

LCW

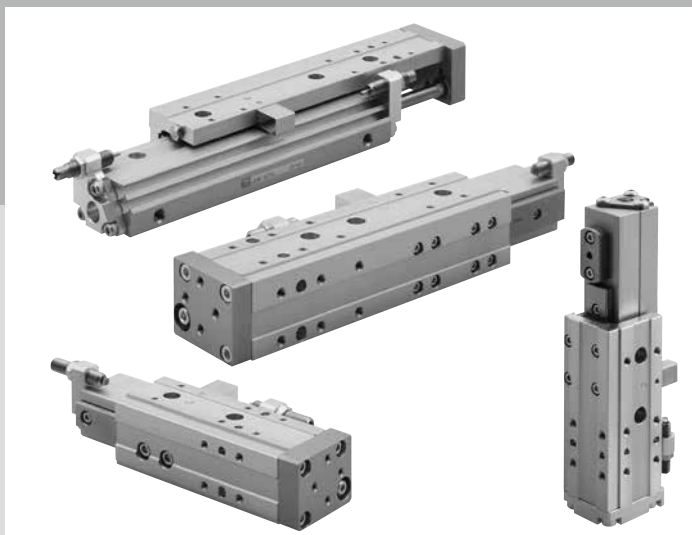
Linear slide cylinder

Combined functions cylinder

ø12/ø16/ø20

Overview

A basic model linear slide cylinder model featuring the specs most used by customers provided as standard.



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Series variation	202
● Double acting/single rod (LCW)	204
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LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
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JSB3
LMB
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CAC4
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SpdContr
Ending

Basic model added

Specs most used by customers are provided as standard!
Selecting the model is easier



LCW Series



Three points for ease of selection

1. Combination of 3 bore sizes

ø12 ø16 ø20

A single piston is used.

(LCR ø8, ø12, ø16 equiv.)

2. Stroke length aggregated to 3 pitches

30 mm 50 mm 75 mm

3. Stroke adjustment function available as standard

3 types of stoppers are available.



■ Rubber cushion stopper (Standard)



■ Metal stopper with rubber cushion (M)



■ Shock absorber stopper (A)

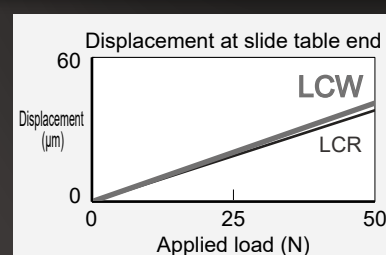


Points regarding reliability

High rigidity

In the spirit of LCR

Enables high rigidity and light weight.



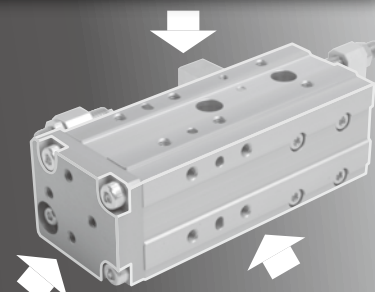
to linear slide cylinders

LCM
LCR
LCG
LCW
LCX
STM
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STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
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Ending

Three points for ease of use

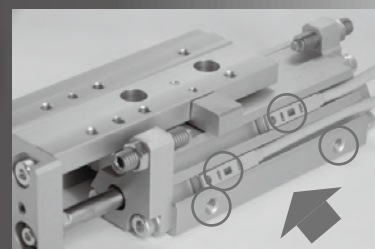
1. 3-surface mounting

First in the industry!! Uses an innovative L-shaped table.
Flexibility in design is greatly improved.



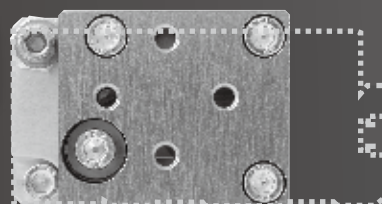
2. Piping and wiring direction on the same surface

Neat wiring and piping.
Workability and visibility are improved.



3. Compact, space saving

Reduction of width direction by 27% and area ratio by 20%.
Stopper position has been revised.



Area ratio
reduced by
20%!

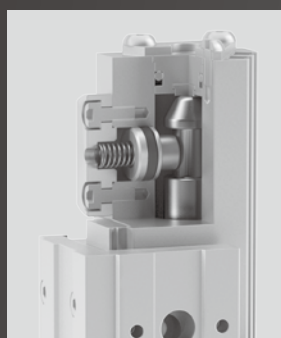
(compared to LCR)

Points regarding safety

Position locking available

First in the industry!!
In addition to the head side, the rod side * also supports position locking.

* Made-to-order product



Position locking mechanism



Head side



Rod side*

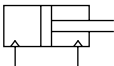
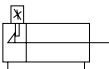
Series variation



Linear slide cylinder LCW Series

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
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RRC
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Hand
Chuk
MecHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

● : Standard ○ : Option ■ : Not available

Variation	Model No. JIS symbol	Bore size (mm)	Stroke length (mm)			Stopper					Switch	Page
						Cushion stopper	Rubber cushion long stopper	Metal stopper with rubber cushion	Metal long stopper with rubber cushion	Shock absorber stopper		
			30	50	75	Blank	S	M	MS	A		
Double acting/ single rod	LCW 	ø12	●	●	●	●	○	○	○	○	○	204
		ø16	●	●	●	●	○	○	○	○	○	
		ø20	●	●	●	●	○	○	○	○	○	
Double acting/ position locking	LCW-Q 	ø12	●	●	●	●	○	○	○	○	○	224
		ø16	●	●	●	●	○	○	○	○	○	
		ø20	●	●	●	●	○	○	○	○	○	

MEMO

LCM
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Ending

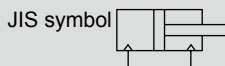
LCM
 LCR
 LCG
LCW
 LCX
 STM
 STG
 STS/STL
 STR2
 UCA2
 ULK*
 JSK/M2
 JSG
 JSC3/JSC4
 USSD
 UFCD
 USC
 UB
 JSB3
 LMB
 LML
 HCM
 HCA
 LBC
 CAC4
 UCAC2
 CAC-N
 UCAC-N
 RCS2
 RCC2
 PCC
 SHC
 MCP
 GLC
 MFC
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 Ending



Linear slide cylinder Double acting/single rod

LCW Series

● Bore size: $\varnothing 12/\varnothing 16/\varnothing 20$



Specifications

Item	LCW		
Bore size mm	$\varnothing 12$	$\varnothing 16$	$\varnothing 20$
Actuation	Double acting		
Working fluid	Compressed air		
Max. working pressure MPa	0.7 (≈ 100 psi, 7 bar)		
Min. working pressure MPa	0.15 (≈ 22 psi, 1.5 bar) (*1)		
Proof pressure MPa	1.05 (≈ 150 psi, 10.5 bar)		
Ambient temperature $^{\circ}\text{C}$	-10 (14 $^{\circ}\text{F}$) to 60 (140 $^{\circ}\text{F}$) (no freezing) (*2)		
Port size	M5		
Working piston speed mm/s	50 to 500 (*3)		
Cushion	Rubber cushion		
Lubrication	Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)		
Allowable absorbed energy J	* Refer to Table 3 on page 243.		

*1: Use at a pressure of 0.4 MPa and over when using a metal stopper with rubber cushion in order to allow metal contact at the end of the stroke.

*2: Operate at -5 to 60 $^{\circ}\text{C}$ when using a shock absorber stopper.

*3: Keep within 50 to 200 mm/s when using a metal stopper with rubber cushion.

Stroke length

Bore size (mm)	Standard stroke length (mm)
$\varnothing 12$	30/50/75
$\varnothing 16$	
$\varnothing 20$	

Note: Products with stroke lengths other than the above are not available.

Adjustable stroke range

(Unit: mm)

Bore size (mm)	Standard rubber cushion				Metal with rubber cushion				Shock absorber	
	Standard stroke length		Custom stroke compatible (S)		Standard stroke length (M)		Custom stroke compatible (MS)		Standard stroke length (A)	
	PUSH	PULL	PUSH	PULL	PUSH	PULL	PUSH	PULL	PUSH	PULL
$\varnothing 12$	10	10	28	10	9	11.5	28	11.5	4	6.5
$\varnothing 16$	7.5	7.5	25	7.5	6	8.5	25	8.5	1.5	3.5
$\varnothing 20$	8	8	25	8	7.5	12	25	12	12.5	17

Theoretical thrust table

(Unit: N)

Bore size (mm)	Operating direction	Working pressure MPa						
		0.15	0.2	0.3	0.4	0.5	0.6	0.7
$\varnothing 12$	PUSH	17	23	34	45	57	68	79
	PULL	13	17	25	34	42	51	59
$\varnothing 16$	PUSH	30	40	60	80	101	121	141
	PULL	26	35	52	69	86	104	121
$\varnothing 20$	PUSH	47	63	94	126	157	188	220
	PULL	40	53	79	106	132	158	185

Switch specifications

Item	Reed 2-wire				Proximity 2-wire		Proximity 3-wire	
	T0H/T0V		T5H/T5V		T2H/T2V	T2WH/T2WV	T3H/T3V	T3WH/T3WV
Applications	For programmable controller, relay		For programmable controller, relay, IC circuit (without indicator lamp), serial connection		Dedicated for programmable controller		For programmable controller, relay	
Output method	-		-		-		NPN output	
Power supply voltage	-		-		-		10 to 28 VDC	
Load voltage	12/24 VDC	110 VAC	5/12/24 VDC	110 VAC	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 50 mA	7 to 20 mA	50 mA or less	20 mA or less	5 to 20 mA		100 mA or less	50 mA or less
Indicator lamp	LED (Lit when ON)		Without indicator lamp		LED (Lit when ON)	Red/green LED (Lit when ON)	LED (Lit when ON)	Red/green LED (Lit when ON)
Leakage current	0 mA				1 mA or less		10 μA or less	
Weight	g 1 m:18 3 m:49 5 m:80							

Item	Proximity 2-wire	Proximity 3-wire	Proximity 2-wire		Proximity 3-wire	
	F2S	F3S	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Dedicated for programmable controller	For programmable controller, relay	Dedicated for programmable controller		For programmable controller, relay	
Output method	-	NPN output	-		NPN output	
Power supply voltage	-	10 to 28 VDC	-		10 to 28 VDC	
Load voltage	10 to 30 VDC	30 VDC or less	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 20 mA	50 mA or less	5 to 20 mA		50 mA or less	
Indicator lamp	Red LED (Lit when ON)		LED (Lit when ON)	Red/green LED (Lit when ON)	LED (Lit when ON)	Red/green LED (Lit when ON)
Leakage current	1 mA or less	10 μA or less	1 mA or less		10 μA or less	
Weight	g 1 m:10 3 m:29					

*1 : Refer to Ending Page 1 for detailed switch specifications and dimensions.

*2 : Switches other than the above models, such as switches with connectors, are also available. Refer to Ending Page 1.

*3 : The max. load current is 20 mA at 25°C. The current is lower than 20 mA if the operating ambient temperature around the switch is higher than 25°C.
(5 to 10 mA at 60°C)

*4 : The F type switch uses a bend-resistant lead wire.

Cylinder weight

● Basic (Unit: g)

Bore size (mm)	Stroke length (mm)		
	30	50	75
ø12	240	370	380
ø16	380	390	600
ø20	690	720	1070

● Stopper additional part (Unit: g)

Bore size (mm)	Stopper code		
	S	MS	A
ø12	3	3	0
ø16	3	3	0
ø20	5	5	14

For stopper code M, the weight is the same as the basic.

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

How to order

● Without switch (built-in magnet for switch)

LCW - 16 - 30 - R - A

● With switch (built-in magnet for switch)

LCW - 16 - 30 - R - T2H - R - A

● Bore size

● Stroke length

● Piping direction

● Switch model No.

[Example of model No.]

LCW-16-30-R-T2H-D-A

Model: Linear slide cylinder

● Bore size : $\phi 16$

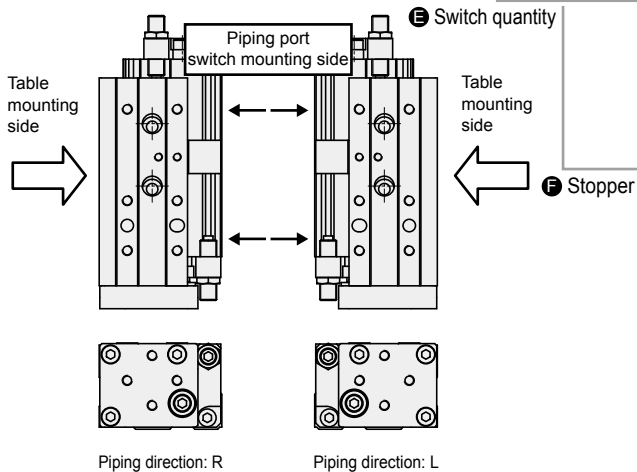
● Stroke length : 30 mm

● Piping direction : Right from rod side

● Switch model No. : Proximity switch T2H,
lead wire 1 m

● Switch quantity : 2

● Stopper : Shock absorber



Code	Description
● Bore size (mm)	
12	$\phi 12$
16	$\phi 16$
20	$\phi 20$

● Stroke length (mm)	
30	30
50	50
75	75

● Piping direction	
R	Right from rod side
L	Left from rod side

● Switch model No.									
Axial lead wire	Radial lead wire	Contact	Voltage		Display	Lead wire	Bore size		
			AC	DC			$\phi 12$	$\phi 16$	$\phi 20$
-	F2S*	Proximity		●	1-color display	2-wire	●		
-	F3S*			●		3-wire			
F2H*	F2V*			●		2-wire			
F3H*	F3V*			●		3-wire			
F2YH*	F2YV*			●	2-color display	2-wire			
F3YH*	F3YV*			●		3-wire			
T0H*	T0V*	Reed	●	●	1-color display	2-wire			
T5H*	T5V*		●	●	Without indicator lamp				
T2H*	T2V*	Proximity		●	1-color display	2-wire		●	●
T3H*	T3V*			●	display	3-wire			
T2WH*	T2WV*			●	2-color display	2-wire			
T3WH*	T3WV*			●	display	3-wire			

* Lead wire length									
Blank	1 m (standard)								●
3	3 m (option)								●
5	5 m (option)								●

● Switch quantity	
R	1 on rod side
H	1 on head side
D	2

● Stopper	
Blank	Cushion stopper
S	Rubber cushion long stopper (custom stroke compatible)
M	Metal stopper with rubber cushion
MS	Long metal stopper with rubber cushion (custom stroke compatible)
A	Shock absorber stopper

How to order switch

For $\varnothing 12$

SW - F2H

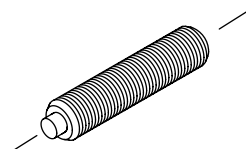
Switch model No.
(Item **D** on page 206)

For $\varnothing 16, \varnothing 20$

SW - T0H

Switch model No.
(Item **D** on page 206)

How to order discrete rubber cushion stopper



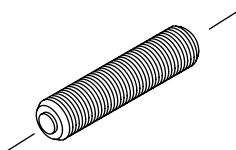
LCW - 12 - S01

Bore size
(Item **A** on page 206)

A Adjustable stroke range	Bore size	Thread size	Adjustable stroke length
S01 (Standard)	$\varnothing 12$	M6 $\times$ 1.0	Single side 10 mm
	$\varnothing 16$	M6 $\times$ 1.0	Single side 7.5 mm
	$\varnothing 20$	M8 $\times$ 1.0	Single side 8 mm
S02 (Long)	$\varnothing 12$	M6 $\times$ 1.0	Single side 28 mm
	$\varnothing 16$	M6 $\times$ 1.0	Single side 25 mm
	$\varnothing 20$	M8 $\times$ 1.0	Single side 25 mm

*1: S02 can also be mounted to the head side.
Adjustable stroke length in that case is the same as above.

How to order discrete metal stopper with rubber cushion



LCW - 12 - M01

Bore size
(Item **A** on page 206)

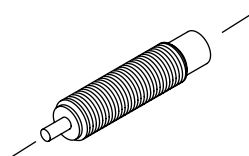
A Adjustable stroke range	Bore size	Thread size	Adjustable stroke length	
			PUSH	PULL
M01 (Standard)	$\varnothing 12$	M6 $\times$ 1.0	Single side 9 mm	Single side 11.5 mm
	$\varnothing 16$	M6 $\times$ 1.0	Single side 6 mm	Single side 8.5 mm
	$\varnothing 20$	M8 $\times$ 1.0	Single side 7.5 mm	Single side 12 mm
M02 (Long)	$\varnothing 12$	M6 $\times$ 1.0	Single side 28 mm	Single side 30 mm
	$\varnothing 16$	M6 $\times$ 1.0	Single side 25 mm	Single side 27 mm
	$\varnothing 20$	M8 $\times$ 1.0	Single side 25 mm	Single side 30 mm

*1: Cannot be changed from the rubber cushion stopper.

*2: Cannot be changed from the shock absorber stopper.
($\varnothing 12, \varnothing 16$ only)

*3: M02 can also be mounted to the head side.
Adjustable stroke length in that case is the same as above.

How to order discrete shock absorber stopper



LCW - 12 - A01

Bore size
(Item **A** on page 206)

Bore size	Thread size
$\varnothing 12$	M6 $\times$ 0.75
$\varnothing 16$	M6 $\times$ 0.75
$\varnothing 20$	M8 $\times$ 1.0

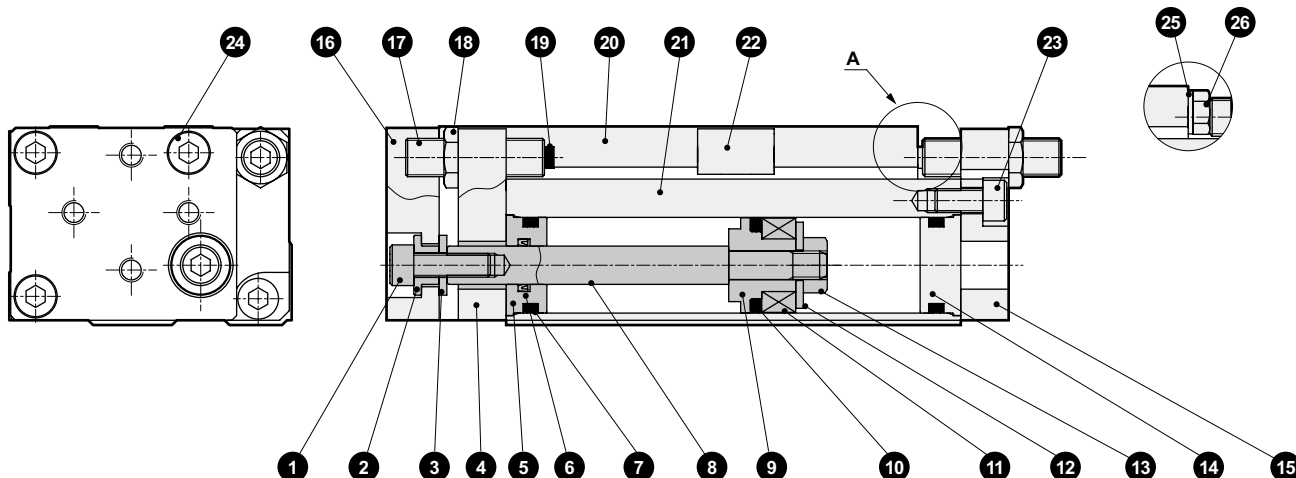
*1: Cannot be changed from the rubber cushion stopper.

