GEFRAN

SMART HART OIL FILLED MELT PRESSURE TRANSMITTERS - HWE SERIES

CURRENT OUTPUT PL d & SIL2 VERSION 4...20mA Output

The HWE series of Gefran are pressure transmitters with HART communication protocol for using in high temperature environment. The main characteristic of this series is the capability to read temperature of the media up to 315°C. The constructive principle is based on the hydraulic trasmission of the pressure.
The fluid-filled system assures the temperature stability.
The physical measure is transformed in a electrical measure by means of thick film strain-gauge technology.
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.

MAIN FEATURES

- Pressure ranges from: 0-17 to 0-1000 bar / 0-250 to 0-15000 psi
- Accuracy: < ±0.25% FS (H); < ±0.5% FS (M)
- Fluid-filled system for temperature stability
- Oil filling meets FDA requirements CFR 178.3620 and CFR 172.878
- SIL2 and PL d approvals for Functional Safety
- 1/2-20UNF, M18x1.5 standard threads; other types available on request
- Autozero function on board / external option
- 17-7 PH corrugated diaphragm with GTP+ coating

GTP+ (advanced protection)
Coating with high resistance against corrosion, abrasion and high temperature

AUTOZERO FUNCTION

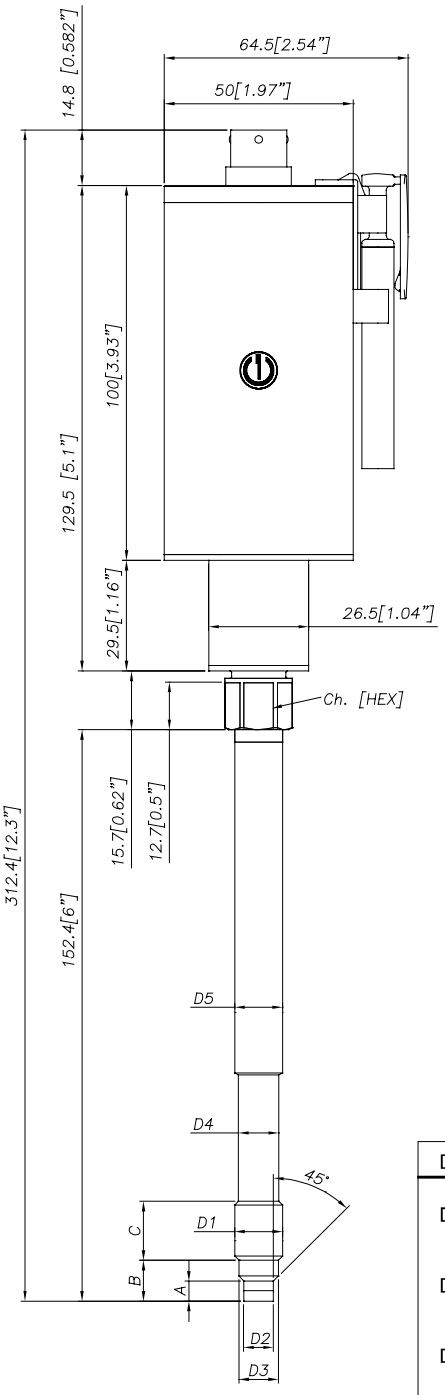
All signal variations in absence of pressure can be eliminated by using the Autozero function.
This function is activated by closing a magnetic contact located on the transmitter housing.
The procedure is permitted only with pressure at zero.
This function can be activited via HART as well.

