New style compact hydraulic cylinders for 16 MPa with absolute position sensor.

- Provided with a small position sensor not affecting the compact design of the cylinder.
- Same dimensions as those of 160S-1 except the sensor on the cap side.
- Usable in a strong magnetic field where magnetic proximity sensors cannot be used.
- Applicable to cylinder with bores of 32 to 125 mm and strokes of 5 to 50 mm. (For strokes more than 60 mm, consult us.)
- The standard cylinders have male threaded rod ends.
- Mounting style: SD, FA and LA (foot type).

Standard Specifications

Type	General purpose type
Nominal pressure	16 MPa
Maximum allowable pressure	16 MPa
Proof test pressure	24 MPa
Minimum operating pressure	0.3 MPa
Working speed range	8 to 100mm/s
Working temperature range (Note 1) (ambient temperature)	−10 to +100℃ (No freezing)
Structure of cushioning	None
Adaptable fluid	Petroleum-based fluid (When using another fluid, refer to the table of fluid adaptability.)
Tolerance for thread	JIS 6g(/6H)
Tolerance of stroke	0 to 0.8mm
Mounting style	SD, FA, LA
Rod end thread	Male thread (Note 2)

Notes) 1. At a temperature exceeding 60℃, the sensor is not damaged, but its accuracy is deteriorated.
2. Since the piston rod has a built-in sensor, a female threaded rod is inapplicable. However, it may be applicable depending on the bore and stroke. Contact us.

Adaptability of Fluid to Seal Material

Seal material	Adaptable fluid				
	Petroleum-based fluid	Water-glycol fluid	Phosphate ester fluid	Water in oil fluid	Oil in water fluid
3 Fluorocarbon	○	×	○	○	○
6 HNBR	◎	◎	×	◎	◎

Notes) 1. ◎○: Applicable ×: Inapplicable
2. The ◎-marked items are recommended seal materials in case of giving the first priority to abrasion resistance.

Terminologies

Nominal pressure
Pressure given to a cylinder for convenience of naming. It is not always the same as the working pressure (rated pressure) that guarantees performance under the specified conditions.

Maximum allowable pressure
Maximum allowable pressure generated in a cylinder (surge pressure, etc.).

Proof test pressure
Test pressure against which a cylinder can withstand without unreliable performance at the return to nominal pressure.

Minimum operating pressure
Minimum pressure at which cylinder installed horizontally operates under no load.

Note) ● This series of cylinders does not have air vents.

Product Lineup

Unit: mm

Series Variation	Type	Mounting Style	φ32	φ40	φ50	φ63	φ80	φ100	φ125
General purpose type	Double acting single rod	PSR-1A	SD	●	●	●	●	●	●	●
			FA	●	●	●	●	●		
			LA	●	●	●	●			

Detector Specifications

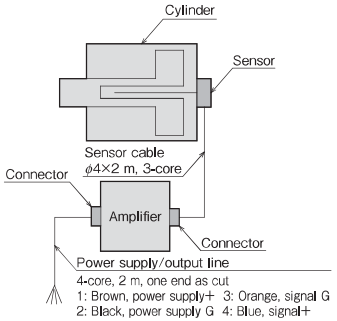
Power supply		12 to 24 V DC ±10% Ripple 10% or less
Consumption current		30 mA or less
Accuracy	Repeatability (Note 1)	±0.1%FS or less
	Linearity	±1%FS or less (at room temperature)
	Temperature characteristics (temperature drift)	±1%FS or less (at 0 to +60): Amplifier block ±2%FS or less (at 0 to +60): Sensor block ±10%FS or less (at −0 to +100): Sensor block
Output (Note 2)		1 to 5 V (1 V at piston retracting end)
Response		4kHz(-3dB)
Working temperature range		−10 to +100℃: Sensor block −10 to +60℃: Amplifier block (No freezing)
Impact resistance		500 m/s², three times in each of X, Y and Z directions
Water resistance (Note 3)		Sensor: Equivalent to IP66 Amplifier: Without protection
Connection		Between sensor and amplifier: 3-core, φ4×2 m
		From amplifier: 4-core, 2 m, one end as cut

Notes) 1. Dispersion of output at the same position under the same conditions (temperature, power supply voltage, etc.).
2. The sensor output at the rod advancing end varies depending on the cylinder stroke. Refer to the sensor output drawing contained in the outline drawings.
3. The water resistance is deteriorated at high temperatures. Take care when cleaning. Install the amplifier in a place away from dust and drops of water.

