Electro-Pneumatic Regulator/ Electronic Vacuum Regulator

IP65 RoHS

For the stepless control of air pressure in proportion to electrical signals

Serial communication specification

Applicable Fieldbus protocols

CC-Link DeviceNet™

PROFIBUS® IO-Link

RS-232C specification

Compact and lightweight (Integrated communication parts)

Weight: 350 g[*1] **(ITV1000)**

Power consumption: 4 W[*1] **or less**

*1 Values for the communication type (PROFIBUS DP)

Electro-Pneumatic Regulators

Set pressure: 0.6 MPa Supply pressure: 1.0 MPa

ITV0000 Series p. 5

Max. flow rate
6 L/min (ANR)

ITV1000 Series p. 13

Grease-free specification (Parts in contact with fluid)

Max. flow rate
200 L/min (ANR)

ITV2000 Series p. 13

Max. flow rate
1500 L/min (ANR)

ITV3000 Series p. 13

Max. flow rate
4000 L/min (ANR)

Electronic Vacuum Regulators

ITV009□ Series p. 39

ITV209□ Series p. 46

ITV Series

SMC

CAT.ES60-15G

Compact Electro-Pneumatic Regulator *ITV0000 Series* p. 5 IP65 equivalent

Compact Vacuum Regulator *ITV009□ Series* p. 39

Compact

15 mm

Thanks to its simplified high-density circuit board design, an extremely compact product has been made possible.

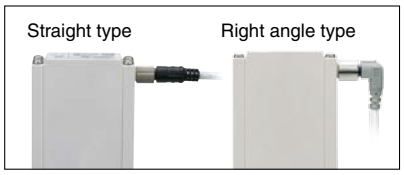
Lightweight

100 g

Improved space saving and weight reduction when used in a manifold

Stations can be easily increased or decreased due to the DIN rail mounting design.

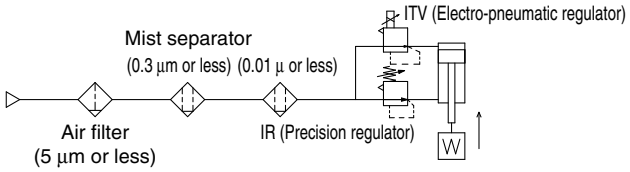
■ 2 types of cable connectors



■ Built-in One-touch fittings
■ With error indication LED
■ 2 types of brackets

Flat bracket L-bracket

- **Linearity: ±1% F.S. or less**
- **Hysteresis: 0.5% F.S. or less**
- **Repeatability: ±0.5% F.S. or less**
- **High-speed response time: 0.1 s** (Without load)
  ∗ This is not a guaranteed value as it depends on the operating environment.
- **High stability**
  Sensitivity: 0.2% F.S. or less



Electro-Pneumatic Regulator *ITV1000/2000/3000 Series* p. 13 IP65

Electronic Vacuum Regulator *ITV209□ Series* p. 46

ITV1000 ITV2000 ITV3000 ITV2090

Serial communication specification

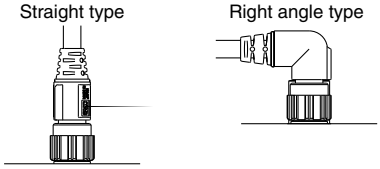
Reduced wiring

Applicable Fieldbus protocols

CC-Link DeviceNet™ PROFIBUS® IO-Link

RS-232C specification

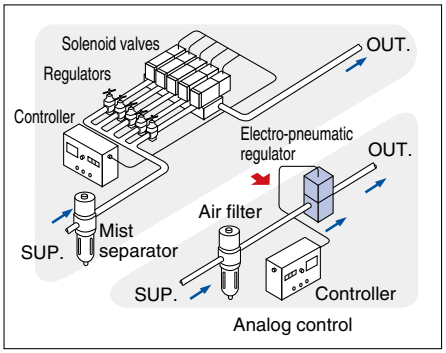
- **Sensitivity: 0.2% F.S. or less**
- **Linearity: ±1% F.S. or less**
- **Hysteresis: 0.5% F.S. or less**
- **Cable connections in 2 directions**



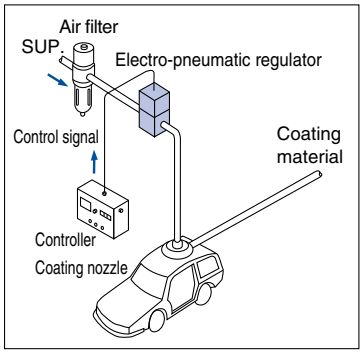
- **Grease-free specification**
  (ITV1000 series)

- **Application examples**

For multi-stage control to analog control



For electrostatic coating control



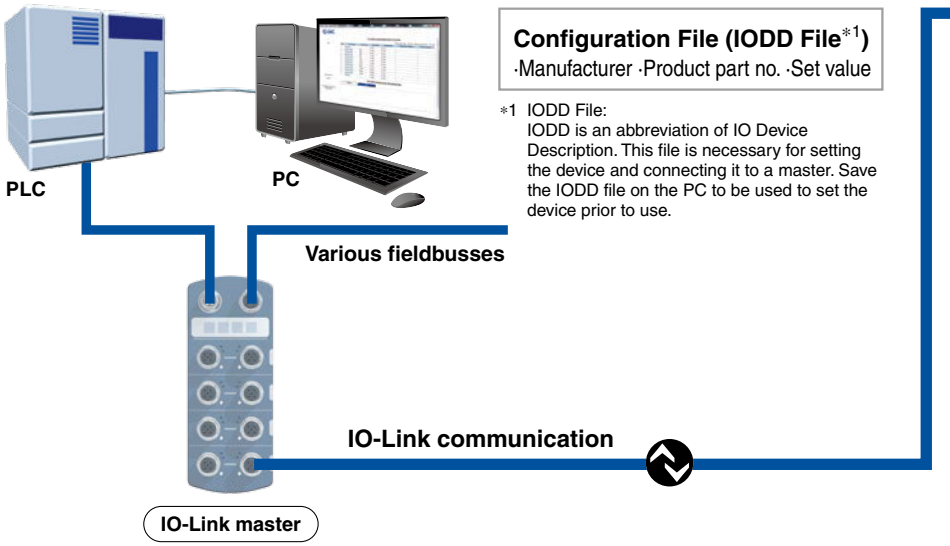
SMC

IO-Link Compatible Devices:
Electro-Pneumatic Regulator ITV10□0/20□0/30□0-IL p. 13
Electronic Vacuum Regulator ITV2090-IL p. 46

IO-Link communication enables users to check device information and monitor device status in addition to performing pressure control.

IO-Link

IO-Link is an open communication interface technology between the sensor/actuator and the I/O terminal that is an international standard: IEC 61131-9.



Configuration File (IODD File*1)
·Manufacturer ·Product part no. ·Set value

*1 IODD File:
IODD is an abbreviation of IO Device Description. This file is necessary for setting the device and connecting it to a master. Save the IODD file on the PC to be used to set the device prior to use.

**IO-Link Compatible Devices:
Electro-Pneumatic Regulator
ITV10□0/20□0/30□0-IL
Electronic Vacuum Regulator
ITV2090-IL**

The IO-Link master and device can be connected with one cable.

Only a single cable combining the communication wire and the power supply wire is required.

Uses 4-wire unshielded cables

Special communication cables are not necessary.
A conventional 4-wire unshielded cable can be used for the input and output of sensors, switches, etc.
(Recommended specifications: Conductor resistance 3 Ω, Wire-to-wire capacitance 3 nF or less, 20 m or less)

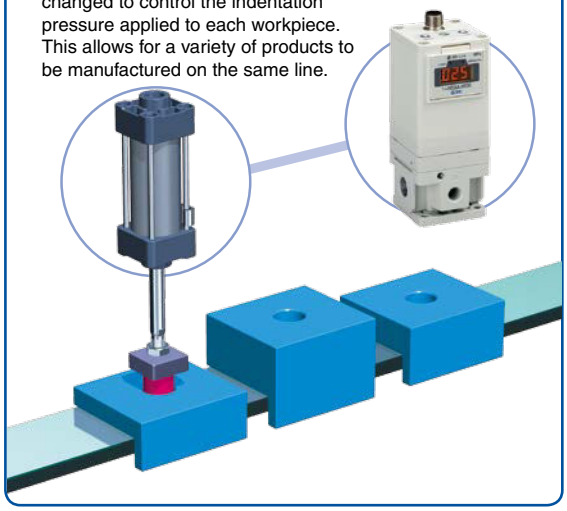
Implement diagnostic bits in the process data.

The diagnostic bit in the cyclic process data makes it easy to find problems with the equipment.
It is possible to find problems with the equipment in real time using the cyclic (periodic) data and to monitor such problems in detail with the noncyclic (aperiodic) data.

Application

For the manufacturing of various products

The set pressure analog value can be changed to control the indentation pressure applied to each workpiece. This allows for a variety of products to be manufactured on the same line.



Diagnosis items
· Output pressure is within the set pressure ±10%
· Notification of energizing time
· Residual pressure error
· Target value over range
· Pressure under range (LLL)
· Pressure over range (HHH)
· Power supply voltage drop
· Excessive power supply voltage
· Warning occurred
· Internal communication error

Process Data

<PD_IN: 4 bytes>

Byte	0								1							
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Value	Output pressure value (16 bits)															

Byte	2								3							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Value	Abnormal					Warning							Notification			SSC1

<PD_OUT: 2 bytes>

Byte	0								1							
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Value	Set pressure value (16 bits)															

Series Variations

For the stepless control of air pressure in proportion to electrical signals

	Series	Model	Set pressure range	Input signal	Port size	Page
Electro-Pneumatic Regulators	**ITV0000 Series** 	**ITV001□**	0.001 to 0.1 MPa	Current type: 4 to 20 mADC (Sink type) Current type: 0 to 20 mADC (Sink type) Voltage type: 0 to 5 VDC Voltage type: 0 to 10 VDC	Built-in One-touch fittings Metric size: ø4 Inch size: ø5/32	**5**
		ITV003□	0.001 to 0.5 MPa			
		ITV005□	0.001 to 0.9 MPa			
	ITV1000 Series 	**ITV101□**	0.005 to 0.1 MPa	Current type: 4 to 20 mADC (Sink type) Current type: 0 to 20 mADC (Sink type) Voltage type: 0 to 5 VDC Voltage type: 0 to 10 VDC Preset input (4 points/16 points) 10-bit digital input CC-Link compatible DeviceNet™ compatible PROFIBUS DP compatible IO-Link compatible RS-232C communication	1/8, 1/4	**13**
		ITV103□	0.005 to 0.5 MPa			
		ITV105□	0.005 to 0.9 MPa			
	ITV2000 Series 	**ITV201□**	0.005 to 0.1 MPa		1/4, 3/8	**13**
		ITV203□	0.005 to 0.5 MPa			
		ITV205□	0.005 to 0.9 MPa			
	ITV3000 Series 	**ITV301□**	0.005 to 0.1 MPa		1/4, 3/8, 1/2	**13**
		ITV303□	0.005 to 0.5 MPa			
		ITV305□	0.005 to 0.9 MPa			
Electronic Vacuum Regulators	**ITV009□ Series** 	**ITV009□**	−1 to −100 kPa	Current type: 4 to 20 mADC (Sink type) Current type: 0 to 20 mADC (Sink type) Voltage type: 0 to 5 VDC Voltage type: 0 to 10 VDC	Built-in One-touch fittings Metric size: ø4 Inch size: ø5/32	**39**
	ITV209□ Series 	**ITV209□**	−1.3 to −80 kPa	Current type: 4 to 20 mADC (Sink type) Current type: 0 to 20 mADC (Sink type) Voltage type: 0 to 5 VDC Voltage type: 0 to 10 VDC Preset input (4 points/16 points) 10-bit digital input CC-Link compatible DeviceNet™ compatible PROFIBUS DP compatible IO-Link compatible RS-232C communication	1/4	**46**

CONTENTS

Electro-Pneumatic Regulators

Electronic Vacuum Regulators

Compact Electro-Pneumatic Regulator
ITV0000 Series

CE RoHS

How to Order

For single unit and single unit for manifold

ITV00 1 0 – 0 □ □ □ N

Pressure range

1	0.1 MPa
3	0.5 MPa
5	0.9 MPa

Power supply voltage

0	24 VDC ±10%
1	12 to 15 VDC

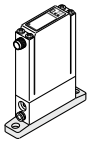
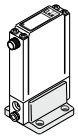
Cable connector (Option)

N	Without cable connector
S	Straight type 3 m
L	Right angle type 2 m

Input signal

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

Bracket/Option for single unit only

Nil	Without bracket
B	Flat bracket 
C	L-bracket 

Built-in One-touch fittings type

For single unit

Symbol		SUP 1	OUT 2	EXH 3
Nil	Metric size (Light gray)	ø4		
U	Inch size (Orange)	ø5/32"		

For manifold

Symbol		SUP 1	OUT 2	EXH 3
Nil	Metric size (Light gray)	ø6	ø4	ø6
U	Inch size (Orange)	ø1/4"	ø5/32"	ø1/4"

Base type

Nil	For single unit
M	For manifold

Manifold

IITV00 – 02 □ – n

Stations

02	2 stations
03	3 stations
⋮	⋮
10	10 stations

Option

If a DIN rail longer than the specified stations is required, specify the applicable stations in two digits.
(Max. 10 stations)
Example) **IITV00-05-07**

One-touch fitting size for supply/exhaust parts (End plate)

Nil	ø6 (Light gray)
U	ø1/4" (Orange)

∗ A DIN rail with the length specified by the number of stations is attached to the manifold. For dimensions of the DIN rail, refer to the external dimensions.

How to Order Manifold Assembly (Example)

Indicate the part numbers of electro-pneumatic regulators to be mounted below the manifold part number.

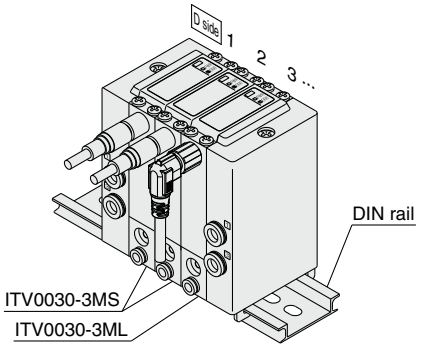
Example)
Due to the common supply/exhaust feature, note that different pressure range combinations are not available.

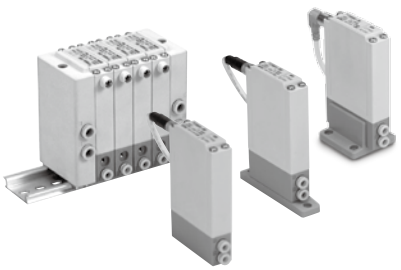
IITV00-03·····1 set (Manifold part no.)
∗ITV0030-3MS·····2 sets (Electro-pneumatic regulator part no. (Stations 1, 2))
∗ITV0030-3ML·····1 set (Electro-pneumatic regulator part no. (Station 3))

Indicate part numbers in order starting from the first station on the D side.

Caution) Combination with having different pressure ranges is not available due to common supply/exhaust features.

The asterisk denotes the symbol for the assembly. Prefix it to the part numbers of the electro-pneumatic regulator.





Specifications

Model		ITV001□	ITV003□	ITV005□
Min. supply pressure		Set pressure + 0.1 MPa		
Max. supply pressure		0.2 MPa	1.0 MPa	
Set pressure range		0.001 to 0.1 MPa	0.001 to 0.5 MPa	0.001 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	**Voltage type**	0 to 5 VDC, 0 to 10 VDC		
	Current type	4 to 20 mADC, 0 to 20 mADC (Sink type)		
Input impedance	**Voltage type**	Approx. 10 kΩ		
	Current type	Approx. 250 Ω		
Output signal∗2	**Analog output**	1 to 5 VDC (Output impedance: Approx. 1 kΩ) Output accuracy: ±6% F.S. or less		
Linearity		±1% F.S. or less		
Hysteresis		0.5% F.S. or less		
Repeatability		±0.5% F.S. or less		
Sensitivity		0.2% F.S. or less		
Temperature characteristics		±0.12% F.S./°C or less		
Operating temperature range		0 to 50°C (No condensation)		
Enclosure		Equivalent to IP65∗3		
Connection type		Built-in One-touch fittings		
Connection size	**For single unit**	Metric size	1, 2, 3: ø4	
		Inch size	1, 2, 3: ø5/32"	
	Manifold	Metric size	1, 3: ø6, 2: ø4	
		Inch size	1, 3: ø1/4", 2: ø5/32"	
Weight∗1		100 g or less (Without options)		

∗1 Indicates the weight of a single unit
For IITV00-n
Total weight (g) ≤ Stations (n) x 100 + 130 (Weight of end block A, B assembly) + Weight (g) of DIN rail

∗2 When measuring ITV analog output from 1 to 5 VDC, if the load impedance is less than 100 kΩ, the analog output monitor accuracy of ±6% F.S. or less may not be available.
The product with an accuracy of within ±6% is supplied upon your request.
Output pressure remains unaffected.

∗3 When using under the conditions equivalent to IP65, connect the fitting or tube to the breathing hole before use. (For details, refer to "Specific Product Precautions 1" on page 53.)

∗ When there is a downstream flow consumption, pressure may become unstable depending on piping conditions.

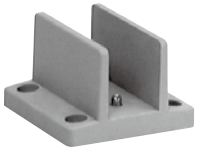
∗ When the input signal is at 0%, the exhaust solenoid valve is controlled to reduce the outlet pressure to zero. For this reason, a noise may be generated. This noise is normal and does not indicate a fault.

Accessories (Option)

Bracket

Flat bracket assembly (including 2 mounting screws)
P39800022

L-bracket assembly (including 2 mounting screws)
P39800023



Tightening torque when assembling is 0.3 N·m.

Cable connector

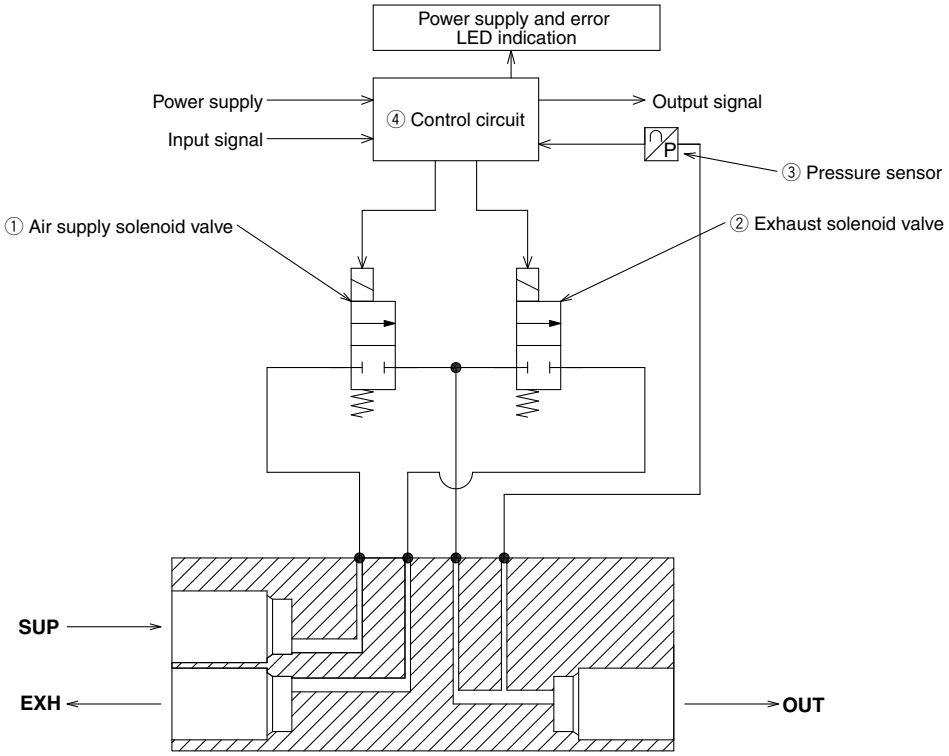
Straight type
M8-4DSX3MG4

Right angle type
P398000-501-2

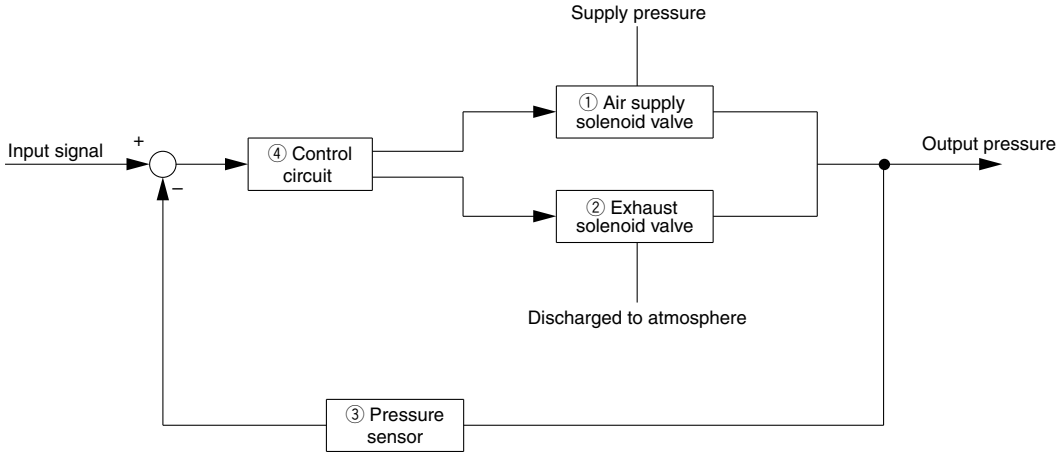
Working Principle

When the input signal rises, the air supply solenoid valve ① turns ON. Due to this, part of the supply pressure passes through the air supply solenoid valve ① and changes to output pressure. This output pressure feeds back to the control circuit ④ via the pressure sensor ③. Here, pressure corrections continue until output pressure becomes proportional to the input signal, enabling output pressure that is proportional to the input signal.

