CKD

The height of "light"

New Product

Linear slide cylinder
LCR Series

LINEAR SLIDE CYLINDER LCR SERIES

CKD Corporation
CC-996A 1

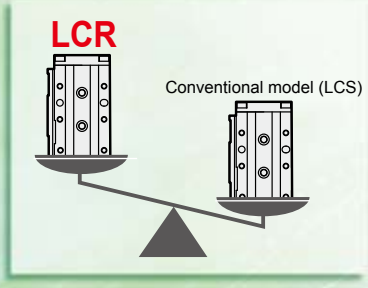
LCR :Renewal Series

Linear slide cylinder

The Height of "Light" LCR :Reduce Weight

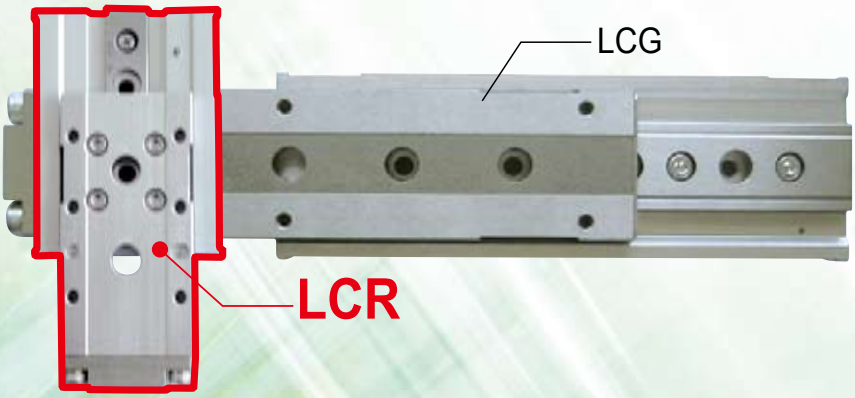
Up to 10% lighter!!!
Compared to conventional models.

- Weight has been reduced up to 10%



- Applications

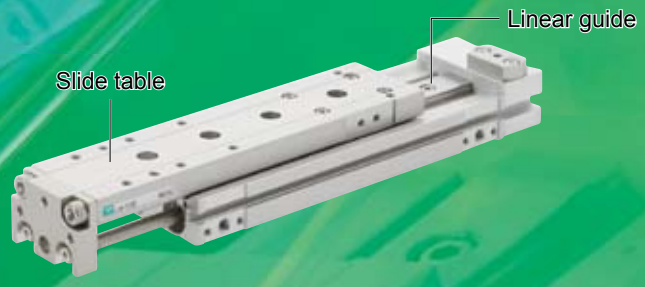
Ideal for use on Z axis.

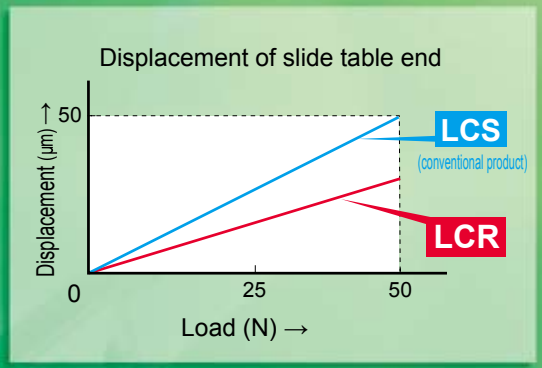


Contributes to downsizing, shorter tact time and saving energy
by reducing the weight of moving parts.

Refined Rigidity LCR :Rigidity

Increased rigidity from conventional model (LCS)
with strengthened slide table and linear guide.





RoHS

CKD Green Technology

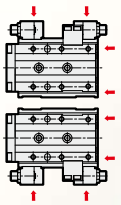
Flexible

Symmetical structure
Fit for a variety of applications

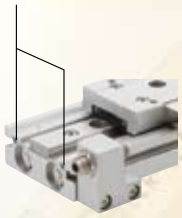
Design with freedom

Symmetrical stopper, multi-side piping, 2 side mounting dowel hole allows this to be used in various designs.

■ Can be changed symmetrically
⬅ shows the piping direction



■ Standard back piping port (not including ø6)

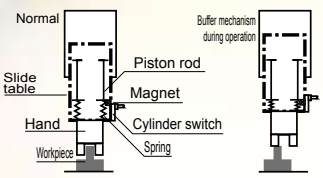


Two color switch

Proximity switch with 2 color indicator available.
The switch is embedded in the body for a slim design.

Buffering function

The buffer protects the cylinder and workpiece when the workpiece and drive section crashes. It is used in situations when shock needs to be absorbed on the end of pick and place equipment.
Also, switches that detect the activation of the buffer (BL type) can be installed to detect abnormalities.

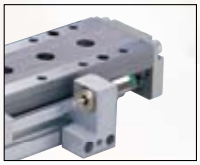


Buffer mechanism

Ample options and variations

Standard, position locking and clean room specifications types are available. Shock absorber type stopper, stopper for adjustable stroke are also available.
* Shock absorber type stopper is not available for clean room specification types.

■ Stopper for adjustable stroke
Single adjusting range 0 to 5mm



■ Shock absorber type stopper
Buffer at stroke limit

■ Installation holes on 2 sides

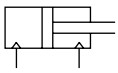
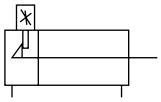
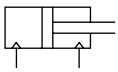
■ LCR product variation

● Option

Series variation	Bore size	Stroke length (mm)									Stopper for stroke adjustment	Shock absorber type stopper	With buffer	Switch
		10	20	30	40	50	75	100	125	150	S*	A*	B*	
Double acting single rod type **LCR**	ø6	●	●	●	●	●	●	●	●	●	●	●	●	●
	ø8	●	●	●	●	●	●	●	●	●	●	●	●	●
	ø12	●	●	●	●	●	●	●	●	●	●	●	●	●
	ø16	●	●	●	●	●	●	●	●	●	●	●	●	●
	ø20, ø25	●	●	●	●	●	●	●	●	●	●	●	●	●
Double acting position locking type **LCR-Q**	ø8	●	●	●	●	●	●	●	●	●	●	●	●	●
	ø12	●	●	●	●	●	●	●	●	●	●	●	●	●
	ø16	●	●	●	●	●	●	●	●	●	●	●	●	●
	ø20, ø25	●	●	●	●	●	●	●	●	●	●	●	●	●
Double acting single rod type (clean room specifications) **LCR-P7***	ø6	●	●	●	●	●	●	●	●	●	●			●
	ø8	●	●	●	●	●	●	●	●	●	●			●
	ø12	●	●	●	●	●	●	●	●	●	●			●
	ø16	●	●	●	●	●	●	●	●	●	●			●
	ø20, ø25	●	●	●	●	●	●	●	●	●	●			●

Series variation

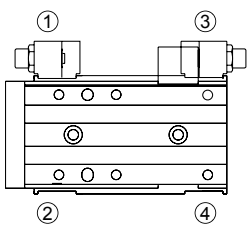
Linear slide cylinder
LCR Series

Variation	Model no. JIS symbol	Bore size (mm)	Stroke length (mm)									
			10	20	30	40	50	75	100	125	150	
Double acting single rod type	LCR 	ø6	●	●	●	●	●					
		ø8	●	●	●	●	●	●				
		ø12	●	●	●	●	●	●	●			
		ø16	●	●	●	●	●	●	●	●		
		ø20, ø25	●	●	●	●	●	●	●	●	●	
Double acting position locking type	LCR-Q 	ø8	●	●	●	●	●	●				
		ø12	●	●	●	●	●	●	●			
		ø16	●	●	●	●	●	●	●	●		
		ø20, ø25	●	●	●	●	●	●	●	●	●	
Double acting single rod type Clean room specifications	LCR-P7* 	ø6	●	●	●	●	●					
		ø8	●	●	●	●	●	●				
		ø12	●	●	●	●	●	●	●			
		ø16	●	●	●	●	●	●	●	●		
		ø20, ø25	●	●	●	●	●	●	●	●	●	

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

	Option															Switch	Page
	Stopper for adjustable stroke						Shock absorber type stopper						With buffer				
	Stopper position ①	Stopper position ②	Stopper position ③	Stopper position ④	Stopper position ①・③	Stopper position ②・④	Stopper position ①	Stopper position ②	Stopper position ③	Stopper position ④	Stopper position ①・③	Stopper position ②・④	Without switch groove	With switch groove	Plug attached		
	S1	S2	S3	S4	S5	S6	A1	A2	A3	A4	A5	A6	B	BL	N		
	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	1
	◎	◎					◎	◎					◎	◎		◎	23
	◎	◎	◎	◎	◎	◎									◎	◎	31

● Stopper position



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 and mechanism, pneumatic or hydraulic 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.
(However, if CKD is consulted prior to use and the customer consents to CKD product specifications, then the product may be used under conditions not intended. In that case, the customer must provide safety measures to avoid risks in the event of failures.))

❶ Use for special applications including nuclear energy, railway, aircraft, marine vessel, vehicle, medical devices, devices coming into contact with beverages or foodstuffs, amusement devices, emergency cutoff circuits (cutoff, open, etc.), press machines, press circuits, or safety devices.
❷ Use for applications where life or assets could be adversely affected, and special safety measures are required.

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

ISO4414, JIS B8370 (pneumatic system rules)
JFPS2008 (principles for pneumatic cylinder selection and use)
Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, body standards and regulations, etc.

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

❶ Do not inspect or service equipment/machinery until safety is confirmed on the entire systems 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 maximum attention to possible leakage of water and 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 precautions 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.

Limited warranty and disclaimer

1 Term of warranty

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

2 Scope of warranty

In case any defect attributable to CKD is found during the term of warranty
This limited warranty will not apply to:
(1) Product abuse/misuse contrary to conditions/environment recommended in its catalogs/specifications.
(2) Failure due to other causes.
(3) Use other than original design purposes.
(4) Third-party repair/modification
(5) Failure due to causes not foreseeable with technology at the time of delivery.
(6) Failure attributable to force majeure.
In no event shall CKD be liable for business interruptions, loss of profits, personal injury, costs of delay or for any other special, indirect, incidental or consequential losses costs or damages.

3 Compatibility confirmation

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

Pneumatic components

Safety precautions

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

Design & Selection

1. Common

⚠CAUTION

■ Select the cylinder according to the "LCR selection guide" on pages 47 to 50.

■ 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 malfunction or get damaged. Protect the product with a cover.

■ Cautions of type with switch

- If the T*V type switch is used with the stopper for stroke adjustment (S3**, S4**, S5**, S6**) or shock absorber type stopper (A3**, A4**, A5**, A6**), the switch on the head interferes with the stopper. Install the switch on the opposite side of the stopper.

If the T*V type switch is used with the stopper for stroke adjustment (S3**, S4**, S5**, S6**) or shock absorber type stopper (A3**, A4**, A5**, A6**), the switch on the head interferes with the stopper. Install the switch on the opposite side of 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.

2. Position locking type LCR-Q

⚠CAUTION

■ Do not use a 3-position valve.

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

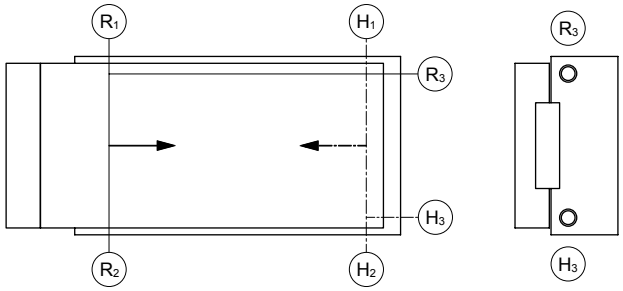
Installation & Adjustment

1. Common; piping

⚠CAUTION

■ When changing the piping position, use adhesive on M3 and M5 plugs (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, Ⓗ 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.

■ Rear piping

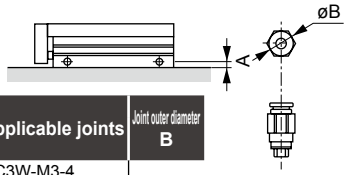
This product can be used with rear piping (port Ⓡ3, Ⓗ3 on figure above) except for ø6 and position locking models. When using this product, remove the plug sealing Ⓡ3 and Ⓗ3, and seal ports Ⓡ1 and Ⓗ1 shown on the table to the right.

Descriptions	Plug
LCR-6	Port Ⓡ3 and Ⓗ3 do not exist.
LCR-8	M5 x 5 (hexagon socket head set screw)
LCR-12	
LCR-16	
LCR-20	R1/8 (hexagon socket head tapered screw plug)
LCR-25	Seal ports Ⓡ3 and Ⓗ3 with plugs used to seal ports Ⓡ1 and Ⓗ1.

2 more plugs are required separately from the chart above when using ø8 to 20.
Use the plug attachment options on page 3 and plug model number on page 6 as a reference.

■ Precautions for piping joint

Install a speed 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 SC3U-M3-4 SC3W-M3-3.2 SC3U-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		

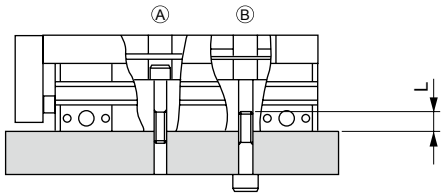
Installation & Adjustment

2. Common; installation

⚠CAUTION

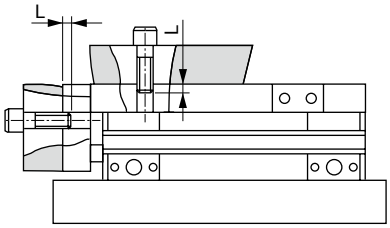
■ Check that no dents or scratches occur on main tubing installation or end plates that may adversely affect flatness.
The flatness of the counter part onto which the end plate installed must be 0.05mm or less.

■ 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)
LCR-6	M3 x 0.5	0.6 to 1.1	M4 x 0.7	1.4 to 2.4	6
LCR-8	M3 x 0.5	0.6 to 1.1	M4 x 0.7	1.4 to 2.4	6
LCR-12	M4 x 0.7	1.4 to 2.4	M5 x 0.8	2.9 to 5.1	8
LCR-16	M5 x 0.8	2.9 to 5.1	M6 x 1.0	4.8 to 8.6	9
LCR-20	M5 x 0.8	2.9 to 5.1	M6 x 1.0	4.8 to 8.6	9
LCR-25	M6 x 1.0	4.8 to 8.6	M8 x 1.25	12.0 to 21.6	12

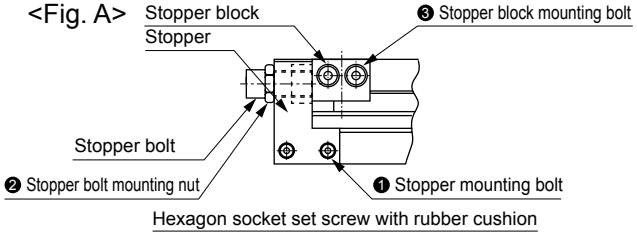
■ Observe the following bolt insertion lengths and tightening torque when installing the jig on the slide table or end plate.
<Fig. 2>

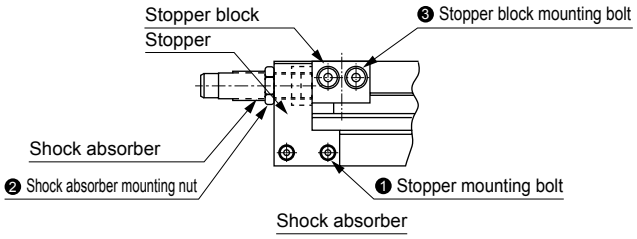


Descriptions	Table		
	Applicable bolts	Tightening torque (N·m)	Screw-in length L (mm)
LCR-6	M3 x 0.5	0.6	3
LCR-8	M3 x 0.5	0.6	3 to 4.5
LCR-12	M4 x 0.7	1.4	4 to 5.5
LCR-16	M5 x 0.8	2.9	5 to 6
LCR-20	M5 x 0.8	2.9	5 to 6
LCR-25	M6 x 1.0	4.8	6 to 7

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

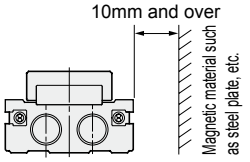
■ Observe the following valves for bolts at the stopper and in nut tightening torque.
<Fig. A>



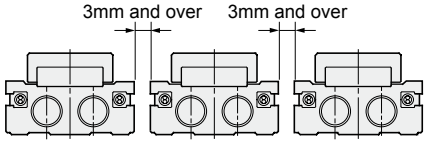


Model	❶ Stopper mounting bolt (N·m)	❷ Stopper bolt mounting nut ❷ Shock absorber mounting nut (N·m)	❸ Stopper block mounting bolt (N·m)
LCR-6	0.4 to 0.5	1.2 to 2.0	0.6 to 0.8
LCR-8	0.4 to 0.5	1.2 to 2.0	0.6 to 0.8
LCR-12	0.6 to 0.8	1.2 to 2.0	0.6 to 0.8
LCR-16	0.6 to 0.8	3.0 to 4.0	1.4 to 1.8
LCR-20	2.9 to 3.5	4.5 to 6.0	1.4 to 1.8
LCR-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 substance, such as a steel plate, near the cylinder switch. Mo the magnetic substance to at least 10mm from the cylinder. (Same for all bore size)



■ Cylinder switch could malfunction if cylinders are placed adjacently. Check that the following distance is maintained between cylinder surfaces. (Same for all bore size)



■ Shock absorbers are consumables.
Replace the shock absorber if energy absorption performance drops or if movement is no longer smooth.

■ When using the dowel hole, the pin must not have dimensions for press fit. There is a risk of debasement in precision if the linear guide is damaged or deformed by press fit load.
Recommended tolerance for the pin is JIS tolerance m6 or less.

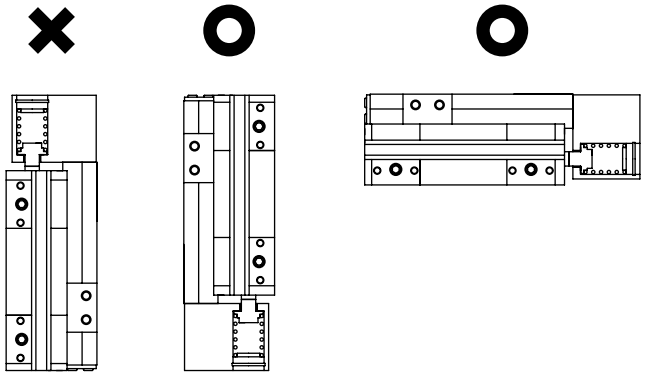
3. Position locking type LCR-Q

⚠CAUTION

- The locking mechanism functions at stroke limit. 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 with 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 exhaust port is clogged.

4. LCR-B with buffer

- Depending on the speed and load, there is a risk of malfunction of switches. Adjust the speed of this product accordingly to the load.
- Note that cylinders with buffers cannot be used vertically upward.



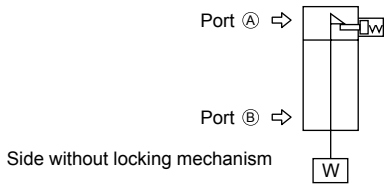
- Use a buffer below the buffer stroke. There is a risk of damage and malfunction.

During Use & Maintenance

1. Position locking type LCR-Q

⚠WARNING

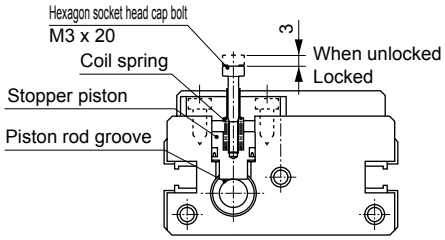
- If pressure is supplied to port (A) in the locked state with neither port pressurized, locks may not be releasable or may be released suddenly, causing the piston rod to pop out, which is extremely dangerous. When releasing the locking mechanism, supply pressure to port (B) and check that no load is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

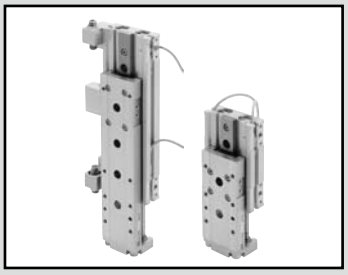


- If lowering speed is to be increased with the quick exhaust valve, the cylinder may move out faster than the lock pin and prevent the locking pin from being released correctly. Do not use a quick exhaust valve with the cylinder with position locking.

⚠CAUTION

- If negative pressure is applied to the locking mechanism, the lock may be released. Use the solenoid valve as a discrete unit, or use an independently exhausted manifold.
- After manually operating the locking mechanism, return the locking mechanism to the original position. Do not use a manual override except during adjustment because it is dangerous.
- Release the lock when installing or adjusting the cylinder.
  The lock could be damaged if the cylinder is installed while it is locked.
- Do not use multiple cylinders in synchronous.
  Do not move more than one workpiece using more than two cylinders with position locking mechanism in synchronous. One of the cylinder's locks may not be released.
- Use the speed control valve with meter-out control.
  Lock 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 operate.
- 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.

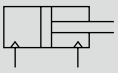




Linear slide cylinder Double acting single rod type

LCR Series

● Bore size: ø6･ø8･ø12･ø16･ø20･ø25

JIS symbol 

RoHS

Specifications

Descriptions		LCR					
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 °C		-10 to 60 (no freezing)					
Port size	Body side surface	M3	M5			Rc1/8	
	Rear body	M3				M5	Rc1/8
Stroke tolerance mm		+ 2.0 0 (Note 2)					
Working piston speed mm/s		50 to 500 (Note 3)					
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 49.					

Note 1: 0.2MPa when using shock absorber type stopper of ø6.
Note 2: When using without a stopper, be careful of the small gap between end plate and floating bush.
Note 3: When use the stroke adjustment stopper, use it when it is 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.

Specification with buffer

Specifications other than the ones shown below are the same as the specifications shown on the table above.

