CKD

SM－213401－A

INSTRUCTION MANUAL

SELEX CYLINDER

SCA2－G2・G3

(Cutting Oil Resistive Cylinder)

- 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

The 2nd edition

For Safety Use

To use this product safety, 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 operation 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.

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SCA2-G2・G3
(Cutting Oil Resistive Cylinder)
Manual No. SM-213401-A

1. UNPACKING

1) Make sure that the type No. on the nameplate of the delivered Selex Cylinder matches the type No. you orderd.
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℃ (No freezing).
2) Carefully avoid other object from hitting the tube. Otherwise, it may get the tube distorted and cause malfunction of the cylinder.
3) Assembly of mounting bracket:
   The mounting bracket are supplied with the cylinder at the time of deliver. Install them as shown in the figures on this page.
   Tighten the tightening torque evenly by the torque in Table 1.
   However, the trunnion types (TC, TA and TB) are shipped with the trunnion mounted.

Assembly of supporting metal fitting (same as disassembling)

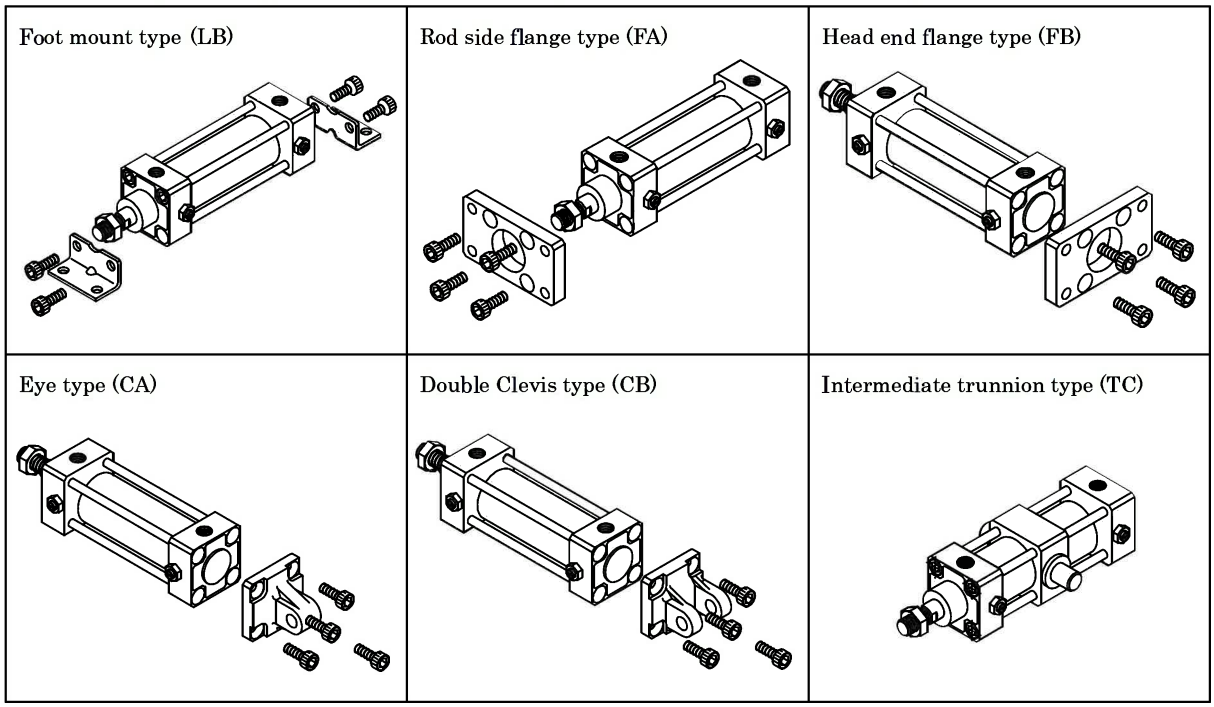
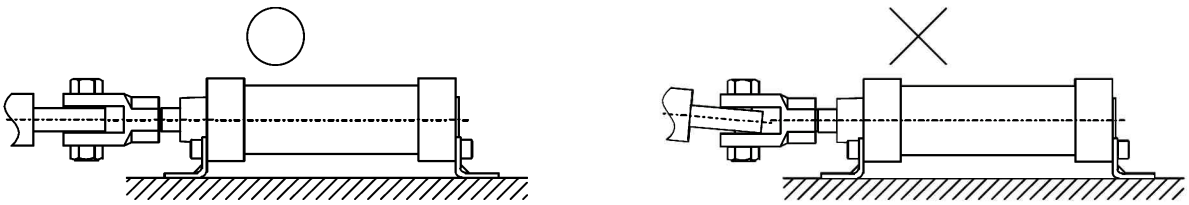


Table 1

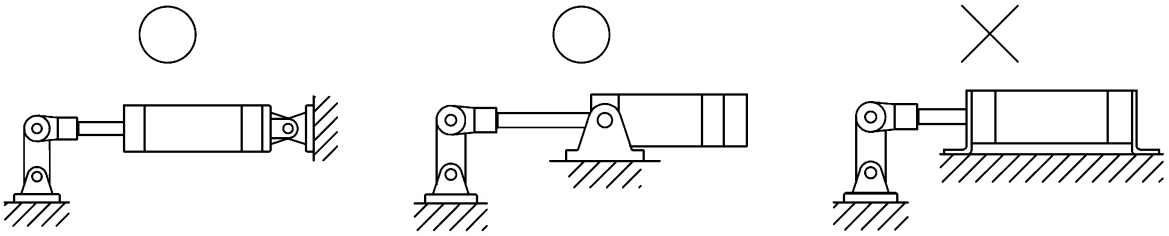
Bore size (mm)	Recommended torque (N·m)
φ40, φ50, φ63	9.8
φ80, φ100	34.8

4) When cylinder is fixed and rod end is guided:
In case the piston rod of cylinder and the load are misaligned, the bushes and packings of the cylinder are extremely worn out. Hence, connect them with CKD floating joint (FJ series).