Working Principle Diagram

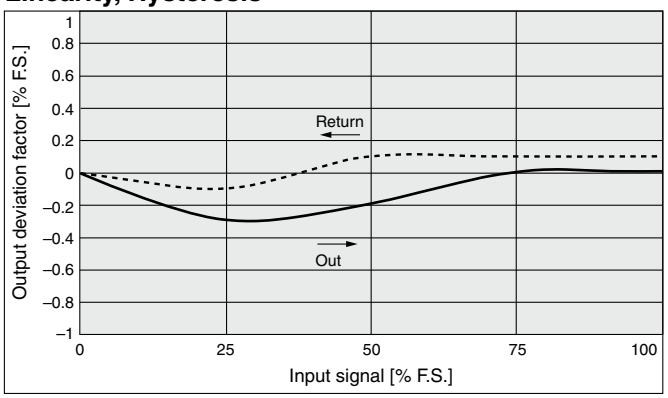


Block Diagram



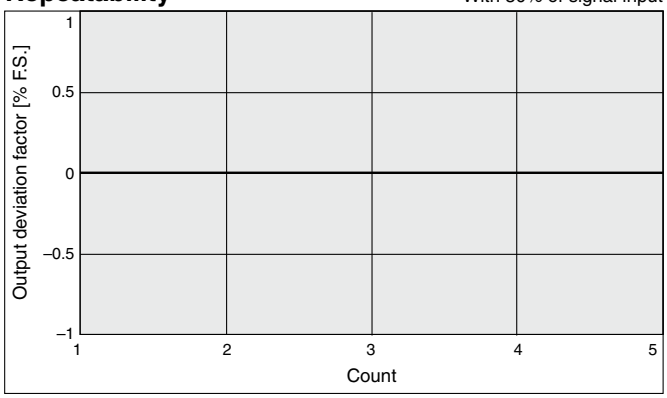
ITV001□ Series

Linearity, Hysteresis



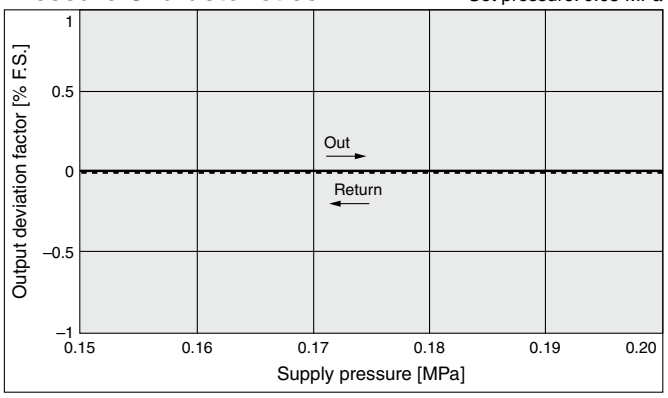
Repeatability

With 50% of signal input



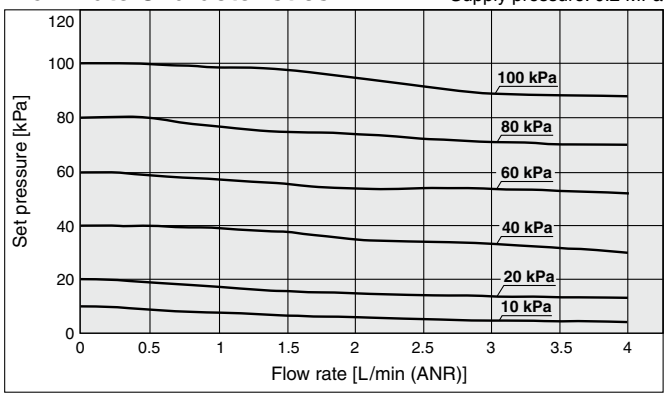
Pressure Characteristics

Set pressure: 0.05 MPa



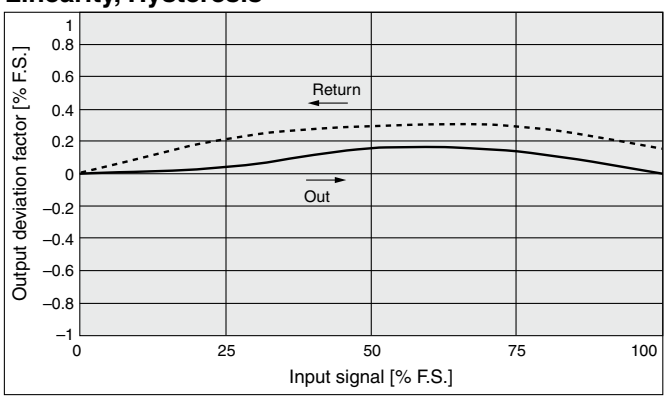
Flow Rate Characteristics

Supply pressure: 0.2 MPa



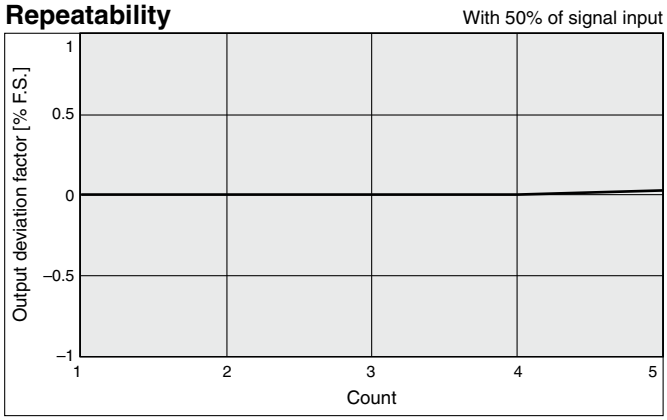
ITV003□ Series

Linearity, Hysteresis



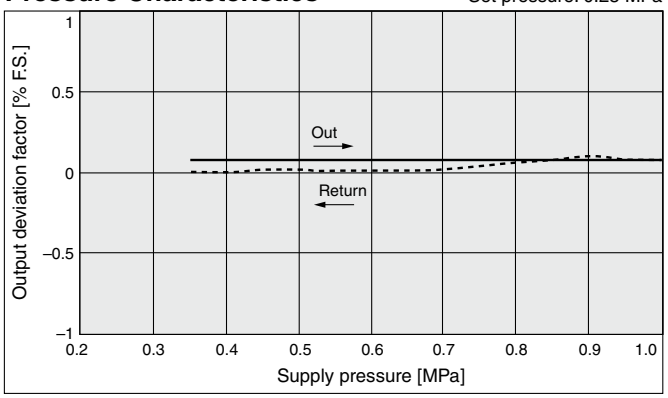
Repeatability

With 50% of signal input



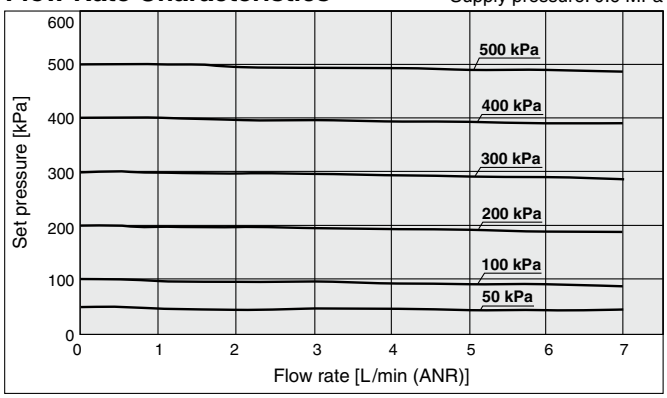
Pressure Characteristics

Set pressure: 0.25 MPa



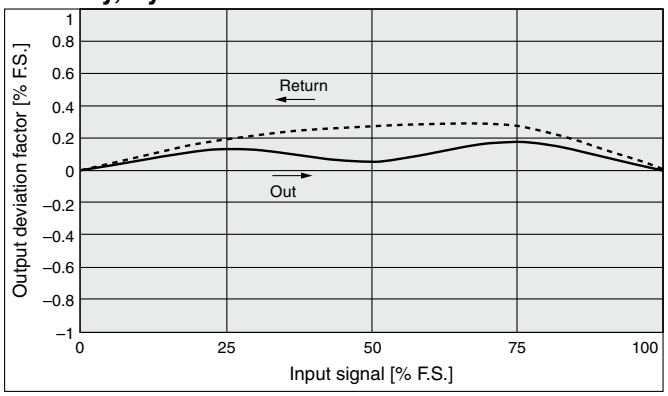
Flow Rate Characteristics

Supply pressure: 0.6 MPa



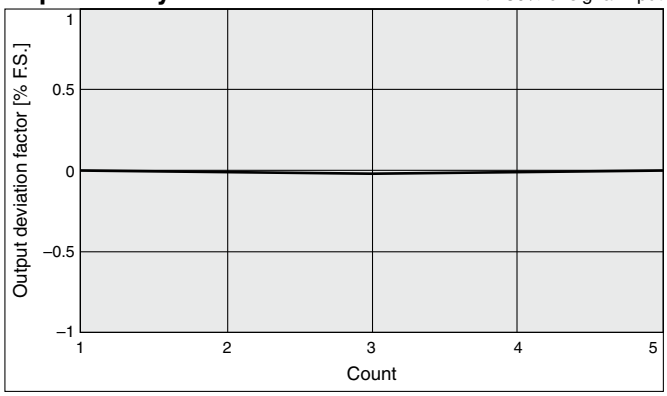
ITV005□ Series

Linearity, Hysteresis



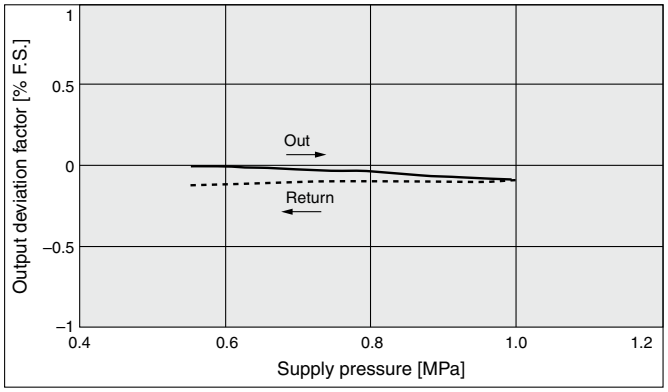
Repeatability

With 50% of signal input



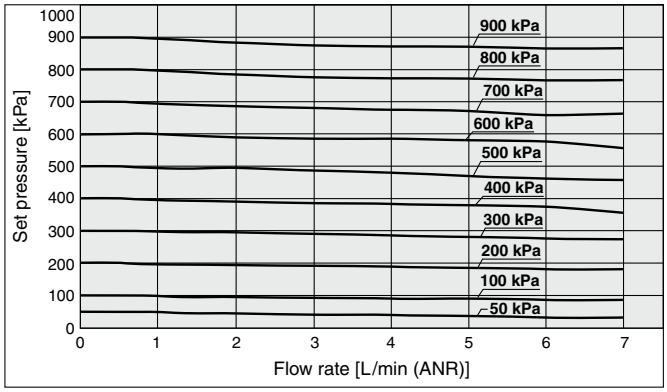
Pressure Characteristics

Set pressure: 0.45 MPa



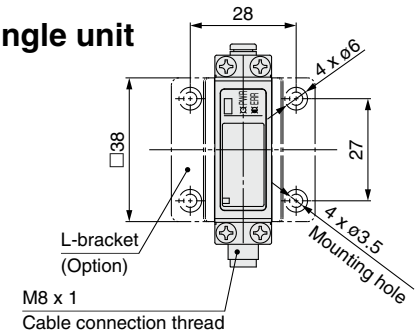
Flow Rate Characteristics

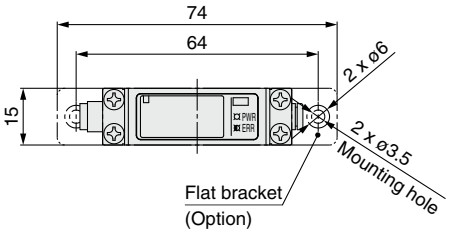
Supply pressure: 1.0 MPa

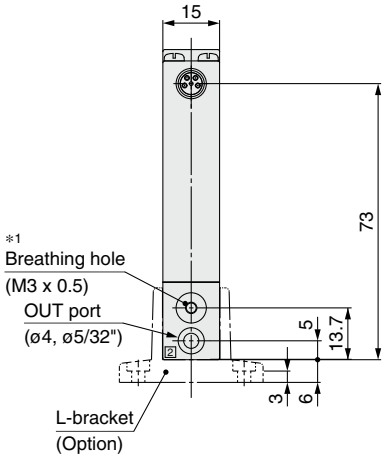


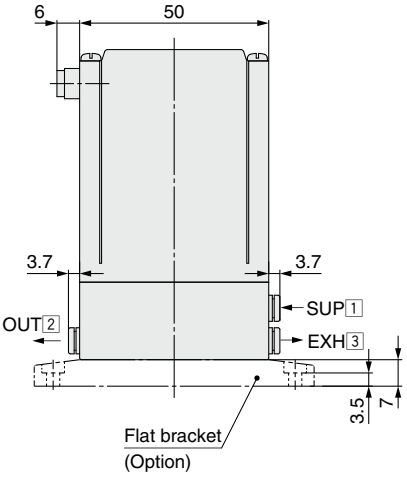
Dimensions

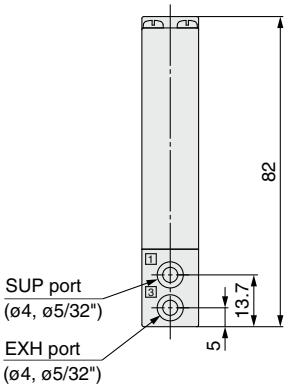
For single unit





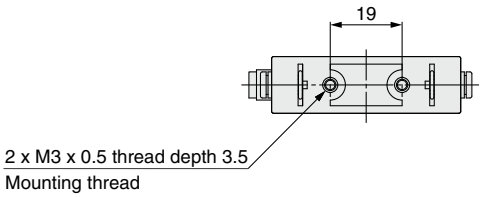




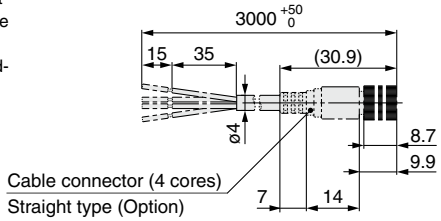


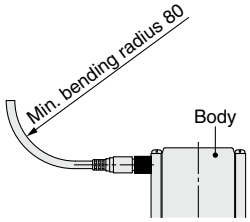
Port Location

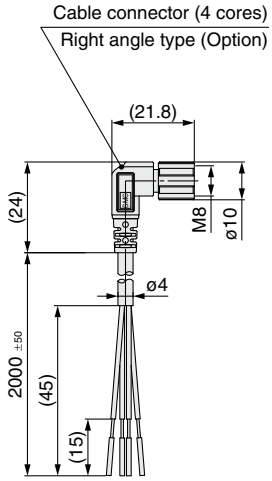
No.	1	2	3
1 ITV003□ 5	SUP	OUT	EXH

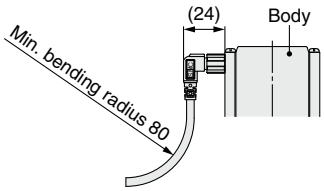


*1 When using under the conditions equivalent to IP65, connect the fittings or tube to the breathing hole before use.
(For details, refer to "Specific Product Precautions 1" on page 53.)



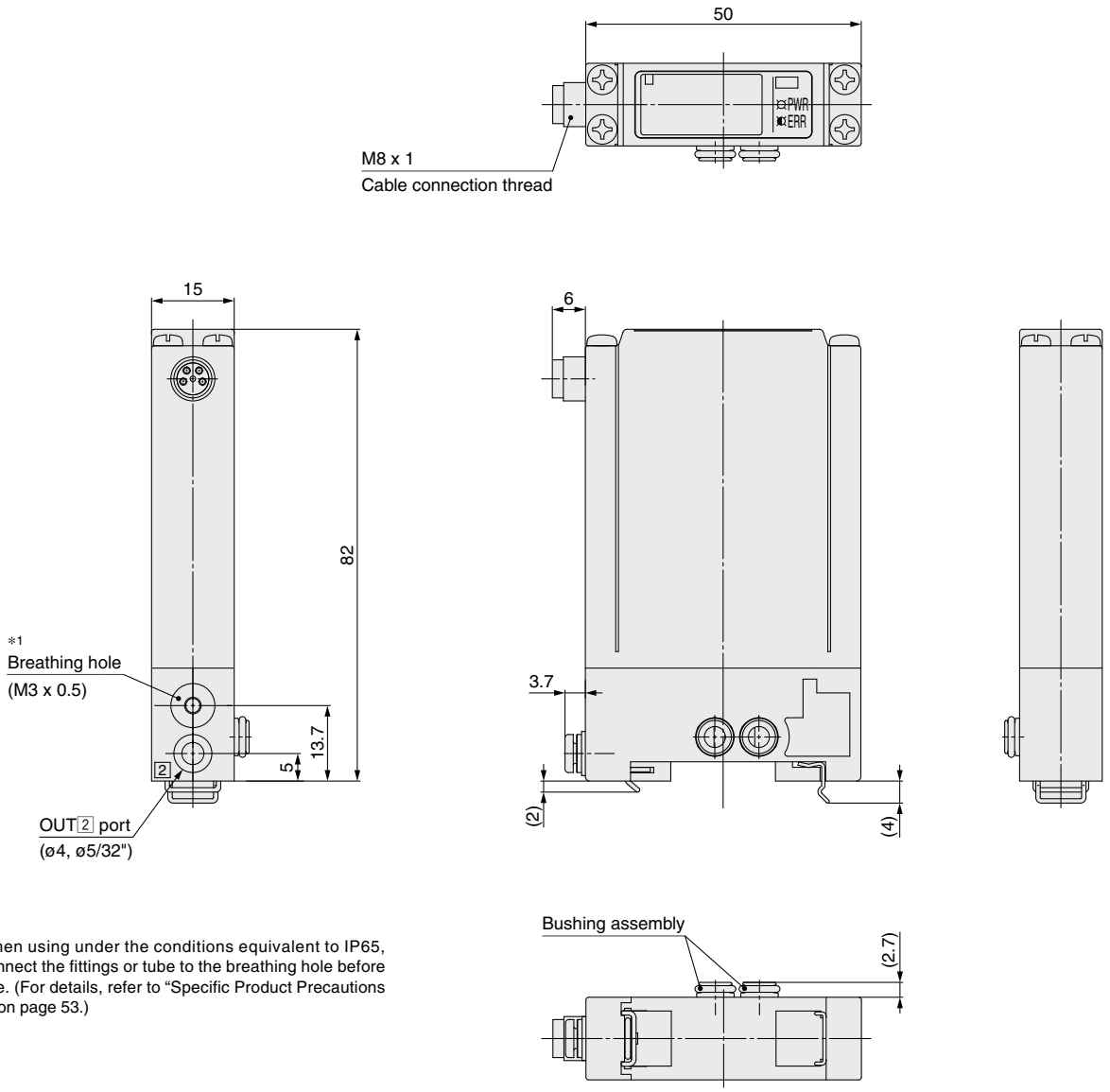






Dimensions

Single unit for manifold

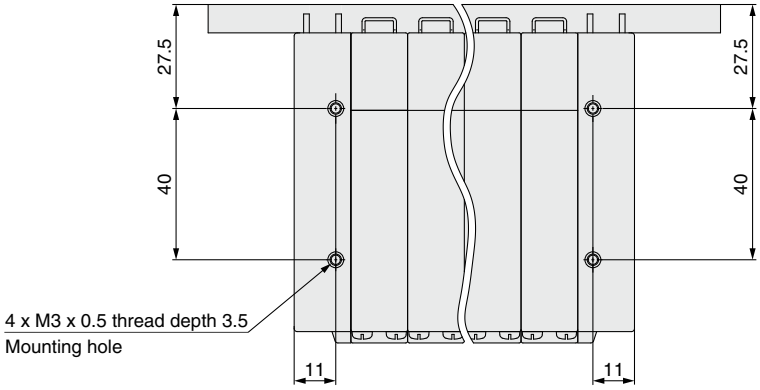


*1 When using under the conditions equivalent to IP65, connect the fittings or tube to the breathing hole before use. (For details, refer to “Specific Product Precautions 1” on page 53.)

* For dimensions of the cable connector, refer to single unit on page 10.

Dimensions

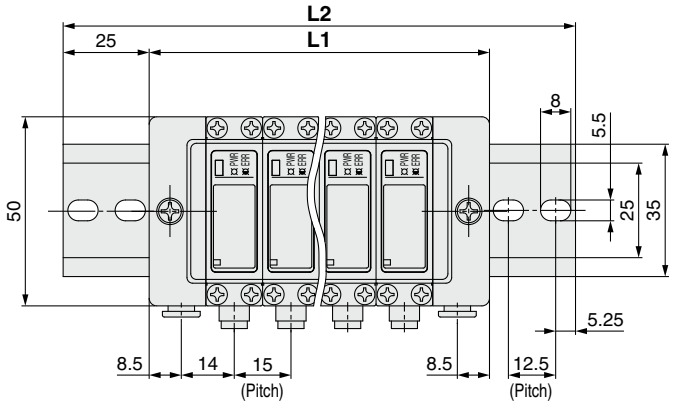
Manifold

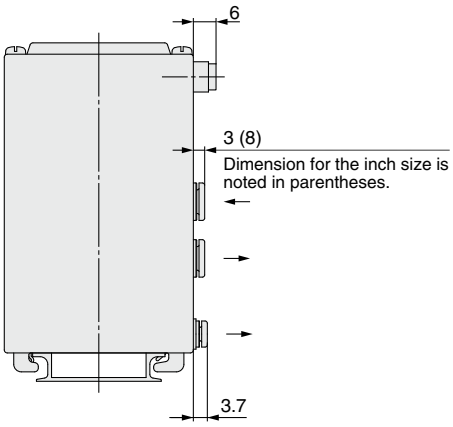


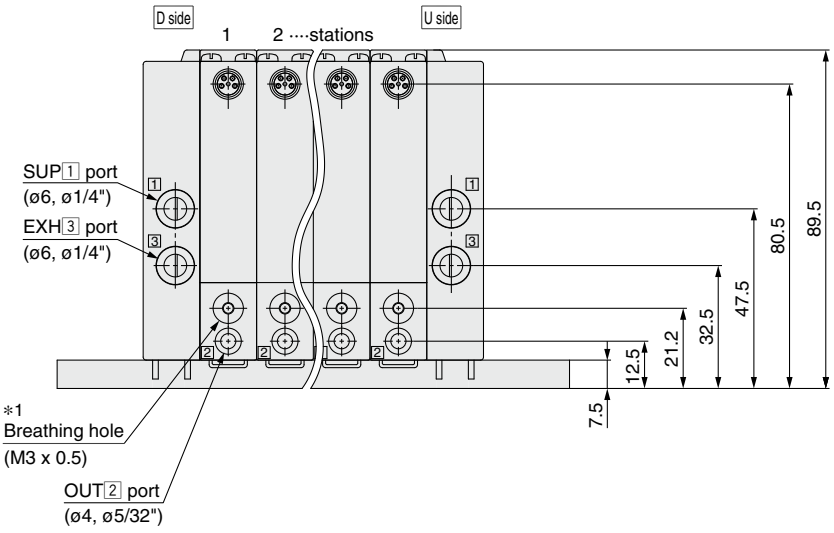
Port Location

No.	1	2	3
1 ITV003□ 5	SUP	OUT	EXH

∗ Stations are counted starting from the D side.







∗ For dimensions of the cable connector, refer to single unit on page 10.

∗1 When using under the conditions equivalent to IP65, connect the fittings or tubing to the breathing hole before use.
(For details, refer to "Specific Product Precautions 1" on page 53.)

[mm]

Manifold stations n	2	3	4	5	6	7	8	9	10
L1	60	75	90	105	120	135	150	165	180
L2	110.5	123	148	160.5	173	185.5	198	223	235.5
Weight of DIN rail [g]	20	22	27	29	31	34	36	41	43

Electro-Pneumatic Regulator
ITV1000/2000/3000 Series

How to Order

ITV 3 0 1 0 – 0 1 □ 2 □ S □ – □□

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

∗ The communication models (CC, DE, PR, RC, and IL), 16 points preset input, and 10-bit digital input options are only available for the 24 VDC.

Input signal/ Communication model

0	Current type 4 to 20 mADC (Sink type)
1	Current type 0 to 20 mADC (Sink type)
2	Voltage type 0 to 5 VDC
3	Voltage type 0 to 10 VDC
40	4 points preset input
52	16 points preset input (Switch output/NPN output)
53	16 points preset input (Switch output/PNP output)
60	10-bit digital input
CC	CC-Link
DE	DeviceNet™
PR	PROFIBUS DP
RC	RS-232C communication
IL	IO-Link

Monitor output

1	Analog output 1 to 5 VDC
2	Switch output/NPN output
3	Switch output/PNP output
4	Analog output 4 to 20 mADC (Sink type)
Nil	None

Thread type

Nil	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)

Bracket∗1

Nil	Without bracket
B	Flat bracket
C	L-bracket

∗1 The bracket is included.

Cable connector type

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

∗ Even when a cable connector is selected, a communication cable is not included for the communication models CC, DE, and PR. Please order it separately. Refer to the table below.
For 10-bit digital input, the right angle type cannot be selected.

Pressure display unit

Nil	MPa
2∗1	kgf/cm²
3	bar
4∗1	psi
5	kPa

∗1 This product is for overseas use only according to the New Measurement Act. (The SI unit type is provided for use in Japan.) For the communication models CC, DE, PR, and RC, only "Nil" is available as it does not have a pressure display.

Made to order

Refer to page 15 for details.

The simple specials system can be used to change the input and output ranges.

∗ The input and output values are limited to the following ranges.

· Input signal: Current type 0 to 20 mA
Voltage type 0 to 10 VDC

· Output pressure: 0.005 to 0.9 MPa/5-900kPa

Please contact your local sales representative for more details.

For communication cables, use the parts listed below
(Refer to the M8/M12 connector in the **Web Catalog** for details.)
or order a product certified for the respective protocol (with M12 connector) separately.

Application	Communication cable part no.	Note
CC-Link compatibility	PCA-1567720 (Socket type)	A dedicated Bus adapter is included with the product.
	PCA-1567717 (Plug type)	
DeviceNet™ compatibility	PCA-1557633 (Socket type)	A T-branch connector is not included with the product.
	PCA-1557646 (Plug type)	
PROFIBUS DP compatibility	PCA-1557688 (Socket type)	A T-branch connector is not included with the product.
	PCA-1557691 (Plug type)	

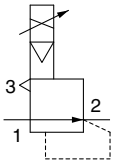
ITV1000

ITV2000

ITV3000

Serial-communications model

Symbol



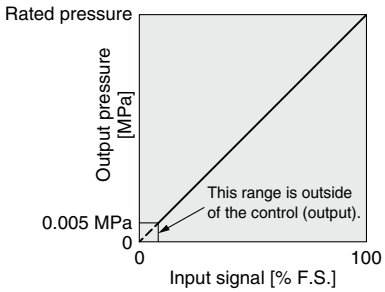


Fig. 1 Input/output characteristics chart

Standard Specifications

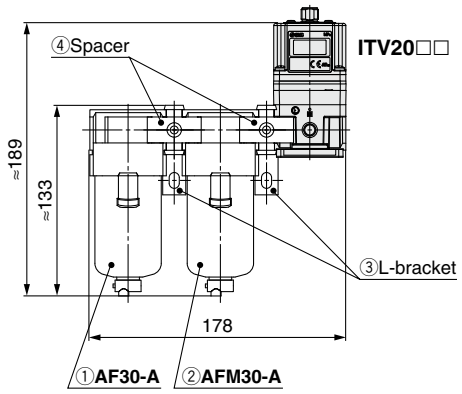
Model		ITV101□*7 / ITV201□ / ITV301□	ITV103□*7 / ITV203□ / ITV303□	ITV105□*7 / ITV205□ / ITV305□
Min. supply pressure		Set pressure + 0.1 MPa		
Max. supply pressure		0.2 MPa	1.0 MPa	
Set pressure range*1		0.005 to 0.1 MPa	0.005 to 0.5 MPa	0.005 to 0.9 MPa
Power supply	Voltage	24 VDC ±10%, 12 to 15 VDC		
	Current consumption	Power supply voltage 24 VDC type: 0.12 A or less*8 Power supply voltage 12 to 15 VDC type: 0.18 A or less		
Input signal*8	Current type*2	4 to 20 mADC, 0 to 20 mADC (Sink type)		
	Voltage type	0 to 5 VDC, 0 to 10 VDC		
	Preset input	4 points (Negative common), 16 points (No common polarity)		
	Digital input	10 bits (Parallel)		
Input impedance	Current type	250 Ω or less*6		
	Voltage type	Approx. 6.5 kΩ		
	Preset input	Power supply voltage 24 VDC type: Approx. 4.7 kΩ Power supply voltage 12 VDC type: Approx. 2.0 kΩ		
	Digital input	Approx. 4.7 kΩ		
Output signal (Monitor output)*3	Analog output	1 to 5 VDC (Output impedance: Approx. 1 kΩ) 4 to 20 mADC (Sink type) (Output impedance: 250 Ω or less) Output accuracy ±6% F.S. or less		
	Switch output	NPN open collector output: Max. 30 V, 80 mA PNP open collector output: Max. 80 mA		
Linearity		±1% F.S. or less		
Hysteresis		0.5% F.S. or less		
Repeatability		±0.5% F.S. or less		
Sensitivity		0.2% F.S. or less		
Temperature characteristics		±0.12% F.S./°C or less		
Output pressure display*4	Accuracy	±2% F.S. ±1 digit or less		
	Min. unit	MPa: 0.001, kgf/cm²: 0.01, bar: 0.01, psi: 0.1*5, kPa: 1		
Ambient and fluid temperatures		0 to 50°C (No condensation)		
Enclosure		IP65		
Weight*8, *9	ITV10□□	Approx. 250 g (Without options)		
	ITV20□□	Approx. 350 g (Without options)		
	ITV30□□	Approx. 645 g (Without options)		

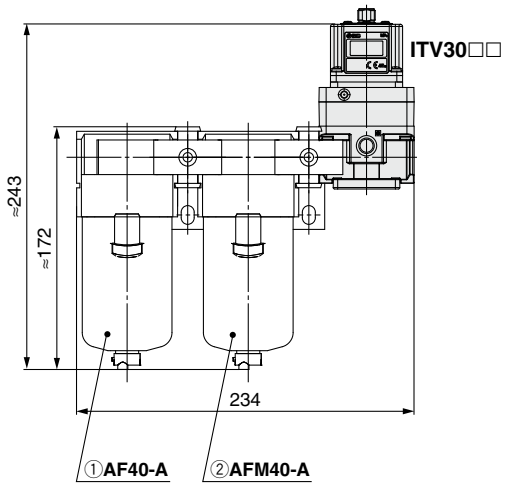
∗1 Please refer to Fig. 1 for the relationship between set pressure and input. Because the max. set pressure differs for each pressure display, refer to page 58.
∗2 2-wire type 4 to 20 mADC is not available. Power supply voltage (24 VDC or 12 to 15 VDC) is required.
∗3 Select either analog output or switch output.
Further, when switch output is selected, select either NPN output or PNP output.
When measuring ITV analog output from 1 to 5 VDC, if the load impedance is less than 100 kΩ, the analog output monitor accuracy of within ±6% (full span) may not be available. The product with the accuracy of within ±6% is supplied upon your request. Output pressure remains unaffected.
∗4 Adjustment of numerical values such as the zero/span adjustment or preset input type is set based on the min. units for output pressure display (e.g. 0.001 to 0.500 MPa). Note that the unit cannot be changed.
∗5 The min. unit for 0.9 MPa (130 psi) types is 1 psi.
∗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 mADC.
∗7 The ITV1000 series is a grease-free specification (parts in contact with fluid).
∗8 Refer to the table below for communication specifications.
∗9 Add 50 g for digital input type, 70 g for 16 points preset input type respectively.
∗ The above characteristics are confined to the static state. When air is consumed on the output side, the pressure may fluctuate.
∗ When using under IP65 conditions, connect the fitting or tube to the solenoid valve EXH before use. (For details, refer to “Specific Product Precautions 4” on page 56.)

Communication Specifications (CC, DE, PR, RC, IL)

Model		ITV□0□0-CC	ITV□0□0-DE	ITV□0□0-PR	ITV□0□0-RC	ITV□0□0-IL
Protocol		CC-Link	DeviceNet™	PROFIBUS DP	RS-232C	IO-Link (Class A)
Version*1		Ver. 1.10	Volume 1 (Edition 3.8), Volume 3 (Edition 1.5)	DP-V0	—	Ver. 1.1
Communication speed		156 k/625 k 2.5 M/5 M/10 Mbps	125 k/250 k/500 kbps	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 Mbps	9.6 kbps	230.4 kbps (COM3)
Configuration file*2		—	EDS	GSD	—	IODD
I/O occupation area (input/output data)		4 words/4 words, 32 bits/32 bits (per station, remote device station)	16 bits/16 bits	16 bits/16 bits	—	4 bytes/2 bytes
Communication data resolution		12 bits (4096 resolution)	12 bits (4096 resolution)	12 bits (4096 resolution)	10 bits (1024 resolution)	12 bits (4096 resolution)
Fail safe		HOLD*3/CLEAR (Switch setting)	HOLD/CLEAR (Switch setting)	CLEAR	HOLD	HOLD/CLEAR
Electric insulation*4		Insulation	Insulation	Insulation	Non-insulation	Non-insulation
Terminating resistor		Built into the product (Switch setting)	Not built into the product	Built into the product (Switch setting)	—	—
Current consumption		0.16 A or less	0.14 A or less	0.16 A or less	0.12 A or less	0.12 A or less
Weight	ITV1000	330	320	350	320	320
	ITV2000	430	420	450	420	420
	ITV3000	730	720	750	720	720

∗1 Please note that versions are subject to change.
∗2 Configuration files can be downloaded from the operation manual page on the SMC website: https://www.smcworld.com
∗3 The output HOLD value when a CC-Link communications error occurs can be set based on the bit area data.
∗4 The insulation between the electrical signal of the communication system and ITV power supply





Modular Products and Accessory Combinations

Applicable products and accessories	Applicable model	
	ITV20□□	**ITV30□□**
① **Air filter**	AF30-A	AF40-A
② **Mist separator**	AFM30-A	AFM40-A
③ **L-bracket**	B310L-A	B410L-A
④ **Spacer**	Y30-A	Y40-A
⑤ **Spacer with L-bracket (③ + ④)**	Y30L-A	Y40L-A
⑥ **Spacer with T-bracket**	—	Y40T-A

∗ For ITV10□□, use a modular adapter (Refer to the **Web Catalog** for details).

Accessories (Option)/Part Nos.

[Bracket]

Applicable model	Description	Part no.	Weight
ITV10□□	Flat bracket assembly (including mounting screws)	P398010-600	90
ITV20□□, 30□□		P398020-600	
ITV10□□	L-bracket assembly (including mounting screws)	P398010-601	
ITV20□□, 30□□		P398020-601	

[Cable connector]

Applicable model	Description		Part no.	Weight
Current type Voltage type 4 points preset input IO-Link	**Cable connector (4 cores)**	**Straight type 3 m**	P398020-500-3	180
		Right angle type 3 m	P398020-501-3	
16 points preset input	**Power cable (4 cores)**	**Straight type 3 m**	P398020-500-3	
		Right angle type 3 m	P398020-501-3	
	Signal cable (5 cores)	**Straight type 3 m**	P398020-502-3	
		Right angle type 3 m	P398020-503-3	
10-bit digital input	**Cable connector (13 cores)**	**Straight type 3 m**	INI-398-0-59	310
CC-Link PROFIBUS DP DeviceNet™	**Power cable (4 cores)**	**Straight type 3 m**	P398020-500-3	180
		Right angle type 3 m	P398020-501-3	
RS-232C	**Power cable (4 cores)**	**Straight type 3 m**	P398020-500-3	
		Right angle type 3 m	P398020-501-3	
	Communication cable (5 cores)	**Straight type 3 m**	P398020-502-3	
		Right angle type 3 m	P398020-503-3	

∗ For the 10-bit digital type, there is no right angle type cable connector.
∗ Even when "with cable connector" is selected, the communication cable is not included in the communication model (CC, DE, and PR). Please order it separately.

[Bus adapter]

Applicable model	Description	Part no.	Weight
CC-Link	**Bus adapter (Included with the product)**	EX9-ACY00-MJ	35

Made to Order

(Refer to pages 34 to 38 for details.)

