

* 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

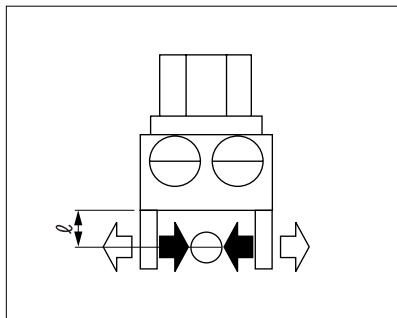
■ If the moving workpiece poses a possible risk to personnel or if fingers could be caught in the master key, etc., install a protective cover, etc.

■ 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.

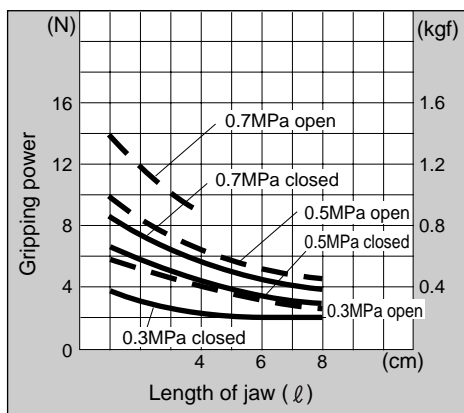
⚠ CAUTION

■ 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 .

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

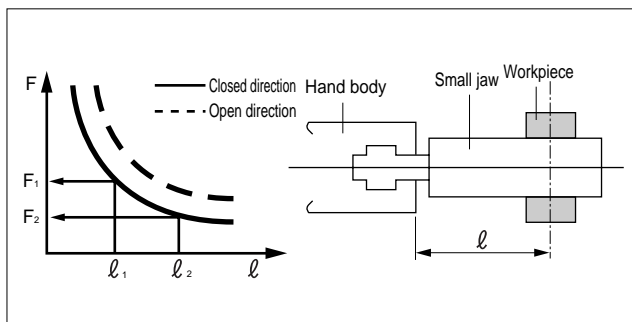
$$W \times 9.8 : (F \times N) = 1:10 \text{ (normal transfer)}$$

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

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

F : Gripping power (N)

N : Number of jaws



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

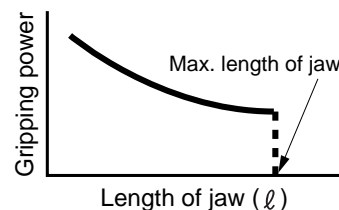
If the small jaw is long and heavy, inertia increases when opening and closing. This may cause play in the master key, and may adversely affect life.

- 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.

