



The HIX series of GEFRAFAN are pressure transmitters with HART communication protocol for using in high temperature environment with explosive atmosphere presence.

The main characteristic of this series is the capability to read pressure of the media up to 350°C with a fluid-free technology. The pressure is transferred, through a high thickness membrane, directly to the silicon sensing element. The transduction of the stress is carried out by a special silicon micro-machined structure (MEMS). The operating principle is piezoresistive.

The **SIL2** and **PL d** approvals make the product suitable for use in the **Functional Safety** applications, particularly in the process plants for the production of polymers, where it is an essential requirement.

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

The sensing element, directly positioned behind the contact membrane, is made in silicon through micromachining techniques.

The micro structure includes the measurement membrane and the piezoresistors.

The minimum deflection required by the sensing 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.

ADVANTAGES

- Total compatibility with the European RoHS Directive
- High strength
- Long life
- High thickness contact diaphragm
- Fluid-free technology
- Fast response time
- Analogue and digital output (Smart/Hart)

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 threading 1/2-20UNF, M18x1.5;
- Autozero function on board / external option
- 15-5 PH stainless steel diaphragm GTP+ coated
- SIL2 and PL d approvals for Functional Safety
- Ex certifications for potentially explosive atmospheres (see details)
- 4-20 mA analogue output and digital with HART protocol

AUTOZERO FUNCTION

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

This function is activated by closing a magnetic contact located in the electronic transmitter or by an external contact.

The procedure is allowed only at zero” pressure.

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

TECHNICAL SPECIFICATIONS

Accuracy (1)	H <±0.25%FS M <±0.5%FS
Resolution	16 Bit
Measurement range	0..10 to 0..1000bar 0..150 to 0..15000psi
Rangeability	3:1
Maximum overpressure (without degrading performances)	1.5 x FS (up to 1200 bar/ 17400 psi max)
Measurement principle	Piezoresistive
Power supply	13...30Vdc
Maximum current absorption	23mA
Output signal Full Scale FS	20mA
Output signal at Zero (tolerance ± 0.25% FS)	4mA
Calibration signal	80% FS
Output short circuit ingress and 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
Maximum diaphragm temperature	350°C / 660°F
Thermal drift in compensated range: Zero / Calibration / Sensibility	< 0.02% FS/°C
Zero signal variation due to process temperature variation in range (20-350°C)	< ± 1.2%FS
Span signal variation due to process temperature variation in range (20-350°C)	< ± 1%FS
Contact diaphragm material	15-5 PH with GTP+ coating
Thermocouple (model HIX2)	STD: type “J” (isolated junction)
Protection degree (with 6-pole female connector CON300)	IP66
SIL2 certification	IEC/EN 62061 / IEC 61508
PL d certification	EN ISO 13849

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).

