CKD

SM-201531-A

INSTRUCTION MANUAL

STOPPER CYLINDER

STK 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.

CKD Corporation

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 application, 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 instruction manual carefully for proper operation.

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

⚠ Precautions

- 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.

INDEX

STK
Stopper Cylinder
Manual No. SM-201531-A

NOTE : Letters & figures enclosed within Gothic style bracket (examples such as [C2-4PP07] · [V2-503-B] etc.) are editorial symbols being unrelated with contents of the book.

Apr.30.1996
Revision : Feb.14.1998

1. PRODUCT

1.1 Specification of Cylinder

Model Code · Action Rod end form Item	STK Double acting Round bar form	STK-M Double acting Round bar form with flat face	STK-Y Single acting (pull) Round bar form	STK-MY Single acting (pull) Round bar form with flat face
Tube bore mm	20, 32, 40, 50			
Standard Stroke mm	ϕ20, ϕ32 ····· 10, 15, 20 ϕ40, ϕ50 ····· 20, 25, 30			
Service Fluid	Compressed Air			
Lubrication	Not required (Use turbine oil Class 1 ISO VG32, if lubrication is preferred.)			
Max. working pressure (Note1) MPa {kgf/cm^2}	1 {10.2}			
Min. working pressure (Note1) MPa {kgf/cm^2}	ϕ20 ····· 0.15 {1.5} ϕ32, ϕ40, ϕ50 ····· 0.1 {1.0}		ϕ20 ····· 0.22 {2.2} ϕ32, ϕ40, ϕ50 ····· 0.12 {1.2}	
Withstanding Pressure MPa {kgf/cm^2}	1.6 {16.3}			
Ambient Temp °C	−10~60 (Not to be frozen)			
Connecting port diam.	ϕ20 ····· M5×0.8 , ϕ32, ϕ40 ····· Rc1/8 , ϕ50 ····· Rc1/4			
Piston Speed mm/s	50~500			
Option	Female thread at the rod end			

Model Code · Action Rod end form Item	STK-Y1 Double acting (with spring) Round bar form	STK-MY1 Double acting (with spring) Round bar form with flat face	STK-JY Single acting (pull) Roller form	STK-JY1 Double acting (with spring) Roller form
Tube bore mm	20, 32, 40, 50			
Standard Stroke mm	ϕ20, ϕ32 ····· 10, 15, 20 ϕ40, ϕ50 ····· 20, 25, 30			
Service Fluid	Compressed Air			
Lubrication	Not required (Use turbine oil ISO VG32, if lubrication is preferred.)			
Max. working pressure (Note1) MPa {kgf/cm^2}	1 {10.2}			
Min. working pressure (Note1) MPa {kgf/cm^2}	ϕ20 ····· 0.22 {2.2} ϕ32, ϕ40, ϕ50 ····· 0.12 {1.2}			
Withstanding Pressure MPa {kgf/cm^2}	1.6 {16.3}			
Ambient Temp °C	−10~60 (Not to be frozen)			
Connecting port diam.	ϕ20 ····· M5×0.8 , ϕ32, ϕ40 ····· Rc1/8 , ϕ50 ····· Rc1/4			
Piston Speed mm/s	50~500			
Option	Female thread at the rod end		———	

Note1 : Pressure unit 1MPa≒10.2kgf/cm^2

1.2 Specification of Switch

1) Kind and application of switch

Model code / Item			Purpose · Application
Peximity	2-code	T2H	for DC programmable controller, exclusive
		T2V	for DC programmable controller, exclusive
	3-code	T3H	for DC programmable controller or Relay
		T3V	for DC programmable controller or Relay
Contact point	2-code	T0H	for AC/DC Relay or programmable controller
		T0V	for AC/DC Relay or programmable controller
		T5H	for AC/DC programmable controller, relay or IC circuit (not including Lamp), for
		T5V	Series connection
2-color indicating, proximity	2-code	T2YH	for DC programmable controller, exclusive
		T2YV	for DC programmable controller, exclusive
	3-code	T3YH	for DC programmable controller or Relay
		T3YV	for DC programmable controller or Relay
Proximity type w/prev. maintenance output	3-code	T2YFH	for DC programmable controller, exclusive
		T2YFV	for DC programmable controller, exclusive
	4-code	T3YFH	for DC programmable controller or Relay
		T3YFV	for DC programmable controller or Relay
	3-code	T2YMH	for DC programmable controller, exclusive (self holding)
		T2YMV	for DC programmable controller, exclusive (self holding)
	4-code	T3YMH	for DC programmable controller or Relay (self holding)
		T3YMV	for DC programmable controller or Relay (self holding)

Note 1: T※H designates Lead cord outlet is straight out type as well as T※V designates Lead cord outlet is L shape type.

2) Switch Specification

Class · Model code / Item	Contact Point type Switch	
	T0H · T0V	T5H · T5V
Application	for Relay and Programmable controller	for Programmable controller, Relay, IC circuit (No Lamp) : Series connection
Power voltage	——	
Load voltage · Current	DC12/24V, 5~50mA AC100V, 7~20mA	DC12/24V, 50mA or less AC100V, 20mA or less
Power consumption	——	
Internal voltage drop	2.4V or less	0V
Lamp	LED is lit when Power is ON	——
Leakage current	0	
Lengh of lead wire (Note 1)	Standard 1m (Oil resistance Vinyl cabtyre cord, 2-core, 0.2mm^2)	
Max. shock	294m/s^2 {30G}	
Insulation resistance	20MΩ or more by DC 500V megger	
Insulation voltage	No abnormalities upon charging AC1000V for one minute.	
Ambience temperature	−10~+ 60°C	
Protective structure	IEC Standard IP67, JIS C0920 (Intrusion type without water), Oil proof	