Product Configuration

PSR-1A includes the following:

- Cylinder body with sensor (with cable between sensor and amplifier)
- Amplifier
- Cable with connector at one end and other end as cut for power supply/output (4-core, 2 m)



Standard Stroke Range

Bore (mm)	Cylinder stroke (mm)									
	5	10	15	20	25	30	35	40	45	50
φ32	○	○	○	○	○	○	○	○	○	○
φ40	○	○	○	○	○	○	○	○	○	○
φ50	○	○	○	○	○	○	○	○	○	○
φ63	○	○	○	○	○	○	○	○	○	○
φ80	○	○	○	○	○	○	○	○	○	○
φ100	○	○	○	○	○	○	○	○	○	○
φ125	○	○	○	○	○	○	○	○	○	○

Note) For strokes of more than 60 mm, contact us.

● How to order

General Purpose Type

The item enclosed by broken line needs not to be entered, if unnecessary. Semi-standard

● Standard type PSR-1A [6] [SD] [40] N [50] T [G] – [L] – [V]

① Type
② Seal material
③ Mounting style
④ Cylinder bore
⑤ Cushioning
⑥ Stroke
⑦ Thread type
⑧ Port type
⑨ Lock nut
⑩ Air vent type

[3] Fluorocarbon
[6] HNBR

[SD] Basic style
[FA] Rod flange
[LA] Foot type

Note) When ordering the FA style cylinder body, it is necessary to change dimension WF of the SD style cylinder. For details, contact us.

SD : ϕ32 to ϕ125
FA : ϕ32 to ϕ80
LA : ϕ32 to ϕ63

No cushion

Male thread type

[None] Rc thread
[G] G thread

Note) G thread is applicable only to the SD style.

[None] Without lock nut
[L] With one lock nut

Note) If two or more lock nuts are required, make an order for the additional lock nut(s).

[None] [None] Without air vent (standard)
[V] With air vents (order made: ϕ32 to ϕ125)

Cylinder stroke (mm)
5, 10, 15, 20, 25, 30, 35, 40, 45, 50 mm
Note) For strokes other than the above standard strokes, contact us.

✪ Port G thread type (only for SD style)

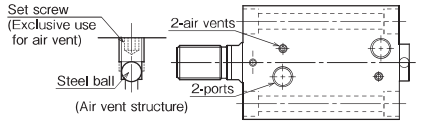
● For a port G thread type cylinder, specify the code as following.

(Example)
PSR-1A 6SD40N50TG
Port G thread type

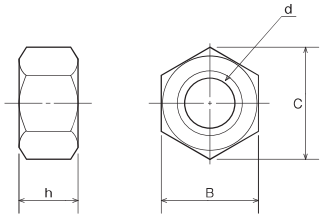
Note) The port G thread has dimensions different from the standard dimensions depending on the bore. Refer to the dimensional drawing.

✪ Air vent specifications (order made)

The air vents are laid on the port surface and located symmetrical positions to the ports.



✪ Lock nut number for ordering



Dimensional Table

Unit: mm

Symbol / Bore	Part number	d	B	C	h
ϕ32	LNH-16F-H	M16×1.5	22	25.4	10
ϕ40	LNH-20F-H	M20×1.5	27	31.2	12
ϕ50	LNH-24F-H	M24×1.5	32	37.0	14
ϕ63	LNH-30F-H	M30×1.5	41	47.3	17
ϕ80	LNH-39F-H	M39×1.5	55	63.5	20
ϕ100	LNH-48F-H	M48×1.5	70	80.8	26
ϕ125	LNH-64F-H	M64×2	90	104	35

Note) When making an order only for the lock nut, indicate the part number.

Weight Table

Unit: kg

Bore (mm)	Basic style (SD)		Flange type (FA)		Foot type (LA)		Amplifier weight
	Basic weight	Additional weight per mm of stroke	Basic weight	Additional weight per mm of stroke	Basic weight	Additional weight per mm of stroke	
ϕ32	1.5	0.025	2.1	0.025	1.5	0.027	0.05
ϕ40	1.9	0.030	3.1	0.030	1.9	0.034	
ϕ50	2.7	0.037	4.3	0.037	2.8	0.044	
ϕ63	4.2	0.047	6.3	0.047	4.5	0.062	
ϕ80	7.4	0.067	11.2	0.067	—	—	
ϕ100	14.0	0.102	—	—	—	—	
ϕ125	24.7	0.152	—	—	—	—	

Calculation formula: Cylinder weight (kg)=basic weight+(cylinder stroke (mm)×additional weight per mm of stroke)