Descriptions		LCR with buffer					
Bore size mm		ø6	ø8	ø12	ø16	ø20	ø25
Buffer stroke mm		4		9		10	
Buffer	At setting N	3	5	10	13	17	21
Spring load	During operation N	7	8	14	20	25	29

Note 1: Rod side stroke adjustment by a type with buffer shortens buffer stroke length as much as adjusted stroke length. This also results in higher spring load at setting.
Note 2: Use buffer stroke below the above stroke length. There is a risk of malfunction and damage.

Switch specifications

* T0/T5 switches are 220 VAC compatible.
Consult CKD for working conditions.

● 1 color/2 color indicator

Descriptions	Reed 2 wire				Proximity 2 wire		Proximity 3 wire	
	T0H/T0V		T5H/T5V		T2H/T2V	T2WH/T2WV	T3H/T3V	T3WH/T3WV
Applications	Programmable controller and relay		Programmable controller, relay IC circuit (w/o light), serial connection		Programmable controller dedicated		Programmable controller and relay	
Output method	-		-		-		NPN output	
Power voltage	-		-		-		10 to 28 VDC	
Load voltage	12/24 VDC	110 VAC	5/12/24 VDC	110 VAC	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 50mA	7 to 20mA	50mA or less	20mA or less	5 to 20mA		100mA or less	50mA or less
Light	LED (ON lighting)		Without indicator light		LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)
Leakage current	0mA				1mA or less		10 μA or less	

Descriptions	Proximity 2 wire	Proximity 3 wire	Proximity 2 wire		Proximity 3 wire	
	F2S	F3S	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Programmable controller dedicated	Programmable controller and relay	Programmable controller dedicated		Programmable controller and relay	
Output method	-	NPN output	-		NPN output	
Power voltage	-	10 to 28 VDC	-		10 to 28 VDC	
Load voltage	10 to 30 VDC	30 VDC or less	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 20mA	50mA or less	5 to 20mA		100mA or less	50mA or less
Light	Red LED (ON lighting)		LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)
Leakage current	1mA or less	10 μA or less	1mA or less		10 μA or less	

Cylinder weight

● Basic type (Unit: g)

Bore size (mm)	Basic type mm stroke (mm)								
	10	20	30	40	50	75	100	125	150
ø6	110	110	130	160	180	-	-	-	-
ø8	160	160	180	230	260	320	-	-	-
ø12	310	320	320	360	390	520	610	-	-
ø16	490	500	500	550	610	840	970	1,110	-
ø20	900	910	920	1,000	1,090	1,390	1,600	1,810	2,020
ø25	1,620	1,640	1,650	1,760	1,860	2,350	2,620	2,890	3,160

● Additional option (Unit: g)

Bore size (mm)	Option, stopper symbol				With buffer
	S1 to S4	S5/S6	A1 to A4	A5/A6	B/BL
ø6	30	40	40	50	40
ø8	40	60	50	70	40
ø12	70	100	80	110	70
ø16	110	150	120	160	80
ø20	170	250	180	270	150
ø25	290	380	300	400	320

Secondary battery compatible specification

LCR-: ⋯ - **P4***

● Structure that can be used in secondary battery manufacturing process.

* Consult with CKD for details.

How to order

Without switch

LCR - 8 - 40 ——— S5

With switch

LCR - 12 - 40 - F2H* - R - A1DT

- LCR — Model no.
- 12 — Ⓐ Bore size
- 40 — Ⓑ Stroke length
- F2H* — Ⓒ Switch model no. Note 11
- 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
F2S		Proximity	1 color indicator	2-wire						
F3S				3-wire						
F2H*	**F2V***			2-wire	●	●	●			
F3H*	**F3V***			3-wire						
F2YH*	**F2YV***		2 color indicator	2-wire						
F3YH*	**F3YV***			3-wire						
T0H*	**T0V***	Reed	1 color indicator	2-wire				●	●	●
T5H*	**T5V***		Without indicator							
T2H*	**T2V***	Proximity	1 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	1 on rod end
H	1 on head end
D	2

Ⓔ Option		
Blank	No option	
S stopper for adjustable stroke	**Adjustable stroke single 5mm** **Note 1, Note 5, note 8**	
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 and ③	
S6**	Stopper position ② and ④	
A shock absorber type stopper	**Note 2, Note 5, note 8**	
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 and ③	
A6**	Stopper position ② and 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	
B with buffer	**Note 7, note 8**	
B	Without switch groove	
BL	With switch groove	
Plug attached		
Blank	None	
N	Plug for side piping attached (can not be selected for ø6 and ø25)) Note 12	

⚠ Note on model no. selection

Note 1: Use stopper for 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: The port position of standard type will be ① and ③ on the figure below when stoppers are not installed.

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

Note 6: Selectable only when using stoppers.

Note 7: Switch for the buffer section must be purchased separately. Please refer to the switch model no. selection chart on page 5.

Note 8: Refer to the selection table on page 4 for option combinations.

Note 9: For ø6 to ø8 cylinders with 10mm stroke or ø12 to ø25 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 10: For ø6 to ø8 and 30mm stroke or less cylinder with S*** or A*** switch, when two switches will be installed, select F*H type switch.

Note 11: F2S and F3S switches will be shipped uninstalled the product. Please consult our sales representative if it needs to be shipped installed.

Note 12: Select when using with rear piping.

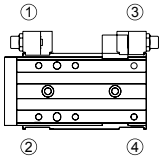
<Example of model number>

LCR-12-40-F2H-R-A1DT

Model: Linear slide cylinder double acting/single rod type LCR

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

● Stopper position



LCR double acting/single rod type combination availability table

(Combinations of stopper for adjustable stroke and shock absorber type stopper) ○: Combination available -: 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
LCR LCR-B and BL	ø6, ø8	10	○	○	○	○	○	○	—	—	○	○	—	—
		20 and over	○	○	○	○	○	○	○	○	○	○	○	○
	ø12 to ø25	10 to 20	○	○	○	○	○	○	—	—	○	○	—	—
		30 and over	○	○	○	○	○	○	○	○	○	○	○	○

Combination of option symbol D: With stopper section port and T: Alloy (nitriding) stopper block follows the combination table above.

How to order switch

For ø6 to ø12

SW - F2H

Switch model no.
(Page 3 Ⓒ section)

For ø16 to ø25

SW - T2H3

Switch model no.
(Page 3 Ⓒ section)

● Buffer

SW - F 2 V 3

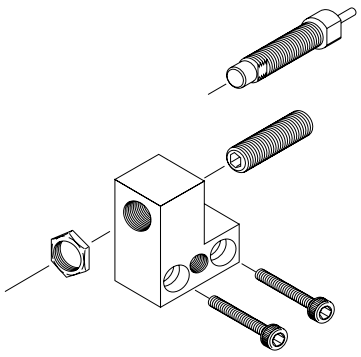
Output type	
2	2 wire proximity DC
3	3 wire proximity DC

Radial lead wire	

Lead wire length	
Blank	1m (standard)
3	3m (option)

How to order stopper set

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



LCR - 12 - S 2 D - S02

Bore size
(Page 3 Ⓐ section)

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

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

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

Ⓓ Adjustable stroke length	Note 2 · Note 3
Blank	Adjustable stroke range 5mm
S02	Adjustable stroke range 15mm
S03	Adjustable stroke range 25mm

Note 1: Refer to the chart below when attaching stopper on ① or ② because the stroke adjustment changes according to the stroke.
Note 2: "S03" can not be selected with ø6 or ø8.
Note 3: Can not be selected with shock absorber type stopper "A".

Precautions for ordering stopper set

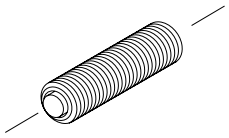
Only when installing a stopper for adjustable stroke or a shock absorber type stopper on installation position ①, ② (refer to page 3), the combination shown on the right may be applied depending on stroke length and adjusted stroke length.

—: not available

Model no. symbol	Option symbol		Discrete stopper for adjustable stroke		
			Adjusted stroke length (mm)		
	Bore size	Stroke length	-5	-15	-25
LCR Series	ø6, ø8	10	S02	—	—
		20 and over	Not required additionally	S02	—
	ø12 to ø25	10	S03	—	—
		20	S02	S03	—
		30 and over	Not required additionally	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 to custom stroke length.



LCR - 12 - S02

Bore size
(Page 3 Ⓐ section)

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

Specify the S01, S02, S03 at the Ⓐ section.
Note: S03 is not available for ø6, ø8.
Depending on model no., some models are not available and adjustable stroke range may be different from above.

Cautions when purchasing discrete stopper.

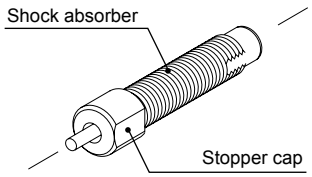
Only when installing a stopper for adjustable stroke or a shock absorber type stopper on installation position ①, ② (refer to page 3), the combination shown on the right may be applied depending on stroke length and adjusted stroke length.

—: combination not available

Model no. symbol	Option symbol		Discrete stopper for adjustable stroke			Shock absorber type discrete stopper
			Adjusted stroke length (mm)			
	Bore size	Stroke length	-5	-15	-25	
LCR 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 shock absorber type stopper to stopper for adjustable stroke



LCR - 12 - A01

Bore size
(Page 3 Ⓐ section)

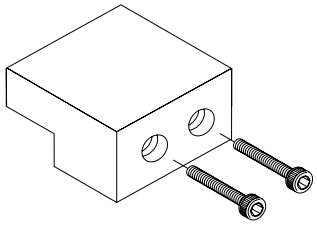
Note: Some models may not be available depending on the type. Refer to Page 3. Refer to page 21 for the stroke adjustment range for the shock absorber type stopper.

Applicable shock absorber model No.

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

Discrete stopper block model no. display

● Used when changing standard type to stopper for adjustable stroke or shock absorber type stopper.



LCR - 12 - SB1 T

Bore size
(Page 3 Ⓐ section)

Ⓐ 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)

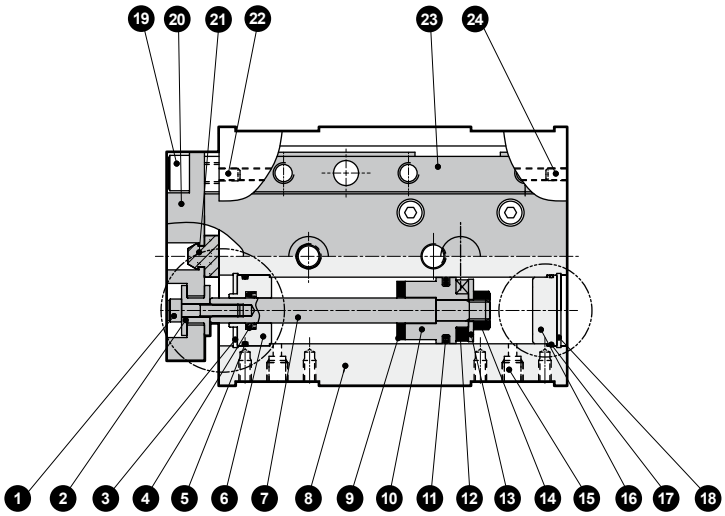
Plug kit model no. display for side piping port

LCR - 12 - N (2 piece/1 set)

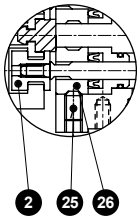
Bore size
(Page 3 Ⓐ section)

Internal structure and parts list

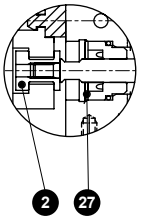
● LCR



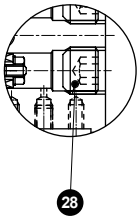
When A section is ø6



When A section is ø8



When B section is ø6.8



Parts list

No.	Parts name	Material	Remarks
1	Hexagon socket head cap bolt	Alloy steel	Zinc chromate
2	Floating bush	Stainless steel	
3	C type snap ring	Steel	For ø8 to 25 only
4	Rod packing seal	Nitrile rubber	
5	Metal gasket	Nitrile rubber	
6	Rod bushing	Aluminum alloy	Alumite
7	Piston rod	Stainless steel	
8	Cylinder body	Aluminum alloy	Hard alumite
9	Cushion rubber (R)	Urethane rubber	
10	Piston	Aluminum alloy	Chromate
11	Piston packing seal	Nitrile rubber	
12	Magnet	Plastic	
13	Plain washer	Stainless steel	
14	Hexagon nut	Stainless steel	
15	Plug	Stainless steel	ø6 to ø16
		Steel	ø20 to ø25

No.	Parts name	Material	Remarks
16	Guard	Aluminum alloy	Chromate
17	Guard gasket	Nitrile rubber	
18	C type snap ring	Steel	For ø12 to 25 only
19	Hexagon socket head cap bolt	Alloy steel	Zinc chromate
20	End plate	Aluminum alloy	Alumite
21	Cushion rubber (H)	Urethane rubber	
22	Hexagon socket head set screw	Stainless steel	
23	Table	Aluminum alloy	Alumite
24	Plug	Stainless steel	ø6 to ø20
		Steel	ø25
25	Hexagon socket head set screw	Stainless steel	Only ø6
26	Rod bushing A	Aluminum alloy	
27	Cap	Stainless steel	
28	Hexagon socket set screw	Alloy steel	Zinc chromate

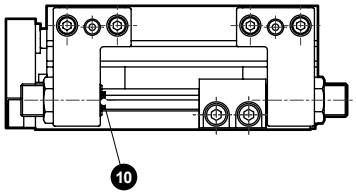
Repair parts list

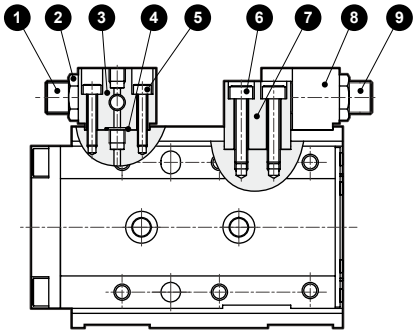
Bore size (mm)	Kit No.	Repair parts number
ø6	LCR-6K	
ø8	LCR-8K	
ø12	LCR-12K	4 5 9
ø16	LCR-16K	11 17 21
ø20	LCR-20K	
ø25	LCR-25K	

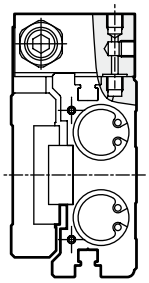
Internal structure and parts list

Configuration with stopper

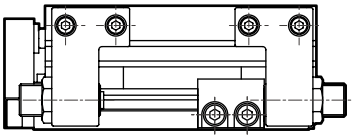
● With port on the side and the bottom (symbol D)

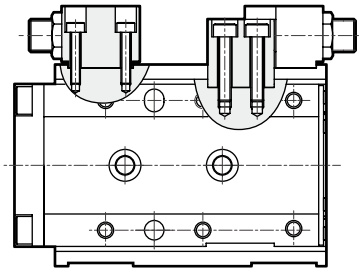


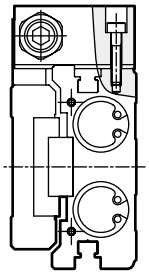




● Without port on the stopper section







Parts list

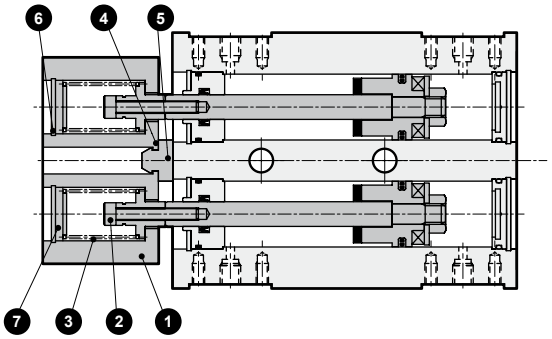
No.	Parts name	Material	Remarks
1	Stopper bolt	Alloy steel	Nickel plated
2	Hexagon nut	Alloy steel	Nickel plated
3	Stopper A	Aluminum alloy	Alumite
4	Gasket	Urethane rubber	
5	Hexagon socket head cap bolt	Alloy steel	Zinc chromate
6	Hexagon socket head cap bolt	Alloy steel	Zinc chromate

No.	Parts name	Material	Remarks
7	Stopper block (Stopper block symbol: Blank)	Steel	Nickel plated
	Stopper block (Stopper block symbol: T)	Alloy steel	Nitriding
8	Stopper B	Aluminum alloy	Alumite
9	Stopper bolt	Alloy steel	Nickel plated
10	Cushion rubber	Urethane rubber	

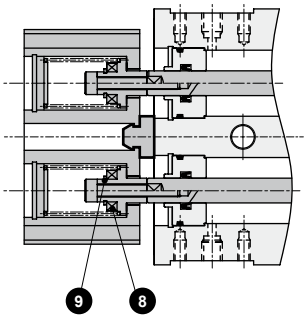
Structural drawing with buffer

LCR-*-*-B*

● Without switch groove, with buffer



● With switch groove, with buffer



Parts list

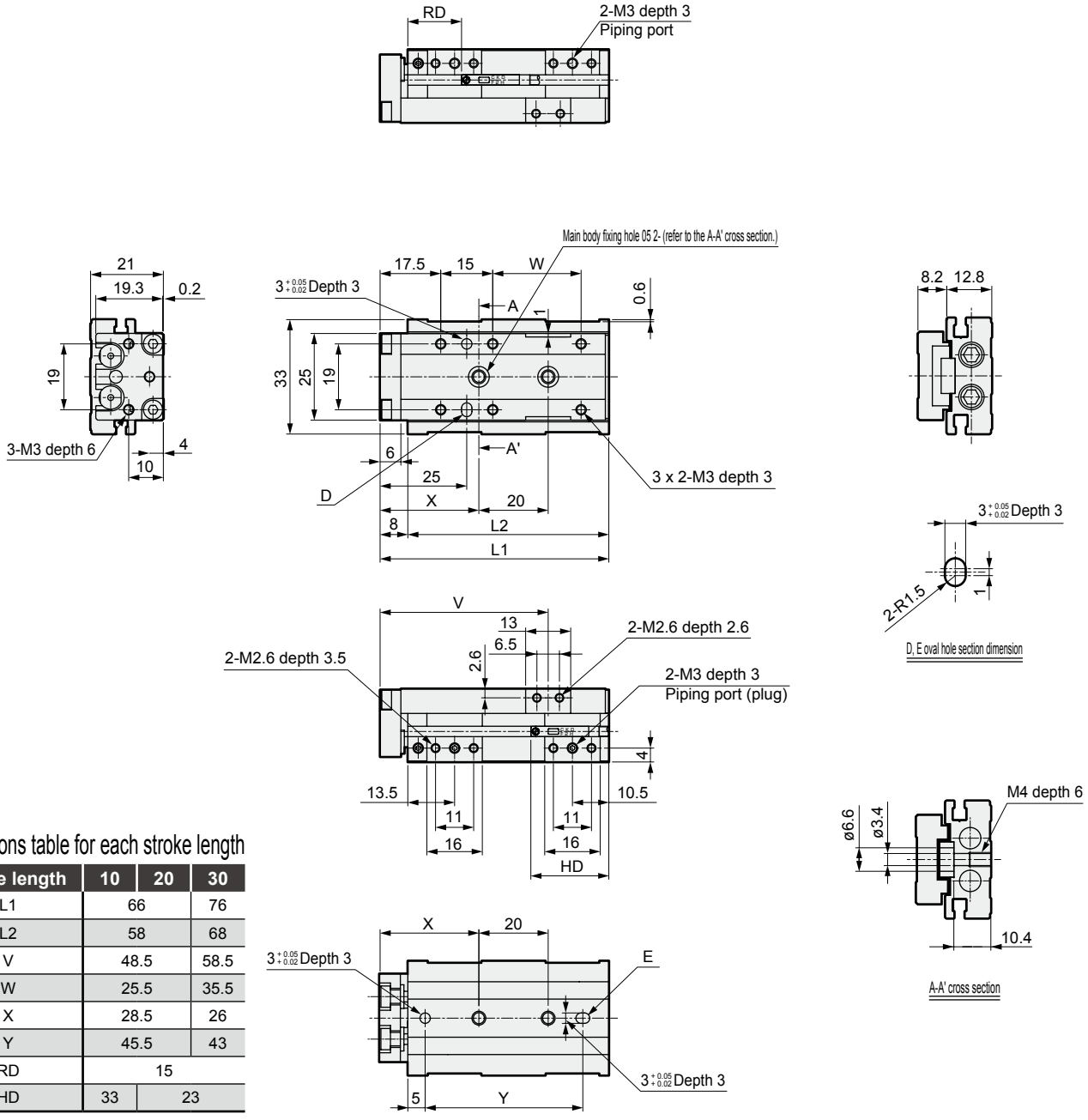
No.	Parts name	Material	Remarks
1	End plate	Aluminum alloy	Alumite
2	Hexagon socket head cap bolt	Alloy steel	Zinc chromate
3	Coil spring	Steel	
4	Stopper	ø6: stainless steel ø8 to 25: aluminum alloy	
5	Cushion rubber	Urethane rubber	

No.	Parts name	Material	Remarks
6	C type snap ring	Steel	
7	Guard	Aluminum alloy	Chromate
8	Magnet	Plastic	
9	E ring	ø6 to 12: stainless steel ø16 to 25: steel	

Dimensions (bore size: ø6)

● LCR-6

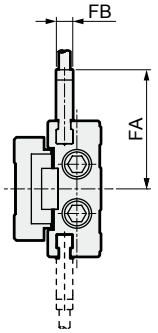
Stroke length: 10, 20, 30
(The main body fixing holes in this drawing is for 20 mm stroke.)



Dimensions table for each 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	15		
HD	33	23	

● Dimensions of projection when cylinder switch F2S or F3S is installed.



