

## INSTRUCTION MANUAL

### SUPER COMPACT CYLINDER

### SSD-X, SSD-Y Series

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

# For Safety Use

To use this product safely, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (to the level pursuant to JIS B 8370 Pneumatic System Rules).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your applications, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, **read this operation manual carefully for proper operation.**

Observe the cautions on handling described in this manual, as well as the following instructions:

## CAUTION :

- Before performing an overhaul inspection on the actuator, deactivate residual pressure completely.
- While the actuator is operating, do not step into or place hands in the driving mechanism.
- To prevent an electric shock, do not touch the electric wiring connections (exposed live parts) of the actuator equipped with a solenoid valve or switch.  
Perform an overhaul inspection with the power off. Also, do not touch these live parts with wet hands.

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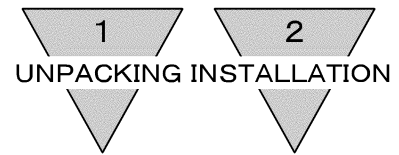
## SSD-X, SSD-Y

## Super Compact Cylinder

Single-acting • Advance type • Retracting type

Manual No. SM-234328-A

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## 1. UNPACKING

- 1) Make sure that the type No. on the nameplate of the delivered Super Compact Cylinder matches the type No. you ordered.
- 2) Check the appearance for any damage.
- 3) Stop up the piping port with a sealing plug to prevent the entry of foreign substances into the cylinder. Remove the sealing plug before piping.

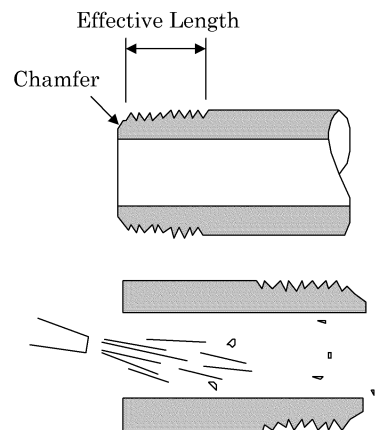
## 2. INSTALLATION

### 2.1 Installation

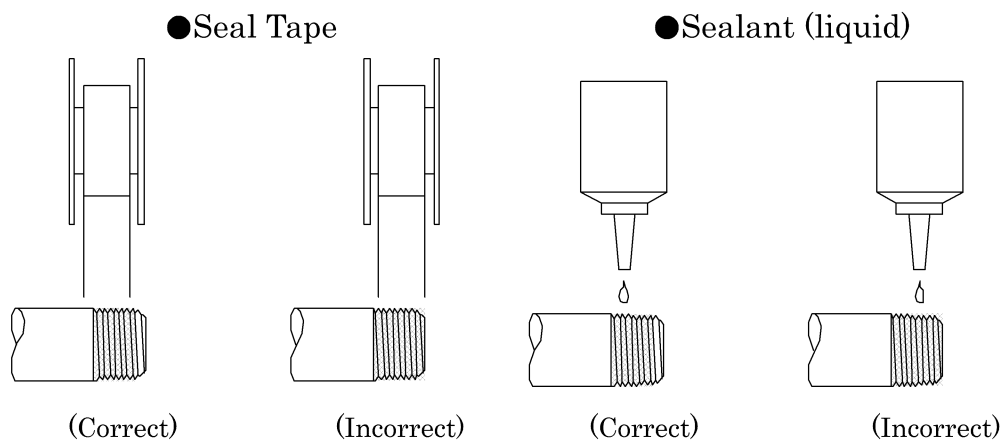
- 1) The ambient temperature for this cylinder is  $-10$  to  $60^{\circ}\text{C}$ . Always operate the cylinder within this temperature range.
- 2) Install cylinder body with a hexagon socket head cap screw directly.
- 3) As for the rod nose screw, there are internal thread type and external thread type. Use it to application.
- 4) Attach a guide so that no lateral load is exerted onto the piston rod.  
(Example) Apply no lateral load at all for the purpose of a stopper.

### 2.2 Piping

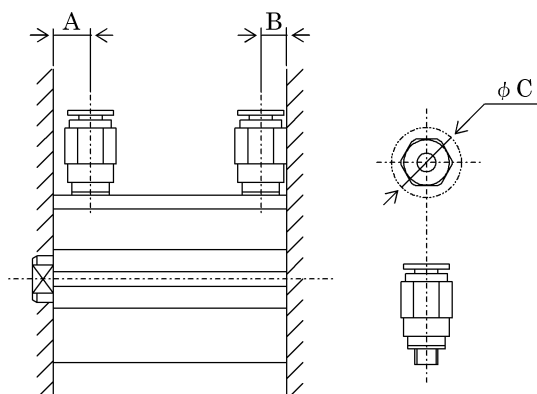
- 1) For piping beyond the filter, use pipes that are tough against corrosion such as galvanized pipes, nylon tubes, rubber tubes, etc.
- 2) See to it that the pipe connecting cylinder and solenoid valve has effective sectional area which is needed for the cylinder to drive at the specified speed.
- 3) Install filter preferably adjacent to the upper-stream to the solenoid valve for eliminating rust, foreign substance in the drain of the pipe.
- 4) Be sure observe the effective thread length of gas pipe and give a chamfer of approx.  $1/2$  pitch from the threaded end.
- 5) Flush air into the pipe to blow out foreign substances and chips before piping.



- 6) Refrain from applying sealant or sealing tape approx. two pitches of thread off the tip of pipe to avoid residual substances from falling into piping system.



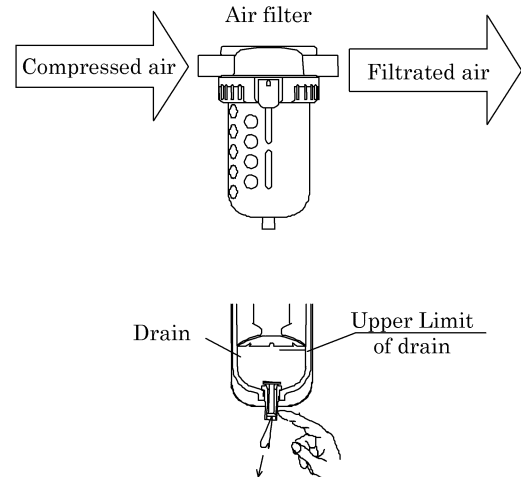
- 7) Because the usable piping joint has limitations, for using it, see the note below.



