CKD

Highly accurate, rigid

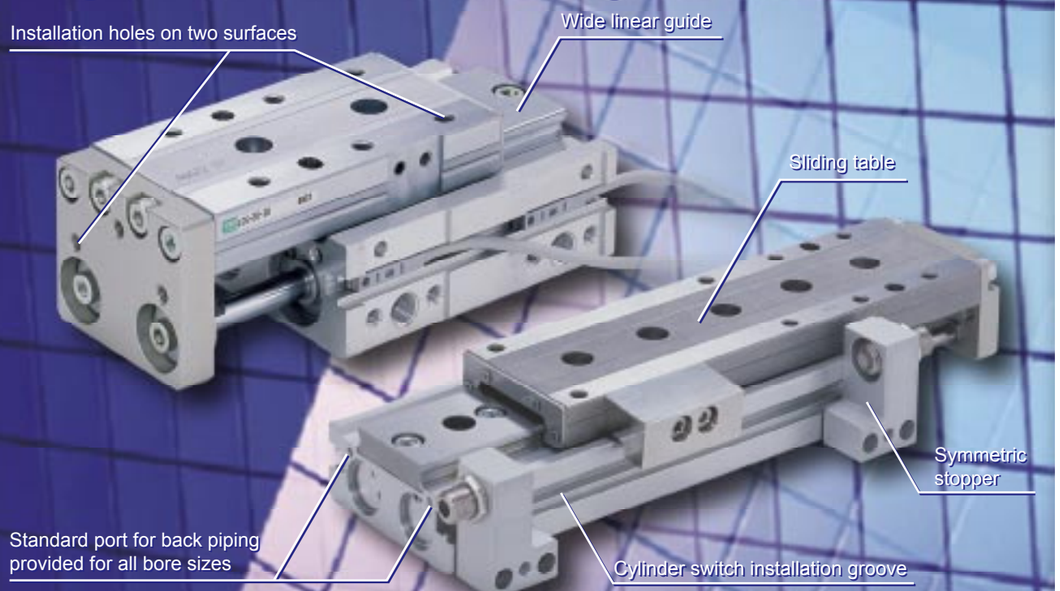
New Product

LINEAR SLIDE CYLINDER
LCG SERIES

LINEAR SLIDE CYLINDER LCG SERIES

CKD Corporation
CC-852A 1

Highly accurate, rigid, and easy to use



Improved accuracy

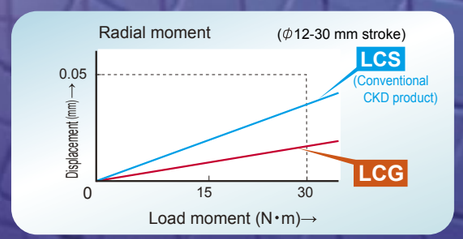
The linear guide's table is used for the sliding table. Accuracy is improved over conventional products.
Parallelism 0.03 mm (ϕ12-30 mm stroke)
End plate perpendicularity 0.05 mm

Easier to use

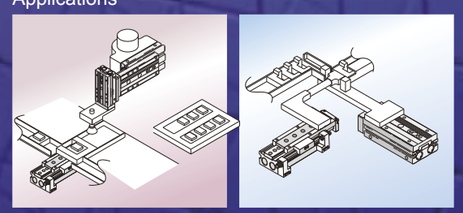
The cylinder and linear slide are now designed together, reducing design work hours. Design for symmetrical stopper installation and multiside piping improve the degree of freedom and ease of use.

Higher rigidity

The slide table material has been changed from conventional aluminum to stainless steel or steel. Rigidity is further increased by using this slide table together with the wide guide.



Applications



Storage of small parts in tray or removal of parts from tray

Feeding of small parts

LCG Series

Linear slide cylinder

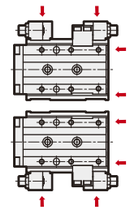
LCG Series linear slide cylinder. (ϕ6, 8, 12, 16, 20, or 25)
The air cylinder's wide guide improves accuracy and rigidity.
The linear guide table acts as the sliding table to provide outstanding accuracy, rigidity, and easy of use.

CKD Green Technology

Increased design freedom

Design is easily made since symmetrical stoppers, multiside piping, and two-surface installation and positioning holes are provided.

■Change to symmetrical

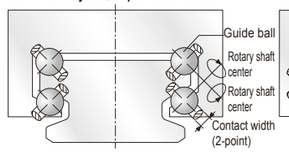


Change to symmetrical Arrows (⬅) show the piping direction.

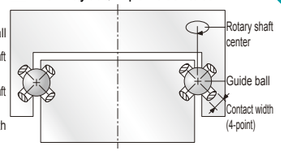
Linear guide with four guide ball rows (excluding ϕ6 and 8)

Four rows of guide balls ensure stable operation in any load direction.
The guide ball contact is narrower than the two-row layout guide, so the frictional resistance generated during rotation is low. This enables smooth operation with increased accuracy and rigidity.

■4-row layout, 2-point contact

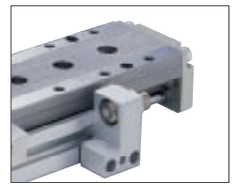


■2-row layout, 4-point contact

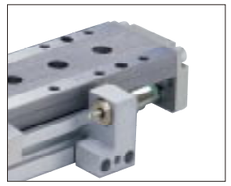


Ample option variations

Standard, position locking, and clean specification models are available. Varied options include a stopper for adjustable stroke and a stopper with a shock absorber.
* The shock absorber stopper cannot be used for clean model specifications.



■Stopper for adjustable stroke
Single side adjustment range
0 to 5 mm



■Stock absorber stopper
Shock cushioned at stroke end

2-color switch selectable

The proximity 2-color display switch is selectable.
Switches are flush with the panel for a neat appearance.

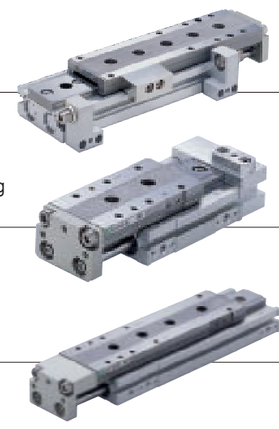
RoHS Directive-compliant

Environmentally harmful substances, including lead and hexavalent chrome, have been eliminated.

RoHS

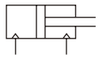
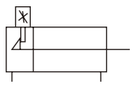
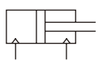
■LCG Series products

Model variation	Bore size	Stroke length (mm)
Double acting single rod **LCG**	ϕ6, ϕ8, ϕ12, ϕ16, ϕ20, ϕ25	10, 20, 30, 40, 50, 75, 100, 125, 150
Double acting position locking **LCG-Q**	ϕ8, ϕ12, ϕ16, ϕ20, ϕ25	10, 20, 30, 40, 50, 75, 100, 125, 150
Double acting single rod (clean room specifications) **LCG-P7※**	ϕ6, ϕ8, ϕ12, ϕ16, ϕ20, ϕ25	10, 20, 30, 40, 50, 75, 100, 125, 150



* Custom order rustproof products are available. Refer to page 54 for details.

●: Standard ◎: Option ○: Available : Not available

Variation	Model no. JIS symbol	Bore size (mm)	Stroke length (mm) 10	20	30	40	50	75	100	125	150		Option: Stopper for adjustable stroke: Stopper position ① S1	Stopper position ② S2	Stopper position ③ S3	Stopper position ④ S4	Stopper position ①and③ S5	Stopper position ②and④ S6	Shock absorber type stopper: Stopper position ① A1	Stopper position ② A2	Stopper position ③ A3	Stopper position ④ A4	Stopper position ①and③ A5	Stopper position ②and④ A6	Switch	Page
Double acting single rod type	LCG 	ø6	●	●	●	●	●						◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	1
		ø8	●	●	●	●	●	●																		
		ø12	●	●	●	●	●	●	●																	
		ø16	●	●	●	●	●	●	●	●																
		ø20, ø25	●	●	●	●	●	●	●	●	●															
Double acting position locking type	LCG-Q 	ø8	●	●	●	●	●	●					◎	◎					◎	◎					◎	23
		ø12	●	●	●	●	●	●	●																	
		ø16	●	●	●	●	●	●	●	●																
		ø20, ø25	●	●	●	●	●	●	●	●	●															
Double acting single rod type Clean room specifications	LCG-P7* 	ø6	●	●	●	●	●						◎	◎	◎	◎	◎	◎							◎	31
		ø8	●	●	●	●	●	●																		
		ø12	●	●	●	●	●	●	●																	
		ø16	●	●	●	●	●	●	●	●																
		ø20, ø25	●	●	●	●	●	●	●	●	●															

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.

❶ 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.
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)
JFPS 2008 (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 enough 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. 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) for the general details on cylinders and cylinder switch.

Design & Selection

1. Common

⚠CAUTION

■ Refer to the LCG Selection Guide on pages 47 to 50 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.

■ Precautions for using type with switch

- When using the T*V switch with the cylinder with a stopper for adjustable stroke (S3**, S4**, S5**, S6**) or shock absorber stopper (A3**, A4**, A5**, A6**), the head side switch could interfere with the stopper. Install the switch on the side opposite the stopper.
- When using a switch with a stroke of less than 30, one switch is installed in each of the two grooves on the body. Check the direction of leads in design.

■ A powerful magnet placed near this product could magnetize the table and cause the switch to malfunction.

2. Position locking type LCG-Q

⚠CAUTION

■ Do not use a 3-position valve.

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

Installation & Adjustment

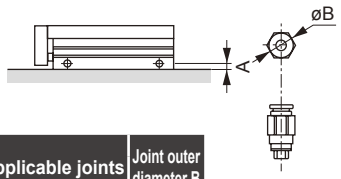
1. Common; Piping

⚠CAUTION

■ When changing a piping port position, apply adhesive to M3 and M5 plug (hexagon socket head set screw). (Low intensity adhesive such as LOCTITE 222, 221, THREE BOND 1344 recommended)

■ Precautions for piping joint

Install a flow control valve when piping. The applicable joints are shown as below.



Descriptions Bore size (mm)	Port size	Port dimension A	Applicable joints	Joint outer diameter B
ø6	M3	4	SC3W-M3-4 SC3WU-M3-4 SC3W-M3-3.2 SC3WU-M3-3.2 GWS3-M3-S GWS4-M3-S	ø8 or less
ø8	M5	5.5	SC3W-M5-4 SC3W-M5-6 GWS4-M5-S GWS4-M5	ø11 or less
ø12		5.5		
ø16		6.5	SC3W-M5-4 SC3W-M5-6 GWS4-M5-S GWS4-M5 GWL4-M5 GWL6-M5 GWS6-M5	ø13 or less
ø20	Rc1/8	8	SC3W-6-4, 6, 8 GWS4-6 GWS8-6 GWL6-6 GWS6-6 GWL4-6	ø15 or less
ø25		9		

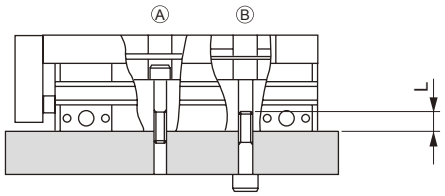
Installation & Adjustment

2. Common; installation

⚠CAUTION

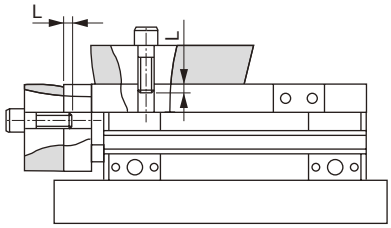
■ Do not dent or scratch or otherwise compromise flatness of the installation or table surface.
Maintain flatness of the corresponding installed component on the body or table at 0.02 mm or less.

■ Observe the following values for the bolt insertion length and tightening torque when installing this product.
<Fig. 1>



Descriptions	Ⓐ		Ⓑ		
	Applicable bolts	Tightening torque (N•m)	Applicable bolts	Tightening torque (N•m)	Max. screw depth L (mm)
LCG-6	M3 x 0.5	0.6 to 1.1	M4 x 0.7	1.4 to 2.4	6
LCG-8	M3 x 0.5	0.6 to 1.1	M4 x 0.7	1.4 to 2.4	6
LCG-12	M4 x 0.7	1.4 to 2.4	M5 x 0.8	2.9 to 5.1	8
LCG-16	M5 x 0.8	2.9 to 5.1	M6 x 1.0	4.8 to 8.6	9
LCG-20	M5 x 0.8	2.9 to 5.1	M6 x 1.0	4.8 to 8.6	9
LCG-25	M6 x 1.0	4.8 to 8.6	M8 x 1.25	12.0 to 21.6	12

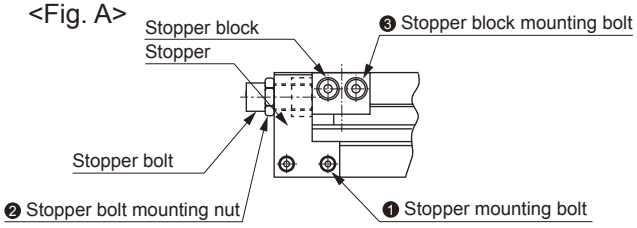
■ Observe the following bolt insertion lengths and tightening torque when installing the jig on the slide table or end plate.
<Fig. 2>



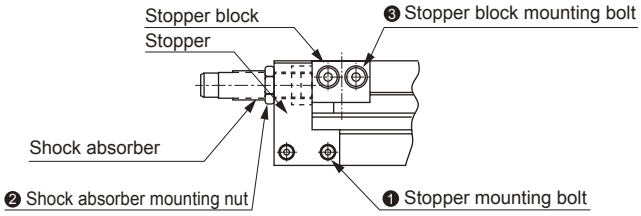
Descriptions	Table		
	Applicable bolts	Tightening torque (N•m)	Max. screw-in length L (mm)
LCG-6	M3 x 0.5	0.6	3
LCG-8	M3 x 0.5	0.6	3
LCG-12	M4 x 0.7	1.4	4
LCG-16	M5 x 0.8	2.9	5
LCG-20	M5 x 0.8	2.9	5
LCG-25	M6 x 1.0	4.8	6

Descriptions	End plate		
	Applicable bolts	Tightening torque (N•m)	Screw-in length L (mm)
LCG-6	M3 x 0.5	0.6	4.5 to 6
LCG-8	M3 x 0.5	0.6	4.5 to 7
LCG-12	M4 x 0.7	1.4	6 to 9
LCG-16	M5 x 0.8	2.9	7.5 to 9
LCG-20	M5 x 0.8	2.9	7.5 to 11
LCG-25	M6 x 1.0	4.8	9 to 11

■ Observe the following valves for bolts at the stopper and in nut tightening torque.
<Fig. A>



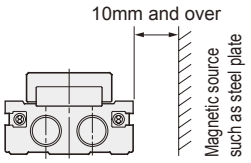
Hexagon socket set screw stopper with rubber cushion



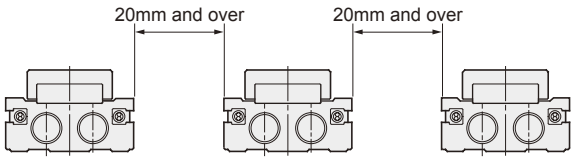
Shock absorber

Model	❶ Stopper mounting bolt (N•m)	❷ Stopper bolt mounting nut ❷ Shock absorber mounting nut (N•m)	❸ Stopper block mounting bolt (N•m)
LCG-6	0.4 to 0.5	1.2 to 2.0	0.6 to 0.8
LCG-8	0.4 to 0.5	1.2 to 2.0	0.6 to 0.8
LCG-12	0.6 to 0.8	1.2 to 2.0	0.6 to 0.8
LCG-16	0.6 to 0.8	3.0 to 4.0	1.4 to 1.8
LCG-20	2.9 to 3.5	4.5 to 6.0	1.4 to 1.8
LCG-25	2.9 to 3.5	4.5 to 6.0	2.9 to 3.5

■ Sources of magnetism such as steel plates near the cylinder switch could cause the cylinder to malfunction. Keep at least 10 mm from the cylinder. (Same for all bore size)



■ If cylinders are adjacent, the cylinder switch could malfunction. Check that the following distance is maintained between cylinder surfaces. (Same for all bore size)



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

3. Position locking type LCG-Q

⚠CAUTION

■ The locking mechanism functions at the stroke end, so applying the stopper with the external stopper at mid-stroke prevents the locking mechanism from functioning and the load may drop. Before setting the load, check that the locking mechanism functions correctly.

■ Supply a pressure higher than the minimum 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 controller is separated from the cylinder port, exhaust 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

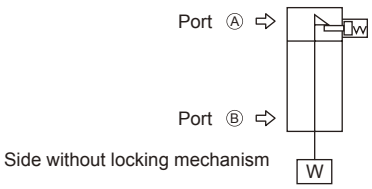
■ Apply AFJ grease (THK) to guide rails once a month or every 1,000,000 operations, whichever is sooner.

■ Check for table corrosion.
The table is made of martensitic stainless steel 6 to 16 in diameter or alloy steel 20 or 25 in diameter. Use in a hot, humid environment or contact with water due to condensation, etc., could cause rust.

2. Position locking type LCG-Q

⚠WARNING

■ If pressure is supplied to port (A) 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 (B) and check that no load is applied to the locking mechanism.



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

⚠CAUTION

■ If negative pressure is applied to the locking mechanism, the lock may be released. Use a discrete solenoid valve or use an individual exhaust 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.

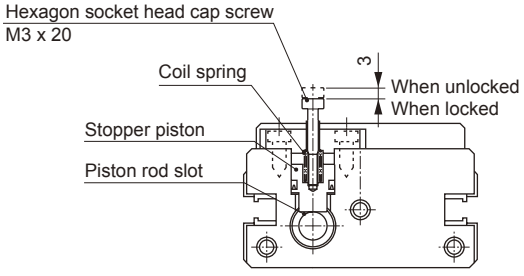
■ Release the lock when installing or adjusting the cylinder.
The lock could be damaged if the cylinder is installed while the lock is applied.

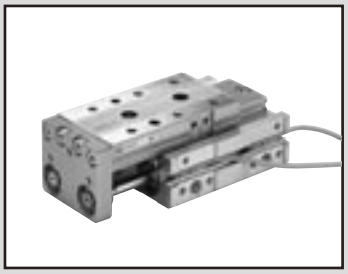
■ Do not use multiple cylinders synchronized.
Do not move one workpiece using more than two position locking cylinders synchronized. One of the cylinder' s locks may not be released.

■ Use the flow 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 cap screw (M3 × 20) into the stopper piston, and pull the bolt up 3 mm with a force of 20N and over. 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.



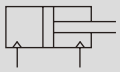


Linear slide cylinder double acting single rod type

LCG Series

● Bore size: ø6, ø8, ø12, ø16, ø20, ø25

JIS symbol



Specifications

Descriptions		LCG					
Bore size mm		ø6	ø8	ø12	ø16	ø20	ø25
Actuation		Double acting					
Working fluid		Compressed air					
Max. working pressure MPa		0.7					
Min. working pressure MPa		0.15 (Note 1)					
Withstanding pressure MPa		1					
Ambient temperature ℃		-10 to 60 (to be unfrozen) (Note 2)					
Port size	Body side surface	M3	M5			Rc1/8	
	Rear body	M3				M5	Rc1/8
Stroke tolerance mm		+ 2.0 0 (Note 3)					
Working piston speed mm/s		50 to 500 (Note 4)					
Cushion		Rubber cushioned					
Lubrication		Not required (when lubricating, use turbine oil Class one ISOVG 32.)					
Allowable energy absorption J		Refer to the table 3 on Page 47.					

Note 1: 0.2 MPa when using the shock absorber stopper 6 in diameter.
Note 2: The maximum temperature is 50℃ when the switch 6 in diameter is used -- 45℃ when installing on a steel plate.
Note 3: When not using a stopper, a slight gap may exist between the end plate and floating bushing.
Note 4: Use the stopper for adjusting the stroke between 50 and 200 mm/s.

Stroke length

Bore size (mm)	Standard stroke length (mm)
ø6	10, 20, 30, 40, 50
ø8	10, 20, 30, 40, 50, 75
ø12	10, 20, 30, 40, 50, 75, 100
ø16	10, 20, 30, 40, 50, 75, 100, 125
ø20	10, 20, 30, 40, 50, 75, 100, 125, 150
ø25	10, 20, 30, 40, 50, 75, 100, 125, 150

Note: Stroke length other than above is not available.

Switch specifications

● 1/2 color indicator

Descriptions	Proximity 2 wire		Proximity 3 wire		Proximity 2 wire		Proximity 3 wire	
	T2H/T2V	T2WH/T2WV	T3H/T3V	T3WH/T3WV	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Programmable Controller dedicated		Programmable Controller and relay		Programmable Controller dedicated		Programmable Controller and relay	
Output type	-		NPN output		-		NPN output	
Power voltage	-		10 to 28V DC		-		10 to 28V DC	
Load voltage	10 to 30V DC	24V DC±10%	30V DC or less		10 to 30V DC	24V DC±10%	30V DC or less	
Load current	5 to 20mA		100mA or less	50mA or less	5 to 20mA		100mA or less	50mA or less
Light	LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)
Leakage current	1mA or less		10μA or less		1mA or less		10μA or less	

Descriptions	Reed 2 wire			
	T0H/T0V		T5H/T5V	
Applications	Programmable Controller and relay		Programmable controller, relay IC circuit (without light), serial connection	
Load voltage	12/24VDC	110VAC	5/12/24VDC	110VAC
Load current	5 to 50mA	7 to 20mA	50mA or less	20mA or less
Light	LED (ON lighting)		Without indicator light	
Leakage current	0mA			

Cylinder weight

● Basic type (Unit: g)

Bore size (mm)	Basic stroke type (mm)								
	10	20	30	40	50	75	100	125	150
ø6	150	150	180	220	240	-	-	-	-
ø8	210	210	250	320	350	440	-	-	-
ø12	480	480	480	530	590	770	920	-	-
ø16	730	730	730	810	890	1,220	1,410	1,620	-
ø20	1,260	1,260	1,260	1,380	1,500	1,920	2,210	2,510	2,800
ø25	2,070	2,070	2,070	2,230	2,430	3,240	3,660	4,080	4,530

● Additional variations and options (stoppers) (Unit: g)

Bore size (mm)	Option and stopper symbol			
	S1 to S4	S5, S6	A1 to A4	A5, A6
ø6	40	60	40	60
ø8	50	70	50	70
ø12	70	110	70	110
ø16	130	180	130	180
ø20	130	200	130	200
ø25	200	270	200	270

How to order

Without switch

LCG - 8 - 40 ——— S5

With switch

LCG - 12 - 40 - F2H* - R - A1DT

- LCG: Model no.
- 12: Ⓐ Bore size
- 40: Ⓑ Stroke length
- F2H*: Ⓒ Switch model no.
- R: Ⓓ Switch quantity
- A1DT: Ⓔ Option

Symbol	Descriptions
Ⓐ Bore size	
6	ø6
8	ø8
12	ø12
16	ø16
20	ø20
25	ø25

Ⓑ Stroke length (mm)

		Bore size (ø)					
		6	8	12	16	20	25
10	10	●	●	●	●	●	●
20	20	●	●	●	●	●	●
30	30	●	●	●	●	●	●
40	40	●	●	●	●	●	●
50	50	●	●	●	●	●	●
75	75		●	●	●	●	●
100	100			●	●	●	●
125	125				●	●	●
150	150					●	●

Ⓒ Switch model no.

