

* Refer to pages 258 to 259 for the wide angle centering hand.

(Note) Grip applies to one jaw.
The actual value is grip x 2.

Range of gripping power at supply pressure 0.5MPa and general jaw length

Variation	Model no.	Action of jaw (J)	Gripping power (N)			Gripping power (N)			Switch model no.	Page	
			5	10	50	50	100	500			1000
Feather hand (Mini-parallel hand)	FH100		110 (8) 112 116	(11) 120 (14) 125 (18)	(20)					T2H/V T2H/V	264
Parallel hand	HAP			1C (8) 2CS (16) 3CS (26)	4CS (26)					T2H/V T3H/V	270
Miniature cross roller parallel hand	BSA2		006C (4)							F2H/V F2H/V	278
Compact cross roller parallel hand	BHA/BHG			01CS1 (5) 03CS1 (9) 04CS1 (11)		05CS1 (15)				T2H/V T3H/V	282 288
Linear guide hand	LHA			006CS (4) 01CS (5)		03CS (9) 04CS (11) 05CS (15) 06CS (20)				F2H/V, F3H/V T2H/V, T3H/V	294
Linear guide hand with rubber cover	LHAG			01CS (5)		03CS (9) 04CS (11) 05CS (15) 06CS (20)				T2H/V T3H/V	302
Cross roller parallel hand	HKP					32CS (24) 40CS (30) 50CS (36) 63CS (40)				T2H/V T3H/V	310
Thin parallel hand (bush type) (bearing type)	HLA/HLB			HLA 12CS (15) HLA 15CS (20) HLB 12CS (13) HLB 15CS (18)		HLA 20CS (25) HLB 20CS (23)				K2H/V, K3H/V K0H/V, K5H/V	316
Rubber covered thin parallel hand (bush type) (bearing type)	HLAG/HLBG			HLAG 12CS (15) HLAG 15CS (20) HLBG 12CS (13) HLBG 15CS (18)		HLAG 15CS (25) HLBG 20CS (23)				K2H, K3H K0H, K5H	324
Bearing parallel hand	HEP					3.5CS (24) 4CS (36) 5CS (40) 6CS (40) 7CS (60)				T2H/V T3H/V	332
Lateral parallel hand	HCP			2CS (20) 3CS (30)		4CS (40)				T2H/V T3H/V	338
Compact wide parallel hand	HMF			12CS (20)		16CS (30) 20CS (40) 25CS (50) 32CS (70) 40CS (100)				T2H/V T3H/V	344
LM guided large wide parallel hand	HMFB					25CS (100) 32CS (120) 40CS (160)				T2H/V T3H/V	354
Wide parallel hand	HFP			2CS (20)		3CS (30) 4CS (40) 5CS (60)				T2H/V T3H/V	360
Thin type long stroke parallel hand	HLC					16CS (40) 20CS (50) 25CS (60) 30CS (70)				T2H/V T3H/V	366
Long stroke parallel hand	HGP			3CS (56)						T2H/V T3H/V	372

(Example)
110 (8)
Model Gripping power Stroke length (mm)
or open and close degree

Parallel hand

Hand

RRC
GRC
RV3*
NHS
HR
LN
FH100
HAP
BSA2
BHA/BHG
LHA
LHAG
HKP
HLA/HLB
HLAG/HLBG
HEP
HCP
HMF
HMFB
HFP
HLC
HGP
FH500
HBL
HDL
HMD
HJL
BHE
CKG
CK
CKA
CKS
CKF
CKJ
CKL2
CKL2 --HC
CKH2
CKLB2
NCK/SCK/FCK
FJ
FK
Ending

RRC
GRC
RV3*
NHS
HR
LN
FH100
HAP
BSA2
BHA/BHG
LHA
LHAG
HKP
HLA/HLB
HLAG/HLBG
HEP
HCP
HMF
HMFB
HFP
HLC
HGP
FH500
HBL
HDL
HMD
HJL
BHE
CKG
CK
CKA
CKS
CKF
CKJ
CKL2
CKL2 --HC
CKH2
CKLB2
NCK/SCK/FCK
FJ
FK
Ending



Safety precautions

Always read this section before starting use.

Refer to Intro 69 for general precautions of the cylinder, and to Intro 78 for general precautions of the cylinder switch.

Hand Series

Design & Selection

1. COMMON

⚠ WARNING

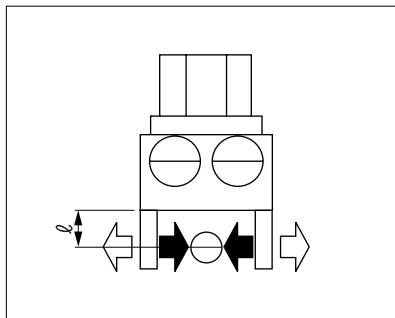
■ If the moving workpiece poses a possible risk to personnel or if fingers could be caught in the master key, etc., install a protective cover, etc.

■ If circuit pressure drops due to a service interruption or problems in the air source, gripping power drops and the workpiece could drop. Provide position locking measures, etc., so that personnel are not injured or machines damaged.

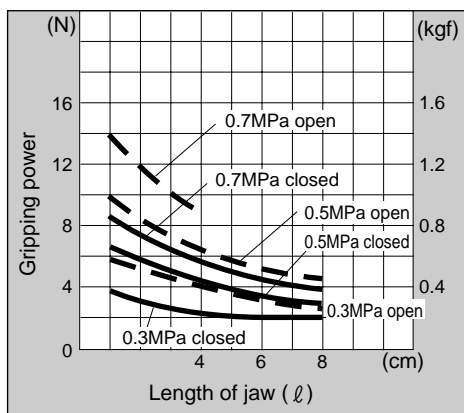
⚠ CAUTION

■ Cautions on gripping power

- The grip is for one master jaw when all master and small jaws contact the workpiece as shown below.



- Performance data indicates the gripping power at hand jaw length ℓ at a supply pressure of 0.15 to 0.7 MPa.



- To obtain gripping power from performance data, if the distance to the workpiece's center of gravity is ℓ when manufacturing the small jaw, gripping power F is expressed as follows

$$\text{When } \ell = \ell_1, \text{ then } F = F_1$$

$$\text{When } \ell = \ell_2, \text{ then } F = F_2$$

Refer to the drawing below.

- The jaw's working max. length can be used within performance data.

