Doc. No.DIT-69900-OM005-E

Operation Manual

PRODUCT NAME

IO-Link/ELECTRO-PNEUMATIC REGULATOR

MODEL / Series / Product Number

ITV1000/2000/3000-IO* Series

This is the operation manual for the IO-Link compliant ITV.
For other contents which are not described in this manual, please refer to the operation manual for the standard product.

1.Product Specifications

Item	Specified value
Power supply voltage	DC24 V ±10% F.S.
Current consumption	0.12 ADC or less
Communication specifications	IO-Link communication
Vendor ID	131(Dec)
Device ID	272(Dec)
ITV FW Version *1	Version1.2

*1 It becomes the FW version of the software of ITV.
Please contact the confirm method of the FW version our company.
Safety Instructions, precautions and other specifications are the same as the standard series.

2.Wiring

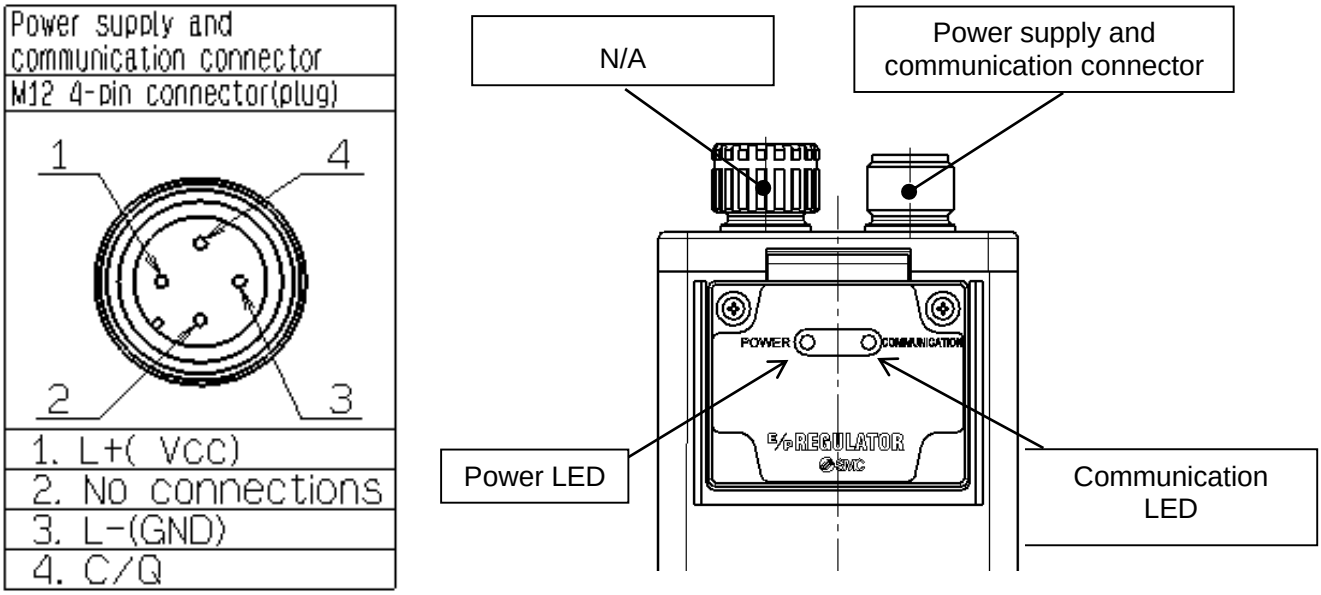


Fig.1 Display and Communication

* Please don't do the insert and remove of live-wire after the power supply is turned on.
It causes the communication abnormality with the master by the situation.

3. Communication specifications

Item	Specification	Note
Protocol	IO-Link	
version	Version 1.1	
Communication speed	230.4 kbps (COM3)	*1
IO-Link port	Class A	
IO-Link type	Device	
Process data	2 bytes IN 2 bytes OUT	Resolution 12 BIT

*1 If parameters are not saved, it may be improved by changing master cycle time to 3.5msec or more.

4. Pressure setting method and output monitoring

Pressure can be set by sending input data from the master PLC to the regulator where the F.S is based on a 12 BIT resolution.
Do not operate the product outside of the specifications.

<Relationship between set data and pressure>

Set data	0x0000	0x7FF8
Output pressure	0%	100%

From the 16 BIT process data (2byte), input the 12BIT resolution starting from 3rd BIT to the 14th BIT.
Refer to the communication data for further details.

