

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

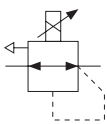
For communication cables, use the parts listed below (refer to the catalogue [M8/M12 Connector] CAT.EUS100-73-UK for details) or order the product certified for the respective protocol (with M12 connector) separately.

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)	

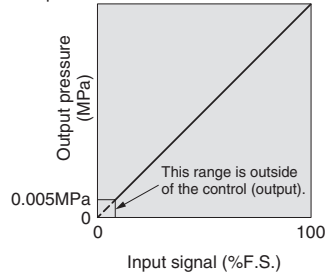
Electro-Pneumatic Regulator *Series ITV1000/2000/3000*



JIS Symbol



Rated pressure



Input/output characteristics chart

Standard Specifications

Model	ITV101□ ^{Note 10)}		ITV103□ ^{Note 10)}	ITV105□ ^{Note 10)}
	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□□□0-CC	ITV□□□0-DN	ITV□□□0-PR	ITV□□□0-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)	—

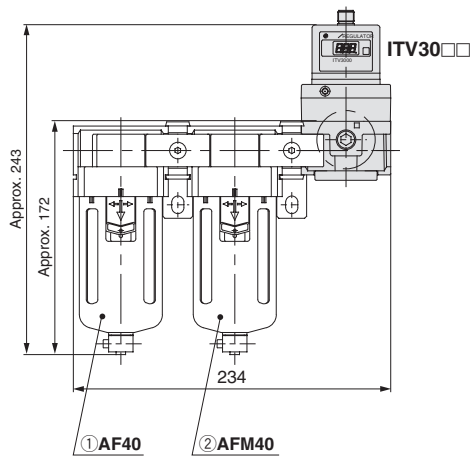
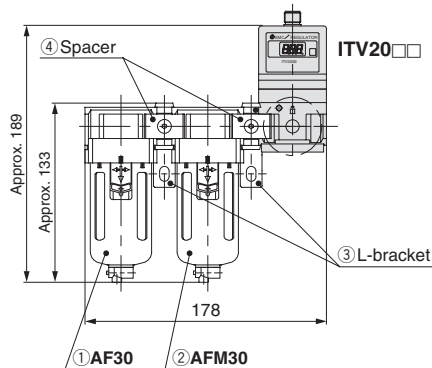
Note 1) Note that this version information is subject to change.

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*



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	■	○
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

* 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
⑥ Spacer with T-bracket	—	Y40T

Accessory (Option)/Part No.



Made to Order

(Refer to pages 25 and 26 for details.)

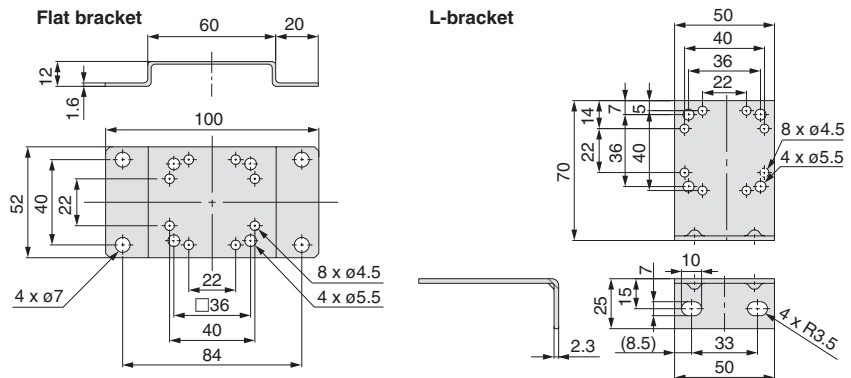
Symbol	CE-compliant	Specifications
X156	Compliant	16 points preset input type
X157	Compliant	Digital input type
X321	Compliant	Reverse type
X322	Compliant	High pressure type (SUP 1.2 MPa, OUT 1.0 MPa)
X323	Compliant	Set pressure range 1 to 100 kPa (Except Series ITV3000)
X154	Compliant	High speed response 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.		
			ITV10□□	ITV20□□	ITV30□□
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	P398010-12		
		Right angle type 3 m	P398010-13		
	ITV□□-PR-Q	Straight type 3 m	P398020-500-3		
		Right angle type 3 m	P398020-501-3		
	ITV□□-DN-Q	Straight type 3 m	P398020-504-3		
		Right angle type 3 m	P398020-505-3		
	ITV□□-CC-Q	Straight type 3 m	P398020-500-3		
		Right angle type 3 m	P398020-501-3		
Bus adapter (CC-Link model only)			EX9-ACY00-MJ		

Dimensions



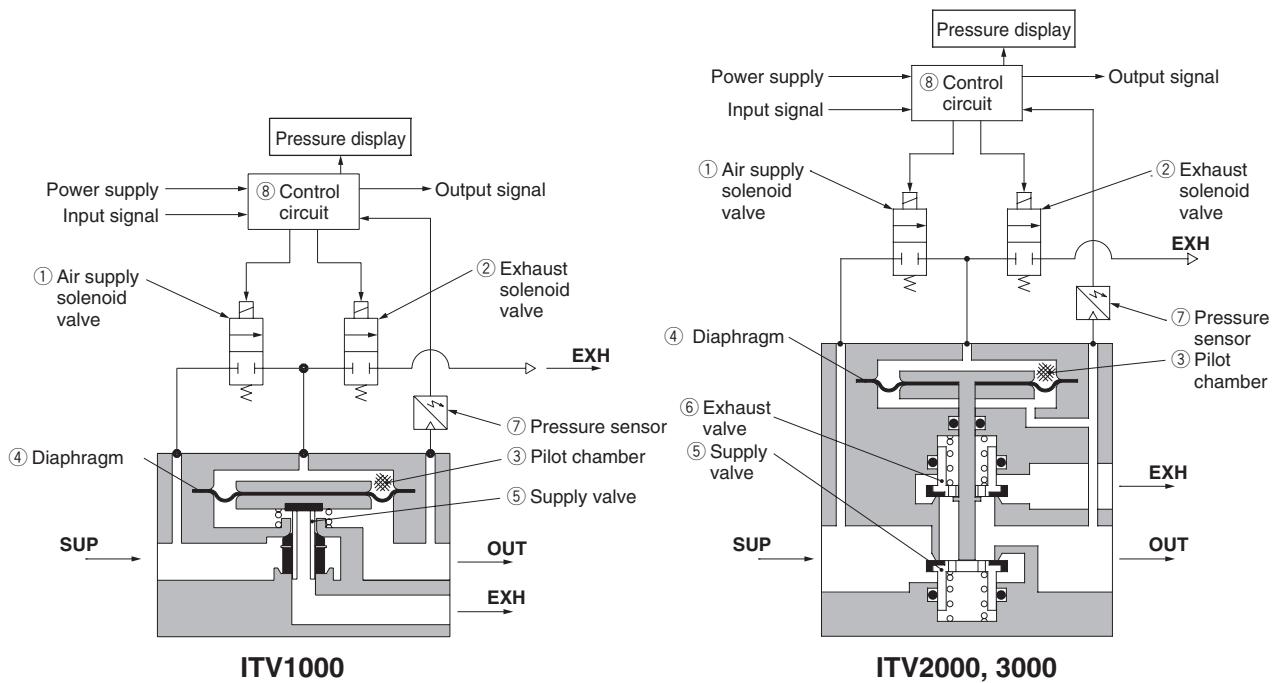
Working Principles

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.

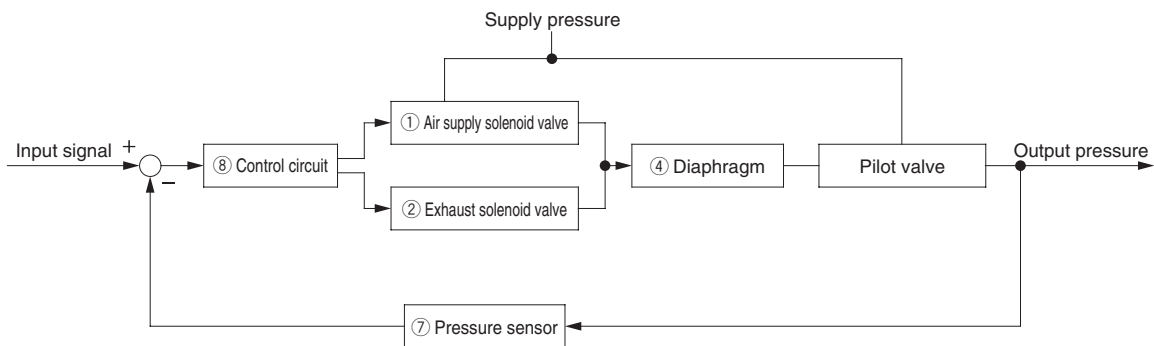
As a result, the air supply valve ⑤ linked to the diaphragm ④ opens, and a portion of the supply pressure becomes output pressure.