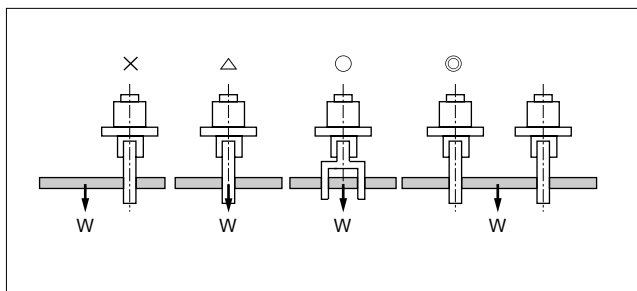
$$W < 1/4H \text{ (1 pc.)}$$

W : Weight of small jaw

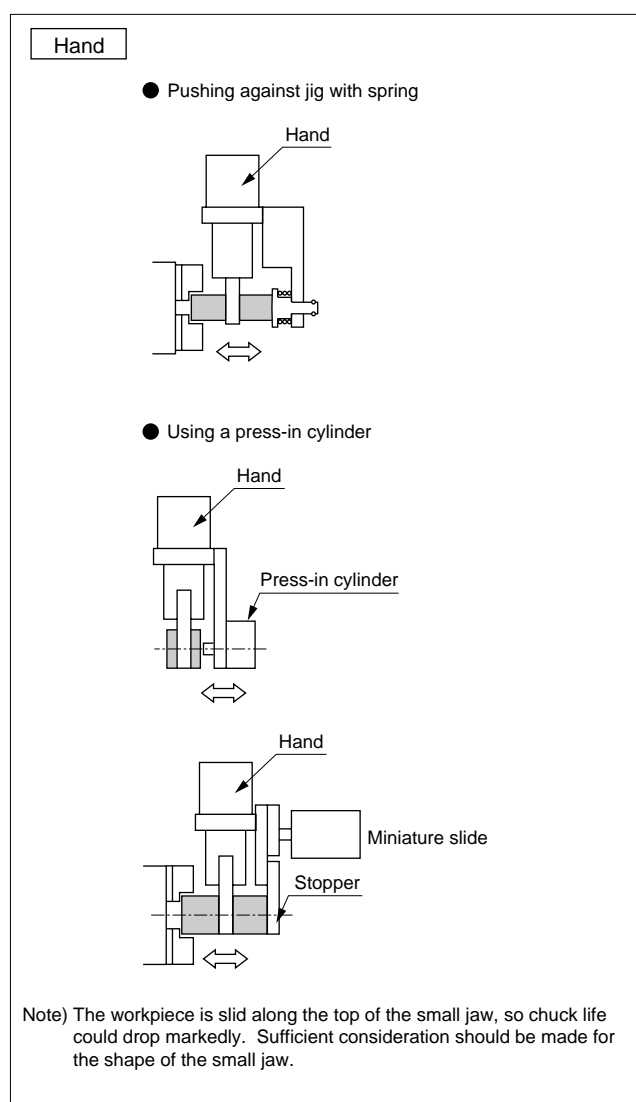
H : Product weight of hand



- 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
HBL
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

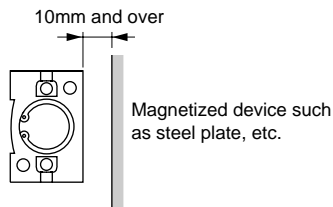
Installation & Adjustment

1. COMMON

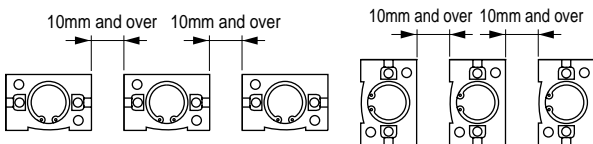
CAUTION

■ 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.

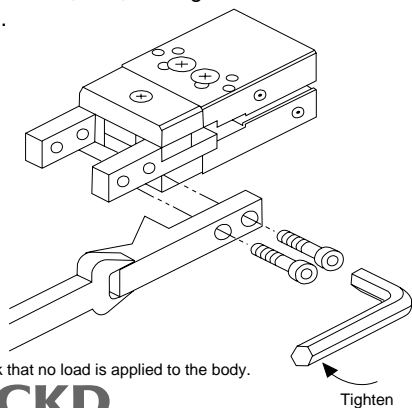


■ If the clamp is operated carefully and slowly as possible, accuracy increases. Repeatability also stabilizes.

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

Installing the jaw

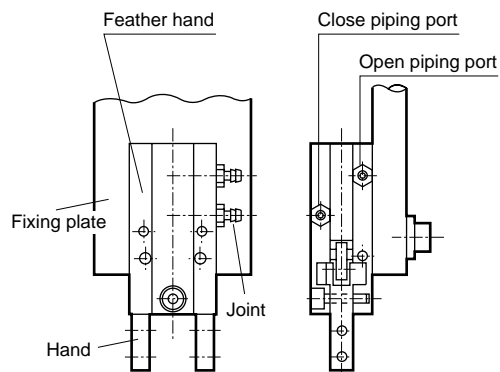
To prevent any effect onto the hand, support the master key with a wrench, etc., and tighten so that the master key is not twisted.



2. Installation

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

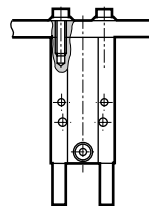
■ If there is a limit to the thickness direction of the FH series body, the available piping joint will be limited. Refer to the following joints.



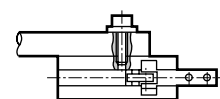
Model	FH*10	FH*12	FH*16	FH*20	FH*25		
Port size	M3			M5			
Joint	Model no.	Applicable O.D. (mm)	Effective sectional area (mm ²)	Model no.	Applicable O.D. (mm)	Effective sectional area (mm ²)	
Barbed joint	Straight FTS	FTS4-M3	φ3.2·φ4	0.4	FTS4-M5	φ3.2·φ4	2.1
		-	-	-	FTS6-M5	φ6	4.1

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

● Top installation



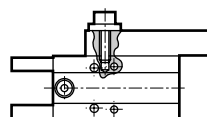
● Front installation



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.

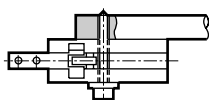
Note) Check that the fixed plate does not overlap the master jaw support.

● 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

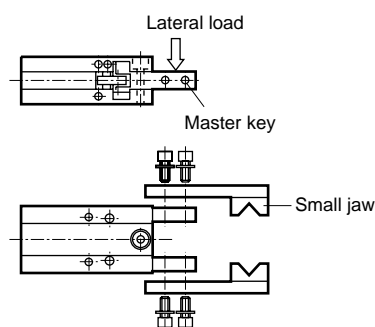


Note) A through hall cannot be used when a switch is provided.