When N is used to express the number of jaws as reference for the coefficient for transferring workpiece weight W .

$$W \times 9.8 : (F \times N) = 1:5 \text{ (only gripping)}$$

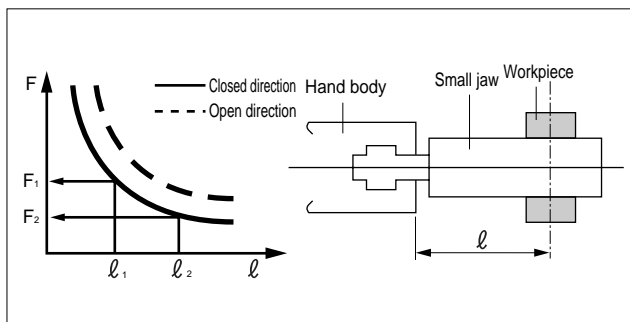
$$W \times 9.8 : (F \times N) = 1:10 \text{ (normal transfer)}$$

$$W \times 9.8 : (F \times N) = 1:20 \text{ (sudden acceleration transfer)}$$

$W \times 9.8$: Workpiece weight (kg)

F : Gripping power (N)

N : Number of jaws



- Use as short and light a small jaw as possible.

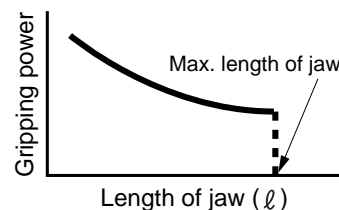
If the small jaw is long and heavy, inertia increases when opening and closing. This may cause play in the master key, and may adversely affect life.

- The small jaw's length must be within performance data.
- The weight of the small jaw affects life, so check that it is within the following value.

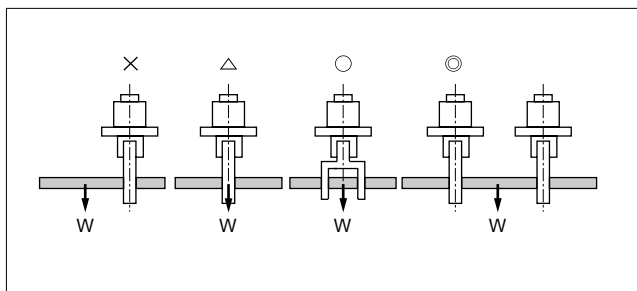
$$W < 1/4H \text{ (1 pc.)}$$

W : Weight of small jaw

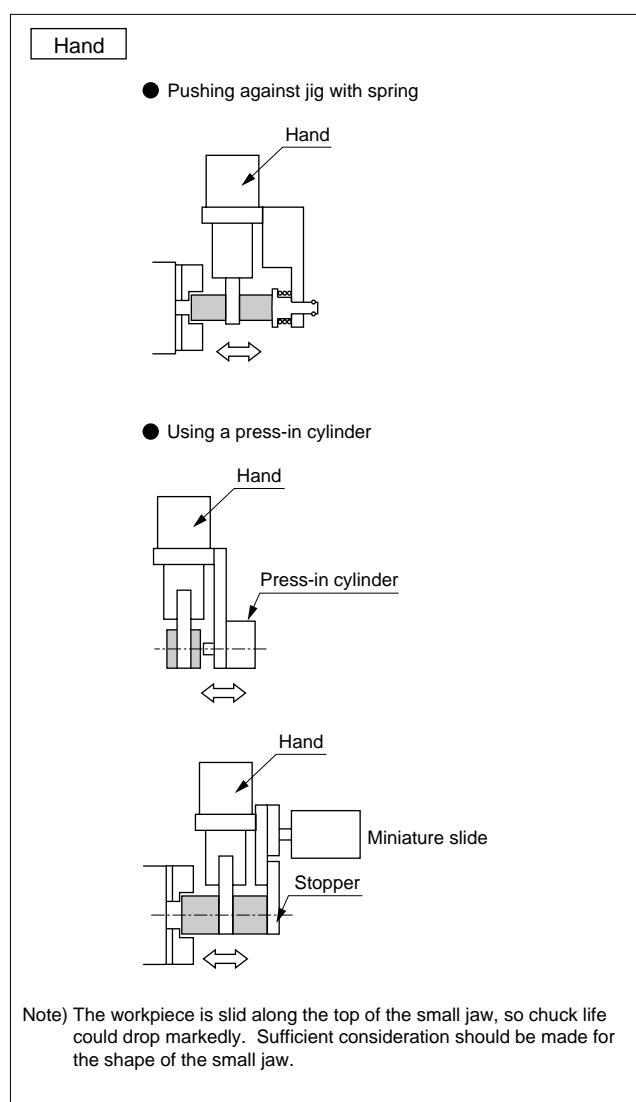
H : Product weight of hand



- When gripping a long object or large workpiece, the center of gravity must be gripped to provide stable prehension. It is also necessary to stabilize prehension by increasing the size or using multiple jaws.



- Select a model that has sufficient power to grip the workpiece weight.
- Select a model that has sufficient opening/closing width for the workpiece size.
- If directly inserting the workpiece into the jig with the hand, consider clearance during design to avoid damaging the hand.



- If the small jaw is not rigid enough, resulting deflection could cause the master jaw to twist or adversely affect operation.
- Adjust the chuck open/close speed with the speed control valve (optional).
Play may occur quickly when used at a high speed.

RRC
GRC
RV3*
NHS
HR
LN
FH100
HAP
BSA2
BHA/ BHG
LHA
LHAG
HKP
HLA/ HLB
HLAG/ HLBG
HEP
HCP
HMF
HMFb
HFP
HLC
HGP
FH500
HL
HDL
HMD
HJL
BHE
CKG
CK
CKA
CKS
CKF
CKJ
CKL2
CKL2 *-HC
CKH2
CKLB2
NCK/ SCK/FCK
FJ
FK

Ending

Hand

RRC
GRC
RV3*
NHS
HR
LN
FH100
HAP
BSA2
BHA/BHG
LHA
LHAG
HKP
HLA/HLB
HLAG/HLBG
HEP
HCP
HMF
HMFb
HFP
HLC
HGP
FH500
HBL
HDL
HMD
HJL
BHE
CKG
CK
CKA
CKS
CKF
CKJ
CKL2
CKL2-*.HC
CKH2
CKLB2
NCK/SCK/FCK
FJ
FK
Ending

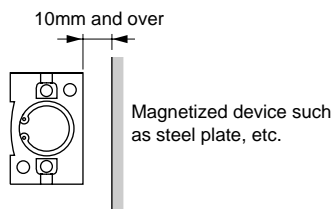
Installation & Adjustment

1. COMMON

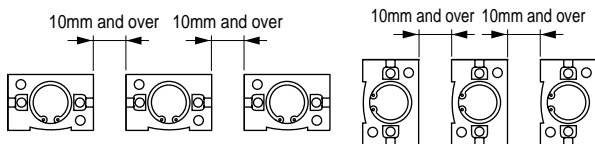
CAUTION

■ If a lateral load or load with a large impact is applied to the master key, play or damage could occur in the master key. Adjust and check that external force is not applied to the master key.

■ The cylinder switch could malfunction if there is magnetic substance, such as a steel plate, near the cylinder switch. Keep magnetic substance at least 10mm from the cylinder.