Class · Model code	Proximity Switch	
Item	T2H · T2V	T2YH · T2YV
Application	for Programmable controller	
Power voltage	——	
Load voltage · Current	DC10~30V 5~25mA (Note 2)	
Power consumption	——	
Internal voltage drop	4V or less	
Lamp	LED is lit when Power is ON	Red / Green LED (Lights while power is ON)
Leakage current	1 mA or less	
Lengh of lead wire (Note 1)	Standard 1m (Oil resistance Vinyl cabtyre cord, 2-core, 0.2mm^2)	
Max. shock	980m/s^2 {100G}	
Insulation resistance	20MΩ or more by DC 500V megger	100MΩ or more by DC 500V megger
Insulation voltage	No abnormalities upon charging AC1000V for one minute.	
Ambience temperature	−10~+60°C	
Protective structure	IEC Standard IP67, JIS C0920 (Intrusion type without water), Oil proof	

Class · Model code	Proximity Switch	
Items	T3H · T3V	T3YH · T3YV
Application	for Programmable controller and Relay	
Power voltage	DC10~28V	
Load voltage · Current	DC30V or lower, 100mA or less	DC30V or lower, 50mA or less
Power consumption	10mA or less at DC24V (While Power is ON)	
Internal voltage drop	0.5V or less by 100mA	0.5V or less
Lamp	LED is lit when Power is ON	Red / Green LED (Lights while power is ON)
Leakage current	10μA or less	
Lengh of lead wire (Note 1)	Standard 1m (Oil resistance Vinyl cabtyre cord, 3-core, 0.2mm^2)	
Max. shock	980m/s^2 {100G}	
Insulation resistance	20MΩ or more by DC 500V megger	100MΩ or more by DC 500V megger
Insulation voltage	No abnormalities upon charging AC1000V for one minute.	
Ambience temperature	−10~+60°C	
Protective structure	IEC Standard IP67, JIS C0920 (Intrusion type without water), Oil proof	

Note1 : 3m, 5m optional lead wire are available beside standard length.

Note2 : Max. Load Current (25mA) is at 25°C. It may drop lower than 25mA when ambient temperature rises higher than 25°C. (for example : it, may be 5~10mA at 60°C)

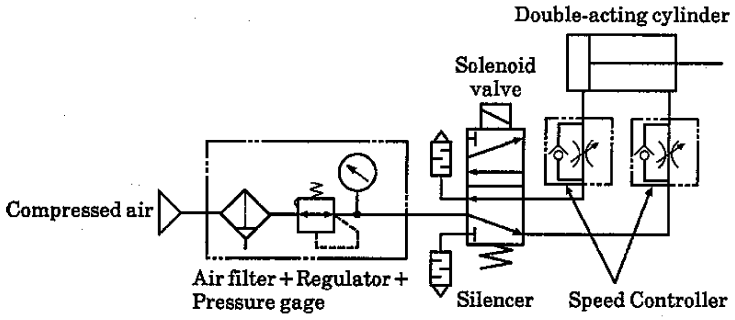
Class · Model code		Proximity 3-core type	Proximity 4-core type	Proximity 3-core type	Proximity 4-core type
Item		T2YFH/V	T3YFH/V	T2YMH/V	T3YMH/V
Application		for Programmable controller	for Programmable controller or Relay	for Programmable controller	for Programmable controller or Relay
Indicator	Mounting position adjustment part	Red /Green LED (Lights while power is ON)			
	Preventive maintenance output part	———		Yellow LED (Lights while power is ON)	
Normal output Segment	Power voltage	———	DC10~28V	———	DC10~28V
	Load voltage	DC10~30V	DC30V or less	DC10~30V	DC30V or less
	Load current	DC5~20mA	DC50mA or less	DC5~20mA	DC50mA or less
	Internal voltage drop	4V or less	0.5V or less	4V or less	0.5V or less
	Current consumption	———	10mA or less	———	10mA or less
	Leak current	1mA or less	10μA or less	1.2mA or less	10A or less
Preventive maintenance Segment	Load voltage	DC30V or less			
	Load current	DC20mA or less	DC50mA or less	DC5~20mA or less	DC50mA or less
	Internal voltage drop	0.5V or less		4V or less	2.4V or less
	Leak current	10μA or less			
	Signal holding (Ton)	———	———	Turns ON (0.4±0.2) seconds after the red LED turns ON at Mounting position adjustment part	
	Signal release (Toff)	———	———	Turns OFF (0.7±0.2) seconds after the red LED turns ON at Mounting position adjustment part	
Lengh of lead cord (※1)		1m(Oil proof vinyl, Cabtyre cord, 3-core, 0.2m^2)	1m(Oil proof vinyl, Cabtyre cord, 4-core, 0.2m)	1m(Oil proof vinyl, Cabtyre cord, 3-core, 0.2m)	1m(Oil proof vinyl, Cabtyre cord, 4-core, 0.2m)
Insulation resistance		100MΩ or more by DC500V megger			
Insulation voltage		No abnormalities upon charging AC1000V for one minute.			
Max. shock		980m/s^2 {100G}			
Ambient temperature		−10~+60°C			
Protective structuure		JIS C0920 (Intrusion type without water), IP67, Oil proof			

Note1 : 3m, 5m optional lead wire are available beside standard length.

Note2 : Max. Load Current (25mA) is at 25°C. It may drop lower than 25mA when ambient temperature rises higher than 25°C. (for example : it, may be 5~10mA at 60°C)

1.3 Fundamental Circuit Diagram & Selection of Related Equipment

1) Fundamental Circuit Diagram of Double-acting Cylinder (Oilles type)
The following is the fundamental circuit diagram



2) Selection of Related Equipment with the Fundamental Circuit Diagram above :

The related equipment depends on the tube inner diameter and speed of the driving cylinder. Select equipment from the Selection Guide Table. (The table provided on the next page is an example of related equipment.)