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



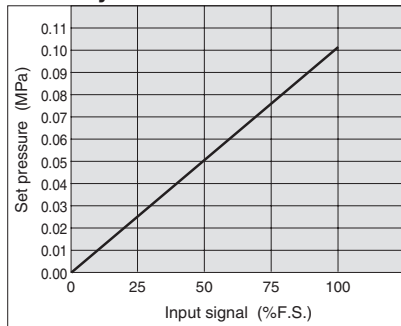
Block diagram



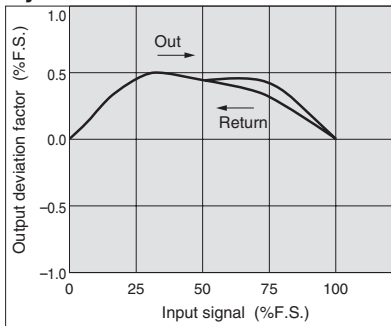
Series ITV1000/2000/3000

Series ITV101 ☐

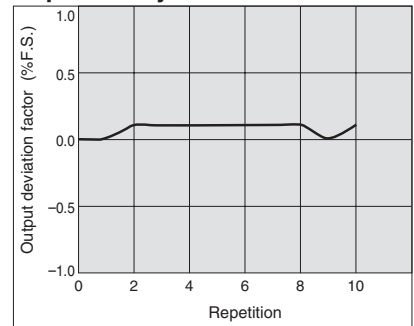
Linearity



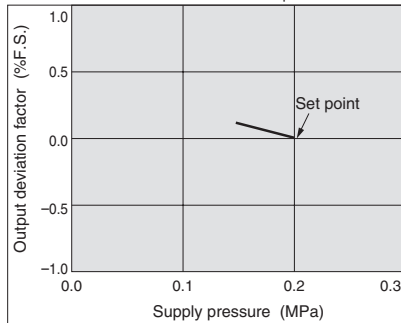
Hysteresis



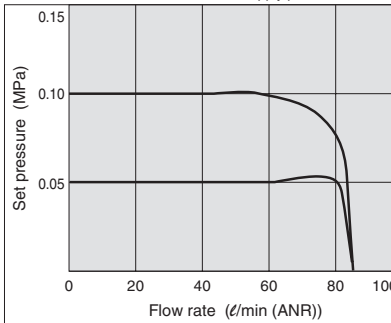
Repeatability



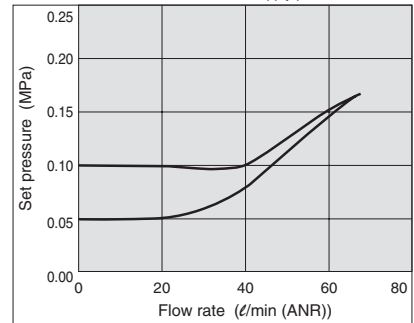
Pressure characteristics Set pressure: 0.05 MPa



Flow characteristics Supply pressure: 0.2 MPa

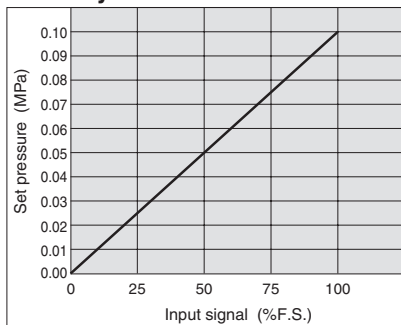


Relief flow characteristics Supply pressure: 0.2 MPa

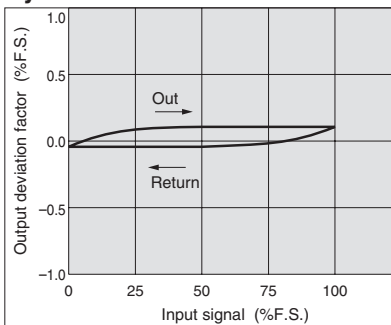


Series ITV201 ☐

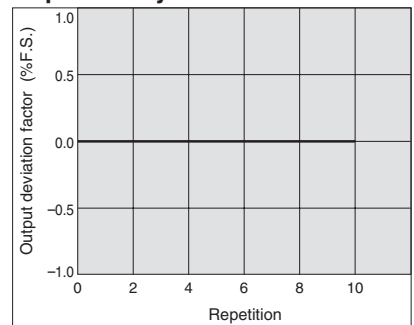
Linearity



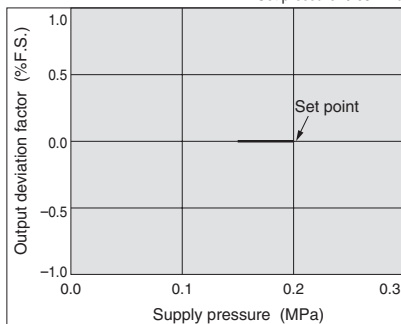
Hysteresis



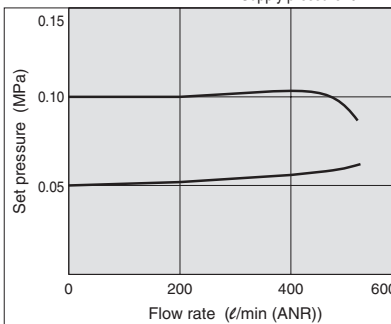
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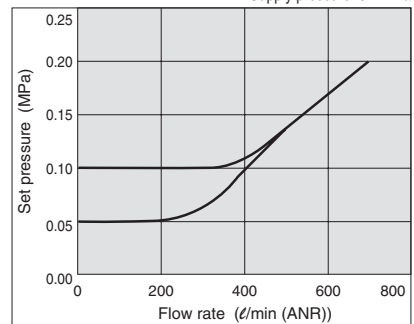
Pressure characteristics Set pressure: 0.05 MPa



Flow characteristics Supply pressure: 0.2 MPa

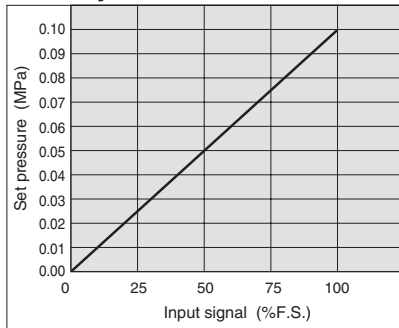


Relief flow characteristics Supply pressure: 0.2 MPa

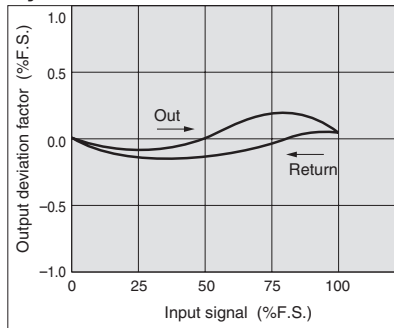


Series ITV301 ☐

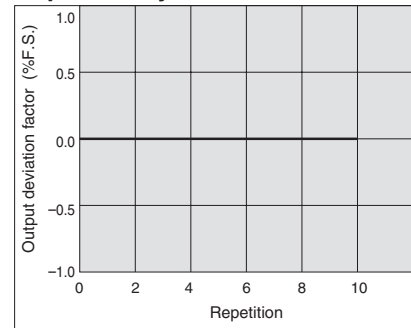
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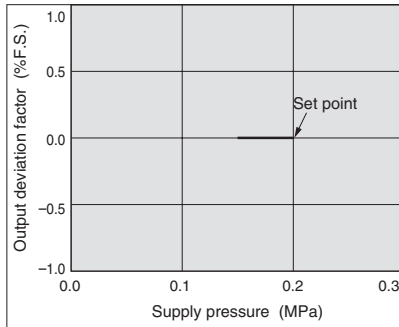
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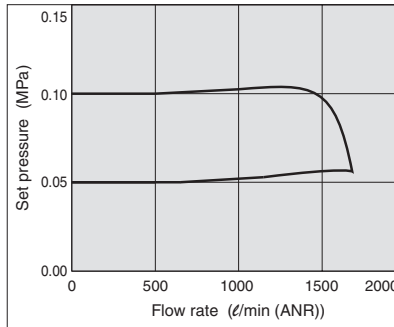
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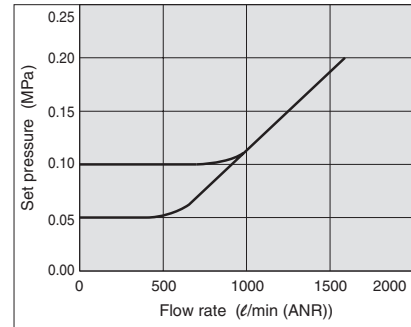
Pressure characteristics Set pressure: 0.05 MPa



Flow characteristics Supply pressure: 0.2 MPa



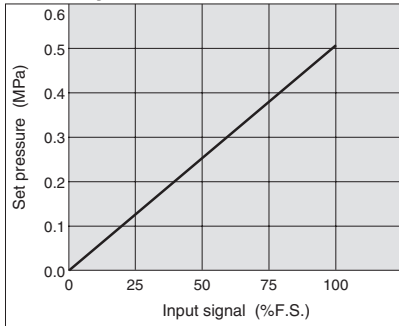
Relief flow characteristics Supply pressure: 0.2 MPa