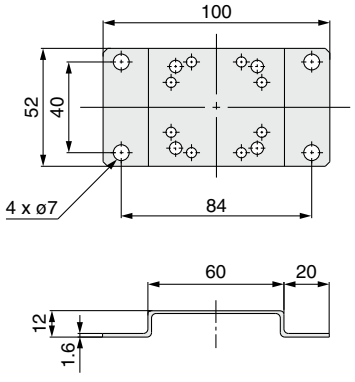
Symbol	Specifications
X102	Reverse type
X224	High-pressure type (SUP 1.2 MPa, OUT 1.0 MPa)
X25	Set pressure range: 1 to 100 kPa (Excludes the ITV3000 series)
X256	Analog output, Current type (Source type)
X88	High-speed response time type (Excludes the ITV3000 series)
X26	For manifold mounting (Excludes the ITV3000 series)
X410	Linearity: ±0.5% F.S. or less
X420	With alarm output

∗ Manifolds are compatible with 2 to 8 stations. Please contact SMC for 9 stations or more.
∗ Products without symbols are also compatible. Please contact SMC separately.
∗ Compliant with CE marking

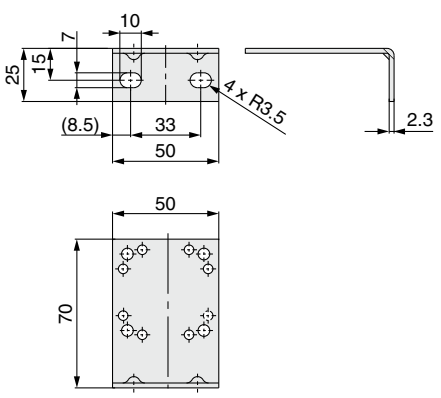
Model	Bracket tightening torque
ITV1000	0.76 ±0.05 N·m
ITV2000/3000	1.5 ±0.05 N·m