Selection Guide Table for Related Equipment

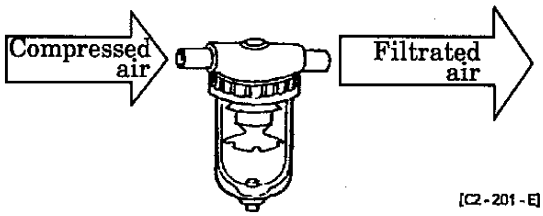
Tube bore (mm)	Theoretical speed (mm/s)	Required flow ℓ/min at P=0.5MPa {5kgf/cm²}	Solenoid valve		Speed Controller	Silencer	Plumbing Tube
			Single Solenoid	Double Solenoid			
φ20	400	46	4KA110	4KA120	SC3G-M5-6	SL-M5	φ6×φ4 Nylon Tube
φ32 φ40	400	180	4K210-06 4L210-06 4F110-06	4K220-06 4L220-06 4F120-06	SCI-6	SLW-6A	φ8×φ6 Nylon Tube
φ50	500	350	4K210-08 4L210-08 4F110-08	4K220-08 4L220-08 4F120-08	SCI-8	SLW-8A SLW-6A	φ10×φ8 Nylon Tube

2
CAUTION

2. CAUTION

2.1 Fluid

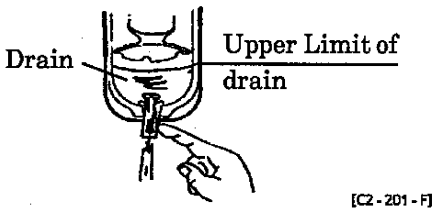
1) Use the compressed air, filtrated and dehumidified. Carefully select a filter of an adequate filtration rate (5μm or lower preferred), flow rate and its mounting location (as closest to directional control valve as possible).



[C2-201-E]

2) Be sure to drain out the accumulation in filter periodically.

3) Note that the intrusion of carbide of compressor oil (such as carbon or tarry substance) into the circuit causes malfunction of solenoid valve and cylinder.

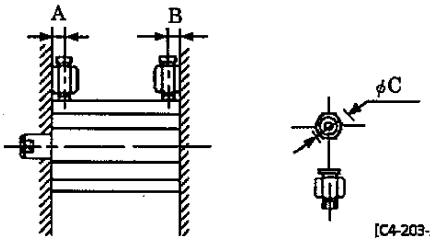


[C2-201-F]

Be sure to carry out thorough inspection and maintenance of compressor.

4) This cylinder does not require lubrication. It is recommended, however, to use Turbine oil Grade 1, ISO VG32 as lubricant for the cylinders with the speed of 500mm/sec and higher.

5) Refer to the table, on next page, to select suitable joint because there are some restrictions of choosing appropriate plumbing joints.



[C4-203-A]

Item / Tube bore (mm)	Port diam.	Port location A	Port location B	Available joints	Joint OD φC	Joint unsuitable
φ20	M5×0.8	8	5.5	SC3G-M5-4, SC3G-M5-6 GSS4-M5-S, GSS4-M5 GSL4-M5, GSL6-M5	φ11 or less	GSS6-M5
φ32	Rc1/8	8	8	SC3G-6-4・6・8, GSS4-6 GSS6-6, GSS8-6 GSL4-6, GSL6-6	φ15 or less	GSS10-6 GSL8-6 GSL10-6
φ40		12	8.5			
φ50	Rc1/4	10.5	10.5	SC3G-8-6・8・10 GSS4-8, GSS6-8 GSS10-8, GSL4~12-8	φ21 or less	GSS-12-8

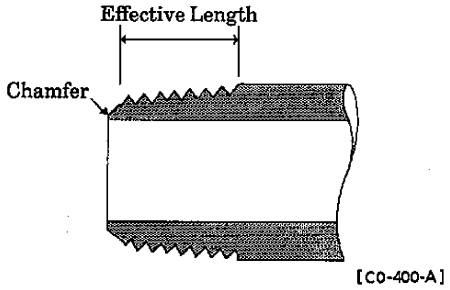
3. OPERATION

1) See to it that the air supply pressure to the cylinder is as shown in the "Specification". Operate the cylinder within this pressure 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 a speed controller as shown in "Fundamental Circuit Diagram" on page 4 to control the piston speed.

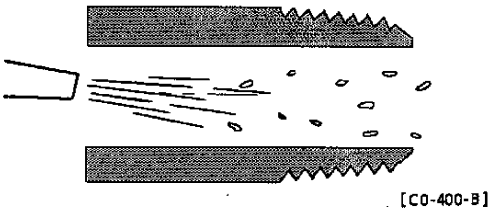
4. INSTALLATION

4.1 Piping

1) For piping beyond the filter, use pipes that hardly get corroded such as galvanized pipes, nylon tubes, rubber tubes, etc. (Refer to Selection Guide Table for Related Equipment.)
2) See to it that the pipe connecting cylinder and solenoid valve has effective sectional area needed for the cylinder to drive at specified speed. (Refer to Selection Guide Table for Related Equipment.)
3) Install filter preferably adjacent upper-stream to solenoid valve for eliminating rust, foreign substance and drain in the pipe.
4) Strictly observe the effective thread length of gas pipe and give a chamfer of approx. 1/2 pitch from the threaded end.

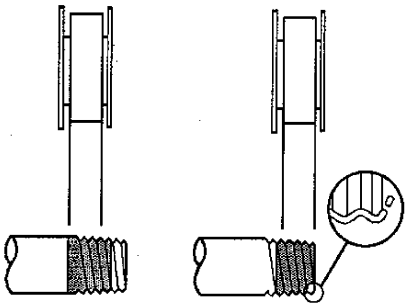


5) Flush air into the pipe to blow out foreign substances and chips before piping.