Calculation example: PSR-1A, SD style, bore ϕ50, cylinder stroke 50 mm
2.7+(50×0.037)=4.55kg

Piston Pressure Receiving Area Table

Unit: mm²

Bore (mm)	Rod dia. (mm)	Double acting single rod	
		Extension side	Retraction side
ϕ32	ϕ18	804	550
ϕ40	ϕ22	1257	876
ϕ50	ϕ28	1963	1348
ϕ63	ϕ36	3117	2100
ϕ80	ϕ45	5027	3436
ϕ100	ϕ56	7854	5391
ϕ125	ϕ70	12272	8424

Calculation formula: $F=A\times P\times\beta(N)$
F: cylinder force (N)
A: piston pressure receiving area (mm²)
P: working pressure (MPa) β: load rate

Calculation example
Double acting single rod, bore ϕ40,
working pressure: 16 MPa, load rate: 0.8
Cylinder force on extension side (N)
=1257×16×0.8=16090(N)
Cylinder force on retraction side (N)
=876×16×0.8=11213(N)

Standard Stroke Range

Bore (mm)	Cylinder stroke (mm)									
	5	10	15	20	25	30	35	40	45	50
ϕ32	○	○	○	○	○	○	○	○	○	○
ϕ40	○	○	○	○	○	○	○	○	○	○
ϕ50	○	○	○	○	○	○	○	○	○	○
ϕ63	○	○	○	○	○	○	○	○	○	○
ϕ80	○	○	○	○	○	○	○	○	○	○
ϕ100	○	○	○	○	○	○	○	○	○	○
ϕ125	○	○	○	○	○	○	○	○	○	○

Note) For strokes of more than 60 mm, contact us.

Discontinued

PQCPA Series dedicated to analog/pulse output from position sensing cylinders

- Environmentally-friendly lead-free indicator.
- Analog input and pulse input types are available.
- Provided with multi-point output function (5 points) as a standard function to enable to individually set the upper and lower limits.Note 1)
- A 16-bit AD converter is provided to realize high resolution. (Analog input type)
- Provided with a counter with a response frequency of 200 kHz (Pulse input type)
- Provided with a pulse position correcting function.Note 2)

Note 1) Setting the bank switching enables to use the multi-output function of up to 15 points.
Note 2) Position correction can be made by mounting a cylinder sensor. Positional error caused by slippage of the encoder is eliminated.

Standard Specifications

Type	Analog	Pulse
Model number	PQCPA-CU-A	PQCPA-CU-P
Applicable input signals	Analog voltage/analog current	Phase AB
Display range	±999999	
Resolution	Stroke×1/10000	—
Reply frequency	1 kHz	200 kHz
Linearity	±0.02%FS	—
Signals	Voltage input 0 to 10 V Voltage input 1 to 5 V Current input 4 to 20 mA	Open collector input Differential input (line driver input) 12 V voltage input 24 V voltage input
Monitor output	Voltage output Note)	Line driver output
Sampling speed	1000 times/sec	
Display speed	10 times/sec	
Display method	Display by fluorescent display tube	
Control input	No-voltage input (reed sensor/solid state sensor)	
Control output	Open collector Max. rating: 50 V DC, 50 mA (Provided with multi-point output function (5 points) to enable to individually set the upper and lower limits and pulse position correcting function)	
Power supply voltage	24 V DC ±10%	
Ambient temperature	0 to 50°C (No freezing)	
Ambient humidity	35 to 80%RH (No condensing)	

Note) The monitor output at current input (4 to 20 mA) is voltage output of 1 to 5 V.

Function Table

Type	Analog input	Pulse input
Model number	PQCPA-CU-A-A	PQCPA-CU-P-12
	PQCPA-CU-A-V	PQCPA-CU-P-24
	—	PQCPA-CU-P-00
Functions	Display of position	Display of position
	Bank switching	Bank switching
	Multi-point output	Multi-point output
	Positional data hold	Positional data hold
	—	0 setting signal
	—	Correcting function

List of Applicable Actuators

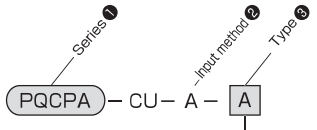
Series	Detection method	Signal type
PTN-1B	Absolute method	Analog type (4 to 20 mA, 0 to 10 V)
PTH-1B		
PTT-1B		
PSR-1A		Analog type (1 to 5 V)
35P-3	Linear pulse encoder	Encoder type
70P-8		
140P-8		

Note) For the details of each cylinder, see the section of each series.

