

# VPT10-H

## HART® PRESSURE TRANSMITTER



- ✓ Two Wire Loop Powered Transmitter with HART®7 Communication Protocol
- ✓ 5-digit, rotative, multi-function LCD including bargraph
- ✓ 7 Pressure Ranges:  
30 inH<sub>2</sub>O to 2987 psi
- ✓ 2 Accuracy Classes:  
Standard Model:  $\pm 0.075\%$   
High Performance Model:  $\pm 0.05\%$
- ✓ Measurement Response Time: 50 ms
- ✓ Non-Volatile Totalization
- ✓ Square Root and User Table
- ✓ Built-in Transiente Suppressor
- ✓ No Polarity 12 to 45 Vdc Power Supply
- ✓ 4-20 mA NAMUR NE 43 Analog Output
- ✓ Operating Temperature -40 to 100 °C
- ✓ Local Adjustment via Magnetic Tool
- ✓ Configuration, Calibration, Monitoring and Diagnostics via Configurator and EDDL and FDT/DTM Tools

## DESCRIPTION

**VPT10-H** is a high performance Capacitive Pressure Transmitter, completely digital, designed for measuring differential, gage and absolute pressure, as well as flanged level, remote seals and sanitary applications.

The transmitter can be powered by a 12 to 45 Vdc power supply, generating a 4-20 mA current channel (according to standard NAMUR NE43), proportional to measured PV. Using a HART configurator, Android platform or EDDL and FDT/DTM tools it is possible to configure sensor type, measuring scales, work units, calibration in addition to monitoring the measurement variables and checking the device status. It is also possible to configure VPT10-H via local adjustment using a magnetic tool.

Prioritizing its high performance and robustness, VPT10-H was designed with the latest technology of electronic components and materials, ensuring long-term reliability for any scale systems.

## OPERATION PRINCIPLE

VPT10-H uses pressure measurement with capacitive sensor principle, which is the most used technology for high-performance pressure measurements, with excellent accuracy and electromagnetic immunity.

A schematic of the capacitive cell is shown in fig. 1.1.

