



**M0030401 FLUX
1 IO Link Digital
Flowmeter and
Pressure Sensor**



METAL WORK M0030401 FLUX 1 IO Link Digital Flowmeter and Pressure Sensor Installation Guide

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METAL WORK M0030401 FLUX 1 IO Link Digital Flowmeter and Pressure Sensor



Product Specifications

- **Product Name:** FLUX IO-Link Digital Flowmeter and Pressure Sensor
- **Model Number:** M0030401 IM05
- **Website:** www.metalwork.eu.

Product Usage Instructions

Installation:

Straight Piping:

The pipe must be straight, and the passage section must be constant.

Length of pipes:

FLUX	Inlet	Outlet
FLUX 1	150 mm	50 mm
FLUX 2	200 mm	50 mm
FLUX 3	300 mm	100 mm
FLUX 4	300 mm	100 mm

Electrical Connection:

- Use a 5-pin M12 connector cod. A for electrical connection to a Master IO-Link.
- Power is supplied directly by the Master.

Displaying Operating Data (For Models with Display):

- Icons of functions are displayed at the top of the screen.
- Displayed Parameters: Flow rate (Nl/min), Power (kW), Mass flow rate (kg/min), Measurement time.

I/O:

Parameters:

- **Flow:** Output switches based on flow values.
- **Pressure:** Output switches based on pressure values.

Frequently Asked Questions (FAQ):

- **Q: What should I do if the device is not functioning properly?**

A: Ensure that the electrical connections are secure and free from interference. Check for any damage to the components and follow the installation instructions carefully.

- **Q: How often should I clean the filter at the inlet of FLUX?**

A: To maintain measurement accuracy and prevent lubricant residue from damaging the sensor, clean the filter regularly according to the manufacturer's recommendations.

INTRODUCTION

FLUX IO-Link is a control unit for measuring all significant data of the gas concerned. Compliant with IO-Link specifications, it offers advanced diagnostics and provides a connection to an IO-Link Master. It supports COM3 communication, by V1.1 specification and Class A Port connection.

INTENDED USE

WARNING

The FLUX IO-Link must only be used as follows:

- As designated in industrial applications.;
- In systems fully assembled and in perfect working order;
- In compliance with the maximum values specified for electrical ratings, pressures, and temperatures.
- Only use a power supply complying with IEC 742/EN60742/VDE0551 with at least 4kV insulation resistance (PELV).

TARGET GROUP

This manual is intended exclusively for technicians qualified in control and automation technology, who have acquired experience in installing, commissioning, programming, and diagnosing electrical and electronic equipment.

TECHNICAL DATA

- Electrical connection: M12 5-pin connector.
- 12...24 VDC power supply.

- Maximum flow rate measured FLUX 1 2000 NI/min, FLUX 2 4000 NI/min, FLUX 3 8000 NI/min, FLUX 4 15000 NI/min.
- Maximum pressure 10 bar.
- Zero internal pressure drop.
- IP65 index of protection.
- Signaling LED.
- Graphic display and keypad for displaying measured values, with units of measurement and parameter setting.

HAZARDS

- Do not use with flammable gases.
- Do not use it in an explosive atmosphere.

WARNING

- CANNOT be used as a normal counter available from the trade.
- It has not been designed and approved for use as a legal metrology instrument.
- DO NOT use gases other than those specified; measurement accuracy is not guaranteed and the device may get damaged.
- Do not use it outside the stated specifications.
- The compressed air from the compressor contains impurities (water, oil, dirt, or other residues), which may affect accuracy or damage the sensor. Make sure that the air supplied to the FLUX is properly filtered and has a minimum purity level of 4.7.3, by ISO 8573-1.
- Do not use with lubricated air.
- Do not insert foreign objects into the connection ports.

INSTALLATION

PNEUMATIC CONNECTION

Pneumatic connection is via the threaded holes in the body.

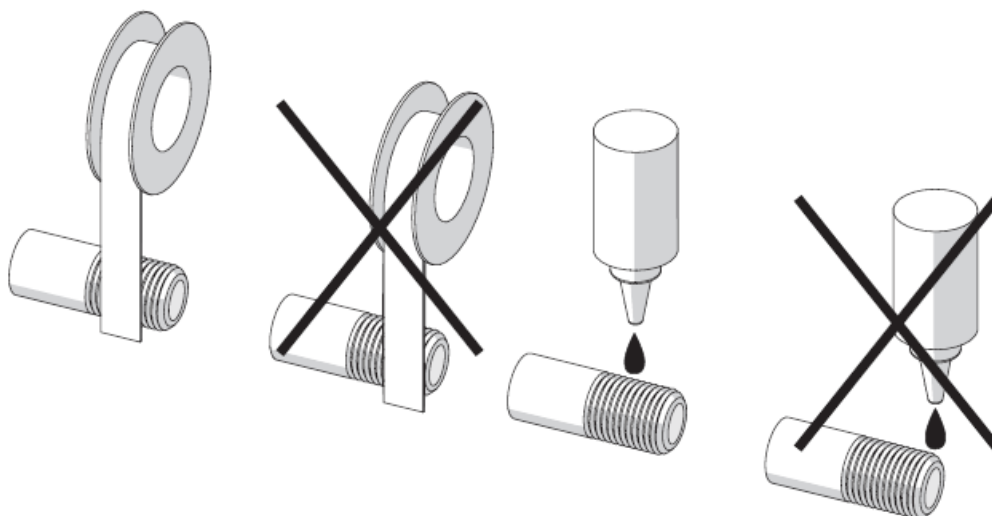
- Install the device following the arrow indicating the direction of the airflow.
- To connect the inlet side, use a straight pipe* with a minimum length as per the table. If straight piping is not installed, the accuracy may vary from what is stated.
 - **Straight pipe:** the pipe must be straight with a constant cross-section.



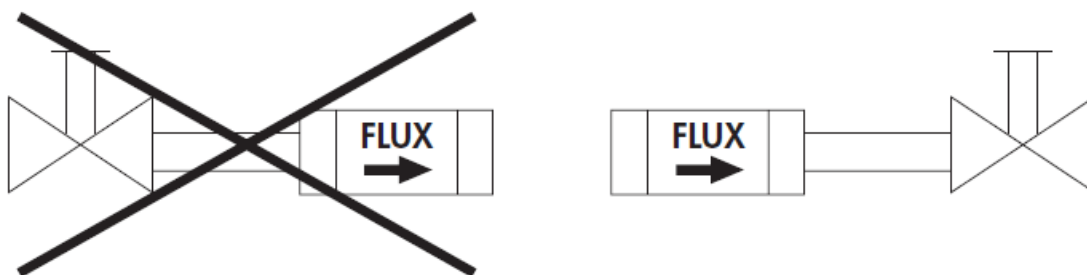
Pipe length

	L Inlet	L1 Outlet
FLUX 1	≥150 mm	≥50 mm
FLUX 2	≥200 mm	≥50 mm
FLUX 3	≥300 mm	≥100 mm
FLUX 4	≥300 mm	≥100 mm

- Clean the pipes before installation, uncleaned air may cause malfunctions or damages to the product.
- Make sure that the sealant does not get inside the pipe. Solid or liquid residues could damage the sensor.



