42HRC	−0.01 −0.02	ELJNP

⚠ Range of guaranteed shank diameter precision ☞ P.242
⚠ Range of guaranteed base material hardness ☞ P.243
⚠ Range of guaranteed surface hardness for nitriding ☞ P.243

L	100	120	140	160	180	200	225	250	275	300	325	350	375	400	425	450	475	500
B	50			75			100			115			150					



Code No. Code	D	L	S	T	H
ELJNP	4	100 120	1.5	6	8
		100 120 160 180 200	2 2.5		
	4.5	100 120	1.5		
		100 120 160 180 200	2 2.5		
	5	100 120 160 180 200 225	2 2.5 3		9
		250 275 300	3		
	5.5	100 120 160 180 200 225	2 2.5 3		
		250 275 300	3		
	6	100 120 160 180 200 225 250 275 300	2 2.5 3 3.5 4		10
		325 350 375 400 425 450	3 3.5		
	6.5	100 120 160 180 200 225 250 275 300	2 2.5 3 3.5 4		11
		325 350 375 400 425 450	3 3.5 4		
	7	100 120 160 180 200 225 250 275 300	2 2.5 3 3.5 4 4.5		
		325 350 375 400 425 450	3 3.5 4 4.5		
	7.5	100 120 160 180 200 225 250 275 300	3 3.5 4 4.5		12
		325 350 375	3.5 4 4.5		
	8	100 120 160 180 200 225 250 275 300	2 2.5 3 3.5 4 4.5 5	8	13
		325 350 375 400 425 450	3 3.5 4 4.5 5		
		475 500	5		
	10	100 120 160 180 200 225 250 275 300 325 350 375 400 425 450	4 4.5 5 5.5 6 6.5		15
		475 500	5 5.5 6 6.5		
	12	100 120 160 180 200 225 250 275 300 325 350 375 400 425 450	4 4.5 5 5.5 6 6.5 7 8		17
		475 500	5 5.5 6 6.5 7 8		
	15	200 225 250 275 300 325 350 375 400 425 450 475 500	9 10		20
	20	200 225 250 275 300 325 350 375 400 425 450 475 500	12 15		25

ORDER

Code No.	L	S
ELJNP4 —	100 —	2

DELIVERY 3 Days ☞ P.15

PRICE Without tax

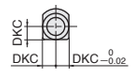
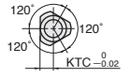
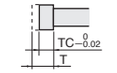
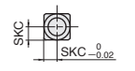
▶Quantity discount rate ☞ P.15

1～4	5～12	13～19	20～50	51～
100%	95%	90%	80%	Enquiry

Code No. Code	D	@/P(1～4P) L100	L120	L140	L160	L180	L200	L225	L250	L275	L300	L325	L350	L375	L400	L425	L450	L475	L500
ELJNP	4 S1.5	17.1	19.5	20.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4 S2・2.5	8.92	11.0	12.1	14.4	16.7	18.3	–	–	–	–	–	–	–	–	–	–	–	–
	4.5 S1.5	17.1	19.5	20.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4.5 S2・2.5	8.92	11.0	12.1	14.4	16.7	18.3	–	–	–	–	–	–	–	–	–	–	–	–
	5	8.73	9.40	10.0	11.9	13.8	14.9	16.4	17.7	18.7	19.6	–	–	–	–	–	–	–	–
	5.5	8.73	9.40	10.0	11.9	13.8	14.9	16.4	17.7	18.7	19.6	–	–	–	–	–	–	–	–
	6	8.49	9.21	9.89	11.7	13.8	14.4	15.8	17.1	18.0	18.9	25.2	27.0	29.3	30.9	35.5	37.7	–	–
	6.5	8.49	9.21	9.89	11.7	13.8	14.4	15.8	17.1	18.0	18.9	25.2	27.0	29.3	30.9	35.5	37.7	–	–
	7	8.73	9.46	10.2	11.9	14.1	15.8	16.8	18.0	18.9	19.8	25.6	27.3	29.6	31.2	37.0	39.0	–	–
	7.5	8.73	9.46	10.2	11.9	14.1	15.8	16.8	18.0	18.9	19.8	25.6	27.3	29.6	–	–	–	–	–
	8	9.15	9.89	10.6	12.3	14.6	16.2	17.7	19.2	20.0	21.1	26.5	28.1	30.6	32.4	37	39.9	42.5	43.3
	10	9.89	10.7	11.5	13.3	15.5	17.3	19.0	20.8	21.8	22.8	28.3	30.0	32.8	34.5	40.6	42.8	45.6	46.2
	12	10.2	11.1	12.0	13.8	16.2	18.0	19.8	21.5	22.7	23.7	29.5	31.2	34.3	38.4	42.0	44.0	46.5	47.4
	15	–	–	–	–	–	20.9	23.0	25.2	26.4	27.7	35.3	37.8	41.7	45.8	54.5	57.7	60.6	61.2
	20	–	–	–	–	–	25.9	28.0	30.0	31.5	33.1	42.4	45.2	49.8	54.8	65.0	69.0	72.5	73.3

ADDITION

Addition details ☞ P.72

Add.	Code(@/P)	Add.	Code(@/P)	Add.	Code(@/P)	Add.	Code(@/P)
Single flat cutting	KC(0.5)	Right-angled two flats cutting	RKC(0.9)	Designated-angled two flats cutting	KGC(1.4)	H dimension alteration	HC(0.6)
ⓜ 0.1 D/2≤KC＜H/2		ⓜ 0.1 D/2≤RKC＜H/2		KGC: ⓜ 0.1 AG: ⓜ 1 D/2≤KGC＜H/2 0＜AG＜360		ⓜ 0.1 D≤HC＜H	
Parallel flats cutting	WKC(0.9)	Right-angled three flats cutting	DKC(1.4)	Three flats cutting at 120°	KTC(1.8)	T dimension alteration	TC(0.6)
							
ⓜ 0.1 D/2≤WKC＜H/2		ⓜ 0.1 D/2≤DKC＜H/2		ⓜ 0.1 D/2≤KTC＜H/2		ⓜ 0.1 T/2≤TC＜T	
Parallel flats cutting	KAC(1.4) KBC(1.4)	Square flats cutting	SKC(1.8)				
							
ⓜ 0.1 D/2≤KAC,KBC＜H/2		ⓜ 0.1 D/2≤SKC＜H/2					

Code No.	L	S	KC・WKC・・・etc.
ELJNP—S5 —	100 —	2 —	KC2.5

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Straight Ejector Sleeves

JIS Head・L Dimension Designated Type

— 3

T SH7 Tolerance

S≤3.0	3.5≤S≤6.0	6.5≤S≤10.0	S≥12.0
$^{+0.010}_{0}$	$^{+0.012}_{0}$	$^{+0.015}_{0}$	$^{+0.018}_{0}$

T D Tolerance

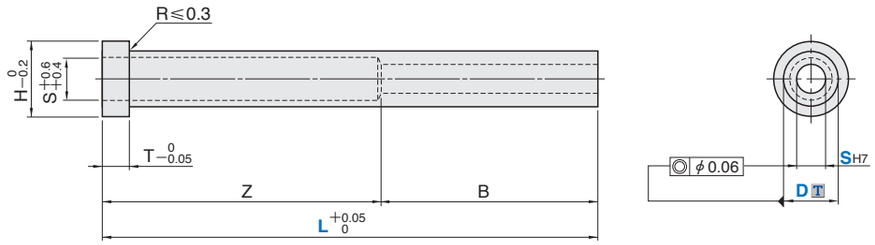
D≤10	D≥12
$^{-0.01}_{-0.02}$	$^{-0.01}_{-0.03}$

Material	Hardness	Applicable center pin shank diameter tolerance	Code
SKD61	(Nitriding) Surface:900HV～ Interior:38～42HRC	$^{-0.01}_{-0.02}$	ELJNPL

⚠ Range of guaranteed shank diameter precision ☞ P.242
⚠ Range of guaranteed base material hardness ☞ P.243
⚠ Range of guaranteed surface hardness for nitriding ☞ P.243

⚠ B dimension depends on the designated L dimension. B=L−Z

L	80.00～100.00	100.01～120.00	120.01～140.00	140.01～160.00	160.01～180.00	180.01～225.00	225.01～250.00	250.01～275.00	275.01～300.00	300.01～325.00	325.01～350.00	350.01～375.00	375.01～400.00	400.01～425.00	425.01～450.00	450.01～475.00	475.01～500.00
Z	50	70	90	85	105	125	150	175	185	210	235	225	250	275	300	325	350



Code No. Code	D	L (in) 0.01	S	T	H
ELJNPL	4	80.00～140.00	1.5 2 2.5	6	8
		140.01～200.00	2 2.5		
	4.5	80.00～140.00	1.5 2 2.5		
		140.01～200.00	2 2.5		
	5	80.00～225.00	2 2.5 3		9
		225.01～300.00	3		
	5.5	80.00～225.00	2 2.5 3		
		225.01～300.00	3		
	6	80.00～300.00	2 2.5 3 3.5 4		10
		300.01～450.00	3 3.5		
	6.5	80.00～300.00	2 2.5 3 3.5 4		11
		300.01～450.00	3 3.5 4		
	7	80.00～300.00	2 2.5 3 3.5 4 4.5		
		300.01～450.00	3 3.5 4 4.5		
	7.5	80.00～300.00	3 3.5 4 4.5		12
		300.01～375.00	3.5 4 4.5		
	8	80.00～300.00	2 2.5 3 3.5 4 4.5 5	8	13
		300.01～450.00	3.5 4 4.5 5		
		450.01～500.00	5		
	10	80.00～450.00	4 4.5 5 5.5 6 6.5		15
		450.01～500.00	5 5.5 6 6.5		
	12	80.00～450.00	4 4.5 5 5.5 6 6.5 7 8		17
		450.01～500.00	5 5.5 6 6.5 7 8		
	15	180.01～500.00	9 10		20
	20	180.01～500.00	12 15		25

ORDER

Code No.	L	S
ELJNPL4 —	100.20 —	S2.5

DELIVERY 3 Days ☞ P.15

PRICE Without tax

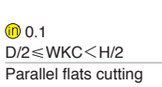
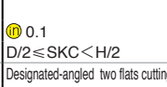
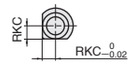
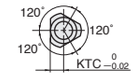
▶Quantity discount rate ☞ P.15

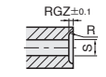
1～4	5～12	13～19	20～50	51～
100%	95%	90%	80%	Enquiry

Code No. Code	D	@/P(1～4P) L 80.00～100.00	L 100.01～120.00	L 120.01～140.00	L 140.01～160.00	L 160.01～180.00	L 180.01～200.00	L 200.01～225.00	L 225.01～250.00	L 250.01～275.00	L 275.01～300.00	L 300.01～325.00	L 325.01～350.00	L 350.01～375.00	L 375.01～400.00	L 400.01～425.00	L 425.01～450.00	L 450.01～475.00	L 475.01～500.00
ELJNPL	4 S1.5	18.3	20.6	21.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4 S2・2.5	10.2	12.2	13.4	15.5	17.8	19.6	–	–	–	–	–	–	–	–	–	–	–	–
	4.5 S1.5	18.3	20.6	21.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4.5 S2・2.5	10.2	12.2	13.4	15.5	17.8	19.6	–	–	–	–	–	–	–	–	–	–	–	–
	5	10.0	10.7	11.3	13.1	15.0	16.1	17.5	19.0	19.9	20.8	–	–	–	–	–	–	–	–
	5.5	10.0	10.7	11.3	13.1	15.0	16.1	17.5	19.0	19.9	20.8	–	–	–	–	–	–	–	–
	6	9.71	10.5	11.2	12.9	14.9	15.6	17.0	18.3	19.2	20.0	26.4	28.1	30.5	32.1	36.7	38.9	–	–
	6.5	9.71	10.5	11.2	12.9	14.9	15.6	17.0	18.3	19.2	20.0	26.4	28.1	30.5	32.1	36.7	38.9	–	–
	7	10.0	10.7	11.5	13.2	15.2	17.0	18.1	19.2	20.0	20.9	26.8	28.4	30.9	32.4	38.1	40.2	–	–
	7.5	10.0	10.7	11.5	13.2	15.2	17.0	18.1	19.2	20.0	20.9	26.8	28.4	30.9	–	–	–	–	–
	8	10.4	11.2	11.8	13.5	15.8	17.4	18.9	20.3	21.4	22.3	27.7	29.5	32.0	33.6	38.1	41.1	43.9	44.5
	10	11.2	11.9	12.7	14.5	16.8	18.4	20.2	22.0	23.0	24.0	29.5	31.2	34.0	35.8	42.0	44.0	47.0	47.4
	12	11.5	12.3	13.2	14.9	17.4	19.2	21.1	22.8	23.9	25.0	30.6	32.4	35.6	39.6	43.1	45.3	47.8	48.7
	15	–	–	–	–	–	22.3	24.3	26.4	27.7	28.9	36.7	39.0	42.8	47.1	55.8	59.0	61.8	62.5
	20	–	–	–	–	–	27.1	29.2	31.2	32.7	34.3	43.6	46.4	50.9	55.9	66.4	70.2	73.7	74.5

ADDITION

Addition details ☞ P.72

Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting (in) 0.1 D/2≤KC<H/2	KC (0.5)	Right-angled three flats cutting (in) 0.1 D/2≤DKC<H/2	DKC (1.4)
Parallel flats cutting (in) 0.1 D/2≤WKC<H/2	WKC (0.9)	Square flats cutting (in) 0.1 D/2≤SKC<H/2	SKC (1.8)
Parallel flats cutting  (in) 0.1 D/2≤KAC,KBC<H/2	KAC (1.4) KBC (1.4)	Designated-angled two flats cutting  KGC: (in) 0.1 AG: (in) 1 D/2≤KGC<H/2 0<AG<360	KGC (1.4)
Right-angled two flats cutting  (in) 0.1 D/2≤RKC<H/2	RKC (0.9)	Three flats cutting at 120°  (in) 0.1 D/2≤KTC<H/2	KTC (1.8)

H dimension alteration (in) 0.1 D≤HC<H	HC (0.6)	Point R processing (in) 0.1 0.3≤RGX≤1.5 RGX≤(D−S)/2−0.1	RGX (9.5)
T dimension alteration (in) 0.1 T/2≤TC<T	TC (0.6)	C-boring on the point (in) 0.1 0.2≤CGZ≤1.0 CGZ≤(D−S)/2−0.1	CGZ (11.8)
Point chamfering  (in) 0.1 0.2≤CGX≤1.5 CGX≤(D−S)/2−0.1	CGX (7.0)	R-boring on the point  (in) 0.1 0.5≤RGZ≤1.0 RGZ≤(D−S)/2−0.1	RGZ (14.2)

Code No.	L	S	KC・WKC…etc.
ELJNPL4 —	105.00 —	S2 —	KC3.5

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

Ejector Sleeves

Stepped Ejector Sleeves

4mm Head Type

T SH7 Tolerance

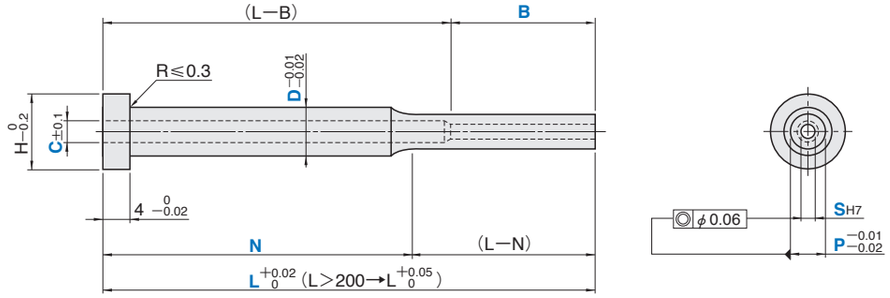
S≤3.0	3.1≤S≤6.0	6.1≤S≤10.0	S≥10.1
$+0.010\ 0$	$+0.012\ 0$	$+0.015\ 0$	$+0.018\ 0$

Range of P dimension

D	P
5～8	P≥S+1.5
9～	P≥S+2.0

Material	Hardness	Applicable center pin shank diameter tolerance	Code
SKD61	(Nitriding) Surface:900HV～ Interior:38～42HRC	−0.01 −0.02	ELNSS

⚠ Range of guaranteed base material hardness ☞ P.243
⚠ Range of guaranteed surface hardness for nitriding ☞ P.243



Code No. Code	D	L (in) 0.01	P (in) 0.01	N (in) 1	S (in) 0.1	C (in) 0.1	Cmax.	N (in) 1	H
ELNSS	5	50.00～250.00	3.50～ 4.95	$N\geqq-\frac{L}{3}$ and $L-N\geqq10$	2.0～ 3.0	C≧S+0.5 and C≦P−1.0	3.5	20～100 L (L−B)min. 50.00～60.00 20 60.01～ 30	8
	5.5		3.50～ 5.45		2.0～ 3.5		4.0		9
	6		4.00～ 5.95		2.0～ 4.0		4.5		
	6.5		4.00～ 6.45		2.0～ 4.5		5.0		10
	7		4.00～ 6.95		2.0～ 5.0		5.5		
	7.5		4.00～ 7.45		2.0～ 5.5		6.0		11
	8	50.00～300.00	4.00～ 7.95		2.5～ 6.0		6.5	20～100 L (L−B)min. 50.00～60.00 20 60.01～70.00 30 70.01～80.00 40 80.01～ 50	
	9		4.50～ 8.95		2.5～ 6.9		7.5		14
	10		4.50～ 9.95		2.5～ 7.9	C≧S+0.5 and C≦P−1.5	8.5		15
	13		5.00～12.95		2.5～10.9		11.5		18
	16		7.00～15.95		2.5～13.0		14.5		21

ORDER

Code No.	L	P	N	S	C	B
ELNSS5 —	100.00 —	P4.00 —	N40 —	S2.0 —	C3.0 —	B30

DELIVERY 3 Days ☞ P.15

PRICE Without tax

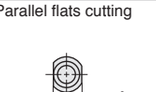
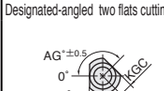
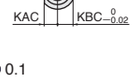
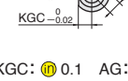
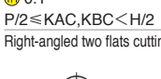
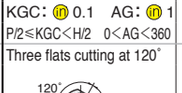
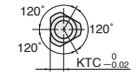
▶Quantity discount rate ☞ P.15

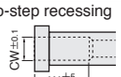
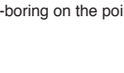
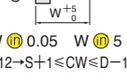
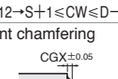
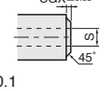
1～4	5～12	13～19	20～50	51～
100%	95%	90%	80%	Enquiry

Code No. Code	D	@/P(1～4P) L50.00～100.00	L100.01～150.00	L150.01～200.00	L200.01～250.00	L250.01～300.00
ELNSS	5	19.8	22.4	26.1	28.0	–
	5.5	21.4	24.0	27.7	31.1	–
	6	18.7	22.0	26.4	29.6	33.1
	6.5	22.0	26.1	31.2	35.5	39.9
	7	19.3	23.0	28.0	31.7	35.5
	7.5	22.4	26.7	32.1	36.4	40.9
	8	19.8	24.0	29.5	33.7	37.8
	9	21.2	25.9	32.0	36.7	41.5
	10	22.0	27.0	33.4	38.4	43.3
	13	23.0	29.0	36.4	42.0	47.5
	16	26.1	32.7	40.6	47.3	53.7

ADDITION

Addition details ☞ P.72

Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting  (in) 0.1 P/2≦KC＜H/2	KC (0.5)	Right-angled three flats cutting  (in) 0.1 P/2≦DKC＜H/2	DKC (1.4)
Parallel flats cutting  (in) 0.1 P/2≦WKC＜H/2	WKC (0.9)	Square flats cutting  (in) 0.1 P/2≦SKC＜H/2	SKC (1.8)
Parallel flats cutting  (in) 0.1 P/2≦KAC,KBC＜H/2	KAC (1.4) KBC (1.4)	Designated-angled two flats cutting  KGC: (in) 0.1 AG: (in) 1 P/2≦KGC＜H/2 0＜AG＜360	KGC (1.4)
Right-angled two flats cutting  (in) 0.1 P/2≦RKC＜H/2	RKC (0.9)	Three flats cutting at 120°  (in) 0.1 P/2≦KTC＜H/2	KTC (1.8)

Add.	Code (@/P)	Add.	Code (@/P)
H dimension alteration  (in) 0.1 P≦HC＜H	HC (0.6)	Point R processing  (in) 0.1 0.3≦RGX≦1.5 RGX≦(P−S)/2−0.1	RGX (9.5)
T dimension alteration  (in) 0.1 2≦TC＜4	TC (0.6)	C-boring on the point  (in) 0.1 0.2≦CGZ≦1.0 CGZ≦(P−S)/2−0.1	CGZ (11.8)
Two-step recessing  CW (in) 0.05 W (in) 5 D≦12→S+1≦CW≦D−1.5 D＞12→S+1≦CW≦D−2.0	CW (M.4.16)	R-boring on the point  (in) 0.1 0.5≦RGZ≦1.0 RGZ≦(P−S)/2−0.1	RGZ (14.2)
Point chamfering  (in) 0.1 0.2≦CGX≦1.5 CGX≦(P−S)/2−0.1	CGX (7.0)		

Code No.	L	P	N	S	C	B	KC・WKC…etc.
ELNSS5 —	100.00 —	P4.00 —	N40 —	S2.0 —	C3.0 —	B30 —	KC2.5

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Stepped Ejector Sleeves

JIS Head Type

T SH7 Tolerance

S≤3.0	3.5≤S≤6.0	6.5≤S≤10.0	S≥10.5
$^{+0.010}_{0}$	$^{+0.012}_{0}$	$^{+0.015}_{0}$	$^{+0.018}_{0}$

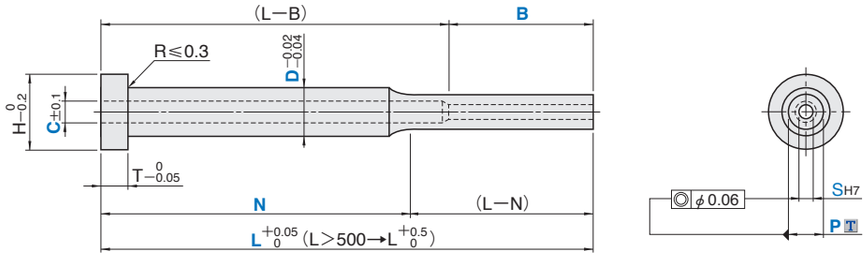
T P Tolerance

P≤12.00	P>12.00
$^{-0.01}_{-0.02}$	$^{-0.01}_{-0.03}$

Material	Hardness	Applicable center pin shank diameter tolerance	Code
SKD61	(Nitriding) Surface:900HV～ Interior:38～42HRC	$^{-0.01}_{-0.02}$	ELJNSS

⚠ Range of guaranteed base material hardness ☞ P.243
⚠ Range of guaranteed surface hardness for nitriding ☞ P.243

L	D5・5.5	D6～7	D7.5～8	D9～20
L≤300	P≥S+1.5	P≥S+1.5	P≥S+1.5	P≥S+2
L>300 and (L−N−10)≤S	−	P≥S+3	P≥S+4	P≥S+4.5
L>300 and (L−N−10)>S	−	P≥S+3 and P−C/2≥0.75	P≥S+4 and P−C/2≥0.75	P≥S+4.5 and P−C/2≥0.75



Code No.		L		P	N	S	C	Cmax.	N	T	H
Code	D	ir 0.01	ir 0.1	ir 0.01	ir 1	ir 0.5	ir 0.5		ir 1		
ELJNSS	5	50.00～300.00	−	3.50～ 4.95	N≥−L/3	2.0～ 3.0	C≥S+0.5 and C≤P−1.0	3.5	20～100 L (L−B)min. 50.00～60.00 20 60.01～ 30	6	9
	5.5			3.50～ 5.45		2.0～ 4.0		4.0			10
	6	50.00～500.00		4.00～ 5.95		2.0～ 4.0		4.5			11
	6.5			4.00～ 6.45		2.0～ 5.0		5.0			
	7			4.00～ 6.95		2.0～ 5.0		5.0			
	7.5			4.00～ 7.45		2.0～ 5.0		5.5			12
	8	70.00～500.00		5.00～ 7.95	L>600 ↓ (L/3≤N≤2/3L)	2.5～ 6.0		6.0	20～100 L−B≥50	8	13
	9			6.00～ 8.95		3.0～ 6.0		7.0			14
	10			6.00～ 9.95		3.0～ 7.0	C≥S+0.5 and C≤P−1.5	8.0			15
	11			7.00～10.95		3.5～ 8.0		9.0			16
	12		500.1～800.0	7.50～11.95		4.0～ 8.5		9.0			17
	13			8.50～12.95		4.0～ 9.0		10.0			18
	14			9.00～13.95		4.0～10.0		11.0			19
	15			10.00～14.95		5.0～10.5		11.0			20
	16	100.00～500.00		10.50～15.95		5.0～11.5		12.0			21
	17			11.00～16.95		5.0～12.0		14.0			22
	18			11.50～17.95		5.0～14.0		15.0			23
	20			13.00～19.95		7.0～16.0		17.0			25

ORDER

Code No.	L	P	N	S	C	B
ELJNSS5 −	150.00 −	P4.80 −	N50 −	S3.0 −	C3.5 −	B40

DELIVERY 3 Days ☞ P.15

⚠ For C=2.5, L−B>290, please enquire.

PRICE Without tax

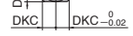
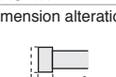
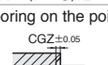
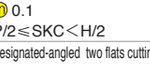
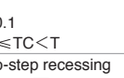
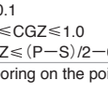
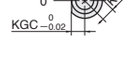
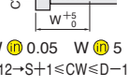
▶Quantity discount rate ☞ P.15

1～4	5～12	13～49	50～100	101～
100%	95%	90%	80%	Enquiry

Code No.		@/P(1～4P)										
Code	D	L 50.00 ～100.00	L 100.01 ～150.00	L 150.01 ～200.00	L 200.01 ～250.00	L 250.01 ～300.00	L 300.01 ～350.00	L 350.01 ～400.00	L 400.01 ～500.00	L 500.1 ～600.0	L 600.1 ～700.0	L 700.1 ～800.0
ELJNSS	5	19.8	22.4	26.1	28.7	31.2	−	−	−	−	−	−
	5.5	21.4	24.0	27.7	30.2	32.8	−	−	−	−	−	−
	6	18.7	22.0	26.4	29.6	33.0	37.8	44.9	52.5	−	−	−
	6.5	22.0	26.1	31.2	35.5	39.6	45.9	54.5	64.3	−	−	−
	7	19.3	23.0	28.0	31.7	35.5	41.2	49.3	58.3	−	−	−
	7.5	22.4	26.7	32.1	36.4	40.8	47.3	56.1	66.4	−	−	−
	8	19.8	24.0	29.5	33.7	38.1	44.6	53.6	63.7	−	−	−
	9	21.2	25.9	32.0	36.7	41.5	48.6	58.4	69.6	−	−	−
	10	22.0	27.0	33.4	38.4	43.3	50.8	61.4	73.0	−	−	−
	11	22.0	27.0	33.4	38.4	43.3	50.8	61.4	73.0	−	−	−
	12	29.0	29.0	36.4	42.0	47.5	56.1	67.7	80.8	102	115	128
	13	29.0	29.0	36.4	42.0	47.5	56.1	67.7	80.8	102	115	128
	14	32.7	32.7	40.6	47.3	53.7	63.6	77.0	92.3	116	128	139
	15	32.7	32.7	40.6	47.3	53.7	63.6	77.0	92.3	116	128	139
	16	33.6	33.6	43.7	48.6	55.2	65.3	79.5	95.6	119	137	164
	17	33.6	33.6	43.7	48.6	55.2	65.3	79.5	95.6	119	137	164
	18	33.6	33.6	43.7	48.6	55.2	65.3	79.5	95.6	119	137	164
	20	37.5	37.5	52.5	52.5	59.9	71.1	87.1	108	141	160	179

ADDITION

Addition details ☞ P.72

Add.	Code (@/P)	Add.	Code (@/P)	Add.	Code (@/P)	Add.	Code (@/P)
Single flat cutting  ir 0.1 P/2≤KC<H/2	KC (0.5)	Right-angled three flats cutting  ir 0.1 P/2≤DKC<H/2	DKC (1.4)	H dimension alteration  ir 0.1 P≤HC<H	HC (0.6)	Point R processing  ir 0.1 0.3≤RGX≤1.5 RGX≤(P−S)/2−0.1	RGX (9.5)
Parallel flats cutting  ir 0.1 P/2≤WKC<H/2	WKC (0.9)	Square flats cutting  ir 0.1 P/2≤SKC<H/2	SKC (1.8)	T dimension alteration  ir 0.1 T/2≤TC<T	TC (0.6)	C-boring on the point  ir 0.1 0.2≤CGZ≤1.0 CGZ≤(P−S)/2−0.1	CGZ (11.8)
Parallel flats cutting  ir 0.1 P/2≤KAC,KBC<H/2	KAC (1.4) KBC (1.4)	Designated-angled two flats cutting  KGC: ir 0.1 AG: ir 1 P/2≤KGC<H/2 0<AG<360	KGC (1.4)	Two-step recessing  CW ir 0.05 W ir 5 D≤12→S+1≤CW≤D−1.5 D>12→S+1≤CW≤D−2.0	CW (M.4.16)	R-boring on the point  ir 0.1 0.5≤RGZ≤1.0 RGZ≤(P−S)/2−0.1	RGZ (14.2)
Right-angled two flats cutting  ir 0.1 P/2≤RKC<H/2	RKC (0.9)	Three flats cutting at 120°  ir 0.1 P/2≤KTC<H/2	KTC (1.8)	Point chamfering  ir 0.1 0.2≤CGX≤1.5 CGX≤(P−S)/2−0.1	CGX (7.0)		

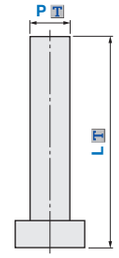
Code No.	L	P	N	S	C	B	KC・WKC…etc.
ELJNSS5 −	150.00 −	P4.80 −	N50 −	S3.0 −	C3.5 −	B40 −	KC2.5

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

STRAIGHT CORE PINS

Guide for Straight Core Pins

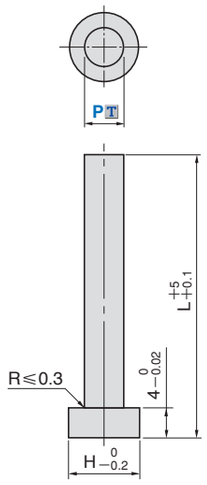
Material	Type	Code	P		L		Delivery	Page
			Dimension	Tolerance	Dimension	Tolerance		
SKH51 59～61HRC	Precision	CPH	0.3～16	$^{0}_{-0.005}$	40・50	$^{+5}_{+0.1}$	In stock	98
		CPLH			60・100		3	
SKD61 40～45HRC	Standard	CPD	1 ～14	$^{0}_{-0.01}$	60	$^{+5}_{+0.1}$	In stock	
SKD61 48～52HRC	Standard	CDH	1 ～16	$^{-0.01}_{-0.02}$	60・100	$^{+5}_{+0.1}$		



Straight Core Pins

General Type

— In stock



Material	Hardness	P T	Code
SKH51	59～61HRC	P +0.005 0	CPH CPLH (Long type)
SKD61	40～45HRC	P +0.01 0	CPD
SKD61	48～52HRC	P −0.01 −0.02	CDH

P	H		
	CPH CPLH	CPD	CDH
0.3～ 0.9	2	—	—
1 ～ 1.5	3	3	3
1.6	3	3	4
1.7～ 2.1	4	4	4
2.2～ 2.6	5	5	5
2.7～ 3.1	6	6	6
3.2～ 4.1	7	7	7
4.2～ 5.1	9	9	8
5.2～ 6.1	10	10	9
6.5～ 7.1	11	11	10
7.5～ 8.1	13	13	11
8.5・ 9	14	—	—
9.5・10	15	15	15
11	16	16	—
12	17	17	—
13	18	—	18
14	19	19	—
16	21	—	21

Material	Code No. Code	P	L	H
SKH51	CPH	0.3 0.4	40	2
		0.5 0.6 0.7 0.8 0.9		
		1 1.1 1.2 1.3 1.4	50	3
		1.5 1.6		
		1.7 1.8 1.9		4
		2		
		2.1		
		2.2 2.3 2.4		5
		2.5		
		2.6		
		2.7 2.8 2.9		6
		3		
		3.1		
		3.2 3.3 3.4		7
		3.5		
		3.6 3.7 3.8 3.9		
		4		
		4.1		
		4.2 4.3 4.4		9
		4.5		
		4.6 4.7 4.8 4.9		
		5		
		5.1		
		5.2 5.3 5.4		10
		5.5		
		5.6 5.7 5.8 5.9		
		6		
		6.1		
		6.5		11
		6.6		
		7		
		7.1		
		7.5 7.6		13
		8		
		8.1		
		8.5		14
		9		
		9.5		15
		10		
		11		16
		12		17
		13		18
		14		19
		16		21

Material	Code No. Code	P	L	H
SKH51	CPLH (Long type)	0.3 0.4	60	2
		0.5		
		0.6 0.7 0.8 0.9	100	3
		1 1.1 1.2 1.3 1.4		
		1.5 1.6		4
		1.7 1.8 1.9		
		2		5
		2.5		6
		3		7
		3.5		
		4		9
		4.5		
		5		10
		5.5		
		6		11
		6.5		
		7		13
		8		
		10		15
		12		17
		13		18
		14		19
		16		21

Material	Code No. Code	P	L	H
SKD61	CPD	1 1.1 1.2 1.3 1.4	60	3
		1.5 1.6		
		1.7 1.8 1.9		4
		2 2.1		
		2.2 2.3 2.4		5
		2.5 2.6		
		2.7 2.8 2.9		6
		3 3.1		
		3.2 3.3 3.4		7
		3.5 3.6 3.7 3.8 3.9		
		4 4.1		9
		4.5 4.6		
		5 5.1		10
		5.5 5.6		
		6 6.1		11
		6.5 6.6		
		7 7.1		13
		7.5 7.6		
		8 8.1		15
		10		16
		11		17
		12		18
		14		19

Material	Code No. Code	P	L	H
SKD61	CDH	1 1.1 1.2 1.3 1.4	60 100	3
		1.5		
		1.6 1.7 1.8 1.9		4
		2		
		2.5		5
		3		6
		3.5		7
		4		
		4.5		8
		5		
		5.5		9
		6		
		6.5		10
		7		
		8		11
		10		15
		13		18
		16		21

ORDER

Code No.	L
CPH1.2	
CPLH2	
CPD3	
CDH4 —	100

DELIVERY

Next In stock working day

CPLH **3** Days ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～49	50～100	101～
100%	95%	Enquiry

Code No. Code	P	@/P (1～49P)
CPH	0.3 0.4	3.89
	0.5	3.42
	0.6	2.25
	0.7	1.95
	0.8 0.9	1.70
	1	1.40
	1.1	1.40
	1.2 1.3 1.4 1.5 1.6	1.28
	1.7 1.8 1.9 2	1.28
	2.1	1.64
	2.2 2.3 2.4	1.64
	2.5	1.40
	2.6	1.64
	2.7 2.8 2.9	1.64
	3	1.46
	3.1	1.95
	3.2 3.3 3.4	1.95
	3.5	1.52
	3.6 3.7 3.8 3.9	1.95
	4	1.64
	4.1	2.20
	4.2 4.3 4.4	2.20
	4.5	1.95
	4.6 4.7 4.8 4.9	2.20
	5	1.95
	5.1	2.20
	5.2 5.3 5.4	2.20
	5.5	2.06
	5.6 5.7 5.8 5.9	2.20
	6	2.06
	6.1	2.49
	6.5	2.20
	6.6	2.49
	7	2.20
	7.1	2.74
	7.5 7.6	2.74
	8	3.05
	8.1	3.28
	8.5 9	3.28
	9.5	3.28
	10	3.71
	11	4.87
	12	5.18
	13	5.55
	14	7.06
	16	7.56

Code No. Code	P	@/P (1～49P)
CPLH	0.3	4.77
	0.4	4.62
	0.5	3.99
	0.6	2.71
	0.7	2.34
	0.8	2.06
	0.9	1.84
	1 1.1	1.71
	1.2～2	1.56
	2.5	1.71
	3	1.78
	3.5	1.92
	4	2.06
	4.5 5	2.34
	5.5 6	2.49
	6.5 7	2.71
	8	3.70
	10	4.55
	12	6.34
	13	6.77
	14	8.62
	16	9.18

Code No. Code	P	@/P (1～49P)
CPD	1	1.16
	1.1	1.03
	1.2	0.92
	1.3～2	0.85
	2.1～2.4	1.28
	2.5	0.92
	2.6～2.9	1.16
	3	0.98
	3.1～3.4	1.77
	3.5	1.34
	3.6～3.9	1.70
	4	1.40
	4.1	1.77
	4.5	1.40
	4.6	1.89
	5	1.52
	5.1	1.89
	5.5	1.64
	5.6	1.89
	6	1.64
	6.1	2.25
	6.5	1.83
	6.6	2.25
	7	1.83
	7.1 7.5 7.6	2.56
	8	1.95
	8.1	3.42
	10	2.49
	11	3.23
	12	3.48
	14	4.75

Code No. Code	P	@/P(1～49P) L60	@/P(1～49P) L100
CDH	1	1.36	1.42
	1.1	1.21	1.28
	1.2	1.07	1.14
	1.3	1.00	1.00
	1.4	1.00	1.00
	1.5	1.00	1.00
	1.6	1.00	1.00
	1.7	1.00	1.00
	1.8	1.00	1.00
	1.9	1.00	1.00
	2	1.00	1.00
	2.5	1.07	1.14
	3	1.14	1.21
	3.5	1.56	1.64
	4	1.64	1.71
	4.5	1.64	1.71
	5	1.78	1.92
	5.5	1.92	2.06
	6	1.92	2.06
	6.5	2.14	2.21
	7	2.14	2.21
	8	2.27	2.34
	10	2.92	3.06
	13	4.27	4.49
	16	5.84	6.12

DATE STAMPS

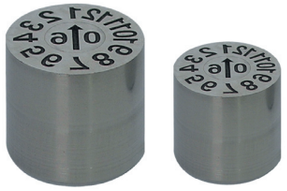
Guide for Date Stamps

Date Stamps Entire Type			Date Stamps Character Designated Type			Date Stamps Character Designated Type		
								
FRYM FRM FR□D FRBL FR6Y FR10Y	P.102	In stock	FRFM FR□M	P.104	7	RS□□	P.105	7

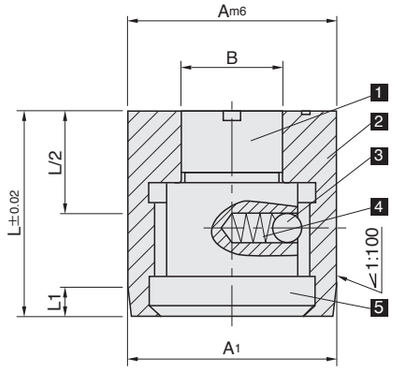
Date Stamps

Entire Type

In stock



Code	Material	Hardness
1 Inner insert	SUS420	43～47HRC
2 Outer ring	SUS420	43～47HRC
3 Steel Ball	SUS420	—
4 Spring	SUS304	—
5 Back plate	SUS420	43～47HRC



⚠ Am6≥L/2 has to be guaranteed

No.	Am6		A1		B	L	L1
4	4	+0.012 +0.004	4	0 −0.02	2	8	≤1
6	6		6		2.9		
8	8	+0.015 +0.006	8		3.9	10	
10	10		10		4.9	12	≤1.5
12	12	+0.018 +0.007	12		5.5	14	
16	16		16		7.4		≤2
20	20	+0.021 +0.008	20		8.7	16	

ORDER

Code No.	Year
FRYM6 —	06
FR31D16	

DELIVERY Next In stock working day ☞ P.15

⚠ FR10Y：7 days

▶ Year･Month type

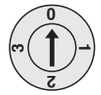
Date marks		Code No. Code	No.	Year	@/P (1～9P)
Year･month		FRYM	4	⚠ Designated the year of inner insert Ex.06 for 2006	78.0
			6		67.0
			8		64.9
			10		68.7
			12		70.3
			16		76.1
			20		81.8

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～9	10～19	20～49	50～100	101～
100%	95%	90%	80%	Enquiry

▶ Month･Day･and Blank Type

Date marks		Code No. Code	No.	@/P (1～9P)
Month		FRM	4	74.6
			6	64.3
			8	62.7
			10	66.1
			12	68.3
			16	71.7
			20	78.4
Day (1st digit)		FR1D	4	72.4
			6	63.1
			8	61.5
			10	66.1
			12	68.3
			16	70.6
			20	76.4
DAY (10th digit)		FR10D	4	65.9
			6	57.7
			8	57.1
			10	59.5
			12	61.7
			16	70.0
			20	74.0
Day		FR31D	12	75.0
			16	77.4
			20	84.6
Blank		FRBL	4	56.1
			6	49.0
			8	47.5
			10	50.6
			12	53.0
			16	58.9
			20	63.7

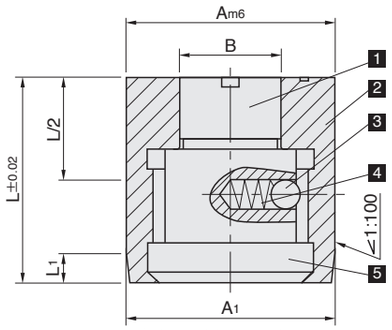
▶ Year selectable type

Date marks		Code No. Code	No.	Year	@/P (1～9P)
Year		FR6Y	4	⚠ designated the start year Ex.06 for 2006～2011	75.8
			6		65.3
			8		63.7
			10		67.1
			12		69.3
			16		72.8
			20		79.6

Date marks		Code No. Code	No.	Year	@/P (1～9P)
Year		FR10Y	4	⚠ designated the start year Ex.06 for 2006～2015	77.0
			6		66.5
			8		64.9
			10		68.3
			12		70.5
			16		74.0
			20		80.6

Date Stamps

Character Designated Type



	Material	Hardness
1 Inner insert	SUS420	43～47HRC
2 Outer ring	SUS420	43～47HRC
3 Steel Ball	SUS420	—
4 Spring	SUS304	—
5 Back plate	SUS420	43～47HRC

⚠ Am6≥L/2 has to be guaranteed

No.	Am6		A1		B	L	L1
4	4	+0.012 +0.004	4	0 −0.02	2	8	≤1
6	6		6		2.9		
8	8	+0.015 +0.006	8		3.9	10	
10	10		10		4.9	12	≤1.5
12	12	+0.018 +0.007	12		5.5	14	
16	16		16		7.4		≤2
20	20	+0.021 +0.008	20		8.7	16	

PRICE Without tax ▶Quantity discount rate ☞ P.15

1～9	10～19	20～49	50～100	101～
100%	95%	90%	80%	Enquiry

DELIVERY **7** Days ☞ P.15

ORDER

Code No.	engraved characters
FRFM6 —	06

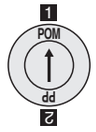
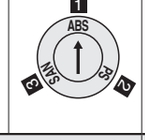
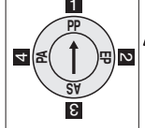
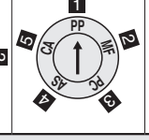
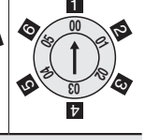
ORDER

Code No.	1 Char	2 Chars	3 Chars	4 Chars	5 Chars	6 Chars
FR6M20 —	05 —	06 —	07 —	08 —	09 —	10
FR2M4 —	AS —	ABS				

▶ Inner insert character designated type

Date marks	Code No. Code	No.	Characters for engraving 2 Chars	@/P (1～9P)
	FRFM	4	Numbers 0～9 Alphabet A～Z	86.2
		6		74.0
		8		73.0
		10		76.1
		12		77.1
		16		81.2
		20		87.3

▶ Outer ring character designated type

Material marks				
FR2M(2 positions)	FR3M(2 positions)	FR4M(2 positions)	FR5M(2 positions)	FR6M(2 positions)
				
1～3 characters can be engraved at each position		1～2 characters can be engraved at each position		

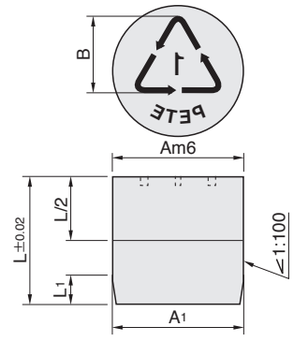
▶ Year･month type

Code No. Code	No.	Characters for engraving	@/P(1～9P) 2M	3M	4M	5M	6M
FR2M FR3M FR4M	4	Numbers 0～9 Alphabet A～Z	73.0	81.2	89.3	—	—
	6		71.1	79.2	87.3	—	—
	8		74.6	81.2	89.3	—	—
FR2M FR3M FR4M FR5M FR6M	10		74.6	83.3	91.4	102	108
	12		79.2	85.3	93.4	105	110
	16		81.2	86.2	94.5	108	112
	20		89.3	93.4	102	114	118

▶ Actual dimension for character engraving(FRFM)

No.4 No.6 No.8 No.10 No.12 No.16 No.20

Recycle Mark Stamps



Material	Hardness	Code
SUS420	48～52HRC	RS□□

⚠ Am6≥L/2 has to be guaranteed

Code No. Code	No.	Am6		A1		B	L	L1	@/P (1～9P)
RS□□	4	4	+0.012 +0.004	4	0 −0.02	2.5	8	≤1	27.5
	6	6		6		4.0			25.8
	8	8	+0.015 +0.006	8		5.0	10		20.6
	10	10		10		6.0	12	≤1.5	22.3
	12	12	+0.018 +0.007	12		7.5	14		24.3
	16	16		16		10		≤2	27.1
	20	20	+0.021 +0.008	20		12	16		34.9

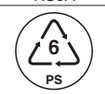
PRICE Without tax ▶Quantity discount rate ☞ P.15

1～9	10～19	20～49	50～100	101～
100%	95%	90%	80%	Enquiry

DELIVERY **7** Days ☞ P.15

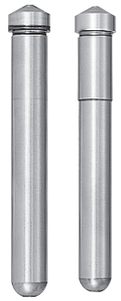
ORDER

Code No.
RS1A6

Applicable Resins	USA SPI Specification	Germany and France Specification	
Type	RS1A	RS1E	
PETE			
Type	RS2A	RS2E	
HDPE（High density polyethylene）			
Type	RS3A	RS3E	
PVC（Polyvinyl chloride）			
Type	RS4A	RS4G（Germany）	RS4F（France）
LDPE（Low density polypropylene ）			
Type	RS5A	RS5A（Same as SPI specification）	
PP（Polypropylene）			
Type	RS6A	RS6A（Same as SPI specification）	
PS（Polystyrene）			
Type	RS7A	RS7E	
Other material			

ANGULAR PINS

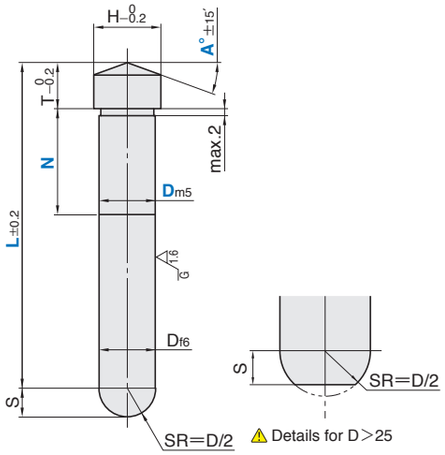
Guide for Angular Pins

Angular Pins			Angular Pins Economy type		
					
AAP AAPS	P.108	3	AAPZ AAPZS	P.111	3

Angular Pins

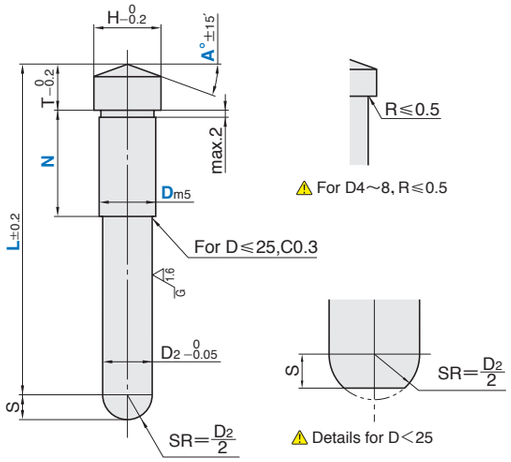
Material	Hardness	D	Code
SKD61	60～63HRC	4～ 8	AAP AAPS (Stepped type)
SUJ2	58HRC～ (High-frequecy quenching)	10～50	

AAP



⚠ Details for D＞25

Stepped type AAPS



⚠ For D4～8, R≤0.5

⚠ Details for D＜25

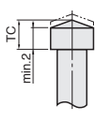
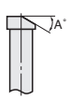
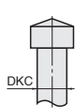
⚠ Profile surface of SR ⌓ 0.3
⚠ D50→A° ±30′
⚠ For D＞10, center hole may on both ends of the pin.
⚠ D2=D−1

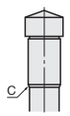
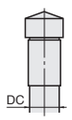
ORDER

Code No.	L	N	A
AAP20 —	180.0 —	N40.0	A12
AAPS16 —	180.0 —	N0	A12

DELIVERY 3 Days ☞ P.15

ADDITION

Add.	Code (@/P)	Spec.
T Dimension alteration 	TC (1.4)	ⓘ 0.1 TC≥(H/2)tanA+2.0 Minimum TC is calculated with above formula and round off to first place of decimals. ⚠ Overall length is a designated dimension. TC=(19/2)tan12°+2.0=4.019→4.1
Single angled surface cutting 	KAC D / @/P 4～25 / 1.4 30 / 2.4	Change head cone into a single angled surface ⚠ D≤30 is available
Press-in lead tolerance alteration 	DKC D / @/P 4～16 / 0.9 20・25 / 1.4 30 / 2.4	Dm5→D +0.005 0 ⚠ D≤30 is available ⚠ N≤200 is available

Add.	Code (@/P)	Spec.
Chamfer at step part 	CM (1.8)	⚠ For AAPS, D≤30 is available ⚠ Chamfer according to standard value for D≤25.
Shank diameter D2 alteration 	DC D / @/P 4～16 / 0.9 20・25 / 1.4 30 / 2.4	ⓘ 0.1 D2＜DC≤(D−0.1) ⚠ Stepped shank diameter tolerance +0.005 0 ⚠ For addition DC,SR=DC/2 ⚠ For AAPS, D≤30 is available

ORDER

Code No.	L	N	A	TC・CM・DKC・DC・KAC
AAPS16 —	180.0 —	N40.0	A12 —	DC15.6—DKC—KAC

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

Code No.	L	N	A	D	m5	f6 (AAP)	S AAP	S AAPS	T	H	@/P(1～9P) AAP	@/P(1～9P) AAPS
Code	D	ⓘ 0.01		ⓘ 1								
AAP AAPS (Stepped type)	4	15.0～ 70.0	2≤N N≤L−T−1 or N=0 (no press-in lead)	0～30	4	+0.009 +0.004	−0.010 −0.018	2	1.5	5	7	5.77	7.95
		70.1～ 90.0										6.73	8.52
	5	15.0～ 70.0			5			2.5	2		8	6.09	7.95
		70.1～ 90.0										6.73	9.17
		90.1～100.0										9.74	12.8
	6	15.0～ 70.0			6			3	2.5		9	6.09	8.52
		70.1～ 90.0										6.73	9.17
		90.1～110.0										9.74	12.8
	8	15.0～ 80.0			8	+0.012 +0.006	−0.013 −0.022	4	3.5		11	6.73	8.52
		80.1～110.0										7.30	9.74
		110.1～130.0										10.4	13.4
	10	20.0～110.0			10			5	4.5		13	7.95	9.74
		110.1～160.0										8.52	11.0
		160.1～200.0										12.2	14.6
	12	20.0～110.0			12			6	5.5	10	15	7.95	10.4
		110.1～160.0										9.17	11.6
		160.1～200.0										9.74	12.2
		200.1～250.0										13.4	17.0
	13	20.0～110.0			13			6.5	6		16	7.95	10.4
		110.1～160.0										9.17	11.6
		160.1～200.0										9.74	12.2
		200.1～250.0				+0.015 +0.007	−0.016 −0.027					13.4	17.0
	15	20.0～110.0			15			7.5	7		18	9.17	11.6
		110.1～160.0										9.74	11.8
		160.1～200.0										10.4	12.2
		200.1～250.0										14.0	17.0
	16	20.0～110.0			16			8	7.5		19	9.17	11.6
		110.1～160.0										9.74	11.8
		160.1～200.0										10.4	12.2
		200.1～250.0										14.0	17.0
	20	40.0～130.0			20				9.5		23	10.4	12.2
		130.1～200.0										11.6	14.0
		200.1～300.0										14.0	16.4
		300.1～350.0										29.8	33.4
	25	40.0～130.0			25	+0.017 +0.008	−0.020 −0.033				28	12.2	14.6
		130.1～200.0										14.0	15.8
		200.1～300.0										17.0	18.1
		300.1～350.0										33.4	36.5
	30	60.0～160.0			30			10	10	15	35	32.3	34.0
		160.1～220.0										34.0	35.9
		220.1～300.0										35.9	37.7
		300.1～400.0										42.5	45.6
		400.1～500.0										49.9	53.0
	32	70.0～160.0			32						37	33.4	35.3
		160.1～220.0										35.3	37.7
		220.1～300.0										37.7	40.2
		300.1～400.0										45.0	48.1
		400.1～500.0										52.3	55.3
	35	100.0～160.0			35						40	34.8	37.1
		160.1～220.0										36.5	38.4
		220.1～300.0										38.9	41.4
		300.1～400.0				+0.020 +0.009	−0.025 −0.041					46.2	48.6
		400.1～500.0										53.4	55.9
	40	100.0～160.0			40						45	36.5	38.4
		160.1～220.0										38.4	40.8
		220.1～300.0										40.8	42.5
		300.1～400.0										48.6	51.1
		400.1～500.0										55.9	58.4
	50	200.0～260.0			50					20	55	68.9	71.2
		260.1～320.0										73.0	75.5
		320.1～400.0										78.6	80.9
		400.1～500.0										84.6	87.0

PRICE Without tax ▶Quantity discount rate ☞ P.15

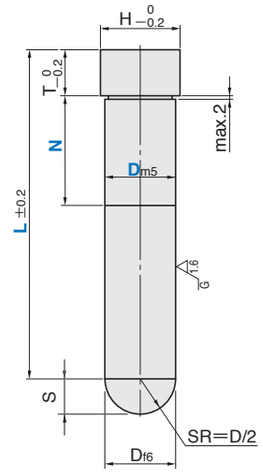
1～9	10～19	20～29	30～50	51～
100%	95%	90%	80%	Enquiry

Angular Pins

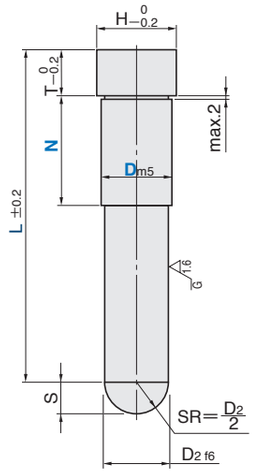
Economy Type

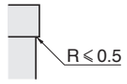
Material	Hardness	D	Code
SKD61	60～63HRC	8	AAPZ AAPZS (Stepped type)
SUJ2	58HRC～ (High-frequecy quenching)	10～20	

AAPZ



Stepped type AAPZS





⚠ Details for D＞25

⚠ Profile tolerance of SR ⌓ 0.3

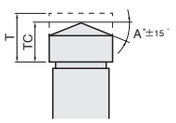
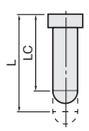
⚠ D2=D−1

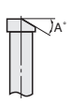
ORDER

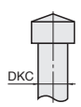
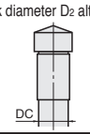
Code No.	L	N
AAPZ10 —	80 —	N25.0

DELIVERY 3 Days ☞ P.15

ADDITION

Add.	Code (@/P)	Spec.
Change flat head end into a cone and reduce T dimension 	ATC (1.4)	A: ㊟ 1 10≤A≤30 TC: ㊟ 0.1 2.0≤TC≤T、TC≥(H/2)tanA+2.0 Minimum TC is calculated with above formula and round off to first place of decimals. ⚠ Overall length is shortened according to (T−TC). When LC is applied, L is equal to LC. TC=(19/2)tan12° +2.0=4.019→4.1 ATC−A20−TC8.0
L dimension alteration 	LC (0.9)	㊟ 0.1 D: 8 — LC: 40＜LC＜110 D: 10 — LC: 40＜LC＜110 D: 12 — LC: 50＜LC＜130 D: 13 — LC: 50＜LC＜130 D: 15 — LC: 70＜LC＜140 D: 16 — LC: 70＜LC＜140 D: 20 — LC: 90＜LC＜180

Add.	Code (@/P)	Spec.
Single angled surface cutting 	KAC (1.4)	Cutting a single angled surface ㊟ 1 0≤A≤30 ☒ Combined with ATC・TTC are not available. KAC−A20
T Dimension alteration 	TTC (0.9)	㊟ 0.1 2.0≤TTC≤T ⚠ Overall length is shortened according to (T−TTC). When LC is applied, L is equal to LC.

Add.	Code (@/P)	Spec.
Press-in lead tolerance alteration 	DKC D: 8～16 — @/P: 0.9 D: 20 — @/P: 1.4	Dm5→D +0.005 0
Shank diameter D2 alteration 	DC D: 8～16 — @/P: 0.9 D: 20 — @/P: 1.4	㊟ 0.1 D−1＜DC≤D−0.1 ⚠ Stepped shank tolerance f6 ⚠ AAPZS is available

Code No.	L (C)	N	ATC・KAC・TTC・DKC・DC
AAPZS10 —	LC68.0 —	N30.0 —	ATC−A20−TTC9.2−DKC−DC9.5

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

Code No. Code	D	L	N ㊟ 0.1	D	m5	f6	T	H	@/P(1～9P) AAPZ	@/P(1～9P) AAPZS
AAPZ AAPZS (Stepped type)	8	40	2≤N N≤L−T−1 or N=0 (no press-in lead)	8	+0.012 +0.006	−0.013 −0.022	5	11	4.12	5.98
		50							4.12	5.98
		60							5.12	6.98
		70							5.12	6.98
		80							5.12	6.98
		90							7.40	9.25
		100							7.40	9.25
		110							7.40	9.25
	10	40		10			10	13	4.12	5.98
		50							4.12	5.98
		60							5.12	6.98
		70							5.12	6.98
		80							5.12	6.98
		90							7.40	9.25
		100							7.40	9.25
		110							7.40	9.25
	12	50		12				15	5.55	7.70
		60							6.12	8.25
		70							6.12	8.25
		80							6.12	8.25
		90							7.98	10.2
		100							7.98	10.2
		110							7.98	10.2
		120							7.98	10.2
		130							10.2	12.3
	15	50		13	+0.015 +0.007	−0.016 −0.027		16	5.55	7.70
		60							6.12	8.25
		70							6.12	8.25
		80							6.12	8.25
		90							7.98	10.2
		100							7.98	10.2
		110							7.98	10.2
		120							7.98	10.2
		130							10.2	12.3
	15	70		15			13	18	7.98	10.9
		80							7.98	10.9
		90							9.25	12.2
		100							9.25	12.2
		110							9.25	12.2
		120							9.25	12.2
		130							11.0	13.9
		140							11.0	13.9
	16	70		16				19	7.98	10.9
		80							7.98	10.9
		90							9.25	12.2
		100							9.25	12.2
		110							9.25	12.2
		120							9.25	12.2
		130							11.0	13.9
		140							11.0	13.9
	20	90		20	+0.017 +0.008	−0.020 −0.033		23	11.2	15.3
		100							11.2	15.3
		110							11.2	15.3
		120							11.2	15.3
		130							13.6	17.8
		140							13.6	17.8
		150							13.6	17.8
		160							13.6	17.8
		170							16.1	20.3
		180							16.1	20.3

PRICE Without tax ▶Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	80%	Enquiry

SPRUE BUSHINGS
LOCATING RINGS

Guide for Sprue Bushings / Locating Rings

Sprue Bushings Standard・10mm Flange Type	Sprue Bushings Standard・10mm Flange Type	Sprue Bushings Shoulder Type
		
SSBB□−B P.114 4	SSBB□ SSBG□ P.116 3	SSBS□ SSBT□ P.118 4

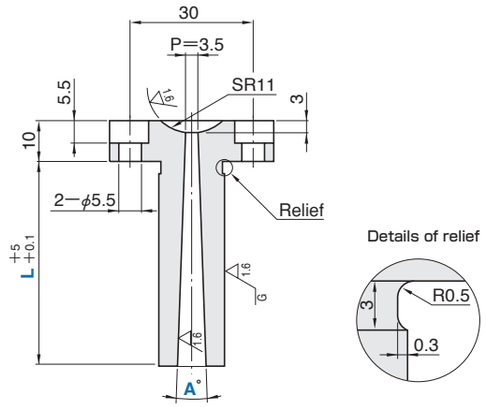
Locating Rings	Locating Rings
	
LLRBD LLRBS LLRBF LLRBW P.120 In stock	LLRSS LLRSD P.122 In stock

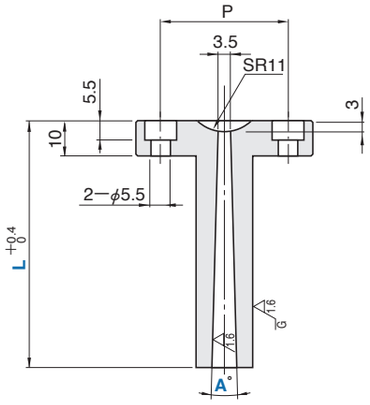
Sprue Bushings

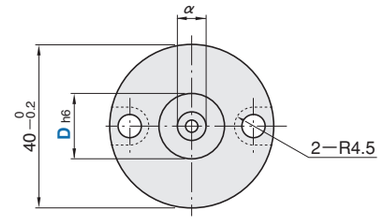
Standard・10mm Flange Type

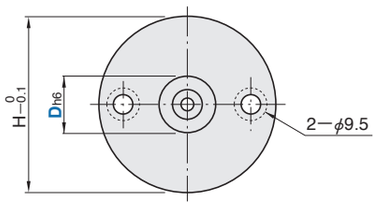
Material Hardness	Code
	Standard type
HPM1 37～43HRC	SSBBP－B
SKD61 48～52HRC	SSBBK－B
SKD11 58～62HRC	SSBBS－B

Accessory：CCB5－12（2 pcs）









⚠ α is decided by L dimension.

Material	Code No. Code	D	L			A	Dh6	
S45C **SKD61** **SKD61**	Standard type SSBBP－B SSBBK－B SSBBS－B	10	40	60	80	2 3	10	0 −0.009
		13					13	0 −0.011
		16					16	

⚠（α Calculation formula）$\alpha = 3.5 + 2(L+7)\tan\frac{A}{2}$

ORDER

Code No.	L	A
SSBBP－B 16 －	80 －	A3

DELIVERY 4 Days ☞ P.20

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～4	5～9	10～14	15～20	21～
100%	95%	90%	80%	Enquiry

L	@/P(1～4P) Standard type HPM1 SSBBP－B	SKD61 SSBBK－B	SKD61 SSBBS－B
40	29.2	32.4	42.3
60	38.3	40.2	53.1
80	50.0	51.2	67.5

ADDITION

Spec.	Code(@/P)	Spec.	Code(@/P)	Spec.	Code(@/P)	Add.	Spec.
	AIW(4.8)		AHW(4.8)		AXW(8.6)	Shape cutting for channel opening：A type A shape（Trapezium） 	⚠ LC can be designated only. ⚠ For C(T,J,L,P)Q,(α－0.4)≧W ☒ MSBA is not available. AIW6
	ATW(9.5)		AJW(9.5)				
	ALW(7)		APW(7)				
	BIR(4.8)		BHR(9.2)		BXR(8.6)	Shape cutting for channel opening：B type B shape（Semicircle） 	⚠ LC can be designated only. ⚠ For C(T,J,L,P)Q,(α－0.4)≧2×R ☒ MSBA is not available. BXR3
	BTR(9.5)		BJR(9.5)				
	BLR(7)		BPR(7)				
	CIQ(4.8)		CHQ(4.8)		CXQ(8.6)	Shape cutting for channel opening：C type C shape（Arc＋tangent） 	⚠ LC can be designated only. ⚠ For C(T,J,L,P)Q,(α－0.4)≧Q×1.09 ☒ MSBA is not available. CTQ4
	CTQ(9.5)		CJQ(9.5)				
	CLQ(7)		CPQ(7)				

Range of dimension W

W	t
3	2.5
4	3
5	3.5
6	4
8	5.5
10	7

Range of dimension R

R
1
1.25
1.5
1.75
2
2.25
2.5
3
3.5
4

Range of dimension Q

Q
2
2.5
3
3.5
4
5
6
8

Add.	Code(@/P)	Spec.
L dimension alteration	LC(0.9)	㎜ 0.1 ⚠ For combined with LKC, L can be ㎜ 0.01 40≦LC≦80 ⚠ For addition LC,$L^{+5}_{+0.1}\rightarrow L^{+0.1}_{0}$ ☒ MSBA is not available
		㎜ 0.1 20≦LC≦80 ⚠ For addition LC,$L^{+0.4}_{0}\rightarrow L^{+0.1}_{0}$ ☒ MSBA is available

Add.	Code(@/P)	Spec.
L dimension tolerance alteration	LKC(2.8)	$L^{+5}_{+0.1}\rightarrow L^{0}_{-0.02}$ ⚠ For L40, L60, L80.combined use with LC is not necessory. ☒ MSBA is not available

Code No.	L(C)	A	AIW・AHW・AXW…etc.
SSBBP－B 10 －	LC75.0 －	A2 －	AIW3

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Sprue Bushings

Standard・10mm Flange Type

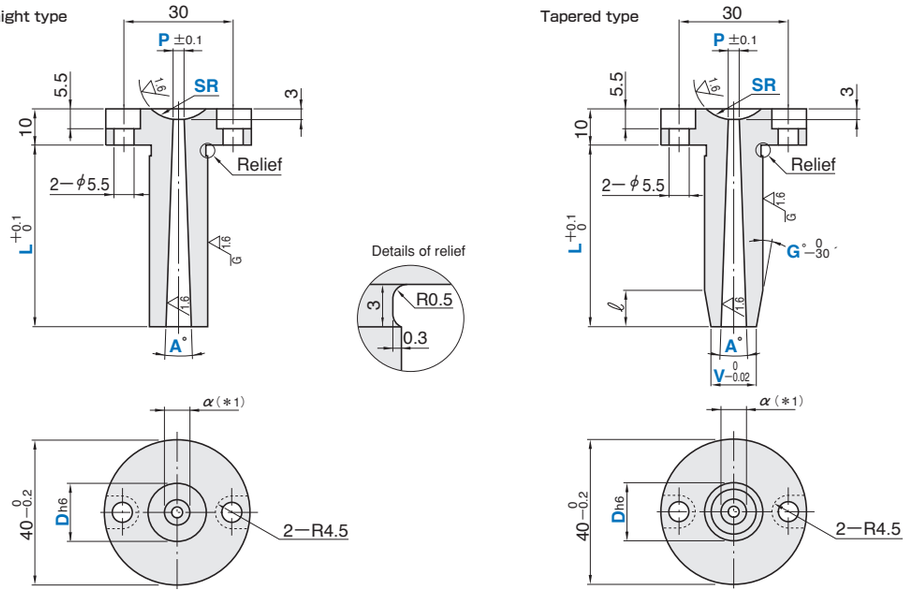
Material Hardness	Code Standard type
HPM1 37～43HRC	SSBBP
SKD61 48～52HRC	SSBBK
SKD11 58～62HRC	SSBBS

Accessory：CCB5－12（2 pcs）

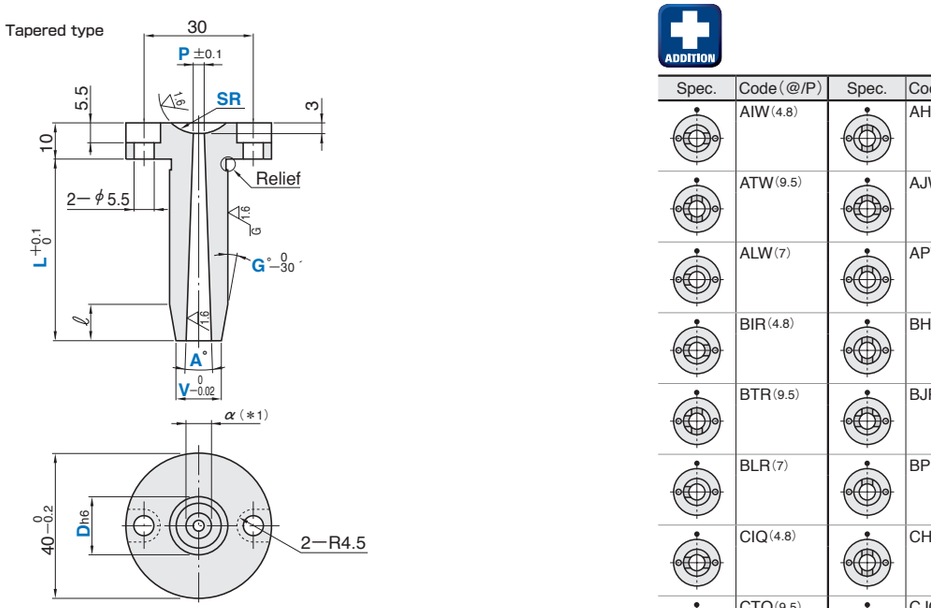
Material Hardness	Code Standard type
HPM1 37～43HRC	SSBGP
SKD61 48～52HRC	SSBGK
SKD11 58～62HRC	SSBGS

Accessory：CCB5－12（2 pcs）

Straight type



Tapered type



Material	Code No. Code	D	0.1 L(＊2)	0.5 SR	0.5 P(＊3)	0.5 A	0.1 V	1 G	Dh6	
	Straight type Standard type	8	0～100.0	0 10.5 11～21	2～3.5	0.5～3			8	0 −0.009
S45C SKD61 SKD61	SSBBP SSBBK SSBBS	10	0～150.0						10	
	Tapered type Standard type	13		0 10.5～21	2～8	0.5～4	D>V≧α＋2 ⚠Tapered type is available.	1～10 ⚠Tapered type is available.	13	0 −0.011
S45C SKD61 SKD61	SSBGP SSBGK SSBGS	16	0～190.0						16	
		20							20	0 −0.013

⚠（＊1）Dimension α is calculated by formula.

⚠（＊2）Dimension L is restricted by P,V,A. G is restricted by L.

⚠ Machining range Straight type D－α≧2

（α calculation formula）$\alpha = P + 2\{L + (U) + 12\}\tan\frac{A}{2}$

U：For addition ZC

Tapered type V－α≧2 L－ℓ≧3

（ℓ calculation formula）$\ell = \frac{D - V}{2\tan(G - 0.25)}$ ※0.25 is a factor for G tolerance

ORDER

Code No.	L	SR	P	A	V	G
SSBBP 10	－ 50.0	－ SR11	－ P3.5	－ A2		

DELIVERY 3 Days ☞ P.20

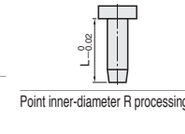
PRICE Without tax

▶Quantity discount rate ☞ P.15

1～4	5～9	10～14	15～20	21～
100%	95%	90%	80%	Enquiry

L	@/P(1～4P) Straight type Standard type HPM1 SSBBP	SKD61 SSBBK	SKD61 SSBBS	Tapered type Standard type HPM1 SSBGP	SKD61 SSBGK	SKD61 SSBGS
0 ～ 20.0	23.3	27.1	36.4	27.1	31.2	41.5
20.1～ 40.0	31.8	35.6	46.7	35.6	39.6	51.2
40.1～ 60.0	42.3	46.1	59.0	46.7	50.6	64.9
60.1～ 80.0	55.2	59.0	74.8	59.6	63.6	80.5
80.1～100.0	63.0	77.3	96.7	67.3	82.4	103
100.1～120.0	72.3	88.9	114	77.7	95.3	120
120.1～140.0	91.5	113	131	97.7	121	137
140.1～160.0	106	127	147	108	134	154
160.1～180.0	224	269	309	227	282	323
180.1～190.0	236	283	325	238	296	339

ADDITION

Spec.	Code(@/P)	Spec.	Code(@/P)	Spec.	Code(@/P)	Add.	Spec.
	AIW(4.8)		AHW(4.8)		AXW(8.6)	Shape cutting for channel opening：A type A shape（Trapezium） 	⚠ For C(T,J,L,P)Q,(α－0.4)≧W ☒ Combined with ZC is not available. ☒ Combined with RC is not available. AIW6
	ATW(9.5)		AJW(9.5)				
	ALW(7)		APW(7)				
	BIR(4.8)		BHR(9.2)		BXR(8.6)	Shape cutting for channel opening：B type B shape（Semicircle）	⚠ For B(T,J,L,P)R,(α－0.4)≧2×R ☒ Combined with ZC is not available. ☒ Combined with RC is not available. BXR3
	BTR(9.5)		BJR(9.5)				
	BLR(7)		BPR(7)				
	CIQ(4.8)		CHQ(4.8)		CXQ(8.6)	Shape cutting for channel opening：C type C shape（Arc＋tangent）	⚠ For C(T,J,L,P)Q,(α－0.4)≧Q×1.09 ☒ Combined with ZC is not available. ☒ Combined with RC is not available. CTQ4
	CTQ(9.5)		CJQ(9.5)				
	CLQ(7)		CPQ(7)				

Range of dimension W

W	t
3	2.5
4	3
5	3.5
6	4
8	5.5
10	7

Range of dimension R

R
1
1.25
1.5
1.75
2
2.25
2.5
3
3.5
4

Range of dimension Q

Q
2
2.5
3
3.5
4
5
6
8

Add.	Code(@/P)	Spec.
Bolt holes number alteration	BC(2.4)	Bolt holes changed from 2 to 4.（4 screws included） ☒ Combined with NC is not available.
Bolt hole cancelling	BN(－2.5)	Bolt holes changed from 2 to 0.（No screws） ⚠ HPM1 is available only
Dowel hole boring	NC(0.9)	－
Bolt hole location alteration K□□(0)		Rotating 45 degree

Add.	Code(@/P)	Spec.
Runner pulling tip machining	ZC(4.8)	S,T,U：0.1 Straight type S≧α＋2 α＋2≦T≦D 2≦U≦5 Lmax≧L＋U Tapered type S≧α＋2 α＋2≦T≦V－2UtanG 2≦U≦5 Lmax≧L＋U ZC－S3.2－T4.0－U2.5 ☒ D8 is not availale.
G tolerance alteration	GKC(8.6)	For tapered type $G^{0}_{-30'} \rightarrow G^{0}_{-15'}$ ⚠ Tapered type ℓ≦15 and (L－ℓ)≧10 are available. ☒ Combined with ZC is not available.
L tolerance alteration	LKC( )	$L^{+0.1}_{0} \rightarrow L^{0}_{-0.02}$ ⚠ For combined with LKC, L can be 0.01 ☒ Combined with ZC is not available.
Point inner-diameter R processing	RC(3.7)	⚠ α≧5 is availabe. ⚠ Straight type：D－α－(2×RC)>2 ⚠ Tapered type：V－α－(2×RC)>2 ☒ Combined with shape A・B・C are not available ☒ Combined with ZC is not available.

Range of dimension R

R
1
2

Code No.	L	SR	P	A	V	G	AIW・AHW・・・etc.
SSBGP 10	－ 50.25	－ SR11	－ P3.5	－ A2	－ V8.0	－ G5	－ AIW3－LKC－BC

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

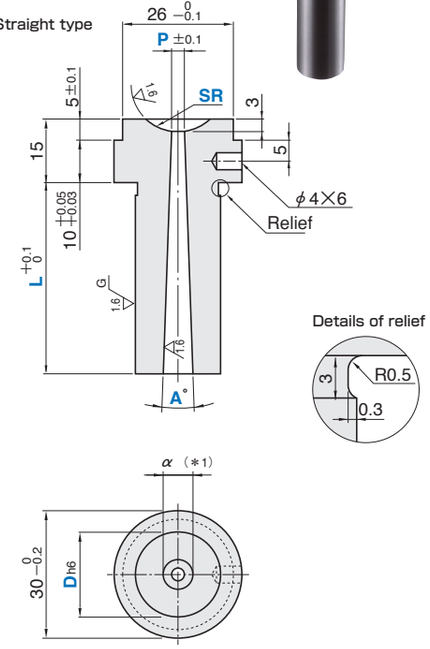
Sprue Bushings

Shoulder Type

Material Hardness	Code Standard type
HPM1 37～43HRC	SSBSM
SKD61 48～52HRC	SSBSD
SKD11 58～62HRC	SSBSS

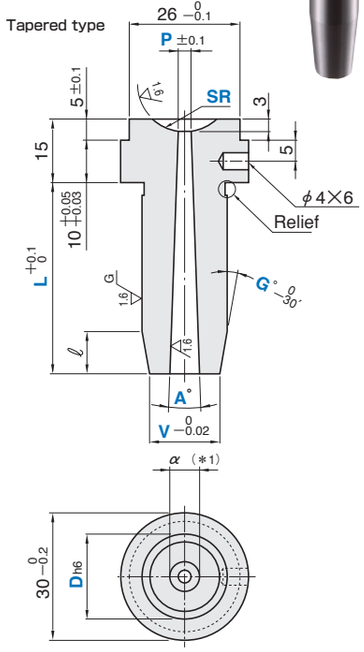
Material Hardness	Code Standard type
HPM1 37～43HRC	SSBTM
SKD61 48～52HRC	SSBTD
SKD11 58～62HRC	SSBTS

Straight type



Details of relief

Tapered type



Material	Code No. Code	D	㎜ 0.1 L(＊2)	㎜ 0.5 SR	㎜ 0.5 P(＊3)	㎜ 0.5 A	㎜ 0.1 V	㎜ 1 G	Dh6	
S45C SKD61 SKD61	Straight type Standard type SSBSM SSBSD SSBSS	8	0～100.0	0 10.5 11～23	2～3.5	0.5～3			8	0 −0.009
		10	0～150.0						10	
		13					D＞V≧α＋2	1～10	13	0 −0.011
S45C SKD61 SKD61	Tapered type Standard type SSBTM SSBTD SSBTS	16		0 10.5～23	2～8	0.5～4	⚠ For tapered type only	⚠ For tapered type only	16	
		20	0～185.0						20	0 −0.013
		25							25	

⚠ (＊1)Dimension α is calculated by formula.
⚠ (＊2)Dimension L is restricted by P,V,A. G is restricted by L.

⚠ Machining range Straight type D−α≧2

(Calculation formula α) $\alpha = P+2\{L+(U)+12\}\tan\frac{A}{2}$

U:For addition ZC

Cone type V−α≧2 L−ℓ≧3

(Calculation formula ℓ) $\ell = \frac{D-V}{2\tan(G-0.25)}$ ※0.25 is a factor for G tolerance

ORDER

Code No.	L	SR	P	A	V	G
SSBSD 10	50.3	SR11	P3.5	A2		
SSBTM 10	50.5	SR11	P3.5	A2	V8.0	G5

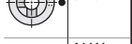
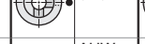
DELIVERY 4 Days ☞ P.15

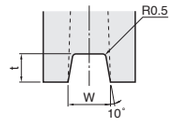
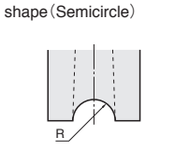
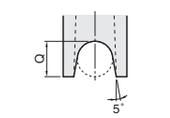
PRICE Without tax ▶Quantity discount rate ☞ P.15

1～4	5～9	10～14	15～20	21～
100%	95%	90%	85%	Enquiry

L	@/P(1～4P) Straight type Standard type S45C SSBSM	Straight type Standard type HPM1 SSBSD	Straight type Standard type SKD61 SSBSS	Cone type Standard type S45C SSBTM	Cone type Standard type HPM1 SSBTD	Cone type Standard type SKD61 SSBTS
0 ～ 20.0	24.0	27.1	32.4	27.8	31.2	37.7
20.1～ 40.0	31.8	35.0	42.3	35.6	38.9	46.7
40.1～ 60.0	41.5	44.8	53.9	46.1	49.3	59.0
60.1～ 80.0	53.1	56.5	67.5	57.7	61.1	73.4
80.1～100.0	59.5	72.7	87	64.0	77.8	93.6
100.1～120.0	69.5	85.6	102	75.0	92.3	110
120.1～140.0	87.1	108	117	93.7	115	125
140.1～160.0	101	124	132	109	130	141
160.1～180.0	212	263	277	228	274	295
180.1～185.0	217	270	284	233	282	302

ADDITION

Spec.	Code (@/P)	Spec.	Code (@/P)	Spec.	Code (@/P)	Spec.	Code (@/P)
	AIW (4.8)		AHW (4.8)		AXW (8.6)		AEW (9.5)
	ATW (9.5)		AJW (9.5)		AKW (9.5)		ACW (7)
	ALW (7)		APW (7)		AUW (7)		
	BIR (4.8)		BHR (4.8)		BXR (8.6)		BER (9.5)
	BTR (9.5)		BJR (9.5)		BKR (9.5)		BCR (7)
	BLR (7)		BPR (7)		BUR (7)		
	CIQ (4.8)		CHQ (4.8)		CXQ (8.6)		CEQ (9.5)
	CTQ (9.5)		CJQ (9.5)		CKQ (9.5)		CCQ (7)
	CLQ (7)		CPQ (7)		CUQ (7)		

Add.	Spec.
Shape cutting for channel opening:A type A shape(Trapezium) 	⚠ Combined with ZC is not available. ⚠ Combined with RC is not available. ⚠ For A(T,J,K,E,L,P,U,C)W,(α−0.4)≧W AIW6
Shape cutting for channel opening:B type B shape(Semicircle) 	⚠ Combined with ZC is not available. ⚠ Combined with RC is not available. ⚠ For B(T,J,K,E,L,P,U,C)R,(α−0.4)≧2×R BXR3
Shape cutting for channel opening:C type C shape(Arc+tangent) 	⚠ Combined with ZC is not available. ⚠ Combined with RC is not available. ⚠ For C(T,J,L,P)Q,(α−0.4)≧Q×1.09 CTQ4

Range of dimension W

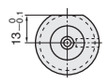
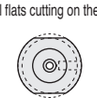
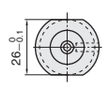
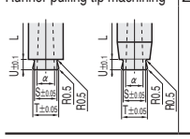
W	t
3	2.5
4	3
5	3.5
6	4
8	5.5
10	7

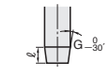
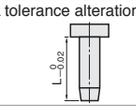
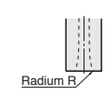
Range of dimension R

R
1
1.25
1.5
1.75
2
2.25
2.5
3
3.5
4

Range of dimension Q

Q
2
2.5
3
3.5
4
5
6
8

Add.	Code (@/P)	Spec.
One flat cutting on the head 	KC (0.9)	
Parallel flats cutting on the head 	WKC (1.8)	
Runner pulling tip machining 	ZC (4.8)	S,T,U:㎜ 0.1 Straight type S≧α+2 α+2≦T≦D 2≦U≦5 Lmax≧L+U Cone type S≧α+2 α+2≦T≦V−2UtanG 2≦U≦5 Lmax≧L+U ZC−S3.2−T4.0−U2.5 ☒ D8 is not available.

Add.	Code (@/P)	Spec.
G tolerance alteration 	GKC (8.6)	$G^{0}_{-30'} \rightarrow G^{0}_{-15'}$ ⚠ For cone type ℓ≦15 and (L−ℓ)≧10 ☒ Combined with ZC is not available.
L tolerance alteration 	LKC (3.7)	$L^{+0.1}_{0} \rightarrow L^{0}_{-0.02}$ ⚠ Combined with LKC can be L: ㎜ 0.01 ☒ Combined with ZC is not available.
Point inner-diameter R processing 	RC (3.7)	⚠ α≧5 is available. ⚠ Straight type:D−α−(2×RC)>2 ⚠ Cone type:V−α−(2×RC)>2 ☒ Combined with shape A・B・C are not available ☒ Combined with ZC is not available.

Range of dimension R

R
1
2

Code No.	L	SR	P	A	V	G	AIW・AHW…etc.
SSBSM 10	50.05	SR11	P3.5	A2			AIW3−LKC−KC

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

Locating Rings

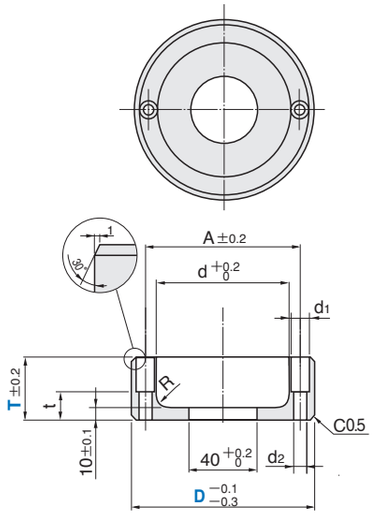
In stock

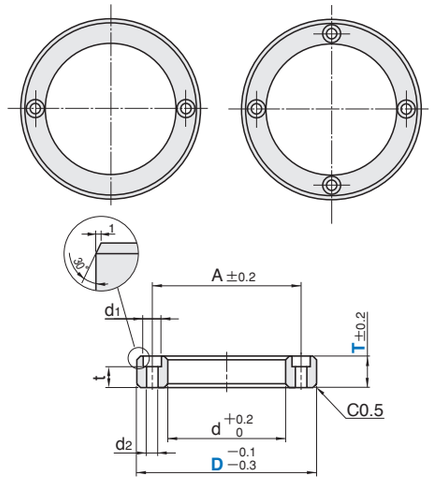
Screw	Holes size for screws	
	d_2	d_1
M5	9	5.5
M6	11	6.5
M8	14	9

Material	Sprue type	Code
S45C	Screw fixed type	LLRBD
	Screw fixed type (2 holes)	LLRBS
	Screw fixed type (4 holes)	LLRBF

LLRBD Screw fixed type

LLRBS Screw fixed type (2 holes)
LLRBF Screw fixed type (4 holes)





▶ Screw fixed type

Code No.		T	Screws	Holes size for screws		t	R	d	A	@/P (1~9P)
Code	D			d_2	d_1					
LLRBD	100	15	M6	6.5	11	9	5	70	85	9.31
		20								9.74
		35				20	10			10.1
		40								11.4
		45								12.7
	120	15				9	5	90	105	11.0
		20								11.4
		35				20	10			12.1
		40								13.7
		45								15.3

ORDER

Code No.	T
LLRBD 100 —	35
LLRBS 120 —	20

DELIVERY Next In stock working day ☞ P.15

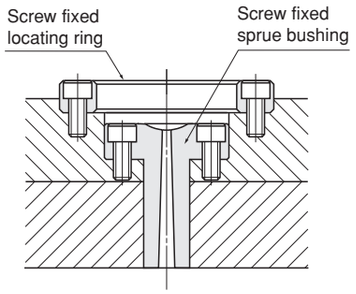
PRICE Without tax

▶ Quantity discount rate ☞ P.15

1~9	10~49	50~99	100~200	201~
100%	95%	90%	85%	Enquiry

▶ Screw fixed type (2 holes)・Screw fixed type (4 holes)

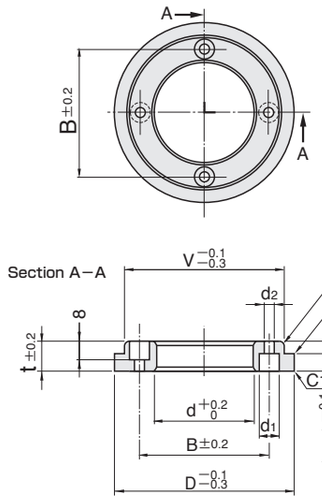
Code No.		T	Screws	Holes size for screws		t	d	A	@/P (1~9P)	
Code	D			d_2	d_1				LLRBS	LLRBF
LLRBS (2 holes)	60	10	M5	5.5	9	5	40	50	26.7	29.0
		15							28.4	31.3
		20							30.8	33.7
		25							33.1	36.0
	100	10	M6	6.5	11	3	70	85	30.8	33.7
		15				8			33.1	36.0
		20							35.4	38.3
		25							39.5	42.4
		30							44.1	47.0
LLRBF (4 holes)	110	10				3	80	95	33.1	36.0
		15				8			35.4	38.3
		20							39.5	42.4
	120	10				3	90	105	37.7	40.1
		15				8			39.5	42.4
		20							44.1	47.0
		25							52.8	55.7
	150	15	M8	9	14	6	110	130	52.8	55.7
		20							61.6	64.5
		25							65.0	68.0



Screw	Holes size for screws	
	d_1	d_2
M5	9	5.5
M6	11	6.5
M8	14	9

Material	Sprue type	Code
S45C	Reversible locating ring	LLRBW

LLRBW
Reversible locating ring (screw fixed)



▶ Reversible locating ring (screw fixed type)

Code No.		Screws	Holes size for screws		d	B	V	D	t	@/P (1~9P)
Code	No.		d_2	d_1						
LLRBW	100	M5	6.6	9	40	50	60	100	14	7.70
	100−16								16	7.86
	120	M6	6.5	11	70	85	100	120	14	7.95
	120−16								16	8.12
	130							130	14	8.03
	130−16								16	8.20

ORDER

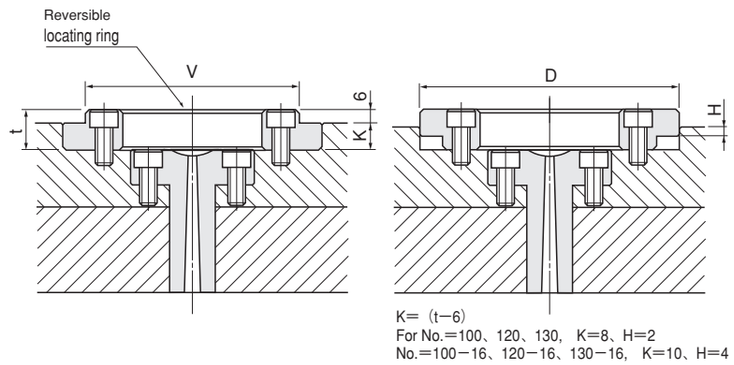
Code No.	T	B
LLRJS 100 —	20 —	50
LLRBW 100−16		

DELIVERY Next In stock working day ☞ P.15

PRICE Without tax

▶ Quantity discount rate ☞ P.15

1~9	10~49	50~99	100~200	201~
100%	95%	90%	85%	Enquiry



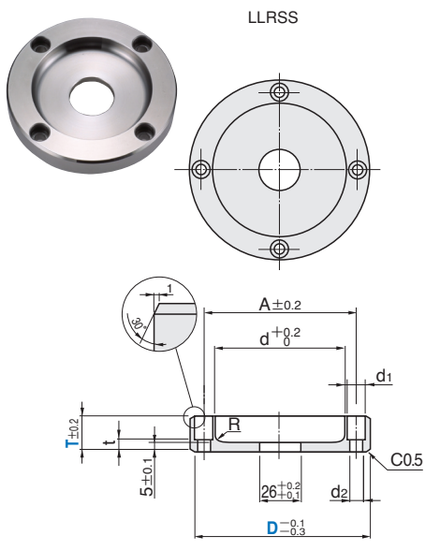
K= (t−6)
For No.=100、120、130, K=8、H=2
No.=100−16、120−16、130−16, K=10、H=4

Locating Rings

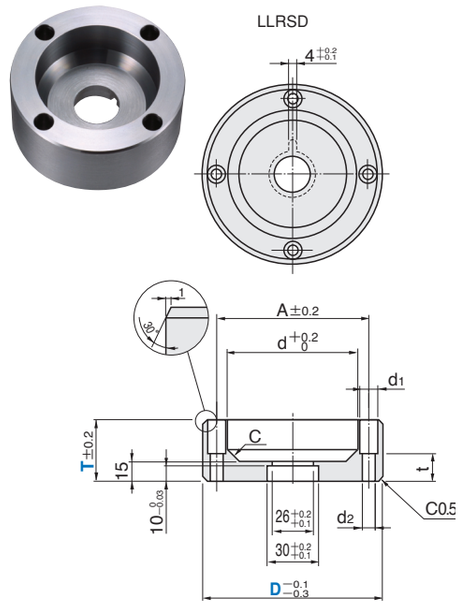
— In stock

Material	Sprue type	Code
S45C	Stepped type	LLRSS LLRSD

LLRSS



LLRSD



▶ Stepped type

Code No. Code	D	T	Screws	Holes size for screws d2	Holes size for screws d1	t	R	d	A	@/P (1~9P)
LLRSS	60	10	M5	5.5	9	4.5	5	40	50	5.39
		15				5				5.55
		20								5.81
		25								6.15
	100	10	M6	6.5	11	3.5	10	70	85	5.98
		15				8				6.15
		20								6.83
		25								7.43
		30								8.12
		35								8.80
	110	15					5	80	95	6.49
		20					10			7.18
		25								7.77
	120	15					5	90	105	7.77
		20					10			8.80
		25								9.74
	150	15	M8	9	14	6	5	110	130	9.74
		20					10			10.5
		25								12.3

▶ Stepped type

Code No. Code	D	T	Screws	Holes size for screws d2	Holes size for screws d1	t	C	d	A	@/P (1~9P)
LLRSD	100	35	M6	6.5	11	20	6.5	70	85	10.7
		40								12.1
		45								13.4
	120	35						90	105	12.7
		40								14.3
		45								15.9

ORDER

Code No.	T
LLRSS 60 —	10
LLRSD 100 —	40

DELIVERY

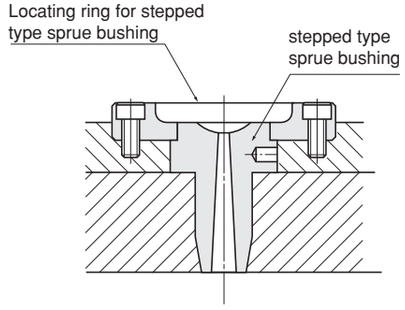
Next In stock working day ☞ P.15

PRICE Without tax

▶ Quantity discount rate ☞ P.15

1~9	10~49	50~99	100~200	201~
100%	95%	90%	85%	Enquiry

Locating ring for stepped type sprue bushing



COMPONENTS of GATE GUIDE

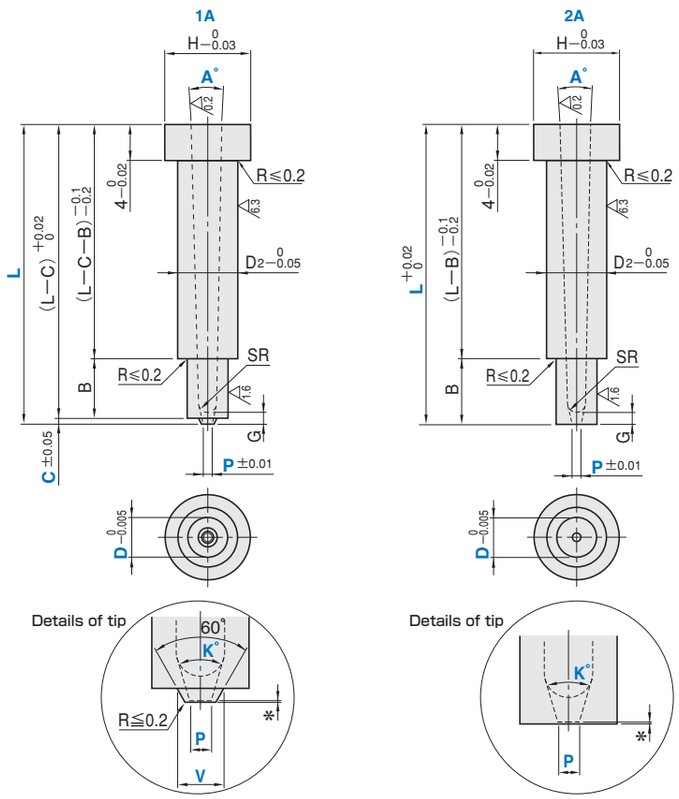
Guide for Components of Gate

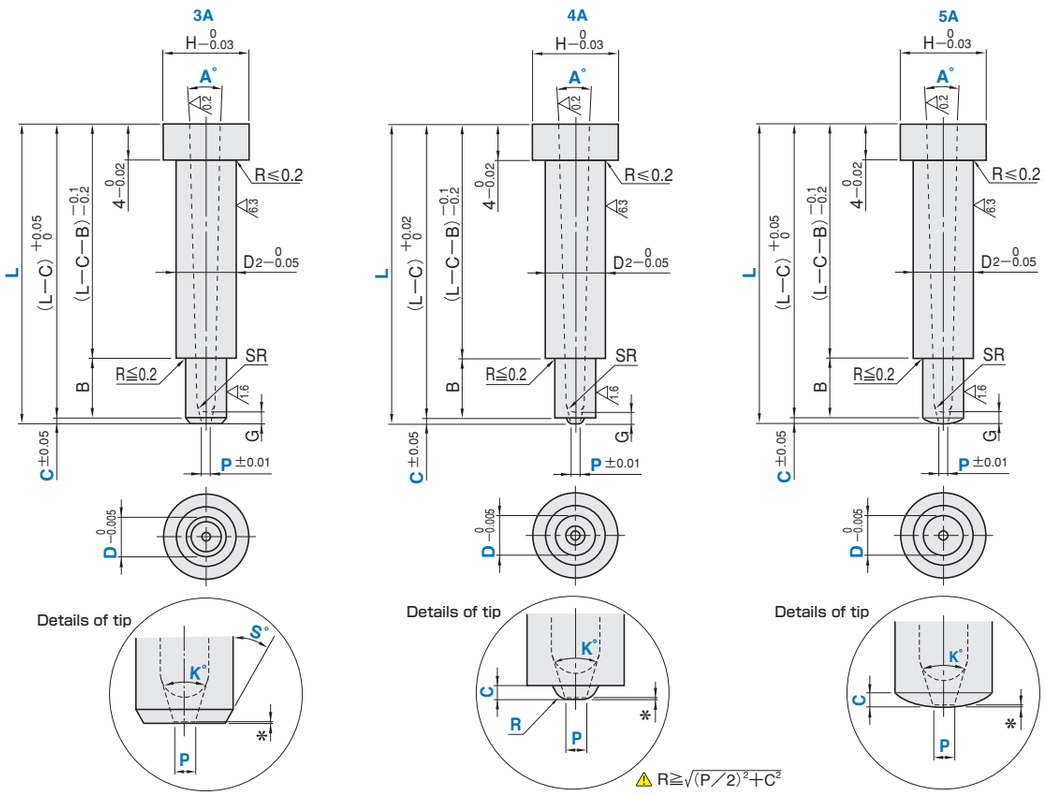
Pin-Point Gate Bushings Flarge Type	Pin-Point Gate Bushings
	
PPGHT□A P.126 5	PPGHB□A PPGH□A P.128 5

Pin-Point Gate Bushings Flarge Type

Material	Hardness	Code
SKH51	59～61HRC	PPGHT□A

⚠ ＊There is a straight section of 0～0.2mm for P at the end.
⚠ SR is machined with EDM.
⚠ Eccentricity between D and P is less than 0.05mm.
⚠ Eccentricity between D and V is less than 0.05mm.





Code No.		D	L	P	A	K	Except 2A	1A only	3A only	4A only	H	D2	G	B	SR
Code	Shape		0.01				0.1 C	0.1 V	1 S	0.1 R					
PPGHT	1A 2A 3A 4A 5A	3	15.00～40.00	0.5 0.6 0.7 0.8 0.9＊1	1 2 3	20 30	0.3～0.8	2.0～2.9	1～45	0.8～1.5	8	5	1.2＊1	6	1.00
		4		0.6 0.7				2.5～3.9			9	6			1.00
				0.8 0.9 1.0 1.2											1.25
		5		0.8 0.9 1.0			0.5～1.5	3.5～4.9		1.0～2.0	11	8			1.25
			20.00～60.00	1.2 1.4											1.50
		6		1.0				4.0～5.9	1～50	1.5～3.0	12	9	1.5＊2	10	1.25
				1.2 1.4 1.6＊2											1.50
		8		1.2 1.4				4.5～7.9	1～60	2.0～4.0	14	11			1.50
				1.6											2.00

ORDER

Code No.	L	P	A	K	C·V·S·R
PPGHT2A 3 —	30.00 —	P0.5 —	A1 —	K20	
PPGHT3A 3 —	30.00 —	P0.5 —	A1 —	K20 —	C0.3—S25
PPGHT4A 3 —	30.00 —	P0.5 —	A1 —	K20 —	C0.3—R0.8
PPGHT5A 3 —	30.00 —	P0.5 —	A1 —	K20 —	C0.3

DELIVERY

5 Days ☞ P.15

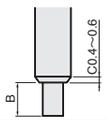
PRICE Without tax

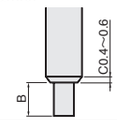
▶Quantity discount rate ☞ P.15

1～4	5～12	13～19	20～50	51～
100%	95%	90%	85%	Enquiry

Code No.		D	L	@/P(1～4P)				
Code				1A	2A	3A	4A	5A
PPGHT		3	15.00～40.00	129	117	119	129	129
		4	15.00～40.00	135	124	126	135	135
		5	20.00～40.00	123	111	113	123	123
			40.01～60.00	125	114	117	125	125
		6	20.00～40.00	123	111	113	123	123
			40.01～60.00	125	114	117	125	125
		8	20.00～40.00	125	113	116	125	125
			40.01～60.00	129	117	119	129	129

ADDITION

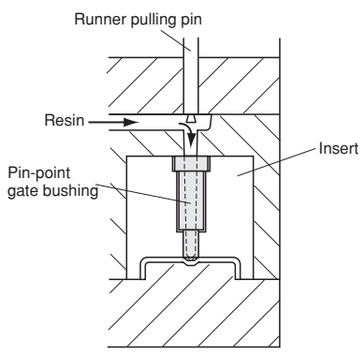
Add.	Code (@/P)	Spec.
Chamfer 	CC(1.4)	⚠ D3・4 C0.3±0.1

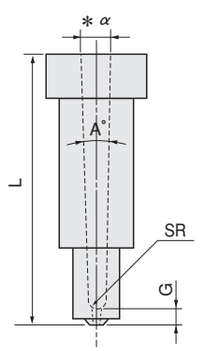
Add.	Code (@/P)	Spec.
Chamfer 	CVC(4.8)	0.1 $0.2 \leqq CVC < -0.1\frac{(D2-D)}{2}-0.1$

Code No.	L	P	A	K	C·V·S·R	CC·CVC
PPGHT1A 3 —	20.00 —	P0.5 —	A1 —	K20 —	C0.3—V2.5 —	CVC0.2

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

EX Example





▶Inlet diameter calculation formula

$*\alpha = 2SR + 2(L - G - SR)\tan\frac{A}{2}$

▶Example

L=50　　G=1.5
SR=1.5　　A=2°

Calculating according to above formula

$*\alpha = 2 \times 1.5 + 2(50 - 1.5 - 1.5)\tan\frac{2}{2}$
$= 3 + 94 \times \tan 1$
$= 3 + 1.64$
$= 4.64$

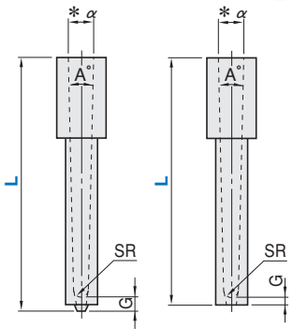
Result is $\alpha = 4.64$mm

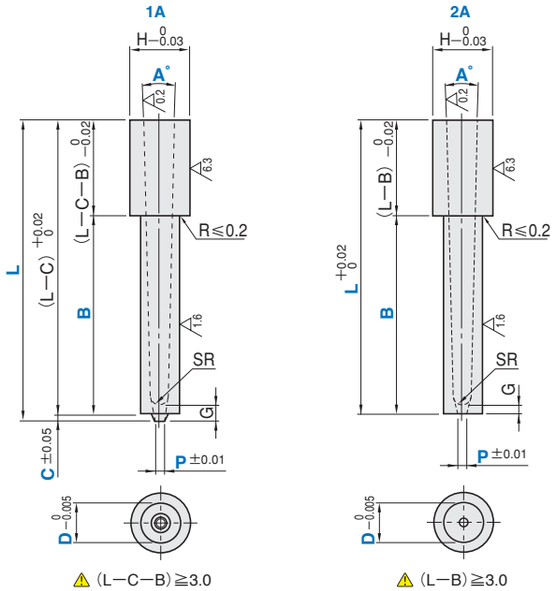
Pin-Point Gate Bushings

Material	Hardness	Code
SKH51	59～61HRC	PPGHB□A PPGH□A

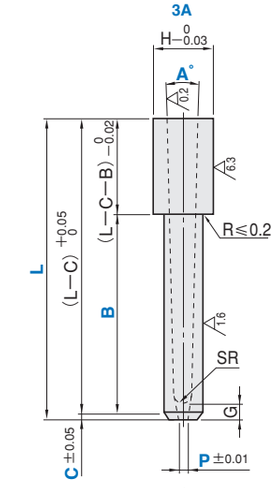
Inlet diameter calculation formula

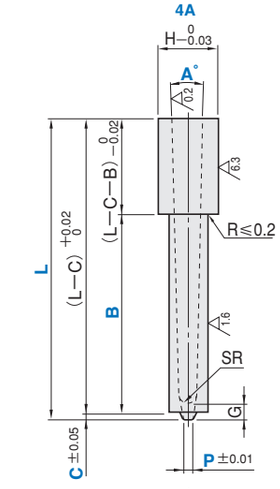
$* \alpha = 2SR + 2(L - G - SR)\tan\frac{A}{2}$

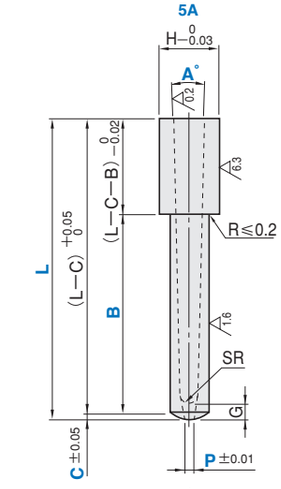




⚠ There is a straight section of 0~0.2mm for P at the end.
⚠ SR is machined with EDM.
⚠ Eccentricity between D and P is less than 0.05mm.
⚠ Eccentricity between D and V is less than 0.05mm.







Code No. Code	Shape	D	ⓜ 0.01 L	P	A	K	B No designation for PPGHB	B ⓜ 0.01 PPGH	Except 2A ⓜ 0.1 C	1A only ⓜ 0.1 V	3A only ⓜ 1 S	4A only ⓜ 0.1 R	H	G	SR
B dimension fixed type PPGHB B dimension designated type PPGH	1A 2A	2	6.00～20.00	0.3 0.4 0.5*	1 2 3	20	3	3.00～ 5.00	0.2～0.4	1.3～1.9	1～45	0.4～0.8	3	0.7	0.60
		2.5	8.00～25.00	0.3 0.4 0.5 0.6*	1 2 3		4	4.00～ 6.00	0.2～0.5	1.5～2.4		0.6～1.0	4	1	0.75
		3	10.00～40.00	0.5 0.6 0.7 0.8 0.9	1 2 3		6	5.00～ 9.00 5.00～ 8.00 5.00～ 7.00	0.3～0.8	2.0～2.9		0.8～1.5	5	1.2*2	1.00
		4		0.6 0.7	1 2 3			5.00～30.00 5.00～20.00		2.5～3.9			6		1.00
				0.8 0.9 1.0 1.2	1 2 3			5.00～30.00 5.00～20.00							1.25
	3A 4A	5	15.00～60.00	0.8 0.9 1.0	1 2 3	30	10	5.00～35.00 5.00～30.00	0.5～1.5	3.5～4.9		1.0～2.0	8	1.5*3	1.25
				1.2 1.4	1 2 3			5.00～30.00 5.00～20.00							1.50
	5A	6		1.0	1 2 3			5.00～50.00 5.00～40.00		4.0～5.9	1～50	1.5～3.0	9		1.25
				1.2 1.4 1.6	1 2 3			5.00～40.00 5.00～30.00							1.50
		8		12 1.4	1 2 3			5.00～50.00		4.5～7.9	1～60	2.0～4.0	11		1.50
				1.6	1 2 3										2.00

⚠ *P0.5 of D2 and P0.5 of D2.5 are available for K20 only. ⚠ For PPGH: (L−C−B)≧3.0 For shape 2A, (L−B)≧3.0

ORDER

Code No.	L	P	A	K	B	C·V·S·R
PPGH1A 2 —	10.00 —	P0.3 —	A1 —	K20 —	B3.50 —	C0.2—V1.3

DELIVERY 5 Days ☞ P.15

PRICE Without tax ▶Quantity discount rate ☞ P.15

1～4	5～12	13～19	20～50	51～
100%	95%	90%	85%	Enquiry

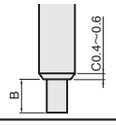
▶ B dimension fixed type

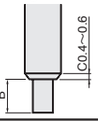
Code No. Code	D	L	@/P(1～4P) 1A	2A	3A	4A	5A
PPGHB	2	6.00～20.00	149	138	140	149	149
	2.5	8.00～25.00	149	138	140	149	149
	3	10.00～25.00	104	92.7	94.9	104	104
		25.01～40.00	112	101	103	112	112
	4	10.00～25.00	107	94.9	97.3	107	107
		25.01～40.00	113	101	104	113	113
	5	15.00～25.00	102	90.3	92.7	102	102
		25.01～40.00	107	94.9	97.3	107	107
		40.01～60.00	113	101	104	113	113
	6	15.00～25.00	102	90.3	92.7	102	102
		25.01～40.00	107	94.9	97.3	107	107
		40.01～60.00	113	101	104	113	113
	8	15.00～25.00	104	91.8	94.2	104	104
		25.01～40.00	109	97.3	100	109	109
		40.01～60.00	116	104	107	116	116

▶ B dimension designated type

Code No. Code	D	L	@/P(1～4P) 1A	2A	3A	4A	5A
PPGH	2	6.00～20.00	163	151	153	163	163
	2.5	8.00～25.00	163	151	153	163	163
	3	10.00～25.00	113	102	104	113	113
		25.01～40.00	122	110	113	122	122
	4	10.00～25.00	117	105	108	117	117
		25.01～40.00	123	111	113	123	123
	5	15.00～25.00	111	100	102	111	111
		25.01～40.00	117	105	108	117	117
		40.01～60.00	123	111	113	123	123
	6	15.00～25.00	111	100	102	111	111
		25.01～40.00	117	105	108	117	117
		40.01～60.00	123	111	113	123	123
	8	15.00～25.00	113	101	104	113	113
		25.01～40.00	119	108	110	119	119
		40.01～60.00	126	115	117	126	126

ADDITION

Add.	Code (@/P)	Spec.
Chamfering 	CC (1.4)	⚠ D3・4 C0.3±0.1

Add.	Code (@/P)	Spec.
Chamfering 	CVC (4.8)	ⓜ 0.1 $0.2 \leqq CVC < -0.1\frac{(D2-D)}{2} - 0.1$

Code No.	L	P	A	K	C·V·S·R	CC·CVC
PPGHT1A 3 —	20.00 —	P0.5 —	A1 —	K20 —	C0.3—V2.5 —	CVC0.2

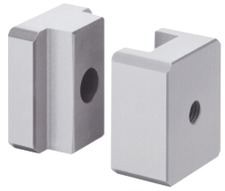
Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

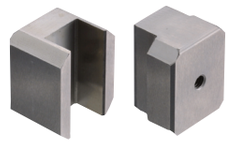
POSITIONING AND LEADER COMPONENTS

Guide for Positioning and Leader Components

Precision Guide Pins Press-in lead desiganted Type	Precision Guide Pins Headed・Oil Groove Type	Precision Guide Bushings Headed Type	Precision Guide Bushings Straight Type
			
GGPHL P.132 In stock	GGPJL P.134 3	GGBH P.136 In stock	GGBS P.137 In stock

Guide Bushings Headed Type	Guide Bushings Straight Type	Guide Bushings Head Type Oil-free Type	Straight Guide Bushings Oil-free Type
			
GGBHE P.138 In stock	GGBSE P.139 In stock	GGBHDZ P.140 3	GGBSDZ P.141 3

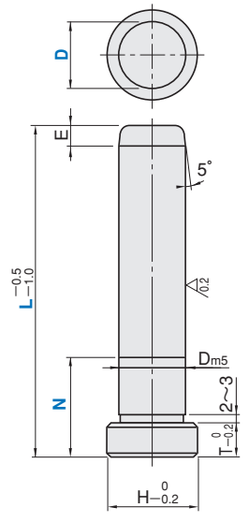
Taper Pin Sets Standard Type	Locating Pin Sets	Taper Block Sets	Side Straight Block Sets
			
TTPN TTPNV TTPNVP TTPNVB P.142 In stock	TTPNF TTPNFP TTPNFB P.144 5	TTBS P.146 3	TTSSB P.148 In stock

Straight Locating Block Sets

TTBSF P.149 In stock

Precision Guide Pins

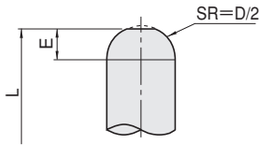
Press-in lead desiganted Type

In stock



GGPHL

Details for D8,D10



Material	Hardness	Code
SUJ2	58HRC～ (Induction hardening)	GGPHL (Press-in lead designated type)

D		Dm5		T	H	E
8	−0.015 −0.020	8	+0.012 +0.006	5	11	3
10		10			13	4
12	−0.020 −0.025	12	+0.015 +0.007		17	5
13		13			18	
16		16		8	21	
20	−0.025 −0.030	20	+0.017 +0.008		25	
25		25			30	
28		28			33	
30		30			35	
32	−0.030 −0.035	32	+0.020 +0.009		37	
35		35			40	
40	−0.030 −0.040	40		10	45	8
50		50		12	55	
60	−0.030 −0.050	60	+0.024 +0.011	15	65	

⚠ Recommended mold temperature for the use of a precision leader pin and bushing is 80℃ or less because of a little clearance between them.