5) When cylinder is fixed and rod end is connected with pin joint:
In case the load acting direction is not parallel with the rod axial center, the rod and tube may get entangled causing seizure, etc. Hence, make sure that the rod axial center and the load transfer direction are aligned to each other.



6) When the load acting direction changes with the cylinder operation:
Use an oscillating cylinder (clevis type or trunnion type) capable of making revolution to a certain angle. Furthermore, install the rod and connecting metal (knuckle) so that it moves in the same direction as the cylinder main body does.



Clevise type　　Trunnion type　　Foot mount type

2.2 Piping

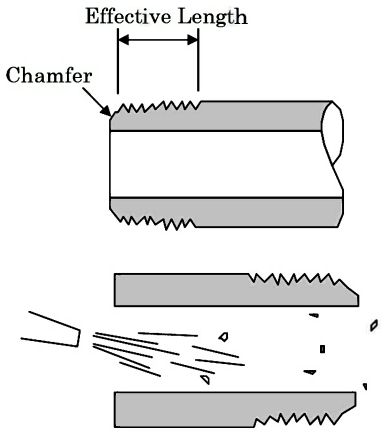
1) For piping beyond the filter, use pipes that are tough against corrosion such as galvanized pipes, nylon tubes, rubber tubes, etc.

2) See to it that the pipe connecting cylinder and solenoid valve has effective cross-sectional area which is needed for the cylinder to drive at the specified speed.

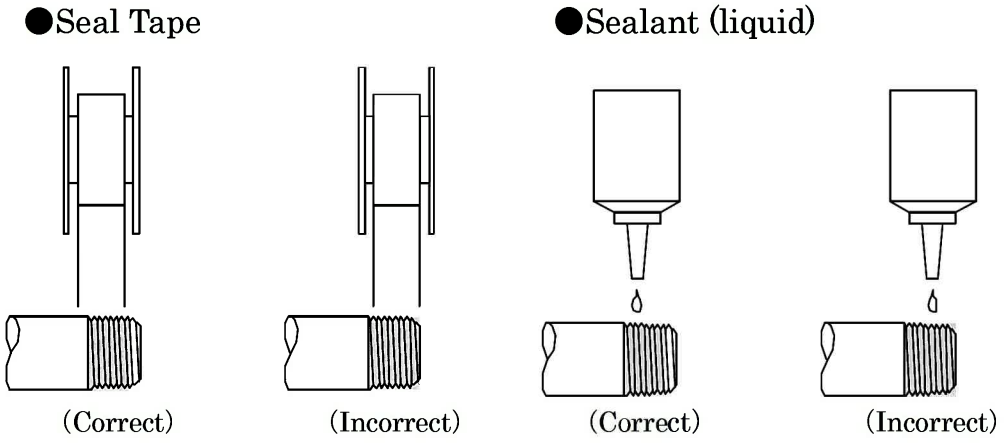
3) Install filter preferably adjacent to the upper-stream to the solenoid valve for eliminating rust, foreign substance in the drain of the pipe.

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.

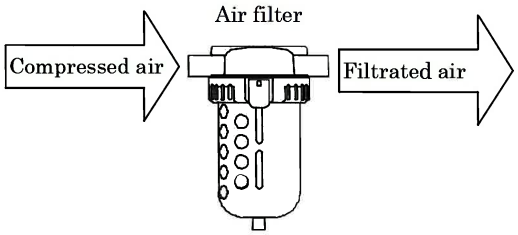


6) Refrain from applying sealant or sealing tape approx. two pitches of thread off the tip of pipe to avoid residual substances from falling into piping system.

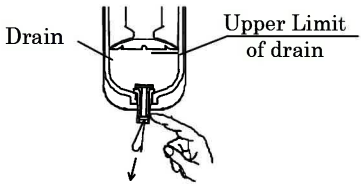


2.3 Fluid

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 μ 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.

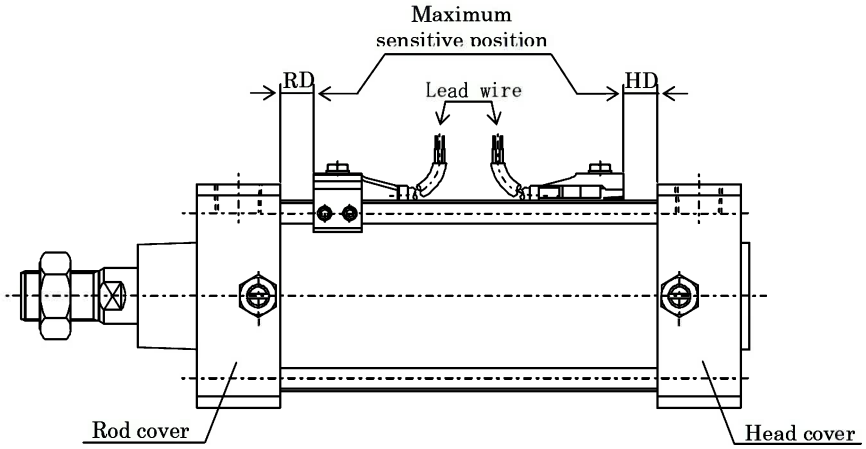


3) Note that the intrusion of carbide for the compressor oil (such as carbon or tarry substance) into the circuit causes malfunction of the solenoid valve and the cylinder. Be sure to carry out thorough inspection and maintenance of the compressor.

