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SG 236
English
January 2003

Model CE3D, Analog and Smart Differential Pressure Transmitter

Control and Measurement

FEATURES

- *A complete family of transmitters*
- *Ranges from 60 mbar to 3600 mbar (0.6 kPa to 36 kPa)*
- *Solid-state, plug-in circuit boards*
- *Compact, rugged construction impervious to vibration*
- *Local span and zero adjustments*
- *Modular construction*
- *Adjustable damping*
- *Numerous options to permit greater application flexibility*
- *Smart, analog, or low-power electronics*

INTRODUCTION

This product data sheet highlights FEPA's model CE3D differential, absolute, gage and high-line pressure differential transmitter features and options. For information about the draft range, liquid level transmitters, transmitters with remote seals, and additional information on smart transmitters, refer to their respective data sheets referenced on the back page of this data sheet.

INDUSTRY-LEADING PERFORMANCE AND FEATURES

The CE3D series of pressure transmitters brings true precision to the measurement of flow, level, gage and absolute pressures, vacuum, and specific gravity. Direct electronic sensing with the completely sealed δ-cell (delta-cell) capacitance sensing element allows significant improvement and stability in pressure measurements. Welded stress isolation clamping in the sensor housing prevents introduction of errors caused by stresses and torques on the process flanges and minimizes effects of line pressure and overpressure.

Installation, calibration, and commissioning are simplified by compact design, integral junction box, and local span and zero adjustements.

The housing features an explosion-proof, weather-proof construction with separate compartments for the electronics and wiring connections. For most models, 316L SST, Hastelloy® C, Monel®, or tantalum materials are available for corrosive service. Modular construction and plug-in printed circuit boards aid in trouble-shooting and reduce parts stocking.

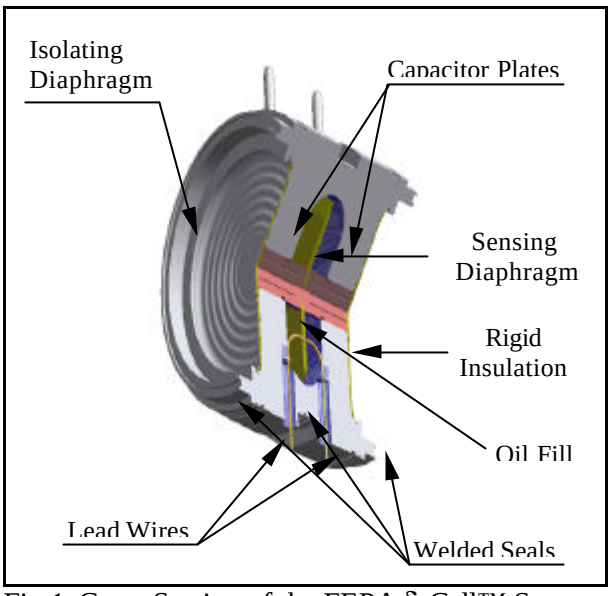


Fig.1. Cross Section of the FEPA δ-Cell™ Sensor.

APPLICATIONS

CE3D Pressure Transmitters are available in a variety of configurations for differential, flow, gage, absolute, vacuum, liquid level, and specific gravity measurement applications. The transmitter model number, determined from the ordering information tables, specifies available features such as pressure ranges, outputs, and materials of construction that are basic to each transmitter. Additional options, such as accesories, certifications, and special manufacturing procedures are also available.

OPERATION

During operation, the isolating diaphragms and fill fluid on the high and low sides transmit the process pressure to the oil fill fluid. The fluid in turn transmits the process pressure to a sensing diaphragm in the center of the δ-cell sensor. The sensing diaphragm functions as a stretched spring element that deflects in response to differential pressure across it (in GP transmitters, atmospheric pressure is transmitted in a like manner to the low side of the sensing diaphragm). In AP transmitters, a reference pressure is maintained on the low side. The displacement of the sensing diaphragm, a maximum movement of 0.004 in. (0.10 mm), is proportional to the pressure. Capacitor plates on both sides detect the position of the sensing diaphragm. The differential capacitance between the sensing diaphragm and the capacitor plates is converted electronically to an appropriate current, voltage, or digital HART® (Highway Addresable Remote Transducer) output signal.

ELECTRONICS MODULE

The electronics module incorporates surface-mount technology. It accepts the digital signal from the sensor module, along with the correction coefficients, then corrects and linearizes the signal. The output section of the electronics module converts the digital signal to an analog output. On the SMART version, the output section also handles communication with the HART Communicator, or PC HART-based control system (see figure 2).

DATA STORAGE

Configuration Data is stored in nonvolatile EEPROM memory in the transmitter electronics module. This data is retained in the transmitter when power is interrupted, so the transmitter is functional immediately upon power up.

SOFTWARE FUNCTIONALITY OF THE MODEL CE3D SMART (option COM)

HART protocol allows easy access to the configuration, test, and detailed setup capabilities of the model CE3D SMART.

Configuration

The Model CE3D SMART can be configured easily using a HART Communicator or other HART-based communications device. Configurator consists of two parts. First, the transmitter operational parameters are set, which include:

- Zero and span set points
- Damping
- Engineering unit selection

Second, data can be entered into the transmitter to allow identification and physical description of the transmitter. This data includes:

- Tag: 8 alphanumeric characters
- Descriptor: 16 alphanumeric characters
- Message: 32 alphanumeric characters
- Date
- Integral Meter Installation

In addition to the configurable parameters, the Model CE3D SMART software contains information that is not user-changeable. Non-configurable information includes: transmitter type, sensor limits, minimum span, fill fluid, isolator material, module serial number, and transmitter software revision level.

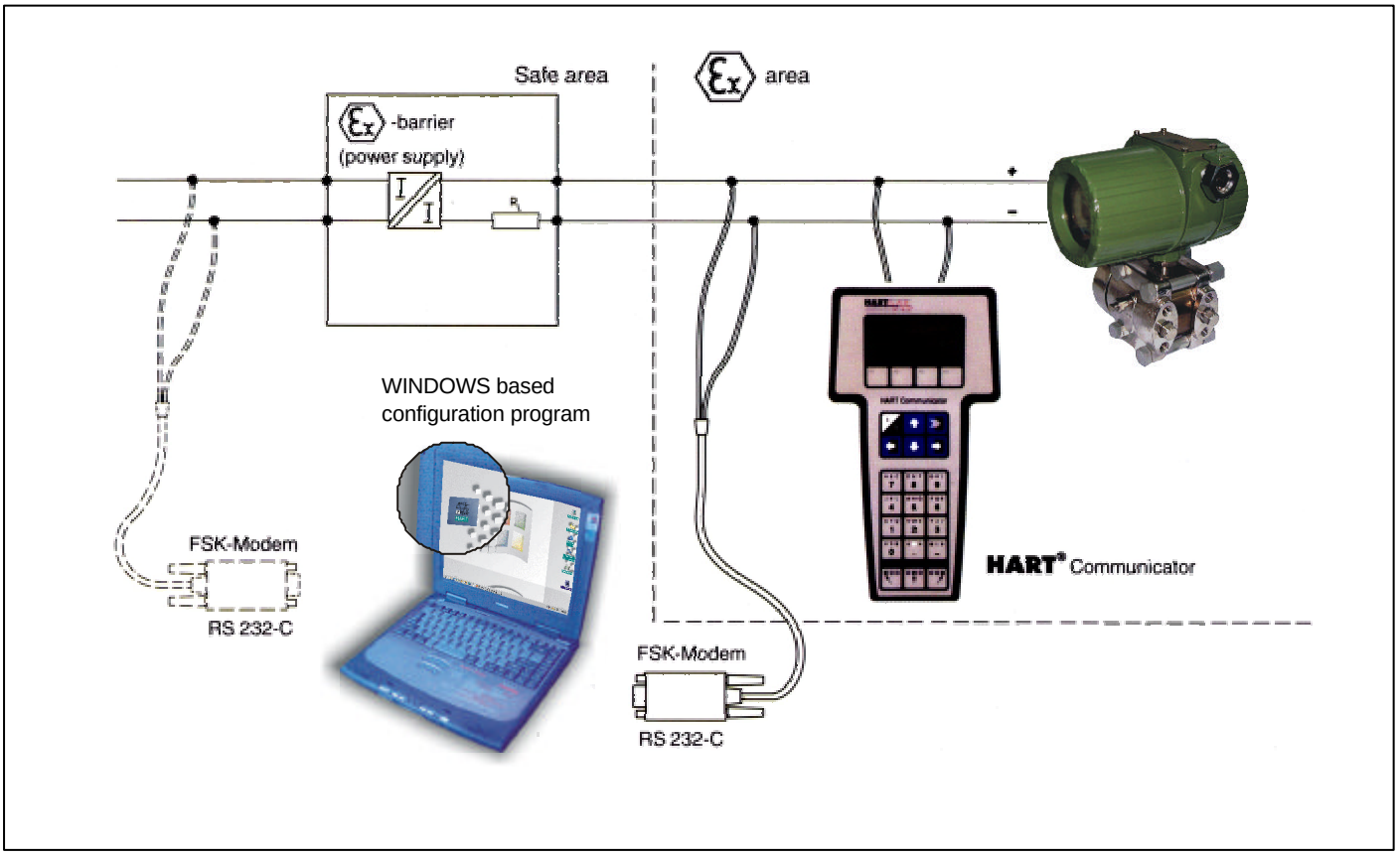


Fig.2. Transmitter communication with hand-held HART communicator or PC (Windows-based configuration program)

SPECIFICATIONS

FUNCTIONAL SPECIFICATIONS

SERVICE
Liquid, gas, and vapor applications.

Ranges

Code	Span (mbar) min	Span (mbar) max	Range limits (mbar)	Max. static pressure (bar)
1	10	30	-30 ... 30	5 or 35
2	25	100	-100 ... 100	35 or 140
3	73.3	220	-220 ... 220	140
4	150	450	-450 ... 450	140
5	333.3	1000	-1000 ... 1000	140
6	600	1800	-1800 ... 1800	140
7	333.3	1000	-1000 ... 1000	310
8	600	1800	-1800 ... 1800	310

Outputs
Standard analog : 4-20 mA dc

Option COM : 4-20 mA / HART Protocol

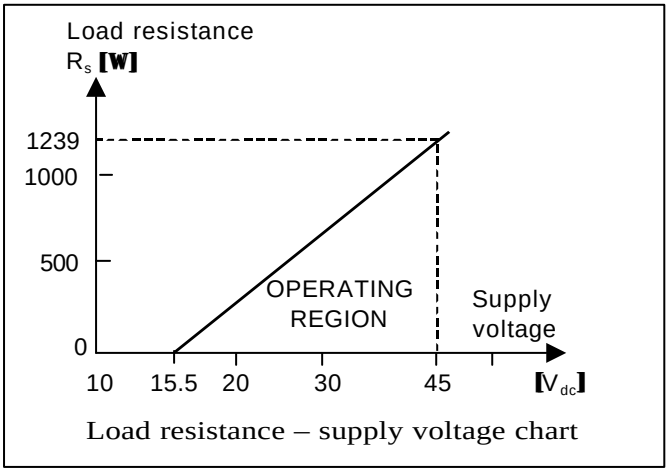
4-20 mA dc, user selectable for linear or square root output. Digital process variable superimposed on 4-20 mA signal, available to any host that conforms to the HART protocol.