Item	Port diam.	Port dimension		Available joints	Joint OD	Joint unsuitable
Bore size (mm)		A	B		$\phi$ C	
$\phi$ 12	M5	5.5	5.5	SC3G-M5-4, SC3G-M5-6 GSS4-M5-S, GSS4-M5 GSL4-M5, GSL6-M5	$\phi$ 11 or less	GSS6-M5
$\phi$ 16						
$\phi$ 20		8				
$\phi$ 25		11	6			
$\phi$ 32	Rc1/8	8	8	SC3G-6-4•6•8 GSS4-6, GSS6-6, GSS8-6 GSL4-6, GSL6-6	$\phi$ 15 or less	GSS10-6 GSL8-6 GSL10-6
$\phi$ 40		12	8.5			
$\phi$ 50	Rc1/4	10.5	10.5	SC3G-8-6•8•10 GSS4-8, GSS6-8, GSS10-8 GSL4~12-8	$\phi$ 21 or less	GSS-12-8

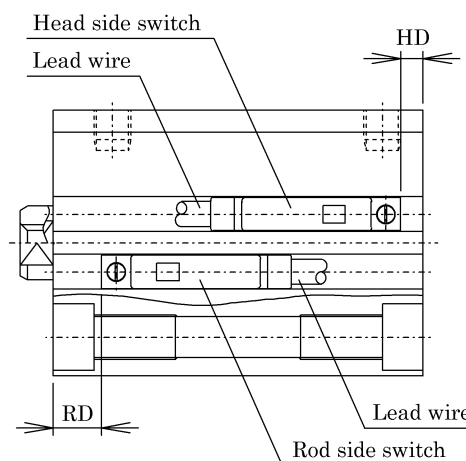
## 2.3 Fluid

- 1) It is necessary to use dehumidified air that has been filtered from compressed air. Carefully select an adequate filter that has an adequate filtration rate (preferably  $5\mu$  m or less), flow rate and its mounting location (as nearest to the directional control valve as possible).
- 2) Be sure to drain out the accumulation in the filter periodically.
- 3) Note that the intrusion of carbide for the compressor oil (such as carbon or tarry substance) into the circuit causes malfunction of the solenoid valve and the cylinder. Be sure to carry out thorough inspection and maintenance of the compressor.
- 4) This cylinder does not require lubrication. It is recommended, however, to use Turbine oil Grade 1, ISO VG32 as a lubricant, if and when lubrication is needed.



## 2.4 Location of mounting Switches on a Cylinder

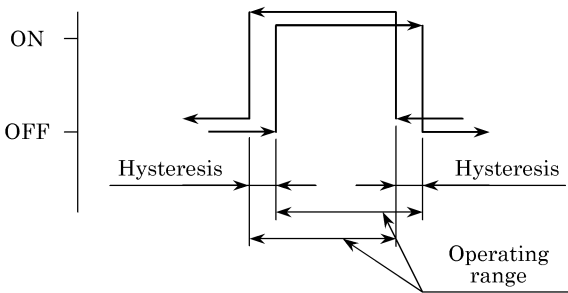
- 1) Location of mounting switches on a cylinder.
  - (1) At the stroke end  
Refer the illustration above. Mount switches within the rod side dimension RD as well as the head side dimension HD for the purpose of having switches function at the points of the maximum sensitive position.



- (2) Intermediate of stroke
- Move the piston where it is anticipated to stop and fix it tentatively Slide a switch carefully along the side of cylinder over the piston to find out the spot where switch turns on. This type spot should be located on both side of piston. The intermediate spot between those posits is of the maximum sensitive position and where the switch is supposed to be installed.
- (3) Relocation of switch
- Slide switch body along cylinder tube after loosening mounting screws and tighten screws when located the maximum sensitive position.
- (4) Replacing switch
- Take out switch out of groove after loosening mounting screws. Slide new replacing switch into groove and tighten screws upon placing the switch at the maximum sensitive position. (Apply tightening torque of 0.1 to 0.2N·m)

- 2) Operating range
- The switch turns on first and turns off as the piston moves along its stroke. Precise operating range deviate slightly depending upon the direction of piston movement as shown right.
- The center of the range is the mostly sensitive position. Setting switch at this point eliminates majority of external disturbance and provides the most stabile actuation of switch.

- 3) Hysteresis
- (1) Precise operating range deviate slightly depending upon the direction of piston movement as shown right.
- (2) Switch is apt to be disturbed its accuracy by external effect when piston stops within this range. Carefully avoid designing stop-  
ping location of piston.



Maximum sensitive position (HD·RD), Operating range and Hysteresis (mm)								
Item	Solid state type (T2H/V、T3H/V)			Reed switch type (T0H/V、T5H/V)				
Bore size (mm)	Maximum sensitive position		Operating range	Hysteresis	Maximum sensitive position		Operating range	Hysteresis
	HD	RD			HD	RD		
φ 12	0	2.5	2 to 6	1.5 or less	0	2.5	5 to 8	3 or less
φ 16	0	2	2 to 5		0	2	4 to 9	
φ 20	3	6.5	3 to 8		3	6.5	6 to 14	
φ 25	3	9.5	3 to 9		3	9.5	5 to 14	
φ 32	3.5	9	3 to 8		3.5	9	5 to 12	
φ 40	7	12	3 to 9		7	12	6 to 14	
φ 50	7.5	12.5	3 to 9		7.5	12.5	6 to 14	

※ Switches at ex-factory shipment are positioned at the maximum sensitive position (HD and RD).  
 Note: HD and RD for five strokes may vary from those stated in the above table since they are set every time the cylinder is installed.

### 3. OPERATION

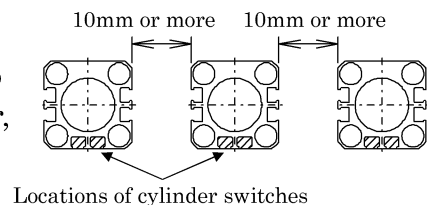
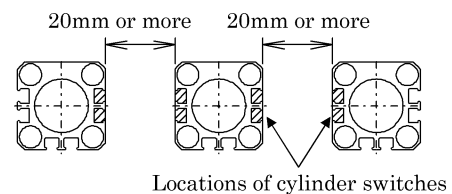
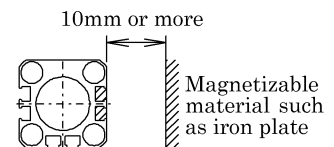
#### 3.1 Operating the Cylinder

- 1) The working pressure for this type of cylinder is specified in “Product Specifications” . Operate the system within this range.
- 2) Install an external stopper when the dynamic energy is large, as it does not absorb the kinetic energy since it has no cushion.
- 3) Install an appropriate speed controller to adjust the working piston speed.

