

# **INSTRUCTION MANUAL**

## **PENCIL CYLINDER**

### **SCPD2-F**

#### **(FINE SPEED TYPE)**

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

## For Safety Use

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

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

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

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

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

### 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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SCPD2-F (Fine Speed Type)

Pencil cylinder

Manual No. SM-423464-A

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## 1. PRODUCT

### 1.1 Specifications

Model	SCPD2-F		
Item	SCPD2-LF		
Bore size                      mm	φ 6	φ 10	φ 16
Actuation	Double-acting, Fine speed type		
Working fluid	Compressed air		
Max. working pressure      MPa	1.0		
Min. working pressure      MPa	0.15	0.1	
Proof pressure                MPa	1.6		
Ambient temperature        °C	5~60		
Bore size	M5		
Stroke tolerance              mm	+1.0 0		
Working piston speed        mm/s	1~200		
Cushion	Rubber cushion (Both ends)		
Lubrication	Not required (Use Grade 1 ISO VG 32 Turbine oil, if lubrication is preferred)		
Allowable energy absorption   J	0.011	0.041	0.162

### 1.2 Product weight

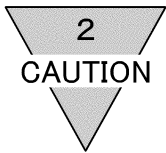
(Unit: g)

Model	Stroke	Without switch				With switch (with two switch)				Weight of switch (per one switch)
	Bore size (mm)	15 st	30 st	40 st	60 st	15 st	30 st	45 st	60 st	
SCPD2-F	φ 6	15	17	19	21	61	63	65	67	24
	φ 10	24	27	31	34	70	73	77	80	
	φ 16	47	52	57	62	95	100	105	110	

### 1.3 Mounting bracket weight

(Unit: g)

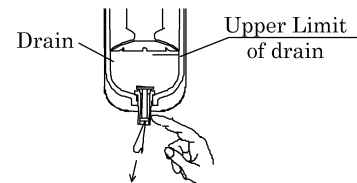
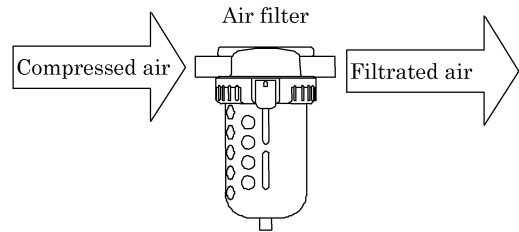
Applicable bore size	Mounting style		
	Foot type LS	Flange FA	Clevis CB
φ 6	6	4	—
φ 10	6	4	4
φ 16	15	12	10

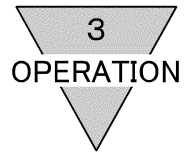


## 2. CAUTION

### 2.3 Fluid

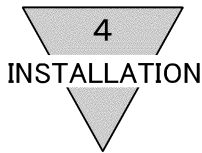
- 1) It is necessary to use dehumidified air that has been filtered from compressed air. Carefully select an adequate filter that has an adequate filtration rate (preferably  $5\ \mu\text{m}$  or less), flow rate and its mounting location (as nearest to the directional control valve as possible).
- 2) 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

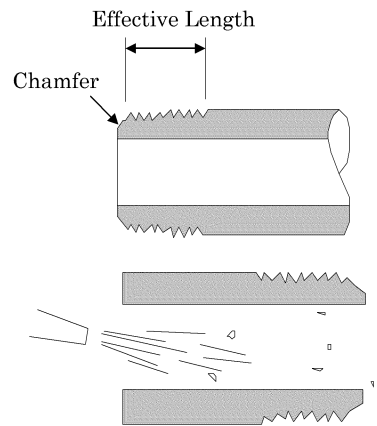
- 1) The working pressure for this type of cylinder is specified in “1.1 Specifications”. Strictly avoid to operate the cylinder with higher range than specified.
- 2) The ambient temperature for this cylinder is 5 to 60°C.
- 3) Keep the range of load connected to the rod reasonable to prevent rod from 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

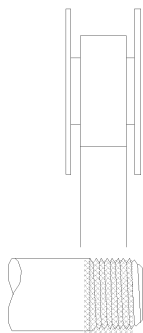
### 4.1 Piping

- 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.