Option R (Reverse Output)

This option permits reversing of pressure input so that electrical output will increase as pressure input decreases.

Load Limitations
Load resistance : 0 ... 1239 Ω, depending on power supply.

Power Supply
External power supply required. Transmitter operates on 12-40 V_{DC} (option 48 V_{DC}). depending on load resistance Reverse polarity protection is standard.



Load resistance – supply voltage chart

Overpressure Limits
All ranges: Max. calibrated range x 10.

Temperature Limits
Process:
-33°C...+80°C (standard), +200°C optional.

Ambient:
- -33°C to +100°C, standard
- -20°C to +80°C with LCD meter.

Storage:
- -33°C to +100°C, standard
- -40°C to +85°C with LCD meter.

Humidity Limits
0-100% relative humidity.

Turn-on Time
Between 2.0 to 20.0 seconds, no warm-up required.

PERFORMANCE SPECIFICATIONS
(Zero-based spans, reference conditions, silicone oil fill, and 316 SST isolating diaphragm)

Reference Accuracy
±0.5% of calibrated span. Includes combined effects of linearity, hysteresis, and repeatability.

Static Pressure Effect
On low range limits

Max static pressure	Error
5 bar	: ±0,5% / 5 bar
35 bar	: ±0,5% / 35 bar
140 bar	: ±0,5% / 140 bar
310 bar	: ±1% / 140 bar

Effect on span
1,5±0,25% / 70 bar.

Overpressure Effect
On low range limits
0,3% (0,5% for the range 0 ... 30 mbar)

Effect on span
0,5%

Pressure Surge Effect

On low range limits

Max static pressure	Error
5 bar	: ±1,5% / 5 bar
140 bar	: ±2% / 140 bar
310 bar	: ±2,5% / 310 bar

Effect on span

±0,5%

Ambient Temperature Effect

Expressed as a total effect per 10°C.

On low range limits

Standard version:
max. 0,15% of span;
max. 0,25% of span between 0 and 30 mbar.

Option code COM:
max. 0,15% of span.

Effect on span

Option code COM:
max. 0,25% / 10°C.

Power Supply Effect

Less than 0,1% of calibrated span per 10 volts.

Mounting Position Effect

Max. 0,25% for 5° turn on, which can be calibrated out.
No span effect.

Explosion proof protection

EEx dII C T4 according to EN 50014, EN 50018.

Similar to Explosion Proof for Class I, Division 1, Groups B, C, and D. Dust-ignition Proof for Class II, Division 1, Groups E, F, and G. Suitable for Class III, indoor and outdoor hazardous locations.

Enclosure protection: IP65 acc. to EN 60529 similar Type NEMA 4X; factory sealed. Approved for Class I, Division 2, Groups A, B, C, and D.

PHYSICAL SPECIFICATIONS

Electrical Connection

Electrical tap, type IPE 13.5.

Process Connection

G1/2" male or female;
1/2-1/4 NPT F or M, G1/2";
Other at request, see coding.

Process Wetted Parts

Isolating Diaphragm
AISI 316 L SST, or equivalent, W1.4541.

Process Connector
316 L stainless steel or Hastelloy.

Non-wetted Parts

Electronics Housing
Low-copper aluminum, NEMA 4X, IP65, IP67, CSA enclosure type 4X.

Paint
Polyurethane.

Cover O-rings
Buna-N.

Fill Fluid
Silicon oil or Fluorolube.

Weight
Approximately 5.5 kg.

Tagging

The transmitter is tagged, at no charge, in accordance with customer requirements. All tags are stainless steel. The standard tag is wired to the trasmitter. Tag character height is 1/2" (0.318 cm). A permanently attached tag is available upon request.

NOTE

One product manual is included per shipment.

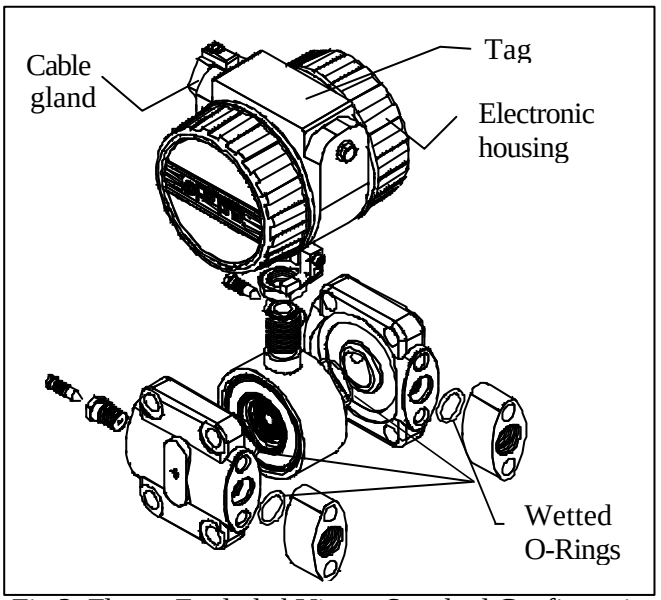


Fig.3. Flange Exploded View - Standard Configuration

MOUNTING

The following sections describe mounting types, overall dimensions, and a variety of available options for mounting of CE3D Transmitter. These options will permit greater application flexibility.

Option Codes For Mounting Brackets

BT1 Flat Bracket for 2” Pipe Mounting

- Bracket for mounting transmitter on 2”. pipe
- Constructed of carbon steel with carbon steel U-bolt

BT2 Right-Angle Bracket for 2” Flat Mounting

- Bracket for vertical mounting transmitter on 2-in. pipe.
- Constructed of carbon steel with carbon steel U-bolt

BP Right-Angle Bracket for Panel Mounting

- Bracket for mounting transmitter on panel or wall
- Constructed of carbon steel with carbon steel bolts

Bolts and Nuts for Flanges and Adapters

Options permit bolts and nuts for flanges and adapters in zinc-plated carbon steel.

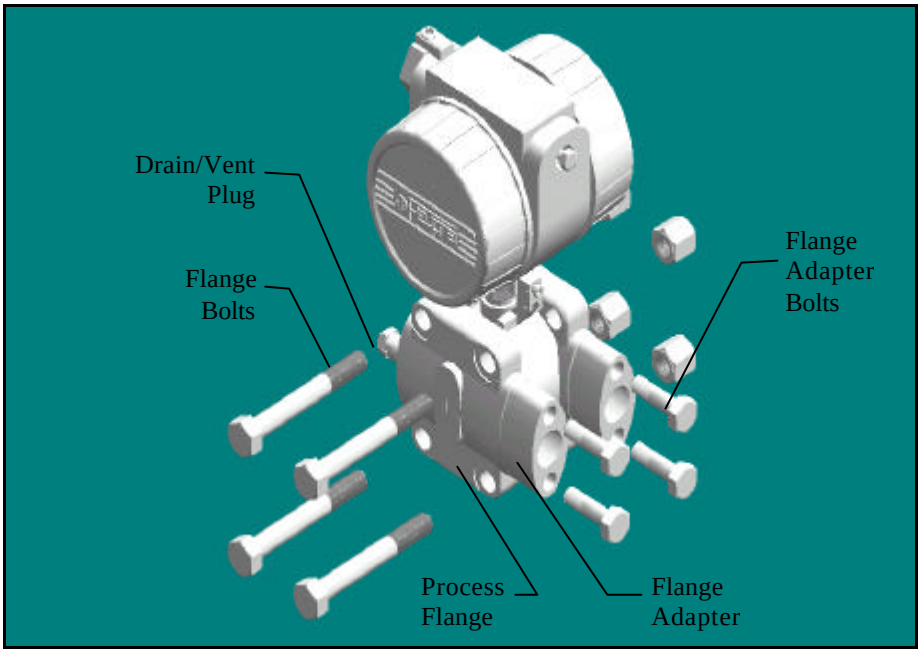


Fig.4. Model CE3D Standard - Flange Configuration.