Dimensions

Flat bracket



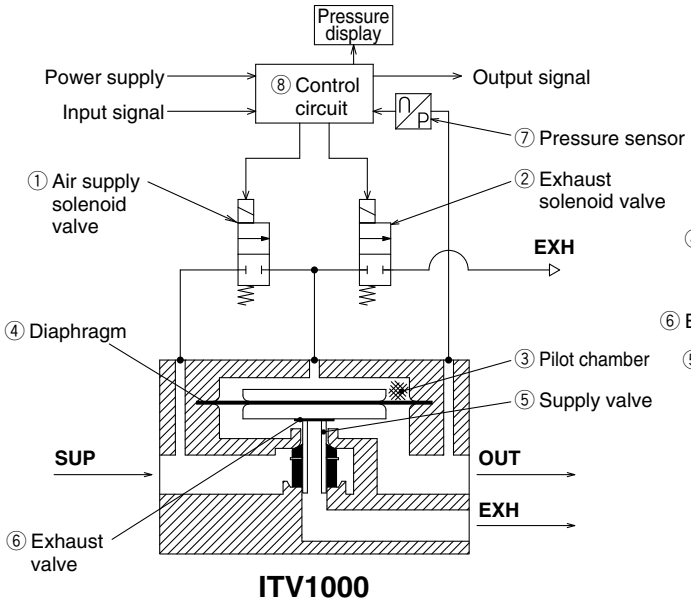
L-bracket



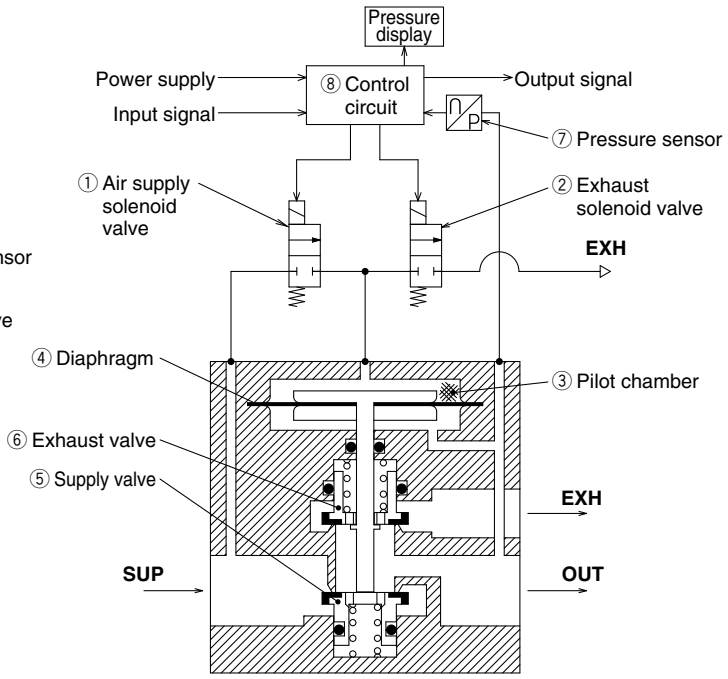
Working Principle

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

Working Principle Diagram

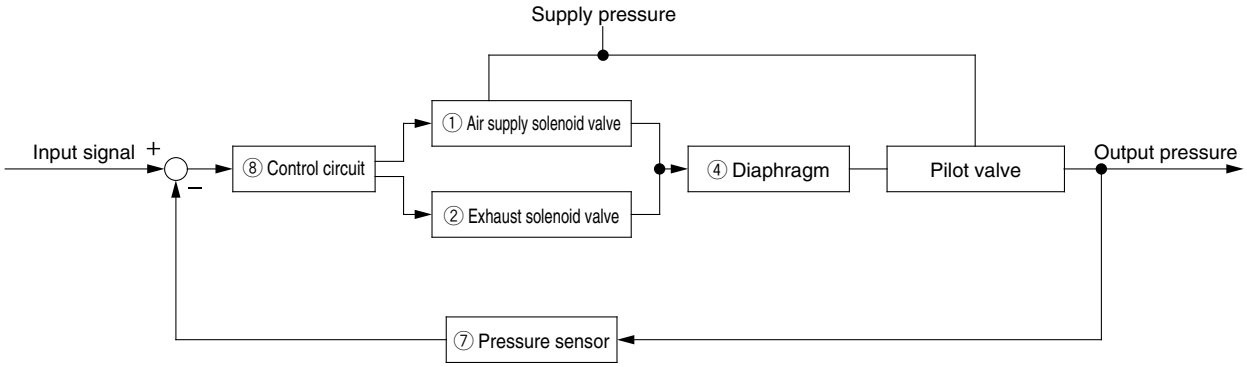


ITV1000



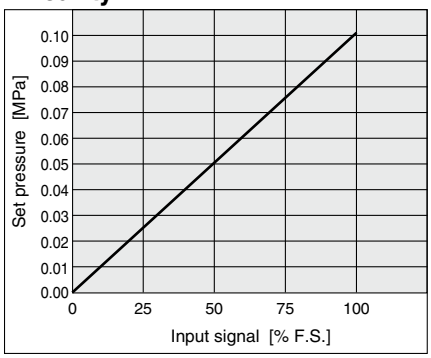
ITV2000/3000

Block Diagram

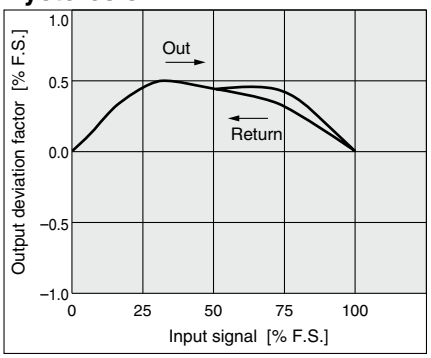


ITV101□ Series

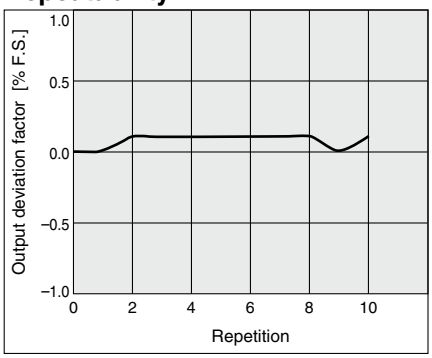
Linearity



Hysteresis

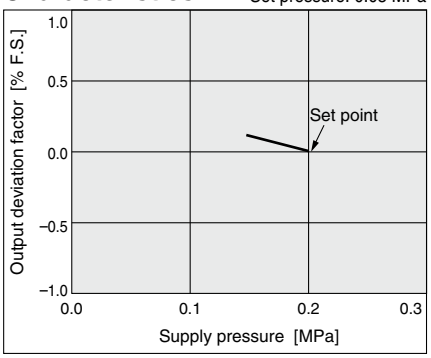


Repeatability



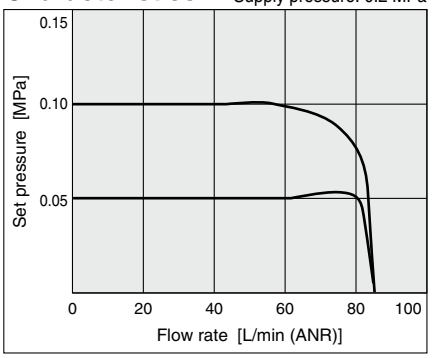
Pressure Characteristics

Set pressure: 0.05 MPa



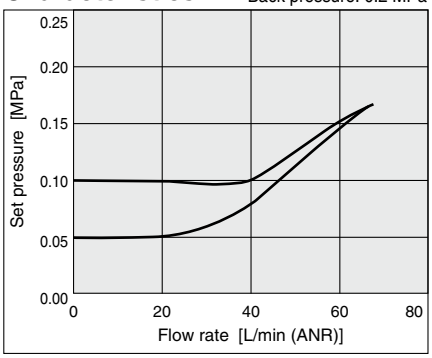
Flow Rate Characteristics

Supply pressure: 0.2 MPa



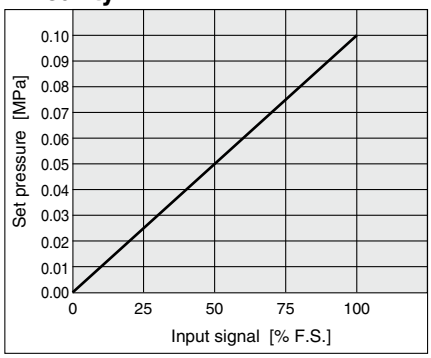
Relief Characteristics

Back pressure: 0.2 MPa

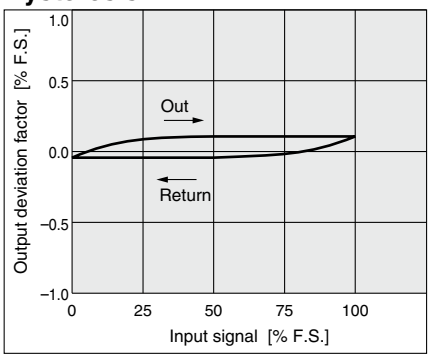


ITV201□ Series

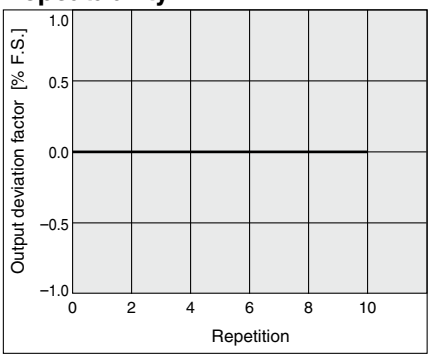
Linearity



Hysteresis

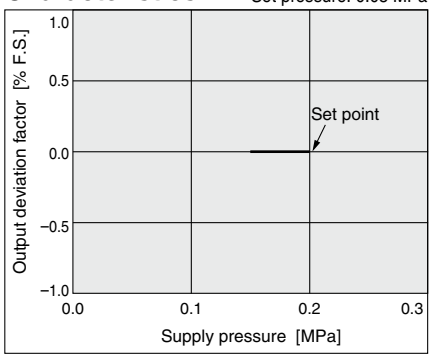


Repeatability



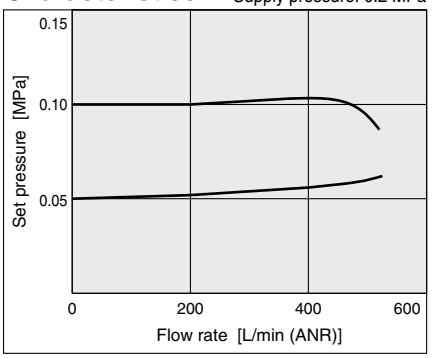
Pressure Characteristics

Set pressure: 0.05 MPa



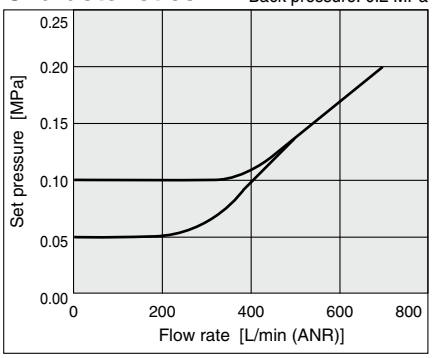
Flow Rate Characteristics

Supply pressure: 0.2 MPa



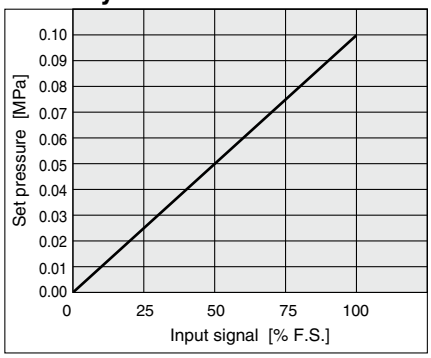
Relief Characteristics

Back pressure: 0.2 MPa

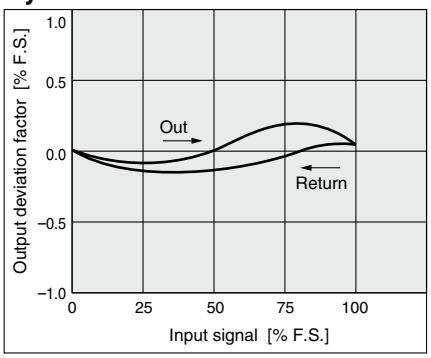


ITV301□ Series

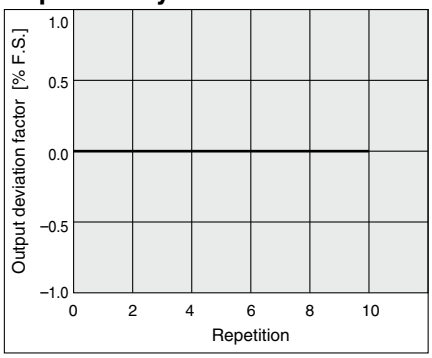
Linearity



Hysteresis

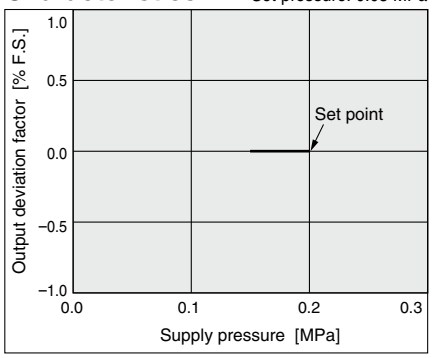


Repeatability



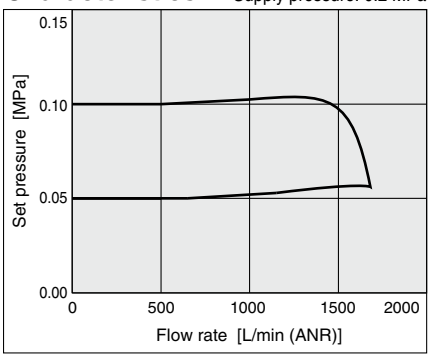
Pressure Characteristics

Set pressure: 0.05 MPa



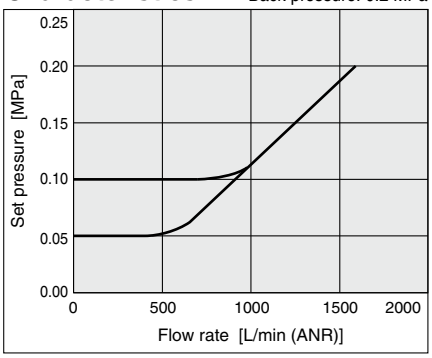
Flow Rate Characteristics

Supply pressure: 0.2 MPa



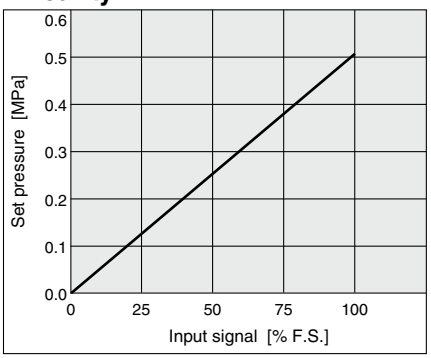
Relief Characteristics

Back pressure: 0.2 MPa

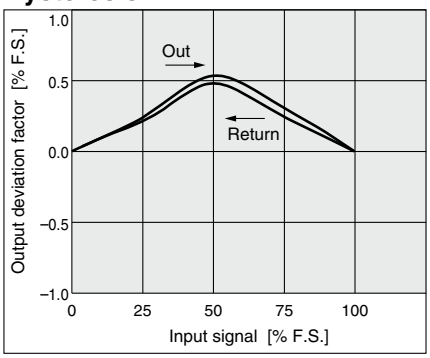


ITV103□ Series

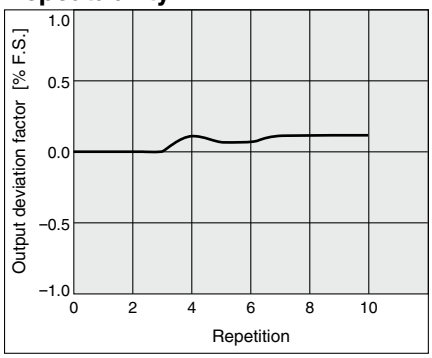
Linearity



Hysteresis

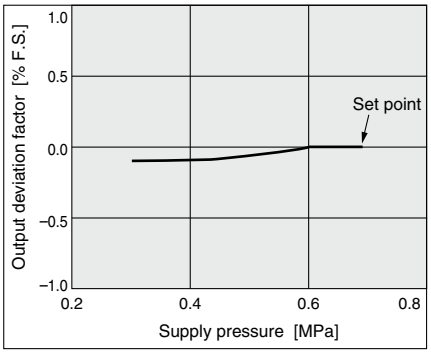


Repeatability



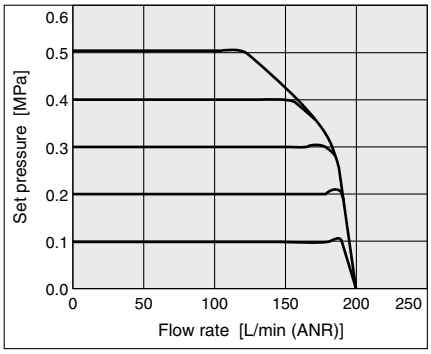
Pressure Characteristics

Set pressure: 0.2 MPa



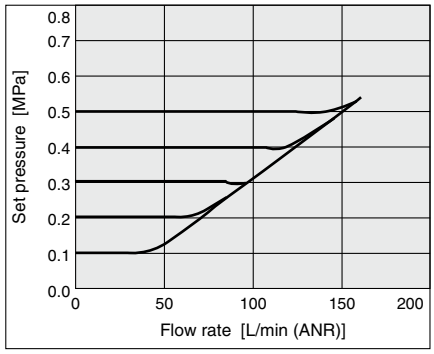
Flow Rate Characteristics

Supply pressure: 0.7 MPa



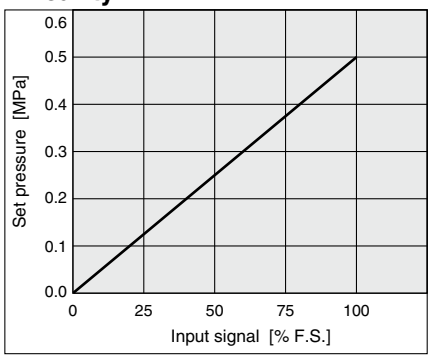
Relief Characteristics

Back pressure: 0.7 MPa

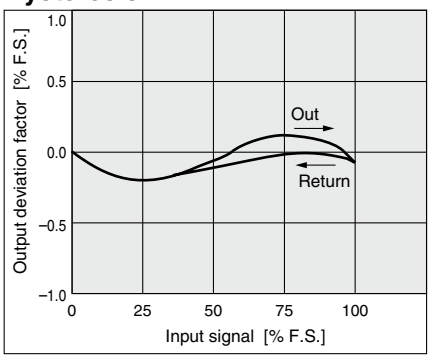


ITV203□ Series

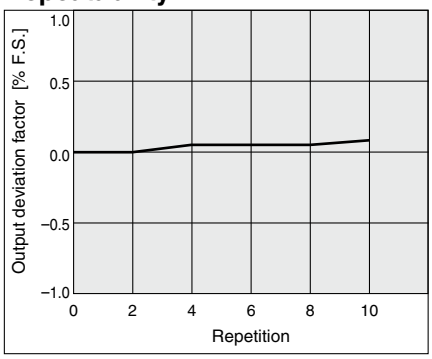
Linearity



Hysteresis

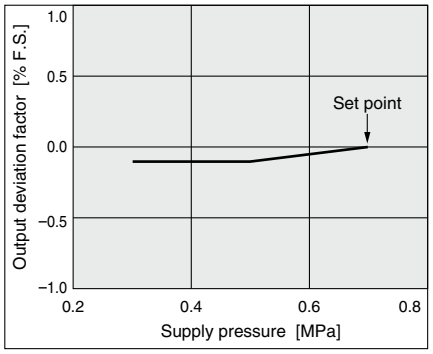


Repeatability



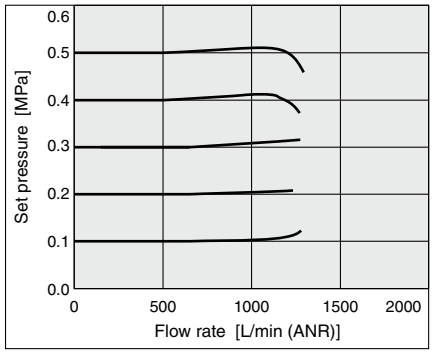
Pressure Characteristics

Set pressure: 0.2 MPa



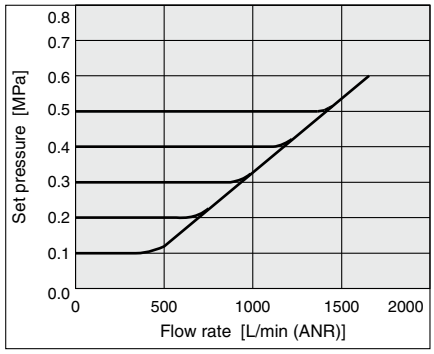
Flow Rate Characteristics

Supply pressure: 0.7 MPa



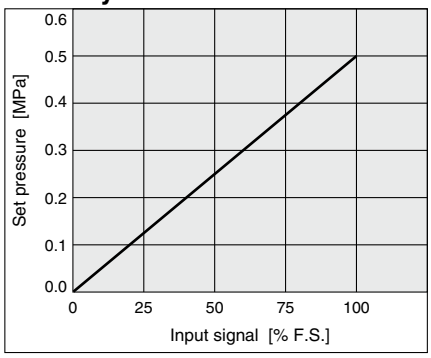
Relief Characteristics

Back pressure: 0.7 MPa

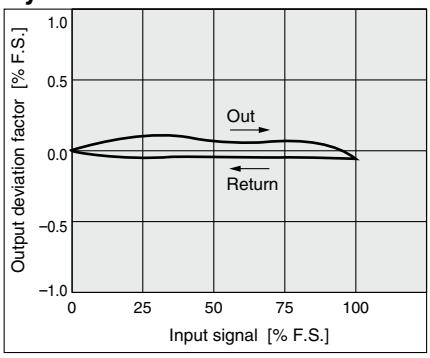


ITV303□ Series

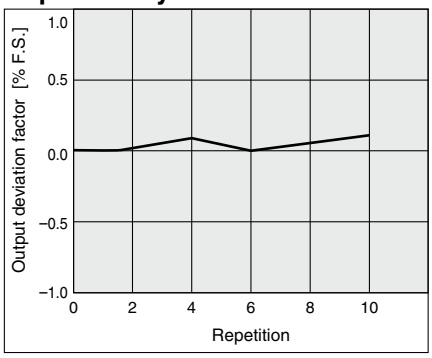
Linearity



Hysteresis

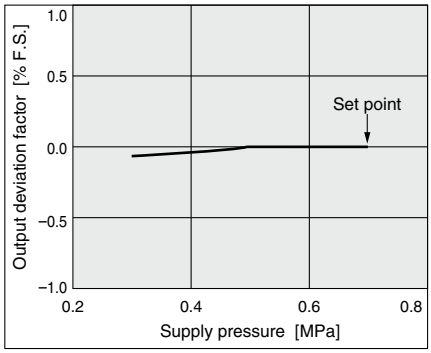


Repeatability



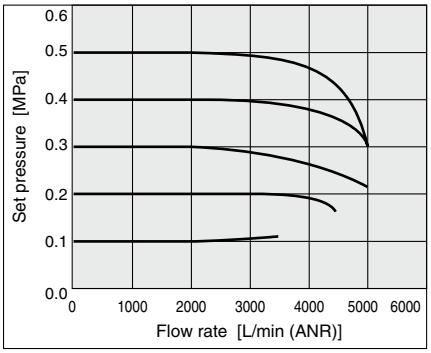
Pressure Characteristics

Set pressure: 0.2 MPa



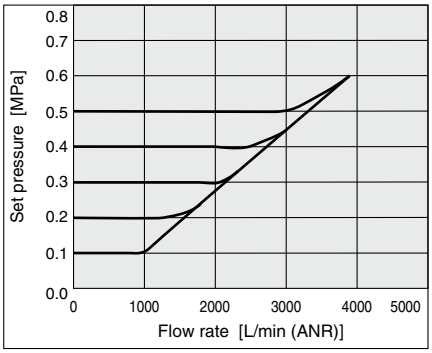
Flow Rate Characteristics

Supply pressure: 0.7 MPa



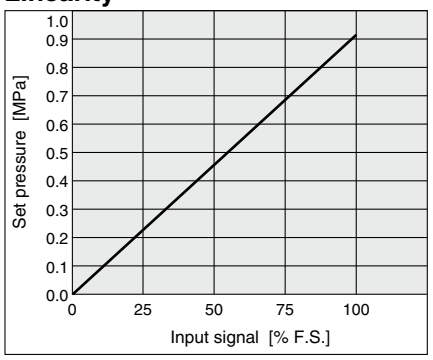
Relief Characteristics

Back pressure: 0.7 MPa

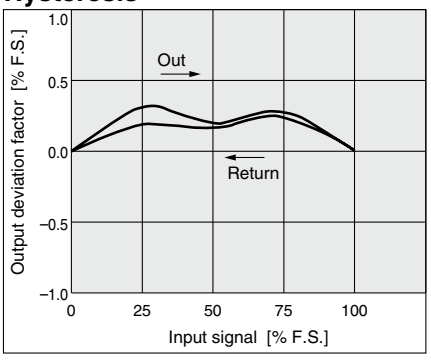


ITV105□ Series

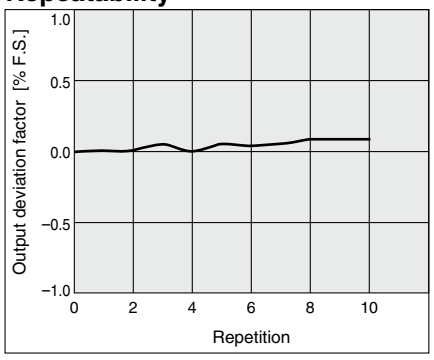
Linearity



Hysteresis

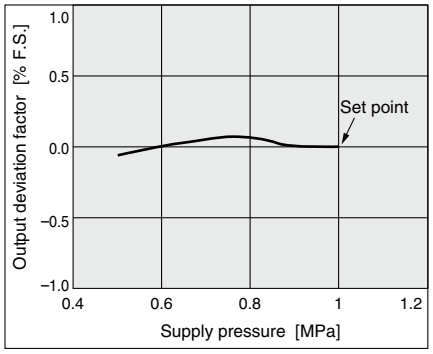


Repeatability



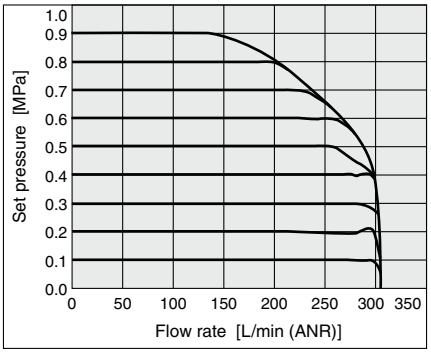
Pressure Characteristics

Set pressure: 0.4 MPa



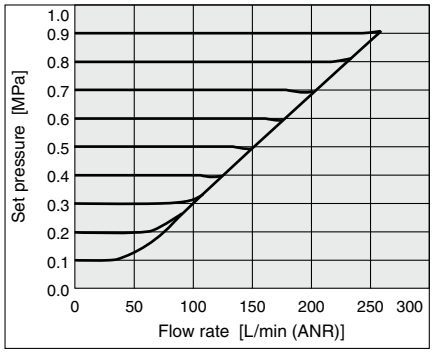
Flow Rate Characteristics

Supply pressure: 1.0 MPa



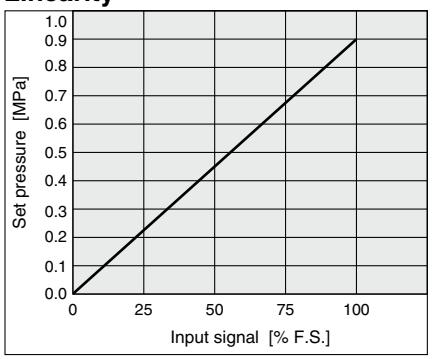
Relief Characteristics

Back pressure: 1.0 MPa

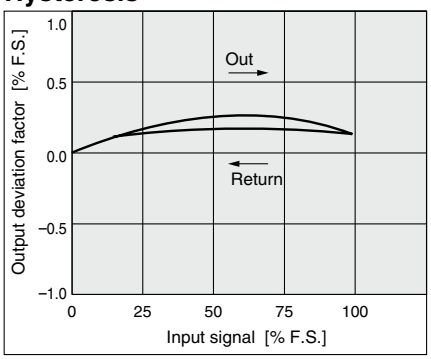


ITV205□ Series

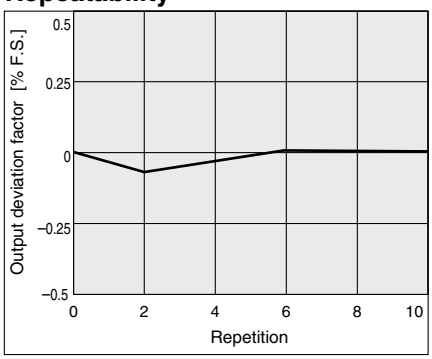
Linearity



Hysteresis

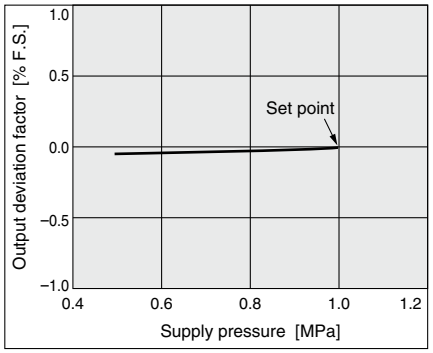


Repeatability



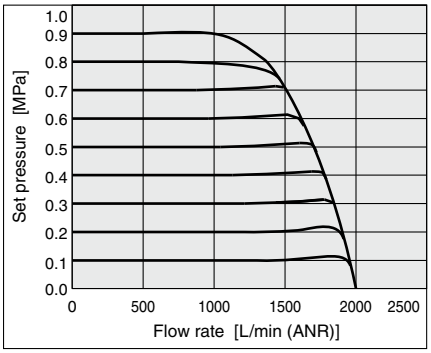
Pressure Characteristics

Set pressure: 0.4 MPa



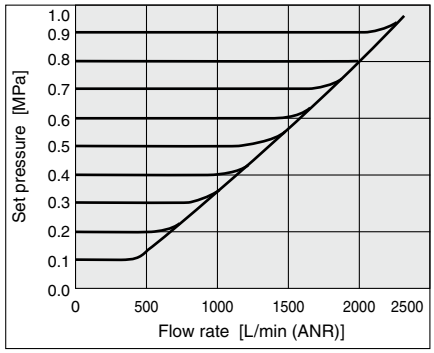
Flow Rate Characteristics

Supply pressure: 1.0 MPa



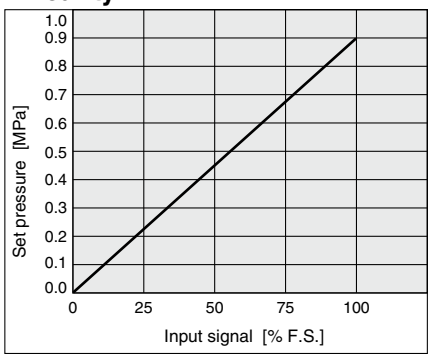
Relief Characteristics

Back pressure: 1.0 MPa

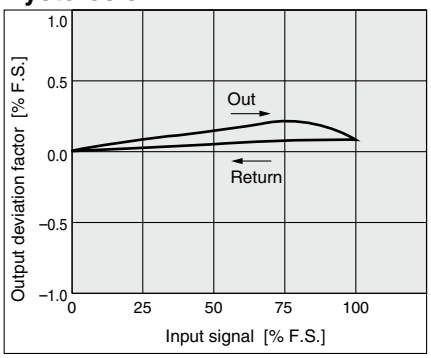


ITV305□ Series

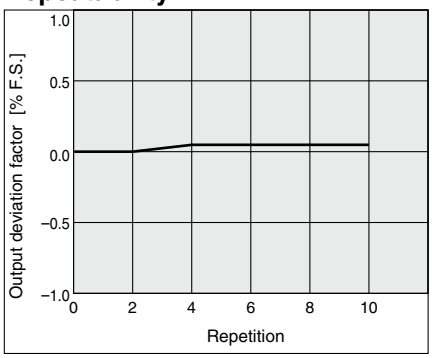
Linearity



Hysteresis

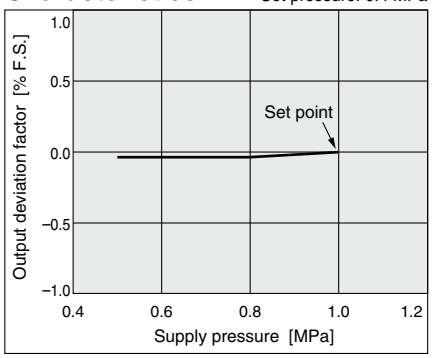


Repeatability



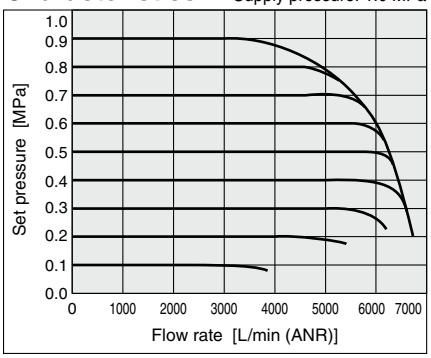
Pressure Characteristics

Set pressure: 0.4 MPa



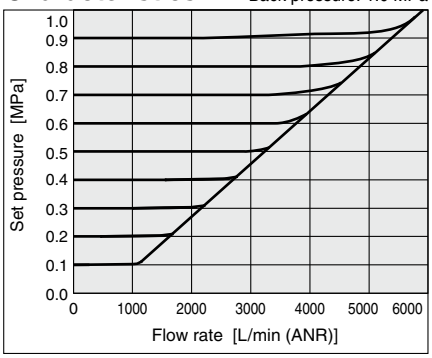
Flow Rate Characteristics

Supply pressure: 1.0 MPa



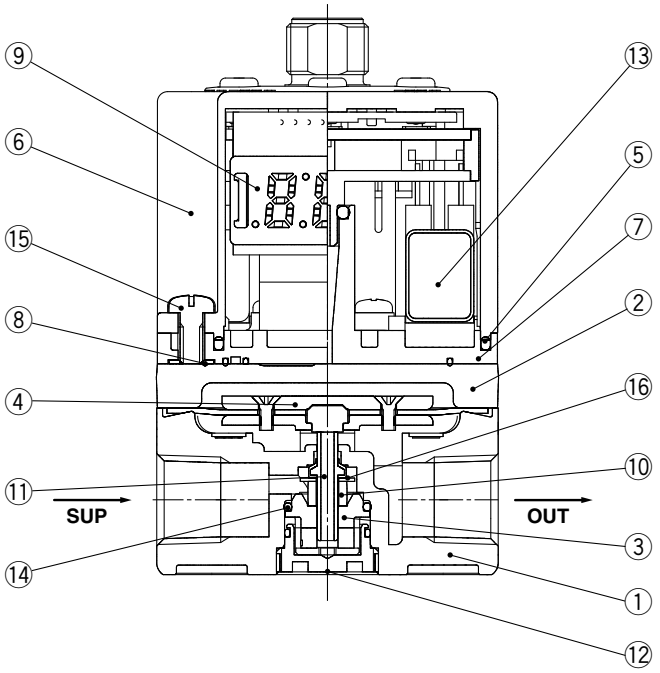
Relief Characteristics

Back pressure: 1.0 MPa



Construction

ITV1000

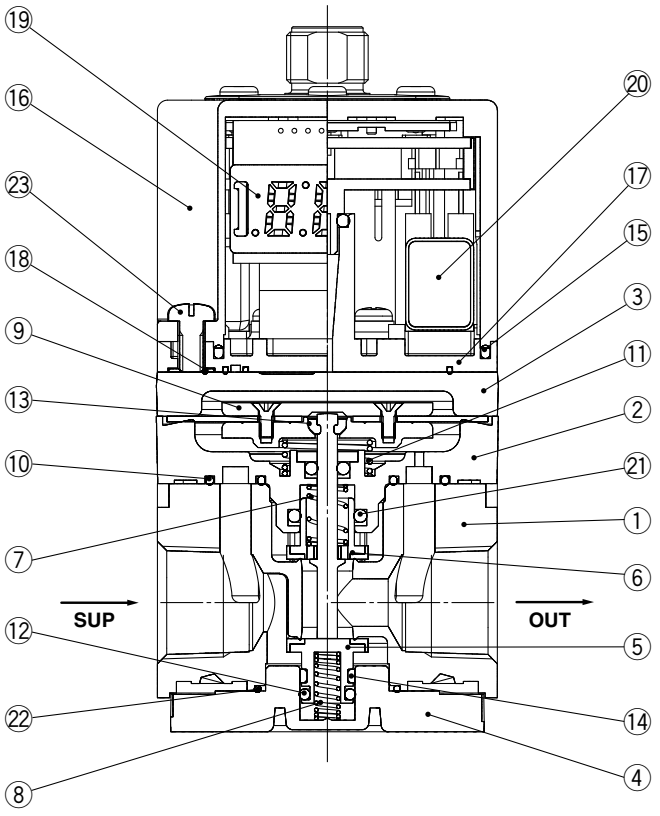


Main Component Parts

	No.	Description	Material
◆	1	Body	Aluminum alloy
	2	Cover	Aluminum alloy
◆	3	Valve guide	Resin
◆	4	Diaphragm assembly	Aluminum alloy
			HNBR
			Steel
	5	Seal	NBR
	6	Bowl assembly	Resin
			Silicone rubber
	7	Sub-plate	Resin
	8	Seal	NBR
	9	Control circuit assembly	—
◆	10	Bumper	NBR
◆	11	Valve	Stainless steel
			HNBR
◆	12	Guide retainer	Aluminum alloy
	13	Solenoid valve	—
◆	14	O-ring	HNBR
	15	Cross recessed round head screw	Steel
◆	16	Flat washer	Stainless steel

∗ Parts in contact with fluid are indicated with a mark ◆.

ITV2000



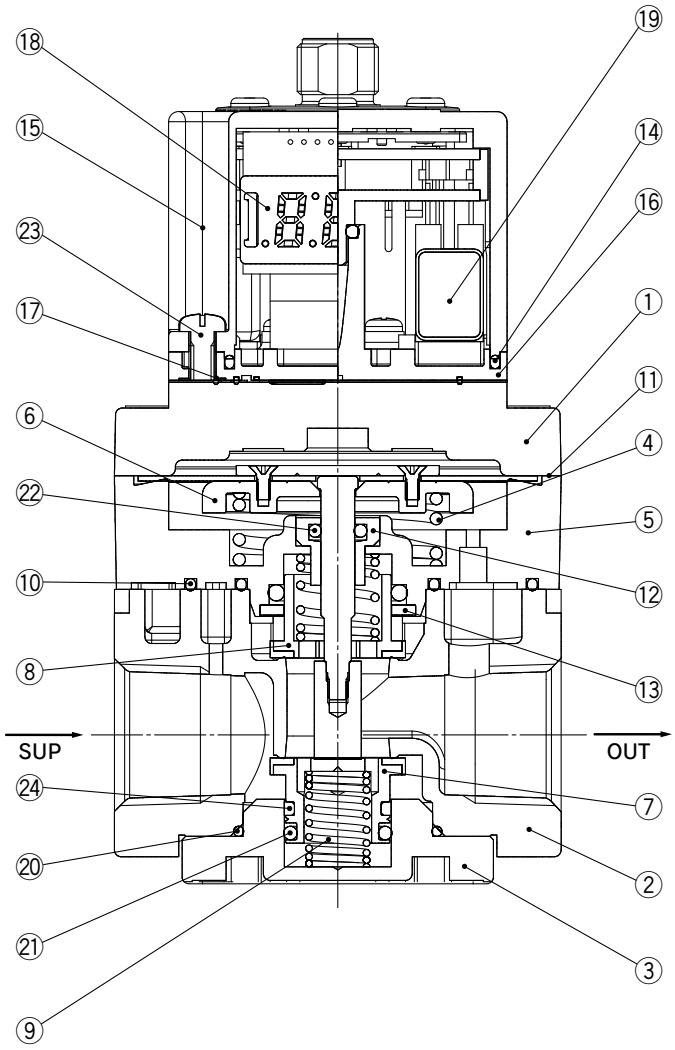
Main Component Parts

	No.	Description	Material
◆	1	Body	Aluminum alloy
◆	2	Intermediate body	Aluminum alloy
	3	Cover	Aluminum alloy
◆	4	Valve guide	Aluminum alloy
◆	5	Valve (Supply valve)	HNBR/Brass
◆	6	Valve (Exhaust valve)	HNBR/Brass
◆	7	Valve spring	Stainless steel
◆	8	Valve spring	Stainless steel
◆	9	Diaphragm assembly	Stainless steel
			Aluminum alloy
			HNBR
			Steel
◆	10	Seal	NBR
◆	11	Bias spring	Stainless steel
◆	12	O-ring	NBR
◆	13	Cotter	Stainless steel
◆	14	Wear ring	Resin
	15	Seal	NBR
	16	Bowl assembly	Resin
			Silicone rubber
	17	Sub-plate	Resin
	18	Seal	NBR
	19	Control circuit assembly	—
	20	Solenoid valve	—
◆	21	O-ring	NBR
	22	O-ring	NBR
	23	Cross recessed round head screw	Steel

∗ Parts in contact with fluid are indicated with a mark ◆.

Construction

ITV3000



Main Component Parts

No.	Description	Material
1	**Cover**	Aluminum alloy
◆ 2	**Body**	Aluminum alloy
◆ 3	**Valve guide**	Aluminum alloy
◆ 4	**Bias spring**	Stainless steel
◆ 5	**Intermediate body**	Aluminum alloy
◆ 6	**Diaphragm assembly**	HNBR
		Stainless steel
		Aluminum alloy
		Steel
◆ 7	**Valve (Supply valve)**	HNBR/Brass
◆ 8	**Valve (Exhaust valve)**	HNBR/Brass
◆ 9	**Valve spring**	Stainless steel
◆ 10	**Seal**	NBR
11	**Seal**	NBR
◆ 12	**Rod guide**	Brass
◆ 13	**O-ring retainer**	Aluminum alloy
14	**Seal**	NBR
15	**Bowl assembly**	Resin
		Silicone rubber
16	**Sub-plate**	Resin
17	**Seal**	NBR
18	**Control circuit assembly**	—
19	**Solenoid valve**	—
20	**O-ring**	NBR
◆ 21	**O-ring**	NBR
◆ 22	**O-ring**	NBR
23	**Cross recessed round head screw**	Steel
◆ 24	**Wear ring**	Resin

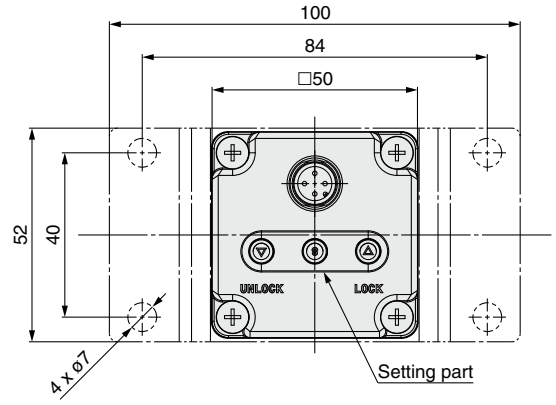
∗ Parts in contact with fluid are indicated with a mark ◆.

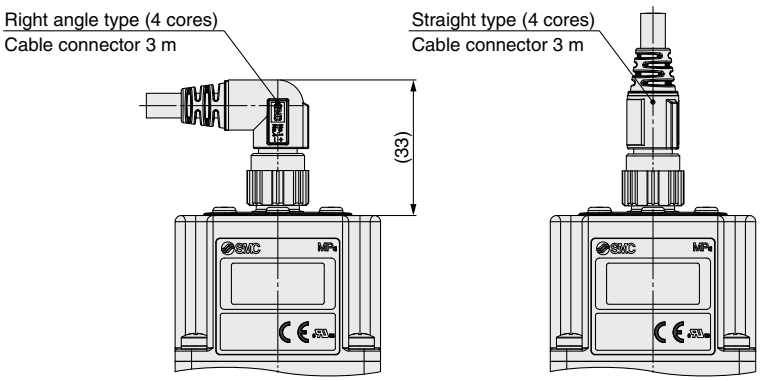
Dimensions

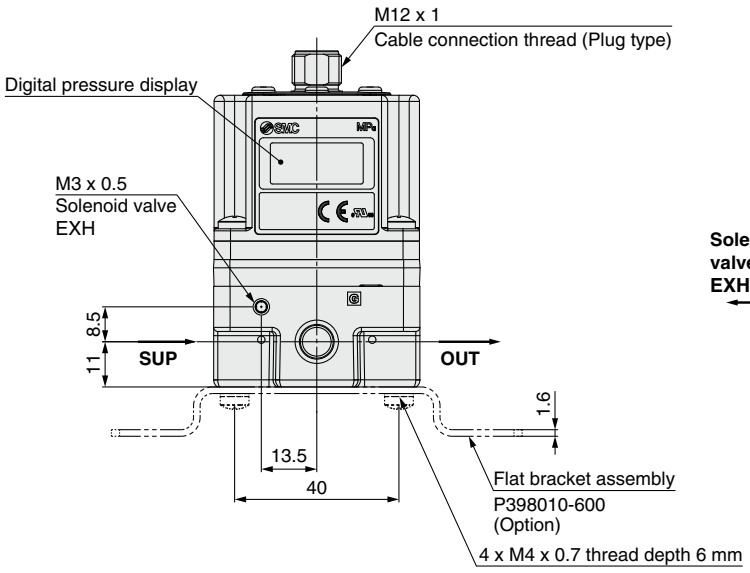
ITV10□□

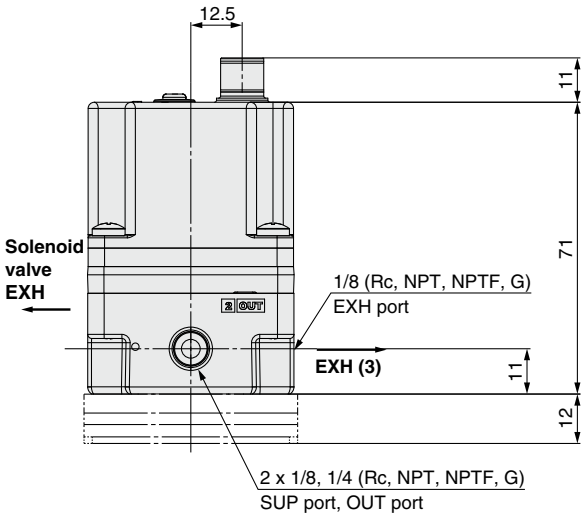
Flat bracket

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

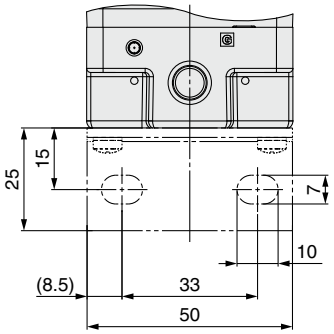


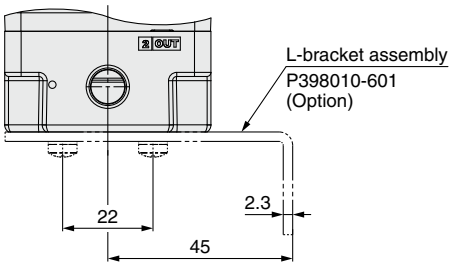






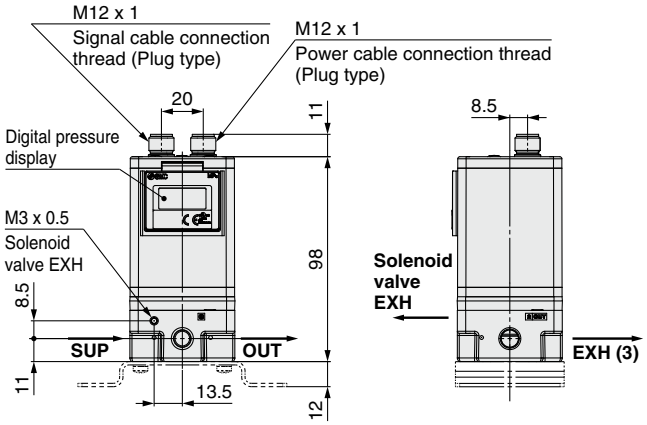
L-bracket



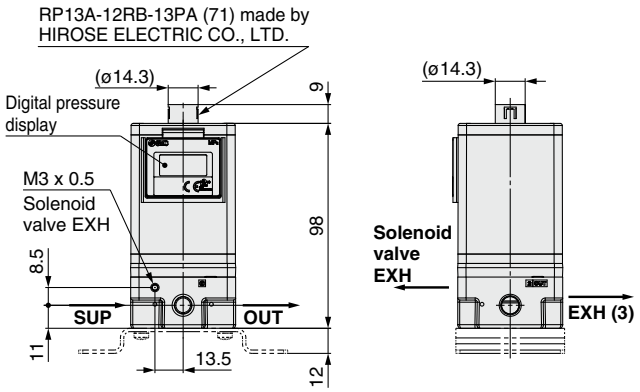


Dimensions (16 points preset input, 10-bit digital input, CC-Link, DeviceNet™)

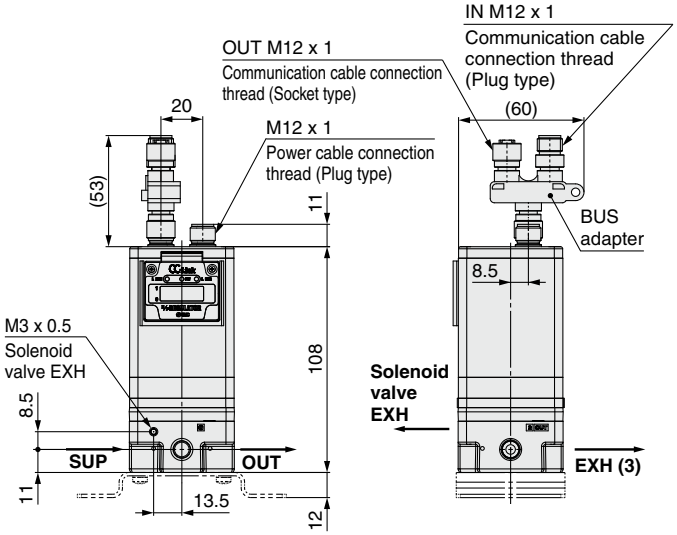
16 points preset input



10-bit digital input

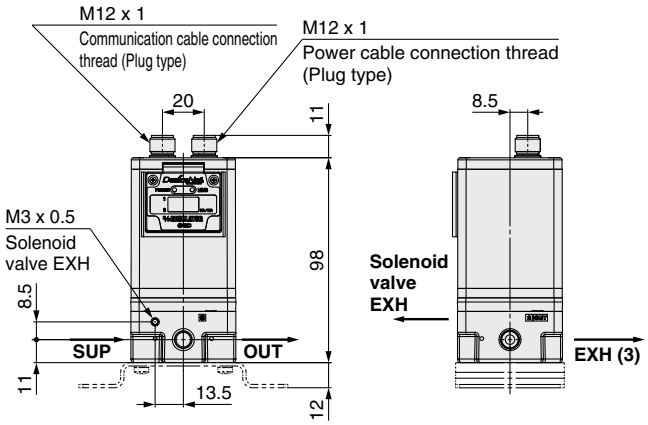


CC-Link: ITV10□0-CC



∗ Dimensions not shown are the same as on page 25.

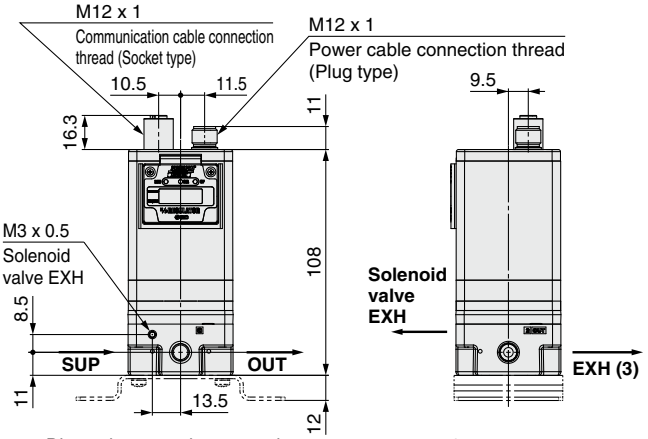
DeviceNet™: ITV10□0-DE



∗ Dimensions not shown are the same as on page 25.

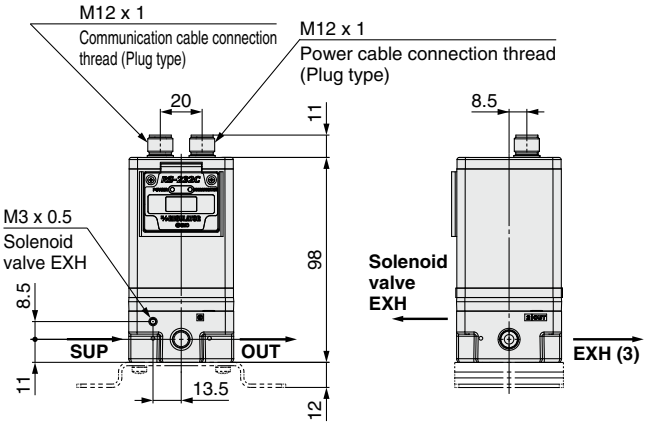
Dimensions (PROFIBUS DP, RS-232C, IO-Link)

PROFIBUS DP: ITV10□0-PR



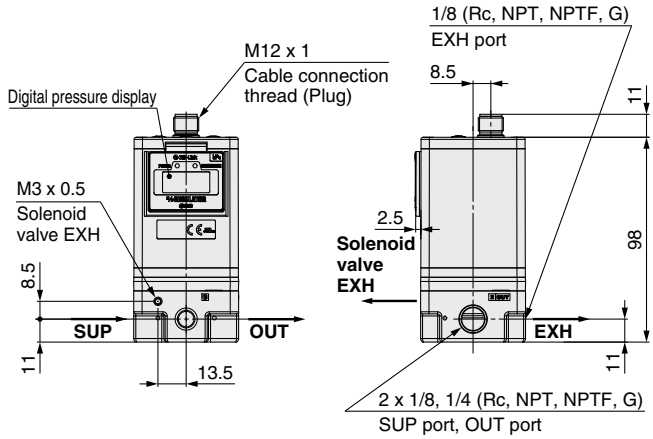
∗ Dimensions not shown are the same as on page 25.

RS-232C: ITV10□0-RC



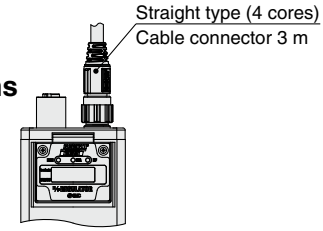
∗ Dimensions not shown are the same as on page 25.

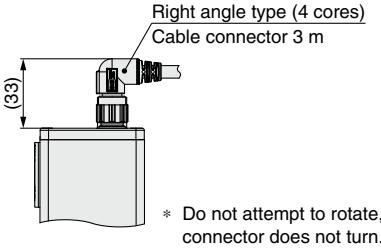
IO-Link: ITV10□0-IL



With power cable connector

∗ **ITV10□0-** **52** **53** **CC** **DE** **PR** **RC** **common dimensions**





∗ Order communication cable (other than 16 points, RS-232C) separately. (Refer to page 13.)

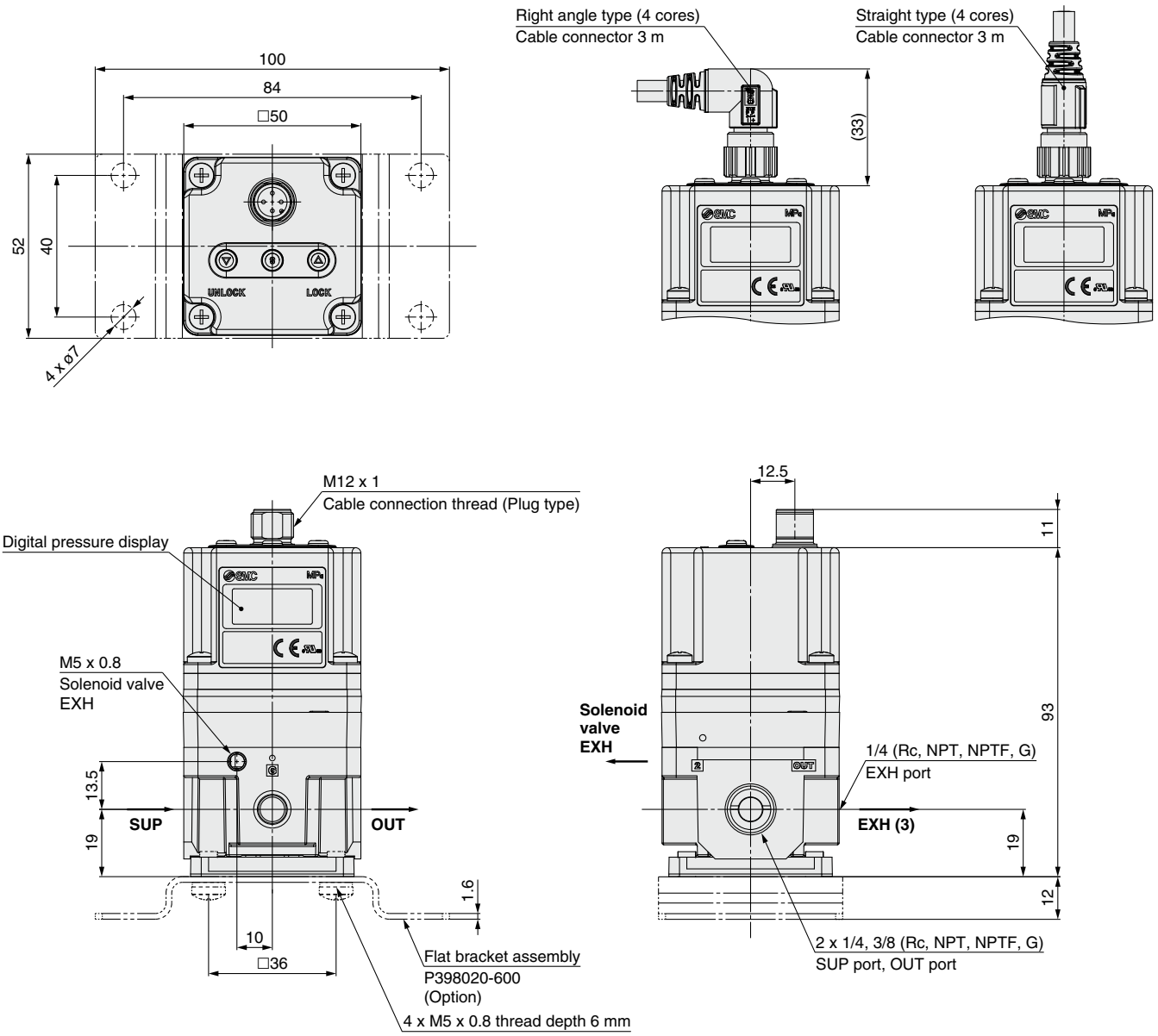
∗ Do not attempt to rotate, as the cable connector does not turn.

