

Magnetically Coupled Rodless Cylinder Low Profile Guide Type

Series **CY1F**

ø10, ø15, ø25

How to Order

CY1F **10** **R** **300** **F9BW**

Magnetically coupled rodless cylinder, low profile guide type

Bore size (mm)

10	10
15	15
25	25

Thread type

Symbol	Type	Bore size (mm)
Nil	M	10, 15
	Rc	25
TN	NPT	
TF	G	

Number of auto switches

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

Auto switch

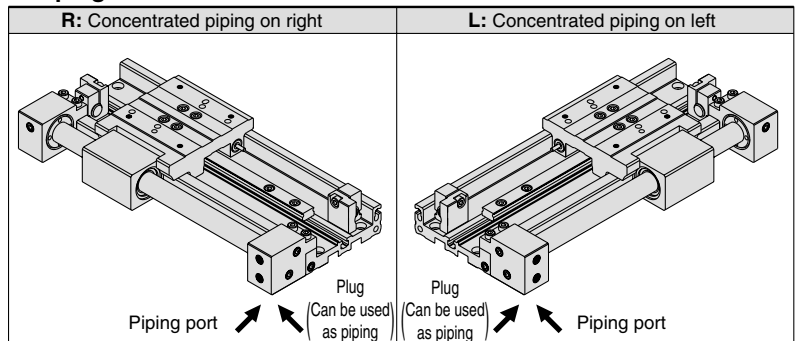
Nil	Without auto switch
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* For the applicable auto switch model, refer to the table below.

Adjustment bolt

Nil	Both sides are standard
AL	Right: Standard For 25 mm adjustment on left
AR	For 25 mm adjustment on right Left: Standard
A	For 25 mm adjustment on both sides

Piping direction



Applicable Auto Switch/Refer to page 8-30-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator/light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)*			Applicable load			
					DC	AC	Electrical entry direction		0.5 (Nil)	3 (L)	5 (Z)				
							Perpendicular	In-line							
Read switch	—	Grommet	No	2-wire	24 V	5 V	100 V or less	A90V	A90	●	●	—	IC circuit	Relay PLC	
						12 V	100 V	A93V	A93	●	●	—	—		
Read switch	—	Grommet	Yes	3-wire (NPN equiv.)	—	5 V	—	A96V	A96	●	●	—	IC circuit	—	
						12 V	—	M9NV	M9N	●	●	○	IC circuit	Relay PLC	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V	—	M9NV	M9N	●	●	○	IC circuit		Relay PLC
						12 V	—	M9PV	M9P	●	●	○	—		
						12 V	—	M9BV	M9B	●	●	○	—		
						5 V	—	F9NWV	F9NW	●	●	○	IC circuit		
						12 V	—	F9PWV	F9PW	●	●	○	—		
Solid state switch	Diagnostic indication (2-color indication)	Grommet	Yes	3-wire (PNP)	24 V	5 V	—	F9NWV	F9NW	●	●	○	IC circuit	Relay PLC	
						12 V	—	F9PWV	F9PW	●	●	○	—		
Solid state switch	—	Grommet	Yes	2-wire	24 V	12 V	—	F9BWV	F9BW	●	●	○	—	Relay PLC	
						12 V	—	F9BWV	F9BW	●	●	○	—		

* Lead wire length symbols 0.5 m Nil (Example) F9NW
3 m L F9NWL
5 m Z F9NWX

* Solid state switches marked with a "○" symbol are produced upon receipt of order.

Magnetically Coupled Rodless Cylinder Low Profile Guide Type Series CY1F



Specifications

Bore size (mm)	10	15	25
Fluid	Air		
Lubrication	Non-lube		
Action	Double acting		
Maximum operating pressure (MPa)	0.7		
Minimum operating pressure (MPa)	0.2		
Proof pressure (MPa)	1.05		
Ambient and fluid temperature (°C)	-10 to 60		
Piston speed (mm/s)	50 to 500		
Cushion	Built-in shock absorber		
Stroke length tolerance (mm)	0 to 250st: $^{+1.0}_0$	251 to 1000st: $^{+1.4}_0$	1001st to: $^{+1.8}_0$
Stroke adjustment movable range (mm) ^{Note 1)}	-1.2 to 0.8		-1.4 to 0.6
Piping type	Centralized piping		
Port size ^{Note 2)}	M5 x 0.8		1/8

Note 1) The stroke adjustment movable range in the above table is that for the standard adjustment bolt. For more information, please refer to page 8-16-21.

Note 2) With ø25, piping screws can be selected by the customer. (Refer to "How to Order".)

Shock Absorber Specifications

Applicable bore size (mm)	10, 15	25	
Shock absorber model	RB0805-X552	RB1006-X552	
Max. energy absorption (J)	0.98	3.92	
Stroke absorption (mm)	5	6	
Max. impact speed (m/s) ^{Note)}	0.05 to 5		
Max. operating frequency (cycle/min)	80	70	
Spring force (N)	When extended	1.96	4.22
	When retracted	3.83	6.18
Weight (g)	15	25	

Note) Represents the maximum absorption energy per cycle. Thus, the operation frequency can be increased with the absorption energy.

Standard Stroke



Made to Order Specifications
(Refer to page 8-16-18 regarding Made to Order Specifications for Series CY1F.)

Bore size (mm)	Standard stroke (mm)	Maximum manufacturable stroke (mm)
10	50, 100, 150, 200, 250, 300	500
15	50, 100, 150, 200, 250, 300, 350, 400, 450, 500	750
25	100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600	1200



* The stroke is available in 1 mm increments with the maximum stroke as the upper limit. For a stroke in the standard stroke range, suffix the part number with -XB10. If the stroke does not fall within the standard stroke range, suffix the part no. with -XB11. Refer to the Made to Order Specifications on page 8-16-18.

