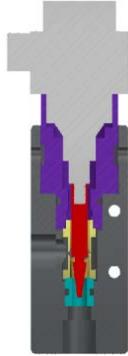


FC+PM

Proportional Flow Control Valve



Industrial application

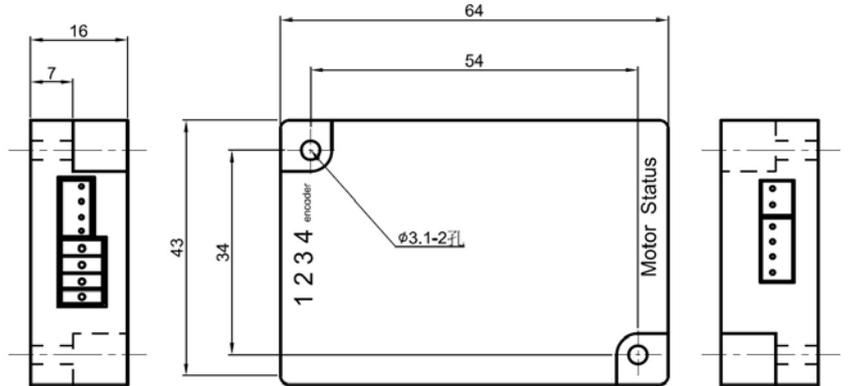
- Pneumatic Operated Soldering Equipment
- High Accuracy and High Resolution Flow Control
- Semiconductor equipment
- Analytical Instrument
- Laser machine
- Gas Mixing

Proportional Flow Control Valve consists of PM series driver and FC series proportional flow valve. With an input signal either through analogue or digital, the needle inside the proportional valve moves proportionally to the signal. This series is able to control the flow rate of air and liquid with high resolution, high accuracy, and high repeatability. It is developed for industries that require a high degree of adjustment in flow rate.

Model	FC-20	FC-120	FC-300	FC-1000	FC-1500	FC-3000
Valve Type	2-Way Proportional Needle valves					
Port Size	G 1/8"			G3/8"		PT 1/2"
Medium	Compatible gases and liquids					
Pressure Range(bar)	-1~7			-1~5	-1~10	-1~20
Pressure Range(psi)	-14.5~101.5			-14.5~72.5	-14.5~145	-14.5~290
Max Flow Air(L/min)	65@6bar	230@6bar	400@6bar	1200@5bar	2300@6 bar	3800@6bar
Max Flow Air(scfm)	2.3@87psi	8.1@87psi	14.1@87psi	42.3@72.5psi	81.2@87psi	134.2@87psi
Max Flow Water(L/min)	1L@6bar	4L@6bar	8L@6bar	28L@5bar	51L@7 bar	94L@10bar
Repeatability	±0.1% F.S.					
Flow Resolution(L/min) @3bar	0.1	0.1~0.2	0.3	0.3~0.5	1~2	1~2
Flow Resolution(scfm) @43.5 psi	0.0035	0.0035~0.007	0.01	0.01~0.017	0.035~0.07	0.035~0.07
Temperature Range	0~84° C (183.2°F)					
Full stroke time	1.5 sec	2 sec	2 sec	2.5 sec	2.5 sec	5 sec
Body material	Aluminum or Stainless steel (FC-120 and FC-1000 has the type without stainless steel)					
Seals	Viton or FFKM					
Wetted Materials	Body- Aluminum : Aluminum 、 VITON 、 NBR(only FC-1500) Body- Stainless steel : Stainless steel 、 EPDM 、 Viton or FFKM					
Ingress Protection	IP 52					

PM controller

PM Series Proportional Valve Driver



Series PM driver provides series FC valve with the required power and control signal (step and direction). It controls the step of a bipolar stepper motor with an analogue signal (0-10 VDC/4-20mA/RS485 Modbus).

