INSTALLATION, OPERATION, CONFIGURATION AND MAINTENANCE MANUAL
July/2020

VPT10-P

PROFIBUS PA PRESSURE TRANSMITTER

VIVACE™ Process Instruments

PROFIBUS®

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NOTE

We have reviewed this manual with great care to maintain compliance with the hardware and software versions described herein. However, due to the dynamic development and version upgrades, the possibility of technical deviations cannot be ruled out. We cannot accept any responsibility for the full compliance of this material.

Vivace reserves the right to, without notice, make modifications and improvements of any kind in its products without incurring in any circumstances, the obligation to make those same modifications to products sold previously.

The information in this manual is frequently updated. Therefore, when using a new product, please check the latest version of the manual on the Internet through our website www.vivaceinstruments.com, where it can be downloaded.

You customer is very important for us. We will always be grateful for any suggestions for improvements as well as new ideas, which can be sent to the e-mail: contato@vivaceinstruments.com preferably with the title "Suggestions".

SUMMARY

WARNING

It is extremely important that all the safety instructions, installation and operation in this manual are followed faithfully. The manufacturer is not liable for damage or malfunction caused by improper use of this equipment.

It is recommended to strictly following the rules and good practice relating to installation, ensuring correct grounding, noise insulation and good quality cables and connections in order to provide the best performance and durability to the equipment.

Special attention must be considered in relation to installations in hazardous areas, where applicable.

SAFETY PROCEDURES

- *Appoint only skilled people, trained with process and equipment;*
- *Install equipment only in operation compatible areas, with the proper connections and protections;*
- *Use proper safety equipment for any handling device in field;*
- *Turn area power off before equipment installation.*

SYMBOLOGY

Caution - indicates risk or error source

Important Information

General or Specific Risk

Electric Shock Danger

GENERAL INFORMATION

Vivace Process Instruments ensures the operation of this equipment, according to the descriptions contained in its manual, as well as technical characteristics, not guaranteeing its full performance in particular applications.

The operator of this equipment is responsible for observing all aspects of safety and prevention of accidents applicable during the execution of the tasks in this manual.

Failures that might occur in the system, causing damage to property or injury to persons, shall additionally be prevented by external means to a safe outlet for the system.

This equipment must be used only for the purposes and methods proposed in this manual.

DATA SAVING

Whenever static data is changed via configuration, LCD will display ⚠ icon, which will be blinking until the save process is complete.

If user wishes to shut down the equipment, he must wait for the process to be finished.

If the equipment is shut down during saving process, a default will be performed, setting default values in device parameters and the user must subsequently check and configure those parameters according to his needs.

ERROR ON SAVING DATA

If a data execution or saving operation was incorrectly performed, message "BlkEr" will be displayed when the equipment is powered up.

In this case, user must perform factory initialization using two magnetic tool units as described below. Application-specific settings should be performed again after this procedure (except for the physical address and the "GSD Identifier Number Selector" parameter).

- With the equipment off, access "Z" and "S" holes of local adjustment, located under the equipment nameplate;
- Insert one of the tools inside "Z" hole and the other inside "S" hole;
- Energize the equipment and keep both magnetic tool units until icon ⚠ is displayed;
- Do not turn off power while icon ⚠ is displayed. If this happens, restart the procedure.

SIMATIC PDM CONFIGURATION

When using SIMATIC PDM tool for configuration/parameterization of this equipment, do not use "Download to Device" option. This function could incorrectly configure the equipment.

It is recommended for user to use "Download to PG/PC" option, to read the equipment parameters and then access the "Menu Device" option, where one can find specific menus for transducers, functional and LCD blocks, plus calibration, maintenance, factory etc. According to each menu, user will then be able to change the parameter or function as desired, in a fast and direct form.

1 EQUIPMENT DESCRIPTION

VPT10-P is a transmitter for differential, absolute or gauge pressure, level or flow measurements with PROFIBUS® technology, which integrates Vivace Process Instruments family of field devices.

The transmitter features intelligent, microprocessor-based capacitive sensor for safe operation and excellent field performance. It has integrated pressure and temperature compensations, providing high performance and stability of measurements.

VPT10-P must be powered by a voltage of 9 to 32 Vdc and uses Profibus PA communication protocol, according to IEC61158-2.

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 address of the VPT10-P via local adjustment, using a magnetic key or using configuration tools.

VPT10-P intelligent pressure transmitter is factory calibrated before shipment to customers. If it is necessary to recalibrate this transmitter in the field, be sure to use a calibrator at least three times more accurate than the specifications. To ensure correct and efficient use of the transmitter, please read this manual before installation.

1.1. BLOCK DIAGRAM

The modularization of the transmitter components is described in the following block diagram.

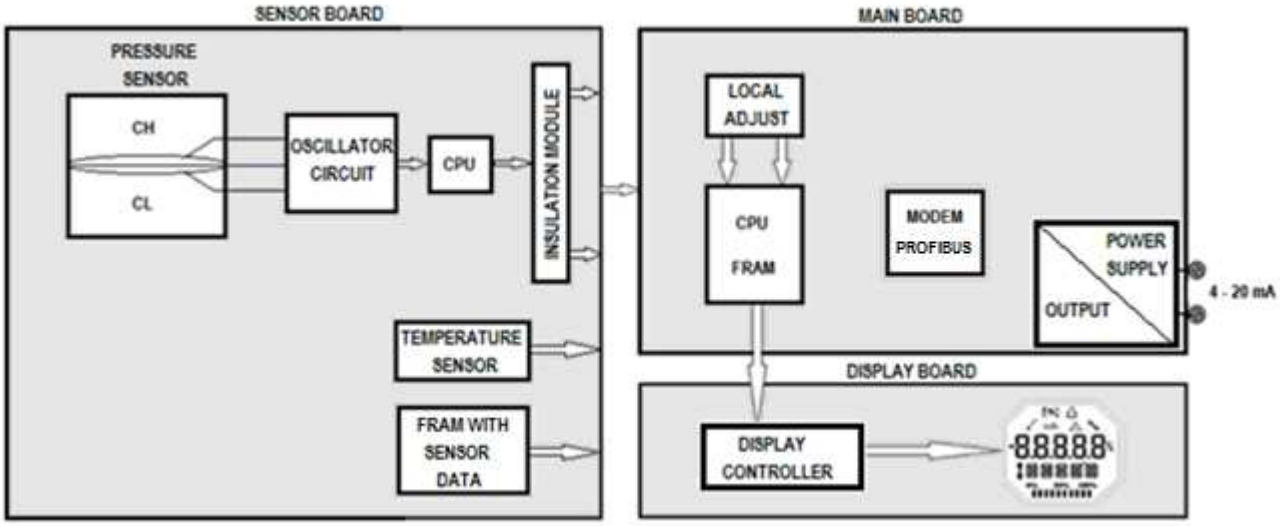


Figure 1.1 –VPT10-P block diagram.

The main board controls the main functions of the pressure transmitter. It contains a Modem Profibus PA and a microcontroller (CPU). The Modem is responsible for interpreting Profibus PA frames, making the interface between CPU and Profibus PA signals of communication network.

The CPU also receives inputs from the local adjustment block (Hall sensors) for the local configuration of the transmitter address using a magnetic key.

The display board has a controller block that works as an interface between LCD and CPU, adapting the messages to be displayed on the display.