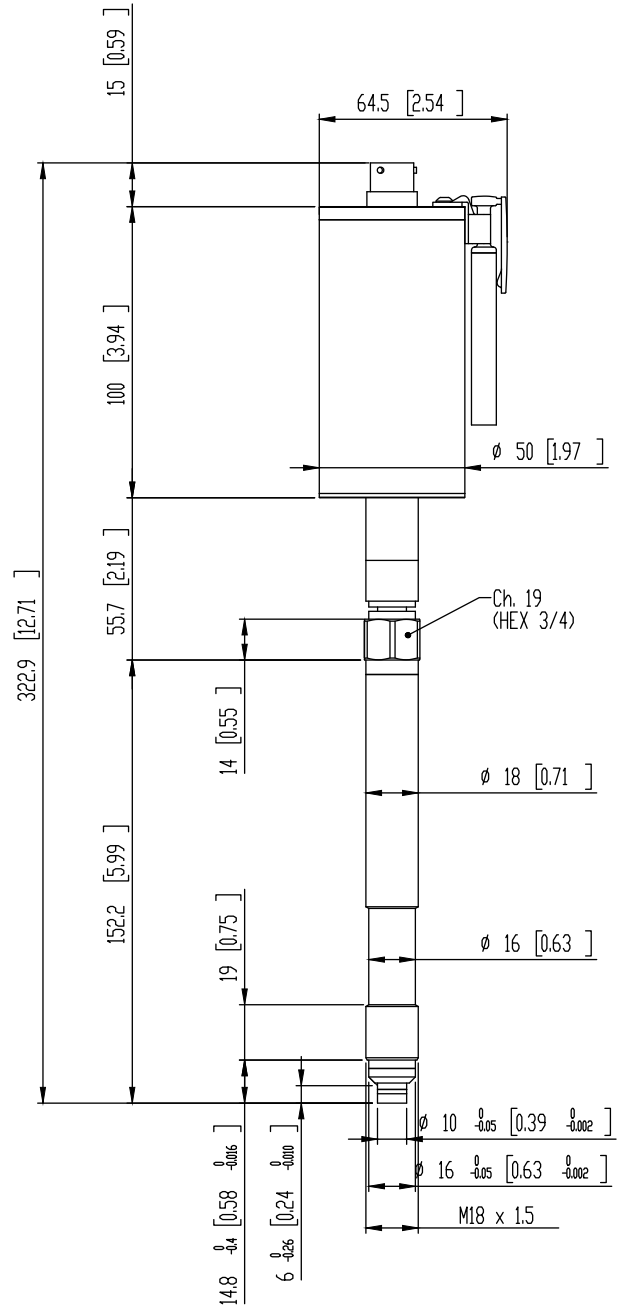
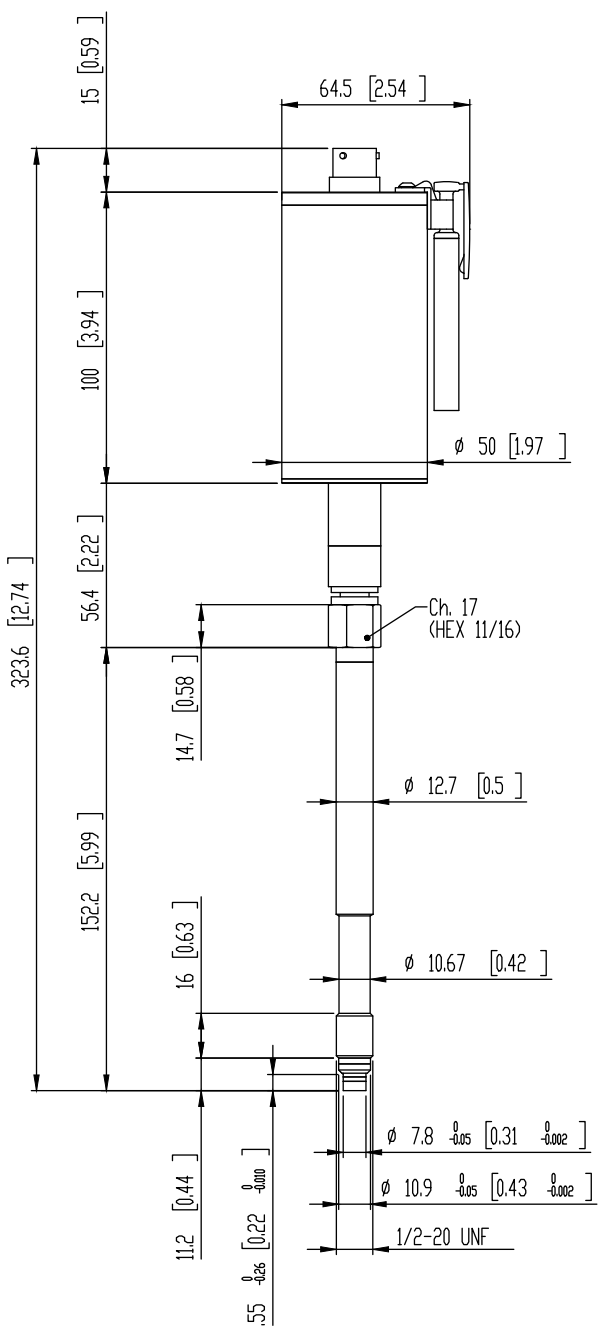
For products sold to EAC Customs Union (EAC mark), due to a different method of calculation, the limits of accuracy are the following:

_M = ±1%

_H = ±0,5%

MECHANICAL DIMENSIONS

HIX0

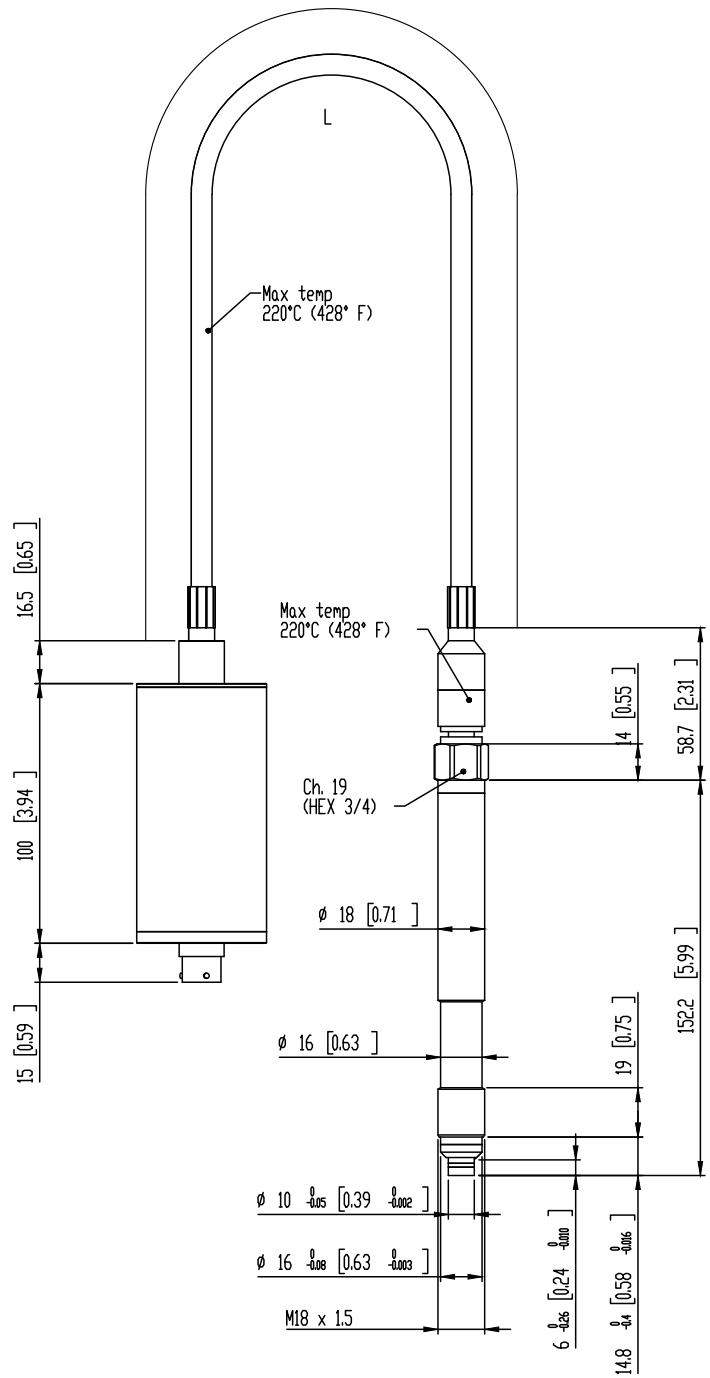
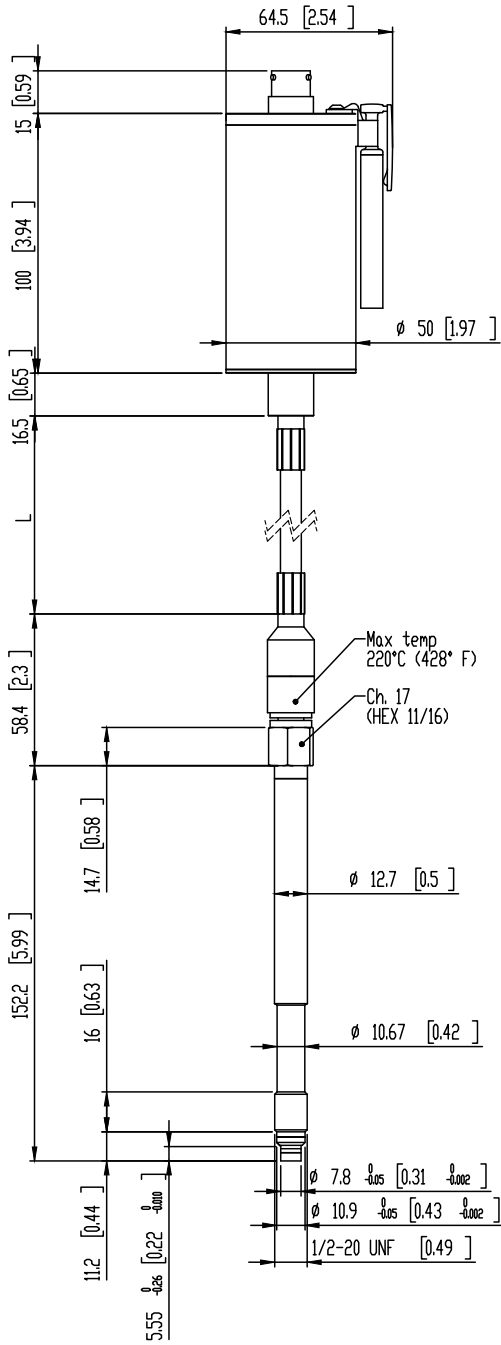