Axial lead wire	Radial lead wire	Contact	Indicator	Lead wire	Bore size ø6	ø8	ø12	ø16	ø20	ø25
F2H*	**F2V***	Proximity	One color indicator	2-wire	●	●	●			
F3H*	**F3V***			3-wire						
F2YH*	**F2YV***		2 color indicator	2-wire						
F3YH*	**F3YV***			3-wire						
T0H*	**T0V***	Reed	One color indicator	2-wire						
T5H*	**T5V***									
T2H*	**T2V***	Proximity	One color indicator	2-wire				●	●	●
T3H*	**T3V***			3-wire						
T2WH*	**T2WV***		2 color indicator	2-wire						
T3WH*	**T3WV***			3-wire						

***Lead wire length**

Blank	1m (standard)					●				
3	3m (option)					●				
5	5m (option)							●		

Ⓓ Switch quantity

R	One on rod end
H	One on head end
D	Two

Ⓔ Option

Blank	No option
S Stopper for adjustable stroke	
Adjustable stroke single side 5mm	**Note 1, Note 5, Note 7**
S1**	Stopper position ① (Changeable to ④)
S2**	Stopper position ② (Changeable to ③)
S3**	Stopper position ③ (Changeable to ②)
S4**	Stopper position ④ (Changeable to ①)
S5**	Stopper position ① and ③
S6**	Stopper position ② and ④
A Shock absorber type stopper	**Note 2, Note 5, Note 7**
A1**	Stopper position ① (Changeable to ④)
A2**	Stopper position ② (Changeable to ③)
A3**	Stopper position ③ (Changeable to ②)
A4**	Stopper position ④ (Changeable to ①)
A5**	Stopper position ① and ③
A6**	Stopper position ② and ④
**** section**	
Blank	Port at stopper section: no port
D	Port at stopper section: with side or base port Note 3, Note 6
Blank	Stopper block material: Rolled steel
T	Stopper block material: Alloy steel (nitriding) Note 6

Stopper installation position

Stopper installation position

⚠ Note on model no. selection

Note 1: Use stopper parts for the adjustable stroke on page 6 when changing the adjustable stroke range.
Note 2: When using a shock absorber, refer to the stopper dimensions table on page 21 for the adjustable stroke range.
Note 3: Refer to stopper dimensions on page 21 for port locations.
Note 4: If no stopper is provided, the standard port locations are (1) and (3) below.
Note 5: The stopper for adjustable stroke and shock absorber stopper combination is available as a customized part.
Note 6: Selectable only when using a stopper.
Note 7: Refer to the selection table on page 4 for option combinations.
Note 8: A1**, A2**, A5**, and A6** at ø6 to ø8-10st or ø12 to ø25-20st or less cannot be adjusted with the standard stopper, and are available only as customized parts.
Note 9: When installing two switches with ø6-10st S*** or A***, select the F*H switch.

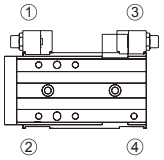
<Example of model number>

LCG-12-40-F2H-R-A1DT

Model: Linear slide cylinder double acting single rod type LCG

- Ⓐ Bore size : ø12
- Ⓑ Stroke length : 40mm
- Ⓒ Switch model no. : Proximity and 2 wire Axial lead wire
- Ⓓ Switch quantity : With one on rod end
- Ⓔ Other options : shock absorber type Stopper position ① With side or base port Material, alloy steel (nitriding)

● Stopper position



LCG Double acting, single rod selection table

(Combination with stopper for adjustable stroke and shock absorber stopper)

○: Available -: Not available

Model no. symbol	Option symbol		Stopper for adjustable stroke						Shock absorber type stopper					
	Bore size	Stroke length	S1	S2	S3	S4	S5	S6	A1	A2	A3	A4	A5	A6
LCG	ø6, ø8	10	○	○	○	○	○	○	-	-	○	○	-	-
		20 and over	○	○	○	○	○	○	○	○	○	○	○	○
	ø12 to ø25	10 to 20	○	○	○	○	○	○	-	-	○	○	-	-
		30 and over	○	○	○	○	○	○	○	○	○	○	○	○

Option symbol D: with stopper section port and T: stopper block alloy steel (nitriding) combined as shown in the selection table above.

How to order switch

If ø6 to ø12

SW - F2H

Switch model no.
(Page 3 item Ⓒ)

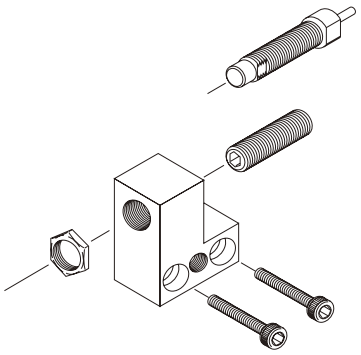
If ø16 to ø25

SW - T2H3

Switch model no.
(Page 3 item Ⓒ)

How to order stopper set

- Stopper section and stopper for adjustable stroke or shock absorber stopper set
- Use when changing from standard to stopper for adjustable stroke or with shock absorber stopper



LCG - 12 - S 2 D

Bore size
(Page 3 item Ⓐ)

Ⓐ Stopper type	
S	Stopper for adjustable stroke
A	Shock absorber type stopper

Ⓑ Stopper installation position	
1	For stopper position ① or ④
2	For stopper position ② or ③

Ⓒ Port at stopper section	
Blank	No port
D	With side and bottom ports

Precautions for ordering stopper set

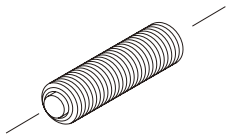
S01 is included in the stopper for adjustable stroke parts for the stopper for adjustable stroke set.
When installing at position ① or ② (refer to page 3), add parts shown on the right based on the stoke or adjustable stroke length.

-: not available

Model no. symbol	Option symbol		Discrete stopper for adjustable stroke		
			Adjustable stroke length (mm)		
	Bore size	Stroke length	-5	-15	-25
LCG Series	ø6, ø8	10	S02	-	-
		20 and over	Addition not required	S02	-
	ø12 to ø25	10	S03	-	-
		20	S02	S03	-
		30 and over	Addition not required	S02	S03

How to order the discrete stopper for adjustable stroke

- Hexagon socket head set screw with urethane
- Use for changing the adjustable stroke range or setting to the middle stroke



LCG - 12 - S02

Bore size
(Page 3 item Ⓐ)

Ⓐ Adjustable stroke range	
S01	Single 5mm (standard)
S02	Single 15mm
S03	Single 25mm

Designate S01, S02, or S03 for Ⓐ.
Note: S03 is not used for ø6 or ø8.
Depending on the type, the incompatible models or adjustable stroke ranges may differ from the above values.

Precautions for ordering discrete stopper

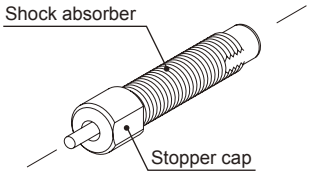
Only when installing the discrete stopper for an adjustable stroke or discrete shock absorber stopper at installation position ① or ② (refer to page 3), the combination will be as shown on the right depending on the stroke or adjustable stroke length.

-: combination not available

Model no. symbol	Option symbol		Discrete stopper for adjustable stroke			Discrete shock absorber type stopper
			Adjustable stroke length (mm)			
	Bore size	Stroke length	-5	-15	-25	
LCG Series -S1, S2, S5, S6 -A1, A2, A5, A6	ø6, ø8	10	S02	-	-	-
		20 and over	S01	S02	-	A01
	ø12 to ø25	10	S03	-	-	-
		20	S02	S03	-	-
		30 and over	S01	S02	S03	A01

How to order the discrete shock absorber stopper

- Sets of shock absorber and stopper cap
- Use for changing from the stopper for an adjustable stroke to the shock absorber stopper.



LCG - 12 - A01

Bore size
(Page 3 item Ⓐ)

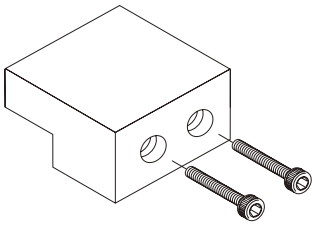
Note: Some models may not be available depending on the type. Refer to Page 3. Refer to Page 21 for adjustable stroke range of a shock absorber type stopper.

Applicable shock absorber model No.

Model	Shock absorber model no.
LCG-6	NCK-00-0.1
LCG-8	NCK-00-0.3
LCG-12	NCK-00-0.3
LCG-16	NCK-00-0.7
LCG-20	NCK-00-1.2
LCG-25	NCK-00-1.2

Discrete stopper block model no. display

- Use when changing from standard to stopper for adjustable stroke or with shock absorber stopper



LCG - 12 - SB1 T

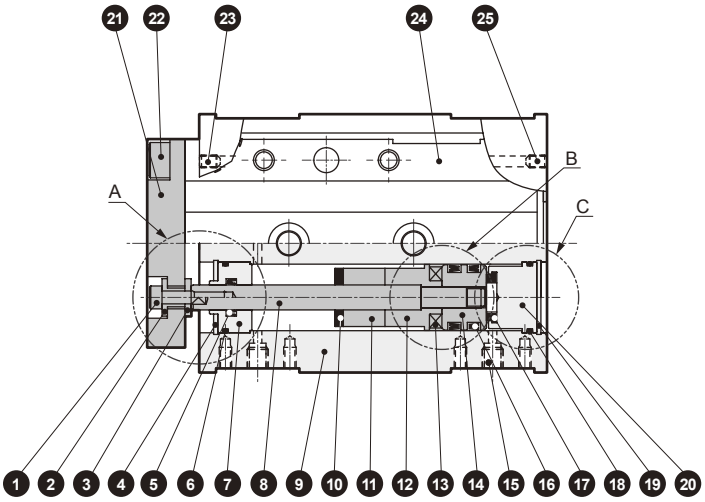
Bore size
(Page 3 item Ⓐ)

Ⓐ Stopper block	
SB1	ø6, ø8: 30 mm stroke or less
	ø12 to ø25: 50 mm stroke or less
SB2	ø6, ø8: 40 mm stroke and over
	ø12 to ø25: 75 mm stroke and over

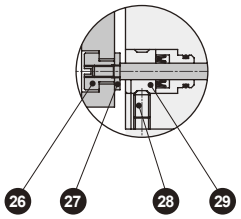
Ⓑ Material	
Blank	Stopper block material: Rolled steel
T	Stopper block material: Alloy steel (nitriding)

Internal structure and parts list

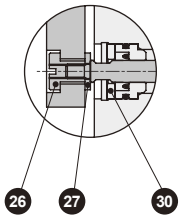
● LCG



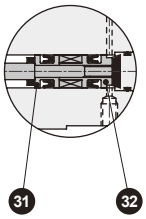
A section for ø6



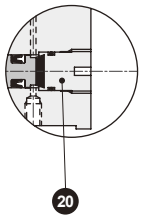
A section for ø8



B section for ø6, ø8, ø12



C section for ø6



Parts list

No.	Parts name	Material	Remarks
1	Hexagon socket head cap screw	Alloy steel	Zinc chromate
2	Floating bush A	Alloy steel	Zinc chromate
3	Floating bush B	Stainless steel	
4	C type snap ring	ø8: Steel ø12 to 25: Stainless steel	Only ø8 to 25
5	Rod packing seal	Nitrile rubber	
6	Metal gasket	Nitrile rubber	
7	Rod bushing	Aluminum alloy	Alumite
8	Piston rod	Stainless steel	
9	Cylinder body	Aluminum alloy	Hard alumite
10	Cushion rubber (R)	Urethane rubber	
11	Spacer	Aluminum alloy	ø6: Only 10, 40, 50st ø8: Only 10st ø12, 16, 20, 25: Only 10, 20st
12	Magnet spacer	Aluminum alloy	Chromate
13	Magnet	Plastic	
14	Piston	Aluminum alloy	Chromate
15	Plug	Stainless steel	
16	Piston packing seal	Nitrile rubber	
17	Cushion rubber (H)	Urethane rubber	
18	Guard gasket	Nitrile rubber	
19	C type snap ring	ø8: steel ø12 to 25: Stainless steel	Only ø8 to 25
20	Guard	Aluminum alloy	Chromate
21	End plate	Aluminum alloy	Alumite
22	Hexagon socket head cap screw	Alloy steel	Zinc chromate
23	Plug	Stainless steel	
24	Table	ø6 to 16: Stainless steel ø20, 25: Steel	
25	Hexagon socket head set screw	Stainless steel	
26	Floating bush A	Stainless steel	
27	Floating bush B	Stainless steel	
28	Hexagon socket head set screw	Stainless steel	Only ø6
29	Rod bushing A	Stainless steel	
30	Cap	Aluminum alloy	Chromate
31	Piston A	Aluminum alloy	Chromate
32	Piston B	Aluminum alloy	Chromate

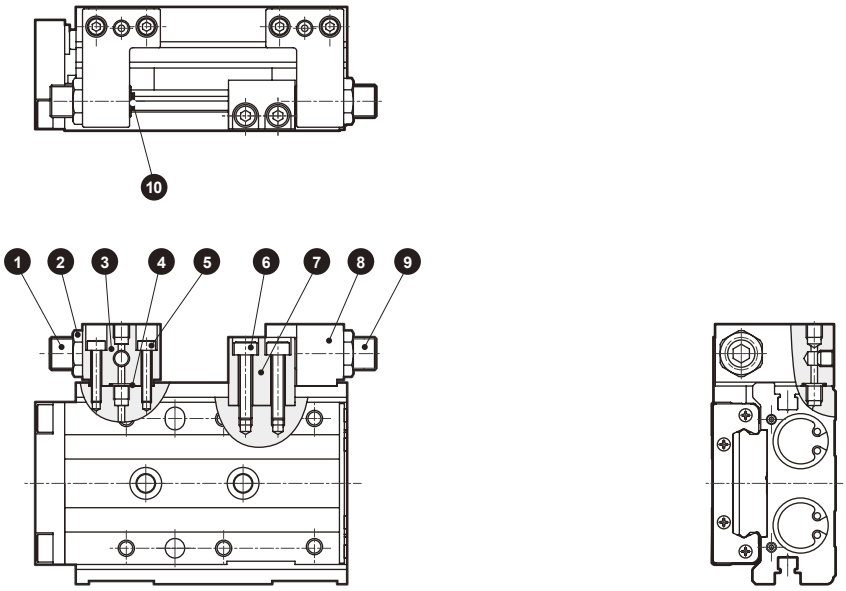
Repair parts list

Bore size (mm)	Kit No.	Repair parts number
ø6	LCG-6K	5 6 10 16 17 18
ø8	LCG-8K	
ø12	LCG-12K	
ø16	LCG-16K	
ø20	LCG-20K	
ø25	LCG-25K	

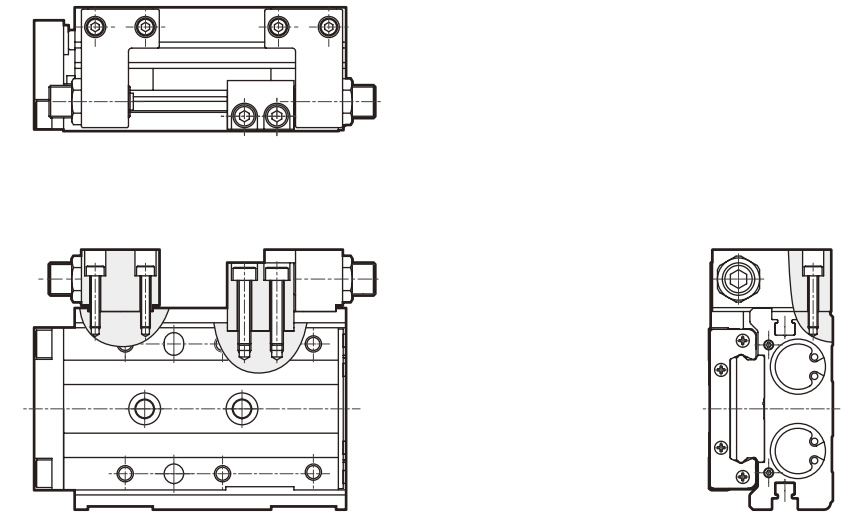
Internal structure and parts list

Configuration with stopper

● Type with stopper section port on side or base (Symbol D)



● Type without stopper section port



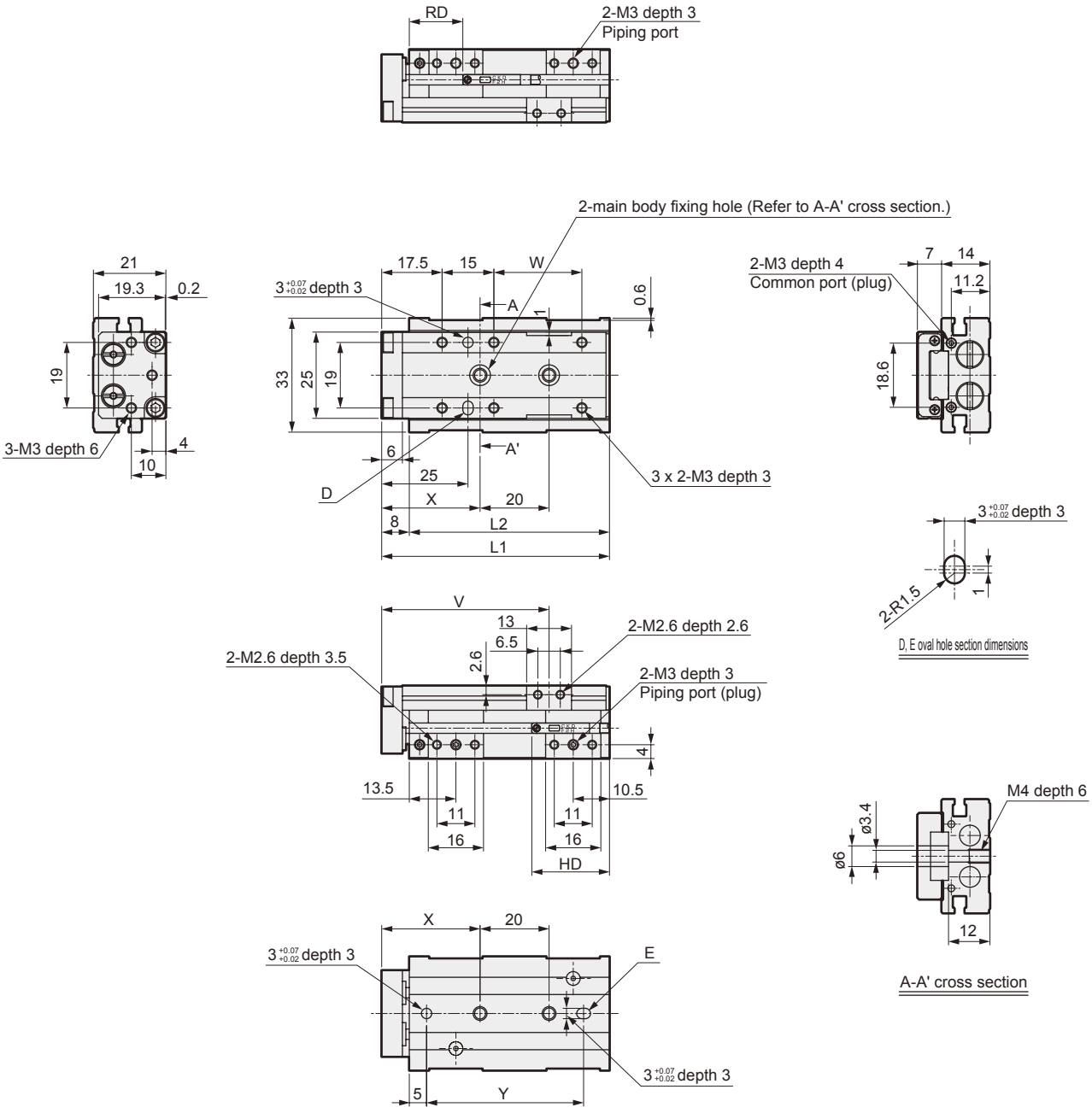
Parts list

No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Stopper bolt	Alloy steel	Nickeling	7	Stopper block (stopper block symbol: blank)	Steel	Nickeling
2	Hexagon nut	Alloy steel	Nickeling				
3	Stopper A	Aluminum alloy	Alumite		Stopper block (stopper block symbol: T)	Alloy steel	Nitriding
4	Gasket	Urethane rubber					
5	Hexagon socket head cap screw	Alloy steel	Zinc chromate	8	Stopper B	Aluminum alloy	Alumite
6	Hexagon socket head cap screw	Alloy steel	Zinc chromate	9	Stopper bolt	Alloy steel	Nickeling
				10	Cushion rubber	Urethane rubber	

Dimensions (bore size: ø6)

● LCG-6

Stroke length: 10, 20, 30
(Main fixing holes in this drawing are for the 20 mm stroke.)



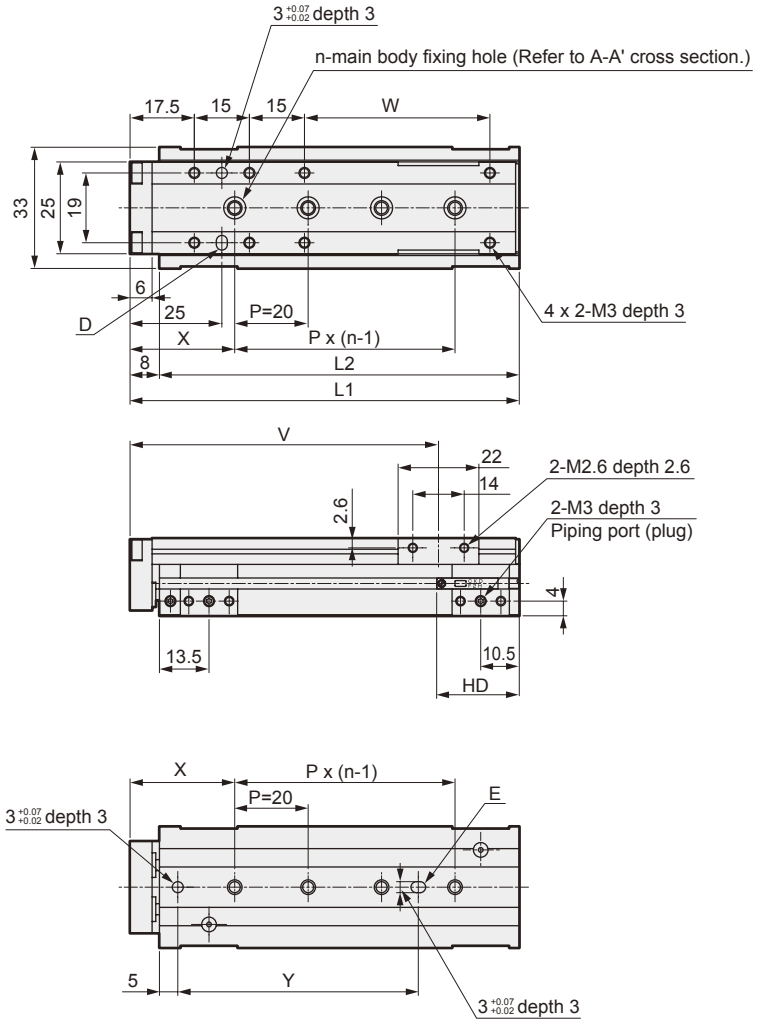
Dimensions table per stroke length

Stroke length	10	20	30
L1	66		76
L2	58		68
V	48.5		58.5
W	25.5		35.5
X	28.5		26
Y	45.5		43
RD	25.5	15.5	
HD	22.5		

Dimensions (bore size: ø6)

● LCG-6

Stroke length: 40, 50
(Main fixing holes in this drawing are for the 50 mm stroke.)



