

Electro-Pneumatic Regulator Electronic Vacuum Regulator



IP65*

RoHS compliant

* ITV009□/209□ are IP65 equivalent.

- Stepless control of air pressure proportional to an electrical signal
- Fieldbus compatibility added to Series ITV1000/2000/3000 specifications!

New

- Reduced wiring

Applicable Fieldbus protocols

CC-Link



Built-in communication board, so no converter needed.

- Now with RS-232C serial communications capability!

Compact & light

Weight: 350 g ^{Note 1)} (ITV1000)

Power consumption: 4 w ^{Note 1)} or less

Note 1) Value for communications type. (PROFIBUS DP)



▼ Electro-Pneumatic Regulators

Note 2) ITV1000. Dimensions in parentheses () are for CC-Link or PROFIBUS DP.

Series ITV0000

Maximum flow rate

6 l/min (ANR)

Set pressure: 0.6 MPa

Supply pressure: 1.0 MPa



Series ITV1000

Maximum flow rate

200 l/min (ANR)

Set pressure: 0.6 MPa

Supply pressure: 1.0 MPa

Non-grease model (wetted parts)



Series ITV2000

Maximum flow rate

1500 l/min (ANR)

Set pressure: 0.6 MPa

Supply pressure: 1.0 MPa



Series ITV3000

Maximum flow rate

4000 l/min (ANR)

Set pressure: 0.6 MPa

Supply pressure: 1.0 MPa



▼ Electronic Vacuum Regulators

Series ITV009 □



Series ITV209 □



Series **ITV**









CAT.EUS60-15E-UK

Electro-Pneumatic Regulator

Electronic Vacuum Regulator

Series *ITV*

- Stepless control of air pressure proportional to an electrical signal.

Series	Model	Regulating pressure range	Input signal	Port size	Page
Series ITV0000 	ITV001□	0.001 to 0.1 MPa	Current type: 4 to 20 mA DC Current type: 0 to 20 mA DC Voltage type: 0 to 5 V DC Voltage type: 0 to 10 V DC	Built-in One-touch fittings Metric size: ø4 Inch size: ø5/32	1
	ITV003□	0.001 to 0.5 MPa			
	ITV005□	0.001 to 0.9 MPa			
Series ITV1000 	ITV101□	0.005 to 0.1 MPa	Current type: 4 to 20 mA DC (Sink type) Current type: 0 to 20 mA DC (Sink type) Voltage type: 0 to 5 V DC Voltage type: 0 to 10 V DC Preset input <i>New</i> CC-Link compatible <i>New</i> DeviceNet™ compatible <i>New</i> PROFIBUS DP compatible <i>New</i> RS-232C communication	1/8, 1/4	9
	ITV103□	0.005 to 0.5 MPa			
	ITV105□	0.005 to 0.9 MPa			
Series ITV2000 	ITV201□	0.005 to 0.1 MPa	Current type: 4 to 20 mA DC (Sink type) Current type: 0 to 20 mA DC (Sink type) Voltage type: 0 to 5 V DC Voltage type: 0 to 10 V DC Preset input <i>New</i> CC-Link compatible <i>New</i> DeviceNet™ compatible <i>New</i> PROFIBUS DP compatible <i>New</i> RS-232C communication	1/4, 3/8	9
	ITV203□	0.005 to 0.5 MPa			
	ITV205□	0.005 to 0.9 MPa			
Series ITV3000 	ITV301□	0.005 to 0.1 MPa	Current type: 4 to 20 mA DC (Sink type) Current type: 0 to 20 mA DC (Sink type) Voltage type: 0 to 5 V DC Voltage type: 0 to 10 V DC Preset input <i>New</i> CC-Link compatible <i>New</i> DeviceNet™ compatible <i>New</i> PROFIBUS DP compatible <i>New</i> RS-232C communication	1/4, 3/8, 1/2	9
	ITV303□	0.005 to 0.5 MPa			
	ITV305□	0.005 to 0.9 MPa			
Series ITV009□ 	ITV009□	-1 to -100 kPa	Current type: 4 to 20 mA DC Current type: 0 to 20 mA DC Voltage type: 0 to 5 V DC Voltage type: 0 to 10 V DC	Built-in One-touch fittings Metric size: ø4 Inch size: ø5/32	27
	ITV009□	-1 to -100 kPa			
Series ITV209□ 	ITV209□	-1.3 to -80 kPa	Current type: 4 to 20 mA DC (Sink type) Current type: 0 to 20 mA DC (Sink type) Voltage type: 0 to 5 V DC Voltage type: 0 to 10 V DC Preset input <i>New</i> CC-Link compatible <i>New</i> DeviceNet™ compatible <i>New</i> PROFIBUS DP compatible <i>New</i> RS-232C communication	1/4	34

Electro-Pneumatic Regulator

Series *ITV1000/2000/3000*



How to Order

ITV 3 0 1 0 - 0 1 [] 2 [] S [] - [] - Q

Model

1	1000 type
2	2000 type
3	3000 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

Note) Communication models are available only for 24 V DC

Input signal

0	Current type 4 to 20 mA (Sink type)
1	Current type 0 to 20 mA (Sink type)
2	Voltage type 0 to 5 VDC
3	Voltage type 0 to 10 VDC
4	Preset input
CC	CC-Link
DN	DeviceNet™
PR	PROFIBUS DP
RC	RS-232C communication

Monitor output

—	None (for communication models)
0	None (for preset input)
1	Analogue 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, 3000 type)
3	3/8 (2000, 3000 type)
4	1/2 (3000 type)

CE compliant

Q	CE compliant
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* For detailed information on CE marked models, refer to SMC's website.

Made to Order Specifications
See pages 11, 25, and 26 for details.

Pressure display unit

—	MPa
2 ^{Note)}	kgf/cm ²
3	bar
4 ^{Note)}	psi
5	kPa

Note) Only for overseas sales (SI units are to be used inside Japan). No units are displayed on communication models.

Cable connector type

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

Note) Communication cable (other than RS-232C) should be obtained separately. See below.

Bracket

—	Without bracket
B	Flat bracket
C	L-bracket

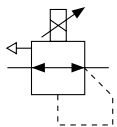
For communication cables, use the parts listed below (refer to the catalogue [M8/M12 Connector] CAT.EUS100-73-UK for details) or order the product certified for the respective protocol (with M12 connector) separately.

Application	Communication cable part number	Remarks
CC-Link compatibility	PCA-1567720 (Socket type)	Dedicated Bus adapter supplied with the product.
	PCA-1567717 (Plug type)	
DeviceNet™ compatibility	PCA-1557633 (Socket type)	T-branch connector not supplied.
	PCA-1557646 (Plug type)	
PROFIBUS DP compatibility	PCA-1557688 (Socket type)	T-branch connector not supplied.
	PCA-1557691 (Plug type)	

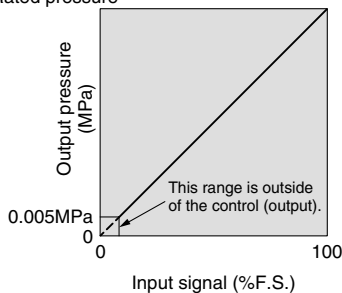
Electro-Pneumatic Regulator *Series ITV1000/2000/3000*



JIS Symbol



Rated pressure



Input/output characteristics chart

Standard Specifications

Model	ITV101	ITV103	ITV105
	ITV201	ITV203	ITV205
	ITV301	ITV303	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	
Input impedance	Preset input	4 points	
	Current type	250 Ω or less ^{Note 6)}	
	Voltage type	Approx. 6.5 kΩ	
Output signal ^{Note 3)} (monitor output)	Analogue output	1 to 5 VDC (Load impedance: 1 kΩ or more) 4 to 20 mA (Sink type) (Load impedance: 250 Ω or less) Output accuracy within ±6% (Full span)	
	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 ^{Note 4)}	Accuracy	±3% (Full span)	
	Minimum unit	MPa: 0.01, kgf/cm ² : 0.01, bar: 0.01, PSI: 0.1 ^{Note 5)} , kPa: 1	
Ambient and fluid temperature	0 to 50°C (No condensation)		
Enclosure	IP65		
Weight ^{Note 9)}	ITV10	Approx. 250 g (without options)	
	ITV20	Approx. 350 g (without options)	
	ITV30	Approx. 645 g (without options)	

Note 1) Please refer to Figure 1 for the relationship between set pressure and input. Because the maximum set pressure differs for each pressure display, refer to Appendix 7.

Additionally, refer to page 18 for the set pressure range by units of standard measured pressure. Additionally, refer to page 18 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 analogue output or switch output.

Further, when switch output is selected, select either NPN output or PNP output.

Note 4) Adjustment of numerical values such as the zero/span adjustment or preset input type is set based on the minimum units for output pressure display (e.g. 0.01 to 0.50 MPa). Note that the unit cannot be changed.

Note 5) The minimum unit for 0.9 MPa (130 psi) types is 1 psi.

Note 6) Value for the state with no over current circuit included. If an allowance is provided for an over current circuit, the input impedance varies depending on the input current. This is 350 Ω or less for an input current of 20 mA DC.

Note 7) The above characteristics are confined to the static state. When air is consumed on the output side, the pressure may fluctuate.

Note 8) For communication models, the maximum current consumption is 0.16 A or less.

Note 9) For communication models, add roughly 80 g to the weight (100 g for the PROFIBUS DP).

Note 10) The ITV1000 series is a non-grease model (Wetted parts).

Communication Specifications

Model	ITV□□□-CC	ITV□□□-DN	ITV□□□-PR	ITV□□□-RC
Protocol	CC-Link	DeviceNet™	PROFIBUS DP	RS-232C
Version ^{Note 1)}	Ver 1.10	Release2.0	DP-V0	—
Communication speed	156 k/625 k 2.5 M/5 M/10 M bps	125 k/250 k/500 k bps	9.6 k/19.2 k/45.45 k 93.75 k/187.5 k/500 k 1.5 M/3 M/6 M/12 M bps	9.6 kbps
Configuration file ^{Note 2)}	—	EDS	GSD	—
I/O occupation area (input/output data)	4 word/4 word, 32 bit/32 bit (per station, remote device station)	16 bit/16 bit	16 bit/16 bit	—
Communication data resolution	12 bit (4096 resolution)	12 bit (4096 resolution)	12 bit (4096 resolution)	10 bit (1024 resolution)
Fail safe ^{Note 4)}	HOLD ^{Note 3)} /CLEAR (Switch setting)	HOLD/CLEAR (Switch setting)	CLEAR	HOLD
Terminating resistance	—	—	Built into the product (Switch setting)	—

Note 1) Note that this version information is subject to change.

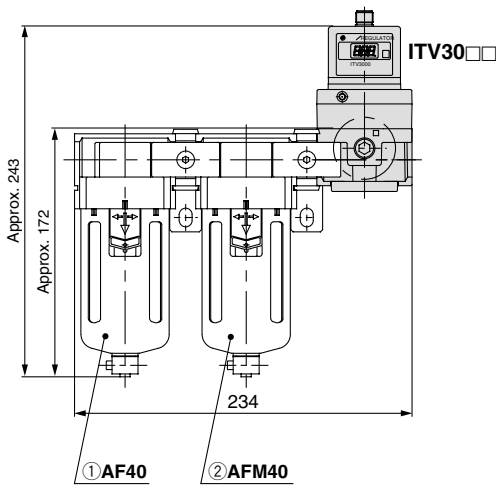
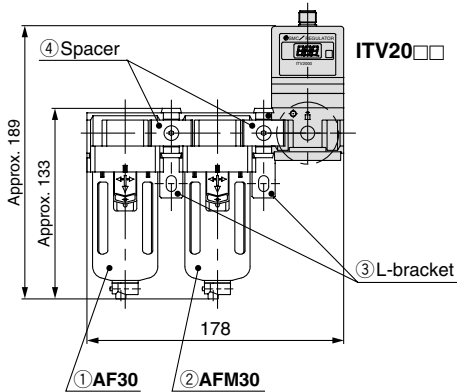
Note 2) Configuration files can be downloaded from SMC's website: <http://www.smc.eu>

Note 3) The output HOLD value when a CC-Link communications error occurs can be set based on the bit area data.

Note 4) It shows the insulation between electric signal for communication and the ITV supply power.

Series ITV1000/2000/3000

○ Standard specifications
 ○ Combination possible
 Combination not possible



Combinations

* ITV1000 models are not applicable.

Specifications	Symbol	Applicable model		
		ITV2000	ITV3000	
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		○	
Accessories	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

* ITV1000 models are not applicable.

Applicable products and accessories	Applicable model	
	ITV2000	ITV3000
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
⑥ Spacer with T-bracket	—	Y40T

Accessory (Option)/Part No.



Made to Order

(Refer to pages 25 and 26 for details.)

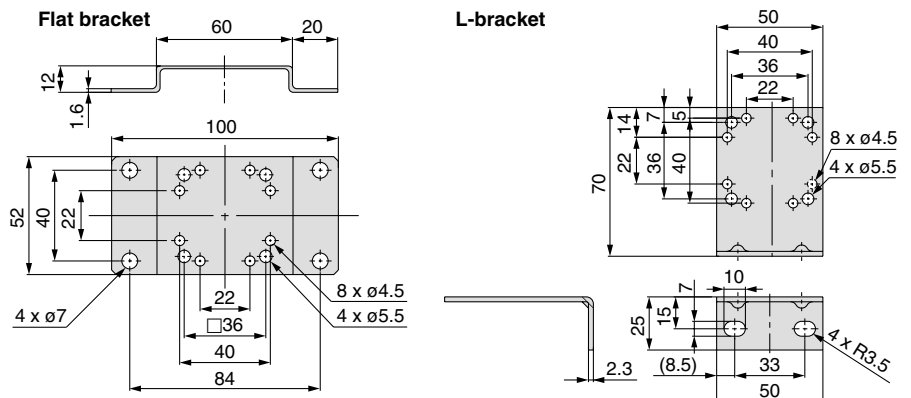
Symbol	CE-compliant	Specifications
X156	Compliant	16 points preset input type
X157	Compliant	Digital input type
X321	Compliant	Reverse type
X322	Compliant	High pressure type (SUP 1.2 MPa, OUT 1.0 MPa)
X323	Compliant	Set pressure range 1 to 100 kPa (Except Series ITV3000)
X154	Compliant	High speed response type (Except Series ITV3000)
X153	Compliant	For manifold mounting (Except Series ITV3000)

Note 1) Manifolds are compatible with 2 to 8 stations. Consult with SMC for 9 stations or more.