- When air flow needs to be regulated with a control valve; install the device upstream of the valve. Otherwise, grease or lubricating oil from the valve could damage the sensor.



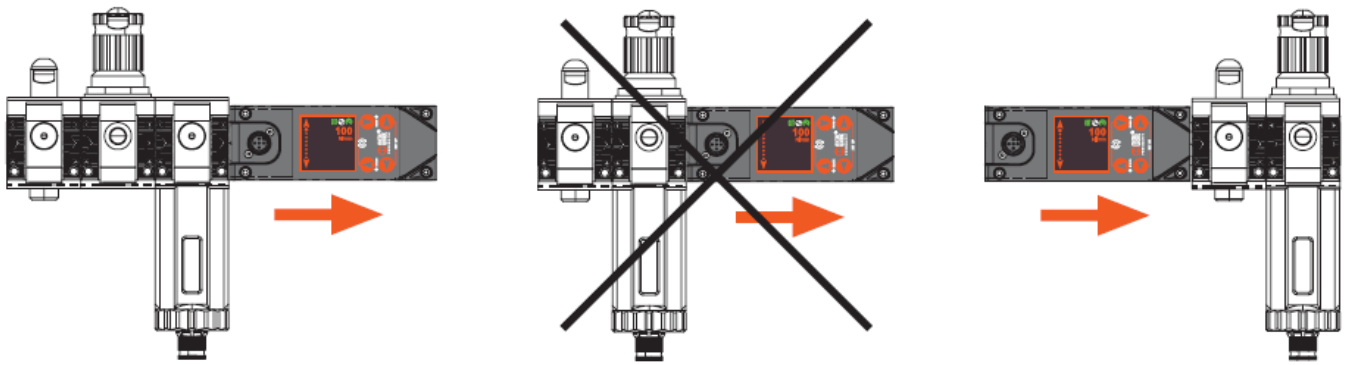
- The device can be installed in any direction.

INTEGRATION WITH COMPONENTS IN THE Syntesi® PRODUCT RANGE

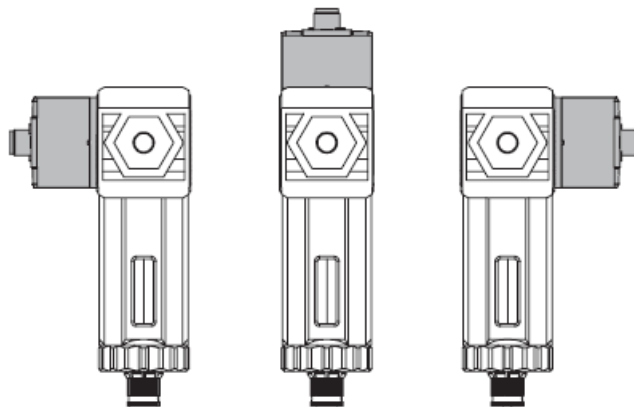
FLUX can be supplemented with Syntesi® parts:

- FLUX 1 with Syntesi® size 1;
- FLUX 2 with Syntesi® size 2.

To guarantee the stated measurement accuracy and to prevent lubricant residues from damaging the measurement sensor, a filter has to be mounted at the FLUX inlet. If the device is fitted with a Syntesi® filter, the SYN filter parameter must be enabled in the system menu to guarantee the stated accuracy (function available only for the version with display).



The Syntesi® components can be easily mounted on the outlet side of the FLUX.



N.B.:

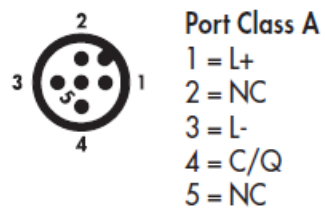
If the FLUX is used downstream a Syntesi® filter, fit it in one of the three positions shown in the figure.

ELECTRICAL CONNECTION

A 5-pin M12 Code A connector is used for the electrical connection and must be connected to an IO-Link Master. Power is supplied directly via the Master.

Connection to the IO-Link network

M12 male connector, A encoding



Pin	Signal	Description of Port Class A	Lead colour
1	L+	+24VDC power supply	Brown
2	NC	/	White
3	L –	0VDC power supply	Blue
4	C/Q	IO-Link communication	Black
5	NC	/	Gray

- **WARNING**

Switch off the mains supply before plugging or unplugging the connector (functional damage hazard).

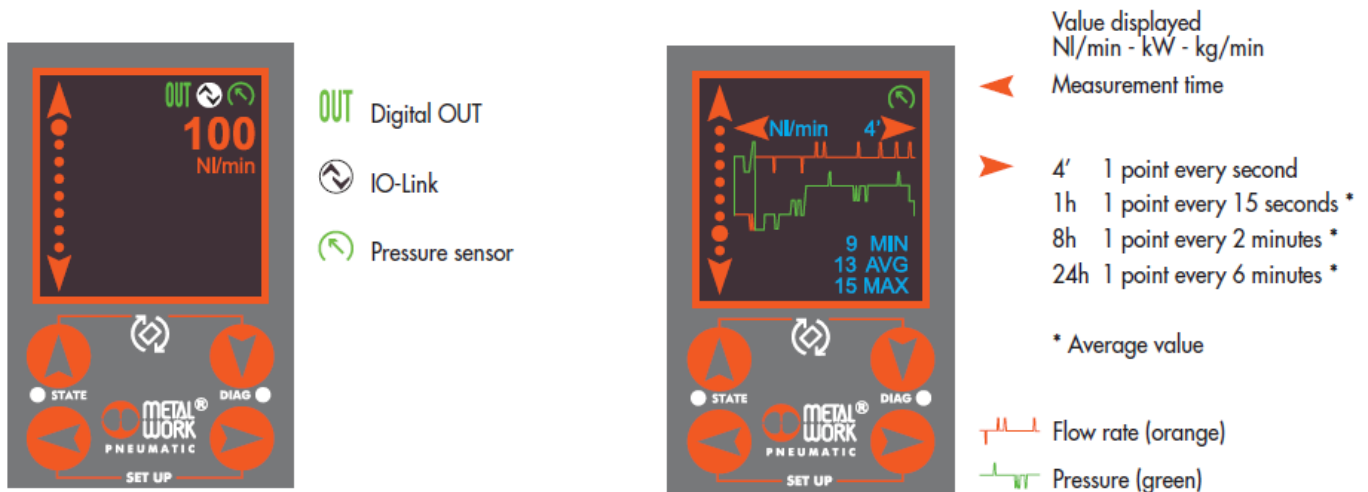
- **WARNING**




Keep the connecting cable separate from the power cables. The device may not work properly due to electromagnetic interference, strong currents, or high voltage.