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

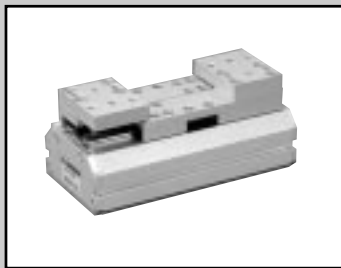
During Use & Maintenance

⚠ 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

Hand



Thin type long stroke parallel hand Double acting
(Standard, long stroke 1)

HLC Series

- Operational stroke length: Standard 40, 50, 60, 70
Long stroke 1 80, 100, 120, 140



Specifications

Descriptions	HLC							
	16CS		20CS		25CS		30CS	
Size	Standard	L1	Standard	L1	Standard	L1	Standard	L1
Cylinder bore size mm	$\phi 16 \times 2$		$\phi 20 \times 2$		$\phi 25 \times 2$		$\phi 30 \times 2$	
Working fluid	Compressed air							
Max. working pressure MPa	0.7							
Min. working pressure MPa	0.2							
Ambient temperature °C	5 to 60							
Port size	M5							
Operational stroke length mm	40	80	50	100	60	120	70	140
Capacity of reciprocating cm ³	16.1	32.2	31.4	62.8	58.9	117.8	99	198
Repeatability mm	± 0.03							
Product weight kg	0.71	0.85	1.03	1.4	1.62	2.23	2.74	3.69
Lubrication	Not required (when lubricating, use turbine oil Class 1 ISO VG32)							

Switch specifications

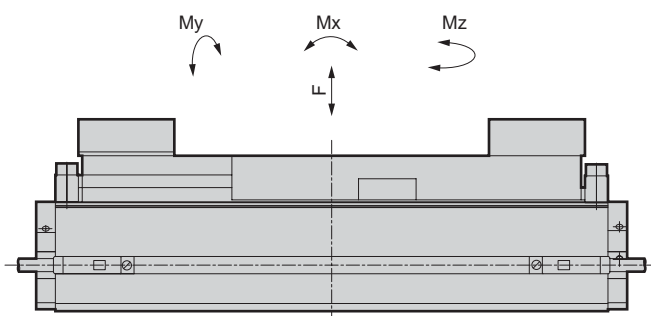
Descriptions	Proximity 2 wire	Proximity 3 wire
	T2H/T2V	T3H/T3V
Applications	Programmable controller	Programmable controller, relay
Output method	-	NPN output
Power voltage	-	10 to 28 VDC
Load voltage/current	10 to 30 VDC, 5 to 20 mA (Note 1)	30 VDC, 100mA or less
Light	LED (ON lighting)	
Maximum shock resistance	980m/s ²	
Leakage current	1mA or less	10 μ A or less

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)

Allowable load and allowable moment of HLC

Allowable load and allowable moment	F	Mx	Mz	My
Model no.	N	N·m	N·m	N·m
HLC-16CS	95	33.8	33.8	3.43
HLC-16CS-L1	95	49.5	49.5	3.43
HLC-20CS	95	50.0	50.0	3.43
HLC-20CS-L1	95	68.1	68.1	3.43
HLC-25CS	157	78.9	78.9	6.86
HLC-25CS-L1	157	120.0	120.0	6.86
HLC-30CS	281	152.0	152.0	13.72
HLC-30CS-L1	281	224.0	224.0	13.72



How to order

HLC - **20CS** - **L1** - **T2H** - **R**

A Size

B Option

C Switch model no.
* indicates lead wire length.

D Switch quantity

Symbol	Descriptions			
A Size				
	16CS			
	20CS			
	25CS			
	30CS			
B Option				
Blank	Standard			
L1	Long stroke 1			
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			

<Example of model number>

HLC-20CS-L1-T2H-R

Model: Thin long stroke parallel hand

- A** Size : 20CS
- B** Option : Long stroke 1
- C** Switch model no. : Proximity T2H switch, lead wire 1m
- D** Switch quantity : One on open side