The sensor board is responsible for reading the capacitances of the capacitive sensor, as well as the temperature for its processing by the main CPU.

1.2. CAPACITIVE SENSOR

The pressure sensor used by VPT10-P pressure transmitter is capacitive (capacitive cell), shown schematically in figure 1.2.

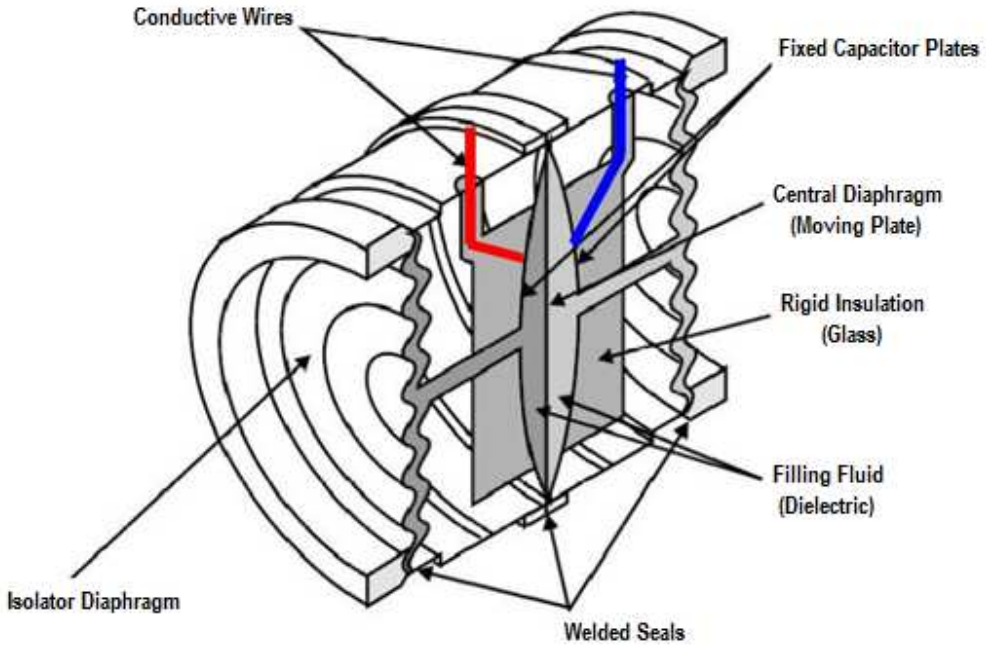


Figure 1.2 – High performance capacitive sensor.

See figure 1.3, below, to understand the working principle of the capacitive sensor.

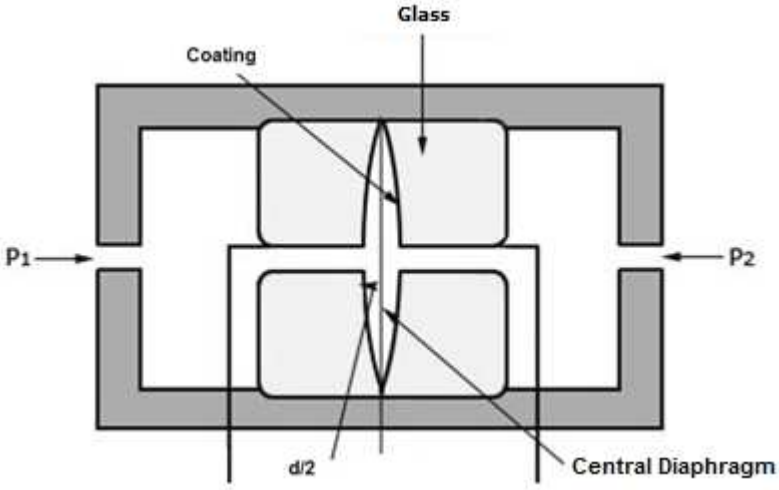


Figure 1.3 – Principle of operation of the capacitive sensor.

The core of the capacitive sensor is the central diaphragm. There are two measuring capacitances (CH and CL), according to the position of this diaphragm. These measuring capacitances share the central diaphragm (movable plate) and the other plate is attached to both sides of the sensor.

When the pressures on both sides are equal, the diaphragm is in the center and the capacitances on both sides are the same. However, when the pressure on the high pressure side (CH) is greater than the pressure on the low pressure side (CL), for example, the filling fluid will move, causing the diaphragm to move to the low pressure side . As a result, the capacitance on the high pressure side will be lower than the capacitance on the low pressure side.

However, when the differential capacitance structure is used, the distance between CL and CH plates has a linear variation with the relation between the difference and the sum of the measured capacitances.

When the displacement of the central diaphragm is inferior than its thickness, there will be a linear relationship between this displacement and the differential pressure. That is, if the differential pressure (ΔP) applied to the capacitive cell does not deflect the sensor diaphragm beyond d/4, we can assume that ΔP will be proportional to Δd.

In short:

P1 and P2 are applied pressures on the high and low pressure sides (H and L), respectively.

CH = capacitance on high pressure side, measured between P1 fixed plate and the central diaphragm.

CL = capacitance on low pressure side, measured between P2 fixed plate and the central diaphragm.

d = distance between the fixed plates of CH and CL.

Δd = deflection of the central diaphragm due to the application of the differential pressure ΔP = P1 - P2.

The capacitance of a capacitor of flat and parallel plates can be expressed as a function of the area (A) of the plates and the distance (d) separating them as:

$C = \frac{\epsilon A}{d}$, where ϵ = the dielectric constant of the medium between the capacitor plates.

If we consider CH and CL as capacitances of flat plates of the same area and parallel, when P1> P2 we have:

$$CH = \frac{\epsilon A}{(d/2) + \Delta d} \qquad CL = \frac{\epsilon A}{(d/2) - \Delta d}$$

On the other hand, if the differential pressure (ΔP) applied to the capacitive cell does not deflect the sensor diaphragm beyond d/4, we can assume ΔP proportional to Δd. $\Delta P \propto \Delta d$

If we develop the expression (CL-CH) / (CL+CH) we get: $\Delta P = \frac{CL - CH}{CL + CH} = \frac{2\Delta d}{d}$

As the distance (d) between the fixed plates of CH and CL is constant, the expression (CL-CH) / (CL+CH) is proportional to Δd and therefore to the differential pressure to be measured.

Thus, it is concluded that the capacitive cell is a pressure sensor composed of two capacitors of variable capacitances, according to the applied differential pressure.

These capacitors are part of an oscillator circuit that has its frequency dependent on the applied differential pressure. This frequency will be inversely proportional to the applied pressure and is measured by the CPU of the pressure sensor with high resolution, accuracy and processing speed

1.3. OPERATING PRINCIPLE

VPT10-P has the following functional blocks: PHY (Physical Block), TRD (Transducer Block), AI (Analog Input Block), TOT (Totalizer Block) and LCD (Local Adjustment Tree and LCD Configuration Block). Figure 1.4 outlines the functional block model for the VPT10-P transmitter.