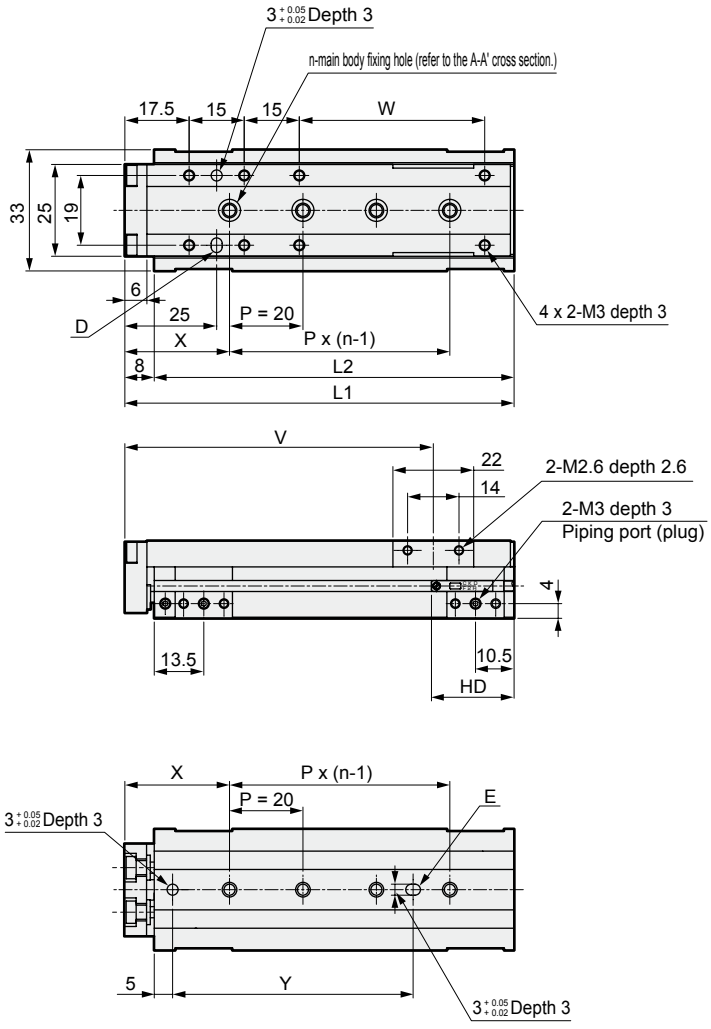
Stroke length	10	20	30
FA	29.1		
FB	4		
RD	14		
HD	34	24	

Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

Dimensions (bore size: ø6)

● LCR-6

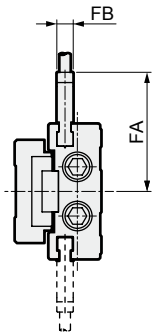
Stroke length: 40, 50
(The main body fixing holes in this drawing is for 50 mm stroke.)



Dimensions table for each 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	15	
HD	23	

● Dimensions of projection when cylinder switch F2S or F3S is installed.



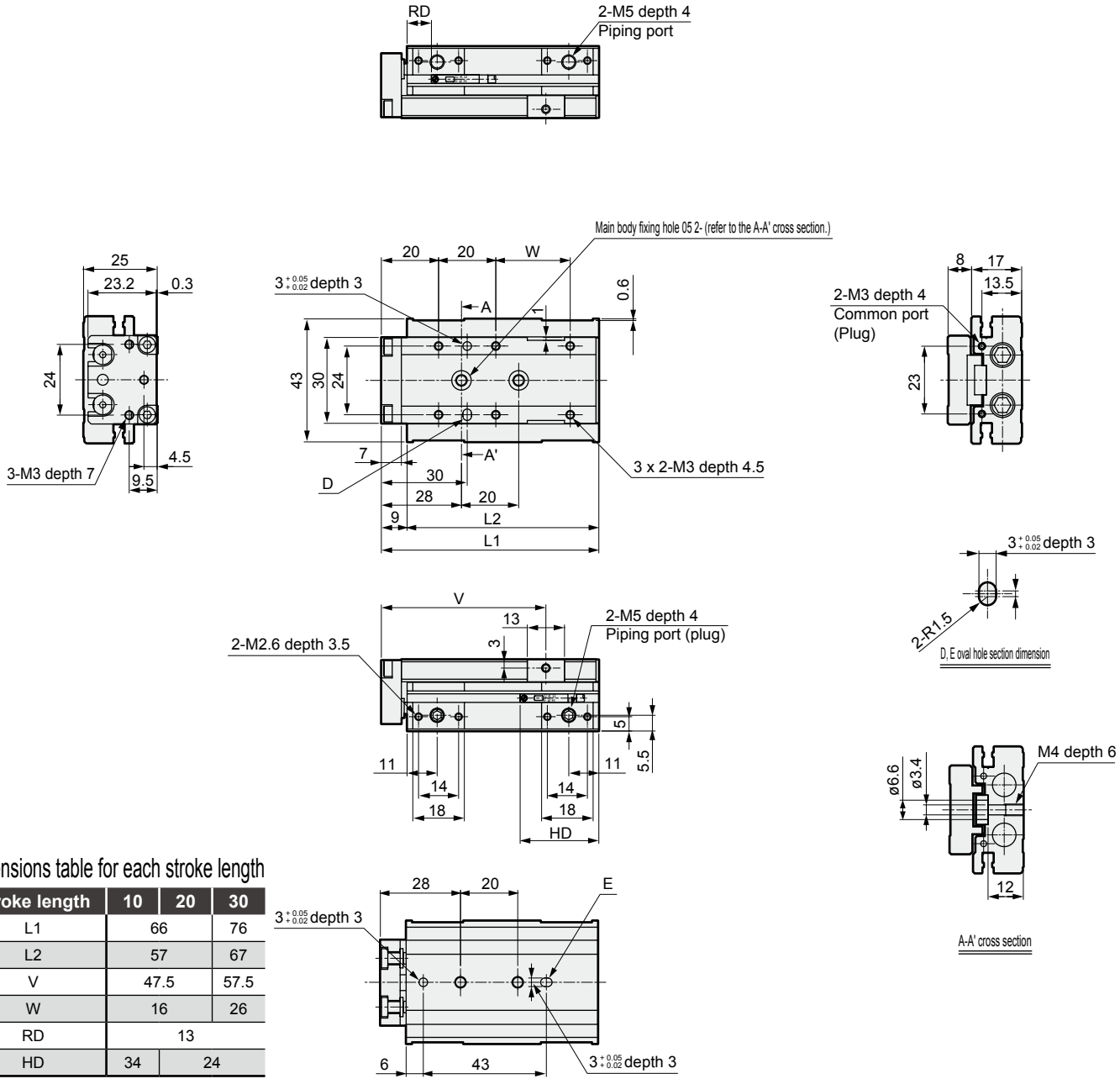
Stroke length	40	50
FA	29.1	
FB	4	
RD	14	
HD	24	

Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. When using the dowel hole, a pin with the dimension for press fit must not be used.
Recommended tolerance of the pin is JIS tolerance m6 or less.

Dimensions (bore size: ø8)

● LCR-8

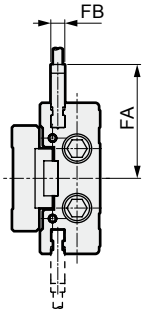
Stroke length: 10, 20, 30
(The main body fixing holes in this drawing is for 30 mm stroke.)



Dimensions table for each stroke length

Stroke length	10	20	30
L1	66		76
L2	57		67
V	47.5		57.5
W	16		26
RD	13		
HD	34	24	

● Dimensions of projection when cylinder switch F2S or F3S is installed.



Stroke length	10	20	30
FA	32.6		
FB	4		
RD	12		
HD	35	25	

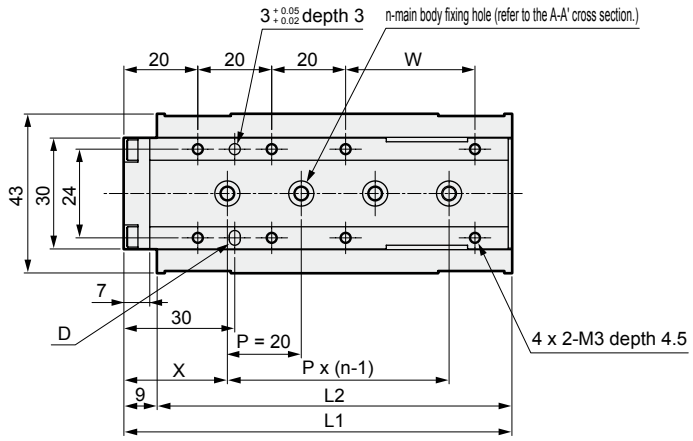
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

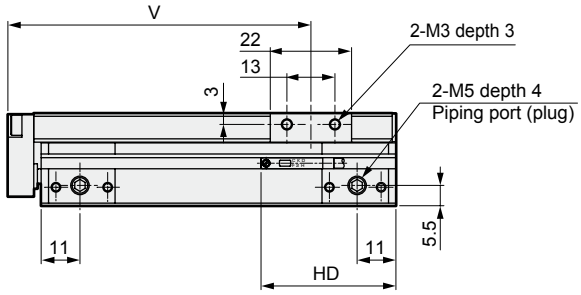
Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

Dimensions (bore size: ø8)

● LCR-8

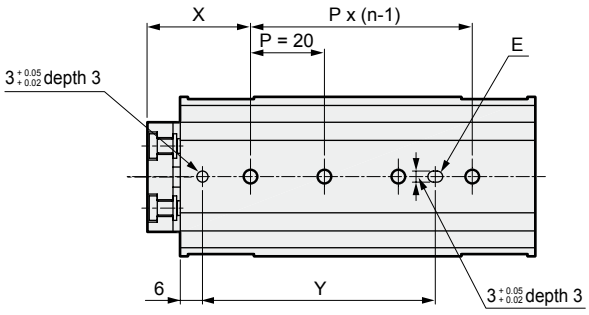
Stroke length: 40, 50, 75
(The main body fixing holes in this drawing is for 50 mm stroke.)



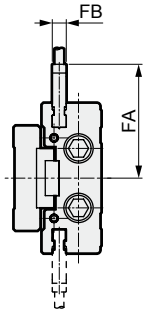


Dimensions table for each stroke length

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	13		
HD	33		



● Dimensions projection when cylinder switch F2S or F3S is installed.



Stroke length	40	50	75
FA	32.6		
FB	4		
RD	12		
HD	34		

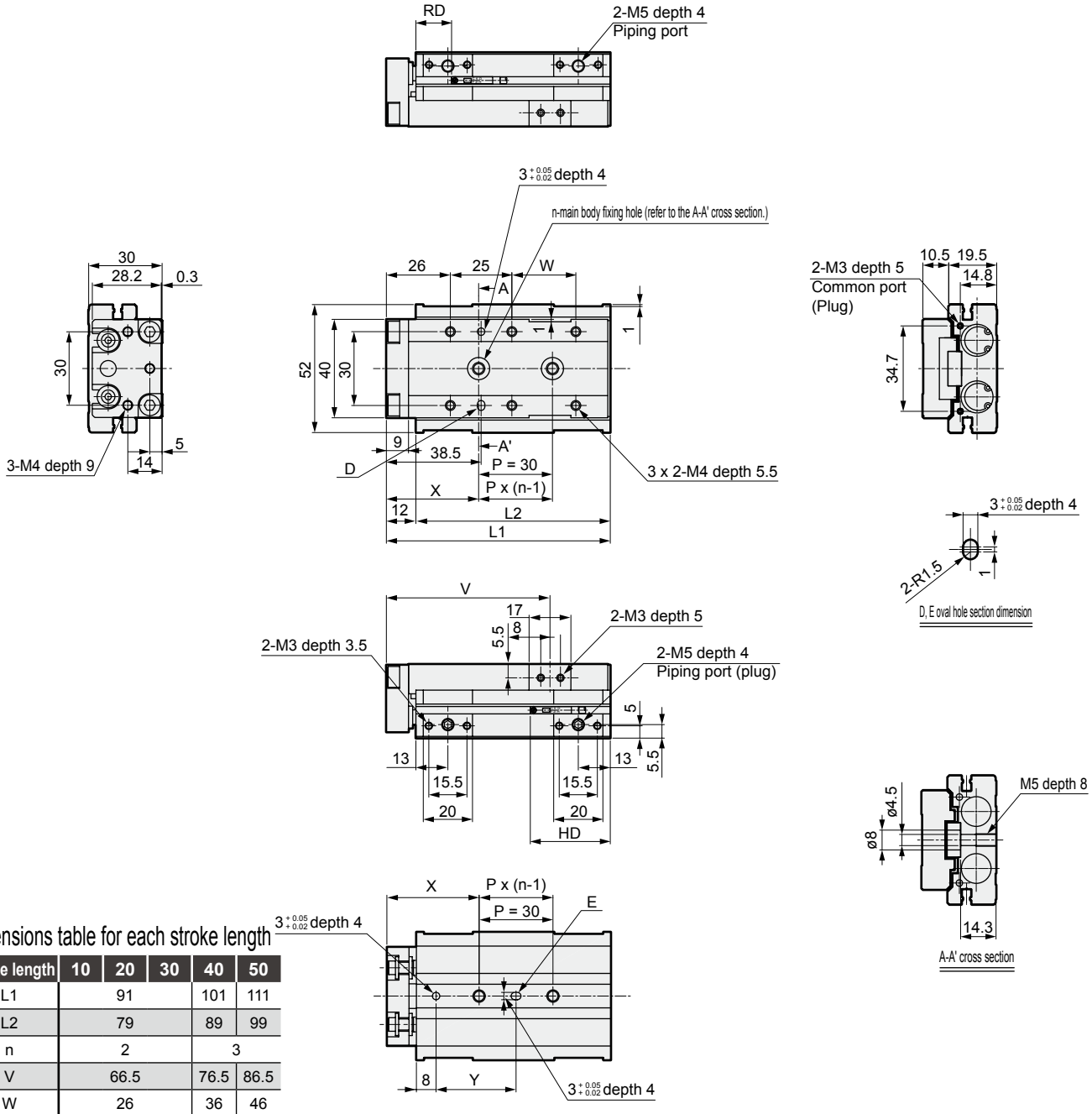
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

Dimensions (bore size: ø12)

● LCR-12

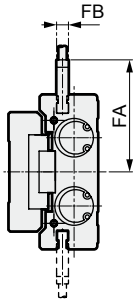
Stroke length: 10, 20, 30, 40, 50
(The main body fixing holes in this drawing is for 30 mm stroke.)



Dimensions table for each 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	16.5				
HD	52.5	42.5	32.5		

● Dimensions of projection when cylinder switch F2S or F3S is installed.



Stroke length	10	20	30	40	50
FA	37.8				
FB	4				
RD	15.5				
HD	53.5	43.5	33.5		

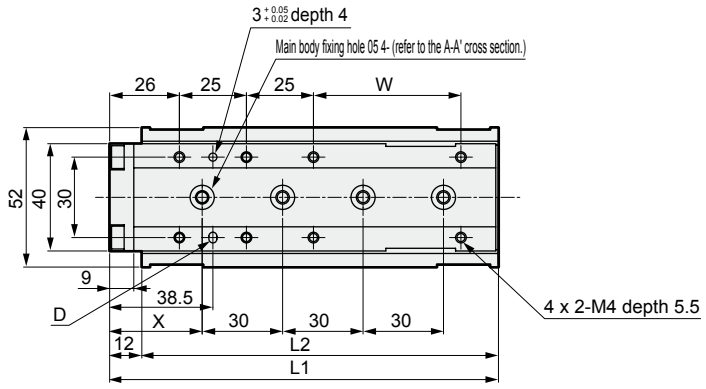
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

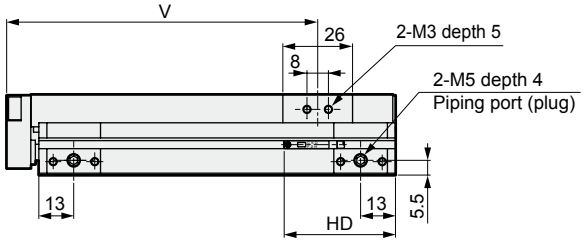
Note 2: Read the precautions on 1. Common ; piping on intro 4 when using rear piping.

Dimensions (bore size: ø12)

● LCR-12

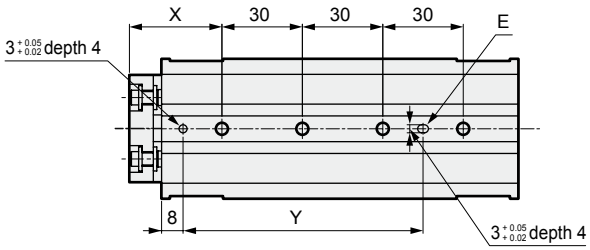
Stroke length: 75, 100
(The main body fixing holes in this drawing is for 100 mm stroke.)



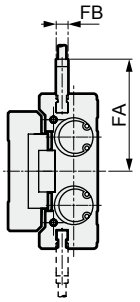


Dimensions table for each stroke length

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	16.5	
HD	41.5	



● Dimensions of projection when cylinder switch F2S or F3S is installed.



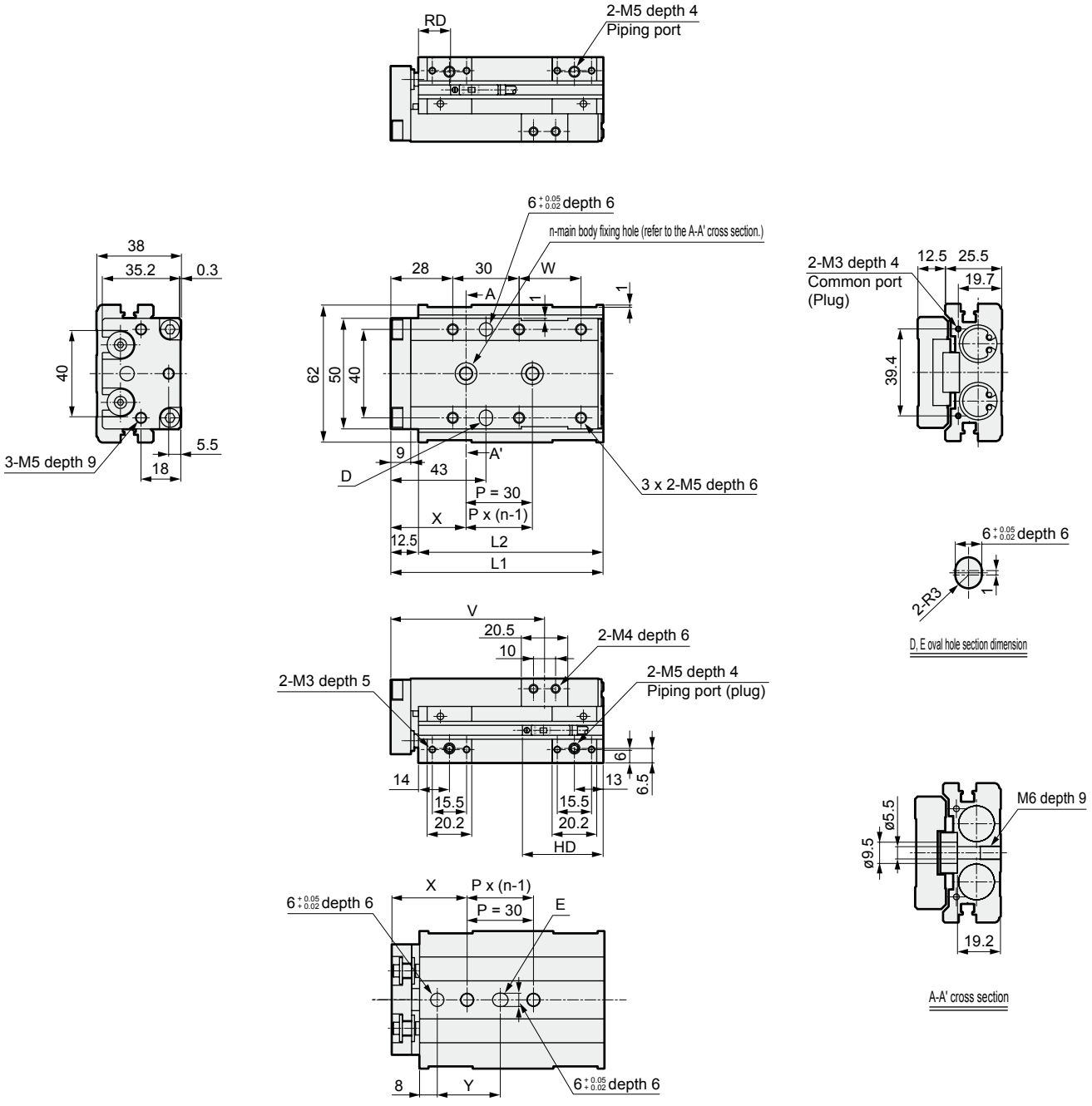
Stroke length	75	100
FA	37.8	
FB	4	
RD	15.5	
HD	42.5	

Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.
Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

Dimensions (bore size: ø16)

● LCR-16

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



Dimensions table for each 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	17				
T2/3*	HD	56.5	46.5	36.5		
T2/3W*	RD	19.5				
	HD	54	44	34		

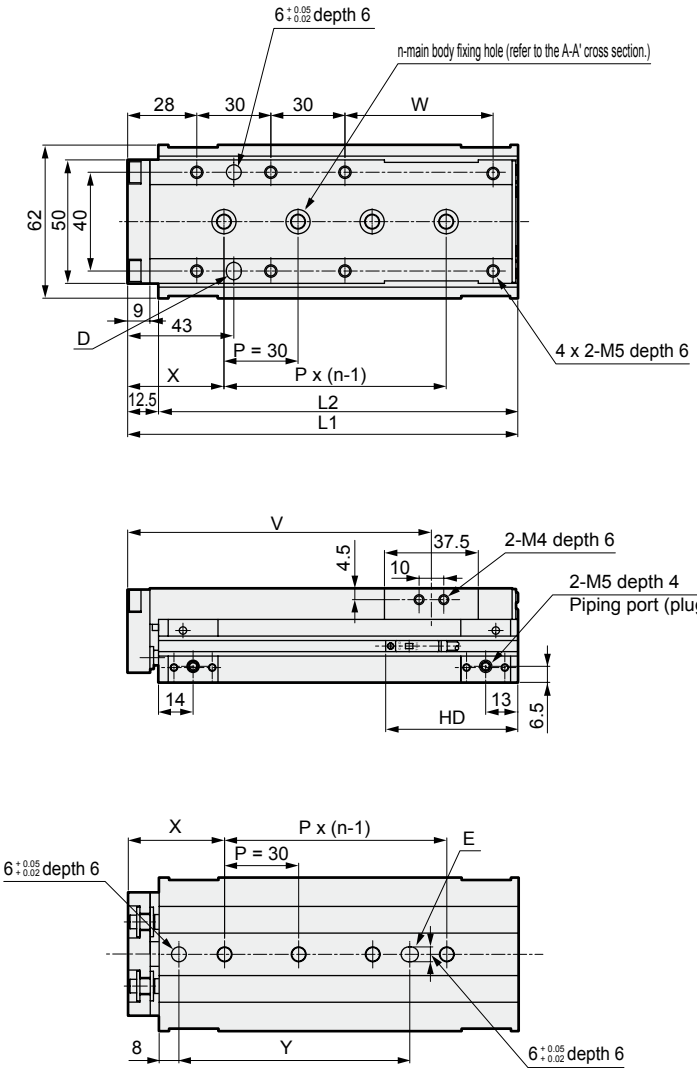
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

Note 2: Read the precautions on 1. Common ; piping on intro 4 when using rear piping.