How to order switch

SW - **T2H**

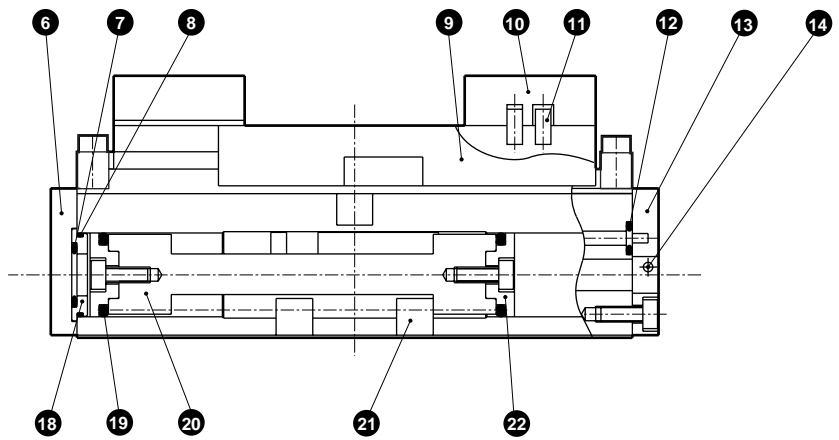
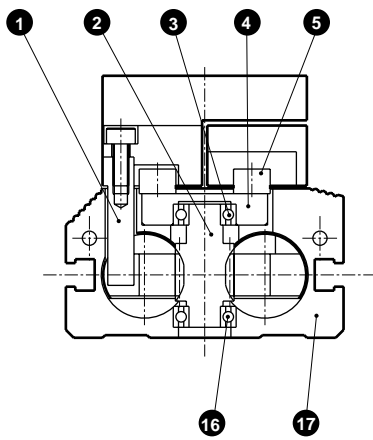
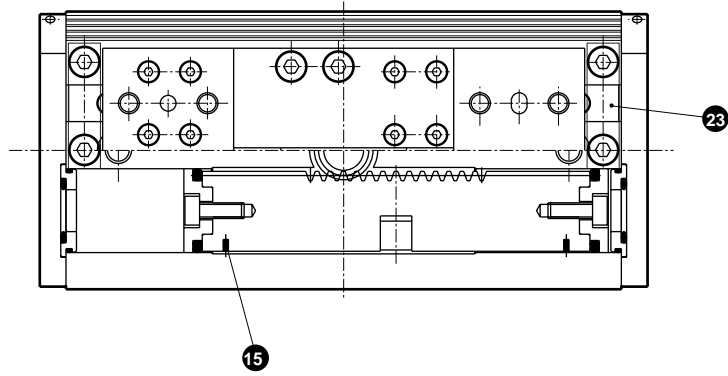
Switch model no.
(Item above **C**)

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

Thin long stroke parallel hand
Hand

Internal structure and parts list

- HLC-16CS to 30CS (standard)
- HLC-16CS to 30CS-L1



Parts list

No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Rack joint	Carbon steel		13	Side plate 1	Aluminum alloy	
2	Pinion	Stainless steel		14	Steel ball	Stainless steel	
3	Single row deep groove ball bearing			15	Semicircle magnet		
4	Bearing holder	Aluminum alloy		16	Single row deep groove ball bearing		Only 20CS
5	LM guide			17	Body	Aluminum alloy	
6	Side plate 2	Aluminum alloy		18	Cylinder guard	Aluminum alloy	
7	Cylinder sealant 1	Nitrile rubber		19	Piston seal	Nitrile rubber	
8	Cylinder sealant 2	Nitrile rubber		20	Rack	Stainless steel	
9	LM plate	Aluminum alloy		21	Key	16CS to 25CS carbon steel 30CS stainless steel	
10	Master key	Aluminum alloy		22	Piston	Acetar resin	
11	Dowel pin			23	Stiffening plate	Stainless steel	Only 16, 20CS
12	Gasket	Nitrile rubber					

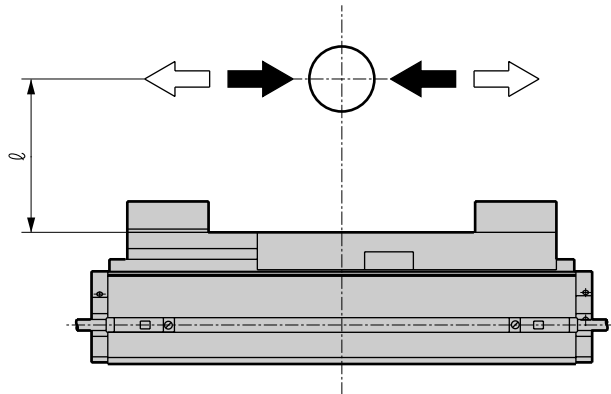
Ending

Gripping power performance data

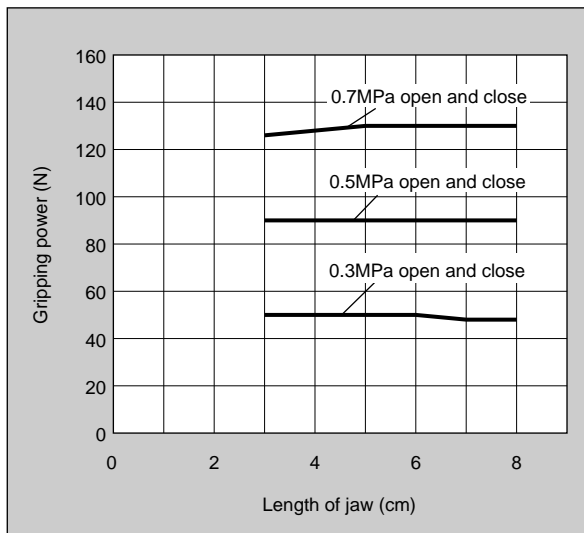
Gripping power that functions to open and closed directions with jaw length l of hand at supply pressure 0.3, 0.5 and 0.7 MPa is shown.

