

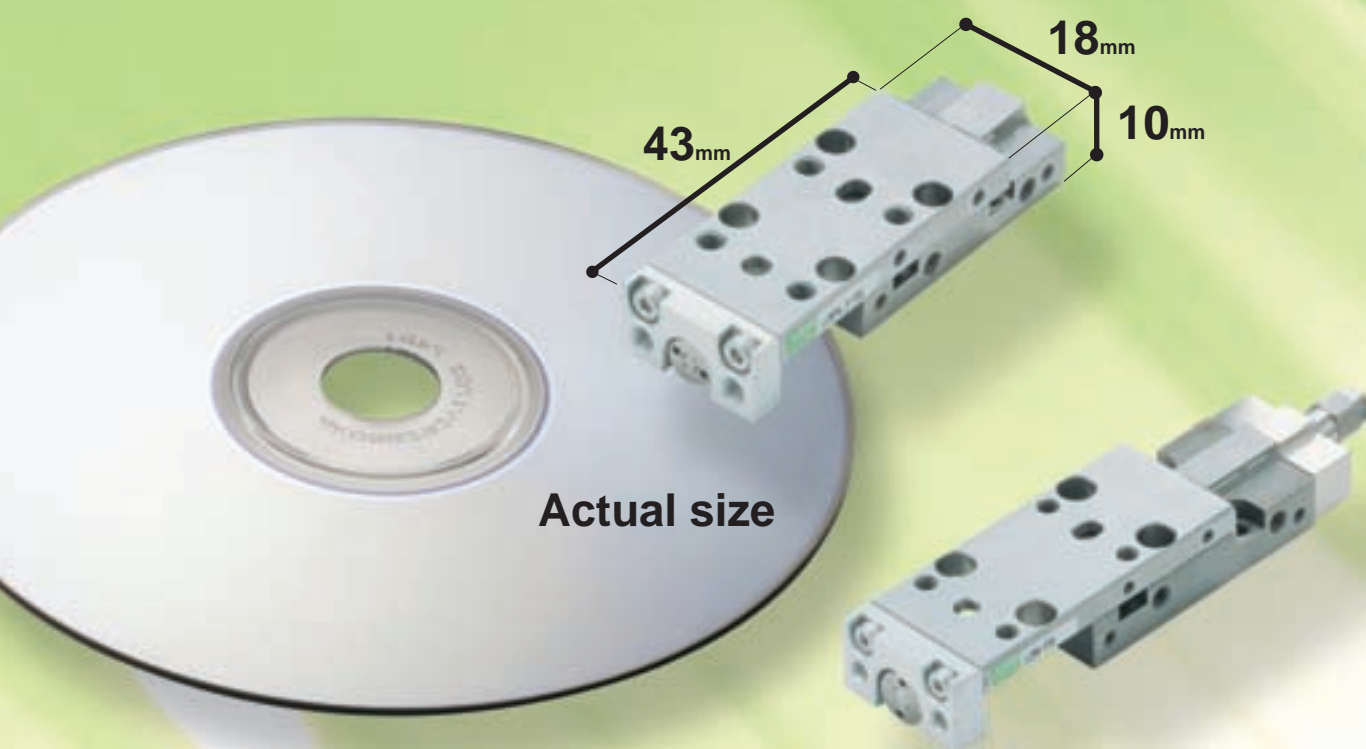
# Linear slide cylinder LCM Series

## LINEAR SLIDE CYLINDER LCM SERIES



# Compact, highly accurate actuator

Highly compact, accurate, and rigid LCM Series linear slide cylinder (ø4.5 · ø6 · ø8)



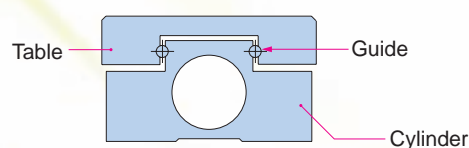
## ● Ideal for high-accuracy positioning

Highly accurate 0.005 mm sliding parallelism and 0.03 mm installation parallelism are ensured, making this actuator ideal for positioning.



## ● Ultimate pursuit of downsizing

The cylinder, linear guide, and slide table have been integrated into a highly compact unit.



**Linear Slide Cylinder**

**LCM Series**

## Compatible with small spaces

This cylinder can be installed even in compact spacing, making layout more flexible.

## Workpiece installation on either of two faces

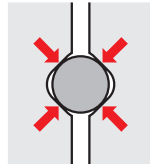
The workpiece can be directly installed either on the table top or front using the installation holes provided.

## Highly reliable stainless steel parts

Corrosion-resistant stainless steel is used for the cylinder and slide table.

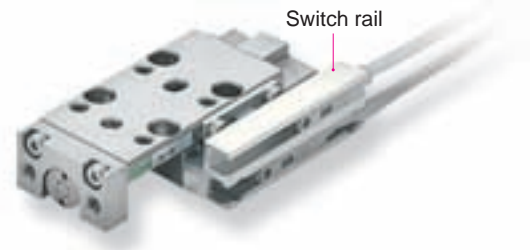
## Powerful design

A linear guide with contacts at four points enables this cylinder to be used with loads in different directions.



## 2-color switch installable

Miniature size, 2-color F type switch is now available.



## Wide variations

Available variations include adjustable-stroke, side installation, and clean room specifications.

## RoHS Directive-compliant

Substances adversely affecting the environment, including lead and hexavalent chromium, have been eliminated.

**RoHS**

### LCM Series product

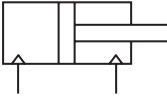
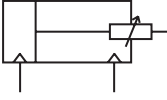
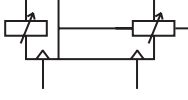
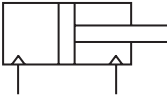
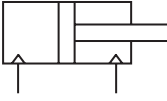
Variation	Bore size	Stroke length (mm)			
		5	10	15	20
Double acting single rod type	4.5 6 8	●	●	●	●
Double acting stroke adjustable type (extended)	4.5 6 8	●	●	●	●
Double acting stroke adjustable type (extended/retracted)	4.5 6 8	●	●	●	●
Double acting side installation type	4.5 6 8	●	●	●	●
Double acting single rod type clean room specifications	4.5 6 8	●	●	●	●

# Series variation



Linear slide cylinder

# LCM Series

Variation	Model no. JIS symbol	Bore size (mm)
Double acting single rod type	LCM 	Φ4.5
		Φ6
		Φ8
Double acting stroke adjustable type (extended)	LCM-P 	Φ4.5
		Φ6
		Φ8
Double acting stroke adjustable type (extended/retracted)	LCM-R 	Φ4.5
		Φ6
		Φ8
Double acting side installation type	LCM-A 	Φ4.5
		Φ6
		Φ8
Double acting single rod type clean room specifications	LCM-P73 	Φ4.5
		Φ6
		Φ8

●: Standard ○: Option ◯: Custom order ■: Not available

Standard stroke length (mm)				Option				Switch	Page
				With buffer	With magnet	With magnet + switch rail	Dowel pin attached		
5	10	15	20	B	M	F	J*		
●	●	■	■						
●	●	●	■	○	○	○	○	○	1
●	●	●	●						
●	●	■	■						
●	●	●	■	○	○	○	○	○	11
●	●	●	●						
●	●	■	■						
●	●	●	■	○	○	○	○	○	19
●	●	●	●						
●	●	■	■						
●	●	●	■	○	○	○	○	○	27
●	●	●	●						
●	●	■	■	■					
●	●	●	■	■	○	○	○	○	39
●	●	●	●	■					

Note: Custom stroke length is not available.



# 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 mechanical 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 of 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.

Note that this product can be used when CKD is consulted prior to use and the customer consents to CKD product specifications. The customer must provide safety measures to avoid risks in the event of problems.

- ① Use for special applications requiring safety including nuclear energy, railroad, aviation, ship, vehicle, medical equipment, equipment, or applications coming into contact with beverage or food, amusement equipment, emergency shutoff circuits, press machine, brake circuits, or for safeguard.
- ② 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)

JFPS 2008 (principles for pneumatic cylinder selection and use)


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.**


- ① Inspect and service the machine and devices after confirming safety of the entire system related to this product.
- ② Note that there may be hot or charged sections even after operation is stopped.
- ③ 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 enough attention to possible water leakage and leakage of electricity.
- ④ 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. CKD cannot be held liable for any business interruption, loss of profit, personal injury, delay cost, or any other ancillary or indirect loss, cost, or damage resulting from the use of or faults in the use of CKD products.
2. CKD cannot be held responsible for the following damage:
  - (1) Damage resulting from failure of CKD parts due to fire from reasons not attributable to CKD, or by intentional or negligence of a third party or customer.
  - (2) When a CKD product is assembled into customer equipment, damage that could have been avoided if customer equipment were provided with functions and structure, etc., generally accepted in the industry.
  - (3) Damage resulting from use exceeding the scope of specifications provided in CKD catalogs or instruction manuals, etc., or from actions not following precautions for installation, adjustment, or maintenance, etc.
  - (4) Damage resulting from production modifications not approved by CKD, or from faults due to combination with other software or other connected devices.





Pneumatic components

# Safety precautions

Always read this section before starting use.

Refer to Pneumatic cylinders (CB-029SA) general details on cylinders and cylinder switch.

## Design & Selection

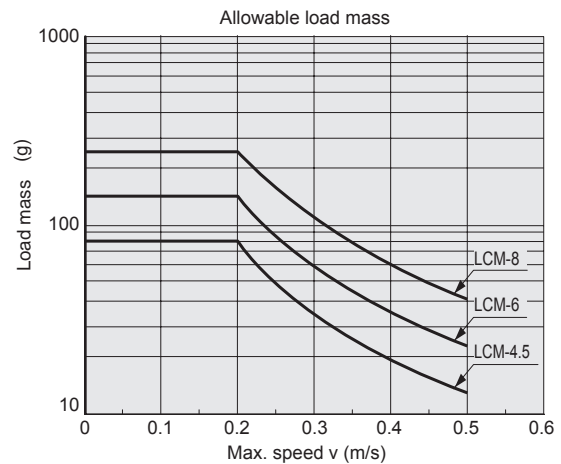
### 1. Common

#### CAUTION

- Refer to the LCM Selection Guide on pages 47 and 48 when selecting the cylinder.
- 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.
- Stainless steel is used for the body and slide table, but rust could form depending on the environment. Regularly apply an anticorrosion agent.
- The switch could malfunction if used in an environment including magnetic fields. Magnetic sources around the switch could also cause malfunction. When attaching a magnetic workpiece to the slide table, check that the workpiece does not extend toward the switch from the end of the table.
- Exposing this product to a powerful magnet could magnetize the product and cause the switch to malfunction.

- Use the cylinder with the tolerable absorption or less shown below. If dynamic energy exceeds this value, consider using a separate shock absorber.

Bore size	Φ4.5	Φ6	Φ8
Allowable energy absorption J	$1.59 \times 10^{-3}$	$2.83 \times 10^{-3}$	$5.02 \times 10^{-3}$



## Installation & Adjustment

### 1. Common: Piping

- When changing a piping port position, apply adhesive to M3 plug (hexagon socket head set screw).  
(Low intensity adhesive such as LOCTITE 222, 221, THREE BOND1344 recommended)  
Tighten the plug to where the bolt does not protrude from the port or contact the base of the port hole.
- Applicable piping joints are limited, so refer to the below table.

#### Recommended joints

Bore size	Recommended joints
All bore sizes	PG-S2-M3
	PG-S2-M3-S
	PG-L2-M3
	FTS4-M3
	FTL4-M3

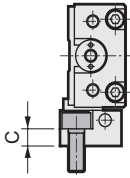
Note: FTL4-M3 cannot be used for the  $\phi 4.5$  clean room specification dust port.

- Avoid denting or scratches that could obstruct the parallelism of the cylinder installation face or slide table face. Maintain parallelism of the installation mate at 0.02 mm or less. If parallelism is poor, guide section accuracy could decrease, rolling resistance could increase, and product life could be adversely affected.
- Use a loose-fitting stepped pin (option) for positioning. A press-fit dimension pin could damage the guide due to the load in press-fitting and result in faults. The pin hole is a through hole so if a pin other than a stepped pin is used, the pin could interfere and result in faults.
- The slide table and end plate are supported by balls. When fixing the jig with bolts, support the slide table and end plate before tightening. If held and tightened, excessive moment on the guide could decrease guide section accuracy.

## Installation & Adjustment

■ When installing a jig guide, slide table, or end plate, observe the following values for bolt screw depth and tightening torque.

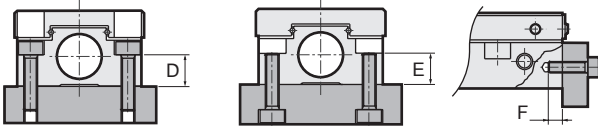
- Cylinder installation (side installation)



Note: Do not use a washer, etc. The installation bolt could contact the guide and break.

Model no.	Applicable bolts	Max. tightening torque N·m	C mm
LCM-A-4.5	M3×0.5	1.14	5
LCM-A-6	M3×0.5	1.14	5
LCM-A-8	M4×0.7	2.7	4

- Cylinder installation

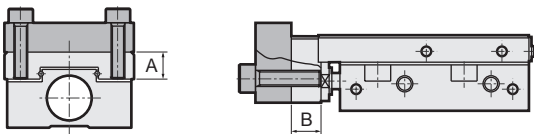


Model no.	Applicable bolts	Max. tightening torque N·m	D mm
LCM-*4.5	M2×0.4	0.32	3.5
LCM-*6	M2.5×0.45	0.65	5
LCM-*8	M2.5×0.45	0.65	5.5

Model no.	Applicable bolts	Max. tightening torque N·m	E mm
LCM-*4.5	M2.5×0.45	0.65	3.5
LCM-*6	M3×0.5	1.14	5
LCM-*8	M3×0.5	1.14	5.5

Model no.	Applicable bolts	Max. tightening torque N·m	Max. screw depth F mm
LCM-*4.5	M2×0.4	0.32	2.5
LCM-*6	M2.5×0.45	0.65	2.5
LCM-*8	M3×0.5	1.14	3

- Jig installation



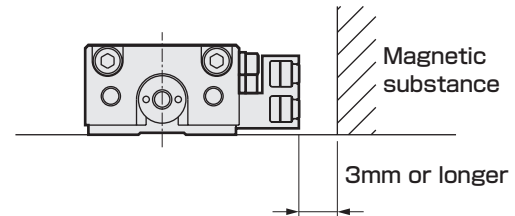
Model no.	Applicable bolts	Max. tightening torque N·m	Max. screw depth A mm	Max. screw depth B mm
LCM-*4.5	M3×0.5	0.63	4	4.5
LCM-*6	M3×0.5	0.63	4	5.5
LCM-*8	M3×0.5	0.63	5	5.5

Note: The work installation bolt must be shorter than the maximum screw depth. If it is too long, it could contact the body and break.

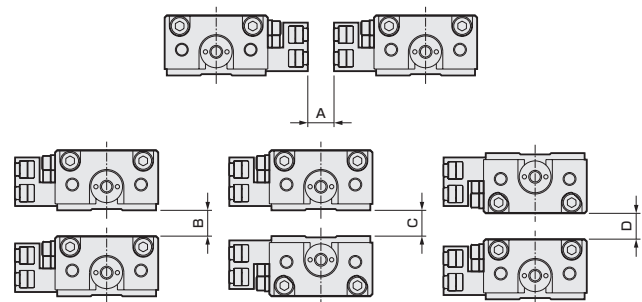
■ This cylinder switch can be changed to one with a switch and the switch installation face can be changed. The tightening torque of the bolt fixing the switch rail is given below. The switch installation face port is not used, so attach a plug before assembling the switch rail.

Model no.	Applicable bolts	Max. tightening torque N·m
LCM-*4.5	M2×0.4	0.17
LCM-*6	M2×0.4	0.17
LCM-*8	M2×0.4	0.17

■ The cylinder may malfunction if a magnetic substance, such as a steel plate, is nearby. Move the magnetic substance to at least 3 mm from the cylinder. (Same clearance for all bore size)



■ The cylinder switch may malfunction if cylinders are installed adjacently. Separate cylinders with maintaining these distances, A, B, C and D = 3 mm or longer. (Same clearance for all bore size)



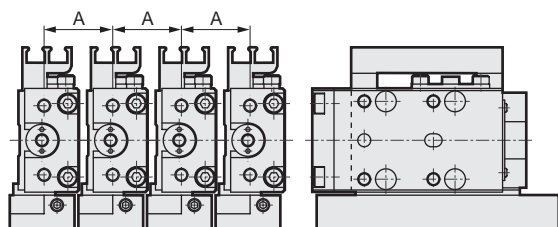


## Installation & Adjustment

### 2. Side installation type

**⚠ CAUTION**

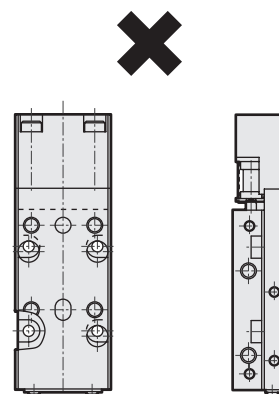
- Interval larger than dimensions listed on the table below must be maintained if the side installation type is installed in parallel.



Model no.	A mm
LCM-A-4.5	12
LCM-A-6	14
LCM-A-8	16

### 3. With buffer

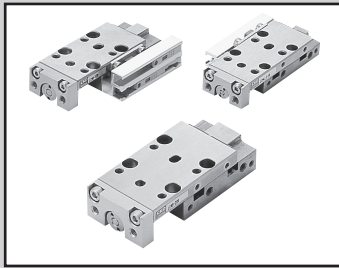
- Care must be taken as the product can not be installed vertically if of the type with a buffer.



## During Use & Maintenance

**⚠ CAUTION**

- Apply CGL grease (Nippon Thompson) to the track rail's tracks of the guide after six months of use or 3,000,000 operations, whichever is sooner.



Linear slide cylinder, double acting single rod type

# LCM Series

● Bore size:  $\Phi 4.5$ ,  $\Phi 6$ ,  $\Phi 8$

JIS symbol



## Specifications

Descriptions		LCM		
Bore size	mm	$\Phi 4.5$	$\Phi 6$	$\Phi 8$
Actuation		Double acting		
Working fluid		Compressed air		
Max. working pressure	MPa	0.7		
Min. working pressure	MPa	0.2		0.15
Withstanding pressure	MPa	1.05		
Ambient temperature	$^{\circ}\text{C}$	0 to 60		
Port size		M3		
Stroke tolerance	mm	+1.0 0		
Working piston speed	mm/s	30 to 500		
Cushion		None	Rubber cushioned	
Lubrication		Not required (when lubricating, use turbine oil Class 1 ISOVG 32.)		
Allowable energy absorption	J	Refer to table on Page 4 in the Introduction.		

## With buffer specifications

Descriptions		LCM-**-*-B	
Buffer stroke length	mm	4 (Max.)	
Buffer section spring load	Set	N	0.3
	Operation	N	0.7

## Stroke length

Bore size (mm)	Standard stroke length (mm)	Min. stroke length of types with switch (mm)
$\Phi 4.5$	5, 10	5
$\Phi 6$	5, 10, 15	
$\Phi 8$	5, 10, 15, 20	

Note 1: Other than standard stroke length is not available.

## Switch specifications

Descriptions	Proximity 2-wire		Proximity 3-wire	
	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Programmable controller		Programmable controller and relay	
Output type	-		NPN output	
Power voltage	-		10 to 28 VDC	
Load voltage	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 20mA (Note 1)		100mA or less	50mA or less
Light	LED (ON lighting)	Red/Green LED (ON lighting)	LED (ON lighting)	Red/Green LED (ON lighting)
Leakage current	1mA or less		10µA or less	

Note 1: The maximum load current 20mA is applied at 25°C. The current will be lower than 20mA if ambient temperature around switch is higher than 25°C. (5 to 10mA at 60°C.)

