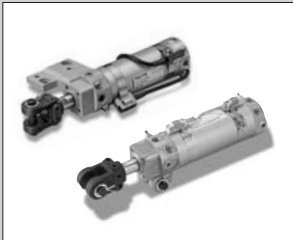




Composite Pneumatic Cylinders

CL1 Series.....AD2



RCA2 Series.....AD14



ST3 Series.....AD26



Standard Clamp Cylinder

- The newly developed cushion seal improves the cushioning property.
- The cushion needle and throttle valve needle are provided with a stopper and have improved operability.
- A metallic scraper is used to remove spatters.
- The use of the newly developed seals improves the operating characteristics.
- Magnetic proximity sensors and sensors resistant to strong magnetic field (only for AC magnetic field) are standardized.
- Flange type cylinders are standardized.



Cylinder Specifications

Type	Switch Set
Cylinder bore (mm)	φ 50 · φ 63
Standard stroke	50 · 75 · 100 · 125 · 150 mm
Working fluid	Air
Note 1) Lubrication	Unnecessary
Working pressure range	0.05 to 1 MPa
Proof test pressure	1.5 MPa
Working speed range	φ 50 : 50 to 300 mm/s, φ 63 : 50 to 200 mm/s
Note 2) Working temperature range	Cylinder body.....-10 to +70°C Switch Set AX type.....-10 to +70°C ZD type.....0 to +60°C
Structure of cushioning	Air cushions on both ends
Note 3) Cushion stroke	Rod side: 21 mm Cap side: 19 mm
Speed adjustment mechanism	Built-in throttle valve
Tolerance for thread	JIS 6g/6H
Mounting style	Clevis type or flange type
Dust preventive measure	Built-in metallic scraper

Table of Comparison of A3 and AX3

Series	CL1R	A3/AX3
Series variation	Double acting single rod	Double acting single rod
Cylinder bore (mm)	φ 50 · φ 63	φ 40 · φ 50 · φ 63
Mounting style	Clevis type Flange type	Clevis type
Sensor	Magnetic proximity type	Iron proximity type
Overall length	Short	Long
Installation	Interchangeable	
Others	●The newly developed cushion seal improves the cushioning property. ●The cushion needle and throttle valve needle are provided with a stopper and have improved operability. ●The use of the newly developed seals improves the operating characteristics. ●Sensors resistant to strong magnetic field are standardized.	

●If you require iron proximity type sensors for CL1 Series, refer to how to order.

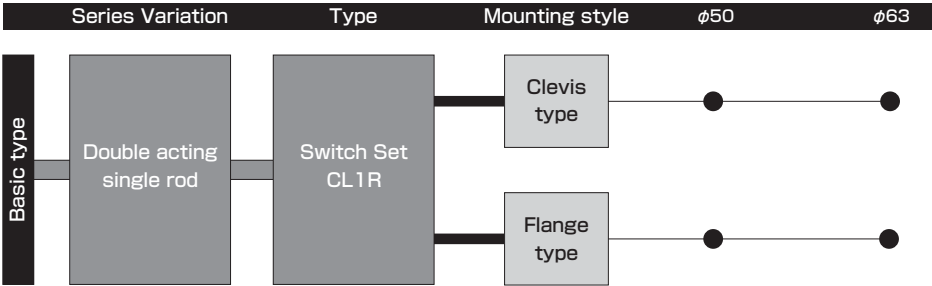
Note 1)
Once lubricating the cylinder, you must continue to lubricate it.

Note 2)
Use the cylinder in a state where it does not freeze.

Note 3)
Cushion ring length

Product Lineup

Unit: mm



Weight Table

Unit: kg

Bore (mm)	Basic weight										Rod end attachment weight		Limit sensor mounting bracket
	Clevis type					Flange type					Rod clevis (Y-end)	Rod eye (T-end)	
	50st	75st	100st	125st	150st	50st	75st	100st	125st	150st			
φ50	1.17	1.28	1.39	1.50	1.61	1.25	1.36	1.47	1.58	1.69	0.30	0.21	0.19
φ63	1.51	1.63	1.75	1.87	1.99	1.60	1.72	1.84	1.96	2.08			

Sensor Additional Weight

Unit: kg

Sensor	AX type			ZD type
	Cord length 1.5 m	Cord length 5 m	Connector type	Cord length 5 m
Bore				
φ50	0.05	0.13	0.04	0.27
φ63				

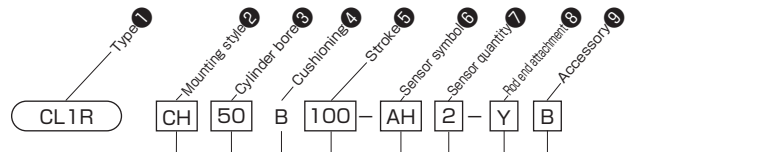
[Calculation formula] Cylinder weight (kg)=body weight+(sensor additional weight×sensor quantity)+rod end attachment weight+limit sensor mounting bracket weight

[Calculation example] CL 1R clevis mounting, bore φ50, cylinder stroke 100 mm, 2 pcs of AX101 (cord length 1.5 m), rod clevis (Y-end)
1.39+(0.05×2)+0.30=1.79kg

Notes) 1. The weight of the clevis mounting cylinder body includes the weight of the pin, washer and split pin.
2. The weight of the rod clevis includes the weight of the pin, washer and split pin.

● How to order

● Switch Set



- Clevis type
- CH Cylinder clevis width 16.5
 - CI Cylinder clevis width 19.5
- Flange type
- FJ Left flange (for mounting accessory width of 16 mm)
 - FK Right flange (for mounting accessory width of 16 mm)
 - FL Left flange (for mounting accessory width of 19 mm)
 - FM Right flange (for mounting accessory width of 19 mm)
- Note) Flange position viewed from the rod side
- Cylinder bore (mm)
φ50 · φ63
- Cushioning
With cushions on both ends
- Cylinder stroke (mm)
50 · 75 · 100 · 125 · 150
- Mounting accessory width
- FJ style
FK style
FL style
FM style
- Sensor symbol
Note) Select applicable sensors out of the Sensor List.
- Note on ordering Switch Set
● Sensors are not mounted on cylinders at delivery.
- Limit sensor mounting bracket
- Rod eye (clevis width: 19 mm)
- Rod clevis (clevis width: 16.5 or 19.5 mm)
- Sensor quantity (1, 2, to n)

Combination of Mounting Style and Rod End Attachment

Mounting style	Rod eye	Rod clevis
CH, FJ, FK (clevis width: 16.5)	19 mm	16.5 mm
C I, FL, FM (clevis width: 19.5)	19 mm	19.5 mm

★ Ordering procedures

- When no sensor is required, specify 0 for the sensor symbol and the sensor quantity.

CL1R CH50B100-00-Y

Sensor symbol Sensor quantity

★ Semi-standard range

- With iron proximity sensor (product corresponding to A3/AX3)

Part number

CL1 CH50B100-FA2-Y

Series Iron proximity type	Sensor symbol FA : L3-101 FB : L3-105 FC : L3-241 FD : L3-245
----------------------------------	---

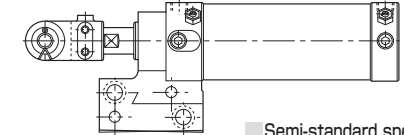
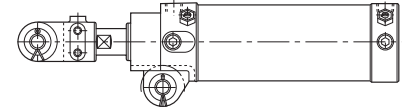
Mounting Style

Clevis type

- CH Cylinder clevis width 16.5
- CI Cylinder clevis width 19.5

Flange type

- FJ Left flange (for mounting accessory width of 16 mm)
- FK Right flange (for mounting accessory width of 16 mm)
- FL Left flange (for mounting accessory width of 19 mm)
- FM Right flange (for mounting accessory width of 19 mm)



Sensor List

Type	Sensor symbol	Load voltage range	Load current range	Max. switching capacity	Protective circuit	Indicating lamp	Wiring method	Cord length	Applicable load
Reed sensor	AF AX101CE	DC:5 to 30 V AC:5 to 120 V	DC:5 to 40 mA AC:5 to 20 mA	DC:1.5 W AC:2 VA	None	LED (Lights in red when sensing)	0.3 mm ² , 2-core, outer dia. φ4 mm, rear wiring	1.5 m	Small relay, programmable controller
	AG AX105CE							5 m	
	AH AX111CE							1.5 m	
	AJ AX115CE							5 m	
	AE AX125CE	DC:30 V or less AC:120 V or less	DC:40 mA or less AD:20 mA or less	2 VA 1.5 W	None	None	4-pin connector type, rear wiring	5 m	
	AK AX11ACE							0.5 m	
	AL AX11BCE							0.5 m	
	AM AX135CE							5 m	
Iron proximity reed sensor	FA L3-101	AC:80 to 220 V	2 to 20 mA	2 VA	Provided	Neon lamp (Lights when not sensing)	0.3 mm ² , 2-core, outer dia. φ5.3 mm, rear wiring	1 m	Small relay, programmable controller
	FB L3-105							5 m	
	FC L3-241							1 m	
	FD L3-245							5 m	
Solid state sensor	BE AX201CE-1	DC:5 to 30 V	5 to 40 mA	—	Provided	LED (Lights in red when sensing)	0.3 mm ² , 2-core, outer dia. φ4 mm, rear wiring	1.5 m	Small relay, programmable controller
	BF AX205CE-1							5 m	
	CE AX211CE-1							1.5 m	
	CF AX215CE-1							5 m	
	CT AX211CE-1							1.5 m	
	CU AX215CE-1							5 m	
	CV AX218CE-1					LED (2-LED type in red/green)	4-pin connector type, rear wiring	0.5 m	
	CW AZ211CE-1						0.3 mm ² , 2-core, outer dia. φ4 mm, upper wiring	1.5 m	
	CX AZ215CE-1						4-pin connector type, upper wiring	5 m	
	CY AZ218CE-1						4-pin connector type, upper wiring	0.5 m	
Strong magnetic field resistance	MK ZD136C-T	DC:10 to 28 V	5 to 50 mA	—	Provided	LED (2-LED type in red/green)	0.5 mm ² , 2-core, outer dia. φ6 mm, rear wiring	5 m	

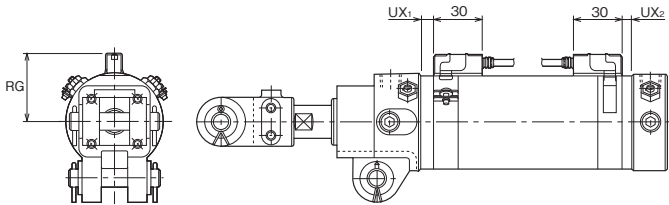
- Notes) ● For the sensors without a protective circuit, be sure to provide a protective circuit (SK-100) with the load when using any induction load (relay, etc.).
- The output logic of AX135CE is a B contact. When the piston is detected, the sensor contact turns off (the lamp turns on).
 - The ZD type sensors are applicable to AC magnetic fields. They cannot be used in DC magnetic fields. For details, contact us.
 - When using a programmable controller having an input voltage of 12 V for the ZD type sensor, confirm whether the ON voltage of the programmable controller is appropriate.
 - For handling of sensors, be sure to see the sensor specifications at the end of this catalog.
 - We recommend AND Unit (AU series) for multiple sensors connected in series. For details, refer to AND Unit at the end of this catalog.
- AX type sensor
- Cord type Connector type
- ZD type sensor



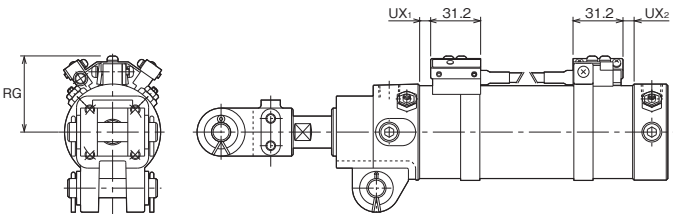
Switch Set

CL1R [CH] [Bore] B [Stroke] – [Sensor symbol] [Sensor quantity] – [Rod end attachment] [Accessory]

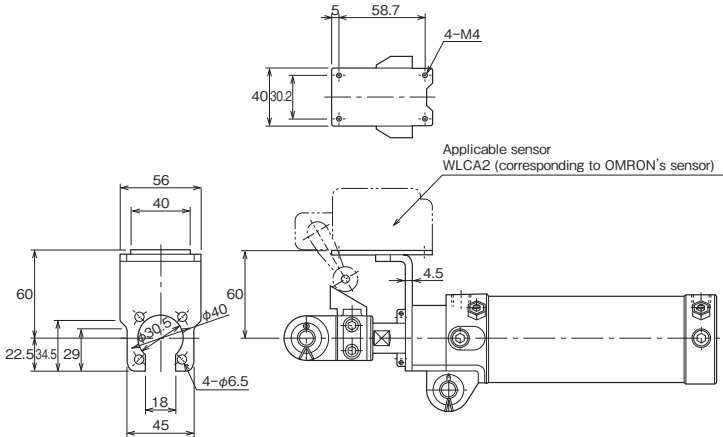
- AX type



- ZD type (solid state sensor)



- Limit sensor mounting bracket



Dimensional Table

Bore	RG		UX ₁			UX ₂		
	AX type	ZD type	Reed sensor	Solid state sensor		Reed sensor	Solid state sensor	
			AX1** type	AX2** type	ZD type	AX1** type	AX2** type	ZD type
φ50	43	50	10	10	11.5	6	6	7.5
φ63	50	57	9	9	11.5	7	7	7.5

Note) Dimension UX indicates the optimum sensor mounting position for detection of stroke end.

