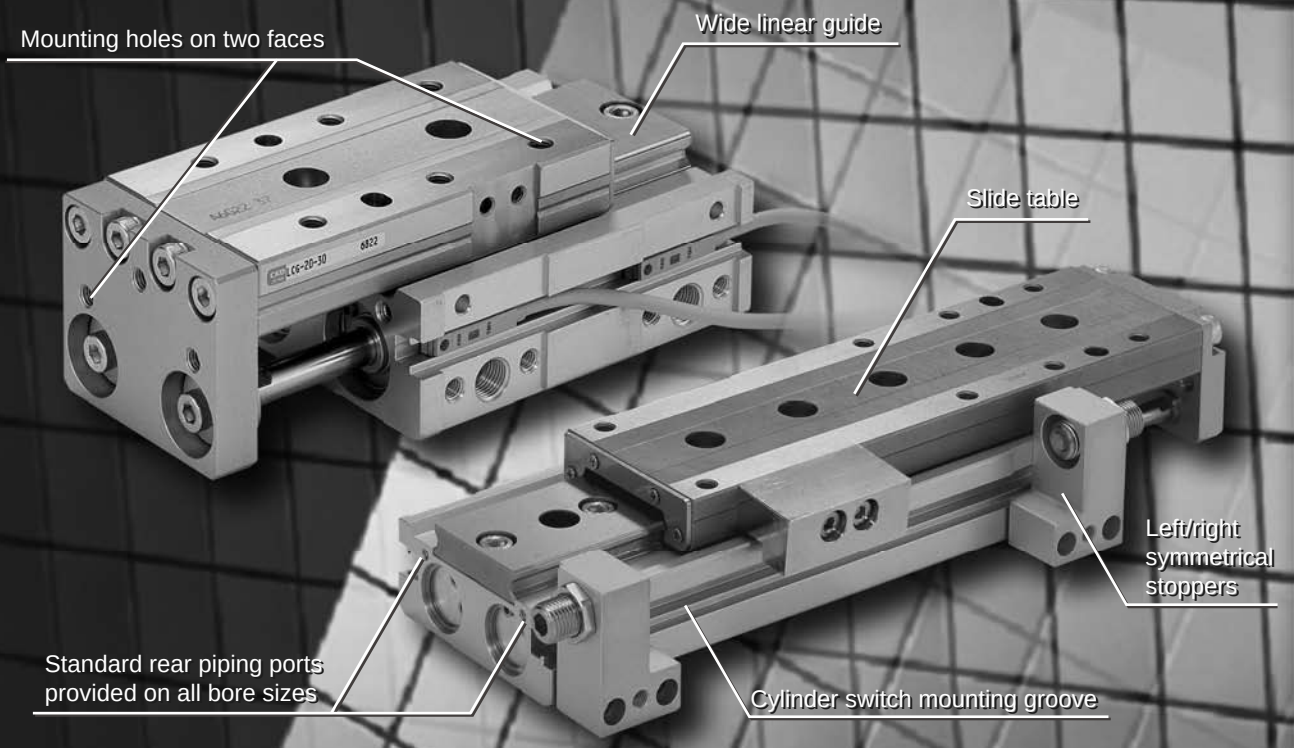
High accuracy, rigidity and easier use.

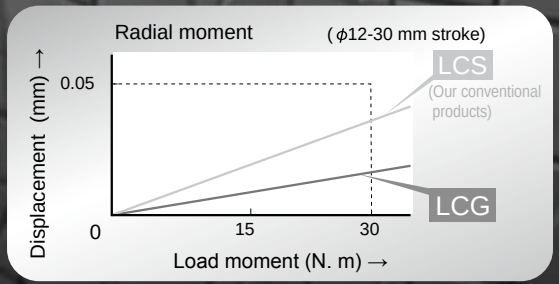


Higher accuracy

The linear guide's table face is used as the slide table, thus realizing a higher accuracy compared to conventional products.
Parallelism 0.03mm (ϕ12-30 mm stroke)
End plate perpendicularity 0.05mm

Higher rigidity

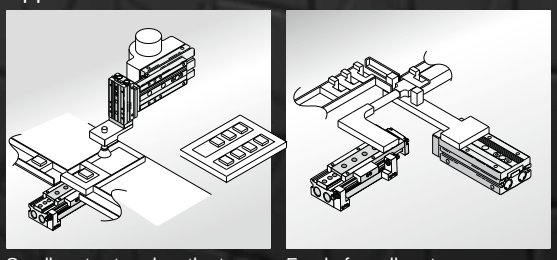
The slide table material has been changed from the conventional aluminum material to stainless steel or steel. A higher rigidity is achieved when used in combination with the wide guide.



Easier use

Hassles for designing the cylinder and linear slide separately have been eliminated, thus reducing the design man-hours. The freedom of design and ease-of-use have been enhanced with left/right symmetrical mounting of stoppers and multi-face piping, etc.

Applications



Small parts stored on the tray or supplied from the tray

Feed of small parts

LCG Series

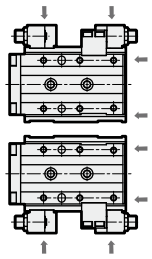
Linear slide cylinder

A wide guide, featuring high accuracy and high rigidity, has been mounted on the air cylinder. The linear guide table face is used as the slide table, thus realizing ease-of-use with an unprecedented accuracy and rigidity.
Linear slide cylinder LCG Series. (ϕ6, ϕ8, ϕ12, ϕ16, ϕ20, ϕ25)

High freedom of design

This product's freedom of design is particularly high with the left/right symmetrical stopper, multi-face piping, two-face mounting and positioning hole, etc.

■ Changeable to left/right symmetrical type

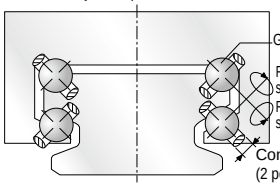


Changeable to left/right symmetrical type
← indicates the piping direction

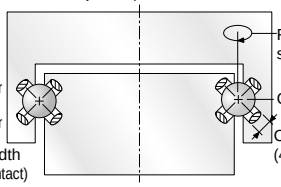
Linear guide with four rows of guide balls (Excluding ϕ6, 8)

The guide balls are arranged in four rows to enable stable operation in all load directions.
The guide ball contact width is small compared to the two-row layout guide, so the frictional resistance when turning can be reduced. This structure enables smooth movement and enhances accuracy and rigidity.

■ 4-row layout, 2-point contact structure

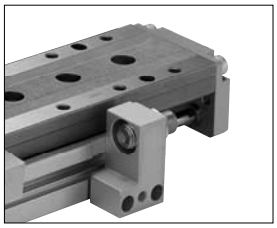


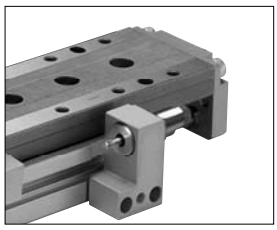
■ 2-row layout, 4-point contact structure



Wide option and variation

The standard type, position locking type and clean specification type models are available.
Options include a stroke adjustment stopper and shock absorption type stopper, etc.
* The shock absorber type stopper cannot be selected for the clean specifications.





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

■ Shock absorber type stopper
Shock is absorbed at stroke end

2-color switch

The 2-color indicator switch can be selected.
This switch provides a flush design without no protrusions.

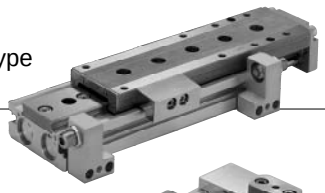
RoHS directive complied

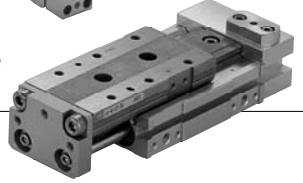
All substances that can adversely affect the environment, including lead and hexavalent chrome, have been eliminated.

RoHS

■ LCG Series products

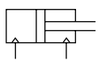
Series variation	Bore size	Stroke length (mm)
		10 20 30 40 50 75 100 125 150
Double acting single rod type **LCG**	ϕ6	● ● ● ● ●
	ϕ8	● ● ● ● ● ●
	ϕ12	● ● ● ● ● ● ●
	ϕ16	● ● ● ● ● ● ● ●
	ϕ20	● ● ● ● ● ● ● ● ●
	ϕ25	● ● ● ● ● ● ● ● ●
Double acting position locking type **LCG-Q**	ϕ8	● ● ● ● ● ●
	ϕ12	● ●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





* Rust proof treated parts are available as custom orders. Refer to page 1759 for details.

● : Standard ◎ : Option : 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 ①・③ S5	Stopper position ②・④ S6	Shock absorber type stopper — Stopper position ① A1	Stopper position ② A2	Stopper position ③ A3	Stopper position ④ A4	Stopper position ①・③ A5	Stopper position ②・④ A6	Switch	Page
Double acting single rod type	LCG 	ϕ 6	●	●	●	●	●					◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	1706
		ϕ 8	●	●	●	●	●	●																	
		ϕ 12	●	●	●	●	●	●	●																
		ϕ 16	●	●	●	●	●	●	●	●															
		ϕ 20, ϕ 25	●	●	●	●	●	●	●	●	●														
Double acting position locking type	LCG-Q	ϕ 8	●	●	●	●	●	●				◎	◎					◎	◎					◎	1728
		ϕ 12	●	●	●	●	●	●	●																
		ϕ 16	●	●	●	●	●	●	●	●															
		ϕ 20, ϕ 25	●	●	●	●	●	●	●	●	●														
Double acting single rod type clean room specifications	LCG-P7*	ϕ 6	●	●	●	●	●					◎	◎	◎	◎	◎	◎							◎	1736
		ϕ 8	●	●	●	●	●	●																	
		ϕ 12	●	●	●	●	●	●	●																
		ϕ 16	●	●	●	●	●	●	●	●															
		ϕ 20, ϕ 25	●	●	●	●	●	●	●	●	●														

Safety precautions

Always read this section before starting use.
Refer to Intro 67 for general precautions.

Linear slide cylinder LCG Series

Design & Selection

1. Common

⚠ CAUTION

■ Select the cylinder based on the “LCG selection guide “ on pages 1752 to 1755.

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

■ Cautions of type with switch

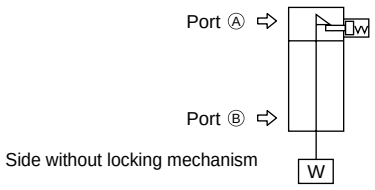
- When using the T*V switch with the cylinder with a stopper for adjustable stroke (S3**, S4**, S5**, S6**) or shock absorber stopper (A3**, A4**, A5**, A6**), the head side switch could interfere with the stopper. Install the switch on the side opposite the stopper.
- When using a switch with a stroke 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

⚠ WARNING

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



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

■ Do not use a 3-position valve.

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

⚠ CAUTION

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

■ Do not use multiple cylinders synchronized.

Do not move more than one workpiece using more than two cylinders with position locking mechanism simultaneously. One of the cylinder’s locks may not be released.

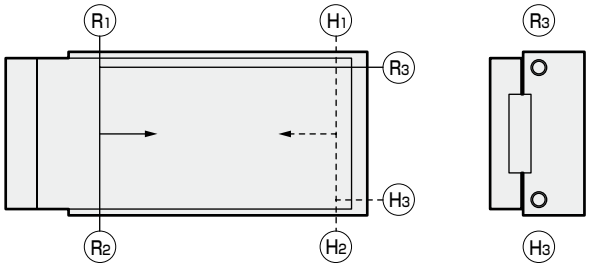
Installation & Adjustment

1. Common; piping

⚠ CAUTION

■ When changing a piping port position, apply adhesive to M3, M5 plug (hexagon socket head set screw). Use a low-strength adhesive such as LOCTITE 222/221, or ThreeBond 1344.

■ Piping port position and operating direction

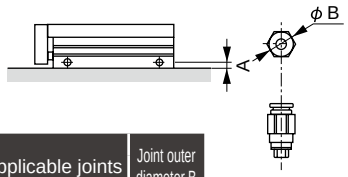


Ⓡ indicates the rod end pressurizing port and Ⓗ indicates the head end pressurizing port. When shipped from the factory, the ports other than Ⓡ1 and Ⓗ1 are sealed with plugs. This may be Ⓡ2 and Ⓗ2 depending on the stopper position if a stopper is selected.

Installation & Adjustment

■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
ϕ 6	M3	4	SC3W-M3-4 SC3WU-M3-4 SC3W-M3-3.2 SC3WU-M3-3.2 GWS3-M3-S GWS4-M3-S	ϕ 8 or less
ϕ 8	M5	5.5	SC3W-M5-4 SC3W-M5-6 GWS4-M5-S GWS4-M5	ϕ 11 or less
ϕ 12		5.5		
ϕ 16		6.5	SC3W-M5-4 SC3W-M5-6 GWS4-M5-S GWS4-M5 GWL4-M5 GWL6-M5 GWS6-M5	ϕ 13 or less
ϕ 20	Rc1/8	8	SC3W-6-4,6,8 GWS4-6 GWS8-6 GWL6-6 GWS6-6 GWL4-6	ϕ 15 or less
ϕ 25		9		

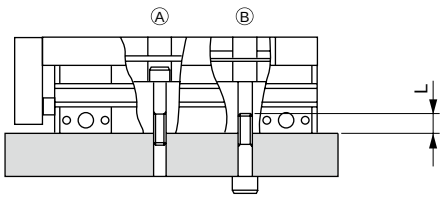
2. Common; installation

⚠CAUTION

■Check that no dents or scratches occur on main tubing installation or end plates that may adversely affect flatness. 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.

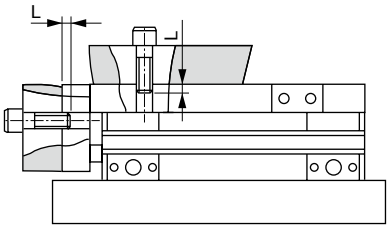
<Fig. 1>



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>

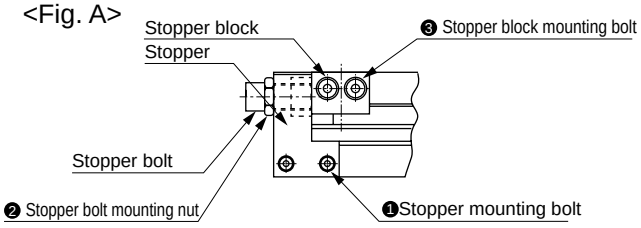


Descriptions	Table		
	Applicable bolts	Tightening torque (N・m)	Max. screw-in length L (mm)
LCG-6	M3 x 0.5	0.6	3
LCG-8	M3 x 0.5	0.6	3
LCG-12	M4 x 0.7	1.4	4
LCG-16	M5 x 0.8	2.9	5
LCG-20	M5 x 0.8	2.9	5
LCG-25	M6 x 1.0	4.8	6

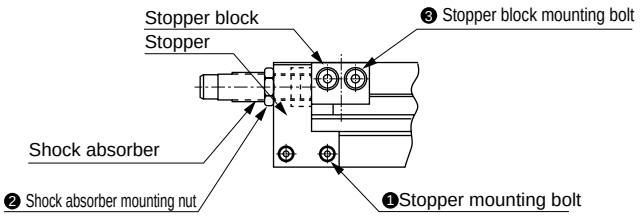
Descriptions	End plate		
	Applicable bolts	Tightening torque (N・m)	Screw-in length L (mm)
LCG-6	M3 x 0.5	0.6	4.5 to 6
LCG-8	M3 x 0.5	0.6	4.5 to 7
LCG-12	M4 x 0.7	1.4	6 to 9
LCG-16	M5 x 0.8	2.9	7.5 to 9
LCG-20	M5 x 0.8	2.9	7.5 to 11
LCG-25	M6 x 1.0	4.8	9 to 11

■Observe the following valves for bolts at the stopper and in nut tightening torque.

<Fig. A>



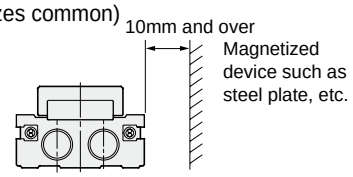
Hexagon socket set screw with rubber cushion



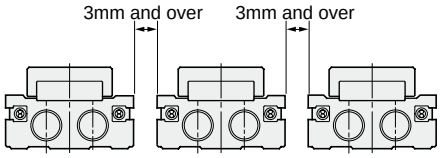
Shock absorber

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

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



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



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

■ Supply a pressure higher than the 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 speed may slow, taking time for the lock to function.
This may also occur if the silencer on the solenoid valve's EXH. port is clogged.

During Use & Maintenance

1. Common

⚠ CAUTION

■ Apply 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 ϕ 6 to ϕ 16 or alloy steel ϕ 20 or ϕ 25. Use in a hot, humid environment or contact with water due to condensation, etc., could cause rust.

2. Position locking type LCG-Q

⚠ CAUTION

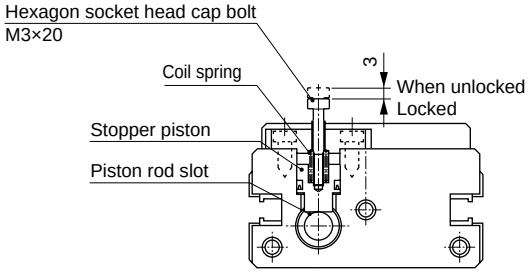
■ After manually operating the locking mechanism, return the locking mechanism to the original position. Do not use a manual override except during adjustment, because this may be dangerous.

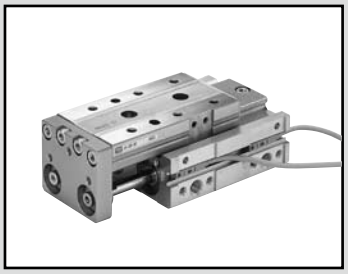
■ Release the lock when installing or adjusting the cylinder.
The lock could be damaged if the cylinder is installed while the lock is applied.

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



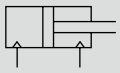


Linear slide cylinder Double acting single rod type

LCG Series

● Bore size: ϕ 6, ϕ 8, ϕ 12, ϕ 16, ϕ 20, ϕ 25

JIS symbol



RoHS CAD

Specifications

Descriptions		LCG					
Bore size mm		ϕ 6	ϕ 8	ϕ 12	ϕ 16	ϕ 20	ϕ 25
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 (no freezing) (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 1 ISOVG 32)					
Allowable energy absorption J		Refer to the table 3 on Page 1752.					

Note 1: 0.2MPa when using shock absorber type stopper with 6 mm diameter.
Note 2: For 6 mm bore cylinder, when using switches, max. ambient temperature is 50℃ (45℃ when installing on an iron 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)
ϕ 6	10, 20, 30, 40, 50
ϕ 8	10, 20, 30, 40, 50, 75
ϕ 12	10, 20, 30, 40, 50, 75, 100
ϕ 16	10, 20, 30, 40, 50, 75, 100, 125
ϕ 20	10, 20, 30, 40, 50, 75, 100, 125, 150
ϕ 25	10, 20, 30, 40, 50, 75, 100, 125, 150

Note: Stroke length other than above is not available.

Switch specifications

● 1 color/2 color indicator

*The T0/T5 switch can be used with 220 VAC. Consult with CKD for working conditions.

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

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		Programmable controller, relay		Programmable controller		Programmable controller, relay	
Output method	-		NPN output		-		NPN output	
Power voltage	-		10 to 28 VDC		-		10 to 28 VDC	
Load voltage	10 to 30 VDC	24 VDC ±10%	30 VDC or less		10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 20 mA		100 mA or less	50 mA or less	5 to 20 mA		50 mA 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	1 mA or less		10 μA or less		1 mA or less		10 μA or less	

Cylinder weight

● Basic type (Unit: g)

Bore size (mm)	Basic type stroke length (mm)								
	10	20	30	40	50	75	100	125	150
ϕ6	150	150	180	220	240	-	-	-	-
ϕ8	210	210	250	320	350	440	-	-	-
ϕ12	480	480	480	530	590	770	920	-	-
ϕ16	730	730	730	810	890	1,220	1,410	1,620	-
ϕ20	1,260	1,260	1,260	1,380	1,500	1,920	2,210	2,510	2,800
ϕ25	2,070	2,070	2,070	2,230	2,430	3,240	3,660	4,080	4,530

● Additional variation/option (stopper) (Unit: g)

Bore size (mm)	Option, stopper symbol			
	S1 to S4	S5/S6	A1 to A4	A5/A6
ϕ6	40	60	40	60
ϕ8	50	70	50	70
ϕ12	70	110	70	110
ϕ16	130	180	130	180
ϕ20	130	200	130	200
ϕ25	200	270	200	270

How to order

Without switch

LCG - 8 - 40 ——— S5

With switch

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

Model no. LCG

Ⓐ Bore size: 12

Ⓑ Stroke length: 40

Ⓒ Switch model no.: F2H*

Ⓓ Switch quantity: R

Ⓔ Option: A1DT

Note on model no. selection

Note 1: When changing adjustable stroke range, use a discrete stopper for adjustable stroke listed on page 1711.