Note 2) Products without symbols are also compatible. Consult with SMC separately.

Description	Part No.		
	ITV1000	ITV2000	ITV3000
Flat bracket assembly (including mounting screws)	KT-ITV-F1		KT-ITV-F2
L-bracket assembly (including mounting screws)	KT-ITV-L1		KT-ITV-L2
Power cable connector	ITV□□-□□-Q	Straight type 3 m	
		Right angle type 3 m	
	ITV□□-PR-Q	Straight type 3 m	
	ITV□□-RC-Q	Right angle type 3 m	
	ITV□□-DN-Q	Straight type 3 m	
		Right angle type 3 m	
ITV□□-CC-Q	Straight type 3 m		
	Right angle type 3 m		
Bus adapter (CC-Link model only)		EX9-ACY00-MJ	

Dimensions



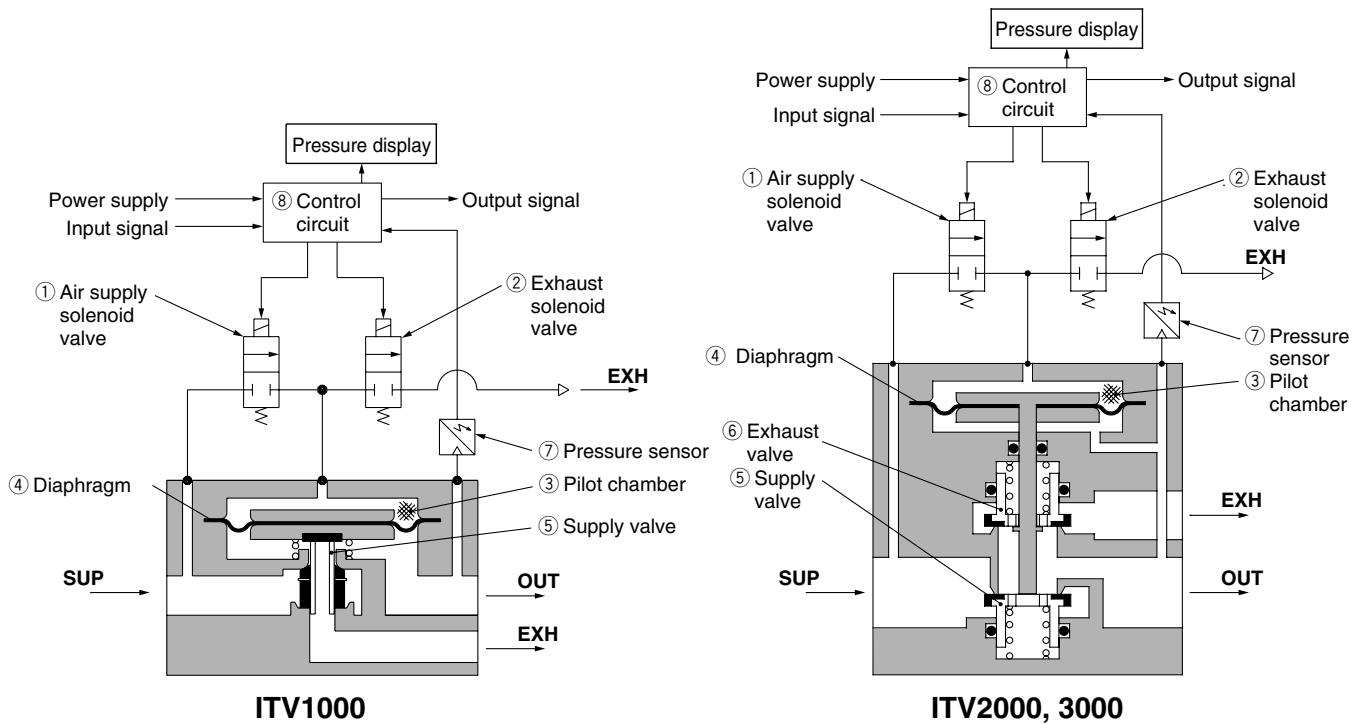
Working Principles

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.

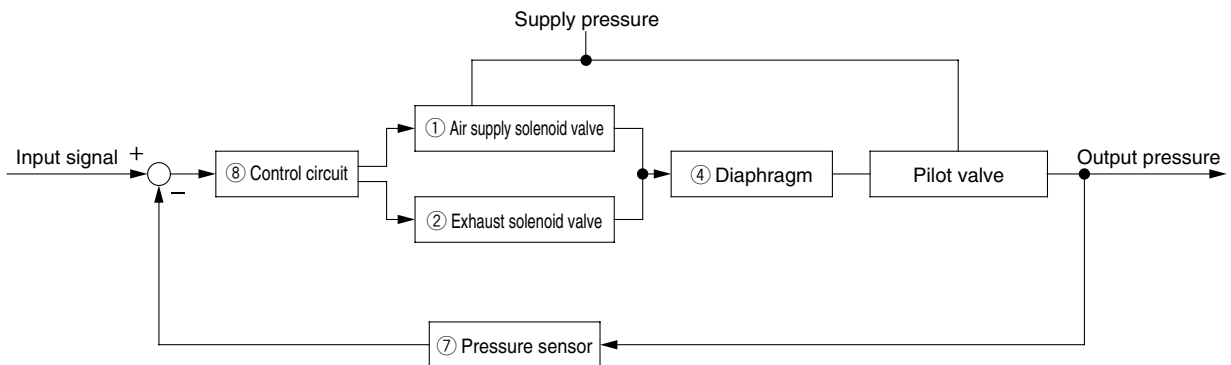
As a result, the air supply valve ⑤ linked to the diaphragm ④ opens, and a portion of the supply pressure becomes output pressure.

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 possible to obtain output pressure proportional to the input signal always.

Working Principle Diagram



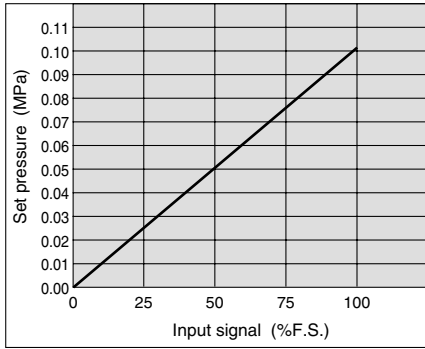
Block diagram



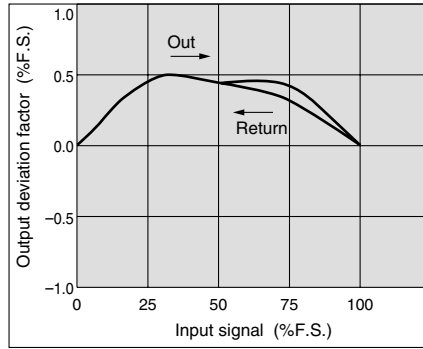
Series ITV1000/2000/3000

Series ITV101

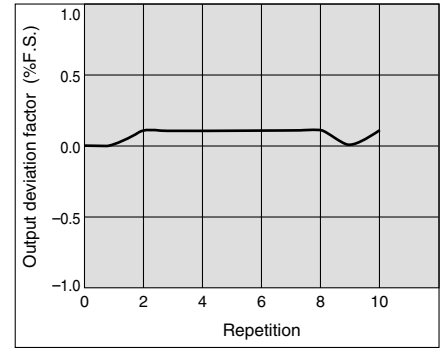
Linearity



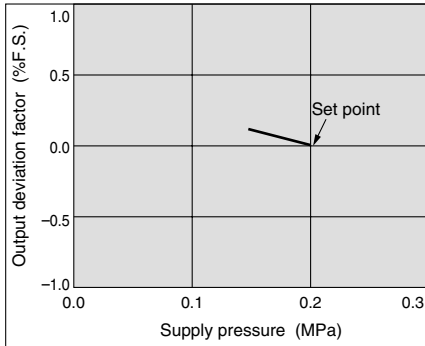
Hysteresis



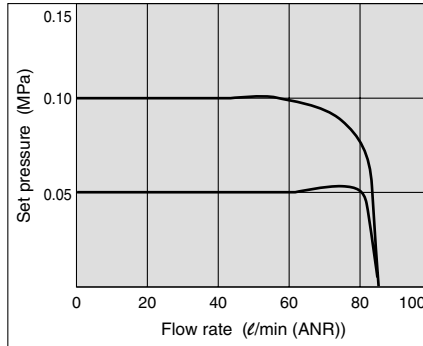
Repeatability



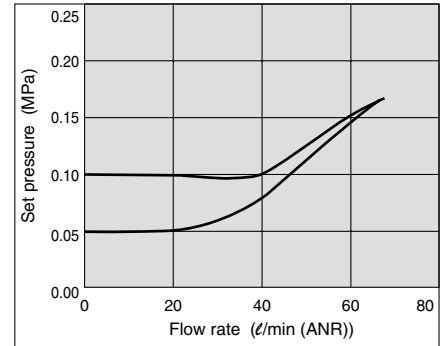
Pressure characteristics Set pressure: 0.05 MPa



Flow characteristics Supply pressure: 0.2 MPa

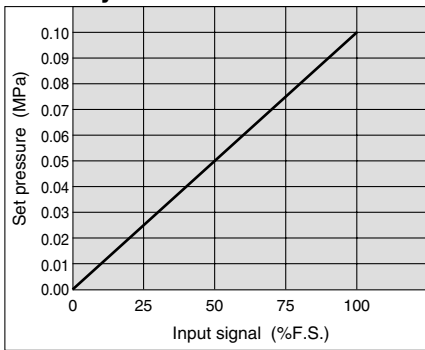


Relief flow characteristics Supply pressure: 0.2 MPa

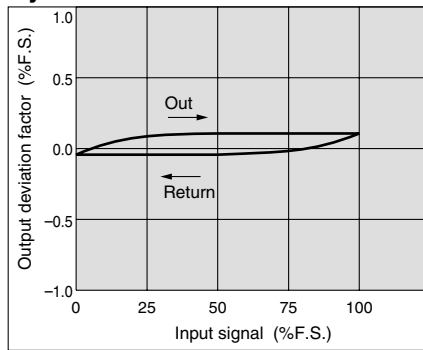


Series ITV201

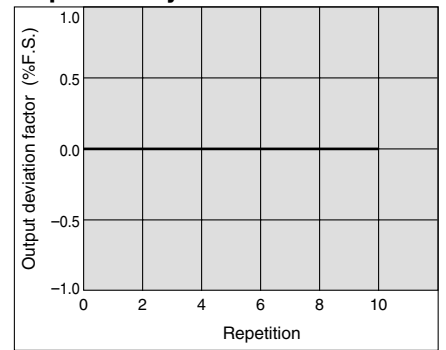
Linearity



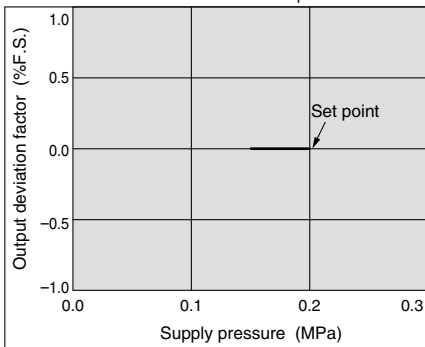
Hysteresis



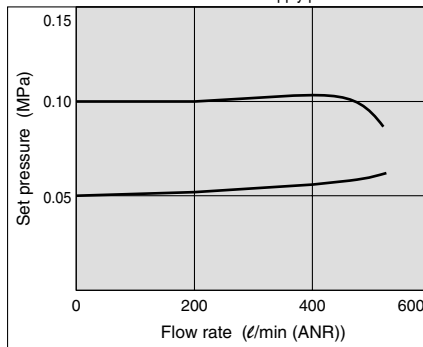
Repeatability



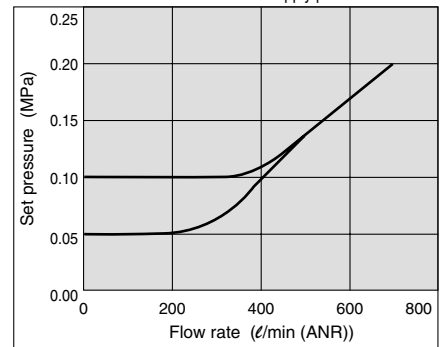
Pressure characteristics Set pressure: 0.05 MPa