TECHNICAL SPECIFICATIONS

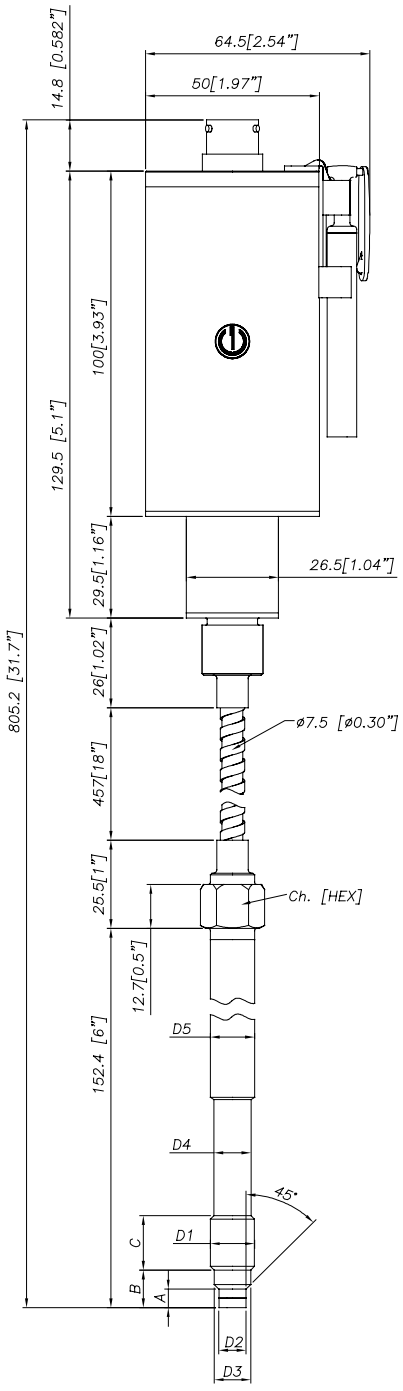
Accuracy (1)	**H** <±0.25%FS (100...1000 bar) **M** <±0.5%FS (10...1000 bar)
Resolution	16 Bit
Measurement range	0..17 to 0..1000bar 0..250 to 0..15000psi
Rangeability	3:1
Maximum overpressure (without degrading performances)	2 x FS 1.5 x FS above 500bar/7500psi
Measurement principle	Extensimetric thick film
Power supply	13...30Vdc
Maximum current absorption	23mA (40mA with relay optional)
Output signal Full Scale (FS)	20mA
Zero balance (tollerance ± 0.25% FS)	4mA
Calibration signal	80% FS
Power supply polarity reverse 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
Diaphragm maximum temperature	315°C / 600°F
Zero drift due to change in process temperature (zero)	< 0.04 bar/°C
Standard material in contact with process medium	Diaphragm: • 17-7 PH corrugated diaphragm with GTP+ coating Stem: • 17-4 PH
Thermocouple (model HWE2)	STD: type "J" (isolated junction)
Protection degree (with 6-pole female connector CON300)	IP66
SIL2 certification PL d certification	IEC/EN 62061 - IEC 61508 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)	

MECHANICAL DIMENSIONS

HWE0



HWE1



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]
B	11.2 [0.44"]
C	15.74 [0.62"]
Ch [Hex]	16 [5/8"]

