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SM－6377－A

INSTRUCTION MANUAL

PENCIL CYLINDER

SCPS2, SCPH2
SCPD2, SCPD2-O

- 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 3rd edition

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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 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:

⚠ 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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SCPS2, SCPH2, SCPD2, SCPD2-O
Pencil cylinder
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1. PRODUCT

1.1 Specifications

Model / Item		SCPS2 SCPS2-L			SCPH2 SCPH2-L			SCPD2 SCPD2-L			SCPD2-O SCPD2-OL		
Bore size	mm	φ6	φ10	φ16	φ6	φ10	φ16	φ6	φ10	φ16	φ6	φ10	φ16
Actuation		Single-acting, advancing type			Single-acting, retracting type			Double-acting			Double-acting, Low speed type		
Working fluid		Compressed air											
Max. working pressure	MPa	1.0											
Min. working pressure	MPa	0.3	0.15		0.39	0.2		0.15	0.1		0.15	0.1	
Proof pressure	MPa	1.6											
Ambient temperature	℃	−10～60 (No freezing)											
Port size		M5											
Stroke tolerance	mm	+1.0 0											
Working piston speed	mm/s	50～500									10～200		
Cushion		Rubber cushion (Both ends)											
Lubrication		Not required (Use Grade 1 ISO VG 32 Turbine oil, if lubrication is preferred)									Must be oil free		
Allowable energy absorption	J	0.011	0.041	0.162	0.011	0.041	0.162	0.011	0.041	0.162	0.011	0.041	0.162

Note : If it would keep pressurizing, a piston rod may not return by spring load when the pressure is extracted.

1.2 Product weight

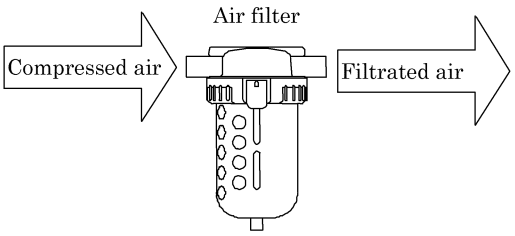
(unit : g)

Model	Stroke / Bore size (mm)	With switch				Without switch (with two switch)				Mass of switch (per one switch)
		15 st	30 st	40 st	60 st	15 st	30 st	45 st	60 st	
SCPS2	φ6	12	12	16	20	58	62	66	70	24
	φ10	26	26	33	40	72	79	86	93	
	φ16	48	48	62	76	96	110	124	138	
SCPH2	φ6	15	15	18	21	61	64	67	70	
	φ10	26	26	32	38	72	78	84	90	
	φ16	51	51	63	76	99	101	124	136	
SCPD2 SCPD2-O	φ6	15	15	17	19	61	63	65	67	
	φ10	24	24	27	31	70	73	77	80	
	φ16	47	47	52	57	95	100	105	110	

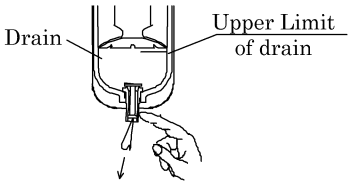
2. CAUTION

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. But must be oil free for low speed type.

3. OPERATION

1) The working pressure for this type of cylinder is specified in "1.1 Specifications". Operate the system within this range.

2) The ambient temperature for this cylinder is −10 to 60℃. (No freezing)

3) Keep the range of load connected to the rod reasonable to prevent rod from being damaged due to the excessive energy of momentum inertia.
Refer to the "1.1 Specifications" for the allowable energy absorption.

4) Carefully prevent lateral load to the rod to avoid irregular wear and tear of rod cover or rod itself.

5) Working piston speed control is possibly accomplished by chalking the compressed air inlet port (meter-in system) but a stable speed control is not achieved.
Consider of regulating it by means of meter-out system adopting doubleacting cylinder (SCPD2) when a stable speed is required.

6) 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 working piston speed.

7) Mount a speed controller directly on or as near to the cylinder as possible.

4. INSTALLATION

4.1 Piping

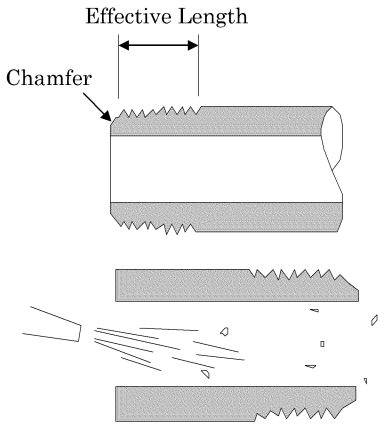
1) For piping beyond the filter, use pipes that are tough against corrosion such as galvanized pipes, nylon tubes, rubber tubes, etc.