Dimensions (bore size: ø16)

● LCR-16

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



Dimensions table for each 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		

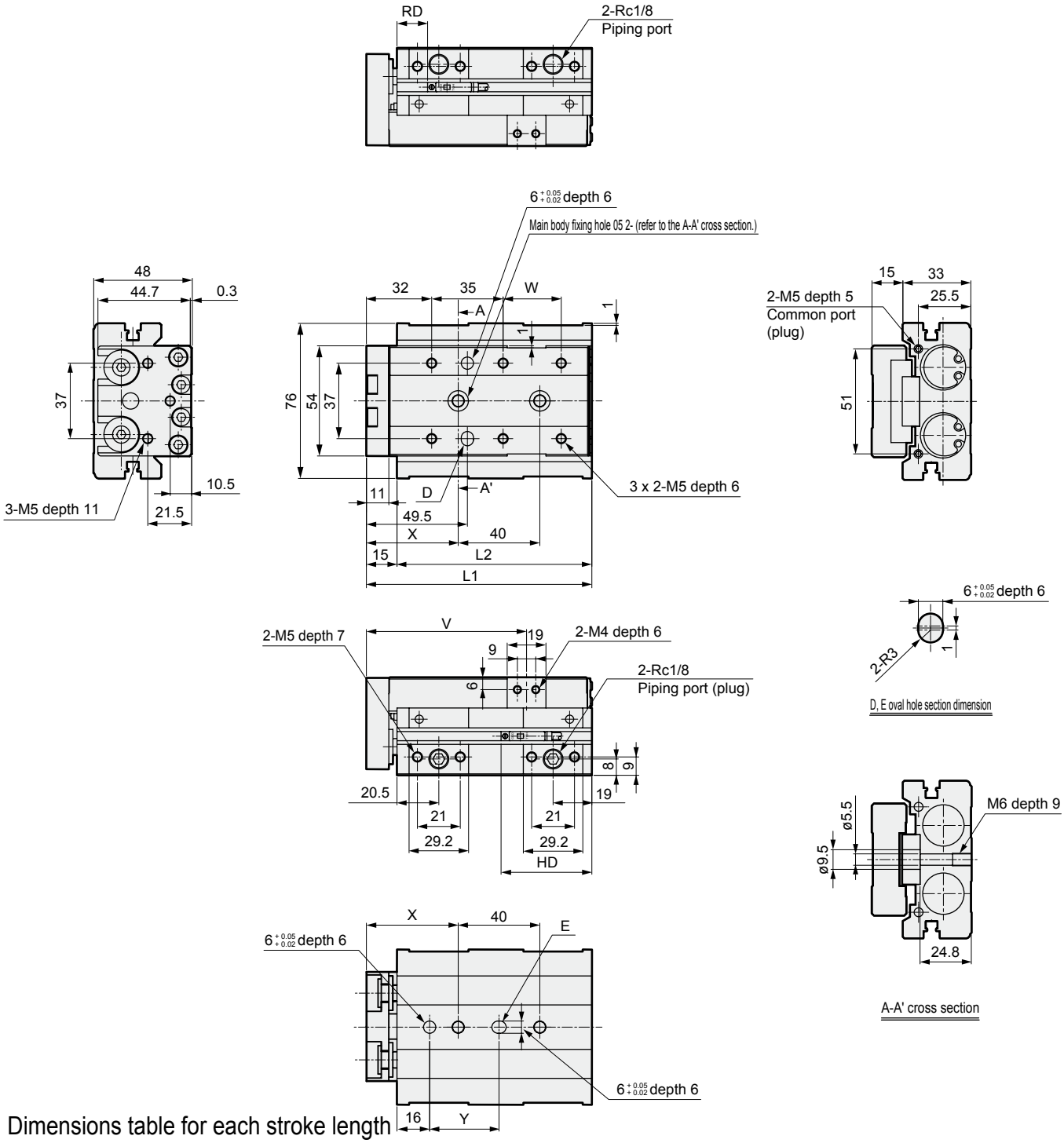
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

Dimensions (bore size: ø20)

● LCR-20

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



Dimensions table for each 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	20.5				
T2/3*	HD	65	55	45		
T2/3W*	RD	22				
	HD	63	53	43		

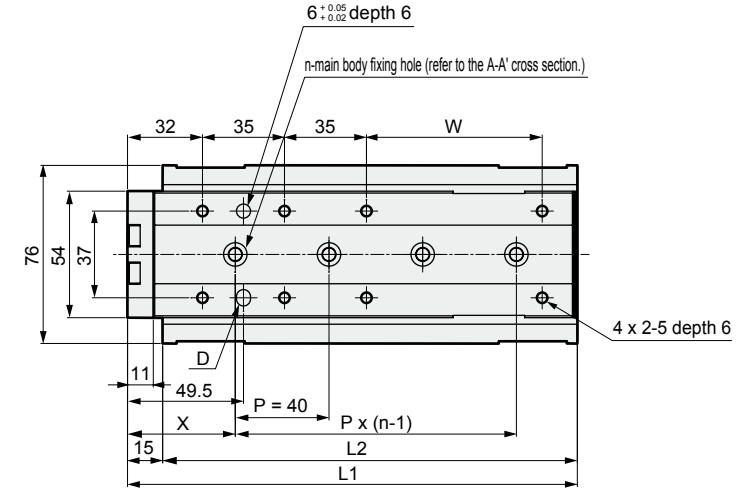
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

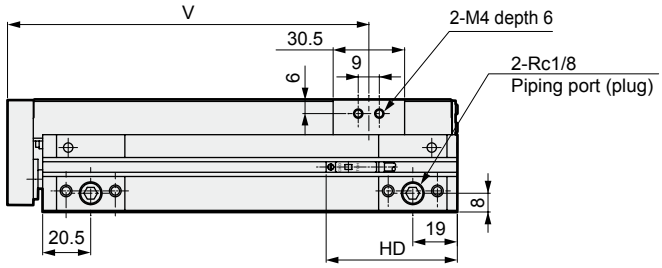
Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

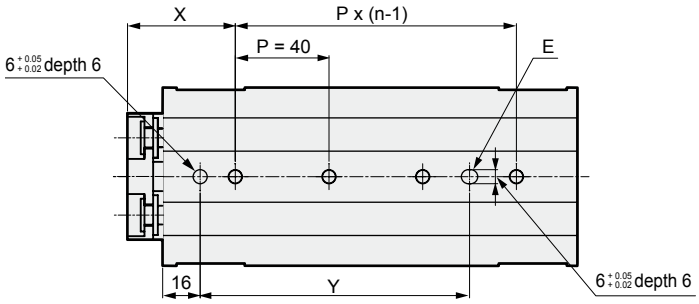
Dimensions (bore size: ø20)

● LCR-20

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







Dimensions table for each 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	20.5			
T2/3*	HD	57.5			
T2/3W*	RD	22			
	HD	55.5			

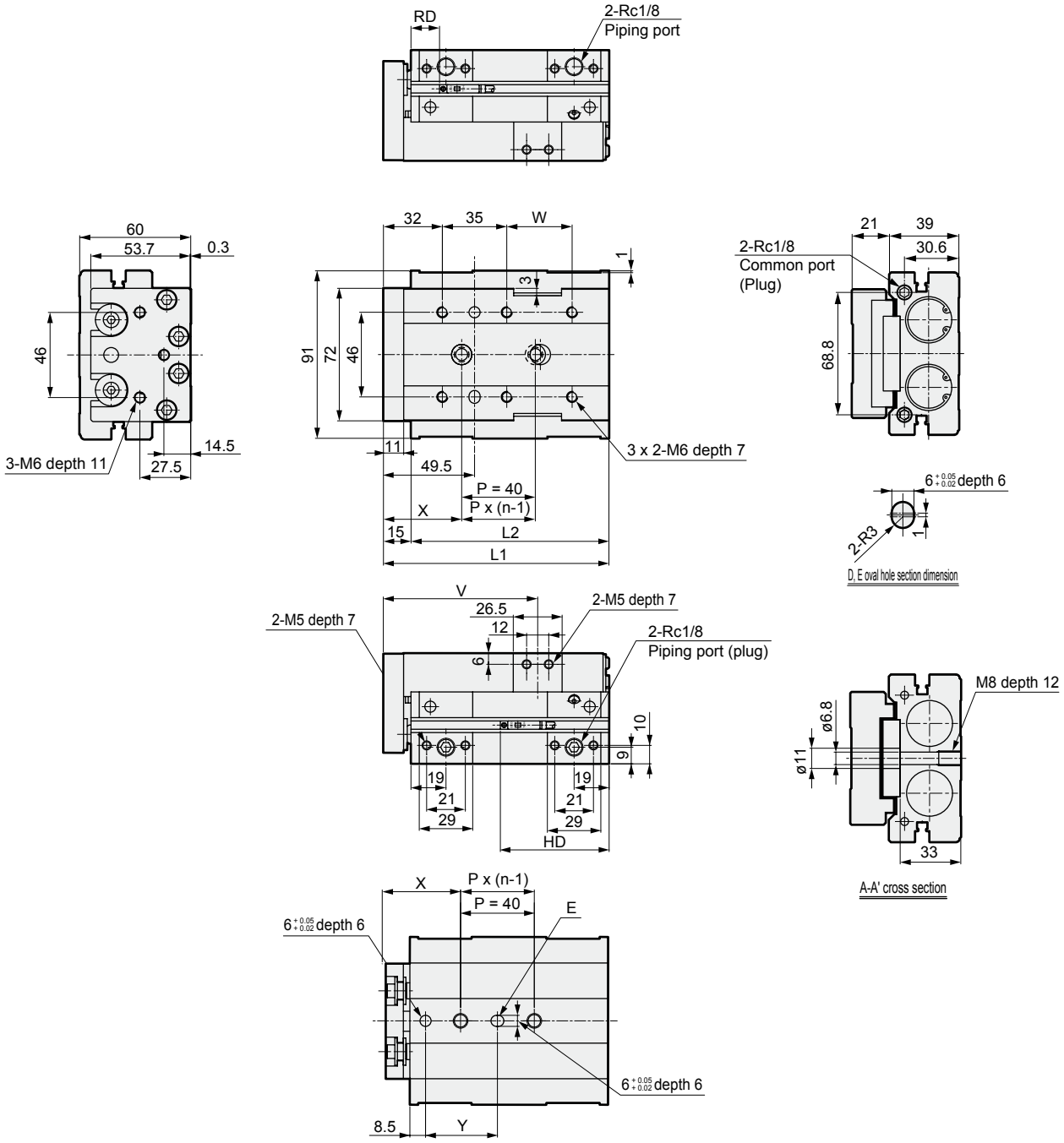
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

Note 2: Read the precautions on 1. Common ; piping on intro 4 when using rear piping.

Dimensions (bore size: ø25)

● LCR-25

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



Dimensions table for each 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	19				
T2/3*	HD	78.5	68.5	58.5		
T2/3W*	RD	21				
	HD	76.5	66.5	56.5		

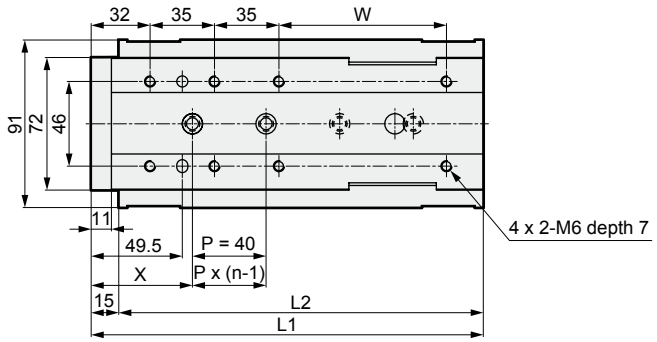
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

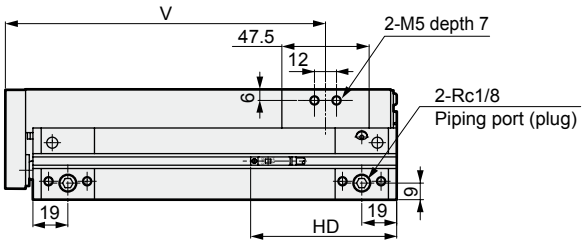
Note 2: Read the precautions on 1. Common ; piping on intro 4 when using rear piping.

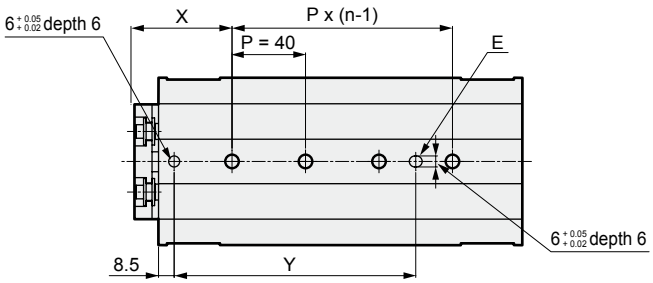
Dimensions (bore size: ø25)

● LCR-25

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







Dimensions table for each stroke length

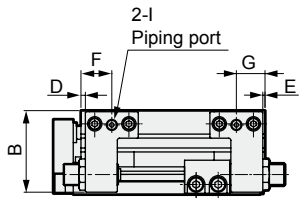
Stroke length		75	100	125	150
L1		188	213	238	263
L2		173	198	223	248
n		3	4	5	
V		138.8	163.8	188.8	213.8
W		66	91	116	141
X		60	55	45	60
Y		96.5	131.5	161.5	176.5
T0/5*	RD	19			
T2/3*	HD	79			
T2/3W*	RD	21			
	HD	77			

Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

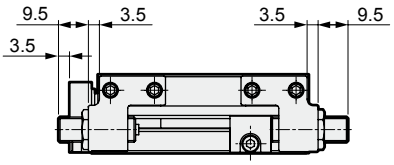
Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

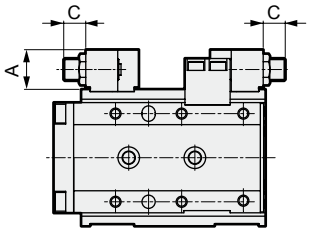
Dimensions: Options

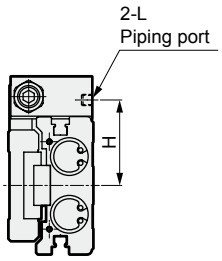
● Stopper for adjustable stroke (S1 to S6)



・For ø8

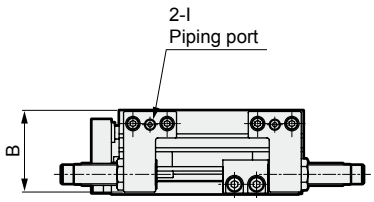


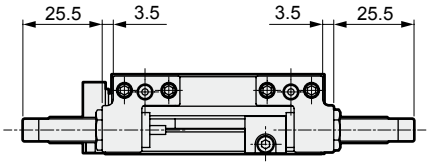


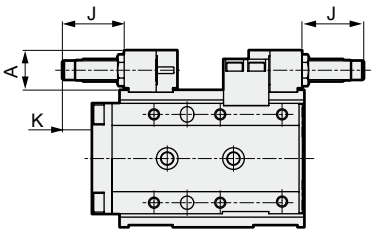


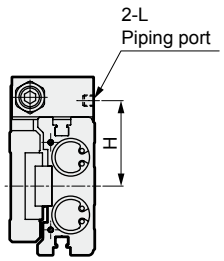
● Shock absorber type stopper (A1 to A6)

・For ø8







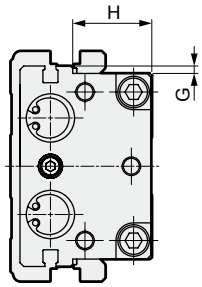


Note 1: The dimensions of F, H, L are only for when there is a stopper section port (*S*D, A*D)
Note 2: The adjustable stroke range of the stopper for adjustable stroke is 5mm per side.
Note 3: For position locking function type, S3** to S6** and A3** to A6** are not available.

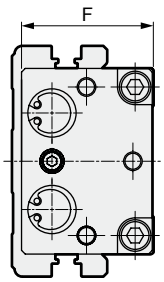
Symbol / Bore size (mm)	A	B	C	D	E	F	G	H	I	J	K	L	Shock absorber type stopper Adjustable stroke range (single)
ø6	14	19.5	11	4	1	13.5	10.5	24	M3 depth 3	21	9	M3 depth 3	9
ø8	15.6	24.5	9.5	0.5	0.5	10.5	10.5	27.3	M5 depth 4	25.5	16	M5 depth 4	17
ø12	15.5	29	12	1	1	13	13	31	M5 depth 4	25.5	12.5	M5 depth 4	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

Dimensions: Option

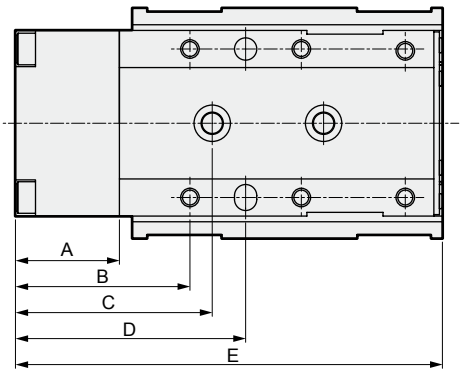
● With buffer (B and BL)



Option symbol: BL



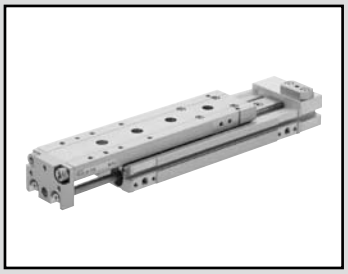
Option symbol: B



Symbol			C									
			Stroke length (mm)									
Bore size (mm)	A	B	10	20	30	40	50	75	100	125	150	D
ø6	22.5	34	45	45	42.5	43.5	45	-	-	-	-	41.5
ø8	21.5	34.5	42.5	42.5	42.5	41	42.5	39.5	-	-	-	44.5
ø12	27	44	55.5	55.5	55.5	54	50	52.5	65	-	-	56.5
ø16	28	47	53	53	53	64.5	54.5	58	56	68	-	62
ø20	31	52	65	65	65	71	69	66	66	73	71	69.5
ø25	34	55	65.5	65.5	65.5	68.5	83.5	83	78	68	83	72.5

Symbol	E									F	G	H
	Stroke length (mm)											
Bore size (mm)	10	20	30	40	50	75	100	125	150			
ø6	82.5	82.5	92.5	112.5	122.5	-	-	-	-	20	3	11
ø8	80.5	80.5	90.5	109.5	119.5	144.5	-	-	-	23.5	3	13.5
ø12	109	109	109	119	129	163	188	-	-	29	3	16
ø16	115	115	115	125	135	177	202	227	-	35.5	1	21.5
ø20	130.5	130.5	130.5	140.5	150.5	187	212	237	262	45.5	4	24.5
ø25	145.5	145.5	145.5	155.5	165.5	211	236	261	286	56	4.5	31

Note 1: Dimensions not indicated are the same as basic type.
Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

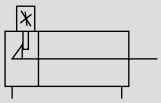


Linear slide cylinder Double acting position locking type

LCR-Q Series

● Bore size: ø8, ø12, ø16, ø20, ø25

JIS symbol



RoHS

Specifications

Descriptions		LCR-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 °C		-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 49.				

Note 1: There will be a slight gap between the end plate and floating bush if used without a stopper.

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 the ones listed above is not available.

Specifications with buffer

Specifications other than below are the same as the above common specifications.

Descriptions		LCR-Q with buffer				
Bore size mm		ø8	ø12	ø16	ø20	ø25
Buffer stroke mm		4	9		10	
Buffer section spring load	When set N	5	10	13	17	21
	Operation N	8	14	20	25	29

Note 1: If the rod side stroke is adjusted with the buffer, the buffer stroke will be shortened as much as the stroke that has been adjusted, and the buffer section spring load will increase during setting.
Note 2: Use buffer stroke below the stroke listed above. There is a risk of damage and malfunction.