5. Communication data

5.1 Process data map

PD OUT (to ITV)

15*1	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Bit**
Set pressure value.(13 BIT)													Disabled*2			**Value**

100% F.S.is indicated using 12 BITs, from the 3rd BIT to the 14th BIT.
*1 Setting up to 120% F.S is possible by using the 15th BIT (However this is out of warranty).
*2 Either 0 or 1 will have no effect.

PD IN (from ITV)

15*3	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Bit**
Output pressure (13BIT)													On hold*4		BDC1	**Value**

100% F.S. is indicated using 12 BITs, from the 3rd BIT to the 14th BIT.
*3 Setting up to 120% F.S is possible by using the 15th BIT (However this is out of warranty).
*4 0 is returned in an unused area.

■ Detection of the set pressure

BDC1	**1**	When set pressure is reached
	0	When set pressure is not reached

*It detects when the output pressure reaches within ±10% F.S. of the set pressure.

5.2 List of parameters

INDEX	Name:	Function
0x0C	Device access lock	The setting of the device access lock is changed.
0x42	Gain tuning function	Sets the response time.
0x43	Sensitivity tuning function	Sets the sensitivity.
0x41	HOLD/CLEAR setting	Sets the operation in response to a communication error.
0x44	Initialization	Resets the settings to the default value.
0x46	Zero adjustment	Sets the minimum pressure.
0x47	Span adjustment	Sets the maximum pressure.

Parameter index	**0x0C**
Parameter name	**Device access lock**
Function	In ITV for IO-Link, you can set "lock / unlock" for data storage function. Locking data storage function will invalidate data storage function. When backing up data storage (Parameter setting data read) or restoring (Overwriting parameter setting data) is instructed while data storage function is locked, the access rejection is answered. Default: 0(unlock)
Bit	**Bit 1, 0**
Value	**Bit**

	1	0	Content
*	0	0	**Unlocking the data storage function (Available data storage function)**
	1	0	**Data storage function lock. (Disable data storage function.)**

* indicates the initial shipping value.

Parameter index	**0x42**
Parameter name	**Gain tuning function**
Function	The response time can be changed by tuning the gain. When the gain is increased, the response time tends to be faster, but stability will be lost, which may cause hunting (unstable pressure). Default: Gain 9
Bit	**Bit 3, 2, 1, 0**
Value	**Bit**

	3	2	1	0	Setting
	0	0	0	0	Gain 0
	0	0	0	1	Gain 1
	0	0	1	0	Gain 2
	0	0	1	1	Gain 3
	0	1	0	0	Gain 4
	0	1	0	1	Gain 5
	0	1	1	0	Gain 6
	0	1	1	1	Gain 7
	1	0	0	0	Gain 8
*	1	0	0	1	Gain 9
	1	0	1	0	Gain A
	1	0	1	1	Gain B
	1	1	0	0	Gain C
	1	1	0	1	Gain D
	1	1	1	0	Gain E
	1	1	1	1	Gain F

* indicates the initial shipping value.

Parameter index	**0x43**
Parameter name	**Sensitivity tuning function**
Function	Changing the sensitivity will change the pressure correction operation near the set pressure point. When the sensitivity is increased, hunting may occur. When the sensitivity is decreased, hunting will be reduced, but the pressure correction will be reduced, so there may be a moderate pressure instability. Default value : Sensitivity 0
Bit	**Bit 2, 1, 0**

Value

	Bit 2	1	0	**Setting**
	0	**0**	**0**	**Sensitivity -**
	0	**0**	**1**	**Sensitivity ¯**
*	**0**	**1**	**0**	**Sensitivity 0**
	0	**1**	**1**	**Sensitivity 1**
	1	**0**	**0**	**Sensitivity 2**
	1	**0**	**1**	**Sensitivity 3**
	1	**1**	**0**	**Sensitivity 4**
	1	**1**	**1**	**Sensitivity 5**

* indicates the initial shipping value.

Parameter index	**0x41**
Parameter name	**Hold/Clear setting**
Function	Sets the output setting when communication error occurs. 0: Exhaust completely (Clear). 1: Output pressure is maintained (Hold). Default value: Clear
Bit	**Bit 0**

Value

	Bit 0	**Setting**
*	**0**	**Clear**
	1	**Hold**

* indicates the initial shipping value.