Dimensions

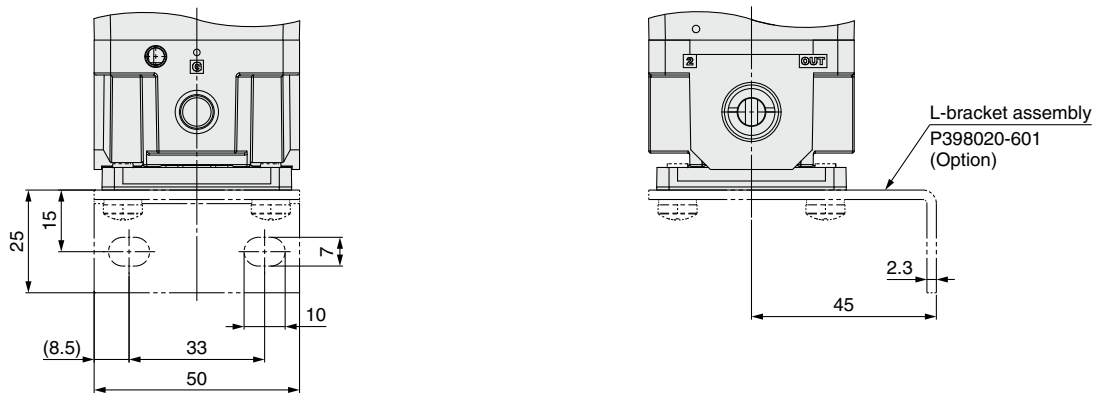
ITV20□□

Flat bracket

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

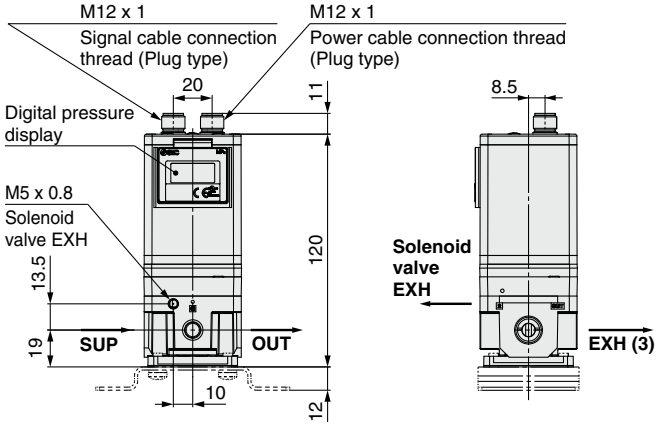


L-bracket

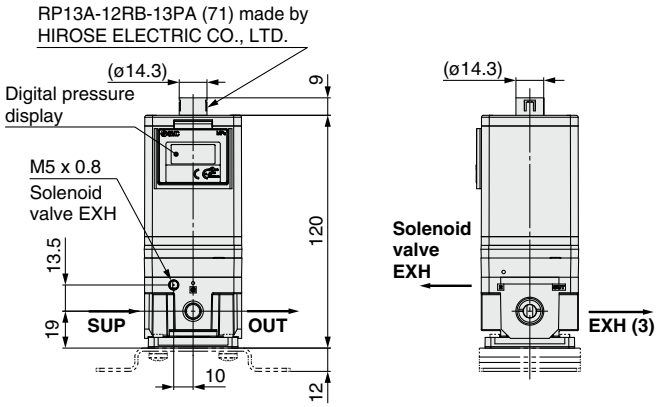


Dimensions (16 points preset input, 10-bit digital input, CC-Link, DeviceNet™)

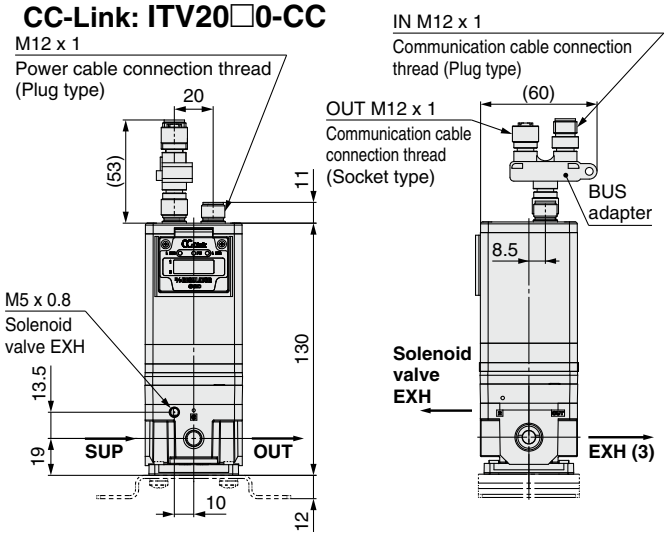
16 points preset input



10-bit digital input

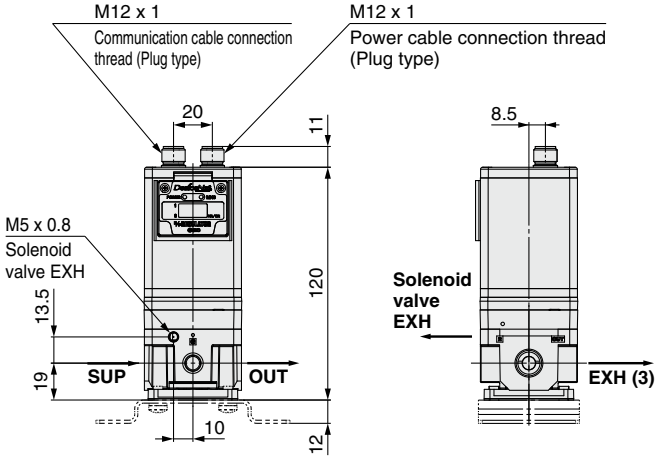


CC-Link: ITV20□0-CC



∗ Dimensions not shown are the same as on page 28.

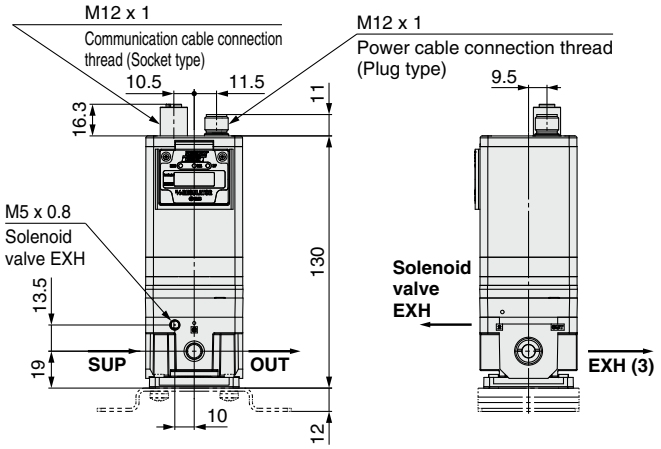
DeviceNet™: ITV20□0-DE



∗ Dimensions not shown are the same as on page 28.

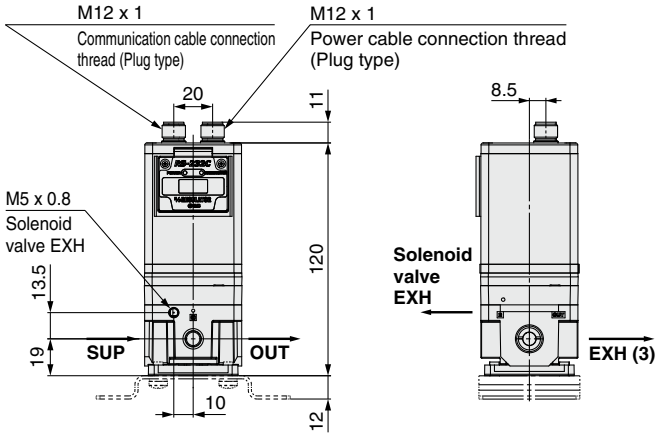
Dimensions (PROFIBUS DP, RS-232C, IO-Link)

PROFIBUS DP: ITV20□0-PR



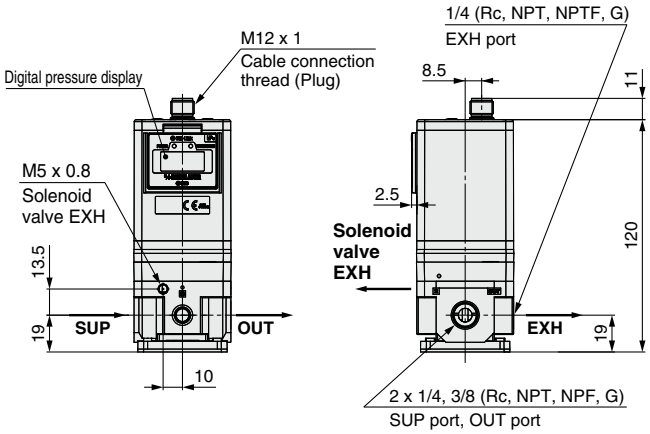
∗ Dimensions not shown are the same as on page 28.

RS-232C: ITV20□0-RC



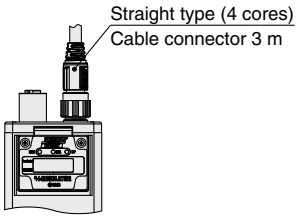
∗ Dimensions not shown are the same as on page 28.

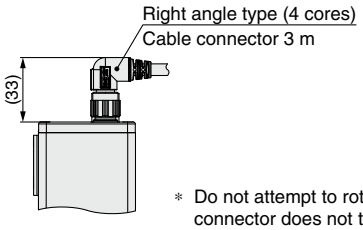
IO-Link: ITV20□0-IL



With power cable connector

∗ **ITV20□0-** **52 53 CC DE PR RC** **common dimensions**





∗ Order communication cable (other than 16 points, RS-232C) separately. (Refer to page 13.)

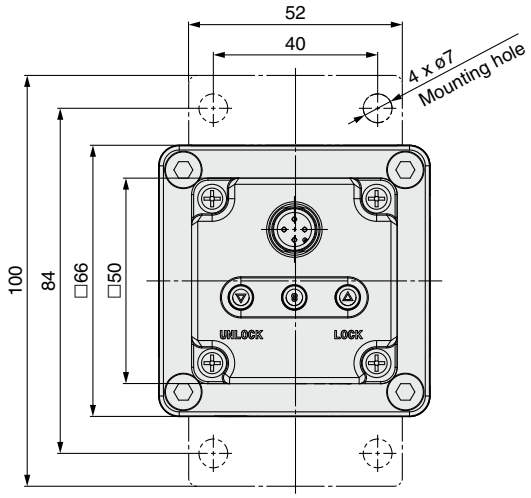
∗ Do not attempt to rotate, as the cable connector does not turn.

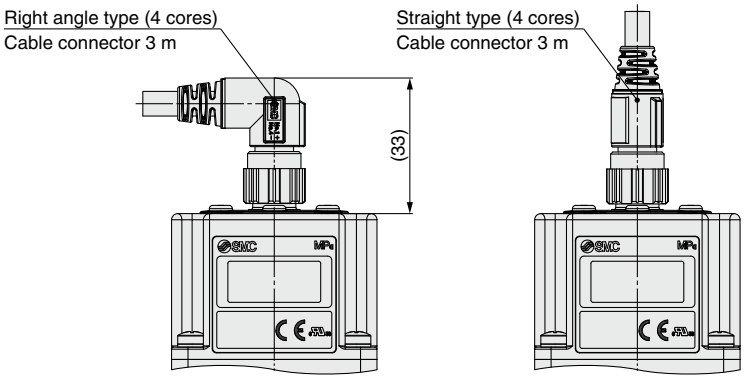
Dimensions

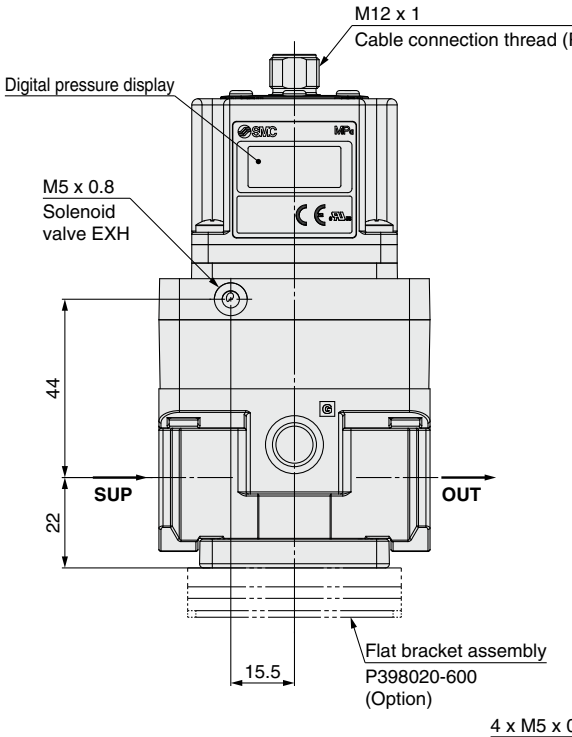
ITV30□□

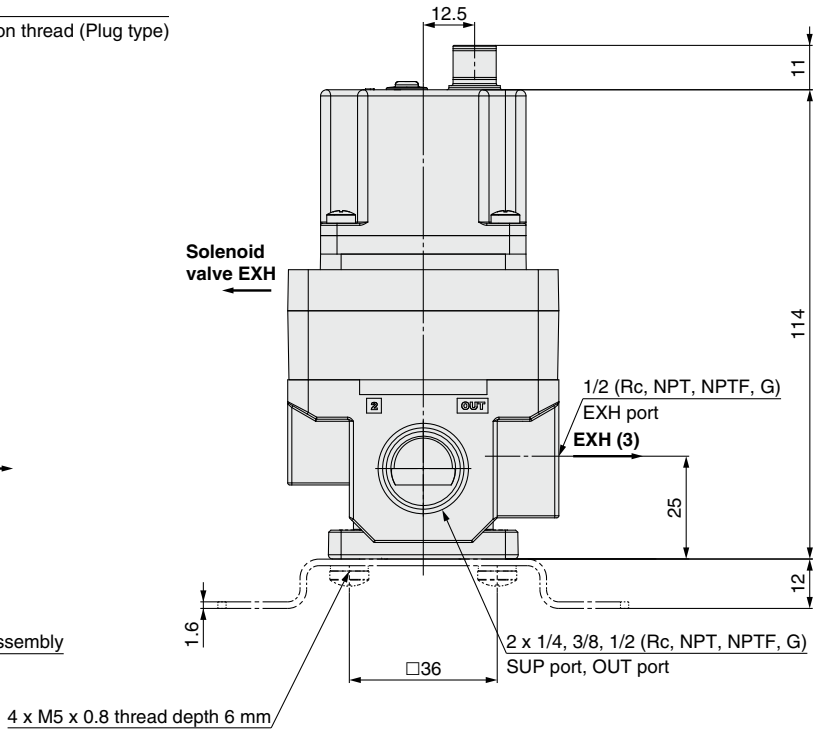
Flat bracket

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

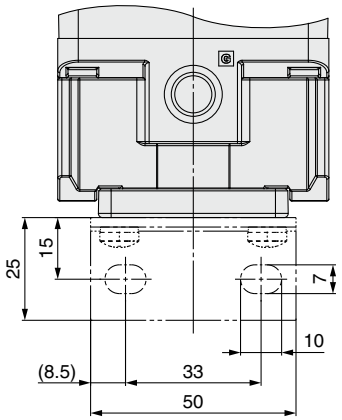


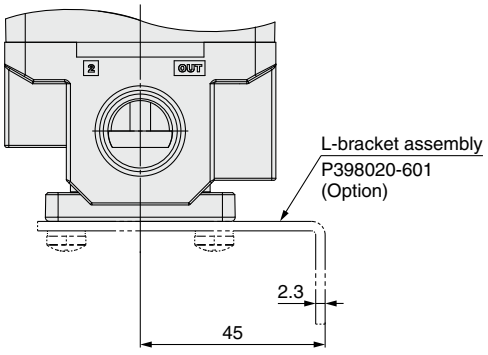






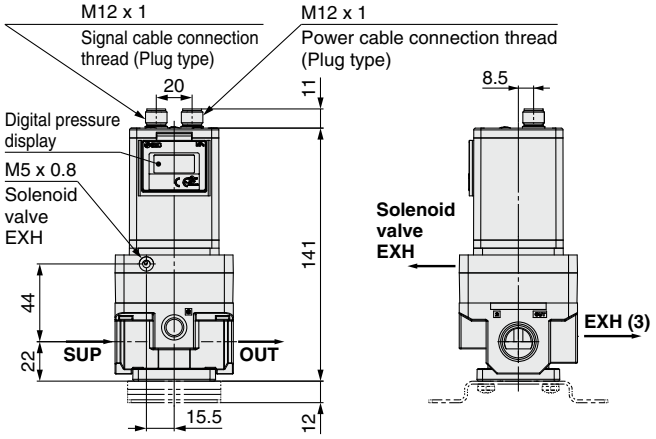
L-bracket



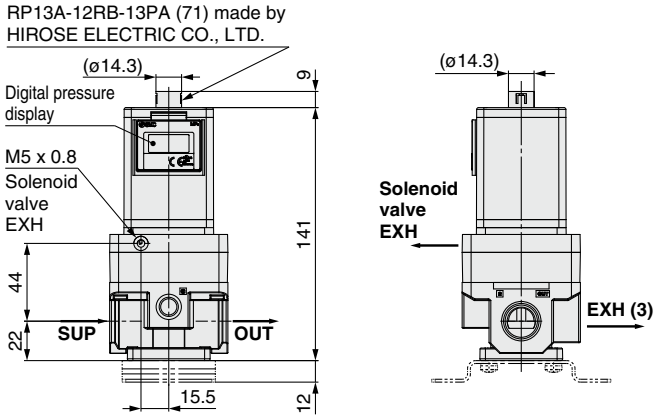


Dimensions (16 points preset input, 10-bit digital input, CC-Link, DeviceNet™)

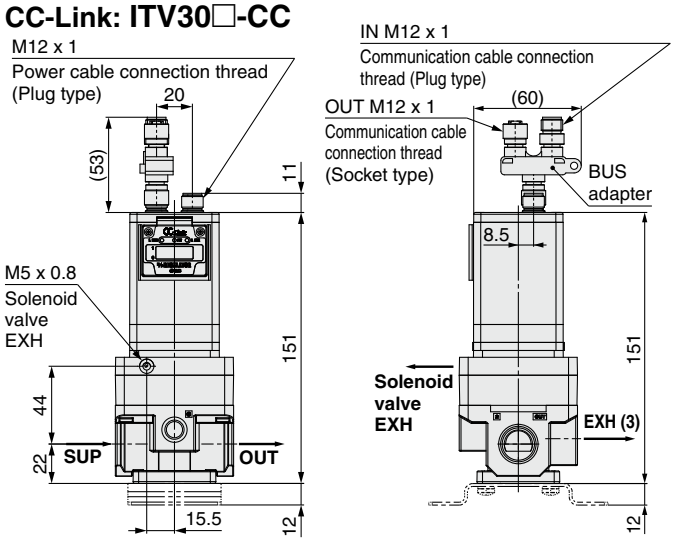
16 points preset input



10-bit digital input

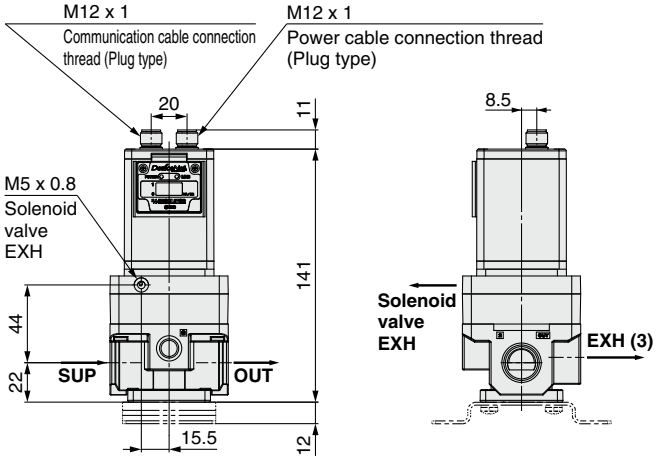


CC-Link: ITV30□-CC



∗ Dimensions not shown are the same as on page 31.

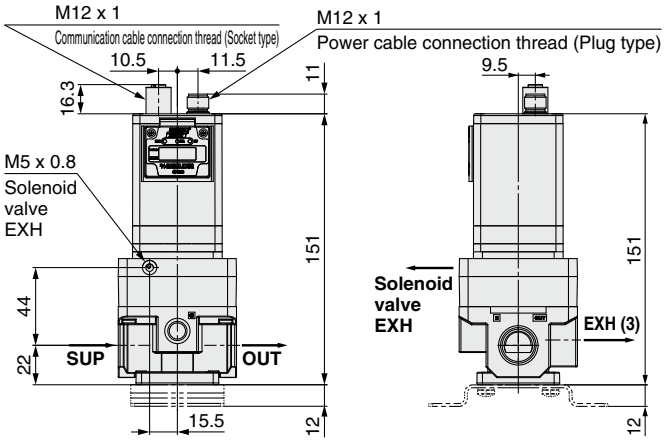
DeviceNet™: ITV30□-DE



∗ Dimensions not shown are the same as on page 31.

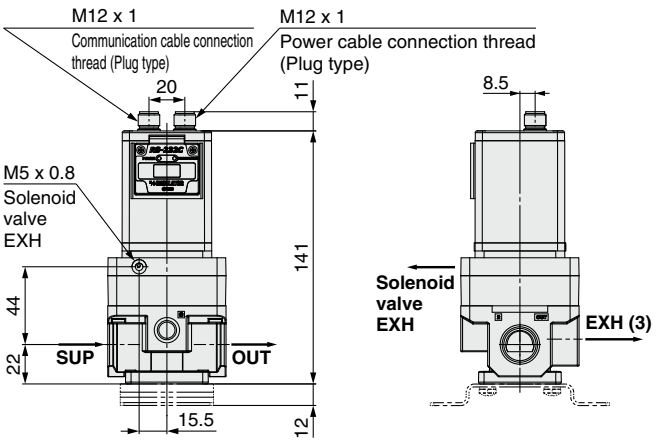
Dimensions (PROFIBUS DP, RS-232C, IO-Link)

PROFIBUS DP: ITV30□-PR



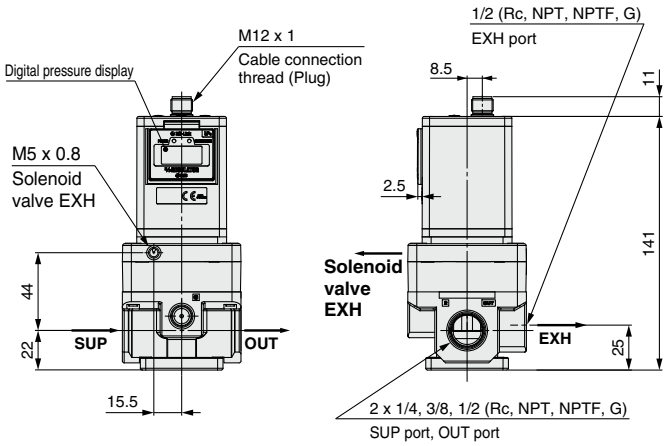
∗ Dimensions not shown are the same as on page 31.

RS-232C: ITV30□-RC



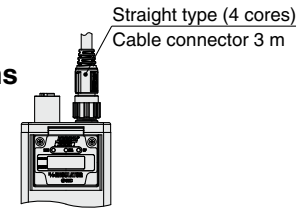
∗ Dimensions not shown are the same as on page 31.

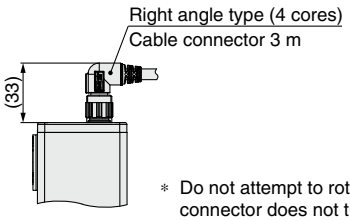
IO-Link: ITV30□0-IL



With power cable connector

∗ ITV30□0- 52 / 53 / CC / DE / PR / RC **common dimensions**





∗ Order communication cable (other than 16 points, RS-232C) separately. (Refer to page 13.)

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

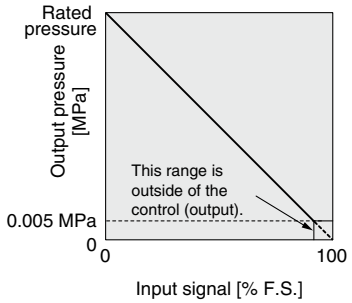
ITV1000/2000/3000 Series
Made to Order

Please contact SMC for detailed dimensions, specifications, and lead times.

1 Reverse Type

In accordance with the input signal, the inverse proportional pressure is output.

ITV10□□–□□□□□□□□–X102
ITV20□□–□□□□□□□□–X102
ITV30□□–□□□□□□□□–X102



Input/output characteristics chart

∗ The □ in the part numbers indicate the model nos. of the standard products.
∗ Excludes the preset input type and the digital input type
∗ For communication models, contact SMC for availability.

2 High-Pressure Type (SUP 1.2 MPa, OUT 1.0 MPa)

ITV10[5]□–□□□□□□□–X224
ITV20[5]□–□□□□□□□–X224
ITV30[5]□–□□□□□□□–X224

∗ For the preset input type, the digital input type, and communication models, contact SMC for availability.

3 Set Pressure Range: 1 to 100 kPa

ITV10[1]□–□□□□□□□–X25
ITV20[1]□–□□□□□□□–X25

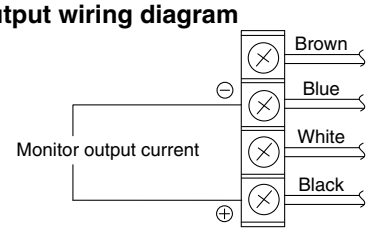
∗ For the preset input type, the digital input type, and communication models, contact SMC for availability.

4 Analog Output, Current Type (Source Type)

Monitor output is analog output from 4 to 20 mADC (source type).

ITV10□0–□4□□□□□–X256
ITV20□0–□4□□□□□–X256
ITV30□0–□4□□□□□–X256

Monitor output wiring diagram



5 High-Speed Response Time Type

Pressure response with no load is approx. 0.1 s.

* This is not a guaranteed value as it depends on the operating environment.
* When the input signal is at 0%, the exhaust solenoid valve is controlled to reduce the outlet pressure to zero. For this reason, a noise may be generated. This noise is normal and does not indicate a fault.
* When operating for the first time, be sure that the power supply voltage and supply pressure are appropriate in relation to the operating environment and conditions.
* For this product, by conducting the procedure described below (steps A to D), the parameters compatible with the power supply voltage and supply pressure in use can be obtained.
  If the desired output pressure values cannot be reached due to fluctuations in the operating conditions, etc., perform this operation.
  A) Change the power supply voltage in use by ±0.4 VDC or more.
  B) After inputting the supply pressure used on the inlet side of the ITV, adjust the input signal as described below.
  (0% → 100% → 0%) (Change it gradually, waiting 10 s or more between each adjustment.)
  ** Please contact SMC if difficulty inputting signals occurs.
  C) Change the power supply voltage according to the operating conditions/requirements, and repeat step B.
  D) Input the power supply voltage and a 0% signal, and retain for 6 minutes or more. (Supply pressure is not required.)
  When re-obtaining the parameters, we recommend operating with the air sealed in the piping in order to reliably reach the set pressure. In addition, if step A above cannot be carried out, it is possible to conduct an "Initialize" operation as described in the operation manual in order to reset the parameters of the product to those set at the time of shipment. When conducting an "Initialize" operation, the min. set pressure (F_1) and the max. set pressure (F_2) will be reset.
* There is no gain or sensitivity adjustment function.

ITV [2] 0 [1] [0] – [0] [1] [ ] [2] [ ] [S] [ ] – X88

Model

1	1000 type
2	2000 type

Pressure range

1	0.1 MPa
3	0.5 MPa
5	0.9 MPa

Power supply voltage

0	24 VDC
1	12 to 15 VDC

Input signal

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

Monitor output

1	Analog output 1 to 5 VDC
2	Switch output/NPN output
3	Switch output/PNP output
4	Analog output 4 to 20 mADC (Sink type)

Thread type

Nil	Rc
N	NPT
T	NPTF
F	G

Port size

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

Bracket∗1

Nil	Without bracket
B	Flat bracket
C	L-bracket

∗1 The bracket is included.

Cable connector type

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

Pressure display unit

Nil	MPa
2∗1	kgf/cm²
3	bar
4∗1	psi
5	kPa

∗1 This product is for overseas use only according to the New Measurement Act. (The SI unit type is provided for use in Japan.)

6 Manifold Specifications (Excludes the ITV3000 series)

2 through 8-station manifold

How to Order Manifolds

IITV20 – □ 02 – 5

Stations

2	2 stations
⋮	⋮
8	8 stations

ITV1000, 2000

OUT port size

02	1/4
03	3/8

Connection thread type

Nil	Rc
N	NPT
F	G

How to Order for Manifold Mounting

ITV 1 0 □□ – □□ 1 □□ – X26

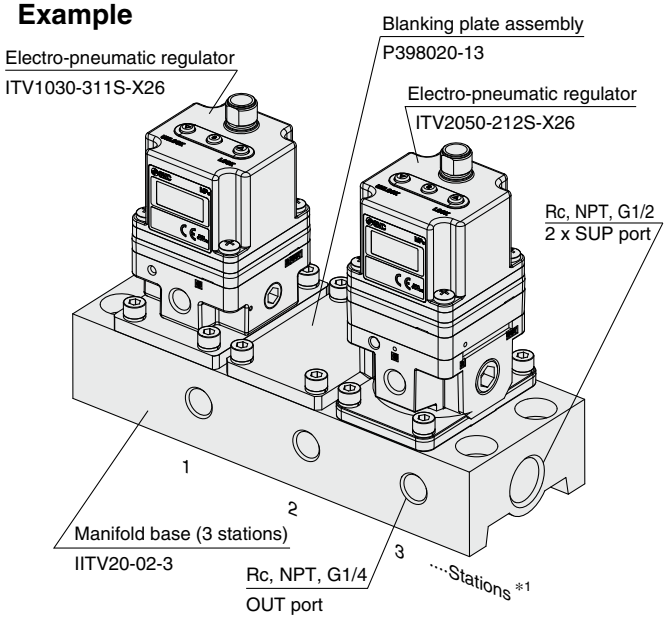
ITV 2 0 □□ – □□ 2 □□ – X26

∗ The □ in the part numbers indicate the model nos. of the standard products.
∗ For communication models, contact SMC for availability.
∗ The thread type is Rc only.
∗ For the ITV1000 series, the port size is 1/8 only.
∗ For the ITV2000 series, the port size is 1/4 only.
∗ The bracket accessory cannot be selected.
∗ Not applicable to the ITV3000 series

IITV20-02-3 .....1 set (3-station manifold base part no.)
∗ITV1030-311S-X26 .....1 set (Electro-pneumatic regulator part no.)∗2
∗P398020-13 .....1 set (Blanking plate assembly part no.)
∗ITV2050-212S-X26 .....1 set (Electro-pneumatic regulator part no.)∗2
The asterisk denotes the symbol for the assembly. Prefix it to the part numbers of the electro-pneumatic regulator, etc.