Note 2: When using shock absorber type, refer to K in the stopper dimensions table on page 1726.

Note 3: Refer to stopper dimensions on page 1726 for port positions.

Note 4: When no stopper, port position of standard type are as following Fig. ① and ③.

Note 5: The stopper for adjustable stroke and shock absorber stopper combination is available as a custom order.

Note 6: Selectable only when using a stopper.

Note 7: Refer to the selection table on Page 1709 for combinations of options.

Note 8: For ϕ 6 to ϕ 8 cylinders with 10mm stroke or ϕ 12 to ϕ 25 cylinders with 20mm stroke or less, custom order is applied because A1**, A2**, A5** and A6** can not be adjusted by a standard stopper.

Note 9: For ϕ 6 to ϕ 8 and 30mm stroke or less cylinder with S*** or A*** switch, when two switches will be installed, select F*H type switch.

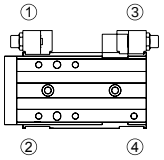
<Example of model number>

LCG-12-40-F2H-R-A1DT

Model: Linear slide cylinder double acting single rod type LCG

Ⓐ Bore size : ϕ 12
Ⓑ Stroke length : 40 mm
Ⓒ Switch model no. : Proximity, 2-wire
Axial lead wire
Ⓓ Switch quantity : One on rod end
Ⓔ Other options : Shock absorber type
Stopper position ①
Side surface and bottom side ports presence
Material and alloy steel (nitriding)

● Stopper position



Symbol	Descriptions
Ⓐ Bore size	
6	ϕ 6
8	ϕ 8
12	ϕ 12
16	ϕ 16
20	ϕ 20
25	ϕ 25

Ⓑ Stroke length (mm)

		Bore size (ϕ)					
		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 ϕ6	ϕ8	ϕ12	ϕ16	ϕ20	ϕ25
F2H*	**F2V***	Proximity	1 color indicator type	2-wire	●	●	●			
F3H*	**F3V***			3-wire						
F2YH*	**F2YV***		2 color indicator type	2-wire						
F3YH*	**F3YV***			3-wire						
T0H*	**T0V***	Reed	1 color indicator type	2-wire				●	●	●
T5H*	**T5V***									
T2H*	**T2V***	Proximity	1 color indicator type	2-wire						
T3H*	**T3V***			3-wire						
T2WH*	**T2WV***		2 color indicator type	2-wire						
T3WH*	**T3WV***			3-wire						

***Lead wire length**

		Bore size					
Blank	1 m (standard)			●			
3	3 m (option)			●			
5	5 m (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 5mm Note 1, Note 5, Note 7	
S1**	Stopper position ① (changeable to ④)	Stopper installation position
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, ③	
S6**	Stopper position ②, ④	
A	**Shock absorber type stopper** Note 2, Note 5, Note 7	
A1**	Stopper position ① (changeable to ④)	Stopper installation position
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, ③	
A6**	Stopper position ②, ④	

**** section**

Blank	Port at stopper section: no port
D	Port at stopper section: side surface and bottom side ports presence Note 3, Note 6
Blank	Stopper block material: Rolled steel
T	Stopper block material: Alloy steel (nitriding) Note 6

LCG double acting single rod type selection table

(Combinations of stopper for adjustable stroke and shock absorber type stopper)

○: Combination possible -: Combination 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	φ6, φ8	10	○	○	○	○	○	○	-	-	○	○	-	-
		20 and over	○	○	○	○	○	○	○	○	○	○	○	○
	φ12 to φ25	10 to 20	○	○	○	○	○	○	-	-	○	○	-	-
		30 and over	○	○	○	○	○	○	○	○	○	○	○	○

The option symbol D: with stopper section port and T stopper block alloy steel (nitriding) combination follows the combination table above.

How to order switch

For ϕ 6 to ϕ 12

SW - F2H

Switch model no.
(Page 1708 section Ⓒ)

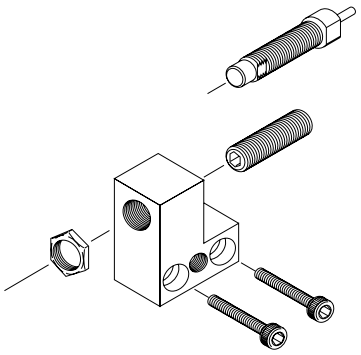
For ϕ 16 to ϕ 25

SW - T2H3

Switch model no.
(Page 1708 section Ⓒ)

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 1708 section Ⓐ)

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

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

Ⓒ Port at stopper section	
Blank	No port
D	Side surface and bottom port presence

Precautions for ordering stopper set

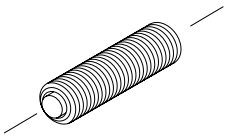
S01 is included in the stopper for adjustable stroke parts for the stopper for adjustable stroke set.
Only when installed on installation position (1), (2) (refer to page 1708), add the right part according to stroke length and adjustable stroke length.

– : 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	ϕ 6, ϕ 8	10	S02	-	-
		20 and over	Additional not required	S02	-
	ϕ 12 to ϕ 25	10	S03	-	-
		20	S02	S03	-
		30 and over	Additional not required	S02	S03

How to order the discrete stopper for adjustable stroke

- Hexagon socket head set screw with urethane
- Used when changing the adjustable stroke range or setting custom stroke length



LCG - 12 - S02

Bore size
(Page 1708 section Ⓐ)

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

Indicate S01, S02, S03 for Ⓐ.
Note: S03 is not available for ϕ 6, ϕ 8.
Depending on the type, the incompatible models or adjustable stroke ranges may differ from the above values.

Cautions when purchasing discrete stopper

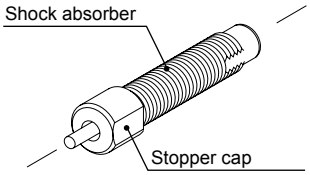
Only when installing a stopper for adjustable stroke or a shock absorber type stopper on installation position (1) or (2) (refer to page 1708), the right combination may be applied depending on stroke length and adjustable stroke length.

– : 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	ϕ 6, ϕ 8	10	S02	-	-	-
		20 and over	S01	S02	-	A01
	ϕ 12 to ϕ 25	10	S03	-	-	-
		20	S02	S03	-	-
		30 and over	S01	S02	S03	A01

How to order the discrete shock absorber stopper

- Shock absorber and stopper cap set
- Used when changing from stopper for adjustable stroke to shock absorber type stopper



LCG - 12 - A01

Bore size
(Page 1708 section Ⓐ)

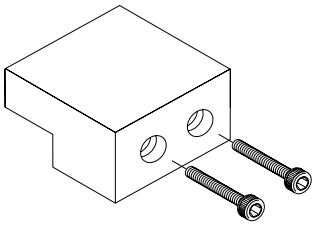
Note:Some models may not be available depending on the type. Refer to Page 1708. Refer to page 1726 for the stroke adjustment range of the shock absorber type stopper.

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

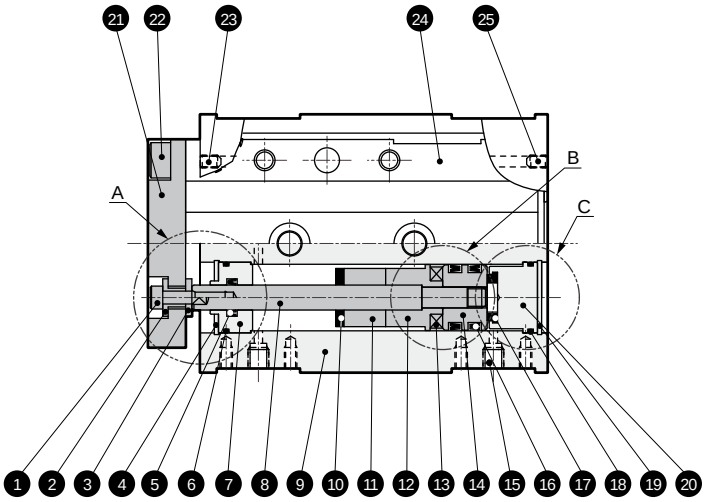
Bore size
(Page 1708 section Ⓐ)

Ⓐ Stopper block	
SB1	ϕ 6, ϕ 8: 30 stroke or less
	ϕ 12 to ϕ 25: 50 stroke or less
SB2	ϕ 6, ϕ 8: 40 stroke and over
	ϕ 12 to ϕ 25: 75 stroke and over

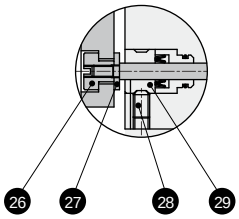
Ⓑ Material	
Blank	Stopper block material: Rolled steel
T	Stopper block material: Alloy steel (nitriding)

Internal structure and parts list

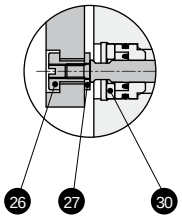
● LCG



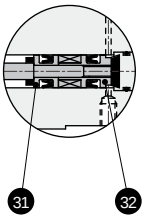
Section A for ϕ6



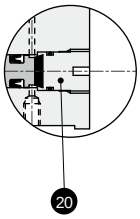
Section A for ϕ8



Section B for ϕ6, ϕ8, ϕ12



Section C for ϕ6



Parts list

No.	Parts name	Material	Remarks
1	Hexagon socket head cap bolt	Alloy steel	Zinc chromate
2	Floating bush A	Alloy steel	Zinc chromate
3	Floating bush B	Stainless steel	
4	C type snap ring	ϕ 8:Steel ϕ 12 to 25: Stainless steel	Only ϕ 8 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	Only ϕ 6: 10, 40, 50st Only ϕ 8: 10st Only ϕ 12, 16, 20, 25: 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	

No.	Parts name	Material	Remarks
17	Cushion rubber (H)	Urethane rubber	
18	Guard gasket	Nitrile rubber	
19	C type snap ring	ϕ 8: Steel ϕ 12 to 25: Stainless steel	Only ϕ 8 to 25
20	Guard	Aluminum alloy	Chromate
21	End plate	Aluminum alloy	Alumite
22	Hexagon socket head cap bolt	Alloy steel	Zinc chromate
23	Plug	Stainless steel	
24	Table	ϕ 6 to 16: Stainless steel ϕ 20, 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 ϕ 6
29	Rod bushing A	Stainless steel	
30	Cap	Aluminum alloy	Chromate
31	Piston A	Aluminum alloy	Chromate
32	Piston B	Aluminum alloy	Chromate

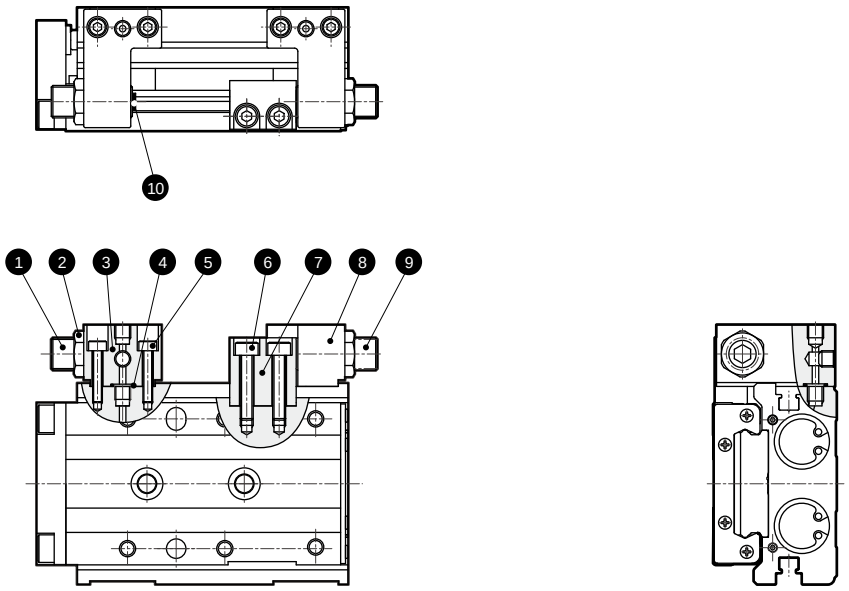
Repair parts list

Bore size (mm)	Kit No.	Repair parts number
ϕ 6	LCG-6K	
ϕ 8	LCG-8K	
ϕ 12	LCG-12K	5 6 10
ϕ 16	LCG-16K	16 17 18
ϕ 20	LCG-20K	
ϕ 25	LCG-25K	

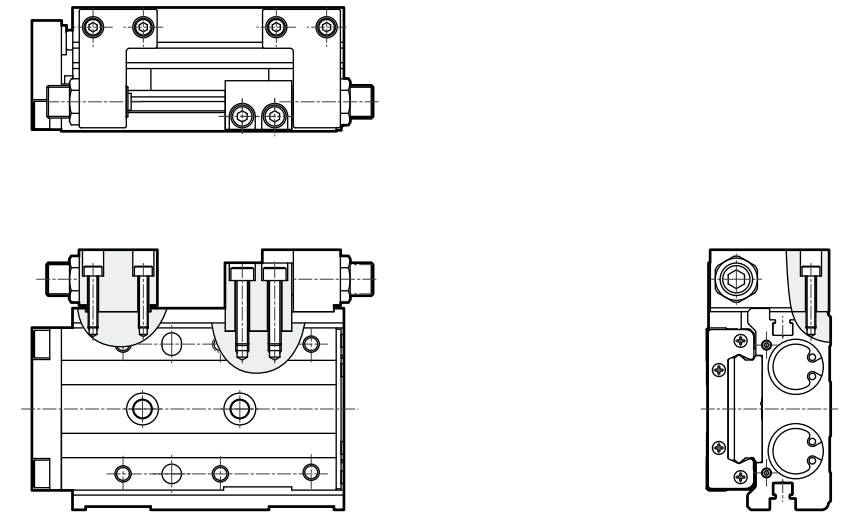
Internal structure and parts list

Configuration with stopper

● Type of stopper part with side and bottom parts (symbol D)



● Without port at stopper section



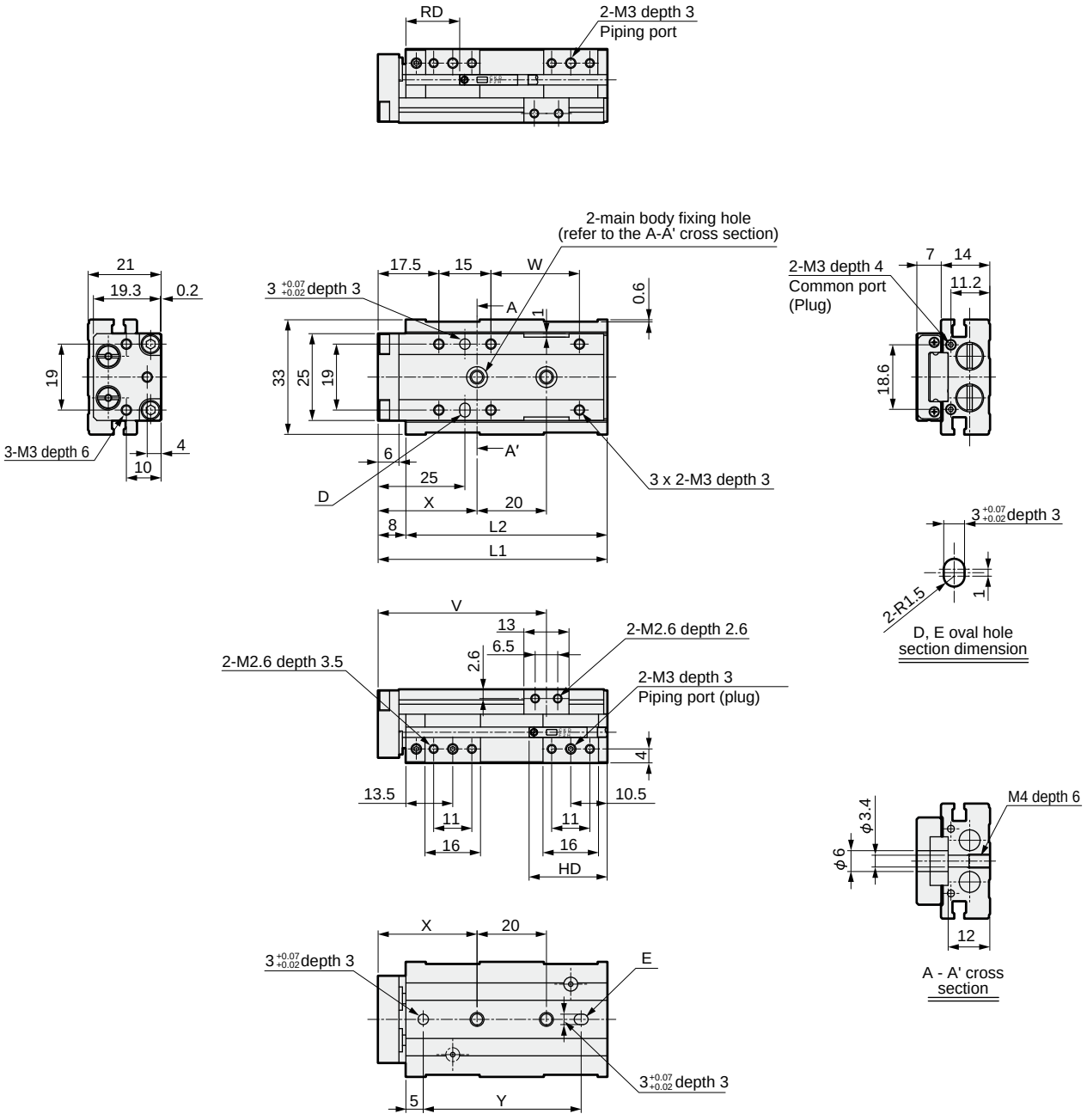
Parts list

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 bolt	Alloy steel	Zinc chromate	8	Stopper B	Aluminum alloy	Alumite
6	Hexagon socket head cap bolt	Alloy steel	Zinc chromate	9	Stopper bolt	Alloy steel	Nickeling
				10	Cushion rubber	Urethane rubber	

Dimensions (bore size: ϕ 6) CAD

● LCG-6

Stroke length: 10, 20, 30
(The main body fixing holes in this drawing is for 20 mm stroke)



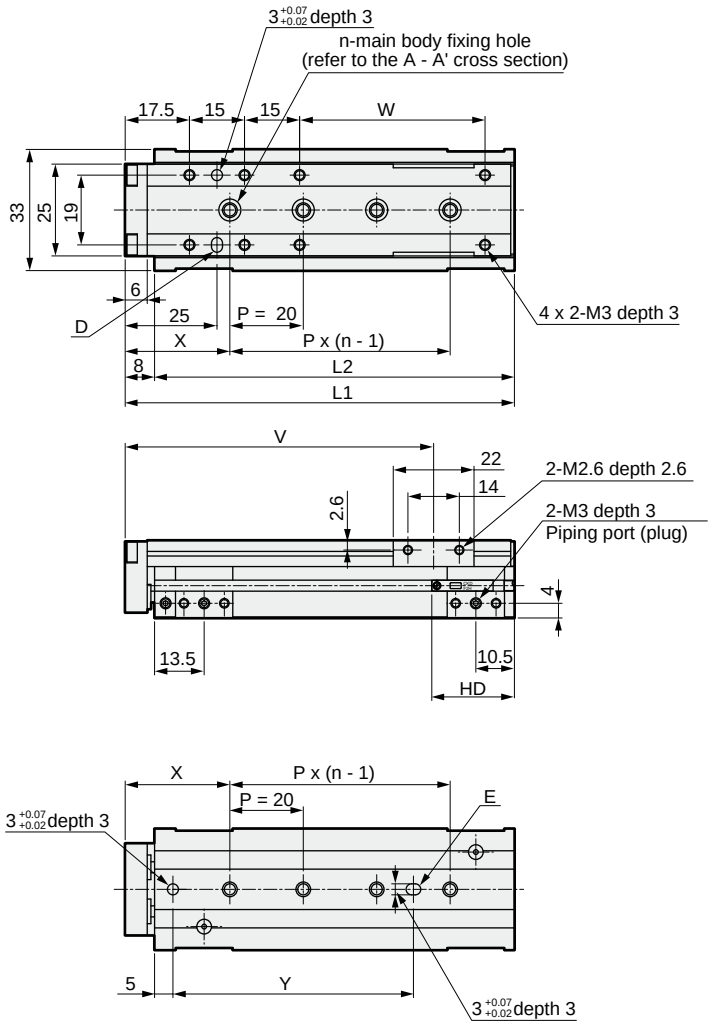
Dimensions table per stroke length

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: ϕ 6)