*2: Cannot be changed from the metal stopper with rubber cushion.
($\varnothing 12, \varnothing 16$ only)

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
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LMB
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CAC4
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CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
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Hand
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MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Internal structure and parts list

For metal stopper with A part rubber cushion (M, MS), shock absorber (A)



Parts list

No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	Hexagon socket head cap screw	Steel	Zinc chromate	16	End plate	Aluminum alloy	Hard alumite
2	Floating bush A	Stainless steel		17	Stopper bolt	Steel	Nickeling
3	Floating bush B	Stainless steel		18	Hexagon nut	Steel	Nickeling
4	Cover holder	Aluminum alloy	Alumite	19	Cushion rubber	Urethane rubber	
5	Rod cover	Aluminum alloy	Hard alumite	20	Table	Aluminum alloy	Alumite
6	Rod packing	Nitrile rubber		21	Body	Aluminum alloy	Hard alumite
7	O-ring	Nitrile rubber		22	Stopper block	Steel	Nickeling
8	Piston rod	Stainless steel		23	Hexagon socket head cap screw	Steel	Zinc chromate
9	Piston	Aluminum alloy	Chromate	24	Hexagon socket head cap screw	Steel	Zinc chromate
10	Piston packing	Nitrile rubber		25	Plain washer	Stainless steel	
11	Magnet	-		26	Hexagon head bolt	Stainless steel	
12	Plain washer	Stainless steel					
13	Hexagon nut	Stainless steel					
14	Head cover	Aluminum alloy	Chromate				
15	Cover holder	Aluminum alloy	Alumite				

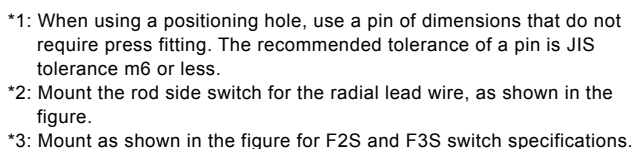
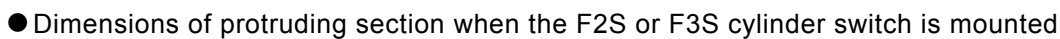
Repair parts list

Bore size (mm)	Kit No.	Repair parts No.
ø12	LCW-12K	6 7 10 19
ø16	LCW-16K	
ø20	LCW-20K	

MEMO

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
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ShkAbs
FJ
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SpdContr
Ending

● LCW-12
Stroke length: 30 Piping direction: R

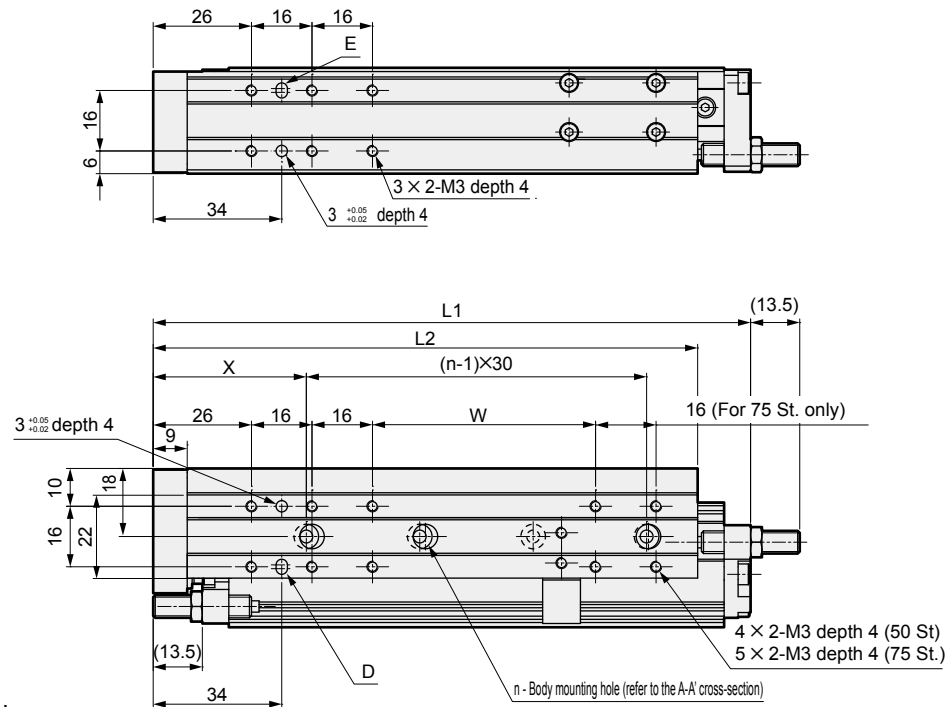


Dimensions (bore size: $\phi 12$)

● LCW-12

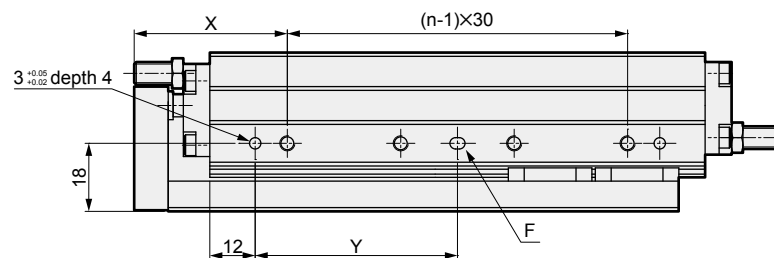
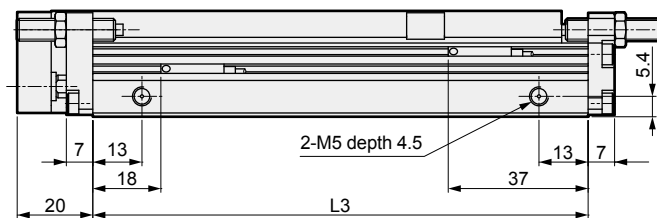
Stroke length: 50, 75 Piping direction: R

(Body mounting hole in the figure shows 75 mm stroke length)

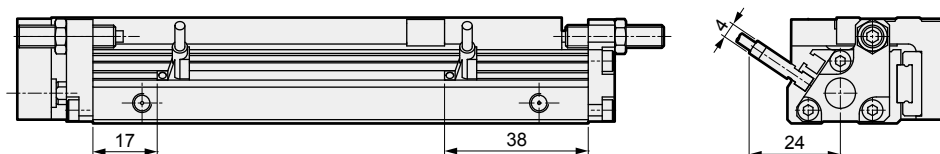


Dimensions by stroke length

Stroke length	50	75
L1	133	158
L2	119	144
L3	106	131
X	43	40.5
Y	50	53.5
W	50	59
n	3	4



● Dimensions of protruding section when the F2S or F3S cylinder switch is mounted



*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

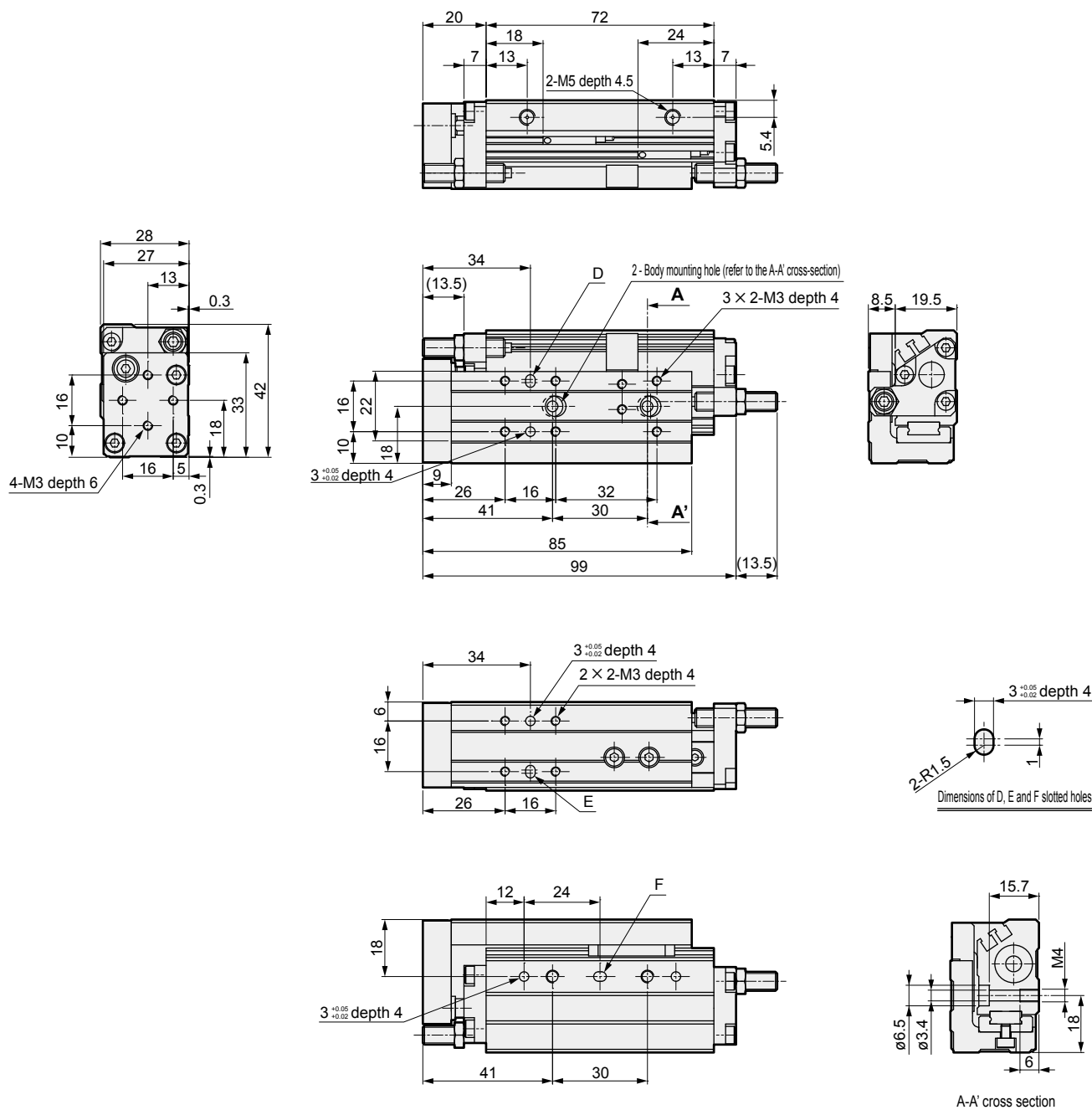
*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

*3: Mount as shown in the figure for F2S and F3S switch specifications.

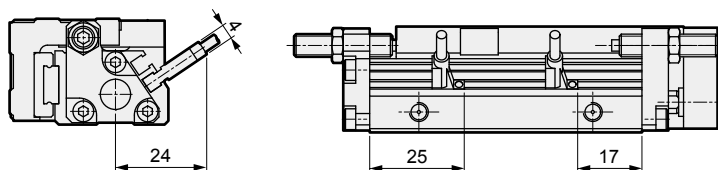
Dimensions (bore size: $\phi 12$)

● LCW-12

Stroke length: 30 Piping direction: L



● Dimensions of protruding section when the F2S or F3S cylinder switch is mounted



*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

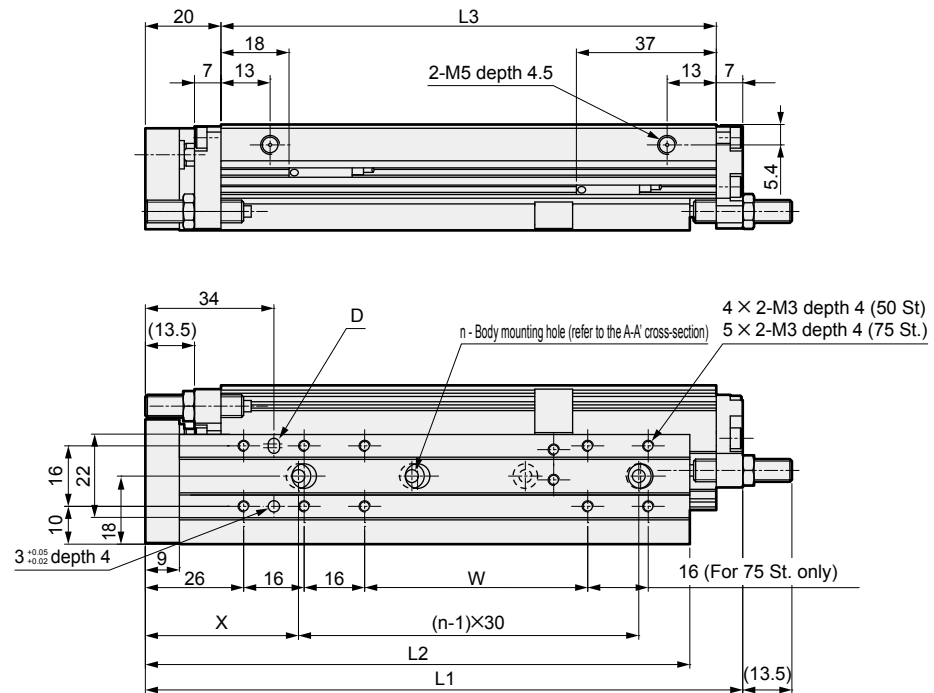
*3: Mount as shown in the figure for F2S and F3S switch specifications.

Dimensions (bore size: $\phi 12$)

● LCW-12

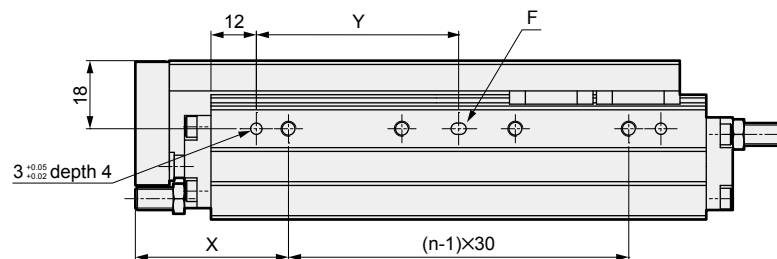
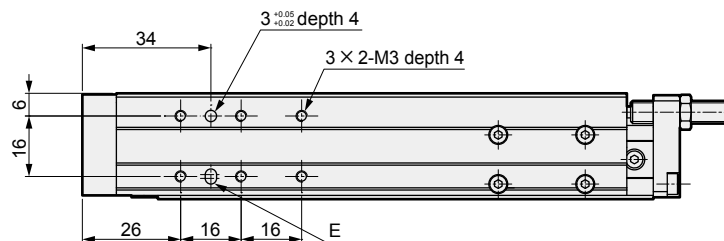
Stroke length: 50, 75 Piping direction: L

(Body mounting hole in the figure shows 75 mm stroke length)

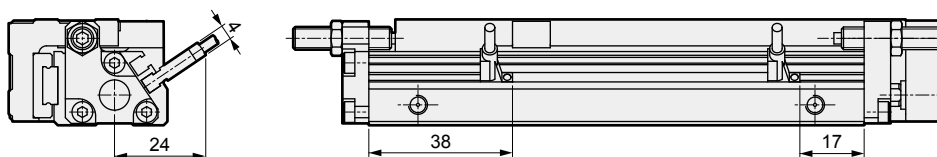


Dimensions by stroke length

Stroke length	50	75
L1	133	158
L2	119	144
L3	106	131
X	43	40.5
Y	50	53.5
W	50	59
n	3	4



● Dimensions of protruding section when the F2S or F3S cylinder switch is mounted



*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

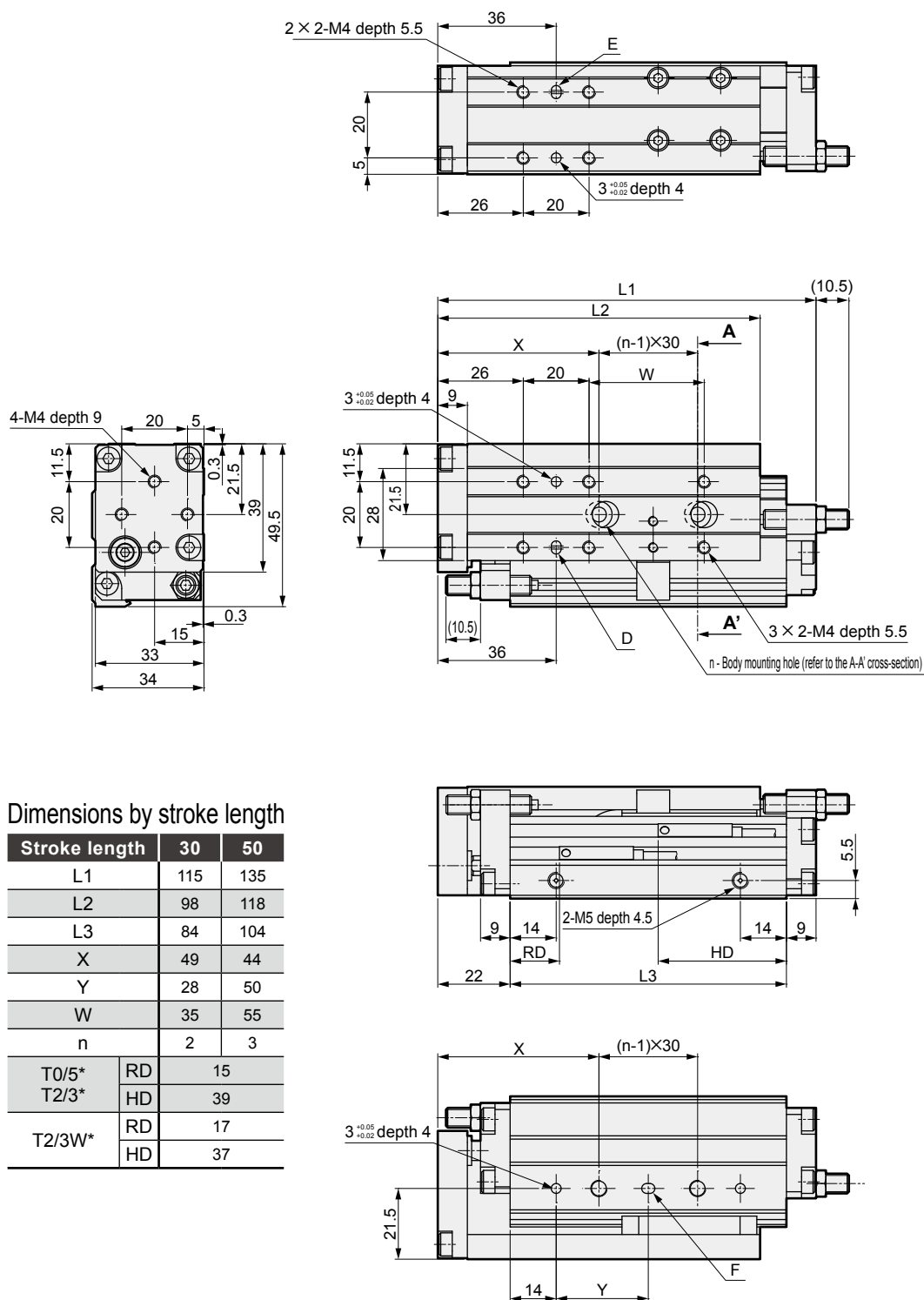
*3: Mount as shown in the figure for F2S and F3S switch specifications.