OPERATING DATA DISPLAY

OPERATING DATA DISPLAY (ONLY FOR MODELS WITH DISPLAY)

Function icons are shown at the top of the display.












- Press the two keys indicated by the icon  simultaneously for 1 second to rotate the screen.
- The arrow keys automatically adapt to the rotation of the screen.
- Use the vertical arrow keys   to scroll through the display pages.
 - page 1: displays the current flow rate.
 - page 2: displays the current flow rate and pressure if a pressure sensor is connected, or the current power consumption.
 - page 3: displays the current flow rate and power consumption if a pressure sensor is connected.
 - page 4: displays the current flow rate and gas mass.
 - page 5: displays the current flow rate and air temperature.
 - page 6: displays all the current data.
 - page 7: displays accumulated consumption.
 - page 8: displays the flow rate chart.
 - page 9: displays the flow rate and pressure chart, if a pressure sensor is connected.

Display time can be set to 4 min, 1 hour, 8 hours, 24 hours.

MENU ACCESS

MENU ACCESS (ONLY FOR MODELS WITH DISPLAY)

Parameter setting

- Press the SETUP buttons   simultaneously for 1 second to access the parameter settings.
- Use the vertical arrow keys   to select the function.
- Press the right arrow key  to access the function parameters.
- Use the vertical arrow keys   to change the parameter.
- Press the right arrow  to confirm.
- Press the left arrow  to return to the previous menu.

SYSTEM

- The compressed air system is connected through the threaded holes on the body.
- To prevent impurities or excessive condensation from causing malfunctions, it is recommended to supply the FLUX with dry 20µm-filtered compressed air at a pressure not exceeding 10 bar.

SYN filter

Set to ON when the FLUX is installed after a Synthesis unit filter to optimize flow rate reading.

Gas type

Helps optimize the measurement of the current flow and consumption figures.

- Types of gas: Air
 - Helium
 - CO2
 - Nitrogen

ENERGY

- K-Energy is the amount of Wh consumed to generate 1 Nm³ of compressed air, depending on the efficiency of the production system.
- Used to calculate the current power (kW) and accumulated energy (kWh) consumption.

I/O

Digital Output – available for models with display

- The digital output can be set as a “Normally Open” or “Normally Closed” contact.
- It can relate to current flow, pressure, or air consumption.

Parameters

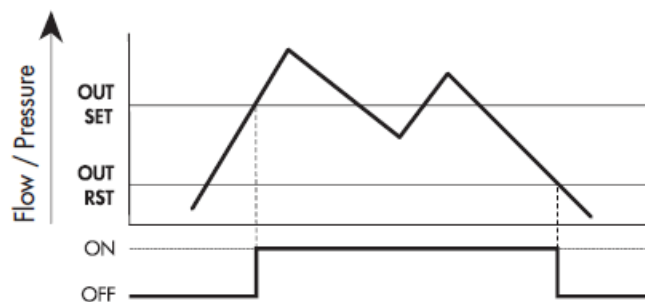
- **Contact type:** NO/NC
- **Reference:**
 - FLOW: The output switches according to flow values.

- Threshold Setting: function – LEVEL SWITCH, BAND SWITCH;
 - OUT SET/HI – Flow value for output activation;
 - OUT RST/LO – Flow value for output de-activation.
- PRESSURE: The output switches according to pressure values.
- Threshold Setting: function – LEVEL SWITCH, BAND SWITCH;
 - OUT SET/HI – Pressure value for output activation;
 - OUT RST/LO – Pressure value for output de-activation.
- VOLUME CONSUMPTION:
 - Function – CONTACT SWITCH, the output switches at the value set under CNT Target;
 - Function – CYCLIC PULSE, the output switches for 100 ms each time the value set in CNT
 - The target is reached. The minimum flow rate can be set to 10 NI for FLUX 1, 20 NI for
 - FLUX 2, 30 NI for FLUX 3, and 60 NI for FLUX 4.

