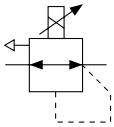
For details about certified products conforming to international standards, visit us at www.smcworld.com.

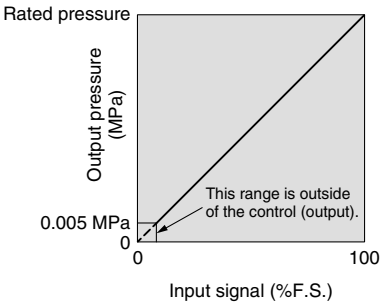
Electro-pneumatic Regulator
ITV1000/2000/3000

Straight type

Right angle type

JIS Symbol





Graph (1) Input/output characteristics chart

Standard Specifications

Model		ITV101□ / ITV201□ / ITV301□	ITV103□ / ITV203□ / ITV303□	ITV105□ / ITV205□ / ITV305□
Minimum supply pressure		Set pressure +0.1 MPa		
Maximum supply pressure		0.2 MPa	1.0 MPa	
Set pressure range Note 1)		0.005 to 0.1 MPa	0.005 to 0.5 MPa	0.005 to 0.9 MPa
Power supply	Voltage	24 VDC ± 10%, 12 to 15 VDC		
	Current consumption	Power supply voltage 24 VDC type: 0.12 A or less Power supply voltage 12 to 15 VDC type: 0.18 A or less		
Input signal	Current type Note 2)	4 to 20 mA, 0 to 20 mA (Sink type)		
	Voltage type	0 to 5 VDC, 0 to 10 VDC		
	Preset input	4 points		
Input impedance	Current type	250 Ω or less		
	Voltage type	Approx. 6.5 kΩ		
	Preset input	Approx. 2.7 kΩ		
Output signal (monitor output) Note 3)	Analog output	1 to 5 VDC (Load impedance: 1 kΩ or more) 4 to 20 mA (Sink type) (Load impedance: 250 Ω or less)		
	Switch output	NPN open collector output: Max. 30 V, 30 mA PNP open collector output: Max. 30 mA		
Linearity		Within ±1% (full span)		
Hysteresis		Within 0.5% (full span)		
Repeatability		Within ±0.5% (full span)		
Sensitivity		Within 0.2% (full span)		
Temperature characteristics		Within ±0.12% (full span)/°C		
Output pressure display	Accuracy	±3% (full span)		
	Minimum unit	MPa: 0.01, kgf/cm²: 0.01, bar: 0.01, PSI: 0.1 Note 4), kPa: 1		
Ambient and fluid temperature		0 to 50°C (with no condensation)		
Enclosure		IP65		
Weight	ITV10□□	Approx. 250 g (without options)		
	ITV20□□	Approx. 350 g (without options)		
	ITV30□□	Approx. 645 g (without options)		

Note 1) Please refer to "Graph (1)", relation to the differences between the set pressure and input. Additionally, refer to page 14-8-29 for the set pressure range by units of standard measured pressure. Additionally, refer to page 14-8-29 as maximum set pressure differs on unit of standard measure.
Note 2) 2-wire type 4 to 20 mA is not available. Power supply voltage (24 VDC or 12 to 15 VDC) is required.
Note 3) Select either analog output or switch output. Further, when switch output is selected, select either NPN output or PNP output.
Note 4) The minimum unit for ITV205□ is 1PSI.
Note 5) The above characteristics are confined to the static state. When air is consumed on the output side, the pressure may fluctuate.

How to Order

ITV 3 0 1 0 – 0 1 □ 2 □ S □ – Q

Model

1	1000
2	2000
3	3000

Pressure range

1	0.1 MPa
3	0.5 MPa
5	0.9 MPa

Power supply voltage

0	24 VDC
1	12 to 15 VDC

Input signal

0	Current 4 to 20 mA (Sink type)
1	Current 0 to 20 mA (Sink type)
2	Voltage 0 to 5 VDC
3	Voltage 0 to 10 VDC
4*	Preset input

* Option

Monitor output

0*	None (for preset input)
1	Analog output 1 to 5V DC
2*	Switch output/NPN output
3*	Switch output/PNP output
4*	Analog output 4 to 20 mA (Sink type)

* Option

Thread type

–	Rc
N*	NPT
T*	NPTF
F*	G

* Option

Port size

1	1/8 (1000 type)
2	1/4 (1000, 2000, 3000 type)
3	3/8 (2000, 3000 type)
4	1/2 (3000 type)

Cable connector type

S	Straight type 3 m
L*	Right angle type 3 m
N*	Without cable connector

* Option

Bracket

–	Without bracket
B*	Flat bracket
C*	L-bracket

* Option

Pressure display unit Note 1)

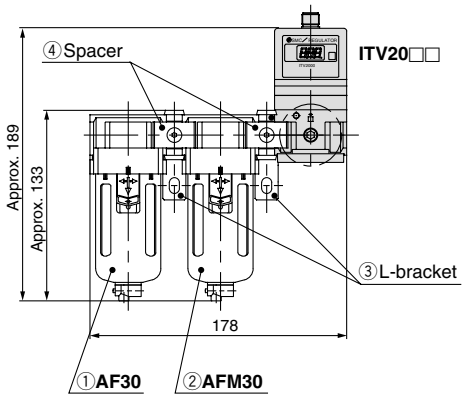
–	MPa
2	kgf/cm²
3	bar
4	PSI
5	kPa

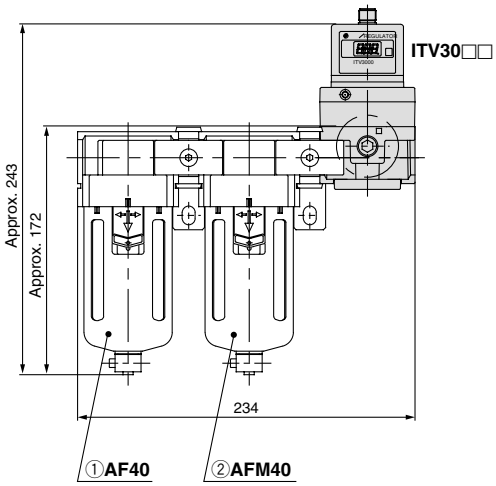
* Option

CE compliance

–	–
Q	CE compliant

* Please visit our SMC homepage: http://www.smcworld.com for the latest details on our CE compliant products.





Combinations

◎ Standard specifications ○ Combination possible ▭ Combination not possible

∗ ITV10□□ models are not applicable.

Specifications		Symbol	Applicable model	
			ITV20□□	ITV30□□
Standard specifications	Set pressure max. 0.1 MPa	1	◎	◎
	Set pressure max. 0.5 MPa	3	◎	◎
	Set pressure max. 0.9 MPa	5	◎	◎
	Connection Rc 1/4	02	◎	◎
	Connection Rc 3/8	03	◎	◎
	Connection Rc 1/2	04		◎
Acces-sories	Bracket	B	○	○
	Bracket	C	○	○
Optional specifications	Connection NPT1/4	N02	○	○
	Connection NPT3/8	N03	○	○
	Connection NPT1/2	N04		○
	Connection G 1/4	F02	○	○
	Connection G 3/8	F03	○	○
	Connection G 1/2	F04		○

Modular Products and Accessory Combinations

∗ ITV10□□ models are not applicable.

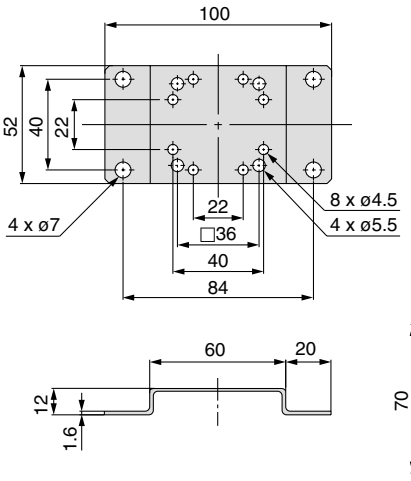
Applicable products and accessories	Applicable model	
	ITV20□□	ITV30□□
① Air filter	AF30	AF40
② Mist separator	AFM30	AFM40
③ L-bracket	B310L	B410L
④ Spacer	Y30	Y40
⑤ Spacer with L-bracket (③ + ④)	Y30L	Y40L

Accessory (Option)/Part No.

