CKD

New Products

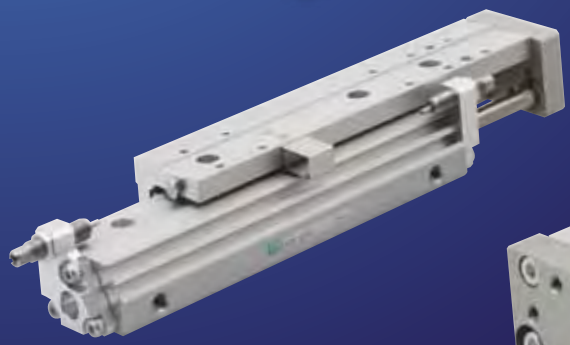
New Product

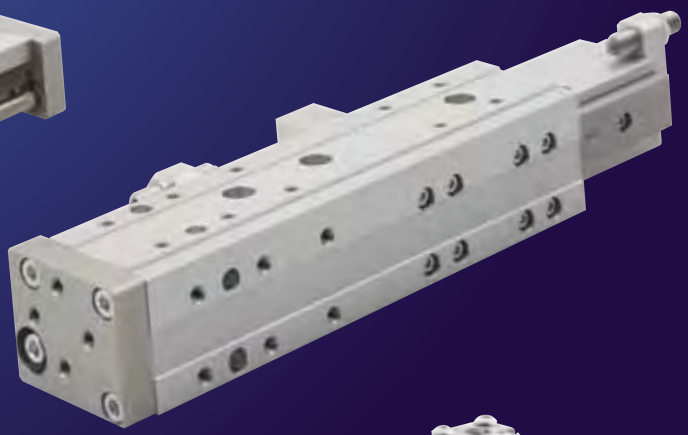
Linear Slide Cylinder
LCW Series

LINEAR SLIDE CYLINDER LCW SERIES

Basic model debut

Popular specifications are provided as standard!
Ordering became easier





New

Position locking type is lined up!

CKD Corporation

CC-1132A 1

Basic model is now available

Popular specifications are provided as standard!
Ordering became easier

LCW Series

3 points on easy selecting

1. Port sizes are integrated in 3 types

φ12 φ16 φ20

2. Stroke length are integrated in 3 types

30 mm 50 mm 75 mm

Single piston is adopted.

(equivalent to φ8, φ12, φ16 for LCR)

3. Stroke adjusting function is provided as standard

3 types of stoppers are available.

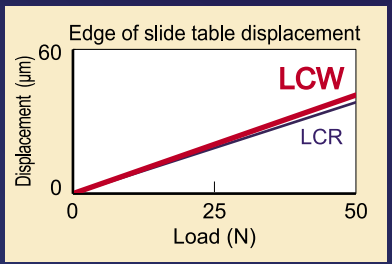
- Rubber cushion type stopper (standard)
- Metal type stopper with rubber cushion (M)
- Shock absorber type stopper (A)

Points of reliability

Highly rigid

Inherited DNA from LCR.

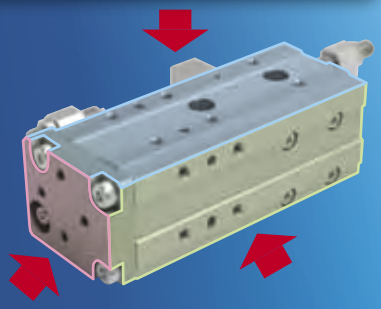
Achieved high rigid and lightweight.



for linear slide cylinder

3 points on easy use

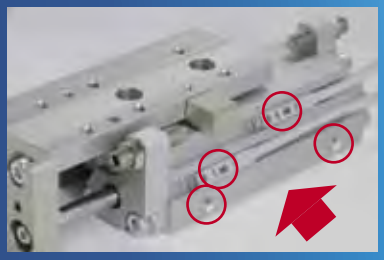
1. Installed on 3 faces



For the first time in the industry! Adopted innovative L type table.

Flexibility is dramatically increased in design stage.

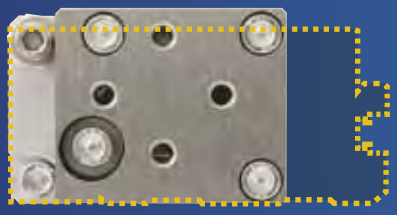
2. Piping and wiring directions are on same side



Simple wiring and piping.

Improved workability and visibility.

3. Compact and space saving



Reduced 27% in width direction, 20% in surface area.

Revised stopper position.

Reduced **20%** in surface area!

(compared to LCR)

Points of safety

Position locking type is lined up

For the first time in the industry!

Position locking type is available not only on head end but also rod end*

* Custom order

Position locking mechanism

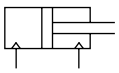
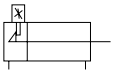
Head end

Rod end*

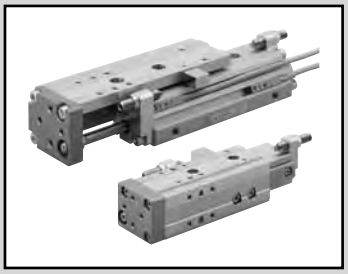
Series variation

Linear slide cylinder LCW Series

●: Standard ◎: Semi-standard : Not available

Variation	Model no. / JIS symbol	Bore size (mm)	Stroke length (mm)			Stopper					Switch	Page
						Rubber cushion type stopper	Rubber cushion type long stopper	Metal type stopper with rubber cushion	Metal type long stopper with rubber cushion	Shock absorber type stopper		
			30	50	75	Blank	S	M	MS	A		
Double acting/single rod type	LCW 	φ12	●	●	●	●	◎	◎	◎	◎	◎	1
		φ16	●	●	●	●	◎	◎	◎	◎	◎	1
		φ20	●	●	●	●	◎	◎	◎	◎	◎	1
Double acting/position locking type	LCW-Q 	φ12	●	●	●	●	◎	◎	◎	◎	◎	21
		φ16	●	●	●	●	◎	◎	◎	◎	◎	21
		φ20	●	●	●	●	◎	◎	◎	◎	◎	21

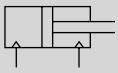
MEMO



Linear slide cylinder Double acting/single rod type

LCW Series

●Bore size: φ12, φ16, φ20

JIS symbol 

RoHS

Specification

Descriptions	LCW		
Bore size mm	φ12	φ16	φ20
Operation type	Double-acting type		
Working fluid	Compressed air		
Max. working pressure MPa	0.7		
Min. working pressure MPa	0.15 (Note 1)		
Proof pressure MPa	1.05		
Ambient temperature °C	-10 to 60 (no freezing) (Note 2)		
Port size	M5		
Operating piston speed mm/s	50 to 500 (Note 3)		
Cushion	Rubber cushion		
Lubrication	Not required (when lubricating, use turbine oil Class 1 ISO VG32.)		
Allowable energy absorption J	* Refer to table 3 on page 40.		

Note 1: Use the metal stopper with rubber cushion at 0.4 MPa or more pressure to make metal contact at the edges of stroke.
Note 2: Use the shock absorber type stopper between -5 and 60°C.
Note 3: Use the metal stopper with rubber cushion between 50 and 200 mm/s.

Stroke length

Bore size (mm)	Standard stroke length (mm)
φ12	30, 50, 75
φ16	
φ20	

Note: Stroke length other than above is not available.

Adjustable stroke range

(unit: mm)

Bore size (mm)	Standard rubber cushion type				Metal type with rubber cushion				Shock absorber type	
	Standard stroke		Custom stroke length compatible (S)		Standard stroke length (M)		Custom stroke length compatible (MS)		Standard stroke length (A)	
	PUSH side	PULL side	PUSH side	PULL side	PUSH side	PULL side	PUSH side	PULL side	PUSH side	PULL side
φ12	10	10	28	10	9	11.5	28	11.5	4	6.5
φ16	7.5	7.5	25	7.5	6	8.5	25	8.5	1.5	3.5
φ20	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
φ12	PUSH	17	23	34	45	57	68	79
	PULL	13	17	25	34	42	51	59
φ16	PUSH	30	40	60	80	101	121	141
	PULL	26	35	52	69	86	104	121
φ20	PUSH	47	63	94	126	157	188	220
	PULL	40	53	79	106	132	158	185

Switch specifications

Descriptions	Reed 2 wire				Proximity 2 wire		Proximity 3 wire	
	T0H/T0V		T5H/T5V		T2H/T2V	T2WH/T2WV	T3H/T3V	T3WH/T3WV
Applications	Programmable controller, relay		Programmable controller, relay IC circuit (w/o indicator), serial connection		Programmable controller		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 light	LED (ON lighting)		w/o indicator		LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)
Leakage current	0 mA				1 mA or less		10 μA or less	
Weight g	1 m: 18 3 m: 49 5 m: 80							

Descriptions	Proximity 2 wire	Proximity 3 wire	Proximity 2 wire		Proximity 3 wire	
	F2S	F3S	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Programmable controller	Programmable controller, relay	Programmable controller		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		100 mA or less	50 mA or less
Indicator light	Red LED (ON lighting)		LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)
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					

Note: T0/T5 switch can be used with 220 VAC. Contact CKD for working conditions.

Cylinder weight

● Basic type (Unit: g)

Bore size (mm)	Stroke length (mm)		
	30	50	75
φ12	240	370	380
φ16	380	390	600
φ20	690	720	1070

● Added stopper (Unit: g)

Bore size (mm)	Stopper symbol		
	S	MS	A
φ12	3	3	0
φ16	3	3	0
φ20	5	5	14

In case of stopper symbol M, weight is same as basic type.

How to order

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

Ⓐ Bore size
Ⓑ Stroke length
Ⓒ Piping direction
Ⓓ Switch model no.
Ⓔ Switch quantity
Ⓕ Stopper

Symbol	Descriptions
Ⓐ Bore size (mm)	
12	φ12
16	φ16
20	φ20

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

Ⓒ Piping direction	
R	Right viewed from rod end
L	Left viewed from rod end

Ⓓ Switch model no.

Axial lead wire	Radial lead wire	Contact	Voltage AC	Voltage DC	Indicator	Lead wire	Bore size φ12	Bore size φ16	Bore size φ20
F2S*		Non-contact		●	1 color indicator	2 wire	●		
F3S*		Non-contact		●	1 color indicator	3 wire	●		
F2H*	**F2V***	Non-contact		●	1 color indicator	2 wire	●		
F3H*	**F3V***	Non-contact		●	1 color indicator	3 wire	●		
F2YH*	**F2YV***	Non-contact		●	2 color indicator	2 wire			
F3YH*	**F3YV***	Non-contact		●	2 color indicator	3 wire			
T0H*	**T0V***	Reed	●	●	1 color indicator	2 wire		●	●
T5H*	**T5V***	Reed	●	●	w/o indicator	2 wire		●	●
T2H*	**T2V***	Non-contact		●	1 color indicator	2 wire		●	●
T3H*	**T3V***	Non-contact		●	1 color indicator	3 wire		●	●
T2WH*	**T2WV***	Non-contact		●	2 color indicator	2 wire			
T3WH*	**T3WV***	Non-contact		●	2 color indicator	3 wire			

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

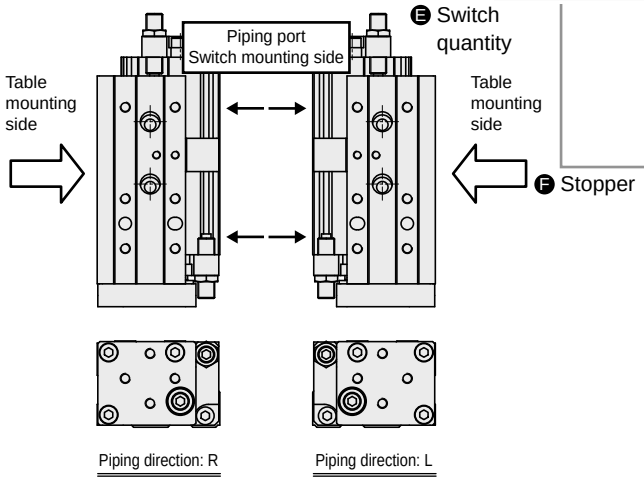
Ⓔ Switch quantity	
R	1 (on rod end)
H	1 (on head-side)
D	2

Ⓕ Stopper	
Blank	Rubber cushion type stopper
S	Rubber cushion type long stopper (custom stroke length compatible)
M	Metal type stopper with rubber cushion
MS	Metal type long stopper with rubber cushion (custom stroke length compatible)
A	Shock absorber type stopper

<Example of model number>

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

Model: linear slide cylinder
Ⓐ Bore size : φ16
Ⓑ Stroke length : 30 mm
Ⓒ Piping direction : Right viewed from rod end
Ⓓ Switch model No. : No-contact switch T2H, lead wire 1 m
Ⓔ Qty. of switch : 2 switches included
Ⓕ Stopper : Shock absorber type



How to order switch

For φ12

SW - F2H

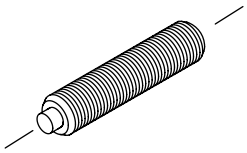
Switch model no.
(Ⓓ at page 3)

For φ16 and φ20

SW - T0H

Switch model no.
(Ⓓ at page 3)

How to order rubber cushion type stopper

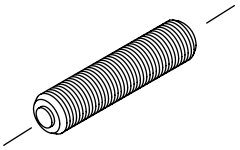


LCW - 12 - S01

Bore size
(Ⓐ at page 3)

Ⓐ Adjustable stroke range	Bore size	Adjustable stroke length
S01 (standard)	φ12	Single 10 mm
	φ16	Single 7.5 mm
	φ20	Single 8 mm
S02 (long)	φ12	Single 28 mm
	φ16	Single 25 mm
	φ20	Single 25 mm

How to order metal type stopper with rubber cushion



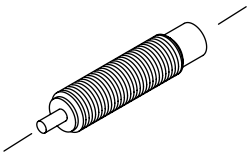
LCW - 12 - M01

Bore size
(Ⓐ at page 3)

Ⓐ Adjustable stroke range	Bore size	Adjustable stroke length	
		PUSH side	PULL side
M01 (standard)	φ12	Single 9 mm	Single 11.5 mm
	φ16	Single 6 mm	Single 8.5 mm
	φ20	Single 7.5 mm	Single 12 mm
M02 (long)	φ12	Single 28 mm	Single 30 mm
	φ16	Single 25 mm	Single 27 mm
	φ20	Single 25 mm	Single 30 mm

Note 1: Change from rubber cushion type stopper is not supported.
Note 2: Change from shock absorber type stopper is not supported. (φ12, φ16 only)

How to order discrete shock absorber type stopper



LCW - 12 - A01

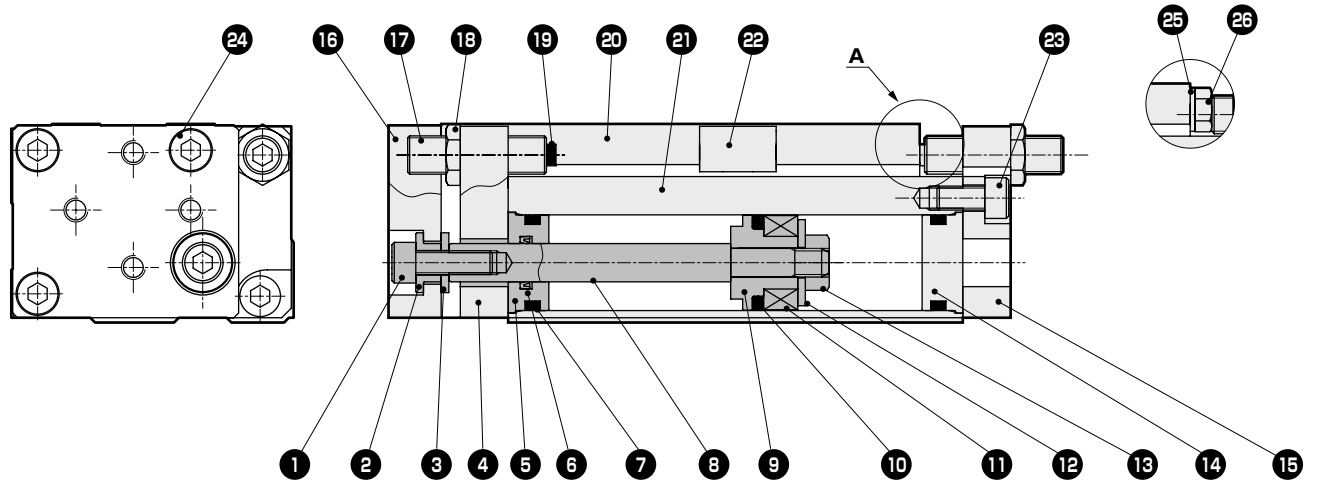
Bore size
(Ⓐ at page 3)

Note 1: Change from rubber cushion type stopper is not supported.
Note 2: Change from metal type stopper with rubber cushion is not supported. (φ12, φ16 only)

Internal structure and parts list

● LCW

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



Parts list

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

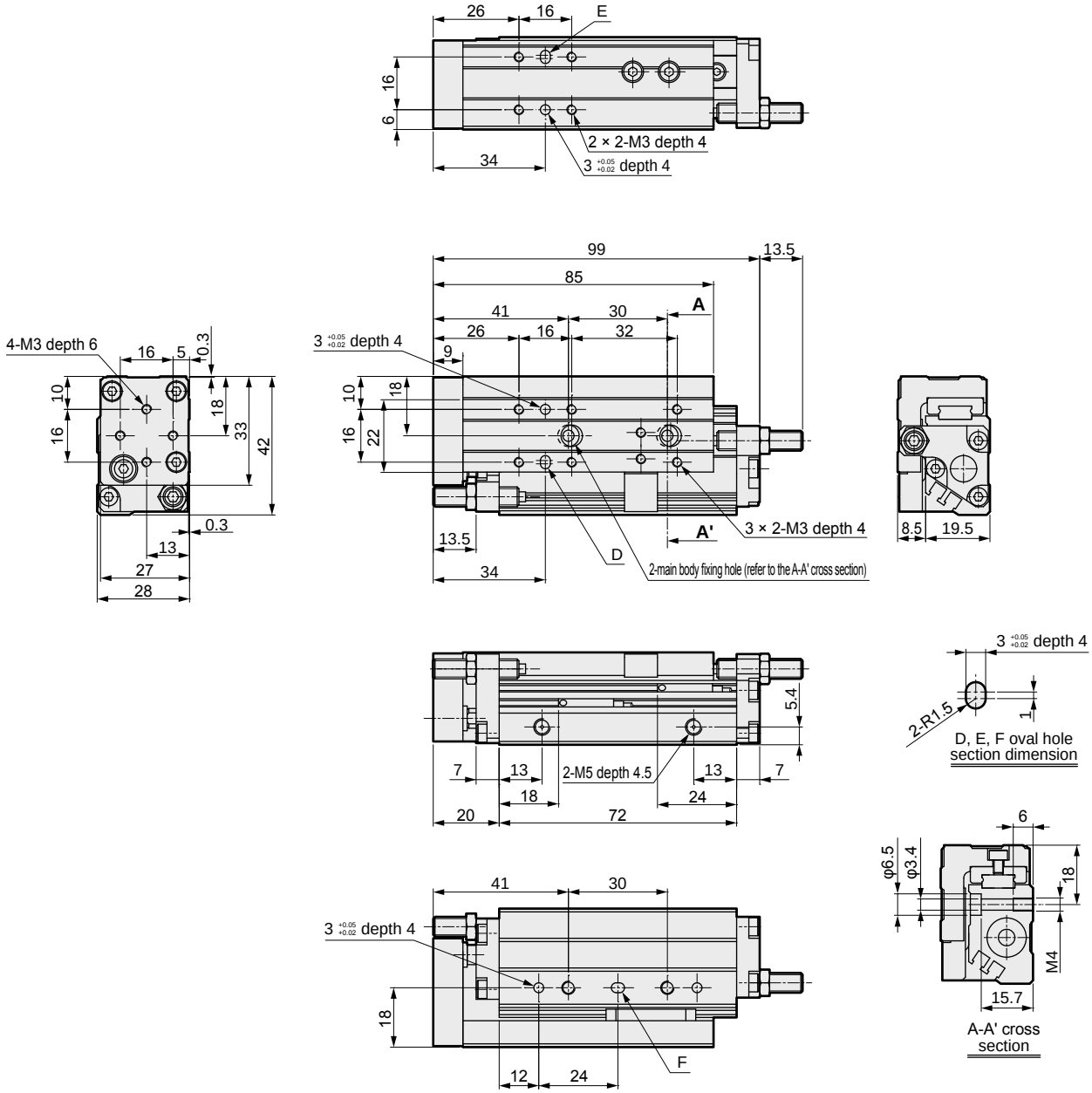
Repair parts list

Bore size (mm)	Kit no.	Repair parts no.
φ12	LCW-12K	⑥⑦⑩⑲
φ16	LCW-16K	
φ20	LCW-20K	

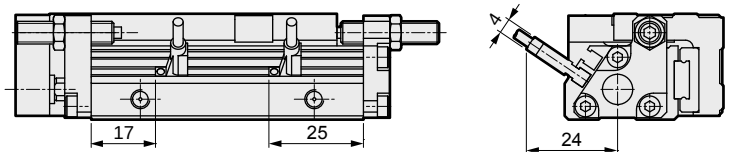
MEMO

Dimensions (bore size: φ12)

● LCW-12
Stroke length: 30, piping direction: R



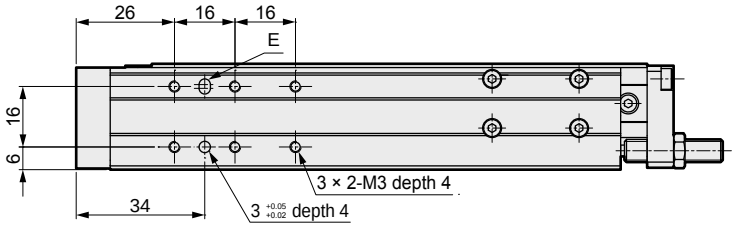
● Dimensions of projecting section for cylinder switch F2S and F3S

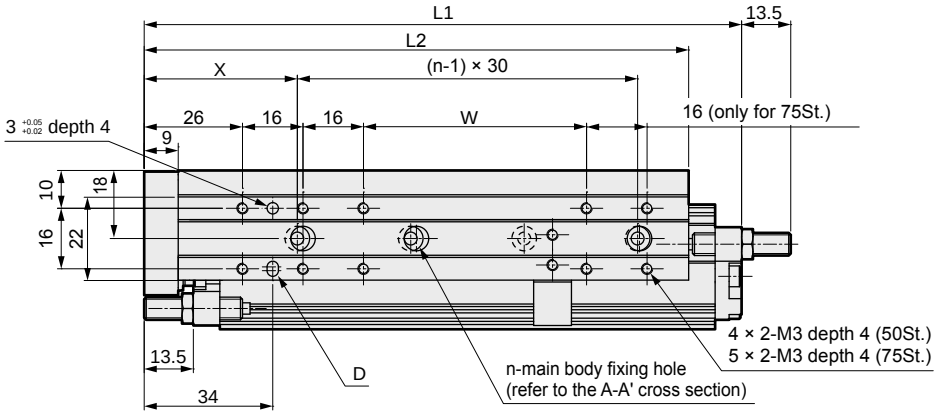


Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.
Note 3: Install switch on F2S or F3S specifications as illustrated in this figure.