● Both open direction (◀) closed direction (▶)
 — (Shown with continuous line)

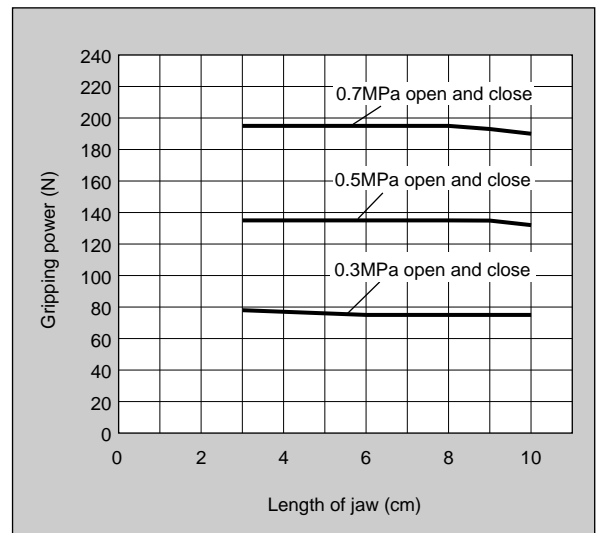
(Note) Grip performance data indicates the grip for one jaw. Since two jaws are used, double the grip in the graph when making a selection.