Dimensions (bore size: $\phi 16$)

● LCW-16

Stroke length: 30, 50 Piping direction: R

(Body mounting hole in the figure shows 30 mm stroke length)



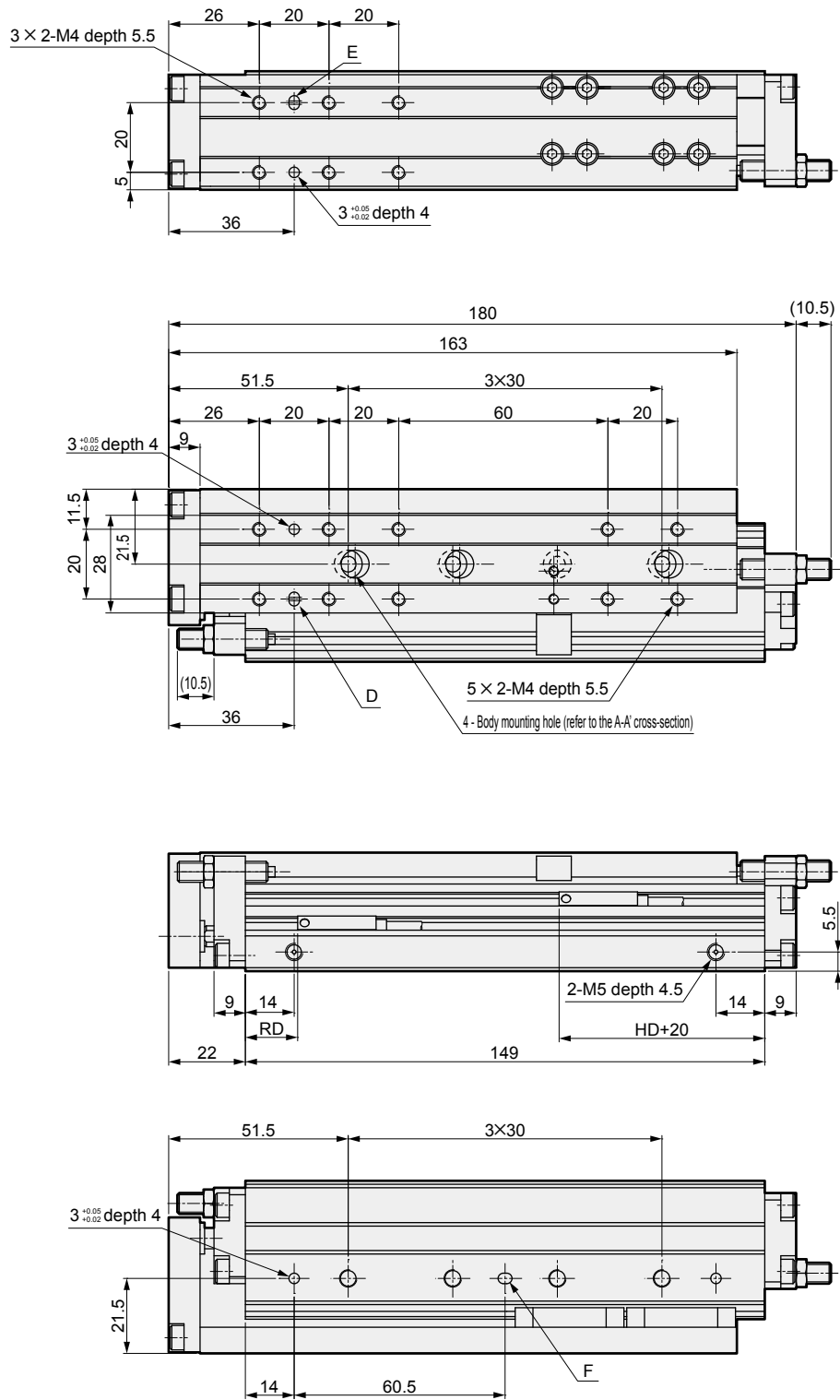
*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

Dimensions (bore size: $\phi 16$)

● LCW-16

Stroke length: 75 Piping direction: R



*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

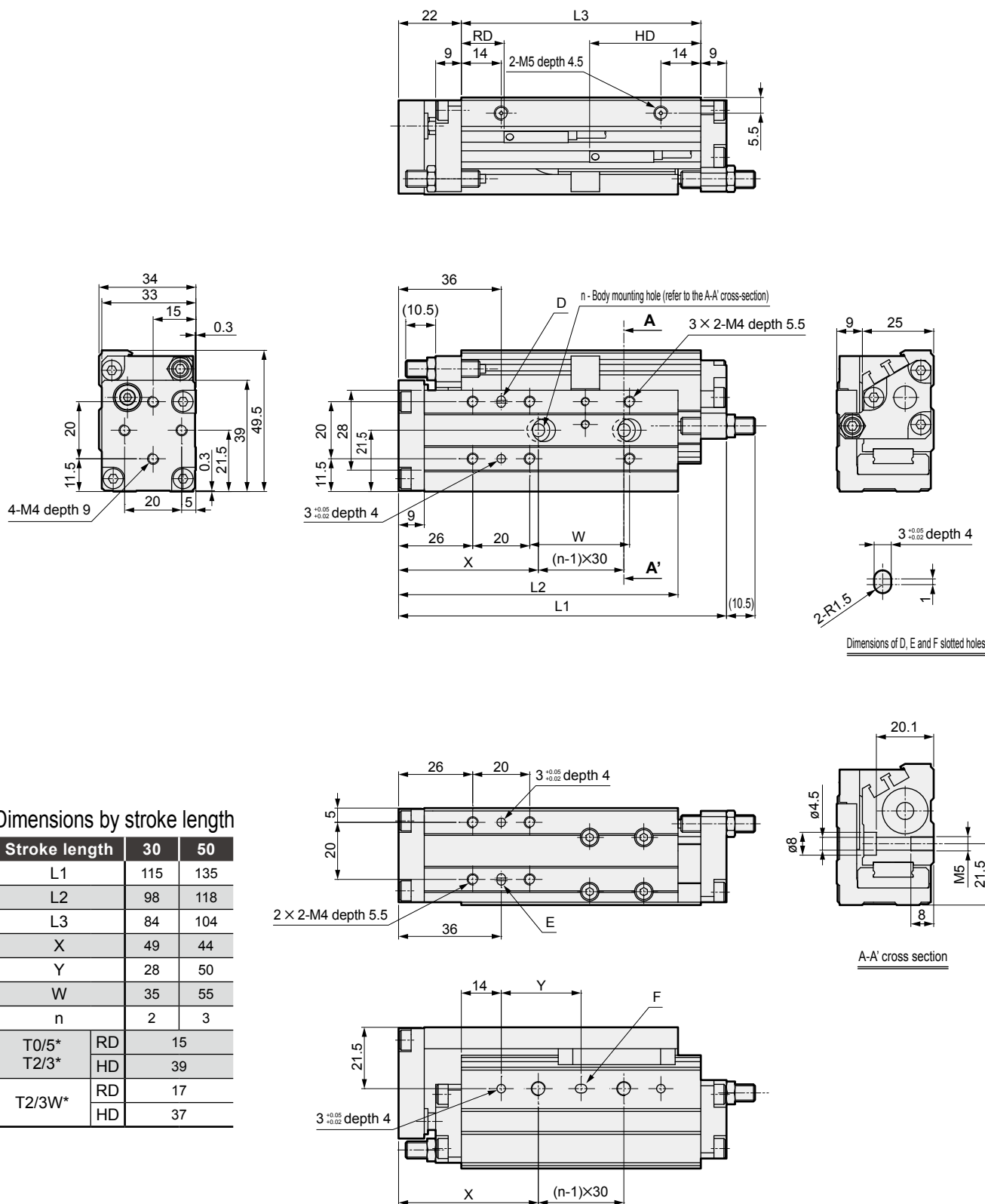
LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Dimensions (bore size: $\phi 16$)

● LCW-16

Stroke length: 30, 50 Piping direction: L

(Body mounting hole in the figure shows 30 mm stroke length)



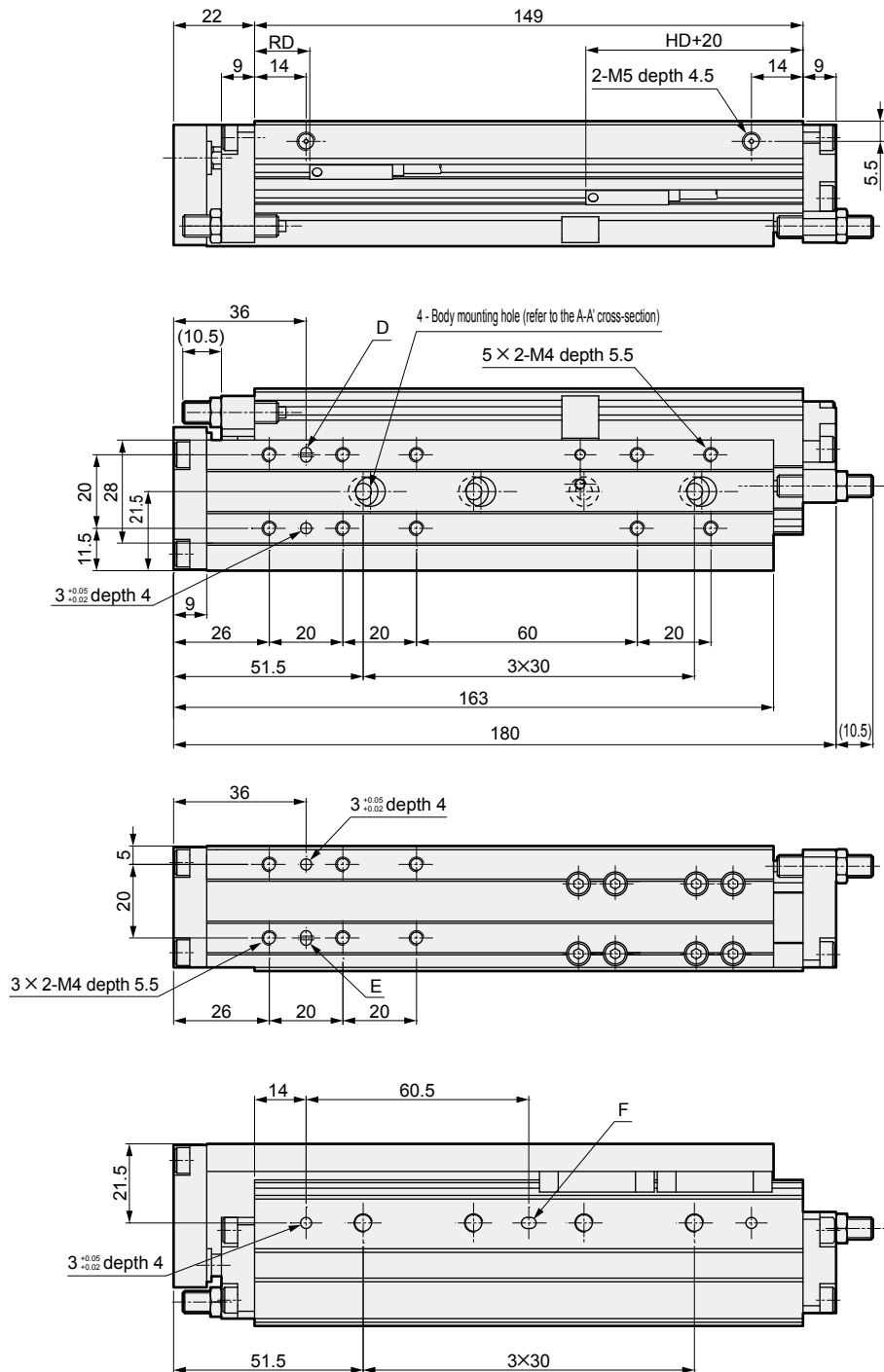
*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

Dimensions (bore size: $\phi 16$)

● LCW-16

Stroke length: 75 Piping direction: L



*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr

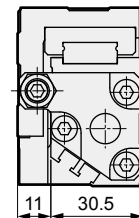
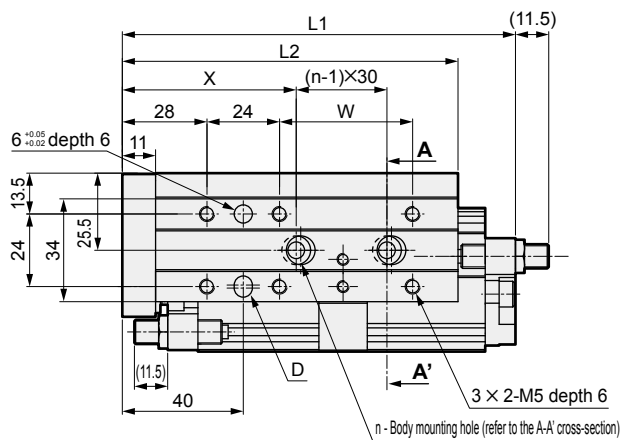
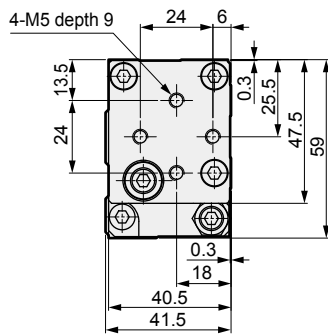
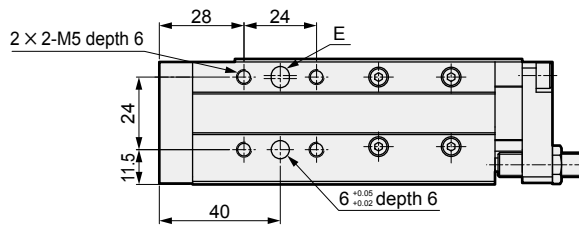
Ending

Dimensions (bore size: $\phi 20$)

● LCW-20

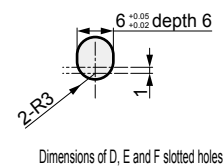
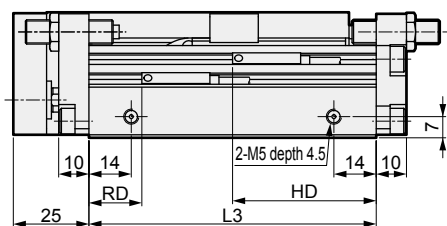
Stroke length: 30, 50 Piping direction: R

(Body mounting hole in the figure shows 30 mm stroke length)

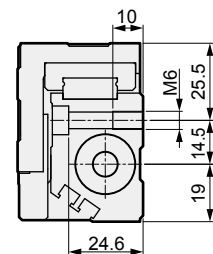
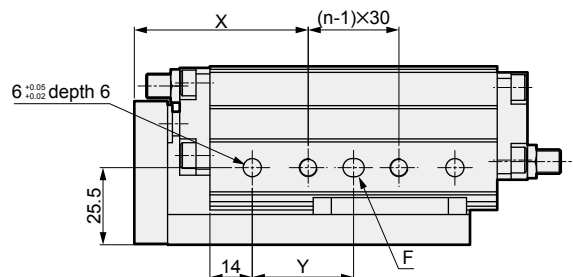


Dimensions by stroke length

Stroke length	30	50
L1	130	150
L2	111	131
L3	95	115
X	57.5	52.5
Y	33.5	60
W	44	64
n	2	3
T0/5*	RD	17.5
T2/3*	HD	47.5
T2/3W*	RD	19.5
	HD	45.5



Dimensions of D, E and F slotted holes



A-A' cross section

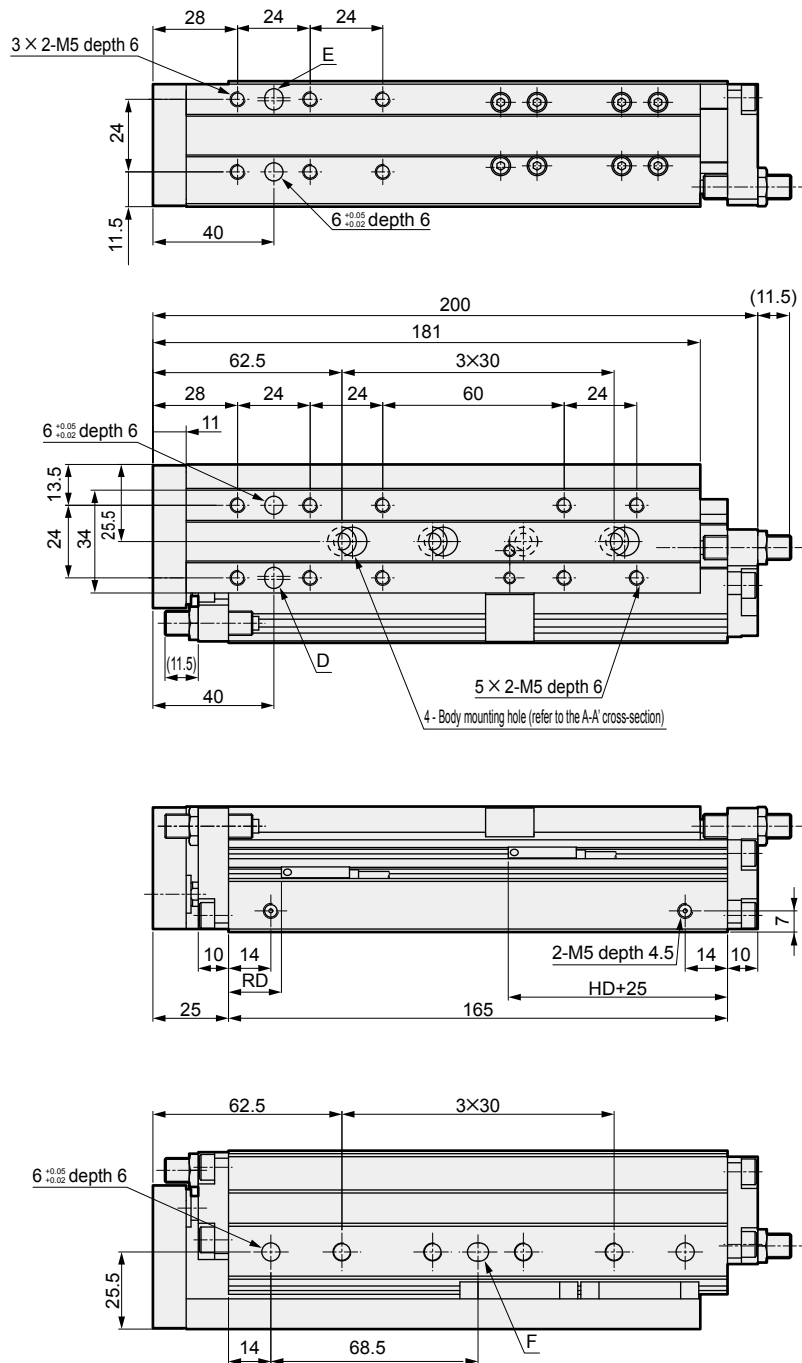
*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