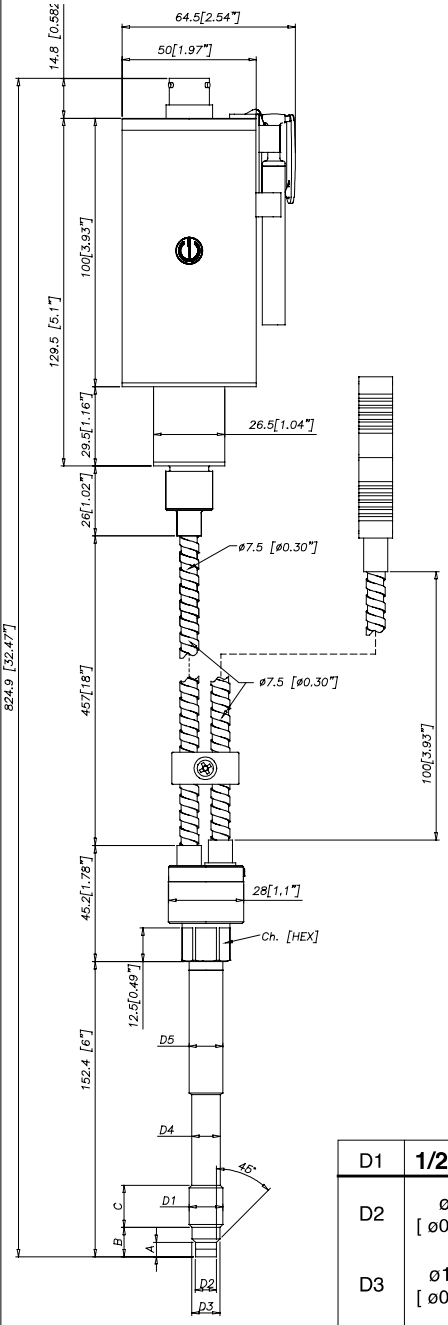
D1	M18x1.5
D2	ø10 -0.05 [ø0.394" -0.002]
D3	ø16 -0.08 [ø0.63" -0.003]
D4	ø16 -0.4 [ø0.63" -0.016]
D5	ø18 [ø0.71"]
A	6 -0.26 [0.24" -0.01]
B	14.8 -0.4 [0.58" -0.016]
C	19 [0.75"]
Ch [Hex]	19 [3/4"]

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

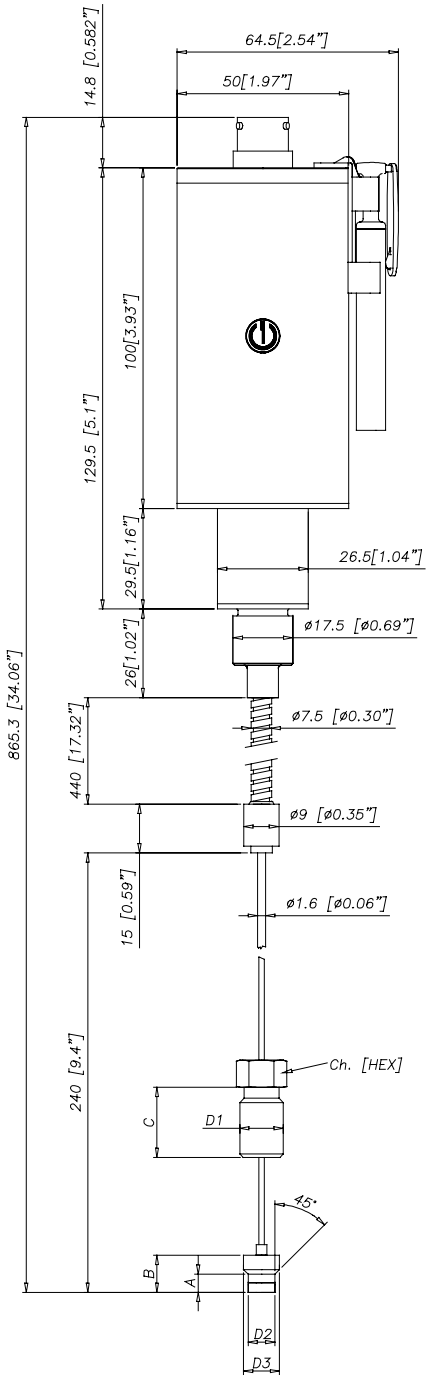
WARNING: For installation use a maximum tightening torque of 56 Nm (500 in-lb)

MECHANICAL DIMENSIONS

HWE2



HWE3



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"]
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C	19 [0.75"]
Ch [Hex]	19 [3/4"]

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 (ONLY FOR SIL2 / PL d VERSIONS)

Below the conditions detected by the sensor self-diagnostics:

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

(*) *In such conditions the Alarm Type can be programmed via HART at ≥ 21 mA.*

OPTIONAL RELAY OUTPUT FOR EXCESS PRESSURE PROTECTION

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	OUTPUT	RELAY STATUS
OFF	-	OPEN
ON	< X%FS	CLOSED
ON	> X%FS	OPEN
ON	Output ≤ 3,6mA	OPEN
ON	Output ≥ 21mA	OPEN

