Discontinue

CKD Corporation

SM-8368-A

INSTRUCTION MANUAL

PENCIL CYLINDERS
SCPS2-V, SCPD2-V SERIES

Please read this operation manual carefully before using this product, particularly the section describing safety.

Retain this operation manual with the product for further consultation whenever necessary.

[EC1-0FC11]

Discontinue

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 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.

Discontinue

INDEX

SCPS2-V, SCPD2-V Series
Pencil cylinder
SM 8368-A

1. PRODUCT

1-1. Specification

1) Specification of Product

Model and Class	SCPS2-V Single acting, Aduancing type		SCPD2-V Double acting type	
Tube bore (mm)	ϕ10	ϕ16	ϕ10	ϕ16
Media	Compressed air			
Max. working pressure MPa {kgf/cm^2}	1 {10}		1 {10}	
Min. working pressure MPa {kgf/cm^2}	0.15 {1.5}		0.10 {1.0}	
With Standing pressure MPa {kgf/cm^2}	15 {1.5}			
Ambient temperature (°C)	−10~+50 (Not to be frozen)			
Connecting port diam.	M5×0.8			
Standard stroke (mm)	15, 30, 45, 60			
Stroke tolerance (mm)	+1.0~0			
Working piston speed (mm/sec)	50 ~ 500			
Cushion	Rubber cushion (both ends)			
Lubrication	Not required (Use Turbine oil, class 1, ISO VG32 if lubrication is preferred.)			

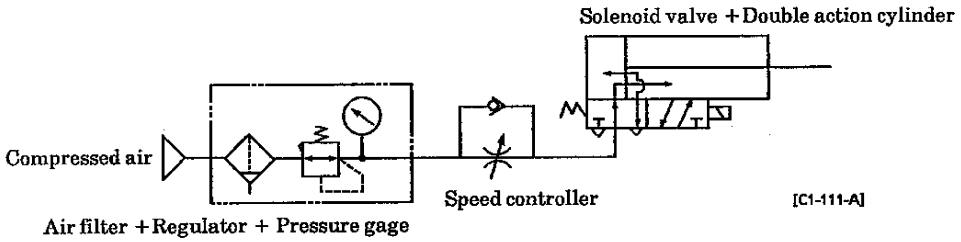
2) Specification of solenoid valve

Rated voltage / Item	AC100V (50 / 60Hz)	AC200V (50 / 60Hz)	DC24V
Starting current (A)	0.056 / 0.044	0.028 / 0.022	0.075
Holding current (A)	0.028 / 0.022	0.014 / 0.011	
Power consumption (W)	1.8 / 1.4	1.8 / 1.4	1.8
Voltage fluctuation range	±10%		
Insulation class	Class B (Moulded coil)		
Temperature rise	45°C		

Note : AC100V(50/60Hz) is serviceable with AC110V, 22V (60 Hz)

1-2. Fundamental Circuit Diagram

1) Fundamental Circuit Diagram for Double-acting Cylinder (Non-lubrication Type) is as follows.

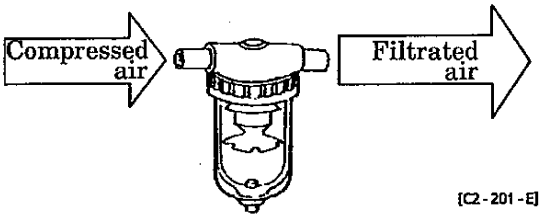


2
WARNING

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).

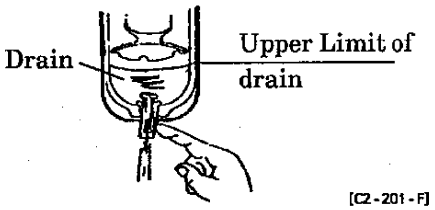


[C2-201-E]

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. 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 if lubrication is preferred.



[C2-201-F]

3. OPERATION

1) Keep the air pressure within the range specified in the Chart 1 below. Strictly avoid to operate the cylinder with higher range than specified.