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.

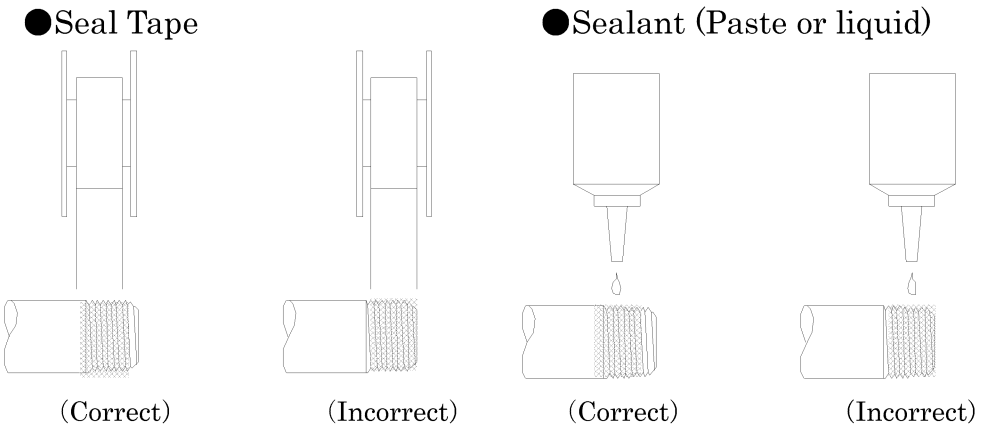
3) Install filter preferably adjacent to the upper-stream to the solenoid valve for eliminating rust, foreign substance in the drain of the pipe.

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.

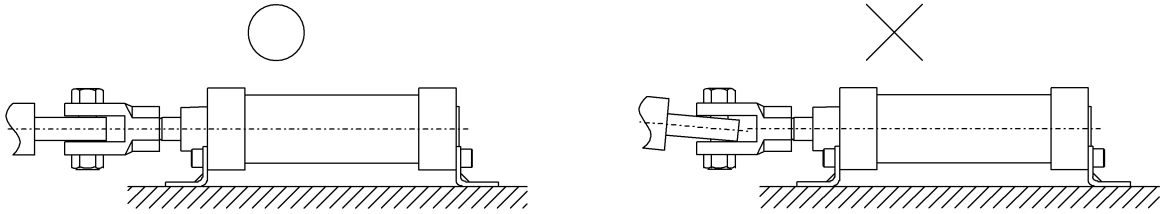


7) Make sure to use a hose nipple (with fixed chalk) or speed controller when piping the pencil cylinder to the system.

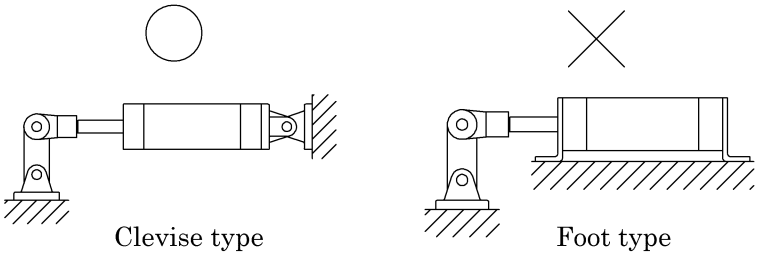
4.2 Installation

1) The most suitable range of ambient temperature to this type cylinder is 5 to 60℃ although the range of allowable ambient temperature is −10 to 60℃.

2) 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.



3) When the load acting direction changes with the cylinder operation:
Use an oscillating cylinder (clevis 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　　Foot type

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

(a)

(b) Check the bolts and nuts fitting the piston rod end brackets and mounting brackets for slackening.

(c) Check to see that the cylinder operates smoothly.

(d) Check any change of the working piston speed and cycle time.

(e) Check for internal and/or external leakage.

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

(g) Check the stroke for 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 overhauled, being a caulked type assembly, Replace if duly trouble occurs to the cylinder itself.

5.2 Trouble Shooting

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 supporting system.
	Broken piston packing	Replace the cylinder.
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 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 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 supporting system.

※ Being a caulked type, this cylinder is unable to be overhauled ; hence, replace the cylinder if duly trouble occurs to the cylinder itself.