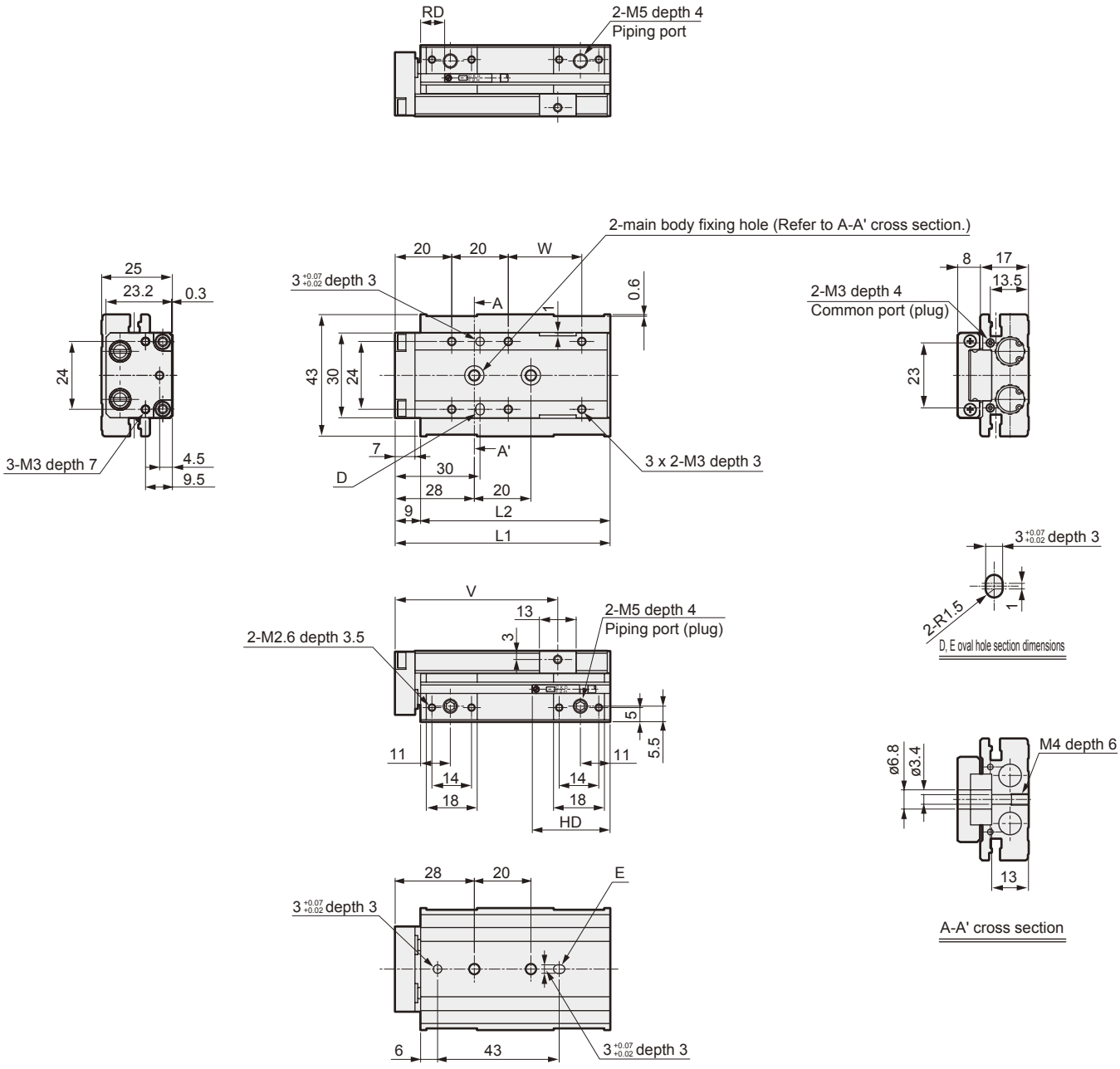
Dimensions table per stroke length

Stroke length	40	50
L1	96	106
L2	88	98
n	3	4
V	74	84
W	40.5	50.5
X	27	28.5
Y	44	65.5
RD	25.5	
HD	22.5	

Dimensions (bore size: ø8)

● LCG-8

Stroke length: 10, 20, 30
(Main fixing holes in this drawing are for the 30 mm stroke.)



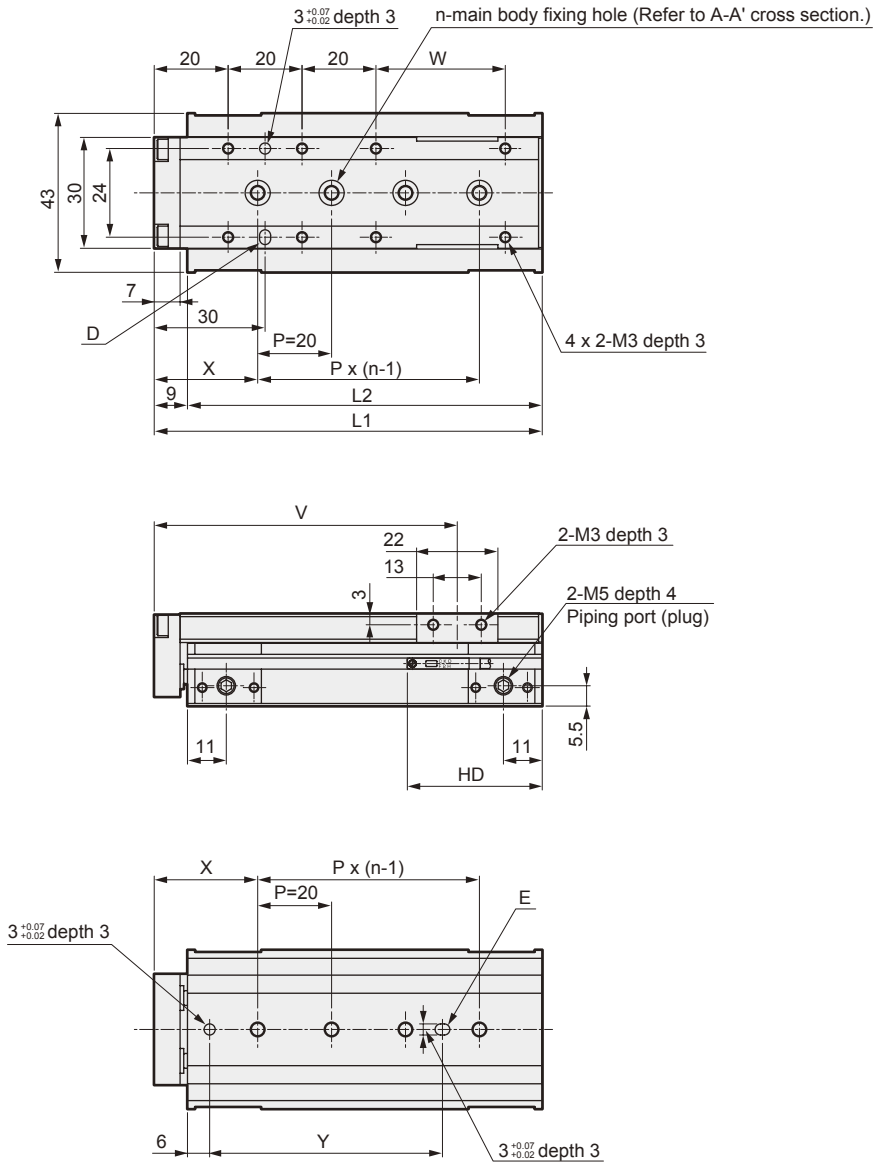
Dimensions table per stroke length

Stroke length	10	20	30
L1	66		76
L2	57		67
V	47.5		57.5
W	16		26
RD	24	14	
HD	23		

Dimensions (bore size: ø8)

● LCG-8

Stroke length: 40, 50, 75
(Main fixing holes in this drawing are for the 50 mm stroke.)



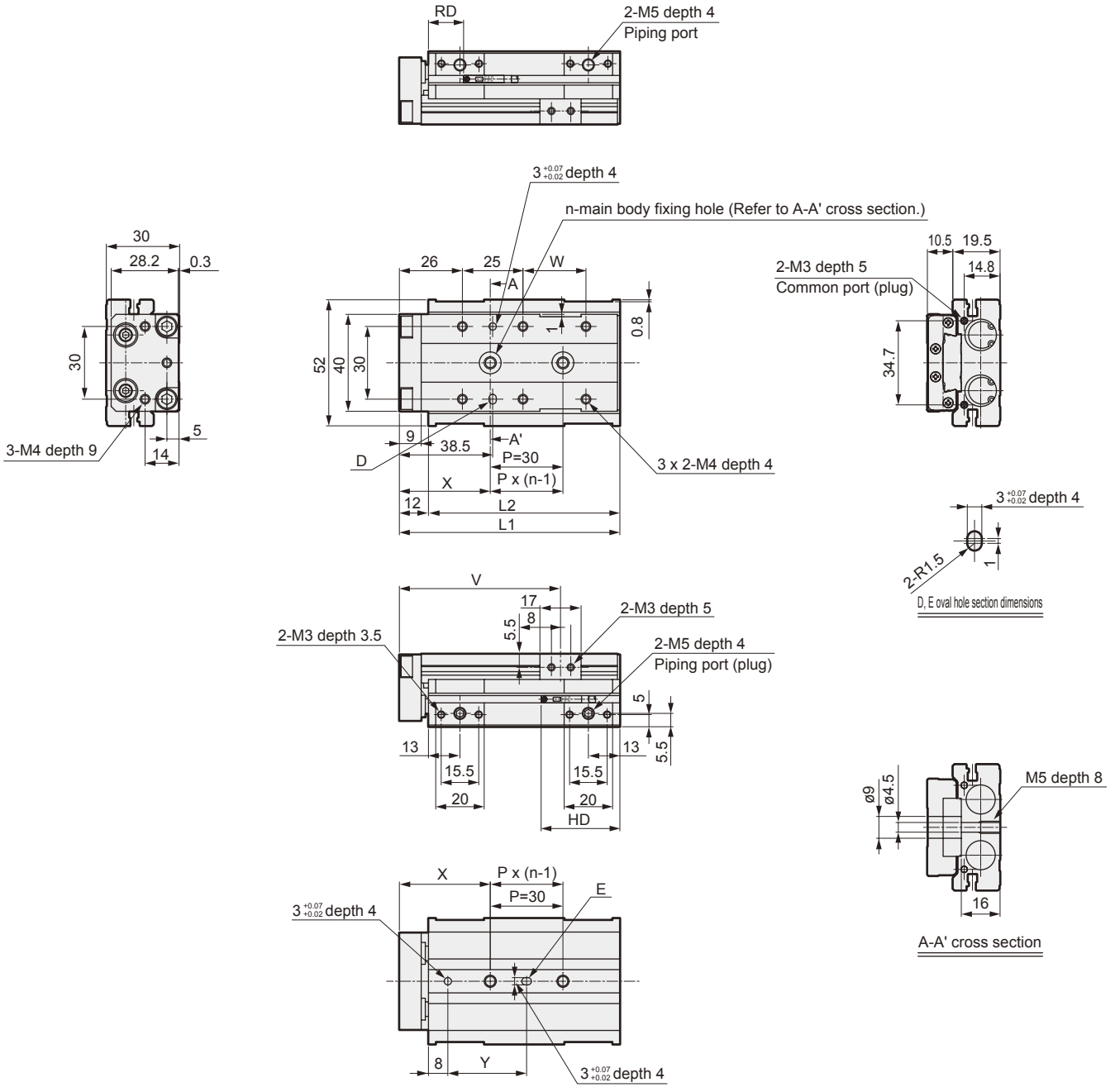
Dimensions table per stroke length

Stroke length	40	50	75
L1	95	105	130
L2	86	96	121
n	3	4	5
V	72	82	107
W	25	35	60
X	26.5	28	25
Y	41.5	63	80
RD	14		
HD	32		

Dimensions (bore size: ø12)

● LCG-12

Stroke length: 10, 20, 30, 40, 50
(Main fixing holes in this drawing are for the 30 mm stroke.)



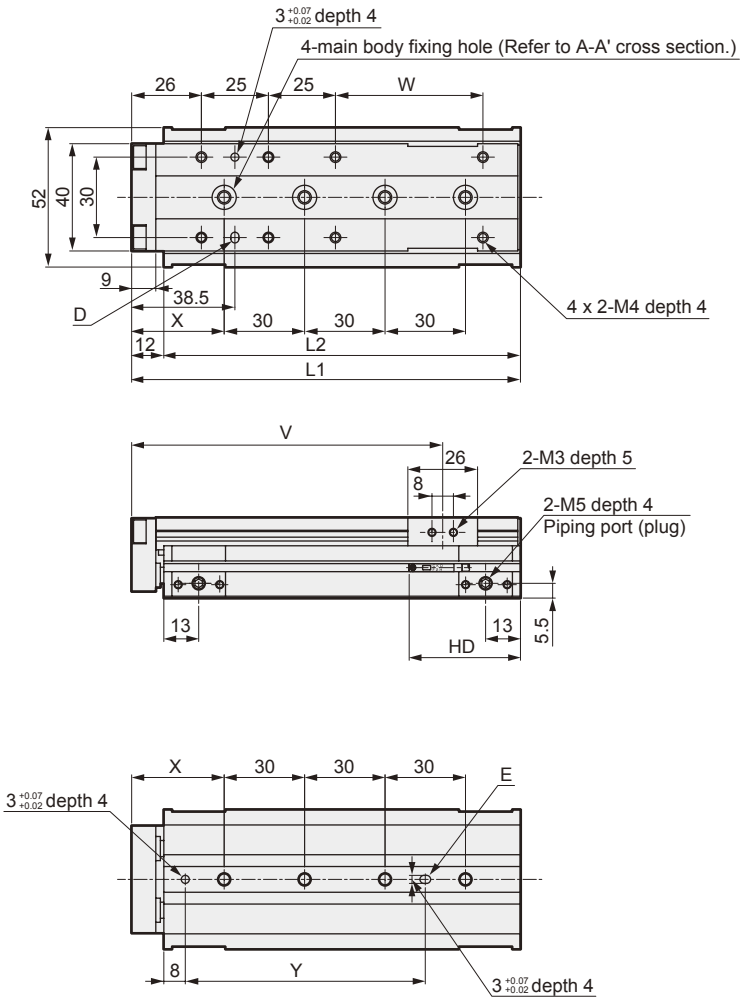
Dimensions table per stroke length

Stroke length	10	20	30	40	50
L1	91			101	111
L2	79			89	99
n	2			3	
V	66.5			76.5	86.5
W	26			36	46
X	37.5			36	32
Y	32.5			31	57
RD	41.5	31.5	21.5		
HD	27				

Dimensions (bore size: ø12)

● LCG-12

Stroke length: 75, 100
(Main fixing holes in this drawing are for the 100 mm stroke.)



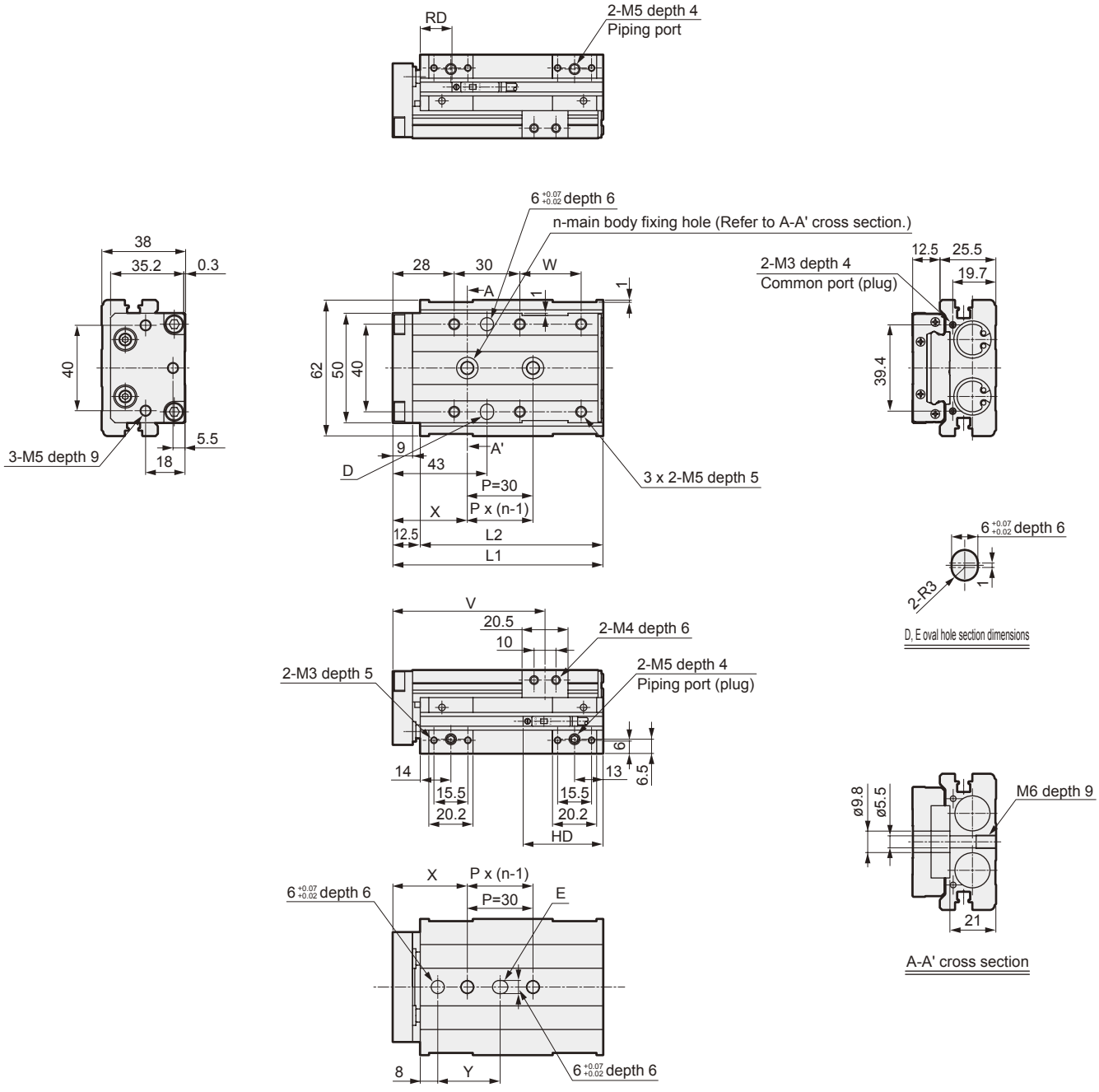
Dimensions table per stroke length

Stroke length	75	100
L1	145	170
L2	133	158
V	116	141
W	55	80
X	34.5	47
Y	89.5	102
RD	21.5	
HD	36	

Dimensions (bore size: ø16)

● LCG-16

Stroke length: 10, 20, 30, 40, 50
(Main fixing holes in this drawing are for the 30 mm stroke.)



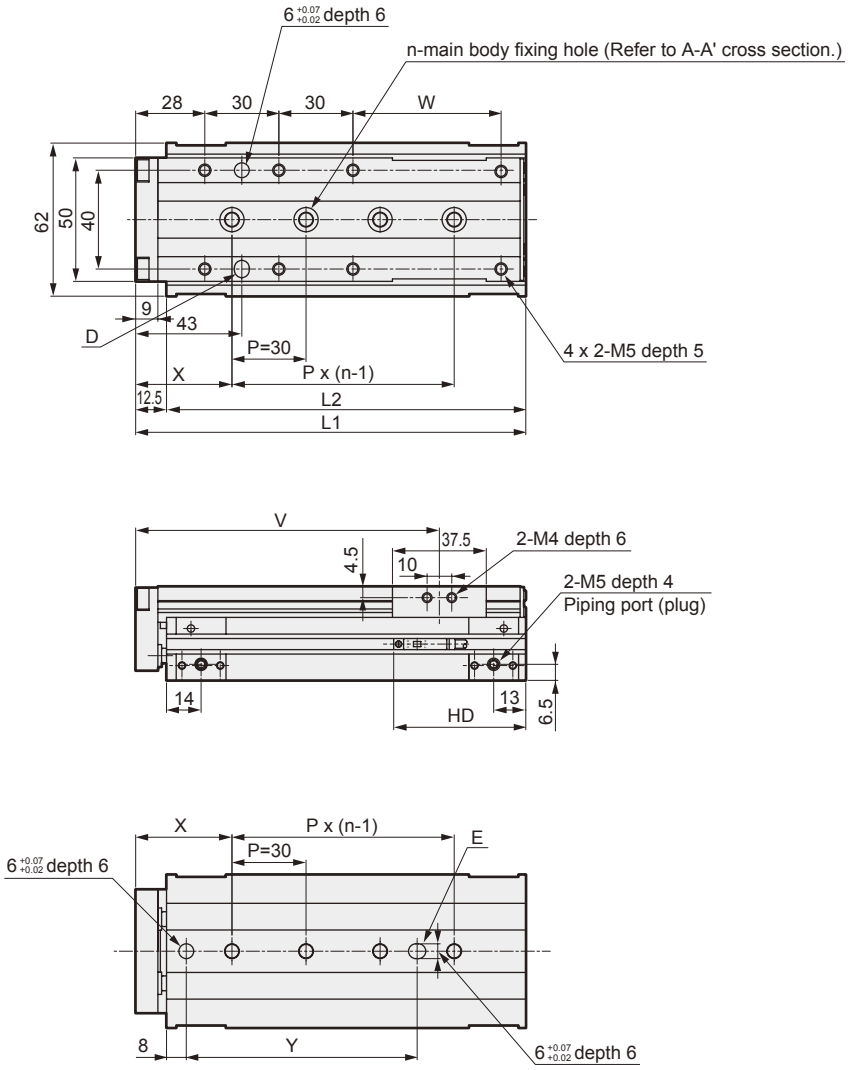
Dimensions table per stroke length

Stroke length		10	20	30	40	50
L1		96			106	116
L2		83.5			93.5	103.5
n		2				3
V		69.8			79.8	89.8
W		28			38	48
X		34			45.5	35.5
Y		28.5			40	60
T0/5*	RD	37	27	17		
T2/3*	HD	36.5				
T2/3W*	RD	39.5	29.5	19.5		
	HD	34				

Dimensions (bore size: ø16)

● LCG-16

Stroke length: 75, 100, 125
(Main fixing holes in this drawing are for the 75 mm stroke.)



