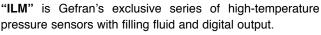
GEFRAN

MELT PRESSURE TRANSMITTERS ILM SERIES IO-LINK VERSION





This new series ILM with "IO-Link" interface is a Smart device specifically designed to meet the requirements of "Industry 4.0" environment, with auxiliary information suitable to prevent machine downtime and thanks to the filling fluid solution it can withstand up to 400°C of process temperature.

In addition, with **PLd** and **SIL2** approvals, the ILM series is the best solution for "functional safety" applications.

MAIN FEATURES

- Pressure ranges from:
 0-17 to 0-2000 bar / 0-250 to 0-30000 psi
- Accuracy: $< \pm 0.25\%$ FS (H); $< \pm 0.5\%$ FS (M)
- 1/2-20UNF, M18x1.5 standard threads; other types available on request
- 15-5 PH diaphragm with GTP+ coating fother types available on request
- 17-7 PH corrugated diaphragm with GTP+ coating for ranges below 100bar-1500psi.
- Stem material: 17-4 PH
- IO-Link output, ready for "Industry 4.0"
- · Rangeabilty: 3:1
- · PLd and SIL2 approvals for Functional safety
- Autozero function
- · Auxiliary information over IO-Link protocol

GTP+ (advanced protection)

Coating with high resistance against corrosion, abrasion and high temperature

AUTOZERO FUNCTION

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

This Autozero function is activated via IO-Link command.

The procedure is allowed only at zero pressure.





The ILM Performance Level 'd'/SIL2 series of Gefran are pressure transmitters for using in high temperature environment with IO-Link output.

The main characteristic of this series is the capability to read temperature of the media up to 400°C (750°F).

The constructive principle is based on the hydraulic trasmission of the pressure.

The fluid-filled system assures the temperature stability. This "Smart" transmitter with IO-Link output is ready for "Industry 4.0" requirements.