■ The cylinder switch could malfunction if cylinders are installed adjacently. Check that the following distances are provided between cylinders.

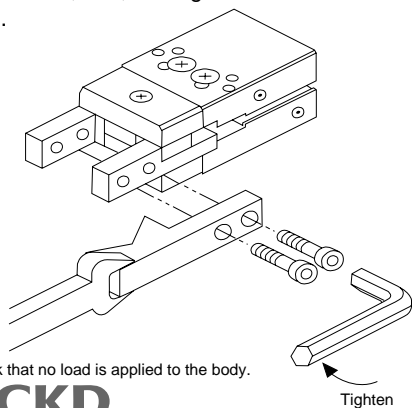


■ If the clamp is operated carefully and slowly as possible, accuracy increases. Repeatability also stabilizes.

■ Regularly grease the sliding section of the master key. Periodic replenishment of grease will extend the life of the part.

Installing the jaw

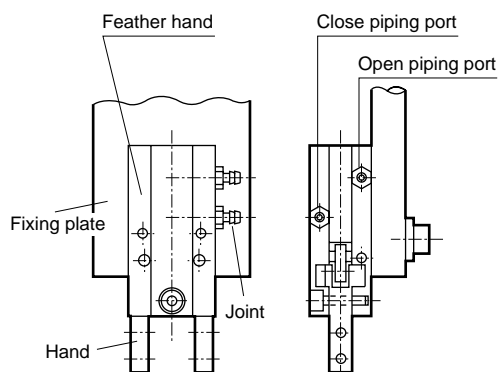
To prevent any effect onto the hand, support the master key with a wrench, etc., and tighten so that the master key is not twisted.



2. Installation

■ Do not cause dents or scratches that may worsen flatness or perpendicularity on the fixing face or master key.

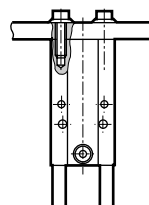
■ If there is a limit to the thickness direction of the FH series body, the available piping joint will be limited. Refer to the following joints.



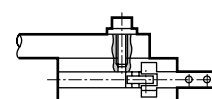
Model	FH*10	FH*12	FH*16	FH*20	FH*25	
Port size	M3			M5		
Joint	Model no.	Applicable O.D. (mm)	Effective sectional area (mm ²)	Model no.	Applicable O.D. (mm)	Effective sectional area (mm ²)
	Barbed joint	Straight FTS				
		FTS4-M3	φ3.2·φ4	0.4	FTS4-M5	φ3.2·φ4
	-	-	-	FTS6-M5	φ6	4.1

■ Refer to the section below for details on installing the FH series.

● Top installation



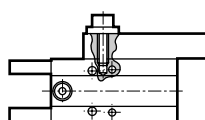
● Front installation



Note) When a switch is provided, screw the bolt into as shown below so the switch is not pressed by the end of the bolt.

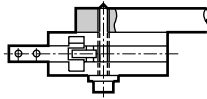
Note) Check that the fixed plate does not overlap the master jaw support.

● Side installation



Model	Applicable bolt size	Max. screw depth (mm)	Recommended tightening torque (N·cm)
FH*10	M3×0.5	4.5	70
FH*12	M3×0.5	4.5	70
FH*16	M4×0.7	6	160
FH*20	M5×0.8	7.5	330
FH*25	M5×0.8	12	330

● Use of through hall

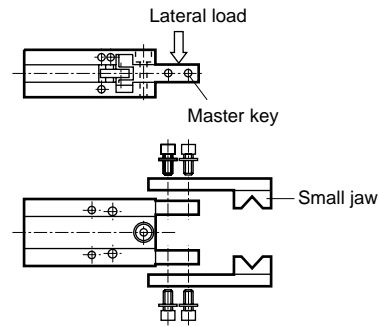


Note) A through hall cannot be used when a switch is provided.

Note) Check that the fixed plate does not overlap the master jaw support.

Model	Applicable bolt size	Recommended tightening torque (N·cm)
FH*10	M3 × 0.5	32
FH*12	M2.5 × 0.45	32
FH*16	M3 × 0.5	90
FH*20	M4 × 0.7	210
FH*25	M4 × 0.7	210

■ When installing the small jaw, check that a lateral load is not applied to the master key.



■ Tighten with the following tightening torque.

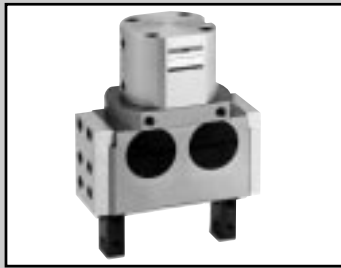
Screw nominal	M3	M4	M5	M6	M8
Recommended tightening torque (N·m)	0.59	1.4	2.8	4.8	12.0

During Use & Maintenance

⚠ CAUTION

- Do not disassemble or modify the body.

RRC
GRC
RV3*
NHS
HR
LN
FH100
HAP
BSA2
BHA/BHG
LHA
LHAG
HKP
HLA/HLB
HLAG/HLBG
HEP
HCP
HMFB
HMF
HMP
HLC
HGP
FH500
HBL
HDL
HMD
HJL
BHE
CKG
CK
CKA
CKS
CKF
CKJ
CKL2
CKL2 *-HC
CKH2
CKLB2
NCK/ SCK/FCK
FJ
FK
Ending



Bearing parallel hand Double acting/single acting

HEP Series

- Operational stroke length: 24, 36, 40, 50, 60mm



RRC
GRC
RV3*
NHS
HR
LN
FH100
HAP
BSA2
BHA/
BHG
LHA
LHAG
HKP
HLA/
HLB
HLAG/
HLBG
HEP
HCP
HMF
HMFB
HFP
HLC
HGP
FH500
HBL
HDL
HMD
HJL
BHE
CKG
CK
CKA
CKS
CKF
CKJ
CKL2
CKL2
*-HC
CKH2
CKLB2
NCK/
SCK/FCK
FJ
FK
Ending

Specifications

Descriptions	HEP				
Size	3.5CS	4CS	5CS	6CS	7CS
Cylinder bore size mm	φ32	φ50	φ63	φ80	φ100
Actuation	Double acting/single acting				
Working fluid	Compressed air				
Max. working pressure MPa	0.7		0.5		
Min. working pressure MPa	0.3				
Ambient temperature °C	5 to 60				
Port size	M5	Rc1/8		Rc1/4	
Operational stroke length mm	24	36	40	50	60
Rod diameter mm	φ14	φ20	φ24	φ28	φ30
Capacity of reciprocating cm ³	17.5	65.0	115.6	236	450
Repeatability mm	±0.03				
Product weight kg	1.2	3.2	4.7	7.8	11.7
Lubrication	Not required (when lubricating, use turbine oil Class 1 ISO VG32)				

Switch specifications

Descriptions	Proximity 2 wire	Proximity 3 wire
	T2H/T2V	T3H/T3V
Applications	Programmable controller	Programmable controller, relay
Output method	-	NPN output
Power voltage	-	10 to 28 VDC
Load voltage/current	10 to 30 VDC, 5 to 20 mA (Note 1)	30 VDC or less, 100mA or less
Light	LED (ON lighting)	
Leakage current	1mA or less	10μA or less
Maximum shock resistance	980m/s ²	
Lead wire	Standard 1m (oil resistant vinyl cabtire cable 2-conductor 0.2mm ²)	Standard 1m (oil resistant vinyl cabtire cable 2-conductor 0.2mm ²)

Note 1: Max. load current above: 20 mA at 25°C.

