GEFRAN

SMART HART MERCURY FILLED MELT PRESSURE TRANSMITTERS - HME SERIES

CURRENT OUTPUT AND PERFORMANCE LEVEL 'c' 4...20mA Output

The HME 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 400°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 strain-gauge technology.

MAIN FEATURES

- Pressure ranges from: 0-17 to 0-2000 bar / 0-250 to 0-30000 psi
- Accuracy: < ±0.25% FSO (H); < ±0.5% FSO (M)
- Fluid-filled system for temperature stability
- Mercury filling volume:
  HME0 (30mm³); HME1, HME2, HME3 (40mm³)
- 1/2-20UNF, M18x1.5 standard threads; other types available on request
- Autozero function on board / external option
- Standard diaphragm is 15-5 PH stainless steel with GTP+ coating
- 17-7 PH corrugated diaphragm with GTP+ coating for ranges below 100 bar-1500 psi

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%FSO (100...2000 bar) **M** <±0.5%FSO (17...2000 bar)
Resolution	16 bit
Measurement range	0..17 to 0..2000bar 0..250 to 0..30000psi
Rangeability	3:1
Maximum overpressure (without degrading performances)	2 x FS 1.5 x FS above 1000bar/15000psi
Measurement principle	Extensimetric
Power supply	13...30Vdc
Maximum current absorption	23mA (40mA with relay optional)
Output signal Full Scale (FSO)	20mA
Zero balance (tollerance ± 0.25% FSO)	4mA
Calibration signal	80% FSO
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% FSO/°C
Diaphragm maximum temperature	400°C / 750°F
Zero drift due to change in process temperature (zero)	< 0.02 bar/°C
Standard material in contact with process medium	Diaphragm: • 15-5 PH with GTP+ coating • 17-7 PH corrugated diaphragm with GTP+ coating for ranges <100bar (1500psi) Stem: • 17-4 PH
Thermocouple (model HME2)	STD: type "J" (isolated junction)
Protection degree (with 6-pole female connector)	IP65

FSO = Full scale output
(1) BFSL method (Best Fit Straight Line): includes combined effects of Non-Linearity, Hysteresis and Repeatability

