SCPD3 Pencil shaped cylinder

Space saving structure

Overview

The lightest miniature series with the smallest bore size (ø6 to ø 16) in the general purpose cylinders.

Features

The exterior color is unified into silver white to enhance its bright image. The T switch helps you save space compared to the older versions. The mounting dimensions and the thread size of the rod tip are unchanged to make it easier to switch from the older models.



Note: Currently the cover is black, but it will be changed to silver.

CONTENTS

Series variation Variation and option selection table	8
 Double acting/single rod (SCPD3) Double acting/fine speed (SCPD3-F) 	10 16
Safety precautions	20

SCPD3	Variation and option selection table	
SCM		
SSD2		
MDC2		
SMG		
LCM		
LCR		
LCG		

 \bigcirc : Option variation (check category 2)

 \bigcirc : C5 compatible (check category 3)

 \bigtriangleup : Available depending on conditions (Estimation)

: Not available

		С	Clean room specifications				
			Exhaust treatment	Vacuum treatment	Exhaust treatment	Vacuum treatment	
		Code	P7	P71	P5	P51	
	Double acting	Blank	0	0	0	0	
	With cylinder switch	L	0	0	0	0	
	Fine speed	F	0	0			
	Double acting double rod	D	0	0	0	0	
	Heat resistant (120°C)	Т					
ation	Low speed	0	0	0			
Varia	High load	К		\bigtriangleup	\bigtriangleup		
	Non-rotation	М					
	With speed controller	Z					
	With valve	V					
	Single acting push	SCPS3					
	Single acting pull	SCPH3					
Cushion	Rubber-air cushioned	С	0	0	0	0	
ц	Rod nut material stainless steel	М	0	0	0	0	
ptio	Axial port position	0	0	0	0	0	
0	Customized piston rod end form	N**	0	0	0	0	

SCPD3
SCM
SSD2
MDC2
SMG
LCM
LCR
LCG
LCX
STM
STG
STR2
MRL2
GRC
Cylinder Switch
MN3E MN4E
4GA/B
M4GA/B
MN4GA/B
F.R.(module unit)
Clean F.R
Precision R
Press gauge Diff. press gauge
Electro- pneumatic R
Speed controller
Auxiliary valve
Fitting/ tube
Clean air unit
Pressure sensor
Flow rate sensor
Valve for air blow
Ending



Pencil shaped cylinder Double acting/single rod SCPD3 Series (made to order)

Bore size: ø6/ø10/ø16 Double acting JIS symbol



Structure and material restriction

SMC	Structure and material restriction								
SIVIG	Structure Material restriction								
LCM	DZ Carias	Exhaust treatment				P7			
LCR	P7 Series	Vacuum treatment				(P71)			
LCG		Exhaust treatment	Copper-based materials prohibited	Silicon-based materials prohibited	Halogen-based materials prohibited (fluorine, chlorine, bromine)	P5			
LCX	P5 Series	Vacuum treatment	Copper-based materials prohibited	Silicon-based materials prohibited	Halogen-based materials prohibited (fluorine, chlorine, bromine)	(P51)			
STM									

Specifications

MDC2

unit) Clean F.R

OTO								
SIG	Descriptio	ons		SCPD3-P7*/P5* SCPD3-L-P7*/P5*				
STR2	Bore size	mm	ø6	ø10	ø16			
MRI 2	Actuation			Double acting				
	Working fluid			Compressed air				
GRC	Max. working press	ure MPa		1.0				
	Min. working press	ure MPa	0.15	.1				
Cylinder	Proof pressure	MPa	1.6					
SWILCH	Ambient tempera	ature °C	-10 to 60 (no freezing)					
MN3E MN4E	Port size		M5					
	Port size (relief p	port)	M5					
4GA/B	Stroke tolerance	mm	+1.0 0					
	Working piston spe	ed mm/s	50 to 500					
M4GA/B	Cushion		Rubber cushion					
	Lubrication			Not available				
MN4GA/B	Allowable energy abs	sorption J	0.012	0.041	0.162			
F.R (module								

Stroke length

	0		
Bore size (mm)	Bore size Standard (mm) length (mm) (mm)		Min. stroke length (mm)*
ø6	45/00/	100	
ø10	15/30/	200	5
ø16	43/00	260	

* For types with switch, minimum stroke length varies depending on installation method. Refer to the following table.

