VIVACE™
Process Instruments
Exceeding Automation Limits

VPT10-P

PROFIBUS PA PRESSURE TRANSMITTER

- ✓ Two Wire Transmitter with Profibus PA Communication Protocol
- ✓ 5-digit, rotative, multi-function LCD including bargraph
- ✓ 7 Pressure Ranges:
  30 inH_2O to 2987 psi
- ✓ 2 Accuracy Classes:
  Standard Model: ± 0.075%
  High Performance Model: ± 0.05%
- ✓ Measuremente Response Time: 50 ms
- ✓ Non-Volatile Totalization
- ✓ Square Root and User Table
- ✓ Built-in Transiente Suppressor
- ✓ No Polarity 9 to 32 Vdc Power Supply
- ✓ Advanced Diagnostics
- ✓ Operating Temperature -40 to 100 °C
- ✓ Local Adjustment via Magnetic Tool
- ✓ Configuration, Calibration, Monitoring and Diagnostics via Profibus or Android Configurator and Supported by EDDL and FDT/DTM Tools

DESCRIPTION

VPT10-P 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 is powered by a 9 to 32 Vdc voltage, using Profibus PA communication protocol, according to IEC61158-2, for configuration, calibration, monitoring and diagnostics. VPT10-P works with the concept of functional blocks such as Analog Input and Transducer. Through a Profibus-PA configurator, Android platform or tools based on EDDL or FDT/DTM it is possible to easily configure the transmitter. In addition, it is possible to configure the VPT10-P via local adjustment via a magnetic key.

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

OPERATION PRINCIPLE

VPT10-P 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.

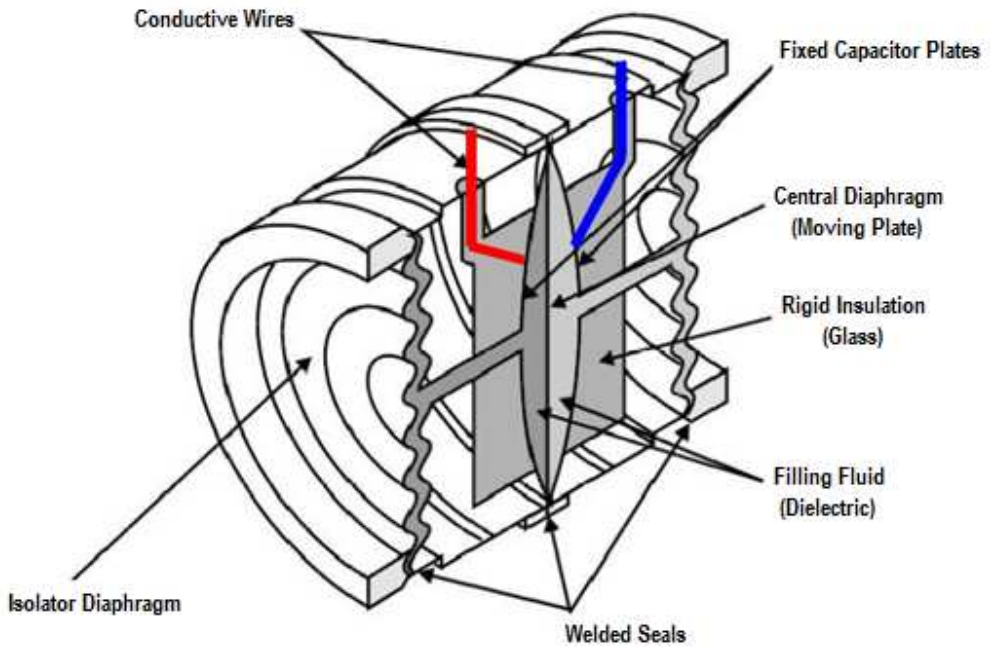
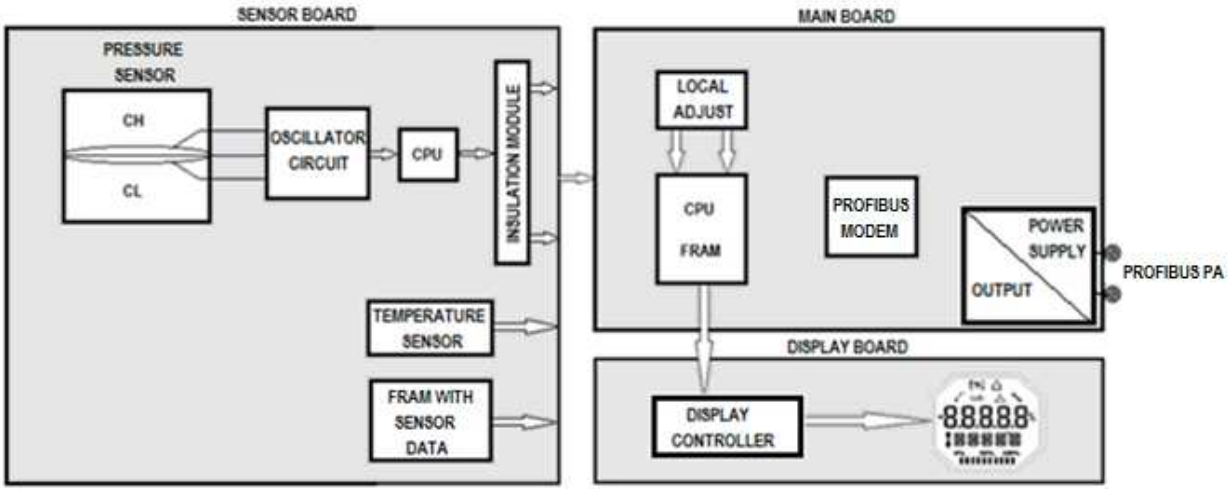