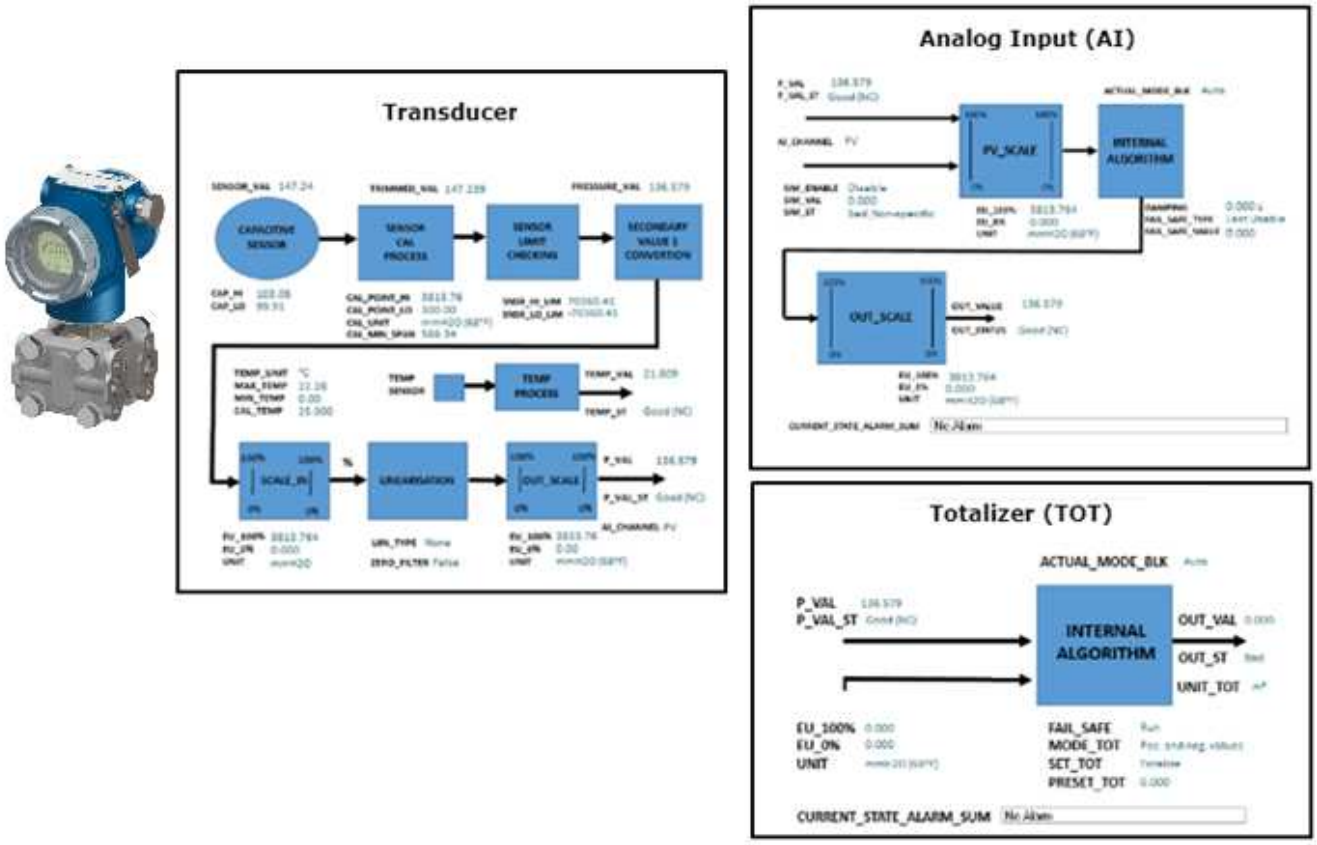


Figure 1.4 – Operating principle of VPT10-P.

Basically, the sensor signal is converted to a measured value through Transducer block and transferred to the AI or TOT function block. At this point, the measured value can be scaled and its values limited, before the output value is made available for cyclic scan from Profibus master

When analyzing the diagram above, it can be seen that pressure signal is delivered to the transducer block, which considers factory and/or user calibration procedures before "trimming" the value available. This value will be verified in the limit conditions according to sensor operating range and, once these conditions are not observed, a status will be generated by the transducer block through primary value. It is important to emphasize that in the strategy implemented by master, actions must be taken according to this status.

According to sensor range, user can choose the treatment for pressure value: Linear, Table, Square Root Extraction or the combination between Table and Square Root Extraction. With Table option, it is possible to mount a table of up to 21 points, mainly used with the characterization of volumes in tanks. The Square Root Extraction is used in the application of the mass and flow measurement transfer function.

VPT10-P still provides the ambient temperature reading as a secondary variable (see AI and TOT blocks in Figure 1.4). AI block receives the pressure or flow value from transducer block. According to user's previous configuration, limits, alerts and failure conditions are verified. In addition, scales, units and damping filters can be configured in the process signal that will be made available through cyclic data exchange. It is possible to simulate a value for loop testing conditions, widely used in commissioning and plant startups.

TOT block also receives, via channel, the flow signal and provides safe status and fault condition treatments. The integration is made taking into account the operation mode (MODE_TOT): only positive values of flow, only negative values of flow or both values. User can also reset the totalizer or set an initial start value (preset) via parameter SET_TOT. The reset option is widely used in batch processes.

2 INSTALLATION

RECOMMENDATION

When taking the equipment to the installation location, transfer it in the original packaging. Unpack the equipment at the installation location to avoid damage during transportation.

RECOMMENDATION

Model and specification of equipment are indicated on identification plate, located at the top of the housing. Check if supplied specification and model correspond to application requirements. Be aware of the maximum and minimum specifications and sensor range. After installation in the field, see Calibration topic.

STORAGE

The following precautions should be observed when storing the equipment, especially for a long period:

1) Select a storage area that meets the following conditions:
   a) No direct exposition to rain, water, snow or sunlight.
   b) No exposition to vibration and shocks.
   c) Normal temperature and humidity (around 20°C / 70°F, 65% RH).

However, it can also be stored under the following temperature and humidity intervals:

- Ambient Temperature: -40°C to 85°C (without LCD)* or -30°C to 80°C (with LCD)
- Relative Humidity: 5% to 98% RH (@ 40°C)

(2) For equipment storage, use original factory package (or similar).

(3) If storing an already used Vivace equipment, dry every moist part and clean all connections that was in contact with the process. Keep covers and connections closed and properly protected for its specific application and requirements.

