ITV Series Electro-Pneumatic Regulator (Communication Protocol Version)



ITV 3000 Series
(ITV3000-MB/IO)



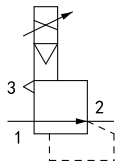
ITV 2000 Series
(ITV2000-MB/IO)



ITV 1000 Series
(ITV1000-MB/IO)

Available series

Operating Instructions



Communication Protocol Type: Modbus RTU over RS-485/IO-Link

Pressure control with digital communication.

Product Features (Modbus)

- Enhanced protection
  Isolated RS-485 interface, stronger anti-interference performance and longer transmission distance.
- Finer Control Granularity
  Setpoint adjustment in 1 kPa increments.
- Minimal Temperature Drift
  Temperature drift: <0.3% F.S. over an ambient temperature range of −10 to 50 °C.
- Digital retrofit for existing equipment
  Supports digital control upgrades to existing equipment.

Product Features (IO-Link)

- Superior Compatibility
  Fully compatible with the functions and mounting dimensions of SMC IO-Link electro-pneumatic proportional valves, with a more compact footprint than SMC products.
- Minimal Temperature Drift
  Temperature drift is controlled within<0.3% F.S. across the full operating temperature range, suitable for working environments from -10°C to 50°C.
- Compact Size
  Same mounting footprint as the standard ITV model.
- ComprehensiveSupport
  IODD available for device configuration and diagnostics.

ITV Series Electro-Pneumatic Regulator (Communication Protocol Version)

Technical Features and Performance Comparison

Modbus



Comparison item	ITV-MB Series (Modbus 485)	Basic Model (Analog Version)
Communication type	Industrial communication protocol	Analog signal
Signal type	Digital	Analog
Transmission medium	Shielded twisted pair	Ordinary cable
Maximum cable length	1200 m	100 m
Communication speed	Up to 115.2 kbps	Low
Two-way communication	Supported	Not supported
Diagnostic function	Supported	Not supported
Anti-interference performance	Excellent	Poor

* Digital communication can reduce dependence on analog signal wiring. The stated 1 kPa adjustment capability requires separate verification.

IO-Link



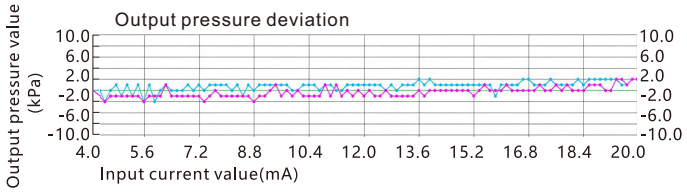
Comparison item	ITV-IO Series (IO-Link)	Basic Model (Analog Version)
Communicaton type	International communication protocol	Analog signal
Signal type	Digital	Analog
Communicaton speed	230.4 kbps(COM3)	Not applicable
Real-time performance	High	Low
Two-way communication	Supported	Not supported
Diagnostic function	Rich	Not supported
Anti-interference performance	Excellent	Poor
Degree of intelligence	High	Low

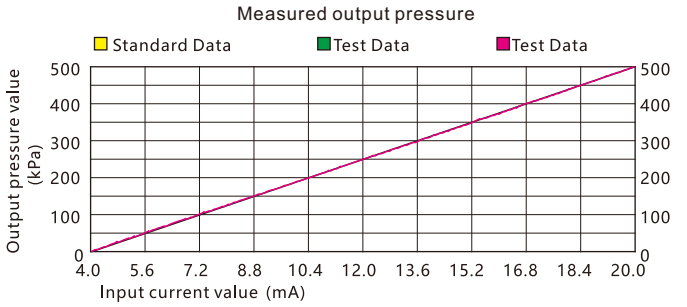
* IO-Link enables digital parameter setting and device diagnostics.

ITV Series Electro-Pneumatic Regulator (Communication Protocol Version)