▶ Length N of the press-in lead designated type

Code No.		5	1	@/P (1～9P)
Code	D	L	N	
GGPHL	8	30～ 40	5～ 60	3.14
		45～ 50		3.24
		55～ 60		3.37
		65～ 70		3.37
	10	30～ 40	5～ 60	3.37
		45～ 50		3.55
		55～ 60		3.74
		65～ 70		3.74
	12	30～ 40	5～ 80	3.61
		45～ 80		4.09
		85～120		4.81
		125～160		5.67
		165～200		7.36
	13	30～ 40	5～ 80	3.80
		45～ 80		4.46
		85～120		5.18
		125～160		6.14
		165～200		7.96
	16	30～ 40	8～ 80	4.46
		45～ 80		5.18
		85～120		5.96
		125～160		6.87
		165～200		8.20
		205～250		10.2
	20	30～ 50	8～100	5.18
		55～ 90		5.96
		95～150		7.11
		155～200		8.50
		205～260		11.7
		265～300		15.2

Code No.		5	1	@/P (1～9P)
Code	D	L	N	
GGPHL	25	40～ 60	8～120	5.90
		65～110		7.48
		115～160		8.93
		165～200		11.0
		205～260		14.7
		265～300		18.7
		305～350		20.0
	28	50～ 60	8～120	6.74
		65～110		7.77
		115～160		9.40
		165～200		12.1
		205～260		15.2
		265～300		19.2
	30	50～ 60	8～130	7.36
		65～100		8.62
		105～160		9.95
		165～200		12.6
		205～260		15.9
		265～300		20.0
		305～350		21.2
		355～400		23.4
	32	50～ 60	8～130	7.36
		65～100		8.62
		105～160		9.95
		165～200		12.6
		205～260		15.9
		265～300		20.0
		305～350		21.2

Code No.		5	1	@/P (1～9P)
Code	D	L	N	
GGPHL	35	60～100	8～130	8.74
		105～160		10.6
		165～200		13.2
		205～260		16.5
		265～330		21.7
		335～400		25.8
		405～450		28.6
	40	80～140	10～200	14.4
		145～190		15.9
		195～240		20.0
		245～300		25.8
		305～380		33.1
		385～450		37.3
		455～500		41.2
	50	100～150	12～200	21.7
		155～190		25.0
		195～240		31.4
		245～300		35.5
		305～360		40.0
		365～400		48.7
		405～460		57.3
		465～500		68.7
		505～550		77.3
	60	200～250	15～200	52.1
		255～300		61.8
		305～350		73.3
		355～400		84.8
		405～450		95.6
		455～500		107
		505～550		114

⚠ Nmin is designated for press-in lead cancel. Ex.：D=13→N=5 ⚠ No press-in lead for N=T＋(2 or 3)

ORDER

Code No.	L	N
GGPHL 8	30	N11

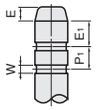
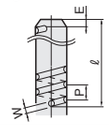
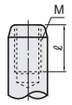
DELIVERY Next In stock working day ☞ P.14

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	85%	Enquiry

ADDITION

Add.	Code (@/P)	Spec.
L dimension alteration 	LC D @/P: 8～30 1.4; 32～60 2.4	1 Lmin.＜LC＜Lmax.
Oil groove machining 	OC D @/P: 8～30 1.4; 32～60 2.4	D W: 8・12 2; 12～28 3; 30 4. ⚠For selection of N dimension, please fefer to the table2 with E1 and P1.
Spiral groove machining 	SOC D @/P: 8～30 3.3; 32～60 4.8	D W: 8・12 2; 12～28 3; 30 4. ⚠For ℓ、P dimension, please refer to the table1.
Point tapping 	MC D @/P: 12～30 0.9; 32～60 1.8	⚠ D≧12 is available. D M×P ℓ: 12・13 M 6×P1.0 12; 16 M10×P1.5 20; 20 M12×P1.75 24; 25～30 M16×P2.0 32

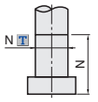
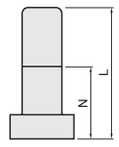
Add.	Code (@/P)	Spec.
Head tapping 	MMC D @/P: 12～30 0.9; 32～60 1.8	⚠ D≧12 is available. D M×P ℓ: 12～20 M5×P0.8 10; 25～60 M8×P1.25 16
Point tapering 	GC D @/P: 8～30 1.4; 32～60 2.4	E: 1 5≦E≦20 (D8・10 5≦E≦15) K: 1 2≦K≦10 ☒Combined with OC・SOC are not available. GC－E20－K10
Tolerance of press-in lead alteration 	DKC D @/P: 8～30 1.4; 32～60 2.4	Dm5→D +0.005 0

Table1 threaded oil-groove alteration SOC

L	30～70	75～120	125～180	185～300	305～550
P	10	15	20	25	30
ℓ	For L−N＞ L/2, ℓ＝L/2 For L−N≦ L/2, ℓ＝L−(N＋10)				



Code No.	L(C)	N	MC・OC・・・etc.
GGPHL 40	LC87	N25	DKC

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

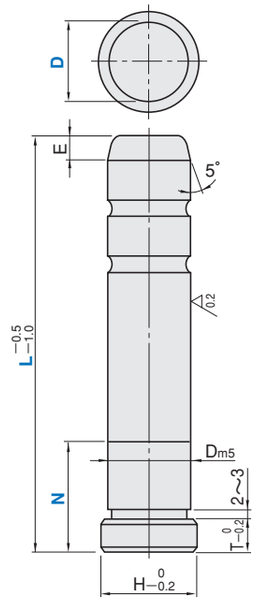
Table2 Oil-groove alteration OC

Code No.		L	E1	P1	No. of groove
Code	D				
GGPHL	8	30～ 45	6	—	1
	10	50～ 65	6	6	2
		70	6	6	3
	12	30～ 40	9	—	1
		45～ 50	10	9	2
		55～ 80			3
		85～120	11	10	
		125～160	12	11	
		165～200	13	12	
	13	30～ 40	9	—	1
		45～ 50	10	9	2
		55～ 80			3
		85～120	11	10	
		125～160	12	11	
		165～200	13	12	
	16	30～ 40	9	—	1
		45～ 50	10	9	2
		55～ 80			3
		85～120	11	10	
		125～160	12	11	
		165～200	13	13	
		205～250	15	14	
	20	30～ 40	10	—	1
		45～ 50		8	2
		55～ 90	11	9	3
		95～150	12	10	
		155～200	15	13	
		205～260	16	14	
		265～300	18	16	
	25	40～ 60	10	8	2
		65～110	11	9	3
		115～160	12	10	
		165～200	15	13	
		205～260	16	14	
		265～300	18	16	
		305～350	22	20	
	28	50～ 60	12	10	2
		65～110	13	11	3
		115～160	14	12	
		165～200	16	14	
		205～260	18	16	
		265～300	20	18	

Code No.		L	E1	P1	No. of groove
Code	D				
GGPHL	30	50～ 60	12	10	2
		65～100	13	11	
		105～160	14	12	3
		165～200	16	14	
		205～260	18	16	
		265～300	20	18	
		305～350	22	20	
		355～400	24	22	
	32	50～ 60	12	10	2
		65～100	13	11	
		105～160	14	12	3
		165～200	16	14	
		205～260	18	16	
		265～300	20	18	
		305～350	22	20	
	35	60～100	14	12	2
		105～160	15	13	
		165～200	16	14	3
		205～260	17	15	
		265～330	18	16	
		335～400	19	17	
		405～450	20	18	
	40	80～140	26	24	2
		145～190	28	26	
		195～240	30	28	3
		245～300	32	30	
		305～380	34	32	
		385～450	36	34	
		455～500	38	36	
	50	100～150	28	26	2
		155～190	30	28	
		195～240	32	30	3
		245～300	34	32	
		305～360	36	34	
		365～400	38	36	
		405～460	40	38	
		465～500	42	40	
		505～550	44	42	
	60	200～240	30	28	2
		245～300	32	30	
		305～360	34	32	3
		365～400	36	34	
		405～460	38	36	
		465～500	40	38	
		505～550	44	42	

Precision Guide Pins

Headed·Oil Groove Type



Material	Hardness	Code
SUJ2	58HRC～ (induction hardening)	GGPJL

D		Dm5		T	H	E
8	−0.015 −0.020	8	+0.012 +0.006	5	11	3
10		10			13	4
12	−0.020 −0.025	12	+0.015 +0.007		17	5
13		13			18	
16		16		8	21	
20	−0.025 −0.030	20	+0.017 +0.008		25	
25		25			30	
28		28			33	
30		30			35	
32	−0.030 −0.035	32	+0.020 +0.009		37	
35		35			40	
40	−0.030 −0.040	40		10	45	8
50		50		12	55	
60	−0.030 −0.050	60	+0.024 +0.011	15	65	

⚠ Recommended mold temperature for the use of a precision leader pin and bushing is 80℃ or less because of a little clearance between them.

Code No. Code	D	L	1 N	@/P (1～9P)
GGPJL	8	40 45	5～16	2.89
		50 55 60 60	5～24	3.00
		70 75 80	5～43	3.00
	10	40 45	5～16	3.00
		50 55 60 65	5～24	3.20
		70 75 80	5～43	3.20
	12	40 45	5～16	3.24
		50 55 60 65	5～24	3.43
		70 75	5～35	3.74
		80 85	5～45	3.74
		90 95	5～50	4.34
		100 105	5～60	4.34
		110 115	5～70	4.34
		120 125 130 135 140 145 150 160	5～80	5.18
		165 170 175 180 185 190 195 200	5～80	6.39
	13	40	6～14	3.43
		45	6～16	4.03
		50 55 60 60	6～24	4.03
		70 75	6～35	4.03
		80	6～43	4.03
		85	6～45	4.77
		90 95	6～50	4.77
		100 105	6～60	4.77
		110 115	6～70	4.77
		120	6～80	4.77
		125 130 135 140 145 150 155 160	6～80	5.53
		165 170 175 180 185 190 195 200	6～80	6.87
	16	40	6～14	4.03
		45	6～16	4.64
		50 55 60 65	6～24	4.64
		70 75	6～35	4.64
		80	6～43	4.64
		85	6～45	5.36
		90 95	6～50	5.36
		100 105	6～60	5.36
		110 115	6～70	5.36
		120	6～80	5.36
		125 130 135 140 145 150 155 160	6～80	6.21
		165 170 175 180 185 190 195 200	6～80	7.42
		210 220 230 240 250	6～80	9.11

Code No. Code	D	L	1 N	@/P (1～9P)
GGPJL	20	50	6～ 23	4.70
		55	6～ 24	5.36
		60 65	6～ 24	5.36
		70 75	6～ 35	5.36
		80 85	6～ 40	5.36
		90	6～ 50	5.36
		95	6～ 50	6.39
		100 105	6～ 60	6.39
		110 115	6～ 70	6.39
		120 125	6～ 80	6.39
		130 135	6～ 90	6.39
		140 145 150	6～100	6.39
		155 160 165 170 175 180 185 190 195 200	6～100	7.59
		210 220 230 240 250 260	6～100	10.5
		270 280 290 300	6～100	13.1
	25	50 55	8～ 24	5.30
		60	8～ 30	5.30
		65	8～ 30	6.70
		70 75 80 85	8～ 40	6.70
		90 95	8～ 50	6.70
		100 105	8～ 60	6.70
		110	8～ 70	6.70
		115	8～ 70	8.00
		120 125	8～ 80	8.00
		130 135	8～ 90	8.00
		140 145	8～100	8.00
		150 155	8～110	8.00
		160	8～119	8.00
		165 170 175 180 185 190 195 200	8～120	10.0
		210 220 230 240 250 260	8～120	13.2
		270 280 290 300	8～120	16.7
		310 320 330 340 350	8～120	19.0
	28	50 55	8～ 24	5.73
		60 65	8～ 30	5.73
		70 75 80 85	8～ 45	6.87
		90 95	8～ 50	6.87
		100 105	8～ 60	6.87
		110 115	8～ 60	6.87
		120 125	8～ 70	8.25
		130 135	8～ 80	8.25
		140 145	8～ 90	8.25
		150 155	8～110	8.25
		160 165 170 175 180 185 190 195 200	8～130	10.4

Code No. Code	D	L	1 N	@/P (1～9P)
GGPJL	30	60	8～ 30	6.09
		65	8～ 30	6.99
		70 75	8～ 40	6.99
		80 85	8～ 45	6.99
		90 95	8～ 50	6.99
		100 105 110	8～ 60	6.99
		115	8～ 60	8.50
		120 125	8～ 70	8.50
		130 135	8～ 80	8.50
		140 145	8～ 90	8.50
		150 155	8～100	8.50
		160	8～110	8.50
		165	8～110	10.8
		170 175 180 185 190 195 200	8～130	10.8
		210 220 230 240 250 260	8～130	13.6
		270 280 290 300	8～130	17.3
		310 320 330 340 350	8～130	20.2
		360 370 380 390 400	8～130	22.3
	32	70 75	8～ 40	7.48
		80 85	8～ 45	7.48
		90 95	8～ 50	7.48
		100 105 110 115	8～ 60	9.03
		120 125	8～ 70	9.03
		130 135	8～ 80	9.03
		140 145	8～ 90	9.03
		150 155	8～100	9.03
		160 165	8～110	9.03
		170 175	8～120	11.4
		180 185 190 195 200	8～130	11.4
		210 220 230 240 250 260	8～130	14.4
		270 280 290 300	8～130	18.3
		310 320 330 340 350	8～130	19.5
	35	70 75	8～ 35	7.90
		80 85	8～ 45	7.90
		90 95	8～ 50	7.90
		100	8～ 60	7.90
		105 110 115	8～ 60	9.59
		120 125	8～ 70	9.59
		130 135	8～ 80	9.59
		140 145	8～ 90	9.59
		150 155	8～100	9.59
		160	8～110	9.59
		165	8～110	11.9
		170 175	8～120	11.9
		180 185 190 195 200	8～130	11.9
		210 220 230 240 250 260	8～130	14.9
		270 280 290 300 310 320 330	8～130	19.5
		340 340 350 370 380 390 400	8～130	23.1
		410 420 430 440 450	8～130	26.2

⚠Nmin is designated for press-in lead cancel.
⚠No press-in lead for N=T+(2 or 3)

ORDER

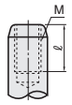
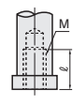
Code No.	L	N
GGPJL 8	— 40	— N5

DELIVERY **3** Days ☞ P.15

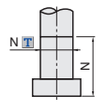
PRICE Without tax ▶Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	85%	Enquiry

ADDITION

Add.	Code (@/P)	Spec.
Point tapping 	MC D / @/P 12～30 / 0.9 32～60 / 1.8	⚠ D≧12 is available. ☒ D=8・10 is not available. D / M×P / ℓ 12・13 / M 6×P1.0 / 12 16 / M10×P1.5 / 20 20 / M12×P1.75 / 24 25～30 / M16×P2.0 / 32
Head tapping 	MMC D / @/P 12～30 / 0.9 32～60 / 1.8	⚠ D≧12 is available. ☒ D=8・10 is not available. D / M×P / ℓ 12～20 / M5×P0.8 / 10 25～60 / M8×P1.25 / 16

Code No. Code	D	L	1 N	@/P (1～9P)
GGPJL	40	100 105	10～ 40	12.9
		110 115	10～ 50	12.9
		120 125 130 135	10～ 60	12.9
		140	10～ 70	12.9
		145	10～ 70	14.4
		150 155 160 165 170 175	10～ 80	14.4
		180 185 190	10～ 90	14.4
		195	10～ 90	18.0
		200 210	10～100	18.0
		220 230	10～110	18.0
		240	10～120	18.0
		250	10～120	23.1
		260 270	10～130	23.1
		280 290 300	10～140	23.1
		310 320 330 340 350 360 370 380	10～140	29.9
		390 400 410 420 430 440 450	10～140	33.6
		460 470 480 490 500	10～140	37.3
	50	120 125	12～ 50	19.5
		130 135	12～ 60	19.5
		140 145	12～ 70	19.5
		150	12～ 80	19.5
		155 160 165 170 175 180 185	12～ 80	22.5
		190	12～ 90	22.5
		195 200	12～ 90	28.3
		210	12～ 90	28.3
		220 230	12～100	28.3
		240	12～110	28.3
		250	12～110	32.0
		260 270	12～120	32.0
		280	12～130	32.0
		290 300	12～140	32.0
		310 320	12～150	36.1
		330 340	12～160	36.1
		350	12～170	36.1
		360	12～180	36.1
		370 380	12～190	43.7
		390 400	12～200	43.7
		410 420 430 440 450 460	12～200	51.5
		470 480 490 500	12～200	61.8
		510 520 530 540 550	12～200	68.7
	60	200 210	12～ 90	47.5
		220 230	12～100	47.5
		240	12～110	47.5
		250	12～110	61.8
		260 270	12～120	61.8
		280	12～130	61.8
		290 300	12～140	61.8
		310 320	12～150	73.3
		330 340	12～160	73.3
		350	12～170	73.3
		360	12～180	73.3
		370 380	12～190	84.8
		390 400	12～200	84.8
		410 420 430 440 450 460	12～200	95.6
		470 480 490 500	12～200	107
		510 520 530 540 550	12～200	114

Add.	Code (@/P)	Spec.
Tolerance of press-in lead alteration 	DKC D / @/P 8～30 / 1.4 32～60 / 2.4	Dm5→D +0.005 0

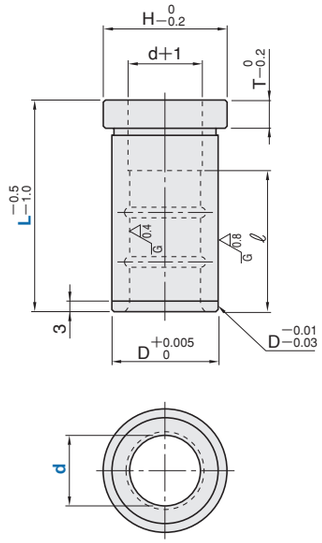
Code No.	L	N	MC・MMC…etc.
GGPJL 12	— 40	— N5	— MC

Product unit price+Addition unit price.
Price discount is also available for addition. ☞ P.14

Precision Guide Bushings

Headed Type

In stock



Material	Hardness	Code
SUJ2	58HRC～	GGBH

d		T	D	H	ℓ												
					L15	L20	L25	L30	L35	L40	L45	L50	L60	L70	L80	L90	L100
8	0 −0.005	5	12	14	15	15	15	–	–	–	–	–	–	–	–	–	–
10			14	16	15	20	20	20	20	20	–	–	–	–	–	–	–
12	−0.005 −0.010		18	22	15	20	25	25	25	25	25	25	–	–	–	–	–
13			20	25	15	20	25	25	25	25	25	25	–	–	–	–	–
16		6	25	30	–	20	25	30	35	30	30	30	–	–	–	–	–
20	−0.010 −0.015	8	30	35	–	20	25	30	35	40	40	40	40	40	–	–	–
25			35	40	–	–	25	30	35	40	45	50	50	50	50	–	–
28			40	45	–	–	25	30	35	40	45	50	56	56	56	–	–
30			42	47	–	–	25	30	35	40	45	50	60	60	60	60	60

Code No. Code	d	L														@/P(1～9P)
GGBH	8	15	20													4.21
				25												4.77
	10	15	20													4.21
				25	30											4.77
						35	40									5.61
	12	15	20	25												4.46
					30	35	40									5.06
								45	50							5.90
	13	15	20	25	30											4.58
						35	40									5.18
								45	50							6.03
	16		20	25	30											4.58
						35	40									5.18
								45	50							6.03
	20		20	25	30	35										5.43
							40	45	50							6.33
										60	70					7.17
	25			25	30	35	40									6.87
								45	50	60						7.71
											70	80				9.17
	28			25	30	35	40									7.77
								45	50	60						8.62
											70	80				10.3
	30			25	30	35	40									8.68
								45	50	60						9.64
											70	80	90	100		11.5

⚠ Clearance is small when precision leader pin and precision leader bushing are wed in combination, please use mold temperature 80℃ or less.

ORDER

Code No.	L
GGBH 8	15

PRICE Without tax

▶Quantity discount rate ☞ P.15

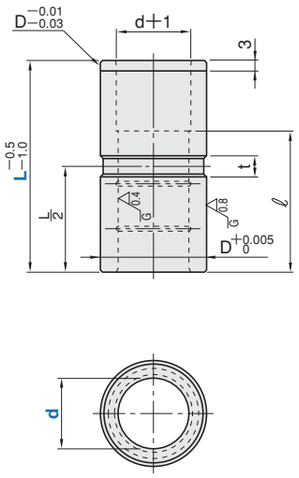
1～9	10～19	20～29	30～50	51～
100%	95%	90%	85%	Enquiry

DELIVERY

Next In stock working day ☞ P.15

Precision Guide Bushings

Straight Type



Material	Hardness	Code
SUJ2	58HRC～	GGBS

d		D	t	ℓ										
				L10	L15	L20	L25	L30	L35	L40	L50	L60	L70	L80
8	0 −0.005	12	6 (L=10→ t=4)	10	15	15	15	–	–	–	–	–	–	–
10		14		10	15	20	20	20	20	20	–	–	–	–
12	−0.005 −0.010	18		10	15	20	25	25	25	25	–	–	–	–
13		20		10	15	20	25	25	25	25	–	–	–	–
16		25		10	15	20	25	30	35	30	30	–	–	–
20	−0.010 −0.015	30		–	15	20	25	30	35	40	40	40	40	–
25		35	8	–	–	20	25	30	35	40	50	50	50	50
28		40		–	–	–	25	30	35	40	50	56	56	56
30		42		–	–	–	25	30	35	40	50	60	60	60

Code No. Code	d	L														@/P(1～9P)
GGBS	8	10	15	20												3.74
					25											4.03
	10	10	15	20												3.74
					25	30										4.03
							35	40								4.58
	12	10	15	20												3.92
					25	30										4.17
							35	40								4.77
	13	10	15	20	25											4.03
						30	35									4.27
								40								4.87
	16	10	15	20	25											4.03
						30	35									4.27
								40	50							4.87
	20		15	20	25	30										4.58
							35	40	50							5.43
										60	70					6.33
	25		20	25	30	35										5.43
								40	50	60						6.56
											70	80				7.71
	28			25	30	35										6.56
								40	50	60						7.53
											70	80				8.62
	30			25	30	35	40									7.71
									50	60						8.62
											70	80				9.77

⚠ Clearance is small when precision leader pin and precision leader bushing are wed in combination, please use mold temperature 80℃ or less.

ORDER

Code No.	L
GGBS 8	10

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	85%	Enquiry

DELIVERY

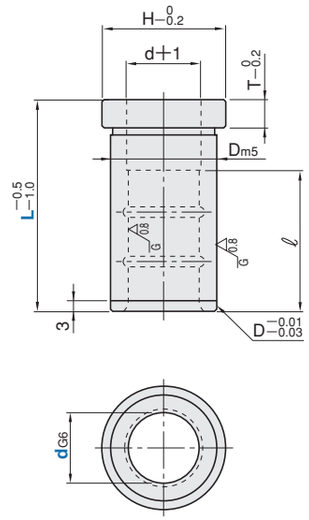
Next In stock working day ☞ P.15

Guide Bushings

Headed Type

In stock

Material	Hardness	Code
SUJ2	58HRC～	GGBHE



dG6		T	Dm5		H	ℓ																
						L15	L20	L25	L30	L35	L40	L45	L50	L60	L70	L80	L90	L100	L110	L120	L130	L140	L150
8	+0.014 +0.005	5	12	+0.015 +0.007	14	15	15	15	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10			14		16	15	20	20	20	20	20	–	–	–	–	–	–	–	–	–	–	–	–
12	+0.017 +0.006		18		22	15	20	25	25	25	25	25	25	–	–	–	–	–	–	–	–	–	–
13			20	+0.017 +0.008	25	15	20	25	25	25	25	25	25	–	–	–	–	–	–	–	–	–	–
16		6	25		30	–	20	25	30	35	30	30	30	–	–	–	–	–	–	–	–	–	–
20		8	30		35	–	20	25	30	35	40	40	40	40	40	40	–	–	–	–	–	–	–
25	+0.020 +0.007		35	+0.020 +0.009	40	–	20	25	30	35	40	45	50	50	50	50	50	50	50	50	–	–	–
28			40		45	–	–	25	30	35	40	45	50	56	56	56	56	56	56	56	–	–	–
30			42		47	–	–	25	30	35	40	45	50	60	60	60	60	60	60	60	–	–	–
32	+0.025 +0.009		45		50	–	–	25	30	35	40	45	50	60	60	60	60	60	60	60	–	–	–
35			48		54	–	–	–	30	35	40	–	50	60	70	70	70	70	70	70	–	–	–
40		10	55	+0.024 +0.011	60	–	–	–	30	35	40	45	50	60	70	80	80	80	80	80	–	–	–
50	+0.029 +0.010	12	70		75	–	–	–	–	–	40	45	50	60	70	80	90	100	100	100	100	100	100
60			80		86	–	–	–	–	–	–	–	–	60	70	80	90	100	110	120	120	120	120

Code No.		@/P(1～9P)																	
Code	d	L15	L20	L25	L30	L35	L40	L45	L50	L60	L70	L80	L90	L100	L110	L120	L130	L140	L150
GGBHE	8	4.09	4.09	4.40	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	10	2.65	2.65	3.20	3.20	3.37	3.37	–	–	–	–	–	–	–	–	–	–	–	–
	12	2.65	2.65	2.65	3.37	3.37	3.37	3.74	3.74	–	–	–	–	–	–	–	–	–	–
	13	2.65	2.65	2.65	3.37	3.37	3.37	3.74	3.74	–	–	–	–	–	–	–	–	–	–
	16	–	2.77	2.77	2.77	3.37	3.37	4.03	4.03	–	–	–	–	–	–	–	–	–	–
	20	–	3.14	3.14	3.14	3.14	4.09	4.09	4.09	5.78	5.78	5.78	–	–	–	–	–	–	–
	25	–	3.92	3.92	3.92	3.92	3.92	5.36	5.36	5.36	8.62	8.62	8.62	8.62	12.1	12.1	12.1	–	–
	28	–	–	5.73	5.73	5.73	5.73	7.48	7.48	7.48	7.48	8.93	8.93	8.93	12.1	12.1	12.1	–	–
	30	–	–	7.17	7.17	7.17	7.17	8.62	8.62	8.62	10.4	10.4	10.4	10.4	15.0	15.0	15.0	–	–
	32	–	–	7.17	7.17	7.17	7.17	8.62	8.62	8.62	10.4	10.4	10.4	10.4	15.0	15.0	15.0	–	–
	35	–	–	–	7.83	7.83	7.83	–	7.83	10.1	10.1	10.8	10.8	19.0	19.0	19.0	19.0	–	–
	40	–	–	–	8.00	8.00	8.00	10.5	10.5	10.5	15.9	15.9	15.9	15.9	21.7	21.7	21.7	–	–
	50	–	–	–	–	–	17.7	17.7	17.7	24.6	24.6	24.6	24.6	36.4	36.4	36.4	49.9	49.9	49.9
	60	–	–	–	–	–	–	–	–	25.8	25.8	34.3	34.3	43.0	43.0	43.0	54.0	54.0	54.0

ORDER

Code No. | L

GGBHE 8 — 15

DELIVERY

Next In stock working day ☞ P.15

PRICE Without tax

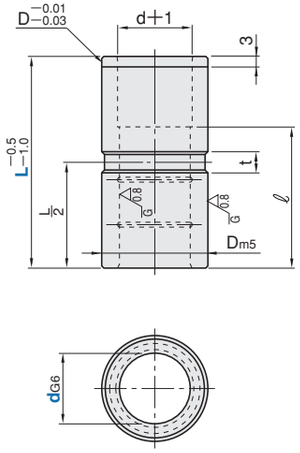
▶Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	85%	Enquiry

Guide Bushings

Straight Type

Material	Hardness	Code
SUJ2	58HRC～	GGBSE



dG6		T	Dm5		ℓ														
					L10	L15	L20	L25	L30	L35	L40	L45	L50	L60	L70	L80	L90	L100	L110	L120
8	+0.014 +0.005	6 (L=10 →t=4)	12	+0.015 +0.007	10	15	15	15	–	–	–	–	–	–	–	–	–	–	–	–
10			14		10	15	20	20	20	20	20	–	–	–	–	–	–	–	–	–
12	+0.017 +0.006		18		10	15	20	25	25	25	25	–	–	–	–	–	–	–	–	–
13			20		10	15	20	25	25	25	25	–	–	–	–	–	–	–	–	–
16			25	+0.017 +0.008	–	15	20	25	30	35	30	30	30	–	–	–	–	–	–	–
20			30		–	15	20	25	30	35	40	40	40	40	40	40	–	–	–	–
25	+0.020 +0.007	8	35	+0.020 +0.009	–	–	20	25	30	35	40	45	50	50	50	50	50	50	–	–
28			40		–	–	20	25	30	35	40	45	50	56	56	56	56	56	–	–
30			42		–	–	20	25	30	35	40	45	50	60	60	60	60	60	–	–
32	+0.025 +0.009		45		–	–	20	25	30	35	40	45	50	60	60	60	60	60	–	–
35			48		–	–	–	25	30	35	40	–	50	60	70	70	70	70	–	–
40			55	+0.024 +0.011	–	–	–	25	30	35	40	45	50	60	70	80	80	80	80	80
50			70		–	–	–	–	30	35	40	45	50	60	70	80	90	100	100	100
60	+0.029 +0.010		80		–	–	–	–	–	–	–	–	50	60	70	80	90	100	110	120

Code No.		@/P(1～9P)															
Code	d	L10	L15	L20	L25	L30	L35	L40	L45	L50	L60	L70	L80	L90	L100	L110	L120
GGBSE	8	2.40	2.40	2.40	2.89	–	–	–	–	–	–	–	–	–	–	–	–
	10	1.98	1.98	1.98	2.40	2.40	2.77	2.77	–	–	–	–	–	–	–	–	–
	12	1.98	1.98	1.98	2.40	2.40	2.77	2.77	–	–	–	–	–	–	–	–	–
	13	1.98	1.98	1.98	2.40	2.40	2.77	2.77	–	–	–	–	–	–	–	–	–
	16	–	1.98	1.98	1.98	2.53	2.53	3.20	3.20	3.20	–	–	–	–	–	–	–
	20	–	2.48	2.48	2.48	2.48	3.31	3.31	3.31	3.31	5.12	5.12	5.12	–	–	–	–
	25	–	–	3.14	3.14	3.14	3.14	4.52	4.52	4.52	4.52	5.78	5.78	7.17	7.17	–	–
	28	–	–	5.36	5.36	5.36	5.36	5.36	6.50	6.50	6.50	7.11	7.11	8.86	8.86	–	–
	30	–	–	6.70	6.70	6.70	6.70	6.70	8.14	8.14	8.14	9.23	9.23	10.4	10.4	–	–
	32	–	–	6.70	6.70	6.70	6.70	6.70	8.14	8.14	8.14	9.23	9.23	10.4	10.4	–	–
	35	–	–	–	6.81	6.81	6.81	6.81	–	7.83	7.83	9.59	9.59	12.1	12.1	–	–
	40	–	–	–	6.93	6.93	6.93	6.93	9.64	9.64	9.64	12.7	12.7	12.7	16.7	16.7	16.7
	50	–	–	–	–	10.9	10.9	10.9	16.1	16.1	16.1	23.3	23.3	23.3	30.3	30.3	30.3
	60	–	–	–	–	–	–	–	–	18.6	24.6	24.6	24.6	30.5	30.5	34.2	34.2

ORDER

Code No. | L

GGBSE 8 — 10

DELIVERY

Next In stock working day ☞ P.15

PRICE Without tax

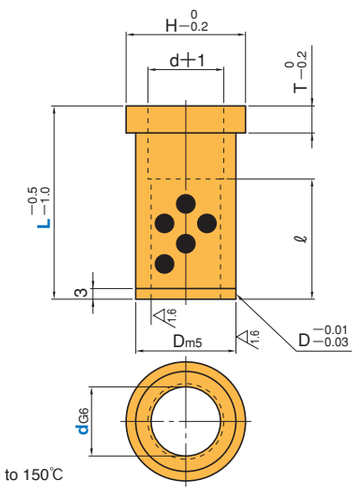
▶Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	85%	Enquiry

Guide Bushings Head Type

Oil-free Type

Material	Code
CAC304 (Copper alloy) Graphite (deposited)	GGBHDZ



⚠ Usable temperature range special solid lubricant up to 150℃

dG6		T	Dm5		H	ℓ											
						L15	L20	L25	L30	L35	L40	L50	L60	L70	L80	L100	L130	L150
10	+0.014 +0.005	5	14	+0.015 +0.007	16	15	20	20	20	20	–	–	–	–	–	–	–	–
13	+0.017 +0.006		20	+0.017 +0.008	25	15	20	25	25	25	25	–	–	–	–	–	–	–
16		6	25		30	15	20	25	30	35	30	30	–	–	–	–	–	–
20		8	30		35	–	20	25	30	35	40	40	40	–	–	–	–	–
25	+0.020 +0.007		35	+0.020 +0.009	40	–	–	25	30	35	40	50	50	50	50	–	–	–
30			42		47	–	–	25	30	35	40	50	60	60	60	–	–	–
35	+0.025 +0.009		48		54	–	–	–	–	–	40	50	60	70	70	70	70	–
40		10	55	+0.024 +0.011	60	–	–	–	–	–	40	50	60	70	80	80	80	–
50		12	70		75	–	–	–	–	–	–	–	60	70	80	100	100	100

Code No.		L
Code	d	
GGBHDZ	10	15 20 25 30 35
	13	15 20 25 30 35 40
	16	15 20 25 30 35 40 50
	20	20 25 30 35 40 50 60
	25	25 30 35 40 50 60 70 80
	30	25 30 35 40 50 60 70 80 100
	35	40 50 60 70 80 100 130
	40	40 50 60 70 80 100 130
	50	60 70 80 100 130 150

Code No.		@/P(1~9P)											
Code	d	20	25	30	35	40	50	60	70	80	100	130	150
GGBHDZ	10	10.0	10.6	12.1	13.7	–	–	–	–	–	–	–	–
	13	12.0	13.1	13.7	14.5	14.6	–	–	–	–	–	–	–
	16	13.1	14.5	15.3	17.0	18.3	–	–	–	–	–	–	–
	20	14.9	15.3	15.9	16.8	18.3	21.1	23.3	–	–	–	–	–
	25	–	19.5	20.0	20.8	21.1	22.1	25.5	27.8	31.2	–	–	–
	30	–	20.3	21.1	22.3	23.4	25.2	27.3	31.7	34.9	43.1	–	–
	35	–	–	–	–	26.7	28.0	30.3	34.3	38.6	50.9	68.1	–
	40	–	–	–	–	28.0	29.6	34.9	40.5	44.9	56.7	70.5	–
	50	–	–	–	–	–	–	43.1	49.8	56.5	67.8	85.6	87.5

ORDER Code No. | L
GGBHDZ 16 — 30

DELIVERY 3 Days ☞ P.15

PRICE Without tax

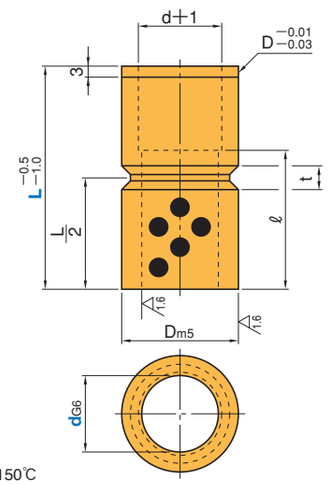
▶Quantity discount rate ☞ P.15

1~9	10~19	20~29	30~50	51~
100%	95%	90%	80%	Enquiry

Straight Guide Bushings

Oil-free Type

Material	Code
CAC304 (Copper alloy) Graphite (deposited)	GGBSDZ



⚠ Usable temperature range special solid lubricant up to 150℃

dG6		t	Dm5		ℓ									
					L15	L20	L25	L30	L35	L40	L50	L60	L80	L100
13	+0.017 +0.006	6	20	+0.017 +0.008	15	20	25	25	–	–	–	–	–	–
16			25		15	20	25	30	35	–	–	–	–	–
20			30		15	20	25	30	35	40	–	–	–	–
25	+0.020 +0.007	8	35	+0.020 +0.009	–	20	25	30	–	40	50	–	–	–
30			42		–	20	25	30	–	40	50	–	–	–
35	+0.025 +0.009		48		–	–	–	30	35	40	50	60	–	–
40			55	+0.024 +0.011	–	–	–	30	–	40	50	60	80	–
50			70		–	–	–	–	–	40	50	60	80	100

Code No.		L
Code	d	
GGBSDZ	13	15 20 25 30
	16	15 20 25 30 35
	20	15 20 25 30 35 40
	25	20 25 30 40 50
	30	20 25 30 40 50
	35	30 35 40 50 60
	40	30 40 50 60 80
	50	40 50 60 80 100

Code No.		@/P(1~9P)							
Code	d	20	25	30	35	40	50	60	80	100
GGBSDZ	13	8.24	9.27	10.0	–	–	–	–	–	–
	16	10.5	11.1	11.5	12.1	–	–	–	–	–
	20	11.2	12.4	13.1	13.9	13.9	–	–	–	–
	25	11.5	12.7	13.3	16.8	18.9	–	–	–	–
	30	15.3	16.5	17.7	20.0	22.3	–	–	–	–
	35	–	–	18.1	20.3	22.0	24.9	28.0	–	–
	40			20.8	24.5	26.1	30.2	38.0	–	–
	50	–	–	–	–	26.4	33.0	38.9	46.5	61.5

ORDER Code No. | L
GGBSDZ 25 — 50

DELIVERY 3 Days ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1~9	10~19	20~29	30~50	51~
100%	95%	90%	80%	Enquiry

Taper Pin Sets

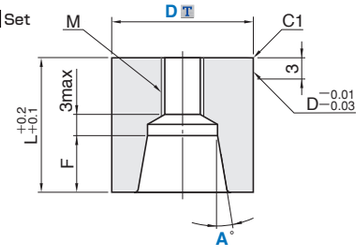
Standard Type

In stock

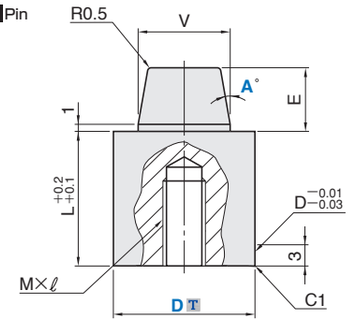
Material Hardness	Type	D T	Code		
			1+2 Set	1 Pin*	2 Sleeve
SKD11 58～62HRC	Matchmark type	Dk6	TTPN	—	—
	Super precision		TTPNV	TTPNVP	TTPNVB

⚠ The set with＊may not matched due to combined use with other brand.

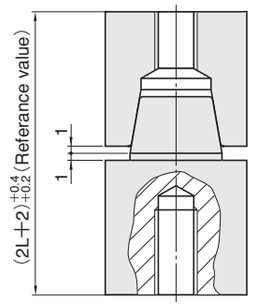
2 Set



1 Pin



Dimensions for combination



Code No.		A	L	V	E	F	M×ℓ	Dk6	@/P(1～9P)				
Code	D								TTPN	TTPNV	TTPNVP TTPNVB	VVTPN	VVTPNP VVTPNB
TTPN TTPNV (1+2 Set) TTPNVP (1 Pin) TTPNVB (2 Sleeve)	10	1	14	7	6	5	M 4×10	+0.010 +0.001	—	4,500	2,250	8,820	4,410
	13		14	7	6	5	M 4×10	+0.012 +0.001	4,280	4,500	2,250	8,820	4,410
	16		14	10	6	5	M 5×10		4,380	4,600	2,300	9,200	4,600
	20	3	19	13	9	8	M 6×12	+0.015 +0.002	4,650	4,900	2,450	9,980	4,990
	25	5	24	16	12	11	M 8×16		4,840	5,080	2,540	10,580	5,290
	30	10*	29	20	15	14	M10×20		5,210	5,480	2,740	11,660	5,830
	32		29	20	15	14	M10×20	+0.018 +0.002	5,310	5,580	2,790	—	—
	35		34	24	18	17	M12×24		5,580	5,880	2,940	—	—

⚠ A10＊is available for TTPN only.

ORDER

Code No.	A
TTPN 13 —	1

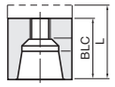
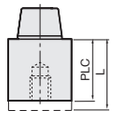
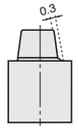
DELIVERY Next In stock working day ☞ P.15

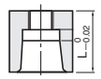
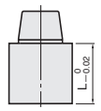
PRICE Without tax

▶Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	80%	Enquiry

ADDITION

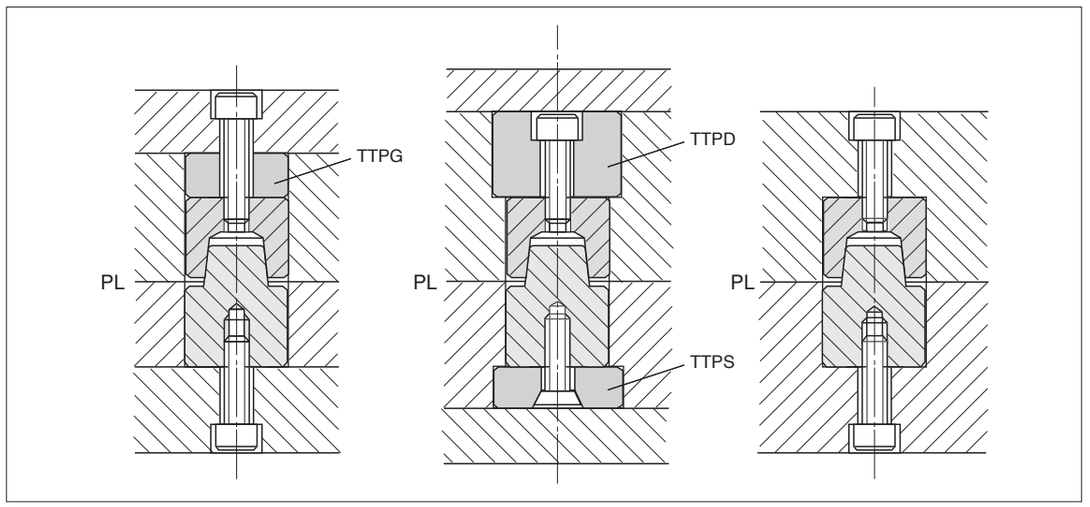
Add.	Code (@/P)	Spec.
L dimension of sleeve alteration 	BLC (0.9)	m 0.1 L−2≦BLC＜L ⚠ Threaded part is shortened according to (L−BLC) Press-in lead (−0.01 −0.03) is shortened according to (L−BLC) ⚠ Taper pin set is available.
L dimension of pin alteration 	PLC (0.9)	m 0.1 L−5≦PLC＜L ⚠ Threaded part is shortened according to (L−PLC) Press-in lead (−0.01 −0.03) is shortened according to (L−PLC) ⚠ Taper pin set is available.
Air vent processing (single side) 	AC (0.9)	Chamfer a 0.3mm deep flat parallel to the cone angle

Add.	Code (@/P)	Spec.
L dimension alteration 	BLK (2.8)	L +0.2 +0.1 → L +0.02 0 ⚠ Taper pin set is available. ☒ The overall length of the se is not available.
Point tapping 	PLK (2.8)	L +0.2 +0.1 → L +0.02 0 ⚠ Taper pin set is available. ☒ The overall length of the se is not available.

Code No.	A	BLC・PLC・AC・BLK・PLK
TTPN 13 —	1 —	BLC12.5—PLC10.4—AC—BLK—PLK

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Type	D T	Remarks
Matchmark type	Dk6	Align the pin and bushing's matchingmarkers for using of the set.
precision		Concentricity between the pin/bushing's external diameter and tapered section 0.01 or less.

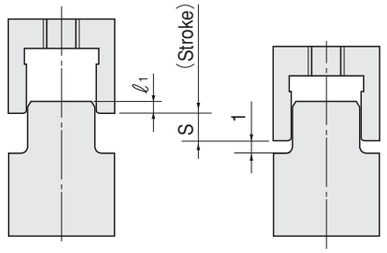


Locating Pin Sets

Material	Hardness	Code
SKD11	58～62HRC	TTPNF (1+2) TTPNFP (1) TTPNFB (2)

When locationg is begun

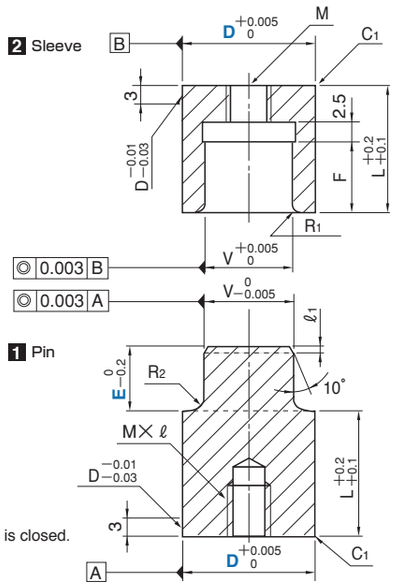
When mold is closed



⚠ Please leave 1mm clearance between pin side and bushing side when mold is closed.

2 Sleeve

1 Pin



Code No.		E	M	ℓ	ℓ1	R1	R2	V	F	L	S (Stroke)	@/P(1～9P) TTPNF (1+2 Set)	@/P(1～9P) TTPNFP(1 Pin) TTPNFB(2 Sleeve)
Code	D												
TTPNF (1+2 Set) TTPNFP (1 Pin) TTPNFB (2 Sleeve)	13	7	4	10	1.0	0.5	0.5	7	5	14.5	4.5	37.8	19.0
		13							11	24.5	10.5	46.7	23.4
	16	7	5	10				10	5	14.5	4.5	38.6	19.5
		13							11	24.5	10.5	46.7	23.4
	20	11	6	12	1.0	0.5	0.8	13	9	19.5	8.5	40.0	20.3
		16			2.0	1.0	1.5		14	29	12.0	49.5	24.9
	25	13	8	16	1.0	0.5	0.8	16	11	29.5	10.5	43.6	22.4
		20			2.0	1.0	1.5		18	34	16.0	54.2	27.1
	30	25	10	20	2.0	1.0	1.5	20	23	39	21.0	58.3	29.5

ORDER

Code No.	E
TTPNF 13	— 7

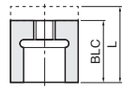
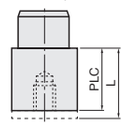
DELIVERY **5** Days ☞ P.15

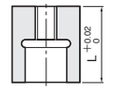
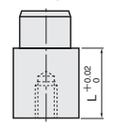
PRICE Without tax

▶Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	80%	Enquiry

ADDITION

Add.	Code (@/P)	Spec.
L dimension of sleeve alteration 	BLC (0.9)	(if) 0.1 L−2≦BLC＜L ⚠ Threaded part is shortened by (L−BLC) ⚠ Locating set is available.
L dimension of pin alteration 	PLC (0.9)	(if) 0.1 L−5≦PLC＜L ⚠ Threaded part is shortened by (L−PLC) ⚠ Locating set is available.

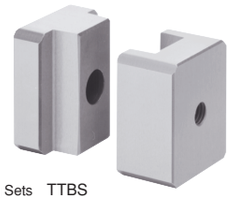
Add.	Code (@/P)	Spec.
L tolerance of sleeve alteration 	BLK (2.8)	$L^{+0.2}_{+0.1} \rightarrow L^{+0.02}_{0}$ ⚠ Locating set is available. ☒ The overall length of the set is not available
L tolerance of pin alteration 	PLK (2.8)	$L^{+0.2}_{+0.1} \rightarrow L^{+0.02}_{0}$ ⚠ Locating set is available. ☒ The overall length of the set is not available

Code No.	E	BLC・PLC…etc.
TTPNF 13	— 7	— BLC13.5−BLK

Product unit price＋Addition unit price.
Price discount is also available for addition.

☞ P.14

Taper Block Sets

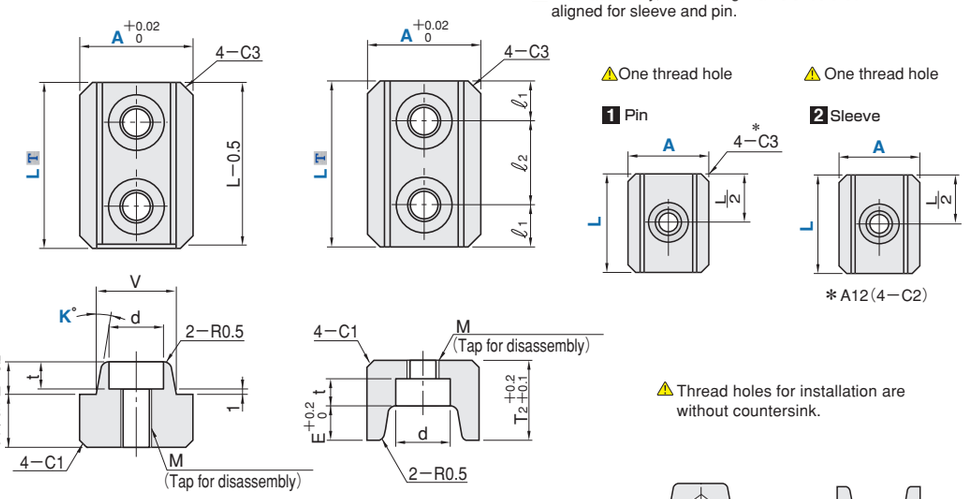


Locating Marking Sets TTBS

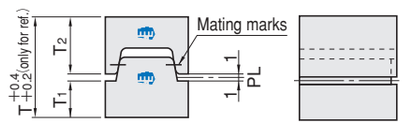
Material Hardness	Type	A T	Code 1+2 Set
SKD11 58～62HRC	Matchmark type	0 +0.02	TTBS

A20～65（TTBS20－20・25、TTBS25－20・25、TTBS30－25 excluded）

⚠ After assembly, the mating marks should be aligned for sleeve and pin.



Dimension for assembly



⚠ Make sure the logo "PUNCH" facing outside for identification.

Code No. Code	A	L	K	T L	V	E	T	T1	T2	Hole for installation ℓ1	ℓ2	d	t	Screw for assembly	Screw for disassembly M	@/Set (1～9Set)
TTBS	12	15	1 3 5	0 −0.3	7	5	23	7	14	7.5	—	—		M3	M 3	31.4
		20								10						35.9
	16	20			9	7	23	7	14	10	—			M4	M 4	37.8
		25								12.5						39.2
	20	20			12	7	23	7	14	10	—	6.5	6.5	M3	M 4	42.3
		25								12.5						43.6
		30								7.5	15					46.1
		40								10	20					47.4
	25	20			15	8	28	9	17	10	—	8	5	M4	M 5	41.1
		25								12.5						42.3
		30								7.5	15					44.8
		40								10	20					46.1
	30	25			17	8	32	10	20	12.5	—	9	6	M5	M 6	46.8
		30								7.5	15					48.1
		40								10	20					49.9
	35	30			20	10	35	11	22	7.5	15	9	6	M5	M 6	52.0
		40								10	20	11	7	M6	M 8	53.7
		50								10	30					57.5
	45	40			25	15	45	14	29	10	20					60.3
		50								10	30					62.8
		75								17.5	40					69.2
		100	3 5	−0.2 −0.5						20	60					90.3
	65	60			35	20	60	19	39	15	30					112
		90								20	50	14	9	M8	M10	165
		120								30	60					195

ORDER

Code No.	L	K
TTBS 12 —	15 —	1

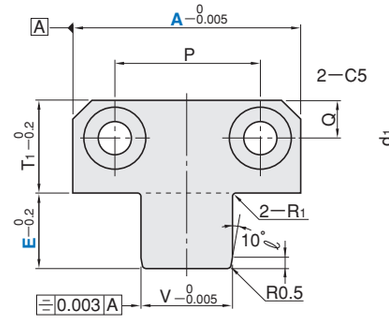
PRICE Without tax

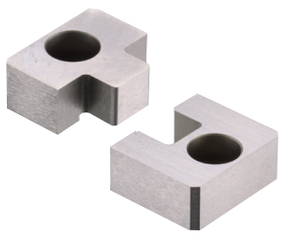
▶Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	80%	Enquiry

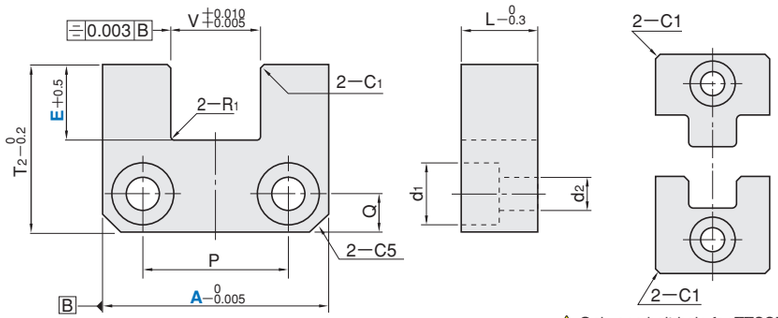
DELIVERY 3 Days ☞ P.15

Side Straight Block Sets





Material	Hardness	Code
SKD11	58～62HRC	TTSSB



⚠ Only one bolt hole for TTSSB20−6

Code No.		E	P	Q	T1	T2	ℓ	R1	C1	V	d1	d2	L	L1	@/P (1～9P)
Code	A														
TTSSB	20	6	—	5	11	17	1	1	0.5	8	8	4.5	8	3	58.4
	30	8	16	6	14	22	1	1	0.5	12	9.5	5.5	10	4	68.1
		20				34	2	2	1						78.6
	40	10	22	7	18	28	1	1	0.5	15	11	6.6	13	6	78.0
		25				43	2	2	1						91.7
	60	20	36	12	30	50	2	2	1	25	14	8.6	20	11	125
		35				65									138
	80	30	52	14	40	70	2	2	1	30	18	11	25	14	159
		45				85									197

ORDER

Code No.	E
TTSSB 30 —	8

PRICE Without tax

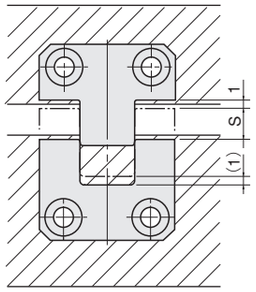
▶Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	80%	Enquiry

DELIVERY 6 Days ☞ P.15

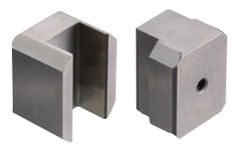
▶Features：
- Used for precision location of mold.
- Suitable specifically for location of cavity and core.

▶Notice
- Be sure there is 1mm clearance between two blocks after close.
- Fitting clearance is very small.



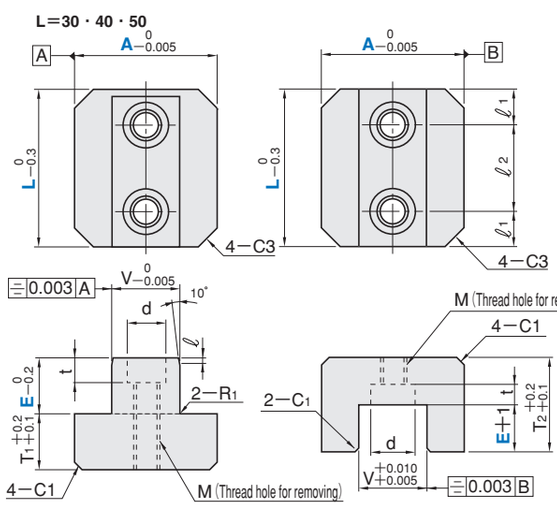
E	S (Maximum fitting length)
6	3.5
8	5.5
10	7.5
20	16.0
25	21.0
30	26.0
35	31.0
45	41.0

Straight Locating Block Sets

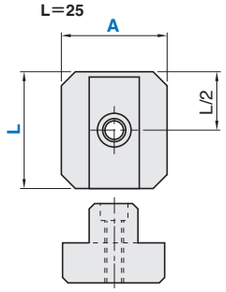


Material	Hardness	Code
SKD11	58～62HRC	TTBSF

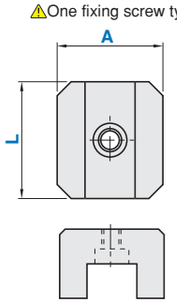
L=30・40・50



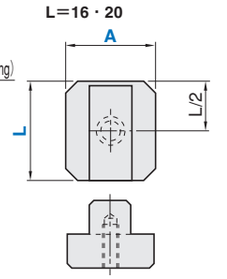
L=25



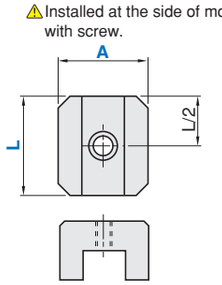
⚠One fixing screw type



L=16・20



⚠Installed at the side of mold with screw.



Code No.		L	E	V	T1	T2	ℓ	R1	C1	Screw hole						@/P (1～9P)
Code	A									ℓ1	ℓ2	d	t	Screw size	M	
TTBSF	16	16	8	9	8	17	1	0.5	0.5	16	16	—		M4	M4	62.5
			12			21										82.0
		20	8			17				20	20					64.9
			12			21										83.0
	20	25	8	12	8	17				25	25	6.5	3.5	M3	M4	70.6
			12			21										85.2
		30	8			17				30	30					73.9
			12			21										86.2
	25	25	10	15	10	21	1	0.5	0.5	25	25	8	5	M4	M5	77.1
			15			26	2	1	1							90.6
		30	10			21	1	0.5	0.5	30	30					80.3
			15			26	2	1	1							93.9
	30	30	12	17	12	23	1	0.5	0.5	30	30	9.5	6	M5	M6	87.0
			20			31	2	1	1							110
		40	12			23	1	0.5	0.5	40	40					93.4
			20			31	2	1	1							122
	35	40	15	20	12	28	2	1	1	40	40	11	7	M6	M6	115
			25			38										130
		50	15			28				50	50					133
			25			38										153

ORDER

Code No.	L	E
TTBSF 16 —	16 —	8

DELIVERY Next In stock working day ☞ P.15

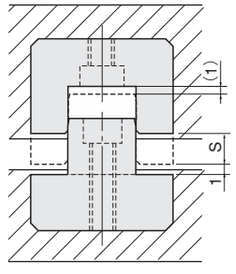
PRICE Without tax

▶Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	80%	Enquiry

▶Features：
- Used for precision location of mold.
- Suitable specifically for location of cavity and core.

▶Note：
- Be sure there is 1mm clearance between two blocks after close. Fitting clearance is very small.



E	S (effective lengthmax)
8	5.5
10	7.5
12	9.5
15	11.0
20	16.0
25	21.0

COMPONENTS of EJECTOR SPACE

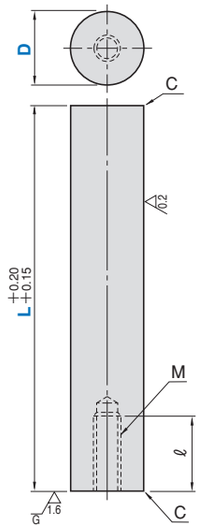
Guide for Components of ejector Space

Ejector Guide Pins	Precision Guide Pins	Ejector Guide Bushings	Ejector Guide Bushings
			
EEGH P.152 3	P.153 3	EEGBH EEGBZS P.154 3	EEGBN EEGBZ P.154 5

Ejector Guide Bushings Linear Guide Type	Return Pins General Type	Return Pins The Overall Length Designated Type	Support Pillars Tapped Type
			
EEGBL P.155 In stock	RRP4TH RRP8TH P.156 5	RRP4TL RRP8TL RRP4TZ RRP8TZ P.158 5	SSPL P.160 5

Ejector Guide Pins

Material	Hardness	Code
SUJ2	58HRC～ (Induction hardening for D30 or higher)	EEGH



D	C
6～30	0.5
32～50	1.5

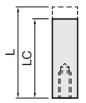
ORDER

Code No.	L
EEGH 8 —	50

DELIVERY **3** Days ☞P.15

ADDITION ▶Quantity discount rate ☞P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	80%	Enquiry

Add.	Code (@/P)	Spec.
L dimension alteration 	LC D / @/P 8～30 / 0.9 32～50 / 1.8	(if) 5 Lmin.＜LC＜Lmax.
L dimension tolerance alteration 	LKC (1.8)	For L≦200, $L^{+0.20}_{+0.15}$ →$L^{+0.02}_{0}$ For L＞200, $L^{+0.20}_{+0.15}$ →$L^{+0.03}_{0}$ ⚠ ℓ dimension is according to standard.

Code No.	L (C)	LKC・LKV・AVC
EEGH 50 —	LC170.6 —	LKC

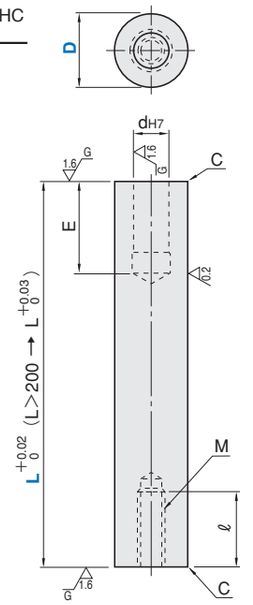
Product unit price＋Addition unit price.
Price discount is also available for addition. ☞P.14

Code No. Code	D	L (if) 5	D		M×P	ℓ	@/P (1～9P)
EEGH	8	40～ 70	8	−0.015 −0.020	M 5×0.8	10	2.03
		75～100					2.37
	10	40～ 70	10				2.24
		75～100					2.56
	12	40～ 70	12				2.43
		75～100					2.74
	13	40～ 70	13				2.62
		75～100					2.95
		105～125					3.20
		130～150		−0.020 −0.025	M 6×1.0	12	3.52
	16	40～70	16				2.95
		75～100					3.27
		105～125					3.65
		130～150					4.03
	20	40～ 70	20				3.27
		75～ 90					3.52
		95～110					3.84
		115～130					4.28
		135～150					4.74
		155～175					5.25
	25	50～ 70	25				4.15
		75～ 90		−0.025 −0.030	M 8×1.25	16	4.48
		95～110					4.74
		115～130					5.25
		135～150					5.96
		155～170					6.73
		175～200					7.43
		205～225					8.25
		230～250					9.17
	30	50～ 70	30				6.02
		75～ 90					6.34
		95～110					7.05
		115～130					7.62
		135～150					8.14
		155～170					9.03
		175～200					9.93
		205～225		−0.025 −0.030	M10×1.5	20	10.4
		230～250					10.7
		255～275					12.5
		280～300					14.3
	32	50～ 70	32				7.50
		75～ 90					7.87
		95～110					8.84
		115～130					9.53

Code No. Code	D	L (if) 5	D		M×P	ℓ	@/P (1～9P)
EEGH	32	135～150	32	−0.025 −0.030	M10×1.5	20	10.3
		155～170					11.2
		175～200					11.8
		205～225					12.8
		230～250					13.3
		255～275					15.5
		280～300					17.7
	35	50～ 70	35				8.20
		75～ 90					8.52
		95～110					9.42
		115～130					10.4
		135～150					11.5
		155～170					12.4
		175～200					13.4
		205～225					14.3
		230～250					15.2
		255～275					17.1
		280～300					19.0
	40	50～ 70	40				9.17
		75～ 90					9.74
		95～110					10.4
		115～130					10.9
		135～150					11.3
		155～170					13.6
		175～200					15.6
		205～225					17.8
		230～250					19.9
		255～275					22.5
		280～300					24.9
		305～325					27.4
		330～350					29.8
	50	50～ 70	50				13.1
		75～ 90					15.2
		95～110					16.4
		115～130					17.7
		135～150					19.5
		155～170					20.9
		175～200					22.5
		205～225					24.9
		230～250					27.7
		255～275					30.5
		280～300					33.4
		305～325					36.5
		330～350					39.6

Precision Guide Pins

Material	Hardness	Code
SUJ2	58HRC～ (Through hardening) (Induction hardening for D30 higher)	EEGHC



Dowel pin size

D	Dowel pin
8	MMSTH 5—25
10	
12	MMSTH 6—30
13	
16	
20	MMSTH 8—40
25	MMSTH 10—40
30	MMSTH 13—50
32	
35	
40	MMSTH 16—50
50	

D	C
6～30	0.5
32～50	1.5

⚠ Accessory：Dowel pin MMSTH (h7)

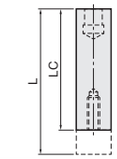
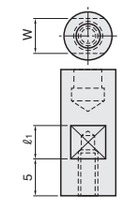
ORDER

Code No.	L
EEGHC 10 —	40

DELIVERY **3** Days ☞P.15

PRICE Without tax ▶Quantity discount rate ☞P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	80%	Enquiry

Add.	Code (@/P)	Spec.
L dimension alteration 	LC D / @/P 10～30 / 0.9 32～50 / 1.8	(if) 5 Lmin.＜LC＜Lmax. ⚠ E is made according to standard size. ⚠ Standard type is designated by increment of 5mm, and length of thread hole is shortened according by (L−LC).
L dimension tolerance alteration 	LKC (1.8)	D / W / ℓ1 10 / 8 / 8 12 / 8 / 8 13 / 8 / 8 16 / 13 / 10 20 / 17 / 10 25 / 22 / 10 30 / 27 / 15 32 / 27 / 15 35 / 30 / 15 40 / 36 / 20 50 / 46 / 20

Code No.	L (C)	SC・LKV
EEGHC 50 —	LC170.6 —	SC

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞P.14

Code No. Code	D	L (if) 5	D		M×P	ℓ	dH7		E	@/P (1～9P)
EEGHC	10	40～ 70	10	−0.015 −0.020	M5×0.8	10	5	+0.012 0	12	5.31
		75～100								5.56
	12	40～ 70	12							5.50
		75～100								5.77
	13	40～ 70	13							5.64
		75～100								5.89
		105～125								6.14
		130～150		−0.020 −0.025	M6×1.0	12	6		15	6.73
	16	40～ 70	16							5.96
		75～100								6.27
		105～125								6.59
		130～150								6.84
	20	50～ 90	20				8		20	6.84
		95～120								7.24
		125～150								8.08
		155～175								8.96
	25	50～ 90	25		M8×1.25	16	10	+0.015 0		7.30
		95～120								8.39
		125～150								9.28
		155～200								10.3
		205～230		−0.025 −0.030						11.6
		235～250								12.0
	30	50～ 90	30		M10×1.5	20	13	+0.018 0	25	11.2
		95～120								12.0
		125～150								12.9
		155～200								14.8
		205～230								15.0
		235～250								15.5
		255～275								17.3
		280～300								19.0

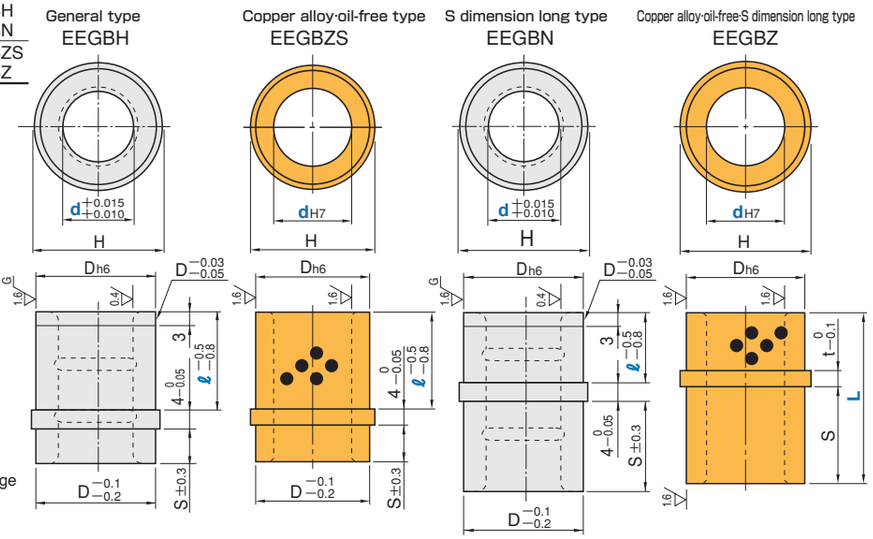
Code No. Code	D	L (if) 5	D		M×P	ℓ	dH7		E	@/P (1～9P)
EEGHC	32	50～ 90	32	−0.025 −0.030	M10×1.5	20	13	+0.018 0	25	12.8
		95～120								13.4
		125～150								14.0
		155～200								15.8
		205～250								21.2
		255～275								21.8
		280～300								22.5
	35	50～120	35							15.2
		125～150								16.4
		155～200								18.1
		205～250								20.0
		255～275								22.0
		280～300								23.9
	40	50～120	40							16.4
		125～150								17.4
		155～220								21.8
		225～250								26.1
		255～275								28.6
		280～300								30.9
		305～325								33.4
		330～350								35.9
	50	50～120	50							22.0
		125～150								23.9
		155～220								30.5
		225～250								34.0
		255～275								37.7
		280～300								41.4
		305～325								45.0
		330～350								48.6

Ejector Guide Bushings

In stock

Material	Hardness	Code
SUJ2	58HRC～	EEGBH EEGBN
CAC304 (Copper alloy)	—	EEGBZS EEGBZ

⚠ Usable temperature range of the special solid lubricant up to 150℃



▶ General type

Code No. Code	d	ℓ	S	H	Dh6		@/P (1～9P)
EEGBH	8	10 13	8	19	16	0 −0.011	4.68
		15					4.99
	10	10 13	8	21	18		4.99
		15 20					5.31
	13	10 13 15	10	25	22		5.31
		20 25					6.02
	16	10 13 15	10	28	25	0 −0.013	6.02
		20 25					6.73
	20	10 13 15	10	33	30		6.73
		20 25 30					7.81
	25	13 15	10	38	35		7.81
		20 25 30					8.84
	30	13 15 20 25 30	15	43	40	0 −0.016	10.4
	32	15 20 25 30	15	45	42		11.3
	35	20 25 30	20	48	45		11.3
	40	20 25 30	20	55	52	0 −0.019	14.2
	50	25 30	20	65	62		17.7

▶ Copper alloy, oil-free type

Code No. Code	d	ℓ	S	H	Dh6		@/P (1～9P)
EEGBZS	13	10 13 15	10	25	22	0 −0.013	14.5
	16	13 15	10	28	25		15.2
		20					15.6
	20	13 15	10	33	30		16.2
		20					17.1
	25	15	10	38	35		18.4
		20 25					20.8
	30	15 20 25	15	43	40	0 −0.016	23.3
	35	20 25	20	48	45		26.1
	40	20 25 30	20	55	52		28.0
	50	25 30	20	65	62	0 −0.019	41.8

ORDER

Code No.	ℓ	L
EEGBH 8	—	10
EEGBZ 13	—	25

DELIVERY

EEGBH	EEGBN	EEGBZS EEGBZ
Next In stock working day	3 Days	Enquiry

☞ P.15

▶ S dimension long type

Code No. Code	d	ℓ	S	H	Dh6		@/P (1～9P)
EEGBN	13	10	ℓ+8	25	22	0 −0.013	7.24
		15 20					9.09
	16	10		28	25		8.20
		15 20					10.2
	20	10 15		33	30		9.17
		20 25					12.8
	25	10		38	35		11.0
		15 20 25					14.7
	30	20 25 30		43	40	0 −0.016	15.5
	32	20 25 30		45	42		16.4
	35	20 25 30		48	45		19.3
	40	20 25 30		55	52		21.2
	50	20 25 30		65	62	0 −0.019	24.2

▶ Copper alloy, oil-free, S dimension long type

Code No. Code	d	ℓ	S	H	Dh6		@/P (1～9P)
EEGBZ	13	25	14	25	22	0 −0.013	13.3
	16	25		28	25		14.6
		33	19				15.3
	20	25	14	33	30		15.0
		33	19				16.8
		38					18.9
		43	24				20.6
	25	25	14	38	35		17.7
		33	19				18.9
		38					19.5
		43 53	24				21.5
	30	33	19	43	40	0 −0.016	20.3
		38	24				21.5
		43					23.0
		53	29				27.1
	35	38	24	48	45		23.0
		43					25.2
		53	29				26.1
		68	39				30.9
	40	43	24	61	55		27.3
		53	29				29.0
		68	39			0 −0.019	36.1
	50	53	29	71	65		48.9
		68	39				57.1

PRICE Without tax

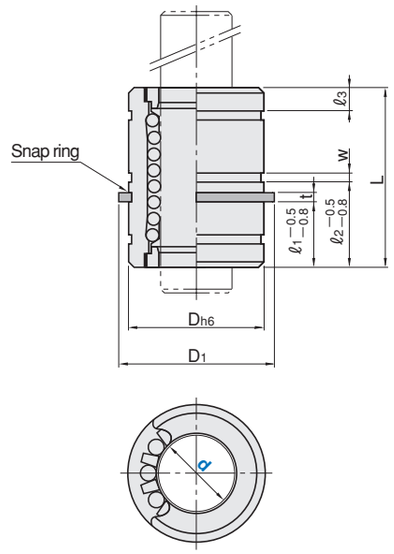
▶ Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	80%	Enquiry

Ejector Guide Bushings

Linear Guide Type

Material	Hardness	Code
Bushing body Steel ball：SUJ2	58HRC～	EEGBL
Cage：Steel	—	



Accessory：Snap ring (EEGBW) (1 pcs)

⚠ Snap ring is installed into groove which is located at ℓ1.

Code No. Code	d	d		Dh6		D1	L		ℓ1	ℓ2	ℓ3	t	W	Dynamic load N	@/P (1～9P)
EEGBL	8	8	0 −0.009	15	0 −0.011	19.3	24	0 −0.2	10	—	3.25	1.0	1.1	265	9.40
	10	10		19	0 −0.013	23.6	29		13	—	3.5	1.2	1.3	373	9.40
	13	13		23		28.5	32			—	4.5			510	9.40
	16	16		28		34.2	37		15	20	5.25	1.5	1.6	775	11.8
	20	20		32		38.4	42		20	25	5.75			863	15.3
	25	25	0 −0.010	40	0 −0.016	47.1	59	0 −0.3			9	1.75	1.85	981	21.2
	30	30		45		52.8	64		25	30	9.75			1,569	30.6

Load {kgf} =Load N×0.101972

ORDER

Code No.
EEGBL 8

DELIVERY

Next In stock working day ☞ P.15

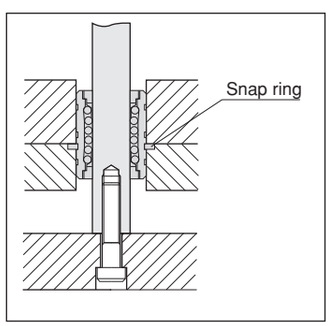
PRICE Without tax

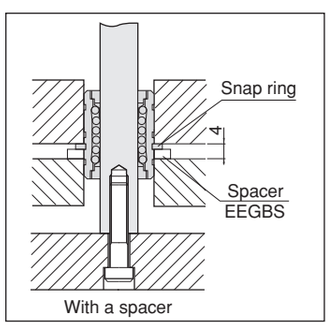
▶ Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	80%	Enquiry

▶ Features
- Location of snap ring is decided by the thickness of ejector plate.
- Only special spacer (EEGBS) can be used with snap ring.

▶ Precaution
- Service temperature is 80℃ or lower



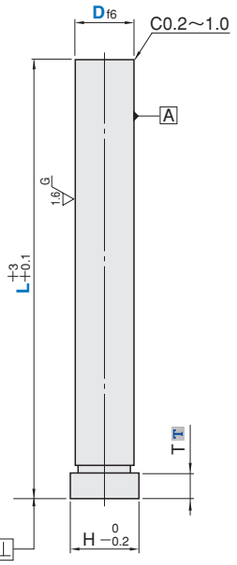


COMPONENTS of EJECTOR SPACE

Return Pins

General Type

Material	Hardness	T T	Code
SUJ2	58HRC～ (Induction hardening)	$4^{0}_{-0.05}$	RRP4TH
		$8^{0}_{-0.1}$	RRP8TH



⚠ A center hole may be left on one or both ends.

▶ Coil springs for return pin
(Coil spring details ☞ P.215～)

Return pin	Coil spring for return pin		
D	SSWU	SSWR	SSWS
8	ϕ14.5	ϕ14.5	ϕ14.5
10	ϕ17	ϕ17	ϕ17
12	ϕ21	ϕ21	ϕ21
13	ϕ21	ϕ21	ϕ21
15	ϕ26	ϕ26	ϕ26
16	ϕ26	ϕ26	ϕ26
20	ϕ31	ϕ31	ϕ31
25	ϕ37	ϕ37	ϕ37
30	ϕ43	ϕ43	ϕ44.5
32	–	ϕ46	ϕ46
35	–	ϕ50	ϕ52

Code No.		L	H	Df6	
Code	D	(if) 50			
RRP4TH	8	150～250	11	8	$^{-0.013}_{-0.022}$
	10	150～300	15	10	
	12	150～300	17	12	$^{-0.016}_{-0.027}$
	13	150～300	18	13	
	15	150～350	20	15	
	16	150～350	21	16	
	20	150～400	25	20	$^{-0.020}_{-0.033}$
	25	150～450	30	25	
	30	150～450	35	30	
	32	150～450	37	32	$^{-0.025}_{-0.041}$
RRP8TH	10	150～300	15	10	$^{-0.013}_{-0.022}$
	12	150～300	17	12	$^{-0.016}_{-0.027}$
	13	150～300	18	13	
	15	150～350	20	15	
	16	150～350	21	16	
	20	150～600	25	20	$^{-0.020}_{-0.033}$
	25	150～600	30	25	
	30	150～650	35	30	
	32	150～650	37	32	$^{-0.025}_{-0.041}$
	35	300～700	40	35	
	40	300～700	45	40	
	50	300～700	55	50	

ORDER

Code No.	L
RRP4TH 8 –	200

DELIVERY 5 Days ☞ P.15

PRICE Without tax

▶ Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	80%	Enquiry

Code No.	D \ L	@/P(1～9P)											
		150	200	250	300	350	400	450	500	550	600	650	700
RRP4TH	8	3.55	4.77	6.70	–	–	–	–	–	–	–	–	–
	10	3.55	4.77	6.70	8.53	–	–	–	–	–	–	–	–
	12	4.02	5.18	7.18	9.08	–	–	–	–	–	–	–	–
	13	4.02	5.18	7.18	9.08	–	–	–	–	–	–	–	–
	15	4.09	5.33	6.90	8.74	10.7	–	–	–	–	–	–	–
	16	4.09	5.33	6.90	8.74	10.7	–	–	–	–	–	–	–
	20	4.65	5.87	7.78	9.77	11.7	14.3	–	–	–	–	–	–
	25	5.87	7.45	9.43	11.6	13.9	16.2	18.4	–	–	–	–	–
	30	7.18	9.08	11.1	13.0	16.2	18.9	21.4	–	–	–	–	–
	32	7.18	9.08	11.1	13.0	16.2	18.9	21.4	–	–	–	–	–
RRP8TH	10	24.1	32.4	45.5	58.0	–	–	–	–	–	–	–	–
	12	27.3	35.2	48.8	61.7	–	–	–	–	–	–	–	–
	13	27.3	35.2	48.8	61.7	–	–	–	–	–	–	–	–
	15	27.8	36.2	46.9	59.4	72.4	–	–	–	–	–	–	–
	16	27.8	36.2	46.9	59.4	72.4	–	–	–	–	–	–	–
	20	31.6	39.9	52.9	66.4	79.4	96.8	132	167	198	229	–	–
	25	39.9	50.6	64.1	78.5	94.4	110	143	176	220	264	–	–
	30	48.8	61.7	75.2	88.0	110	128	176	220	269	331	392	–
	32	48.8	61.7	75.2	88.0	110	128	176	220	269	331	392	–
	35	–	–	–	207	239	270	331	391	451	511	573	636
	40	–	–	–	207	239	270	331	391	451	511	573	636
	50	–	–	–	258	291	331	396	476	549	622	695	794

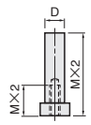
ADDITION

Add.	Code (@/P)	Spec.
Head Tapping	MMC	(if) 1

D	@/P
4·5·6	1.8
8·10·12	2.8

Thread hole size

D	Thread hole M
8	4
10	4·5
12	
13	5·6
15	
16	6·8
20	
25	8·10
30	
32	
35	8·10·12
40	
50	



Add.	Code (@/P)	Spec.							
Parallel flats cutting on the head	SC (1.8)	D	8	10	12	13	15	16	20
		B	8	10	13	13	17	17	22
		D	25	30	32	35	40	50	
		B	27	32	32	35	40	50	

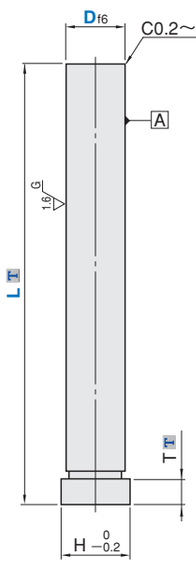
Code No.	L	MMC・SC
RRP4TH 10 –	200 –	MMC 5

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Return Pins

The overall Length Designated Type

Material	Hardness	T T	L T	Perpendicularity of head	Code
SUJ2	58HRC～ (Induction hardening)	$4^{0}_{-0.05}$	$^{+0.5}_{+0.1}$	⊥ 0.1 A	RRP4TL
		$8^{0}_{-0.1}$			RRP8TL
		$4^{0}_{-0.05}$	L≦200→$^{+0.02}_{0}$ L>200→$^{+0.05}_{0}$	⊥ 0.02 A	RRP4TZ
		$8^{0}_{-0.1}$			RRP8TZ



D	f6
8 10	$^{-0.013}_{-0.022}$
12 13 15 16	$^{-0.016}_{-0.027}$
20 25 30	$^{-0.020}_{-0.033}$
32 35 40 50	$^{-0.025}_{-0.041}$

⚠ A center hole may be left on one or both ends.

Code No. Code	D	L ⓜ 10	H
RRP4TL	8	35.0～250.0	11
	10	35.0～300.0	15
	12	35.0～300.0	17
	13	35.0～300.0	18
	15	35.0～350.0	20
	16	35.0～350.0	21
	20	50.0～400.0	25
	25	50.0～450.0	30
	30	50.0～450.0	35
	32	50.0～450.0	37
RRP8TL	10	35.0～300.0	15
	12	35.0～300.0	17
	13	35.0～300.0	18
	15	35.0～350.0	20
	16	35.0～350.0	21
	20	50.0～600.0	25
	25	50.0～600.0	30
	30	50.0～650.0	35
	32	50.0～650.0	37
	35	100.0～700.0	40
	40	100.0～700.0	45
	50	100.0～700.0	55

Code No. Code	D	L ⓜ 10	H
RRP4TZ	8	35.00～250.00	11
	10	35.00～300.00	15
	12	35.00～300.00	17
	13	35.00～300.00	18
	15	35.00～350.00	20
	16	35.00～350.00	21
	20	50.00～400.00	25
	25	50.00～450.00	30
	30	50.00～450.00	35
	32	50.00～450.00	37
RRP8TZ	10	35.00～300.00	15
	12	35.00～300.00	17
	13	35.00～300.00	18
	15	35.00～350.00	20
	16	35.00～350.00	21
	20	50.00～400.00	25
	25	50.00～450.00	30
	30	50.00～450.00	35
	32	50.00～450.00	37

ORDER

Code No.	L
RRP4TL 8	— 150.0

DELIVERY 5 Days ☞ P.15

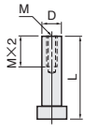
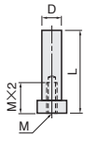
PRICE Without tax ▶Quantity discount rate ☞ P.15

1～9	10～19	20～29	30～50	51～
100%	95%	90%	80%	Enquiry

Code No.	D \ L	@/P(1～9P) 35.0～150.0	150.1～200.0	200.1～250.0	250.1～300.0	300.1～350.0	350.1～400.0	400.1～450.0	450.1～500.0	500.1～550.0	550.1～600.0	600.1～650.0	650.1～700.0
RRP4TL	8	6.83	8.06	9.30	–	–	–	–	–	–	–	–	–
	10	6.83	8.06	9.90	11.6	–	–	–	–	–	–	–	–
	12	7.24	8.48	10.4	11.7	–	–	–	–	–	–	–	–
	13	7.24	8.48	10.4	11.7	–	–	–	–	–	–	–	–
	15	7.30	8.53	10.2	12.0	13.8	–	–	–	–	–	–	–
	16	7.30	8.53	10.2	12.0	13.8	–	–	–	–	–	–	–
	20	7.93	9.08	11.1	13.0	14.9	16.8	–	–	–	–	–	–
	25	9.08	10.8	12.6	14.8	17.1	19.5	22.7	–	–	–	–	–
	30	10.4	12.4	14.3	16.2	19.5	22.0	26.5	–	–	–	–	–
	32	10.4	12.4	14.3	16.2	19.5	22.0	26.5	–	–	–	–	–
RRP8TL	10	6.83	8.06	9.90	11.6	–	–	–	–	–	–	–	–
	12	7.24	8.48	10.4	11.7	–	–	–	–	–	–	–	–
	13	7.24	8.48	10.4	11.7	–	–	–	–	–	–	–	–
	15	7.30	8.53	10.2	12.0	13.8	–	–	–	–	–	–	–
	16	7.30	8.53	10.2	12.0	13.8	–	–	–	–	–	–	–
	20	7.93	9.08	11.1	13.0	14.9	16.8	20.0	25.3	29.8	34.3	–	–
	25	9.08	10.8	12.6	14.8	17.1	19.5	22.7	26.5	33.0	39.6	–	–
	30	10.4	12.4	14.3	16.2	19.5	22.0	26.5	33.0	40.2	49.3	58.3	–
	32	10.4	12.4	14.3	16.2	19.5	22.0	26.5	33.0	40.2	49.3	58.3	–
	35	31.2	31.2	31.2	31.2	35.8	40.5	49.3	58.1	67.0	75.9	85.0	94.2
	40	31.2	31.2	31.2	31.2	35.8	40.5	49.3	58.1	67.0	75.9	85.0	94.2
	50	38.6	38.6	38.6	38.6	43.6	49.3	59.0	70.8	81.4	92.3	103	118

Code No.	D \ L	@/P(1～9P) 35.0～150.0	150.1～200.0	200.1～250.0	250.1～300.0	300.1～350.0	350.1～400.0	400.1～450.0
RRP4TZ RRP8TZ	8	10.2	11.5	12.6	–	–	–	–
	10	10.2	11.5	13.3	15.2	–	–	–
	12	10.8	11.9	13.8	15.8	–	–	–
	13	10.8	11.9	13.8	15.8	–	–	–
	15	10.9	12.0	13.7	15.3	17.4	–	–
	16	10.9	12.0	13.7	15.3	17.4	–	–
	20	11.7	12.8	14.8	16.5	18.6	20.5	–
	25	13.0	14.6	16.5	18.7	21.1	23.3	25.5
	30	14.5	16.4	18.3	20.2	23.6	26.1	28.7
	32	14.5	16.4	18.3	20.2	23.6	26.1	28.7

ADDITION

Add.	Code(@/P)	Spec.
Point tapping 	MC	D: 4·5·6 @/P 1.8; 8·10·12·16 @/P 2.8 Thread hole size: D 8,10,12 → M 4; D 13,15 → M 4·5; D 16,20 → M 5·6; D 25,30,32,35,40,50 → M 6·8·10·12
Head tapping 	MMC	D: 4·5·6 @/P 1.8; 8·10·12 @/P 2.8 Thread hole size: D 8,10,12 → M 4; D 13,15 → M 4·5; D 16,20 → M 5·6; D 25,30,32 → M 6·8; D 35,40,50 → M 8·10·12

Add.	Code(@/P)	Spec.
Parallel flats cutting on the head 	SC(1.8)	D: 8 10 12 13 15 16 20; B: 8 10 13 13 17 17 22 D: 25 30 32 35 40 50; B: 27 32 32 35 40 50

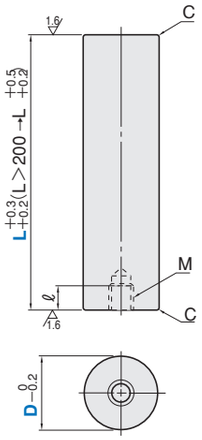
Code No.	L	MC·MMC·SC
RRP4TL 20	— 300.0	— MC12—MMC8

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Support Pillars

Tapped Type

Material	Surface treatment	Code
S45C	Blacking (Fe_3O_4)	SSPL



D	C
12～18	0.3
20～50	0.5
55～80	0.8

⚠ No surface treatment on upper end for some dimension.

Code No. Code	D	L (IT) 5	L (IT) 10	M×P	ℓ	@/P (1～9P)
SSPL	12	40～55*	60～ 70*	M6×1.0	12	2.23
		–	80～100*			2.40
	14	40～55*	60～ 70*			2.31
		–	80～120*			2.55
	16	40～55*	60～ 70*			2.40
		–	80～120*			2.71
	18	40～55*	60～ 70*			2.48
		–	80～120*			2.87
	20	40～55*	60～ 70*			2.64
		–	80～120			3.03
			130～150			4.56
	25	40～55*	60～ 80			3.43
		–	90～120			3.83
			130～150			5.36
	30	–	50～ 80			4.17
			90～120			4.56
			130～160			6.48
			170～200			8.00
			210～250			9.52
			260～300			11.1
	32	–	50～ 80			4.56
			90～120			4.96
			130～160			6.87
			170～200			8.40
			210～250			9.93
			260～300	M8×1.25	16	11.5
	35	–	50～ 90			4.96
			100～120			5.59
			130～150			7.45
			160～180			8.73
			190～210			9.93
			220～250			11.1
			260～300			12.6
	40	–	50～ 90			5.36
			100～120			6.08
			130～150			7.61
			160～180			9.93
			190～210			11.5
			220～250			13.0
			260～300			14.8

Code No. Code	D	L (IT) 10	M×P	ℓ	@/P (1～9P)
SSPL	45	50～ 90	M 8×1.25	16	7.68
		100～120			9.24
		130～170			12.3
		180～200			14.7
	50	50～ 90			9.93
		100～120			12.2
		130～170			14.5
		180～200			17.5
		210～250			19.0
		260～300			22.1
		310～350			25.0
		360～400			28.1
	55	50～ 90	M12×1.75	24	12.0
		100～120			14.2
		130～170			16.4
		180～200			19.6
	60	70～ 90			13.7
		100～120			15.9
		130～170			18.1
		180～200			21.2
		210～250			22.7
		260～300			25.8
		310～350			28.7
		360～400			31.8
	80	70～ 90			17.5
		100～120			19.8
		130～170			22.1
		180～200			25.0
		210～250			26.5
		260～300			30.3
		310～350			34.2
		360～400			37.3

ORDER

Code No.	L
SSPL 32 —	80

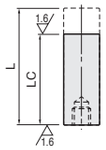
DELIVERY **5** Days ☞ P.15

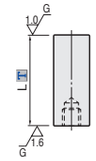
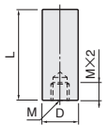
PRICE Without tax

▶Quantity discount rate ☞ P.15

1～9	10～19	20～49	50～100	101～
100%	95%	90%	80%	Enquiry

ADDITION

Add.	Code (@/P)	Spec.
L dimension alteration 	LC D / @/P 12～50 / 0.9 55～80 / 1.8	For combined with LKC, can be (IT) 0.01 ⚠ No treatment for machined surface. ⚠ ℓ dimension is according to standard. D / LC 12 / 20≦LC＜100 14～18 / 20≦LC＜120 20 / 20≦LC＜150 25 / 30≦LC＜150 30～40 / 50＜LC＜300 45 / 50＜LC＜200 50 / 50＜LC＜400 55 / 50＜LC＜200 60・80 / 70＜LC＜400
One flat cutting on the shank 	KC D / @/P 12～50 / 1.8 55～80 / 2.8	(IT) 1 $KC \leqq \frac{(D-M)}{2}+1$
Two flats cutting on the shank 	WKC D / @/P 12～50 / 1.8 55～80 / 4.3	(IT) 1 $WKC \leqq \frac{(D-M)}{2}+1$

Add.	Code (@/P)	Spec.
L dimension tolerance alteration 	LKC D / @/P 12～50 / 1.8 55～80 / 2.8	For L≦200,L $^{+0.3}_{+0.2}$ → $^{+0.02}_{0}$ For L＞200,L $^{+0.5}_{+0.2}$ → $^{+0.03}_{0}$ ⚠ Combined with LC can be (IT) 0.01 ⚠ 40≦L≦350 is available ⚠ No treatment on two ends. For addition LKC, the length L can be made same by lapping if ordered quantity less than 8 pieces.
Tapping size alteration 	MC (0.9)	D / Thread hole M 12・14 / 5 16～20 / 8・10 25～50 / 10・12 55～80 / 16
One flat cutting on shank and blacking 	KF D / @/P 12～50 / 2.8 55～80 / 4.3	(IT) 1 $KF \leqq \frac{(D-M)}{2}+1$
Parallel flats cutting on shank and black 	WKF D / @/P 12～50 / 3.7 55～80 / 5.6	(IT) 1 $WKF \leqq \frac{(D-M)}{2}+1$

Code No.	L (C)	KC・WKC…etc.
SSPL 32 —	LC75 —	LKC—MC12

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

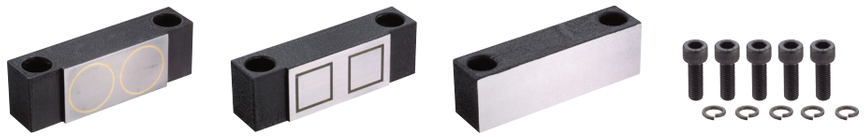
DIE OPENING CONTROLLERS

Guide for Die Opening Controllers

Stop Bolts	Puller Bolts Female Thread Type	Puller Bolts	Parting Locks
			
SSTBG P.164 In stock	PPBTN P.164 In stock	PPBTX P.165 In stock	PPL PPLB PPLP P.168 In stock

Bushings for Parting Lock	Ultra Lock Sets
	
PPLBS P.169 In stock	MMPLK MMPLKB P.170 In stock

Magnet Lock Sets

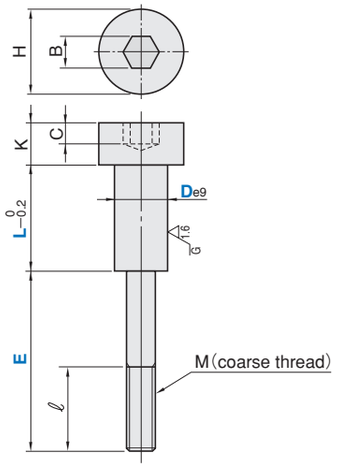


MMLK P.171 In stock

Stop Bolts

In stock

Material Hardness	Code
SCM435 33～38HRC	SSTBG



Code No. Code	D	L	E						C	K	H	B	M× ℓ	@/P (1～9P)
SSTBG	10	10	19	24					4	8	16	6	M 6X17	1.62
		15	19	24	29									1.71
		20	19	24	29	34								1.71
	13	10	22	27					4	8	18	8	M 8X20	1.87
		15	22	27	32	37								1.87
		20	22	27	32	37	42							1.87
		25		27	32	37	42							2.14
		30		27	32	37	42	47						2.23
		35				37	42	47						2.30
	16	10	30	35					7	13	24	10	M10X23	2.56
		15	30	35	40									2.81
		20	30	35	40	45								2.90
		25	30	35	40	45								2.99
		30		35	40	45	50	55						3.17
		35				45	50	55						3.42
	20	15	38	43					9	13	27	14	M12X26	3.42
		20	38	43	48									3.59
		25	38	43	48	53								3.75
		30			48	53	58							4.02
		35			48	53	58							4.27
		45				53	58							4.53
	25	15	44	49					10	18	33	17	M16X32	6.83
		20		49	54	59								6.83
		25		49	54	59								7.27
		30		49	54	59	64							7.70
		40			54	59	64	69						8.55

ORDER

Code No.	L	E
SSTBG10	10	19

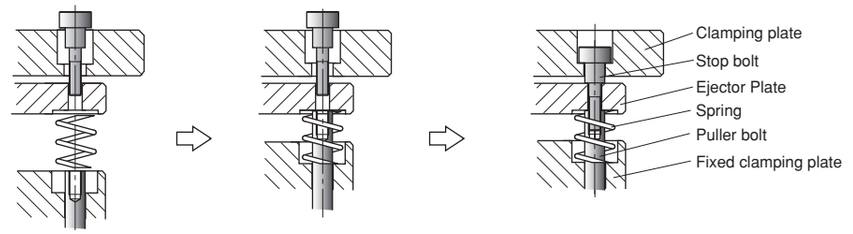
DELIVERY

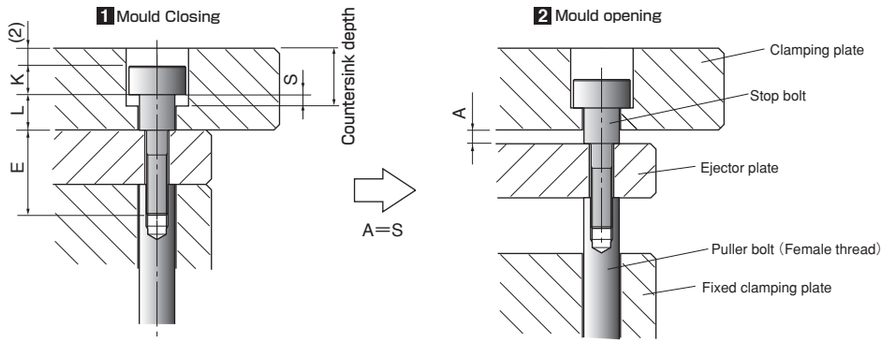
Next In stock working day ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～9	10～19	20～49	50～100	101～
100%	95%	90%	80%	Enquiry





- Countersink depth=S+K+2
- L=Thickness of clamping plate−K−2
- E=M×1.5+Thickness of ejector plate

▶ Selection of stop bolt

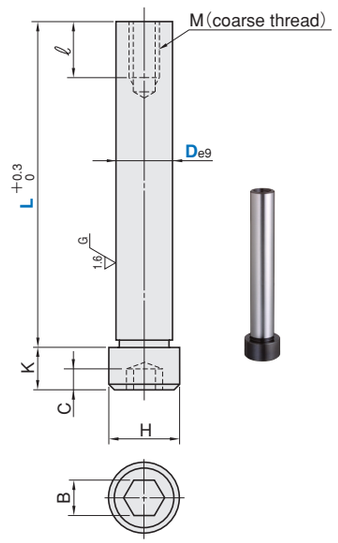
Thickness of clamping plate	Stop bolt D	Stop bolt L	Thickness of ejector plate 10	15	20	25	30	35	40	50
			E							
20	10	10	19	24						
	13	10	22	27						
25	10	15	19	24	29					
	13	15	22	27	32	37				
	16	10		30	35					
30	10	20	29	24	29	34				
	13	20	22	27	32	37	42			
	16	15		30	35	40				
	20	15			38	43				
35	13	25		27	32	37	42			
	16	20		30	35	40	45			
	20	20			38	43	48			
	25	15			44	49				
40	13	30		27	32	37	42	47		
	16	25		30	35	40	45			
	20	25			38	43	48	53		
	25	20				49	54	59		
45	13	35				37	42	47		
	16	30			35	40	45	50	55	
	20	30					48	53	58	
	25	25				49	54	59		
50	16	35					45	50	55	
	20	35					48	53	58	
	25	30				48	54	59	64	
60	20	45						53	58	
	25	40					54	59	64	59

Puller Bolts

Female Thread Type

In stock

Material Hardness	Code
SCM435 33～38HRC	PPBTN



Code No.		L					C	K	H	B	M× ℓ	@/P (1～9P)
Code	D											
PPBTN	10	40	50	60	70	260	4	8	16	6	M 6X17	2.99
		80	90									3.42
		100	110	120								4.09
		130	140	150								4.53
		160	170	180								5.39
	13	60	70				4	8	18	8	M 8X20	3.24
		80	90			260						3.59
		100	110	120								4.53
		130	140	150								5.12
		160	170	180								6.83
		190	200	210								7.86
		220	230	240	250	260						11.8
		280										14.4
	16	100	110	120			7	13	24	10	M10X23	5.46
		130	140	150								6.15
		160	170	180								8.03
		190	200	210								9.14
		220	230	240	250							13.4
		280	300									17.1
	20	120	130	140	150		9	13	27	14	M12X26	8.98
		160	170	180								10.7
		190	200	210								11.9
		220	230	240	250							16.1
		280	300									19.6
		350										27.3
		400										48.0
	25	170	180				10	18	33	17	M16X32	13.7
		190	200									14.8
		210	220									17.3
		230	240									18.6
		250	260									20.8
		280	300									23.9
		350										32.4
		400										60.2

⚠ Special spacer should be used with puller bolt for control mold opening stroke.

ORDER

Code No.	L
PPBTN 10 —	40

DELIVERY Next In stock working day ☞ P.15

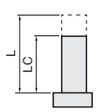
PRICE Without tax

▶Quantity discount rate ☞ P.15

1～9	10～19	20～49	50～100	101～
100%	95%	90%	80%	Enquiry

ADDITION

Add.	Code (@/P)	Spec.
L dimension alteration	LC	ⓘ 5

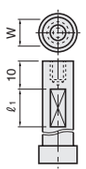


D	@/P
10･13	0.9
16	1.4
20	2.8
25	4.3

D	LC
10	35～175
13	55～275
16	95～295
20	115～395
25	165～395

⚠ ℓ dimension is according to standard.

Add.	Code (@/P)	Spec.
Wrench flats cutting	SC	



D	@/P
13	2.4
16	2.4
20	2.8
25	3.7

D	W	ℓ1
13	11	20
16	14	
20	18	
25	23	

⚠ D≧13 is available.

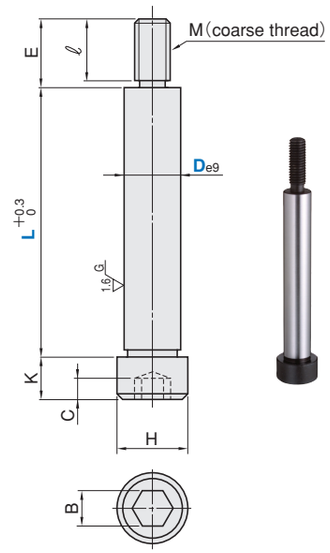
ORDER

Code No.	L(C)	SC
PPBTN 13 —	LC65 —	SC

Product unit price＋Addition unit price.
Price discount is also available for addition. ☞ P.14

Puller Bolts

Material Hardness	Code
SCM435 33～38HRC	PPBTX



⚠ Short L dimension：Distance bolts.

Code No.		L			C	K	H	B	E	M× ℓ	@/P (1～9P)
Code	D										
PPBTX	10	100	110	120	4	8	16	6	19	M 6X17	4.53
		130	140	150							4.96
	13	100	110	120	4	8	18	8	22	M 8X20	4.78
		130	140	150							5.55
		160	170	180							7.18
		190	200								8.12
		210	220	230	240	260					12.0
	16	100	110	120	7	13	24	10	30	M10X26	6.40
		130	140	150							7.27
		160	170	180							9.06
		190	200								10.3
		210	220	230	240	260					15.5
	20	140	150		9	13	27	14	38	M12X33	10.5
		160	170	180							12.3
		190	200								13.5
		210	220	230	240	250	260				18.1
		280	300								21.8
	25	170	180		10	18	33	17	44	M16X39	16.2
		190	200								17.5
		210	220								20.0
		230	240								21.7
		250	260								24.6
		280	300								27.5

ORDER

Code No.	L
PPBTX 10 —	100

DELIVERY Next In stock working day ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

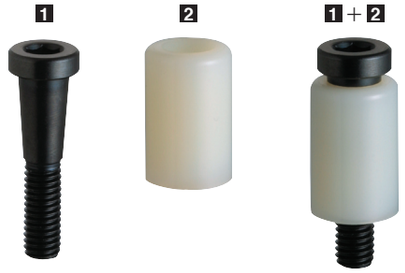
1～9	10～19	20～49	50～100	101～
100%	95%	90%	80%	Enquiry

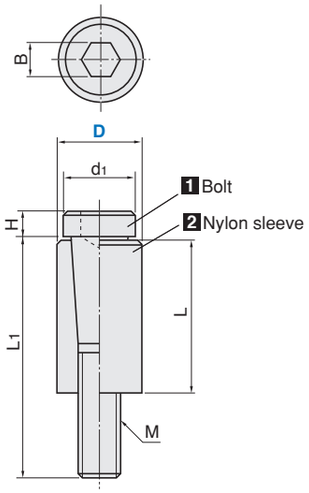
Parting Locks

In stock

Material	Code	
1 SCM435	PPLB	PPL 1＋2 set
2 Special nylon	PPLP	

⚠ Service temperature is under 80℃.
⚠ Bolt and nylon sleeve should be used as a set because they can not be used separately with other brand made by other company.





▶ Parting Locks Set

Code No. Code	D	d1	M	B	L	H	L1	@/P (1～19P)
PPL (1+2 Set)	10	8.5	5	4	18	3	28	3.89
	13	11.5	6	5	20	3.2	30	4.11
	16	14	8	6	25	4	35	5.11
	20	18	10	6	30	4	40	6.20

▶ Bolt

Code No. Code	No.	@/P (1～19P)
PPLB (1 Bolt only)	10	2.09
	13	2.23
	16	2.89
	20	3.58

▶ Nylon sleeve

Code No. Code	No.	@/P (1～19P)
PPLP (2 Nylon sleeve only)	10	1.80
	13	1.93
	16	2.27
	20	2.68

ORDER
Code No.
PPL 10 Set
PPLB 10 Bolt
PPLP 10 Nylon sleeve

DELIVERY
Next In stock working day ☞ P.15

PRICE Without tax
▶Quantity discount rate ☞ P.15

1～19	20～29	30～49	50～100	101～
100%	95%	90%	80%	Enquiry

▶ Nylon sleeve and Bolt

- Put bolt into nylon sleeve until there is a 3mm gap between head and sleeve, then install them on to mold with wrench.
- Nylon sleeve is always recommend to use with bolt together, if not, chamfer is necessary for hole.
- Note: Do not contact with oil.

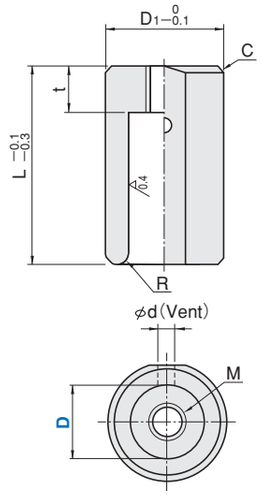
▶ PPL Standard specification

Code No.	Recommend number	Mold weight
PPL10	4 pcs	⩽100kg
PPL13	4 pcs	⩽250kg
PPL16	4 pcs	⩾250kg
PPL20	4 pcs	⩾300kg

⚠ Specification in the above table are standard use recommended.
Specific use may vary due to difference in hole tolerance, surface roughness, and bolt fitting length.