Dimensions (bore size: φ12)

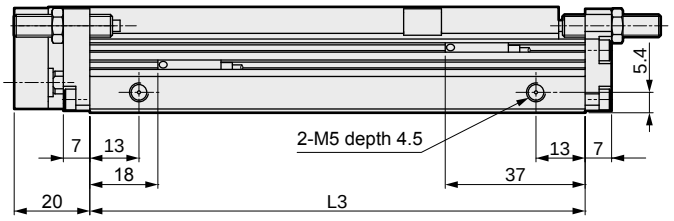
● LCW-12
Stroke length: 50, 75, piping direction: R
(The main body fixing holes in this drawing are for 75 mm stroke)

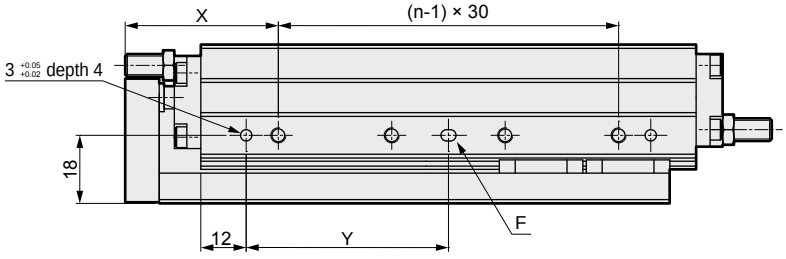




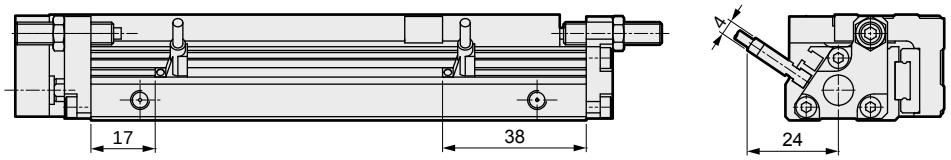
Dimensions table for each stroke length

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





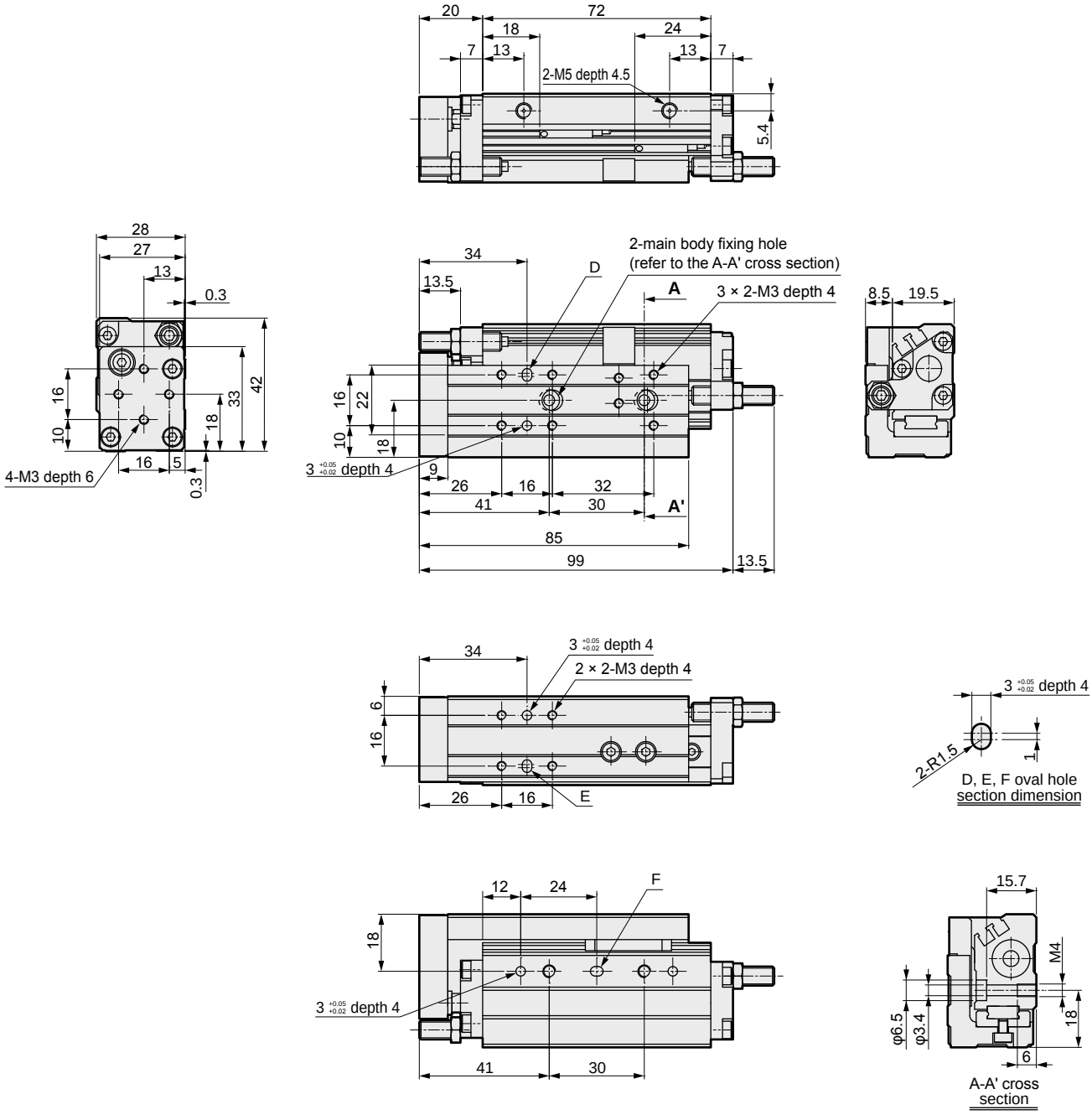
● Dimensions of projecting section for cylinder switch F2S and F3S



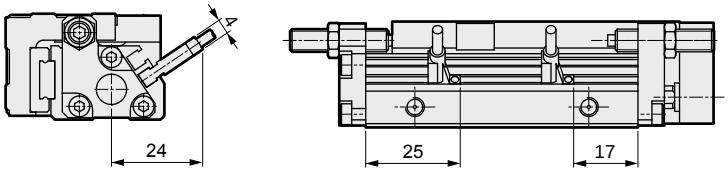
Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.
Note 3: Install switch on F2S or F3S specifications as illustrated in this figure.

Dimensions (bore size: φ12)

● LCW-12
Stroke length: 30, piping direction: L



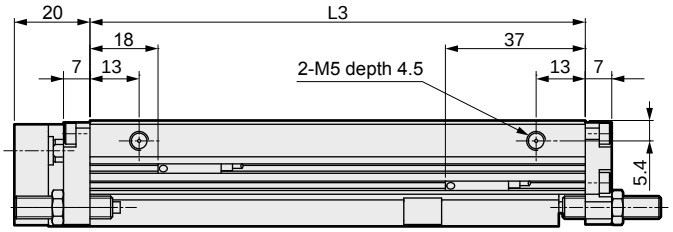
● Dimensions of projecting section for cylinder switch F2S and F3S

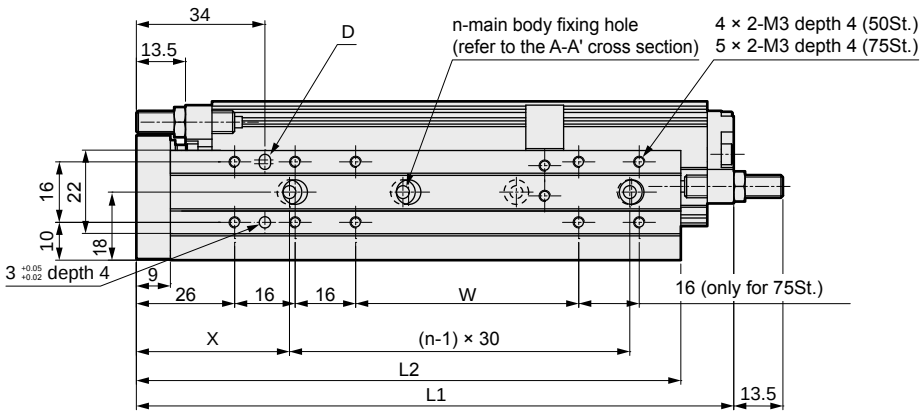


Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.
Note 3: Install switch on F2S or F3S specifications as illustrated in this figure.

Dimensions (bore size: φ12)

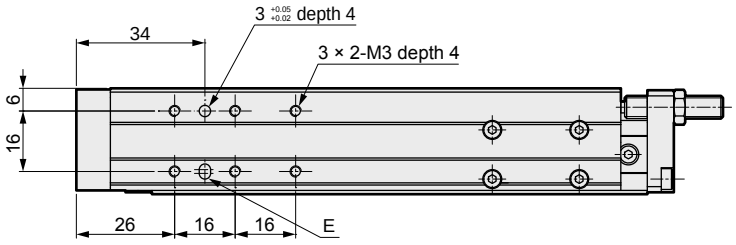
● LCW-12
Stroke length: 50, 75, piping direction: L
(The main body fixing holes in this drawing are for 75 mm stroke)

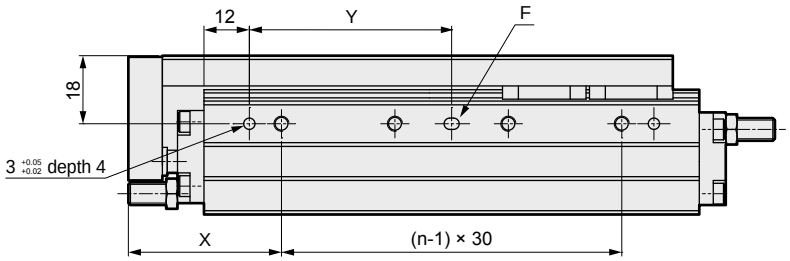




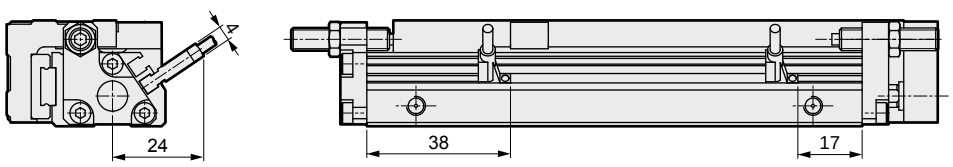
Dimensions table for each stroke length

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





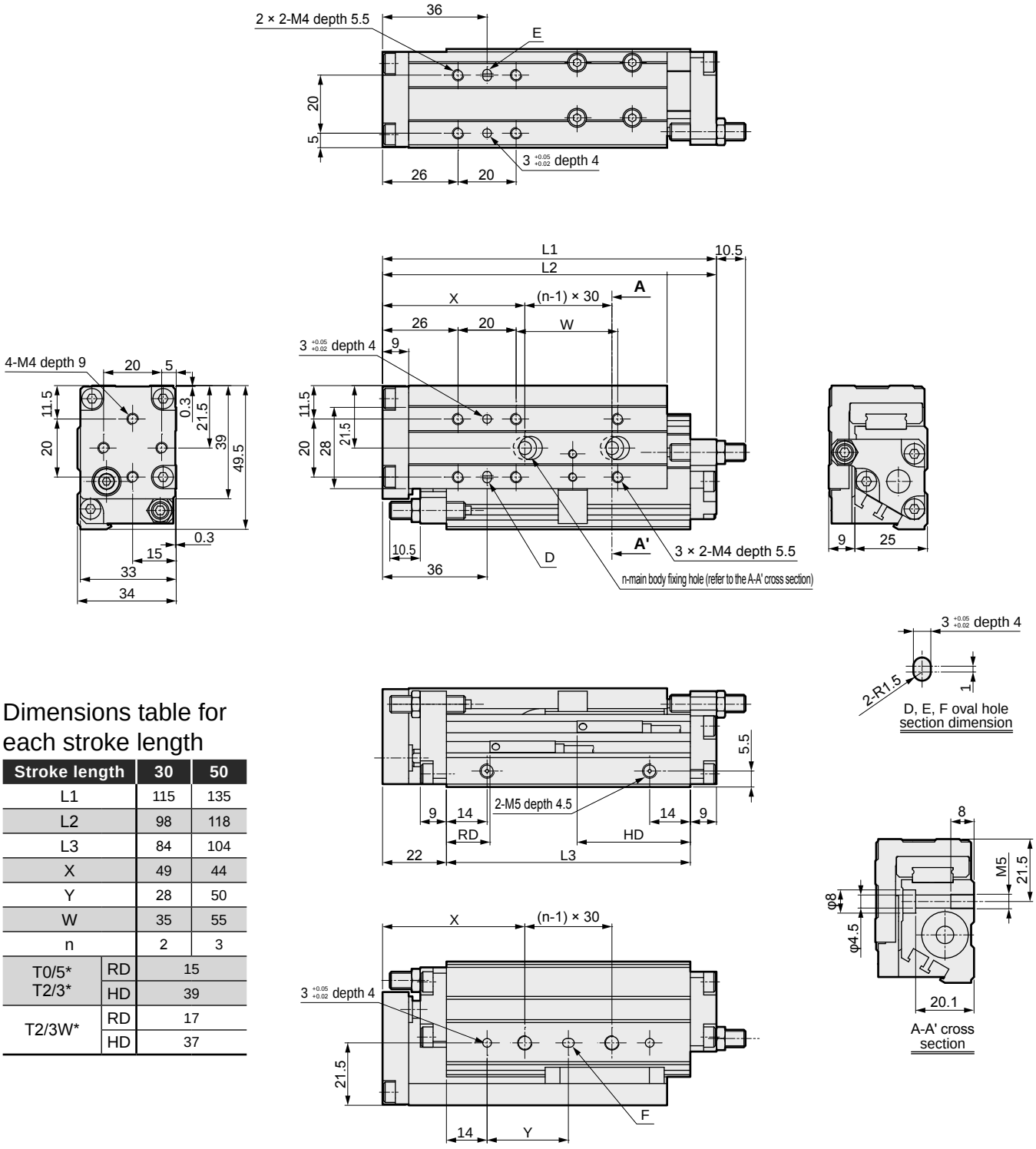
● Dimensions of projecting section for cylinder switch F2S and F3S



Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.
Note 3: Install switch on F2S or F3S specifications as illustrated in this figure.

Dimensions (bore size: φ16)

● LCW-16
Stroke length: 30, 50, piping direction: R
(The main body fixing holes in this drawing are for 30 mm stroke)



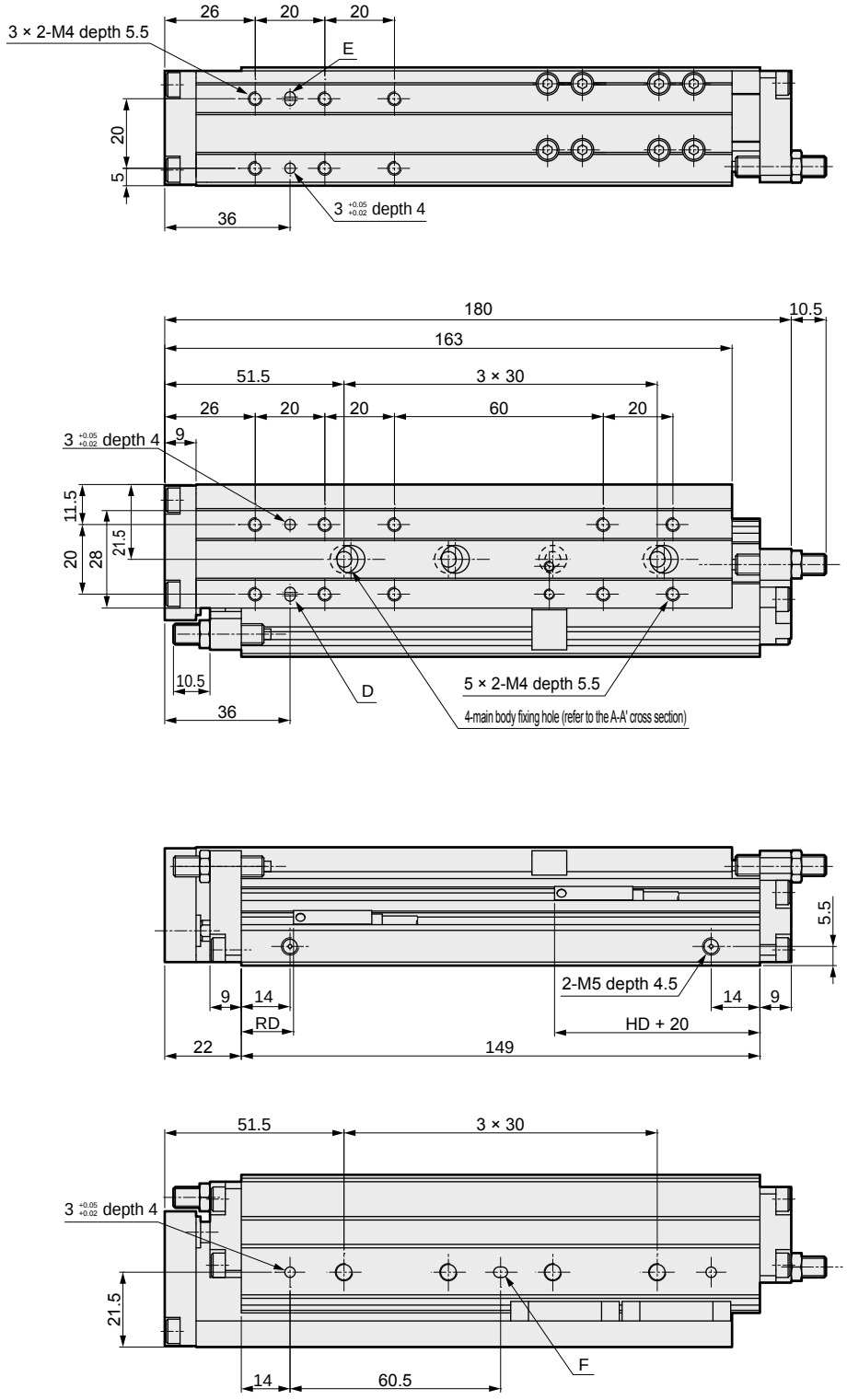
Dimensions table for each stroke length

Stroke length		30	50
L1		115	135
L2		98	118
L3		84	104
X		49	44
Y		28	50
W		35	55
n		2	3
T0/5* T2/3*	RD	15	
	HD	39	
T2/3W*	RD	17	
	HD	37	

Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

Dimensions (bore size: φ16)

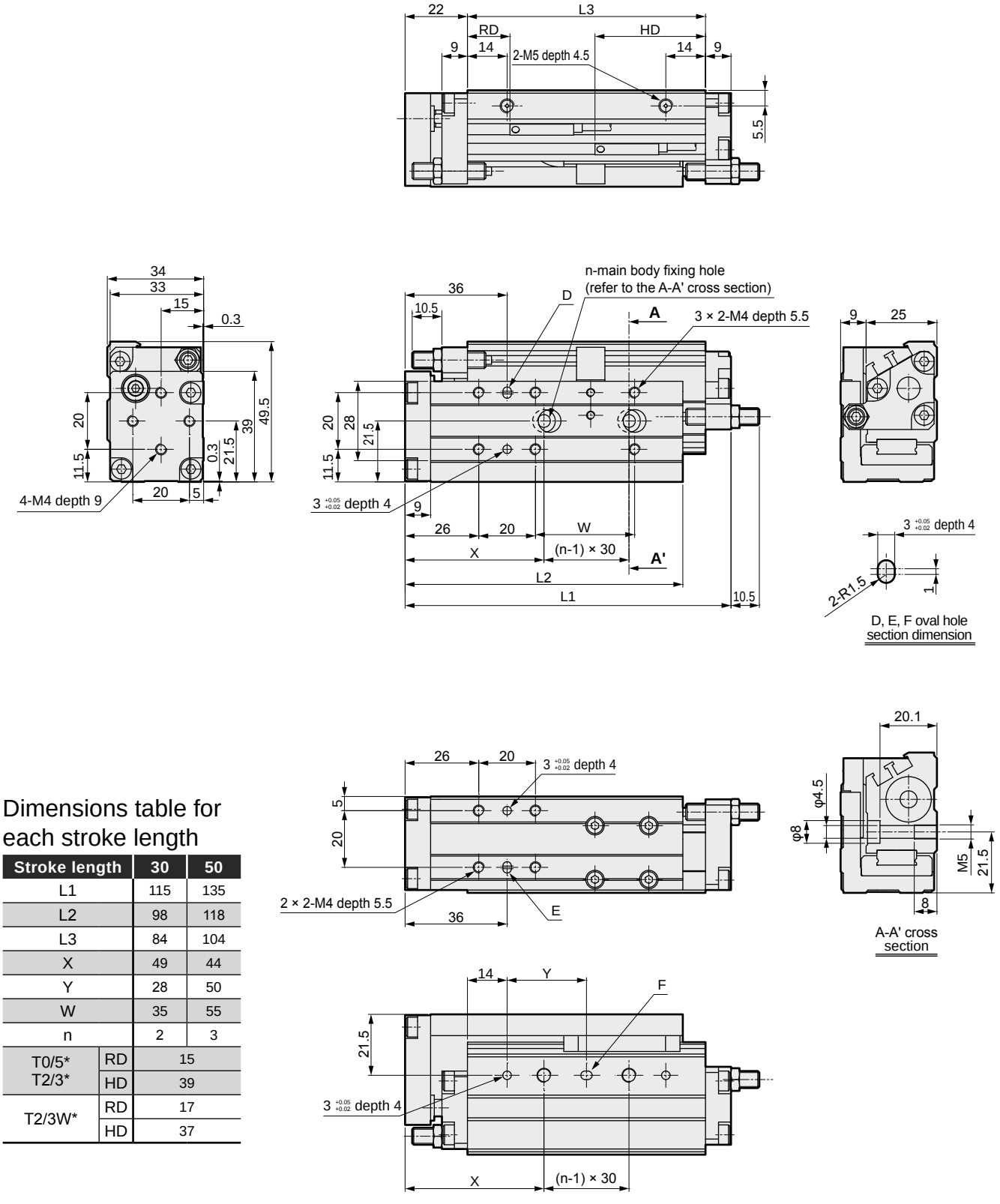
● LCW-16
Stroke length: 75, piping direction: R



Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

Dimensions (bore size: φ16)

● LCW-16
Stroke length: 30, 50, piping direction: L
(The main body fixing holes in this drawing are for 30 mm stroke)



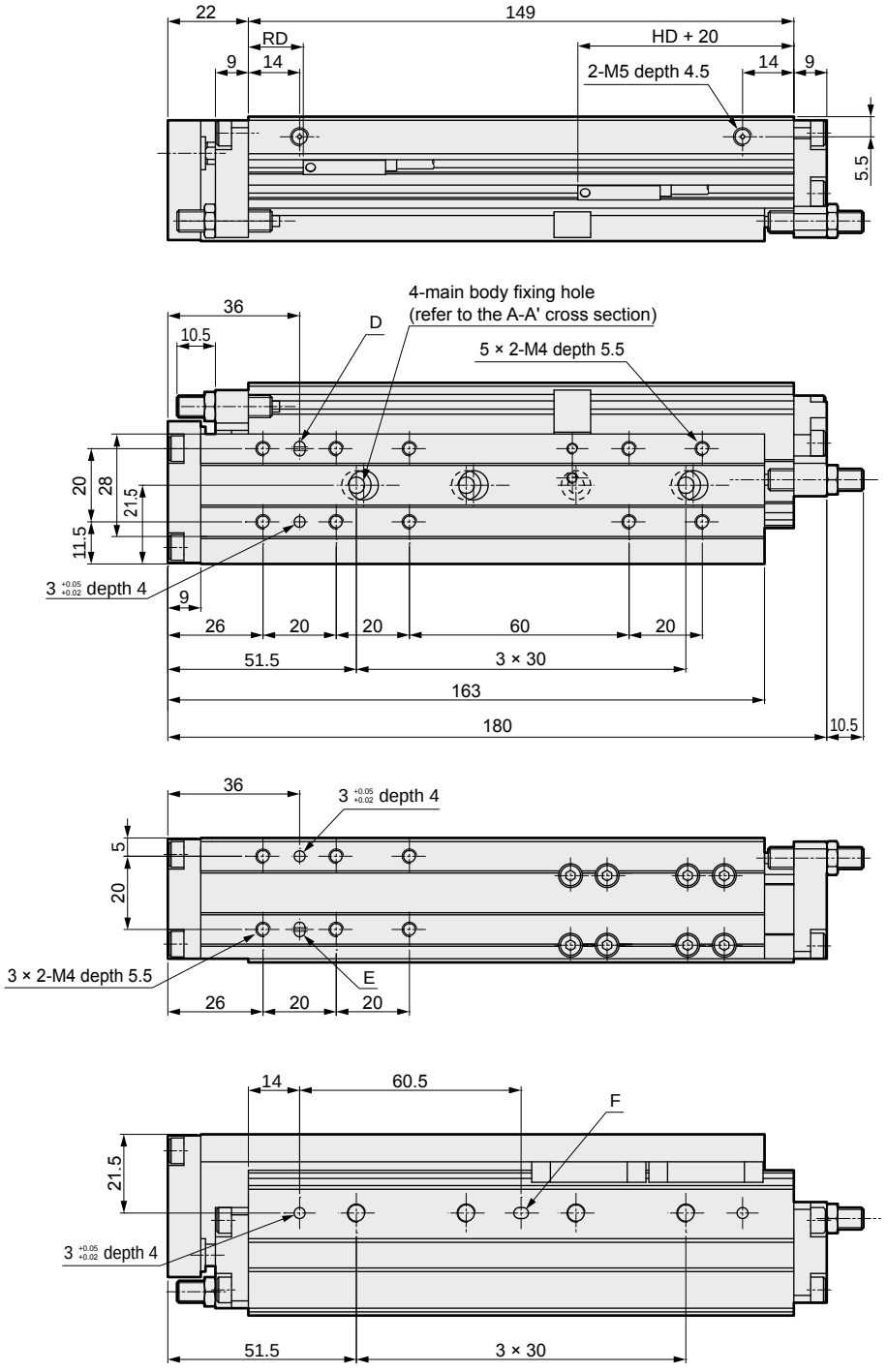
Dimensions table for each stroke length

Stroke length		30	50
L1		115	135
L2		98	118
L3		84	104
X		49	44
Y		28	50
W		35	55
n		2	3
T0/5* T2/3*	RD	15	
	HD	39	
T2/3W*	RD	17	
	HD	37	

Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

Dimensions (bore size: φ16)

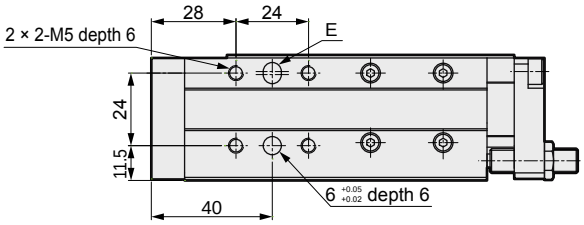
● LCW-16
Stroke length: 75, piping direction: L

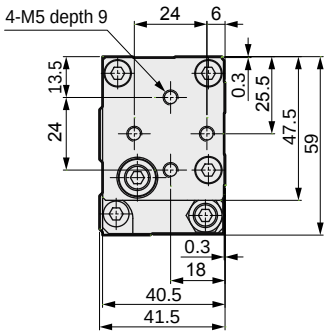


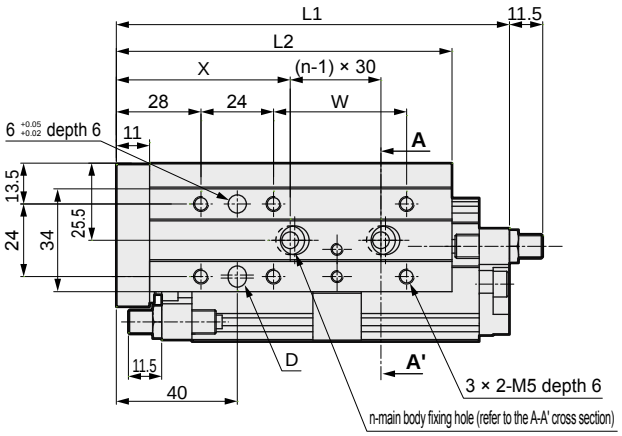
Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

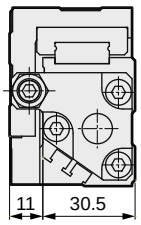
Dimensions (bore size: φ20)

● LCW-20
Stroke length: 30, 50, piping direction: R
(The main body fixing holes in this drawing are for 30 mm stroke)



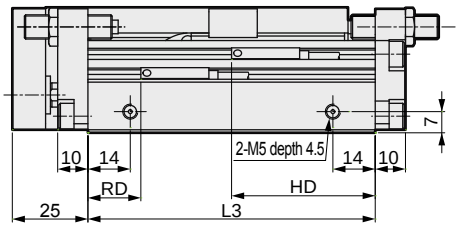


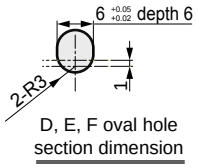




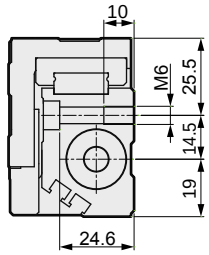
Dimensions table for each stroke length

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	

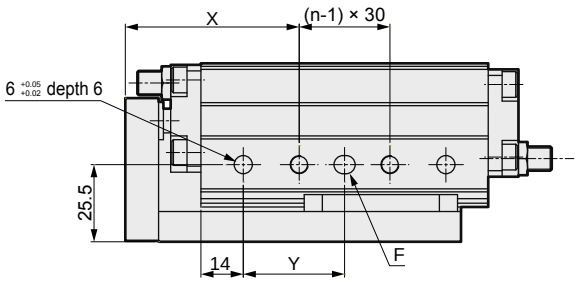




D, E, F oval hole section dimension



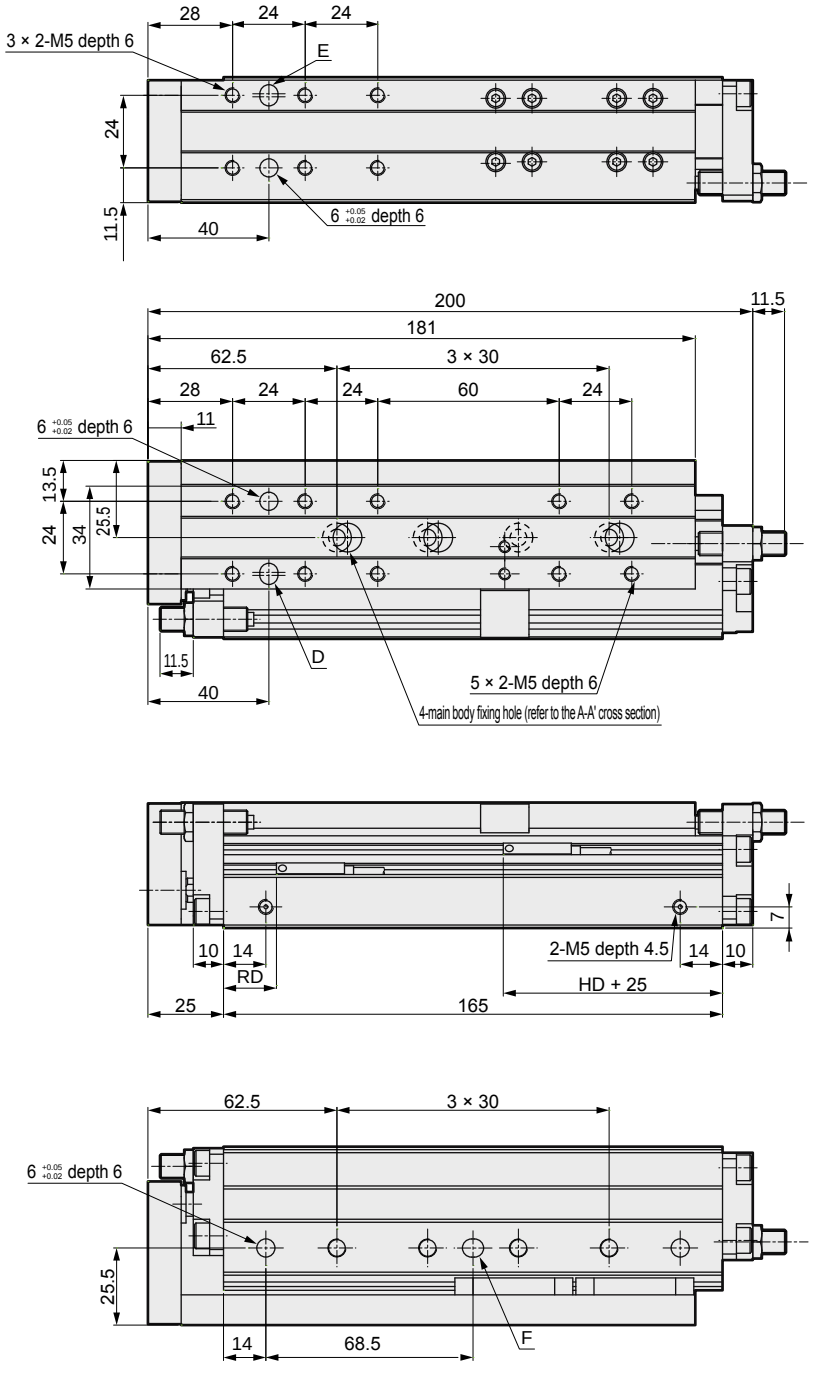
A-A' cross section



Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

Dimensions (bore size: φ20)

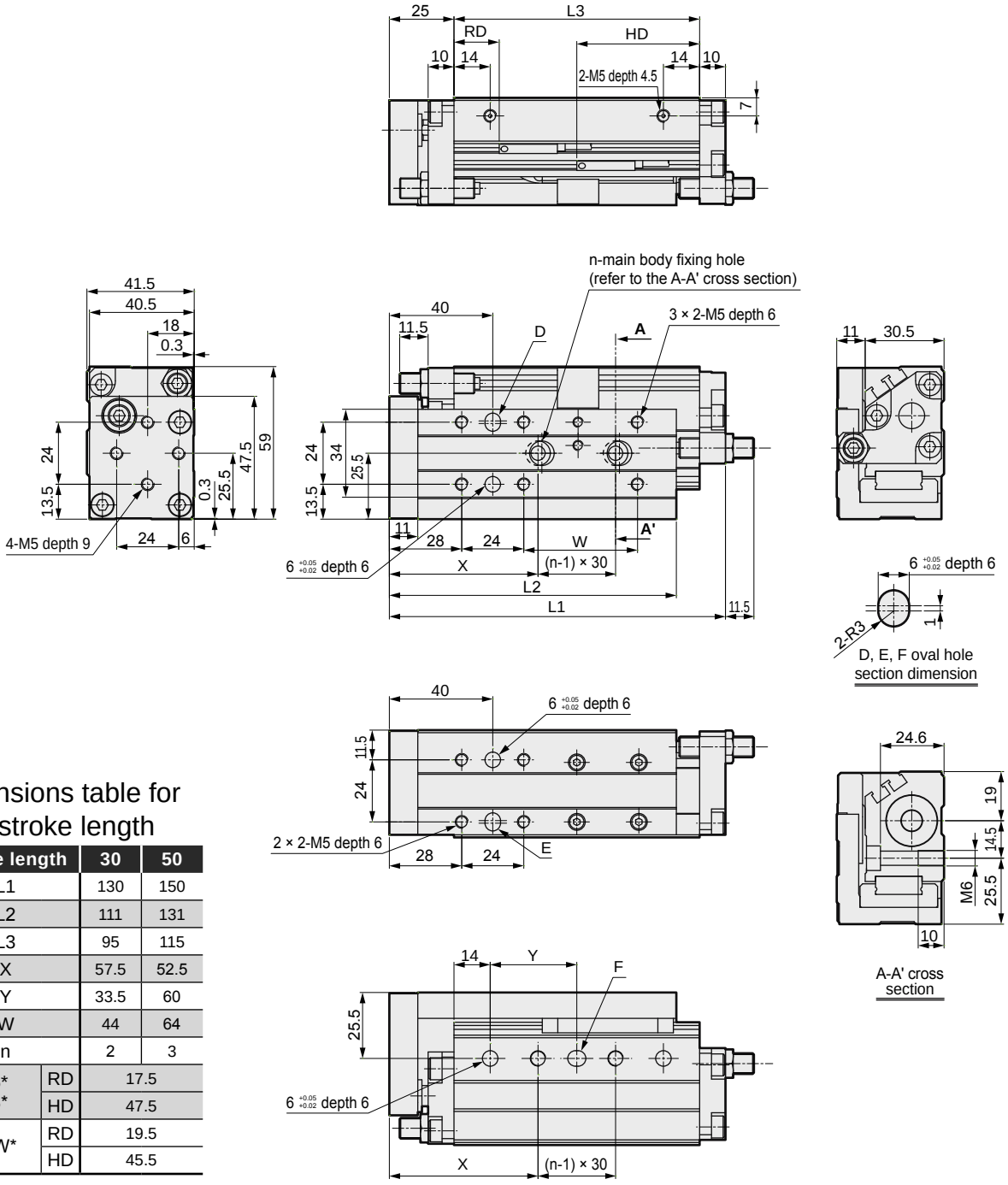
● LCW-20
Stroke length: 75, piping direction: R



Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

Dimensions (bore size: φ20)

● LCW-20
Stroke length: 30, 50, piping direction: L
(The main body fixing holes in this drawing are for 30 mm stroke)



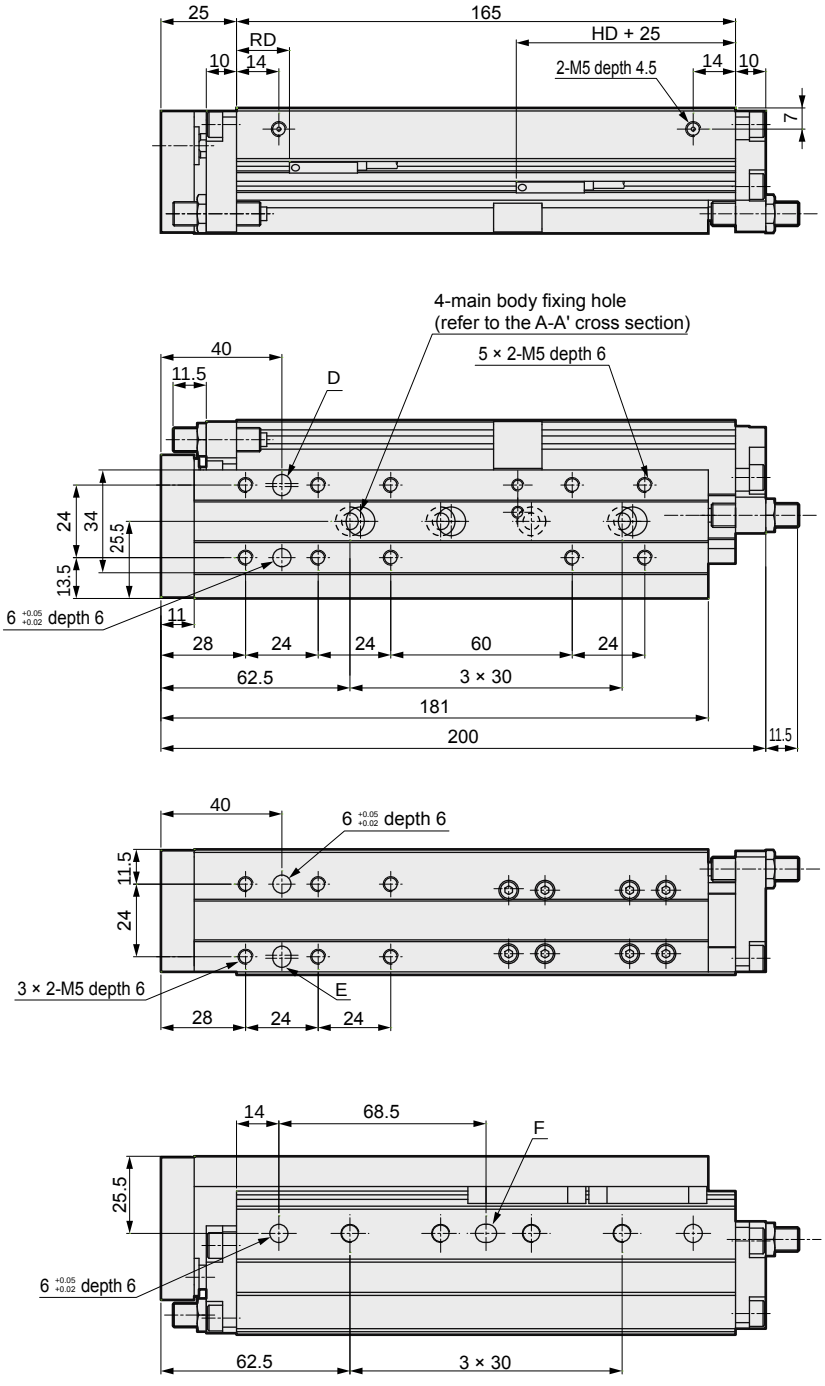
Dimensions table for each stroke length

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	

Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

Dimensions (bore size: φ20)

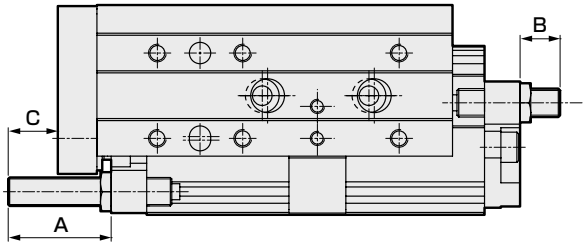
● LCW-20
Stroke length: 75, piping direction: L



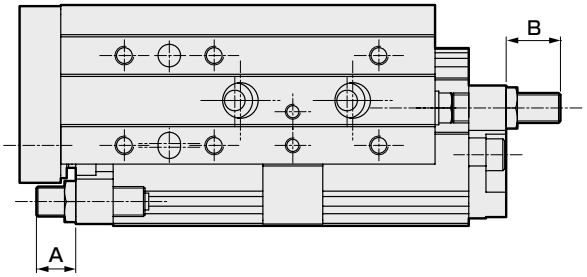
Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

Dimensions: Option

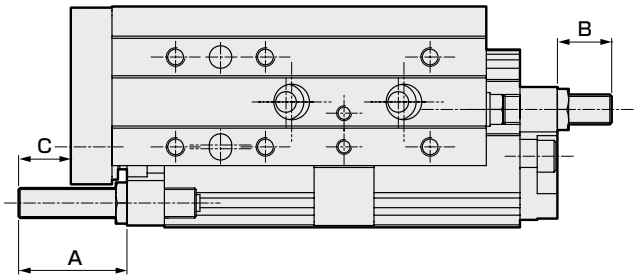
● Rubber cushion type long stopper (S)



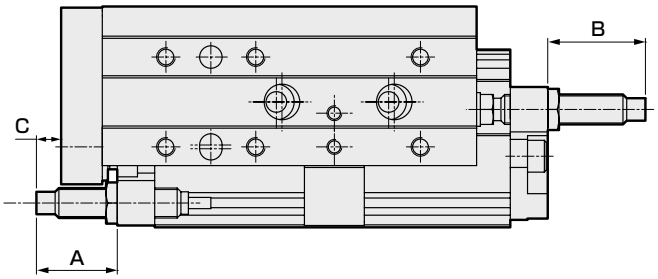
● Metal type stopper with rubber cushion (M)



● Metal type long stopper with rubber cushion (MS)



● Shock absorber type stopper (A)



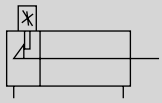
Bore size	Rubber cushion type long stopper (S)			Metal type stopper with rubber cushion (M)			Metal type long stopper with rubber cushion (MS)			Shock absorber type stopper (A)		
	A	B	C	A	B	C	A	B	C	A	B	C
φ12	31.5	13.5	18.5	12	14.5	–	31	14.5	18	11	13.5	–
φ16	28.5	10.5	15.5	9.5	11.5	–	28.5	11.5	15.5	8.5	10.5	–
φ20	28.5	11.5	13.5	10.5	15	–	28.5	15	13.5	21.5	26	6.5

MEMO

Linear slide cylinder Double acting/position locking type

LCW-Q Series

●Bore size: φ12, φ16, φ20

JIS symbol 

RoHS

Specifications

Descriptions		LCW-Q		
Bore size	mm	φ12	φ16	φ20
Actuation		Double acting		
Working fluid		Compressed air		
Max. working pressure	MPa	0.7		
Min. working pressure	MPa	0.15 (Note 1)		
Proof pressure	MPa	1.05		
Ambient temperature	°C	-10 to 60 (no freezing) (Note 2)		
Port size		M5		
Working piston speed	mm/s	50 to 500 (Note 3)		
Cushion		Rubber cushion		
Holding force	N	15.5	27.6	47.6
Lubrication		Not required (Use Turbine lubricant type 1 ISO VG32 if necessary)		
Allowable absorbed energy	J	* Refer to table 3 on page 40.		