** Only for general use. For explosion proof version, follow product certification requirements.*

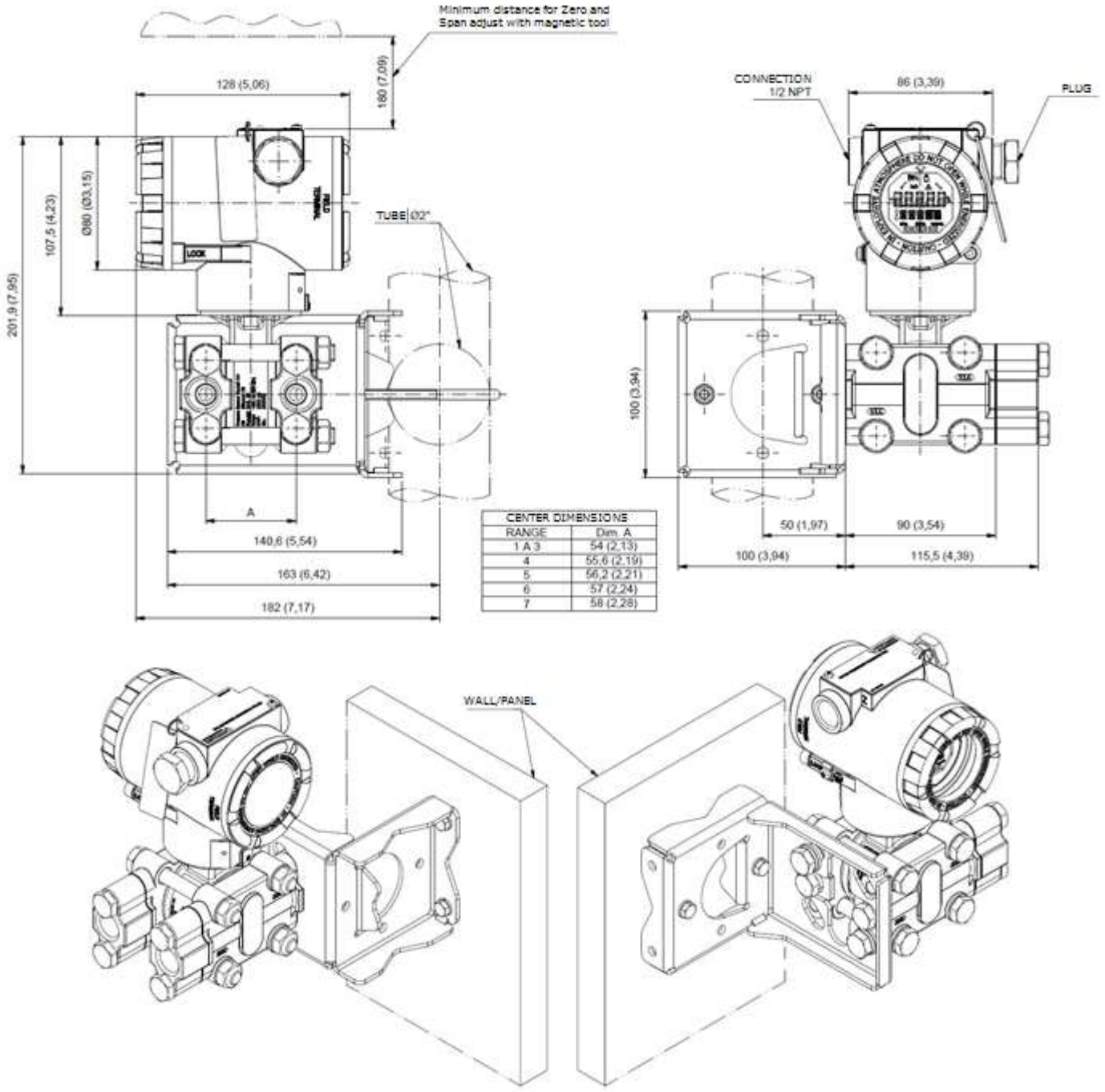
2.1. MECHANICAL ASSEMBLY

VPT10-P transmitter is designed for field installation and thus supports weather exposure, having good performance with variations in temperature, humidity and vibration.

Its housing has an IP67 degree of protection, being immune to water entering its electronic circuit and terminal block, provided that the cable gland or conduit of the electrical connection is correctly assembled and sealed with non-hardenable sealant. The covers should also be tightly closed to prevent moisture entering, as the threads of the housing are not protected by paint.

The electronic circuit is coated with a moisture-proof lacquer, but constant exposures to moisture or corrosive media can compromise its protection and damage electronic components.

Figure 2.1 shows the dimensional design and mounting forms of the VPT10-P.



CENTER DIMENSIONS	
RANGE	Dim. A
1 A 3	54 (2,13)
4	55,6 (2,19)
5	56,2 (2,21)
6	57 (2,24)
7	58 (2,28)

Figure 2.1 –Dimensional drawing and mounting for VPT10-P.

In order to avoid risk of the VPT10-P covers being released unintentionally due to vibrations, for example, they can be locked by means of a screw, as shown in figure 2.2.

VPT10-P is a field device that can be installed through a holder in a 2" tube secured by a U-clip. For best LCD positioning the equipment can rotate 4 x 90°, as shown in figure 2.3 . The transmitter can also be fixed with the same bracket on wall or panel.

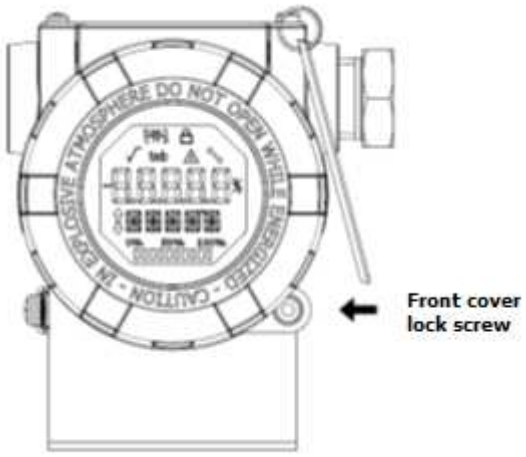


Figure 2.2 – Front cover lock.

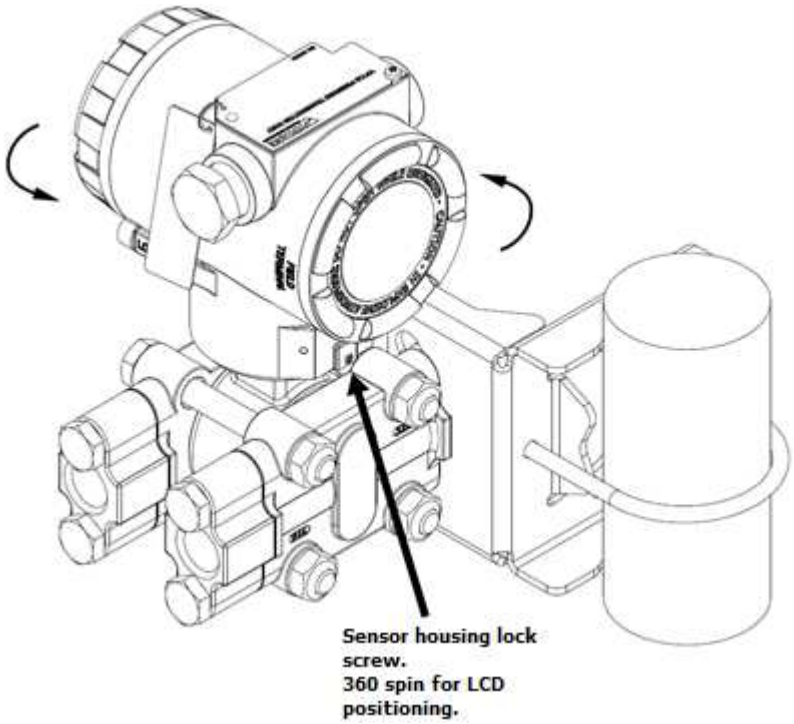


Figure 2.3 – Housing position adjustment.

VPT10-P LCD liquid crystal display can be rotated 4 x 90° so that the display is as adequate as possible for easy user viewing.

Figure 2.4 illustrates the possible rotation for VPT10-P LCD.