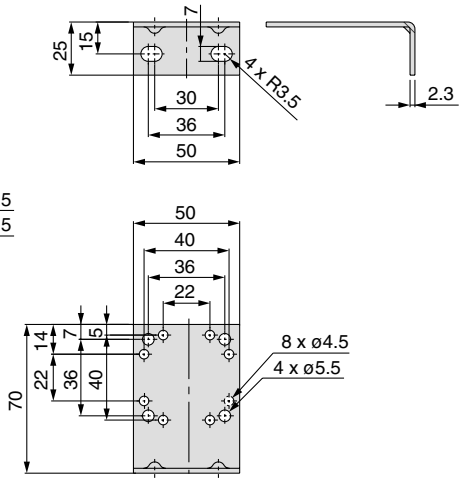
Description		Part no.		
		ITV10□□	ITV20□□	ITV30□□
Flat bracket		P3020114 (Mounting thread is not included.)		
L-bracket		INI-398-0-6 (Mounting thread is not included.)		
Cable connector	Straight type 3 m	TM-4DSX3HG4		
	Right angle type 3 m	TM-4DLX3HG4		

Dimensions

Flat bracket



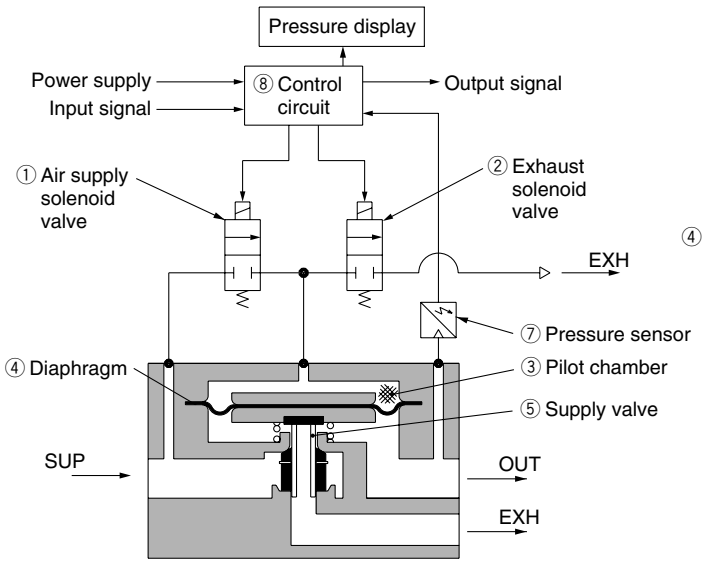
L-bracket



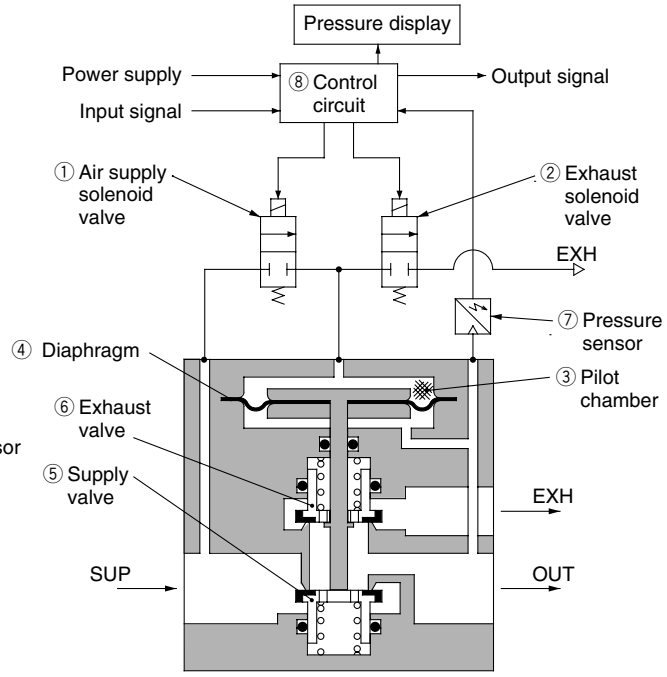
Working Principle

When the input signal rises, the air supply solenoid valve ① turns ON, and the exhaust solenoid valve ② turns OFF. Therefore, supply pressure passes through the air supply solenoid valve ① and is applied to the pilot chamber ③. The pressure in the pilot chamber ③ increases and operates on the upper surface of the diaphragm ④.
As a result, the air supply valve ⑤ linked to the diaphragm ④ opens, and a portion of the supply pressure becomes output pressure.
This output pressure feeds back to the control circuit ⑧ via the pressure sensor ⑦. Here, a correct operation functions until the output pressure is proportional to the input signal, making it possible to always obtain output pressure proportional to the input signal.