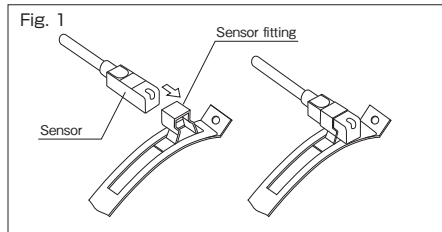
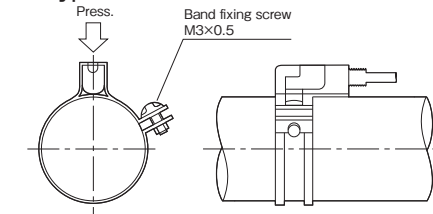
Operating Range and Hysteresis

Bore	Reed sensor		Solid state sensor		Strong magnetic field resistance	
	AX1** type		AX2** type		ZD type	
	Operating range	Hysteresis	Operating range	Hysteresis	Operating range	Hysteresis
φ50	7 to 12	2 or less	3 to 8 (2 to 7)	1 or less	3 to 6 (1 to 3)	1 or less
φ63	8 to 13					

Note) Parenthesized are the optimum adjustment ranges (the green lamp is on).

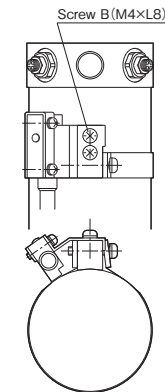
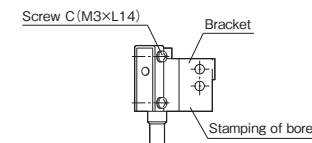
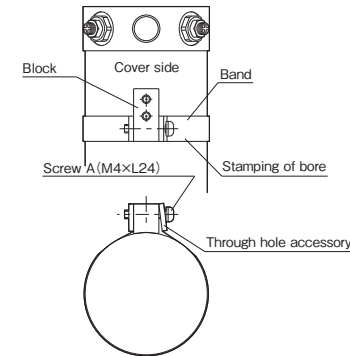
Setting method of sensor detecting position

AX type sensor



1. Twist the band body, and draw out one end of the sensor fitting from the slit in the band.
2. Insert the sensor to the sensor fitting along the groove, and attach the sensor fitting to the band body. (Fig. 1)
3. After removing the band fixing screw (M3), wind the band on the cylinder tube, and set the band around the detecting position.
4. Align the band mounting hole and the threaded portion, and lightly tighten the band fixing screw to temporarily secure the band.
5. Move the band and the sensor on the tube to determine the detecting position. When the sensor turns on, the lamp lights up. The detecting position delicately changes depending on the piston rotating speed and ambient temperature. Therefore, for reliable detection, shift the sensor 2 to 3 mm from the sensor ON position toward the piston start position. To mount a sensor to detect the stroke end, refer to dimension UX shown in the catalog. When a 2-LED sensor is used, ensure that the green lamp lights up at the desired position.
6. After determining the sensor position, gently hold the top of the sensor, and tighten the band fixing screw to secure the band.
[Recommended tightening torque: 0.3 N·m]
Note) Inappropriate tightening torque may cause the off-center of the sensor position.

ZD type sensor



1. Set the block between the band ends as shown in the left figure, and temporarily secure the band on the cylinder tube with the screw A (so that the band can be removed by hand).
Note: Fit the band with the through hole accessory at the end of the band on the right when the cover is set upward as shown left. Set the block in such a way that it protrudes from the upper side of the band (cover side).
2. Mount the sensor on the bracket with the screw C. (Tightening torque: 0.6 to 0.8 N·m)
3. Secure the bracket provided with the sensor on the block with the screw B.
4. Adjust the sensor position turning the band, and retighten the temporarily tightened screw A to secure the band. (Tightening torque: 1.2 to 1.4 N·m)
*Note: If there is friction between the sensor and the cylinder tube when the band is turned for adjustment of the sensor position, loosen the screw B (M4xL8).

Handling procedures

Notes on installation

1. Mounting of cylinder

- 1-1. In the case of cap clevis (CH/CI style)
- ① Install the cylinder body with the supplied clevis pin.
 - ② The cylinder output is high. Make sure that the mounting surface has high rigidity. If its rigidity is insufficient, the mounting material will be deformed by the cylinder thrust force, and bearings, seals and piston sliding parts will wear earlier and cause operation failure.
 - ③ The cylinder swings following the moving direction of the load. Mount the clamp arm, etc. to be linked through the rod end attachment in such a way that it moves in the same direction as the cylinder moving direction.
 - ④ When the stroke is long, the cylinder head may swing largely. Take care that the pipes and wires can follow the cylinder movement.

- 1-2. In the case of flange type (FJ/FK/FL/FM style)
- ① Install the cylinder body with M10 bolts and nuts. The cylinder flange has two 8 mm dia. reamed holes for positioning. Make a hole in the mounting surface, and drive a straight pin having a nominal diameter of 8 mm to position the cylinder.
 - ② Be sure to align the piston rod center with the moving direction of the article to be moved by the cylinder.

2. Piping

- ① Flush the piping with compressed air in advance. If rust particles, dust, etc. in the piping enter the cylinder, it may be disabled.
- ② When using sealing tape, wind the sealing tape with the upper one or two threads left exposed. If the sealing tape is wound to the screw end, the sealing tape may enter the cylinder.
- ③ The piping length must be as short as possible. Locate the directional control valve as close to the cylinder as possible.
- ④ If steel pipes are used, select pipes which hardly rust or corrode (galvanized steel pipes).
- ⑤ When screwing a joint or a pipe in the cylinder port, take care not to tighten it with excessive force. Doing so may crack the cylinder port, thereby causing air leak. (Tightening torque: 12 to 14 N·m)
- ⑥ When using rubber hoses or nylon tubes, take care that they are not bent at a radius smaller than the minimum bending radius.

Notes on operation

1. Check of air source

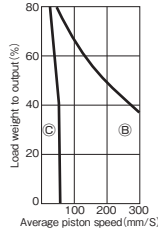
- ① When an after-cooler and an air dryer are connected to the air source, make sure that these devices are operating.
- ② If drain has collected in the middle of the piping, discharge the drain.
- ③ When operating the cylinder for the first time, start the cylinder at as low a pressure as possible, check for abnormalities of the devices, and increase the pressure gradually to the working pressure.

2. Adjustment of cylinder speed

- Procedures for adjusting the speed control valve in cylinder
- ① Loosen the needle lock nut of the throttle valve needle.
 - ② Turn clockwise the throttle valve needle with a screwdriver, and the cylinder speed will be reduced.
 - ③ When the cylinder is used for clamping, the fluctuation of load is large. In this case, adjust the cylinder advancing speed with the speed control valve on the rod cover side, and adjust the returning speed with the speed control valve on the cap cover side. Since the throttle valve is not provided with a check mechanism, the speeds in both directions will be changed by adjusting the speed in one direction.
 - ④ The cylinder speed changes according to the air pressure, flow rate and load weight. Therefore, when adjusting the speed, attach the actual work to the cylinder, and adjust the speed under the same conditions as the actual working conditions.
 - ⑤ Before starting the cylinder, tighten the needle lock nut of the throttle valve needle to secure the valve.

3. Adjustment of cushion

- ① The cushion in the cylinder can absorb impact in the range ⑥ or ⑦ shown in the chart. Use the cylinder within any of these ranges. If the impact exceeds the range, avoid absorbing energy with the cylinder cushion. Use a shock absorber to absorb the energy.
- ② The cushion adjustment is affected by air pressure, load weight and cylinder speed. Therefore, when adjusting the cushion, attach the actual work to the cylinder, and adjust the cushion under the same conditions as the actual working conditions.
- ③ To adjust the cushion, gradually loosen the cushion needle from the state where it is opened 45° to 90° from the fully closed position. Adjust the cushion from high cushioning force to low cushioning force. In a high cushioning force range, the kinetic energy cannot be smoothly replaced with the absorption energy, thereby causing a bounding phenomenon. In a low cushioning force range, the absorption energy is low for the kinetic energy, and the piston gets into direct contact with the cover, thereby causing impact sound and damaging the cover. When adjusting, carefully observe the cylinder behavior.



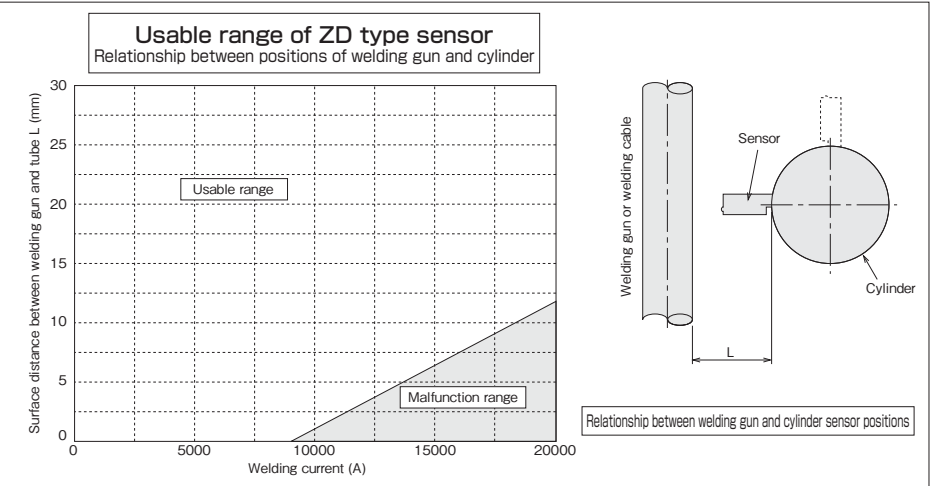
Outline of Operation of ZD Type Sensor

Sensor	Without disturbance AC magnetic field		With disturbance AC magnetic field	
	Without magnet	With magnet	Without magnet	With magnet
Sensor element	OFF	ON	OFF→ON	OFF→ON
Sensor output	OFF	ON	OFF	ON

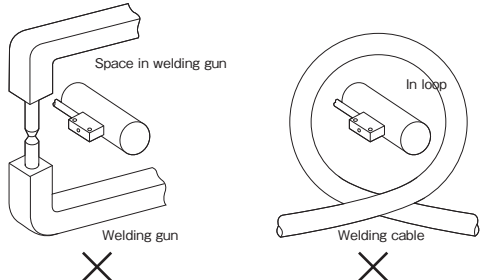
When disturbance AC magnetic field does not exist
When the sensor element detects the magnetic field of the magnet, the sensor output turns on. When the magnet goes away, the sensor output turns off. However, a delay time of up to 80 ms is caused until the sensor output changes after the sensor element operates.

When disturbance AC magnetic field exists
Although the sensor element turns on and off repeatedly under the influence of the disturbance AC magnetic field irrespective of the existence of the magnet, the ON delay circuit, OFF delay circuit and holding circuit keeps the sensor output in the state (ON or OFF) before the disturbance AC magnetic field is generated. Accordingly, the piston position cannot be detected while the cylinder is operating when the disturbance AC magnetic field exists. When the disturbance AC magnetic field has disappeared and the delay time of up to 80 ms has lapsed, the holding circuit is canceled, and the sensor output conforms to the current status of the sensor element.

The following chart shows the relationship between the welding current applied to the welding gun and the usable range of the sensor resistant to strong magnetic field (ZD type) at each distance between the cylinder sensor and the welding gun (welding cable).



- Notes) ● The sensor can be mounted at any position on the cylinder tube circumference.
● The sensor cannot be used when the cylinder is located in the space in the welding gun or in the welding cable loop.



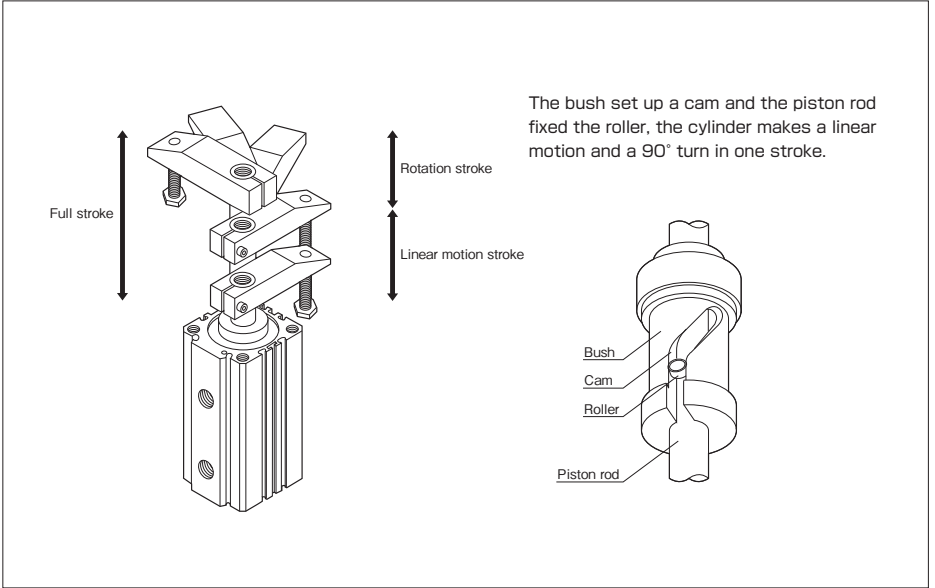
- The above chart is plotted based on experimental values obtained by us. Before using the cylinder, check that the sensor does not malfunction on your welding machine referring to this chart.