The current will be lower than 20mA if ambient temperature around switch is higher than 25°C. (5 to 10mA with 60°C)

How to order

Without switch

HEP - 3.5CS - C

With switch

HEP - 3.5CS - C - T2H - R

A Size

B Option
Note 1
Note 2

C Switch model no.

D Switch quantity

Symbol	Descriptions			
A Size				
3.5CS				
4CS				
5CS				
6CS				
7CS				
B Option				
Blank	Standard (double acting)			
O	Single acting (normally open)			
C	Single acting (normally closed)			
Y1	With small jaw material (S50C)			
Y2	With small jaw material (MC nylon)			
C Switch model no.				
Axial lead wire	Radial lead wire	Contact	Indicator	Lead wire
T2H*	T2V*	Proximity	1 color indicator type	2-wire
T3H*	T3V*			3-wire
*Lead wire length				
Blank	1m (standard)			
3	3m (option)			
5	5m (option)			
D Switch quantity				
R	One on open side			
H	One on closed side			
D	Two			

⚠ Note on model no. selection

Note 1: Refer to pages 412 to 413 for the dimensions and applicable model of the small jaw. These are attached at shipment. (When ordered as an option, two are included)

Note 2: 6CS and 7CS have no small jaw.

<Example of model number>

HEP-3.5CS-O-T2H-R

Model: Bearing parallel hand

- A** Size : 3.5CS
- B** Option : Single acting, normally open type
- C** Switch model no.: Proximity T2H switch, lead wire 1m
- D** Switch quantity : One on open side

How to order switch

● For switch T*H*

· Switch body + mounting bracket

HEP - T2H

Switch model no.
(Item above C)

· Switch body

SW - T2H

Switch model no.
(Item above C)

· Mounting bracket

HEP - T

● For switch T*V*

· Switch body + mounting bracket

HEP - T2V - *

Switch model no.
(Item above C)

· Switch body

SW - T2V

Switch model no.
(Item above C)

· Mounting bracket

HEP - TV - *

(Select either R (open) or H (closed) for sections marked with an asterisk (*).)

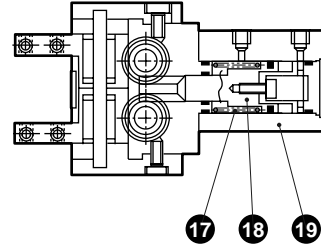
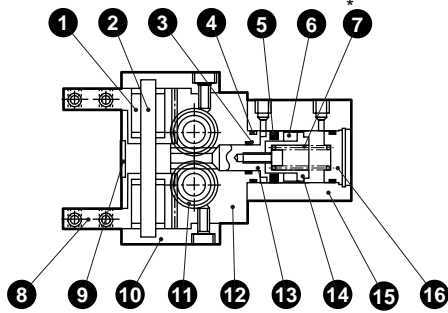
RRC
GRC
RV3*
NHS
HR
LN
FH100
HAP
BSA2
BHA/ BHG
LHA
LHAG
HKP
HLA/ HLB
HLAG/ HLBG
HEP
HCP
HMF
HMFB
HFP
HLC
HGP
FH500
HBL
HDL
HMD
HJL
BHE
CKG
CK
CKA
CKS
CKF
CKJ
CKL2
CKL2 *-HC
CKH2
CKLB2
NCK/ SCK/FCK
FJ
FK
Ending

Bearing parallel hand
Hand

Internal structure and parts list

Standard (double acting)/O (normally open) type

C (normally closed) type



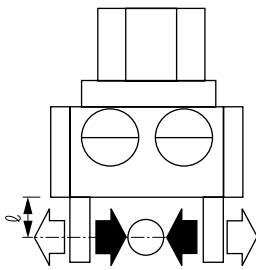
* Spring of 7 is not contained in standard (double acting) type.

No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Bearing	Steel		11	Pinion gear	Steel	
2	Guide rod	Alloy steel		12	Body	Aluminum alloy	
3	Rod packing seal	Nitrile rubber		13	Piston A	Stainless steel	
4	Cylinder gasket	Nitrile rubber		14	Piston B	Stainless steel (4 to 7CS) Acetar resin (3.5CS)	
5	Piston packing seal	Nitrile rubber		15	Cylinder	Aluminum alloy	
6	Magnet			16	Cylinder guard	Aluminum alloy	
7	Spring	Steel	Only O type	17	Spring	Stainless steel	
8	Master key	Steel		18	Piston	Stainless steel	
9	Center guard	Steel		19	Cylinder	Aluminum alloy	
10	Side cover	Aluminum alloy					

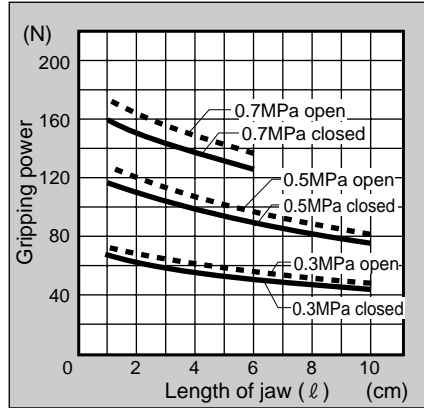
Gripping power performance data

Gripping power that functions to open and closed directions with jaw length ℓ of hand at supply pressure 0.3, 0.5 and 0.7 MPa is shown.