Flow characteristics Supply pressure: 0.2 MPa

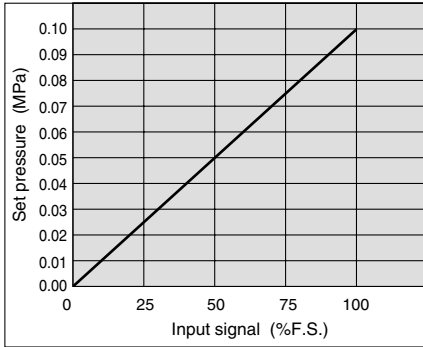


Relief flow characteristics Supply pressure: 0.2 MPa

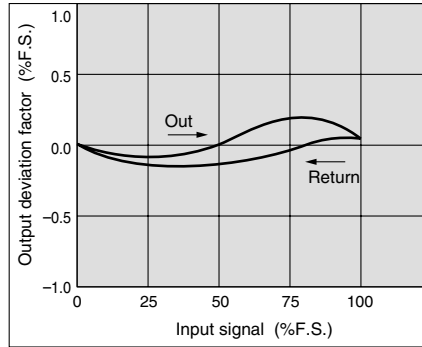


Series ITV301

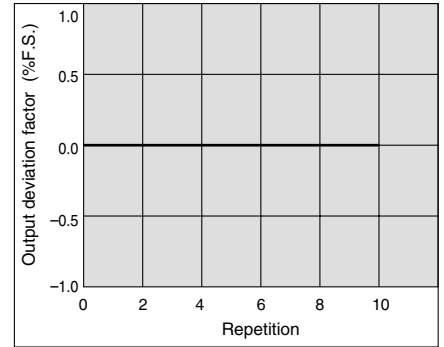
Linearity



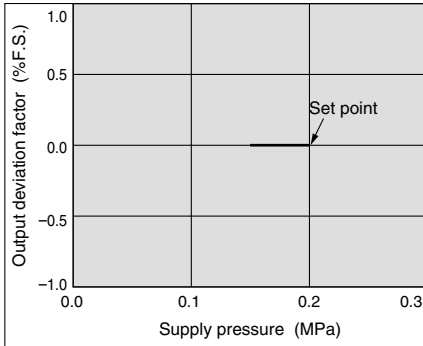
Hysteresis



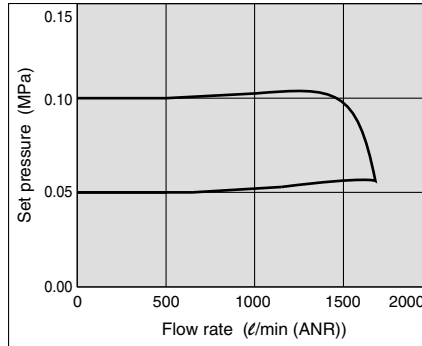
Repeatability



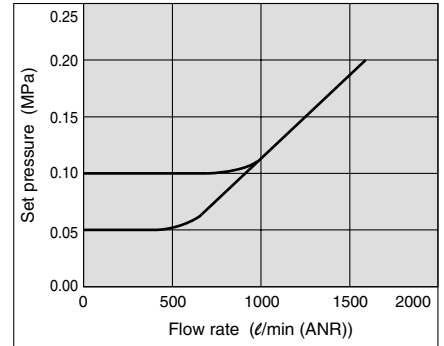
Pressure characteristics Set pressure: 0.05 MPa



Flow characteristics Supply pressure: 0.2 MPa



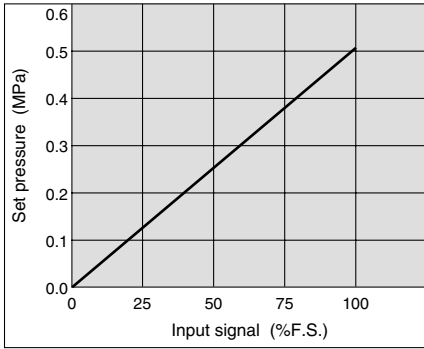
Relief flow characteristics Supply pressure: 0.2 MPa



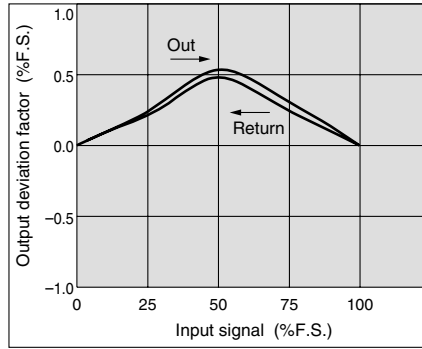
Series ITV1000/2000/3000

Series ITV103

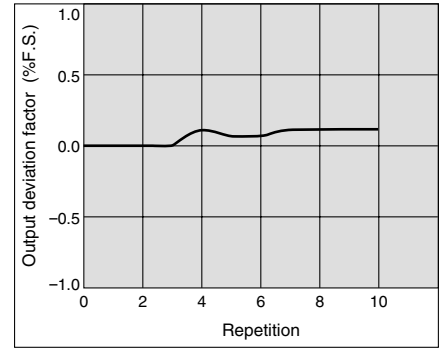
Linearity



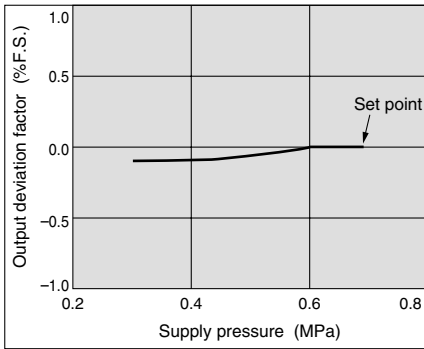
Hysteresis



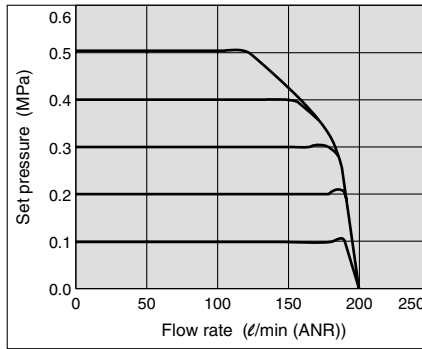
Repeatability



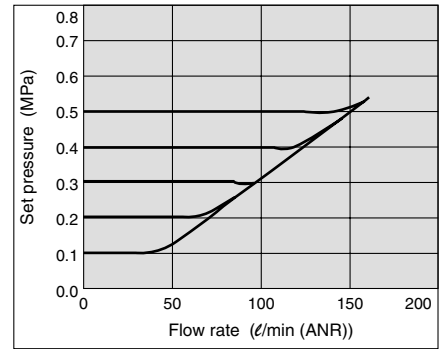
Pressure characteristics Set pressure: 0.2 MPa



Flow characteristics Supply pressure: 0.7 MPa

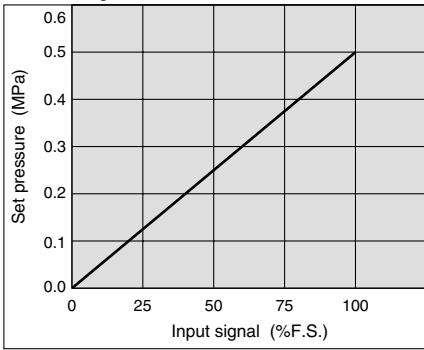


Relief flow characteristics Supply pressure: 0.7 MPa

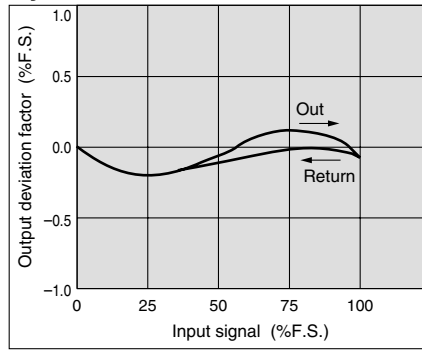


Series ITV203

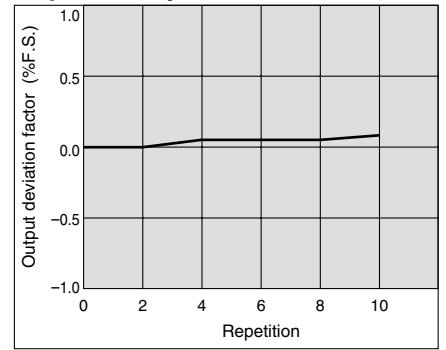
Linearity



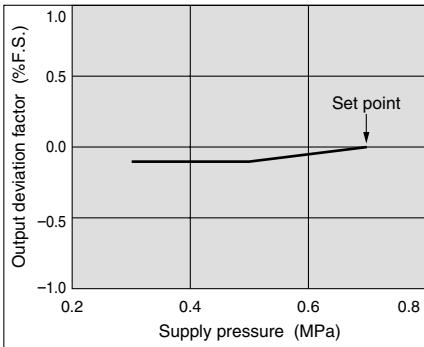
Hysteresis



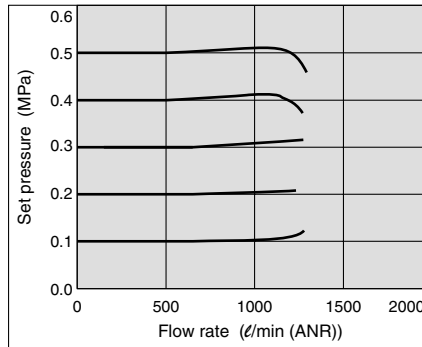
Repeatability



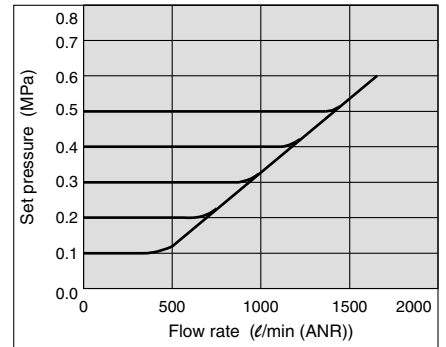
Pressure characteristics Set pressure: 0.2 MPa



Flow characteristics Supply pressure: 0.7 MPa

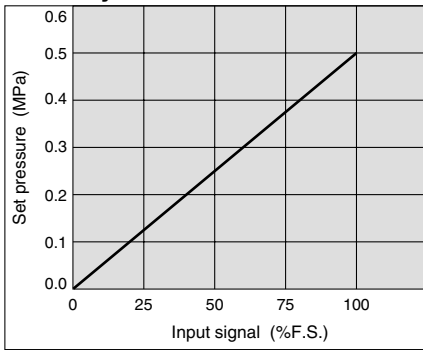


Relief flow characteristics Supply pressure: 0.7 MPa

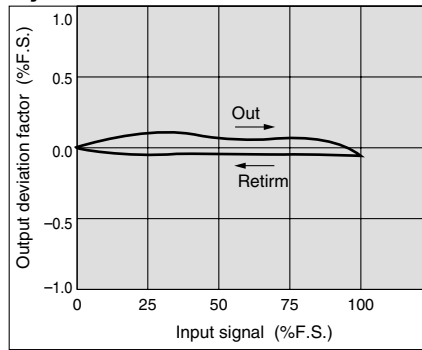


Series ITV303

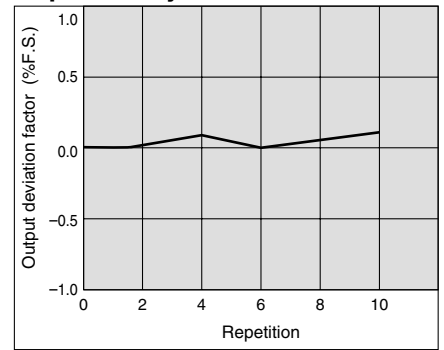
Linearity



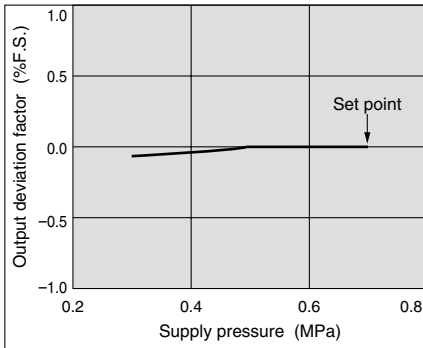
Hysteresis



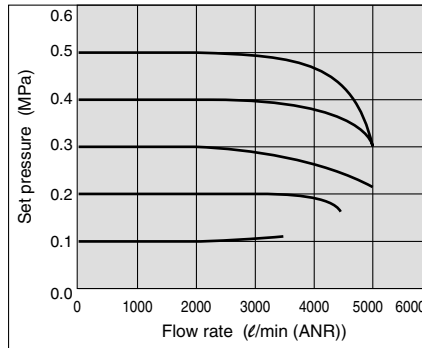
Repeatability



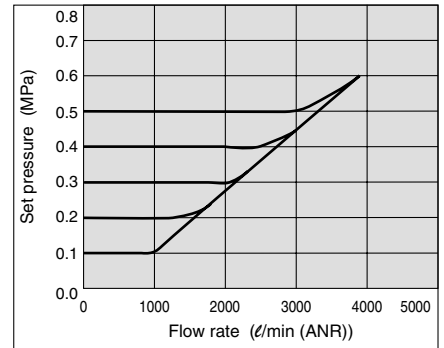
Pressure characteristics Set pressure: 0.2 MPa



Flow characteristics Supply pressure: 0.7 MPa



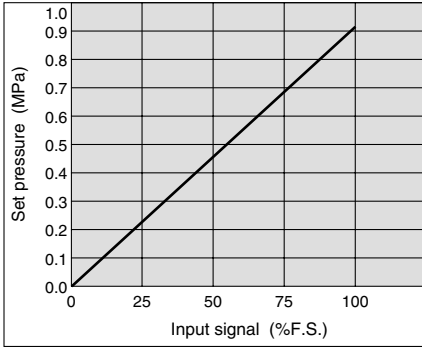
Relief flow characteristics Supply pressure: 0.7 MPa