How to order Discontinued

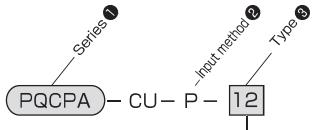
Position Indicator

●Analog input



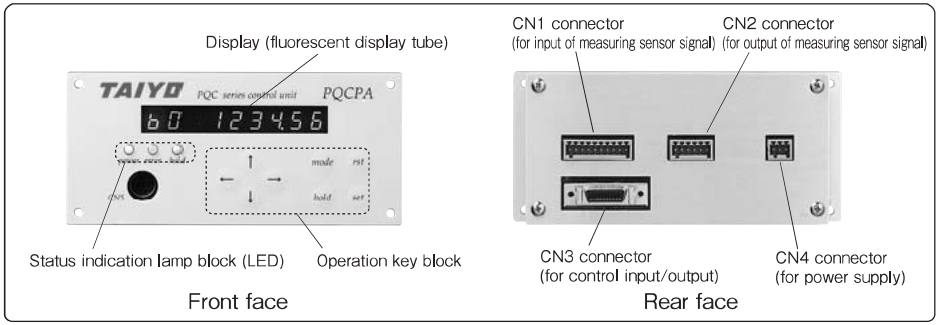
A Current input
V Voltage input

●Pulse input

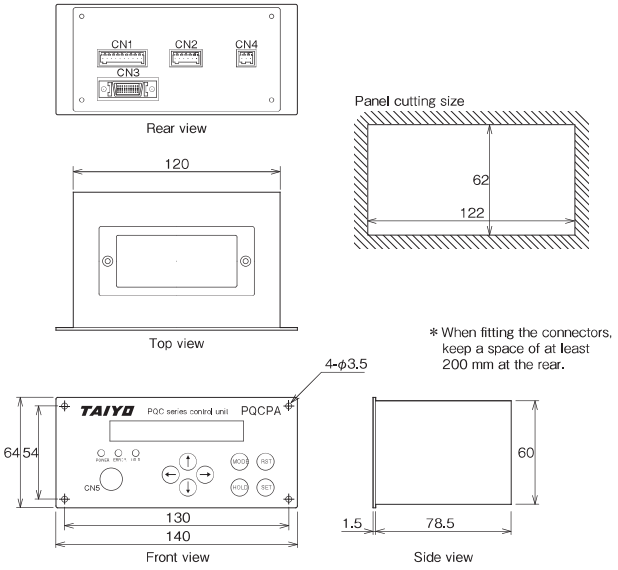


12 12 V open collector input, 12 V voltage input
24 24 V open collector input, 24 V voltage input
00 Differential input

Note) Cylinders do not come with indicators of differential input type 00.
(Specification to use the indicator in stand-alone state)



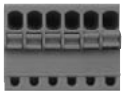
Dimensional Drawings



Supplied Connector

- CN1 connector
  (for input of length measuring sensor signal)

- CN2 connector
  (for output of length measuring sensor signal)

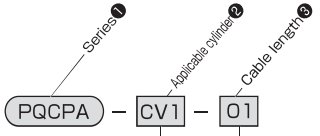


- CN3 connector
  (for control input/output)

- CN4 connector
  (for power supply)

Discontinued

How to order cable between sensor and indicator

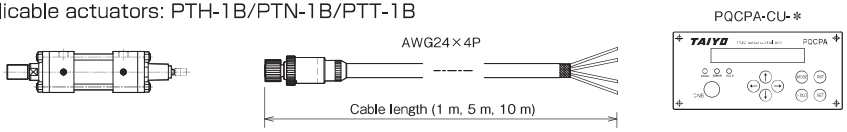


CV1	PTH-1・PTN-1B・PTT-1B	01	1m
CV2	35P-3・70P-8・140P-8	05	5m
CV3	PSR-1A	10	10m

* When ordering a cable, confirm the series name of the actuator on the sensor side. Some models cannot be connected.
* After wiring, connect the indicator side connector to the CN1 connector on the indicator.