NAMUR COMPLIANCE (ONLY FOR SIL2 / PL d 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:

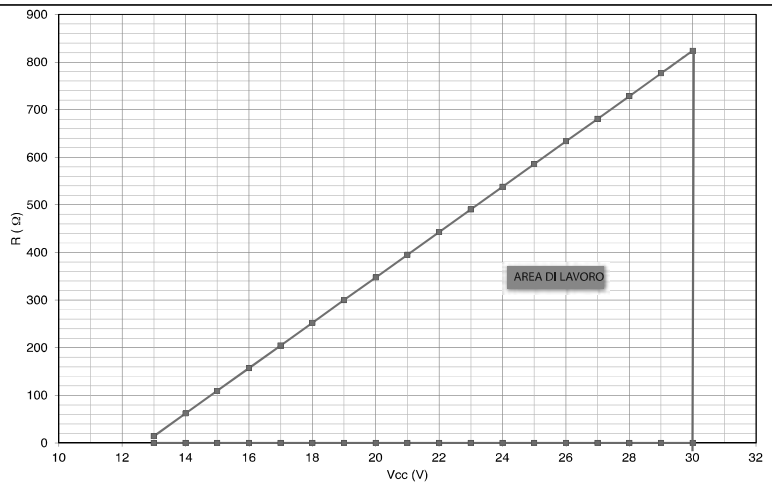
- Cut cable: breakdown information as the signal is ≤ 3.6mA
- Device not connected: breakdown information as the signal is ≤ 3.6mA
- Broken power-supply: breakdown information as the signal is ≤ 3.6mA or in case of performance problems:
- Broken primary element ≥21mA
- Pressure above 200% of the span, output ≥21mA
- Others ≤ 3.6mA(*)

(*) *IIn such a condition the Alarm Type can be programmed via HART at ≥ 21 mA.*

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

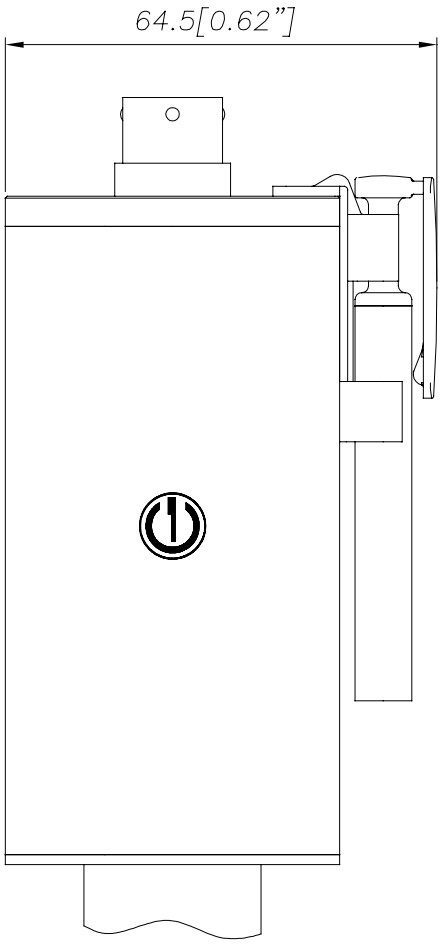
Recommendation: the error level set by the customer (e.g. maximum pressure value) has to be inside the nominal range.

LOAD DIAGRAM



Nel diagramma riportato è rappresentato il rapporto ottimale tra il carico
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 two lines in the graph above.