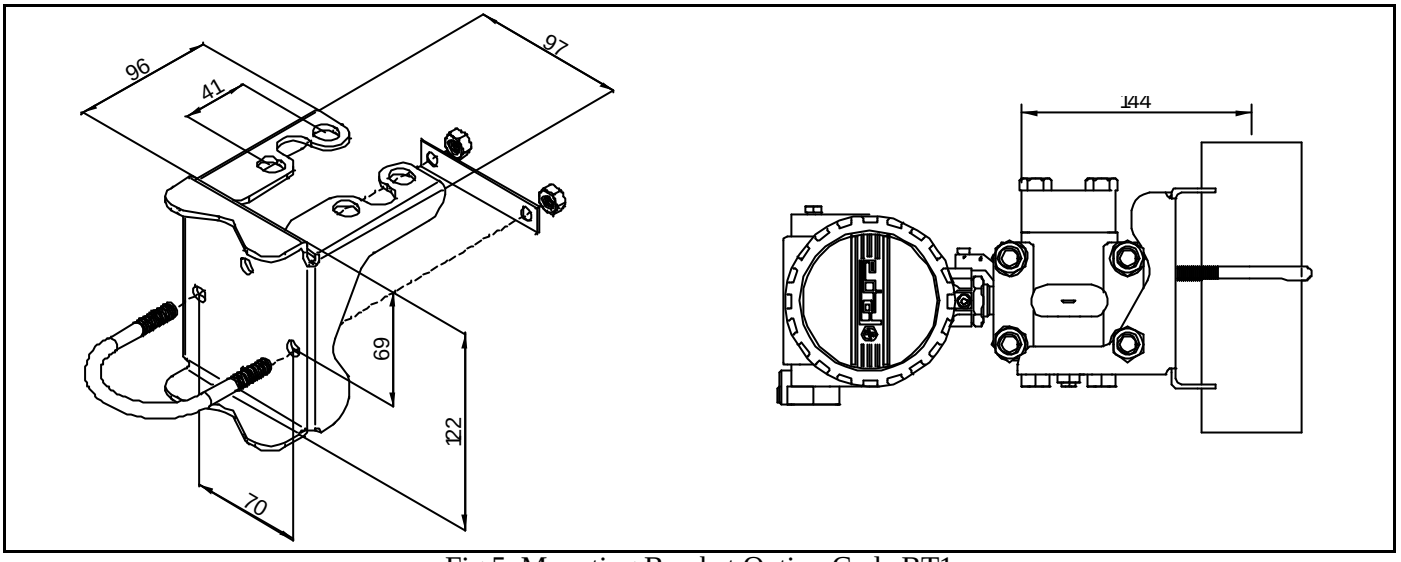


Fig.5. Mounting Bracket Option Code BT1

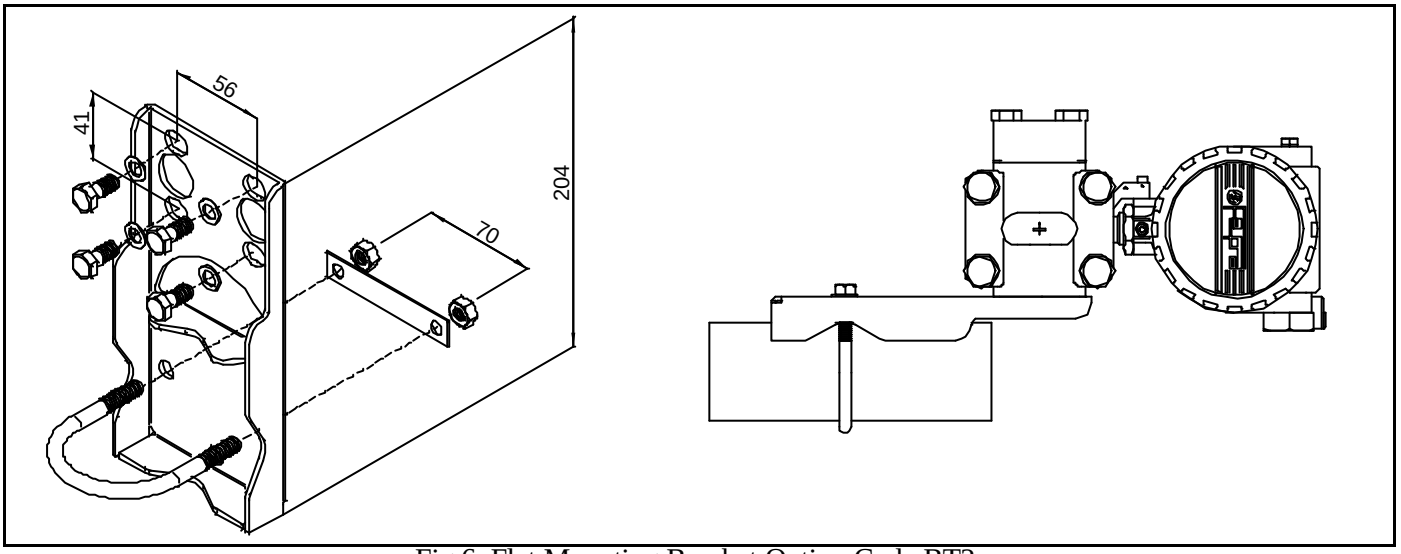


Fig.6. Flat Mounting Bracket Option Code BT2.

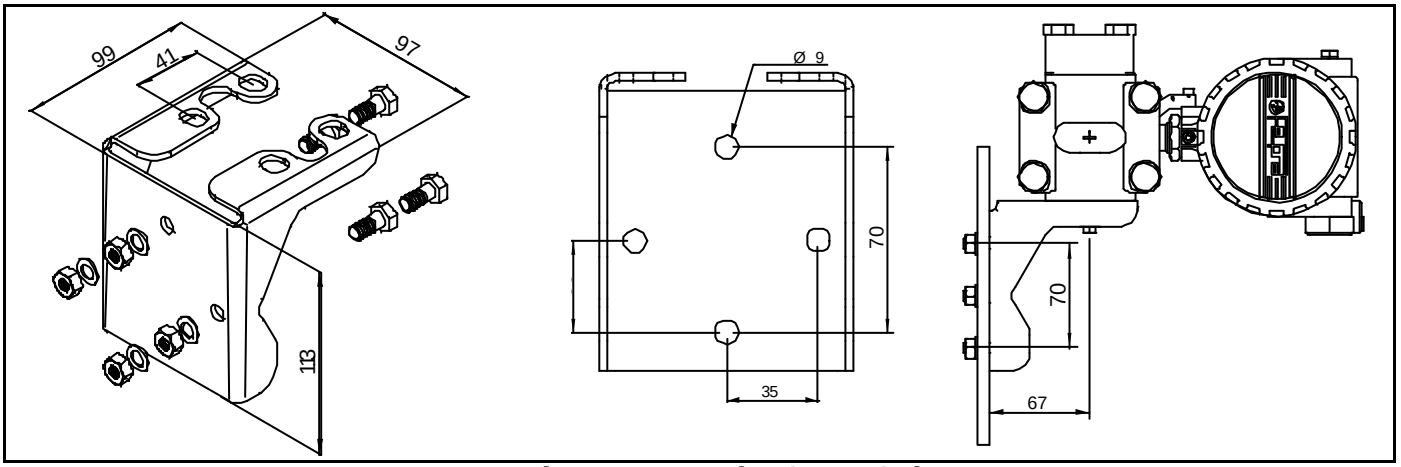


Fig.7. Panel Mounting Bracket Option Code BP.

Process Connections

Standard Drain/Vent
Drain/vent valve mounted in side of flange.

Used to vent gas buildup in liquid process applications or to drain liquid buildup in gas process applications with transmitter mounted vertically

Plug of same material as requested flange inserted in end of flange opposite adapter.

Process Connection
Option provides G1/2", 1/2", 1/4" NPT or NPT F, male or female threaded;
Other at request, see coding level (f).

Flange adapters are delivered to provide desired connection, according with coding level (f).

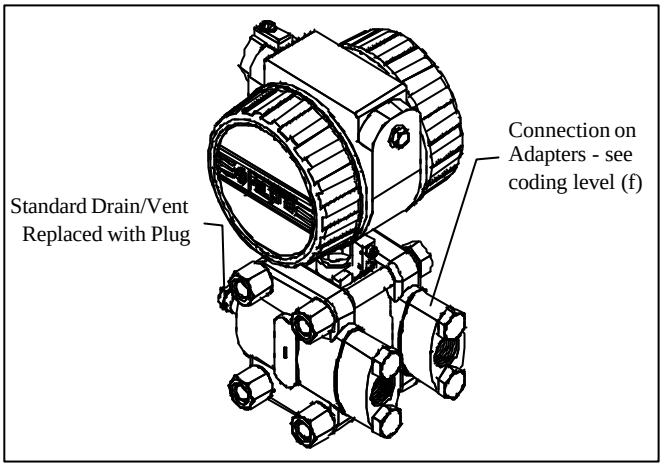


Fig.8. Model CE3D Process Connections
Standard Configuration

MS Assembled with Remote Diaphragm Seal
Options provide for the assembly one or two remote diaphragm seals.

Order according FEPA Product Data Sheet SG274 (MS).

When ordering this option, the following transmitter performances doubles: measured error, hysteresis, linrearity and repeatability.

Response time is 10 s and dead band is ±0,2%.

Not compatible with options OIU, OIL and BR.

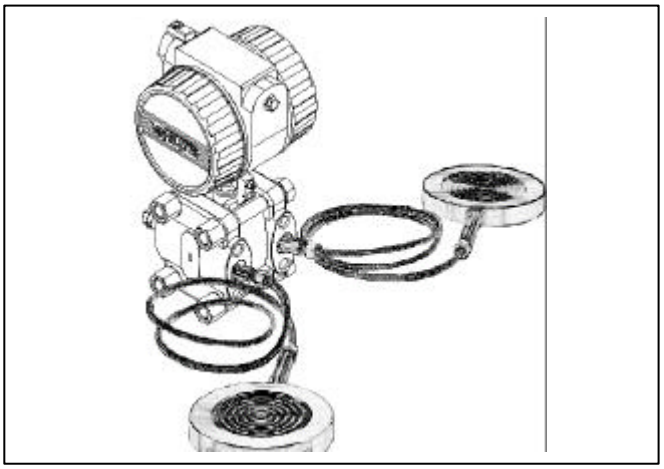


Fig.9. Model CE3D with Remote Diaphragm Seal

BR Optional manifolds for Process Connection
Options provide three-valve manifolds or 5-valve manifolds (two valves for drain/vent of low and high pressure).

These are made from zinc-plated carbon steel or stainless steel, depending on process media.

Versions available for direct mounting to transmitter or by pipes.

Order according FEPA Product Data Sheet SG552 (BR).

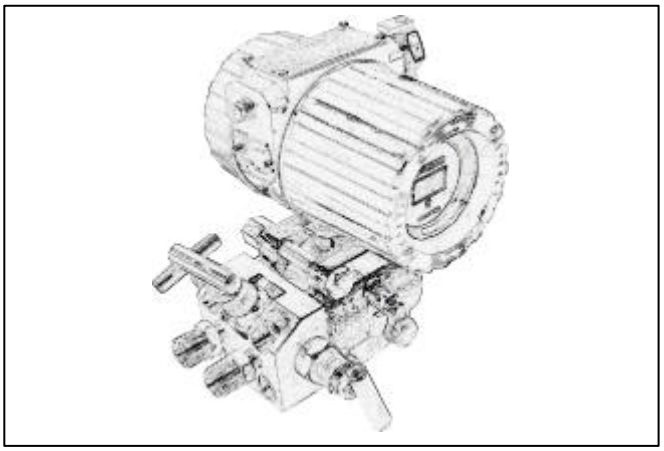


Fig.10. Model CE3D with Manifolds

OTHER OPTIONS

Meters

Analog
Meters have 2-in. (50.8 mm) scale.

Plug-in mounting configuration.

Indication accuracy ±2%.

Operating temperature limit: -27 to 177°F (-33 to 80°C).

Meters are enclosed in a housing in waterproof protection type IP 65 acc. EN 60529 or explosion proof protection type EEx dII CT4 acc. EN 50014 and EN 50018, upon request.