Features

- ◆ compact
- ◆ low cost
- ◆ High sensitive
- ◆ Analog / Digital signal
- ◆ easy-control
- ◆ Full scale linearity flow rate control

Wiring



No.	Function
1	DC24V +
2	DC24V -
3	Signal +/A \ RS485 +
4	Signal -/B \ RS485-

Encoder Wiring Description

No.	Color	Function
4	Yellow	B channel
3	Orange	+5V DC
2	Blue	A channel
1	Brown	Ground

Specifications

Input signal	0-10V / 4-20mA / RS485
Supply	DC24V ($\leq 12W$)
Indicator LED Status (*with Encoder function)	on/off LED on is motor running on/off LED off is motor stopping on/off LED flashing is motor error * error/null LED on is encoder error * error/null LED off is encoder normal
Encoder Resolution	$1.587 \times 10^{-3} \text{mm}$
Motor Status output	Sink 50mA
Temp. Range(Operating)	0-60°C
Cable Length	1 meter, consult for longer cable

FC+PM

Proportional Flow Control Valve



Ordering Code

FC - - + PM - -

Type

20	0~65 LPM@6bar	G 1/8"
120	0~230 LPM@6bar	
300	0~400 LPM@6bar	
1000	0~1200 LPM@5bar	G 3/8"
1500	0~2600 LPM@7bar	
3000	0~5000LPM@10bar	PT 1/2"

Seal

For SUS Body	
-	FFKM
V	VITON

*For Aluminum Body only VITON Seal.

Type

20	For FC-20
120	For FC-120
300	For FC-300
1000	For FC-1000
1500	For FC-1500
3000	For FC-3000

Wiring

L1	1m(Standard)
L2	2m(Customized)
L3	3m(Customized)

Body Material

-	Aluminum
SUS	Stainless steel

*Only for:FC-20 \ FC-300 \ FC-1500 \ FC-3000

Input Signal

E	0 - 10 V*
A	4 - 20 mA
R	RS485 Modbus

*note 1 : For Command Signal type 0-10V, the minimum driving current is 3mA

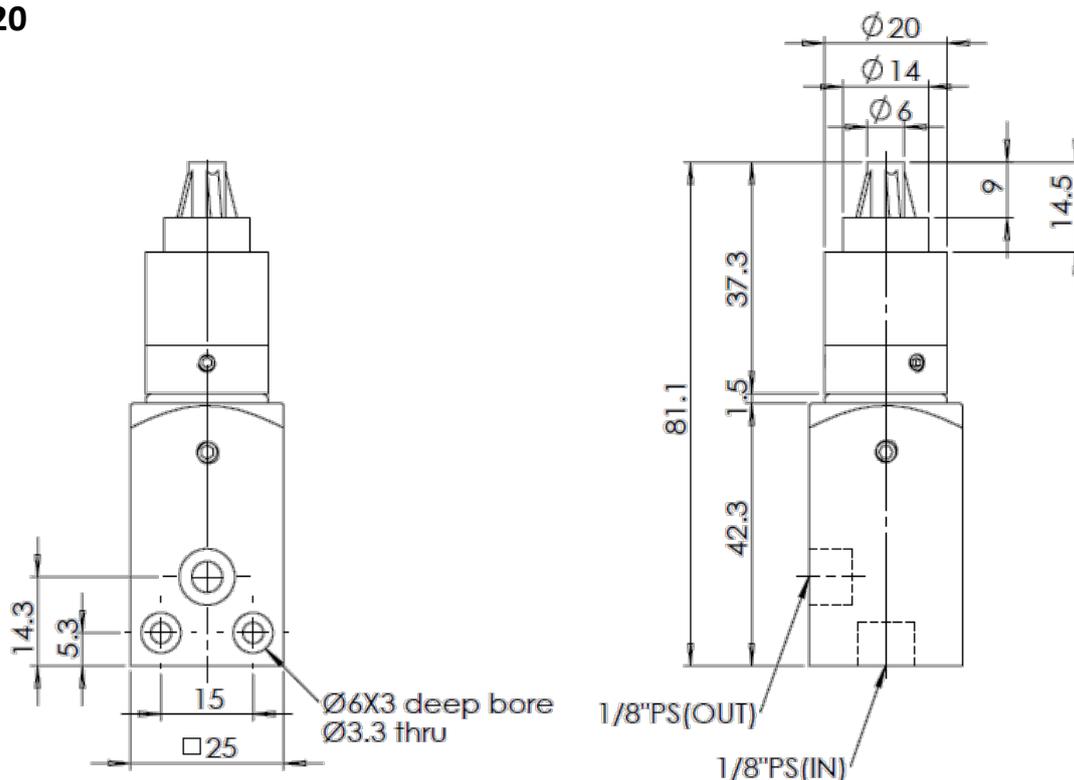
note 2 : The indicated flow rate is air, please consult for liquid flow rate

note 3 : Please contact us for customized flow range

★ note 4 : FC and PM series are calibrated in pair. Before operating, please ensure the serial numbers on FC and PM are in pair in order to prevent potential leakage issue.