## Cylinder weight

Unit: g

Stroke length (mm)	5		10		15		20		Additional weight	
	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With buffer	Weight per switch
Φ4.5	42	46	42	46	-	-	-	-	3	10
Φ6	58	63	58	63	66	72	-	-	4	10
Φ8	83	88	83	88	104	110	104	110	5	10

## Theoretical thrust table

Unit: N

Bore size (mm)	Operation direction	Working pressure MPa					
		0.2	0.3	0.4	0.5	0.6	0.7
Φ4.5	Push	3.2	4.8	6.4	8.0	9.5	11.1
	Pull	2.6	3.8	5.1	6.4	7.7	9.0
Φ6	Push	5.6	8.5	11.3	14.1	16.9	19.7
	Pull	4.2	6.4	8.5	10.6	12.7	14.8
Φ8	Push	10.1	15.1	20.1	25.2	30.2	35.2
	Pull	8.6	13.0	17.3	21.6	25.9	30.2

## How to order

● Without switch

LCM - 6 - 10 - R ————— J2

● With switch

LCM - 6 - 10 - R - F2H - R - J2

A Bore size

B Stroke length

C Piping direction

D Switch model no.

E Switch quantity

F Option

Symbol	Descriptions
<b>A Bore size (mm)</b>	
4.5	Φ4.5
6	Φ6
8	Φ8

		Bore size		
		Φ4.5	Φ6	Φ8
<b>B Stroke length (mm)</b>	5	●	●	●
	10	●	●	●
	15	-	●	●
	20	-	-	●

<b>C Piping direction</b>	
R	Right viewed from rod end
L	Left viewed from rod end

<b>D Switch model no.</b>				
Axial lead wire	Radial lead wire	Contact	Indicator	Lead wire
F2H*	F2V*	Proximity	One color indicator type	2-wire
F3H*	F3V*			3-wire
F2YH*	F2YV*		Two color indicator type	2-wire
F3YH*	F3YV*			3-wire

<b>*Lead wire length</b>	
Blank	1m (standard)
3	3m (option)

<b>E Switch quantity</b>	
R	One on rod end
H	One on head end
D	Two

<b>F Option</b>	
B	With buffer
M Note 1	With magnet
F1 Note 1, 2	Magnet + switch rail (one switch groove)
F2 Note 1	Magnet + switch rail (two switch grooves)
J*	Dowel pin attached (* indicates pin number)

### ⚠ Note on model no. selection

Note 1: Selection not required when designating the switch type.

Note 2: Selectable if Φ4.5 is selected.

<Example of model number>

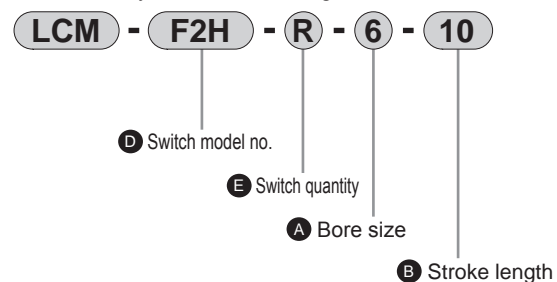
**LCM-6-10-R-F2H-R-J2**

Model: Linear slide cylinder, double acting

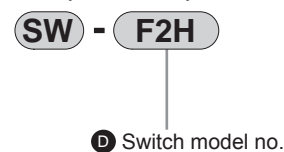
- A Bore size: Φ6mm
- B Stroke length: 10 mm
- C Piping direction: Right viewed from rod end
- D Switch model no.: Proximity switch F2H, lead wire 1m
- E Switch quantity: One on rod end
- F Option: Dowel pin attached (two pcs.)

## How to order switch

- Switch body + switch rail + magnet

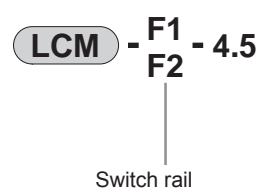


- Only switch body

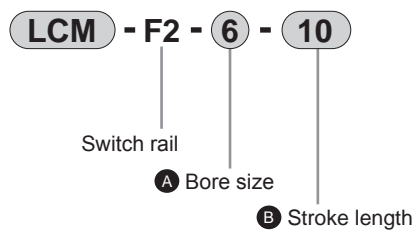


- Only switch rail

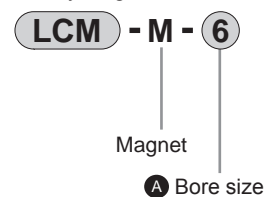
- $\Phi 4.5$



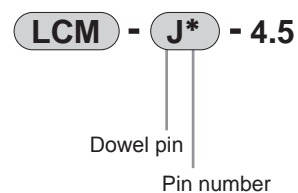
- $\Phi 6, \Phi 8$



- Only magnet

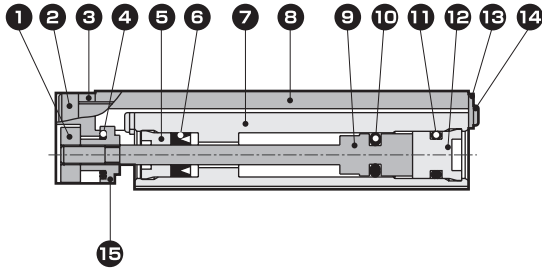


## How to order discrete dowel pin

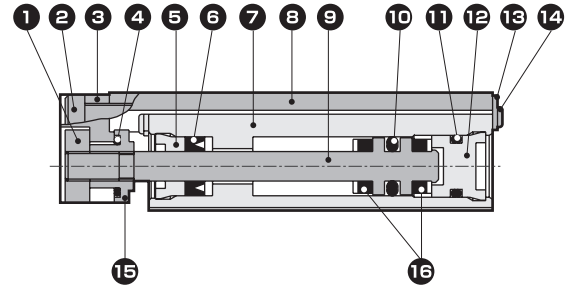


## Internal structure and parts list

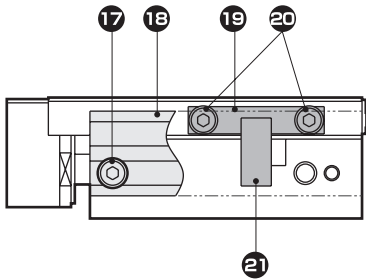
### ● LCM-4.5



### ● LCM-6.8



### ● LCM-4.5 to 8 with magnet and switch rail



### • Dowel pin



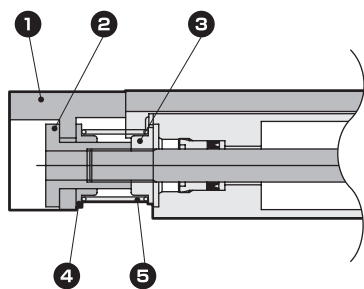
## Parts list

No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Floating bush A	Stainless steel		12	Guard	Acetar resin	
2	Bolt	Stainless steel		13	Stop plate	Stainless steel	
3	End plate	Aluminum alloy		14	Machine screw	Stainless steel	
4	O ring	Nitrile rubber		15	Floating bush B	Stainless steel	
5	Rod cover	Acetar resin		16	Cushion rubber	Urethane rubber (Φ6, Φ8)	
6	Rod packing seal	Nitrile rubber		17	Hexagon socket head cap screw	Stainless steel	
7	Cylinder body	Stainless steel		18	Switch rail	Aluminum alloy	
8	Slide table	Stainless steel		19	Plate	Aluminum alloy	
9	Piston	Stainless steel		20	Hexagon socket head cap screw	Stainless steel	
10	Piston packing seal	Nitrile rubber		21	Magnet	Plastic	
11	O ring	Nitrile rubber		22	Dowel pin	Steel	



### Internal structure and parts list

● LCM-4.5 to 8 with buffer

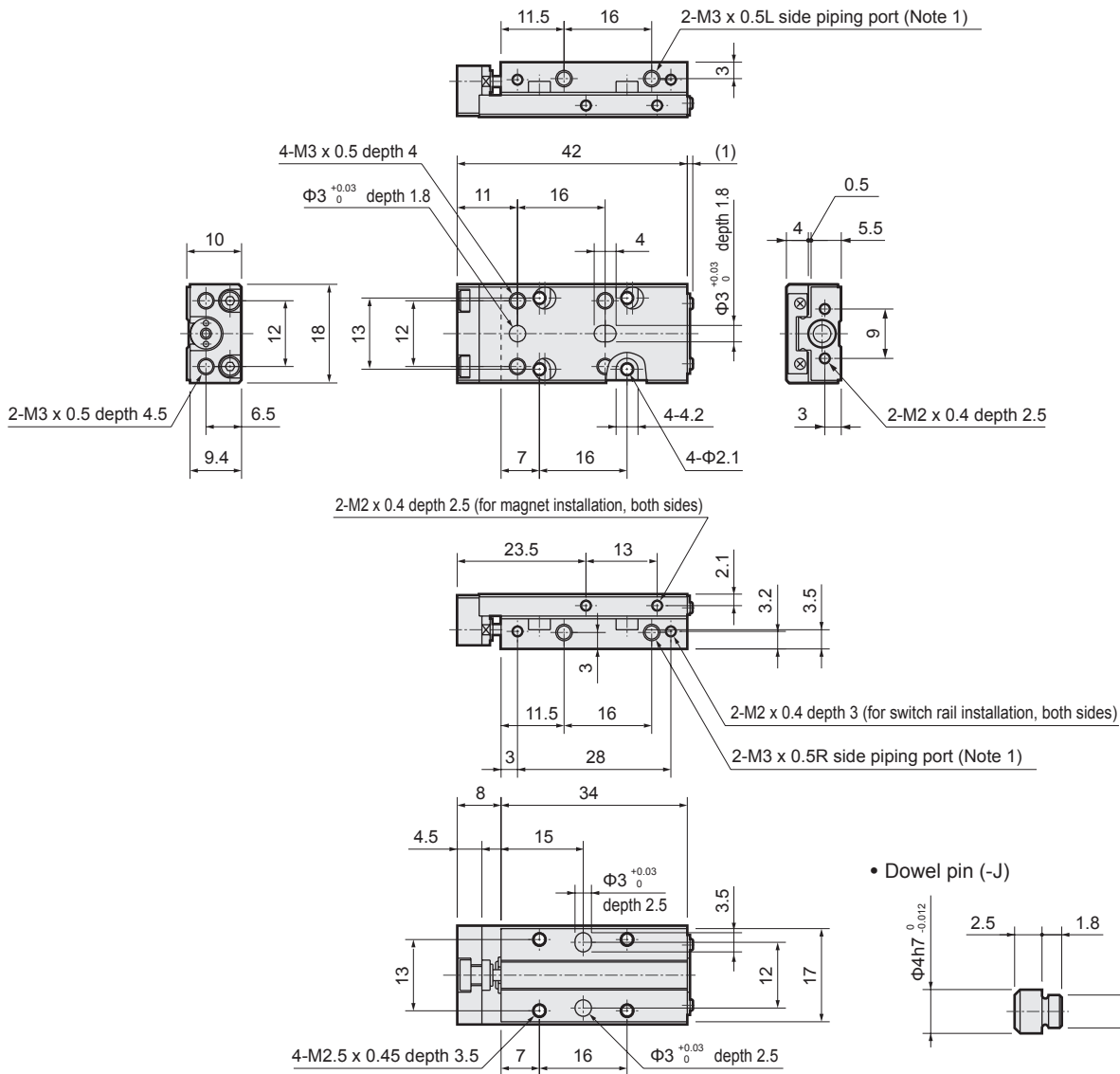


### Parts list

No.	Parts name	Material	Remarks
1	End plate	Aluminum alloy	
2	Floating bush A	Stainless steel	
3	Floating bush B	Stainless steel	
4	Spring holder	Copper alloy	
5	Coil spring	Stainless steel	

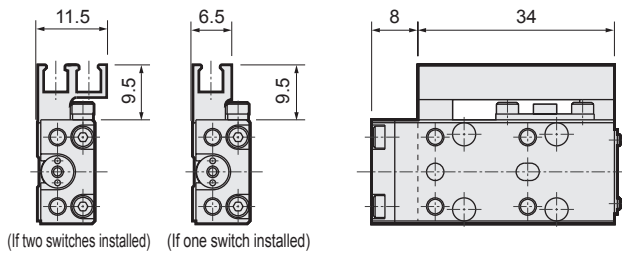
## Dimensions

● LCM-4.5

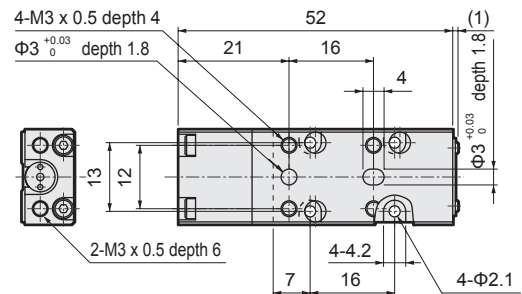


(Note 1) A plug is assembled on the opposite side of piping port indicated in the model no.

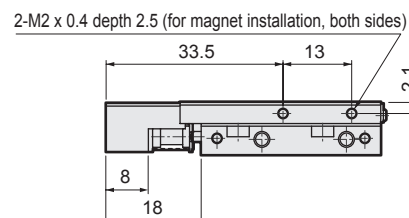
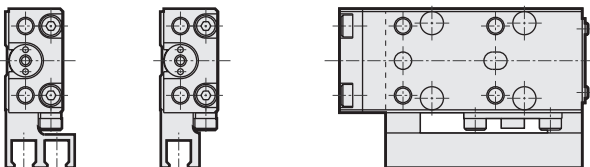
• With magnet and cylinder switch (piping direction: -R)



• With buffer (-B)



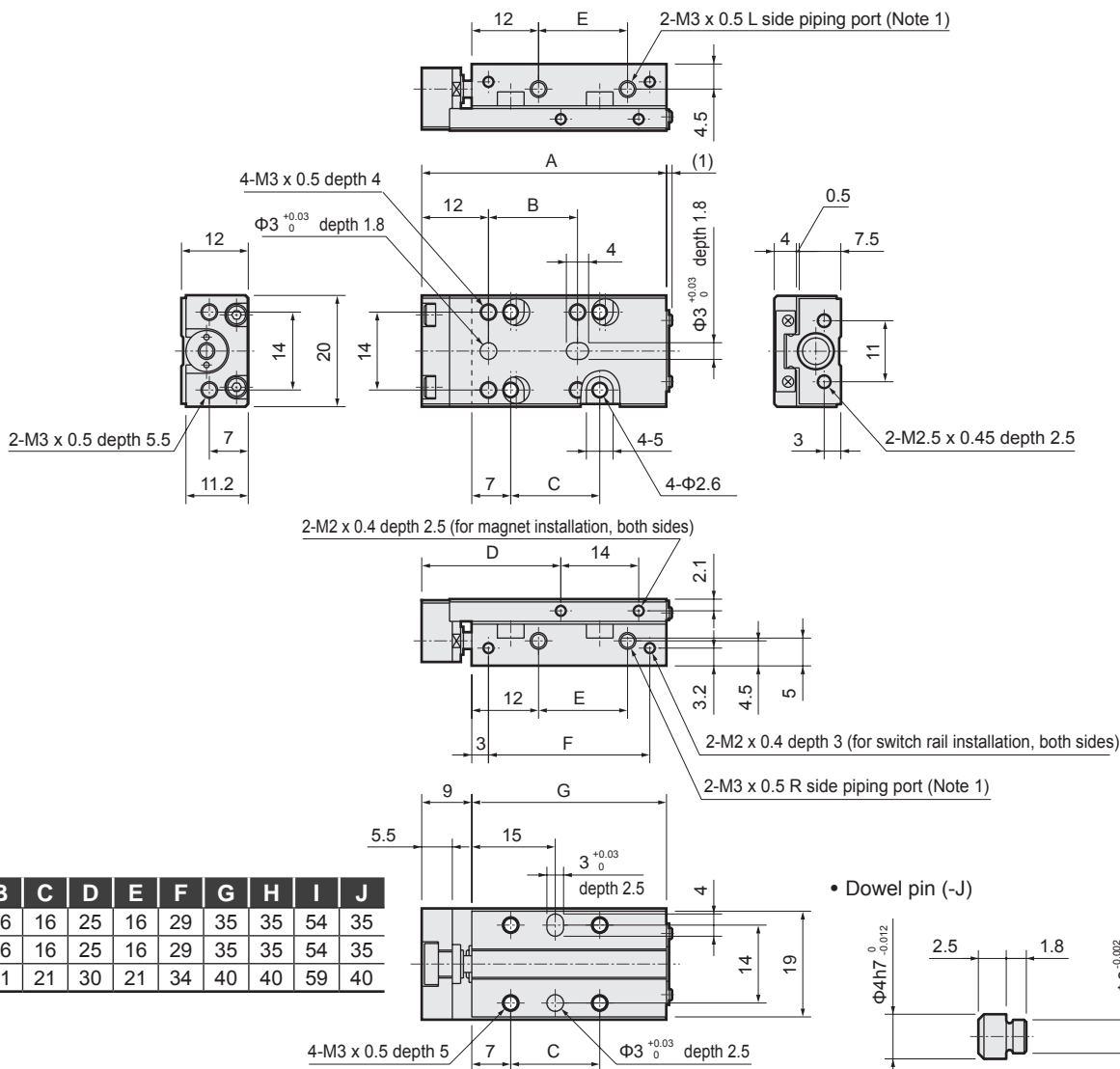
• With magnet and cylinder switch (piping direction: -L)



Note: Refer to Page 46 for switch installation position dimensions.

### Dimensions

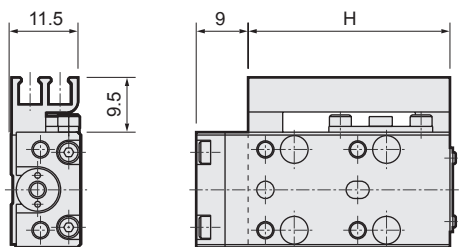
● LCM-6



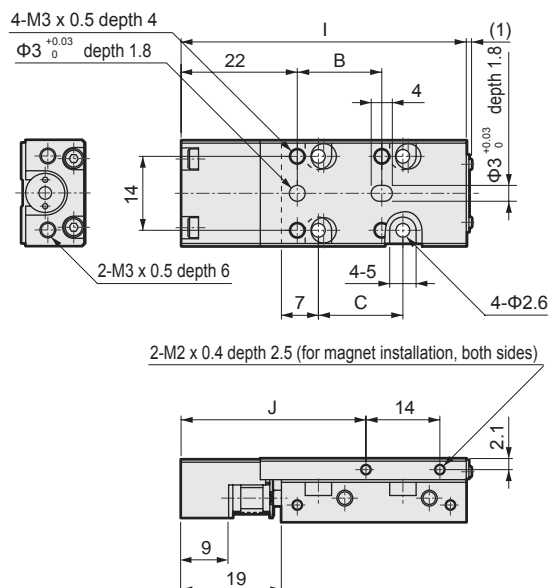
Stroke length	A	B	C	D	E	F	G	H	I	J
5	44	16	16	25	16	29	35	35	54	35
10	44	16	16	25	16	29	35	35	54	35
15	49	21	21	30	21	34	40	40	59	40

(Note 1) A plug is assembled on the opposite side of piping port indicated in the model no.