Magnetic Holding Force

Unit: N

Bore size (mm)	10	15	25
Magnetic holding force	53.9	137	363

MX

MTS

MY

CY

MG

CX

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Data

Series CY1F

Theoretical Output

Unit: N

Bore size (mm)	Piston area (mm ²)	Operating pressure [MPa]					
		0.2	0.3	0.4	0.5	0.6	0.7
10	78	15	23	31	39	46	54
15	176	35	52	70	88	105	123
25	490	98	147	196	245	294	343

Note) Theoretical output (N) = Pressure (MPa) x Piston area (mm²)

Option

Adjustment Bolt

Bore size (mm)	Standard adjustment bolt	25 mm adjustment bolt
10, 15	CYF-S10	CYF-L10
25	CYF-S25	CYF-L25

Weight

Unit: kg

Model	Basic weight	Additional weight per each 50 mm of stroke	Standard adjustment bolt weight	Weight of adjustment bolt for 25 mm adjustment
CY1F10	0.520	0.095	0.004	0.012
CY1F15	0.815	0.133	0.004	0.012
CY1F25	1.970	0.262	0.007	0.021

Calculation method

Example: CY1F15-150AL

Basic weight 0.815 kg

Additional weight 0.133 kg/50 st

Standard adjustment bolt weight 0.004 kg

Weight of adjustment bolt for 25 mm adjustment ... 0.012 kg

0.815 + 0.133 x 150 ÷ 50 + 0.004 + 0.012 = 1.23 (kg)

Cylinder stroke 150st

Left 25 mm adjustment bolt

Right Standard adjustment bolt

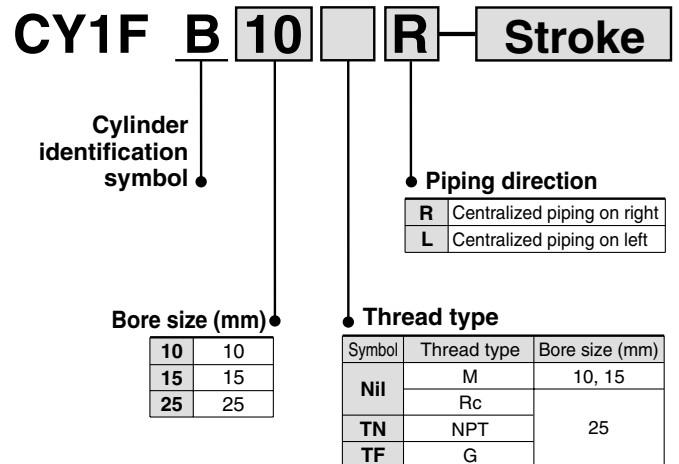
Replacement Parts

Part No. of Replacement Shock Absorber

Bore size (mm)	Shock absorber model no.
10, 15	RB0805-X552
25	RB1006-X552

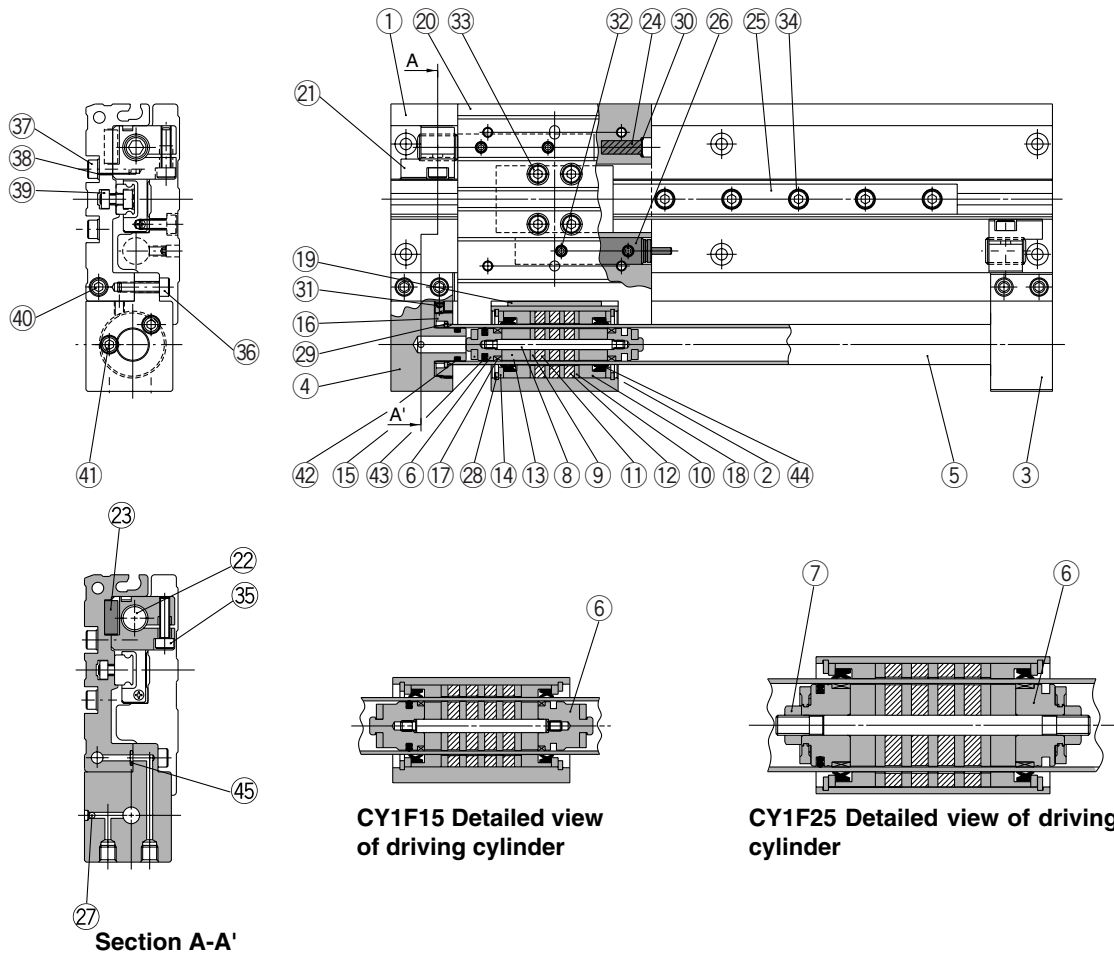
Note) Order 2 units for each unit of cylinder.