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.

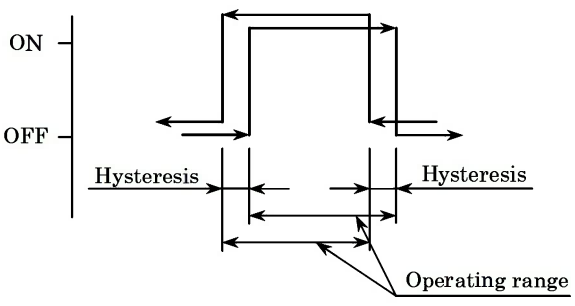


(1) At the stroke end
Refer the illustration above. Mount switches within the rod side dimension RD as well as the head side dimension HD for the purpose of having switches function at the points of the maximum sensitive position.

(2) Intermediate of stroke
Move the piston where it is anticipated to detect 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) Location around the circumference of cylinder
There is no restriction. However,90° interval around circumference will be the most appropriate location when considered convenient posture of mounting tie rods.

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.



3) Hysteresis
Precise operating range deviate slightly depending upon the direction of piston movement as shown right.

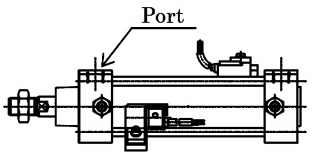
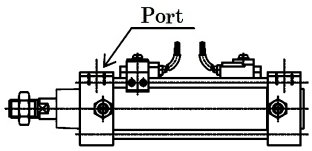
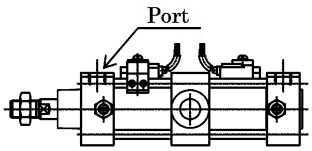
4) Maximum sensitive position.

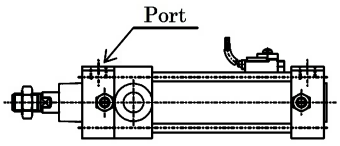
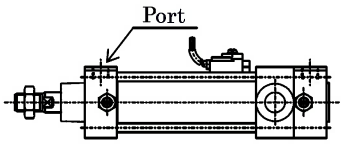
(unit : mm)

Item / Bore size (mm)	Maximum sensitive position
	HD/RD
φ40	10
φ50	12
φ63	
φ80	13.5
φ100	17.5

5) Location of switches mounted at ex-factory
Switches are mounted at the maximum sensitive position on cylinder. The location along circumference of cylinder differs in accordance with stroke. Refer the table below.

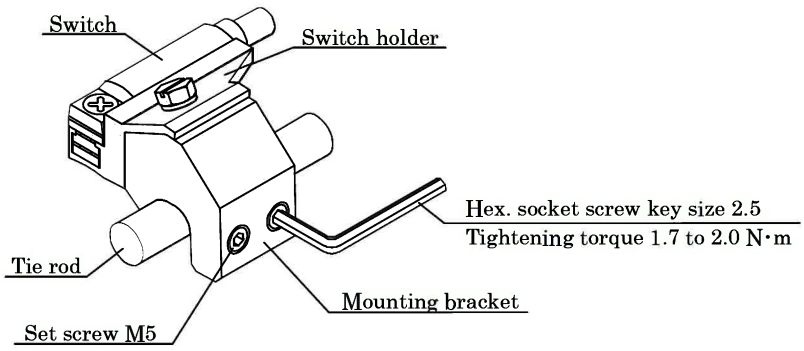
(Unit : mm)

Item	Different surface installation				Same surface installation				Center trunnion mounted			
Rough sketch												
Switch quantity / Bore size (mm)	1	2	3	4	1	2	3	4	1	2	3	4
40 dia.	10	20	35	50	10	50	100	150	86(66)	86(66)	92(92)	92(92)
50 dia.	10	20	40	55	10	50	100	150	86(66)	86(66)	92(92)	92(92)
63 dia.	10	20	40	55	10	35	100	150	91(71)	91(71)	97(97)	97(97)
80 dia.	10	20	40	55	10	20	100	150	96(76)	96(76)	102(102)	102(102)
100 dia.	10	20	40	55	10	20	100	150	106(86)	106(86)	112(112)	112(112)

Item	Rod side trunnion mounted	Head side trunnion mounted
Rough sketch	 The piston at rod side stroke end cannot be detected.	 The piston at head side stroke end cannot be detected.
Switch quantity / Bore size (mm)	1	1
40 dia.	38(28)	38(28)
50 dia.	36(26)	36(26)
63 dia.	41(31)	41(31)
80 dia.	44(34)	44(34)
100 dia.	50(40)	50(40)

Note 1 : Value in ( ) for R * B (terminal box type).
Note 2 : When stroke length is not greater than 15mm, two switches could turn ON at the same time. In this case, adjust the distance between switches as far as possible.