Bushings for Parting Lock

Material	Surface treatment	Code
S45C	Blacking (Fe3O4)	PPLBS



Code No. Code	D	D1	L	t	R	d	C	M	@/P (1～19P)
PPLBS (PPL Sleeve)	10	16	26	6	2	2.3	0.8	6	3.67
	13	20	30	8	2.5	2.8	1.0	8	3.93
	16	25	37	10	3	3	1.0	10	4.70
	20	30	42	10	3	3	1.0	10	5.81

⚠ The hole for nylon sleeve should be $D1^{+0.1}_{+0.05}$, The hole depth should be $L^{+0.5}_{+0.1}$.

ORDER
Code No.
PPLBS 10

DELIVERY
Next In stock working day ☞ P.15

PRICE Without tax
▶Quantity discount rate ☞ P.15

1～19	20～29	30～49	50～100	101～
100%	95%	90%	80%	Enquiry

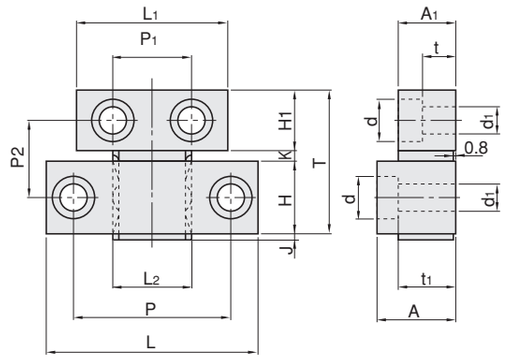
Ultra Lock Sets

Material	Code
Lock sleeve：SK105 Roller：SUJ2 Guide block：S50C	MMPLK(set)

In stock

Accessory：screw 4pcs

MMPLK 30・60・100



⚠ Service temperature is under 80℃.

Code No. Code	No.	L	L1	L2	A1	A	H1	H	T	P	P1	P2	J	K	t	t1	d	d1	Accessory 2 pieces each size	Pulling force N
MMPLK	20	54	42	25	16	24	18	22	42.0	40	28	22	2	2.0	9.0	16	11	6.5	CCB 6—20、CCB 6—255	1961
	30	65	46	35	19	27	20	25	48.5	50	31	26	3.5	3.5	9.5	17	11	7	CCB 6—30、CCB 6—35	2942
	60	73	50	35	19	27	20	25	48.5	52	33	26	3.5	3.5	9.5	17	14	9	CCB 8—30、CCB 8—35	5884
	80	73	50	35	19	27	20	25	87.5	52	33	65	3.5	42.5	9.5	17	14	9		7845
	100	103	65	48	25	34	24	30	58.0	76	42	31	4	4.0	13	19	17	11	CCB10—30、CCB10—35	9807

⚠ Pulling force is capacity of two sets of lock set.

Load {kgf} =Load N×0.101972

ORDER Code No. MMPLK 30

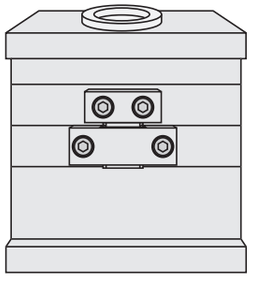
DELIVERY Next In stock working day ☞ P.15

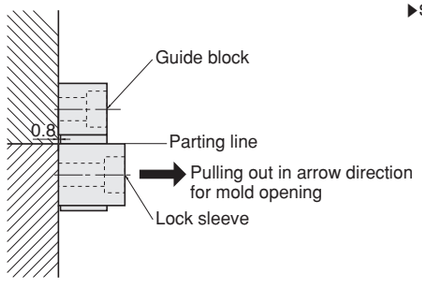
PRICE Without tax ▶Quantity discount rate ☞ P.15

1～9	10～19	20～49	50～100	101～
100%	95%	90%	80%	Enquiry

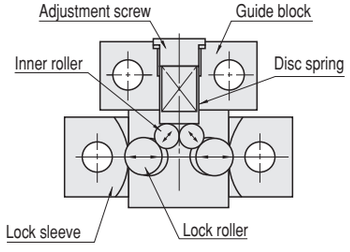
Code No. Code	No.	@/Set (1～9Set)
MMPLK	20	106
	30	109
	60	110
	80	150
	100	155

⚠ Above price is of single set. One mold use at least two sets.





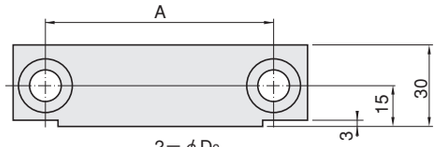
▶Structure and installation



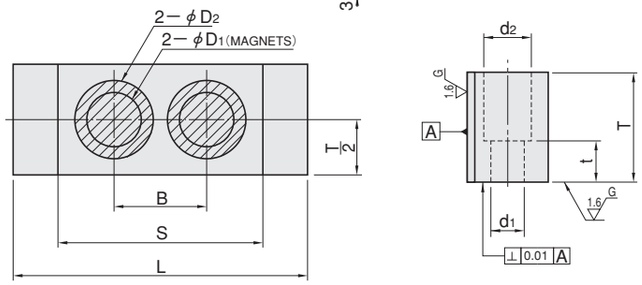
Magnet Lock Sets

Material	Code
SS400	MMLK

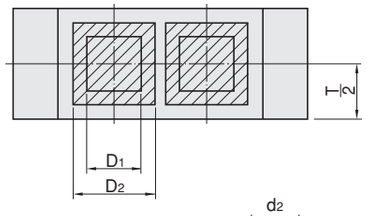
Seat



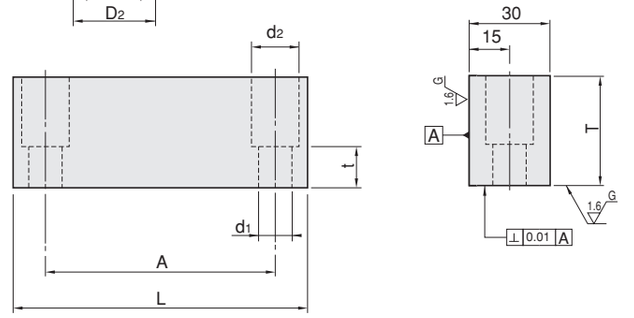
40・100



80・200



Square Block



Code No. Code	No.	Minimum locking force of single set(20℃) N	A	B	S	L	T	t	D1	D2	d1	d2	Accessary	Magnet	Work temperature
MMLK	40	392.3	63	25	60	80	25	12	16	22	9	14	CCB 8—25 4 pcs Spring washer 4 pcs	Al-Ni-Co Magnet	80℃
	80	784.5							15	19				Rare earth magnet	200℃
	100	980.7	100	39	79	126	40	15	21	34	11	18	CCB10—30 4 pcs Spring washer 4 pcs	Al-Ni-Co Magnet	80℃
	200	1961.3							24	28				Rare earth magnet	200℃

ORDER Code No. MMLK 40

DELIVERY Next In stock working day ☞ P.15

PRICE Without tax ▶Quantity discount rate ☞ P.15

1～9	10～19	20～49	50～100	101～
100%	95%	90%	80%	Enquiry

Code No. Code	No.	@/Set (1～9Set)
MMLK	40	130
	80	234
	100	149
	200	244

⚠ The price is set price including seat, square block and accessary.

⚠ At least two sets be used for a mould.

COMPONENTS

Guide for Components

Dowel Pins Straight Type			Dowel Pins Tapped Type			Dowel Pins Tapered・Tapped Type			Stepped Dowel Pins		
											
MMS MMSV	P.174	In stock	MMSTM MMSTP MMST MMSTH	P.174	In stock	MMTT	P.174	In stock	MMSFW MMSFWM	P.176	In stock

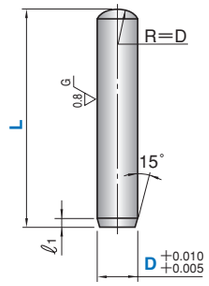
Lifting Eye Bolts			Socket Head Cap Screws			Socket Head Cap Screws Loosening Prevention Type			Low Head Cap Screws		
											
CCHI	P.177	In stock	CCB	P.178	In stock	LLB	P.179	In stock	FFB	P.180	In stock

Low Head Cap Screws Extra Low Head Cap Screws			Screw Plugs			Screw Plugs			Washers / Spacers		
											
CCBS CCBSS	P.181	In stock	MMSW MMSWS MMSWA MMSWAS MMSWZ MMSWZS	P.182	In stock	MMSWJ MMSWC MMSWT MMSWTS	P.183	In stock	MMSRB LLRB SSSWA	P.184	In stock

Washers / Spacers			Washers / Spacers			Spring Washers			Male Screw Stripper Bolts			O Rings		
														
TT RR KK WW JJ SSTR SSRW	P.185	In stock	SSW SSPW	P.186	In stock	CCBW	P.186	In stock	MMSB	P.187	In stock	OORS OORP OORG	P.188	In stock

Dowel Pins

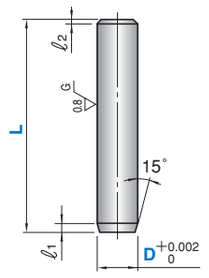
MMS (straight type)



Material：SUJ2　Hardness：58HRC～

Code No. Code	D	L	ℓ1	@/P 1～299P	300～499P	500～1999P	2000～4000P
MMS	1	6 8 10	0.4	2.05	1.75	0.31	0.26
	1.5	6 8 10	0.6	1.45	1.20	0.22	0.18
	2	10 15	1.0	1.00	0.85	0.15	0.13
		6 8 20		1.45	1.20	0.22	0.18
	2.5	8 10 15 20		1.00	0.85	0.15	0.13
		6 25 30		1.45	1.20	0.22	0.18
	3	10 15 20		0.60	0.50	0.09	0.08
		6 8 25 30 35 40		1.45	1.20	0.22	0.18
	4	10 15 20	1.5	0.75	0.60	0.12	0.09
		8 25 30 35 40 45 50		1.45	1.20	0.22	0.18
	5	10 15 20 25 30		1.00	0.85	0.15	0.13
		8 35 40 45 50		1.45	1.20	0.22	0.18
	6	15 20 25 30	2.0	1.15	0.95	0.17	0.14
		8 10 35 40 45 50 55 60		2.05	1.75	0.31	0.26
	8	30 40 50	2.5	2.00	1.65	0.30	0.25
		10 15 20 25 35 45 55 60 65 70 80		2.80	2.30	0.42	0.34
	10	40 50 60	3.0	2.80	2.30	0.42	0.34
		15 20 25 30 35 45 55 65 70 80		5.00	4.15	0.74	0.62
	12	40 50 60		4.00	3.30	0.59	0.49
		20 25 30 35 45 55 70 80	3.5	5.20	4.30	0.77	0.64
	13	40 50 60		5.20	4.30	0.77	0.64
		30 70 80		5.85	4.85	0.87	0.72

MMSV (high precision type)

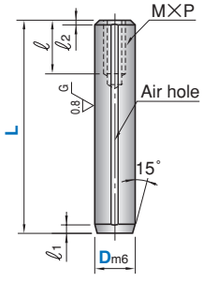


Material：SUJ2　Hardness：58HRC～

Code No. Code	D	L	ℓ1	ℓ2	@/P 1～299P	300～499P	500～1999P	2000～4000P
MMSV	2	6 8 10	1.0	0.2	0.94	0.89	0.84	0.82
	3	8 10 15 20 25 30	1.0	0.5	0.70	0.67	0.63	0.59
	4	10 15 20 25 30	1.5		0.70	0.67	0.63	0.59
	5	10 15 20 25 30			0.94	0.89	0.84	0.80
	6	10 15 20 25 30	2.0		0.94	0.89	0.84	0.80
	8	20 30 40	2.5		1.17	1.11	1.06	1.00
	10	30 40 50 60	3.0		1.64	1.55	1.48	1.40

⚠ High precision dowel pins are tested in a thermostatic chamber.

MMSTM (tapped・m6 type)



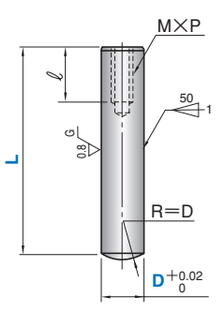
⚠ For D5・D6,L=10,the screw hole may be through.

Material：SUJ2　Hardness：45～50HRC

Code No. Code	D	L	ℓ1	ℓ2	M×P	ℓ	Dm6	@/P 1～299P	300～499P	500～1999P	2000～4000P
MMSTM	5	10 15 20 25 30	1.5	0.3	3×0.5	6	+0.012 +0.004	4.40	3.65	0.65	0.54
	6	20 30	2.0		4×0.7	＊8		2.90	2.40	0.43	0.36
		10 15 25 35 40 50						3.30	2.75	0.49	0.41
	8	30		0.5	5×0.8		+0.015 +0.006	2.90	2.40	0.43	0.36
		15 20 25 35 40 45 50 60						3.70	3.05	0.55	0.45
		70 80						7.35	6.10	1.09	0.90
	10	40			6×1.0	10		3.30	2.75	0.49	0.41
		15 20 25 30 35 45 50 60 70						4.00	3.30	0.59	0.49
		80						7.35	6.10	1.09	0.90
	12	20 30 40 50 60 70	2.5	1.0				5.20	4.30	0.77	0.64
		80						7.35	6.10	1.09	0.90
	13	50					+0.018 +0.007	5.20	4.30	0.77	0.64
		40 60 70			8×1.25	15		5.85	4.85	0.87	0.72
		80						7.35	6.10	1.09	0.90
	16	60						6.65	5.50	0.98	0.81
		40 50 70 80						7.35	6.10	1.09	0.90
	20	50 60 70 80	3.0	1.5	10×1.5	18	+0.021 +0.008	10.2	8.50	1.50	1.25

＊For MMSTM6－10, ℓ＝6.

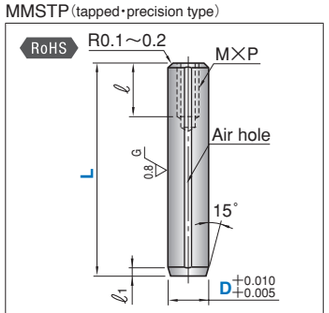
MMTT (tapered・tapped type)



Material：SK95　Hardness：45～50HRC

Code No. Code	D	L	M×P	ℓ	@/P 1～299P	300～499P	500～1999P	2000～4000P
MMTT	8	30 40	5×0.8	9	5.85	4.85	0.87	0.72
	10	40 50	6×1.0	10	8.10	6.70	1.20	0.99
	12	40 50			11.0	9.10	1.62	1.34
	13	50 60	8×1.25	14	11.0	9.10	1.62	1.34
	16	60 70	10×1.5	16	20.5	17.0	3.02	2.50

MMSTP (tapped・precision type)



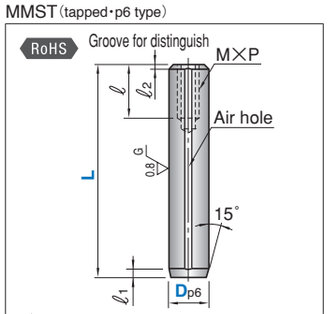
⚠ For D5・D6,L=10,the screw hole may be through.

Material：SUJ2　Hardness：58HRC～

Code No. Code	D	L	ℓ1	M×P	ℓ	@/P 1～299P	300～499P	500～1999P	2000～4000P
MMSTP	5	10 15 20 25 30	1.5	3×0.5	6	4.40	3.65	0.65	0.54
	6	20 30	2.0	4×0.7	＊8	2.90	2.40	0.43	0.36
		10 15 25 35 40 50				3.30	2.75	0.49	0.41
	8	30				2.90	2.40	0.43	0.36
		15 20 25 35 40 45 50 60		5×0.8		3.70	3.05	0.55	0.45
		70 80				7.35	6.10	1.09	0.90
	10	40	2.5			3.30	2.75	0.49	0.41
		15 20 25 30 35 45 50 60 70		6×1.0	10	4.00	3.30	0.59	0.49
		80				7.35	6.10	1.09	0.90
	12	20 30 40 50 60 70				5.20	4.30	0.77	0.64
		80				7.35	6.10	1.09	0.90
	13	50				5.20	4.30	0.77	0.64
		40 60 70		8×1.25	15	5.85	4.85	0.87	0.72
		80				7.35	6.10	1.09	0.90
	16	60	3.0			6.65	5.50	0.98	0.81
		40 50 70 80				7.35	6.10	1.09	0.90
	20	50 60 70 80		10×1.5	18	10.2	8.50	1.50	1.25

＊For MMSTP6－10, ℓ＝6

MMST (tapped・p6 type)



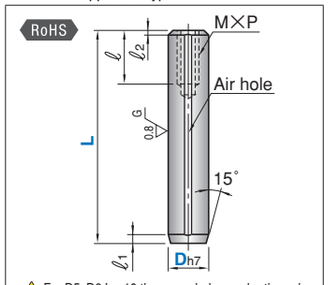
⚠ For D5・D6,L=10,the screw hole may be through.

Material：SUJ2　Hardness：45～50HRC

Code No. Code	D	L	ℓ1	ℓ2	M×P	ℓ	Dp6	@/P 1～299P	300～499P	500～1999P	2000～4000P
MMST	5	10 15 20 25 30	1.5	0.5	3×0.5	6	+0.020 +0.012	4.40	3.65	0.65	0.54
	6	20 30	2.0		4×0.7	＊8		2.90	2.40	0.43	0.36
		10 15 25 35 40 50						3.30	2.75	0.49	0.41
	8	30		0.7	5×0.8		+0.024 +0.015	2.90	2.40	0.43	0.36
		15 20 25 35 40 45 50 60						3.70	3.05	0.55	0.45
		70 80						7.35	6.10	1.09	0.90
	10	40				10		3.30	2.75	0.49	0.41
		15 20 25 30 35 45 50 60 70			6×1.0			4.00	3.30	0.59	0.49
		80						7.35	6.10	1.09	0.90
	12	20 30 40 50 60 70	2.5					5.20	4.30	0.77	0.64
		80						7.35	6.10	1.09	0.90
	13	50					+0.029 +0.018	5.20	4.30	0.77	0.64
		40 60 70		1.0	8×1.25	15		5.85	4.85	0.87	0.72
		80						7.35	6.10	1.09	0.90
	16	60	3.0					6.65	5.50	0.98	0.81
		40 50 70 80						7.35	6.10	1.09	0.90
	20	50 60 70 80			10×1.5	18	+0.035 +0.022	10.2	8.50	1.50	1.25

＊For MMST6－10, ℓ＝6

MMSTH (tapped・h7 type)



⚠ For D5・D6,L=10,the screw hole may be through.

Material：SUJ2　Hardness：45～50HRC

Code No. Code	D	L	ℓ1	ℓ2	M×P	ℓ	Dh7	@/P 1～299P	300～499P	500～1999P	2000～4000P
MMSTH	5	10 15 20 25 30	1.5	0.3	3×0.5	6	0 −0.012	4.40	3.65	0.65	0.54
	6	10 15 20 25 30 35 40 50	2.0		4×0.7	＊8		2.90	2.40	0.43	0.36
								5.85	4.85	0.87	0.72
	8	15 20 25 30 35 40 45 50 60 70 80			5×0.8			3.70	3.05	0.55	0.45
								6.25	5.20	0.92	0.77
		100						11.0	9.10	1.62	1.34
	10	15 20 25 30 35 40 45 50 60 70 80 100 120		0.5			0 −0.015	3.30	2.75	0.49	0.41
								6.65	5.50	0.98	0.81
								11.7	9.70	1.73	1.43
	12	20 30 40 50 60 70 80 100 120	2.5		6×1.0	10		17.6	14.5	2.59	2.14
								4.80	3.95	0.71	0.59
								7.35	6.10	1.09	0.90
								13.2	10.9	1.95	1.61
								20.5	17.0	3.02	2.50
	13	40 50 60 70 80 100 120		1.0			0 −0.018	5.20	4.30	0.77	0.64
								8.80	7.30	1.30	1.08
								16.1	13.3	2.37	1.96
								24.2	20.0	3.56	2.95
	16	40 50 60 70 80 100 120 150	3.0	1.5	8×1.25	15		6.65	5.50	0.98	0.81
								10.2	8.50	1.50	1.25
								22.0	18.2	3.24	2.68
								25.7	21.3	3.78	3.14
								36.0	29.8	5.30	4.39

＊For MMSTH6－10, ℓ＝6

⚠ ℓ1、ℓ2 are reference dimensions, and they may be larger than the dimensions in the table.

⚠ The target depth from outer diameter is 0.15mm, but it will differ from different methods. So, it is for reference only (MMSTM・MMSTP・MMST・MMSTH).

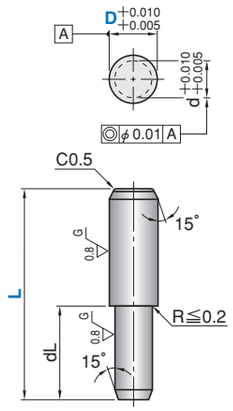
ORDER　Code No. | L　MMS1 — 10

DELIVERY　Next In stock working day　☞ P.15

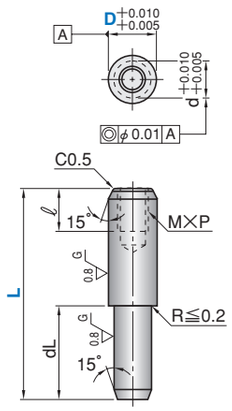
PRICE Without tax　⚠ For quantity more than 4001P, please enquire the price and delivery day.

Stepped Dowel Pins

MMSFW



MMSFWM (tapped type)



Material：SUJ2 Hardness：58HRC～

Code No. Code	D	L	MMSFWM only M×P	MMSFWM only ℓ	d	dL	@/P(1～49P) MMSFW	@/P(1～49P) MMSFWM
MMSFW MMSFWM (tapped type)	5	15	–	–	4	5	4.15	–
		25				10	4.15	–
	6	20	–	–	5	10	4.40	–
		30	3×0.5	6		15	4.40	5.02
	8	25	4×0.7	8	6	10	5.40	6.03
		35				15	5.40	6.03
	10	35	5×0.8		8	15	7.42	8.17
		40				15	7.42	8.17
	13	45	6×1.0	10	10	20	10.9	11.6
		55				25	10.9	11.6
		70				30	10.9	11.6

ORDER

Code No.	L
MMSFW5	15

DELIVERY Next In stock working day ☞ P.15

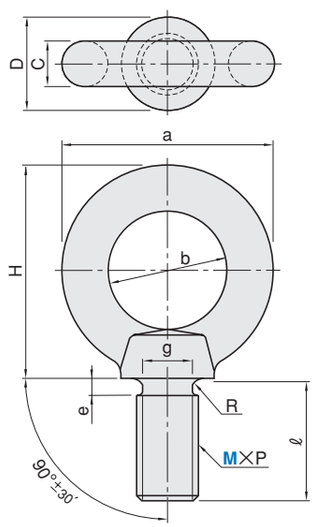
PRICE Without tax

▶Quantity discount rate ☞ P.15

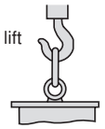
1～49	50～99	100～299	300～500	501～
100%	95%	90%	85%	Enquiry

Lifting Eye Bolts (JIS B 1168)

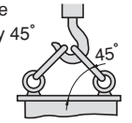
Material	Code
SS400	CCHI

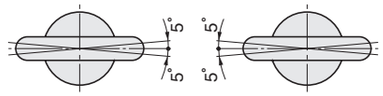


A type
Vertical lift



B type
Lift by 45°

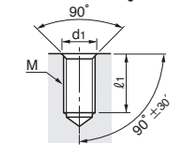




⚠ Set two eye bolts in the same direction (within 5 degrees) as shown above.

▶How to mount
Fasten the eye bolt lightly so that the seat of the bolt is firmly in contact with the plate.

Dimension of mounting hole



M	d1	ℓ1
6	9	17
8	11	17
10	13	20
12	16	24
16	20	30
20	24	34
24	28	42
30	36	50
36	42	60
42	48	70
48	56	76

Code No. Code	M	M×P	a	b	C	D	H	ℓ	e	g	R	A Type N{kgf}/1P	B Type N{kgf}/2P	@/P (1～19P)
CCHI	6	6×1.0	24.9	14.5	5.2	12.8	28.45	15	3	4.7	1.0	392{ 40}	392{ 40}	1.29
	8	8×1.25	32.6	20	6.3	16	33.3	15	3	6	1.0	785{ 80}	785{ 80}	1.00
	10	10×1.5	41	25	8	20	41.5	18	4	7.7	1.2	1471{ 150}	1471{ 150}	1.06
	12	12×1.75	50	30	10	25	51	22	5	9.4	1.4	2157{ 220}	2157{ 220}	1.17
	16	16×2.0	60	35	12.5	30	60	27	5	13	1.6	4413{ 450}	4413{ 450}	1.71
	20	20×2.5	72	40	16	35	71	30	6	16.4	2	6178{ 630}	6178{ 630}	2.58
	24	24×3.0	90	50	20	45	90	38	8	19.6	2.5	9316{ 950}	9316{ 950}	5.15
	30	30×3.5	110	60	25	60	110	45	8	25	3	14710{1500}	14710{1500}	9.68
	36	36×4.0	133	70	31.5	70	131.5	55	10	30.3	3	22555{2300}	22555{2300}	18.6
	42	42×4.5	151	80	35.5	80	150.5	65	12	35.6	3.5	33342{3400}	33342{3400}	34.9
	48	48×5.0	170	90	40	90	170	70	12	41	4	44130{4500}	44130{4500}	61.7

Load {kgf} =Load N×0.101972

ORDER

Code No.
CCHI6

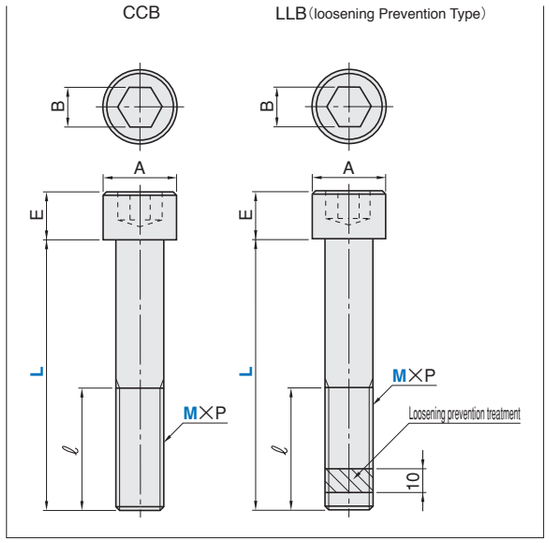
DELIVERY Next In stock working day ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～19	20～49	50～99	100～200	201～
100%	95%	90%	85%	Enquiry

Socket Head Cap Screws



Material	Hardness	Strength class	Code
SCM435	38～43HRC (M2～M20) 32～37HRC (M24)	12.9 (M2～M20) 10.9 (M24)	CCB
	38～43HRC	12.9	LLB (loosening prevention type)

⚠ ℓ is the transitional dimension to new JIS, and some may be of conventional JIS standard.
Threaded part JIS B0205 grade 2
Precision of screw JIS B 1176

M×P	A	E	B
2×0.4	3.8	2.0	1.5
2.5×0.45	4.5	2.5	2.0
2.6×0.45	4.5	2.5	2.0
3×0.5	5.5	3	2.5
4×0.7	7	4	3
5×0.8	8.5	5	4
6×1.0	10	6	5
8×1.25	13	8	6
10×1.5	16	10	8
12×1.75	18	12	10
14×2.0	21	14	12
16×2.0	24	16	14
20×2.5	30	20	17
24×3.0	36	24	19

⚠ Strength class=Tensile strength of thread
(Example) 12.9
- 1/10 of the value: Indicates that the yield point or the minimum proof strength is 90% of the tensile strength.
- 12: Indicates that the minimum value of normal tensile strength is 1220N/mm²

CCB

Code No.			ℓ	※	@/P	
Code	M	L	New JIS	Quantity	※Less than	※More than
CCB	3	5	Full thread	500	0.05	0.04
		6			0.05	0.04
		8			0.05	0.04
		10			0.05	0.04
		12			0.05	0.04
		14			0.05	0.04
		15			0.05	0.04
		16			0.05	0.04
		18			0.05	0.04
		20			0.05	0.04
		22			0.06	0.05
		25			0.06	0.05
		30	18	200	0.09	0.08
		35			0.09	0.08
		40			0.10	0.09
		45			0.15	0.14
		50			0.23	0.23
		55			0.23	0.23
		60			0.70	0.70
		65			0.76	0.75
	4	5	Full thread	500	0.05	0.04
		6			0.05	0.04
		8			0.05	0.04
		10			0.05	0.04
		12			0.05	0.04
		14			0.05	0.04
		15			0.05	0.04
		16			0.05	0.04
		18			0.05	0.04
		20			0.05	0.04
		22			0.05	0.04
		25			0.05	0.04
		30	20	200	0.06	0.05
		35			0.08	0.06
		40			0.09	0.08
		45			0.10	0.09
		50			0.12	0.10
		55			0.22	0.20
		60			0.23	0.23
		65			0.48	0.46
		70			0.53	0.52
		75			0.59	0.58

CCB

Code No.			ℓ	※	@/P	
Code	M	L	New JIS	Quantity	※Less than	※More than
CCB	5	5	Full thread	400	0.13	0.12
		6			0.12	0.10
		8			0.05	0.04
		10			0.05	0.04
		12			0.05	0.04
		14			0.05	0.04
		15			0.05	0.04
		16			0.05	0.04
		18			0.05	0.04
		20			0.05	0.04
		22			0.05	0.04
		25			0.05	0.04
		30	22	200	0.06	0.05
		35			0.08	0.06
		40			0.09	0.08
		45			0.10	0.09
		50			0.12	0.10
		55			0.13	0.12
		60			0.14	0.13
		65			0.15	0.14
		70			0.17	0.15
		75	22		0.19	0.17
		80			0.23	0.22
		85			0.36	0.35
		90			0.36	0.35
		95			0.59	0.58
		100		100	0.59	0.58
		110			0.76	0.75
		120			0.87	0.87
		130			1.00	0.98
		140			1.11	1.09
	6	6	Full thread	200	0.17	0.17
		8			0.06	0.05
		10			0.05	0.04
		12			0.05	0.04
		14			0.05	0.04
		15			0.05	0.04
		16			0.05	0.04
		18			0.05	0.04
		20			0.06	0.05
		22			0.06	0.05
		25			0.06	0.05
		30			0.08	0.06
		35	24		0.09	0.08
		40			0.10	0.09
		45			0.12	0.10
		50			0.13	0.12
		55		100	0.13	0.12
		60			0.14	0.13
		65			0.17	0.15
		70			0.17	0.17
		75			0.19	0.17

CCB

Code No.			ℓ	※	@/P	
Code	M	L	New JIS	Quantity	※Less than	※More than
CCB	6	80	24	100	0.23	0.22
		85			0.23	0.23
		90			0.25	0.23
		95			0.30	0.28
		100			0.34	0.32
		110			0.48	0.45
		120			0.94	0.91
		130			1.17	1.14
		140			1.52	1.49
		150			1.75	1.73
	8	8	Full thread	100	0.17	0.17
		10			0.10	0.09
		12			0.10	0.09
		15			0.10	0.09
		16			0.10	0.09
		18			0.10	0.09
		20			0.10	0.09
		22			0.10	0.09
		25			0.10	0.09
		30			0.10	0.09
		35			0.12	0.10
		40	28		0.13	0.12
		45			0.13	0.12
		50			0.14	0.13
		55		50	0.17	0.15
		60			0.19	0.17
		65			0.20	0.19
		70			0.23	0.22
		75			0.25	0.23
		80			0.30	0.28
		85			0.36	0.35
		90			0.37	0.36
		95			0.42	0.39
		100			0.42	0.39
		110			0.52	0.49
		120			0.59	0.58
		130			0.82	0.81
		140			0.91	0.89
		150			1.06	1.03
		160			1.40	1.38
		200			2.86	2.83
	10	10	Full thread	100	0.19	0.03
		12			0.19	0.03
		15			0.15	0.03
		20			0.13	0.02
		25			0.14	0.03
		30		50	0.15	0.03

CCB

Code No.			ℓ	※	@/P	
Code	M	L	New JIS	Quantity	※Less than	※More than
CCB	10	10	32	50	0.17	0.03
		40	Full thread		0.17	0.03
		45			0.19	0.03
		50			0.22	0.04
		55			0.23	0.04
		60			0.27	0.04
		65			0.30	0.05
		70		40	0.31	0.05
		75			0.36	0.06
		80			0.39	0.06
		85			0.43	0.07
		90		30	0.46	0.07
		95			0.50	0.08
		100			0.50	0.08
		110			0.59	0.09
		120			0.70	0.11
		130			0.82	0.13
		140			0.92	0.14
		150			1.03	0.16
		160		20	1.78	0.27
		170			2.02	0.30
		180			2.24	0.33
		190			2.62	0.39
		200			2.77	0.41
		210			3.28	0.49
	12	15	Full thread	50	0.30	0.05
		20			0.23	0.04
		25			0.23	0.04
		30			0.25	0.04
		35			0.26	0.04
		40			0.27	0.04
		45			0.30	0.05
		50		40	0.32	0.05
		55	36		0.36	0.06
		60			0.39	0.06
		65			0.41	0.07
		70		30	0.45	0.07
		75			0.48	0.08
		80			0.52	0.08
		85			0.63	0.10
		90		25	0.67	0.10
		95			0.70	0.11
		100			0.70	0.11
		110			0.81	0.12
		120			0.89	0.14
		130			1.02	0.15
		140			1.12	0.17
		150			1.21	0.18
		160		20	1.42	0.21
		170			1.53	0.23
		180			1.68	0.25
		190			1.78	0.27
		200			1.96	0.29
		210			2.21	0.33

CCB

Code No.			ℓ	※	@/P	
Code	M	L	New JIS	Quantity	※Less than	※More than
CCB	12	220	36	20	2.40	0.36
		230			2.59	0.39
		240			2.73	0.41
		250			2.92	0.43
		260			3.11	0.46
		270			8.27	1.22
		280			8.84	1.30
		290			9.43	1.39
	16	20	Full thread	40	0.65	0.63
		25			0.65	0.63
		30			0.56	0.53
		35			0.56	0.53
		40		30	0.56	0.54
		45			0.59	0.56
		50			0.63	0.61
		55		25	0.70	0.67
		60			0.74	0.72
		65	44		0.78	0.76
		70		20	0.84	0.82
		75			0.89	0.87
		80			0.94	0.91
		85			1.00	0.97
		90		15	1.04	1.02
		95			1.11	1.09
		100			1.11	1.09
		110			1.26	1.24
		120		12	1.42	1.39
		130			1.55	1.52
		140			1.70	1.67
		150			1.83	1.80
		160			2.05	2.02
		170		10	2.40	2.37
		180			2.61	2.59

CCB

Code No.			ℓ	※	@/P	
Code	M	L	New JIS	Quantity	※Less than	※More than
CCB	16	190	44	10	2.80	2.77
		200			2.95	2.93
		210			3.36	3.33
		220			3.62	3.58
		230			3.84	3.81
		240			4.11	4.08
		250			4.36	4.31
		260			4.55	4.50
		270			8.27	8.15
		280			8.84	8.74
		290			9.43	9.31
		300			9.55	9.43
		310			9.78	9.67
		320			10.1	9.90
	20	40	Full thread	20	1.14	1.12
		45		15	1.17	1.14
		50			1.21	1.18
		55			1.28	1.25
		60			1.34	1.31
		65			1.42	1.39
		70			1.48	1.45
		75			1.53	1.52
		80	52	12	1.61	1.58
		85			1.73	1.70
		90			1.80	1.77
		95		10	1.90	1.87
		100			1.90	1.87
		110			2.11	2.08
		120		8	2.31	2.28
		130			2.56	2.53
		140			2.80	2.77
		150		6	3.11	3.08
		160			3.50	3.46
		170			3.77	3.74
		180			4.03	3.99
		190			4.42	4.39
		200			4.65	4.61
		210			5.24	5.20
		220			5.42	5.37
		230			5.71	5.67
		240			5.98	5.93
		250		10	6.24	6.18
	24	50	Full thread	20	2.43	2.40
		60		15	2.53	2.50
		70			2.71	2.68
		80			2.87	2.83
		90	60	10	3.05	3.02
		100			3.31	3.27
		110			3.58	3.53
		120			3.83	3.77
		130			4.08	4.05
		140			4.24	4.20
		150			4.56	4.53

LLB (loosening prevention type)

Code No.			ℓ	@/P	
Code	M	L	New JIS	1～99P	100P～
LLB	4	8	Full thread	0.17	0.03
		10		0.17	0.03
		12		0.17	0.03
		15		0.17	0.03
		20		0.17	0.03
		25		0.17	0.03
		30	20	0.17	0.03
	5	10	Full thread	0.17	0.03
		12		0.17	0.03
		15		0.17	0.03
		20		0.17	0.03
		25		0.17	0.03
		30	22	0.19	0.03
		35		0.20	0.03
	6	10	Full thread	0.17	0.03
		15		0.17	0.03
		20		0.19	0.03
		25		0.19	0.03
		30		0.20	0.03
		35	24	0.22	0.04

LLB

Code No.			ℓ	@/P	
Code	M	L	New JIS	1～99P	100P～
LLB	6	40	24	0.23	0.04
		45		0.25	0.04
		50		0.26	0.04
	8	15	Full thread	0.25	0.04
		20		0.25	0.04
		25		0.25	0.04
		30		0.25	0.04
		35		0.26	0.04
		40	28	0.28	0.05
		45		0.31	0.05
		50		0.32	0.05
		55		0.39	0.06
		60		0.48	0.08
	10	20	Full thread	0.34	0.05
		25		0.35	0.06
		30		0.36	0.06
		35		0.36	0.06
		40		0.37	0.06
		45	32	0.41	0.07
		50		0.42	0.07

LLB

Code No.			ℓ	@/P	
Code	M	L	New JIS	1～99P	100P～
LLB	10	55	32	0.48	0.08
		60		0.53	0.08
	12	25	Full thread	0.50	0.08
		30		0.53	0.08
		35		0.54	0.08
		40		0.56	0.09
		45		0.58	0.09
		50		0.62	0.10
		55	36	0.68	0.10
		60		0.74	0.11

ORDER
Code No.
CCB3 — 5

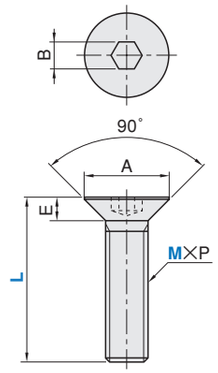
DELIVERY
Next In stock working day
☞ P.15

Low Head Cap Screws／Extra Low Head Cap Screwss

▶Low head cap screws

Material	Hardness	Code
SCM435	32～38HRC	FFB

⚠ JIS B 0205 grade 2



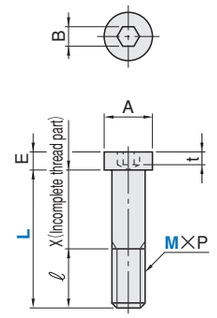
Code No. Code	M	L	M×P	A max	E max	B	※ Quantity	@/P ※Less than	@/P ※More than
FFB	4	10	4X0.7	8	2.3	2.5	1,000	0.06	0.05
		15						0.06	0.05
		20						0.06	0.05
		25					800	0.08	0.06
		30						0.09	0.08
		35						0.13	0.12
	5	10	5X0.8	10	2.8	3	400	0.06	0.05
		12						0.06	0.05
		15						0.06	0.05
		16						0.06	0.05
		20					200	0.06	0.05
		25						0.08	0.06
		30						0.09	0.08
		35						0.13	0.12
		40						0.14	0.13
	6	10	6X1.0	12	3.3	4	400	0.06	0.05
		12					200	0.06	0.05
		15						0.06	0.05
		16						0.06	0.05
		20						0.06	0.05
		25						0.08	0.06
		30					100	0.09	0.08
		35						0.13	0.12
		40						0.14	0.13
		45						0.15	0.14
	8	15	8X1.25	16	4.4	5	100	0.10	0.09
		20						0.12	0.10
		25						0.12	0.10
		30						0.12	0.10
		35						0.13	0.12
		40						0.14	0.13
		45						0.15	0.14
		50						0.17	0.15
	10	20	10X1.5	20	5.5	6	100	0.14	0.13

ORDER Code No. FFB4 — 10

DELIVERY Next In stock working day ☞ P.15

▶Low head cap screws

Material	Hardness	Strength class	Code
SCM435	39～44HRC	8.8	CCBS

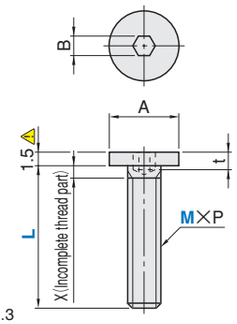


Code No. Code	M	L	M×P	A	E	B	X	t max	ℓ CCBS	ℓ CCBSST	@/P 1～99P	@/P 100P～
CCBS	3	6	3X0.5	5.5	2	2	1.5	1.5	Full thread	Full thread	0.14	0.13
		8									0.14	0.13
		10									0.14	0.13
		12									0.17	0.15
		16									0.19	0.17
		20					8		12		0.19	0.17
	4	6	4X0.7	7	2.8	2.5	2.1	2.3	Full thread	Full thread	0.17	0.17
		8									0.17	0.17
		10									0.17	0.17
		12									0.17	0.17
		16									0.20	0.19
		20									0.23	0.22
		25									0.23	0.23
	5	8	5X0.8	8.5	3.5	3	2.4	2.7	Full thread	Full thread	0.23	0.22
		10									0.20	0.19
		12									0.20	0.19
		16									0.20	0.19
		20									0.20	0.19
		25									0.25	0.23
		30					14		16	24	0.28	0.26
	6	8	6X1.0	10	4	4	3	3	Full thread	Full thread	0.25	0.23
		10									0.23	0.22
		12									0.23	0.22
		16									0.23	0.22
		20									0.23	0.22
		25									0.25	0.23
		30					12				0.28	0.26
		35					17		18	26	0.32	0.30
		40					22				0.36	0.35
		45					27				0.45	0.42
	8	10	8X1.25	13	5	5	3.75	3.8	Full thread	Full thread	0.39	0.37
		12									0.39	0.37
		16									0.39	0.36
		20									0.39	0.36
		25									0.39	0.36
		30									0.41	0.39
		35					13		22	30	0.46	0.43
		40					18				0.49	0.46
		45					23				0.58	0.54
		50					28				0.63	0.59
	10	16	10X1.5	16	6	6	4.5	4.5	Full thread	Full thread	0.56	0.52
		20									0.59	0.56
		25									0.65	0.62
		30									0.70	0.65
		35									0.75	0.70
		40									0.80	0.75
		45					19		26	36	0.85	0.81
		50					24				0.89	0.84
	12	20	12X1.75	18	7	8	5.25	5	Full thread	Full thread	0.92	0.87
		25									0.82	0.78
		30									0.87	0.82
		35									1.09	1.03
		40									1.11	1.06
		45									1.17	1.11
		50					20		30	40	1.44	1.35

▶Extra low head cap screws

Material	Hardness	Code
SCM435	39～44HRC	CCBSS

⚠ Strength class：10.9, head strength class：5.8



⚠ For M3, 1.5→1.3

Code No. Code	M	L	M×P	A	B	X	t max	@/P 1～99P	@/P 100P～
CCBSS	3	6	3X0.5	6	1.5	1.6	2	0.36	0.34
		8						0.36	0.34
		10						0.36	0.35
	4	6	4X0.7	8	2	1.6	2.5	0.30	0.27
		8						0.31	0.28
		10						0.32	0.30
	5	8	5X0.8	9	3	1.6	3	0.34	0.31
		10						0.35	0.32
		12						0.36	0.34
		16						0.36	0.35
		20						0.37	0.36
	6	8	6X1.0	10	3	2.0	4	0.36	0.35
		10						0.39	0.36
		12						0.39	0.37
		16						0.42	0.39
		20						0.45	0.42
		25						0.46	0.43
	8	8	8X1.25	13	4	2.5	5	0.89	0.84
		10						0.82	0.78
		12						0.61	0.58
		16						0.63	0.59
		20						0.65	0.62
		25						0.70	0.65
		30						0.70	0.65
	10	10	10X1.5	16	5	3.0	5	1.11	1.06
		12						0.95	0.89
		16						0.76	0.72
		20						0.78	0.74
		25						0.80	0.75
		30						0.89	0.84

⚠ Strength class＝Tensile strength of thread
(Example) 8.8
- 8 — Indicates that the yield point or the minimum proof strength is 80% of the tensile strength.
- 8 — Indicates that the minimum value of tensile strength is 800N/mm²

M×P	A	B	Incomplete thread part X	t max
3X0.5	5.5	2.5	1.6	2
4X0.7	7	3	1.6	2.5
5X0.8	8.5	4	1.6	3
6X1.0	10	5	2	4
8X1.25	13	6	2.5	5
10X1.5	16	8	3	5

ORDER Code No. CCBS4 — 6

DELIVERY Next In stock working day ☞ P.15

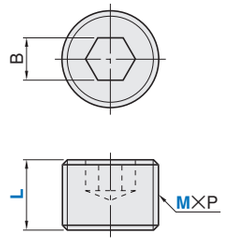
Components

Screw Plugs

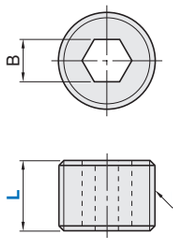
Material	Hardness	Code
SCM435 (M2.5～10)	34～43HRC	MMSW
S45C (M12～45)		MMSWS
S45C		MMSWA
		MMSWAS
	33～38HRC	MMSWZ
		MMSWZS

Surface treatment：blacking（Fe_3O_4）
⚠ JIS B 0207 Grade 2

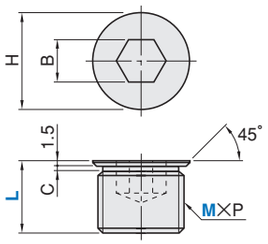
MMSW
MMSWS（short type）



MMSWA（through hole type）
MMSWAS（through hole・short type）



MMSWZ（washer type）
MMSWZS（washer・short type）



Code No. / Code	M	L	P	B	@/P 1～299P	300～499P	500～999P	1000～2000P
MMSW	2.5	3	0.45	1.3	0.12	0.10	0.10	0.09
	3	3	0.5	1.5	0.12	0.10	0.10	0.09
	4	4	0.7	2	0.12	0.10	0.10	0.09
	5	5	0.8	2.5	0.17	0.15	0.14	0.14
	6	6	1.0	3	0.17	0.15	0.14	0.14
	8	8	1.25	4	0.23	0.22	0.22	0.20
	10	10	1.5	5	0.30	0.25	0.25	0.23
	12			6	0.41	0.36	0.36	0.35
	14				0.48	0.42	0.41	0.39
	16			8	0.59	0.52	0.52	0.49
	18				0.64	0.56	0.56	0.56
	20	12		10	0.70	0.63	0.62	0.59
	22			12	0.82	0.73	0.73	0.70
	24				0.94	0.84	0.82	0.80
	25				1.06	0.94	0.94	0.90
	26			14	1.17	1.04	1.04	1.00
	27				1.29	1.16	1.14	1.09
	28				1.40	1.25	1.24	1.20
	30			17	1.46	1.30	1.29	1.24
	33				1.64	1.46	1.45	1.39
	36	18			3.02	2.73	2.68	2.58
	38				3.96	3.55	3.53	3.37
	40				5.12	4.61	4.56	4.36
	42				6.75	6.06	6.02	5.74
	45				8.15	7.33	7.25	6.92

Code No. / Code	M—L	P	B	@/P 1～299P	300～499P	500～999P	1000～2000P
MMSWS (short type)	8—6	1.25	4	0.59	0.53	0.52	0.49
	10—6	1.5	5	0.64	0.59	0.58	0.56
	12—6		6	0.76	0.70	0.68	0.64
	14—6			0.82	0.74	0.73	0.70
	16—6		8	0.94	0.84	0.82	0.80
	18—6		10	1.00	0.90	0.89	0.84
	20—8			1.06	0.95	0.94	0.90
	22—8		12	1.17	1.06	1.04	1.00
	24—8			1.29	1.16	1.14	1.09
	25—8			1.40	1.26	1.24	1.20
	26—8		14	1.52	1.37	1.35	1.29
	27—8			1.64	1.48	1.45	1.39
	28—8			1.75	1.56	1.55	1.49
	30—8		17	1.80	1.64	1.61	1.53
	33—8			1.99	1.77	1.75	1.70

Code No. / Code	M	L	P	B	@/P 1～299P	300～499P	500～999P	1000～2000P
MMSWA (through hole type)	8	8	1.25	4	0.53	0.48	0.48	0.45
	10	10	1.5	5	0.53	0.48	0.48	0.45
	12			6	0.59	0.53	0.52	0.50
	14				0.64	0.59	0.58	0.56
	16			8	0.70	0.63	0.62	0.59
	18			10	0.82	0.74	0.73	0.70
	20	12			0.87	0.80	0.78	0.75
	22			12	0.94	0.84	0.82	0.80
	24			14	1.11	1.00	1.00	0.95
	25				1.17	1.06	1.04	1.00
	26				1.23	1.11	1.09	1.04
	27				1.29	1.16	1.14	1.09
	28				1.40	1.26	1.25	1.20
	30			17	1.46	1.30	1.29	1.24
	33				1.64	1.48	1.46	1.39

Code No. / Code	M—L	P	B	@/P 1～299P	300～499P	500～999P	1000～2000P
MMSWAS (through hole・short type)	8—6	1.25	4	0.87	0.80	0.78	0.75
	10—6	1.5	5	0.87	0.80	0.78	0.75
	12—6		6	0.94	0.84	0.82	0.80
	14—6			1.00	0.90	0.89	0.84
	16—6		8	1.06	0.95	0.94	0.90
	18—6		10	1.17	1.06	1.04	1.00
	20—8			1.23	1.11	1.09	1.04
	22—8		12	1.29	1.16	1.14	1.09
	24—8		14	1.46	1.30	1.29	1.24
	25—8			1.52	1.37	1.35	1.29
	26—8			1.56	1.43	1.40	1.34
	27—8			1.64	1.48	1.46	1.39
	28—8			1.75	1.56	1.55	1.49
	30—8		17	1.80	1.64	1.61	1.53
	33—8			1.99	1.77	1.75	1.70

Code No. / Code	M	L	P	B	H	C	@/P 1～99P	100～199P	200～299P	300～500P
MMSWZ (washer type)	6	8	1.0	3	9	2.5	1.17	1.11	1.06	1.00
	8	10	1.25	4	11		1.17	1.11	1.06	1.00
	10	12	1.5	5	13		1.29	1.23	1.16	1.09
	12			6	15		1.40	1.33	1.26	1.20
	14				17		1.52	1.45	1.37	1.29
	16			8	19		1.64	1.55	1.48	1.39
	18			10	21		1.75	1.67	1.56	1.48
	20				23		1.86	1.77	1.68	1.58
	22			12	25		2.09	1.99	1.89	1.77
	24			14	27		2.33	2.21	2.09	1.99
	25				28		2.68	2.55	2.42	2.27
	26	15			29		2.92	2.77	2.62	2.46
	27				30		3.15	2.99	2.83	2.68
	28				31		3.39	3.21	3.03	2.87
	30			17	33		3.62	3.43	3.24	3.06
	33				36		3.84	3.65	3.46	3.25

Code No. / Code	M—L	P	B	H	C	@/P 1～99P	100～199P	200～299P	300～500P
MMSWZS (through hole・short type)	10—10	1.5	5	13	2.0	1.64	1.55	1.48	1.39
	12—10		6	15		1.75	1.67	1.56	1.48
	14—10			17		1.86	1.77	1.68	1.58
	16—10		8	19		1.99	1.89	1.77	1.68
	18—10		10	21		2.09	1.99	1.89	1.77
	20—10			23		2.21	2.11	1.99	1.87
	22—10		12	25		2.45	2.33	2.21	2.08
	24—10		14	27		2.68	2.55	2.42	2.27
	25—10			28		3.02	2.89	2.73	2.58
	26—10			29		3.25	3.11	2.93	2.77
	27—10			30		3.49	3.33	3.15	2.96
	28—10			31		3.73	3.55	3.36	3.17
	30—12		17	33		3.96	3.75	3.56	3.37
	33—12			36		4.20	3.98	3.77	3.56

ORDER

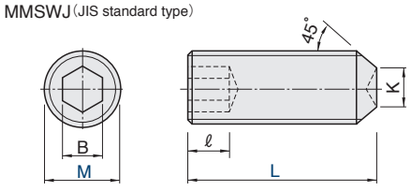
Code No.
MMSW2.5
MMSWS8 — 6

DELIVERY Next In stock working day ☞ P.15

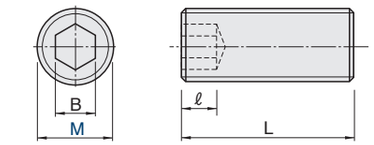
PRICE Without tax ⚠ Please enquire the price and delivery day for quantity more than listed above.

Material	Hardness	Surface tr	Code
SCM435	32～42HRC		MMSWJ（JIS standard type）
S45C			MMSWC（long type）
			MMSWT（tapered type）
SUSXM7	—	—	MMSWTS（Stainless steel・tapered type）

MMSWJ（JIS standard type）

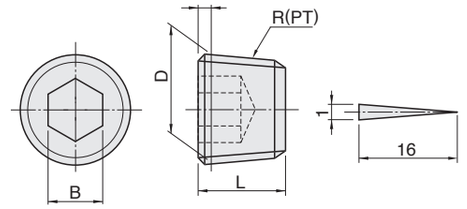


MMSWC（long type）



MMSWT（Tapered type）
MMSWTS（Stainless steel・tapered type）

Standard diameter position



⚠ Tread part：JIS B 0203
Thread for tubing：R（PT）
＊The tread part of MMSWT No.S is ANSI B2.2
Tapered thread：（NPTF）for american tubing

DELIVERY Next In stock working day ☞ P.15

▶ Tapered type

Code No. / Code	No.	D	a	⚠ No. of threads	Pitch	L	B	R(PT)	MMSWT @/P 1～99P	MMSWT @/P 100～199P	MMSWTS @/P 1～99P	MMSWTS @/P 100～199P
MMSWT (JIS)	J＊	7.723	0.45	28	0.91	6	4	1/16	0.41	0.38	—	—
	S＊	7.779	0.47	27	0.94	6.4	4	1/16				
MMSWT MMSWTS (stainless steel)	1	9.728	0.45	28	0.91	7	5	1/8	0.16	0.15	1.71	1.48
	2	13.157	0.7	19	1.34	8.9	6	1/4	0.19	0.16	2.95	2.58
	3	16.662				10	8	1/8	0.23	0.21	3.92	3.43
	4	20.955	0.9	14	1.81	12	10	1/2	0.36	0.34	5.64	4.65
	6	26.441				14	14	3/4	0.93	0.89	10.6	8.95
	8	33.249	1.1	11	2.31	17	17	1	1.75	1.67	18.6	16.2

⚠ No. of threads per 25.4mm ＊MMSWT No.J is JIS thread. MMSWT No.S is ANSI thread.

Code No. / Code	M	L	M×P（粗牙）	ℓ	K	B	@/P 1～99P	100～199P	200～299P	300～500P
MMSWJ (JIS standard type)	3	4	3×0.5	1.5	1.5	1.5	0.09	0.08	0.08	0.06
		5								
		6								
	4	5	4×0.7	2	2	2	0.10	0.09	0.09	0.08
		6								
		8								
	5	6	5×0.8	2.5	2.5	2.5	0.14	0.12	0.12	0.12
		8								
		10								
	6	8	6×1.0	3	3	3	0.15	0.14	0.12	0.12
		10								
		15								
	8	10	8×1.25	4	5	4	0.21	0.20	0.19	0.17
		12								
		15								
	10	12	10×1.5	4	6	5	0.36	0.34	0.32	0.30
		15								
		20								
	12	15	12×1.75	5	8	6	0.53	0.49	0.47	0.45
		20								
		25								

Code No. / Code	M	M×P（粗牙）	L	B	ℓ	@/P 1～49P	50～99P	100～199P	200～300P
MMSWC (long type)	6	6×1.0	30	3	3	0.36	0.34	0.34	0.32
	8	8×1.25		4	4	0.36	0.34	0.34	0.32
	10	10×1.5		5	5	0.59	0.58	0.56	0.56
	12	12×1.75		6	6	0.87	0.86	0.85	0.84
	14	14×2.0				1.06	1.04	1.03	1.02
	16	16×2.0		8	8	1.17	1.15	1.14	1.13
	18	18×2.5				1.29	1.26	1.25	1.24
	20	20×2.5	35	10	10	1.46	1.44	1.42	1.41
	22	22×2.5		12		1.62	1.61	1.59	1.56
	24	24×3.0			12	1.86	1.84	1.81	1.80
	27	27×3.0		14	14	2.09	2.06	2.05	2.02
	30	30×3.5		17	17	2.33	2.30	2.28	2.25

ORDER

Code No. | L
MMSWJ3 — 4
MMSWC6
MMSWTJ
MMSWTS1

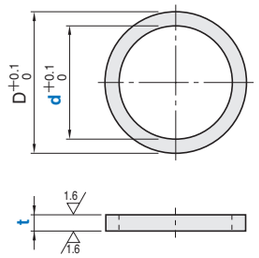
PRICE Without tax ▶ Quantity discount rate ☞ P.15

1～19	20～49	50～199	200～500	501～
100%	95%	90%	85%	Enquiry

Components

Washers / Spacers

MMSRB (spacers for male screw stripper bolt)



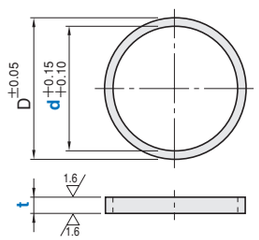
Material：SK85

T	t		
0.1	±0.02	0.5	±0.03
0.2	±0.02	1.0	±0.04
0.3	±0.03	2.0	±0.09

Code No.		t	D	@/P			
Code	d			1～49P	50～99P	100～499P	500～1000P
MMSRB	＊4	0.1	6.5	0.13	0.12	0.08	0.08
	4.5	0.2	7	0.13	0.12	0.08	0.08
	＊5	0.3	8	0.13	0.12	0.08	0.08
	5.5	0.5	9	0.13	0.12	0.08	0.08
	＊6	1.0	9	0.13	0.12	0.08	0.08
	6.5	2.0	10	0.13	0.12	0.08	0.08
	8		13	0.14	0.13	0.10	0.10
	10		16	0.17	0.15	0.13	0.12
	＊12		17	0.20	0.19	0.15	0.14
	13		18	0.20	0.19	0.15	0.14
	16		24	0.23	0.23	0.19	0.17
	20		27	0.31	0.30	0.26	0.25

⚠＊For d4・5・6・12, t=2.0 is not available.

LLRB (spacers for guide lifter・lifter pin)

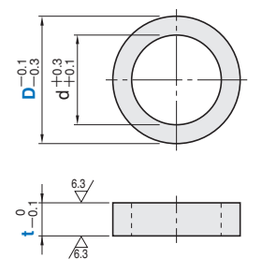


Material：SK85

T	t		
0.1	±0.020	0.5	±0.030
0.2	±0.020	1.0	±0.040
0.3	±0.030		

Code No.		t	D	@/P			
Code	d			1～49P	50～99P	100～499P	500～1000P
LLRB	4	0.1	6	0.10	0.09	0.05	0.05
	5	0.2	7	0.12	0.10	0.06	0.06
	6	0.3	8	0.13	0.12	0.08	0.08
	8	0.5	10	0.14	0.13	0.10	0.10
	10	1.0	13	0.17	0.15	0.13	0.12
	13		16	0.20	0.19	0.15	0.14
	16		19	0.23	0.23	0.19	0.17
	20		23	0.28	0.27	0.23	0.23

SSSWA (washers for coil spring)



Material：SS400

Code No.		t	d	Available spring D	@/P (1～19P)				
Code	D				t=1.0	t=2.0	t=3.0	t=4.0	t=5.0
SSSWA	5	1.0	3.0	6	0.74	0.74	0.74	0.84	0.93
	7	2.0	5.0	8	0.74	0.74	0.74	0.84	0.93
	9	3.0	6.0	10	0.74	0.74	0.74	0.84	0.93
	11.5	4.0	7.0	12	0.74	0.74	0.74	0.84	0.93
	13	5.0	8.0	14	0.74	0.74	0.74	0.84	0.93
	15		9.0	16	0.84	0.84	0.84	0.93	1.12
	17		10.0	18	0.84	0.84	0.84	0.93	1.12
	19		12.0	20	0.84	0.84	0.84	0.93	1.12
	21		12.0	22	0.93	0.93	0.93	1.03	1.21
	24		14.5	25	0.93	0.93	0.93	1.03	1.21
	26		15.0	27	0.93	0.93	0.93	1.03	1.21
	29		17.0	30	1.08	1.08	1.08	1.21	1.39
	34		20.0	35	1.08	1.08	1.08	1.21	1.39
	39		23.0	40	1.08	1.08	1.08	1.21	1.39

ORDER

Code No.	t
MMSRB4 —	0.1
LLRB4 —	0.1
SSSWA5 —	1.0

DELIVERY Next In stock working day ☞ P.15

SSSWA

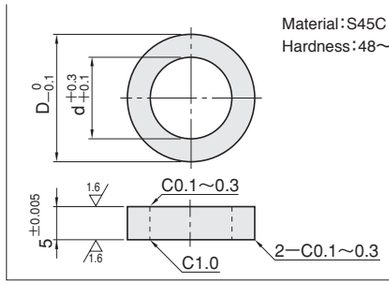
PRICE Without tax

▶Quantity discount rate ☞ P.15

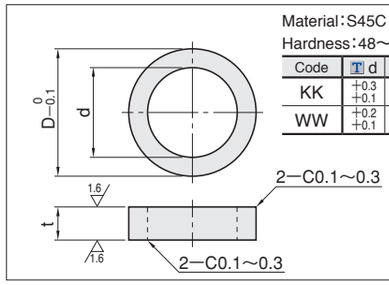
1～19	20～49	50～199	200～500	501～
100%	95%	90%	85%	Enquiry

⚠For MMSRB・LLRB, when quantity is more than 1001P, please enquire the price and delivery day.

TT・RR (spacers for busing stripper bolt)

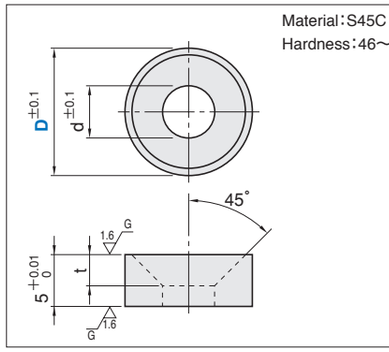


KK・WW (spacers for female screw stripper bolt)

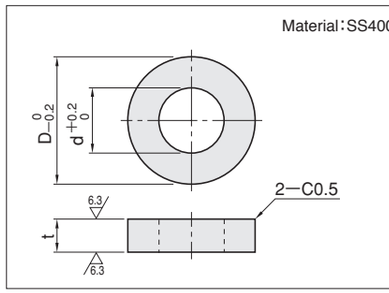


Code	T d	T t
KK	+0.3 +0.1	5±0.005
WW	+0.2 +0.1	5±0.01

SSTR (stop rings)



SSRW (washers for stripper guide pin)



Code No.		D	d	t	@/P			
Code	No.				1～49P	50～199P	200～499P	500～1000P
TT	6.5	11.5	4		0.65	0.62	0.59	0.55
	8	13	5		0.65	0.62	0.59	0.55
	10	15	6		0.65	0.62	0.59	0.55
	13	18	8		0.74	0.70	0.67	0.63
	16	21	10		0.84	0.79	0.75	0.72
	20	23	12		1.12	1.06	1.00	0.94
RR	6.5—16	16	4		0.93	0.88	0.83	0.78
	6.5—18	18			0.93	0.88	0.83	0.78
	8 —18	18	5		0.93	0.88	0.83	0.78
	8 —20	20			0.93	0.88	0.83	0.78
	8 —22	22			0.93	0.88	0.83	0.78
	10 —20	20	6		0.93	0.88	0.83	0.78
	10 —22	22			0.93	0.88	0.83	0.78
	10 —25	25			0.93	0.88	0.83	0.78
	10 —27	27			0.93	0.88	0.83	0.78
	13 —25	25	8		1.21	1.14	1.09	1.03
	13 —27	27			1.21	1.14	1.09	1.03
	13 —30	30			1.21	1.14	1.09	1.03
	16 —30	30	10		1.48	1.41	1.33	1.25
	16 —35	35			1.48	1.41	1.33	1.25
	16 —40	40			1.48	1.41	1.33	1.25
	20 —35	35	12		2.40	2.28	2.17	2.03
	20 —40	40			2.40	2.28	2.17	2.03

Code No.		D	d	@/P			
Code	No.			1～49P	50～199P	200～499P	500～1000P
KK	10	10	6	0.56	0.53	0.50	0.48
	13	13	8	0.65	0.62	0.59	0.55
	16	16	10	0.74	0.70	0.67	0.63
	20	20	12	0.84	0.79	0.75	0.72
WW	10	8	5	0.56	0.53	0.50	0.48
	13	11	6	0.65	0.62	0.59	0.55
	16	14	8	0.74	0.70	0.67	0.63
	20	17	10	0.84	0.79	0.75	0.72

Code No.		d	t	@/P			
Code	D			1～49P	50～199P	200～499P	500～1000P
SSTR	16	5.5	3.0	1.21	1.12	1.09	1.03
	20	6.5	3.5	1.48	1.39	1.34	1.25
	25	8.5	4.5	1.86	1.77	1.67	1.58

Code No.		D	d	t	@/P			
Code	No.				1～49P	50～199P	200～499P	500～1000P
SSRW	8	12	5.3	3	0.93	0.88	0.83	0.78
	10	15			0.93	0.88	0.83	0.78
	13	19	6.4	4	1.12	1.06	1.00	0.94
	16	22			1.12	1.06	1.00	0.94
	20	26	8.4	5	1.39	1.32	1.25	1.18
	25	30			1.39	1.32	1.25	1.18

ORDER

Code No.
RR8 — 18
SSTR16

DELIVERY Next In stock working day ☞ P.15

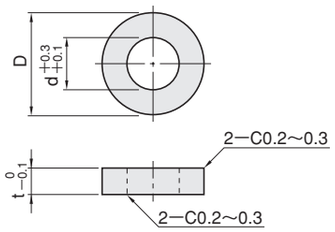
PRICE Without tax

⚠For quantity more than 1001P, please enquire the price and delivery day.

Components

Washers／Spacers／Spring Washers

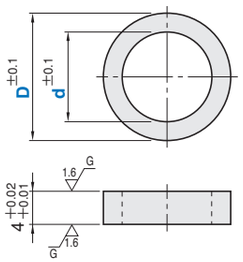
SSW（washers for stripper bolt･coil spring）



Material：S45C
Hardness：48～52HRC

Code No.		D	d	t	@/P			
Code	No.				1～19P	20～49P	50～99P	100～200P
SSW	10	10	4.5	3	1.67	1.58	1.50	1.43
	12	12	5.5		1.67	1.58	1.50	1.43
	12— 6		6		1.80	1.71	1.62	1.53
	16	16	6.5	4	1.95	1.86	1.75	1.67
	20	20	8	5	1.95	1.86	1.75	1.67
	22	22	10		2.14	2.03	1.93	1.83
	25	25			2.14	2.03	1.93	1.83
	25—12		12		2.28	2.17	2.05	1.95
	27	27	13	8	2.50	2.37	2.25	2.15
	30	30			2.50	2.37	2.25	2.15
	35	35	16		3.15	2.99	2.84	2.70
	40	40			3.15	2.99	2.84	2.70
	50	50	20	10	3.71	3.52	3.34	3.18

SSPW（spacers）

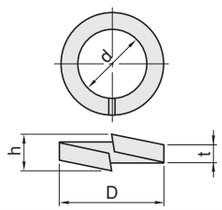


Material：S45C

Code No.		d	@/P			
Code	D		1～49P	50～199P	200～499P	500～1000P
SSPW	13	4.5	0.93	0.88	0.83	0.78
		5.5	0.93	0.88	0.83	0.78
		6.5	0.93	0.88	0.83	0.78
	16	6.5	0.93	0.88	0.83	0.78
		8.5	0.93	0.88	0.83	0.78
	20	8.5	1.39	1.30	1.25	1.18
		10.5	1.39	1.30	1.25	1.18
	25	10.5	1.39	1.30	1.25	1.18
		12.5	1.39	1.30	1.25	1.18

▶Spring washers

Material	Hardness	Code
SWRH62	42～50HRC	CCBW



Code No.		d	D	h	t	@/P			
Code	No.					1～49P	50～199P	200～499P	500～1000P
CCBW	3	3.1	5.6	2	1	0.12	0.10	0.09	0.09
	4	4.1	7	2.4	1.2	0.12	0.10	0.09	0.09
	5	5.1	8.8	3.2	1.6	0.12	0.10	0.09	0.09
	6	6.1	9.9	3.2	1.6	0.12	0.10	0.09	0.09
	8	8.1	12.7	4	2	0.12	0.10	0.09	0.09
	10	10.2	16	5	2.5	0.13	0.12	0.10	0.10
	12	12.2	18	5	2.5	0.14	0.13	0.13	0.13
	16	16.2	24.4	7	3.5	0.23	0.23	0.22	0.20
	20	20.2	30.6	9	4.5	0.34	0.31	0.30	0.27
	24	24.5	35.9	10	5	0.63	0.59	0.56	0.53

ORDER

Code No.
CCWB10

DELIVERY

Next In stock working day ☞ P.15

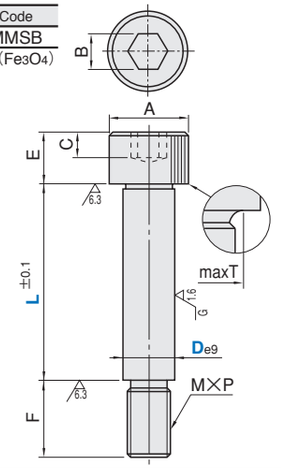
PRICE Without tax

⚠ Please enquire the price and delivery day for quantity more than listed above.

Male Screw Stripper Bolts

Material	Hardness	Code
SCM435	33～38HRC	MMSB

Surface treatment：Blacking（Fe_3O_4）
⚠ Strength class 10.9



De9		A	B	C	E	F	M×P	T
4	−0.020 −0.050	6.5	2.5	1.6	3	5	2.5×0.45	4.5
4.5		7				6	3 ×0.5	5
5		8			3.5			5.5
5.5		9	3	2.2	4	7	4 ×0.7	6
6				2				6.5
6.5	−0.025 −0.061	10	4	2.5	5	9	5 ×0.8	7
8		13	5	3	6	9	6 ×1.0	8.7
10		16	6	4	8	12	8 ×1.25	10.8
12	−0.032 −0.075	17						12.8
13		18	8	5	10	16	10 ×1.5	14
16		24	10	7	14	18	12 ×1.75	17
20	−0.040 −0.092	27	14	9	18	24	16 ×2.0	21

Code No.		L	@/P
Code	D		(1～19P)
MMSB	4	15 20 25 30 35 40	0.49
		10 45	0.61
	4.5	15 20 25 30 35 40	0.49
		10 45 50	0.61
	5	15 20 25 30 35 40	0.53
		10 45 50	0.65
	5.5	15 20 25 30 35 40	0.49
		10 45 50 55	0.61
	6	15 20 25 30 35 40	0.65
		10 45 50 55 60 65 70	0.82
	6.5	15 20 25 30 35 40	0.49
		10 45 50 55 60 65 70 75 80	0.58
	8	15 20 25 30 35 40 45	0.58
		10 50 55 60 65 70 75 80 85 90	0.70
		95 100 110 120	0.90
	10	15 20 25 30 35 40 45 50 55	0.74
		60 65 70 75	0.86
		10 80 85 90 95 100 110 120	1.06
	12	15 20 25 30 35 40 45 50 55	1.02
		60 65 70 75	1.23
		10 80 85 90 95 100	1.55
	13	15 20 25 30 35 40 45 50 55 60 65 70	1.06
		75 80 85 90 95 100	1.39
		10 110 120 130	1.87
	16	15 20 25 30 35 40 45 50 55 60 65 70 75 80 85	1.95
		90 95 100	2.11
		110 120 130 140 150	2.84
	20	40 50 60 70 80 90 100	3.00
		110 120 130 140 150	3.74

ORDER

Code No. | L
MMSB4 — 15

DELIVERY

Next In stock working day ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～19	20～49	50～199	200～500	501～
100%	95%	90%	85%	Enquiry

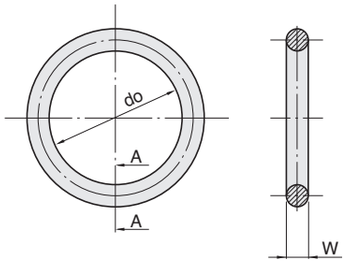
Components

O Rings

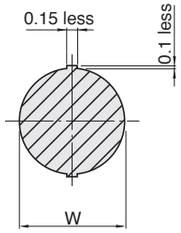
In stock

Work temperature	Material	Code
−30～ 80℃	Neoprene (JIS 1 kind of A)	OORS
−15～150℃	Fluoroelastomer (JIS 4 kinds of D)	OORP OORG

⚠ Work temperature is only for reference.



Section A—A



Code No. Code	No.	W (Thickness)	do (ID)		*d		*D		*D1		@/P (1～29P)
OORS (For space-saving)	3	1.5±0.1	2.5	±0.15	3	0 −0.05	5	+0.05 0	5.3	+0.05 0	0.16
	4		3.5		4		6		6.3		0.16
	5		4.5		5		7		7.3		0.16
	6		5.5		6		8		8.3		0.16
	7		6.5		7		9		9.3		0.16
	8		7.5		8		10		10.3		0.16
	9		8.5		9		11		11.3		0.19
	10		9.5		10		12		12.3		0.19
	12		11.5		12		14		14.3		0.22
	14		13.5		14		16		16.3		0.22
	15		14.5		15		17		17.3		0.22
	16		15.5		16		18		18.3		0.22
	18		17.5		18		20		20.3		0.22
	20		19.5		20		22		22.3		0.31
	22		21.5		22		24		24.3		0.31
	24	2.0±0.1	23.5		24		27		27.5		0.34
	25		24.5		25		28		28.5		0.34
	26		25.5		26		29		29.5		0.34
	28		27.5		28		31		31.5		0.39
	30		29.5		30		33		33.5		0.39
	32		31.5		32		35		35.5		0.42
	34		33.5		34		37		37.5		0.42
	35		34.5		35		38		38.5		0.43
	36		35.5		36		39		39.5		0.43
	38		37.5		38		41		41.5		0.43
	39		38.5		39		42		42.5		0.43
	40		39.5		40		43		43.5		0.43
	42		41.5	±0.25	42		45		45.5		0.55
	44		43.5		44		47		47.5		0.55
	46		45.5		46		49		49.5		0.74
	48		47.5		48		51		51		0.74

Code No. Code	No.	W (Thickness)	do (ID)		*d		*D		JIS No.	@/P (1～29P)
OORP (For moving sealing)	3	1.9±0.08	2.8	±0.14	3	0 −0.05	6	+0.05 0	P 3	0.52
	4		3.8		4		7		P 4	0.52
	5		4.8	±0.15	5		8		P 5	0.52
	6		5.8		6		9		P 6	0.58
	7		6.8	±0.16	7		10		P 7	0.58
	8		7.8		8		11		P 8	0.58
	9		8.8	±0.17	9		12		P 9	0.64
	10		9.8		10		13		P 10	0.71
	11	2.4±0.09	10.8	±0.18	11	0 −0.06	15	+0.06 0	P 11	0.79
	12		11.8	±0.19	12		16		P 12	0.94
	14		13.8		14		18		P 14	1.04
	15		14.8	±0.20	15		19		P 15	1.15
	16		15.8		16		20		P 16	1.24
	18		17.8	±0.21	18		22		P 18	1.24
	20		19.8	±0.22	20		24		P 20	1.43
	21		20.8	±0.23	21		25		P 21	1.43
	22		21.8	±0.24	22		26		P 22	1.43
	24	3.5±0.1	23.7		24	0 −0.08	30	+0.08 0	P 24	1.74
	25		24.7	±0.25	25		31		P 25	1.74
	26		25.7	±0.26	26		32		P 26	1.87
	28		27.7	±0.28	28		34		P 28	1.87
	30		29.7	±0.29	30		36		P 30	2.09
	31		30.7	±0.30	31		37		P 31	2.09
	32		31.7	±0.31	32		38		P 32	2.09
	34		33.7	±0.33	34		40		P 34	2.09
	35		34.7	±0.34	35		41		P 35	2.09
	36		35.7		36		42		P 36	2.39
	38		37.7		38		44		P 38	2.39
	39		38.7	±0.37	39		45		P 39	2.39
	40		39.7		40		46		P 40	2.68
	42		41.7	±0.39	42		48		P 42	2.68
	44		43.7	±0.41	44		50		P 44	2.68
	46		45.7	±0.42	46		52		P 46	3.49
	48		47.7	±0.44	48		54		P 48	3.49
OORG (For static sealing)	25	3.1±0.1	24.4	±0.25	25	0 −0.10	30	+0.10 0	G 25	1.86
	30		29.4	±0.29	30		35		G 30	1.86
	35		34.4	±0.33	35		40		G 35	2.77
	40		39.4	±0.37	40		45		G 40	2.77
	45		44.4	±0.41	45		50		G 45	3.50
	50		49.4	±0.45	50		55		G 50	3.50
	55		54.4	±0.49	55		60		G 55	4.11
	60		59.4	±0.53	60		65		G 60	4.11
	65		64.4	±0.57	65		70		G 65	4.80
	70		69.4	±0.61	70		75		G 70	4.80
	75		74.4	±0.65	75		80		G 75	5.56
	80		79.4	±0.69	80		85		G 80	5.56
	85		84.4	±0.73	85		90		G 85	4.89
	90		89.4	±0.77	90		95		G 90	4.89
	95		94.4	±0.81	95		100		G 95	5.36
	100		99.4	±0.85	100		105		G100	5.36
	105		104.4	±0.87	105		110		G105	6.00
	110		109.4	±0.91	110		115		G110	6.00
	115		114.4	±0.94	115		120		G115	6.71
	120		119.4	±0.98	120		125		G120	6.71

ORDER

Code No.
OORS 3

DELIVERY

Next In stock working day ☞ P.15

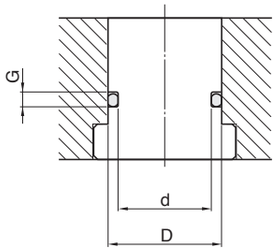
PRICE Without tax

▶Quantity discount rate ☞ P.15

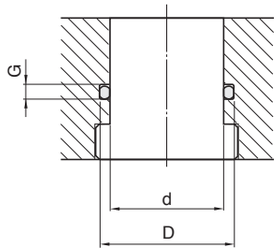
1～29	30～199	200～299	300～500	501～
100%	95%	90%	80%	Enquiry

Installation and Gland Design for O-Rings

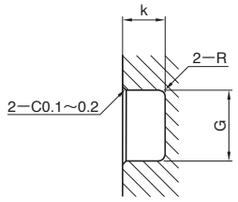
For cylinder face fixing



Male gland type

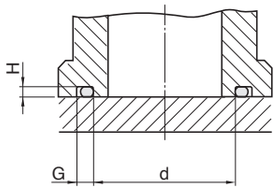


Female Gland Type

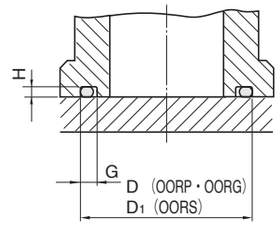


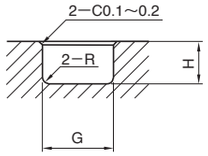
k=(D—d)／2

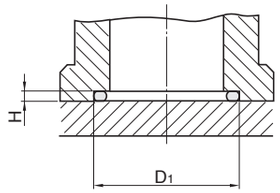
Appearance



Against external pressure

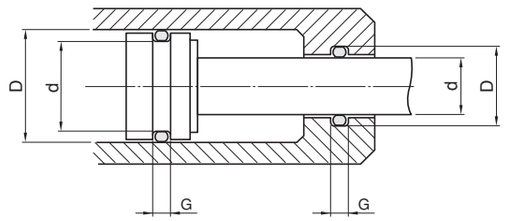






Against internal pressure

For movable fixing



O-ring Groove Dimensions

Code No.		W	$G^{+0.25}_{0}$	T H		Rmax
Code	No.					
OORS	3～ 22	1.5	2.5	1.0	$^{0}_{-0.1}$	—
	24～ 48	2.0	2.7	1.5		—
OORP	3～ 10	1.9	2.5	1.4	±0.05	0.4
	11～ 22	2.4	3.2	1.8		
	24～ 48	3.5	4.7	2.7		0.7
OORG	25～120	3.1	4.1	2.4		0.8

⚠ H dimension is required for flat surface fixing
⚠ For D・d dimensions, refer to ☞ P.906.

Gland Design for O-Rings

▶ Types of O-Ring & physical properties

Property test		Material	
		JIS Class 1A	JIS Class 4D
		Nitrile rubber	Fluoric rubber
Tensile strength MPa	Min.	7.8	7.8
Tensile elongation %	Min.	200	160
tensile stress MPa (100% stretching)	Min.	2.7	1.9

▶ Material property of O-Rings

excerpt from JIS standard

Property test		Material	
		JIS Class 1A	JIS Class 4D
Normality	Shore hardness of A type	A70/S±5	A70/S±5
	Tensile strength MPa min.	9.8	9.8
	Tensile elongation(%) min.	250	200
	Tensile stress MPa min. (100% stretching)	2.7	1.9
Aging test	Temperature & time	120℃、70hour	230℃、24hour
	Shore hardness of A type max.	+10	+5
	Variation on tensile strength (%) max.	−15	−10
	Variation on tensile strength(%) max.	−45	−25
Permanent compression test	Temperature & time	120℃、70hour	175℃、22hour
	Permanent compression(%) max.	40	40
Oil resistant test	Temperature, time & testing grease	120℃、70hour Grease No.1	175℃、70hour Grease No.1
	Variation for Shore hardness of A type	−5～+8	−10～+5
	Variation on tensile strength (%) max.	−15	−20
	Variation on tensile elongation(%) max.	−40	−20
	Variation of volume(%)	−8～+5	−5～+5
	Temperature, time & testing grease	120℃、70hour Grease No.3	175℃、70hour Grease No.3
	Variation for Shore hardness of A type	−15～0	−10～+5
	Variation on tensile strength(%) max.	−25	−20
	Variation on tensile elongation(%) max.	−35	−20
	Variation of volume(%)	0～+20	−5～+5
Fatigue testing at low temperature	Temperature & time	−30～−35℃、5hour	
	Appearance	No cracking after two testes	
Corrosion test	Temperature & time	70±1℃、24hour	
	Appearance	No corrosion or adherent metal pieces. Discoloration of metal surface is not considered as corrosion.	

COIL SPRINGS

Guide for Coil Springs

Wire Springs	Wire Springs	Wire Springs	Wire Springs	Wire Springs
				
WWY P.205 In stock	WWR P.206 In stock	WWF P.207 In stock	WWL P.208 In stock	WWT P.209 In stock

Wire Springs	Wire Springs	Wire Springs	Coil Springs For Ultra High Deflection	Coil Springs For Super High Deflection
				
WWM P.210 In stock	WWH P.211 In stock	WWB P.212 In stock	SSWY P.214 In stock	SSWU P.215 In stock

Coil Springs For High Deflection	Coil Springs For Medium Deflection	Coil Springs For Minimal Load	Coil Springs For Light Load	Coil Springs For Medium Load
				
SSWR P.216 In stock	SSWS P.218 In stock	SSWF P.220 In stock	SSWL P.222 In stock	SSWM P.224 In stock

Coil Springs For Heavy Load	Coil Springs For Extra Heavy Load	Coil Springs For Super Heavy Load	Coil Springs For High Speed Extra Heavy Load
			
SSWH P.226 In stock	SSWB P.228 In stock	SSWG P.230 In stock	SSWX P.232 In stock

How to Use the Specification Table

Coil spring has been widely applied for striper bolt, lifter pin, and knockout pin in press die. Designers need to consider the installation space, load, and life-span of spring, and then select the compatible products from over 3200 types. In order to lookup conveniently, the specification table is designed based on max. deflection and load, in terms of product codes.

①Select the most compatible load specification based on installation space.

②Select the most compatible installation specification based on designing load.

Furthermore, the specification tables in the catalog can be used as supporting tool for designing, in order to benefit product selection.

Usage example of specification table

①Select the load based on installation space.

For the selection of specification, please compare the spring constants（loads）

The example below is for selection of specification with outer diameter 4mm and free length 40mm.

Similarly, more coil springs with different loads could be easily found out.

②Select the specification based on designing load.

Select the range of spring constant（load）according to design, and then look up the compatible specification according to installation space.The example below is for selection of specification with spring constant 2.9N/mm. Similarly, more coil springs matching the designed spring constant（load）could be easily found out.

Operation frequency	1 million times																	
Max. deflection ratio	75%		60%		45%		40%		40%		35%		30%		25%			
Outer diameter D	Free length L	WWY ☞P.929		WWR ☞P.206		WWF ☞P.207		WWL ☞P.208		WWT ☞P.209		WWM ☞P.210		WWH ☞P.211		WWB ☞P.212		L
		Max. deflection {mm}	Spring constant N{kgf}	Max. deflection {mm}	Spring constant N{kgf}	Max. deflection {mm}	Spring constant N{kgf}	Max. deflection {mm}	Spring constant N{kgf}	Max. deflection {mm}	Spring constant N{kgf}	Max. deflection {mm}	Spring constant N{kgf}	Max. deflection {mm}	Spring constant N{kgf}	Max. deflection {mm}	Spring constant N{kgf}	
4	5	3.7		3.0		2.2		2.0		2.0		1.7		1.5		1.2		5
	10	7.5		6.0		4.5		4.0		4.0		3.5		3.0		2.5		10
	15	11.2		9.0		6.7		6.0		6.0		5.2		4.5	2.9	3.7		15
	20	15.0	0.1 (0.01)	12.0		9.0		8.0		8.0	1.5 (0.15)	7.0	2.0 (0.20)	6.0	(0.30)	5.0		20
	25	18.7		15.0		11.2		10.0		10.0		8.7		7.5		6.2	4.9 (0.50)	25
	30	22.5		18.0		13.5		12.0	1.0 (0.10)	12.0		10.5		9.0		7.5		30
	35	26.2		21.0	0.3 (0.03)	15.7	0.5 (0.05)	14.0		14.0		12.2				8.7		35
	40	30.0		24.0		18.0		16.0		16.0		12.0				10.0		40
	45			27.0		20.2		18.0								11.2		45
	50			30.0		22.5		20.0								12.5		50
	55			33.0		24.7		22.0										55
	60			36.0		27.0		24.0										60
	65			39.0		29.2												65
	70			42.0		31.5												70
5	5			3.0		2.2		2.0		2.0		1.7		1.5		1.2		5
	10	7.5		6.0		4.5		4.0		4.0		3.5		3.0		2.5		10
	15	11.2		9.0		6.7		6.0		6.0		5.2		4.5		3.7		15
	20	15.0		12.0		9.0		8.0		8.0		7.0		6.0	5.9 (0.60)	5.0		20
	25	18.7		15.0	0.3	11.2	0.5	10.0	1.0	10.0	2.0	8.7	2.9	7.5		6.2	9.8	
	30	22.5	0.1 (0.01)	18.0	(0.03)	13.5	(0.05)	12.0	(0.10)	12.0	(0.20)	10.5	(0.30)	7.5			(1.00)	30
	35	26.2		21.0		15.7		14.0		14.0		12.2		8.4		8.7		35
	40	30.0		24.0		18.0		16.0		14.0		14.0		8.8		10.0		40
	45	33.7		27.0		20.2		18.0		15.7		15.7				11.2		45
	50	37.5		30.0		22.5		20.0		17.5		15.0				12.5		50

Selected specification with outer diameter 4, free length 40

Selected specifications with spring constant 2.9N/mm

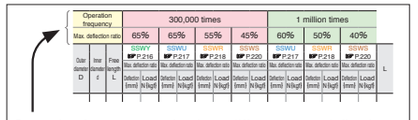
Specific pages

Wire Springs	☞P.196
Coil springs（high deflection）	☞P.198
Coil springs（for heavy load）	☞P.200（D6～22）
	☞P.202（D25～70）

⚠ For details, refer to the specific page please.

⚠ Please select the specification by referring the ［directions and precautions for coil springs］（☞P.204）

⚠ For coil springs



Operation frequency varies from different max. deflection. Do not use in excess of max. deflection and operation frequency to prevent the breakage and low performance. Please select the proper specification after adequately consideration.

Wire Springs

Specification Table

Outer diameter D	Free length L	1 million times 75% WWY ☞P.205 Max. deflection {mm}	Spring constant N {kgf}	60% WWR ☞P.206 Max. deflection {mm}	Spring constant N {kgf}	45% WWF ☞P.207 Max. deflection {mm}	Spring constant N {kgf}	40% WWL ☞P.208 Max. deflection {mm}	Spring constant N {kgf}	40% WWT ☞P.209 Max. deflection {mm}	Spring constant N {kgf}	35% WWM ☞P.210 Max. deflection {mm}	Spring constant N {kgf}	30% WWH ☞P.211 Max. deflection {mm}	Spring constant N {kgf}	25% WWB ☞P.212 Max. deflection {mm}	Spring constant N {kgf}	L
2	5							2.0	0.5 (0.05)									5
	10							4.0										10
	15							6.0										15
	20							8.0										20
	25							10.0										25
	30							12.0										30
3	5	3.7	0.1 (0.01)	3.0	0.3 (0.03)	2.2	0.5 (0.05)	2.0	1.0 (0.10)	2.0	1.5 (0.15)	1,7	2.0 (0.20)			1.2	3.9 (0.40)	5
	10	7.5		6.0		4.5		4.0		4.0		3.5				2.5		10
	15	11.2		9.0		6.7		6.0		6.0		5.2				3.7		15
	20	15.0		12.0		9.0		8.0		8.0		7.0				5.0		20
	25	18.7		15.0		11.2		10.0		10.0		7.5				6.2		25
	30	22.5		18.0		13.5		12.0				9.0				7.5		30
	35			21.0		15.7		14.0								8.7		35
	40			24.0		18.0		16.0								10.0		40
4	5	3.7	0.1 (0.01)	3.0	0.3 (0.03)	2.2	0.5 (0.05)	2.0	1.0 (0.10)	2.0	1.5 (0.15)	1.7	2.0 (0.20)	1.5	2.9 (0.30)	1.2	4.9 (0.50)	5
	10	7.5		6.0		4.5		4.0		4.0		3.5		3.0		2.5		10
	15	11.2		9.0		6.7		6.0		6.0		5.2		4.5		3.7		15
	20	15.0		12.0		9.0		8.0		8.0		7.0		6.0		5.0		20
	25	18.7		15.0		11.2		10.0		10.0		8.7		7.5		6.2		25
	30	22.5		18.0		13.5		12.0		12.0		10.5		9.0		7.5		30
	35	26.2		21.0		15.7		14.0		14.0		12.2				8.7		35
	40	30.0		24.0		18.0		16.0		16.0		12.0				10.0		40
	45			27.0		20.2		18.0								11.2		45
	50			30.0		22.5		20.0								12.5		50
	55			33.0		24.7		22.0										55
	60			36.0		27.0		24.0										60
	65			39.0		29.2												65
	70			42.0		31.5												70
5	5		0.1 (0.01)	3.0	0.3 (0.03)	2.2	0.5 (0.05)	2.0	1.0 (0.10)	2.0	2.0 (0.20)	1.7	2.9 (0.30)	1.5	5.9 (0.60)	1.2	9.8 (1.00)	5
	10	7.5		6.0		4.5		4.0		4.0		3.5		3.0		2.5		10
	15	11.2		9.0		6.7		6.0		6.0		5.2		4.5		3.7		15
	20	15.0		12.0		9.0		8.0		8.0		7.0		6.0		5.0		20
	25	18.7		15.0		11.2		10.0		10.0		8.7		7.5		6.2		25
	30	22.5		18.0		13.5		12.0		12.0		10.5		9.0		7.5		30
	35	26.2		21.0		15.7		14.0		14.0		12.2				8.7		35
	40	30.0		24.0		18.0		16.0		16.0		14.0				10.0		40
	45	33.7		27.0		20.2		18.0		18.0		15.7				11.2		45
	50	37.5		30.0		22.5		20.0				17.5				12.5		50
	55			33.0		24.7		22.0				19.2				13.7		55
	60			36.0		27.0		24.0				21.0				15.0		60
	65			39.0		29.2		26.0				22.7				16.2		65
	70			42.0		31.5		28.0				24.5				17.5		70
6	5		0.1 (0.01)	3.0	0.3 (0.03)	2.2	0.5 (0.05)	2.0	1.0 (0.10)	2.0	2.0 (0.20)	1.7	2.9 (0.30)	1.5	5.9 (0.60)	1.2	9.8 (1.00)	5
	10	7.5		6.0		4.5		4.0		4.0		3.5		3.0		2.5		10
	15	11.2		9.0		6.7		6.0		6.0		5.2		4.5		3.7		15
	20	15.0		12.0		9.0		8.0		8.0		7.0		6.0		5.0		20
	25	18.7		15.0		11.2		10.0		10.0		8.7		7.5		6.2		25
	30	22.5		18.0		13.5		12.0		12.0		10.5		9.0		7.5		30
	35	26.2		21.0		15.7		14.0		14.0		12.2		10.5		8.7		35
	40	30.0		24.0		18.0		16.0		16.0		14.0		12.0		10.0		40
	45	33.7		27.0		20.2		18.0		18.0		15.7		14.0		11.2		45
	50	37.5		30.0		22.5		20.0		20.0		17.5		15.0		12.5		50
	55	41.2		33.0		24.7		22.0		22.0		19.2		16.5		13.7		55
	60	45.0		36.0		27.0		24.0		24.0		21.0		18.0		15.0		60
	65	48.7		39.0		29.2		26.0		26.0		22.7		19.5		16.2		65
	70	52.5		42.0		31.5		28.0		28.0		24.5		21.0		17.5		70
	80			48.0		36.0		32.0		32.0		28.0		24.0		20.0		80

⚠ Spring constant {kgf/mm} = {N/mm} × 0.101972

How to use the specification table ☞ P.195

Outer diameter D	Free length L	1 million times 75% WWY ☞P.205 Max. deflection {mm}	Spring constant N {kgf}	60% WWR ☞P.206 Max. deflection {mm}	Spring constant N {kgf}	45% WWF ☞P.207 Max. deflection {mm}	Spring constant N {kgf}	40% WWL ☞P.208 Max. deflection {mm}	Spring constant N {kgf}	L
8	10	7.5	0.1 (0.01)	6.0	0.3 (0.03)	4.5	0.5 (0.05)	4.0	1.0 (0.10)	10
	15	11.2		9.0		6.7		6.0		15
	20	15.0		12.0		9.0		8.0		20
	25	18.7		15.0		11.2		10.0		25
	30	22.5		18.0		13.5		12.0		30
	35	26.2		21.0		15.7		14.0		35
	40	30.0		24.0		18.0		16.0		40
	45	33.7		27.0		20.2		18.0		45
	50	37.5		30.0		22.5		20.0		50
	55	41.2		33.0		24.7		22.0		55
	60	45.0		36.0		27.0		24.0		60
	65	48.7		39.0		29.2		26.0		65
	70	52.5		42.0		31.5		28.0		70
	80			48.0		36.0		32.0		80
10	10		0.2 (0.02)	6.0	0.3 (0.03)	4.5	0.5 (0.05)	4.0	1.0 (0.10)	10
	15	11.2		9.0		6.7		6.0		15
	20	15.0		12.0		9.0		8.0		20
	25	18.7		15.0		11.2		10.0		25
	30	22.5		18.0		13.5		12.0		30
	35	26.2		21.0		15.7		14.0		35
	40	30.0		24.0		18.0		16.0		40
	45	33.7		27.0		20.2		18.0		45
	50	37.5		30.0		22.5		20.0		50
	55	41.2		33.0		24.7		22.0		55
	60	45.0		36.0		27.0		24.0		60
	65	48.7		39.0		29.2		26.0		65
	70	52.5		42.0		31.5		28.0		70
	80			48.0		36.0		32.0		80
12	10		0.2 (0.02)	6.0	0.3 (0.03)	4.5	0.5 (0.05)	4.0	1.0 (0.10)	10
	15			9.0		6.7		6.0		15
	20			12.0		9.0		8.0		20
	25			15.0		11.2		10.0		25
	30			18.0		13.5		12.0		30
	35			21.0		15.7		14.0		35
	40			24.0		18.0		16.0		40
	45			27.0		20.2		18.0		45
	50			30.0		22.5		20.0		50
	55			33.0		24.7		22.0		55
	60			36.0		27.0		24.0		60
	65			39.0		29.2		26.0		65
	70			42.0		31.5		28.0		70
	80			48.0		36.0		32.0		80
	90			54.0		40.5		36.0		90
13	10		0.2 (0.02)	6.0	0.3 (0.03)	4.5	0.5 (0.05)	4.0	1.0 (0.10)	10
	15			9.0		6.7		6.0		15
	20	15.0		12.0		9.0		8.0		20
	25	18.7		15.0		11.2		10.0		25
	30	22.5		18.0		13.5		12.0		30
	35	26.2		21.0		15.7		14.0		35
	40	30.0		24.0		18.0		16.0		40
	45	33.7		27.0		20.2		18.0		45
	50	37.5		30.0		22.5		20.0		50
	55	41.2		33.0		24.7		22.0		55
	60	45.0		36.0		27.0		24.0		60
	65	48.7		39.0		29.2		26.0		65
	70	52.5		42.0		31.5		28.0		70
	80			48.0		36.0		32.0		80
	90			54.0		40.5		36.0		90
14	15		0.2 (0.02)	9.0	0.3 (0.03)	6.7	0.5 (0.05)	6.0	1.0 (0.10)	15
	20			12.0		9.0		8.0		20
	25			15.0		11.2		10.0		25
	30			18.0		13.5		12.0		30
	35			21.0		15.7		14.0		35
	40			24.0		18.0		16.0		40
	45			27.0		20.2		18.0		45
	50			30.0		22.5		20.0		50
	55			33.0		24.7		22.0		55
	60			36.0		27.0		24.0		60
	65			39.0		29.2		26.0		65
	70			42.0		31.5		28.0		70
	80			48.0		36.0		32.0		80
	90			54.0		40.5		36.0		90

1 million times 40% WWT ☞P.209 Max. deflection {mm}	Spring constant N {kgf}	35% WWM ☞P.210 Max. deflection {mm}	Spring constant N {kgf}	30% WWH ☞P.211 Max. deflection {mm}	Spring constant N {kgf}	25% WWB ☞P.212 Max. deflection {mm}	Spring constant N {kgf}	L
4.0	2.0 (0.20)	3.5	2.9 (0.30)	3.0	5.9 (0.60)	2.5	9.8 (1.00)	10
6.0		5.2		4.5		3.7		15
8.0		7.0		6.0		5.0		20
10.0		8.7		7.5		6.2		25
12.0		10.5		9.0		7.5		30
14.0		12.2		10.5		8.7		35
16.0		14.0		12.0		10.0		40
18.0		15.7		13.5		11.2		45
20.0		17.5		15.0		12.5		50
22.0		19.2		16.5		13.7		55
24.0		21.0		18.0		15.0		60
26.0		22.7		16.9		16.2		65
28.0		24.5		18.9		17.5		70
32.0		28.0				20.0		80
4.0	2.0 (0.20)	3.5	2.9 (0.30)	3.0	5.9 (0.60)	2.5	9.8 (1.00)	10
6.0		5.2		4.5		3.7		15
8.0		7.0		6.0		5.0		20
10.0		8.7		7.5		6.2		25
12.0		10.5		9.0		7.5		30
14.0		12.2		10.5		8.7		35
16.0		14.0		12.0		10.0		40
18.0		15.7		13.5		11.2		45
20.0		17.5		15.0		12.5		50
22.0		19.2		16.5		13.7		55
24.0		21.0		18.0		15.0		60
26.0		22.7		19.5		16.2		65
28.0		24.5		21.0		17.5		70
32.0		28.0		24.0		20.0		80
		3.5	2.9 (0.30)	3.0	5.9 (0.60)	2.5	9.8 (1.00)	10
		5.2		4.5		3.7		15
		7.0		6.0		5.0		20
		8.7		7.5		6.2		25
		10.5		9.0		7.5		30
		12.2		10.5		8.7		35
		14.0	2.9 (0.30)	12.0	5.9 (0.60)	10.0	9.8 (1.00)	40
		15.7		13.5		11.2		45
		17.5		15.0		12.5		50
		19.2		16.5		13.7		55
		21.0		18.0		15.0		60
		22.7		19.5		16.2		65
		24.5		21.0		17.5		70
		28.0		24.0		20.0		80
		3.5	2.9 (0.30)	3.0	9.8 (1.00)	2.5	19.6 (2.00)	10
6.0		5.2		4.5		3.7		15
8.0		7.0		6.0		5.0		20
10.0		8.7		7.5		6.2		25
12.0		10.5		9.0		7.5		30
14.0		12.2		10.5		8.7		35
16.0	2.0 (0.20)	14.0	2.9 (0.30)	12.0	9.8 (1.00)	10.0	19.6 (2.00)	40
18.0		15.7		13.5		11.2		45
20.0		17.5		15.0		12.5		50
22.0		19.2		16.5		13.7		55
24.0		21.0		18.0		15.0		60
26.0		22.7		19.5		16.2		65
28.0		24.5		21.0		17.5		70
32.0		28.0		24.0		20.0		80
		31.5						90
		5.2	2.9 (0.30)	4.5	9.8 (1.00)	3.7	19.6 (2.00)	15
		7.0		6.0		5.0		20
		8.7		7.5		6.2		25
		10.5		9.0		7.5		30
		12.2		10.5		8.7		35
		14.0		12.0		10.0		40
		15.7	2.9 (0.30)	13.5	9.8 (1.00)	11.2	19.6 (2.00)	45
		17.5		15.0		12.5		50
		19.2		16.5		13.7		55
		21.0		18.0		15.0		60
		22.7		19.5		16.2		65
		24.5		21.0		17.5		70
		28.0		24.0		20.0		80
		31.5						90

Outer diameter D	Free length L	1 million times 75% WWY ☞P.205 Max. deflection {mm}	Spring constant N {kgf}	60% WWR ☞P.206 Max. deflection {mm}	Spring constant N {kgf}	45% WWF ☞P.207 Max. deflection {mm}	Spring constant N {kgf}	40% WWL ☞P.208 Max. deflection {mm}	Spring constant N {kgf}	40% WWT ☞P.209 Max. deflection {mm}	Spring constant N {kgf}	35% WWM ☞P.210 Max. deflection {mm}	Spring constant N {kgf}	30% WWH ☞P.211 Max. deflection {mm}	Spring constant N {kgf}	25% WWB ☞P.212 Max. deflection {mm}	Spring constant N {kgf}	L
16	15		0.2 (0.02)	9.0	0.3 (0.03)	6.7	0.5 (0.05)	6.0	1.0 (0.10)	6.0	2.0 (0.20)	5.2	2.9 (0.30)	4.5	9.8 (1.00)	3.7	19.6 (2.00)	15
	20	15.0		12.0		9.0		8.0		8.0		7.0		6.0		5.0		20
	25	18.7		15.0		11.2		10.0		10.0		8.7		7.5		6.2		25
	30	22.5		18.0		13.5		12.0		12.0		10.5		9.0		7.5		30
	35	26.2		21.0		15.7		14.0		14.0		12.2		10.5		8.7		35
	40	30.0		24.0		18.0		16.0		16.0		14.0		12.0		10.0		40
	45	33.7		27.0		20.2		18.0		18.0		15.7		13.5		11.2		45
	50	37.5		30.0		22.5		20.0		20.0		17.5		15.0		12.5		50
	55	41.2		33.0		24.7		22.0		22.0		19.2		16.5		13.7		55
	60	45.0		36.0		27.0		24.0		24.0		21.0		18.0		15.0		60
	65	48.7		39.0		29.2		26.0		26.0		22.7		19.5		16.2		65
	70	52.5		42.0		31.5		28.0		28.0		24.5		21.0		17.5		70
	80			48.0		36.0		32.0		32.0		28.0		24.0		20.0		80
	90			54.0		40.5		36.0				31.5						90
18	20		0.2 (0.02)	12.0	0.3 (0.03)	9.0	0.5 (0.05)	8.0	1.0 (0.10)	8.0	2.0 (0.20)	7.0	2.9 (0.30)	6.0	9.8 (1.00)	5.0	19.6 (2.00)	20
	25			15.0		11.2		10.0		10.0		8.7		7.5		6.2		25
	30			18.0		13.5		12.0		12.0		10.5		9.0		7.5		30
	35			21.0		15.7		14.0		14.0		12.2		10.5		8.7		35
	40			24.0		18.0		16.0		16.0		14.0		12.0		10.0		40
	45			27.0	0.5 (0.05)	20.2	1.0 (0.10)	18.0	3.9 (0.40)	18.0		15.7		13.5		11.2		45
	50			30.0		22.5		20.0	2.9 (0.30)	20.0		17.5	4.9 (0.50)	15.0	14.7 (1.50)	12.5	29.4 (3.00)	50
	55			33.0		24.7		22.0		22.0		19.2		16.5		13.7		55
	60			36.0		27.0		24.0		24.0		21.0		18.0		15.0		60
	65			39.0		29.2		26.0		26.0		22.7		19.5		16.2		65
	70			42.0		31.5		28.0		28.0		24.5		21.0		17.5		70
	80			48.0		36.0		32.0		32.0		28.0		24.0		20.0		80
	90							36.0				31.5		26.1		22.5		90
	100							40.0				35.0		24.0		25.0		100
20	20		0.2 (0.02)	12.0	0.3 (0.03)	9.0	0.5 (0.05)	8.0	1.0 (0.10)			7.0		6.0				20
	25			15.0		11.2		10.0				8.7		7.5				25
	30			18.0		13.5		12.0				10.5		9.0				30
	35			21.0		15.7		14.0				12.2		10.5				35
	40			24.0		18.0		16.0				14.0		12.0				40
	45			27.0	0.5 (0.05)	20.2	1.0 (0.10)	18.0	2.9 (0.30)			15.7		13.5				45
	50			30.0		22.5		20.0				17.5	4.9 (0.50)	15.0	14.7 (1.50)			50
	55			33.0		24.7		22.0				19.2		16.5				55
	60			36.0		27.0		24.0				21.0		18.0				60
	65			39.0		29.2		26.0				22.7		19.5				65
	70			42.0		31.5		28.0				24.5		21.0				70
	80			48.0		36.0		32.0				28.0		24.0				80
	90							36.0				31.5		27.0				90
	100							40.0				35.0		30.0				100
22	20		0.2 (0.02)	12.0	0.3 (0.03)	9.0	0.5 (0.05)	8.0	1.0 (0.10)	8.0	2.0 (0.20)	7.0	2.9 (0.30)	6.0	9.8 (1.00)	5.0	19.6 (2.00)	20
	25			15.0		11.2		10.0		10.0		8.7		7.5		6.2		25
	30			18.0		13.5		12.0		12.0		10.5		9.0		7.5		30
	35			21.0		15.7		14.0		14.0		12.2		10.5		8.7		35
	40			24.0		18.0		16.0		16.0		14.0		12.0		10.0		40
	45			27.0	0.5 (0.05)	20.2	1.0 (0.10)	18.0	2.9 (0.30)	18.0	3.9 (0.40)	15.7		13.5		11.2		45
	50			30.0		22.5		20.0		20.0		17.5	4.9 (0.50)	15.0	14.7 (1.50)	12.5	29.4 (3.00)	50
	55			33.0		24.7		22.0		22.0		19.2		16.5		13.7		55
	60			36.0		27.0		24.0		24.0		21.0		18.0		15.0		60
	65			39.0		29.2		26.0		26.0		22.7		19.5		16.2		65
	70			42.0		31.5		28.0		28.0		24.5		21.0		17.5		70
	80			48.0		36.0		32.0		32.0		28.0		24.0		20.0		80
	90							36.0				31.5		26.1		22.5		90
	100							40.0				35.0		26.0		25.0		100
27	30		0.2 (0.02)	18.0	0.3 (0.03)	13.5	0.5 (0.05)	12.0	1.0 (0.10)	12.0	2.0 (0.20)	10.5	2.9 (0.30)	9.0	9.8 (1.00)	7.5	19.6 (2.00)	30
	35			21.0		15.7		14.0		14.0		12.2		10.5		8.7		35
	40			24.0		18.0		16.0		16.0		14.0		12.0		10.0		40
	45			27.0		20.2		18.0		18.0		15.7		13.5		11.2		45
	50			30.0	0.5 (0.05)	22.5	1.0 (0.10)	20.0	2.9 (0.30)	20.0	3.9 (0.40)	17.5		15.0		12.5		50
	55			33.0		24.7		22.0		22.0		19.2	4.9 (0.50)	16.5	14.7 (1.50)	13.7	29.4 (3.00)	55
	60			36.0		27.0		24.0		24.0		21.0		18.0		15.0		60
	65			39.0		29.2		26.0		26.0		22.7		19.5		16.2		65
	70			42.0		31.5		28.0		28.0		24.5		21.0		17.5		70
	80			48.0		36.0		32.0		32.0		28.0		24.0		20.0		80
	90							36.0				31.5		27.0		22.5		90
	100							40.0				35.0		30.0		25.0		100