Working Principle Diagram

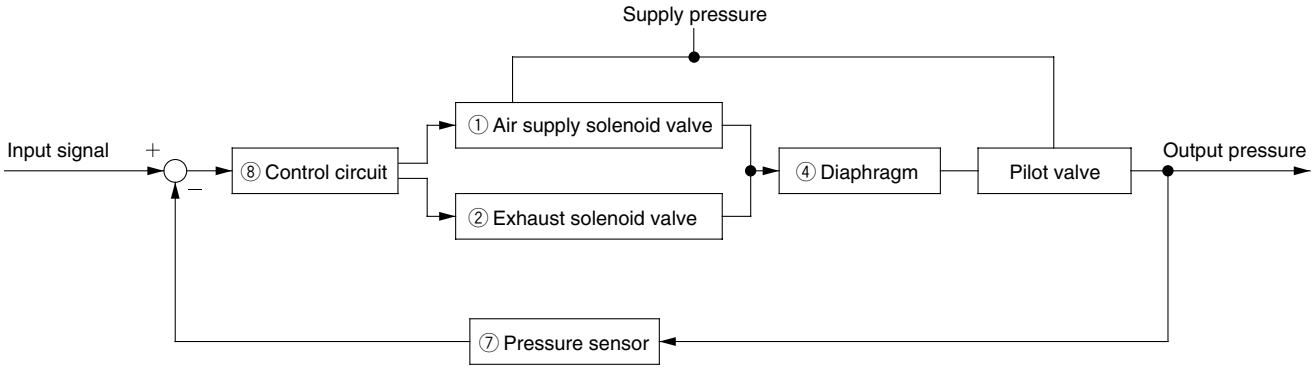


ITV1000



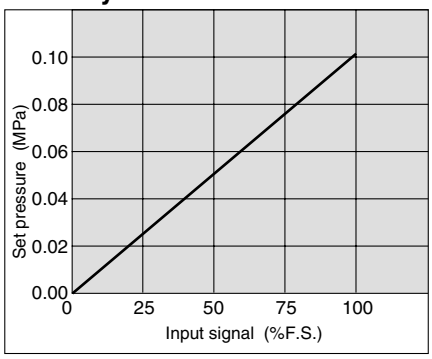
ITV2000, 3000

Block diagram

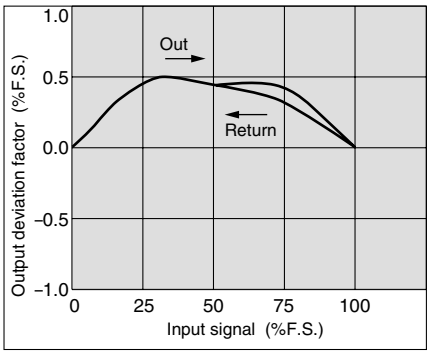


Series ITV101□

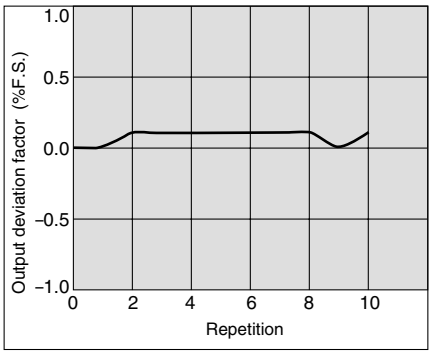
Linearity



Hysteresis

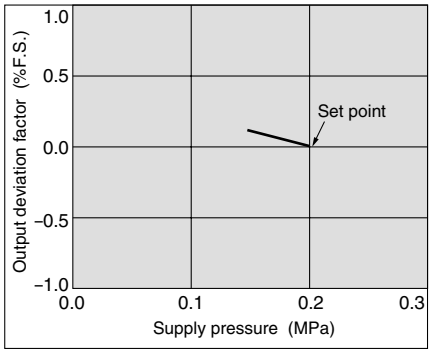


Repeatability



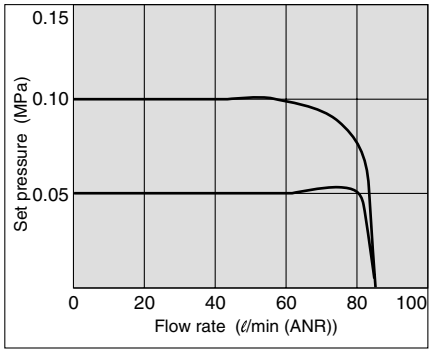
Pressure Characteristics

Set pressure: 0.05 MPa



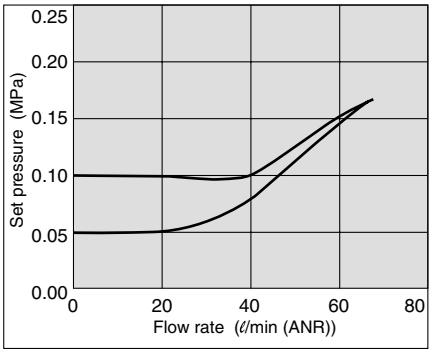
Flow Characteristics

Supply pressure: 0.2 MPa



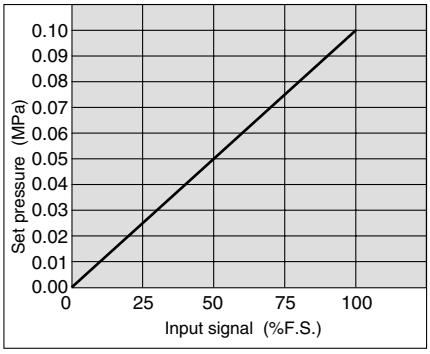
Relief Flow Characteristics

Supply pressure: 0.2 MPa

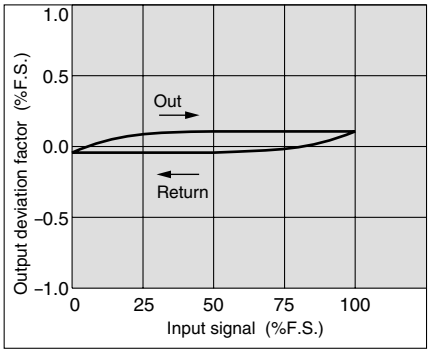


Series ITV201□

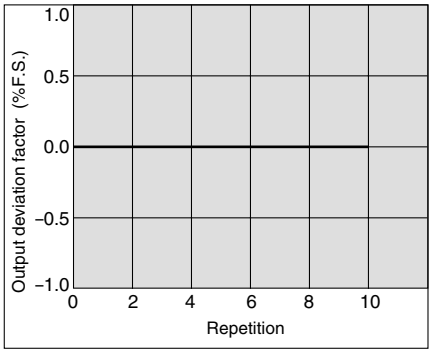
Linearity



Hysteresis

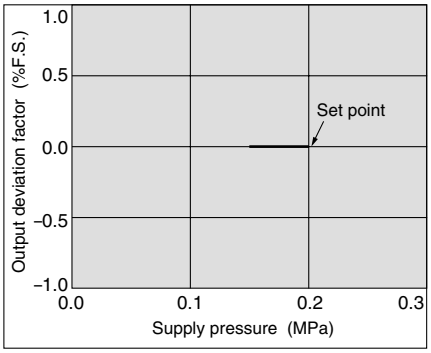


Repeatability



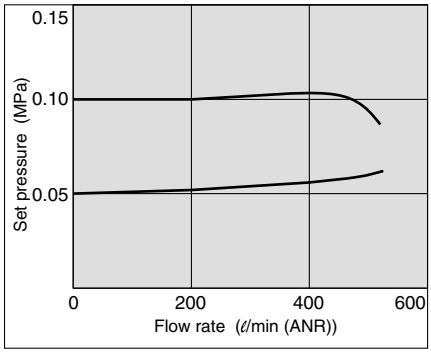
Pressure Characteristics

Set pressure: 0.05 MPa



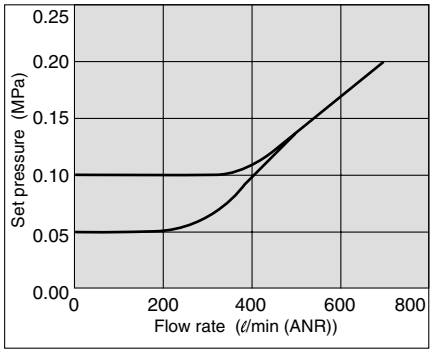
Flow Characteristics

Supply pressure: 0.2 MPa



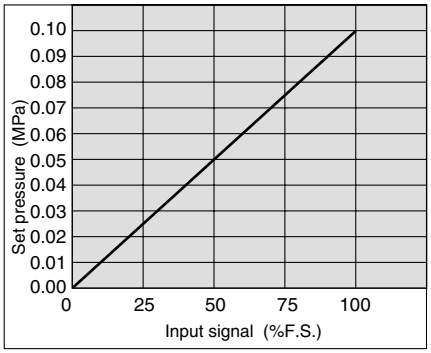
Relief Flow Characteristics

Supply pressure: 0.2 MPa

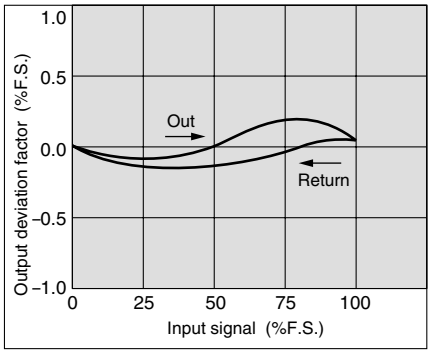


Series ITV301□

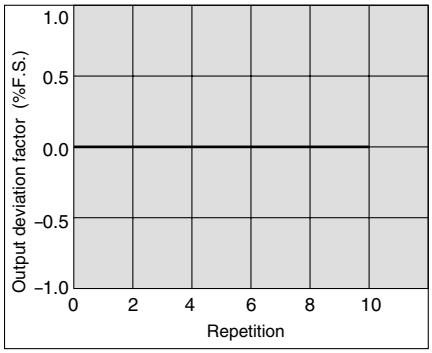