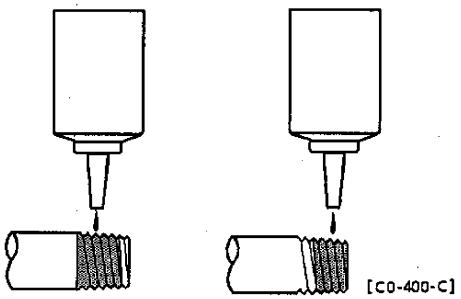


6) Refrain applying sealant or sealing tape approx. two pitches of thread off the tip of pipe to avoid residual substances from falling into piping system.

● Seal Tape



● Sealant (Paste or liquid)

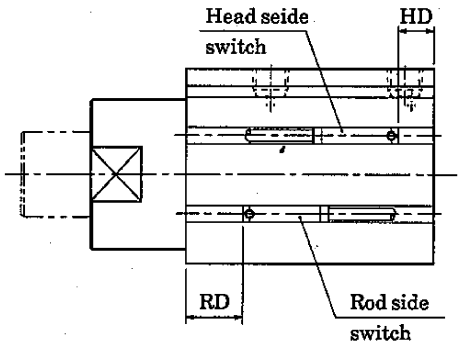


4.2 Installation

1) The ambient temperature range for this cylinder is −10~60°C (Standard model). Be sure that the cylinder be used within this range.
2) Mount the cylinder body directly using a hexagonal socket head screw.
3) There are two types of rod end threading; male thread and female thread. Select either one to suit for your needs.

4.3 Location of mounting Switch

1) Location of mounting it



(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 highest sensitivity.

Mount the switches to have lead wires come out inward as per illustrated.

(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 points is of the highest sensitivity and where the switch is supposed to be installed.

- Relocation of switch

  Slide switch body along cylinder tube after loosening mounting screws and tighten screws when located the most sensitive position.

- 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 most sensitive position. (Apply tightening torque of 0.1~0.2N · m {0.01~0.02kgf · m})

2) Motion limit

(1) The range where switch turns on first and turns off as the piston moves along its stroke is called motion limit.

(2) 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) The distance is called hysteresis between the positions where switch turns ON as piston slides long and where switch turns OFF due to reversing stroke of piston.

(2) Switch is apt to be disturbed its accuracy by external effect when piston stops within this range. Carefully avoid designing stopping location of piston.

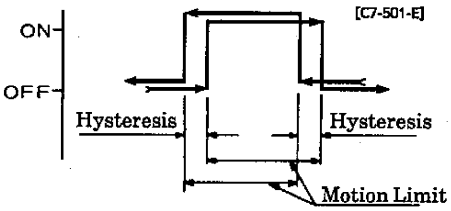


Table of the most sensitive points (HD · RD), motion limit and hysteresis. (mm)

Item		Proximity switch (T2H/V, T3H/V)				Contact point switch (T0H/V, T5H/V)			
Model	Tube bore (mm)	The most sensitive points		Motion Limit	Hys-teresis	The most sensitive points		Motion Limit	Hys-teresis
		HD	RD			HD	RD		
STK STK-M	ϕ20	5.5	21	3~8	1.5 or more	5.5	21	6~14	3 or more
	ϕ32	9.5	21	3~8		9.5	21	5~12	
	ϕ40	10.5	24	3~9		10.5	24	6~14	
	ϕ50	11.5	24	3~9		11.5	24	6~14	
STK-Y STK-MY STK-JY STK-Y1 STK-MY1 STK-JY1	ϕ20	7.0	19.5	3~8		7.0	19.5	6~14	
	ϕ32	10.5	20	3~8		10.5	20	5~12	
	ϕ40	11.5	23	3~9		11.5	23	6~14	
	ϕ50	12.5	23	3~9		12.5	23	6~14	

※ Switches at ex-factory shipment are positioned at the most sensitive points (HD and RD).

5. OPERATIONAL CAUTIONS OF SWITCHES

5.1 General Cautions

1) Magnetic environment

Avoid usage of these switches within the area where strong magnetic field or large current exists. (such as a large magnet or spot welding equipment) Position censoring errors will be resulted when installing many cylinders with switches in parallel or magnetized piece come across the cylinder due to intervention among each other.

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) Service temperature

It is unsuitable to operate it in high temperature (above 60°C) due to thermal characteristics of magnetic parts and electronic parts. Eliminate operation in such high temperature.

4) Intermediate position sensing

Beware of unstable respondence of relay when piston speed is excessive in the event of intending actuation of switch in the way of piston stroke.

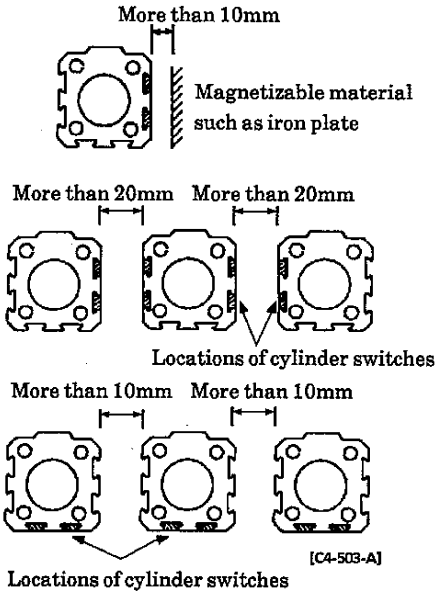
(Example) Operate cylinder with the speed of less than 500mm/s in case the relay actuation time is 20ms.

5) Shock

Carefully avoid big shock or vibration during transportation of cylinder or mounting and adjusting switch.

6) Magnetizable material such as iron plate near by cylinder switch is apt to cause malfunction of cylinder switches. Keep it from cylinder surface at least 10mm away. (This is applicable for all bore sizes of tube.)

7) It usually causes malfunction of 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.)