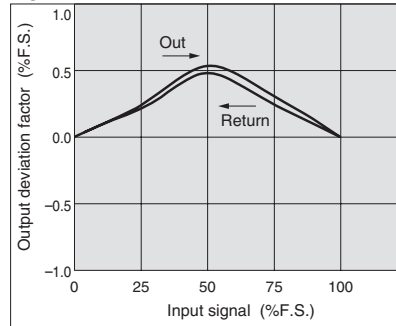
Series ITV1000/2000/3000

Series ITV103

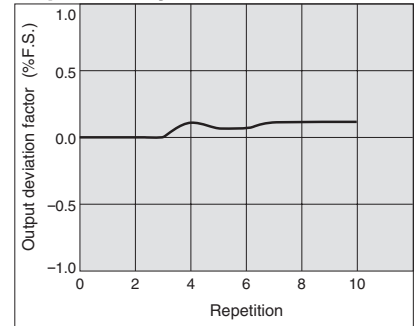
Linearity



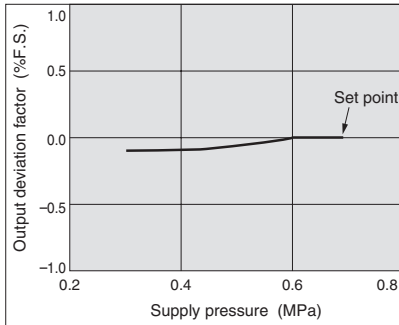
Hysteresis



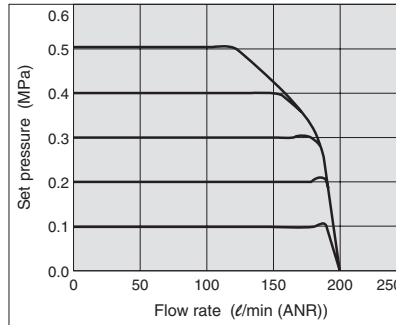
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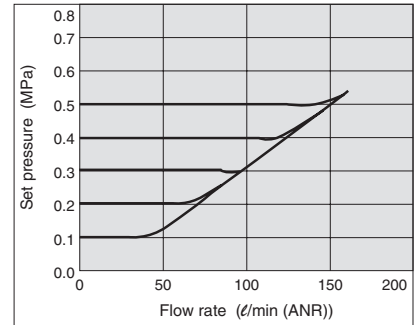
Pressure characteristics Set pressure: 0.2 MPa



Flow characteristics Supply pressure: 0.7 MPa

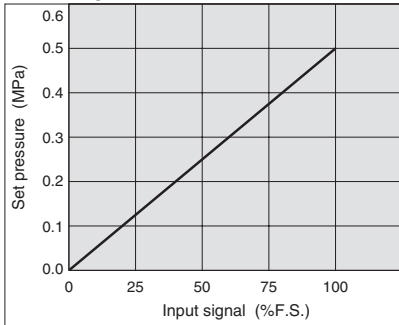


Relief flow characteristics Supply pressure: 0.7 MPa

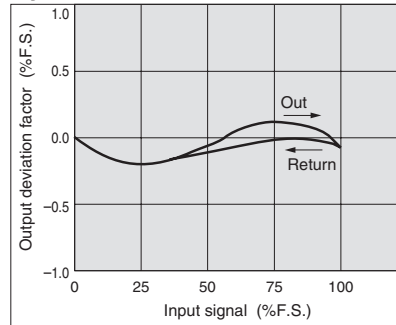


Series ITV203

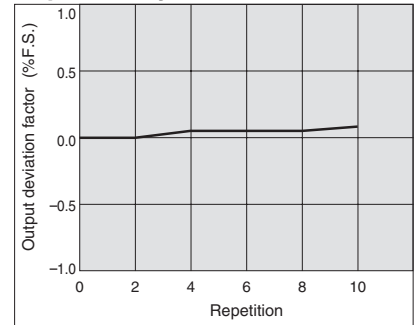
Linearity



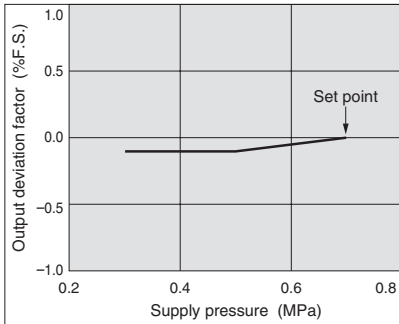
Hysteresis



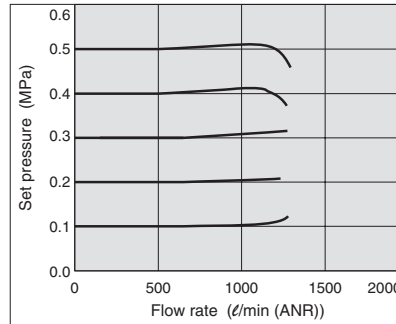
Repeatability



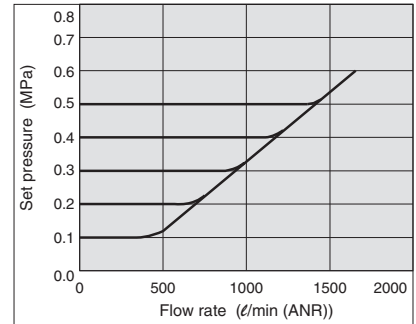
Pressure characteristics Set pressure: 0.2 MPa



Flow characteristics Supply pressure: 0.7 MPa

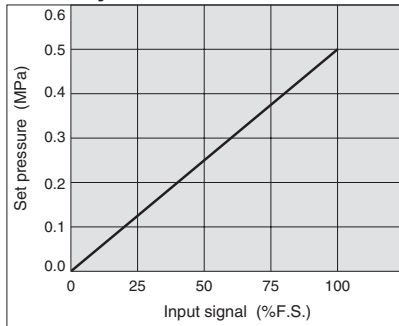


Relief flow characteristics Supply pressure: 0.7 MPa

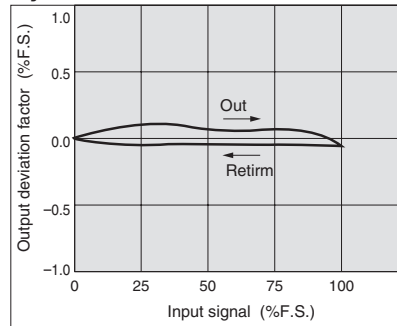


Series ITV303

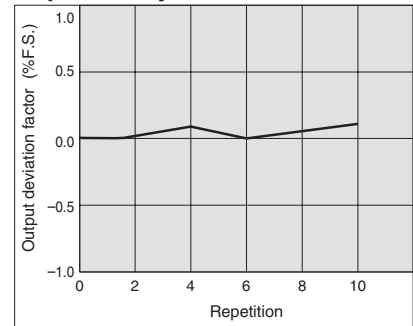
Linearity



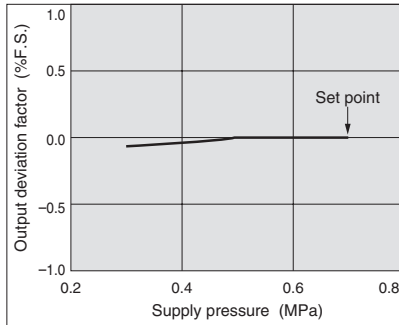
Hysteresis



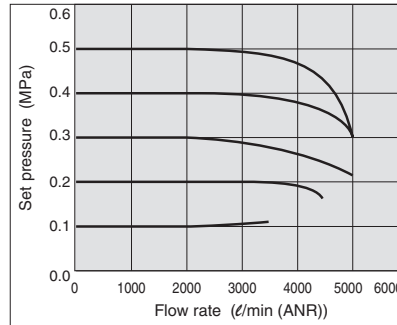
Repeatability



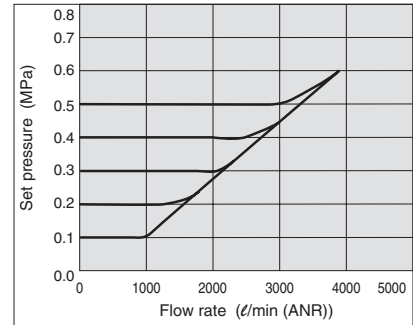
Pressure characteristics Set pressure: 0.2 MPa



Flow characteristics Supply pressure: 0.7 MPa



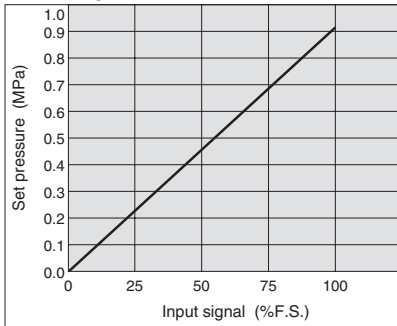
Relief flow characteristics Supply pressure: 0.7 MPa