Note 1: Use in conditions with more than 0.4 MPa pressure, to contact with metal at the end of stroke during the use of metal type stopper with rubber cushion.
Note 2: Use the shock absorber type stopper between -5 and 60°C.
Note 3: Use the metal stopper with rubber cushion between 50 and 200 mm/s.

Stroke length

Bore size (mm)	Standard stroke length (mm)
φ12	30, 50, 75
φ16	
φ20	

Note: Stroke length other than above is not available.

Adjustable stroke range

(Unit: mm)

Bore size (mm)	Standard rubber cushion type		Metal type with rubber cushion		Shock absorber type
	Standard stroke length	For custom stroke length (S)	Standard stroke length (M)	For custom stroke length (MS)	Standard stroke length (A)
	PUSH side	PUSH side	PUSH side	PUSH side	PUSH side
φ12	10	28	9	28	4
φ16	7.5	25	6	25	1.5
φ20	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
φ12	PUSH	17	23	34	45	57	68	79
	PULL	13	17	25	34	42	51	59
φ16	PUSH	30	40	60	80	101	121	141
	PULL	26	35	52	69	86	104	121
φ20	PUSH	47	63	94	126	157	188	220
	PULL	40	53	79	106	132	158	185

Switch specifications

Descriptions	Reed 2 wire				Proximity 2 wire		Proximity 3 wire	
	T0H/T0V		T5H/T5V		T2H/T2V	T2WH/T2WV	T3H/T3V	T3WH/T3WV
Applications	Programmable controller, relay		Programmable controller, relay IC circuit (w/o light), serial connection		Programmable controller		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
Indication light	LED (ON lighting)		W/o light		LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)
Leakage current	0 mA				1 mA or less		10 μA or less	
Weight g	1 m: 18 3 m: 49 5 m: 80							

Descriptions	Proximity 2 wire	Proximity 3 wire	Proximity 2 wire		Proximity 3 wire	
	F2S	F3S	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Programmable controller	Programmable controller, relay	Programmable controller		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		100 mA or less	50 mA or less
Indication light	Red LED (ON lighting)		LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)
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					

Note: The T0/T5 switch can be used with 220 VAC. Contact CKD for working conditions.

Cylinder weight

● Position locking type (Unit: g)

Bore size (mm)	Stroke length (mm)		
	30	50	75
φ12	300	440	450
φ16	450	460	690
φ20	770	800	1,160

● Added stopper (Unit: g)

Bore size (mm)	Stopper symbol		
	S	MS	A
φ12	3	3	0
φ16	3	3	0
φ20	5	5	14

In case of stopper symbol M, weight is same as position locking type.

How to order

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

- Ⓐ Bore size
- Ⓑ Stroke length
- Ⓒ Position locking mechanism
- Ⓓ Piping direction
- Ⓔ Switch model no.
- Ⓕ Switch quantity
- Ⓖ Stopper

Symbol	Descriptions
Ⓐ Bore size (mm)	
12	φ12
16	φ16
20	φ20

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

Ⓒ Position locking mechanism	
H	Head end position locking mechanism

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

Ⓔ Switch model no.

Axial lead wire	Radial lead wire	Contact	Voltage AC	Voltage DC	Display	Lead wire	Bore size φ12	Bore size φ16	Bore size φ20
F2S*		Proximity		●	1 color display type	2 wire	●		
F3S*				●		3 wire			
F2H*	**F2V***			●		2 wire			
F3H*	**F3V***			●		3 wire			
F2YH*	**F2YV***			●	2 color display type	2 wire			
F3YH*	**F3YV***			●		3 wire			
T0H*	**T0V***	Reed	●	●	1 color display type	2 wire		●	●
T5H*	**T5V***		●	●	Without indicator light				
T2H*	**T2V***	Proximity		●	1 color display type	2 wire			
T3H*	**T3V***			●		3 wire			
T2WH*	**T2WV***			●	2 color display type	2 wire			
T3WH*	**T3WV***			●		3 wire			

Ⓕ Switch quantity	
R	1 (on rod end)
H	1 (on head end)
D	2

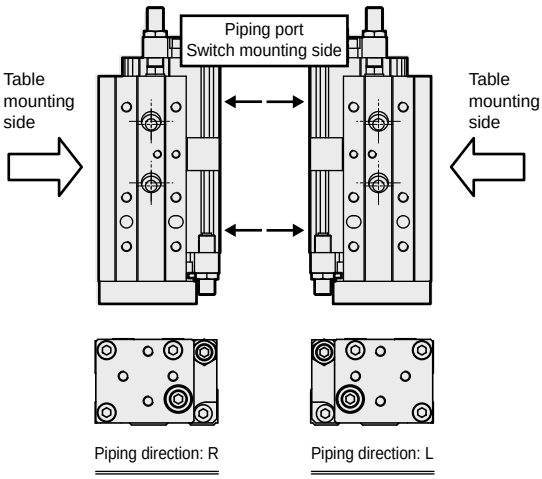
Ⓖ Stopper	
Blank	Rubber cushion type stopper
S	Long stopper with rubber cushion (for custom stroke)
M	Metal type stopper with rubber cushion
MS	Long metal type stopper with rubber cushion (for custom stroke)
A	Shock absorber type stopper

<Example of model number>

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

Model: Linear slide cylinder/position locking type

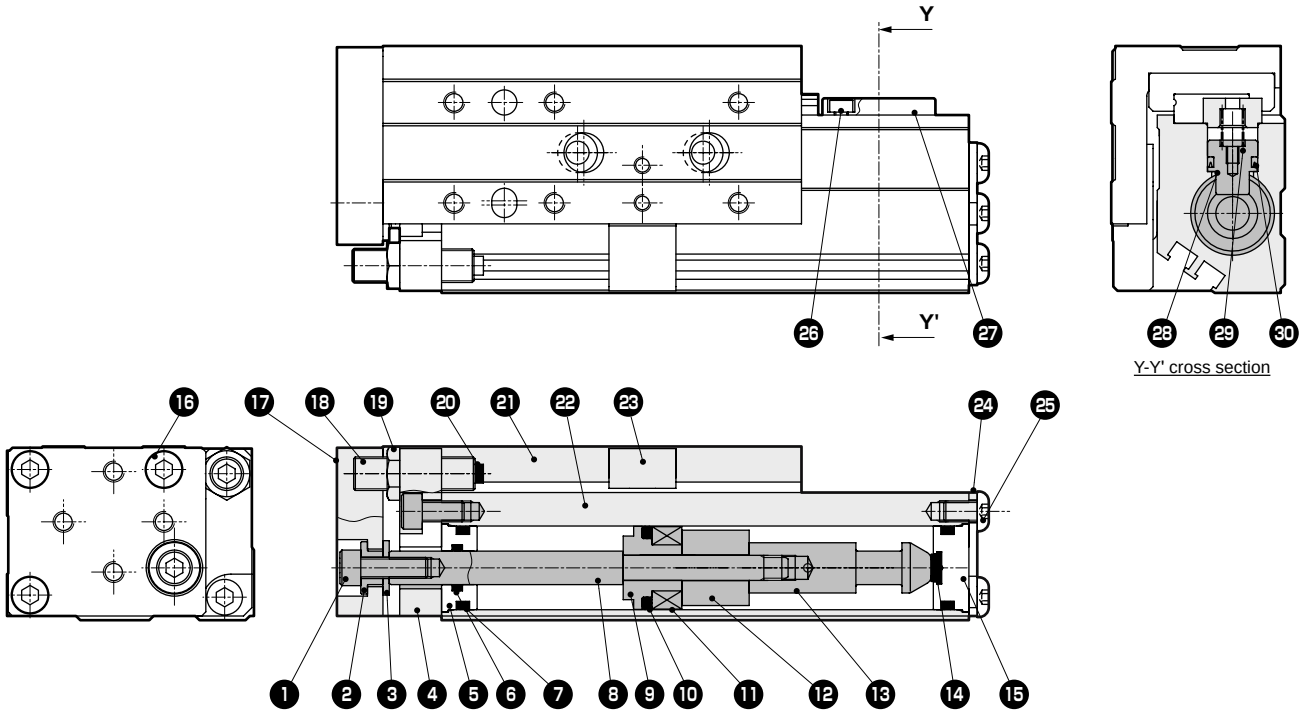
- Ⓐ Bore size : φ16
- Ⓑ Stroke length : 30 mm
- Ⓒ Position locking mechanism: Head side position locking mechanism
- Ⓓ Piping direction : Right from rod side
- Ⓔ Switch model no.: Proximity T2H switch, lead wire 1 m
- Ⓕ Switch quantity : 2
- Ⓖ Stopper : Shock absorber type stopper



* Refer to page 4 for how to order the discrete.

Internal structure and parts list

● LCW-Q



Y-Y' cross section

Parts list

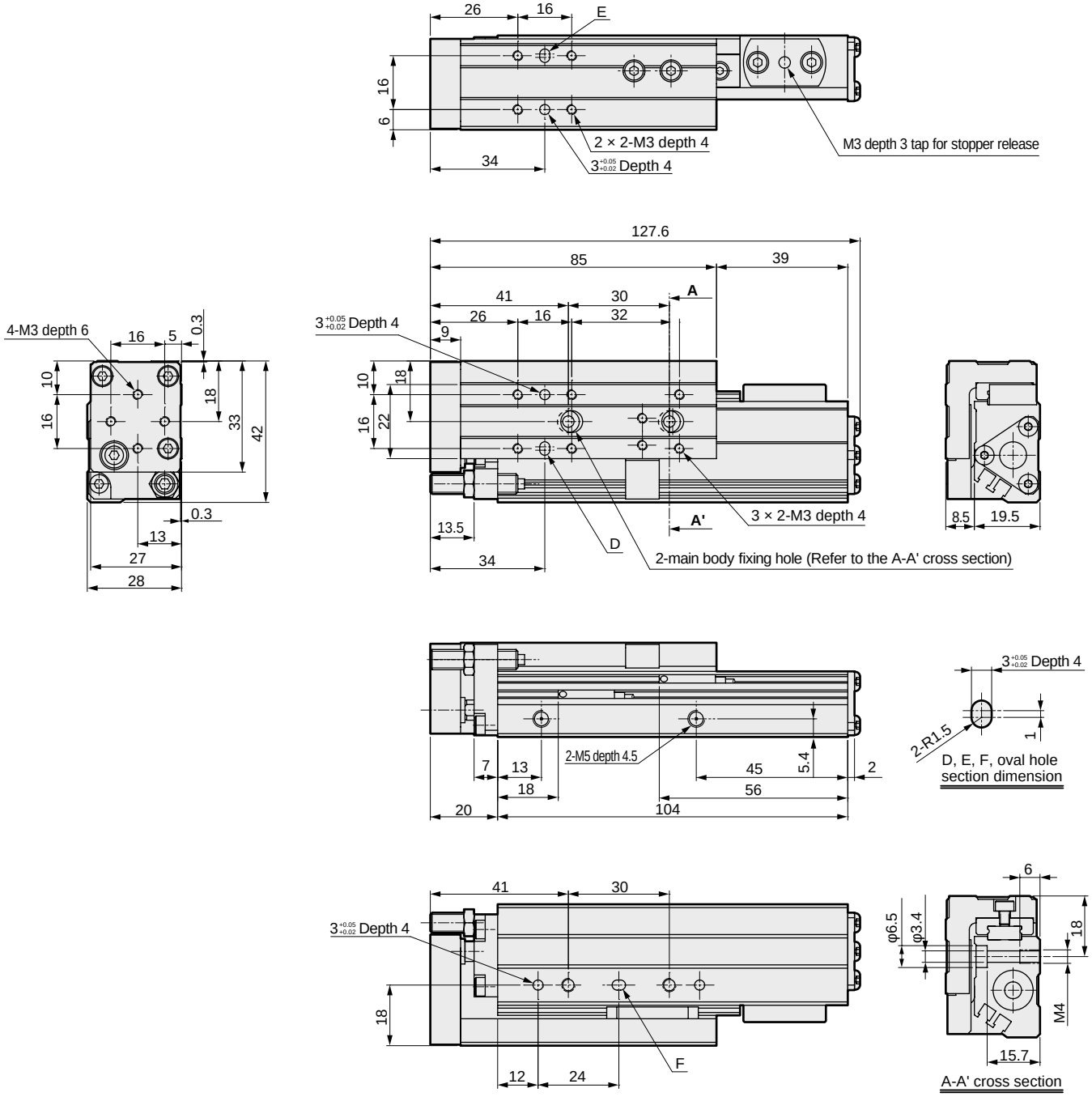
No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Hexagon socket head cap screw	Steel	Zinc chromate	16	Hexagon socket head cap screw	Steel	Zinc chromate
2	Floating bush A	Stainless steel		17	End plate	Aluminum alloy	Hard alumite
3	Floating bush B	Stainless steel		18	Stopper bolt	Steel	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 head button screw	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	Cylindrical spring	Steel	
15	Head cover	Aluminum alloy	Chromate	30	Stopper packing seal	Nitrile rubber	

Repair parts list

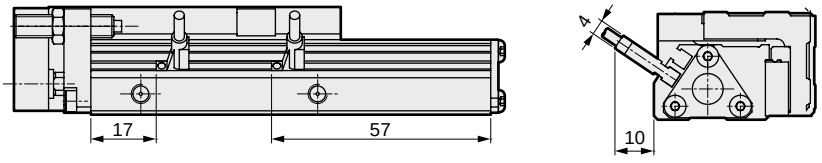
Bore size (mm)	Kit no.	Repair parts no.
φ12	LCW-Q-12HK	⑥⑦⑩⑭㉔
φ16	LCW-Q-16HK	
φ20	LCW-Q-20HK	

Dimensions (bore size: φ12)

● LCW-Q-12
Stroke length: 30, piping direction: R



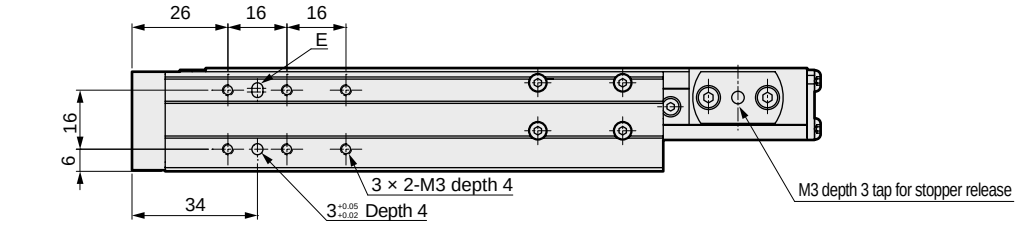
● Dimensions of projecting section for cylinder switch F2S and F3S

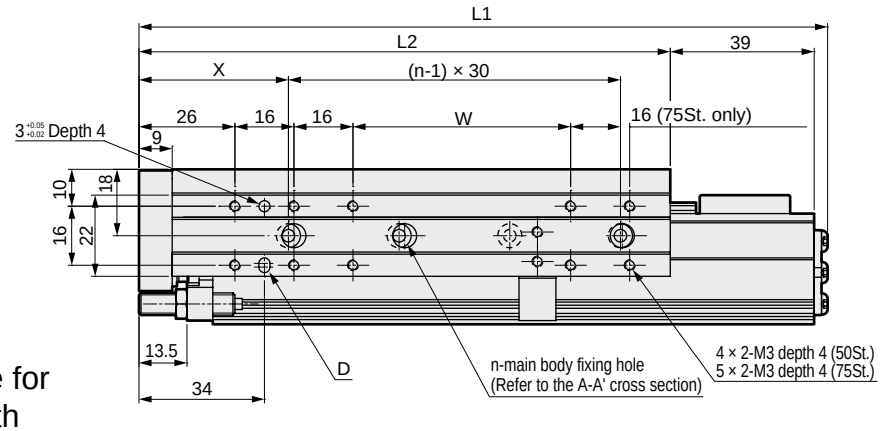


Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.
Note 3: Install switch on F2S or F3S specifications as illustrated in this figure.