5.2 Operational Cautions, Proximity switch

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 load side circuit. Wiring work without shutting electricity may, also, cause damage to load side circuit.

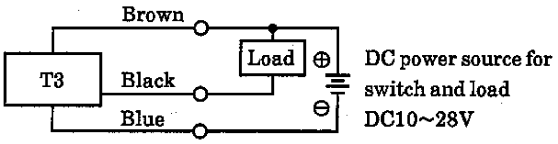


Fig.1 Basic Circuit Example (1)
(The same power source is used for switch and load.)

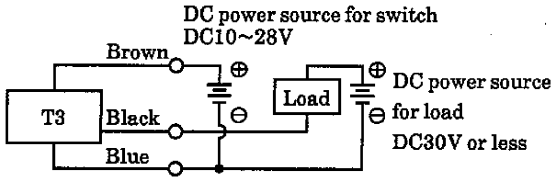


Fig.2 Basic Circuit Example (3) (Different power sources are used for switch and load.)

2) Protection of output circuit

Install some protective circuit as per illustrated in Fig. 3 when inducing type load (Relay or solenoid valve) are to be used because those types apt to generate surge current at turning switch off.

Install some protective circuit as per illustrated in Fig. 4 when capacitor type lord (Capacitor type) are to be used because those types apt to generate dash current at turning switch on.

Install some protective circuit as per illustrated in Fig. 5 or 6 (in case of model T2) and Fig 7 (in case of model T3).

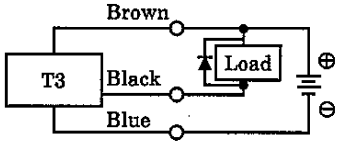


Fig.3 An example of using inducing load together with surge absorptive element (diode). (Hitachi Mfg. made diode V06C or equivalent is recommended.)

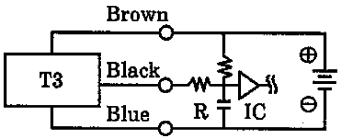


Fig.4 An example of using capacitor type load together with current regulating resister R. Comply with the following formula to figure out required R. $\frac{V}{0.10} = R(\Omega)$

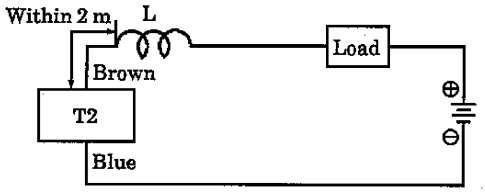


Fig.5 • Choke coil
L= a couple hundred μH ~ a couple mH surpassing high frequency characteristic
• Install it nearby the switch (within 2 m).

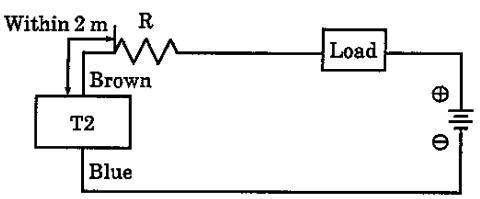


Fig.6 • Dash current restriction resister
R= As much large resister as the load circuit can afford.
• Install it nearby the switch (within 2 m).

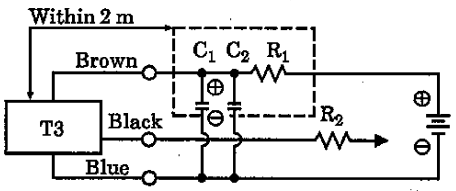


Fig.7

- Electric power noise absorptive circuit
  C_1=20~50μF electrolytic capacitor
  (withstanding 50V or more)
  C_2=0.01~0.1μF ceramic capacitor
- Dash current restriction resister
  R_1=20~30Ω
  R_2=As much large resister as the load circuit can afford.
- Install it nearby the switch (within 2 m).

3) Connection to a programmable controller (Sequencer)

Type of the connection varies depending upon the model of the programmable controller. Refer to the following Fig. 8~12 respectively.

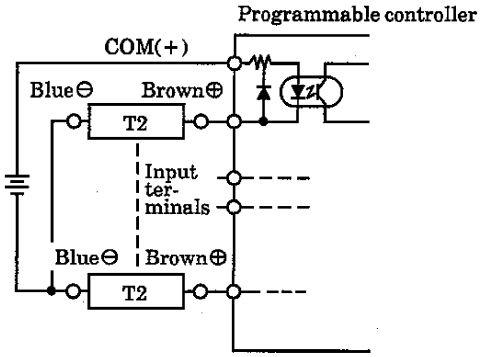


Fig.8 An example of T2 connection to source input type (an external power source)

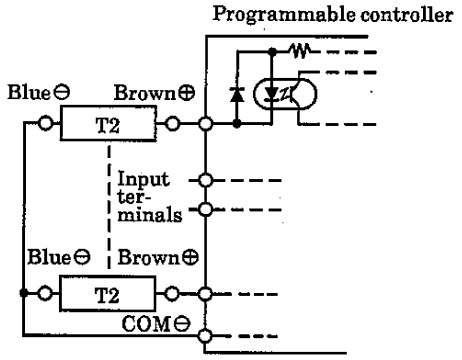


Fig.9 An example of T2 connection to source input type (an internal power source)

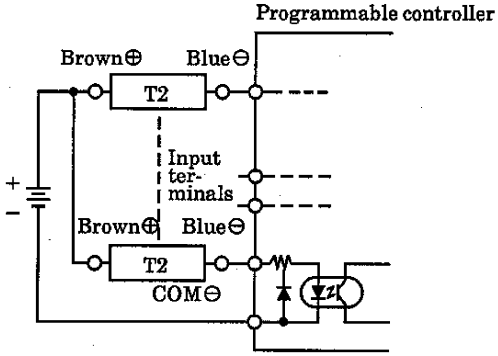


Fig.10An example of T2 connection to sink input type

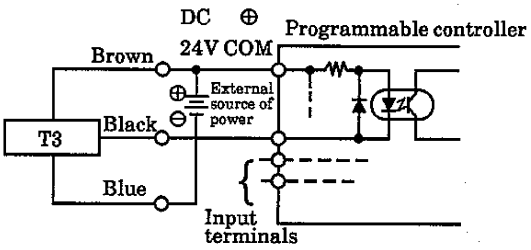


Fig.11An example of T3 connection to source input type (an external power source)

