

**TAIYO**

FLAT CYLINDER

**10F-1** Series

PNEUMATIC ACTUATOR

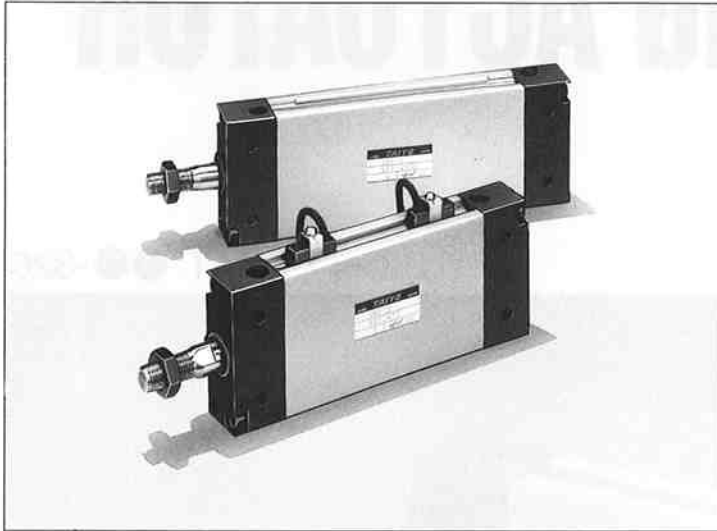
# SPACE-SAVING ACTUATOR

- THE PREVENTION OF ROTATION AND SPACE SAVING.
- RESPOND TO BAD ENVIRONMENT.
- A VARIETY OF MOUNTING STYLE.

CAT. A11-326a



# 10F-1 FLAT CYLINDER



Thin Type Flat Cylinder is Ideal for Use at Narrow Space with Cylinder Width Shortened by Shaping Piston Ovally.

- The prevention of rotation and space saving are possible with oval-shaped piston.
- Respond to bad environment with the adoption of powerful type scraper.
- With 2 piping ports provided for head cover, it responds to the diversification of piping methods.
- System improved for mounting switch even later.
- A variety of mounting is available to meet with applications.  
(Ten mounting taps for cover)

## SPECIFICATIONS

Type	Fundamental type•Switch set		
Structure	Double acting type		
Cylinder bore(mm)	φ 25 or equivalent	φ 32 or equivalent	φ 50 or equivalent
Standard stroke(mm)	25 · 50 · 75 · 100		25-50-75-100-150-200
Working fluid	Air		
Lubrication	Unnecessary(But possible)		
Pressure range	1~10kgf/cm <sup>2</sup> (0.098~0.980MPa)		
Proof test pressure	15kgf/cm <sup>2</sup> (1.471MPa)		
Speed range	50~500mm/sec		
Temperature range	-10~+60°C (Do not use when frozen.)		
Structure of cushioning	With cushion pads at both ends	Both ends cushioned	
Cushion stroke	—		12mm
Tolerance for thread	ISO 4795/1 6g		
Tolerance of stroke	+1.0 0 mm		
Allowable rotation torque	10kgf · cm	16kgf · cm	40kgf · cm
Backlash accuracy	±1.0°	±0.8°	±0.5°

## SWITCH SPECIFICATIONS

Code	With cord (1.5m)	KR101
	With cord (5m)	KR105
Max. voltage	AC:120V DC:50V	
Current range	AC	3~20mA
	DC	3~40mA
Max. load capacity	AC:2VA DC:1.5W	
Wiring method	0.3mm <sup>2</sup> 2 Cores Outer dia. φ 3.4mm Oil-proof cable cord	
Indicating lamp	LED(Lighting with switch ON)	

Note: The protective circuit SK-100 shall be surely provided for load in case that induction load (relay, etc.) is applied.

## MIN. CYLINDER STROKE FOR MOUNTING SWITCH Unit:mm

Bore	Q'ty	1 switch	2 switches
φ 25 or equivalent	10	10	25
φ 32 or equivalent			
φ 50 or equivalent			

## STANDARD STROKE

Unit:mm

Bore \ Stroke	25	50	75	100	150	200
φ 25 or equivalent	○	○	○	○	—	—
φ 32 or equivalent	○	○	○	○	—	—
φ 50 or equivalent	○	○	○	○	○	○

Contact to Our Company for medium stroke other than the above stroke.

## MAXIMUM STROKE

Unit:mm

Bore	Stroke
φ 25 or equivalent	100
φ 32 or equivalent	100
φ 50 or equivalent	200

The above is the maximum stroke of standard model that is available.  
Contact to Our Company for longer stroke than the above.

# FLAT CYLINDER 10F-1

## CODE

For order, specify the following code.