Dimensions (bore size: φ12)

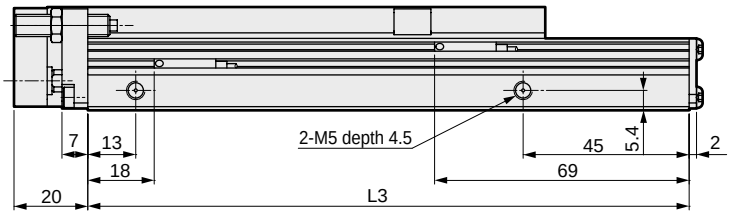
● LCW-Q-12
Stroke length: 50, 75, piping direction: R
(The main body fixing holes in this drawing are for 75 mm stroke)

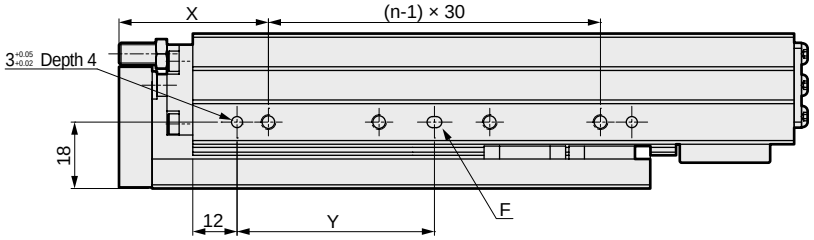




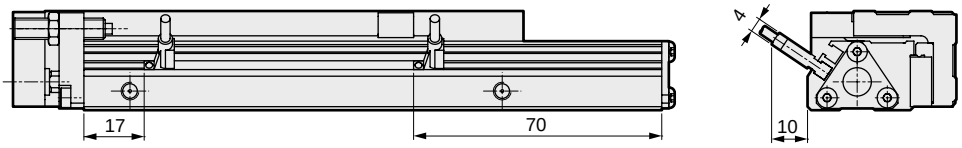
Dimensions table for each stroke length

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





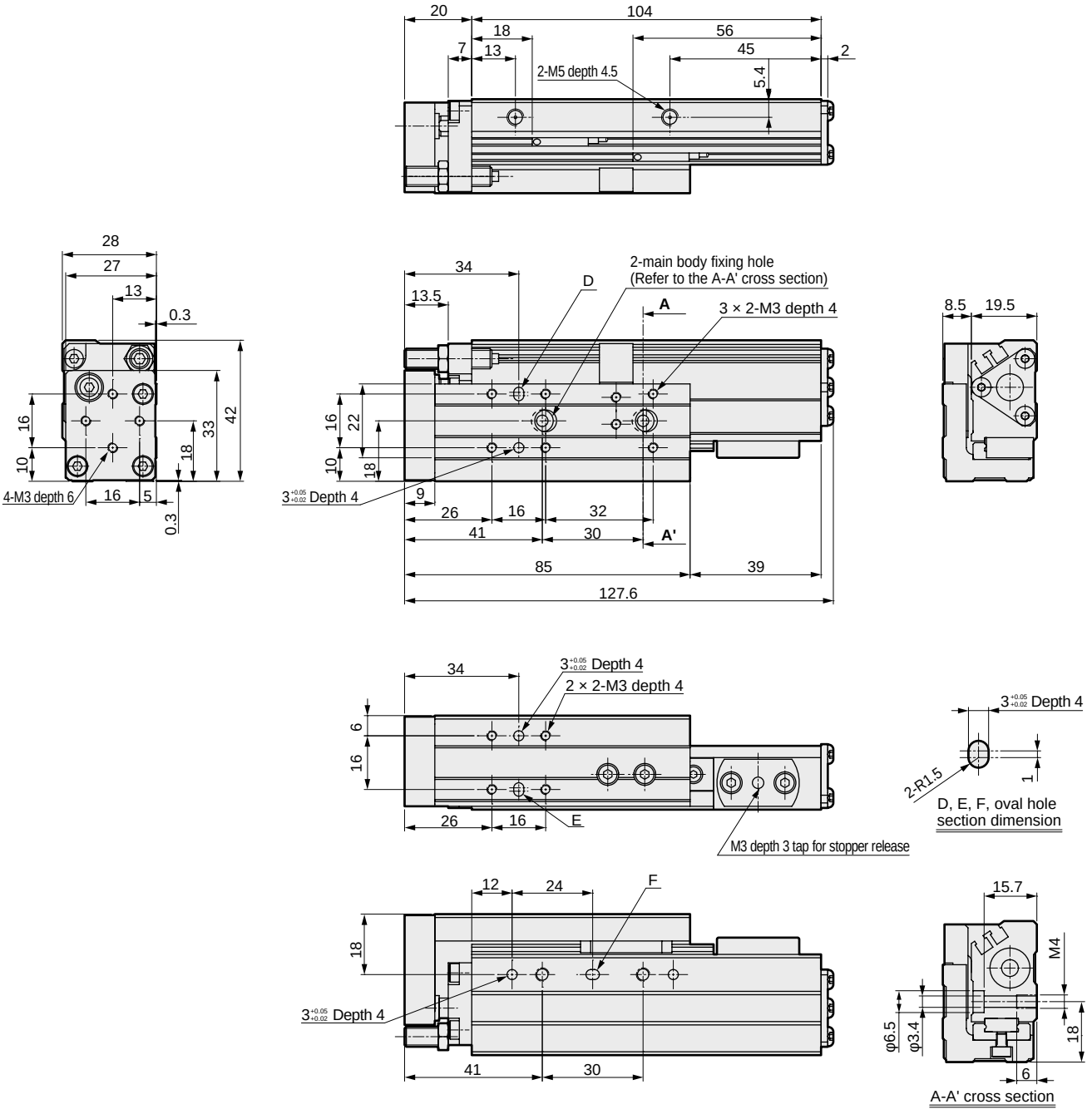
● Dimensions of projecting section for cylinder switch F2S and F3S



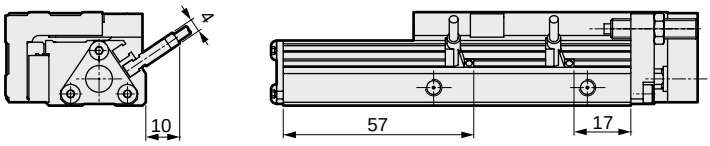
Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.
Note 3: Install switch on F2S or F3S specifications as illustrated in this figure.

Dimensions (bore size: φ12)

● LCW-Q-12
Stroke length: 30, piping direction: L



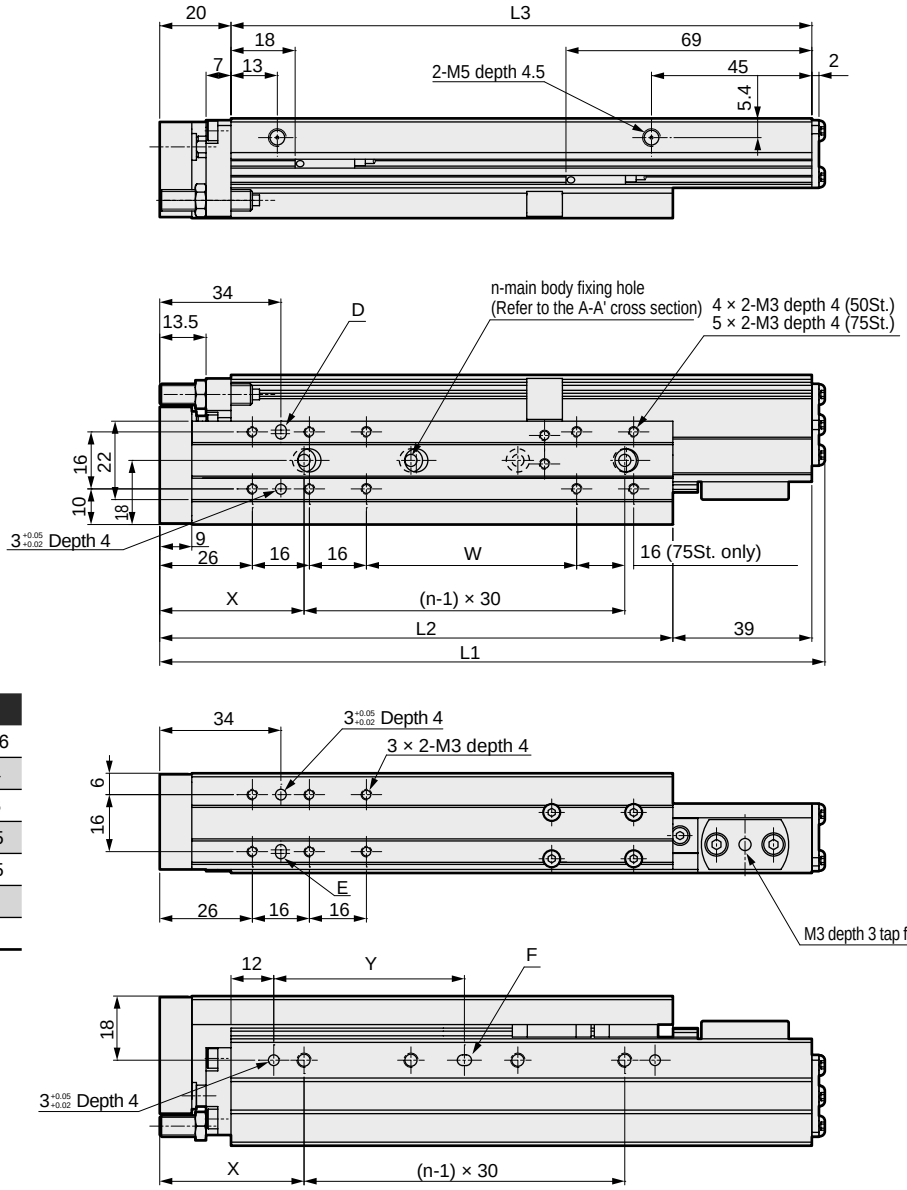
● Dimensions of projecting section for cylinder switch F2S and F3S



Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.
Note 3: Install switch on F2S or F3S specifications as illustrated in this figure.

Dimensions (bore size: φ12)

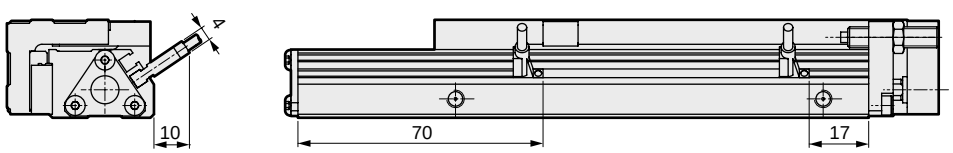
● LCW-Q-12
Stroke length: 50, 75, piping direction: L
(The main body fixing holes in this drawing are for 75 mm stroke)



Dimensions table for each 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

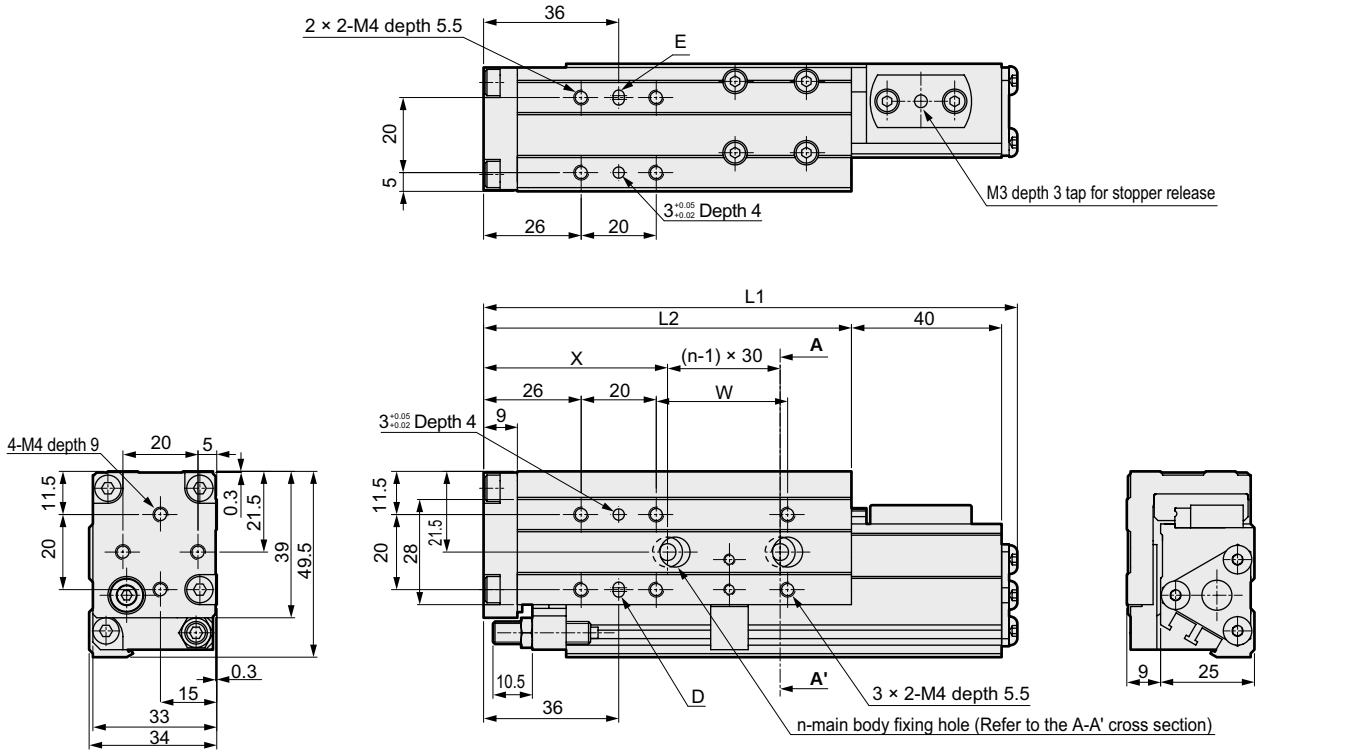
● Dimensions of projecting section for cylinder switch F2S and F3S



Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.
Note 3: Install switch on F2S or F3S specifications as illustrated in this figure.

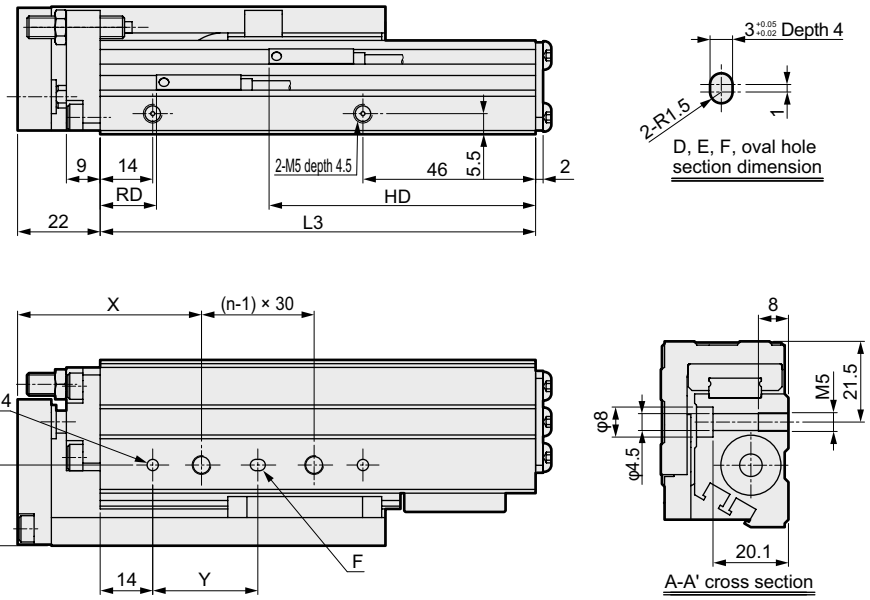
Dimensions (bore size: φ16)

● LCW-Q-16
Stroke length: 30, 50, piping direction: R
(The main body fixing holes in this drawing are for 30 mm stroke)



Dimensions table for each stroke length

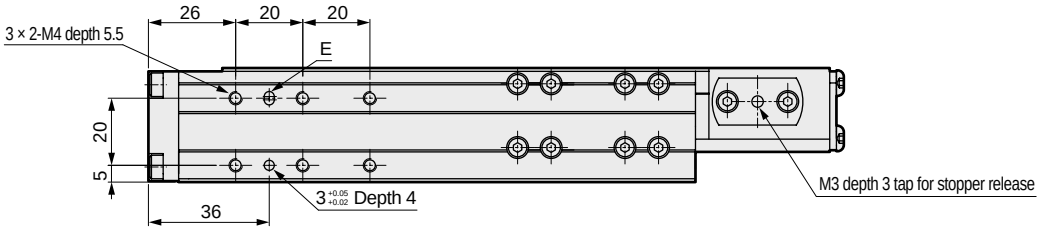
Stroke length		30	50
L1		142.2	162.2
L2		98	118
L3		116	136
X		49	44
Y		28	50
W		35	55
n		2	3
T0/5* T2/3*	RD	15	
	HD	71	
T2/3W*	RD	17	
	HD	69	

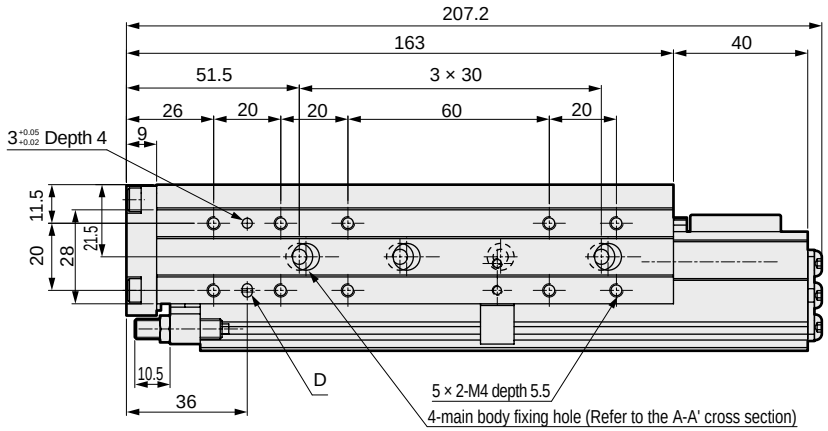


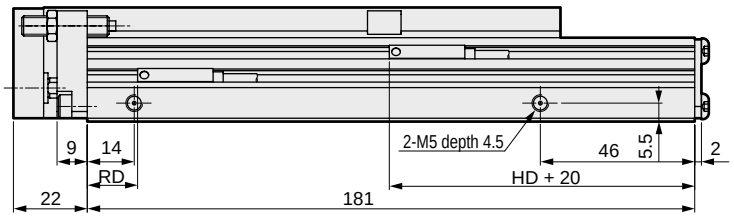
Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

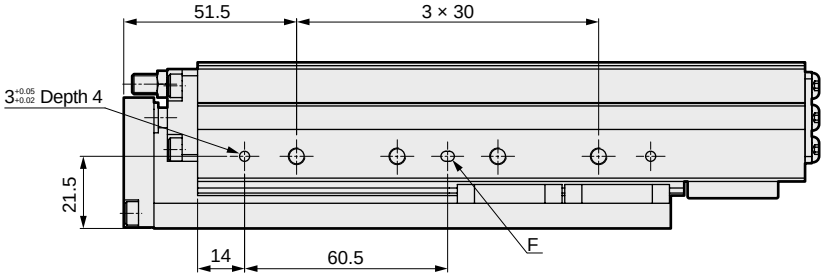
Dimensions (bore size: φ16)

● LCW-Q-16
Stroke length: 75, piping direction: R





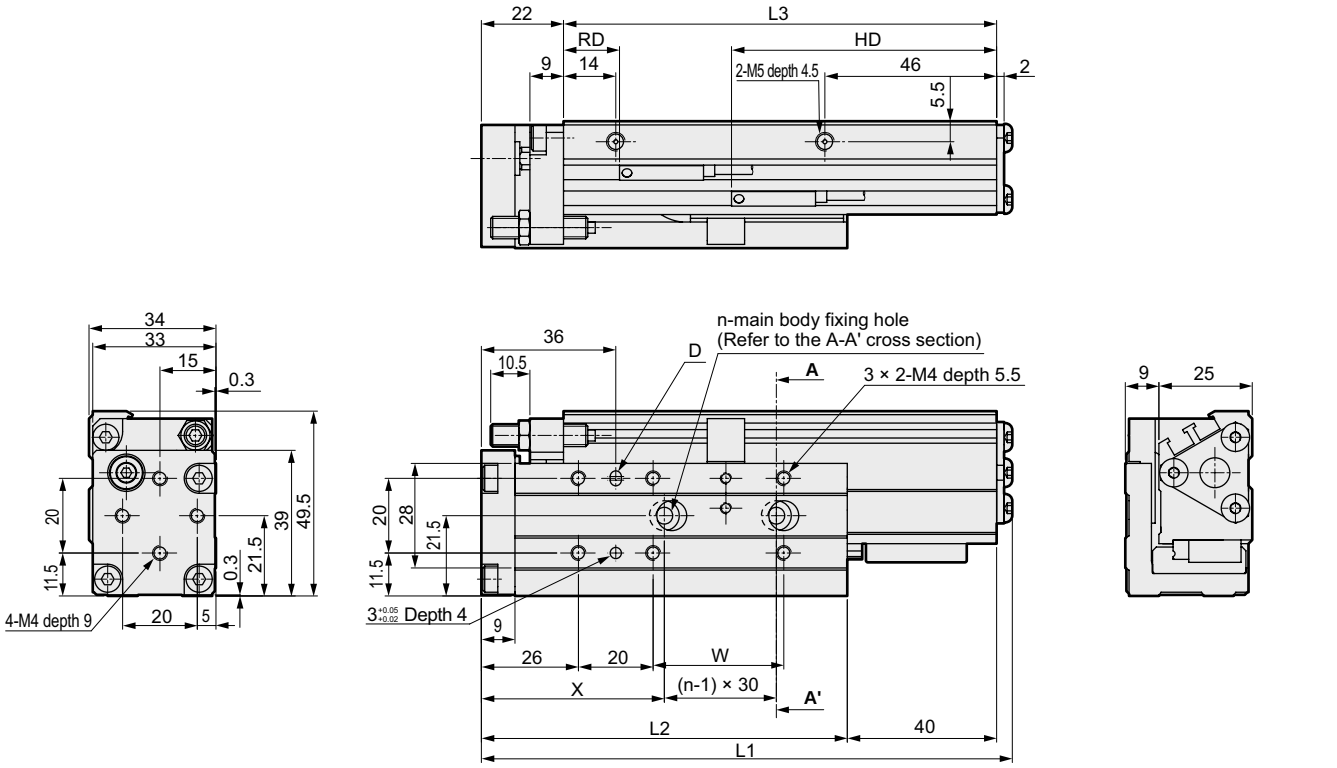




Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

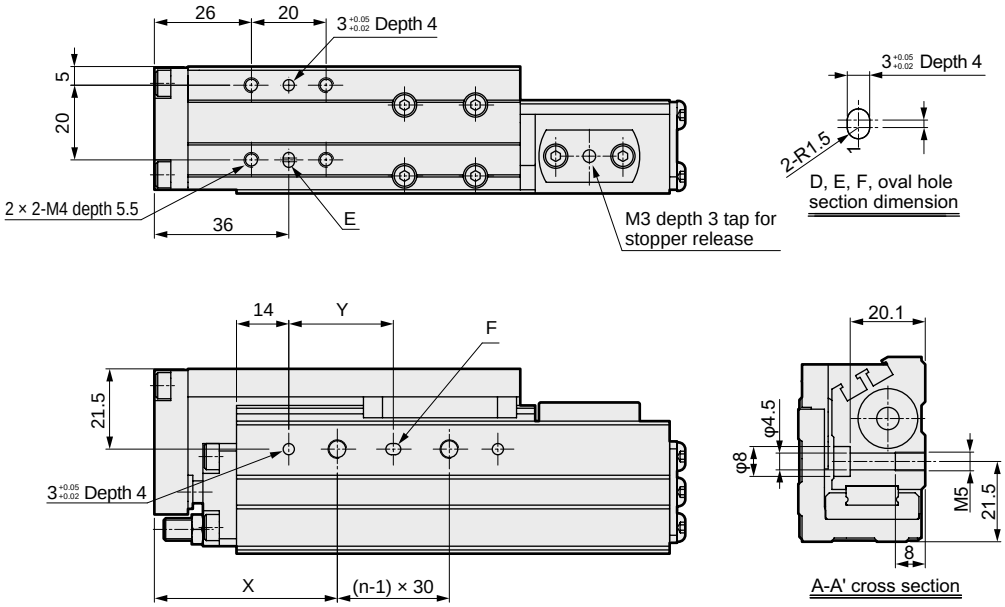
Dimensions (bore size: φ16)

● LCW-Q-16
Stroke length: 30, 50, piping direction: L
(The main body fixing holes in this drawing are for 30 mm stroke)