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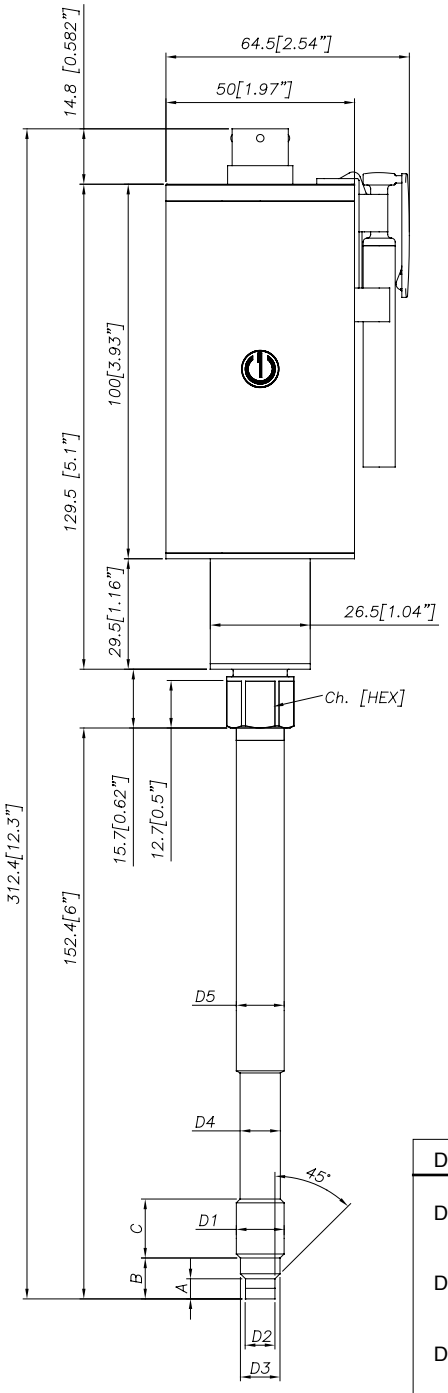
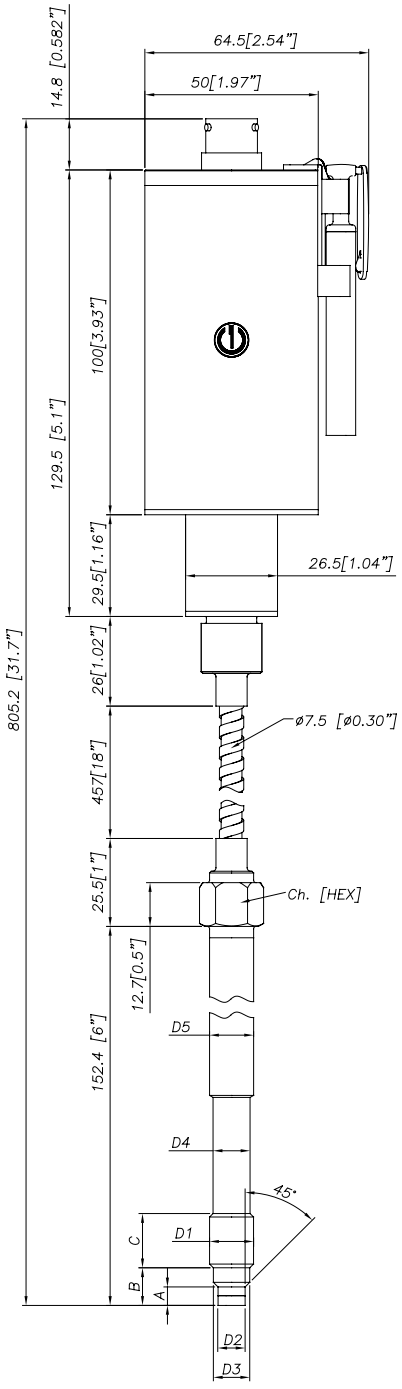
MECHANICAL DIMENSIONS

HME0



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"]

HME1



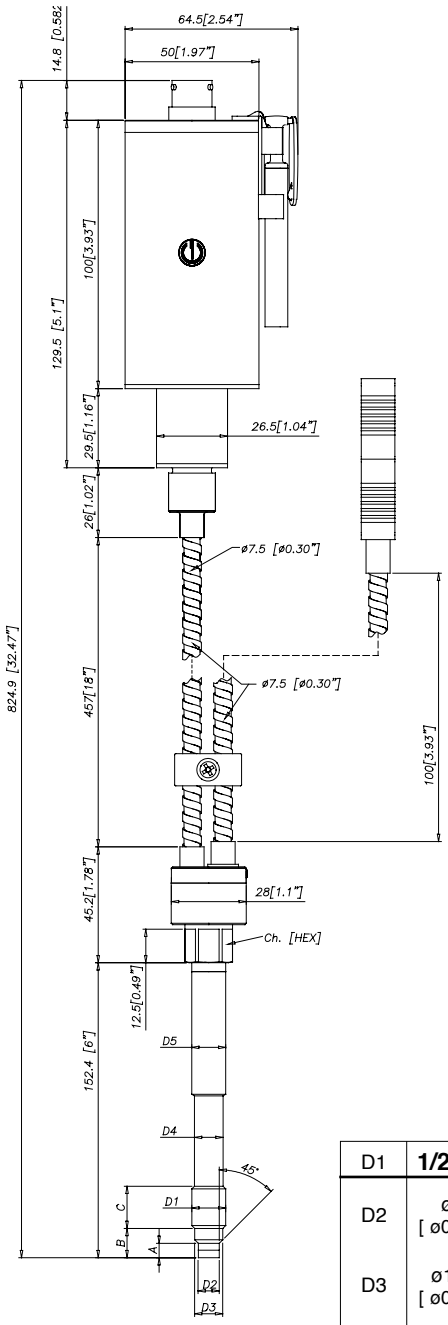
D1	M18x1.5
D2	ø10 -0.05 [ø0.394" -0.002]
D3	ø16 -0.08 [ø0.63" -0.003]
D4	ø16 -0.4 [ø0.63" -0.016]
D5	ø18 [ø0.71"]
A	6 -0.26 [0.24" -0.01]
B	14.8 -0.4 [0.58" -0.016]
C	19 [0.75"]
Ch [Hex]	19 [3/4"]