● LCG-6

Stroke length: 40, 50
(The main body fixing holes in this drawing is for 50 mm stroke)



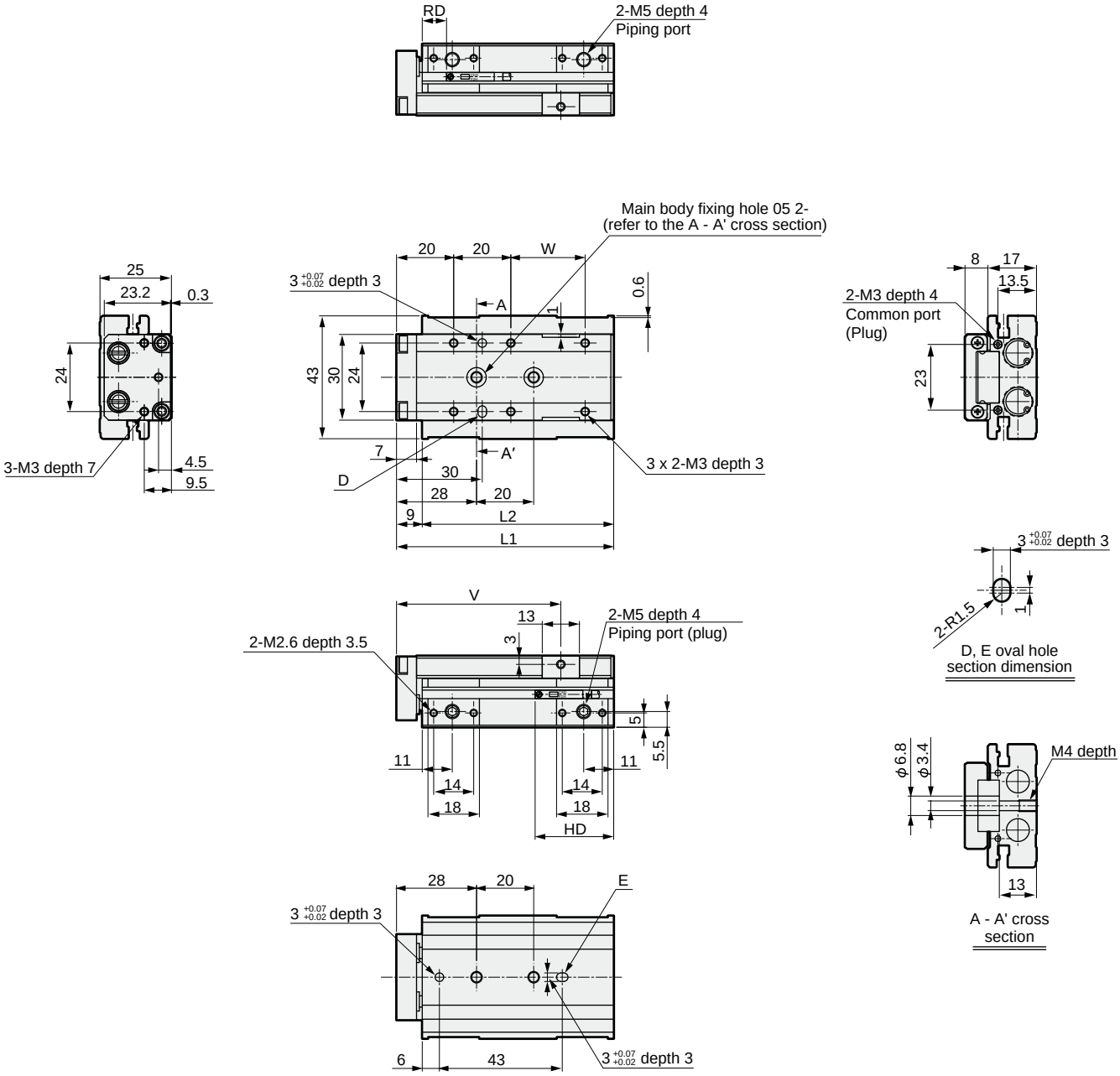
Dimensions table per stroke length

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: ϕ 8) CAD

● LCG-8

Stroke length: 10, 20, 30
(The main body fixing holes in this drawing is for 30 mm stroke)



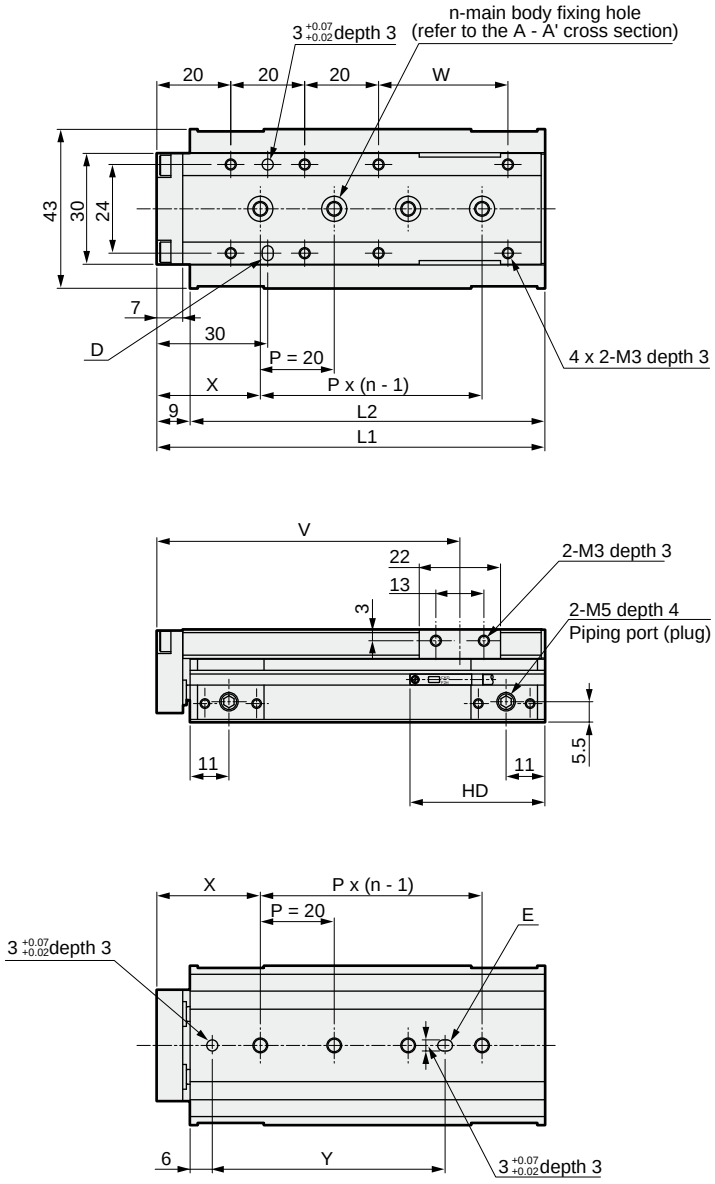
Dimensions table per stroke length

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: ϕ 8)

● LCG-8

Stroke length: 40, 50, 75
(The main body fixing holes in this drawing is for 50 mm stroke)



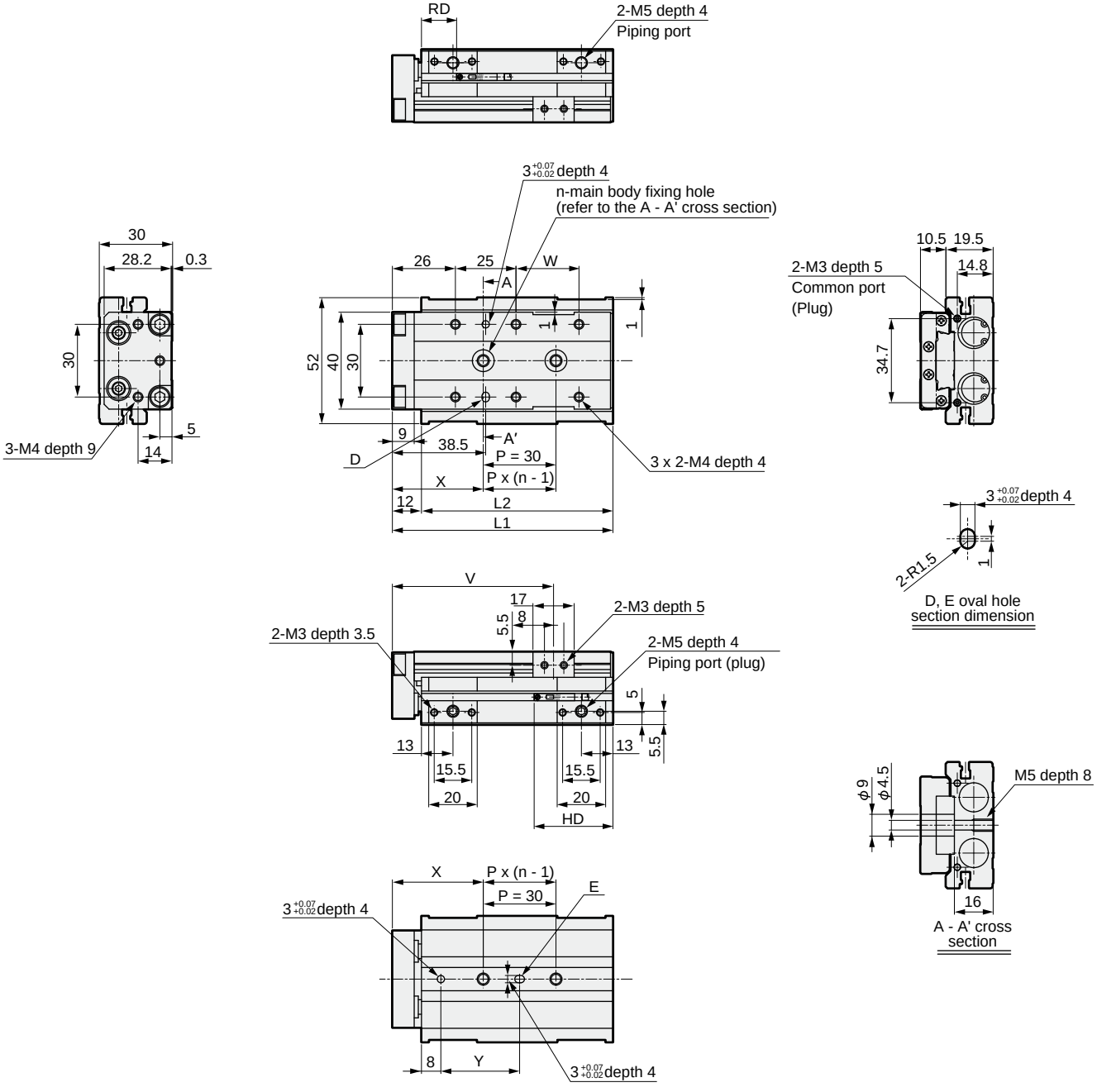
Dimensions table per stroke length

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: ϕ 12) CAD

● LCG-12

Stroke length: 10, 20, 30, 40, 50
(The main body fixing holes in this drawing is for 30 mm stroke)



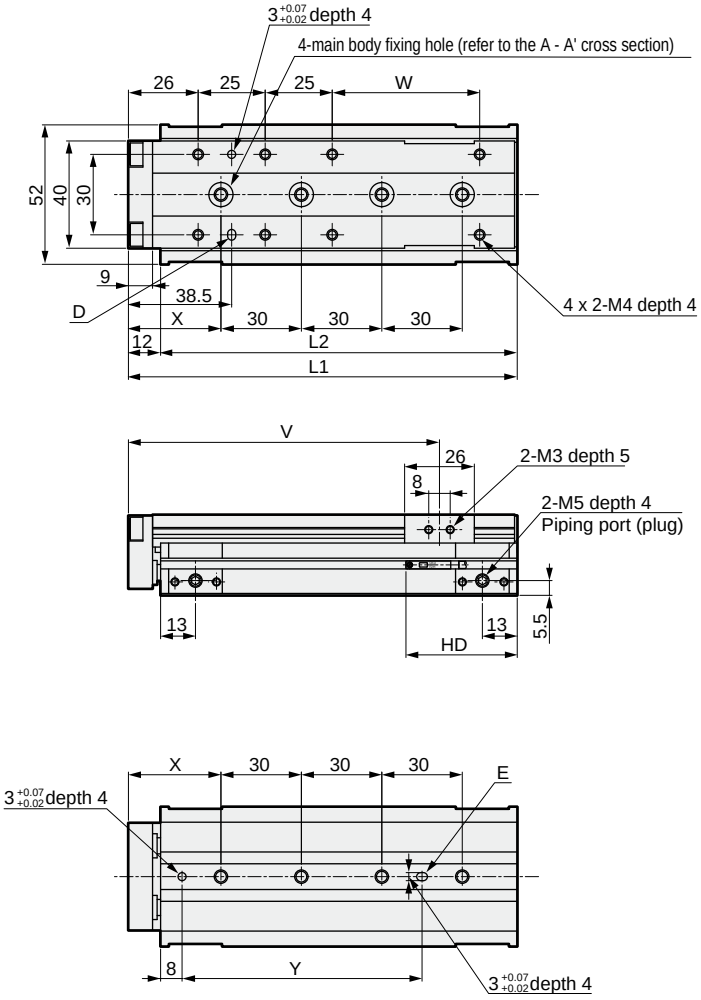
Dimensions table per stroke length

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: ϕ 12) CAD

● LCG-12

Stroke length: 75,100
(The main body fixing holes in this drawing is for 100 mm stroke)



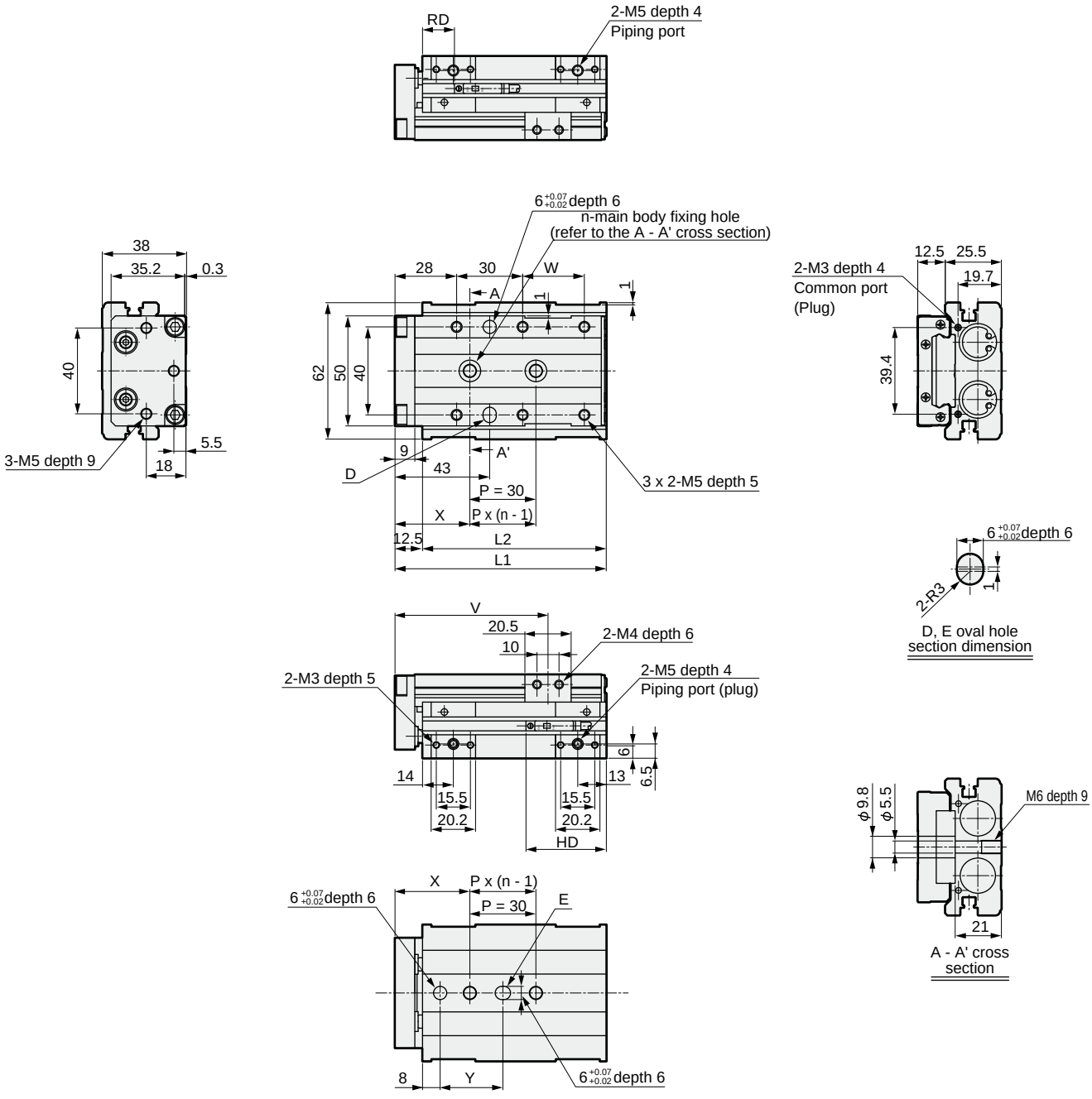
Dimensions table per stroke length

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: ϕ 16) CAD

● LCG-16

Stroke length: 10, 20, 30, 40, 50
(The main body fixing holes in this drawing is for 30 mm stroke)



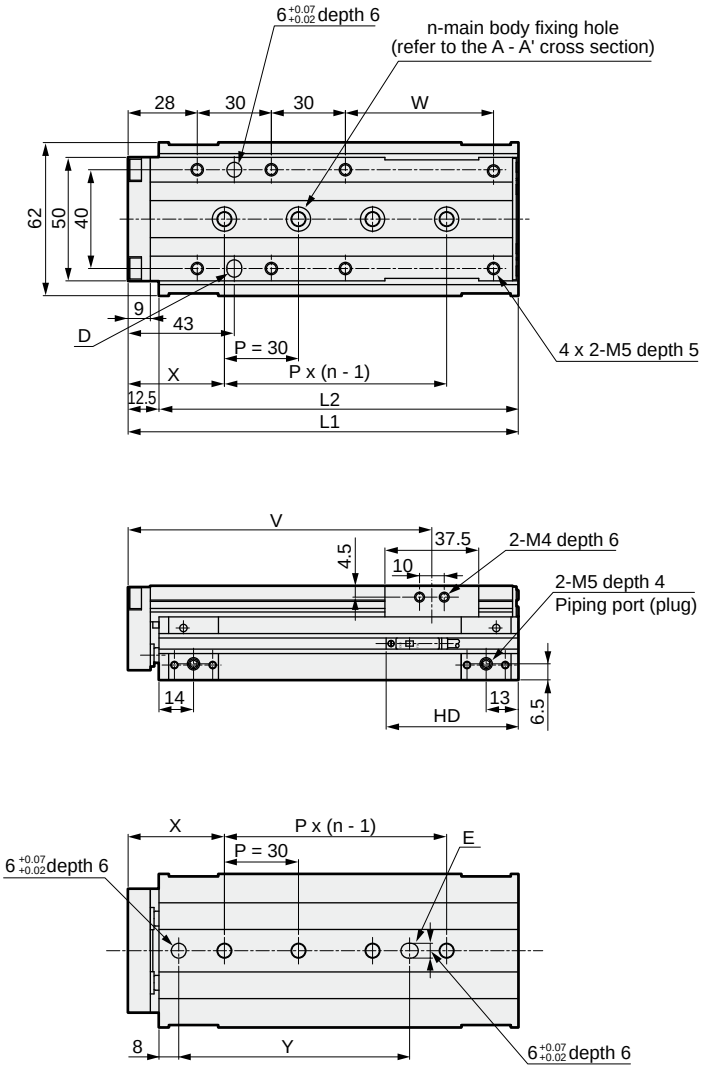
Dimensions table per stroke length

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: ϕ 16)