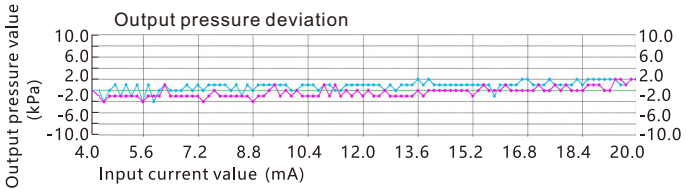
Low Hysteresis Performance

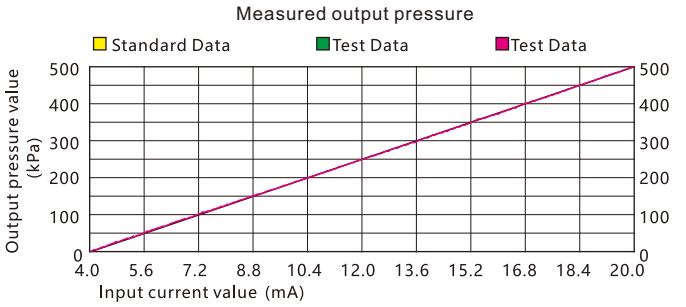
Modbus





IO-Link

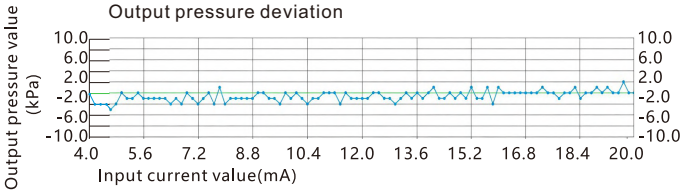


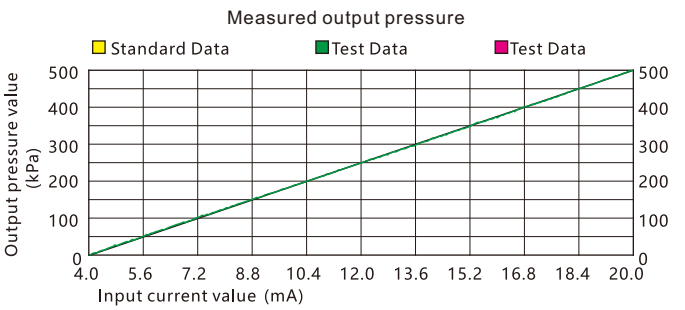


* The test curves for pressure rise and pressure drop almost completely overlap, demonstrating extremely low hysteresis.
The measured curves for increasing and decreasing pressure overlap closely over the tested range.

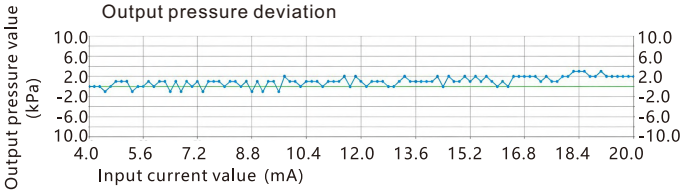
Excellent Linearity

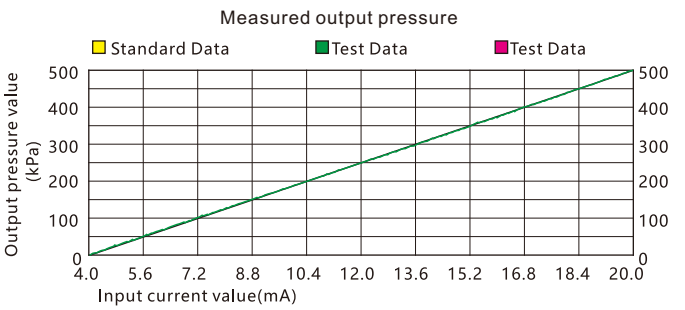
Modbus





IO-Link





* The measured output pressure closely follows the target pressure over the tested range.
The standard curve (green) fully overlaps with the measured data (blue), enabling finer and more precise control.

ITV Series Electro-Pneumatic Regulator (Communication Protocol Version)

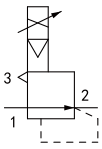


IO-Link



Modbus

Operating Instructions



Ordering Code

ITV Series Electro-Pneumatic Regulator (Communication Protocol Version)

ITV3 0 1 0 - MB □ 2 □ S □ - □

Model
1: 1000 series
2: 2000 series
3: 3000 series

Pressure range
1: 0.1MPa
3: 0.5MPa
5: 0.9MPa

Supply voltage
0: DC24V
1: DC12 to 15V
* Please consult our company for ordering(12 to 15V).

Input signal model
MB: RS-485 communication
IO: IO-Link communication

Thread type
Nil: PT
G: G
N: NPT

Port size
1: 1/8(1000 series)
2: 1/4(1000/2000/3000 series)
3: 3/8(2000/3000 series)
4: 1/2(3000 series)

Attachment
Nil: No bracket
B: Flat bracket
C: L-shaped bracket
* Bracket included in factory packaging.

Cable type
S: Linear type 3m
L: Right angle type 3m
N: No cable plug
* Plug included in factory packaging.