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

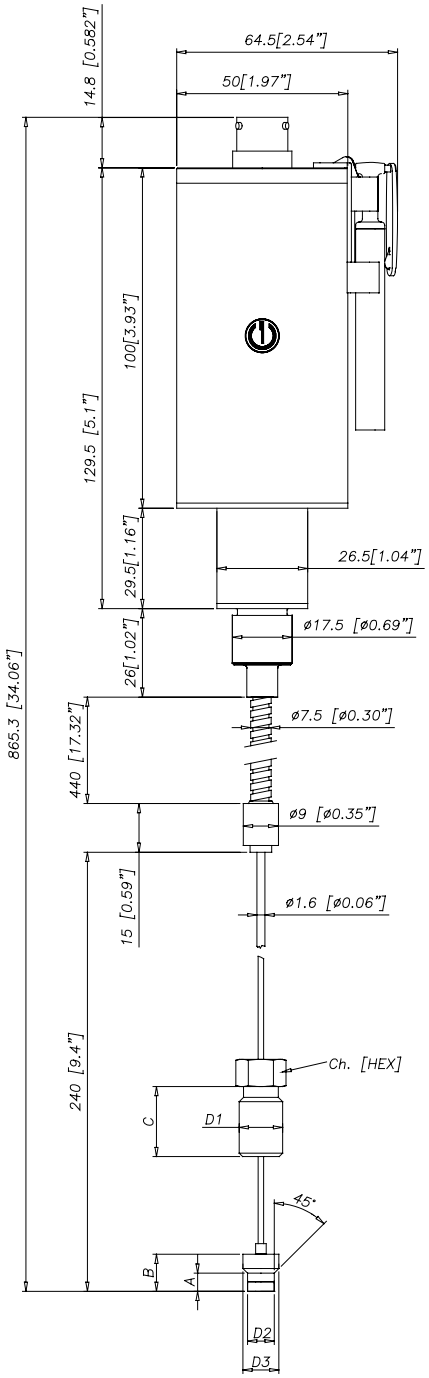
WARNING: For installation use a maximum tightening torque of 56 Nm (500 in-lb)

MECHANICAL DIMENSIONS

HME2



HME3



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"]

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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 PL'C' 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 a condition 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% FSO

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 PL'C' VERSIONS)

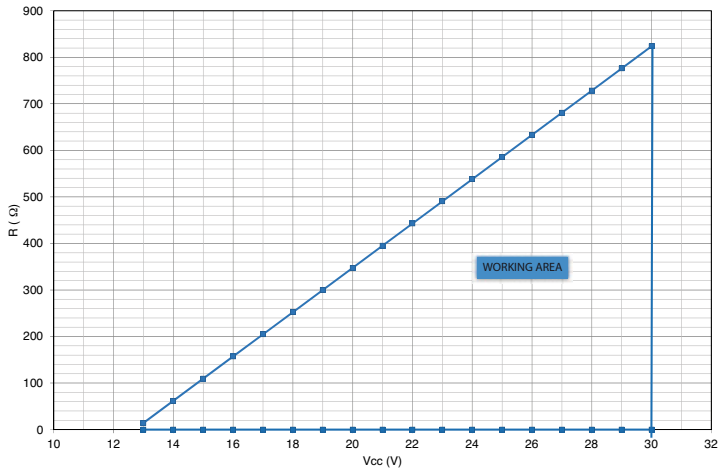
The sensors are tested according to Namur NE21 recommendations. The same compatibility is valid for the NE43 Namur recommendation with the following sensor behaviour in case of breakdown:
· Cut cable: breakdown information as the signal is ≤ 3.6mA
· Device not connected: breakdown information as the 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 ≥21 mA
· Others ≤3.6mA (*)