Switch specifications

● 1 color/2 color indicator

* T0/T5 switches can be used under 220VAC
Consult CKD for working conditions

Descriptions	Reed 2 wire				Proximity 2 wire		Proximity 3 wire	
	T0H/T0V		T5H/T5V		T2H/T2V	T2WH/T2WV	T3H/T3V	T3WH/T3WV
Applications	Programmable controller and relay		Programmable controller, relay IC circuit (w/o light), serial connection		Programmable controller		Programmable controller and relay	
Output method	-		-		-		NPN output	
Power voltage	-		-		-		10 to 28 VDC	
Load voltage	12/24 VDC	110 VAC	5/12/24 VDC	110 VAC	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 50mA	7 to 20mA	50mA or less	20mA or less	5 to 20mA		100mA or less	50mA or less
Light	LED (ON lighting)		Without indicator light		LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)
Leakage current	0mA				1mA or less		10 μA or less	

Descriptions	Proximity 2 wire	Proximity 3 wire	Proximity 2 wire		Proximity 3 wire	
	F2S	F3S	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Programmable controller	Programmable controller and relay	Programmable controller		Programmable controller and relay	
Output method	-	NPN output	-		NPN output	
Power voltage	-	10 to 28 VDC	-		10 to 28 VDC	
Load voltage	10 to 30 VDC	30 VDC or less	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 20mA	50mA or less	5 to 20mA		100mA or less	50mA or less
Light	Red LED (ON lighting)		LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)
Leakage current	1mA or less	10 μA or less	1mA or less		10 μA or less	

Cylinder weight

● Position locking type

(Unit: g)

Bore size (mm)	Basic type mm stroke (mm)								
	10	20	30	40	50	75	100	125	150
ø8	260	260	280	330	360	420	-	-	-
ø12	415	425	425	465	495	625	715	-	-
ø16	670	680	680	730	790	1,020	1,150	1,290	-
ø20	1,150	1,160	1,170	1,250	1,340	1,640	1,850	2,060	2,270
ø25	2,000	2,020	2,030	2,140	2,240	2,730	3,000	3,270	3,540

● Additional option

(Unit: g)

Bore size (mm)	Option, stopper symbol		With buffer
	S1·S2	A1·A2	B/BL
ø8	40	50	40
ø12	70	80	70
ø16	110	120	80
ø20	170	180	150
ø25	290	300	320

Secondary battery compatible specification

LCR-: ··· - **P4***

● Structure that can be used in secondary battery manufacturing process.

* Consult with CKD for details.

How to order

Without switch

LCR-Q - 8 - 40 ——— S2

With switch

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

- Model no.
- Ⓐ Bore size
- Ⓑ Stroke length
- Ⓒ Switch model no. Note 10
- Ⓓ 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**
F2S		Proximity	1 color indicator	2-wire	●	●			
F3S				3-wire					
F2H*	**F2V***			2-wire					
F3H*	**F3V***			3-wire					
F2YH*	**F2YV***		2 color indicator	2-wire					
F3YH*	**F3YV***			3-wire					
T0H*	**T0V***	Reed	1 color indicator	2-wire					
T5H*	**T5V***		Without indicator						
T2H*	**T2V***	Proximity	1 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	1 on rod end
H	1 on head end
D	2

Ⓔ Option		
Blank	No option	
S stopper for adjustable stroke		
Adjustable stroke single 5mm	**Note 1, Note 5, note 8**	
S1**	Stopper position ①	Stopper installation position
S2**	Stopper position ②	
A shock absorber type stopper	**Note 2, Note 5, note 8**	
A1**	Stopper position ①	Stopper installation position
A2**	Stopper position ②	
**** 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	
B with buffer	**Note 7, note 8**	
B	Without switch groove	
BL	With switch groove	

⚠ 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: The port position of standard type will be ① and ③ on the figure below when stoppers are not installed.

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 page 27 when selecting switch for buffer section.

Note 8: Refer to the selection table on page 26 for combinations of options.

Note 9: For ø8 cylinders with 10mm stroke or ø12 to ø25 cylinders with 20mm stroke or less, custom order is applied because A1**, A2** can not be adjusted by a standard stopper.

Note 10: F2S and F3S switches are shipped with the product. Consult our sales representative if you need it shipped with the switches installed.

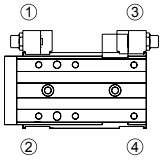
<Example of model number>

LCR-Q-12-40-F2H-R-A1DT

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

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

● Stopper position



LCR-Q position locking type combination availability table

(Combinations of stopper for adjustable stroke and shock absorber type stopper) ○: Combination available -: 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
LCR-Q LCR-Q-B and BL	ø8	10	○	○	—	—	—	—	—	—	—	—	—	—
		20 and over	○	○	—	—	—	—	○	○	—	—	—	—
	ø12 to ø25	10 to 20	○	○	—	—	—	—	—	—	—	—	—	—
		30 and over	○	○	—	—	—	—	○	○	—	—	—	—

Combination of option symbol “D: with stopper section port” and “T: alloy steel (nitriding) ” follows the chart shown above.

How to order switch

For ø8 to ø12

SW - F2H

Switch model no.
(Page 25, section Ⓒ)

For ø16 to ø25

SW - T2H3

Switch model no.
(Page 25, section Ⓒ)

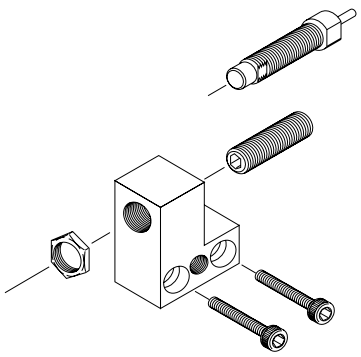
● Buffer

SW - F 2 V 3

Output type	
2	2 wire proximity DC
3	3 wire proximity DC
Radial lead wire	
Lead wire length	
Blank	1m (standard)
3	3m (option)

How to order stopper set

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



LCR - 12 - S 2 D - S02

Bore size
(Page 25 section Ⓐ)

Ⓐ Stopper type	
S	Stopper for adjustable stroke
A	Shock absorber type stopper
Ⓑ Stopper installation position	**Note 1**
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 port
Ⓓ Adjustable stroke length	**Note 2·Note 3**
Blank	Adjustable stroke range 5mm
S02	Adjustable stroke range 15mm
S03	Adjustable stroke range 25mm

Note 1: Refer to the chart below when attaching stopper on ① or ② because the stroke adjustment changes according to the stroke.
Note 2: "S03" can not be selected with ø6 or ø8.
Note 3: Can not be selected with shock absorber type stopper "A".

Precautions when ordering stopper set

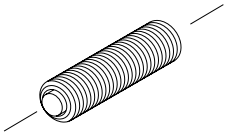
SO1 is included as the stopper for adjustable stroke in the stopper for adjustable stroke set.
When installing on ① , ② (refer to page 25), add the parts on the right according to the stroke and stroke adjustment.

—: not available

Model no. symbol	Option symbol		Discrete stopper for adjustable stroke		
			Adjusted stroke length (mm)		
	Bore size	Stroke length	-5	-15	-25
LCR-Q Series	ø8	10	S02	—	—
		20 and over	Not required additionally	S02	—
	ø12 to ø25	10	S03	—	—
		20	S02	S03	—
		30 and over	Not required additionally	S02	S03

How to order the discrete stopper for adjustable stroke

● Hexagon socket head set screw with urethane
● Use when changing the adjustable stroke range or setting to custom stroke length.



LCR - 12 - S02

Bore size
(Page 25 section Ⓐ)

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

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

Precautions when ordering discrete stopper

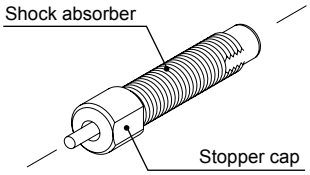
Please be warned that when installing discrete stopper for stroke adjustment, discrete shock absorber type stopper on positions ① and ② (refer to page 25), the available combination will be as shown on the right.

—: combination not available

Model no. symbol	Option symbol		Discrete stopper for adjustable stroke			Discrete shock absorber type stopper
			Adjusted stroke length (mm)			
	Bore size	Stroke length	-5	-15	-25	
LCR 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

● Set of shock absorber and stopper cap
● Used when changing from shock absorber type stopper to stopper for adjustable stroke



LCR - 12 - A01

Bore size
(Page 25 section Ⓐ)

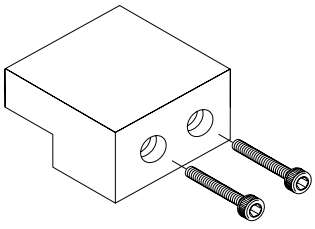
Note: Some models may not be available depending on the type. Refer to Page 25.
Refer to page 21 for the stroke adjustment range of shock absorber type stopper.

Applicable shock absorber model No.

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



LCR - 12 - SB1 T

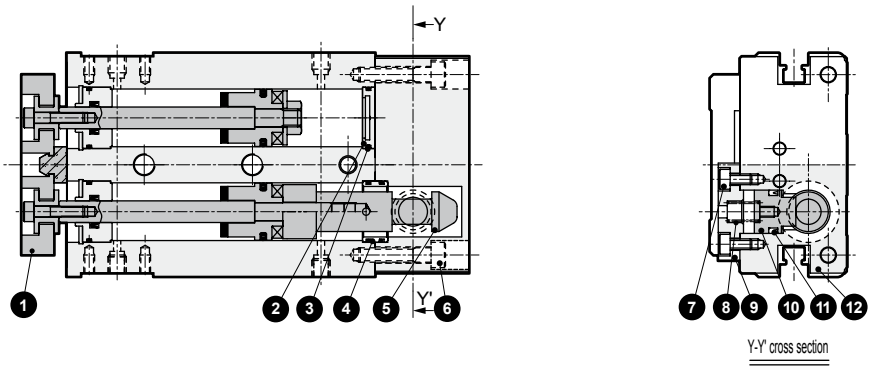
Bore size
(Page 25 section Ⓐ)

Ⓐ 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

● LCR-Q



Parts list

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

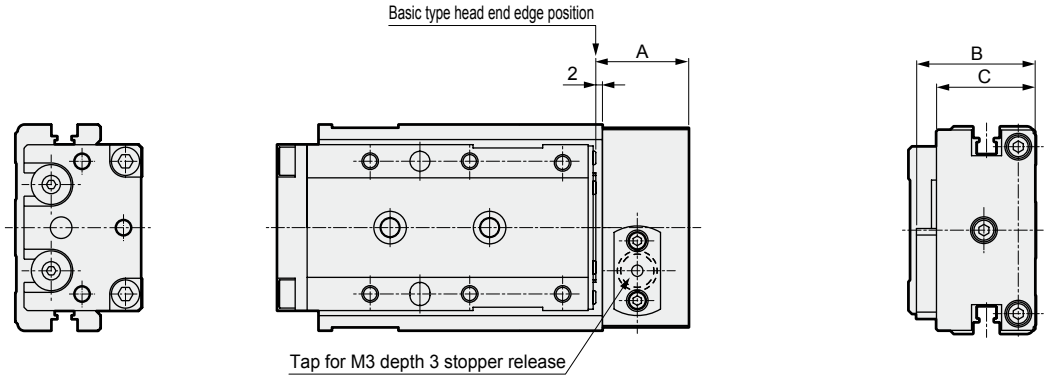
Repair parts list

Bore size (mm)	Kit No.	Repair parts number	
		Position locking unit repair parts	Basic unit repair parts
ø8	LCR-Q-8K	⑪	④ ⑤ ⑨ ⑪ ⑰ ㉑
ø12	LCR-Q-12K		
ø16	LCR-Q-16K		
ø20	LCR-Q-20K		
ø25	LCR-Q-25K		

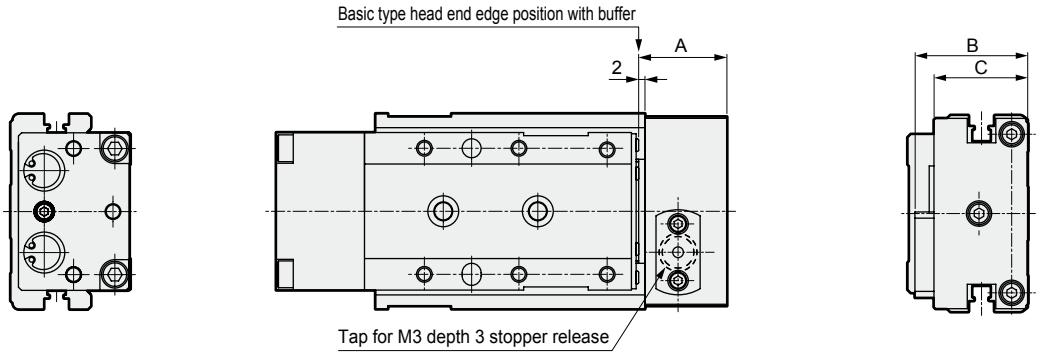
Note: Consumable parts for the base is compatible with the double acting, single rod type parts listed on page 7.

Dimensions

● LCR-Q

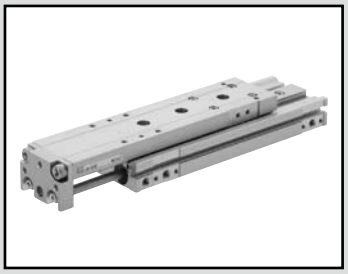


● LCR-Q-*-*-B (with buffer)



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

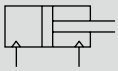
Note: Dimensions not listed above are the same as double acting single rod type.



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

LCR-P7* Series

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

JIS symbol 

RoHS

Specifications

Descriptions		LCR-P7*					
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 °C		-10 to 60 (no freezing)					
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 1)					
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 49.					

Note 1: There will be a slight gap between the end plate and floating bush if used without a stopper.

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

* T0/T5 switches 220 VAC are also available.
Consult CKD for working conditions.

● 1 color/2 color indicator

Descriptions	Reed 2 wire				Proximity 2 wire		Proximity 3 wire	
	T0H/T0V		T5H/T5V		T2H/T2V	T2WH/T2WV	T3H/T3V	T3WH/T3WV
Applications	Programmable controller and relay		Programmable controller, relay IC circuit (w/o light), serial connection		Programmable controller		Programmable controller and relay	
Output method	-		-		-		NPN output	
Power voltage	-		-		-		10 to 28 VDC	
Load voltage	12/24 VDC	110 VAC	5/12/24 VDC	110 VAC	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 50mA	7 to 20mA	50mA or less	20mA or less	5 to 20mA		100mA or less	50mA or less
Light	LED (ON lighting)		Without indicator light		LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)
Leakage current	0mA				1mA or less		10 µA or less	

Descriptions	Proximity 2 wire	Proximity 3 wire	Proximity 2 wire		Proximity 3 wire	
	F2S	F3S	F2H/F2V	F2YH/F2YV	F3H/F3V	F3YH/F3YV
Applications	Programmable controller	Programmable controller and relay	Programmable controller		Programmable controller and relay	
Output method	-	NPN output	-		NPN output	
Power voltage	-	10 to 28 VDC	-		10 to 28 VDC	
Load voltage	10 to 30 VDC	30 VDC or less	10 to 30 VDC	24 VDC ±10%	30 VDC or less	
Load current	5 to 20mA	50mA or less	5 to 20mA		100mA or less	50mA or less
Light	Red LED (ON lighting)		LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)
Leakage current	1mA or less	10 µA or less	1mA 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
ø6	130	130	150	180	200	-	-	-	-
ø8	220	220	240	290	320	380	-	-	-
ø12	400	410	410	450	480	610	700	-	-
ø16	620	630	630	680	740	970	1,100	1,240	-
ø20	1,160	1,170	1,180	1,260	1,350	1,650	1,860	2,070	2,280
ø25	2,010	2,030	2,040	2,150	2,250	2,740	3,010	3,280	3,550

● Additional weight for variations/options (stopper) (Unit: g)

Bore size (mm)	Option, stopper symbol	
	S1 to S4	S5/S6
ø6	30	40
ø8	40	60
ø12	70	100
ø16	110	150
ø20	170	250
ø25	290	380

LCR-P7* Series

How to order

Without switch

LCR - 8 - 40 ——— S5 - P72

With switch

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

Model no.

Ⓐ Bore size

Ⓑ Stroke length

Ⓒ Switch model no. Note 5

Ⓓ Switch quantity

Ⓔ Option

Ⓕ 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
F2S		Proximity	1 color indicator	2-wire						
F3S				3-wire						
F2H*	**F2V***			2-wire	●	●	●			
F3H*	**F3V***			3-wire						
F2YH*	**F2YV***		2 color indicator	2-wire						
F3YH*	**F3YV***			3-wire						
T0H*	**T0V***	Reed	1 color indicator	2-wire						
T5H*	**T5V***		Without indicator							
T2H*	**T2V***	Proximity	1 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	1 on rod end	●
H	1 on head end	●
D	2	●

Ⓔ 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 and ③	●
S6**	Stopper position ② and 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
Plug attached		
Blank	None	
N	Port for side piping port attached (Not selectable for ø6 and ø25)) Note 6	

Ⓕ 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: The port position of standard type will be ① and ③ on the figure below when stoppers are not installed.

Note 3: Selectable only when using a stopper.

Note 4: Select F□H type switch when using S**** ø6 to 8 under 30th with 2 switches.

Note 5: F2S and F3S switches are shipped with the product. Consult our sales representative if you need it shipped with the switches installed.

Note 6: Select by rear piping for use.

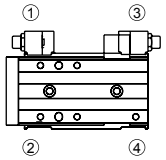
<Example of model number>

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

Type: Linear slide cylinder Double acting, single rod type (clean specification) LCR-P7*

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

● Stopper position

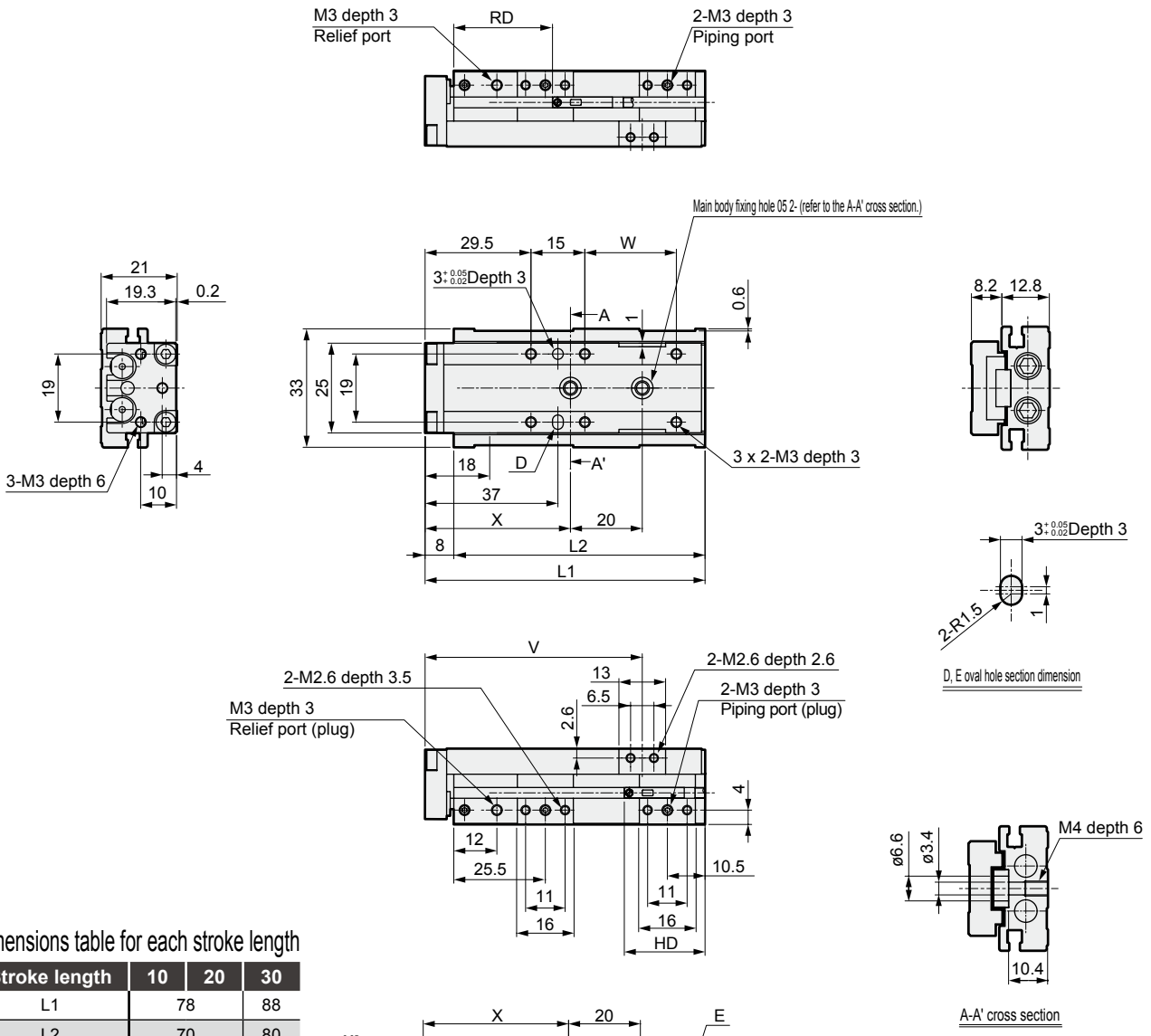


MEMO

Dimensions (bore size: ø6)

● LCR-6-P7*

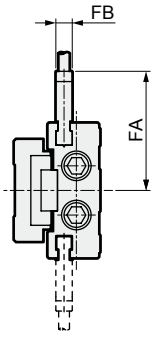
Stroke length: 10, 20, 30
(The main body fixing holes in this drawing is for 20 mm stroke.)



Dimensions table for each 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	27		
HD	33	23	

● Dimensions of projection when cylinder switch F2S or F3S is installed.