Table 1

Operational type \ Tube bore	The highest service pressure MPa {kgf/cm²}		The lowest service pressure MPa {kgf/cm²}	
	ϕ10	ϕ16	ϕ10	ϕ16
Double acting type	0.1 {1.0}		9.9	
Single-acting, Advancing type	0.15 {1.5}			

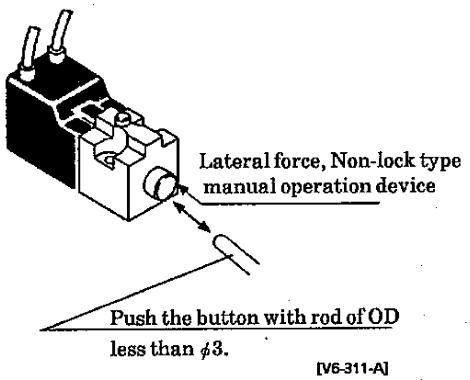
2) Piston speed control is possibly accomplished by chalking the compressed air inlet port (meter-in system) but it is not expectable to attain a stable speed control.

Consider of regulating it by means of meter-out system adopting double-acting cylinder (SCPD2) when a stable speed is required.

3) Make sure of mounting a speed controller to the system except when using cylinder to simply advancing piston rod with no load. There may be possible damage to the rod end due to the impact energy as it is difficult for the small cylinder to control the piston speed.

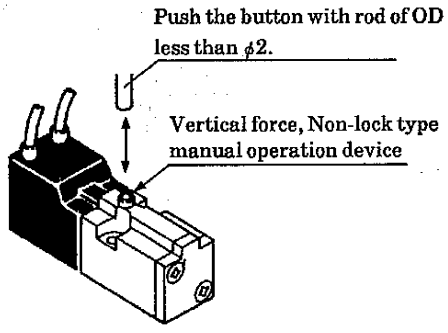
4) The cylinder of this type has been so designed as to enable manual operation. Make use of this characteristics during test run or power failure. As for manual operation, pushing manual operation button (same effect as current is charged) makes piston rod move. Furthermore, piston rod is to return to its former position when pushing force onto button is released due to its type being of non-locking.

● Solenoid valve for Model SCPS2-V



[V6-311-A]

● Solenoid valve for Model SCPD2-V

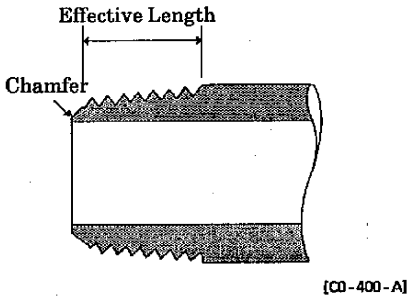


[V6-311-B]

4. INSTALLATION

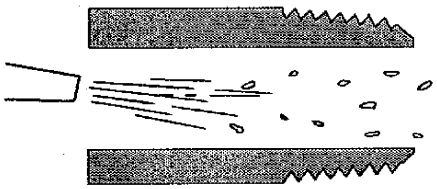
4-1. Piping

1) For piping beyond the filter, use pipes that hardly get corroded such as galvanized pipes, nylon tubes, rubber tubes, etc.
2) See to it that the pipes connecting cylinder have effective sectional area needed for the cylinder to drive at specified speed.
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.

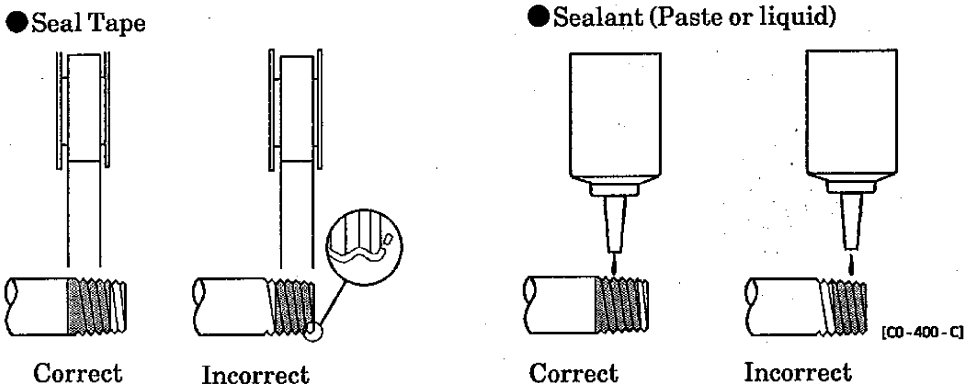


[C0-400-A]

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


[C0-400-B]

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.