Product Lineup

Unit: mm

Series Variation	Type	Option	φ40	φ50	φ63
Double acting type	Standard type RCA2	Without arm	●	●	●
		With arm	●	●	●
	Switch Set RCA2	Without arm	●	●	●
		With arm	●	●	●

Explanation of operation



Weight Table

Unit: g

Bore	Piping position	Basic weight		Additional weight of rod end square	Arm weight	Flange weight	Sensor weight (1 pc.)	
		Stroke 10	Stroke 20				Cord length 1 m	Cord length 3 m
φ40	Side port	1130	1280	-20	210	290	15	60
φ50	Side port	1915	2165	-50	480	450		
φ63	Side port	2510	2800	-50	480	610		

Calculation formula

Cylinder weight (g)=basic weight+arm weight+(sensor weight×sensor quantity)+flange weight

Calculation example

Bore φ50, linear stroke 10 mm, with arm, 2 pcs of PD12L1 (cord length 1 m), FA
1915+480+(15×2)+450=2,875g

All Standard Heavy Duty with proximity sensors. Rotary Clamp.

- The cam provided on the bush enhances the durability and reduces backlash at the arm end. The roller structure ensures smooth operation.
- The use of the strong scraper enables to use the cylinder in a dusty environment.
- The mounting dimension is the same as that of our 10S-6 Series compact design pneumatic cylinders.



Standard Specifications

Series variation	Double acting type		
Type	Standard type/Switch Set		
Cylinder bore (mm)	φ 40	φ 50	φ 63
Theoretical clamping force (N) Note 1)	527	825	1401
Allowable moment (N · m) Note 2)	47	107	182
Rotation stroke	20 mm		
Linear motion stroke	10 mm·20 mm		
Accuracy of prevention of rotation in linear motion stroke zone	±0.7°	±0.5°	±0.5°
Rotating angle	90°		
Rotating angle tolerances	±5°	±7°	±7°
Rotating direction Note 3)	Right/left		
Working fluid	Air		
Lubrication	Unnecessary		
Working pressure range	0.1 to 1 MPa		
Proof test pressure	1.5 MPa		
Working temperature range	Standard type: -10 to +70°C		
	Switch Set: 0 to +70°C (No freezing)		
Structure of cushioning	With shock-absorbing pads on both ends		
Tolerance for thread	JIS 6H/6 g		
Mounting style	SD·FA·FB		

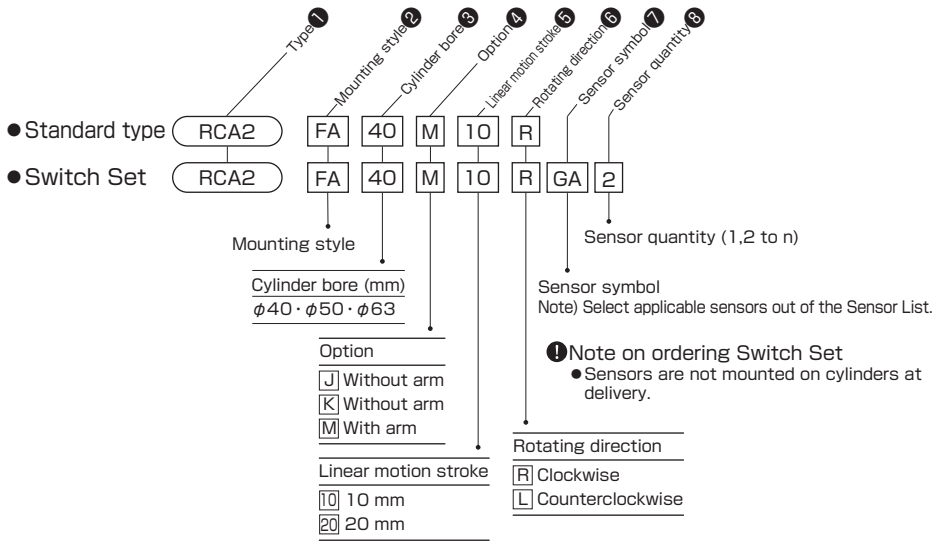
- Note 1) Values at allowable pressure of 0.5 MPa
- Note 2) Max. bending moment applicable to piston rod
- Note 3) Rotating direction when piston rod retracts as viewed from rod side

Table of Theoretical Clamping Force

Unit: N

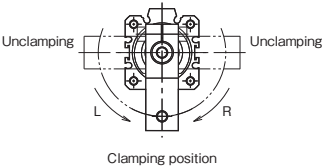
Bore	Working direction	Working pressure (MPa)									
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
φ 40	Extension side	126	251	377	503	628	754	880	1005	1131	1257
	Retraction side	106	211	317	422	528	633	739	844	950	1056
φ 50	Extension side	196	393	589	785	982	1178	1374	1571	1767	1963
	Retraction side	165	330	495	660	825	990	1155	1319	1484	1649
φ 63	Extension side	312	623	935	1247	1559	1870	2182	2494	2806	3117
	Retraction side	280	561	841	1121	1402	1682	1962	2242	2523	2803

● How to order



✦ Rotating direction

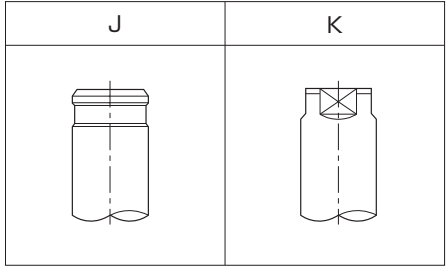
When determining the piston rod rotating direction, view the rotary clamp from the rod side, and select the direction according to the rotating direction in which the piston rod retracts. For clockwise rotation, specify R for the model number. For counterclockwise rotation, specify L.



Mounting Accessory Part Number

Bore (mm)	FA/FB style
φ40	MAS5-FA040
φ50	MAS5-FA050
φ63	MAS5-FA063
Remarks	With 4 mounting screws

✦ Option



Option Part Number (arm)

Bore (mm)	Arm type
φ40	RCA-M040
φ50	RCA-M050
φ63	RCA-M063

Sensor List

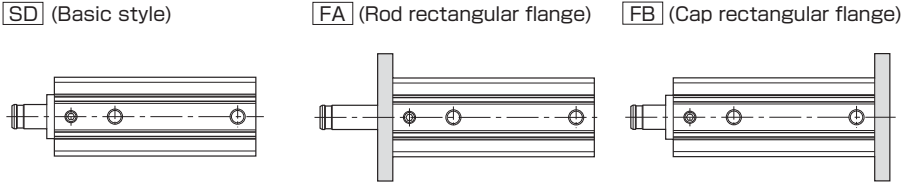
Type	Sensor symbol	Load voltage range	Load current range	Protective circuit	Indicating lamp	Wiring method	Cord length	Classification
Reed sensor	GA PD12L1	24 V DC 110 V AC	DC: 2.5 to 40 mA AC: 2.5 to 20 mA	None	None	0.2 mm ² , 2-core, outer dia. φ2.6 mm, rear wiring	1 m	Standard
	GB PD12L3		0.2 mm ² , 2-core, outer dia. φ2.6 mm, rear wiring			3 m		
	GC PD11L1		DC: 5 to 40 mA AC: 5 to 20 mA		LED (Lights when sensing)	0.2 mm ² , 2-core, outer dia. φ2.6 mm, rear wiring	1 m	
	GD PD11L3		DC: 2.5 to 40 mA AC: 2.5 to 20 mA			0.2 mm ² , 2-core, outer dia. φ2.6 mm, upper wiring	3 m	
	GE PD32L1		DC: 5 to 40 mA AC: 2.5 to 20 mA		None	0.2 mm ² , 2-core, outer dia. φ2.6 mm, upper wiring	1 m	
	GF PD32L3		0.2 mm ² , 2-core, outer dia. φ2.6 mm, upper wiring			3 m		
	GG PD31L1		DC: 5 to 40 mA AC: 5 to 20 mA		LED (Lights when sensing)	0.2 mm ² , 2-core, outer dia. φ2.6 mm, upper wiring	1 m	
	GH PD31L3		0.2 mm ² , 2-core, outer dia. φ2.6 mm, upper wiring			3 m		
Solid state sensor	GJ PD14L1	10 to 28 V DC	5 to 20 mA	Provided	LED (Lights when sensing)	0.2 mm ² , 2-core, outer dia. φ2.6 mm, rear wiring	1 m	Standard
	GK PD14L3	28 V DC or less	0.1 to 40 mA			0.15 mm ² , 3-core, outer dia. φ2.6 mm, rear wiring	3 m	
	GL PD13L1				10 to 28 V DC	5 to 20 mA	LED (Lights when sensing)	
	GM PD13L3	0.15 mm ² , 3-core, outer dia. φ2.6 mm, upper wiring	3 m					
	GN PE34L1	28 V DC or less	0.1 to 40 mA		LED (Lights when sensing)	0.2 mm ² , 2-core, outer dia. φ2.6 mm, upper wiring	1 m	
	GP PE34L3					0.15 mm ² , 3-core, outer dia. φ2.6 mm, upper wiring	3 m	
	GR PE33L1				LED (Lights when sensing)	0.2 mm ² , 2-core, outer dia. φ2.6 mm, upper wiring	1 m	
	GS PE33L3					0.15 mm ² , 3-core, outer dia. φ2.6 mm, upper wiring	3 m	

Notes) ● For handling of sensors, be sure to see the sensor specifications at the end of this catalog.
● For ZE type sensors, see the sensor specifications at the end of this catalog.
● We recommend AND Unit (AU series) for multiple sensors connected in series.
For details, refer to AND Unit at the end of this catalog.

● Standard type
PD/PE type sensor



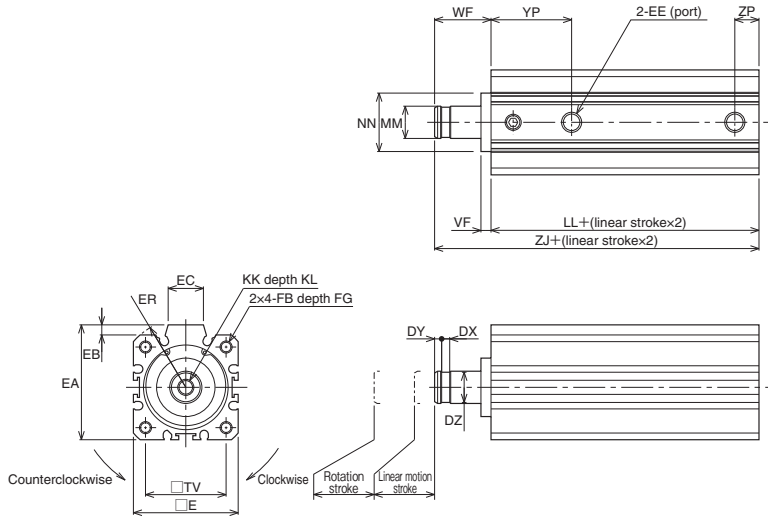
Mounting Style



SD

RCA2 SD Bore Option Linear motion stroke Rotating direction

RCA2/TRCA2 Bore CAD/DATA is available.

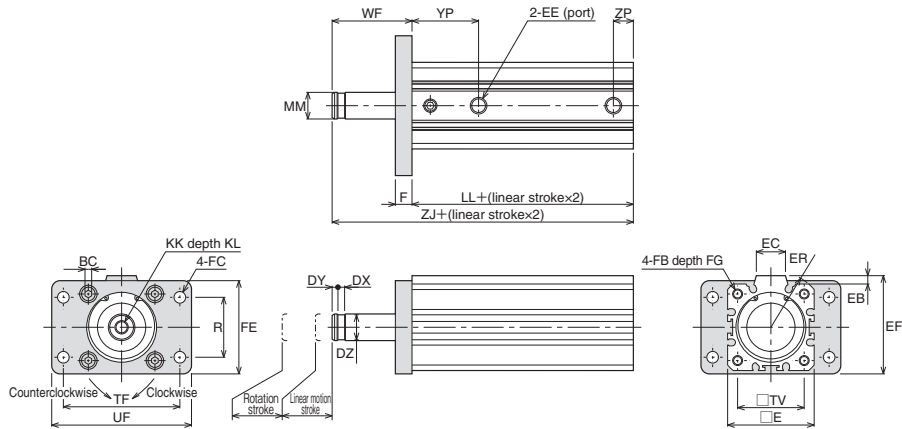


Note) For the rod end option [K], see the "Rod end square" page.

FA

RCA2 FA Bore Option Linear motion stroke Rotating direction

RCA2/TRCA2 Bore



Note) For the rod end option [K], see the "Rod end square" page.