Replacement Actuator (Cylinder)



Magnetically Coupled Rodless Cylinder Low Profile Guide Type Series CY1F

Construction



Section A-A'

Component Parts

No.	Description	Material	Note
①	Body (rodless cylinder)	Aluminium alloy	Anodized
②	Body	Aluminium alloy	Hard anodized
③	End cover A	Aluminium alloy	Hard anodized
④	End cover B	Aluminium alloy	Hard anodized
⑤	Cylinder tube	Stainless steel	
⑥	Piston	Aluminium alloy Brass	Chromate (ø25) Electroless nickel plated (ø10, ø15)
⑦	Piston nut	Carbon steel	(Only for ø25)
⑧	Shaft	Stainless steel	
⑨	Piston side yoke	Rolled steel plate	Zinc chromated (ø15, ø25) Zinc chromated (ø10)
⑩	External slider side yoke	Rolled steel plate	Zinc chromated (ø15, ø25) Zinc chromated (ø10)
⑪	Magnet A	Rare earth magnet	(ø15, ø25) (ø10)
⑫	Magnet B	Rare earth magnet	(ø15, ø25) Chromate (ø10)
⑬	Piston spacer	Aluminium alloy	
⑭	Spacer	Rolled steel plate	Nickel plated
⑮	Bumper	Urethane rubber	
⑯	Attachment ring	Aluminium alloy	Hard anodized
⑰	Wear ring A	Special resin	
⑱	Wear ring B	Special resin	
⑲	Wear ring C	Special resin	
⑳	Slide table	Aluminium alloy	Hard anodized
㉑	Adjuster holder	Carbon steel	Electroless nickel plated

No.	Description	Material	Note
㉒	Adjustment bolt	Chrome molybdenum steel	Nickel plated
㉓	Adjuster holder positioning key	Carbon steel	Zinc chromated
㉔	Magnet	Rare earth magnet	
㉕	Guide	—	
㉖	Shock absorber	—	
㉗	Steel ball	Bearing steel	
㉘	C type snap ring for hole	Carbon tool steel	Nickel plated
㉙	C type snap ring for shaft	Hard steel wire Stainless steel	(ø15) (ø10, ø25)
㉚	Snap ring	Stainless steel	
㉛	Hexagon socket head set screw	Chrome molybdenum steel	Nickel plated
㉜	Hexagon socket head set screw	Chrome molybdenum steel	Nickel plated
㉝	Hexagon socket head bolt	Chrome molybdenum steel	Nickel plated
㉞	Hexagon socket head bolt	Chrome molybdenum steel	Nickel plated
㉟	Hexagon socket head bolt	Chrome molybdenum steel	Nickel plated
㊱	Hexagon socket head bolt	Chrome molybdenum steel	Nickel plated
㊲	Hexagon socket head bolt	Chrome molybdenum steel	Nickel plated
㊳	Hexagon socket head bolt	Chrome molybdenum steel	Nickel plated
㊴	Flat washer	Rolled steel	Nickel plated
㊵	Square nut	Carbon steel	Nickel plated
㊶	Hexagon socket head plug	Chrome molybdenum steel	Nickel plated
㊷	Hexagon socket head plug	Chrome molybdenum steel	Nickel plated (Hexagon socket head taper plug for ø25)
㊸	Cylinder tube gasket	NBR	
㊹	Piston seal	NBR	
㊺	Scraper	NBR	
㊻	Body (rodless cylinder) gasket	NBR	