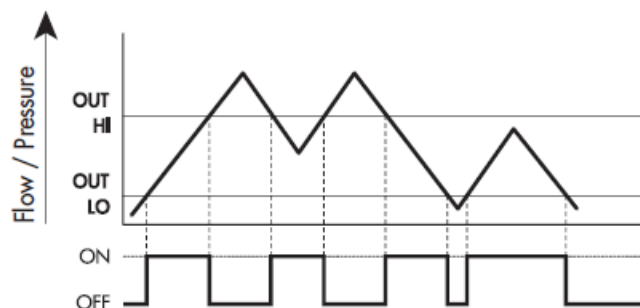
FLOW/PRESSURE

DIGITAL OUT MODE NORMALLY OPEN – NO

Level switch mode with hysteresis

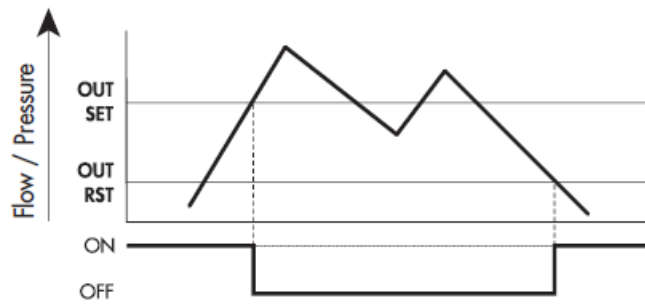


Band switch mode

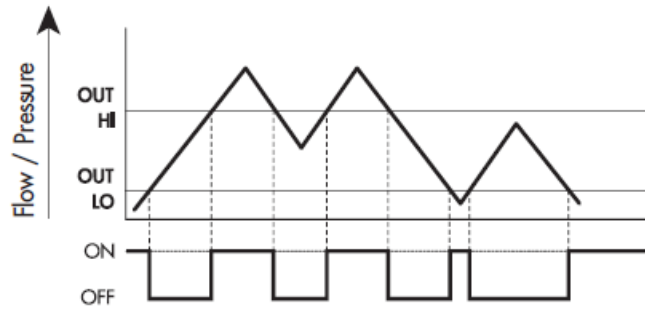


DIGITAL OUT MODE NORMALLY CLOSED – NC

Level switch mode with hysteresis



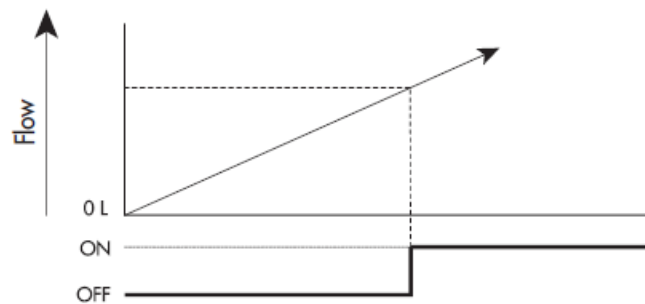
Band switch mode



VOLUME CONSUMPTION

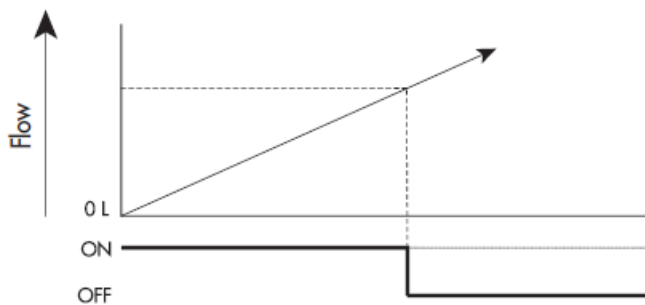
DIGITAL OUT MODE NORMALLY OPEN – NO

Volume consumption mode

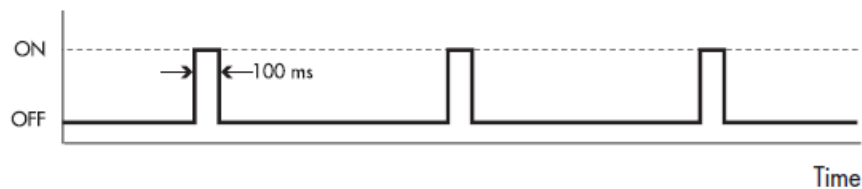


DIGITAL OUT MODE NORMALLY CLOSED – NC


Volume consumption mode



CYCLIC PULSE OUTPUT MODE



DISPLAY

Is possible to rotate the display by 90°, 180°, or 270° to adapt it to the mounting position, by pressing the two keys indicated by the icon  for 1 second.

PARAMETERS

- Language: Italiano, English, Deutsch, Français, Español.
- Flow rate unit of measurement: NI/min, NI/h, Nm3/min, Nm3/h, Nft3/min, Nft3/h.
- Pressure unit of measurement: bar, MPa, psi.

Setting the flow rate value display for color change from orange to yellow.

Can be used to highlight abnormal air consumption.

- SET FL COL. – flow rate value at which the color changes to yellow.
- RES FL COL. – flow rate value at which the color reverts to orange.

SERVICE

- Consumption reset: accumulated consumption is reset.
- Sensor check: with flow rate and pressure at zero, it verifies that the measuring sensor is not faulty.
- Internal temperature: displays the temperature of control electronics.
- Password: This is a three-digit code used to protect the set configuration.
If you forget the password, contact the manufacturer to obtain a password reset code
- Factory reset: resets the factory configuration.





INFO

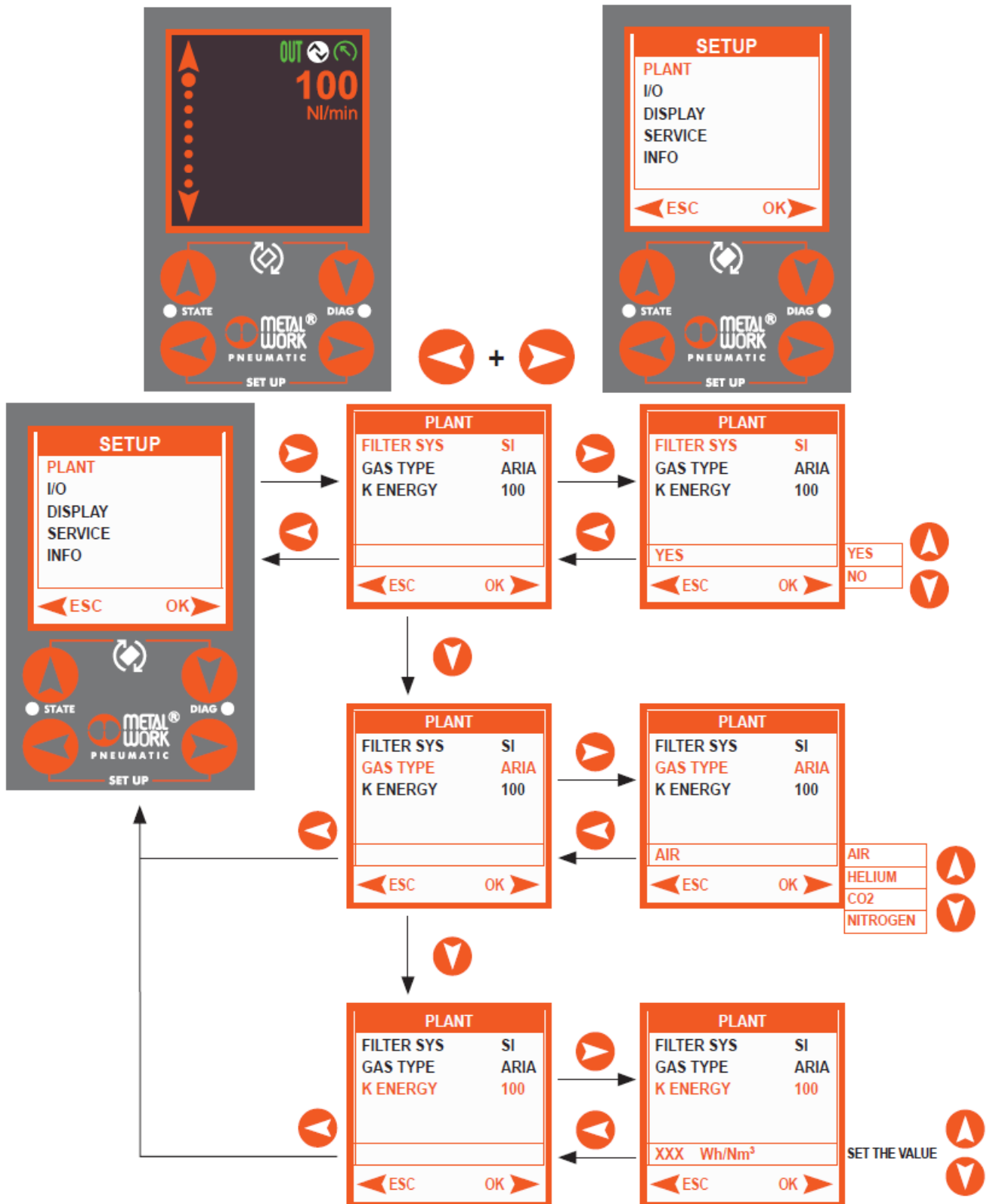
- S/N: serial number.
- Software version.
- Diameter: diameter of the internal passage.
- Pressure: pressure transducer availability.
- Model: type and options available.