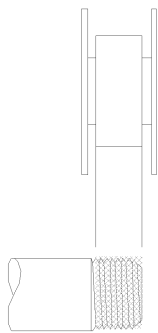


- 6) Refrain from applying sealant or sealing tape approx. two pitches of thread off the tip of pipe to avoid residual substances from falling into piping system.

#### ● Seal Tape

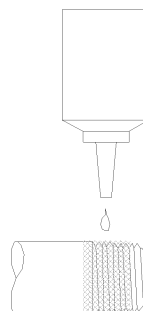


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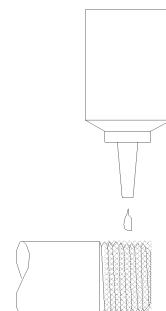


(Incorrect)

#### ● Sealant (Paste or liquid)



(Correct)

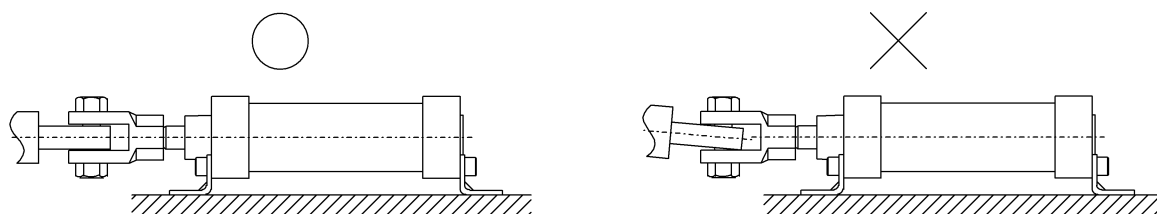


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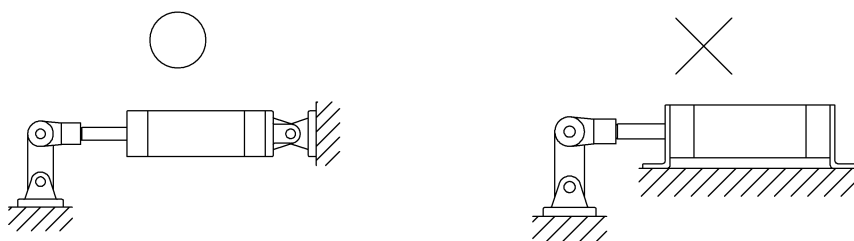
- 7) Make sure to use a hose nipple (with fixed chalk) or speed controller when piping the pencil cylinder to the system.

## 4.2 Installation

- 1) 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.



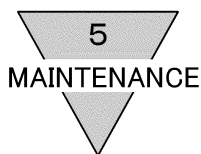
- 2) When the load acting direction changes with the cylinder operation:  
Use an oscillating cylinder (clevis type) capable of making revolution to a certain angle. Furthermore, install the rod and connecting metal (knuckle) so that it moves in the same direction as the cylinder main body does.



Clevis type

Foot type

- 3) Adjust the alignment, etc., so lateral load is not applied to the cylinder.  
Adjust and install so the sliding guide is not twisted.
  - Operation may become unstable due to fluctuations in load and resistance.
  - A guide having great difference between static and dynamic friction may become unstable.



Discontinue

## 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 bracket and mounting bracket 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 mounting style.
	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 mounting style.
	Exertion of transverse (lateral) load.	Install a guide. Revise the installation state and/or change the mounting style.
	Excessive load.	Increase the pressure itself and/or the inner diameter of the tube.
	Speed control valve is built in the way of “Meter in” circuit.	Change the 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 mounting style.

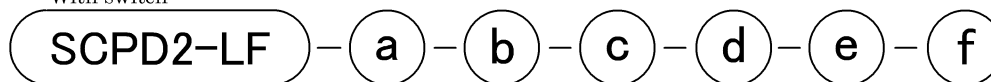
※ Being a caulked type, this cylinder is unable to be overhauled ; hence, replace the cylinder if duly trouble occurs to the cylinder itself.

## 6. HOW TO ORDER

Without switch



With switch



(a) mounting Style (note1)		(b) Bore size		(c) Stroke	
00	Basic type	6	φ 6	φ 6	5~100
LS	Single axial foot type (rod side)	10	φ 10	φ 10	5~200
FA	Rod side flange type	16	φ 16	φ 16	5~260
CB	Double clevis type				

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

(d) Switch model			(e) Qty. of switch		(f) 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)