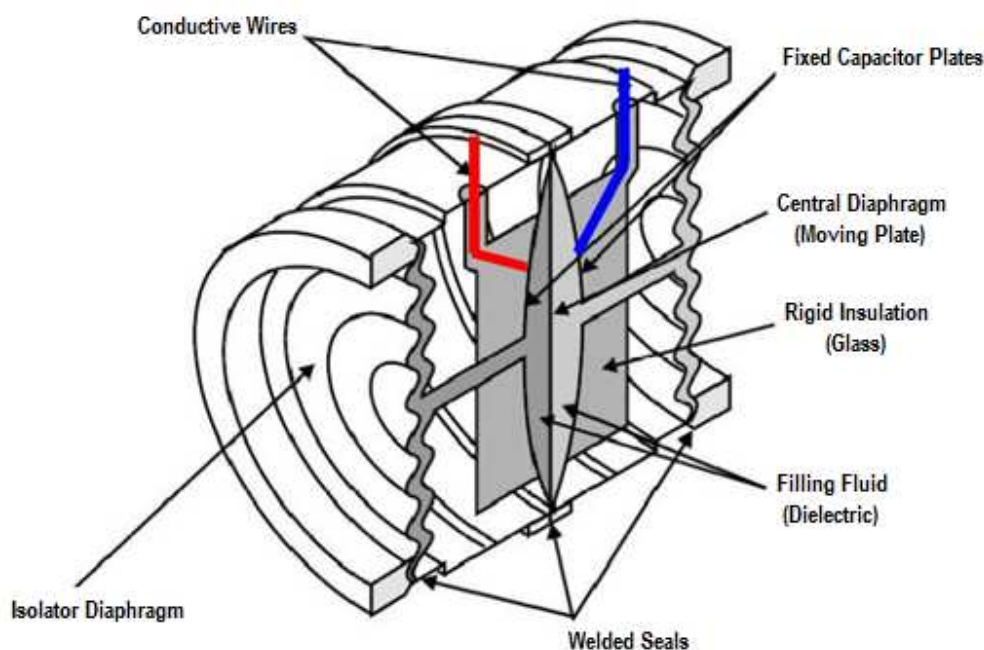
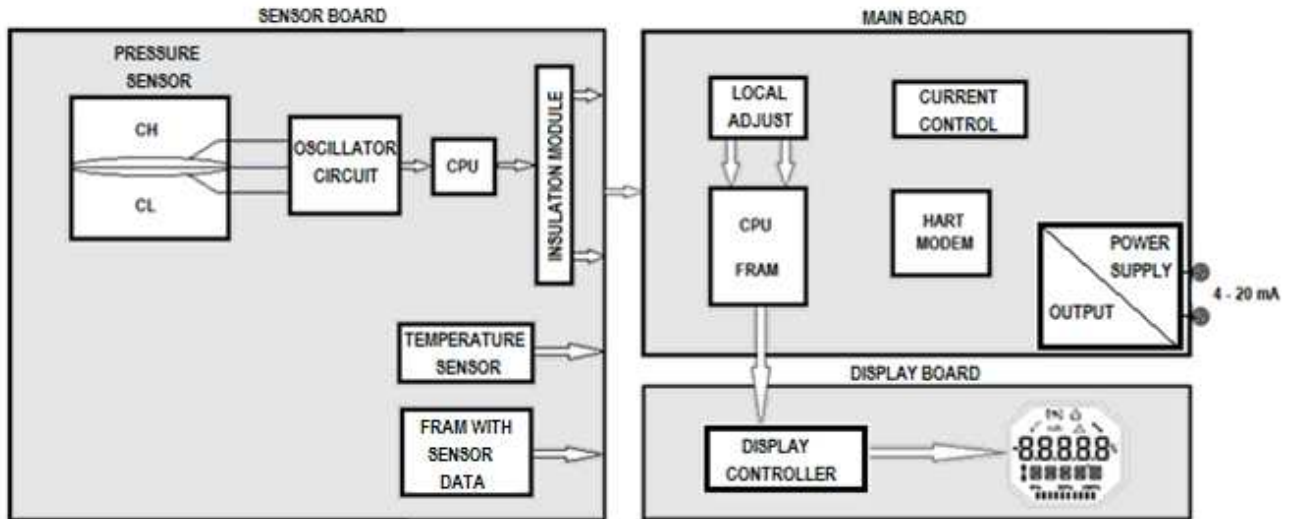


Fig. 1.1 – Capacitive Cell Scheme.

The capacitive cell is a pressure sensor made up of two capacitors with variable capacitances, depending on the applied differential pressure. It is a symmetrical part, with a central diaphragm that is flexed according to the difference of pressures applied on the right and left sides. The pressures are applied to the insulating diaphragms (which have direct contact with the process fluid) which must be of suitable material to prevent corrosion.

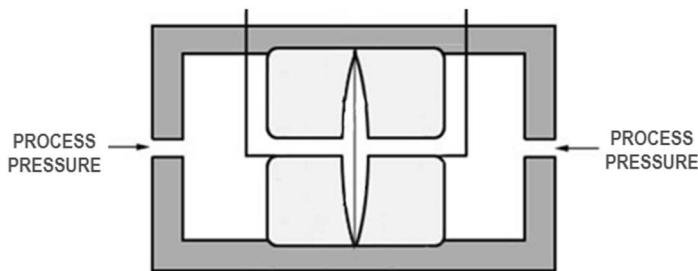
The pressures are transmitted to the central diaphragm by the filling oil and the difference between them causes it to deflect. The capacitors that make up the capacitive cell are part of an oscillator circuit that has its frequency dependent on the applied differential pressure. This frequency will be inversely proportional to the pressure applied and will be measured by the CPU of the pressure sensor with high resolution, accuracy and processing speed.