Pressure unit
Nil: MPa
2: kgf/cm²
3: bar
4: psi
5: kPa

Customized specifications

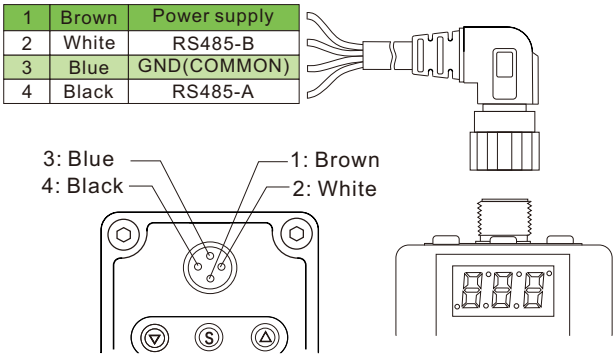
ITV Series Electro-Pneumatic Regulator (Communication Protocol Version)

Wiring Method

⚠ Caution

1. To avoid signal attenuation and misoperation caused by interference, Keep the signal cable away from other cables, equipment and sources of electromagnetic interference.
2. Please use shielded twisted-pair cable for long-distance communication. Maintain shield continuity at intermediate connections.
3. Do not rotate the right-angle connector, it is not designed to rotate.

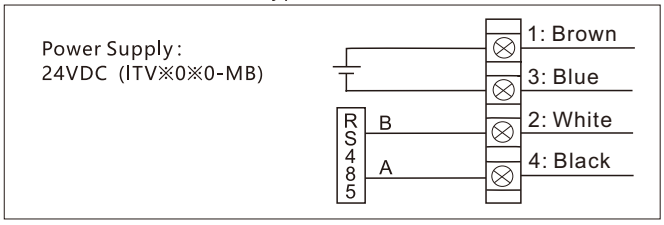
1	Brown	Power supply
2	White	RS485-B
3	Blue	GND(COMMON)
4	Black	RS485-A



* The wire colors shown apply only to the optional cable.

Wiring Diagram(Power Supply & Communication Signal)

RS-485 Communication Type (ITV※0※※-MB)



Scan QR Code for Assistant App

Setting Method

Item	Specifications
Communication interface	RS-485
Slave address	1 Default
Communication Speed (Baud rate)	9600 Default
Communication format	8-N-1 Default
Communication protocol	ModBus-RTU

⚠ Caution

1. During communication, ensure consistent communication parameters between the master station and slave station to guarantee normal communication among devices.
2. After setting the slave address, baud rate and communication format, enable the key lock to prevent accidental changes.

Register Functions

Register address	Display	Function	Description	Operation
0000	.900	Current pressure	1.Read current pressure value 2.Pressure zero clear(reset target pressure)	Read
0001	.900	Target pressure	Setting pressure range 0.1MPa: 0 to 0.12MPa 0.5MPa: 0 to 0.60MPa 0.9MPa: 0 to 1.08MPa	Read/Write
0002	GL.9	Gain	Gain parameter(0~9)Default: GL.9	Read
0003	SL.0	Sensitivity	Sensitivity parameter(0~5) Default: SL.0	
0004	Adr	Slave address	Communication address(1~247) Default:1	Read (Restart the device for the changes to take effect.)
0005	bud	Communication speed	Baud rate 0:9600 1:1440 2:19200 3:28800 4:38400 5:57600 6:115200 Default 0:9600	
0006	PAr	Communication format	Baud rate 0: 8-N-1 1: 8-O-1 2: 8-E-1 3: 8-N-2 Default: 0:8-N-1	

ITV Series Electro-Pneumatic Regulator (Communication Protocol Version)

RS-485 Communication Type

NO.	Key operation	LED display value
1	Unlock keys	
2	Press S-key	Display slave address
3	Use △/▽ to set keys Adr	Adr'⟷1'(alternating display)△/▽ keys to change value
4	Press S-key	Display baud rate
5	Use △/▽ to set keys bud	bud'⟷0'(alternating display)△/▽ keys to change value
6	Press S-key	Display communication format
7	Use △/▽ to set keys PAr	PAr'⟷0'(alternating display)△/▽ keys to change value
8	Press S-key	
9		Return to display current pressure
10	Lock keys	

Reset Function

This procedure restores the communication parameters listed below to their default values.