#### 3.2 How to use the Switches

##### 3.2.1 Common items

- 1) Magnetic environment  
Do not operate this product in a place where a strong magnetic field or large current (large magnet or spot welder, etc.) exists. If a cylinder with the switch is installed in parallel to this product or the magnetic substance moves near the cylinder, the mutual interference may occur and affect the detection accuracy.
- 2) Protection of lead cord  
Pay consideration to eliminate repeating bending stress or stretching of lead cord while laying the cord.  
To the moving portion, use such cord of flexibility as for building a robot.
- 3) Operating temperature  
Do not operate the product at a high temperature (60°C)  
Always avoid operation of the product in a hot place due to temperature characteristics of magnetic and electronics parts.
- 4) Intermediate position detection  
When activating the switch halfway of the stroke, the relay may not respond if the piston speed is too fast.  
(Example) Operate cylinder with the speed of less than 500mm/s in case the relay actuation time is 20ms.
- 5) Shock resistance  
Do not apply a large vibration or impact to the product when transporting the cylinder, or mounting or adjusting the switch.





- 6) Magnetizable material such as ironplate near by cylinder switch is apt to cause malfunction of cylinder switches. Keep it from cylinder surface at least10mm away (This is applicable for all bore sizes of tube).
- 7) It usually causes malfunction cylinder switches when plural cylinders are laid adjoining. Keep a space between each other as illustrated to right (This is applicable for all bore sizes of tube).
- 8) Changing switch lead wire colors  
 The colors of the switch lead wires have been changed, as shown in the following table, in response to the revision of the JIS standard and the subsequent revision of the NECA (Nippon Electric Controllers Association) standard.

		Before change	After change
M, S, R, A, T, K, V, H Series	2-wire type	White (+)	Brown (+)
		Black (-)	Blue (-)
	3-wire type	Red (+)	Brown (+)
		White (output)	Black (output)
T, K Series (Equipped with preventive maintenance output)	3-wire type	Black (-)	Blue (-)
		White (+)	Brown (+)
		Yellow (preventive maintenance output)	Orange (preventive maintenance output)
	4-wire type	Black (-)	Blue (-)
		Red (+)	Brown (+)
		White (regular output)	Black (regular output)
		Yellow (preventive maintenance output)	Orange (preventive maintenance output)
		Black (-)	Blue (-)

### 3.2.2 Operational Cautions, Solid state switch (T2, T3)

- 1) Connection of lead cord  
 Comply with the color coding specified on the illustrations. Be sure to turn the power off before starting connecting work.  
 An erroneous wiring or short circuiting of load causes damage to not only switches, but also load side circuit. Wiring work without shutting electricity off may cause damage to the load side circuit

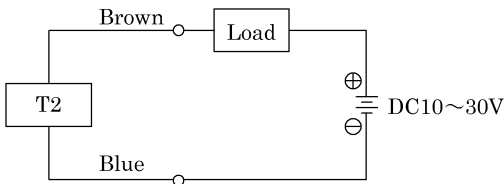


Fig.1 Fundamental circuit Example

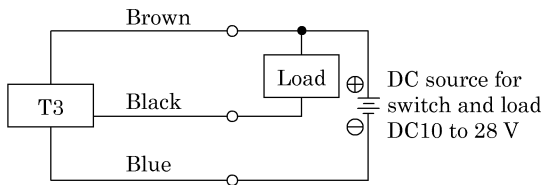


Fig.2 Fundamental circuit Example (1)  
(In case the same source of power is used.)

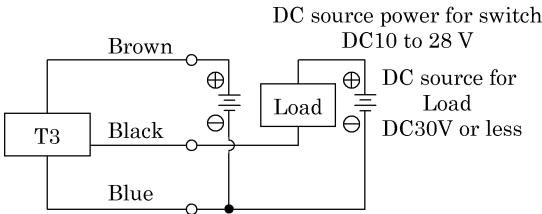


Fig.3 Fundamental circuit Example (2)  
(In case individual sources of power are used.)

## 2) Protection of output circuit

Install some protective circuit as illustrated in Fig. 4 when inducing type load (Relay or solenoid valve) are to be used because those types apt to generate surge current switch off.

Install some protective circuit as illustrated in Fig. 5 when capacitor type load (Capacitor type) are to be used, because these types apt to generate a dash current when turning the switch ON.

Install some protective circuit as illustrated in Fig. 6 or 7 (in case of model T2) and Fig 8 (in case of model T3).

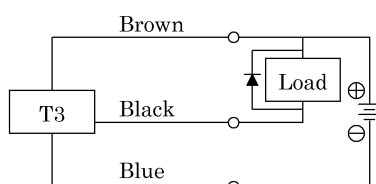


Fig.4 An example of using inducing load together with surge absorptive element (diode). (Hitachi Mfg. made diode V06C or equivalent is recommended.)

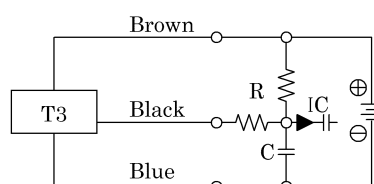


Fig.5 An example of using capacitor type load together with current regulating resistor R. Comply with the following formula to figure out required R.

$$\frac{V}{0.05} = R(\Omega)$$

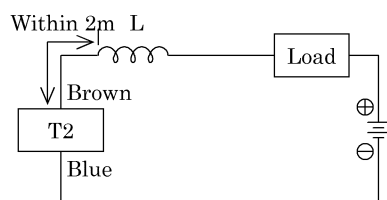


Fig.6 · Choke coil  
L = a couple hundred  $\mu$  H to a couple mH surpassing high frequency characteristic  
· Install it near by a switch (within 2m).

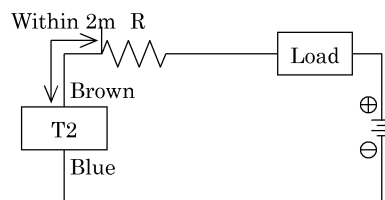


Fig.7 · Dash current restriction resistor.  
R = As much large resistor as the load circuit can afford.  
· Install it near by a switch (within 2m).