● LCG-16

Stroke length: 75,100,125
(The main body fixing holes in this drawing is for 75 mm stroke)



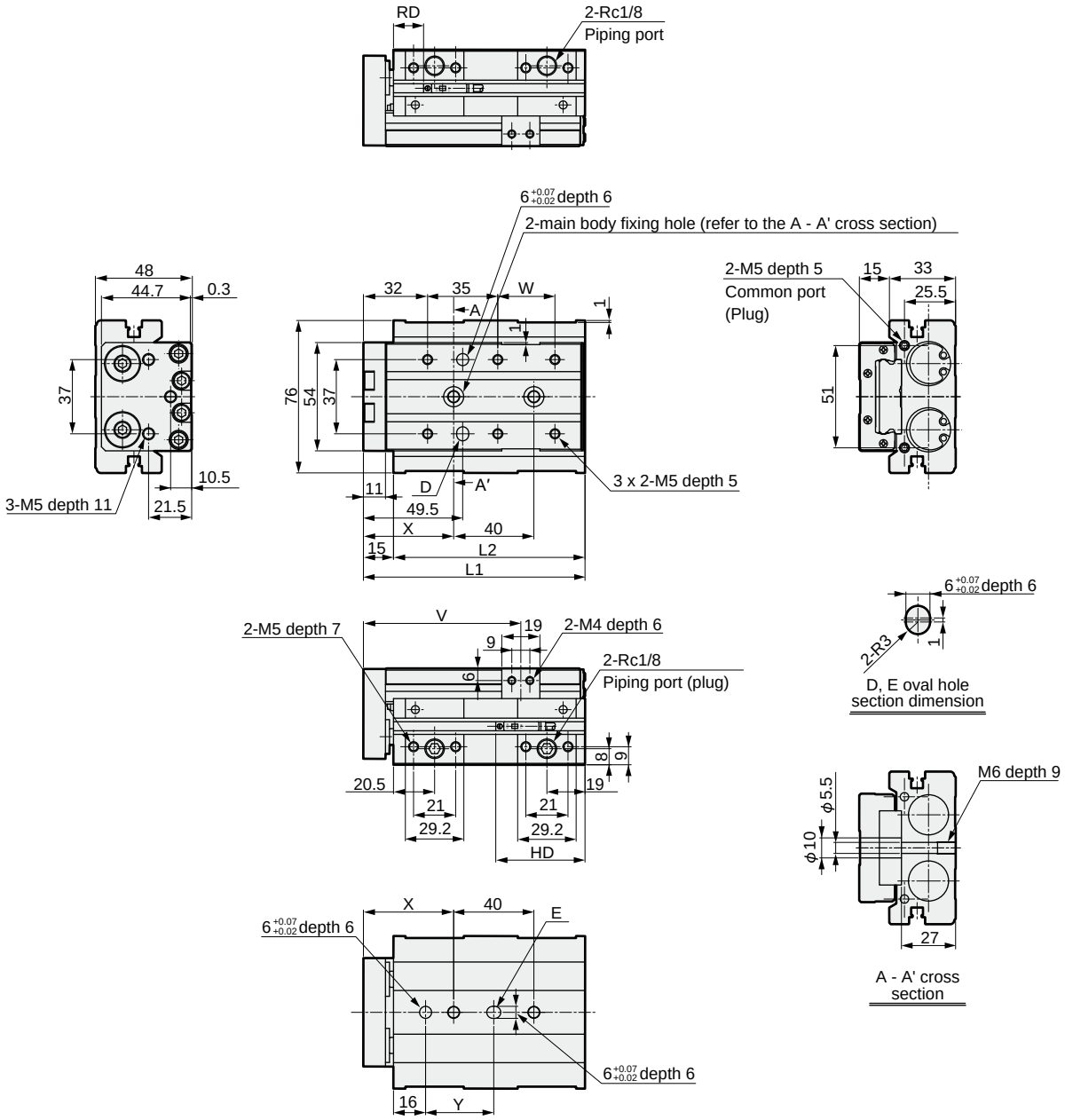
Dimensions table per stroke length

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: ϕ 20) CAD

● LCG-20

Stroke length: 10, 20, 30, 40, 50
(The main body fixing holes in this drawing is for 30 mm stroke)



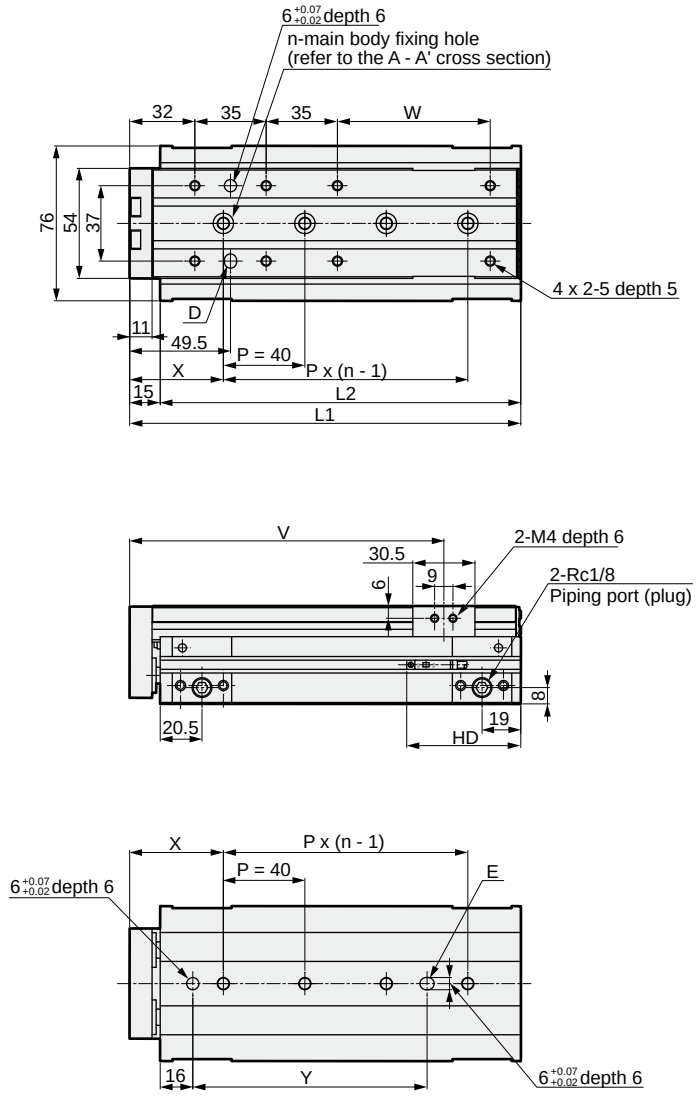
Dimensions table per stroke length

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: ϕ 20)

● LCG-20

Stroke length: 75,100,125,150
(The main body fixing holes in this drawing is for 100 mm stroke)



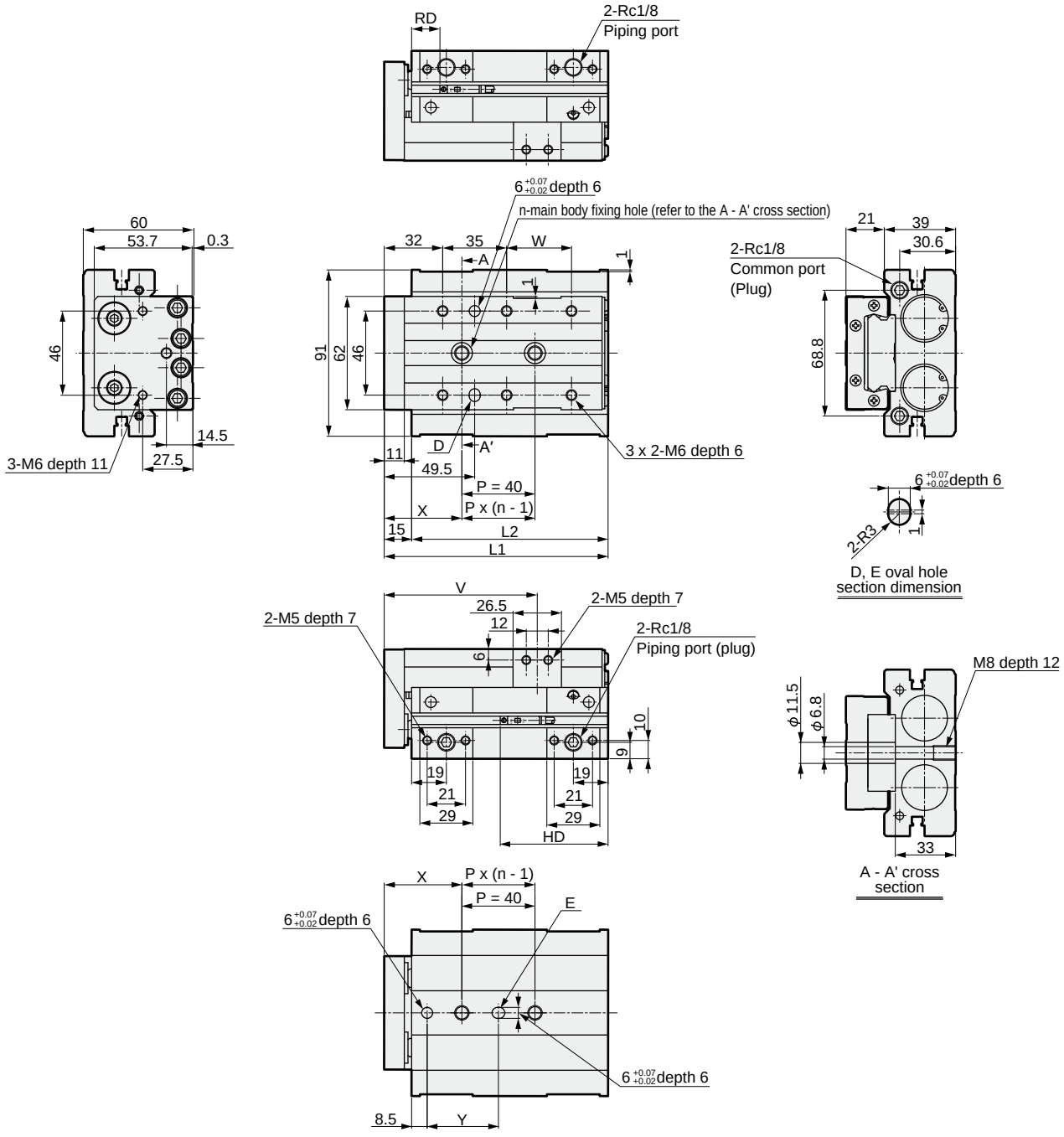
Dimensions table per stroke length

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: ϕ 25) CAD

● LCG-25

Stroke length: 10, 20, 30, 40, 50
(The main body fixing holes in this drawing is for 30 mm stroke)



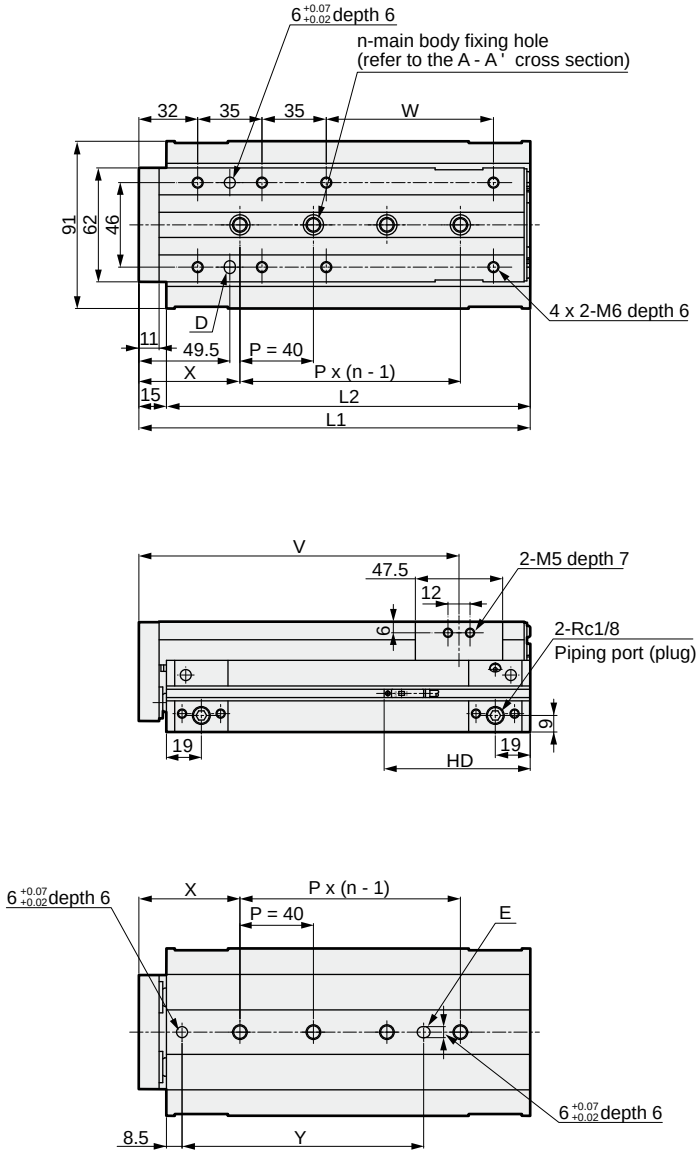
Dimensions table per stroke length

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: ϕ 25)

● LCG-25

Stroke length: 75,100,125,150
(The main body fixing holes in this drawing is for 100 mm stroke)

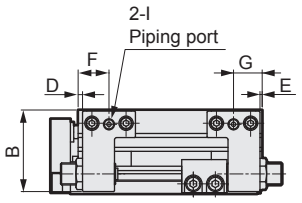


Dimensions table per stroke length

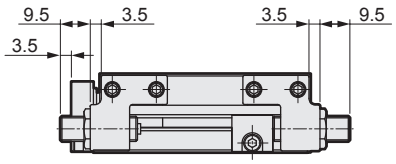
Stroke length		75	100	125	150
L1		188	213	238	263
L2		173	198	223	248
n		3	4	5	
V		138.8	163.8	188.8	213.8
W		66	91	116	141
X		60	55	45	60
Y		96.5	131.5	161.5	176.5
T0/5*	RD	18.5			
T2/3*	HD	79.5			
T2/3W*	RD	21			
	HD	77			

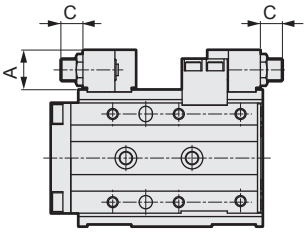
Dimensions: Option CAD

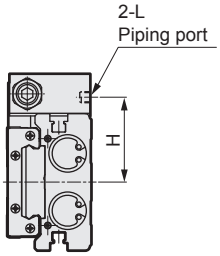
● Stopper for adjustable stroke (S1 to S6)



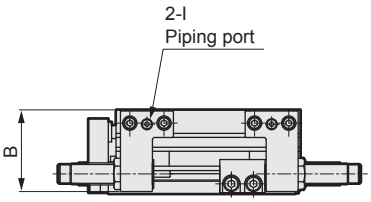
・For ϕ 8



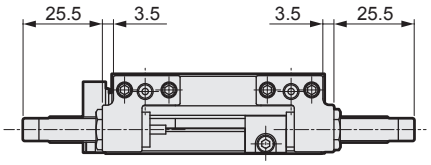


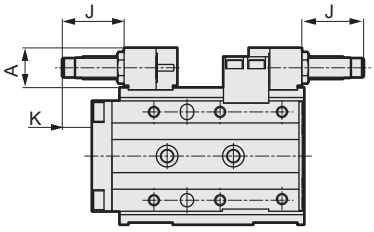


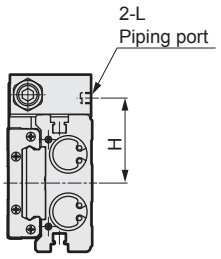
● Shock absorber type stopper (A1 to A6)



・For ϕ 8

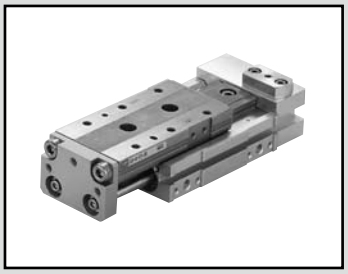






Note 1: E, H and L dimensions are applied only when ports are provided at stopper section (S*D*, A*D*)
Note 2: The adjustable stroke range of the stopper for adjustable stroke is 5mm per side.
Note 3: For position locking function type, S3** to S6** and A3** to A6** are not available.

Symbol / Bore size (mm)	A	B	C	D	E	F	G	H	I	J	K	L	Shock absorber type stopper adjustable stroke range (single)
ϕ 6	14	19.5	11	4	1	13.5	10.5	24	M3 depth 3	21	9	M3 depth 3	9
ϕ 8	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
ϕ 12	15.5	29	12	1	1	13	13	31	M5 depth 4	25.5	12.5	M5 depth 4	14.5
ϕ 16	18	37	10	2	1	14	13	39	M5 depth 4	28.5	14	M5 depth 4	15
ϕ 20	20.5	45	14.5	4	2.5	20.5	19	46	Rc1/8	29.5	10.5	M5 depth 4	13
ϕ 25	20.5	57	11.5	2.5	2.5	19	19	54.5	Rc1/8	26.5	9	M5 depth 4	10

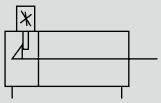


Linear slide cylinder Double acting position locking type

LCG-Q Series

● Bore size: ϕ 8, ϕ 12, ϕ 16, ϕ 20, ϕ 25

JIS symbol



RoHS CAD

Specifications

Descriptions		LCG-Q				
Bore size mm		ϕ 8	ϕ 12	ϕ 16	ϕ 20	ϕ 25
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 (no freezing)				
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		Theoretical thrust x 0.7 at PULL (0.7MPa)				
Lubrication		Not required (when lubricating, use turbine oil Class 1 ISOVG 32)				
Allowable energy absorption J		Refer to the table 3 on Page 1752.				

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)
ϕ 8	10, 20, 30, 40, 50, 75
ϕ 12	10, 20, 30, 40, 50, 75, 100
ϕ 16	10, 20, 30, 40, 50, 75, 100, 125
ϕ 20	10, 20, 30, 40, 50, 75, 100, 125, 150
ϕ 25	10, 20, 30, 40, 50, 75, 100, 125, 150

Note: Stroke length other than above is not available.

Switch specifications

*The T0/T5 switch can be used with 220 VAC.
Consult with CKD for working conditions.

● 1 color/2 color indicator

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

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		Programmable controller, relay		Programmable controller		Programmable controller, relay	
Output method	-		NPN output		-		NPN output	
Power voltage	-		10 to 28 VDC		-		10 to 28 VDC	
Load voltage	10 to 30 VDC	24 VDC ±10%	30 VDC or less		10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 20 mA		100 mA or less	50 mA or less	5 to 20 mA		50 mA 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	1 mA or less		10 μA or less		1 mA or less		10 μA or less	

Cylinder weight

● Position locking type

(Unit: g)

Bore size (mm)	Basic type stroke length (mm)								
	10	20	30	40	50	75	100	125	150
ϕ8	310	310	350	420	450	540	-	-	-
ϕ12	585	585	585	635	695	875	1,025	-	-
ϕ16	910	910	910	990	1,070	1,400	1,590	1,800	-
ϕ20	1,510	1,510	1,510	1,630	1,750	2,170	2,460	2,760	3,050
ϕ25	2,450	2,450	2,450	2,610	2,810	3,620	4,040	4,460	4,910

● Additional variation/option (stopper)

(Unit: g)

Bore size (mm)	Option, stopper symbol	
	S1/S2	A1/A2
ϕ8	50	50
ϕ12	70	70
ϕ16	130	130
ϕ20	130	130
ϕ25	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	ϕ 8
12	ϕ 12
16	ϕ 16
20	ϕ 20
25	ϕ 25

Ⓑ Stroke length (mm)

		Bore size (ϕ)				
		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 ϕ 8	ϕ 12	ϕ 16	ϕ 20	ϕ 25
F2H*	**F2V***	Proximity	1 color indicator type	2-wire	●	●			
F3H*	**F3V***			3-wire					
F2YH*	**F2YV***		2 color indicator type	2-wire					
F3YH*	**F3YV***			3-wire					
T0H*	**T0V***	Reed	1 color indicator type	2-wire					
T5H*	**T5V***								
T2H*	**T2V***	Proximity	1 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	1 m (standard)			●		
3	3 m (option)			●		
5	5 m (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 5mm	Note 1, Note 5, Note 7
S1**	Stopper position ① (Stopper installation position)
S2**	Stopper position ② (Stopper installation position)
A Shock absorber type stopper	Note 2, Note 5, Note 7
A1**	Stopper position ① (Stopper installation position)
A2**	Stopper position ② (Stopper installation position)
**** section**	
Blank	Port at stopper section: no port
D	Port at stopper section: side surface and bottom side ports presence 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: When changing adjustable stroke range, use a discrete stopper for adjustable stroke listed on page 1711.