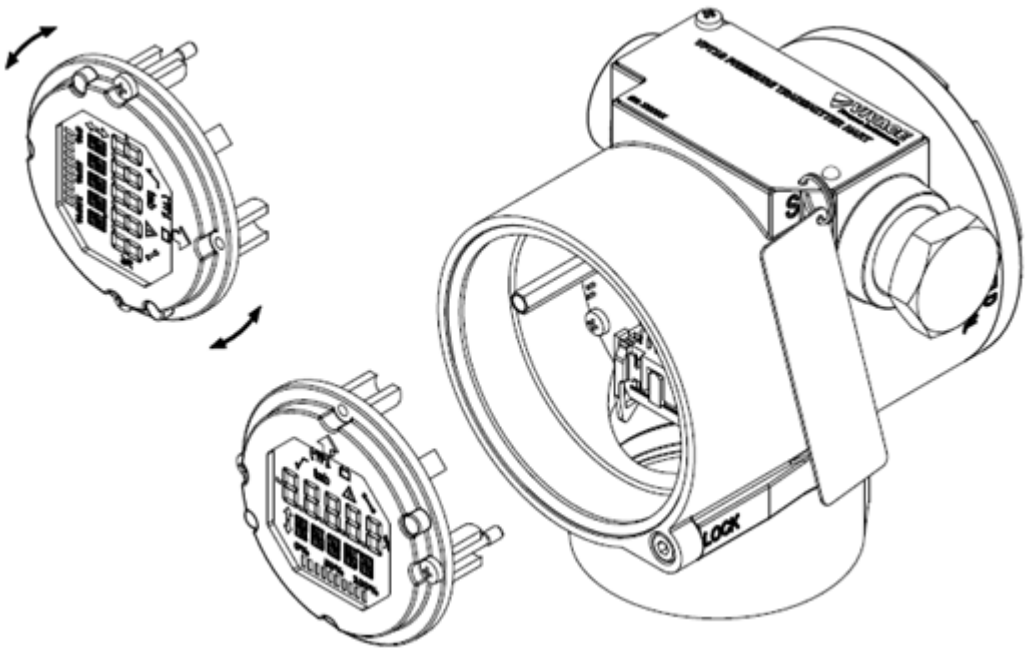


Figure 2.4 –4 x 90° LCD rotation.

VPT10-P pressure transmitter is designed to withstand harsh environmental conditions. However, to ensure stable and accurate operation for a long time, the following precautions must be observed when selecting an installation location.

(1) Ambient Temperature

VPT10-P has an intrinsic algorithm to compensate temperature variations. In the production process each transmitter is subjected to several cycles of temperature and a polynomial is created in order to minimize temperature variation, ensuring high performance of pressure measurements at any temperature. However, it is recommended to avoid locations subject to large variations in temperature or temperature gradients. If the site is exposed to radiant heat, provide adequate thermal insulation or ventilation. Also, facilities where process fluid can freeze inside the transmitter chamber should be avoided, which could cause permanent damage to the capacitor cell.

(2) Atmospheric Conditions

Avoid installing the transmitter in a corrosive atmosphere. If necessary, provide adequate measures to prevent or minimize intrusion/stagnation of rainwater or condensation that may accumulate through the electrical input. In addition, proper precautions should be taken in regard to corrosion due to condensation or moisture at the terminal block. Inspect it regularly, checking for proper closure of its covers. The covers must be completely closed manually until the o-ring is compressed, ensuring complete sealing. Avoid using tools in this operation. Be careful not to remove housing covers in the field, as each opening introduces more moisture to the circuits.

(3) Shock and Vibration

Select an installation location subject to minimum shocks and vibrations. Although the transmitter is designed to be relatively resistant and insensitive to vibration, it is recommended to follow good engineering practice. Mounts close to pumps, turbines or other equipment that generate excessive vibration should be avoided. If vibration is unavoidable, install the transmitter on a solid base using flexible hoses that do not transmit vibration.

(4) Installation of Transmitters with Explosion Proof Certification

Transmitters with this certification must be installed in hazardous areas according to the classification of the area for which they are certified. Installations in classified areas should follow the recommendations of standard NBR/IEC60079-14.

(5) Accessibility

Always select a location that provides easy access to the transmitter for maintenance and/or calibration. If so, rotate the LCD for proper viewing.

When the measured fluid contains suspended solids, install valves at regular intervals to clean the tubing (discharge).

Clean pipes internally (using steam or compressed air) or drain the line with the process fluid itself, whenever possible, before connecting these lines to the pressure transmitter.

Do not allow steam to enter the measuring chamber. Close the valves well after each drain or discharge operation.

Some examples of assemblies, showing the location of the transmitter relative to the outlet, are shown in figure 2.5. The location of the pressure take-off and the relative position of the transmitter are shown in table 2.1.

Process Fluid	Sockets Location	VPT10-P Location in relation to Sockets
Gas	Superior or Lateral	Above
Liquid	Lateral	Below or at same level
Steam	Lateral	Below using condensation chamber

Table 2.1 – Location of pressure sockets.

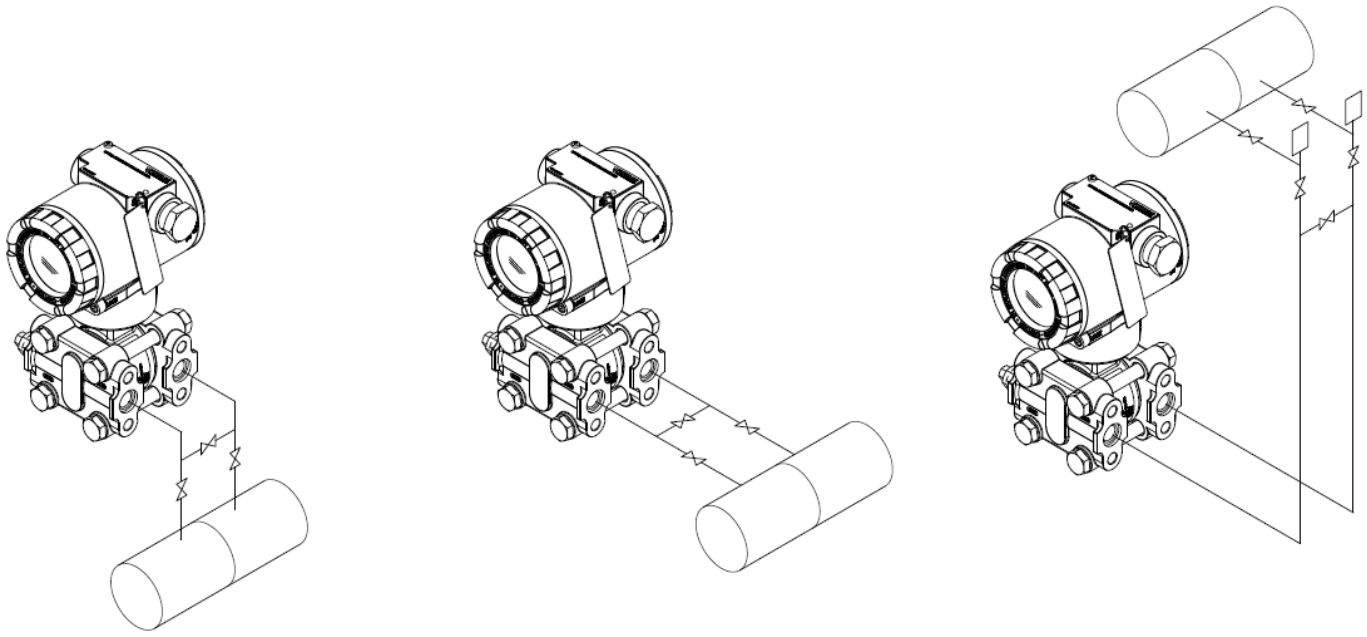


Figure 2.5 – Examples for transmitter mounting, in relation to pressure socket.