[C0-400-C]

7) Make sure to provide hose nipple with fixed throttle or speed controller to piping system of pencil cylinder.
8) Install speed controller directly on the cylinder or as near by cylinder as possible.

4-2. Installation

1) The most advisable range of ambient temperature for cylinder of this type is 5~60°C although serviceable range itself is −10~50°C. In the event that temperature is expected to drop lower than 5°C, give some freezing prevention measures as there is an anxiety of causing mechanical trouble due to frozen humidity within piping of the system.

○ Anti-freezing procedures

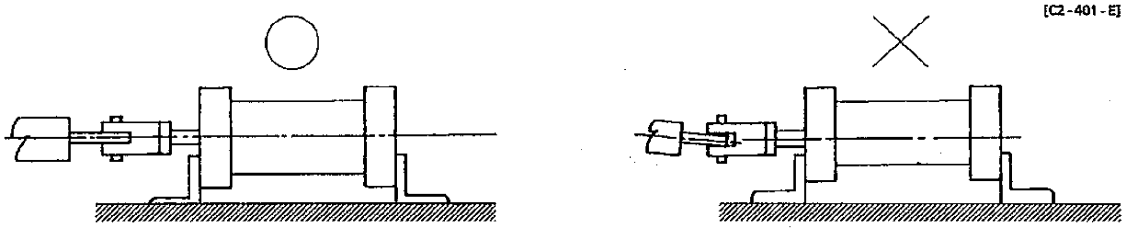
(a) Dehumidify the compressed air. (Recommended: Dry pack drier)

(b) Mix some anti-freezing solution to bring the freezing point down (Recommended: Ethylene grecole)

(c) Install some heat insulator over machines and system or warming facility to keep system above freezing point.

2) 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.

[C2-401-E]



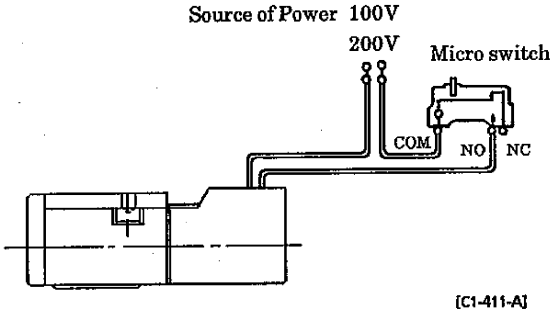
3) Prevent fixedly connection of excessive load to Rod. Damage to the rod may be caused due to large kinetic energy.

Reference : Tolerable kinetic energy $\phi 6$: 5.5N · cm {0.55kgf · cm}
$\phi 10$: 2.1N · cm {0.21kgf · cm}
$\phi 16$: 8.2N · cm {0.82kgf · cm}

4) Prevent transverse load to the rod for the purpose of eliminating the wear and tear of rod cover or damage to the rod.

5) Wiring

One solenoid valve is used to shift this cylinder. Piston rod actuates when current is charged. It returns to former position when current is shut off. It is, therefore, necessary to provide some cam or relay to keep condition of current charge so as to make piston rod complete its stroke.



[C1-411-A]

5. MAINTENANCE

5-1. 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 remarkable 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 any abnormality.

See 5-2,"Trouble shooting", should there be any trouble found, also carry out additional tightening if bolts, nuts, etc.are slackened.

Note : This type of cylinder is unable to be overfauled, being a caulked type assembly, Replace if duly trouble occurs to the culinder itcelf.