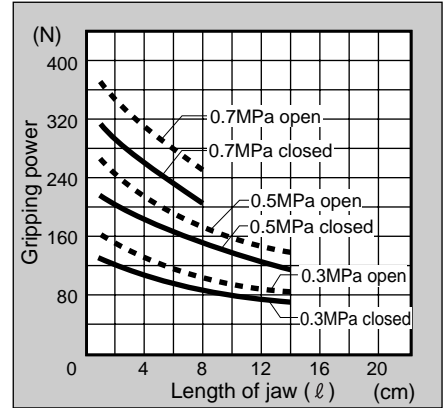
- Open direction (↔) - - - - (shown with broken line)
- Closed direction (→) ——— (shown with continuous line)



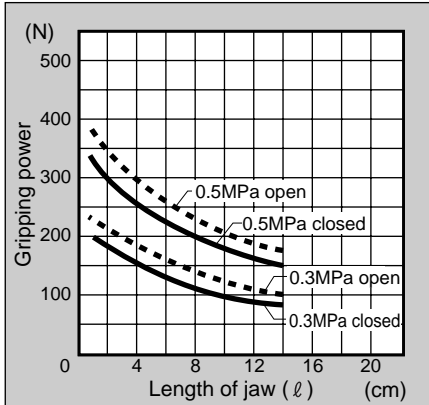
● HEP-3.5CS



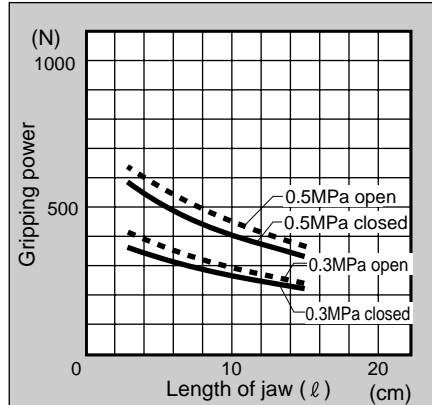
● HEP-4CS



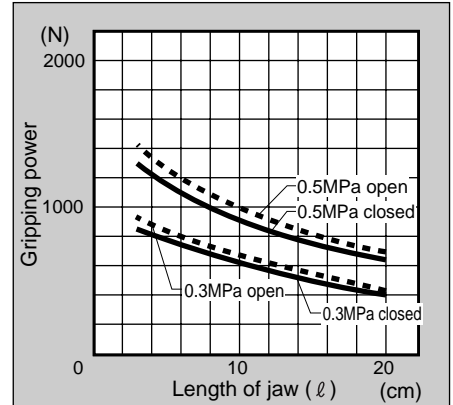
● HEP-5CS



● HEP-6CS



● HEP-7CS



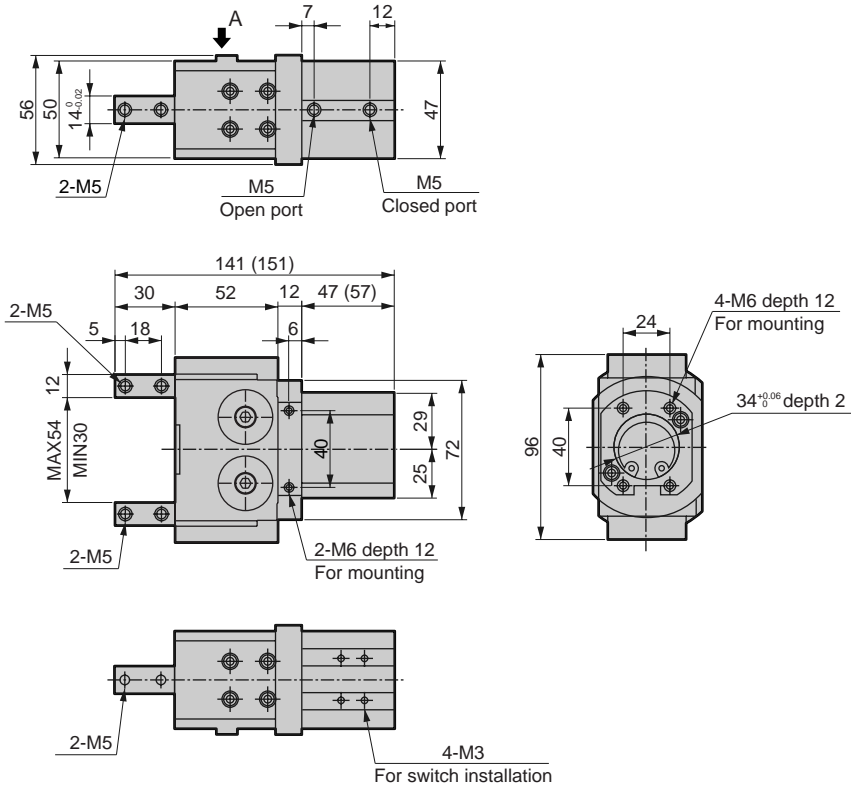
(Note) O type gripping power decreases approximate 20 to 30 % comparing to double acting type to closed direction.
C type gripping power decreases approximate 10 to 20 % comparing to double acting type to open direction.
Grip performance data indicates the grip for one jaw. Since two jaws are used, double the grip in the graph when making a selection.

Dimensions

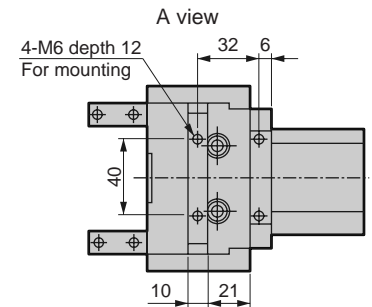
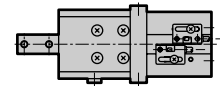
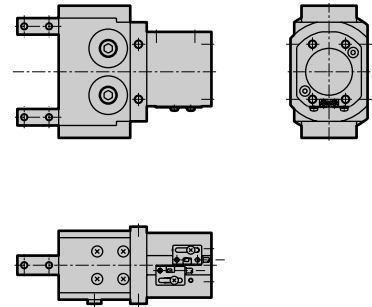


● HEP-3.5CS standard/O/C

● Dimension in () for C (normally closed) specifications.