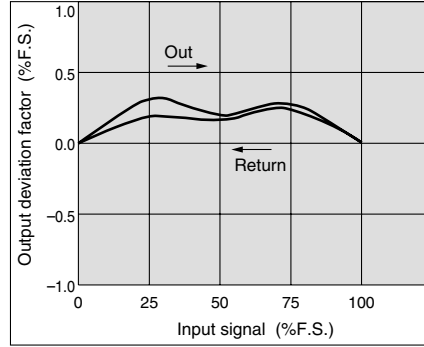
Series ITV1000/2000/3000

Series ITV105

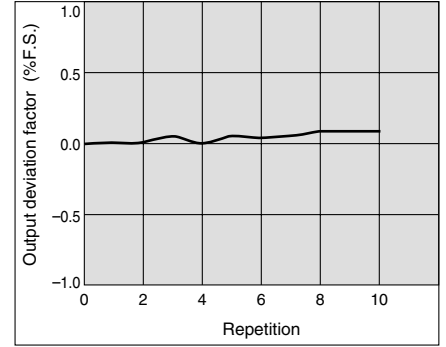
Linearity



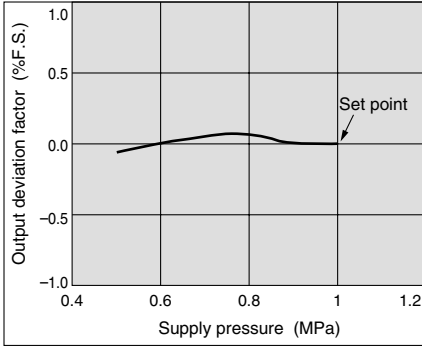
Hysteresis



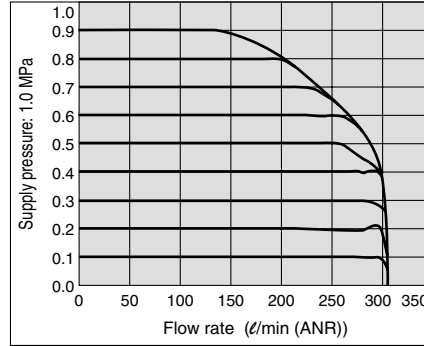
Repeatability



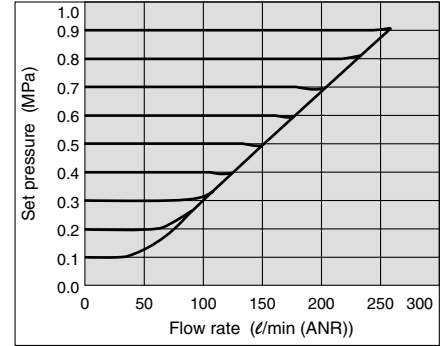
Pressure characteristics Set pressure: 0.4 MPa



Flow characteristics Supply pressure: 1.0 MPa

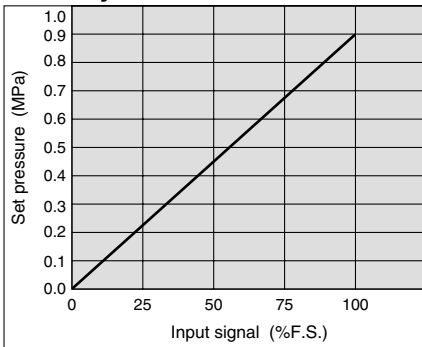


Relief flow characteristics Supply pressure: 1.0 MPa

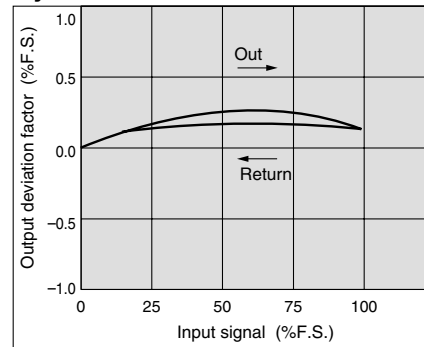


Series ITV205

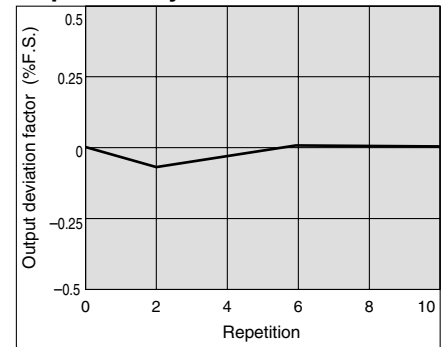
Linearity



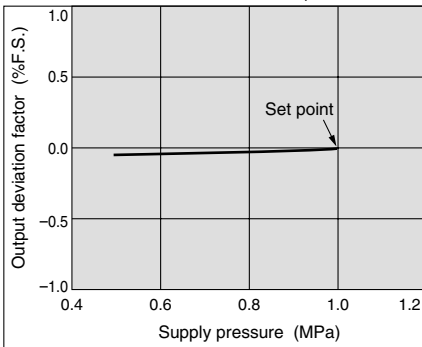
Hysteresis



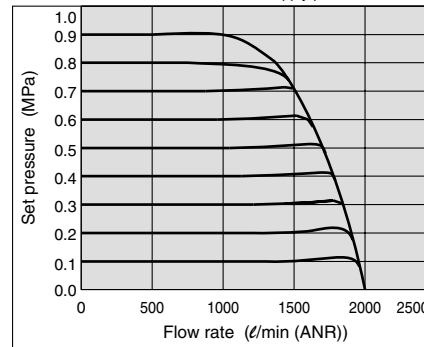
Repeatability



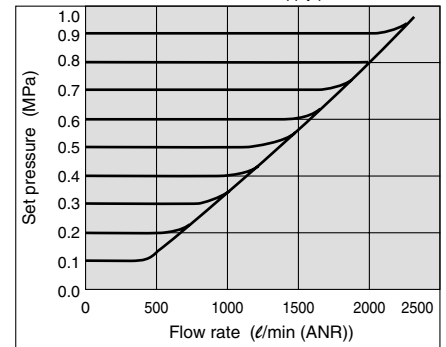
Pressure characteristics Set pressure: 0.4 MPa



Flow characteristics Supply pressure: 1.0 MPa

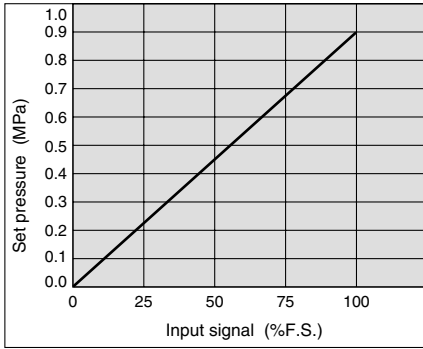


Relief flow characteristics Supply pressure: 1.0 MPa

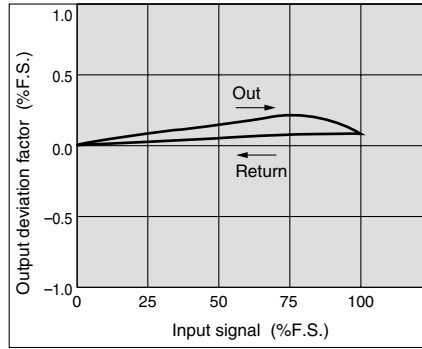


Series ITV305

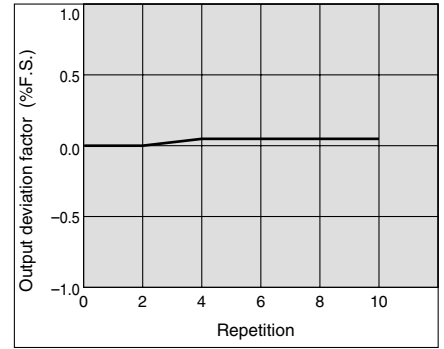
Linearity



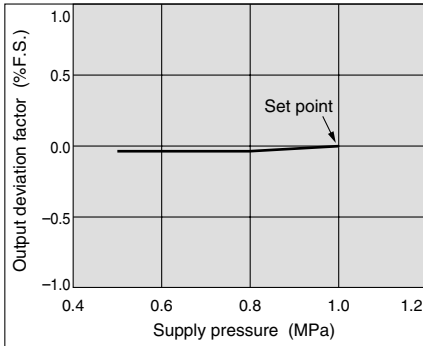
Hysteresis



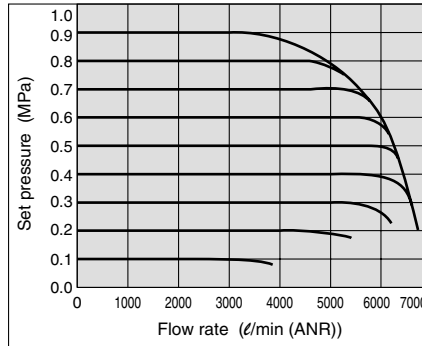
Repeatability



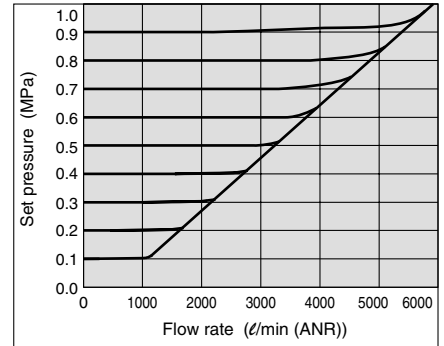
Pressure characteristics Set pressure: 0.4 MPa



Flow characteristics Supply pressure: 1.0 MPa



Relief flow characteristics Supply pressure: 1.0 MPa

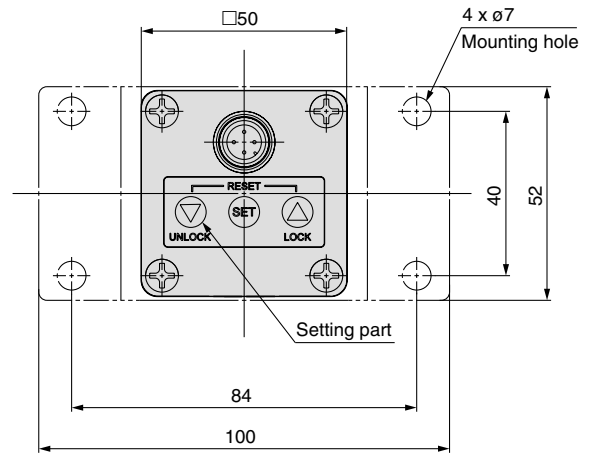
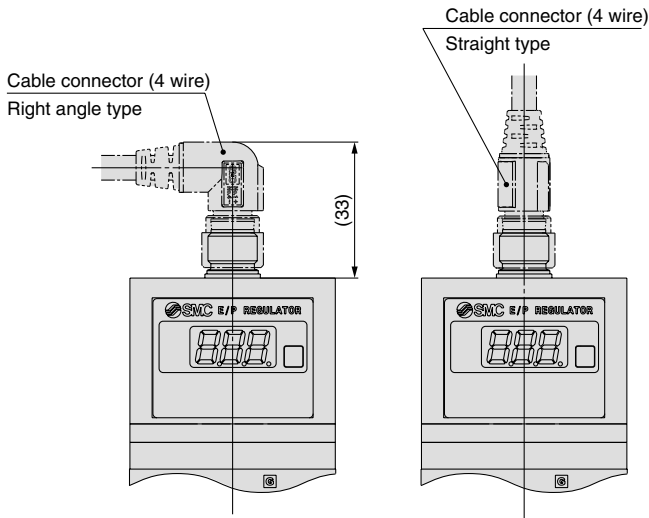
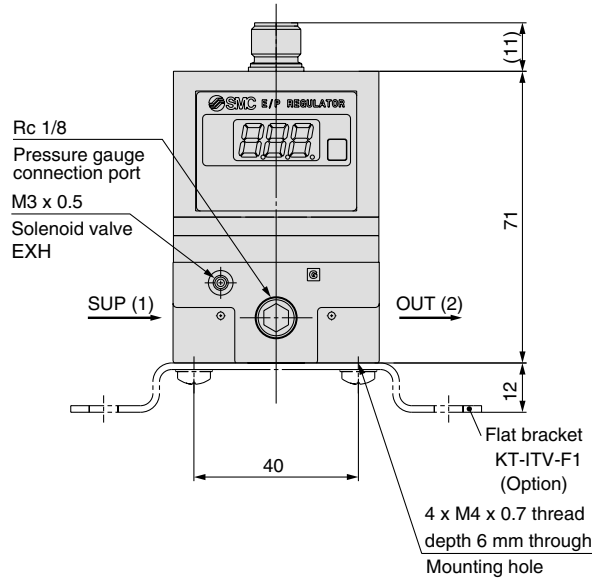
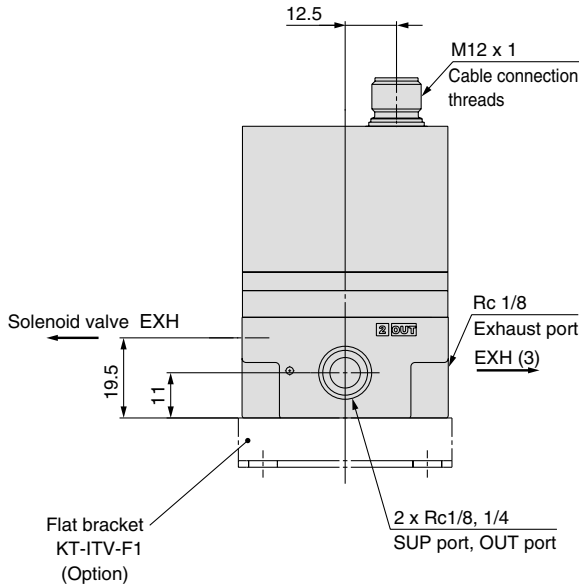


Series ITV1000/2000/3000

Dimensions

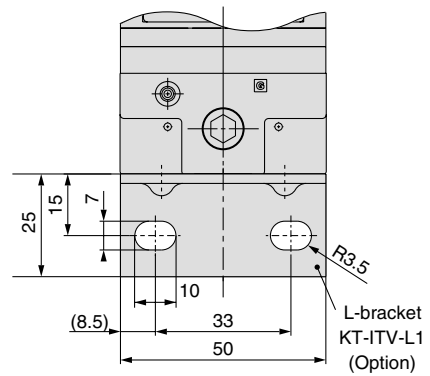
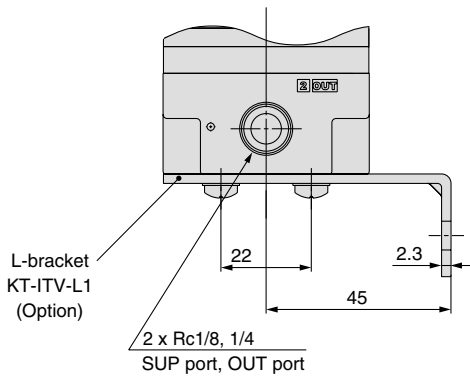
ITV10□□

Flat bracket



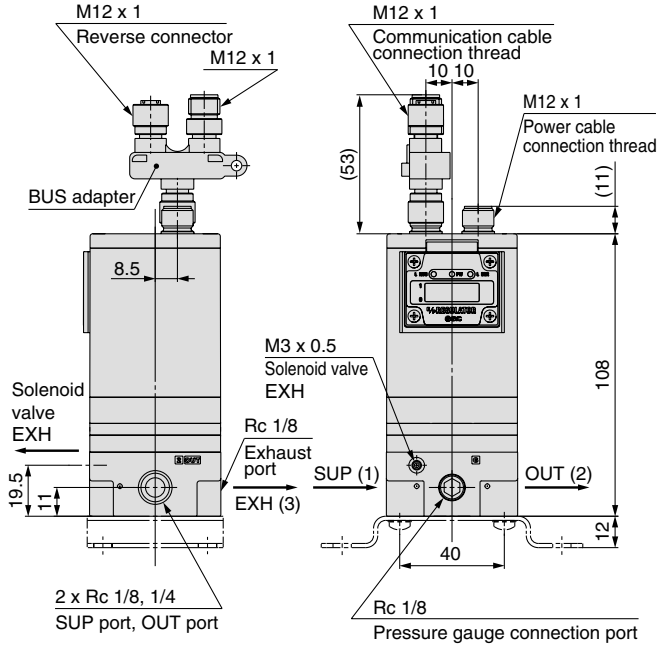
Note) Do not attempt to rotate, as the cable connector does not turn.

