



IMPACT “ILI” series of Gefran, are pressure transmitters, without transmission fluid, for using in High temperature process environment (up to 350°C).

Pressure is transduced by a micro-worked silicon structure (MEMS) and the operating principle is “piezoresistive”.

This “Smart” transmitter with IO-Link output is ready for “Industry 4.0” requirements

“IMPACT” is Gefran’s exclusive series of high-temperature pressure sensors that use the piezoresistive principle. This new series “ILI” with “IO-Link” digital output is a Smart device specifically designed to meet the requirements of “Industry 4.0” environment, with auxiliary information suitable to prevent machine downtime.

The main characteristic of “IMPACT” sensors is that they do not contain any transmission fluid.

The sensitive element, directly positioned behind the contact membrane, is realised in silicon through microprocessing techniques.

The micro structure includes the measurement membrane and piezoresistors.

The minimum deflection required by the sensitive element makes it possible to use very robust mechanics.

The process contact membrane can be up to **15 times** thicker than the membrane used in traditional Melt sensors. Suitable for Functional Safety applications thanks to **PLd** and **SIL2** approvals.

### ADVANTAGES

- Total compatibility with the European RoHS Directive
- Ready for “Industry 4.0”
- PLd and SIL2 approvals for Functional Safety
- Working temperature: up to 350°C
- Excellent read stability over time
- Fast response time
- Auxiliary information over IO-Link protocol

### MAIN FEATURES

- Pressure ranges:  
0-10 to 0-1000 bar / 0-150 to 0-15000 psi
- Accuracy: < ±0.25% FS (H); < ±0.5% FS (M)
- Standard thread: 1/2-20UNF, M18x1.5
- Rangeability: 3:1
- Autozero function
- 15-5 PH stainless steel diaphragm GTP+ coated
- Temperature reading over IO-Link (optional)

### AUTOZERO FUNCTION

All signal variations in the absence of pressure can be eliminated by using the Autozero function.

Autozero function can be activated via IO-Link command. The procedure is allowed only at zero pressure.

The Autozero function should be activated **ONLY** when the sensor is completely installed on the system.