Dimensional Table/SD

Symbol	DX	DY	DZ	E	EA	EB	EC	EE	ER	FB	FG	KK	KL
Bore													
φ 40	4	3.5	φ 15	52	57	5	17.5	Rc1/8	R34.5	M6×1	12	M8×1.25	13
φ 50	4	12	φ 19	64	71	7	19	Rc1/4	R42.5	M8×1.25	16	M10×1.5	17
φ 63	4	12	φ 19	77	84	7	19	Rc1/4	R51	M10×1.5	20	M10×1.5	17

Symbol	LL	MM	NN	TV	VF	WF	YP	ZJ	ZP
Bore									
φ 40	113	φ 16	φ 29f9	40	5	28	40	141	12
φ 50	124	φ 20	φ 36f9	50	5	38	45	162	12
φ 63	127	φ 20	φ 40f9	60	5	38	45	165	13.5

Dimensional Table/FA

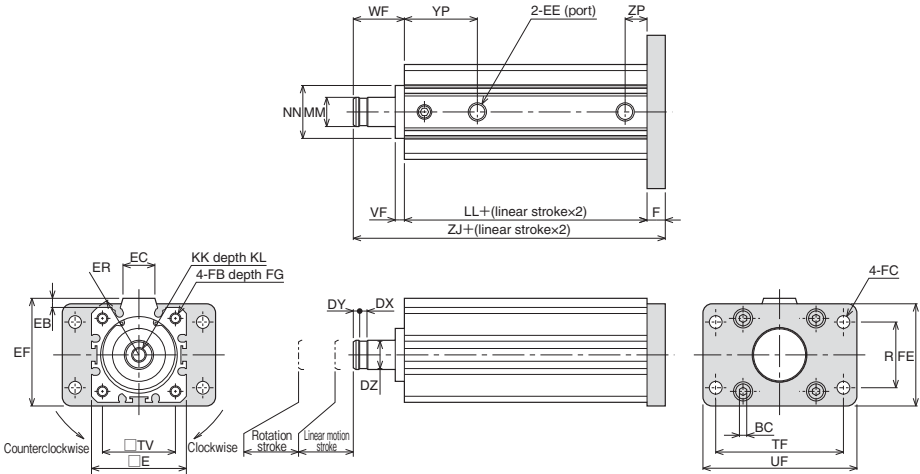
Symbol	BC	DX	DY	DZ	E	EB	EC	EE	EF	ER	F	FB	FC	FE	FG
Bore															
φ 40	4	4	3.5	φ 15	52	5	17.5	Rc1/8	59	R34.5	10	M6×1	φ 7	56	12
φ 50	5	4	12	φ 19	64	7	19	Rc1/4	74	R42.5	10	M8×1.25	φ 9	70	16
φ 63	6	4	12	φ 19	77	7	19	Rc1/4	87.5	R51	10	M10×1.5	φ 9	84	20

Symbol	KK	KL	LL	MM	R	TF	TV	UF	WF	YP	ZJ	ZP
Bore												
φ 40	M8×1.25	13	113	φ 16	36	70	40	84	48	40	161	12
φ 50	M10×1.5	17	124	φ 20	47	86	50	104	58	45	182	12
φ 63	M10×1.5	17	127	φ 20	56	98	60	116	58	45	185	13.5

FB

RCA2 FB Bore Option Linear motion stroke Rotating direction

RCA2/TRCA2 Bore is available. 



Note) For the rod end option , see the "Rod end square" page.

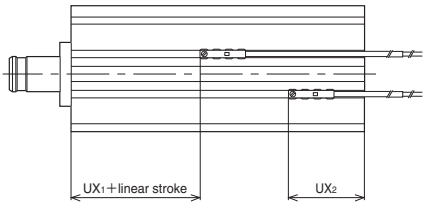
Dimensional Table/FB

Symbol	BC	DX	DY	DZ	E	EB	EC	EE	EF	ER	F	FB	FC	FE	FG	KK	KL
Bore																	
φ40	4	4	3.5	φ15	52	5	17.5	Rc1/8	59	R34.5	10	M6×1	φ7	56	12	M8×1.25	13
φ50	5	4	12	φ19	64	7	19	Rc1/4	74	R42.5	10	M8×1.25	φ9	70	16	M10×1.5	17
φ63	6	4	12	φ19	77	7	19	Rc1/4	87.5	R51	10	M10×1.5	φ9	84	20	M10×1.5	17

Symbol	LL	MM	NN	R	TF	TV	UF	VF	WF	YP	ZJ	ZP
Bore												
φ40	113	φ16	φ29f9	36	70	40	84	5	28	40	151	12
φ50	124	φ20	φ36f9	47	86	50	104	5	38	45	172	12
φ63	127	φ20	φ40f9	56	98	60	116	5	38	45	175	13.5

Switch Set

RCA2 Mounting style Bore Option Linear motion stroke Rotating direction Sensor symbol Sensor quantity



Dimensional Table

Bore (mm)	Reed sensor		Solid state sensor	
	UX ₁	UX ₂	UX ₁	UX ₂
φ 40	58.5	34.5	62.5	30.5
φ 50	66.5	37.5	70.5	33.5
φ 63	66.5	40.5	70.5	36.5

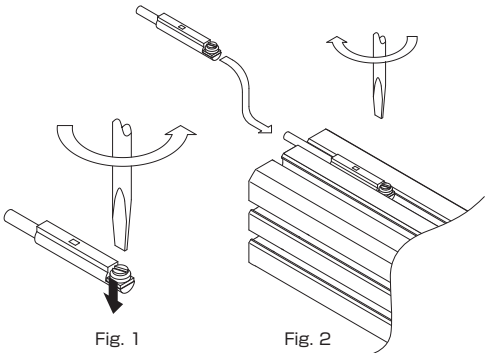
Note) Dimension UX indicates the optimum sensor mounting position for detection of stroke end.

Operating Range and Hysteresis

Bore (mm)	Reed sensor		Solid state sensor	
	Operating range	Hysteresis	Operating range	Hysteresis
φ 40	9 to 13	1.5 or less	2.5 to 5.5	1 or less
φ 50	10 to 14		3 to 7	
φ 63	11 to 15.5		3 to 7	

Setting method of sensor detecting position

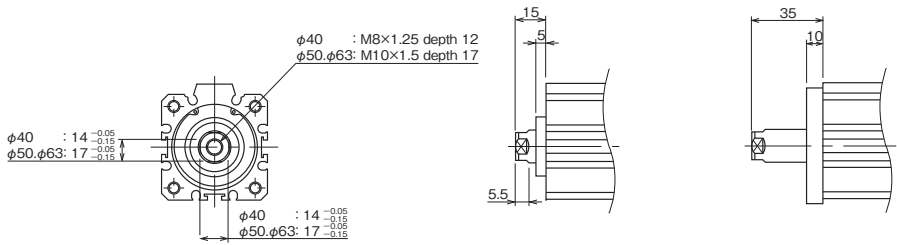
1. Turn the sensor fixing screw to bring it into contact with the nut.
(The sensor fixing screw has left-hand threads. Turn it counterclockwise as shown in Fig. 1.)
2. Insert the sensor in the sensor fitting groove in the cylinder body from the cap or rod side, and slide it.
3. Secure the sensor at the optimum setting position. (Turn the sensor fixing screw clockwise as shown in Fig. 2, and the sensor fixing screw will be in contact with the sensor fitting groove in the cylinder body to secure the sensor.)
The tightening torque must be 0.1 to 0.2 N·m.
4. If the sensor has an indicating lamp, the lamp will light up when the sensor is turned on.



Rod end square

SD FB style

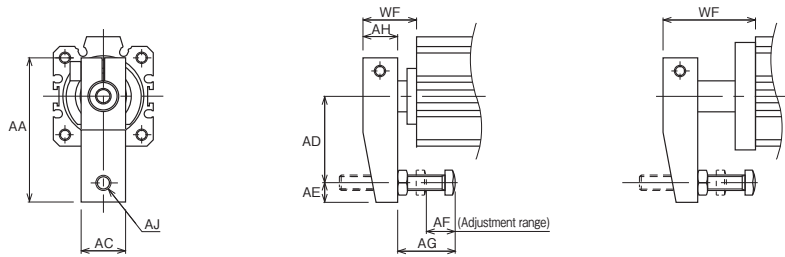
FA style



Arm block

SD FB style

FA style



Dimensional Table

Symbol Bore	AA	AC	AD	AE	AF	AG	AH	AJ	WF	
									SD, FB	FA
φ 40	75	23	45	10	15	30	18	M8×1.25	28	48
φ 50	99	30	65	12	15	30	28	M10×1.25	38	58
φ 63	99	30	65	12	15	30	28	M10×1.25	38	58

Instruction procedures

Precautions for use

Carrying and installation

- When carrying and installing the cylinder, take care not to scratch or dent the piston rod sliding parts. Doing so may damage the seals and cause air leakage.
- Take care that the body mounting surface and the plate mounting surfaces on both sides are free from scratches and dents which may degrade the flatness.
- If the piston rod is twisted or bent when the body is mounted, the operation resistance will be abnormally increased, or the bearings will wear earlier, thereby causing insufficient accuracy and air leakage. Take care not to twist or bend the rod.

Piping

- When piping, take utmost care that dust or foreign matter does not get into the piping. Before connecting, sufficiently flush the pipes and joints with clean air.
- Install an air filter in the middle of the piping to prevent entry of dust, water and foreign matter into the cylinder.

Lubrication

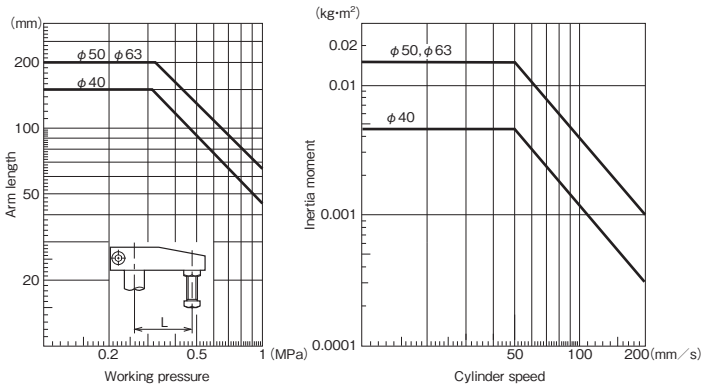
- The cylinder can be used without lubrication. To lubricate it, use lubricating oil JIS K2213 Class 1 (non-additive turbine oil ISO VG32) or its equivalent. (Do not use machine oil or spindle oil.)

Cleaning

- If the piston rod is heavily contaminated, periodically clean it.

Notes on manufacture and installation of arm

Use an arm having length and inertia moment within the ranges shown in the charts.
For the calculation of inertia moment, see the following page.

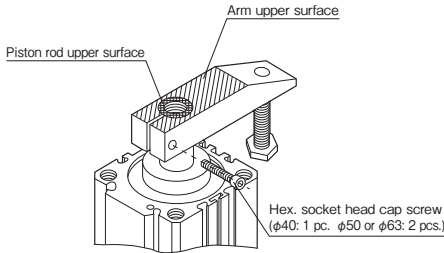


[Note] When the arm is installed using the female threads on the end face of the piston rod, use the cylinder at a pressure equal to or less than the value shown in the following table.

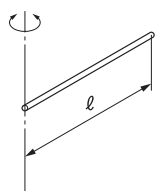
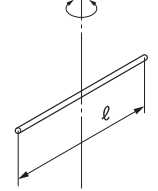
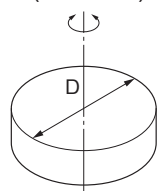
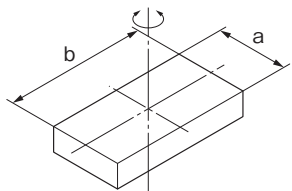
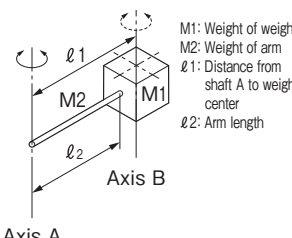
Bore	Pressure (MPa)
φ40	1
φ50	0.8
φ63	0.5

Procedures for installing and removing the arm

To install or remove the arm, tighten or loosen the hex. socket head cap screw.
When the arm upper surface is at the same level as the piston rod upper surface, the arm is in the standard position.
Install and remove the arm in the state where the piston rod has retracted.
Recommended tightening torque: 4 to 5 N·m

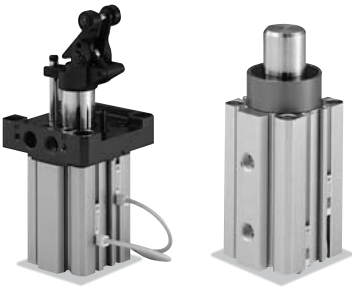


Inertia Moment Calculation Table

Case	I: Inertia moment	Case	I: Inertia moment
● When the axis is at the bar end 	$I = \frac{M l^2}{3}$	● When the axis is in the center of bar  Note) The axis passes through the center of gravity.	$I = \frac{M l^2}{12}$
● In the case of cylinder solid (incl. disc)  Note) The axis passes through the center of gravity.	$I = \frac{MD^2}{8}$	● In the case of rectangular solid  Note) The axis passes through the center of gravity.	$I = \frac{M}{12} (a^2 + b^2)$
● In the case of arm (rotating around axis A)  M1: Weight of weight M2: Weight of arm l1: Distance from shaft A to weight center l2: Arm length Axis B Axis A	$I = I_1 + M_1 l_1^2 + \frac{M_2 l_2^2}{3}$ I ₁ : Inertia of weight when the shaft (shaft B) passing through weight gravity center is positioned in center	I (I ₁): Inertia moment kg · m ² M (M ₁ , M ₂): Weight kg l , a, b : Length m D : Diameter m	

Control of stop and transfer of pallets on conveyor line

- (Lever type)
- The built-in shock absorber stops the pallets softly.
 - The lever type stopper saves you adjusting the timing of rising of the cylinder.
 - Space saving by installing the solenoid valve directly to the rod cover (only $\phi 50$)
- (Straight type)
- Simple type by stopping directly the piston rod.
 - The increased rod bearing area ensures the body strength.
 - A lock is provided to prevent the stopper being dislocated (straight type with flat face and roller types). The stopper position can be adjusted in any direction.