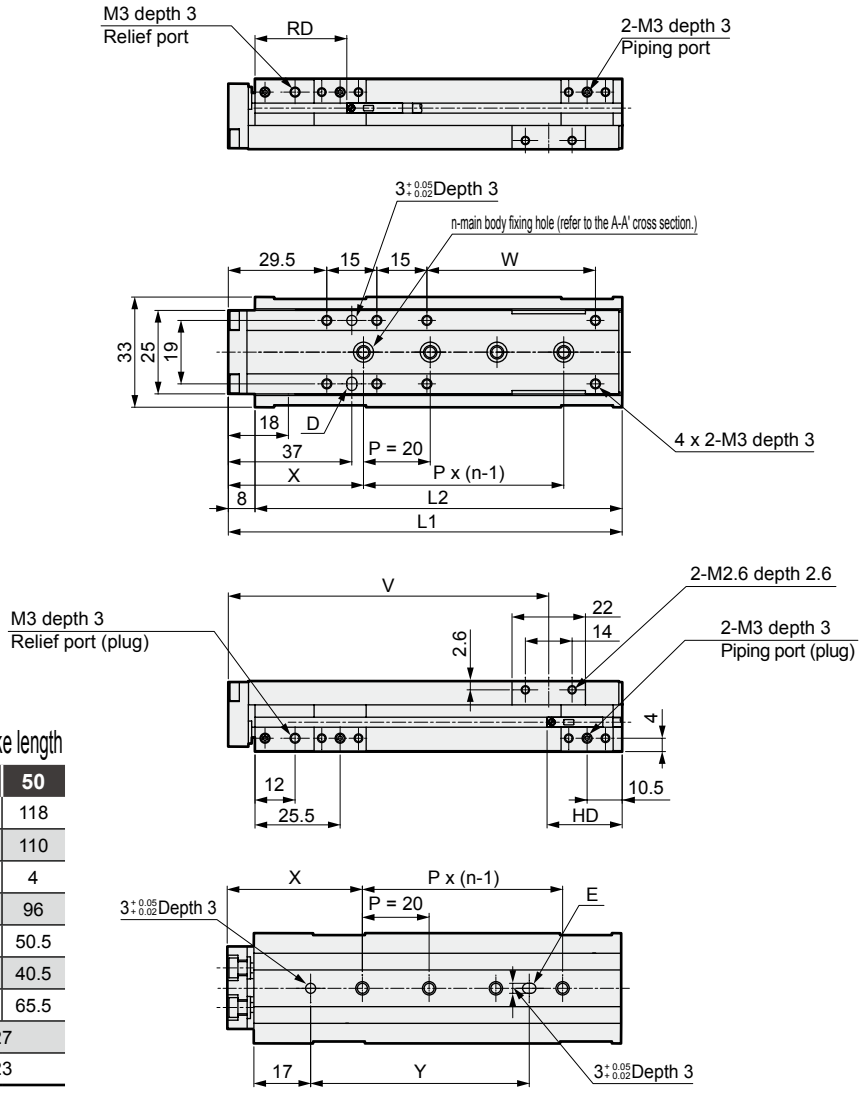
Stroke length	10	20	30
FA	29.1		
FB	4		
RD	26		
HD	34	24	

Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

Dimensions (bore size: ø6)

● LCR-6-P7*

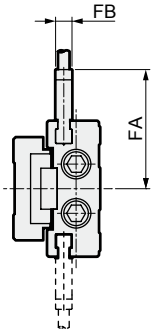
Stroke length: 40, 50
(The main body fixing holes in this drawing is for 50 mm stroke.)



Dimensions table for each 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	27	
HD	23	

● Dimensions of projection when cylinder switch F2S and F3S are installed.



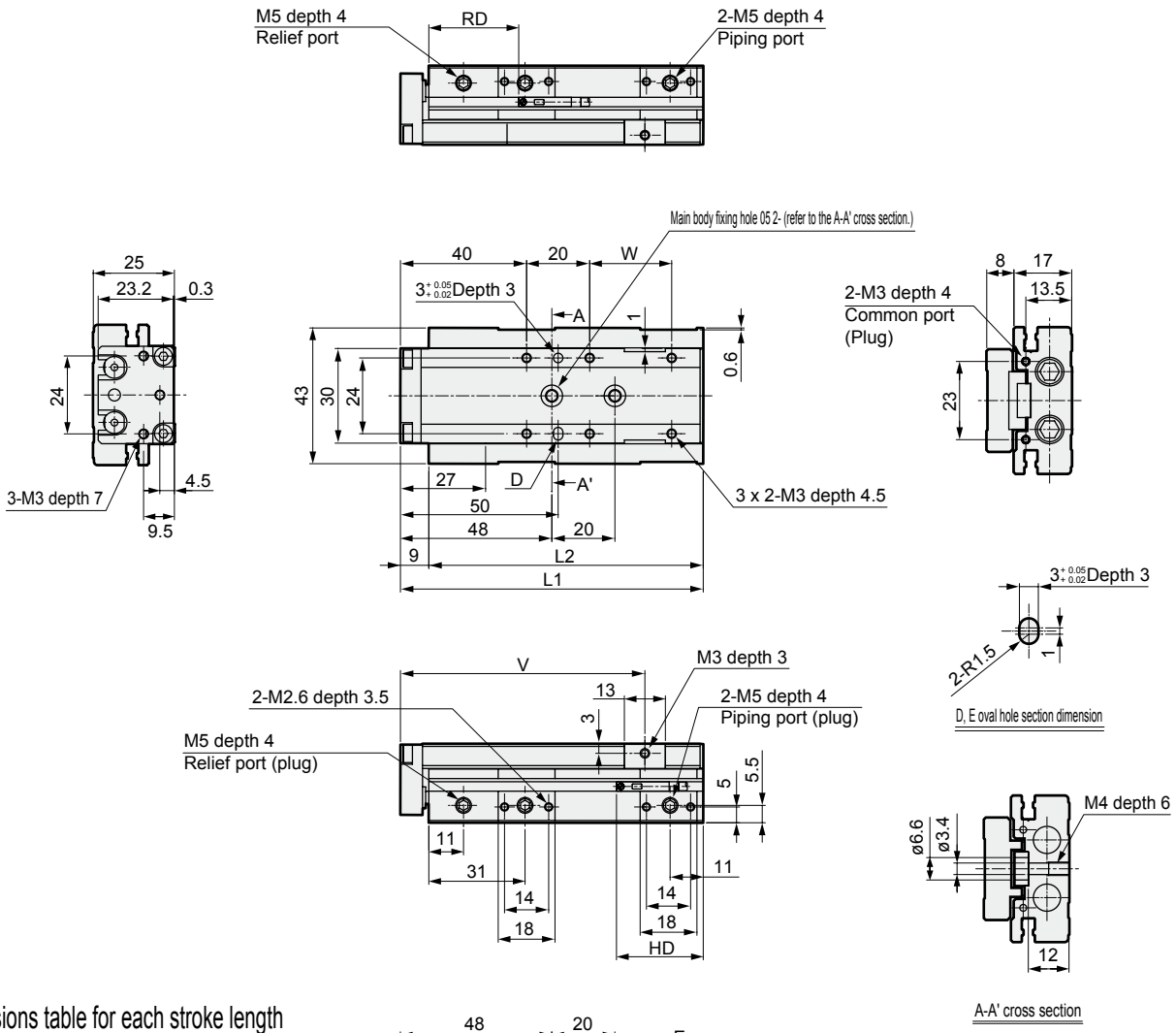
Stroke length	40	50
FA	29.1	
FB	4	
RD	26	
HD	24	

Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

Dimensions (bore size: ø8)

● LCR-8-P7*

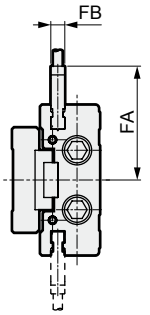
Stroke length: 10, 20, 30
(The main body fixing holes in this drawing is for 30 mm stroke.)



Dimensions table for each stroke length

Stroke length	10	20	30
L1	86		96
L2	77		87
V	67.5		77.5
W	16		26
RD	33		
HD	34	24	

● Dimensions of projection when cylinder switch F2S or F3S is installed.



Stroke length	10	20	30
FA	32.6		
FB	4		
RD	32		
HD	35	25	

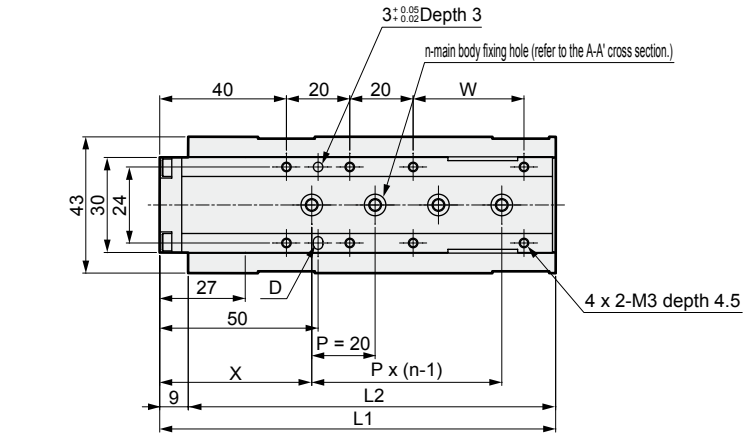
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

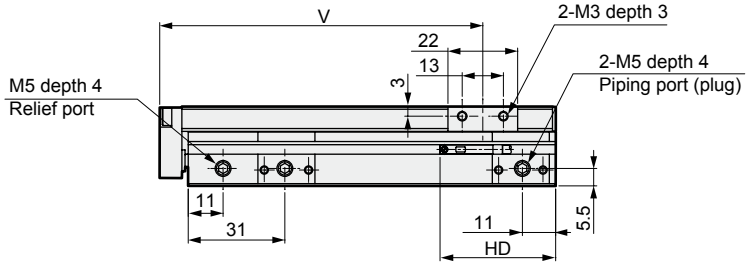
Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

Dimensions (bore size: ø8)

● LCR-8-P7*

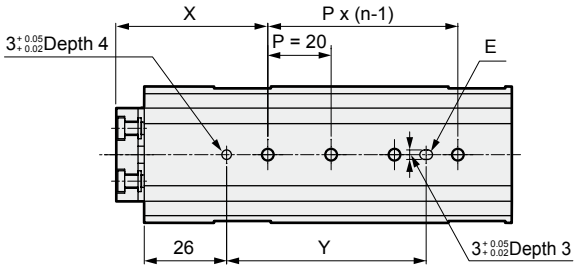
Stroke length: 40, 50, 75
(The main body fixing holes in this drawing is for 50 mm stroke.)



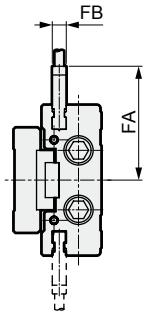


Dimensions table for each stroke length

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	33		
HD	33		



● Dimensions of projection when cylinder switch F2S or F3S is installed.



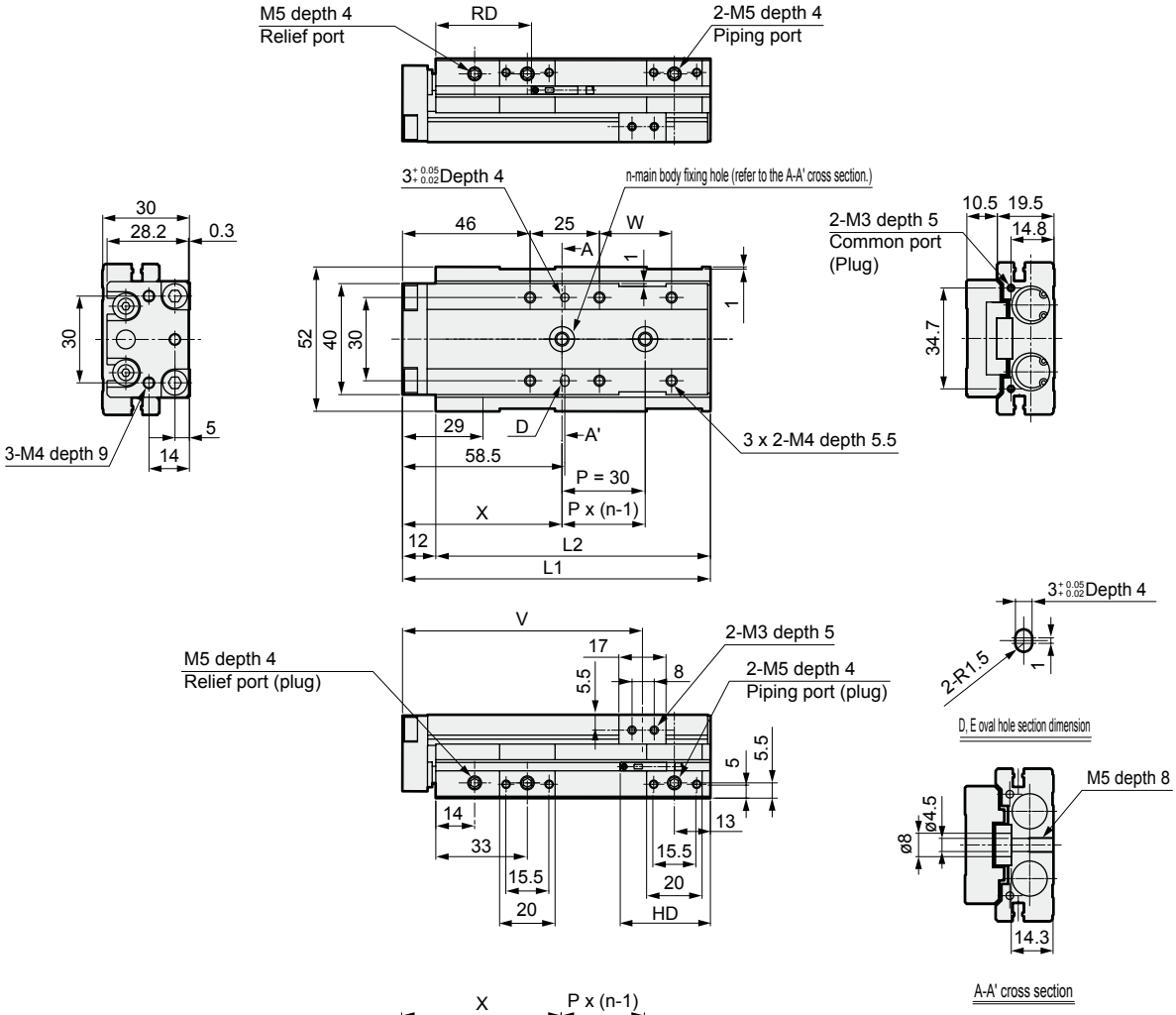
Stroke length	40	50	75
FA	32.6		
FB	4		
RD	32		
HD	34		

Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.
Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

Dimensions (bore size: ø12)

● LCR-12-P7*

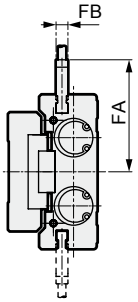
Stroke length: 10, 20, 30, 40, 50
(The main body fixing holes in this drawing is for 30 mm stroke.)



Dimensions table for each 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	36.5				
HD	52.5	42.5	32.5		

● Dimensions of projection when cylinder switch F2S or F3S is installed.



Stroke length	10	20	30	40	50
FA	37.8				
FB	4				
RD	35.5				
HD	53.5	43.5	33.5		

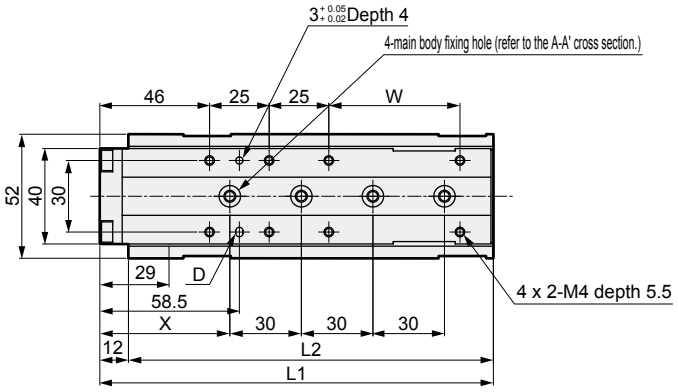
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

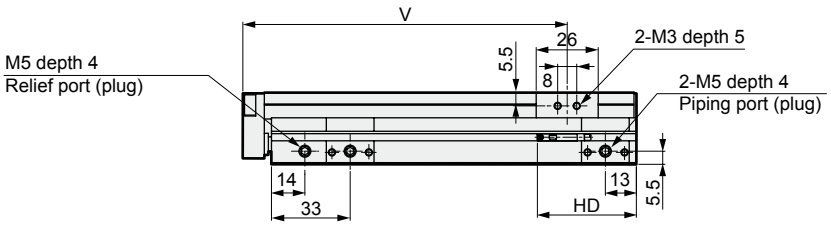
Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

Dimensions (bore size: ø12)

● LCR-12-P7*

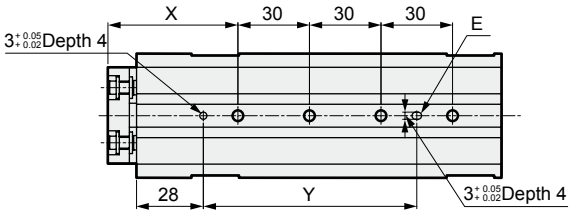
Stroke length: 75, 100
(The main body fixing holes in this drawing is for 100 mm stroke.)



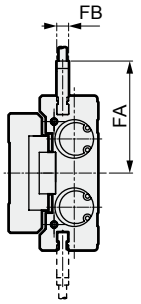


Dimensions table for each stroke length

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	36.5	
HD	41.5	



● Dimensions of projection when cylinder switch F2S or F3S is installed.



Stroke length	75	100
FA	37.8	
FB	4	
RD	35.5	
HD	42.5	

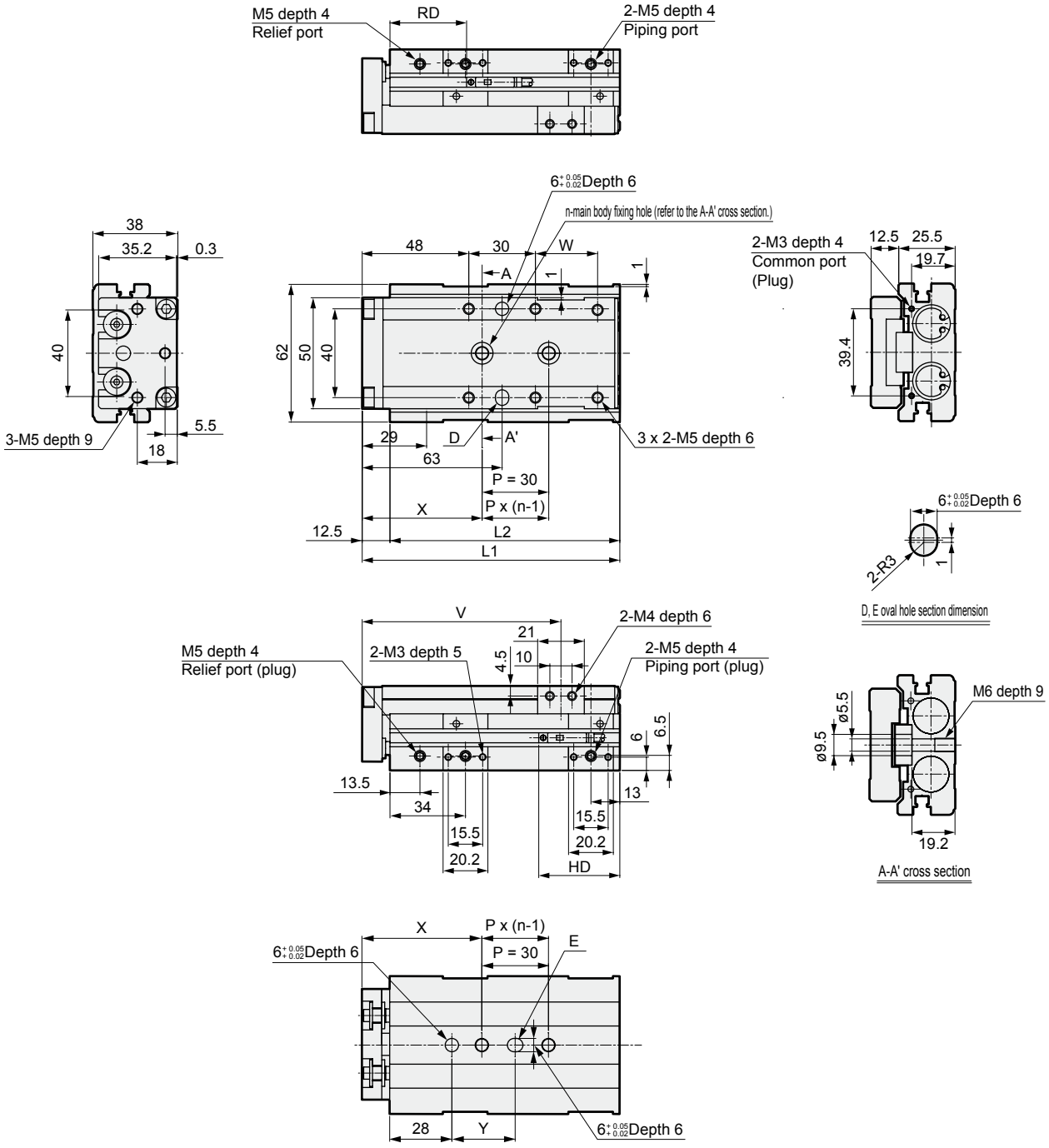
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

Dimensions (bore size: ø16)

● LCR-16-P7*

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



Dimensions table for each 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
T0/5*	RD	37				
T2/3*	HD	56.5	46.5	36.5		
T2/3W*	RD	39.5				
	HD	54	44	34		

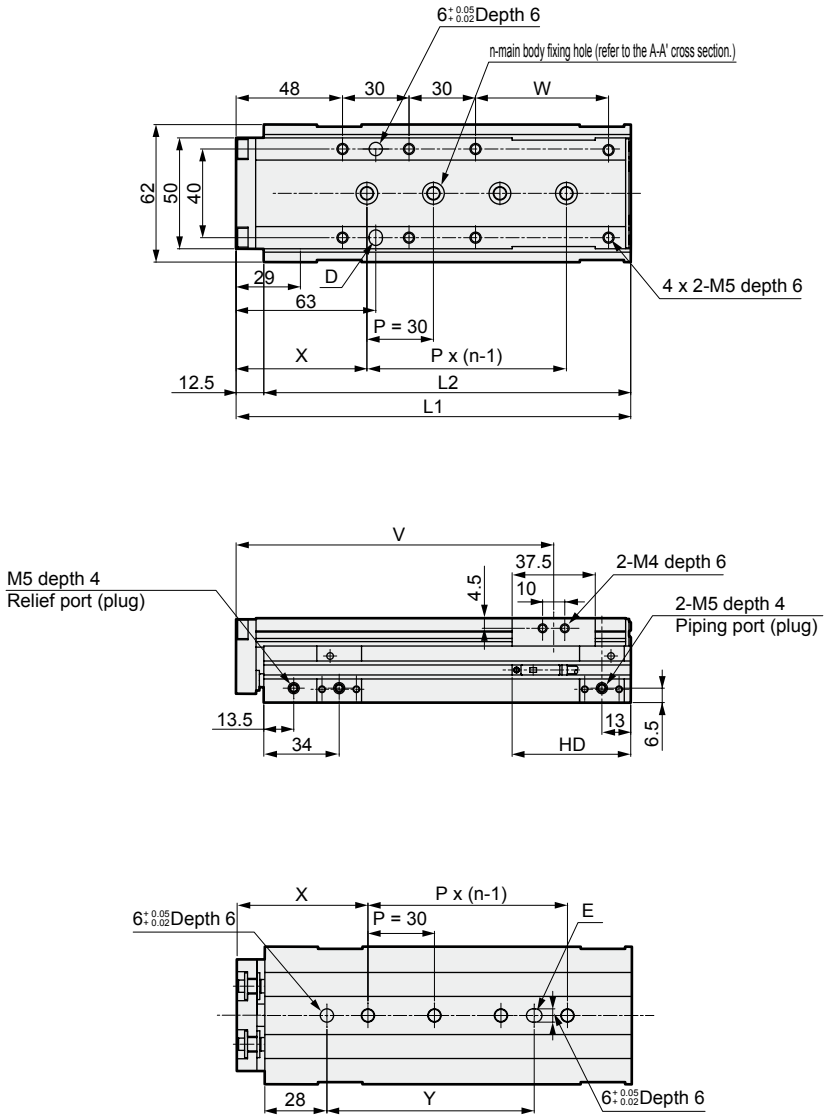
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

Note 2: Read the precautions on 1. Common ; piping on intro 4 when using rear piping.