Coil Springs（High Deflection）

Specification Table

Operation frequency			300,000 times								1 million times								
Max. deflection ratio			65%		65%		55%		45%		60%		50%		40%				
Outer diameter D	Inner diameter d	Free length L	SSWY ☞P.214		SSWU ☞P.215		SSWR ☞P.216		SSWS ☞P.218		SSWU ☞P.215		SSWR ☞P.216		SSWS ☞P.218				L
			Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio				
			Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}			
10.5	【U】【R】6 【S】5.5	15			9.8		8.3				9.0		7.5						15
		20			13.0		11.0		9.0		12.0		10.0		8.0				20
		25			16.3		13.8		11.3		15.0		12.5		10.0				25
		30			19.5		16.5		13.5		18.0		15.0		12.0				30
		35			22.8		19.3		15.8		21.0		17.5		14.0				35
		40			26.0		22.0		18.0		24.0		20.0		16.0				40
		45			29.3	74.4 {7.6}	24.8	86.3 {8.8}	20.3	97.1 {9.9}	27.0	68.6 {7.0}	22.5	78.5 {8.0}	18.0	87.3 {8.9}			45
		50			32.5		27.5		22.5		30.0		25.0		20.0				50
		55			35.8		30.3		24.8		33.0		27.5		22.0				55
		60			39.0		33.0		27.0		36.0		30.0		24.0				60
		65			42.3		35.8		29.3		39.0		32.5		26.0				65
		70			45.5		38.5		31.5		42.0		35.0		28.0				70
		75			48.8		41.3		33.8		45.0		37.5		30.0				75
		80			52.0		44.0		36.0		48.0		40.0		32.0				80
12.5	【Y】11 【U】【R】【S】7 6.5	15			9.8		8.3				9.0		7.5						15
		20	13.0		13.0		11.0		9.0		12.0		10.0		8.0				20
		25	16.3		16.3		13.8		11.3		15.0		12.5		10.0				25
		30	19.5		19.5		16.5		13.5		18.0		15.0		12.0				30
		35	22.8		22.8		19.3		15.8		21.0		17.5		14.0				35
		40	26.0		26.0		22.0		18.0		24.0		20.0		16.0				40
		45	29.3		29.3		24.8		20.3		27.0		22.5		18.0				45
		50	32.5	29.4 {3.0}	32.5	85.2 {8.7}	27.5	97.1 {9.9}	22.5	137.2 {14.0}	30.0	78.5 {8.0}	25.0	88.3 {9.0}	20.0	121.6 {12.4}			50
		55	35.8		35.8		30.3		24.8		33.0		27.5		22.0				55
		60	39.0		39.0		33.0		27.0		36.0		30.0		24.0				60
		65	42.3		42.3		35.8		29.3		39.0		32.5		26.0				65
		70	45.5		45.5		38.5		31.5		42.0		35.0		28.0				70
		75	48.8		48.8		41.3		33.8		45.0		37.5		30.0				75
		80	52.0		52.0		44.0		36.0		48.0		40.0		32.0				80
		90	58.5		58.5		49.5				54.0		45.0						90
		100	65.0		65.0		55.0				60.0		50.0						100
12.5	【Y】12.5 【U】【R】【S】14.5 8.5	15			9.8		8.3				9.0		7.5						15
		20	13.0		13.0		11.0		9.0		12.0		10.0		8.0				20
		25	16.3		16.3		13.8		11.3		15.0		12.5		10.0				25
		30	19.5		19.5		16.5		13.5		18.0		15.0		12.0				30
		35	22.8		22.8		19.3		15.8		21.0		17.5		14.0				35
		40	26.0		26.0		22.0		18.0		24.0		20.0		16.0				40
		45	29.3		29.3		24.8		20.3		27.0		22.5		18.0				45
		50	32.5		32.5		27.5	140.1 {14.3}	22.5	220.5 {22.5}	30.0		25.0	127.5 {13.0}	20.0	196.1 {20.0}			50
		55	35.8		35.8		30.3		24.8		33.0		27.5		22.0				55
		60	39.0	40.2 {4.1}	39.0	105.8 {10.8}	33.0		27.0		36.0	98.1 {10.0}	30.0		24.0				60
		65	42.3		42.3		35.8		29.3		39.0		32.5		26.0				65
		70	45.5		45.5		38.5		31.5		42.0		35.0		28.0				70
		75	48.8		48.8		41.3		33.8		45.0		37.5		30.0				75
		80	52.0		52.0		44.0		36.0		48.0		40.0		32.0				80
		90	58.5		58.5		49.5		40.5		54.0		45.0		36.0				90
		100	65.0		65.0		55.0		45.0		60.0		50.0		40.0				100
		110	71.5		71.5						66.0								110
		120	78.0		78.0						72.0								120
		125	81.3		81.3		68.8	140.1 {14.3}	56.3	220.5 {22.5}	75.0		62.5	127.5 {13.0}	50.0	196.1 {20.0}			125
		150			97.5		82.5		67.5		90.0		75.0		60.0				150
16.5	【Y】16.5 【U】【R】【S】17 10.5	20			13.0		11.0				12.0		10.0						20
		25	16.3		16.3		13.8		11.3		15.0		12.5		10.0				25
		30	19.5		19.5		16.5		13.5		18.0		15.0		12.0				30
		35	22.8		22.8		19.3		15.8		21.0		17.5		14.0				35
		40	26.0		26.0		22.0		18.0		24.0		20.0		16.0				40
		45	29.3		29.3		24.8		20.3		27.0		22.5		18.0				45
		50	32.5		32.5		27.5	215.6 {22.0}	22.5		30.0		25.0	196.1 {20.0}	20.0				50
		55	35.8		35.8		30.3		24.8	331.2 {33.8}	33.0		27.5		22.0	294.2 {30.0}			55
		60	39.0		39.0		33.0		27.0		36.0		30.0		24.0				60
		65	42.3	91.2 {9.3}	42.3	158.7 {16.2}	35.8		29.3		39.0	147.1 {15.0}	32.5		26.0				65
		70	45.5		45.5		38.5		31.5		42.0		35.0		28.0				70
		75	48.8		48.8		41.3		33.8		45.0		37.5		30.0				75
		80	52.0		52.0		44.0		36.0		48.0		40.0		32.0				80
		90	58.5		58.5		49.5		40.5		54.0		45.0		36.0				90
		100	65.0		65.0		55.0		45.0		60.0		50.0		40.0				100
		110	71.5		71.5						66.0								110
		120	78.0		78.0						72.0								120
		125	81.3		81.3		68.8	215.6 {22.0}	56.3	331.2 {33.8}	75.0		62.5	196.1 {20.0}	50.0	294.2 {30.0}			125
		150	97.5		97.5		82.5		67.5		90.0		75.0		60.0				150
		175			113.8		96.3				105.0		87.5						175

Operation frequency			300,000 times					
Max. deflection ratio			65%		65%		55%	
Outer diameter D	Inner diameter d	Free length L	SSWY ☞P.214		SSWU ☞P.215		SSWR ☞P.216	
			Max. deflection ratio		Max. deflection ratio		Max. deflection ratio	
			Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load {N}
20.5	【Y】【U】【R】【S】21 13.5	25			16.3		13.8	
		30	19.5		19.5		16.5	
		35	22.8		22.8		19.3	
		40	26.0		26.0		22.0	
		45	29.3		29.3		24.8	
		50	32.5		32.5		27.5	
		55	35.8		35.8		30.3	
		60	39.0		39.0		33.0	
		65	42.3		42.3		35.8	
		70	45.5		45.5		38.5	
		75	48.8	108.9 {11.1}	48.8	244.0 {24.9}	41.3	323.6 {33.0}
		80	52.0		52.0		44.0	
		90	58.5		58.5		49.5	
		100	65.0		65.0		55.0	
		110	71.5		71.5		60.5	
		120	78.0		78.0		66.0	
		125	81.3		81.3		68.8	
		130	84.5		84.5		71.5	
		140	91.0		91.0		77.0	
		150	97.5		97.5		82.5	
		175			113.8		96.3	
		200			130.0		110.0	
24.5	【Y】24.5 【U】【R】【S】26 16.5	30	19.5		19.5		16.5	
		35	22.8		22.8		19.3	
		40	26.0		26.0		22.0	
		45	29.3		29.3		24.8	
		50	32.5		32.5		27.5	
		55	35.8		35.8		30.3	
		60	39.0		39.0		33.0	
		65	42.3		42.3		35.8	
		70	45.5		45.5		38.5	
		75	48.8	136.3 {13.9}	48.8	318.5 {32.5}	41.3	432.4 {44.1}
		80	52.0		52.0		44.0	
		90	58.5		58.5		49.5	
		100	65.0		65.0		55.0	
		110	71.5		71.5		60.5	
		120	78.0		78.0		66.0	
		125	81.3		81.3		68.8	
		130	84.5		84.5		71.5	
		140	91.0		91.0		77.0	
		150	97.5		97.5		82.5	
		175	113.8		113.8		96.3	
		200	130.0		130.0		110.0	
		225			146.3		123.8	
		250			162.5		137.5	
30	【Y】30 【U】【R】【S】31 21	35	22.8		22.8		19.3	
		40	26.0		26.0		22.0	
		45	29.3		29.3		24.8	
		50	32.5		32.5		27.5	
		55	35.8		35.8		30.3	
		60	39.0		39.0		33.0	
		65	42.3		42.3		35.8	
		70	45.5		45.5		38.5	
		75	48.8		48.8		41.3	
		80	52.0		52.0		44.0	
		90	58.5		58.5		49.5	
		100	65.0		65.0		55.0	
		110	71.5	200.1 {20.4}	71.5	403.7 {41.2}	60.5	539.3 {55.0}
		120	78.0		78.0		66.0	
		125	81.3		81.3		68.8	
		130	84.5		84.5		71.5	
		140	91.0		91.0		77.0	
		150	97.5		97.5		82.5	
		160	104.0		104.0		88.0	
		170	110.5		110.5		93.5	
		175	113.8		113.8		96.3	
		180	117.0		117.0		99.0	
		190	123.5		123.5		104.5	
		200	130.0		130.0		110.0	
		225	146.3		146.3		123.8	
		250	162.5		162.5		137.5	
		275	178.8		178.8		151.3	
		300	195.0		195.0		165.0	

300,000 times	1 million times			
45%	60%	50%	40%	
SSWS ☞P.218	SSWU ☞P.215	SSWR ☞P.216	SSWS ☞P.218	L
Max. deflection ratio	Max. deflection ratio	Max. deflection ratio	Max. deflection ratio	
Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	
		15.0		12.5				25
13.5		18.0		15.0		12.0		30
15.8		21.0		17.5		14.0		35
18.0		24.0		20.0		16.0		40
20.3		27.0		22.5		18.0		45
22.5		30.0		25.0		20.0		50
24.8		33.0		27.5		22.0		55
27.0		36.0		30.0		24.0		60
29.3		39.0		32.5		26.0		65
31.5		42.0		35.0		28.0		70
33.8	473.6 {48.3}	45.0	225.6 {23.0}	37.5	294.2 {30.0}	30.0	421.7 {43.0}	75
36.0		48.0		40.0		32.0		80
40.5		54.0		45.0		36.0		90
45.0		60.0		50.0		40.0		100
49.5		66.0		55.0		44.0		110
54.0		72.0		60.0		48.0		120
56.3		75.0		62.5		50.0		125
58.5		78.0		65.0		52.0		130
63.0		84.0		70.0		56.0		140
67.5		90.0		75.0		60.0		150
78.8		105.0		87.5		70.0		175
90.0		120.0		100.0		80.0		200
13.5		18.0		15.0		12.0		30
15.8		21.0		17.5		14.0		35
18.0		24.0		20.0		16.0		40
20.3		27.0		22.5		18.0		45
22.5		30.0		25.0		20.0		50
24.8		33.0		27.5		22.0		55
27.0		36.0		30.0		24.0		60
29.3		39.0		32.5		26.0		65
31.5		42.0		35.0		28.0		70
33.8		45.0		37.5		30.0		75
36.0	640.3 {65.3}	48.0	294.2 {30.0}	40.0	392.3 {40.0}	32.0	568.8 {58.0}	80
40.5		54.0		45.0		36.0		90
45.0		60.0		50.0		40.0		100
49.5		66.0		55.0		44.0		110
54.0		72.0		60.0		48.0		120
56.3		75.0		62.5		50.0		125
58.5		78.0		65.0		52.0		130
63.0		84.0		70.0		56.0		140
67.5		90.0		75.0		60.0		150
78.8		105.0		87.5		70.0		175
90.0		120.0		100.0		80.0		200
101.3		135.0		112.5		90.0		225
112.5		150.0		125.0		100.0		250
		21.0		17.5				35
18.0		24.0		20.0		16.0		40
20.3		27.0		22.5		18.0		45
22.5		30.0		25.0		20.0		50
24.8		33.0		27.5		22.0		55
27.0		36.0		30.0		24.0		60
29.3		39.0		32.5		26.0		65
31.5		42.0		35.0		28.0		70
33.8		45.0		37.5		30.0		75
36.0		48.0		40.0		32.0		80
40.5		54.0		45.0		36.0		90
45.0		60.0		50.0		40.0		100
49.5	882.5 {90.0}	66.0	372.7 {38.0}	55.0	490.3 {50.0}	44.0	783.6 {79.9}	110
54.0		72.0		60.0		48.0		120
56.3		75.0		62.5		50.0		125
58.5		78.0		65.0		52.0		130
63.0		84.0		70.0		56.0		140
67.5		90.0		75.0		60.0		150
72.0		96.0		80.0		64.0		160
76.5		102.0		85.0		68.0		170
78.8		105.0		87.5		70.0		175
81.0		108.0		90.0		72.0		180
85.5		114.0		95.0		76.0		190
90.0		120.0		100.0		80.0		200
112.5		150.0		125.0		100.0		250
135.0		180.0		150.0		120.0		300

Operation frequency			300,000 times								1 million times								
Max. deflection ratio			65%		65%		55%		45%		60%		50%		40%				
Outer diameter D	Inner diameter d	Free length L	SSWY ☞P.214		SSWU ☞P.215		SSWR ☞P.216		SSWS ☞P.218		SSWU ☞P.215		SSWR ☞P.216		SSWS ☞P.218				L
			Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio				
			Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}			
37	26	40	26.0		26.0		22.0		18.0		24.0		20.0		16.0				40
		45	29.3		29.3		24.8		20.3		27.0		22.5		18.0				45
		50	32.5		32.5		27.5		22.5		30.0		25.0		20.0				50
		55	35.8		35.8		30.3		24.8		33.0		27.5		22.0				55
		60	39.0		39.0		33.0		27.0		36.0		30.0		24.0				60
		65	42.3	294.2 {30.0}	42.3	499.1 {50.9}	35.8	647.2 {66.0}	29.3	937.5 {95.6}	39.0	460.9 {47.0}	32.5	588.4 {60.0}	26.0	833.6 {85.0}			65
		70	45.5		45.5		38.5		31.5		42.0		35.0		28.0				70
		75	48.8		48.8		41.3		33.8		45.0		37.5		30.0				75
		80	52.0		52.0		44.0		36.0		48.0		40.0		32.0				80
		90	58.5		58.5		49.5		40.5		54.0		45.0		36.0				90
		100	65.0		65.0		55.0		45.0		60.0		50.0		40.0				100
		110	71.5		71.5		60.5		49.5		66.0		55.0		44.0				110
		120	78.0		78.0		66.0		54.0		72.0		60.0		48.0				120
		125					68.8		56.3				62.5		50.0				125
		130	84.5		84.5		71.5		58.5		78.0		65.0		52.0				130
		140	91.0	294.2 {30.0}	91.0	499.1 {50.9}	77.0	647.2 {66.0}	63.0	937.5 {95.6}	84.0	460.9 {47.0}	70.0	588.4 {60.0}	56.0	833.6 {85.0}			140
		150	97.5	{30.0}	97.5	{50.9}	82.5	{66.0}	67.5	{95.6}	90.0	{47.0}	75.0	{60.0}	60.0	{85.0}			150
		160	104.0		104.0		88.0		72.0		96.0		80.0		64.0				160
		170	110.5		110.5		93.5		76.5		102.0		85.0		68.0				170
		175					96.3		78.8				87.5		70.0				175
		180	117.0		117.0		99.0		81.0		108.0		90.0		72.0				180
		190	123.5		123.5		104.5		85.5		114.0		95.0		76.0				190
		200	130.0	294.2 {30.0}	130.0	499.1 {50.9}	110.0		90.0		120.0	460.9 {47.0}	100.0		80.0				200
		225	146.3		146.3						135.0								225
		250	162.5		162.5		137.5	647.2 {66.0}	112.5	937.5 {95.6}	150.0	588.4 {60.0}	125.0		100.0	833.6 {85.0}			250
		275	178.8		178.8						165.0								275
		300	195.0		195.0		165.0	647.2 {66.0}	135.0	937.5 {95.6}	180.0		150.0		120.0	833.6 {85.0}			300
42	31	50	32.5		32.5		27.5		22.5		30.0		25.0		20.0				50
		60	39.0		39.0		33.0		27.0		36.0		30.0		24.0				60
		70	45.5		45.5		38.5		31.5		42.0		35.0		28.0				70
		80	52.0		52.0		44.0		36.0		48.0		40.0		32.0				80
		90	58.5		58.5		49.5		40.5		54.0		45.0		36.0				90
		100	65.0		65.0		55.0		45.0		60.0		50.0		40.0				100
		110	71.5		71.5		60.5		49.5		66.0		55.0		44.0				110
		120	78.0		78.0		66.0		54.0		72.0		60.0		48.0				120
		130	84.5		84.5		71.5		58.5		78.0		65.0		52.0				130
		140	91.0	392.3 {40.0}	91.0	637.4 {65.0}	77.0	916.9 {93.5}	63.0	1125 {114}	84.0	588.4 {60.0}	70.0	833.6 {85.0}	56.0	1000 {102}			140
		150	97.5		97.5		82.5		67.5		90.0		75.0		60.0				150
		160	104.0		104.0		88.0		72.0		96.0		80.0		64.0				160
		170	110.5		110.5		93.5		76.5		102.0		85.0		68.0				170
		180	117.0		117.0		99.0		81.0		108.0		90.0		72.0				180
		190	123.5		123.5		104.5		85.5		114.0		95.0		76.0				190
		200	130.0		130.0		110.0		90.0		120.0		100.0		80.0				200
		225	146.3		146.3		123.8		101.3		135.0		112.5		90.0				225
		250	162.5		162.5		137.5		112.5		150.0		125.0		100.0				250
		275	178.8		178.8		151.3		123.8		165.0		137.5		110.0				275
		300	195.0		195.0		165.0		135.0		180.0		150.0		120.0				300
46	33	50					27.5		22.5				25.0		20.0				50
		60					33.0		27.0				30.0		24.0				60
		70					38.5		31.5				35.0		28.0				70
		80					44.0		36.0				40.0		32.0				80
		90					49.5		40.5				45.0		36.0				90
		100					55.0		45.0				50.0		40.0				100
		110					60.5		49.5				55.0		44.0				110
		120					66.0		54.0				60.0		48.0				120
		125					68.8	1187 {121}	56.3	1434 {146}			62.5	1079 {110}	50.0	1275 {130}			125
		130					71.5		58.5				65.0		52.0				130
		140					77.0		63.0				70.0		56.0				140
		150					82.5		67.5				75.0		60.0				150
		175					96.3		78.8				87.5		70.0				175
		200					110.0		90.0				100.0		80.0				200
		225					123.8		101.3				112.5		90.0				225
		250					137.5		112.5				125.0		100.0				250
		275					151.3		123.8				137.5		110.0				275
		300					165.0		135.0				150.0		120.0				300
50	36	50					27.5						25.0						50
		60					33.0		27.0				30.0		24.0				60
		70					38.5		31.5				35.0		28.0				70
		80					44.0		36.0				40.0		32.0				80
		90					49.5		40.5				45.0		36.0				90
		100					55.0		45.0				50.0		40.0				100
		110					60.5		49.5				55.0		44.0				110
【R】	【R】	120					66.0		54.0				60.0		48.0				120
		130					71.5	1456 {148}	58.5	1765 {180}			65.0	1324 {135}	52.0	1569 {160}			130
【S】	【S】	140					77.0		63.0				70.0		56.0				140
52	37	150					82.5		67.5				75.0		60.0				150
		175					96.3		78.8				87.5		70.0				175
		200					110.0		90.0				100.0		80.0				200
		225					123.8		101.3				112.5		90.0				225
		250					137.5		112.5				125.0		100.0				250
		275					151.3		123.8				137.5		110.0				275
		300					165.0		135.0				150.0		120.0				300
		350					192.5						175.0						350
		400					220.0						200.0						400

⚠ Load {kgf} = {N} ×0.101972

How to use the specification table ☞P.195

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Coil Springs（For Heavy Load）

Specification Table（D6～22）

Operation frequency			300,000 times										1 million times											
Max. deflection ratio			50%		40%		32%		24%		20%	20%	40%		32%		25.6%		19.2%		16%	16%		
Outer diameter D	Inner diameter d	Free length L	SSWF ☞P.220		SSWL ☞P.222		SSWM ☞P.226		SSWH ☞P.226		SSWB ☞P.228	SSWG ☞P.230	SSWF ☞P.220		SSWL ☞P.222		SSWM ☞P.226		SSWH ☞P.226		SSWB ☞P.228	SSWG ☞P.230		L
			Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio	Max. deflection ratio	Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio	Max. deflection ratio		
			Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Deflection {mm}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Deflection {mm}	Load N {kgf}	
6	3	15	7.5		6.0		4.8		3.6		3.0		6.0		4.8		3.8		2.9		2.4			15
		20	10.0		8.0		6.4		4.8		4.0		8.0		6.4		5.1		3.8		3.2			20
		25	12.5	58.8 {6.0}	10.0	78.5 {8.0}	8.0	98.1 {10.0}	6.0	137.3 {14.0}	5.0		10.0	47.1 {4.8}	8.0	62.8 {6.4}	6.4	78.5 {8.0}	4.8	109.8 {11.2}	4.0	141.2 {14.4}		25
		30	15.0		12.0		9.6		7.2		6.0		12.0		9.6		7.7		5.8		4.8			30
		35	17.5		14.0		11.2		8.4		7.0		14.0		11.2		9.0		6.7		5.6			35
		40	20.0		16.0		12.8		9.6		8.0		16.0		12.8		10.2		7.7		6.4			40
		45					14.4		10.8		9.0						11.5		8.6		7.2			45
		50					16.0		12.0		10.0						12.8		9.6		8.0			50
		55					17.6		13.2		11.0						14.1		10.6		8.8			55
		60					19.2		14.4		12.0						15.4		11.5		9.6			60
8	4	10	5.0		4.0		3.2		2.4		2.0		4.0		3.2		2.6		1.9		1.6			10
		15	7.5		6.0		4.8		3.6		3.0		6.0		4.8		3.8		2.9		2.4			15
		20	10.0		8.0		6.4		4.8		4.0		8.0		6.4		5.1		3.8		3.2			20
		25	12.5		10.0		8.0		6.0		5.0		10.0		8.0		6.4		4.8		4.0			25
		30	15.0		12.0		9.6		7.2		6.0		12.0		9.6		7.7		5.8		4.8			30
		35	17.5		14.0		11.2		8.4		7.0		14.0		11.2		9.0		6.7		5.6			35
		40	20.0	78.5 {8.0}	16.0	98.1 {10.0}	12.8	137.3 {14.0}	9.6	205.9 {21.0}	8.0	323.6 {33.0}	16.0	62.8 {6.4}	12.8	78.5 {8.0}	10.2	109.8 {11.2}	7.7	164.8 {16.8}	6.4	258.9 {26.4}		40
		45	22.5		18.0		14.4		10.8		9.0		18.0		14.4		11.5		8.6		7.2			45
		50	25.0		20.0		16.0		12.0		10.0		20.0		16.0		12.8		9.6		8.0			50
		55	27.5		22.0		17.6		13.2		11.0		22.0		17.6		14.1		10.6		8.8			55
		60	30.0		24.0		19.2		14.4		12.0		24.0		19.2		15.4		11.5		9.6			60
		65	32.5		26.0		20.8		15.6		13.0		26.0		20.8		16.6		12.5		10.4			65
		70	35.0		28.0		22.4		16.8		14.0		28.0		22.4		17.9		13.4		11.2			70
		75	37.5		30.0		24.0		18.0		15.0		30.0		24.0		19.2		14.4		12.0			75
		80	40.0		32.0		25.6		19.2		16.0		32.0		25.6		20.5		15.4		12.8			80
10	5	10	5.0		4.0		3.2		2.4		2.0		4.0		3.2		2.6		1.9		1.6			10
		15	7.5		6.0		4.8		3.6		3.0	Beyond allowable range	6.0		4.8		3.8		2.9		2.4	2.4		15
		20	10.0		8.0		6.4		4.8		4.0	4.0	8.0		6.4		5.1		3.8		3.2	3.2		20
		25	12.5		10.0		8.0		6.0		5.0	5.0	10.0		8.0		6.4		4.8		4.0	4.0		25
		30	15.0		12.0		9.6		7.2		6.0	6.0	12.0		9.6		7.7		5.8		4.8	4.8		30
		35	17.5		14.0		11.2		8.4		7.0	7.0	14.0		11.2		9.0		6.7		5.6	5.6		35
		40	20.0		16.0		12.8		9.6		8.0	8.0	16.0		12.8		10.2		7.7		6.4	6.4		40
		45	22.5	98.1 {10.0}	18.0	137.3 {14.0}	14.4	196.1 {20.0}	10.8	294.2 {30.0}	9.0	441.3 {45.0}	9.0	490.3 {50.0}	18.0	78.5 {8.0}	14.4	109.8 {11.2}	11.5	156.9 {16.0}	8.6	235.4 {24.0}	7.2	353.0 {36.0}	7.2	392.3 {40.0}	45
		50	25.0		20.0		16.0		12.0		10.0	10.0	20.0		16.0		12.8		9.6		8.0	8.0		50
		55	27.5		22.0		17.6		13.2		11.0	11.0	22.0		17.6		14.1		10.6		8.8	8.8		55
		60	30.0		24.0		19.2		14.4		12.0	12.0	24.0		19.2		15.4		11.5		9.6	9.6		60
		65	32.5		26.0		20.8		15.6		13.0	13.0	26.0		20.8		16.6		12.5		10.4	10.4		65
		70	35.0		28.0		22.4		16.8		14.0	14.0	28.0		22.4		17.9		13.4		11.2	11.2		70
		75	37.5		30.0		24.0		18.0		15.0	15.0	30.0		24.0		19.2		14.4		12.0	12.0		75
		80	40.0		32.0		25.6		19.2		16.0	16.0	32.0		25.6		20.5		15.4		12.8	12.8		80
		90	45.0		36.0		28.8		21.6		18.0	18.0	36.0		28.8		23.0		17.3		14.4	14.4		90
		100										20.0										16.0		100
12	6	15	7.5		6.0		4.8		3.6		3.0	Beyond allowable range	6.0		4.8		3.8		2.9		2.4	2.4		15
		20	10.0		8.0		6.4		4.8		4.0	4.0	8.0		6.4		5.1		3.8		3.2	3.2		20
		25	12.5		10.0		8.0		6.0		5.0	5.0	10.0		8.0		6.4		4.8		4.0	4.0		25
		30	15.0		12.0		9.6		7.2		6.0	6.0	12.0		9.6		7.7		5.8		4.8	4.8		30
		35	17.5		14.0		11.2		8.4		7.0	7.0	14.0		11.2		9.0		6.7		5.6	5.6		35
		40	20.0		16.0		12.8		9.6		8.0	8.0	16.0		12.8		10.2		7.7		6.4	6.4		40
		45	22.5	137.3 {14.0}	18.0	205.9 {21.0}	14.4	284.4 {29.0}	10.8	421.7 {43.0}	9.0	566.8 {58.0}	9.0	735.5 {75.0}	18.0	109.8 {11.2}	14.4	164.8 {16.8}	11.5	227.5 {23.2}	8.6	337.3 {34.3}	7.2	455.0 {46.4}	7.2	588.4 {60.0}	45
		50	25.0		20.0		16.0		12.0		10.0	10.0	20.0		16.0		12.8		9.6		8.0	8.0		50
		55	27.5		22.0		17.6		13.2		11.0	11.0	22.0		17.6		14.1		10.6		8.8	8.8		55
		60	30.0		24.0		19.2		14.4		12.0	12.0	24.0		19.2		15.4		11.5		9.6	9.6		60
		65	32.5		26.0		20.8		15.6		13.0	13.0	26.0		20.8		16.6		12.5		10.4	10.4		65
		70	35.0		28.0		22.4		16.8		14.0	14.0	28.0		22.4		17.9		13.4		11.2	11.2		70
		75	37.5		30.0		24.0		18.0		15.0	15.0	30.0		24.0		19.2		14.4		12.0	12.0		75
		80	40.0		32.0		25.6		19.2		16.0	16.0	32.0		25.6		20.5		15.4		12.8	12.8		80
		90	45.0		36.0		28.8		21.6		18.0	18.0	36.0		28.8		23.0		17.3		14.4	14.4		90
		100										20.0										16.0		100
14	7	20	10.0		8.0		6.4		4.8		4.0	Beyond allowable range	8.0		6.4		5.1		3.8		3.2	3.2		20
		25	12.5		10.0		8.0		6.0		5.0	5.0	10.0		8.0		6.4		4.8		4.0	4.0		25
		30	15.0		12.0		9.6		7.2		6.0	6.0	12.0		9.6		7.7		5.8		4.8	4.8		30
		35	17.5		14.0		11.2		8.4		7.0	7.0	14.0		11.2		9.0		6.7		5.6	5.6		35
		40	20.0		16.0		12.8		9.6		8.0	8.0	16.0		12.8		10.2		7.7		6.4	6.4		40
		45	22.5		18.0		14.4		10.8		9.0	9.0	18.0		14.4		11.5		8.6		7.2	7.2		45
		50	25.0	176.5 {18.0}	20.0	274.6 {28.0}	16.0	382.5 {39.0}	12.0	578.6 {59.0}	10.0	735.5 {75.0}	10.0	951.2 {97.0}	20.0	141.2 {14.0}	16.0	219.7 {22.4}	12.8	306.0 {31.2}	9.6	462.9 {47.2}	8.0	588.4 {60.0}	8.0	761.0 {77.6}	50
		55	27.5		22.0		17.6		13.2		11.0	11.0	22.0		17.6		14.1		10.6		8.8	8.8		55
		60	30.0		24.0		19.2		14.4		12.0	12.0	24.0		19.2		15.4		11.5		9.6	9.6		60
		65	32.5		26.0		20.8		15.6		13.0	13.0	26.0		20.8		16.6		12.5		10.4	10.4		65
		70	35.0		28.0		22.4		16.8		14.0	14.0	28.0		22.4		17.9		13.4		11.2	11.2		70
		75	37.5		30.0		24.0		18.0		15.0	15.0	30.0		24.0		19.2		14.4		12.0	12.0		75
		80	40.0		32.0		25.6		19.2		16.0	16.0	32.0		25.6		20.5		15.4		12.8	12.8		80
		90	45.0		36.0		28.8		21.6		18.0	18.0	36.0		28.8		23.0		17.3		14.4	14.4		90
		100	50.0		40.0		32.0		24.0		20.0	20.0	40.0		32.0		25.6		19.2		16.0	16.0		100

⚠ Load {N} → {kgf} : {kgf} = {N} ×0.101972

How to use the specification table ☞ P.195

Operation frequency			300,000 times										1 million times											
Max. deflection ratio			50%		40%		32%		24%		20%	20%	40%		32%		25.6%		19.2%		16%	16%		
Outer diameter D	Inner diameter d	Free length L	SSWF ☞P.220		SSWL ☞P.222		SSWM ☞P.224		SSWH ☞P.226		SSWB ☞P.228	SSWG ☞P.230	SSWF ☞P.220		SSWL ☞P.222		SSWM ☞P.224		SSWH ☞P.226		SSWB ☞P.228	SSWG ☞P.230		L
			Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio	Max. deflection ratio	Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio	Max. deflection ratio		
			Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Deflection {mm}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Deflection {mm}	Load N {kgf}	
16	8	20	10.0		8.0		6.4		4.8		4.0	Beyond allowable range	8.0		6.4		5.1		3.8		3.2	3.2		20
		25	12.5		10.0		8.0		6.0		5.0	5.0	10.0		8.0		6.4		4.8		4.0	4.0		25
		30	15.0		12.0		9.6		7.2		6.0	6.0	12.0		9.6		7.7		5.8		4.8	4.8		30
		35	17.5		14.0		11.2		8.4		7.0	7.0	14.0		11.2		9.0		6.7		5.6	5.6		35
		40	20.0		16.0		12.8		9.6		8.0	8.0	16.0		12.8		10.2		7.7		6.4	6.4		40
		45	22.5		18.0		14.4		10.8		9.0	9.0	18.0		14.4		11.5		8.6		7.2	7.2		45
		50	25.0		20.0		16.0		12.0		10.0	10.0	20.0		16.0		12.8		9.6		8.0	8.0		50
		55	27.5	205.9 {21.0}	22.0	343.2 {35.0}	17.6	500.1 {51.0}	13.2	755.1 {77.0}	11.0	980.7 {100}	11.0	1275 {130}	22.0	164.8 {16.8}	17.6	274.6 {28.0}	14.1	400.1 {40.8}	10.6	604.1 {61.6}	8.8	784.5 {80.0}	8.8	1020 {104}	55
		60	30.0		24.0		19.2		14.4		12.0		24.0		19.2		15.4		11.5		9.6	9.6		60
		65	32.5		26.0		20.8		15.6		13.0		26.0		20.8		16.6		12.5		10.4	10.4		65
		70	35.0		28.0		22.4		16.8		14.0		28.0		22.4		17.9		13.4		11.2	11.2		70
		75	37.5		30.0		24.0		18.0		15.0		30.0		24.0		19.2		14.4		12.0	12.0		75
		80	40.0		32.0		25.6		19.2		16.0		32.0		25.6		20.5		15.4		12.8	12.8		80
		90	45.0		36.0		28.8		21.6		18.0		36.0		28.8		23.0		17.3		14.4	14.4		90
		100	50.0		40.0		32.0		24.0		20.0		40.0		32.0		25.6		19.2		16.0	16.0		100
		125	62.5		50.0								50.0		40.0									125
18	9	20	10.0		8.0		6.4		4.8		4.0	Beyond allowable range	8.0		6.4		5.1		3.8		3.2	3.2		20
		25	12.5		10.0		8.0		6.0		5.0	5.0	10.0		8.0		6.4		4.8		4.0	4.0		25
		30	15.0		12.0		9.6		7.2		6.0	6.0	12.0		9.6		7.7		5.8		4.8	4.8		30
		35	17.5		14.0		11.2		8.4		7.0	7.0	14.0		11.2		9.0		6.7		5.6	5.6		35
		40	20.0		16.0		12.8		9.6		8.0	8.0	16.0		12.8		10.2		7.7		6.4	6.4		40
		45	22.5		18.0		14.4		10.8		9.0	9.0	18.0		14.4		11.5		8.6		7.2	7.2		45
		50	25.0		20.0		16.0		12.0		10.0	10.0	20.0		16.0		12.8		9.6		8.0	8.0		50
		55	27.5	255.0 {26.0}	22.0	421.7 {43.0}	17.6	637.4 {65.0}	13.2	951.2 {97.0}	11.0	1226 {125}	11.0	1569 {160}	22.0	204.0 {20.8}	17.6	337.3 {34.4}	14.1	509.9 {52.0}	10.6	761.0 {77.6}	8.8	980.7 {100}	8.8	1255 {128}	55
		60	30.0		24.0		19.2		14.4		12.0		24.0		19.2		15.4		11.5		9.6	9.6		60
		65	32.5		26.0		20.8		15.6		13.0		26.0		20.8		16.6		12.5		10.4	10.4		65
		70	35.0		28.0		22.4		16.8		14.0		28.0		22.4		17.9		13.4		11.2	11.2		70
		75	37.5		30.0		24.0		18.0		15.0		30.0		24.0		19.2		14.4		12.0	12.0		75
		80	40.0		32.0		25.6		19.2		16.0		32.0		25.6		20.5		15.4		12.8	12.8		80
		90	45.0		36.0		28.8		21.6		18.0		36.0		28.8		23.0		17.3		14.4	14.4		90
		100	50.0		40.0		32.0		24.0		20.0		40.0		32.0		25.6		19.2		16.0	16.0		100
		125	62.5		50.0								50.0		40.0									125
20	【F】11 【L】 【M】 【H】 【B】 【G】10	20	10.0		8.0		6.4		4.8		4.0	Beyond allowable range	8.0		6.4		5.1		3.8		3.2	3.2		20
		25	12.5		10.0		8.0		6.0		5.0	5.0	10.0		8.0		6.4		4.8		4.0	4.0		25
		30	15.0		12.0		9.6		7.2		6.0	6.0	12.0		9.6		7.7		5.8		4.8	4.8		30
		35	17.5		14.0		11.2		8.4		7.0	7.0	14.0		11.2		9.0		6.7		5.6	5.6		35
		40	20.0		16.0		12.8		9.6		8.0	8.0	16.0		12.8		10.2		7.7		6.4	6.4		40
		45	22.5		18.0		14.4		10.8		9.0	9.0	18.0		14.4		11.5		8.6		7.2	7.2		45
		50	25.0		20.0		16.0		12.0		10.0	10.0	20.0		16.0		12.8		9.6		8.0	8.0		50
		55	27.5	313.8 {32.0}	22.0	529.6 {54.0}	17.6	784.5 {80.0}	13.2	1177 {120}	11.0	1569 {160}	11.0	2059 {210}	22.0	251.1 {25.6}	17.6	423.6 {43.2}	14.1	627.6 {64.0}	10.6	941 {96}	8.8	1255 {128}	8.8	1648 {168}	55
		60	30.0		24.0		19.2		14.4		12.0		24.0		19.2		15.4		11.5		9.6	9.6		60
		65	32.5		26.0		20.8		15.6		13.0		26.0		20.8		16.6		12.5		10.4	10.4		65
		70	35.0		28.0		22.4		16.8		14.0		28.0		22.4		17.9		13.4		11.2	11.2		70
		75	37.5		30.0		24.0		18.0		15.0		30.0		24.0		19.2		14.4		12.0	12.0		75
		80	40.0		32.0		25.6		19.2		16.0		32.0		25.6		20.5		15.4		12.8	12.8		80
		90	45.0		36.0		28.8		21.6		18.0		36.0		28.8		23.0		17.3		14.4	14.4		90
		100	50.0		40.0		32.0		24.0		20.0		40.0		32.0		25.6		19.2		16.0	16.0		100
		125	62.5		50.0		40.0		30.0		25.0		50.0		40.0		32.0		24.0		20.0	20.0		125
		150	75.0		60.0		48.0		36.0		30.0				60.0		48.0		38.4		28.8	24.0		150
22	11	20										Beyond allowable range												
		25	12.5		10.0		8.0		6.0		5.0	5.0	10.0		8.0		6.4		4.8		4.0	3.2		25
		30	15.0		12.0		9.6		7.2		6.0	6.0	12.0		9.6		7.7		5.8		4.8	4.0		30
		35	17.5		14.0		11.2		8.4		7.0	7.0	14.0		11.2		9.0		6.7		5.6	4.8		35
		40	20.0		16.0		12.8		9.6		8.0	8.0	16.0		12.8		10.2		7.7		6.4	5.6		40
		45	22.5		18.0		14.4		10.8		9.0	9.0	18.0		14.4		11.5		8.6		7.2	6.4		45
		50	25.0		20.0		16.0		12.0		10.0	10.0	20.0		16.0		12.8		9.6		8.0	8.0		50
		55	27.5		22.0		17.6		13.2		11.0	11.0	22.0		17.6		14.1		10.6		8.8	8.0		55
22		60	30.0	392.3 {40.0}	24.0	657.0 {67.0}	19.2	951.2 {97.0}	14.4	1422 {145}	12.0	1912 {195}	12.0	2354 {240}	24.0	313.8 {32.0}	19.2	525.6 {53.6}	15.4	761.0 {77.6}	11.5	1138 {116}	9.6	1530 {156}	8.8	1883 {192}	60
		65	32.5		26.0		20.8		15.6		13.0	13.0	26.0		20.8		16.6		12.5		10.4	9.6		65
		70	35.0		28.0		22.4		16.8		14.0	14.0	28.0		22.4		17.9		13.4		11.2	10.4		70
		75	37.5		30.0		24.0		18.0		15.0	15.0	30.0		24.0		19.2		14.4		12.0	11.2		75
		80	40.0		32.0		25.6		19.2		16.0	16.0	32.0		25.6		20.5		15.4		12.8	12.0		80
		90	45.0		36.0		28.8		21.6		18.0	18.0	36.0		28.8		23.0		17.3		14.4	12.8		90
		100	50.0		40.0		32.0		24.0		20.0	20.0	40.0		32.0		25.6		19.2		16.0	16.0		100
		125	62.5		50.0		40.0		30.0		25.0	25.0	50.0		40.0		32.0		24.0		20.0	20.0		125
		150	75.0		60.0		48.0		36.0		30.0		60.0		48.0		38.4		28.8		24.0	20.0		150

Coil Springs（For Heavy Load）

Specification Table（D25～70）

Outer diameter D	Inner diameter d	Free length L	Operation frequency	300,000 times								1 million times											
			Max. deflection ratio	50%		40%		32%		24%		20%		20%		40%		32%		25.6%		19.2%		16%		16%	
				SSWF ☞P.220		SSWL ☞P.222		SSWM ☞P.224		SSWH ☞P.226		SSWB ☞P.228		SSWG ☞P.230		SSWF ☞P.220		SSWL ☞P.222		SSWM ☞P.224		SSWH ☞P.226		SSWB ☞P.228		SSWG ☞P.230		
				Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		
				Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	L
25	13.5 【F】 【L】 【M】 【H】 【B】 【G】 12.5	20											Beyond allowable range											3.2		20
		25	12.5		10.0		8.0		6.0		5.0		5.0		10.0		8.0		6.4		4.8		4.0		4.0		25
		30	15.0		12.0		9.6		7.2		6.0		6.0		12.0		9.6		7.7		5.8		4.8		4.8		30
		35	17.5		14.0		11.2		8.4		7.0		7.0		14.0		11.2		9.0		6.7		5.6		5.6		35
		40	20.0		16.0		12.8		9.6		8.0		8.0		16.0		12.8		10.2		7.7		6.4		6.4		40
		45	22.5		18.0		14.4		10.8		9.0		9.0		18.0		14.4		11.5		8.6		7.2		7.2		45
		50	25.0		20.0		16.0		12.0		10.0		10.0		20.0		16.0		12.8		9.6		8.0		8.0		50
		55	27.5		22.0		17.6		13.2		11.0		11.0		22.0		17.6		14.1		10.6		8.8		8.8	2432 {248}	55
		60	30.0		24.0		19.2	1226 {125}	14.4	1834 {187}	12.0	2403 {245}	12.0	3040 {310}	24.0		19.2	659.0 {67.2}	15.4	980.7 {100}	11.5	1471 {150}	9.6	1922 {196}	9.6		60
		65	32.5	490.3 {50.0}	26.0	823.8 {84.0}	20.8		15.6		13.0		13.0		26.0	392.3 {40.0}	20.8		16.6		12.5		10.4		10.4		65
		70	35.0		28.0		22.4		16.8		14.0		14.0		28.0		22.4		17.9		13.4		11.2		11.2		70
		75	37.5		30.0		24.0		18.0		15.0		15.0		30.0		24.0		19.2		14.4		12.0		12.0		75
		80	40.0		32.0		25.6		19.2		16.0		16.0		32.0		25.6		20.5		15.4		12.8		12.8		80
		90	45.0		36.0		28.8		21.6		18.0		18.0		36.0		28.8		23.0		17.3		14.4		14.4		90
		100	50.0		40.0		32.0		24.0		20.0		20.0		40.0		32.0		25.6		19.2		16.0		16.0		100
		125	62.5		50.0		40.0		30.0		25.0		25.0		50.0		40.0		32.0		24.0		20.0		20.0		125
		150	75.0		60.0		48.0		36.0		30.0				60.0		48.0		38.4		28.8						150
		175	87.5		70.0		56.0		42.0		35.0				70.0		56.0		44.8		33.6		28.0				175
		200	100.0		80.0										80.0		64.0										200
27	13.5 【F】 【L】 【M】 【H】 【B】 【G】 12.5	20											Beyond allowable range											3.2		20
		25	12.5		10.0		8.0		6.0		5.0		5.0		10.0		8.0		6.4		4.8		4.0		4.0		25
		30	15.0		12.0		9.6		7.2		6.0		6.0		12.0		9.6		7.7		5.8		4.8		4.8		30
		35	17.5		14.0		11.2		8.4		7.0		7.0		14.0		11.2		9.0		6.7		5.6		5.6		35
		40	20.0		16.0		12.8		9.6		8.0		8.0		16.0		12.8		10.2		7.7		6.4		6.4		40
		45	22.5		18.0		14.4		10.8		9.0		9.0		18.0		14.4		11.5		8.6		7.2		7.2		45
		50	25.0		20.0		16.0		12.0		10.0		10.0		20.0		16.0		12.8		9.6		8.0		8.0		50
		55	27.5		22.0		17.6		13.2		11.0		11.0		22.0		17.6		14.1		10.6		8.8		8.8	2903 {296}	55
		60	30.0		24.0		19.2	1432 {146}	14.4	2148 {219}	12.0	2844 {290}	12.0	3628 {370}	24.0		19.2	784.5 {80.0}	15.4	1147 {117}	11.5	1716 {175}	9.6	2275 {232}	9.6		60
		65	32.5	588.4 {60.0}	26.0	980.7 {100}	20.8		15.6		13.0		13.0		26.0	470.7 {48.0}	20.8		16.6		12.5		10.4		10.4		65
		70	35.0		28.0		22.4		16.8		14.0		14.0		28.0		22.4		17.9		13.4		11.2		11.2		70
		75	37.5		30.0		24.0		18.0		15.0		15.0		30.0		24.0		19.2		14.4		12.0		12.0		75
		80	40.0		32.0		25.6		19.2		16.0		16.0		32.0		25.6		20.5		15.4		12.8		12.8		80
		90	45.0		36.0		28.8		21.6		18.0		18.0		36.0		28.8		23.0		17.3		14.4		14.4		90
		100	50.0		40.0		32.0		24.0		20.0		20.0		40.0		32.0		25.6		19.2		16.0		16.0		100
		125	62.5		50.0		40.0		30.0		25.0		25.0		50.0		40.0		32.0		24.0		20.0		20.0		125
		150	75.0		60.0		48.0		36.0		30.0		30.0		60.0		48.0		38.4		28.8		24.0		24.0		150
		175	87.5		70.0		56.0		42.0		35.0				70.0		56.0		44.8		33.6		28.0				175
		200	100.0		80.0										80.0		64.0										200
30	16 【F】 【L】 【M】 【H】 【B】 【G】 15	20											Beyond allowable range											3.2		20
		25	12.5		10.0		8.0		6.0		5.0		5.0		10.0		8.0		6.4		4.8		4.0		4.0		25
		30	15.0		12.0		9.6		7.2		6.0		6.0		12.0		9.6		7.7		5.8		4.8		4.8		30
		35	17.5		14.0		11.2		8.4		7.0		7.0		14.0		11.2		9.0		6.7		5.6		5.6		35
		40	20.0		16.0		12.8		9.6		8.0		8.0		16.0		12.8		10.2		7.7		6.4		6.4		40
		45	22.5		18.0		14.4		10.8		9.0		9.0		18.0		14.4		11.5		8.6		7.2		7.2		45
		50	25.0		20.0		16.0		12.0		10.0		10.0		20.0		16.0		12.8		9.6		8.0		8.0		50
		55	27.5		22.0		17.6		13.2		11.0		11.0		22.0		17.6		14.1		10.6		8.8		8.8		55
		60	30.0		24.0		19.2		14.4		12.0		12.0		24.0		19.2		15.4		11.5		9.6		9.6		60
		65	32.5		26.0		20.8	1765 {180}	15.6	2648 {270}	13.0	3530 {360}	13.0	4707 {480}	26.0	564.9 {57.6}	20.8	949 {97}	16.6	1412 {144}	12.5	2118 {216}	10.4	2824 {288}	10.4	3766 {384}	65
		70	35.0	706.1 {72.0}	28.0	1187 {121}	22.4		16.8		14.0		14.0		28.0		22.4		17.9		13.4		11.2		11.2		70
		75	37.5		30.0		24.0		18.0		15.0		15.0		30.0		24.0		19.2		14.4		12.0		12.0		75
		80	40.0		32.0		25.6		19.2		16.0		16.0		32.0		25.6		20.5		15.4		12.8		12.8		80
		90	45.0		36.0		28.8		21.6		18.0		18.0		36.0		28.8		23.0		17.3		14.4		14.4		90
		100	50.0		40.0		32.0		24.0		20.0		20.0		40.0		32.0		25.6		19.2		16.0		16.0		100
		125	62.5		50.0		40.0		30.0		25.0		25.0		50.0		40.0		32.0		24.0		20.0		20.0		125
		150	75.0		60.0		48.0		36.0		30.0		30.0		60.0		48.0		38.4		28.8		24.0		24.0		150
		175	87.5		70.0		56.0		42.0		35.0		35.0		70.0		56.0		44.8		33.6		28.0		28.0		175
		200	100.0		80.0		64.0		48.0		40.0		40.0		80.0		64.0		51.2		38.4		32.0		32.0		200
35	19 【F】 【L】 【M】 【H】 【B】 【G】 17.5	30											6.0											4.8		30
		35											7.0											5.6		35
		40	20.0		16.0		12.8		9.6		8.0		8.0		16.0		12.8		10.2		7.7		6.4		6.4		40
		45	22.5		18.0		14.4		10.8		9.0		9.0		18.0		14.4		11.5		8.6		7.2		7.2		45
		50	25.0		20.0		16.0		12.0		10.0		10.0		20.0		16.0		12.8		9.6		8.0		8.0		50
		55	27.5		22.0		17.6		13.2		11.0		11.0		22.0		17.6		14.1		10.6		8.8		8.8		55
		60	30.0		24.0		19.2		14.4		12.0		12.0		24.0		19.2		15.4		11.5		9.6		9.6		60
		65	32.5		26.0		20.8		15.6		13.0		13.0		26.0		20.8		16.6		12.5		10.4		10.4		65
		70	35.0	961.1 {98.0}	28.0	1618 {165}	22.4	2403 {245}	16.8	3599 {367}	14.0	4805 {490}	14.0	6178 {630}	28.0	768.8 {78.4}	22.4	1294 {132}	17.9	1922 {196}	13.4	2883 {294}	11.2	3844 {392}	11.2	4943 {504}	70
		75	37.5		30.0		24.0		18.0		15.0		15.0		30.0		24.0		19.2		14.4		12.0		12.0		75
		80	40.0		32.0		25.6		19.2		16.0		16.0		32.0		25.6		20.5		15.4		12.8		12.8		80
		90	45.0		36.0		28.8		21.6		18.0		18.0		36.0		28.8		23.0		17.3		14.4		14.4		90
		100	50.0		40.0		32.0		24.0		20.0		20.0		40.0		32.0		25.6		19.2		16.0		16.0		100
		125	62.5		50.0		40.0		30.0		25.0		25.0		50.0		40.0		32.0		24.0		20.0		20.0		125
		150	75.0		60.0		48.0		36.0		30.0		30.0		60.0		48.0		38.4		28.8		24.0		24.0		150
		175	87.5		70.0		56.0		42.0		35.0		35.0		70.0		56.0		44.8		33.6		28.0		28.0		175
		200	100.0		80.0		64.0		48.0		40.0		40.0		80.0		64.0		51.2		38.4		32.0		32.0		200

⚠ Load {kgf} = {N} ×0.101972

How to use the specification table ☞ P.195

Outer diameter D	Inner diameter d	Free length L	Operation frequency	300,000 times										1 million times									
			Max. deflection ratio	50%		40%		32%		24%		20%		20%		40%		32%		25.6%		19.2%		16%		16%	
				SSWF ☞P.220		SSWL ☞P.222		SSWM ☞P.224		SSWH ☞P.226		SSWB ☞P.228		SSWG ☞P.230		SSWF ☞P.220		SSWL ☞P.222		SSWM ☞P.224		SSWH ☞P.226		SSWB ☞P.228		SSWG ☞P.230		
				Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		Max. deflection ratio		
				Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	Deflection {mm}	Load N {kgf}	L
40	22 【F】 【L】 【M】 【H】 【B】 【G】 20	35										7.0														35
		40	20.0		16.0		12.8		9.6		8.0		8.0		16.0		12.8		10.2		7.7		6.4		6.4		40
		45	22.5		18.0		14.4		10.8		9.0		9.0		18.0		14.4		11.5		8.6		7.2		7.2		45
		50	25.0		20.0		16.0		12.0		10.0		10.0		20.0		16.0		12.8		9.6		8.0		8.0		50
		55	27.5		22.0		17.6		13.2		11.0		11.0		22.0		17.6		14.1		10.6		8.8		8.8		55
		60	30.0		24.0		19.2		14.4		12.0		12.0		24.0		19.2		15.4		11.5		9.6		9.6		60
		65	32.5		26.0		20.8		15.6		13.0		13.0		26.0		20.8		16.6		12.5		10.4		10.4	6433 {656}	65
		70	35.0		28.0		22.4		16.8		14.0		14.0	8041 {820}	28.0		22.4		17.9		13.4		11.2		11.2		70
		75	37.5		30.0		24.0		18.0		15.0		15.0		30.0		24.0		19.2		14.4		12.0		12.0		75
		80	40.0		32.0		25.6		19.2		16.0		16.0		32.0		25.6		20.5		15.4		12.8		12.8		80
		90	45.0		36.0		28.8		21.6		18.0		18.0		36.0		28.8		23.0		17.3		14.4		14.4		90
		100	50.0		40.0		32.0		24.0		20.0		20.0		40.0		32.0		25.6		19.2		16.0		16.0		100
		125	62.5		50.0		40.0		30.0		25.0		25.0		50.0		40.0		32.0		24.0		20.0		20.0		125
		150	75.0		60.0		48.0		36.0		30.0		30.0		60.0		48.0		38.4		28.8		24.0		24.0		150
		175	87.5		70.0		56.0		42.0		35.0		35.0		70.0		56.0		44.8		33.6		28.0				175
		200	100.0		80.0		64.0		48.0		40.0		40.0		80.0		64.0		51.2		38.4		32.0				200
50	27.5 【F】 【L】 【M】 【H】 【B】 25	50	25.0		20.0		16.0		12.0		10.0		10.0		20.0		16.0		12.8		9.6		8.0		8.0		50
		55	27.5		22.0		17.6		13.2		11.0		11.0		22.0		17.6		14.1		10.6		8.8		8.8		55
		60	30.0		24.0		19.2		14.4		12.0		12.0		24.0		19.2		15.4		11.5		9.6		9.6		60
		65	32.5		26.0		20.8		15.6		13.0		13.0		26.0		20.8		16.6		12.5		10.4		10.4		65
		70	35.0		28.0		22.4		16.8		14.0		14.0		28.0		22.4		17.9		13.4		11.2		11.2		70
		75	37.5		30.0		24.0		18.0		15.0		15.0	12258 {1250}	30.0		24.0		19.2		14.4		12.0		12.0		75
		80	40.0		32.0		25.6		19.2		16.0		16.0		32.0		25.6		20.5		15.4		12.8		12.8		80
		90	45.0		36.0		28.8		21.6		18.0		18.0		36.0		28.8		23.0		17.3		14.4		14.4		90
		100	50.0		40.0		32.0	4903 {500}	24.0	7355 {750}	20.0	9807 {1000}	20.0		40.0	1569 {160}	32.0		25.6	3923 {400}	19.2	5884 {600}	16.0	7845 {800}	16.0		100
		125	62.5		50.0		40.0		30.0		25.0		25.0		50.0		40.0		32.0		24.0		20.0		20.0		125
		150	75.0	1961 {200}	60.0	3315 {338}	48.0		36.0		30.0		30.0		60.0	2648 {270}	48.0		38.4		28.8		24.0		24.0	9807 {1000}	150
		175	87.5		70.0		56.0		42.0		35.0		35.0		70.0		56.0		44.8		33.6		28.0		28.0		175
		200	100.0		80.0		64.0		48.0		40.0		40.0		80.0		64.0		51.2		38.4		32.0		32.0		200
		225	112.5		90.0		72.0		54.0		45.0				90.0		72.0		57.6		43.2		36.0				225
		250	125.0		100.0		80.0		60.0		50.0				100.0		80.0		64.0		48.0		40.0				250
		275	137.5		110.0		88.0		66.0		55.0				110.0		88.0		70.4		52.8		44.0				275
		300	150.0		120.0		96.0		72.0		60.0				120.0		96.0		76.8		57.6		48.0				300
60	33 【F】 【L】 【M】 【H】 【B】 30	60	30.0		24.0		19.2		14.4		12.0				24.0		19.2		15.4		11.5		9.6				60
		70	35.0		28.0		22.4		16.8		14.0				28.0		22.4		17.9		13.4		11.2				70
		80	40.0		32.0		25.6		19.2		16.0				32.0		25.6		20.5		15.4		12.8				80
		90	45.0		36.0		28.8		21.6		18.0				36.0		28.8		23.0		17.3		14.4				90
		100	50.0		40.0		32.0		24.0		20.0				40.0		32.0		25.6		19.2		16.0				100
		125	62.5		50.0		40.0		30.0		25.0				50.0		40.0		32.0		24.0		20.0				125
		150	75.0	2824 {288}	60.0	4766 {486}	48.0	7061 {720}	36.0	10581 {1079}	30.0	14122 {1440}			60.0		48.0	5649 {596}	38.4	8463 {863}	28.8	11297 {1152}				150
		175	87.5		70.0		56.0		42.0		35.0				70.0	2256 {230}	56.0	3815 {389}	44.8		33.6		28.0				175
		200	100.0		80.0		64.0		48.0		40.0				80.0		64.0		51.2		38.4		32.0				200
		225	112.5		90.0		72.0		54.0		45.0				90.0		72.0		57.6		43.2		36.0				225
		250	125.0		100.0		80.0		60.0		50.0				100.0		80.0		64.0		48.0		40.0				250
		275	137.5		110.0		88.0		66.0		55.0				110.0		88.0		70.4		52.8		44.0				275
		300	150.0		120.0		96.0		72.0		60.0				120.0		96.0		76.8		57.6		48.0				300
		350	175.0		140.0		112.0		84.0		70.0				140.0		112.0		89.6		67.2		56.0				350
		400	200.0		160.0										160.0		128.0										400
		450	225.0		180.0										180.0		144.0										450
		500	250.0		200.0										200.0		160.0										500
70	38.5	70	35.0		28.0		22.4		16.8		14.0				28.0		22.4		17.9		13.4		11.2				70
		80	40.0		32.0		25.6		19.2		16.0				32.0		25.6		20.5		15.4		12.8				80
		90	45.0		36.0		28.8		21.6		18.0				36.0		28.8		23.0		17.3		14.4				90
		100	50.0		40.0		32.0		24.0		20.0				40.0		32.0		25.6		19.2		16.0				100
		125	62.5		50.0		40.0		30.0		25.0				50.0		40.0		32.0		24.0		20.0				125
		150	75.0	3923 {400}	60.0	5982 {610}	48.0	8336 {850}	36.0	12553 {1280}	30.0	17064 {1740}			60.0	3138 {320}	48.0	4786 {488}	38.4	6669 {680}	28.8	10042 {1024}	24.0	13651 {1392}			150
		175	87.5		70.0		56.0		42.0		35.0				70.0		56.0		44.8		33.6		28.0				175
		200	100.0		80.0		64.0		48.0		40.0				80.0		64.0		51.2		38.4		32.0				200
		250	125.0		100.0		80.0		60.0		50.0				100.0		80.0		64.0		48.0		40.0				250
		300	150.0		120.0		96.0		72.0		60.0				120.0		96.0		76.8		57.6		48.0				300
		350	175.0		140.0		112.0		84.0		70.0				140.0		112.0		89.6		67.2		56.0				350

Directions and precautions for Coil Springs

Direction and precaution for coil spring

Operating temperature

The operation frequencies and max. deflections of coil springs in this catalog are measured at normal temperature （25℃）. And the durability will vary from different operating conditions. Lowered durability may reduce the operation frequency and constant of spring, and shorten the free length.

※ The main operating conditions which will lead high temperature and low durability：

- High initial deflection condition for a long time.
- Quick operating speed（repeat speed）
- Long stroke（large difference between initial deflection and max. deflection）

For the conditions above, please maintain the spring under the operation frequency shown in the catalog.

※ The allowable temperature of spring is lower than the allowable temperature of spring wire.
（120℃ for round wires, 220℃ for irregular shaped wires）

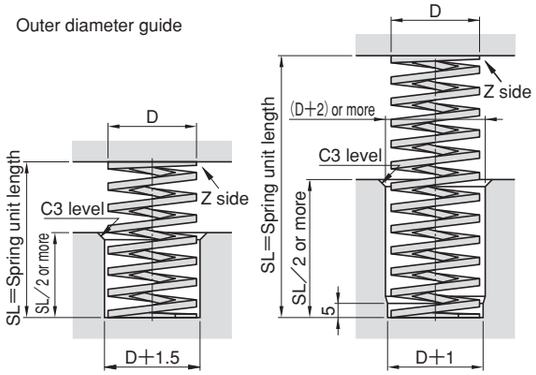
allowable deflection

Please use the spring under the max. deflection. And the operation frequency may differ from actual deflection. Overloaded operation will not only reduce the operation frequency or spring constant, but also cause breakage of the spring or damage of the die.
Besides, solid height is the standard value; and do not use the spring near solid height. Please redesign the load or free length if necessary.
When the coil spring is used under solid condition, its free length and spring constant will decrease and the operation frequency will be shortened too.

Others

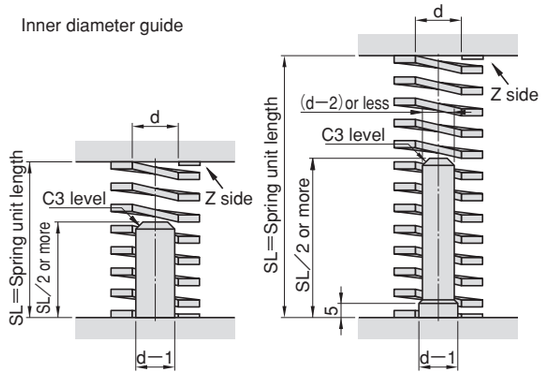
(1) For preventing the breakage caused by repeating impact force, please set up an initial deflection.
(2) The spring mounting surface should be flat, and the axes of spring should be plumb to mounting surface, in order to avoid bias load.
(3) For bending prevention, a spring guide is required.(For details, refer to the drawing below)
(4) In order to prevent breakage caused by foreign matter, pay attention to the operating environment.
(5) For two springs using in series, bending will occur because of unstable interface. And for combined using of springs with different load, stress concentration will happen to the weaker one. As a result, the operation frequency will be reduced.
(6) For nested using of two springs, the interference between the springs will cause abrasion, and breakage may happen.
(7) Do not combine using with springs of other brands, in order to prevent durability from being decreased.

Outer diameter guide



Design the spring hole diameter by referring to the drawings above. When deflected, the OD of coil spring expands, and small spring hole diameter may cause stress concentration, which may cause breakage. On the other hand, shallow spring hole may cause friction to the OD of spring, and this may cause breakage, too. The spring hole depth should be longer than half of the unit. And a C3 chamfering around the edge of the spring hole is recommended.

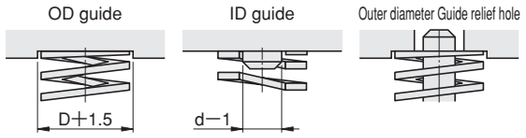
Inner diameter guide



Design the spring guide pin diameter according to the drawings above. If the spring guide pin diameter is large, the ID of coil spring may contact with the pin and abrasion will occur. This will lead to the spring's eventually breaking at the point of wear. On the other hand, small spring guide pin diameter may cause friction to the ID of spring, and this may cause breakage, too.
In order to reduce the horizontal deflection of spring, the length of spring guide pin should be longer than half of the unit. And a C3 chamfering around the point is recommended.

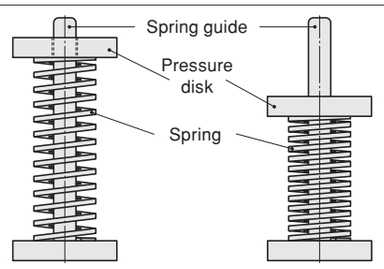
▶ Z side processing

As shown in the right drawings, fixing the spring position with OD guide or ID guide is recommended.
For installing ID guide on Z side and opposite side, if the movable part is long, please process the OD guide and bolt relief hole.



Recommended measuring method for the load of long spring

Assembling the spring to the spring guide hole（or guide pin）for deflecting the free length to measure the load. This can reduce the error, and obtain the right testing result.
・Standard value：Length of spring：free length÷OD≧3
・Diameter of spring guide pin: ID of the spring−1mm approximately
・The pressure disk with a guide hole is for safety test.



Wire Springs

WWY

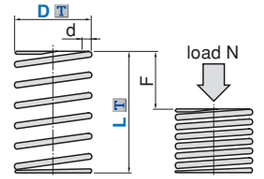
Material	Code
SWP−A	WWY

D	Spring constant(N/mm)
	WWY
3～ 8	0.1
10～16	0.2
Fmax	L×75%

⚠ Spring constant：±10%
⚠ Allowable deflection(Fmax)：1 million times

D	T Tolerance
3～10	0 −0.5
13～16	0 −0.8

L	T Tolerance
5～50	±1.5
55～70	±2.5



ORDER
Code No.
WWY4 − 10

DELIVERY
Next In stock working day
☞ P.15

PRICE Without tax
▶Quantity discount rate ☞ P.15

1～9	10～19	20～99	100～500	501～
100%	95%	90%	85%	Enquiry

▶WWY : Fmax(allowable deflection)＝L×75%

Code No. Code	D	L	d	Solid height	F max	N{kgf} max	@/P (1～9P)
WWY	3	5	0.16	1.0	3.75	0.38 {0.04}	0.78
		10	0.2	2.0	7.5	0.75 {0.08}	0.78
		15	0.23	3.6	11.2	1.12 {0.11}	0.78
		20	0.23	3.6	15	1.5 {0.15}	0.78
		25	0.25	5.5	18.7	1.87 {0.19}	0.82
		30	0.26	6.5	22.5	2.25 {0.23}	0.82
WWY	4	5	0.2	1.1	3.75	0.38 {0.04}	0.82
		10	0.23	1.9	7.5	0.7 {0.08}	0.82
		15	0.23	1.9	11.2	1.1 {0.11}	0.82
		20	0.25	2.7	15	1.5 {0.15}	0.82
		25	0.29	5.0	18.7	1.8 {0.19}	0.87
		30	0.29	5.0	22.5	2.2 {0.23}	0.87
		35	0.32	7.7	26.2	2.6 {0.26}	0.87
		40	0.32	7.7	30	2.9 {0.30}	0.87
WWY	5	10	0.25	1.7	7.5	0.7 {0.08}	0.85
		15	0.25	1.7	11.2	1.1 {0.11}	0.85
		20	0.3	3.2	15	1.5 {0.15}	0.85
		25	0.3	3.2	18.7	1.8 {0.19}	0.91
		30	0.35	6.3	22.5	2.2 {0.23}	0.91
		35	0.35	6.3	26.2	2.6 {0.26}	0.91
		40	0.38	9.2	30	2.9 {0.30}	0.91
		45	0.38	9.2	33.7	3.3 {0.34}	0.91
		50	0.38	9.2	37.5	3.7 {0.38}	0.91
WWY	6	10	0.3	2.1	7.5	0.75 {0.08}	0.87
		15	0.32	2.8	11.2	1.1 {0.11}	0.87
		20	0.32	2.8	15	1.5 {0.15}	0.87
		25	0.35	4.1	18.7	1.8 {0.19}	0.94
		30	0.38	5.6	22.5	2.2 {0.23}	0.94
		35	0.38	5.6	26.2	2.6 {0.26}	0.94
		40	0.4	7.2	30	2.9 {0.30}	0.94
		45	0.4	7.2	33.7	3.3 {0.34}	0.94
		50	0.4	7.2	37.5	3.7 {0.38}	0.94
		55	0.45	12.2	41.2	4.0 {0.41}	1.00
		60	0.45	12.2	45	4.4 {0.45}	1.00
		65	0.45	12.2	48.7	4.8 {0.49}	1.00
		70	0.45	12.2	52.5	5.1 {0.53}	1.00

Code No. Code	D	L	d	Solid height	F max	N{kgf} max	@/P (1～9P)
WWY	8	10	0.35	2.1	7.5	0.75 {0.08}	1.00
		15	0.38	3	11.2	1.1 {0.11}	1.00
		20	0.4	3.5	15	1.5 {0.15}	1.00
		25	0.4	3.5	18.7	1.8 {0.19}	1.06
		30	0.45	5.7	22.5	2.2 {0.23}	1.06
		35	0.45	5.7	26.2	2.6 {0.26}	1.06
		40	0.45	5.7	30	2.9 {0.30}	1.06
		45	0.45	5.7	33.7	3.3 {0.34}	1.06
		50	0.5	9	37.5	3.7 {0.38}	1.06
		55	0.5	9	41.2	4.0 {0.41}	1.11
		60	0.5	9	45	4.4 {0.45}	1.11
		65	0.5	9	48.7	4.8 {0.49}	1.11
		70	0.5	9	52.5	5.1 {0.53}	1.11
WWY	10	15	0.5	3	11.2	2.26 {0.23}	1.17
		20	0.55	4.6	15	2.9 {0.30}	1.17
		25	0.55	4.6	18.7	3.7 {0.38}	1.17
		30	0.6	6.6	22.5	4.4 {0.45}	1.17
		35	0.6	6.6	26.2	5.1 {0.53}	1.17
		40	0.65	9.1	30	5.9 {0.60}	1.17
		45	0.65	9.1	33.7	6.6 {0.68}	1.17
		50	0.65	9.1	37.5	7.4 {0.75}	1.17
		55	0.7	12.6	41.2	8.1 {0.83}	1.23
		60	0.7	12.6	45	8.8 {0.90}	1.23
		65	0.7	12.6	48.7	9.6 {0.98}	1.23
		70	0.7	12.6	52.5	10.3 {1.05}	1.23

Code No. Code	D	L	d	Solid height	F max	N{kgf} max	@/P (1～9P)
WWY	13	20	0.6	3.9	15	2.9 {0.30}	1.23
		25	0.65	5.1	18.7	3.7 {0.38}	1.23
		30	0.65	5.1	22.5	4.4 {0.45}	1.23
		35	0.7	6.7	26.2	5.1 {0.53}	1.23
		40	0.75	8.7	30	5.9 {0.60}	1.23
		45	0.75	8.7	33.7	6.6 {0.68}	1.23
		50	0.8	11.6	37.5	7.4 {0.75}	1.23
		55	0.8	11.6	41.2	8.1 {0.83}	1.29
		60	0.8	11.6	45	8.8 {0.90}	1.29
		65	0.85	15.3	48.7	9.6 {0.98}	1.29
		70	0.85	15.3	52.5	10.3 {1.05}	1.29
WWY	16	20	0.65	3.6	15	2.9 {0.30}	1.52
		25	0.7	4.6	18.7	3.7 {0.38}	1.52
		30	0.75	5.7	22.5	4.4 {0.45}	1.52
		35	0.8	7	26.2	5.1 {0.53}	1.52
		40	0.85	9	30	5.9 {0.60}	1.52
		45	0.85	9	33.7	6.6 {0.68}	1.52
		50	0.9	11.3	37.5	7.4 {0.75}	1.52
		55	0.9	11.3	41.2	8.1 {0.83}	1.64
		60	0.9	11.3	45	8.8 {0.90}	1.64
		65	0.9	11.3	48.7	9.6 {0.98}	1.64
		70	0.9	11.3	52.5	10.3 {1.05}	1.64

⚠ Load calculation method：Load＝Spring constant×Deflection
N＝N/mm×Fmm
（kgf＝N×0.101972）
⚠ No grinding on both ends of all WWY type springs
⚠ The solid height values are reference only ☞ P.204
⚠ Operation frequency：1 million times（allowable deflection：L×75%）

Wire Springs

WWR／WWF

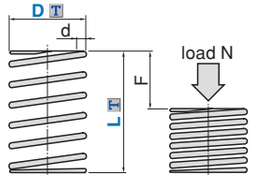
Material	Code
SWP—A	WWR WWF

D	Spring constant(N/mm)	
	WWR	WWF
3～16	0.3	0.5
18～27	0.5	1.0
Fmax	L×60%	L×45%

⚠ Spring constant：±10%
⚠ Allowable deflection (Fmax)：1 million times

D	T Tolerance
3～10	0 −0.5
12～27	0 −0.8

L	T Tolerance
5～50	±1.5
55～90	±2.5



ORDER

Code No.
WWR5 — 15
WWF3 — 5

DELIVERY

Next In stock working day ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～9	10～19	20～99	100～500	501～
100%	95%	90%	85%	Enquiry

▶WWR : Fmax(allowable deflection)＝L×60%

Code No. Code	D	L	d	Solid height	F max	N{kgf} max		@/P (1～9P)
WWR	3	5	0.23	1.8	3	0.9	0.09	0.70
		10	0.25	2.3	6	1.8	0.18	0.70
		15	0.3	4.8	9	2.6	0.27	0.70
		20	0.3	4.8	12	3.5	0.36	0.70
		25	0.32	6.8	15	4.4	0.45	0.75
		30	0.32	6.8	18	5.3	0.54	0.75
		35	0.35	11.5	21	6.2	0.63	0.75
		40	0.35	11.5	24	7.1	0.72	0.75
WWR	4	5	0.26	1.6	3	0.9	0.09	0.75
		10	0.29	2.2	6	1.8	0.18	0.75
		15	0.32	3.2	9	2.6	0.27	0.75
		20	0.38	6.5	12	3.5	0.36	0.75
		25	0.38	6.5	15	4.4	0.45	0.81
		30	0.4	8.4	18	5.3	0.54	0.81
		35	0.4	8.4	21	6.2	0.63	0.81
		40	0.45	15	24	7.1	0.72	0.81
		45	0.45	15	27	7.9	0.81	0.81
		50	0.45	15	30	8.8	0.90	0.81
		55	0.45	15	33	9.7	0.99	0.81
		60	0.5	23.5	36	10.6	1.08	0.81
		65	0.5	25	39	11.5	1.17	0.81
		70	0.5	25	42	12.4	1.26	0.81
WWR	5	5	0.3	1.6	3	0.9	0.09	0.78
		10	0.35	1.6	6	1.8	0.18	0.78
		15	0.35	2.8	9	2.6	0.27	0.78
		20	0.4	4.8	12	3.5	0.36	0.78
		25	0.45	8	15	4.4	0.45	0.84
		30	0.45	8	18	5.3	0.54	0.84
		35	0.5	12.5	21	6.2	0.63	0.84
		40	0.5	12.5	24	7.1	0.72	0.84
		45	0.55	17.6	27	7.9	0.81	0.84
		50	0.55	18	30	8.8	0.90	0.84
		55	0.55	20	33	9.7	0.99	0.87
		60	0.55	20	36	10.6	1.08	0.87
		65	0.55	20.9	39	11.5	1.17	0.87
		70	0.55	20.9	42	12.4	1.26	0.87
WWR	6	5	0.32	1.6	3	0.9	0.09	0.81
		10	0.4	3.2	6	1.8	0.18	0.81
		15	0.4	3.2	9	2.6	0.27	0.81
		20	0.5	7.5	12	3.5	0.36	0.81
		25	0.5	7.5	15	4.4	0.45	0.87
		30	0.5	7.5	18	5.3	0.54	0.87
		35	0.55	11.5	21	6.2	0.63	0.87
		40	0.55	11.5	24	7.1	0.72	0.87
		45	0.6	17.4	27	7.9	0.81	0.87
		50	0.6	17.4	30	8.8	0.90	0.87
		55	0.6	17.4	33	9.7	0.99	0.92
		60	0.6	17.4	36	10.6	1.08	0.92
		65	0.6	17.4	39	11.5	1.17	0.92
		70	0.6	17.4	42	12.4	1.26	0.92
		80	0.65	27.3	48	14.1	1.44	0.92
WWR	8	10	0.45	2.7	6	1.8	0.18	0.92
		15	0.5	4	9	2.6	0.27	0.92
		20	0.5	4	12	3.5	0.36	0.92
		25	0.55	5.8	15	4.4	0.45	0.98
		30	0.6	8.4	18	5.3	0.54	0.98
		35	0.6	8.4	21	6.2	0.63	0.98
		40	0.6	8.4	24	7.1	0.72	0.98
		45	0.7	16	27	7.9	0.81	0.98
		50	0.7	16	30	8.8	0.90	0.98
		55	0.7	16	33	9.7	0.99	1.04
		60	0.7	16	36	10.6	1.08	1.04
		65	0.7	16	39	11.5	1.17	1.04
		70	0.7	16	42	12.4	1.26	1.04
		80	0.75	22.9	48	14.1	1.44	1.04

Code No. Code	D	L	d	Solid height	F max	N{kgf} max		@/P (1～9P)
WWR	10	10	0.55	3.6	6	1.8	0.18	1.04
		15	0.6	4.8	9	2.6	0.27	1.04
		20	0.65	6.5	12	3.5	0.36	1.04
		25	0.65	6.5	15	4.4	0.45	1.04
		30	0.7	8.8	18	5.3	0.54	1.04
		35	0.7	8.8	21	6.2	0.63	1.04
		40	0.7	8.8	24	7.1	0.72	1.04
		45	0.8	16	27	7.9	0.81	1.04
		50	0.8	16	30	8.8	0.90	1.04
		55	0.8	16	33	9.7	0.99	1.09
		60	0.85	21	36	10.6	1.08	1.09
		65	0.85	21	39	11.5	1.17	1.09
		70	0.85	21	42	12.4	1.26	1.09
		80	0.9	28.8	48	14.1	1.44	1.09
WWR	12	10	0.6	3.6	6	1.8	0.18	1.06
		15	0.65	4.6	9	2.6	0.27	1.06
		20	0.65	4.6	12	3.5	0.36	1.06
		25	0.7	6	15	4.4	0.45	1.06
		30	0.7	6	18	5.3	0.54	1.06
		35	0.7	6	21	6.2	0.63	1.06
		40	0.8	10.4	24	7.1	0.72	1.06
		45	0.8	10.4	27	7.9	0.81	1.06
		50	0.9	17.1	30	8.8	0.90	1.06
		55	0.9	17.1	33	9.7	0.99	1.12
		60	0.9	17.1	36	10.6	1.08	1.12
		65	0.9	17.1	39	11.5	1.17	1.12
		70	0.9	17.1	42	12.4	1.26	1.12
		80	1.0	28	48	14.1	1.44	1.12
WWR	13	10	0.6	3.2	6	1.8	0.18	1.09
		15	0.7	4.9	9	2.6	0.27	1.09
		20	0.7	4.9	12	3.5	0.36	1.09
		25	0.8	8.4	15	4.4	0.45	1.09
		30	0.8	8.4	18	5.3	0.54	1.09
		35	0.8	8.4	21	6.2	0.63	1.09
		40	0.9	13.5	24	7.1	0.72	1.09
		45	0.9	13.5	27	7.9	0.81	1.09
		50	0.9	13.5	30	8.8	0.90	1.09
		55	0.9	13.5	33	9.7	0.99	1.15
		60	1.0	22	36	10.6	1.08	1.15
		65	1.0	22	39	11.5	1.17	1.15
		70	1.0	22	42	12.4	1.26	1.15
		80	1.0	22	48	14.1	1.44	1.15
		90	1.0	22	54	15.9	1.62	1.15
WWR	14	15	0.7	4.6	9	2.6	0.27	1.27
		20	0.75	5.6	12	3.5	0.36	1.27
		25	0.8	7.2	15	4.4	0.45	1.27
		30	0.8	7.2	18	5.3	0.54	1.27
		35	0.8	7.2	21	6.2	0.63	1.27
		40	0.9	11.3	24	7.1	0.72	1.27
		45	0.9	11.3	27	7.9	0.81	1.27
		50	0.9	11.3	30	8.8	0.90	1.27
		55	1.0	18	33	9.7	0.99	1.38
		60	1.0	18	36	10.6	1.08	1.38
		65	1.0	18	39	11.5	1.17	1.38
		70	1.0	18	42	12.4	1.26	1.38
		80	1.1	28.6	48	14.1	1.44	1.38
		90	1.1	28.6	54	15.9	1.62	1.38

Code No. Code	D	L	d	Solid height	F max	N{kgf} max		@/P (1～9P)
WWR	16	15	0.75	4.5	9	2.6	0.27	1.38
		20	0.8	5.6	12	3.5	0.36	1.38
		25	0.9	8	15	4.4	0.45	1.38
		30	0.9	8	18	5.3	0.54	1.38
		35	0.9	8	21	6.2	0.63	1.38
		40	1.0	13	24	7.1	0.72	1.38
		45	1.0	13	27	7.9	0.81	1.38
		50	1.0	13	30	8.8	0.90	1.38
		55	1.0	13	33	9.7	0.99	1.49
		60	1.1	20	36	10.6	1.08	1.49
		65	1.1	20	39	11.5	1.17	1.49
		70	1.1	20	42	12.4	1.26	1.49
		80	1.1	20	48	14.1	1.44	1.49
		90	1.2	28.8	54	15.9	1.62	1.49
WWR	18	20	1.0	7	12	5.8	0.60	1.59
		25	1.0	7	15	7.4	0.75	1.59
		30	1.1	9.9	18	8.8	0.90	1.59
		35	1.1	9.9	21	10.3	1.05	1.59
		40	1.2	14.4	24	11.8	1.20	1.59
		45	1.2	14.4	27	13.2	1.35	1.59
		50	1.2	14.4	30	14.7	1.50	1.59
		55	1.3	19.5	33	16.2	1.65	1.73
		60	1.3	19.5	36	17.7	1.80	1.73
		65	1.3	19.5	39	19.1	1.95	1.73
		70	1.3	19.5	42	20.6	2.10	1.73
		80	1.4	27.3	48	23.5	2.40	1.73
WWR	20	20	1.0	6	12	5.8	0.60	1.67
		25	1.1	8.3	15	7.4	0.75	1.67
		30	1.1	8.3	18	8.8	0.90	1.67
		35	1.2	10.8	21	10.3	1.05	1.67
		40	1.2	10.8	24	11.8	1.20	1.67
		45	1.2	10.8	27	13.2	1.35	1.67
		50	1.3	15	30	14.7	1.50	1.67
		55	1.3	15	33	16.2	1.65	1.77
		60	1.3	15	36	17.7	1.80	1.77
		65	1.3	15	39	19.1	1.95	1.77
		70	1.4	21	42	20.6	2.10	1.77
		80	1.4	21	48	23.5	2.40	1.77
WWR	22	20	1.1	6.9	12	5.9	0.60	1.73
		25	1.2	9	15	7.4	0.75	1.73
		30	1.2	9	18	8.8	0.90	1.73
		35	1.3	12.4	21	10.3	1.05	1.73
		40	1.3	12.4	24	11.8	1.20	1.73
		45	1.3	12.4	27	13.2	1.35	1.73
		50	1.4	16.1	30	14.7	1.50	1.73
		55	1.4	16.1	33	16.2	1.65	1.83
		60	1.4	16.1	36	17.7	1.80	1.83
		65	1.5	22.5	39	19.1	1.95	1.83
		70	1.5	22.5	42	20.6	2.10	1.83
		80	1.5	22.5	48	23.5	2.40	1.83
WWR	27	30	1.3	8.5	18	8.8	0.90	1.95
		35	1.4	10.5	21	10.3	1.05	1.95
		40	1.4	10.5	24	11.8	1.20	1.95
		45	1.4	10.5	27	13.2	1.35	1.95
		50	1.6	17.6	30	14.7	1.50	1.95
		55	1.6	17.6	33	16.2	1.65	2.06
		60	1.6	17.6	36	17.7	1.80	2.06
		65	1.7	22.1	39	19.1	1.95	2.06
		70	1.7	22.1	42	20.6	2.10	2.06
		80	1.7	22.1	48	23.5	2.40	2.06

⚠ Load calculation method：Load＝Spring constant×Deflection
N＝N/mm×Fmm
(kgf＝N×0.101972)
⚠ No grinding on both ends of all WWR type springs
⚠ The solid height values are reference only ☞ P.204
⚠ Operation frequency：1 million times (allowable deflection：L×60%)

▶WWF：Fmax(allowable deflection)＝L×45%

Code No. Code	D	L	d	Solid height	F max	N{kgf} max		@/P (1～9P)
WWF	3	5*	0.26	2	2.25	1.1	0.11	0.70
		10*	0.32	5	4.5	2.2	0.23	0.70
		15*	0.32	5	6.7	3.2	0.34	0.70
		20*	0.35	7	9	4.4	0.45	0.70
		25*	0.35	7	11.2	5.5	0.56	0.75
		30	0.4	13.2	13.5	6.6	0.68	0.75
		35	0.4	13.2	15.7	7.6	0.79	0.75
		40	0.4	13.2	18	8.8	0.90	0.75
WWF	4	5*	0.32	2.3	2.25	1.1	0.11	0.75
		10*	0.35	3.1	4.5	2.2	0.23	0.75
		15*	0.4	5.6	6.7	3.2	0.34	0.75
		20*	0.4	5.6	9	4.4	0.45	0.75
		25*	0.45	9.9	11.2	5.5	0.56	0.81
		30*	0.45	9.9	13.5	6.6	0.68	0.81
		35	0.5	16.5	15.7	7.6	0.79	0.81
		40	0.5	16.5	18	8.8	0.90	0.81
		45	0.5	16.5	20.2	9.8	1.01	0.81
		50	0.5	16.5	22.5	10.8	1.13	0.81
		55	0.5	16.5	24.7	12.1	1.24	0.81
		60	0.5	16.5	27	12.7	1.35	0.81
		65*	0.55	26.4	29.2	14.3	1.46	0.81
		70*	0.55	26.4	31.5	15.4	1.58	0.81
WWF	5	5*	0.35	2	2.25	1.1	0.11	0.78
		10*	0.38	2.8	4.5	2.2	0.23	0.78
		15*	0.4	3.4	6.7	3.2	0.34	0.78
		20*	0.45	5.4	9	4.4	0.45	0.78
		25*	0.5	8.5	11.2	5.5	0.56	0.84
		30	0.55	13.2	13.5	6.6	0.68	0.84
		35	0.55	13.2	15.7	7.6	0.79	0.84
		40	0.55	20.4	18	8.8	0.90	0.84
		45	0.6	20.4	20.2	9.8	1.01	0.84
		50	0.6	20.4	22.5	10.8	1.13	0.84
		55	0.6	20.4	24.7	12.1	1.24	0.87
		60	0.6	20.4	27	12.7	1.35	0.87
		65	0.6	20.4	29.2	14.3	1.46	0.87
		70	0.6	20.4	31.5	15.4	1.58	0.87
WWF	6	5	0.4	2.3	2.25	1.1	0.11	0.81
		10	0.5	5	4.5	2.2	0.23	0.81
		15	0.55	8	6.7	3.2	0.34	0.81
		20	0.55	8	9	4.4	0.45	0.81
		25	0.6	12	11.2	5.5	0.56	0.87
		30	0.65	16	13.5	6.6	0.68	0.87
		35	0.65	17	15.7	7.6	0.79	0.87
		40	0.65	17	18	8.8	0.90	0.87
		45	0.65	17	20.2	9.8	1.01	0.87
		50	0.7	25.2	22.5	10.8	1.13	0.87
		55	0.7	25.2	24.7	12.1	1.24	0.92
		60	0.7	25.2	27	12.7	1.35	0.92
		65	0.7	25.2	29.2	14.3	1.46	0.92
		70	0.7	25.2	31.5	14.7	1.58	0.92
		80	0.7	25.2	36	17.7	1.80	0.92
WWF	8	10	0.6	5	4.5	2.2	0.23	0.92
		15	0.65	7.5	6.7	3.2	0.34	0.92
		20	0.7	10.8	9	4.4	0.45	0.92
		25	0.7	10.8	11.2	5.5	0.56	0.98
		30	0.75	14.5	13.5	6.6	0.68	0.98
		35	0.75	14.5	15.7	7.6	0.79	0.98
		40	0.8	20	18	8.8	0.90	0.98
		45	0.8	20	20.2	9.8	1.01	0.98
		50	0.8	20	22.5	10.8	1.13	0.98
		55	0.8	20	24.7	12.1	1.24	1.04
		60	0.85	27.6	27	12.7	1.35	1.04
		65	0.85	27.6	29.2	14.3	1.46	1.04
		70	0.85	27.6	31.5	14.7	1.58	1.04
		80	0.85	28.1	36	17.7	1.80	1.04

Code No. Code	D	L	d	Solid height	F max	N{kgf} max		@/P (1～9P)
WWF	10	10	0.65	5	4.5	2.2	0.23	1.04
		15	0.65	5	6.7	3.2	0.34	1.04
		20	0.8	10.4	9	4.4	0.45	1.04
		25	0.8	10.4	11.2	5.5	0.56	1.04
		30	0.85	14	13.5	6.6	0.68	1.04
		35	0.85	14	15.7	7.6	0.79	1.04
		40	0.9	17.5	18	8.8	0.90	1.04
		45	0.9	17.5	20.2	9.8	1.01	1.04
		50	0.9	17.5	22.5	10.8	1.13	1.04
		55	0.9	17.5	24.7	12.1	1.24	1.09
		60	1.0	31	27	12.7	1.35	1.09
		65	1.0	31	29.2	14.3	1.46	1.09
		70	1.0	31	31.5	14.7	1.58	1.09
		80	1.0	31	36	17.7	1.80	1.09
WWF	12	10	0.7	4.6	4.5	2.3	0.23	1.06
		15	0.7	4.6	6.7	3.2	0.34	1.06
		20	0.8	7.2	9	4.4	0.45	1.06
		25	0.8	7.2	11.2	5.5	0.56	1.06
		30	0.9	11.3	13.5	6.6	0.68	1.06
		35	0.9	11.3	15.7	7.6	0.79	1.06
		40	0.9	11.3	18	8.8	0.90	1.06
		45	0.9	11.3	20.2	9.8	1.01	1.06
		50	1.0	18	22.5	10.8	1.13	1.06
		55	1.0	18	24.7	12.1	1.24	1.12
		60	1.0	18	27	12.7	1.35	1.12
		65	1.0	18	29.2	14.3	1.46	1.12
		70	1.1	28.1	31.5	14.7	1.58	1.12
		80	1.1	27.5	36	17.7	1.80	1.12
WWF	13	10	0.75	4.9	4.5	2.3	0.23	1.09
		15	0.8	6	6.7	3.2	0.34	1.09
		20	0.8	6	9	4.4	0.45	1.09
		25	0.85	7.2	11.2	5.5	0.56	1.09
		30	1.0	15	13.5	6.6	0.68	1.09
		35	1.0	15	15.7	7.6	0.79	1.09
		40	1.0	15	18	8.8	0.90	1.09
		45	1.0	15	20.2	9.8	1.01	1.09
		50	1.0	15	22.5	10.8	1.13	1.09
		55	1.1	22	24.7	12.1	1.24	1.15
		60	1.1	22	27	12.7	1.35	1.15
		65	1.1	22	29.2	14.3	1.46	1.15
		70	1.1	22	31.5	14.7	1.58	1.15
		80	1.1	22	36	17.7	1.80	1.15
		90	1.2	33.6	40.5	19.9	2.03	1.15
WWF	14	15	0.8	5.2	6.7	3.2	0.34	1.27
		20	0.9	7.9	9	4.4	0.45	1.27
		25	0.9	7.9	11.2	5.5	0.56	1.27
		30	1.0	12	13.5	6.6	0.68	1.27
		35	1.0	12	15.7	7.6	0.79	1.27
		40	1.0	12	18	8.8	0.90	1.27
		45	1.0	12	20.2	9.8	1.01	1.27
		50	1.1	18.2	22.5	10.8	1.13	1.27
		55	1.1	18.2	24.7	12.1	1.24	1.38
		60	1.1	18.2	27	12.7	1.35	1.38
		65	1.2	27.6	29.2	14.3	1.46	1.38
		70	1.2	27.6	31.5	14.7	1.58	1.38
		80	1.2	27.6	36	17.7	1.80	1.38
		90	1.3	39.7	40.5	19.9	2.03	1.38

Code No. Code	D	L	d	Solid height	F max	N{kgf} max		@/P (1～9P)
WWF	16	15	0.9	6.3	6.7	3.2	0.34	1.38
		20	1.0	8.7	9	4.4	0.45	1.38
		25	1.0	8.7	11.2	5.5	0.56	1.38
		30	1.1	12.8	13.5	6.6	0.68	1.38
		35	1.1	12.8	15.7	7.6	0.79	1.38
		40	1.2	18.6	18	8.8	0.90	1.38
		45	1.2	18.6	20.2	9.8	1.01	1.38
		50	1.2	18.6	22.5	10.8	1.13	1.38
		55	1.2	18.6	24.7	12.1	1.24	1.49
		60	1.3	26.8	27	12.7	1.35	1.49
		65	1.3	26.8	29.2	14.3	1.46	1.49
		70	1.3	26.8	31.5	14.7	1.58	1.49
		80	1.4	36	36	17.7	1.80	1.49
		90	1.4	36.4	40.5	19.9	2.03	1.49
WWF	18	20	1.2	9	9	8.8	0.90	1.59
		25	1.3	12.4	11.2	10.8	1.13	1.59
		30	1.3	12.4	13.5	12.7	1.35	1.59
		35	1.4	16.1	15.7	14.7	1.58	1.59
		40	1.5	21	18	17.7	1.80	1.59
		45	1.5	21	20.2	19.9	2.03	1.59
		50	1.5	21	22.5	22.1	2.25	1.59
		55	1.6	28.8	24.7	24.3	2.48	1.73
		60	1.6	28.8	27	26.5	2.70	1.73
		65	1.6	28.8	29.2	28.7	2.93	1.73
		70	1.7	37.4	31.5	30.9	3.15	1.73
		80	1.7	37.4	36	35.3	3.60	1.73
WWF	20	20	1.2	7.2	9	8.8	0.90	1.67
		25	1.3	9.8	11.2	10.8	1.13	1.67
		30	1.4	12.6	13.5	12.7	1.35	1.67
		35	1.4	12.6	15.7	14.7	1.58	1.67
		40	1.5	16.5	18	17.7	1.80	1.67
		45	1.5	16.5	20.2	19.9	2.03	1.67
		50	1.6	21.6	22.5	22.1	2.25	1.67
		55	1.6	21.6	24.7	24.3	2.48	1.77
		60	1.6	21.6	27	26.5	2.70	1.77
		65	1.7	28.1	29.2	28.7	2.93	1.77
		70	1.7	28.1	31.5	30.9	3.15	1.77
		80	1.7	28.1	36	35.3	3.60	1.77
WWF	22	20	1.3	7.8	9	8.8	0.90	1.73
		25	1.4	10.5	11.2	11.0	1.13	1.73
		30	1.4	10.5	13.5	13.2	1.35	1.73
		35	1.5	13.5	15.7	15.4	1.58	1.73
		40	1.5	13.5	18	17.7	1.80	1.73
		45	1.7	22.1	20.2	19.8	2.03	1.73
		50	1.7	22.1	22.5	22.1	2.25	1.73
		55	1.7	22.1	24.7	24.2	2.48	1.83
		60	1.8	28.8	27	26.5	2.70	1.83
		65	1.8	28.8	29.2	28.6	2.93	1.83

Wire Springs

WWL／WWT

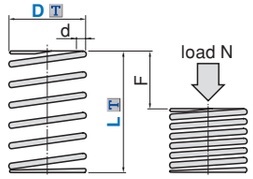
Material	Code
SWP—A	WWL WWT

D	Spring constant(N/mm)	
	WWL	WWT
2	0.5	—
3・4	1.0	1.5
5～16	1.0	2.0
18～27	2.9	3.9
Fmax	L×40%	L×40%

⚠ Spring constant：±10%
⚠ Allowable deflection (Fmax)：1 million times

D	T Tolerance
2～10	$^{0}_{-0.5}$
12～27	$^{0}_{-0.8}$

L	T Tolerance
5～ 50	±1.5
55～100	±2



ORDER

Code No.
WWL3 — 5
WWT3 — 5

DELIVERY

Next In stock working day ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～9	10～19	20～99	100～500	501～
100%	95%	90%	85%	Enquiry

▶WWL：Fmax (allowable deflection) = L×40%

Code No. Code	D	L	d	Solid height	F max	N {kgf} max	@/P (1～9P)
WWL	2	5*	0.2	1.7	2	0.98 {0.1}	0.70
		10*	0.26	5.2	4	2.0 {0.2}	0.70
		15*	0.26	5.2	6	2.9 {0.3}	0.70
		20*	0.29	9	8	3.9 {0.4}	0.70
		25*	0.29	9	10	4.9 {0.5}	0.75
		30*	0.3	10.8	12	5.9 {0.6}	0.75
WWL	3	5*	0.3	2.1	2	2.0 {0.2}	0.70
		10*	0.35	3.9	4	3.9 {0.4}	0.70
		15*	0.4	6.5	6	5.9 {0.6}	0.70
		20*	0.4	6.5	8	7.8 {0.8}	0.70
		25*	0.45	13	10	9.8 {1.0}	0.74
		30*	0.45	13	12	11.8 {1.2}	0.74
		35*	0.45	13	14	13.7 {1.4}	0.74
		40*	0.5	21	16	15.7 {1.6}	0.74
WWL	4	5*	0.35	2.1	2	2.0 {0.2}	0.75
		10*	0.45	5	4	3.9 {0.4}	0.75
		15*	0.45	5	6	5.9 {0.6}	0.75
		20	0.5	9	8	7.8 {0.8}	0.75
		25	0.5	9	10	9.8 {1.0}	0.81
		30	0.55	13.9	12	11.8 {1.2}	0.81
		35	0.55	13.9	14	13.7 {1.4}	0.81
		40	0.6	21.6	16	15.7 {1.6}	0.81
		45	0.6	21.6	18	17.7 {1.8}	0.81
		50	0.6	21.6	20	19.6 {2.0}	0.81
		55	0.6	21.6	22	21.6 {2.2}	0.81
		60	0.65	33	24	23.5 {2.4}	0.81
WWL	5	5*	0.4	2.3	2	2.0 {0.2}	0.78
		10*	0.45	3.4	4	3.9 {0.4}	0.78
		15*	0.5	5	6	5.9 {0.6}	0.78
		20	0.55	7.7	8	7.8 {0.8}	0.78
		25	0.6	10.8	10	9.8 {1.0}	0.84
		30	0.6	10.8	12	11.8 {1.2}	0.84
		35	0.65	15.6	14	13.7 {1.4}	0.84
		40	0.65	15.6	16	15.7 {1.6}	0.84
		45	0.7	20	18	17.7 {1.8}	0.84
		50	0.7	20	20	19.6 {2.0}	0.84
		55	0.7	23.1	22	21.6 {2.2}	0.87
		60	0.75	33	24	23.5 {2.4}	0.87
		65	0.75	32.3	26	25.5 {2.6}	0.87
		70	0.75	32.3	28	27.5 {2.8}	0.87
WWL	6	5*	0.45	2.5	2	2.0 {0.2}	0.81
		10	0.55	4.7	4	3.9 {0.4}	0.81
		15	0.55	4.7	6	5.9 {0.6}	0.81
		20	0.65	9	8	7.8 {0.8}	0.81
		25	0.65	9	10	9.8 {1.0}	0.87
		30	0.7	13.7	12	11.8 {1.2}	0.87
		35	0.7	13.7	14	13.7 {1.4}	0.87
		40	0.7	13.7	16	15.7 {1.6}	0.87
		45	0.75	18.9	18	17.7 {1.8}	0.87
		50	0.75	18.9	20	19.6 {2.0}	0.87
		55	0.75	18.9	22	21.6 {2.2}	0.92
		60	0.8	26.4	24	23.5 {2.4}	0.92
		65	0.8	26.4	26	25.5 {2.6}	0.92
		70	0.85	30.6	28	27.5 {2.8}	0.92
		80	0.85	34.9	32	31.4 {3.2}	0.92
WWL	8	10	0.65	4.7	4	3.9 {0.4}	0.92
		15	0.75	8.5	6	5.9 {0.6}	0.92
		20	0.75	8.5	8	7.8 {0.8}	0.92
		25	0.75	8.5	10	9.8 {1.0}	0.98
		30	0.8	11.2	12	11.8 {1.2}	0.98
		35	0.8	11.2	14	13.7 {1.4}	0.98
		40	0.8	11.2	16	15.7 {1.6}	0.98
		45	0.85	15.3	18	17.7 {1.8}	0.98
		50	0.85	15.3	20	19.6 {2.0}	0.98
		55	0.85	15.3	22	21.6 {2.2}	1.04
		60	0.9	19.4	24	23.5 {2.4}	1.04
		65	0.9	19.4	26	25.5 {2.6}	1.04
		70	1.0	31	28	27.5 {2.8}	1.04
		80	1.0	31	32	31.4 {3.2}	1.04

Code No. Code	D	L	d	Solid height	F max	N {kgf} max	@/P (1～9P)
WWL	10	10	0.75	5.3	4	3.9 {0.4}	1.04
		15	0.8	6.4	6	5.9 {0.6}	1.04
		20	0.8	6.4	8	7.8 {0.8}	1.04
		25	0.9	10.8	10	9.8 {1.0}	1.04
		30	0.9	10.8	12	11.8 {1.2}	1.04
		35	0.9	10.8	14	13.7 {1.4}	1.04
		40	0.9	10.8	16	15.7 {1.6}	1.04
		45	1.0	17	18	17.7 {1.8}	1.04
		50	1.0	17	20	19.6 {2.0}	1.04
		55	1.0	17	22	21.6 {2.2}	1.09
		60	1.0	17	24	23.5 {2.4}	1.09
		65	1.1	24	26	25.5 {2.6}	1.09
		70	1.1	24	28	27.5 {2.8}	1.09
		80	1.1	24.2	32	31.4 {3.2}	1.09
WWL	12	10	0.8	4.8	4	4.0 {0.4}	1.06
		15	0.9	7.2	6	5.9 {0.6}	1.06
		20	0.9	7.2	8	7.8 {0.8}	1.06
		25	0.9	7.2	10	9.8 {1.0}	1.06
		30	1.0	10.5	12	11.8 {1.2}	1.06
		35	1.0	10.5	14	13.7 {1.4}	1.06
		40	1.0	10.5	16	15.7 {1.6}	1.06
		45	1.1	15.4	18	17.7 {1.8}	1.06
		50	1.1	15.4	20	19.6 {2.0}	1.06
		55	1.1	15.4	22	21.6 {2.2}	1.12
		60	1.2	22.8	24	23.5 {2.4}	1.12
		65	1.2	22.8	26	25.5 {2.6}	1.12
		70	1.2	22.8	28	27.5 {2.8}	1.12
		80	1.3	34.5	32	31.4 {3.2}	1.12
WWL	13	10	0.85	5.1	4	4.0 {0.4}	1.09
		15	0.9	6.3	6	5.9 {0.6}	1.09
		20	1.0	8.7	8	7.8 {0.8}	1.09
		25	1.0	8.7	10	9.8 {1.0}	1.09
		30	1.1	13.2	12	11.8 {1.2}	1.09
		35	1.1	13.2	14	13.7 {1.4}	1.09
		40	1.1	13.2	16	15.7 {1.6}	1.09
		45	1.1	13.2	18	17.7 {1.8}	1.09
		50	1.1	13.2	20	19.6 {2.0}	1.09
		55	1.1	13.2	22	21.6 {2.2}	1.15
		60	1.1	13.2	24	23.5 {2.4}	1.15
		65	1.2	18.6	26	25.5 {2.6}	1.15
		70	1.2	18.6	28	27.5 {2.8}	1.15
		80	1.4	37.8	32	31.4 {3.2}	1.15
		90	1.4	37.8	36	35.3 {3.6}	1.15
WWL	14	15	1.0	7.5	6	5.9 {0.6}	1.27
		20	1.0	7.5	8	7.8 {0.8}	1.27
		25	1.0	7.5	10	9.8 {1.0}	1.27
		30	1.1	11	12	11.8 {1.2}	1.27
		35	1.1	11	14	13.7 {1.4}	1.27
		40	1.1	11	16	15.7 {1.6}	1.27
		45	1.2	15.6	18	17.7 {1.8}	1.27
		50	1.2	15.6	20	19.6 {2.0}	1.27
		55	1.2	15.6	22	21.6 {2.2}	1.38
		60	1.2	15.6	24	23.5 {2.4}	1.38
		65	1.3	22.1	26	25.5 {2.6}	1.38
		70	1.3	22.1	28	27.5 {2.8}	1.38
		80	1.3	22.1	32	31.4 {3.2}	1.38
		90	1.5	43.5	36	35.3 {3.6}	1.38

Code No. Code	D	L	d	Solid height	F max	N {kgf} max	@/P (1～9P)
WWL	16	15	1.1	8.2	6	5.9 {0.6}	1.38
		20	1.1	8.2	8	7.8 {0.8}	1.38
		25	1.2	10	10	9.8 {1.0}	1.38
		30	1.2	10	12	11.8 {1.2}	1.38
		35	1.2	10	14	13.7 {1.4}	1.38
		40	1.2	10	16	15.7 {1.6}	1.38
		45	1.4	21	18	17.7 {1.8}	1.38
		50	1.4	21	20	19.6 {2.0}	1.38
		55	1.4	21	22	21.6 {2.2}	1.49
		60	1.4	21	24	23.5 {2.4}	1.49
		65	1.5	29.7	26	25.5 {2.6}	1.49
		70	1.5	29.7	28	27.5 {2.8}	1.49
		80	1.5	29.7	32	31.4 {3.2}	1.49
		90	1.6	40	36	35.3 {3.6}	1.49
WWL	18	20	1.5	10	8	23.5 {2.4}	1.59
		25	1.6	12	10	29.4 {3.0}	1.59
		30	1.6	12	12	35.3 {3.6}	1.59
		35	1.7	16.2	14	41.2 {4.2}	1.59
		40	1.7	16.2	16	47.1 {4.8}	1.59
		45	1.8	19.8	18	53.0 {5.4}	1.59
		50	1.8	19.8	20	58.8 {6.0}	1.59
		55	1.8	19.8	22	64.7 {6.6}	1.73
		60	1.8	19.8	24	70.6 {7.2}	1.73
		65	2.0	32	26	76.5 {7.8}	1.73
		70	2.0	32	28	82.4 {8.4}	1.73
		80	2.0	32	32	94.1 {9.6}	1.73
		90	2.2	43	36	105.9 {10.8}	1.83
		100	2.2	43	40	117.7 {12.0}	1.83
WWL	20	20	1.6	10.4	8	23.5 {2.4}	1.67
		25	1.6	10.4	10	29.4 {3.0}	1.67
		30	1.7	12.8	12	35.3 {3.6}	1.67
		35	1.7	12.8	14	41.2 {4.2}	1.67
		40	1.8	15.8	16	47.1 {4.8}	1.67
		45	1.8	15.8	18	53.0 {5.4}	1.67
		50	1.8	15.8	20	58.8 {6.0}	1.67
		55	1.8	15.8	22	64.7 {6.6}	1.77
		60	2.0	24	24	70.6 {7.2}	1.77
		65	2.0	24	26	76.5 {7.8}	1.77
		70	2.0	24	28	82.4 {8.4}	1.77
		80	2.2	37.4	32	94.1 {9.6}	1.77
		90	2.2	37.4	36	105.9 {10.8}	1.89
		100	2.2	37.4	40	117.7 {12.0}	1.89
WWL	22	20	1.7	10.8	8	23.5 {2.4}	1.73
		25	1.8	13.3	10	29.4 {3.0}	1.73
		30	1.8	13.3	12	35.3 {3.6}	1.73
		35	1.8	13.3	14	41.2 {4.2}	1.73
		40	2.0	20	16	47.1 {4.8}	1.73
		45	2.0	20	18	53.0 {5.4}	1.73
		50	2.0	20	20	58.8 {6.0}	1.73
		55	2.0	20	22	64.7 {6.6}	1.83
		60	2.2	28.6	24	70.6 {7.2}	1.83
		65	2.2	28.6	26	76.5 {7.8}	1.83
		70	2.2	28.6	28	82.4 {8.4}	1.83
		80	2.2	28.6	32	94.1 {9.6}	1.83
		90	2.3	34.5	36	105.9 {10.8}	1.95
		100	2.3	34.5	40	117.7 {12.0}	1.95
WWL	27	30	2.1	14	12	35.3 {3.6}	1.95
		35	2.1	14	14	41.2 {4.2}	1.95
		40	2.3	19	16	47.1 {4.8}	1.95
		45	2.3	19	18	53.0 {5.4}	1.95
		50	2.3	19	20	58.8 {6.0}	1.95
		55	2.3	19	22	64.7 {6.6}	2.06
		60	2.5	28	24	70.6 {7.2}	2.06
		65	2.5	28	26	76.5 {7.8}	2.06
		70	2.6	34.5	28	82.4 {8.4}	2.06
		80	2.6	34.5	32	94.1 {9.6}	2.06
		90	2.8	46.7	36	105.9 {10.8}	2.18
		100	2.8	46.7	40	117.7 {12.0}	2.18

⚠ Load calculation method：Load＝Spring constant×Deflection
N＝N/mm×Fmm
(kgf＝N×0.101972)
⚠ No grinding on both ends of all WWL type springs
⚠ The solid height values are reference only ☞ P.204
⚠ Operation frequency：1 million times (WWL→allowable deflection：L×40%)

▶WWT : Fmax (allowable deflection) = L×40%

Code No. Code	D	L	d	Solid height	F max	N {kgf} max	@/P (1～9P)
WWT	3	5*	0.3	1.73	2	2.9 {0.3}	0.70
		10*	0.4	5	4	5.9 {0.6}	0.70
		15*	0.45	8.78	6	8.8 {0.9}	0.70
		20*	0.45	8.78	8	11.8 {1.2}	0.76
		25*	0.5	14.5	10	14.7 {1.5}	0.76
WWT	4	5*	0.4	2.7	2	2.9 {0.3}	0.76
		10*	0.4	2.7	4	5.9 {0.6}	0.76
		15*	0.5	6.5	6	8.8 {0.9}	0.76
		20	0.55	9.63	8	11.8 {1.2}	0.76
		25	0.55	9.63	10	14.7 {1.5}	0.82
		30	0.6	15	12	17.7 {1.8}	0.82
		35	0.6	15	14	20.6 {2.1}	0.82
		40	0.65	22.1	16	23.5 {2.4}	0.82
WWT	5	5*	0.45	2.36	2	3.9 {0.4}	0.80
		10*	0.5	3.25	4	7.8 {0.8}	0.80
		15	0.6	6.3	6	11.8 {1.2}	0.80
		20	0.6	6.3	8	15.7 {1.6}	0.80
		25	0.7	12.6	10	19.6 {2.0}	0.85
		30	0.7	12.6	12	23.5 {2.4}	0.85
		35	0.75	17.3	14	27.5 {2.8}	0.85
		40	0.75	17.3	14	31.4 {2.8}	0.85
		45	0.8	24	15.7	35.3 {3.2}	0.85
		50	0.8	24	17.5	34.3 {3.5}	0.85
		55	0.85	32.3	19.2	37.8 {3.9}	0.87
		60	0.85	32.3	21	41.2 {4.2}	0.87
		65	0.85	34	22.7	44.5 {4.6}	0.87
		70	0.9	44.6	24.5	48.1 {4.9}	0.87
WWT	6	5*	0.5	2.38	2	3.9 {0.4}	0.82
		10	0.6	4.35	4	7.8 {0.8}	0.82
		15	0.6	4.35	6	11.8 {1.2}	0.82
		20	0.7	7.7	8	15.7 {1.6}	0.82
		25	0.7	7.7	10	19.6 {2.0}	0.87
		30	0.8	14	12	23.5 {2.4}	0.87
		35	0.8	14	14	27.5 {2.8}	0.87
		40	0.85	18.7	16	31.4 {3.2}	0.87
		45	0.85	18.7	18	35.3 {3.6}	0.87
		50	0.9	24.8	20	39.2 {4.0}	0.87
		55	0.9	24.8	19.2	37.8 {3.9}	0.94
		60	0.9	24.8	21	41.2 {4.2}	0.94
		65	0.9	26.1	22.7	44.5 {4.6}	0.94
		70	1.0	43	24.5	48.1 {4.9}	0.94
		80	1.0	43	28	54.9 {5.6}	0.94