L-bracket



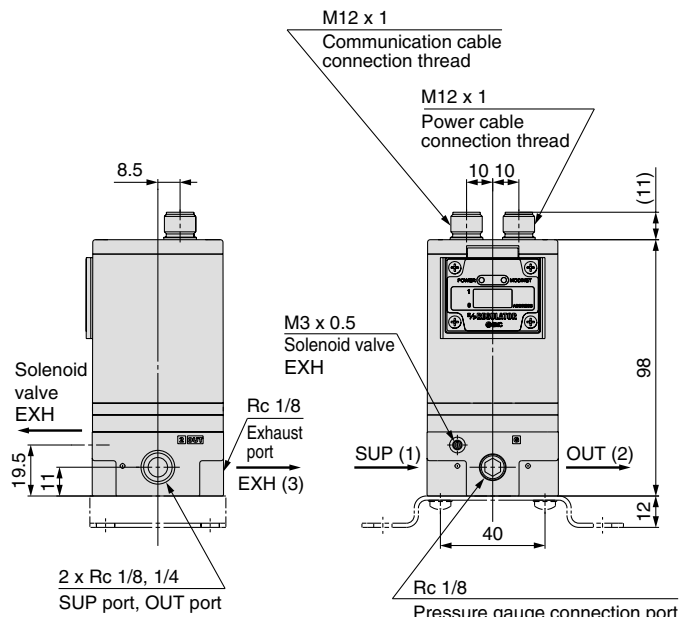
Dimensions (CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)

CC-Link/ITV10□0-CC



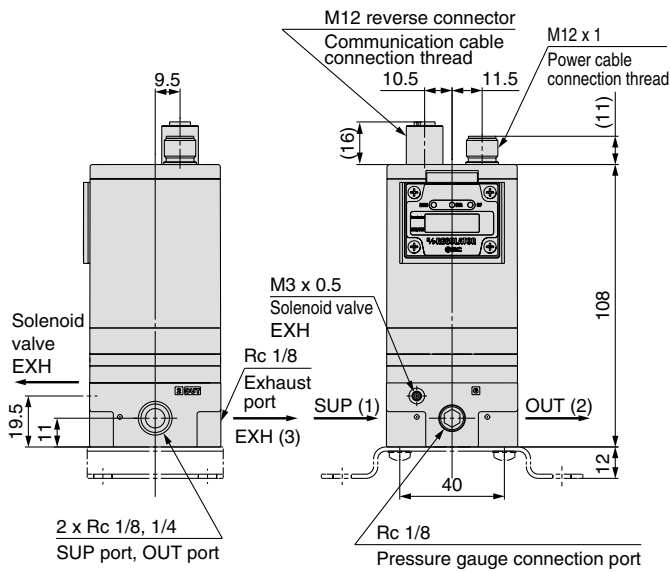
* Dimensions not shown are as on P.19.

DeviceNet™/ITV10□0-DN



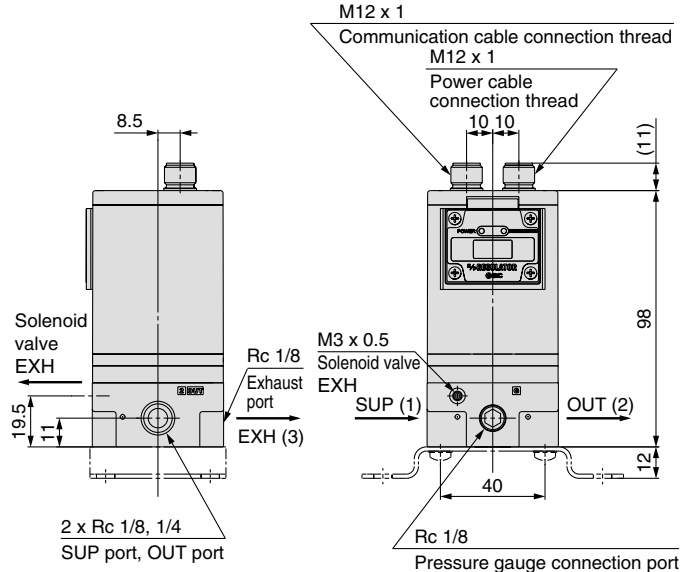
* Dimensions not shown are as on P.19.

PROFIBUS DP/ITV10□0-PR



* Dimensions not shown are as on P.19.

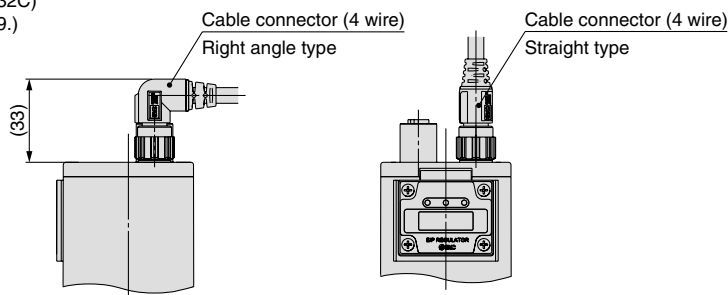
RS-232C/ITV10□0-RC



* Dimensions not shown are as on P.19.

With power cable connector * ITV10□0-CC, DN, PR, RC common dimensions

Note) Communication cable (other than RS-232C) should be obtained separately. (See P.9.)



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

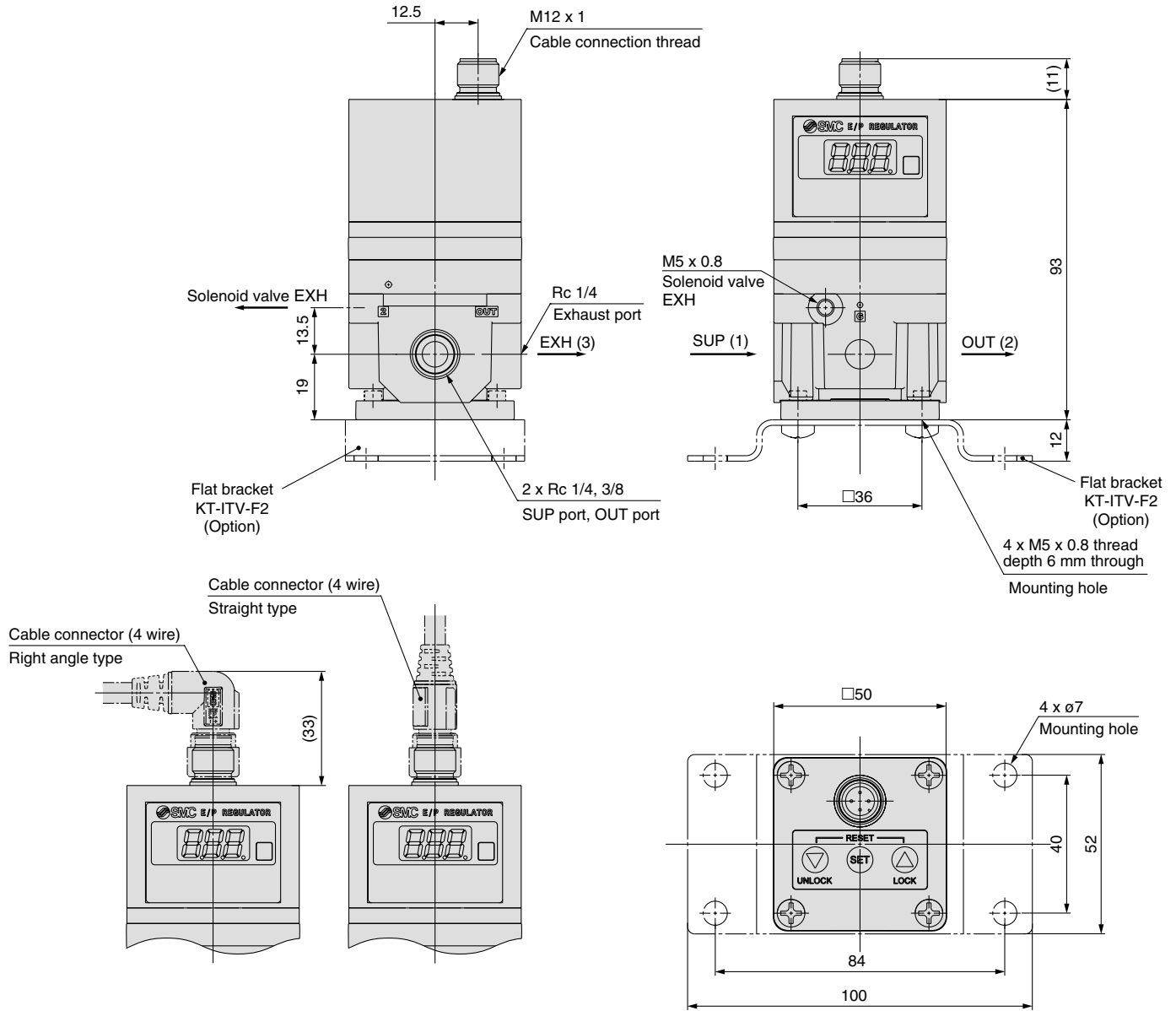
Series ITV1000/2000/3000

Dimensions

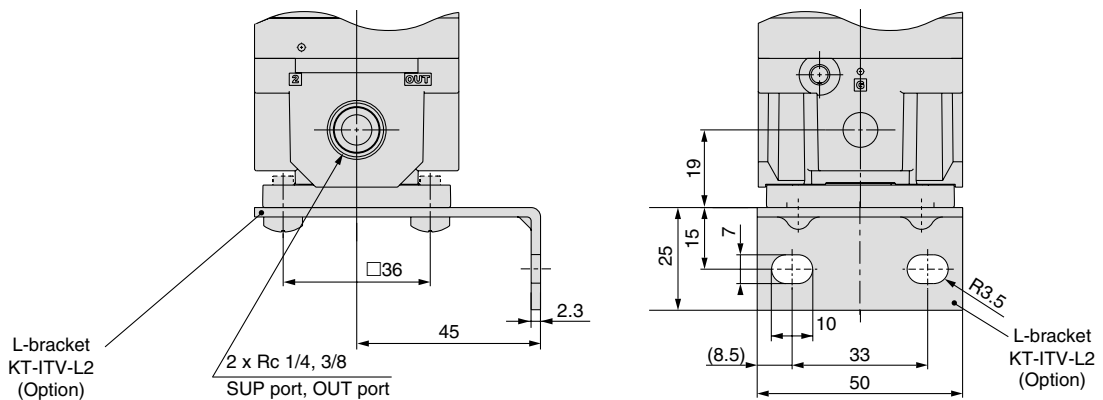
ITV20□□

Flat bracket

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

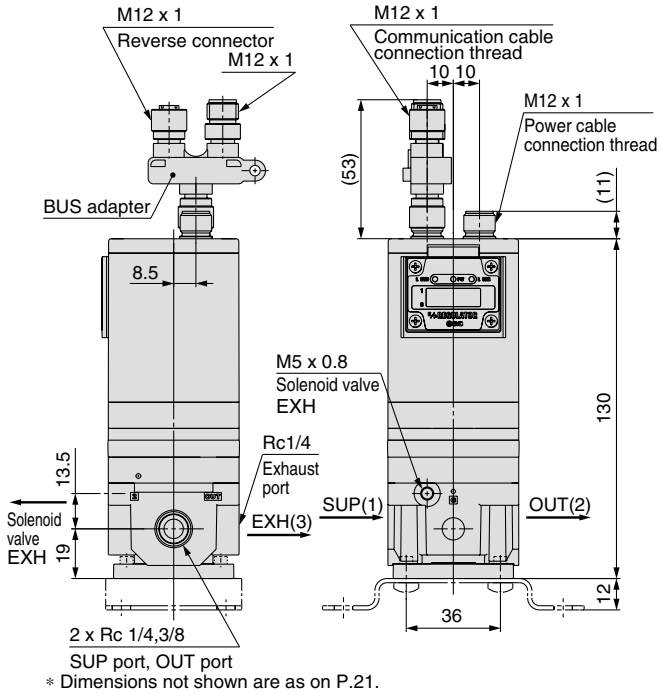


L-bracket

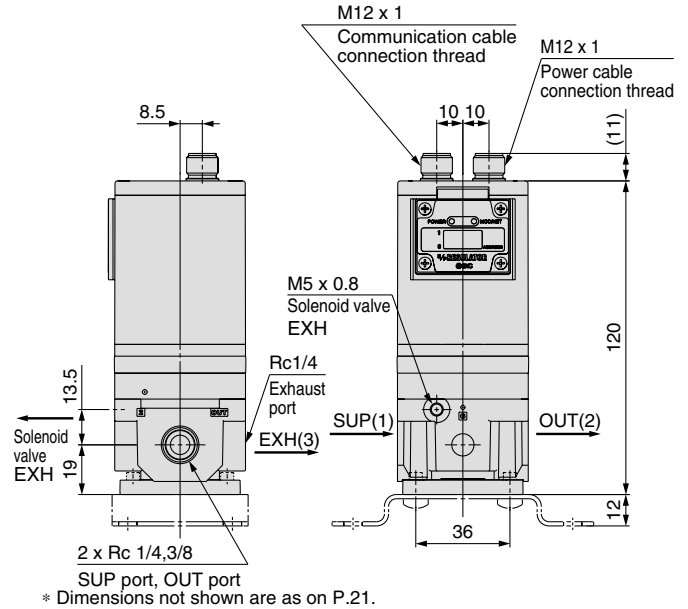


Dimensions (CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)