### • FUNDAMENTAL TYPE

10F-1 SD 32 N 100

Mounting type

④ Cylinder stroke mm

①	Cylinder bore mm φ 25 · φ 32 · φ 50 or equivalent
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Structure of cushioning	
②	N With cushion pads at both ends( φ 25 · φ 32 or equivalent)
	B Both ends cushioned( φ 50 or equivalent)

### • SWITCH SET

10F-1 SD 32 N 100 - E 2

Mounting type

⑤ Switch q'ty

①	Cylinder bore mm φ 25 · φ 32 · φ 50 or equivalent
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Switch symbol	
④	E KR101(With cord 1.5m)
	F KR105(With cord 5m)

Structure of cushioning	
②	N With cushion pads at both ends( φ 25 · φ 32 or equivalent)
	B Both ends cushioned( φ 50 or equivalent)

③ Cylinder stroke mm

## DELIVERY FORM

•For switch set, deliver with switch not mounted on body.

## WEIGHT TABLE

Unit:gf

Bore mm	Basic weight	Additional weight per stroke 1mm	Switch additional weight	
			Cord length 1.5m	Cord length 5m
φ 25 or equivalent	289	2.22	30	70
φ 32 or equivalent	458	3.44		
φ 50 or equivalent	1556	7.91		

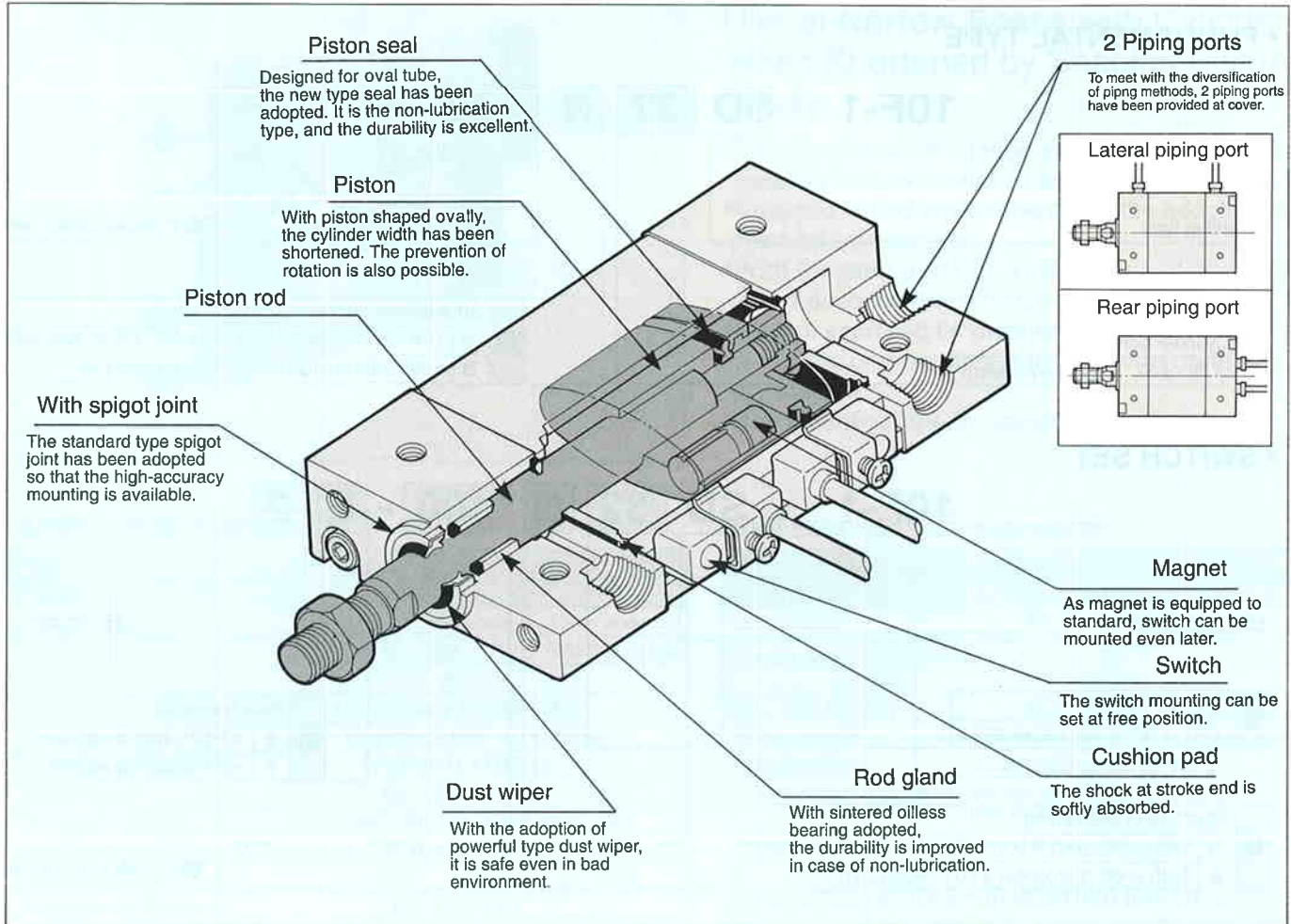
Note: In the basic weight of the above table, the switch weight is not included. For switch set, the switch weight shall be added.