Min. stroke length with switch

Clean F.R		1	l	2	2
Precision R					00
Press gauge Diff. press gauge	Sketch				
Electro- pneumatic R					
Speed controller		Rod end installation	Head end installation	Different surface installation	Same surface installation
Auxiliary valve	Min. stroke length	5 n	nm	10 mm	28 mm
Fitting/ tube		3	3		
Clean air unit			0 00		
Pressure sensor	Sketch				
Flow rate sensor					
Valve for air blow		Different surface installation	Same surface installation		
Ending	Min. stroke length	38 mm	54 mm		

Specifications

Switch specifications

Switch specif	ications				SCPD3
	Proxim	ity 2-wire	Proximity 3-wi	re	
Descriptions	T2H/T2V	T2WH/T2WV	T3H/T3V	T3WH/T3WV	SCM
Applications	Programma	ble controller	Programmable control	ller, relay	
Output method		-	NPN output		SSD2
Power supply voltage		-	10 to 28 VDC	;	MDCO
Load voltage	10 to 30 VDC	24 VDC ±10%	30 VDC or les	S	MDC2
Load current	5 to 20	0 mA (*2)	100 mA or less	50 mA or less	SMG
Indicator lamp	LED (lit when ON) Red/green LED (lit when ON) LED (lit when ON) Red/green LED (lit when ON)		Red/green LED (lit when ON)	LCM	
Leakage current	1 mA	or less	10 µA or less		
Weight g	1 m:18 3 n	n: 49 5 m: 80	1 m: 18 3 m: 49 5 m: 80 L		
Descriptions		Reed 2-wire			1.00
Descriptions	TOF	I/TOV	T5H/T5V	LCG	
Applications	Programmable	controller, relay	Programmable controller, relay indicator lamp), serial c	IC circuit (without connection	LCX
Load voltage	12/24 VDC	110 VAC	5/12/24 VDC	110 VAC	STM
Load current	5 to 50 mA	7 to 20 mA	50 mA or less	20 mA or less	
Indicator lamp	LED (lit	when ON)	Without indicator	lamp	STG
Leakage current	0	mA	0 mA		
Weight g	1 m:18 3 n	n: 49 5 m: 80	1 m: 18 3 m: 49 5	5 m: 80	STR2
*1: Refer to page 309 fo *2: Max. load current: 20	r detailed switch specifications, dime OmA at 25°C.The current is lower tha	nsions, etc. n 25 mA if the operating ambient tempe	rature around the switch is higher than 2	20°C.	MRL2

*2: Max. load current: 20mA at 25°C. The current is lower than 25 mA if the operating ambient temperature around the switch is higher than 20°C.

(At 60°C, it will be 5 to 10mA.)

Cylinder weig	jht					(Unit: g)	Cvlinder		
Descriptions	Mounting br	acket weight				Mountina	Switch		
Bore size (mm)	Foot (LS)	Flange (FA)	mm stroke length	10 mm stroke length	(per switch)	bracket weight	MN3E MN4E		
ø6	6	4	23	1	Refer to weight		4GA/B		
ø10	6	4	34	2	information provided in	2			
ø16	15	12	69	3	the switch specifications.		M4GA/B		
Example: Product weight of SCPD3-L-LS-10-30-T0H-D-P7 Mounting bracket weight (Foot)									
 Product weight for 0 mm stroke length									

Theoretical thrust table

Bore size	Operating direction						Working	pressure	MPa				Diff. pre
(mm)	Operating direction	0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	Electro
ø6	Push	-	4.24	5.65	8.48	11.3	14.1	17.0	19.8	22.6	25.4	28.3	Spor
	Pull	-	3.18	4.24	6.36	8.48	10.6	12.7	14.8	17.0	19.1	21.2	cont
	Push	7.85	11.8	15.7	23.6	31.4	39.3	47.1	55.0	62.8	70.7	78.5	Aux
ØTU	Pull	6.60	9.90	13.2	19.8	26.4	33.0	39.6	46.2	52.8	59.4	66.0	valv
~16	Push	20.1	30.2	40.2	60.3	80.4	1.01 × 10 ²	1.21 × 10 ²	1.41 × 10 ²	1.61 × 10 ²	1.81 × 10 ²	2.01 × 10 ²	Fitti
Ø10	Pull	18.1	27.2	36.3	54.4	72.6	90.7	1.09 × 10 ²	1.27 × 10 ²	1.45 × 10 ²	1.63 × 10 ²	1.81 × 10 ²	tub

itting/ ibe Clean air unit Pressure sensor Flow rate sensor Valve for air blow

Precision R

(Unit: N) Press gauge

GRC



Head cover port direction

For 00, LS and FA mounting, the head cover port direction can be selected from two options: vertical to the axis direction and horizontal to the axis direction.

