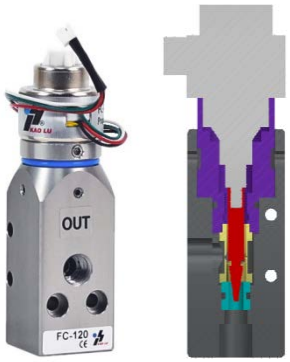
FC+PM

Proportional Flow Control Valve



Industrial Application

- Gas Mixing
- Analytical Instrument
- Semiconductor equipment
- High Accuracy and High Resolution Flow Control
- Blow Molding

■ Stainless steel, aluminum and Peek body material.

■ FFKM or FKM seals

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.

Specifications

Model	FC-10	FC-20	FC-120	FC-300
Valve Type	2-Way Proportional Needle valves			
Port Size	G1/8”			
Medium	Vacuum, Compatible gases, oil, water and liquids			
Pressure Range	-1~7bar			
Flow Range of Air	0~18 L/min @6bar	0~65 L/min @6bar	0~230 L/min @6bar	0~400 L/min @6bar
Flow Range of Water	0~0.3 L/min @6bar	0~1 L/min @6bar	0~4 L/min @6bar	0~8 L/min @6bar
Repeatability	±0.1% F.S.			
Flow Resolution of Air	0.1 L/min 0.2 @3bar	0.1 L/min @3bar	0.1L~0.2 L/min @3bar	0.3 L/min @3bar
Flow Resolution of Water	0.003 L/min @3bar	0.003 L/min @3bar	0.003~0.005 L/min @3bar	0.008 L/min @3bar
Temperature Range	-70 ~84° C			
Full Stroke Time	1.5 sec	1.5 sec	2 sec	2 sec
Body Material	Stainless steel	Aluminum, Stainless steel or Peek	Aluminum	Aluminum, Stainless steel or Peek
Seals	Body- Aluminum ： All VITON or VITON+EPDM Body- Stainless steel or Peek ： All FFKM or FFKM+EPDM --- ** For vacuum or water, it is recommended to choose EPDM.			
Ingress Protection	IP 52			

FC+PM

Proportional Flow Control Valve

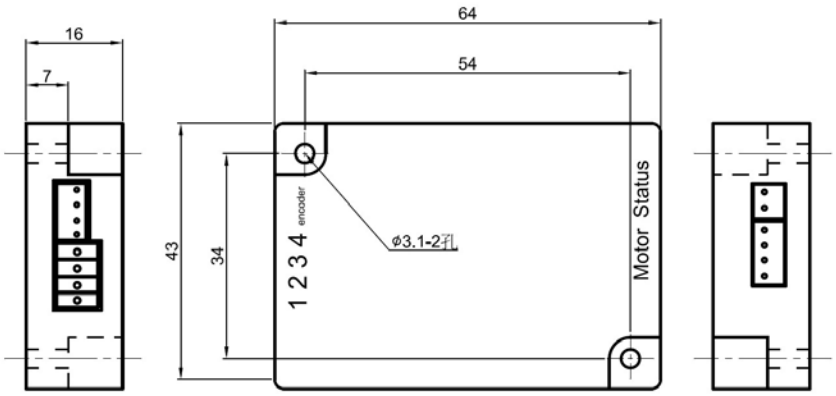
Specifications

Model	FC-1000	FC-1500	FC-2000	FC-3000
Valve Type	2-Way Proportional Needle valves			
Port Size	G3/8"			PT 1/2"
Medium	Vacuum, Compatible gases, oil, water and liquids.			
Pressure Range	-1~6bar	-1~3 bar	-1~15 bar	-1~20bar
Flow Range of Air	0~1200L/min @5bar	0~1200L/min @3 bar	0~2700L/min @7 bar	0~5000L/min @10bar
Flow Range of Water	0~28L/min @5bar	0~35L/min @3 bar	0~50L/min @7bar	0~94L/min @10bar
Repeatability	±0.1% F.S.			
Flow Resolution of Air	0.3~0.5 L/min @3bar	1~2 L/min @3bar	1~2 L/min @3bar	1~2 L/min @3bar
Flow Resolution of Water	0.008 ~0.014 L/min@3bar	0.027~0.055 L/min@3bar	0.027~0.055 L/min@3bar	0.027~0.055 L/min@3bar
Temperature Range	-70 ~84° C			
Full Stroke Time	2.5 sec	2.5 sec	2.5 sec	5 sec
Body Material	Aluminum	Aluminum or Stainless steel	Aluminum or Peek	Aluminum or Stainless steel
Seals	Body- Aluminum ：All VITON or VITON+EPDM Body- Stainless steel or Peek ：All FFKM or FFKM+EPDM --- ** For vacuum or water, it is recommended to choose EPDM.			
Ingress Protection	IP 52			
There are also NPT port. If you need it, please contact our sales representative, thank you!				