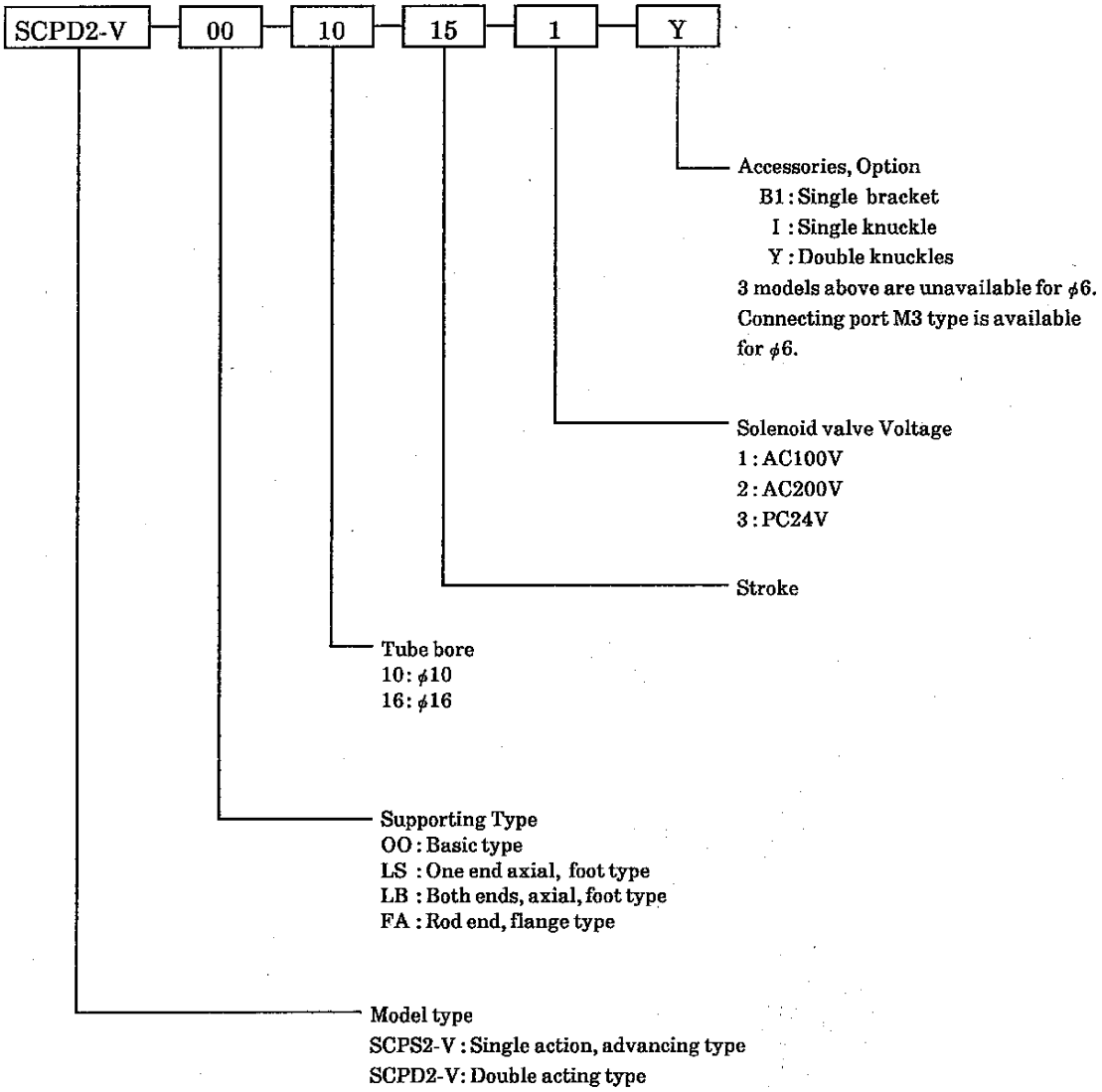
5-2. Trouble Shooting

Trouble	Cause	Countermeasure
Does not operate	No pressure or inadequate pressure	Provide an adequate pressure source.
	Signal is not transmitted to solenoid valve	Inspect and correct cause or replace solenoid valve. ※ (Note 1)
	Improper or misalignment of installation	Revise the supporting state. Mount Free joint.
	Broken packing	Replace the cylinder. ※ (Note 2)
Does not function smoothly	Speed lower than the low speed limitation	Lighten the load. Use low oil pressure cylinder.
	Improper or misalignment of installation	Revise the supporting state. Mount Free joint.
	Exertion of transverse load	Install a guide. Revise the supporting state.
	Excessive load	Increase the pressure. Use one step larger OD tube.
Breakage and/or deformation	Impact force due to high speed operation	Turn the speed down. Lighten the load. Install External cushion device.
	Exertion of transverse load	Install a guide. Revise the supporting state.

Note 1 : Solenoid valve is replaceable by loosening mounting countersink screws.
Note 2 : Being caulking type, the cylinder of this type is unable to be overhauled.

6. MODEL CODE

6-1. Unit



6-2. Solenoid valve

Solenoid valve for Single acting : P5132-M0E- Voltage

Solenoid valve for Double acting: P5142-M6E- Voltage