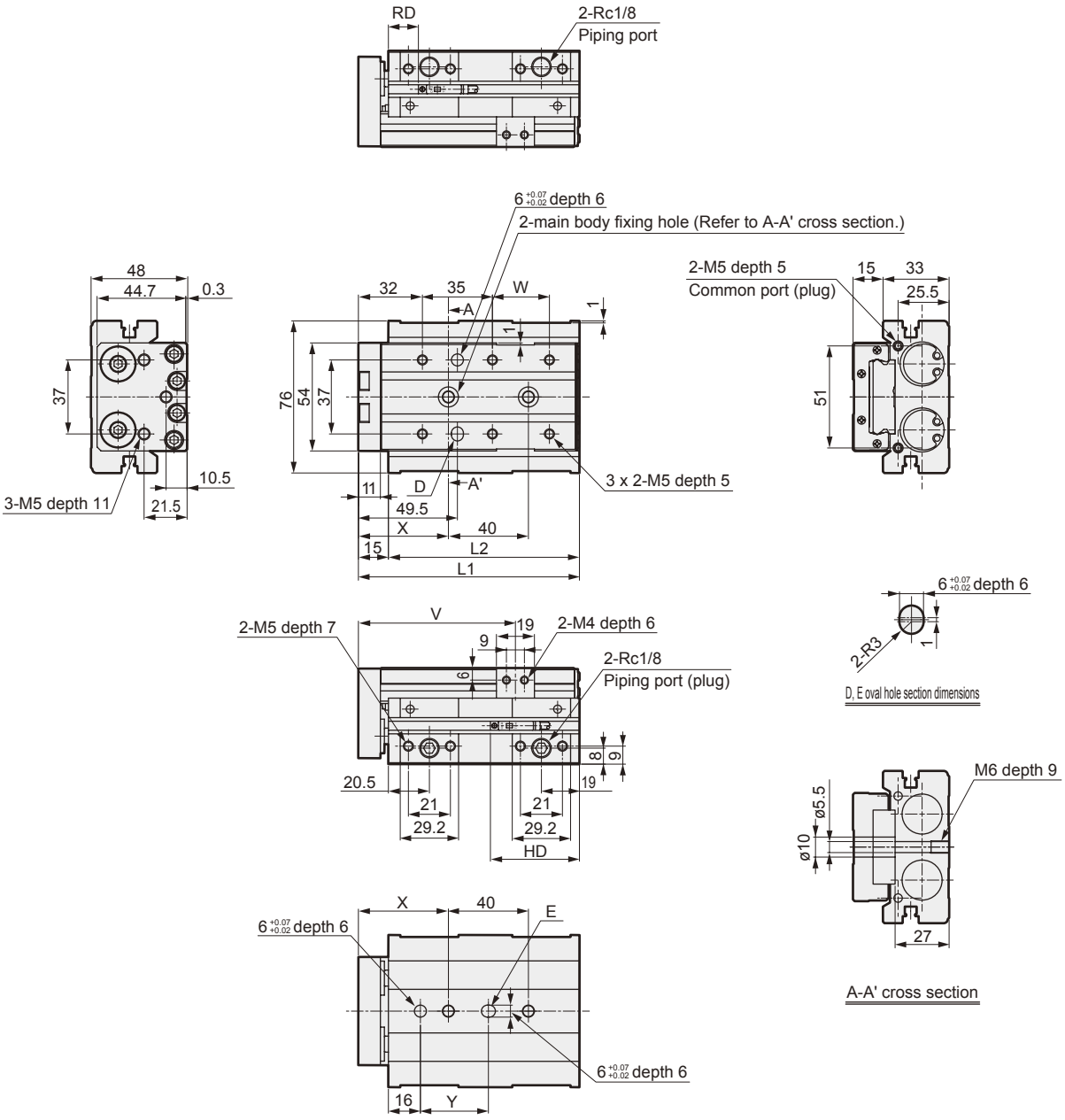
Dimensions table per stroke length

Stroke length		75	100	125
L1		158	183	208
L2		145.5	170.5	195.5
n		4	5	
V		123.3	148.3	173.3
W		60	85	110
X		39	37	49
Y		93.5	121.5	133.5
T0/5*	RD	17		
T2/3*	HD	53.5		
T2/3W*	RD	19.5		
	HD	51		

Dimensions (bore size: ø20)

● LCG-20

Stroke length: 10, 20, 30, 40, 50
(Main fixing holes in this drawing are for the 30 mm stroke.)



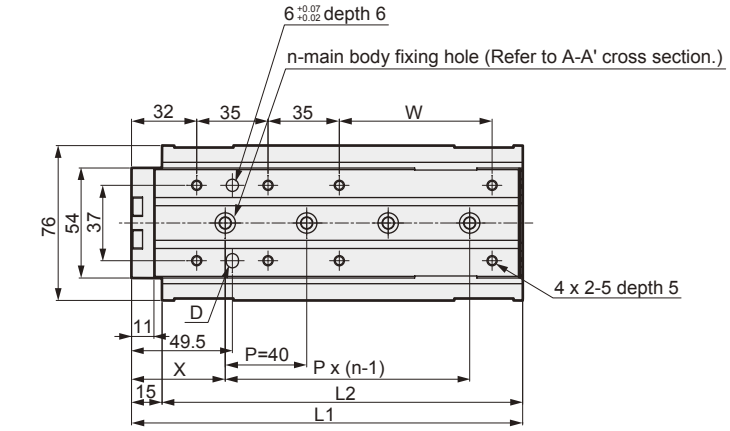
Dimensions table per stroke length

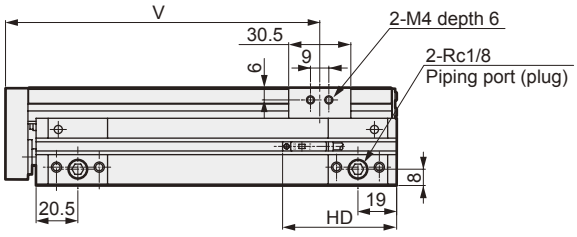
Stroke length		10	20	30	40	50
L1		110.5			120.5	130.5
L2		95.5			105.5	115.5
V		78.5			88.5	98.5
W		28.5			38.5	48.5
X		45			51	49
Y		34			40	38
T0/5*	RD	36	26	16		
T2/3*	HD	49.5				
T2/3W*	RD	38.5	28.5	18.5		
	HD	47				

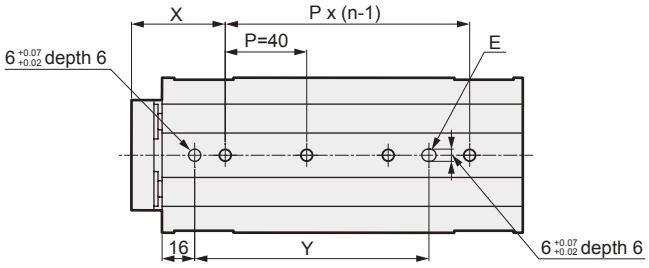
Dimensions (bore size: ø20)

● LCG-20

Stroke length: 75, 100, 125, 150
(Main fixing holes in this drawing are for the 100 mm stroke.)







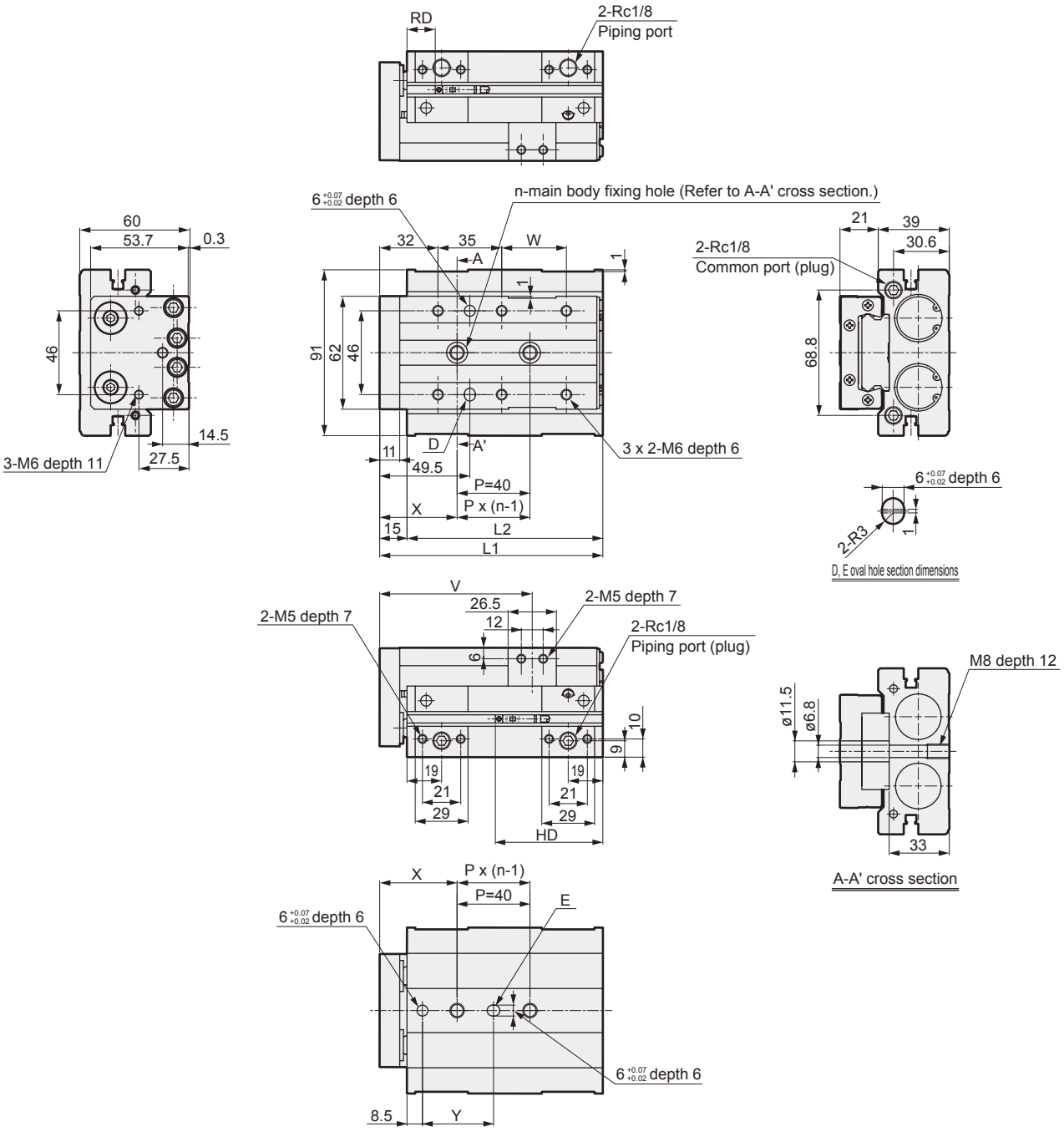
Dimensions table per stroke length

Stroke length		75	100	125	150
L1		167	192	217	242
L2		152	177	202	227
n		3	4		5
V		129.3	154.3	179.3	204.3
W		50	75	100	125
X		46		53	51
Y		75	115	122	160
T0/5*	RD	16			
T2/3*	HD	61			
T2/3W*	RD	18.5			
	HD	58.5			

Dimensions (bore size: ø25)

● LCG-25

Stroke length: 10, 20, 30, 40, 50
(Main fixing holes in this drawing are for the 30 mm stroke.)



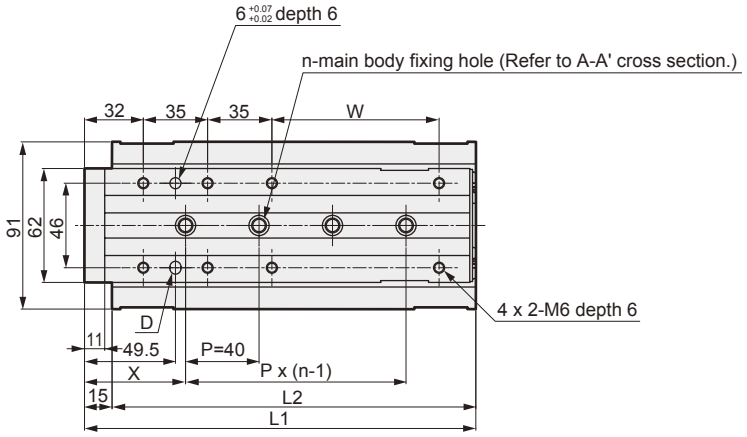
Dimensions table per stroke length

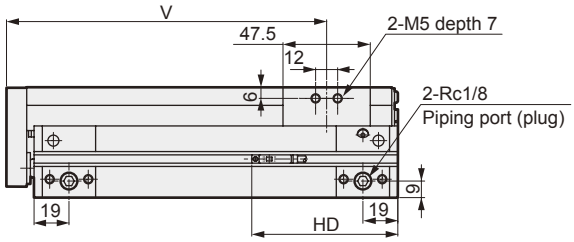
Stroke length		10	20	30	40	50
L1		122.5			132.5	142.5
L2		107.5			117.5	127.5
n		2			3	2
V		83.8			93.8	103.8
W		35.5			45.5	55.5
X		42.5			45.5	60.5
Y		39			42	57
T0/5*	RD	38.5	28.5	18.5		
T2/3*	HD	59				
T2/3W*	RD	41	31	21		
	HD	56.5				

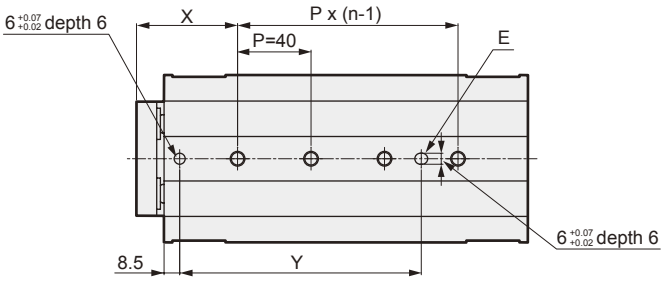
Dimensions (bore size: ø25)

● LCG-25

Stroke length: 75, 100, 125, 150
(Main fixing holes in this drawing are for the 100 mm stroke.)





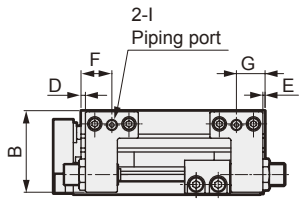


Dimensions table per stroke length

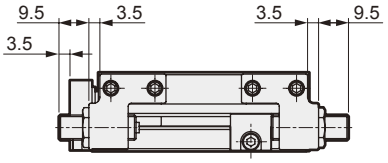
Stroke length		75	100	125	150
L1		188	213	238	263
L2		173	198	223	248
n		3	4	5	
V		138.8	163.8	188.8	213.8
W		66	91	116	141
X		60	55	45	60
Y		96.5	131.5	161.5	176.5
T0/5*	RD	18.5			
T2/3*	HD	79.5			
T2/3W*	RD	21			
	HD	77			

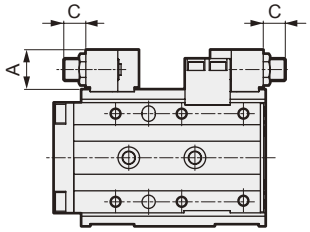
Dimensions: Option

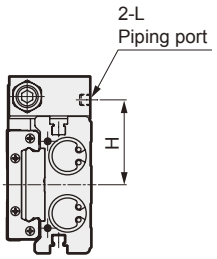
● Stopper for adjustable stroke (S1 to S6)



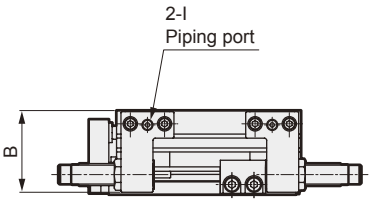
・For ø8



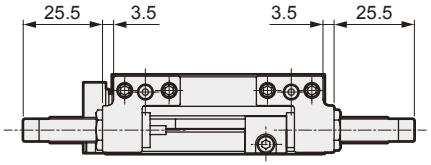


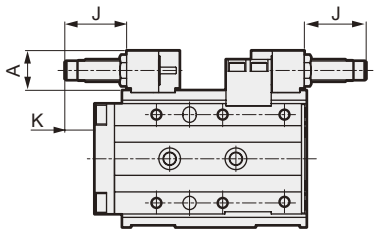


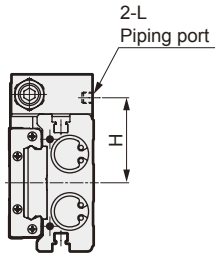
● Shock absorber stopper (A1 to A6)



・For ø8



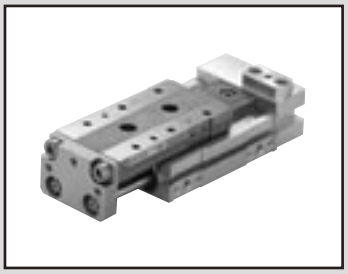




Note 1: F, H, and L dimensions apply only to that with a stopper section port (S*D*, A*D*).
Note 2: The adjustable stroke range for the stopper is 5 mm on a side.
Note 3: S3** to S6** and A3** to A6** are not available for that with position locking.

Symbol / Bore size (mm)	A	B	C	D	E	F	G	H	I	J	K	L	Shock absorber type stopper Stroke adjustment range (single side)
ø6	14	19.5	11	4	1	13.5	10.5	24	M3 depth 3	21	9	M3 depth 3	9
ø8	15.6	24.5	9.5	0.5	0.5	10.5	10.5	27.3	M5 depth 4	25.5	16	M5 depth 4	17
ø12	15.5	29	12	1	1	13	13	31	M5 depth 4	25.5	12.5	M5 depth 4	14.5
ø16	18	37	10	2	1	14	13	39	M5 depth 4	28.5	14	M5 depth 4	15
ø20	20.5	45	14.5	4	2.5	20.5	19	46	Rc1/8	29.5	10.5	M5 depth 4	13
ø25	20.5	57	11.5	2.5	2.5	19	19	54.5	Rc1/8	26.5	9	M5 depth 4	10

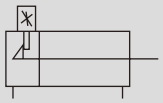
MEMO



Linear slide cylinder double acting position locking type

LCG-Q Series

● Bore size: ø8, ø12, ø16, ø20, ø25

JIS symbol 

Specifications

Descriptions		LCG-Q				
Bore size mm		ø8	ø12	ø16	ø20	ø25
Actuation		Double acting				
Working fluid		Compressed air				
Max. working pressure MPa		0.7				
Min. working pressure MPa		0.15				
Withstanding pressure MPa		1				
Ambient temperature ℃		-10 to 60 (to be unfrozen)				
Port size	Body side surface	M5			Rc1/8	
	Rear body	None				
Stroke tolerance mm		+ 2.0 0 (Note 1)				
Working piston speed mm/s		50 to 500				
Cushion		Rubber cushioned				
Position locking mechanism		Head end				
Holding force N		At PULL, theoretical thrust × 0.7 (at 0.7 MPa)				
Lubrication		Not required (when lubricating, use turbine oil Class one ISOVG 32.)				
Allowable energy absorption J		Refer to the table 3 on Page 47.				

Note 1: When not using a stopper, a slight gap may exist between the end plate and floating bushing.

Stroke length

Bore size (mm)	Standard stroke length (mm)
ø8	10, 20, 30, 40, 50, 75
ø12	10, 20, 30, 40, 50, 75, 100
ø16	10, 20, 30, 40, 50, 75, 100, 125
ø20	10, 20, 30, 40, 50, 75, 100, 125, 150
ø25	10, 20, 30, 40, 50, 75, 100, 125, 150

Note: Stroke length other than above is not available.

Switch specifications

● 1/2 color indicator

Descriptions	Proximity 2 wire		Proximity 3 wire		Proximity 2 wire		Proximity 3 wire	
	T2H/T2V	T2WH/T2WV	T3H/T3V	T3WH/T3WV	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Programmable Controller dedicated		Programmable Controller and relay		Programmable Controller dedicated		Programmable Controller and relay	
Output type	-		NPN output		-		NPN output	
Power voltage	-		10 to 28V DC		-		10 to 28V DC	
Load voltage	10 to 30V DC	24V DC±10%	30V DC or less		10 to 30V DC	24V DC±10%	30V DC or less	
Load current	5 to 20mA		100mA or less	50mA or less	5 to 20mA		100mA or less	50mA or less
Light	LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)
Leakage current	1mA or less		10μA or less		1mA or less		10μA or less	

Descriptions	Reed 2 wire			
	T0H/T0V		T5H/T5V	
Applications	Programmable Controller and relay		Programmable controller, relay IC circuit (without light), serial connection	
Load voltage	12/24VDC	110VAC	5/12/24VDC	110VAC
Load current	5 to 50mA	7 to 20mA	50mA or less	20mA or less
Light	LED (ON lighting)		Without indicator light	
Leakage current	0mA			

Cylinder weight

● Position locking type

(Unit: g)

Bore size (mm)	Basic stroke type (mm)								
	10	20	30	40	50	75	100	125	150
ø8	310	310	350	420	450	540	-	-	-
ø12	585	585	585	635	695	875	1,025	-	-
ø16	910	910	910	990	1,070	1,400	1,590	1,800	-
ø20	1,510	1,510	1,510	1,630	1,750	2,170	2,460	2,760	3,050
ø25	2,450	2,450	2,450	2,610	2,810	3,620	4,040	4,460	4,910

● Additional variations and options (stoppers)

(Unit: g)

Bore size (mm)	Option and stopper symbol	
	S1, S2	A1, A2
ø8	50	50
ø12	70	70
ø16	130	130
ø20	130	130
ø25	200	200

How to order

Without switch

LCG-Q - 8 - 40 ——— S2

With switch

LCG-Q - 12 - 40 - F2H* - R - A1DT

- Model no.
- Ⓐ Bore size
- Ⓑ Stroke length
- Ⓒ Switch model no.
- Ⓓ Switch quantity
- Ⓔ Option

Symbol	Descriptions
Ⓐ Bore size	
8	ø8
12	ø12
16	ø16
20	ø20
25	ø25

Ⓑ Stroke length (mm)

		Bore size (ø)				
		8	12	16	20	25
10	10	●	●	●	●	●
20	20	●	●	●	●	●
30	30	●	●	●	●	●
40	40	●	●	●	●	●
50	50	●	●	●	●	●
75	75	●	●	●	●	●
100	100		●	●	●	●
125	125			●	●	●
150	150				●	●

Ⓒ Switch model no.

Axial lead wire	Radial lead wire	Contact	Indicator	Lead wire	Bore size ø8	ø12	ø16	ø20	ø25
F2H*	F2V*	Proximity	One color indicator type	2-wire	●	●			
F3H*	F3V*			3-wire					
F2YH*	F2YV*		2 color indicator type	2-wire					
F3YH*	F3YV*			3-wire					
T0H*	T0V*	Reed	One color indicator type	2-wire					
T5H*	T5V*								
T2H*	T2V*	Proximity	One color indicator type	2-wire			●	●	●
T3H*	T3V*			3-wire					
T2WH*	T2WV*		2 color indicator type	2-wire					
T3WH*	T3WV*			3-wire					

***Lead wire length**

Blank	1m (standard)			●	
3	3m (option)			●	
5	5m (option)				●

Ⓓ Switch quantity

R	One on rod end
H	One on head end
D	Two

Ⓔ Option

Blank	No option	
S Stopper for adjustable stroke		
	Adjustable stroke single side 5mm	**Note 1, Note 5, Note 7**
S1**	Stopper position ①	Stopper installation position
S2**	Stopper position ②	
A Shock absorber type stopper		**Note 2, Note 5, Note 7**
A1**	Stopper position ①	Stopper installation position
A2**	Stopper position ②	
**** section**		
Blank	Port at stopper section: no port	
D	Port at stopper section: with side or base port	Note 3, Note 6
Blank	Stopper block material: Rolled steel	
T	Stopper block material: Alloy steel (nitriding)	Note 6

⚠ Note on model no. selection

Note 1: Use stopper parts for the adjustable stroke on page 6 when changing the adjustable stroke range.
Note 2: When using a shock absorber, refer to the stopper dimensions table on page 21 for the adjustable stroke range.
Note 3: Refer to stopper dimensions on page 21 for port locations.
Note 4: If no stopper is provided, the standard port locations are (1) and (3) below.
Note 5: The stopper for adjustable stroke and shock absorber stopper combination is available as a customized part.
Note 6: Selectable only when using a stopper.
Note 7: Refer to the selection table on page 26 for option combinations.
Note 8: A1** and A2** at ø8-10st or ø12 to ø25-20st or less cannot be adjusted with the standard stopper, and are available only as customized parts.

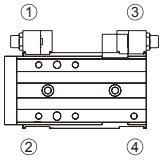
<Example of model number>

LCG-Q-12-40-F2H-R-A1DT

Model: Linear slide cylinder double acting position locking type LCG-Q

- Ⓐ Bore size : ø12
- Ⓑ Stroke length : 40mm
- Ⓒ Switch model no. : Proximity and 2 wire Axial lead wire
- Ⓓ Switch quantity : With one pc. on rod end
- Ⓔ Other options : shock absorber type Stopper position ① With side or base port Material, alloy steel (nitriding)

● Stopper position



LCG-Q position locking type selection table

(Combination with stopper for adjustable stroke and shock absorber stopper)

○: Available -: Not available

Model no. symbol	Option symbol		Stopper for adjustable stroke						Shock absorber type stopper					
	Bore size	Stroke length	S1	S2	S3	S4	S5	S6	A1	A2	A3	A4	A5	A6
LCG-Q base	ø8	10	○	○	-	-	-	-	-	-	-	-	-	-
		20 and over	○	○	-	-	-	-	○	○	-	-	-	-
	ø12 to ø25	10 to 20	○	○	-	-	-	-	-	-	-	-	-	-
		30 and over	○	○	-	-	-	-	○	○	-	-	-	-

Option symbol D: with stopper section port and T: stopper block alloy steel (nitriding) combined as shown in the selection table above.