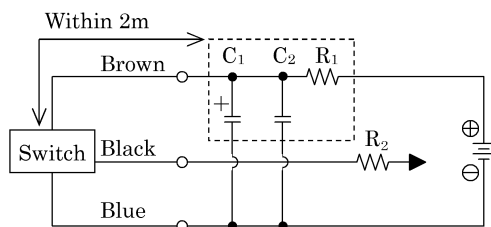


Fig8 · Electric power noise absorptive circuit.  
 $C_1$  = 20 to 50  $\mu$  F electrolytic capacitor (Withstand voltage 50V or more)  
 $C_2$  = 0.01 to 0.1  $\mu$  F ceramic capacitor  
 $R_1$  = 20 to 30  $\Omega$   
· Dash current restriction resistor.  
 $R_2$  = As much large resistor as the load circuit can afford.  
· Install it nearby the switch (Within 2m)

3) Connection to a programmable controller (Sequencer).

Type of connection varies depending upon the model of the programmable controller. Refer to the following Fig. 9 to 13 respectively.

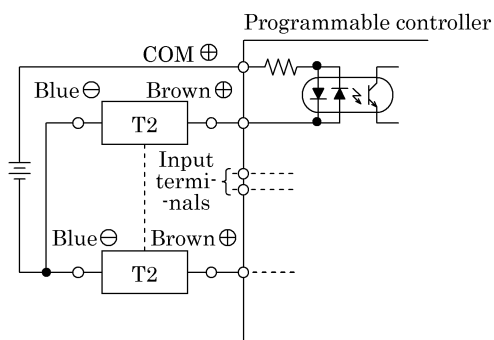


Fig.9 An example of T2 connection to source input type (an external power source)

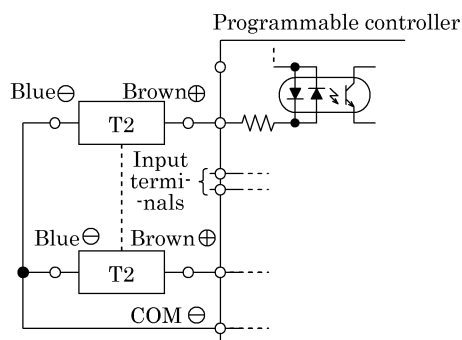


Fig.10 An example of T2 connection to source input type (an internal power source)

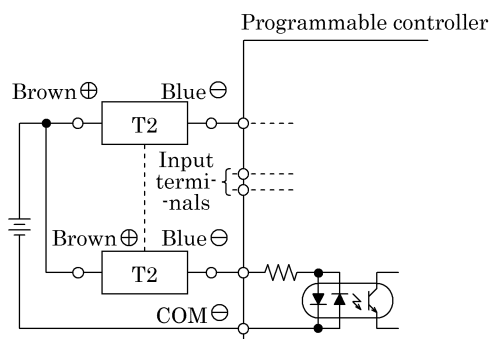


Fig.11 An example of T2 connection to source input type

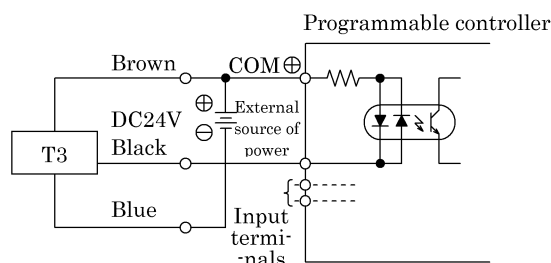


Fig.12 An example of T3 connection to source input type (an internal power source)

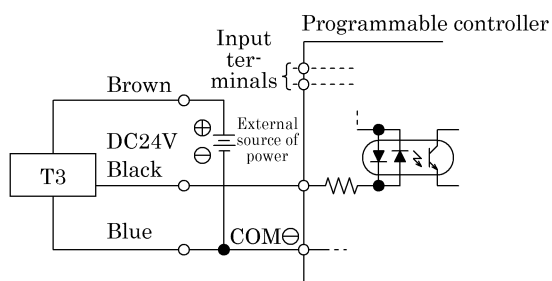


Fig.13 An example of T3 connection to source input type (an internal power source)

4) Series connection

The total voltage will decrease when the T2 switches connections have a leak. Therefore, confirm the input specifications for the programmable controllers, which are the connecting load. However, dimming or total failure of the indicator light may exist.

T3 switches hardly ever leak. When less than  $10 \mu A$ , then leakage may occur. Usually dimming and failure of the indicator light do not occur.

3.2.3 Reed switch (T0, T5)

- 1) Lead wire connections
- Do not connect the lead wires of the switch to the power supply directly. Always connect the loads in series. For T0 switch, carefully check following items ㉠, ㉡.
- ㉠ When using the switch for DC power supply, connect the brown and blue lines to the positive and negative sides, respectively. If these lines are connected reversely, the switch is activated, but the indicator light is not lit.
- ㉡ When the switch is connected to an AC relay or a programmable controller input, the indicator light on the switch is not lit if the half-wave rectification is performed in the connected circuit. If this occurs, reverse the polarities of the switch lead wire connection. The indicator light may then be lit.

- 2) Contact protective measures
- When an inductive load, such as relay is used or the wire length exceeds that stated in Table1, always install a contact protective circuit.

Table1

Electric power	Length of wire
DC	100m
AC	10m

(1) Protective circuit when connecting an inductive type load.

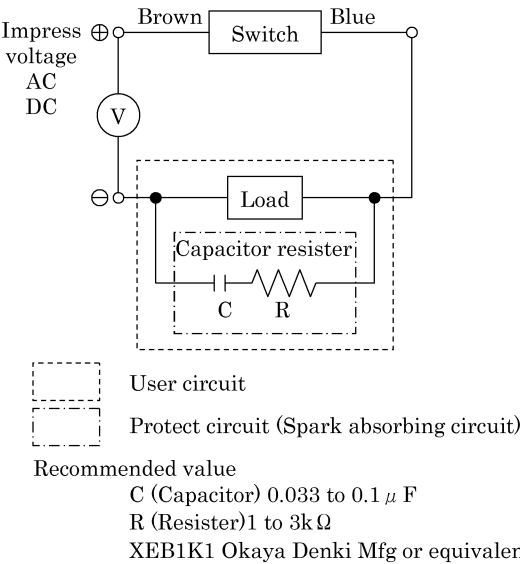


Fig.1 When capacitor resister is used.