M1 **Analog Meter, linear scale in mA and 0 to 100%**
M2 **Analog Meter, square root scale in mA and 0 to 100%**
M3 **Analog Meter, linear scale in mA and square root scale 0 to 100%**

LCD
4-digit display.

Indication accuracy ±0.25% of calibrated span ±1 digit.

Display resolution at ±0.5% of calibrated span ±1 digit.

Operating temperature limit: -27 to 177°F (-33 to 80°C).

Plug-in mouting configuration.

Meters are enclosed in a housing in waterproof protection type IP 65 acc. EN 60529 or explosion proof protection type EEx dII CT4 acc. EN 50014 and EN 50018, upon request.

MD3 **LCD Meter, display in mA**
MD4 **LCD Meter, 0 to 100% display**

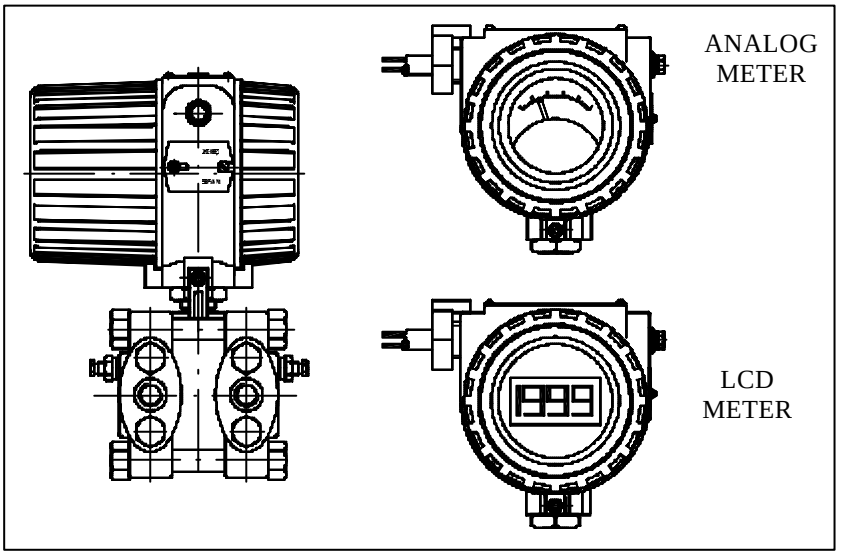


Fig.11. Meter Options

Assembling with Integral Orifice

Designed for highly accurate, small-bore flow measurement of any clean gas, liquid, or vapor.

Reduce the costs associated with traditional orifice plate installations.

Several configurations are available factory assembled to FEPA differential pressure transmitters (see figure 13).

Wide orifice bore/flow range capability.

Wide choice of process connections, including threaded, socket weld, and ANSI flanges.

Static pressure maximum limit is 3,000 psig.

OIU **Attachment of integral orifice type U**

OIL **Attachment of integral orifice line type L**

OVERALL DIMENSIONS

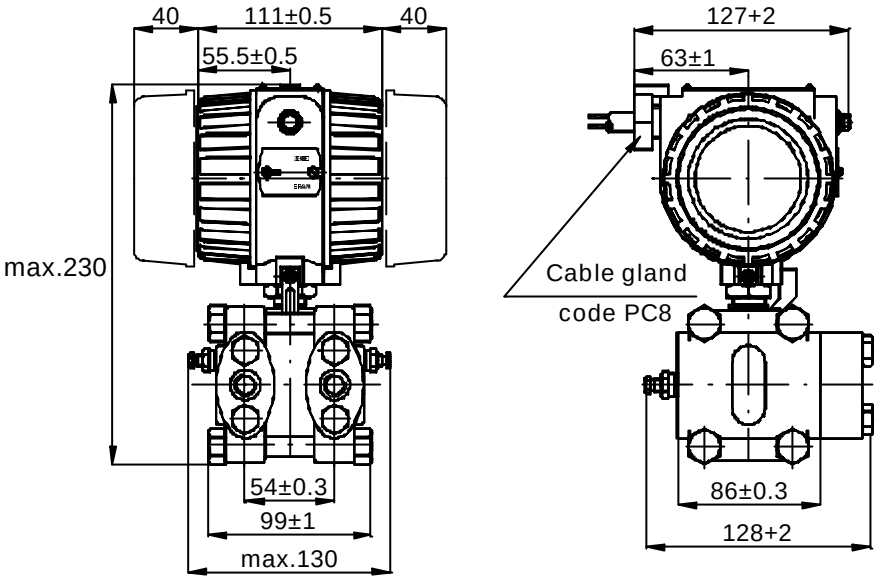
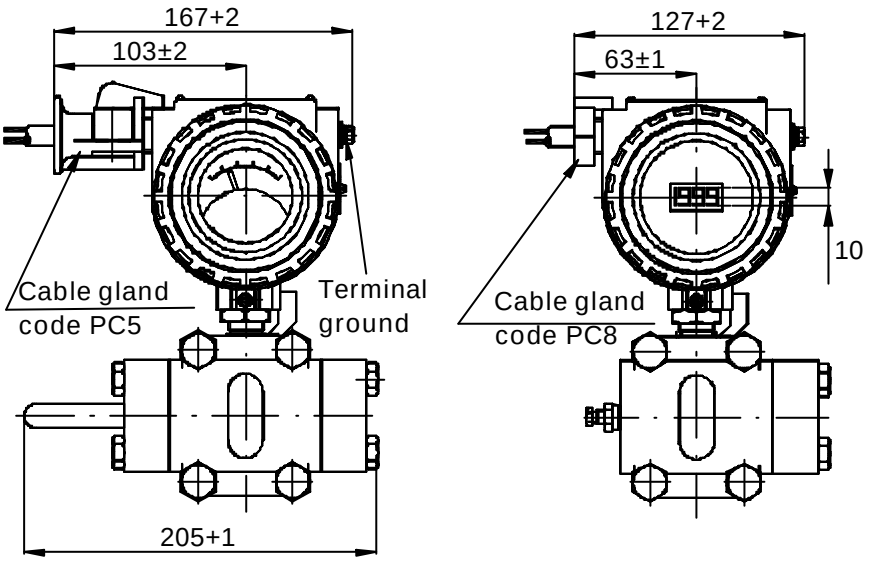


Fig.12. Standard version



a) U Type b) Line Type

Fig.13. Integral Orifice and Indication Version

STANDARD ACCESSORIES

All models are shipped with flange adapters, drain/vent valves, and one instruction manual per shipment.

Tagging
The CE3D Transmitter will be tagged, at no charge, in accordance with customer requirements. All tags are stainless steel. The standard tag is wired to the transmitter. Tag character height is 0.125 in. (0.318 cm). A permanently attached tag is available upon request.

Calibration
Transmitters are factory calibrated to the customer's specified range. If calibration is not specified, the transmitters are calibrated at maximum range. Calibration is performed at ambient temperature and pressure.

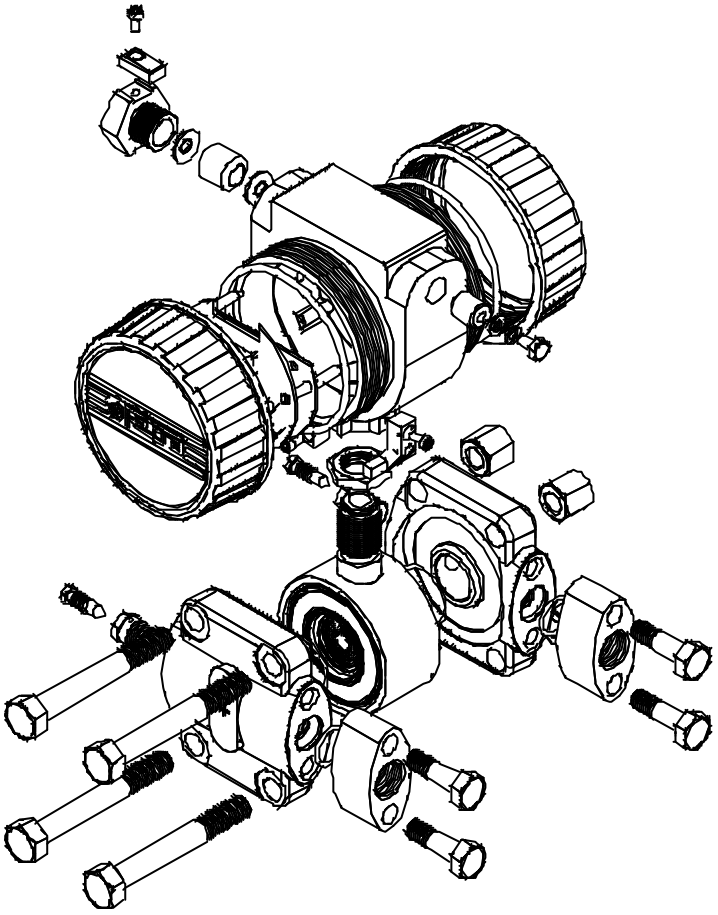


Fig.14. Typical Transmitter Exploded View.

ORDERING INFORMATION

Model CE3D	X	X	XX	X	(...)	X	X	X	X	Coding level denomination
Coding levels	a	b	c	d	e	f	g	h	i	

	a. Static pressure
LL	Max. 5 bar.
L	Max. 35 bar.
M	Max. 140 bar.
H	Max. 310 bar.

	b. Protection class
A	Waterproof protection IP 65, acc. EN 60529.
B	Explosion proff protection, type EEx dII CT4 acc. EN 50014 and EN 50018.

	c. Wetted parts materials (flanges, connectors, drain/vent valves, isolating diaphragm) and silicon oil filling fluid.
01	OLC25 / AISI316 / AISI316.
02	AISI316 / AISI316 / AISI316
xx	On request: Hastelloy C-276; Monel; Tantal; delivery time six months from order.

	d. Pressure ranges.			
	Span (mbar)		**Range limits (mbar)**	**Max. static pressure (according to "a")**
	Min.	**Max.**		
1	10	30	-30 ... 30	LL or L
2	25	100	-100 ... 100	L or M
3	73.3	220	-220 ... 220	M
4	150	450	-450 ... 450	M
5	333.3	1000	-1000 ... 1000	M
6	600	1800	-1800 ... 1800	M
7	333.3	1000	-1000 ... 1000	H
8	600	1800	-1800 ... 1800	H

	e. Calibrated range limits[1)].
(...)	Specify the lower and upper limits of the calibrated range.