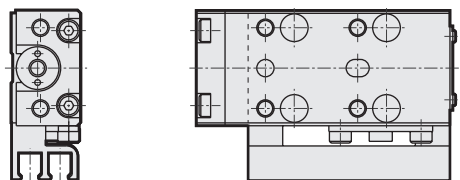
• With magnet and cylinder switch (piping direction: -R)



• With buffer (-B)



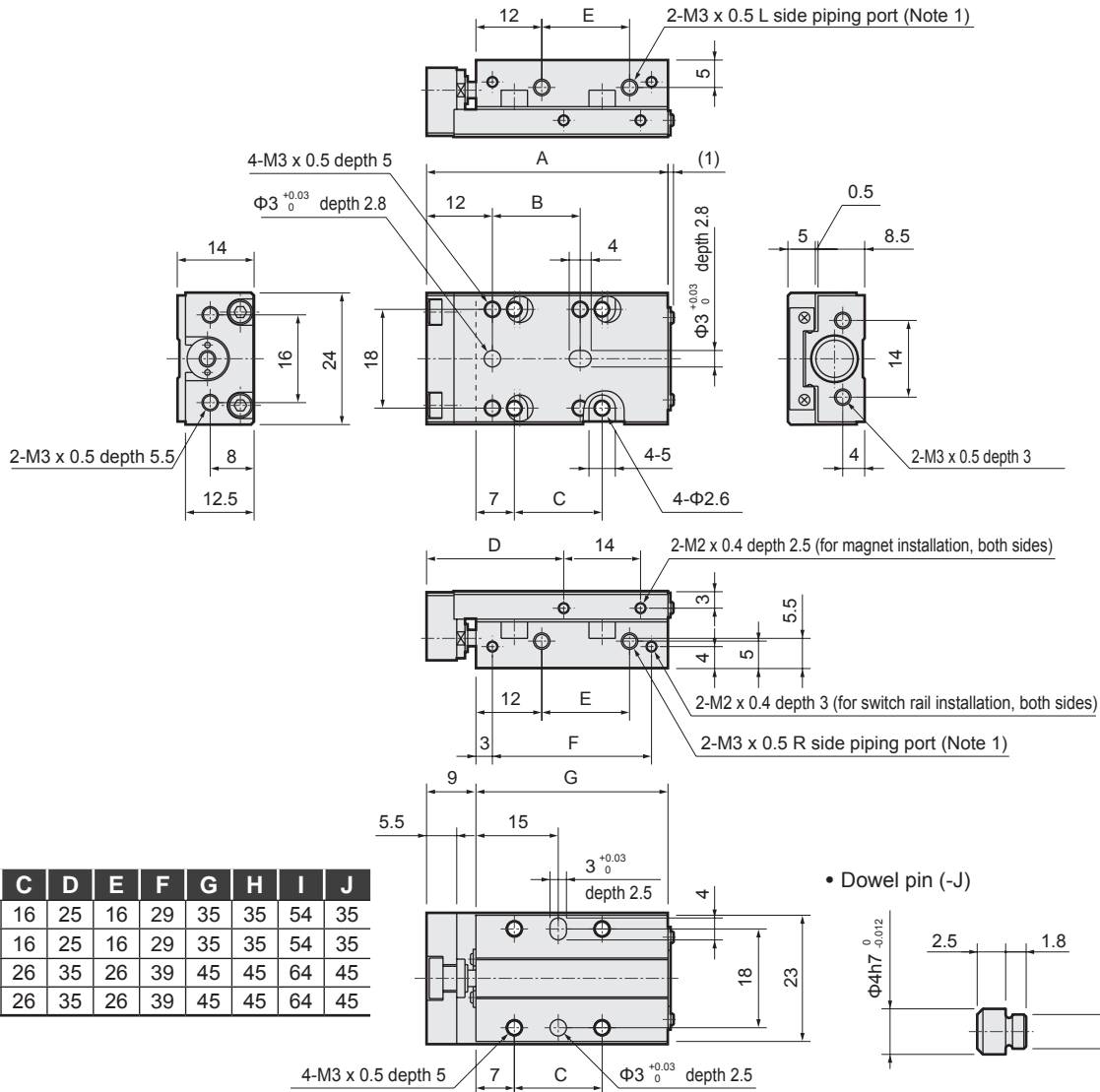
• With magnet and cylinder switch (piping direction: -L)



Note: Refer to Page 46 for switch installation position dimensions.

## Dimensions

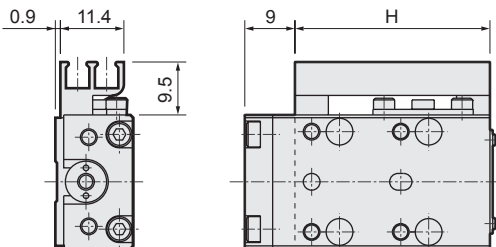
● LCM-8



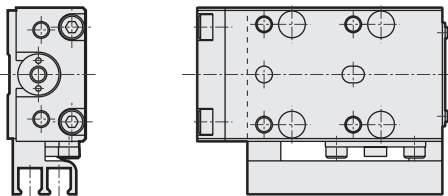
Stroke length	A	B	C	D	E	F	G	H	I	J
5	44	16	16	25	16	29	35	35	54	35
10	44	16	16	25	16	29	35	35	54	35
15	54	26	26	35	26	39	45	45	64	45
20	54	26	26	35	26	39	45	45	64	45

(Note 1) Plugs are assembled on the opposite side of piping port indicated in the model no.

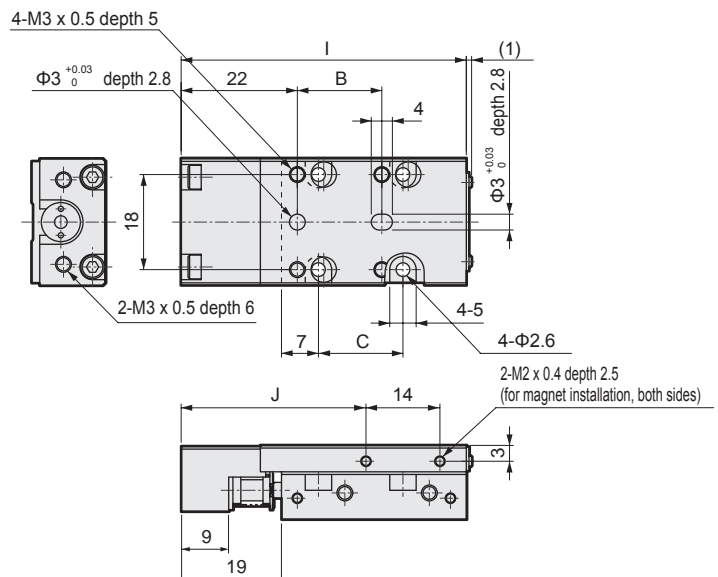
• With magnet and cylinder switch (piping direction: -R)



• With magnet and cylinder switch (piping direction: -L)



• With buffer (-B)

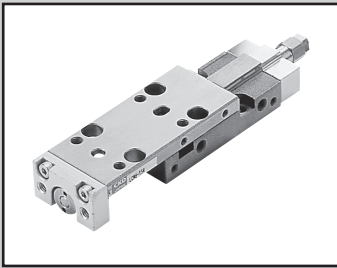


Note: Refer to Page 46 for switch installation position dimensions.

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MEMO

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Linear slide cylinder, double acting stroke adjustable type (extended)

# LCM-P Series

● Bore size:  $\Phi 4.5$ ,  $\Phi 6$ ,  $\Phi 8$



## Specifications

Descriptions		LCM-P		
Bore size	mm	$\Phi 4.5$	$\Phi 6$	$\Phi 8$
Actuation		Double acting		
Working fluid		Compressed air		
Max. working pressure	MPa	0.7		
Min. working pressure	MPa	0.25	0.2	0.15
Withstanding pressure	MPa	1.05		
Ambient temperature	$^{\circ}\text{C}$	0 to 60		
Port size		M3		
Stroke tolerance	mm	+1.0 0		
Working piston speed	mm/s	30 to 500		
Cushion		None		
Lubrication		Not required (when lubricating, use turbine oil Class 1 ISOVG 32.)		
Adjustable stroke range	mm	-5 to 0		
Repeat position accuracy	mm	$\pm 0.02$		
Allowable energy absorption	J	Refer to table on Page 4 in the Introduction.		

## With buffer specifications

Descriptions			LCM-*-*-B
Buffer stroke length	mm		4 (Max.)
Buffer section spring load	Set	N	0.3
	Operation	N	0.7

## Stroke length

Bore size (mm)	Standard stroke length (mm)	Min. stroke length of types with switch (mm)
$\Phi 4.5$	5, 10	5
$\Phi 6$	5, 10, 15	
$\Phi 8$	5, 10, 15, 20	

Note 1: Other than standard stroke length is not available.



## Switch specifications

Descriptions	Proximity 2-wire		Proximity 3-wire	
	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Programmable controller		Programmable controller and relay	
Output type	-		NPN output	
Power voltage	-		10 to 28 VDC	
Load voltage	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 20mA (Note 1)		100mA or less	50mA or less
Light	LED (ON lighting)	Red/Green LED (ON lighting)	LED (ON lighting)	Red/Green LED (ON lighting)
Leakage current	1mA or less		10µA or less	

Note 1: The maximum load current 20mA is applied at 25°C. The current will be lower than 20mA if ambient temperature around switch is higher than 25°C. (5 to 10mA at 60°C.)

## Cylinder weight

Unit: g

Stroke length (mm)	5		10		15		20		Additional weight	
	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With buffer	Weight per switch
Φ4.5	49	53	49	53	-	-	-	-	3	10
Φ6	68	73	68	73	77	83	-	-	4	10
Φ8	97	102	97	102	120	126	120	126	5	10

## Theoretical thrust table

Unit: N

Bore size (mm)	Working pressure MPa					
	0.2	0.3	0.4	0.5	0.6	0.7
Φ4.5	2.6	3.8	5.1	6.4	7.7	9.0
Φ6	4.2	6.4	8.5	10.6	12.7	14.8
Φ8	8.6	13.0	17.3	21.6	25.9	30.2

## How to order

● Without switch

**LCM-P - 6 - 10 - R** ————— **J2**

● With switch

**LCM-P - 6 - 10 - R - F2H - R - J2**

**A** Bore size

**B** Stroke length

**C** Piping direction

**D** Switch model no.

**E** Switch quantity

**F** Option

Symbol	Descriptions			
<b>A Bore size (mm)</b>				
4.5	Φ4.5			
6	Φ6			
8	Φ8			
<b>B Stroke length (mm)</b>				
		Bore size		
		Φ4.5	Φ6	Φ8
5	5	●	●	●
10	10	●	●	●
15	15	-	●	●
20	20	-	-	●
<b>C Piping direction</b>				
R	Right viewed from rod end			
L	Left viewed from rod end			
<b>D Switch model no.</b>				
Axial lead wire	Radial lead wire	Contact	Indicator	Lead wire
<b>F2H*</b>	<b>F2V*</b>	Proximity	One color indicator type	2-wire
<b>F3H*</b>	<b>F3V*</b>			3-wire
<b>F2YH*</b>	<b>F2YV*</b>		Two color indicator type	2-wire
<b>F3YH*</b>	<b>F3YV*</b>			3-wire
<b>*Lead wire length</b>				
Blank	1m (standard)			
3	3m (option)			
<b>E Switch quantity</b>				
R	One on rod end			
H	One on head end			
D	Two			
<b>F Option</b>				
B	With buffer			
M	Note 1	With magnet		
F1	Note 1, 2	Magnet + switch rail (one switch groove)		
F2	Note 1	Magnet + switch rail (two switch grooves)		
J*	Dowel pin attached (* indicates pin number)			

### ⚠ Note on model no. selection

Note 1: Selection not required when designating the switch type.

Note 2: Selectable if Φ4.5 is selected.

<Example of model number>

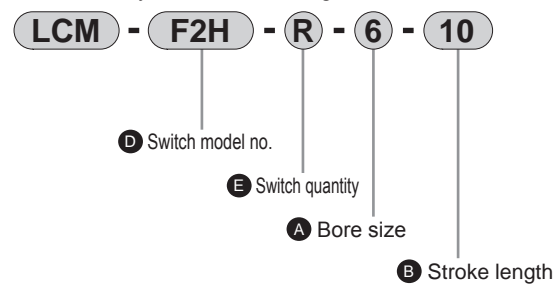
**LCM-P-6-10-R-F2H-R-J2**

Model: Linear side cylinder, double acting stroke adjustable type (extended)

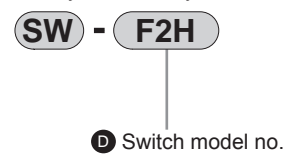
- A** Bore size: Φ6mm
- B** Stroke length: 10 mm
- C** Piping direction: Right viewed from rod end
- D** Switch model no.: Proximity switch F2H, lead wire 1m
- E** Switch quantity: One on rod end
- F** Option: Dowel pin attached (two pcs.)

### How to order switch

- Switch body + switch rail + magnet

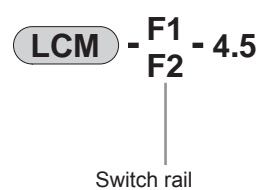


- Only switch body

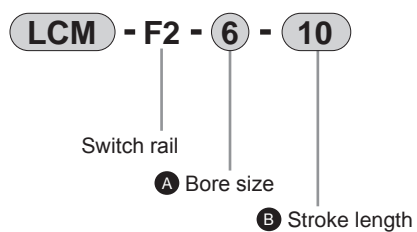


- Only switch rail

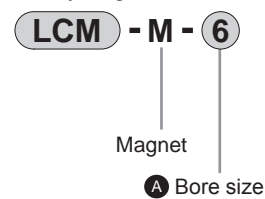
- $\Phi 4.5$



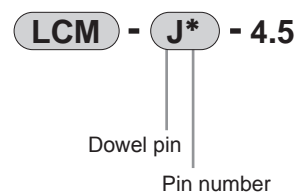
- $\Phi 6, \Phi 8$



- Only magnet

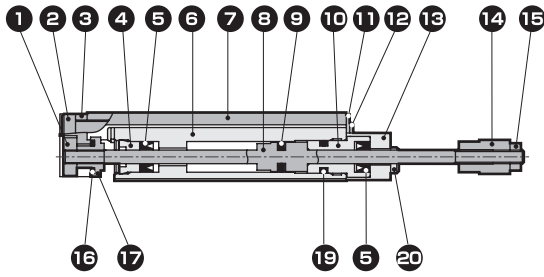


### How to order discrete dowel pin

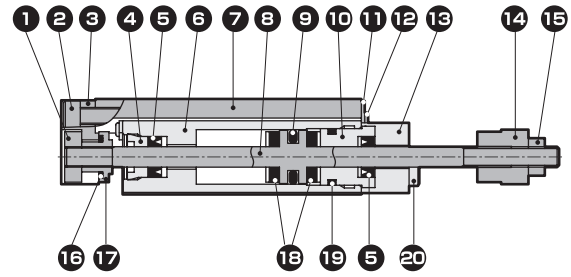


## Internal structure and parts list

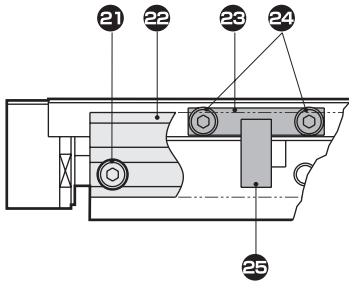
### ● LCM-P-4.5



### ● LCM-P-6.8



### ● LCM-P-4.5 to 8 with magnet and switch rail



### • Dowel pin (-J)

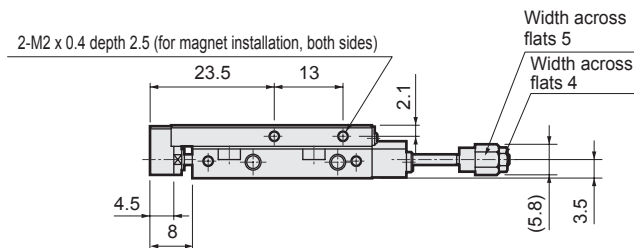
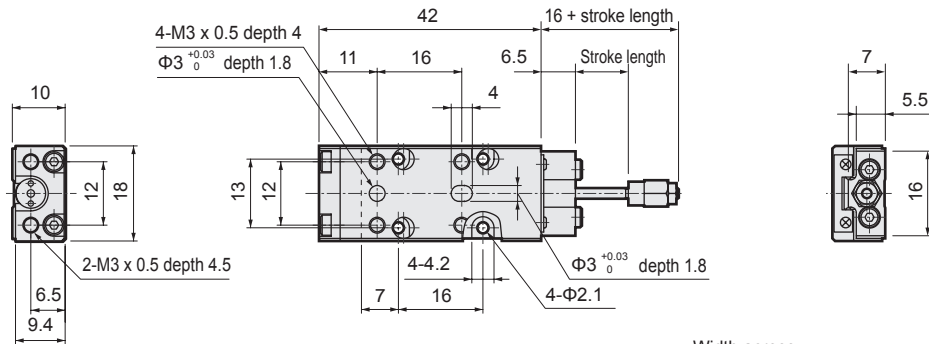


## Parts list

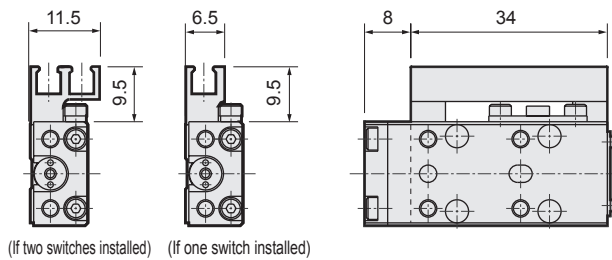
No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Floating bush A	Stainless steel		14	Adjustable stopper	Steel	Nickel plating
2	Bolt	Stainless steel		15	Hexagon nut	Φ4.5 Stainless steel	
3	End plate	Aluminum alloy				Φ6, Φ8 Steel	Nickel plating
4	Rod cover	Acetar resin		16	O ring	Nitrile rubber	
5	Rod packing seal	Nitrile rubber		17	Floating bush B	Stainless steel	
6	Cylinder body	Stainless steel		18	Cushion rubber	Urethane rubber (Φ6, Φ8)	
7	Slide table	Stainless steel		19	O ring	Nitrile rubber	
8	Piston	Stainless steel		20	Hexagon socket head cap screw	Stainless steel	
9	Piston packing seal	Nitrile rubber		21	Hexagon socket head cap screw	Stainless steel	
10	Guard	Aluminum alloy		22	Switch rail	Aluminum alloy	
11	Stop plate	Stainless steel		23	Plate	Aluminum alloy	
12	Machine screw	Stainless steel		24	Hexagon socket head cap screw	Stainless steel	
13	Stopper A	Steel	Nickel plating	25	Magnet	Plastic	
				26	Dowel pin	Steel	

Dimensions (Dimensions other than listed below are the same as double acting single rod type. Refer to Page 7.)