Dimensions table for each stroke length

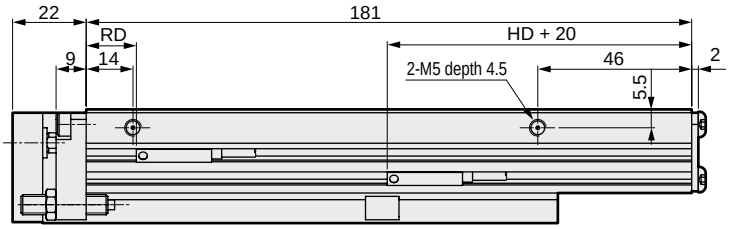
Stroke length		30	50
L1		142.2	162.2
L2		98	118
L3		116	136
X		49	44
Y		28	50
W		35	55
n		2	3
T0/5* T2/3*	RD	15	
	HD	71	
T2/3W*	RD	17	
	HD	69	

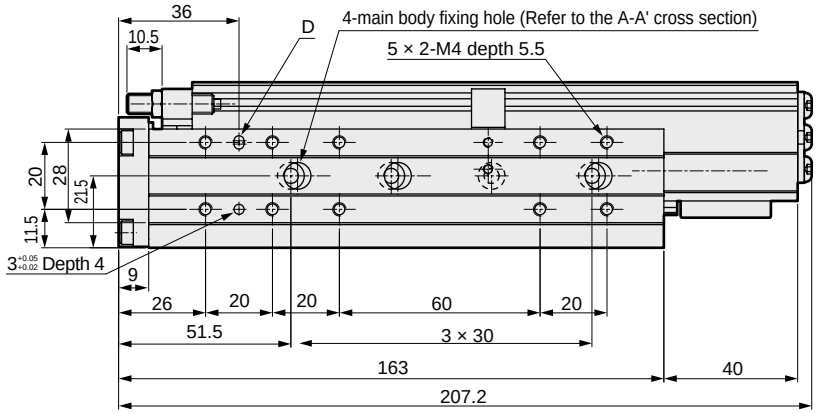


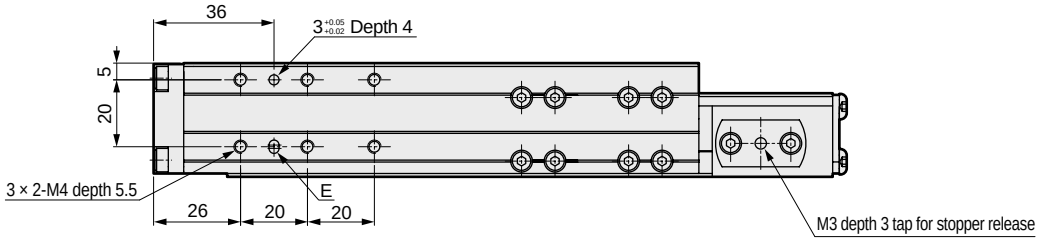
Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

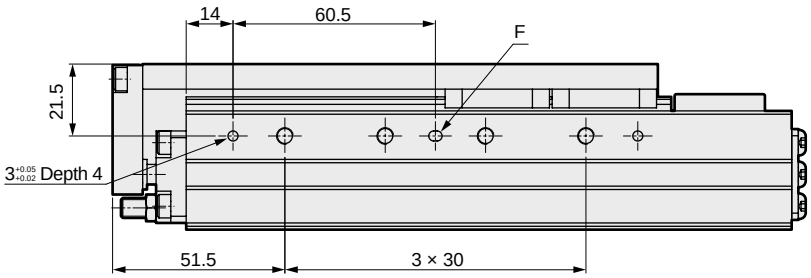
Dimensions (bore size: φ16)

● LCW-Q-16
Stroke length: 75, piping direction: L





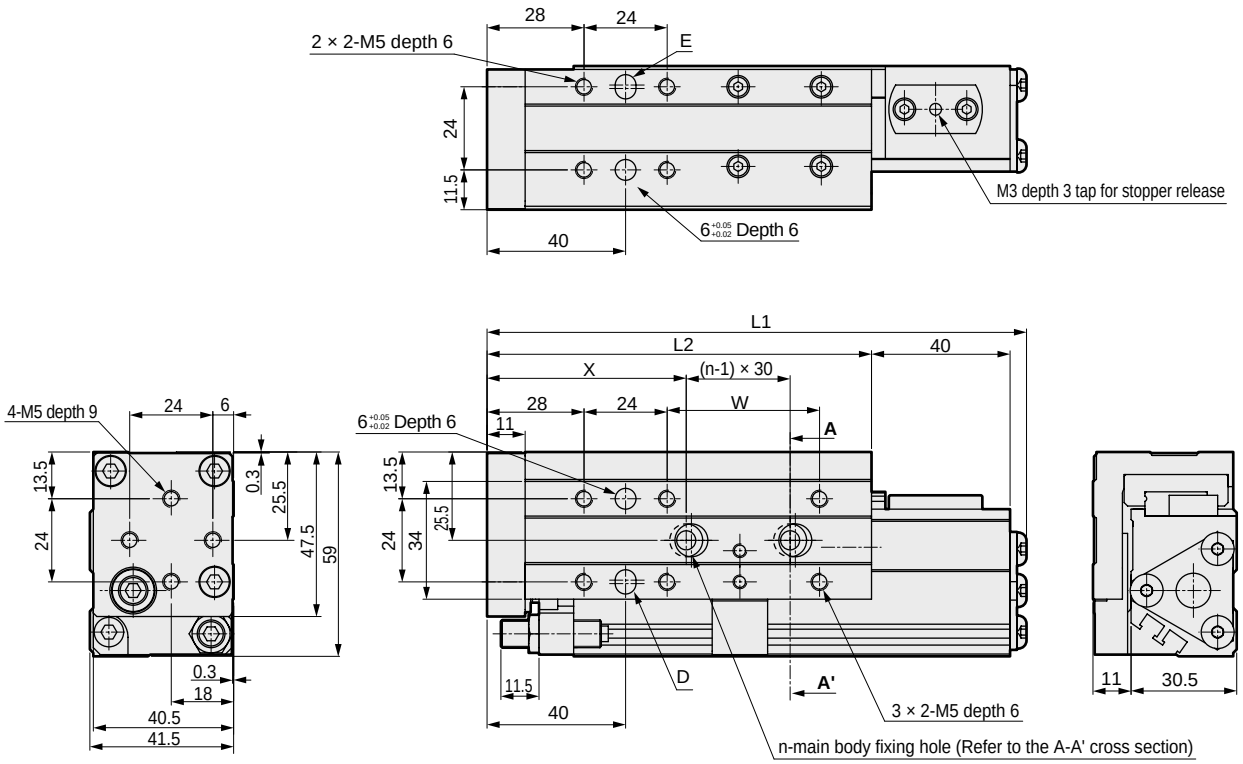




Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

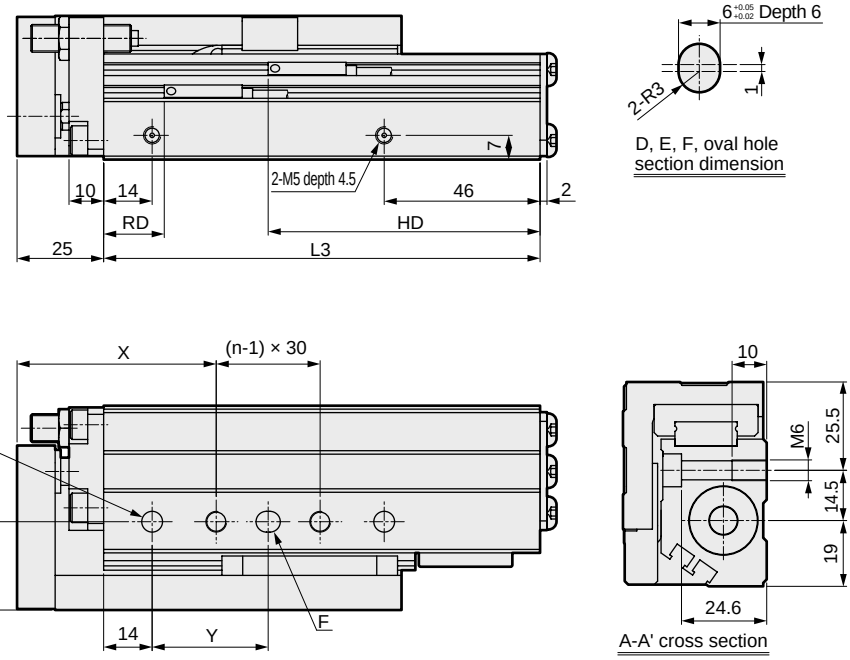
Dimensions (bore size: φ20)

● LCW-Q-20
Stroke length: 30, 50, piping direction: R
(The main body fixing holes in this drawing are for 30 mm stroke)



Dimensions table for each stroke length

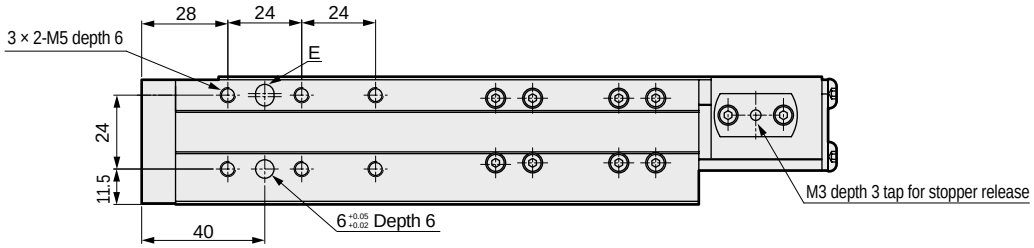
Stroke length		30	50
L1		155.8	175.8
L2		111	131
L3		126	146
X		57.5	52.5
Y		33.5	60
W		44	64
n		2	3
T0/5* T2/3*	RD	17.5	
	HD	78.5	
T2/3W*	RD	19.5	
	HD	76.5	

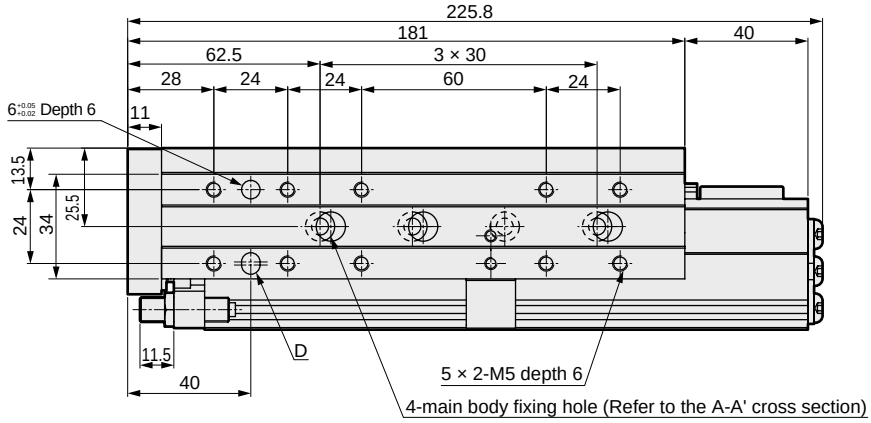


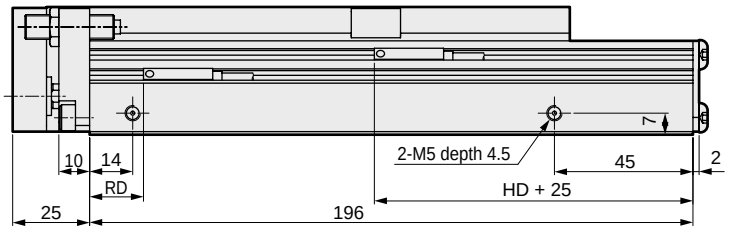
Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

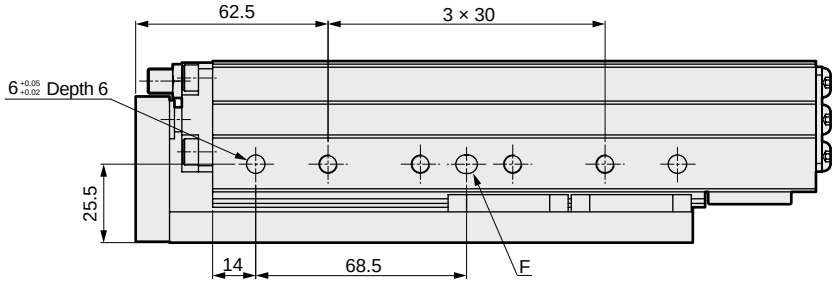
Dimensions (bore size: φ20)

● LCW-Q-20
Stroke length: 75, piping direction: R





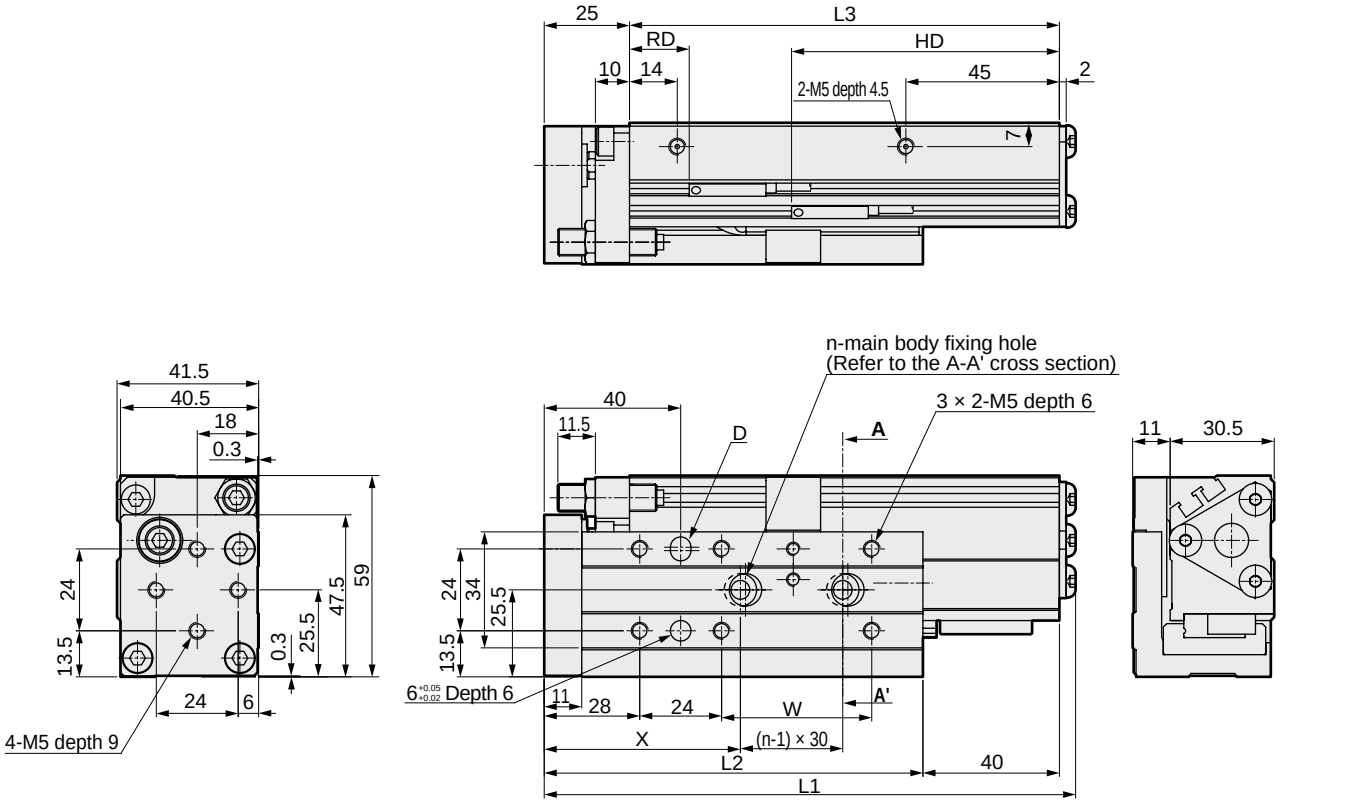




Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

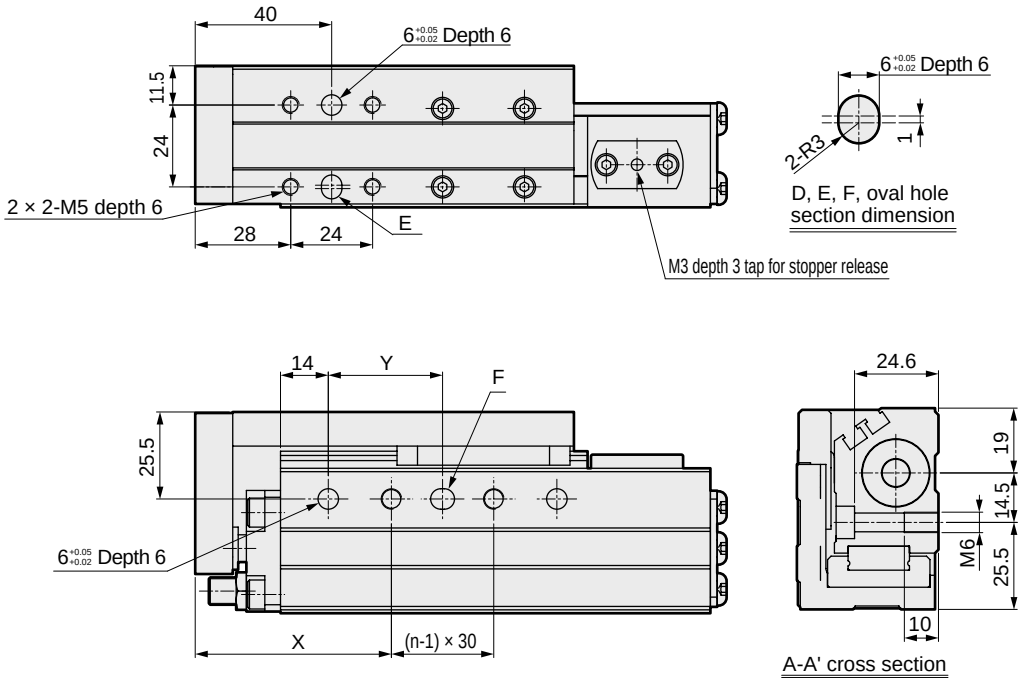
Dimensions (bore size: φ20)

● LCW-Q-20
Stroke length: 30, 50, piping direction: L
(The main body fixing holes in this drawing are for 30 mm stroke)



Dimensions table for each stroke length

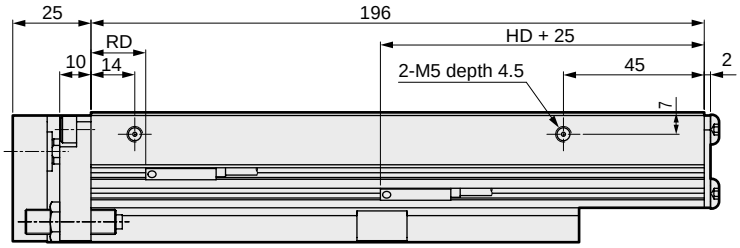
Stroke length		30	50
L1		155.8	175.8
L2		111	131
L3		126	146
X		57.5	52.5
Y		33.5	60
W		44	64
n		2	3
T0/5* T2/3*	RD	17.5	
	HD	78.5	
T2/3W*	RD	19.5	
	HD	76.5	

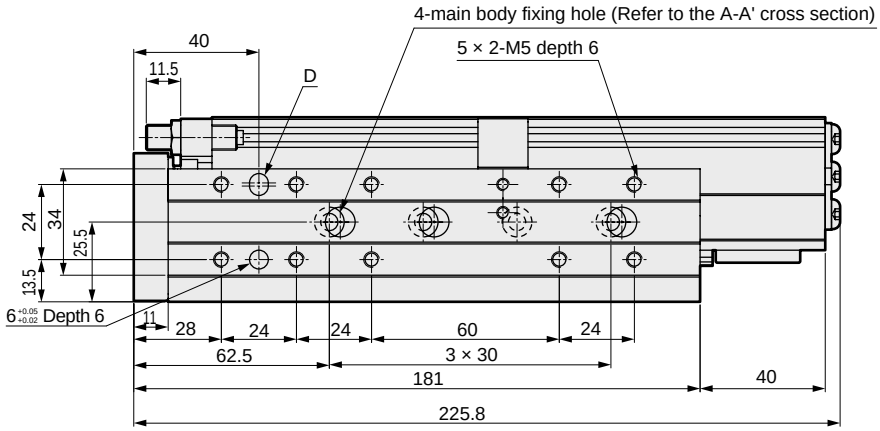


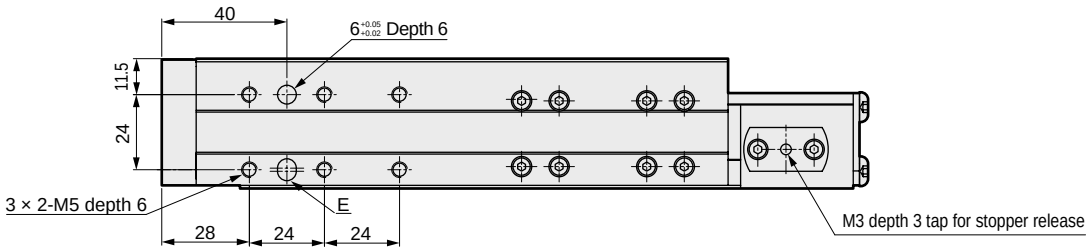
Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

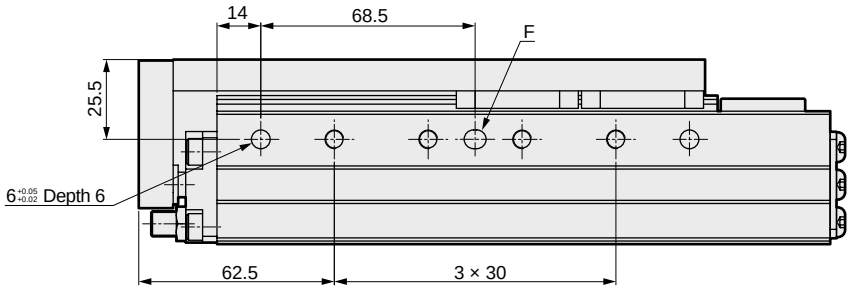
Dimensions (bore size: φ20)

● LCW-Q-20
Stroke length: 75, piping direction: L





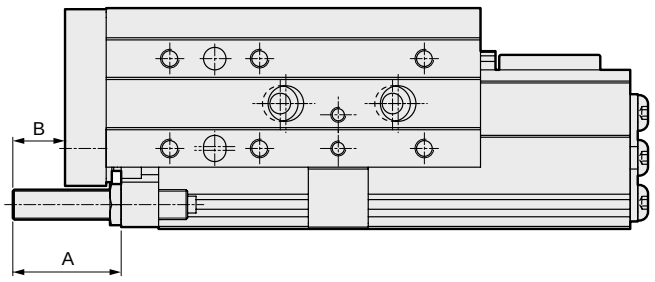




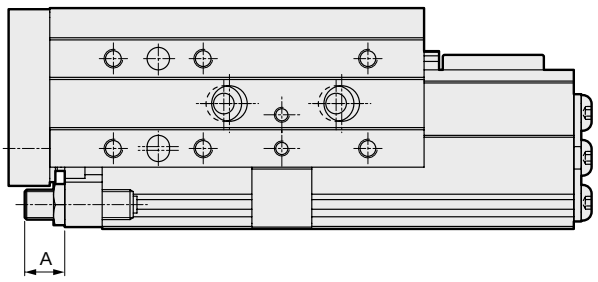
Note 1: When using a positioning hole, use a pin with a size that is not press fitted. The recommended tolerance for a pin is JIS tolerance m6 or less.
Note 2: Install the switch on the rod side for radial lead wire as illustrated in this figure.