Calculation formula : Cylinder weight(gf) = Basic weight + Additional weight per stroke 1mm × Cylinder stroke mm + Switch additional weight.

Calculation example : Cylinder bore φ 32 or equivalent, Cylinder stroke 100mm, With 2 switches (KR101 · Cord length 1.5m)

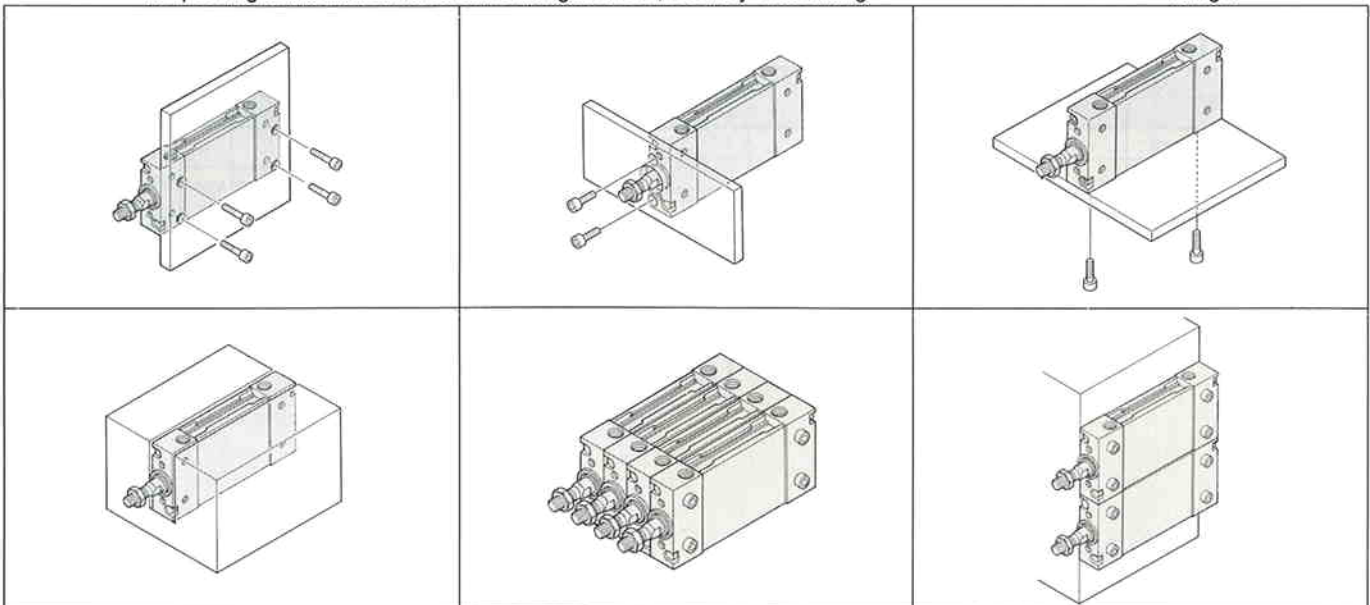
$$458+3.44 \times 100+30 \times 2=862\text{gf}$$