Specifications for Cylinder

Specifications		Lever type	Straight type
Cylinder bore		$\phi 32 \cdot \phi 50 \cdot \phi 80$	$\phi 32 \cdot \phi 40 \cdot \phi 50$
Type		Single piston type	
Series variations		Single acting type, double acting type, double acting type (with spring)	
Rod end shape		Lever type	Round rod type, flat face type, roller type
Stroke (mm)		$\phi 32: 20 \cdot \phi 50, \phi 80: 30$	$\phi 32: 20 \cdot \phi 40: 25 \cdot \phi 50: 30$
Working fluid		Air	
Lubrication		Unnecessary	
Working pressure range	Without valve	0.3 to 1 MPa	
	With valve	0.3 to 0.7 MPa	—
Proof test pressure		1.5 MPa	
Working temperature range		-5 to +70°C (No freezing)	
Structure of cushioning		With cushion pads on both ends	
Tolerance of stroke		$+1.0_{-0}^0$ mm	
Note) Pull down force (N)		$\phi 32: 235 \cdot \phi 50: 559 \cdot \phi 80: 1500$	$\phi 32: 235 \cdot \phi 40: 375 \cdot \phi 50: 559$
Related device	Shock absorber	$\phi 32: F3M10B008$	—
		$\phi 50: AS2-10-6-PLD$	
		$\phi 80: AS2-14-7PLD$	

Note) Values at fluid supply pressure of 0.5 MPa.

Lever type

Standard type

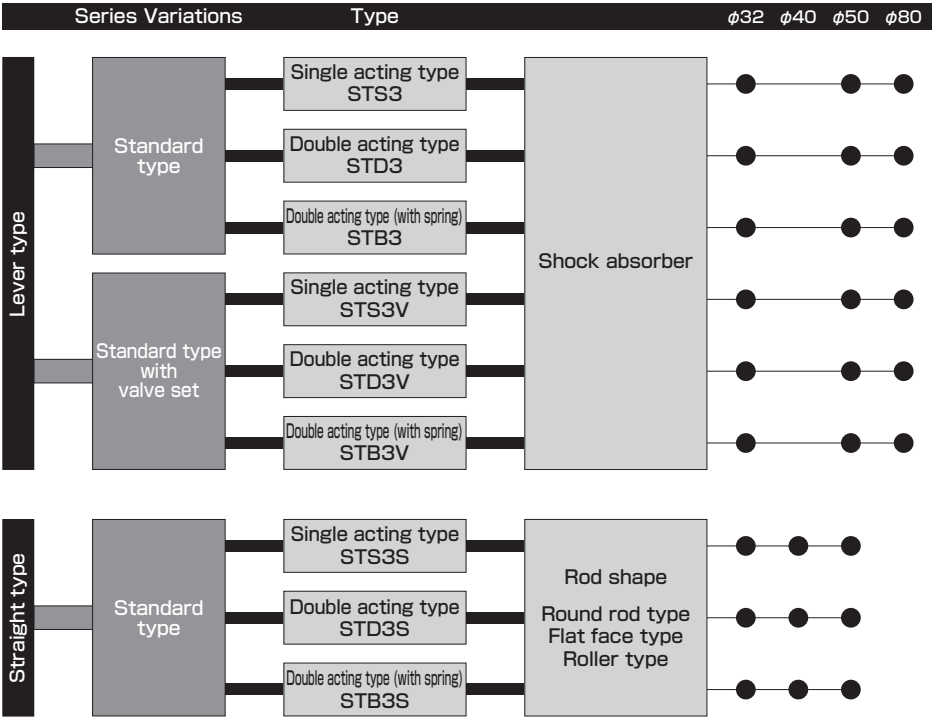
Standard with valve set

Straight type

Standard type

Product Lineup

Unit: mm



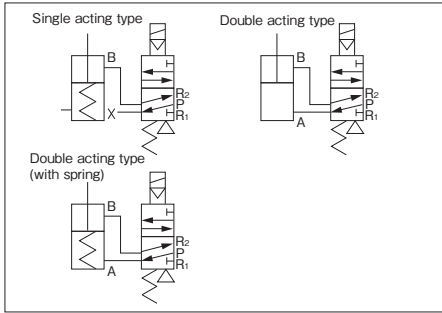
Specifications for Cylinders with Shock Absorber

Applicable cylinder bore (mm)	$\phi 32$	$\phi 50$	$\phi 80$
Model number	F3M10B008	AS2-10-6-PLD	AS2-14-7-PLD
Max. absorbed energy	0.98J	8J	17.7J
Stroke (mm)	5	6	7
Rod returning force	5.9N	23.5N	34.3N
Series Variations	Fixed type	Adjustable	

Specifications for Valves type

Rated voltage		24 V DC	100 V AC	200 V AC
Working voltage range V		21.6 to 26.4 (24±10%)	90 to 132 (100 $^{+32}_{-10}$ %)	180 to 264 (200 $^{+32}_{-10}$ %)
Current value (when rated voltage is applied)	Frequency Hz	—	50 60	50 60
	Starting mA (r.m.s)	—	34 32	17 16
	Exciting mA (r.m.s)	75 (1.8W)	22 20	11 10
Allowable circuit leakage current value mA		4	4	2

Valve Set Circuit Diagram



Sensor List

Type	Sensor symbol	Load voltage range	Load current range	Protective circuit	Indicating lamp	Wiring method	Cord length	Classification
Reed sensor	 PD12L1	24 V DC 110 V AC	DC: 2.5 to 40mA AC: 2.5 to 20mA	None	None	0.2 mm ² , 2-core, outer dia. φ2.6 mm, rear wiring	1m	Standard
	 PD12L3		DC: 2.5 to 40mA AC: 2.5 to 20mA			0.2 mm ² , 2-core, outer dia. φ2.6 mm, rear wiring	3m	
	 PD11L1		DC: 5 to 40mA AC: 5 to 20mA		(Lights when sensing)	0.2 mm ² , 2-core, outer dia. φ2.6 mm, rear wiring	1m	
	 PD11L3		DC: 2.5 to 40mA AC: 2.5 to 20mA			0.2 mm ² , 2-core, outer dia. φ2.6 mm, rear wiring	3m	
	 PD32L1		DC: 2.5 to 40mA AC: 2.5 to 20mA		None	0.2 mm ² , 2-core, outer dia. φ2.6 mm, upper wiring	1m	
	 PD32L3		DC: 5 to 40mA AC: 5 to 20mA			0.2 mm ² , 2-core, outer dia. φ2.6 mm, upper wiring	3m	
	 PD31L1		DC: 5 to 40mA AC: 5 to 20mA		(Lights when sensing)	0.2 mm ² , 2-core, outer dia. φ2.6 mm, upper wiring	1m	
	 PD31L3		DC: 5 to 40mA AC: 5 to 20mA			0.2 mm ² , 2-core, outer dia. φ2.6 mm, upper wiring	3m	
Solid state sensor	 PD14L1	10 to 28 V DC	5 to 20mA	Provided	LED (Lights when sensing)	0.2 mm ² , 2-core, outer dia. φ2.6 mm, rear wiring	1m	Standard
	 PD14L3	28 V DC or less	0.1 to 40mA			0.2 mm ² , 2-core, outer dia. φ2.6 mm, rear wiring	3m	
	 PD13L1	10 to 28 V DC	5 to 20mA		LED (Lights when sensing)	0.15 mm ² , 3-core, outer dia. φ2.6 mm, rear wiring	1m	
	 PD13L3					0.15 mm ² , 3-core, outer dia. φ2.6 mm, rear wiring	3m	
	 PE34L1	28 V DC or less	0.1 to 40mA		LED (Lights when sensing)	0.2 mm ² , 2-core, outer dia. φ2.6 mm, upper wiring	1m	
	 PE34L3					0.2 mm ² , 2-core, outer dia. φ2.6 mm, upper wiring	3m	
	 PE33L1	28 V DC or less	0.1 to 40mA		LED (Lights when sensing)	0.15 mm ² , 3-core, outer dia. φ2.6 mm, rear wiring	1m	
	 PE33L3					0.15 mm ² , 3-core, outer dia. φ2.6 mm, rear wiring	3m	

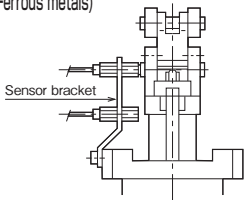
Notes) ● For handling of sensors, be sure to see the sensor specifications at the end of this catalog.
● For ZE type sensors, see the sensor specifications at the end of this catalog.
● We recommend AND Unit (AU series) for multiple sensors connected in series.
For details, refer to AND Unit at the end of this catalog.

● Standard type
PD/PE type sensor



★ List of Recommended Proximity Sensors(Defecting Ferrous metals)

Cylinder bore	Part number of sensor (manufacturer)
ϕ 50	GM-8ML (SUNX)
	E2E-X4MD (OMRON)
	EV-108U (Keyence)
	GX-12ML (SUNX)
ϕ 80	EV-112M (Keyence)
	E2E-X8MD (OMRON)



Weight Table/Lever type

Bore (mm)	Basic weight		Flange weight		Weight of related devices		Sensor additional weight	
	Single acting type	Double acting type	Square	Rectangle	Shock absorber	Valve	Cord length 1 m	Cord length 3 m
ϕ 32	560	555 (551)	0	—	20	147	15	35
ϕ 50	1782	1772 (1738)	0	—24	180	153		
ϕ 80	5319	5309 (5263)	0	—	—	495		

Weight Table/Straight type

Bore (mm)	Basic weight			Sensor additional weight	
	Round rod type	Flat face type	Roller type	Cord length 1 m	Cord length 3 m
ϕ 32	428 (423)	426 (421)	446 (441)	15	35
ϕ 40	758 (746)	752 (740)	812 (800)		
ϕ 50	1396 (1371)	1390 (1365)	1478 (1453)		

Note) The parenthesized values in the basic weight columns apply to the double acting type (without spring).
[Calculation formula] Cylinder weight (g)=basic weight+flange weight+weight of related device+(sensor additional weight×sensor quantity)
[Calculation example] Lever type, double acting type with spring, bore ϕ 32, with shock absorber, with valve, 2 pcs of PD12L1 (cord length 1 m)
 $555+20+147+(15\times 2)=752\text{g}$

● How to order

● Lever type STD3

● Valve Set STD3V

1 Type 2 Shape of flange 3 Cylinder bore 4 Stroke 5 Shock absorber 6 Valve mounting direction 7 Valve voltage 8 Sensor symbol 9 Sensor quantity 10 Lever lock symbol

None Without lever lock
A With lever lock

Sensor quantity (1, 2 to n)

Sensor symbol
Bracket for proximity sensor
B With bracket

Note) The proximity sensor brackets can be fitted only to 50 and 80 mm bore cylinders. Up to two sensors can be fitted.
Lever position sensors for 50 mm bore cylinders can be manufactured to order. Please contact us.
Note) Select applicable sensors out of the Sensor List.

1 Note on ordering Switch Set
● Sensors are not mounted on cylinders at delivery.

1 100 V AC 50/60Hz
2 200 V AC 50/60Hz
8 24 V DC

None Without shock absorber
S With shock absorber

Note) All 80 mm bore cylinders are provided with a shock absorber.

H Valve mounted on upper side
L Valve mounted on lower side

Cylinder bore
 ϕ 32· ϕ 50· ϕ 80

Stroke
 ϕ 32=20mm· ϕ 50, ϕ 80=30mm

None Without lever lock
A With lever lock

None Without shock absorber
S With shock absorber

Note) All 80 mm bore cylinders are provided with a shock absorber.

H Valve mounted on upper side
L Valve mounted on lower side

● How to order only valve SR532 – RMM Voltage RK

SR532 For ϕ 32 and ϕ 50	1 100 V AC
SR552 For ϕ 80	2 200 V AC
	8 24 V DC

● Straight type

1 Type 2 Cylinder bore 3 Rod end shape 4 Sensor symbol 5 Sensor quantity 6

None Round rod type
D Flat face type
R Roller type

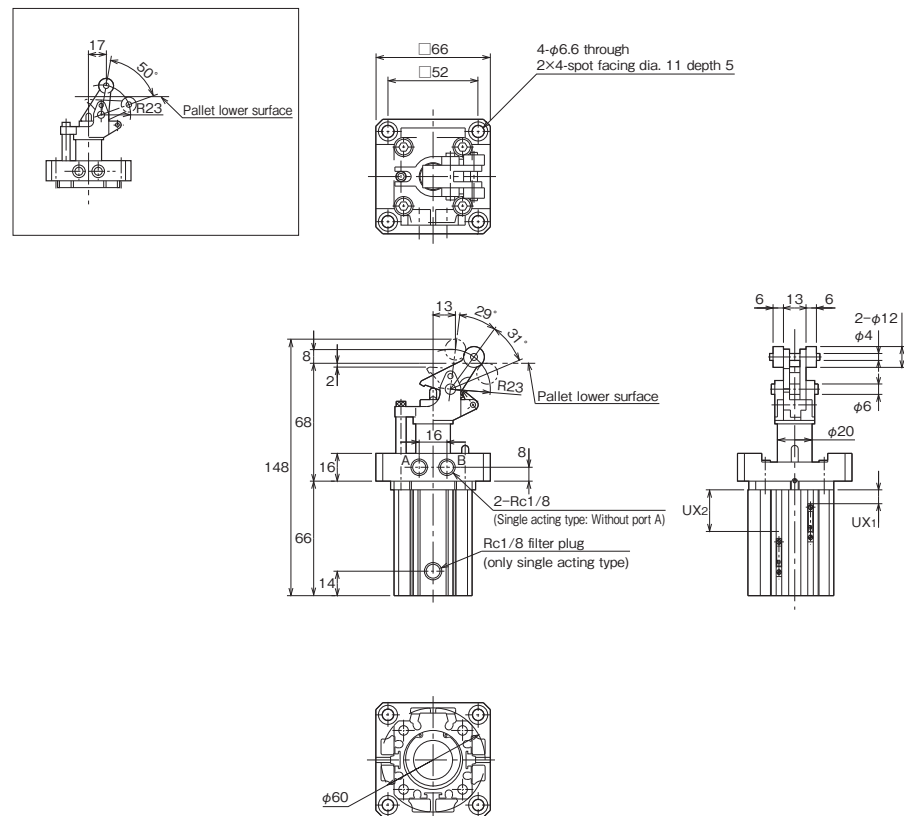
Cylinder bore
 ϕ 32· ϕ 40· ϕ 50

Stroke
 ϕ 32=20mm, ϕ 40=25mm, ϕ 50=30mm

Lever type/Bore $\phi 32$

ST3 -32-20 Shock absorber symbol - Sensor symbol Sensor quantity
ST3, STD3, STB3

● Without shock absorber



- The sensor shown in these drawings is upper wiring type.
- These drawings show the external dimensions of Switch Set with shock absorber.
- These drawings show the state where the piston rod is extended.
- The parenthesized values apply in the case where the shock absorber is not provided.