Code No. Code	D	L	d	Solid height	F max	N {kgf} max	@/P (1～9P)
WWT	8	10	0.7	4.38	4	7.8 {0.8}	0.94
		15	0.8	6.8	6	11.8 {1.2}	0.94
		20	0.8	6.8	8	15.7 {1.6}	0.94
		25	0.8	6.8	10	19.6 {2.0}	1.00
		30	0.9	10.8	12	23.5 {2.4}	1.00
		35	0.9	10.8	14	27.5 {2.8}	1.00
		40	1.0	17.5	16	31.4 {3.2}	1.00
		45	1.0	17.5	18	35.3 {3.6}	1.00
		50	1.0	17.5	20	39.2 {4.0}	1.00
		55	1.1	27.5	22	43.1 {4.4}	1.06
		60	1.1	27.5	24	47.1 {4.8}	1.06
		65	1.1	27.5	26	51.0 {5.2}	1.06
		70	1.1	27.5	28	54.9 {5.6}	1.06
		80	1.2	42	32	62.8 {6.4}	1.06
WWT	10	10	0.85	5.53	4	7.8 {0.8}	1.06
		15	0.9	6.75	6	11.8 {1.2}	1.06
		20	0.9	6.75	8	15.7 {1.6}	1.06
		25	1.0	10	10	19.6 {2.0}	1.06
		30	1.0	10	12	23.5 {2.4}	1.06
		35	1.0	10	14	27.5 {2.8}	1.06
		40	1.0	10	16	31.4 {3.2}	1.06
		45	1.1	14.3	18	35.3 {3.6}	1.06
		50	1.1	14.3	20	39.2 {4.0}	1.06
		55	1.2	21.6	22	43.1 {4.4}	1.11
		60	1.2	21.6	24	47.1 {4.8}	1.11
		65	1.2	21.6	26	51.0 {5.2}	1.11
		70	1.3	32.5	28	54.9 {5.6}	1.11
		80	1.3	32.5	32	62.8 {6.4}	1.11
WWT	13	15	1.0	6	6	11.8 {1.2}	1.11
		20	1.1	8.25	8	15.7 {1.6}	1.11
		25	1.1	8.25	10	19.6 {2.0}	1.11
		30	1.2	11.1	12	23.5 {2.4}	1.11
		35	1.2	11.1	14	27.5 {2.8}	1.11
		40	1.2	11.1	16	31.4 {3.2}	1.11
		45	1.2	11.1	18	35.3 {3.6}	1.11
		50	1.3	15.6	20	39.2 {4.0}	1.17
		55	1.3	15.6	22	43.1 {4.4}	1.17
		60	1.3	15.6	24	47.1 {4.8}	1.17
		65	1.4	21	26	51.0 {5.2}	1.17
		70	1.4	21	28	54.9 {5.6}	1.17
		80	1.4	21	32	62.8 {6.4}	1.17
WWT	16	15	1.2	7.5	6	11.8 {1.2}	1.40
		20	1.3	9.43	8	15.7 {1.6}	1.40
		25	1.4	12.6	10	19.6 {2.0}	1.40
		30	1.4	12.6	12	23.5 {2.4}	1.40
		35	1.4	12.6	14	27.5 {2.8}	1.40
		40	1.4	12.6	16	31.4 {3.2}	1.40
		45	1.6	22.4	18	35.3 {3.6}	1.40
		50	1.6	22.4	20	39.2 {4.0}	1.40
		55	1.6	22.4	22	43.1 {4.4}	1.52
		60	1.7	28.9	24	47.1 {4.8}	1.52
		65	1.7	28.9	26	51.0 {5.2}	1.52
		70	1.7	28.9	28	54.9 {5.6}	1.52
		80	1.7	28.9	32	62.8 {6.4}	1.52

Code No. Code	D	L	d	Solid height	F max	N {kgf} max	@/P (1～9P)
WWT	18	20	1.6	10.8	8	31.4 {3.2}	1.64
		25	1.7	13.6	10	39.2 {4.0}	1.64
		30	1.7	13.6	12	47.1 {4.8}	1.64
		35	1.7	13.6	14	54.9 {5.6}	1.64
		40	1.8	16.7	16	62.8 {6.4}	1.64
		45	1.9	20.5	18	70.6 {7.2}	1.64
		50	1.9	20.5	20	78.5 {8.0}	1.64
		55	2.0	26	22	86.3 {8.8}	1.75
		60	2.0	26	24	94.1 {9.6}	1.75
		65	2.0	26	26	102.0 {10.4}	1.75
		70	2.0	26	28	109.8 {11.2}	1.75
		80	2.1	31.5	32	125.5 {12.8}	1.75
WWT	22	20	1.8	11.3	8	31.4 {3.2}	1.75
		25	1.8	11.3	10	39.2 {4.0}	1.75
		30	1.9	13.3	12	47.1 {4.8}	1.75
		35	1.9	13.3	14	54.9 {5.6}	1.75
		40	2.0	16	16	62.8 {6.4}	1.75
		45	2.1	19.5	18	70.6 {7.2}	1.75
		50	2.1	19.5	20	78.5 {8.0}	1.75
		55	2.3	28.2	22	86.3 {8.8}	1.86
		60	2.3	28.2	24	94.1 {9.6}	1.86
		65	2.3	28.2	26	102.0 {10.4}	1.86
		70	2.3	28.2	28	109.8 {11.2}	1.86
		80	2.4	33.6	32	125.5 {12.8}	1.86
WWT	27	30	2.1	13.2	12	47.1 {4.8}	1.99
		35	2.3	17.9	14	54.9 {5.6}	1.99
		40	2.3	17.9	16	62.8 {6.4}	1.99
		45	2.4	20.4	18	70.6 {7.2}	1.99
		50	2.6	28.6	20	78.5 {8.0}	1.99
		55	2.6	28.6	22	86.3 {8.8}	2.09
		60	2.6	28.6	24	94.1 {9.6}	2.09
		65	2.6	28.6	26	102.0 {10.4}	2.09
		70	2.8	39.2	28	109.8 {11.2}	2.09
		80	2.8	39.2	32	125.5 {12.8}	2.09

⚠ Load calculation method：Load＝Spring constant×Deflection
N＝N/mm×Fmm
(kgf＝N×0.101972)
⚠ The solid height values are reference only ☞ P.204
⚠ Operation frequency：1 million times (allowable deflection：L×40%)
⚠ Fmax. for (L) size
WWT5—40 Fmax＝L×35%
WWT5—45 Fmax＝L×35%
WWT5—50 Fmax＝L×35%
WWT5—55 Fmax＝L×35%
WWT5—60 Fmax＝L×35%
WWT5—65 Fmax＝L×35%
WWT5—70 Fmax＝L×35%
WWT6—55 Fmax＝L×35%
WWT6—60 Fmax＝L×35%
WWT6—65 Fmax＝L×35%
WWT6—70 Fmax＝L×35%
WWT6—80 Fmax＝L×35%
⚠ No grinding on both ends of all WWT type springs

Wire Springs

WWM／WWH

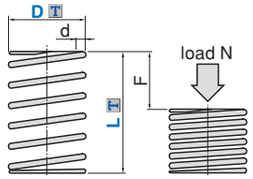
Material	Code
SWP−A	WWM WWH

D	Spring constant(N/mm)	
	WWM	WWH
3・4	2.0	2.9
5～12	2.9	5.9
13～16	2.9	9.8
18～27	4.9	14.7
Fmax	L×35%	L×30%

⚠ Spring constant：±10%
⚠ Allowable deflection (Fmax)：1 million times

D	T Tolerance
3～10	0 −0.5
12～27	0 −0.8

L	T Tolerance
5～ 50	±1.5
55～100	±2



ORDER

Code No.
WWM3 — 5
WWH4 — 5

DELIVERY

Next In stock working day ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～9	10～19	20～99	100～500	501～
100%	95%	90%	85%	Enquiry

▶WWM：Fmax(allowable deflection)＝L×35%

Code No. Code	D	L	d	Solid height	F max	N {kgf} max		@/P (1～9P)
WWM	3	5*	0.35	2.5	1.7	3.4	0.4	0.87
		10*	0.38	3.3	3.5	6.9	0.7	0.87
		15*	0.45	7	5.2	10.3	1.1	0.87
		20*	0.5	11.5	7	13.7	1.4	0.87
		25	0.5	11.5	7.5	14.7	1.5	0.92
		30	0.55	20.4	9	17.7	1.8	0.92
WWM	4	5*	0.4	2.3	1.7	3.9	0.4	0.78
		10*	0.45	3.4	3.5	6.9	0.7	0.78
		15*	0.5	5.1	5.2	10.8	1.1	0.78
		20	0.55	7.7	7	13.7	1.4	0.78
		25	0.6	11.7	8.7	17.7	1.8	0.84
		30	0.6	11.7	10.5	20.6	2.1	0.84
		35	0.65	17.6	12.2	24.0	2.5	0.84
		40	0.65	17.6	12	23.5	2.4	0.84
WWM	5	5*	0.5	2.8	1.7	4.9	0.5	0.78
		10	0.6	4.2	3.5	9.8	1.1	0.78
		15	0.65	6.5	5.2	14.7	1.6	0.78
		20	0.65	6.5	7	20.6	2.1	0.78
		25	0.7	9.1	8.7	25.5	2.6	0.84
		30	0.75	12.7	10.5	30.4	3.2	0.84
		35	0.8	17.4	12.2	35.3	3.7	0.84
		40	0.85	23.8	14	41.2	4.2	0.84
		45	0.85	23.8	15.7	46.1	4.7	0.84
		50	0.9	23.8	15	51.0	4.5	0.84
		55	0.9	30	16.5	49.0	5.0	0.87
		60	0.9	30	18	53.0	5.4	0.87
		65	0.9	30	17.5	52.0	5.3	0.87
		70	0.9	30	19.6	58.8	5.9	0.87
WWM	6	5*	0.55	2.8	1.7	4.9	0.5	0.81
		10	0.65	4.7	3.5	9.8	1.1	0.81
		15	0.75	8	5.2	14.7	1.6	0.81
		20	0.75	8	7	20.6	2.1	0.81
		25	0.85	13.6	8.7	25.5	2.6	0.87
		30	0.85	13.6	10.5	30.4	3.2	0.87
		35	0.9	18	12.2	35.3	3.7	0.87
		40	0.9	18	14	41.2	4.2	0.87
		45	0.9	18	15.7	46.1	4.7	0.87
		50	0.9	18	17.5	51.0	5.3	0.87
		55	1.0	31	19.2	55.9	5.8	0.92
		60	1.0	31	18	53.0	5.4	0.92
		65	1.0	31	18.8	54.9	5.7	0.92
		70	1.1	47.3	19.6	58.8	5.9	0.92
		80	1.1	48.4	22.4	65.9	6.7	0.92
WWM	8	10	0.75	4.2	3.5	9.8	1.1	0.92
		15	0.9	8.5	5.2	14.7	1.6	0.92
		20	0.9	8.5	7	20.6	2.1	0.92
		25	0.9	8.5	8.7	25.5	2.6	0.98
		30	0.9	8.5	10.5	30.4	3.2	0.98
		35	1.0	13	12.2	35.3	3.7	0.98
		40	1.0	13	14	41.2	4.2	0.98
		45	1.1	19.8	15.7	46.1	4.7	0.98
		50	1.1	19.8	17.5	51.0	5.3	0.98
		55	1.2	31.2	19.2	55.9	5.8	1.04
		60	1.2	31.2	21	61.8	6.3	1.04
		65	1.2	31.2	22.7	64.7	6.8	1.04
		70	1.2	31.2	24.5	71.6	7.4	1.04
		80	1.3	44.2	28	82.4	8.4	1.04
WWM	10	10	0.9	5.2	3.5	9.8	1.1	1.04
		15	1.0	7.7	5.2	14.7	1.6	1.04
		20	1.0	7.7	7	20.6	2.1	1.04
		25	1.1	11	8.7	25.5	2.6	1.04
		30	1.1	11	10.5	30.4	3.2	1.04
		35	1.2	16.2	12.2	35.3	3.7	1.04
		40	1.2	16.2	14	41.2	4.2	1.04
		45	1.3	22.1	15.7	46.1	4.7	1.04
		50	1.3	22.1	17.5	51.0	5.3	1.04
		55	1.3	22.1	19.2	55.9	5.8	1.09
		60	1.4	32.1	21	61.8	6.3	1.09
		65	1.4	32.1	22.7	64.7	6.8	1.09
		70	1.4	32.1	24.5	71.6	7.4	1.09
		80	1.4	32.2	28	82.4	8.4	1.09
WWM	12	10	1.0	5.5	3.5	10.3	1.1	1.06
		15	1.1	7.4	5.2	14.7	1.6	1.06
		20	1.1	7.4	7	20.6	2.1	1.06
		25	1.1	7.4	8.7	25.5	2.6	1.06
		30	1.2	10.2	10.5	30.4	3.2	1.06
		35	1.2	10.2	12.2	35.3	3.7	1.06
		40	1.3	14.3	14	41.2	4.2	1.06
		45	1.3	14.3	15.7	46.1	4.7	1.06
		50	1.3	14.3	17.5	51.0	5.3	1.06
		55	1.4	19.6	19.2	55.9	5.8	1.12
		60	1.4	19.6	21	61.8	6.3	1.12
		65	1.5	26.3	22.7	64.7	6.8	1.12
		70	1.5	26.3	24.5	71.6	7.4	1.12
		80	1.6	36.8	28	82.4	8.4	1.12
WWM	13	10	1.0	5	3.5	10.3	1.1	1.09
		15	1.2	8.4	5.2	14.7	1.6	1.09
		20	1.3	11.7	7	20.6	2.1	1.09
		25	1.3	11.7	8.7	25.5	2.6	1.09
		30	1.4	14.5	10.5	30.4	3.2	1.09
		35	1.4	14.5	12.2	35.3	3.7	1.09
		40	1.4	14.5	14	41.2	4.2	1.09
		45	1.4	14.5	15.7	46.1	4.7	1.09
		50	1.4	14.5	17.5	51.0	5.3	1.09
		55	1.5	22.5	19.2	55.9	5.8	1.15
		60	1.5	22.5	21	61.8	6.3	1.15
		65	1.6	28.8	22.7	64.7	6.8	1.15
		70	1.6	28.8	24.5	71.6	7.4	1.15
		80	1.7	37.4	28	82.4	8.4	1.15
		90	1.7	37.4	31.5	92.9	9.5	1.15
WWM	14	15	1.2	7.5	5.2	14.7	1.6	1.27
		20	1.3	9.8	7	20.6	2.1	1.27
		25	1.4	13.3	8.7	25.5	2.6	1.27
		30	1.4	13.3	10.5	30.4	3.2	1.27
		35	1.4	13.3	12.2	35.3	3.7	1.27
		40	1.4	13.3	14	41.2	4.2	1.27
		45	1.5	17.3	15.7	46.1	4.7	1.27
		50	1.5	17.3	17.5	51.0	5.3	1.27
		55	1.5	17.3	19.2	55.9	5.8	1.38
		60	1.6	23.2	21	61.8	6.3	1.38
		65	1.6	23.2	22.7	64.7	6.8	1.38
		70	1.7	30.6	24.5	71.6	7.4	1.38
		80	1.7	30.6	28	82.4	8.4	1.38
		90	1.8	39.6	31.5	92.7	9.5	1.38
WWM	16	15	1.3	7.8	5.2	14.7	1.6	1.38
		20	1.4	9.8	7	20.6	2.1	1.38
		25	1.5	12.5	8.7	25.5	2.6	1.38
		30	1.5	12.5	10.5	30.4	3.2	1.38
		35	1.6	15	12.2	35.3	3.7	1.38
		40	1.6	15	14	41.2	4.2	1.38
		45	1.7	20.4	15.7	46.1	4.7	1.38
		50	1.7	20.4	17.5	51.0	5.3	1.38
		55	1.8	27	19.2	55.9	5.8	1.49
		60	1.8	27	21	61.8	6.3	1.49
		65	1.8	27	22.7	64.7	6.8	1.49
		70	1.8	27	24.5	71.6	7.4	1.49
		80	1.8	27	28	82.4	8.4	1.49
		90	1.9	34.2	31.5	92.7	9.5	1.49
WWM	18	20	1.7	11.9	7	34.3	3.5	1.59
		25	1.8	14.4	8.7	42.2	4.4	1.59
		30	1.8	14.4	10.5	51.0	5.3	1.59
		35	1.8	14.4	12.2	59.8	6.1	1.59
		40	1.8	14.4	14	68.6	7.0	1.59
		45	2.0	22	15.7	77.5	7.9	1.59
		50	2.0	22	17.5	85.3	8.8	1.59
		55	2.0	22	19.2	94.1	9.6	1.73
		60	2.0	22	21	103.0	10.5	1.73
		65	2.2	34.1	22.7	110.8	11.4	1.73
		70	2.2	34.1	24.5	119.6	12.3	1.73
		80	2.2	34.1	28	137.3	14.0	1.73
		90	2.3	41.4	31.5	154.0	15.8	1.83
		100	2.3	41.4	35	171.6	17.5	1.83
WWM	20	20	1.8	11.7	7	34.3	3.5	1.67
		25	1.8	11.7	8.7	42.2	4.4	1.67
		30	1.9	14.3	10.5	51.0	5.3	1.67
		35	1.9	14.3	12.2	59.8	6.1	1.67
		40	1.9	14.3	14	68.6	7.0	1.67
		45	2.0	17	15.7	77.5	7.9	1.67
		50	2.0	17	17.5	85.3	8.8	1.67
		55	2.2	24.8	19.2	94.1	9.6	1.77
		60	2.2	24.8	21	103.0	10.5	1.77
		65	2.2	24.8	22.7	110.8	11.4	1.77
		70	2.2	24.8	24.5	119.6	12.3	1.77
		80	2.4	36	28	137.3	14.0	1.77
		90	2.4	36	31.5	154.0	15.8	1.89
		100	2.4	36	35	171.6	17.5	1.89
WWM	22	20	1.9	12	7	34.3	3.5	1.73
		25	2.0	14	8.7	42.2	4.4	1.73
		30	2.0	14	10.5	51.0	5.3	1.73
		35	2.0	14	12.2	59.8	6.1	1.73
		40	2.0	14	14	68.6	7.0	1.73
		45	2.3	23	15.7	77.5	7.9	1.73
		50	2.3	23	17.5	85.3	8.8	1.73
		55	2.3	23	19.2	94.1	9.6	1.83
		60	2.3	23	21	103.0	10.5	1.83
		65	2.4	30	22.7	110.8	11.4	1.83
		70	2.4	30	24.5	119.6	12.3	1.83
		80	2.4	30	28	137.3	14.0	1.83
		90	2.6	40	31.5	154.0	15.8	1.95
		100	2.6	40	35	171.6	17.5	1.95
WWM	27	30	2.3	14	10.5	51.0	5.3	1.95
		35	2.4	17	12.2	59.8	6.1	1.95
		40	2.4	17	14	68.6	7.0	1.95
		45	2.4	18	15.7	77.5	7.9	1.95
		50	2.6	23	17.5	85.3	8.8	1.95
		55	2.6	23	19.2	94.1	9.6	2.06
		60	2.6	23	21	103.0	10.5	2.06
		65	2.8	31	22.7	110.8	11.4	2.06
		70	2.8	31	24.5	119.6	12.3	2.06
		80	2.8	31	28	137.3	14.0	2.06
		90	3.0	43.5	31.5	154.0	15.8	2.18
		100	3.0	43.5	35	171.6	17.5	2.18

⚠ Load calculation method：Load＝Spring constant×Deflection
N＝N/mm×Fmm
(kgf＝N×0.101972)
⚠ The solid height values are reference only ☞ P.204
⚠ Operation frequency：1 million times (allowable deflection：L×35%)
⚠ Fmax. for (L) size

WWM3—25	Fmax＝L×30%	WWM5—65	Fmax＝L×27%
WWM3—30	Fmax＝L×30%	WWM5—70	Fmax＝L×28%
WWM4—40	Fmax＝L×30%	WWM6—60	Fmax＝L×30%
WWM5—50	Fmax＝L×30%	WWM6—65	Fmax＝L×29%
WWM5—55	Fmax＝L×30%	WWM6—70	Fmax＝L×28%
WWM5—60	Fmax＝L×30%	WWM6—80	Fmax＝L×28%

⚠ No grinding on both ends of all WWM type springs

▶WWH：Fmax(allowable deflection)＝L×30%

Code No. Code	D	L	d	Solid height	F max	N {kgf} max		@/P (1～9P)
WWH	4	5*	0.45	2.7	1.5	4.9	0.5	0.78
		10*	0.45	2.7	3	8.8	0.9	0.78
		15	0.55	5.8	4.5	13.7	1.4	0.78
		20	0.6	8.4	6	17.7	1.8	0.78
		25	0.65	12.4	7.5	22.6	2.3	0.84
		30	0.65	12.4	9	26.5	2.7	0.84
WWH	5	5*	0.6	3.3	1.5	8.8	0.9	0.78
		10	0.7	5.5	3	17.7	1.8	0.78
		15	0.75	7.5	4.5	26.5	2.7	0.78
		20	0.75	7.5	6	35.3	3.6	0.78
		25	0.85	13.6	7.5	44.1	4.5	0.84
		30	0.85	13.6	7.5	53.0	4.5	0.84
		35	0.9	17.1	8.7	61.8	5.3	0.84
		40	0.9	17.1	8.8	70.6	5.3	0.84
WWH	6	5*	0.65	3.3	1.5	8.8	0.9	0.81
		10	0.75	5.2	3	17.7	1.8	0.81
		15	0.8	6.4	4.5	26.5	2.7	0.81
		20	0.9	9.9	6	35.3	3.6	0.81
		25	0.9	9.9	7.5	44.1	4.5	0.87
		30	1.0	16	9	53.0	5.4	0.87
		35	1.0	16	10.5	61.8	6.3	0.87
		40	1.1	25	12	70.6	7.2	0.87
		45	1.1	25	11.2	66.7	6.8	0.87
		50	1.2	39.6	10	58.8	6.0	0.87
		55	1.2	39.6	14.3	85.3	8.6	0.92
		60	1.2	39.6	13.8	82.4	8.3	0.92
		65	1.2	39.6	13.6	82.4	8.2	0.92
		70	1.2	39.6	14.7	88.3	8.8	0.92
WWH	8	10	0.9	5.4	3	17.7	1.8	0.92
		15	1.0	8	4.5	26.5	2.7	0.92
		20	1.1	11.5	6	35.3	3.6	0.92
		25	1.1	11.5	7.5	44.1	4.5	0.98
		30	1.2	16.8	9	53.0	5.4	0.98
		35	1.2	16.8	10.5	61.8	6.3	0.98
		40	1.2	16.8	12	70.6	7.2	0.98
		45	1.3	24.7	13.5	79.4	8.1	0.98
		50	1.3	24.7	15	88.3	9.0	0.98
		55	1.4	35	16.5	97.1	9.9	1.04
		60	1.4	35	18	105.9	10.8	1.04
		65	1.4	35	16.9	100.0	10.1	1.04
		70	1.4	35	18.9	111.8	11.3	1.04
WWH	10	10	1.0	5.4	3	17.7	1.8	1.04
		15	1.1	7	4.5	26.5	2.7	1.04
		20	1.2	9.6	6	35.3	3.6	1.04
		25	1.2	9.6	7.5	44.1	4.5	1.04
		30	1.3	13.9	9	53.0	5.4	1.04
		35	1.4	18	10.5	61.8	6.3	1.04
		40	1.4	18	12	70.6	7.2	1.04
		45	1.5	25	13.5	79.4	8.1	1.04
		50	1.5	25	15	88.3	9.0	1.04
		55	1.5	25	16.5	97.1	9.9	1.09
		60	1.5	25	18	105.9	10.8	1.09
		65	1.6	35	19.5	114.7	11.7	1.09
		70	1.6	35	21	123.6	12.6	1.09
		80	1.7	45.9	24	141.0	14.4	1.09
WWH	12	10	1.2	6.9	3	17.7	1.8	1.06
		15	1.3	9.1	4.5	26.5	2.7	1.06
		20	1.3	9.1	6	35.3	3.6	1.06
		25	1.3	9.1	7.5	44.1	4.5	1.06
		30	1.4	11.9	9	53.0	5.4	1.06
		35	1.4	11.9	10.5	61.8	6.3	1.06
		40	1.5	15.4	12	70.6	7.2	1.06
		45	1.5	15.4	13.5	79.4	8.1	1.06
		50	1.6	20.4	15	88.3	9.0	1.06
		55	1.6	20.4	16.5	97.1	9.9	1.12
		60	1.7	26.8	18	105.9	10.8	1.12
		65	1.7	26.8	19.5	114.7	11.7	1.12
		70	1.8	35.1	21	123.6	12.6	1.12
		80	1.9	45.6	24	141.0	14.4	1.12
WWH	13	10	1.3	6.2	3	29.4	3.0	1.09
		15	1.5	9.3	4.5	44.1	4.5	1.09
		20	1.6	12.3	6	58.8	6.0	1.09
		25	1.6	12.3	7.5	73.5	7.5	1.09
		30	1.7	15	9	88.3	9.0	1.09
		35	1.7	15	10.5	103.0	10.5	1.09
		40	1.8	19	12	117.7	12.0	1.09
		45	1.9	25	13.5	132.4	13.5	1.09
		50	1.9	25	15	147.1	15.0	1.09
		55	2.0	30	16.5	161.8	16.5	1.15
		60	2.0	30	18	176.5	18.0	1.15
		65	2.1	39	19.5	191.2	19.5	1.15
		70	2.1	39	21	205.9	21.0	1.15
		80	2.1	39	24	235.4	24.0	1.15
WWH	14	15	1.6	10.4	4.5	44.1	4.5	1.27
		20	1.6	10.4	6	58.8	6.0	1.27
		25	1.6	10.4	7.5	73.5	7.5	1.27
		30	1.7	12.8	9	88.3	9.0	1.27
		35	1.7	12.8	10.5	103.0	10.5	1.27
		40	1.9	20	12	117.7	12.0	1.27
		45	1.9	20	13.5	132.4	13.5	1.27
		50	2.1	30.5	15	147.1	15.0	1.27
		55	2.1	30.5	16.5	161.8	16.5	1.38
		60	2.1	30.5	18	176.5	18.0	1.38
		65	2.2	37.4	19.5	191.2	19.5	1.38
		70	2.2	37.4	21	205.9	21.0	1.38
		80	2.3	47.2	24	235.4	24.0	1.38
WWH	16	15	1.7	10.2	4.5	44.1	4.5	1.38
		20	1.8	12.6	6	58.8	6.0	1.38
		25	1.9	14.5	7.5	73.5	7.5	1.38
		30	1.9	14.5	9	88.3	9.0	1.38
		35	2.0	18	10.5	103.0	10.5	1.38
		40	2.1	21	12	117.7	12.0	1.38
		45	2.2	26	13.5	132.4	13.5	1.38
		50	2.2	26	15	147.1	15.0	1.38
		55	2.2	26	16.5	161.8	16.5	1.49
		60	2.3	32	18	176.5	18.0	1.49
		65	2.3	32	19.5	191.2	19.5	1.49
		70	2.4	38	21	205.9	21.0	1.49
		80	2.5	47.5	24	235.4	24.0	1.49
WWH	18	20	2.1	12.6	6	88.3	9.0	1.59
		25	2.2	15.4	7.5	109.8	11.3	1.59
		30	2.2	15.4	9	132.4	13.5	1.59
		35	2.3	18.4	10.5	154.0	15.8	1.59
		40	2.4	21.6	12	176.5	18.0	1.59
		45	2.5	25	13.5	199.1	20.3	1.59
		50	2.5	25	15	220.6	22.5	1.59
		55	2.6	30	16.5	242.2	24.8	1.73
		60	2.6	30	18	264.8	27.0	1.73
		65	2.8	42	19.5	286.4	29.3	1.73
		70	2.8	42	21	308.9	31.5	1.73
		80	2.9	49.3	24	353.0	36.0	1.73
		90	3.0	57	26.1	397.2	39.2	1.83
		100	3.0	57	24	441.3	36.0	1.83
WWH	20	20	2.2	12.7	6	88.3	9.0	1.67
		25	2.3	15	7.5	109.8	11.3	1.67
		30	2.3	15	9	132.4	13.5	1.67
		35	2.5	20	10.5	154.0	15.8	1.67
		40	2.5	20	12	176.5	18.0	1.67
		45	2.5	20	13.5	199.1	20.3	1.67
		50	2.6	22.8	15	220.6	22.5	1.67
		55	2.6	22.8	16.5	242.2	24.8	1.77
		60	2.8	30.8	18	264.8	27.0	1.77
		65	2.8	30.8	19.5	286.4	29.3	1.77
		70	3.0	42	21	308.9	31.5	1.77
		80	3.0	42	24	353.0	36.0	1.77
		90	3.2	56.8	27	397.2	40.5	1.89
		100	3.2	56.8	30	441.3	45.0	1.89
WWH	22	20	2.3	12.7	6	88.3	9.0	1.73
		25	2.5	16.7	7.5	109.8	11.3	1.73
		30	2.5	16.7	9	132.4	13.5	1.73
		35	2.6	18.2	10.5	154.0	15.8	1.73
		40	2.8	25	12	176.5	18.0	1.73
		45	2.8	25	13.5	199.1	20.3	1.73
		50	2.8	25	15	220.6	22.5	1.73
		55	3.0	33	16.5	242.2	24.8	1.83
		60	3.0	33	18	264.8	27.0	1.83
		65	3.0	33	19.5	286.4	29.3	1.83
		70	3.2	43	21	308.9	31.5	1.83
		80	3.2	43	24	353.0	36.0	1.83
		90	3.2	43	26.1	397.2	39.2	1.95
		100	3.5	64.4	26	441.3	39.0	1.95
WWH	27	30	2.8	16.8	9	132.4	13.5	1.95
		35	2.8	16.8	10.5	154.0	15.8	1.95
		40	2.9	18.8	12	176.5	18.0	1.95
		45	2.9	19.4	13.5	199.1	20.3	1.95
		50	3.2	25.5	15	220.6	22.5	1.95
		55	3.2	25.5	16.5	242.2	24.8	2.06
		60	3.5	35.5	18	264.8	27.0	2.06
		65	3.5	35.5	19.5	286.4	29.3	2.06
		70	3.5	35.5	21	308.9	31.5	2.06
		80	3.5	35.5	24	353.0	36.0	2.06
		90	3.5	35.5	27	397.2	40.5	2.18
		100	4.0	68	30	441.3	45.0	2.18

⚠ Load calculation method：Load＝Spring constant×Deflection
N＝N/mm×Fmm
(kgf＝N×0.101972)
⚠ The solid height values are reference only ☞ P.204
⚠ Operation frequency：1 million

Wire Springs

WWB

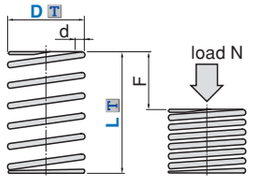
Material	Code
SWP—A	WWB

D	Spring constant(N/mm)
	WWB
3	3.9
4	4.9
5～12	9.8
13～16	19.6
18～27	29.4
Fmax	L×25%

⚠ Spring constant：±10%
⚠ Allowable deflection(Fmax)：1 million times

D	T Tolerance
3～10	0 −0.5
12～27	0 −0.8

L	T Tolerance
5～ 50	±1
55～100	±1.5



ORDER

Code No.
WWB4 — 10

DELIVERY

In stock Next working day ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～9	10～19	20～99	100～500	501～
100%	95%	90%	85%	Enquiry

▶WWB : Fmax(allowable deflection)＝L×25%

Code No. Code	D	L	d	Solid height	F max	N {kgf} max		@/P (1～9P)
WWB	3	5*	0.4	3.2	1.2	4.9	0.5	0.87
		10*	0.5	6.5	2.5	9.8	1.0	0.87
		15*	0.55	10.5	3.7	14.7	1.5	0.87
		20*	0.55	12.7	5	19.6	2.0	0.87
		25*	0.6	17.4	6.2	24.5	2.5	0.92
		30*	0.6	21	7.5	29.4	3.0	0.92
		35*	0.65	24	8.7	34.3	3.5	0.92
		40*	0.65	27	10	39.2	4.0	0.92
WWB	4	5*	0.5	3	1.2	5.9	0.6	0.87
		10	0.6	6	2.5	12.3	1.3	0.87
		15	0.65	9.8	3.7	18.1	1.9	0.87
		20	0.7	12.6	5	24.5	2.5	0.87
		25	0.75	16.5	6.2	30.4	3.1	0.92
		30	0.75	20.3	7.5	36.8	3.8	0.92
		35	0.8	24	8.7	43.1	4.4	0.92
		40	0.8	28	10	49.0	5.0	0.92
		45	0.8	29	11.2	55.4	5.6	0.92
		50	0.85	34	12.5	61.3	6.3	0.92
WWB	5	5*	0.65	3.3	1.2	12.7	1.3	0.87
		10	0.8	7	2.5	24.5	2.5	0.87
		15	0.8	7	3.7	37.3	3.8	0.87
		20	0.9	13	5	49.0	5.0	0.87
		25	0.9	13	6.2	61.8	6.3	0.93
		30	1.0	21	7.5	73.5	7.5	0.93
		35	1.0	25	8.7	86.3	8.8	0.93
		40	1.0	25	10	98.1	10.0	0.93
		45	1.1	31	11.2	110.8	11.3	0.93
		50	1.1	34	12.5	122.6	12.5	0.93
		55	1.1	39	13.7	135.3	13.8	1.00
		60	1.1	43	15	147.1	15.0	1.00
		65	1.2	46	16.2	159.8	16.3	1.00
		70	1.2	50	17.5	171.6	17.5	1.00
WWB	6	5*	0.7	3.5	1.2	12.7	1.3	0.88
		10	0.8	7	2.5	24.5	2.5	0.88
		15	0.9	7.5	3.7	37.3	3.8	0.88
		20	1.0	11.5	5	49.0	5.0	0.88
		25	1.1	17.5	6.2	61.8	6.3	0.95
		30	1.1	19.5	7.5	73.5	7.5	0.95
		35	1.1	20	8.7	86.3	8.8	0.95
		40	1.2	28	10	98.1	10.0	0.95
		45	1.2	30	11.2	110.8	11.3	0.95
		50	1.2	32	12.5	122.6	12.5	0.95
		55	1.2	32	13.7	135.3	13.8	1.01
		60	1.3	43	15	147.1	15.0	1.01
		65	1.3	46	16.2	159.8	16.3	1.01
		70	1.3	50	17.5	171.6	17.5	1.01
		80	1.4	57	20	196.1	20.0	1.01
WWB	8	10	1.0	6	2.5	24.5	2.5	1.01
		15	1.2	10.8	3.7	37.3	3.8	1.01
		20	1.2	11.5	5	49.0	5.0	1.01
		25	1.3	17	6.2	61.8	6.3	1.08
		30	1.3	17	7.5	73.5	7.5	1.08
		35	1.4	24.5	8.7	86.3	8.8	1.08
		40	1.4	25.2	10	98.1	10.0	1.08
		45	1.5	32	11.2	110.8	11.3	1.08
		50	1.5	33	12.5	122.6	12.5	1.08
		55	1.5	36.5	13.7	135.3	13.8	1.14
		60	1.5	36.5	15	147.1	15.0	1.14
		65	1.6	48	16.2	159.8	16.3	1.14
		70	1.6	48	17.5	171.6	17.5	1.14
		80	1.6	55	20	196.1	20.0	1.14

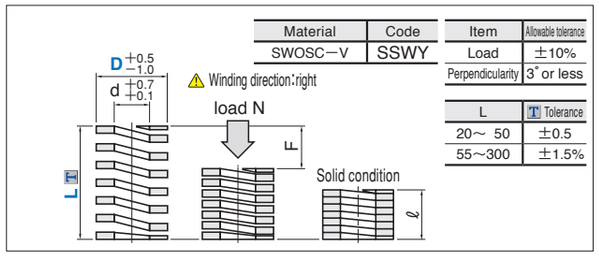
Code No. Code	D	L	d	Solid height	F max	N {kgf} max		@/P (1～9P)
WWB	10	10	1.2	6	2.5	24.5	2.5	1.14
		15	1.3	8.5	3.7	37.3	3.8	1.14
		20	1.4	12	5	49.0	5.0	1.14
		25	1.5	16.5	6.2	61.8	6.3	1.14
		30	1.5	17	7.5	73.5	7.5	1.14
		35	1.6	23	8.7	86.3	8.8	1.14
		40	1.6	24	10	98.1	10.0	1.14
		45	1.7	30	11.2	110.8	11.3	1.14
		50	1.7	31.5	12.5	122.6	12.5	1.14
		55	1.8	40	13.7	135.3	13.8	1.21
		60	1.8	40	15	147.1	15.0	1.21
		65	1.8	43	16.2	159.8	16.3	1.21
		70	1.8	43	17.5	171.6	17.5	1.21
		80	1.8	54	20	196.1	20.0	1.21
WWB	12	10	1.4	6.5	2.5	24.5	2.5	1.21
		15	1.4	7.7	3.7	36.3	3.8	1.21
		20	1.6	12.5	5	49.0	5.0	1.21
		25	1.6	13.6	6.2	60.8	6.3	1.21
		30	1.7	18	7.5	73.5	7.5	1.21
		35	1.8	22.5	8.7	85.3	8.8	1.21
		40	1.8	24	10	98.1	10.0	1.21
		45	1.8	24	11.2	109.8	11.3	1.21
		50	2.0	34	12.5	122.6	12.5	1.21
		55	2.0	38	13.7	134.4	13.8	1.27
		60	2.0	40	15	147.1	15.0	1.27
		65	2.0	42	16.2	158.9	16.3	1.27
		70	2.1	48.5	17.5	171.6	17.5	1.27
		80	2.1	52.5	20	196.1	20.0	1.27
WWB	13	10	1.6	6.4	2.5	49.0	5.0	1.21
		15	1.8	11	3.7	74.5	7.5	1.21
		20	1.8	11	5	98.1	10.0	1.21
		25	2.0	17	6.2	123.6	12.5	1.21
		30	2.0	18	7.5	147.1	15.0	1.21
		35	2.1	22	8.7	172.6	17.5	1.21
		40	2.1	22	10	196.1	20.0	1.21
		45	2.3	32	11.2	221.6	22.5	1.21
		50	2.3	32	12.5	245.2	25.0	1.21
		55	2.4	40	13.7	270.7	27.5	1.27
		60	2.4	42	15	294.2	30.0	1.27
		65	2.4	42	16.2	319.7	32.5	1.27
		70	2.5	50	17.5	343.2	35.0	1.27
		80	2.5	50	20	392.3	40.0	1.27
WWB	14	15	1.8	9	3.7	72.6	7.5	1.44
		20	2.0	13	5	98.1	10.0	1.44
		25	2.0	14	6.2	121.6	12.5	1.44
		30	2.1	18	7.5	147.1	15.0	1.44
		35	2.1	23	8.7	170.6	17.5	1.44
		40	2.3	26.3	10	196.1	20.0	1.44
		45	2.3	27.6	11.2	219.7	22.5	1.44
		50	2.4	31	12.5	245.2	25.0	1.44
		55	2.5	37.5	13.7	268.7	27.5	1.55
		60	2.5	41	15	294.2	30.0	1.55
		65	2.5	43.5	16.2	317.7	32.5	1.55
		70	2.6	48	17.5	343.2	35.0	1.55
		80	2.6	52	20	392.3	40.0	1.55

Code No. Code	D	L	d	Solid height	F max	N {kgf} max		@/P (1～9P)
WWB	16	15	2.0	10	3.7	74.5	7.5	1.50
		20	2.1	12.5	5	98.1	10.0	1.50
		25	2.3	17	6.2	123.6	12.5	1.50
		30	2.3	18.5	7.5	147.1	15.0	1.50
		35	2.4	21.5	8.7	172.6	17.5	1.50
		40	2.4	21.5	10	196.1	20.0	1.50
		45	2.5	27.5	11.2	221.6	22.5	1.50
		50	2.5	27.5	12.5	245.2	25.0	1.50
		55	2.6	32	13.7	270.7	27.5	1.64
		60	2.6	32	15	294.2	30.0	1.64
		65	2.8	46	16.2	319.7	32.5	1.64
		70	2.8	46	17.5	343.2	35.0	1.64
		80	2.9	55	20	392.3	40.0	1.64
WWB	18	20	2.5	13.5	5	147.1	15.0	1.75
		25	2.6	17	6.2	185.3	18.8	1.75
		30	2.6	17	7.5	220.6	22.5	1.75
		35	2.8	23.5	8.7	258.9	26.3	1.75
		40	2.9	27.5	10	294.2	30.0	1.75
		45	2.9	27.5	11.2	332.4	33.8	1.75
		50	3.0	33	12.5	367.7	37.5	1.75
		55	3.0	33	13.7	406.0	41.3	1.89
		60	3.2	43	15	441.3	45.0	1.89
		65	3.2	44.5	16.2	479.5	48.8	1.89
		70	3.2	44.5	17.5	514.8	52.5	1.89
		80	3.4	58	20	588.4	60.0	1.89
		90	3.4	61	22.5	661.9	67.5	2.02
		100	3.5	71	25	735.5	75.0	2.02
WWB	22	20	2.8	13.5	5	147.1	15.0	1.89
		25	2.9	16	6.2	185.3	18.8	1.89
		30	3.0	18	7.5	220.6	22.5	1.89
		35	3.0	18	8.7	258.9	26.3	1.89
		40	3.2	24	10	294.2	30.0	1.89
		45	3.2	24	11.2	332.4	33.8	1.89
		50	3.5	36	12.5	367.7	37.5	1.89
		55	3.5	36	13.7	406.0	41.3	2.02
		60	3.5	36	15	441.3	45.0	2.02
		65	3.6	45	16.2	479.5	48.8	2.02
		70	3.6	45	17.5	514.8	52.5	2.02
		80	3.8	57	20	588.4	60.0	2.02
		90	3.8	57	22.5	661.9	67.5	2.15
		100	4.0	72	25	735.5	75.0	2.15
WWB	27	30	3.5	19	7.5	220.6	22.5	2.15
		35	3.6	21	8.7	258.9	26.3	2.15
		40	3.6	21	10	294.2	30.0	2.15
		45	3.8	30	11.2	332.4	33.8	2.15
		50	3.8	30	12.5	367.7	37.5	2.15
		55	4.0	38	13.7	406.0	41.3	2.27
		60	4.0	38	15	441.3	45.0	2.27
		65	4.0	38	16.2	479.5	48.8	2.27
		70	4.0	38	17.5	514.8	52.5	2.27
		80	4.5	57	20	588.4	60.0	2.27
		90	4.5	63	22.5	661.9	67.5	2.40
		100	4.5	67	25	735.5	75.0	2.40

⚠ Load calculation method：Load＝Spring constant×Deflection
N＝N/mm×Fmm
(kgf＝N×0.101972)
⚠ The solid height values are reference only ☞ P.204
⚠ Operation frequency：1 million times(allowable deflection：L×25%)
⚠ No grinding on both ends of all WWB type springs

Coil Springs

For Ultra High Deflection SSWY



Material	Code
SWOSC−V	SSWY

Item	Allowable tolerance
Load	±10%
Perpendicularity	3° or less

L	T Tolerance
20～ 50	±0.5
55～300	±1.5%

ORDER

Code No.
SSWY20.5 − 45

DELIVERY

In stock Next working day ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～19	20～49	50～199	200～500	501～
100%	95%	90%	85%	Enquiry

Code No.			d	Spring constant		ℓmin Solid height	F=L×65%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	
SSWY	11	20	7	2.26	(0.23)	5.0	13.0	29.4 (3.0)	1.96
		25		1.81	(0.18)	6.3	16.3		2.08
		30		1.51	(0.15)	7.5	19.5		2.21
		35		1.29	(0.13)	8.8	22.8		2.33
		40		1.13	(0.12)	10.0	26.0		2.45
		45		1.01	(0.10)	11.3	29.3		2.58
		50		0.90	(0.09)	12.5	32.5		2.70
		55		0.82	(0.08)	13.8	35.8		2.81
		60		0.75	(0.08)	15.0	39.0		2.95
		65		0.70	(0.07)	16.2	42.3		3.06
		70		0.65	(0.07)	17.5	45.5		3.18
		75		0.60	(0.06)	18.8	48.8		3.31
		80		0.57	(0.06)	20.0	52.0		3.43
		90		0.50	(0.05)	22.5	58.5		3.80
		100		0.45	(0.05)	25.0	65.0		4.05
SSWY	12.5	20	8.5	3.09	(0.32)	5.0	13.0	40.2 (4.1)	2.02
		25		2.47	(0.25)	6.3	16.3		2.27
		30		2.06	(0.21)	7.5	19.5		2.45
		35		1.77	(0.18)	8.8	22.8		2.58
		40		1.55	(0.16)	10.0	26.0		2.75
		45		1.37	(0.14)	11.3	29.3		2.87
		50		1.24	(0.13)	12.5	32.5		3.06
		55		1.12	(0.11)	13.8	35.8		3.18
		60		1.03	(0.11)	15.0	39.0		3.31
		65		0.95	(0.10)	16.2	42.3		3.55
		70		0.88	(0.09)	17.5	45.5		3.68
		75		0.82	(0.08)	18.8	48.8		3.92
		80		0.77	(0.08)	20.0	52.0		4.05
		90		0.69	(0.07)	22.5	58.5		4.17
		100		0.62	(0.06)	25.0	65.0		4.48
		110		0.56	(0.06)	27.5	71.5		4.59
		120		0.52	(0.05)	30.0	78.0		4.65
		125		0.49	(0.05)	31.2	81.3		4.78
SSWY	16.5	20	10.5	7.02	(0.72)	5.0	13.0	91.2 (9.3)	2.39
		25		5.61	(0.57)	6.3	16.3		2.45
		30		4.68	(0.48)	7.5	19.5		2.58
		35		4.01	(0.41)	8.8	22.8		2.64
		40		3.51	(0.36)	10.0	26.0		2.75
		45		3.12	(0.32)	11.3	29.3		3.06
		50		2.81	(0.29)	12.5	32.5		3.18
		55		2.55	(0.26)	13.8	35.8		3.43
		60		2.34	(0.24)	15.0	39.0		3.55
		65		2.16	(0.22)	16.2	42.3		3.68
		70		2.00	(0.20)	17.5	45.5		3.86
		75		1.87	(0.19)	18.8	48.8		4.05
		80		1.75	(0.18)	20.0	52.0		4.17
		90		1.56	(0.16)	22.5	58.5		4.42
		100		1.40	(0.14)	25.0	65.0		4.71
		110		1.28	(0.13)	27.5	71.5		4.84
		120		1.17	(0.12)	30.0	78.0		4.90
		125		1.12	(0.11)	31.2	81.3		5.02
		150		0.94	(0.10)	37.5	97.5		5.15

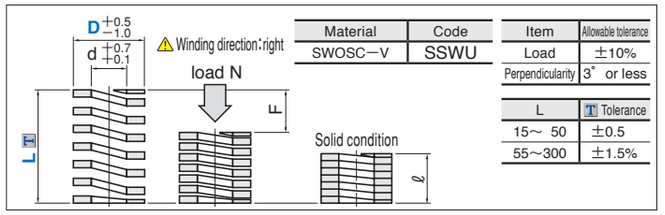
Code No.			d	Spring constant		ℓmin Solid height	F=L×65%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	
SSWY	20.5	30	13.5	5.58	(0.57)	7.5	19.5	108.9 (11.1)	2.87
		35		4.79	(0.49)	8.8	22.8		3.06
		40		4.19	(0.43)	10.0	26.0		3.18
		45		3.72	(0.38)	11.3	29.3		3.43
		50		3.35	(0.34)	12.5	32.5		3.55
		55		3.05	(0.31)	13.8	35.8		3.68
		60		2.79	(0.28)	15.0	39.0		3.86
		65		2.58	(0.26)	16.2	42.3		4.05
		70		2.39	(0.24)	17.5	45.5		4.17
		75		2.23	(0.23)	18.8	48.8		4.28
		80		2.09	(0.21)	20.0	52.0		4.42
		90		1.86	(0.19)	22.5	58.5		4.59
		100		1.68	(0.17)	25.0	65.0		4.84
		110		1.52	(0.16)	27.5	71.5		4.96
		120		1.40	(0.14)	30.0	78.0		5.15
		125		1.34	(0.14)	31.2	81.3		5.15
		130		1.29	(0.13)	32.5	84.5		5.21
		140		1.20	(0.12)	35.0	91.0		5.33
		150		1.12	(0.11)	37.5	97.5		5.33
SSWY	24.5	30	16.5	6.99	(0.71)	7.5	19.5	136.3 (13.9)	3.61
		35		5.99	(0.61)	8.8	22.8		3.68
		40		5.24	(0.53)	10.0	26.0		3.86
		45		4.66	(0.48)	11.3	29.3		4.05
		50		4.19	(0.43)	12.5	32.5		4.17
		55		3.81	(0.39)	13.8	35.8		4.28
		60		3.49	(0.36)	15.0	39.0		4.48
		65		3.23	(0.33)	16.2	42.3		4.59
		70		3.00	(0.31)	17.5	45.5		4.84
		75		2.80	(0.29)	18.8	48.8		4.96
		80		2.62	(0.27)	20.0	52.0		5.15
		90		2.33	(0.24)	22.5	58.5		5.21
		100		2.01	(0.21)	25.0	65.0		5.33
		110		1.91	(0.19)	27.5	71.5		5.45
		120		1.75	(0.18)	30.0	78.0		5.58
		125		1.68	(0.17)	31.2	81.3		5.58
		130		1.61	(0.16)	32.5	84.5		5.75
		140		1.50	(0.15)	35.0	91.0		5.89
		150		1.40	(0.14)	37.5	97.5		6.00
		175		1.20	(0.12)	43.8	113.8		6.12
		200		1.05	(0.11)	50.0	130.0		6.37
SSWY	30	35	21	8.79	(0.90)	8.8	22.8	200.1 (20.4)	3.86
		40		7.69	(0.78)	10.0	26.0		3.92
		45		6.84	(0.70)	11.3	29.3		4.05
		50		6.15	(0.63)	12.5	32.5		4.17
		55		5.59	(0.57)	13.8	35.8		4.28
		60		5.13	(0.52)	15.0	39.0		4.48
		65		4.73	(0.48)	16.2	42.3		4.59
		70		4.40	(0.45)	17.5	45.5		4.71
		75		4.10	(0.42)	18.8	48.8		4.84
		80		3.85	(0.39)	20.0	52.0		5.02
		90		3.42	(0.35)	22.5	58.5		5.21
		100		3.08	(0.31)	25.0	65.0		5.75
		110		2.80	(0.29)	27.5	71.5		6.00
		120		2.56	(0.26)	30.0	78.0		6.12
		125		2.46	(0.25)	31.2	81.3		6.25
		130		2.37	(0.24)	32.5	84.5		6.37
		140		2.20	(0.22)	35.0	91.0		6.62
		150		2.05	(0.21)	37.5	97.5		6.86
		160		1.92	(0.20)	40.0	104.0		6.99
		170		1.81	(0.18)	42.5	110.5		7.28
		175		1.76	(0.18)	43.8	113.8		7.42
		180		1.71	(0.17)	45.0	117.0		7.53
		190		1.62	(0.17)	47.5	123.5		7.73
		200		1.54	(0.16)	50.0	130.0		8.02
		250		1.23	(0.13)	62.5	162.5		8.95
		300		1.03	(0.10)	75.0	195.0		9.56

Code No.			d	Spring constant		ℓmin Solid height	F=L×65%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	
SSWY	37	40	26	11.32	(1.15)	10.0	26.0	294.2 (30.0)	5.08
		45		10.06	(1.03)	11.3	29.3		5.27
		50		9.05	(0.92)	12.5	32.5		5.45
		55		8.23	(0.84)	13.8	35.8		5.64
		60		7.54	(0.77)	15.0	39.0		5.75
		65		6.96	(0.71)	16.2	42.3		5.95
		70		6.47	(0.66)	17.5	45.5		6.12
		75		6.03	(0.62)	18.8	48.8		6.37
		80		5.66	(0.58)	20.0	52.0		6.62
		90		5.03	(0.51)	22.5	58.5		6.86
		100		4.53	(0.46)	25.0	65.0		7.11
		110		4.11	(0.42)	27.5	71.5		7.36
		120		3.77	(0.38)	30.0	78.0		7.59
		130		3.48	(0.36)	32.5	84.5		7.96
		140		3.23	(0.33)	35.0	91.0		8.21
		150		3.02	(0.31)	37.5	97.5		8.46
		160		2.83	(0.29)	40.0	104.0		8.64
		170		2.66	(0.27)	42.5	110.5		8.95
		180		2.51	(0.26)	45.0	117.0		9.25
		190		2.38	(0.24)	47.5	123.5		9.56
		200		2.26	(0.23)	50.0	130.0		9.93
		225		2.01	(0.21)	56.2	146.3		10.8
		250		1.81	(0.18)	62.5	162.5		11.8
		275		1.65	(0.17)	68.8	178.8		12.7
		300		1.51	(0.15)	75.0	195.0		13.5
SSWY	42	50	31	12.07	(1.23)	12.5	32.5	392.3 (40.0)	6.00
		60		10.06	(1.03)	15.0	39.0		6.25
		70		8.62	(0.88)	17.5	45.5		6.55
		80		7.54	(0.77)	20.0	52.0		6.86
		90		6.71	(0.68)	22.5	58.5		7.17
		100		6.04	(0.62)	25.0	65.0		7.48
		110		5.49	(0.56)	27.5	71.5		7.84
		120		5.03	(0.51)	30.0	78.0		8.21
		130		4.64	(0.47)	32.5	84.5		8.64
		140		4.31	(0.44)	35.0	91.0		9.12
		150		4.02	(0.41)	37.5	97.5		9.56
		160		3.77	(0.38)	40.0	104.0		9.99
		170		3.55	(0.36)	42.5	110.5		10.5
		180		3.35	(0.34)	45.0	117.0		10.9
		190		3.18	(0.32)	47.5	123.5		11.2
		200		3.02	(0.31)	50.0	130.0		11.6
		225		2.68	(0.27)	56.2	146.3		12.9
		250		2.41	(0.25)	62.5	162.5		15.5
		275		2.19	(0.22)	68.8	178.8		16.5
		300		2.01	(0.21)	75.0	195.0		17.5

⚠ Load calculation method：Load＝Spring constant×Deflection
N＝N/mm×Fmm
(kgf＝N×0.101972)
⚠ The solid height values are reference only ☞ P.206
⚠ Operation frequency：1 million times (allowable deflection：L×65%)
300,000 times (allowable deflection：L×70%)

Coil Springs

For Super High Deflection SSWU



Material	Code
SWOSC−V	SSWU

Item	Allowable tolerance
Load	±10%
Perpendicularity	3° or less

L	T Tolerance
15～ 50	±0.5
55～300	±1.5%

ORDER

Code No.
SSWU10.5 − 15

DELIVERY

In stock Next working day ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～19	20～49	50～199	200～500	501～
100%	95%	90%	85%	Enquiry

Code No.			d	Spring constant		ℓmin Solid height	F=L×60%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	
SSWU	10.5	15	6.0	7.63	(0.78)	4.5	9.0	68.6 (7.0)	1.25
		20		5.72	(0.58)	6.0	12.0		1.25
		25		4.57	(0.47)	7.5	15.0		1.35
		30		3.81	(0.39)	9.0	18.0		1.47
		35		3.27	(0.33)	10.5	21.0		1.58
		40		2.86	(0.29)	12.0	24.0		1.70
		45		2.54	(0.26)	13.5	27.0		1.80
		50		2.29	(0.23)	15.0	30.0		1.80
		55		2.08	(0.21)	16.5	33.0		1.80
		60		1.91	(0.19)	18.0	36.0		1.92
		65		1.76	(0.18)	19.5	39.0		2.02
		70		1.63	(0.17)	21.0	42.0		2.14
		75		1.52	(0.16)	22.5	45.0		2.25
		80		1.43	(0.15)	24.0	48.0		2.37
SSWU	12.5	15	7.0	8.72	(0.89)	4.5	9.0	78.5 (8.0)	1.58
		20		6.54	(0.67)	6.0	12.0		1.58
		25		5.23	(0.53)	7.5	15.0		1.70
		30		4.36	(0.45)	9.0	18.0		1.70
		35		3.74	(0.38)	10.5	21.0		1.70
		40		3.27	(0.33)	12.0	24.0		1.80
		45		2.91	(0.30)	13.5	27.0		2.02
		50		2.62	(0.27)	15.0	30.0		2.14
		55		2.38	(0.24)	16.5	33.0		2.25
		60		2.18	(0.22)	18.0	36.0		2.37
		65		2.01	(0.21)	19.5	39.0		2.49
		70		1.87	(0.19)	21.0	42.0		2.59
		75		1.74	(0.18)	22.5	45.0		2.71
		80		1.64	(0.17)	24.0	48.0		2.81
		90		1.45	(0.15)	27.0	54.0		2.93
		100		1.31	(0.13)	30.0	60.0		3.17
SSWU	14.5	15	8.5	10.90	(1.11)	4.5	9.0	98.1 (10.0)	1.47
		20		8.18	(0.83)	6.0	12.0		1.58
		25		6.54	(0.67)	7.5	15.0		1.80
		30		5.45	(0.56)	9.0	18.0		1.92
		35		4.67	(0.48)	10.5	21.0		2.02
		40		4.09	(0.42)	12.0	24.0		2.14
		45		3.63	(0.37)	13.5	27.0		2.25
		50		3.27	(0.33)	15.0	30.0		2.37
		55		2.97	(0.30)	16.5	33.0		2.49
		60		2.73	(0.28)	18.0	36.0		2.59
		65		2.52	(0.26)	19.5	39.0		2.81
		70		2.34	(0.24)	21.0	42.0		2.93
		75		2.18	(0.22)	22.5	45.0		3.05
		80		2.04	(0.21)	24.0	48.0		3.17
		90		1.82	(0.19)	27.0	54.0		3.27
		100		1.64	(0.17)	30.0	60.0		3.49
		110		1.49	(0.15)	33.0	66.0		3.61
		120		1.36	(0.14)	36.0	72.0		3.73
		125		1.31	(0.13)	37.5	75.0		3.73
		150		1.09	(0.11)	45.0	90.0		3.96
SSWU	17	20	10.5	12.26	(1.25)	6.0	12.0	147.1 (15.0)	1.92
		25		9.81	(1.00)	7.5	15.0		1.92
		30		8.17	(0.83)	9.0	18.0		2.02
		35		7.01	(0.71)	10.5	21.0		2.02
		40		6.13	(0.63)	12.0	24.0		2.14
		45		5.45	(0.56)	13.5	27.0		2.37
		50		4.90	(0.50)	15.0	30.0		2.49
		55		4.46	(0.45)	16.5	33.0		2.71
		60		4.09	(0.42)	18.0	36.0		2.81
		65		3.77	(0.38)	19.5	39.0		2.93
		70		3.50	(0.36)	21.0	42.0		3.05
		75		3.27	(0.33)	22.5	45.0		3.17
		80		3.06	(0.31)	24.0	48.0		3.27
		90		2.72	(0.28)	27.0	54.0		3.49
		100		2.45	(0.25)	30.0	60.0		3.73
		110		2.23	(0.23)	33.0	66.0		3.84
		120		2.04	(0.21)	36.0	72.0		3.84
		125		1.96	(0.20)	37.5	75.0		3.96
		150		1.63	(0.17)	45.0	90.0		4.06
		175		1.40	(0.14)	52.5	105.0		4.28

Code No.			d	Spring constant		ℓmin Solid height	F=L×60%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	
SSWU	21	25	13.5	15.04	(1.53)	7.5	15.0	225.6 (23.0)	2.14
		30		12.53	(1.28)	9.0	18.0		2.25
		35		10.74	(1.10)	10.5	21.0		2.37
		40		9.40	(0.96)	12.0	24.0		2.49
		45		8.36	(0.85)	13.5	27.0		2.71
		50		7.52	(0.77)	15.0	30.0		2.81
		55		6.84	(0.70)	16.5	33.0		2.93
		60		6.27	(0.64)	18.0	36.0		3.05
		65		5.78	(0.59)	19.5	39.0		3.17
		70		5.37	(0.55)	21.0	42.0		3.27
		75		5.01	(0.51)	22.5	45.0		3.39
		80		4.70	(0.48)	24.0	48.0		3.49
		90		4.18	(0.43)	27.0	54.0		3.61
		100		3.76	(0.38)	30.0	60.0		3.84
		110		3.42	(0.35)	33.0	66.0		3.96
		120		3.13	(0.32)	36.0	72.0		4.06
		125		3.01	(0.31)	37.5	75.0		4.06
		130		2.89	(0.30)	39.0	78.0		4.06
		140		2.69	(0.27)	42.0	84.0		4.18
		150		2.51	(0.26)	45.0	90.0		4.18
		175		2.15	(0.22)	52.5	105.0		4.40
		200		1.88	(0.19)	60.0	120.0		4.64
SSWU	26	30	16.5	16.34	(1.67)	9.0	18.0	294.2 (30.0)	2.81
		35		14.00	(1.43)	10.5	21.0		2.93
		40		12.26	(1.25)	12.0	24.0		3.05
		45		10.90	(1.11)	13.5	27.0		3.17
		50		9.81	(1.00)	15.0	30.0		3.27
		55		8.92	(0.91)	16.5	33.0		3.39
		60		8.17	(0.83)	18.0	36.0		3.49
		65		7.54	(0.77)	19.5	39.0		3.61
		70		7.01	(0.71)	21.0	42.0		3.84
		75		6.54	(0.67)	22.5	45.0		3.96
		80		6.13	(0.63)	24.0	48.0		4.06
		90		5.45	(0.56)	27.0	54.0		4.06
		100		4.90	(0.50)	30.0	60.0		4.18
		110		4.46	(0.45)	33.0	66.0		4.28
		120		4.09	(0.42)	36.0	72.0		4.40
		125		3.92	(0.40)	37.5	75.0		4.40
		130		3.77	(0.38)	39.0	78.0		4.50
		140		3.50	(0.36)	42.0	84.0		4.64
		150		3.27	(0.33)	45.0	90.0		4.74
		175		2.80	(0.29)	52.5	105.0		4.86
		200		2.45	(0.25)	60.0	120.0		5.08
		225		2.18	(0.22)	67.5	135.0		5.43
		250		1.96	(0.20)	75.0	150.0		5.87
SSWU	31	35	21	17.75	(1.81)	10.5	21.0	372.7 (38.0)	2.93
		40		15.53	(1.58)	12.0	24.0		3.05
		45		13.80	(1.41)	13.5	27.0		3.17
		50		12.42	(1.27)	15.0	30.0		3.27
		55		11.29	(1.15)	16.5	33.0		3.39
		60		10.35	(1.06)	18.0	36.0		3.49
		65		9.56	(0.98)	19.5	39.0		3.61
		70		8.87	(0.91)	21.0	42.0		3.73
		75		8.28	(0.85)	22.5	45.0		3.84
		80		7.76	(0.79)	24.0	48.0		3.96
		90		6.90	(0.70)	27.0	54.0		4.06
		100		6.21	(0.63)	30.0	60.0		4.50
		110		5.65	(0.58)	33.0	66.0		4.74
		120		5.18	(0.53)	36.0	72.0		4.86
		125		4.97	(0.51)	37.5	75.0		4.98
		130		4.78	(0.49)	39.0	78.0		5.08
		140		4.44	(0.45)	42.0	84.0		5.20
		150		4.14	(0.42)	45.0	90.0		5.43
		160		3.88	(0.40)	48.0	96.0		5.53
		170		3.65	(0.37)	51.0	102.0		5.75
		175		3.55	(0.36)	52.5	105.0		5.87
		180		3.45	(0.35)	54.0	108.0		5.98
		190		3.27	(0.33)	57.0	114.0		6.09
		200		3.11	(0.32)	60.0	120.0		6.33
		250		2.48	(0.25)	75.0	150.0		7.00
		300		2.07	(0.21)	90.0	180.0		7.56

Code No.			d	Spring constant		ℓmin Solid height	F=L×60%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	
SSWU	37	40	26	19.20	(1.96)	12.0	24.0	460.9 (47.0)	4.06
		45		17.07	(1.74)	13.5	27.0		4.18
		50		15.36	(1.57)	15.0	30.0		4.28
		55		13.97	(1.43)	16.5	33.0		4.40
		60		12.80	(1.31)	18.0	36.0		4.50
		65		11.82	(1.21)	19.5	39.0		4.64
		70		10.97	(1.12)	21.0	42.0		4.74
		75		10.24	(1.05)	22.5	45.0		4.98
		80		9.60	(0.98)	24.0	48.0		5.20
		90		8.54	(0.87)	27.0	54.0		5.43
		100		7.68	(0.78)	30.0	60.0		5.65
		110		6.98	(0.71)	33.0	66.0		5.87
		120		6.40	(0.65)	36.0	72.0		5.98
		130		5.91	(0.60)	39.0	78.0		6.23
		140		5.49	(0.56)	42.0	84.0		6.45
		150		5.12	(0.52)	45.0	90.0		6.67
		160		4.80	(0.49)	48.0	96.0		6.89
		170		4.52	(0.46)	51.0	102.0		7.12
		180		4.27	(0.44)	54.0	108.0		7.34
		190		4.04	(0.41)	57.0	114.0		7.56
		200		3.84	(0.39)	60.0	120.0		7.80
		225		3.41	(0.35)	67.5	135.0		8.36
		250		3.07	(0.31)	75.0	150.0		9.03
		275		2.79	(0.29)	82.5	165.0		9.73
		300		2.56	(0.26)	90.0	180.0		10.5
SSWU	43	50	31	19.61	(2.00)	15.0	30.0	588.4 (60.0)	4.68
		60		16.34	(1.67)	18.0	36.0		4.92
		70		14.00	(1.43)	21.0	42.0		5.14
		80		12.26	(1.25)	24.0	48.0		5.36
		90		10.90	(1.11)	27.0	54.0		5.58
		100		9.81	(1.00)	30.0	60.0		5.80
		110		8.92	(0.91)	33.0	66.0		6.14
		120		8.17	(0.83)	36.0	72.0		6.36
		130		7.54	(0.77)	39.0	78.0		6.70
		140		7.01	(0.71)	42.0	84.0		7.03
		150		6.54	(0.67)	45.0	90.0		7.48
		160		6.13	(0.63)	48.0	96.0		7.81
		170		5.77	(0.59)	51.0	102.0		8.03
		180		5.45	(0.56)	54.0	108.0		8.37
		190		5.16	(0.53)	57.0	114.0		8.71
		200		4.90	(0.50)	60.0	120.0		9.05
		225		4.36	(0.44)	67.5	135.0		10.1
		250		3.92	(0.40)	75.0	150.0		12.1
		275		3.57	(0.36)	82.5	165.0		12.9
		300		3.27	(0.33)	90.0	180.0		13.6

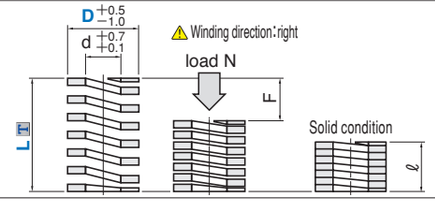
⚠ Load calculation method：Load＝Spring constant×Deflection
N＝N/mm×Fmm
(kgf＝N×0.101972)
⚠ The solid height values are reference only ☞ P.206
⚠ Operation frequency：1 million times (allowable deflection：L

Coil Springs

For High Deflection SSWR

Material	Code
SWOSC-V	SSWR

Item	Allowable tolerance
Load	±10%
Perpendicularity	3° or less



L	T Tolerance
15～ 50	±0.5
55～400	±1.5%

Code No.			d	Spring constant		ℓmin Solid height	F=L×50%		@/P (1～19P)
Code	D	L		N/mm	{kgf/mm}		Fmm	Load N {kgf}	
SSWR	10.5	15	6.0	10.47	{1.07}	6.0	7.5	78.5 {8.0}	1.01
		20		7.85	{0.80}	8.0	10.0		1.01
		25		6.28	{0.64}	10.0	12.5		1.01
		30		5.23	{0.53}	12.0	15.0		1.13
		35		4.49	{0.46}	14.0	17.5		1.25
		40		3.93	{0.40}	16.0	20.0		1.35
		45		3.49	{0.36}	18.0	22.5		1.35
		50		3.14	{0.32}	20.0	25.0		1.47
		55		2.85	{0.29}	22.0	27.5		1.58
		60		2.62	{0.27}	24.0	30.0		1.70
		65		2.42	{0.25}	26.0	32.5		1.80
		70		2.24	{0.23}	28.0	35.0		1.92
		75		2.09	{0.21}	30.0	37.5		2.02
		80		1.96	{0.20}	32.0	40.0		2.14
SSWR	12.5	15	7.0	11.77	{1.20}	6.0	7.5	88.3 {9.0}	1.01
		20		8.83	{0.90}	8.0	10.0		1.01
		25		7.06	{0.72}	10.0	12.5		1.13
		30		5.89	{0.60}	12.0	15.0		1.25
		35		5.05	{0.51}	14.0	17.5		1.35
		40		4.42	{0.45}	16.0	20.0		1.47
		45		3.92	{0.40}	18.0	22.5		1.58
		50		3.53	{0.36}	20.0	25.0		1.70
		55		3.21	{0.33}	22.0	27.5		1.80
		60		2.94	{0.30}	24.0	30.0		1.92
		65		2.72	{0.28}	26.0	32.5		2.02
		70		2.52	{0.26}	28.0	35.0		2.14
		75		2.35	{0.24}	30.0	37.5		2.25
		80		2.21	{0.23}	32.0	40.0		2.37
		90		1.96	{0.20}	36.0	45.0		2.59
		100		1.77	{0.18}	40.0	50.0		2.71
SSWR	14.5	15	8.5	17.00	{1.73}	6.0	7.5	127.5 {13.0}	1.25
		20		12.75	{1.30}	8.0	10.0		1.35
		25		10.20	{1.04}	10.0	12.5		1.47
		30		8.50	{0.87}	12.0	15.0		1.58
		35		7.29	{0.74}	14.0	17.5		1.70
		40		6.38	{0.65}	16.0	20.0		1.80
		45		5.67	{0.58}	18.0	22.5		1.92
		50		5.10	{0.52}	20.0	25.0		2.02
		55		4.64	{0.47}	22.0	27.5		2.02
		60		4.25	{0.43}	24.0	30.0		2.14
		65		3.92	{0.40}	26.0	32.5		2.25
		70		3.64	{0.37}	28.0	35.0		2.37
		75		3.40	{0.35}	30.0	37.5		2.49
		80		3.19	{0.33}	32.0	40.0		2.59
		90		2.83	{0.29}	36.0	45.0		2.81
		100		2.55	{0.26}	40.0	50.0		3.05
		125		2.04	{0.21}	50.0	62.5		3.27
		150		1.70	{0.17}	60.0	75.0		3.49

Code No.			d	Spring constant		ℓmin Solid height	F=L×50%		@/P (1～19P)
Code	D	L		N/mm	{kgf/mm}		Fmm	Load N {kgf}	
SSWR	17	20	10.5	19.61	{2.00}	8.0	10.0	196.1 {20.0}	1.47
		25		15.69	{1.60}	10.0	12.5		1.58
		30		13.07	{1.33}	12.0	15.0		1.70
		35		11.21	{1.14}	14.0	17.5		1.80
		40		9.81	{1.00}	16.0	20.0		1.92
		45		8.72	{0.89}	18.0	22.5		2.02
		50		7.84	{0.80}	20.0	25.0		2.02
		55		7.13	{0.73}	22.0	27.5		2.14
		60		6.54	{0.67}	24.0	30.0		2.25
		65		6.03	{0.62}	26.0	32.5		2.37
		70		5.60	{0.57}	28.0	35.0		2.49
		75		5.23	{0.53}	30.0	37.5		2.59
		80		4.90	{0.50}	32.0	40.0		2.71
		90		4.36	{0.44}	36.0	45.0		2.93
		100		3.92	{0.40}	40.0	50.0		3.05
		125		3.14	{0.32}	50.0	62.5		3.39
		150		2.61	{0.27}	60.0	75.0		3.73
		175		2.24	{0.23}	70.0	87.5		4.06
SSWR	21	25	13.5	23.54	{2.40}	10.0	12.5	294.2 {30.0}	1.80
		30		19.61	{2.00}	12.0	15.0		1.92
		35		16.81	{1.72}	14.0	17.5		2.02
		40		14.71	{1.50}	16.0	20.0		2.02
		45		13.08	{1.33}	18.0	22.5		2.14
		50		11.77	{1.20}	20.0	25.0		2.25
		55		10.70	{1.09}	22.0	27.5		2.37
		60		9.81	{1.00}	24.0	30.0		2.49
		65		9.05	{0.92}	26.0	32.5		2.59
		70		8.41	{0.86}	28.0	35.0		2.71
		75		7.85	{0.80}	30.0	37.5		2.81
		80		7.36	{0.75}	32.0	40.0		2.93
		90		6.54	{0.67}	36.0	45.0		3.05
		100		5.88	{0.60}	40.0	50.0		3.05
		110		5.35	{0.55}	44.0	55.0		3.17
		120		4.90	{0.50}	48.0	60.0		3.27
		125		4.71	{0.48}	50.0	62.5		3.39
		130		4.53	{0.46}	52.0	65.0		3.49
		140		4.20	{0.43}	56.0	70.0		3.61
		150		3.92	{0.40}	60.0	75.0		3.73
		175		3.36	{0.34}	70.0	87.5		3.96
		200		2.94	{0.30}	80.0	100.0		4.28
SSWR	26	25	16.5	31.38	{3.20}	10.0	12.5	392.3 {40.0}	2.14
		30		26.15	{2.67}	12.0	15.0		2.25
		35		22.42	{2.29}	14.0	17.5		2.37
		40		19.61	{2.00}	16.0	20.0		2.49
		45		17.44	{1.78}	18.0	22.5		2.59
		50		15.69	{1.60}	20.0	25.0		2.71
		55		14.27	{1.46}	22.0	27.5		2.81
		60		13.08	{1.33}	24.0	30.0		2.93
		65		12.07	{1.23}	26.0	32.5		3.05
		70		11.21	{1.14}	28.0	35.0		3.05
		75		10.46	{1.07}	30.0	37.5		3.17
		80		9.81	{1.00}	32.0	40.0		3.27
		90		8.72	{0.89}	36.0	45.0		3.39
		100		7.85	{0.80}	40.0	50.0		3.49
		110		7.13	{0.73}	44.0	55.0		3.61
		120		6.54	{0.67}	48.0	60.0		3.73
		125		6.28	{0.64}	50.0	62.5		3.73
		130		6.04	{0.62}	52.0	65.0		3.84
		140		5.60	{0.57}	56.0	70.0		3.96
		150		5.23	{0.53}	60.0	75.0		3.96
		175		4.48	{0.46}	70.0	87.5		4.50
		200		3.92	{0.40}	80.0	100.0		5.08
		225		3.49	{0.36}	90.0	112.5		5.30
		250		3.14	{0.32}	100.0	125.0		5.65

⚠ Load calculation method: Load=Spring constant×Deflection
N=N/mm×Fmm
(kgf=N×0.101972)
⚠ The solid height values are reference only ☞P.206
⚠ Operation frequency: 1 million times (allowable deflection: L×50%)
300,000 times (allowable deflection: L×55%)

ORDER

Code No.
SSWR10.5 — 15

DELIVERY

Next In stock working day ☞P.15

PRICE Without tax

▶Quantity discount rate ☞P.15

1～19	20～49	50～199	200～500	501～
100%	95%	90%	85%	Enquiry

Code No.			d	Spring constant		ℓmin Solid height	F=L×50%		@/P (1～19P)
Code	D	L		N/mm	{kgf/mm}		Fmm	Load N {kgf}	
SSWR	31	35	21	28.02	{2.86}	14.0	17.5	490.3 {50.0}	2.49
		40		24.52	{2.50}	16.0	20.0		2.59
		45		21.79	{2.22}	18.0	22.5		2.71
		50		19.61	{2.00}	20.0	25.0		2.81
		55		17.83	{1.82}	22.0	27.5		2.93
		60		16.34	{1.67}	24.0	30.0		3.05
		65		15.09	{1.54}	26.0	32.5		3.17
		70		14.01	{1.43}	28.0	35.0		3.17
		75		13.07	{1.33}	30.0	37.5		3.27
		80		12.26	{1.25}	32.0	40.0		3.39
		90		10.90	{1.11}	36.0	45.0		3.61
		100		9.81	{1.00}	40.0	50.0		3.84
		110		8.91	{0.91}	44.0	55.0		3.96
		120		8.17	{0.83}	48.0	60.0		4.06
		125		7.84	{0.80}	50.0	62.5		4.18
		130		7.54	{0.77}	52.0	65.0		4.28
		140		7.00	{0.71}	56.0	70.0		4.50
		150		6.54	{0.67}	60.0	75.0		4.64
		160		6.13	{0.63}	64.0	80.0		4.86
		170		5.77	{0.59}	68.0	85.0		4.98
		175		5.60	{0.57}	70.0	87.5		5.08
		180		5.45	{0.56}	72.0	90.0		5.08
		190		5.16	{0.53}	76.0	95.0		5.30
		200		4.90	{0.50}	80.0	100.0		5.43
		250		3.92	{0.40}	100.0	125.0		6.23
		300		3.27	{0.33}	120.0	150.0		7.00
SSWR	37	35	26	33.62	{3.43}	14.0	17.5	588.4 {60.0}	3.17
		40		29.42	{3.00}	16.0	20.0		3.27
		45		26.15	{2.67}	18.0	22.5		3.39
		50		23.54	{2.40}	20.0	25.0		3.49
		55		21.40	{2.18}	22.0	27.5		3.61
		60		19.61	{2.00}	24.0	30.0		3.73
		65		18.10	{1.85}	26.0	32.5		3.84
		70		16.81	{1.72}	28.0	35.0		3.96
		75		15.69	{1.60}	30.0	37.5		4.06
		80		14.71	{1.50}	32.0	40.0		4.06
		90		13.08	{1.33}	36.0	45.0		4.28
		100		11.77	{1.20}	40.0	50.0		4.50
		110		10.70	{1.09}	44.0	55.0		4.64
		120		9.81	{1.00}	48.0	60.0		4.74
		125		9.41	{0.96}	50.0	62.5		4.86
		130		9.05	{0.92}	52.0	65.0		4.98
		140		8.41	{0.86}	56.0	70.0		5.08
		150		7.85	{0.80}	60.0	75.0		5.08
		160		7.36	{0.75}	64.0	80.0		5.20
		170		6.92	{0.71}	68.0	85.0		5.30
		175		6.72	{0.69}	70.0	87.5		5.43
		180		6.54	{0.67}	72.0	90.0		5.53
		190		6.19	{0.63}	76.0	95.0		5.65
		200		5.88	{0.60}	80.0	100.0		5.75
		250		4.71	{0.48}	100.0	125.0		6.77
		300		3.92	{0.40}	120.0	150.0		7.68
SSWR	43	50	31	33.34	{3.40}	20.0	25.0	833.6 {85.0}	4.12
		60		27.79	{2.84}	24.0	30.0		4.24
		70		23.82	{2.43}	28.0	35.0		4.36
		80		20.84	{2.13}	32.0	40.0		4.46
		90		18.52	{1.89}	36.0	45.0		4.58
		100		16.67	{1.70}	40.0	50.0		4.68
		110		15.16	{1.55}	44.0	55.0		4.68
		120		13.89	{1.42}	48.0	60.0		4.92
		130		12.82	{1.31}	52.0	65.0		5.02
		140		11.91	{1.22}	56.0	70.0		5.14
		150		11.11	{1.13}	60.0	75.0		5.36
		160		10.42	{1.06}	64.0	80.0		5.46
		170		9.81	{1.00}	68.0	85.0		5.58
		180		9.26	{0.95}	72.0	90.0		5.80
		190		8.77	{0.90}	76.0	95.0		5.90
		200		8.34	{0.85}	80.0	100.0		6.14
		225		7.41	{0.76}	90.0	112.5		6.70
		250		6.67	{0.68}	100.0	125.0		7.25
		275		6.06	{0.62}	110.0	137.5		7.81
		300		5.56	{0.57}	120.0	150.0		8.14

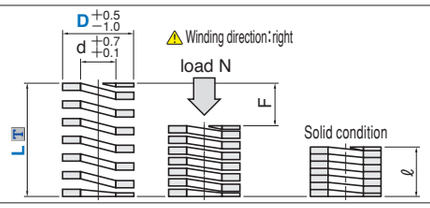
Code No.			d	Spring constant		ℓmin Solid height	F=L×50%		@/P (1～19P)
Code	D	L		N/mm	{kgf/mm}		Fmm	Load N {kgf}	
SSWR	46	50	33	43.15	{4.40}	20.0	25.0	1079 {110}	4.24
		60		35.96	{3.67}	24.0	30.0		4.36
		70		30.82	{3.14}	28.0	35.0		4.46
		80		26.97	{2.75}	32.0	40.0		4.58
		90		23.97	{2.45}	36.0	45.0		4.68
		100		21.57	{2.20}	40.0	50.0		4.80
		110		19.61	{2.00}	44.0	55.0		4.92
		120		17.98	{1.83}	48.0	60.0		5.02
		125		17.26	{1.76}	50.0	62.5		5.02
		130		16.60	{1.69}	52.0	65.0		5.14
		140		15.41	{1.57}	56.0	70.0		5.24
		150		14.38	{1.47}	60.0	75.0		5.36
		175		12.33	{1.26}	70.0	87.5		5.68
		200		10.79	{1.10}	80.0	100.0		5.90
		225		9.59	{0.98}	90.0	112.5		6.24
		250		8.63	{0.88}	100.0	125.0		6.59
		275		7.85	{0.80}	110.0	137.5		6.81
		300		7.19	{0.73}	120.0	150.0		7.15
SSWR	50	50	36	52.96	{5.40}	20.0	25.0	1324 {135}	5.02
		60		44.13	{4.50}	24.0	30.0		5.24
		70		37.83	{3.86}	28.0	35.0		5.36
		80		33.01	{3.38}	32.0	40.0		5.58
		90		29.42	{3.00}	36.0	45.0		5.68
		100		26.48	{2.70}	40.0	50.0		5.80
		110		24.07	{2.46}	44.0	55.0		6.02
		120		22.07	{2.25}	48.0	60.0		6.24
		130		20.37	{2.08}	52.0	65.0		6.70
		140		18.91	{1.93}	56.0	70.0		7.37
		150		17.65	{1.80}	60.0	75.0		7.70
		175		15.13	{1.54}	70.0	87.5		8.71
		200		13.24	{1.35}	80.0	100.0		9.71
		225		11.77	{1.20}	90.0	112.5		10.8
		250		10.59	{1.08}	100.0	125.0		11.8
		275		9.63	{0.98}	110.0	137.5		12.7
		300		8.83	{0.90}	120.0	150.0		13.6
		350		7.57	{0.77}	140.0	175.0		15.6
		400		6.62	{0.68}	160.0	200.0		17.7

Coil Springs

For Medium Deflection SSWS

Material	Code
SWOSC-V	SSWS

Item	Allowable tolerance
Load	20%～−10%
Perpendicularity	3° or less



L	T Tolerance
20～300	±2%

Code No.			d	Spring constant		ℓmin Solid height	F=L×40%		@/P (1～19P)
Code	D	L		N/mm	{kgf/mm}		Fmm	Load N {kgf}	
SSWS	10.5	20	5.5	10.90	{1.11}	10.0	8.0	87.3 {8.9}	1.25
		25		8.72	{0.89}	12.5	10.0		1.35
		30		7.27	{0.74}	15.0	12.0		1.47
		35		6.23	{0.64}	17.5	14.0		1.58
		40		5.45	{0.56}	20.0	16.0		1.70
		45		4.84	{0.49}	22.5	18.0		1.80
		50		4.36	{0.44}	25.0	20.0		1.80
		55		3.96	{0.40}	27.5	22.0		1.80
		60		3.63	{0.37}	30.0	24.0		1.92
		65		3.35	{0.34}	32.5	26.0		2.02
		70		3.11	{0.32}	35.0	28.0		2.14
		75		2.91	{0.30}	37.5	30.0		2.25
		80		2.73	{0.28}	40.0	32.0		2.37
SSWS	12.5	20	6.5	15.25	{1.56}	10.0	8.0	121.6 {12.4}	1.47
		25		12.20	{1.24}	12.5	10.0		1.58
		30		10.17	{1.04}	15.0	12.0		1.70
		35		8.71	{0.89}	17.5	14.0		1.80
		40		7.63	{0.78}	20.0	16.0		1.92
		45		6.78	{0.69}	22.5	18.0		2.02
		50		6.10	{0.62}	25.0	20.0		2.14
		55		5.55	{0.57}	27.5	22.0		2.25
		60		5.08	{0.52}	30.0	24.0		2.37
		65		4.69	{0.48}	32.5	26.0		2.49
		70		4.36	{0.44}	35.0	28.0		2.59
		75		4.07	{0.41}	37.5	30.0		2.71
		80		3.81	{0.39}	40.0	32.0		2.71
SSWS	14.5	20	8.5	24.50	{2.50}	10.0	8.0	196.1 {20.0}	1.58
		25		19.60	{2.00}	12.5	10.0		1.70
		30		16.33	{1.67}	15.0	12.0		1.80
		35		14.00	{1.43}	17.5	14.0		1.92
		40		12.25	{1.25}	20.0	16.0		2.02
		45		10.89	{1.11}	22.5	18.0		2.02
		50		9.80	{1.00}	25.0	20.0		2.14
		55		8.91	{0.91}	27.5	22.0		2.25
		60		8.17	{0.83}	30.0	24.0		2.37
		65		7.54	{0.77}	32.5	26.0		2.59
		70		7.00	{0.71}	35.0	28.0		2.71
		75		6.53	{0.67}	37.5	30.0		2.81
		80		6.13	{0.63}	40.0	32.0		2.93
		90		5.44	{0.56}	45.0	36.0		3.05
		100		4.90	{0.50}	50.0	40.0		3.27
		125		3.92	{0.40}	62.5	50.0		3.61
		150		3.27	{0.33}	75.0	60.0		3.96

Code No.			d	Spring constant		ℓmin Solid height	F=L×40%		@/P (1～19P)
Code	D	L		N/mm	{kgf/mm}		Fmm	Load N {kgf}	
SSWS	17	25	10.5	29.42	{3.00}	12.5	10.0	294.2 {30.0}	1.80
		30		24.52	{2.50}	15.0	12.0		1.92
		35		21.01	{2.14}	17.5	14.0		2.02
		40		18.39	{1.88}	20.0	16.0		2.02
		45		16.34	{1.67}	22.5	18.0		2.14
		50		14.71	{1.50}	25.0	20.0		2.25
		55		13.37	{1.36}	27.5	22.0		2.37
		60		12.26	{1.25}	30.0	24.0		2.49
		65		11.32	{1.15}	32.5	26.0		2.59
		70		10.51	{1.07}	35.0	28.0		2.71
		75		9.81	{1.00}	37.5	30.0		2.81
		80		9.19	{0.94}	40.0	32.0		2.93
		90		8.17	{0.83}	45.0	36.0		3.05
		100		7.36	{0.75}	50.0	40.0		3.27
		125		5.88	{0.60}	62.5	50.0		3.61
		150		4.90	{0.50}	75.0	60.0		3.96
SSWS	21	30	13.5	35.17	{3.59}	15.0	12.0	421.7 {43.0}	2.02
		35		30.14	{3.08}	17.5	14.0		2.14
		40		26.38	{2.69}	20.0	16.0		2.25
		45		23.44	{2.39}	22.5	18.0		2.37
		50		21.10	{2.15}	25.0	20.0		2.49
		55		19.18	{1.96}	27.5	22.0		2.59
		60		17.58	{1.79}	30.0	24.0		2.71
		65		16.23	{1.66}	32.5	26.0		2.81
		70		15.07	{1.54}	35.0	28.0		2.93
		75		14.07	{1.44}	37.5	30.0		3.05
		80		13.19	{1.35}	40.0	32.0		3.05
		90		11.72	{1.20}	45.0	36.0		3.27
		100		10.55	{1.08}	50.0	40.0		3.49
		110		9.59	{0.98}	55.0	44.0		3.61
		120		8.79	{0.90}	60.0	48.0		3.73
		125		8.44	{0.86}	62.5	50.0		3.84
		130		8.12	{0.83}	65.0	52.0		3.96
		140		7.54	{0.77}	70.0	56.0		4.06
		150		7.03	{0.72}	75.0	60.0		4.06
		175		6.03	{0.62}	87.5	70.0		4.50
		200		5.28	{0.54}	100.0	80.0		4.98
SSWS	26	30	16.5	47.42	{4.84}	15.0	12.0	568.8 {58.0}	2.49
		35		40.64	{4.15}	17.5	14.0		2.59
		40		35.56	{3.63}	20.0	16.0		2.71
		45		31.61	{3.23}	22.5	18.0		2.81
		50		28.45	{2.90}	25.0	20.0		2.93
		55		25.86	{2.64}	27.5	22.0		3.05
		60		23.71	{2.42}	30.0	24.0		3.05
		65		21.88	{2.23}	32.5	26.0		3.17
		70		20.32	{2.07}	35.0	28.0		3.27
		75		18.97	{1.94}	37.5	30.0		3.39
		80		17.78	{1.81}	40.0	32.0		3.49
		90		15.81	{1.61}	45.0	36.0		3.73
		100		14.23	{1.45}	50.0	40.0		3.96
		110		12.93	{1.32}	55.0	44.0		4.06
		120		11.85	{1.21}	60.0	48.0		4.06
		125		11.38	{1.16}	62.5	50.0		4.18
		130		10.94	{1.12}	65.0	52.0		4.28
		140		10.16	{1.04}	70.0	56.0		4.40
		150		9.48	{0.97}	75.0	60.0		4.50
		175		8.13	{0.83}	87.5	70.0		5.08
		200		7.11	{0.73}	100.0	80.0		5.75
		225		6.32	{0.65}	112.5	90.0		6.09
		250		5.69	{0.58}	125.0	100.0		6.77

⚠ Load calculation method: Load=Spring constant×Deflection
N=N/mm×Fmm
(kgf=N×0.101972)
⚠ The solid height values are reference only ☞ P.206
⚠ Operation frequency: 1 million times (allowable deflection: L×40%)
300,000 times (allowable deflection: L×45%)

ORDER

Code No.
SSWS10.5 − 20

DELIVERY

Next In stock working day ☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～19	20～49	50～199	200～500	501～
100%	95%	90%	85%	Enquiry

Code No.			d	Spring constant		ℓmin Solid height	F=L×40%		@/P (1～19P)
Code	D	L		N/mm	{kgf/mm}		Fmm	Load N {kgf}	
SSWS	31	40	21	49.00	{5.00}	20.0	16.0	783.6 {79.9}	2.93
		45		43.56	{4.44}	22.5	18.0		3.05
		50		39.20	{4.00}	25.0	20.0		3.05
		55		35.64	{3.64}	27.5	22.0		3.17
		60		32.67	{3.33}	30.0	24.0		3.27
		65		30.15	{3.08}	32.5	26.0		3.39
		70		28.00	{2.86}	35.0	28.0		3.49
		75		26.13	{2.67}	37.5	30.0		3.61
		80		24.50	{2.50}	40.0	32.0		3.73
		90		21.78	{2.22}	45.0	36.0		3.96
		100		19.60	{2.00}	50.0	40.0		4.06
		110		17.82	{1.82}	55.0	44.0		4.28
		120		16.33	{1.67}	60.0	48.0		4.40
		125		15.68	{1.60}	62.5	50.0		4.50
		130		15.08	{1.54}	65.0	52.0		4.74
		140		14.00	{1.43}	70.0	56.0		4.86
		150		13.07	{1.33}	75.0	60.0		4.98
		160		12.25	{1.25}	80.0	64.0		5.08
		170		11.53	{1.18}	85.0	68.0		5.20
		175		11.20	{1.14}	87.5	70.0		5.30
		180		10.89	{1.11}	90.0	72.0		5.53
		190		10.32	{1.05}	95.0	76.0		5.65
		200		9.80	{1.00}	100.0	80.0		5.75
		250		7.84	{0.80}	125.0	100.0		6.55
		300		6.53	{0.67}	150.0	120.0		7.34
SSWS	37	40	26	52.13	{5.32}	20.0	16.0	833.6 {85.0}	3.96
		45		46.33	{4.73}	22.5	18.0		4.06
		50		41.70	{4.26}	25.0	20.0		4.18
		55		37.91	{3.87}	27.5	22.0		4.28
		60		34.75	{3.55}	30.0	24.0		4.40
		65		32.08	{3.27}	32.5	26.0		4.50
		70		29.79	{3.04}	35.0	28.0		4.64
		75		27.80	{2.84}	37.5	30.0		4.74
		80		26.06	{2.66}	40.0	32.0		4.98
		90		23.17	{2.36}	45.0	36.0		5.20
		100		20.85	{2.13}	50.0	40.0		5.43
		110		18.95	{1.93}	55.0	44.0		5.65
		120		17.38	{1.77}	60.0	48.0		5.75
		125		16.68	{1.70}	62.5	50.0		5.98
		130		16.04	{1.64}	65.0	52.0		6.09
		140		14.89	{1.52}	70.0	56.0		6.23
		150		13.90	{1.42}	75.0	60.0		6.45
		160		13.03	{1.33}	80.0	64.0		6.67
		170		12.26	{1.25}	85.0	68.0		6.77
		175		11.91	{1.22}	87.5	70.0		6.89
		180		11.58	{1.18}	90.0	72.0		7.12
		190		10.97	{1.12}	95.0	76.0		7.24
		200		10.43	{1.06}	100.0	80.0		7.46
		250		8.34	{0.85}	125.0	100.0		8.48
		300		6.95	{0.71}	150.0	120.0		9.39

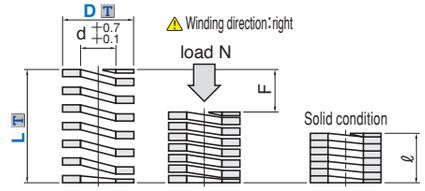
Code No.			d	Spring constant		ℓmin Solid height	F=L×40%		@/P (1～19P)
Code	D	L		N/mm	{kgf/mm}		Fmm	Load N {kgf}	
SSWS	44.5	50	31	50.15	{5.12}	25.0	20.0	1000 {102}	4.46
		60		41.79	{4.26}	30.0	24.0		4.68
		70		35.82	{3.66}	35.0	28.0		4.92
		80		31.34	{3.20}	40.0	32.0		5.14
		90		27.86	{2.84}	45.0	36.0		5.46
		100		25.07	{2.56}	50.0	40.0		5.68
		110		22.80	{2.33}	55.0	44.0		5.90
		120		20.90	{2.13}	60.0	48.0		6.14
		130		19.29	{1.97}	65.0	52.0		6.36
		140		17.91	{1.83}	70.0	56.0		6.59
		150		16.72	{1.71}	75.0	60.0		6.81
		160		15.67	{1.60}	80.0	64.0		7.03
		170		14.75	{1.51}	85.0	68.0		7.37
		180		13.93	{1.42}	90.0	72.0		7.59
		190		13.20	{1.35}	95.0	76.0		7.81
		200		12.54	{1.28}	100.0	80.0		8.03
		225		11.14	{1.14}	112.5	90.0		9.15
		250		10.03	{1.02}	125.0	100.0		10.4
		275		9.12	{0.93}	137.5	110.0		11.7
		300		8.36	{0.85}	150.0	120.0		12.7
SSWS	46	50	33	63.74	{6.50}	25.0	20.0	1275 {130}	5.02
		60		53.12	{5.42}	30.0	24.0		5.14
		70		45.53	{4.65}	35.0	28.0		5.24
		80		39.84	{4.07}	40.0	32.0		5.36
		90		35.41	{3.61}	45.0	36.0		5.58
		100		31.87	{3.25}	50.0	40.0		5.80
		110		28.98	{2.96}	55.0	44.0		6.02
		120		26.56	{2.71}	60.0	48.0		6.36
		125		25.50	{2.60}	62.5	50.0		6.70
		130		24.52	{2.50}	65.0	52.0		6.92
		140		22.77	{2.32}	70.0	56.0		7.48
		150		21.25	{2.17}	75.0	60.0		7.70
		175		18.21	{1.86}	87.5	70.0		8.71
		200		15.94	{1.63}	100.0	80.0		9.71
		225		14.17	{1.45}	112.5	90.0		10.8
		250		12.75	{1.30}	125.0	100.0		11.8
		275		11.59	{1.18}	137.5	110.0		12.5
		300		10.62	{1.08}	150.0	120.0		13.8
SSWS	52	60	37	65.38	{6.67}	30.0	24.0	1569 {160}	5.68
		70		56.04	{5.72}	35.0	28.0		5.80
		80		49.03	{5.00}	40.0	32.0		6.02
		90		43.58	{4.45}	45.0	36.0		6.24
		100		39.23	{4.00}	50.0	40.0		6.48
		110		35.66	{3.64}	55.0	44.0		6.70
		120		32.69	{3.34}	60.0	48.0		7.03
		130		30.17	{3.08}	65.0	52.0		7.48
		140		28.02	{2.86}	70.0	56.0		8.14
		150		26.15	{2.67}	75.0	60.0		8.48
		175		22.41	{2.29}	87.5	70.0		9.71
		200		19.61	{2.00}	100.0	80.0		10.9
		225		17.43	{1.78}	112.5	90.0		12.0
		250		15.69	{1.60}	125.0	100.0		13.0
		275		14.26	{1.46}	137.5	110.0		13.8
		300		13.08	{1.33}	150.0	120.0		15.0

Coil Springs

For Minimal Load SSWF

Material	Code
SWOSC−V	SSWF

Item	Allowable tolerance
Load	±10%
Perpendicularity	2° or less



D	T Tolerance
6～60	0 −0.7
70	0 −1.0

L	T Tolerance
10～ 50	±0.5
55～500	±1%

Code No. Code	D	L	d	Spring constant N/mm	(kgf/mm)	ℓ min Solid height	F=L×40% Fmm	Load N (kgf)	F=L×45% Fmm	Load N (kgf)	F=L×50% Fmm	Load N (kgf)	@/P (1～19P)
SSWF	6	15	3	7.9	(0.80)	6.8	6.0		6.8		7.5		0.92
		20		5.9	(0.60)	9.0	8.0		9.0		10.0		0.92
		25		4.7	(0.48)	11.3	10.0	47.1 (4.8)	11.3	53.0 (5.4)	12.5	58.8 (6.0)	1.15
		30		3.9	(0.40)	13.5	12.0		13.5		15.0		1.15
		35		3.4	(0.34)	15.8	14.0		15.8		17.5		1.15
		40		3.0	(0.30)	18.0	16.0		18.0		20.0		1.28
SSWF	8	10	4	15.8	(1.61)	4.5	4.0		4.5		5.0		0.81
		15		10.5	(1.07)	6.8	6.0		6.8		7.5		0.81
		20		7.9	(0.81)	9.0	8.0		9.0		10.0		0.81
		25		6.3	(0.64)	11.3	10.0		11.3		12.5		1.04
		30		5.3	(0.54)	13.5	12.0		13.5		15.0		1.04
		35		4.5	(0.46)	15.8	14.0		15.8		17.5		1.15
		40		4.0	(0.40)	18.0	16.0	62.8 (6.4)	18.0	70.6 (7.2)	20.0	78.5 (8.0)	1.15
		45		3.5	(0.36)	20.2	18.0		20.2		22.5		1.28
		50		3.2	(0.32)	22.5	20.0		22.5		25.0		1.39
		55		2.9	(0.29)	24.8	22.0		24.8		27.5		1.50
		60		2.6	(0.27)	27.0	24.0		27.0		30.0		1.61
		65		2.4	(0.25)	29.2	26.0		29.2		32.5		1.61
		70		2.3	(0.23)	31.5	28.0		31.5		35.0		1.74
		75		2.1	(0.21)	33.8	30.0		33.8		37.5		1.84
		80		2.0	(0.20)	36.0	32.0		36.0		40.0		1.96
SSWF	10	10	5	19.6	(2.00)	4.5	4.0		4.5		5.0		0.81
		15		13.1	(1.34)	6.8	6.0		6.8		7.5		0.81
		20		9.8	(1.00)	9.0	8.0		9.0		10.0		0.81
		25		7.9	(0.80)	11.3	10.0		11.3		12.5		0.81
		30		6.5	(0.67)	13.5	12.0		13.5		15.0		0.81
		35		5.6	(0.57)	15.8	14.0		15.8		17.5		0.81
		40		4.9	(0.50)	18.0	16.0		18.0		20.0		0.92
		45		4.4	(0.45)	20.2	18.0	78.5 (8.0)	20.2	88.3 (9.0)	22.5	98.1 (10.0)	1.04
		50		3.9	(0.40)	22.5	20.0		22.5		25.0		1.15
		55		3.6	(0.36)	24.8	22.0		24.8		27.5		1.15
		60		3.3	(0.33)	27.0	24.0		27.0		30.0		1.28
		65		3.0	(0.31)	29.2	26.0		29.2		32.5		1.39
		70		2.8	(0.29)	31.5	28.0		31.5		35.0		1.39
		75		2.6	(0.27)	33.8	30.0		33.8		37.5		1.61
		80		2.5	(0.25)	36.0	32.0		36.0		40.0		1.74
		90		2.2	(0.22)	40.5	36.0		40.5		45.0		1.96
SSWF	12	15	6	18.2	(1.85)	6.8	6.0		6.8		7.5		0.92
		20		13.6	(1.39)	9.0	8.0		9.0		10.0		0.92
		25		10.9	(1.11)	11.3	10.0		11.3		12.5		1.04
		30		9.1	(0.93)	13.5	12.0		13.5		15.0		1.15
		35		7.8	(0.79)	15.8	14.0		15.8		17.5		1.15
		40		6.8	(0.70)	18.0	16.0		18.0		20.0		1.15
		45		6.1	(0.62)	20.2	18.0		20.2		22.5		1.28
		50		5.5	(0.56)	22.5	20.0	109.8 (11.2)	22.5	123.6 (12.6)	25.0	137.3 (14.0)	1.39
		55		5.0	(0.51)	24.8	22.0		24.8		27.5		1.50
		60		4.5	(0.46)	27.0	24.0		27.0		30.0		1.61
		65		4.2	(0.43)	29.2	26.0		29.2		32.5		1.61
		70		3.9	(0.40)	31.5	28.0		31.5		35.0		1.74
		75		3.6	(0.37)	33.8	30.0		33.8		37.5		1.84
		80		3.4	(0.35)	36.0	32.0		36.0		40.0		1.96
		90		3.0	(0.31)	40.5	36.0		40.5		45.0		2.20
SSWF	14	20	7	17.5	(1.79)	9.0	8.0		9.0		10.0		1.28
		25		14.0	(1.43)	11.3	10.0		11.3		12.5		1.28
		30		11.7	(1.19)	13.5	12.0		13.5		15.0		1.39
		35		10.0	(1.02)	15.8	14.0		15.8		17.5		1.50
		40		8.8	(0.89)	18.0	16.0		18.0		20.0		1.61
		45		7.8	(0.79)	20.2	18.0		20.2		22.5		1.61
		50		7.0	(0.71)	22.5	20.0	141.2 (14.4)	22.5	158.9 (16.2)	25.0	176.5 (18.0)	1.74
		55		6.4	(0.65)	24.8	22.0		24.8		27.5		1.84
		60		5.8	(0.60)	27.0	24.0		27.0		30.0		1.84
		65		5.4	(0.55)	29.2	26.0		29.2		32.5		1.96
		70		5.0	(0.51)	31.5	28.0		31.5		35.0		1.96
		75		4.7	(0.48)	33.8	30.0		33.8		37.5		2.08
		80		4.4	(0.45)	36.0	32.0		36.0		40.0		2.20
		90		3.9	(0.40)	40.5	36.0		40.5		45.0		2.30
		100		3.5	(0.36)	45.0	40.0		45.0		50.0		2.55
				Operation frequency		1 million times			500,000 times		300,000 times		

Code No. Code	D	L	d	Spring constant N/mm	(kgf/mm)	ℓ min Solid height	F=L×40% Fmm	Load N (kgf)	F=L×45% Fmm	Load N (kgf)	F=L×50% Fmm	Load N (kgf)	@/P (1～19P)
SSWF	16	20	8	20.8	(2.13)	9.0	8.0		9.0		10.0		1.39
		25		16.7	(1.70)	11.3	10.0		11.3		12.5		1.39
		30		13.9	(1.42)	13.5	12.0		13.5		15.0		1.50
		35		11.9	(1.22)	15.8	14.0		15.8		17.5		1.61
		40		10.4	(1.06)	18.0	16.0		18.0		20.0		1.61
		45		9.3	(0.95)	20.2	18.0		20.2		22.5		1.74
		50		8.3	(0.85)	22.5	20.0		22.5		25.0		1.84
		55		7.6	(0.77)	24.8	22.0	164.8 (16.8)	24.8	185.3 (18.9)	27.5	205.9 (21.0)	1.96
		60		6.9	(0.71)	27.0	24.0		27.0		30.0		2.08
		65		6.4	(0.65)	29.2	26.0		29.2		32.5		2.20
		70		6.0	(0.61)	31.5	28.0		31.5		35.0		2.30
		75		5.6	(0.57)	33.8	30.0		33.8		37.5		2.30
		80		5.2	(0.53)	36.0	32.0		36.0		40.0		2.55
		90		4.6	(0.47)	40.5	36.0		40.5		45.0		2.78
		100		4.2	(0.43)	45.0	40.0		45.0		50.0		3.00
		125		3.3	(0.34)	56.2	50.0		56.2		62.5		3.24
SSWF	18	20	9	25.7	(2.63)	9.0	8.0		9.0		10.0		1.39
		25		20.6	(2.10)	11.3	10.0		11.3		12.5		1.39
		30		17.1	(1.75)	13.5	12.0		13.5		15.0		1.50
		35		14.7	(1.50)	15.8	14.0		15.8		17.5		1.61
		40		12.9	(1.31)	18.0	16.0		18.0		20.0		1.61
		45		11.4	(1.17)	20.2	18.0		20.2		22.5		1.74
		50		10.3	(1.05)	22.5	20.0		22.5		25.0		1.84
		55		9.4	(0.95)	24.8	22.0	204.0 (20.8)	24.8	229.5 (23.4)	27.5	255.0 (26.0)	1.96
		60		8.6	(0.88)	27.0	24.0		27.0		30.0		2.08
		65		7.9	(0.81)	29.2	26.0		29.2		32.5		2.20
		70		7.4	(0.75)	31.5	28.0		31.5		35.0		2.30
		75		6.9	(0.70)	33.8	30.0		33.8		37.5		2.30
		80		6.4	(0.66)	36.0	32.0		36.0		40.0		2.55
		90		5.7	(0.58)	40.5	36.0		40.5		45.0		2.78
		100		5.1	(0.53)	45.0	40.0		45.0		50.0		3.12
		125		4.1	(0.42)	56.2	50.0		56.2		62.5		3.24
SSWF	20	20	11	31.9	(3.25)	9.0	8.0		9.0		10.0		1.39
		25		25.5	(2.60)	11.3	10.0		11.3		12.5		1.39
		30		21.2	(2.17)	13.5	12.0		13.5		15.0		1.50
		35		18.2	(1.86)	15.8	14.0		15.8		17.5		1.61
		40		15.9	(1.63)	18.0	16.0		18.0		20.0		1.61
		45		14.2	(1.45)	20.2	18.0		20.2		22.5		1.84
		50		12.8	(1.30)	22.5	20.0		22.5		25.0		1.84
		55		11.6	(1.18)	24.8	22.0	251.1 (25.6)	24.8	282.4 (28.8)	27.5	313.8 (32.0)	1.96
		60		10.6	(1.08)	27.0	24.0		27.0		30.0		2.08
		65		9.8	(1.00)	29.2	26.0		29.2		32.5		2.20
		70		9.1	(0.93)	31.5	28.0		31.5		35.0		2.30
		75		8.5	(0.87)	33.8	30.0		33.8		37.5		2.30
		80		8.0	(0.81)	36.0	32.0		36.0		40.0		2.43
		90		7.1	(0.72)	40.5	36.0		40.5		45.0		2.65
		100		6.4	(0.65)	45.0	40.0		45.0		50.0		2.78
		125		5.1	(0.52)	56.2	50.0		56.2		62.5		3.00
		150		4.3	(0.43)	67.5	60.0		67.5		75.0		3.36
SSWF	22	25	11	31.4	(3.20)	11.3	10.0		11.3		12.5		1.39
		30		26.2	(2.67)	13.5	12.0		13.5		15.0		1.52
		35		22.4	(2.29)	15.8	14.0		15.8		17.5		1.62
		40		19.6	(2.00)	18.0	16.0		18.0		20.0		1.62
		45		17.4	(1.78)	20.2	18.0		20.2		22.5		1.86
		50		15.7	(1.60)	22.5	20.0		22.5		25.0		1.86
		55		14.3	(1.46)	24.8	22.0		24.8		27.5		1.98
		60		13.1	(1.34)	27.0	24.0	313.8 (32.0)	27.0	353.0 (36.0)	30.0	392.3 (40.0)	2.09
		65		12.1	(1.23)	29.2	26.0		29.2		32.5		2.21
		70		11.2	(1.14)	31.5	28.0		31.5		35.0		2.31
		75		10.5	(1.07)	33.8	30.0		33.8		37.5		2.31
		80		9.8	(1.00)	36.0	32.0		36.0		40.0		2.45
		90		8.7	(0.89)	40.5	36.0		40.5		45.0		2.80
		100		7.9	(0.80)	45.0	40.0		45.0		50.0		2.80
		125		6.3	(0.64)	56.2	50.0		56.2		62.5		3.14
		150		5.2	(0.53)	67.5	60.0		67.5		75.0		3.49
				Operation frequency		1 million times			500,000 times		300,000 times		