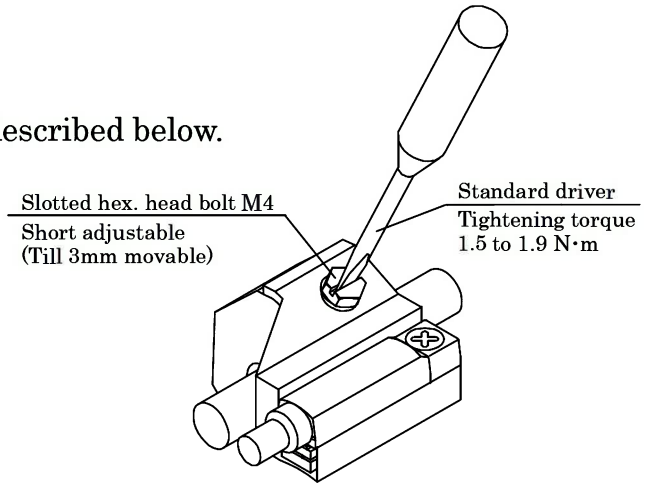
6) Relocation of switch
Loosen the set screws (2 ea.) for approx. 1/2 to 3/4 turn. It enables the switch to slide along the tie rod without letting screws drop off.
After setting the new location of switch, hold switch holder against the tube surface and tighten set screws to the tie rod. Adequate torque of tightening it is 1.7 to 2.0 N・m. It is considered to be sufficient, as a rule of thumb, when hex. socket screw key starts bending slightly.

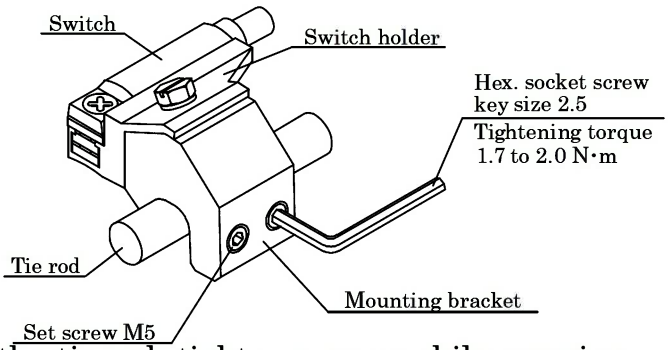


7) Installation of switch
Follow the procedures (1) to (3) as described below.

(1) While holding a switch underneath of switch holder, tighten M4 slotted hex. head bolt to mount it on the bracket.

(2) Screw-in the set screws to mount the bracket on the tie rod. While letting the mounting bracket hook the tie rod, slightly screw further until it touches the rod. Thus, it eliminates the whole set of switch from falling off the rod, yet enables to slide the set along the rod. Make use this merit when engaged in adjusting location of the switch set.





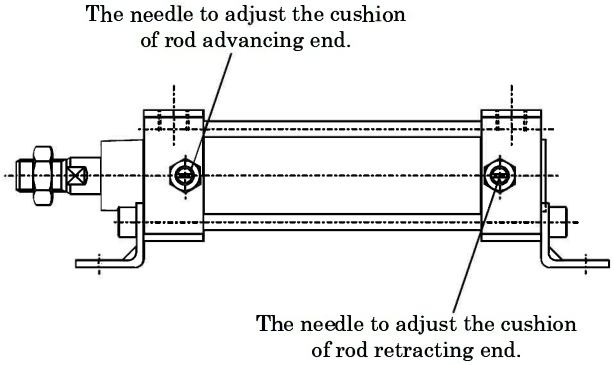
(3) To fix the mounting bracket on the tie rod, tighten screws while pressing bracket slightly against tube. Adequate torque of tightening screw is 1.7 to 2.0 N・m. It is considered to be sufficient, as a rule of thumb, when hex. socket screw key starts bending slightly.

3. OPERATION

3.1 Operating the Cylinder

1) The cylinder feed pressure is 0.05 to 1.0 MPa hence regulate the pressure within this pressure range.

2) Though the cushion has been adjusted at no load when delivered, adjust the cushion needle when the change of cushion effect is required.
Tightening the needle (clockwise) makes cushion more effective. Tighten the needle lock nut all the way after adjustment.



However, if kinetic energy such as load is heavy or speed is too fast, exceeding the values given in Table 2, consider of providing a shock absorber.

Table 2

Bore size (mm)	Effective air cushion length (mm)	Allowable energy absorption (J)	
		With cushion	Without cushion
ϕ40	14.6	4.29	0.15
ϕ50	16.6	8.37	0.24
ϕ63	16.6	15.8	0.24
ϕ80	20.6	27.9	0.54
ϕ100	23.6	49.8	0.87

3) Adjust the working piston speed with the speed controller mounded.

3.2 How to use the Switches

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.

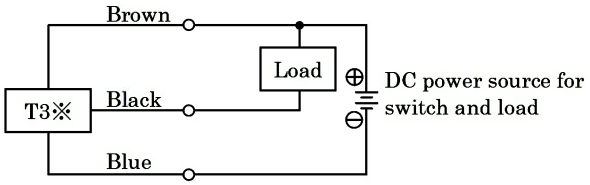


Fig.1 Basic Circuit Example(1)
(The same power source is used for switch and load.)

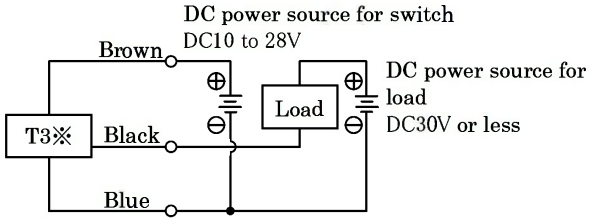


Fig.2 Basic Circuit Example(2)
(Different power source are used for switch and load.)

2) Protection of output circuit

Install some protective circuit as illustrated in Fig.3 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.4 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.5 or 6(in case of model T2) and Fig.7(in case of model T3)

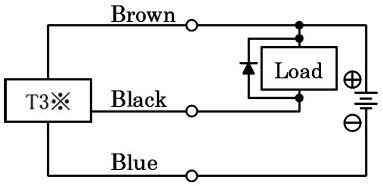


Fig.3 An example of using inducing load together with surge absorptive element(diode).(Hitachi Mfg. made diode V06C or equivalent is recommended.)