# 10F-1 FLAT CYLINDER



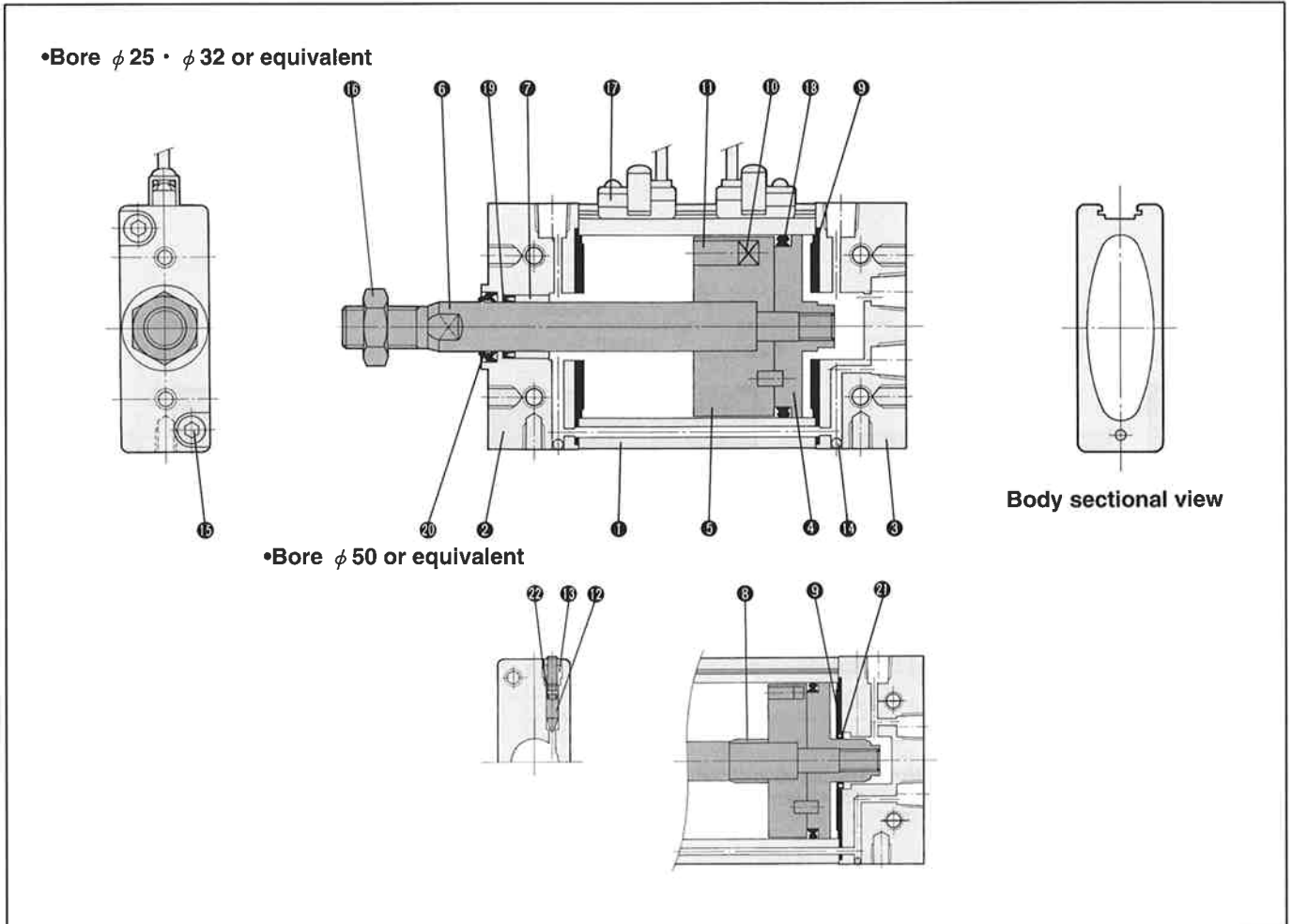
## MOUNTING EXAMPLES

•Responding to the diversification of mounting methods, a variety of mounting is available even with no metal fittings.



# FLAT CYLINDER 10F-1

## SECTIONAL DRAWINGS



## PARTS LIST

No.	Name	Material	Q'ty
①	Body	Aluminum alloy	1
②	Head cover	Aluminum alloy	1
③	Cap	Aluminum alloy	1
④	Piston H	Synthetic resin + Aluminum alloy	1
⑤	Piston R	Aluminum alloy	1
⑥	Piston rod	Carbon steel	1
⑦	Rod gland	Sintered oilless bearing (Bronze casting)	1
⑧	Cushion ring	Carbon steel	1
⑨	Cushion pad	Nitrile rubber	2

No.	Name	Material	Q'ty
⑩	Magnet	—	1
⑪	Plug	Nitrile rubber	1
⑫	Cushion needle	Chromium molybdenum steel	2
⑬	Cushion needle nut	Chromium molybdenum steel	2
⑭	Steel ball	High carbon chrome bearing steel	2
⑮	Bolt with hexagonal hole	Chromium molybdenum steel	4
⑯	Lock nut for rod end attachment	Rolled steel	1
⑰	Switch	—	※