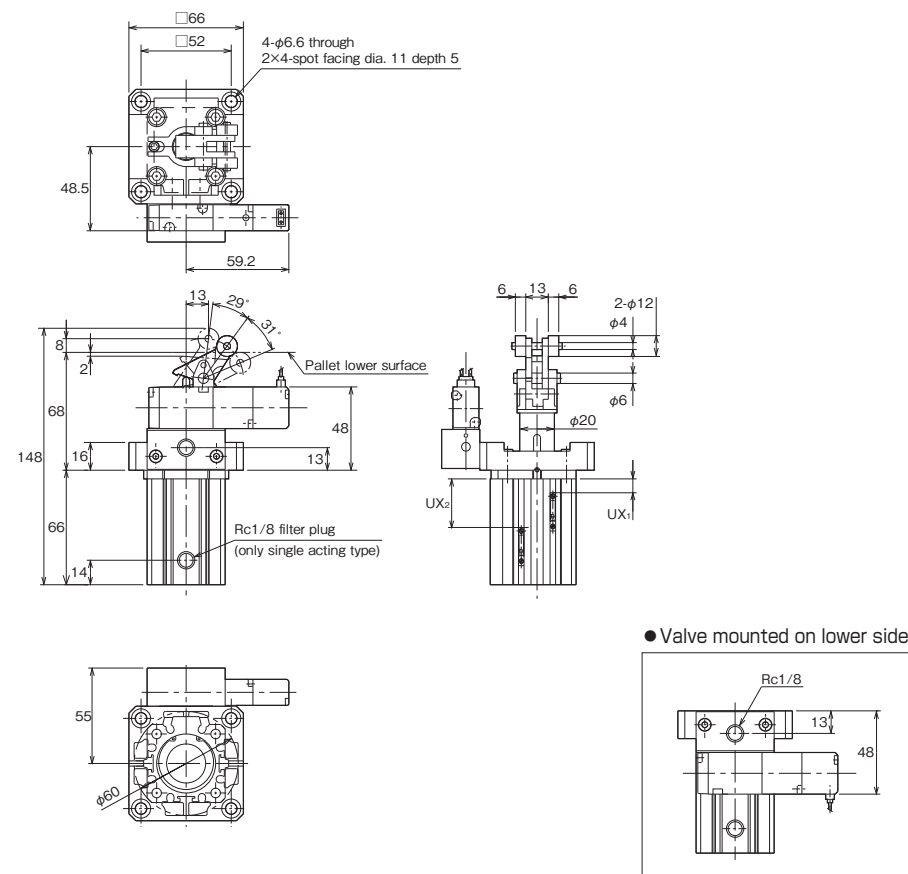
Dimensional Table

Reed sensor		Solid state sensor			
PD type		PD type		PE type	
UX ₁	UX ₂	UX ₁	UX ₂	UX ₁	UX ₂
1	21	7	27	6	26

Note) Dimension UX indicates the optimum sensor mounting position for detection of stroke end.

Lever type/Bore $\phi 32$ /Valve Set

ST3V -32-20 Shock absorber symbol - Valve mounting direction Valve voltage - Sensor symbol Sensor quantity
ST3V, STD3V, STB3V



- The sensor shown in these drawings is upper wiring type.
- These drawings show the external dimensions of Switch Set with valve (mounted on the upper side) and shock absorber.
- These drawings show the state where the piston rod is extended.

Dimensional Table

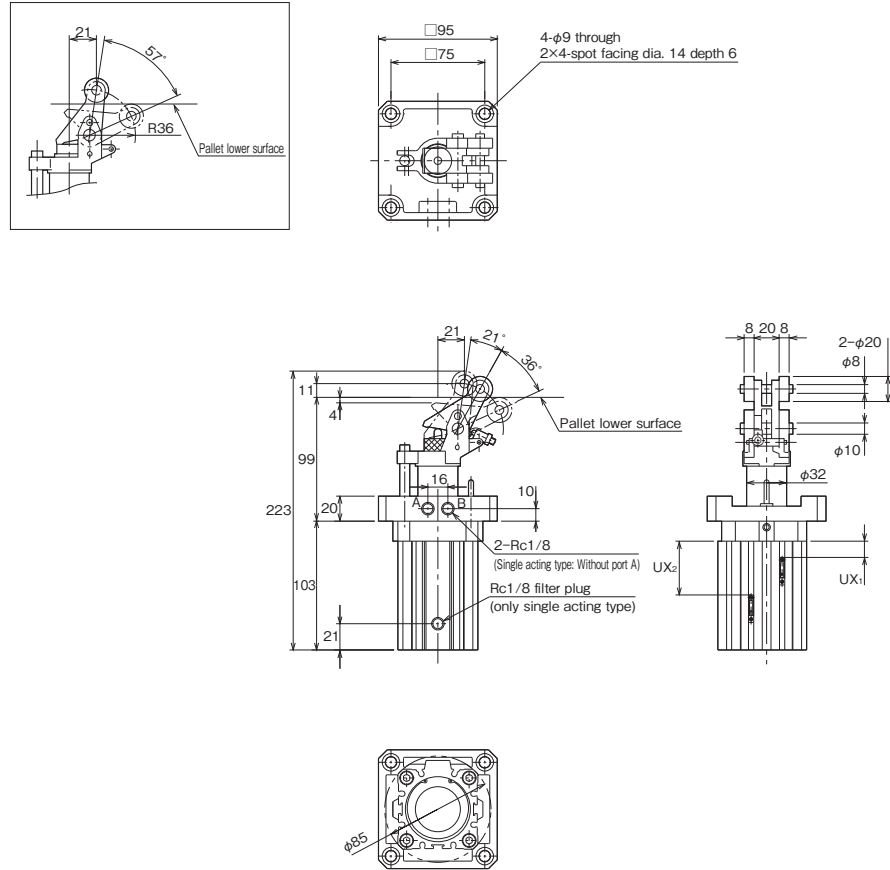
Reed sensor		Solid state sensor			
PD type		PD type		PE type	
UX ₁	UX ₂	UX ₁	UX ₂	UX ₁	UX ₂
1	21	7	27	6	26

Note) Dimension UX indicates the optimum sensor mounting position for detection of stroke end.

Lever type/Bore $\phi 50$

STS3 -50-30 Shock absorber symbol - Sensor symbol Sensor quantity
STS3, STD3, STB3

● Without shock absorber



- The sensor shown in these drawings is upper wiring type.
- These drawings show the external dimensions of Switch Set with shock absorber.
- These drawings show the state where the piston rod is extended.

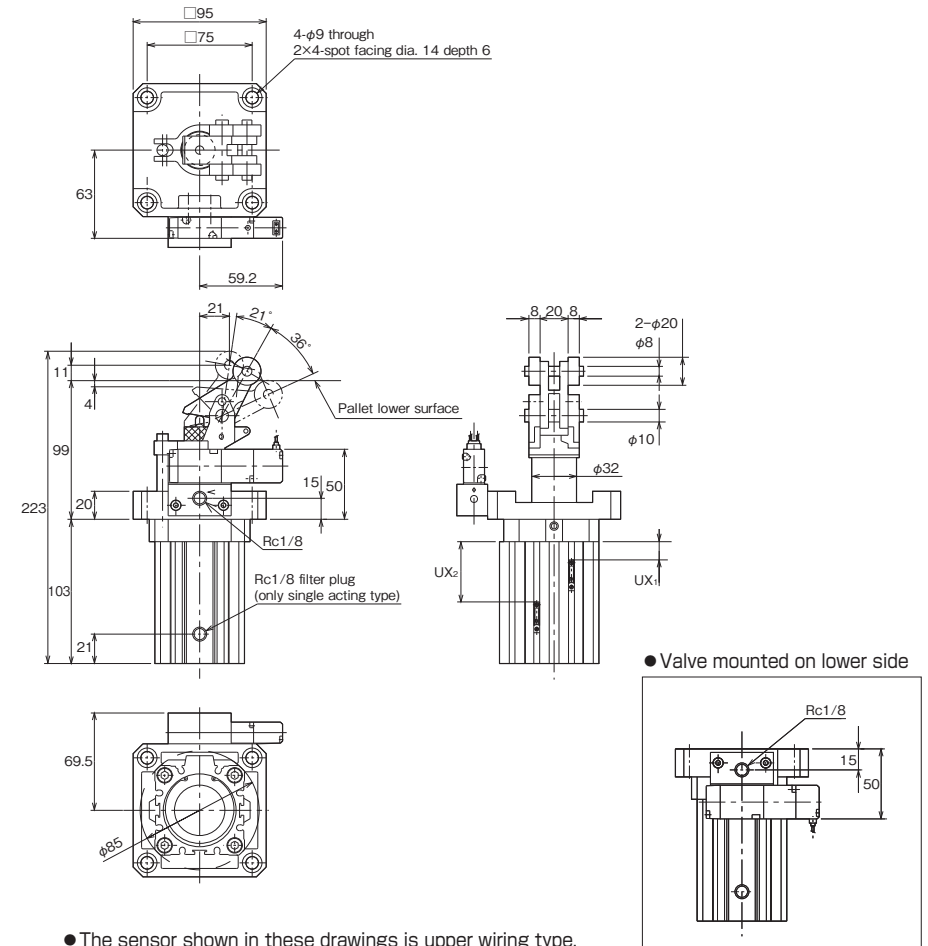
Dimensional Table

Reed sensor		Solid state sensor			
PD type		PD type		PE type	
UX ₁	UX ₂	UX ₁	UX ₂	UX ₁	UX ₂
6	36	12	42	11	41

Note) Dimension UX indicates the optimum sensor mounting position for detection of stroke end.

Lever type/Bore $\phi 50$ /Valve Set

STS3V -50-30 Shock absorber symbol - Valve mounting direction Valve voltage - Sensor symbol Sensor quantity
STS3V, STD3V, STB3V



● Valve mounted on lower side

- The sensor shown in these drawings is upper wiring type.
- These drawings show the external dimensions of Switch Set with valve (mounted on the upper side) and shock absorber.
- These drawings show the state where the piston rod is extended.

Dimensional Table

Reed sensor		Solid state sensor			
PD type		PD type		PE type	
UX ₁	UX ₂	UX ₁	UX ₂	UX ₁	UX ₂
6	36	12	42	11	41

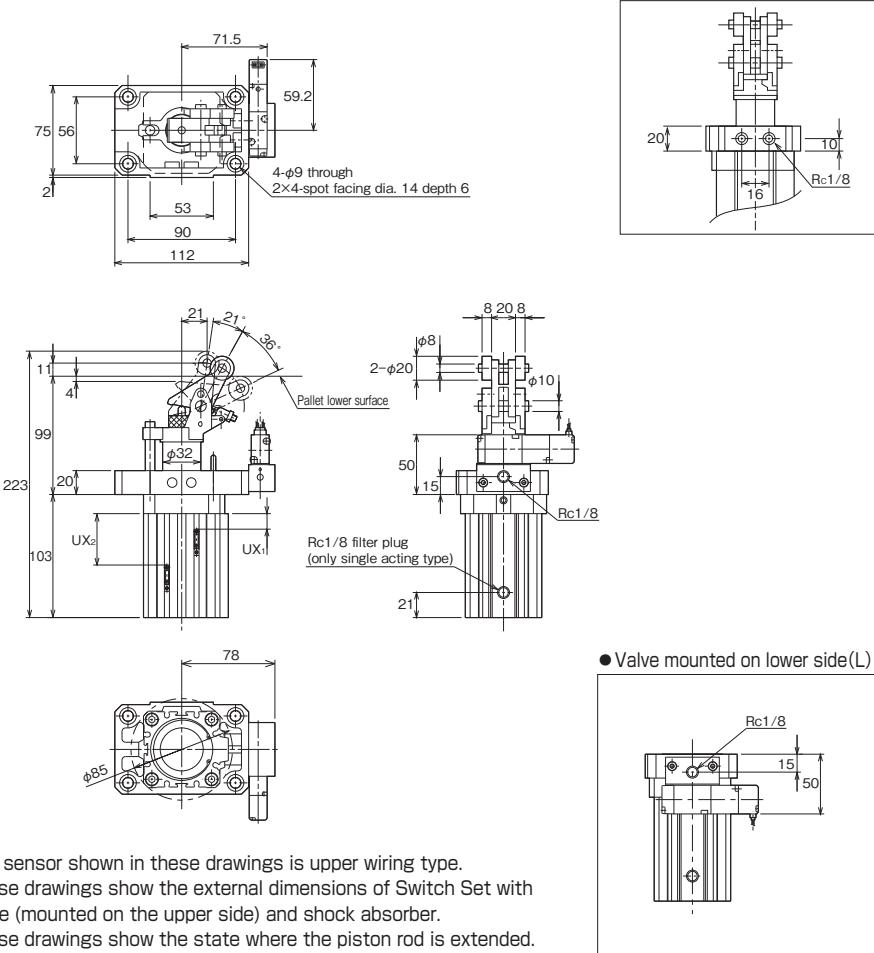
Note) Dimension UX indicates the optimum sensor mounting position for detection of stroke end.