TECHNICAL SPECIFICATIONS

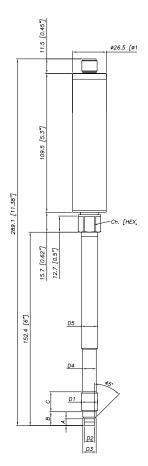
Measurement range Maximum overpressure (without degrading performances) Measurement principle Power supply Maximum current absorption (*) Zero offset Zero adjustment Communication interface IO-Link Cycle time Profile Smart sensor generic profile Slo Mode Required class for Master port A Pressure process data resolution Rangeability Calibration signal Rower supply polarity reverse protection Compensed temperature range housing Conget temperature range housing Thermal drift in compesated range: Zero drift due to change in process temperature (option all) Profile supply polarity includes compensed to metal to pick the pick of	Accuracy (1)	H <±0.25% FS (1002000 bar) M <±0.5% FS (172000 bar)
(without degrading performances) 1.5 x FS above 700bar/10000psi Measurement principle Extensimetric (Thick film) Power supply 18-30 Vdc Maximum current absorption (*) 1 W (1.2 W with relay optional) Zero offset <±0.25% FS	Measurement range	
Measurement principle Power supply 18-30 Vdc 1 W (1.2 W with relay optional) Zero offset Zero adjustment 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 Required class for Master port Analog output resolution Temperature process data resolution Rangeability Calibration signal Compensed temperature range housing Operating temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature verse uptor of the due to change in process of the suitable mating connector Protection degree (5-pole female connector) Integral temperature (optional) Possible (1.2 W with relay ovdice (1.3 W (1.2 W with relay optional) 1 W (1.2 W with relay ovdice 1 W (1.2 W with relay ovdice 1 W (1.2 W with relay optional) 1 W (1.2 W with relay ovdice 4 W (1.2 W with relay ovdice 1 W (1.2 W with relay optional)		_
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Maximum current absorption (*) Zero offset Zero adjustment Communication interface IO-Link Cycle time IO-Link version Transmission type Profile Smart sensor generic profile SIO Mode Required class for Master port Analog output resolution Tamperature process data resolution Rangeability Calibration signal Analog output reverse protection Compensed temperature range housing Storage temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (optional) Protection degree (5-pole female connector) Integral temperature varies and suitable mating connector		, ,
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IO-Link version Transmission type COM2 (38.4 kBaud) Profile Smart sensor generic profile SlO Mode Required class for Master port A Pressure process data resolution Analog output resolution Temperature process data resolution Rangeability Calibration signal Sow FS Power supply polarity reverse protection Compensed temperature range housing Operating temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector)	Communication interface	IO-Link
Transmission type COM2 (38.4 kBaud) Profile Smart sensor generic profile SlO Mode Required class for Master port A Pressure process data resolution Analog output resolution Temperature process data resolution Rangeability Calibration signal Sow FS Power supply polarity reverse protection Compensed temperature range housing Operating temperature range housing Storage temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector) Smart sensor generic profile A COM2 (38.4 kBaud) Smart sensor generic profile Shall suitable mating connector	Cycle time	2 msec
Profile SIO Mode Required class for Master port A Pressure process data resolution Analog output resolution Temperature process data resolution Rangeability Calibration signal Bo% FS Power supply polarity reverse protection Compensed temperature range housing Operating temperature range housing Storage temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector)	IO-Link version	1.1
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Required class for Master port Pressure process data resolution Analog output resolution Temperature process data resolution Rangeability Calibration signal Power supply polarity reverse protection Compensed temperature range housing Operating temperature range housing Storage temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector)	Profile	Smart sensor generic profile
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Analog output resolution Temperature process data resolution Rangeability Calibration signal Power supply polarity reverse protection Compensed temperature range housing Operating temperature range housing Storage temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector)	Required class for Master port	A
Temperature process data resolution Rangeability Calibration signal Power supply polarity reverse protection Compensed temperature range housing Operating temperature range housing Storage temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector) Assume the protection of the bit of the process of the proce	Pressure process data resolution	14 bit
Rangeability Calibration signal Power supply polarity reverse protection Compensed temperature range housing Operating temperature range housing Storage temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector) Some FS Compensed temperature range housing -30+85°C -30+85°C -40+125°C -40.02% FS/°C -40.02% FS/	Analog output resolution	16 bit
Calibration signal Power supply polarity reverse protection Compensed temperature range housing Operating temperature range housing Storage temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector) Accuracy T/C type J PSS** PES** PSS** O+85°C -30+85°C -40+125°C -40	Temperature process data resolution	16 bit
Power supply polarity reverse protection Compensed temperature range housing Operating temperature range housing Storage temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector) PSS°C -0.02% FS/°C -0	Rangeability	3:1 (analogue output opt.)
Compensed temperature range housing Operating temperature range housing Storage temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector) O+85°C C+125°C <0.02% FS/°C <0.02% FS/°C <0.02% FS/°C <0.02% FS/°C Accuracy T/C type J P65 with suitable mating connector	Calibration signal	80% FS
Operating temperature range housing Storage temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector) Storage temperature range housing -40+125°C < 0.02% FS/°C < 0.02% FS/°C < 2 bar/100°C / < 15 psi/100°F Accuracy T/C type J IP65 with suitable mating connector	Power supply polarity reverse protection	YES
Storage temperature range housing Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector) -40+125°C -	Compensed temperature range housing	0+85°C
Thermal drift in compesated range: Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector) - 0.02% FS/°C - 0.02% FS/°C - 2 bar/100°C / - 2 bar/100°C / - 2 bar/100°F - 2 connector (2 bar/100°C / - 2 bar/100°C / - 3 bar/100°C / - 3 bar/100°C / - 4 bar/100°C / - 5 bar/10	Operating temperature range housing	-30+85°C
Zero / Calibration / Sensibility Diaphragm maximum temperature Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector) Accuracy T/C type J Protection degree (5-pole female connector)	Storage temperature range housing	-40+125°C
Zero drift due to change in process temperature (zero) Integral temperature (optional) Protection degree (5-pole female connector)		< 0.02% FS/°C
temperature (zero) < 15 psi/100°F Integral temperature (optional) Accuracy T/C type J Protection degree IP65 (5-pole female connector) with suitable mating connector	Diaphragm maximum temperature	400°C / 750°F
Protection degree IP65 (5-pole female connector) with suitable mating connector		1
(5-pole female connector) with suitable mating connector	Integral temperature (optional)	Accuracy T/C type J
	Protection degree	00

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

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

MECHANICAL DIMENSIONS





D1	1/2 - 20UNF
D2	ø7.8 -0.05 [ø0.31" -0.002]
D3	ø10.5 -0.025 [ø0.41" -0.001]
D4	ø10.67 [ø0.42"]
D5	ø12.7 [ø0.5"]
A	5.56 -0.26 [0.22" -0.01]
В	11.2 [0.44"]
С	15.74 [0.62"]
Ch [Hex]	16 [5/8"]