### SPECIFICHE TECNICHE

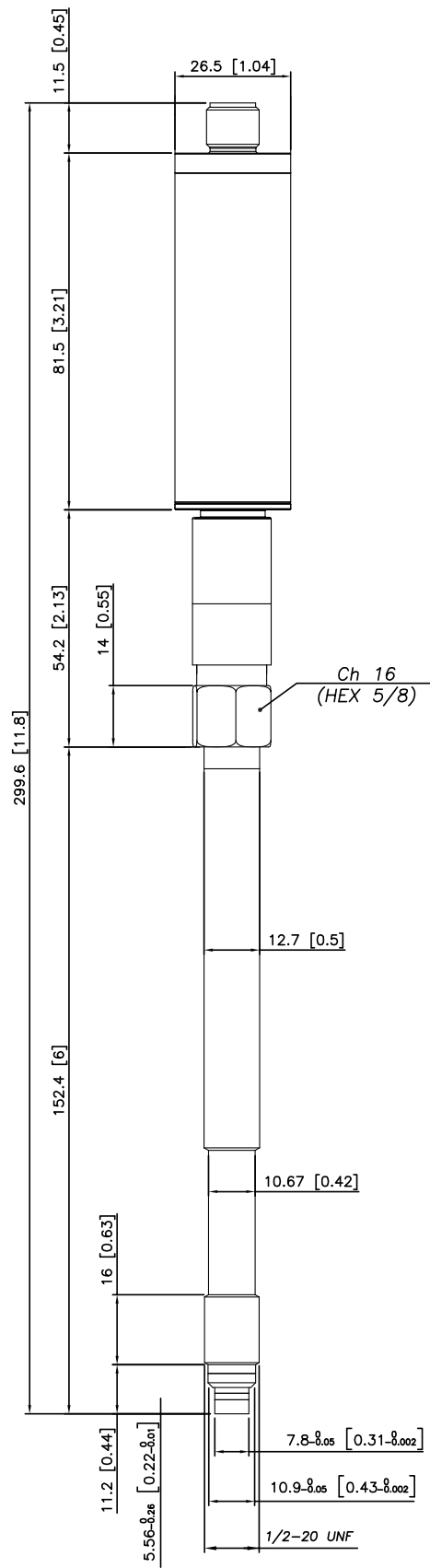
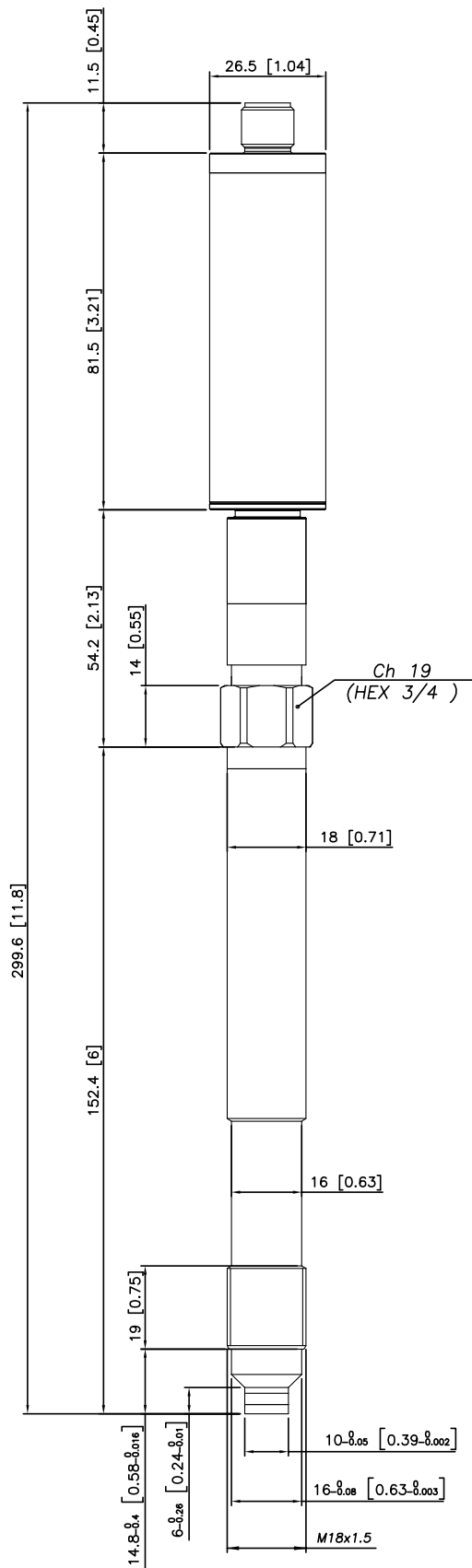
Accuracy (1)	H <±0.25%FS (100...1000 bar) M <±0.5%FS (10...1000 bar)
Resolution	16 Bit
Measurement range	0..10 to 0..1000bar 0..150 to 0..15000psi
Maximum overpressure (without degrading performances)	1.5 x FS (up to 1200 bar/17400 psi max)
Measurement principle	Piezoresistive
Power supply	18-30 Vdc
Maximum current absorption (*)	1 W (1.2 W with optional relay)
Zero offset	± 0.25% FS
Zero adjustment	“Autozero” function (via IO-Link)
Communication interface	IO-Link
Cycle time	2 msec
IO-Link version	1.1
Transmission type	COM2 (38.4 kBaud)
Profile	Smart sensor generic profile
SIO Mode	Yes
Required class for Master port	A
Pressure process data resolution	14 bit
Temperature process data resolution (opt.)	16 bit
Rangeability	3:1 (analogue output opt.)
Calibration signal	80% FS
Supply reverse polarity protection	Yes
Compensated temperature range housing	0...+85°C
Operating temperature range housing	-30...+85°C
Storage temperature range housing	-40...+125°C
Thermal drift in compensated range: Zero / Calibration / Sensibility	< 0.02% FS/°C
Maximum diaphragm temperature	350°C / 660°F
Zero drift on process temp. 20 to 350°C	< ± 1.2%FS
Span drift on process temp. 20 to 350°C	< ± 1%FS
Std contact diaphragm with process	15-5 PH GTP+
Integral temperature (optional)	Accuracy ± 5 °C
Protection degree (with 5-pole female connector)	IP65 (with suitable mating connector)

FS = Full Scale (1) BFSL method (Best Fit Straight Line): includes combined effects of Non-Linearity, Hysteresis and Repeatability (acc. to IEC 62828-2).