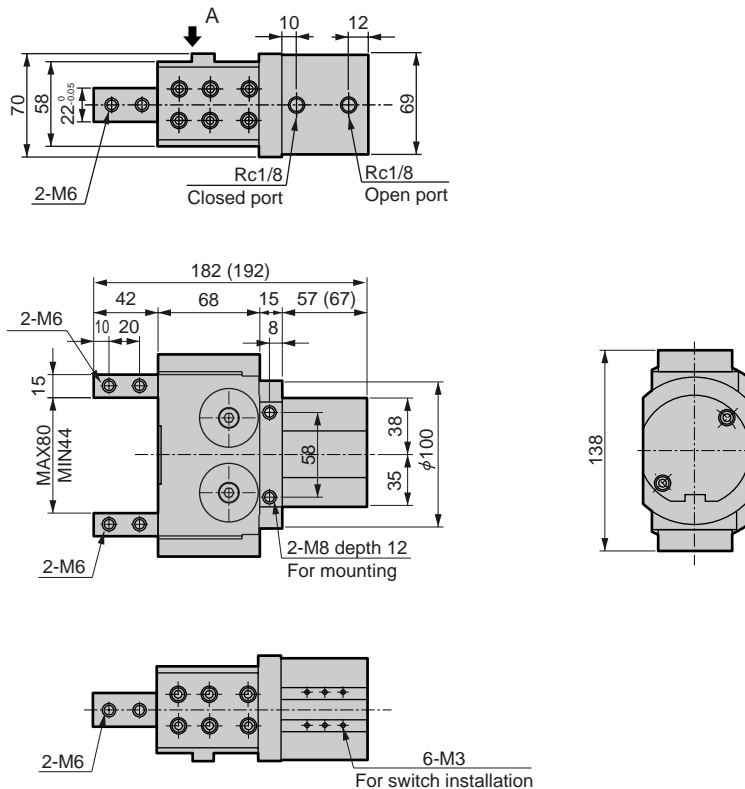


● With switch

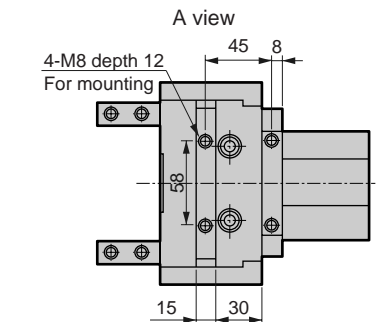
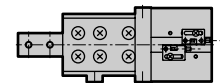
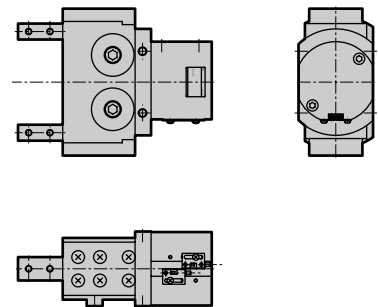


● HEP-4CS standard/O/C

● Dimension in () for C (normally closed) specifications.



● With switch



RRC
GRC
RV3*
NHS
HR
LN
FH100
HAP
BSA2
BHA/BHG
LHA
LHAG
HKP
HLA/HLB
HLAG/HLBG
HEP
HCP
HMF
HMFB
HFP
HLC
HGP
FH500
HLB
HDL
HMD
HJL
BHE
CKG
CK
CKA
CKS
CKF
CKJ
CKL2
CKL2 *-HC
CKH2
CKLB2
NCK/SCK/FCK
FJ
FK

Bearing parallel hand
Hand

Dimensions

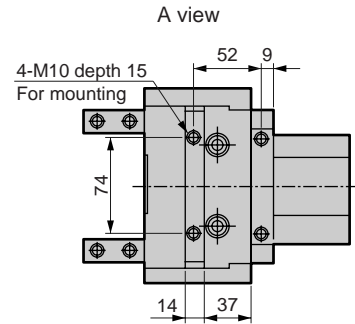
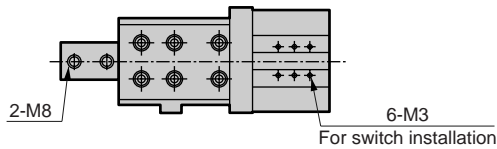
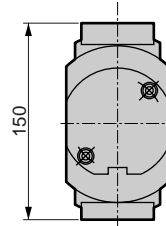
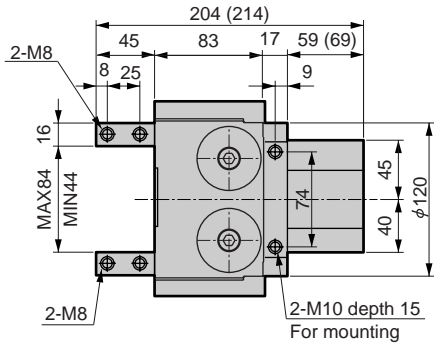
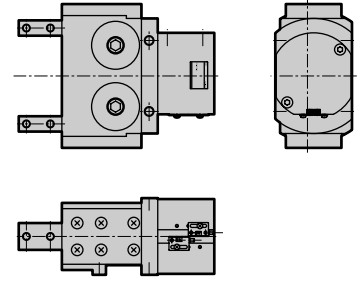
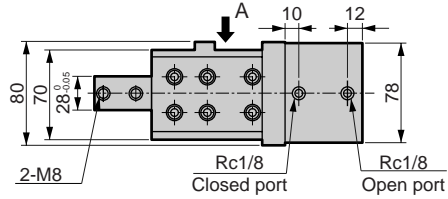


RRC
GRC
RV3*
NHS
HR
LN
FH100
HAP
BSA2
BHA/BHG
LHA
LHAG
HKP
HLA/HLB
HLAG/HLBG
HEP
HCP
HMF
HMFB
HFP
HLC
HGP
FH500
HBL
HDL
HMD
HJL
BHE
CKG
CK
CKA
CKS
CKF
CKJ
CKL2
CKL2 -*.HC
CKH2
CKLB2
NCK/ SCK/FCK
FJ
FK
Ending

● HEP-5CS standard/O/C

● With switch

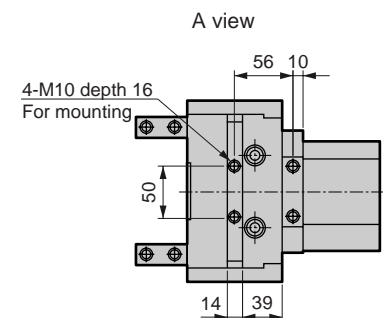
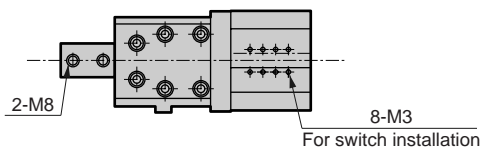
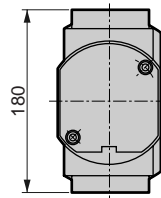
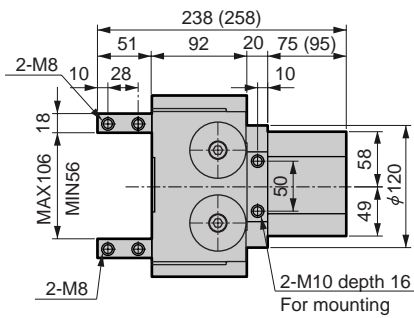
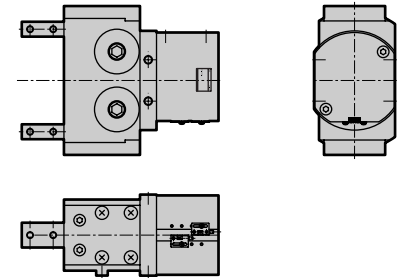
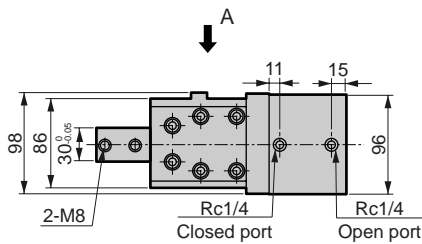
● Dimension in () for C (normally closed) specifications.



● HEP-6CS standard/O/C

● With switch

● Dimension in () for C (normally closed) specifications.