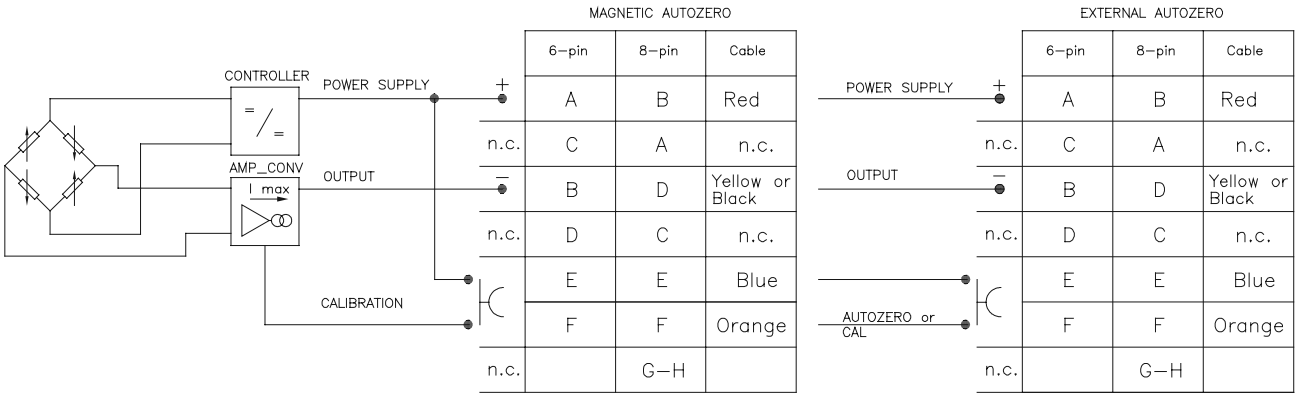
AUTOZERO FUNCTION



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.

ELECTRICAL CONNECTIONS

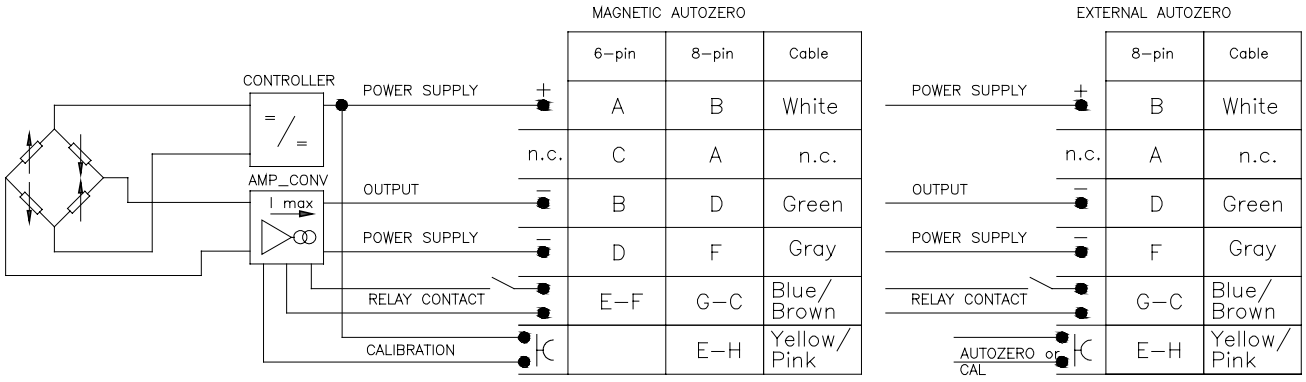
CURRENT OUTPUT



	MAGNETIC AUTOZERO			EXTERNAL AUTOZERO		
	6−pin	8−pin	Cable	6−pin	8−pin	Cable
+	A	B	Red	A	B	Red
n.c.	C	A	n.c.	C	A	n.c.
−	B	D	Yellow or Black	B	D	Yellow or Black
n.c.	D	C	n.c.	D	C	n.c.
	E	E	Blue	E	E	Blue
	F	F	Orange	F	F	Orange
n.c.		G−H			G−H	