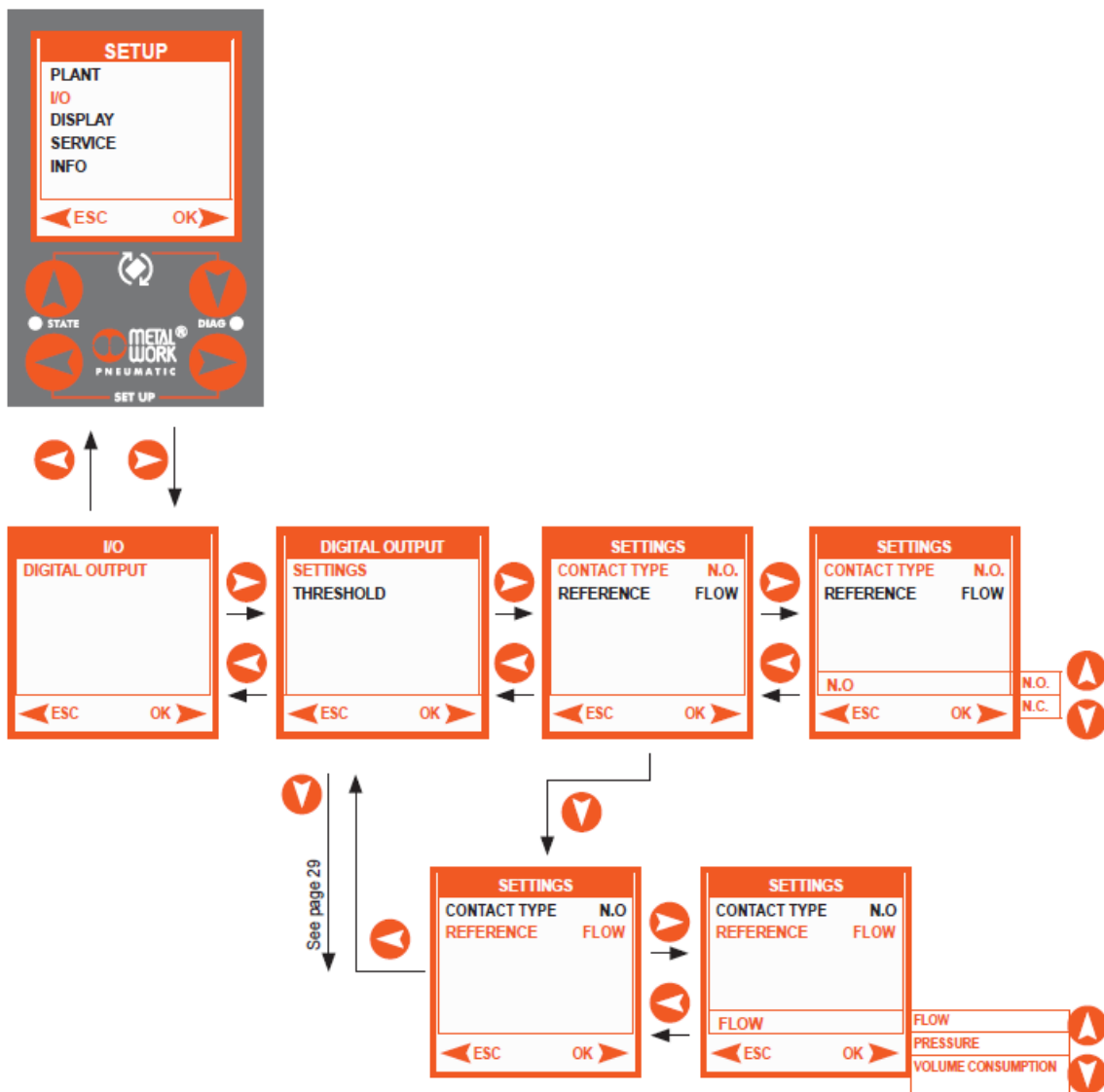
A	Analog
I	IO-Link
H	Display

MENU ACCESS FROM KEYPAD

MENU ACCESS FROM KEYPAD (ONLY FOR MODELS WITH DISPLAY)