NO.	Key operation	LED display value
1	Unlock keys	
2	Press and hold △ and ▽ simultaneously for more than 3 seconds	Display current pressure value
3	Press S-key	
4	Execute reset	Show rES for approx. 1 second

Reset Contents

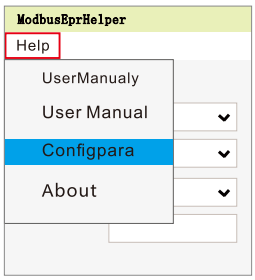
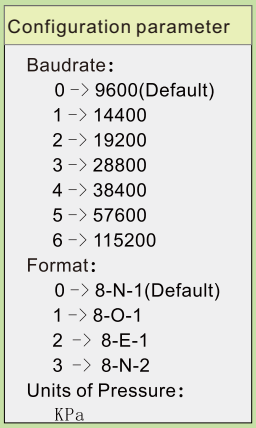
Item	Reset content	Applicable type
Adr	Slave address (Default:1)	RS-485 Communication type
bud	Default: code 0 (9,600bps)	
PAr	Communication format (Default: 0:8-N-1)	

* Gain (GL), Sensitivity (SL) and pressure unit (MPa/bar/psi) will not be reset.

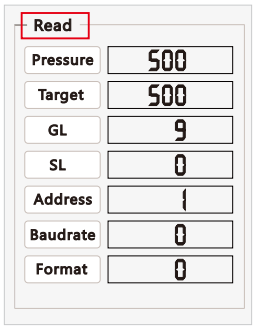
ITV Series Electro-Pneumatic Regulator (Communication Protocol Version)

Related Settings

Software Configuration Parameters (ModbusEprHelper)

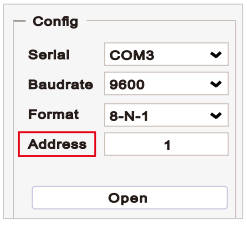
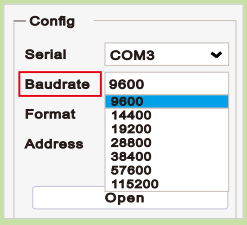
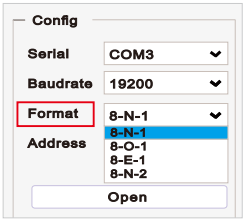
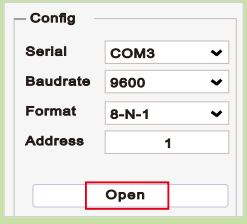
NO.	Configuration parameter	Software display
1	From help, select configuration parameters	
2	Detailed software configuration parameters (Baud rate/Communication format/Pressure unit)	

Output Pressure Setting of Electro-Pneumatic Proportional Valve (ModbusEprHelper)

NO.	Setting content	Software display
1	Input the required pressure value (kPa). Click Target Pressure, then the electro-pneumatic proportional valve starts output immediately	
2	Click reset target pressure to stop output of the electro-pneumatic proportional valve	
3	Click Read to display the regulator parameters	

ITV Series Electro-Pneumatic Regulator (Communication Protocol Version)

Software Communication Parameter Settings (ModbusEprHelper)

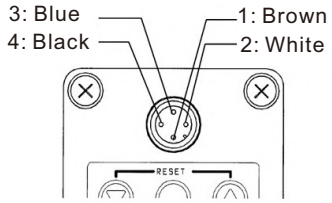
NO.	Setting	Software screen
1	Slave address (Match the regulator's slave address)	
2	Baud rate (Match the regulator's baud rate)	
3	Communication format (Match the regulator's communication format)	
4	Connect device	

ITV Series Electro-Pneumatic Regulator (Communication Protocol Version)

Wiring Method IO-Link

* The wire colors shown apply to the optional accessory cable.

1	Brown	Power supply (L+)
2	White	Not connected
3	Blue	GND(L-)
4	Black	IO-Link communication (C/Q)



IO-Link Function

1. Communication Function
   This product supports cyclic data communication via the IO-Link system to monitor pressure adjustments and parameter information.
2. Device status monitoring
   This function monitors the product status through IO-Link communication.
   Multiple faults can be detected(e.g.,internal hardware faults)
   Multiple alarms can be detected(e.g.,low pressure, overpressure)
3. Output behavior on communication error
   The output can be configured to hold or clear when IO-Link communication fails.
4. Communication Specifications

Item	Specification	Remarks
IO-Link device type	Device	
Version	Version1.1	
Communication cycle time	230.4kbps(COM3)	
Minimum cycle time	3.2ms	
IO-Link port	Class A	
Process data length	4 bytes input, 2 bytes output	Resolution:12bit
Acyclic data communication	Supported	
Data storage function	Not supported	
Event function	Supported	

Setting via Buttons

⚠ Caution

1. If an incorrect button press or a display error occurs during setup, switch off the power and restart the setup procedure.
2. Change the settings with the air supply pressure removed. After the maximum and minimum pressure values are configured, press the <SET> key to start operation immediately.
3. The key-lock setting is stored in nonvolatile EEPROM and retained after power is switched off. The factory default is unlocked.
4. Parameters can also be configured via IO-Link.Local button inputs take priority while the buttons are being pressed; IO-Link settings are processed separately.
5. Do not perform settings using both button operation and IO-Link communication at the same time configuring parameters by these two methods simultaneously maylead to unexpected settings.