2.2. ELECTRICAL CONNECTION

To access the terminal block, remove the rear cover of VPT10-P. To do this, loosen the cover locking screw (see figure 2.6) by turning it clockwise.

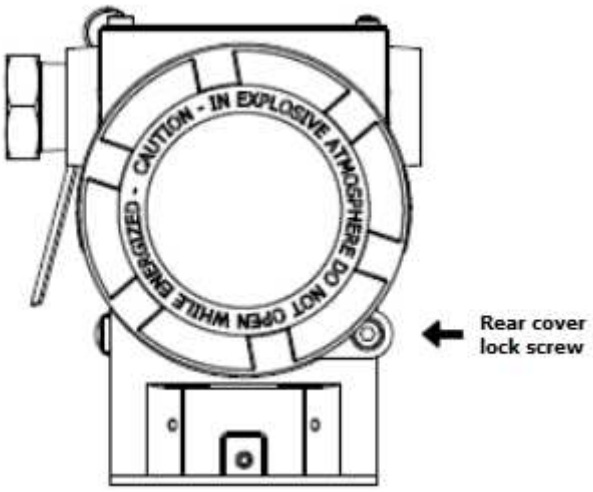


Figure 2.6 – Rear cover lock.

Figure 2.7 shows the power terminals (PWR BUS), the ground terminals (one internal and one external), in addition to the communication terminals. To power the equipment it is recommended to use Profibus PA certified cables type AWG18 with shield (capacitance < 30 pF).

Table 2.2 describes the functions of the VPT10-P.

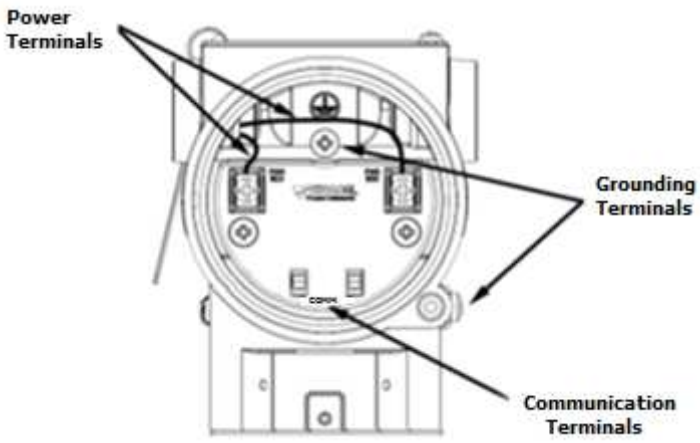


Figure 2.7 – Connections for VPT10-P.

Terminal Description
Power Terminals - PWR BUS 9 to 32 Vdc without polarity
Grounding Terminals 1 internal and 1 external
Communication Terminals - COMM Communication with Profibus PA Configurator

Table 2.2 – Terminal description for VPT10-P.

NOTE

All cables used to connect the VPT10-P to the Profibus PA network must be shielded to avoid interference and noise.

NOTE

It is extremely important to ground the equipment for complete eletromagnetic protection and also to ensure the correct performance of transmitter on Profibus-PA network.

The conduits through which the power cables of the equipment pass must be mounted in such a way as to prevent water from entering the terminal block. The threads of the conduits must be sealed according to the standards required by the area. The unused electrical connection must be sealed with a suitable plug and sealant.

Figure 2.8 shows the correct way to install the conduit in order to avoid the entrance of water or other product that could cause damage to the equipment.

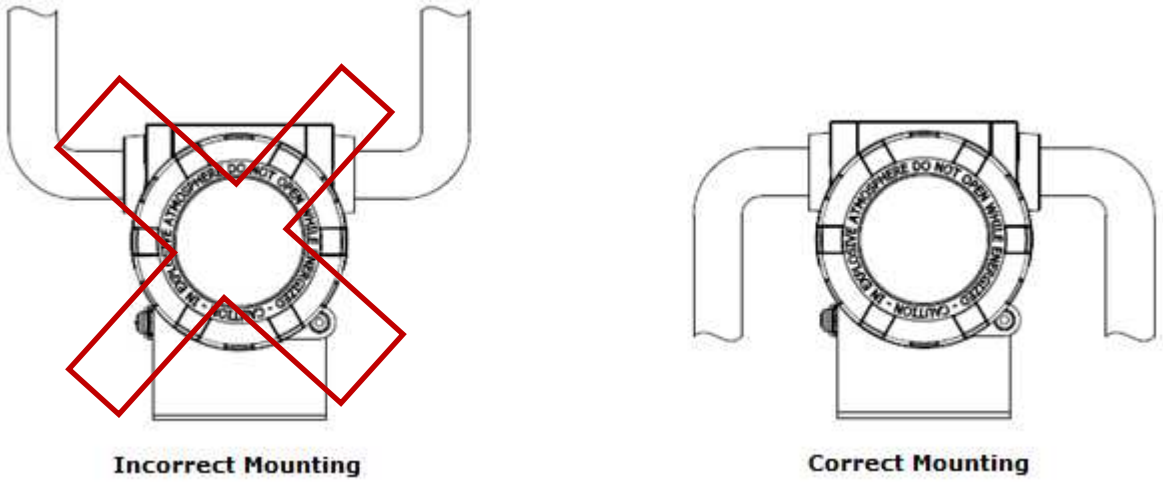


Figure 2.8 – Conduit installation.

2.3. PROFIBUS-PA NETWORK CONNECTION

Figure 2.9 illustrates the installation of a number of Profibus network elements and the connection of Profibus PA devices to the Profibus network.