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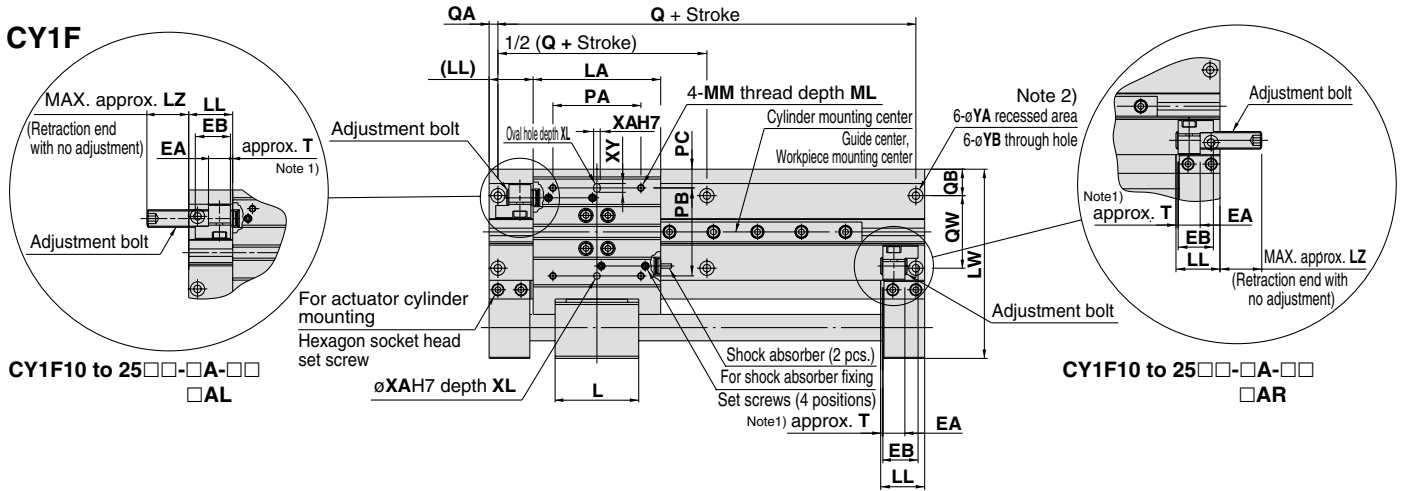
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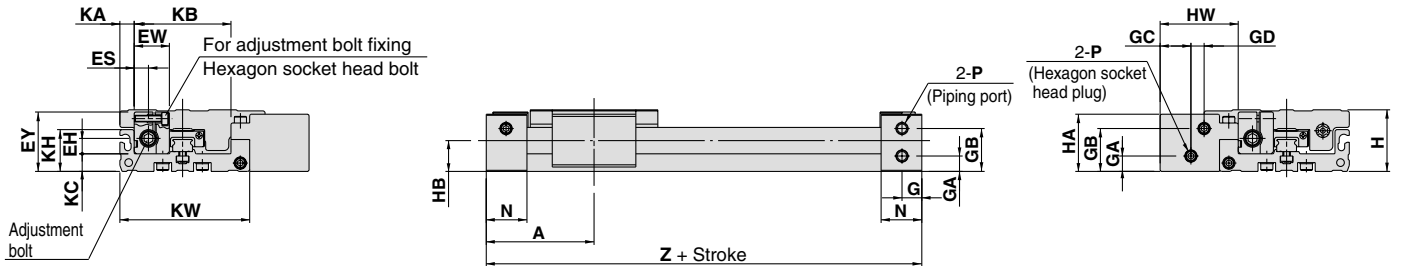
Data

Series CY1F

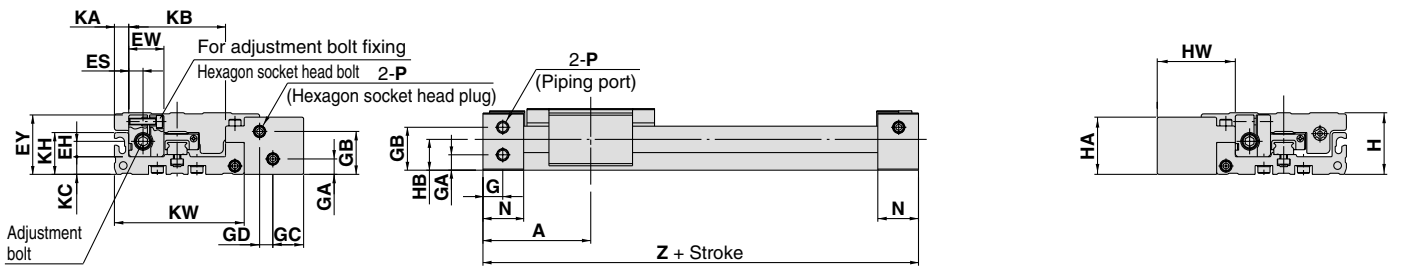
Dimensions



Concentrated piping on right (CY1F10 to 25□R-□□-□□)



Concentrated piping on left (CY1F10 to 25□L-□□-□□)



Model	Standard stroke	A	EA	EB	EH	ES	EW	EY	G	GA	GB	GC	GD	H	HA	HB	HW
CY1F10	50,100,150,200,250,300	49	10	16	7	6.5	16	27	9	7	19.5	14	6	28	26	14	35.5
CY1F15	50,100,150,200,250,300,350,400,450,500	52.5	10	16	7	6.5	16	29	9	8	23	17	9	34	32	17	41.5
CY1F25	50,100,150,200,250,300,350,400,450,500,550,600	70	13	17	10.5	8	22	40	10	12	33.5	22.5	12	46	44	23.5	55

Model	KA	KB	KC	KH	KW	L	LA	LL	LW	LZ	ML	MM	N	PA	PB	PC	Q	QA	QB	QW
CY1F10	6.5	44	8	19	59	38	58	20	86	19	5	M3 x 0.5	18.5	40	40	8.5	90	4	12	33
CY1F15	6.5	51	10	19	66	53	65	20	99	19	5	M3 x 0.5	18.5	50	50	7	97	4	12	40
CY1F25	7.5	66	13	27	84.5	70	89	25.5	128.5	17	9	M5 x 0.8	24	65	65	8	129	5.5	14.5	52

Model	T	XA	XL	XY	YA	YB	Z	Shock absorber
CY1F10	1	3 ^{+0.012} ₀	4	4	6.5 depth 3.4	3.4	98	RB0805- X552
CY1F15	1	3 ^{+0.012} ₀	4	4	6.5 depth 3.4	3.4	105	RB0805- X552
CY1F25	1	5 ^{+0.012} ₀	5	7.5	9.5 depth 5.4	5.5	140	RB1006- X552

Model	P (Piping port)		
	Nil	TN	TF
CY1F10	M5 x 0.8	—	—
CY1F15	M5 x 0.8	—	—
CY1F25	Rc1/8	NPT1/8	G1/8

Note 1) When adjusting the stroke, keep the T dimension within a 0 to 2 mm range. However, with the 25 mm adjustment bolt, an adjustment range of 0 to 26 mm is available.

Note 2) There are four øYA and øYB dimensions with a 50 mm stroke.