Note:
1) Lower range limit can be suppressed (suppression) with 200% of min span and elevated (elevation) with 300% of min span. For option D (square root device) is about ±10% of span

ORDERING INFORMATION (continued)

Model CE3D	X	X	XX	X	(...)	X	X	X	X	Coding level denomination
Coding levels	a	b	c	d	e	f	g	h	i	
										f. Process connection type
						0				Non-removable diaphragm seal type MS, or manifolds type BR .
						1				Br1/4" female thread (1/4-18NPT F).
						2				Br1/2" female thread (1/2-14NPT F).
						3				G1/2" female thread
						4				Br1/4" male thread (1/4-18NPT F).
						5				Br1/2" male thread (1/2-14NPT F).
						6				G1/2" male thread.
										g. Wetted O-rings materials.
							1			Buna N or equivalent.
							2			PTFE .
							3			Viton A.
							4			Silicon rubber.
										h. Process mounting configurations.
								BT1		Flat bracket for mounting on 2” vertical pipe.
								BT2		Right – angle bracket for mounting on 2” flat pipe.
								BP		Right – angle bracket for panel mounting.
										i. Options
									COM	Transmitter with HART PROTOCOL, accuracy ±0,5%.
									R	Reverse output (20...4mA DC).
									PC5	Aluminum alloy cable gland for cables of diametres 7,5; 9; 11.
									PC8	SST cable gland for cables of diametres 7,5; 9; 11.
									MS	Remote seal; coding acc. Product data sheet 274R for MS (see note 2).
									M1	Analog meter, linear scale in mA and 0 to 100%.
									M2	Analog meter, square root scale in mA and 0 to 100%.
									M3	Analog meter, linear scale in mA and square root scale 0 to 100%.
									MD3	LCD meter, display in mA.
									MD4	LCD meter, 0 to 100% display.
									D	Square root device enclosed; (see note 3).
									HP	Transmitter for hydrogen service and positive temperature; coded "02" at level "c" and "1" or "3" at level "g".

Note:

2) When order this option, the following transmitter performances doubles; measured error, hysteresis, linearity and repetability; Response time is 10s and dead band is ±0,2%.This option is not compatible with option OIU; OIL and BR.

3) For this option transmitter performance are guaranteed from 4% of measuring range (20% of output range). Within 0 and 4% the characteristic is linear.

ORDERING INFORMATION (continued)

Model CE3D	X	X	XX	X	(...)	X	X	X	X	Coding level denomination
Coding levels	a	b	c	d	e	f	g	h	i	
									HN	Transmitter for hydrogen service and negative temperature; coded "03 at level "c" (see note 4).
									OS	Transmitter for oxygen service; coded only 2x at level “c”(see note 4).
									OIU	Attachment of integral orifice, type U, (see note 5).
									OIL	Attachment of integral orifice, line type, L, (see note 5).
									BR	Manifold for process connexion. Coding according Product Data Sheet SG552 for BR
									W	Belt for fixing the cover.
CE3D	**M**	**A**	**02**	**5**	**(0...100 mbar)**	**1**	**2**	**BP**	**PC5**	**Typical model number**

Note:

4) No compatible options **HP, HN** and **OS**.

5) For these options coded only 02 and xx at coding level “c”, the transmitter is delivered with a set of integral orifice in order to chose the adequate.

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SG280
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MODEL CE7D
LEVEL DIFFERENTIAL TRANSMITTER

Control and Measurement

FEATURES

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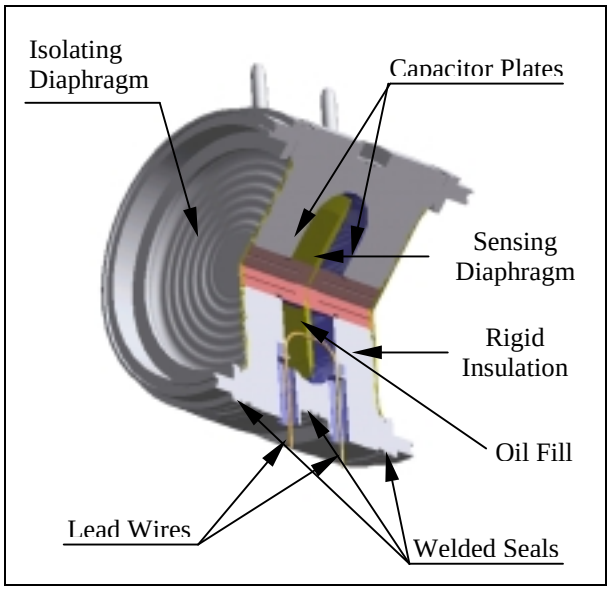

Fig.1. Cross Section of the FEPA δ-Cell™ Sensor.

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During operation, the isolating diaphragms and fill fluid on the high and low sides transmit the process pressure to the oil fill fluid. The fluid in turn transmits the process pressure to a sensing diaphragm in the center of the δ-cell sensor. The sensing diaphragm functions as a stretched spring element that deflects in response to differential pressure across it (in GP transmitters, atmospheric pressure is transmitted in a like manner to the low side of the sensing diaphragm). In AP transmitters, a reference pressure is maintained on the low side. The displacement of the sensing diaphragm, a maximum movement of 0.004 in. (0.10 mm), is proportional to the pressure. Capacitor plates on both sides detect the position of the sensing diaphragm. The differential capacitance between the sensing diaphragm and the capacitor plates is converted electronically to an appropriate current, voltage, or digital HART® (Highway Addresable Remote Transducer) output signal.

ELECTRONICS MODULE

The electronics module incorporates surface-mount technology. It accepts the digital signal from the sensor module, along with the correction coefficients, then corrects and linearizes the signal. The output section of the electronics module converts the digital signal to an analog output. On the SMART version, the output section also handles communication with the HART Communicator, or PC HART-based control system (see figure 2).

DATA STORAGE

Configuration Data is stored in nonvolatile EEPROM memory in the transmitter electronics module. This data is retained in the transmitter when power is interrupted, so the transmitter is functional immediately upon power up.

SOFTWARE FUNCTIONALITY OF THE MODEL CE3D SMART (option COM)

HART protocol allows easy access to the configuration, test, and detailed setup capabilities of the model CE7D SMART.

Configuration

The Model CE7D SMART can be configured easily using a HART Communicator or other HART-based communications device. Configurator consists of two parts. First, the transmitter operational parameters are set, which include:

- Zero and span set points
- Damping
- Engineering unit selection

Second, data can be entered into the transmitter to allow identification and physical description of the transmitter. This data includes:

- Tag: 8 alphanumeric characters
- Descriptor: 16 alphanumeric characters
- Message: 32 alphanumeric characters
- Date
- Integral Meter Installation

In addition to the configurable parameters, the Model CE7D SMART software contains information that is not user-changeable. Non-configurable information includes: transmitter type, sensor limits, minimum span, fill fluid, isolator material, module serial number, and transmitter software revision level.

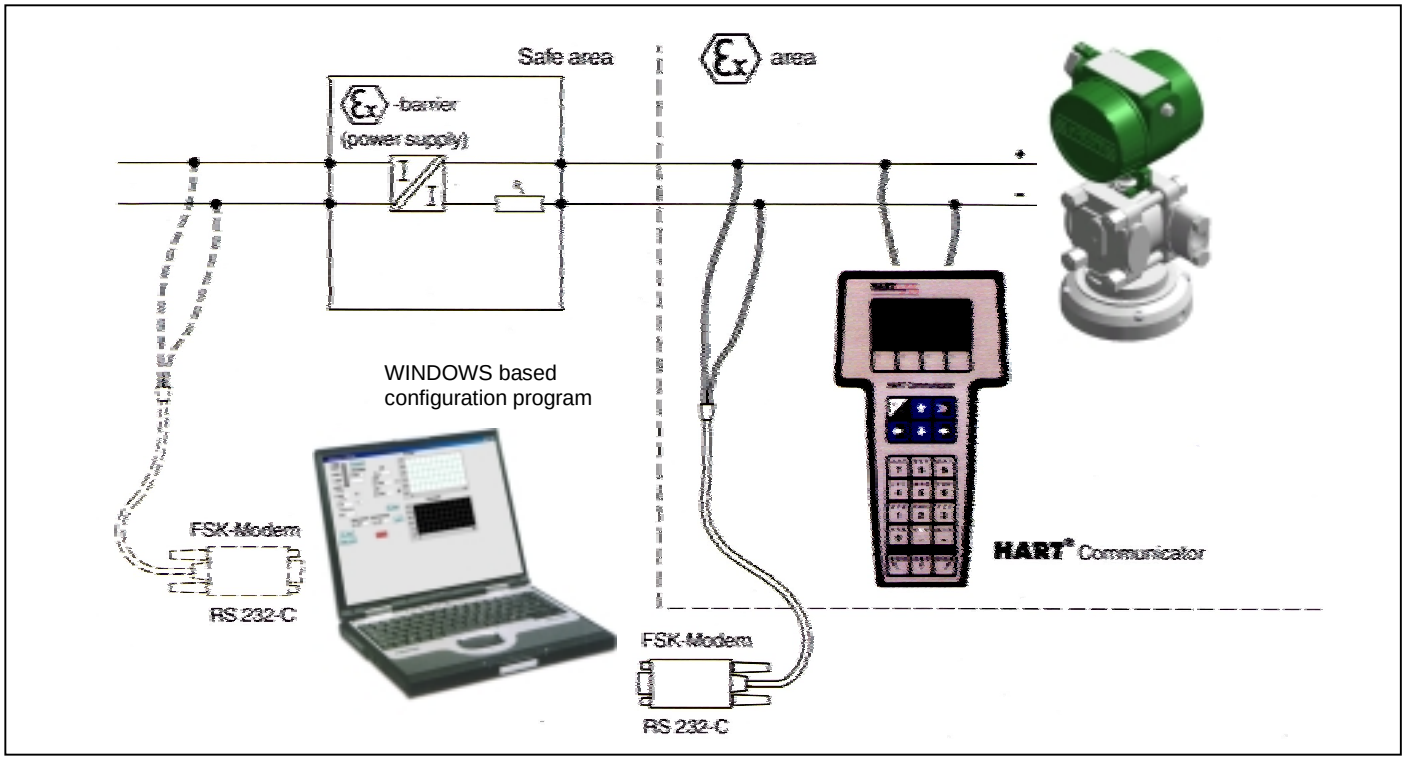

Fig.2. Transmitter communication with hand-held HART communicator or PC
(Windows-based configuration program)

SPECIFICATIONS

FUNCTIONAL SPECIFICATIONS

SERVICE

Liquid, gas, and vapor applications.