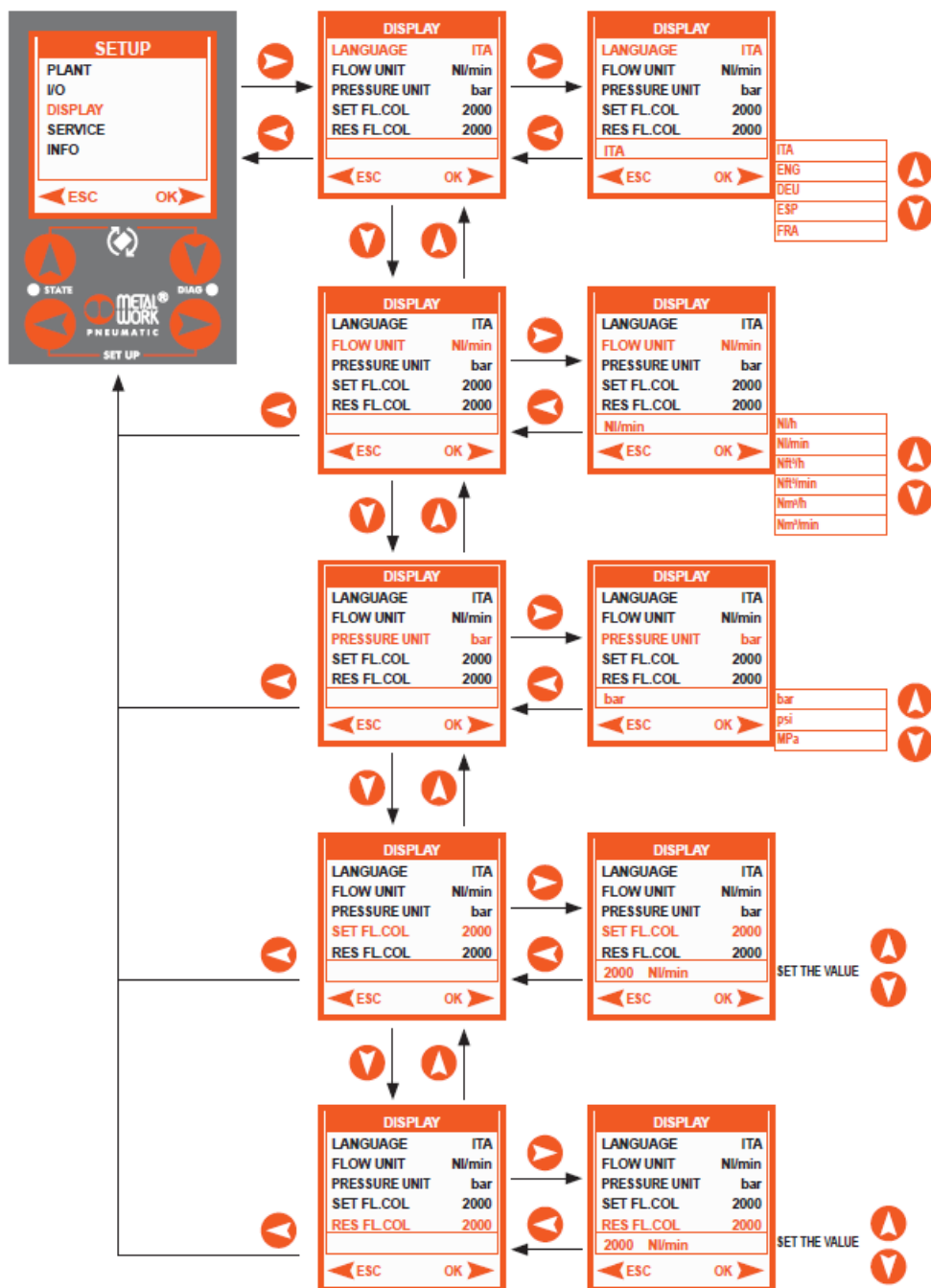
- Press the  and  buttons simultaneously for 1 second to access the parameter setting menu.
- Use the arrow keys   to scroll through the menu and edit the parameters.
- Press OK to confirm.