How to Order Manifold Assemblies

Example



∗ Refer to the table below for possible mixed combination.

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

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

7 Linearity: ±0.5% F.S. or Less

Application examples: Polishing equipment and peripheral equipment for wafers, LCD glasses, color filters, etc.

ITV 3 0 1 0 – 0 1 □ 2 □ S □ – X410

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

Input signal

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

Monitor output

1	Analog output 1 to 5 VDC
2	Switch output/NPN output
3	Switch output/PNP output
4	Analog output 4 to 20 mADC (Sink type)

Thread type

Nil	Rc
N	NPT
T	NPTF
F	G

Bracket∗1

Nil	Without bracket
B	Flat bracket
C	L-bracket

∗1 The bracket is included.

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)

Linearity:
±0.5% F.S. or less

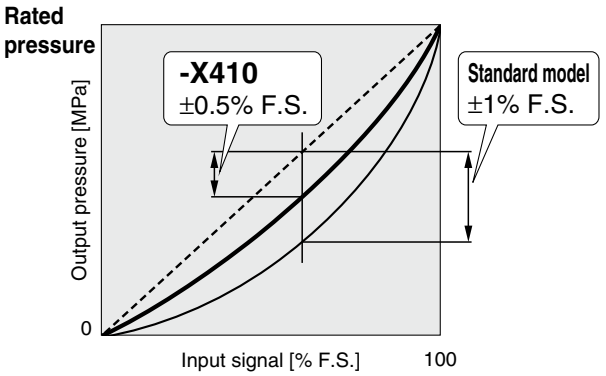
Pressure display unit

Nil	MPa
2∗1	kgf/cm²
3	bar
4∗1	psi
5	kPa

∗1 This product is for overseas use only according to the New Measurement Act. (The SI unit type is provided for use in Japan.)

Cable connector type

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



The graph shown above is a typical example. (This graph shows that the output pressure curve is in a negative range when compared to the ideal line.)

Specifications

Fluid		Air
Min. supply pressure		Set pressure + 0.1 MPa
Max. supply pressure		1.0 MPa (Pressure range 0.1 MPa type: 0.2 MPa)
Proof pressure	**(Supply side)**	1.5 MPa (Pressure range 0.1 MPa type: 0.3 MPa)
	(Output side)	1 MPa (Pressure range 0.1 MPa type: 0.2 MPa)
Set pressure range		1: 0.005 to 0.1 MPa, 3: 0.005 to 0.5 MPa, 5: 0.005 to 0.9 MPa
Power supply voltage		0: 24 VDC ±10%, 1: 12 to 15 VDC
Current consumption		0.12 A or less (24 VDC ±10% type) 0.18 A or less (12 to 15 VDC type)
Input signal		0: 4 to 20 mA, 1: 0 to 20 mA, 2: 0 to 5 VDC, 3: 0 to 10 VDC
Input impedance		Voltage type: Approx. 6.5 kΩ, Current type: 250 Ω or less
Output signal		Analog output: 1 to 5 VDC/4 to 20 mADC, Switch output (NPN/PNP)
Linearity		±0.5% F.S. or less
Hysteresis		0.5% F.S. or less
Repeatability		±0.5% F.S. or less
Sensitivity		0.2% F.S. or less
Temperature characteristics		±0.12% F.S./°C or less
Output pressure display	**Accuracy**	±2% F.S. ±1 digit or less
	Min. unit	MPa: 0.001, kgf/cm²: 0.01, bar: 0.01, psi: 0.1, kPa: 1
Ambient and fluid temperatures		0 to 50°C (No condensation)
Enclosure		IP65
Weight		ITV10□□: Approx. 250 g, ITV20□□: Approx. 350 g, ITV30□□: Approx. 645 g (Without brackets)

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

8 With Alarm Output

Alarm is output if the set pressure is not reached or maintained for 5 seconds or more.

Application examples: Pressure management for thrust control, etc.

ITV 3 0 1 0 – 0 2 □ 2 □ S □ – X420

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

Input signal

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

Monitor output

2	Alarm output/NPN output
3	Alarm output/PNP output

Thread type

Nil	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)

Bracket∗1

Nil	Without bracket
B	Flat bracket
C	L-bracket

∗1 The bracket is included.

Cable connector type

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

With alarm output

Pressure display unit

Nil	MPa
2∗1	kgf/cm²
3	bar
4∗1	psi
5	kPa

∗1 This product is for overseas use only according to the New Measurement Act. (The SI unit type is provided for use in Japan.)

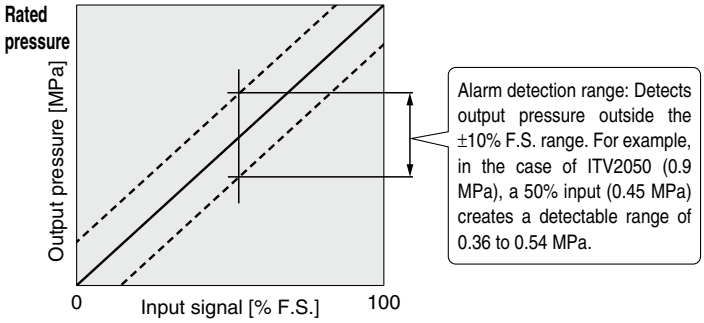


Fig. 1 Alarm output range

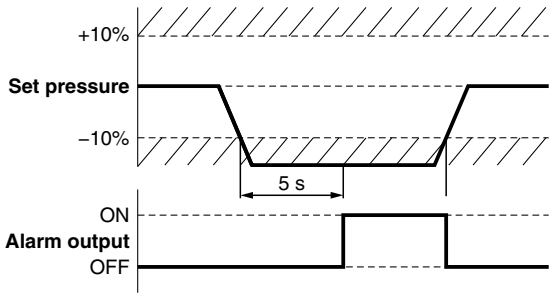


Fig. 2 Relationship between output pressure and alarm output

Specifications

Fluid		Air
Min. supply pressure		Set pressure + 0.1 MPa
Max. supply pressure		1.0 MPa (Pressure range 0.1 MPa type: 0.2 MPa)
Proof pressure	**(Supply side)**	1.5 MPa (Pressure range 0.1 MPa type: 0.3 MPa)
	(Output side)	1 MPa (Pressure range 0.1 MPa type: 0.2 MPa)
Set pressure range		1: 0.005 to 0.1 MPa, 3: 0.005 to 0.5 MPa, 5: 0.005 to 0.9 MPa
Power supply voltage		0: 24 VDC ±10%, 1: 12 to 15 VDC
Current consumption		0.12 A or less (24 VDC ±10% type) 0.18 A or less (12 to 15 VDC type)
Input signal		0: 4 to 20 mA, 1: 0 to 20 mA, 2: 0 to 5 VDC, 3: 0 to 10 VDC
Input impedance		Voltage type: Approx. 6.5 kΩ, Current type: 250 Ω or less
Output signal		Alarm output (NPN/PNP)
Linearity		±1.0% F.S. or less
Hysteresis		0.5% F.S. or less
Repeatability		±0.5% F.S. or less
Sensitivity		0.2% F.S. or less
Temperature characteristics		±0.12% F.S./°C or less
Output pressure display	**Accuracy**	±2% F.S. ±1 digit or less
	Min. unit	MPa: 0.001, kgf/cm²: 0.01, bar: 0.01, psi: 0.1, kPa: 1
Ambient and fluid temperatures		0 to 50°C (No condensation)
Enclosure		IP65
Weight		ITV10□□: Approx. 250 g, ITV20□□: Approx. 350 g, ITV30□□: Approx. 645 g (Without brackets)

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

Compact Vacuum Regulator
ITV009□ Series

CE RoHS

How to Order

For single unit and single unit for manifold

ITV00 9 0 – 3 □ □ □ N

Pressure range

9	–100 kPa

Power supply voltage

0	24 VDC ±10%
1	12 to 15 VDC

Input signal

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

Built-in One-touch fittings type

For single unit

Symbol		VAC[1]	OUT[2]	ATM[3]
Nil	Metric size (Light gray)	ø4		
U	Inch size (Orange)	ø5/32"		

For manifold

Symbol		VAC[1]	OUT[2]	ATM[3]
Nil	Metric size (Light gray)	ø6	ø4	ø6
U	Inch size (Orange)	ø1/4"	ø5/32"	ø1/4"

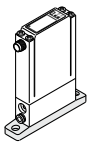
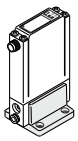
Base type

Nil	For single unit
M	For manifold

Cable connector (Option)

N	Without cable connector
S	Straight type 3 m
L	Right angle type 2 m

Bracket/Option for single unit only

Nil	Without bracket
B	Flat bracket 
C	L-bracket 

Manifold

IITV00 – 02 □ – n

Stations

02	2 stations
03	3 stations
⋮	⋮
10	10 stations

Option

If a DIN rail longer than the specified stations is required, specify the applicable stations in two digits.
(Max. 10 stations)
Example) **IITV00-05-07**

One-touch fitting size for supply/exhaust parts (End plate)

Nil	ø6 (Light gray)
U	ø1/4" (Orange)

∗ A DIN rail with the length specified by the number of stations is attached to the manifold. For dimensions of the DIN rail, refer to the external dimensions.

How to Order Manifold Assembly (Example)

Indicate the part numbers of vacuum regulators to be mounted below the manifold part number.

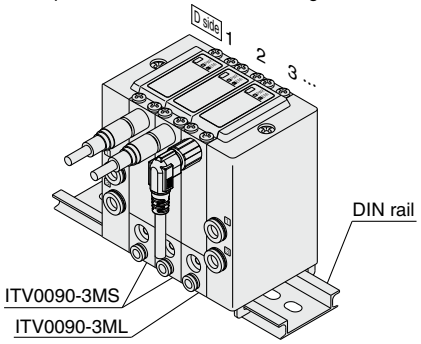
Example)
Due to the common supply/exhaust feature, note that different pressure range combinations are not available.

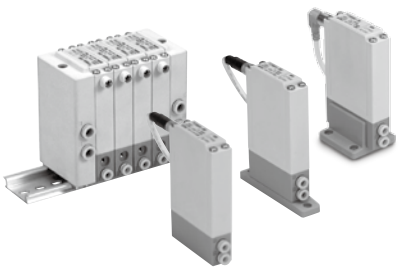
IITV00-03·····1 set (Manifold part no.)
∗ITV0090-3MS·····2 sets (Vacuum regulator part no. (Stations 1, 2))
∗ITV0090-3ML·····1 set (Vacuum regulator part no. (Station 3))

Indicate part numbers in order starting from the first station on the D side.

Caution) Combination with having different pressure ranges is not available due to common supply/exhaust features.

The asterisk denotes the symbol for the assembly.
Prefix it to the part numbers of the vacuum regulator.





Specifications

Model		ITV009□	
Min. supply pressure		Set pressure – 1 kPa	
Max. supply pressure		–101 kPa	
Set pressure range		–1 to –100 kPa	
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	**Voltage type**	0 to 5 VDC, 0 to 10 VDC	
	Current type	4 to 20 mADC, 0 to 20 mADC (Sink type)	
Input impedance	**Voltage type**	Approx. 10 kΩ	
	Current type	Approx. 250 Ω	
Output signal∗2	**Analog output**	1 to 5 VDC (Output impedance: Approx. 1 kΩ) Output accuracy: ±6% F.S. or less	
Linearity		±1% F.S. or less	
Hysteresis		0.5% F.S. or less	
Repeatability		±0.5% F.S. or less	
Sensitivity		0.2% F.S. or less	
Temperature characteristics		±0.12% F.S./°C or less	
Operating temperature range		0 to 50°C (No condensation)	
Enclosure		IP65 equivalent∗3	
Connection type		Built-in One-touch fittings	
Connection size	**For single unit**	Metric size	1, 2, 3: ø4
		Inch size	1, 2, 3: ø5/32"
	Manifold	Metric size	1, 3: ø6, 2: ø4
		Inch size	1, 3: ø1/4", 2: ø5/32"
Weight∗1		100 g or less (Without options)	

∗1 Indicates the weight of a single unit
For IITV00-n
Total weight (g) ≤ Stations (n) x 100 + 130 (Weight of end block A, B assembly) + Weight (g) of DIN rail

∗2 When measuring ITV analog output from 1 to 5 VDC, if the load impedance is less than 100 kΩ, the analog output monitor accuracy of ±6% F.S. or less may not be available.
The product with an accuracy of within ±6% is supplied upon your request.
Output pressure remains unaffected.

∗3 When using under the conditions equivalent to IP65, connect the fitting or tube to the breathing hole before use. (For details, refer to "Specific Product Precautions 1" on page 53.)

∗ When there is a downstream flow consumption, pressure may become unstable depending on piping conditions.

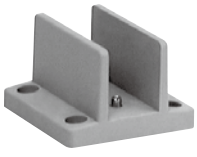
∗ When the power is turned on, a noise may be generated. This noise is normal and does not indicate a fault.

Accessories (Option)

Bracket

Flat bracket assembly (including 2 mounting screws)
P39800022

L-bracket assembly (including 2 mounting screws)
P39800023



Tightening torque when assembling is 0.3 N·m.

Cable connector

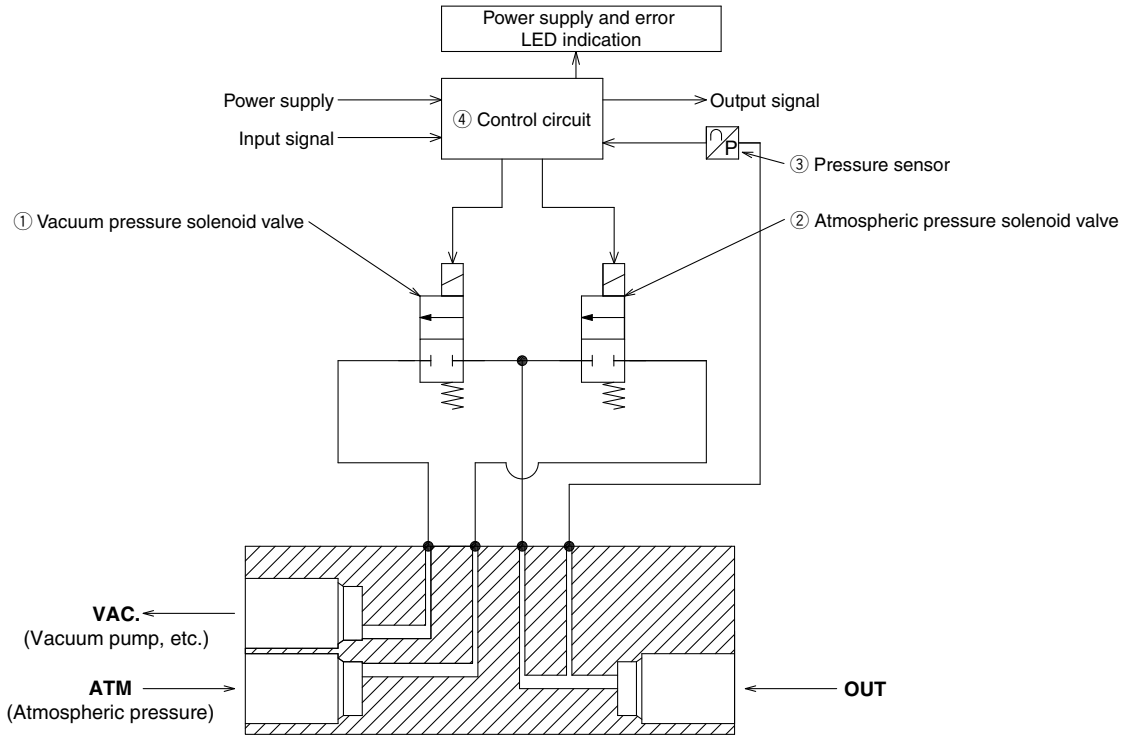
Straight type
M8-4DSX3MG4

Right angle type
P398000-501-2

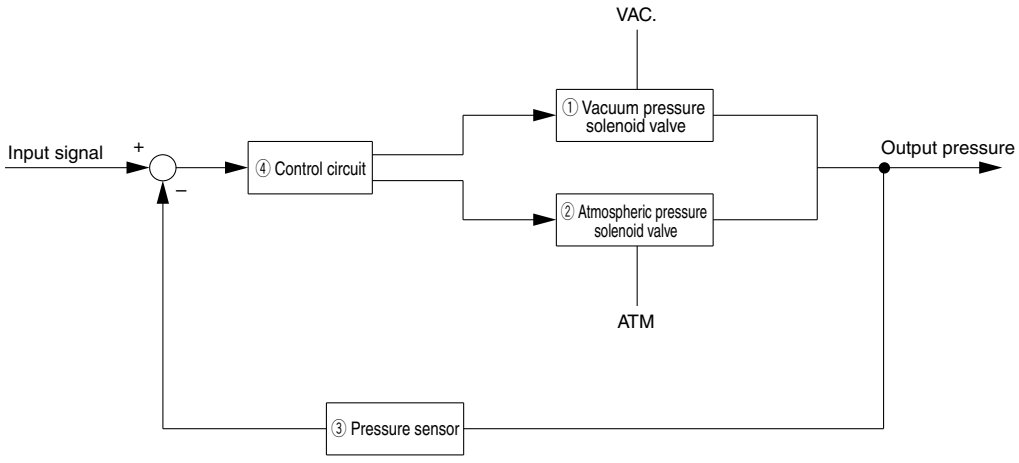
Working Principle

When the input signal rises, the vacuum pressure solenoid valve ① turns ON. Due to this, part of the vacuum pressure (VAC.) passes through the vacuum pressure solenoid valve ① and changes to a vacuum pressure. This vacuum pressure feeds back to the control circuit ④ via the pressure sensor ③. Here, the vacuum pressure solenoid valve and the atmospheric pressure solenoid valve work alternately to make continuous pressure corrections until vacuum pressure becomes proportional to the input signal, thus, supplying vacuum pressure that is consistently proportional to the input signal.

Working Principle Diagram

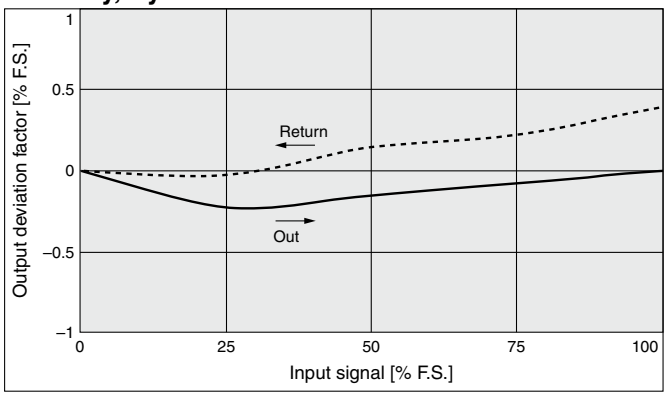


Block Diagram



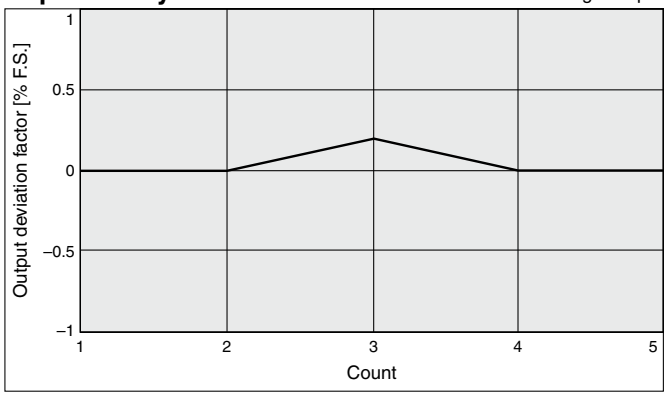
ITV009□ Series

Linearity, Hysteresis



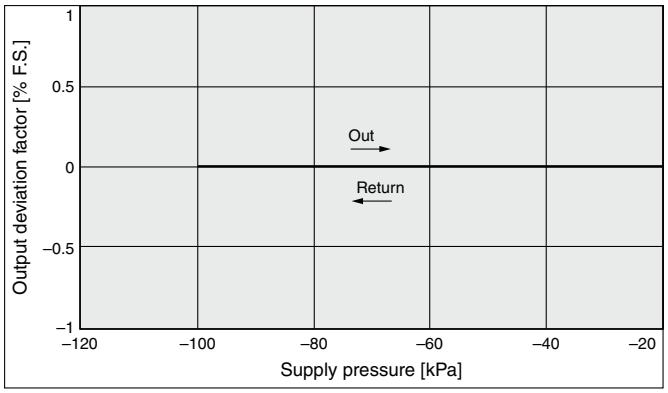
Repeatability

With 50% of signal input

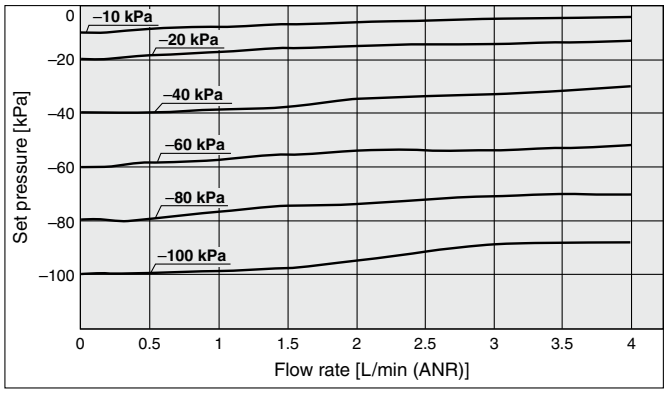


Pressure Characteristics

Set pressure: −10 kPa

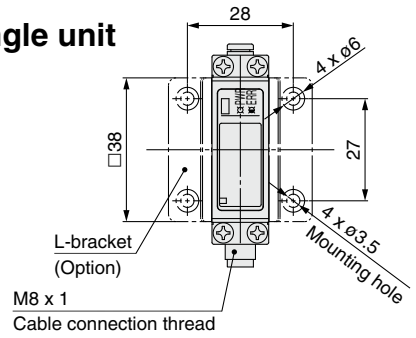


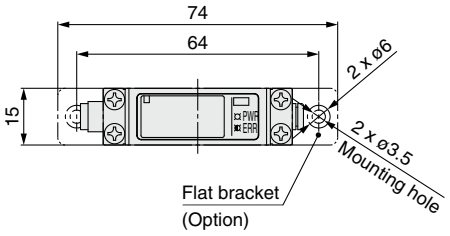
Flow Rate Characteristics

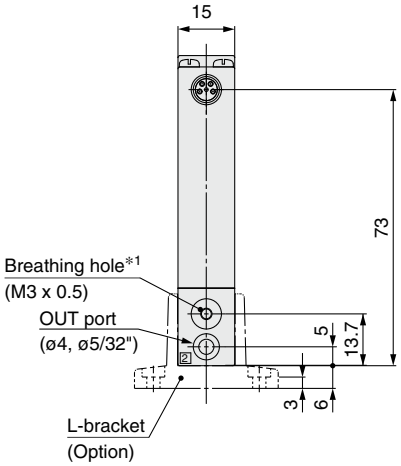


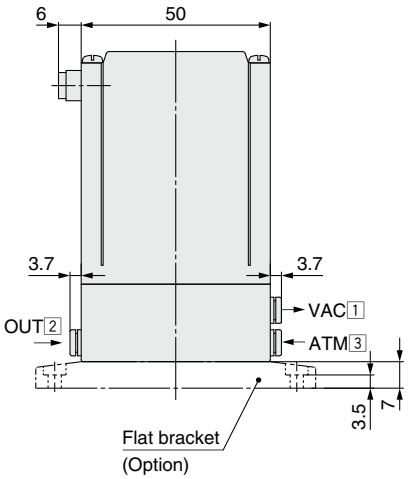
Dimensions

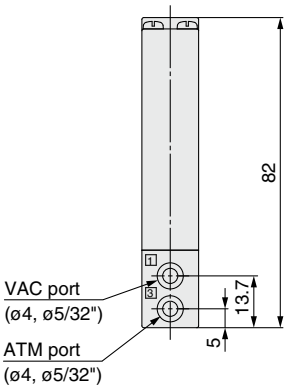
For single unit





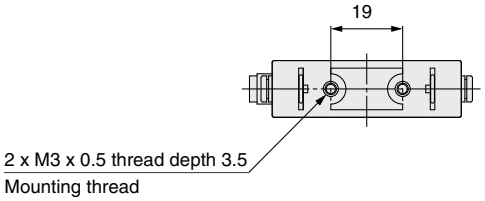




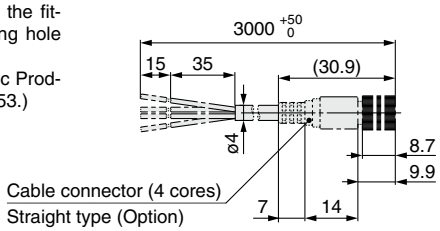


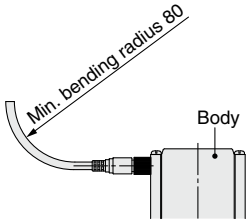
Port Location

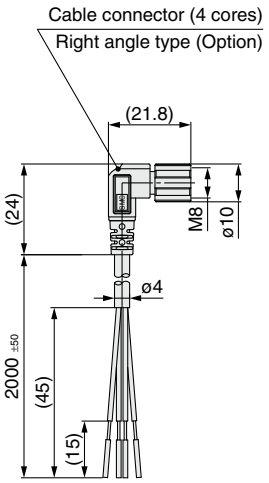
No.	1	2	3
ITV009□	VAC	OUT	ATM

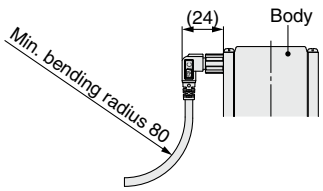


*1 When using under the conditions equivalent to IP65, connect the fittings or tube to the breathing hole before use.
(For details, refer to "Specific Product Precautions 1" on page 53.)



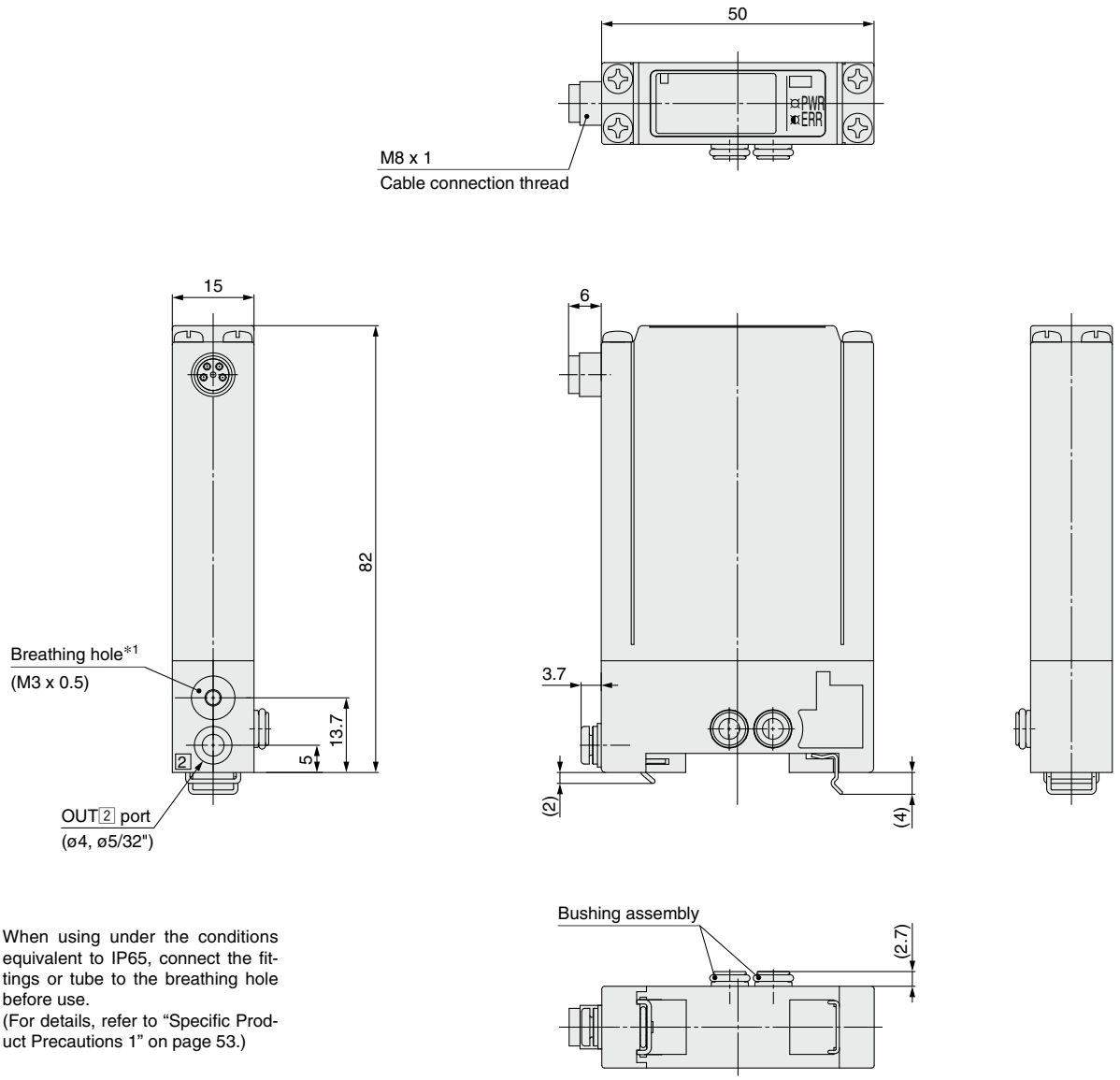






Dimensions

Single unit for manifold

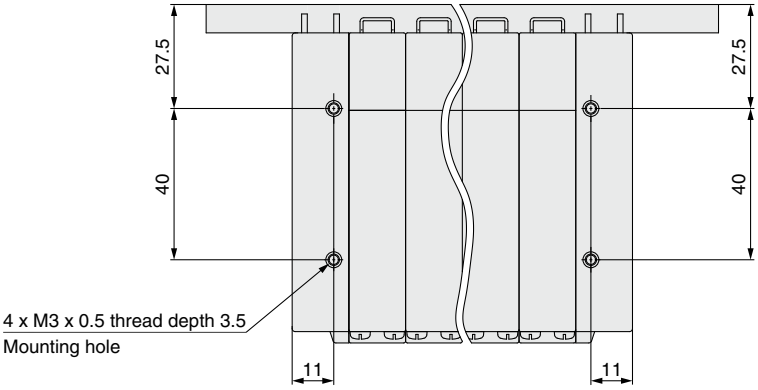


*1 When using under the conditions equivalent to IP65, connect the fittings or tube to the breathing hole before use.
(For details, refer to "Specific Product Precautions 1" on page 53.)