Valve for air blow

Dimensions

SCPD3

SCM

SSD2

MDC2

SMG

LCM

LCR

LCG

LCX

STM

STG

STR2

MRL2

GRC

Cylinder Switch

MN3E

MN4E

4GA/B

M4GA/B

MN4GA/B

F.R.(module unit)

Clean

Х

85

89

89



T2W, T3W

HD

3.5

4

5

RD

4

5.5

3.5

Ρ

11.5

13.5

17

T0, T5, T2, T3

RD

2

3.5

2

HD

2

2.5

3.5

QB N axial	15	UB	St C	
QB	QC	т	UA	UB
4	12.5	1.8	12	11(8)
4.5	12.5	2.4	12	12
4.5	13	3.2	18	18
		· · · · · · · · ·		

QB

SCPD3-L-P7*/P5* Single sided axial foot (LS)

Bore size

ø6

ø10

ø16

(mm)

IK

7

7

10

LR

22

22

29

LS

32

32

42

LT

1.6

1.6

2.3

CKD

LF

184

18.4

197

LD

42

42

5.2

LL

57

61

61

LH

9

9

14

SCPD3 Dimensions

SSD2

MDC2

SMG

LCM

LCR

LCG

LCX

STM

STG

SCM SCPD3-L-P7*/P5* rod end flange (FA)

2.3

ø16

2

3.5

3.5

5

17



STR2 • The dimensions are the same in the type without switch (although magnet is not built in).

• *1: As the thread depth of ø6/ø10 port is 3.8 mm, use a fitting with the thread length of 3.8 mm or less if necessary.

MRL2	Code	Rod end flange (FA) basic dimensions												Installation dimensions					
	Bore size (mm)	В	G	J	K	K	LL	MB	MM	QA	QB	QC	Т	Х	FD	FF	FH	FL	FM
GRC	ø6	5.5	27	8	N	3	57	M6	3	23	4	12.5	1.8	85	4.2	11.4	14	22	32
	ø10	7	27.5	9	N	M4		M8 × 1.0	4	23	4.5	12.5	2.4	89	4.2	11.4	14	22	32
Cylinder	ø16	8	28	9	N	M5		M10 × 1.0	5	23.5	4.5	13	3.2	89	5.2	10.7	20	29	42
SWILCH	Code		With s	switch															
MN3E	Bore size \	ize \		T0, T5, T2, T3 T2W, T3W		р													
IVIIN4L	(mm)	Г 1	RD	HD	RD	HD													
4GA/B	ø6	1.6	2	2	4	3.5	11.5												
	ø10	1.6	3.5	2.5	5.5	4	13.5												

M4GA/B MN4GA/B F.R (module unit)

Clean F.R Precision R Press gauge Diff. press gauge Electropneumatic R Speed controller Auxiliary valve Fitting/ tube Clean air unit Pressure sensor Flow rate sensor Valve for air blow

CPD3
SCM
SD2
IDC2
SMG
.CM
.CR
.CG
.CX
STM
STG
STR2
IRL2
GRC
ylinder
MICH IN3E
(IN4E
R.(module
it)
R
ess gauge f. press gauge
ectro- ieumatic R
peed ontroller
uxiliary alve
itting/ ube
lean ir unit
ressure ensor
low rate ensor
alve for ir blow
ndina

SCPD3 SCM SSD2				Pencil shaped cy Double acting/fine SCPD Bore size: Ø6/Ø IIS symbol	linder e speed 3-F ø10/ø16	Series (I	nade	to o	rder) RoHS
MDC2	_								
SMG	Structure	and ma	terial restriction	1					
LCM LCR	P7 Series	Exhaust treat	Iment P7 Iment P71						
LCG				-					
LCX	Specificati	ions				Stroke	e length		
STM	Descript	ions	SCPD3-F-F	P7*/SCPD3-LF-P7* (with switch)	Bore	Standard	Max.	Min.
STG	Bore size	mm	ø6	Ø10	ø16	size	length	length	length
010	Working fluid			Compressed air			(mm)	(mm)	(mm) *
STR2	Max. working pre	ssure MPa		1.0		Ø6	15/30/	200	5
MDL2	Min. working pres	sure MPa	0.15	().1		45/60	260	0
IVIT LZ	Proof pressure	MPa		1.6		* For types	with switch,	minimum stro	ke length

5 to 60

M5

+1.0 0

1 to 200

Rubber cushion

Not available

0.041

0.162

* For types with switch, minimum stroke length varies depending on installation method. Refer to the following table.