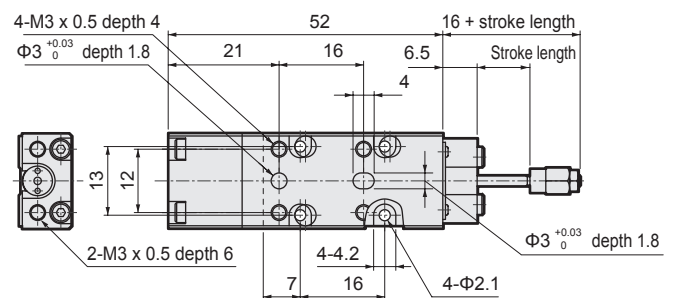
● LCM-P-4.5



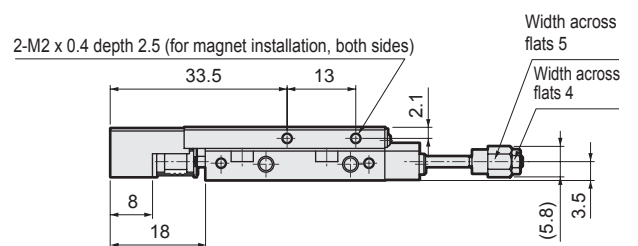
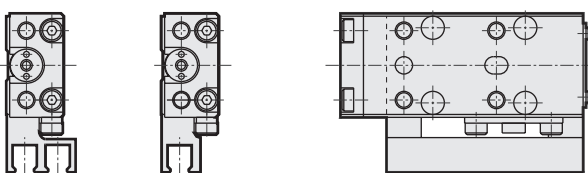
• With magnet and cylinder switch (piping direction: -R)



• With buffer (-B)



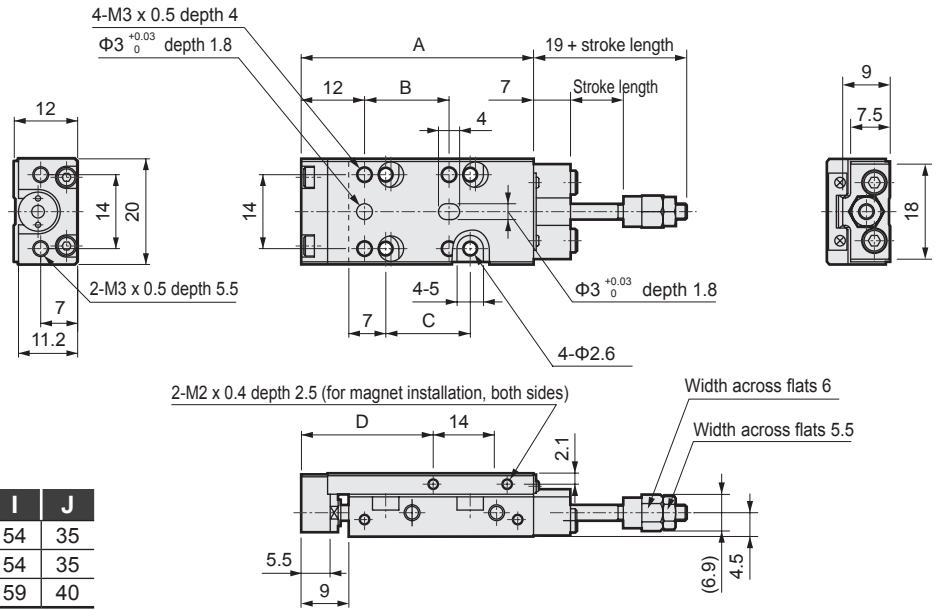
• With magnet and cylinder switch (piping direction: -L)



Note: Refer to Page 46 for switch installation position dimensions.

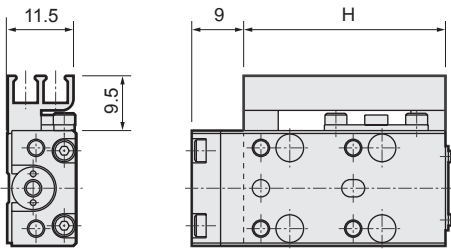
Dimensions (Dimensions other than listed below are the same as double acting single rod type. Refer to Page 7.)

● LCM-P-6

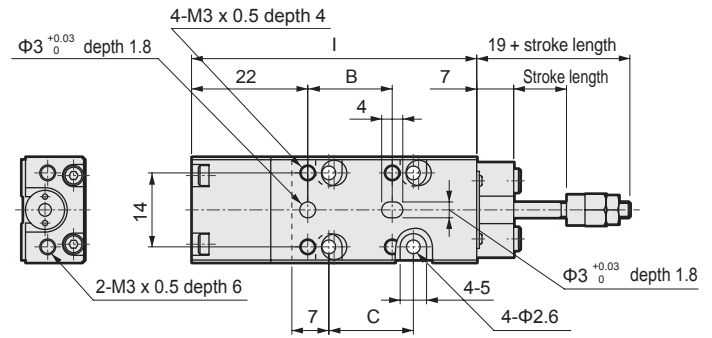


Stroke length	A	B	C	D	H	I	J
5	44	16	16	25	35	54	35
10	44	16	16	25	35	54	35
15	49	21	21	30	40	59	40

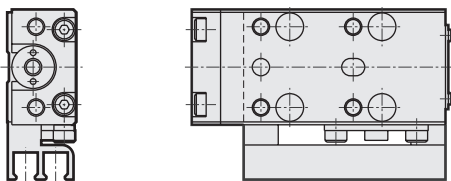
• With magnet and cylinder switch (piping direction: -R)



• With buffer (-B)



• With magnet and cylinder switch (piping direction: -L)

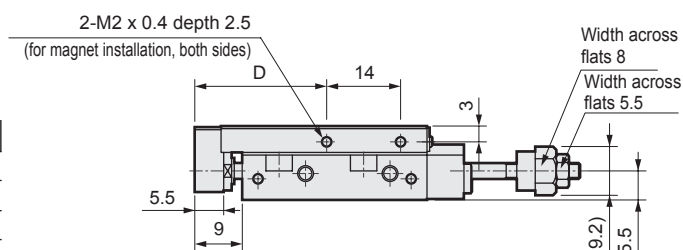
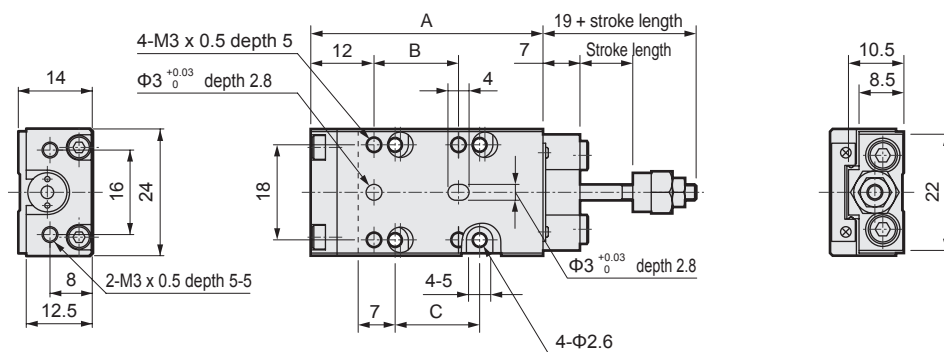


Note: Refer to Page 46 for switch installation position dimensions.



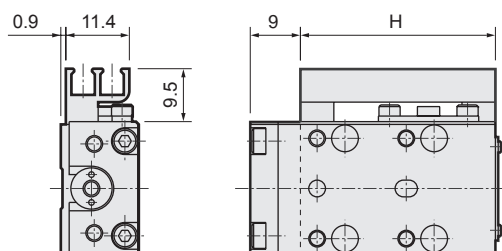
Dimensions (Dimensions other than listed below are the same as double acting single rod type. Refer to Page 7.)

● LCM-P-8

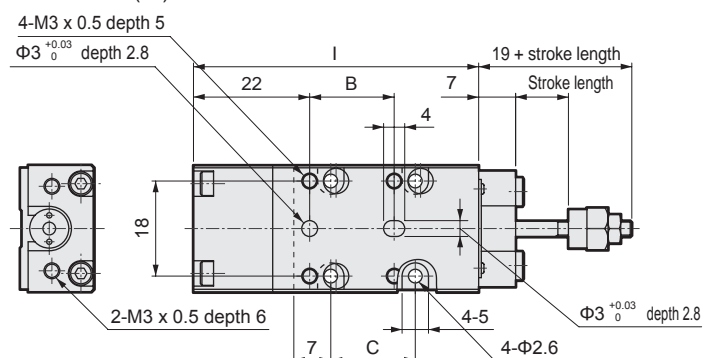


Stroke length	A	B	C	D	H	I	J
5	44	16	16	25	35	54	35
10	44	16	16	25	35	54	35
15	54	26	26	35	45	64	45
20	54	26	26	35	45	64	45

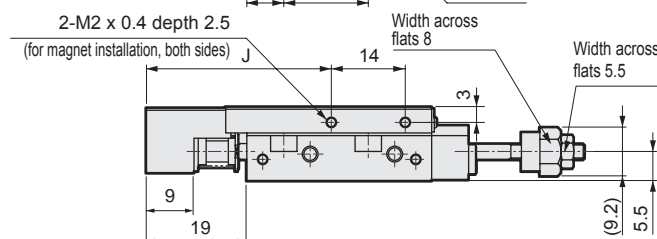
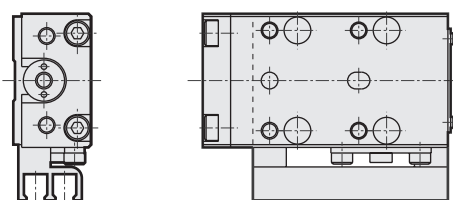
• With magnet and cylinder switch (piping direction: -R)



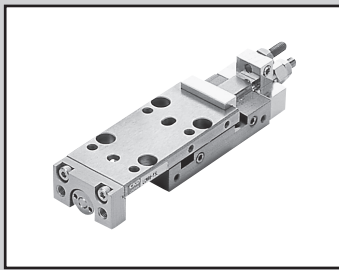
• With buffer (-B)



• With magnet and cylinder switch (piping direction: -L)



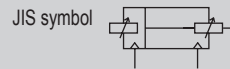
Note: Refer to Page 46 for switch installation position dimensions.



Linear slide cylinder, double acting stroke adjustable type (extended/retracted)

# LCM-R Series

● Bore size:  $\Phi 4.5$ ,  $\Phi 6$ ,  $\Phi 8$



## Specifications

Descriptions		LCM-R		
Bore size	mm	$\Phi 4.5$	$\Phi 6$	$\Phi 8$
Actuation		Double acting		
Working fluid		Compressed air		
Max. working pressure	MPa	0.7		
Min. working pressure	MPa	0.25	0.2	0.15
Withstanding pressure	MPa	1.05		
Ambient temperature	$^{\circ}\text{C}$	0 to 60		
Port size		M3		
Stroke tolerance	mm	+1.0 0		
Working piston speed	mm/s	30 to 500		
Cushion	Extended	None		
	Retracted	None		
Lubrication		Not required (when lubricating, use turbine oil Class 1 ISOVG 32.)		
Adjustable stroke range	Extended	mm	-5 to 0	
	Retracted	mm	-7 to 0	
Repeatability	mm	$\pm 0.02$		
Allowable energy absorption	J	Refer to table on Page 4 in the Introduction.		

## With buffer specifications

Descriptions		LCM-**-**-B	
Buffer stroke length	mm	4 (Max.)	
Buffer section spring load	Set	N	0.3
	Operation	N	0.7

## Stroke length

Bore size (mm)	Standard stroke length (mm)	Min. stroke length of types with switch (mm)
$\Phi 4.5$	5, 10	5
$\Phi 6$	5, 10, 15	
$\Phi 8$	5, 10, 15, 20	

Note 1: Other than standard stroke length is not available.

### Switch specifications

Descriptions	Proximity 2-wire		Proximity 3-wire	
	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Programmable controller		Programmable controller and relay	
Output type	-		NPN output	
Power voltage	-		10 to 28 VDC	
Load voltage	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 20mA (Note 1)		100mA or less	50mA or less
Light	LED (ON lighting)	Red/Green LED (ON lighting)	LED (ON lighting)	Red/Green LED (ON lighting)
Leakage current	1mA or less		10µA or less	

Note 1: The maximum load current 20mA is applied at 25°C. The current will be lower than 20mA if ambient temperature around switch is higher than 25°C. (5 to 10mA at 60°C.)

### Cylinder weight

Unit: g

Stroke length (mm)	5		10		15		20		Additional weight	
	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With buffer	Weight per switch
Φ4.5	52	56	52	56	-	-	-	-	3	10
Φ6	71	76	71	76	80	86	-	-	4	10
Φ8	100	105	100	105	123	129	123	129	5	10

### Theoretical thrust table

Unit: N

Bore size (mm)	Working pressure MPa					
	0.2	0.3	0.4	0.5	0.6	0.7
Φ4.5	2.6	3.8	5.1	6.4	7.7	9.0
Φ6	4.2	6.4	8.5	10.6	12.7	14.8
Φ8	8.6	13.0	17.3	21.6	25.9	30.2

## How to order

● Without switch

**LCM-R - 6 - 10 - R - J2**

● With switch

**LCM-R - 6 - 10 - R - F2H - R - J2**

**A** Bore size

**B** Stroke length

**C** Piping direction

**D** Switch model no.

**E** Switch quantity

**F** Option

Symbol	Descriptions			
<b>A Bore size (mm)</b>				
4.5	Φ4.5			
6	Φ6			
8	Φ8			
<b>B Stroke length (mm)</b>				
		Bore size		
		Φ4.5	Φ6	Φ8
5	5	●	●	●
10	10	●	●	●
15	15	-	●	●
20	20	-	-	●
<b>C Piping direction</b>				
R	Right viewed from rod end			
L	Left viewed from rod end			
<b>D Switch model no.</b>				
Axial lead wire	Radial lead wire	Contact	Indicator	Lead wire
<b>F2H*</b>	<b>F2V*</b>	Proximity	One color indicator type	2-wire
<b>F3H*</b>	<b>F3V*</b>			3-wire
<b>F2YH*</b>	<b>F2YV*</b>		Two color indicator type	2-wire
<b>F3YH*</b>	<b>F3YV*</b>			3-wire
<b>*Lead wire length</b>				
Blank	1m (standard)			
3	3m (option)			
<b>E Switch quantity</b>				
R	One on rod end			
H	One on head end			
D	Two			
<b>F Option</b>				
B	With buffer			
M	Note 1	With magnet		
F1	Note 1, 2	Magnet + switch rail (one switch groove)		
F2	Note 1	Magnet + switch rail (two switch grooves)		
J*	Dowel pin attached (* indicates pin number)			

### ⚠ Note on model no. selection

Note 1: Selection not required when designating the switch type.

Note 2: Selectable if Φ4.5 is selected.

<Example of model number>

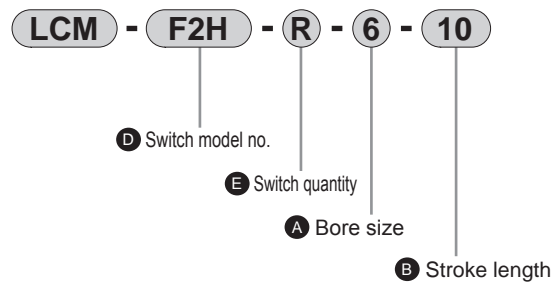
**LCM-R-6-10-R-F2H-R-J2**

Model: Linear slide cylinder, double acting stroke adjustable type (extended/retracted)

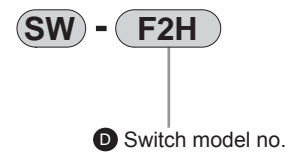
- A** Bore size: Φ6mm
- B** Stroke length: 10 mm
- C** Piping direction: Right viewed from rod end
- D** Switch model no.: Proximity switch F2H, lead wire 1m
- E** Switch quantity: One on rod end
- F** Option: Dowel pin attached (two pcs.)

### How to order switch

- Switch body + switch rail + magnet

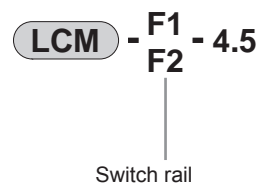


- Only switch body

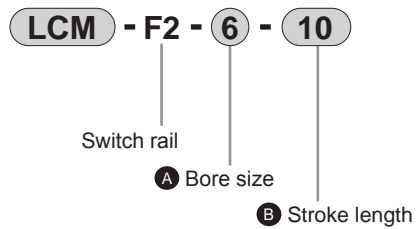


- Only switch rail

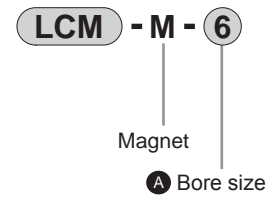
- $\Phi 4.5$



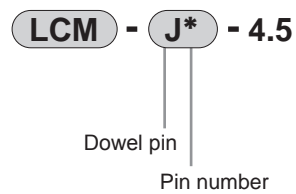
- $\Phi 6, \Phi 8$



- Only magnet

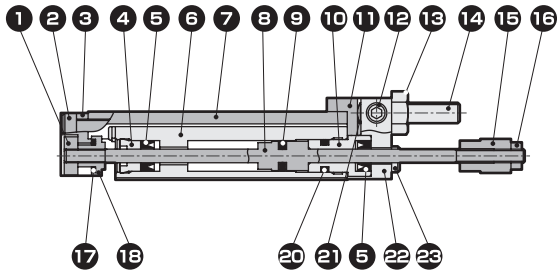


### How to order discrete dowel pin

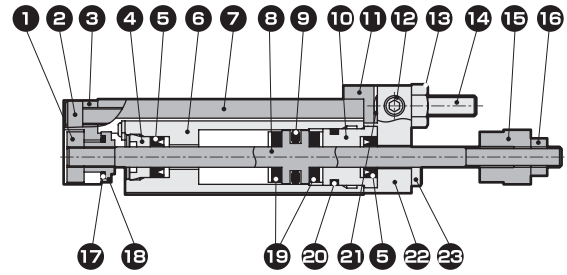


## Internal structure and parts list

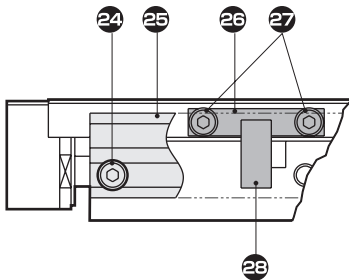
### ● LCM-R-4.5



### ● LCM-R-6.8



### ● LCM-R-4.5 to 8 with magnet and switch rail



### • Dowel pin (-J)



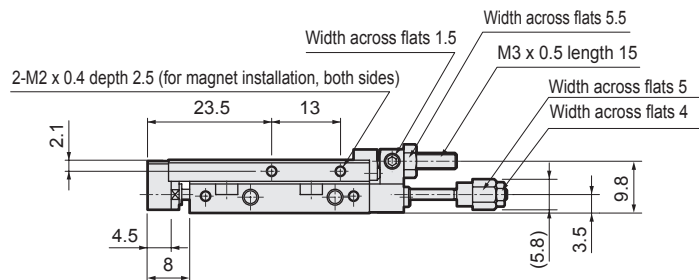
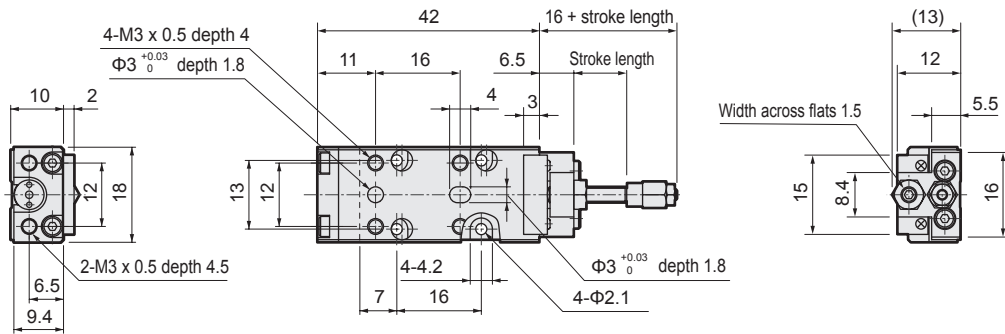
## Parts list

No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Floating bush A	Stainless steel		16	Hexagon nut	Φ4.5 Stainless steel	
2	Bolt	Stainless steel				Φ6, Φ8 Steel	Nickel plating
3	End plate	Aluminum alloy		17	O ring	Nitrile rubber	
4	Rod cover	Acetar resin		18	Floating bush B	Stainless steel	
5	Rod packing seal	Nitrile rubber		19	Cushion rubber	Urethane rubber (Φ6, Φ8)	
6	Cylinder body	Stainless steel		20	O ring	Nitrile rubber	
7	Slide table	Stainless steel		21	Machine screw	Stainless steel	
8	Piston	Stainless steel		22	Stopper A	Steel	Nickel plating
9	Piston packing seal	Nitrile rubber		23	Hexagon socket head cap screw	Stainless steel	
10	Guard	Aluminum alloy		24	Hexagon socket head cap screw	Stainless steel	
11	Stopper B	Steel	Nickel plating	25	Switch rail	Aluminum alloy	
12	Machine screw	Stainless steel		26	Plate	Aluminum alloy	
13	Hexagon nut	Stainless steel		27	Hexagon socket head cap screw	Stainless steel	
14	Stopper bolt	Stainless steel		28	Magnet	Plastic	
15	Adjustable stopper	Steel	Nickel plating	29	Dowel pin	Steel	

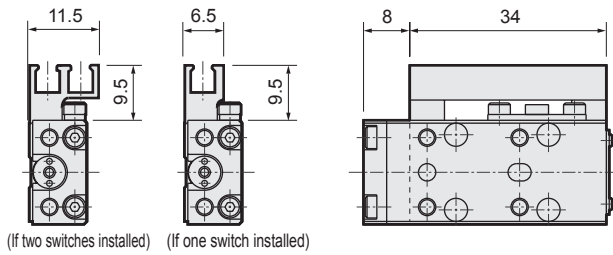


Dimensions (Dimensions other than listed below are the same as double acting single rod type. Refer to Page 7.)