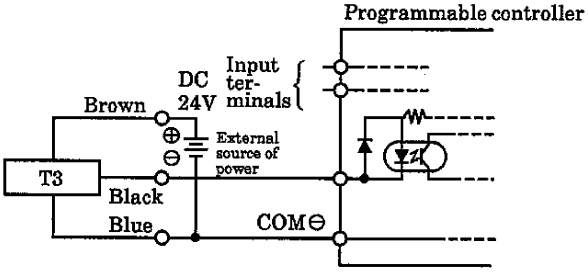
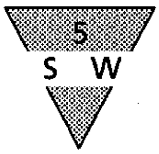


Fig.14An example of T3 connection to source input type (an internal power source)



4) Series connection

The total voltage loss when series connected T2 switches according to the number of switches connected. Therefore confirm the input specifications of programmable controllers which are connecting load. However, it may dim lamp or sometimes no lamp may be lit.

T3 switches, on the contrary, leak current is usually very minor (less than 10μA) to the extent of negligible, although leakage increases according total number of switches connected. Therefore, there is no incident of dim lamp or no lit lamp.

5) Magnetic environment

Avoid usage of these switches within the area where strong magnetic field or large current exists. (such as a large magnet or spot welding equipment) Position censoring errors will be resulted when installing many cylinders with switch in parallel or magnetized piece come across the cylinder due to intervention among each other.

6) 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.

5.3 Operational cautions, Contact point switch, Model T0 & T5

1) Connection of lead cord

Instead of connecting a cord to the power source directly, always connect to the load in series. In case of model T0 connection, pay the following precautions.

Ⓐ For DC connection, use such polarities of cords as white ⊕ and black ⊖. The switch still functions right with reversed polarities but lamp is not lit.

Ⓑ For AC connection to either relay or input terminal to programmable controller, Switch lamp sometimes is not lit in case when half-wave rectification is being carried out. Lamp is lit, in this occasion, when polarities of cords for switch is reversed.

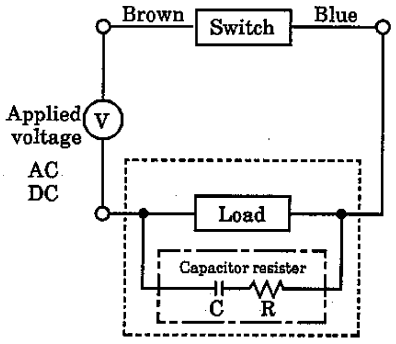
2) Capacity of contact points

Avoid using a load exceeding the max. capacity of contact points. On the other hand, in case of T0 model, switch lamp may not be lit sometimes when current is lower than rated current.

3) Protection of contact point

Install such protective circuit as illustrated in either Fig 1 or 2, as follows, when inducing type load such as relay is to be used.

Furthermore, install such protective circuit as illustrated in either Fig. 3 or 4, on the following page, in case the cord length exceeds the length per following table.

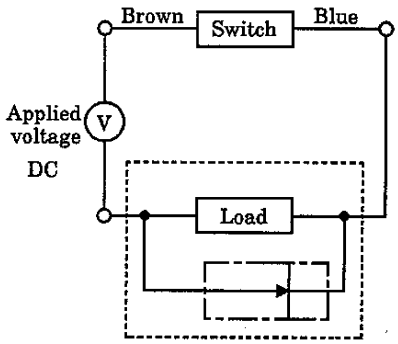


User circuit

Protective circuit (Spark absorbing circuit)

Recommended value C (Capacitor) = 0.033~0.1μF
R (Resister) = 1~3kΩ
XEB1K1 Okaya Denki Mfg. or equivalent

Fig. 1 When capacitor resister is used.

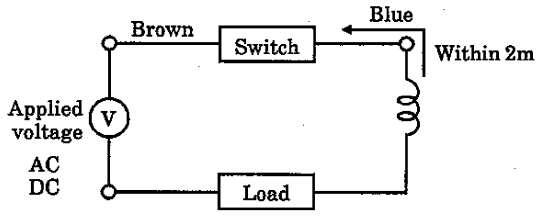


User circuit

Protective circuit

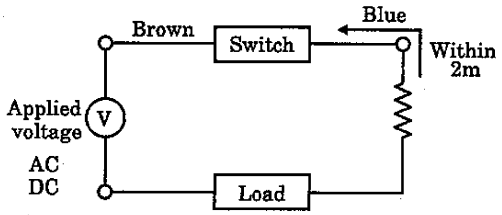
Rectifying diode, general use
Hitachi Mfg. product V06C or equivalent

Fig.2 When diode is used.



- Choke coil L
  L= a couple hundred μH ~ a couple mH
  surpassing high frequency characteristic
- Install it near by a switch (within 2 m).

Fig. 3



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

Fig. 4

4) Relay

Use such products as specified below or equivalent.

OMRON Corporation	model MY
FUJI ELECTRIC CORP	model HH5
Matsushita Electric Working Ltd.	model HC

5) Series 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. Lamp 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 dimmed lamp or no lamp lit.

7) Magnetic environment

Avoid usage of these switches within the area where strong magnetic field or large current exists. (such as a large magnet or spot welding equipment) Position censoring errors will be resulted when installing many cylinders with switch in parallel or magnetized piece come across the cylinder due to intervention among each other.

8) 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.