Ranges

Code	Span (mmH_2O) min	Span (mmH_2O) max	Range limits (mmH_2O)
71	100	300	0...300
72	255	1020	0...1020
73	745	2245	0...2245
74	1530	4590	0...4590
75	3400	10195	0...10195
76	6120	18355	0...18355

Maximum static pressure is 8.96...100 bar, depending on type of flange

Outputs

Standard analog : 4-20 mA dc

Option COM : 4-20 mA / HART Protocol
4-20 mA dc, user selectable for linear or square root output. Digital process variable superimposed on 4-20 mA signal, available to any host that conforms to the HART protocol.

Option R (Reverse Output)
This option permits reversing of pressure input so that electrical output will increase as pressure input decreases.

Load Limitations

Load resistance : 0 ... 1239 Ω, depending on power supply.

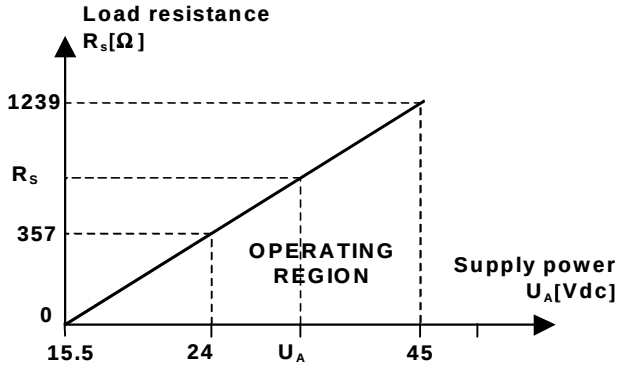

Fig.3.Load resistance - power supply chart (R_S-U_A).

Power Supply

External power supply required. Transmitter operates on 12-40 V dc depending on load resistance. Reverse polarity protection is standard.

Overpressure Limits

All ranges: Max. calibrated range x 1.5.

Temperature Limits

Process:
-33°C...+100°C (standard), +200°C optional.
Ambient:
- -33°C to +80°C, standard
- -20°C to +80°C with LCD meter.

Humidity Limits

0-100% relative humidity.

Turn-on Time

Between 2.0 to 20.0 seconds, no warm-up required.

PERFORMANCE SPECIFICATIONS

(Zero-based spans, reference conditions, silicone oil fill, and 316 SST isolating diaphragm)

Reference Accuracy

±0.5% of calibrated span. Includes combined effects of linearity, hysteresis, and repeatability.

Static Pressure Effect

On low range limits : ±0.25% of output span /70bar;
For range 0...100...300 mm H_2O : ±0.5% of output span /5bar;

Effect on span : 1,5±0,25% / 70 bar.

Overpressure Effect

On low range limits : ±2%

Effect on span : ±0,5%

Pressure Surge Effect

On low range limits : ±2%

Effect on span : ±0,5%

Ambient Temperature Effect

Expressed as a total effect per 10°C.

On low range limits
Standard version:
max. 0,15% of span;
max 0,25% for range 0...100...300 mmH_2O.
Option code COM:
max. 0,15% of span.

Effect on span
max. 0,25%

Power Supply Effect

Less than 0,1% of calibrated span per 10 volts.

Mounting Position Effect

Max. 0,25% for 5° turn on, which can be calibrated out. No span effect.

Explosion proof protection

EEx dII C T4 according to EN 50014, EN 50018.

Similar to Explosion Proof for Class I, Division 1, Groups B, C, and D. Dust-ignition Proof for Class II, Division 1, Groups E, F, and G. Suitable for Class III, indoor and outdoor hazardous locations.

Enclosure protection: IP65 acc. to EN 60529 similar Type NEMA 4X; factory sealed. Approved for Class I, Division 2, Groups A, B, C, and D.

PHYSICAL SPECIFICATIONS

Electrical Connection

Electrical tap, type IPE 13.5.

Process Connection

Br1/4", Br1/2", G1/2", female;
Other at request, see coding.

Process Wetted Parts

Isolating Diaphragm
AISI 316 L SST, or equivalent, W1.4541.

Process Connector
316 L stainless steel or Hastelloy.

Non-wetted Parts

Electronics Housing
Low-copper aluminum, NEMA 4X, IP65, IP67, CSA enclosure type 4X.

Paint
Polyurethane.

Cover O-rings
Buna-N.

Fill Fluid
Silicon oil or Fluorolube.

Weight
Approximately 13 kg.

Tagging

The transmitter is tagged, at no charge, in accordance with customer requirements. All tags are stainless steel. The standard tag is wired to the trasmitter. Tag character height is 1/2" (0.318 cm). A permanently attached tag is available upon request.

NOTE

One product manual is included per shipment.

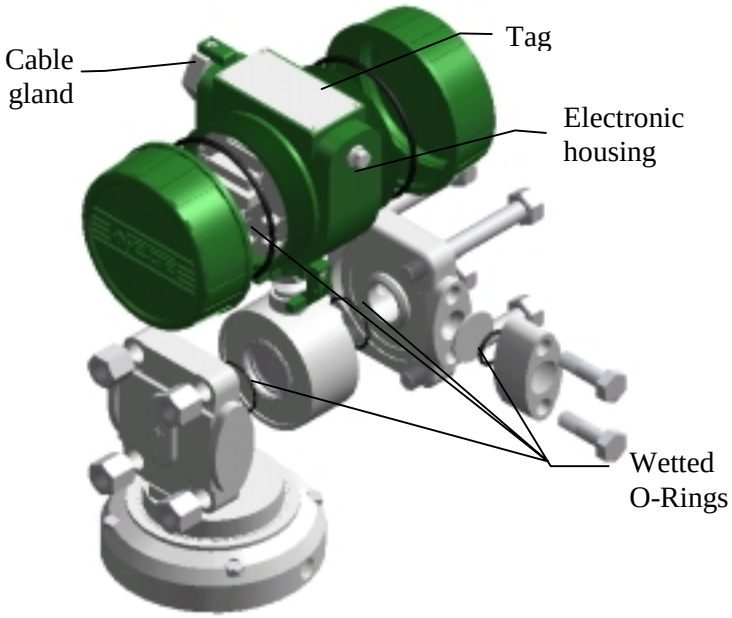

Fig.4. Flange Exploded View - Standard Configuration

MOUNTING

The process mounting of CE7D transmitter is made by flanges of various dimensions (see dimensional drawings) in stainless steel. The tipical mounting configuration is shown in figure 4.

Bolts and Nuts for Flanges and Adapters

Options permit bolts and nuts for flanges and adapters in zinc-plated carbon steel or stainless steel type W1.4571, AISI 316, Hastelloy C, or Monel.

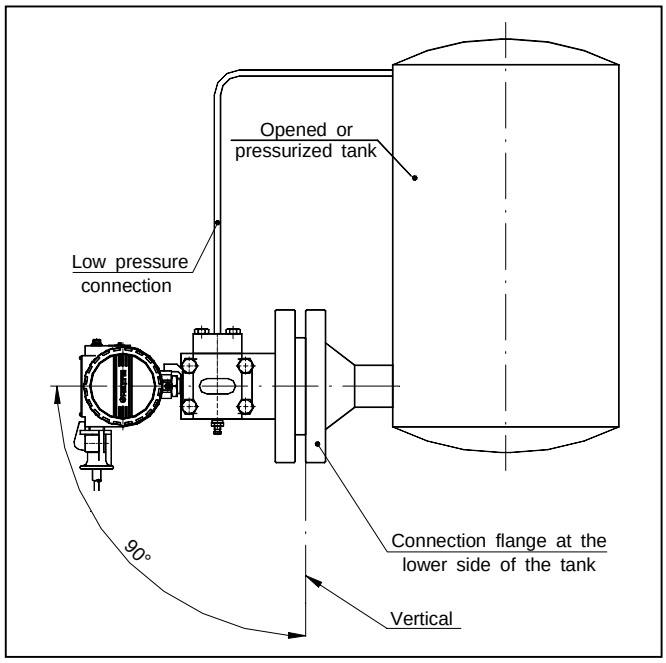

Fig.5. CE7D Process connection

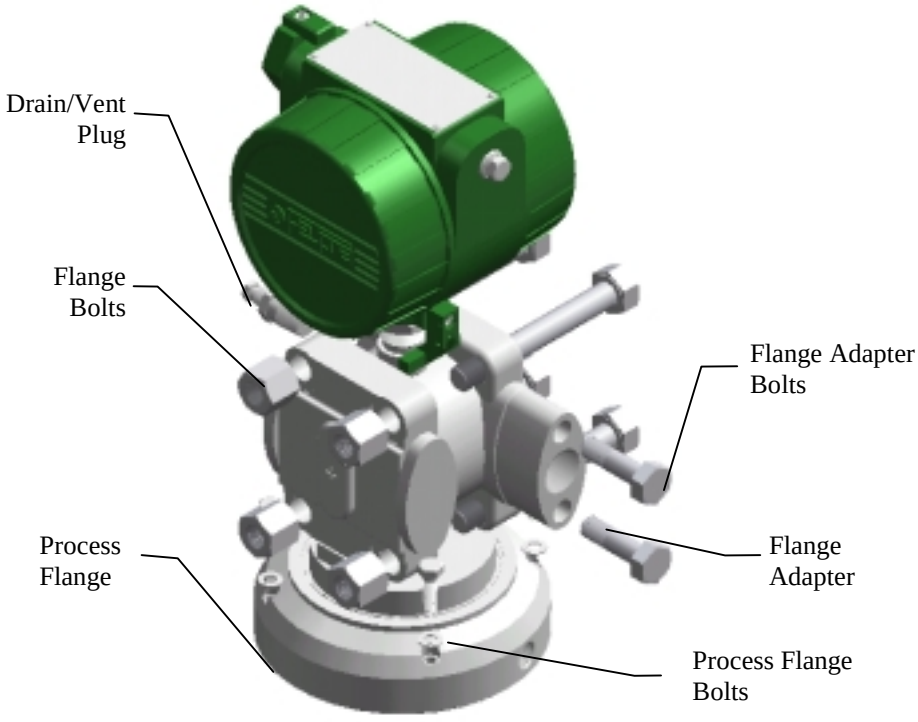

Fig.6. Model CE7D Standard - Flange Configuration.

Process Connections

Standard Drain/Vent
Drain/vent valve mounted in side of flange.

Used to vent gas buildup in liquid process applications or to drain liquid buildup in gas process applications with transmitter mounted vertically

Plug of same material as requested flange inserted in end of flange opposite adapter.

Process Connection
Option provides connections type G1/2”, Br1/2”, Br1/4”; other at request.