NOTE : dimensions refer to rigid stem length option "4" (153 mm – 6")

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

MECHANICAL DIMENSIONS

HIX1-S

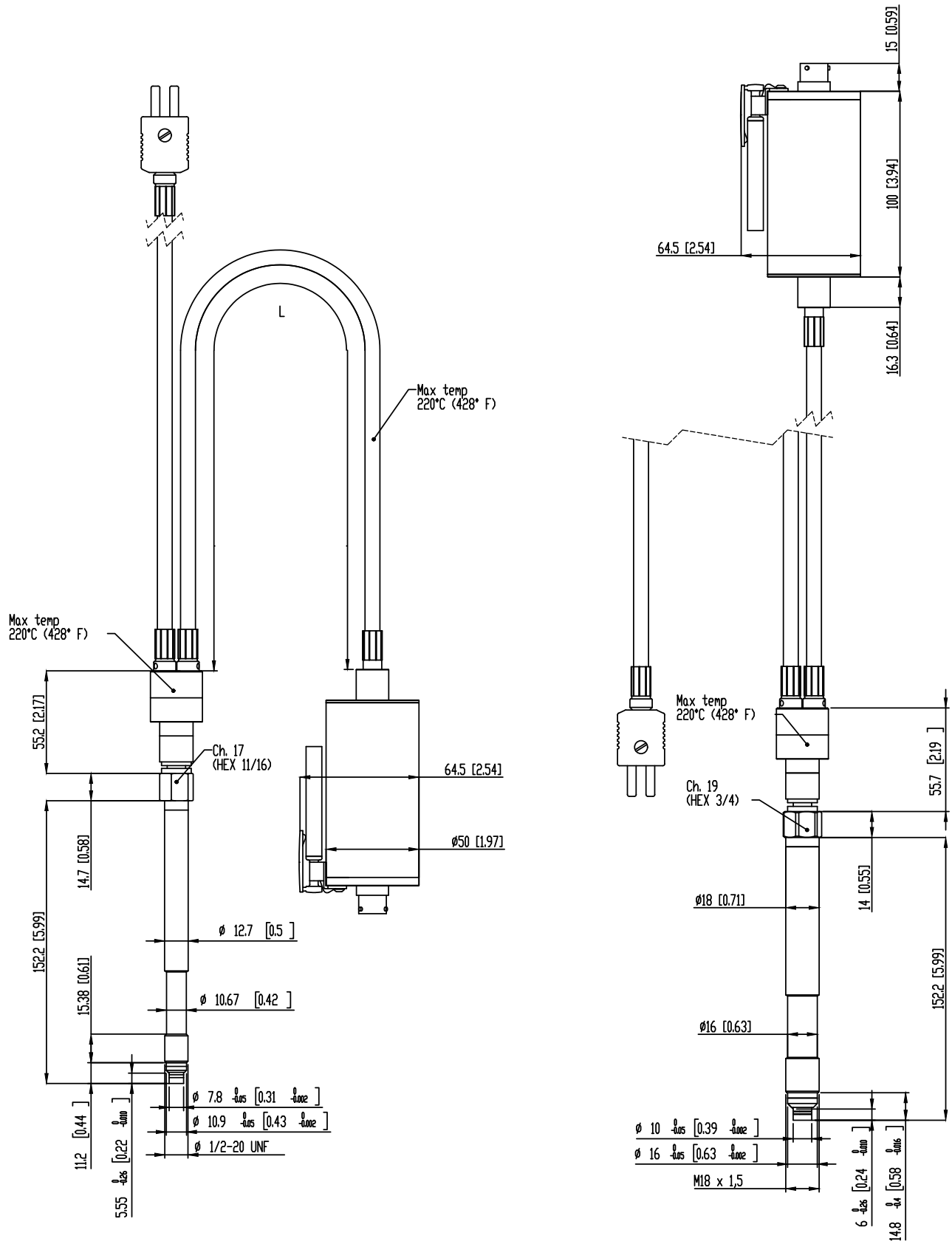


NOTE : dimensions refer to rigid stem length option "4" (153 mm – 6")