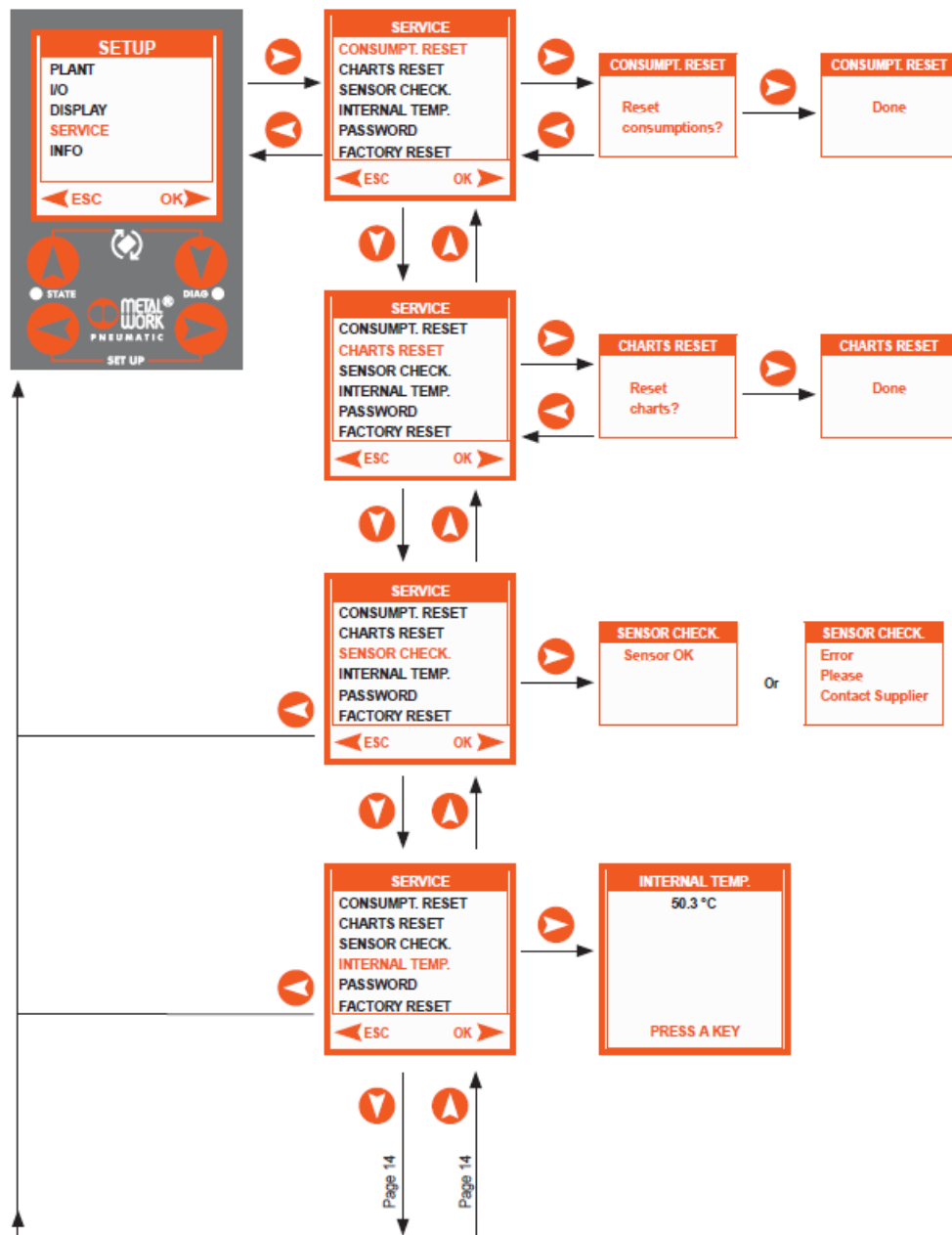


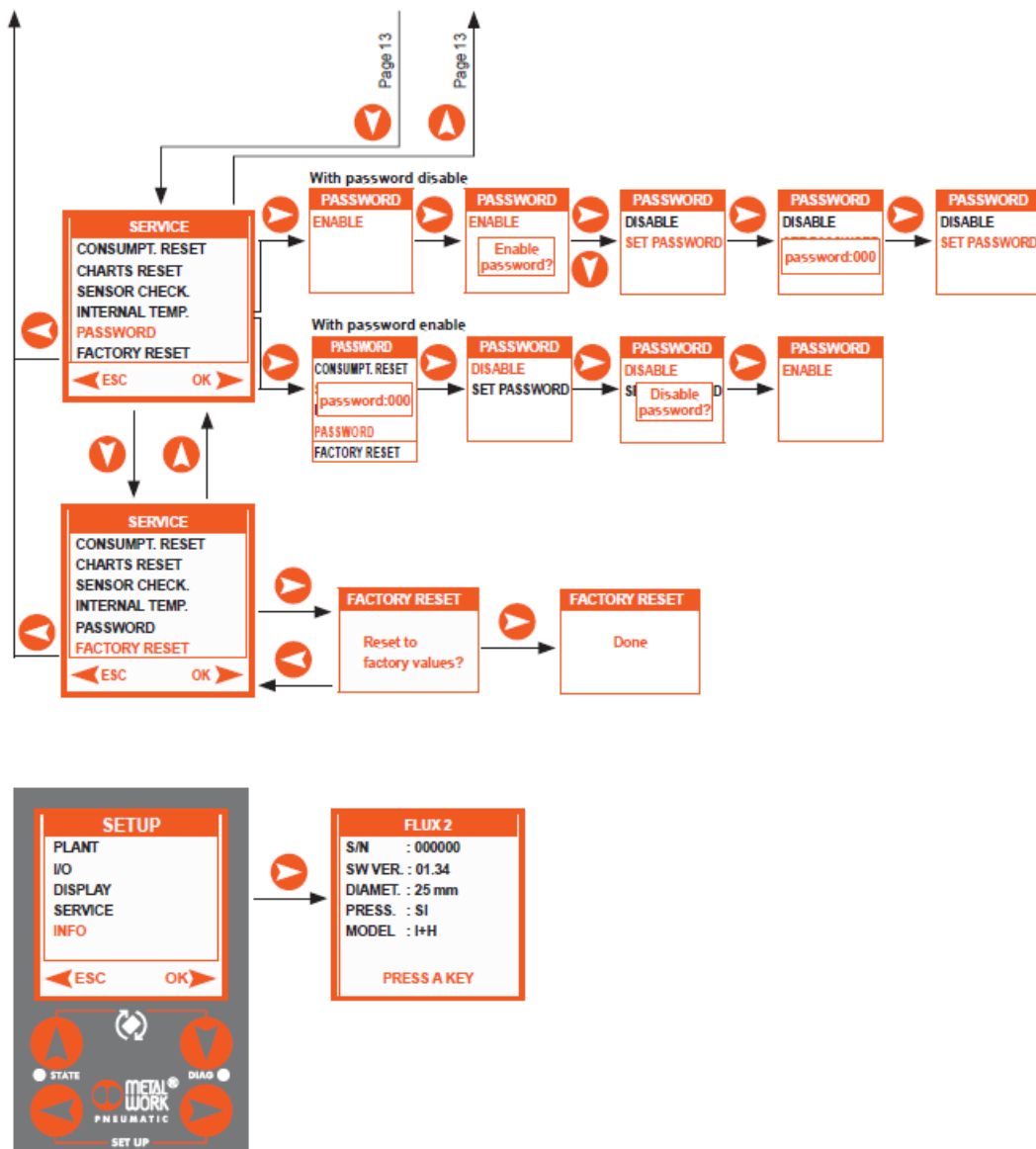


THRESHOLD

- FLOW
- PRESSURE







COMMISSIONING

INSTALLING THE FLUX IO-Link in an IO-Link NETWORK

IODD CONFIGURATION FILE

The corresponding "MetalWork-FLUX-_____-IODD1 1" IODD configuration file available on the Metal Work website is supplied with the FLUX IO-Link.

ADDRESSING

Cyclic data

- 4 input bytes for the measured flow [NI/h]
- 2 input bytes for measured pressure [mbar]
- 1 input byte for status indication (digital switch)
- 1 input byte for diagnostics.

Function	Data type	Address
Flow NI/h	DWord	%ID0
Pressure mbar	Word	%IW4
Digital output	Byte (bit 0)	%I6.0
Diagnostics	Byte	%IB7

Acyclic data

Function		Index	Subindex	Description		Data type	Format
Temperature	°C	100	0	Temperature	°C	Read 2 byte	Hex
Flow NI/min		101	0	Flow	NI/min	Read 2 byte	Hex
Flow NI/h		102	0	Flow	NI/h	Read 4 byte	Hex
Flow Nm3/min		103	0	Flow	Nm3/min	Read 4 byte	Hex
Flow Nm3/h		104	0	Flow	Nm3/h	Read 4 byte	Hex
Flow ft3/min		105	0	Flow	ft3/min	Read 4 byte	Hex
Flow ft3/h		106	0	Flow	ft3/h	Read 4 byte	Hex
Volume consumption	NI	107	0	Volume consumption	NI	Read 4 byte	Hex
Energy consumption	kWh	108	0	Energy consumption	kWh	Read 4 byte	Hex
Mass consumption	kg	109	0	Mass consumption	kg	Read 4 byte	Hex
Mass flow rate	gr/min	110	0	Mass flow rate	gr/min	Read 2 byte	Hex
Power	W	111	0	Power	W	Read 2 byte	Hex
Series FLUX		112	0	1 = FLUX 1 2 = FLUX 2		Read 1 byte	Hex
Display		113	0	0 = Not present 1 = Present		Read 1 byte	Hex
Pressure sensor		115	0	0 = Not present 1 = Present		Read 1 byte	Hex
Alarms		116	0	0 = No alarms 1 = Alarm		Read 1 byte	Hex
Consumption reset		02	0	Value = Dec 160 Hex 0xA0		Write 1 byte	Hex

Configuration of parameters from Master IO-Link

Parameter		Index	Subindex	Description	Data type
Display – Flow rate unit of measurement		65	0	0 = NI_min 1 = NI_h 2 = Nm3_min 3 = Nm3_h 4 = ft3/min 5 = ft3/h	R/W 1 byte
GAS type		66	0	0 = Air 1 = Nitrogen 2 = CO2 3 = Helium	R/W 1 byte
Display – Pressure unit of measurement		67	0	0 = bar 1 = MPa 2 = psi	R/W 1 byte
K-Energy	Wh/Nm³	68	0	DEC value = 100 hex 00 64	R/W 1 byte
Digital output enables status		69	0	0 = NO 1 = NC	R/W 1 byte
Digital output enables reference		70	0	0 = Flow [NI/h] 1 = Volume consumption 2 = Pressure [mbar]	R/W 1 byte
Digital output function		71	0	0 = level switch (reference – flow rate or pressure) 1 = band switch (reference – flow rate or pressure) 2 = contact switch (reference – volume) 3 = cyclic pulse (reference – volume)	R/W 1 byte
Digital output function – Set/High value	NI/h or mbar	72	0	The reference value for digital output activation	R/W 4 bytes