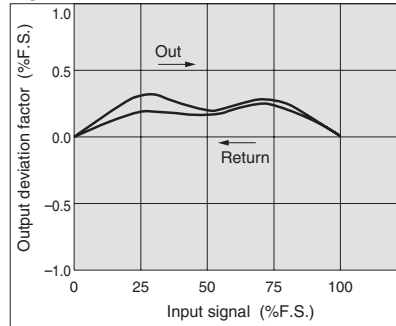
Series ITV1000/2000/3000

Series ITV105

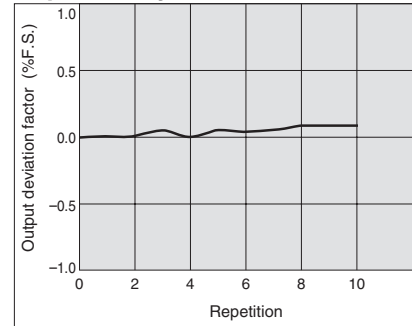
Linearity



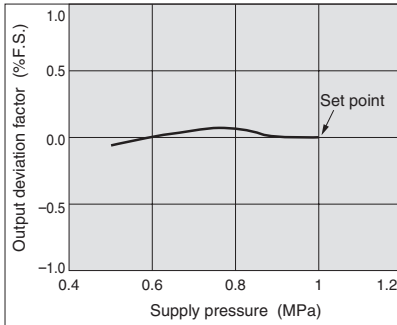
Hysteresis



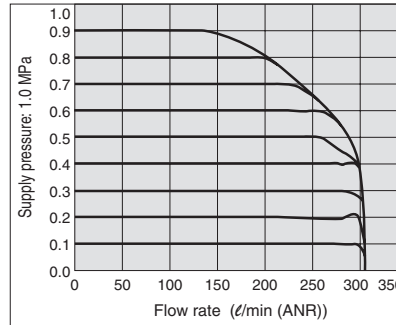
Repeatability



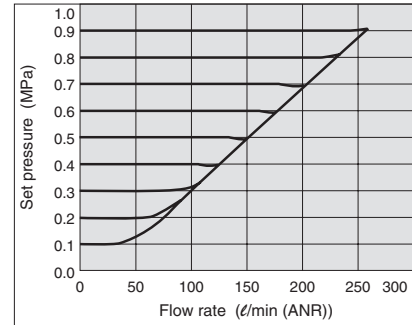
Pressure characteristics Set pressure: 0.4 MPa



Flow characteristics Supply pressure: 1.0 MPa

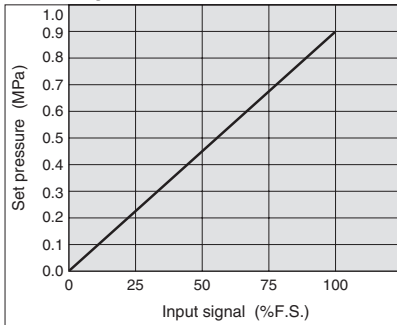


Relief flow characteristics Supply pressure: 1.0 MPa

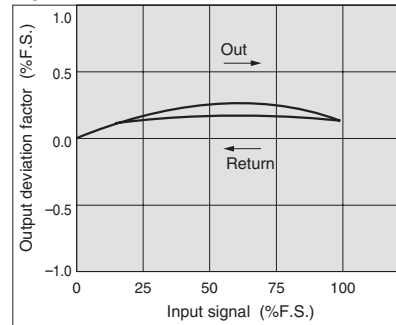


Series ITV205

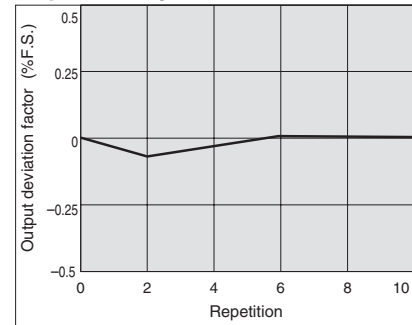
Linearity



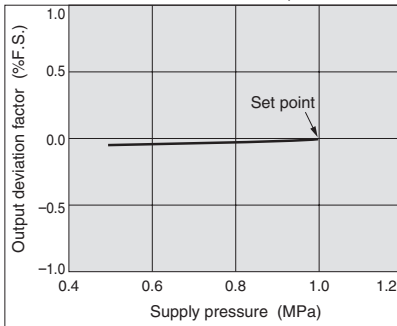
Hysteresis



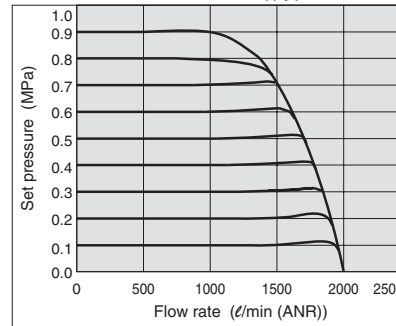
Repeatability



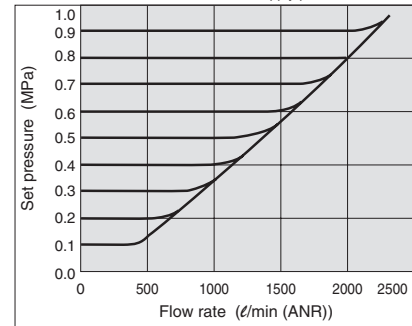
Pressure characteristics Set pressure: 0.4 MPa



Flow characteristics Supply pressure: 1.0 MPa

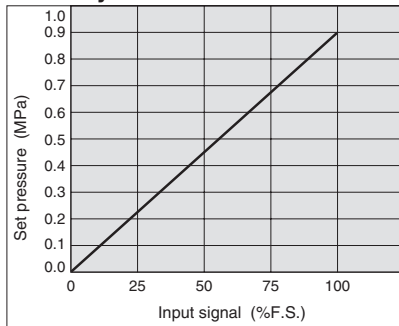


Relief flow characteristics Supply pressure: 1.0 MPa

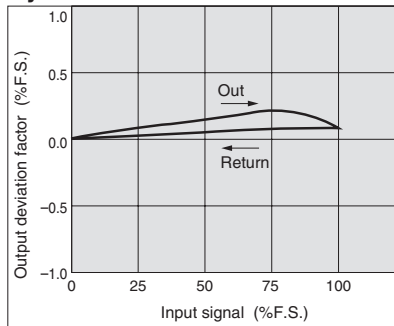


Series ITV305

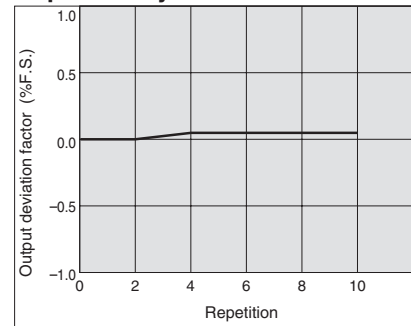
Linearity



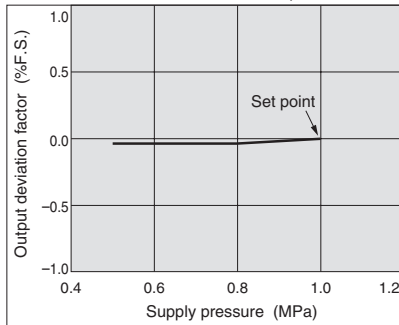
Hysteresis



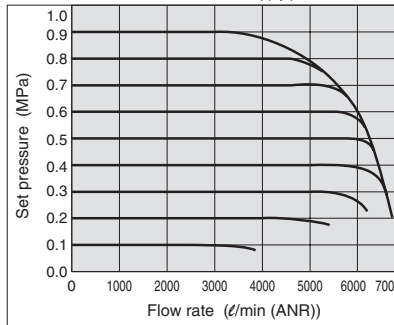
Repeatability



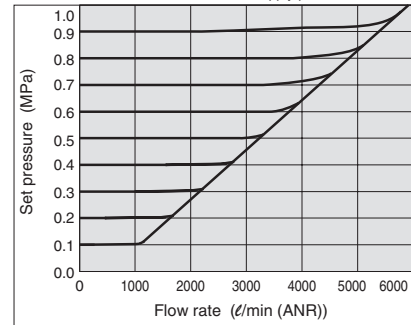
Pressure characteristics Set pressure: 0.4 MPa