(*) *In 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.

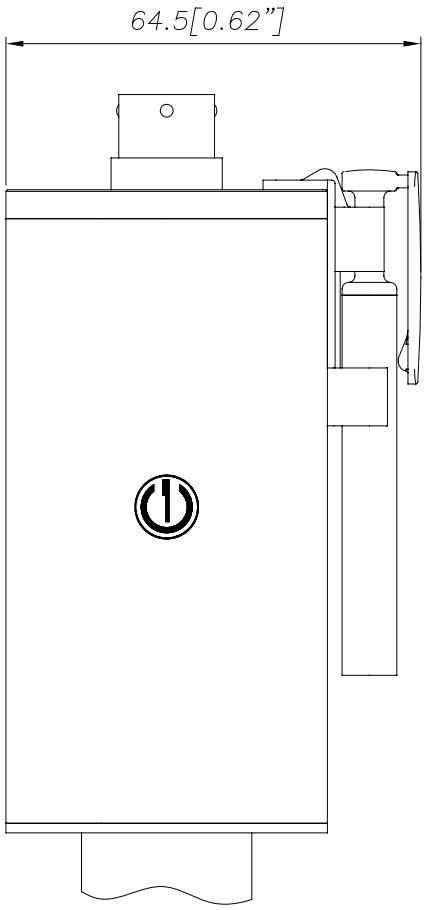
Recommendation: the error level set by the customer (e.g. maximum pressure value) has to be inside the nominal range.

LOAD DIAGRAM



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.

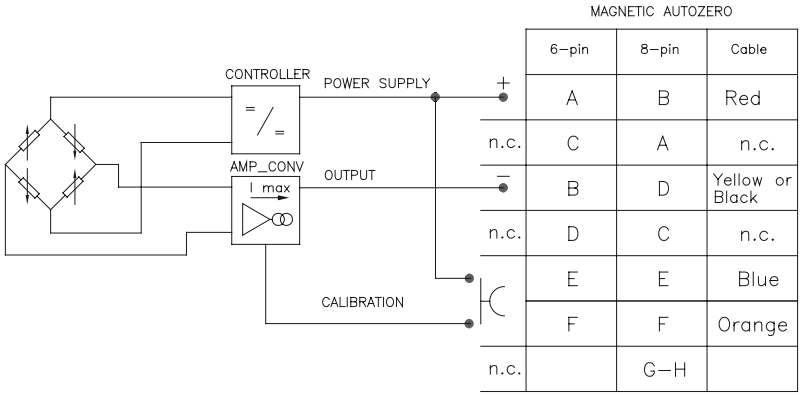
AUTOZERO FUNCTION



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.