How to order switch

If ø8 to ø12

SW - F2H

Switch model no.
(Page 25 item Ⓒ)

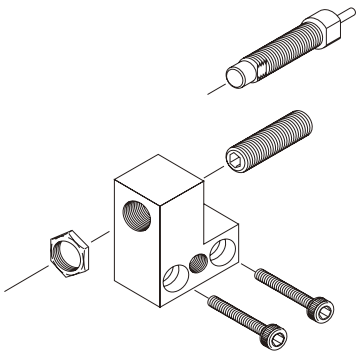
If ø16 to ø25

SW - T2H3

Switch model no.
(Page 25 item Ⓒ)

How to order stopper set

- Stopper section and stopper for adjustable stroke or shock absorber stopper set
- Use when changing from standard to stopper for adjustable stroke or with shock absorber stopper



LCG - 12 - S 2 D

Bore size
(Page 25 item Ⓐ)

Ⓐ Stopper type	
S	Stopper for adjustable stroke
A	Shock absorber type stopper

Ⓑ Stopper installation position	
1	For stopper position ① or ④
2	For stopper position ② or ③

Ⓒ Port at stopper section	
Blank	No port
D	With side and bottom ports

Precautions for ordering stopper set

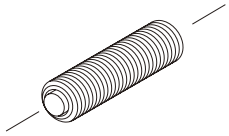
S01 is included in the stopper for adjustable stroke parts for the stopper for adjustable stroke set.
When installing at position ① or ② (refer to page 25), add parts shown on the right based on the stoke or adjustable stroke length.

-: not available

Model no. symbol	Option symbol		Discrete stopper for adjustable stroke		
			Adjustable stroke length (mm)		
	Bore size	Stroke length	-5	-15	-25
LCG-Q Series	ø8	10	S02	-	-
		20 and over	Addition not required	S02	-
	ø12 to ø25	10	S03	-	-
		20	S02	S03	-
		30 and over	Addition not required	S02	S03

How to order the discrete stopper for adjustable stroke

● Hexagon socket head set screw with urethane
● Use for changing the adjustable stroke range or setting to the middle stroke



LCG - 12 - S02

Bore size
(Page 25 item Ⓐ)

Ⓐ Adjustable stroke range	
S01	Single 5mm (standard)
S02	Single 15mm
S03	Single 25mm

Indicate S01, S02 or S03 in Ⓐ section.
Note: S03 is not used for ø8.
Depending on the type, the incompatible models or adjustable stroke ranges may differ from the above values.

Precautions for ordering discrete stopper

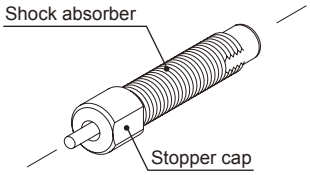
Only when installing the discrete stopper for an adjustable stroke or discrete shock absorber stopper at installation position ① or ② (refer to page 25), the combination will be as shown on the right depending on the stroke or adjustable stroke length.

-: combination not available

Model no. symbol	Option symbol		Discrete stopper for adjustable stroke			Discrete shock absorber type stopper
			Adjustable stroke length (mm)			
	Bore size	Stroke length	-5	-15	-25	
LCG Series -S1, S2 -A1, A2	ø8	10	S02	-	-	-
		20 and over	S01	S02	-	A01
	ø12 to ø25	10	S03	-	-	-
		20	S02	S03	-	-
		30 and over	S01	S02	S03	A01

How to order the discrete shock absorber stopper

● Sets of shock absorber and stopper cap
● Use for changing from the stopper for an adjustable stroke to the shock absorber stopper.



LCG - 12 - A01

Bore size
(Page 25 item Ⓐ)

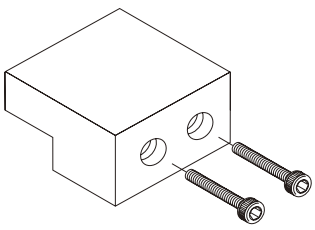
Note: Some models may not be available depending on the type. Refer to page 25.
Refer to page 21 for adjustable stroke range of a shock absorber type stopper.

Applicable shock absorber model No.

Model	Shock absorber model no.
LCG-8	NCK-00-0.3
LCG-12	NCK-00-0.3
LCG-16	NCK-00-0.7
LCG-20	NCK-00-1.2
LCG-25	NCK-00-1.2

Discrete stopper block model no. display

● Use when changing from standard to stopper for adjustable stroke or with shock absorber stopper



LCG - 12 - SB1 T

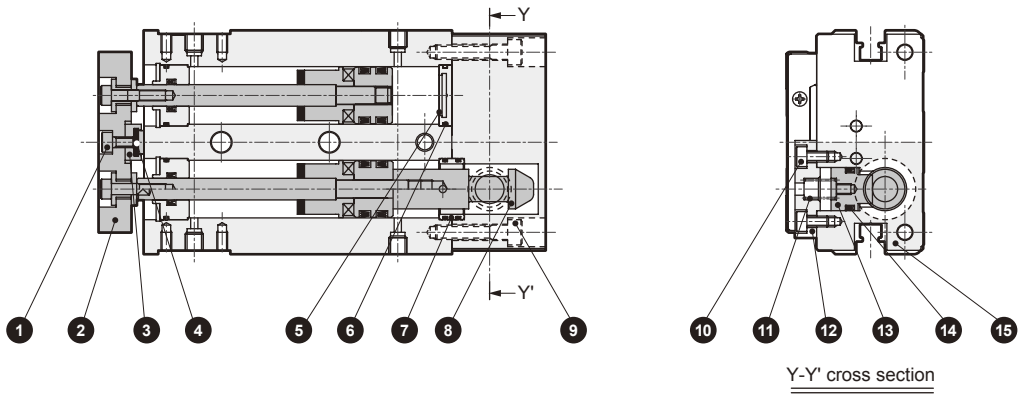
Bore size
(Page 25 item Ⓐ)

Ⓐ Stopper block	
SB1	ø8: 30 mm stroke or less
	ø12 to ø25: 50 mm stroke or less
SB2	ø8: 40 mm stroke and over
	ø12 to ø25: 75 mm stroke and over

Ⓑ Material	
Blank	Stopper block material: Rolled steel
T	Stopper block material: Alloy steel (nitriding)

Internal structure and parts list

● LCG-Q



Y-Y' cross section

Parts list

No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Hexagon socket head cap screw	Alloy steel	Zinc chromate	8	Sleeve	Carbon steel	Nitriding
2	End plate	Aluminum alloy	Alumite	9	Hexagon socket head cap screw	Alloy steel	Zinc chromate
3	Stopper	Aluminum alloy	Alumite	10	Hexagon socket head cap screw	Alloy steel	Zinc chromate
4	Cushion rubber (H)	Urethane rubber		11	Coil spring	Steel	
5	Guard	Aluminum alloy		12	Stopper guard	Aluminum alloy	Alumite
6	Gasket	Nitrile rubber		13	Stopper piston	Carbon steel	Nitriding
7	Joint ring	ø8: stainless steel ø12 to 25: aluminum alloy	ø12 to 25: chromate	14	Stopper packing seal	Nitrile rubber	
				15	Head cover	Aluminum alloy	Alumite

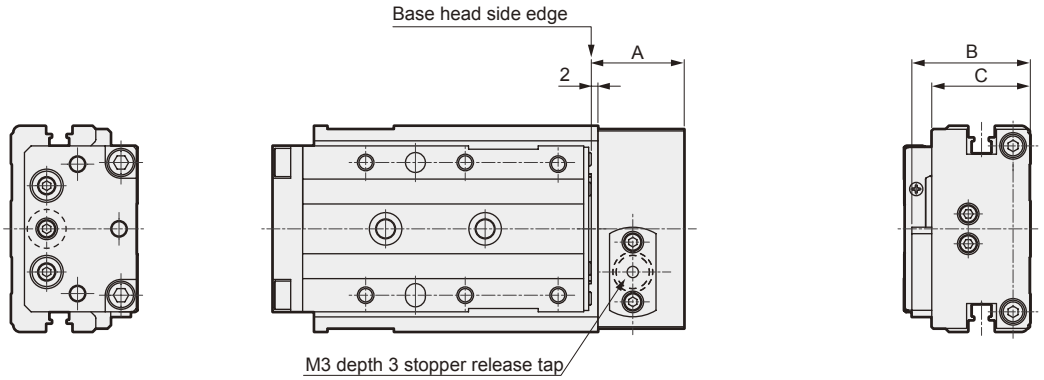
Repair parts list

Bore size (mm)	Kit No.	Repair parts number	
		Position locking unit repair parts	Basic unit repair parts
ø8	LCG-Q-8K	4 14	5 6 10 16 18
ø12	LCG-Q-12K		
ø16	LCG-Q-16K		
ø20	LCG-Q-20K		
ø25	LCG-Q-25K		

Note: Basic unit repair part numbers correspond to the double acting single rod parts list on page 7.

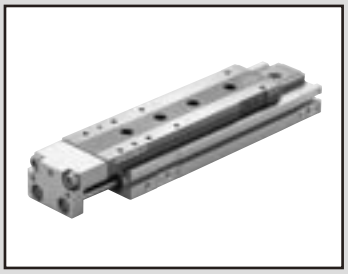
Dimensions

● LCG-Q



Symbol / Bore size (mm)	A	B	C
ø8	23	29.5	22
ø12	24.5	30.5	24.5
ø16	28	35.7	29.7
ø20	30	39	33
ø25	30	48	42

Note: Dimensions other than the above are the same as for the double acting single rod model.

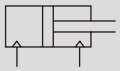


Linear slide cylinder double acting single rod type clean room specifications

LCG-P7* Series

● Bore size: ø6, ø8, ø12, ø16, ø20, ø25

JIS symbol



Specifications

Descriptions		LCG-P73					
Bore size mm		ø6	ø8	ø12	ø16	ø20	ø25
Actuation		Double acting					
Working fluid		Compressed air					
Max. working pressure MPa		0.7					
Min. working pressure MPa		0.15					
Withstanding pressure MPa		1					
Ambient temperature ℃		-10 to 60 (to be unfrozen) (Note 1)					
Port size	Body side surface	M3	M5			Rc1/8	
	Rear body	M3				M5	Rc1/8
Relief port size		M3	M5			Rc1/8	
Stroke tolerance mm		+2.0 0 (Note 2)					
Working piston speed mm/s		50 to 500					
Cushion		Rubber cushioned					
Lubrication		Not available					
Allowable energy absorption J		Refer to the table 3 on Page 47.					

Note 1: The maximum temperature is 50℃ when the switch 6 in diameter is used -- 45℃ when installing on a steel plate.
Note 2: When not using a stopper, a slight gap may exist between the end plate and floating bushing.

Stroke length

Bore size (mm)	Standard stroke length (mm)
ø6	10, 20, 30, 40, 50
ø8	10, 20, 30, 40, 50, 75
ø12	10, 20, 30, 40, 50, 75, 100
ø16	10, 20, 30, 40, 50, 75, 100, 125
ø20	10, 20, 30, 40, 50, 75, 100, 125, 150
ø25	10, 20, 30, 40, 50, 75, 100, 125, 150

Note: Stroke length other than above is not available.

Switch specifications

● 1/2 color indicator

Descriptions	Proximity 2 wire		Proximity 3 wire		Proximity 2 wire		Proximity 3 wire	
	T2H/T2V	T2WH/T2WV	T3H/T3V	T3WH/T3WV	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Programmable Controller dedicated		Programmable Controller and relay		Programmable Controller dedicated		Programmable Controller and relay	
Output type	-		NPN output		-		NPN output	
Power voltage	-		10 to 28V DC		-		10 to 28V DC	
Load voltage	10 to 30V DC	24V DC±10%	30V DC or less		10 to 30V DC	24V DC±10%	30V DC or less	
Load current	5 to 20mA		100mA or less	50mA or less	5 to 20mA		100mA or less	50mA or less
Light	LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)
Leakage current	1mA or less		10μA or less		1mA or less		10μA or less	

Descriptions	Reed 2 wire			
	T0H/T0V		T5H/T5V	
Applications	Programmable Controller and relay		Programmable controller, relay IC circuit (without light), serial connection	
Load voltage	12/24VDC	110VAC	5/12/24VDC	110VAC
Load current	5 to 50mA	7 to 20mA	50mA or less	20mA or less
Light	LED (ON lighting)		Without indicator light	
Leakage current	0mA			

Cylinder weight

● Clean room specifications (Unit: g)

Bore size (mm)	Basic stroke type (mm)								
	10	20	30	40	50	75	100	125	150
ø6	170	170	200	240	260	-	-	-	-
ø8	270	270	310	380	410	500	-	-	-
ø12	570	570	570	620	680	860	1,010	-	-
ø16	860	860	860	940	1,020	1,350	1,540	1,750	-
ø20	1,520	1,520	1,520	1,640	1,760	2,180	2,470	2,770	3,060
ø25	2,460	2,460	2,460	2,620	2,820	3,630	4,050	4,470	4,920

● Additional variations and options (stoppers) (Unit: g)

Bore size (mm)	Option and stopper symbol	
	S1 to S4	S5, S6
ø6	40	60
ø8	50	70
ø12	70	110
ø16	130	180
ø20	130	200
ø25	200	270

How to order

Without switch

LCG - 8 - 40 ——— S5 - P72

With switch

LCG - 12 - 40 - F2H* - R - S1DT - P72

- LCG: Model no.
- 12: Ⓐ Bore size
- 40: Ⓑ Stroke length
- F2H*: Ⓒ Switch model no.
- R: Ⓓ Switch quantity
- S1DT: Ⓔ Option
- P72: Ⓕ Clean room specifications

Symbol	Descriptions
Ⓐ Bore size	
6	ø6
8	ø8
12	ø12
16	ø16
20	ø20
25	ø25

Ⓑ Stroke length (mm)

		Bore size (ø)					
		6	8	12	16	20	25
10	10	●	●	●	●	●	●
20	20	●	●	●	●	●	●
30	30	●	●	●	●	●	●
40	40	●	●	●	●	●	●
50	50	●	●	●	●	●	●
75	75		●	●	●	●	●
100	100			●	●	●	●
125	125				●	●	●
150	150					●	●

Ⓒ Switch model no.

Axial lead wire	Radial lead wire	Contact	Indicator	Lead wire	Bore size ø6	ø8	ø12	ø16	ø20	ø25
F2H*	**F2V***	Proximity	One color indicator type	2-wire	●	●	●			
F3H*	**F3V***			3-wire						
F2YH*	**F2YV***		2 color indicator type	2-wire						
F3YH*	**F3YV***			3-wire						
T0H*	**T0V***	Reed	One color indicator type	2-wire						
T5H*	**T5V***									
T2H*	**T2V***	Proximity	One color indicator type	2-wire				●	●	●
T3H*	**T3V***			3-wire						
T2WH*	**T2WV***		2 color indicator type	2-wire						
T3WH*	**T3WV***			3-wire						

Lead wire length

Blank	1m (standard)	●
3	3m (option)	●
5	5m (option)	●

Ⓓ Switch quantity

R	One on rod end	●
H	One on head end	●
D	Two	●

Ⓔ Option

Blank	No option	●
S Stopper for adjustable stroke		
Adjustable stroke single side 5mm		**Note 4**
S1**	Stopper position ① (Changeable to ④)	●
S2**	Stopper position ② (Changeable to ③)	●
S3**	Stopper position ③ (Changeable to ②)	●
S4**	Stopper position ④ (Changeable to ①)	●
S5**	Stopper position ① and ③	●
S6**	Stopper position ② and ④	●
**** section**		
Blank	Port at stopper section: no port	●
D	Port at stopper section: with side or base port	● Note 1, Note 3
Blank	Stopper block material: Rolled steel	●
T	Stopper block material: Alloy steel (nitriding)	● Note 3

Stopper installation position

Ⓕ Clean room specifications

	Structure
P72	Exhaust treatment
P73	Vacuum treatment

⚠ Note on model no. selection

Note 1: Refer to stopper dimensions on page 21 for port locations.
Note 2: If no stopper is provided, the standard port locations are (1) and (3) below.
Note 3: Selectable only when using a stopper.
Note 4: When installing two switches with ø6-10st S***, select the F*H switch.

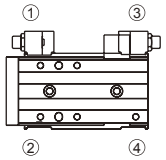
<Example of model number>

LCG-12-40-F2H*-R-S1DT-P72

Model: Linear slide cylinder double acting single rod type (clean room specifications) LCG-P7*

- Ⓐ Bore size : ø12
- Ⓑ Stroke length : 40mm
- Ⓒ Switch model no. : Proximity and 2 wire Axial lead wire
- Ⓓ Switch quantity : With one pc. on rod end
- Ⓔ Other options : Stopper for stroke adjustment Stopper position ① With side or base port Material, alloy steel (nitriding)
- Ⓕ Clean room specifications: Exhaust treatment

● Stopper position

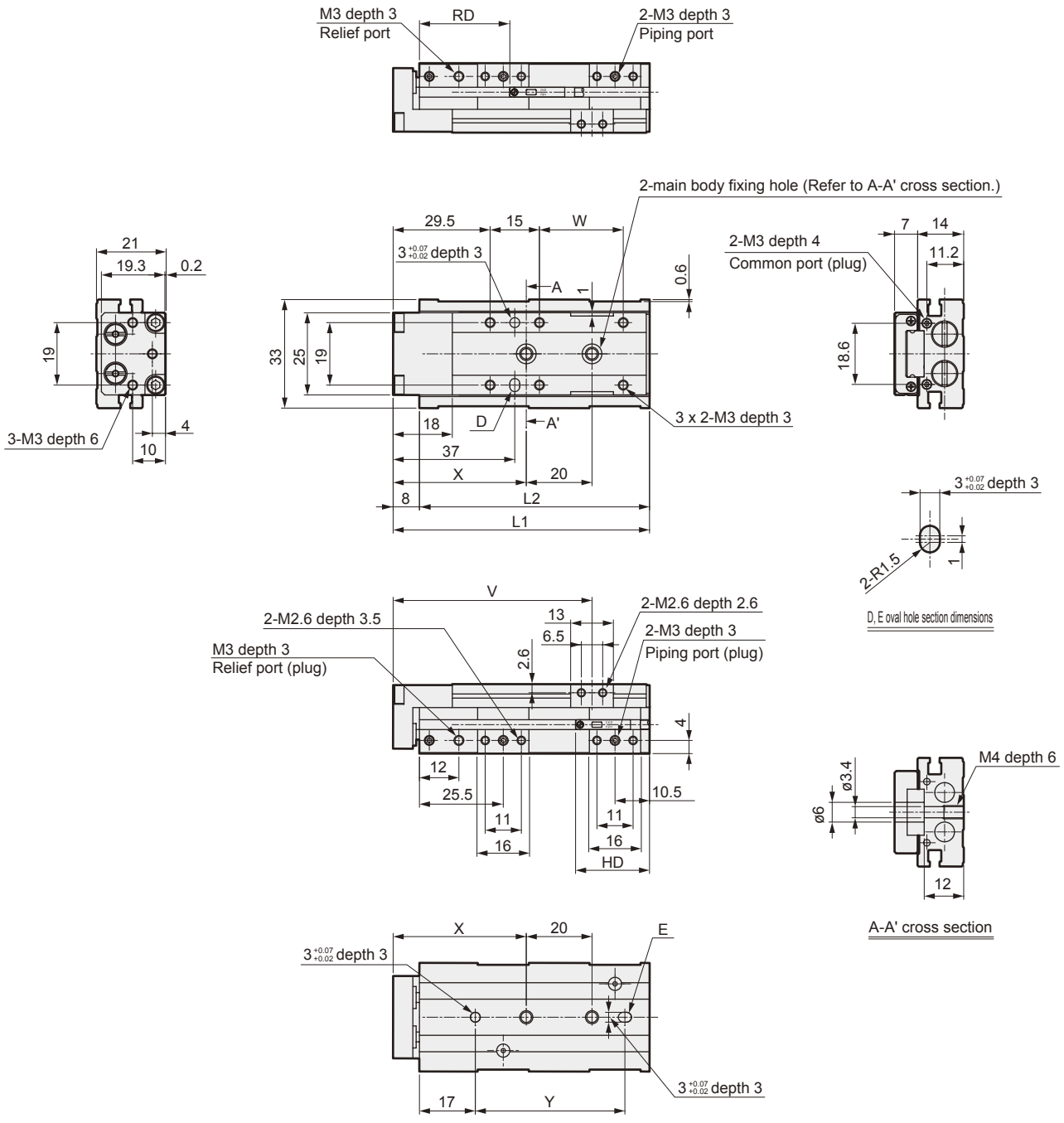


MEMO

Dimensions (bore size: ø6)

● LCG-6-P7*

Stroke length: 10, 20, 30
(Main fixing holes in this drawing are for the 20 mm stroke.)



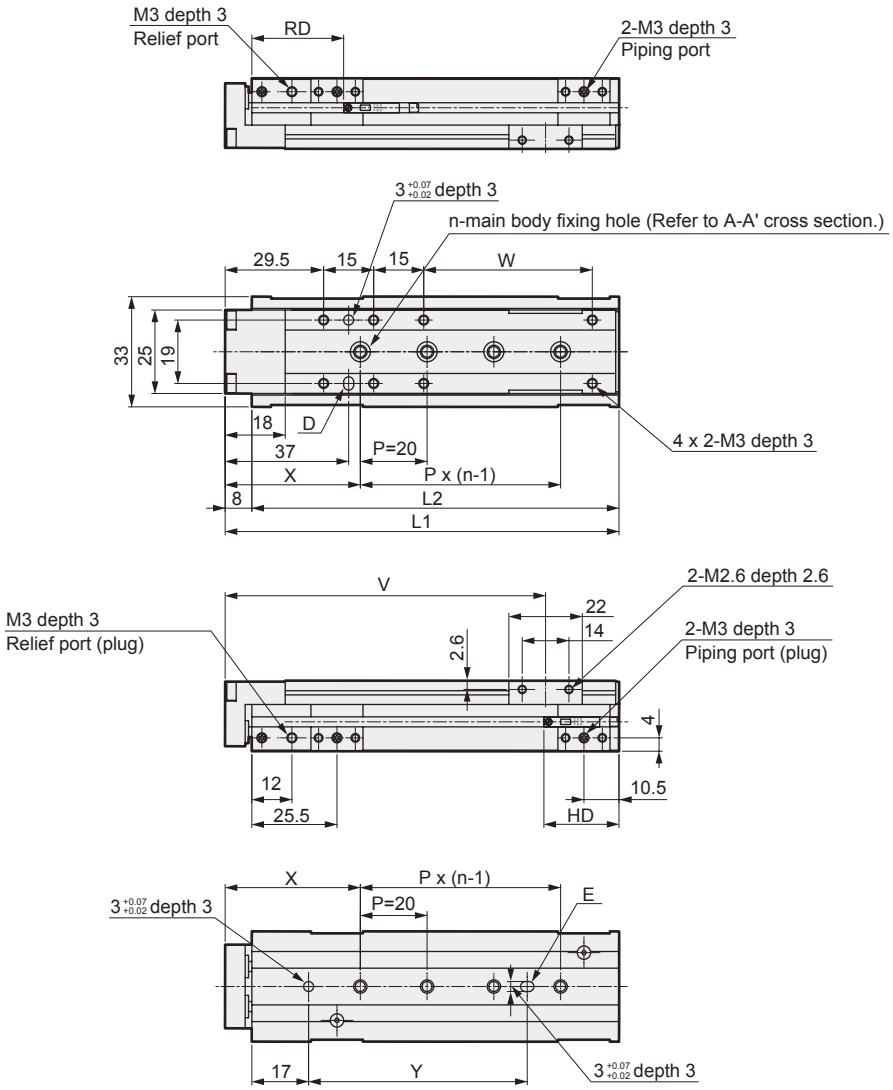
Dimensions table per stroke length

Stroke length	10	20	30
L1	78		88
L2	70		80
V	60.5		70.5
W	25.5		35.5
X	40.5		38
Y	45.5		43
RD	37.5	27.5	
HD	22.5		

Dimensions (bore size: ø6)

● LCG-6-P7*

Stroke length: 40, 50
(Main fixing holes in this drawing are for the 50 mm stroke.)