## BLOCK DIAGRAM



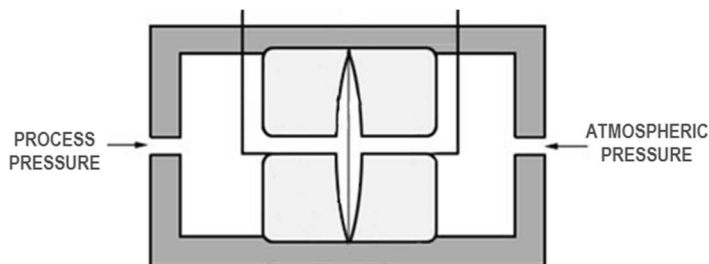
## TRANSMITTER TYPES

### Differential Transmitter – VPT10-D and VPT10-H



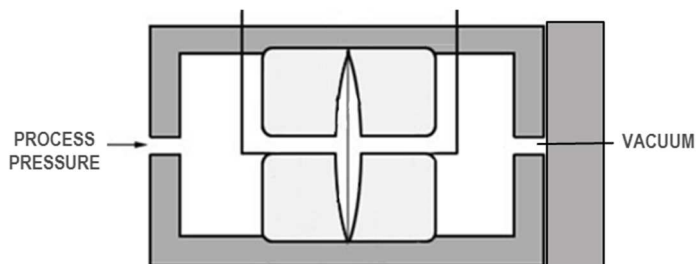
Transmitters in which process pressure is applied to the high and low sides of sensor. VPT10-H is used for processes with high static pressure.

### Gage Transmitter – VPT10-M



In this type of transmitter the process pressure is applied on the high side of the transmitter and the low side is opened into the atmosphere, so the atmospheric pressure is the reference for the capacitive sensor.

### Absolute Transmitter – VPT10-A



In these types of transmitter the process pressure is applied on the high side of the transmitter, while on the low side there is a vacuum chamber which is the absolute zero reference for the capacitive sensor.

## TECHNICAL AND PHYSICAL SPECIFICATIONS

Accuracy	Standard Model: $\pm 0.075\%$	High Performance Model: $\pm 0.05\%$	
Communication Protocol	HART® 7		
Sensor Type	Capacitive sensor with microprocessor, digital reading and temperature/pressure compensation algorithm.		
Models / Measurement Range	D1 / -7.5 to 7.5 kPa (-30 to 30 inH <sub>2</sub> O)      D2 / -37.4 to 37.4 kPa (-150 to 150 inH <sub>2</sub> O) D3 / -147.1 to 147.1 kPa (-21 to 21 psi)      D4 / -690 to 690 kPa (-100 to 100 psi) D5 / -2068 to 2068 kPa (-300 to 300 psi)      D6 / -6890 to 6890 kPa (-1000 to 1000 psi) M1 / -7.5 to 7.5 kPa (-30 to 30 inH <sub>2</sub> O)      M2 / -37.4 to 37.4 kPa (-150 to 150 inH <sub>2</sub> O) M3 / -100 to 147.1 kPa (-14.7 to 21 psi)      M4 / -100 to 690 kPa (-14.7 to 100 psi) M5 / -100 to 2068 kPa (-14.7 to 300 psi)      M6 / -100 to 6890 kPa (-14.7 to 1000 psi) M7 / -0.1 to 20.68 MPa (-14.7 to 3000 psi)      A2 / 0 to 37.4 (0 to 150 inH <sub>2</sub> O) A3 / 0 to 147.1 kPa (0 to 21 psi)      A4 / 0 to 690 kPa (0 to 100 psi) A5 / 0 to 2068 kPa (0 to 300 psi)      A6 / 0 to 6890 kPa (0 to 1000 psi) H2 / -37.4 to 37.4 kPa (-150 to 150 inH <sub>2</sub> O)      H3 / -147.1 to 147.1 kPa (-21 to 21 psi) H4 / -690 to 690 kPa (-100 to 100 psi)      H5 / -2068 to 2068 kPa (-300 to 300 psi)		
Static Pressure and Overpressure Limits	Range 1: 8 MPa (81.6 kgf/cm <sup>2</sup> )      Range 2 to 6: 16 MPa (163.1 kgf/cm <sup>2</sup> ) Range 7: 40 MPa (407.9 kgf/cm <sup>2</sup> )		
Stability <sup>(1)</sup>	Standard Model: $\pm 0.2\%$ *URL (5 years)      High Performance Model: $\pm 0.2\%$ *URL (15 years)		
Turndown	150:1 or 200:1 (depending on model)		
Response Time	50 ms		
Current Output	4-20 mA according to NAMUR-NE43		
Output Type	Linear, Square Root and Table		
Power Supply	12 to 45 Vdc, no polarity, with transient suppressor		
Temperature Limits	Ambient: -40 to 85°C	Process: -40 to 100°C	Storage: -40 to 100°C
Humidity Limits	0 to 100% RH (relative humidity)		
Configuration	Remote configuration using EDDL or FDT/DTM-based tools, as well as PALM and Android platforms. Local configuration via magnetic tool.		
Write Protection	Via hardware and software with indicative icon on display		
Totalization	Non-volatile volumetric and mass flow		
Hazardous Area Classification	Explosion Proof and Intrinsically Safe		
Protection Degree	IP67		
Mounting	Field, through a bracket on a 2" pipe		
Housing Material	Aluminum		
Approximated Weight with Bracket	4 Kg		