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

MECHANICAL DIMENSIONS

HIX2



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

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

SELF DIAGNOSTICS (ONLY FOR PL d / SIL2 VERSIONS)

Below the conditions detected by the sensor self-diagnostics:

- Cut cable / device non connected / broken power supply, output $\leq 3.6\text{mA}$
- Pin detachment output $\leq 3.6\text{mA}$
- Broken primary element $\geq 21\text{mA}$
- Pressure above 200% of the span, output $\geq 21\text{mA}$
- Voltage monitor in case of overvoltage/undervoltage/voltage variation in the electronics, output $\leq 3.6\text{mA}$ (*)
- Program sequence error, output $\leq 3.6\text{mA}$ (*)
- Overtemperature on the electronics, output $\leq 3.6\text{mA}$ (*)
- Error on the primary element output or on the first amplification stage, output $\geq 21\text{mA}$

(*) In such conditions the Alarm Type can be programmed via HART at $\geq 21\text{mA}$.

NAMUR COMPLIANCE (ONLY FOR PL d / SIL2 VERSIONS)

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 $\leq 3.6\text{mA}$
- Device not connected: breakdown information as the signal is $\leq 3.6\text{mA}$
- Broken power-supply: breakdown information as the signal is $\leq 3.6\text{mA}$
- or in case of performance problems:
- Broken primary element $\geq 21\text{mA}$
- Pressure above 200% of the span, output $\geq 21\text{mA}$
- Others $\leq 3.6\text{mA}$ (*)

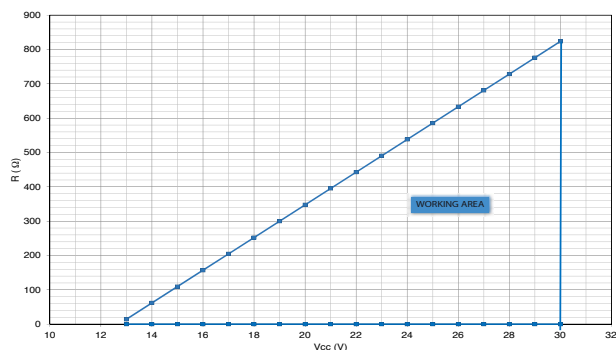
(*) In such a condition the Alarm Type can be programmed via HART at $\geq 21\text{mA}$.

Note: in all the remaining situations, the output signal is always included between 3.8 and 20.5mA.



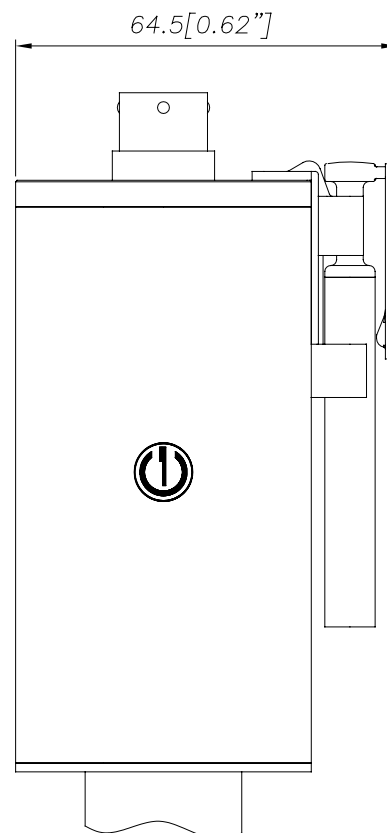
Recommendation: the error level set by the customer (e.g. maximum pressure value) has to be inside the nominal range.

LOAD DIAGRAM



The diagram shows the optimum ratio between load and power supply for transmitters with 4...20mA output. For correct function, use a combination of load resistance and voltage that falls within the working area.