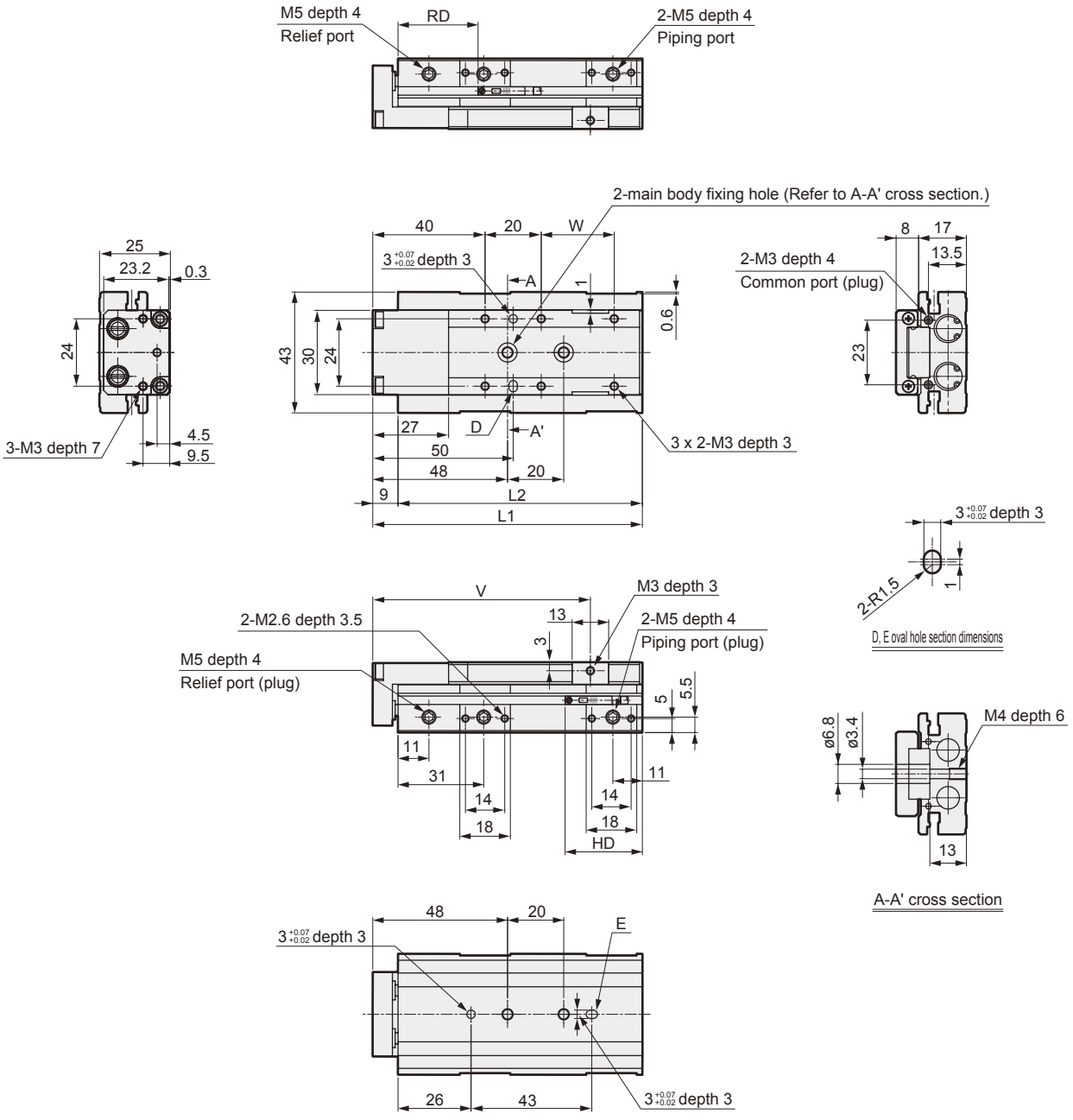
Dimensions table per stroke length

Stroke length	40	50
L1	108	118
L2	100	110
n	3	4
V	86	96
W	40.5	50.5
X	39	40.5
Y	44	65.5
RD	37.5	
HD	22.5	

Dimensions (bore size: ø8)

● LCG-8-P7*

Stroke length: 10, 20, 30
(Main fixing holes in this drawing are for the 30 mm stroke.)



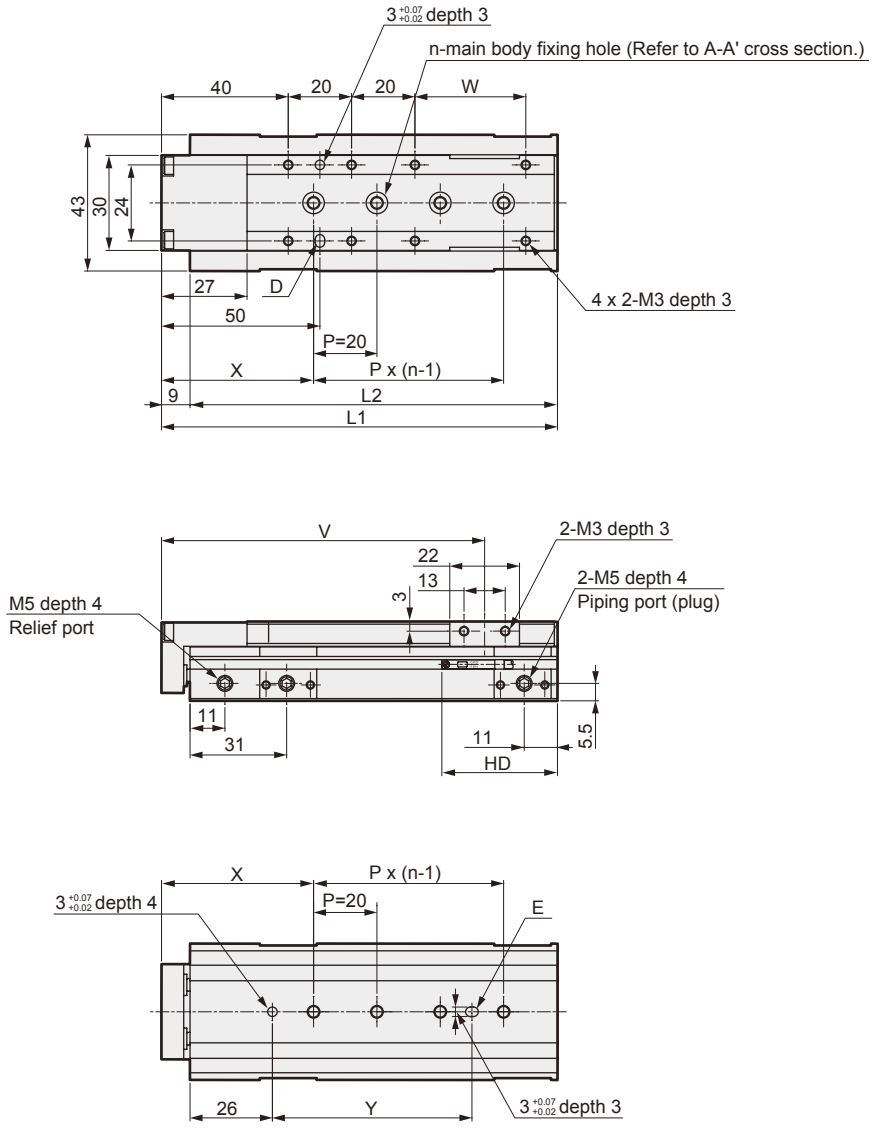
Dimensions table per stroke length

Stroke length	10	20	30
L1	86		96
L2	77		87
V	67.5		77.5
W	16		26
RD	44	34	
HD	23		

Dimensions (bore size: ø8)

● LCG-8-P7*

Stroke length: 40, 50, 75
(Main fixing holes in this drawing are for the 50 mm stroke.)



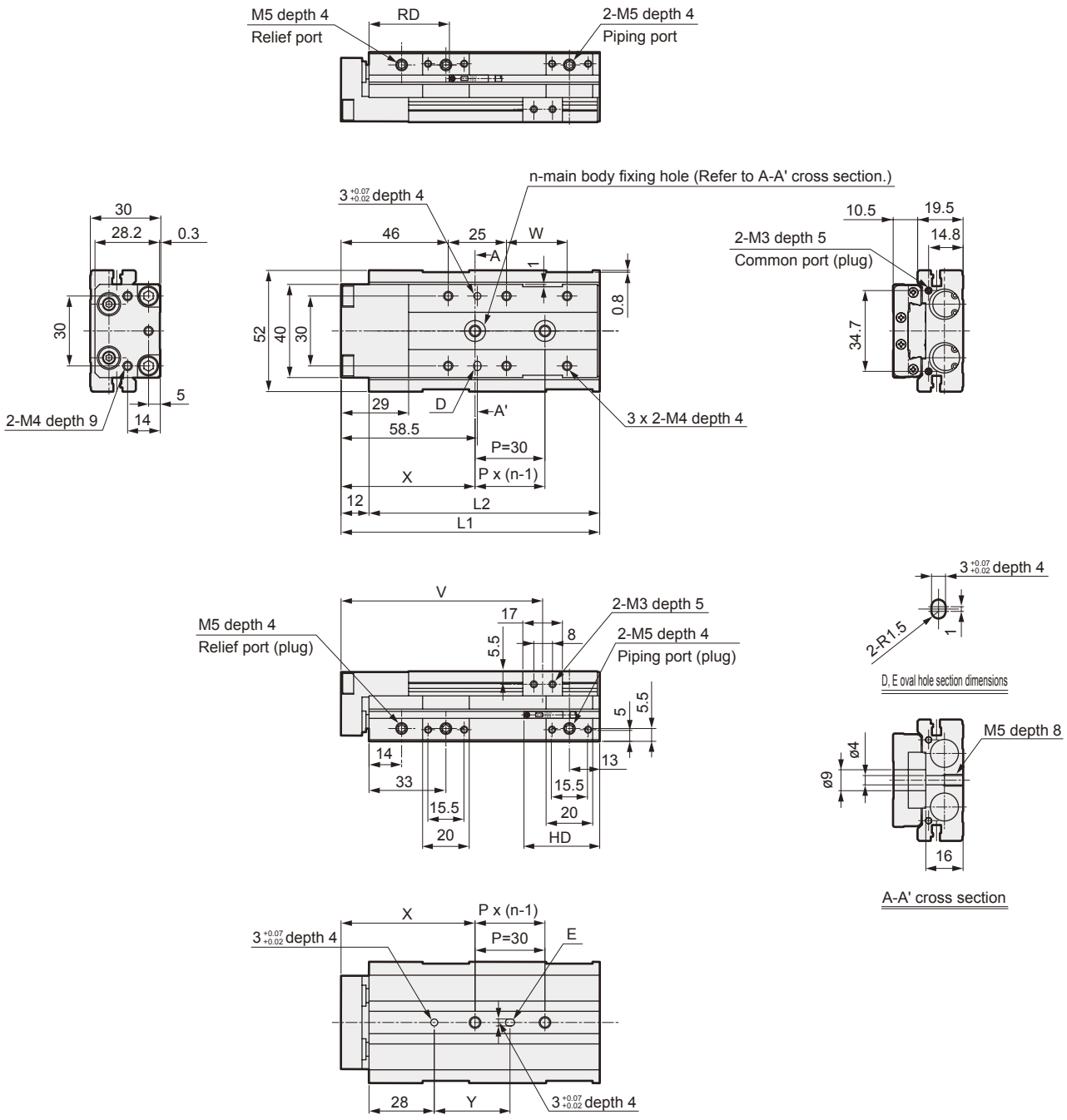
Dimensions table per stroke length

Stroke length	40	50	75
L1	115	125	150
L2	106	116	141
n	3	4	5
V	92	102	127
W	25	35	60
X	46.5	48	45
Y	41.5	63	80
RD	34		
HD	32		

Dimensions (bore size: ø12)

● LCG-12-P7*

Stroke length: 10, 20, 30, 40, 50
(Main fixing holes in this drawing are for the 30 mm stroke.)



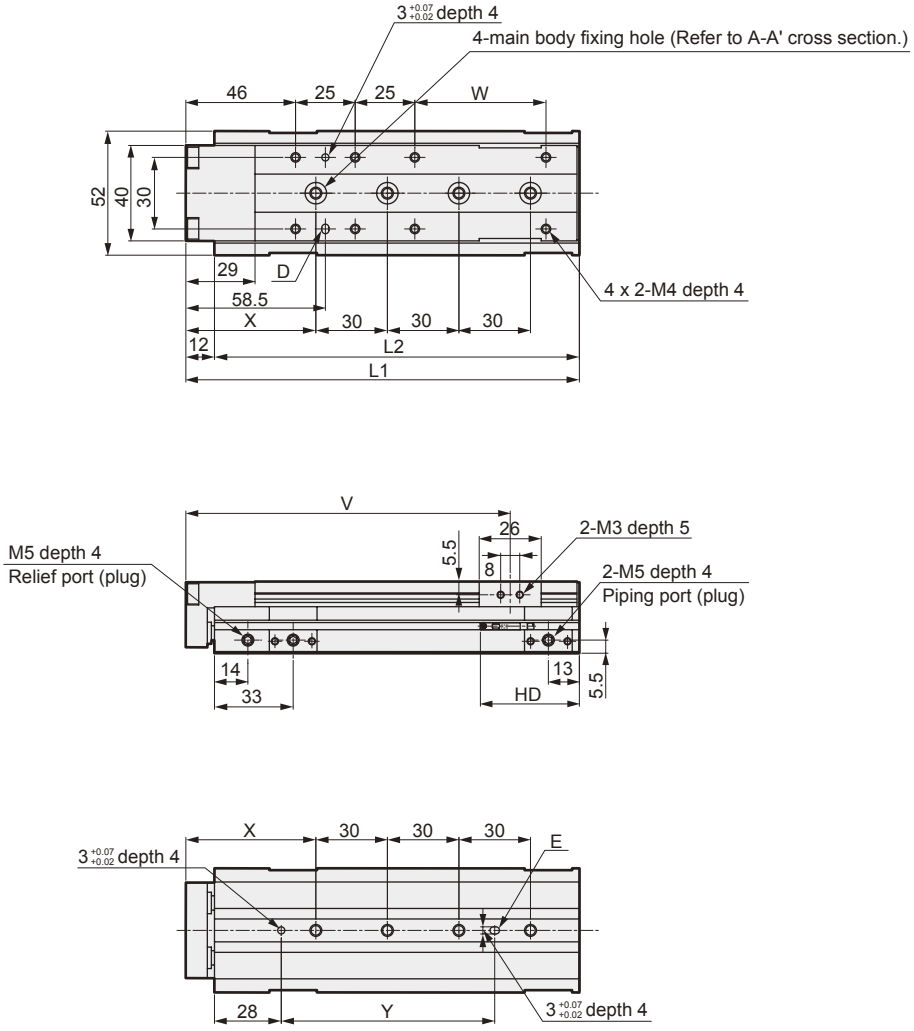
Dimensions table per stroke length

Stroke length	10	20	30	40	50
L1	111			121	131
L2	99			109	119
n	2			3	
V	86.5			96.5	106.5
W	26			36	46
X	57.5			56	52
Y	32.5			31	57
RD	61.5	51.5	41.5		
HD	27				

Dimensions (bore size: ø12)

● LCG-12-P7*

Stroke length: 75, 100
(Main fixing holes in this drawing are for the 100 mm stroke.)



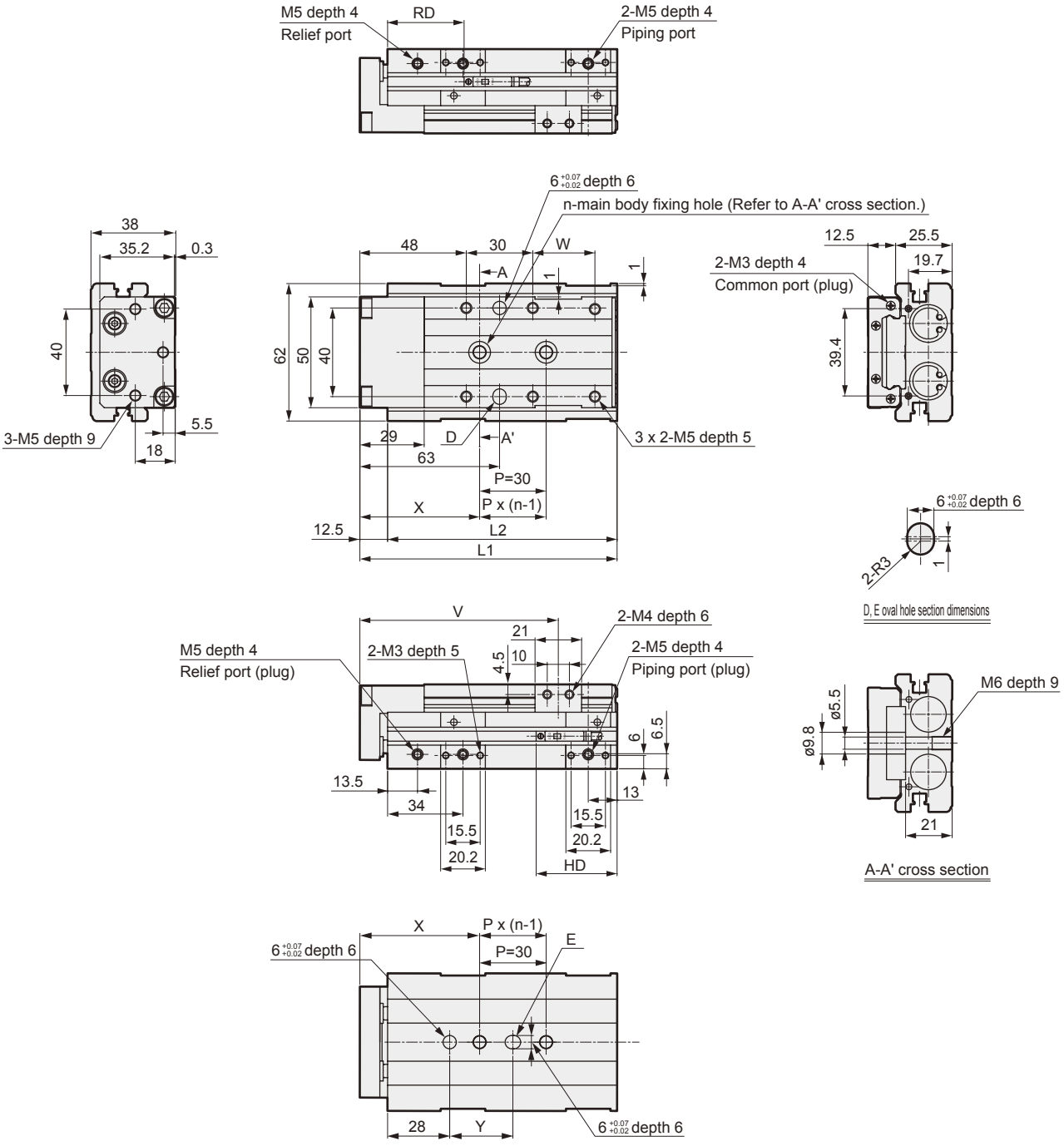
Dimensions table per stroke length

Stroke length	75	100
L1	165	190
L2	153	178
V	136	161
W	55	80
X	54.5	67
Y	89.5	102
RD	41.5	
HD	36	

Dimensions (bore size: ø16)

● LCG-16-P7*

Stroke length: 10, 20, 30, 40, 50
(Main fixing holes in this drawing are for the 30 mm stroke.)



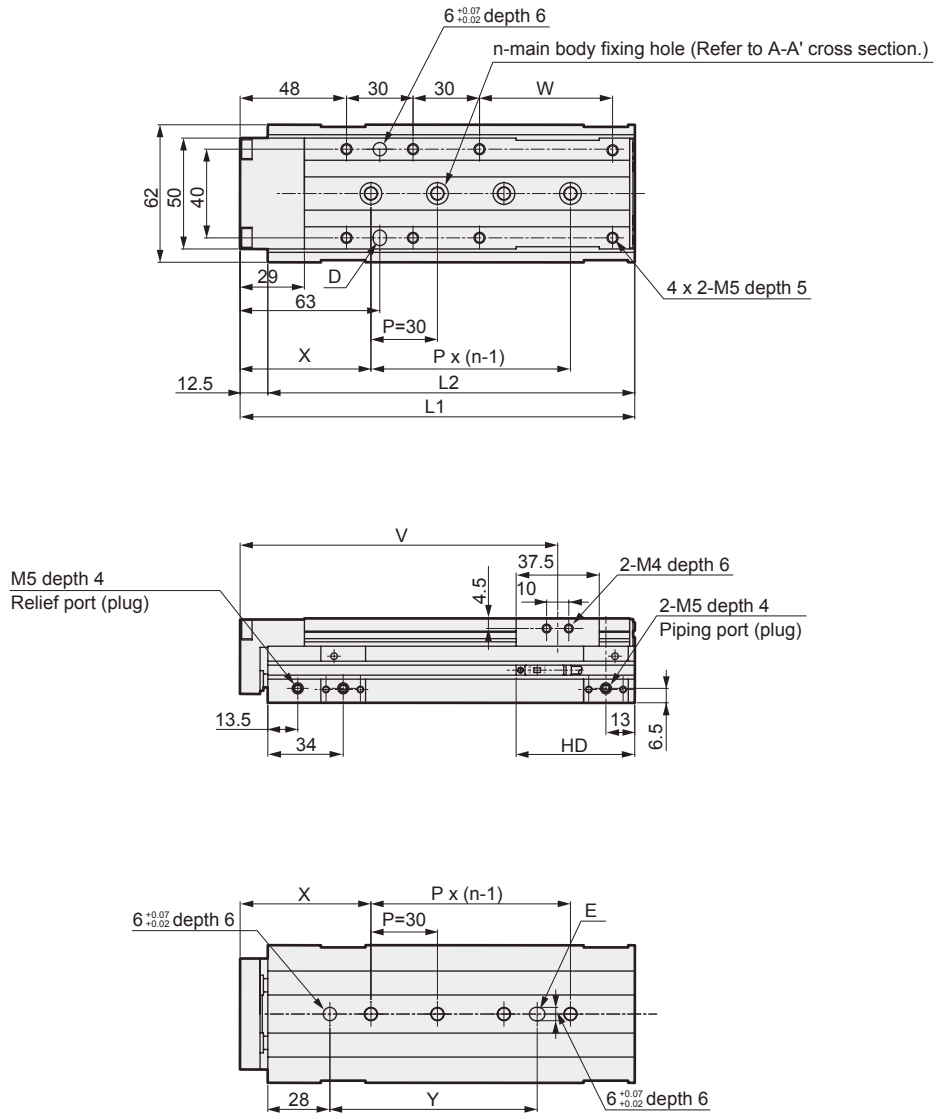
Dimensions table per stroke length

Stroke length		10	20	30	40	50
L1		116			126	136
L2		103.5			113.5	123.5
n		2				3
V		89.8			99.8	109.8
W		28			38	48
X		54			65.5	55.5
Y		28.5			40	60
T0*/T5*	RD	57	47	37		
T2*/T3*	HD	36.5				
T2W*/T3W*	RD	59.5	49.5	39.5		
	HD	34				

Dimensions (bore size: ø16)

● LCG-16-P7*

Stroke length: 75, 100, 125
(Main fixing holes in this drawing are for the 75 mm stroke.)