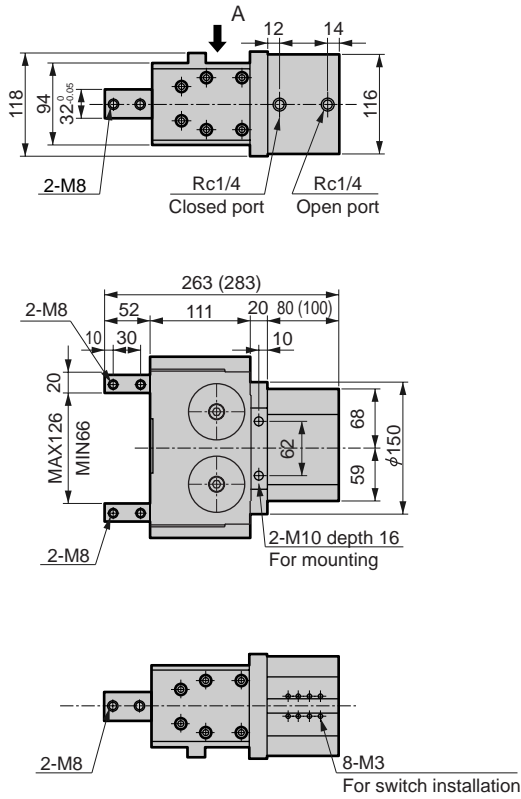


Dimensions

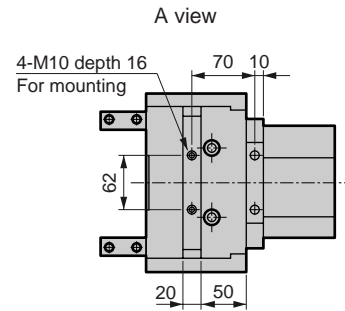
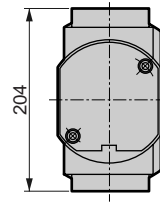
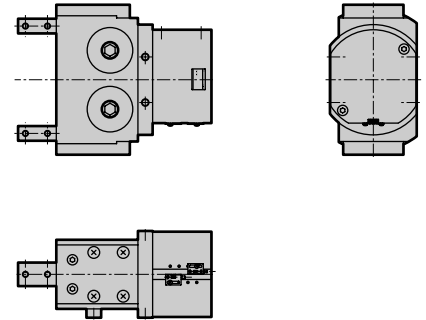


● HEP-7CS standard/O/C

● Dimension in () for C (normally closed) specifications



● With switch



RRC
GRC
RV3*
NHS
HR
LN
FH100
HAP
BSA2
BHA/ BHG
LHA
LHAG
HKP
HLA/ HLB
HLAG/ HLBG
HEP
HCP
HMF
HMFB
HFP
HLC
HGP
FH500
HLB
HDL
HMD
HJL
BHE
CKG
CK
CKA
CKS
CKF
CKJ
CKL2
CKL2 *-HC
CKH2
CKLB2
NCK/ SCK/FCK
FJ
FK
Ending

Bearing parallel hand
Hand

RRC
GRC
RV3*
NHS
HR
LN
FH100
HAP
BSA2
BHA/BHG
LHA
LHAG
HKP
HLA/HLB
HLAG/HLBG
HEP
HCP
HMF
HMFb
HFP
HLC
HGP
FH500
HBL
HDL
HMD
HJL
BHE
CKG
CK
CKA
CKS
CKF
CKJ
CKL2
CKL2
*-HC
CKH2
CKLB2
NCK/
SCK/FCK
FJ
FK
Ending



Small jaw

● Material: Iron, engineering plastic



Features

A variety of small jaws is available to match user machining needs.

● **Socket and spigot section machined**

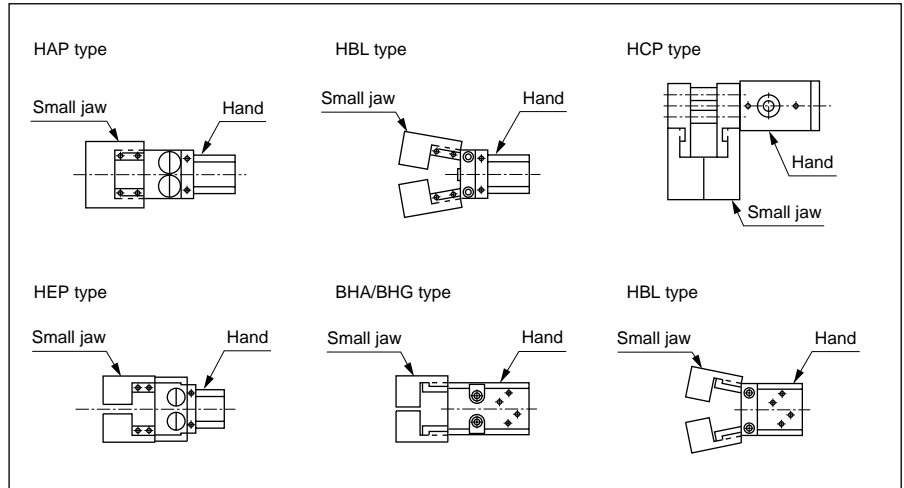
Standard section (socket and spigot section) machined.

Wide series variation to select according to workpiece shape and dimension.

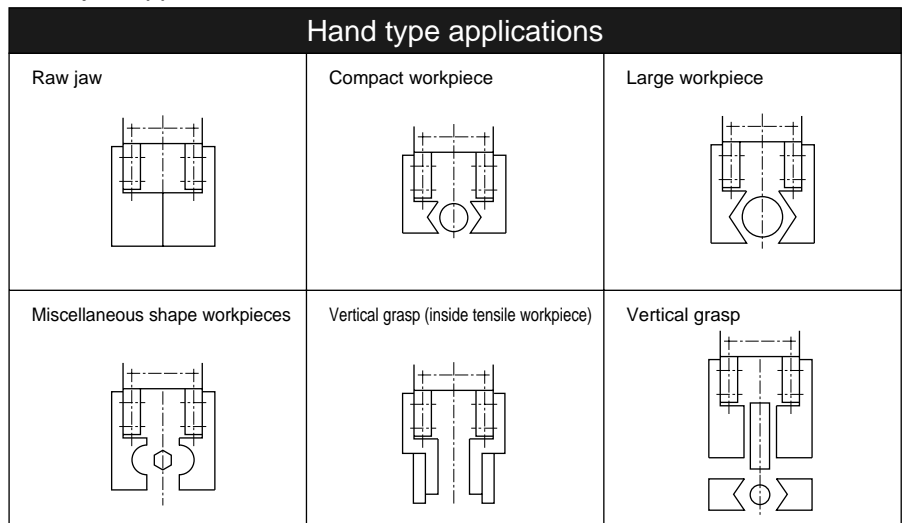
● **2 types of materials for small jaw**

Iron (S50C) and engineering plastic (MC nylon) are available according to material and working conditions of workpiece.