(1) For  $\pm 20$  °C temperature changes, 0-100% relative humidity, up to 7 MPa (70 bar) line pressure, installation according to best practices and proper assembly for processes in which hydrogen atoms may be generated (hydrogen migration).

# ORDERING CODE

## VPT10 Pressure Transmitter

Communication Protocol	H	HART
	P	PROFIBUS
Accuracy Class	S	STANDARD
	H	HIGH PERFORMANCE (SEE NOTE 1)
Sensor Type (SEE NOTE 2)	A	ABSOLUTE
	D	DIFFERENTIAL
	H	DIFFERENTIAL HIGH STATIC PRESSURE
	M	MANOMETRIC
Sensor Range	1	-7.5 to 7.5 kPa (-30 to 30 inH <sub>2</sub> O)
	2	-37.4 to 37.4 kPa (-150 to 150 inH <sub>2</sub> O)
	3	-147.1 to 147.1 kPa (-21 to 21 psi)
	4	-690 to 690 kPa (-100 to 100 psi)
	5	-2068 to 2068 kPa (-300 to 300 psi)
	6	-6890 to 6890 kPa (-1000 to 1000 psi)
	7	-0.1 to 20.68 MPa (-14.7 to 3000 psi)
Diafragma Material	I	SS 316L
Fill Fluid	S	SILICON OIL
Flange/Adapter/Purge Material	I	SS 316
Purge Position	0	NO PURGE
	1	PURGE ON PROCESS CONNECTION OPPOSITE SIDE
	2	PURGE ON SUPERIOR PROCESS SIDE
	3	PURGE ON INFERIOR PROCESS SIDE
Material Cell's Sealing Ring	B	BUNA-N
	V	VITON
	T	TEFLON
Process Connection	0	½ - 18NPT (NO ADAPTER)
	1	½ - 14NPT (WITH ADAPTER)
Certification Type	0	NO CERTIFICATION
	1	INTRINSICALLY SAFE
	2	EXPLOSION PROOF
Certification Body	0	NO CERTIFICATION
	1	INMETRO
Housing Material	A	ALUMINUM
Electrical Connection	1	½ - 14 NPT
Painting	1	BLUE - RAL 5005
Mounting Bracket	0	NO BRACKET
	1	SS 304 BRACKET

Ordering Code Example:

VPT10-	H	S	-	D	1	-	I	S	I	0	B	0	-	0	0	-	A	1	1	0
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Obs: Explosion Proof Certification Ex tb (dust ignition) and Ex db (flame)

NOTE 1: Only available for Differential and Gauge models

NOTE 2: Ranges might be extended up to 0.8xLRL and 1.2xURL with minimal accuracy degradation