## SEAL LIST

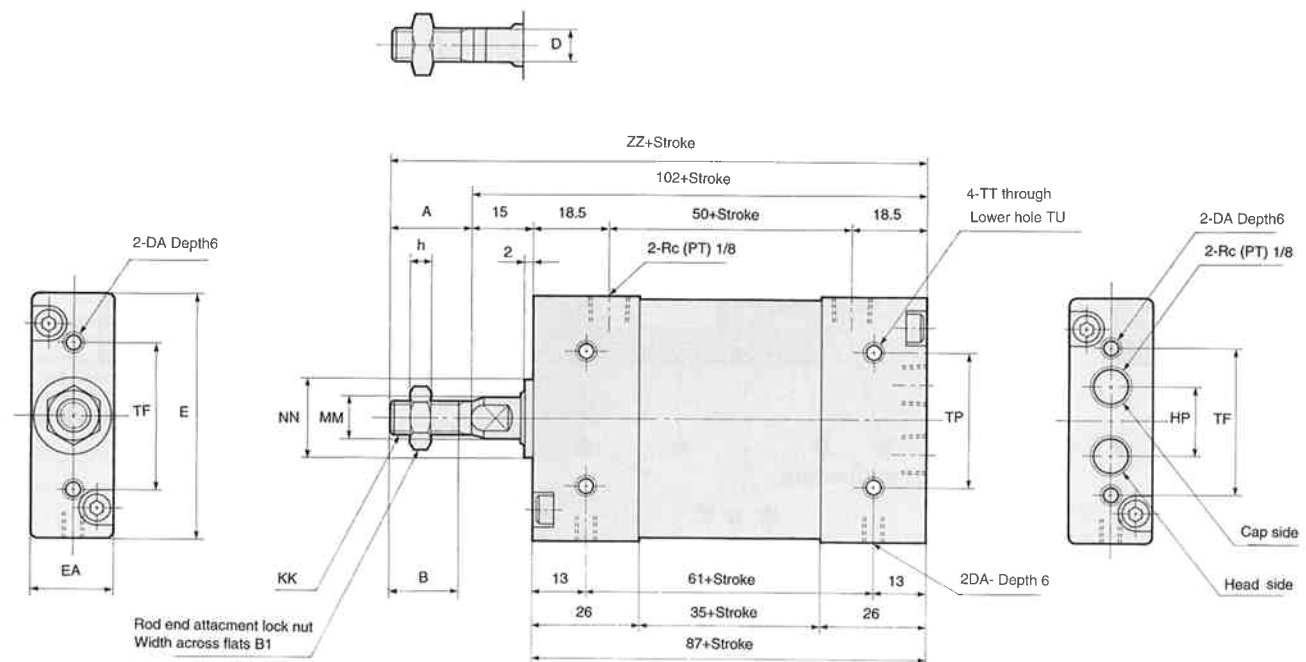
Name	⑮	⑰	⑱	⑲	⑳
	Piston seal	Rod seal	Dust wiper	Cushion seal	Cushion needle seal
Material	Nitrile rubber	Nitrile rubber	Nitrile rubber + Cold rolled steel	Urethane rubber + Cold rolled steel	Nitrile rubber
Bore mm	Q'ty	Q'ty	Q'ty	Q'ty	Q'ty
$\phi$ 25 or equivalent	FPPY-25	DYR-10	K2-10	—	—
$\phi$ 32 or equivalent	FPPY-32	DYR-14	K2-14	—	—
$\phi$ 50 or equivalent	FPPY-50	DYR-20	K2-20	FCP-22	S-4

# 10F-1 FLAT CYLINDER

## DIMENSIONAL DRAWINGS/BORE $\phi 25 \cdot \phi 32$ OR EQUIVALENT

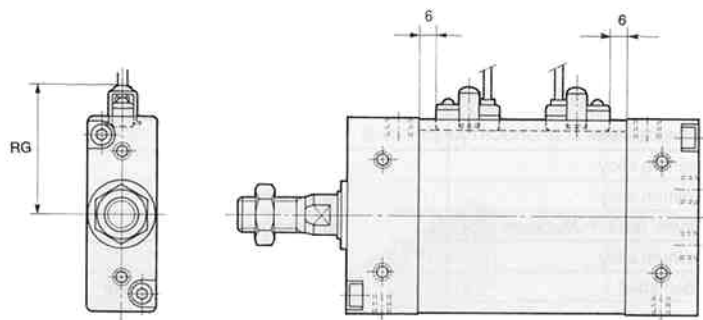
Unit : mm

### •FUNDAMENTAL TYPE



Note: The direction of width across flats of piston rod end differs with the above drawings in some cases.

### •SWITCH SET



## DIMENSIONAL TABLE

Bore	Symbol	A	B	B <sub>1</sub>	D	DA	E	EA	HP	KK
$\phi 25$ or equivalent		20	17	13	8	M5×0.8	60	20	17	M8×1.25
$\phi 32$ or equivalent		24	21	19	12	M6×1.0	70	25	20	M12×1.25

Bore	Symbol	MM	NN	RG	TF	TP	TT	TU	ZZ	h
$\phi 25$ or equivalent		$\phi 10$	$\phi 19h9$	42	36	33	M5×0.8	4.1	122	5
$\phi 32$ or equivalent		$\phi 14$	$\phi 24h9$	47	45	40	M6×1.0	5.0	126	7