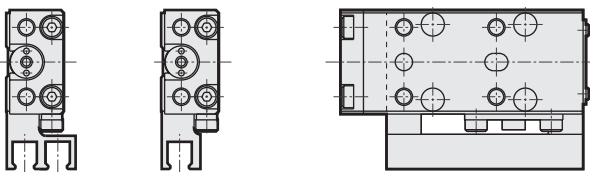
● LCM-R-4.5



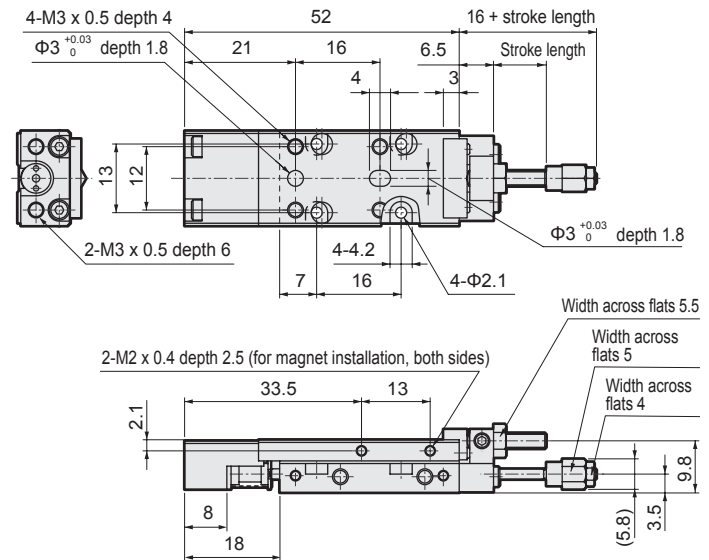
• With magnet and cylinder switch (piping direction: -R)



• With magnet and cylinder switch (piping direction: -L)



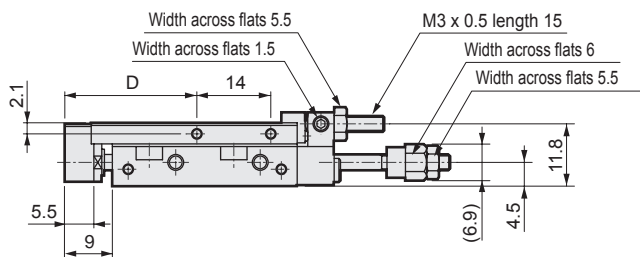
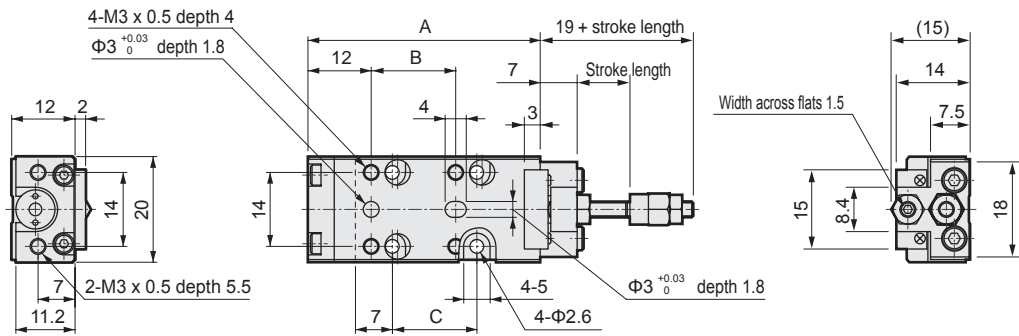
• With buffer (-B)



Note: Refer to Page 46 for switch installation position dimensions.

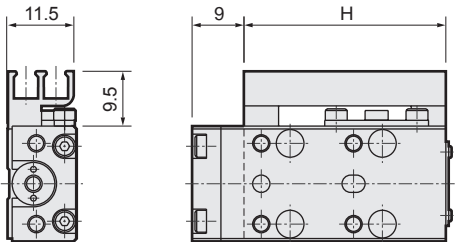
Dimensions (Dimensions other than listed below are the same as double acting single rod type. Refer to Page 7.)

● LCM-R-6

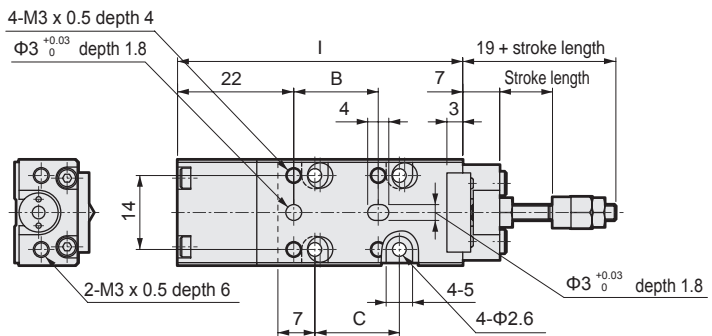


Stroke length	A	B	C	D	H	I	J
5	44	16	16	25	35	54	35
10	44	16	16	25	35	54	35
15	49	21	21	30	40	59	40

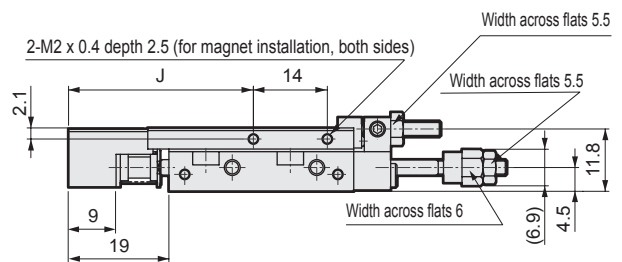
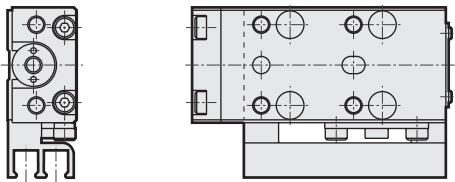
• With magnet and cylinder switch (piping direction: -R)



• With buffer (-B)



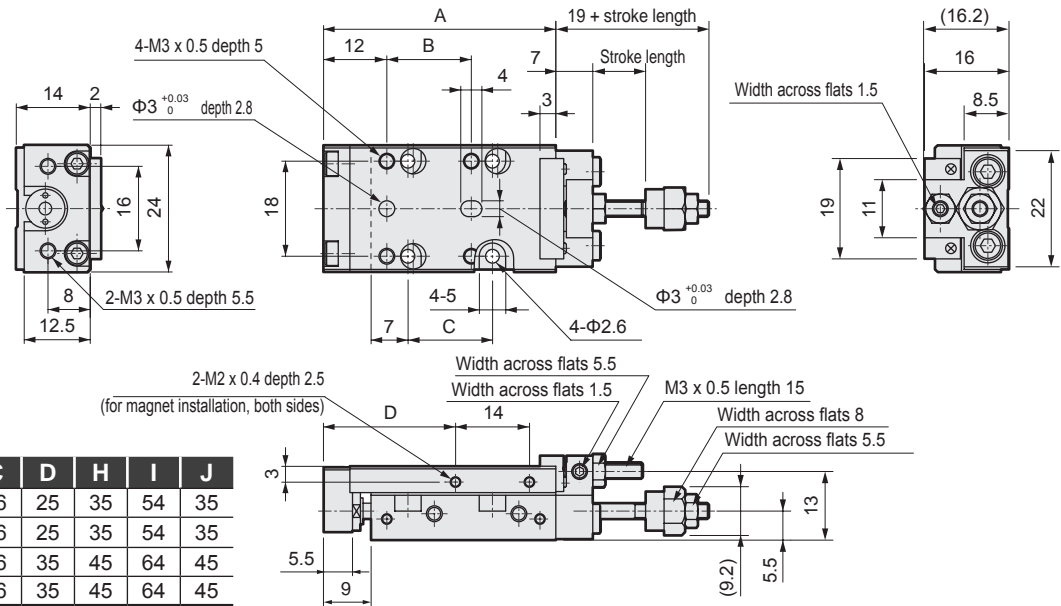
• With magnet and cylinder switch (piping direction: -L)



Note: Refer to Page 46 for switch installation position dimensions.

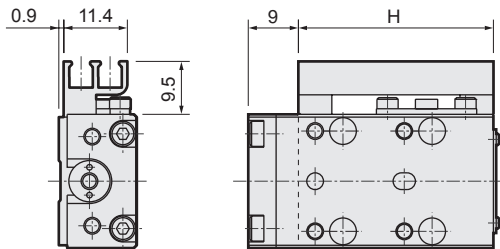
Dimensions (Dimensions other than listed below are the same as double acting single rod type. Refer to Page 7.)

● LCM-R-8

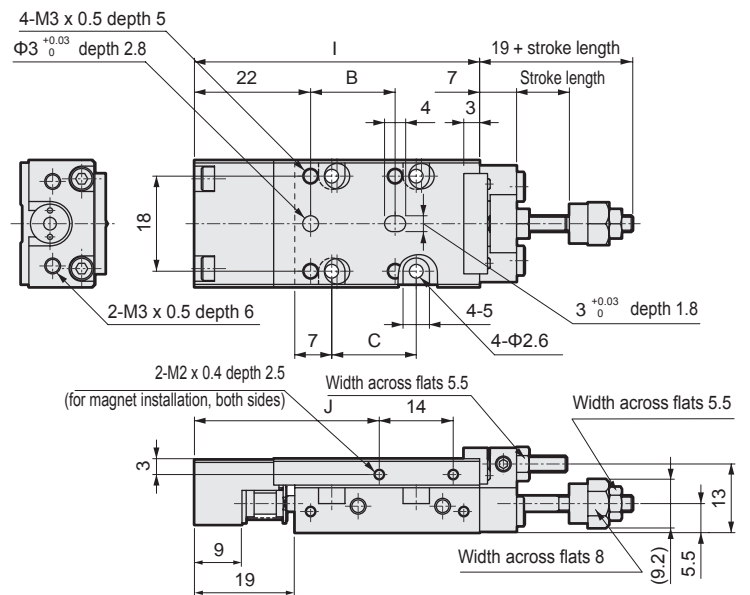


Stroke length	A	B	C	D	H	I	J
5	44	16	16	25	35	54	35
10	44	16	16	25	35	54	35
15	54	26	26	35	45	64	45
20	54	26	26	35	45	64	45

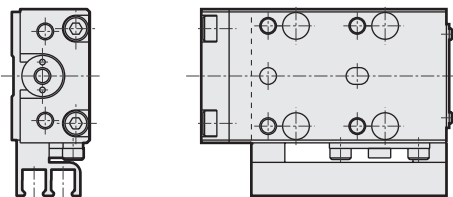
• With magnet and cylinder switch (piping direction: -R)



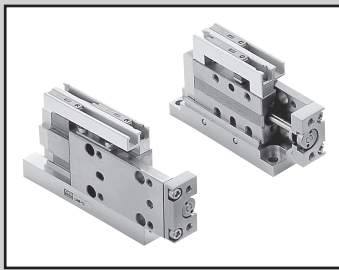
• With buffer (-B)



• With magnet and cylinder switch (piping direction: -L)



Note: Refer to Page 46 for switch installation position dimensions.



Linear slide cylinder, double acting side installation type

# LCM-A Series

● Bore size:  $\Phi 4.5$ ,  $\Phi 6$ ,  $\Phi 8$



## Specifications

Descriptions		LCM-A		
Bore size	mm	$\Phi 4.5$	$\Phi 6$	$\Phi 8$
Actuation		Double acting		
Working fluid		Compressed air		
Max. working pressure	MPa	0.7		
Min. working pressure	MPa	0.2		0.15
Withstanding pressure	MPa	1.05		
Ambient temperature	$^{\circ}\text{C}$	0 to 60		
Port size		M3		
Stroke tolerance	mm	+1.0 0		
Working piston speed	mm/s	30 to 500		
Cushion		None	Rubber cushioned	
Lubrication		Not required (when lubricating, use turbine oil Class 1 ISOVG 32.)		
Allowable energy absorption	J	Refer to table on Page 4 in the Introduction.		

## With buffer specifications

Descriptions		LCM-*-*-B	
Buffer stroke length	mm	4 (Max.)	
Buffer section spring load	Set	N	0.3
	Operation	N	0.7

## Stroke length

Bore size (mm)	Standard stroke length (mm)	Min. stroke length of types with switch (mm)
$\Phi 4.5$	5, 10	5
$\Phi 6$	5, 10, 15	
$\Phi 8$	5, 10, 15, 20	

Note 1: Other than standard stroke length is not available.

### Switch specifications

Descriptions	Proximity 2-wire		Proximity 3-wire	
	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Programmable controller		Programmable controller and relay	
Output type	-		NPN output	
Power voltage	-		10 to 28 VDC	
Load voltage	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 20mA (Note 1)		100mA or less	50mA or less
Light	LED (ON lighting)	Red/Green LED (ON lighting)	LED (ON lighting)	Red/Green LED (ON lighting)
Leakage current	1mA or less		10µA or less	

Note 1: The maximum load current 20mA is applied at 25°C. The current will be lower than 20mA if ambient temperature around switch is higher than 25°C. (5 to 10mA at 60°C.)

### Cylinder weight

Unit: g

Stroke length (mm)	5		10		15		20		Additional weight	
	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With buffer	Weight per switch
Φ4.5	59	63	59	63	-	-	-	-	3	10
Φ6	78	83	78	83	88	94	-	-	4	10
Φ8	106	111	106	111	132	138	132	138	5	10

### Theoretical thrust table

Unit: N

Bore size (mm)	Operation direction	Working pressure MPa					
		0.2	0.3	0.4	0.5	0.6	0.7
Φ4.5	Push	3.2	4.8	6.4	8.0	9.5	11.1
	Pull	2.6	3.8	5.1	6.4	7.7	9.0
Φ6	Push	5.6	8.5	11.3	14.1	16.9	19.7
	Pull	4.2	6.4	8.5	10.6	12.7	14.8
Φ8	Push	10.1	15.1	20.1	25.2	30.2	35.2
	Pull	8.6	13.0	17.3	21.6	25.9	30.2

## How to order

● Without switch

LCM-A - 6 - 10 - R ————— J2

● With switch

LCM-A - 6 - 10 - R - F2H - R - J2

Ⓐ Bore size

Ⓑ Stroke length

Ⓒ Table direction

Ⓓ Switch model no.

Ⓔ Switch quantity

Ⓕ Option

Symbol	Descriptions			
<b>Ⓐ Bore size (mm)</b>				
4.5	Φ4.5			
6	Φ6			
8	Φ8			
<b>Ⓑ Stroke length (mm)</b>				
		Bore size		
		Φ4.5	Φ6	Φ8
5	5	●	●	●
10	10	●	●	●
15	15	-	●	●
20	20	-	-	●
<b>Ⓒ Table direction</b>				
R	Right viewed from rod end			
L	Left viewed from rod end			
<b>Ⓓ Switch model no.</b>				
Axial lead wire	Radial lead wire	Contact	Indicator	Lead wire
F2H*	F2V*	Proximity	One color indicator type	2-wire
F3H*	F3V*			3-wire
F2YH*	F2YV*		Two color indicator type	2-wire
F3YH*	F3YV*			3-wire
<b>*Lead wire length</b>				
Blank	1m (standard)			
3	3m (option)			
<b>Ⓔ Switch quantity</b>				
R	One on rod end			
H	One on head end			
D	Two			
<b>Ⓕ Option</b>				
B	With buffer			
M	Note 1	With magnet		
F1	Note 1, 2	With magnet + switch rail (one switch groove)		
F2	Note 1	With magnet + switch rail (two switch grooves)		
J*	Dowel pin attached (* indicates pin number)			

### ⚠ Note on model no. selection

Note 1: Selection not required when designating the switch type.

Note 2: Selectable if Φ4.5 is selected.

<Example of model number>

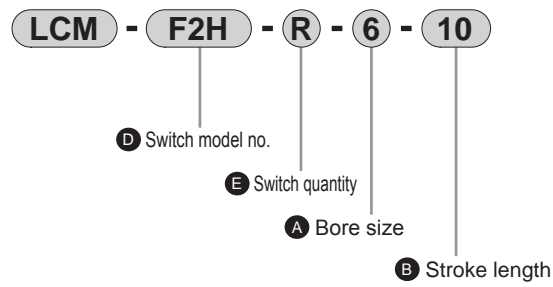
**LCM-A-6-10-R-F2H-R-J2**

Model: Linear slide cylinder, double acting side installation type

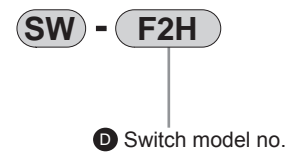
- Ⓐ Bore size: Φ6mm
- Ⓑ Stroke length: 10 mm
- Ⓒ Piping direction: Right viewed from rod end
- Ⓓ Switch model no.: Proximity switch F2H, lead wire 1m
- Ⓔ Switch quantity: One on rod end
- Ⓕ Option: Dowel pin attached (two pcs.)