(\*) does not take into account absorption on DO in SIO mode (limited to 200mA)

# MECHANICAL DIMENSIONS

**IL10**

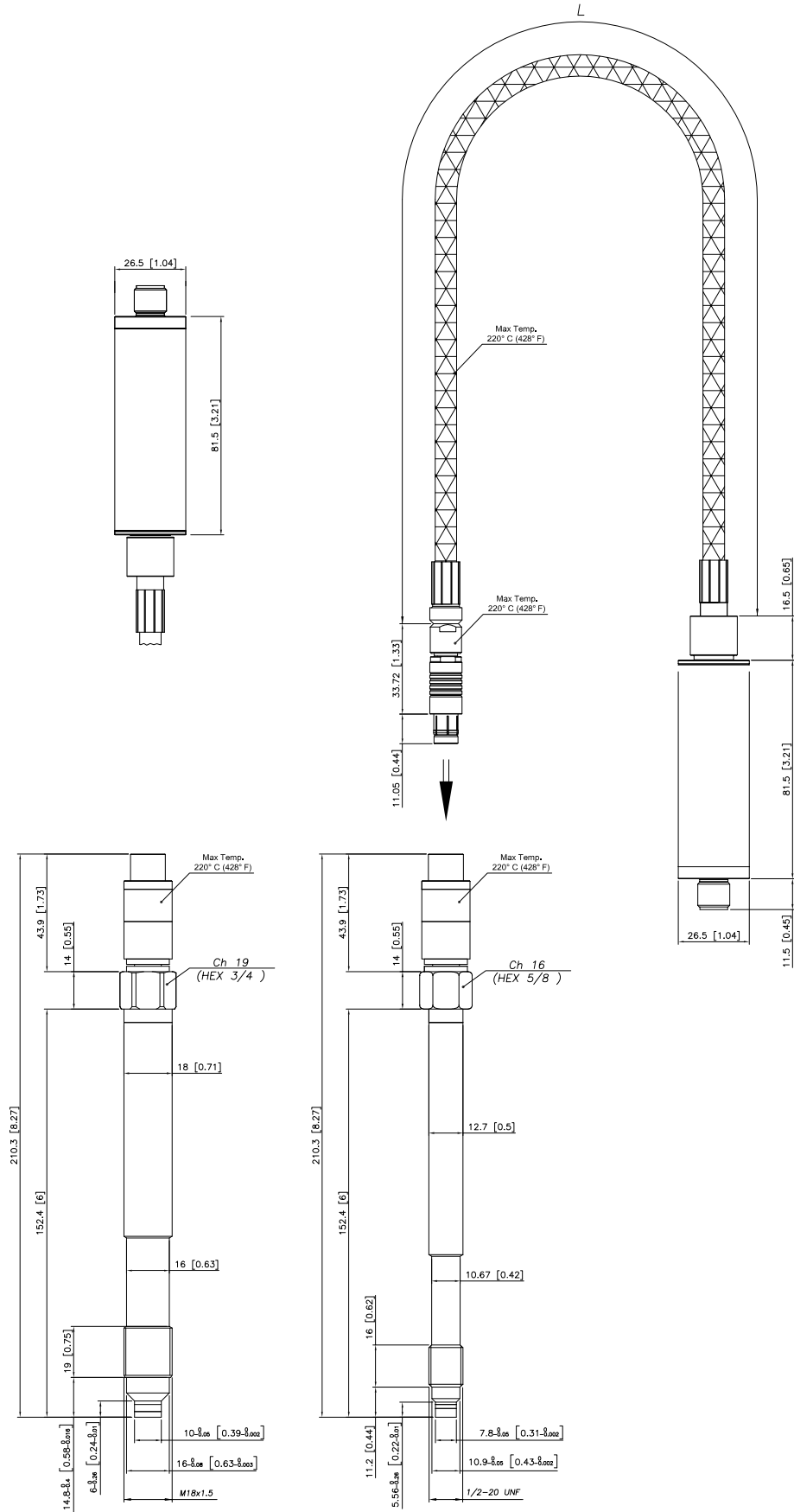


**NOTE :** dimensions refer to rigid stem length option "4" (153 mm – 6")

**ATTENZIONE :** For installation use a maximum tightening torque of 40 Nm (355 in-lb)

# MECHANICAL DIMENSIONS

**ILI1-M**

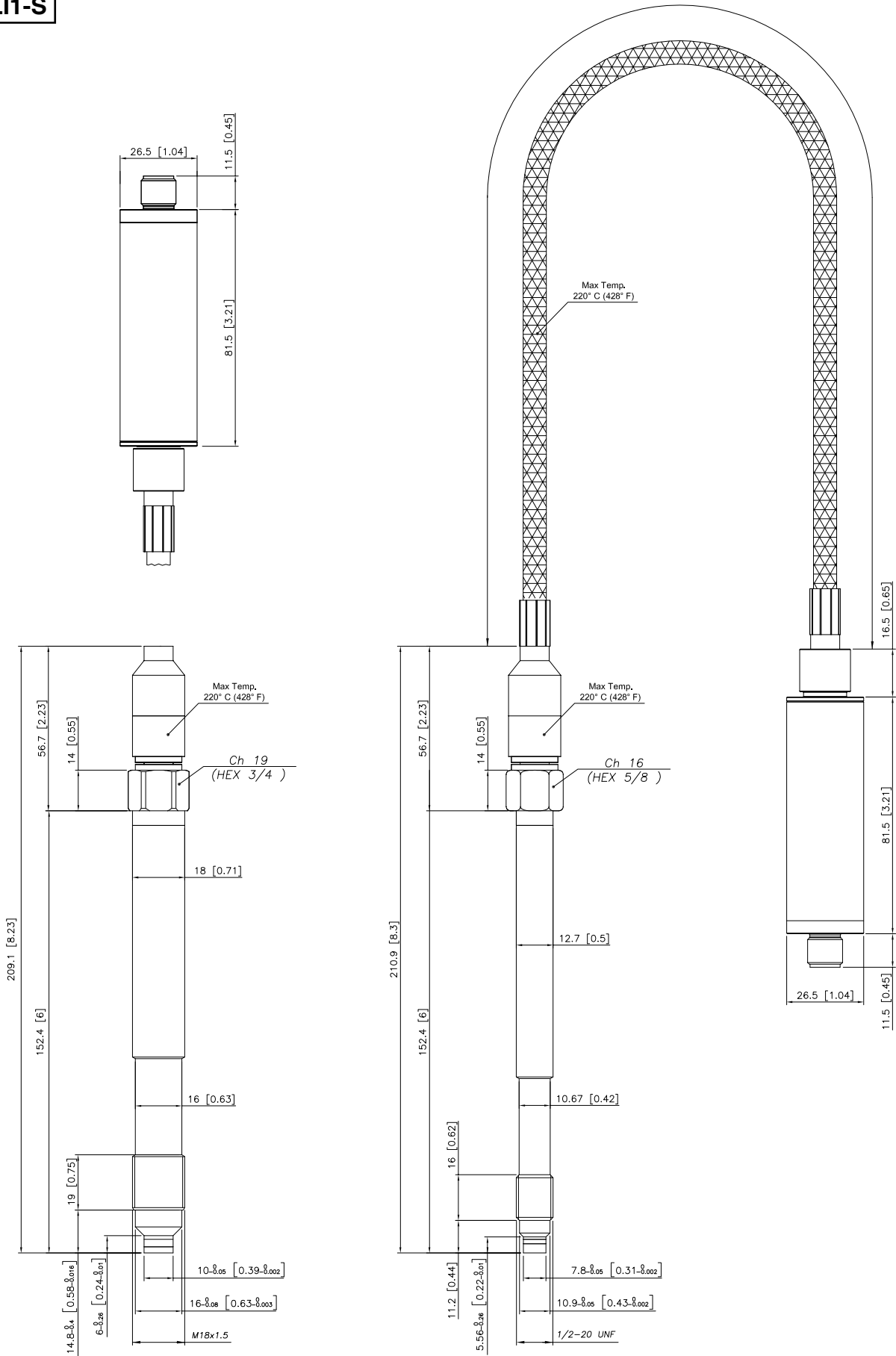


**NOTE :** dimensions refer to rigid stem length option "4" (153 mm – 6")

**ATTENZIONE :** For installation use a maximum tightening torque of 40 Nm (355 in-lb)

# MECHANICAL DIMENSIONS

**ILI1-S**



**NOTE :** dimensions refer to rigid stem length option “4” (153 mm – 6”)

**ATTENZIONE :** For installation use a maximum tightening torque of 40 Nm (355 in-lb)

## SELF DIAGNOSTICS (for SIL/PL certified models only)

Below the conditions detected by the sensor self-diagnostics:

