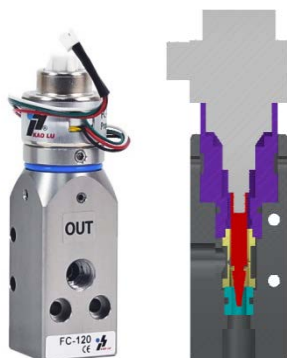


FC+PM

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 | | | |

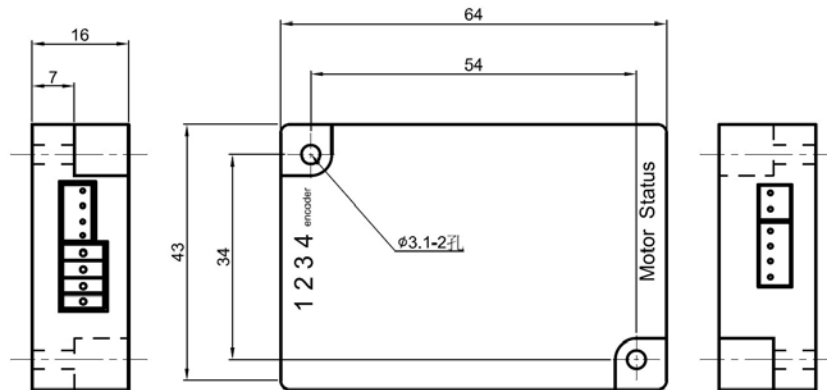
| | |
|--|--|
| FC+PM |  |
| Proportional Flow Control Valve | |

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 ($\leq 12W$) |
| 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°C |
| 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 | G 3/8" |
| 1000 | 0~1200 LPM@5bar | |
| 1500 | 0~1200 LPM@3bar | |
| 2000 | 0~2700 LPM@7bar | PT 1/2" |
| 3000 | 0~5000 LPM@10bar | |

*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 |

Wiring

| | |
|----|----|
| L1 | 1m |
| L5 | 5m |

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.