Dimensions

◆ FC-20



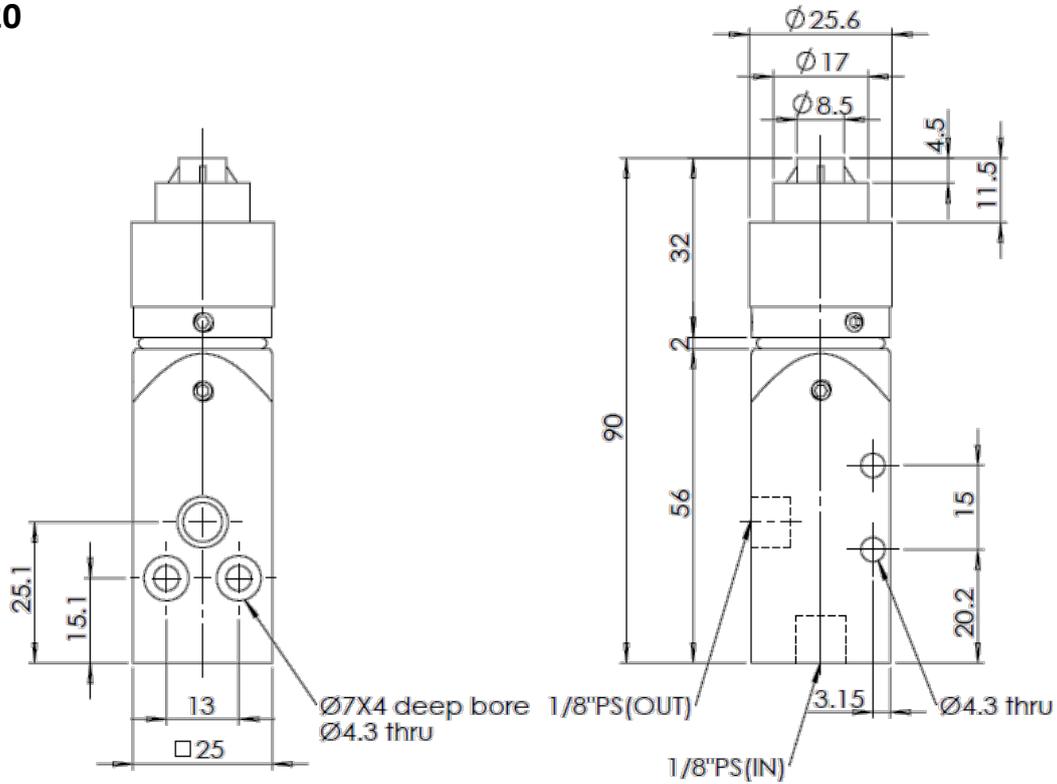
FC+PM

Proportional Flow Control Valve

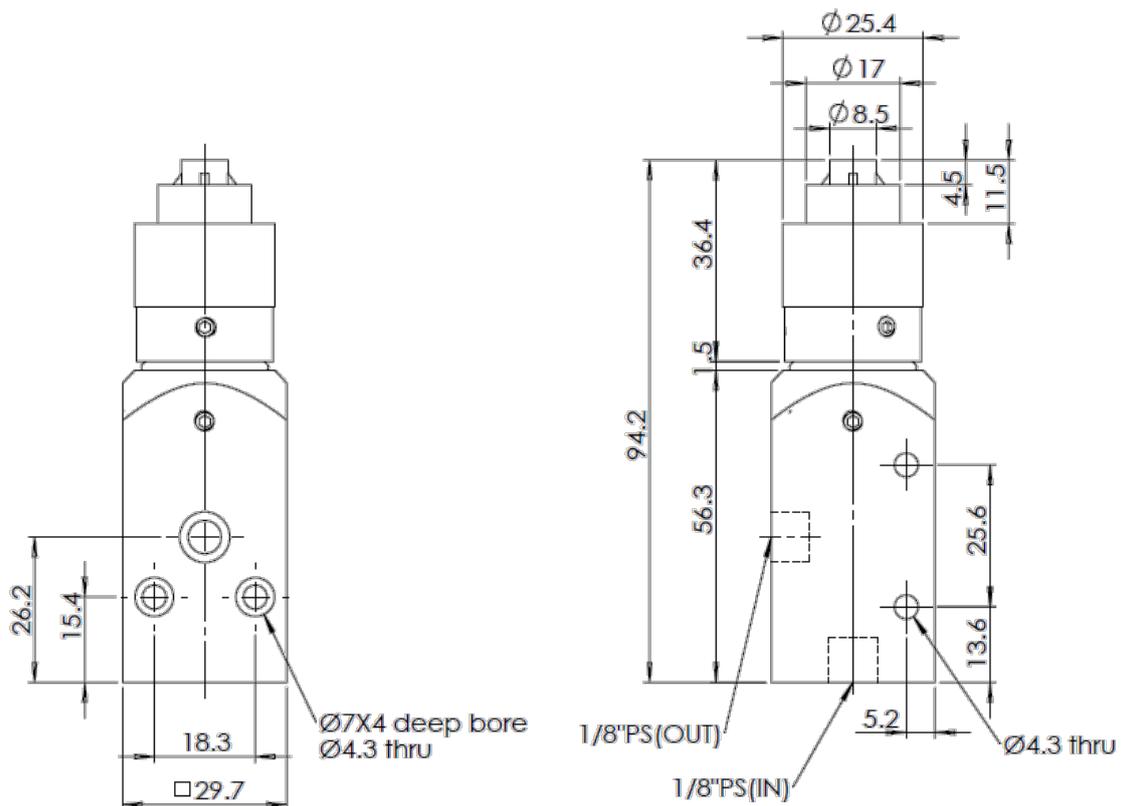


Dimensions

◆ FC-120



◆ FC-300



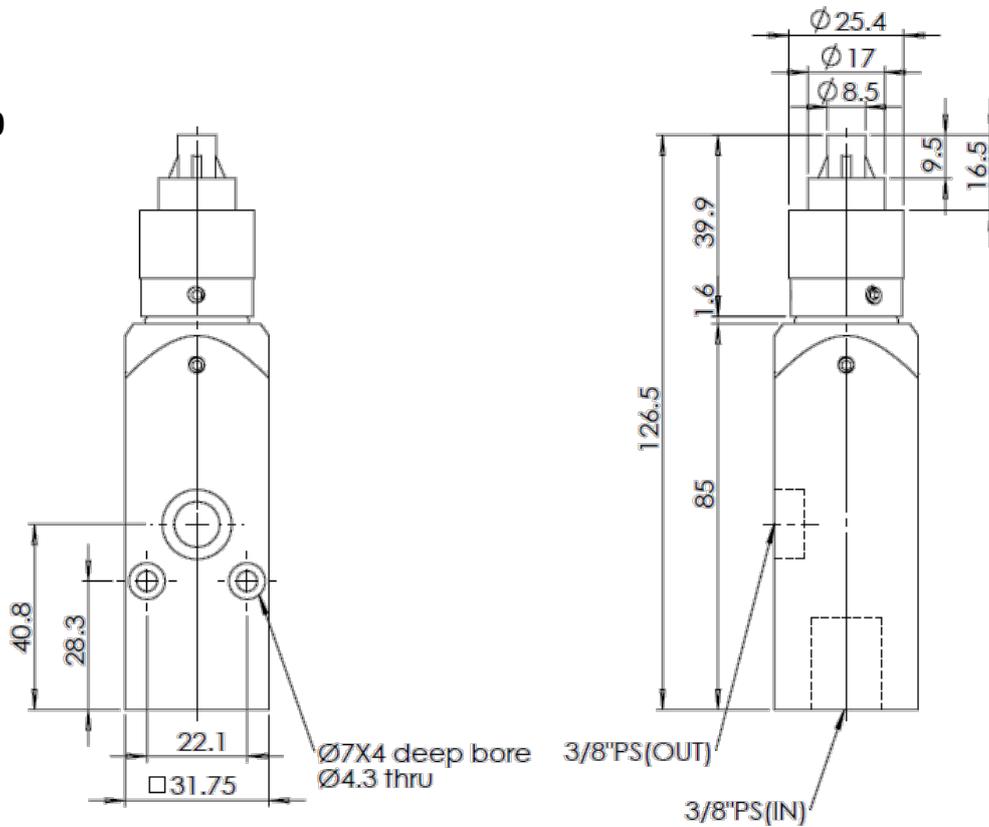
FC+PM

Proportional Flow Control Valve

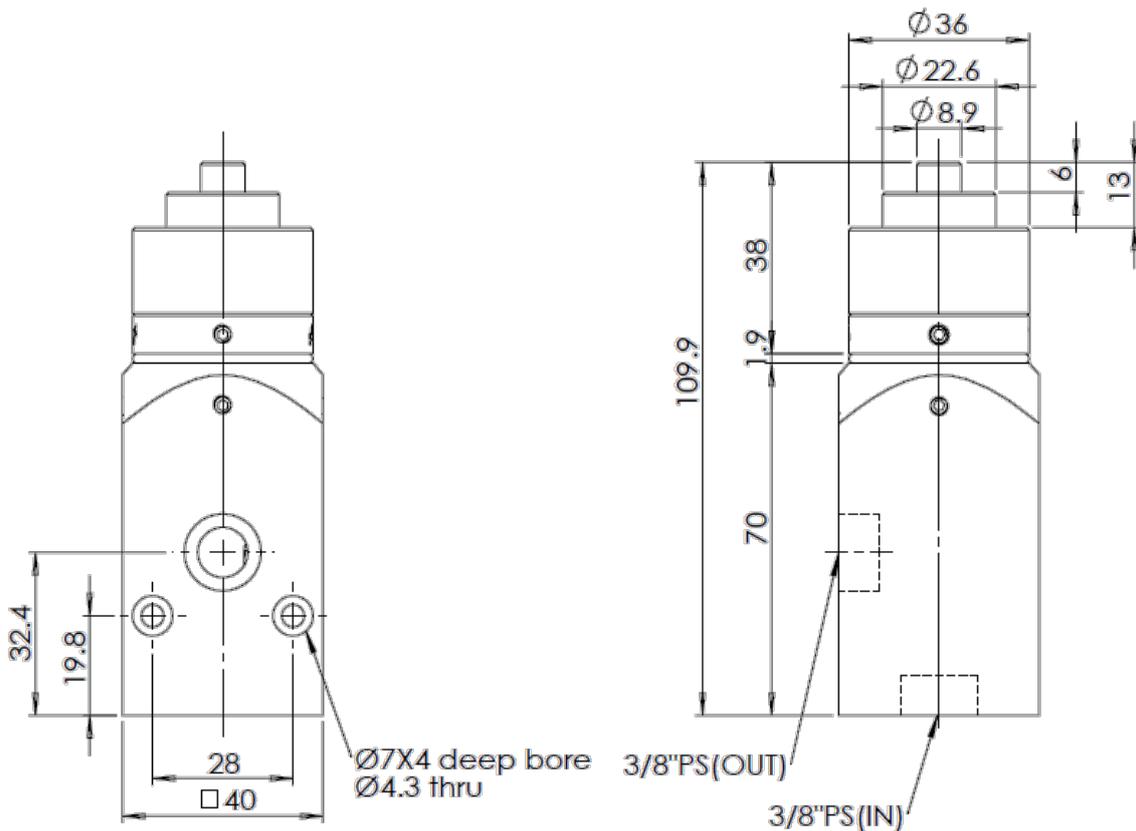


Dimensions

◆ FC-1000



◆ FC-1500



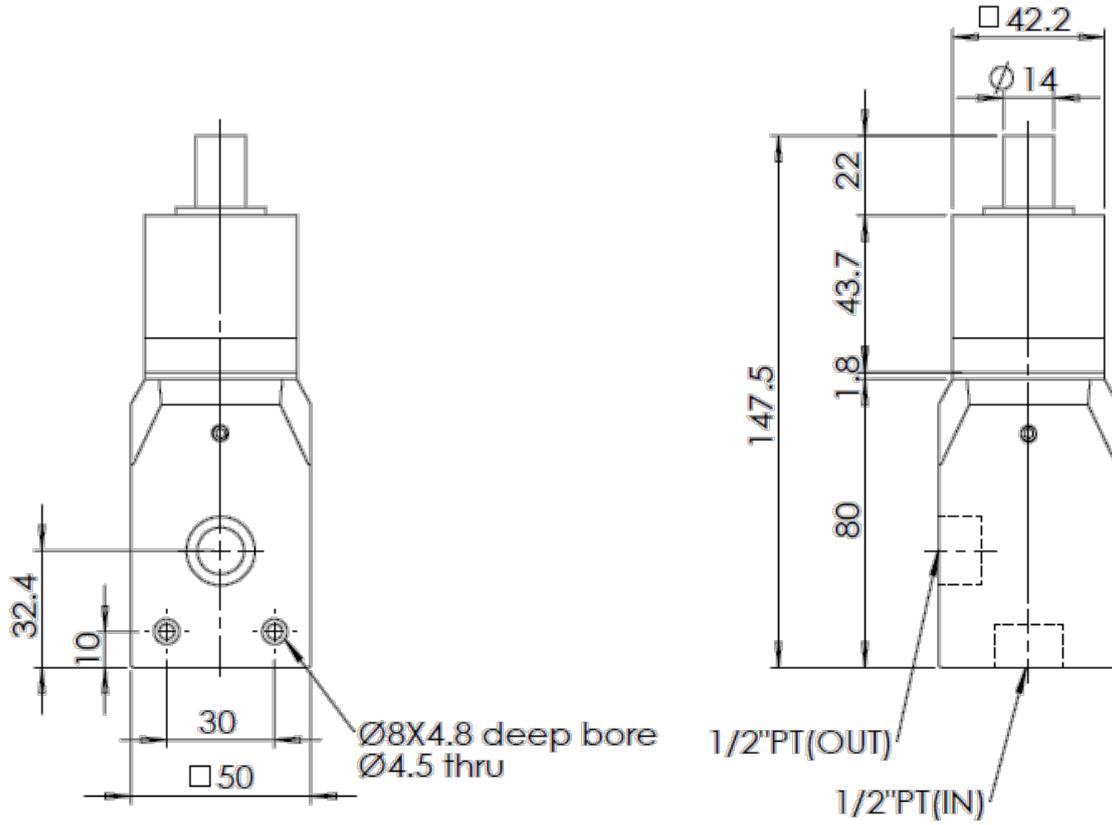
FC+PM

Proportional Flow Control Valve



Dimensions

◆ FC-3000





Product Precautions

1. Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.
2. When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the piping. When sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.