Proper Auto Switch Mounting Position (Detection at stroke end)

D-A9□, D-A9□V

(mm)

Bore size (mm)	Mounting pattern①		Mounting pattern②		Mounting pattern③		*Operating range
	A1	B1	A2	B2	A3	B3	
10	38	60	18	80	38	80	9
15	39	66	19	86	39	86	10
25	44.5	95.5	24.5	115.5	44.5	115.5	11

D-M9□, D-M9□V

(mm)

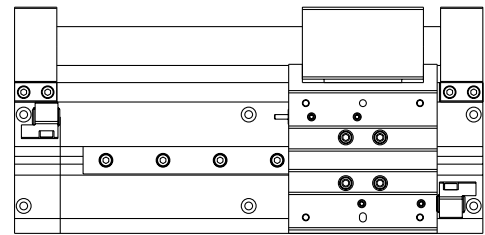
Bore size (mm)	Mounting pattern①		Mounting pattern②		Mounting pattern③		*Operating range
	A1	B1	A2	B2	A3	B3	
10	34	64	22	76	34	76	5.5
15	35	70	23	82	35	82	5
25	40.5	99.5	28.5	111.5	40.5	111.5	5

D-F9□W, D-F9□WV

(mm)

Bore size (mm)	Mounting pattern①		Mounting pattern②		Mounting pattern③		*Operating range
	A1	B1	A2	B2	A3	B3	
10	34	64	22	76	34	76	5.5
15	35	70	23	82	35	82	5
25	40.5	99.5	28.5	111.5	40.5	111.5	5

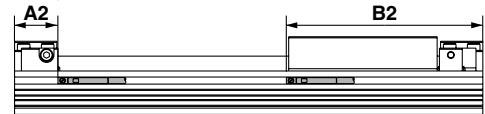
* These values are given as a guideline including the hysteresis and are not guaranteed. They may vary significantly depending on the ambient environment (with ±30% variation).



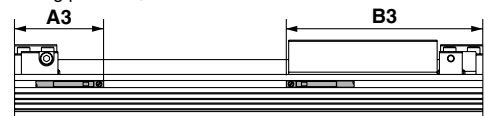
Mounting pattern ①



Mounting pattern ②



Mounting pattern ③



MX□

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MY□

CY□

MG□

CX□

D-

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Data

⚠ Caution

① When adjusting the stroke, confirm the minimum stroke for auto switch mounting.

See the table below for the minimum stroke for auto switch mounting.

Minimum Stroke for Auto Switch Mounting (1 pc.)

(mm)

Bore size (mm)	D-A9□, D-A9□V D-M9□, D-M9□V	D-F9□W D-F9□WV
10	5	10
15		
25		

Minimum Stroke for Auto Switch Mounting (2 pcs.)

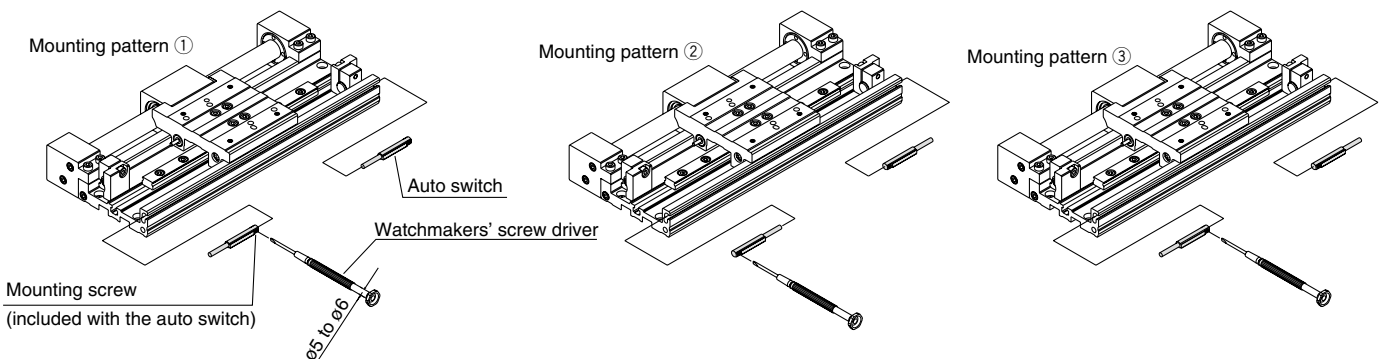
(mm)

Bore size (mm)	D-A90 D-A96	D-A93	D-A90V D-A96V D-A93V	D-M9□ D-F9□W	D-M9□V D-F9□WV
Mounting pattern ①, ②	32	35	22	32	20
Mounting pattern ③	20			12	

Mounting of Auto Switch

As shown below, there are 3 ways to mount the auto switch according to 3 types of electrical entries. Insert the auto switch into the switch groove. Then use a flat head watchmakers' screw driver to tighten the included fixing screws.

Note) When tightening the holding screw (included with the auto switch), use a watchmakers' screwdriver with a handle 5 to 6mm in diameter. The tightening torque should be 0.1 to



Series *CY1F*

Made to Order Specifications:

Please contact with SMC for further information on specifications, dimensions and delivery.

1 Intermediate Stroke

Symbol
-XB10

Intermediate strokes are available within the standard stroke range.
The stroke can be set in 1 mm increments.

Stroke Range

Bore size (mm)	Stroke range (mm)
10	51 to 299
15	51 to 499
25	101 to 599

CY1F Bore size Piping thread type Piping direction Stroke Adjustment bolt symbol Auto switch Symbol **-XB10**

(Example) CY1F10R-237AL-A93-**XB10**

2 Long Stroke

Symbol
-XB11

Available with long strokes exceeding the standard strokes.
The stroke can be set in 1 mm increments.