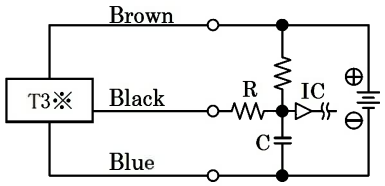


Fig.4 An example of using capacitor type load together with current regulating resister R. Comply with the following formula to figure out required R.

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

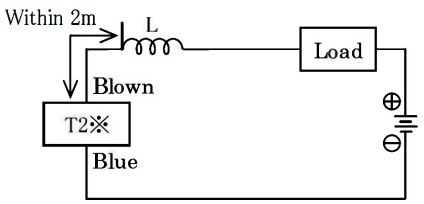


Fig.5 ・Choke coil
L = a couple hundred μH to a couple mH surpassing high frequency characteristic.
・Install it near by the switch(within 2m).

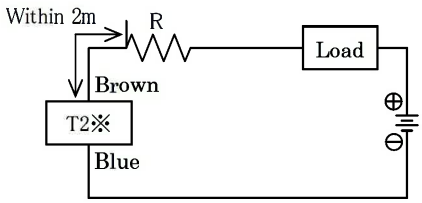


Fig.6 ・Dash current restriction resister
R = As much large resister as the load circuit can afford.
・Install it near by the switch(within 2m).

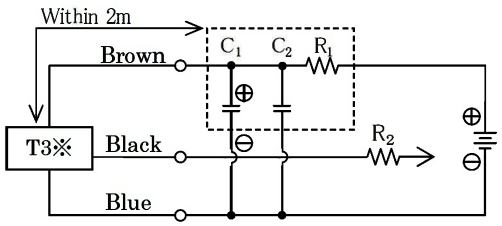


Fig.7 ·Electric power noise absorptive circuit
C_1 = 20 to 50 μF electrolytic capacitor
(Withstand voltage 50V or more)
C_2 = 0.01 to 0.1 μF ceramic capacitor
·Dash current restriction resister
R_1 = 20 to 30 Ω
R_2 = As much large resister as the load circuit can afford.
·Install it near by the switch(within 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.8 to 12 respectively.

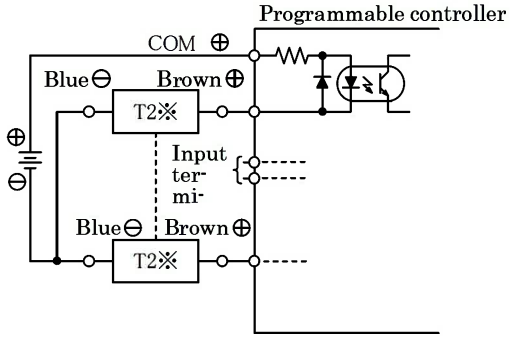


Fig.8 An example of T2※ connection to source input type (an external power source)

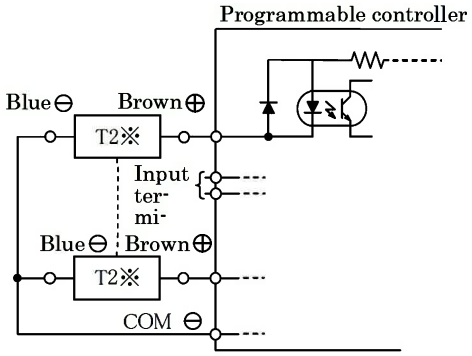


Fig.9 An example of T2※ connection to source input type (an internal power source)

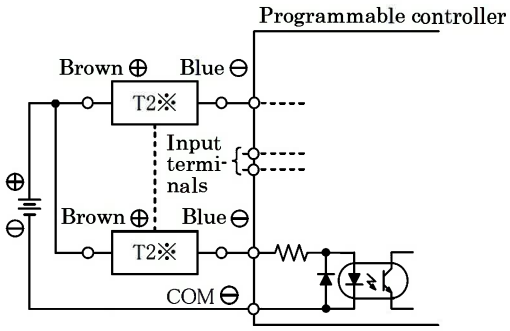


Fig.10 An example of T2※ connection to sink input type

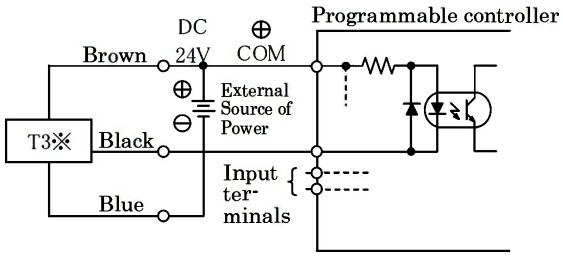


Fig.11 An example of T3※ connection to source input type (an external power source)

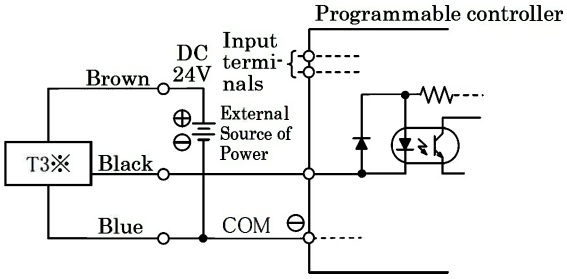


Fig.12 An example of T3※ connection to source input type (an internal power source)