- Cut cable / device non connected / broken power supply, output <3.6 mA/0.25 V
- Broken primary element / pin detachment, output >20.6 mA/10.8 V
- Pressure above 200% of the span, output <3.6 mA/0.25 V
- Pressure below the -30% of the span related to the zero value, output <3.6 mA/0.25 V
- Voltage monitor in case of overvoltage/undervoltage/voltage variation in the electronics, output <3.6 mA/0.25 V
- Program sequence error, output <3.6 mA/0.25 V
- Overtemperature on the electronics, output <3.6 mA/0.25 V
- Error on the primary element output or on the first amplification stage, output <3.6 mA/0.25 V

## OPTIONAL RELAY OUTPUT FOR EXCESS PRESSURE PROTECTION (for SIL/PL certified models only)

Safety relay characteristics:

- Activation threshold to be defined in the order code
- Rated carry current: 1A
- Rated voltage: 24Vdc  $\pm$  20%
- Switch accuracy: 2 x sensor accuracy
- Hysteresis: 2% FS

SUPPLY	OUTPUT	RELAY STATUS
OFF	-	OPEN
ON	< X%FS	CLOSED
ON	> X%FS	OPEN
ON	under range	OPEN
ON	over range	OPEN

## NAMUR COMPLIANCE (for SIL/PL certified models only)

The sensors are tested according to Namur NE21 recommendations.

The same compatibility is valid for the NE43 Namur recommendation with the following sensor behaviour in case of breakdown:

- Cut cable: breakdown information as the signal is <3.6 mA/0.25 V
  - Device not connected: breakdown information as the signal is <3.6 mA/0.25 V
  - Broken power-supply: breakdown information as the signal is <3.6 mA/0.25 V
- or in case of performance problems:

- most common failures on primary sensors: the signal goes to >20.6 mA/10.8 V

Note: in all the remaining situations, the output signal is always included between 3.6 mA/0.25 V and 20.6 mA/10.8 V



**Recommendation:** the error level set by the customer (e.g. maximum pressure value) has to be inside the nominal range

## AUTOZERO FUNCTION

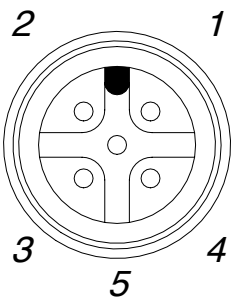
The Autozero function is activated by IO-Link command.

All zero drift caused by temperature change on the tip can be removed by using this function.

This autozero procedure must be performed at zero pressure only, when the sensor is completely installed on the system.

See operating manual for complete Autozero Function explanation

## ELECTRICAL CONNECTIONS

<b>5 pin M12x1 connector</b> 	M12x1 5 pin Connector	IO-LINK Output	Relay Output Option	Analogue Output Option
	1	V+	V+	V+
	2	DO (*)	Relay Conctat 1	DO (*)
	3	V-	V-	V-
	4	IO-LINK	IO-LINK	IO-LINK
5	N.C.	Relay Conctat 2	Analogue Output	

(\*) DO = digital output only active in SIO mode

## ACCESSORIES

### Connectors

5-pin female connector (IP65 protection degree)	<b>CON031</b>
5-pin female connector, angle 90° (IP65 protection degree)	<b>CON041</b>

### IO-Link connection cables

IO-Link and Safety output Y splitter cable, 5 pins M12 connector	<b>CAV500</b>
2m unshielded cable, with M12 female 5 pins straight connector and M12 male 5 pins straight connector	<b>CAV501</b>
5m unshielded cable, with M12 female 5 pins straight connector and M12 male 5 pins straight connector	<b>CAV502</b>
10m unshielded cable, with M12 female 5 pins straight connector and M12 male 5 pins straight connector	<b>CAV503</b>

### Master IO-Link

Gefran has analyzed and then qualified the main masters on the market that meet the IEC 61131-9 standard relating to the digital communication interface IO-Link 1.1, and therefore compatible with ILM, ILW, ILK and ILI transducers.