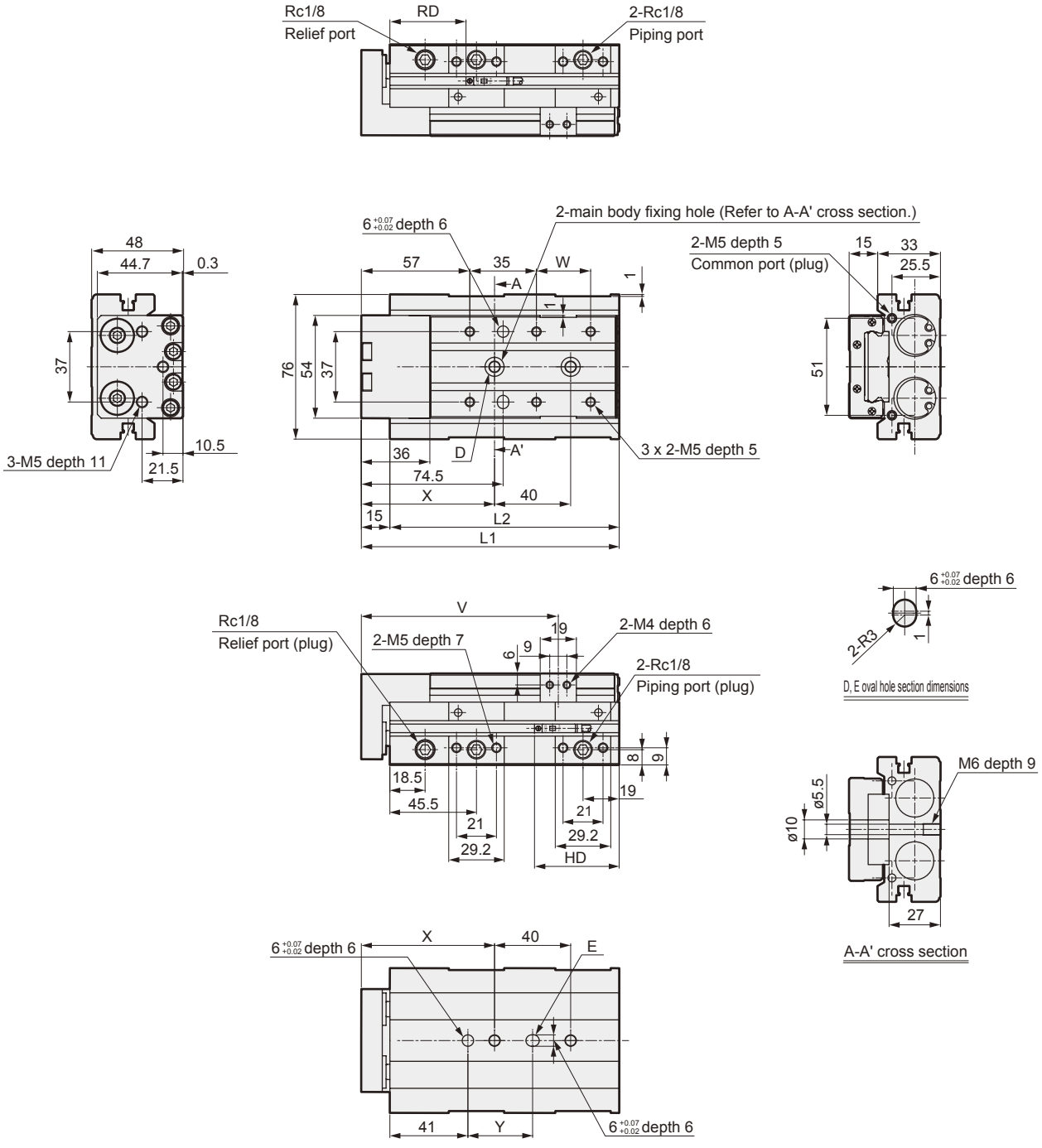
Dimensions table per stroke length

Stroke length		75	100	125
L1		178	203	228
L2		165.5	190.5	215.5
n		4	5	
V		143.3	168.3	193.3
W		60	85	110
X		59	57	69
Y		93.5	121.5	133.5
T0*/T5*	RD	37		
T2*/T3*	HD	53.5		
T2W*/T3W*	RD	39.5		
	HD	51		

Dimensions (bore size: ø20)

● LCG-20-P7*

Stroke length: 10, 20, 30, 40, 50
(Main fixing holes in this drawing are for the 30 mm stroke.)



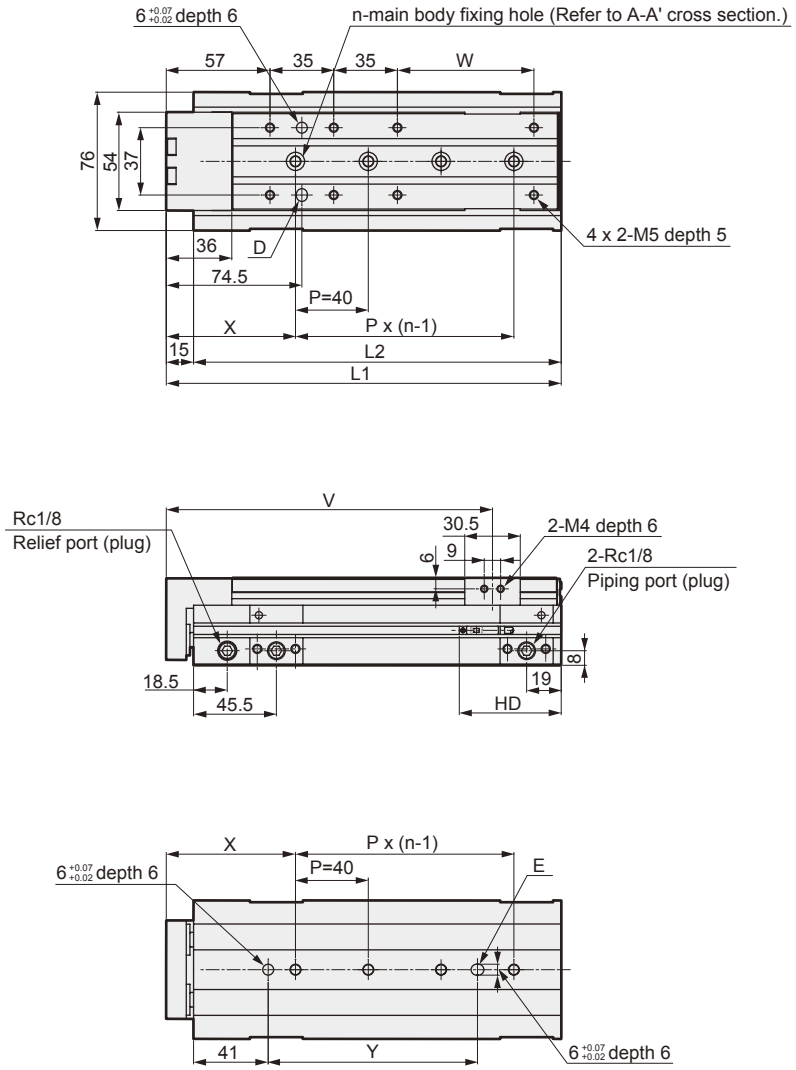
Dimensions table per stroke length

Stroke length		10	20	30	40	50
L1		135.5			145.5	155.5
L2		120.5			130.5	140.5
V		103.5			113.5	123.5
W		28.5			38.5	48.5
X		70			76	74
Y		34			40	38
T0*/T5*	RD	61	51	41		
T2*/T3*	HD	49.5				
T2W*/T3W*	RD	63.5	53.5	43.5		
	HD	47				

Dimensions (bore size: ø20)

● LCG-20-P7*

Stroke length: 75, 100, 125, 150
(Main fixing holes in this drawing are for the 100 mm stroke.)



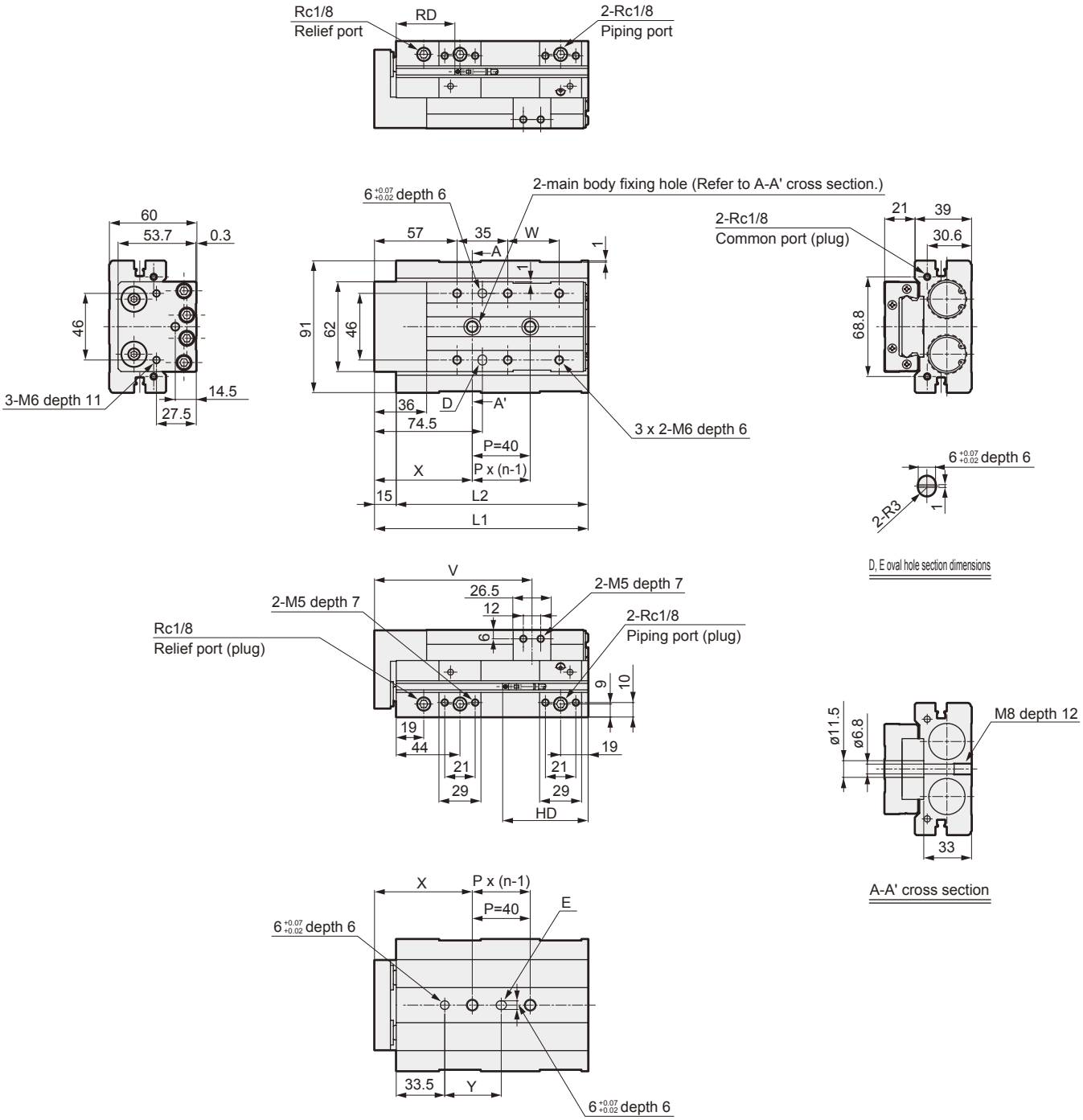
Dimensions table per stroke length

Stroke length		75	100	125	150
L1		192	217	242	267
L2		177	202	227	252
n		3	4		5
V		154.3	179.3	204.3	229.3
W		50	75	100	125
X		71		78	76
Y		75	115	122	160
T0*/T5*	RD	41			
T2*/T3*	HD	61			
T2W*/T3W*	RD	43.5			
	HD	58.5			

Dimensions (bore size: ø25)

● LCG-25-P7*

Stroke length: 10, 20, 30, 40, 50
(Main fixing holes in this drawing are for the 30 mm stroke.)



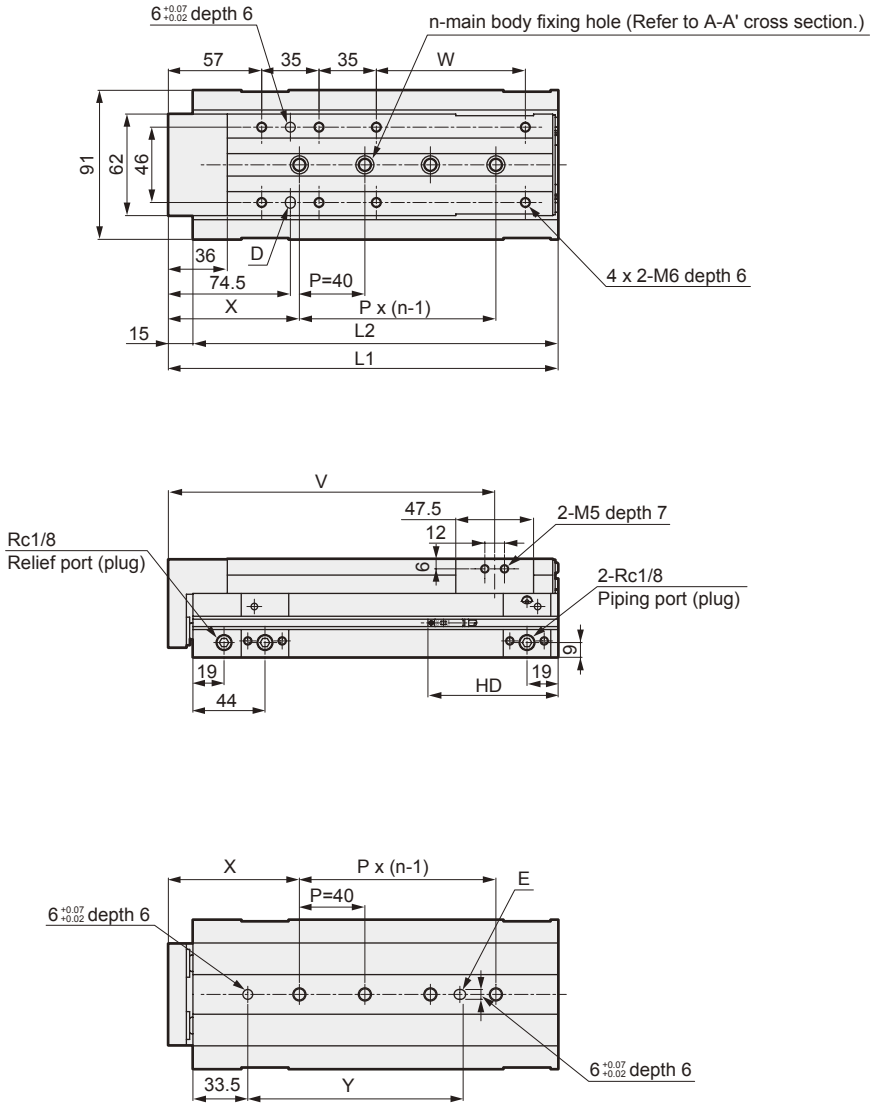
Dimensions table per stroke length

Stroke length		10	20	30	40	50
L1		147.5			157.5	167.5
L2		132.5			142.5	152.5
n		2			3	2
V		108.8			118.8	128.8
W		35.5			45.5	55.5
X		67.5			70.5	85.5
Y		39			42	57
T0*/T5*	RD	63.5	53.5	43.5		
T2*/T3*	HD	59				
T2W*/T3W*	RD	66	56	46		
	HD	56.5				

Dimensions (bore size: ø25)

● LCG-25-P7*

Stroke length: 75, 100, 125, 150
(Main fixing holes in this drawing are for the 100 mm stroke.)

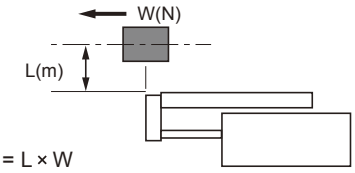


Dimensions table per stroke length

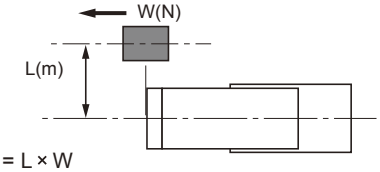
Stroke length		75	100	125	150
L1		213	238	263	288
L2		198	223	248	273
n		3	4	5	
V		163.8	188.8	213.8	238.8
W		66	91	116	141
X		85	80	70	85
Y		96.5	131.5	161.5	176.5
T0*/T5*	RD	43.5			
T2*/T3*	HD	79.5			
T2W*/T3W*	RD	46			
	HD	77			

STEP-1

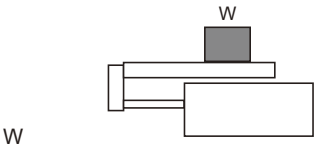
❶ Obtain the load and impact moment generated in each direction at the stroke end.



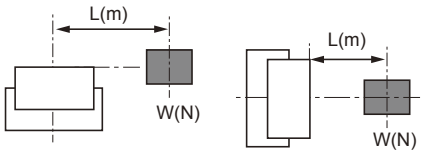
M1' = L × W



M3' = L × W



W' = W



M2' = L × W

Obtain the approximate G coefficient from [Table 1].

[Table 1] Va (average speed) = $\frac{\text{Moving distance}}{\text{Moving time}}$ (m/s)

Va average speed (m/s)	Vm Stroke end speed (m/s)	G coefficient
to 0.07	to 0.1	5
to 0.2	to 0.3	14
to 0.27	to 0.4	19
to 0.35	to 0.5	24

G coefficient = ☐

M1' × G = ☐ (N•m)

M2' = ☐ (N•m)

M3' × G = ☐ (N•m)

W' = ☐ (N)

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

= ☐ (J)

$(m \fallingdotseq \frac{W}{9.8})$

❷ Temporarily select a bore size that satisfies the following conditional expression:

$$M'_T = \frac{M1' \times G}{M1'\ max} + \frac{M2'}{M2'\ max} + \frac{M3' \times G}{M3'\ max} + \frac{W'}{W'\ max} < 1$$

$E' < E\ max$

M'_T : Moment composite (As condition, must be smaller than 1)

G : G coefficient

W' max : W' maximum tolerance (From Table 2)

M1' max : M1' maximum tolerance (From Table 2)

M2' max : M2' maximum tolerance (From Table 2)

M3' max : M3' maximum tolerance (From Table 2)

E max : E_0 maximum tolerance (From Table 3)

m_α : Table weight (From Table 4)

[Table 2] Static load tolerance

Bore size	Stroke length (mm)	Vertical load W' max(N)	Bending moment M1' max(N•m)	Radial moment M2' max(N•m)	Twist moment M3' max(N•m)
ø6	10 to 30	140	1.7	4.0	1.7
	40 to 50	186	10.7	6.0	10.7
ø8	10 to 30	152	3.4	6.8	3.4
	40 to 75	230	13.8	10.3	13.8
ø12	10 to 50	220.8	5.7	15.2	5.7
	75 to 100		22.2	21.0	22.2
ø16	10 to 50	380.8	17.8	36.0	17.8
	75 to 125		37.3	40.0	37.3
ø20	10 to 50	548.8	31.1	60.3	31.1
	75 to 150		56.2	61.6	56.2
ø25	10 to 50	961.5	65.1	131.8	65.1
	75 to 150		127.5	132.0	127.5

Note: When load is applied t□
over, calculate th□.

[Table 3] LCG allowable energy absorption (E_0)

Bore size	Standard (J)	With stopper for adjustable stroke (J)	With shock absorber stopper (J)
ø6	0.025	0.0032	0.6
ø8	0.058	0.0032	2.1
ø12	0.112	0.014	2.1
ø16	0.176	0.043	5.4
ø20	0.314	0.055	9.7
ø25	0.314	0.14	9.7

[Table 4] Table weight (Unit: kg)

Bore size	Stroke length (mm)								
	10	20	30	40	50	75	100	125	150
ø6	0.050	0.050	0.060	0.080	0.085	-	-	-	-
ø8	0.065	0.065	0.080	0.100	0.110	0.140	-	-	-
ø12	0.185	0.185	0.185	0.210	0.230	0.310	0.370	-	-
ø16	0.275	0.275	0.275	0.310	0.340	0.470	0.555	0.640	-
ø20	0.405	0.405	0.405	0.450	0.495	0.645	0.750	0.860	0.965
ø25	0.685	0.685	0.685	0.745	0.820	1.100	1.260	1.415	1.580

STEP-2

Next, increase the accuracy of the load factor, effective thrust, speed at stroke end, and moment composite value.

● Obtain the load factor.

$$\alpha = \frac{F_0}{F} \times 100[\%]$$

α : Load factor

F_0 : Force required to move the workpiece (N)

F : Cylinder theoretical thrust (N) [Table 5]

At horizontal operation	At vertical operation
$F_0 = F_W$	$F_0 = W+F_W$
FW: W × 0.2 Note (N)	
W: Load (N)	

Note: Friction coefficient

[Table 5] Theoretical thrust table (Unit: N)

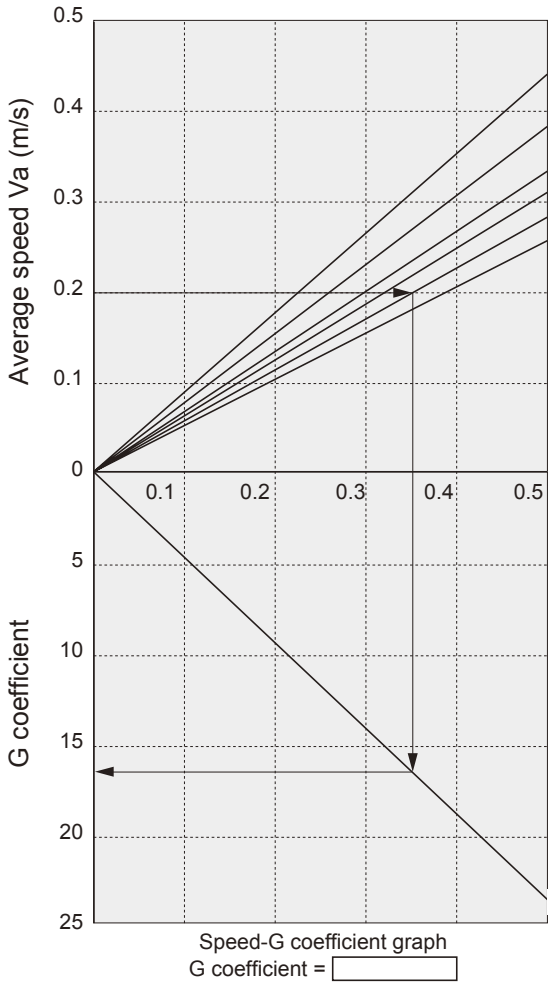
Bore size (mm)	Operation direction	Working pressure MPa						
		0.15	0.2	0.3	0.4	0.5	0.6	0.7
ø6	PUSH	8	11	17	23	28	34	40
	PULL	7	10	15	20	25	30	35
ø8	PUSH	15	20	30	40	50	60	70
	PULL	13	18	26	35	44	53	62
ø12	PUSH	34	45	68	90	113	136	158
	PULL	30	40	59	79	99	119	139
ø16	PUSH	60	80	121	161	201	241	281
	PULL	56	75	112	150	187	224	262
ø20	PUSH	94	126	188	251	314	377	440
	PULL	87	116	173	231	289	347	405
ø25	PUSH	147	196	295	393	491	589	687
	PULL	135	181	271	361	452	542	632

[Table 6] Guide to 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-3

Obtain the speed at stroke end (Vm) and G coefficient from the average speed (Va) and load factor obtained in STEP-2.