Note 2: When using shock absorber type, refer to K in the stopper dimensions table on page 1726.

Note 3: Refer to stopper dimensions on page 1726 for port positions.

Note 4: When no stopper, port position of standard type are as following Fig. ① and ③.

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 1731 for optional combination.

Note 8: For ϕ 8 cylinders with 10mm stroke or ϕ 12 to ϕ 25 cylinders with 20mm stroke or less, custom order is applied because A1**, A2** can not be adjusted by a standard stopper.

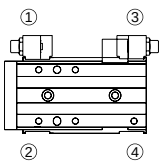
<Example of model number>

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

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

- Ⓐ Bore size : ϕ 12
- Ⓑ Stroke length : 40 mm
- Ⓒ Switch model no. : Proximity, 2-wire
  Axial lead wire
- Ⓓ Switch quantity : One on rod end
- Ⓔ Other options : Shock absorber type
  Stopper position ①
  Side and bottom port
  Material and alloy steel (nitriding)

● Stopper position



LCG-Q position locking type selection table

(Combinations of stopper for adjustable stroke and shock absorber type stopper)

○: Combination possible -: Combination 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 basic	ϕ 8	10	○	○	-	-	-	-	-	-	-	-	-	-
		20 and over	○	○	-	-	-	-	○	○	-	-	-	-
	ϕ 12 to ϕ 25	10 to 20	○	○	-	-	-	-	-	-	-	-	-	-
		30 and over	○	○	-	-	-	-	○	○	-	-	-	-

The option symbol D: with stopper section port and T stopper block alloy steel (nitriding) combination follows the combination table above.

How to order switch

For ϕ 8 to ϕ 12

SW - F2H

Switch model no.
(Page 1730 section Ⓒ)

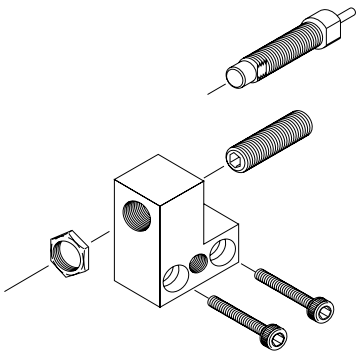
For ϕ 16 to ϕ 25

SW - T2H3

Switch model no.
(Page 1730 section Ⓒ)

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 1730 section Ⓐ)

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

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

Ⓒ Port at stopper section	
Blank	No port
D	Side surface and bottom port presence

Precautions for ordering stopper set

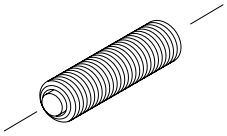
S01 is included in the stopper for adjustable stroke parts for the stopper for adjustable stroke set.
Only when installed on installation position (1), (2) (refer to page 1730), add the right part according to stroke length and adjustable stroke length.

– : 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	ϕ 8	10	S02	-	-
		20 and over	Additional not required	S02	-
	ϕ 12 to ϕ 25	10	S03	-	-
		20	S02	S03	-
		30 and over	Additional not required	S02	S03

How to order the discrete stopper for adjustable stroke

- Hexagon socket head set screw with urethane
- Used when changing the adjustable stroke range or setting custom stroke length



LCG - 12 - S02

Bore size
(Page 1730 section Ⓐ)

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

Indicate S01, S02, S03 for Ⓐ.
Note: S03 is not available for ϕ 8.
Depending on the type, the incompatible models or adjustable stroke ranges may differ from the above values.

Cautions when purchasing discrete stopper

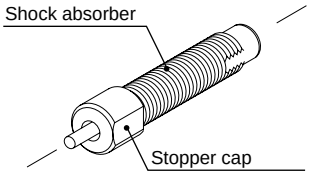
Only when installing a stopper for adjustable stroke or a shock absorber type stopper on installation position (1) or (2) (refer to page 1730), the right combination may be applied depending on stroke length and adjustable stroke length.

- : 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	ϕ 8	10	S02	-	-	-
		20 and over	S01	S02	-	A01
	ϕ 12 to ϕ 25	10	S03	-	-	-
		20	S02	S03	-	-
		30 and over	S01	S02	S03	A01

How to order the discrete shock absorber stopper

- Shock absorber and stopper cap set
- Used when changing from stopper for adjustable stroke to shock absorber type stopper



LCG - 12 - A01

Bore size
(Page 1730 section Ⓐ)

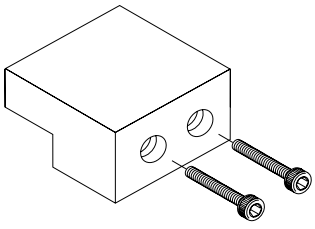
Note: Some models may not be available depending on the type. Refer to Page 1730.
Refer to page 1726 for the stroke adjustment range of the shock absorber type stopper.

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

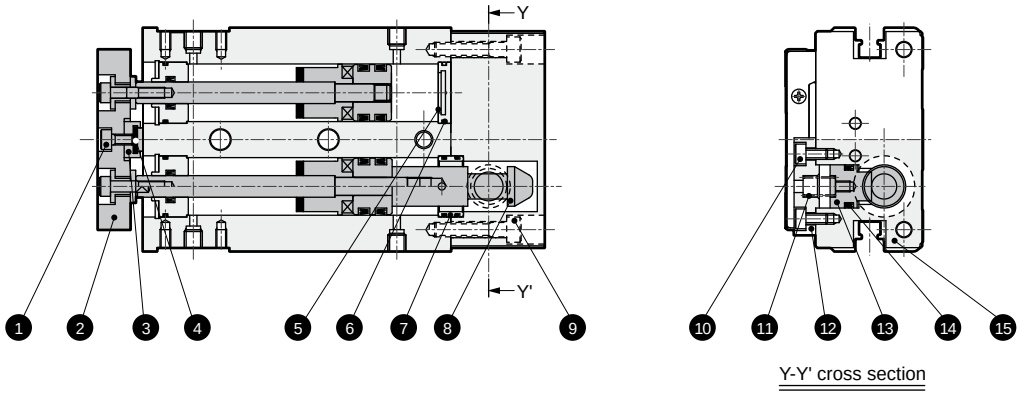
Bore size
(Page 1730 section Ⓐ)

Ⓐ Stopper block	
SB1	ϕ 8: 30 stroke or less
	ϕ 12 to ϕ 25: 50 stroke or less
SB2	ϕ 8: 40 stroke and over
	ϕ 12 to ϕ 25: 75 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 bolt	Alloy steel	Zinc chromate	8	Sleeve	Carbon steel	Nitriding
2	End plate	Aluminum alloy	Alumite	9	Hexagon socket head cap bolt	Alloy steel	Zinc chromate
3	Stopper	Aluminum alloy	Alumite	10	Hexagon socket head cap bolt	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	ϕ 8: Stainless steel ϕ 12 to 25: Aluminum alloy	ϕ 12 to 25: Chromate	14	Stopper packing seal	Nitrile rubber	
				15	Head cover	Aluminum alloy	Alumite

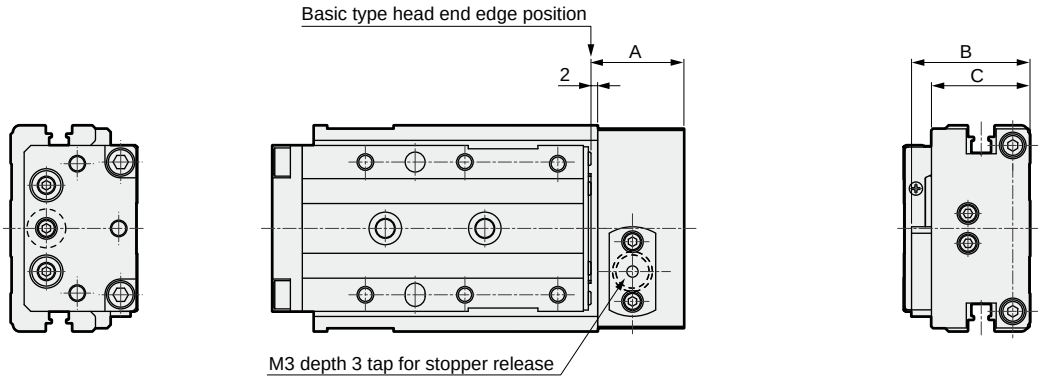
Repair parts list

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

Note: Refer to parts list of basic type on page 1712 for basic repair parts No.

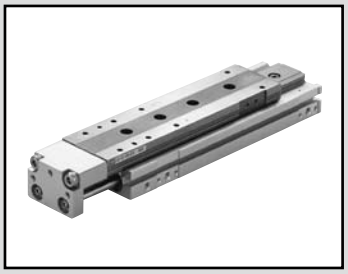
Dimensions

● LCG-Q



Symbol / Bore size (mm)	A	B	C
ϕ 8	23	29.5	22
ϕ 12	24.5	30.5	24.5
ϕ 16	28	35.7	29.7
ϕ 20	30	39	33
ϕ 25	30	48	42

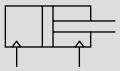
Note: Other than the above dimension is same as double acting single rod type.



Linear slide cylinder Double acting single rod type clean room specifications

LCG-P7* Series

● Bore size: ϕ 6, ϕ 8, ϕ 12, ϕ 16, ϕ 20, ϕ 25

JIS symbol 

Specifications

Descriptions		LCG-P73					
Bore size mm		ϕ 6	ϕ 8	ϕ 12	ϕ 16	ϕ 20	ϕ 25
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 (no freezing) (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 1752.					

Note 1: For 6 mm bore cylinder, when using switches, max. ambient temperature is 50℃ (45℃ when installing on an iron 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)
ϕ 6	10, 20, 30, 40, 50
ϕ 8	10, 20, 30, 40, 50, 75
ϕ 12	10, 20, 30, 40, 50, 75, 100
ϕ 16	10, 20, 30, 40, 50, 75, 100, 125
ϕ 20	10, 20, 30, 40, 50, 75, 100, 125, 150
ϕ 25	10, 20, 30, 40, 50, 75, 100, 125, 150

Note: Stroke length other than above is not available.

Switch specifications

*The T0/T5 switch can be used with 220 VAC.
Consult with CKD for working conditions.

● 1 color/2 color indicator

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

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		Programmable controller, relay		Programmable controller		Programmable controller, relay	
Output method	-		NPN output		-		NPN output	
Power voltage	-		10 to 28 VDC		-		10 to 28 VDC	
Load voltage	10 to 30 VDC	24 VDC ±10%	30 VDC or less		10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 20 mA		100 mA or less	50 mA or less	5 to 20 mA		50 mA 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	1 mA or less		10 μA or less		1 mA or less		10 μA or less	

Cylinder weight

● Clean room specifications (Unit: g)

Bore size (mm)	Basic stroke length types (mm)								
	10	20	30	40	50	75	100	125	150
ϕ6	170	170	200	240	260	-	-	-	-
ϕ8	270	270	310	380	410	500	-	-	-
ϕ12	570	570	570	620	680	860	1,010	-	-
ϕ16	860	860	860	940	1,020	1,350	1,540	1,750	-
ϕ20	1,520	1,520	1,520	1,640	1,760	2,180	2,470	2,770	3,060
ϕ25	2,460	2,460	2,460	2,620	2,820	3,630	4,050	4,470	4,920

● Additional variation/option (stopper) (Unit: g)

Bore size (mm)	Option, stopper symbol	
	S1 to S4	S5/S6
ϕ6	40	60
ϕ8	50	70
ϕ12	70	110
ϕ16	130	180
ϕ20	130	200
ϕ25	200	270

How to order

Without switch

LCG - 8 - 40 ——— S5 - P72

With switch

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

Model no.

Ⓐ Bore size

Ⓑ Stroke length

Ⓒ Switch model no.

Ⓓ Switch quantity

Ⓔ Option

Ⓕ Clean room specifications

Symbol	Descriptions
Ⓐ Bore size	
6	ϕ 6
8	ϕ 8
12	ϕ 12
16	ϕ 16
20	ϕ 20
25	ϕ 25

Ⓑ Stroke length (mm)

		Bore size (ϕ)					
		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 ϕ6	ϕ8	ϕ12	ϕ16	ϕ20	ϕ25
F2H*	**F2V***	Proximity	1 color indicator type	2-wire	●	●	●			
F3H*	**F3V***			3-wire						
F2YH*	**F2YV***		2 color indicator type	2-wire						
F3YH*	**F3YV***			3-wire						
T0H*	**T0V***	Reed	1 color indicator type	2-wire				●	●	●
T5H*	**T5V***									
T2H*	**T2V***	Proximity	1 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	1 m (standard)	●
3	3 m (option)	●
5	5 m (option)	● (ϕ16 or more)

Ⓓ 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 5mm		Note 4
S1**	Stopper position ① (changeable to ④)	Stopper installation position	●
S2**	Stopper position ② (changeable to ③)		●
S3**	Stopper position ③ (changeable to ②)		●
S4**	Stopper position ④ (changeable to ①)		●
S5**	Stopper position ①,③		●
S6**	Stopper position ②,④		●
**** section**			
Blank	Port at stopper section: no port		●
D	Port at stopper section: side surface and bottom side ports presence		● Note 1, Note 3
Blank	Stopper block material: Rolled steel		●
T	Stopper block material: Alloy steel (nitriding)		● Note 3

Ⓕ Clean room specifications

	Structure
P72	Exhaust treatment
P73	Vacuum treatment

⚠ Note on model no. selection

Note 1: Refer to stopper dimensions on page 1726 for port positions.
Note 2: When no stopper, port position of standard type are as following Fig. (1) and (3).
Note 3: Selectable only when using a stopper.
Note 4: For ϕ 6 and 10mm stroke cylinder with S*** switch, when two switches will be installed, select F*H type switch.

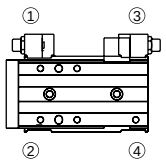
<Example of model number>

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

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

Ⓐ Bore size : ϕ 12
Ⓑ Stroke length : 40 mm
Ⓒ Switch model no. : Proximity, 2-wire
Lead wire straight
Ⓓ Switch quantity : One on rod end
Ⓔ Other options : Stopper for adjustable stroke
Stopper position ①
Side surface and bottom side ports presence
Material and alloy steel (nitriding)
Ⓕ Clean room specifications : Exhaust treatment

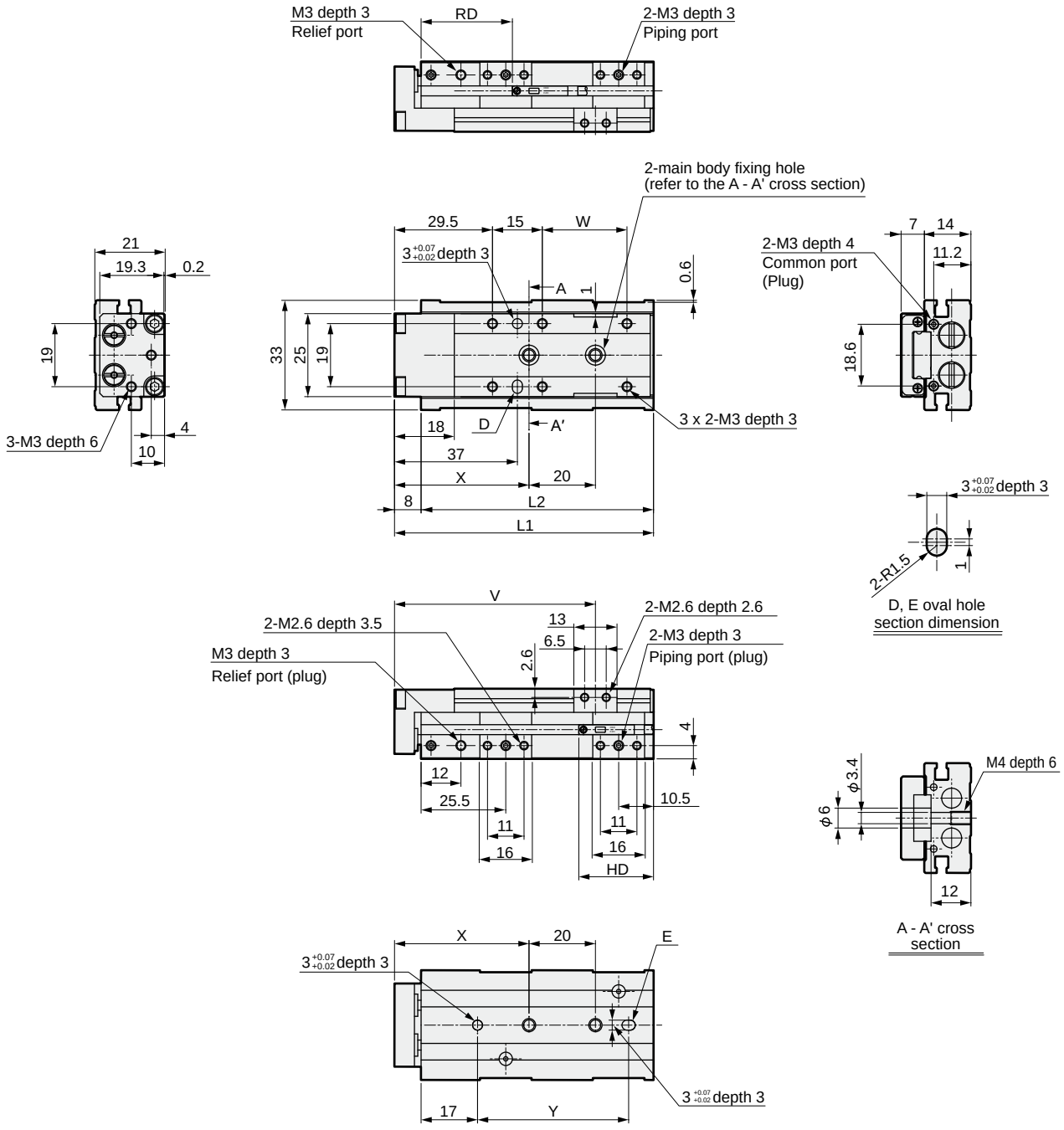
● Stopper position



Dimensions (bore size: ϕ 6) CAD

● LCG-6-P7*

Stroke length: 10, 20, 30
(The main body fixing holes in this drawing is for 20 mm stroke)



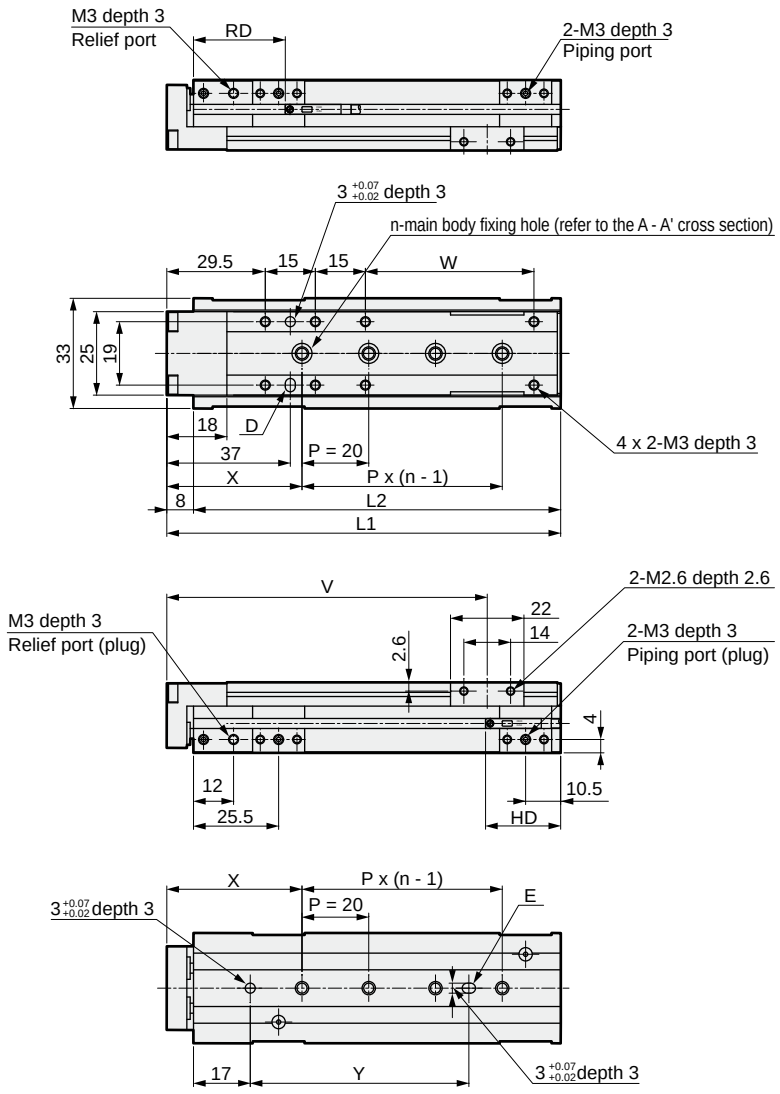
Dimensions table per stroke length

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: ϕ 6)