ORDER Code No. SSWF6 — 15

DELIVERY Next In stock working day P.15

PRICE Without tax ▶Quantity discount rate P.15

1～19	20～49	50～199	200～500	501～
100%	95%	90%	85%	Enquiry

Code No. Code	D	L	d	Spring constant N/mm	(kgf/mm)	ℓ min Solid height	F=L×40% Fmm	Load N (kgf)	F=L×45% Fmm	Load N (kgf)	F=L×50% Fmm	Load N (kgf)	@/P (1～19P)
SSWF	25	25	13.5	39.2	(4.00)	11.3	10.0		11.3		12.5		1.52
		30		32.7	(3.33)	13.5	12.0		13.5		15.0		1.62
		35		28.0	(2.86)	15.8	14.0		15.8		17.5		1.62
		40		24.5	(2.50)	18.0	16.0		18.0		20.0		1.74
		45		21.8	(2.22)	20.2	18.0		20.2		22.5		1.86
		50		19.6	(2.00)	22.5	20.0		22.5		25.0		1.86
		55		17.8	(1.82)	24.8	22.0		24.8		27.5		1.98
		60		16.3	(1.67)	27.0	24.0		27.0		30.0		2.09
		65		15.1	(1.54)	29.2	26.0	392.3 (40.0)	29.2	441.3 (45.0)	32.5	490.3 (50.0)	2.31
		70		14.0	(1.43)	31.5	28.0		31.5		35.0		2.31
		75		13.1	(1.33)	33.8	30.0		33.8		37.5		2.45
		80		12.3	(1.25)	36.0	32.0		36.0		40.0		2.56
		90		10.9	(1.11)	40.5	36.0		40.5		45.0		2.80
		100		9.8	(1.00)	45.0	40.0		45.0		50.0		2.90
		125		7.8	(0.80)	56.2	50.0		56.2		62.5		3.37
		150		6.5	(0.67)	67.5	60.0		67.5		75.0		3.73
		175		5.6	(0.57)	78.8	70.0		78.8		87.5		4.08
		200		4.9	(0.50)	90.0	80.0		90.0		100.0		4.55
SSWF	27	25	13.5	47.1	(4.80)	11.3	10.0		11.3		12.5		1.52
		30		39.2	(4.00)	13.5	12.0		13.5		15.0		1.62
		35		33.6	(3.43)	15.8	14.0		15.8		17.5		1.62
		40		29.4	(3.00)	18.0	16.0		18.0		20.0		1.74
		45		26.1	(2.67)	20.2	18.0		20.2		22.5		1.86
		50		23.5	(2.40)	22.5	20.0		22.5		25.0		1.86
		55		21.4	(2.18)	24.8	22.0		24.8		27.5		1.98
		60		19.6	(2.00)	27.0	24.0		27.0		30.0		2.09
		65		18.1	(1.85)	29.2	26.0	470.7 (48.0)	29.2	529.6 (54.0)	32.5	588.4 (60.0)	2.31
		70		16.8	(1.72)	31.5	28.0		31.5		35.0		2.31
		75		15.7	(1.60)	33.8	30.0		33.8		37.5		2.45
		80		14.7	(1.50)	36.0	32.0		36.0		40.0		2.56
		90		13.1	(1.33)	40.5	36.0		40.5		45.0		2.80
		100		11.8	(1.20)	45.0	40.0		45.0		50.0		2.90
		125		9.4	(0.96)	56.2	50.0		56.2		62.5		3.37
		150		7.8	(0.80)	67.5	60.0		67.5		75.0		3.84
		175		6.7	(0.69)	78.8	70.0		78.8		87.5		4.42
		200		5.9	(0.60)	90.0	80.0		90.0		100.0		4.78
SSWF	30	25	16	56.9	(5.80)	11.3	10.0		11.3		12.5		1.52
		30		47.4	(4.84)	13.5	12.0		13.5		15.0		1.62
		35		40.6	(4.15)	15.8	14.0		15.8		17.5		1.62
		40		35.5	(3.63)	18.0	16.0		18.0		20.0		1.74
		45		31.6	(3.22)	20.2	18.0		20.2		22.5		1.86
		50		28.4	(2.90)	22.5	20.0		22.5		25.0		1.98
		55		25.9	(2.64)	24.8	22.0		24.8		27.5		2.09
		60		23.7	(2.42)	27.0	24.0		27.0		30.0		2.21
		65		21.9	(2.23)	29.2	26.0	564.9 (57.6)	29.2	635.5 (64.8)	32.5	706.1 (72.0)	2.31
		70		20.3	(2.07)	31.5	28.0		31.5		35.0		2.31
		75		19.0	(1.93)	33.8	30.0		33.8		37.5		2.45
		80		17.8	(1.81)	36.0	32.0		36.0		40.0		2.56
		90		15.8	(1.61)	40.5	36.0		40.5		45.0		2.80
		100		14.2	(1.45)	45.0	40.0		45.0		50.0		3.03
		125		11.4	(1.16)	56.2	50.0		56.2		62.5		3.49
		150		9.5	(0.97)	67.5	60.0		67.5		75.0		3.96
		175		8.1	(0.83)	78.8	70.0		78.8		87.5		4.55
		200		7.1	(0.73)	90.0	80.0		90.0		100.0		4.89
SSWF	35	40	19	47.8	(4.88)	18.0	16.0		18.0		20.0		1.86
		45		42.5	(4.34)	20.2	18.0		20.2		22.5		1.98
		50		38.2	(3.90)	22.5	20.0		22.5		25.0		2.21
		55		34.8	(3.55)	24.8	22.0		24.8		27.5		2.31
		60		31.9	(3.25)	27.0	24.0		27.0		30.0		2.45
		65		29.4	(3.00)	29.2	26.0		29.2		32.5		2.68
		70		27.3	(2.79)	31.5	28.0	768.8 (78.4)	31.5	864.9 (88.2)	35.0	961.1 (98.0)	2.80
		75		25.5	(2.60)	33.8	30.0		33.8		37.5		2.90
		80		23.9	(2.44)	36.0	32.0		36.0		40.0		3.03
		90		21.2	(2.17)	40.5	36.0		40.5		45.0		3.25
		100		19.1	(1.95)	45.0	40.0		45.0		50.0		3.61
		125		15.3	(1.56)	56.2	50.0		56.2		62.5		4.31
		150		12.7	(1.30)	67.5	60.0		67.5		75.0		5.00
		175		10.9	(1.12)	78.8	70.0		78.8		87.5		5.71
		200		9.6	(0.98)	90.0	80.0		90.0		100.0		6.42
				Operation frequency		1 million times			500,000 times		300,000 times		

⚠ Load calculation method: Load=Spring constant×Deflection
N=N/mm×Fmm
(kgf=N×0.101972)
⚠ The solid height values are reference only P.204

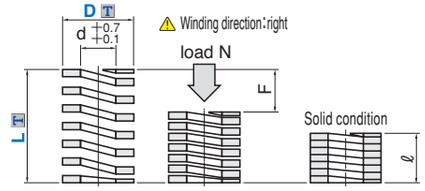
Code No. Code	D	L	d	Spring constant N/mm	(kgf/mm)	ℓ min Solid height	F=L×40% Fmm	Load N (kgf)	F=L×45% Fmm	Load N (kgf)	F=L×50% Fmm	Load N (kgf)	@/P (1～19P)
SSWF	40	40	22	62.5	(6.38)	18.0	16.0		18.0		20.0		2.31
		45		55.6	(5.67)	20.2	18.0		20.2		22.5		2.45
		50		50.0	(5.10)	22.5	20.0		22.5		25.0		2.56
		55		45.5	(4.64)	24.8	22.0		24.8		27.5		2.80
		60		41.7	(4.25)	27.0	24.0		27.0		30.0		2.90
		65		38.5	(3.93)	29.2	26.0		29.2		32.5		3.25
		70		35.7	(3.65)	31.5	28.0		31.5		35.0		3.37
		75		33.3	(3.40)	33.8	30.0		33.8		37.5		3.61
		80		31.3	(3.19)	36.0	32.0	1000 (102)	36.0	1128 (115)	40.0	1255 (128)	3.73
		90		27.8	(2.84)	40.5	36.0		40.5		45.0		4.08
		100		25.0	(2.55)	45.0	40.0		45.0		50.0		4.55
		125		20.0	(2.04)	56.2	50.0		56.2		62.5		5.48
		150		16.7	(1.70)	67.5	60.0		67.5		75.0		6.42
		175		14.3	(1.46)	78.8	70.0		78.8		87.5		7.34
		200		12.5	(1.28)	90.0	80.0		90.0		100.0		8.40
		225		11.1	(1.13)	101.2	90.0		101.2		112.5		9.33
		250		10.0	(1.02)	112.5	100.0		112.5		125.0		10.2
		275		9.1	(0.93)	124.0	110.0		123.8		137.5		12.3
		300		8.3	(0.85)	142.2	120.0		135.0		150.0		13.2
SSWF	50	50	27.5	78.5	(8.01)	22.5	20.0		22.5		25.0		4.12
		55		71.3	(7.28)	24.8	22.0		24.8		27.5		4.36
		60		65.4	(6.67)	27.0	24.0		27.0		30.0		4.46
		65		60.4	(6.16)	29.2	26.0		29.2		32.5		4.70
		70		56.0	(5.72)	31.5	28.0		31.5		35.0		4.93
		75		52.3	(5.34)	33.8	30.0		33.8		37.5		5.30
		80		49.0	(5.00)	36.0	32.0		36.0		40.0		5.52
		90		43.6	(4.45)	40.5	36.0		40.5		45.0		5.99
		100		39.2	(4.00)	45.0	40.0		45.0		50.0		6.71
		125		31.4	(3.20)	56.2	50.0	1569 (160)	56.2	1765 (180)	62.5	1961 (200)	8.00
		150		26.2	(2.67)	67.5	60.0		67.5		75.0		9.30
		175		22.4	(2.29)	78.8	70.0		78.8		87.5		10.8
		200		19.6	(2.00)	90.0	80.0		90.0		100.0		12.2
		225		17.4	(1.78)	101.2	90.0		101.2		112.5		13.6
		250		15.7	(1.60)	112.5	100.0		112.5		125.0		14.8
		275		14.3	(1.46)	124.0	110.0		123.8		137.5		16.1
		300		13.1	(1.33)	135.0	120.0		135.0		150.0		17.5
		350		11.2	(1.14)	165.9	140.0		157.5		175.0		20.9
		400		9.8	(1.00)	189.6	160.0		180.0		200.0		23.1
		450		8.7	(0.89)	213.3	180.0		202.5		225.0		25.0
		500		7.8	(0.80)	237.0	200.0		225.0		250.0		27.0
SSWF	60	60	33	94.0	(9.59)	27.0	24.0		27.0		30.0		7.28
		70		80.6	(8.22)	31.5	28.0		31.5		35.0		7.65
		80		70.5	(7.19)	36.0	32.0		36.0		40.0		7.89
		90		62.7	(6.39)	40.5	36.0		40.5		45.0		8.48
		100		56.4	(5.75)	45.0	40.0		45.0		50.0		9.18
		125		45.1	(4.60)	56.2	50.0		56.2		62.5		11.2
		150		37.6	(3.84)	67.5	60.0		67.5		75.0		13.2
		175		32.2	(3.29)	78.8	70.0	2256 (230)	78.8	2540 (259)	87.5	2824 (288)	15.2
		200		28.2	(2.88)	90.0	80.0		90.0		100.0		17.1
		225		25.1	(2.56)	101.3	90.0		101.3		112.5		18.7
		250		22.6	(2.30)	112.5	100.0		112.5		125.0		20.6
		275		20.5	(2.09)	123.8	110.0		123.8		137.5		22.4
		300		18.8	(1.92)	135.0	120.0		135.0		150.0		24.3
		350		16.1	(1.64)	165.9	140.0		157.5		175.0		28.7
		400		14.1	(1.44)	189.6	160.0		180.0		200.0		32.1
		450		12.5	(1.28)	213.3	180.0		202.5		225.0		34.6
		500		11.3	(1.15)	237.0	200.0		225.0		250.0		37.3
SSWF	70	70	38.5	112.1	(11.44)	33.2	28.0		31.5		35.0		13.8
		80		98.1	(10.01)	37.9	32.0		36.0		40.0		14.2
		90		87.2	(8.89)	42.7	36.0		40.5		45.0		14.7
		100		78.5	(8

Coil Springs

For Light Load SSWL

Material	Code
SWOSC−V	SSWL

Item	Allowable tolerance
Load	±10%
Perpendicularity	2° or less



D	T Tolerance
6～60	0 −0.7
70	0 −1.0

L	T Tolerance
10～ 50	±0.5
55～500	±1%

Code No.			d	Spring constant		ℓ min Solid height	F=L×32%		F=L×36%		F=L×40%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	Fmm	Load N (kgf)	Fmm	Load N (kgf)	
SSWL	6	15	3	13.1	(1.34)	8.6	4.8	62.8 (6.4)	5.4	70.6 (7.2)	6.0	78.5 (8.0)	0.81
		20		9.8	(1.00)	11.5	6.4		7.2		8.0		0.92
		25		7.9	(0.80)	14.4	8.0		9.0		10.0		1.04
		30		6.5	(0.67)	17.2	9.6		10.8		12.0		1.15
		35		5.6	(0.57)	20.1	11.2		12.6		14.0		1.15
		40		4.9	(0.50)	23.0	12.8		14.4		16.0		1.28
SSWL	8	10	4	24.5	(2.50)	5.4	3.2	78.5 (8.0)	3.6	88.3 (9.0)	4.0	98.1 (10.0)	0.81
		15		16.4	(1.67)	8.1	4.8		5.4		6.0		0.81
		20		12.3	(1.25)	10.8	6.4		7.2		8.0		0.81
		25		9.8	(1.00)	13.5	8.0		9.0		10.0		0.81
		30		8.2	(0.83)	16.2	9.6		10.8		12.0		0.92
		35		7.0	(0.72)	18.9	11.2		12.6		14.0		1.04
		40		6.1	(0.63)	21.6	12.8		14.4		16.0		1.15
		45		5.5	(0.56)	24.3	14.4		16.2		18.0		1.15
		50		4.9	(0.50)	27.0	16.0		18.0		20.0		1.28
		55		4.5	(0.46)	29.7	17.6		19.8		22.0		1.39
		60		4.1	(0.42)	32.4	19.2		21.6		24.0		1.50
		65		3.8	(0.39)	37.3	20.8		23.4		26.0		1.61
		70		3.5	(0.36)	40.2	22.4		25.2		28.0		1.61
		75		3.3	(0.33)	43.1	24.0		27.0		30.0		1.74
		80		3.1	(0.31)	45.9	25.6		28.8		32.0		1.84
SSWL	10	10	5	34.3	(3.50)	5.4	3.2	109.8 (11.2)	3.6	123.6 (12.6)	4.0	137.3 (14.0)	0.81
		15		22.9	(2.34)	8.1	4.8		5.4		6.0		0.81
		20		17.2	(1.75)	10.8	6.4		7.2		8.0		0.81
		25		13.7	(1.40)	13.5	8.0		9.0		10.0		0.81
		30		11.4	(1.17)	16.2	9.6		10.8		12.0		0.81
		35		9.8	(1.00)	18.9	11.2		12.6		14.0		0.81
		40		8.6	(0.88)	21.6	12.8		14.4		16.0		0.92
		45		7.6	(0.78)	24.3	14.4		16.2		18.0		1.04
		50		6.9	(0.70)	27.0	16.0		18.0		20.0		1.15
		55		6.2	(0.64)	29.7	17.6		19.8		22.0		1.15
		60		5.7	(0.58)	32.4	19.2		21.6		24.0		1.28
		65		5.3	(0.54)	35.1	20.8		23.4		26.0		1.39
		70		4.9	(0.50)	37.8	22.4		25.2		28.0		1.39
		75		4.6	(0.47)	40.5	24.0		27.0		30.0		1.61
		80		4.3	(0.44)	43.2	25.6		28.8		32.0		1.74
		90		3.8	(0.39)	48.6	28.8		32.4		36.0		1.96
SSWL	12	15	6	34.7	(3.54)	8.1	4.8	164.8 (16.8)	5.4	185.3 (18.9)	6.0	205.9 (21.0)	0.92
		20		26.1	(2.66)	10.8	6.4		7.2		8.0		0.92
		25		20.8	(2.13)	13.5	8.0		9.0		10.0		1.04
		30		17.4	(1.77)	16.2	9.6		10.8		12.0		1.15
		35		14.9	(1.52)	18.9	11.2		12.6		14.0		1.15
		40		13.0	(1.33)	21.6	12.8		14.4		16.0		1.15
		45		11.6	(1.18)	24.3	14.4		16.2		18.0		1.28
		50		10.4	(1.06)	27.0	16.0		18.0		20.0		1.39
		55		9.5	(0.97)	29.7	17.6		19.8		22.0		1.50
		60		8.7	(0.89)	32.4	19.2		21.6		24.0		1.61
		65		8.0	(0.82)	35.1	20.8		23.4		26.0		1.61
		70		7.4	(0.76)	37.8	22.4		25.2		28.0		1.74
		75		6.9	(0.71)	40.5	24.0		27.0		30.0		1.84
		80		6.5	(0.66)	43.2	25.6		28.8		32.0		1.96
		90		5.8	(0.59)	48.6	28.8		32.4		36.0		2.20
SSWL	14	20	7	34.3	(3.50)	10.8	6.4	219.7 (22.4)	7.2	247.1 (25.2)	8.0	274.6 (28.0)	1.28
		25		27.5	(2.80)	13.5	8.0		9.0		10.0		1.28
		30		22.9	(2.34)	16.2	9.6		10.8		12.0		1.39
		35		19.6	(2.00)	18.9	11.2		12.6		14.0		1.5
		40		17.2	(1.75)	21.6	12.8		14.4		16.0		1.61
		45		15.3	(1.56)	24.3	14.4		16.2		18.0		1.61
		50		13.7	(1.40)	27.0	16.0		18.0		20.0		1.74
		55		12.5	(1.27)	29.7	17.6		19.8		22.0		1.84
		60		11.5	(1.17)	32.4	19.2		21.6		24.0		1.84
		65		10.6	(1.08)	35.1	20.8		23.4		26.0		1.96
		70		9.8	(1.00)	37.8	22.4		25.2		28.0		1.96
		75		9.2	(0.93)	40.5	24.0		27.0		30.0		2.08
		80		8.6	(0.88)	43.2	25.6		28.8		32.0		2.20
		90		7.6	(0.78)	48.6	28.8		32.4		36.0		2.30
		100		6.9	(0.70)	54.0	32.0		36.0		40.0		2.55
				Operation frequency			1 million times		500,000 times		300,000 times		

Code No.			d	Spring constant		ℓ min Solid height	F=L×32%		F=L×36%		F=L×40%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	Fmm	Load N (kgf)	Fmm	Load N (kgf)	
SSWL	16	20	8	42.9	(4.38)	10.8	6.4	274.6 (28.0)	7.2	308.9 (31.5)	8.0	343.2 (35.0)	1.39
		25		34.3	(3.50)	13.5	8.0		9.0		10.0		1.39
		30		28.6	(2.92)	16.2	9.6		10.8		12.0		1.50
		35		24.5	(2.50)	18.9	11.2		12.6		14.0		1.61
		40		21.5	(2.19)	21.6	12.8		14.4		16.0		1.61
		45		19.1	(1.95)	24.3	14.4		16.2		18.0		1.74
		50		17.2	(1.75)	27.0	16.0		18.0		20.0		1.84
		55		15.6	(1.59)	29.7	17.6		19.8		22.0		1.96
		60		14.3	(1.46)	32.4	19.2		21.6		24.0		2.08
		65		13.2	(1.35)	35.1	20.8		23.4		26.0		2.20
		70		12.3	(1.25)	37.8	22.4		25.2		28.0		2.30
		75		11.4	(1.17)	40.5	24.0		27.0		30.0		2.30
		80		10.7	(1.09)	43.2	25.6		28.8		32.0		2.55
		90		9.5	(0.97)	48.6	28.8		32.4		36.0		2.78
		100		8.6	(0.88)	54.0	32.0		36.0		40.0		3.00
		125		6.9	(0.70)	67.5	40.0		45.0		50.0		3.24
SSWL	18	20	9	52.7	(5.38)	10.8	6.4	337.3 (34.4)	7.2	379.5 (38.7)	8.0	421.7 (43.0)	1.39
		25		42.2	(4.30)	13.5	8.0		9.0		10.0		1.39
		30		35.1	(3.58)	16.2	9.6		10.8		12.0		1.50
		35		30.1	(3.07)	18.9	11.2		12.6		14.0		1.61
		40		26.3	(2.69)	21.6	12.8		14.4		16.0		1.61
		45		23.4	(2.39)	24.3	14.4		16.2		18.0		1.74
		50		21.1	(2.15)	27.0	16.0		18.0		20.0		1.84
		55		19.2	(1.96)	29.7	17.6		19.8		22.0		1.96
		60		17.6	(1.79)	32.4	19.2		21.6		24.0		2.08
		65		16.2	(1.65)	35.1	20.8		23.4		26.0		2.20
		70		15.1	(1.54)	37.8	22.4		25.2		28.0		2.30
		75		14.1	(1.43)	40.5	24.0		27.0		30.0		2.30
		80		13.2	(1.34)	43.2	25.6		28.8		32.0		2.55
		90		11.7	(1.19)	48.6	28.8		32.4		36.0		2.78
		100		10.5	(1.08)	54.0	32.0		36.0		40.0		3.12
		125		8.4	(0.86)	67.5	40.0		45.0		50.0		3.36
SSWL	20	20	10	65.9	(6.73)	10.8	6.4	423.6 (43.2)	7.2	476.6 (48.6)	8.0	529.6 (54.0)	1.50
		25		53.0	(5.40)	13.5	8.0		9.0		10.0		1.50
		30		44.1	(4.50)	16.2	9.6		10.8		12.0		1.61
		35		37.8	(3.86)	18.9	11.2		12.6		14.0		1.61
		40		33.1	(3.38)	21.6	12.8		14.4		16.0		1.74
		45		29.4	(3.00)	24.3	14.4		16.2		18.0		1.84
		50		26.5	(2.70)	27.0	16.0		18.0		20.0		1.96
		55		24.1	(2.46)	29.7	17.6		19.8		22.0		2.08
		60		22.1	(2.25)	32.4	19.2		21.6		24.0		2.20
		65		20.4	(2.08)	35.1	20.8		23.4		26.0		2.30
		70		18.9	(1.93)	37.8	22.4		25.2		28.0		2.30
		75		17.6	(1.80)	40.5	24.0		27.0		30.0		2.43
		80		16.5	(1.69)	43.2	25.6		28.8		32.0		2.55
		90		14.7	(1.50)	48.6	28.8		32.4		36.0		2.78
		100		13.2	(1.35)	54.0	32.0		36.0		40.0		3.00
		125		10.6	(1.08)	67.5	40.0		45.0		50.0		3.24
		150		8.8	(0.90)	81.0	48.0		54.0		60.0		3.48
SSWL	22	25	11	65.7	(6.70)	13.5	8.0	525.6 (53.6)	9.0	591.3 (60.3)	10.0	657.0 (67.0)	1.52
		30		54.9	(5.60)	16.2	9.6		10.8		12.0		1.62
		35		47.1	(4.80)	18.9	11.2		12.6		14.0		1.62
		40		41.2	(4.20)	21.6	12.8		14.4		16.0		1.86
		45		36.6	(3.73)	24.3	14.4		16.2		18.0		1.86
		50		32.9	(3.36)	27.0	16.0		18.0		20.0		1.98
		55		29.9	(3.06)	29.7	17.6		19.8		22.0		2.09
		60		27.4	(2.80)	32.4	19.2		21.6		24.0		2.21
		65		25.3	(2.59)	35.1	20.8		23.4		26.0		2.31
		70		23.5	(2.40)	37.8	22.4		25.2		28.0		2.31
		75		22.0	(2.24)	40.5	24.0		27.0		30.0		2.56
		80		20.6	(2.10)	43.2	25.6		28.8		32.0		2.68
		90		18.3	(1.87)	48.6	28.8		32.4		36.0		2.80
		100		16.5	(1.68)	54.0	32.0		36.0		40.0		3.14
		125		13.2	(1.34)	67.5	40.0		45.0		50.0		3.37
		150		11.0	(1.12)	81.0	48.0		54.0		60.0		3.96
				Operation frequency			1 million times		500,000 times		300,000 times		

ORDER Code No. SSWL6 − 15

DELIVERY Next In stock working day P.15

PRICE Without tax ▶Quantity discount rate P.15

1～19	20～49	50～199	200～500	501～
100%	95%	90%	85%	Enquiry

Code No.			d	Spring constant		ℓ min Solid height	F=L×32%		F=L×36%		F=L×40%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	Fmm	Load N (kgf)	Fmm	Load N (kgf)	
SSWL	25	25	12.5	82.4	(8.40)	13.5	8.0	659.0 (67.2)	9.0	741.4 (75.6)	10.0	823.8 (84.0)	1.62
		30		68.6	(7.00)	16.2	9.6		10.8		12.0		1.62
		35		58.8	(6.00)	18.9	11.2		12.6		14.0		1.74
		40		51.5	(5.25)	21.6	12.8		14.4		16.0		1.86
		45		45.8	(4.67)	24.3	14.4		16.2		18.0		1.98
		50		41.2	(4.20)	27.0	16.0		18.0		20.0		1.98
		55		37.4	(3.82)	29.7	17.6		19.8		22.0		2.21
		60		34.3	(3.50)	32.4	19.2		21.6		24.0		2.31
		65		31.7	(3.23)	35.1	20.8		23.4		26.0		2.31
		70		29.4	(3.00)	37.8	22.4		25.2		28.0		2.45
		75		27.4	(2.80)	40.5	24.0		27.0		30.0		2.56
		80		25.7	(2.63)	43.2	25.6		28.8		32.0		2.68
		90		22.9	(2.33)	48.6	28.8		32.4		36.0		2.90
		100		20.6	(2.10)	54.0	32.0		36.0		40.0		3.14
		125		16.5	(1.68)	67.5	40.0		45.0		50.0		3.61
		150		13.7	(1.40)	81.0	48.0		54.0		60.0		4.08
		175		11.8	(1.20)	94.5	56.0		63.0		70.0		4.42
		200		10.3	(1.05)	108.0	64.0		72.0		80.0		4.78
SSWL	27	25	13.5	98.1	(10.01)	13.5	8.0	784.5 (80.0)	9.0	882.6 (90.0)	10.0	980.7 (100)	1.62
		30		81.7	(8.33)	16.2	9.6		10.8		12.0		1.62
		35		70.0	(7.14)	18.9	11.2		12.6		14.0		1.86
		40		61.3	(6.25)	21.6	12.8		14.4		16.0		1.86
		45		54.5	(5.56)	24.3	14.4		16.2		18.0		1.98
		50		49.0	(5.00)	27.0	16.0		18.0		20.0		2.21
		55		44.6	(4.55)	29.7	17.6		19.8		22.0		2.31
		60		40.8	(4.17)	32.4	19.2		21.6		24.0		2.31
		65		37.7	(3.85)	35.1	20.8		23.4		26.0		2.56
		70		35.0	(3.57)	37.8	22.4		25.2		28.0		2.68
		75		32.7	(3.33)	40.5	24.0		27.0		30.0		2.80
		80		30.6	(3.13)	43.2	25.6		28.8		32.0		2.80
		90		27.2	(2.78)	48.6	28.8		32.4		36.0		3.14
		100		24.5	(2.50)	54.0	32.0		36.0		40.0		3.37
		125		19.6	(2.00)	67.5	40.0		45.0		50.0		3.84
		150		16.3	(1.67)	81.0	48.0		54.0		60.0		4.42
		175		14.0	(1.43)	94.5	56.0		63.0		70.0		4.89
		200		12.3	(1.25)	108.0	64.0		72.0		80.0		5.36
SSWL	30	25	15	118.9	(12.13)	13.5	8.0	949 (97)	9.0	1069 (109)	10.0	1187 (121)	1.62
		30		99.1	(10.11)	16.2	9.6		10.8		12.0		1.74
		35		84.9	(8.66)	18.9	11.2		12.6		14.0		1.86
		40		74.3	(7.58)	21.6	12.8		14.4		16.0		1.98
		45		66.0	(6.74)	24.3	14.4		16.2		18.0		2.21
		50		59.4	(6.07)	27.0	16.0		18.0		20.0		2.31
		55		54.0	(5.51)	29.7	17.6		19.8		22.0		2.45
		60		49.5	(5.05)	32.4	19.2		21.6		24.0		2.56
		65		45.7	(4.67)	35.1	20.8		23.4		26.0		2.80
		70		42.5	(4.33)	37.8	22.4		25.2		28.0		2.80
		75		39.6	(4.04)	40.5	24.0		27.0		30.0		3.03
		80		37.1	(3.79)	43.2	25.6		28.8		32.0		3.14
		90		33.0	(3.37)	48.6	28.8		32.4		36.0		3.37
		100		29.7	(3.03)	54.0	32.0		36.0		40.0		3.73
		125		23.8	(2.43)	67.5	40.0		45.0		50.0		4.42
		150		19.8	(2.02)	81.0	48.0		54.0		60.0		5.14
		175		17.0	(1.73)	94.5	56.0		63.0		70.0		5.93
		200		14.9	(1.52)	108.0	64.0		72.0		80.0		6.75
SSWL	35	40	17.5	101.1	(10.32)	21.6	12.8	1294 (132)	14.4	1461 (149)	16.0	1618 (165)	2.31
		45		89.9	(9.17)	24.3	14.4		16.2		18.0		2.56
		50		80.9	(8.26)	27.0	16.0		18.0		20.0		2.80
		55		73.6	(7.51)	29.7	17.6		19.8		22.0		3.03
		60		67.4	(6.88)	32.4	19.2		21.6		24.0		3.14
		65		62.2	(6.35)	35.1	20.8		23.4		26.0		3.37
		70		57.8	(5.90)	37.8	22.4		25.2		28.0		3.61
		75		53.9	(5.50)	40.5	24.0		27.0		30.0		3.73
		80		50.6	(5.16)	43.2	25.6		28.8		32.0		3.96
		90		44.9	(4.59)	48.6	28.8		32.4		36.0		4.42
		100		40.5	(4.13)	54.0	32.0		36.0		40.0		4.78
		125		32.4	(3.30)	67.5	40.0		45.0		50.0		5.83
		150		27.0	(2.75)	81.0	48.0		54.0		60.0		6.75
		175		23.1	(2.36)	94.5	56.0		63.0		70.0		7.81
		200		20.2	(2.06)	108.0	64.0		72.0		80.0		8.86
				Operation frequency			1 million times		500,000 times		300,000 times		

⚠ Load calculation method: Load=Spring constant×Deflection
N=N/mm×Fmm
(kgf=N×0.101972)

⚠ The solid height values are reference only P.206

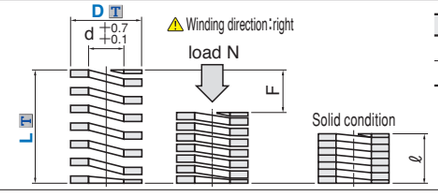
Code No.			d	Spring constant		ℓ min Solid height	F=L×32%		F=L×36%		F=L×40%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	Fmm	Load N (kgf)	Fmm	Load N (kgf)	
SSWL	40	40	20	132.3	(13.50)	21.6	12.8	1697 (173)	14.4	1902 (194)	16.0	2118 (216)	3.14
		45		117.8	(12.02)	24.3	14.4		16.2		18.0		3.25
		50		106.0	(10.82)	27.0	16.0		18.0		20.0		3.37
		55		96.4	(9.83)	29.7	17.6		19.8		22.0		3.73
		60		88.3	(9.01)	32.4	19.2		21.6		24.0		3.96
		65		81.5	(8.32)	35.1	20.8		23.4		26.0		4.31
		70		75.7	(7.73)	37.8	22.4		25.2		28.0		4.55
		75		70.7	(7.21)	40.5	24.0		27.0		30.0		4.89
		80		66.2	(6.76)	43.2	25.6		28.8		32.0		5.14
		90		58.9	(6.01)	48.6	28.8		32.4		36.0		5.59
		100		53.0	(5.41)	54.0	32.0		36.0		40.0		6.17
		125		42.4	(4.33)	67.5	40.0		45.0		50.0		7.46
		150		35.3	(3.61)	81.0	48.0		54.0		60.0		8.62
		175		30.3	(3.09)	94.5	56.0		63.0		70.0		9.92
		200		26.5	(2.70)	108.0	64.0		72.0		80.0		11.2
		225		23.6	(2.40)	121.5	72.0		81.0		90.0		12.7
		250		21.2	(2.16)	135.0	80.0		90.0		100.0		13.7
		275		19.3	(1.97)	149.0	88.0		99.0		110.0		15.9
		300		17.7	(1.80)	172.2	96.0		108.0		120.0		18.4
SSWL	50	50	25	165.6	(16.90)	27.0	16.0	2648 (270)	18.0	2981 (304)	20.0	3315 (338)	5.75
		55		150.9	(15.40)	29.7	17.6		19.8		22.0		5.99
		60		138.3	(14.12)	32.4	19.2		21.6		24.0		6.12
		65		127.7	(13.03)	35.1	20.8		23.4		26.0		6.59
		70		118.6	(12.10)	37.8	22.4		25.2		28.0		6.95
		75		110.7	(11.29)	40.5	24.0		27.0		30.0		7.42
		80		103.8	(10.59)	43.2	25.6		28.8		32.0		7.65
		90		92.2	(9.41)	48.6	28.8		32.4		36.0		8.48
		100		83.0	(8.47)	54.0	32.0		36.0		40.0		9.30
		125		66.4	(6.78)	67.5	40.0		45.0		50.0		11.2
		150		55.3	(5.65)	81.0	48.0		54.0		60.0		13.1
		175		47.4	(4.84)	94.5	56.0		63.0		70.0		14.8
		200		41.5	(4.23)	108.0	64.0		72.0		80.0		16.7
		225		36.9	(3.76)	122.0	72.0		81.0		90.0		18.6
		250		33.2	(3.39)	135.0	80.0		90.0		100.0		20.2
		275		30.2	(3.08)	149.0	88.0		99.0		110.0		22.1
		300		27.7	(2.82)	162.0	96.0		108.0		120.0		24.0
		350		23.7	(2.42)	200.9	112.0		126.0		140.0		28.7
		400		20.7	(2.11)	216.0	128.0		144.0		160.0		39.2
		450		18.4	(1.88)	243.0	144.0		162.0		180.0		47.0
		500		16.6	(1.69)	270.0	160.0		182.0		200.0		56.5
SSWL	60	60	30	199.0	(20.30)	32.4	19.2	3815 (389)	21.6	4286 (437)	24.0	4766 (486)	10.3
		70		170.5	(17.40)	37.8	22.4		25.2		28.0		10.6
		80		149.2	(15.23)	43.2	25.6		28.8		32.0		11.1
		90		132.6	(13.53)	48.6	28.8		32.4		36.0		11.7
		100		119.4	(12.18)	54.0	32.0		36.0		40.0		12.5
		125		95.5	(9.74)	67.5	40.0		45.0		50.0		15.0
		150		79.6	(8.12)	81.0	48.0		54.0		60.0		17.5
		175		68.2	(6.96)	94.5	56.0		63.0		70.0		20.0
		200		59.7	(6.09)	108.0	64.0		72.0		80.0		22.7
		225		53.0	(5.40)	122.0	72.0		81.0		90.0		28.4
		250		47.8	(4.87)	135.0	80.0		90.0		100.0		27.7
		275		43.4	(4.42)	149.0	88.0		99.0		110.0		34.0
		300		39.8	(4.06)	162.0	96.0		108.0		120.0		33.0
		350		34.1	(3.48)	200.9	112.0		126.0		140.0		39.2
		400		29.8	(3.04)	216.0	128.0		144.0		160.0		52.5
		450		26.5	(2.70)	243.0	144.0		162.0		180.0		62.3
		500		23.9	(2.43)	240.0	160.0		180.0		200.0		74.0
SSWL	70	70	38.5	213.7	(21.80)	40.2	22.4	4786 (488)	25.2	5384 (549)	28.0	5982 (610)	17.0
		80		187.0	(19.08)	45.9	25.6		28.8		32.0		17.7
		90	

Coil Springs

For Medium Load SSWM

Material	Code
SWOSC−V	SSWM

Item	Allowable tolerance
Load	±10%
Perpendicularity	2° or less



D	T Tolerance
6~60	0 −0.7
70	0 −1.0

L	T Tolerance
10~ 50	±0.5
55~350	±1%

Code No.			d	Spring constant		ℓ min Solid height	F=L×25.6%		F=L×28.8%		F=L×32%		@/P (1~19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	Fmm	Load N (kgf)	Fmm	Load N (kgf)	
SSWM	6	15	3	20.4	2.08	9.8	3.8	78.5 (8.0)	4.3	88.3 (9.0)	4.8	98.1 (10.0)	0.81
		20		15.3	1.56	13.1	5.1		5.8		6.4		0.92
		25		12.3	1.25	16.4	6.4		7.2		8.0		1.04
		30		10.2	1.04	19.6	7.7		8.6		9.6		1.15
		35		8.8	0.89	22.9	9.0		10.1		11.2		1.28
		40		7.7	0.78	26.2	10.2		11.5		12.8		1.28
		45		6.8	0.69	29.4	11.5		13.0		14.4		1.28
		50		6.1	0.63	32.6	12.8		14.4		16.0		1.39
		55		5.6	0.57	36.0	14.1		15.8		17.6		1.50
		60		5.1	0.52	39.2	15.4		17.3		19.2		1.61
SSWM	8	10	4	42.9	4.37	6.6	2.6	109.8 (11.2)	2.9	123.6 (12.6)	3.2	137.3 (14.0)	0.70
		15		28.6	2.92	9.4	3.8		4.3		4.8		0.70
		20		21.4	2.19	12.5	5.1		5.8		6.4		0.81
		25		17.1	1.75	15.7	6.4		7.2		8.0		0.81
		30		14.3	1.46	18.8	7.7		8.6		9.6		0.81
		35		12.2	1.25	21.9	9.0		10.1		11.2		0.92
		40		10.7	1.09	25.0	10.2		11.5		12.8		1.04
		45		9.5	0.97	28.2	11.5		13.0		14.4		1.15
		50		8.6	0.87	31.3	12.8		14.4		16.0		1.39
		55		7.8	0.80	34.4	14.1		15.8		17.6		1.61
		60		7.1	0.73	37.6	15.4		17.3		19.2		1.74
		65		6.6	0.67	42.5	16.6		18.7		20.8		1.96
		70		6.1	0.62	45.8	17.9		20.2		22.4		2.08
		75		5.7	0.58	49.1	19.2		21.6		24.0		2.30
		80		5.4	0.55	52.3	20.5		23.0		25.6		2.43
SSWM	10	10	5	61.3	6.26	6.6	2.6	156.9 (16.0)	2.9	176.5 (18.0)	3.2	196.1 (20.0)	0.70
		15		40.9	4.17	9.8	3.8		4.3		4.8		0.70
		20		30.7	3.13	12.5	5.1		5.8		6.4		0.70
		25		24.5	2.50	15.7	6.4		7.2		8.0		0.81
		30		20.4	2.09	18.8	7.7		8.6		9.6		0.81
		35		17.5	1.79	21.9	9.0		10.1		11.2		0.92
		40		15.3	1.56	25.0	10.2		11.5		12.8		1.04
		45		13.6	1.39	28.2	11.5		13.0		14.4		1.15
		50		12.3	1.25	31.3	12.8		14.4		16.0		1.15
		55		11.2	1.14	34.4	14.1		15.8		17.6		1.15
		60		10.2	1.04	37.6	15.4		17.3		19.2		1.28
		65		9.4	0.96	40.7	16.6		18.7		20.8		1.39
		70		8.8	0.89	43.8	17.9		20.2		22.4		1.39
		75		8.2	0.83	47.0	19.2		21.6		24.0		1.61
		80		7.7	0.78	50.1	20.5		23.0		25.6		1.74
		90		6.8	0.70	56.3	23.0		25.9		28.8		1.84
SSWM	12	15	6	59.3	6.05	9.8	3.8	227.5 (23.2)	4.3	256.0 (26.1)	4.8	284.4 (29.0)	0.92
		20		44.4	4.53	12.5	5.1		5.8		6.4		0.92
		25		35.5	3.63	15.7	6.4		7.2		8.0		1.04
		30		29.6	3.02	18.8	7.7		8.6		9.6		1.15
		35		25.4	2.59	21.9	9.0		10.1		11.2		1.15
		40		22.2	2.27	25.0	10.2		11.5		12.8		1.15
		45		19.7	2.01	28.2	11.5		13.0		14.4		1.28
		50		17.8	1.81	31.3	12.8		14.4		16.0		1.39
		55		16.2	1.65	34.4	14.1		15.8		17.6		1.50
		60		14.8	1.51	37.6	15.4		17.3		19.2		1.61
		65		13.7	1.39	40.7	16.6		18.7		20.8		1.61
		70		12.7	1.29	43.8	17.9		20.2		22.4		1.61
		75		11.8	1.21	47.0	19.2		21.6		24.0		1.84
		80		11.1	1.13	50.1	20.5		23.0		25.6		1.96
		90		9.9	1.01	56.3	23.0		25.9		28.8		2.2
SSWM	14	20	7	59.8	6.10	13.1	5.1	306.0 (31.2)	5.8	344.2 (35.1)	6.4	382.5 (39.0)	1.28
		25		47.9	4.88	15.7	6.4		7.2		8.0		1.28
		30		39.9	4.07	18.8	7.7		8.6		9.6		1.39
		35		34.2	3.49	21.9	9.0		10.1		11.2		1.50
		40		29.9	3.05	25.0	10.2		11.5		12.8		1.61
		45		26.6	2.71	28.2	11.5		13.0		14.4		1.61
		50		23.9	2.44	31.3	12.8		14.4		16.0		1.74
		55		21.8	2.22	34.4	14.1		15.8		17.6		1.84
		60		19.9	2.03	37.6	15.4		17.3		19.2		1.84
		65		18.4	1.88	40.7	16.6		18.7		20.8		1.96
		70		17.1	1.74	43.8	17.9		20.2		22.4		1.96
		75		16.0	1.63	47.0	19.2		21.6		24.0		2.08
		80		15.0	1.53	50.1	20.5		23.0		25.6		2.08
		90		13.3	1.36	56.3	23.0		25.9		28.8		2.30
		100		12.0	1.22	62.6	25.6		28.8		32.0		2.55
				Operation frequency			1 million times		500,000 times		300,000 times		

Code No.			d	Spring constant		ℓ min Solid height	F=L×25.6%		F=L×28.8%		F=L×32%		@/P (1~19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	Fmm	Load N (kgf)	Fmm	Load N (kgf)	
SSWM	16	20	8	78.5	8.01	13.1	5.1	400.1 (40.8)	5.8	450.1 (45.9)	6.4	500.1 (51.0)	1.50
		25		62.8	6.41	15.7	6.4		7.2		8.0		1.50
		30		52.4	5.34	18.8	7.7		8.6		9.6		1.61
		35		44.9	4.58	21.9	9.0		10.1		11.2		1.61
		40		39.3	4.01	25.0	10.2		11.5		12.8		1.84
		45		34.9	3.56	28.2	11.5		13.0		14.4		1.84
		50		31.4	3.21	31.3	12.8		14.4		16.0		1.96
		55		28.6	2.91	34.4	14.1		15.8		17.6		2.20
		60		26.2	2.67	37.6	15.4		17.3		19.2		2.30
		65		24.2	2.47	40.7	16.6		18.7		20.8		2.30
		70		22.4	2.29	43.8	17.9		20.2		22.4		2.55
		75		20.9	2.14	47.0	19.2		21.6		24.0		2.65
		80		19.6	2.00	50.1	20.5		23.0		25.6		2.78
		90		17.5	1.78	56.3	23.0		25.9		28.8		2.89
		100		15.7	1.60	62.6	25.6		28.8		32.0		3.12
SSWM	18	20	9	99.6	10.16	13.1	5.1	509.9 (52.0)	5.8	573.7 (58.5)	6.4	637.4 (65.0)	1.61
		25		79.7	8.13	15.7	6.4		7.2		8.0		1.61
		30		66.4	6.78	18.8	7.7		8.6		9.6		1.61
		35		56.9	5.81	21.9	9.0		10.1		11.2		1.84
		40		49.8	5.08	25.0	10.2		11.5		12.8		1.84
		45		44.3	4.52	28.2	11.5		13.0		14.4		1.96
		50		39.8	4.07	31.3	12.8		14.4		16.0		2.20
		55		36.2	3.70	34.4	14.1		15.8		17.6		2.30
		60		33.2	3.39	37.6	15.4		17.3		19.2		2.30
		65		30.6	3.13	40.7	16.6		18.7		20.8		2.55
		70		28.5	2.90	43.8	17.9		20.2		22.4		2.65
		75		26.6	2.71	47.0	19.2		21.6		24.0		2.78
		80		24.9	2.54	50.1	20.5		23.0		25.6		2.89
		90		22.1	2.26	56.3	23.0		25.9		28.8		3.12
		100		19.9	2.03	62.6	25.6		28.8		32.0		3.36
SSWM	20	20	10	122.6	12.51	13.1	5.1	627.6 (64.0)	5.8	706.1 (72.0)	6.4	784.5 (80.0)	1.61
		25		98.1	10.01	15.7	6.4		7.2		8.0		1.61
		30		81.7	8.34	18.8	7.7		8.6		9.6		1.61
		35		70.0	7.15	21.9	9.0		10.1		11.2		1.84
		40		61.3	6.25	25.0	10.2		11.5		12.8		1.84
		45		54.5	5.56	28.2	11.5		13.0		14.4		1.96
		50		49.0	5.00	31.3	12.8		14.4		16.0		2.20
		55		44.6	4.55	34.4	14.1		15.8		17.6		2.30
		60		40.9	4.17	37.6	15.4		17.3		19.2		2.30
		65		37.7	3.85	40.7	16.6		18.7		20.8		2.55
		70		35.0	3.57	43.8	17.9		20.2		22.4		2.65
		75		32.7	3.34	47.0	19.2		21.6		24.0		2.78
		80		30.6	3.13	50.1	20.5		23.0		25.6		2.89
		90		27.2	2.78	56.3	23.0		25.9		28.8		3.12
		100		24.5	2.50	62.6	25.6		28.8		32.0		3.36
		125		19.6	2.00	78.2	32.0		36.0		40.0		3.71
		150		16.3	1.67	93.9	38.4		43.2		48.0		4.17
SSWM	22	25	11	119.0	12.14	15.7	6.4	761.0 (77.6)	7.2	856.1 (87.3)	8.0	951.2 (97.0)	1.62
		30		99.1	10.12	18.8	7.7		8.6		9.6		1.74
		35		85.0	8.67	21.9	9.0		10.1		11.2		1.86
		40		74.4	7.59	25.0	10.2		11.5		12.8		1.86
		45		66.1	6.74	28.2	11.5		13.0		14.4		1.98
		50		59.5	6.07	31.3	12.8		14.4		16.0		1.98
		55		54.1	5.52	34.4	14.1		15.8		17.6		2.09
		60		49.6	5.06	37.6	15.4		17.3		19.2		2.21
		65		45.8	4.67	40.7	16.6		18.7		20.8		2.31
		70		42.5	4.34	43.8	17.9		20.2		22.4		2.31
		75		39.7	4.05	47.0	19.2		21.6		24.0		2.45
		80		37.2	3.79	50.1	20.5		23.0		25.6		2.56
		90		33.1	3.37	56.3	23.0		25.9		28.8		2.80
		100		29.7	3.03	62.6	25.6		28.8		32.0		2.80
		125		23.8	2.43	78.2	32.0		36.0		40.0		3.25
		150		19.8	2.02	93.9	38.4		43.2		48.0		3.73
				Operation frequency			1 million times		500,000 times		300,000 times		

ORDER Code No. SSWM6 − 15

DELIVERY Next In stock working day P.15

PRICE Without tax ▶Quantity discount rate P.15

1~19	20~49	50~199	200~500	501~
100%	95%	90%	85%	Enquiry

Code No.			d	Spring constant		ℓ min Solid height	F=L×25.6%		F=L×28.8%		F=L×32%		@/P (1~19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	Fmm	Load N (kgf)	Fmm	Load N (kgf)	
SSWM	25	25	12.5	153.2	15.64	15.7	6.4	980.7 (100)	7.2	1108 (113)	8.0	1226 (125)	1.62
		30		127.7	13.03	18.8	7.7		8.6		9.6		1.62
		35		109.5	11.17	21.9	9.0		10.1		11.2		1.86
		40		95.8	9.77	25.0	10.2		11.5		12.8		1.86
		45		85.1	8.69	28.2	11.5		13.0		14.4		1.98
		50		76.6	7.82	31.3	12.8		14.4		16.0		2.21
		55		69.7	7.11	34.4	14.1		15.8		17.6		2.31
		60		63.8	6.52	37.6	15.4		17.3		19.2		2.31
		65		58.9	6.01	40.7	16.6		18.7		20.8		2.56
		70		54.7	5.58	43.8	17.9		20.2		22.4		2.68
		75		51.1	5.21	47.0	19.2		21.6		24.0		2.80
		80		47.9	4.89	50.1	20.5		23.0		25.6		2.90
		90		42.6	4.34	56.3	23.0		25.9		28.8		3.14
		100		38.3	3.91	62.6	25.6		28.8		32.0		3.37
		125		30.6	3.13	78.2	32.0		36.0		40.0		3.96
		150		25.5	2.61	93.9	38.4		43.2		48.0		4.55
		175		21.9	2.23	109.5	44.8		50.4		56.0		5.00
SSWM	27	25	13.5	179.3	18.30	15.7	6.4	1147 (117)	7.2	1285 (131)	8.0	1432 (146)	1.74
		30		149.4	15.25	18.8	7.7		8.6		9.6		1.86
		35		128.1	13.07	21.9	9.0		10.1		11.2		1.98
		40		112.1	11.43	25.0	10.2		11.5		12.8		2.09
		45		99.6	10.16	28.2	11.5		13.0		14.4		2.31
		50		89.6	9.15	31.3	12.8		14.4		16.0		2.31
		55		81.5	8.32	34.4	14.1		15.8		17.6		2.45
		60		74.7	7.62	37.6	15.4		17.3		19.2		2.68
		65		69.0	7.04	40.7	16.6		18.7		20.8		2.80
		70		64.0	6.53	43.8	17.9		20.2		22.4		2.80
		75		59.8	6.10	47.0	19.2		21.6		24.0		3.03
		80		56.0	5.72	50.1	20.5		23.0		25.6		3.14
		90		49.8	5.08	56.3	23.0		25.9		28.8		3.37
		100		44.8	4.57	62.6	25.6		28.8		32.0		3.61
		125		35.9	3.66	78.2	32.0		36.0		40.0		4.20
		150		29.9	3.05	93.9	38.4		43.2		48.0		4.89
		175		25.6	2.61	109.5	44.8		50.4		56.0		5.48
SSWM	30	25	15	220.7	22.52	15.7	6.4	1412 (144)	7.2	1589 (162)	8.0	1765 (180)	1.86
		30		183.9	18.76	18.8	7.7		8.6		9.6		1.98
		35		157.6	16.08	21.9	9.0		10.1		11.2		2.21
		40		137.9	14.07	25.0	10.2		11.5		12.8		2.31
		45		122.6	12.51	28.2	11.5		13.0		14.4		2.56
		50		110.3	11.26	31.3	12.8		14.4		16.0		2.80
		55		100.3	10.23	34.4	14.1		15.8		17.6		2.80
		60		91.9	9.38	37.6	15.4		17.3		19.2		3.03
		65		84.9	8.66	40.7	16.6		18.7		20.8		3.14
		70		78.8	8.04	43.8	17.9		20.2		22.4		3.37
		75		73.6	7.51	47.0	19.2		21.6		24.0		3.49
		80		69.0	7.04	50.1	20.5		23.0		25.6		3.61
		90		61.3	6.25	56.3	23.0		25.9		28.8		3.96
		100		55.2	5.63	62.6	25.6		28.8		32.0		4.31
		125		44.1	4.50	78.2	32.0		36.0		40.0		5.14
		150		36.8	3.75	93.9	38.4		43.2		48.0		5.93
		175		31.5	3.22	109.5	44.8		50.4		56.0		6.89
		200		27.6	2.81	125.2	51.2		57.6		64.0		7.58
SSWM	35	40	17.5	187.7	19.15	25.0	10.2	1922 (196)	11.5	2167 (221)	12.8	2403 (245)	2.80
		45		166.8	17.03	28.2	11.5		13.0		14.4		3.14
		50		150.2	15.32	31.3	12.8		14.4		16.0		3.37
		55		136.5	13.93	34.4	14.1		15.8		17.6		3.61
		60		125.1	12.77	37.6	15.4		17.3		19.2		3.73
		65		115.5	11.79	40.7	16.6		18.7		20.8		4.08
		70		107.3	10.94	43.8	17.9		20.2		22.4		4.31
		75		100.1	10.22	47.0	19.2		21.6		24.0		4.55
		80		93.9	9.58	50.1	20.5		23.0		25.6		4.78
		90		83.4	8.51	56.3	23.0		25.9		28.8		5.14
		100		75.1	7.66	62.6	25.6		28.8		32.0		5.71
		125		60.1	6.13	78.2	32.0		36.0		40.0		6.89
		150		50.1	5.11	93.9	38.4		43.2		48.0		8.17
		175		42.9	4.38	109.5	44.8		50.4		56.0		9.21
		200		37.5	3.83	125.5	51.2		57.6		64.0		10.4
				Operation frequency			1 million times		500,000 times		300,000 times		

⚠ Load calculation method: Load=Spring constant×Deflection
N=N/mm×Fmm
(kgf=N×0.101972)
⚠ The solid height values are reference only P.206

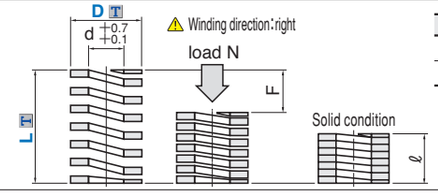
Code No.			d	Spring constant		ℓ min Solid height	F=L×25.6%		F=L×28.8%		F=L×32%		@/P (1~19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	Fmm	Load N (kgf)	Fmm	Load N (kgf)	
SSWM	40	40	20	245.2	25.02	25.0	10.2	2511 (256)	11.5	2824 (288)	12.8	3138 (320)	3.73
		45		217.9	22.24	29.4	11.5		13.0		14.4		3.96
		50		196.1	20.01	31.3	12.8		14.4		16.0		4.08
		55		178.3	18.19	36.0	14.1		15.8		17.6		4.42
		60		163.4	16.68	37.6	15.4		17.3		19.2		4.78
		65		150.9	15.39	42.5	16.6		18.7		20.8		5.00
		70		140.1	14.30	43.8	17.9		20.2		22.4		5.36
		75		130.8	13.34	49.1	19.2		21.6		24.0		5.71
		80		122.6	12.51	50.1	20.5		23.0		25.6		5.93
		90		109.0	11.12	56.3	23.0		25.9		28.8		6.65
		100		98.1	10.01	62.6	25.6		28.8		32.0		7.23
		125		78.5	8.01	78.2	32.0		36.0		40.0		8.86
		150		65.4	6.67	93.9	38.4		43.2		48.0		10.4
		175		56.0	5.72	109.5	44.8		50.4		56.0		12.1
		200		49.0	5.00	125.5	51.2		57.6		64.0		13.7
		225		43.6	4.45	141.0	57.6		64.8		72.0		15.0
		250		39.2	4.00	156.5	64.0		72.0		80.0		16.2
		275		35.7	3.64	172.0	70.4		79.2		88.0		19.2
		300		32.7	3.34	196.2	76.8		86.4		96.0		22.1
SSWM	50	50	25	306.8	31.31	31.3	12.8	3923 (400)	14.4	4413 (450)	16.0	4903 (500)	6.83
		55		278.6	28.43	34.4	14.1		15.8		17.6		7.06
		60		255.4	26.06	37.6	15.4		17.3		19.2		7.28
		65		235.7	24.06	40.7	16.6		18.7		20.8		7.77
		70		218.9	22.34	43.8	17.9		20.2		22.4		8.24
		75		204.3	20.85	47.0	19.2		21.6		24.0		8.59
		80		191.5	19.54	50.1	20.5		23.0		25.6		9.06
		90		170.3	17.37	56.3	23.0		25.9		28.8		9.89
		100		153.2	15.64	62.6	25.6		28.8		32.0		10.9
		125		122.6	12.51	78.2	32.0		36.0		40.0		13.2
		150		102.2	10.42	93.9	38.4		43.2		48.0		15.5
		175		87.6	8.93	109.5	44.8		50.4		56.0		17.7
		200		76.6	7.82	125.2	51.2		57.6		64.0		20.2
		225		68.1	6.95	141.0	57.6		64.8		72.0		21.8
		250		61.3	6.25	156.5	64.0		72.0		80.0		24.5
		275		55.7	5.69	172.0	70.4		79.2		88.0		26.8
		300		51.1	5.21	187.8	76.8		86.4		96.0		29.0
		350		43.8	4.47	228.9	89.6		100.8		112.0		34.8
SSWM	60	60	30	367.5	37.50	37.6	15.4	5649 (596)	17.3	6355 (648)	19.2	7061 (720)	10.3
		70		315.0	32.14	43.8	17.9		20.2		22.4		10.9
		80		275.6	28.13	50.1	20.5		23.0		25.6		12.3
		90		245.0	25.00	56.3	23.0		25.9		28.8		13.5
		100		220.5	22.50	62.6	25.6		28.8		32.0		14.8
		125		176.4	18.00	78.2	32.0		36.0		40.0		17.7
		150		147.0	15.00	93.9	38.4		43.2		48.0		20.9
		175		126.0	12.86	109.5	44.8		50.4		56.0		24.3
		200		110.3	11.25	125.2	51.2		57.6		64.0		27.5
		225		98.0	10.00	141.0	57.6		64.8		72.0		30.5
		250		88.2	9.00	156.5	64.0		72.0		80.0		33.4
		275		80.2	8.18	172.0	70.4		79.2		88.0		36.4
		300		73.5	7.50	187.8	76.8		86.4		96.0		39.5
		350		63.0	6.43	228.9	89.6		100.8		112.0		46.2
SSWM	70	70	38.5	372.1	37.97	45.8	17.9	6669 (680)	20.2	7502 (765)	22.4	8336 (850)	20.2
		80		325.6	33.23	52.3	20.5		23.0		25.6		20.8
		90		289.4	29.53	58.9	23.0		25.9		28.8		21.5
		100		260.5	26.58	65.4	25.6		28.8		32.0		23.4
		125		208.4	21.26	81.8	32.0		36.0		40.0		28.4
		150		173.7	17.72	98.1	38.4		43.2		48.0		33.1
		175		148.9	15.19	114.5	44.8		50.4		56.0		37.3
		200		130.2	13.29	130.8	51.2		57.6		64.0		42.0

Coil Springs

For Heavy Load SSWH

Material	Code
SWOSC−V	SSWH

Item	Allowable tolerance
Load	±10%
Perpendicularity	2° or less



D	T Tolerance
6~60	0 −0.7
70	0 −1.0

L	T Tolerance
10~ 50	±0.5
55~350	±1%

Code No.			d	Spring constant		ℓ min Solid height	F=L×19.2%		F=L×21.6%		F=L×24%		@/P (1~19P)
Code	D	L		N/mm	kgf/mm		Fmm	Load N {kgf}	Fmm	Load N {kgf}	Fmm	Load N {kgf}	
SSWH	6	15	3	38.1	3.9	11.0	2.9	109.8 {11.2}	3.2	123.6 {12.6}	3.6	137.3 {14.0}	1.15
		20		28.6	2.9	14.7	3.8		4.3		4.8		1.28
		25		22.9	2.3	18.4	4.8		5.4		6.0		1.28
		30		19.1	1.9	22.0	5.8		6.5		7.2		1.28
		35		16.3	1.7	25.7	6.7		7.6		8.4		1.39
		40		14.3	1.5	29.4	7.7		8.6		9.6		1.50
		45		12.7	1.3	33.0	8.6		9.7		10.8		1.61
		50		11.4	1.2	36.6	9.6		10.8		12.0		1.61
		55		10.4	1.1	40.4	10.6		11.9		13.2		1.74
		60		9.5	1.0	44.0	11.5		13.0		14.4		1.74
SSWH	8	10	4	86.5	8.8	7.4	1.9	164.8 {16.8}	2.2	185.3 {18.9}	2.4	205.9 {21.0}	0.81
		15		57.2	5.8	10.8	2.9		3.2		3.6		0.81
		20		42.9	4.4	14.4	3.8		4.3		4.8		0.81
		25		34.3	3.5	18.0	4.8		5.4		6.0		1.04
		30		28.6	2.9	21.6	5.8		6.5		7.2		1.15
		35		24.5	2.5	25.2	6.7		7.6		8.4		1.28
		40		21.5	2.2	28.8	7.7		8.6		9.6		1.39
		45		19.1	1.9	32.4	8.6		9.7		10.8		1.50
		50		17.2	1.8	36.0	9.6		10.8		12.0		1.61
		55		15.6	1.6	39.6	10.6		11.9		13.2		1.61
		60		14.3	1.5	43.2	11.5		13.0		14.4		1.74
		65		13.2	1.3	47.7	12.5		14.0		15.6		2.08
		70		12.3	1.3	51.4	13.4		15.1		16.8		2.30
		75		11.4	1.2	55.1	14.4		16.2		18.0		2.43
		80		10.7	1.1	58.7	15.4		17.3		19.2		2.65
SSWH	10	10	5	123.0	12.5	7.4	1.9	235.4 {24.0}	2.2	264.8 {27.0}	2.4	294.2 {30.0}	0.81
		15		81.7	8.3	11.0	2.9		3.2		3.6		0.81
		20		61.3	6.3	14.4	3.8		4.3		4.8		0.81
		25		49.0	5.0	18.0	4.8		5.4		6.0		0.92
		30		40.8	4.2	21.6	5.8		6.5		7.2		1.04
		35		35.0	3.6	25.2	6.7		7.6		8.4		1.15
		40		30.6	3.1	28.8	7.7		8.6		9.6		1.15
		45		27.2	2.8	32.4	8.6		9.7		10.8		1.15
		50		24.5	2.5	36.0	9.6		10.8		12.0		1.28
		55		22.3	2.3	39.6	10.6		11.9		13.2		1.39
		60		20.4	2.1	43.2	11.5		13.0		14.4		1.50
		65		18.8	1.9	46.8	12.5		14.0		15.6		1.61
		70		17.5	1.8	50.4	13.4		15.1		16.8		1.61
		75		16.3	1.7	54.0	14.4		16.2		18.0		1.61
		80		15.3	1.6	57.6	15.4		17.3		19.2		1.74
		90		13.6	1.4	64.8	17.3		19.4		21.6		1.96
SSWH	12	15	6	117.0	11.9	11.0	2.9	337.3 {34.4}	3.2	379.5 {38.7}	3.6	421.7 {43.0}	1.28
		20		87.7	8.9	14.4	3.8		4.3		4.8		1.15
		25		70.2	7.2	18.0	4.8		5.4		6.0		1.15
		30		58.5	6.0	21.6	5.8		6.5		7.2		1.28
		35		50.1	5.1	25.2	6.7		7.6		8.4		1.39
		40		43.9	4.5	28.8	7.7		8.6		9.6		1.50
		45		39.0	4.0	32.4	8.6		9.7		10.8		1.61
		50		35.1	3.6	36.0	9.6		10.8		12.0		1.61
		55		31.9	3.3	39.6	10.6		11.9		13.2		1.74
		60		29.2	3.0	43.2	11.5		13.0		14.4		1.74
		65		27.0	2.8	46.8	12.5		14.0		15.6		1.84
		70		25.1	2.6	50.4	13.4		15.1		16.8		1.84
		75		23.4	2.4	54.0	14.4		16.2		18.0		1.84
		80		21.9	2.2	57.6	15.4		17.3		19.2		2.08
		90		19.5	2.0	64.8	17.3		19.4		21.6		2.30
SSWH	14	20	7	120.1	12.3	14.7	3.8	462.9 {47.2}	4.3	520.7 {53.1}	4.8	578.6 {59.0}	1.39
		25		96.2	9.8	18.0	4.8		5.4		6.0		1.39
		30		80.2	8.2	21.6	5.8		6.5		7.2		1.50
		35		68.8	7.0	25.2	6.7		7.6		8.4		1.61
		40		60.2	6.1	28.8	7.7		8.6		9.6		1.61
		45		53.5	5.5	32.4	8.6		9.7		10.8		1.74
		50		48.1	4.9	36.0	9.6		10.8		12.0		1.84
		55		43.8	4.5	39.6	10.6		11.9		13.2		1.84
		60		40.1	4.1	43.2	11.5		13.0		14.4		1.96
		65		37.0	3.8	46.8	12.5		14.0		15.6		1.96
		70		34.4	3.5	50.4	13.4		15.1		16.8		2.08
		75		32.1	3.3	54.0	14.4		16.2		18.0		2.20
		80		30.1	3.1	57.6	15.4		17.3		19.2		2.20
		90		26.7	2.7	64.8	17.3		19.4		21.6		2.30
		100		24.1	2.5	72.0	19.2		21.6		24.0		2.55
				Operation frequency			1 million times		500,000 times		300,000 times		

Code No.			d	Spring constant		ℓ min Solid height	F=L×19.2%		F=L×21.6%		F=L×24%		@/P (1~19P)
Code	D	L		N/mm	kgf/mm		Fmm	Load N {kgf}	Fmm	Load N {kgf}	Fmm	Load N {kgf}	
SSWH	16	20	8	158.3	16.2	14.7	3.8	604.1 {61.6}	4.3	679.6 {69.3}	4.8	755.1 {77.0}	1.61
		25		126.7	12.9	18.0	4.8		5.4		6.0		1.61
		30		105.6	10.8	21.6	5.8		6.5		7.2		1.61
		35		90.5	9.2	25.2	6.7		7.6		8.4		1.84
		40		79.2	8.1	28.8	7.7		8.6		9.6		1.84
		45		70.4	7.2	32.4	8.6		9.7		10.8		1.96
		50		63.3	6.5	36.0	9.6		10.8		12.0		2.20
		55		57.6	5.9	39.6	10.6		11.9		13.2		2.30
		60		52.8	5.4	43.2	11.5		13.0		14.4		2.30
		65		48.7	5.0	46.8	12.5		14.0		15.6		2.55
		70		45.2	4.6	50.4	13.4		15.1		16.8		2.65
		75		42.2	4.3	54.0	14.4		16.2		18.0		2.78
		80		39.6	4.0	57.6	15.4		17.3		19.2		2.89
		90		35.2	3.6	64.8	17.3		19.4		21.6		3.12
		100		31.7	3.2	72.0	19.2		21.6		24.0		3.36
SSWH	18	20	9	199.2	20.3	14.7	3.8	761.0 {77.6}	4.3	856.1 {87.3}	4.8	951.2 {97.0}	1.61
		25		159.4	16.3	18.0	4.8		5.4		6.0		1.74
		30		132.8	13.6	21.6	5.8		6.5		7.2		1.84
		35		113.8	11.6	25.2	6.7		7.6		8.4		1.96
		40		99.6	10.2	28.8	7.7		8.6		9.6		2.08
		45		88.5	9.0	32.4	8.6		9.7		10.8		2.30
		50		79.7	8.1	36.0	9.6		10.8		12.0		2.30
		55		72.4	7.4	39.6	10.6		11.9		13.2		2.43
		60		66.4	6.8	43.2	11.5		13.0		14.4		2.65
		65		61.3	6.3	46.8	12.5		14.0		15.6		2.78
		70		56.9	5.8	50.4	13.4		15.1		16.8		2.78
		75		53.1	5.4	54.0	14.4		16.2		18.0		3.00
		80		49.8	5.1	57.6	15.4		17.3		19.2		3.12
		90		44.3	4.5	64.8	17.3		19.4		21.6		3.36
		100		39.8	4.1	72.0	19.2		21.6		24.0		3.58
SSWH	20	20	10	245.2	25.0	14.7	3.8	941 {96.0}	4.3	1059 {108}	4.8	1177 {120}	1.61
		25		196.1	20.0	18.0	4.8		5.4		6.0		1.61
		30		163.4	16.7	21.6	5.8		6.5		7.2		1.61
		35		140.1	14.3	25.2	6.7		7.6		8.4		1.84
		40		122.6	12.5	28.8	7.7		8.6		9.6		1.84
		45		109.0	11.1	32.4	8.6		9.7		10.8		1.96
		50		98.1	10.0	36.0	9.6		10.8		12.0		2.20
		55		89.1	9.1	39.6	10.6		11.9		13.2		2.30
		60		81.7	8.3	43.2	11.5		13.0		14.4		2.30
		65		75.4	7.7	46.8	12.5		14.0		15.6		2.55
		70		70.0	7.1	50.4	13.4		15.1		16.8		2.65
		75		65.4	6.7	54.0	14.4		16.2		18.0		2.78
		80		61.3	6.3	57.6	15.4		17.3		19.2		2.89
		90		54.5	5.6	64.8	17.3		19.4		21.6		3.12
		100		49.0	5.0	72.0	19.2		21.6		24.0		3.36
		125		39.2	4.0	90.0	24.0		27.0		30.0		3.83
		150		32.7	3.3	108.0	28.8		32.4		36.0		4.40
SSWH	22	25	11	237.0	24.2	18.0	4.8	1138 {116}	5.4	1285 {131}	6.0	1422 {145}	1.74
		30		197.4	20.1	21.6	5.8		6.5		7.2		1.86
		35		169.2	17.3	25.2	6.7		7.6		8.4		1.86
		40		148.1	15.1	28.8	7.7		8.6		9.6		1.98
		45		131.6	13.4	32.4	8.6		9.7		10.8		1.98
		50		118.4	12.1	36.0	9.6		10.8		12.0		2.09
		55		107.7	11.0	39.6	10.6		11.9		13.2		2.21
		60		98.7	10.1	43.2	11.5		13.0		14.4		2.31
		65		91.1	9.3	46.8	12.5		14.0		15.6		2.31
		70		84.6	8.6	50.4	13.4		15.1		16.8		2.45
		75		79.0	8.1	54.0	14.4		16.2		18.0		2.56
		80		74.0	7.6	57.6	15.4		17.3		19.2		2.68
		90		65.8	6.7	64.8	17.3		19.4		21.6		2.80
		100		59.2	6.0	72.0	19.2		21.6		24.0		3.14
		125		47.4	4.8	90.0	24.0		27.0		30.0		3.61
		150		39.5	4.0	108.0	28.8		32.4		36.0		4.08
				Operation frequency			1 million times		500,000 times		300,000 times		

ORDER Code No. SSWH6 − 15

DELIVERY Next In stock working day ☞ P.15

PRICE Without tax ▶Quantity discount rate ☞ P.15

1~19	20~49	50~199	200~500	501~
100%	95%	90%	85%	Enquiry

Code No.			d	Spring constant		ℓ min Solid height	F=L×19.2%		F=L×21.6%		F=L×24%		@/P (1~19P)
Code	D	L		N/mm	kgf/mm		Fmm	Load N {kgf}	Fmm	Load N {kgf}	Fmm	Load N {kgf}	
SSWH	25	25	12.5	306.2	31.3	18.0	4.8	1471 {150}	5.4	1648 {168}	6.0	1834 {187}	1.86
		30		255.2	26.0	21.6	5.8		6.5		7.2		1.86
		35		218.8	22.3	25.2	6.7		7.6		8.4		1.98
		40		191.4	19.5	28.8	7.7		8.6		9.6		2.21
		45		170.1	17.4	32.4	8.6		9.7		10.8		2.31
		50		153.1	15.6	36.0	9.6		10.8		12.0		2.31
		55		139.2	14.2	39.6	10.6		11.9		13.2		2.56
		60		127.6	13.0	43.2	11.5		13.0		14.4		2.68
		65		117.8	12.0	46.8	12.5		14.0		15.6		2.80
		70		109.4	11.2	50.4	13.4		15.1		16.8		2.90
		75		102.1	10.4	54.0	14.4		16.2		18.0		3.03
		80		95.7	9.8	57.6	15.4		17.3		19.2		3.14
		90		85.1	8.7	64.8	17.3		19.4		21.6		3.37
		100		76.6	7.8	72.0	19.2		21.6		24.0		3.61
		125		61.2	6.3	90.0	24.0		27.0		30.0		4.31
		150		51.0	5.2	108.0	28.8		32.4		36.0		4.89
		175		43.8	4.5	126.0	33.6		37.8		42.0		5.59
SSWH	27	25	13.5	357.9	36.5	18.0	4.8	1716 {175}	5.4	1932 {197}	6.0	2148 {219}	1.98
		30		298.3	30.4	21.6	5.8		6.5		7.2		2.09
		35		255.7	26.1	25.2	6.7		7.6		8.4		2.31
		40		223.7	22.8	28.8	7.7		8.6		9.6		2.31
		45		198.9	20.3	32.4	8.6		9.7		10.8		2.45
		50		179.0	18.3	36.0	9.6		10.8		12.0		2.68
		55		162.7	16.6	39.6	10.6		11.9		13.2		2.80
		60		149.1	15.2	43.2	11.5		13.0		14.4		2.80
		65		137.7	14.0	46.8	12.5		14.0		15.6		3.03
		70		127.8	13.0	50.4	13.4		15.1		16.8		3.14
		75		119.3	12.2	54.0	14.4		16.2		18.0		3.14
		80		111.9	11.4	57.6	15.4		17.3		19.2		3.37
		90		99.4	10.1	64.8	17.3		19.4		21.6		3.73
		100		89.5	9.1	72.0	19.2		21.6		24.0		4.08
		125		71.6	7.3	90.0	24.0		27.0		30.0		5.14
		150		59.7	6.1	108.0	28.8		32.4		36.0		5.93
		175		51.1	5.2	126.0	33.6		37.8		42.0		6.75
SSWH	30	25	15	441.3	45.0	18.0	4.8	2118 {216}	5.4	2383 {243}	6.0	2648 {270}	2.21
		30		367.7	37.5	21.6	5.8		6.5		7.2		2.31
		35		315.0	32.1	25.2	6.7		7.6		8.4		2.56
		40		275.7	28.1	28.8	7.7		8.6		9.6		2.80
		45		245.0	25.0	32.4	8.6		9.7		10.8		2.80
		50		220.5	22.5	36.0	9.6		10.8		12.0		3.03
		55		200.5	20.5	39.6	10.6		11.9		13.2		3.14
		60		183.8	18.8	43.2	11.5		13.0		14.4		3.37
		65		169.6	17.3	46.8	12.5		14.0		15.6		3.49
		70		157.5	16.1	50.4	13.4		15.1		16.8		3.61
		75		147.0	15.0	54.0	14.4		16.2		18.0		3.73
		80		137.8	14.1	57.6	15.4		17.3		19.2		3.96
		90		122.5	12.5	64.8	17.3		19.4		21.6		4.42
		100		110.3	11.3	72.0	19.2		21.6		24.0		4.89
		125		88.2	9.0	90.0	24.0		27.0		30.0		5.93
		150		73.5	7.5	108.0	28.8		32.4		36.0		7.11
		175		63.0	6.4	126.0	33.6		37.8		42.0		8.27
		200		55.1	5.6	144.0	38.4		43.2		48.0		9.33
SSWH	35	40	17.5	374.9	38.3	28.8	7.7	2883 {294}	8.6	3236 {330}	9.6	3599 {367}	3.14
		45		333.3	34.0	32.4	8.6		9.7		10.8		3.37
		50		299.4	30.5	36.0	9.6		10.8		12.0		3.73
		55		272.2	27.8	39.6	10.6		11.9		13.2		3.96
		60		249.5	25.5	43.2	11.5		13.0		14.4		4.31
		65		230.3	23.5	46.8	12.5		14.0		15.6		4.65
		70		213.8	21.8	50.4	13.4		15.1		16.8		4.89
		75		199.6	20.4	54.0	14.4		16.2		18.0		5.14
		80		187.1	19.1	57.6	15.4		17.3		19.2		5.36
		90		166.3	17.0	64.8	17.3		19.4		21.6		5.93
		100		149.7	15.3	72.0	19.2		21.6		24.0		6.52
		125		119.8	12.2	90.0	24.0		27.0		30.0		7.93
		150		99.8	10.2	108.0	28.8		32.4		36.0		9.33
		175		85.5	8.7	126.0	33.6		37.8		42.0		10.8
		200		74.8	7.6	144.0	38.4		43.2		48.0		12.2
				Operation frequency			1 million times		500,000 times		300,000 times		

⚠ Load calculation method: Load=Spring constant×Deflection
N=N/mm×Fmm
(kgf=N×0.101972)
⚠ The solid height values are reference only ☞ P.206

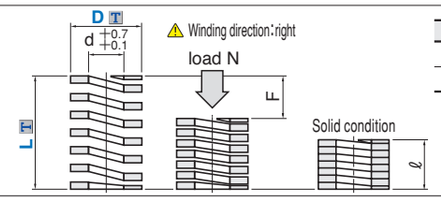
Code No.			d	Spring constant		ℓ min Solid height	F=L×19.2%		F=L×21.6%		F=L×24%		@/P (1~19P)
Code	D	L		N/mm	kgf/mm		Fmm	Load N {kgf}	Fmm	Load N {kgf}	Fmm	Load N {kgf}	
SSWH	40	40	20	490.4	50.0	28.8	7.7	3766 {384}	8.6	4236 {432}	9.6	4707 {480}	3.96
		45		435.9	44.5	33.0	8.6		9.7		10.8		4.31
		50		392.3	40.0	36.0	9.6		10.8		12.0		4.65
		55		356.6	36.4	40.4	10.6		11.9		13.2		5.00
		60		326.9	33.4	43.2	11.5		13.0		14.4		5.24
		65		301.8	30.8	47.7	12.5		14.0		15.6		5.71
		70		280.2	28.6	50.4	13.4		15.1		16.8		5.93
		75		261.5	26.7	55.1	14.4		16.2		18.0		6.52
		80		245.2	25.0	57.6	15.4		17.3		19.2		6.75
		90		217.9	22.2	64.8	17.3		19.4		21.6		7.46
		100		196.1	20.0	72.0	19.2		21.6		24.0		8.17
		125		156.9	16.0	90.0	24.0		27.0		30.0		9.92
		150		130.8	13.3	108.0	28.8		32.4		36.0		11.6
		175		112.1	11.4	126.0	33.6		37.8		42.0		13.3
		200		98.1	10.0	144.0	38.4		43.2		48.0		15.0
		225		87.2	8.9	162.0	43.2		48.6		54.0		16.8
		250		78.5	8.0	180.0	48.0		54.0		60.0		18.4
		275		71.3	7.3	198.0	52.8		59.4		66.0		21.1
		300		65.4	6.7	220.2	57.6		64.8		72.0		23.7
SSWH	50	50	25	613.0	62.5	36.0	9.6	5884 {600}	10.8	6619 {675}	12.0	7355 {750}	7.77
		55		557.2	56.9	39.6	10.6		11.9		13.2		8.00
		60		510.8	52.1	43.2	11.5		13.0		14.4		8.24
		65		471.5	48.1	46.8	12.5		14.0		15.6		8.71
		70		437.8	44.7	50.4	13.4		15.1		16.8		9.18
		75		408.6	41.7	54.0	14.4		16.2		18.0		9.77
		80		383.1	39.1	57.6	15.4		17.3		19.2		10.3
		90		340.5	34.7	64.8	17.3		19.4		21.6		11.3
		100		306.5	31.3	72.0	19.2		21.6		24.0		12.4
		125		245.2	25.0	90.0	24.0		27.0		30.0		14.9
		150		204.3	20.8	108.0	28.8		32.4		36.0		17.5
		175		175.1	17.9	126.0	33.6		37.8		42.0		20.2
		200		153.2	15.6	144.0	38.4		43.2		48.0		22.7
		225		136.2	13.9	162.0	43.2		48.6		54.0		25.3
		250		122.6	12.5	180.0	48.0		54.0		60.0		27.8
		275		111.4	11.4	198.0	52.8		59.4		66.0		30.8
		300		102.2	10.4	216.0	57.6		64.8		72.0		33.4
		350		87.6	8.9	256.9	67.2		75.6		84.0		38.7
SSWH	60	60	30	735.5	75.1	43.2	11.5	8463 {863}	13.0	9522 {971}	14.4	10581 {1079}	12.2
		70		630.4	64.3	50.4	13.4		15.1		16.8		12.6
		80		551.6	56.3	57.6	15.4		17.3		19.2		14.0
		90		490.3	50.0	64.8	17.3		19.4		21.6		15.5
		100		441.3	45.0	72.0	19.2		21.6		24.0		17.0
		125		353.0	36.0	90.0	24.0		27.0		30.0		20.3
		150		294.2	30.0	108.0	28.8		32.4		36.0		24.2
		175		252.2	25.7	126.0	33.6		37.8		42.0		27.5
		200		220.7	22.5	144.0	38.4		43.2		48.0		31.2
		225		196.0	20.0	162.0	43.2		48.6		54.0		33.9
		250		176.5	18.0	180.0	48.0		54.0		60.0		36.5
		275		160.0	16.4	198.0	52.8		59.4		66.0		39.5
		300		147.1	15.0	216.0	57.6		64.8		72.0		42.1
		350		126.1	12.9	256.9	67.2		75.6		84.0		48.6
SSWH	70	70	38.5	758.9	77.4	51.4	13.4	10042 {1024}	15.1	11297 {1152}	16.8	12553 {1280}	22.1
		80		664.0	67.8	58.7	15.4		17.3		19.2		22.8
		90		590.2	60.2	66.1	17.3		19.4		21.6		23.6
		100		531.2	54.2	72.0	19.2		21.6		24.0		24.3
		125		425.0	43.4	90.0	24.0		27.0		30.0		29.0
		150		354.1	36.1	108.0	28.8		32.4		36.0		34.0
		175		303.5	31.0	126.0	33.6		37.8		42.0		38.7
		200		265.6	27.1	144.0	38.4		43.2		48.0		43.0
		250		212.5	21.

Coil Springs

For Extra Heavy Load SSWB

Material	Code
SWOSC−V	SSWB

Item	Allowable tolerance
Load	±10%
Perpendicularity	2° or less



D	T Tolerance
6～60	0 −0.7
70	0 −1.0

L	T Tolerance
10～ 50	±0.5
55～350	±1%

Code No.			d	Spring constant		ℓ min Solid height	F=L×16%		F=L×18%		F=L×20%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	Fmm	Load N (kgf)	Fmm	Load N (kgf)	
SSWB	6	15	3	58.8	6.0	11.6	2.4	141.2 (14.4)	2.7	158.9 (16.2)	3.0	176.5 (18.0)	1.39
		20		44.1	4.5	15.5	3.2		3.6		4.0		1.50
		25		35.3	3.6	19.4	4.0		4.5		5.0		1.61
		30		29.4	3.0	23.2	4.8		5.4		6.0		1.61
		35		25.2	2.6	27.1	5.6		6.3		7.0		1.61
		40		22.1	2.3	31.0	6.4		7.2		8.0		1.74
		45		19.6	2.0	34.8	7.2		8.1		9.0		1.84
		50		17.6	1.8	38.7	8.0		9.0		10.0		1.96
		55		16.1	1.6	42.6	8.8		9.9		11.0		2.08
		60		14.7	1.5	46.4	9.6		10.8		12.0		2.20
SSWB	8	10	4	161.8	16.5	7.7	1.6	258.9 (26.4)	1.8	291.3 (29.7)	2.0	323.6 (33.0)	1.15
		15		107.9	11.0	11.6	2.4		2.7		3.0		1.15
		20		80.9	8.3	15.9	3.2		3.6		4.0		1.15
		25		64.7	6.6	19.4	4.0		4.5		5.0		1.28
		30		53.9	5.5	23.2	4.8		5.4		6.0		1.39
		35		46.2	4.7	27.1	5.6		6.3		7.0		1.50
		40		40.5	4.1	31.0	6.4		7.2		8.0		1.61
		45		36.0	3.7	34.8	7.2		8.1		9.0		1.61
		50		32.4	3.3	38.7	8.0		9.0		10.0		1.74
		55		29.4	3.0	42.6	8.8		9.9		11.0		1.84
		60		27.0	2.8	46.4	9.6		10.8		12.0		1.84
		65		24.9	2.5	50.3	10.4		11.7		13.0		2.20
		70		23.1	2.4	54.2	11.2		12.6		14.0		2.43
		75		21.6	2.2	58.1	12.0		13.5		15.0		2.55
		80		20.2	2.1	61.9	12.8		14.4		16.0		2.78
SSWB	10	10	5	220.7	22.5	7.7	1.6	353.0 (36.0)	1.8	397.2 (40.5)	2.0	441.3 (45.0)	1.15
		15		147.1	15.0	11.6	2.4		2.7		3.0		1.15
		20		110.3	11.3	15.5	3.2		3.6		4.0		1.15
		25		88.3	9.0	19.4	4.0		4.5		5.0		1.15
		30		73.5	7.5	23.2	4.8		5.4		6.0		1.28
		35		63.0	6.4	27.1	5.6		6.3		7.0		1.39
		40		55.2	5.6	31.0	6.4		7.2		8.0		1.50
		45		49.0	5.0	34.8	7.2		8.1		9.0		1.61
		50		44.1	4.5	38.7	8.0		9.0		10.0		1.61
		55		40.1	4.1	42.6	8.8		9.9		11.0		1.61
		60		36.8	3.8	46.4	9.6		10.8		12.0		1.74
		65		33.9	3.5	50.3	10.4		11.7		13.0		1.84
		70		31.5	3.2	54.2	11.2		12.6		14.0		1.84
		75		29.4	3.0	58.1	12.0		13.5		15.0		1.96
		80		27.6	2.8	61.9	12.8		14.4		16.0		2.08
		90		24.5	2.5	69.7	14.4		16.2		18.0		2.30
SSWB	12	15	6	189.6	19.3	11.6	2.4	455.0 (46.4)	2.7	511.9 (52.2)	3.0	568.8 (58.0)	1.50
		20		142.2	14.5	15.5	3.2		3.6		4.0		1.50
		25		113.8	11.6	19.4	4.0		4.5		5.0		1.61
		30		94.8	9.7	23.2	4.8		5.4		6.0		1.61
		35		81.3	8.3	27.1	5.6		6.3		7.0		1.61
		40		71.1	7.3	31.0	6.4		7.2		8.0		1.74
		45		63.2	6.4	34.8	7.2		8.1		9.0		1.84
		50		56.9	5.8	38.7	8.0		9.0		10.0		1.96
		55		51.7	5.3	42.6	8.8		9.9		11.0		2.08
		60		47.4	4.8	46.4	9.6		10.8		12.0		2.20
		65		43.8	4.5	50.3	10.4		11.7		13.0		2.30
		70		40.6	4.1	54.2	11.2		12.6		14.0		2.30
		75		37.9	3.9	58.1	12.0		13.5		15.0		2.43
		80		35.5	3.6	61.9	12.8		14.4		16.0		2.65
		90		31.6	3.2	69.7	14.4		16.2		18.0		2.89
SSWB	14	20	7	183.9	18.8	15.5	3.2	588.4 (60.0)	3.6	661.9 (67.5)	4.0	735.5 (75.0)	1.74
		25		147.1	15.0	19.4	4.0		4.5		5.0		1.74
		30		122.6	12.5	23.2	4.8		5.4		6.0		1.74
		35		105.1	10.7	27.1	5.6		6.3		7.0		1.84
		40		91.9	9.4	31.0	6.4		7.2		8.0		1.84
		45		81.7	8.3	34.8	7.2		8.1		9.0		1.96
		50		73.5	7.5	38.7	8.0		9.0		10.0		2.08
		55		66.9	6.8	42.6	8.8		9.9		11.0		2.30
		60		61.3	6.3	46.4	9.6		10.8		12.0		2.30
		65		56.6	5.8	50.3	10.4		11.7		13.0		2.55
		70		52.5	5.4	54.2	11.2		12.6		14.0		2.65
		75		49.0	5.0	58.1	12.0		13.5		15.0		2.78
		80		46.0	4.7	61.9	12.8		14.4		16.0		2.78
		90		40.9	4.2	69.7	14.4		16.2		18.0		2.89
		100		36.8	3.8	77.4	16.0		18.0		20.0		3.12
				Operation frequency			1 million times		500,000 times		300,000 times		

Code No.			d	Spring constant		ℓ min Solid height	F=L×16%		F=L×18%		F=L×20%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	Fmm	Load N (kgf)	Fmm	Load N (kgf)	
SSWB	16	20	8	245.2	25.0	15.5	3.2	784.5 (80.0)	3.6	882.6 (90.0)	4.0	980.7 (100)	1.84
		25		196.1	20.0	19.4	4.0		4.5		5.0		1.84
		30		163.4	16.7	23.2	4.8		5.4		6.0		1.84
		35		140.1	14.3	27.1	5.6		6.3		7.0		1.96
		40		122.6	12.5	31.0	6.4		7.2		8.0		2.08
		45		109.0	11.1	34.8	7.2		8.1		9.0		2.30
		50		98.1	10.0	38.7	8.0		9.0		10.0		2.30
		55		89.2	9.1	42.6	8.8		9.9		11.0		2.55
		60		81.7	8.3	46.4	9.6		10.8		12.0		2.65
		65		75.4	7.7	50.3	10.4		11.7		13.0		2.78
		70		70.1	7.1	54.2	11.2		12.6		14.0		2.89
		75		65.4	6.7	58.1	12.0		13.5		15.0		3.12
		80		61.3	6.3	61.9	12.8		14.4		16.0		3.24
		90		54.5	5.6	69.7	14.4		16.2		18.0		3.36
		100		49.0	5.0	77.4	16.0		18.0		20.0		3.58
SSWB	18	20	9	306.4	31.3	15.5	3.2	980.7 (100)	3.6	1108 (113)	4.0	1226 (125)	1.84
		25		245.2	25.0	19.4	4.0		4.5		5.0		1.84
		30		204.3	20.8	23.2	4.8		5.4		6.0		1.84
		35		175.1	17.9	27.1	5.6		6.3		7.0		2.08
		40		153.2	15.6	31.0	6.4		7.2		8.0		2.20
		45		136.2	13.9	34.8	7.2		8.1		9.0		2.30
		50		122.6	12.5	38.7	8.0		9.0		10.0		2.43
		55		111.4	11.4	42.6	8.8		9.9		11.0		2.65
		60		102.2	10.4	46.4	9.6		10.8		12.0		2.78
		65		94.3	9.6	50.3	10.4		11.7		13.0		2.89
		70		87.6	8.9	54.2	11.2		12.6		14.0		3.00
		75		81.7	8.3	58.1	12.0		13.5		15.0		3.12
		80		76.6	7.8	61.9	12.8		14.4		16.0		3.36
		90		68.1	6.9	69.7	14.4		16.2		18.0		3.71
		100		61.3	6.3	77.4	16.0		18.0		20.0		4.06
SSWB	20	20	10	392.3	40.0	15.5	3.2	1255 (128)	3.6	1412 (144)	4.0	1569 (160)	1.84
		25		313.8	32.0	19.4	4.0		4.5		5.0		1.84
		30		261.5	26.7	23.2	4.8		5.4		6.0		1.84
		35		224.2	22.9	27.1	5.6		6.3		7.0		1.96
		40		196.1	20.0	31.0	6.4		7.2		8.0		2.2
		45		174.3	17.8	34.8	7.2		8.1		9.0		2.30
		50		156.9	16.0	38.7	8.0		9.0		10.0		2.55
		55		142.6	14.6	42.6	8.8		9.9		11.0		2.78
		60		130.8	13.3	46.4	9.6		10.8		12.0		2.78
		65		120.7	12.3	50.3	10.4		11.7		13.0		3.00
		70		112.1	11.4	54.2	11.2		12.6		14.0		3.12
		75		104.6	10.7	58.1	12.0		13.5		15.0		3.36
		80		98.1	10.0	61.9	12.8		14.4		16.0		3.48
		90		87.2	8.9	69.7	14.4		16.2		18.0		3.71
		100		78.5	8.0	77.4	16.0		18.0		20.0		4.06
		125		62.8	6.4	96.8	20.0		22.5		25.0		4.86
		150		52.3	5.3	116.1	24.0		27.0		30.0		5.56
SSWB	22	25	11	382.5	39.0	19.4	4.0	1530 (156)	4.5	1726 (176)	5.0	1912 (195)	1.86
		30		318.7	32.5	23.2	4.8		5.4		6.0		1.98
		35		273.2	27.9	27.1	5.6		6.3		7.0		2.09
		40		239.0	24.4	31.0	6.4		7.2		8.0		2.31
		45		212.5	21.7	34.8	7.2		8.1		9.0		2.45
		50		191.2	19.5	38.7	8.0		9.0		10.0		2.68
		55		173.8	17.7	42.6	8.8		9.9		11.0		2.80
		60		159.4	16.3	46.4	9.6		10.8		12.0		2.90
		65		147.1	15.0	50.3	10.4		11.7		13.0		3.14
		70		136.6	13.9	54.2	11.2		12.6		14.0		3.25
		75		127.5	13.0	58.1	12.0		13.5		15.0		3.37
		80		119.5	12.2	61.9	12.8		14.4		16.0		3.61
		90		106.2	10.8	69.7	14.4		16.2		18.0		3.84
		100		95.6	9.8	77.4	16.0		18.0		20.0		4.20
		125		76.5	7.8	96.8	20.0		22.5		25.0		5.00
		150		63.7	6.5	116.1	24.0		27.0		30.0		5.83
				Operation frequency			1 million times		500,000 times		300,000 times		

ORDER Code No. SSWB6 − 15

DELIVERY Next In stock working day P.15

PRICE Without tax ▶Quantity discount rate P.15

1～19	20～49	50～199	200～500	501～
100%	95%	90%	85%	Enquiry

Code No.			d	Spring constant		ℓ min Solid height	F=L×16%		F=L×18%		F=L×20%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	Fmm	Load N (kgf)	Fmm	Load N (kgf)	
SSWB	25	25	12.5	480.6	49.0	19.0	4.0	1922 (196)	4.5	2167 (221)	5.0	2403 (245)	1.86
		30		400.4	40.9	22.8	4.8		5.4		6.0		1.98
		35		343.2	35.0	26.6	5.6		6.3		7.0		2.21
		40		300.3	30.6	30.4	6.4		7.2		8.0		2.31
		45		267.0	27.2	34.2	7.2		8.1		9.0		2.56
		50		240.3	24.5	38.0	8.0		9.0		10.0		2.80
		55		218.4	22.3	41.8	8.8		9.9		11.0		2.80
		60		200.2	20.4	45.6	9.6		10.8		12.0		3.03
		65		184.8	18.9	49.4	10.4		11.7		13.0		3.14
		70		171.6	17.5	53.2	11.2		12.6		14.0		3.37
		75		160.2	16.3	57.0	12.0		13.5		15.0		3.49
		80		150.2	15.3	60.8	12.8		14.4		16.0		3.61
		90		133.5	13.6	68.4	14.4		16.2		18.0		3.96
		100		120.1	12.3	76.0	16.0		18.0		20.0		4.31
		125		96.1	9.8	95.0	20.0		22.5		25.0		5.14
		150		80.1	8.2	114.0	24.0		27.0		30.0		5.93
		175		68.6	7.0	133.0	28.0		31.5		35.0		6.89
SSWB	27	25	13.5	568.8	58.0	19.0	4.0	2275 (232)	4.5	2560 (261)	5.0	2844 (290)	2.09
		30		474.0	48.4	22.8	4.8		5.4		6.0		2.31
		35		406.3	41.5	26.6	5.6		6.3		7.0		2.45
		40		355.5	36.3	30.4	6.4		7.2		8.0		2.68
		45		316.0	32.2	34.2	7.2		8.1		9.0		2.80
		50		284.4	29.0	38.0	8.0		9.0		10.0		2.90
		55		258.5	26.4	41.8	8.8		9.9		11.0		3.14
		60		237.0	24.2	45.6	9.6		10.8		12.0		3.25
		65		218.8	22.3	49.4	10.4		11.7		13.0		3.37
		70		203.1	20.7	53.2	11.2		12.6		14.0		3.61
		75		189.6	19.3	57.0	12.0		13.5		15.0		3.73
		80		177.7	18.1	60.8	12.8		14.4		16.0		3.84
		90		158.0	16.1	68.4	14.4		16.2		18.0		4.42
		100		142.2	14.5	76.0	16.0		18.0		20.0		4.89
		125		113.8	11.6	95.0	20.0		22.5		25.0		5.93
		150		94.8	9.7	114.0	24.0		27.0		30.0		6.99
		175		81.3	8.3	133.0	28.0		31.5		35.0		8.17
SSWB	30	25	15	706.1	72.0	19.0	4.0	2824 (288)	4.5	3177 (324)	5.0	3530 (360)	2.31
		30		588.4	60.0	22.8	4.8		5.4		6.0		2.45
		35		504.3	51.5	26.6	5.6		6.3		7.0		2.80
		40		441.3	45.0	30.4	6.4		7.2		8.0		2.80
		45		392.3	40.0	34.2	7.2		8.1		9.0		3.14
		50		353.0	36.0	38.0	8.0		9.0		10.0		3.25
		55		320.9	32.7	41.8	8.8		9.9		11.0		3.49
		60		294.2	30.0	45.6	9.6		10.8		12.0		3.61
		65		271.6	27.7	49.4	10.4		11.7		13.0		3.84
		70		252.2	25.7	53.2	11.2		12.6		14.0		4.08
		75		235.4	24.0	57.0	12.0		13.5		15.0		4.31
		80		220.7	22.5	60.8	12.8		14.4		16.0		4.42
		90		196.1	20.0	68.4	14.4		16.2		18.0		4.89
		100		176.5	18.0	76.0	16.0		18.0		20.0		5.14
		125		141.2	14.4	95.0	20.0		22.5		25.0		6.30
		150		117.7	12.0	114.0	24.0		27.0		30.0		7.23
		175		100.9	10.3	133.0	28.0		31.5		35.0		8.40
		200		88.3	9.0	152.0	32.0		36.0		40.0		9.33
SSWB	35	40	17.5	600.7	61.3	31.0	6.4	3844 (392)	7.2	4325 (441)	8.0	4805 (490)	3.37
		45		533.9	54.5	34.8	7.2		8.1		9.0		3.61
		50		480.5	49.0	38.7	8.0		9.0		10.0		3.96
		55		436.8	44.6	42.6	8.8		9.9		11.0		4.31
		60		400.4	40.9	46.4	9.6		10.8		12.0		4.65
		65		369.6	37.7	50.3	10.4		11.7		13.0		4.89
		70		343.2	35.0	54.2	11.2		12.6		14.0		5.14
		75		320.4	32.7	58.1	12.0		13.5		15.0		5.48
		80		300.3	30.6	61.9	12.8		14.4		16.0		5.83
		90		267.0	27.2	69.7	14.4		16.2		18.0		6.52
		100		240.3	24.5	77.4	16.0		18.0		20.0		7.11
		125		192.2	19.6	96.8	20.0		22.5		25.0		8.50
		150		160.2	16.3	116.1	24.0		27.0		30.0		9.92
		175		137.3	14.0	135.4	28.0		31.5		35.0		11.5
		200		120.1	12.3	154.8	32.0		36.0		40.0		12.9
				Operation frequency			1 million times		500,000 times		300,000 times		

⚠ Load calculation method：Load＝Spring constant×Deflection
N＝N/mm×Fmm
（kgf＝N×0.101972）

⚠ The solid height values are reference only P.206

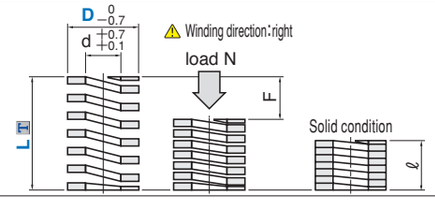
Code No.			d	Spring constant		ℓ min Solid height	F=L×16%		F=L×18%		F=L×20%		@/P (1～19P)
Code	D	L		N/mm	(kgf/mm)		Fmm	Load N (kgf)	Fmm	Load N (kgf)	Fmm	Load N (kgf)	
SSWB	40	40	20	784.5	80.1	31.0	6.4	5021 (512)	7.2	5649 (576)	8.0	6276 (640)	4.78
		45		697.4	71.2	34.8	7.2		8.1		9.0		5.14
		50		627.6	64.0	38.7	8.0		9.0		10.0		5.14
		55		570.6	58.2	42.6	8.8		9.9		11.0		5.59
		60		523.0	53.4	46.4	9.6		10.8		12.0		5.93
		65		482.8	49.3	50.3	10.4		11.7		13.0		6.30
		70		448.3	45.7	54.2	11.2		12.6		14.0		6.65
		75		418.4	42.7	58.1	12.0		13.5		15.0		7.11
		80		392.3	40.0	61.9	12.8		14.4		16.0		7.34
		90		348.7	35.6	69.7	14.4		16.2		18.0		8.17
		100		313.8	32.0	77.4	16.0		18.0		20.0		8.75
		125		251.1	25.6	96.8	20.0		22.5		25.0		10.5
		150		209.2	21.3	116.1	24.0		27.0		30.0		12.3
		175		179.3	18.3	135.4	28.0		31.5		35.0		14.1
		200		156.9	16.0	154.8	32.0		36.0		40.0		15.9
		225		139.5	14.2	174.2	36.0		40.5		45.0		17.5
		250		125.5	12.8	193.5	40.0		45.0		50.0		19.3
		275		114.1	11.6	212.8	44.0		49.5		55.0		22.4
		300		104.6	10.7	232.2	48.0		54.0		60.0		25.0
SSWB	50	50	25	980.7	100.1	38.7	8.0	7845 (800)	9.0	8826 (900)	10.0	9807 (1000)	8.36
		55		891.5	91.0	42.6	8.8		9.9		11.0		8.59
		60		817.2	83.4	46.4	9.6		10.8		12.0		8.71
		65		754.4	77.0	50.3	10.4		11.7		13.0		9.42
		70		700.5	71.5	54.2	11.2		12.6		14.0		10.0
		75		653.8	66.7	58.1	12.0		13.5		15.0		10.8
		80		612.9	62.5	61.9	12.8		14.4		16.0		11.2
		90		544.8	55.6	69.7	14.4		16.2		18.0		12.4
		100		490.3	50.0	77.4	16.0		18.0		20.0		13.6
		125		392.3	40.0	96.8	20.0		22.5		25.0		16.2
		150		326.9	33.4	116.1	24.0		27.0		30.0		19.3
		175		280.2	28.6	135.4	28.0		31.5		35.0		22.1
		200		245.2	25.0	154.8	32.0		36.0		40.0		25.0
		225		217.9	22.2	174.2	36.0		40.5		45.0		27.8
		250		196.1	20.0	193.5	40.0		45.0		50.0		30.6
		275		178.3	18.2	212.8	44.0		49.5		55.0		33.4
		300		163.4	16.7	232.2	48.0		54.0		60.0		36.2
		350		140.1	14.3	270.9	56.0		63.0		70.0		43.0
SSWB	60	60	30	1176.8	120.1	46.4	9.6	11297 (1152)	10.8	12709 (1296)	12.0	14122 (1440)	14.5
		70		1008.7	102.9	54.2	11.2		12.6		14.0		15.6
		80		882.6	90.1	61.9	12.8		14.4		16.0		16.7
		90		784.5	80.1	69.7	14.4		16.2		18.0		17.1
		100		706.1	72.0	77.4	16.0		18.0		20.0		18.6
		125		564.9	57.6	96.8	20.0		22.5		25.0		22.1
		150		470.7	48.0	116.1	24.0		27.0		30.0		25.8
		175		403.5	41.2	135.4	28.0		31.5		35.0		29.2
		200		353.0	36.0	154.8	32.0		36.0		40.0		33.0
		225		314.0	32.0	174.2	36.0		45.0		45.0		35.9
		250		282.4	28.8	193.5	40.0		45.0		50.0		39.2
		275		257.0	26.2	212.9	44.0		49.5		55.0		42.3
		300		235.4	24.0	232.2	48.0		54.0		60.0		45.6
		350		201.7	20.6	270.9	56.0		63.0		70.0		53.9
SSWB	70	70	38.5	1260.9	128.7	54.2	11.2	13651 (1392)	12.6	13357 (1566)	14.0	17064 (1740)	24.5
		80		1103.2	112.6	61.9	12.8		14.4		16.0		25.3
		90		980.7	100.1	69.7	14.4		16.2		18.0		26.2
		100		882.6	90.1	77.4	16.0		18.0		20.0		27.7
		125		706.1	72.0	96.8	20.0		22.5		25.0		32.4
		150		588.4	60.0	116.1	24.0		27.0		30.0		37.8
		175		504.3	51.5	135.4	28.0		31.5		35.0		42.8
		200		441.3	45.0	154.8	32.0		36.0		40.0		47.8
		250		353.0	36.0	193.5	40.0

Coil Springs

For Super Heavy Load SSWG

Material	Code
SWOSC−V	SSWG

Item	Allowable tolerance
Load	±10%
Perpendicularity	2° or less



L	T Tolerance
15～ 50	±0.5
55～200	±1%

Code No.			d	Spring constant		ℓ min Solid height	F=L×16%		F=L×18%		F=L×20%		@/P (1～19P)
Code	D	L		N/mm	{kgf/mm}		Fmm	Load N {kgf}	Fmm	Load N {kgf}	Fmm	Load N {kgf}	
SSWG	10	15	5	163.3	{16.7}	11.4	2.4		2.7		Beyond allowable range		1.96
		20		123.0	{12.5}	15.0	3.2		3.6		4.0		1.96
		25		98.1	{10.0}	19.0	4.0		4.5		5.0		2.08
		30		81.7	{ 8.3}	22.8	4.8		5.4		6.0		2.21
		35		70.0	{ 7.1}	26.6	5.6		6.3		7.0		2.33
		40		61.2	{ 6.3}	30.4	6.4		7.2		8.0		2.45
		45		54.5	{ 5.6}	34.2	7.2		8.1		9.0		2.58
		50		49.0	{ 5.0}	38.0	8.0	392.3	9.0	441.3	10.0	490.3	2.70
		55		44.6	{ 4.5}	41.8	8.8	{40.0}	9.9	{45.0}	11.0	{50.0}	2.81
		60		40.9	{ 4.2}	45.6	9.6		10.8		12.0		2.95
		65		37.7	{ 3.8}	49.4	10.4		11.7		13.0		3.24
		70		35.0	{ 3.6}	53.2	11.2		12.6		14.0		3.31
		75		32.7	{ 3.3}	57.0	12.0		13.5		15.0		3.43
		80		30.6	{ 3.1}	60.8	12.8		14.4		16.0		3.61
		90		27.2	{ 2.8}	68.4	14.4		16.2		18.0		3.98
		100		24.5	{ 2.5}	76.0	16.0		18.0		20.0		4.17
SSWG	12	15	6	245.0	{25.0}	11.4	2.4		2.7		Beyond allowable range		2.64
		20		184.0	{18.8}	15.0	3.2		3.6		4.0		2.64
		25		147.0	{15.0}	19.0	4.0		4.5		5.0		2.70
		30		123.0	{12.5}	22.8	4.8		5.4		6.0		2.75
		35		105.0	{10.7}	26.6	5.6		6.3		7.0		2.81
		40		91.9	{ 9.4}	30.4	6.4		7.2		8.0		2.95
		45		81.7	{ 8.3}	34.2	7.2		8.1		9.0		3.12
		50		73.5	{ 7.5}	38.0	8.0	588.4	9.0	661.9	10.0	735.5	3.31
		55		66.9	{ 6.8}	41.8	8.8	{60.0}	9.9	{67.5}	11.0	{75.0}	3.49
		60		61.3	{ 6.3}	45.6	9.6		10.8		12.0		3.68
		65		56.6	{ 5.8}	49.4	10.4		11.7		13.0		3.92
		70		52.5	{ 5.4}	53.2	11.2		12.6		14.0		4.11
		75		49.0	{ 5.0}	57.0	12.0		13.5		15.0		4.28
		80		46.0	{ 4.7}	60.8	12.8		14.4		16.0		4.59
		90		40.9	{ 4.2}	68.4	14.4		16.2		18.0		4.90
		100		36.8	{ 3.8}	76.0	16.0		18.0		20.0		5.21
SSWG	14	20	7	238.0	{24.3}	15.2	3.2		3.6		Beyond allowable range		3.00
		25		190.0	{19.4}	19.0	4.0		4.5		5.0		3.00
		30		159.0	{16.2}	22.8	4.8		5.4		6.0		2.95
		35		136.0	{13.9}	26.6	5.6		6.3		7.0		3.06
		40		119.0	{12.1}	30.4	6.4		7.2		8.0		3.18
		45		106.0	{10.8}	34.2	7.2		8.1		9.0		3.31
		50		95.1	{ 9.7}	38.0	8.0		9.0		10.0		3.49
		55		86.5	{ 8.8}	41.8	8.8	761.0	9.9	856.1	11.0	951.2	3.74
		60		79.3	{ 8.1}	45.6	9.6	{77.6}	10.8	{87.3}	12.0	{97.0}	3.98
		65		73.2	{ 7.5}	49.4	10.4		11.7		13.0		4.34
		70		67.9	{ 6.9}	53.2	11.2		12.6		14.0		4.53
		75		63.4	{ 6.5}	57.0	12.0		13.5		15.0		4.71
		80		59.5	{ 6.1}	60.8	12.8		14.4		16.0		4.78
		90		52.8	{ 5.4}	68.4	14.4		16.2		18.0		4.96
		100		47.6	{ 4.9}	76.0	16.0		18.0		20.0		5.33
SSWG	16	20	8	319.0	{32.5}	15.2	3.2		3.6		Beyond allowable range		3.12
		25		255.0	{26.0}	19.0	4.0		4.5		5.0		3.12
		30		212.0	{21.6}	22.8	4.8		5.4		6.0		3.12
		35		182.0	{18.6}	26.6	5.6		6.3		7.0		3.31
		40		159.0	{16.2}	30.4	6.4		7.2		8.0		3.49
		45		142.0	{14.5}	34.2	7.2		8.1		9.0		3.74
		50		127.0	{13.0}	38.0	8.0	1020	9.0	1147	10.0	1275	3.98
		55		116.0	{11.8}	41.8	8.8	{104}	9.9	{117}	11.0	{130}	4.23
		60		106.0	{10.8}	45.6	9.6		10.8		12.0		4.48
		65		98.1	{10.0}	49.4	10.4		11.7		13.0		4.78
		70		91.1	{ 9.3}	53.2	11.2		12.6		14.0		4.96
		75		85.0	{ 8.7}	57.0	12.0		13.5		15.0		5.21
		80		79.7	{ 8.1}	60.8	12.8		14.4		16.0		5.52
		90		70.8	{ 7.2}	68.4	14.4		16.2		18.0		5.81
		100		63.7	{ 6.5}	76.0	16.0		18.0		20.0		6.12
		Operation frequency				1 million times			500,000 times		300,000 times		