* For dimensions of the cable connector, refer to single unit on page 43.

Dimensions

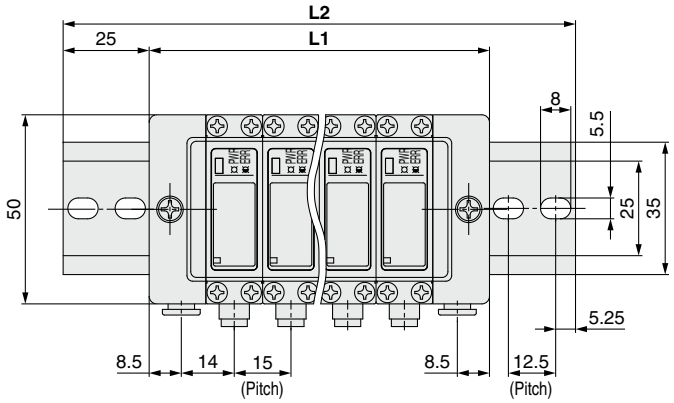
Manifold

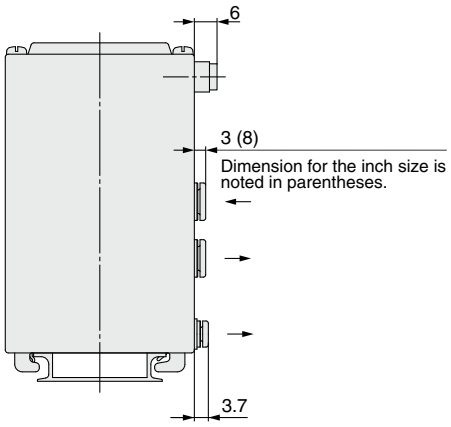


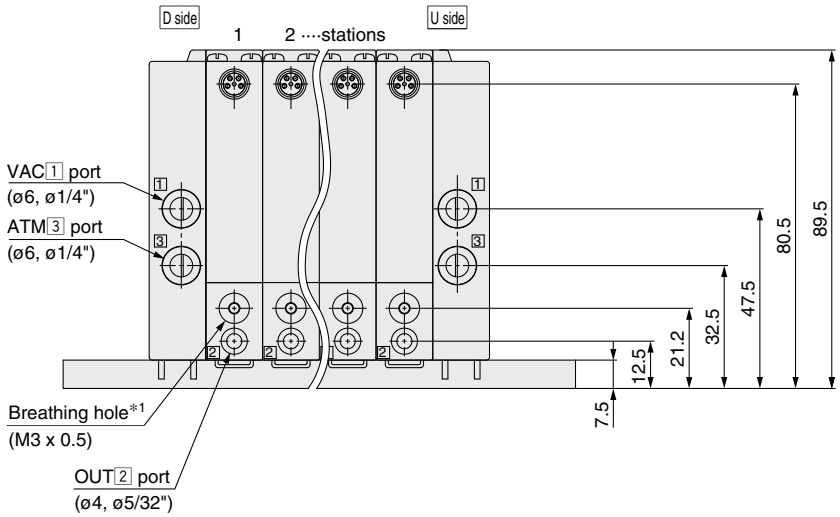
Port Location

No.	1	2	3
ITV009□	VAC	OUT	ATM

∗ Stations are counted starting from the D side.







∗ For dimensions of the cable connector, refer to single unit on page 43.

∗1 When using under the conditions equivalent to IP65, connect the fittings or tubing to the breathing hole before use.
(For details, refer to "Specific Product Precautions 1" on page 53.)

[mm]

Manifold stations n	2	3	4	5	6	7	8	9	10
L1	60	75	90	105	120	135	150	165	180
L2	110.5	123	148	160.5	173	185.5	198	223	235.5
Weight of DIN rail [g]	20	22	27	29	31	34	36	41	43

Electronic Vacuum Regulator
ITV2090/2091 Series

How to Order

ITV 209 0 – 0 1 □ 2 □ S 5

Pressure range

9	–1.3 to –80 kPa

Power supply voltage

0	24 VDC
1	12 to 15 VDC

∗ The communication models (CC, DE, PR, RC, and IL), 16 points preset input, and 10-bit digital input options are only available for the 24 VDC.

Input signal/ Communication model

0	Current type 4 to 20 mADC (Sink type)
1	Current type 0 to 20 mADC (Sink type)
2	Voltage type 0 to 5 VDC
3	Voltage type 0 to 10 VDC
40	4 points preset input
52	16 points preset input (Switch output/NPN output)
53	16 points preset input (Switch output/PNP output)
60	10-bit digital input
CC	CC-Link
DE	DeviceNet™
PR	PROFIBUS DP
RC	RS-232C communication
IL	IO-Link

Monitor output

1	Analog output 1 to 5 VDC
2	Switch output/NPN output
3	Switch output/PNP output
4	Analog output 4 to 20 mADC (Sink type)
Nil	None

Thread type

Nil	Rc
N	NPT
T	NPTF
F	G

Port size

2	1/4

Bracket∗1

Nil	Without bracket
B	Flat bracket
C	L-bracket

∗1 The bracket is included.

Cable connector type

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

∗ Even when a cable connector is selected, a communication cable is not included for the communication models CC, DE, and PR. Please order it separately. Refer to the table below.
For 10-bit digital input, the right angle type cannot be selected.

Pressure display unit

5	kPa

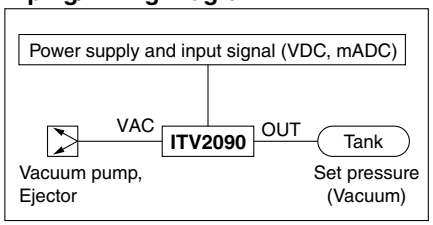
∗ For the communication models CC, DE, PR, and RC, only "Nil" is available as it does not have a pressure display.

For communication cables, use the parts listed below
(Refer to the M8/M12 connector in the **Web Catalog** for details.)
or order the product certified for the respective protocol (with M12 connector) separately.

Application	Communication cable part no.	Note
CC-Link compatibility	PCA-1567720 (Socket type)	A dedicated Bus adapter is included with the product.
	PCA-1567717 (Plug type)	
DeviceNet™ compatibility	PCA-1557633 (Socket type)	A T-branch connector is not included with the product.
	PCA-1557646 (Plug type)	
PROFIBUS DP compatibility	PCA-1557688 (Socket type)	A T-branch connector is not included with the product.
	PCA-1557691 (Plug type)	

For the stepless control of vacuum pressure in proportion to electrical signals

Piping/Wiring Diagram



Standard Specifications

Model		ITV2090	ITV2091
Min. supply vacuum pressure∗1		Set pressure – 13.3 kPa	
Max. supply vacuum pressure		–101 kPa	
Set pressure range		–1.3 to –80 kPa	
Power supply	**Voltage**	24 VDC ±10%	12 to 15 VDC
	Current consumption	Power supply voltage 24 VDC type: 0.12 A or less∗6 Power supply voltage 12 to 15 VDC type: 0.18 A or less	
Input signal∗6	**Current type**∗2	4 to 20 mADC, 0 to 20 mADC (Sink type)	
	Voltage type	0 to 5 VDC, 0 to 10 VDC	
	Preset input	4 points (Negative common), 16 points (No common polarity)	
	Digital input	10 bits (Parallel)	
Input impedance	**Current type**	250 Ω or less∗3	
	Voltage type	Approx. 6.5 kΩ	
	Preset input	Power supply voltage 24 VDC type: Approx. 4.7 kΩ Power supply voltage 12 VDC type: Approx. 2.0 kΩ	
	Digital input	Approx. 4.7 kΩ	
Output signal∗4 **(Monitor output)**	**Analog output**	1 to 5 VDC (Output impedance: Approx. 1 kΩ) 4 to 20 mADC (Sink type) (Output impedance: 250 Ω or less) Output accuracy ±6% F.S. or less	
	Switch output	NPN open collector output: Max. 30 V, 80 mA PNP open collector output: Max. 80 mA	
Linearity		±1% F.S. or less	
Hysteresis		0.5% F.S. or less	
Repeatability		±0.5% F.S. or less	
Sensitivity		0.2% F.S. or less	
Temperature characteristics		±0.12% F.S./°C or less	
Output pressure display	**Accuracy**	±2% F.S. ±1 digit or less	
	Unit	kPa∗5 Min. display: 1	
Ambient and fluid temperatures		0 to 50°C (No condensation)	
Enclosure		IP65	
Weight∗6, ∗7		390 g	

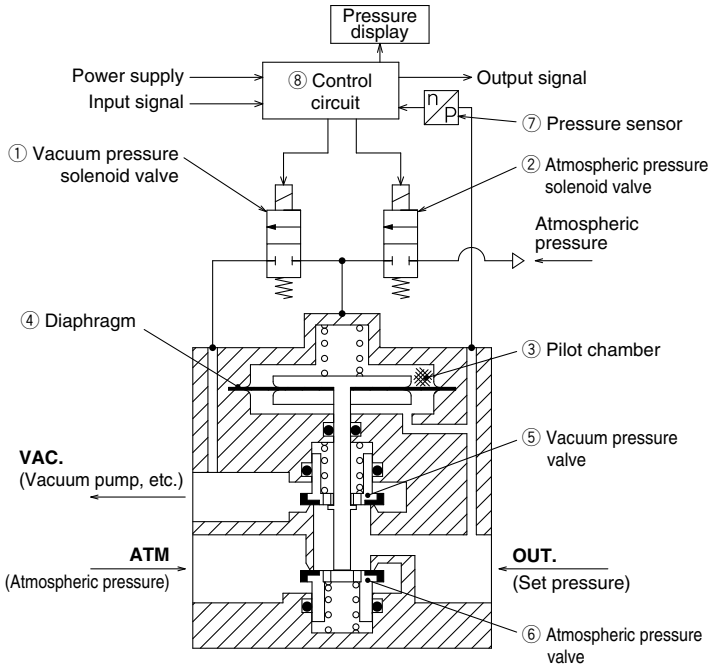
∗1 The min. supply vacuum pressure should be 13.3 kPa less than the max. vacuum pressure setting value.
∗2 4 to 20 mADC is not possible with the 2-wire type. Power supply voltage (24 VDC or 12 to 15 VDC) is required.
∗3 Value for the state with no over current circuit included. If an allowance is provided for an over current circuit, the input impedance varies depending on the input power supply. This is 350 Ω or less for an input current of 20 mADC.
When measuring ITV analog output from 1 to 5 VDC, if the load impedance is less than 100 kΩ, the analog output monitor accuracy of within ±6% (full span) may not be available. The product with the accuracy of within ±6% is supplied upon your request. Output pressure remains unaffected.
∗4 Either analog output or switch output must be selected. Furthermore, when switch output is selected, either NPN output or PNP output must also be selected. Use caution that the preset input type is not equipped with an output signal function.
∗5 Please contact SMC regarding indication with other units of pressure.
∗6 Refer to the table below for communication specifications.
∗7 Add 50 g for digital input type, 70 g for 16 points preset input type respectively.
∗ The product characteristics are confined to the static state.
Pressure may fluctuate when air is consumed at the output side.

Communication Specifications (CC, DE, PR, RC, IL)

Model	ITV□0□0-CC□□	ITV□0□0-DE□□	ITV□0□0-PR□□	ITV□0□0-RC□□	ITV□0□0-IL□□
Protocol	CC-Link	DeviceNet™	PROFIBUS DP	RS-232C	IO-Link (Class A)
Version∗1	Ver. 1.10	Volume 1 (Edition 3.8), Volume 3 (Edition 1.5)	DP-V0	—	Ver. 1.1
Communication speed	156 k/625 k 2.5 M/5 M/10 Mbps	125 k/250 k/500 kbps	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 Mbps	9.6 kbps	230.4 kbps (COM3)
Configuration file∗2	—	EDS	GSD	—	IODD
I/O occupation area (input/output data)	4 words/4 words, 32 bits/32 bits (per station, remote device station)	16 bits/16 bits	16 bits/16 bits	—	4 bytes/2 bytes
Communication data resolution	12 bits (4096 resolution)	12 bits (4096 resolution)	12 bits (4096 resolution)	10 bits (1024 resolution)	12 bits (4096 resolution)
Fail safe	HOLD∗3/CLEAR (Switch setting)	HOLD/CLEAR (Switch setting)	CLEAR	HOLD	HOLD/CLEAR
Electric insulation∗4	Insulation	Insulation	Insulation	Non-insulation	Non-insulation
Terminating resistor	Built into the product (Switch setting)	Not built into the product	Built into the product (Switch setting)	—	—
Current consumption	0.16 A or less	0.14 A or less	0.16 A or less	0.12 A or less	0.12 A or less
Weight **ITV2090**	470	460	490	460	460

∗1 Please note that versions are subject to change.
∗2 Configuration files can be downloaded from the operation manual page on the SMC website: https://www.smcworld.com
∗3 The output HOLD value when a CC-Link communications error occurs can be set based on the bit area data.
∗4 The insulation between the electrical signal of the communication system and ITV power supply

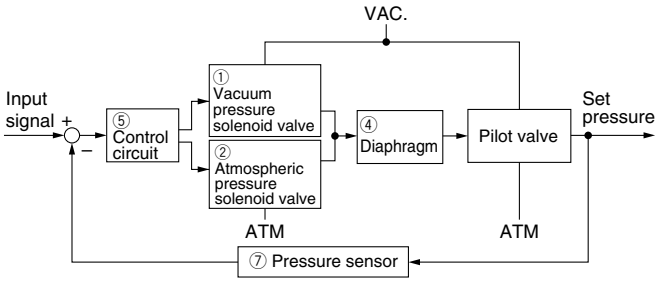
Working Principle



Working Principle

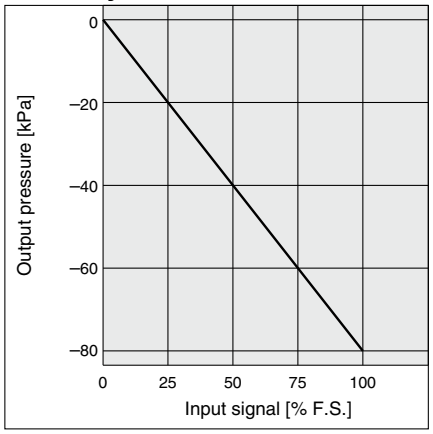
When the input signal increases, the vacuum pressure solenoid valve ① turns ON, and the atmospheric pressure solenoid valve ② turns OFF. Because of this, VAC. and the pilot chamber ③ are connected, the pressure in the pilot chamber ③ becomes negative and acts on the top of the diaphragm ④.
As a result, the vacuum pressure valve ⑤ which is linked to the diaphragm ④ opens, VAC. and OUT. are connected, and the set pressure becomes negative.
This negative pressure feeds back to the control circuit ⑧ via the pressure sensor ⑦. Then, a correct operation works until a vacuum pressure proportional to the input signal is reached, and a vacuum pressure is obtained which is always proportional to the input signal.

Block Diagram

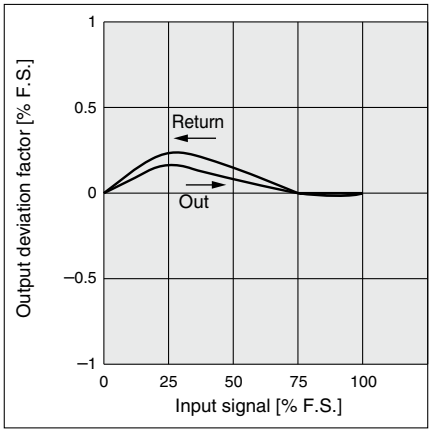


ITV209□ Series

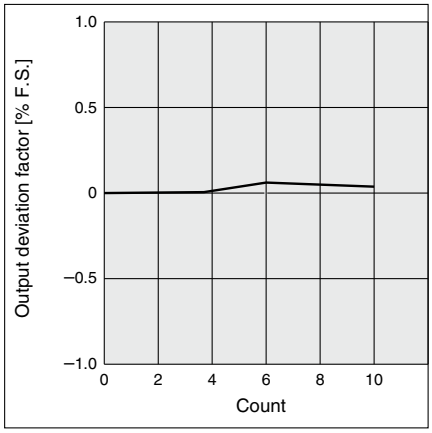
Linearity



Hysteresis

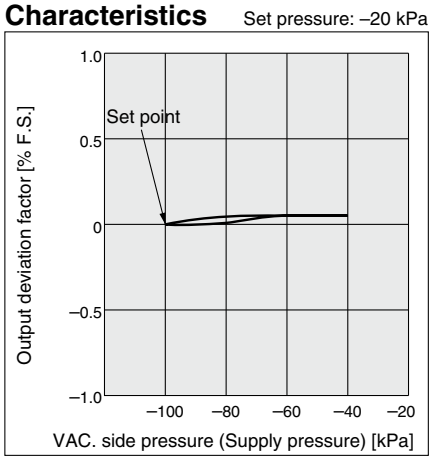


Repeatability



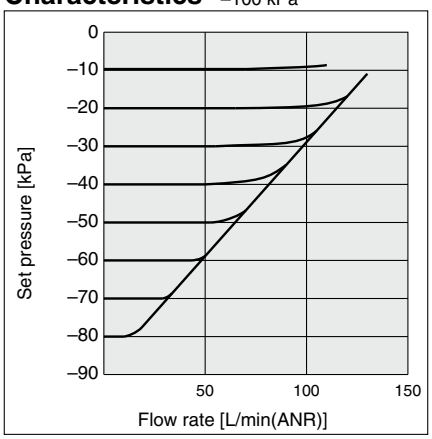
Pressure Characteristics

Set pressure: –20 kPa



Flow Rate Characteristics

Supply vacuum pressure: –100 kPa



Flow rate characteristics measurement conditions

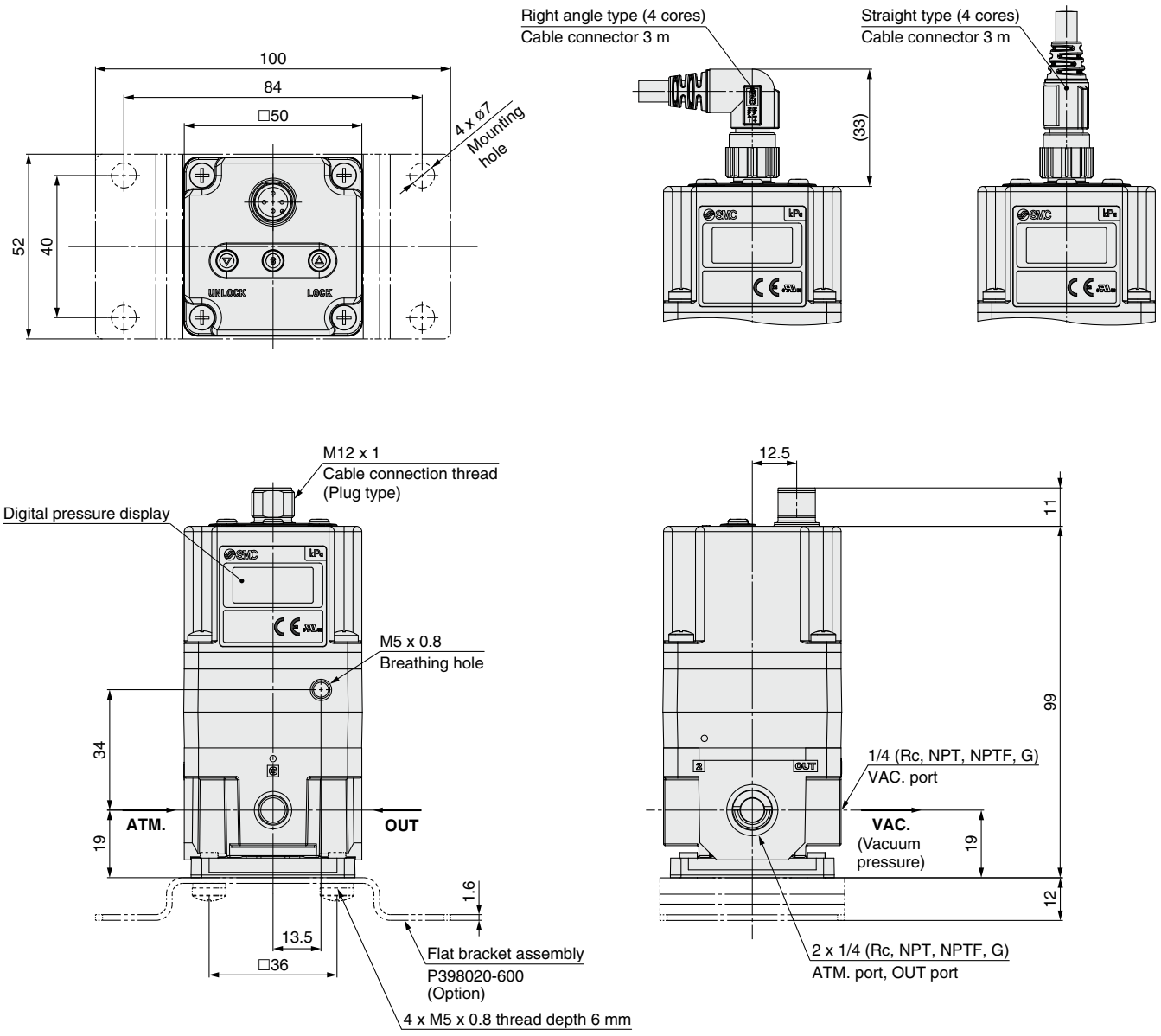
- Exhaust flow rate of the vacuum pump used for measurement: 500 L/min (ANR)
- Inlet vacuum pressure: –100 kPa (When outlet flow rate is 0 L/min (ANR))
- Max. flow rate: 132 L/min (ANR) (With inlet vacuum pressure at –39 kPa)

Dimensions

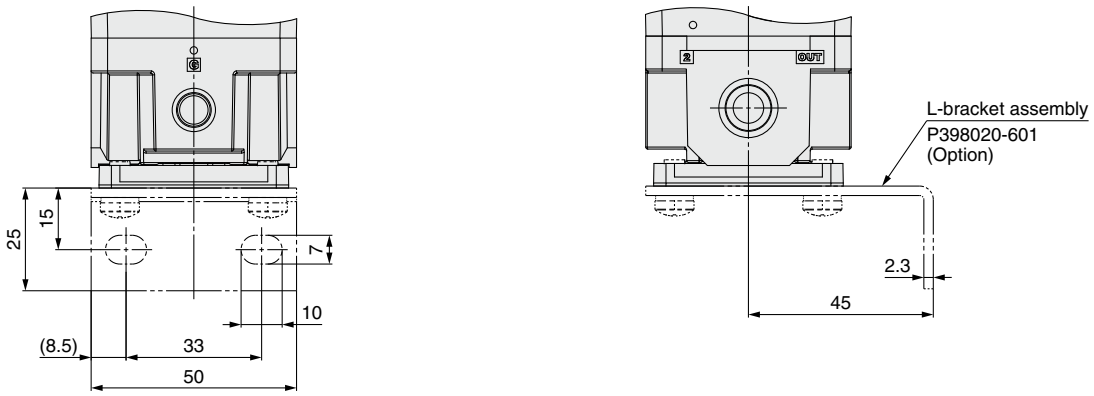
ITV209□

Flat bracket

∗ Do not attempt to rotate the cable connector, as it does not turn.

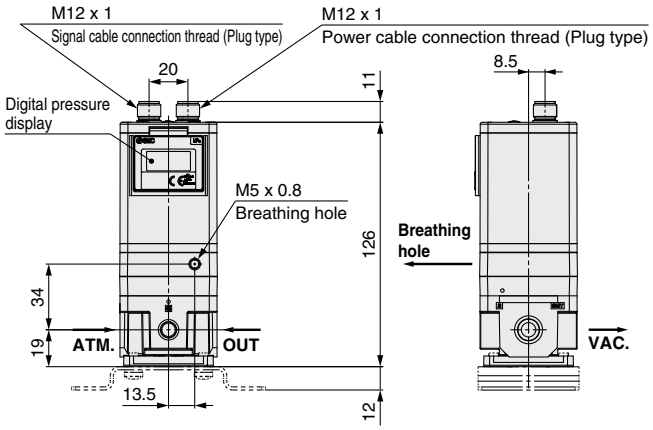


L-bracket

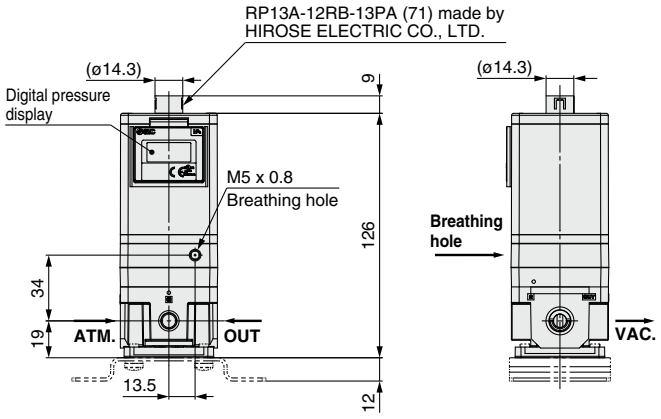


Dimensions (16 points preset input, 10-bit digital input, CC-Link, DeviceNet™)

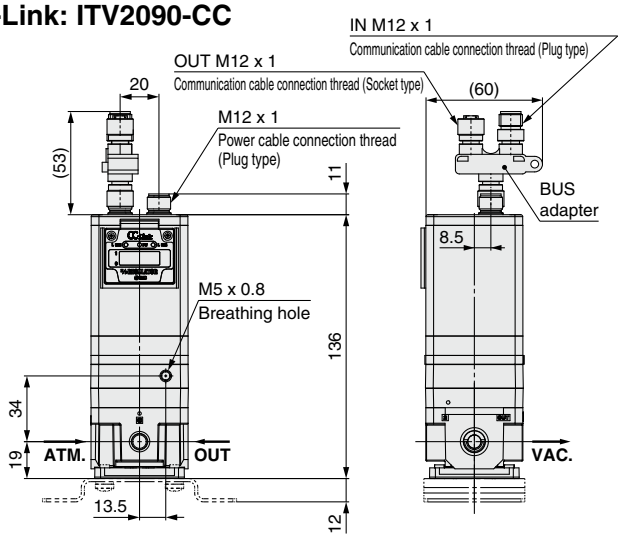
16 points preset input



10-bit digital input

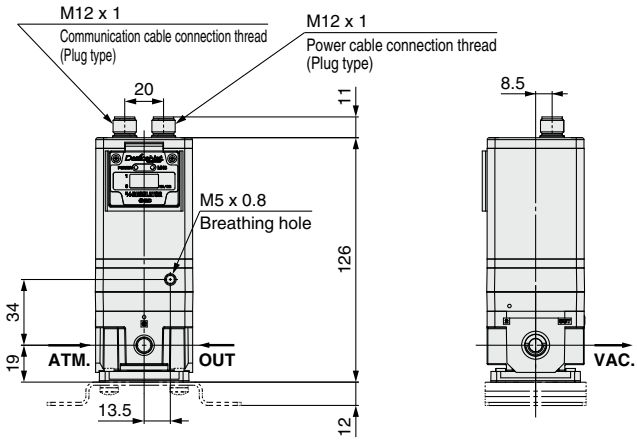


CC-Link: ITV2090-CC



∗ Dimensions not shown are the same as on page 49.

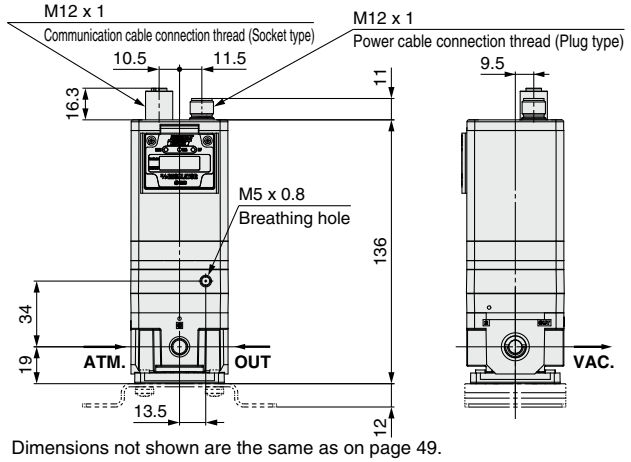
DeviceNet™: ITV2090-DE



∗ Dimensions not shown are the same as on page 49.