AUTOZERO FUNCTION



The Autozero function is activated through a magnetic contact (external magnet supplied with the sensor). The Autozero function can be activated through HART command as well. See the manual for a complete Autozero function explanation.

INTRINSIC SAFETY CHARACTERISTICS

Transmitters are designed and produced in compliance with:

- _ ATEX Directive 2014/34/EU
- _ IECEx scheme
- _ EAC TR CU 012/2011 regulation

Type of Protection:

_ ATEX: group II, category 1G, 1D

GAS type of protection: Ex ia IIC T6, T5, T4 Ga (Ambient Temp.: -20°C...+60°C / +75°C / +85°C)

DUST type of protection: Ex ia IIC T85°C, T100°C, T135°C

Da IP65 (Ambient Temp.: -20°C...+60°C / +75°C / +85°C)

_ IECEx:

group II, category 1G

GAS type of protection: Ex ia IIC T6, T5, T4 Ga (Ambient Temp.: -20°C...+60°C / +75°C / +85°C)

_ EAC Ex:

group/category 0

GAS type of protection: Ex ia IIC T6, T5, T4 Ga (Ambient Temp.: -20°C...+60°C / +75°C / +85°C)

DUST type of protection: Ex ia IIC T85°C, T100°C, T135°C

Da IP65 (Ambient Temp.: -20°C...+60°C / +75°C / +85°C)

Maximum voltage	30 V
Maximum current	100 mA
Maximum power	0.75W
Maximum inductance (*)	17 µH
Maximum capacity (*)	10 nF
(*) includes inductance levels and capacity of a cable: (typical L 1µH/m and typical C 100 pF/m) with maximum length 15mt.	

The Melt pressure transmitters must be connected to other equipment (galvanic isolation barriers) with individual Ex certification such as [Ex ia Ga] IIC. The thermocouple circuit must be powered by means of galvanic isolation barriers with a maximum of 30V.

EC-Type Examination Certificate number: **DNV 13 ATEX 3894**




IECEx CoC number: **PRE 20.0091**

EAC Ex number: **C-IT.A.107.B.02919/20**

ELECTRICAL CHARACTERISTICS AND TEMPERATURE CLASSES

MODEL	(*) LEVEL L2	(*) LEVEL L1	TEMPERATURE CLASS	AMBIENT TEMPERATURE
HIX0	> 165mm	> 125mm	T6/T85	-20...+60°C
			T5/T100	-20...+75°C
			T4/T135	-20...+85°C
HIX1	> 665mm	> 625mm	T6/T85	-20...+60°C
			T5/T100	-20...+75°C
			T4/T135	-20...+85°C
HIX2	> 665mm	> 625mm	T6/T85	-20...+60°C
			T5/T100	-20...+75°C
			T4/T135	-20...+85°C

(*) with the level (L) in fig. 1, the table sets the minimum distance that the electrical circuit has to maintain from the block at high temperature.

-  thermal isolating material with adequate thickness for the process temperature
-  pressure transmitter housing block
-  fluid at temperature (350°C)