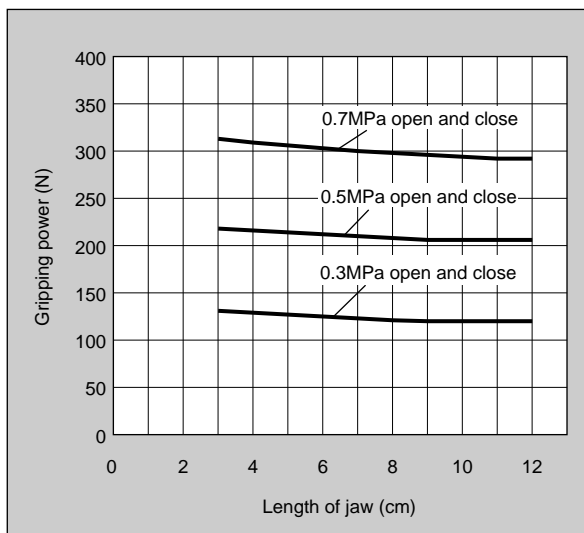
● HLC-16CS



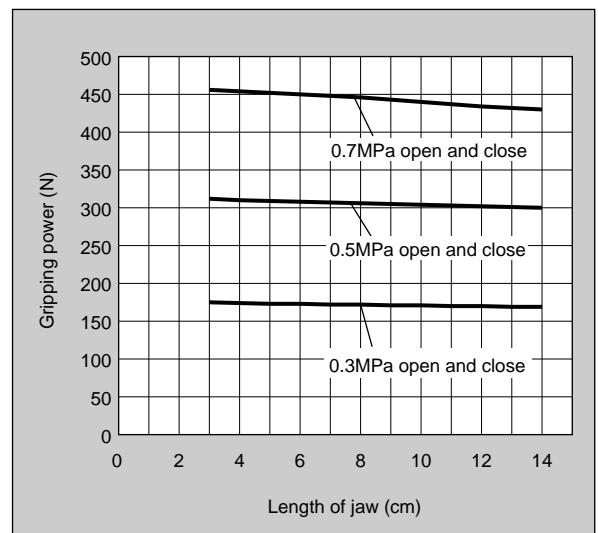
● HLC-20CS



● HLC-25CS



● HLC-30CS



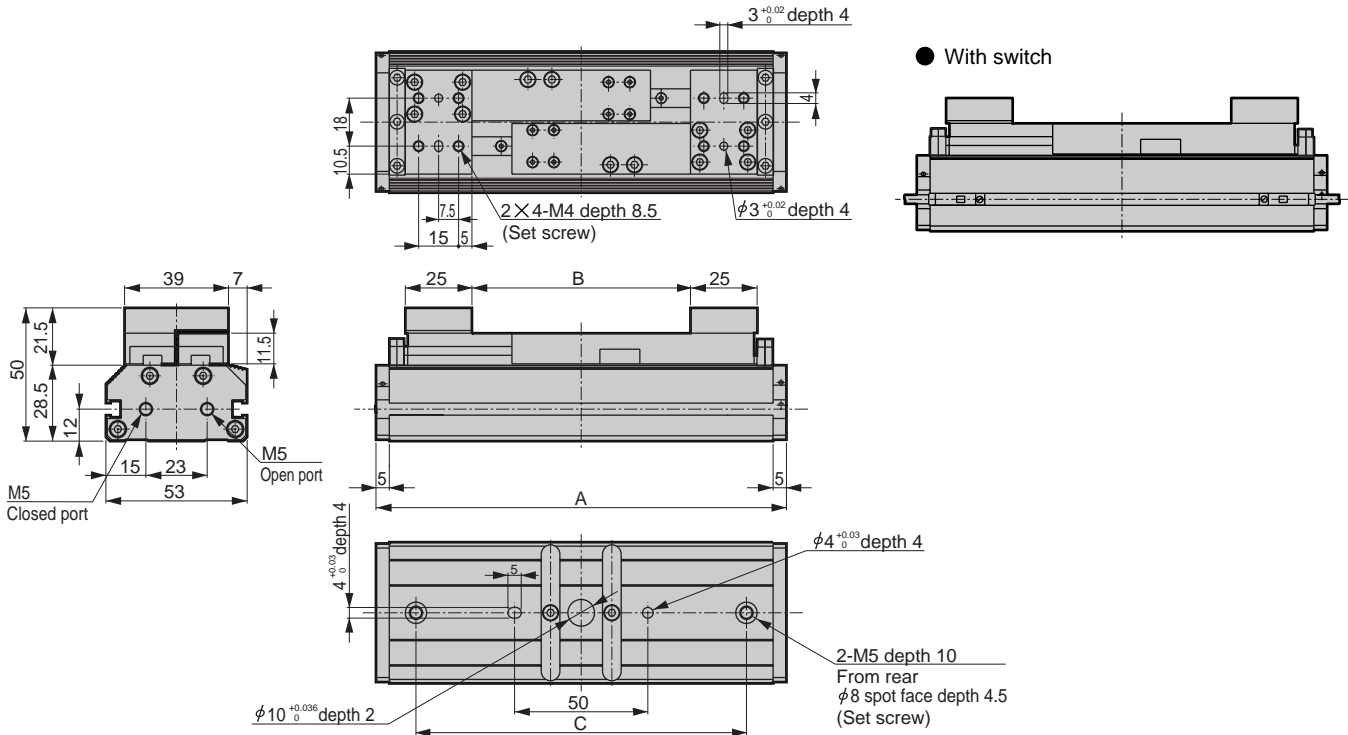
- RRC
- GRC
- RV3*
- NHS
- HR
- LN
- FH100
- HAP
- BSA2
- BHA/BHG
- LHA
- LHAG
- HKP
- HLA/HLB
- HLAG/HLBG
- HEP
- HCP
- HMF
- HMFB
- HFP
- HLC**
- HGP
- FH500
- HLB
- HDL
- HMD
- HJL
- BHE
- CKG
- CK
- CKA
- CKS
- CKF
- CKJ
- CKL2
- CKL2 *-HC
- CKH2
- CKLB2
- NCK/SCK/FCK
- FJ
- FK
- Ending