Parameter name	**0x44**
Parameter name	**Initialization**
Function	All of the setup including the internal control constant is initialized with this function. Perform this function only when the product is completely stopped due to error.
Bit	**BIT 0 to 7**
Value	**Any value between 0 to 11111111**

* indicates the initial shipping value.

<table>
<tr><td>Parameter index</td><td>0x46(Zero adjusting), 0x47(Span adjusting)</td></tr>
<tr><td>Parameter name</td><td>Zero adjusting , Span adjusting</td></tr>
<tr><td>Function</td><td>Zero adjusting (hereinafter referred to as F_1) corresponds to set the minimum pressure, Span adjusting (hereinafter referred to as F_2) to set the maximum pressure. F_1 and F_2 have setting ranges of 0-90%F.S. and 10-120%F.S., respectively. However, the set pressure exceed rated output; 100%F.S. is out of warranty. (refer to Fig.2,3)
The values are necessary to satisfy “F_1 + 10%F.S. < F2”. If not, the previous values are reflected in this function.
Default of Zero adjusting: 0x0000
Default of Span adjusting: 0x0FFF(Hexadecimal Number)</td></tr>
<tr><td>Bit</td><td>BIT 13 (It is Bit 12 up to 100%.)</td></tr>
<tr><td>Value</td><td>Relationship between F1/F2 and the set pressure (Hexadecimal Number)
<table>
<tr><td></td><td colspan="2">Zero adjusting F_1</td><td colspan="2">Span adjusting F_2</td></tr>
<tr><td></td><td>Minimum</td><td>Maximum</td><td>Minimum</td><td>Maximum</td></tr>
<tr><td>Input value</td><td>0x0000</td><td>0x0E65</td><td>0x019A</td><td>0x1332</td></tr>
<tr><td>Set pressure</td><td>0%F.S.</td><td>90%F.S.</td><td>10%F.S.</td><td>120%F.S.</td></tr>
</table></td></tr>
</table>