Flow characteristics Supply pressure: 1.0 MPa



Relief flow characteristics Supply pressure: 1.0 MPa

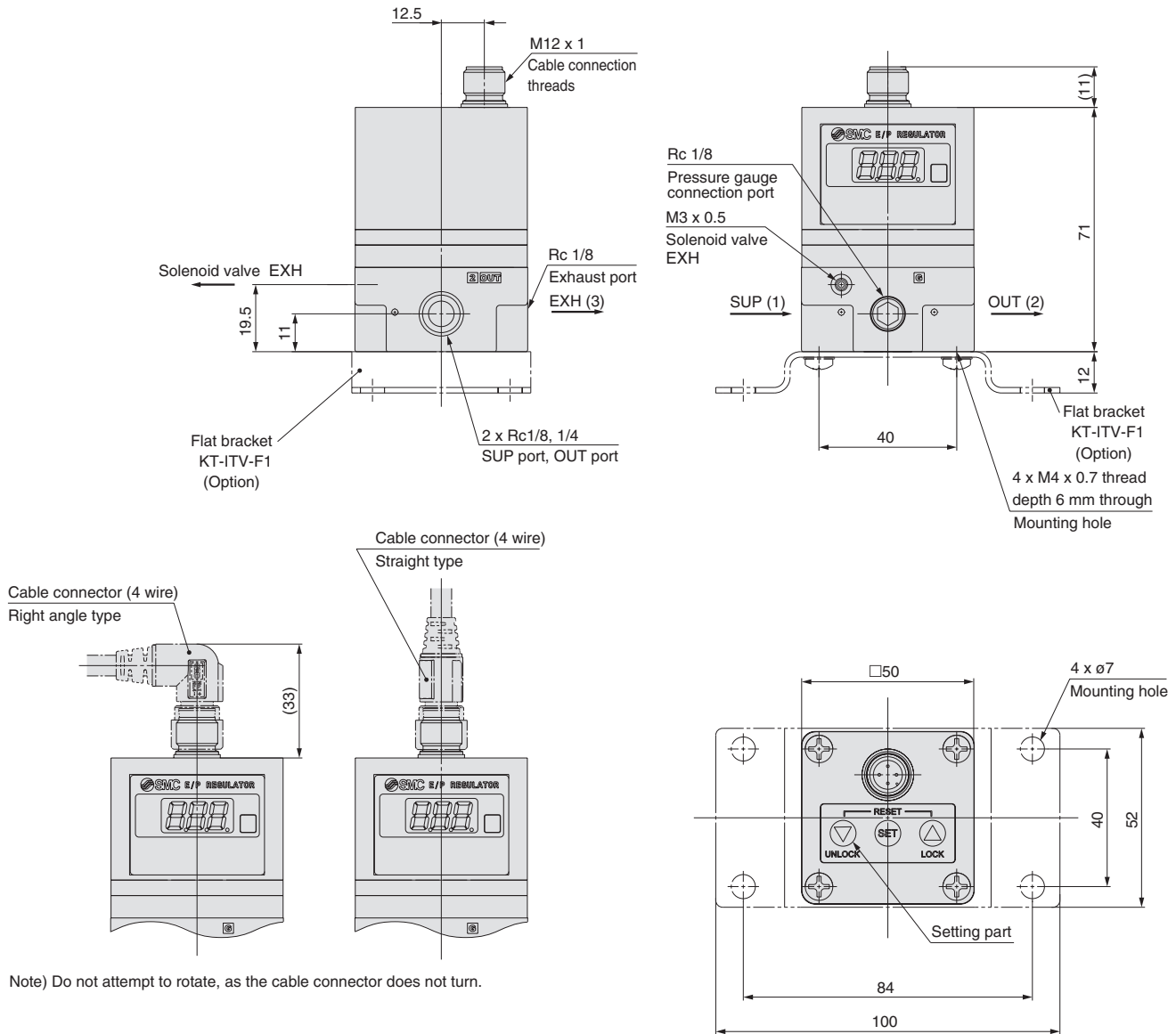


Series ITV1000/2000/3000

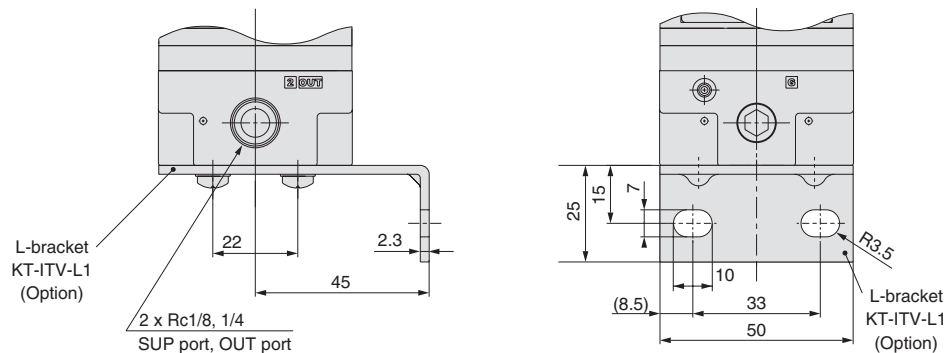
Dimensions

ITV10□□

Flat bracket

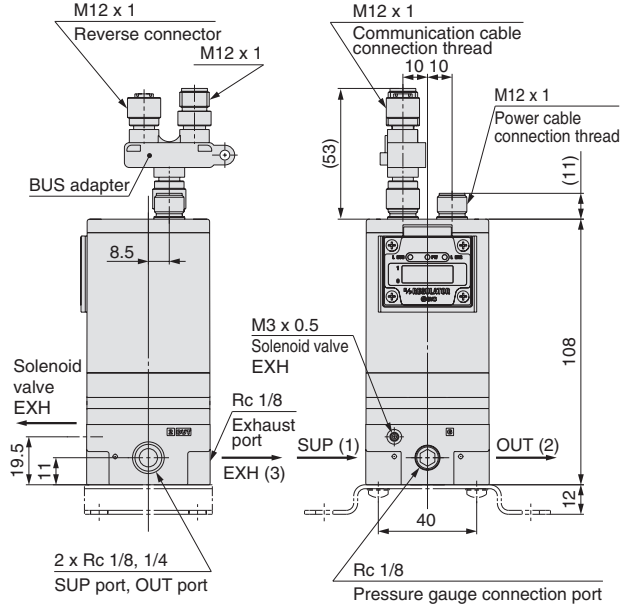


L-bracket



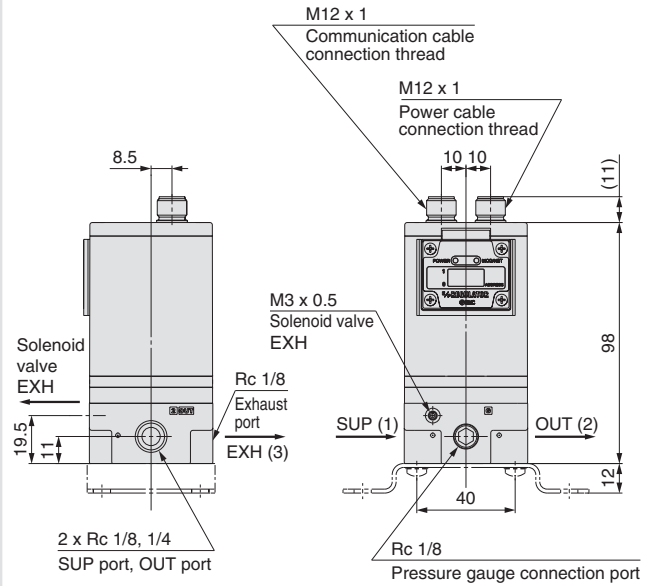
Dimensions (CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)

CC-Link/ITV10□0-CC



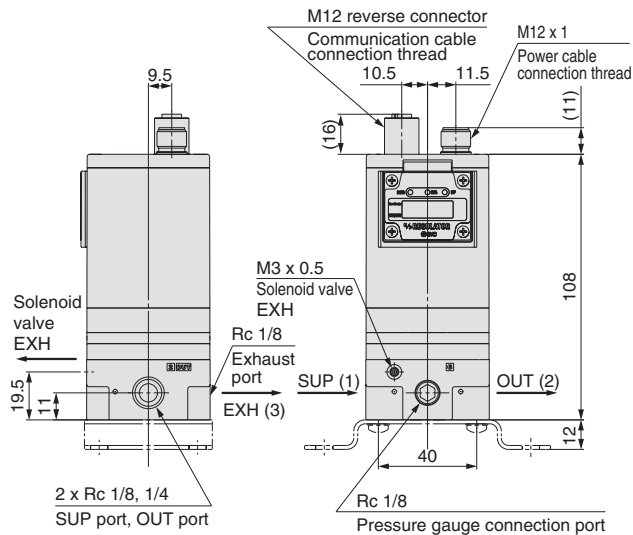
* Dimensions not shown are as on P.19.

DeviceNet™/ITV10□0-DN



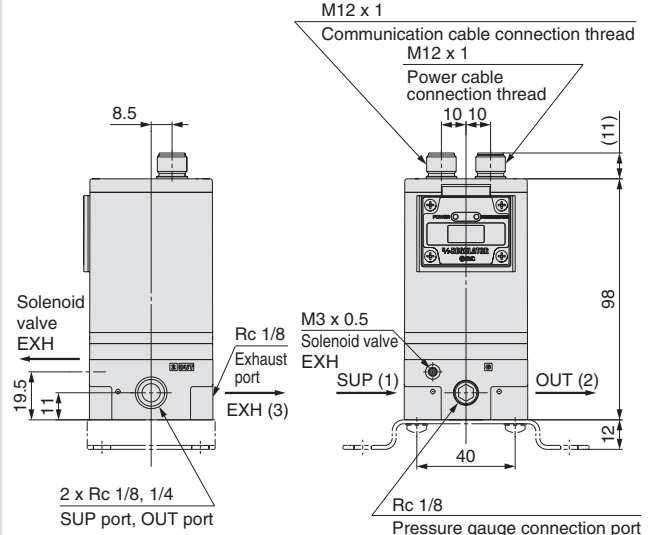
* Dimensions not shown are as on P.19.