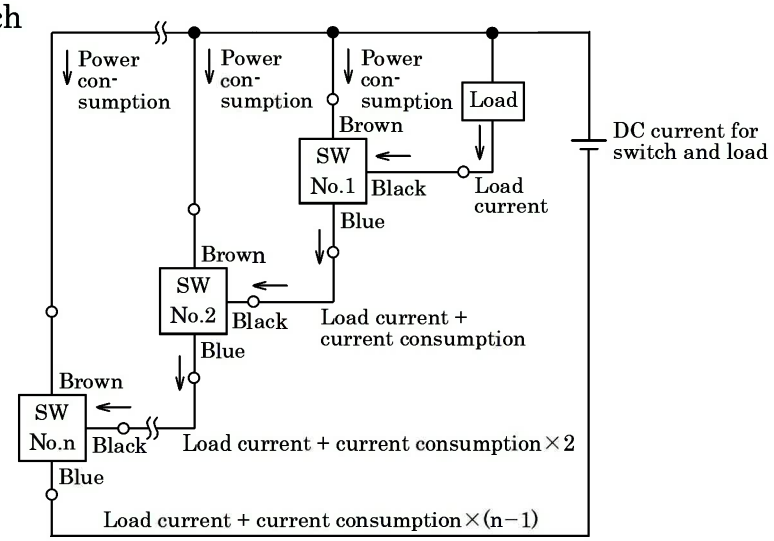
4) Magnetic environment
Avoid usage of these switches within the area where a strong magnetic field or large current exists. (such as a large magnet or spot welding equipment) Position censoring errors will result when installing many cylinders with a switch which is parallel or a magnetized piece come across the cylinder due to intervention among them.

5) Protection of lead cord
Pay consideration to eliminate repeating bending stress or stretching of the lead cord while laying the cord. For the moving portion, use a cord of flexibility as for building a robot.

6) 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 μA, then leakage may occur. Usually dimming and failure of the indicator light do not occur.

7) Serial connection
When two or more T2※ switches are connected in series, the voltage drop is equal to the sum of the voltage drops in all of the connected switches. The voltage applied to the load is the result of subtracting the total voltage drop from the power source voltage. It is necessary to determine the number of switches to be connected based on the specifications of the load.
When two or more T3※ switches are connected in series, the voltage drop is equal to the sum of the voltage drops in all the connected switches as in the case of the T2※ switches. The current flowing through the switches is equivalent to the sum of the current consumption of the connected switches as shown in the figure below and the load current. Determine the number of switches to be connected based on the specifications of the load so that the current will not exceed the maximum load current.

T3※ switch



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 fittings and supporting fittings for slackening.
   (2) Check to see that the cylinder operates smoothly.
   (3) Check any change of the working 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 Disassembling

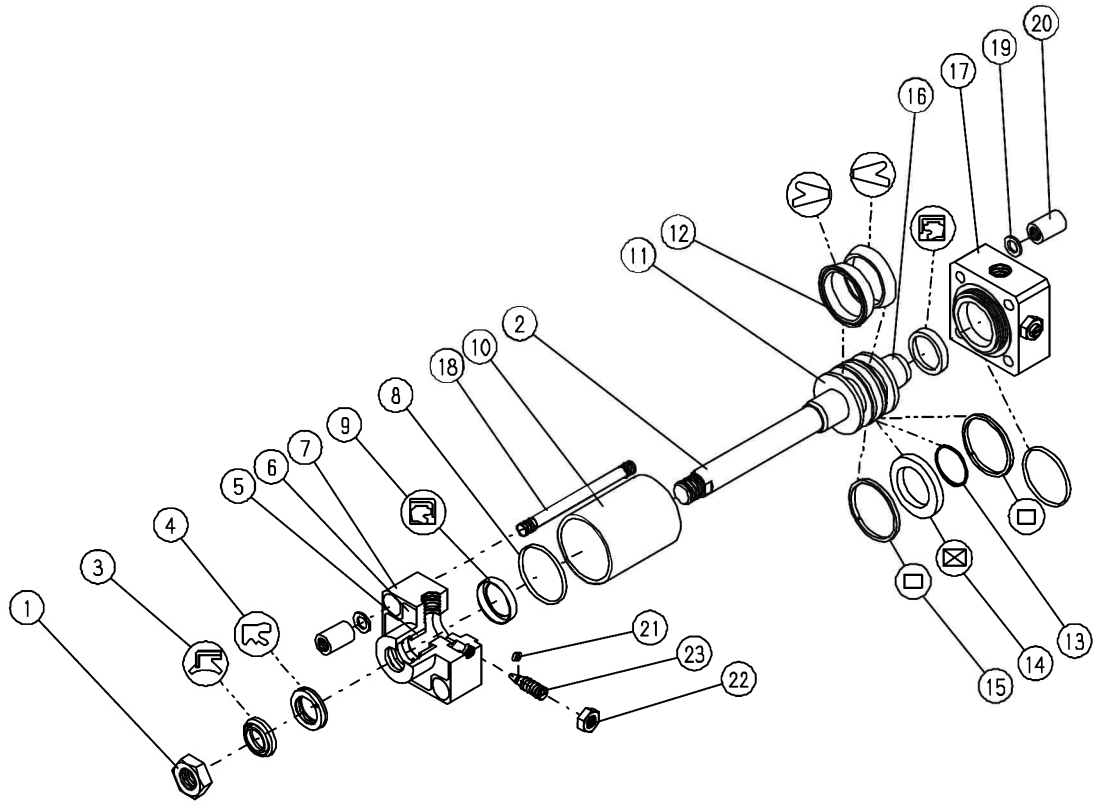
Should any air leakage occur, take the following corrective actions.

1) Prepare the following tools for disassembling.