Thin long stroke parallel hand
Hand

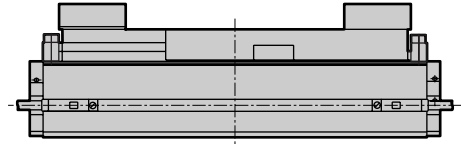
Dimensions



● HLC-16CS standard/L1

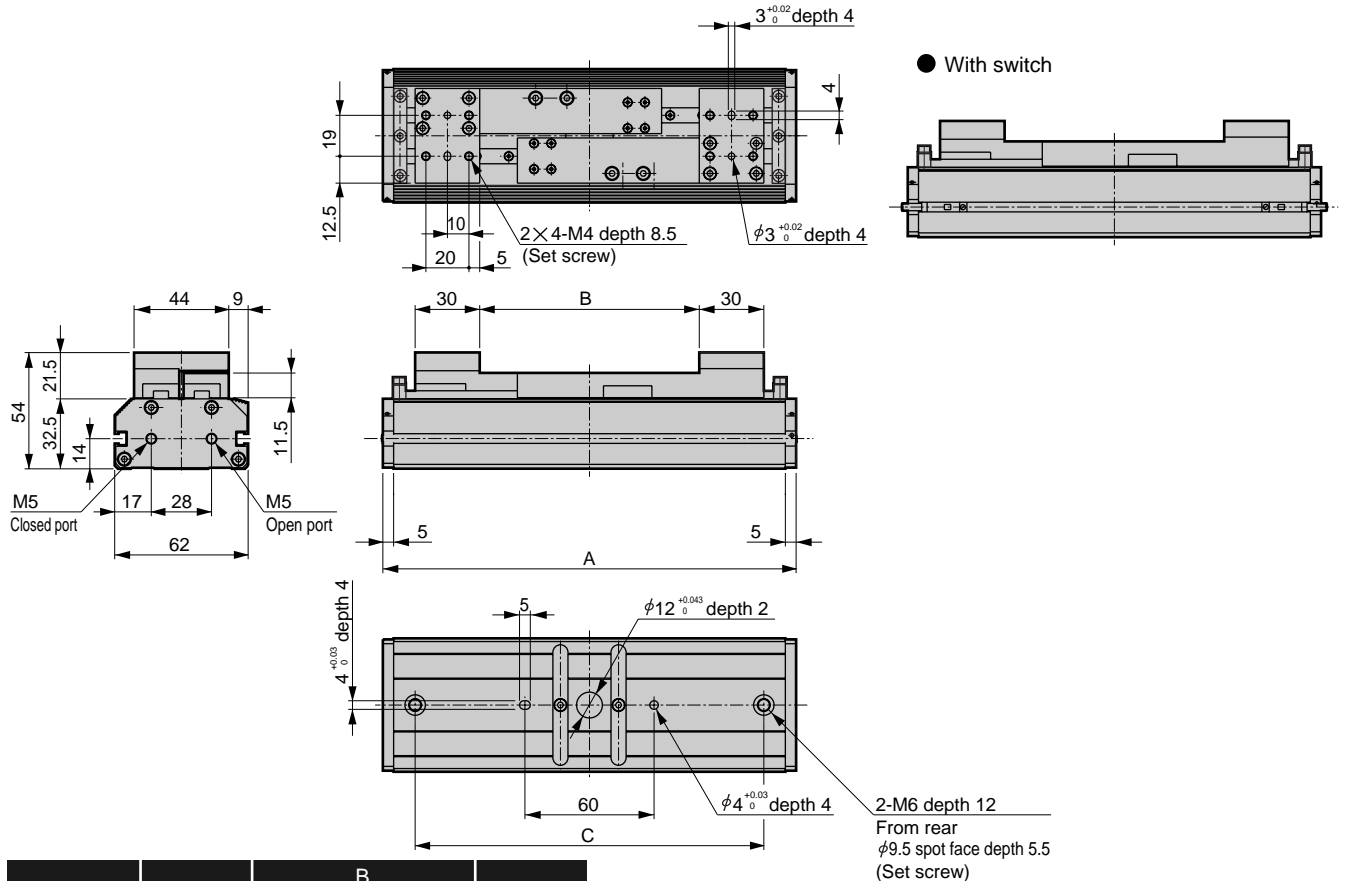


● With switch

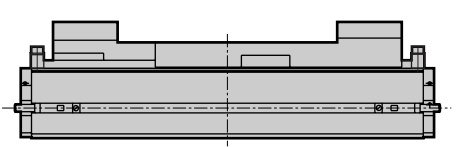


Symbol	A	B		C
		MAX	MIN	
Standard	116	42	2	86
L1	154	82	2	124

● HLC-20CS standard/L1



● With switch



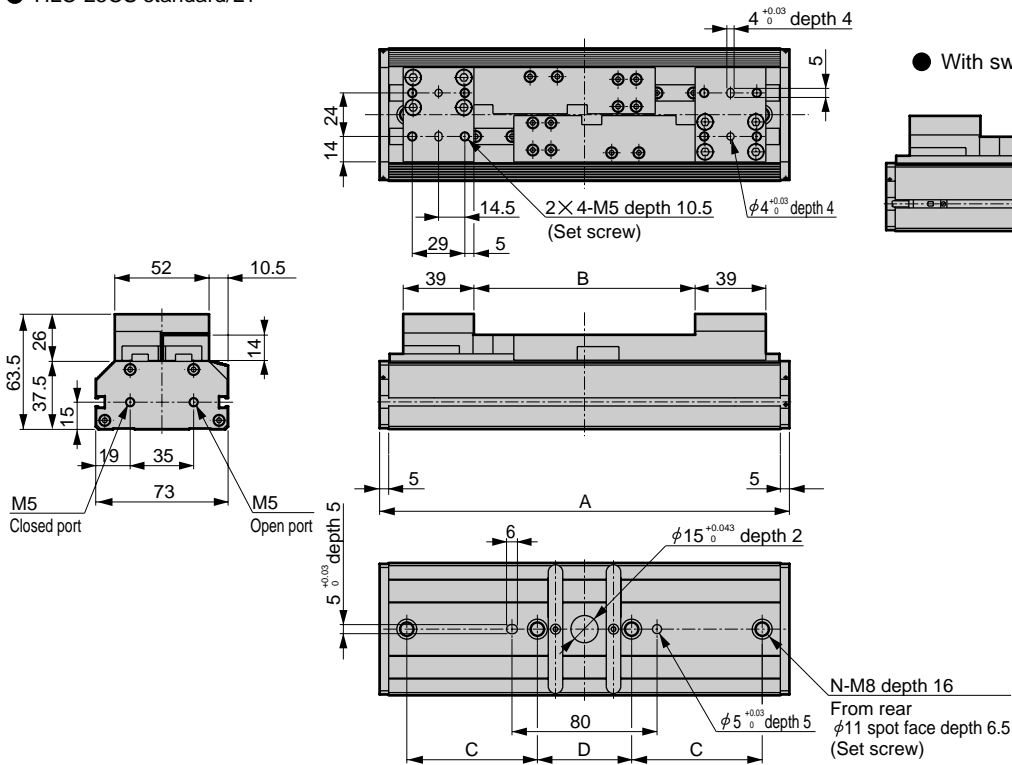
Symbol	A	B		C
		MAX	MIN	
Standard	132	52	2	102
L1	192	102	2	162