## How to order switch

- Switch body + switch rail + magnet

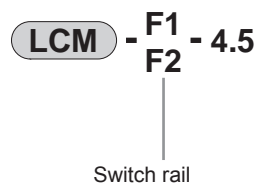


- Only switch body

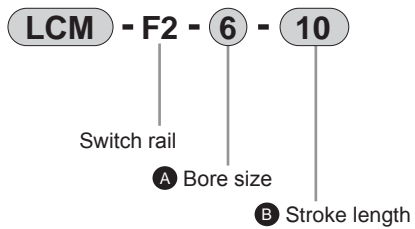


- Only switch rail

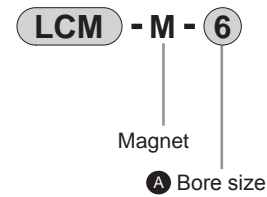
- $\Phi 4.5$



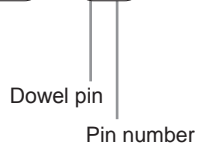
- $\Phi 6, \Phi 8$



- Only magnet

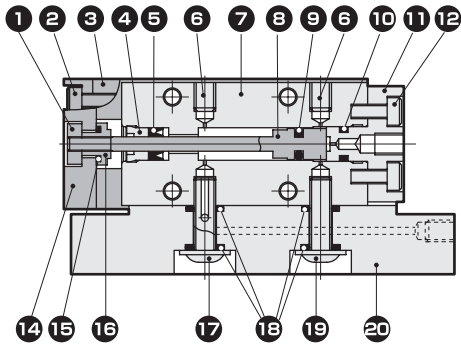


## How to order discrete dowel pin

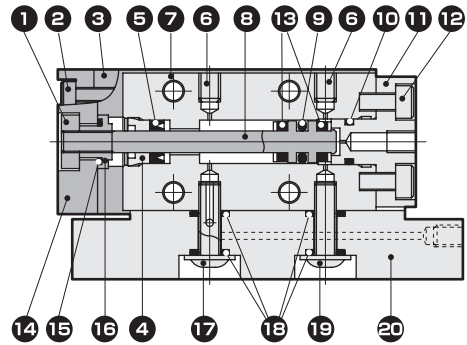


## Internal structure and parts list

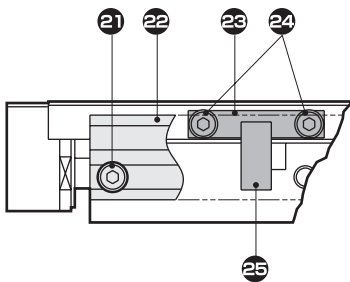
### ● LCM-A-4.5



### ● LCM-A-6.8



### ● LCM-A-4.5 to 8-F with magnet and switch rail



### • Dowel pin (-J)



## Parts list

No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Floating bush A	Stainless steel		14	End plate	Aluminum alloy	
2	Bolt	Stainless steel		15	O ring	Nitrile rubber	
3	Slide table	Stainless steel		16	Floating bush B	Stainless steel	
4	Rod cover	Acetar resin		17	Hexagon socket head cap screw	Stainless steel	
5	Rod packing seal	Nitrile rubber		18	O ring	Nitrile rubber	
6	Machine screw	Stainless steel		19	Hexagon socket head cap screw	Stainless steel	
7	Cylinder body	Stainless steel		20	Base	Aluminum alloy	
8	Piston Note 1	Stainless steel		21	Hexagon socket head cap screw	Stainless steel	
9	Piston packing seal	Nitrile rubber		22	Switch rail	Aluminum alloy	
10	O ring	Nitrile rubber		23	Plate	Aluminum alloy	
11	Head cover	Aluminum alloy	Alumite	24	Hexagon socket head cap screw	Stainless steel	
12	Bolt	Stainless steel		25	Magnet	Plastic	
13	Cushion rubber	Urethane rubber (Φ6, Φ8)		26	Dowel pin	Steel	



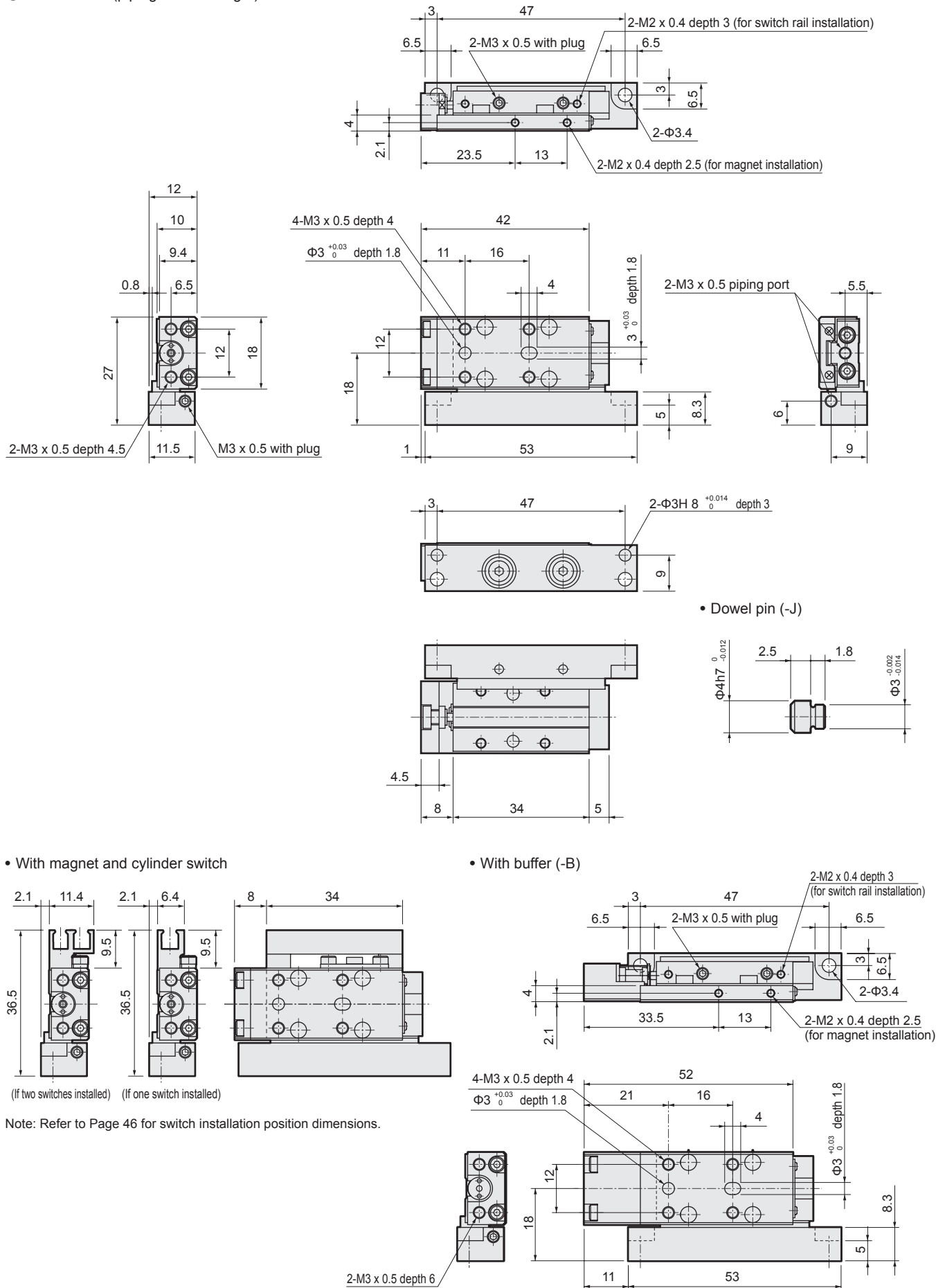
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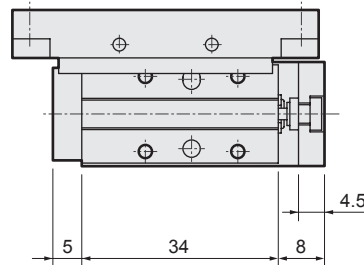
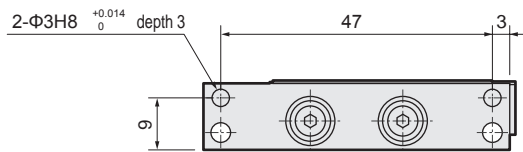
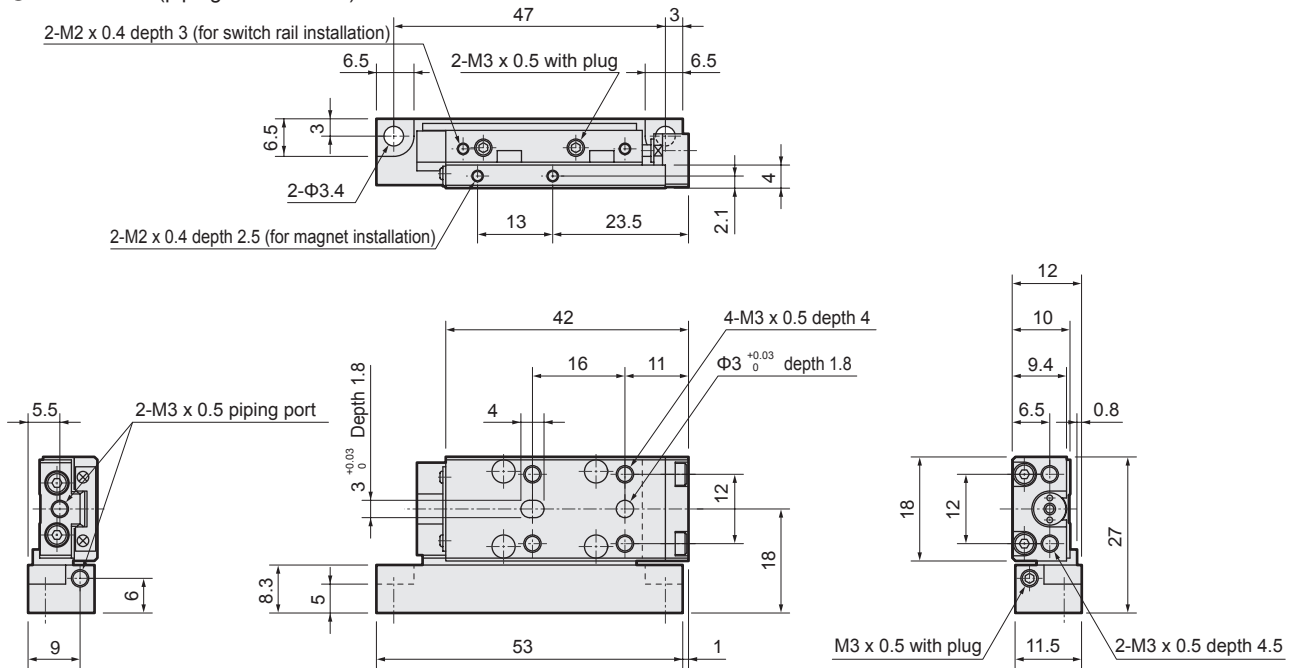
## Dimensions

● LCM-A-4.5-R (piping direction: right)

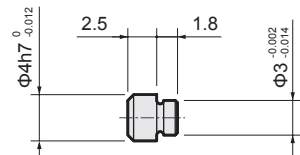


## Dimensions

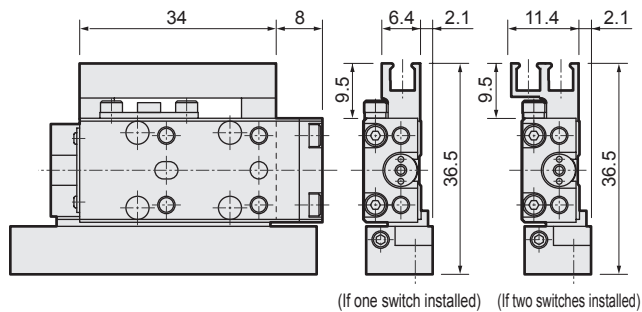
● LCM-A-4.5-L (piping direction: left)



• Dowel pin (-J)

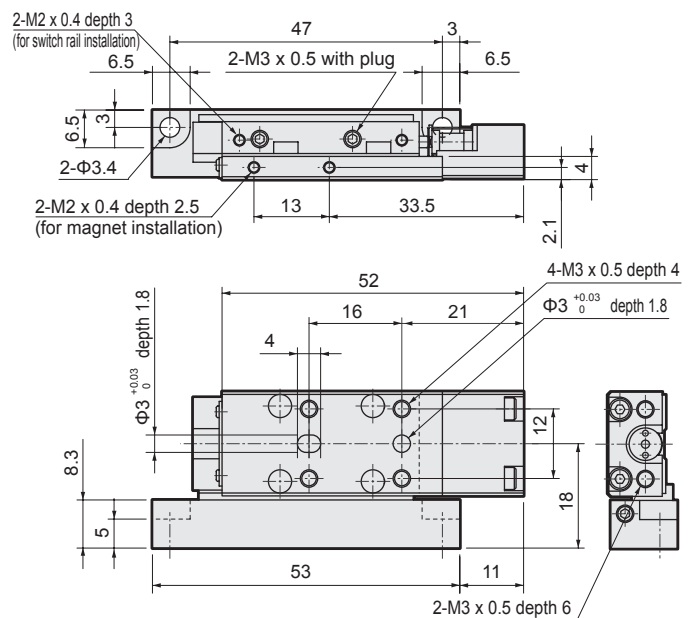


• With magnet and cylinder switch



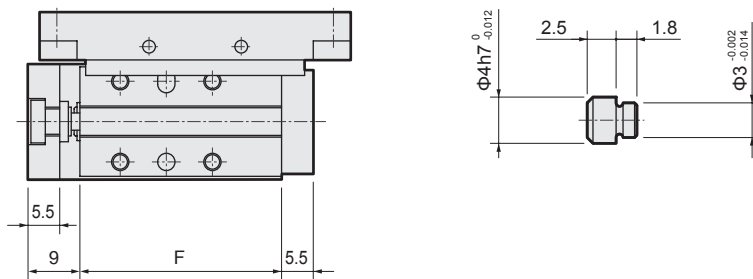
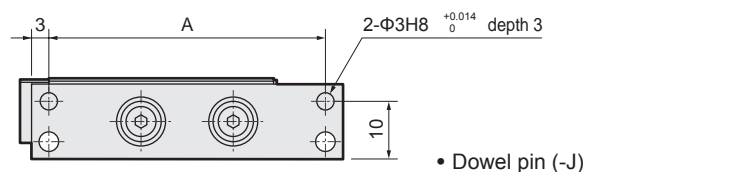
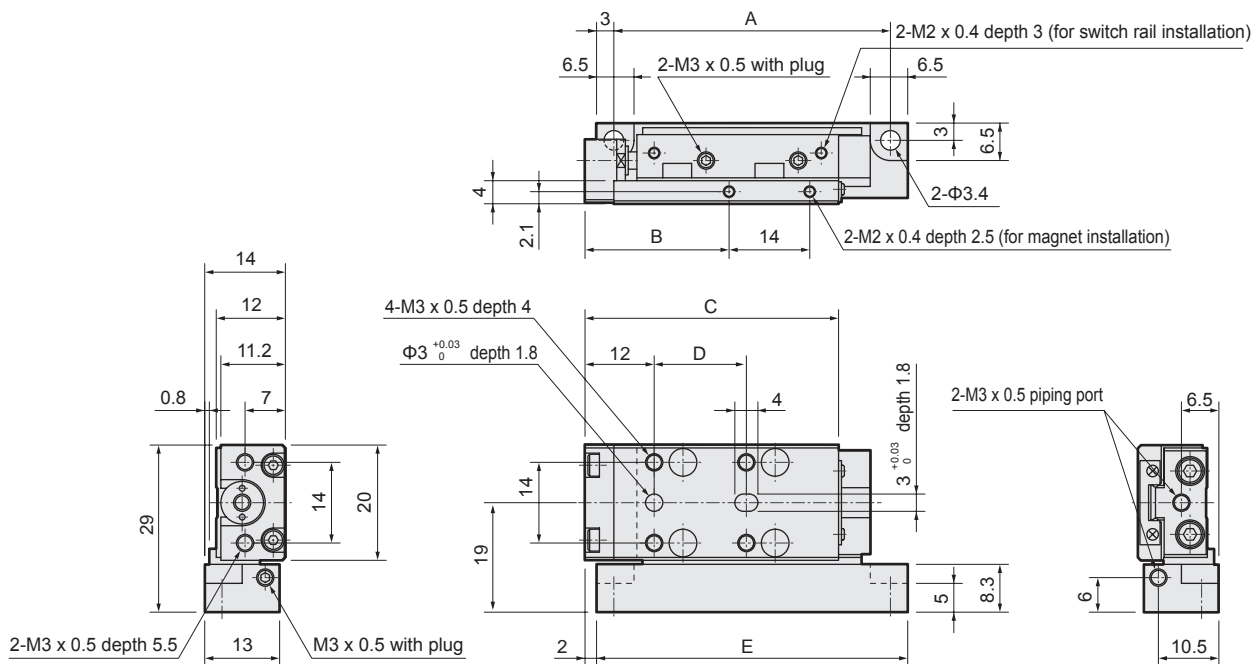
Note: Refer to Page 46 for switch installation position dimensions.

• With buffer (-B)



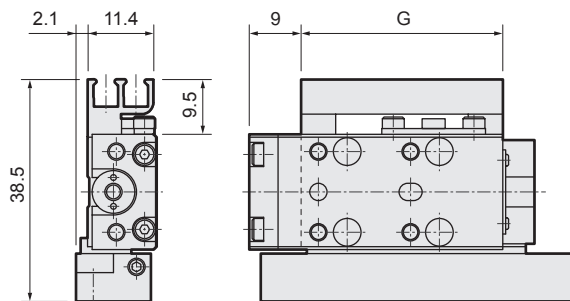
## Dimensions

● LCM-A-6-R (piping direction: right)



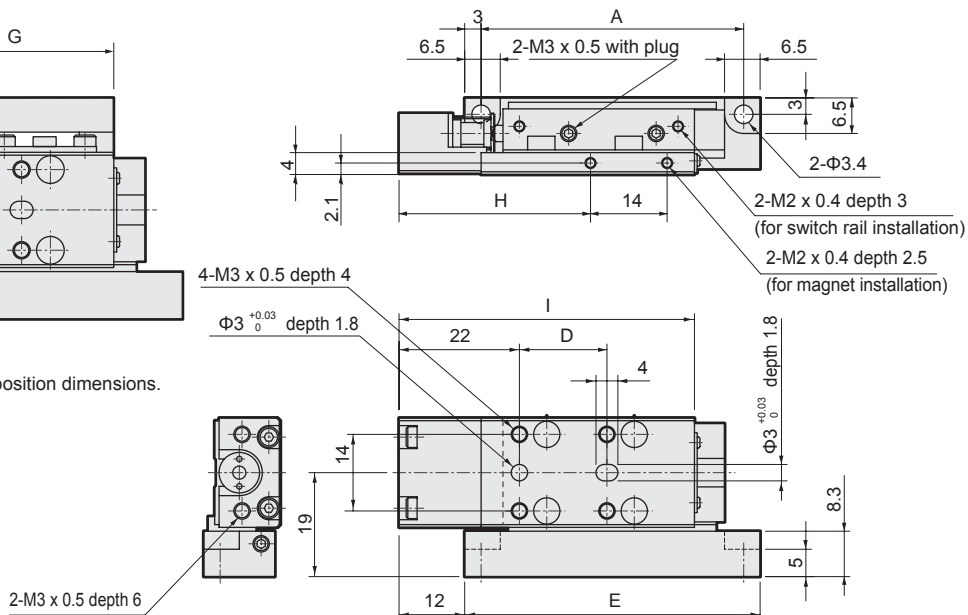
Stroke length	A	B	C	D	E	F	G	H	I
5	48	25	44	16	54	35	35	35	54
10	48	25	44	16	54	35	35	35	54
15	53	30	49	21	59	40	40	40	59

• With magnet and cylinder switch



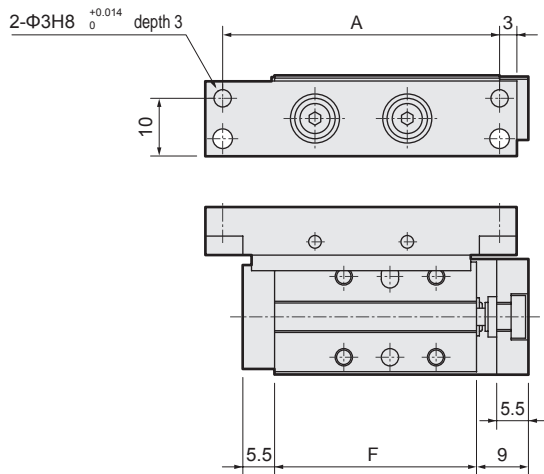
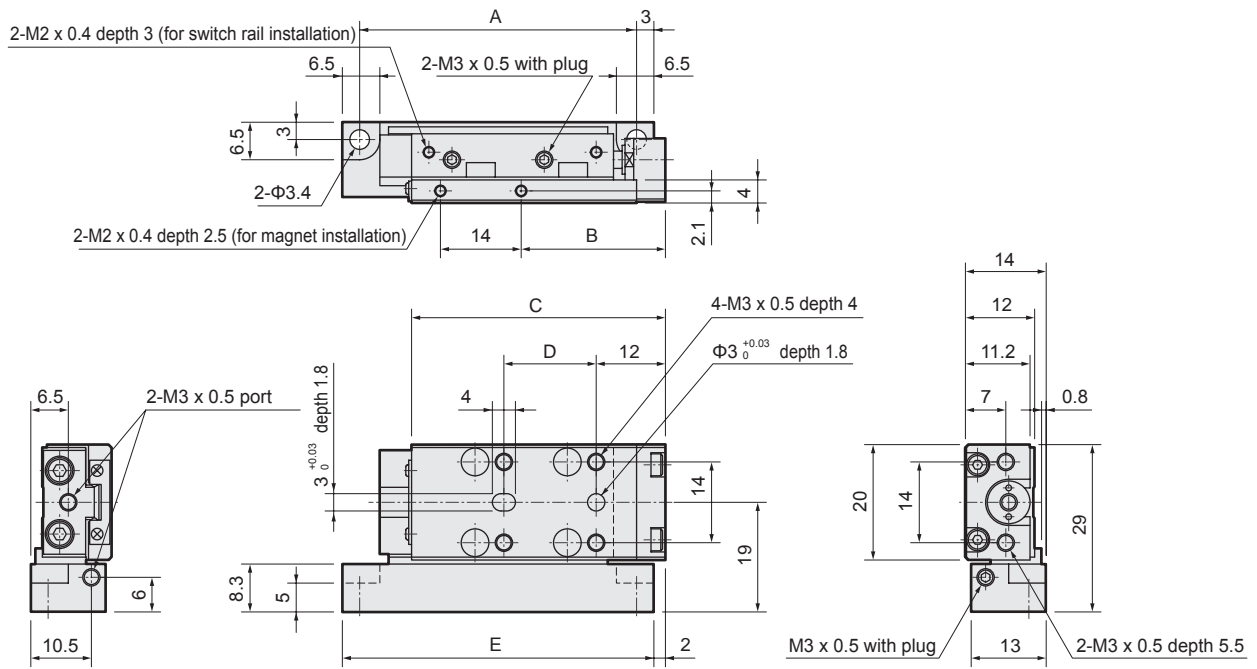
Note: Refer to Page 46 for switch installation position dimensions.