Dimensions (bore size: $\varnothing 20$)

● LCW-20

Stroke length: 75 Piping direction: R



*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

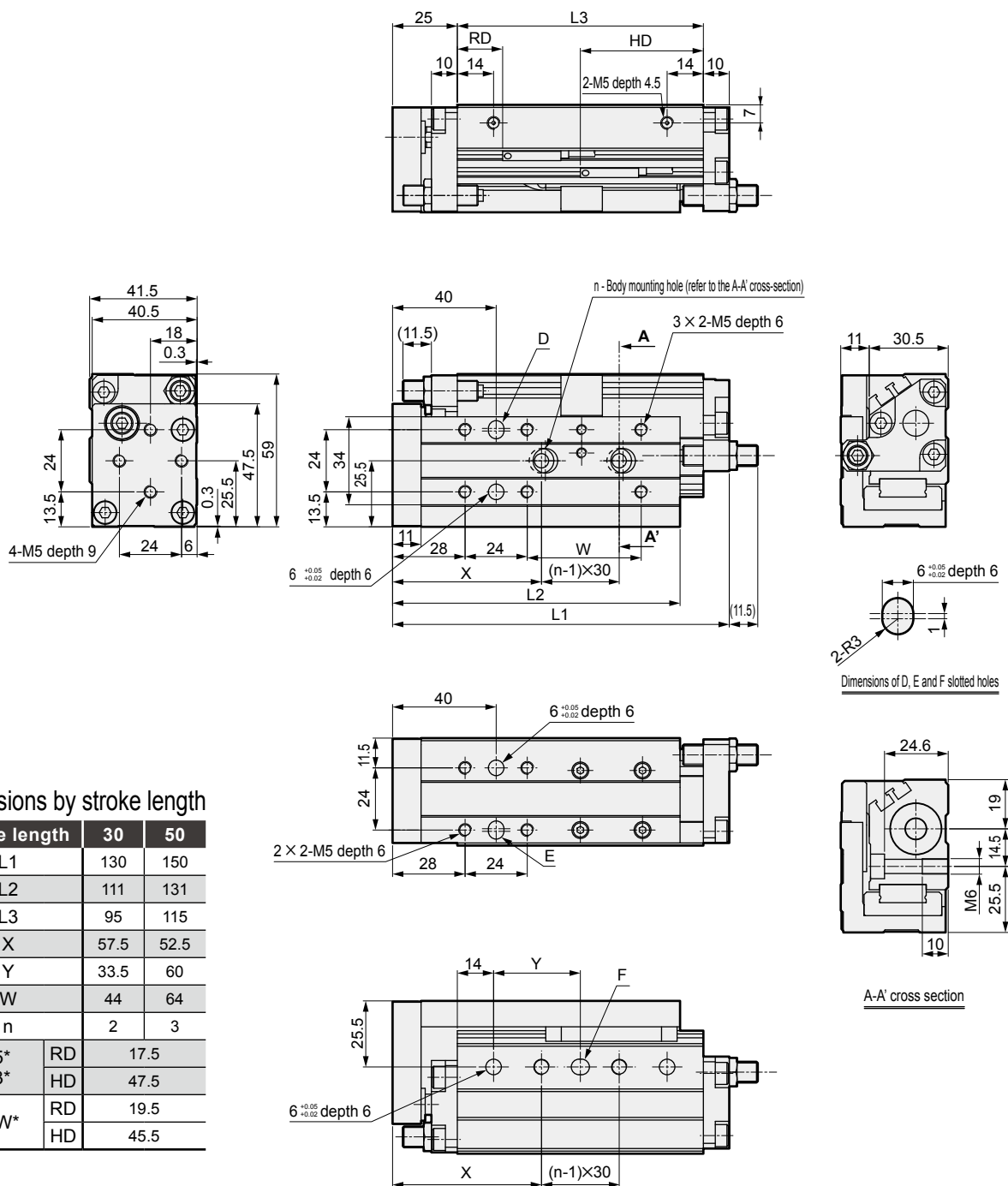
*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

● LCW-20

Stroke length: 30, 50 Piping direction: L

(Body mounting hole in the figure shows 30 mm stroke length)



Dimensions by stroke length

Stroke length		30	50
L1		130	150
L2		111	131
L3		95	115
X		57.5	52.5
Y		33.5	60
W		44	64
n		2	3
T0/5* T2/3*	RD	17.5	
	HD	47.5	
T2/3W*	RD	19.5	
	HD	45.5	

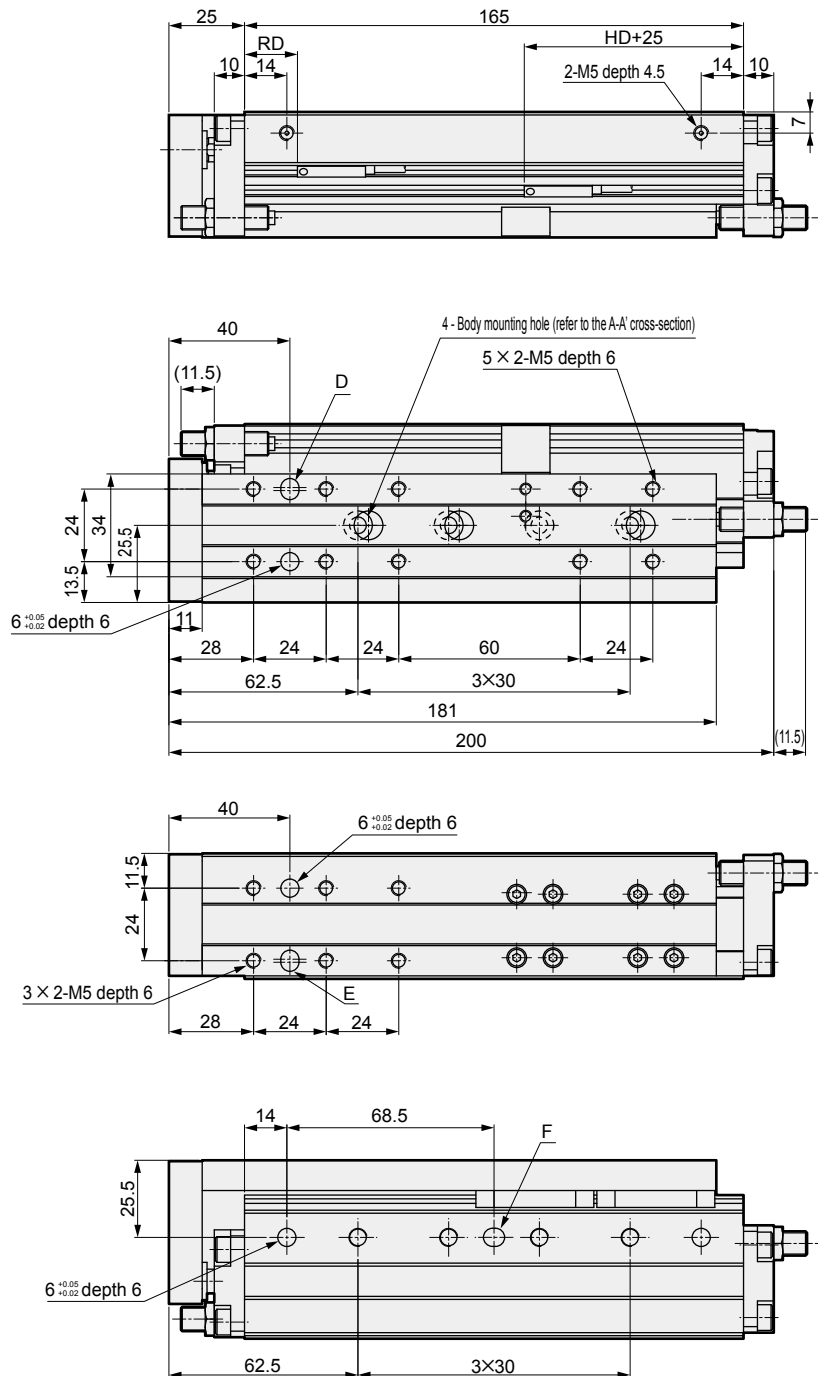
*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

Dimensions (bore size: $\phi 20$)

● LCW-20

Stroke length: 75 Piping direction: L



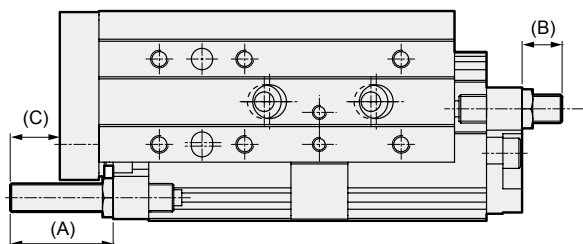
*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

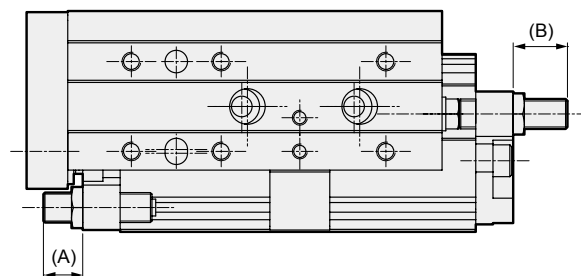
LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Dimensions: Option

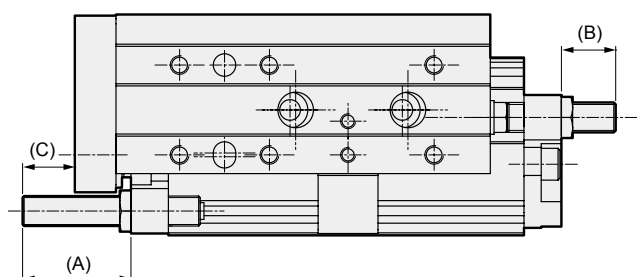
● Rubber cushion long stopper (S)



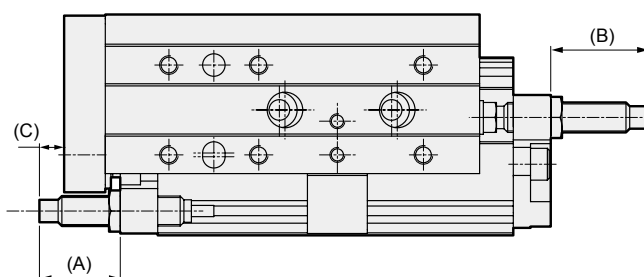
● Metal stopper with rubber cushion (M)



● Metal long stopper with rubber cushion (MS)



● Shock absorber stopper (A)



Bore size	Rubber cushion long stopper (S)			Metal stopper with rubber cushion (M)			Metal long stopper with rubber cushion (MS)			Shock absorber stopper (A)		
	A	B	C	A	B	C	A	B	C	A	B	C
ø12	31.5	13.5	18.5	12	14.5	-	31	14.5	18	11	13.5	-
ø16	28.5	10.5	15.5	9.5	11.5	-	28.5	11.5	15.5	8.5	10.5	-
ø20	28.5	11.5	13.5	10.5	15	-	28.5	15	13.5	21.5	26	6.5

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

LCM
 LCR
 LCG
LCW
 LCX
 STM
 STG
 STS/STL
 STR2
 UCA2
 ULK*
 JSK/M2
 JSG
 USC3/USC4
 USSD
 UFCD
 USC
 UB
 JSB3
 LMB
 LML
 HCM
 HCA
 LBC
 CAC4
 UCAC2
 CAC-N
 UCAC-N
 RCS2
 RCC2
 PCC
 SHC
 MCP
 GLC
 MFC
 BBS
 RRC
 GRC
 RV3*
 NHS
 HRL
 LN
 Hand
 Chuk
 MecHnd/Chuk
 ShkAbs
 FJ
 FK
 SpdContr
 Ending

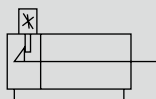


Linear slide cylinder Double acting/position locking

LCW-Q Series

● Bore size: $\varnothing 12/\varnothing 16/\varnothing 20$

JIS symbol



RoHS

Specifications

Item	LCW-Q			
Bore size mm	$\varnothing 12$	$\varnothing 16$	$\varnothing 20$	
Actuation	Double acting			
Working fluid	Compressed air			
Max. working pressure MPa	0.7 (≈ 100 psi, 7 bar)			
Min. working pressure MPa	0.15 (≈ 22 psi, 1.5 bar) (*1)			
Proof pressure MPa	1.05 (≈ 150 psi, 10.5 bar)			
Ambient temperature $^{\circ}\text{C}$	-10 (14 $^{\circ}\text{F}$) to 60 (140 $^{\circ}\text{F}$) (no freezing) (*2)			
Port size	M5			
Working piston speed mm/s	50 to 500 (*3)			
Cushion	Rubber cushion			
Holding force N	15.5	27.6	47.6	
Lubrication	Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)			
Allowable absorbed energy J	* Refer to Table 3 on page 243.			

*1: Use at a pressure of 0.4 MPa and over when using a metal stopper with rubber cushion in order to allow metal contact at the end of the stroke.

*2: Operate at -5 to 60 $^{\circ}\text{C}$ when using a shock absorber stopper.

*3: Keep within 50 to 200 mm/s when using a metal stopper with rubber cushion.

Stroke length

Bore size (mm)	Standard stroke length (mm)
$\varnothing 12$	30/50/75
$\varnothing 16$	
$\varnothing 20$	

Note: Products with stroke lengths other than the above are not available.

Adjustable stroke range

(Unit: mm)

Bore size (mm)	Standard rubber cushion		Metal with rubber cushion		Shock absorber
	Standard stroke length	Custom stroke compatible (S)	Standard stroke length (M)	Custom stroke compatible (MS)	Standard stroke length (A)
	PUSH	PUSH	PUSH	PUSH	PUSH
$\varnothing 12$	10	28	9	28	4
$\varnothing 16$	7.5	25	6	25	1.5
$\varnothing 20$	8	25	7.5	25	12.5

Theoretical thrust table

(Unit: N)

Bore size (mm)	Operating direction	Working pressure MPa						
		0.15	0.2	0.3	0.4	0.5	0.6	0.7
$\varnothing 12$	PUSH	17	23	34	45	57	68	79
	PULL	13	17	25	34	42	51	59
$\varnothing 16$	PUSH	30	40	60	80	101	121	141
	PULL	26	35	52	69	86	104	121
$\varnothing 20$	PUSH	47	63	94	126	157	188	220
	PULL	40	53	79	106	132	158	185

Switch specifications

Item	Reed 2-wire				Proximity 2-wire		Proximity 3-wire	
	T0H/T0V		T5H/T5V		T2H/T2V	T2WH/T2WV	T3H/T3V	T3WH/T3WV
Applications	For programmable controller, relay		For programmable controller, relay, IC circuit (without indicator lamp), serial connection		Dedicated for programmable controller		For programmable controller, relay	
Output method	-		-		-		NPN output	
Power supply voltage	-		-		-		10 to 28 VDC	
Load voltage	12/24 VDC	110 VAC	5/12/24 VDC	110 VAC	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 50 mA	7 to 20 mA	50 mA or less	20 mA or less	5 to 20 mA		100 mA or less	50 mA or less
Indicator lamp	LED (Lit when ON)		Without indicator lamp		LED (Lit when ON)	Red/green LED (Lit when ON)	LED (Lit when ON)	Red/green LED (Lit when ON)
Leakage current	0 mA				1 mA or less		10 μA or less	
Weight	g 1 m:18 3 m:49 5 m:80							

Item	Proximity 2-wire	Proximity 3-wire	Proximity 2-wire		Proximity 3-wire	
	F2S	F3S	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Dedicated for programmable controller	For programmable controller, relay	Dedicated for programmable controller		For programmable controller, relay	
Output method	-	NPN output	-		NPN output	
Power supply voltage	-	10 to 28 VDC	-		10 to 28 VDC	
Load voltage	10 to 30 VDC	30 VDC or less	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 20 mA	50 mA or less	5 to 20 mA		50 mA or less	
Indicator lamp	Red LED (Lit when ON)		LED (Lit when ON)	Red/green LED (Lit when ON)	LED (Lit when ON)	Red/green LED (Lit when ON)
Leakage current	1 mA or less	10 μA or less	1 mA or less		10 μA or less	
Weight	g 1 m:10 3 m:29					

*1 : Refer to Ending Page 1 for detailed switch specifications and dimensions.

*2 : Switches other than the above models, such as switches with connectors, are also available. Refer to Ending Page 1.

*3 : The max. load current is 20 mA at 25°C. The current is lower than 20 mA if the operating ambient temperature around the switch is higher than 25°C.
(5 to 10 mA at 60°C)

*4 : The F type switch uses a bend-resistant lead wire.

Cylinder weight

● Position locking (Unit: g)

Bore size (mm)	Stroke length (mm)		
	30	50	75
ø12	300	440	450
ø16	450	460	690
ø20	770	800	1,160

● Stopper additional part (Unit: g)

Bore size (mm)	Stopper code		
	S	MS	A
ø12	3	3	0
ø16	3	3	0
ø20	5	5	14

For stopper code M, the weight is the same as the position locking.

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

How to order

● Without switch (built-in magnet for switch)

LCW-Q-16-30-H R — S

● With switch (built-in magnet for switch)

LCW-Q-16-30-H R - T2H - R - S

Ⓐ Bore size

Ⓑ Stroke length

Ⓒ Position locking mechanism

Ⓓ Piping direction

Ⓔ Switch model No.

[Example of model No.]