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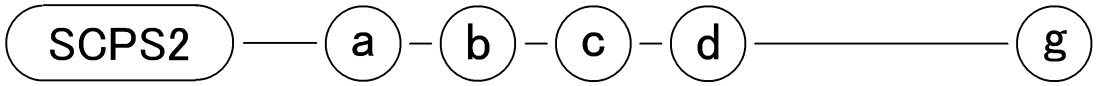
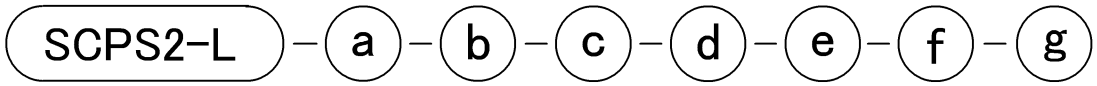
6. HOW TO ORDER

(1) Single-acting, Advance type

Without switch

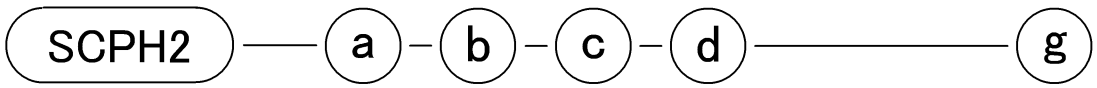


With switch

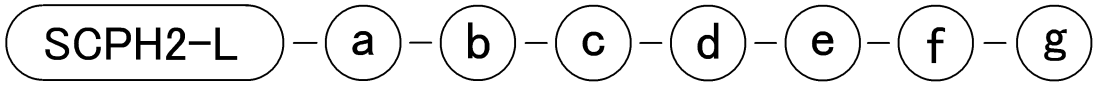


(2) Single-acting, Retracting type

Without switch

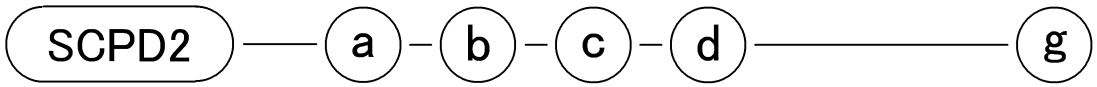


With switch

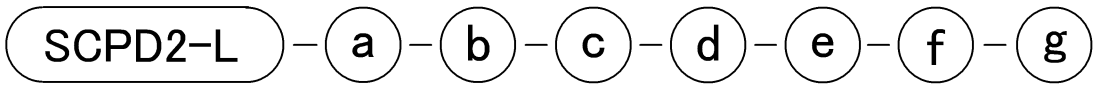


(3) Double-acting

Without switch

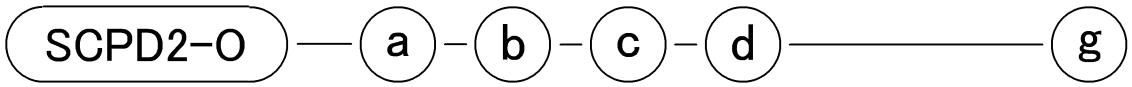


With switch

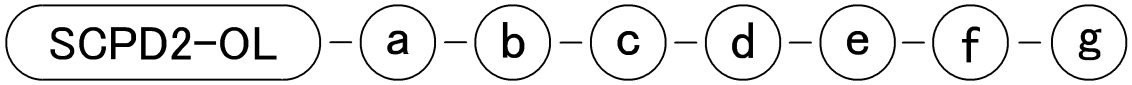


(4) Double-acting, Low speed type

Without switch



With switch



(a) Mounting Style (note1)		(b) Bore size		(c) Stroke		(d) Port Direction	
00	Basic type	6	ϕ6	15	15	No code	perpendicular to cylinder axis
LS	Single axial foot type (rod side)	10	ϕ10	30	30		
FA	Rod side flange type	16	ϕ16	45	45	0	Parallel to cylinder axis
CB	Double clevis type			60	60		

note1: Mounting bracket is attached to the product at shipment.

(e) Switch model			(f) Qty. of switch		(g) Accessory	
M2V※	Solid state type switch	2-wire	R	Rod side, 1 ea.	I	Rod eye
M2WV※			H	Head side, 1 ea.	Y	Rod clevis
M3V※		3-wire	D	2 ea.	B1	Eye bracket
M3WV※			T	3 ea.	B2	Clevis bracket
M0V※	Reed switch type switch	2-wire				
M5V※						

※ Lead wire Length	
No code	1m (Standard)
3	3m (Option)
5	5m (Option)