Linearity



Hysteresis

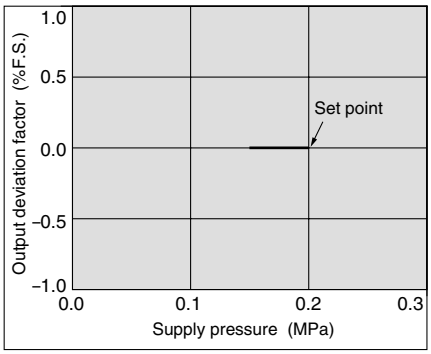


Repeatability



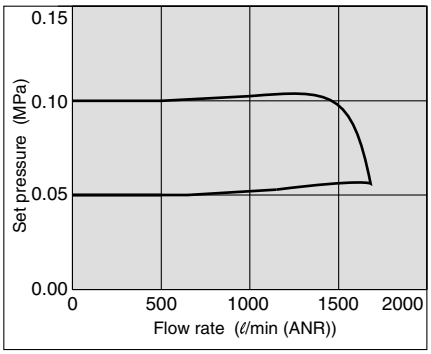
Pressure Characteristics

Set pressure: 0.05 MPa



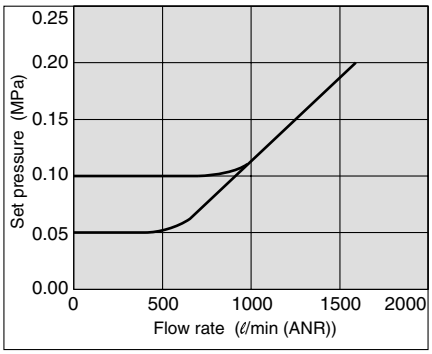
Flow Characteristics

Supply pressure: 0.2 MPa



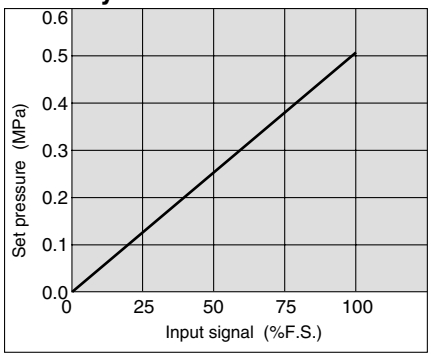
Relief Flow Characteristics

Supply pressure: 0.2 MPa

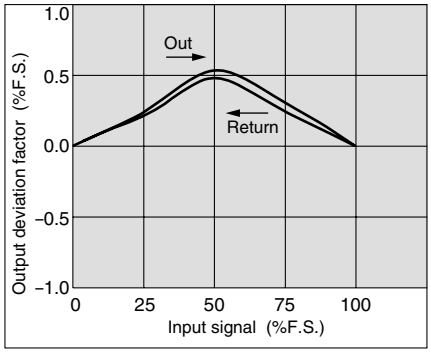


Series ITV103□

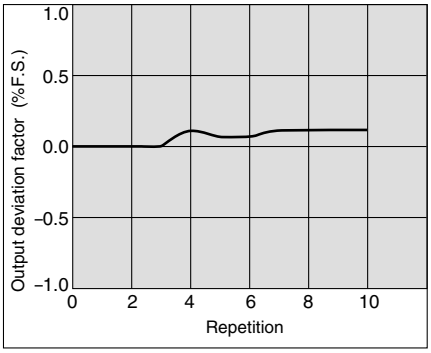
Linearity



Hysteresis

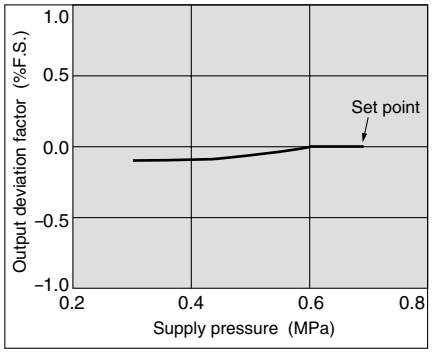


Repeatability



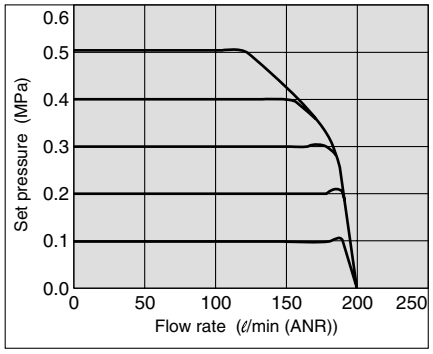
Pressure Characteristics

Set pressure: 0.2 MPa



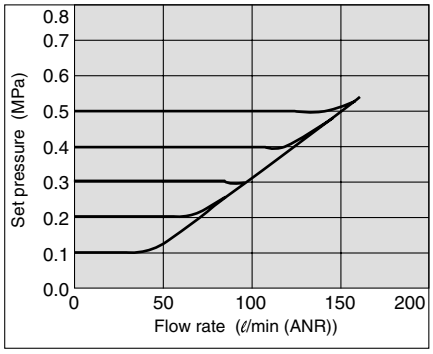
Flow Characteristics

Supply pressure: 0.7 MPa



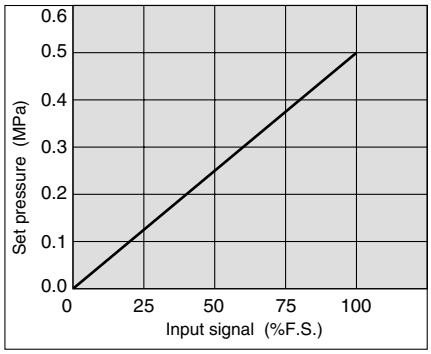
Relief Flow Characteristics

Supply pressure: 0.7 MPa

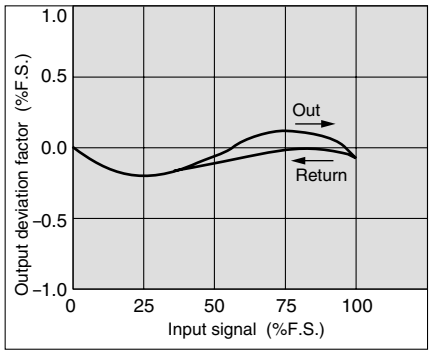


Series ITV203□

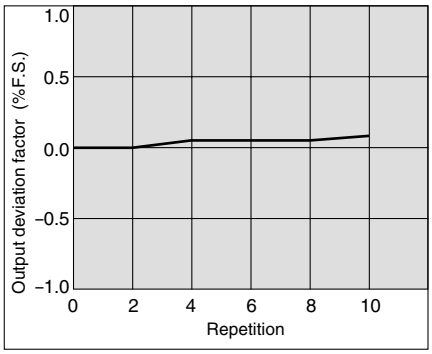
Linearity



Hysteresis

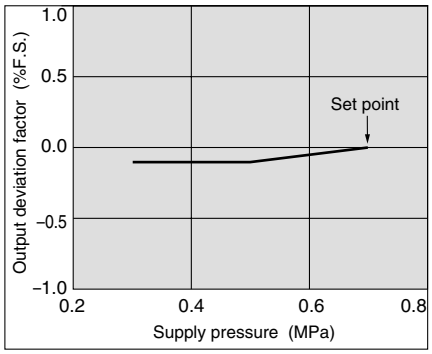


Repeatability



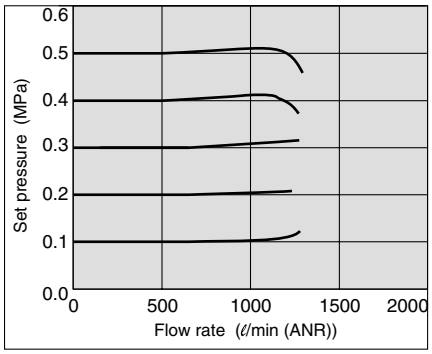
Pressure Characteristics

Set pressure: 0.2 MPa



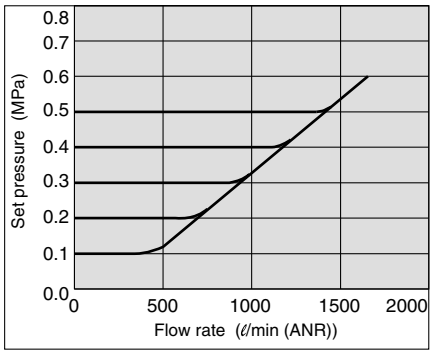
Flow Characteristics