Min. stroke length with switch

0.012

mm

Ambient temperature °C

Working piston speed mm/s

Allowable energy absorption J

Port size

Cushion Lubrication

Stroke tolerance

GRC

Cylinder switch

MN3E MN4E

4GA/B

M4GA/B

MN4GA/B

	-			
	1		2	
				пп
Sketch				
	Rod end installation	Head end installation	Different surface installation	Same surface installation
Min. stroke length	5 n	nm	10 mm	28 mm
	3	}		
Sketch				
	└┉╢─ <u>┇</u> ┇═┋╢			
	Different surface installation	Same surface installation		
Min. stroke length	38 mm	54 mm		
	Sketch Min. stroke length Sketch Min. stroke length	Sketch Image: Constant of the system of	Sketch Image: Constant of the sector of	Sketch Image: Constant of the state of t

Specifications

GRC

Precision R

(Unit: N) Press gauge

Switch specifications

e miteri epeen	loadono							
Descriptions	Proxim	ity 2-wire	Proxim	Proximity 3-wire				
Descriptions	T2H/T2V	T2WH/T2WV	T3H/T3V	T3WH/T3WV				
Applications	Programma	ble controller	Programmable	controller, relay				
Output method		-	NPN	output				
Power supply voltage		-	10 to 1	28 VDC				
Load voltage	10 to 30 VDC	24 VDC ±10%	30 VD0	C or less				
Load current	5 to	20 mA	100 mA or less	50 mA or less				
dicator lamp LED (lit when ON)		Red/green LED (lit when ON)	LED (lit when ON)	Red/green LED (lit when ON)				
Leakage current	1 mA	or less	10 µA	or less				
Weight g	1 m:18 3 n	n: 49 5 m: 80	1 m: 18 3 n	n: 49 5 m: 80				
Descriptions		Reed	d 2-wire	2-wire				
Descriptions	TOF	I/TOV	T5H	/T5V				
Applications	Programmable	controller, relay	Programmable controlle indicator lamp),	er, relay IC circuit (without serial connection				
Load voltage	12/24 VDC	110 VAC	5/12/24 VDC	110 VAC				
Load current	5 to 50 mA	7 to 20 mA	50 mA or less	20 mA or less				
Indicator lamp	LED (lit	when ON)	Without indicator lamp					
Leakage current	0	mA	0 mA					
Weight g	1 m: 18 3 n	n: 49 5 m: 80	1 m: 18 3 m: 49 5 m: 80					
1: Refer to page 309 fo 2: Max. load current: 2	or detailed switch specifications, of 0mA at 25°C. The current is lowe	dimensions, etc. er than 25 mA if the operating ambi	ent temperature around the switch is	s higher than 20°C.				

*2: Max. load current: 20mA at 25°C. The current is lower than 25 mA if the operating ambient temperature around the switch is higher than 20°C. (60 to 5 mA at 10°C)

Culinder	(a) abt									
Cylinder w	leight						(Unit: g)	Cylinder		
	Descriptions	Mounting bra	acket weight		Additional weight		Mounting	Switch		
Туре	Bore size (mm)	Foot LS	Flange FA	0 mm stroke length	per 10 mm stroke length	Switch weight (per switch)	bracket weight	MN3E MN4E		
	ø6	6	4	23	1	Refer to weight		4GA/B		
SCPD3-F	ø10	6	4	34	2	information provided in	2			
	ø16	15	12	69	3	the switch specifications.		M4GA/B		
Example: Proc	luct weight of SC	PD3-LF-LS-1	0-30-T0H-D-I	P7						
● Mounting bracket weight (Foot) 6 g										
 Product weight for 0 mm stroke length										
• vveight of 2 switches										