- 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

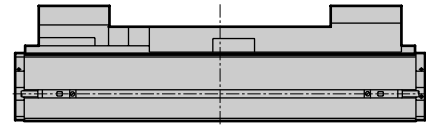
Dimensions



● HLC-25CS standard/L1

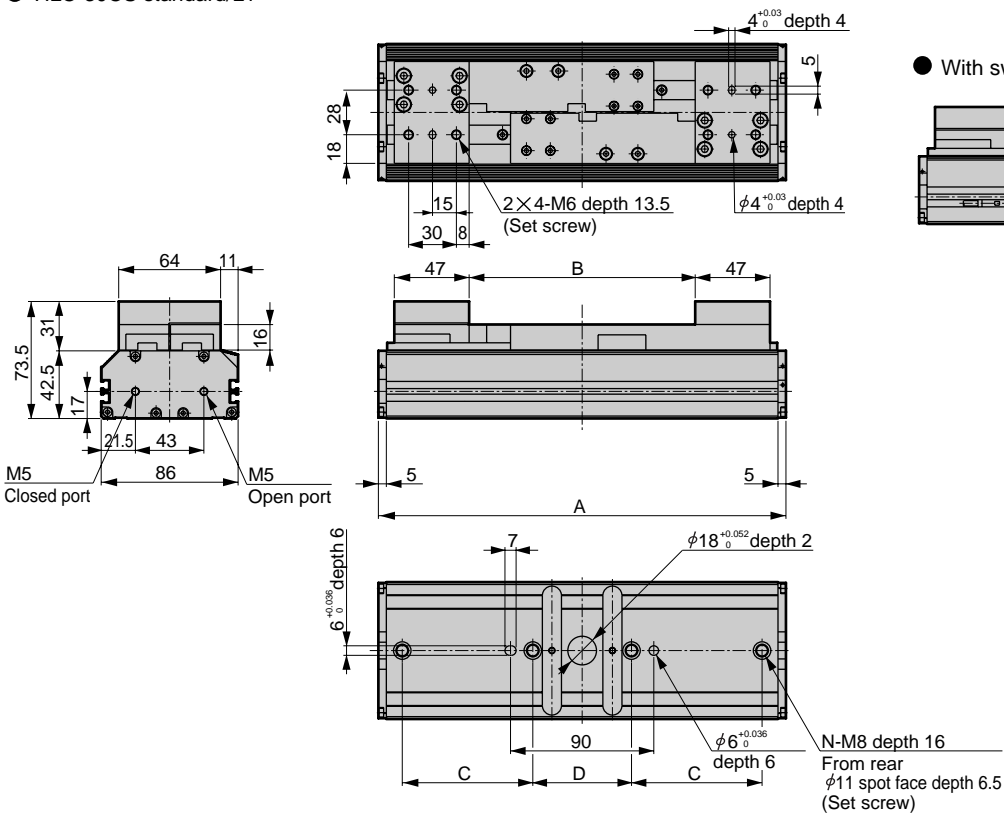


● With switch

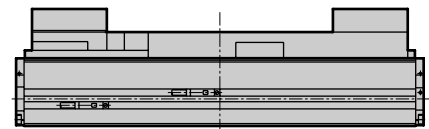


Symbol	A	B		C	D	N
		MAX	MIN			
Standard	152	62	2	0	122	2
L1	226	122	2	72	52	4

● HLC-30CS standard/L1



● With switch



Symbol	A	B		C	D	N
		MAX	MIN			
Standard	174	72	2	0	144	2
L1	256	142	2	82	62	4

- 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

Thin long stroke parallel hand
Hand