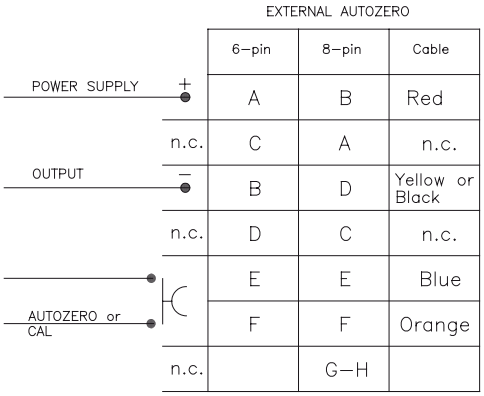
ELECTRICAL CONNECTIONS

CURRENT OUTPUT



MAGNETIC AUTOZERO

	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	

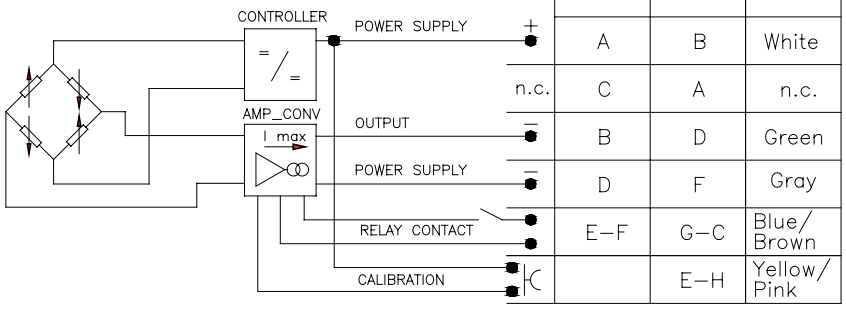


EXTERNAL AUTOZERO

	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	

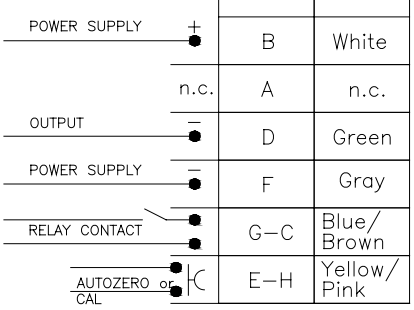
The cable shield is tied to both sides, i.e. to the sensor connector and to the controller

RELAY OUTPUT



MAGNETIC AUTOZERO

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

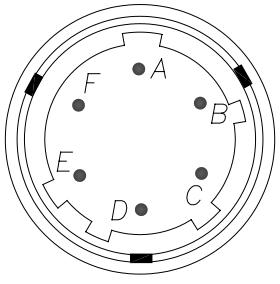


EXTERNAL AUTOZERO

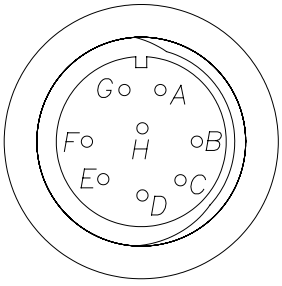
	8–pin	Cable
+	B	White
n.c.	A	n.c.
−	D	Green
−	F	Gray
	G–C	Blue/ Brown
	E–H	Yellow/ Pink

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)