6. MAINTENANCE

6.1 Periodic Inspection

1) In order to upkeep the cylinder in optimum condition, carry out periodic inspection once or twice a year.

2) Inspection items

ⓐ Check the bolts and nuts fitting the piston rod end fittings and supporting fittings for slackening.

ⓑ Check to see that the cylinder operates smoothly.

ⓒ Check any change of the piston speed and cycle time.

ⓓ Check for internal and/or external leakage.

ⓔ Check the piston rod for flaw (scratch) and deformation.

ⓕ Check the stroke for abnormality.

See "Trouble shooting", 6.2, should there be any trouble found, also carry out additional tightening if bolts, nuts, etc.are slackened.

6.2 Trouble Shooting

1) Cylinder

Trouble	Cause	Countermeasure
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 supporting system.
	Broken packing	Replace the packing.
Does not function smoothly	Lowert speed than rated	Reduce the load. Consider the use of hydraulic cylinder.
	Improper or misalignment of installation	Correct the installation state and/or change the supporting system.
	Exertion of transverse (lateral) load	Install a guide. Revise the installation state and/or change the supporting system.
	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 installation direction of the speed control valve.
Breakage and/or deformation	Impact force due to high speed operation	Turn the speed down. Reduce the load. Install cushion device with more efficiency. (External cushion)
	Exertion of transverse load	Install a guide. Revise the installation state and/or change the supporting system.

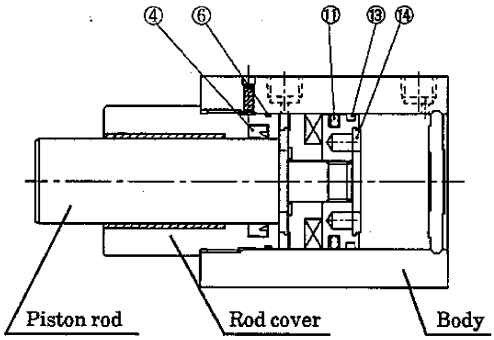
2) Switch

Trouble	Possible causes	Countermeasure
Lamp is not lit.	Deposited contact point	Replace switch.
	Excessive load than rated capacity	Replace the relay w/recommended one or replace the switch
	Damage to the lamp	Replace the lamp.
	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
	Incorrect direction of switch mounting	Correct the direction of the switch.
	Relay is unable to respond properly within the piston stroke	Adjust speed slow Replace the relay
	Excessive load than rated capacity	Replace the relay with a recommended one or replace the switch
Switch does not return.	Piston is not moving	Correct to have 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
	Improper ambient temperature	Adjust the ambient temperature within the range of −10~60°C
	Existence of a foreign magnetic field	Shield the magnetic field.
	Inadequate incoming signal	Review the external signal circuit and remove the causes.

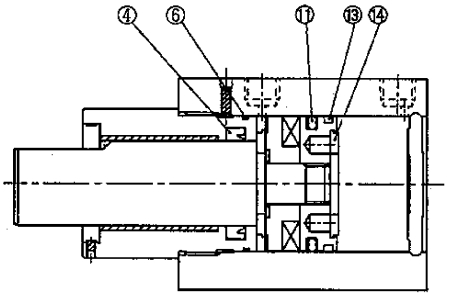
6.3 Disassembly

1) This cylinder is able to be disassembled.
   Replace component parts by disassembling cylinder referring to internal structure diagram when air leakage is ever occured.
2) Loosen the rod cover, remove it from the body, and pull out the piston rod.
3) Internal structure diagram and expendable parts list

● STK
(Double acting · Rod end round bar form)



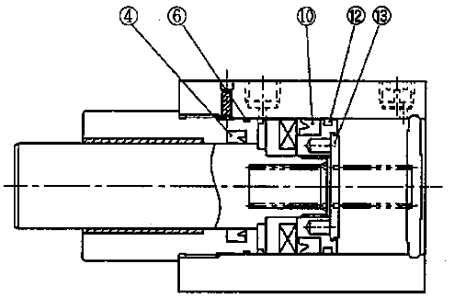
● STK-M
(Double acting · Rod end round bar form with flat face)



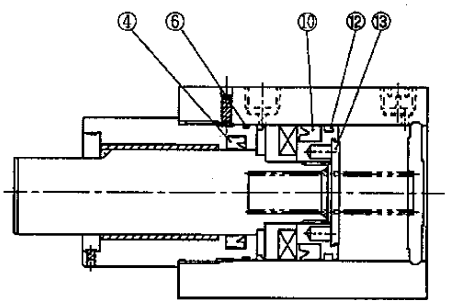
Expendable parts list (Specify the kit No. when ordering)

Part No. / Part Name / Kit No. / Tube bore (mm)		④ Rod packing	⑥ Metal gasket	⑪ Piston packing	⑬ Wear ring	⑭ Cushion rubber (H)
ϕ20	STK-20K	DYR-12	F3-657968	PSD-20	F4-125610	F4-659112
ϕ32	STK-32K	DYR-20	F3-657975	PSD-32	F4-654960	F4-659049
ϕ40	STK-40K	PNY-25	F3-657976	PSD-40	F4-650239	F4-659039
ϕ50	STK-50K	PNY-30	F3-657977	PSD-50	F4-650240	F4-659026

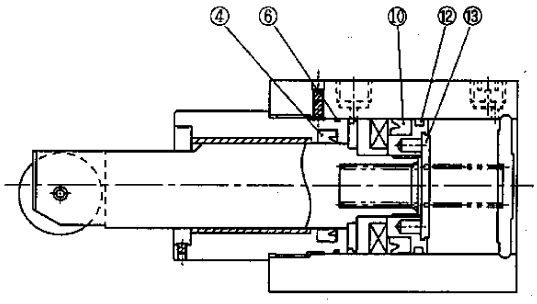
● STK-Y
(Single acting (pull) · Rod end round bar form)