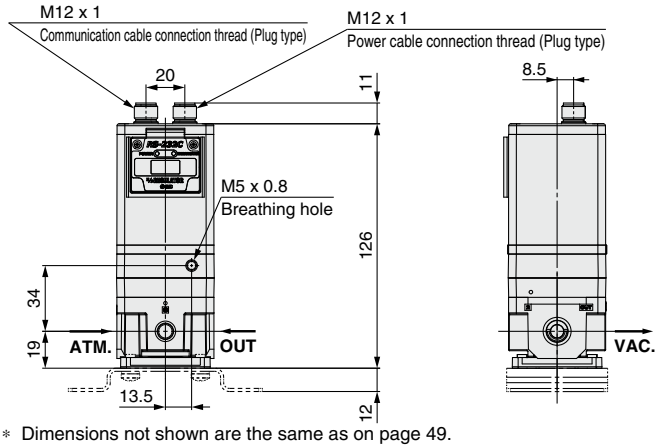
Dimensions (PROFIBUS DP, RS-232C, IO-Link)

PROFIBUS DP: ITV2090-PR



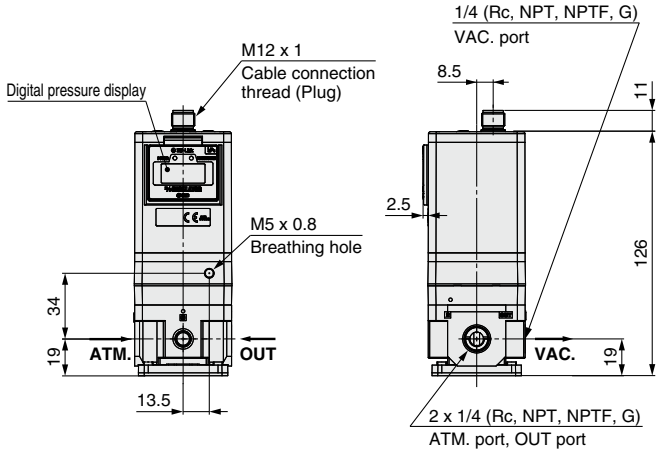
∗ Dimensions not shown are the same as on page 49.

RS-232C: ITV2090-RC



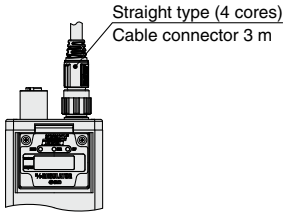
∗ Dimensions not shown are the same as on page 49.

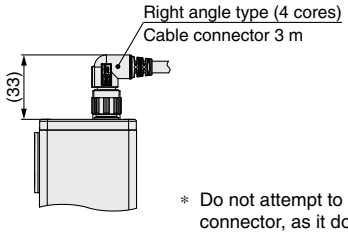
IO-Link: ITV2090-IL



With power cable connector

∗ **ITV2090-** 52 / 53 / CC / DE / PR / RC **common dimensions**





∗ Order communication cable (other than 16 points, RS-232C) separately. (Refer to page 46.)

∗ Do not attempt to rotate the cable connector, as it does not turn.

Accessories (Option)

Accessories (Option)/Part Nos.

[Bracket]

Description	Part no.	Weight
Flat bracket assembly (including mounting screws)	P398020-600	90
L-bracket assembly (including mounting screws)	P398020-601	

[Cable connector]

Applicable model	Description		Part no.	Weight
Current type Voltage type 4 points preset input IO-Link	**Cable connector (4 cores)**	**Straight type 3 m**	P398020-500-3	180
		Right angle type 3 m	P398020-501-3	
16 points preset input	**Power cable (4 cores)**	**Straight type 3 m**	P398020-500-3	
		Right angle type 3 m	P398020-501-3	
	Signal cable (5 cores)	**Straight type 3 m**	P398020-502-3	
		Right angle type 3 m	P398020-503-3	
10-bit digital input	**Cable connector (13 cores)**	**Straight type 3 m**	INI-398-0-59	310
CC-Link PROFIBUS DP DeviceNet™	**Power cable (4 cores)**	**Straight type 3 m**	P398020-500-3	180
		Right angle type 3 m	P398020-501-3	
RS-232C	**Power cable (4 cores)**	**Straight type 3 m**	P398020-500-3	
		Right angle type 3 m	P398020-501-3	
	Communication cable (5 cores)	**Straight type 3 m**	P398020-502-3	
		Right angle type 3 m	P398020-503-3	

∗ For the 10-bit digital type, there is no right angle type cable connector.
∗ Even when "with cable connector" is selected, the communication cable is not included in the communication model (CC, DE, and PR). Please order it separately.

[Cable connector specifications]

P398020-500-3, P398020-501-3

Conductor	**Nominal cross section**	4 x AWG21
	Outside diameter	Approx. 0.9 mm
Insulator	**Outside diameter**	Approx. 1.7 mm
Sheath	**Material**	PVC
Finished outside diameter		ø6 mm
Min. bending radius		60 mm

P398020-502-3, P398020-503-3

Conductor	**Nominal cross section**	5 x AWG21
	Outside diameter	Approx. 0.9 mm
Insulator	**Outside diameter**	Approx. 1.7 mm
Sheath	**Material**	PVC
Finished outside diameter		ø6 mm
Min. bending radius		60 mm

INI-398-0-59

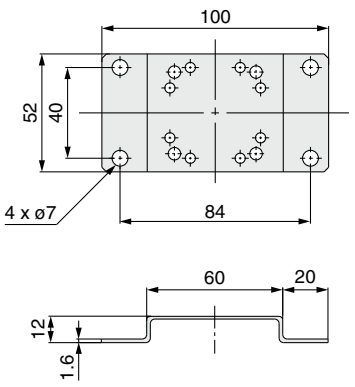
Conductor	**Nominal cross section**	16 x AWG24
	Outside diameter	Approx. 0.75 mm
Insulator	**Outside diameter**	Approx. 1.21 mm
Sheath	**Material**	PVC
Finished outside diameter		ø8 mm
Min. bending radius		60 mm

[Bus adapter]

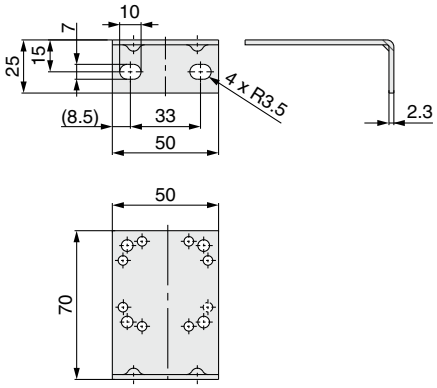
Applicable model	Description	Part no.	Weight
CC-Link	**Bus adapter (Included with the product)**	EX9-ACY00-MJ	35

Dimensions

Flat bracket



L-bracket



Model	Bracket tightening torque
ITV1000	0.76 ±0.05 N·m
ITV2000/3000	1.5 ±0.05 N·m

ITV Series
Specific Product Precautions 1

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For F.R.L. units precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

ITV0000/009□ Series Precautions

Air Supply

⚠ Warning

1. **Please consult with SMC when using the product in applications other than compressed air.**
2. **Do not use compressed air that contains chemicals, synthetic oils that include organic solvents, salt, corrosive gases, etc., as doing so may result in a malfunction.**

⚠ Caution

1. **Install an air filter near this product on the supply side. Select an air filter with a filtration size of 5 μm or smaller.**
2. **Compressed air that contains a large amount of drainage can result in the malfunction of this product and other pneumatic equipment. Therefore, take appropriate measures to ensure air quality, such as by providing an aftercooler, air dryer, or water separator.**
3. **If excessive carbon dust is generated by the compressor, it may adhere to the inside of this product and cause it to malfunction.**

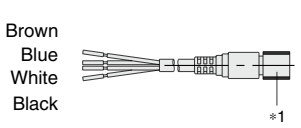
   Refer to the "SMC Air Preparation System" for further details on compressed air quality.

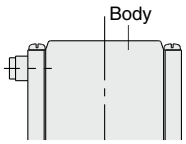
Wiring

⚠ Caution

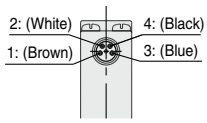
Connect the cable to the connector on the body with the wiring arranged as shown below. Proceed carefully, as incorrect wiring can result in damage.

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





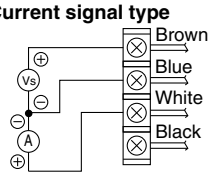
Terminal no.	1	2	3	4
Lead wire color	Brown	White	Blue	Black
Wiring	Power	Signal	COM	Monitor



*1 A right angle type cable is also available. The entry direction for the right angle type connector is downward (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.

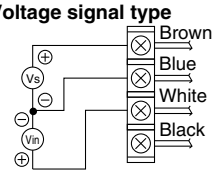
Wiring diagrams

Current signal type



Vs: Power supply 24 VDC ±10%
12 to 15 VDC
A : Input signals 4 to 20 mADC
0 to 20 mADC

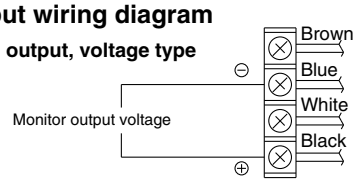
Voltage signal type



Vs : Power supply 24 VDC ±10%
12 to 15 VDC
Vin: Input signals 0 to 5 VDC
0 to 10 VDC

Monitor output wiring diagram

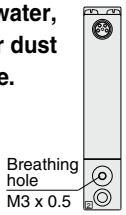
Analog output, voltage type



Handling

⚠ Caution

1. **Do not use a lubricator on the supply side of this product, as doing so may result in a malfunction. When lubrication of terminal equipment is necessary, connect a lubricator on the output side of this equipment.**
2. **If electric power is shut off while pressure is being applied, pressure will be retained on the output side.**
   However, this output pressure is held only temporarily and is not guaranteed. If exhausting of this pressure is desired, shut off the power after reducing the set pressure, and discharge the air using a residual pressure exhaust valve, etc.
3. **If the power to this product is cut off due to a power failure, etc., when it is in a controlled state, the 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 failure to do so may result in a malfunction.**
6. **The optional cable connector is a 4-wire type. When the monitor output (analog output) is not being used, keep it from touching the other wires as doing so may result in a 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, 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. When air is consumed on the output side, and especially used in the system with large leakage, pressure cannot approach the set pressure and the service life is drastically shortened with a humming noise of the solenoid valve.**
10. **For details on the handling of this product, refer to the operation 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 TIU01□-□□ tube recommended) onto the breathing hole and run the tube to a location not exposed to moisture, dust, etc.



Specific Product Precautions 2

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For F.R.L. units precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

ITV0000/009□ Series Precautions

Handling

⚠ Caution

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.

13. Each product needs to be powered by one power supply unit.

The wiring of this product has the same common between the GND for power and the signals; there is a possibility that a wrong current occurs and prevents a proper operation if one power supply unit controls multiple electro-pneumatic regulators.

14. This product does not have a shut-off valve function. If air pressure is supplied without electric power being applied, output pressure may increase to the pressure equivalent of the supply pressure. Operate the system to shut off the supply pressure when not operating the product.

15. For this product, by conducting the procedure described below (steps A to D), the parameters compatible with the power supply voltage and supply pressure in use can be obtained.
If the desired output pressure values cannot be reached due to fluctuations in the operating conditions, etc., perform this operation.

A) Change the power supply voltage in use by ±0.4 VDC or more.

B) After inputting the supply pressure used on the inlet side of the ITV, adjust the input signal as described below.
(0% → 100% → 0%) (Change it gradually, waiting 10 s or more between each adjustment.)
* Please contact SMC if difficulty inputting signals occurs.

C) Change the power supply voltage according to the operating conditions/requirements, and repeat step B.

D) Input the power supply voltage and a 0% signal, and retain for 6 minutes or more. (Supply pressure is not required.)

While conducting the procedure stated above, noise may be generated by the solenoid valve. However, this does not affect the obtainment of the parameters. In addition, be sure to conduct the procedure with the air sealed in the piping.

Return of Product

⚠ Warning

If the product to be returned is contaminated or is possibly contaminated with substances that are harmful to humans, for safety reasons, please contact SMC beforehand and then employ a specialist cleaning company to decontaminate the product. After the decontamination prescribed above has been carried out, submit a Product Return Request Sheet or the Detoxification/Decontamination Certificate to SMC and await SMC's approval and further instructions before attempting to return the item.
Please refer to the International Chemical Safety Cards (ICSC) for a list of harmful substances.
If you have any further questions, please don't hesitate to contact your SMC sales representative.

ITV Series
Specific Product Precautions 3

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For F.R.L. units precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

ITV1000/2000/3000/209□ Series Precautions

Piping

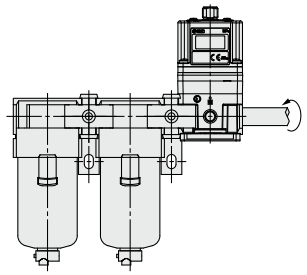
⚠ Warning

1. When screwing piping into a component, tighten within the recommended tightening torque range while holding the female thread side.

If the tightening torque is insufficient, looseness or sealing failure may occur. On the other hand, excess tightening torque can result in damage to the threads. Furthermore, tightening without holding the female thread side can result in damage due to the excess force that is applied directly to the piping bracket.

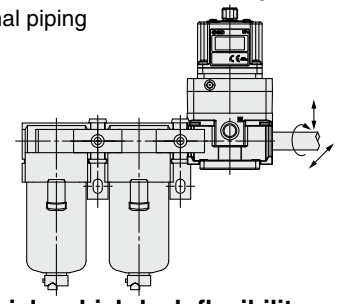
Recommended tightening torque range: N·m

Connection thread	1/8	1/4	3/8	1/2
Torque	3 to 5	8 to 12	15 to 20	20 to 25



2. Avoid excessive torsional moment and bending moment other than those caused by the equipment's own weight, as failure to do so may result in damage.

Support external piping separately.



3. Piping materials which lack flexibility, such as steel tube piping, are prone to being affected by excess moment loads and vibrations from the piping side. Use flexible tubing in between to avoid such effects.

⚠ Caution

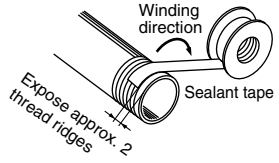
1. Preparation before piping

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.

If chips, sealing material, or other debris enter into this product, the solenoid valve may buzz or the outlet pressure may not be output properly.

2. Winding of sealant tape

When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not enter the piping. Also, if sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



Operating Environment

⚠ Warning

1. Do not use in atmospheres containing corrosive gases, chemicals, sea water, or where there is direct contact with any of these.

2. Please contact SMC regarding use at power stations or in instrumentation applications.

⚠ Caution

1. When used in locations where the body of the product is exposed to water, water vapor, dust, etc., there is a possibility that moisture or dust could enter the body through the EXH (solenoid) ports, thereby causing problems.

2. To prevent this, simply install tubing to each port, using the fittings, and extend the tubing so that the other end is in 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 use in places subject to heavy vibration and/or impact.

4. The product should not be exposed to prolonged sunlight. Use a protective cover if this is unavoidable.

5. Remove any sources of excessive heat.

6. In locations where there is contact with water, oil, weld spatter, etc., take suitable protective measures.

Air Supply

⚠ Warning

1. Please contact SMC when using the product in an application using a fluid other than compressed air.

2. Do not use compressed air that contains chemicals, synthetic oils that include organic solvents, salt, corrosive gases, etc., as doing so may result in a malfunction.

⚠ Caution

1. Install an air filter near this product on the supply side. Select an air filter with a filtration size of 5 μm or smaller.

2. Compressed air that contains a large amount of drainage can cause the malfunction of this product and other pneumatic equipment. Therefore, take appropriate measures to ensure air quality, such as providing an aftercooler, air dryer, or water separator.

3. If excessive carbon dust is generated by the compressor, it may adhere to the inside of this product and cause it to malfunction.

Refer to the "SMC Air Preparation System" for further details on compressed air quality.

Specific Product Precautions 4

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For F.R.L. units precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

ITV1000/2000/3000/209□ Series Precautions

Handling

⚠ Caution

1. **Do not use a lubricator on the supply side of this product, as doing so may result in a malfunction. When lubrication of terminal equipment is necessary, connect a lubricator on the output side of this equipment.**
2. **If electric power is shut off while pressure is being applied, pressure will be retained on the output side. However, this output pressure is held only temporarily and is not guaranteed. If exhausting of this pressure is desired, shut off the power after reducing the set pressure, and discharge the air using a residual pressure exhaust valve, etc.**
3. **If the 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. **The setting side pressure cannot be completely released from this product in the range below 0.005 MPa (or –1.3 kPa for vacuum models). In cases where the pressure needs to be reduced completely to 0 MPa, install a 3-port valve, etc., on the setting side to discharge the residual pressure.**
6. **This product is adjusted for each specification at the time of shipment from the factory. Avoid careless disassembly or removal of parts, as failure to do so may result in a malfunction.**
7. **The optional cable connector is a 4-wire type. When the monitor output (analog output or switch output) is not being used, keep it from touching the other wires as doing so may result in a malfunction.**
8. **When connecting the cable to this product, turn the lock ring of the cable. If a portion other than the lock ring of the cable is turned, it may damage the connector on the body. Turn the lock ring by hand without using a tool.**
9. **The right angle cable does not rotate and is limited to only one entry direction. If the right angle cable is rotated forcibly, the cable may be broken or damaged, or may damage the connector on the body.**
10. **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, power lines, etc.
    3) Be sure to implement protective measures against load surge for induction loads (solenoid valves, relays, etc.).
11. **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 AN20 or AN40 series) on the exhaust port (EXH port). The port sizes are Rc1/8, Rc1/4, and Rc1/2.**
12. **Specifications on pages 14 and 47 are in case of static environment. Pressure may fluctuate when air is consumed at the output side.**

Handling

⚠ Caution

13. **For details on the handling of this product, refer to the operation manual which is included with the product.**
14. **This product does not have a shut-off valve function. If air pressure is supplied without electric power being applied, output pressure may increase to the pressure equivalent of the supply pressure. Operate the system to shut off the supply pressure when not operating the product.**
15. **The solenoid valves built into this product are consumables. Perform periodic maintenance in environments where the solenoid valves are operated at a high frequency. The parts can be replaced with a solenoid valve assembly. Please contact SMC for the part number.**
16. **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 solenoid valve EXH port. Mount a fitting and tube onto the solenoid valve EXH port and run the tube to a location not exposed to moisture, dust, etc.**

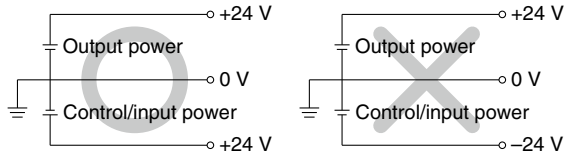
Design and Selection

⚠ Caution

1. **Use the following UL approved products for DC power supply combinations.**
   (1) 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
   • Max. voltage (with no load): 30 Vrms (42.4 V peak) or less
   • Max. 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 [A]
0 to 20 [V]	5.0
Over 20 and 30 or less [V]	$\frac{100}{\text{Peak voltage}}$

   (2) A circuit (class 2 circuit) with max. 30 Vrms (42.4 V peak) or less, and a power supply consisting of a class 2 power supply unit confirming to UL1310, or a class 2 transformer confirming to UL1585
2. **Operate these products only within the specified voltage.**
   Using voltages beyond the specified levels could result in faults or malfunctions.
3. **Use 0 V as the baseline for the power supplied to the unit for output, control, and input.**



4. **Each product needs to be powered by one power supply unit.**
   The wiring of this product has the same common between the GND for power and the signals; there is a possibility that a wrong current occurs and prevents a proper operation if one power supply unit controls multiple electro-pneumatic regulators.
5. **Please contact SMC for the usage when the downstream side is released to atmosphere.**
   This product is a pressure controller. The downstream side being released to atmosphere makes the inlet valve full open, allowing a large amount of atmosphere flow into the body. Please contact SMC for the appropriate usage when you use the product under such condition since the product may not meet the specification or the life of the product may be shortened.

ITV Series
Specific Product Precautions 5

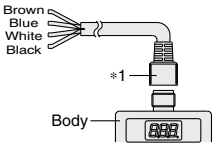
Be sure to read this before handling the products. Refer to the back cover for safety instructions. For F.R.L. units precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

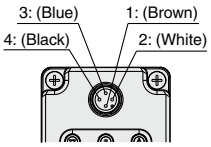
ITV1000/2000/3000/209□ Series Precautions

Wiring

⚠ Caution

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





Current Signal Type
Voltage Signal Type

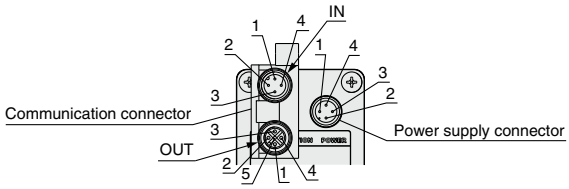
1	Brown	Power supply
2	White	Input signal
3	Blue	GND (COMMON)
4	Black	Monitor output

Preset Input Type

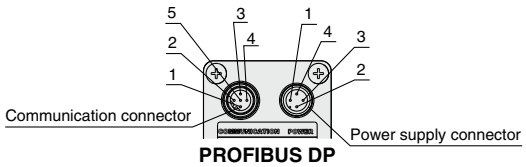
1	Brown	Power supply
2	White	Input signal 1
3	Blue	GND (COMMON)
4	Black	Input signal 2

IO-Link

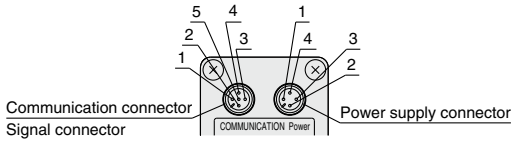
1	Brown	Power supply
2	White	No connection
3	Blue	GND
4	Black	IO-Link communication data



CC-Link



PROFIBUS DP



DeviceNet™, RS-232C, 16 points preset

	IN/OUT communication connector				Signal connector
Pin no.	CC-Link	DeviceNet™	PROFIBUS DP	RS-232C	16 points preset
1	SLD [–]	DRAIN [–]	No connection	No connection	Input signal 1 [Brown]
2	DB [White]	V+ [Red]	RxD/TxD-N [Green]	TxD [White]	Input signal 2 [White]
3	DG [Yellow]	V– [Black]	No connection	RxD [Blue]	Input signal 3 [Blue]
4	DA [Blue]	CAN_H [White]	RxD/TxD-P [Red]	GND [Black]	Input signal 4 [Black]
5	No connection	CAN_L [Blue]	No connection	No connection	Common [Gray]

	Power supply connector				
Pin no.	CC-Link	DeviceNet™	PROFIBUS DP	RS-232C	16 points preset
1 [Brown]	Vcc	Vcc	Vcc	Vcc	Vcc
2 [White]	FG	Cannot connect	FG	No connection	No connection
3 [Blue]	GND	GND	GND	GND	GND
4 [Black]	No connection	Cannot connect	No connection	FG	Monitor output

*1 The cable is also available in a right angle type. (Communication cable: straight type only) A right angle type connector is attached facing left (toward the SUP port). On communication models, the connector faces backward (toward the EXH port). Do not attempt to rotate, as the connector does not turn.

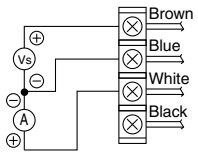
* The indicated wire colors are when a cable connector made by SMC is used.
* Perform the wiring so that no electric potential difference occurs between GND of the power supply and GND of the communication section. If any electric potential difference occurs, this may cause the internal parts to burn out.

Knock-down connectors * Order separately.

Application	CC-Link compatibility		DeviceNet™ compatibility			PROFIBUS DP compatibility		
Part no.	Plug	Socket	Plug	Socket	Terminal plug	Plug	Socket	Terminal plug
	PCA-1075526	PCA-1075527	PCA-1075528	PCA-1075529	PCA-1557675	PCA-1075530	PCA-1075531	PCA-1557727

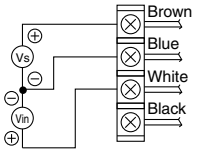
Wiring diagrams

Current signal type



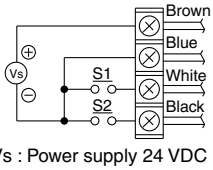
Vs : Power supply 24 VDC
12 to 15 VDC
A : Input signal 4 to 20 mADC
0 to 20 mADC

Voltage signal type



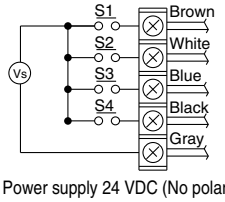
Vs : Power supply 24 VDC
12 to 15 VDC
Vin: Input signal 0 to 5 VDC
0 to 10 VDC

4 points preset input type



Vs : Power supply 24 VDC
12 to 15 VDC
(Negative common)

16 points preset input type



Vs : Power supply 24 VDC (No polarity)

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

S1	OFF	ON	OFF	ON	OFF		ON	OFF	ON
S2	OFF	OFF	ON	ON	OFF		OFF	ON	ON
S3	OFF	OFF	OFF	OFF	ON	···	ON	ON	ON
S4	OFF	OFF	OFF	OFF	OFF		ON	ON	ON
Preset pressure	P01	P02	P03	P04	P05		P14	P15	P16

* For safety reasons, it is recommended that one of the preset pressures be set to 0 MPa.
* Preset pressures are set based on the min. unit for output display.

MPa	kgf/cm²	bar	psi	kPa
0.001	0.01	0.01	0.1	1

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

■ **Trademark**
DeviceNet™ is a trademark of ODVA.

Specific Product Precautions 6

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For F.R.L. units precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

ITV1000/2000/3000/209□ Series Precautions

Wiring

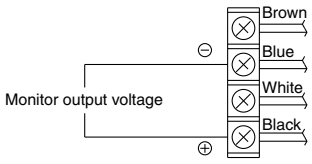
10-bit digital input type

Wire color	Signal name
Pink-Black 2	Power supply (24 VDC)
Green-Black 2	Power supply (GND)
Blue	Signal common (No polarity)
Blue-Black 2	MSB 10 bit
Gray-Black 1	9 bit
Orange-Black 1	8 bit
Green-Black 1	7 bit
Pink-Black 1	6 bit
Blue-Black 1	5 bit
Gray	4 bit
Orange	3 bit
Green	2 bit
Pink	LSB 1 bit

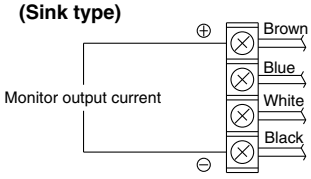
∗ The wire color is shown for when an option cable is used.

Monitor output wiring diagrams

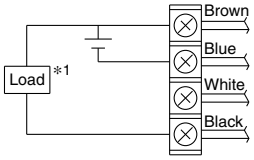
Analog output: Voltage type



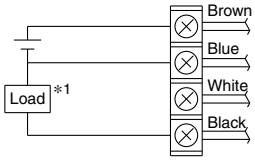
Analog output: Current type (Sink type)



Switch output: NPN type



Switch output: PNP type



∗1 When 80 mADC or more is applied, detecting device for overcurrent starts activating and then emits an error signal. (Error number "5")

Set Pressure Range

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

Set pressure range, by unit of standard measured pressure

Unit	Set 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 Marking

• ITV0000 Series

Model	Ferrite core necessity	Recommended power supply cable
ITV0000-□□	Unnecessary	M8-4DSX3MG4 (Straight type) P398000-501-2 (Right angle type)

∗ Recommended power supply cable length is 3 m. (P398000-501-2 is 2 m.) If any other length is desired, please contact SMC.

• ITV1000/2000/3000 Series

Model	Ferrite core necessity	Recommended power supply cable	
ITV□□-□□	Unnecessary	—	P398020-500-3 (Straight type) P398020-501-3 (Right angle type)
ITV□□-52□ **ITV□□-53□**		Power	P398020-500-3 (Straight type) P398020-501-3 (Right angle type)
		Signal	P398020-502-3 (Straight type) P398020-503-3 (Right angle type)
ITV□□-60□		—	INI-398-0-59 (Straight type)
ITV□□-CC□ ∗1, ∗2		Power	P398020-500-3 (Straight type) P398020-501-3 (Right angle type)
		Communication	PCA-1567720 (Socket type) PCA-1567717 (Plug type)
ITV□□-DE□ ∗1, ∗3		Power	P398020-500-3 (Straight type) P398020-501-3 (Right angle type)
		Communication	PCA-1557633 (Socket type) PCA-1557646 (Plug type)
ITV□□-PR□ ∗1, ∗3		Power	P398020-500-3 (Straight type) P398020-501-3 (Right angle type)
		Communication	PCA-1557688 (Socket type) PCA-1557691 (Plug type)
ITV□□-RC□		Power	P398020-500-3 (Straight type) P398020-501-3 (Right angle type)
		Communication	P398020-502-3 (Straight type) P398020-503-3 (Right angle type)
ITV□□-IL□		—	P398020-500-3 (Straight type) P398020-501-3 (Right angle type)

∗1 Even when the "with cable connector" type is selected, the communication connector is not included. Refer to the catalog [M8/M12 Connector] CAT. ES100-73 for the details of the communication cable.
∗2 For CC-Link compatible products, a dedicated Bus adapter is included with the product.
∗3 For DeviceNet™ compatible products, and PROFIBUS DP compatible products, a T-branch connector is not included with the product.
∗ Recommended power supply cable length is 3 m. If any other length is desired, please contact SMC.

Return of Product

⚠Warning

If the product to be returned is contaminated or is possibly contaminated with substances that are harmful to humans, for safety reasons, please contact SMC beforehand and then employ a specialist cleaning company to decontaminate the product. After the decontamination prescribed above has been carried out, submit a Product Return Request Sheet or the Detoxification/Decontamination Certificate to SMC and await SMC's approval and further instructions before attempting to return the item.
Please refer to the International Chemical Safety Cards (ICSC) for a list of harmful substances.
If you have any further questions, please don't hesitate to contact your SMC sales representative.

ITV Series
Specific Product Precautions 7

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ITV009□/209□ Series 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 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 result in failure.

Handling

⚠Caution

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 doing so may result in a 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) 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, power lines, etc.
    3) Be sure to implement protective measures against load surge for induction loads (solenoid valves, relays, etc.).
15. Refer to the operation manual included with the product for details on its handling.

Return of Product

⚠Warning

If the product to be returned is contaminated or is possibly contaminated with substances that are harmful to humans, for safety reasons, please contact SMC beforehand and then employ a specialist cleaning company to decontaminate the product. After the decontamination prescribed above has been carried out, submit a Product Return Request Sheet or the Detoxification/Decontamination Certificate to SMC and await SMC's approval and further instructions before attempting to return the item.
Please refer to the International Chemical Safety Cards (ICSC) for a list of harmful substances.
If you have any further questions, please don't hesitate to contact your SMC sales representative.

⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

⚠ Caution: **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

⚠ Warning: **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ Danger : **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

⚠ 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, whichever is first.*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 catalog for the particular products.

*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.

⚠ Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

⚠ Safety Instructions	Be sure to read the "Handling Precautions for SMC Products" (M-E03-3) and "Operation Manual" before use.

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Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.

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