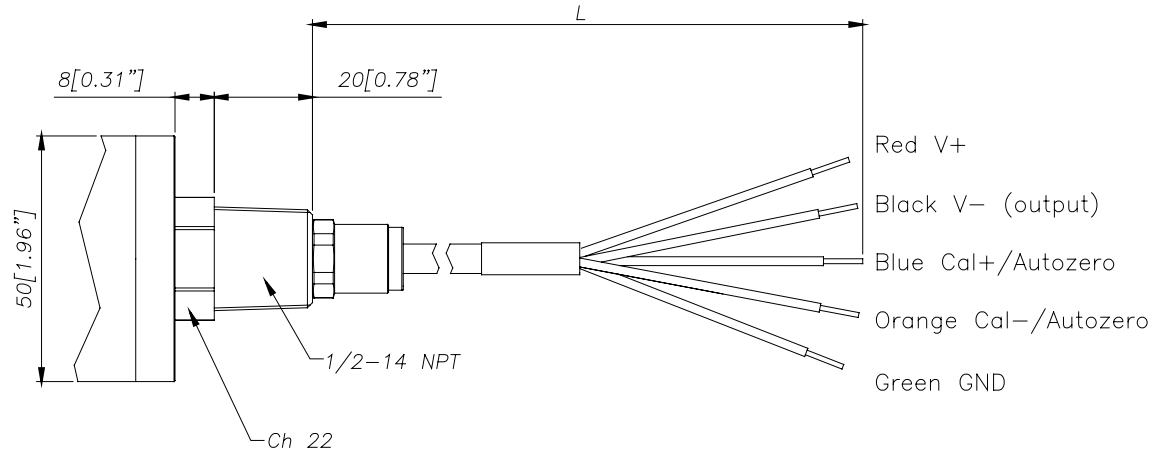


8 pin Connector (PC02E-12-8P) Bendix

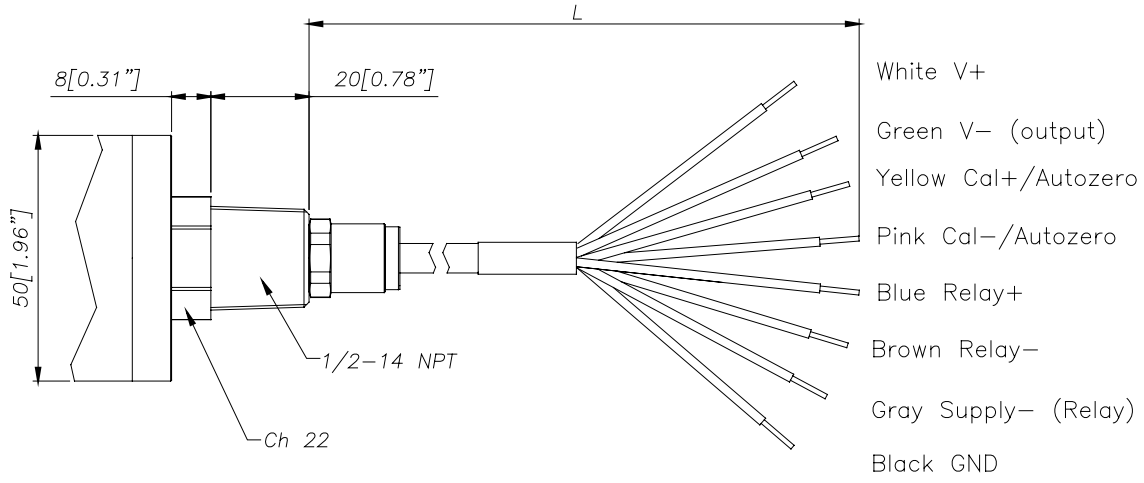


CABLE OUTPUT (1/2 14-NPT) L = 1 m

Current output



Relay output
Magnetic Autozero/External Autozero



ACCESSORIES

Connectors

6-pin female connector (IP65 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	**PKIT1032**
Autozero pen	**PKIT378**

Thermocouple for HME2 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

ORDER CODE

HM -□-□-□-□-□□□□-□-□-□-□-□ | **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% FSO (ranges ≥ 100 bar/1500 psi)	**H**
0.5% FSO	**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**
1400	**B14C**	20000	**P20M**
2000	**B02M**	30000	**P30M**

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='c'
0	Standard 4...20mA

FLEXIBLE ROD LENGTH (mm / inches)		
Standard (HME0)		
0	**none**	
Standard (HME1, HME2)		
D	457mm	18"
E	610mm	24"
F	760mm	30"
Standard (HME3)		
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 (HME0, HME1, HME2)		
4	153mm	6"
5	318mm	12.5"
Standard (HME3)		
0	**none**	
Available on request		
1	38mm	1,5"
2	50mm	2"
3	76mm	3"
6	350mm	14"
7	400mm	16"
8	456mm	18"

Example
HME1-6-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='c'

Sensors are manufactured in compliance with:

- EMC compatibility directive
- Machinery directive

Product designed and available in compliance with Directive 2011/65/EU (RoHS II) only for large-scale stationary installation or industrial tools, or for B-to-B laboratory equipments for R&D purposes

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