Dimensions (bore size: ø16)

● LCR-16-P7*

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



Dimensions table for each 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
T0/5*	RD	37		
T2/3*	HD	53.5		
T2/3W*	RD	39.5		
	HD	51		

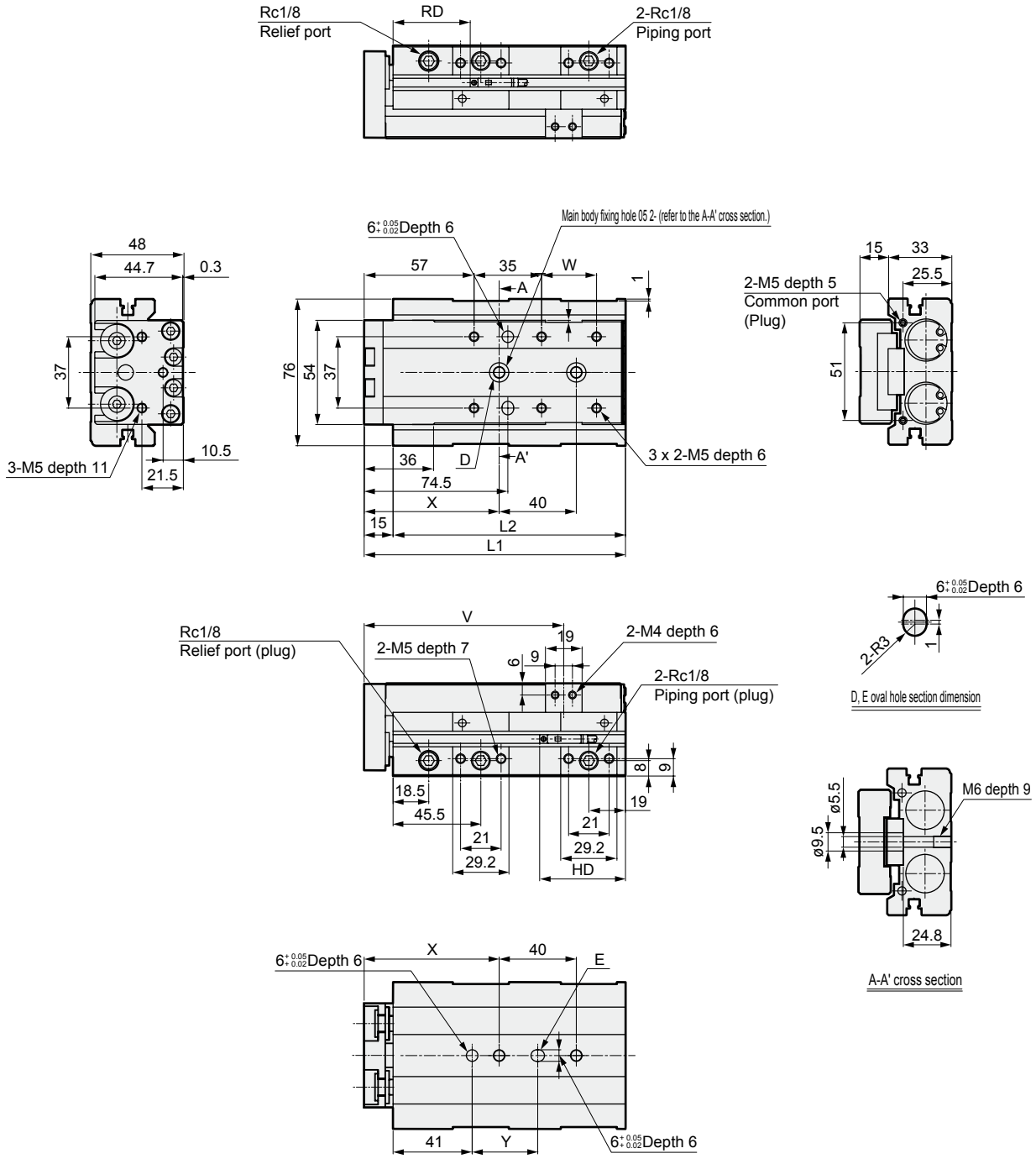
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

Dimensions (bore size: ø20)

● LCR-20-P7*

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



Dimensions table for each 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
T0/5*	RD	45.5				
T2/3*	HD	65	55	45		
T2/3W*	RD	47				
	HD	63	53	43		

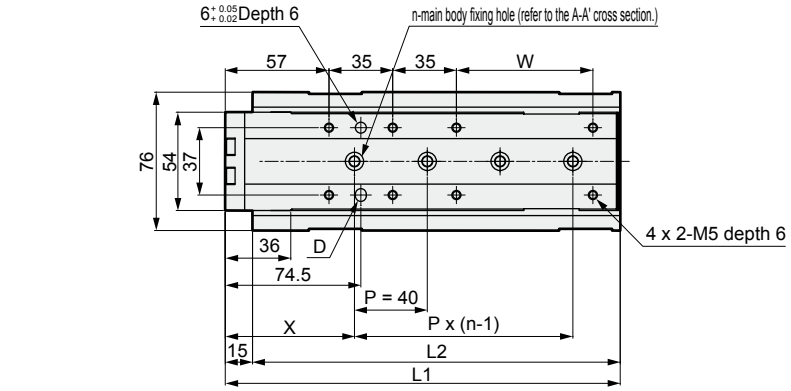
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

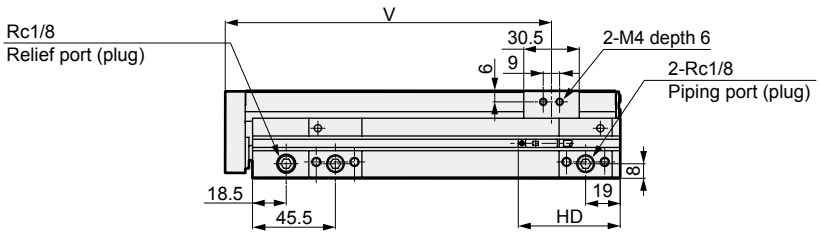
Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

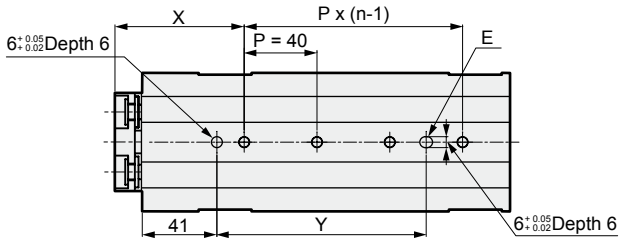
Dimensions (bore size: ø20)

● LCR-20-P7*

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







Dimensions table for each 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
T0/5*	RD	45.5			
T2/3*	HD	57.5			
T2/3W*	RD	47			
	HD	55.5			

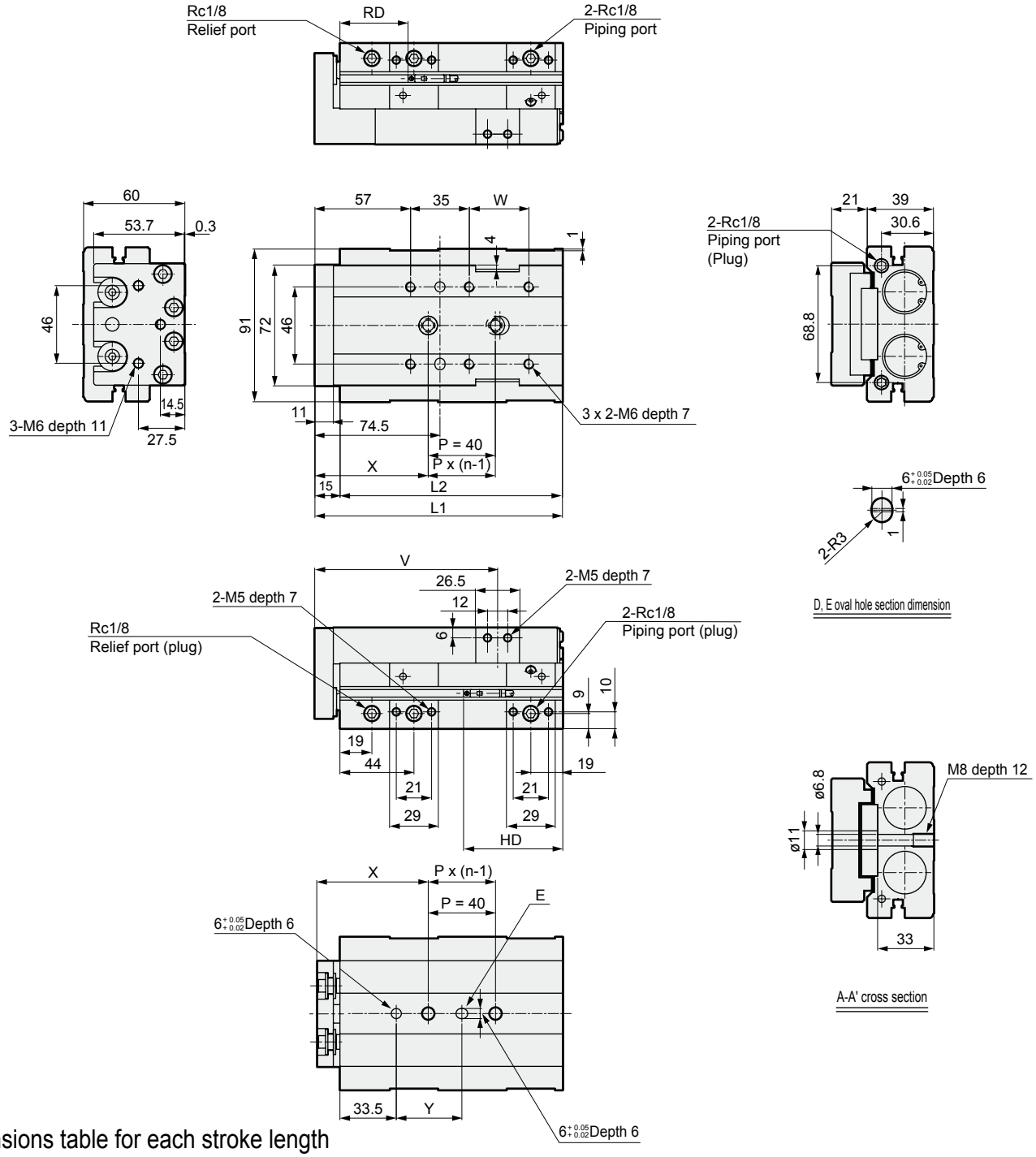
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

Dimensions (bore size: ø25)

● LCR-25-P7*

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



Dimensions table for each 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
T0/5*	RD	44				
T2/3*	HD	78.5	68.5	58.5		
T2/3W*	RD	46				
	HD	76.5	66.5	56.5		

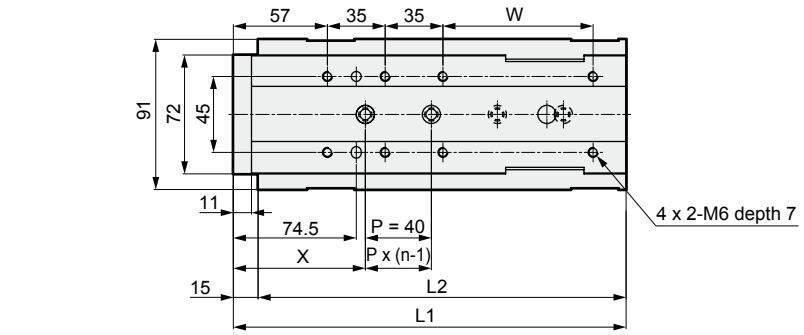
Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used. Recommended tolerance for the pin is JIS tolerance m6 or less.

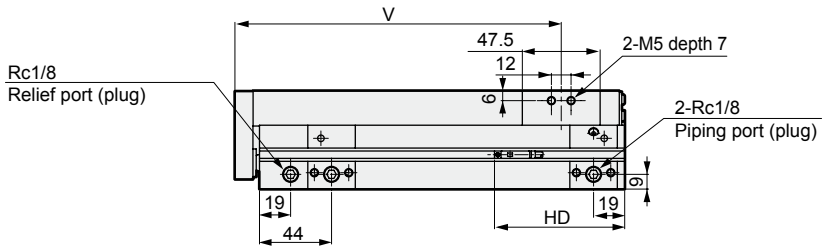
Note 2: Read the precautions on 1. Common ; piping on intro 4 when using rear piping.

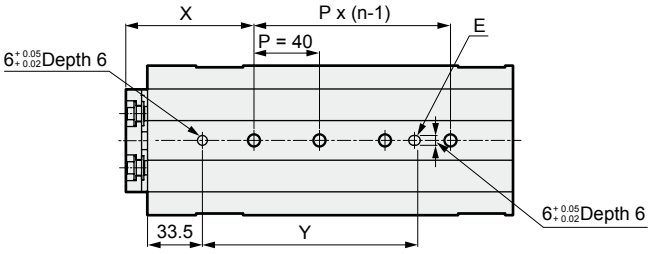
Dimensions (bore size: ø25)

● LCR-25-P7*

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







Dimensions table for each stroke length

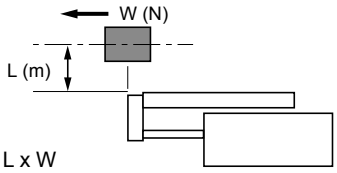
Stroke length		75	100	125	150
L1		213	238	263	288
L2		198	223	248	273
n		3	4	5	
V		163.8	188.8	213.8	238.8
W		66	91	116	141
X		85	80	70	85
Y		96.5	131.5	161.5	176.5
T0/5*	RD	44			
T2/3*	HD	79			
T2/3W*	RD	46			
	HD	77			

Note 1: When using the dowel hole, a pin with the dimension for press fit must not be used.
Recommended tolerance for the pin is JIS tolerance m6 or less.

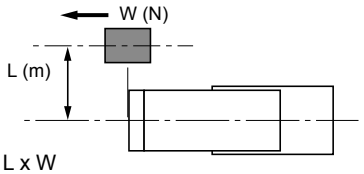
Note 2: Read the precautions on (1. Common ; piping) on intro 4 when using rear piping.

STEP-1

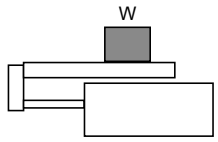
❶ Obtain the load and impact moment generated in each direction at the stroke end.



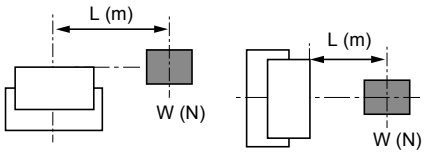
M1' = L x W



M3' = L x W



W' = W



M2' = L x W

Retrieve the rough estimate of G coefficient from [table 1]

[table 1] VA (Avg. speed) = $\frac{\text{Travel distance}}{\text{Travel time}}$ (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 Composition of momentum : (must be less than 1)

G : G coefficient

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

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

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

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

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

m_α : 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)
ø6	10 to 30	140	1.7	3.5	1.7
	40 to 50	186	10.7	5.6	10.7
ø8	10 to 30	140	1.7	3.5	1.7
	40 to 75	186	10.7	5.6	10.7
ø12	10 to 50	220.8	5.7	9.8	5.7
	75 to 100		22.2		22.2
ø16	10 to 50	380.8	17.8	19.2	17.8
	75 to 125		37.3		37.3
ø20	10 to 50	548.8	31.1	37.6	31.1
	75 to 150		56.2		56.2
ø25	10 to 50	961.5	65.1	116.3	65.1
	75 to 150		127.5		127.5

Note: When setting a load on the end plate, the allowable value must be calculated with the short stroke (ø6, ø8, ··· 30or less, ø12 or more ··· 50 or less) even when the long stroke is selected (ø6, ø8, ··· 40 or more, ø12 or more ··· 75 or more).

[Table 3] Allowable energy absorption of LCR (E_0)

Bore size	Standard (J)	With stopper for adjustable stroke (J)	With shock absorber type 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)									Additional P72, P73	Additional B/BL
	10	20	30	40	50	75	100	125	150		
ø6	0.035	0.035	0.04	0.05	0.055	-	-	-	-	0.005	0.030
ø8	0.055	0.055	0.06	0.075	0.08	0.095	-	-	-	0.015	0.030
ø12	0.13	0.13	0.13	0.14	0.155	0.195	0.225	-	-	0.025	0.060
ø16	0.185	0.185	0.185	0.2	0.215	0.285	0.325	0.365	-	0.035	0.070
ø20	0.29	0.29	0.29	0.315	0.335	0.415	0.47	0.525	0.585	0.045	0.140
ø25	0.505	0.505	0.505	0.54	0.58	0.745	0.835	0.925	1.015	0.075	0.310

STEP-2

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

● Find load factor.

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

α : Load factor

F_0 : Force required 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)

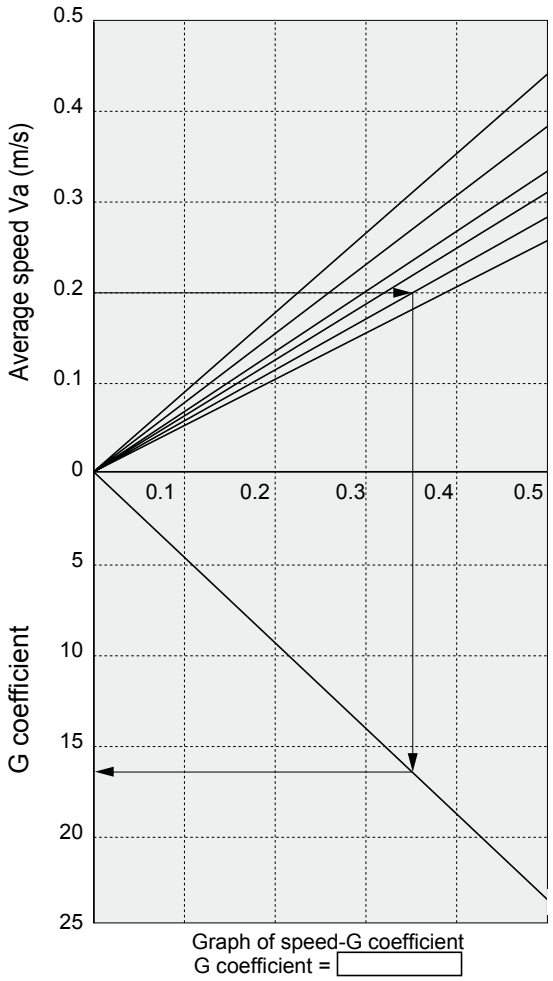
Bore size (mm)	Operating direction	Working pressure MPa						
		0.15	0.2	0.3	0.4	0.5	0.6	0.7
ø6	PUSH	8	11	17	23	28	34	40
	PULL	6	8	13	17	21	25	30
ø8	PUSH	15	20	30	40	50	60	70
	PULL	11	15	23	30	38	45	53
ø12	PUSH	34	45	68	90	113	136	158
	PULL	25	34	51	68	85	102	119
ø16	PUSH	60	80	121	161	201	241	281
	PULL	52	69	104	138	173	207	242
ø20	PUSH	94	126	188	251	314	377	440
	PULL	79	106	158	211	264	317	369
ø25	PUSH	147	196	295	393	491	589	687
	PULL	124	165	247	330	412	495	577

[Table 6] Estimated 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 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 obtain [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 (MT) with G coefficient and speed at stroke end (Vm) found at STEP-3.