CAD/DATA
ST3/TST3A is available.

Lever type/Bore $\phi 50$ /Rectangular flange (line flow direction)/Valve Set

STS3VL -50-30 Shock absorber symbol - Valve mounting direction Valve voltage - Sensor symbol Sensor quantity
STS3VL, STD3VL, STB3VL

● Standard type
(STS3L, STD3L, STB3L)



Dimensional Table

Reed sensor		Solid state sensor			
PD type		PD type		PE type	
UX ₁	UX ₂	UX ₁	UX ₂	UX ₁	UX ₂
6	36	12	42	11	41

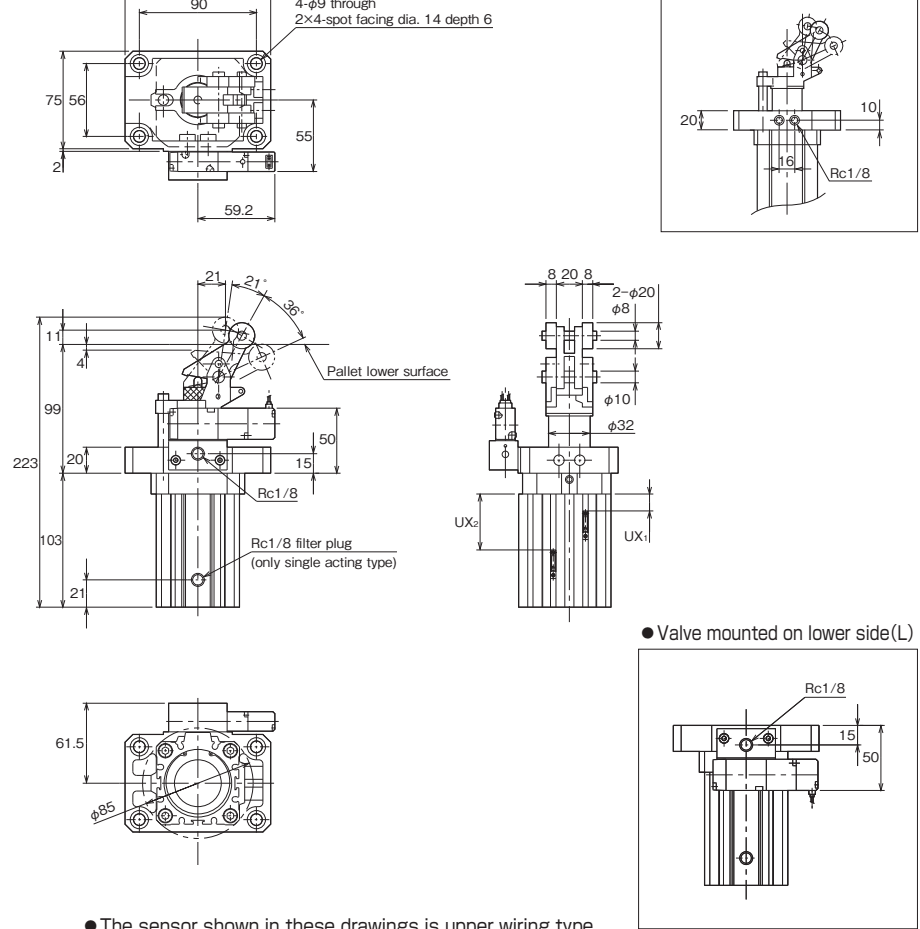
Note) Dimension UX indicates the optimum sensor mounting position for detection of stroke end.

CAD/DATA
ST3/TST3A is available.

Lever type/Bore $\phi 50$ /Rectangular flange(perpendicular to line flow direction)/Valve Set

STS3VN -50-30 Shock absorber symbol - Valve mounting direction Valve voltage - Sensor symbol Sensor quantity
STS3VN, STD3VN, STB3VN

● Standard type
(STS3N, STD3N, STB3N)



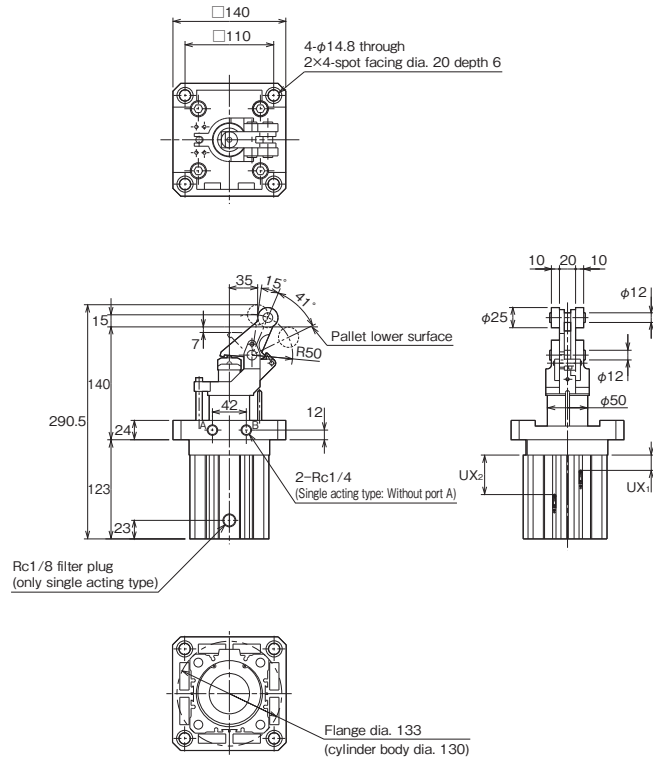
Dimensional Table

Reed sensor		Solid state sensor			
PD type		PD type		PE type	
UX ₁	UX ₂	UX ₁	UX ₂	UX ₁	UX ₂
6	36	12	42	11	41

Note) Dimension UX indicates the optimum sensor mounting position for detection of stroke end.

Lever type/Bore $\phi 80$

STS3 -80-30 Shock absorber symbol - Sensor symbol Sensor quantity
STS3, STD3, STB3



- The sensor shown in these drawings is upper wiring type.
- These drawings show the external dimensions of Switch Set with shock absorber.
- These drawings show the state where the piston rod is extended.

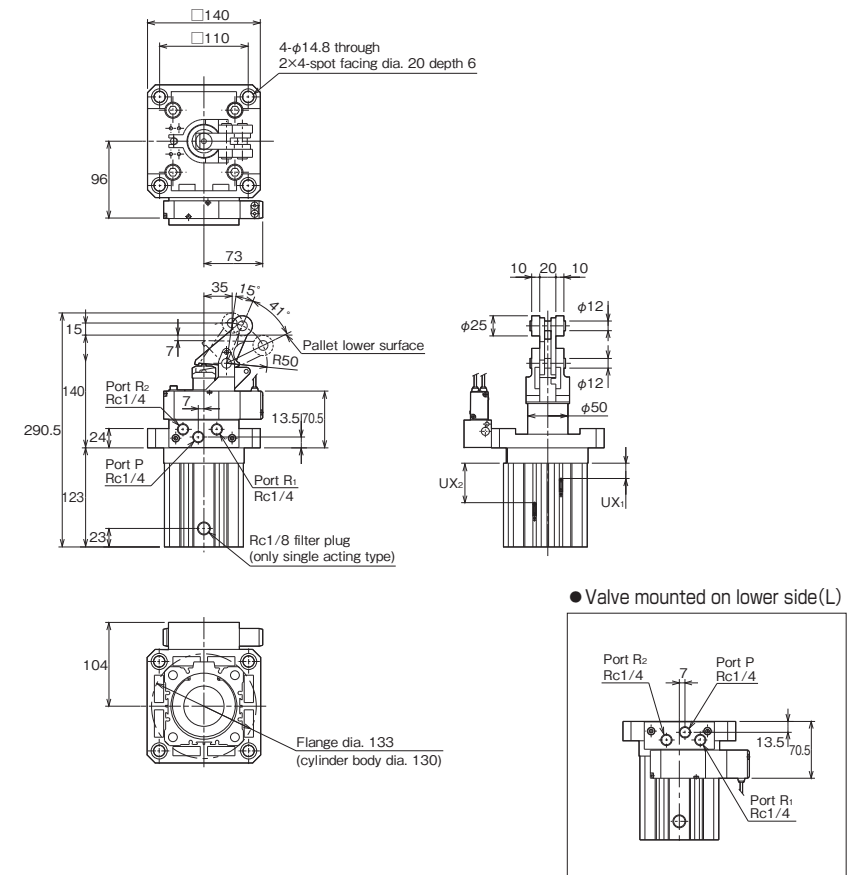
Dimensional Table

Reed sensor		Solid state sensor			
PD type		PD type		PE type	
UX ₁	UX ₂	UX ₁	UX ₂	UX ₁	UX ₂
12	42	18	48	17	47

Note) Dimension UX indicates the optimum sensor mounting position for detection of stroke end.

Lever type/Bore $\phi 80$ /Valve Set

STS3V -80-30 Shock absorber symbol - Valve mounting direction Valve voltage - Sensor symbol Sensor quantity
STS3V, STD3V, STB3V



- These drawings show the external dimensions of Switch Set with valve (mounted on the upper side) and shock absorber.
- These drawings show the state where the piston rod is extended.

Dimensional Table

Reed sensor		Solid state sensor			
PD type		PD type		PE type	
UX ₁	UX ₂	UX ₁	UX ₂	UX ₁	UX ₂
12	42	18	48	17	47

Note) Dimension UX indicates the optimum sensor mounting position for detection of stroke end.

CAD/DATA
ST3/TST3B is available.



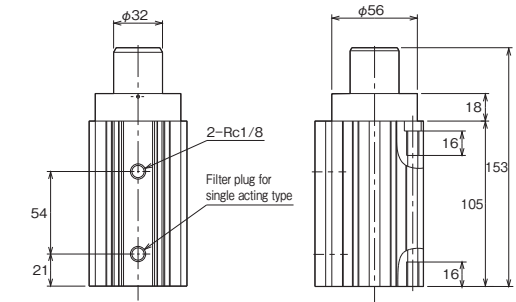
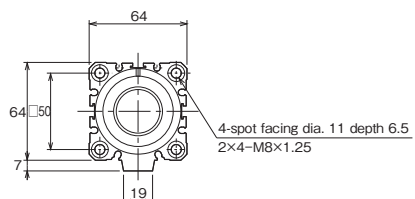
Straight type/Bore $\phi 50$

● Round rod type

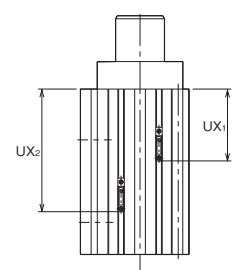
STS3S -50-30 - [Sensor symbol] [Sensor quantity]

STS3S, STD3S, STB3S

● These drawings show the state where the piston rod is extended.



● Switch Set

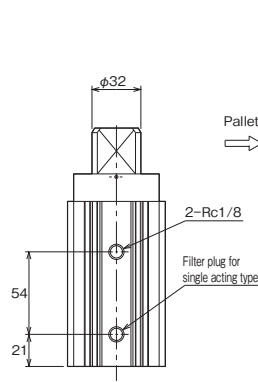


● Flat face type

STS3S -50-30D - [Sensor symbol] [Sensor quantity]

STS3S, STD3S, STB3S

● These drawings show the state where the piston rod is extended.

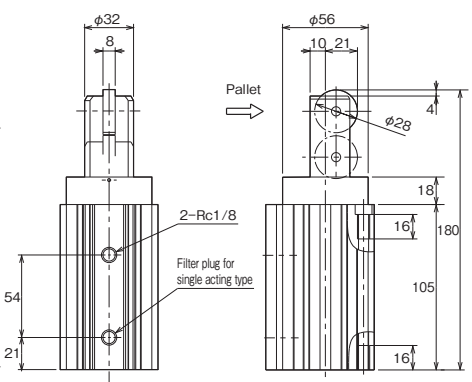


● Roller type

STS3S -50-30R - [Sensor symbol] [Sensor quantity]

STS3S, STD3S, STB3S

● These drawings show the state where the piston rod is extended.