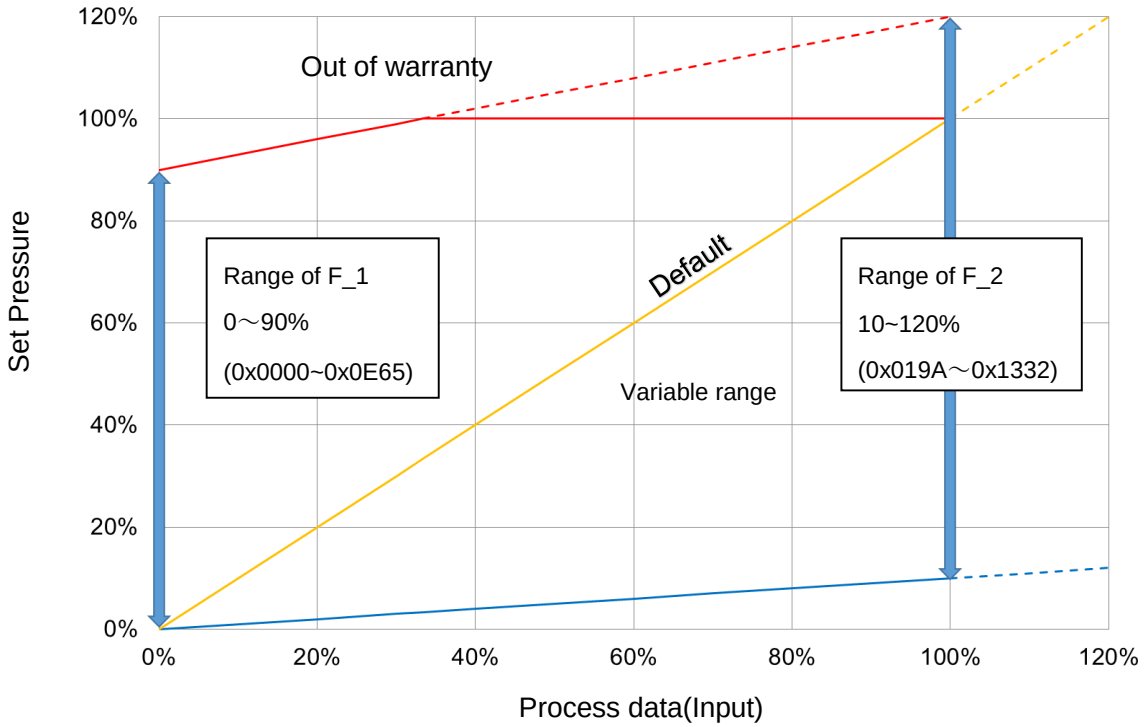
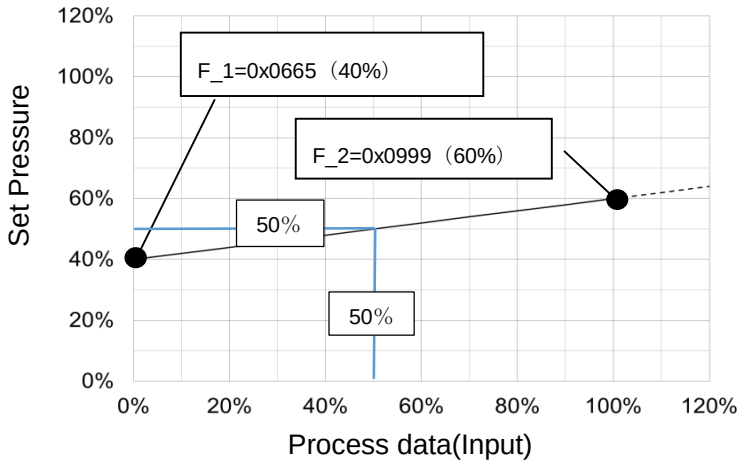
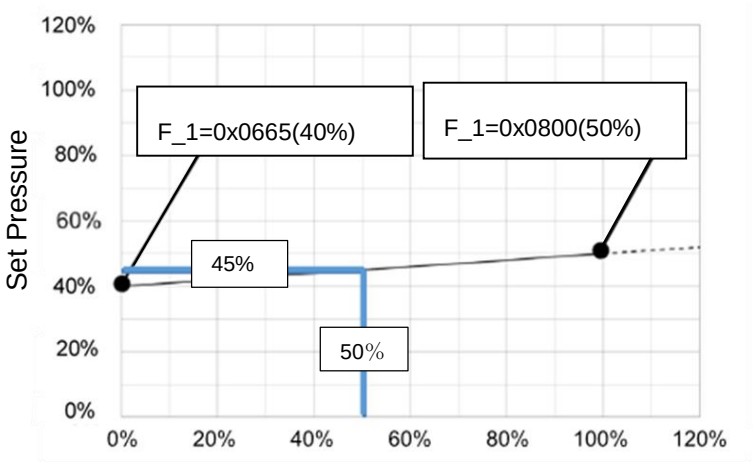


Fig.2 Range of F_1 and F_2



The set pressure output 50% when the process date input 50%



The set pressure output 45% when the process date input 50%

Fig.3 F_1 and F_2 usage example

5.3 Error Message

LED

Item	ON	OFF	Flashing
Power	Power is supplied (Green) Internal diagnosis error (Red)	Power supply is not connected	-
Communication	Communication in stand-by mode(Green)	Communication disconnected	Communication exchange (Green)

Error code

Error No.	Name:	Description
0x5000	Internal diagnosis error	ROM read / write error Control depends on the Hold/Clear setting. Power LED turned ON Red. If the error is not corrected even after disconnecting the power supply, perform "Initialization".
0x6320	Target value over range error	The data of the target value has exceeded the specification (120% F.S. is exceeded). Input a target value within the specification.
0x8C20	Output pressure value over range error	The data of the output pressure value has exceeded the specification (120% F.S. is exceeded). Adjust the output pressure to within the specification.

6. Product ID

When reading the product ID from the master side, the following product ID is read out.
In addition, when selecting a product ID from the IODD file, you will choose from the following.

Product ID
ITV1010-IO-X395 *1
ITV1030-IO-X395 *1
ITV1050-IO-X395 *1
ITV2010-IO-X395 *1
ITV2030-IO-X395 *1
ITV2050-IO-X395 *1
ITV2090-IO-X395 *1
ITV3010-IO-X395 *1
ITV3030-IO-X395 *1
ITV3050-IO-X395 *1
ITV3050-IOF3N-DIT00375

*1: This becomes product ID added since FW Ver1.2.

End of report

Revision
E: Correction concerning communication data, Product ID addition and correction by software modification.

SMC Corporation
4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021 JAPAN
Tel: + 81 3 5207 8249 Fax: +81 3 5298 5362
URL http://www.smcworld.com

0120-837-838