● LCG-6-P7*

Stroke length: 40, 50
(The main body fixing holes in this drawing is for 50 mm stroke)



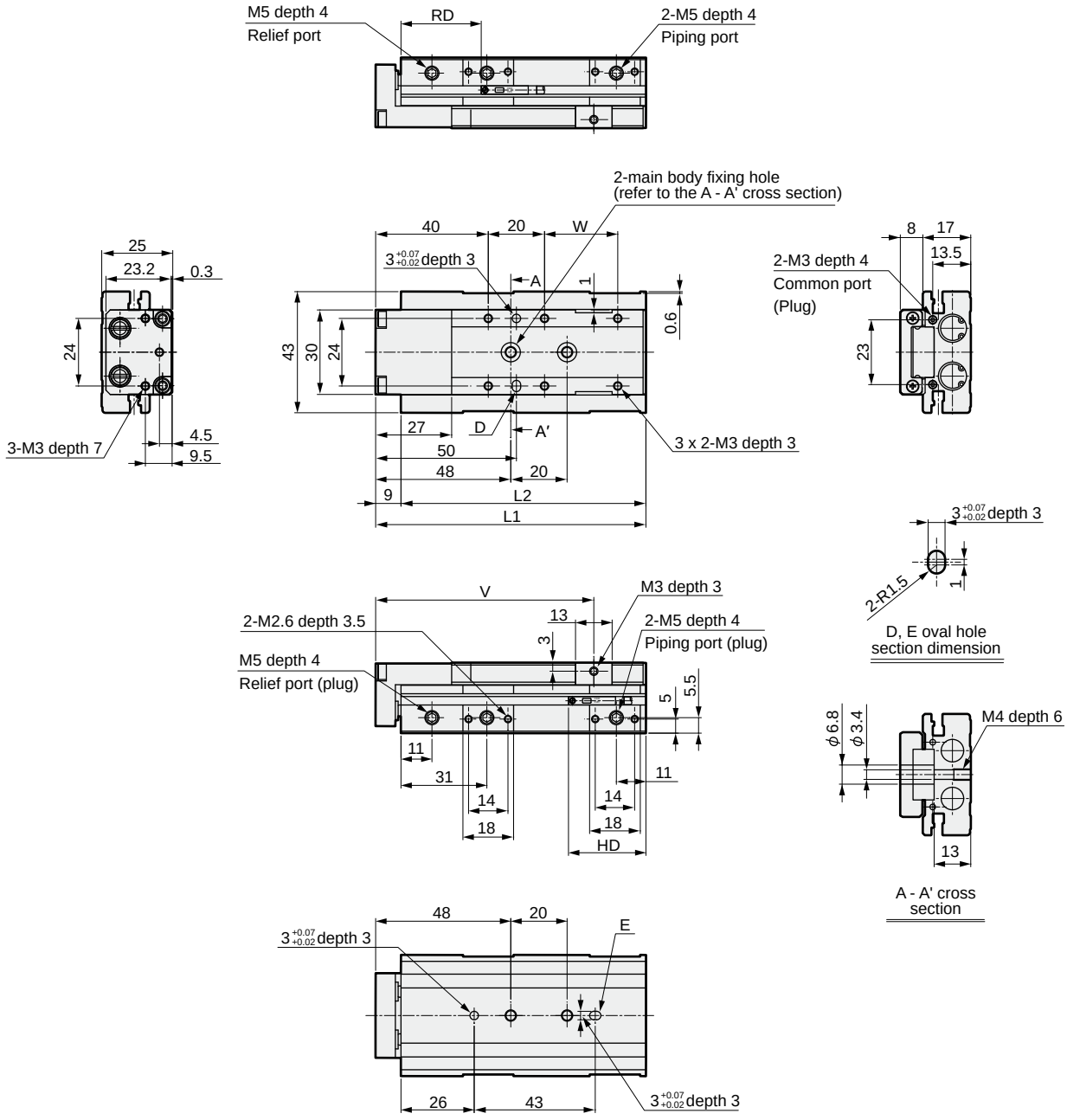
Dimensions table per stroke length

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: ϕ 8) CAD

● LCG-8-P7*

Stroke length: 10, 20, 30
(The main body fixing holes in this drawing is for 30 mm stroke)



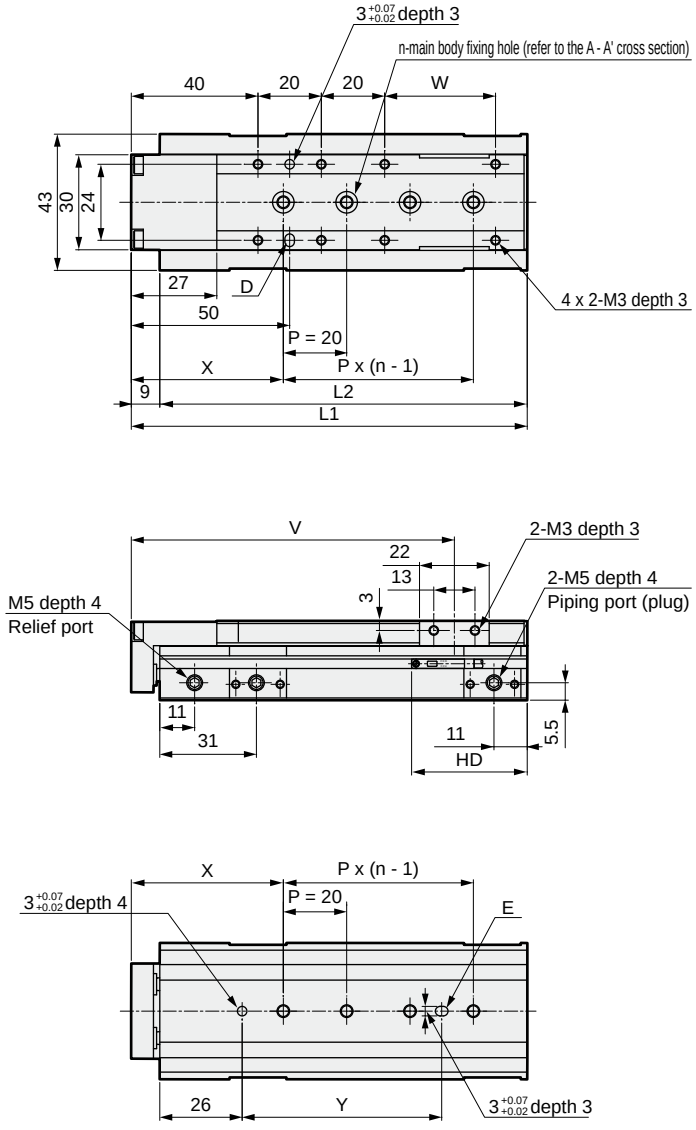
Dimensions table per stroke length

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: ϕ 8)

● LCG-8-P7*

Stroke length: 40, 50, 75
(The main body fixing holes in this drawing is for 50 mm stroke)



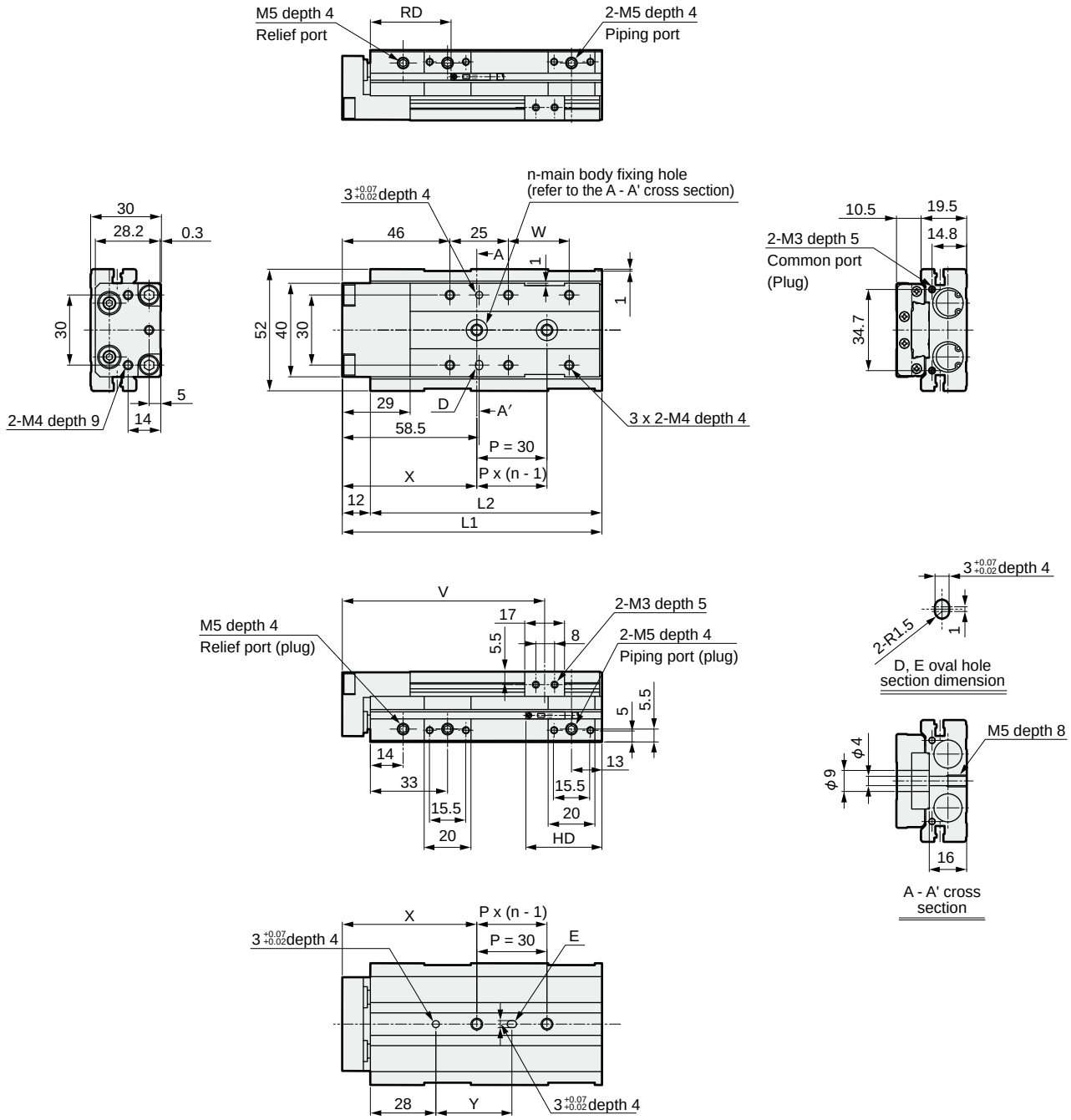
Dimensions table per stroke length

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: ϕ 12) CAD

● LCG-12-P7*

Stroke length: 10, 20, 30, 40, 50
(The main body fixing holes in this drawing is for 30 mm stroke)



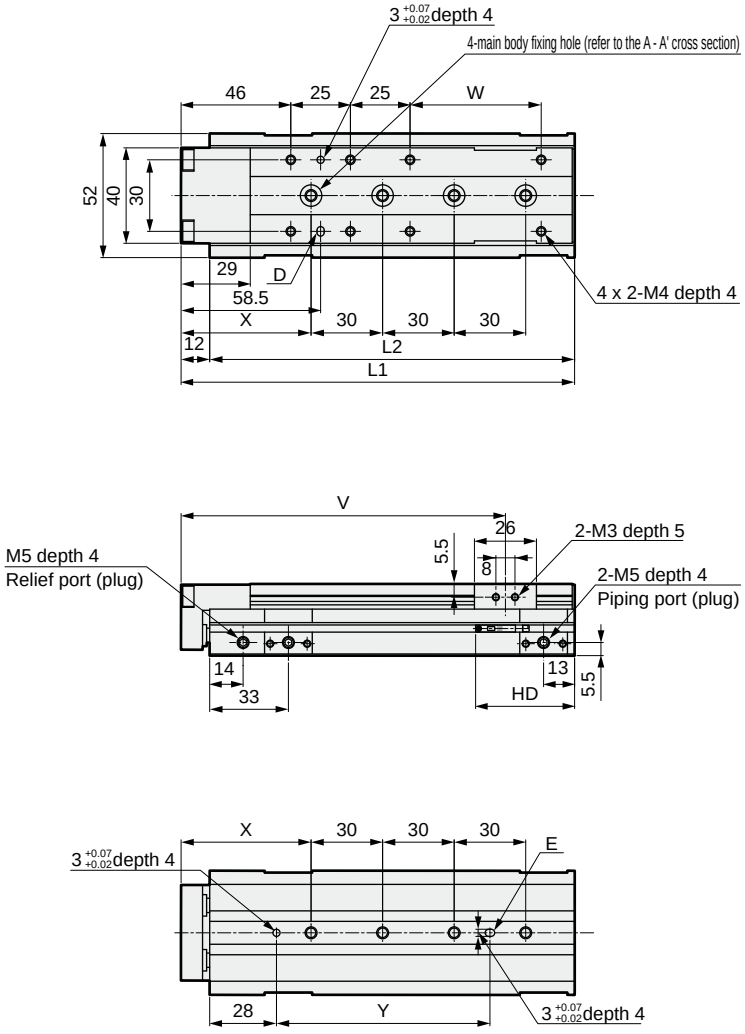
Dimensions table per stroke length

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: ϕ 12)

● LCG-12-P7*

Stroke length: 75, 100
(The main body fixing holes in this drawing is for 100 mm stroke)



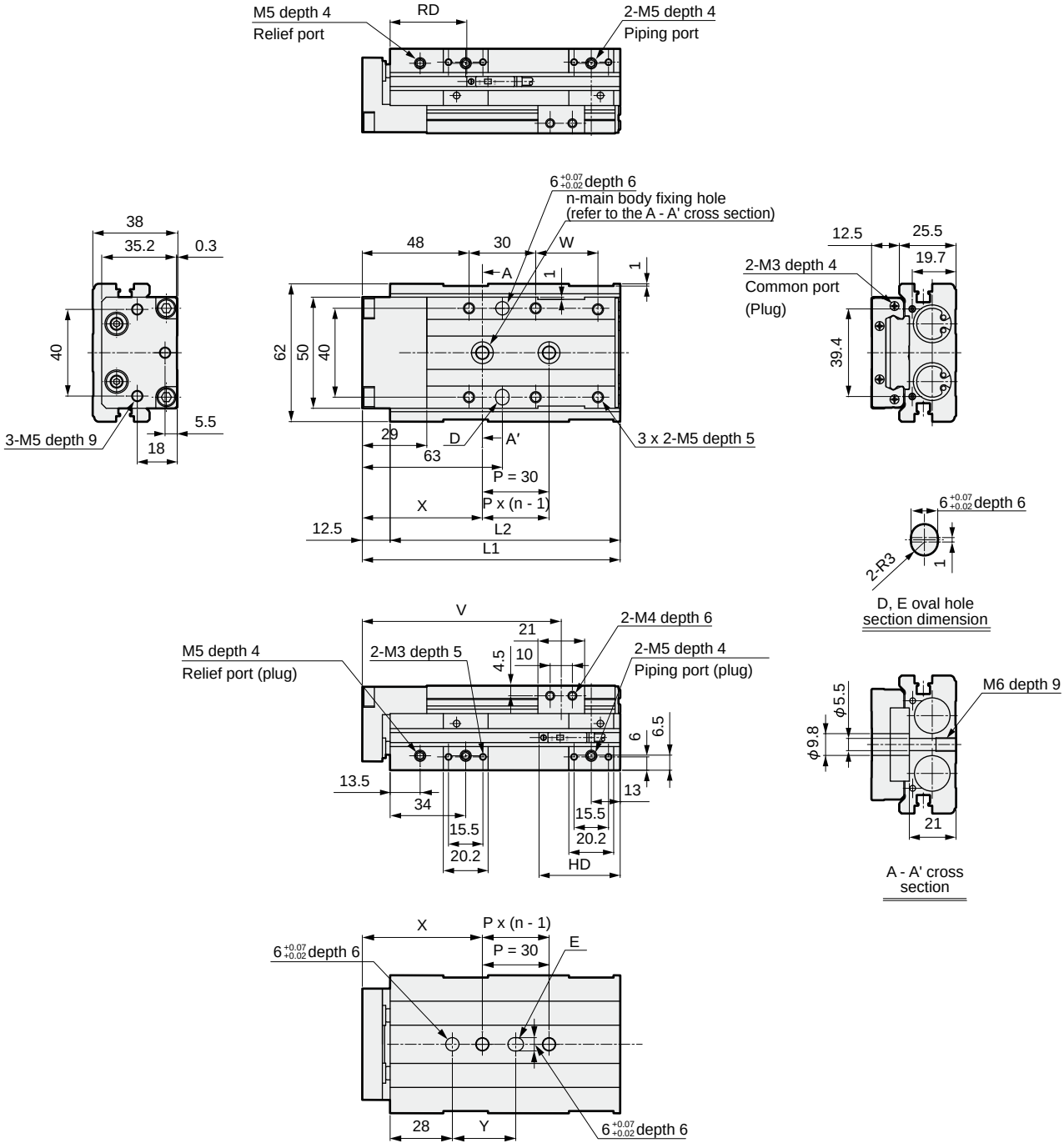
Dimensions table per stroke length

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: ϕ 16) CAD

● LCG-16-P7*

Stroke length: 10, 20, 30, 40, 50
(The main body fixing holes in this drawing is for 30 mm stroke)



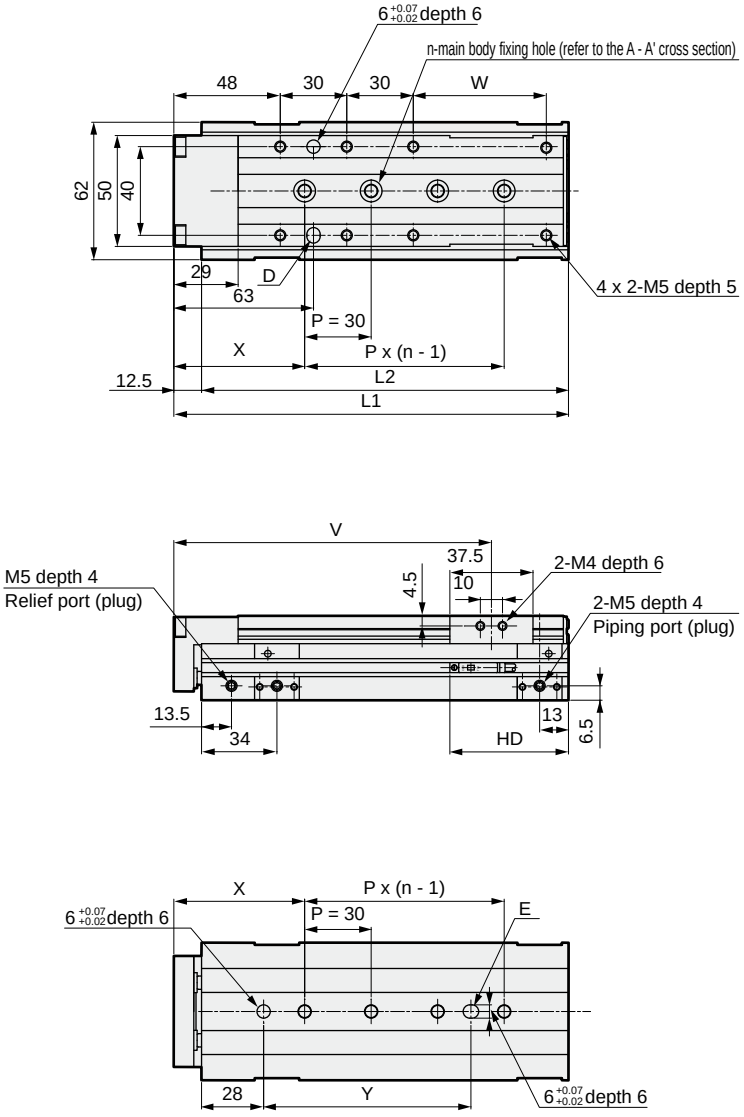
Dimensions table per stroke length

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: ϕ 16)