PROFIBUS DP/ITV10□0-PR



* Dimensions not shown are as on P.19.

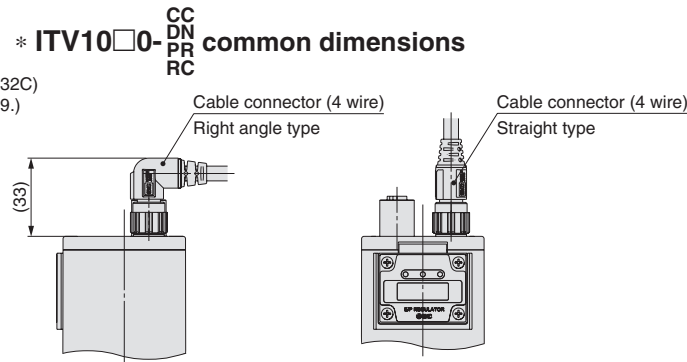
RS-232C/ITV10□0-RC



* 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.

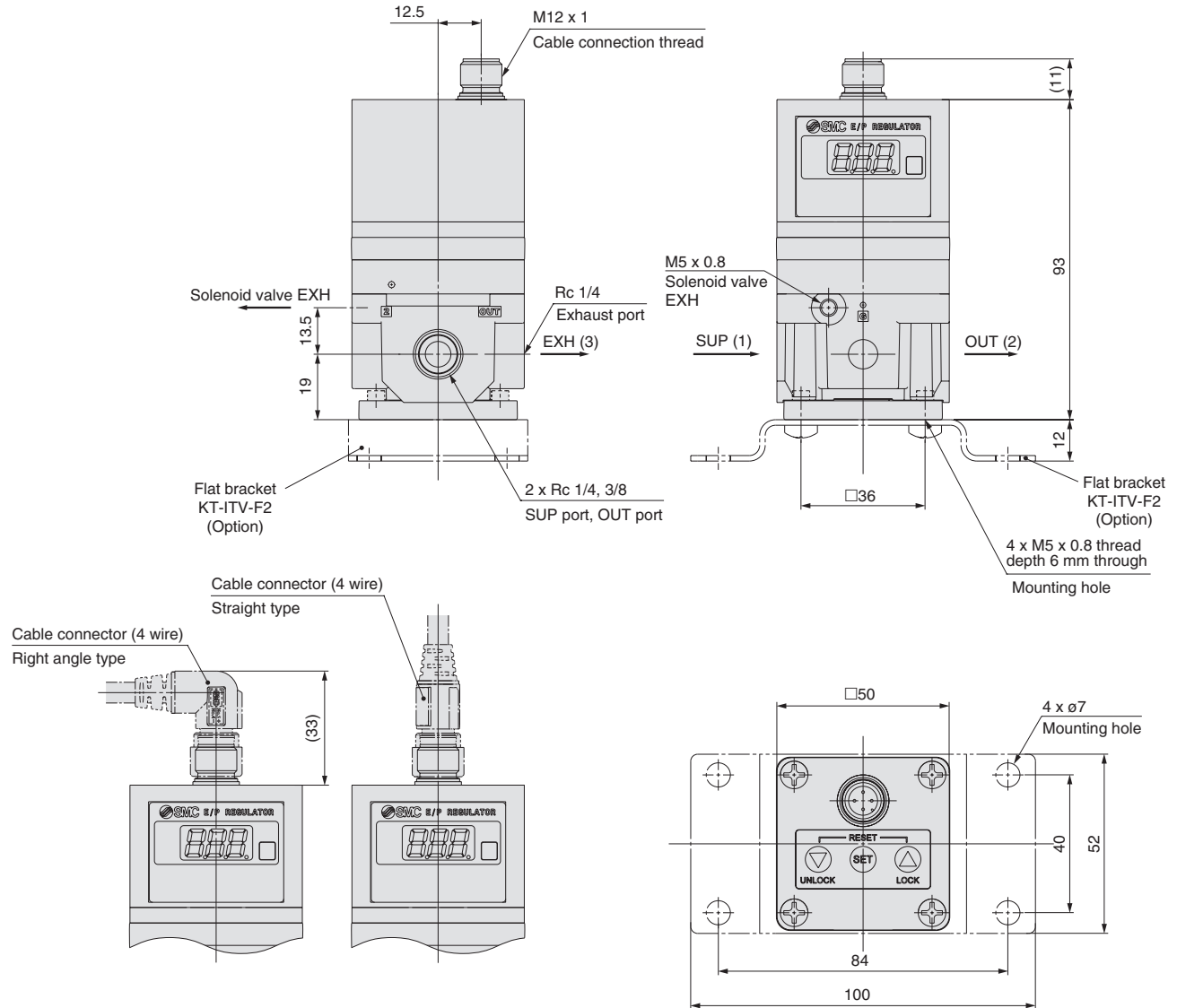
Series ITV1000/2000/3000

Dimensions

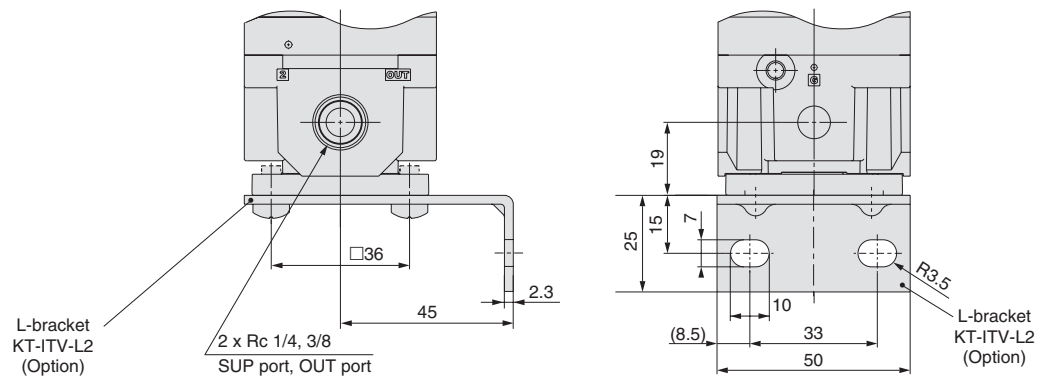
ITV20□□

Flat bracket

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

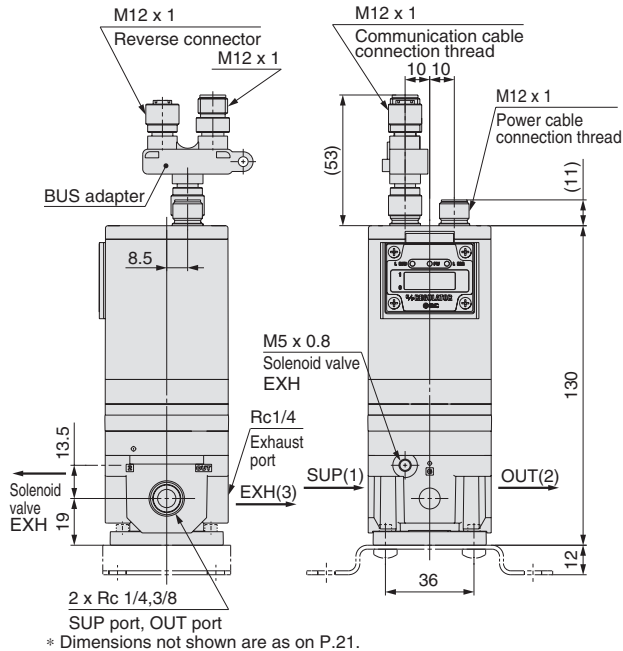
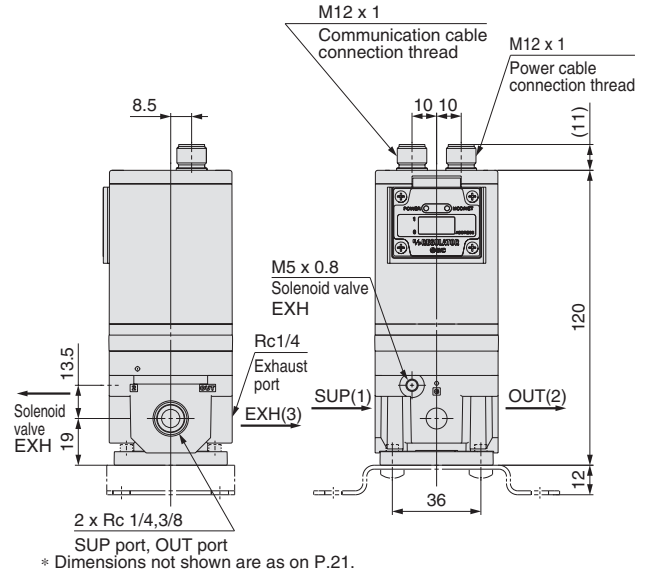