Fig. 1.1 – Capacitive Cell Scheme.

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.

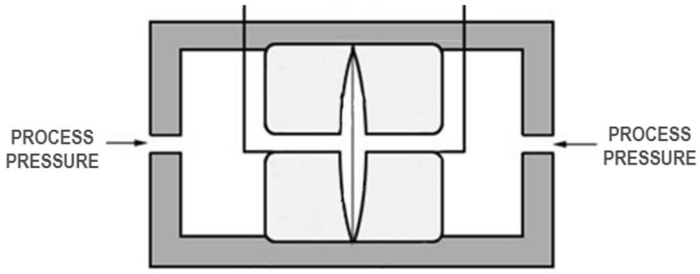
The pressures are transmitted to the central diaphragm by the filling oil and the difference between them causes it to deflect. The capacitors that make up the capacitive cell are part of an oscillator circuit that has its frequency dependent on the applied differential pressure. This frequency will 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



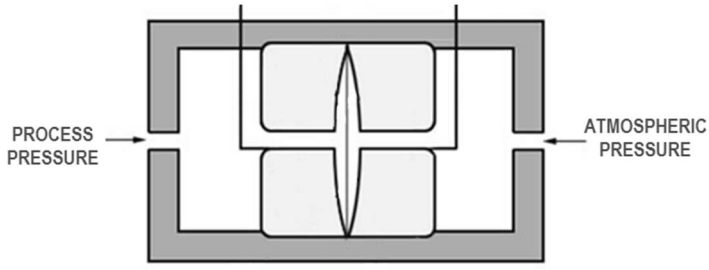
TRANSMITTER TYPES

Differential Transmitter – VPT10-D and VPT10-H



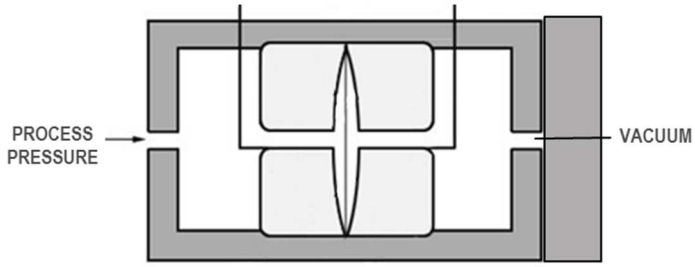
Transmitters in which process pressure is applied to the high and low sides of sensor. VPT10-H is used for processes with high static pressure.