Applicable model for standard small jaw



Small jaw applications



How to order (Note: When ordering repair parts, 1 pc. is provided.)

BHA - **Y1** - **110**

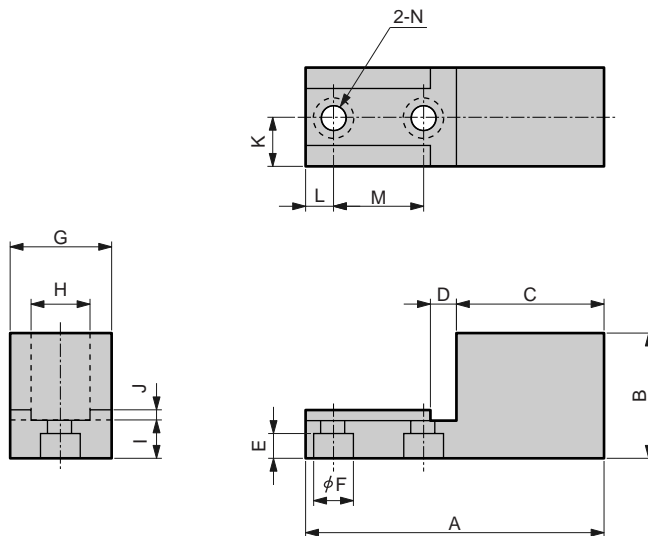
A Model **B** Material **C** Small jaw no.

A Model		B Material		C Small jaw no.			
Symbol	Descriptions	Symbol	Descriptions	Symbol	Applicable model	Symbol	Applicable model
FH	Feather hand (FH100/FH500)	Y1	Material S50C	110	HAP-1C	210	HEP-5CS
HAP	Parallel hand	Y2	Material MC nylon	120	HAP-2CS, HBL-2CS	310	FH110, FH510
BHA	Compact cross roller parallel hand			130	HAP-3CS, HBL-3CS	320	FH112, FH512
BHG	Compact cross roller parallel hand with rubber cover			140	HAP-4CS, HBL-4CS	330	FH116, FH516
HEP	Bearing parallel hand			150	HBL-1CS	340	FH120, FH520
HCP	Lateral parallel hand			160	HCP-2CS	350	FH125
HBL	Fulcrum hand			170	HCP-3CS	260	BHA-01CS1, BHG-01CS
				180	HCP-4CS	270	BHA-03CS1, BHG-03CS
				190	HEP-3.5CS	280	BHA-04CS1, BHG-04CS
				200	HEP-4CS	290	BHA-05CS1, BHG-05CS

Dimensions



● 110 to 350



*Material
Y1: S50C
Y2: MC nylon

Small jaw no.	Applicable model	*Material	Dimension (mm)														Weight (g)
			A	B	C	D	E	φF	G	H ₀ ^{+0.02}	I	J	K	L	M	φN	
110	HAP-1C	Y1	40	17	24.5	4.5	3	6	10	8	5	1.5	5	3.5	8	3.5	39
		Y2	21	9							8						
120	HAP-2CS HBL-2CS	Y1	50	26	28	5.5	4	8	20	10	6	2	10	5	12	4.5	135
		Y2		30							10						25
130	HAP-3CS HBL-3CS	Y1	60	33	30.5	6.5	5	9.5	20	12	8	2	10	5.5	18	5.5	194
		Y2															
140	HAP-4CS HBL-4CS	Y1	80	43	44	7.5	6	11	20	14	10	2	10	8	20	6.5	352
		Y2		50							17						53
150	HBL-1C	Y1	40	19	19	4.5	3	6	12	8	5	1.5	6	4	10	3.5	44
		Y2			21												7
160	HCP-2CS	Y1	60	29	33	9.5	5	9.5	22	18 ^{+0.02} _{-0.01}	9	2	11	11	10	5.5	206
		Y2															
170	HCP-3CS	Y1	70	35	34	11.5	6	11	25	20 ^{+0.02} _{-0.01}	10	2	12.5	8	20	6.5	303
		Y2															
180	HCP-4CS	Y1	80	40	42	13	6	11	35	25 ^{+0.02} _{-0.01}	10	2	17.5	10	20	6.5	563
		Y2	78	44										8			97
190	HEP-3.5CS	Y1	80	41	50	7.5	5	9.5	20	14	10	2	10	6	18	5.5	360
		Y2		49							18						70
200	HEP-4CS	Y1	120	60	81	11.5	6	11	30	22	13	2	15	8	20	6.5	1245
		Y2		77							30		16				270
210	HEP-5CS	Y1	135	60	91	14.5	8	14	30	28	16	2	15	10	25	8.5	1443
		Y2		79							38		19				382
310	FH110 FH510	Y1	29.5	15	14	4.5	3	6	12	7	4	1.5	6	3.5	8	3.5	22
		Y2															
320	FH112 FH512	Y1	29.5	16.5	14	4.5	3	6	12	7	4	1.5	6	3.5	8	3.5	23
		Y2															
330	FH116 FH516	Y1	39	20	20.5	5.5	4	8	12	10	5	1.5	6	3.5	10	4.5	48
		Y2															
340	FH120 FH520	Y1	39	22.5	20.5	5.5	4	8	12	10	5	1.5	6	3.5	10	4.5	53
		Y2		25.5							8						10
350	FH125	Y1	48.5	22.5	28.5	6.5	5	9.5	14	12	8	2	7	4.5	10	5.5	105
		Y2		25.5							14						17
260	BHA-01CS1 BHG-01CS	Y1	30	17.5	14.5	4.5	3	6	14	10	5	1.5	7	4	8	3.5	38
		Y2															
270	BHA-03CS1 BHG-03CS	Y1	40	21	21	5.5	4	8	14	10	6	1.5	7	4.5	10	4.5	61
		Y2		23							8						11
280	BHA-04CS1 BHG-04CS	Y1	40	26.5	21	5.5	4	8	14	10	6	1.5	7	4.5	10	4.5	76
		Y2		29.5							9						12
290	BHA-05CS1 BHG-05CS	Y1	50	33	28.5	6.5	5	9.5	14	10	8	2	7	6	10	5.5	123
		Y2		39							14						23

- RRC
- GRC
- RV3*
- NHS
- HR
- LN
- FH100
- HAP
- BSA2
- BHA/
BHG
- LHA
- LHAG
- HKP
- HLA/
HLB
- HLAG/
HLBG
- HEP
- HCP
- HMF
- HMFB
- HFP
- HLC
- HGP
- FH500
- HLB
- HDL
- HMD
- HJL
- BHE
- CKG
- CK
- CKA
- CKS
- CKF
- CKJ
- CKL2
- CKL2
*-HC
- CKH2
- CKLB2
- NCK/
SCK/FCK
- FJ
- FK

Ending

Hand