● LCG-16-P7*

Stroke length: 75,100,125
(The main body fixing holes in this drawing is for 75 mm stroke)



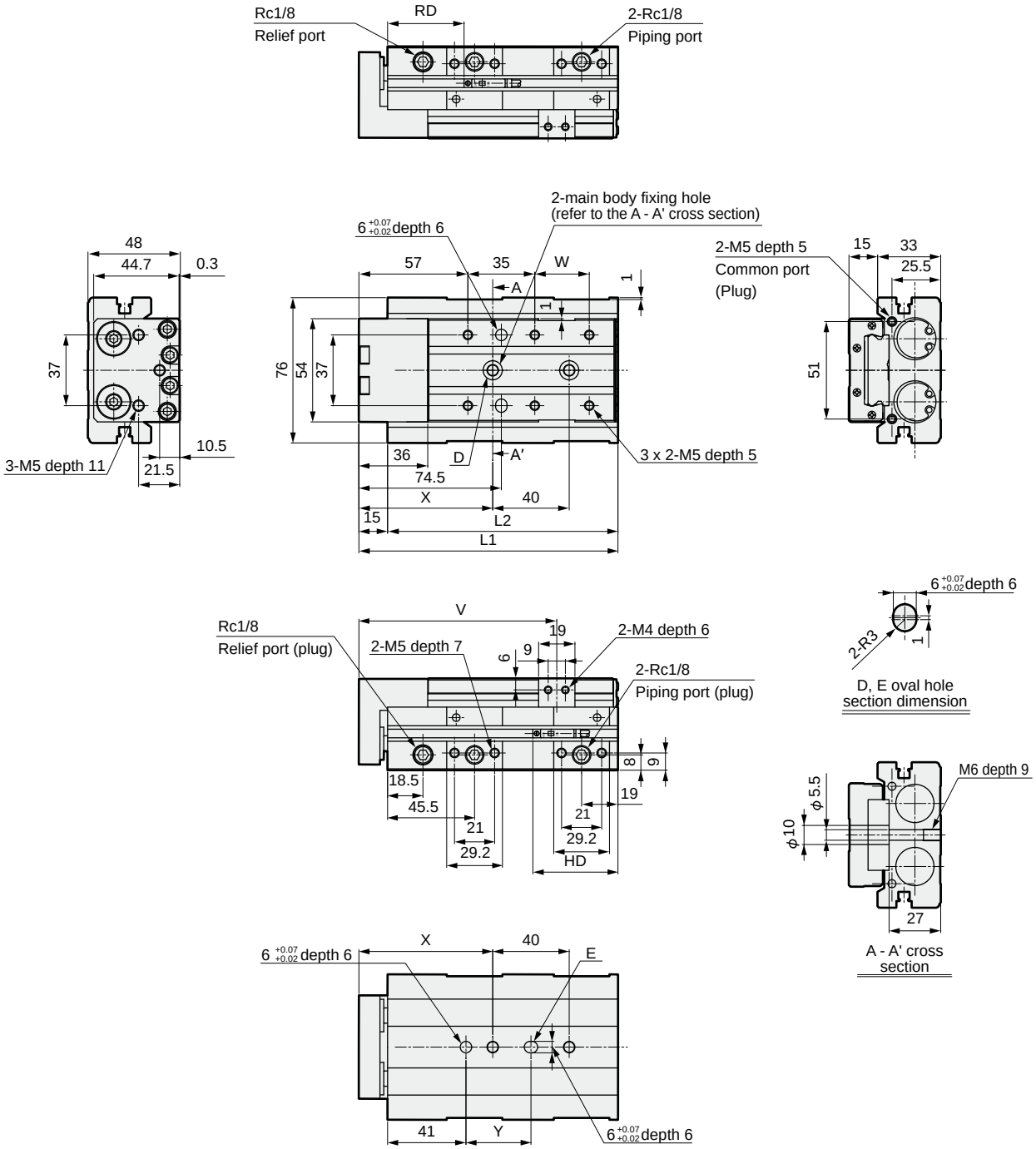
Dimensions table per stroke length

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: ϕ 20)

● LCG-20-P7*

Stroke length: 10, 20, 30, 40, 50
(The main body fixing holes in this drawing is for 30 mm stroke)



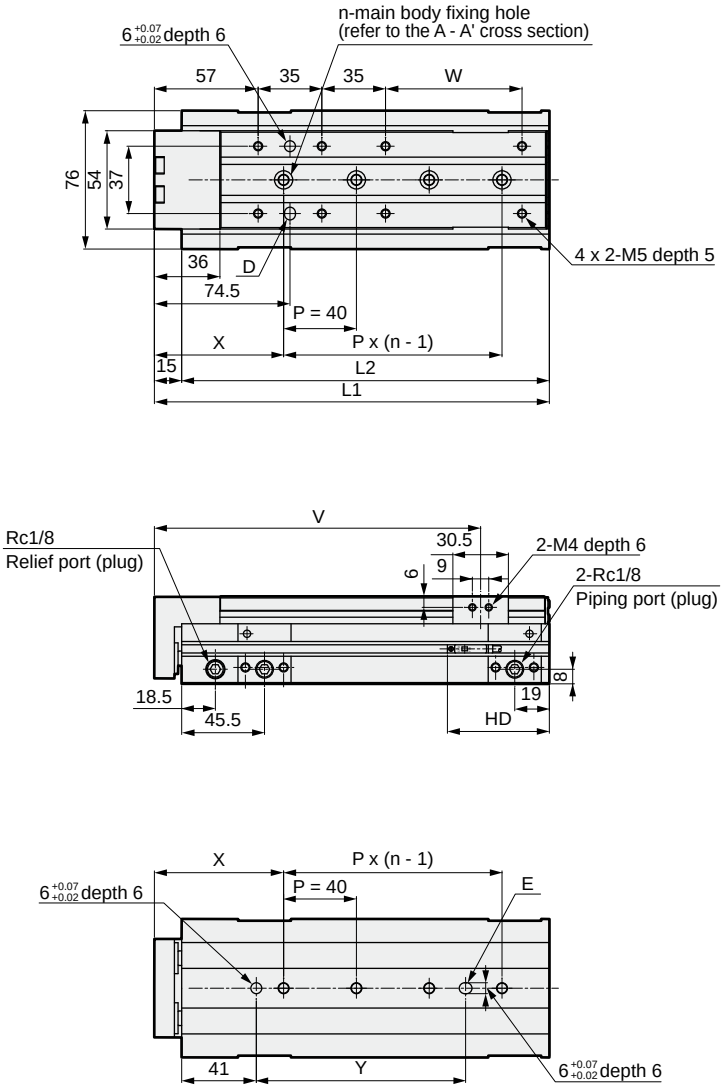
Dimensions table per stroke length

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: ϕ 20)

● LCG-20-P7*

Stroke length: 75, 100, 125, 150
(The main body fixing holes in this drawing is for 100 mm stroke)



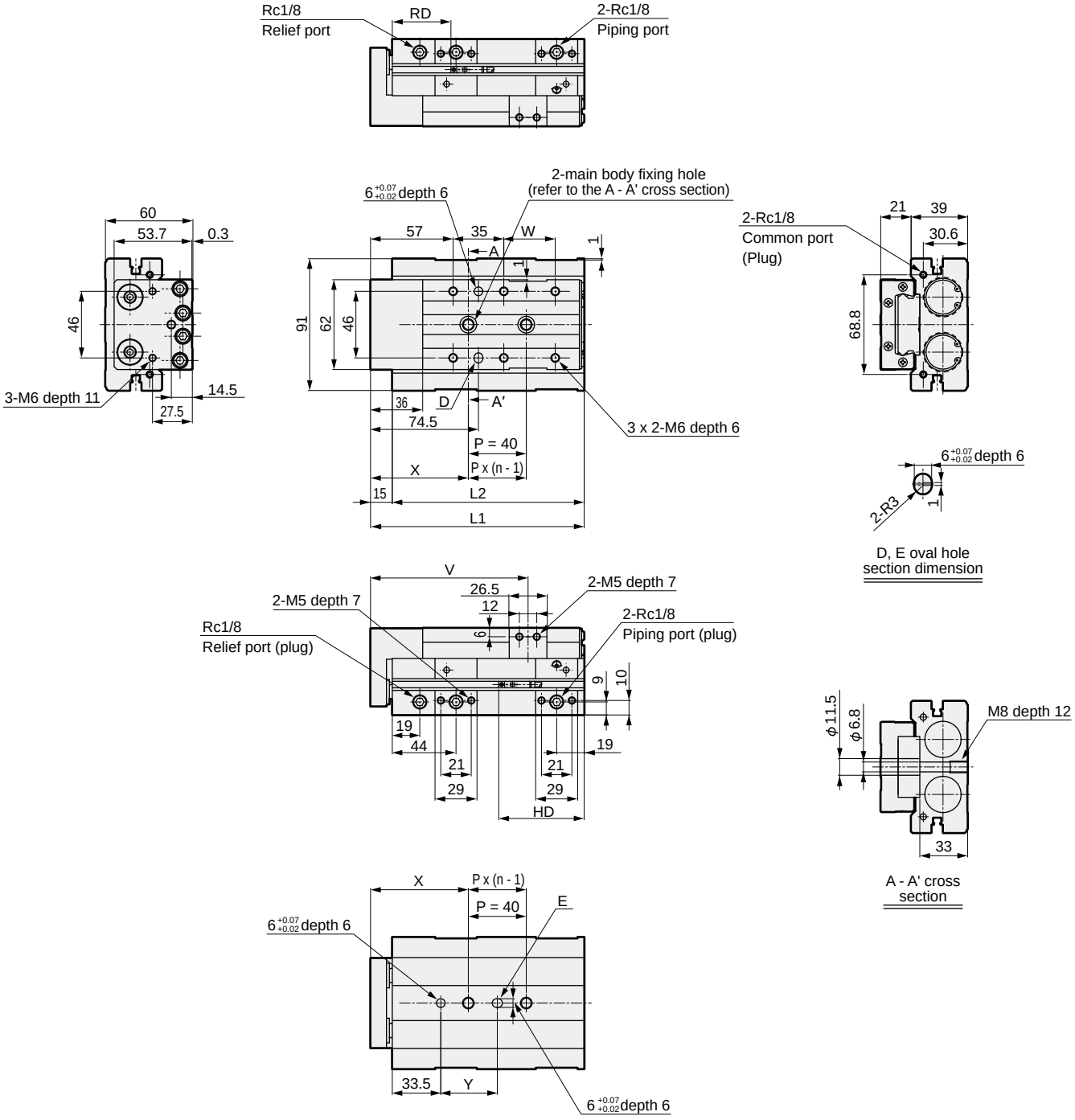
Dimensions table per stroke length

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: ϕ 25) CAD

● LCG-25-P7*

Stroke length: 10, 20, 30, 40, 50
(The main body fixing holes in this drawing is for 30 mm stroke)



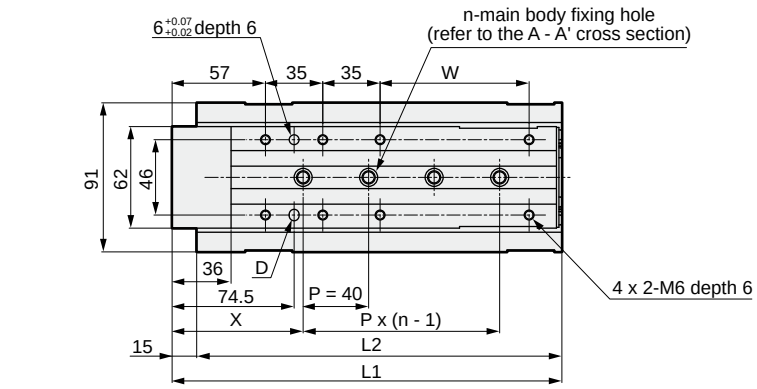
Dimensions table per stroke length

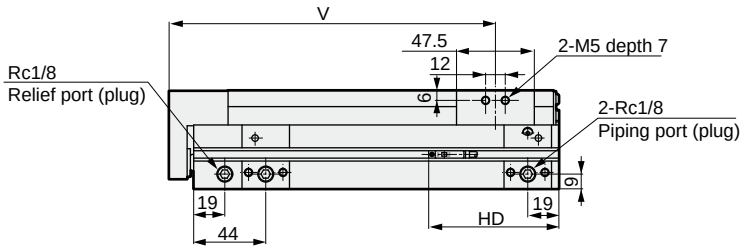
Stroke length		10	20	30	40	50
L1		147.5			157.5	167.5
L2		132.5			142.5	152.5
n		2			3	2
V		108.8			118.8	128.8
W		35.5			45.5	55.5
X		67.5			70.5	85.5
Y		39			42	57
T0*/T5*	RD	63.5	53.5	43.5		
T2*/T3*	HD	59				
T2W*/T3W*	RD	66	56	46		
	HD	56.5				

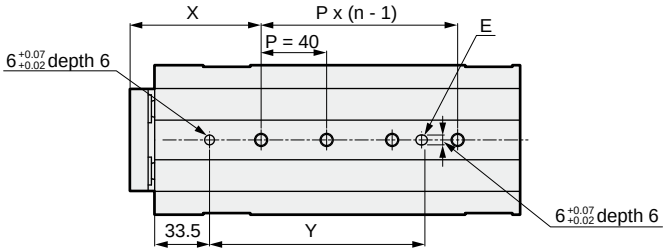
Dimensions (bore size: ϕ 25)

● LCG-25-P7*

Stroke length: 75, 100, 125, 150
(The main body fixing holes in this drawing is for 100 mm stroke)





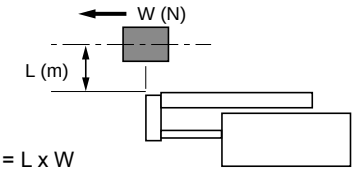


Dimensions table per stroke length

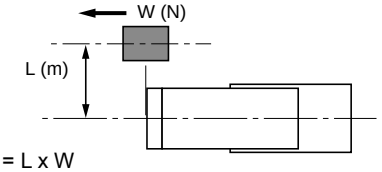
Stroke length		75	100	125	150
L1		213	238	263	288
L2		198	223	248	273
n		3	4	5	
V		163.8	188.8	213.8	238.8
W		66	91	116	141
X		85	80	70	85
Y		96.5	131.5	161.5	176.5
T0*/T5*	RD	43.5			
T2*/T3*	HD	79.5			
T2W*/T3W*	RD	46			
	HD	77			

STEP-1

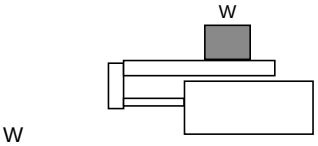
❶ Obtain the load and impact moment generated in each direction at the stroke end.



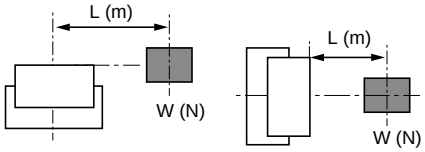
M1' = L x W



M3' = L x W



W' = W



M2' = L x W

Find rough value of 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 Speed at stroke end (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' x G = ☐ (N·m)

M2' = ☐ (N·m)

M3' x 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 : Composite moment (should be smaller than 1)

G : G coefficient

W'max : Max. allowable of W' (from table 2)

M1'max : Max. allowable of M1' (from table 2)

M2'max : Max. allowable of M2' (from table 2)

M3'max : Max. allowable of M3' (from table 2)

E max : Max. allowable of E_0 (from table 3)

$m\alpha$: Weight of table (from table 4)

[Table 2] Allowable static load

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)
φ 6	10 to 30	140	1.7	4.0	1.7
	40 to 50	186	10.7	6.0	10.7
φ 8	10 to 30	152	3.4	6.8	3.4
	40 to 75	230	13.8	10.3	13.8
φ 12	10 to 50	220.8	5.7	15.2	5.7
	75 to 100		22.2	21.0	22.2
φ 16	10 to 50	380.8	17.8	36.0	17.8
	75 to 125		37.3	40.0	37.3
φ 20	10 to 50	548.8	31.1	60.3	31.1
	75 to 150		56.2	61.6	56.2
φ 25	10 to 50	961.5	65.1	131.8	65.1
	75 to 150		127.5	132.0	127.5

Note: When setting a load on the end plate, the allowable value must be calculated with the short stroke (φ 6, φ 8, ... 30 or less, φ 12 or more ... 50 or less) even when the long stroke is selected (φ 6, φ 8 ... 40 or more, φ 12 or more ... 75 or more).

[Table3] Allowable energy absorption of LCG (E_0)

Bore size	Standard (J)	With stopper for adjustable stroke (J)	With shock absorber type stopper (J)
φ 6	0.025	0.0032	0.6
φ 8	0.058	0.0032	2.1
φ 12	0.112	0.014	2.1
φ 16	0.176	0.043	5.4
φ 20	0.314	0.055	9.7
φ 25	0.314	0.14	9.7

[Table 4] Table weight (Unit: kg)

Bore size	Stroke length (mm)									Additional P72, P73
	10	20	30	40	50	75	100	125	150	
φ 6	0.060	0.060	0.070	0.085	0.095	-	-	-	-	0.005
φ 8	0.080	0.080	0.090	0.110	0.125	0.150	-	-	-	0.015
φ 12	0.210	0.210	0.210	0.235	0.260	0.335	0.400	-	-	0.025
φ 16	0.315	0.315	0.315	0.350	0.380	0.515	0.595	0.680	-	0.035
φ 20	0.475	0.475	0.475	0.520	0.565	0.715	0.820	0.930	1.035	0.045
φ 25	0.785	0.785	0.785	0.845	0.915	1.200	1.360	1.515	1.680	0.075

STEP-2

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

● Find the load factor.

$$\alpha = \frac{F_0}{F} \times 100\ (\%)$$

α : Load factor

F_0 :Required force to move a work piece (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 x 0.2 note (N)	
W : Load (N)	

Note: Coefficient of friction

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

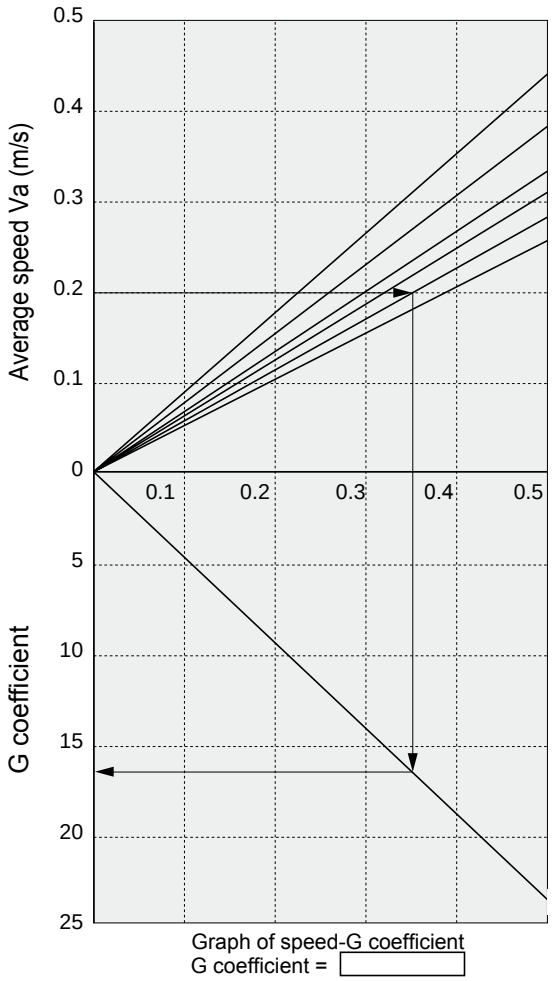
Bore size (mm)	Operating direction	Working pressure MPa						
		0.15	0.2	0.3	0.4	0.5	0.6	0.7
ϕ 6	PUSH	8	11	17	23	28	34	40
	PULL	6	8	13	17	21	25	30
ϕ 8	PUSH	15	20	30	40	50	60	70
	PULL	11	15	23	30	38	45	53
ϕ 12	PUSH	34	45	68	90	113	136	158
	PULL	25	34	51	68	85	102	119
ϕ 16	PUSH	60	80	121	161	201	241	281
	PULL	52	69	104	138	173	207	242
ϕ 20	PUSH	94	126	188	251	314	377	440
	PULL	79	106	158	211	264	317	369
ϕ 25	PUSH	147	196	295	393	491	589	687
	PULL	124	165	247	330	412	495	577

[Table 6] Reference of load factor

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

STEP-3

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



Graph of speed-G coefficient
G coefficient = ☐

Arrow (→) in the figure shows an example to find [speed at stroke end : 0.35m/s] and [G coefficient: 16.8] at average speed: 0.20m/s and load factor: 50%.