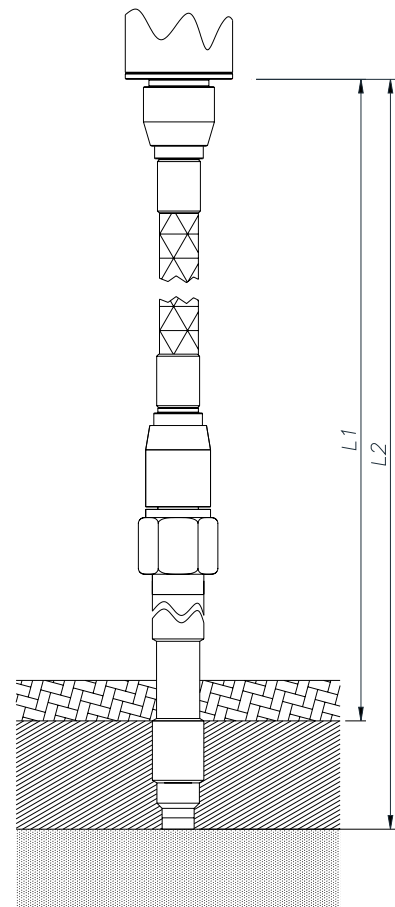
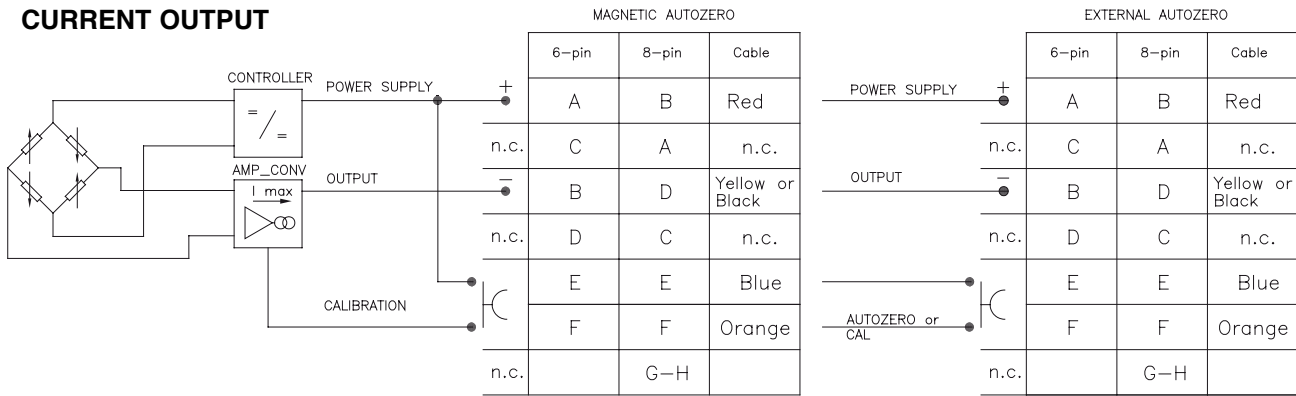


Fig. 1

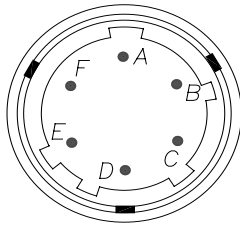
ELECTRICAL CONNECTIONS

CURRENT OUTPUT

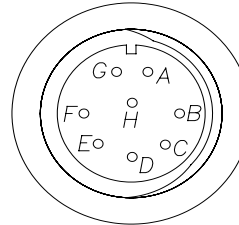


The cable shield is tied to both sides, i.e. to the sensor connector and to the controller

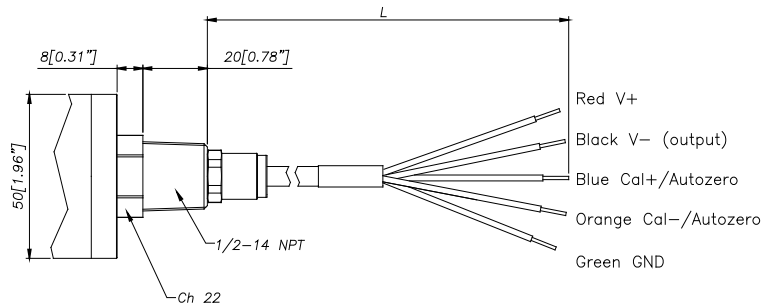
**6 pin Connector
VPT07RA10-6PT2
(PT02A-10-6P)**



**8 pin Connector
(PC02E-12-8P) Bendix**



**Cable outlet (1/2 14-NPT)
Current output
L = 1 m**



ACCESSORIES

Connectors

6-pin female connector (IP66 protection degree)
8-pin female connector

CON300
CON307

Accessories

Mounting bracket
Dummy plug for 1/2-20UNF
Dummy plug for M18x1.5
Drill kit for 1/2-20UNF
Drill kit for M18x1.5
Cleaning kit for 1/2-20UNF
Cleaning kit for M18x1.5
Fixing pen clip
Autozero pen

SF18
SC12
SC18
KF12
KF18
CT12
CT18
PKIT1032
PKIT378

Extension cables

6-pin connector with 3mt Atex cable
6-pin connector with 4mt Atex cable
6-pin connector with 5mt Atex cable
6-pin connector with 10mt Atex cable

PCAV221
PCAV104
PCAV105
PCAV106

Thermocouples for model HIX2

Type "J" (for rigid rod 153mm - 6")