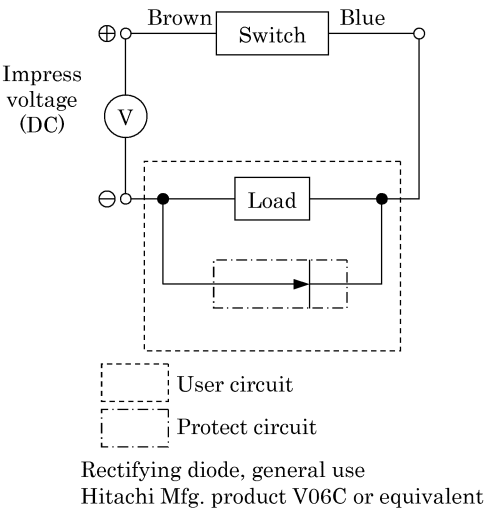
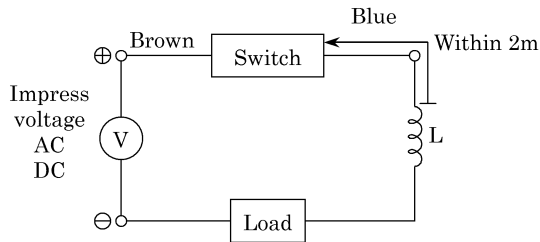


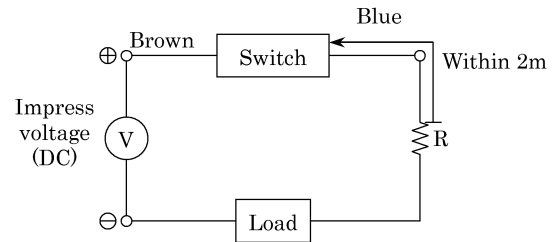
Fig.2 When diode is used.

(2) Protective circuit when the wire length exceeds that stated Table1.



- Choke coil  
L=a couple hundred  $\mu$  H to a couple mH  
surpassing high frequency characteristic
- Install it near by a switch (within 2m).

Fig.3



- Dash current restriction resister  
R=As much large resister as the load circuit can afford.
- Install it near by a switch (within 2m).

Fig.4

3) Contact capacity

Do not use a load exceeding the maximum contact capacity of the switch. Additionally, if the current is lower than the rated current value, the indicator light may not be lit.

4) Relay

Always use the relays listed below.

Omron Corporation ..... MY type  
Fuji Electric Co., Ltd. .... HH5 type  
Panasonic, Ltd. .... HC type

5) Serial connection

Total voltage loss, when connected T0 switches in series, equals to the sum of respective voltage loss of each switch.

The total voltage loss becomes equivalent to one T0 (approx. 2.4V) when connecting the combination of one T0 for actuation confirming and rest of T5 switches. Indicator light is lit only when all switches turn on.

6) Parallel connection

There is no restriction in parallel connection number of switches of these types. Multi number connection of model T0, sometimes, cause a dimmed indicator light or complete indicator light failure.

## 4. MAINTENANCE

### 4.1 Periodical Inspection

- 1) In order to upkeep the cylinder in optimum condition, carry out periodic inspection once or twice a year.
- 2) Inspection items
  - (1) Check the bolts and nuts fitting the piston rod end brackets and mounting brackets for slackening.
  - (2) Check to see that the cylinder operates smoothly.
  - (3) Check any change of the piston speed and cycle time.
  - (4) Check for internal and/or external leakage.
  - (5) Check the piston rod for flaw (scratch) and deformation.
  - (6) Check the stroke for abnormality.

See “Trouble shooting”, 5 should there be any trouble found, also carry out additional tightening if bolts, nuts, etc. are slackened.

### 4.2 Disassembly

- 1) This cylinder is able to be disassembled.

At the time of disassembly, there is a possibility that parts may jump out with a spring. Be careful enough.

Replace component parts listed in Expendable parts List by disassembling cylinder referring to internal structure diagram when air leakage is ever occurred.
- 2) Remove piston rod and rod metal after removing C shape snap ring for the purpose of disassembly.

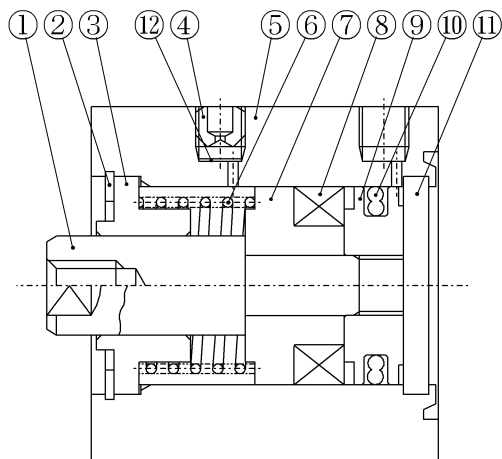
### 4.3 Assembly

- 1) Clean each component parts.
- 2) Take reversed sequence of disassembly to assemble cylinder after cleaning parts. Carefully avoid giving damage to packings to prevent malfunction or air leakage.
- 3) Apply a film of high grade grease (Lithium alkali base) over the inner surface of cylinder tube, outer surface of piston and packings.

## 4.4 Internal structure drawings and Expendable parts list

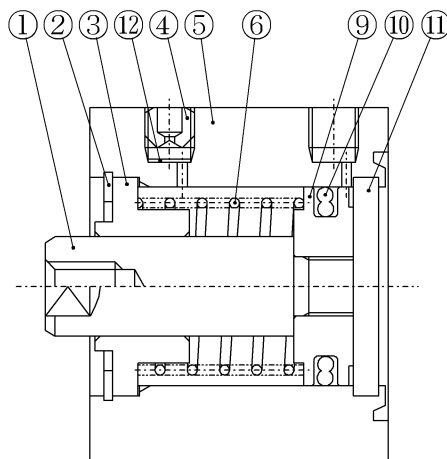
### ●SSD-XL

(Single acting·Advancing type·with switch )



### ●SSD-X

(Single acting·Advancing type)



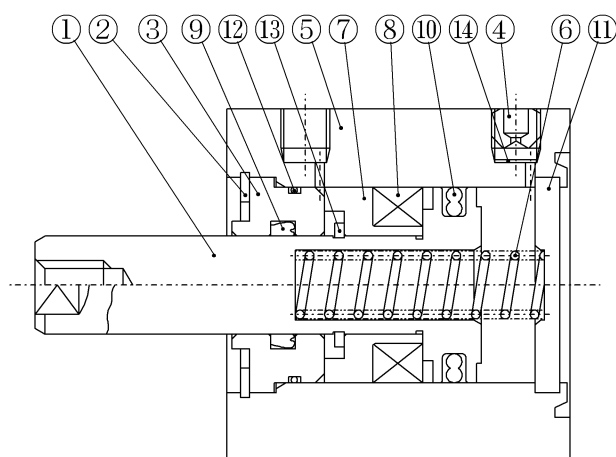
Parts No.	Parts name	Material	Parts No.	Parts name	Material
1	Piston rod	$\phi 12 \sim \phi 25$ : Stainless steel $\phi 32 \sim \phi 50$ : Steel	7	Spacer	$\phi 12$ : Stainless steel $\phi 16 \sim \phi 50$ : Aluminum alloy
2	Retaining ring C type	Steel	8	Piston magnet	Plastic magnet
3	Rod bushing	Special aluminum	9	piston	Aluminum alloy
4	Blank plug	Steel	10	Piston packing	Nitrile rubber
5	Body	Aluminum alloy	11	Cover	$\phi 12 \sim \phi 25$ : Stainless steel $\phi 32 \sim \phi 50$ : Aluminum alloy
6	Spring	Piano wire	12	Stainless wire net	Stainless steel