LCW-Q-16-30-HR-T2H-D-A

Model: Linear slide cylinder/position locking

Ⓐ Bore size : ø16

Ⓑ Stroke length : 30 mm

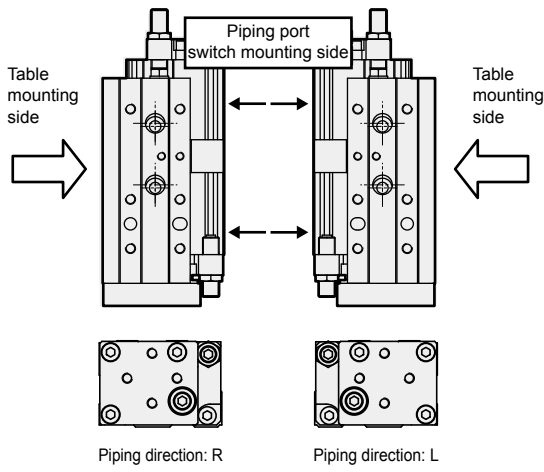
Ⓒ Position locking mechanism : Head side position locking mechanism

Ⓓ Piping direction : Right from rod side

Ⓔ Switch model No. : Proximity switch T2H, lead wire 1 m

Ⓕ Switch quantity : 2

Ⓖ Stopper : Shock absorber stopper



Code	Description
Ⓐ Bore size (mm)	
12	ø12
16	ø16
20	ø20

Ⓑ Stroke length (mm)	
30	30 mm
50	50 mm
75	75 mm

Ⓒ Position locking mechanism	
H	Head side position locking mechanism

Ⓓ Piping direction	
R	Right from rod side
L	Left from rod side

Axial lead wire	Radial lead wire	Contact	Voltage		Display	Lead wire	Bore size		
			AC	DC			ø12	ø16	ø20
-	F2S*	Proximity		●	1-color display	2-wire	●		
-	F3S*			●		3-wire			
F2H*	F2V*			●		2-wire			
F3H*	F3V*			●	2-color display	3-wire			
F2YH*	F2YV*			●		2-wire			
F3YH*	F3YV*			●		3-wire			
T0H*	T0V*	Reed	●	●	1-color display	2-wire			
T5H*	T5V*		●	●	no indicator lamp				
T2H*	T2V*	Proximity		●	1-color display	2-wire			
T3H*	T3V*			●	display	3-wire			
T2WH*	T2WV*			●	2-color display	2-wire			
T3WH*	T3WV*			●	display	3-wire			

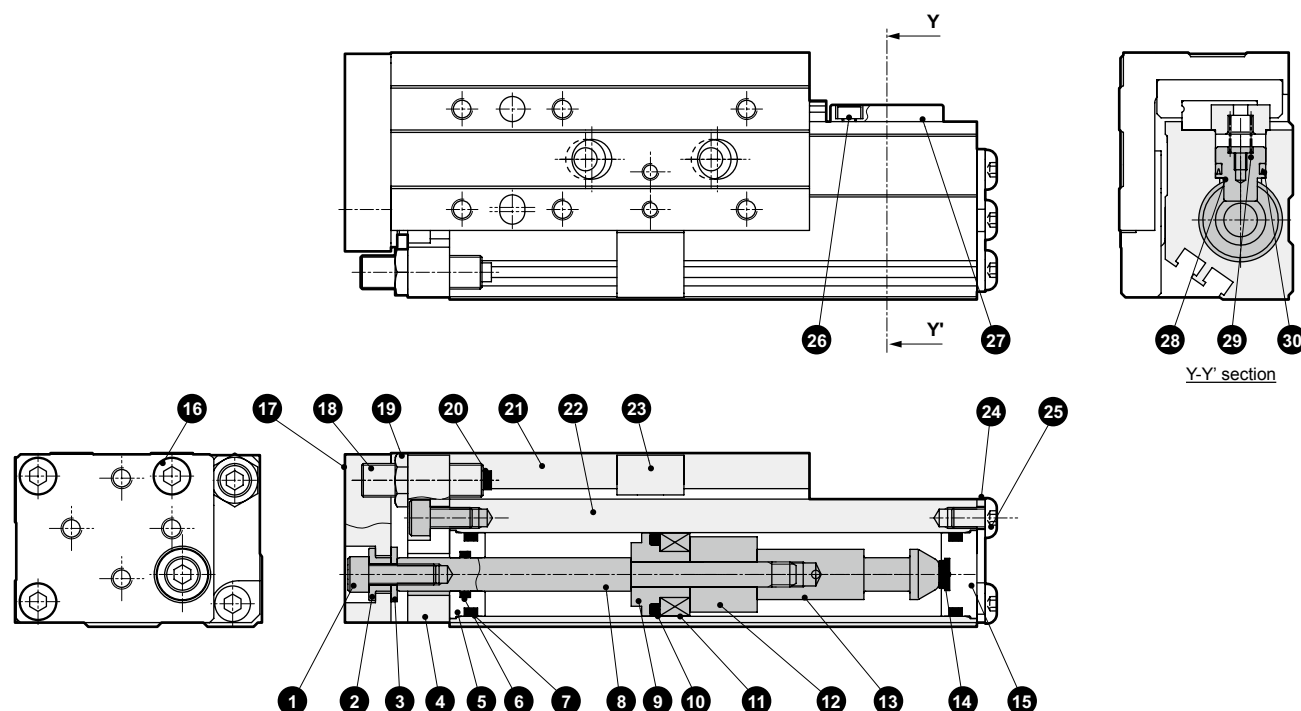
* Lead wire length		
Blank	1 m (standard)	●
3	3 m (option)	●
5	5 m (option)	●

Ⓕ Switch quantity	
R	1 on rod side
H	1 on head side
D	2

Ⓖ Stopper	
Blank	Cushion stopper
S	Rubber cushion long stopper (custom stroke compatible)
M	Metal stopper with rubber cushion
MS	Long metal stopper with rubber cushion (custom stroke compatible)
A	Shock absorber stopper

* Refer to page 207 for how to order discrete items.

Internal structure and parts list



Parts list

No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	Hexagon socket head cap screw	Steel	Zinc chromate	16	Hexagon socket head cap screw	Steel	Zinc chromate
2	Floating bush A	Stainless steel		17	End plate	Aluminum alloy	Hard alumite
3	Floating bush B	Stainless steel		18	Stopper bolt	Steel	Nickeling
4	Cover holder	Aluminum alloy	Alumite	19	Hexagon nut	Steel	Nickeling
5	Rod cover	Aluminum alloy	Hard alumite	20	Cushion rubber	Urethane rubber	
6	Rod packing	Nitrile rubber		21	Table	Aluminum alloy	Alumite
7	O-ring	Nitrile rubber		22	Body	Aluminum alloy	Hard alumite
8	Piston rod	Stainless steel		23	Stopper block	Steel	Nickeling
9	Piston	Aluminum alloy	Chromate	24	Cover holder	Stainless steel	
10	Piston packing	Nitrile rubber		25	Hexagon socket button head bolt	Steel	Zinc chromate
11	Magnet	-		26	Hexagon socket head cap screw	Steel	Zinc chromate
12	Collar	Aluminum alloy	Chromate	27	Stopper cover	Stainless steel	
13	Sleeve	Steel	Nitriding	28	Stopper piston	Steel	Nitriding
14	Cushion rubber	Urethane rubber		29	Coil spring	Steel	
15	Head cover	Aluminum alloy	Chromate	30	Stopper packing	Nitrile rubber	

Repair parts list

Bore size (mm)	Kit No.	Repair parts No.
ø12	LCW-Q-12HK	
ø16	LCW-Q-16HK	6 7 10 14 24
ø20	LCW-Q-20HK	

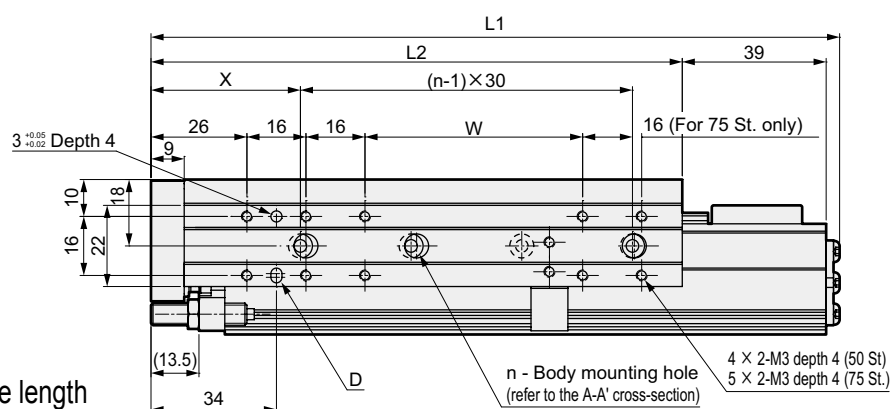
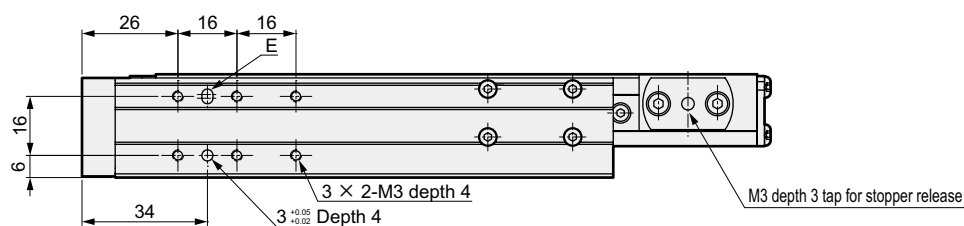
LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Dimensions (bore size: $\phi 12$)

● LCW-Q-12

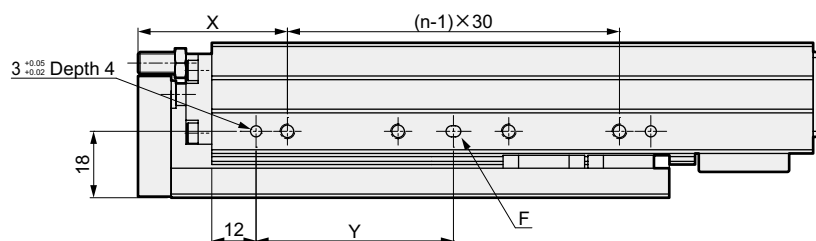
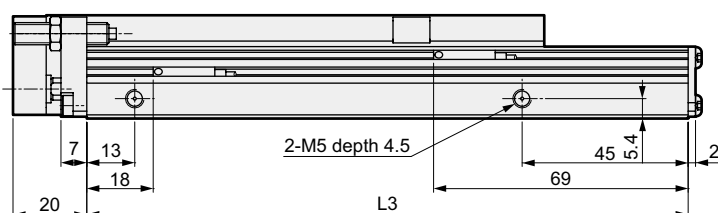
Stroke length: 50, 75 Piping direction: R

(Body mounting hole in the figure shows 75 mm stroke length)

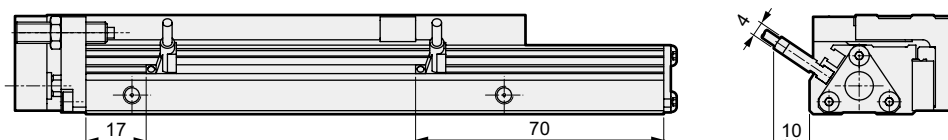


Dimensions by stroke length

Stroke length	50	75
L1	161.6	186.6
L2	119	144
L3	138	163
X	43	40.5
Y	50	53.5
W	50	59
n	3	4



● Dimensions of protruding section when the F2S or F3S cylinder switch is mounted



*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

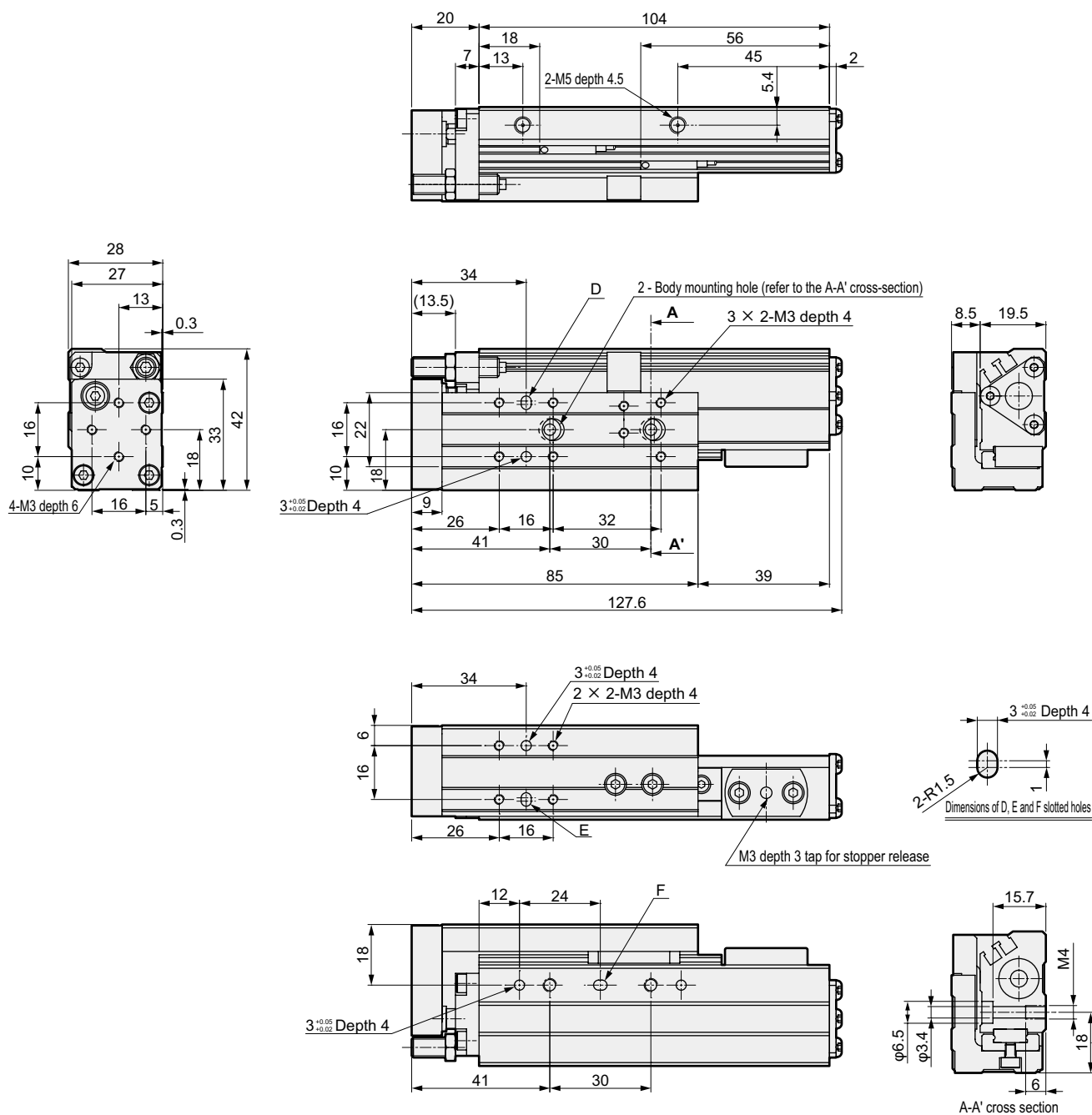
*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

*3: Mount as shown in the figure for F2S and F3S switch specifications.

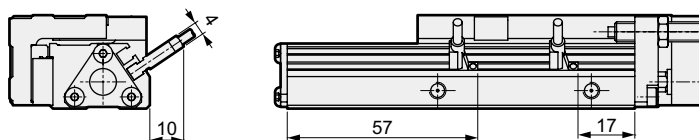
Dimensions (bore size: $\phi 12$)

● LCW-Q-12

Stroke length: 30 Piping direction: L



● Dimensions of protruding section when the F2S or F3S cylinder switch is mounted



- *1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.
- *2: Mount the rod side switch for the radial lead wire, as shown in the figure.
- *3: Mount as shown in the figure for F2S and F3S switch specifications.

Dimensions (bore size: $\phi 12$)

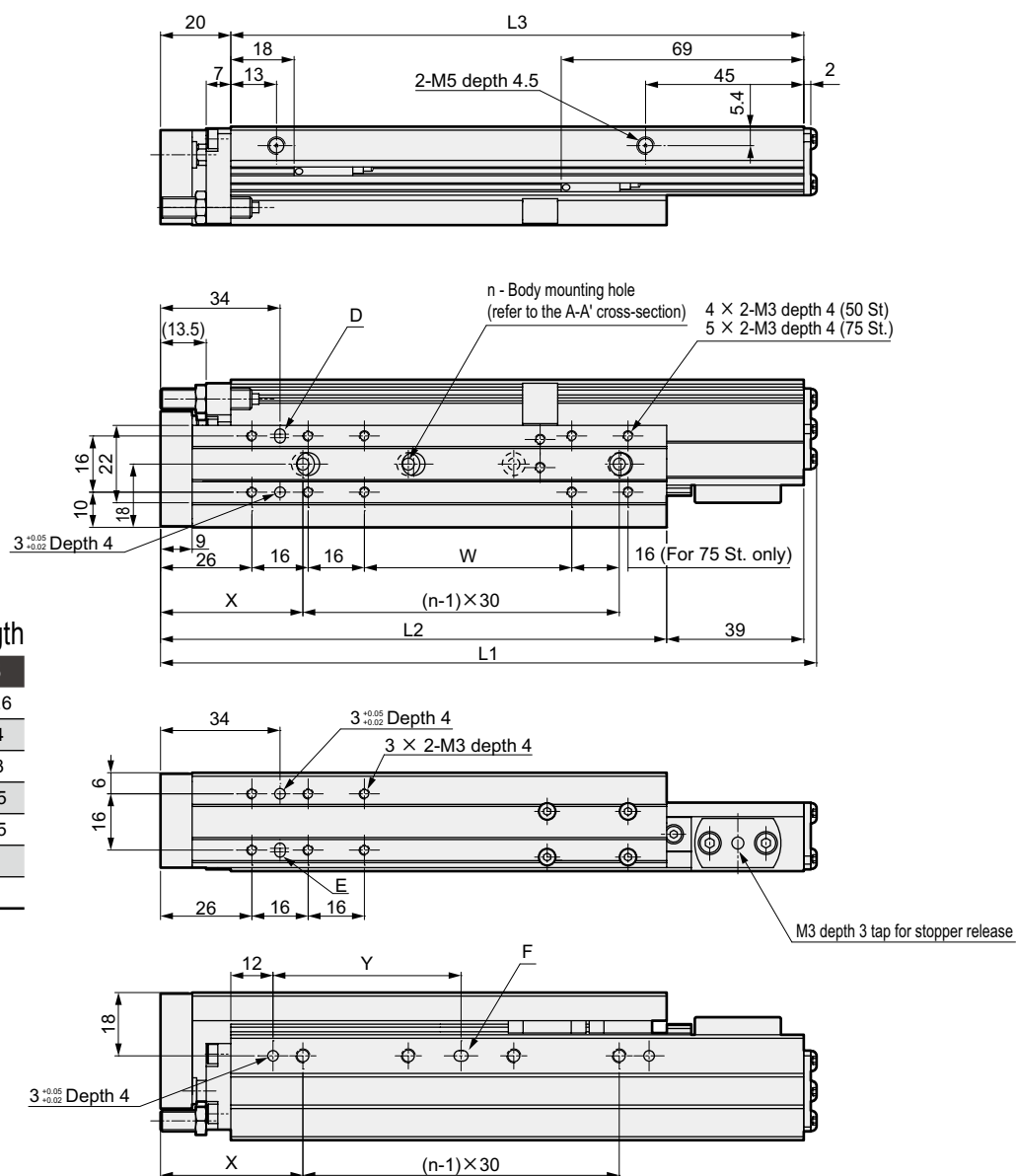
● LCW-Q-12

Stroke length: 50, 75 Piping direction: L

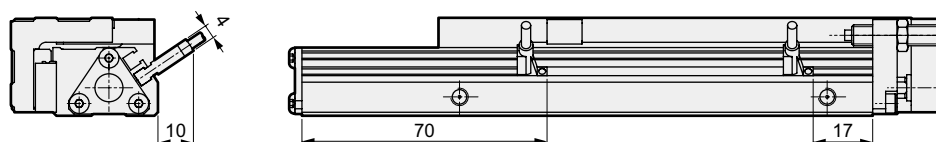
(Body mounting hole in the figure shows 75 mm stroke length)

Dimensions by stroke length

Stroke length	50	75
L1	161.6	186.6
L2	119	144
L3	138	163
X	43	40.5
Y	50	53.5
W	50	59
n	3	4



● Dimensions of protruding section when the F2S or F3S cylinder switch is mounted



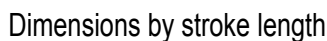
*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

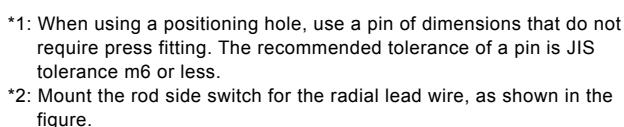
*3: Mount as shown in the figure for F2S and F3S switch specifications.