Theoretical thrust table

													Diff pross gaug
Bore size	Operating						Working	pressure	MPa				Dill. picoo yauy
(mm)	direction	0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	Electro-
ø6	Push	-	4.24	5.65	8.48	11.3	14.1	17.0	19.8	22.6	25.4	28.3	Speed
	Pull	-	3.18	4.24	6.36	8.48	10.6	12.7	14.8	17.0	19.1	21.2	controller
ø10	Push	7.85	11.8	15.7	23.6	31.4	39.3	47.1	55.0	62.8	70.7	78.5	Auxiliary
	Pull	6.60	9.90	13.2	19.8	26.4	33.0	39.6	46.2	52.8	59.4	66.0	valve
ø16	Push	20.1	30.2	40.2	60.3	80.4	1.01 × 10 ²	1.21 × 10 ²	1.41 × 10 ²	1.61 × 10 ²	1.81 × 10 ²	2.01 × 10 ²	Fitting/
	Pull	18.1	27.2	36.3	54.4	72.6	90.7	1.09 × 10 ²	1.27 × 10 ²	1.45 × 10 ²	1.63 × 10 ²	1.81 × 10 ²	tube
ø16	Pull	18.1	27.2	36.3	54.4	72.6	90.7	1.21×10^{2} 1.09×10^{2}	1.41×10^{2} 1.27×10^{2}	1.45×10^2	1.63×10^2	1.81 × 10 ²	tube

itting/ lbe Clean air unit Pressure sensor Flow rate sensor Valve for air blow



Same as SCPD3 Series (double acting/single rod). Refer to pages 13 and 14.

CKD

SCPD3
SCM
SSD2
MDC2
SMG
LCM
LCR
LCG
LCX
STM
STG
STR2
MRL2
GRC
Cylinder Switch
MN3E MN4E
4GA/B
M4GA/B
VIN4GA/B
F.R.(module
Clean E.R
Precision
ress gauge Diff. press naune
electro-
Speed
Auxiliary
Fitting/
Clean
Pressure
Flow rate
Valve for
=nding



SCPD3

SCM

SSD2

MDC2

SMG

LCM

LCR

LCG

LCX

STG

STR2

MRL2

GRC

switch

Safety Precautions

Always read this section before use.

Refer to page 2 for general information of the cylinder, and to page 320 for general information of the cylinder switch.

Pencil shaped cylinder SCPD3 Series



1. Fine speed SCPD3-F

CAUTION

- Use the product with no lubrication.
 - Application of lubrication may cause changes in characteristics.
- Assemble the speed controller near the cylinder.
- When installed at a distant place from the cylinder, the adjustment becomes unstable.
- For the speed control valve, SC-M3/M5-F, SC3W and SCD-M3/M5-F Series are recommended.
- At the higher air pressure and the lower load factor. STM the speed generally becomes more stable.
 - The load factor should be 50% or less.
 - Stable speed control is achieved with a meter-out circuit. When fine speed activation is performed with operating direction PUSH for the sin gle rod cylinder, the popping out phenomenon occurs when operation starts if the load resistance is low. As a countermeasure, use a circuit of (6), (G) or (d). Note that circuit (d) is the most stable.



2. Restrict the speed with the speed controller y until there is no popping out. 3. Check the speed again

Note 1: When comparing **()**, **()**, and **()**, operation is the most stable with **6** circuit.

(Note 2) For vertical mounting, combine the cylinder with a meter-out circuit, as it will fall under its own weight when a meter-in circuit is used



(Note 3) Use the circuit as shown in the figure below for the serial connection of the speed control valves.



(Guidelines for pop-out generation)

Popping out occurs in the following cases.

- Thrust > Resistance
- * Resistance: a force produced by a residual pressure on the +outlet side (for fine speed, Inlet pressure = Residual pressure)

When using horizontally : frictional force caused by load When using vertically : load selfweight

- Do not apply a lateral load to the cylinder. With a lateral load, operation will become unstable.
- Avoid use in places subject to vibrations.
 - The product will be adversely affected by vibration and operation will become unstable.

CKD

SCP3 series



During use & maintenance SCPD3 SCM (1. Common) SSD2 **CAUTION** MDC2 Because this cylinder is a non-disassemble type, do not apply excessive force to the end cover or tube. SMG LCM LCR LCG LCX STM STG STR2 MRL2 GRC Cylinder switch MN3E MN4E 4GA/B M4GA/B MN4GA/B F.R (module unit) Clean F.R Precision R Press gauge Diff. press gauge Electropneumatic R Speed controller Auxiliary valve Fitting/ tube Clean air unit Pressure sensor Flow rate sensor Valve for air blow Ending **CKD** 22