Expendable parts list (Specify the kit No. when ordering)

Bore size (mm)		Parts No.		⑩
		Parts name		Piston packing
		Kit No		
$\phi 12$		SSD-X-12K	SSD-XL-12K	PSD-12
$\phi 16$		SSD-X-16K	SSD-XL-16K	PSD-16
$\phi 20$		SSD-X-20K	SSD-XL-20K	PSD-20
$\phi 25$		SSD-X-25K	SSD-XL-25K	PSD-25
$\phi 32$		SSD-X-32K	SSD-XL-32K	PSD-32
$\phi 40$		SSD-X-40K	SSD-XL-40K	PSD-40
$\phi 50$		SSD-X-50K	SSD-XL-50K	PSD-50

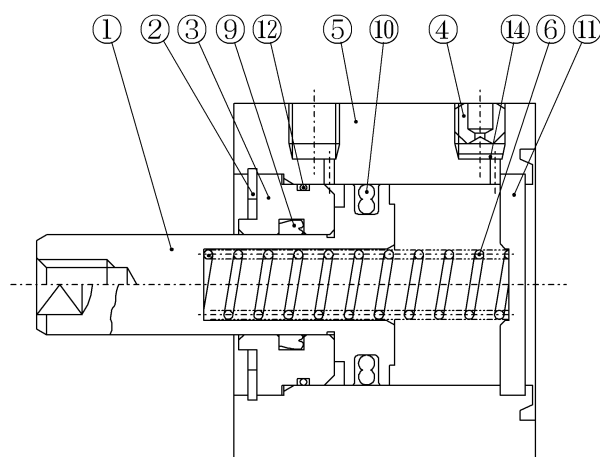
●SSD-YL

(Single acting・Retracting type・with switch )



●SSD-Y

(Single acting・Retracting type)

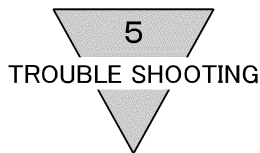


Parts No.	Parts name	Material	Parts No.	Parts name	Material
1	Piston	$\phi 12 \sim \phi 25, \phi 40, \phi 50$ : Aluminum alloy $\phi 32$ : Stainless	8	Piston magnet	Plastic magnet
2	Retaining ring C type	Steel	9	Rod packing	Nitrile rubber
3	Rod metal	Special Aluminum alloy	10	Piston packing	Nitrile rubber
4	Blank plug	Steel	11	Cover	$\phi 12 \sim \phi 25$ : Stainless steel $\phi 32 \sim \phi 50$ : Aluminum alloy
5	Body	Aluminum alloy	12	Rod metal gasket	Nitrile rubber
6	Spring	Piano wire	13	Retaining ring circle S type	Steel
7	Spacer	$\phi 12 \sim \phi 32$ : Stainless steel $\phi 40, \phi 50$ : Aluminum alloy	14	Stainless wire net	Stainless steel

Expendable parts list (Specify the kit No. when ordering)

Parts No.			⑨	⑩	⑫
Parts name			Rod packing	Piston packing	Rod metal gasket
Bore size (mm)	Kit No				
$\phi 12$	SSD-Y-12K	SSD-YL-12K	MYR-6	PSD-12	F3-657972
$\phi 16$	SSD-Y-16K	SSD-YL-16K	MYR-8	PSD-16	F3-657973
$\phi 20$	SSD-Y-20K	SSD-YL-20K	MYR-10	PSD-20	F3-657968
$\phi 25$	SSD-Y-25K	SSD-YL-25K	MYR-12	PSD-25	F3-657969
$\phi 32$	SSD-Y-32K	SSD-YL-32K	MYR-16	PSD-32	F3-657975
$\phi 40$	SSD-Y-40K	SSD-YL-40K	MYR-16	PSD-40	F3-657976
$\phi 50$	SSD-Y-50K	SSD-YL-50K	F4-428464	PSD-50	F3-657977





## 5. TROUBLE SHOOTING

### 1) Cylinder

Trouble	Causes	Remedies
Does not operate.	No pressure or inadequate pressure.	Provide an adequate pressure source.
	Signal is not transmitted to direction control valve.	Correct the control circuit.
	Improper or misalignment of installation.	Correct the installation state and/or change the mounting style.
	Broken piston packing	Replace the piston packing.
Does not function smoothly.	Speed is below the low speed limit	Limit the load variation.
	Improper or misalignment of installation.	Correct the installation state and/or change the mounting style.
	Exertion of transverse (lateral) load.	Install a guide. Revise the installation state and/or change the mounting style.
	Excessive load.	Increase the pressure itself and/or the inner diameter of the tube.
	Speed control valve is built in the way of "Meter in" circuit.	Change the meter-out circuit of the speed control valve.
Breakage and / or deformation	Impact force due to high speed operation	Turn the speed down. Reduce the load and/or install a mechanism with more secured cushion effect (e.g. external cushion mechanism).
	Exertion of transverse load.	Install a guide. Reverse the installation state and/or change the mounting style.

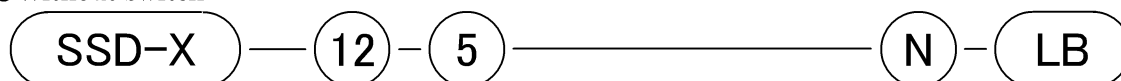
### 2) Switch

Troubles	Causes	Remedies
Indicator light is not lit.	Deposited contact point	Replace the switch.
	Excessive load than rated capacity	Replace the relay with a recommended one or replace the switch.
	Damaged indicator light	Replace the switch.
	Inadequate incoming signal	Review the external signal circuit and remove the causes.
Switch does not function right.	Broken circuit	Replace the switch.
	Inadequate incoming signal	Review the external signal circuit and remove the causes.
	Improper voltage	Correct voltage to specified.
	Incorrect location of switch	Correct its location.
	Aberrant position of switch	Set it back to original position and tighten the mounting device.
	Incorrect direction of switch mounting	Correct the direction of the switch mounting.
	Relay is unable to respond properly	Turn the speed down. Replace the relay with a recommended one.
	Excessive load than rated capacity	Replace the relay with a recommended one or replace the switch.
Switch does not return.	Piston is not moving	Make the piston move.
	Deposited contact point	Replace the switch
	Excessive load (relay) than rated capacity	Replace the relay with a recommended one or replace the switch.
	The ambient temperature is out of the specification range	Adjust the ambient temperature within the range of -10 to 60°C
	Existence of a foreign magnetic field	Shield the magnetic field.
	Inadequate incoming signal	Review the external signal circuit and remove the causes.