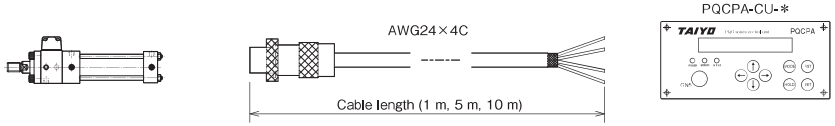
PQCPA-CV1-Cable length

Applicable actuators: PTH-1B/PTN-1B/PTT-1B



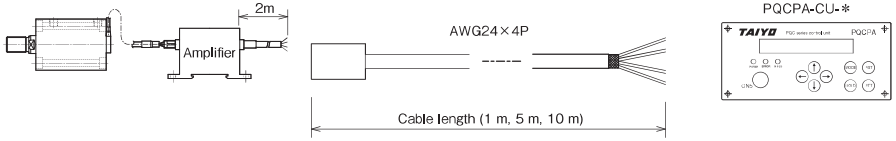
PQCPA-CV2-Cable length

Applicable actuators: 35P-3/70P-8/140P-8



PQCPA-CV3-Cable length

Applicable actuators: PSR-1A

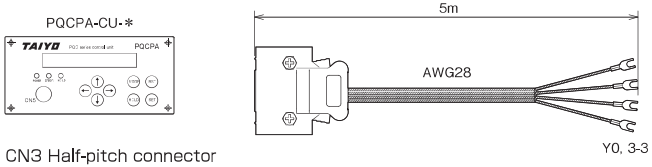


Note) PSR-1A comes with a 2m cable as a standard accessory. If another cable is required, select this cable. (In this case, disconnect the standard cable (2 m) of PSR-1A, and connect the selected cable directly to the amplifier.)

How to order I/O cable

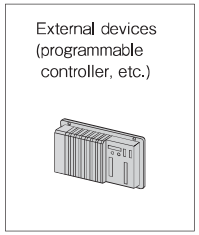
PQCPA – IO

* The I/O cable is 5 m long.



CN3 Half-pitch connector

Note) Only the CN3 half-pitch connector is supplied as a standard accessory. If you need the connector with a cable, place an order for the connector.



Discontinued

External input/output

CN1

Pin No.	Description	Signals
1	Voltage/current input	Analog input
2	NC	–
3	Voltage/current GND	Analog input
4	Phase A	Pulse input
5	Phase −A	Pulse input
6	Phase B	Pulse input
7	Phase −B	Pulse input
8	+24V	Power supply output
9	+12V	Power supply output
10	GND	Power supply output/Phase AB GND

CN2

Pin No.	Description	Signals
1	Pout	Analog output
2	Vss	Analog output
3	A pulse	Pulse output
4	A pulse GND	Pulse output
5	B pulse	Pulse output
6	B pulse GND	Pulse output

CN4

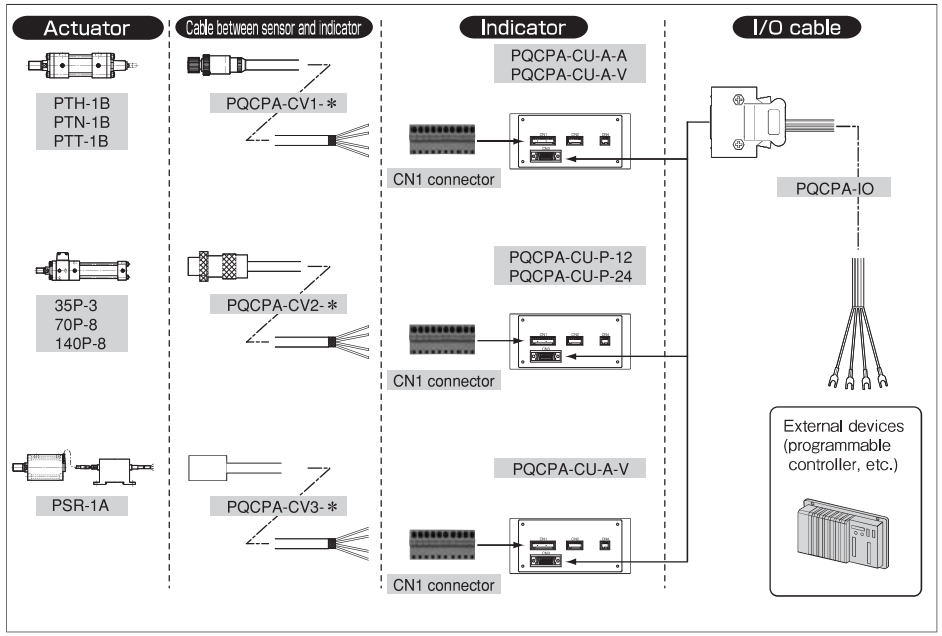
Pin No.	Description	Signals
1	P24	Power supply
2	N24	Power supply
3	PE	Power supply

CN3

Pin No.	Description	Signals
1	0 setting signal	Input
2	Positional data hold	Input
3	Correcting function	Input
4	Bank switching 0	Input
5	Bank switching 1	Input
6	Bank switching 2	Input
7	Reserved input	Input
8	Reserved input	Input
9	Input common	Input
10	Input common	Input
11	Multi-point output signal 0	Output
12	Multi-point output signal 1	Output
13	Multi-point output signal 2	Output
14	Multi-point output signal 3	Output
15	Multi-point output signal 4	Output
16	Reserved output	Output
17	Reserved output	Output
18	Reserved output	Output
19	Output common	Output
20	Output common	Output

*For details, see the instruction manual.