• With buffer (-B)

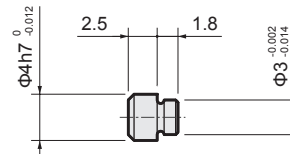


## Dimensions

● LCM-A-6-L (piping direction: left)

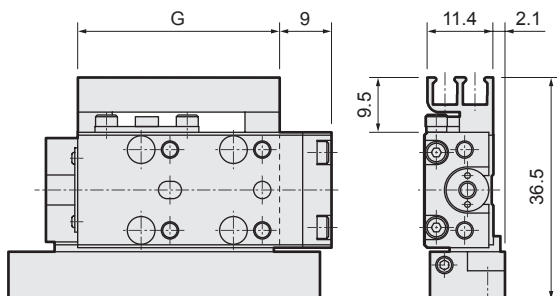


• Dowel pin (-J)

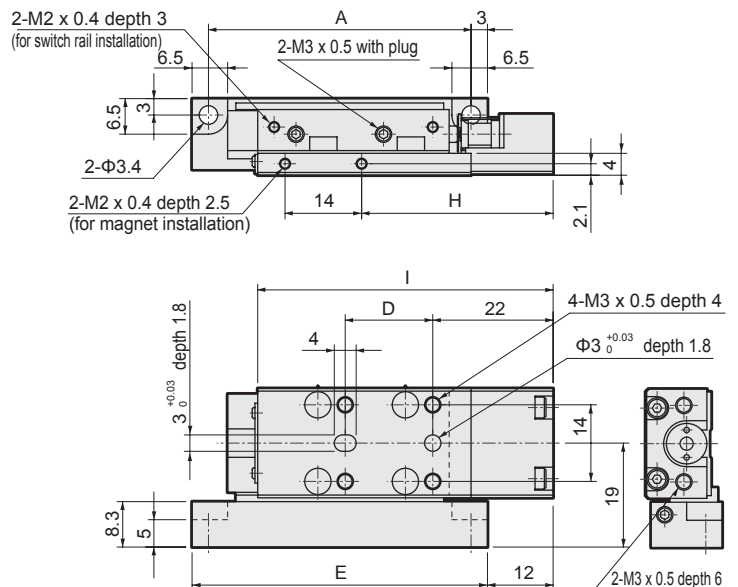


Stroke length	A	B	C	D	E	F	G	H	I
5	48	25	44	16	54	35	35	35	54
10	48	25	44	16	54	35	35	35	54
15	53	30	49	21	59	40	40	40	59

• With magnet and cylinder switch



• With buffer (-B)

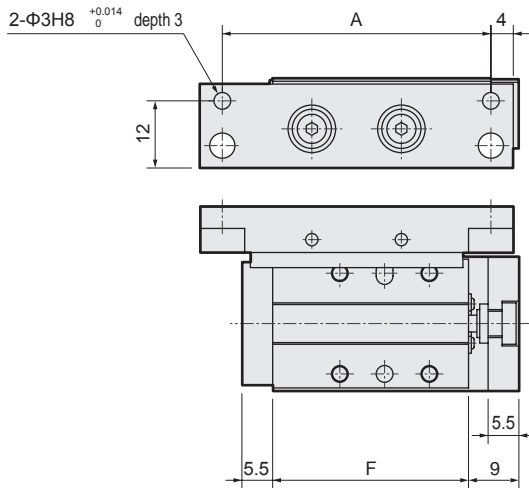
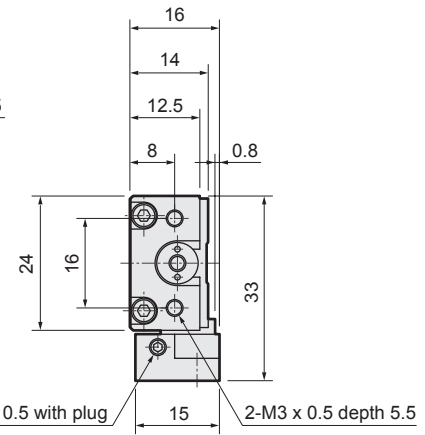
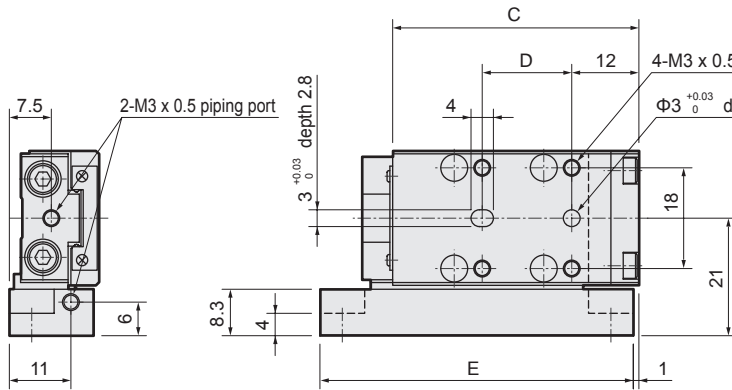
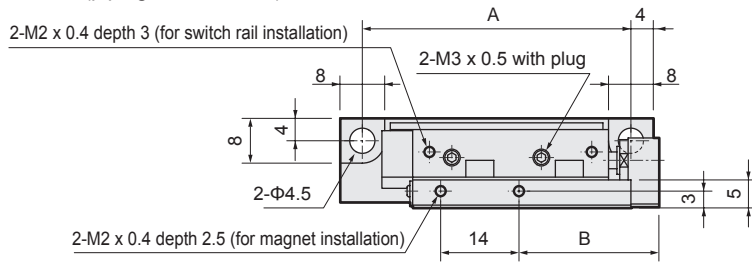


Note: Refer to Page 46 for switch installation position dimensions.

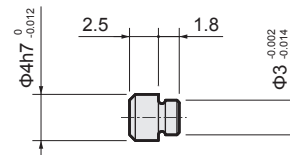


## Dimensions

● LCM-A-8-L (piping direction: left)

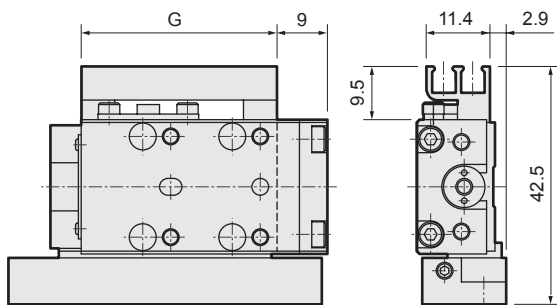


• Dowel pin (-J)



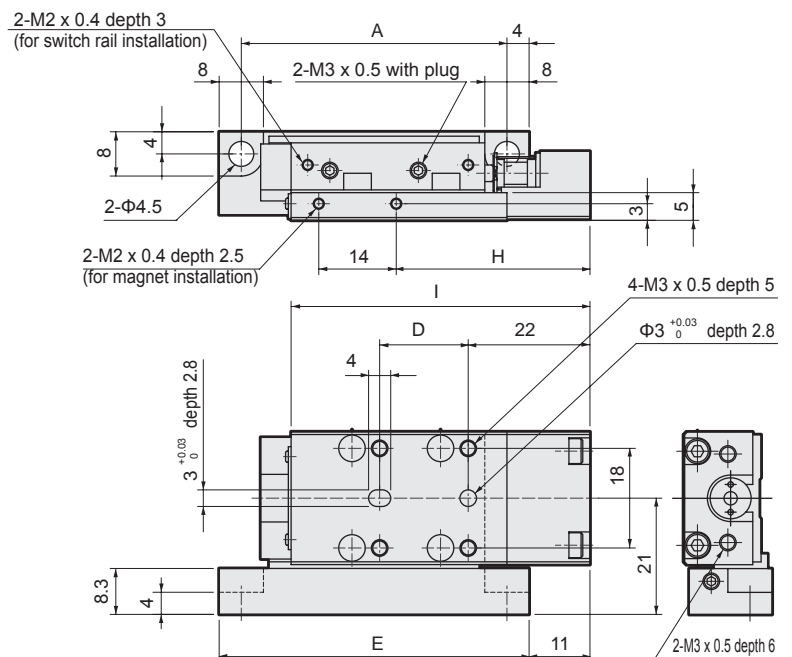
Stroke length	A	B	C	D	E	F	G	H	I
5	48	25	44	16	56	35	35	35	54
10	48	25	44	16	56	35	35	35	54
15	58	35	54	26	66	45	45	45	64
20	58	35	54	26	66	45	45	45	64

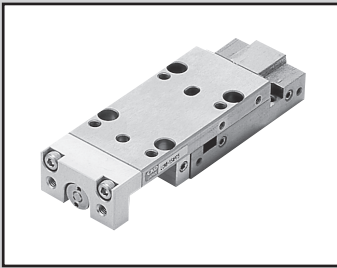
• With magnet and cylinder switch



Note: Refer to Page 46 for switch installation position dimensions.

• With buffer (-B)

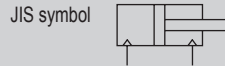




Linear slide cylinder, double acting single rod type clean room specifications

# LCM -P73 Series

● Bore size:  $\Phi 4.5$ ,  $\Phi 6$ ,  $\Phi 8$



## Specifications

Descriptions		LCM -P73		
		$\Phi 4.5$	$\Phi 6$	$\Phi 8$
Bore size	mm	$\Phi 4.5$	$\Phi 6$	$\Phi 8$
Actuation		Double acting		
Working fluid		Compressed air		
Max. working pressure	MPa	0.7		
Min. working pressure	MPa	0.2		0.15
Withstanding pressure	MPa	1.05		
Ambient temperature	$^{\circ}\text{C}$	0 to 60		
Port size		M3		
Stroke tolerance	mm	+1.0 0		
Working piston speed	mm/s	30 to 300		
Cushion		None	Rubber cushioned	
Lubrication		Not available		
Allowable energy absorption	J	Refer to table on Page 4 in the Introduction.		

## Stroke length

Bore size (mm)	Standard stroke length (mm)	Min. stroke length of types with switch (mm)
$\Phi 4.5$	5, 10	5
$\Phi 6$	5, 10, 15	
$\Phi 8$	5, 10, 15, 20	

Note 1: Other than standard stroke length is not available.

## Switch specifications

Descriptions	Proximity 2-wire		Proximity 3-wire	
	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Programmable controller		Programmable controller and relay	
Output type	-		NPN output	
Power voltage	-		10 to 28 VDC	
Load voltage	10 to 30 VDC	24 VDC $\pm 10\%$	30 VDC or less	
Load current	5 to 20mA (Note 1)		100mA or less	50mA or less
Light	LED (ON lighting)	Red/Green LED (ON lighting)	LED (ON lighting)	Red/Green LED (ON lighting)
Leakage current	1mA or less		10 $\mu\text{A}$ or less	

Note 1: The maximum load current 20mA is applied at 25 $^{\circ}\text{C}$ . The current will be lower than 20mA if ambient temperature around switch is higher than 25 $^{\circ}\text{C}$ . (5 to 10mA at 60 $^{\circ}\text{C}$ .)



### Cylinder weight

Unit: g

Stroke length (mm)	5		10		15		20		Additional weight
	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	With magnet + without switch rail	With magnet + switch rail	
Φ4.5	45	49	45	49	-	-	-	-	10
Φ6	61	66	61	66	69	75	-	-	10
Φ8	87	92	87	92	108	114	108	114	10

### Theoretical thrust table

Unit: N

Bore size (mm)	Operation direction	Working pressure MPa					
		0.2	0.3	0.4	0.5	0.6	0.7
Φ4.5	Push	3.2	4.8	6.4	8.0	9.5	11.1
	Pull	2.6	3.8	5.1	6.4	7.7	9.0
Φ6	Push	5.6	8.5	11.3	14.1	16.9	19.7
	Pull	4.2	6.4	8.5	10.6	12.7	14.8
Φ8	Push	10.1	15.1	20.1	25.2	30.2	35.2
	Pull	8.6	13.0	17.3	21.6	25.9	30.2

## How to order

● Without switch

**LCM - 6 - 10 - R** ————— **J2 P73**

● With switch

**LCM - 6 - 10 - R - F2H - R - J2 P73**

**A** Bore size

**B** Stroke length

**C** Piping direction

**D** Switch model no.

**E** Switch quantity

**F** Option

**G** Clean room spec.

Symbol	Descriptions			
<b>A Bore size (mm)</b>				
4.5	Φ4.5			
6	Φ6			
8	Φ8			
<b>B Stroke length (mm)</b>				
		Bore size		
		Φ4.5	Φ6	Φ8
5	5	●	●	●
10	10	●	●	●
15	15	-	●	●
20	20	-	-	●
<b>C Piping direction</b>				
R	Right viewed from rod end			
L	Left viewed from rod end			
<b>D Switch model no.</b>				
Axial lead wire	Radial lead wire	Contact	Indicator	Lead wire
<b>F2H*</b>	<b>F2V*</b>	Proximity	One color indicator type	2-wire
<b>F3H*</b>	<b>F3V*</b>			3-wire
<b>F2YH*</b>	<b>F2YV*</b>		Two color indicator type	2-wire
<b>F3YH*</b>	<b>F3YV*</b>			3-wire
<b>*Lead wire length</b>				
Blank	1m (standard)			
3	3m (option)			
<b>E Switch quantity</b>				
R	One on rod end			
H	One on head end			
D	Two			
<b>F Option</b>				
<b>M</b>	Note 1	With magnet		
<b>F1</b>	Note 1, 2	With magnet + switch rail (one switch groove)		
<b>F2</b>	Note 1	With magnet + switch rail (two switch grooves)		
<b>J*</b>		Dowel pin attached (* indicates pin number)		
<b>G Clean room specifications</b>				
<b>P73</b>	Vacuum treatment			

### ⚠ Note on model no. selection

Note 1: Selection not required when designating the switch type.

Note 2: Selectable if Φ4.5 is selected.

<Example of model number>

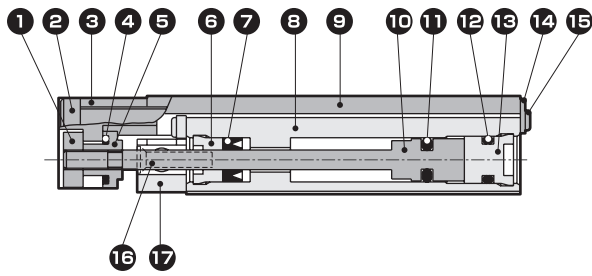
**LCM-6-10-R-F2H-R-J2P73**

Model: Linear slide cylinder, double acting

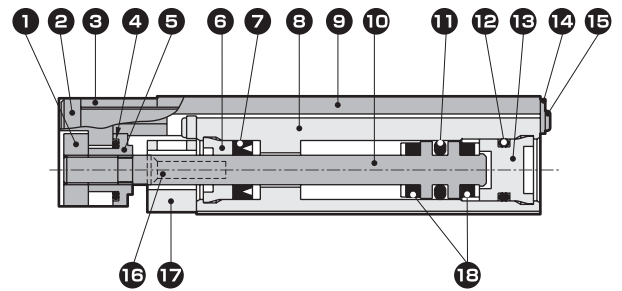
- A** Bore size: Φ6mm
- B** Stroke length: 10 mm
- C** Piping direction: Right viewed from rod end
- D** Switch model no.: Proximity switch F2H, lead wire 1m
- E** Switch quantity: One on rod end
- F** Option: Dowel pin attached (two pcs.)
- G** Clean room specifications: Vacuum treatment

### Internal structure and parts list

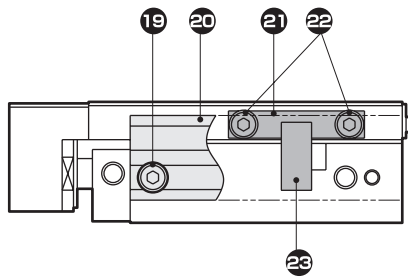
#### ● LCM-4.5-P73



#### ● LCM-6.8-P73



#### ● LCM-4.5 to 8-F-P73 with magnet and switch rail



#### • Dowel pin



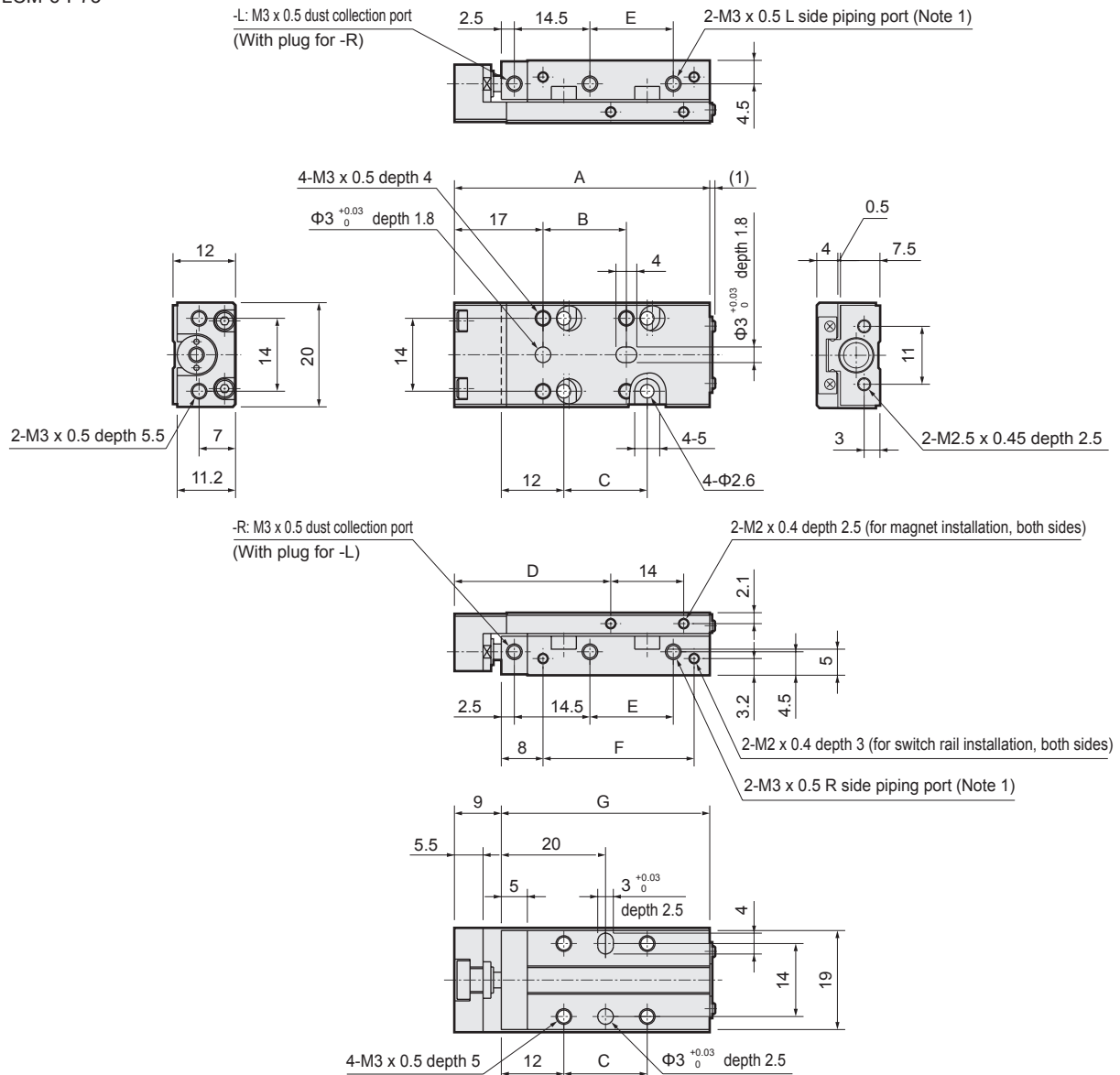
### Parts list

No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Floating bush A	Stainless steel		13	Guard	Acetar resin	
2	Bolt	Stainless steel		14	Stop plate	Stainless steel	
3	End plate	Aluminum alloy		15	Machine screw	Stainless steel	
4	O ring	Nitrile rubber		16	Machine screw	Stainless steel	
5	Floating bush B	Stainless steel		17	Dust collection block	Aluminum alloy	
6	Rod cover	Acetar resin		18	Cushion rubber	Urethane rubber (Φ6, Φ8)	
7	Rod packing seal	Nitrile rubber		19	Hexagon socket head cap screw	Stainless steel	
8	Cylinder body	Stainless steel		20	Switch rail	Aluminum alloy	
9	Slide table	Stainless steel		21	Plate	Aluminum alloy	
10	Piston	Stainless steel		22	Hexagon socket head cap screw	Stainless steel	
11	Piston packing seal	Nitrile rubber		23	Magnet	Plastic	
12	O ring	Nitrile rubber		24	Dowel pin	Steel	



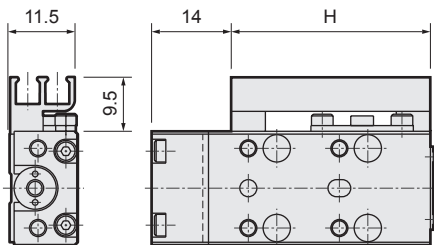
## Dimensions

● LCM-6-P73

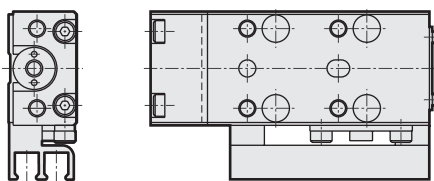


(Note 1) A plug is assembled on the opposite side of piping port indicated in the model no.