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

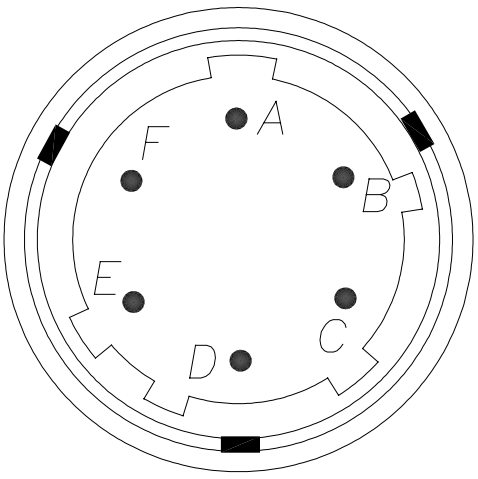
RELAY OUTPUT



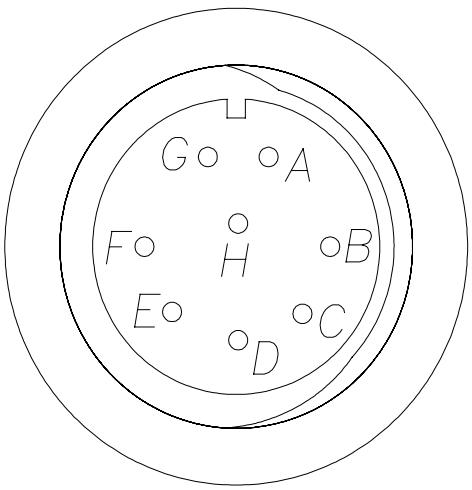
	MAGNETIC AUTOZERO			EXTERNAL AUTOZERO	
	6−pin	8−pin	Cable	8−pin	Cable
+	A	B	White	B	White
n.c.	C	A	n.c.	A	n.c.
−	B	D	Green	D	Green
−	D	F	Gray	F	Gray
	E−F	G−C	Blue/ Brown	G−C	Blue/ Brown
		E−H	Yellow/ Pink	E−H	Yellow/ Pink

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)