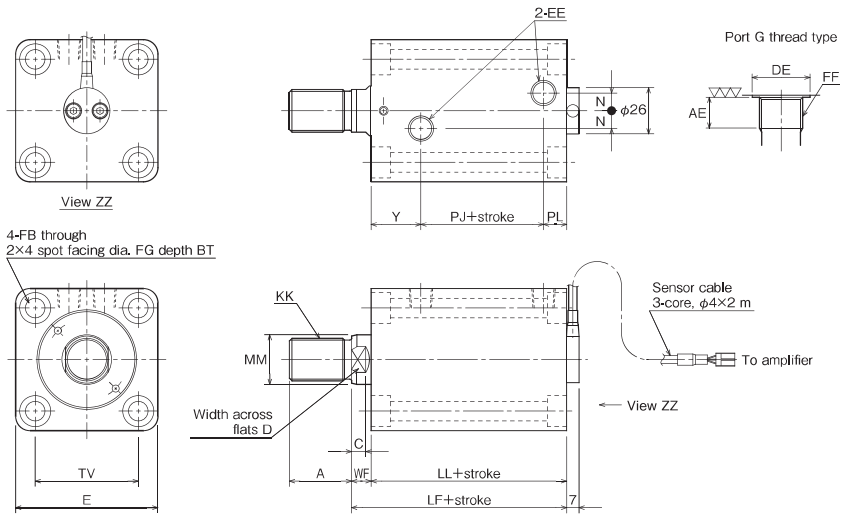
Example of product configuration



CAD/DATA is available.
PSR_1A/TPSR1A Bore

SD General purpose type PSR-1A 6 SD Bore N Stroke T

● Bore ϕ32 to ϕ125



Unit: mm

Dimensional Table

Symbol / Bore	A	AE	BT	C	D	DE	E	EE	FB	FF	FG	KK
φ32	25(40)	8	6.5	7	14	φ17.2	□62	Rc1/4	φ6.6	G1/8	φ11	M16×1.5
φ40	30(45)	8	8.6	7	19	φ17.2	□70	Rc1/4	φ9	G1/8	φ14	M20×1.5
φ50	35(50)	12	10.8	8	24	φ21.5	□80	Rc1/4	φ11	G1/4	φ17.5	M24×1.5
φ63	45(60)	12	13	9	30	φ21.5	□94	Rc1/4	φ14	G1/4	φ20	M30×1.5
φ80	60(80)	12	15.2	14	41	φ21.5	□114	Rc3/8	φ16	G1/4	φ23	M39×1.5
φ100	75(95)	12	19.5	22	50	φ25.5	□140	Rc3/8	φ20	G3/8	φ29	M48×1.5
φ125	95(125)	14	23.5	25	65	φ30	□172	Rc1/2	φ24	G1/2	φ35	M64×2

Symbol / Bore	LF	LL	MM	N		PJ		PL		TV	WF	Y	
				Rc thread	G thread	Rc thread	G thread	Rc thread	G thread			Rc thread	G thread
φ32	64	54	φ18	10	10	14	14	12	12	□47	10	28	28
φ40	65	55	φ22	10	10	16	16	12	12	□52	10	27	27
φ50	71	60	φ28	10	14	19	13.5	13	18.5	□58	11	28	28
φ63	80	67	φ36	10	16	24	20	13	17	□69	13	30	30
φ80	95	78	φ45	15	19	25	24	18	18	□86	17	35	36
φ100	122	96	φ56	15	18	26	26	28	28	□106	26	42	42
φ125	135	105	φ70	25	25	29	29	30	30	□132	30	46	46

Notes) 1. When the lock nut is used, the parenthesized dimension A is recommended.
2. The tolerance of MM is f8.
3. Since the piston rod has a built-in sensor, a female threaded rod is inapplicable as a rule. However, it may be applicable depending on the bore, stroke and dimension W. Contact us.