Speed-G coefficient graph

G coefficient = ☐

The arrow in the figure indicates an example for obtaining the following:
Speed at stroke end: 0.35 m/s
G coefficient: 16.8
at
Average speed: 0.20 m/s
Load factor: 50%

STEP-4

Confirm composite moment (MT) with the G coefficient speed at stroke end (Vm) obtained in STEP-3.

M1' × G = ☐ (N•m)

M2' = ☐ (N•m)

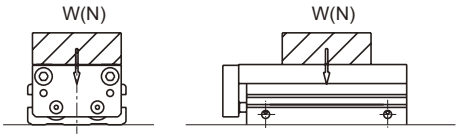
M3' × G = ☐ (N•m)

W' = ☐ (N)

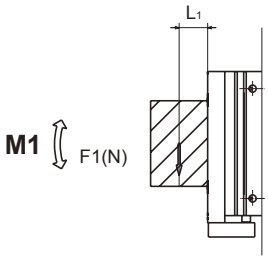
$$M'_T = \frac{M1' \times G}{M1'\ max} + \frac{M2'}{M2'\ max} + \frac{M3' \times G}{M3'\ max} + \frac{W'}{W'\ max} = \square$$

Confirm composite moment MT during travel. (Note that this differs from the value obtained in STEP-1.)

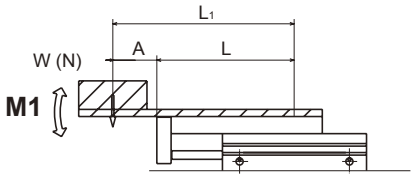
● Vertical load: W (N)



● Bending moment: M1 (N·m)

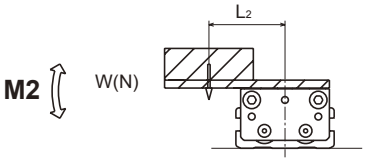


M1=F1 x L_1

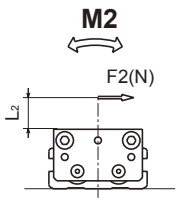


M1=W x L_1
L_1=A+L
L is taken from the following table

● Radial moment: M2 (N·m)

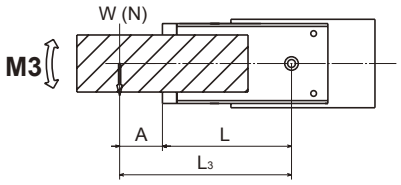


M2=W x L_2

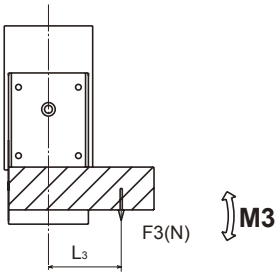


M2=F2 x L_2

● Twist moment: M3 (N·m)



M3=W x L_3
L_3=A+L
L is taken from the following table



M3=F3 x L_3

Value L

Unit (m)

Bore size	Stroke length									Section added from page 72/73
	10	20	30	40	50	75	100	125	150	
ø6	0.039	0.0415	0.049	0.0615	0.069	-	-	-	-	0.012
ø8	0.0395	0.042	0.0495	0.0615	0.069	0.088	-	-	-	0.020
ø12	0.053	0.0555	0.058	0.0655	0.073	0.096	0.115	-	-	0.020
ø16	0.0555	0.058	0.0605	0.068	0.0755	0.1025	0.1215	0.140	-	0.020
ø20	0.0635	0.066	0.0685	0.076	0.0835	0.108	0.127	0.1455	0.1645	0.025
ø25	0.0695	0.072	0.0745	0.082	0.0895	0.1185	0.1375	0.156	0.175	0.025

M1=M1 = ☐ (N•m)

M2=M2 = ☐ (N•m)

M3=M3 = ☐ (N•m)

W=W = ☐ (N)

$$M_T = \frac{M1 \times G}{M1max} + \frac{M2}{M2max} + \frac{M3 \times G}{M3max} + \frac{W}{Wmax} = \square$$

M_T : Moment composite

Wmax : W maximum tolerance (From Table 7)

M1max: M1 maximum tolerance (From Table 7)

M2max: M2 maximum tolerance (From Table 7)

M3max: M3 maximum tolerance (From Table 7)

E max : E_0 maximum tolerance (From Table 3)

[Table 7] Travel load tolerance

Bore size	Stroke length (mm)	Vertical load Wmax (N)	Bending moment M1max (N•m)	Radial moment M2max (N•m)	Twist moment M3max (N•m)
ø6	10 to 30	14	0.17	0.40	0.17
	40 to 50	15.5	0.89	0.50	0.89
ø8	10 to 30	15.2	0.34	0.68	0.34
	40 to 75	19.2	1.1	0.86	1.1
ø12	10 to 50	27.6	0.71	1.9	0.71
	75 to 100		2.2	2.1	2.2
ø16	10 to 50	47.6	1.9	4.0	1.9
	75 to 125		4.6	5.0	4.6
ø20	10 to 50	68.6	3.4	6.7	3.4
	75 to 150		7.0	7.7	7.0
ø25	10 to 50	128.2	7.6	15.5	7.6
	75 to 150		17.0	17.6	17.0

Note: When load is applied t□
over, calculate th□.

Confirm if M_T and $M'_T \leqq 1$.
↓
Bore size determination
↓
øA

STEP-5

Confirm allowable energy absorption

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

E : Kinetic energy at workpiece end (J)

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

m_α : Table weight (From Table 4)

Vm : Stroke end speed (m/s)

E max : E_0 maximum tolerance (From Table 3)

Confirm that E ≦ E max
↓
Bore size determination
↓
øB

STEP-6

Bore size determined with STEP-4
(load conditions)
øA

Bore size determined with STEP-5
(allowable energy absorption)
øB

øA≦øB → øB Select øB

or → øA Handle with øA and the external damper or shock absorber stopper.

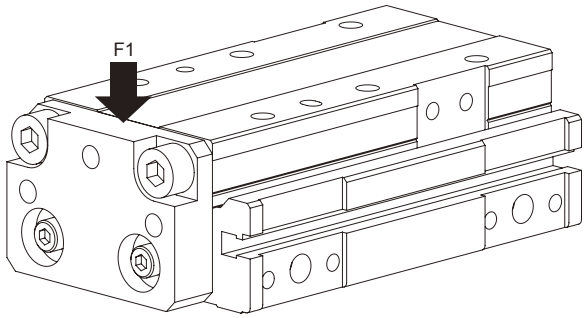
øA > øB → øA Select øA

Technical data 1) Displacement at table edge (Reference)

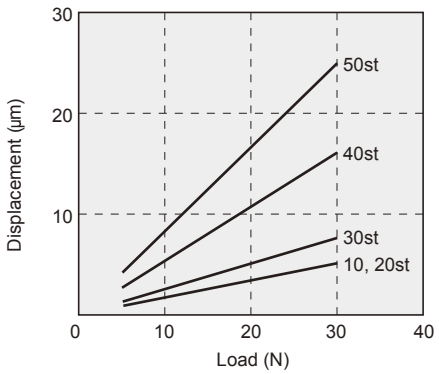
Displacement at point A

[Amount of table displacement caused by M1 moment]

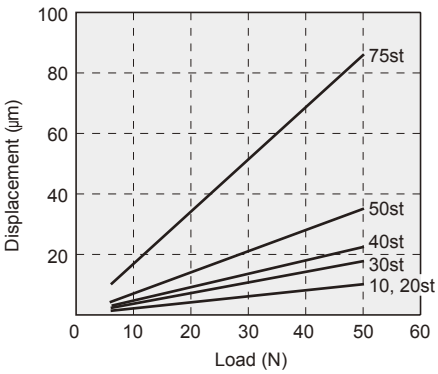
Displacement at table end when load (F1) is applied to table end



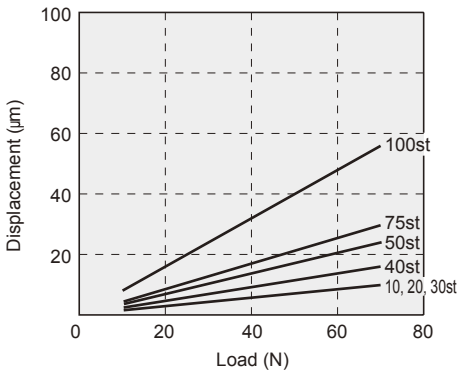
LCG-6 (M1)



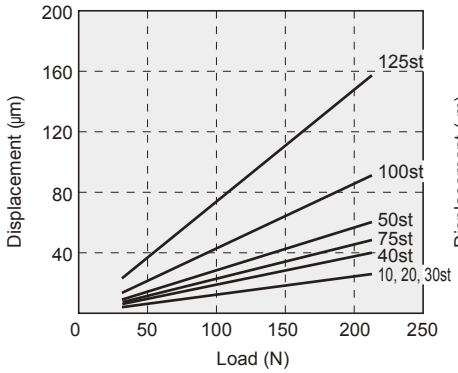
LCG-8 (M1)



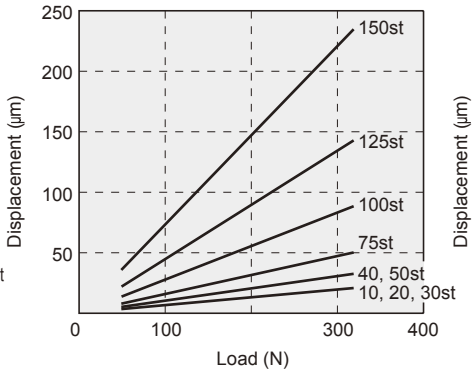
LCG-12 (M1)



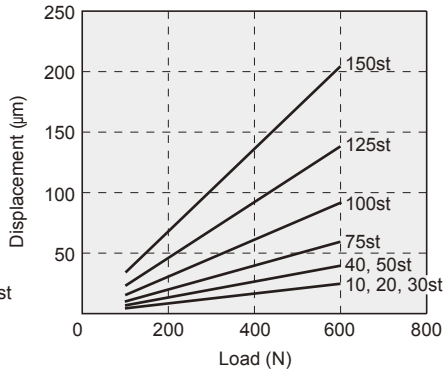
LCG-16 (M1)



LCG-20 (M1)



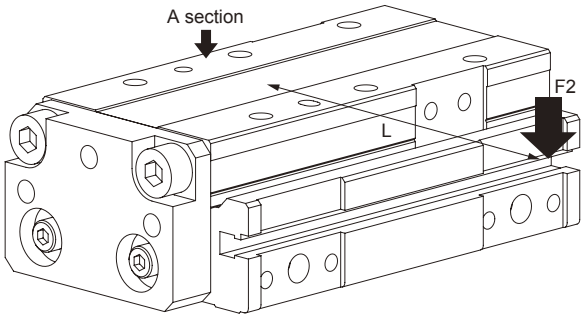
LCG-25 (M1)



Displacement at point A

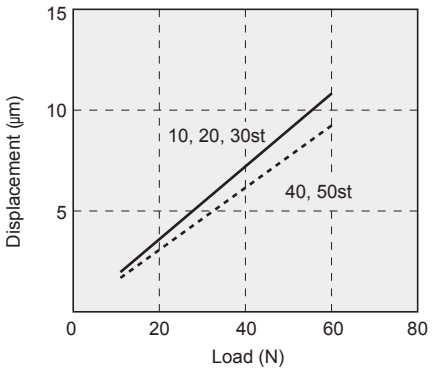
[Amount of table displacement caused by M2 moment]

Displacement at table end (A section) when load (F2) is applied at a location separated L mm from the center of the cylinder

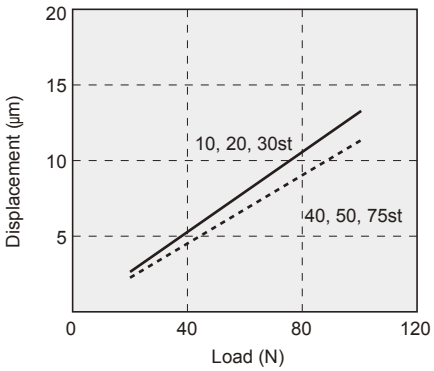


Value L
ø 6: L = 70, ø 8: L = 70
ø12: L = 90, ø16: L =100
ø20: L =100, ø25: L =200

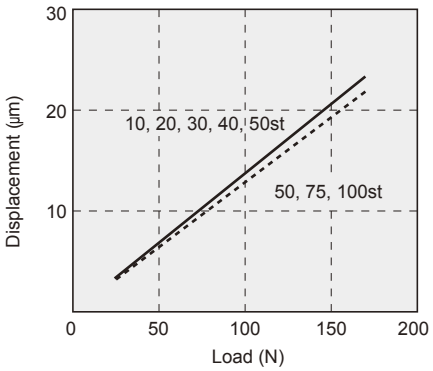
LCG-6 (M2)



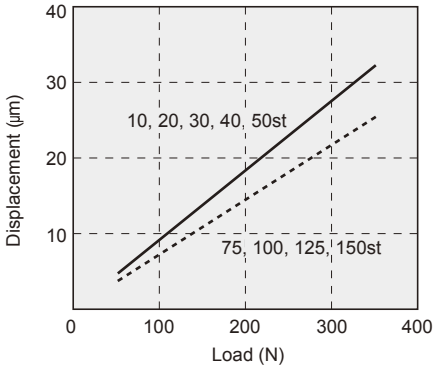
LCG-8 (M2)



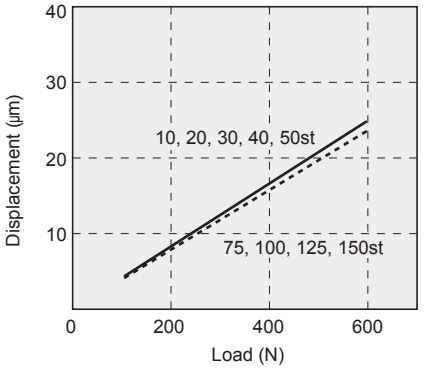
LCG-12 (M2)



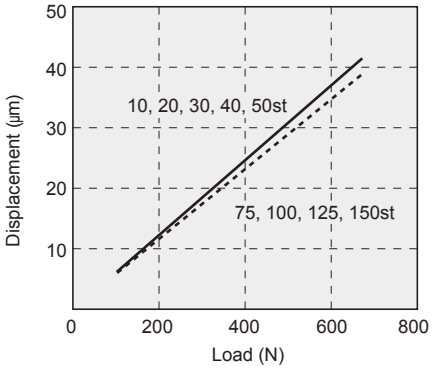
LCG-16 (M2)



LCG-20 (M2)



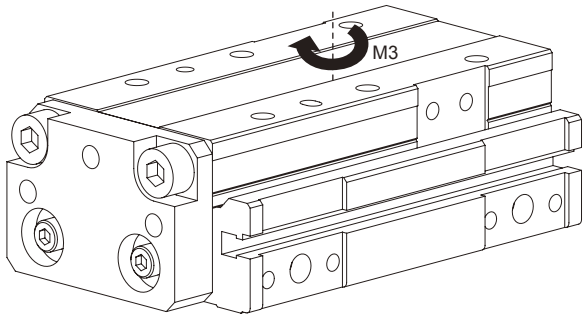
LCG-25 (M2)



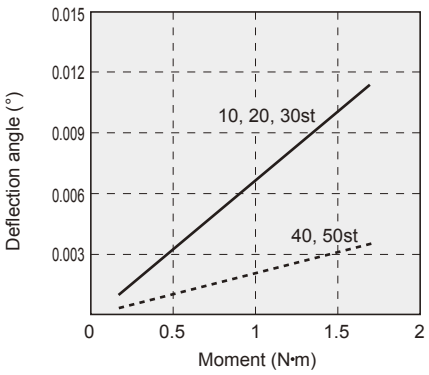
Displacement at point A

[Table displacement angle caused by M3 moment]

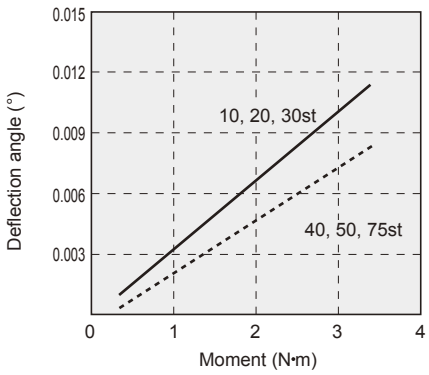
Table displacement angle when rotary moment (M3) is applied to cylinder



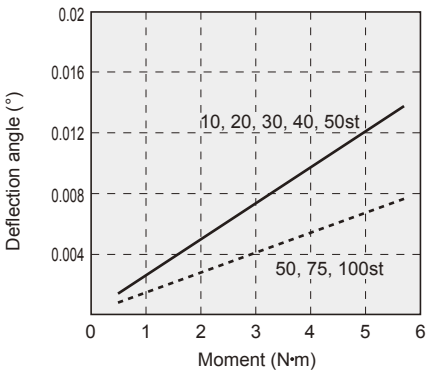
LCG-6 (M3)



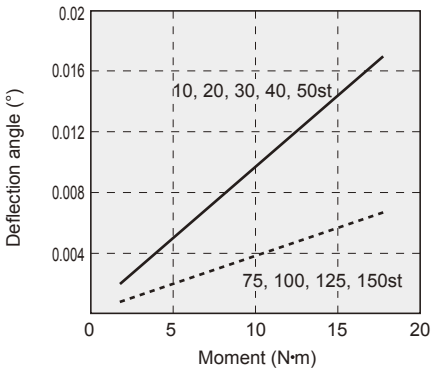
LCG-8 (M3)



LCG-12 (M3)



LCG-16 (M3)



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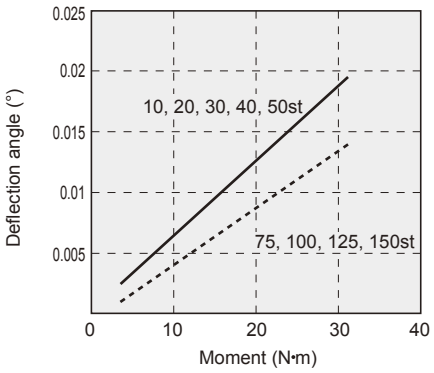

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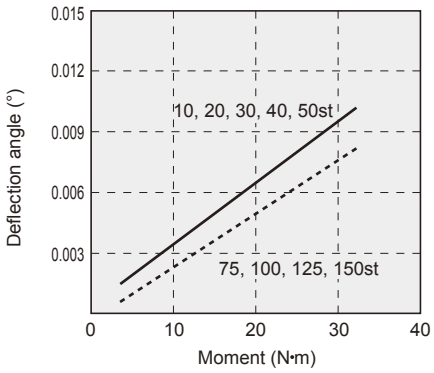
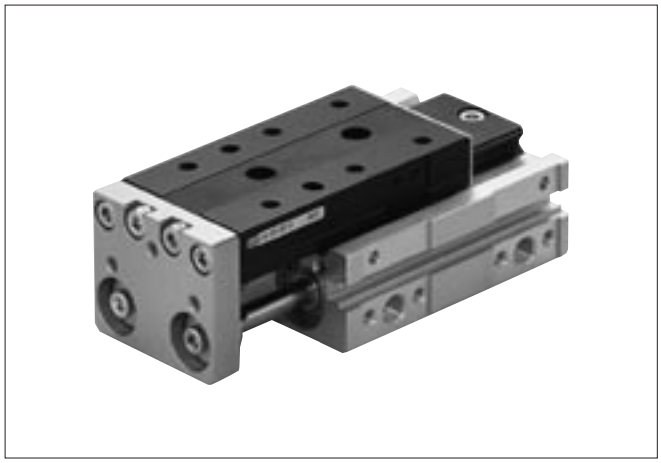
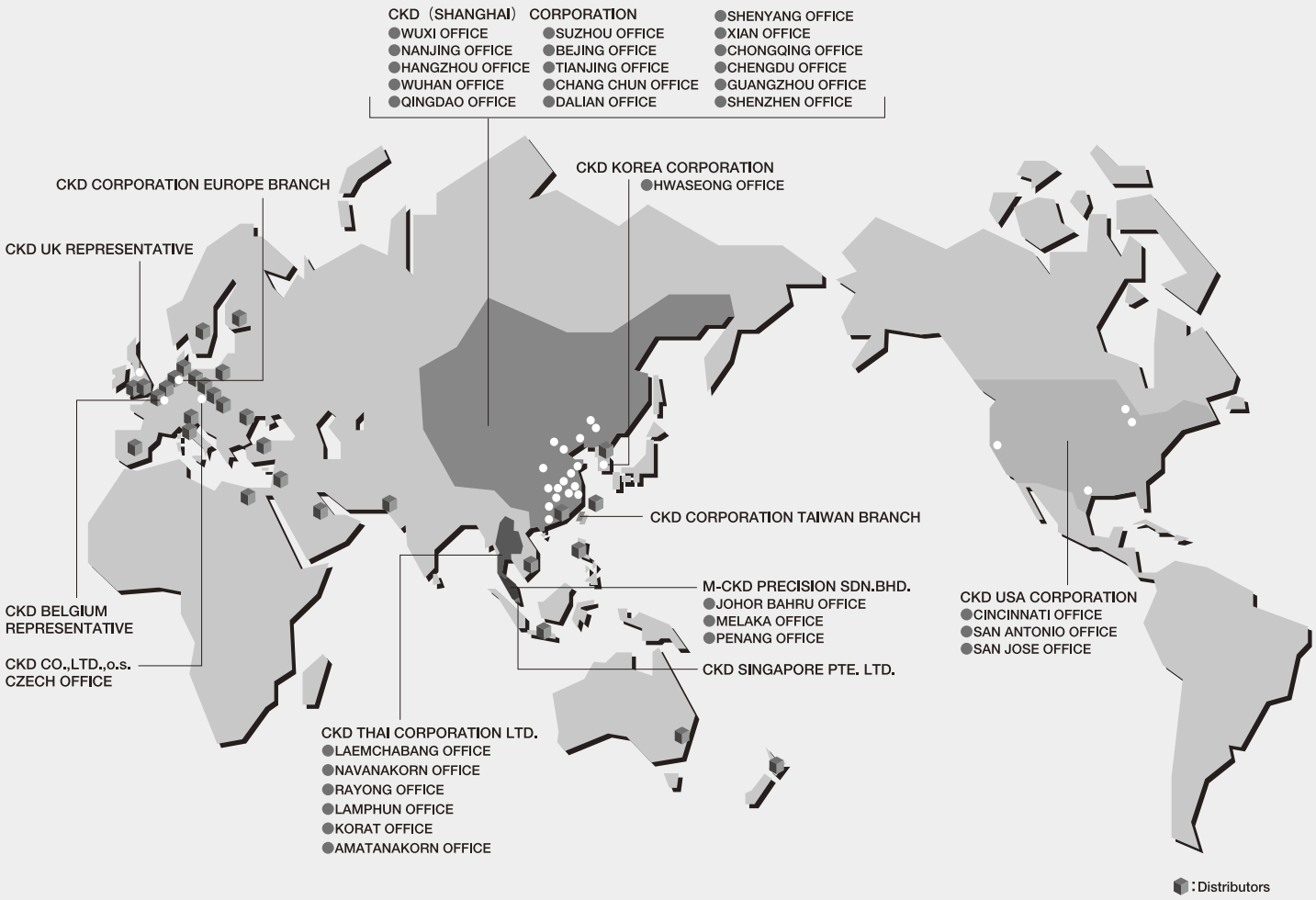


Custom order parts



A rustproof guide rail and table are available as custom order parts. Contact your nearest CKD Sales Office or agent for details.



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