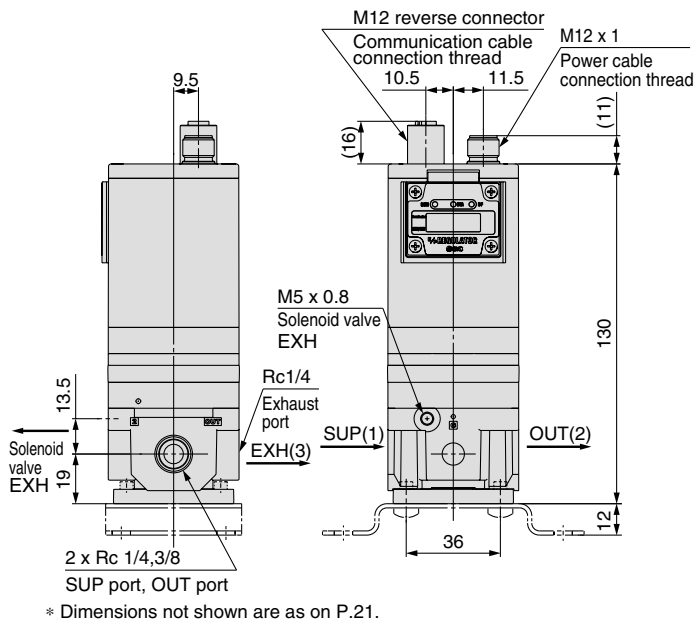
CC-Link/ITV20□0-CC



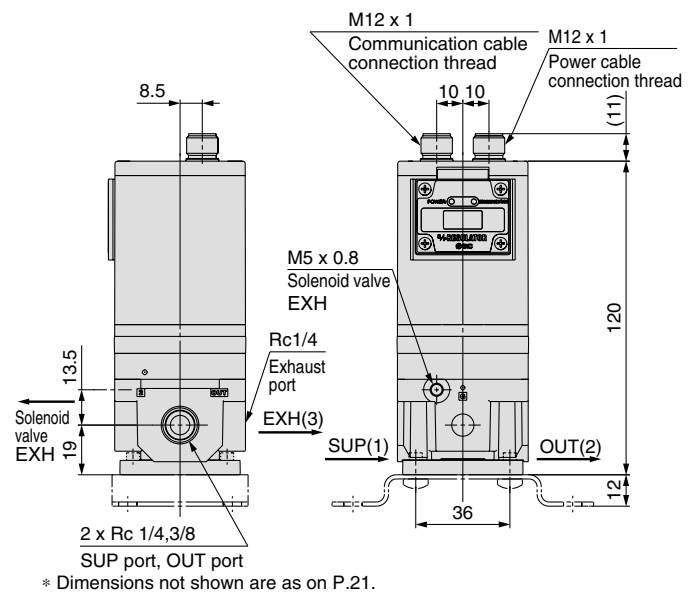
DeviceNet™/ITV20□0-DN



PROFIBUS DP/ITV20□0-PR

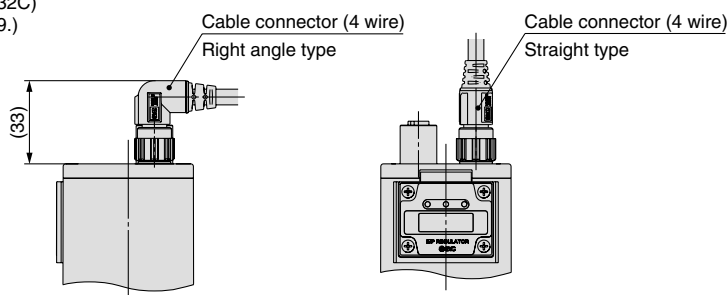


RS-232C/ITV20□0-RC



With power cable connector * ITV20□0-CC, DN, PR, RC common dimensions

Note) Communication cable (other than RS-232C) should be obtained separately. (See P.9.)



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

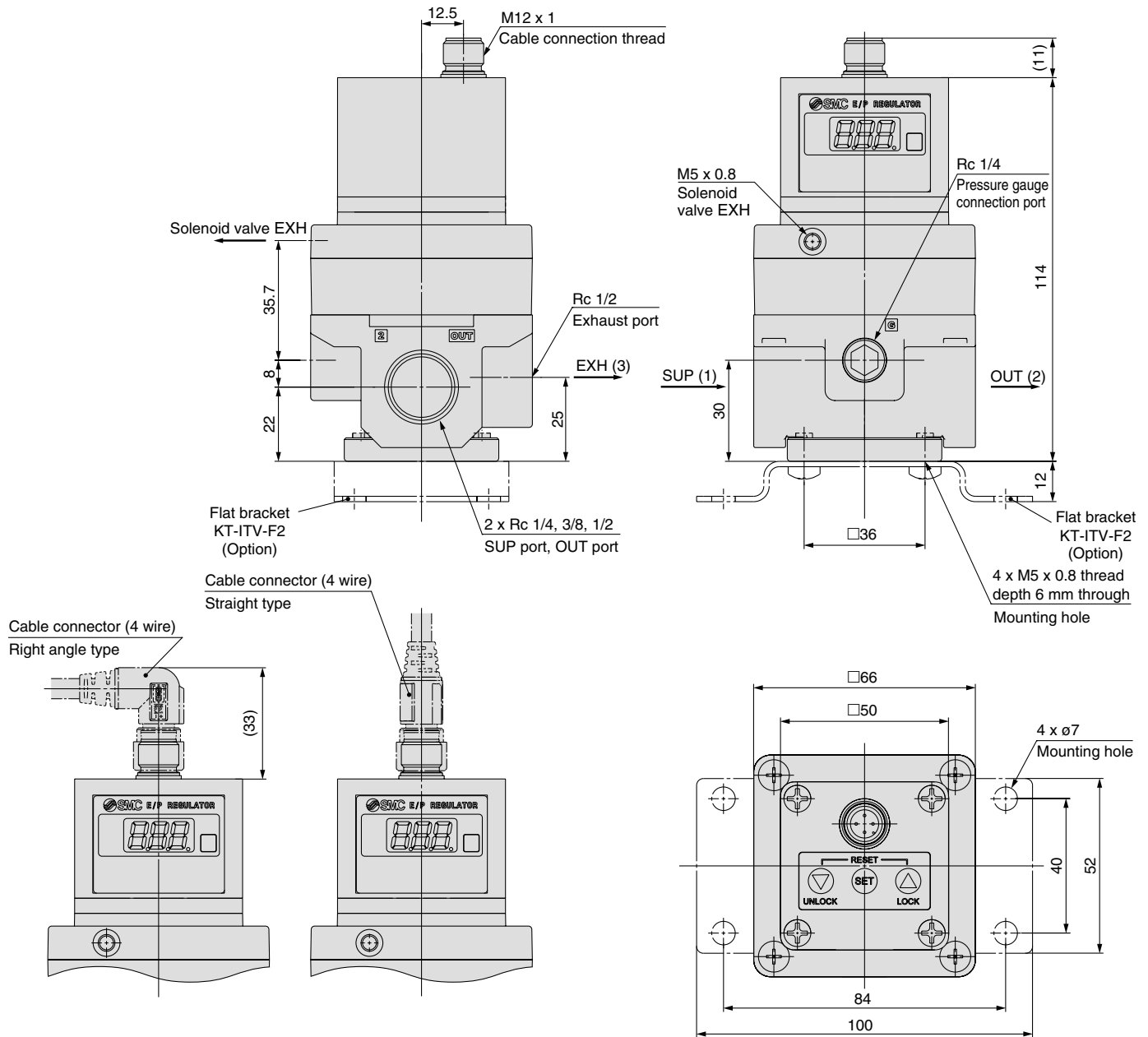
Series ITV1000/2000/3000

Dimensions

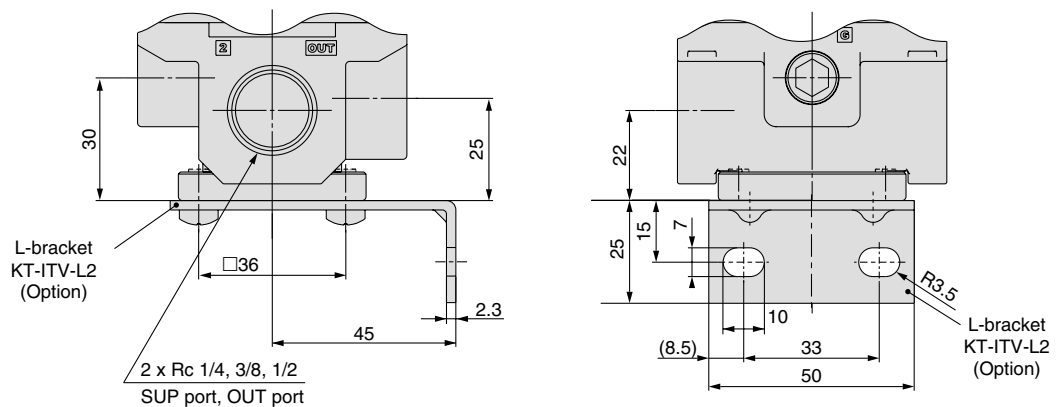
ITV30□□

Flat bracket

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

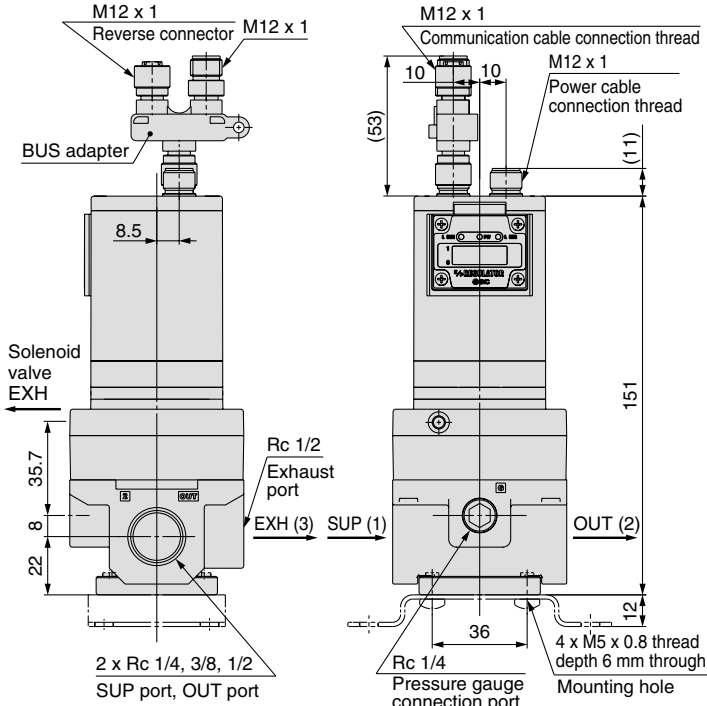


L-bracket



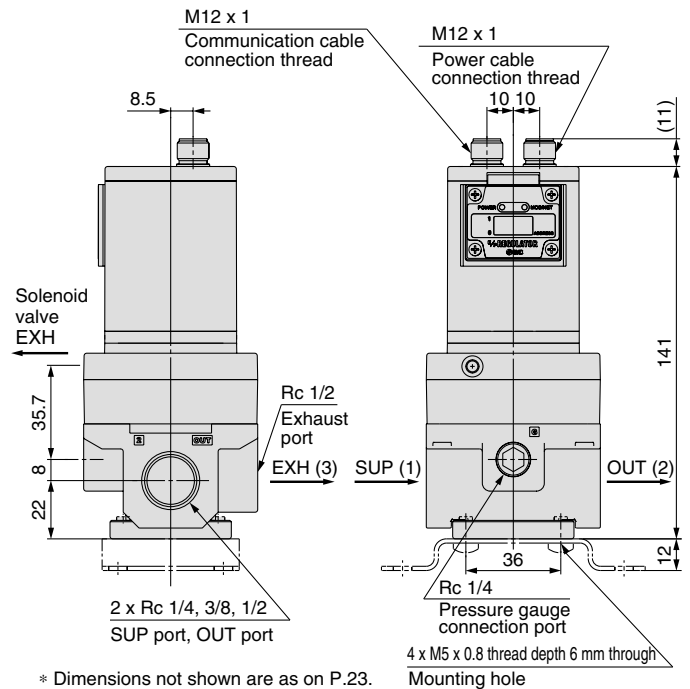
Dimensions (CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)

CC-Link/ITV30□-CC



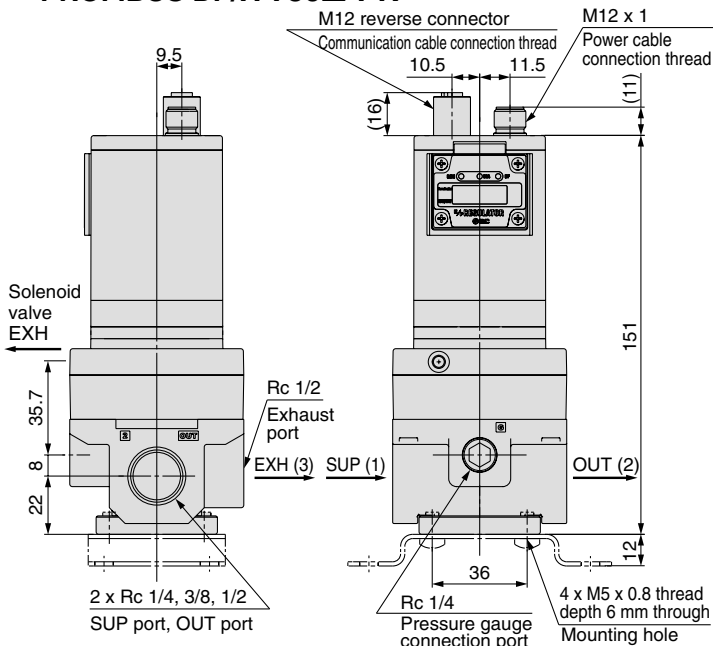
* Dimensions not shown are as on P.23.