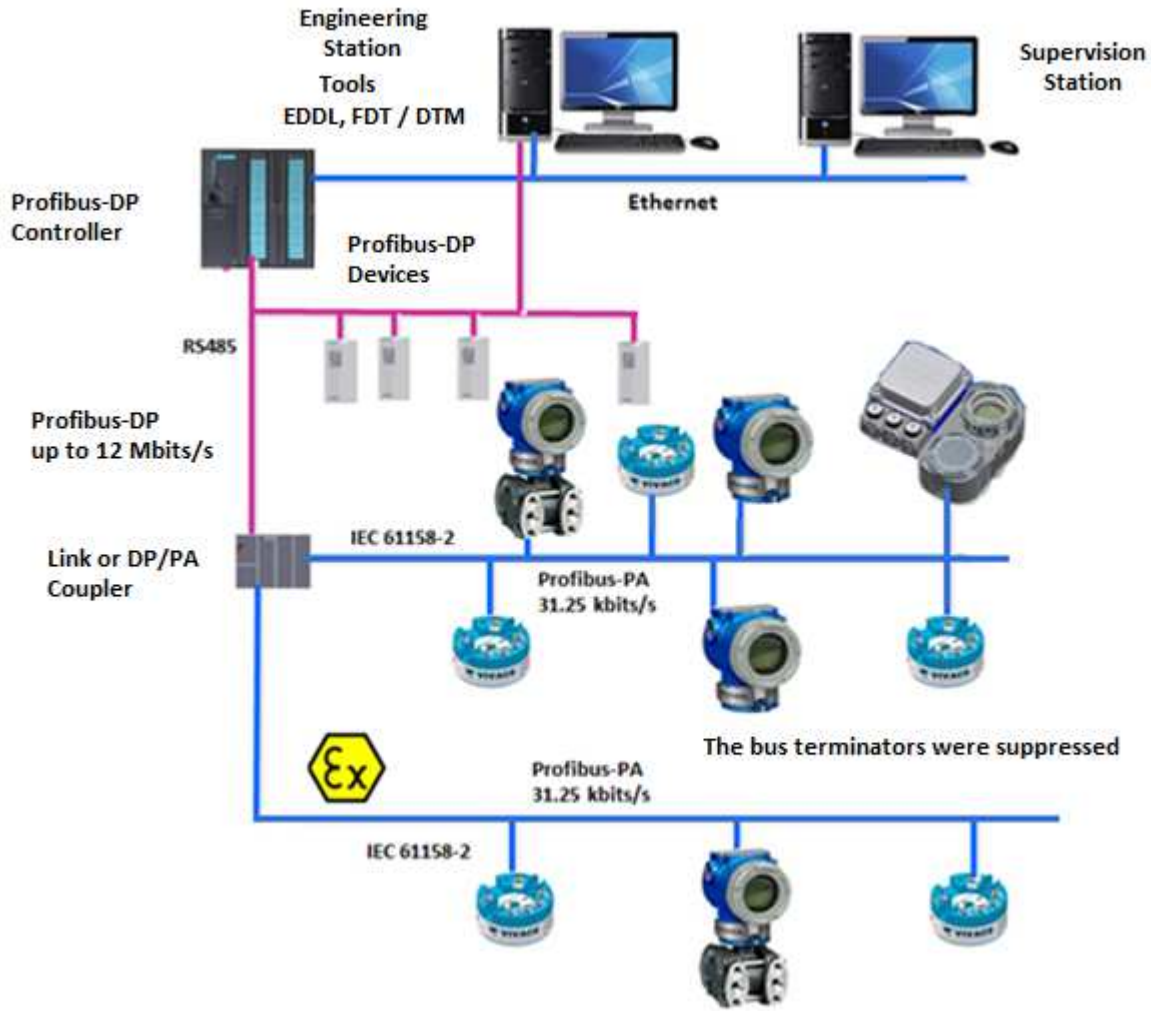


Figure 2.9 - Connecting a Profibus PA device to the bus.

3 CONFIGURATION

VPT10-P configuration can be made through a programmer compatible with Profibus PA technology. Vivace offers the interfaces of VCI10-P line (USB and Bluetooth) as a solution for the configuration and monitoring of the equipment of Profibus PA line. The address of the VPT10-P can also be configured by local adjustment, with the help of a Vivace magnetic key.

3.1. LOCAL CONFIGURATION

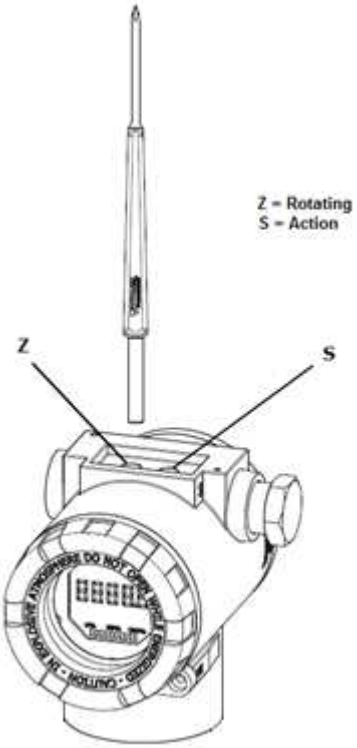


Figure 3.1 – Z and S orifices and magnetic screwdriver.

Transmitter's local configuration is executed by using Vivace's magnetic screwdriver on Z and S orifices, located at housing superior side, under identification plate. Orifice Z starts local configuration and changes the field to be configured. Orifice S is responsible for changing and saving the new value on the selected field. Saving after LCD value changing is automatic.

Figure 3.1 shows orifices Z and S for local configuration, stamped on device housing, and their functions on magnetic screwdriver actuation.

Insert the magnetic screwdriver on *Zero* orifice (Z). icon appears to indicate that device has recognized the screwdriver action. Keep the magnetic screwdriver inside until "LOCAL ADJST" message is shown on display, then remove it for 3 seconds. Insert the magnetic screwdriver into Z orifice again, so user can navigate through local adjust parameters.

Table 3.1 indicates actions executed by magnetic screwdriver when inserted on Z and S orifices.

ORIFICE	ACTION
Z	**Select configuration tree function**
S	**Act on selected function**

Table 3.1 – Z and S orifices actions.

Some parameters show the icon to allow user configuration on it by inserting the magnetic screwdriver into *Span* orifice (S). In case the parameter has pre-defined values, those will be rotate on display, while the magnetic screwdriver remains into *Span* orifice (S).

If the parameter is numerical, this field will enter on edition mode and decimal point will start blinking, and shifting to left. When user removes magnetic screwdriver from S, the least significant digit (in the right) starts blinking, indicating it is ready for edition. By inserting the magnetic screwdriver into S, user is enabled to increase the digit value, from 0 to 9.

After the least significant digit edition, user should remove magnetic screwdriver from S in order to start the edition of the next digit (in the left). User will be able to edit each digit independently, until the most significant digit (5th digit on the left) is complete. After the 5th digit edition, user can also change the signal for the numerical value still on S orifice.

During each step of edition, user is able to return to the previous digit (to the right) by inserting the magnetic screwdriver into Z orifice, so corrections can be made. By removing the magnetic screwdriver at any time, user will see the digits blinking until the final step, where the edition mode will be finished, saving the numerical value configured by user.

If the configured value is not acceptable by that device parameter (invalid value), it will be returned to the last valid value before edition. Depending on the parameter, some values can be shown on numerical or alphanumerical fields, adjusting the best option view to user.

With the magnetic screwdriver out of Z and S orifices, device will leave local adjust mode after some seconds and monitoring mode will be shown.

3.2. JUMPER CONFIGURATION FOR LOCAL ADJUST AND WRITE PROTECTION

VPT10-P has two jumpers on its main board to protect data writing (WP1) and also enabling/disabling local adjust (ADJL1). Figure 3.2 presents those jumpers.