PM

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).

Wiring



No.	Function
1	DC24V +
2	DC24V -
3	Signal + 、RS485 +
4	Signal - 、RS458-

Features

- Compact
- Low Cost
- High Sensitive
- Analog / Digital Signal
- Easy-Control
- Full Scale Linearity Flow Rate Control

Specifications

Input Signal	0-10V / 4-20mA / RS485
Supply	DC24V (≦12W)
Indicator LED Status	on/off LED on is motor running on/off LED off is motor stopping on/off LED flashing is motor error
Motor Status Output	Sink 50mA
Ambient Temp.	0-60℃
Cable Length	1 meter or 5 meter

FC+PM

Proportional Flow Control Valve

Ordering Code

FC□ − □ − □ + PM□ − □ − □

Type

10	0~18 LPM@6bar	G 1/8”
20	0~65 LPM@6bar	
120	0~230 LPM@6bar	
300	0~400 LPM@6bar	
1000	0~1200 LPM@5bar	G 3/8”
1500	0~1200 LPM@3bar	
2000	0~2700 LPM@7bar	
3000	0~5000LPM@10bar	PT 1/2”

***Body Material**

-	Aluminum
SUS	Stainless steel
PK	Peek
*Please refer to product specifications for the body materials of each series.	

Seal

For Aluminum Body	
-	VITON
E	VITON+EPDM
For SUS / Peek Body	
-	FFKM
E	FFKM+EPDM

Type

10	For FC-10
20	For FC-20
120	For FC-120
300	For FC-300
1000	For FC-1000
1500	For FC-1500
2000	For FC-2000
3000	For FC-3000