Digital output function – Set/Low value	NI/h o mbar	73	0	Digital output function Reference value for digital output-activation	R/W4 byte
Digital output function – counter	NI	74	0	Totalizer value for digital output activation	R/W4 byte
Display – Language		75	0	0 = ENG 1 = ITA 2 = FRA 3 = ESP 4 = DEU	R/W 1 byte
Display – Orientation	°	76	0	0, 90, 180, 270	R/W 2 byte
Display – FLUX ON color	NI/h	77	0	Flow rate value at which the color changes to yellow	R/W 4 byte
Display – FLUX Off color	NI/h	78	0	Flow rate value at which the color reverts to orange	R/W 4 byte
Syntesi® filter		79	0	0 = Not present 1 = Present	R/W 1 byte

IO-Link NODE DIAGNOSTIC MODE

	LED STATE	MEANING
○	OFF	No power supply, device switched off
●	ON (green)	Device powered correctly
⦿	Flashing (green)	Device malfunction. Power supply out of range, faulty sensor.
	LED DIAG	MEANING
●	ON (green)	Operating status
⦿	Flashing (green)	Pre-operating status
●	ON (red)	IO-Link communication error
⦿	Flashing (red)	IO-Link power supply error (undervoltage or overvoltage)
○	OFF	No IO-Link power supply



DIAGNOSTICS AND TROUBLESHOOTING

The diagnostics functions report the status of the device via error codes in hexadecimal or decimal format in order of priority to the controller. The status byte is read by the controller as an input byte.



The table below describes the correct interpretation of the codes:

Codice Hex	Codice DEC	Meaning	Note
0xD5	213	Flow sensor failure	Contact Service
0xD1	209	Pressure sensor failure	Contact Service
0xCC	204	Analog output failure	If a power failure or the current is too high, check the device is connected to a proper input.
0xB0	176	Digital output failure.	Power failure or current too high.
0x16	22	Flash memory reset or corrupted / E2prom reset or corrupted or not ready / Measurement log error.	Memory read/write error. Switch the unit off and on again. If the fault persists, contact service.
0x15	21	Power supply out of range.	Power the system with a voltage within the permissible operating range.
0x00	0	The module operates correctly.	

TECHNICAL DATA

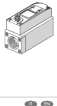
TECHNICAL DATA		FLUX 1	FLUX 2	FLUX 3	FLUX 4
Measured flow range	Nl/min	0 to 2000	0 to 4000	0 to 8000	0 to 15000
Fluid		Compressed air free of any lubricants and inert gases			
Fluid temperature	°C	0 to 50			
Direction of flow		Unidirectional			
Measuring method		Thermal			
Working pressure range	bar	0 to 10			
	MPa	0 to 1			
	psi	0 to 145			
Pressure drop		None			
Temperature range	°C	0 to 50			
Threaded ports		1/2"	1"	1 1/2"	2"
Degree of protection		IP65			
Weight	g	585	705	1975	4000
IO-Link supply voltage range	VDC	15 - 27 (with IO-Link Master)			
Current consumption	mA	80 mA (at 24VDC)			
Maximum admissible voltage	VDC	32 ▲			
DISPLAY					
Instant flow rate	Nl/min	0 to 2300	0 to 4600	0 to 8800	0 to 16500
Cumulative flow rate	Nl	999.999.999			
	Nm³	999.999			
	Nft³	35.320.000			
Pressure ■	bar	0 to 10			
Resolution	bar	0.01			
PRECISION ●					
Flow rate		0 to 100% of the full scale			
Measuring range		from 0 to 20% of the FS - better than ±1% of the FS			
Single unit display accuracy		from 20% to 100% of the FS - better than ±3% of the FS			
Display accuracy of unit installed in an SY unit *		from 0 to 20% of the FS - better than ±2% of the FS	-		
		from 20% to 100% of the FS - better than ±6% of the FS	-		
Repeatability		±1% of the FS			
Temperature characteristic		Automatic compensation of fluid temperature from 0 to 50°			
Version with pressure transducer		Between 0 and 15°C and between 35 and 50°C ±0.6% of the FS every °C			
Version without pressure transducer		Without compensation, between 0 and 15°C and between 35 and 50°C ±1.2 % of the FS every °C			
Pressure		0 to 10			
Measuring range	bar	0 to 10			
Display accuracy		±2% of the FS			
DIGITAL OUTPUT +					
Operating mode, if set on flow rate		Level switch, Band switch, Value switch, Cyclic pulse			
Min. accumulated volume by pulse (pulse width 100 msec)	Nl	10	20	30	60
	Nm³	1	1	1	1
	Nft³	1	1	1	2
Response mode, with pressure mode setting		Level switch, Band switch			
Hysteresis		Adjustable			

- ▲ **IMPORTANT!** Voltage greater than 32VDC will damage the system irreparably.
- In versions with pressure transducer.
- Accuracy referred to compressed air gas, at a pressure of 5 bar and a fluid temperature of 25°C ±10°C.

-  To guarantee the stated measurement accuracy and to prevent lubricant residues from damaging the measurement sensor, a filter has to be mounted at the FLUX inlet. If the device is fitted with a Syntesi® filter, the SYN filter parameter must be enabled in the system menu to guarantee the stated accuracy (function available only for the version with display).
-  Available only for versions with display.

www.metalwork.eu.

Documents / Resources

	<p>METAL WORK M0030401 FLUX 1 IO Link Digital Flowmeter and Pressure Sensor [pdf] Installation Guide</p> <p>FLUX 1, FLUX 2, FLUX 3, FLUX 4, M0030401 FLUX 1 IO Link Digital Flowmeter and Pressure Sensor, M0030401, FLUX 1, IO Link Digital Flowmeter and Pressure Sensor, Link Digital Flowmeter and Pressure Sensor, Digital Flowmeter and Pressure Sensor, Flowmeter and Pressure Sensor, and Pressure Sensor, Pressure Sensor, Sensor</p>
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References

- [User Manual](#)

[Manuals+.](#) [Privacy Policy](#)

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