Code No.			d	Spring constant		ℓ min Solid height	F=L×16%		F=L×18%		F=L×20%		@/P (1～19P)
Code	D	L		N/mm	{kgf/mm}		Fmm	Load N {kgf}	Fmm	Load N {kgf}	Fmm	Load N {kgf}	
SSWG	18	20	9	392.0	{40.0}	15.2	3.2		3.6		Beyond allowable range		3.18
		25		314.0	{32.0}	19.0	4.0		4.5		5.0		3.18
		30		262.0	{26.7}	22.8	4.8		5.4		6.0		3.18
		35		224.0	{22.9}	26.6	5.6		6.3		7.0		3.43
		40		196.0	{20.0}	30.4	6.4		7.2		8.0		3.68
		45		174.0	{17.8}	34.2	7.2		8.1		9.0		3.92
		50		157.0	{16.0}	38.0	8.0	1255	9.0	1412	10.0	1569	4.17
		55		143.0	{14.6}	41.8	8.8	{128}	9.9	{144}	11.0	{160}	4.42
		60		131.0	{13.4}	45.6	9.6		10.8		12.0		4.65
		65		121.0	{12.3}	49.4	10.4		11.7		13.0		4.96
		70		112.0	{11.4}	53.2	11.2		12.6		14.0		5.15
		75		105.0	{10.7}	57.0	12.0		13.5		15.0		5.39
		80		98.1	{10.0}	60.8	12.8		14.4		16.0		5.75
		90		87.2	{ 8.9}	68.4	14.4		16.2		18.0		6.31
		100		78.5	{ 8.0}	76.0	16.0		18.0		20.0		6.80
SSWG	20	20	10	515.0	{52.6}	15.2	3.2		3.6		Beyond allowable range		3.24
		25		412.0	{42.0}	19.0	4.0		4.5		5.0		3.24
		30		343.0	{35.0}	22.8	4.8		5.4		6.0		3.24
		35		294.0	{30.0}	26.6	5.6		6.3		7.0		3.49
		40		257.0	{26.2}	30.4	6.4		7.2		8.0		3.74
		45		229.0	{23.4}	34.2	7.2		8.1		9.0		3.98
		50		206.0	{21.0}	38.0	8.0	1648	9.0	1853	10.0	2059	4.23
		55		187.1	{19.1}	41.8	8.8	{168}	9.9	{189}	11.0	{210}	4.48
		60		172.0	{17.5}	45.6	9.6		10.8		12.0		4.71
		65		158.5	{16.2}	49.4	10.4		11.7		13.0		5.02
		70		147.1	{15.0}	53.2	11.2		12.6		14.0		5.33
		75		137.3	{14.0}	57.0	12.0		13.5		15.0		5.64
		80		128.8	{13.1}	60.8	12.8		14.4		16.0		5.95
		90		114.4	{11.7}	68.4	14.4		16.2		18.0		6.31
		100		103.0	{10.5}	76.0	16.0		18.0		20.0		6.86
		125		82.4	{ 8.4}	95.0	20.0		22.5		25.0		8.39
SSWG	22	20	11	588.4	{60.0}	15.2	3.2		3.6		Beyond allowable range		3.31
		25		471.0	{48.1}	19.0	4.0		4.5		5.0		3.31
		30		392.1	{40.0}	22.8	4.8		5.4		6.0		3.31
		35		336.1	{34.3}	26.6	5.6		6.3		7.0		3.55
		40		294.1	{30.0}	30.4	6.4		7.2		8.0		3.80
		45		262.0	{26.7}	34.2	7.2		8.1		9.0		4.05
		50		235.4	{24.0}	38.0	8.0	1883	9.0	2118	10.0	2354	4.28
		55		214.0	{21.8}	41.8	8.8	{192}	9.9	{216}	11.0	{240}	4.53
		60		196.1	{20.0}	45.6	9.6		10.8		12.0		4.78
		65		181.1	{18.5}	49.4	10.4		11.7		13.0		5.08
		70		168.1	{17.2}	53.2	11.2		12.6		14.0		5.39
		75		157.0	{16.0}	57.0	12.0		13.5		15.0		5.70
		80		147.1	{15.0}	60.8	12.8		14.4		16.0		6.00
		90		131.0	{13.4}	68.4	14.4		16.2		18.0		6.37
		100		118.0	{12.0}	76.0	16.0		18.0		20.0		6.92
		125		94.2	{ 9.6}	95.0	20.0		22.5		25.0		8.52
SSWG	25	20	12.5	760.0	{77.6}	15.2	3.2		3.6		Beyond allowable range		3.37
		25		608.0	{62.0}	19.0	4.0		4.5		5.0		3.37
		30		507.0	{51.7}	22.8	4.8		5.4		6.0		3.43
		35		434.3	{44.3}	26.6	5.6		6.3		7.0		3.68
		40		380.0	{38.8}	30.4	6.4		7.2		8.0		3.98
		45		338.0	{34.5}	34.2	7.2		8.1		9.0		4.28
		50		304.0	{31.0}	38.0	8.0	2432	9.0	2736	10.0	3040	4.59
		55		276.4	{28.2}	41.8	8.8	{248}	9.9	{279}	11.0	{310}	4.90
		60		253.3	{25.9}	45.6	9.6		10.8		12.0		5.08
		65		234.0	{23.9}	49.4	10.4		11.7		13.0		5.33
		70		217.1	{22.2}	53.2	11.2		12.6		14.0		5.64
		75		203.0	{20.7}	57.0	12.0		13.5		15.0		5.81
		80		190.0	{19.4}	60.8	12.8		14.4		16.0		6.06
		90		169.0	{17.2}	68.4	14.4		16.2		18.0		6.55
		100		152.0	{15.5}	76.0	16.0		18.0		20.0		7.17
		125		121.6	{12.4}	95.0	20.0		22.5		25.0		8.52
		Operation frequency				1 million times			500,000 times		300,000 times		

ORDER

Code No.
SSWG20 − 45

DELIVERY

Next In stock working day

☞ P.15

PRICE Without tax

▶Quantity discount rate ☞ P.15

1～19	20～49	50～199	200～500	501～
100%	95%	90%	85%	Enquiry

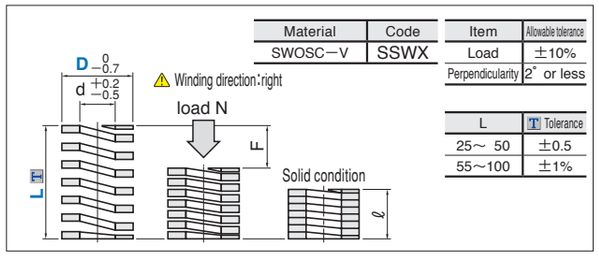
Code No.			d	Spring constant		ℓ min Solid height	F=L×16%		F=L×18%		F=L×20%		@/P (1～19P)
Code	D	L		N/mm	{kgf/mm}		Fmm	Load N {kgf}	Fmm	Load N {kgf}	Fmm	Load N {kgf}	
SSWG	27	20	13.5	907.2	{ 92.6}	15.2	3.2		3.6		Beyond allowable range		3.80
		25		726.0	{ 74.1}	19.0	4.0		4.5		5.0		3.80
		30		605.0	{ 61.7}	22.8	4.8		5.4		6.0		3.86
		35		518.4	{ 52.9}	26.6	5.6		6.3		7.0		4.17
		40		454.0	{ 46.3}	30.4	6.4		7.2		8.0		4.48
		45		403.2	{ 41.1}	34.2	7.2		8.1		9.0		4.65
		50		363.0	{ 37.0}	38.0	8.0		9.0		10.0		4.90
		55		330.0	{ 33.7}	41.8	8.8		9.9		11.0		5.15
		60		302.4	{ 30.9}	45.6	9.6	2903	10.8	3266	12.0	3628	5.39
		65		279.1	{ 28.5}	49.4	10.4	{296}	11.7	{333}	13.0	{370}	5.64
		70		259.2	{ 26.4}	53.2	11.2		12.6		14.0		5.89
		75		242.0	{ 24.7}	57.0	12.0		13.5		15.0		6.12
		80		227.0	{ 23.2}	60.8	12.8		14.4		16.0		6.37
		90		202.0	{ 20.6}	68.4	14.4		16.2		18.0		7.28
		100		181.4	{ 18.5}	76.0	16.0		18.0		20.0		8.02
		125		145.2	{ 14.8}	95.0	20.0		22.5		25.0		9.86
		150		121.0	{ 12.3}	114.0	24.0		27.0		30.0		11.6
SSWG	30	20	15	1177.0	{120.1}	15.2	3.2		3.6		Beyond allowable range		4.11
		25		941.5	{ 96.1}	19.0	4.0		4.5		5.0		4.11
		30		785.0	{ 80.1}	22.8	4.8		5.4		6.0		4.28
		35		672.5	{ 68.6}	26.6	5.6		6.3		7.0		4.53
		40		588.4	{ 60.0}	30.4	6.4		7.2		8.0		4.84
		45		523.1	{ 53.4}	34.2	7.2		8.1		9.0		5.15
		50		471.0	{ 48.1}	38.0	8.0		9.0		10.0		5.45
		55		428.0	{ 43.7}	41.8	8.8		9.9		11.0		5.75
		60		392.3	{ 40.0}	45.6	9.6	3766	10.8	4236	12.0	4707	6.06
		65		362.1	{ 37.0}	49.4	10.4	{384}	11.7	{432}	13.0	{480}	6.43
		70		336.2	{ 34.3}	53.2	11.2		12.6		14.0		6.80
		75		314.0	{ 32.0}	57.0	12.0		13.5		15.0		7.17
		80		294.2	{ 30.0}	60.8	12.8		14.4		16.0		7.53
		90		262.0	{ 26.7}	68.4	14.4		16.2		18.0		8.02
		100		235.4	{ 24.0}	76.0	16.0		18.0		20.0		8.52
		125		188.3	{ 19.2}	95.0	20.0		22.5		25.0		10.4
		150		157.0	{ 16.0}	114.0	24.0		27.0		30.0		12.0
		175		134.5	{ 13.7}	133.0	28.0		31.5		35.0		13.6
		200		118.0	{ 12.0}	152.0	32.0		36.0		40.0		15.9
SSWG	35	30	17.5	1030.0	{105.1}	22.8	4.8		5.4		6.0		5.70
		35		883.0	{ 90.1}	26.6	5.6		6.3		7.0		5.70
		40		772.3	{ 78.8}	30.4	6.4		7.2		8.0		5.81
		45		686.5	{ 70.1}	34.2	7.2		8.1		9.0		5.95
		50		618.0	{ 63.1}	38.0	8.0		9.0		10.0		6.49
		55		562.0	{ 57.3}	41.8	8.8		9.9		11.0		7.17
		60		515.0	{ 52.5}	45.6	9.6		10.8		12.0		7.65
		65		475.3	{ 48.5}	49.4	10.4	4943	11.7	5560	13.0	6178	8.15
		70		441.3	{ 45.0}	53.2	11.2	{504}	12.6	{567}	14.0	{630}	8.58
		75		412.0	{ 42.0}	57.0	12.0		13.5		15.0		9.12
		80		386.2	{ 39.4}	60.8	12.8		14.4		16.0		9.74
		90		343.3	{ 35.0}	68.4	14.4		16.2		18.0		10.8
		100		309.0	{ 31.5}	76.0	16.0		18.0		20.0		11.7
		125		247.2	{ 25.2}	95.0	20.0		22.5		25.0		14.1
		150		206.0	{ 21.0}	114.0	24.0		27.0		30.0		16.4
		175		177.0	{ 18.1}	133.0	28.0		31.5		35.0		19.0
		200		154.0	{ 15.7}	152.0	32.0		36.0		40.0		21.4
		Operation frequency				1 million times			500,000 times		300,000 times		

⚠ Load calculation method：Load＝Spring constant×Deflection
N＝N/mm×Fmm
（kgf＝N×0.101972）
⚠ The solid height values are reference only ☞ P.206
⚠ Operation frequency：1 million times（allowable deflection：L×16%）
500,000 times（allowable deflection：L×18%）
300,000 times（allowable deflection：L×20%）

Code No.			d	Spring constant		ℓ min Solid height	F=L×16%		F=L×18%		F=L×20%		@/P (1～19P)
Code	D	L		N/mm	{kgf/mm}		Fmm	Load N {kgf}	Fmm	Load N {kgf}	Fmm	Load N {kgf}	
SSWG	40	35	20	1149.0	{117.2}	26.6	5.6		6.3		7.0		8.15
		40		1005.0	{102.6}	30.4	6.4		7.2		8.0		8.15
		45		893.1	{ 91.1}	34.2	7.2		8.1		9.0		8.39
		50		804.0	{ 82.0}	38.0	8.0		9.0		10.0		8.75
		55		731.0	{ 74.6}	41.8	8.8		9.9		11.0		9.31
		60		670.0	{ 68.4}	45.6	9.6		10.8		12.0		9.86
		65		619.0	{ 63.2}	49.4	10.4		11.7		13.0		10.5
		70		574.4	{ 58.6}	53.2	11.2	6433	12.6	7237	14.0	8041	11.1
		75		536.0	{ 54.7}	57.0	12.0	{656}	13.5	{738}	15.0	{820}	11.7
		80		503.0	{ 51.3}	60.8	12.8		14.4		16.0		12.2
		90		447.0	{ 45.6}	68.4	14.4		16.2		18.0		13.5
		100		402.0	{ 41.0}	76.0	16.0		18.0		20.0		14.6
		125		321.9	{ 32.9}	95.0	20.0		22.5		25.0		17.3
		150		268.0	{ 27.4}	114.0	24.0		27.0		30.0		20.2
		175		230.0	{ 23.5}	133.0	28.0		31.5		35.0		23.9
		200		201.0	{ 20.5}	152.0	32.0		36.0		40.0		27.1
SSWG	50	50	25	1226.0	{125.1}	39.0	8.0		9.0		10.0		14.3
		55		1114.0	{113.7}	43.0	8.8		9.9		11.0		14.8
		60		1022.0	{104.3}	47.0	9.6		10.8		12.0		15.0
		65		943.0	{ 96.2}	51.0	10.4		11.7		13.0		15.9
		70		876.0	{ 89.4}	54.0	11.2		12.6		14.0		17.1
		75		817.0	{ 83.4}	58.0	12.0	9807	13.5	11032	15.0	12258	18.1
		80		766.0	{ 78.2}	61.0	12.8	{1000}	14.4	{1125}	16.0	{1250}	18.9
		90		681.0	{ 69.5}	68.4	14.4		16.2		18.0		20.9
		100		613.0	{ 62.6}	76.0	16.0		18.0		20.0		23.0
		125		490.0	{ 50.0}	95.0	20.0		22.5		25.0		27.7
		150		409.0	{ 41.7}	114.0	24.0		27.0		30.0		32.7
		175		350.0	{ 35.7}	133.0	28.0		31.5		35.0		38.4
		200		306.3	{ 31.3}	152.0	32.0		36.0		40.0		43.6
		Operation frequency				1 million times			500,000 times		300,000 times		

Coil Springs

For High Speed Extra Heavy Load SSWX



Material	Code
SWOSC−V	SSWX

Item	Allowable tolerance
Load	±10%
Perpendicularity	2° or less

L	T Tolerance
25～ 50	±0.5
55～100	±1%

ORDER

Code No.
SSWX20 − 45

DELIVERY

In stock Next working day ☞P.15

PRICE Without tax

▶Quantity discount rate ☞P.15

1～19	20～49	50～199	200～500	501～
100%	95%	90%	85%	Enquiry

Code No. Code	D	L	d	Spring constant N/mm	{kgf/mm}	ℓ min Solid height	F=L×10% Fmm	Load N {kgf}	@/P (1～19P)
SSWX	20	25	9.5	510	{52.0}	20.0	2.5	1275 {130}	3.80
		30		425	{43.4}	24.0	3.0		3.92
		35		363	{37.1}	28.0	3.5		4.11
		40		319	{32.5}	32.0	4.0		4.48
		45		283	{28.9}	36.0	4.5		4.78
		50		255	{26.0}	40.0	5.0		5.27
		55		232	{23.6}	44.0	5.5		5.64
		60		213	{21.7}	48.0	6.0		5.95
SSWX	22	25	10.5	628	{64.0}	20.0	2.5	1569 {160}	3.86
		30		523	{53.3}	24.0	3.0		4.11
		35		448	{45.7}	28.0	3.5		4.34
		40		392	{40.0}	32.0	4.0		4.71
		45		349	{35.6}	36.0	4.5		5.02
		50		314	{32.0}	40.0	5.0		5.52
		55		285	{29.1}	44.0	5.5		5.89
		60		262	{26.7}	48.0	6.0		6.18
SSWX	25	25	12	785	{80.1}	20.0	2.5	1961 {200}	3.98
		30		654	{66.7}	24.0	3.0		4.28
		35		560	{57.1}	28.0	3.5		4.59
		40		490	{50.0}	32.0	4.0		4.90
		45		435	{44.4}	36.0	4.5		5.39
		50		392	{40.0}	40.0	5.0		5.75
		55		357	{36.4}	44.0	5.5		6.06
		60		327	{33.3}	48.0	6.0		6.43
		70		280	{28.6}	59.0	7.0		6.80
		80		245	{25.0}	68.0	8.0		7.17
SSWX	27	25	13	941	{96.0}	20.0	2.5	2354 {240}	4.28
		30		785	{80.1}	24.0	3.0		4.65
		35		673	{68.6}	28.0	3.5		4.90
		40		588	{60.0}	32.0	4.0		5.39
		45		523	{53.3}	36.0	4.5		5.75
		50		471	{48.0}	40.0	5.0		6.06
		55		428	{43.6}	44.0	5.5		6.43
		60		392	{40.0}	48.0	6.0		6.80
		70		336	{34.3}	59.0	7.0		7.23
		80		294	{30.0}	68.0	8.0		7.65

Code No. Code	D	L	d	Spring constant N/mm	{kgf/mm}	ℓ min Solid height	F=L×10% Fmm	Load N {kgf}	@/P (1～19P)
SSWX	30	25	14.6	1432	{146.1}	20.0	2.5	3579 {365}	4.71
		30		1193	{121.7}	24.0	3.0		5.08
		35		1023	{104.3}	28.0	3.5		5.52
		40		895	{ 91.3}	32.0	4.0		5.89
		45		795	{ 81.2}	36.0	4.5		6.18
		50		716	{ 73.0}	40.0	5.0		6.55
		55		651	{ 66.4}	44.0	5.5		6.92
		60		597	{ 60.9}	48.0	6.0		7.23
		70		511	{ 52.2}	59.0	7.0		8.15
		80		447	{ 45.6}	68.0	8.0		9.06
		90		398	{ 40.6}	76.0	9.0		9.99
		100		358	{ 36.5}	85.0	10.0		10.9
SSWX	35	40	18	1030	{105.1}	34.0	4.0	4119 {420}	6.92
		45		915	{ 93.4}	38.2	4.5		7.28
		50		824	{ 84.1}	42.5	5.0		8.02
		55		749	{ 76.4}	46.8	5.5		8.75
		60		687	{ 70.1}	51.0	6.0		9.37
		70		588	{ 60.0}	59.5	7.0		10.6
		80		515	{ 52.5}	68.0	8.0		12.0
		90		458	{ 46.7}	76.5	9.0		13.3
		100		412	{ 42.0}	85.0	10.0		14.8
SSWX	40	40	20.5	1300	{132.6}	34.0	4.0	5198 {530}	9.68
		45		1155	{117.9}	38.2	4.5		10.3
		50		1040	{106.1}	42.5	5.0		10.8
		55		945	{ 96.4}	46.8	5.5		11.4
		60		866	{ 88.4}	51.0	6.0		12.2
		70		743	{ 75.8}	59.5	7.0		13.6
		80		650	{ 66.3}	68.0	8.0		14.9
		90		578	{ 58.9}	76.5	9.0		16.4
		100		520	{ 53.0}	85.0	10.0		18.0

⚠ Load calculation method：Load＝Spring constant×Deflection
N＝N/mm×Fmm
（kgf＝N×0.101972）
⚠ The solid height values are reference only ☞P.206
⚠ Operation frequency：1000 times（allowable deflection：L×10%）

▶Features and notes

- ●SSWX is a spring that is developed for high-speed applications.
- ●No painting
- ●For high durability, please use springs as a max. deflection of 10% of overall length.
- ●Although antirust oil is applied, early use after purchasing is recommended.
- ●Pay attention to rusty springs during operation, and replace them immediately.

PRODUCTS & TECHNICAL DATA

Coating Treatment（PVD method）

Kinds of surface treatment can be adopted according to different application purposes.
PUNCH INDUSTRY® is fully capable of different surface treatment for components for Mould.

Method		Coating Layer
Physical Vapor Deposition	PVD method	TiN
		TiCN
	New PVD method	CMiT
Chemicial Vapor Deposion	CVD method	TiC
		TiCN

PVD method

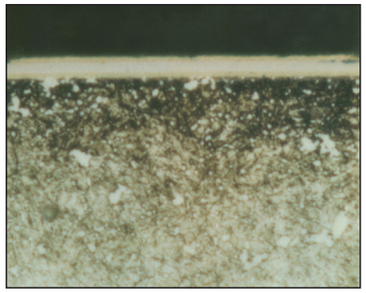
A high current, low voltage arc is initiated on the target（solid material used for deposition）. The metal is evaporated and instantaneously ionized. These metal ions are accelerated at high energies into the vacuum through an inert gas or reactive gas and subsequently deposited on the part. The typical PVD treatment contains Vacuum evaporation, Sputtering and Ion plating.

Feature

1）Dirt on the surface of the part is removed by the metal ions under arc acceleration. The coating layer is deposited on the active surface of the part.
2）The part is nearly no deformation or deterioration by the reason of lower treating temperature（350~550℃）
3）With the feature of wearability, anti-sintering, and demoulding are dramatically improved by the reason of higher hardness of coating layer.
4）Due to the compact coating layer, surface roughness of the part remains the same after treatment.
5）Interior of deep holes and narrow grooves is hardly to be coated.
6）Protected by cover for designated position, partial treatment is applicable.

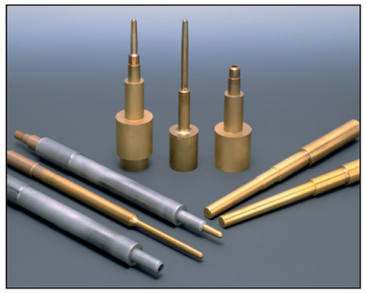
TiN COAT

By the feature of widely application range, TiN is one of the PVD methods and has been broadly adopted. Especially for cutting tools, TiN has better roughness and shape angle preservation than TiC. The lower treating temperature does not case the base material deformation or reduce the hardness, certainly, the dimension and performance of the part will be insured. TiN is recommended to be used for the material that tempering temperature is higher then coating temperature. Surface hardness of the part exceeds 2200HV after coating treatment.



TiCN COAT

TiCN combines the features of high hardness for TiC and the high roughness for TiN together. The content ratio of C（Carbon）and N（Nitrogen）determines the relation between hardness and roughness. TiCN treatment can achieve the excellent performance rather than TiC or TiN been individually applied by preset the content ratio of C and N according to different application. The surface hardness of the part after TiCN can reach 3000HV that higher than TiN and the application performance as the same as composite coating with double or triple layers.



Feature and application range of coating layer

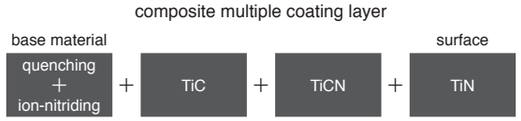
Physical properties \ Type		Titanium carbide	Titanium carbonitride	Titanium nitride	Application range
hardness HV		3000～3800	2800～3200	1900～2400	—
Melting point ℃		3160	3050	2950	
Density g/cm³		4.92	5.18	5.43	
Thermal expansion coefficient（200℃）/℃		7.8×10^{-6}	8.1×10^{-6}	8.3×10^{-6}	
Resistance（20℃）Ω		85	50	22	
Elastic modulus kg/mm²		4.48×104	3.52×104	2.56×104	
Friction coefficient μ		0.25	0.37	0.49	
Coating layer thickness μm		2～8	2～8	2～8	
Cutting tool	High-speed tool steel	◎	○	○	Drill bit, Milling cutter, Reamer
	Carbide alloy	×	○	○	Carbide alloy blade
Mould	High-speed steel	◎	○	○	Cold-forging, punch and button die for pressing
	Cold die steel（SKD11）	○	△	△	
	Hot die steel（SKD61）	○	△	△	Aluminum die-cast mould, plastic mould
	Carbide alloy	×	○	○	Punch and button die for cold-forging
Machine parts	SS, SC, SCM etc.	△	△	○	Parts with highly requirement for corrosion resistance and wearability such like Roller, cam and shaft etc.
	SUS（Stainless steel）	○	△	○	
	Aluminum・Copper alloy	×	△	○	
Accessories	Steel	×	○	○	for material with melting point lower than 350℃
	Nonferrous metal	×	○	○	

◎most applicable ○applicable △may applicable ×not applicable

Composite Coating Treatment（New PVD Method）

New PVD method

The PVD method used previously only coat single layer of TiN and the application range has been limited. The new PVD method coats the composite Titanium carbide or Titanium nitride layer on the part. This method firstly applies the ion-nitriding on surface of the part followed with ion-coating in order to generate composite coating layer of TiC, TiCN along with TiN and lifespan of part is dramatically extended.



Composite coating layer

1. Feature

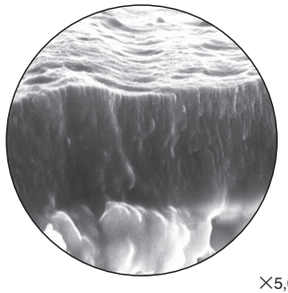
1）The multiple coating treatment（TiC, TiCN, TiN）which been sequentially applied after special ion-nitriding prevent the oxide film formed and consequently, surface features such as stronger adhesiveness, better wearability, and higher compression resistance can be acquired.

2）The special ion-nitriding treatment insure the surface hardness is much higher than that been treated by CVD and the inner hardness remained the same.

3）Applicable for the material with tempering temperature higher than the treating temperature（350～550℃）, especially applicable for SKH51, DC53, SKD11, and SKD61.

4）The parts inside the coating furnace keep rotating during the treating process, so the coating layer can be formed equally.

5）With the thickness of 3 μm and hardness of 3,800HV, coating layer firmly adheres with the base material. Punch and Button die for cold-forging are more applicable to adapt this method.

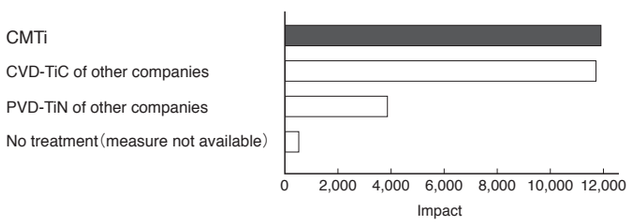


×5,000
Scanning electron microscope（SEM）（JEOL JSM-6,400）

Wearability after high-temperature treatment of TiC and TD under CVD method is obviously improved.

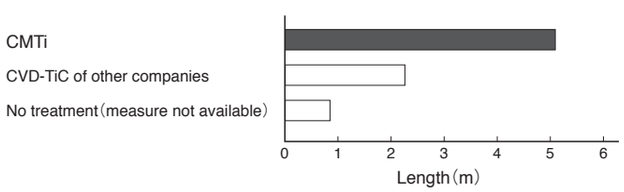
2.Performance comparison of CMTi

●Lifespan comparison of punch for cold-forging



Processing condition
1. Processing Tool：SKH51 punch φ50
2. Coating layer：CMTi
3. Processing material：SCM440
4. Test machine：Toggle press
5. Nominal force：600t

●Lifespan comparison of cutting tools



Processing condition
1.processing tool：SKH5 milling cutter φ10
2. Coating layer：CMTi
3. Material for testing：SKD61（39HRC）
4. 22m/min（700rpm）
5. Amount of feed：0.075mm/per cut 105mm/min
6. Dry cutting：DRY
7. Forced depth：10×0.1mm
8. Applied cutting：climb cutting

Coating Treatment（New CVD Method）

New PVD method

Chemical vapor deposition（CVD）is a chemical process used to produce high-purity, high-performance solid materials. In a typical CVD process, the wafer（substrate）is exposed to one or more volatile precursors, which react and/or decompose on the substrate surface to produce the desired deposit. CVD is classified by operating pressure into Atmospheric pressure CVD, Low-pressure CVD, and Plasma-assisted CVD.

TiC COAT

1. Feature

1）Base material and coating layer inter-diffuses under the high treating temperature（950～1050℃）, so the coating layer adheres with the part firmly.

2）Parts with complex shape or fine hole can also be coated equally.

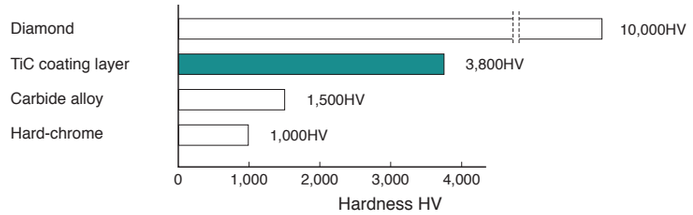
3）Better wearability can be acquired after mirror grinding under polishing.

4）Coating layer thickness：5～10 μm

5）Hardness is second only to Diamond（3,800HV）

6）Deformation may occur due to the high processing temperature.

2. Hardness comparison



3. Typical reaction example

Coating material	Reaction example
TiC	$TiC\ell_4 + CH_4 \xrightarrow[950\sim1100℃]{H_2} TiC + 4HCR$
TiCN	$TiC\ell_4 + CH_4 + N_2 \xrightarrow[950\sim1050℃]{H_2} 2TiCN + 8HCR$

4. Applicable base material and main application

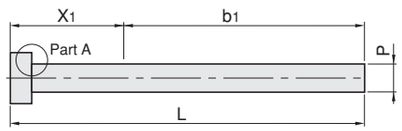
Coating material	Applicable base material	Main application	Specific feature
TiC	SKD1 SKD11 DC53 SKD61 SKH51 SKH55 SKH57 P/M high speed steel	Pressing punches Drawing punches, button dies Forming button dies Cold-forging punches, button dies	Improve the wearability Prevent sintering Prevent melting
TiCN		Core pins for aluminum die casting die Heavy load punches, button dies Drawing Punches, button dies Machine parts	Improve the demoulding Prevent wearing and depositing Improve the wearability Prevent sintering and melting

Range of Guaranteed Shank Diameter Precision

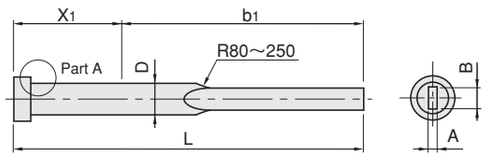
Ejector pins

Range of Guaranteed Shaft Diameter (P) and Installation Shaft Diameter (D) for Ejector Pins

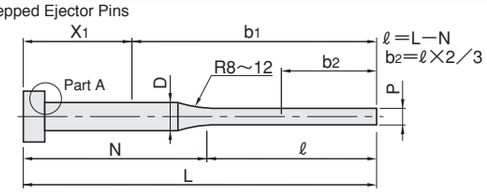
Straight Ejector Pins



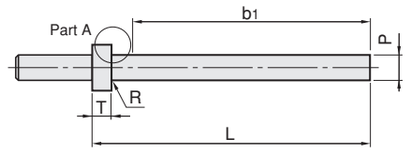
Rectangular Ejector Pins

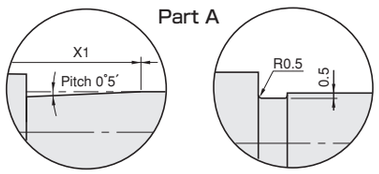


Stepped Ejector Pins



Free Flange Position Ejector Pins





⚠ Pitch groove processing or round R groove the root.

Category of Ejector Pins		Range of Guaranteed Shaft D(P) Tolerance	Length of Pitch Groove X1
Straight Ejector Pins Stepped Ejector Pins Rectangular Ejector Pins	General type	b1=overall length L×2/3	X1=overall length L×1／3
	Overall length L designation	b1=overall length L−X1	

L Dimension	X1	L Dimension	X1
(20.00～ 30.00)	10	350.01～ 400.00	135
(30.01～ 60.00)	17	400.01～ 450.00	150
40.01～100.00	35	450.01～ 500.00	170
100.01～150.00	50	500.01～ 600.00	200
150.01～200.00	70	600.01～ 700.00	235
200.01～250.00	85	700.01～ 800.00	270
250.01～300.00	100	800.01～ 900.00	300
300.01～350.00	120	900.01～1000.00	335

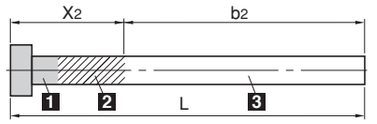
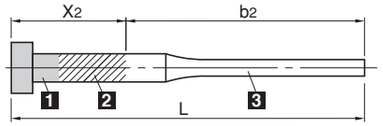
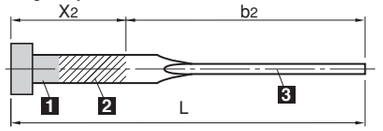
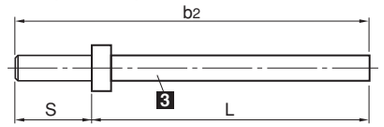
▶Straight Ejector Pins　Shaft diameter designation, overall length・shaft diameter designation　b1=overall length L−X1　Unit:mm

Type	Code	P Dimension	P Tolerance	L Dimension	Length of Pitch groove X1(max.) Overall length L	Length of Pitch Groove X1	Overall length L	Length of Pitch Groove X1
P dimension designation type	EPHVP	0.210～ 5.990	0 −0.002	50～200	50.00～200.00	X1=overall length L/3	–	–
L・P dimension designation type	EPHVS	0.210～ 5.990		30～200	30.00～200.00	X1=overall length L/3	–	–
P dimension designation type	EPHP	0.21 ～12.09	0 −0.005	50～350	50.00～300.00	For P≤4.00, 20mm For P＞4.00, 30mm	300.01～350.00	100～120
L・P dimension designation type	EPHS	0.21 ～12.09		30～350	30.00～300.00		300.01～350.00	100～120
P dimension designation type	EPSP	0.21 ～11.99	−0.01 −0.02	60～350	60.00～300.00		300.01～350.00	100～120
L・P dimension designation type	EPSS	0.21 ～11.99		30～350	30.00～300.00		300.01～350.00	100～120
P dimension designation type	EPHSYP	0.210～ 0.995	0 −0.005	60	60.00	10mm	–	–
L・P dimension designation type	EPHSYS	0.210～ 0.995		20～ 60	20.00～ 60.00	10mm	–	–
P dimension designation type	EP4NP	0.80 ～15.99	−0.01 −0.02	100～400	100.00～300.00	For P≤4.00, 20mm For P＞4.00, 30mm	300.01～400.00	100～140
	EPJNP	3.40 ～24.99		100～400	100.00～300.00		300.01～400.00	100～140
L・P dimension designation type	EP4NS	0.80 ～15.99		40～400	40.00～300.00		300.01～400.00	100～140
	EPJNS	3.40 ～24.99		40～400	40.00～300.00		300.01～400.00	100～140
P dimension designation type	EPBHP	0.90 ～12.99	0 −0.005	100～500	100.00～300.00		300.01～500.00	100～170
	EPBSP	0.90 ～12.99	−0.01 −0.02	100～500	100.00～300.00		300.01～500.00	100～170
L・P dimension designation type	EPBHS	0.90 ～12.99	0 −0.005	40～500	40.00～300.00		300.01～500.00	100～170
	EPBSS	0.90 ～12.99	−0.01 −0.02	40～500	40.00～300.00		300.01～500.00	100～170
P dimension designation type	EPPHP	1.40 ～11.99	−0.01 −0.02	100～300	100.00～300.00		–	–
L・P dimension designation type	EPPHS	1.40 ～11.99		40～300	40.00～300.00		–	–
P dimension designation type	EPFP	1.40 ～19.99		100～400	100.00～300.00		300.01～400.00	100～140
L・P dimension designation type	EPFS	1.40 ～19.99		40～400	40.00～300.00		300.01～400.00	100～140
P dimension designation type	EPSUP	0.90 ～ 5.99	0 −0.005	100～200	100.00～200.00	30mm	–	–
	EPSUJP	3.40 ～ 5.99		100～200	100.00～200.00	35mm	–	–
L・P dimension designation type	EPSUS	0.90 ～ 5.99		40～200	40.00～200.00	30mm	–	–
	EPSUJS	3.40 ～ 5.99		40～200	40.00～200.00	35mm	–	–
L・P dimension designation type	DDEPB	3.00 ～19.99	−0.01 −0.02	50～300	50.00～300.00	40mm	–	–

⚠ The coaxiality of tip diameter(P) and installation shaft diameter(D) for stepped ejector pins was no more than 0.2mm.
⚠ The coaxiality of the rectangular tip section(A・B) and installation shaft diameter(D) for rectangular ejector pins was no more than0.1mm.

Range of Guaranteed Base Material Hardness

Ejector pins

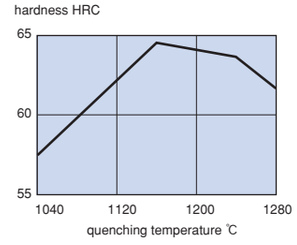
Range of Guaranteed Base Material Hardness b2 for Ejector Pins	Material		1 Head	2 X2	3 b2	4 X2(max.) Unit mm
Straight Ejector Pins 	Completely quenching (without annealing on the head)		59～61HRC	59～61HRC	59～61HRC	0～35
	Completely quenching (without annealing on the head)		35～40HRC	35～61HRC	59～61HRC	30～35
	SUS440C		26～35HRC	26～60HRC	56～60HRC	30～35
	SKD61		28～45HRC	28～55HRC	50～55HRC	30～35
Stepped Ejector Pins 	SKD61 Nitriding	P≤ϕ3	28～35HRC	28～45HRC	40～45HRC	15～20
		ϕ3.1≤P≤ϕ5	28～35HRC	28～45HRC	40～45HRC	20～25
Rectangular Ejector Pins 	SKD61 Prehardened	ϕ5.1≤P≤ϕ8	28～35HRC	28～45HRC	40～45HRC	25～30
		ϕ10≤P	28～35HRC	28～45HRC	40～45HRC	28～35
Free Flange Position Ejector Pins 	Completely quenching (without annealing on the head)		59～61HRC	59～61HRC	59～61HRC	–

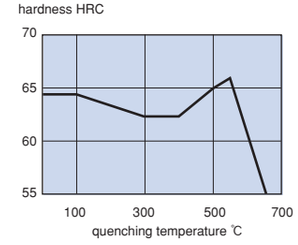
⚠ SKH51 the production for completely quenching including (without annealing on the head) EPHSYL・EPHSYP・EPHSYS.

⚠ The whole process from heat treatment to nitriding treatment for the ejector pins was performed within PUNCH INDUSTRY's own factory.

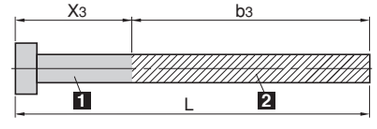
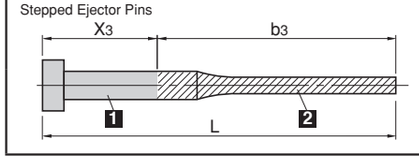
⚠ As the chart shown, the hardness various depending on the quenching and annealing temperature, so you can adopt different quenching and annealing combinations to obtain different hardness.

⚠ Ejector Pins' heat treated of PUNCH INDUSTRY was under the optimal condition, with perfect abrasion-proof and toughness ability.





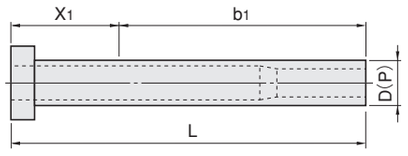
SKH51

Nitriding Treatment for Ejector Pins		1 Material hardness～surface hardness 900HV X3	2 surface hardness 900HV b3
Straight Ejector Pins  Stepped Ejector Pins 	(D)P≤ϕ3	15～20	b3=L−X3
	ϕ3.1≤(D)P≤ϕ5	20～25	
	ϕ5.1≤(D)P≤ϕ8	25～30	
	(D)P≥ϕ10	28～35	

Range of Guaranteed Shank Diameter Precision

Ejector sleeve／Core pin

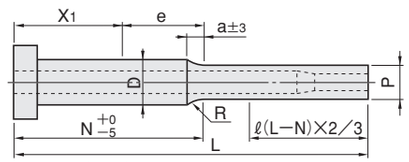
Range of Guaranteed Shank Hardness b1 for Ejector Sleeves



Unit:mm

Material	X1(max.)
SKH51	30
SKD61＋Nitriding	30～35

Range of guaranteed installation shank diameter precision of stepped ejector sleeves



e≧N−X1(max.)−a−8

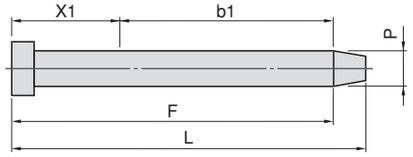
Calculation method of a

$$a=\sqrt{\frac{D-P}{2}\times\left(2R-\frac{D-P}{2}\right)}$$

Unit:mm

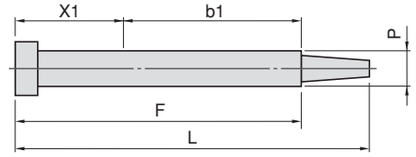
Material	X1(max.)
SKH51	30
SKD61＋Nitriding	30～35

Range of guaranteed shank hardness for Core Pins



⚠ The range may various depends on material and overall length.

Range of guaranteed installation shank diameter precision of stepped core pins

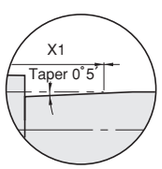


⚠ The range may various depends on material and overall length.

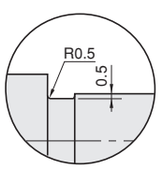
SKH51 Core pin	Range of Guaranteed P Dimension Tolerance	length of taper relief X1(max.)
Straight core pin diameter P fixed Core pin diameter P fixed	b1＝F−X1	L dimension / X1 50.00～100.00 / 35 100.01～150.00 / 50 150.01～200.00 / 70 200.01～250.00 / 85 250.01～300.00 / 100 300.01～350.00 / 120
Straight core pin diameter P designated The overall length L・diameter P of core pin designated	L100.00～300.00	30
	L300.01～350.00	100～120

SKD61＋Nitriding Core pin	Range of Guaranteed P Dimension Tolerance	length of taper relief X1(max.)
Straight core pin diameter P fixed Core pin diameter P fixed	b1＝Overall length L×2/3e＝N−X1 max−a	L dimension / X1 50.00～100.00 / 35 100.01～150.00 / 50 150.01～200.00 / 70 200.01～250.00 / 85 250.01～300.00 / 100 300.01～350.00 / 120 350.01～400.00 / 135 400.01～450.00 / 150 450.01～500.00 / 170 500.01～600.00 / 200 600.01～700.00 / 235
Straight core pin diameter P designated The overall length L・diameter P of core pin designated	b1＝F−X1	L100.00～200.00 / 35 L200.01～250.00 / 110 L250.01～300.00 / 160 L300.01～350.00 / 210

⚠ the coaxiality between point diameter(P)and installation shank diameter(D)of stepped ejector sleeve is less than 0.1mm.



⚠ For taper relief processing when L≧200.01

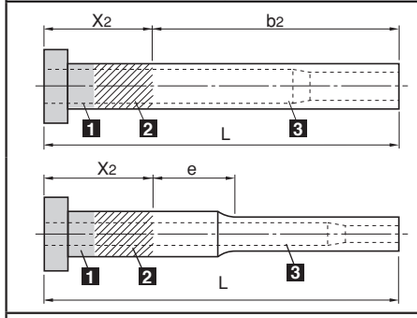


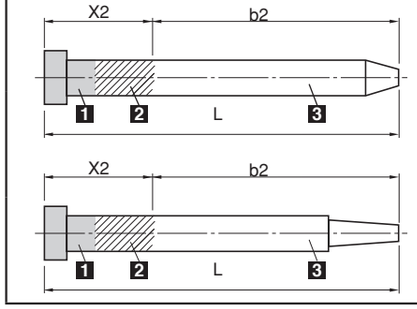
⚠ Relief processing with Radius under the head

Range of Guaranteed Base Material Hardness

Ejector Sleeve / Core Pin

Range of guaranteed base material hardness for ejector sleeve・core pin

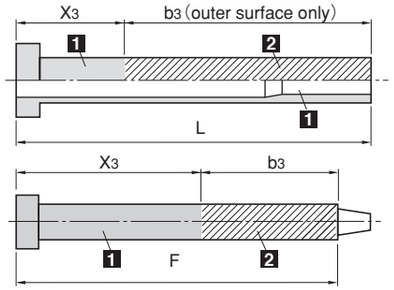




Material	1 Head	2 X2	3 b2	4 X2(max) Unit mm
SKH51 Completely quenching (without the head)	59～61HRC	59～61HRC	59～61HRC	0
SKD61＋Nitriding	28～42HRC	28～42HRC	38～42HRC	30～35
SKH51 Completely quenching (without the head)	28～35HRC	28～61HRC	59～61HRC	30～35
SKD61＋Nitriding	28～45HRC	28～45HRC	40～45HRC	30～35
SKD61 Completely quenching	28～45HRC	28～55HRC	50～55HRC	30

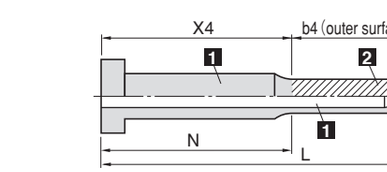
▶ Range of guaranteed nitriding surface hardness for ejector sleeve・core pin

Straight type



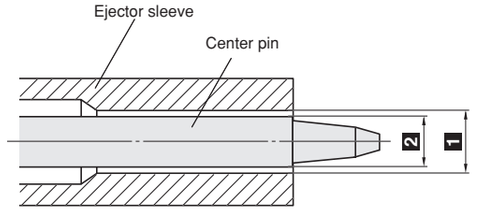
ϕD(P)	1 Material hardness～surface hardness 900HV X3(max.)	2 Surface hardness 900HV b3
(D)P≦ϕ3	15～20	Ejector sleeve(outer surface only) b3＝L−X3 Core pin b3＝F−X3
ϕ3.1≦(D)P≦ϕ5	20～25	
ϕ5.1≦(D)P≦ϕ8	25～30	
(D)P≧ϕ10	28～35	

Stepped type



1 Material hardness～surface hardness 900HV X4	2 Surface hardness 900HV b4
X4＝N	Ejector sleeve(outer surface only) b4＝L−X4 Core pin b4＝F−X4

Ejector Sleeve and Center Pin Sets



1 Hole diameter of ejector sleeve
2 Shank diameter of center pin
1−**2**=**3** Clearance

▶ Ejector sleeve and center pin sets

1 Ejector sleeve		**2** Core pin		**3** Clearance	
Material	Tolerance of hole diameter	Material	Tolerance of shank diameter	min	max
SKH51	+0.005 0	SKH51	0 −0.005	0	0.01
	+0.005 0		0 −0.01	0	0.015
	+0.005 0		−0.01 −0.02	0.01	0.025
	+0.01 0		0 −0.005	0	0.015
	+0.01 0		0 −0.01	0	0.02
	+0.01 0		−0.01 −0.02	0.01	0.03
SKD61 + Nitriding	+0.01 0	SKD61 + Nitriding	−0.01 −0.02	0.01	0.03
	+0.015 0		−0.01 −0.02	0.01	0.035

1 Ejector sleeve			**2** Core pin		**3** Clearance	
Material	穴径S(V)	Tolerance of hole diameter(H7)	Material	Tolerance of shank diameter	min	max
SKD61 + Nitriding	～ 3.0	+0.01 0	SKD61 + Nitriding	−0.01 −0.02	0.01	0.03
	3.1～ 6.0	+0.012 0		−0.01 −0.02	0.01	0.032
	6.1～10.0	+0.015 0		−0.01 −0.02	0.01	0.035
	10.1～16.0	+0.018 0		−0.01 −0.02	0.01	0.038

⚠ There are kinds of combination between the ejector sleeve and center pin according to the diameter tolerance of hole and shank.
Take the consideration of property of plastic, temperature of mould, frequency of opening, and stroke time into selection.

Inspection Criteria for Ejector Sleeve

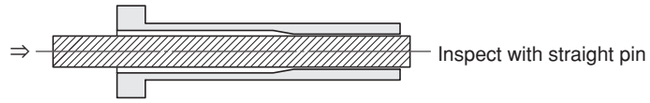
Inspection criteria for through hole of ejector sleeve

For hole diameter tolerance with $^{+0.005}_{0}$ (Assembled with the core pin with shank diameter tolerance $^{0}_{-0.005}$)

1 Inspect the through hole with straight pin　　**2** Inspect with plain plug gauge

Inspect method：For checking whether the hole is through, use the straight pin with shank diameter tolerance ±0.001 insert into the sleeve from the head end. Sequentially, insert the plain plug gauge with shank diameter tolerance ±0, which made of carbide alloy into the sleeve form the point end for checking the through hole.

For hole diameter tolerance with $^{+0.01}_{0}$、and H7 (Assembled with the core pin with shank diameter tolerance $^{-0.01}_{-0.02}$)

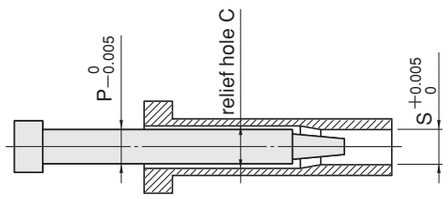


Inspect with straight pin

Inspect method：for checking whether the hole is through, use the straight pin with shank diameter tolerance $^{-0.006}_{-0.007}$ insert into the sleeve from the head end. Pay attention that the core pin with tolerance $^{0}_{-0.005}$ may not be inserted.

Inspection criteria for relief hole of ejector sleeve

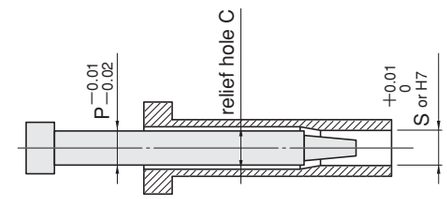
Tolerance of hole diameter $^{+0.005}_{0}$



The core pin with shank diameter tolerance $^{0}_{-0.005}$ should smoothly insert into the relief hole with hole diameter tolerance $^{+0.005}_{0}$ of the ejector sleeve.

The insect method is insert the straight pin smoothly.

Tolerance of hole diameter $^{+0.01}_{0}$ 又はH7



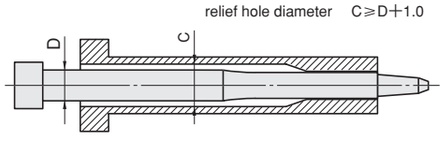
The core pin with shank diameter tolerance $^{-0.01}_{-0.02}$ should smoothly insert into the relief hole with hole diameter tolerance $^{+0.01}_{0}$ of the ejector sleeve

The insect method is inserting the straight pin smoothly.

Taper relief hole by WEDM

For single side wall thickness under 0.2mm, the diameter of relief hole may not be guaranteed. For preventing the bending or fracture during usage, inner relief hole is machined with 0.5° taper by WEDM.

relief hole diameter　C≥D+1.0



For stepped core pin, the relief hole diameter of C≥D+1.0 for ejector sleeve should be guaranteed.

International System of Units（SI）

—Excerpt from JIS Z 8203(2000)—

The International System of Units is used to clear up the inconvenience of international technical communion and international trade caused by the metric system and British measurement system, SI is formed by base units, derived units and prefixes. The system definition is shown in Table 1 and other items are shown in Table 2 to Table 5.

Table 1　The Composing of the International System of Units

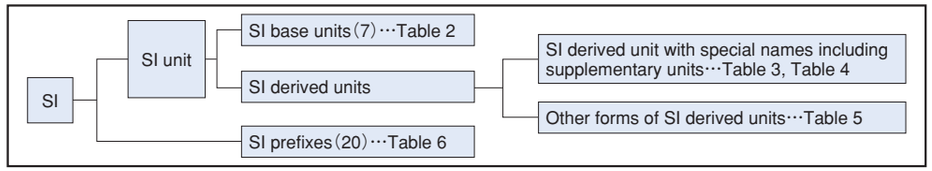


Table 2　SI base units and their definition

Volume	SI base unit		Definition
	Name	Symbol	
Length	Meter	m	The meter is the length of the path traveled by light in a vacuum during a time interval of 1/299,792,458 of a second.
Mass	Kilogram	kg	The kilogram is a unit of mass, it is equal to the mass of international prototype of the kilogram.
Time	Second	s	The second is the duration of 9,192,631,770 periods of radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium 133 atom.
Electric current	Ampere	A	The ampere is that constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed 1 meter apart in a vacuum, would produce between these conductors a force equal to 2×10^{-7} Newton per meter of length.
Thermodynamic emperature	Kelvin	K	Kelvin, a unit of thermodynamic temperature, is the fraction 1/273.16 of the thermodynamic temperature of the triple point of water.
Amount of substance	Mole	mol	The mole is the amount of substance of a system which contains as many elementary entities as there are atoms in 0.012 kilogram of carbon 12. When the mole is used, the elementary entities must be specified and may be atoms, molecules, ions, electrons, other particles, or specified groups of such particles.
Luminous intensity	Candela	cd	The candela is the luminous intensity, in a given direction, of a source that emits monochromatic radiation of frequency 540×10^{12} hertz and that has a radiant intensity in that direction of 1/683 watt per steradian.

Table 3　SI derived units with special names including supplementary units

Volume	SI derived units		
	Name	Symbol	Expression in terms of SI base units and SI derived units.
[plane] Angle	Radian	rad	1 rad=1 m/m
Solid angle	Steradian	sr	1 sr=1 m^2/m^2
Frequency	Hertz	Hz	1 Hz=1 s^{-1}
Force	Newton	N	1 N=1 kg·m/s^2
Pressure, stress	Pascal	Pa	1 Pa=1 N/m^2
Energy, work, quantity of heat	Joule	J	1 J=1 N·m
Power, radiant flux	Watt	W	1 W=1 J/s
Quantity of electricity	Coulomb	C	1 C=1 A·s
Electric potential, potential difference, voltage, electromotive force	Volt	V	1 V=1 W/A
Capacitance	Farad	F	1 F=1 C/V
Electric resistance	Ohm	Ω	1 Ω=1 V/A
Electric conductance	Siemens	S	1 S=1 Ω^{-1}
Magnetic flux	Weber	Wb	1 Wb=1 V·s
Magnetic flux density	Tesla	T	1 T=1 Wb/m^2
Inductance	Henry	H	1 H=1 Wb/A
Celsius temperature	Degree Celsius	℃	1 ℃=1 K
Luminous flux	Lumen	lm	1 lm=1 cd·sr
Illuminance	Lux	lx	1 lx=1 lm/m^2

Table 4　the derived units with special names established with a view to safeguarding human health

Item	SI derived units		
	Name	Symbol	Expression in terms of SI base units and SI derived units.
Activity referred to a radionuclide	Becquerel	Bq	1 Bq=1 s^{-1}
Absorbed dose, Specific energy(imparted), Kerma	Gray	Gy	1 Gy=1 J/kg
Dose equivalent	Sievert	Sv	1 Sv=1 J/kg

Table 5　SI derived units expressed in terms of base units

Volume	Derived units	
	Name	Symbol
Area	Square	m^2
Volume	Cubic	m^3
Velocity	Meter/second	m/s
Acceleration	Meter/second2	m/s^2
Wave numbers	Every meter	m^{-1}
Density	Kilogram every cubic meter	kg/m^3
Electric current density	Ampere every square meter	A/m^2
Magnetic field strength	Ampere every meter	A/m
Concentration of substance	Mole every cubic meter	mol/m^3
Specific volume	Cubic meter every kilogram	m^3/kg
Luminance	Candela every square meter	cd/m^2

Table 6　SI prefixes

Factor	Prefixes	
	Name	Symbol
10^{24}	Yotta	Y
10^{21}	Zetta	Z
10^{18}	Exa	E
10^{15}	Peta	P
10^{12}	Tera	T
10^{9}	Giga	G
10^{6}	Mega	M
10^{3}	Kilo	k
10^{2}	Hecto	h
10^{1}	Deka	da
10^{-1}	Deci	d
10^{-2}	Centi	c
10^{-3}	Milli	m
10^{-6}	Micro	μ
10^{-9}	Nano	n
10^{-12}	Pico	p
10^{-15}	Femto	f
10^{-18}	Atto	a
10^{-21}	Zepto	z
10^{-24}	Yocto	y

Conversion table for SI units (the units contained in bold lines are SI units.)

Commonly used conversion table between non-SI and SI units.

	N	dyn	kgf
Force	1	1×10^{5}	1.01972×10^{-1}
	1×10^{-5}	1	1.01972×10^{-6}
	9.80665	9.80665×10^{5}	1

	Pa·s	cP	P
Viscosity	1	1×10^{3}	1×10
	1×10^{-3}	1	1×10^{-2}
	1×10^{-1}	1×10^{2}	1

⚠ 1P=1dyn·s/cm^2=1g/cm·s
1Pa·s=1N·s/m^2　1cP=1mPa·s

	Pa or N/m^2	MPa or N/mm^2	kgf/mm^2	kgf/cm^2
Stress	1	1×10^{-6}	1.01972×10^{-7}	1.01972×10^{-5}
	1×10^{6}	1	1.01972×10^{-1}	1.01972×10
	9.80665×10^{6}	9.80665	1	1×10^{2}
	9.80665×10^{4}	9.80665×10^{-2}	1×10^{-2}	1

⚠ 1Pa=1N/m^2　1MPa=1N/mm^2

	m^2/s	cSt	St
Kinematic viscosity	1	1×10^{6}	1×10^{4}
	1×10^{-6}	1	1×10^{-2}
	1×10^{-4}	1×10^{2}	1

⚠ 1St=1cm^2/s　1cSt=1mm^2/s

	Pa	kPa	MPa	bar	kgf/cm^2	atm	mmH_2O	mmHg or Torr
Pressure	1	1×10^{-3}	1×10^{-6}	1×10^{-5}	1.01972×10^{-5}	9.86923×10^{-6}	1.01972×10^{-1}	7.50062×10^{-3}
	1×10^{3}	1	1×10^{-3}	1×10^{-2}	1.01972×10^{-2}	9.86923×10^{-3}	1.01972×10^{2}	7.50062
	1×10^{6}	1×10^{3}	1	1×10	1.01972×10	9.86923	1.01972×10^{5}	7.50062×10^{3}
	1×10^{5}	1×10^{2}	1×10^{-1}	1	1.01972	9.86923×10^{-1}	1.01972×10^{4}	7.50062×10^{2}
	9.80665×10^{4}	9.80665×10	9.80665×10^{-2}	9.80665×10^{-1}	1	9.67841×10^{-1}	1×10^{4}	7.35559×10^{2}
	1.01325×10^{5}	1.01325×10^{2}	1.01325×10^{-1}	1.01325	1.03323	1	1.03323×10^{4}	7.60000×10^{2}
	9.80665	9.80665×10^{-3}	9.80665×10^{-6}	9.80665×10^{-5}	1×10^{-4}	9.67841×10^{-5}	1	7.35559×10^{-2}
	1.33322×10^{2}	1.33322×10^{-1}	1.33322×10^{-4}	1.33322×10^{-3}	1.35951×10^{-3}	1.31579×10^{-3}	1.35951×10	1

⚠ 1Pa=1N/m^2

	J	kW·h	kgf·m	kcal
Work Energy Quantity of heat	1	2.77778×10^{-7}	1.01972×10^{-1}	2.38889×10^{-4}
	3.600×10^{6}	1	3.67098×10^{5}	8.6000×10^{2}
	9.80665	2.72407×10^{-6}	1	2.34270×10^{-3}
	4.18605×10^{3}	1.16279×10^{-3}	4.26858×10^{2}	1

⚠ 1J=1W·s, 1J=1N·m

	W	kgf·m/s	PS	kcal/h
Power Heat flow rate	1	1.01972×10^{-1}	1.35962×10^{-3}	8.6000×10^{-1}
	9.80665	1	1.33333×10^{-2}	8.43371
	7.355×10^{2}	7.5×10	1	6.32529×10^{2}
	1.16279	1.18572×10^{-1}	1.58095×10^{-3}	1

⚠ 1W=1J/s　PS：Horsepower

	W/(m·K)	kcal/(h·m·℃)
Thermal conductivity	1	8.6000×10^{-1}
	1.16279	1

	$W/(m^2\cdot K)$	$kcal/(h\cdot m^2\cdot℃)$
Coefficient of heat transfer	1	8.6000×10^{-1}
	1.16279	1

	J/(kg·K)	kcal/(kg·℃) cal/(g·℃)
Specific heat	1	2.38889×10^{-4}
	4.18605×10^{3}	1

Hardness Test Methods

Hardness tests	Features	Applicable examples	Principle	Reference
Rockwell hardness (HR__) __part is value of scale mark	This hardness test can be used in an abroad range of application for materials irrespective of hardness and size. It is the commonly-used hardness measure method for press dies	・A scale …Carbide ・B scale …Annealed part ・C scale …Quenched-tempered parts ・D scale …Nitrided part	This test is applied via a diamond or ball indenter following the order：minor load-major load-minor load. The hardness is measured by depth of penetration. For the minor load is 10 kgf, it is called Rockwell. For the minor load is 3 kgf, it is called Superficial Rockwell.	JIS Z 2245
Vickers hardness (HV)	This hardness test can be abroadly used for material with nitrided surface, Carburized surface or thin specimens. Besides, the required calculations are the same between soft and hard.	・Hardened layer (coating layer,induction quenched layer, Nitriding layer) ・Those of thin sheet or small specimens can not be tested by Rockwell hardness	The Vickers test is a square-based pyramid whose opposite sides meet at the apex at an angle of 136˚	JIS Z 2244
Brinell hardness (HB)	Because indent is large for the relation between specimens' load and test, it's available for calculating average hardness of specimens.	・Material ・Rolled material ・Forging part ・Casting part	A (steel or super hard alloy) ball indenter is used to indent the test surface. Hardness is given as a quotient divided by the surface area of the dent, computed from the diameter.	JIS Z 2243
Shore hardness (HS)	It is extremely easy to operate as it is compact, portable and its indent is kept shallow compared with other tests. But it is easy to make measuring and man-made mistakes so the operator must be skillful.	・Large material with low mobility.Rolled material etc. ・Indent is very shallow, therefore an indent is hardly left.	A hammer is dropped from a uniform height. Hardness is based on how height the hammer bounces.	JIS Z 2246

Hardness Conversion Table

—Excerpt from SAE J417 (revised in 1983)—

▶Conversion table for approximate values for steel according to rockwell hardness C scale

(HRC) Rockwell hardness Load 60kgf Diamond conical penetrator	(HV) Vickers hardness	(HB) Load for 10mm ball 3000kgf		Rockwell superficial hardness			Superficial Rockwell Diamond conical penetrator			(HS) Shore hardness	Tensile strength (Approximate value) MPa (1)
		Standard ball	Tungsten carbide ball	(HRA) A scale Load 60kgf Diamond conical penetrator	(HRB) B scale Load 100kgf Diameter1.6mm (1/16in)Sphere	(HRD) D scale Load 100kgf Diamond conical penetrator	15—N scale Load 15kgf	30—N scale Load 30kgf	45—N scale Load 45kgf		
68	940	—	—	85.6	—	76.9	93.2	84.4	75.4	97	—
67	900	—	—	85.0	—	76.1	92.9	83.6	74.2	95	—
66	865	—	—	84.5	—	75.4	92.5	82.8	73.3	92	—
65	832	—	(739)	83.9	—	74.5	92.2	81.9	72.0	91	—
64	800	—	(722)	83.4	—	73.8	91.8	81.1	71.0	88	—
63	772	—	(705)	82.8	—	73.0	91.4	80.1	69.9	87	—
62	746	—	(688)	82.3	—	72.2	91.1	79.3	68.8	85	—
61	720	—	(670)	81.8	—	71.5	90.7	78.4	67.7	83	—
60	697	—	(654)	81.2	—	70.7	90.2	77.5	66.6	81	—
59	674	—	(634)	80.7	—	69.9	89.8	76.6	65.5	80	—
58	653	—	615	80.1	—	69.2	89.3	75.7	64.3	78	—
57	633	—	595	79.6	—	68.5	88.9	74.8	63.2	76	—
56	613	—	577	79.0	—	67.7	88.3	73.9	62.0	75	—
55	595	—	560	78.5	—	66.9	87.9	73.0	60.9	74	2075
54	577	—	543	78.0	—	66.1	87.4	72.0	59.8	72	2015
53	560	—	525	77.4	—	65.4	86.9	71.2	58.6	71	1950
52	544	(500)	512	76.8	—	64.6	86.4	70.2	57.4	69	1880
51	528	(487)	496	76.3	—	63.8	85.9	69.4	56.1	68	1820
50	513	(475)	481	75.9	—	63.1	85.5	68.5	55.0	67	1760
49	498	(464)	469	75.2	—	62.1	85.0	67.6	53.8	66	1695
48	484	451	455	74.7	—	61.4	84.5	66.7	52.5	64	1635
47	471	442	443	74.1	—	60.8	83.9	65.8	51.4	63	1580
46	458	432	432	73.6	—	60.0	83.5	64.8	50.3	62	1530
45	446	421	421	73.1	—	59.2	83.0	64.0	49.0	60	1480
44	434	409	409	72.5	—	58.5	82.5	63.1	47.8	58	1435
43	423	400	400	72.0	—	57.7	82.0	62.2	46.7	57	1385
42	412	390	390	71.5	—	56.9	81.5	61.3	45.5	56	1340
41	402	381	381	70.9	—	56.2	80.9	60.4	44.3	55	1295
40	392	371	371	70.4	—	55.4	80.4	59.5	43.1	54	1250
39	382	362	362	69.9	—	54.6	79.9	58.6	41.9	52	1215
38	372	353	353	69.4	—	53.8	79.4	57.7	40.8	51	1180
37	363	344	344	68.9	—	53.1	78.8	56.8	39.6	50	1160
36	354	336	336	68.4	(109.0)	52.3	78.3	55.9	38.4	49	1115
35	345	327	327	67.9	(108.5)	51.5	77.7	55.0	37.2	48	1080
34	336	319	319	67.4	(108.0)	50.8	77.2	54.2	36.1	47	1055
33	327	311	311	66.8	(107.5)	50.0	76.6	53.3	34.9	46	1025
32	318	301	301	66.3	(107.0)	49.2	76.1	52.1	33.7	44	1000
31	310	294	294	65.8	(106.0)	48.4	75.6	51.3	32.5	43	980
30	302	286	286	65.3	(105.5)	47.7	75.0	50.4	31.3	42	950
29	294	279	279	64.7	(104.5)	47.0	74.5	49.5	30.1	41	930
28	286	271	271	64.3	(104.0)	46.1	73.9	48.6	28.9	41	910
27	279	264	264	63.8	(103.0)	45.2	73.3	47.7	27.8	40	880
26	272	258	258	63.3	(102.5)	44.6	72.8	46.8	26.7	38	860
25	266	253	253	62.8	(101.5)	43.8	72.2	45.9	25.5	38	840
24	260	247	247	62.4	(101.0)	43.1	71.6	45.0	24.3	37	825
23	254	243	243	62.0	100.0	42.1	71.0	44.0	23.1	36	805
22	248	237	237	61.5	99.0	41.6	70.5	43.2	22.0	35	785
21	243	231	231	61.0	98.5	40.9	69.9	42.3	20.7	35	770
20	238	226	226	60.5	97.8	40.1	69.4	41.5	19.6	34	760
(18)	230	219	219	—	96.7	—	—	—	—	33	730
(16)	222	212	212	—	95.5	—	—	—	—	32	705
(14)	213	203	203	—	93.9	—	—	—	—	31	675
(12)	204	194	194	—	92.3	—	—	—	—	29	650
(10)	196	187	187	—	90.7	—	—	—	—	28	620
(8)	188	179	179	—	89.5	—	—	—	—	27	600
(6)	180	171	171	—	87.1	—	—	—	—	26	580
(4)	173	165	165	—	85.5	—	—	—	—	25	550
(2)	166	158	158	—	83.5	—	—	—	—	24	530
(0)	160	152	152	—	81.7	—	—	—	—	24	515

Notes 1：the figures in blue are based on table 1 of ASTM E 140 (Adjusted by SAE—ASM and ASTM in collaboration)
SAE ：Society of Automotive Engineers
ASM ：American Society for Metals
ASTM：American Society of Testing Materials

Notes 2：The figures in table are less frequently used values and are for reference only.

⚠ (1) 1MPa=1N/mm²

Datums for Geometrical Tolerances

—Excerpt from JIS B 0022（1984）JIS B 0021（1998）—

For indicating geometrical tolerances on drawings, line and plane can be indicated separately for defining form, but for defining perpendicularity tolerance and coaxiality tolerance, datum mark, line and plane must be offered.

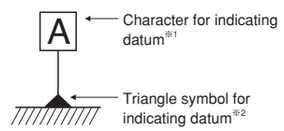
▶Geometrical tolerance without dutams

Kind of tolerance	Feature	Symbol
Form tolerance	Straightness tolerance	—
	Flatness tolerance	▱
	Circularity tolerance	○
	Cylindricity tolerance	⌭

▶Geometrical tolerance with dutams

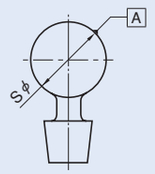
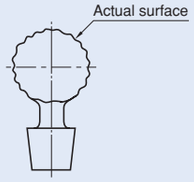
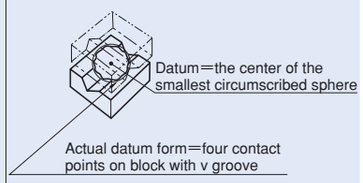
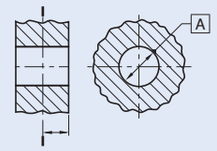
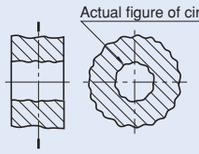
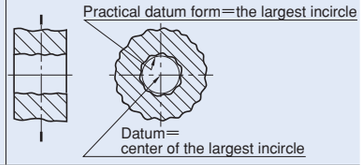
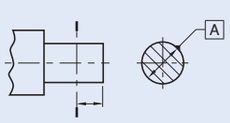
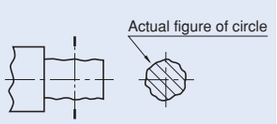
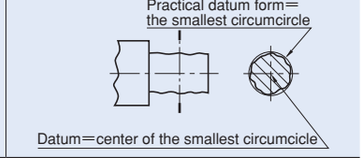
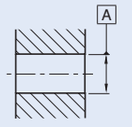
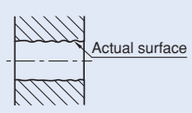
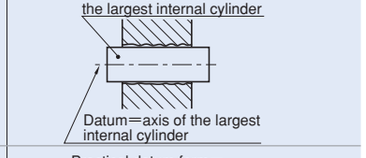
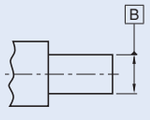
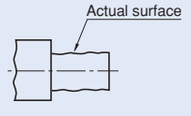
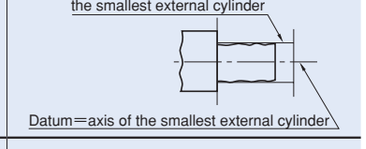
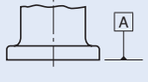
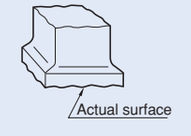
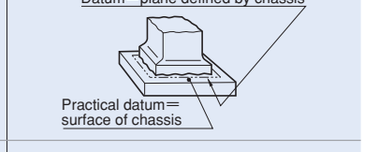
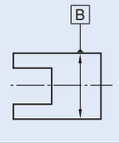
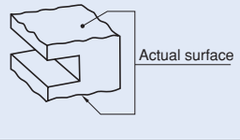
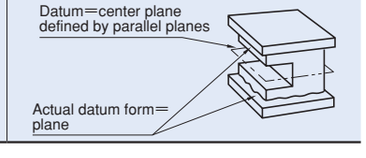
Kind of tolerance	Feature	Symbol
Orientation tolerance	Parallelism tolerance	//
	Perpendicularity tolerance	⊥
Location tolerance	Positional tolerance	⌖
	Coaxiality tolerance	◎
Run-out tolerance	Symmetry tolerance	⌯
	Circular run-out tolerance	↗

▶Datum graphic mark



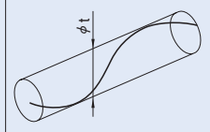
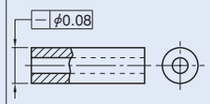
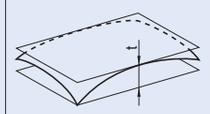
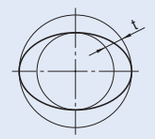
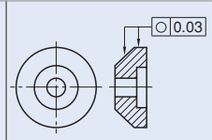
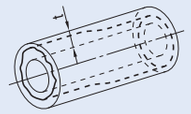
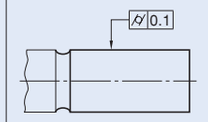
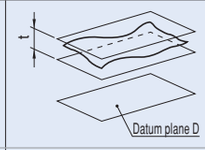
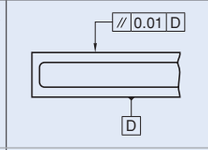
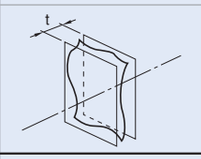
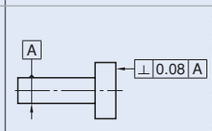
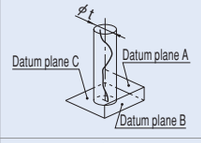
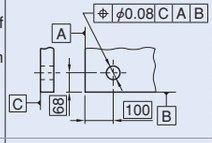
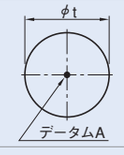
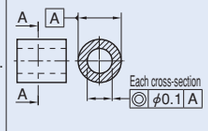
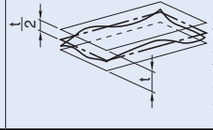
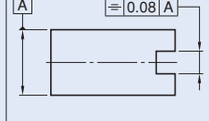
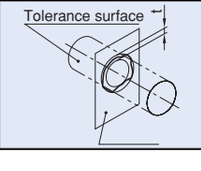
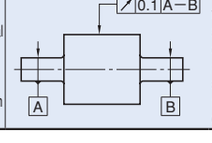
※1 character are the example
※2 triangle symbol not fully painted is also available

▶Example of indicating datums

Kind		Datum drawing	Datum form	Indicating datum
Datum mark	Center point of sphere			
	Center point of hole			
	Center point of axis			
Datum line	Axis of hole			
	Axial axis			
Datum plane	The surface of component			
	Center plane of component with parallel planes			

Indications of Geometrical Tolerance on Drawings

—Excerpt from JIS0021（revised in 1998）—

Kind of tolerance		Symbol	Definition of tolerance zone	Examples of diagrammatical indication and its interpretation
Form tolerance	Straightness tolerance	—	 Where symbol ϕ is attached before the numerical value indicating a tolerance zone, this tolerance zone is a zone in a cylinder of diameter t.	 Where a tolerance frame is connected to the dimension showing the diameter of a cylinder, the axis of the cylinder shall be contained a cylinder of ϕ0.08mm diameter.
	Flatness tolerance	▱	 The tolerance zone is a zone held between two parallel planes a distance t apart.	 This surface shall be contained between two parallel planes 0.08mm apart.
	Circularity tolerance	○	 The tolerance zone in the considered plane is a zone between two concentric circles a distance t apart.	 The circumference in any section normal to the axis shall be contained between two concentric circles 0.1mm apart on the same plane.
	Cylindricity tolerance	⌭	 The tolerance zone is z zone contained between two coaxial cylinder surfaces a distance t apart.	 The considered surface shall be contained between two coaxial cylinder surfaces 0.1mm apart
Orientation tolerance	Parallelism tolerance	//	 The tolerance zone is a zone held between two parallel planes parallel to the datum plane and a distance t apart from each other.	 The surface shown by the arrow of the leader line shall be contained between two planes parallel to the datum plane D and 0.01mm apart from each other in the direction of the arrow of the leader line.
	Perpendicularity tolerance	⊥	 A perpendicularity tolerance zone is defined by two parallel planes perpendicular to the datum axis and a distance t apart from each other.	 The surface shown by the arrow of the leader line shall be contained between two planes perpendicular to the datum axis and 0.08mm apart from each other in the direction of the arrow of the leader line.
Location tolerance	Positional tolerance	⌖	 The tolerance zone is a zone within a cylinder of diameter t, whose axis agrees respectively with the datum axial straight line C, A and B at the theoretically exact location.	 The point shown by the arrow of the leader line shall be contained within a circle of 0.08mm diameter having its center at the theoretically exact location respectively from the datum straight line C, A and B.
	Coaxiality tolerance or concentricity tolerance	◎	 The tolerance zone is a zone within a circle of diameter t having its center at datum point A.	 The surface shown by the arrow of the leader line shall be contained within a cylinder of 0.01mm diameter whose axis agrees with the datum median plane A.
	Symmetry tolerance	⌯	 The tolerance zone is a zone held between two parallel planes a distance t apart from each other and arranged symmetrically about the datum median plane.	 The median surface shown by the arrow of the leader line shall be contained between two parallel planes 0.08mm apart from each other and arranged symmetrically about the datum median plane A.
Run-out tolerance	Circular run-out tolerance	↗	 The tolerance is a zone between two concentric circles whose centers agree with the datum axial straight line on any measuring plane normal to the datum axial straight line and which are a distance t apart from each other in the radial direction.	 The run-out in the radial direction of the cylinder surface shown by the arrow of the leader line shall not exceed 0.1mm on any measuring plane normal to the datum axial straight line when the cylinder is rotated by one rotation about the datum axial straight line A-B.

Surface Roughness and Expressing Methods

JIS B 0601(2001)
—Excerpt from JIS B 0031(1994) —
JIS B 0122(1978)

▶Surface roughness

JIS standards of surface roughness have been revised a lot based on ISO changes in 2001.
The main content of JIS'(JIS B 0601—2001)revised part is as follows.

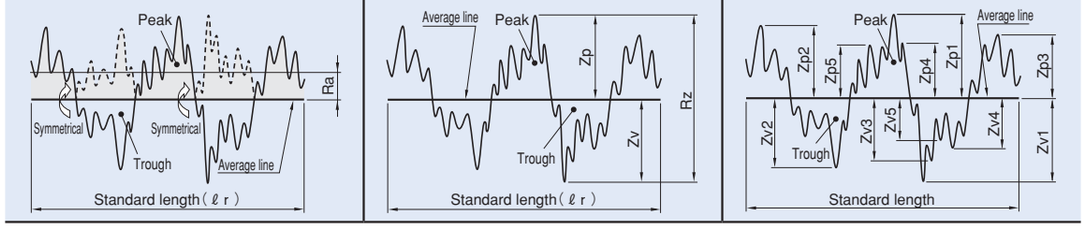
①Alter old JIS'(JIS B 0601—1994)maximum height, Ry to maximum RZ(Table 1※1).
②Delete the old JIS' ten-spot average roughness RZ from the standard, according to the new JIS addenda, it is defined as Rzjis(Table 1※2)different from JIS Rz.
③Profile curves for articulating eigenvalue are cross-section curve, roughness curve, expansion curve, which are defined respectively as cross-section curve eigenvalue(the initial P),roughness curve eigenvalue(the initial value R), expansion curve eigenvalue(the initial W)

Table 1 comparison of surface roughness between new and old JIS standards

Eigenvalue / Standard series	Arithmetic average height			Max. height			Ten-spot average roughness
	Cross-section curve eigenvalue	Roughness curve eigenvalue	Expansion curve eigenvalue	Cross-section curve eigenvalue	Roughness curve eigenvalue	Expansion curve eigenvalue	
New JIS standards JIS 0601—2001	Pa	Ra	Wa	Pz	Rz※1	Wz	RzJIS※2 (appendix 1)
Old JIS standards JIS 0601—1994	—	Ra	—	—	Ry	—	Rz

▶About surface roughness

Arithmetic mean roughness:Ra	Maximum peak:Rz(old JIS standard:Ry)	Ten-spot average roughness:RzJIS (old JIS standard:Rz)
A section of standard length (ℓr) is sampled from the mean line on the roughness chart. The value is obtained with the area between the peaks and valleys divide by the standard length (ℓr).	A section of standard length is sampled from the mean line on the roughness chart. The distance between the peaks and valleys of the sampled line is measured in the z direction.	A section of standard length is sampled from the mean line on the roughness chart. The distance between the peaks and valleys of the sampled line is measured in the z direction.
Ra=□Part area÷standard length ℓr	Rz=Zp+Zv	RzJIS=Zp1～5の平均+Zv1～5の平均

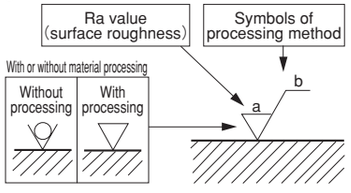


▶Conversion between old machining symbol and new JIS roughness

Old machining Symbol	Arithmetic mean roughness Ra			Maximum peak Rz(old JIS standard:Ry)			Ten-spot average roughness RZJIS(old JIS:Rz)		
	Standard series Ra【μm】	Standard length ℓr【mm】	Evaluation length ℓn【mm】	Standard series Rz【μm】	Standard length ℓr【mm】	Evaluation length ℓn【mm】	Standard series RzJIS【μm】	Standard length —【mm】	Evaluation length —【mm】
▽▽▽▽	0.012	0.08	0.4	0.05	0.08	0.4	0.05	0.08	0.4
	0.025	0.25	1.25	0.1	0.25	1.25	0.1	0.25	1.25
	0.05			0.2			0.2		
	0.1			0.4			0.4		
▽▽▽	0.2	0.8	4	0.8	0.8	4	0.8	0.8	4
	0.4			1.6			1.6		
	0.8			3.2			3.2		
	1.6			6.3			6.3		
▽▽	3.2	2.5	12.5	12.5	2.5	12.5	12.5	2.5	12.5
	6.3			25			25		
▽	12.5	8	40	50	8	40	50	8	40
	25			100			100		
～	50			200			200		

▶Examples of graphic method

In order to meet the international standards of graphic method, JIS B 0031—2003 is revised to a great extent. But the old processing symbols or old JIS(JIS B 0031—1994) symbols can be normally used too. Here the introduction of the old JIS graphic method is given.

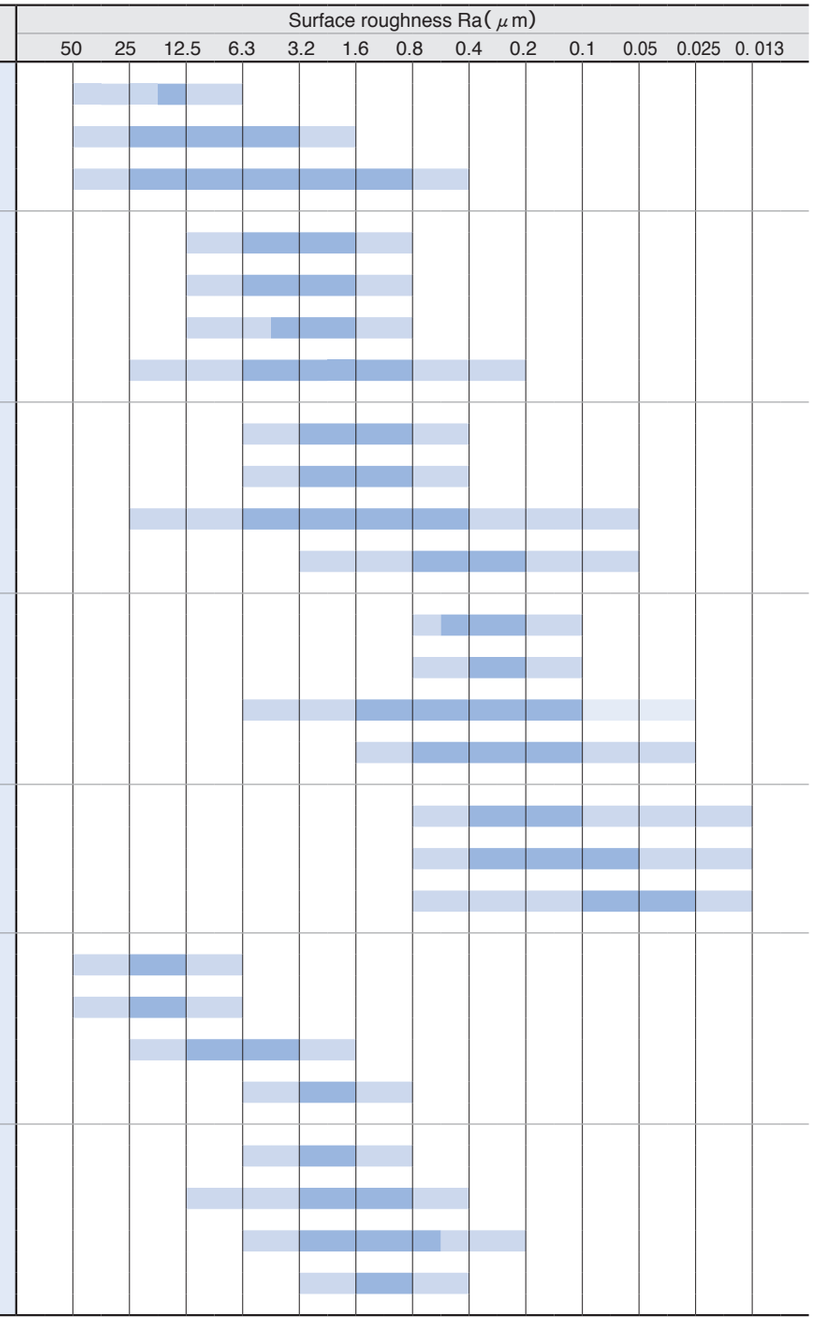


Symbols of processing method are excerpted from(JIS B 0122—1978)

Processing method	Symbol
Turning	L
Drilling	D
Reaming	DR
Threading	RT
Milling	M

Processing method	Symbol
Grinding	G
Lapping	GL
Honing	GH
Electric discharge machining	SPED
Polishing(manually)	FL

Surface Roughness by Different Methods



〔Note〕 range of roughness obtained in general condition. Range of roughness obtained in special condition.

〔Reference〕Onishi-ching writes:mechanism design drawings survey based on JIS standards, science and engineering institution(2003)

Tolerances of Regularly Used Hole Fits

—Excerpt from JIS B 0401 (1998) —

Basic size (mm)		Class of tolerance range of hole																Unit: μm
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														

Basic size (mm)		Class of tolerance range of hole														Unit: μm
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

⚠ In each column, the upper value is the upper dimensional tolerance, and the lower value is the lower dimensional tolerances.

Tolerances of Regularly Used Shaft Fits

—Excerpt from JIS B 0401 (1998) —

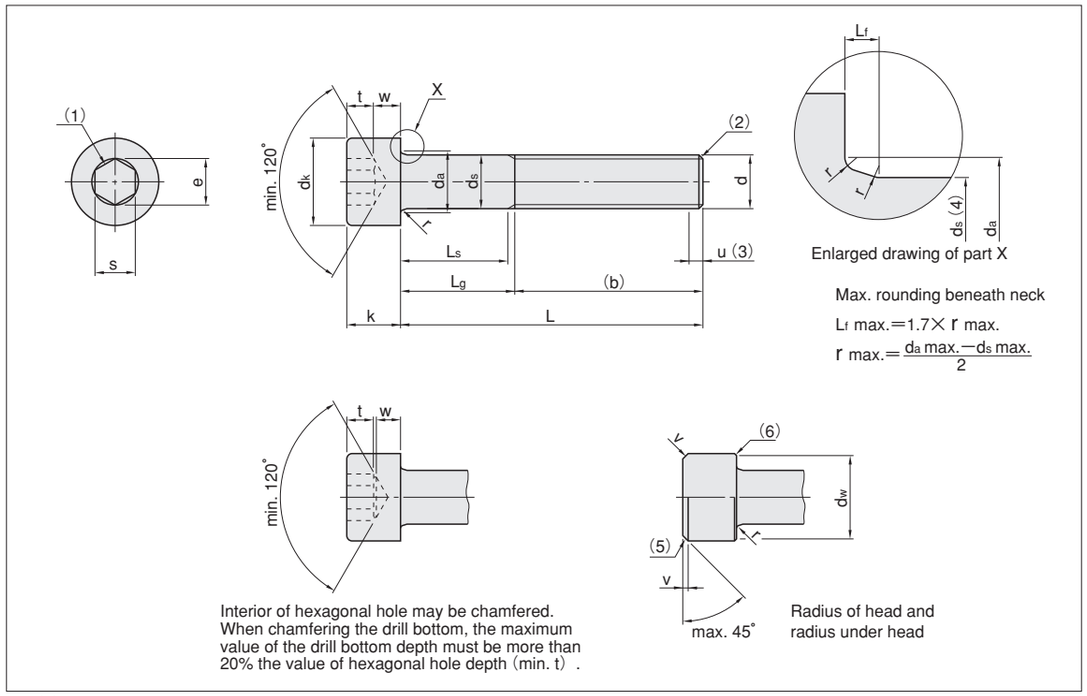
Basic size (mm)		Dimensional tolerances of shaft, regularly used fitting																Unit: μm
Over	Or less	b9	c9	d8	d9	e7	e8	e9	f6	f7	f8	g5	g6	h5	h6	h7		
—	3	−140 −165	− 60 − 85	− 20 − 34	− 20 − 45	− 14 − 24	− 14 − 28	− 14 − 39	− 6 − 12	− 6 − 16	− 6 − 20	− 2 − 6	− 2 − 8	0 − 4	0 − 6	0 −10		
3	6	−140 −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															

Basic size (mm)		Dimensional tolerances of shaft, regularly used fitting														Unit: μm
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

⚠ In each column, the upper value is the upper dimensional tolerance, and the lower value is the lower dimensional tolerances.

Socket Head Cap Screws

—Excerpt from JIS B 1176(2000)—



⚠(1) The head may be chamfered or rounded.
(2) It should be chamfered in advance, but when it is M4 or less, to be chamfered afterwards is also available.
(3) Incomplete threaded portion u≤2P
(4) ds is available for the screw with minimum Ls designated.
(5) Whether to chamfer or round head depends on the manufactures.
(6) Chamfered or rounded head should not have burr.

Unit:mm

Nominal diameter(d)		M3	M4	M5	M6	M8	M10	M12	(M14)	M16	M20	M24
P[7]		0.5	0.7	0.8	1	1.25	1.5	1.75	2	2	2.5	3
b[8] (Reference)		18	20	22	24	28	32	36	40	44	52	60
dk	Max.[9]	5.50	7.00	8.50	10.00	13.00	16.00	18.00	21.00	24.00	30.00	36.00
	Max.[10]	5.68	7.22	8.72	10.22	13.27	16.27	18.27	21.33	24.33	30.33	36.39
	Min.	5.32	6.78	8.28	9.78	12.73	15.73	17.73	20.67	23.67	29.67	35.61
da	Max.	3.6	4.7	5.7	6.8	9.2	11.2	13.7	15.7	17.7	22.4	26.4
ds	Max.	3.00	4.00	5.00	6.00	8.00	10.00	12.00	14.00	16.00	20.00	24.00
	Min.	2.86	3.82	4.82	5.82	7.78	9.78	11.73	13.73	15.73	19.67	23.67
e	Min.[11]	2.87	3.44	4.58	5.72	6.86	9.15	11.43	13.72	16.00	19.44	21.73
Lf	Max.	0.51	0.60	0.60	0.68	1.02	1.02	1.45	1.45	1.45	2.04	2.04
k	Max.	3.00	4.00	5.00	6.00	8.00	10.00	12.00	14.00	16.00	20.00	24.00
	Min.	2.86	3.82	4.82	5.70	7.64	9.64	11.57	13.57	15.57	19.48	23.48
r	Min.	0.1	0.2	0.2	0.25	0.4	0.4	0.6	0.6	0.6	0.8	0.8
s	呼び	2.5	3	4	5	6	8	10	12	14	17	19
	Max.[12]	2.560	3.071	4.084	5.084	6.095	8.115	10.115	12.142	14.142	17.230	19.275
	Max.[13]	2.580	3.080	4.095	5.140	6.140	8.175	10.175	12.212	14.212		
	Min.	2.520	3.020	4.020	5.020	6.020	8.025	10.025	12.032	14.032	17.050	19.065
t	Min.	1.3	2	2.5	3	4	5	6	7	8	10	12
v	Max.	0.3	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	2	2.4
dw	Min.	5.07	6.53	8.03	9.38	12.33	15.33	17.23	20.17	23.17	28.87	34.81
w	Min.	1.15	1.4	1.9	2.3	3.3	4	4.8	5.8	6.8	8.6	10.4

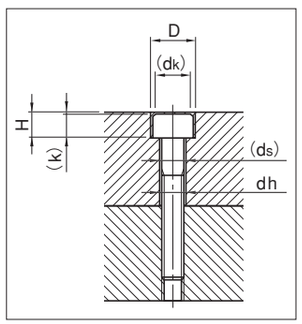
⚠(7) P is for the pitch.
(8) It is available for incomplete threaded screws.
(9) It is available for cap screws without knurl.
(10) It is available for cap screws with knurl.
(11) e(min.)=1.14×s min.
(12) It is available for strength grade 12.9.
(13) It is available for other strength grades.

▶Table for socket head cap screw

Unit:mm

Nominal diameter(d)			M3		M4		M5		M6		M8		M10		M12		(M14)[15]		M16		M20		M24	
L[14]			Incomplete threaded screw Ls min. and Lg max.																					
Nominal length	Min.	Max.	Ls Min.	Lg Max.	Ls Min.	Lg Max.	Ls Min.	Lg Max.	Ls Min.	Lg Max.	Ls Min.	Lg Max.	Ls Min.	Lg Max.	Ls Min.	Lg Max.	Ls Min.	Lg Max.	Ls Min.	Lg Max.	Ls Min.	Lg Max.	Ls Min.	Lg Max.
5	4.76	5.24																						
6	5.76	6.24																						
8	7.71	8.29																						
10	9.71	10.29																						
12	11.65	12.35																						
16	15.65	16.35																						
20	19.58	20.42																						
25	24.58	25.42	4.5	7																				
30	29.58	30.42	9.5	12	6.5	10	4	8																
35	34.5	35.5			11.5	15	9	13	6	11														
40	39.5	40.5			16.5	20	14	18	11	16	5.75	12												
45	44.5	45.5					19	23	16	21	10.75	17	5.5	13										
50	49.5	50.5					24	28	21	26	15.75	22	10.5	18										
55	54.4	55.6							26	31	20.75	27	15.5	23	10.25	19								
60	59.4	60.6							31	36	25.75	32	20.5	28	15.25	24	10	20						
65	64.4	65.6									30.75	37	25.5	33	20.25	29	15	25	11	21				
70	69.4	70.6									35.75	42	30.5	38	25.25	34	20	30	16	26				
80	79.4	80.6									45.75	52	40.5	48	35.25	44	30	40	26	36	15.5	28		
90	89.3	90.7											50.5	58	45.25	54	40	50	36	46	25.5	38	15	30
100	99.3	100.7											60.5	68	55.25	64	50	60	46	56	35.5	48	25	40
110	109.3	110.7													65.25	74	60	70	56	66	45.5	58	35	50
120	119.3	120.7													75.25	84	70	80	66	76	55.5	68	45	60
130	129.2	130.8															80	90	76	86	65.5	78	55	70
140	139.2	140.8															90	100	86	96	75.5	88	65	80
150	149.2	150.8																	96	106	85.5	98	75	90
160	159.2	160.8																	106	116	95.5	108	85	100
180	179.2	180.8																			115.5	128	105	120
200	199.075	200.925																			135.5	148	125	140

⚠(14) ( ) is for commonly used nominal length, is for full-threaded screw, incomplete threaded portion should be within 3P.
(15) Avoid using (M14)



▶(Reference) Counterbore hole / screw hole dimensions for socket head cap screws

Unit:mm

Nominal diameter(d)	M3	M4	M5	M6	M8	M10	M12	M14	M16	M20	M24
dh	3.4	4.5	5.5	6.6	9	11	13.5	15.5	17.5	22	26
ds (Reference)	3	4	5	6	8	10	12	14	16	20	24
D	6.5	8	9.5	11	14	17.5	20	23	26	32	39
dk (Reference)	5.5	7	8.5	10	13	16	18	21	24	30	36
H	3.3	4.4	5.4	6.5	8.6	10.8	13	15.2	17.5	21.5	25.5
k (Reference)	3	4	5	6	8	10	12	14	16	20	24

Table of Hole Size before Threading

—Excerpt from JIS B 1004 (1975) —

▶Metric coarse thread

Thread				Hole diameter of thread(2)									Reference of screw thread ID.(3)			
				Series										Max. dimension		
Nominal diameter of thread	OD. d	Pitch P	Height of engagement H1(1)	100	95	90	85	80	75	70	65	60	Min. dimension	5H or grade 1	6H or grade 2	7H or grade 3
M2.5	2.500	0.45	0.244	2.01	2.04	2.06	2.09	2.11	2.13	2.16	2.18	2.21	2.013	2.113	2.138	—
M3	3.000	0.5	0.271	2.46	2.49	2.51	2.54	2.57	2.59	2.62	2.65	2.68	2.459	2.571	2.599	2.639
M3.5	3.500	0.6	0.325	2.85	2.88	2.92	2.95	2.98	3.01	3.05	3.08	3.11	2.850	2.975	3.010	3.050
M4	4.000	0.7	0.379	3.24	3.28	3.32	3.36	3.39	3.43	3.47	3.51	3.55	3.242	3.382	3.422	3.466
M4.5	4.500	0.75	0.406	3.69	3.73	3.77	3.81	3.85	3.89	3.93	3.97	4.01	3.688	3.838	3.878	3.924
M5	5.000	0.8	0.433	4.13	4.18	4.22	4.26	4.31	4.35	4.39	4.44	4.48	4.134	4.294	4.334	4.384
M6	6.000	1	0.541	4.92	4.97	5.03	5.08	5.13	5.19	5.24	5.30	5.35	4.917	5.107	5.153	5.217
M7	7.000	1	0.541	5.92	5.97	6.03	6.08	6.13	6.19	6.24	6.30	6.35	5.917	6.107	6.153	6.217
M8	8.000	1.25	0.677	6.65	6.71	6.78	6.85	6.92	6.99	7.05	7.12	7.19	6.647	6.859	6.912	6.982
M9	9.000	1.25	0.677	7.65	7.71	7.78	7.85	7.92	7.99	8.05	8.12	8.19	7.647	7.859	7.912	7.982
M10	10.000	1.5	0.812	8.38	8.46	8.54	8.62	8.70	8.78	8.86	8.94	9.03	8.376	8.612	8.676	8.751
M11	11.000	1.5	0.812	9.38	9.46	9.54	9.62	9.70	9.78	9.86	9.94	10.03	9.376	9.612	9.676	9.751
M12	12.000	1.75	0.947	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	10.106	10.371	10.441	10.531
M14	14.000	2	1.083	11.8	11.9	12.1	12.2	12.3	12.4	12.5	12.6	12.7	11.835	12.135	12.210	12.310
M16	16.000	2	1.083	13.8	13.9	14.1	14.2	14.3	14.4	14.5	14.6	14.7	13.835	14.135	14.210	14.310
M18	18.000	2.5	1.353	15.3	15.4	15.6	15.7	15.8	16.0	16.1	16.2	16.4	15.294	15.649	15.744	15.854
M20	20.000	2.5	1.353	17.3	17.4	17.6	17.7	17.8	18.0	18.1	18.2	18.4	17.294	17.649	17.744	17.854
M22	22.000	2.5	1.353	19.3	19.4	19.6	19.7	19.8	20.0	20.1	20.2	20.4	19.294	19.649	19.744	19.854
M24	24.000	3	1.624	20.8	20.9	21.1	21.2	21.4	21.6	21.7	21.9	22.1	20.752	21.152	21.252	21.382
M27	27.000	3	1.624	23.8	23.9	24.1	24.2	24.4	24.6	24.7	24.9	25.1	23.752	24.152	24.252	24.382
M30	30.000	3.5	1.894	26.2	26.4	26.6	26.8	27.0	27.2	27.3	27.5	27.7	26.211	26.661	26.771	26.921
M33	33.000	3.5	1.894	29.2	29.4	29.6	29.8	30.0	30.2	30.3	30.5	30.7	29.211	29.661	29.771	29.921
M36	36.000	4	2.165	31.7	31.9	32.1	32.3	32.5	32.8	33.0	33.2	33.4	31.670	32.145	32.270	32.420
M39	39.000	4	2.165	34.7	34.9	35.1	35.3	35.5	35.8	36.0	36.2	36.4	34.670	35.145	35.270	35.420
M42	42.000	4.5	2.436	37.1	37.4	37.6	37.9	38.1	38.3	38.6	38.8	39.1	37.129	37.659	37.799	37.979
M45	45.000	4.5	2.436	40.1	40.4	40.6	40.9	41.1	41.3	41.6	41.8	42.1	40.129	40.659	40.799	40.979
M48	48.000	5	2.706	42.6	42.9	43.1	43.4	43.7	43.9	44.2	44.5	44.8	42.587	43.147	43.297	43.487

⚠ (1) $H_1 = 0.541266P$

(2) Hole diameter of thread = d − 2× (thread working rate / 100)

(3) Allowed dimension range of screw thread ID. excerpts from JIS B 0209 (allowed dimension range and tolerance of metric coarse thread).

⚠ Note: ■■■ is the allowed dimension range, its classification is as follow.

■:5H or grade 1 ■:6H or grade 2 ■:7H or grade 3

▶Metric fine pitch thread

Thread				Hole diameter of thread(5)									Reference of screw thread ID.(6)			
				Series										Max. dimension		
Nominal diameter of thread	OD. d	Pitch P	Height of engagement H1(4)	100	95	90	85	80	75	70	65	60	Min. dimension	5H or grade 1	6H or grade 2	7H or grade 3
M2.5	2.500	0.35	0.189	2.12	2.14	2.16	2.18	2.20	2.22	2.24	2.25	2.27	2.121	2.201	2.221	—
M3	3.000	0.35	0.189	2.62	2.64	2.66	2.68	2.70	2.72	2.74	2.75	2.77	2.621	2.701	2.721	—
M3.5	3.500	0.35	0.189	3.12	3.14	3.16	3.18	3.20	3.22	3.24	3.25	3.27	3.121	3.201	3.221	—
M4	4.000	0.5	0.271	3.46	3.49	3.51	3.54	3.57	3.59	3.62	3.65	3.68	3.459	3.571	3.599	3.639
M4.5	4.500	0.5	0.271	3.96	3.99	4.01	4.04	4.07	4.09	4.12	4.15	4.18	3.959	4.071	4.099	4.139
M5	5.000	0.5	0.271	4.46	4.49	4.51	4.54	4.57	4.59	4.62	4.65	4.68	4.459	4.571	4.599	4.639
M5.5	5.500	0.5	0.271	4.96	4.99	5.01	5.04	5.07	5.09	5.12	5.15	5.18	4.959	5.071	5.099	5.139
M6	6.000	0.75	0.406	5.19	5.23	5.27	5.31	5.35	5.39	5.43	5.47	5.51	5.188	5.338	5.378	5.424
M7	7.000	0.75	0.406	6.19	6.23	6.27	6.31	6.35	6.39	6.43	6.47	6.51	6.188	6.338	6.378	6.424
M8	8.000	1	0.541	6.92	6.97	7.03	7.08	7.13	7.19	7.24	7.30	7.35	6.917	7.107	7.153	7.217
		0.75	0.406	7.19	7.23	7.27	7.31	7.35	7.39	7.43	7.47	7.51	7.188	7.338	7.378	7.424
M9	9.000	1	0.541	7.92	7.97	8.03	8.08	8.13	8.19	8.24	8.30	8.35	7.917	8.107	8.153	8.217
		0.75	0.406	8.19	8.23	8.27	8.31	8.35	8.39	8.43	8.47	8.51	8.188	8.338	8.378	8.424

⚠ (4) $H_1 = 0.541266P$

(5) Hole diameter of thread = d − 2× (thread working rate / 100)

(6) Allowed dimension range of screw thread ID. excerpts from JIS B 0211 (allowed dimension range and tolerance of metric fine pitch thread).

⚠ Note: ■■■ is the allowed dimension range, its classification is as follow.

■:5H or grade 1 ■:6H or grade 2 ■:7H or grade 3

▶Metric fine pitch thread

Thread				Hole diameter of thread(5)									Reference of screw thread ID.(6)			
				Series										Max. dimension		
Nominal diameter of thread	OD. d	Pitch P	Height of engagement H1(4)	100	95	90	85	80	75	70	65	60	Min. dimension	5H or grade 1	6H or grade 2	7H or grade 3
M10	10.000	1.25	0.677	8.65	8.71	8.78	8.85	8.92	8.98	9.05	9.12	9.19	8.647	8.859	8.912	8.982
		1	0.541	8.92	8.97	9.03	9.08	9.13	9.19	9.24	9.30	9.35	8.917	9.107	9.153	9.217
		0.75	0.406	9.19	9.23	9.27	9.31	9.35	9.39	9.43	9.47	9.51	9.188	9.338	9.378	9.424
M11	11.000	1	0.541	9.92	9.97	10.03	10.08	10.13	10.19	10.24	10.30	10.35	9.917	10.107	10.153	10.217
		0.75	0.406	10.19	10.23	10.27	10.31	10.35	10.39	10.43	10.47	10.51	10.188	10.338	10.378	10.424
M12	12.000	1.5	0.812	10.38	10.46	10.54	10.62	10.70	10.78	10.86	10.94	11.03	10.376	10.612	10.676	10.751
		1.25	0.677	10.65	10.71	10.78	10.85	10.92	10.99	11.05	11.12	11.19	10.647	10.859	10.912	10.982
		1	0.541	10.92	10.97	11.03	11.08	11.13	11.19	11.24	11.30	11.35	10.917	11.107	11.153	11.217
M14	14.000	1.5	0.812	12.38	12.46	12.54	12.62	12.70	12.78	12.86	12.94	13.03	12.376	12.612	12.676	12.751
		1	0.541	12.92	12.97	13.03	13.08	13.13	13.19	13.24	13.30	13.35	12.917	13.107	13.153	13.217
M15	15.000	1.5	0.812	13.38	13.46	13.54	13.62	13.70	13.78	13.86	13.94	14.03	13.376	13.612	13.676	13.751
		1	0.541	13.92	13.97	14.03	14.08	14.13	14.19	14.24	14.30	14.35	13.917	14.107	14.153	14.217
M16	16.000	1.5	0.812	14.38	14.46	14.54	14.62	14.70	14.78	14.86	14.94	15.03	14.376	14.612	14.676	14.751
		1	0.541	14.92	14.97	15.03	15.08	15.13	15.19	15.24	15.30	15.35	14.917	15.107	15.153	15.217
M17	17.000	1.5	0.812	15.38	15.46	15.54	15.62	15.70	15.78	15.86	15.94	16.03	15.376	15.612	15.676	15.751
		1	0.541	15.92	15.97	16.03	16.08	16.13	16.19	16.24	16.30	16.35	15.917	16.107	16.153	16.217
M18	18.000	2	1.083	15.8	15.9	16.1	16.2	16.3	16.4	16.5	16.6	16.7	15.835	16.135	16.210	16.310
		1.5	0.812	16.38	16.46	16.54	16.62	16.70	16.78	16.86	16.94	17.03	16.376	16.612	16.676	16.751
		1	0.541	16.92	16.97	17.03	17.08	17.13	17.19	17.24	17.30	17.35	16.917	17.107	17.153	17.217
M20	20.000	2	1.083	17.8	17.9	18.1	18.2	18.3	18.4	18.5	18.6	18.7	17.835	18.135	18.210	18.310
		1.5	0.812	18.38	18.46	18.54	18.62	18.70	18.78	18.86	18.94	19.03	18.376	18.612	18.676	18.751
		1	0.541	18.92	18.97	19.03	19.08	19.13	19.19	19.24	19.30	19.35	18.917	19.107	19.153	19.217
M22	22.000	2	1.083	19.8	19.9	20.1	20.2	20.3	20.4	20.5	20.6	20.7	19.835	20.135	20.210	20.310
		1.5	0.812	20.38	20.46	20.54	20.62	20.70	20.78	20.86	20.94	21.03	20.376	20.612	20.676	20.751
		1	0.541	20.92	20.97	21.03	21.08	21.13	21.19	21.24	21.30	21.35	20.917	21.107	21.153	21.217
M24	24.000	2	1.083	21.8	21.9	22.1	22.2	22.3	22.4	22.5	22.6	22.7	21.835	22.135	22.210	22.310
		1.5	0.812	22.38	22.46	22.54	22.62	22.70	22.78	22.86	22.94	23.03	22.376	22.612	22.676	22.751
		1	0.541	22.92	22.97	23.03	23.08	23.13	23.19	23.24	23.30	23.35	22.917	23.107	23.153	23.217
M25	25.000	2	1.083	22.8	22.9	23.1	23.2	23.3	23.4	23.5	23.6	23.7	22.835	23.135	23.210	23.310
		1.5	0.812	23.38	23.46	23.54	23.62	23.70	23.78	23.86	23.94	24.03	23.376	23.612	23.676	23.751
		1	0.541	23.92	23.97	24.03	24.08	24.13	24.19	24.24	24.30	24.35	23.917	24.107	24.153	24.217
M26	26.000	1.5	0.812	24.38	24.46	24.54	24.62	24.70	24.78	24.86	24.94	25.03	24.376	24.612	24.676	24.751
M27	27.000	2	1.083	24.8	24.9	25.1	25.2	25.3	25.4	25.5	25.6	25.7	24.835	25.135	25.210	25.310
		1.5	0.812	25.38	25.46	25.54	25.62	25.70	25.78	25.86	25.94	26.03	25.376	25.612	25.676	25.751
		1	0.541	25.92	25.97	26.03	26.08	26.13	26.19	26.24	26.30	26.35	25.917	26.107	26.153	26.217
M28	28.000	2	1.083	25.8	25.9	26.1	26.2	26.3	26.4	26.5	26.6	26.7	25.835	26.135	26.210	26.310
		1.5	0.812	26.38	26.46	26.54	26.62	26.70	26.78	26.86	26.94	27.03	26.376	26.612	26.676	26.751
		1	0.541	26.92	26.97	27.03	27.08	27.13	27.19	27.24	27.30	27.35	26.917	27.107	27.153	27.217
M30	30.000	3	1.624	26.8	26.9	27.1	27.2	27.4	27.6	27.7	27.9	28.1	26.752	27.152	27.252	27.382
		2	1.083	27.8	27.9	28.1	28.2	28.3	28.4	28.5	28.6	28.7	27.835	28.135	28.210	28.310
		1.5	0.812	28.38	28.46	28.54	28.62	28.70	28.78	28.86	28.94	29.03	28.376	28.612	28.676	28.751
		1	0.541	28.92	28.97	29.03	29.08	29.13	29.19	29.24	29.30	29.35	28.917	29.107	29.153	29.217
M32	32.000	2	1.083	29.8	29.9	30.1	30.2	30.3	30.4	30.5	30.6	30.7	29.835	30.135	30.210	30.310
		1.5	0.812	30.38	30.46	30.54	30.62	30.70	30.78	30.86	30.94	31.03	30.376	30.612	30.676	30.751
M33	33.000	3	1.624	29.8	29.9	30.1	30.2	30.4	30.6	30.7	30.9	31.1	29.752	30.152	30.252	30.382
		2	1.083	30.8	30.9	31.1	31.2	31.3	31.4	31.5	31.6	31.7	30.835	31.135	31.210	31.310
		1.5	0.812	31.38	31.46	31.54	31.62	31.70	31.78	31.86	31.94	32.03	31.376	31.612	31.676	31.751
M35	35.000	1.5	0.812	33.38	33.46	33.54	33.62	33.70	33.78	33.86	33.94	34.03	33.376	33.612	33.676	33.751
M36	36.000	3	1.624	32.8	32.9	33.1	33.2	33.4	33.6	33.7	33.9	34.1	32.752	33.152	33.252	33.382
		2	1.083	33.8	33.9	34.1	34.2	34.3	34.4	34.5	34.6	34.7	33.835	34.135	34.210	34.310
		1.5	0.812	34.38	34.46	34.54	34.62	34.70	34.78	34.86	34.94	35.03	34.376	34.612	34.676	34.751
M38	38.000	1.5	0.812	36.38	36.46	36.54	36.62	36.70	36.78	36.86	36.94	37.03	36.376	36.612	36.676	36.751
M39	39.000	3	1.624	35.8	35.9	36.1	36.2	36.4	36.6	36.7	36.9	37.1	35.752	36.152	36.252	36.382
		2	1.083	36.8	36.9	37.1	37.2	37.3	37.4	37.5	37.6	37.7	36.835	37.135	37.210	37.310
		1.5	0.812	37.38	37.46	37.54	37.62	37.70	37.78	37.86	37.94	38.03	37.376	37.612	37.676	37.751
M40	40.000	3	1.624	36.8	36.9	37.1	37.2	37.4	37.6	37.7	37.9	38.1	36.752	37.152	37.252	37.382
		2	1.083	37.8	37.9	38.1	38.2	38.3	38.4	38.5	38.6	38.7	37.835	38.135	38.210	38.310
		1.5	0.812	38.38	38.46	38.54	38.62	38.70	38.78	38.86	38.94	39.03	38.376	38.612	38.676	38.751
M42	42.000	4	2.165	37.7	37.9	38.1	38.3	38.5	38.8	39.0	39.2	39.4	37.670	38.145	38.270	38.420
		3	1.624	38.8	38.9	39.1	39.2	39.4	39.6	39.7	39.9	40.1	38.752	39.152	39.252	39.382
		2	1.083	39.8	39.9	40.1	40.2	40.3	40.4	40.5	40.6	40.7	39.835	40.135	40.210	40.310
		1.5	0.812	40.38	40.46	40.54	40.62	43.70	40.78	40.86	40.94	41.03	40.376	40.612	40.676	40.751
M45	45.000	4	2.165	40.7	40.9	41.1	41.3	41.5	41.8	42.0	42.2	42.4	40.670	41.145	41.270	41.420
		3	1.624	41.8	41.9	42.1	42.2	42.4	42.6	42.7	42.9	43.1	41.752	42.152	42.252	42.382
		2	1.083	42.8	42.9	43.1	43.2	43.3	43.4	43.5	43.6	43.7	42.835	43.135	43.210	43.310
		1.5	0.812	43.38	43.46	43.54	43.62	43.70	43.78	43.86	43.94	44.03	43.376	43.612	43.676	43.751
M48	48.000	4	2.165	43.7	43.9	44.1	44.3	44.5	44.8	45.0	45.2	45.4	43.670	44.145	44.270	44.420
		3	1.624	44.8	44.9	45.1	45.2	45.4	45.6	45.7	45.9	46.1	44.752	45.152	45.252	45.382
		2	1.083	45.8	45.9	46.1	46.2	46.3	46.4	46.5	46.6	46.7	45.835	46.135	46.210	46.310
		1.5	0.812	46.38	46.46	46.54	46.62	46.70	46.78	46.86	46.94	47.03	46.376	46.612	46.676	46.751

⚠ (4) $H_1 = 0.541266P$

(5) Hole diameter of thread = d − 2× (thread working rate / 100)

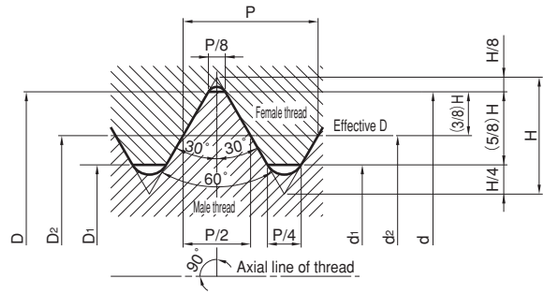
(6) Allowed dimension range of screw thread ID. excerpts from JIS B 0211 (allowed dimension range and tolerance of metric fine pitch thread).