Manual Adjustment Method for Gain/Sensitivity

Normally, keep the factory-default gain and sensitivity settings. Adjust them only if output pressure fluctuates significantly.

ITV Series Electro-Pneumatic Regulator (Communication Protocol Version)

NO.	Key operation	LED display
1	Unlock the key-lock (Refer to standard model)	Displays current pressure value
2	Press and hold the <SET> key for more than 3 seconds	F01'⟷GL.9'(Alternating display)
3	Use △/▽ to adjust gain F01	GL.9' Use △/▽ keys to change the value
4	Press the <SET> key	
5	Use △/▽ to adjust gain sensitivity F02	SL.0' Use △/▽ keys to change the value
6	Press the <SET> key	
7	Press and hold the <SET> key for more than 3 seconds	
8	Activate key-lock (Refer to standard model)	

• Relationship between Gain Setting and Response

Responsiveness	Fast ⟷ Slow											
Gain setting	GL.F	GL.E	GL.D	GL.C	GL.B	GL.A	GL.9	GL.8	……	GL.2	GL.1	GL.0

Default Gain: GL.9

• Effect of sensitivity setting on response

Sensitivity	Responsive⟷Slower response							
Sensitivity setting	SL.	SL.⁻	SL.0	SL.1	SL.2	SL.3	SL.4	SL.5

Default Sensitivity: SL.0

Zero-point Clear

If residual pressure remains in the piping, shut off the air supply and vent the downstream piping before performing zero clear.

NO.	Key operation	LED display
1	Unlock the key-lock (Refer to standard model)	Displays current pressure value
2	Press and hold the <SET> key for more than 3 seconds	F01'⟷GL.9'(Alternating display)
3	Press △key	F02'⟷SL.0'(Alternating display)
4	Press △key	F03'⟷0cL'(Alternating display)
5	Press <SET> keys to set F03'	0cL'(Display flashes)
6	Press and hold both △ and ▽ keys simultaneously for more than 3 seconds	0cL'(Display remains steady)
7		clr' displayed for approx.1 second
8	Zero-point clearing complete	

* Adjustment range: Within ± 5% F.S. of 100% F.S.

Reset Contents

Operation Procedure

NO.	Key operation	LED display
1	Unlock keys (Refer to standard model)	
2	Press and hold both △ and ▽ keys simultaneously for more than 3 seconds	Current pressure value displayed
3		rES' displayed for approx.1 second
4	Setting reset	

ITV Series Electro-Pneumatic Regulator (Communication Protocol Version)

Reset Contents

Item	Reset value	Applicable type
F_1	0%F.S.	IO-Link
F_2	100%F.S.	IO-Link

* Gain (GL), sensitivity (SL) and the pressure unit will not be reset.

IO-Link Initialization

Initialization restores all settings to factory defaults. Use it only under the conditions specified in the operating instructions.

NO.	Key operation	LED display
1	Unlock keys (Refer to standard model)	Current pressure value displayed
2	Press and hold the <SET> key for more than 3 seconds	F01 ⟷ GL.9 (Alternating display)
3	Press ▽ key	F99 ⟷ in.1 (Alternating display)
4	Press <SET> key to set F99	in.1 (Display flashes)
5	Press and hold both △ and SET keys simultaneously for more than 3 seconds	in.1 (Display remains steady)
6	Initialization completed	

* Pressure settings / Gain/Sensitivity /Pressure unit/Zero-point offset are all restored to factory defaults.

LED Indication

Item	Steady-on	Blinking	Off
Power	Normal operation	Communication system error	Communication error, turn off power supply
Communication	IO-Link communication not established (SIO Mode)	IO-Link communication established	Power off

Error Indication Function

NO.	LED Display	Error description	Countermeasure
1	Er.1	Input signal out of rated range	Set the input signal within the rated range, then power-on the unit again
2	Er.2	EEPROM read-write error	Contact our company
3	Er.3	Memory read-write error	Contact our company
4	Er.4	Solenoid valve malfunction	Solenoid valve replacement is required. Please consult separately for replacement instructions.
5	Er.6	Supply voltage outside the rated range	Ensure the supply voltage is within 13-28 VDC, then use a suitable power supply.