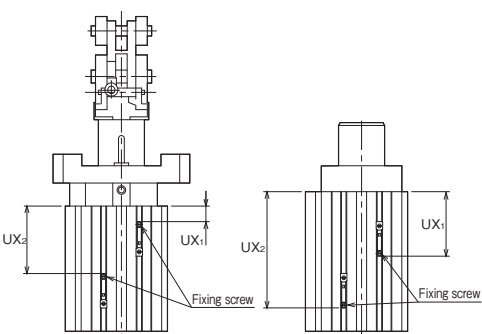
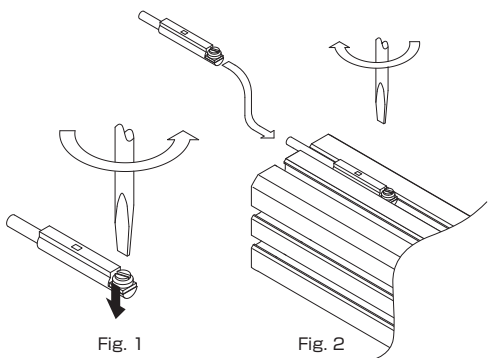
Dimensional Table

Reed sensor		Solid state sensor			
PD type		PD type		PE type	
UX ₁	UX ₂	UX ₁	UX ₂	UX ₁	UX ₂
50	80	44	74	45	75

Note) Dimension UX indicates the optimum sensor mounting position for detection of stroke end.

Setting method of sensor detecting position

1. Turn the sensor fixing screw to bring it into contact with the nut.
(The sensor fixing screw has left-hand threads. Turn it counterclockwise as shown in Fig. 1.)
2. Insert the sensor in the sensor fitting groove in the cylinder body from the cap or rod side, and slide it.
3. Secure the sensor at the optimum setting position.
(Turn the sensor fixing screw clockwise as shown in Fig. 2, and the sensor fixing screw will be in contact with the sensor fitting groove in the cylinder body to secure the sensor.)
The tightening torque must be 0.1 to 0.2 N·m.
4. If the sensor has an indicating lamp, the lamp will light up when the sensor is turned on.



Note) Note that the lever type and straight type vary in sensor mounting direction.

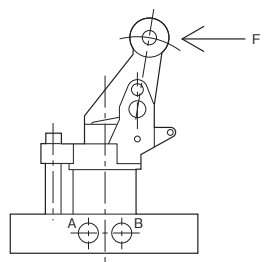
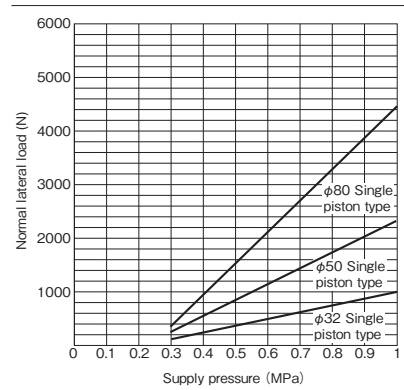
Operating Range and Hysteresis

Bore (mm)	Reed sensor		Solid state sensor	
	PD type		PD type/PE type	
	Operating range	Hysteresis	Operating range	Hysteresis
$\phi 32$	9 to 13	2 or less	3.5 to 7	1 or less
$\phi 40$	9.5 to 13		3.5 to 7	
$\phi 50$	10.5 to 14.5		3 to 8	
$\phi 80$	10 to 16		4.5 to 8.5	

Return Spring Load

Cylinder bore (mm)	$\phi 32$	$\phi 40$	$\phi 50$
Load in mounted state(N)	19.6	29.4	39.2
Load in operating state(N)	46.6	74.6	90.8

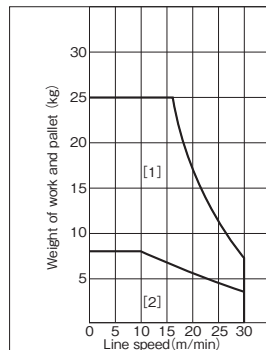
Dependence of Normal Lateral Load on Supply Pressure



Information

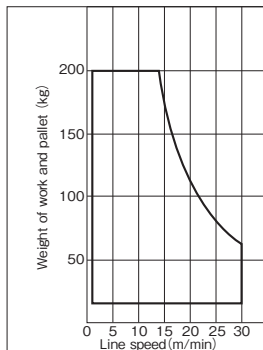
Line Speed and Allowable Work Weight (Lever type)

- For stopper with shock absorber
Bore $\phi 32$

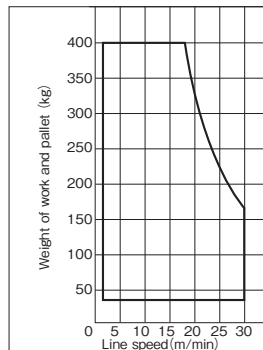


Range [1] Allowable range for cylinder body
(The pallet may bounce at the stop position.)
Range [2] Energy absorbing range of shock absorber
(The pallet stops softly.)

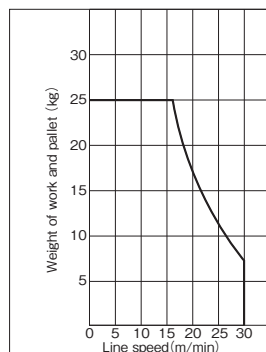
Bore $\phi 50$



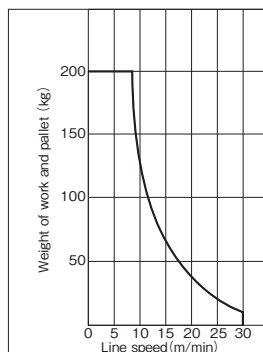
Bore $\phi 80$



- For stopper without shock absorber
Bore $\phi 32$

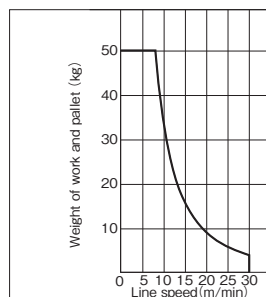


Bore $\phi 50$

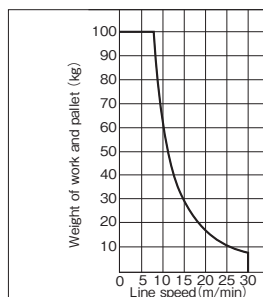


Line Speed and Allowable Work Weight (Straight type)

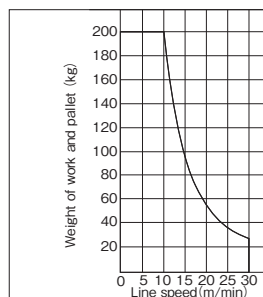
Bore $\phi 32$



Bore $\phi 40$



Bore $\phi 50$



Handling procedures

Precautions for use

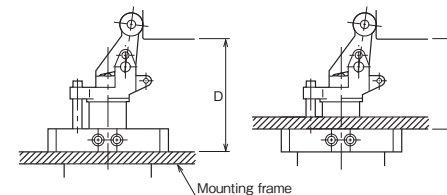
Installing method

- To mount the body, use the mounting hole in the rod cover. Use a clamp bolt of the following size.

Body Mounting Bolt Diameter

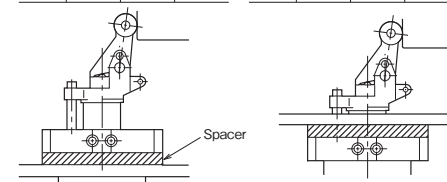
Cylinder bore	$\phi 32$	$\phi 50$	$\phi 80$
Bolt diameter	M6	M8	M12

- The body can be mounted in two ways, from the upper side of the rod cover and from the lower side of the rod cover. The distance from the pallet bottom to the mounting frame must be equal to the dimension D or E. If the distance is incorrect, stop and transfer of pallets cannot be controlled smoothly (the pallet may run on the stopper or be knocked up). Carefully check the distance.



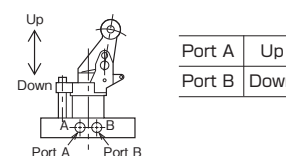
Bore	$\phi 32$	$\phi 50$	$\phi 80$
D	68	99	140

Bore	$\phi 32$	$\phi 50$	$\phi 80$
E	52	79	116



Piping

- When piping, take utmost care that dust or foreign matter does not get into the piping. Before connecting, sufficiently flush the pipes and joints with clean air.
- Fit an air filter in the middle of the piping to prevent entry of dirt, water and foreign particles in the pallet stopper.
- Pipe the pallet stopper paying attention to the piping port position and the cylinder operating direction.

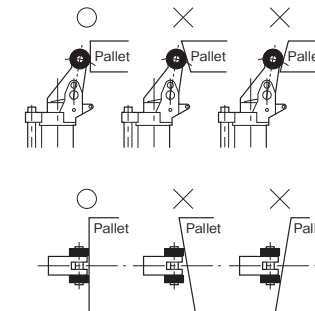


Lubrication

- The stopper can be used without lubrication. To lubricate it, use lubricating oil JIS K2213 Class 1 (non-additive turbine oil ISO VG32) or its equivalent. Do not use machine oil or spindle oil.

Shape of pallet

- The pallet surface to be in contact with the rollers of the body must be flat, and the surface is perpendicular to the rollers when it is in contact with the rollers. Take care that the surface is simultaneously brought into contact with the two rollers and the surface is not in contact with the rollers unevenly. (Uneven contact may damage the rollers and roller retaining rings and gives a torque to the piston rod, thereby damaging the guide bar.)



- The pallet must have a thickness larger than dimension T. (Ensure an allowance of 3 to 5 mm as a rule.) If the pallet does not have a sufficient thickness, stop and transfer of pallets cannot be smoothly controlled.

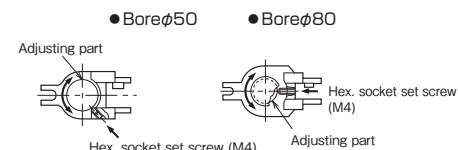
Cylinder bore	$\phi 32$	$\phi 50$	$\phi 80$
T (mm)	8	11	15

Procedures for adjusting the shock absorber resisting force

- The shock absorber in the pallet stopper is adjustable. When using the stopper, adjust the absorber according to the pallet weight and speed to moderate the impact. To stop more than one pallet, the impact to the first pallet can be absorbed, but the impact to the second and following pallets may not be absorbed.

Adjusting procedures

- Loosen the hex. socket set screw (M4) on the lever bracket side.
- Turn the adjusting part by hand to eliminate the impact to the pallet.
 - For temporary adjustment, set the adjusting part to the most tightened position, and get the pallet colliding. If the impact at the initial stage of collision is large (the work bounces), turn the adjusting part in the loosening direction.
 - If the impact at the stop position is large (the work bounces), turn the adjusting part in the tightening direction.
- After the completion of adjustment, surely tighten the set screw.



Note) For the 32 mm bore cylinders, stationary type shock absorbers are used. The absorbers cannot be adjusted.

Shock absorber replacing procedures

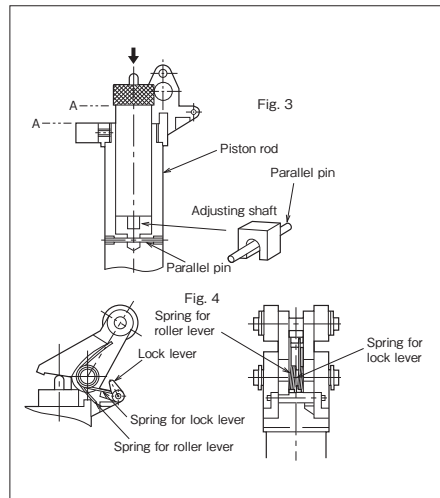
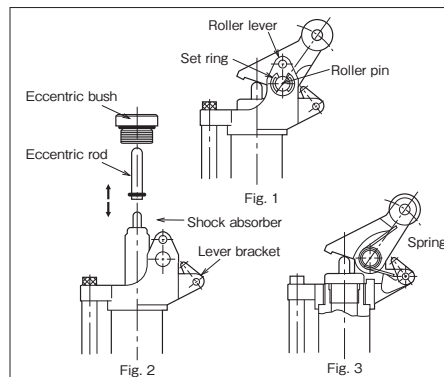
ST*3-32 Series

Removing procedures

- Remove the roller pin set ring, and remove the roller lever. (Fig. 1)
- Remove the eccentric bush, and remove the shock absorber. (Fig. 2)

Fitting procedures

- Fit the shock absorber and the eccentric rod onto the piston rod.
- Surely screw the eccentric bush onto the piston rod.
- Fit the spring as shown in Fig. 3. Secure the shorter arm on the lever bracket side.



ST*3-80 Series

Removing procedures

- Remove the roller pin set ring, and remove the roller lever. (Fig. 1)
- Loosen the set screws at the two positions, and remove the shock absorber. (Figs. 2 and 3)

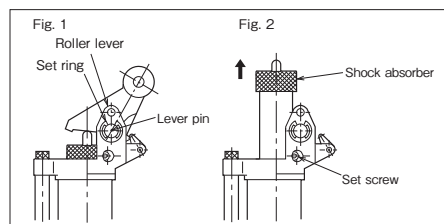
Fitting procedures

- Insert the shock absorber until surfaces X and Y are at the same level, and tighten the set screw A. (Figs. 2 and 3)
- Fit the spring as shown in Fig. 3. Secure the shorter arm on the lever bracket side.
- After the completion of adjustment of the shock absorber, tighten the set screw B to lock it.

ST*3-50 Series

Removing procedures

- Remove the roller pin set ring, and remove the roller lever. (Fig. 1)
- Loosen the set screw for adjustment lock, and remove the shock absorber. (Fig. 2)



Fitting procedures

- When inserting the piston rod, fit the slit in the shock absorber adjusting shaft onto the parallel pin. (Fig. 3)
- Insert the shock absorber until surfaces A are at the same level.
- If it is not inserted completely, the roller lever cannot be fitted.
- Prepare two springs for the roller lever and the lock lever. The spring having a smaller diameter and a smaller number of turns is designed for the lock lever. Fit the springs to the proper positions referring to Fig. 4.
- After the completion of adjustment of the shock absorber, tighten the set screw to lock it.