Supply pressure: 0.7 MPa



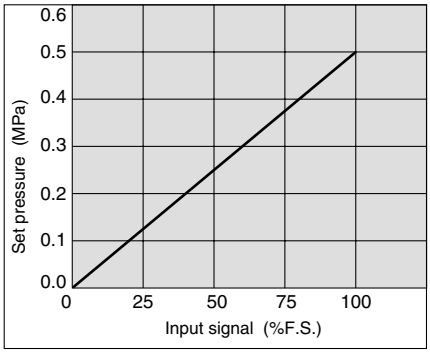
Relief Flow Characteristics

Supply pressure: 0.7 MPa

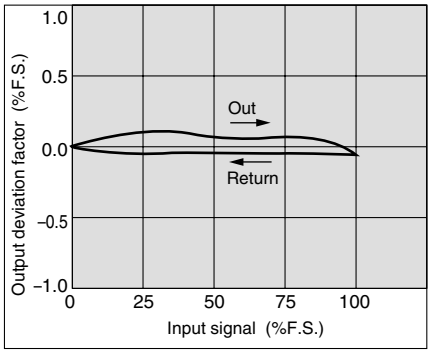


Series ITV303□

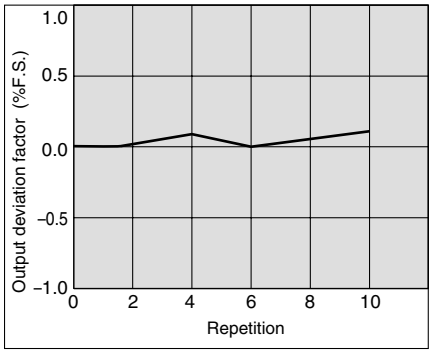
Linearity



Hysteresis

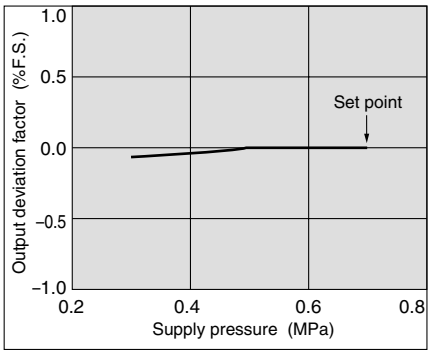


Repeatability



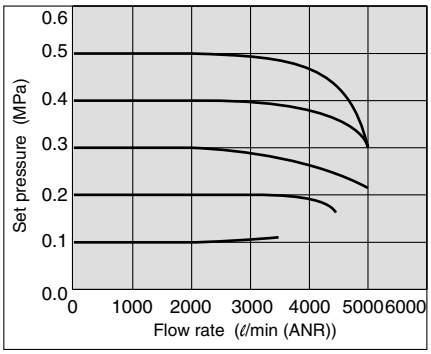
Pressure Characteristics

Set pressure: 0.2 MPa



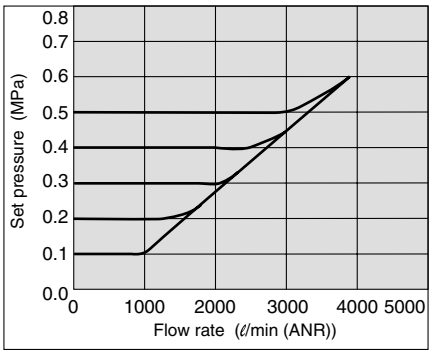
Flow Characteristics

Supply pressure: 0.7 MPa



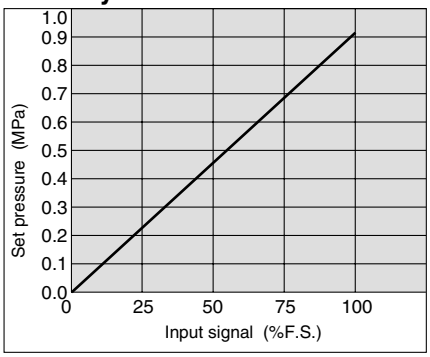
Relief Flow Characteristics

Supply pressure: 0.7 MPa

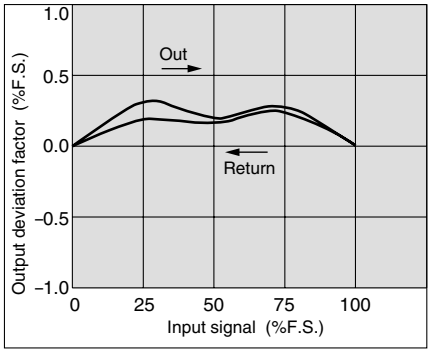


Series ITV105□

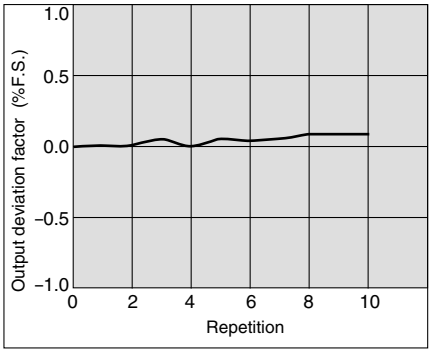
Linearity



Hysteresis

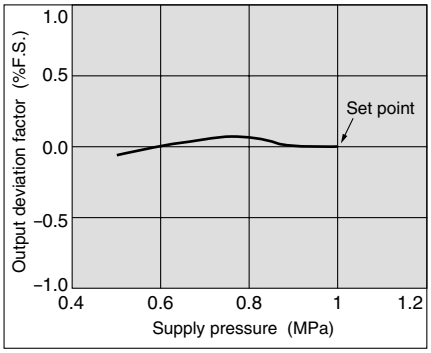


Repeatability



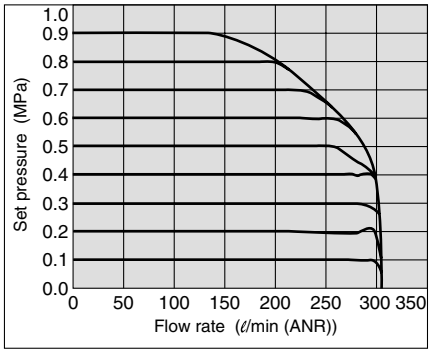
Pressure Characteristics

Set pressure: 0.4 MPa



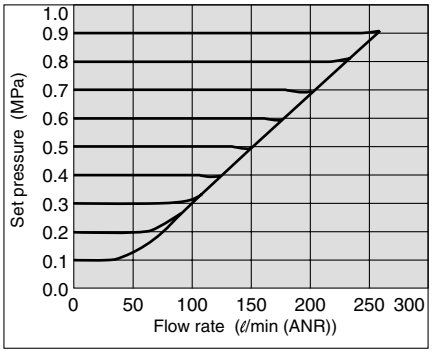
Flow Characteristics

Supply pressure: 1.0 MPa



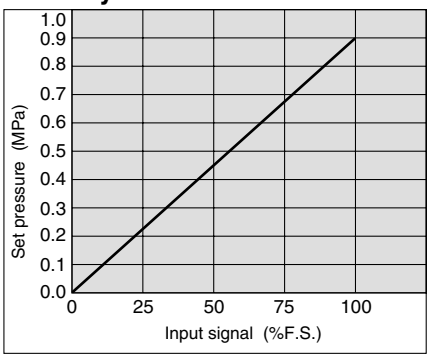
Relief Flow Characteristics

Supply pressure: 1.0 MPa

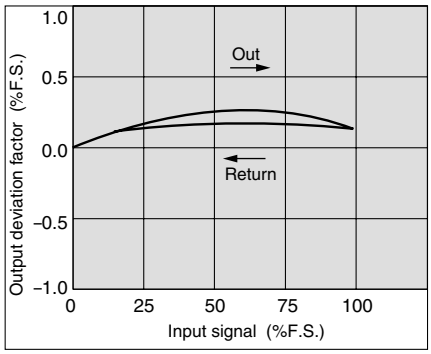


Series ITV205□

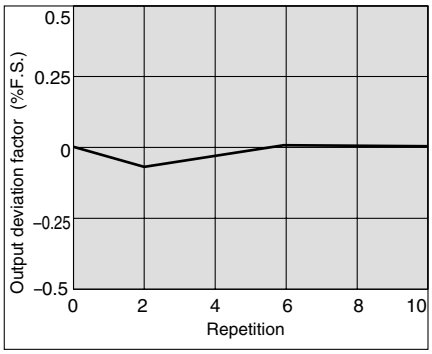
Linearity



Hysteresis