DeviceNet™/ITV30□-DN



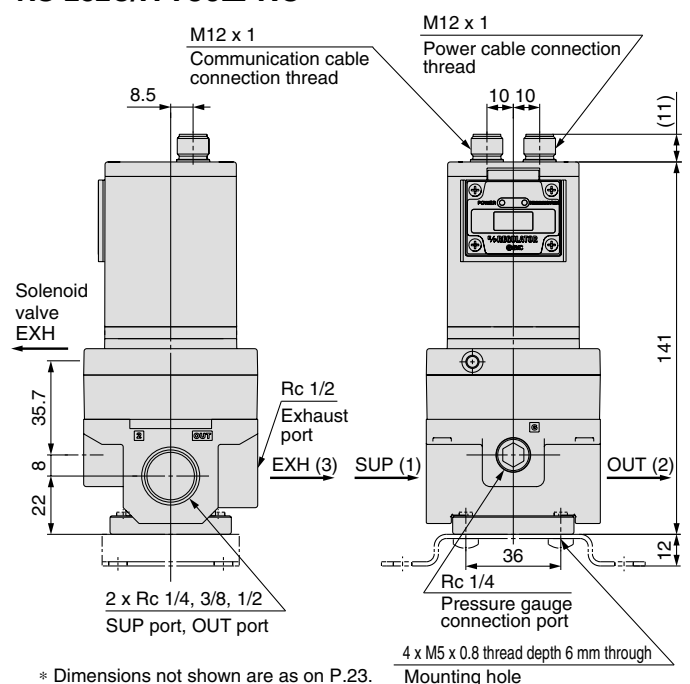
* Dimensions not shown are as on P.23.

PROFIBUS DP/ITV30□-PR



* Dimensions not shown are as on P.23.

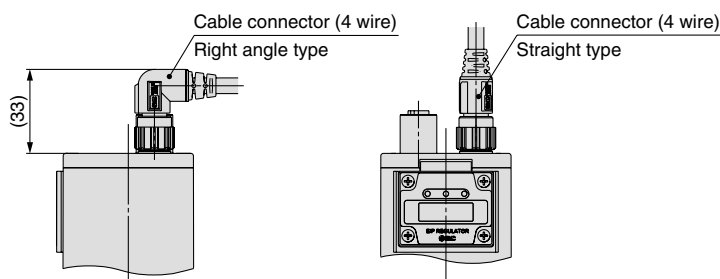
RS-232C/ITV30□-RC



* Dimensions not shown are as on P.23.

With power cable connector

* ITV30□-
CC
DN
PR
RC
common dimensions



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

Series ITV1000/2000/3000 Made to Order Specifications 1



Contact SMC regarding detailed dimensions, specifications and delivery times.

1 16 Points Preset Input Type

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

ITV10 0 - 4 $\frac{2}{3}$ - X156

ITV20 0 - 4 $\frac{2}{3}$ - X156

ITV30 0 - 4 $\frac{2}{3}$ - X156

Note 1) in part number is the same model no. for the standard products. ● 16 points preset type

Note 2) Monitor output is switch output type only. This cannot be selected for types without a monitor output or with analogue output.

Note 3) Values can be adjusted starting from the minimum output pressure display units.

MPa	kgf/cm ²	bar	psi	kPa
0.01	0.01	0.01	0.1	1

* 130 psi type: 1 psi

2 Digital Input Type

Parallel input type with digital 10 bit.

ITV10 0 - 4 0 S N - X157

ITV20 0 - 4 0 S N - X157

ITV30 0 - 4 0 S N - X157

Digital input type ●

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

Note 2) Right angle type cable connectors cannot be selected.

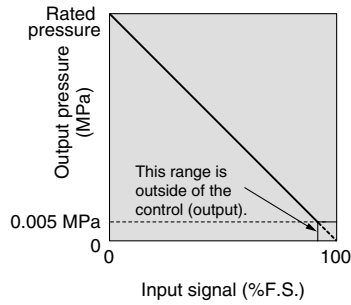
3 Reverse Type

In compliance with the input, inverse proportional pressure is displayed.

ITV10 - - X321

ITV20 - - X321

ITV30 - - X321



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.

4 High Pressure Type (SUP 1.2 MPa, OUT 1.0 MPa)

ITV10 5 - - X322

ITV20 5 - - X322

ITV30 5 - - X322

High pressure type (SUP 1.2 MPa, OUT 1.0 MPa) ●

5 Set Pressure Range 1 to 100 kPa

ITV10 1 - - X323

ITV20 1 - - X323

Set pressure range 1 to 100 kPa ●

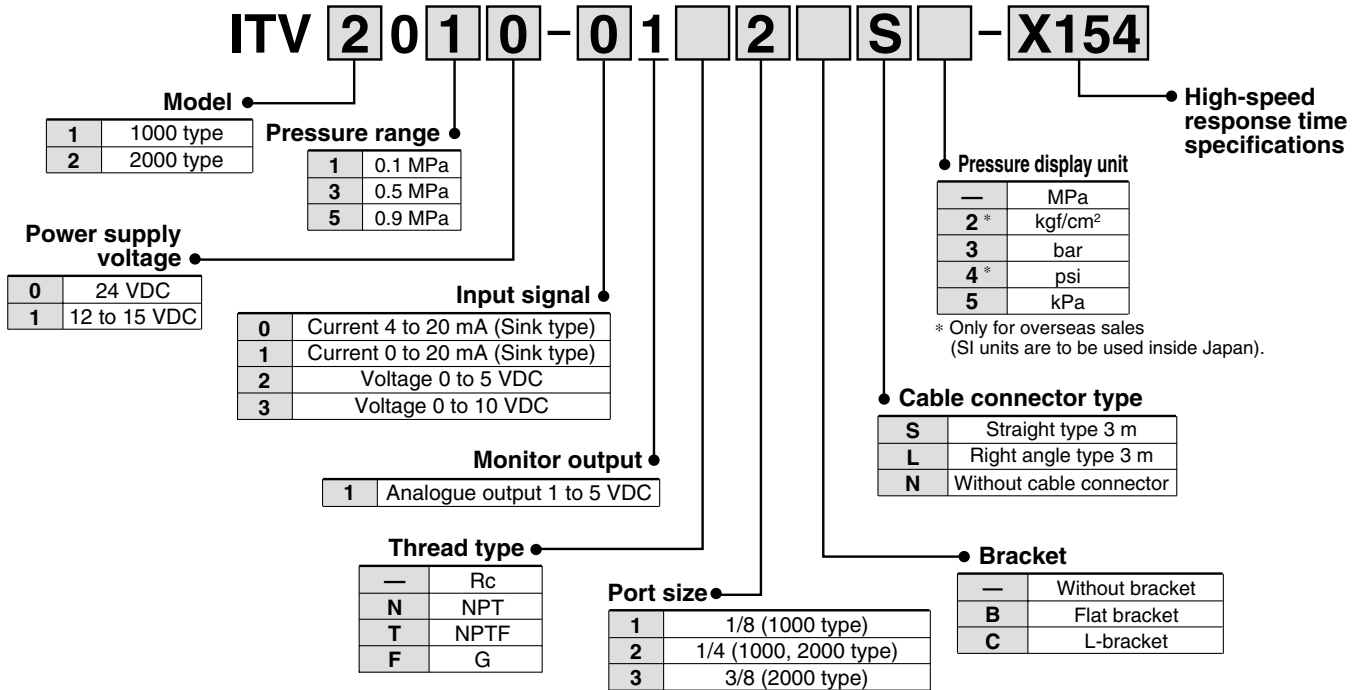
Series ITV1000/2000/3000 Made to Order Specifications 2



Contact SMC regarding detailed dimensions, specifications and delivery times.

6 High-Speed Response Time Type

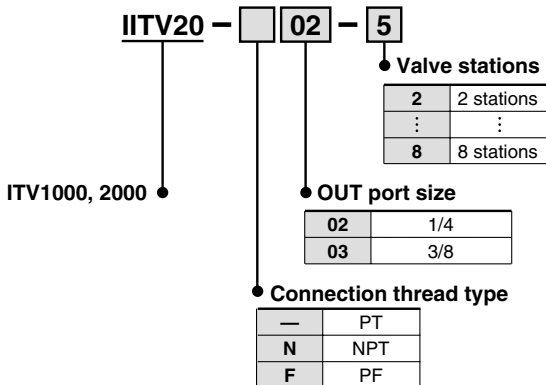
Pressure response with no load is approx. 0.1 sec.



7 Manifold Specifications (Except Series ITV3000)

2 through 8 station manifold.

How to Order Manifolds



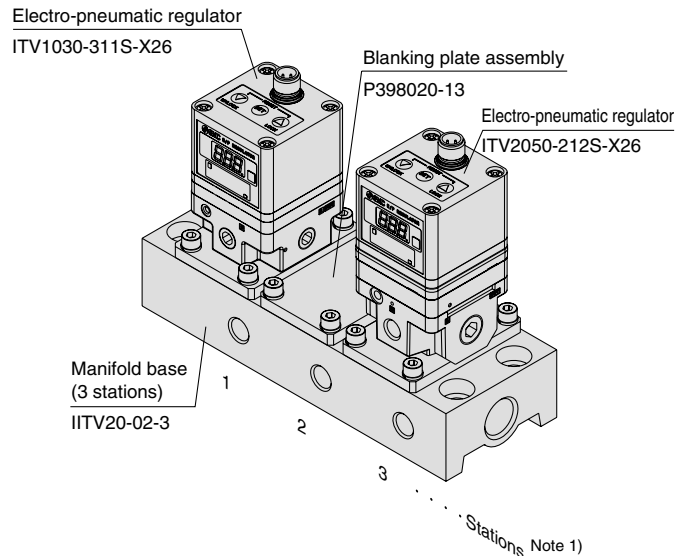
IITV20-02-31 set (3 station manifold base part no.)
 *ITV1030-311S-X261 set (Electro-pneumatic regulator part no.) Note 2)
 *P398020-131 set (Blanking plate assembly part no.)
 *ITV2050-212S-X261 set (Electro-pneumatic regulator part no.) Note 2)
 ↳ The * is the symbol for mounting. Add the * symbol 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 Assemblies

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 Rc 1/8 (ITV1000), Rc 1/4 (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.



Safety Instructions

Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.^{Note 2)}
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

Note 2) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.



Series ITV0000/1000/2000/3000 Specific Product Precautions 1

Be sure to read before handling. Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Common Precautions.

Series ITV0000/009 Precautions

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.

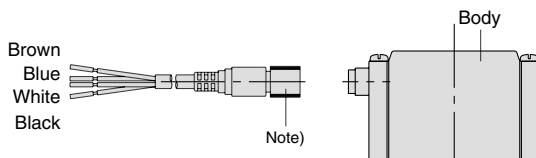
For details on the above compressed air quality, refer to SMC's "Air Preparation Systems".

Wiring

⚠ Caution

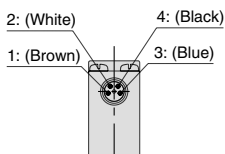
Connect the cable to the connector on the body with the wiring arranged as shown below. Proceed carefully, as incorrect wiring can cause damage.

Further, use DC power with sufficient capacity and a low ripple.



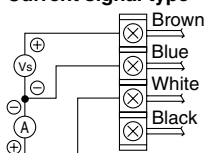
Terminal No.	1	2	3	4
Lead wire colour	Brown	White	Blue	Black
Wiring	Power	Signal	COM	Monitor

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



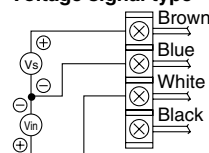
Wiring Diagrams

Current signal type



Vs: Power Supply 24 V DC ±10%
12 to 15 V DC
A : Input signals 4 to 20 mA DC
0 to 20 mA DC

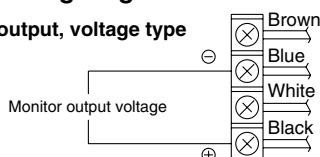
Voltage signal type



Vs : Power Supply 24 V DC ±10%
12 to 15 V DC
Vin: Input signals 0 to 5 V DC
0 to 10 V DC

Monitor output wiring diagram

Analogue output, voltage type



Handling

⚠ Caution

1. Do not use a lubricator on the supply side of this product, as this can cause malfunction. When lubrication of the 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.
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.

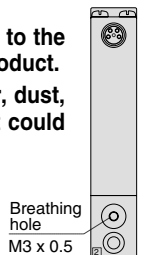
5. This product is adjusted for each specification at the time of shipment from the factory. Avoid careless disassembly or removal of parts, as this can lead to malfunction.
6. The optional cable connector is a 4 wire type. When the monitor output (analogue output or switch output) is not being used, keep it from touching the other wires as this can cause malfunction.
7. Please note that the right angle cable does not rotate and is limited to only one entry direction.
8. 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 or static electricity, 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.).

9. The product characteristics are confined to the static state. The pressure may not reach the set pressure and the life of the product may extremely be shortened with buzzing of the solenoid valve when air is consumed on the output side, especially when it is used with a system which has a large amount of leakage.

10. For details on the handling of this product, refer to the instruction manual which is included with the product.

11. In locations where the body is exposed to water, dust, etc., there is a possibility that moisture or dust could enter the body through the breathing hole.