L-bracket

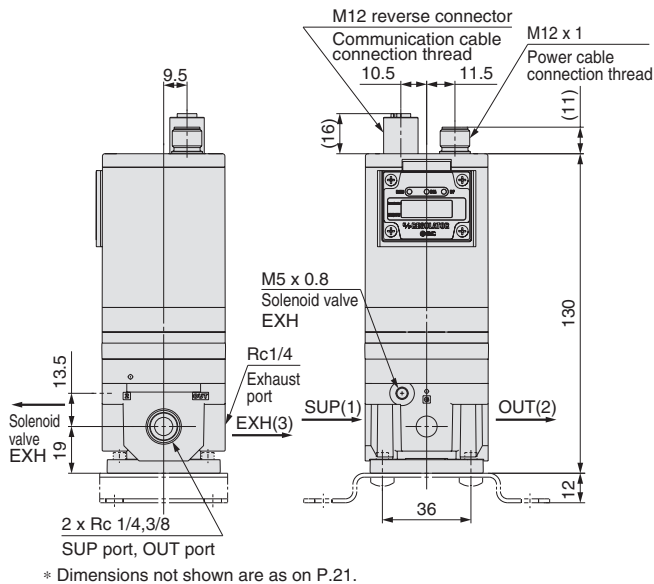
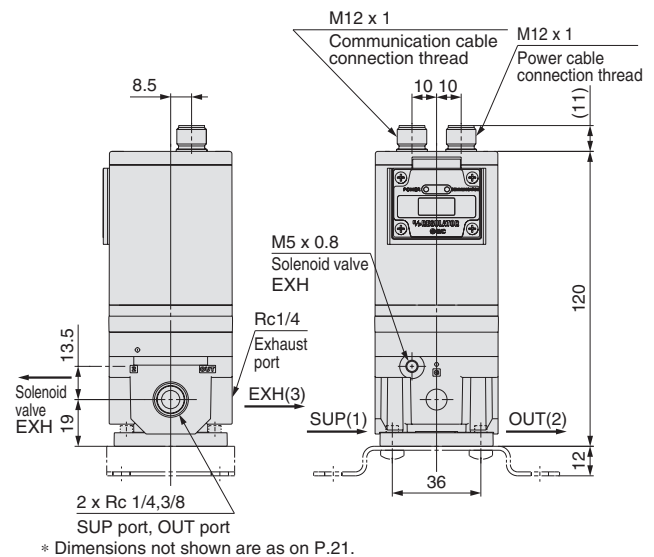


Dimensions (CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)

CC-Link/ITV20□0-CC

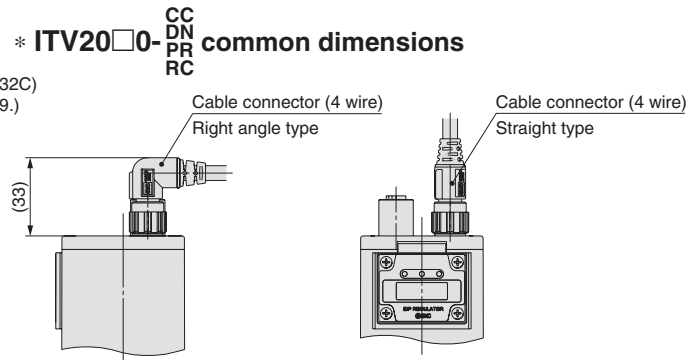
**DeviceNet™/ITV20□0-DN**

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.