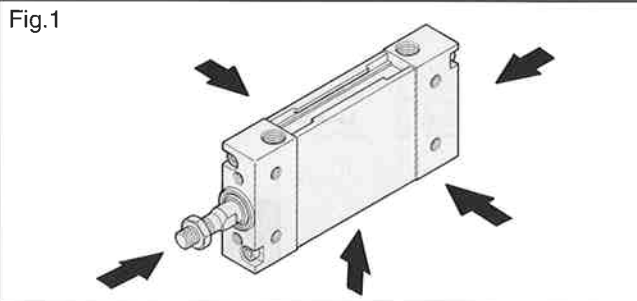


# 10F-1 FLAT CYLINDER

## HANDLING INSTRUCTIONS

### PRECAUTIONS FOR USE

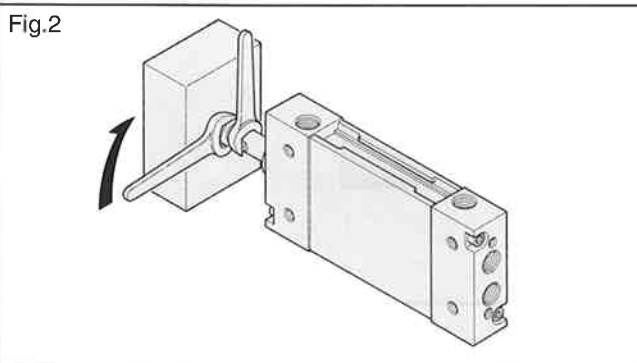
- The mounting is available to meet with applications as the mounting holes are equipped at 5 directions of cylinder cover in case of the cylinder mounting. But cautions shall be taken that excessive force will not be applied to cylinder by selecting the location with little vibration as much as possible. (Fig.1)



- In case that the mounting hole for cylinder is utilized, bolt for mounting shall be fastened with torque in the following table as criterion.

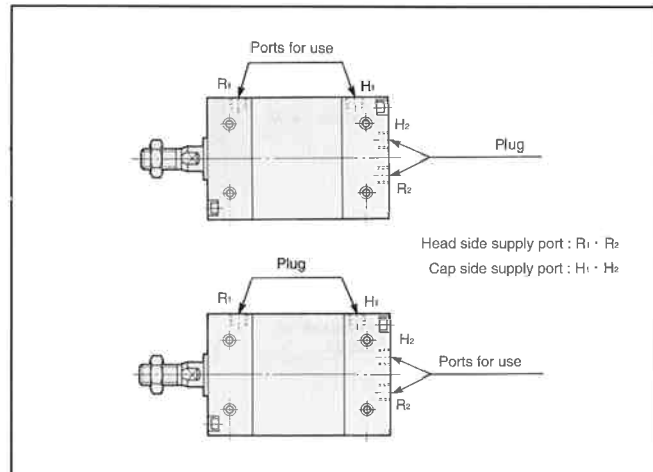
Cylinder bore mm	Bolt size	Clamp torque kgf·cm
φ 25 or equivalent	M5	22
φ 32 or equivalent	M6	37
φ 50 or equivalent	M10	180

- In case that load is applied to rod of cylinder, it shall be fixed so that excessive torque is not applied to rod. (Fig.2)
- As a rule, the rotating torque shall not be applied to rod. In an unavoidable case for use, it shall not exceed the allowable torque.
- It shall be used after confirming that the load direction and the core of rod are surely set.



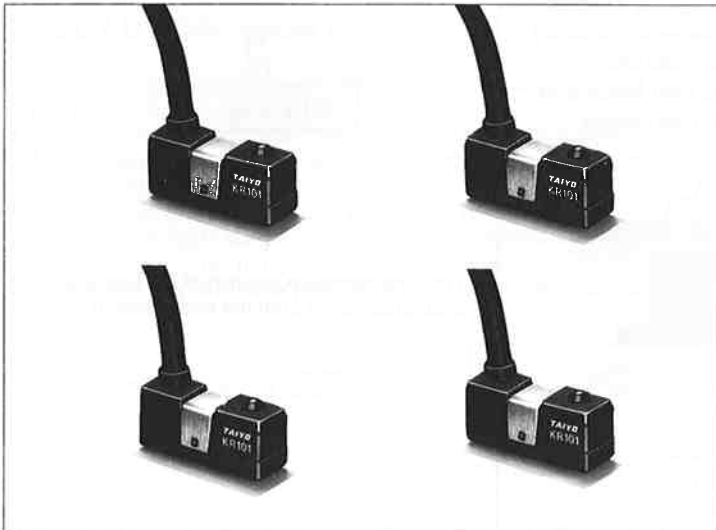
### PIPING PORT POSITION

- The piping port of cylinder is shown in the following table. The piping shall be tightly conducted by using the fittings, tube and seal tape that are suited to port diameter. There are 4 ports including 2 each at cap side and head side.
- By using one of the two pipings, the unused port shall be plugged.
- When the unused port is plugged, accessories (taper screw plug with hexagonal hole grade 1) shall be used. Trouble may be caused for cylinder mounting because plug is not inserted deep in cover if seal tape is excessively rolled and unspecified article is used for plugging.