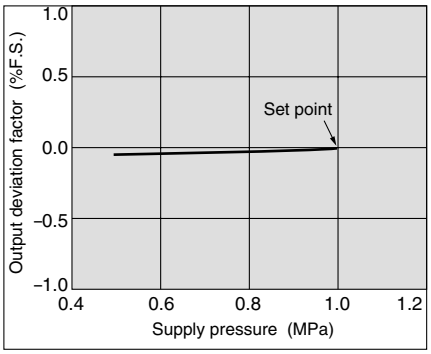


Repeatability



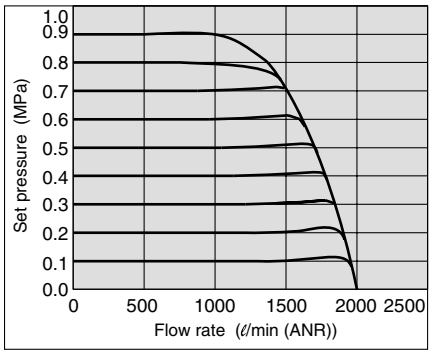
Pressure Characteristics

Set pressure: 0.4 MPa



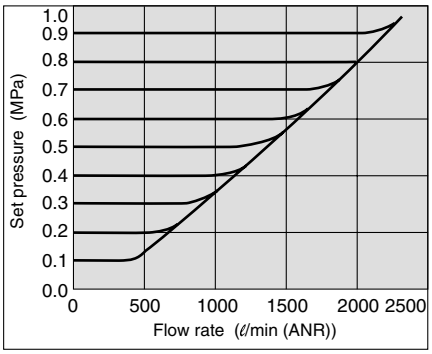
Flow Characteristics

Supply pressure: 1.0 MPa



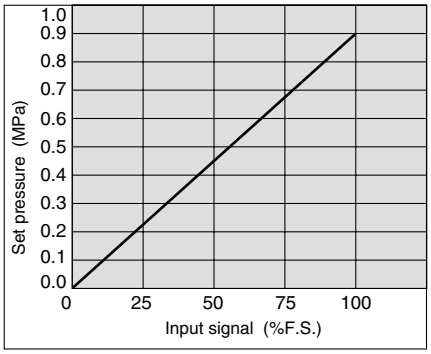
Relief Flow Characteristics

Supply pressure: 1.0 MPa

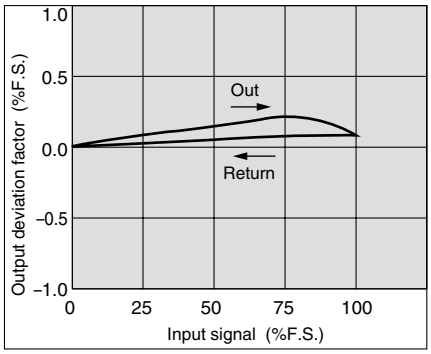


Series ITV305□

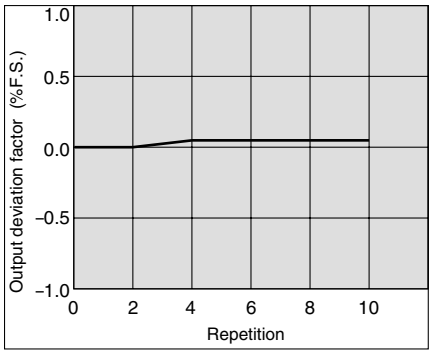
Linearity



Hysteresis

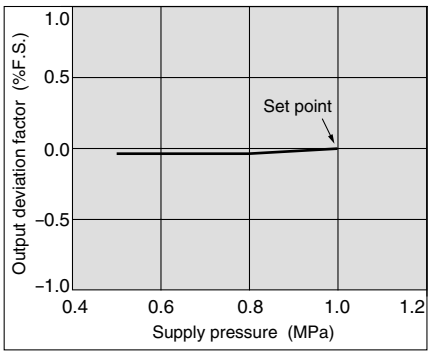


Repeatability



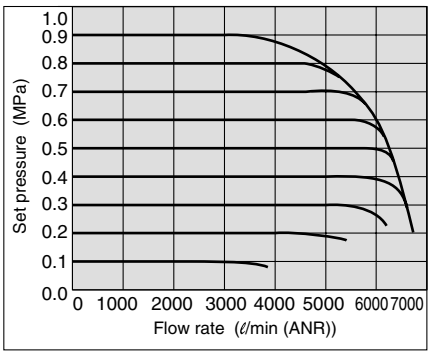
Pressure Characteristics

Set pressure: 0.4 MPa



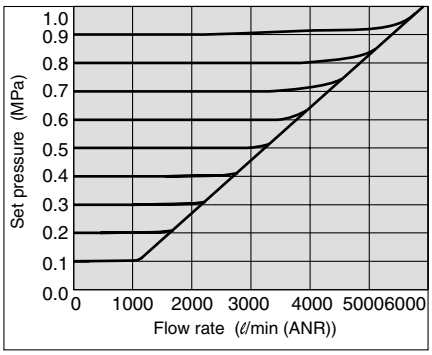
Flow Characteristics

Supply pressure: 1.0 MPa



Relief Flow Characteristics

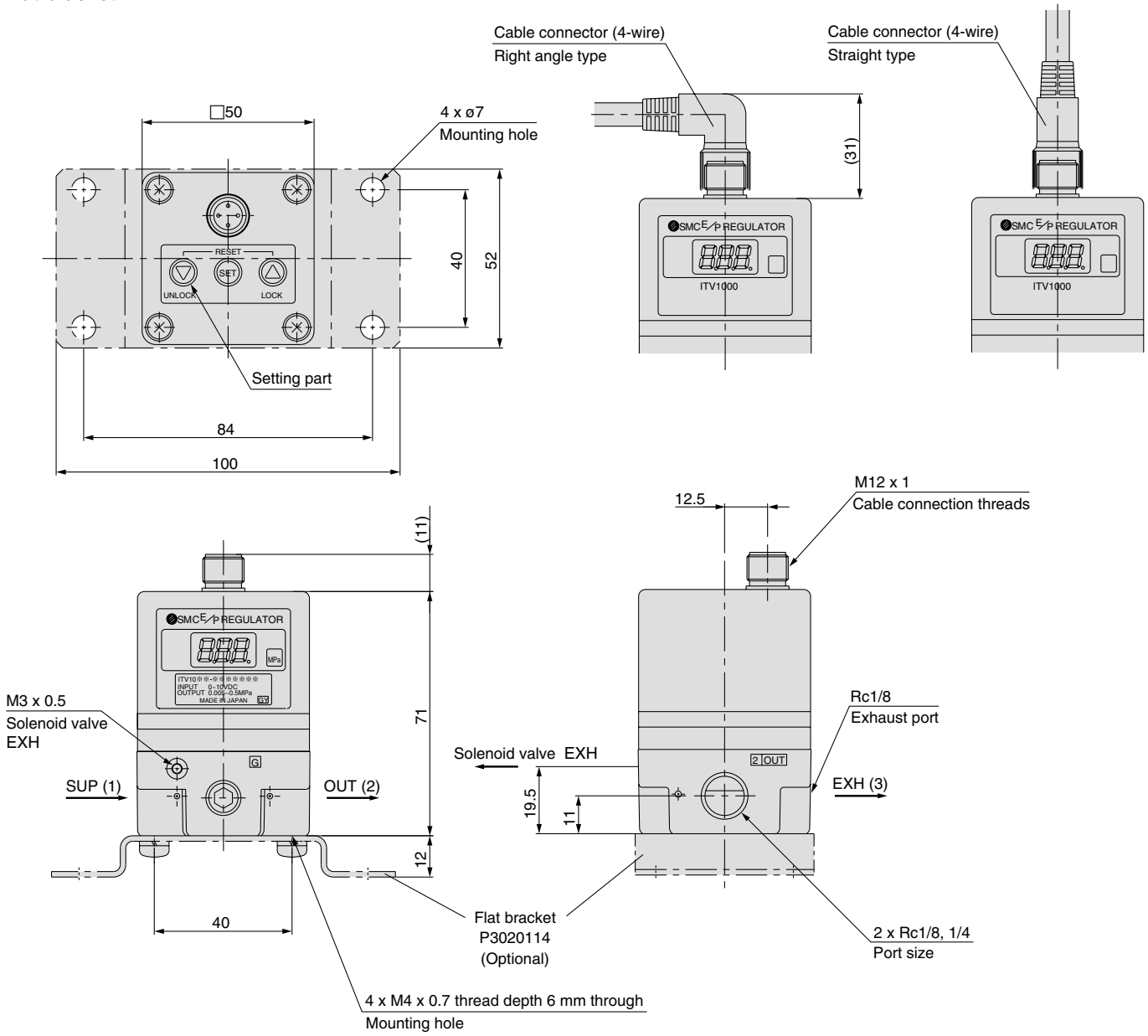
Supply pressure: 1.0 MPa



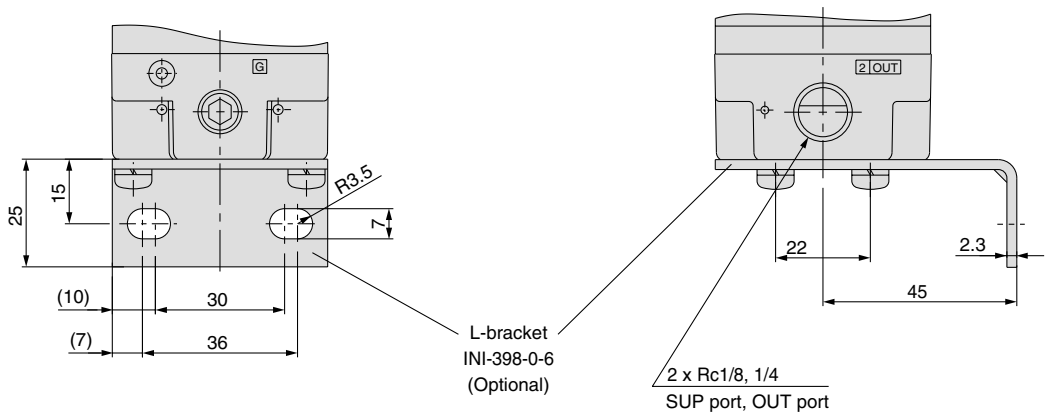
Dimensions

ITV10□□
Flat bracket

Note) Do not attempt to rotate, as the cable connector does not turn.



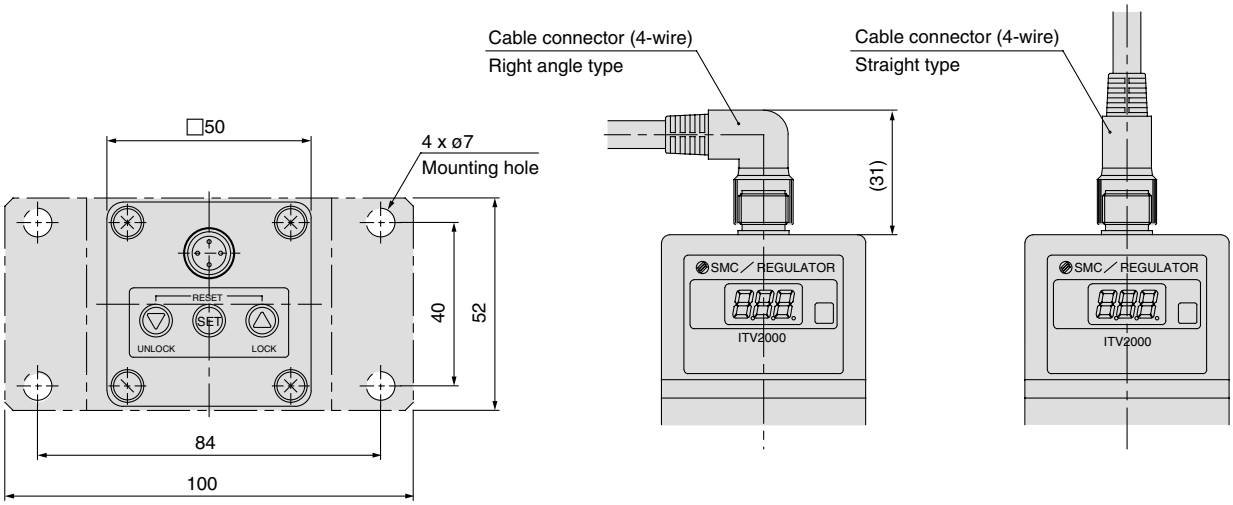
L-bracket

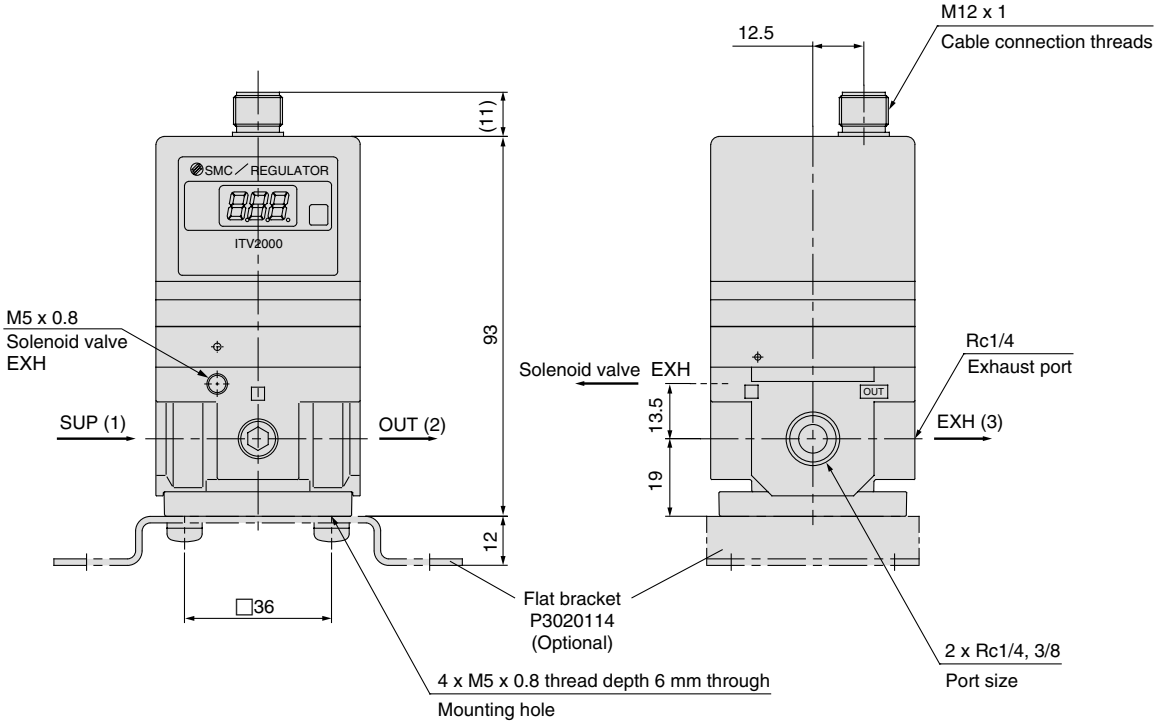


Dimensions

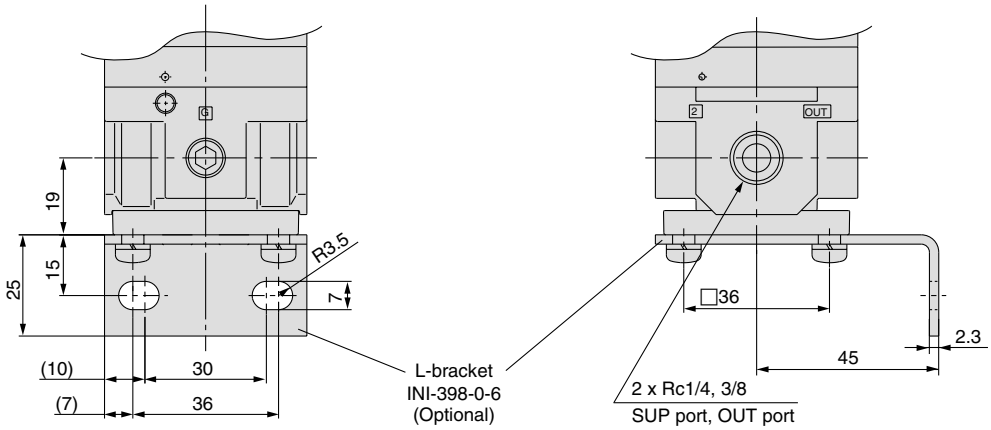
ITV20□□
Flat bracket

Note) Do not attempt to rotate, as the cable connector does not turn.