**Note:** For further information (ordering codes, technical specifications, etc.) please contact Gefran or write to: [info@gefran.com](mailto:info@gefran.com).

### Accessories

Mounting bracket	<b>SF18</b>
Dummy plug for 1/2-20UNF	<b>SC12</b>
Dummy plug for M18x1.5	<b>SC18</b>
Drill kit for 1/2-20UNF	<b>KF12</b>
Drill kit for M18x1.5	<b>KF18</b>
Cleaning kit for 1/2-20UNF	<b>CT12</b>
Cleaning kit for M18x1.5	<b>CT18</b>

# ORDER CODE

ILI - - - - - 0 00 0 X 000 X 00

VERSION	
Rigid rod	0
Rigid + flexible stem	1

MECHANICS	
Single fixed	A
Modular fixed	B*
Single Floating	S
Modular Floating	M*

\* Not available for ILI0 version

CONNECTOR	
M12x1 (5 pin)	5

ACCURACY CLASS	
0.25% FS	H
0.5% FS	M

MEASUREMENT RANGE			
bar		psi	
10*	<b>B01D</b>	150*	<b>P15D</b>
20	<b>B02D</b>	300	<b>P03C</b>
35	<b>B35U</b>	500	<b>P05C</b>
50	<b>B05D</b>	750	<b>P75D</b>
70	<b>B07D</b>	1000	<b>P01M</b>
100	<b>B01C</b>	1500	<b>P15C</b>
200	<b>B02C</b>	3000	<b>P03M</b>
350	<b>B35D</b>	5000	<b>P05M</b>
500	<b>B05C</b>	7500	<b>P75C</b>
700	<b>B07C</b>	10000	<b>P10M</b>
1000	<b>B01M</b>	15000	<b>P15M</b>

(\*) Only for M18x1.5 version

THREADING	
Standard	
1	1/2 - 20 UNF
4	M18 x 1.5

**Output relay option (\*)**  
 Activation threshold:  
 X = no relay B = 80% FS  
 A = 70% FSC = 90% FS  
 Other threshold available on request

(\*) Available only with PLd/SIL2 version

SPECIAL FUNCTIONS	
0	No special function
R	Reset fault state command (*)
N	Signed pressure data
Z	Reset fault state command + Signed pressure data (*)

(\*) Available only with PLd/SIL2 version

ANALOG OUTPUT	
00	No analogue output
01	4-20 mA output (*)(**)(***)
02	0.5-10.5 V output (*)(**)

(\*) Analogue output is not available with relay option

(\*\*) Available only with PLd/SIL2 version

(\*\*\*) RLoad max 500 Ω

PROCESS DATA	
0	Pressure
T	Pressure and temperature

CERTIFICATIONS	
P	Performance Level='d' / SIL2
0	Standard IO-Link

FLEXIBLE STEM LENGTH (mm/inches)		
Standard (ILI0)		
0	none	
Standard (ILI1)		
D	457mm	18"
E	610mm	24"
F	760mm	30"

RIGID STEM LENGTH (mm/inches)		
Standard		
4	153mm	6"
5	318mm	12.5"
Available on request		
3	76mm	3"
6	350mm	14"
7	400mm	16"
8	456mm	18"

Example

**ILI1-S-5-M-B07C-1-4-D-P T000C000X00**

Melt pressure transducer without filling, IO-Link output, 5-pin, connector, 1/2-20 UNF threading, 700 bar pressure range, 0.5% accuracy, 153 mm (6") rigid stem, 457 mm (18") flexible stem, Performance Level=d/SIL2, integral temperature, relay option with 90%FS threshold

Sensors are manufactured in compliance with:

- EMC compatibility directive
- RoHS directive
- Machinery directive

Electrical installation requirements and Conformity certificate are available on our web site: [www.gefran.com](http://www.gefran.com)

GEFRAN spa reserves the right to make any kind of design or functional modification at any moment without prior notice