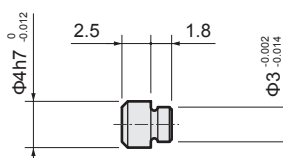
• With magnet and cylinder switch (piping direction: -R)



• With magnet and cylinder switch (piping direction: -L)



• Dowel pin (-J)

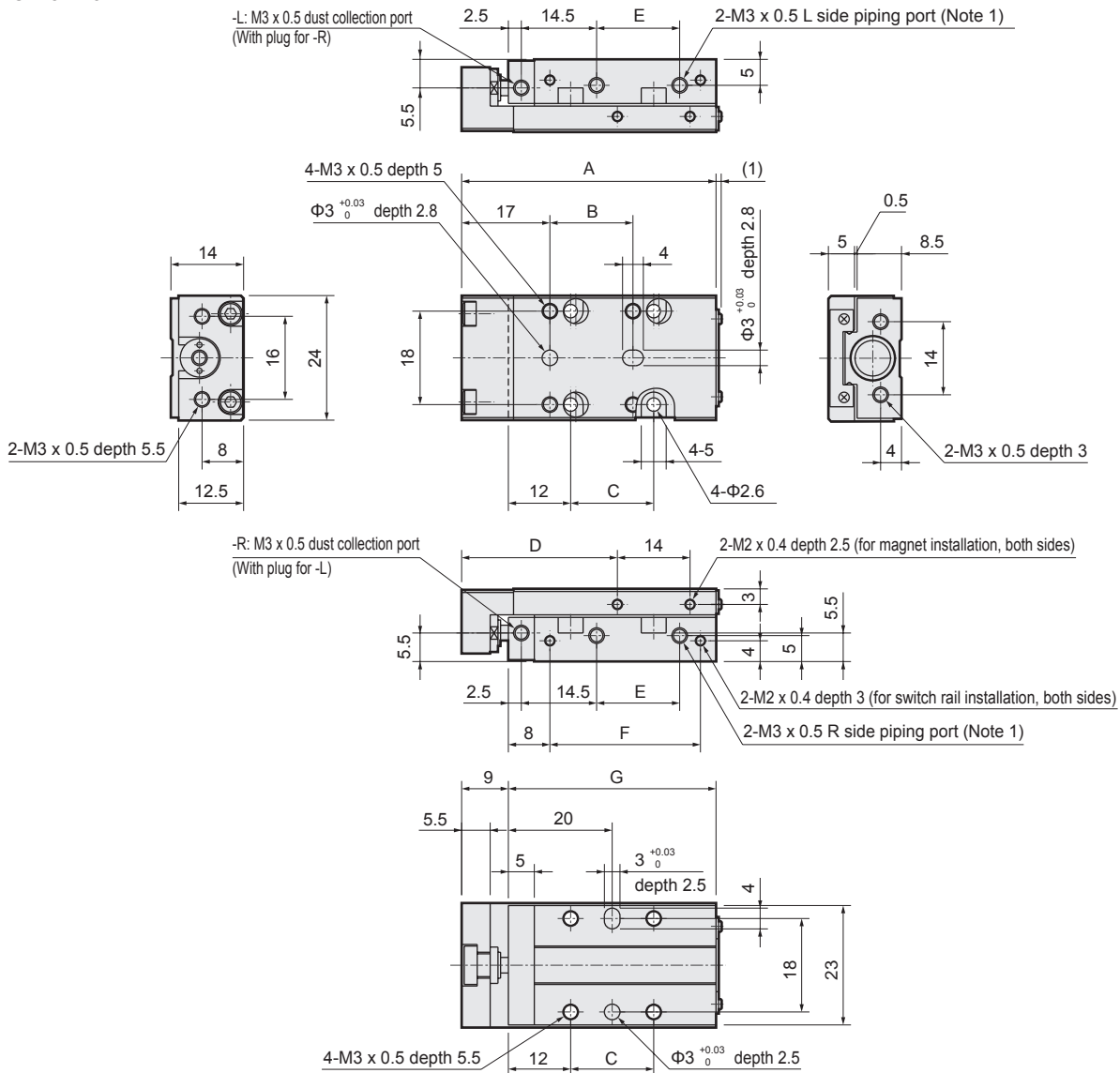


Note: Refer to Page 46 for switch installation position dimensions.

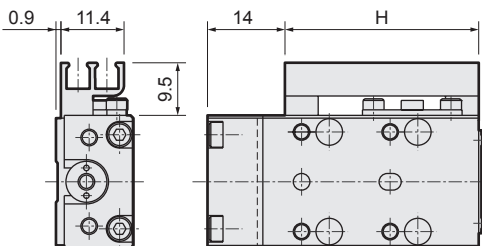
Stroke length	A	B	C	D	E	F	G	H
5	49	16	16	30	16	29	40	35
10	49	16	16	30	16	29	40	35
15	54	21	21	35	21	34	45	40

## Dimensions

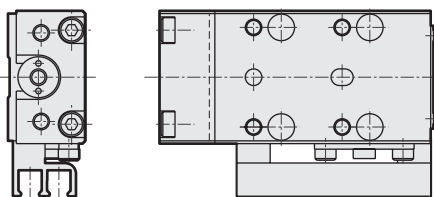
### ● LCM-8-P73



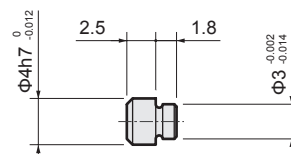
• With magnet and cylinder switch (piping direction: -R)



• With magnet and cylinder switch (piping direction: -L)



• Dowel pin (-J)

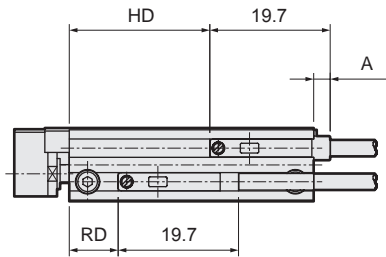


Stroke length	A	B	C	D	E	F	G	H
5	49	16	16	30	16	29	40	35
10	49	16	16	30	16	29	40	35
15	59	26	26	40	26	39	50	45
20	59	26	26	40	26	39	50	45

Note: Refer to Page 46 for switch installation position dimensions.

## LCM Series common: Switch installation and projection dimensions

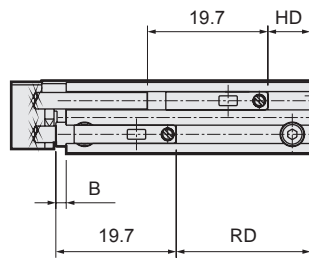
● For rear lead wire outlet



Bore size (mm)	Stroke length	RD	HD	A	
				1 color indicator type	2 color indicator type
φ4.5	5	12	17	2.7	7.2
	10	7	17		
φ6	5	13	18		
	10	8	18		
	15	8	23		
φ8	5	13	18		
	10	8	18		
	15	13	28		
	20	8	28		

(Projecting length for axial lead wire.)

● For front lead wire outlet



Bore size (mm)	Stroke length	RD	HD	B	
				1 color indicator type	2 color indicator type
φ4.5	5	12	7	-	-
	10	17		1.7	6.2
φ6	5	12	7	-	-
	10	17		1.7	6.2
	15	22		1.7	6.2
φ8	5	12	7	-	-
	10	17		1.7	6.2
	15	22		-	-
	20	27		1.7	6.2

(Projecting length for axial lead wire.)

### STEP-1

Confirm that the load moment in each direction is below the allowable value in all strokes.

- Direction of moment, guide center position X

Direction	Figure	Formula
M1 moment		$M1=L1 \times W$
M2 moment		$M2=L2 \times W$
M3 moment		$M3=L3 \times W$

- Allowable moment

N:m

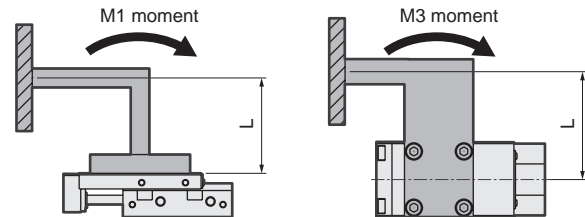
Model no.	M1	M2	M3
LCM-*4.5	0.24	0.22	0.29
LCM-*6	0.28	0.23	0.34
LCM-*8	0.28	0.38	0.34

- Guide center position dimensions

mm

Model no.	Stroke length	X		
		Standard	With buffer	Clean room spec.
LCM-*4.5	5	30	40	35
	10			
LCM-*6	5	31.5	41.5	36.5
	10			
	15			
LCM-*8	5	31.5	41.5	36.5
	10			
	15	41.5	51.5	46.5
	20			

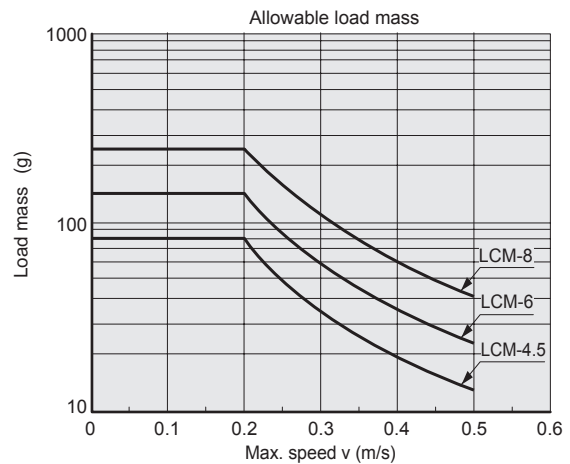
\*Note that when butting the work at a point offset from the guide section in the middle of the stroke, a large moment will be generated by the thrust of the mini guide slider.



### STEP-2

Confirm that dynamic energy from cylinder load weight and piston speed is less than allowable energy absorption.

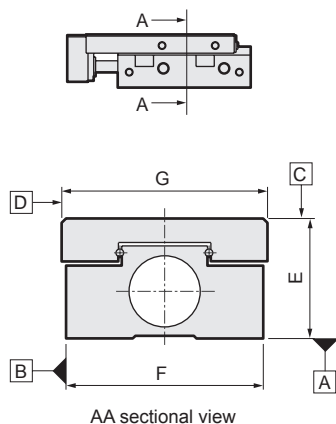
Bore size	Φ4.5	Φ6	Φ8
Allowable energy absorption J	$1.59 \times 10^{-3}$	$2.83 \times 10^{-3}$	$5.02 \times 10^{-3}$





## Technical data

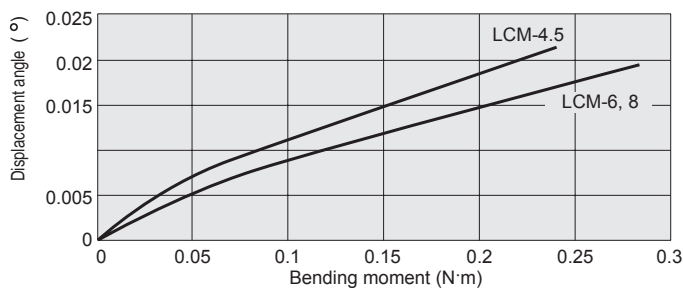
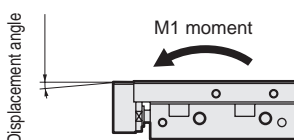
### Accuracy of slide table



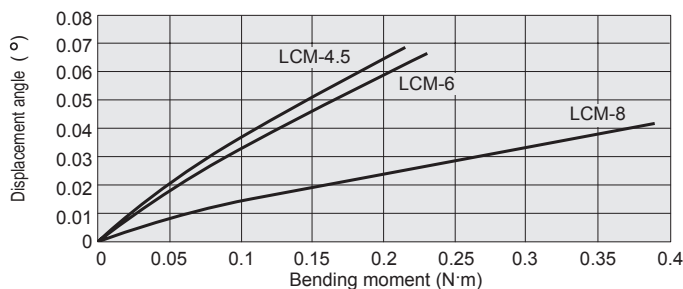
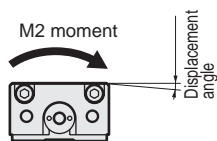
Descriptions		LCM-*-4.5 to 8	mm
Parallelism	C plane against A plane	0.03	
	D plane against B plane	0.03	
Sliding parallelism	C plane against A plane	0.005	
	D plane against B plane	0.005	
Tolerance of E		±0.05	
Tolerance of F		±0.05	
Tolerance of G		±0.05	

### Displacement angle of slide table caused by bending moment (reference value)

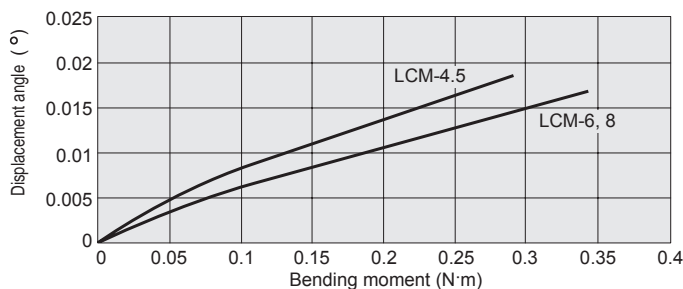
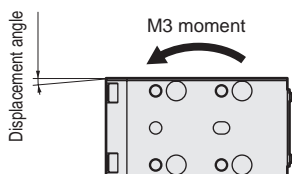
#### M1 moment



#### M2 moment



#### M3 moment



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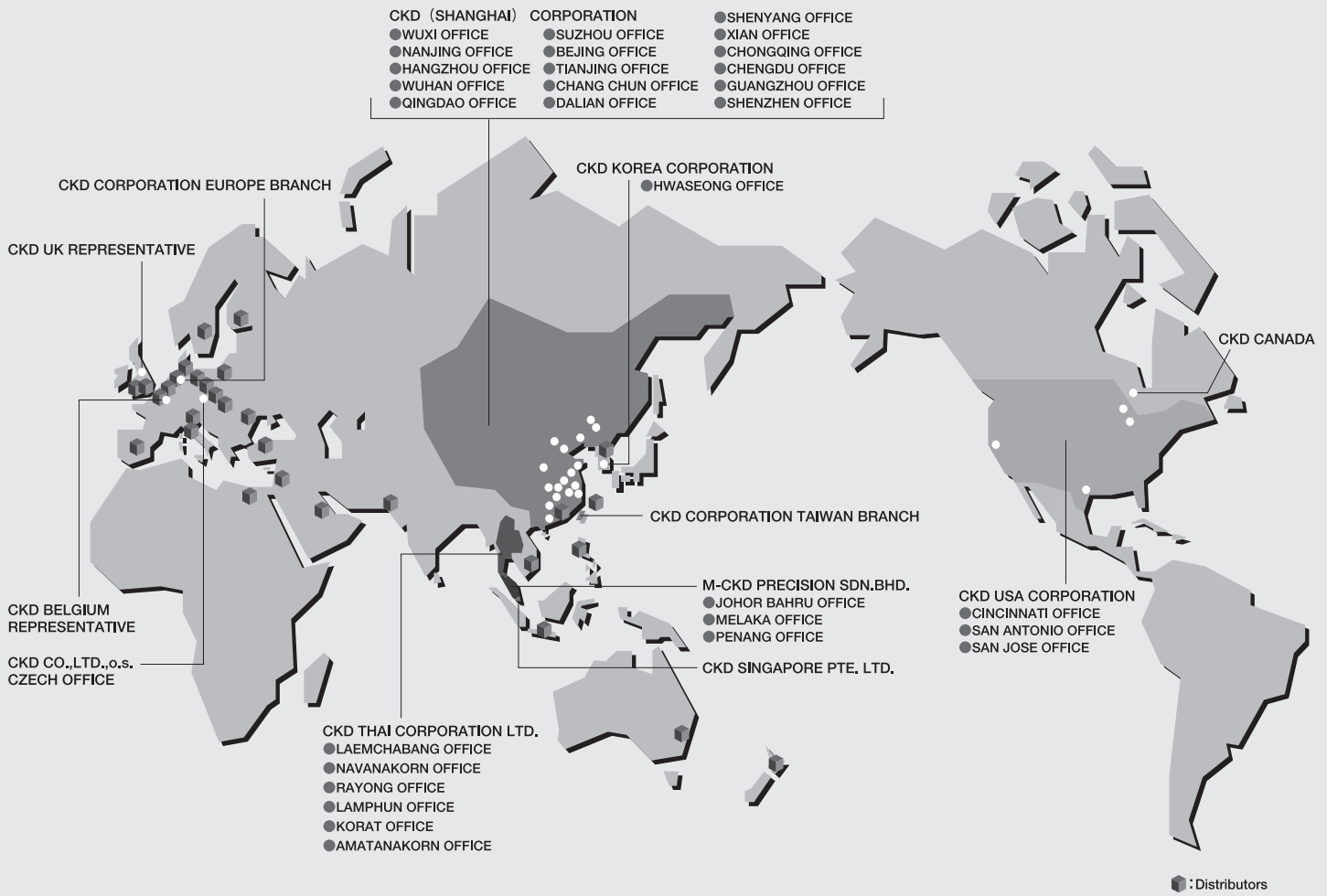
MEMO

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MEMO

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