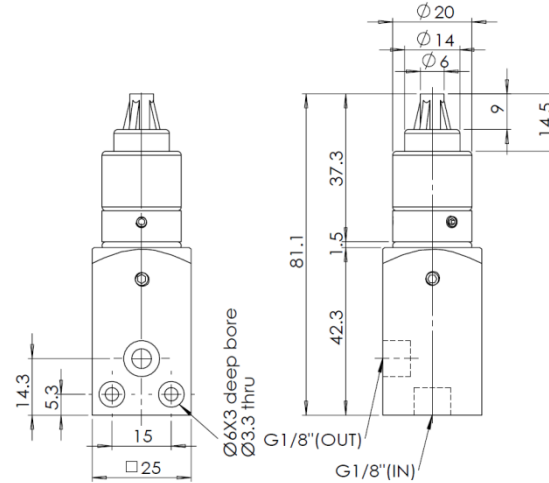
FC+PM

Proportional Flow Control Valve

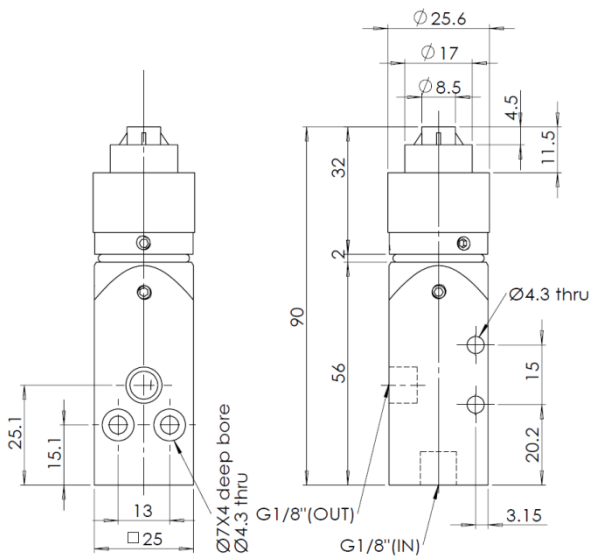


Dimensions

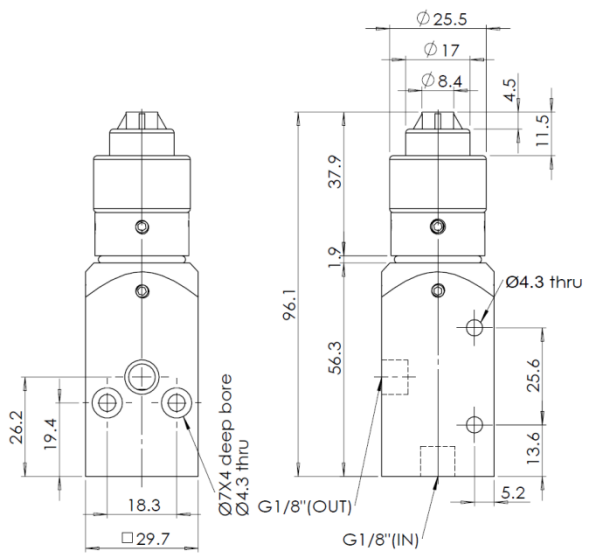
◆ FC-10 Stainless Steel/FC-20 Aluminum. Stainless Steel