● LCW-Q-16

(Body mounting hole in the figure shows 30 mm stroke length)



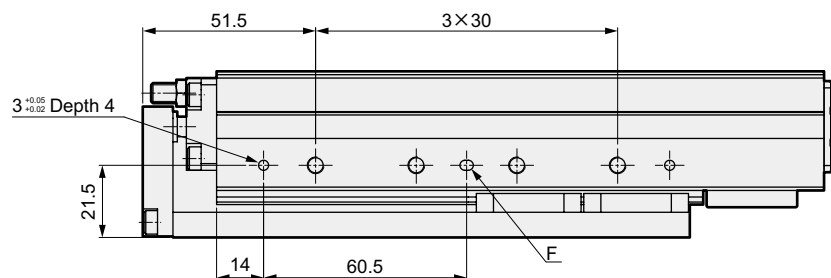
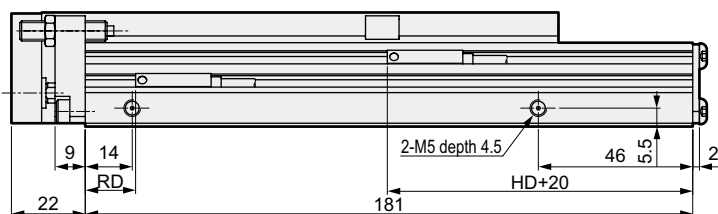
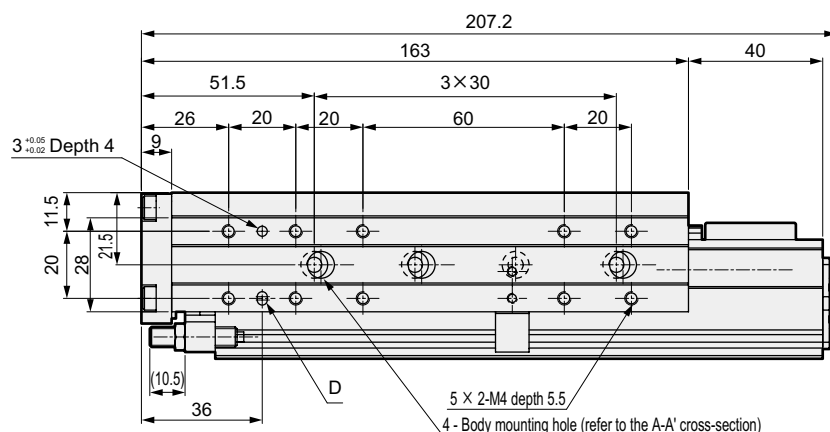
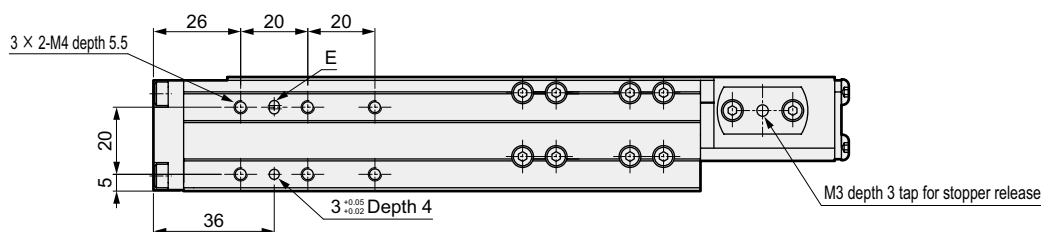
Stroke length		30	50
L1		142.2	162.2
L2		98	118
L3		116	136
X		49	44
Y		28	50
W		35	55
n		2	3
T0/5* T2/3*	RD	15	
	HD	71	
T2/3W*	RD	17	
	HD	69	



Dimensions (bore size: $\phi 16$)

● LCW-Q-16

Stroke length: 75 Piping direction: R



*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

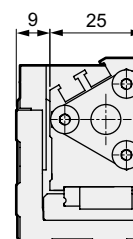
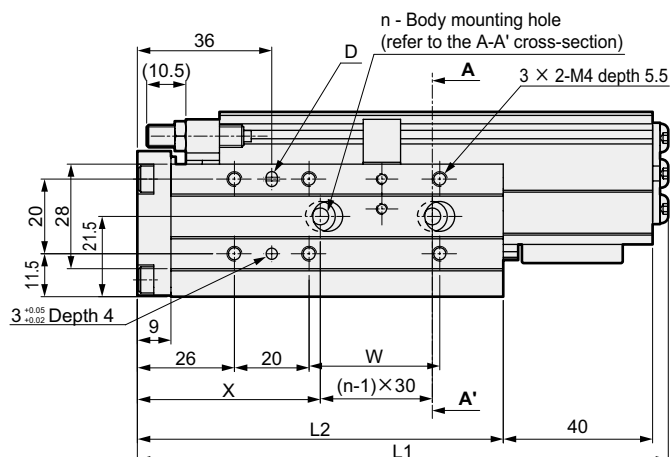
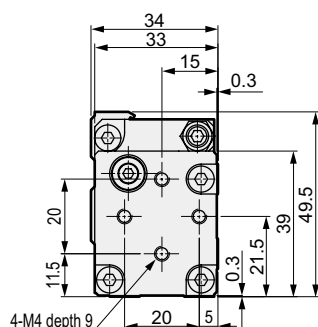
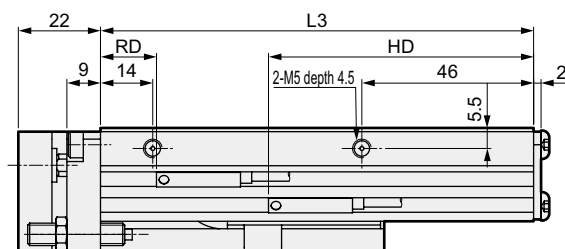
LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Dimensions (bore size: $\phi 16$)

● LCW-Q-16

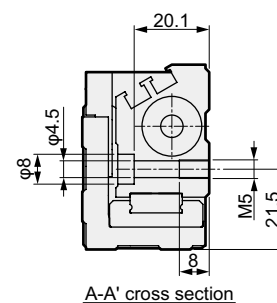
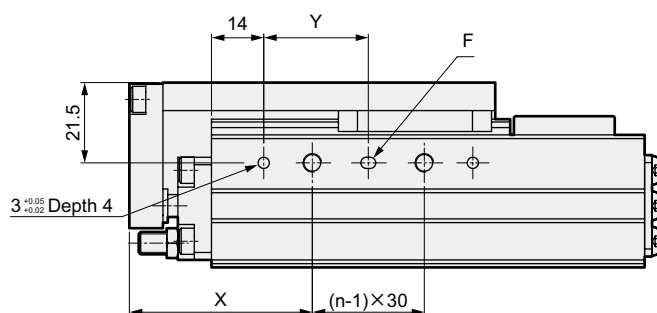
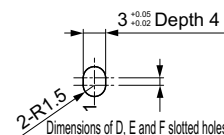
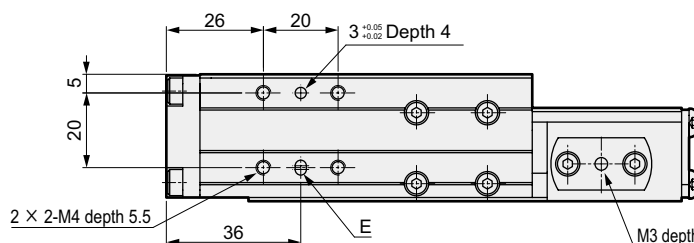
Stroke length: 30, 50 Piping direction: L

(Body mounting hole in the figure shows 30 mm stroke length)



Dimensions by stroke length

Stroke length		30	50
L1		142.2	162.2
L2		98	118
L3		116	136
X		49	44
Y		28	50
W		35	55
n		2	3
T0/5*	RD	15	
T2/3*	HD	71	
T2/3W*	RD	17	
	HD	69	

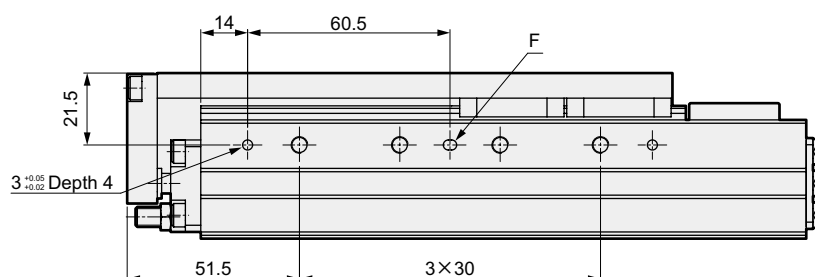


*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

● LCW-Q-16

Stroke length: 75 Piping direction: L



LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Endin

*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

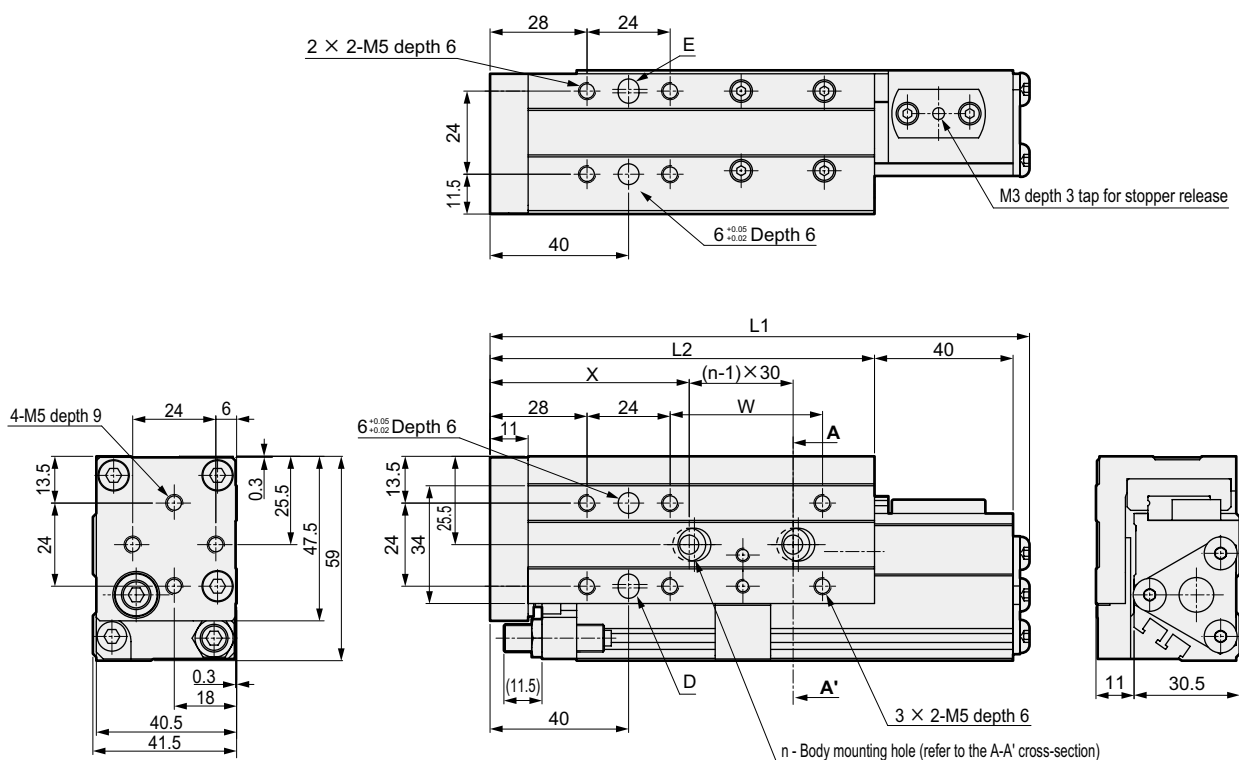
*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

Dimensions (bore size: $\phi 20$)

● LCW-Q-20

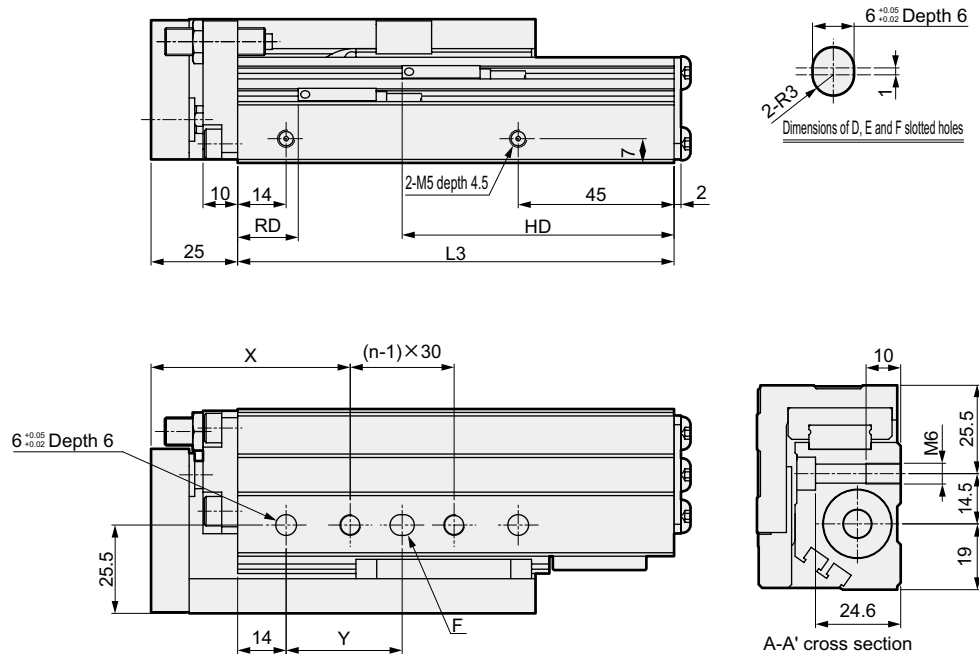
Stroke length: 30, 50 Piping direction: R

(Body mounting hole in the figure shows 30 mm stroke length)



Dimensions by stroke length

Stroke length	30	50
L1	155.8	175.8
L2	111	131
L3	126	146
X	57.5	52.5
Y	33.5	60
W	44	64
n	2	3
T0/5*	RD	17.5
T2/3*	HD	78.5
T2/3W*	RD	19.5
	HD	76.5



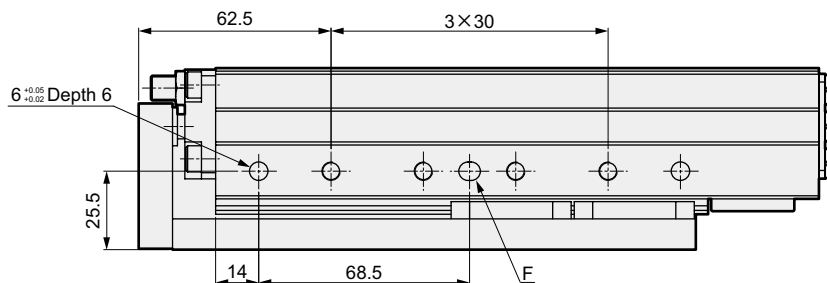
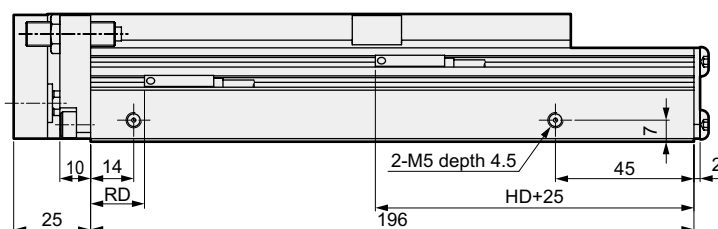
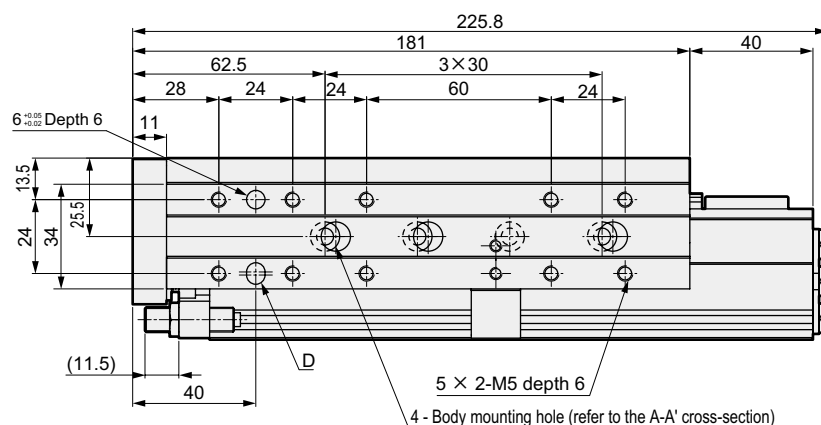
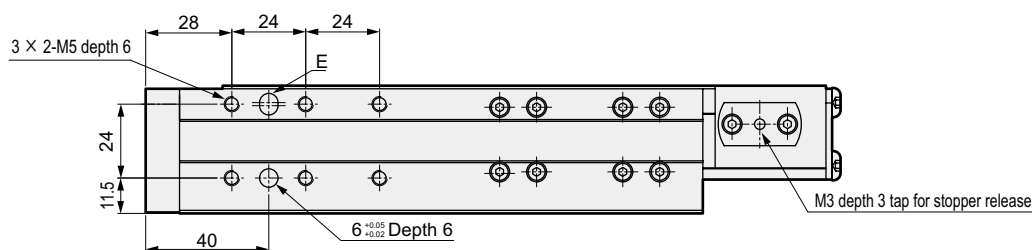
*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

Dimensions (bore size: $\phi 20$)