Stroke Range

Bore size (mm)	Stroke range (mm)
10	301 to 500
15	501 to 750
25	601 to 1200

CY1F Bore size Piping thread type Piping direction Stroke Adjustment bolt symbol Auto switch Symbol **-XB11**

(Example) CY1F25L-777A-A93-**XB11**



Series CY1F

Specific Product Precautions 1

Be sure to read before handing.

Mounting

⚠ Caution

1. Do not apply a large impact or excessive moment to the slide table (slider).

Because the slide table (slider) is supported by a precision bearing, do not apply a large impact or excessive moment when mounting a workpiece.

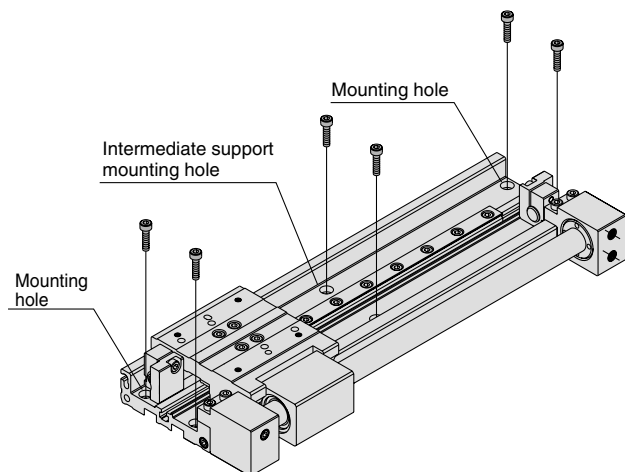
2. Align carefully when connecting to a load with an external guide mechanism.

Although a magnetic rodless cylinder (Series CY1F) can directly receive a load within the allowable range of the guide, it is necessary to align sufficiently when connecting to a load with an external guide mechanism.

The longer the stroke is, the greater the displacement of the shaft center becomes. Therefore, adopt a connection method (floating mechanism) that can ensure absorption of the displacement.

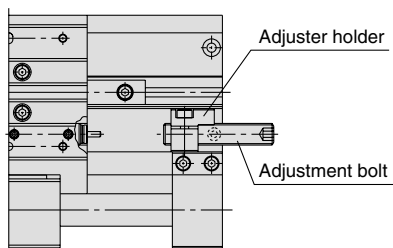
3. Be sure to use the 4 mounting holes on both ends of the guide body when mounting the product on equipment.

The mounting hole at the center of the guide body is used to mount an intermediate support. Be sure to use the 4 mounting holes at both ends to secure the product.



4. When a 25 mm adjustment bolt is selected, the mounting holes will be hidden behind it. Adjust the adjustment bolt after the cylinder is installed.

According to "2. Adjusting bolt adjustment" on page 8-16-21, move the adjustment bolt to a position where it does not interfere with any of the mounting holes and secure the cylinder with mounting screws. After securing the cylinder, readjust the stroke with the adjustment bolt.



25 mm adjustment bolt

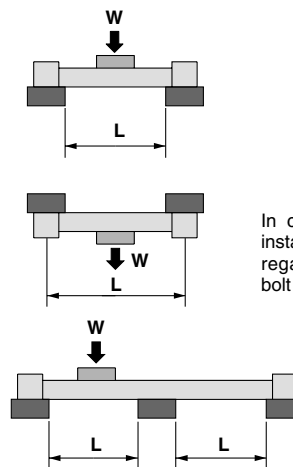
⚠ Caution

5. Long stroke operation causes deflection of the path table or cylinder tube. In such a case, provide an intermediate support.

Provide an intermediate support with the mounting holes on the center of the path table so that the distance between supports given as L in the figure will not exceed the value shown in the graph.

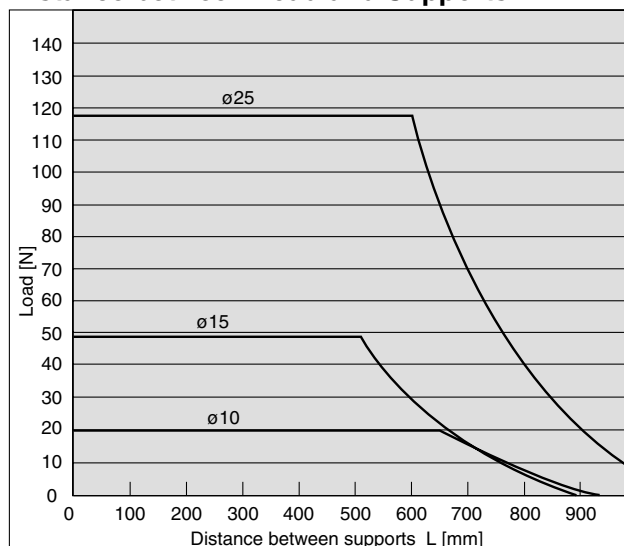
• If the counter surface lacks precision, malfunction may result so adjust the level at the same time.

• In an environment where vibration or impact occurs, provide an intermediate support even if the distance is within the allowable range in the graph.



In case the product is installed on the ceiling, regard the mounting bolt pitch as L.

Distance between Load and Supports



6. There are limitations on the load mass and operating pressure in case the product is used in the vertical direction.

When using the product in the vertical direction, confirm the allowable values in "Vertical Operation" in Model Selection (1). If the allowable value is exceeded, the magnet coupling may slip off, causing the workpiece to drop down.



Be sure to read before handing.