⚠ Note: ■■■ is the allowed dimension range, its classification is as follow.

■:5H or grade 1 ■:6H or grade 2 ■:7H or grade 3

Metric Coarse Threads

—Excerpt from JIS B 0205(2001)—



▶ Calculation formula for basic dimension
H=0.866025404P
5/8H=0.541265877P
d_2=d−0.649519P
d_1=d−1.082532P
D=d
D_2=d_2
D_1=d_1

⚠ Basic thread is shown in bold line.

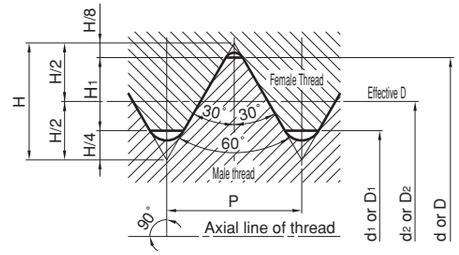
Unit:mm

Nominal diameter(1)			Pitch P	Thread performance height 5/8H	Female Thread		
					Diameterd D	Effective D_2	ID. D_1
					Male thread		
Column 1	Column 2	Column 3			OD. d	Effective d_2	Diameterd D_1
M 1			0.25	0.135	1.000	0.838	0.729
	M 1.1		0.25	0.135	1.100	0.938	0.829
M 1.2			0.25	0.135	1.200	1.038	0.929
	M 1.4		0.3	0.162	1.400	1.205	1.075
M 1.6			0.35	0.189	1.600	1.373	1.221
	M 1.8		0.35	0.189	1.800	1.573	1.421
M 2			0.4	0.217	2.000	1.740	1.567
	M 2.2		0.45	0.244	2.200	1.908	1.713
M 2.5			0.45	0.244	2.500	2.208	2.013
M 3			0.5	0.271	3.000	2.675	2.459
	M 3.5		0.6	0.325	3.500	3.110	2.850
M 4			0.7	0.379	4.000	3.545	3.242
	M 4.5		0.75	0.406	4.500	4.013	3.688
M 5			0.8	0.433	5.000	4.480	4.134
M 6			1	0.541	6.000	5.350	4.917
	M 7		1	0.541	7.000	6.350	5.917
M 8			1.25	0.677	8.000	7.188	6.647
		M 9	1.25	0.677	9.000	8.188	7.647
M 10			1.5	0.812	10.000	9.026	8.376
		M 11	1.5	0.812	11.000	10.026	9.376
M 12			1.75	0.947	12.000	10.863	10.106
	M 14		2	1.083	14.000	12.701	11.835
M 16			2	1.083	16.000	14.701	13.835
	M 18		2.5	1.353	18.000	16.376	15.294
M 20			2.5	1.353	20.000	18.376	17.294
	M 22		2.5	1.353	22.000	20.376	19.294
M 24			3	1.624	24.000	22.051	20.752
	M 27		3	1.624	27.000	25.051	23.752
M 30			3.5	1.894	30.000	27.727	26.211
	M 33		3.5	1.894	33.000	30.727	29.211
M 36			4	2.165	36.000	33.402	31.670
	M 39		4	2.165	39.000	36.402	34.670
M 42			4.5	2.436	42.000	39.077	37.129
	M 45		4.5	2.436	45.000	42.077	40.129
M 48			5	2.706	48.000	44.752	42.587
	M 52		5	2.706	52.000	48.752	46.587
M 56			5.5	2.977	56.000	52.428	50.046
	M 60		5.5	2.977	60.000	56.428	54.046
M 64			6	3.248	64.000	60.103	57.505
	M 68		6	3.248	68.000	64.103	61.505

⚠ (1) Priority should be given to Column1. If required, select items in Column 2 and 3, in that order.

Metric Fine Pitch Threads (1)

—Excerpt from JIS B 0207(1982)—



▶ Calculation formula for basic dimension
H=0.866025P
H1=0.541266P
d_2=d−0.649519P
d_1=d−1.082532P
D=d
D_2=d_2
D_1=d_1

⚠ Basic thread is shown in bold line.

Unit:mm

Nominal diameter	Pitch P	Thread performance height H_1	Female Thread		
			Diameterd D	Effective D_2	ID. D_1
			Male thread		
			OD. d	Effective d_2	Diameterd d_1
M 1 ×0.2	0.2	0.108	1.000	0.870	0.783
M 1.1×0.2	0.2	0.108	1.100	0.970	0.883
M 1.2×0.2	0.2	0.108	1.200	1.070	0.983
M 1.4×0.2	0.2	0.108	1.400	1.270	1.183
M 1.6×0.2	0.2	0.108	1.600	1.470	1.383
M 1.8×0.2	0.2	0.108	1.800	1.670	1.583
M 2 ×0.25	0.25	0.135	2.000	1.838	1.729
M 2.2×0.25	0.25	0.135	2.200	2.038	1.929
M 2.5×0.35	0.35	0.189	2.500	2.273	2.121
M 3 ×0.35	0.35	0.189	3.000	2.773	2.621
M 3.5×0.35	0.35	0.189	3.500	3.273	3.121
M 4 ×0.5	0.5	0.271	4.000	3.675	3.459
M 4.5×0.5	0.5	0.271	4.500	4.175	3.959
M 5 ×0.5	0.5	0.271	5.000	4.675	4.459
M 5.5×0.5	0.5	0.271	5.500	5.175	4.959
M 6 ×0.75	0.75	0.406	6.000	5.513	5.188
M 7 ×0.75	0.75	0.406	7.000	6.513	6.188
M 8 ×1	1	0.541	8.000	7.350	6.917
M 8 ×0.75	0.75	0.406	8.000	7.513	7.188
M 9 ×1	1	0.541	9.000	8.350	7.917
M 9 ×0.75	0.75	0.406	9.000	8.513	8.188
M10 ×1.25	1.25	0.677	10.000	9.188	8.647
M10 ×1	1	0.541	10.000	9.350	8.917
M10 ×0.75	0.75	0.406	10.000	9.513	9.188
M11 ×1	1	0.541	11.000	10.350	9.917
M11 ×0.75	0.75	0.406	11.000	10.513	10.188
M12 ×1.5	1.5	0.812	12.000	11.026	10.376
M12 ×1.25	1.25	0.677	12.000	11.188	10.647
M12 ×1	1	0.541	12.000	11.350	10.917
M14 ×1.5	1.5	0.812	14.000	13.026	12.376
M14 ×1.25	1.25	0.677	14.000	13.188	12.647
M14 ×1	1	0.541	14.000	13.350	12.917
M15 ×1.5	1.5	0.812	15.000	14.026	13.376
M15 ×1	1	0.541	15.000	14.350	13.917
M16 ×1.5	1.5	0.812	16.000	15.026	14.376
M16 ×1	1	0.541	16.000	15.350	14.917
M17 ×1.5	1.5	0.812	17.000	16.026	15.376
M17 ×1	1	0.541	17.000	16.350	15.917
M18 ×2	2	1.083	18.000	16.701	15.835
M18 ×1.5	1.5	0.812	18.000	17.026	16.376
M18 ×1	1	0.541	18.000	17.350	16.917
M20 ×2	2	1.083	20.000	18.701	17.835
M20 ×1.5	1.5	0.812	20.000	19.026	18.376
M20 ×1	1	0.541	20.000	19.350	18.917
M22 ×2	2	1.083	22.000	20.701	19.835
M22 ×1.5	1.5	0.812	22.000	21.026	20.376
M22 ×1	1	0.541	22.000	21.350	20.917
M24 ×2	2	1.083	24.000	22.701	21.835
M24 ×1.5	1.5	0.812	24.000	23.026	22.376
M24 ×1	1	0.541	24.000	23.350	22.917

Metric Fine Pitch Threads (2)

—Excerpt from JIS B 0207 (1982) —

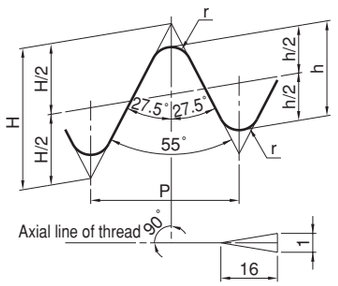
Unit：mm

Nominal diameter	Pitch P	Thread performance height H_1	Female Thread		
			Diameterd D	Effective DD_2	ID. D_1
			Male thread		
			OD. d	Effective Dd_2	Diameterd d_1
M 25×2	2	1.083	25.000	23.701	22.835
M 25×1.5	1.5	0.812	25.000	24.026	23.376
M 25×1	1	0.541	25.000	24.350	23.917
M 26×1.5	1.5	0.812	26.000	25.026	24.376
M 27×2	2	1.083	27.000	25.701	24.835
M 27×1.5	1.5	0.812	27.000	26.026	25.376
M 27×1	1	0.541	27.000	26.350	25.917
M 28×2	2	1.083	28.000	26.701	25.835
M 28×1.5	1.5	0.812	28.000	27.026	26.376
M 28×1	1	0.541	28.000	27.350	26.917
M 30×3	3	1.624	30.000	28.051	26.752
M 30×2	2	1.083	30.000	28.701	27.835
M 30×1.5	1.5	0.812	30.000	29.026	28.376
M 30×1	1	0.541	30.000	29.350	28.917
M 32×2	2	1.083	32.000	30.701	29.835
M 32×1.5	1.5	0.812	32.000	31.026	30.376
M 33×3	3	1.624	33.000	31.051	29.752
M 33×2	2	1.083	33.000	31.701	30.835
M 33×1.5	1.5	0.812	33.000	32.026	31.376
M 35×1.5	1.5	0.812	35.000	34.026	33.376
M 36×3	3	1.624	36.000	34.051	32.752
M 36×2	2	1.083	36.000	34.701	33.835
M 36×1.5	1.5	0.812	36.000	35.026	34.376
M 38×1.5	1.5	0.812	38.000	37.026	36.376
M 39×3	3	1.624	39.000	37.051	35.752
M 39×2	2	1.083	39.000	37.701	36.835
M 39×1.5	1.5	0.812	39.000	38.026	37.376
M 40×3	3	1.624	40.000	38.051	36.752
M 40×2	2	1.083	40.000	38.701	37.835
M 40×1.5	1.5	0.812	40.000	39.026	38.376
M 42×4	4	2.165	42.000	39.402	37.670
M 42×3	3	1.624	42.000	40.051	38.752
M 42×2	2	1.083	42.000	40.701	39.835
M 42×1.5	1.5	0.812	42.000	41.026	40.376
M 45×4	4	2.165	45.000	42.402	40.670
M 45×3	3	1.624	45.000	43.051	41.752
M 45×2	2	1.083	45.000	43.701	42.835
M 45×1.5	1.5	0.812	45.000	44.026	43.376
M 48×4	4	2.165	48.000	45.402	43.670
M 48×3	3	1.624	48.000	46.051	44.752
M 48×2	2	1.083	48.000	46.701	45.835
M 48×1.5	1.5	0.812	48.000	47.026	46.376
M 50×3	3	1.624	50.000	48.051	46.752
M 50×2	2	1.083	50.000	48.701	47.835
M 50×1.5	1.5	0.812	50.000	49.026	48.376
M 52×4	4	2.165	52.000	49.402	47.670
M 52×3	3	1.624	52.000	50.051	48.752
M 52×2	2	1.083	52.000	50.701	49.835
M 52×1.5	1.5	0.812	52.000	51.026	50.376
M 55×4	4	2.165	55.000	52.402	50.670
M 55×3	3	1.624	55.000	53.051	51.752
M 55×2	2	1.083	55.000	53.701	52.835
M 55×1.5	1.5	0.812	55.000	54.026	53.376
M 56×4	4	2.165	56.000	53.402	51.670
M 56×3	3	1.624	56.000	54.051	52.752
M 56×2	2	1.083	56.000	54.701	53.835
M 56×1.5	1.5	0.812	56.000	55.026	54.376
M 58×4	4	2.165	58.000	55.402	53.670
M 58×3	3	1.624	58.000	56.051	54.752
M 58×2	2	1.083	58.000	56.701	55.835
M 58×1.5	1.5	0.812	58.000	57.026	56.376
M 60×4	4	2.165	60.000	57.402	55.670
M 60×3	3	1.624	60.000	58.051	56.752
M 60×2	2	1.083	60.000	58.701	57.835
M 60×1.5	1.5	0.812	60.000	59.026	58.376

Taper Pipe Threads

—Excerpt from JIS B 0203 (1999) —

▶Reference thread shape and basic dimension for a tapered male/female thread



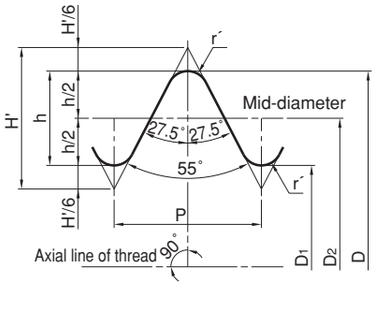
⚠ Basic thread is shown in bold line.

▶ Calculation formula for basic dimension

$P=\frac{25.4}{n}$

H=0.960237P
h=0.640327P
r=0.137278P

▶Reference thread shape for a parallel female thread



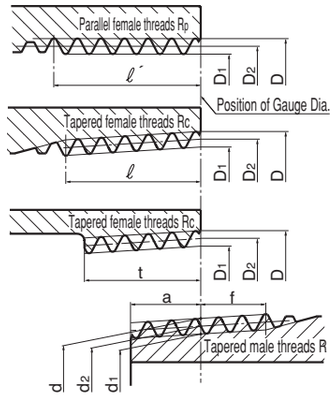
⚠ Basic thread is shown in bold line.

▶ Calculation formula for basic dimension

$P=\frac{25.4}{n}$

H´=0.960491P
h=0.640327P
r´=0.137329P

▶Fitting together a tapered female thread or parallel female thread and a tapered male thread



▶ Symbol

Tapered male threads	R 1½
Tapered female threads	Rc 1½
Parallel female threads	Rp 1½

Unit：mm

(1) Nominal thread	Thread: Number of threads (For 25.4mm) n	Thread: Pitch P (Reference)	Thread: Thread height h	Thread: Roundness r or r´	Gauge Dia. Male thread: Minor Dia. d	Gauge Dia. Male thread: Effective Dia. d_2	Gauge Dia. Male thread: Inner Dia. d_1	Gauge Dia. Female Thread: Minor Dia. D	Gauge Dia. Female Thread: Effective Dia. D_2	Gauge Dia. Female Thread: Inner Dia. D_1	Position of Gauge Dia. Male thread: From pipe end, Reference length a	Position of Gauge Dia. Male thread: From pipe end, Axial tolerance ±b	Position of Gauge Dia. Female Thread: Pipe end, Axial tolerance ±c	D, D_2 and D_1 tolerances of parallel female threads ±	Length of effective thread (Min.): Male thread, From position of Gauge Dia. spot to major Dia. spot f	Length of effective thread (Min.): Female Thread, With incomplete threaded portion, Tapered female threads, From position of Gauge Dia. spot to minor Dia.spot ℓ	Length of effective thread (Min.): Female Thread, With incomplete threaded portion, Parallel female threads, From pipe end or pipe fitting end ℓ´	Length of effective thread (Min.): Female Thread, Without incomplete threaded portion, Tapered female threads Parallel female threads, From position of Gauge Dia. spot or pipe fitting end t	Carbon steel for piping size of steel pipe (Reference) OD.	Carbon steel for piping size of steel pipe (Reference) Thickness
R1/16	28	0.9071	0.581	0.12	7.723	7.142	6.561	3.97	0.91	1.13	0.071	2.5	6.2	7.4	4.4	—	—
R⅛	28	0.9071	0.581	0.12	9.728	9.147	8.566	3.97	0.91	1.13	0.071	2.5	6.2	7.4	4.4	10.5	2.0
R¼	19	1.3368	0.856	0.18	13.157	12.301	11.445	6.01	1.34	1.67	0.104	3.7	9.4	11.0	6.7	13.8	2.3
R⅜	19	1.3368	0.856	0.18	16.662	15.806	14.950	6.35	1.34	1.67	0.104	3.7	9.7	11.4	7.0	17.3	2.3
R½	14	1.8143	1.162	0.25	20.955	19.793	18.631	8.16	1.81	2.27	0.142	5.0	12.7	15.0	9.1	21.7	2.8
R¾	14	1.8143	1.162	0.25	26.441	25.279	24.117	9.53	1.81	2.27	0.142	5.0	14.1	16.3	10.2	27.2	2.8
R1	11	2.3091	1.479	0.32	33.249	31.770	30.291	10.39	2.31	2.89	0.181	6.4	16.2	19.1	11.6	34	3.2
R1¼	11	2.3091	1.479	0.32	41.910	40.431	38.952	12.70	2.31	2.89	0.181	6.4	18.5	21.4	13.4	42.7	3.5
R1½	11	2.3091	1.479	0.32	47.803	46.324	44.845	12.70	2.31	2.89	0.181	6.4	18.5	21.4	13.4	48.6	3.5
R2	11	2.3091	1.479	0.32	59.614	58.135	56.656	15.88	2.31	2.89	0.181	7.5	22.8	25.7	16.9	60.5	3.8
R2½	11	2.3091	1.479	0.32	75.184	73.705	72.226	17.46	3.46	3.46	0.216	9.2	26.7	30.1	18.6	76.3	4.2
R3	11	2.3091	1.479	0.32	87.884	86.405	84.926	20.64	3.46	3.46	0.216	9.2	29.8	33.3	21.1	89.1	4.2
R4	11	2.3091	1.479	0.32	113.030	111.551	110.072	25.40	3.46	3.46	0.216	10.4	35.8	39.3	25.9	114.3	4.5
R5	11	2.3091	1.479	0.32	138.430	136.951	135.472	28.58	3.46	3.46	0.216	11.5	40.1	43.5	29.3	139.8	4.5
R6	11	2.3091	1.479	0.32	163.830	162.351	160.872	28.58	3.46	3.46	0.216	11.5	40.1	43.5	29.3	165.2	5.0

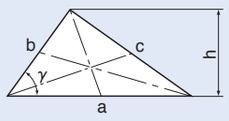
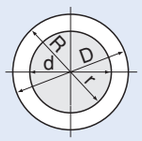
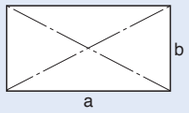
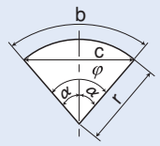
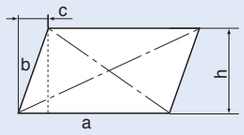
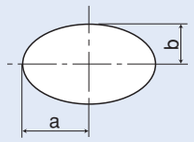
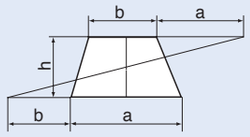
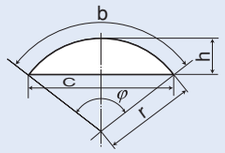
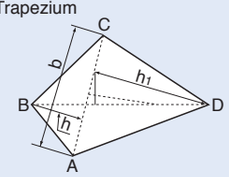
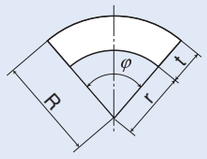
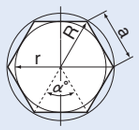
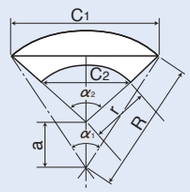
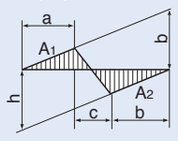
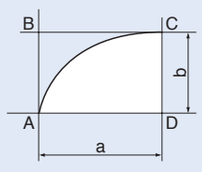
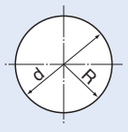
⚠ (1) The nominal of a tapered male thread is given here. For a taper female thread or parallel female thread, R should be replaced with Rc or Rp.

⚠ 1. The threads should be at right angles to the central axial line, and the pitch should be measured along the central axial line.

2. The length of the effective thread means the length over which threads are fully provided. A pipe or a pipe fitting may be left in place on the crests of the last few threads. A chamfered end, if any, of a pipe or a pipe fitting should be included in the length of the effective thread.

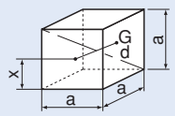
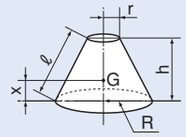
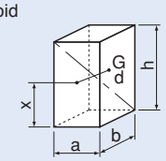
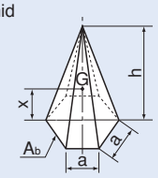
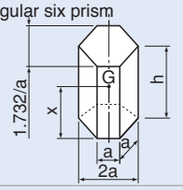
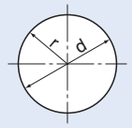
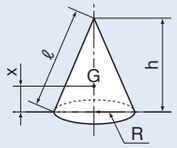
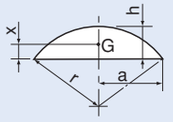
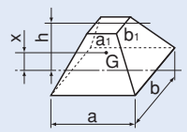
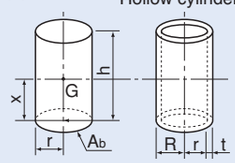
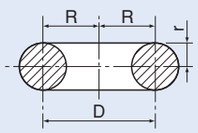
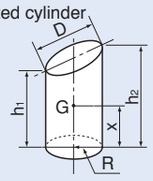
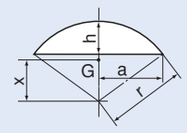
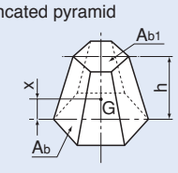
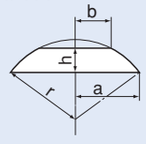
3. When the value of a, f and t does not meet the requirements, the criteria of other standard is provided.

Calculation of Area

A=Area		A=Area	
Triangle 	$A=\frac{ah}{2}=\frac{ab\sin\gamma}{2}$	Ring 	$A=\pi\frac{D^2-d^2}{4}=\pi(R^2-r^2)$
Rectangle 	$A=ab$	Sector 	$A=\frac{br}{2}=\frac{\varphi}{360}\pi r^2$
Parallelogram 	$A=ah$ $h=\sqrt{b^2-c^2}$	Ellipse 	$A=\pi ab$
Trapezia 	$A=\frac{a+b}{2}h$	Lune 	$A=\frac{r^2}{2}(\frac{\varphi\pi}{180}-\sin\varphi)$ $=\frac{r(b-c)+ch}{2}$
Trapezium 	$A=\frac{h+h_1}{2}b$	Arch 	$A=\frac{\varphi\pi}{360}(R^2-r^2)$
Equilateral polygon 	$A=\frac{na^2}{4}\cot\frac{\alpha}{2}=\frac{nR^2}{4}\sin\alpha$ $=nr^2\tan\frac{\alpha}{2}$	Arch 	$A=\frac{\pi R^2\alpha_1}{360}-\frac{\pi r^2\alpha_2}{360}-\frac{aC_1}{2}$
Plane of projection 	$A_1=\frac{h}{2}\frac{a^2}{a+b}$ $A_2=\frac{h}{2}\frac{b^2}{a+b}$ $A_2-A_1=\frac{h}{2}(b-a)$	Parabola 	AreaACD $A_1=\frac{2}{3}ab$ AreaABC $A_2=\frac{1}{3}ab$
Round 	$A=d^2\frac{\pi}{4}=\pi r^2=\frac{sd}{4}$ Rerimeter $s=\pi d$		

Calculation of Volume

V=Cubic Volume S=Superficial area As=Sectional area Ab=Area of base x=Distance between underside and gravitational center

Cube 	$V=a^3$ $S=6a^2$ $As=4a^2$ $x=\frac{a}{2}$ $d=\sqrt{3}$ $a=1.7321a$	Frustum of a cone 	$V=\frac{\pi h}{3}(R^2+Rr+r^2)$ $=\frac{h}{4}(\pi a^2+\frac{1}{3}\pi b^2)$ $As=\pi\ell a$ $a=R+r$ $b=R-r$ $\ell=\sqrt{b^2+h^2}$ $x=\frac{h}{4}\frac{R^2+2Rr+3r^2}{R^2+Rr+r^2}$
Cuboid 	$V=abh$ $S=2(ab+ah+bh)$ $As=2h(a+b)$ $x=\frac{h}{2}$ $d=\sqrt{a^2+b^2+h^2}$	Pyramid 	$V=\frac{Abh}{3}$ $x=\frac{h}{4}$
Regular six prism 	$V=2.598a^2h$ $S=5.1963a^2+6ah$ $As=6ah$ $x=\frac{h}{2}$ $d=\sqrt{h+4a^2}$	Sphere 	$V=\frac{4\pi r^3}{3}=4.188790205r^3$ $=\frac{\pi d^3}{6}=0.523598776d^3$ $S=4\pi r^2=\pi d^2$ $r=\sqrt[3]{\frac{3V}{4\pi}}=0.620351\sqrt[3]{V}$
Circular cone 	$V=\frac{\pi R^2h}{3}$ $As=\pi R\ell$ $\ell=\sqrt{R^2+h^2}$ $x=\frac{h}{4}$	Ball segment 	$V=\frac{\pi h}{6}(3a^2+h^2)=\frac{\pi h^2}{6}(3r-h)$ $As=2\pi Vh=\pi(a^2+h^2)$ $a^2=h(2r-h)$ $x=\frac{3}{4}\frac{(2r-h)^2}{3r-h}$
Regular multilateral prism a=Side length n=Number of sides Ab=Area of base	$V=Abh$ $S=2Ab+nha$ $As=nha$ $x=\frac{h}{2}$	Frustum of a prism 	$V=\frac{h}{6}[(2a+a_1)b+(2a_1+a)b_1]$ $=\frac{h}{6}[ab+(a+a_1)(b+b_1)+a_1b_1]$ $x=\frac{h}{2}\frac{ab+ab_1+a_1b+3a_1b_1}{2ab+ab_1+a_1b+2a_1b_1}$
Column  Hollow cylinder	$V=\pi r^2h=Ash$ $S=2\pi r(r+h)$ $As=2\pi rh$ $x=\frac{h}{2}$		$V=\pi h(R^2-r^2)=\pi ht(2R-t)=\pi ht(2r+t)$ $x=\frac{h}{2}$
Torus 	$V=2\pi^2Rr^2=19.739Rr^2$ $=\frac{1}{4}\pi^2Dd^2=2.4674Dd^2$ $S=4\pi^2Rr=39.478Rr$ $=\pi^2Dd=9.8696Dd$		
Truncated cylinder 	$V=\pi R^2\frac{h_1+h_2}{2}$ $As=\pi R(h_1+h_2)$ $D=\sqrt{4R^2+(h_2-h_1)^2}$ $x=\frac{h_1+h_2}{2}$	Spherical quadrant 	$V=\frac{2\pi r^2h}{2}=2.0943951024r^2h$ $S=\pi r(2h+a)$ $x=\frac{3}{8}(2r-h)$
Turncated pyramid 	$V=\frac{h}{3}(Ab+Ab_1+\sqrt{AbAb_1})$ $x=\frac{h}{4}\frac{Ab+2\sqrt{AbAb_1}+3Ab_1}{Ab+\sqrt{AbAb_1}+Ab_1}$	Spherical belt 	$V=\frac{\pi h}{6}(3a^2+3b^2+h^2)$ $As=2\pi rh$ $r^2=a^2+(\frac{a^2-b^2-h^2}{2h})^2$

Trigonometric Tables

Angle(θ) Degrees	Deg	sin θ Rad	cos θ Rad	tan θ Rad	cot θ Rad		
0	0	0.0000	1.0000	0.0000	∞	90	0
	10	0.0029	1.0000	0.0029	343.77	89	50
	20	0.0058	1.0000	0.0058	171.89		40
	30	0.0087	1.0000	0.0087	114.59		30
	40	0.0116	0.9999	0.0116	85.940		20
	50	0.0145	0.9999	0.0145	68.750		10
1	0	0.0175	0.9998	0.0175	57.290		0
	10	0.0204	0.9998	0.0204	49.104	88	50
	20	0.0233	0.9997	0.0233	42.964		40
	30	0.0262	0.9997	0.0262	38.188		30
	40	0.0291	0.9996	0.0291	34.368		20
	50	0.0320	0.9995	0.0320	31.242		10
2	0	0.0349	0.9994	0.0349	28.636		0
	10	0.0378	0.9993	0.0378	26.432	87	50
	20	0.0407	0.9992	0.0407	24.542		40
	30	0.0436	0.9990	0.0437	22.904		30
	40	0.0465	0.9989	0.0466	21.470		20
	50	0.0494	0.9988	0.0495	20.206		10
3	0	0.0523	0.9986	0.0524	19.081		0
	10	0.0552	0.9985	0.0553	18.075	86	50
	20	0.0581	0.9983	0.0582	17.169		40
	30	0.0610	0.9981	0.0612	16.350		30
	40	0.0640	0.9980	0.0641	15.605		20
	50	0.0669	0.9978	0.0670	14.924		10
4	0	0.0698	0.9976	0.0699	14.301		0
	10	0.0727	0.9974	0.0729	13.727	85	50
	20	0.0756	0.9971	0.0758	13.197		40
	30	0.0785	0.9969	0.0787	12.706		30
	40	0.0814	0.9967	0.0816	12.251		20
	50	0.0843	0.9964	0.0846	11.826		10
5	0	0.0872	0.9962	0.0875	11.430		0
	10	0.0901	0.9959	0.0904	11.059	84	50
	20	0.0929	0.9957	0.0934	10.712		40
	30	0.0958	0.9954	0.0963	10.385		30
	40	0.0987	0.9951	0.0992	10.078		20
	50	0.1016	0.9948	0.1022	9.7882		10
6	0	0.1045	0.9945	0.1051	9.5144		0
	10	0.1074	0.9942	0.1080	9.2553	83	50
	20	0.1103	0.9939	0.1110	9.0098		40
	30	0.1132	0.9936	0.1139	8.7769		30
	40	0.1161	0.9932	0.1169	8.5555		20
	50	0.1190	0.9929	0.1198	8.3450		10
7	0	0.1219	0.9925	0.1228	8.1443		0
	10	0.1248	0.9922	0.1257	7.9530	82	50
	20	0.1276	0.9918	0.1287	7.7704		40
	30	0.1305	0.9914	0.1317	7.5958		30
	40	0.1334	0.9911	0.1346	7.4287		20
	50	0.1363	0.9907	0.1376	7.2687		10
8	0	0.1392	0.9903	0.1405	7.1154		0
	10	0.1421	0.9899	0.1435	6.9682	81	50
	20	0.1449	0.9894	0.1465	6.8269		40
	30	0.1478	0.9890	0.1495	6.6912		30
	40	0.1507	0.9886	0.1524	6.5606		20
	50	0.1536	0.9881	0.1554	6.4348		10
9	0	0.1564	0.9877	0.1584	6.3138		0
	10	0.1593	0.9872	0.1614	6.1970	80	50
	20	0.1622	0.9868	0.1644	6.0844		40
	30	0.1650	0.9863	0.1673	5.9758		30
	40	0.1679	0.9858	0.1703	5.8708		20
	50	0.1708	0.9853	0.1733	5.7694		10
10	0	0.1736	0.9848	0.1763	5.6713		0
	10	0.1765	0.9843	0.1793	5.5764	79	50
	20	0.1794	0.9838	0.1823	5.4845		40
	30	0.1822	0.9833	0.1853	5.3955		30
	40	0.1851	0.9827	0.1883	5.3093		20
	50	0.1880	0.9822	0.1914	5.2257		10
11	0	0.1908	0.9816	0.1944	5.1446		0
	10	0.1937	0.9811	0.1974	5.0658	78	50
	20	0.1965	0.9805	0.2004	4.9894		40
	30	0.1994	0.9799	0.2035	4.9152		30
	40	0.2022	0.9793	0.2065	4.8430		20
	50	0.2051	0.9787	0.2095	4.7729		10
		cos θ Rad	sin θ Rad	cot θ Rad	tan θ Rad	Degrees	Deg
						Angle(θ)	

Angle(θ) Degrees	Deg	sin θ Rad	cos θ Rad	tan θ Rad	cot θ Rad		
12	0	0.2079	0.9781	0.2126	4.7046	78	0
	10	0.2108	0.9775	0.2156	4.6382	77	50
	20	0.2136	0.9769	0.2186	4.5736		40
	30	0.2164	0.9763	0.2217	4.5107		30
	40	0.2193	0.9757	0.2247	4.4494		20
	50	0.2221	0.9750	0.2278	4.3897		10
13	0	0.2250	0.9744	0.2309	4.3315		0
	10	0.2278	0.9737	0.2339	4.2747	76	50
	20	0.2306	0.9730	0.2370	4.2193		40
	30	0.2334	0.9724	0.2401	4.1653		30
	40	0.2363	0.9717	0.2432	4.1126		20
	50	0.2391	0.9710	0.2462	4.0611		10
14	0	0.2419	0.9703	0.2493	4.0108		0
	10	0.2447	0.9696	0.2524	3.9617	75	50
	20	0.2476	0.9689	0.2555	3.9136		40
	30	0.2504	0.9681	0.2586	3.8667		30
	40	0.2532	0.9674	0.2617	3.8208		20
	50	0.2560	0.9667	0.2648	3.7760		10
15	0	0.2588	0.9659	0.2679	3.7321		0
	10	0.2616	0.9652	0.2711	3.6891	74	50
	20	0.2644	0.9644	0.2742	3.6470		40
	30	0.2672	0.9636	0.2773	3.6059		30
	40	0.2700	0.9628	0.2805	3.5656		20
	50	0.2728	0.9621	0.2836	3.5261		10
16	0	0.2756	0.9613	0.2867	3.4874		0
	10	0.2784	0.9605	0.2899	3.4495	73	50
	20	0.2812	0.9596	0.2931	3.4124		40
	30	0.2840	0.9588	0.2962	3.3759		30
	40	0.2868	0.9580	0.2994	3.3402		20
	50	0.2896	0.9572	0.3026	3.3052		10
17	0	0.2924	0.9563	0.3057	3.2709		0
	10	0.2952	0.9555	0.3089	3.2371	72	50
	20	0.2979	0.9546	0.3121	3.2041		40
	30	0.3007	0.9537	0.3153	3.1716		30
	40	0.3035	0.9528	0.3185	3.1397		20
	50	0.3062	0.9520	0.3217	3.1084		10
18	0	0.3090	0.9511	0.3249	3.0777		0
	10	0.3118	0.9502	0.3281	3.0475	71	50
	20	0.3145	0.9492	0.3314	3.0178		40
	30	0.3173	0.9483	0.3346	2.9887		30
	40	0.3201	0.9474	0.3378	2.9600		20
	50	0.3228	0.9465	0.3411	2.9319		10
19	0	0.3256	0.9455	0.3443	2.9042		0
	10	0.3283	0.9446	0.3476	2.8770	70	50
	20	0.3311	0.9436	0.3508	2.8502		40
	30	0.3338	0.9426	0.3541	2.8239		30
	40	0.3365	0.9417	0.3574	2.7980		20
	50	0.3393	0.9407	0.3607	2.7725		10
20	0	0.3420	0.9397	0.3640	2.7475		0
	10	0.3448	0.9387	0.3673	2.7228	69	50
	20	0.3475	0.9377	0.3706	2.6985		40
	30	0.3502	0.9367	0.3739	2.6746		30
	40	0.3529	0.9356	0.3772	2.6511		20
	50	0.3557	0.9346	0.3805	2.6279		10
21	0	0.3584	0.9336	0.3839	2.6051		0
	10	0.3611	0.9325	0.3872	2.5826	68	50
	20	0.3638	0.9315	0.3906	2.5605		40
	30	0.3665	0.9304	0.3939	2.5386		30
	40	0.3692	0.9293	0.3973	2.5172		20
	50	0.3719	0.9283	0.4006	2.4960		10
22	0	0.3746	0.9272	0.4040	2.4751		0
	10	0.3773	0.9261	0.4074	2.4545	67	50
	20	0.3800	0.9250	0.4108	2.4342		40
	30	0.3827	0.9239	0.4142	2.4142		30
	40	0.3854	0.9228	0.4176	2.3945		20
	50	0.3881	0.9216	0.4210	2.3750		10
23	0	0.3907	0.9205	0.4245	2.3559		0
	10	0.3934	0.9194	0.4279	2.3369	66	50
	20	0.3961	0.9182	0.4314	2.3183		40
	30	0.3987	0.9171	0.4348	2.2998		30
	40	0.4014	0.9159	0.4383	2.2817		20
	50	0.4041	0.9147	0.4417	2.2637		10
		cos θ Rad	sin θ Rad	cot θ Rad	tan θ Rad	Degrees	Deg
						Angle(θ)	

Angle(θ) Degrees	Deg	sin θ Rad	cos θ Rad	tan θ Rad	cot θ Rad		
24	0	0.4067	0.9135	0.4452	2.2460	66	0
	10	0.4094	0.9124	0.4487	2.2286	65	50
	20	0.4120	0.9112	0.4522	2.2113		40
	30	0.4147	0.9100	0.4557	2.1943		30
	40	0.4173	0.9088	0.4592	2.1775		20
	50	0.4200	0.9075	0.4628	2.1609		10
25	0	0.4226	0.9063	0.4663	2.1445		0
	10	0.4253	0.9051	0.4699	2.1283	64	50
	20	0.4279	0.9038	0.4734	2.1123		40
	30	0.4305	0.9026	0.4770	2.0965		30
	40	0.4331	0.9013	0.4806	2.0809		20
	50	0.4358	0.9001	0.4841	2.0655		10
26	0	0.4384	0.8988	0.4877	2.0503		0
	10	0.4410	0.8975	0.4913	2.0353	63	50
	20	0.4436	0.8962	0.4950	2.0204		40
	30	0.4462	0.8949	0.4986	2.0057		30
	40	0.4488	0.8936	0.5022	1.9912		20
	50	0.4514	0.8923	0.5059	1.9768		10
27	0	0.4540	0.8910	0.5095	1.9626		0
	10	0.4566	0.8897	0.5132	1.9486	62	50
	20	0.4592	0.8884	0.5169	1.9347		40
	30	0.4617	0.8870	0.5206	1.9210		30
	40	0.4643	0.8857	0.5243	1.9074		20
	50	0.4669	0.8843	0.5280	1.8940		10
28	0	0.4695	0.8829	0.5317	1.8807		0
	10	0.4720	0.8816	0.5354	1.8676	61	50
	20	0.4746	0.8802	0.5392	1.8546		40
	30	0.4772	0.8788	0.5430	1.8418		30
	40	0.4797	0.8774	0.5467	1.8291		20
	50	0.4823	0.8760	0.5505	1.8165		10
29	0	0.4848	0.8746	0.5543	1.8040		0
	10	0.4874	0.8732	0.5581	1.7917	60	50
	20	0.4899	0.8718	0.5619	1.7796		40
	30	0.4924	0.8704	0.5658	1.7675		30
	40	0.4950	0.8689	0.5696	1.7556		20
	50	0.4975	0.8675	0.5735	1.7437		10
30	0	0.5000	0.8660	0.5774	1.7321		0
	10	0.5025	0.8646	0.5812	1.7205	59	50
	20	0.5050	0.8631	0.5851	1.7090		40
	30	0.5075	0.8616	0.5890	1.6977		30
	40	0.5100	0.8601	0.5930	1.6864		20
	50	0.5125	0.8587	0.5969	1.6753		10
31	0	0.5150	0.8572	0.6009	1.6643		0
	10	0.5175	0.8557	0.6048	1.6534	58	50
	20	0.5200	0.8542	0.6088	1.6426		40
	30	0.5225	0.8526	0.6128	1.6319		30
	40	0.5250	0.8511	0.6168	1.6212		20
	50	0.5275	0.8496	0.6208	1.6107		10
32	0	0.5299	0.8480	0.6249	1.6003		0
	10	0.5324	0.8465	0.6289	1.5900	57	50
	20	0.5348	0.8450	0.6330	1.5798		40
	30	0.5373	0.8434	0.6371	1.5697		30
	40	0.5398	0.8418	0.6412	1.5597		20
	50	0.5422	0.8403	0.6453	1.5497		10
33	0	0.5446	0.8387	0.6494	1.5399		0
	10	0.5471	0.8371	0.6536	1.5301	56	50
	20	0.5495	0.8355	0.6577	1.5204		40
	30	0.5519	0.8339	0.6619	1.5108		30
	40	0.5544	0.8323	0.6661	1.5013		20
	50	0.5568	0.8307	0.6703	1.4919		10
34	0	0.5592	0.8290	0.6745	1.4826		0
	10	0.5616	0.8274	0.6787	1.4733	55	50
	20	0.5640	0.8258	0.6830	1.4641		40
	30	0.5664	0.8241	0.6873	1.4550		30
	40	0.5688	0.8225	0.6916	1.4460		20
	50	0.5712	0.8208	0.6959	1.4370		10
		cos θ Rad	sin θ Rad	cot θ Rad	tan θ Rad	Degrees	Deg
						Angle(θ)	

Angle(θ) Degrees	Deg	sin θ Rad	cos θ Rad	tan θ Rad	cot θ Rad		
35	0	0.5736	0.8192	0.7002	1.4281	55	0
	10	0.5760	0.8175	0.7046	1.4193	54	50
	20	0.5783	0.8158	0.7089	1.4106		40
	30	0.5807	0.8141	0.7133	1.4019		30
	40	0.5831	0.8124	0.7177	1.3934		20
	50	0.5854	0.8107	0.7221	1.3848		10
36	0	0.5878	0.8090	0.7265	1.3764		0
	10	0.5901	0.8073	0.7310	1.3680	53	50
	20	0.5925	0.8056	0.7355	1.3597		40
	30	0.5948	0.8039	0.7400	1.3514		30
	40	0.5972	0.8021	0.7445	1.3432		20
	50	0.5995	0.8004	0.7490	1.3351		10
37	0	0.6018	0.7986	0.7536	1.3270		0
	10	0.6041	0.7969	0.7581	1.3190	52	50
	20	0.6065	0.7951	0.7627	1.3111		40
	30	0.6088	0.7934	0.7673	1.3032		30
	40	0.6111	0.7916	0.7720	1.2954		20
	50	0.6134	0.7898	0.7766	1.2876		10
38	0	0.6157	0.7880	0.7813	1.2799		0
	10	0.6180	0.7862	0.7860	1.2723	51	50
	20	0.6202	0.7844	0.7907	1.2647		40
	30	0.6225	0.7826	0.7954	1.2572		30
	40	0.6248	0.7808	0.8002	1.2497		20
	50	0.6271	0.7790	0.8050	1.2423		10
39	0	0.6293	0.7771	0.8098	1.2349		0
	10	0.6316	0.7753	0.8146	1.2276	50	50
	20	0.6338	0.7735	0.8195	1.2203		40
	30	0.6361	0.7716	0.8243	1.2131		30
	40	0.6383	0.7698	0.8292	1.2059		20
	50	0.6406	0.7679	0.8342	1.1988		10
40	0	0.6428	0.7660	0.8391	1.1918		0
	10	0.6450	0.7642	0.8441	1.1847	49	50
	20	0.6472	0.7623	0.8491	1.1778		40
	30	0.6494	0.7604	0.8541	1.1708		30
	40	0.6517	0.7585	0.8591	1.1640		20
	50	0.6539	0.7566	0.8642	1.1571		10
41	0	0.6561	0.7547	0.8693	1.1504		0
	10	0.6583	0.7528	0.8744	1.1436	48	50
	20	0.6604	0.7509	0.8796	1.1369		40
	30	0.6626	0.7490	0.8847	1.1303		30
	40	0.6648	0.7470	0.8899	1.1237		20
	50	0.6670	0.7451	0.8952	1.1171		10
42	0	0.6691	0.7431	0.9004	1.1106		0
	10	0.6713	0.7412	0.9057	1.1041	47	50
	20	0.6734	0.7392	0.9110	1.0977		40
	30	0.6756	0.7373	0.9163	1.0913		30
	40	0.6777	0.7353	0.9217	1.0850		20
	50	0.6799	0.7333	0.9271	1.0786		10
43	0	0.6820	0.7314	0.9325	1.0724		0
	10	0.6841	0.7294	0.9380	1.0661	46	50
	20	0.6862	0.7274	0.9435	1.0599		40
	30	0.6884	0.7254	0.9490	1.0538		30
	40	0.6905	0.7234	0.9545	1.0477		20
	50	0.6926	0.7214	0.9601	1.0416		10
44	0	0.6947	0.7193	0.9657	1.0355		0
	10	0.6967	0.7173	0.9713	1.0295	45	50
	20	0.6988	0.7153	0.9770	1.0235		40
	30	0.7009	0.7133	0.9827	1.0176		30
	40	0.7030	0.7112	0.9884	1.0117		20
	50	0.7050	0.7092	0.9942	1.0058		10
45	0	0.7071	0.7071	1.0000	1.0000		0
		cos θ Rad	sin θ Rad	cot θ Rad	tan θ Rad	Degrees	Deg
						Angle(θ)	

Tables for Comparison of Die Steel by Manufacturers

Category	JIS or equivalent	AISI or equivalent	Manufacturer								
			AICHI STEEL	SANYO SPECIAL STEEL	DAIDO STEEL	NIPPON KOSHUHA	HITACHI METALS	NACHI	RIKEN SEIKO	UDDEHOLM	BOHLER
Carbon tool steels	SK105	W1-10	SK3	QK3	YK3						K990
Alloy tool steel	SKS93		SK301	QK3M	YK30	K3M	YCS3				
	SKS3		SKS3	QKS3	GOA	KS3	SGT			ARNE	K460
	SKD1	D3	SKD1	QC1	DC1	KD1	CRD			SVERKER3	K100 K107
	SKD11	D2	SKD11	QC11	DC11	KD11	SLD	CDS11	RD11	SVERKER21 SVERKER SF	K105 K110
	SKD11		AUD15 AUD11	QCM8 QCH7	DC53	KD11S KD21	SLD8	MDS9		SLEIPNER	K340
	CrSKD		SXACE				ARK1				
	SKD12	A2	SKD12		DC12	KD12				RIGOR	K305
	Preharden 40HRC				GO40F	KAP65				IMPAX HH	
	Preharden 50HRC or more					RC55					
	Flame-hardened steel		SX105V SX4	QF3	GO5	FH5 KRCX	HMD5 HMD1			FERMO	
	Low temperature air-cooled steel		AKS3		GO4	KSM	ACD37				
	High-impact steel		AKS4	QF1	GS5	KTV5	YSM				K630
	Others		AUD11 SX5 SX44				SLD10 SLD-MAGIC	ICS22 MCR1		CALMAX CALDIE ELMAX VANCRON40 VANADIS4 VANADIS4E VANADIS6 VANADIS10 WEARTEC ROLTEC	K190 K390 K890
High-speed tool steel	SKH51	M2		QH51	MH51	H51	YXM1	SKH9	RHM1		S600
	SKH51										S705
	SKH55				MH55	HM35	YXM4	HM35 HS53M			
	SKH57				MH8	MV10	XVC5	HS93R HS98M FM38V			S700
	Matrix group			QHZ	DRM1 DRM2 DRM3	KMX1 KMX2 KMX3	YXR33 YXR3 YXR7	MDS1 MDS3 MDS7 MATRIX2 ATM3		CALDIE UNIMAX	W360
Powdered high-speed tool steel	SKH40				DEX40		HAP40	FAX38		ASP30	S590
	Matrix group				DEX-M1 DEX-M3		HAP5R				
	Others			SPM23 SPM30 SPM60 SPMR8	DEX20 DEX60		HAP10 HAP50 HAP72	FAX31 FAX55 FAXG1 FAXG2		ASP23 ASP60	S290 S390 S690 S790

〔Reference〕association special steels：table for comparison of die steel.

Table for Carbide Steel Grade〔Wear-resistant and Impact-resistant Tool〕

▶Table for wear-resistant and impact-resistant carbide steel

Using category mark		HRA	A.L.M.T Corp.	CHIYODA YANKIN	DIJET INDUSTRIAL	DIALLAY INDUSTRY	FUJI DICE	HITACHI TOOL	KANSAI CARBIDE	KOKUSAN GOKIN	KYORITSU GOKIN	KYOCERA	MAKOTOLOY	MITSUBISHI MATERIAL	MIZUHOLOY
Category	Symbol														
V	V10	89 or more	D10	TD10	D1	D1	D10 D20	WH10 WH20	UD25	G1	H1 G1 KD05		FD20	GTi05	G1
	V20	88 or more	D20	TD25	D2	D2	D40 D50 C50 G55	WH30	UD3	GH2	G2 KD10 A10W		GP30 GK30	GTi10 GTi15	G2
	V30	87 or more	D30	TD30	D3	D3	D60	WH40	UD4 UD5	GH3 GH4	G3 G4 KD20 MC30		GP50 GK50	GTi20	G3 G5A
	V40	85 or more	D50	TD40	G5 GD195	D4	C60 G65	WH50	UD6 UT13 UGM5	GH5 GH6	G5 TB6 KD40		GP60 GK60 GL60	GTi30	G5 G5C
	V50	83 or more	D60	TD50	MH3 MH4 GD174 GD201	D5	C70 C84 G70 G85	WH60	UD7 UG60 UGM6	GH7	TB7	VW50	GM60 GL70	GTi35 GTi30S GTi40	G6C G6
	V60	78 or more	D70 D80	TD60	MH5 MH7 MH8 GD206	D6	C95	WB60	UT24 UG70 UGM7		G8		GM80 GL80 GM90 GL90	GTi40S GTi50S	G7 G8M

Using category mark		Hardness HRA	NIHON HARD METAL	NIPPON TUNGSTEN	NIPPON TOKUSHU GOKIN	SANALLOY	SANALLOY INDUSTRY	SANWALOY	SUMITOMO HARDMETAL	TOHO KINZOKU	TOKAI GOKIN	TOSHIBA TUNGALOY	TOYO KOHAN	GUHRING	CERATIZIT
Category	Symbol														
V	V10	89 or more	G1	G1	G2	DA20 DA25	DA10 DA20 DA25	H10 D10	D1	G1 G2	H1 G15	D10	D05 D10	DG100 DG150F	GC10
	V20	88 or more	G2	G2	G3	DA30 VA30	DA30 VA30	D20	D2	G3	G2 GF05 GF10 RA30	D20 D25	D20	DG200	GC20
	V30	87 or more	G3	G3 G20	G4 HN1	DA50 VA40	DA50 VA40	D30	D3 ED30	G4	G3 G4 GF20	D30	D30	DG300	GC30
	V40	85 or more	G5	G30 G40	G5	DA60 EA50 VA50	DA60 VA50 EA50	D40	G5 ED50	G5	G5 G6 GF40	D40	D40	DG400	GC40
	V50	83 or more		G50 G60	G6 G7	EA60 VA60 EA70 VA70	VA60 VA70 EA60 EA70	D50 D60 KG6	G6	G6	G7 G72	D50	D50	DG550	GC50 GC55
	V60	78 or more		G80 SD1	G8	EA80 EA90 VA80	VA80 EA80 EA90	D70 D80 KG7	G7 G8	G7	G8	D60	D60 D70	DG550	GC60 GC62 GC65

▶Table for ultralloy micro alloy for wear-resistant and impact-resistant tools

Using category mark		HRA	DIJET INDUSTRIAL	DIALLOY INDUSTRY	FUJI DICE	HITACHI TOOL	KANSAI CARBIDE	KOKU SAN GOKIN	KYORITSU GOKIN	MAKOTOLOY	MITSUBISHI MATERIAL	SANALLOY	NIPPON TOKUSHU GOKIN	NIPPON TUNGSTEN	SANALLOY	SANALLOY INDUSTRY	SUNITOMO HARDMETAL	TOHO KINZOKU	CERATIZIT	NIHON HARD METAL
Category	Symbol																			
V	V10	89 or more	FB01 FB10 FZ05	A10	F08 F10 F20 M10	FM10	UF05		EF05 EF10	ZF10	UF20	G2F MX01	ZN01	FN10 FN20			F0 SF1 ED10 AFU	MG25		G1
	V20	88 or more	FB20 FZ15			NM25 NM40		GF3 SF3	EF20	ZF10	UF30		ZN15	FN30 SF30	FD25	FD25	AF0 AF1	MG25	TSM20	G2
	V30	87 or more	FZ25				UF20							FN40	FD15	FD15	A1 CC	MG30	TSM30	G3
	V40	85 or more						GF6 SF6						SF50	FD50				TSM40	G5
	V50	83 or more										G6F								

〔Reference〕carbide alloy tool association：carbide alloy tool manuals.

Steel Code and Chemical Composition

Carbon Tool Steels／Alloy Tool Steels

—Excerpt from JIS G 4401（2000）/4404（2000）—

▶Carbon tool steels　Unit：%

Code	ISO Symbol	Chemical composition C	Si	Mn	P	S	Application（Reference）
SK140（SK1）	—	1.30～1.50	0.10～0.35	0.10～0.50	0.030 or less	0.030 or less	File, sand paper
SK120（SK2）	TC120	1.15～1.25	0.10～0.35	0.10～0.50	0.030 or less	0.030 or less	Jackbit, small punch, hand file, cutting-tool, hand saws, razor,spring
SK105（SK3）	TC105	1.00～1.10	0.10～0.35	0.10～0.50	0.030 or less	0.030 or less	Hand saws, gauge,cutting-tool, spring, die, workpiece holder, steel chisel
SK95（SK4）	—	0.90～1.00	0.10～0.35	0.10～0.50	0.030 or less	0.030 or less	Wood drill,chopper, steel chisel, spring, pen point, die, gauge, sewing needle
SK90	TC90	0.85～0.95	0.10～0.35	0.10～0.50	0.030 or less	0.030 or less	Die, gauge, spring, needle
SK85（SK5）	—	0.80～0.90	0.10～0.35	0.10～0.50	0.030 or less	0.030 or less	Steel seal, die, spring, band saw, workpiece holder, cutting-tool, disc saw, gauge, needle
SK80	TC80	0.75～0.85	0.10～0.35	0.10～0.50	0.030 or less	0.030 or less	Steel seal, die, spring
SK75（SK6）	—	0.70～0.80	0.10～0.35	0.10～0.50	0.030 or less	0.030 or less	Steel seal, die, spring, snap ring, disc saw
SK70	TC70	0.65～0.75	0.10～0.35	0.10～0.50	0.030 or less	0.030 or less	Steel seal, die, spring, snap ring
SK65（SK7）	—	0.60～0.70	0.10～0.35	0.10～0.50	0.030 or less	0.030 or less	Steel seal, die spring, snap ring
SK60	—	0.55～0.65	0.10～0.35	0.10～0.50	0.030 or less	0.030 or less	Steel seal, die, snap ring

⚠ Impurity in each steel grade should not be over the following value：Cu 0.25%, Cr 0.30%, Ni 0.25%.
⚠ 1. SK75 and SK65 may be removed 5 years later during revision.
2. Brackets（SK＊＊）is for the old JIS steel grade, TC＊＊ is for ISO/FDIS 4957：1998 standard steel grade 1998.

▶Alloy tool steels—Cutting-tool steel　Unit：%

Code	Chemical composition C	Si	Mn	P	S	Ni	Cr	W	V	Application（Reference）
SKS11	1.20～1.30	0.50 or less	0.50 or less	0.030 or less	0.030 or less	—	0.20～0.50	3.00～4.00	0.10～0.30	Lathe tool, cold-drawing die, center drill
SKS2	1.00～1.10	0.35 or less	0.80 or less	0.030 or less	0.030 or less	—	0.50～1.00	1.00～1.50	（1）	Screw tap, aiguille, facing cutter, die, thread-rolled die
SKS21	1.00～1.10	0.35 or less	0.50 or less	0.030 or less	0.030 or less	—	0.20～0.50	0.50～1.00	0.10～0.25	
SKS5	0.75～0.85	0.35 or less	0.50 or less	0.030 or less	0.030 or less	0.70～1.30	0.20～0.50	—	—	Disc saw, band saw
SKS51	0.75～0.85	0.35 or less	0.50 or less	0.030 or less	0.030 or less	1.30～2.00	0.20～0.50	—	—	
SKS7	1.10～1.20	0.35 or less	0.50 or less	0.030 or less	0.030 or less	—	0.20～0.50	2.00～2.50	（1）	Hand saw
SKS81	1.10～1.30	0.35 or less	0.50 or less	0.030 or less	0.030 or less	—	0.20～0.50	—	—	Blade, cutting tool, hand saw
SKS8	1.30～1.50	0.35 or less	0.50 or less	0.030 or less	0.030 or less	—	0.20～0.50	—	—	File, needle file

⚠（1）Less than 0.20% vanadium is allowed to be added in SKS2 and SKS7.
⚠ Impurity Ni should not exceed 0.25%（except SKS5 and SKS51）and impurity Cu should not exceed 0.25% in each steel grade.

▶Alloy tool steels—Impact-resistant tool steel　Unit：%

Code	Chemical composition C	Si	Mn	P	S	Ni	Cr	W	V	Application（Reference）
SKS4	0.45～0.55	0.35 or less	0.50 or less	0.030 or less	0.030 or less	—	0.50～1.00	0.50～1.00	—	Steel chisel, punch, shears edge
SKS41	0.35～0.45	0.35 or less	0.50 or less	0.030 or less	0.030 or less	—	1.00～1.50	2.50～3.50	—	
SKS43	1.00～1.10	0.10～0.30	0.10～0.40	0.030 or less	0.030 or less	—	—	—	0.10～0.20	Gadder piston, heading set
SKS44	0.80～0.90	0.25 or less	0.30 or less	0.030 or less	0.030 or less	—	—	—	0.10～0.25	Steel chisel, heading set

⚠ Impurity Ni, Cu should not exceed 0.25% in all steel grades.
⚠ Impurity Cr should not exceed 0.20% in SKS43 and SKS44.

Steel Code and Chemical Composition

Alloy tool Steels／High-speed Steels

—Excerpt from JIS G 4403（2000）—

▶Alloy tool steels—cold working tool steel　Unit：%

Code	Chemical composition C	Si	Mn	P	S	Cr	Mo	W	V	Application（Reference）
SKS3	0.90～1.00	0.35 or less	0.90～1.20	0.030 or less	0.030 or less	0.50～1.00	—	0.50～1.00	—	Gauge, shears edge, thread-rolled die
SKS31	0.95～1.05	0.35 or less	0.90～1.20	0.030 or less	0.030 or less	0.80～1.20	—	1.00～1.50	—	Gauge, thread-rolled die
SKS93	1.00～1.10	0.50 or less	0.80～1.10	0.030 or less	0.030 or less	0.20～0.60	—	—	—	Shears edge, gauge, die
SKS94	0.90～1.00	0.50 or less	0.80～1.10	0.030 or less	0.030 or less	0.20～0.60	—	—	—	
SKS95	0.80～0.90	0.50 or less	0.80～1.10	0.030 or less	0.030 or less	0.20～0.60	—	—	—	
SKD1	1.90～2.20	0.10～0.60	0.20～0.60	0.030 or less	0.030 or less	11.00～13.00	—	—	（2）	Drawbench die, die, stock die, powder mold
SKD2	2.00～2.30	0.10～0.40	0.30～0.60	0.030 or less	0.030 or less	11.00～13.00	—	0.60～0.80	—	
SKD10	1.45～1.60	0.10～0.60	0.20～0.60	0.030 or less	0.030 or less	11.00～13.00	0.70～1.00	—	0.70～1.00	
SKD11	1.40～1.60	0.40 or less	0.60 or less	0.030 or less	0.030 or less	11.00～13.00	0.80～1.20	—	0.20～0.50	Gauge, thread-rolled die, cutting tool, forming roller
SKD12	0.95～1.05	0.10～0.40	0.40～0.80	0.030 or less	0.030 or less	4.80～5.50	0.90～1.20	—	0.15～0.35	

⚠（2）Less than 0.30% vanadium can be added in for SKD1.

▶Alloy tool steels—hot die steel　Unit：%

Code	Chemical composition C	Si	Mn	P	S	Ni	Cr	Mo	W	V	Co	Application（Reference）
SKD4	0.25～0.35	0.40 or less	0.60 or less	0.030 or less	0.020 or less	—	2.00～3.00	—	5.00～6.00	0.30～0.50	—	Die, casting die, extrusion die, shears edge
SKD5	0.25～0.35	0.10～0.40	0.15～0.45	0.030 or less	0.020 or less	—	2.50～3.20	—	8.50～9.50	0.30～0.50	—	
SKD6	0.32～0.42	0.80～1.20	0.50 or less	0.030 or less	0.020 or less	—	4.50～5.50	1.00～1.50	—	0.30～0.50	—	
SKD61	0.35～0.42	0.80～1.20	0.25～0.50	0.030 or less	0.020 or less	—	4.80～5.50	1.00～1.50	—	0.80～1.15	—	
SKD62	0.32～0.40	0.80～1.20	0.20～0.50	0.030 or less	0.020 or less	—	4.75～5.50	1.00～1.60	1.00～1.60	0.20～0.50	—	Die, extrusion die
SKD7	0.28～0.35	0.10～0.40	0.15～0.45	0.030 or less	0.020 or less	—	2.70～3.20	2.50～3.00	—	0.40～0.70	—	
SKD8	0.35～0.45	0.15～0.50	0.20～0.50	0.030 or less	0.020 or less	—	4.00～4.70	0.30～0.50	3.80～4.50	1.70～2.10	4.00～4.50	Die, casting die, extrusion die
SKT3	0.50～0.60	0.35 or less	0.60 or less	0.030 or less	0.020 or less	0.25～0.60	0.90～1.20	0.30～0.50	—	（3）	—	Casting die, die, extrusion die
SKT4	0.50～0.60	0.10～0.40	0.60～0.90	0.030 or less	0.020 or less	1.50～1.80	0.80～1.20	0.35～0.55	—	0.05～0.15	—	
SKT6	0.40～0.50	0.10～0.40	0.20～0.50	0.030 or less	0.020 or less	3.80～4.30	1.20～1.50	0.15～0.35	—	—	—	

⚠（3）Less than 0.20% vanadium can be added in for SKT3.

▶High-speed tool steel　Unit：%

Code	Chemical composition C	Si	Mn	P	S	Ni	Cr	Mo	W	V	Co	Application（Reference）
SKH2	0.73～0.83	0.45 or less	0.40 or less	0.030 or less	0.030 or less	—	3.80～4.50	—	17.20～18.70	1.00～1.20	—	Various tools for ordinary cutting
SKH3	0.73～0.83	0.45 or less	0.40 or less	0.030 or less	0.030 or less	—	3.80～4.50	—	17.00～19.00	0.80～1.20	4.50～5.50	Various tools for high-speed & heavy cutting
SKH4	0.73～0.83	0.45 or less	0.40 or less	0.030 or less	0.030 or less	—	3.80～4.50	—	17.00～19.00	1.00～1.50	9.00～11.00	Various tools for hard-cutting material
SKH10	1.45～1.60	0.45 or less	0.40 or less	0.030 or less	0.030 or less	—	3.80～4.50	—	11.50～13.50	4.20～5.20	4.20～5.20	Various tools for extreme hard-cutting material
SKH40	1.23～1.33	0.45 or less	0.40 or less	0.030 or less	0.030 or less	—	3.80～4.50	4.70～5.30	5.70～6.70	2.70～3.20	8.00～8.80	
SKH50	0.77～0.87	0.70 or less	0.45 or less	0.030 or less	0.030 or less	—	3.50～4.50	8.00～9.00	1.40～2.00	1.00～1.40	—	
SKH51	0.80～0.88	0.45 or less	0.40 or less	0.030 or less	0.030 or less	—	3.80～4.50	4.70～5.20	5.90～6.70	1.70～2.10	—	Various tools for ordinary cutting with certain tenacity
SKH52	1.00～1.10	0.45 or less	0.40 or less	0.030 or less	0.030 or less	—	3.80～4.50	5.50～6.50	5.90～6.70	2.30～2.60	—	Various tools for high rigidity material cutting with high tenacity
SKH53	1.15～1.25	0.45 or less	0.40 or less	0.030 or less	0.030 or less	—	3.80～4.50	4.70～5.20	5.90～6.70	2.70～3.20	—	
SKH54	1.25～1.40	0.45 or less	0.40 or less	0.030 or less	0.030 or less	—	3.80～4.50	4.20～5.00	5.20～6.00	3.70～4.20	—	
SKH55	0.87～0.95	0.45 or less	0.40 or less	0.030 or less	0.030 or less	—	3.80～4.50	4.70～5.20	5.90～6.70	1.70～2.10	4.50～5.00	Various tools for high-speed and heavy cutting with high tenacity
SKH56	0.85～0.95	0.45 or less	0.40 or less	0.030 or less	0.030 or less	—	3.80～4.50	4.70～5.20	5.90～6.70	1.70～2.10	7.00～9.00	
SKH57	1.20～1.35	0.45 or less	0.40 or less	0.030 or less	0.030 or less	—	3.80～4.50	3.20～3.90	9.00～10.00	3.00～3.50	9.50～10.50	
SKH58	0.95～1.05	0.70 or less	0.40 or less	0.030 or less	0.030 or less	—	3.50～4.50	8.20～9.20	1.50～2.10	1.70～2.20	—	Various tools for ordinary cutting with certain tenacity
SKH59	1.05～1.15	0.70 or less	0.40 or less	0.030 or less	0.030 or less	—	3.50～4.50	9.00～10.00	1.20～1.90	0.90～1.30	7.50～8.50	Various tools for high-speed &heavy cutting with high tenacity

⚠ Impurity of Cu should not exceed 0.25% in each steel grade.

Tables for Comparisons of Materials between JIS and Foreign Standards (1)

—Excerpt from JIS manual—

This table is used as standard and embodies foreign standards which is similar to JIS, all the indicating contents are based on relevant standards. For details, please refer to relevant standards.
The foreign standard symbols involved in this table are as follow:

I S O：International Organization for Standardization
A I S I：American Iron and Steel Institute
ASTM：American Society of Testing Materials
S A E：Society of Automotive Engineers
U N S：Unified Numbering System
B S：British Standards
D I N：Deutsches Institut für Normung
VDEh：Verein Deutscher Eisenhuettenleute (German Iron and Steel Institute)
N F：Norme Française French Standard
Г OCT：National Standards of Former USSR OCT

▶Tool steel

Japan industrial standards		Steel types related to foreign standards					
Standard number・Name	Symbol	International standard ISO	USA AISI / ASTM	UK BS	Germany DIN / VDEh	France NF	Russia (Former USSR) Г OCT
JIS G 4401 Carbon tool steel	SK140 (旧SK1)	TC 140	—	—	—	C 140E 3U	Y13
	SK120 (旧SK2)	TC 120	W 1-11 1/2	—	—	C 120E 3U	Y12
	SK105 (旧SK3)	TC 105	W 1-10	—	C105W1	C 105E 2U	Y11
	SK95 (旧SK4)	TC 90	W 1-9	—	—	C 90E 2U	Y10
	SK85 (旧SK5)	TC 90 TC 80	W 1-8	—	C80W1	C 90E 2U C 80E 2U	Y8 Г Y9
	SK75 (旧SK6)	TC 80 TC 70	—	—	C80W1	C 80E 2U C 70E 2U	Y8
	SK65 (旧SK7)	—	—	—	C70W2	C 70E 2U	Y7
JIS G 4403 High speed tool steel	SKH2	HS 18-0-1	T 1	BT 1	—	HS 18-0-1	P18
	SKH3	HS 18-1-1-5	T 4	BT 4	S 18-1-2-5	HS 18-1-1-5	—
	SKH4	HS 18-0-1-10	T 5	BT 5	—	HS 18-0-2-9	—
	SKH10	HS 12-1-5-5	T 15	BT 15	S12-1-4-5	HS 12-1-5-5	—
	SKH51	HS 6-5-2	M 2	BM 2	S 6-5-2	HS 6-5-2	—
	SKH52	—	M 3-1	—	—	—	—
	SKH53	HS 6-5-3	M 3-2	—	S 6-5-3	HS 6-5-3	—
	SKH54	—	M 4	BM 4	—	HS 6-5-4	—
	SKH55	HS 6-5-2-5	—	BM 35	S 6-5-2-5	HS 6-5-2-5 HC	P6M5K5
	SKH56	—	M 36	—	—	—	—
	SKH57	HS 10-4-3-10	—	BT 42	S10-4-3-10	HS 10-4-3-10	—
	SKH58	HS 2-9-2	M 7	—	—	HS 2-9-2	—
	SKH59	HS 2-9-1-8	M 42	BM 42	S 2-10-1-8	HS 2-9-1-8	—
JIS G 4404 Alloy tool steel	SKS11	—	F 2	—	—	—	XB4
	SKS2	105WCr1	—	—	105WCr 6	105WCr 5	XB Г
	SKS21	—	—	—	—	—	—
	SKS5	—	—	—	—	—	—
	SKS51	—	L 6	—	—	—	—
	SKS7	—	—	—	—	—	—
	SKS8	—	—	—	—	Y2140C	13X
	SKS4	—	—	—	—	—	—
	SKS41	—	—	—	—	—	—
	SKS43	TCV105	W 2-9 1/2	BW 2	—	100V2	—
	SKS44	—	WZ-8 1/2	—	—	—	—
	SKS3	—	—	—	—	—	9XB Г
	SKS31	105WCr1	—	—	105WCr 6	105WCr 5	XB Г
	SKS93	—	—	—	—	—	—
	SKS94	—	—	—	—	—	—
	SKS95	—	—	—	—	—	—
	SKD1	210Cr12	D 3	BD 3	X210Cr12	X200Cr12	X12
	SKD11	—	D 2	BD 2	—	X160CrMoV12	—
	SKD12	100CrMoV 5	A 2	BA 2	—	X100CrMoV 5	—
	SKD4	30WCrV 5	—	—	—	X32WCrV 3	—
	SKD5	30WCrV 9	H 21	BH 21	—	X30WCrV 9	—
	SKD6	—	H 11	BH 11	X38CrMoV51	X38CrMoV 5	4X5MΦC
	SKD61	40CrMoV 5	H 13	BH 13	X40CrMoV51	X40CrMoV 5	4X5MΦ1C
	SKD62	—	H 12	BH 12	—	X35CrWMoV 5	3X3M3Φ
	SKD7	30CrMoV 3	H 10	BH 10	X32CrMoV33	32CrMoV12-28	—
	SKD8	—	H 19	BH 19	—	—	—
	SKT3	—	—	—	—	55CrNiMoV 4	—
	SKT4	55NiCrMoV 2	—	BH 224/5	55NiCrMoV6	55NiCrMoV 7	5XHM

▶Carbon steel・alloy steel for machine structural use (1)

Japan industrial standards		Steel types related to foreign standards					
Standard number・Name	Symbol	International standard ISO	USA AISI / SAE	UK BS	Germany DIN	France NF	Russia (Former USSR) Г OCT
		ISO683-1,10,11(5)	—	BS 970 Part1,3 BS EN 10083-1,2	DIN EN 10084 DIN EN 10083-1,2	NF A35-551 NF EN 10083-1,2	Г OCT4543
JIS G 4051 Carbon steel for machine structural use	S10C	C10	1010	040A10 045A10 045M10	C10E C10R	XC10	—
	S12C	—	1012	040A12	—	XC12	—
	S15C	C15E4 C15M2	1015	055M15	C15E C15R	—	—
	S17C	—	1017	—	—	XC18	—
	S20C	—	1020	070M20 C22 C22E C22R	C22 C22E C22R	C22 C22E C22R	—
	S22C	—	1023	—	—	—	—
	S25C	C25 C25E4 C25M2	1025	C25 C25E C25R	C25 C25E C25R	C25 C25E C25R	—
	S28C	—	1029	—	—	—	25 Г
	S30C	C30 C30E4 C30M2	1030	080A30 080M30 C30 C30E C30R	C30 C30E C30R	C30 C30E C30R	30 Г
	S33C	—	—	—	—	—	30 Г
	S35C	C35 C35E4 C35M2	1035	C35 C35E C35R	C35 C35E C35R	C35 C35E C35R	35 Г
	S38C	—	1038	—	—	—	35 Г
	S40C	C40 C40E4 C40M2	1039 1040	080M40 C40 C40E C40R	C40 C40E C40R	C40 C40E C40R	40 Г
	S43C	—	1042 1043	080A42	—	—	40 Г
	S45C	C45 C45E4 C45M2	1045 1046	C45 C45E C45R	C45 C45E C45R	C45 C45E C45R	45 Г
	S48C	—	—	080A47	—	—	45 Г
	S50C	C50 C50E4 C50M2	1049	080M50 C50 C50E C50R	C50 C50E C50R	C50 C50E C50R	50 Г
	S53C	—	1050 1053	—	—	—	50 Г
	S55C	C55 C55E4 C55M2	1055	070M55 C55 C55E C55R	C55 C55E C55R	C55 C55E C55R	—
	S58C	C60 C60E4 C60M2	1059 1060	C60 C60E C60R	C60 C60E C60R	C60 C60E C60R	60 Г
	S09CK	—	—	045A10 045M10	C10E	XC10	—
	S15CK	—	—	—	C15E	XC12	—
	S20CK	—	—	—	—	XC18	—
JIS G 4102 Nickel chromium steel	SCN236	—	—	—	—	—	40XH
	SCN415	—	—	—	—	—	—
	SCN631	—	—	—	—	—	30XH3A
	SCN815	15NiCr13	—	655M13	15NiCr13	—	—
	SCN836	—	—	—	—	—	—
JIS G 4103 Nickel chrome molybdenum	SNCM220	20NiCrMo2 20NiCrMoS2	8615 8617 8620 8622	805A20 805M20 805A22 805M22	20NiCrMo2 20NiCrMoS2	20NCD2	—
	SNCM240	41CrNiMo2 41CrNiMoS2	8637 8640	—	—	—	—
	SNCM415	—	—	—	—	—	—
	SNCM420	—	4320	—	—	—	20XH2M
	SNCM431	—	—	—	—	—	—
	SNCM439	—	4340	—	—	—	—
	SNCM447	—	—	—	—	—	—
	SNCM616	—	—	—	—	—	—
	SNCM625	—	—	—	—	—	—
	SNCM630	—	—	—	—	—	—
	SNCM815	—	—	—	—	—	—

⚠ (5) JIS G 7501, G 7502, G 7503 is translation version.

Tables for Comparisons of Materials between JIS and Foreign Standards (2)

—Excerpt from JIS manual—

▶Carbon steel・alloy steel for machine structural use(2)

Japan industrial standards		Steel types related to foreign standards					
Standard number・Name	Symbol	International standard ISO	USA AISI / SAE	UK BS	Germany DIN	France NF	Russia(Former USSR) ГОСТ
		ISO683-1,10,11(5)	–	BS 970 Part1,3 BS EN 10083-1,2	DIN EN 10084 DIN EN 10083-1,2	NF A35-551 NF EN 10083-1,2	ГОСТ4543
JIS G 4104 Chrome steel	SCr415	—	—	—	17Cr3 17CrS3	—	15X 15XA
	SCr420	20Cr4 20CrS4	5120	—	—	—	20X
	SCr430	34Cr4 34CrS4	5130 5132	34Cr4 34CrS4	34Cr4 34CrS4	34Cr4 34CrS4	30X
	SCr435	34Cr4 34CrS4 37Cr4 37CrS4	5132	37Cr4 37CrS4	37Cr4 37CrS4	37Cr4 37CrS4	35X
	SCr440	37Cr4 37CrS4 41Cr4 41CrS4	5140	530M40 41Cr4 41CrS4	41Cr4 41CrS4	41Cr4 41CrS4	40X
	SCr445	—	—	—	—	—	45X
JIS G 4105 Chrome molybdenum steel	SCM415	—	—	—	—	—	—
	SCM418	18CrMo4 18CrMoS4	—	—	18CrMo4 18CrMoS4	—	20XM
	SCM420	—	—	708M20	—	—	20XM
	SCM421	—	—	—	—	—	—
	SCM430	—	4131	—	—	—	30XM 30XMA
	SCM432	—	—	—	—	—	—
	SCM435	34CrMo4 34CrMoS4	4137	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	35XM
	SCM440	42CrMo4 42CrMoS4	4140 4142	708M40 709M40 42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	—
	SCM445	—	4145 4147	—	—	—	—
	SCM822	—	—	—	—	—	—
JIS G 4106 Structural manganese steel for machine structural use and manganese chrome steel	SMn420	22Mn6	1522	150M19	—	—	—
	SMn433	—	1534	150M36	—	—	30Г2 35Г2
	SMn438	36Mn6	1541	150M36	—	—	35Г2 40Г2
	SMn443	42Mn6	1541	—	—	—	40Г2 45Г2
	SMnC420	—	—	—	—	—	
	SMnC443	—	—	—	—	—	—
JIS G 4202 Nickel chrome molybdenum	SACM645	41CrAlMo74	—	—	—	—	—
JIS G 4052 Structural steel with guaranteed hardenability (H shape steel)	SMn420H	22Mn6	1522H	—	—	—	—
	SMn433H	—	—	—	—	—	—
	SMn438H	36Mn6	1541H	—	—	—	—
	SMn443H	42Mn6	1541H	—	—	—	—
	SMnC420H	—	—	—	—	—	—
	SMnC443H	—	—	—	—	—	—
	SCr415H	—	—	—	17Cr3 17CrS3	—	15X
	SCr420H	20Cr4 20CrS4	5120H	—	—	—	20X
	SCr430H	34Cr4 34CrS4	5130H 5132H	34Cr4 34CrS4	34Cr4 34CrS4	34Cr4 34CrS4	30X
	SCr435H	34Cr4 34CrS4 37Cr4 37CrS4	5135H	37Cr4 37CrS4	37Cr4 37CrS4	37Cr4 37CrS4	35X
	SCr440H	37Cr4 37CrS4 41Cr4 41CrS4	5140H	41Cr4 41CrS4	41Cr4 41CrS4	41Cr4 41CrS4	40X

⚠ (5)JIS G 7501, G 7502, G 7503 is translation version.

▶Carbon steel・alloy steel for machine structural use(3)

Japan industrial standards		Steel types related to foreign standards					
Standard number・Name	Symbol	International standard ISO	USA AISI / SAE	UK BS	Germany DIN	France NF	Russia(Former USSR) ГОСТ
		ISO683-1,10,11(5)	–	BS 970 Part1,3 BS EN 10083-1,2	DIN EN 10084 DIN EN 10083-1,2	NF A35-551 NF EN 10083-1,2	ГОСТ4543
JIS G 4052 Struetual steel with guaranteed hardenability (H shape steel)	SCM415H	—	—	—	—	—	—
	SCM418H	18CrMo4 18CrMoS4	—	—	18CrMo4 18CrMoS4	—	—
	SCM420H	—	—	708H20	—	—	—
	SCM435H	34CrMo4 34CrMoS4	4135H 4137H	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	—
	SCM440H	42CrMo4 42CrMoS4	4140H 4142H	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	—
	SCM445H	—	4145H 4147H	—	—	—	—
	SCM822H	—	—	—	—	—	—
	SNC415H	—	—	—	—	—	—
	SNC631H	—	—	—	—	—	—
	SNC815H	15NiCr13	—	655H13	15NiCr13	—	—
	SNCM220H	20NiCrMo2 20NiCrMoS2	8617H 8620H 8622H	805H17 805H20 805H22	—	20NCD2	—
	SNCM420H	—	4320H	—	—	—	—
JIS G 4107 High-temperature alloy steel for bolts	SNB5	—	501	—	—	—	—
	SNB7	42CrMo4 42CrMoS4	4140 4142 4145	708M40 709M40 42CrMo4(1)	42CrMo4(2)	42CrMo4(4)	—
	SNB16	—	—	40CrMoV4-6(1)	40CrMoV47(3)	40CrMoV4-6(4)	—
JIS G 4108 Steel bar for special-purpose alloy steel bolt	SNB21-1～5	42CrMo4 42CrMoS4	4142H	—	42CrMo4(2)	—	—
	SNB22-1～5						
	SNB23-1～5	—	E4340H	—	—	—	—
	SNB24-1～5	—	4340	—	—	—	—

⚠ (1) BS EN 10269 (2) DIN 1654 Part4 (3) DIN 17240 (4) NF EN 10269 (5) JIS G 7501,G 7502,G 7503 translated edition.

▶Spring steel

Japan industrial standards		Steel types related to foreign standards					
Standard number・Name	Symbol	International standard ISO	USA AISI / SAE	UK BS	Germany DIN	France NF	Russia(Former USSR) ГОСТ
JIS G 4801 Spring steel	SUP3	—	1078	—	—	—	75 85 80
	SUP6	59Si7	—	—	—	RH388	60C2
	SUP7	59Si7	9260	—	—	—	60C2Г
	SUP9	55Cr3	5155	—	55Cr3	55C3	—
	SUP9A	—	5160	—	—	—	—
	SUP10	51CrV4	6150	735A51,735H51	50CrV4	50CV4	ХФА50ХГФА
	SUP11A	60CrB3	51B60	—	—	—	50ХГР
	SUP12	55SiCr63	9254	685A57,685H57	54SiCr6	—	—
	SUP13	60CrMo33	4164	705A60,705H60	—	—	—

▶Free cutting steel

Japan industrial standards		Steel types related to foreign standards					
Standard number・Name	Symbol	International standard ISO	USA AISI / SAE	UK BS	Germany DIN	France NF	Russia(Former USSR) ГОСТ
JIS G 4804 Sulfur and sulfur combined free cutting steel	SUM11	—	1110	—	—	—	—
	SUM12	—	1109	—	—	—	—
	SUM21	9S20	1212	—	—	—	—
	SUM22	11S Mn28	1213	220M07,230M07	9S Mn28	S250	—
	SUM22L	11S Mn Pb28	12L13	—	9S Mn Pb28	S250 Pb	—
	SUM23	—	1215	—	—	—	—
	SUM23L	—	12L15	—	—	—	—
	SUM24L	11S Mn Pb28	12L14	—	9S Mn Pb28	S250 Pb	—
	SUM25	12S Mn35	—	—	9S Mn36	S300	—
	SUM31	—	1117	—	15S10	—	—
	SUM31L	—	11L17	—	—	—	—
	SUM32	—	—	—	—	13MF14	—
	SUM41	—	1137	—	—	35MF6	—
	SUM42	—	1141	—	—	45MF6.1	—
	SUM43	44S Mn28	1144	226M44	—	45MF6.3	—

▶Bearing steel

Japan industrial standards		Steel types related to foreign standards					
Standard number・Name	Symbol	International standard ISO	USA AISI / SAE	UK BS	Germany DIN	France NF	Russia(old sovied Russia) ГОСТ
JIS G 4805 High-carbon chrome bearing steel	SUJ1	—	51100	—	—	—	—
	SUJ2	B1	52100	—	100Cr 6	100Cr 6	Щ Х15
	SUJ3	B2	ASTM A485 Grade 1	—	—	—	—
	SUJ4	—	—	—	—	—	—
	SUJ5	—	—	—	—	—	—

Tables for Comparisons of Materials between JIS and Foreign Standards (3)

—Excerpt from JIS manual—

▶Stainless steel(1)

Japan industrial standards		Steel types related to foreign standards									
Standard number・Name	Symbol	International standard ISO	USA UNS	USA AISI	European standards EN Kind	European standards EN Serial No.	UK BS	Germany DIN	France NF	Russia(Former USSR) ГОСТ
JIS G 4303 Stainless steel bar	SUS 201	○	S20100	201	X12CrMnNiN17-7-5	1.4372	—	—	Z12CMN17-07Az	—
	SUS 202	—	S20200	202	X12CrMnNiN18-9-5	1.4373	284S16	—	—	12Х17Г9АН4
	SUS 301	○	S30100	301	X5CrNi17-7	1.4319	301S21	X12CrNi17-7	Z11CN17-08	07Х16Н6
	SUS 301L	○	—	—	X2CrNiN18-7	1.4318	—	X2CrNiN18-7	—	—
JIS G 4304 Hot-rolled plate and band	SUS 301J1	—	—	—	—	—	—	X12CrNi17-7	—	—
	SUS 302	—	S30200	302	—	—	302S25	—	Z12CN18-09	12Х18Н10
	SUS 302B	—	S30215	302B	—	—	—	—	—	—
	SUS 303	○	S30300	303	X8CrNiS18-9	1.4305	303S21	X10CrNiS18-9	Z8CNF18-09	—
	SUS 303Se	—	S30323	303Se	—	—	303S41	—	—	12Х18Н10Е
JIS G 4305 Cold-rolled stainless steel and steel plate	SUS 303Cu	—	—	—	—	—	—	—	—	—
	SUS 304	○	S30400	304	X5CrNi18-10	1.4301	304S31	X5CrNi18-10	Z7CN18-09	08Х18Н10
	SUS 304L	○	S30403	304L	X2CrNi19-11	1.4307	304S11	X2CrNi19-11	Z3CN19-11	03Х18Н11
	SUS 304 N 1	○	S30451	304N	X2CrNi18-9	1.4306	—	—	Z6CN19-09Az	—
	SUS 304N2	—	S30452	—	—	—	—	—	—	—
JIS G 4308 Wire stainless steel	SUS 304LN	○	S30453	304LN	X2CrNiN18-10	1.4311	—	X2CrNiN18-10	Z3CN18-10Az	—
	SUS 304J1	—	—	—	—	—	—	—	—	—
	SUS 304J2	—	—	—	—	—	—	—	—	—
	SUS 304J3	—	S30431	30431	—	—	—	—	—	—
JIS G 4309 Wire stainless steel	SUS 305	○	S30500	305	X4CrNi18-12	1.4303	305S19	X5CrNi18-12	Z8CN18-12	06Х18Н11
	SUS 305J1	—	—	—	—	—	—	—	—	—
	SUS 309S	—	S30908	309S	—	—	—	—	Z10CN24-13	—
	SUS 310S	—	S31008	310S	X6CrNi25-20	—	310S31	—	Z8CN25-20	10Х23Н18
JIS G 4313 Wire stainless steel for spring	SUS 315J1	—	—	—	—	—	—	—	—	—
	SUS 315J2	—	—	—	—	—	—	—	—	—
	SUS 316	○	S31600	316	X4CrNiMo17-12-2	1.4401	316S31	X5CrNiMo17-12-2	Z7CND17-12-02	—
	SUS 316F	○	—	—	X4CrNiMo17-13-3	1.4436	—	X5CrNiMo17-13-3	Z6CND18-12-03	—
JIS G 4314 Band for spring	SUS 316L	○	S31603	316L	X2CrNiMo17-12-2 X2CrNiMo17-13-3 X2CrNiMo18-14-3	1.4404 1.4432 1.4435	316S11	X2CrNiMo17-13-2 X2CrNiMo17-14-3	Z3CND17-12-02 Z3CND17-13-03	03Х17Н14М3
	SUS 316N	—	S31651	316N	—	—	—	—	—	—
JIS G 4315 Wires for cold forging	SUS 316LN	○	S31653	316LN	X2CrNiMoN17-11-2 X2CrNiMoN17-13-3	1.4406 1.4429	—	X2CrNiMoN17-12-2 X2CrNiMoN17-13-3	Z3CND17-11Az Z3CND17-12Az	—
	SUS 316Ti	○	S31635	—	X6CrNiMoTi17-12-2	1.4571	—	X6CrNiMoTi17-12-2	Z6CNDT17-12	08Х17Н13М2Т
	SUS 316J1	—	—	—	—	—	—	—	—	—
JIS G 4317 Hot rolling Stainless steel Rectangular	SUS 316J1L	—	—	—	—	—	—	—	—	—
	SUS 317	—	S31700	317	—	—	317S16	—	—	—
	SUS 317L	○	S31703	317L	X2CrNiMo18-15-4	1.4438	317S12	X2CrNiMo18-16-4	Z3CND19-15-04	—
	SUS 317LN	○	S31753	—	X2CrNiMoN18-12-4	1.4434	—	—	Z3CND19-14Az	—
	SUS 317J1	—	—	—	X2CrNiMoN17-13-5	1.4439	—	—	—	—
JIS G 4318 Cold-rolled steel bars	SUS 317J2	—	—	—	—	—	—	—	—	—
	SUS 317J3L	—	—	—	—	—	—	—	—	—
	SUS 836L	—	N08367	—	—	—	—	—	—	—
	SUS 890L	○	N08904	N08904	X1CrNiMoCuN25-25-5	1.4539	904S14	—	Z2NCDU25-20	—
JIS G 4319 Stainless steel Billet for tempered steel product	SUS 321	○	S32100	321	X6CrNiTi18-10	1.4541	321S31	X6CrNiTi18-10	Z6CNT18-10	08Х18Н10Т
	SUS 347	○	S34700	347	X6CrNiNb18-10	1.4550	347S31	X6CrNiNb18-10	Z6CNNb18-10	08Х18Н12Б
	SUS 384	○	S38400	384	—	—	—	—	Z6CN18-16	—
	SUS XM7	○	S30430	304Cu	X3CrNiCu18-9-4	1.4587	394S17	—	Z2CNU18-10	—
	SUS XM15J1	—	S38100	—	X1CrNiSi18-15-4	1.4381	—	—	Z15CNS20-12	—
	SUS 329J1	—	S32900	329	—	—	—	—	—	—
	SUS 329J3L	○	S31803	31803	X2CrNiMoN22-5-3	1.4462	—	—	Z3CNDU22-05Az	08Х21Н6М2Т
	SUS 329J4L	○	S32250	32250	X2CrNiMoCuN25-6-3	1.4507	—	—	Z3CNDU25-07Az	—
JIS G 4320 Cold forming equilateral angle iron	SUS405	○	S40500	405	X6CrAl13	1.4002	405S17	X6CrAl13	Z8CA12	—
	SUS410L	—	—	—	—	—	—	—	Z3C14	—
	SUS429	—	S42900	429	—	—	—	—	—	—
	SUS430	○	S43000	430	X6Cr17	1.4016	430S17	X6Cr17	Z8C17	12Х17
	SUS430F	○	S43020	430F	X6CrMoS17	1.4105	—	X7CrMoS18	Z8CF17	—
	SUS430LX	○	S43035	—	X3CrTi17 X2CrTi17	1.4510 1.4520	—	X6CrTi17 X6CrNb17	Z4CT17	— —
	SUS430J1L	—	—	—	X3CrNb17	1.4511	—	—	Z4CNb17	—
	SUS434	○	S43400	434	X6CrMo17-1	1.4113	434S17	X6CrMo17-1	Z8CD17-01	—
	SUS436L	—	S43600	436	X1CrMoTi16-1	1.4513	—	—	—	—
	SUS436J1L	—	—	—	—	—	—	—	—	—
	SUS444	○	S44400	444	X2CrMoTi18-2	1.4521	—	—	Z3CDT18-02	—
	SUS445J1	—	—	—	—	—	—	—	—	—
	SUS445J2	—	—	—	—	—	—	—	—	—
	SUS447J1	—	S44700	—	—	—	—	—	—	—

▶Stainless steel(2)

Japan industrial standards		Steel types related to foreign standards								
Standard number・Name	Symbol	International standard ISO	USA UNS	USA AISI	European standards EN Kind	European standards EN Serial No.	UK BS	Germany DIN	France NF	Russia(Former USSR) ГОСТ
JIS G 4303 ～4320 Sequel	SUSXM27	—	S44627	—	—	—	—	—	Z1CD26-01	—
	SUS403	—	S40300	403	—	—	—	—	—	—
	SUS410	○	S41000	410	X12Cr13	1.4006	410S21	X10Cr13	Z13C13	—
	SUS410S	○	S41008	410S	X6Cr13	1.4000	403S17	X6Cr13	Z8C12	08Х13
	SUS410F2	—	—	—	—	—	—	—	—	—
	SUS410J1	—	S41025	—	—	—	—	—	—	—
	SUS416	○	S41600	416	X12CrS13	1.4005	416S21	—	Z11CF13	—
	SUS420J1	○	S42000	420	X20Cr13	1.4021	420S29	X20Cr13	Z20C13	20Х13
	SUS420J2	○	S42000	420	X30Cr13	1.4028	420S37	X30Cr13	Z33C13	30Х13
	SUS420F	—	S42020	420F	X29CrS13	1.4029	—	—	Z30CF13	—
	SUS420F2	—	—	—	—	—	—	—	—	—
	SUS429J1	—	—	—	—	—	—	—	—	—
	SUS431	○	S43100	431	X19CrNi17 2	1.4057	431S29	X20CrNi17-2	Z15CN16-02	20Х17Н2
	SUS440A	—	S44002	440A	X70CrMo15	1.4109	—	—	Z70C15	—
	SUS440B	—	S44003	440B	—	—	—	—	—	—
	SUS440C	—	S44004	440C	X105CrMo17	1.4125	—	—	Z100CD17	95Х18
	SUS440F	—	S44020	S44020	—	—	—	—	—	—
	SUS630	○	S17400	S17400	X5CrNiCuNb16-4	1.4542	—	—	Z6CNU17-04	—
	SUS631	○	S17700	S17700	X7CrNiAl17-7	1.4568	—	X7CrNiAl17-7	Z9CNA17-07	09Х17Н7Ю
	SUS632J1	—	—	—	—	—	—	—	—	—
JIS G 4311 Heat resisting steel bar	SUH31	—	—	—	—	—	331S42	—	Z35CNWS14-14	45Х14Н14В2М
	SUH35	—	—	—	—	—	349S52	—	Z52CMN21-09Az	—
	SUH36	—	S63008	—	—	—	349S54	X53CrMnNi21-9	Z55CMN21-09Az	55Х20Г9АН4
	SUH37	—	S63017	—	—	—	381S34	—	—	—
JIS G 4312 Heat resisting steel plate	SUH38	—	—	—	—	—	—	—	—	—
	SUH309	—	S30900	309	—	—	309S24	—	Z15CN24-13	—
	SUH310	—	S31000	310	—	—	310S24	CrNi2520	Z15CN25-20	20Х25Н20С2
	SUH330	—	N08330	N08330	—	—	—	—	Z12NCS35-16	—
	SUH660	—	S66286	—	—	—	—	—	Z6NCTV25-20	—
	SUH661	—	R30155	—	—	—	—	—	—	—
	SUH21	—	—	—	—	—	—	CrAl1205	—	—
	SUH409	○	S40900	409	X6CrTi12	—	409S19	X6CrTi12	Z6CT12	—
	SUH409L	○	—	—	X2CrTi12	1.4512	—	—	Z3CT12	—
	SUH446	—	S44600	446	—	—	—	—	Z12C25	15Х28
	SUH1	—	S65007	—	—	—	401S45	X45CrSi9-3	Z45CS9	—
	SUH3	—	—	—	—	—	—	—	Z40CSD10	40Х10С2М
	SUH4	—	—	—	—	—	443S65	—	Z80CSN20-02	—
	SUH11	—	—	—	—	—	—	—	—	40Х9С2
	SUH600	—	—	—	—	—	—	—	—	20Х12ВНМБФР
	SUH616	—	S42200	—	—	—	—	—	—	—

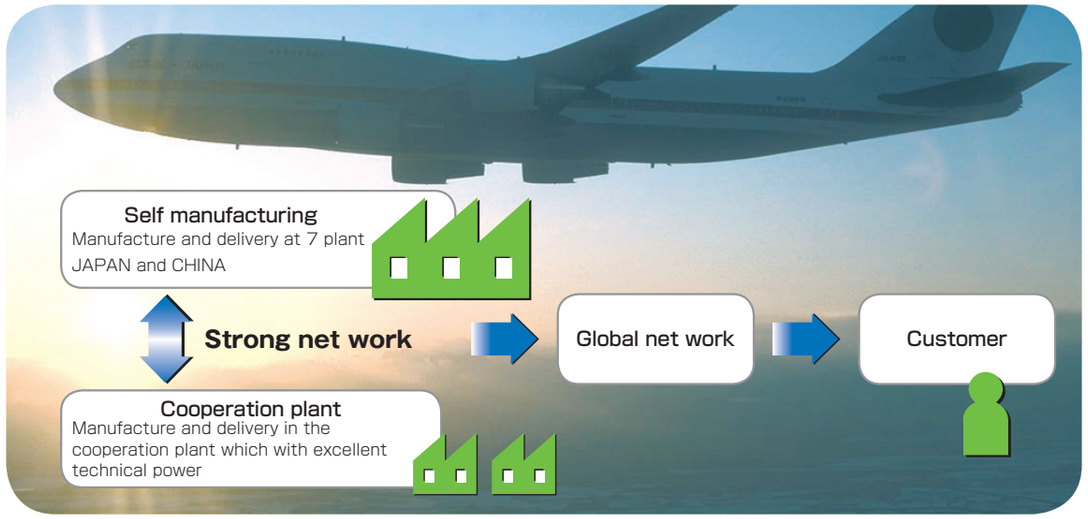
⚠ Notes 1:The ISO is based on the ISO/CD TR15510:1999. mark the right steel grade with o before confirming due to changes caused by steel grade addition. The code is the same as the EN expression.
2:For USA,UNS registration numbers and AISI steel manuals are referred.
3:European standards are based on the EN10088-1:1995
4:For European countries, BS,DIN,NF,etc, has been referred, but the specifications of each country will be abolished by the EN enactment.
5:Russian standard Excerpt from ГОСТ5632.

GUIDANCE
of the DEALINGS

Guide of Punch Production Facilities

Reassurance Self Manufacture and Sale System

Punch Industry self manufacturing the most kinds of the products which could satisfy the all requires of our customer.
With the most advance technology and experience, Punch Industry not only good at the standard products but also the customer design products.



Our Equipment

With the most advanced equipment and the professional technical employees, Punch Industry provides the reliable products for customers.

Electrical discharge machines	JAPAN	CHINA
NC electrical discharge machines	56	53
NC Wire electrical discharge machines		
CNC Small-hole Drilling electrical discharge machines		
Small-hole Drilling electrical discharge machines		
Other electrical discharge machines		

Cutting machines	JAPAN	CHINA
CNC Lathes	170	323
NC Lathes		
NC Milling machines		
Generic Lathes & Bench Lathes		
Gundrilling machine		
Machining centers		
Other Cutting machines		

Grinding machines	JAPAN	CHINA
CNC Profile grinders	351	414
CNC Centerless grinders		
CNC Surface grinders		
CNC Special shape grinders		
NC Jig grinders		
Jig grinders		
Internal grinders		
Cylindrical grinders		
Other Grinding machines		

Heat treatment equipments	JAPAN	CHINA
Vacuum heat treatment furnaces	24	47
Salt bath heat treatment furnaces		
Gas nitrocarburizing furnaces		
Induction hardening furnaces		
Other Heat treatment equipments		

Surface treatment equipments	JAPAN	CHINA
PVD Coating equipment	10	7
Hard Chrome Plating equipment		
Other Surface treatment equipments		

Inspection equipments	JAPAN	CHINA
3D Profilometers	280	183
Roundness measuring instruments		
Surface roughness meters		
Laser micrometers		
Profile projectors		
Industrial microscopes		
Optical microscopes		
Stereoscopic microscopes		
Microhardness testers		
Digital hardness meters		
Length measuring instruments		
Contour measuring instruments		
Other Inspection equipments		

⚠ Exclude the equipment of cooperation plant

CHINA Plant Guidance

Low Cost & High-Performance CHINA Plant

Company Profile

Outline

Corporate name	**PUNCH INDUSTRY CO.,LTD　　Registered Trademark**
President	Yuji Morikubo
Headquaters	MEISAN-TAKAHAMA BLDG.,9F,2-12-23,KONAN,MINATO-KU,TOKYO,108-0075,JAPAN　tel : ＋81-3-3472-0087
Plants	KITAKAMI PLANT.　21-26-17,MURASAKINO,KITAKAMI-CITY,IWATE Pref.024-0004,JAPAN. MIYAKO PLANT.　29-1,UENO,DAIICHICHIWARI,MATSUYAMA,MIYAKO-CITY,IWATE Pref.027-0037.JAPAN CHIBA PLANT.　2-7080-11,AZA-KAWANISHI,KAMAKAZU,ASAHI-CITY,CHIBA Pref.289-2505.JAPAN. LOGISTICS CENTER. Tokyo Logistics Center　1-2-7 keihin jima , Ota-ku, Tokyo 143-0003, JAPAN
Affiliated Companies	PINTEC INDUSTRY CO.,LTD PUNCH INDUSTRY（Dalian）CO.,LTD　PUNCH INDUSTRY（Wafangdian）CO.,LTD PUNCH INDUSTRY（Wuxi）Co.,LTD　PUNCH INDUSTRY（Dongguan）CO.,LTD.
Sales Offices	Kitakami, Sendai, Niigata, Utsunomiya, Kita-Kanto, Kanto, Nagano, Shizuoka, Kanazawa, Nagoya, Kyoto, Osaka,Hiroshima, Fukuoka, Overseas Division
Capital	382.5 Million yen
Sales volume	14.7 Billion yen（2009）
Established	29th March,1975
Bank References	The Bank of Tokyo-Mitsubishi UFJ, Ltd., Resona Bank, Ltd., Mizuho Corporate Bank, Ltd., The Sumitomo Mitsui Banking Corporation, The Shoko Chukin Bank

History

1975	Established under the name Kanba Shokai CO.,LTD. in Tokyo
1977	Company name changed to PUNCH INDUSTRY CO., Ltd.
1982	Succeeds in developing own production technology for plastic mold component ejector pins made of high-speed steel
1983	Kitakami Plant（Iwate Pref.）starts operation, establishes a mass production system for mold components
1987	Production Division consolidated at Kitakami Plant
1990	Establishment of Miyako Punch Industry CO., LTD.（Iwate Pref.）, production of press die molds consolidated at that plant PUNCH INDUSTRY（Dalian）CO.,LTD. Company established in Dalian, China, production of mold components started in China
1991	General catalog of plastic mold components issued and distributed throughout Japan, general catalog of press die components issued and distributed throughout Japan
1995	To increase production capacity in China, plant established at Dalian Wafangdian, plant goes into operation
1996	Sales of FA mechanical component catalog started
1999	PUNCH INDUSTRY（Dalian）CO.,LTD. obtains ISO 9002 certification
2001	Kitakami Plant obtains ISO 9002 certification Construction of a new plant in Chiba to increase production capacity of FA mechanical components
2002	PUNCH INDUSTRY（Dalian）CO.,LTD. establishes sales office in Shanghai and Dongguan（currently expanded to 24 sales offices） Tokyo Logistics Center opened to improve logistics services and consolidate various functions
2003	Kitakami Plant 2 opened to expand production capacity and consolidate R&D Department
2004	PUNCH INDUSTRY（Wuxi）CO.,LTD. established at Wuxi in China's Jiangsu Province, and startup of mold component production PUNCH INDUSTRY（Dongguan）CO.,LTD. established at Dongguan in China's Guandong Province, and startup of mold component production Miyako Punch Industry Co., LTD. expanded by opening of Plant 3 Head Office moved from Shinagawa to Minato Ward
2006	Plant at Dalian Wafangdian becomes independent as PUNCH INDUSTRY（Wafangdian）CO.,LTD.
2007	Chiba Plant certificated by ISO 9001
2008	Chiba Plant is established, Punch Industry（Chiba）Co., Ltd. is incorporated in it.

Guarantee Regulation

Warranty Standard

ALL warranties on products（the"products"）purchased by the customer from Punch Industry（the Company"）that are listed in the Standard Components for Press Dies Catalog（the "catalog"）are all following warranty provisions（this "Warranty）, It is necessary to know the following warranty standard, no matter whether attached the warranty or guarantee certificate when you purchase or using the products in this catalog.

Guarantee Items

With respect to the Products Purchased by the customer, the Company will replace all or part of the Products or repair the Products free of charge it if is deemed there is any damage, deformation of defects to the Products（the "Defects"）that are attributable to the Company, on the condition that written notification stating sufficient details of the Defects, as deemed by Company within a year since delivery day,

Provided, however, that the following cases are outside of the scope of the warranty.

1.Minor flaws such as scratches, marks, dents, that do not make the Products unusable do not constitute Defects, provided, however, that if the Company deems any flaws such as scratches, marks, dents to be particularly significant, and such flaws will constitute a Defect.
2.Defects caused by the customer using the Products in violation of the provisions of the Rules.
3.Defects caused by natural disasters（including, without limitation, earthquakes, fires and floods）
4.Defects caused by the customer itself processing, repairing, modifying or disassembling the Products.
5.Defects caused by the rebuild and repaired by customer itself without permission of Company.

Disclaimer

The Company will not be liable for any damages arising out of or in connection with any of the following cases:

1.Defects caused by use of the Products in any way other than as a part of general production equipment, In this case, general production equipment means press dies and jigs & fixtures series for inspection, but does not include transportation devices with the purpose of transporting humans such as automobiles, vehicles, or ships, medical equipment with the purpose of curing and diagnosing humans, or consumer goods that are used in general households such as electronic and electric equipment.
2.Defects caused by use of or inability to use the Products.
3.Defects in the Products caused by the willful misconduct or negligence of the customer, or force majeure.
4.Infringement of any patent right and other rights of third party arising in relation to the Products.
5.Export of the Products of delays in or prohibition of exportation of the Products due to laws or ordinances, or regulations.

Warranty Standard for Oversea Customer

The warranty items are applied just based on within China and Japan (the domestic). The warranty items are similar with the domestic one, but if the trouble and damage are caused by products you used is fall short of the oversea technical standard, we will treat that as the item 2, witch out of the scope of warranty.

Using Limit

Do not applicable the Products on military-related products or plants such as weapons or arms.

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