3. Do not operate in locations having an atmosphere of corrosive gases, chemicals, sea water, or where there will be contact with the same.
4. Ensure the fluid passing through the valve does not contain solid particles. Please use a filter before the inlet port.
5. In locations which receive direct sunlight, provide a protective cover etc.
6. KaoLu's product cannot be used as an emergency shutoff. A redundant safety system should be installed in the system to prevent serious injury or loss of life.
- ★ 7. FC and PM series are calibrated in pair. Before operating, please ensure the serial numbers on FC and PM are in pair in order to prevent potential leakage issue.



Precautions of control signal

1. Don't give the control signal over 10V or 20 mA. In order to avoid the motor being stuck at the highest position when it runs for a long time.
2. If the DC24V keep supplying during the control process, but there is an action of switching control signal or unplugging the motor and controller. Please make sure to control the signal in 0V or 4mA. When the signal turned on, the circuit board would default the zero point. Therefore, if the signal is higher than 0V or 4mA, it would cause the zero point get error. The motor would stuck if it runs for a long time.
**If you're not sure whether the position of needle valve swifts or not, please turn on the DC24V again to let the motor calibrate to the zero starting position.
3. When the connection between the controller and stepper motor is disconnected, please turn on and off the power repeatedly to ensure the both are connected successfully.



Warranty

KaoLu Enterprise Co. Ltd. products are warranted to the original purchaser only against defects in material or workmanship for 1year from the date of manufacture. The extent of KaoLu's liability under this warranty is limited to repair or replacement of the defective unit at KaoLu's option. KaoLu shall have no liability under this warranty where improper installation or filtration occurred.