Handling

⚠ Caution

1. Do not inadvertently move the guide adjusting unit.

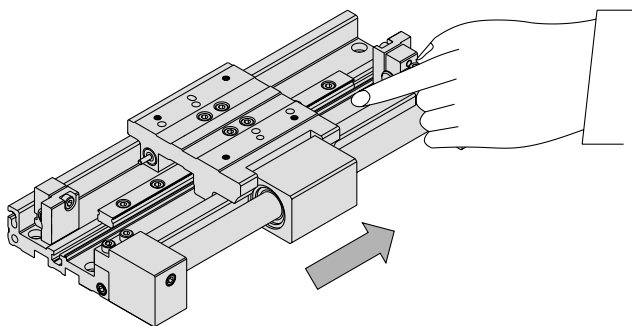
The guide is installed at the proper tightening torque. Do not loosen the mounting bolts of the guide.

2. Do not operate the magnetic rodless cylinder if the magnet couplings on the actuator are displaced.

If the magnet couplings are displaced by an external force beyond the holding force, supply an air pressure of 0.7 MPa to the cylinder port to return the external slider to the right position of the stroke end.

3. Take precautions to avoid getting your hands caught in the unit.

Be careful not to let your hand caught between the slide table and adjuster holder at the stroke end. Install a protective cover or take some other measures to keep any part of the human body from directly touching the place.



4. Never disassemble the magnetic component parts (external slider, internal slider) of the actuator (cylinder).

If will cause decline of the holding force, etc.

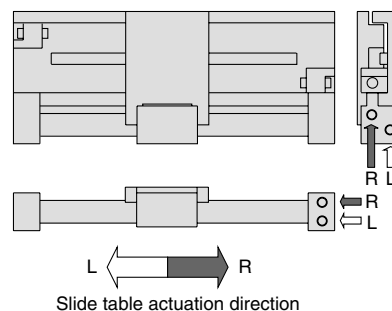
Piping

⚠ Caution

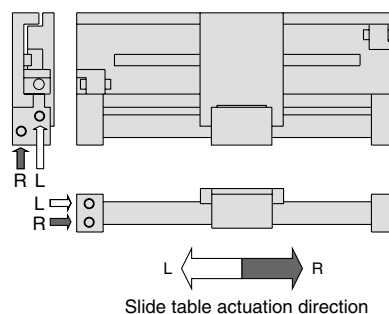
1. Be careful about the direction of the piping port and that of the slide table movement.

The direction of the piping port and that of the slide table movement differ between the right side centralized piping and left side centralized piping.

Centralized piping on right



Centralized piping on left



2. The plug position of the piping port can be changed to suit the operating conditions.

When screwing in the plug for the second time, wrap a sealant tape around the plug to prevent leakage.

(1) M5

First tighten lightly until the rotation stops. Then tighten an additional 1/6 to 1/4 turn.

(2) Rc 1/8

Tighten with a 7 to 9 N·m torque using tightening tools.

MX

MTS

MY

CY

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Data



Adjustment

⚠ Caution

1. Stroke adjustable range

The stroke of series CY1F can be controlled by adjusting the attached adjustment bolt.

For stroke adjustment amount, please refer to the table below.

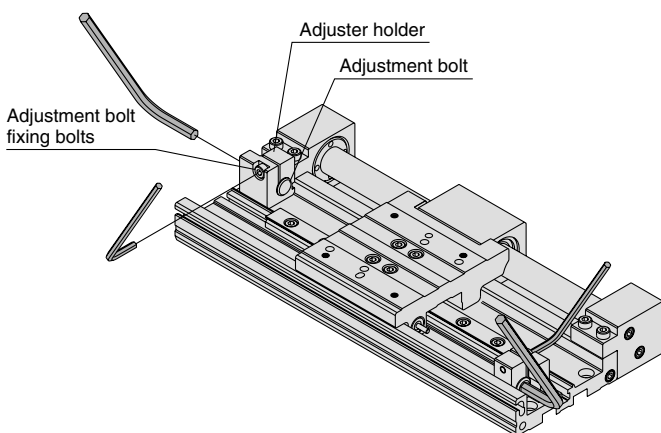
Bore size (mm)	(mm)	
	Standard adjustment bolt	25 mm adjustment bolt
10	-1.2 to 0.8	-25.2 to 0.8
15	-1.4 to 0.6	-25.4 to 0.6
25	-1.4 to 0.6	-25.4 to 0.6

The adjustment values above are those for one side.

2. Adjusting bolt adjustment

- 1) Loose the adjustment bolt fixing bolts.
- 2) Insert a hexagon wrench into a hexagon hole at the end of the adjustment bolt to adjust the adjustment bolt.
- 3) After adjustment, tighten the adjustment bolt fixing bolts.

Bore size (mm)	Adjustment bolt fixing bolts	Tightening torque	Adjustment width across flats
10	M3	1.0 to 1.3 N·m	4
15			
25	M5	4.6 to 6.2 N·m	5



⚠ Caution

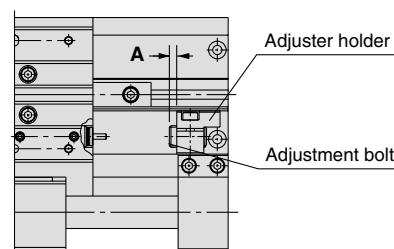
1. When adjusting the stroke, be careful about the operating pressure limits.

When making the stroke smaller than the reference stroke with the adjustment bolt, operate at a pressure below the operating pressure limit in (1) "Intermediate stop by external stopper or stroke adjustment with adjustment bolt" on page 8-16-8. If the operating pressure limit is exceeded, the magnet coupling on the actuator (cylinder) will slip off.

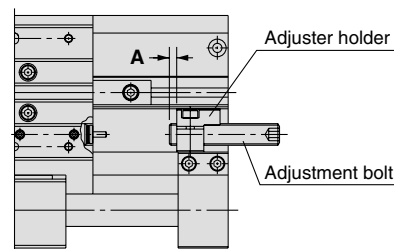
2. When adjusting the stroke, use the distance from the end of the adjustment bolt to the end of the adjuster holder as a guideline.