Input Signal

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

Wiring

L1	1m
L5	5m

** **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.

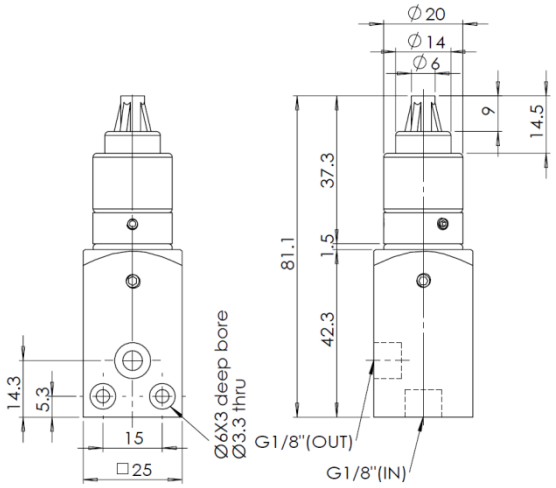
FC+PM

Proportional Flow Control Valve

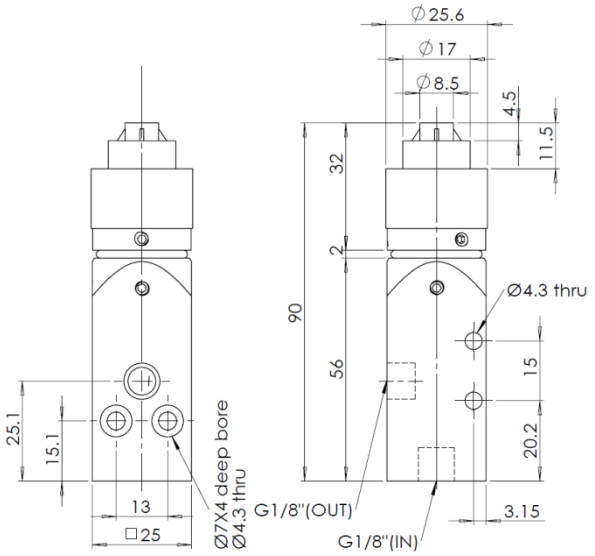
KAO LU

Dimensions

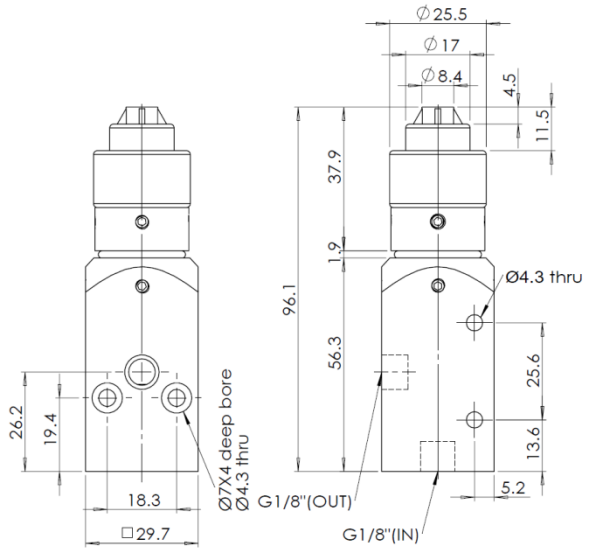
◆ FC-10 Stainless Steel/FC-20 Aluminum. Stainless Steel