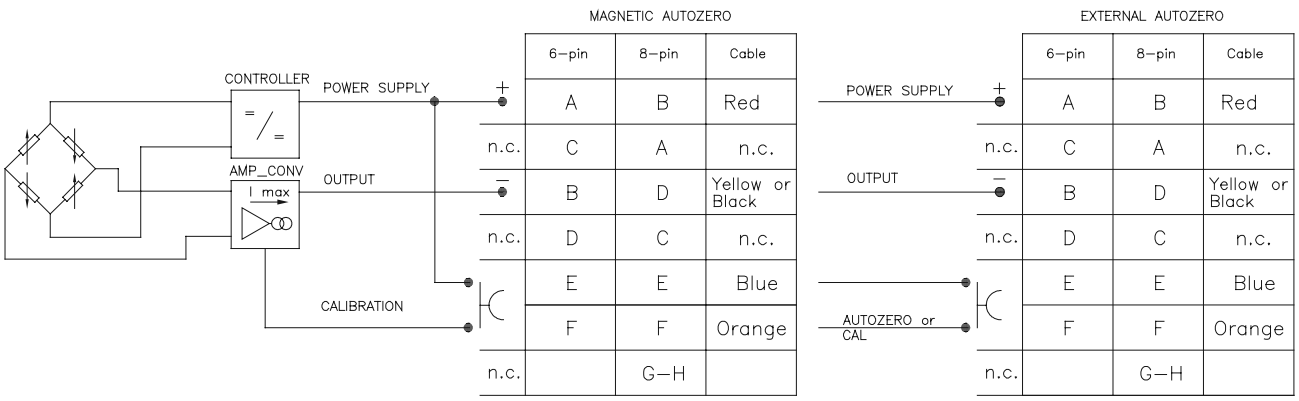


8 pin Connector
(PC02E-12-8P) Bendix



CABLE OUTPUT (1/2 14-NPT) L = 1 m

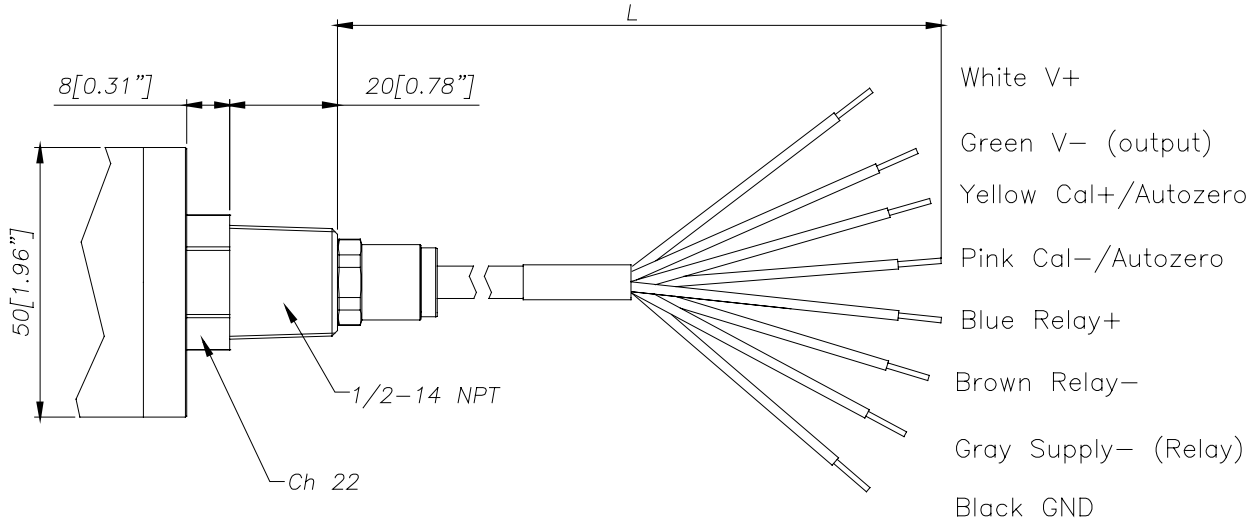
CURRENT OUTPUT



	6–pin	8–pin	Cable
+	A	B	Red
n.c.	C	A	n.c.
–	B	D	Yellow or Black
n.c.	D	C	n.c.
	E	E	Blue
	F	F	Orange
n.c.		G–H	

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

RELAY OUTPUT
Magnetic Autozero / External Autozero



ACCESSORIES

Connectors	
6-pin female connector (IP66 protection degree)	**CON300**
8-pin female connector	**CON307**
Extension cables	
6-pin connector with 8m (25ft) cable	**C08WLS**
6-pin connector with 15m (50ft) cable	**C15WLS**
6-pin connector with 25m (75ft) cable	**C25WLS**
6-pin connector with 30m (100ft) cable	**C30WLS**
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**
Fixing pen clip	**PKIT 1032**
Autozero pen	**PKIT 378**
Thermocouple for HWE2 model	
Type "J" (153mm - 6" rigid rod)	**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

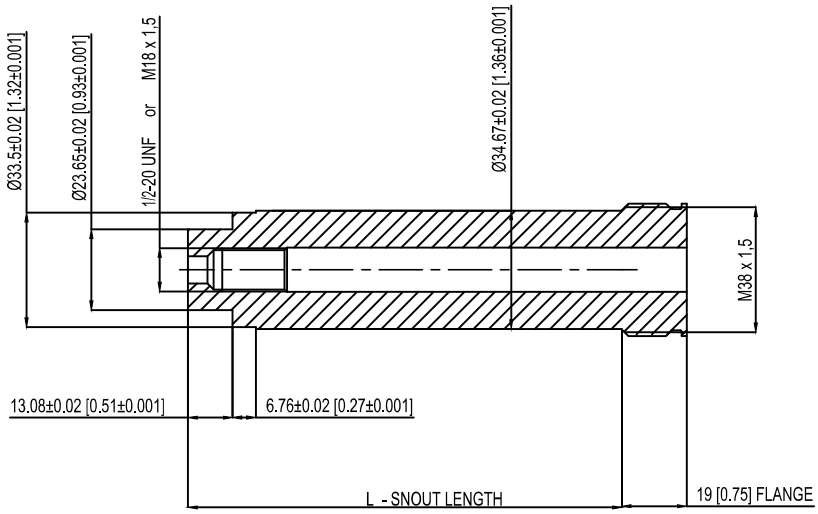
PROCESS FLANGE ADAPTER

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 adpter 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