If dimension A is made smaller than 0, the slide table and adjuster holder will collide, resulting in damage to the slide table such as scratches or gouges.

Bore size (mm)	(mm)			
	At the minimum stroke of standard adjustment bolt	At the minimum stroke of 25 mm adjustment bolt	Basic stroke	At maximum stroke adjustment
10	A < 2	A < 26	A = 0.8	A ≥ 0
15	A < 2	A < 26	A = 0.6	
25	A < 2	A < 26	A = 0.6	



Standard adjustment bolt



25 mm adjustment bolt



Series CY1F

Specific Product Precautions 4

Be sure to read before handling.

Maintenance and Replacement

⚠ Caution

Replacement of Actuator

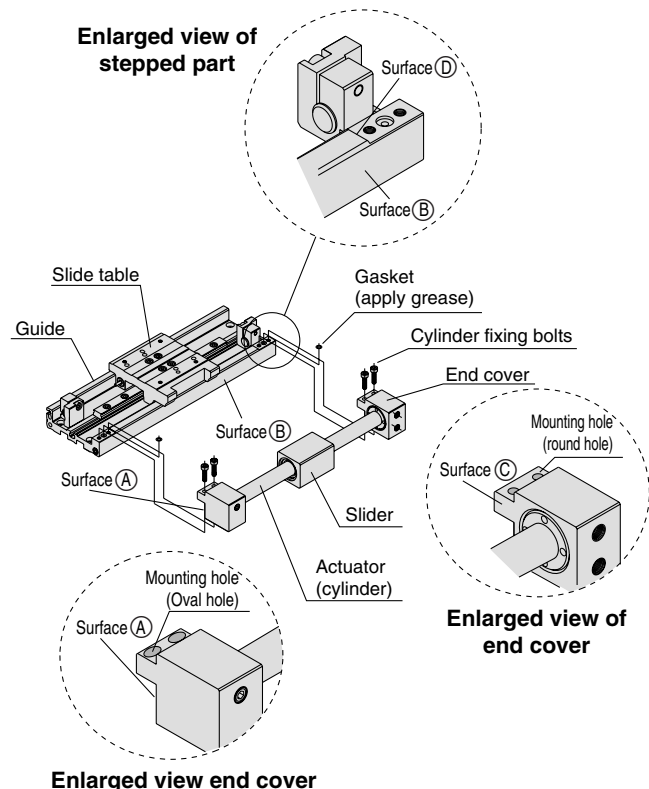
1. The actuator (cylinder) of series CY1F can be replaced.

Refer to "Replacement Actuator (Cylinder)" on page 8-16-14 about how to order.

2. Replacement of actuator (cylinder) of series CY1F.

- 1) Remove the 4 cylinder fixing bolts and pull out the actuator from the guide.
- 2) Apply grease to the gaskets attached to the replacement actuator (cylinder) and replace the installed gaskets with the new ones.
- 3) Fit the slider of the replacement actuator into the recessed part of the slide table. Align the surface C (on the side with round mounting holes) of the end cover of the replacement actuator and surface D of the stepped part on the guide.
- 4) In the condition described in (3), put surface A and surface B in close contact with each other. Tighten the 4 cylinder fixing bolts evenly.

Bore size (mm)	Cylinder fixing bolt	Tightening torque
10	M3	0.55 to 0.72N·m
15	M3	0.55 to 0.72N·m
25	M5	2.6 to 3.5N·m



3. Be sure to fasten the cylinder fixing bolts.

Fasten the cylinder fixing bolts firmly. If they become loose, damage or malfunction may result. After replacing the actuator, be sure to conduct a test run before actually using the product.

⚠ Caution

Replacement of Shock Absorber

1. The shock absorber of series CY1F can be replaced.

The shock absorber should be replaced as a spare part if a decline in the energy absorption capacity is observed.

Refer to the table below about how to order a replacement shock absorber.

Bore size (mm)	No.
10	RB0805-X552
15	
25	RB1006-X552

2. Replacement of shock absorber

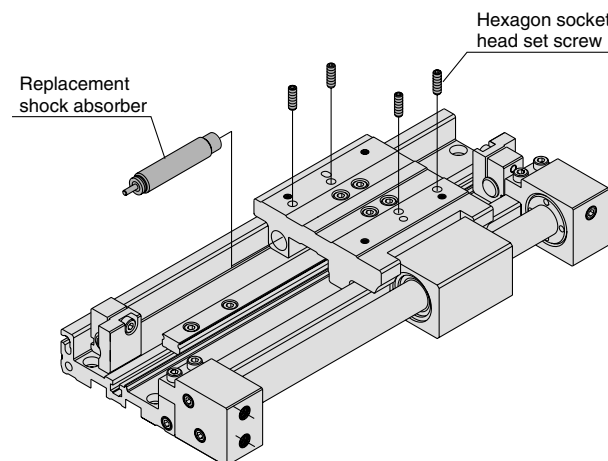
Follow the steps below to replace the shock absorber.

- 1) Remove the workpiece from the slide table.
- 2) Loosen the 4 hexagon socket head screws on the top of the slide table and pull out the shock absorber.
- 3) Insert the replacement shock absorber into the slide table until it reaches the rear end and tighten 4 hexagon socket head screws.

Bore size (mm)	Hexagon socket head set screw	Tightening torque
10	M3	0.37 to 0.45 N·m
15		
25	M5	0.54 to 0.64 N·m

3. Be careful about the tightening torque of the hexagon socket head screws.

Be careful excessive tightening may cause damage or malfunction of the shock absorber.



MX

MTS

MY

CY

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D-

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Data