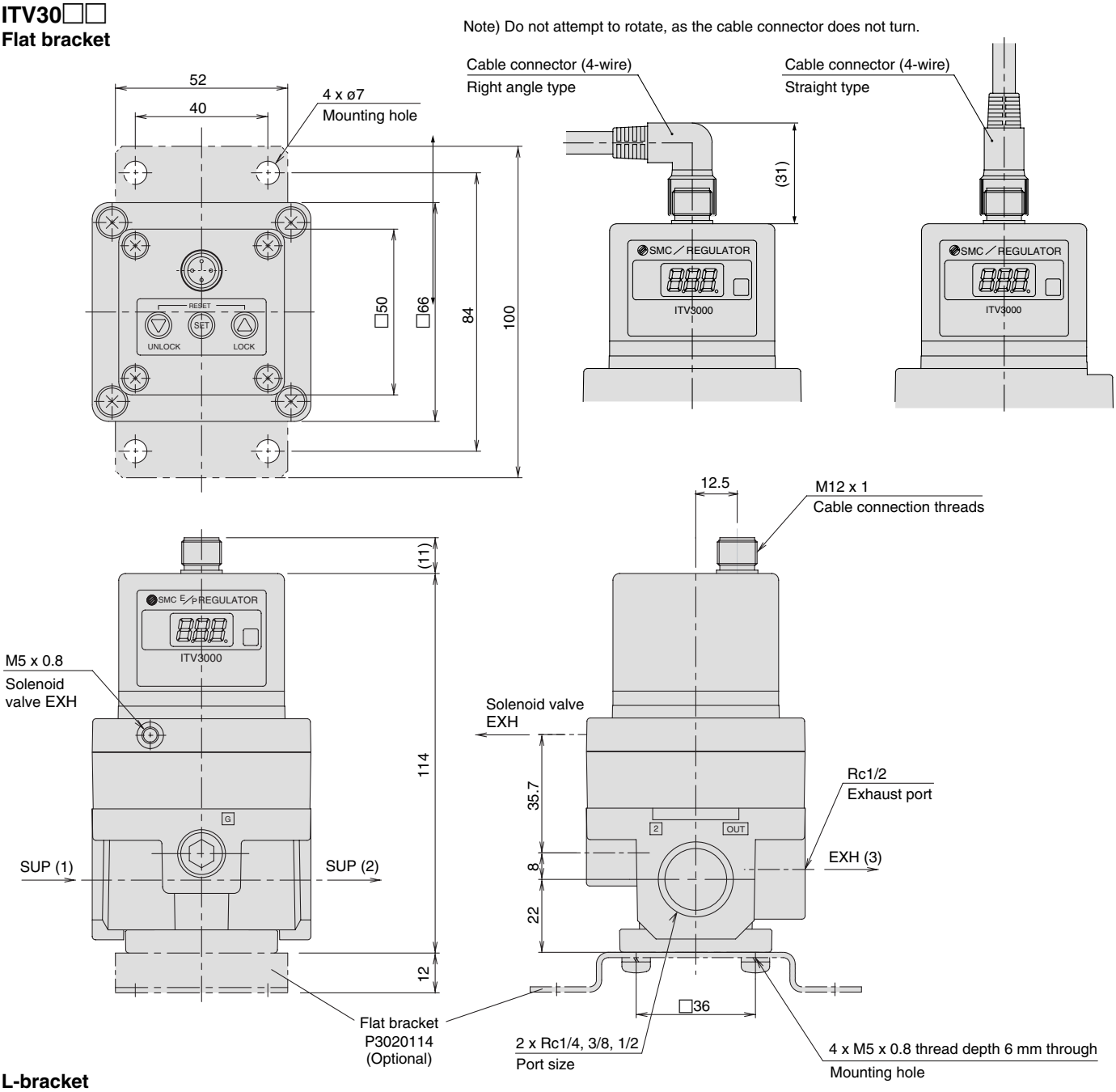
L-bracket



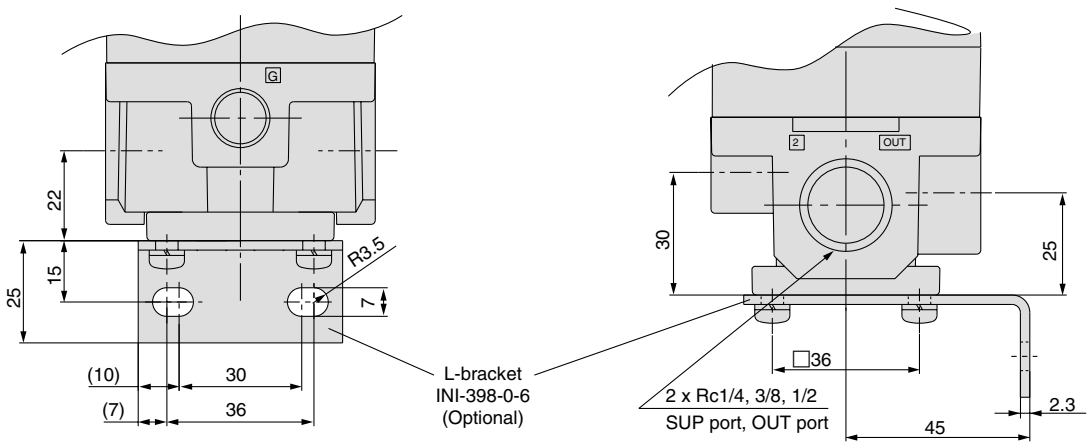
Dimensions

ITV30□□
Flat bracket

Note) Do not attempt to rotate, as the cable connector does not turn.



L-bracket



Made to Order Specifications:

Please contact SMC regarding detailed dimensions, specifications and delivery times.

1 Ozone Resistant

Fluoro rubber is used for the rubber parts of seals.

80 — Standard model number

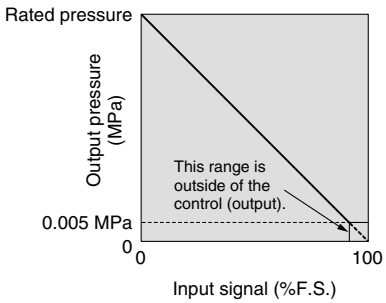
● **Ozone resistant**

2 Reverse Type -X102

In compliance with input, inverse proportional pressure is displayed.

ITV10 □□ — □□□□□□□ — **X102**
ITV20 □□ — □□□□□□□ — **X102**
ITV30 □□ — □□□□□□□ — **X102**

● **Reverse type**



Input/output characteristics chart

Note 1) □ in part number is the same model no. for the standard products.
Note 2) Except for preset input type.

3 16 Points Preset Input Type -X81

Able to control 16-point-pressure by 4 bit switching input

ITV10 □ **0** — **4** □□□□□□ — **X81**
ITV20 □ **0** — **4** □□□□□□ — **X81**
ITV30 □ **0** — **4** □□□□□□ — **X81**

● **16 points preset type**

Note 1) □ in part number is the same model no. for the standard products.
Note 2) Monitor output is switch output type only.

4 Digital Input Type -X93

Parallel input type with digital 10 bit.

ITV10 □ **0** — **4 0** □□□□□ — **X93**
ITV20 □ **0** — **4 0** □□□□□ — **X93**
ITV30 □ **0** — **4 0** □□□□□ — **X93**

● **Digital input type**

Note 1) □ in part number is the same model no. for the standard products.

5 DeviceNet Compliant -X80

It is conforming to DeviceNet.

ITV10 □ **0** — **4 0** □□□□ — **X80**
ITV20 □ **0** — **4 0** □□□□ — **X80**
ITV30 □ **0** — **4 0** □□□□ — **X80**

● **DeviceNet compliant**

Note 1) □ in part number is the same model no. for the standard products.
Note 2) The pressure is not indicated.

Made to Order

Made to Order Specifications:

Please contact SMC regarding detailed dimensions, specifications and delivery times.

6 Manifold Specifications (Except Series ITV3000)

2 through 8 station manifold.

How to Order Manifold

IITV20 — □ 02 — 5

- ITV1000/2000
- OUT port size

02	1/4
03	3/8

- Connection thread type

–	PT
N	NPT
F	PF

- Valve stations

2	2 stations
⋮	⋮
8	8 stations

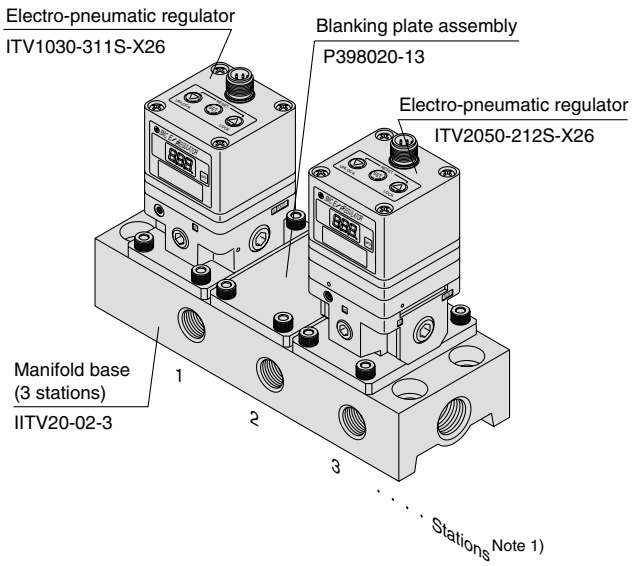
IITV20-02-3 .....1 set (3 station manifold base part no.)
*ITV2030-311S-X26 .....1 set (Electro-pneumatic regulator part no.) Note 2)
*P398020-13 .....1 set (Blanking plate assembly part no.)
*ITV2050-212S-X26 .....1 set (Electro-pneumatic regulator part no.) Note 2)
The * is the symbol for mounting. Add the * symbol at the beginning of part numbers for electro-pneumatic regulators, etc. to be mounted on the base.