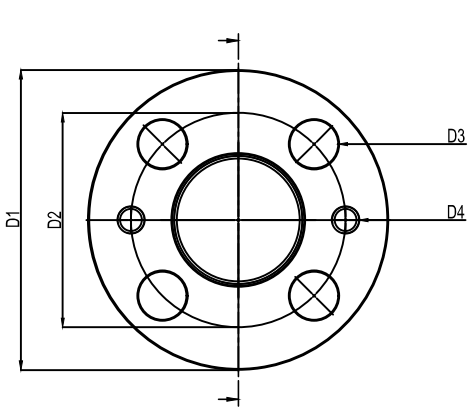
ADAPTER BODY

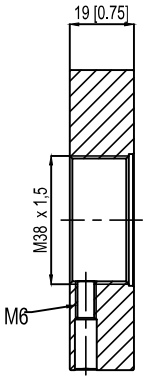


1/2-20 UNF	L -SNOUT LENGTH
STE1020	127 [5]
STE1021	51,6 [2,031]

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

ORDER CODE

HW -□-□-□-□-□□□□-□-□-□-□-□

0000	X	000	X	0

Output relay version (activation threshold):
X = no relay B = 80% fs
A = 70% fs C = 90% fs

000= Special executions

OUTPUT SIGNAL	
4...20mA	E

VERSION	
Rigid rod	0
Rigid + flexible rod	1
With thermocouple	2
Exposed capillary	3

CONNECTOR	
6 pin	6
8 pin	8
NPT Cable	N

ACCURACY CLASS	
0.25% FS (ranges ≥ 100 bar/1500 psi)	H
0.5% FS	M

MEASUREMENT RANGE			
bar		psi	
17	B17U	250	P25D
35	B35U	500	P05C
50	B05D	750	P75D
70	B07D	1000	P01M
100	B01C	1500	P15C
200	B02C	3000	P03M
350	B35D	5000	P05M
500	B05C	7500	P75C
700	B07C	10000	P10M
1000	B01M	15000	P15M

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

E	External Autozero (*)
0	Magnetic Autozero
(*) as an alternative to the CAL function	

P	Performance Level='d'
S	SIL2
0	Standard 4...20mA

FLEXIBLE ROD LENGTH (mm / inches)		
Standard (HWE0)		
0	none	
Standard (HWE1, HWE2)		
D	457mm	18"
E	610mm	24"
F	760mm	30"
Standard (HWE3)		
L	711mm	28"
Available on request		
A	76mm	3"
B	152mm	6"
C	300mm	12"
G	914mm	36"
H	1067mm	42"
I	1220mm	48"
J	1372mm	54"
K	1520mm	60"

RIGID ROD LENGTH (mm / inches)		
Standard (HWE0, HWE1,HWE2)		
4	153mm	6"
5	318mm	12.5"
Standard (HWE3)		
0	nessuno	
Available on request		
1	38mm	1,5"
2	50mm	2"
3	76mm	3"
6	350mm	14"
7	400mm	16"
8	456mm	18"

Example
HWE1-6-M-B07C-1-4-D-P-0

Melt pressure transmitter, 4...20mA output with HART protocol, 6-pin connector, 1/2-20 UNF threading, 700 bar pressure range, 0.5% accuracy, 153 mm (6") rigid rod, 457 mm (18") flexible rod; Performance Level='d'.

Sensors are manufactured in compliance with:
- EMC compatibility directive: 2014/30/EU
- MACHINERY directive: 2006/42/EC
- RoHS directive: 2011/65/EU

Electrical installation requirements and conformity certificate are available on our web site: www.gefran.com

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