Disassembling tools

Name	Qty	Place of use	Applicable tube ID (mm)
Hex. bar spanner (Nominal 8)	2	20	40, 50, 63
Hex. bar spanner (Nominal 12)	2	20	80, 100
Spanner (Nominal 13)	1	22	For all tube ID
Minus tip screwdriver (Nominal 5.5×75)	1	12, 23	For all tube ID
Minus tip screwdriver (Nominal 9×200)	1	9	For all tube ID
Marret hammer	1	For disassembling 7, 17 and 10	For all tube ID
Ice pick	1	3, 4, 8,21	For all tube ID

2) Disassemble the cylinder, referring to the following drawing.



Part No.	Part Name	Qty	Part No.	Part Name	Qty	Part No.	Part Name	Qty
1	Rod nut	1	9	Cushion packing	2	17	Head cover	1
2	Piston rod	1	10	Cylinder tubu	1	18	Tie rod	4
3	Dust wiper	1	11	Piston (R)	1	19	Conical spring washer	8
4	Rod packing	1	12	Piston packing	2	20	Round nut	8
5	Bush	1	13	Piston gasket	1	21	Needle gasket	2
6	Masking plate	2	14	Magnet	1	22	Needle nut	2
7	Rod cover	1	15	Wear ring	2	23	Cushion needle	2
8	Cylinder gasket	2	16	Piston (H)	1			

3) Inspect the following items.
   (a) Scratch marks on the boar surface of the tube
   (b) Scratch marks on the surface of piston rod, peel-off of plating and rusting
   (c) Scratch marks and wear inside of the bush
   (d) Scratch marks, wear and crack of the surface of piston
   (e) Loosened connection of piston and rod
   (f) Crack of both end covers
   (g) Scratch marks and wear of packing in sliding part. (Dust wiper, Rod packing, Cushion packing and Piston packing)

   Check all of above items. If any abnormality is found, repair it or replace the parts, when defective.

4) Followings are expendable parts.
   Specify the kit No. when ordering.
   (a) SCA2-G2

Part No.	Part Name \ Bore size (mm) / Kit No.	φ40	φ50	φ63	φ80	φ100
		SCA2-G2-40K	SCA2- G2-50K	SCA2- G2-63K	SCA2-G2-80K	SCA2- G2-100K
3	Dust wiper	SDB-16	SDB-20	SDB-20	SDB-25	SDB-30
4	Rod packing	PNY-16	PNY-20	PNY-20	PNY-25	PNY-30
8	Cylinder gasket	F4-667115	F4-667116	F4-667117	F4-667118	F4-667119
9	Cushion packing	F4-436638	F4-436639	F4-436639	F4-436640	F4-436641
12	Piston packing	PMY-40	PMY-50	PMY-63	PMY-80	PMY-100
15	Wear ring	F4-650239	F4-650240	F4-650241	F4-650242	F4-650243
21	Needle gasket	P-3	P-3	P-3	P-3	P-3

   (b) SCA2-G3

Part No.	Part Name \ Bore size (mm) / Kit No.	φ40	φ50	φ63	φ80	φ100
		SCA2-G3-40K	SCA2-G3-50K	SCA2-G3-63K	SCA2-G3-80K	SCA2-G3-100K
3	Dust wiper	SDB-16F	SDB-20F	SDB-20F	SDB-25F	SDB-30F
4	Rod packing	PNY-16F	PNY-20F	PNY-20F	PNY-25F	PNY-30F
8	Cylinder gasket	F4-667140	F4-667141	F4-667142	F4-667143	F4-667144
9	Cushion packing	PCS-20F	PCS-24F	PCS-24F	PCS-35F	PCS-45F
12	Piston packing	PGY-40F	PGY-50F	PGY-63F	PGY-80F	PGY-100F
15	Wear ring	F4-650239	F4-650240	F4-650241	F4-650242	F4-650243
21	Needle gasket	P-3F	P-3F	P-3F	P-3F	P-3F

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 and consider the adoption of low pressure cylinder.
	Improper or misalignment of installation.	Correct the installation state and/or change the mounting style.
	Exertion of transverse 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.
	Inadequate lubricant.	Apply the lubricant.
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

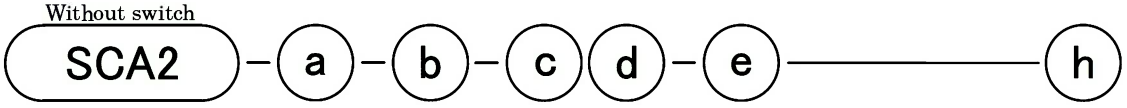
Troubles	Causes	Remedies
Indicator light is not lit.	Deposited contact point	Replace the switch.
	Excessive load than rated capacity	Replace the relay with a recommended one or replace the switch.
	Damaged indicator light	Replace the switch.
	Inadequate incoming signal	Review the external signal circuit 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. Tightening torque is 1.5 to 1.9 N·m
	Incorrect direction of switch mounting	Correct the direction of the switch mounting.
	Relay is unable to respond properly	Replace the relay with a recommended one.
	Excessive load than rated capacity	Replace the relay with a recommended one or replace the switch.
	Excessive speed of piston if it is to sense an intermediate point of stroke	Reduce the speed of piston.
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℃
	Existence of a foreign magnetic field	Shield the magnetic field.
	Inadequate incoming signal	Review the external signal circuit and remove the causes.

Note 1. Refer "2.4 Location of mounting Switches on a Cylinder" as for replacing a switch and correcting its location.