Note) Refer to the table below for possible mixed combination.

Model	ITV101□	ITV103□	ITV105□	ITV201□	ITV203□	ITV205□
ITV101□	●	—	—	●	—	—
ITV103□	—	●	●	—	●	●
ITV105□	—	●	●	—	●	●
ITV201□	●	—	—	●	—	—
ITV203□	—	●	●	—	●	●
ITV205□	—	●	●	—	●	●

How to Order Manifold Assembly

Example



Note 1) Electro-pneumatic regulators are counted starting from station 1 on the left side with the OUT ports in front.
Note 2) The port size for mounted electro-pneumatic regulators is Rc1/8 (ITV1000), Rc1/4 (ITV2000) only.
Note 3) When there is a large number of stations, use piping with the largest possible inside diameter for the supply side, such as steel piping.
Note 4) The use of the straight type cable connector is recommended. To mount right angle type, be certain to check that no possible interference occurs.
Note 5) When mounting a blanking plate and the regulator with different pressure set, please inform SMC of the order of a manifold station beside a purchase order.

7 High-Speed Response Time Specifications -X88

Pressure response with no load is approx. 0.1 sec.

ITV 2 0 1 0 — 0 1 □ 2 □ S □ — X88

- Model

1	1000 type
2	2000 type

- Pressure range

1	0.1 MPa
3	0.5 MPa
5	0.9 MPa

- Power supply voltage

0	24 VDC
1	12 to 15 VDC

- Input signal

0	Current 4 to 20 mA (Sink type)
1	Current 0 to 20 mA (Sink type)
2	Voltage 0 to 5 VDC
3	Voltage 0 to 10 VDC

- Monitor output

1	Analog output 1 to 5V DC
2	Switch output/NPN output
3	Switch output/PNP output
4	Analog output 4 to 20 mA (Sink type)

- Thread type

–	Rc
N	NPT
T	NPTF
F	G

- Port size

1	1/8 (1000 type)
2	1/4 (1000, 2000 type)
3	3/8 (2000 type)

- Bracket

–	Without bracket
B	Flat bracket
C	L-bracket

- Cable connector type

S	Straight type 3 m
L	Right angle type 3 m
N	Without cable connector

- Pressure display unit

–	MPa
2	kgf/cm²
3	bar
4	PSI
5	kPa

- High-speed response time specifications

Specific Product Precautions 1

Be sure to read before handling.

Operating Environment

⚠ Warning

1. Employ suitable protective measures in locations where there is contact with water droplets, oil or welding spatter, etc.
2. Consult SMC when used in power plants, or if instrumentation related.

Air Supply

⚠ Caution

1. Install an air filter near this product on the supply side. Select a filtration degree of 5 μm or less.
2. Compressed air containing large amounts of drainage can cause malfunction of this product and other pneumatic equipment. As a countermeasure, install an aftercooler, air dryer or Drain Catch, etc.
3. If large amounts of carbon dust are generated by the compressor, it can accumulate inside this product and cause malfunction.

   For details on the above compressed air quality, refer to Best Pneumatics Vol. 16.

Handling

⚠ Caution

1. Do not use a lubricator on the supply side of this product, as this can cause malfunction. When lubrication of terminal equipment is necessary, connect a lubricator on the output side of this equipment.
2. If electric power is shut off while pressure is being applied, pressure will be retained on the output side.
   However, this output pressure is held only temporarily and is not guaranteed. If exhausting of this pressure is desired, shut off the power after reducing the set pressure, and discharge the air using a residual pressure exhaust valve, etc.
3. If power to this product is cut off due to a power failure, etc. when it is in a controlled state, output pressure will be retained temporarily. Handle carefully when operating with output pressure released to the atmosphere, as air will continue to flow out.

Handling

⚠ Caution

4. If supply pressure to this product is interrupted while the power is still on, the internal solenoid valve will continue to operate and a humming noise may be generated. Since the life of the product may be shortened, shut off the power supply also when supply pressure is shut off.
5. In this product, the output side pressure cannot be completely relieved within the range of 0.005 MPa or less. If it is desired to reduce the pressure completely to 0 MPa, install a 3 way valve or other device on the output side to exhaust the pressure.
6. This product is adjusted for each specification at the time of shipment from the factory. Avoid careless disassembly or removal of parts, as this can lead to malfunction.
7. The optional cable connector is a 4 wire type. When the monitor output (analog output or switch output) is not being used, keep it from touching the other wires as this can cause malfunction.
8. Please note that the right angle cable does not rotate and is limited to only one entry direction.
9. Take the following steps to avoid malfunction due to noise.
   1) Remove power supply noise during operation by installing a line filter, etc. in the AC power line.
   2) For avoiding the influence of noise install this product and its wiring as far as possible from strong electric fields such as those of motors and power lines, etc.
   3) Be sure to implement protective measures against load surge for induction loads (solenoid valves, relays, etc.).
   4) Install or remove the connector after shutting off the power supply to avoid the influence of chattering of the power supply.
10. Due to the large volume of the output side, a loud exhaust noise will be produced when being used for the purpose of a relief function. Therefore, install a silencer (SMC Series AN200 or AN400) on the exhaust port (EXH port). The port sizes are Rc1/8, Rc1/4 and Rc1/2.
11. Specifications on page 1 is in case of static environment. Pressure may fluctuate when air is consumed at the output side.
12. For details on the handling of this product, refer to the instruction manual which is included with the product.

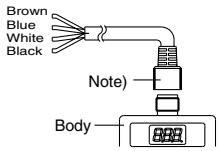
Specific Product Precautions 2

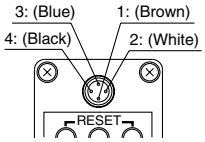
Be sure to read before handling.

Wiring

⚠ Caution

Connect the cable to the connector on the body with the wiring arranged as shown below. Proceed carefully, as incorrect wiring can cause damage.
Further, use DC power with sufficient capacity and a low ripple.





Current signal type
Voltage signal type

1	Brown	Power supply
2	White	Input signal
3	Blue	GND (COMMON)
4	Black	Monitor output

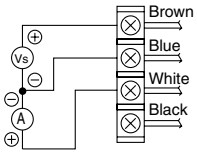
Preset input type

1	Brown	Power supply
2	White	Input signal
3	Blue	GND (COMMON)
4	Black	Monitor output

Note) A right angle type cable is also available.
The entry direction for the right angle type connector is to the left (SUP port side).
Never turn the connector as it is not designed to turn.

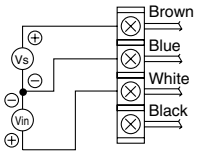
Wiring diagram

Current signal type



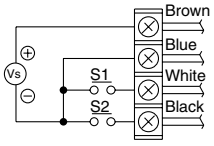
Vs: Power supply 24 VDC
12 to 15 VDC
A : Input signal 4 to 20 mADC
0 to 20 mADC

Voltage signal type



Vs : Power supply 24 VDC
12 to 15 VDC
Vin: Input signal 0 to 5 VDC
0 to 10 VDC

Preset input type



Vs: Power supply 24 VDC
12 to 15 VDC

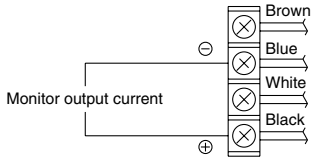
One of the preset pressures P1 through P4 is selected by the ON/OFF combination of S1 and S2.

S1	OFF	ON	OFF	ON
S2	OFF	OFF	ON	ON
Preset pressure	P1	P2	P3	P4

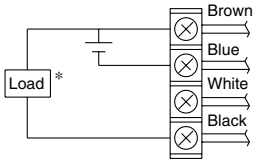
∗ For safety reasons, it is recommended that one of the preset pressures be set to 0 MPa.

Monitor output wiring diagram

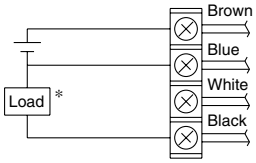
Analog output, voltage type



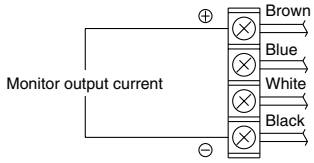
Switch output, NPN type



Switch output, PNP type



Analog output, current type (sink type)



∗ When 30 mA DC or more is applied, detecting device for overcurrent starts activating and then emits an error signal.
(Error number “5”)

Set Pressure Range

The regulating pressure range, by unit of standard measured pressure, is shown in the table below.

Regulating pressure range, by unit of standard measured pressure

Unit	Regulating pressure range		
	ITV□01□	ITV□03□	ITV□05□
MPa	0.005 to 0.1	0.005 to 0.5	0.005 to 0.9
kgf/cm²	0.05 to 1	0.05 to 5	0.05 to 9
bar	0.05 to 1	0.05 to 5	0.05 to 9
PSI	0.7 to 15	0.7 to 70	0.7 to 130
kPa	5 to 100	5 to 500	5 to 900