Dimensions: Option

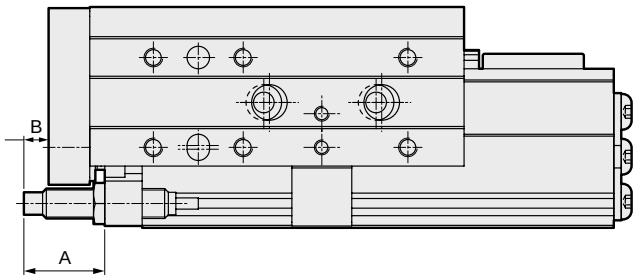
● Rubber cushion type long stopper (S)
Metal type long stopper with rubber cushion (MS)



● Metal type stopper with rubber cushion (M)



● Shock absorber type stopper (A)



Bore size	Rubber cushion type long stopper (S)		Metal type stopper with rubber cushion (M)		Metal type long stopper with rubber cushion (MS)		Shock absorber type stopper (A)	
	A	B	A	B	A	B	A	B
φ12	31.5	18.5	12	–	31	18	11	–
φ16	28.5	15.5	9.5	–	28.5	15.5	8.5	–
φ20	28.5	13.5	10.5	–	28.5	13.5	21.5	6.5

MEMO

STEP-1

Check the load factor and determine the bore size.

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

α : Load factor

Fo : Required force to move a work piece (N)

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

At horizontal operation	At vertical operation
Fo = Fw	Fo = W + Fw
FW: W × 0.2 Note (N) W: Load (N)	

Note: Coefficient of friction

[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
φ12	PUSH	17	23	34	45	57	68	79
	PULL	13	17	25	34	42	51	59
φ16	PUSH	30	40	60	80	101	121	141
	PULL	26	35	52	69	86	104	121
φ20	PUSH	47	63	94	126	157	188	220
	PULL	40	53	79	106	132	158	185

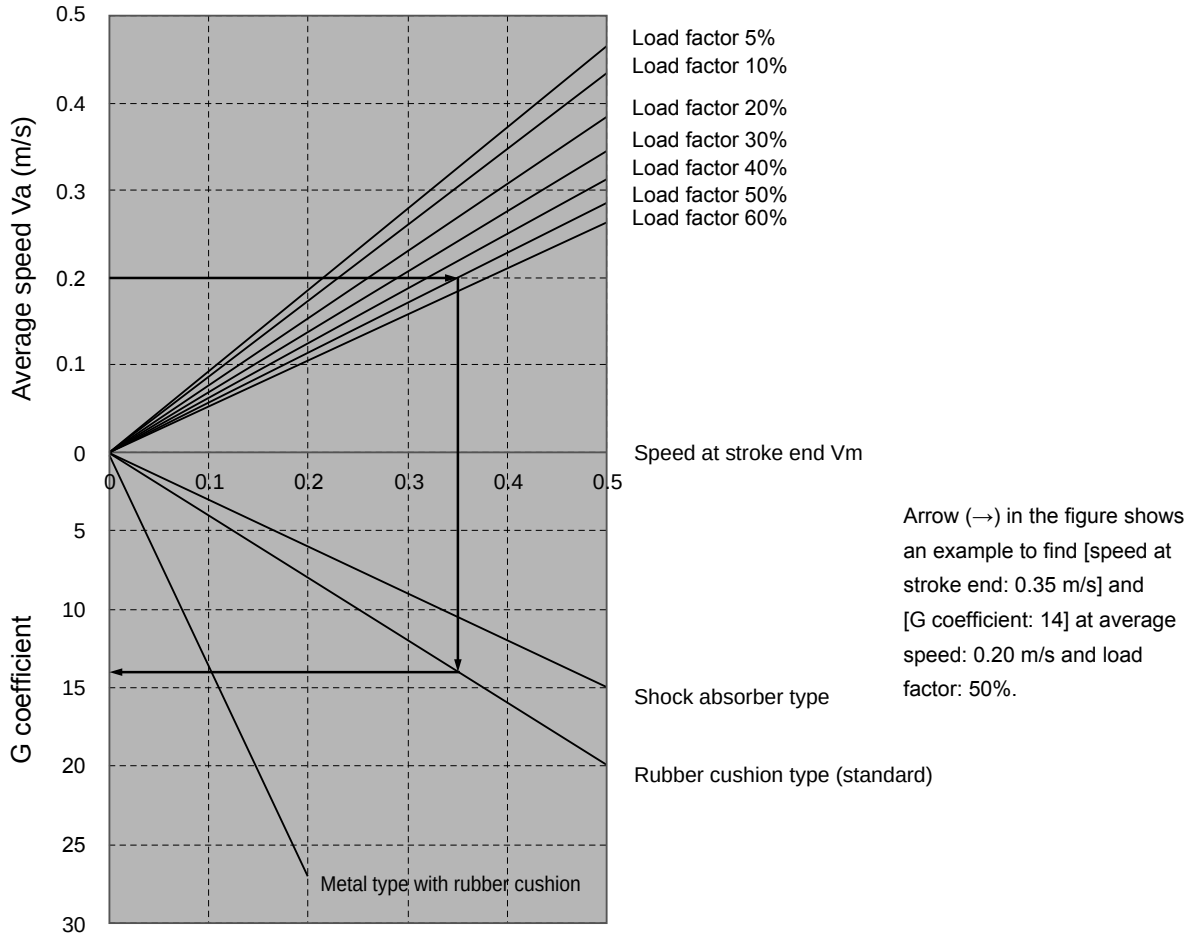
[Table 2] Reference of load factor

Working pressure MPa	Load factor (%)
0.2 to 0.3	α ≦ 40
0.3 to 0.6	α ≦ 50
0.6 to 0.7	α ≦ 60

STEP-2

Obtain the speed at stroke end (Vm) and G coefficient.

Obtain the speed at stroke end (Vm) and G coefficient with average speed (Va) and load factor obtained in STEP-1.



STEP-3

Check the allowable energy absorption.

$E = \frac{1}{2} \times (m+m_\alpha) \times Vm^2$

E : Kinetic energy (J) at workpiece end

m : Weight (kg) of the load ($m \fallingdotseq \frac{W\ (N)}{9.8}$)

m_α : Weight of table (from table 4)

Vm : Speed at stroke end (m/s)

E max : Max. allowable of Eo (from Table 3)

Confirm that E ≦ E max.

[Table 3] Allowable energy absorption of LCW

Bore size (mm)	Rubber cushion type (standard) (J)	Metal type with rubber cushion (J)	Shock absorber type (J)
φ12	0.027	0.0053	0.054
φ16	0.055	0.0053	0.11
φ20	0.11	0.043	0.22

[Table 4] Table weight (unit: kg)

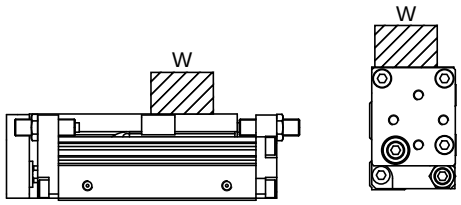
Bore size (mm)	Stroke length (mm)		
	30	50	75
φ12	0.059	0.089	0.111
φ16	0.089	0.112	0.164
φ20	0.141	0.176	0.264

STEP-4

Confirm composite moment M'T during rest.

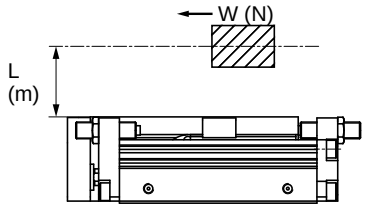
Obtain the static load (moment) and impact moment at the stroke end in order to find the static composite moment M'T.

● Vertical load: W' (N)



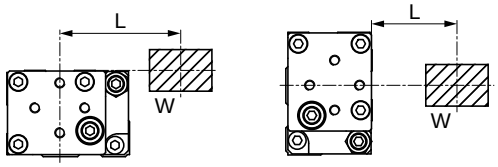
W' = W

● Bending moment: M1' (N·m)



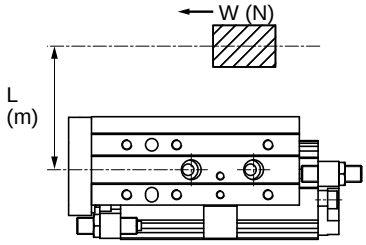
M1' = L × W

● Radial moment: M2' (N·m)



M2' = L × W

● Oscillating moment: M3' (N·m)



M3' = L × W

W' = ☐ (N)

M1' × G = ☐ (N·m)

M2' = ☐ (N·m)

M3' × G = ☐ (N·m)

$M'_T = \frac{W'}{W'max} + \frac{M1' \times G}{M1'max} + \frac{M2'}{M2'max} + \frac{M3' \times G}{M3'max} =$ ☐

M'T : Composite moment

G : G coefficient

W'max : Max. allowable of W' (from Table 5)

M1'max : Max. allowable of M1' (from Table 5)

M2'max : Max. allowable of M2' (from Table 5)

M3'max : Max. allowable of M3' (from Table 5)

[Table 5] Allowable static load

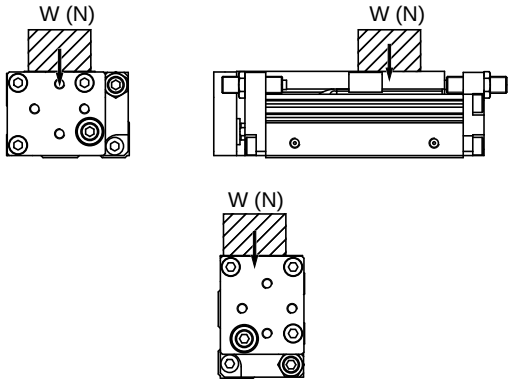
Bore size (mm)	Stroke length (mm)	Vertical load W'max (N)	Bending moment M1'max (N·m)	Radial moment M2'max (N·m)	Oscillating moment M3'max (N·m)
φ12	30	140	0.7	3.5	0.7
	50, 75	186	10.7	5.6	10.7
φ16	30, 50	221	5.7	9.8	5.7
	75		22.2		22.2
φ20	30, 50	381	17.8	19.2	17.8
	75		37.3		37.3

Confirm that M'T ≦ 1.

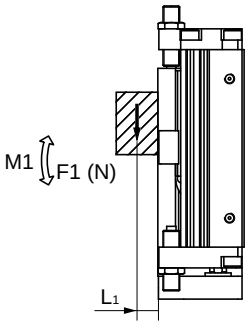
STEP-5

Confirm composite moment MT during travel. (note that this differs from the value obtained in STEP-4.)

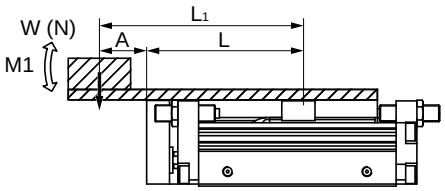
● Vertical load: W (N)



● Bending moment: M1 (N·m)

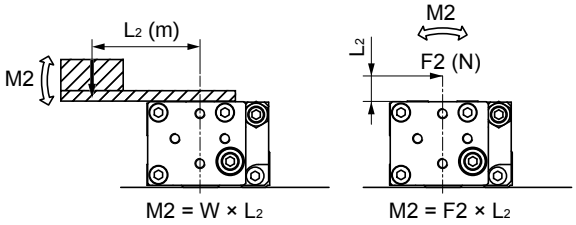


$M1 = F1 \times L_1$

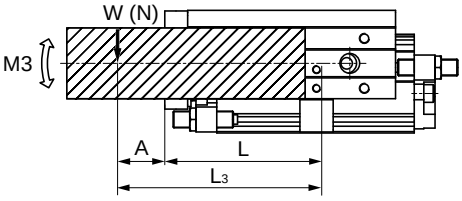


$M1 = W \times L_1$
$L_1 = A + L$
L is the value in the table below.

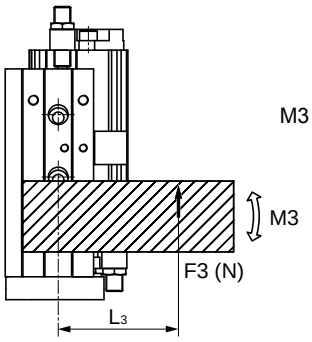
● Radial moment: M2 (N·m)



● Oscillating moment: M3 (N·m)



$M3 = W \times L_3$
$L_3 = A + L$
L is the value in the table below.



$M3 = F3 \times L_3$

[Table 6] L value (unit: m)

Bore size (mm)	Stroke length (mm)		
	30	50	75
φ12	0.066	0.097	0.122
φ16	0.077	0.097	0.131
φ20	0.085	0.105	0.141

W = W = ☐ (N)

M1 = M1 = ☐ (N·m)

M2 = M2 = ☐ (N·m)

M3 = M3 = ☐ (N·m)

M_T : Composite moment

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

M1max : Max. allowable of M1 (from table 7)

M2max : Max. allowable of M2 (from table 7)

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

[Table 7] Allowable traveling load

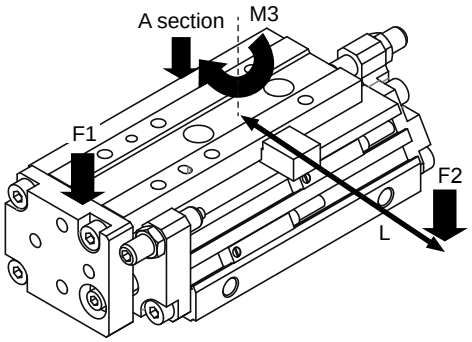
Bore size (mm)	Stroke length (mm)	Vertical load Wmax (N)	Bending moment M1max (N·m)	Radial moment M2max (N·m)	Oscillating moment M3max (N·m)
φ12	30	14	0.17	0.35	0.17
	50, 75	16	0.89	0.47	0.89
φ16	30, 50	28	0.71	1.2	0.71
	75		2.2		2.2
φ20	30, 50	48	1.9	2.4	1.9
	75		4.6		4.6

Available if $M_T \leqq 1$.

Table displacement

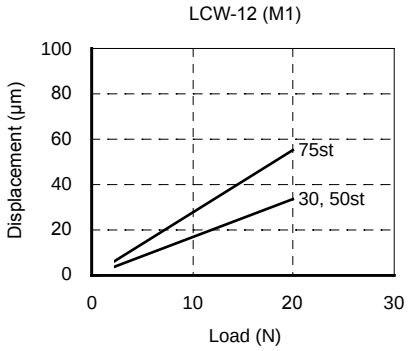
[Amount of table displacement caused by M1, M2, and M3 moments]

M1 moment: Displacement amount at table end when load (F1) is applied on table end
M2 moment: Displacement amount at table end (A section) when load (F2) is applied at position separated L mm from center of cylinder
M3 moment: Table displacement angle when rotary moment (M3) is applied on cylinder



L Value
φ12: L = 70
φ16: L = 90
φ20: L = 100

Amount of table displacement caused by M1 moment



Amount of table displacement caused by M2 moment

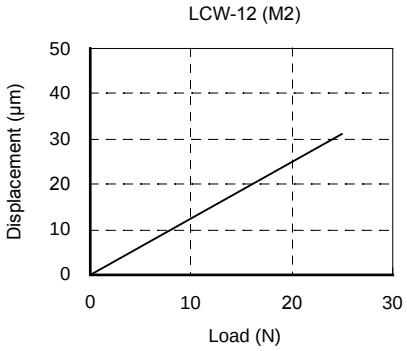
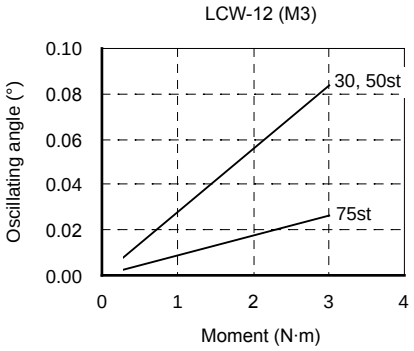
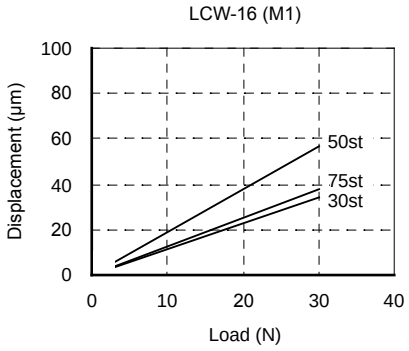
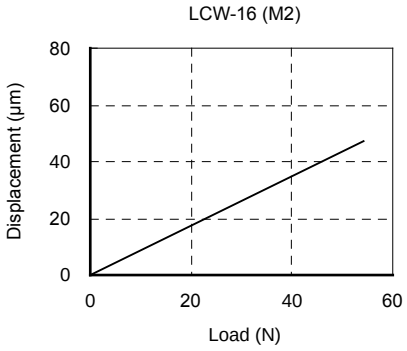
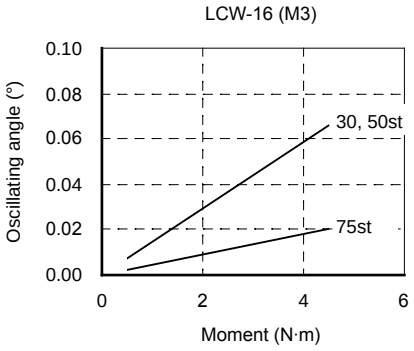


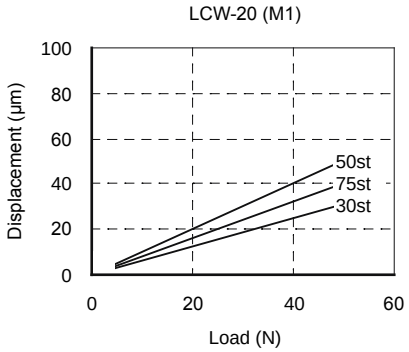
Table displacement angle caused by M3 moment

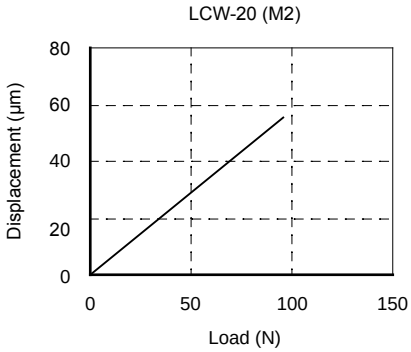


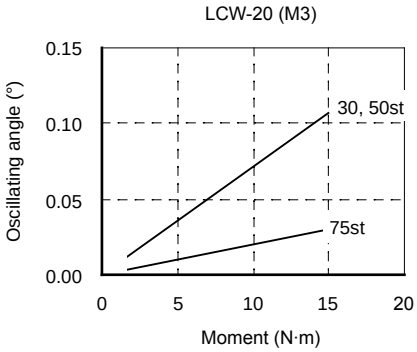












Safety precautions

Always read this section before starting use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanism, pneumatic control circuit, or water control circuit and the system operated by electrical control that controls the devices is secured.
It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

WARNING

1 This product is designed and manufactured as a general industrial machine part.
It must be handled by an operator having sufficient knowledge and experience in handling.

2 Use this product in accordance with specifications.

This product must be used within its stated specifications. It must not be modified or machined.
This product is intended for use as a general-purpose industrial device or part. It is not intended for use outdoors or for use under the following conditions or environment.
(If you consult CKD upon adoption and consent to CKD product specification, it will be applicable, however, safeguards should be adopted that will circumvent dangers in the event of failure.)

❶ Use for special applications including nuclear energy, railway, aircraft, marine vessel, vehicle, medicinal devices, devices or applications coming into contact with beverages or foodstuffs, amusement devices, emergency shutoff circuits, press machine, brake circuits, or for safeguard.
❷ Use for applications where life or assets could be adversely affected, and special safety measures are required.

3 Observe corporate standards and regulations, etc., related to the safety of device design and control, etc.

ISO 4414, JIS B 8370 (pneumatic system rules)
JFPS2008 (principles for pneumatic cylinder selection and use)
Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, body standards and regulations, etc.