STEP-4

Confirm the composite moment (M_T) with coefficient G and speed at stroke end (Vm) found at STEP-3.

M1' x G = ☐ (N·m)

M2' = ☐ (N·m)

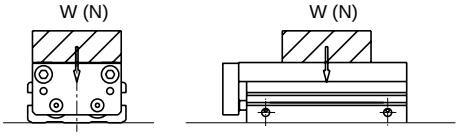
M3' x G = ☐ (N·m)

W' = ☐ (N)

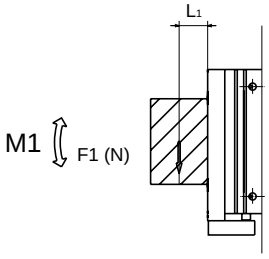
$$M'_T = \frac{M1' \times G}{M1' \text{ max}} + \frac{M2'}{M2' \text{ max}} + \frac{M3' \times G}{M3' \text{ max}} + \frac{W'}{W' \text{ max}} = \square$$

Confirm composite moment MT during travel. (This value is different from the value found at STEP-1)

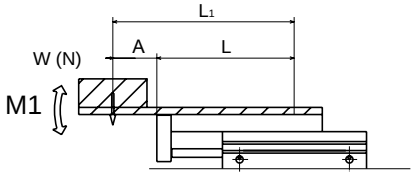
● Vertical load: W (N)



● Bending moment: M1 (N・m)

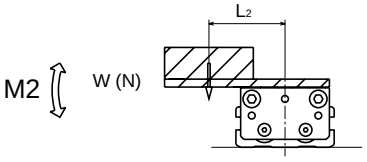


M1 = F1 x L_1

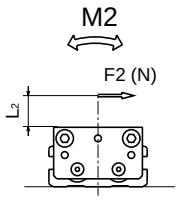


M1 = W x L_1
L_1=A + L
L is the value in the table below

● Radial moment: M2 (N・m)

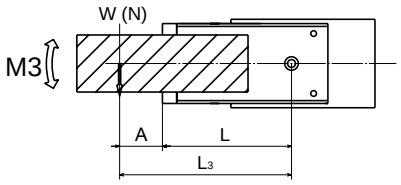


M2 = W x L_2

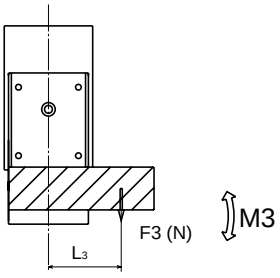


M2 = F2 x L_2

● Twist moment: M3 (N・m)



M3 = W x L_3
L_3=A + L
L is the value in the table below



M3 = F3 x L_3

L value

Unit (m)

Bore size	Stroke length									Additional
	10	20	30	40	50	75	100	125	150	P72, P73
ϕ 6	0.039	0.0415	0.049	0.0615	0.069	-	-	-	-	0.012
ϕ 8	0.0395	0.042	0.0495	0.0615	0.069	0.088	-	-	-	0.020
ϕ 12	0.053	0.0555	0.058	0.0655	0.073	0.096	0.115	-	-	0.020
ϕ 16	0.0555	0.058	0.0605	0.068	0.0755	0.1025	0.1215	0.140	-	0.020
ϕ 20	0.0635	0.066	0.0685	0.076	0.0835	0.108	0.127	0.1455	0.1645	0.025
ϕ 25	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)

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

M_T : Composite of moment
Wmax : Max. allowable of W (from table 7)
M1max : Max. allowable of M1 (from table 7)
M2max : Max. allowable of M2 (from table 7)
M3max : Max. allowable of M3 (from table 7)
E max : Max. allowable of E_0 (from table 3)

[Table 7] Allowable travel load

Bore size	Stroke length (mm)	Vertical load Wmax. (N)	Bending moment M1max. (N • m)	Radial moment M2max. (N • m)	Twist moment M3max. (N • m)
ϕ 6	10 to 30	14	0.17	0.40	0.17
	40 to 50	15.5	0.89	0.50	0.89
ϕ 8	10 to 30	15.2	0.34	0.68	0.34
	40 to 75	19.2	1.1	0.86	1.1
ϕ 12	10 to 50	27.6	0.71	1.9	0.71
	75 to 100		2.2	2.1	2.2
ϕ 16	10 to 50	47.6	1.9	4.0	1.9
	75 to 125		4.6	5.0	4.6
ϕ 20	10 to 50	68.6	3.4	6.7	3.4
	75 to 150		7.0	7.7	7.0
ϕ 25	10 to 50	128.2	7.6	15.5	7.6
	75 to 150		17.0	17.6	17.0

Note: When setting a load on the end plate, the allowable value must be calculated with the short stroke (ϕ 6, ϕ 8, ... 30 or less, ϕ 12 or more ... 50 or less) even when the long stroke is selected (ϕ 6, ϕ 8 ... 40 or more, ϕ 12 or more ... 75 or more).

Confirm that M_T, $M'_T \leqq 1$.
↓
Determining bore size
↓
ϕ A

STEP-5

Allowable energy absorption confirmation

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

E : Kinetic energy at workpiece end (J)
m : Load weight (kg) ($m \fallingdotseq \frac{W\ (N)}{9.8}$)
m_α : Weight of table (from table 4)
Vm : Speed at stroke end (m/s)
E max : Max. allowable of E_0 (from table 3)

Confirm that E ≦ E max.
↓
Determining bore size
↓
ϕ B

STEP-6

STEP-4 Bore size determined according to (load conditions)
ϕ A

STEP-5 Bore size determined according to (allowable energy absorption)
ϕ B

ϕ A ≦ ϕ B → ϕ B should be selected.
or → ϕ A can be selected if a shock absorber type stopper is used together.

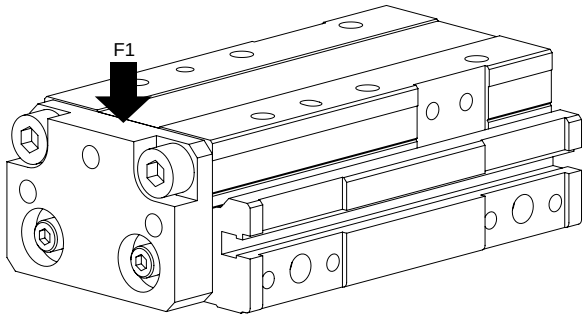
ϕ A > ϕ B → ϕ A should be selected.

Technical data ❶ Displacement at table end (reference value)

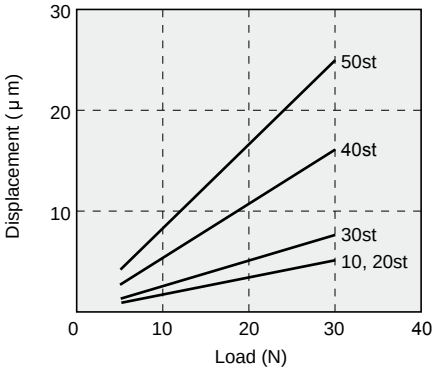
Displacement at point A

[Amount of table displacement caused by M1 moment]

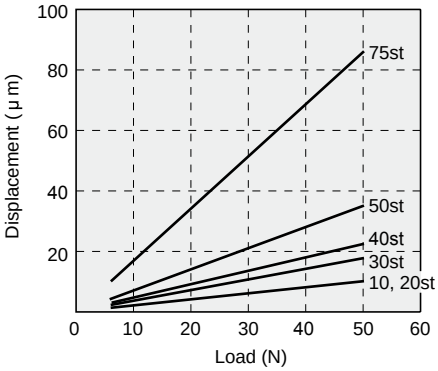
Displacement amount at table end when load (F1) is applied on table end



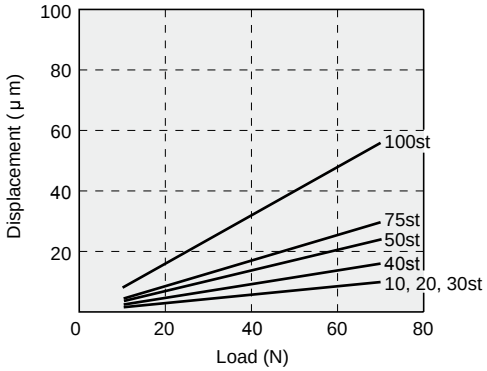
LCG-6 (M1)



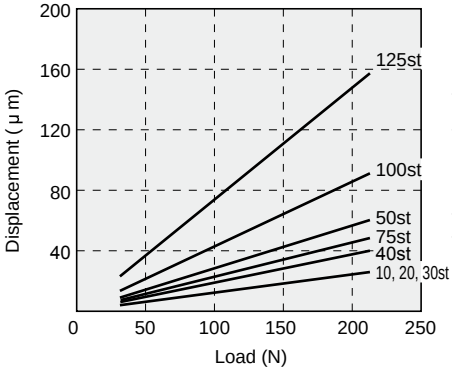
LCG-8 (M1)



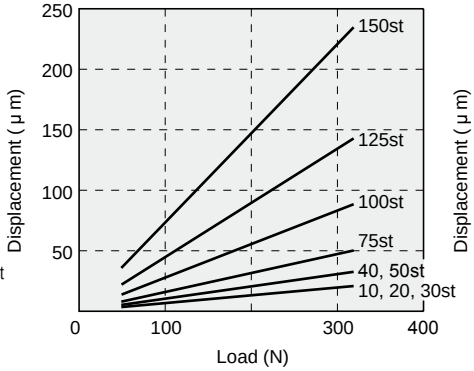
LCG-12 (M1)



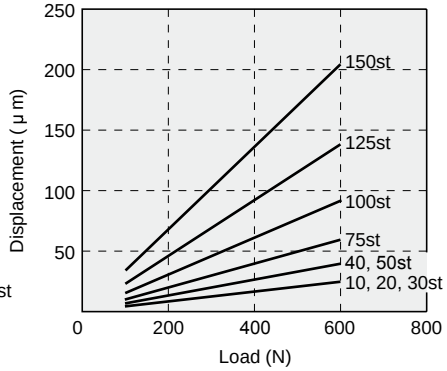
LCG-16 (M1)



LCG-20 (M1)



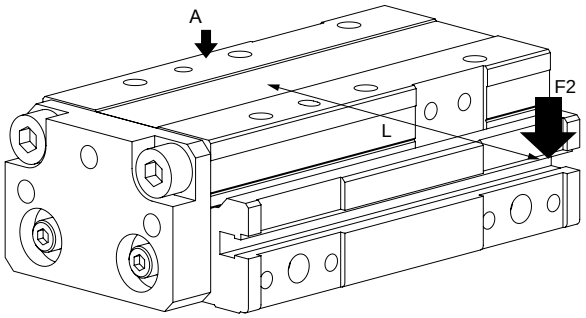
LCG-25 (M1)



Displacement at point A

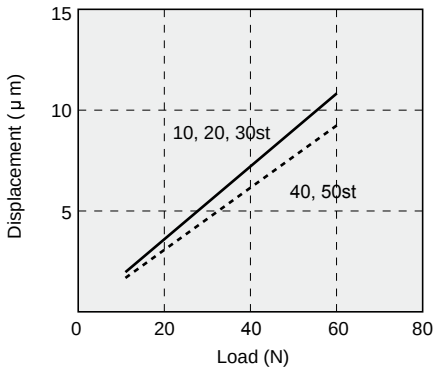
[Amount of table displacement caused by M2 moment]

Displacement amount at table end (section A) when load (F2) is applied at position separated Lmm from center of cylinder

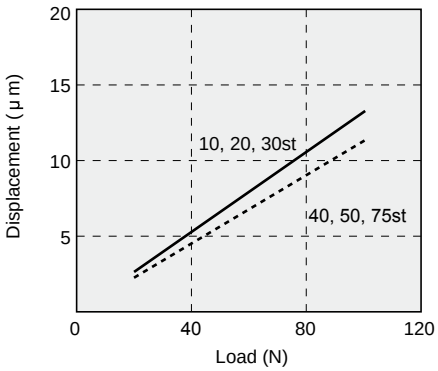


L value
ϕ 6: L = 70, ϕ 8: L = 70
ϕ 12: L = 90, ϕ 16: L =100
ϕ 20: L =100, ϕ 25: L =200

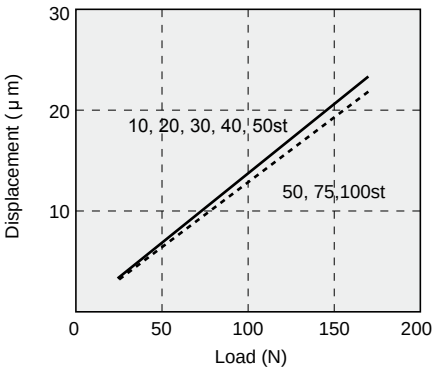
LCG-6 (M2)



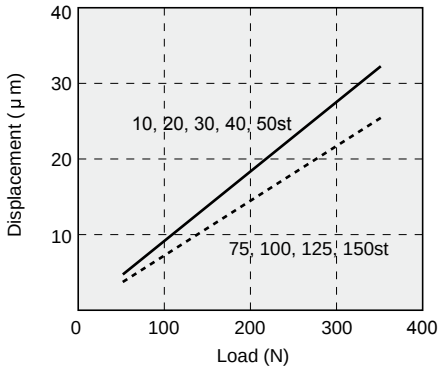
LCG-8 (M2)



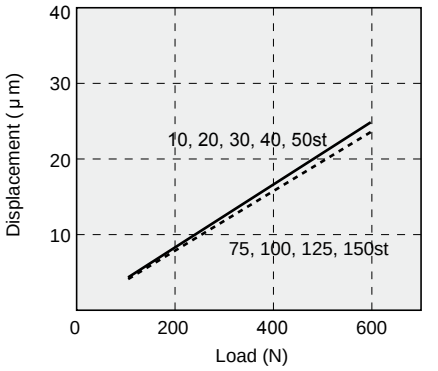
LCG-12 (M2)



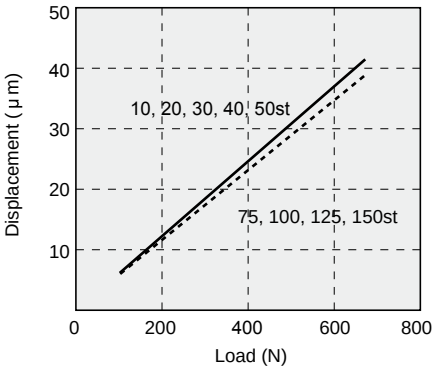
LCG-16 (M2)



LCG-20 (M2)



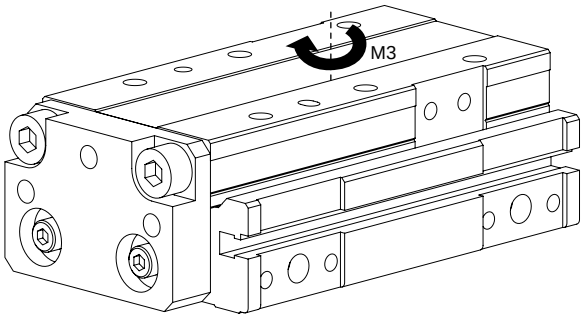
LCG-25 (M2)



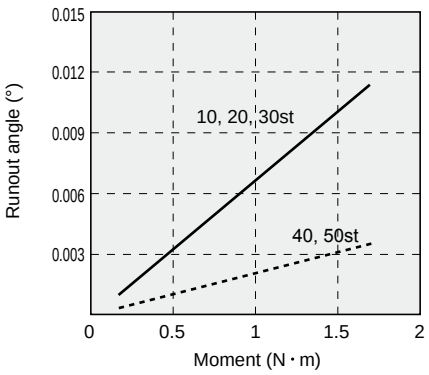
Displacement at point A

[Table displacement angle caused by M3 moment]

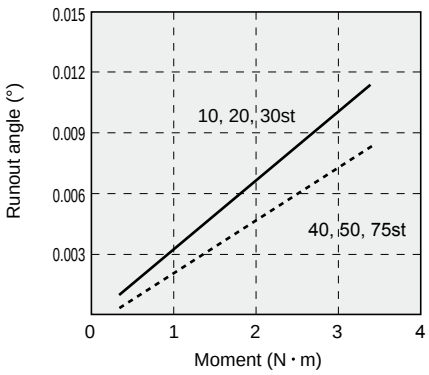
Table displacement angle when rotary moment (M3) is applied on cylinder



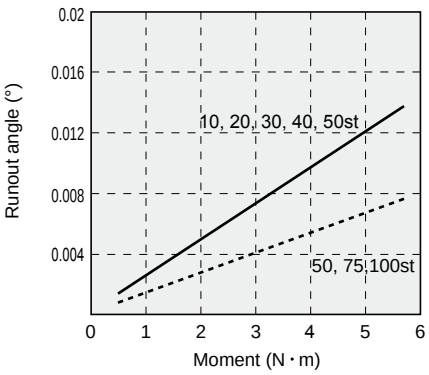
LCG-6 (M3)



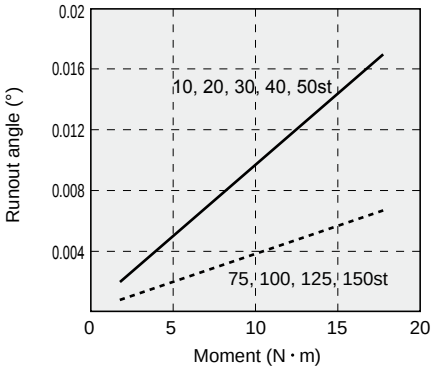
LCG-8 (M3)



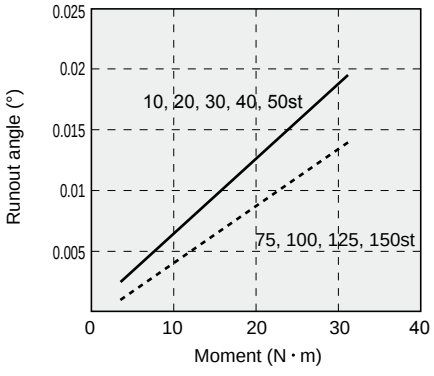
LCG-12 (M3)



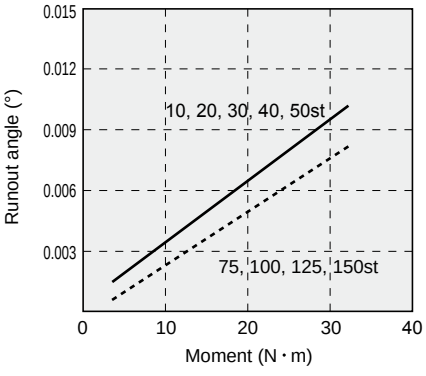
LCG-16 (M3)



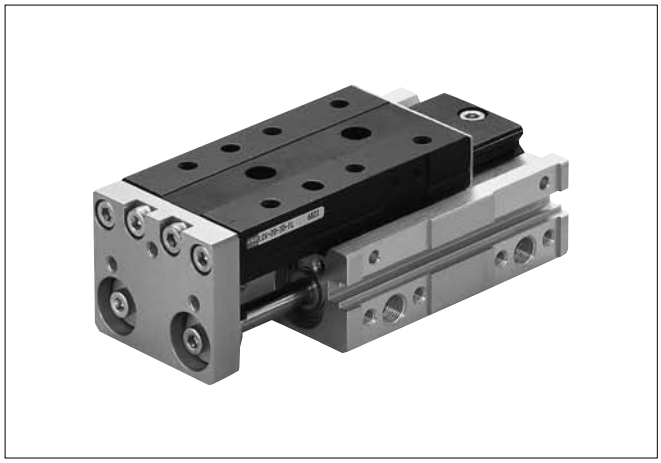
LCG-20 (M3)



LCG-25 (M3)



Custom order parts



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