Flange adapters are delivered to provide desired connection, according with coding level (h).

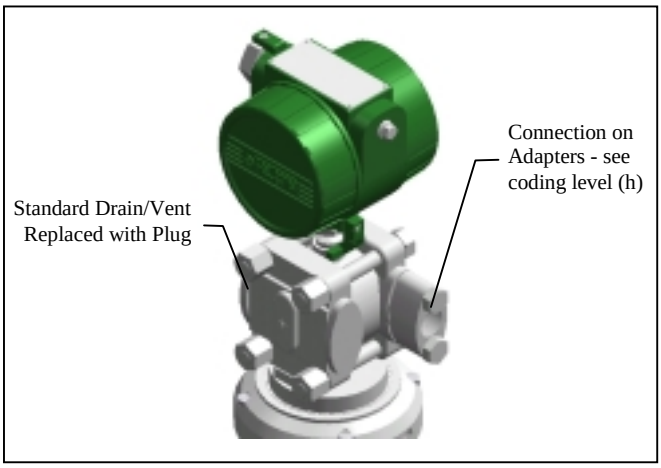

Fig.7 Model CE7D Process Connections
Standard Configuration

Cable Glands

Option provides two types of cable glands for 7,5; 9; 11 mm diameter.
The standard cable glands are PC5, in aluminum alloy and PC8, in stainless steel - see figure 8.

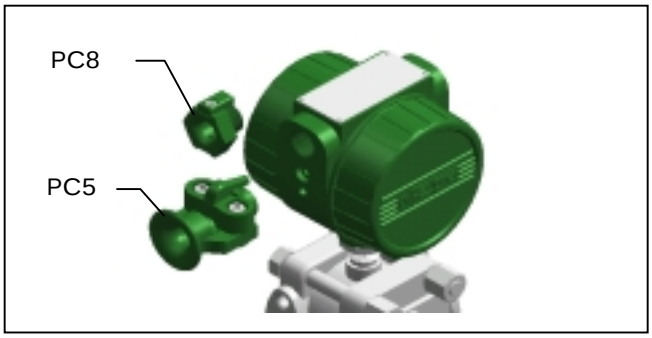

Fig.8 Cable Glands

OTHER OPTIONS

Meters

Analog
Meters have 2-in. (50.8 mm) scale.

Plug-in mounting configuration.

Indication accuracy ±2%.

Operating temperature limit: -27 to 177°F (-33 to 80°C).

Meters are enclosed in a housing in waterproof protection type IP 65 acc. EN 60529 or explosion proof protection type EEx dII CT4 acc. EN 50014 and EN 50018, upon request.

M1 Analog Meter, linear scale in mA and 0 to 100%

LCD
4-digit display.

Indication accuracy ±0.25% of calibrated span ±1 digit.

Display resolution at ±0.5% of calibrated span ±1 digit.

Operating temperature limit: 0 to 177°F (-20 to 80°C).

Plug-in mouting configuration.

Meters are enclosed in a housing in waterproof protection type IP 65 acc. EN 60529 or explosion proof protection type EEx dII CT4 acc. EN 50014 and EN 50018, upon request.

MD3 LCD Meter, display in mA
MD4 LCD Meter, 0 to 100% display

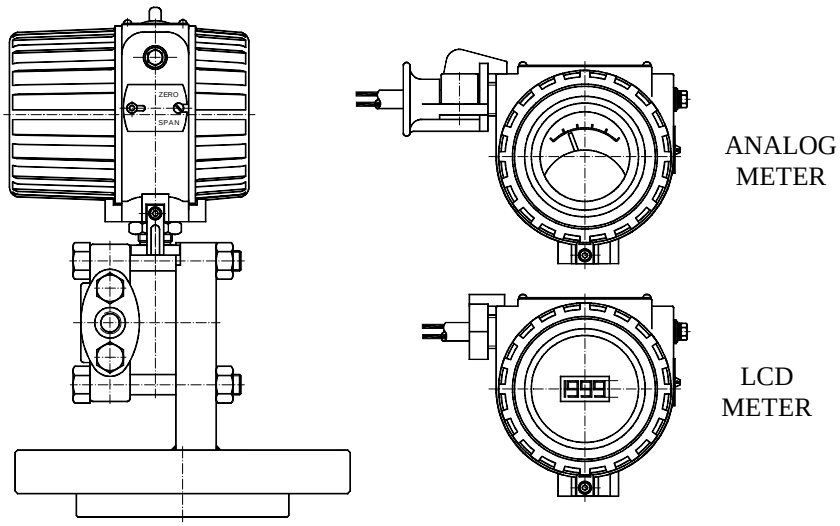

Fig.9.Meter options

OVERALL DIMENSIONS

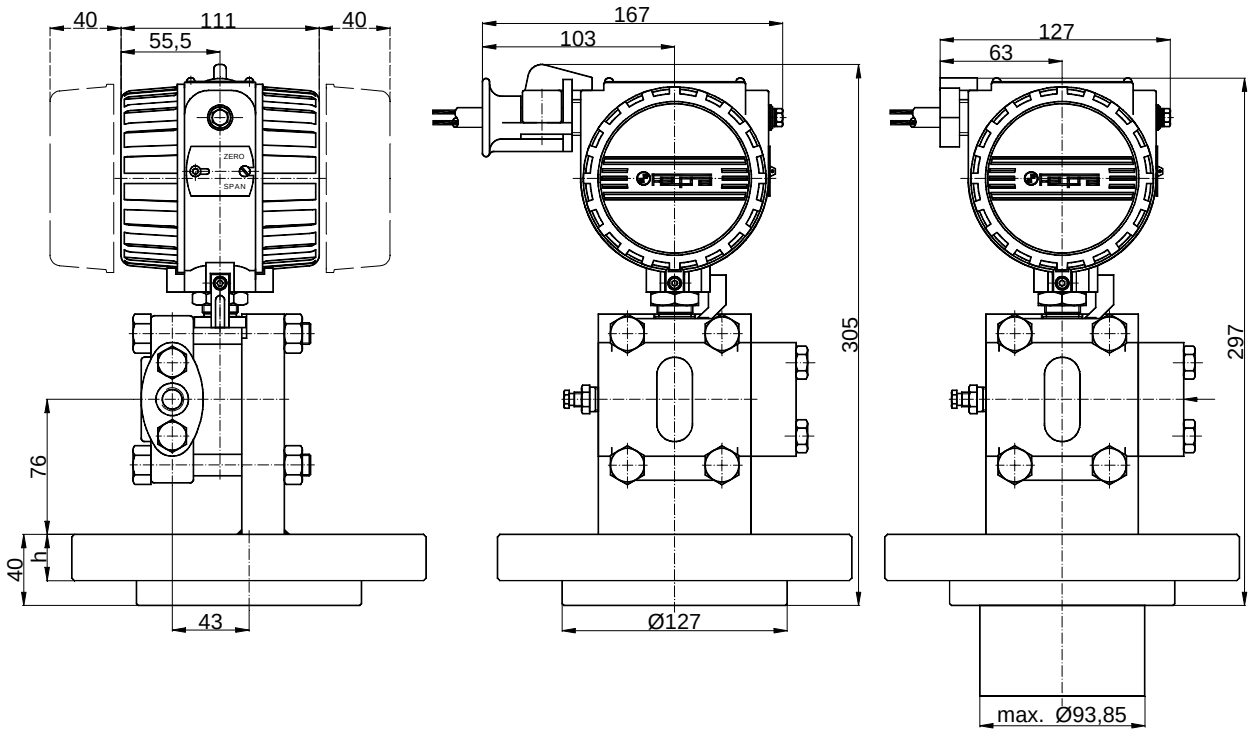

Fig.10. CE7D without indicator

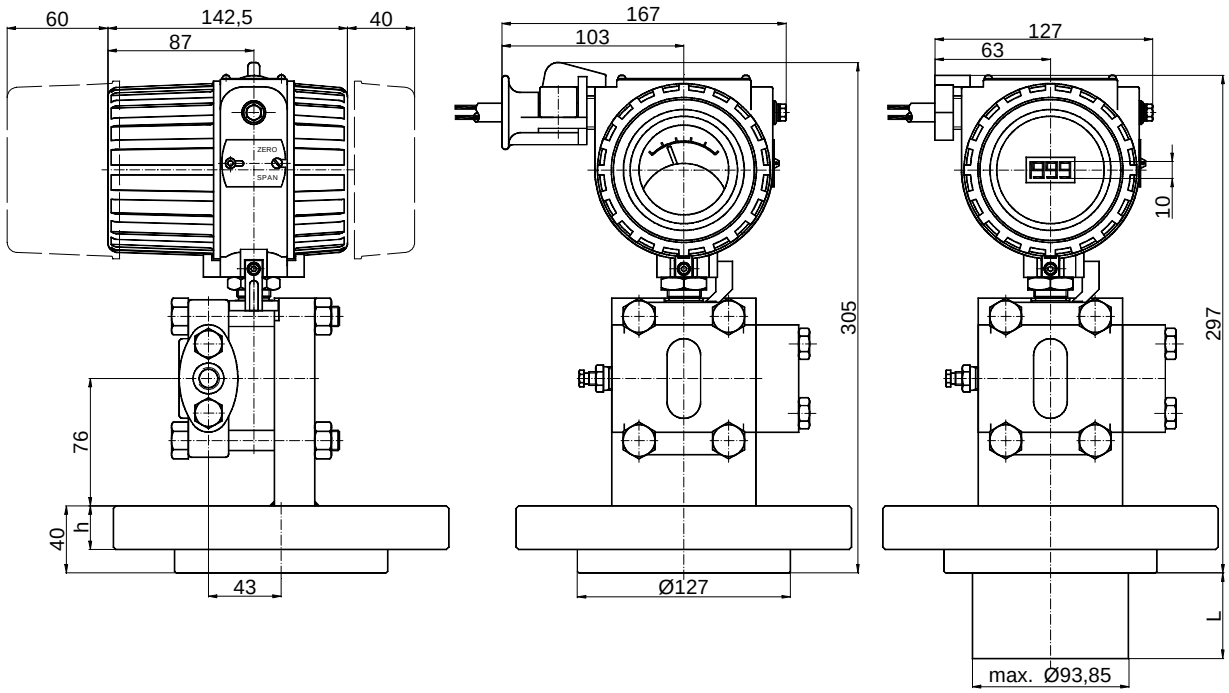

Fig.11.CE7D with analog or digital indicator

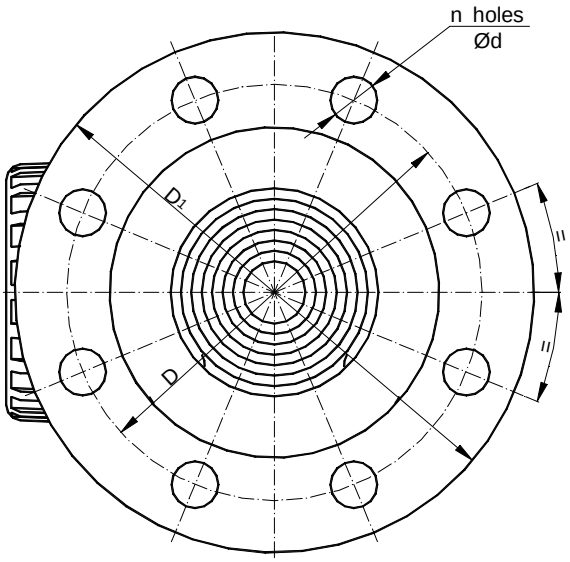

Fig.12.Mounting dimensions for flanges

Table 1				
Flange type	**D1**	**D**	**d**	**n**
DN 80 Pn 25	200	160	18	8
DN 80 Pn 100	230	180	26	8
DN 80 Pn 16	220	180	18	8
DN 80 Pn 40	235	190	22	8
3 inch. 150 psi ANSI	190	152.5	19	4
3 inch. 600 psi ANSI	209.5	168	25.4	8
4 inch. 150 psi ANSI	228	190.5	19	8
4 inch. 300 psi ANSI	254	200	22	8