Bore	Port dia.
φ 25 or equivalent	Rc(PT)1/8
φ 32 or equivalent	Rc(PT)1/8
φ 50 or equivalent	Rc(PT)1/4

# MAGNETIC PROXIMITY TYPE (WITH CONTACT) KR TYPE SWITCH



Small, Light, Cheap, Magnetic Proximity Type Reed Switch

- Small type, lightweight, compact.
- AC•DC are commonly used for working voltage.
- Oil-proof cabtyre cord is used.
- Switch can be mounted at free position.

## SPECIFICATIONS

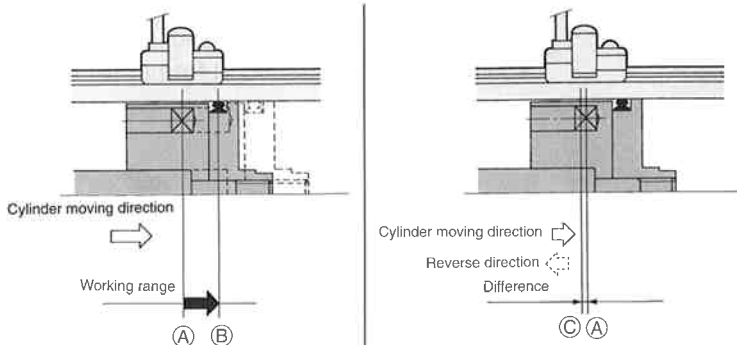
Code	With cord (1.5m)	KR101	
	With cord (5m)	KR105	
Pressure range	AC	MAX.AC120V	
	DC	MAX.DC50V	
Current range	AC	3 ~ 20mA	
	DC	3 ~ 40mA	
Max. load capacity	AC	2.0VA	
	DC	1.5W	
Inner drop voltage	AC	2V and less	
	DC	2V and less	
Leakage current	0		
Working time	1 msec and less		
Return time	1 msec and less		
Shock-proof	30G		
Wiring method	0.3mm <sup>2</sup> 2 Cores Outer dia. φ 3.4mm Oil-proof cabtyre cord		
Protective structure	IP67 (Japan Electrical Manufacturers' Association grade) or equivalent		
Indicating lamp	LED (Lighting with switch ON)		
Electric circuit	Note : ⊕ White ⊖ Black		
Applied load	Miniature relay · Sequencer		

Note : In case that induction load (relay, etc.) is applied, the protective circuit SK-100 shall surely be provided for load.

# KR TYPE SWITCH MAGNETIC PROXIMITY TYPE (WITH CONTACT)

## WORKING DESCRIPTION

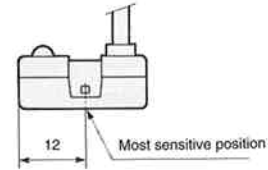
With reed switch and indicating lamp, etc. all set in case, the magnetic proximity switch of resin-mounted structure is mounted in the periphery of cylinder body. As a magnet-equipped piston is placed below the reed switch, the reed switch actuates and the stroke position of cylinder is detected from outside without contact.



When the piston moves in the  $\rightarrow$  direction and the magnet arrives at position (A), the reed switch actuates. The switch remains on from (A) to (B). This is called the working range.

When the piston reaches position (A) and then returns in the reverse direction  $\leftarrow$ , the reed switch remains on until position (C). The interval between (A) and (C) is called the difference.

## SWITCH MOST SENSITIVE POSITION



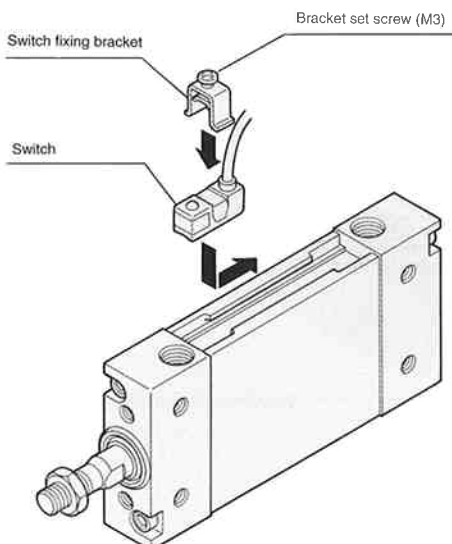
The most sensitive position of KR type switch is located at 12mm from the end of switch.