4 Do not handle, pipe, or remove devices before confirming safety.

❶ Inspect and service the machine and devices after confirming safety of the entire system related to this product.
❷ Note that there may be hot or charged sections even after operation is stopped.
❸ When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power to the facility. Discharge any compressed air from the system, and pay attention to possible water leakage and leakage of electricity.
❹ When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

5 Observe warnings and cautions on the pages below to prevent accidents.

■ The safety cautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.

DANGER: When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, or when there is a high degree of emergency to a warning.

WARNING: When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.

CAUTION: When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation.
In any case, important information that must be observed is explained.

Disclaimer

1 Warranty period

"Warranty Period" is one (1) year from the first delivery to the customer.

2 Scope of warranty

In case any defect attributable to CKD is found during the term of warranty, CKD shall, at its own discretion repair the defect or replace the relevant product in whole or in part, according to its judgement.
Note that the following faults are excluded from the warranty term:
(1) Product abuse/misuse contrary to conditions/environment recommended in its catalogs/specifications
(2) Failure caused by other than the delivered product
(3) Use other than original design purposes
(4) Third-party repair/modification
(5) Faults caused by reason that is unforeseble with technology put into practical use at the time of delivery
(6) Failure attributable to force majeure
The warranty mentioned here covers the discrete delivered product. Only the scope of warranty shall not cover losses induced by the failure of the delivered product.

3 Compatibility confirmation

In no event shall CKD be liable for merchantability or fitness for a particular purpose, notwithstanding any disclosure to CKD of the use to which the product is to be put.

Pneumatic components

Safety precautions

Always read this section before starting use.
Refer to "Pneumatic cylinders (CB-029SA)" for general details on cylinders and cylinder switches.

Specific precautions: Linear slide cylinder LCW Series

Design & Selection

1. Common

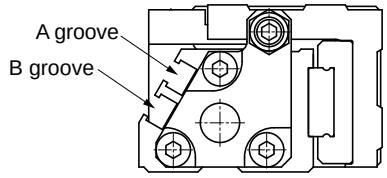
CAUTION

■ Select the cylinder based on the "LCW selection guide" on pages 39 to 41.

■ When using the cylinder where it could be subject to water or oil exposure, where it could corrode, or where high levels of dust are present, the cylinder could be damaged or malfunction. Protect the product with a cover.

■ Cautions of type with switch

- Install one switch whose stroke length is 30 mm in one body groove.
- Install the switch on the rod side for radial lead wire (T□V, F□V) in B groove in the figure below.



■ Avoid use with vibration.
The product will be adversely affected by vibration and operation will be unstable.

2. Position locking type LCW-Q

CAUTION

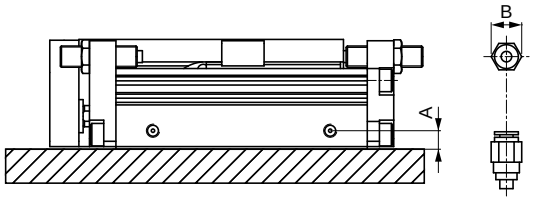
■ Do not use a 3-position valve.
Do not use this cylinder combined with 3-position valve, especially that with a closed center metal seal. The lock is not applied if pressure is sealed on the port having the lock. Even if locked once, air leakage from the valve may enter the cylinder then the lock may be released over time.

Installation & Adjustment

1. Common: Piping

CAUTION

■ Precautions for piping joint
Install a speed control valve when piping. The applicable fittings are shown as below.



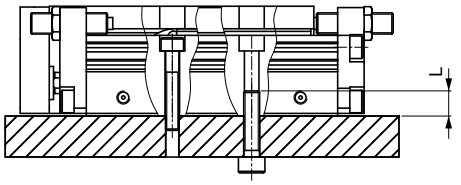
Items Bore size (mm)	Port size	Port dimension A	Applicable fittings	Fitting O.D. B
φ12	M5	5.5	SC3W-M5-4 SC3W-M5-6	φ11 or less
φ16		5.5	GWS4-M5-S GWS4-M5	φ11 or less
φ20		7	SC3W-M5-4 SC3W-M5-6 GWS4-M5-S GWS4-M5 GWL6-M5 GWS6-M5	φ13 or less

2. Common: Installation

CAUTION

■ Check that no dents or scratches occur on main tubing installation or end plates that may adversely affect flatness.
Maintain the flatness of the corresponding installed component on the body or table at 0.02 mm or less.

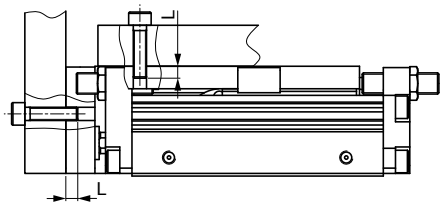
■ Observe the following values for the bolt insertion length and tightening torque when installing this product.



Items	1		2		
	Applicable bolts	Tightening torque (N·m)	Applicable bolts	Tightening torque (N·m)	Max. screw-in 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

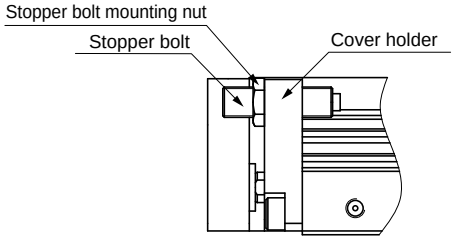
Installation & Adjustment

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



Items	Table			End plate		
	Applicable bolts	Tightening torque (N·m)	Screw-in length (mm)	Applicable bolts	Tightening torque (N·m)	Screw-in length (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 valves for the stopper bolt mounting nut tightening torque.



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

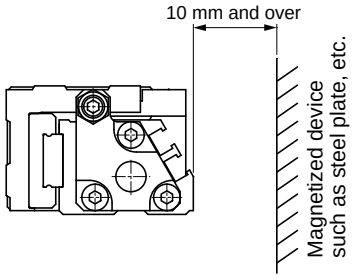
■ Do not use stopper bolts with removed from cover holder. Doing so could cause a damage.

■ Do not place hands etc. while unit operation. Otherwise they might be pinched with stopper bolts.

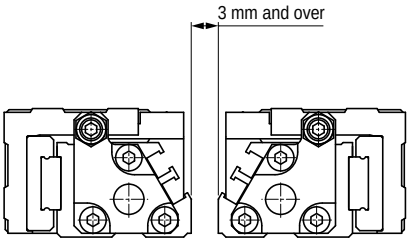
■ While attaching and removing works on slide table and end plate, make sure to hold slide table itself to operate.

■ The CKD shock absorber is treated as a consumable.
Replace the shock absorbers when energy absorption performance drops or when movement is no longer smooth.

■ The cylinder switch could malfunction if there is a magnetic body, such as a steel plate, near the cylinder switch. Separate the magnetic body by at least 10 mm and over from the cylinder surface, or change the cylinder switch mounting surface for safe use. (All bore sizes common)



■ The cylinder switch may malfunction if cylinders are installed adjacently as illustrated in the figure below. Separate cylinders by the following distance. (All bore sizes common)



■ When using a positioning hole, use a pin with a size that is not press fitted. Using a pin of the press fit size sheds load on the press fit, which may cause damage to the linear guide or a degraded accuracy due to distortion.
The recommended tolerance for a pin is JIS tolerance m6 or less.

3. Position locking type LCW-Q

⚠ CAUTION

■ The locking mechanism functions at the stroke end. If the stopper is applied with the external stopper in the middle of a stroke, the locking mechanism will not function and the load may drop. Before setting the load, check that the locking mechanism functions correctly.

■ Supply a pressure higher than the min. working pressure to the port having the locking mechanism.

■ If piping on the side with the lock is thin and long, or if the speed control valve is separated from the cylinder port, exhaust speed may slow, taking time for the lock to function. This may also occur if the silencer on the solenoid valve's EXH. port is clogged.

During Use & Maintenance

1. Common

⚠ CAUTION

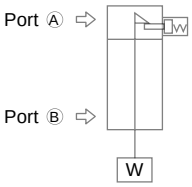
■ Apply grease to guide rails once in 6 months or every 1 million operations, whichever is sooner. (Contact CKD for recommended grease.)

■ When disassemble end plate while replacing packing, make sure to hold slide table itself to operate.

2. Position locking type LCW-Q

⚠ WARNING

■ If pressure is applied to port Ⓐ in the locked state with neither port pressurized, locks may not be releasable or may be released suddenly, causing the piston rod to pop out, which is extremely dangerous. When releasing the locking mechanism, supply pressure to port Ⓑ and check that no load is applied to the locking mechanism.



Side without locking mechanism

■ If lowering speed is to be increased with the quick exhaust valve, the cylinder may move out faster than the lock pin and prevent the locking pin from being released correctly. Do not use a quick exhaust valve with the cylinder with position locking.

⚠ CAUTION

■ If negative pressure is applied to the locking mechanism, the lock may be released. Use the solenoid valve as a discrete unit, or use an independently exhausted manifold.

■ After manually operating the locking mechanism, return the locking mechanism to the original position. Do not use a manual override except during adjustment, because this may be dangerous.

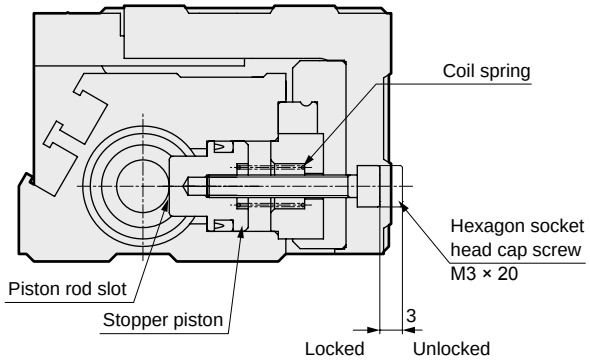
■ Release the lock when installing or adjusting the cylinder.
The lock could be damaged if the cylinder is installed while the lock is applied.

■ Do not use multiple cylinders synchronized.
Do not move more than one workpiece using more than two cylinders with position locking mechanism simultaneously. One of the cylinder may become unable to unlock.

■ Use the speed control valve with meter-out control.
Locks may not be released during meter-in control.

■ Use the side with the lock with the cylinder stroke end.
If the cylinder's piston does not reach the stroke end, the lock may not be applied or may not be released.

■ How to release
Screw a hexagon socket head screw (M3 × 20) into the stopper piston, and pull the screw up 3 mm with a force of 20 N or more. The stopper piston moves and the lock is released during horizontal no-load installation or with the rod port pressurized. When the hand is released, the stopper piston is returned by the internal spring and enters the piston rod slot, locking the cylinder.



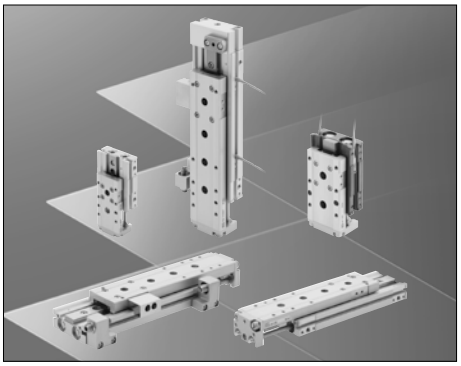
MEMO

MEMO

Related products

Linear slide cylinder LCR Series

Catalog No. CB-029SA



- Aluminum table is adopted to reduce weight by 10%
- Higher rigidity with rigid linear guide and slide table
- More flexible design, such as stopper's symmetrical form, multiple piping and positioning hole

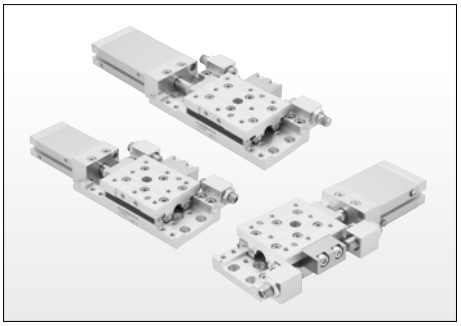
Linear slide cylinder LCG Series

Catalog No. CB-029SA

- Industry's broadest guide is adopted to realize the industry leading super-high rigidity
- Higher rigidity with rigid linear guide and slide table
- More flexible design, such as stopper's symmetrical form, multiple piping and positioning hole

Linear slide cylinder LCX Series

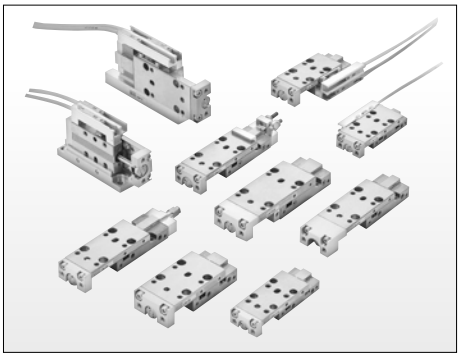
Catalog No. CB-029SA



- Thin type design
  Exhaustive thinning: conventional dimension halved from 60 mm to 34 mm, optimizing space-saving use
- For reducing cycle time and energy
  Conventional product weight halved, enabling the moving parts to be lighter
- High precision and high rigidity
  Linear guide of separate type is adopted
- Wide variation of options, such as flexible combination, position locking type, long stroke type, and positioning hole-equipped type

Linear slide cylinder LCM Series

Catalog No. CB-029SA

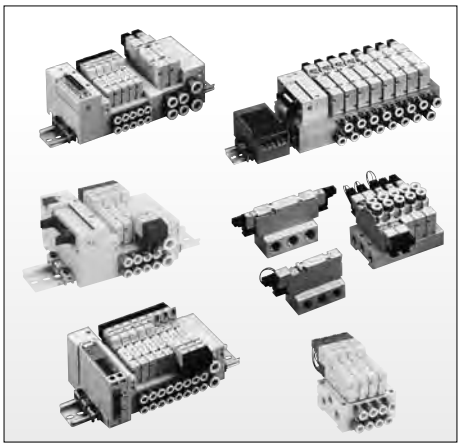


- Best for high precision positioning
- With the size installable in a narrow space, piping flexibility is increased
- Workpiece can be direct installed on the top and front of table
- Corrosion-proof stainless steel is adopted for the cylinder body and slide table
- 4-point contact linear guide is adopted. Load in all directions is supported

Related products

Pilot operated 3, 4, 5 port valve 4G Series

Catalog No. CB-023SA



- Cylinders up to φ100 are driven with valve width 10 mm, 15 mm and 18 mm
  New 3, 4, 5 port reduced wiring valve with safety function
- Safety function reinforced by detailed response
  Manual override with protective cover, check valve and filter on air supplying port are equipped as standard
- Improved reliability
  Service life of over 60 millions cycles, response time of 12 ms ±2 ms and low wattage of 0.6 W are realized
- Ease of use enhanced
  Common upper and side wiring, reduced wiring connector rotation (upper and side), and tool-free manual override are adopted
- Wide variations
  Discrete, metal-based manifold, block manifold, individual and reduced wiring

Hand-chuck

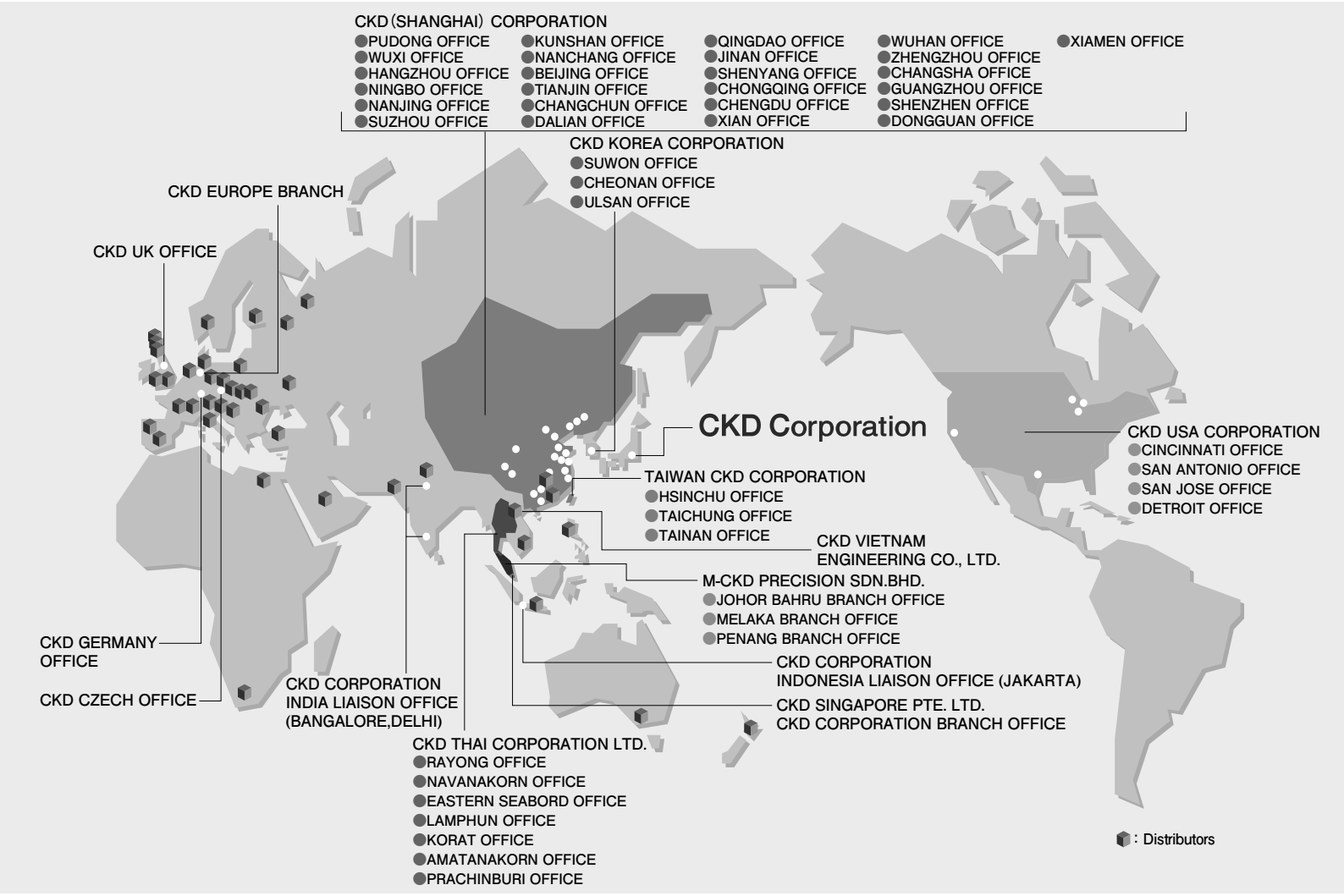
Catalog No. CB-030SA

- A wide range of models, variations and options
- You can make a selection depending on the use
- Various cylinder switches, such as reed and proximity

Speed controller with adjusting dial DSC Series

Catalog No. CC-1021A

- Flow characteristics in proportion to number of needle rotation
- Stylization of speed setting
- Push lock method is adopted
- Prevent misadjustment
- Reduce work man-hours



CKD Corporation

Website http://www.ckd.co.jp/

□ OVERSEAS SALES ADMINISTRATION DPT.
SALES AND MARKETING DIV. 2-250 Ouji Komaki, Aichi 485-8551, Japan
□ PHONE +81-(0)568-74-1338 FAX +81-(0)568-77-3461

U.S.A.
CKD USA CORPORATION
● CHICAGO HEADQUARTERS
4080 Winnetka Avenue, Rolling Meadows, IL 60008, USA
PHONE +1-847-368-0539 FAX +1-847-788-0575

EUROPE
CKD CORPORATION EUROPE BRANCH
De Fruittuinen 28 Hoofddorp, the Netherlands
PHONE +31-(0)23-5541490 FAX +31-(0)23-5541491

Malaysia
M-CKD PRECISION SDN.BHD.
● HEAD OFFICE
Lot No.6,Jalan Modal 23/2, Seksyen 23, Kawasan MIEL, Fasa 8, 40300 Shah Alam,Selangor Darul Ehsan, Malaysia
PHONE +60-(0)3-5541-1468 FAX +60-(0)3-5541-1533

Thailand
CKD THAI CORPORATION LTD.
● SALES HEADQUARTERS
Suwan Tower, 14/1 Soi Saladaeng 1, North Sathorn Road, Kwaeng Silom, Khet Bangrak, Bangkok 10500, Thailand
PHONE +66-(0)2-267-6300 FAX +66-(0)2-267-6305

Singapore
CKD SINGAPORE PTE. LTD.
No.33 Tannery Lane #04-01 Hoesteel Industrial Building, Singapore 347789, Singapore
PHONE +65-67442623 FAX +65-67442486
CKD CORPORATION BRANCH OFFICE
No.33 Tannery Lane #04-01 Hoesteel Industrial Building, Singapore 347789, Singapore
PHONE +65-67447260 FAX +65-68421022

Vietnam
CKD VIETNAM ENGINEERING CO., LTD.
18th Floor, CMC Tower, Duy Tan Street, Cau Giay District, Hanoi, Vietnam
PHONE +84-4-37957631 FAX +84-4-37957637

Taiwan
TAIWAN CKD CORPORATION
16F-3, No. 7, Sec. 3, New Taipei Blvd., Xinzhuang Dist., New Taipei City 242, Taiwan
PHONE +886-(0)2-8522-8198 FAX +886-(0)2-8522-8128

China
CKD (SHANGHAI) CORPORATION
● SALES HEADQUARTERS / SHANGHAI OFFICE
Room 601, Yuanzhongkeyan Building, No. 1905 Hongmei Road, Xinhui District, Shanghai 200233, China
PHONE +86-(0)21-61911888 FAX +86-(0)21-60905356

Korea
CKD KOREA CORPORATION
● HEADQUARTERS
(3rd Floor), 44, Sinsu-ro, Mapo-gu, Seoul 121-856, Korea
PHONE +82-(0)2-783-5201～5203 FAX +82-(0)2-783-5204

2014.9.YAC