● STK-MY
(Single acting (pull) · Rod end round bar form with flat face)



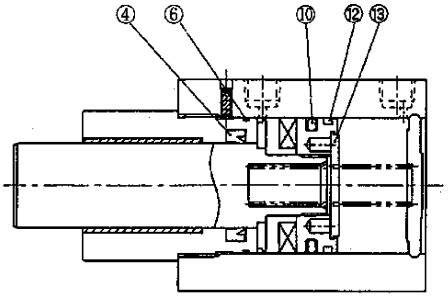
● STK-JY
(Single acting (pull) · Rod end roller form)



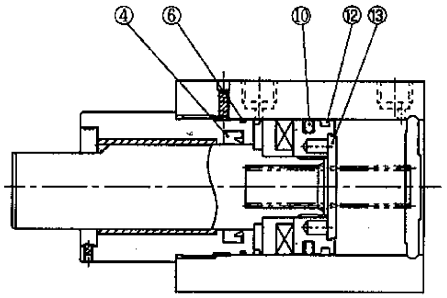
Expendable parts list (Specify the kit No. when ordering)

Part No. / Part Name / Kit No. / Tube bore (mm)		④ Rod packing	⑥ Metal gasket	⑩ Piston packing	⑫ Wear ring	⑬ Cushion rubber (H)
ϕ20	STK-Y-20K	DYR-12	F3-657968	MYN-16	——	F4-659112
ϕ32	STK-Y-32K	DYR-20	F3-657975	PGY-32N	F4-654960	F4-659049
ϕ40	STK-Y-40K	PNY-25	F3-657976	PGY-40N	F4-650239	F4-659039
ϕ50	STK-Y-50K	PNY-30	F3-657977	PGY-50N	F4-650240	F4-659026

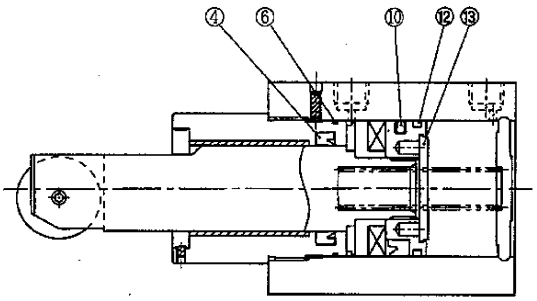
● STK-Y1
(Double acting with spring · Rod end round bar form)



● STK-MY1
(Double acting with spring · Rod end round bar form with flat face)



● STK-JY1
(Double acting with spring · Rod end roller form)



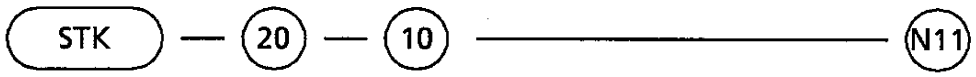
Expendable parts list (Specify the kit No. when ordering)

Part No. / Part Name / Kit No. / Tube bore (mm)		④ Rod packing	⑥ Metal gasket	⑩ Piston packing	⑫ Wear ring	⑬ Cushion rubber (H)
ϕ20	STK-Y1-20K	DYR-12	F3-657968	PSD-20L	——	F4-659112
ϕ32	STK-Y1-32K	DYR-20	F3-657975	PSD-32L	F4-654960	F4-659049
ϕ40	STK-Y1-40K	PNY-25	F3-657976	PSD-40L	F4-650239	F4-659039
ϕ50	STK-Y1-50K	PNY-30	F3-657977	PSD-50L	F4-650240	F4-659026

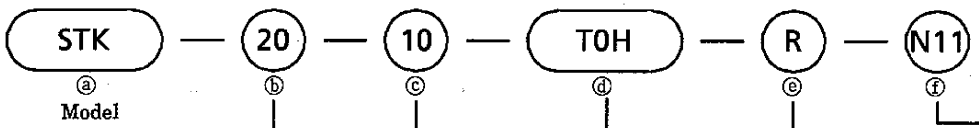
7. MODEL CODING

7.1 Model coding of product

• Without switch



• With switch



ⓐ Model		ⓑ Tube bore (mm)		ⓒ Standard stroke (mm)	
STK	Double acting · Rod end round bar form	20	ϕ20	ϕ20, ϕ32	ϕ40, ϕ50
STK-M	Double acting · Rod end round bar form with flat face	32	ϕ32	10	20
STK-Y	Single acting(pull) · Rod end round bar form	40	ϕ40	15	25
STK-MY	Single acting(pull) · Rod end round bar form with flat face	50	ϕ50	20	30
STK-JY	Single acting(pull) · Rod end roller form				
STK-Y1	Double acting with spring · Rod end roller form				
STK-MY1	Double acting with spring · Rod end round bar form with flat face				
STK-JY1	Double acting with spring · Rod end foller form				

ⓓ Switch model code				ⓔ Qty of switch		ⓕ Option	
Lead outlet straight type	Lead outlet L type			R	1 ea., Rod side	N11	Female thread at the rod end
T0H※	T0V※	Contact Point	2-core	H	1 ea., Head side		
T5H※	T5V※			D	2 ea.		
T2H※	T2V※	Proximity	3-core				
T3H※	T3V※						
T2YH※	T2YV※	2-color indicating, Proximity	2-core				
T3YH※	T3YV※						
T2YFH※	T2YFV※	Preventive maintenance, Proximity	3-core				
T3YFH※	T3YFV※		4-core				
T2YMH※	T2YMV※		3-core				
T3YMH※	T3YMV※		4-core				

※ Disable to make N11 for cylinder "Rod end roller form

※ Lead cord length	
No code	1m (Standard)
3	3m (Optional)
5	5m (Optional)

7.2 Model coding of parts

1) Switch

Switch model code

→ Switch model code (above-mentioned item ⓓ)