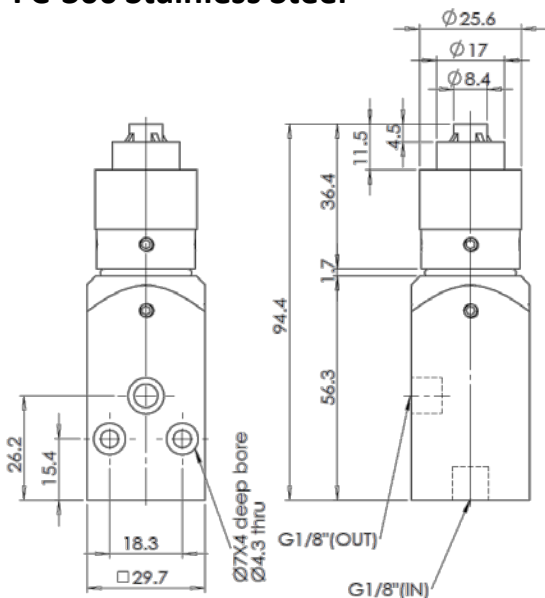
◆ FC-120 Aluminum



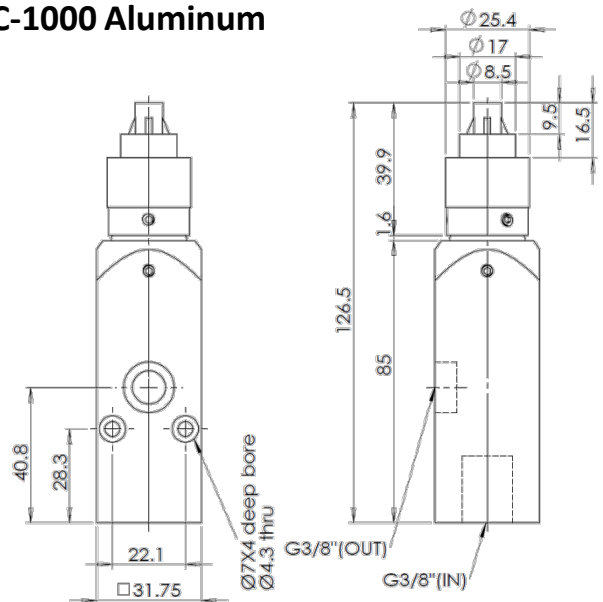
◆ FC-300 Aluminum



◆ FC-300 Stainless Steel

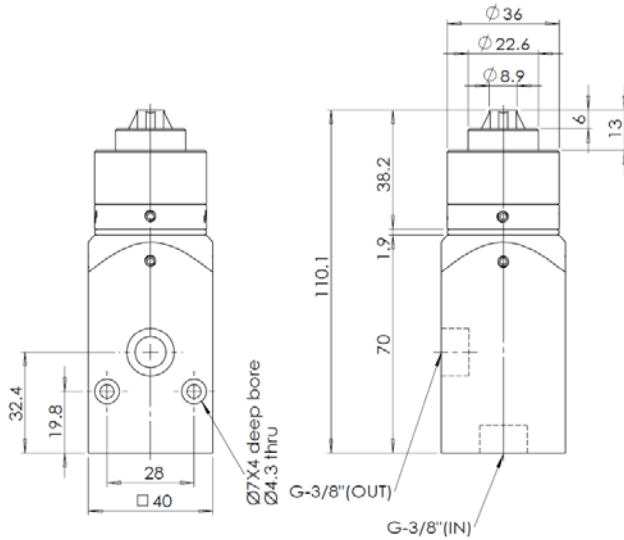


◆ FC-1000 Aluminum

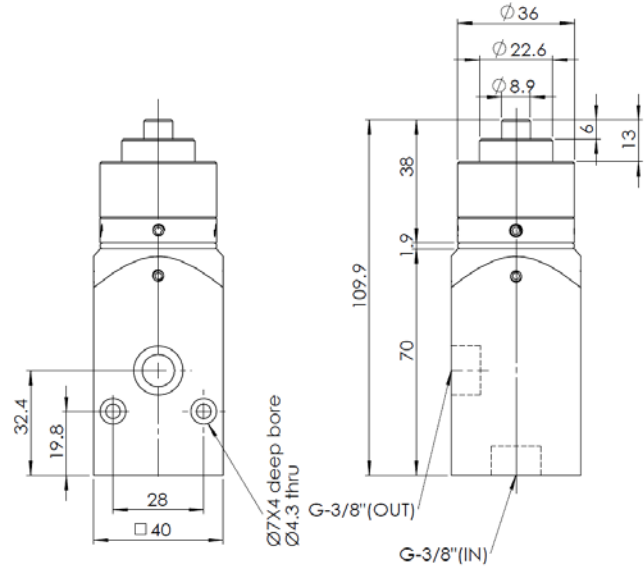


Dimensions

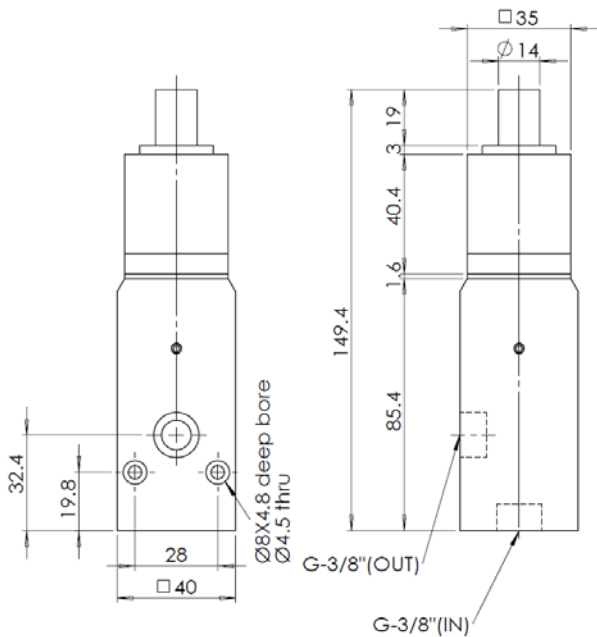
◆ FC-1500 Aluminum



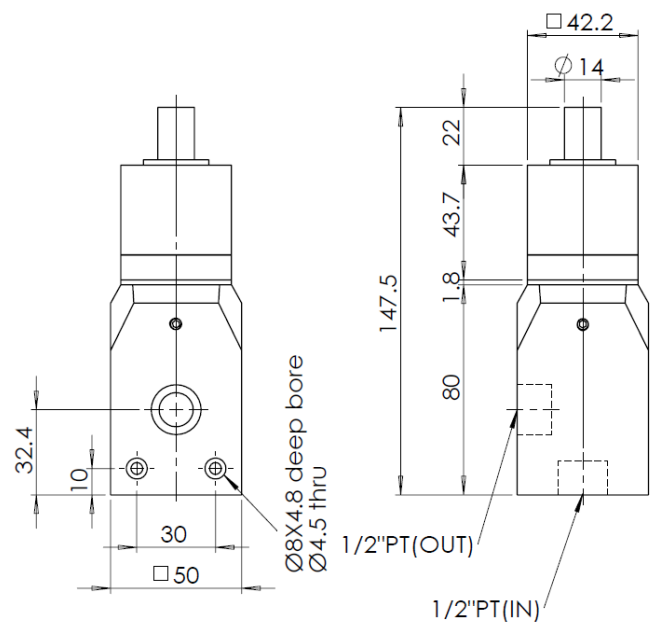
◆ FC-1500 Stainless Steel



◆ FC-2000 Aluminum



◆ FC-3000 Aluminum/Stainless Steel



Proportional Flow Control Valve



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 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.