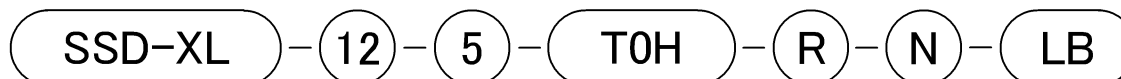
## 6. HOW TO ORDER

### 6.1 Product Number Coding

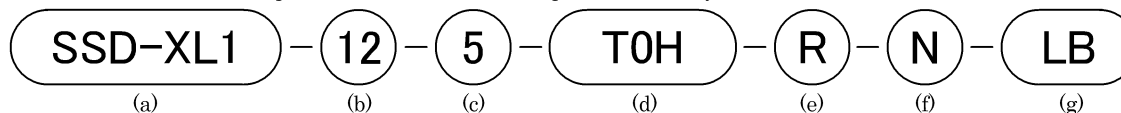
● Without switch



● With switch



● Bi colors indication · With preventive maintenance output switch (Only  $\phi 12$  and  $\phi 16$ )



(a) Model		(b) Bore size (mm)		(c) Standard stroke	
SSD-X	Single acting, Advance type	12	$\phi 12$	$\phi 12 \sim \phi 32$	$\phi 40 \sim \phi 50$
SSD-XL	Single acting, Advance type, with switch	16	$\phi 16$	5	10
SSD-XL1	$\phi 12, \phi 16$ , Bi colors indication, With preventive maintenance output switch	20	$\phi 20$	10	20
		25	$\phi 25$		
SSD-Y	Single acting, Retracting type	32	$\phi 32$		
SSD-YL	Single acting, Retracting type, with switch	40	$\phi 40$		
SSD-YL1	$\phi 12, \phi 16$ , Bi colors indication, With preventive maintenance output switch	50	$\phi 50$		

(d) Switch model code					(e) Qty of switch	
Lead wire		Switch type	Indicator light	Lead wire	R	1ea. Rod end
Straight type	L-shaped type				H	1ea. Head
T0H※	T0V※	Reed switch	One color indication	2-wire	D	2ea.
T5H※	T5V※					
T2H※	T2V※					
T3H※	T3V※	Solid state type switch	One color indication	2-wire		
T2YH※	T2YV※			3-wire		
T3YH※	T3YV※		Bi colors indication	2-wire		
T2YFH※	T2YFV※			3-wire		
T3YFH※	T3YFV※		Preventive maintenance output	4-wire		
T2YMH※	T2YMV※			3-wire		
T3YMH※	T3YMV※			4-wire		
T2JH※	T2JV※		Off delay type	2-wire		
T2YD※	—		Critical magnetic proof switch	2-wire		
T2YDT※	—					

※ mark indicates the length of lead wire.

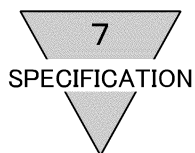
※ Lead wire length		(f) Option		(g) Mounting bracket (Note1)	
No code	1m (Standard)	N	Male thread rod end	LB	Axial foot
3	3m (Optional)			CB	Double clevis
5	5m (Optional)				

Note1: Mounting bracket is attached to the product at shipment.

### 6.2 Component parts Model coding



Switch model code Item (d)



## 7. SPECIFICATION

### 7.1 Product Specifications

Model		SSD-X SSD-XL (With switch)				SSD-Y SSD-YL (With switch)		
Item								
Bore size	mm	φ 12	φ 16	φ 20	φ 25	φ 32	φ 40	φ 50
Actuation		SSD-X, XL:Single acting, Advance type·SSD-Y, YL:Single acting, Retracting type						
Working fluid		Compressed Air						
Max. working pressure	MPa	1.0						
Min. working pressure	MPa	0.2		0.17		0.12		
Proof pressure	MPa	1.6						
Ambient temperature	℃	-10 to 60 (Not to be frozen)						
Port size		M5				Rc1/8		Rc1/4
Stroke tolerance	mm	+1.0 0						
Working piston speed	mm/s	50 to 500						
Cushion		Without Cushion						
Lubrication		Not required (Use Grade 1 ISO VG 32 Turbine oil, if lubrication is preferred)						
Option		Male thread rod end (N)						
Allowable energy absorption	J	0.004	0.01	0.016	0.021	0.025	0.092	0.1

Note: Do not leave a single acting type cylinder pressurizing. If it is left pressurizing when pressure is extracted a piston rod may not return. When use by pressurization leaving is necessary, double acting type is used.

## 7.2 Switch Specification

Type & Model	Reed switch			
Item	T0H, T0V		T5H, T5V	
Applications	For use with relay, programmable controller		For use with programmable controller relay, IC circuit (without indicator light), series connection	
Load Voltage	DC12/24V	AC110V	DC5/12/24V	AC110V
Load Current	5~50mA	7~20mA	50mA or less	20mA or less
Current consumption	—			
Internal voltage drop	2.4V or less		0V	
Indicator light	LED (ON lighting)		—	
Leakage current	0mA			
Lead wire length (Note1)	Standard 1m (Oil-proof vinyl cabtyre cord, 2-wire, 0.2mm <sup>2</sup> )			
Shock resistance	294m/s <sup>2</sup>			
Insulation resistance	20M Ω or more measuring with DC500V megger tester			
Withstand voltage	No abnormalities should occur after applying AC1,000V for 1 minute			
Ambient temperature	-10 to 60℃			
Degree of protection	IEC Standard IP67, JIS C0920 (water tight type), Oil resistance			