● LCW-Q-20

Stroke length: 75 Piping direction: R



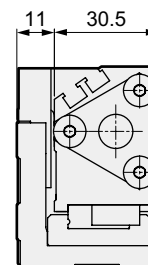
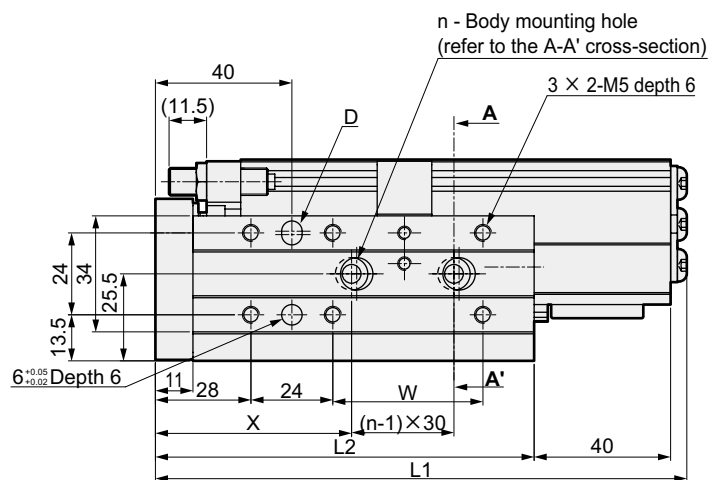
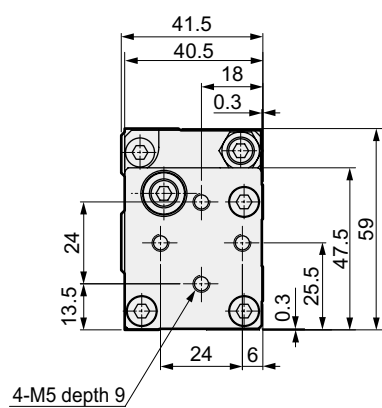
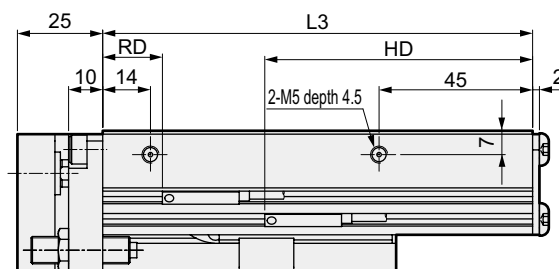
*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

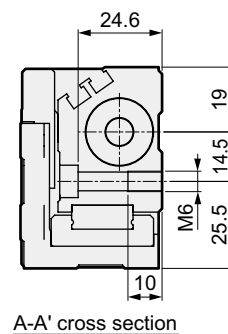
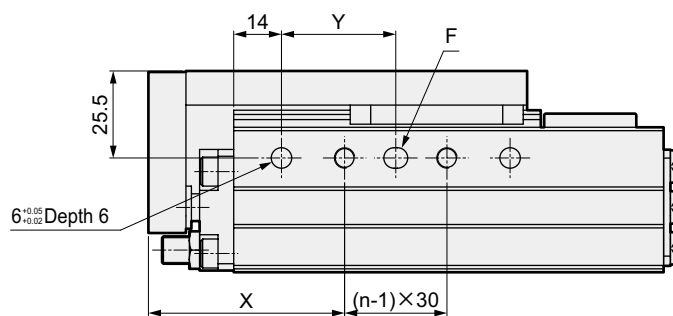
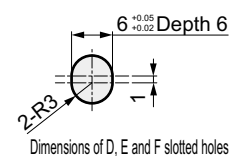
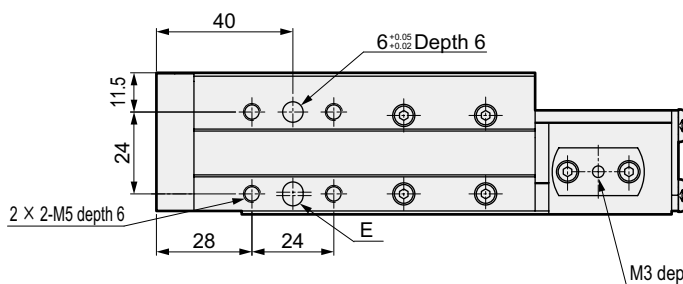
LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

● LCW-Q-20

(Body mounting hole in the figure shows 30 mm stroke length)



Stroke length		30	50
L1		155.8	175.8
L2		111	131
L3		126	146
X		57.5	52.5
Y		33.5	60
W		44	64
n		2	3
T0/5* T2/3*	RD	17.5	
	HD	78.5	
T2/3W*	RD	19.5	
	HD	76.5	

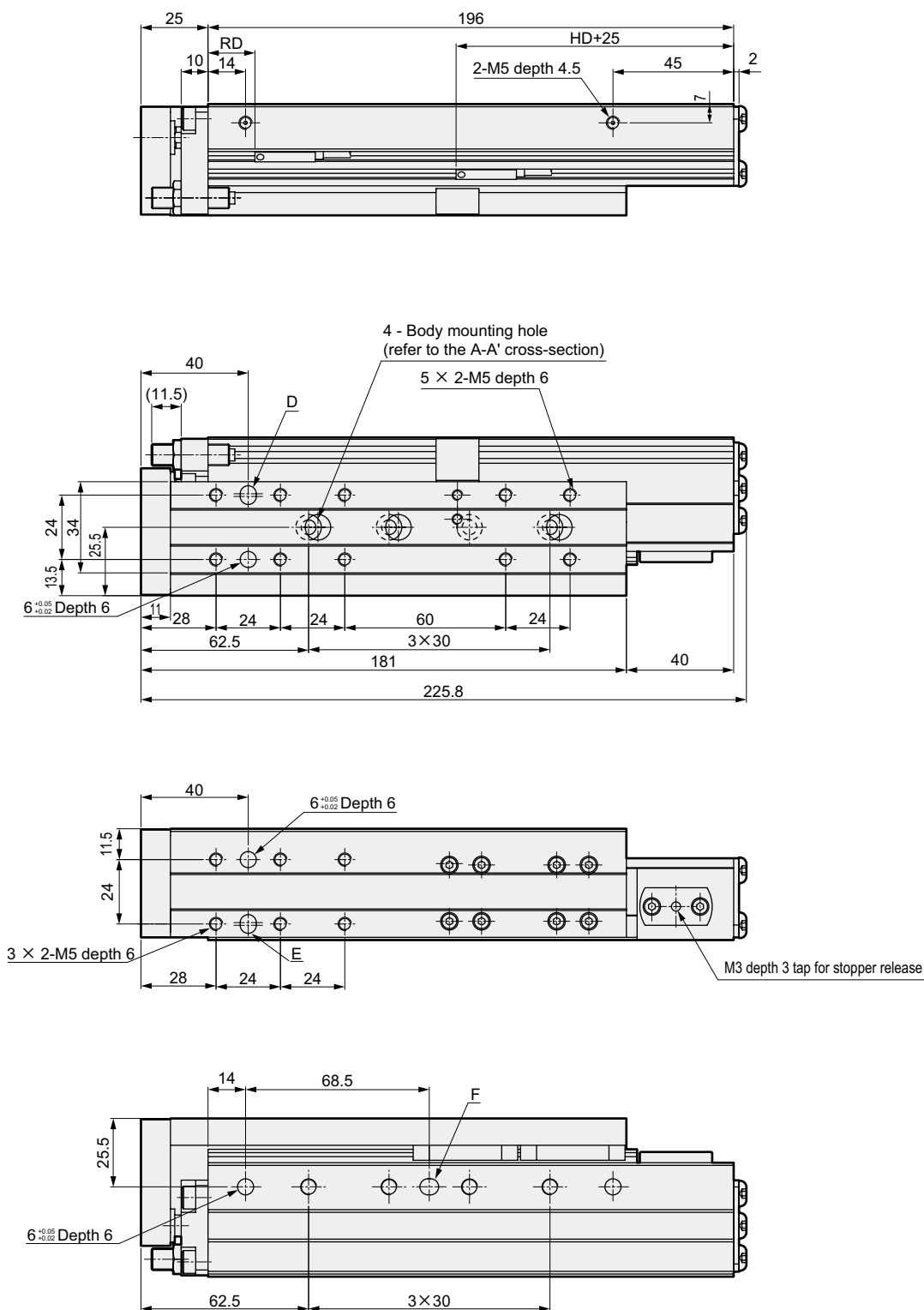


*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

Dimensions (bore size: $\varnothing 20$)

● LCW-Q-20

Stroke length: 75 Piping direction: L



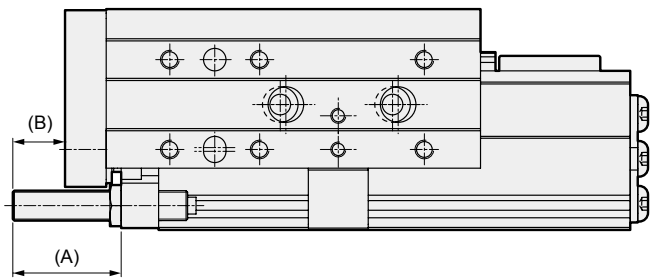
*1: When using a positioning hole, use a pin of dimensions that do not require press fitting. The recommended tolerance of a pin is JIS tolerance m6 or less.

*2: Mount the rod side switch for the radial lead wire, as shown in the figure.

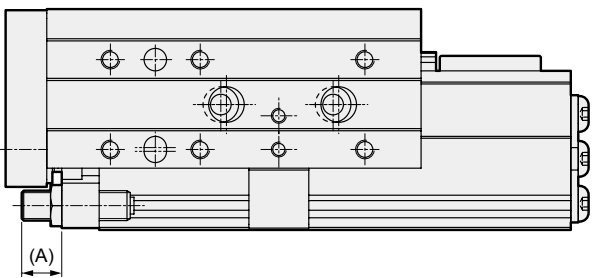
LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Dimensions: Option

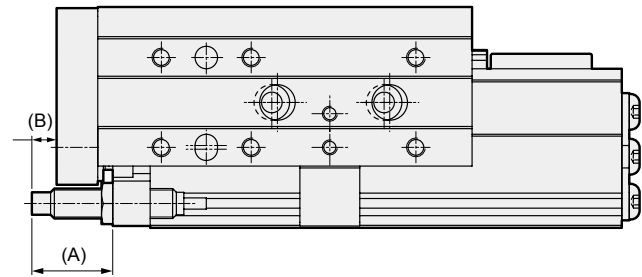
- Rubber cushion long stopper (S)
Metal long stopper with rubber cushion (MS)



- Metal stopper with rubber cushion (M)



- Shock absorber stopper (A)



Bore size	Rubber cushion long stopper (S)		Metal stopper with rubber cushion (M)		Metal long stopper with rubber cushion (MS)		Shock absorber stopper (A)	
	A	B	A	B	A	B	A	B
ø12	31.5	18.5	12	-	31	18	11	-
ø16	28.5	15.5	9.5	-	28.5	15.5	8.5	-
ø20	28.5	13.5	10.5	-	28.5	13.5	21.5	6.5

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

STEP 1

Calculate the load factor and decide the bore size.

$$\alpha = \frac{F_o}{F} \times 100 \text{ [%]}$$

α : Load factor

F_o : Force (N) required to move the workpiece

F : Cylinder theoretical thrust (N)
[Table 1]

[Table 1] Theoretical thrust table

(Unit: N)

Bore size (mm)	Operating direction	Working pressure MPa						
		0.15	0.2	0.3	0.4	0.5	0.6	0.7
ø12	PUSH	17	23	34	45	57	68	79
	PULL	13	17	25	34	42	51	59
ø16	PUSH	30	40	60	80	101	121	141
	PULL	26	35	52	69	86	104	121
ø20	PUSH	47	63	94	126	157	188	220
	PULL	40	53	79	106	132	158	185

[Table 2] Load factor guidelines

Working pressure MPa	Load factor (%)
0.2 to 0.3	$\alpha \leq 40$
0.3 to 0.6	$\alpha \leq 50$
0.6 to 0.7	$\alpha \leq 60$

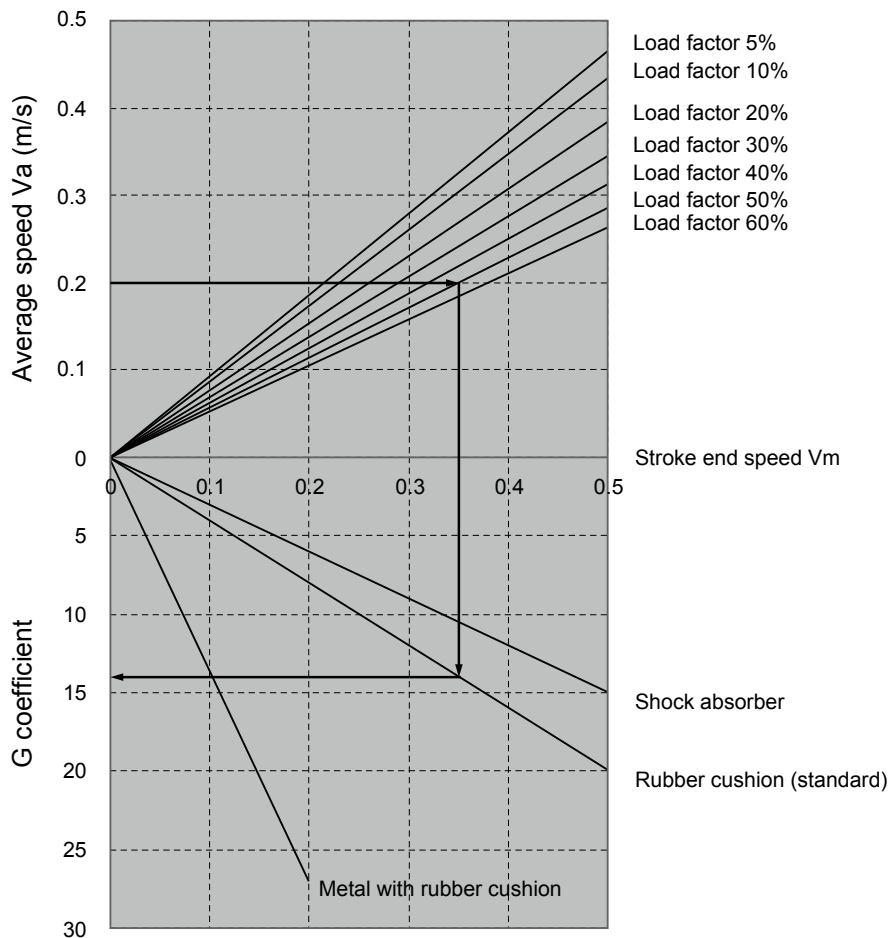
For horizontal operation	For vertical operation
$F_o = F_w$	$F_o = W + F_w$
FW: $W \times 0.2$ Note (N)	
W: Load (N)	

Note: Coefficient of friction

STEP 2

Obtain the stroke end speed (V_m) and G coefficient.

Obtain the stroke end speed (V_m) and G coefficient from the average speed (V_a) and load factor obtained in STEP 1.



The arrows (→) in the figure show an example in which stroke end speed of 0.35 m/s and G coefficient of 14 are obtained at a 0.20 m/s average speed and 50% load factor.

STEP 3

Check the allowable absorbed energy.

$$E = \frac{1}{2} \times (m + m_a) \times V_m^2$$

E : Kinetic energy at workpiece end (J)

m : Load weight (kg) ($m \approx \frac{W(N)}{9.8}$)

m_a : Table weight (from Table 4)

V_m : Stroke end speed (m/s)

$E_{\max}$: Max. allowable value of E_o (from Table 3)

Confirm $E \leq E_{\max}$.

[Table 3] LCW allowable absorbed energy

Bore size (mm)	Rubber cushion (standard) (J)	Metal with rubber cushion (J)	Shock absorber (J)
ø12	0.027	0.0053	0.054
ø16	0.055	0.0053	0.11
ø20	0.11	0.043	0.22

[Table 4] Table weight (Unit: kg)

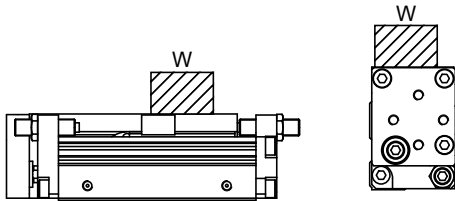
Bore size (mm)	Stroke length (mm)		
	30	50	75
ø12	0.059	0.089	0.111
ø16	0.089	0.112	0.164
ø20	0.141	0.176	0.264

STEP 4

Obtain $M'T$ (resultant moment at rest).

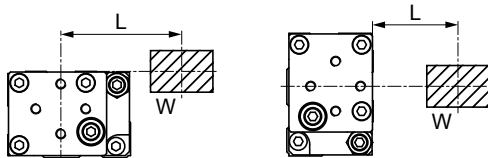
Calculate the load (moment) and the moment of impact occurring at the stroke end and obtain $M'T$ (resultant moment at rest).

● Vertical load: W' (N)



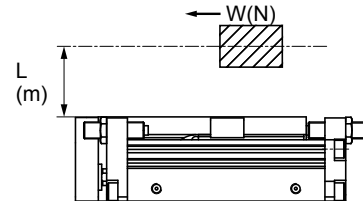
$$W' = W$$

● Radial moment: $M2'$ (N·m)



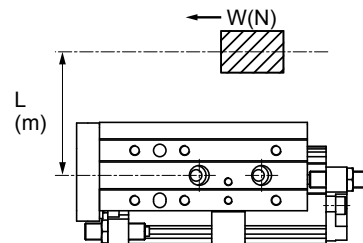
$$M2' = L \times W$$

● Bending moment: $M1'$ (N·m)



$$M1' = L \times W$$

● Torsion moment: $M3'$ (N·m)



$$M3' = L \times W$$

$$W' = \text{ } (N)$$

$$M1' \times G = \text{ } (N \cdot m)$$

$$M2' = \text{ } (N \cdot m)$$

$$M3' \times G = \text{ } (N \cdot m)$$

$$M'T = \frac{W'}{W'_{\max}} + \frac{M1' \times G}{M1'_{\max}} + \frac{M2'}{M2'_{\max}} + \frac{M3' \times G}{M3'_{\max}} = \text{ }$$

$M'T$: Synthesis of moment

G : G coefficient

$W'_{\max}$: Max. allowable value of W' (from Table 5)

$M1'_{\max}$: Max. allowable value of $M1'$ (from Table 5)

$M2'_{\max}$: Max. allowable value of $M2'$ (from Table 5)

$M3'_{\max}$: Max. allowable value of $M3'$ (from Table 5)

[Table 5] Allowable static load

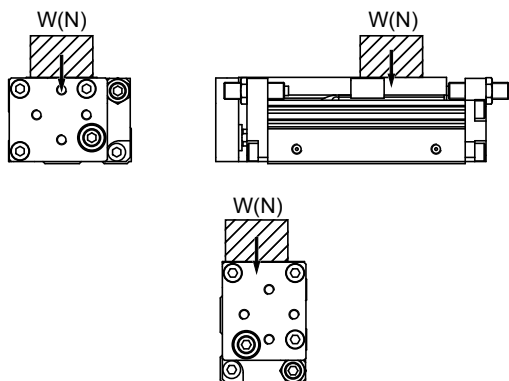
Bore size (mm)	Stroke length (mm)	Vertical load $W'_{\max}$ (N)	Bending moment $M1'_{\max}$ (N·m)	Radial moment $M2'_{\max}$ (N·m)	Torsion moment $M3'_{\max}$ (N·m)
ø12	30	140	0.7	3.5	0.7
	50, 75	186	10.7	5.6	10.7
ø16	30, 50	221	5.7	9.8	5.7
	75		22.2		22.2
ø20	30, 50	381	17.8	19.2	17.8
	75		37.3		37.3

Confirm $M'T \leq 1$.