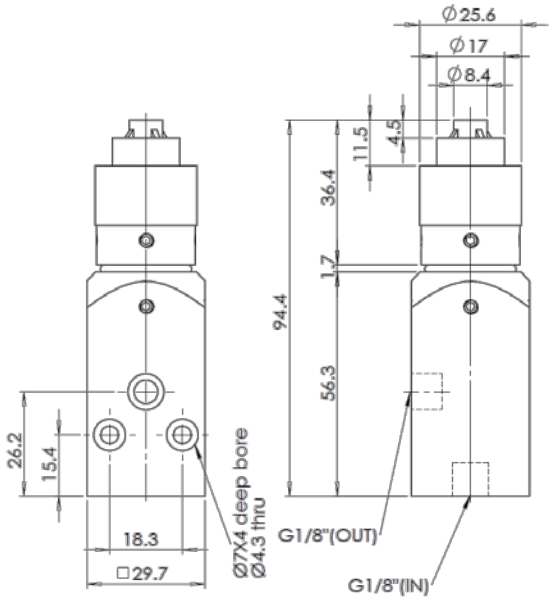
◆ FC-120 Aluminum



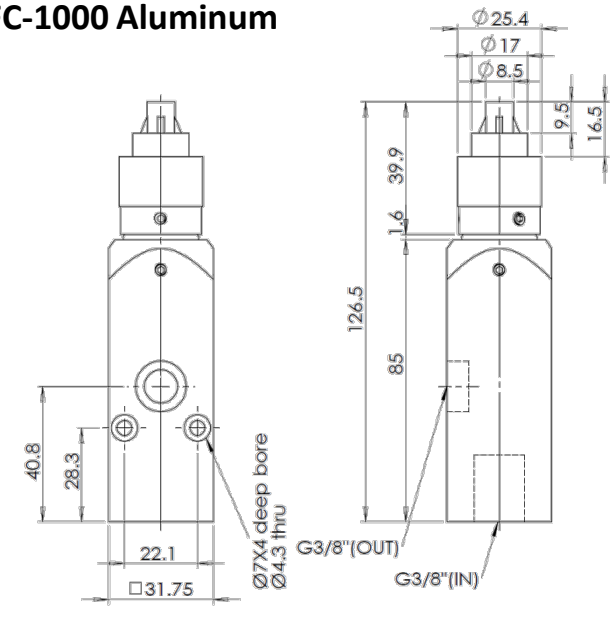
◆ FC-300 Aluminum



◆ FC-300 Stainless Steel



◆ FC-1000 Aluminum

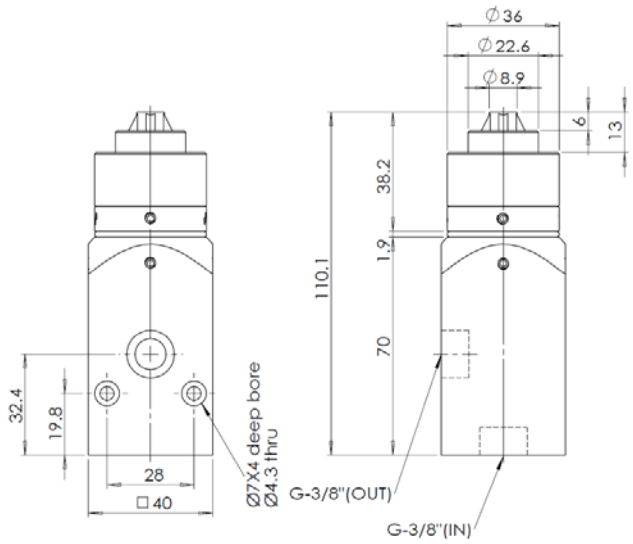


FC+PM

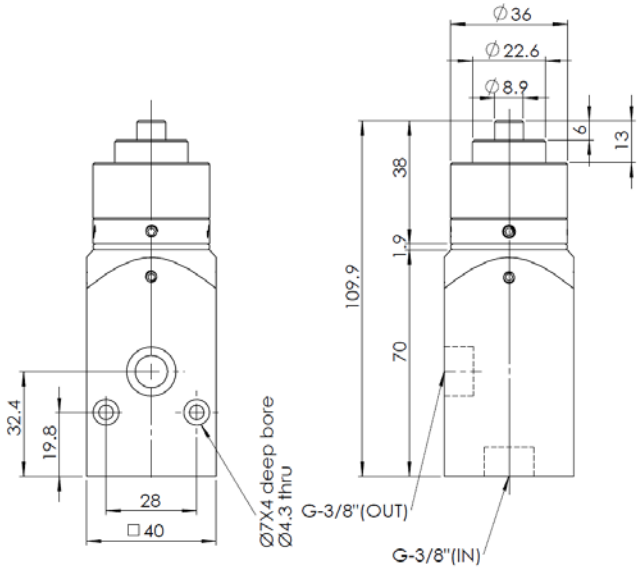
Proportional Flow Control Valve

Dimensions

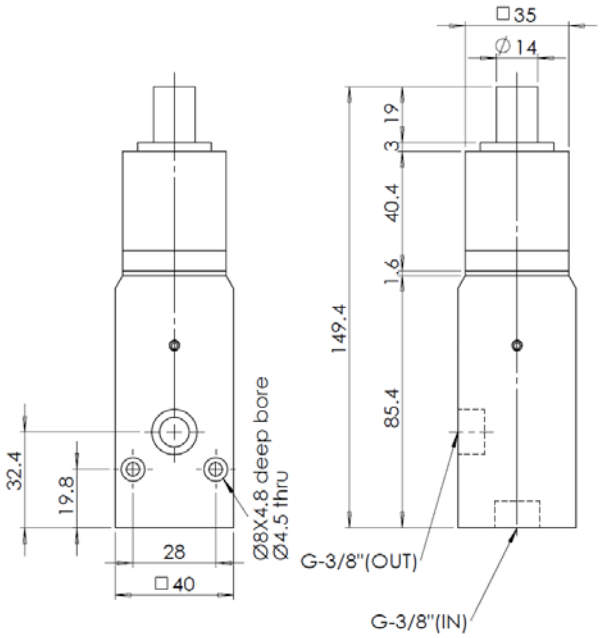
◆ FC-1500 Aluminum



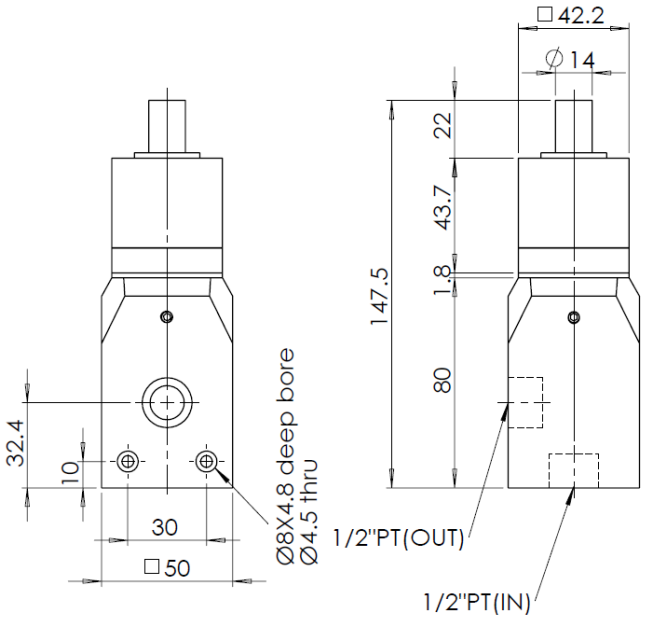
◆ FC-1500 Stainless Steel



◆ FC-2000 Aluminum



◆ FC-3000 Aluminum/Stainless Steel



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 swiching 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 6 months 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.