Type & Model	Solid state type switch		
Item	T2H, T2V	T2YH, T2YV	T2JH, T2JV
Applications	For use exclusively with programmable controller		
Load Voltage	DC10 to 30V		
Load Current	5 to 20mA (Note2)		
Current consumption	—		
Internal voltage drop	4V or less		
Delay hour off	—		200±50ms
Indicator light	LED (ON lighting)	Red／Green LED (ON lighting)	LED (ON lighting)
Leakage current	1mA or less		
Lead wire length (Note 1)	Standard 1m (Oil-proof vinyl cabtyre cord, 2-wire, 0.2mm <sup>2</sup> )	Standard 1m (Oil-proof vinyl cabtyre cord, 2-wire, 0.3mm <sup>2</sup> )	
Shock resistance	980m/s <sup>2</sup>		
Insulation resistance	20MΩ or more measuring with DC500V megger tester	100MΩ or more measuring with DC500V megger tester	
Withstand voltage	No abnormalities should occur after applying AC1,000V for 1 minute		
Ambient temperature	-10 to 60℃		
Degree of protection	IEC Standard IP67, JIS C0920 (water tight type), Oil resistance		

Type & Model	Solid state type switch	
Item	T3H, T3V	T3YH, T3YV
Applications	For use with programmable controller, relay	
Power supply voltage	DC10 to 28V	
Load Voltage	DC30V or less	
Load Current	100mA or less	50mA or less
Current consumption	10mA or less when it is on at DC24V	
Internal voltage drop	0.5V or less	
Delay hour off	—	
Indicator light	LED (ON lighting)	Red/Green LED (ON lighting)
Leakage current	10 μA or less	
Lead wire length (Note 1)	Standard 1m (Oil-proof vinyl cabtyre cord, 3-wire, 0.2mm <sup>2</sup> )	
Shock resistance	980m/s <sup>2</sup>	
Insulation resistance	20MΩ or more measuring with DC500V megger tester	100MΩ or more measuring with DC500V megger tester
Withstand voltage	No abnormalities should occur after applying AC1,000V for 1 minute	
Ambient temperature	-10 to 60℃	
Degree of protection	IEC Standard IP67, JIS C0920 (water tight type), Oil resistance	

Type & Model		Solid state type switch	
Item		T2YFH, T2YFV	T3YFH, T3YFV
Applications		For use exclusively with programmable controller	For use with programmable controller, relay
Indicator light	Mounting position adjustment part	Red/Green LED (ON lighting)	
	Preventive maintenance output part	—	
Output part	Power supply voltage	—	DC10 to 28V
	Load voltage	DC10 to 30V	DC30V
	Load current	DC5 to 20mA	DC50mA or less
	Internal voltage drop	4V or less	0.5V or less
	Current consumption	—	10mA or less
	Leakage current	1mA or less	10 $\mu$ A or less
Preventive maintenance output part	Load voltage	DC30V or less	
	Load current	DC20mA or less	DC50mA or less
	Internal voltage drop	0.5V or less	
	Leakage current	10 $\mu$ A or less	
	Signal holding (T on)	—	
	Signal release (T off)	—	
Lead wire length (Note1)		Standard 1m (Oil-proof vinyl cabtyre cord, 3-wire, 0.2mm <sup>2</sup> )	Standard 1m (Oil-proof vinyl cabtyre cord, 4-wire, 0.2mm <sup>2</sup> )
Shock resistance		980m/s <sup>2</sup>	
Insulation resistance		100M $\Omega$ or more measuring with DC500V megger tester	
Withstand voltage		No abnormalities should occur after applying AC1,000V for 1 minute	
Ambient temperature		-10 to 60°C	
Degree of protection		IEC Standard IP67, JIS C0920 (water tight type), Oil resistance	

Type & Model		Solid state type switch	
Item		T2YMH, T2YMV	T3YMH, T3YMV
Applications		For use exclusively with programmable controller	For use with programmable controller, relay
Indicator light	Mounting position adjustment part	Red/Green LED (ON lighting)	
	Preventive maintenance output part	Yellow LED is lit when switch is ON	
Output part	Power supply voltage	—	DC10 to 28V
	Load voltage	DC10 to 30V	DC30V or less
	Load current	DC5 to 20mA	DC50mA or less
	Internal voltage drop	4V or less	0.5V or less
	Current consumption	—	10mA or less
	Leakage current	1.2mA or less	10 $\mu$ A or less
Preventive maintenance output part	Load voltage	DC30V or less	
	Load current	DC5~20mA or less	DC50mA or less
	Internal voltage drop	4V or less	2.4V or less
	Leakage current	10 $\mu$ A or less	
	Signal holding (T on)	Turns ON(0. 4 $\pm$ 0. 2) seconds after the red LED turns ON at Mounting position adjustment part	
	Signal release (T off)	Turns OFF(0. 7 $\pm$ 0. 2) seconds after the red LED turns ON at Mounting position adjustment part	
Lead wire length (Note1)		Standard 1m (Oil-proof vinyl cabtyre cord, 3-wire, 0.2mm <sup>2</sup> )	Standard 1m (Oil-proof vinyl cabtyre cord, 4-wire, 0.2mm <sup>2</sup> )
Shock resistance		980m/s <sup>2</sup>	
Insulation resistance		100M $\Omega$ or more measuring with DC500V megger tester	
Withstand voltage		No abnormalities should occur after applying AC1,000V for 1 minute	
Ambient temperature		-10 to 60°C	
Degree of protection		IEC Standard IP67, JIS C0920 (water tight type), Oil resistance	

Type & Model	Solid state type switch	
Item	T2YD	T2YDT
Applications	For use exclusively with programmable controller	
Indicator light	Red/Green LED (ON lighting)	
Load voltage	DC24V±10%	
Load current	5 to 20mA	
Internal voltage drop	6V or less	
Leakage current	1.0mA or less	
Output delay time (Note3) (ON delay、OFF delay)	30 to 60ms	
Lead wire length (Note1)	Standard 1m (Oil-proof vinyl cabtyre cord, 2-wire, 0.5mm <sup>2</sup> )	Standard 1m (Non-flammable cabtyre cord, 2-wire, 0.5mm <sup>2</sup> ) (Option)
Shock resistance	980m/s <sup>2</sup>	
Insulation resistance	100MΩ or more measuring with DC500V megger tester	
Withstand voltage	No abnormalities should occur after applying AC1,000V for 1 minute	
Ambient temperature	-10 to 60℃	
Degree of protection	IEC Standard IP67, JIS C0920 (water tight type), Oil resistance	

Note 1: 3m or 5m long lead wire is optionally available.

Note 2: Maximum value, 25mA is at 25℃ of ambient temperature. Load current decreases less than 25mA when the ambient temperature exceeds 25℃. For example: it may be 5 to 10mA at 60℃

Note 3: This shows a period of time between detection of the piston magnet by the magnetic sensor and sending of switch output.