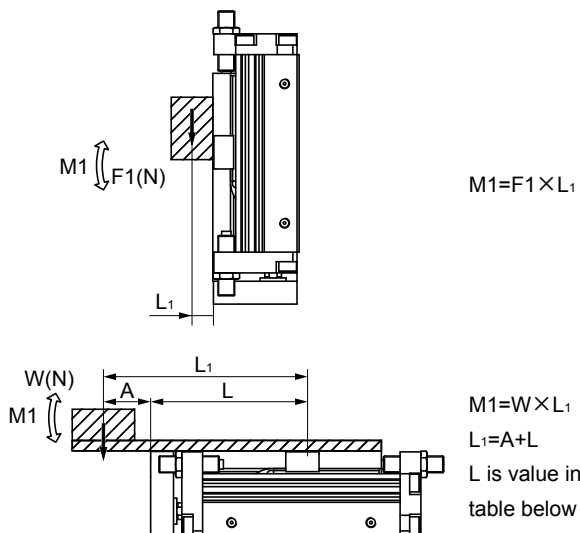
STEP 5

Obtain MT (resultant moment during movement) (Note that it differs from that obtained in STEP 4.)

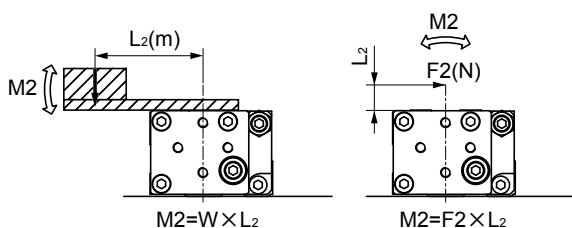
● Vertical load: W (N)



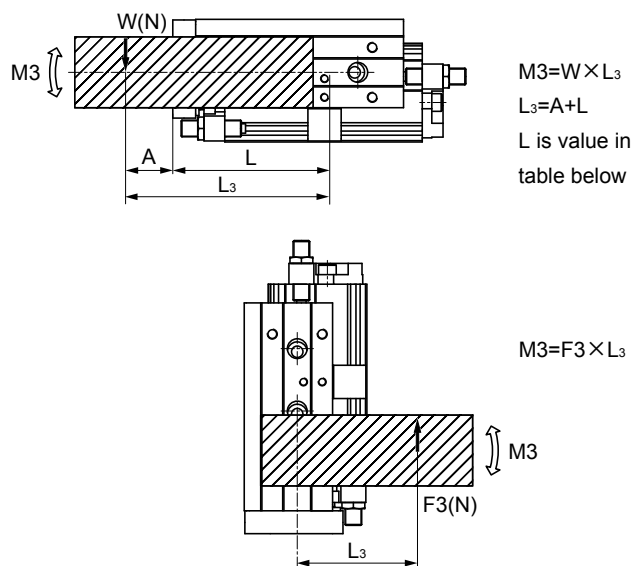
● Bending moment: M1 (N·m)



● Radial moment: M2 (N·m)



● Torsion moment: M3 (N·m)



[Table 6] L value (Unit: m)

Bore size (mm)	Stroke length (mm)		
	30	50	75
ø12	0.066	0.097	0.122
ø16	0.077	0.097	0.131
ø20	0.085	0.105	0.141

W=W = (N)

M1=M1 = (N·m)

M2=M2 = (N·m)

M3=M3 = (N·m)

MT : Synthesis of moment

Wmax : Max. allowable value of W (from Table 7)

M1max : Max. allowable value of M1 (from Table 7)

M2max : Max. allowable value of M2 (from Table 7)

M3max : Max. allowable value of M3 (from Table 7)

[Table 7] Allowable running load

Bore size (mm)	Stroke length (mm)	Vertical load Wmax (N)	Bending moment M1 max (N·m)	Radial moment M2 max (N·m)	Torsion moment M3 max (N·m)
ø12	30	14	0.17	0.35	0.17
	50, 75	16	0.89	0.47	0.89
ø16	30, 50	28	0.71	1.2	0.71
	75		2.2		2.2
ø20	30, 50	48	1.9	2.4	1.9
	75		4.6		4.6

Can be used when $M_T \leq 1$.

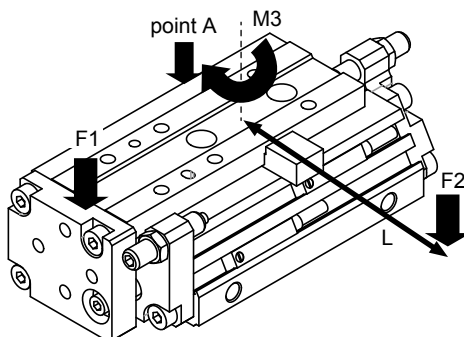
Table displacement

[Displacement of table due to M1, M2 and M3 moments]

M1 moment: Displacement at the table end when load (F1) is applied to the table end

M2 moment: Displacement at the table end (point A) when load (F2) is applied to a point L mm away from the center of the cylinder

M3 moment: Displacement angle of the table when rotation moment (M3) is applied to the cylinder

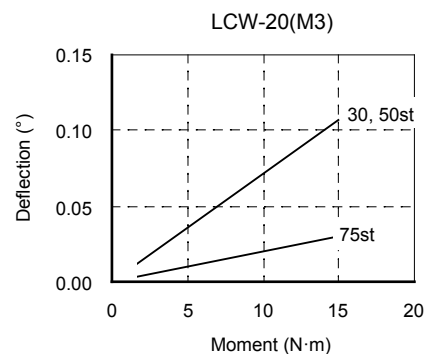
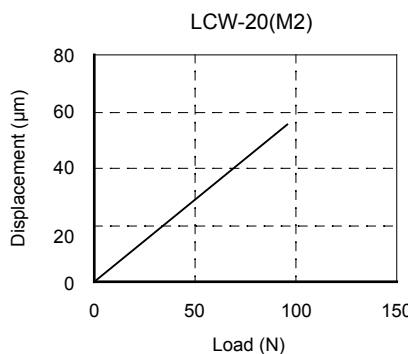
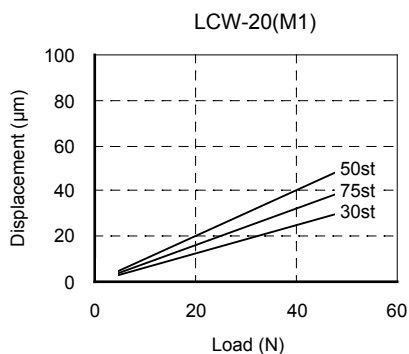
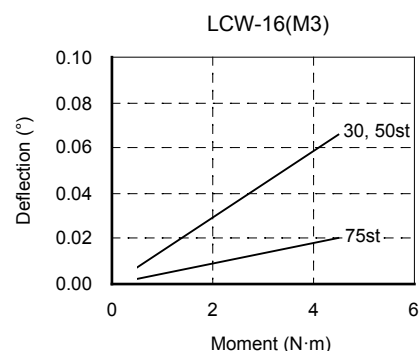
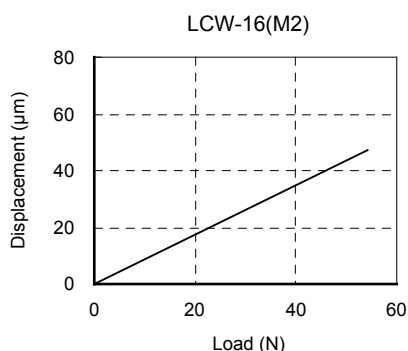
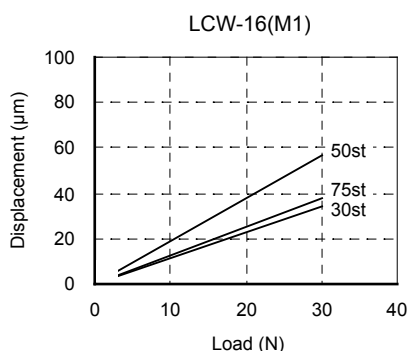
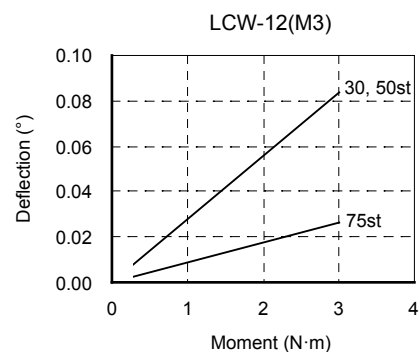
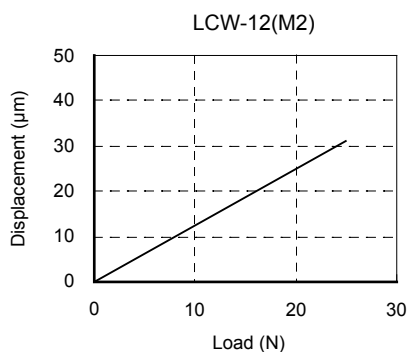
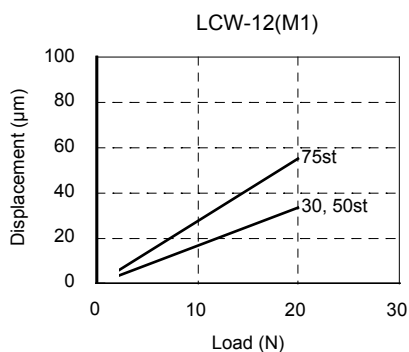


L value
 ø12: L = 70
 ø16: L = 90
 ø20: L = 100

Displacement of table due to M1 moment

Displacement of table due to M2 moment

Displacement of table due to M3 moment



LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending



Safety Precautions

Be sure to read this section before use.

Refer to Intro Page 73 for general information of the cylinder, and to Intro Page 80 for general information of the cylinder switch.

Product-specific cautions: Linear slide cylinder LCW Series

Design/selection

1. Common

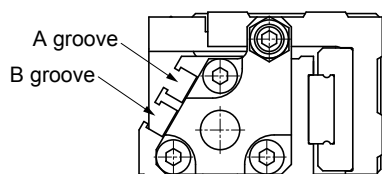
CAUTION

■ When selecting the cylinder, follow the “LCW selection guide” on pages 242 to 244.

■ Protect the cylinder with a cover to prevent damage and malfunction in a place where it is exposed to dripping water or oil, corrosive conditions or much dust.

■ Precautions for type with switch

- Mount one stroke length 30 switch per body groove.
- If using the radial lead wire (T□V, F□V), mount the rod side switch to the B groove in the figure below.



■ Avoid use in places subject to vibrations.
The product will be adversely affected by vibration and operation will become unstable.

2. Position locking LCW-Q

CAUTION

■ Do not use 3-position valves.

Avoid using the cylinder in combination with 3-position (especially closed center metal seal) valves. If the port at the side where the lock mechanism is provided is pressurized, the lock cannot be engaged. Even if it is locked once, the air leaked from the valve enters the cylinder, and the lock may be released after a certain period of time.

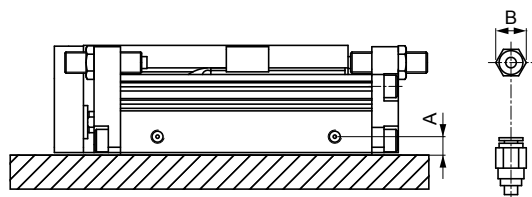
Mounting, installation and adjustment

1. Common: when piping

CAUTION

■ Precautions for piping fittings

Be sure to attach a speed controller during piping before use. The available fittings are as below.



Item	Bore size (mm)	Port size	Port position dimension A	Applicable fitting	Fitting O.D. B
	ø12	M5	5.5	SC3W-M5-4 SC3W-M5-6	ø11 or less
	ø16		5.5	GWS4-M5-S GWS4-M5	ø11 or less
	ø20		7	SC3W-M5-4 SC3W-M5-6 GWS4-M5-S GWS4-M5 GWL6-M5 GWS6-M5	ø13 or less

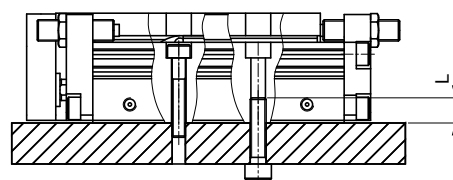
2. Common: when installing

CAUTION

■ Do not damage the surface flatness by denting or scratching the body (tube) mounting surface or the table surface.

In addition, ensure that the flatness of the mating surface for body and table mounting is 0.02 mm or less.

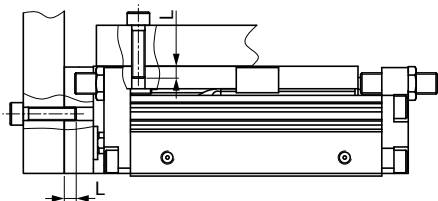
■ Observe the following bolt insertion lengths and tightening torque when mounting the body.



Item	1		2		
	Bolt used	Tightening torque (N·m)	Bolt used	Tightening torque (N·m)	Max. insertion depth L (mm)
LCW-12	M3×0.5	0.6 to 1.1	M4×0.7	1.4 to 2.4	6
LCW-16	M4×0.7	1.4 to 2.4	M5×0.8	2.9 to 5.1	8
LCW-20	M5×0.8	2.9 to 5.1	M6×1.0	4.8 to 8.6	10

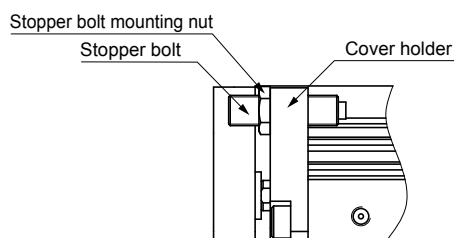
Mounting, installation and adjustment

- Observe the following bolt insertion lengths and tightening torque when installing the jig on the slide table or end plate.



Item	Table			End plate		
	Bolt used	Tightening torque (N·m)	Screw insertion length L (mm)	Bolt used	Tightening torque (N·m)	Screw insertion depth L (mm)
LCW-12	M3×0.5	0.6	3 to 4	M3×0.5	0.6	4.5 to 6
LCW-16	M4×0.7	1.4	4 to 5.5	M4×0.7	1.4	6 to 9
LCW-20	M5×0.8	2.9	5 to 6	M5×0.8	2.9	7.5 to 9

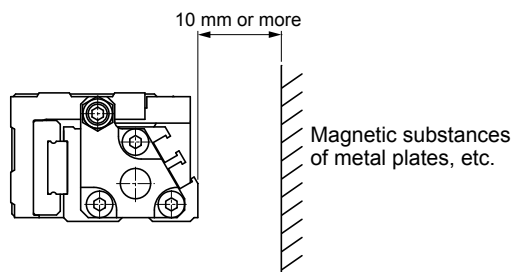
- Observe the following tightening torque of the stopper bolt mounting nut.



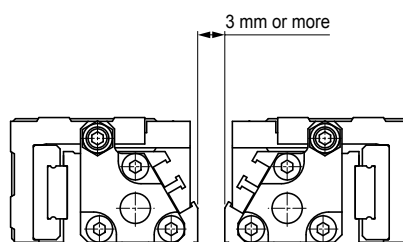
LCW-12, LCW-16 : 0.6 to 1.0 N·m
LCW-20 : 1.2 to 2.0 N·m

- Do not use the stopper bolt when removed from the cover holder. It may cause damage.
- Do not bring your hands near the body during operation, as they may get pinched by the stopper bolt.
- When attaching or detaching the workpiece to/from the slide table and end plate, be sure to keep the slide table itself retained.
- CKD's shock absorber is a repair part. Replace it when the energy absorption performance has degraded or the operation is not smooth.

- The cylinder switch may malfunction if there is a magnetic substance such as a metal plate installed adjacently. To ensure safe operation, keep it 10 mm and over away from the cylinder surface or change the installation surface of the cylinder switch. (Common for all port sizes)



- The cylinder switches may accidentally function if the cylinders are close to each other as shown in the figure below. Keep the distance below between the surfaces of the cylinders. (Common for all port sizes)



- When using a positioning hole, use a pin of dimensions that do not require press fitting. If a pin is press fitted, the load of press fitting may damage or distort the linear guide, lowering the accuracy. The recommended tolerance of a pin is JIS tolerance m6 or less.

3. Position locking LCW-Q

CAUTION

- The locking mechanism works at the stroke end. If the stopper is engaged on the way of the stroke by the external stopper, the locking mechanism may not work and the piston could fall. When setting a load, make sure to check that the lock mechanism functions before installing the product.
- Supply pressure equal to or higher than the min. working pressure to the port on the lock mechanism side for each model.
- When the piping at the side where the lock mechanism is provided is long and thin, or when the speed controller is far away from the cylinder port, note that it takes time to engage the lock. Clogging in the silencer mounted on the EXH. port of the solenoid valve may also cause the same result.

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Use/maintenance

1. Common

⚠ CAUTION

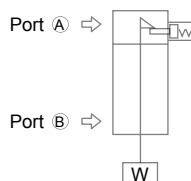
- Apply grease to the guide rail every six months or when the number of operation times reaches one million, whichever is earlier.
(For information on recommended grease, contact CKD separately.)

- When disassembling the end plate during packing replacement, be sure to keep the slide table itself retained.

2. Position locking LCW-Q

⚠ WARNING

- If pressure is supplied to port ① when both ports are not pressurized and the piston is locked, the lock may not be released or the piston rod may suddenly pop out just after the lock is released. This can be extremely hazardous. To release the lock mechanism, make sure to supply pressure to port ②. Check that load is not applied to the lock mechanism.



- For usage where the drop rate is increased using the quick exhaust valve, the lock may not release normally because the cylinder body starts operating before the lock pin. For the position locking cylinder, do not use the quick exhaust valve.

⚠ CAUTION

- If back pressure is applied to the locking mechanism, the lock may be released. Use a single solenoid valve, or an individual exhaust manifold.
- After the locking mechanism is manually operated, make sure to return the locking mechanism to the original state before use. Do not perform manual operation except for adjustment, as it is dangerous.
- When mounting or adjusting the cylinder, release the lock.
If mounting work, etc., is done while the lock is engaged, the lock part may be damaged.
- Do not use multiple synchronized cylinders.
Do not use so that 1 workpiece is moved by synchronizing 2 or more position locking cylinders. Lock release may fail for one of the cylinders.
- Use the speed controller with meter-out.
If the meter-in control is used, the lock may not be able to be released.

- At the side where the lock mechanism is attached, be sure to use the cylinder from the stroke end.
If the cylinder piston does not reach the stroke end, the lock may not be engaged or the lock may not be able to be released.

■ How to unlock

By screwing the hexagon socket head cap screw (M3 x 20) into the stopper piston and pulling the bolt 3 mm with force of 20 N or more, the stopper piston moves and the lock is released. (when horizontally installed with no load and with the rod port pressurized). When the screw is released, the internal spring returns the stopper piston. When the stopper piston fits in the piston rod groove, the cylinder is locked.