## WORKING RANGE, DIFFERENCE

Unit : mm

Series	Cylinder bore	Working range	Difference
10F-1	$\phi$ 25 or equivalent	8.5~10.5	2.0 and less
	$\phi$ 32 or equivalent		
	$\phi$ 50 or equivalent		

## HOW TO SET SWITCH DETECTING POSITION



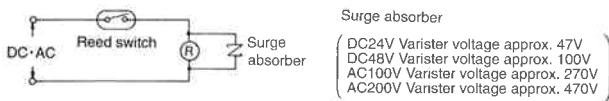
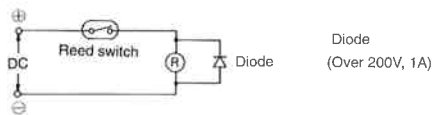
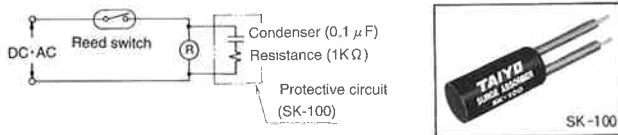
1. Mount in the fitting part at the center of switch by loosening a band set screw (M3) of bracket for fixing a switch.
2. Slide inside by mounting from both ends of switch mounting groove of cylinder body.
3. The most ideal position of switch mounting is fixed at 6mm from the cover end, and a band set screw of bracket shall be fastened. (Clamp torque : about 4kgf·cm)
4. The indicating lamp lights when the switch is set ON.

# MAGNETIC PROXIMITY TYPE (WITH CONTACT) KR TYPE SWITCH

## HANDLING INSTRUCTIONS

### PRECAUTIONS FOR USE

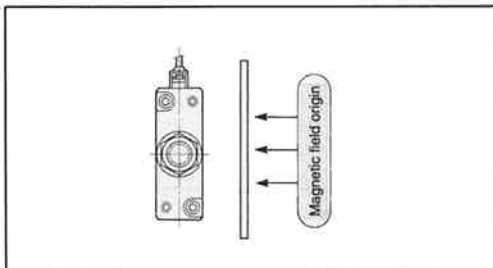
- Do not apply loads which exceed the working voltage /current and load capacity of switch.
- Do not connect the switch directly with the power supply. Make sure to connect it with the specific load such as relay or sequencer.
- Provide the protective circuit in parallel to load for switch protection if high surge voltages are generated near the power supply or if coils which generate high surge voltages (relay above approx. 4VA etc.) are to be used as loads.



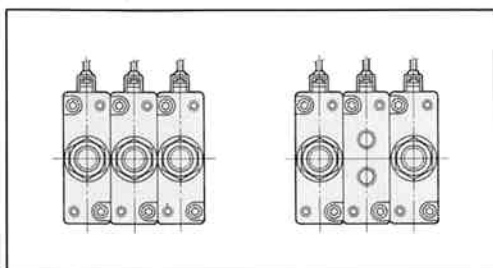
- If the working voltage/current of switch is insufficient, the indicating lamp may not light up.

### INSTALLATION

- Use iron plates as magnetic shield in locations with the strong ambient magnetic field.



- Contact to Our Company in case that switches with cylinder bore φ 25 or equivalent are built up for use. The switches may actuate erroneously by perceiving the magnet of nearby cylinder.



### WIRING

- Do not apply the switch cord to loads such as bending, pulling, etc. Especially in order that loads are not applied to the switch cord end, the switch cord shall be fixed.
- Do not connect switches in series. (The indicating lamp may not light up or the load may fail to work due to the voltage drop caused by the switch itself.)
- Do not connect switches in parallel. (Signals are output normally, but the indicating lamp may not light up.)
- Keep the switch cord away from the power supply of other electric appliances as much as possible. Switches and loads are badly affected by the induction current if the switch cords are bundled or wired near the power supply.
- Choke coil (NEC-made NSS-1) shall be connected in series near switch as the deposition may be caused when switch is closed in case that the switch cord is extended over 10m.

### DETECTABLE CYLINDER PISTON SPEED

- When switch is set at the intermediate position, keep the cylinder speeds lower than 300mm/sec to ensure the response of load relay.
- If the piston speed is too fast, the switch actuating time is short and loads of relay may not work although switch will actuate. The detectable cylinder piston speed shall be set with the following formula as reference.

$$\text{Detectable Piston Speed (mm/sec)} = \frac{\text{Switch Actuating Range (mm)}}{\text{Load Working Time (m·sec)}} \times 1000$$

Note: Refer to the load working time of relay of various companies.

## PRODUCT LINES

- **Pneumatic equipment**

Cylinders, valves, motors, accessories, control equipment, fitting, tubes

- **Hydraulic equipment**

Standard cylinders, custom cylinders, valves, pumps, accumulators, units, filters

- **Labor-saving automation equipment**

Industrial robots, automatic assembly, automatic conveyors, vacuum equipment, vacuum transfer equipment

- **Environmental machinery, recycling machinery**

Can presses, bailing presses

- **Business form printers**

NC business form printers

For further information, please contact :

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