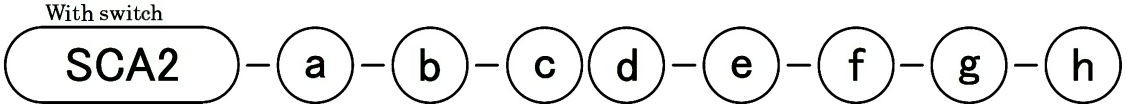
6. HOW TO ORDER

6.1 Product Number Coding

Without switch



With switch



(a) Protection structure		(b) Mounting style Note1		(c) Bore size (mm)	
G2	Material of dust wiper : Acrylonitrile−butadiene rubber	00	Basic type	40	ϕ 40
		LB	Axial foot type	50	ϕ 50
G3	Material of dust wiper : Fluuro rubber	FA	Rod flange type	63	ϕ 63
		FB	Head flange type	80	ϕ 80
		FC	Head special flange type	100	ϕ 100
		CA	Eye type		
		CB	Clevis type		
		TC	Intermediate trunnion type		
		TA	Rod trunnion type		
		TB	Head trunnion type		

Note1 : Mounting bracket is attached to the product at shipment. (The trunnion mounting types are assembled at shipment.)

(d) Cushion		(e) Stroke (mm)		(f) switch model			
B	Both ends cushioned	25	250	T2YLH※	Solid state type switch 2-color indicating	2-wire	Axial lead wire
R	Rod end cushioned	50	300	T3YLH※		3-wire	
H	Head end cushioned	75	350	T2YLV※		2-wire	Radial lead wire
N	Non−cushioned	100	400	T3YLV※		3-wire	
		150	450	※mark indicates the lead wire length.			
		200	500				

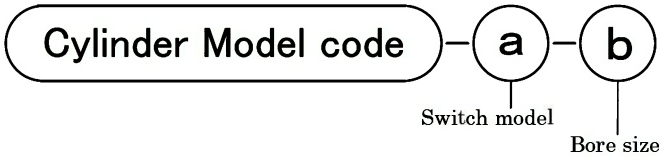
※ Lead wire length	
No code	1m (Standard)
3	3m (optional)
5	5m (optional)

(g) Switch Qty.	
R	Including one rod end
H	Including one head end
D	Including 2
T	Including 3

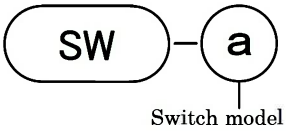
(h) Accessory & options	
No code	Cushion needle position R (Standard)
S	Cushion needle position S
T	Cushion needle position T
I	Rod eye
Y	Rod clevis
B1	Eye bracket
B2	Clevis bracket
B4	Trunnion type second bracket

6.2 Component parts Model coding

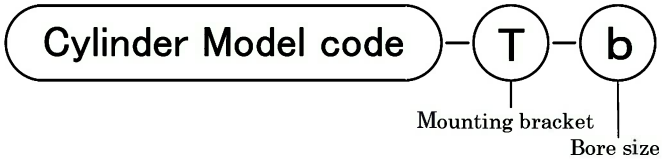
(1) Switch body + Mounting bracket



(2) Switch alone



(3) Mounting bracket



(a) Switch model				(b) Bore size (mm)	
T2YLH※	Solid state type switch 2-color indicating	2-wire	Axial lead wire	40	ϕ 40
T3YLH※		3-wire		50	ϕ 50
T2YLV※		2-wire	Radial lead wire	63	ϕ 63
T3YLV※		3-wire		80	ϕ 80
※mark indicates the lead wire length.				100	ϕ 100

※ Read wire length	
1	1m(Standard)
3	3m(option)
5	3m(option)

7. SPECIFICATION

7.1 Product Specifications

Model / Item		SCA2−G2･G3				
Bore size	mm	φ40	φ50	φ63	φ80	φ100
Actuation		Double-acting type				
Working fluid		Compressed Air				
Max. working pressure	MPa	1.0				
Min. working pressure	MPa	0.05				
Proof pressure	MPa	1.6				
Ambient temperature	℃	-10 to 60 (No freezing)				
Port size		Rc1/4	Rc3/8		Rc1/2	
Stroke tolerance	mm	$^{+0.9}_{0}$ (360 or less), $^{+1.4}_{0}$ (1000 or less)				
Working piston speed	mm/s	50 to 1000 (Set the speed within the range of energy absorption.)				
Cushion		Air cushion				
Lubrication		Not required (Use Grade 1 ISO VG 32 Turbine oil, if lubrication is preferred)				
Allowable energy absorption	J	4.29	8.37	15.8	27.9	49.8

7.2 Switches Specifications

Type･Model / Item	Solid state switch	
	T2YLH、T2YLV	T3YLH、T3YLV
Applications	For use exclusively with programmable controller	For use with programmable controller, relay
Power supply voltage	—	DC10 to 28V
Load voltage	DC10 to 30V	DC30V or less
Load current	5 to 20mA	50mA or less
Current consumption	—	10mA or lower when it is ON at DC24V
Internal voltage drop	4V or less	0.5V or less
Indicator light	Red / Green LED is lit when switch is ON	
Leakage current	1mA or less	10μA or less
Lead wire length (Note1)	1m (Oil-Proof vinyl cabtyre cord, 2-wire, 0.3mm²)	1m (Oil-Proof vinyl cabtyre cord, 3-wire, 0.2mm²)
Shock resistance	980 m/s²	
Insulation resistance	100MΩor over measuring with DC500V megger tester	
Withstand voltage	No abnormalities should occur after applying AC1000V for one minute	
Ambient temperature	−10 to 60℃	
Degree of protection	For Grommet-IEC standard IP67,JIS C0920(water Tight type), Oil resistance	

Note1：3m or 5m long lead wire is optionally available.