M1'× G = ☐ (N·m)

M2' = ☐ (N·m)

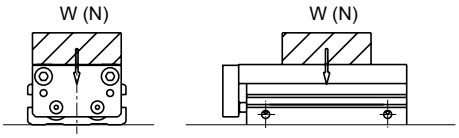
M3'× G = ☐ (N·m)

W' = ☐ (N)

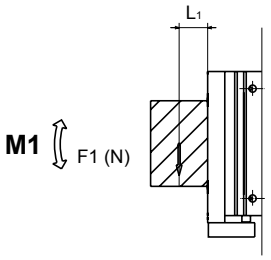
$$M'_T = \frac{M1'\times G}{M1'max} + \frac{M2'}{M2'max} + \frac{M3'\times G}{M3'max} + \frac{W'}{W'max} = \square$$

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

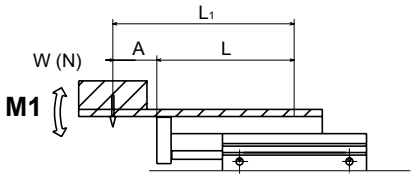
● Vertical load: W (N)



● Bending moment: M1 (N·m)

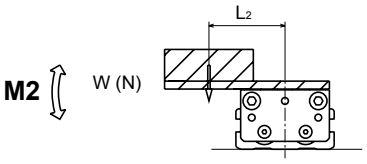


M1 = F1 x L_1

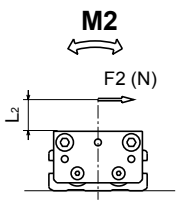


M1 = W x L_1
L_1=A+L
L is the value in the table below

● Radial moment: M2 (N·m)

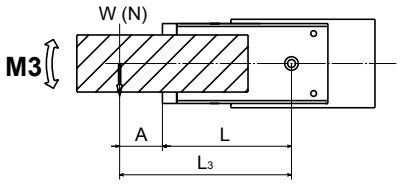


M2 = W x L_2

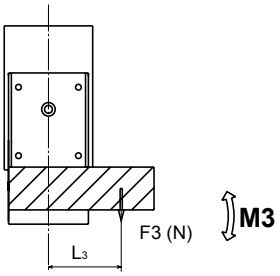


M2 = F2 x L_2

● 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									P72·P73	B/BL
	10	20	30	40	50	75	100	125	150	Additional	Additional
ø6	0.042	0.042	0.052	0.067	0.077	-	-	-	-	0.012	0.0165
ø8	0.041	0.041	0.051	0.065	0.075	0.100	-	-	-	0.020	0.0145
ø12	0.058	0.058	0.058	0.068	0.078	0.108	0.133	-	-	0.020	0.018
ø16	0.062	0.062	0.062	0.072	0.082	0.115	0.140	0.165	-	0.020	0.019
ø20	0.070	0.070	0.070	0.080	0.090	0.115	0.140	0.165	0.190	0.025	0.020
ø25	0.074	0.074	0.074	0.084	0.094	0.129	0.154	0.179	0.204	0.025	0.023

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 value of W (table 7)

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

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

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

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

[Table 7] allowable traveling load value

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	0.35	0.17
	40 to 50	15.5	0.89	0.47	0.89
ø8	10 to 30	14	0.17	0.35	0.17
	40 to 75	15.5	0.89	0.47	0.89
ø12	10 to 50	27.6	0.71	1.2	0.71
	75 to 100		2.2		2.2
ø16	10 to 50	47.6	1.9	2.4	1.9
	75 to 125		4.6		4.6
ø20	10 to 50	68.6	3.4	4.7	3.4
	75 to 150		7.0		7.0
ø25	10 to 50	128.2	7.6	15.5	7.6
	75 to 150		17.0		17.0

Note: When setting a load on the end plate, the allowable value must be calculated with the short stroke (ø6, ø8, ··· 30or less, ø12 or more ··· 50 or less) even when the long stroke is selected (ø6, ø8, ··· 40 or more, ø12 or more ··· 75 or more).

Confirm that M_T, $M'_T \leqq 1$.

↓

Determining bore size

↓

øA

STEP-5

Confirming allowable energy absorption

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

E : Kinetic energy at workpiece end (J)

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

m_α : Weight of table (from table 4)

Vm : Speed at stroke end (m/s)

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

Confirm that E ≦ E max.

↓

Determining bore size

↓

øB

STEP-6

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

øA

Bore size determined according to STEP-5 (allowable energy consumption)

øB

øA ≦ øB → øB should be selected

or → øA can be selected if a shock absorber type stopper is used together.

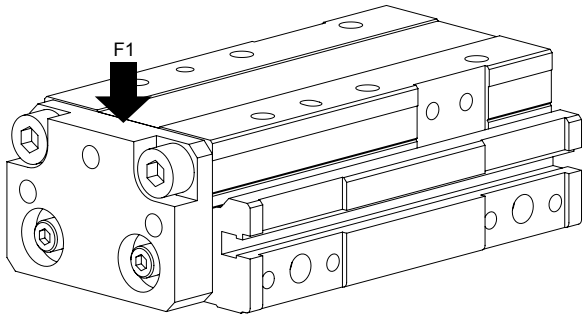
øA > øB → øA should be selected

Technical data ❶ Displacement at table end (reference value)

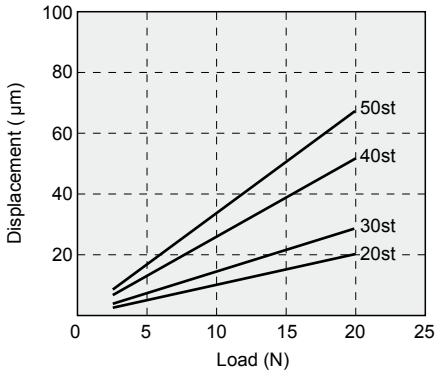
Displacement at point A

[Amount of table displacement caused by M1 moment]

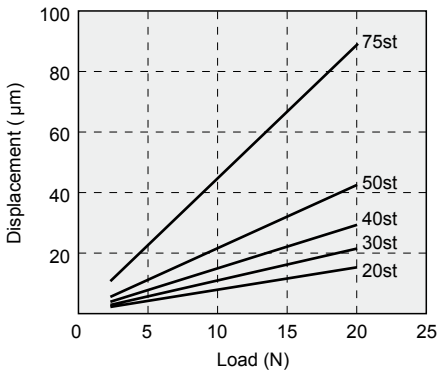
Displacement of table end when load (F1) is applied to table end.



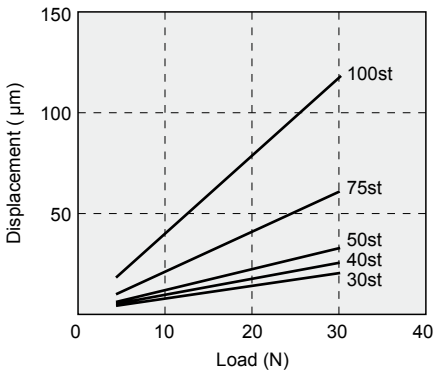
LCR-6 (M1)



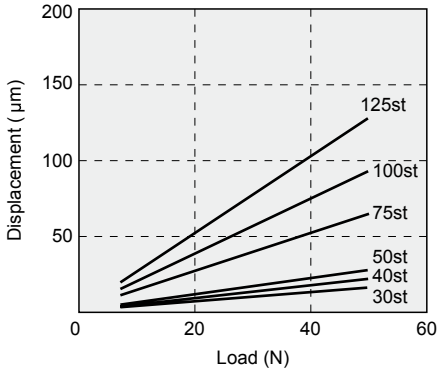
LCR-8 (M1)



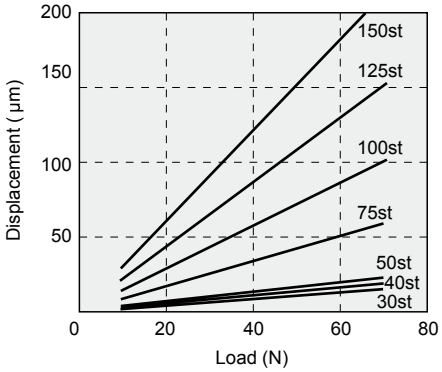
LCR-12 (M1)



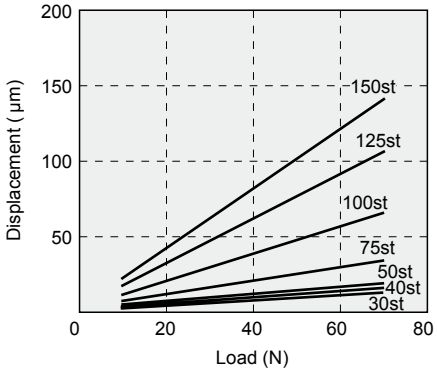
LCR-16 (M1)



LCR-20 (M1)



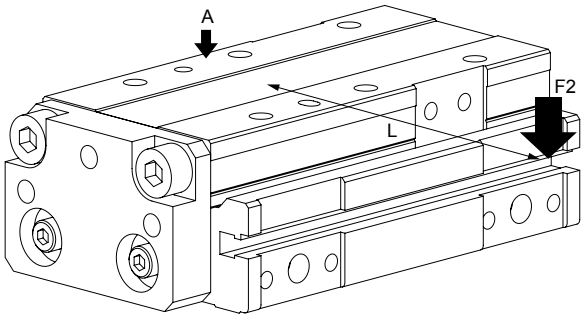
LCR-25 (M1)



Displacement at point A

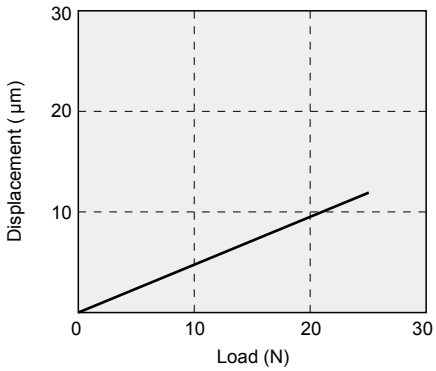
[Table displacement caused by M2 moment]

Displacement of table end (point A) when load (F2) is applied to a point Lmm away from the center of the cylinder.

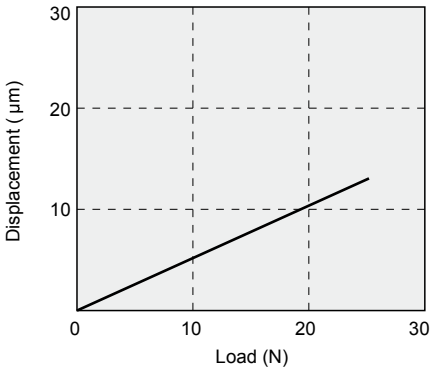


L value
ø 6: L = 70, ø 8: L = 70
ø 12: L = 90, ø 16: L = 100
ø 20: L = 100, ø 25: L = 200

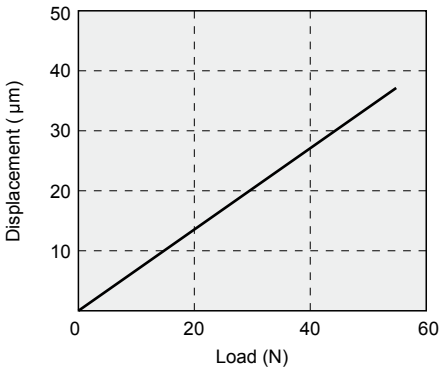
LCR-6 (M2)



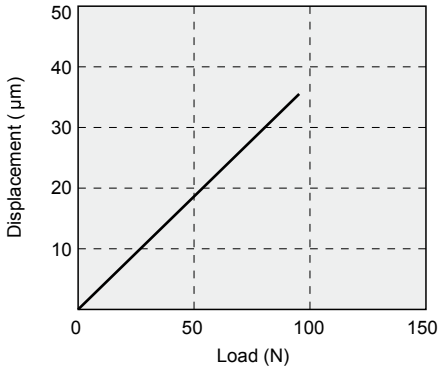
LCR-8 (M2)



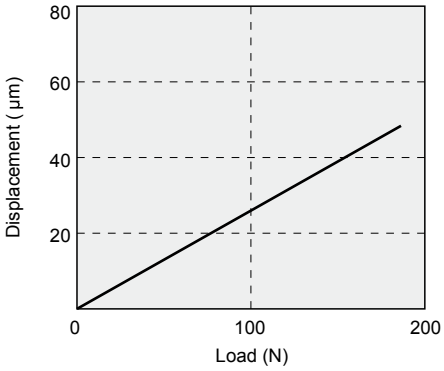
LCR-12 (M2)



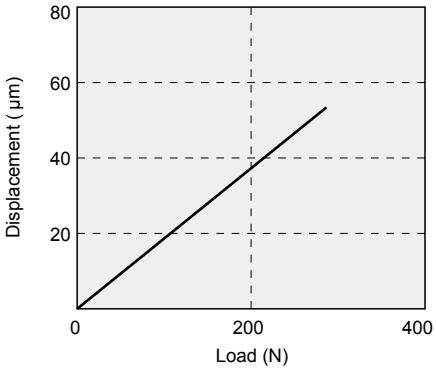
LCR-16 (M2)



LCR-20 (M2)



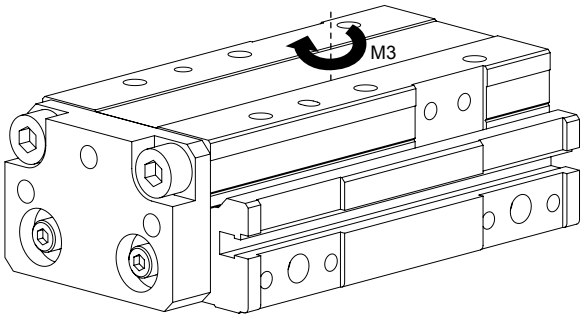
LCR-25 (M2)



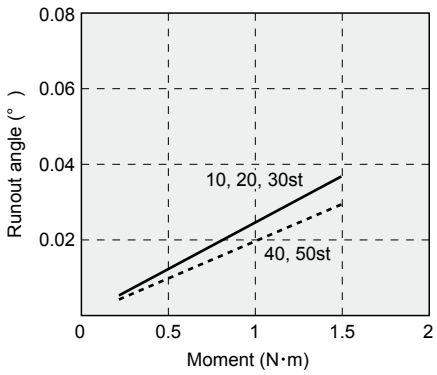
Displacement at point A

[Displacement angle caused by M3 moment]

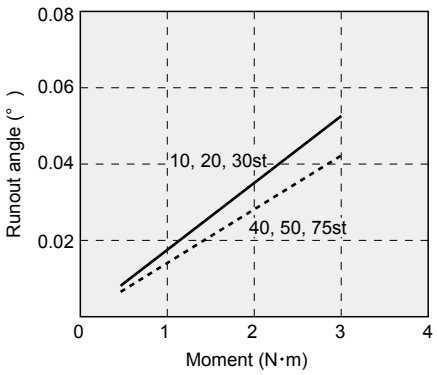
Displacement angle of the table when angular moment (M3) is applied to the cylinder.



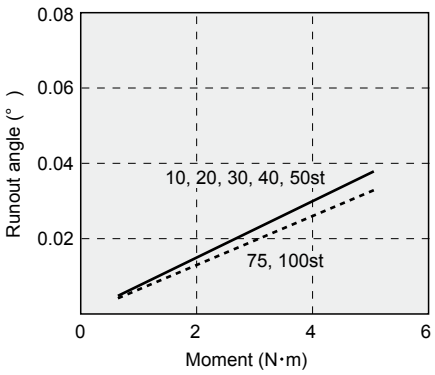
LCR-6 (M3)



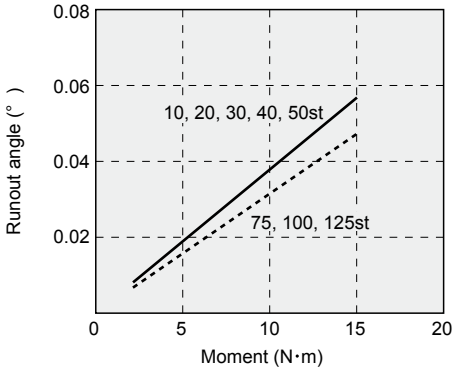
LCR-8 (M3)



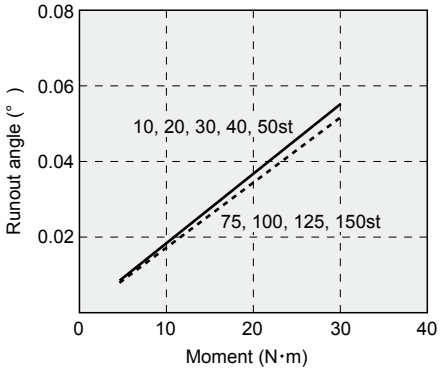
LCR-12 (M3)



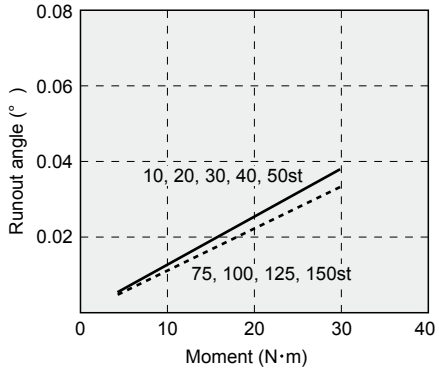
LCR-16 (M3)



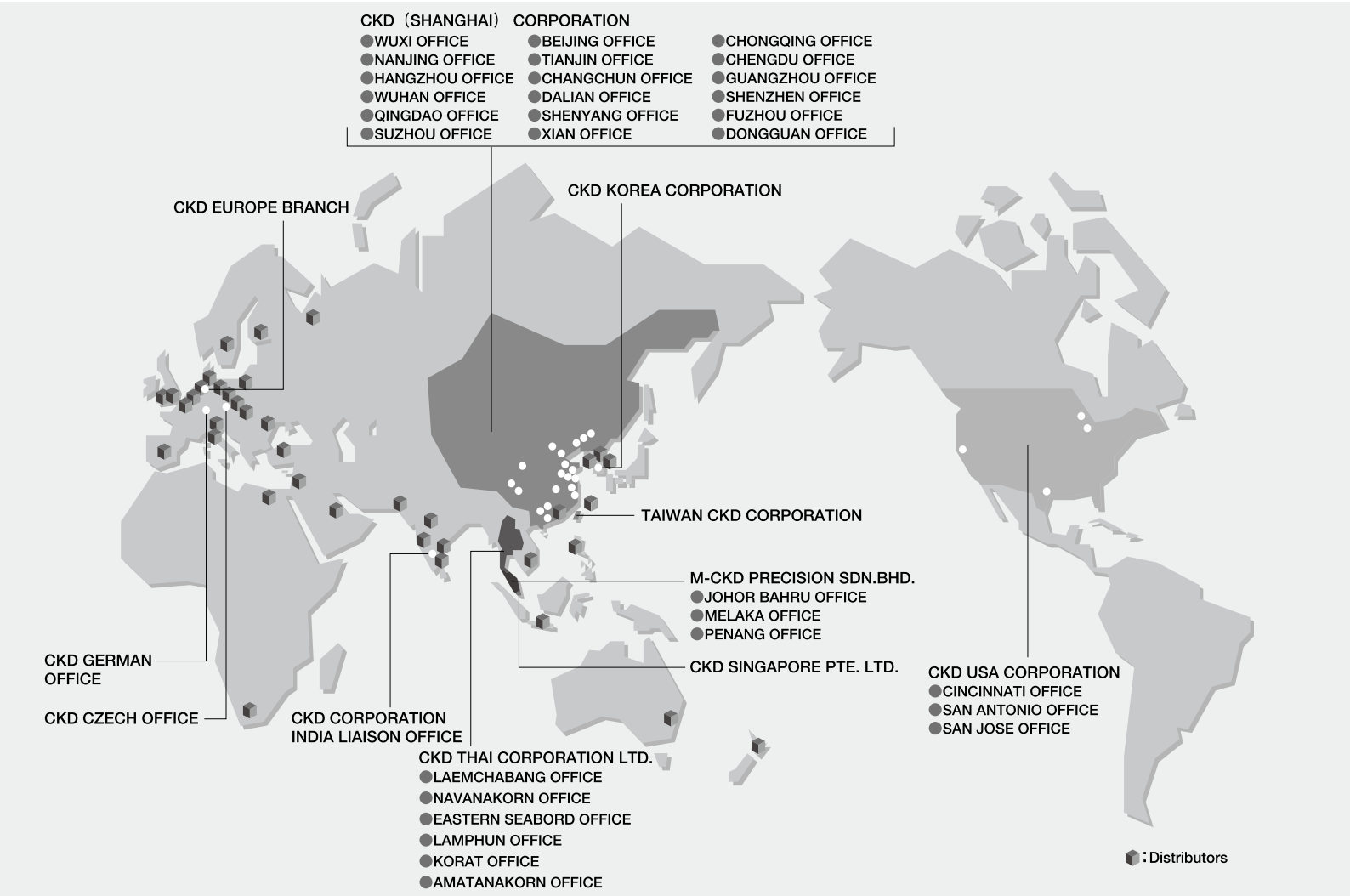
LCR-20 (M3)



LCR-25 (M3)



MEMO



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Contents revised
・Partial correction of dimensions

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