D1

D2

D3

D4

D5

Α

В

С

Ch

[Hex]

M18x1.5 ø10 -0.05 [ø0.394" -0.002]

ø16 -0.08 [ø0.63" -0.003]

Ø16 -0.4

[Ø0.63" -0.016]

ø18

[ø0.71"]

6 -0.26 [0.24" -0.01]

14.8 -0.4

[0.58" -0.016]

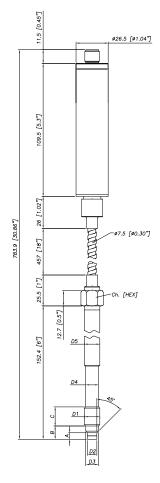
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[0.75"]

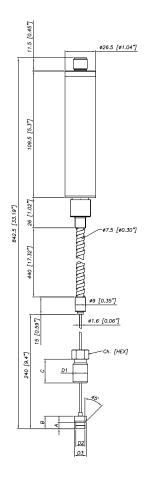
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[3/4"]

ILM1







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

WARNING: For installation use a maximum tightening torque of 56 Nm (500 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
- · Pin detachment, output >20.6 mA/10.8 V
- · Pressure above 200% of the span, output >20.6 mA/10.8 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 ± 20%
- · Switch accuracy: 2 x sensor accuracy
- · Hysteresis: 2% FS

SUPPLY	ОИТРИТ	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

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

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

ACCESSORIES

Connectors	
5-pin female connector	CON031
5-pin female connector, angle 90°	CON041
IO-Link connection cables	
IO-Link and Safety output Y splitter cable, 5 pins M12 connector	CAV500
2m unshielded cable, with M12 female 5 pins straight connector and M12 male 5 pins straight connector	CAV501
5m unshielded cable, with M12 female 5 pins straight connector and M12 male 5 pins straight connector	CAV502
10m unshielded cable, with M12 female 5 pins straight connector and M12 male 5 pins straight connector	CAV503

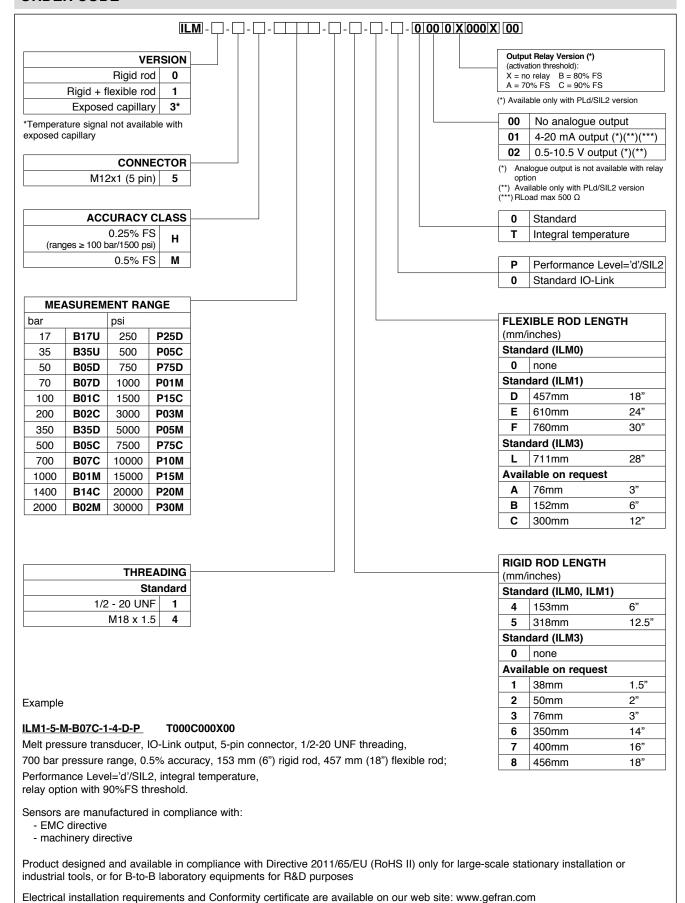
Master IO-Link

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.

 $\textbf{Note} : \textbf{For further information (ordering codes, technical specifications, etc.) please contact Gefran or write to: \textit{info@gefran.com}.$

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

ORDER CODE



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



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