TTER 601

Cable color code	
Conn.	Wire
A-2	Red
B-4	Black
C-1	White
D-6	Green
E-7	Blue
F-3	Orange
5	Grey
8	Pink

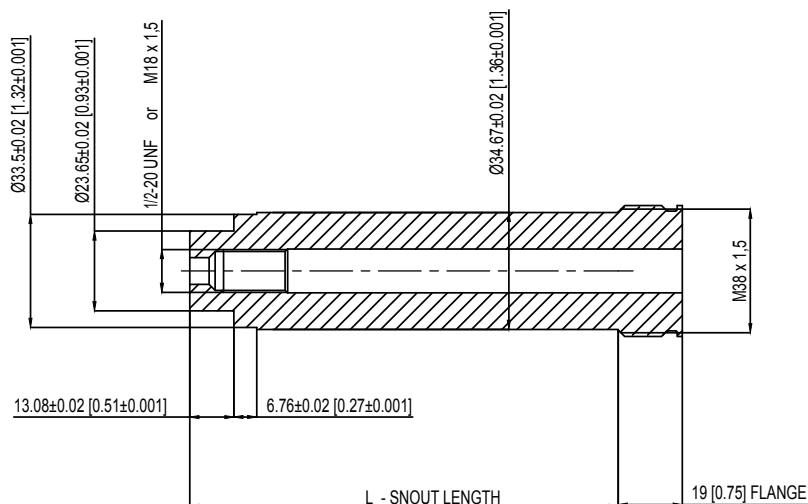
PROCESS FLANGE ADAPTER

The process flange adapter is a sensor accessory that allows for the installation of 1/2-20 UNF or M18x1.5 melt pressure sensor in a button seal style process mounting port. The adapter is made with an adapter body with different snout lengths plus an adapter flange available in different sizes (see tables and drawing below). Each combination of snout and flange is available according to the ordering information with a specific ordering code.

SPECIFICATIONS

- Pressure range: according to the selected sensor (up to 1000 bar/15000 psi max)
- Temperature range: according to the selected sensor
- Material of construction: 17-4PH Stainless steel

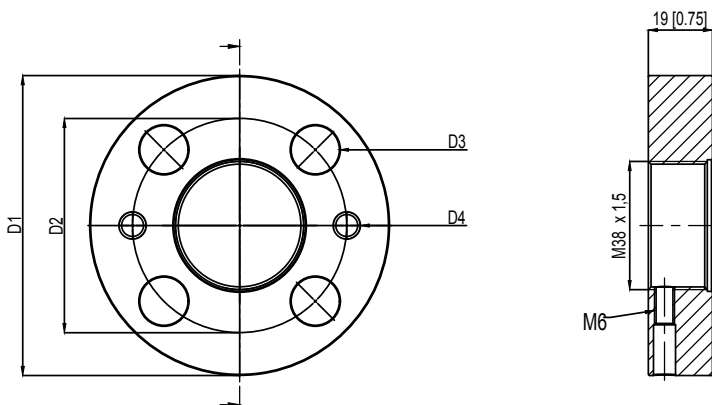
ADAPTER BODY



1/2-20 UNF	L - SNOUT LENGTH
STE1020	127 [5]
STE1021	51,6 [2,031]

M18 X 1,5	L - SNOUT LENGTH
STE1022	127 [5]
STE1023	51,6 [2,031]

ADAPTER FLANGE



	FLA960	FLA961
D1	82,6 [3,25]	88,9 [3,50]
D2	54 [2,14]	63,5 [2,50]
D3	13,2 [0,52]	14,3 [0,56]
D4	5/16-18 UNC	5/16-18 UNC

ORDER CODE

KIT - 5 - 0 - 1

Snout length	
5 inch [127 mm]	5
2.031 inch [51.6 mm]	2

Flange type (see technical drawing)	
FLA960	0
FLA961	1

Thread dimensions	
1/2-20 UNF	1
M18 x 1.5	4

ADAPTER GASKESTS			
Material	Dimensions	Max Pressure	Ord. Code
Aluminium	30.2 mm [1.19"] OD 24.1 mm [.950"] ID	200 bar/3000 psi	RON360
AISI 303 SS	30.2 mm [1.19"] OD 24.1 mm [.950"] ID	700 bar/10000 psi	RON361

Example:

KIT501

Process adapter with 5" snout length, 82.6 mm size flange, suitable for 1/2-20 UNF melt sensor