STANDARD ACCESSORIES

All models are shipped with flange adapters, drain/vent valves, and one instruction manual per shipment.

Tagging
The CE3D Transmitter will be tagged, at no charge, in accordance with customer requirements. All tags are stainless steel. The standard tag is wired to the transmitter. Tag character height is 0.125 in. (0.318 cm). A permanently attached tag is available upon request.

Calibration
Transmitters are factory calibrated to the customer's specified range. If calibration is not specified, the transmitters are calibrated at maximum range. Calibration is performed at ambient temperature and pressure.

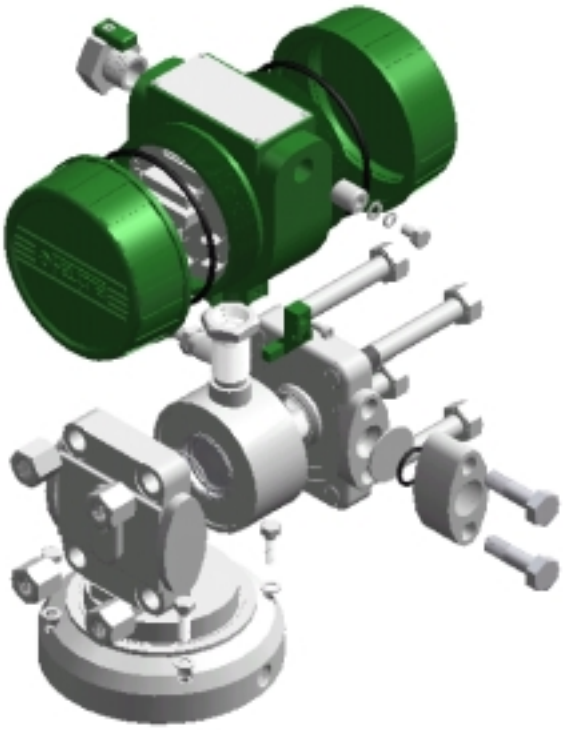

Fig.13.Typical Transmitter Exploded View.

ORDERING INFORMATION

Model CE7D Coding level	X a	XX b	XX c	(...) d	X e	X f	X g	X h	X i	X j	X k	Coding level and code denomination
												a. Housing enclosure type.
	A											Watertight enclosure type IP65, according SR EN 60529.
	B											Explosion-proof enclosure, type EEx dll CT6 according SR EN 50014, SR EN 50018.
												b. Material of detector cover, connectors / drain and vent valves / isolating diaphragm.
												When the filling fluid is silicon oil
		01										Carbon steel / AISI 316 / AISI 316
		02										Stainless steel / AISI 316 / AISI 316.
		03										Stainless steel W1.4571/ Stainless steel W1.4571/ Stainless steel W1.4571 for “HN” option at "j" level.
		04*										Carbon steel / Hastelloy C / Hastelloy C-276.
		05*										Carbon steel / Monel / Monel.
		06*										Carbon steel / AISI 316 / Tantal.
		07*										Stainless steel / AISI 316 / Hastelloy C-276.
		08*										Stainless steel / AISI 316 / Monel.
		09*										Ojel inox / AISI 316 / Tantal.
		10*										Hastelloy C / Hastelloy C / Hastelloy C-276.
		11*										Hastelloy C / Hastelloy C / Tantal
		12*										Monel / Monel / Monel.
												When the filling fluid is fluorolube (for "OS" option at "j" level)
		20*										Carbon steel / AISI 316 / AISI 316
		21*										Stainless steel / AISI 316 / AISI 316.
		22*										Carbon steel / Hastelloy C / Hastelloy C-276.
		23*										Stainless steel / AISI 316 / Hastelloy C-276.
		24*										Hastelloy C / Hastelloy C / Hastelloy C-276.
		25*										Carbon steel / AISI 316 / Tantal.
		26*										Stainless steel / AISI 316 / Tantal.
		27*										Hastelloy C / Hastelloy C / Tantal
												c.Sensing element type / span (mmH_2O)
												Min. span / Max. span / Range
				71								100 / 300 / 0...300
				72								255 / 1020 / 0...1020
				73								745 / 2245 / 0...2245
				74								1530 / 4590 / 0...4590
				75								3400 / 10195 / 0...10195
				76								6120 / 18355 / 0...18355

Note:

* These options are the object of a special command, which can be solved in 6 months from the request.

ORDERING INFORMATION (continued)

Model CE7D	X	XX	XX	(...)	X	X	X	X	X	X	X	Coding level and code denomination
Coding level	a	b	c	d	e	f	g	h	i	j	k	
												d. Calibrated range limits.
				(...)								Specify the calibrated range limits and the measuring unit.The range lower limit may be positively decalated with 200% from minimum span, excepting “72” range (level “c”), where the suppresion is 300%.
												e. Flange type (see fig.3 and table 1)
					A							DN 80 Pn 25, STAS 7451-88
					B							DN 80 Pn 100, STAS 7451-88
					C							DN 100 Pn 16, STAS 7451-88
					D							DN 100 Pn 40, STAS 7451-89
					E							3 inch. 150 psi, ANSI B16.5–81; coded only "4" at "g" level
					F							3 inch. 600 psi, ANSI B16.5–81; coded only "4" at "g" level
					G							4 inch. 150 psi, ANSI B16.5–81; coded only "4" at "g" level
					H							4 inch. 300 psi, ANSI B16.5–81;
					I( )							Other, at request; between parenthesis, must specified the type of flange.
												f. Extension length (see fig.2 dimension L)
						0						No extension - only "A","B","E" at "e" level.
						1						50 mm - only "C","D","F","G" at "e" level.
						2						100 mm - only "C","D","F","G" at "e" level.
						3						150 mm - only "C","D","F","G" at "e" level.
						(...)						Other length at request, in mm. - coded only "C","D","F","G" at "e" level.
												g. Flange sealing surface type[1)]
							1					PU – STAS 1730 –89
							2					CP2 – STAS 1731-80
							3					PA2 – STAS1732-82
							4					RF - AISI B 16,5 – 81.
												h. Process connection type for the low pressure side.
								1				Br 1/4” female
								2				Br 1/2” female
								3				G 1/2" female
												i. Material for wetted O-rings (low pressure side).
									1			Buna N or equivalent
									2			PTFE
									3			Viton A
									4			Silicon rubber

Note:

1. For flange sealing are used asbestos gaskets according: STAS 1733/89 for "1" and "4" at "g" level; STAS 1741/89 for "2" at "g" level and STAS 1740/80 for "3" at "g" level.

ORDERING INFORMATION (continued)

Model CE7D Coding level	X	XX	XX	(...)	X	X	X	X	X	X	X	Coding level and code denomination
	a	b	c	d	e	f	g	h	i	j	k	

	j. Options (may be ordered more compatible options)
0	No options
COM	Transmitter with HART communication protocol, accuracy ±0,5%.
R	Reverse output (20 ... 4 mAcc).
PC5	Aluminium alloy cable gland for cable diameters of Ø7,5; Ø9; Ø11. (delivered with a set of cable sealing rings).
PC8	Stainless steel cable gland for cable diameters of Ø7,5; Ø9; Ø11. (delivered with a set of cable sealing rings).
MX	LCD meter, linear scale (X means type of meter - see downwards).
1	Analog meter, scale in mA and %, 2.5 class
D3	3-digit meter, scale in mA, range of temperature -20°C ... +80°C with max. ±0,5%/10°C, class 1%. (Umin=19.5Vcc, Rs less with 159,1Ω).
D4	3-digit meter, scale in %, range of temperature -20°C ... +80°C with max. ±0,5%/10°C, class 1%. (Umin=19.5Vcc, Rs less with 159,1Ω).
HP[2)]	Hydrogen service and positive temperature, coded only "02" at "b" level (see the note).
HN[2)]	Hydrogen service and negative temperature, coded only "03" at "b" level (see the note).
OS[2)]	Oxygen service. Coded only "2X" at "b" level (see the note).
W	Belt for fixing the adapter cover; ordered for "B" at "a" level.
SF	Stainless steel flange or equivalent.

	k. Static pressure
k	Specify the static pressure in bar.

Note:
2. "HP", "HN", "OS" options are inconsistent one with another.

Example of coding

CE7D	A	2	73	0 ... 1500	A	0	1	3	2	PC8 and MD4	25

A	IP65 protection enclosures, SR EN 60529.
2	Material of detector cover, connectors / drain and vent valves / isolating diaphragm: Stainless steel / AISI 316 / AISI 316.
73	Min. span: 745 mm H_2O / Max. span: 2245 mm H_2O / Range: 0...2245 mm H_2O
0... 1500	Calibrated range limits in mm H_2O
A	Flamge type DN 80 Pn 25, STAS 7451-88
0	No extension - coded only A,B,E at "e" level.
1	Flange sealing surface type PU – STAS 1730 –89
3	Process connection type G 1/2" female
2	Wetted O-rings in PTFE
PC8 MD4	Options: PC8 and MD4.
25	Is indicated the particular static pressure in bar.