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: ± 0.075% High Performance Model: ± 0.05%
Communication Protocol	Profibus PA according to IEC 61185-2(H1), voltage mode 31.25 Kbits/s, with bus power
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_2O) D2 / -37.4 to 37.4 kPa (-150 to 150 inH_2O) 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_2O) M2 / -37.4 to 37.4 kPa (-150 to 150 inH_2O) 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_2O) 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_2O) 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^2) Ranges 2 to 6: 16 MPa (163.1 kgf/cm^2) Range 7: 40 MPa (407.9 kgf/cm^2)
Stability(1)	Standard Model: ±0.2%*URL (5 years) High Performance Model: ±0.2%*URL (15 years)
Turndown	150:1 or 200:1 (depending on model)
Response Time	50 ms
Function Blocks	1 Analog Input (AI) and 1 Totalizer (TOT)
Output Type	Linear, Square Root and Table
Power Supply / Quiescent Current	9 to 32 Vdc, no polarity / 12 mA
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 Android platform. Local configuration via magnetic tool.
Write Proteção	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 ±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	**A**	ABSOLUTE
	D	DIFFERENTIAL
	H	DIFFERENTIAL HIGH STATIC PRESSURE
	M	MANOMETRIC
Sensor Range	**1**	-7.5 to 7.5 kPa (-30 to 30 inH_2O)
	2	-37.4 to 37.4 kPa (-150 to 150 inH_2O)
	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)
Diafragm 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**	¼ - 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-	**P**	**S**	**-**	**D**	**1**	**-**	**I**	**S**	**I**	**0**	**B**	**0**	**-**	**0**	**0**	**-**	**A**	**1**	**1**	**0**

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

VPT10 *Flanged Pressure Transmitter*

Communication Protocol	**H**	HART
	P	PROFIBUS
Sensor Type	**L**	LEVEL
Sensor Range	**2**	-37.4 to 37.4 kPa (-150 to 150 inH_2O)
	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 Diafragm 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**	¼ - 18NPT (NO ADAPTER)
	1	½ - 14NPT (WITH ADAPTER)
Process Connection (Level Socket)	**1**	1 ½" 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 Diafragm 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**	½ – 14 NPT
Painting	**1**	BLUE – RAL 5005

Ordering Code Example:

VPT10-	**P**	**-**	**L**	**2**	**-**	**I**	**S**	**I**	**0**	**B**	**0**	**-**	**1**	**I**	**0**	**I**	**S**	**-**	**0**	**0**	**-**	**A**	**1**	**1**

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VPT10 *Sanitary Pressure Transmitter*

Communication Protocol	H	HART
	P	PROFIBUS
Sensor Type	S	SANITARY
Sensor Range	2	-37.4 to 37.4 kPa (-150 to 150 inH_2O)
	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 Diafragm 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	¼ - 18NPT (NO ADAPTER)
	1	½ - 14NPT (WITH ADAPTER)
Process Connection (Sanitary Socket)	1	TRI CLAMP 1 ½" WITHOUT EXTENSION
	2	TRI CLAMP 2" 150 WITHOUT EXTENSION
	3	TRI CLAMP 2" 150 WITH EXTENSION
	4	SMS 1 ½" 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	PROPILEN GLICOL (NEOBEE)
Sanitary Socket Diafragm 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	½ – 14 NPT
Painting	1	BLUE – RAL 5005

Ordering Code Example:

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

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