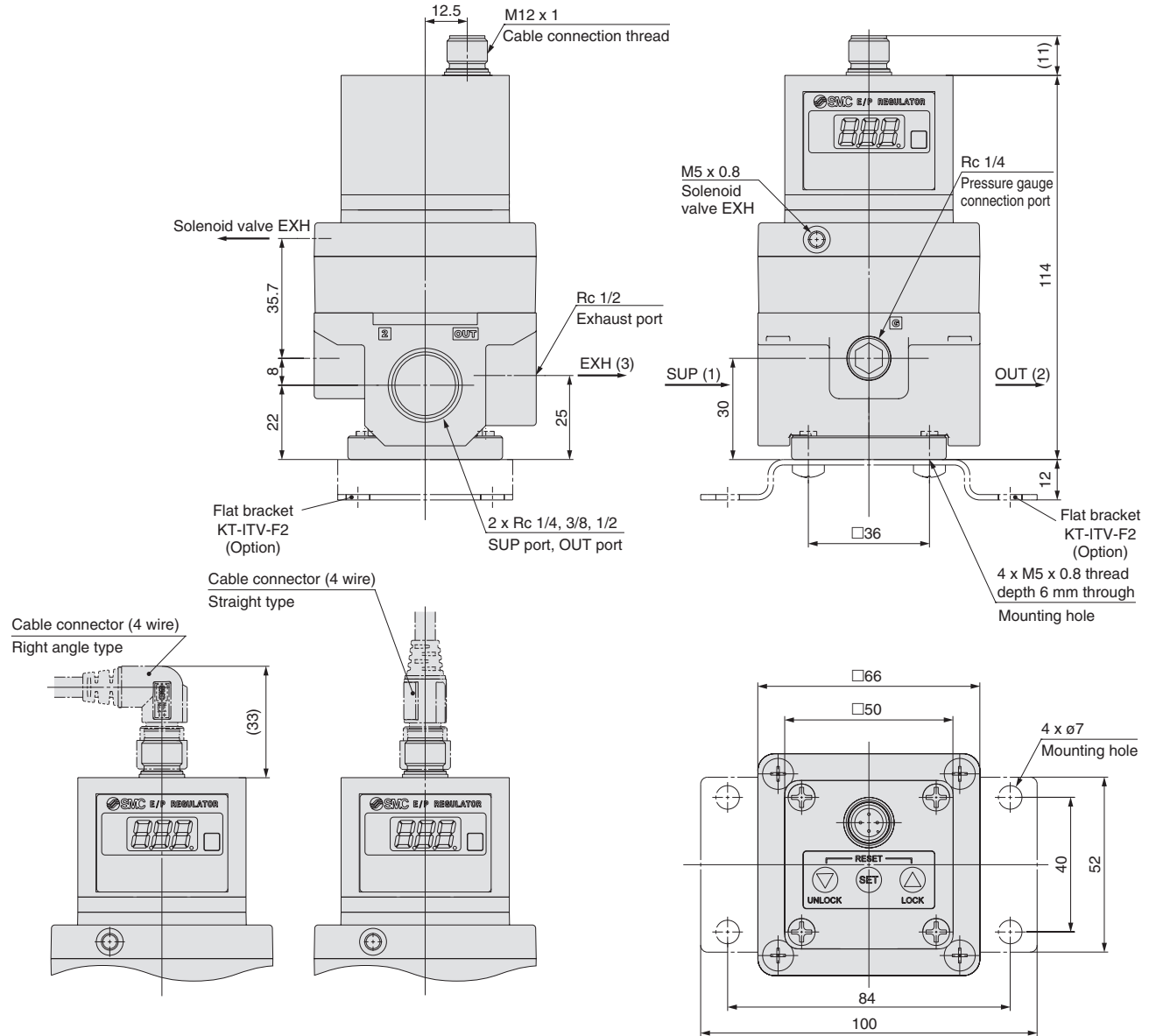
Series ITV1000/2000/3000

Dimensions

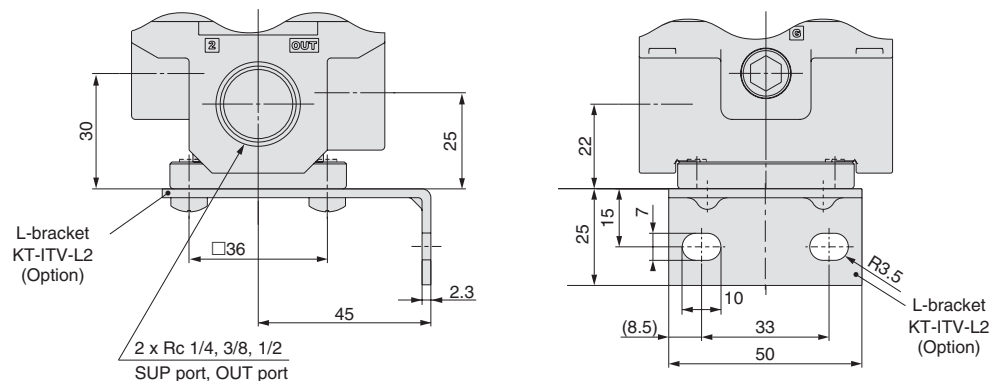
ITV30□□

Flat bracket

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

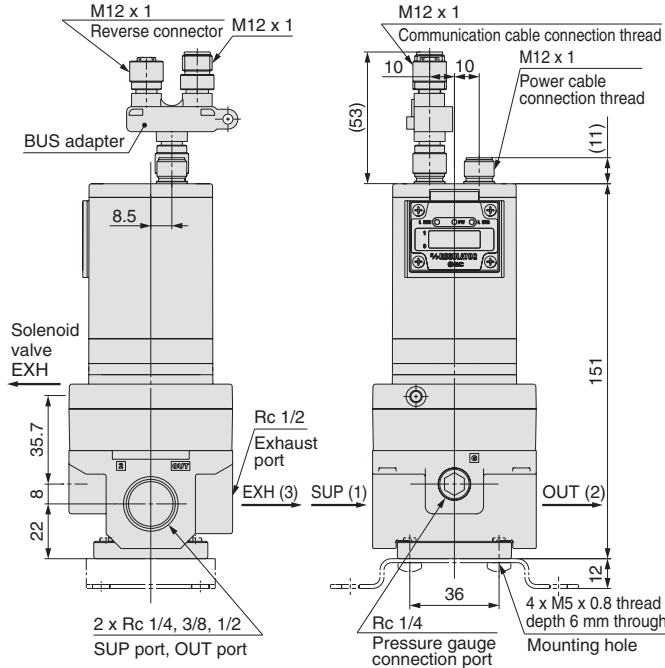


L-bracket



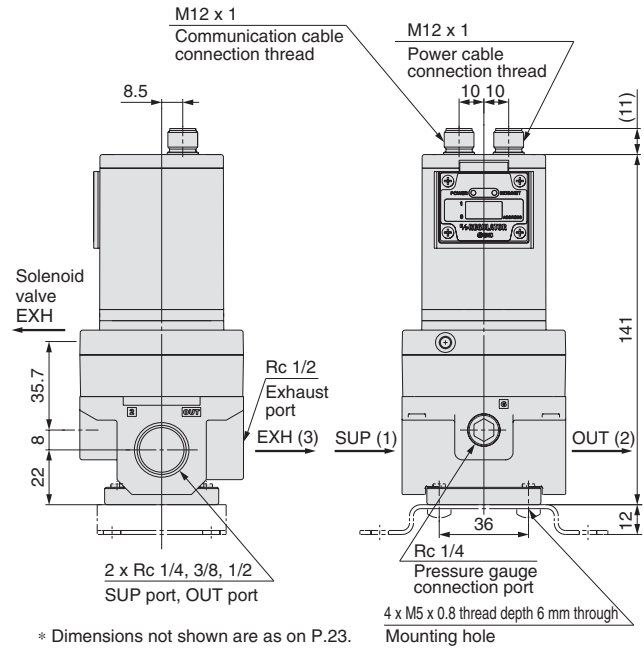
Dimensions (CC-Link, DeviceNet™, PROFIBUS DP and RS-232C)

CC-Link/ITV30□-CC



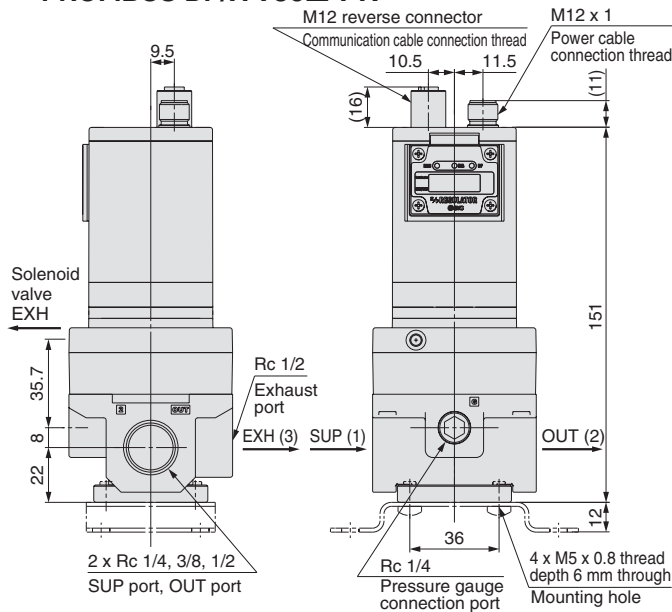
* Dimensions not shown are as on P.23.

DeviceNet™/ITV30□-DN



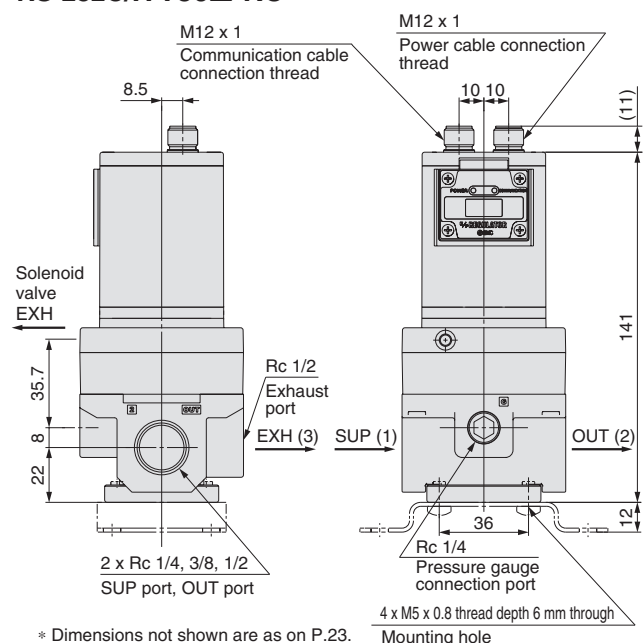
* Dimensions not shown are as on P.23.

PROFIBUS DP/ITV30□-PR



* Dimensions not shown are as on P.23.

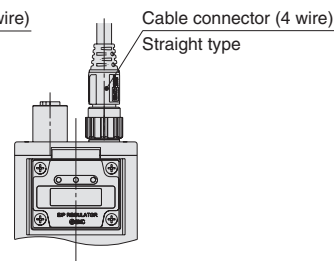
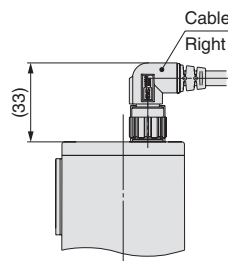
RS-232C/ITV30□-RC



* 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.

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 $\frac{2}{3}$ - X156ITV20 0 - 4 $\frac{2}{3}$ - X156ITV30 0 - 4 - 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 - X157ITV20 0 - 4 0 SN - X157

ITV30 0 - 4 0 SN - 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

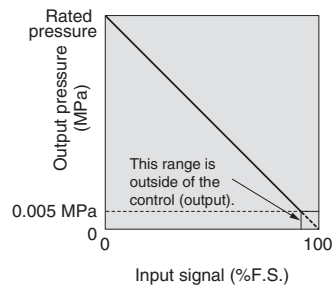
In compliance with the input, inverse proportional pressure is displayed.

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]

ITV205- -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 ●

6 High-Speed Response Time Type

Pressure response with no load is approx. 0.1 sec.

ITV 2010-01 2 S-X154

- 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	Analogue output 1 to 5 VDC
---	----------------------------
- 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)
- Pressure display unit**

—	MPa
2*	kgf/cm ²
3	bar
4*	psi
5	kPa

* Only for overseas sales (SI units are to be used inside Japan).
- Cable connector type**

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

—	Without bracket
B	Flat bracket
C	L-bracket

High-speed response time specifications

7 Manifold Specifications (Except Series ITV3000)

2 through 8 station manifold.

How to Order Manifolds

IITV20-02-5

- ITV1000, 2000**
- Valve stations**

2	2 stations
...	...
8	8 stations
- OUT port size**

02	1/4
03	3/8
- Connection thread type**

—	PT
N	NPT
F	PF

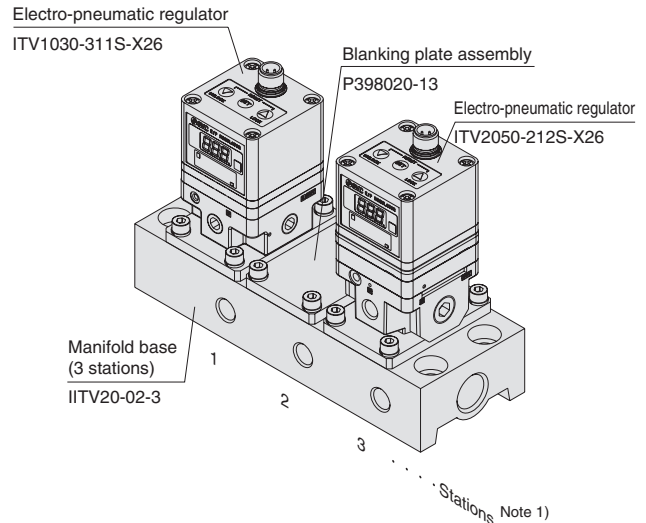
IITV20-02-3 1 set (3 station manifold base part no.)
 *ITV1030-311S-X26 1 set (Electro-pneumatic regulator part no.) Note 2)
 *P398020-13 1 set (Blanking plate assembly part no.)
 *ITV2050-212S-X26 1 set (Electro-pneumatic regulator part no.) Note 2)
 The * is the symbol for mounting. Add the * symbol 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 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.