Mount a fitting and tube (M-3AU-3 fitting and TIU01m-mm tube recommended) onto the breathing hole and run the tube to a location not exposed to moisture or dust, etc.



12. If this product will be used in a sealed environment, such as inside an inspection box, a ventilation fan should be installed to ensure adequate ventilation as this product can generate heat in some operating conditions.

When the power is turned on, a noise may be generated as a means of checking the operating condition of the solenoid valve. This noise is normal and does not indicate a fault.



Series ITV0000/1000/2000/3000 Specific Product Precautions 2

Be sure to read before handling. Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Common Precautions.

Series ITV1000/2000/3000/209 □ Precautions

Piping

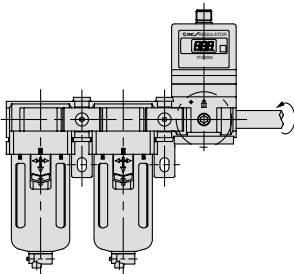
⚠ Warning

1. Screw piping together with the recommended proper torque while holding the side that has female threads.

Looseness or faulty sealing will occur if tightening torque is insufficient, while thread damage will result if the torque is excessive. Furthermore, if the side with the female threads is not held while tightening, excessive force will be applied directly to the piping brackets, etc. causing damage or other problems.

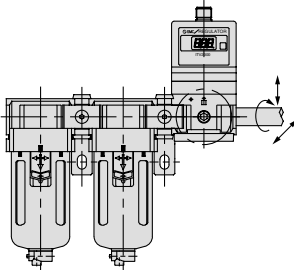
Recommended proper torque: N · m

Connection thread	1/8	1/4	3/8	1/2
Torque	7 to 9	12 to 14	22 to 24	28 to 30



2. Do not allow twisting or bending moment to be applied other than the weight of the equipment itself.

Provide separate support for external piping, as damage may otherwise occur.



3. Since excessive moment loads and the propagation of vibrations, etc. can easily result from inflexible piping made of materials such as steel, avoid these problems by using flexible tubing for intermediate connections.

⚠ Caution

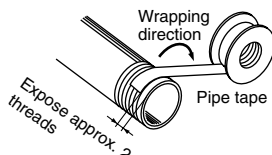
1. Preparation before piping

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. Wrapping of pipe tape

When screwing together pipes and fittings, etc., be sure that chips from the pipe threads and sealing material do not get inside the piping.

Also, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



Operating Environment

⚠ Warning

1. Do not operate in locations having an atmosphere of corrosive gases, chemicals, sea water, or where there will be contact with them.
2. Do not operate in locations where vibration or impact occurs.

⚠ Caution

1. In locations where the body is exposed to water, steam, dust, etc., there is a possibility that moisture or dust could enter the body through the EXH (solenoid) ports, thereby causing problems.
2. To overcome this, simply install tubing to each port, using the fittings, and extend the tubing so that the other end is at a location where no water splash, etc. occurs. Make sure not to bend, or block the I.D. of the tubing as this will have a detrimental effect on the pressure control.
3. Do not operate in locations where vibration or impact occurs.
4. In locations which receive direct sunlight, provide a protective cover, etc.
5. In locations near heat sources, block off any radiated heat.
6. In locations where there is contact with spatter from water, oil or solder etc., implement suitable protective measures.

Air Supply

⚠ Warning

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

⚠ 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 SMC's "Air Preparation Systems".



Series ITV0000/1000/2000/3000

Specific Product Precautions 3

Be sure to read before handling. Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Common Precautions.

Series ITV1000/2000/3000/209 □ Precautions

Handling

⚠ Caution

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- The optional cable connector is a 4 wire type. When the monitor output (analogue output or switch output) is not being used, keep it from touching the other wires as this can cause malfunction.
- Please note that the right angle cable does not rotate and is limited to only one entry direction.
- Take the following steps to avoid malfunction due to noise.
 - Remove power supply noise during operation by installing a line filter, etc. in the AC power line.
 - For avoiding the influence of noise or static electricity, install this product and its wiring as far as possible from strong electric fields such as those of motors and power lines, etc.
 - Be sure to implement protective measures against load surge for induction loads (solenoid valves, relays, etc.).

Handling

⚠ Caution

- 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 Rc 1/8, Rc 1/4 and Rc 1/2.
- Specifications on page 10 is in case of static environment. Pressure may fluctuate when air is consumed at the output side.
- For details on the handling of this product, refer to the instruction manual which is included with the product.

Design and Selection

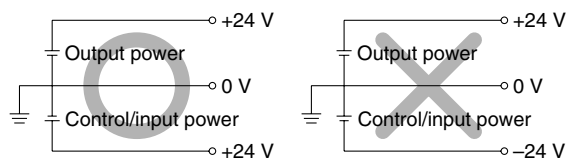
⚠ Caution

- The direct-current power supply to combine should be UL authorized power supply.
 - Limited voltage current circuit in accordance with UL 508. A circuit in which power is supplied by the secondary coil of a transformer that meets the following conditions.
 - Maximum voltage (with no load):
30 Vrms (42.4 V peak) or less
 - Maximum current:
(1) 8 A or less (including when short circuited)
(2) limited by circuit protector (such as fuse) with the following ratings.

No load voltage (V peak)	Max. current rating
0 to 20 [V]	5.0
Above 20 to 30 [V]	100 Peak voltage

- A circuit using max. 30 Vrms or less (42.4 V peak), which is powered by UL1310 or UL1585 compatible Class-2 power supply.

- Operate these products only within the specified voltage.
Using voltages beyond the specified levels could cause faults or malfunctions.
- Use 0 V as the baseline for the power supplied to the unit for output, control and input.





Series ITV0000/1000/2000/3000 Specific Product Precautions 4

Be sure to read before handling. Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Common Precautions.

Series ITV1000/2000/3000/209□ Precautions

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.

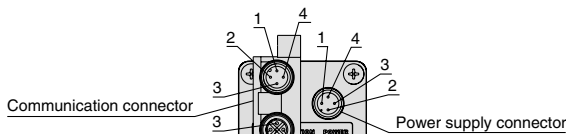


Current Signal Type Voltage Signal Type

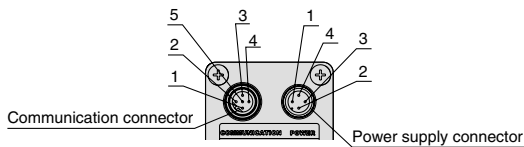
1	Brown	Power supply
2	White	Input signal
3	Blue	GND (COMMON)
4	Black	Monitor output

Preset Input Type

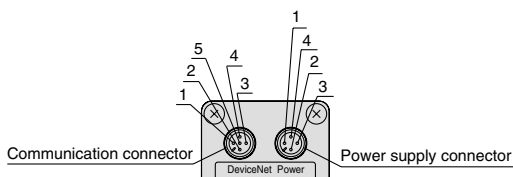
1	Brown	Power supply
2	White	Input signal 1
3	Blue	GND (COMMON)
4	Black	Input signal 2



CC-Link



PROFIBUS DP



DeviceNet™, RS-232C

IN/OUT communication connector				
Pin No.	CC-Link	DeviceNet™	PROFIBUS DP	RS-232C
1	SLD	DRAIN	NC	NC
2	DB	V+	RxD/TxD-N	TxD
3	DG	V-	NC	RxD
4	DA	CAN_H	RxD/TxD-P	GND
5	NC	CAN_L	NC	NC

Power supply connector				
Pin No.	CC-Link	DeviceNet™	PROFIBUS DP	RS-232C
1	Vcc	Vcc	Vcc	Vcc
2	FG	No connection	NC	NC
3	GND	GND	GND	GND
4	NC	No connection	NC	FG

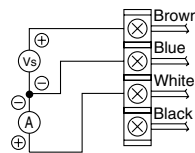
Note) The cable is also available in a right-angle type. A right-angle type connector is attached facing left (towards the SUP port). On communication models, the connector faces backwards (towards the EXH port). Do not attempt to rotate, as the connector does not turn.

Trademark Information

DeviceNet™ is a trademark of ODVA.

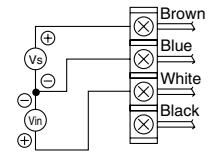
Wiring diagram

Current signal type



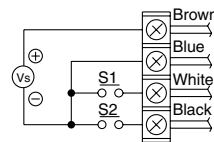
Vs : Power supply 24 VDC
12 to 15 VDC
A : Input signal 4 to 20 mADC
0 to 20 mADC

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.

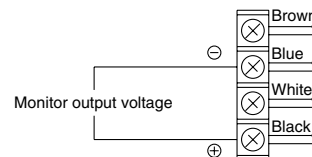
* Preset pressures are set based on the minimum unit for output display.

MPa	kgf/cm ²	bar	psi	kPa
0.01	0.01	0.01	0.1	1

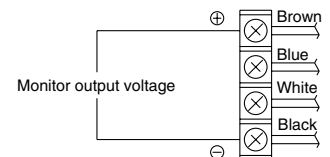
· Note that this is 1 psi for 130-psi types.

Monitor output wiring diagram

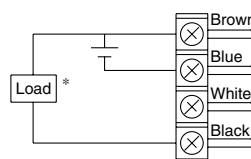
Analogue output: Voltage type



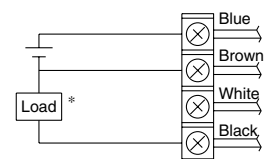
Analogue output: Current type (Sink type)



Switch output: NPN type



Switch output: PNP type



* When 30 mADC or more is applied, detecting device for overcurrent starts activating and then emits an error signal. (Error number "5")



Series ITV0000/1000/2000/3000 Specific Product Precautions 5

Be sure to read before handling. Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Common Precautions.

Series ITV1000/2000/3000/209□ Precautions

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□	ITV209□
MPa	0.005 to 0.1	0.005 to 0.5	0.005 to 0.9	—
kgf/cm ²	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	-1.3 to -80

CE Mark

In case that a CE marked ITV (including a special product) is used with a cable which is purchased separately, mount a ferrite core to the cable if it is necessary according to the table below.

ITV0000 series

Model	Ferrite core	Recommended power cable part No.
ITV0000-□□-Q	Not necessary	M8-4DSX3MG4 (Straight type) ELWIKA-KV4408 PVC025 2M (Right angle type)

ITV1000/2000/3000 series

Model	Ferrite core	Recommended power cable part No.
ITV□□-□□-Q	Necessary	P398010-12 (Straight type) (With ferrite core) P398010-13 (Right angle type) (With ferrite core)
ITV□□-CC□-Q	Not necessary	P398020-500-3 (Straight type) P398020-501-3 (Right angle type)
ITV□□-DN□-Q	Necessary (Ferrite core is attached to the body)	P398020-504-3 (Straight type) P398020-505-3 (Right angle type)
ITV□□-PR□-Q ITV□□-RC□-Q	Necessary (Ferrite core is attached to the body)	P398020-500-3 (Straight type) P398020-501-3 (Right angle type)

(Note) Length of the recommended cable is 3m (however, ELWIKA-KV4408 PVC025 2M is 2 metres. Consult SMC for length of other cables)



Series ITV0000/1000/2000/3000

Specific Product Precautions 6

Be sure to read before handling. Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Common Precautions.

Series ITV009□/209□ Precautions

Handling

Caution

1. Connect the vacuum pump to the port, which is labeled "VAC".
2. Pressure adjustment changes from "atmospheric pressure to vacuum pressure" when the input signal is increased, and from "vacuum pressure to atmospheric pressure" when the input signal is decreased.
3. When adjusting the vacuum pressure, be careful not to block the atmospheric pressure inlet port labeled "ATM".
4. Since this product is designed exclusively for use with negative pressure, be careful not to apply positive pressure in error.
5. In cases where the vacuum pump being used has a relatively small capacity, or the piping has a small inside diameter, etc., large variations in the set pressure (the range of pressure variation when changing from no flow to flow state) may appear. In this situation, the vacuum pump or the piping, etc. should be changed. In cases where it is not practical to change the vacuum pump, install a capacity tank (volume depending on the operating conditions) on the VAC side.
6. The vacuum pressure response time after a change in the input signal is influenced by the internal volume on the setting side (including piping). Since the capacity of the vacuum pump also influences the response time, give careful consideration to these points before operation.
7. If the electric power is shut off when in a control state, the pressure on the setting side will go into a holding condition. However, this setting side pressure will be held only temporarily and is not guaranteed. In addition, when atmospheric pressure is desired, shut off the power after reducing the set pressure, and then introduce atmospheric pressure by using a vacuum release valve, etc.
8. If the power for this product is cut off by a power failure, etc. when it is in a controlled state, the setting side pressure will be held temporarily. Further, if operated without sealing the setting side so that atmospheric air is sucked in, handle with care as air will continue to be sucked in.
9. If the VAC side pressure to this product is interrupted while the power is still on, the internal solenoid valve will continue to operate and may cause a humming noise. Since this may shorten the life of the product, be sure to shut off the power when the VAC side pressure is shut off.
10. The setting side pressure cannot be completely released from this product in the range below -1.3 kPa. In cases where the pressure needs to be reduced completely to 0 kPa, install a 3 port valve, etc. on the setting side to discharge the residual pressure.
11. This product is adjusted for each specification at the factory before shipment. Avoid careless disassembly or removal of parts, as this can cause failure.
12. The optional cable connector is a 4-wire type. When the monitor output (analog output, switch output) is not being used, keep it from touching the other wires, as this can cause malfunction.
13. Use caution that the right angle cable does not rotate and is limited to only one entry direction.
14. Take the following steps to avoid malfunction due to noise.
 - 1) Eliminate power supply noise during operation by installing a line filter, etc. in the AC power line.
 - 2) For avoiding the influence of noise or static electricity, install this product and its wiring as far as possible from strong electric fields such as those of motors and power lines, etc.
 - 3) Make sure to take protective measures against load surge for an induction load (solenoid valves, relays, etc.).
15. Refer to the instruction manual included with the product for details on its handling.


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