LRL = Lower Range Limit ; URL = Upper Range Limit



## VPT10 Flanged Pressure Transmitter

Communication Protocol	H	HART
	P	PROFIBUS
Sensor Type	L	LEVEL
Sensor Range (SEE NOTE 1)	2	-37.4 to 37.4 kPa (-150 to 150 inH <sub>2</sub> O)
	3	-147.1 to 147.1 kPa (-21 to 21 psi)
	4	-690 to 690 kPa (-100 to 100 psi)
	5	-2068 to 2068 kPa (-300 to 300 psi)
Sensor Diafrgm Material	I	SS 316L
Sensor Fill Fluid	S	SILICON OIL
Flange/Adapter/Purge Material (Low Side)	I	SS 316
Purge Position	0	NO PURGE
	1	PURGE ON PROCESS CONNECTION OPPOSITE SIDE
	2	PURGE ON SUPERIOR PROCESS SIDE
	3	PURGE ON INFERIOR PROCESS SIDE
Cell's Sealing Ring Material	B	BUNA-N
	V	VITON
	T	TEFLON
Process Connection (Reference Socket)	0	1/4" - 18NPT (NO ADAPTER)
	1	1/2" - 14NPT (WITH ADAPTER)
Process Connection (Level Socket)	1	1 1/2" 150 #ANSI B16.5
	2	2" 150 #ANSI B16.5
	3	3" 150 #ANSI B16.5
	4	2" 300 #ANSI B16.5
	5	3" 300 #ANSI B16.5
Process Connection Material (Flange)	I	SS 316
Extension Length	0	NO EXTENSION
	1	50 mm
	2	100 mm
	3	150 mm
Level Socket Diafrgm Material	I	SS 316
Level Socket Fill Fluid	S	SILICON DC200/20
Certification Type	0	NO CERTIFICATION
	1	INTRINSICALLY SAFE
	2	EXPLOSION PROOF
Certification Body	0	NO CERTIFICATION
	1	INMETRO
Housing Material	A	ALUMINUM
Electrical Connection	1	1/2" - 14 NPT
Painting	1	BLUE - RAL 5005

Ordering Code Example:

VPT10- H - L 2 - I S I 0 B 0 - 1 I 0 I S - 0 0 - A 1 1

Obs: Explosion Proof Certification Ex tb (dust ignition) and Ex db (flame)

NOTE 1: Ranges might be extended up to 0.8xLRL and 1.2xURL with minimal accuracy degradation

LRL = Lower Range Limit ; URL = Upper Range Limit

## VPT10 Sanitary Pressure Transmitter

Communication Protocol	H	HART
	P	PROFIBUS
Sensor Type	S	SANITARY
Sensor Range (SEE NOTE 1)	2	-37.4 to 37.4 kPa (-150 to 150 inH <sub>2</sub> O)
	3	-147.1 to 147.1 kPa (-21 to 21 psi)
	4	-690 to 690 kPa (-100 to 100 psi)
	5	-2068 to 2068 kPa (-300 to 300 psi)
Sensor Diaphragm Material	I	SS 316L
Sensor Fill Fluid	S	SILICON OIL
Flange/Adapter/Purge Material (Low Side)	I	SS 316
Purge Position	0	NO PURGE
	1	PURGE ON PROCESS CONNECTION OPPOSITE SIDE
	2	PURGE ON PROCESS CONNECTION OPPOSITE SIDE
	3	PURGE ON PROCESS CONNECTION OPPOSITE SIDE
Cell's Sealing Ring Material	B	BUNA-N
	V	VITON
	T	TEFLON
Process Connection (Reference Socket)	0	1/4 - 18NPT (NO ADAPTER)
	1	1/2 - 14NPT (WITH ADAPTER)
Process Connection (Sanitary Socket)	1	TRICLAMP 1 1/2" WITHOUT EXTENSION
	2	TRICLAMP 2" 150 WITHOUT EXTENSION
	3	TRICLAMP 2" 150 WITH EXTENSION
	4	SMS 1 1/2" WITHOUT EXTENSION
	5	SMS 2" WITHOUT EXTENSION
	6	SMS 2" WITH EXTENSION
Process Connection Material (Sanitary Socket)	I	SS 316
Sanitary Socket Fill Fluid	S	SILICON DC200
	N	PROPILENGLICOL (NEOBEE)
Sanitary Socket Diaphragm Material	I	SS 316
Sanitary Socket Sealing Ring Material	0	NO SEALING RING
	B	BUNA-N
	V	VITON
	T	TEFLON
Adapter Glove	0	NO ADAPTER GLOVE
	1	SS 316L GLOVE
Certification Type	0	NO CERTIFICATION
	1	INTRINSICALLY SAFE
	2	EXPLOSION PROOF
Certification Body	0	NO CERTIFICATION
	1	INMETRO
Housing Material	A	ALUMINUM
Electrical Connection	1	1/2 - 14 NPT
Painting	1	BLUE - RAL 5005

Ordering Code Example:

VPT10- H - S 2 - I S I 0 B 0 - 1 I S I B 0 - 0 0 - A 1 1

Obs: Explosion Proof Certification Ex tb (dust ignition) and Ex db (flame)

NOTE 1: Ranges might be extended up to 0.8xLRL and 1.2xURL with minimal accuracy degradation

LRL = Lower Range Limit ; URL = Upper Range Limit

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