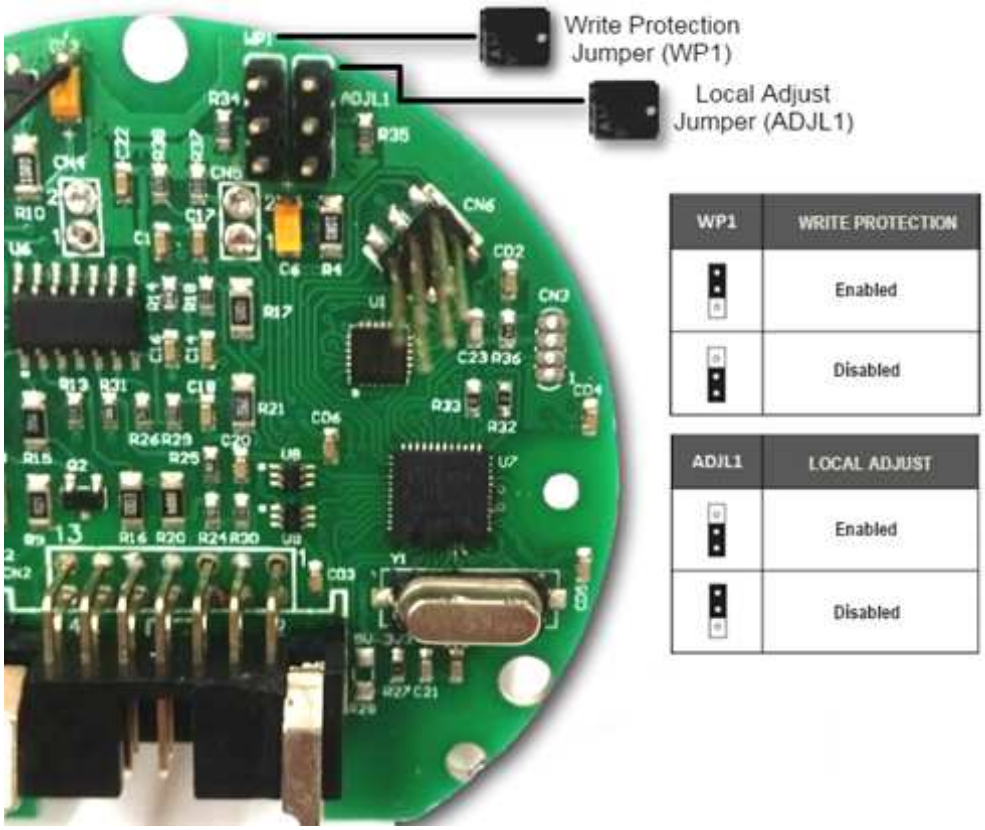


Figure 3.2 – Jumpers WP1 (write protection) and ADJL1 (local adjust) on VPT10-P main board.

Default selection for these jumpers is Write Protection **DISABLED** and Local Adjust **ENABLED.**

3.3. LIQUID CRYSTAL DISPLAY (LCD)

The main information regarding the equipment is available on the LCD display. Figure 3.3 shows the LCD with all its display fields. The numerical field is mainly used to indicate the values of the monitored variables. The alphanumeric indicates the currently monitored variable, units, or auxiliary messages. The meanings of each of the icons are described in table 3.2.

Figure 3.3 – LCD fields and icons.

SYMBOL	DESCRIPTION
	Sending Communication
	Receiving communication
	Write protection enabled
√	Square root function enabled
tab	Characterization table enabled
	Diagnostic occurence
	Recommended maintenance
	Increment values in the local adjust
	Decrement values in the local adjust
°	Degrees symbol for temperature units
0% 50% 100%	Bargraph to indicate the measured variable range

Table 3.2 – LCD icon description.

3.4. PROFIBUS PROGRAMMER

The configuration of the equipment can be made through a programmer compatible with Profibus PA technology. Vivace offers the interfaces VCI10-P (USB and Bluetooth) as a solution for the identification, configuration and monitoring of the equipment of the Profibus PA line.

Figure 3.4 shows the connection diagram for configuring the VPT10-P via the Vivace VCI10-UP USB interface, which feeds the device in local mode, with a personal computer that has the PACTware configuration software.

Figure 3.4 – Connection of VCI10-UP to VPT10-P.

3.5. LOCAL ADJUST CONFIGURATION TREE

Figure 3.5 shows available fields for local configuration and the sequence they are presented by magnetic screwdriver actuation on Z and S orifices.

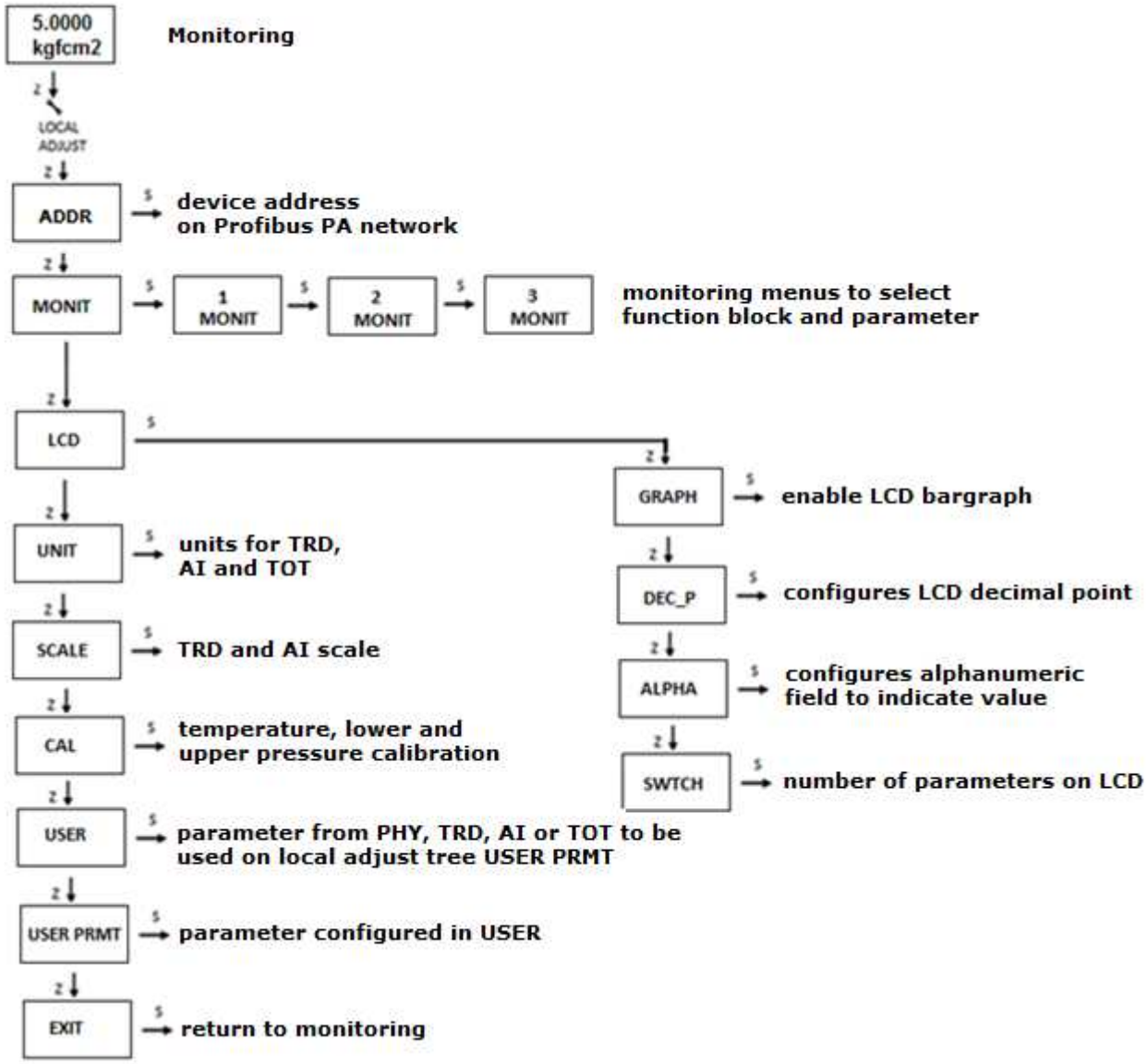


Figure 3.5 – Local adjust programming tree for VPT10-P.

3.6. PROFIBUS CONFIGURATOR PROGRAMMING TREE

The configuration tree is a tree-shaped structure with the menus for all software resources available, as shown on figure 3.6.

For online configuration of the transmitter, check it is correctly installed, powered by the adequate voltage, necessary for communication.

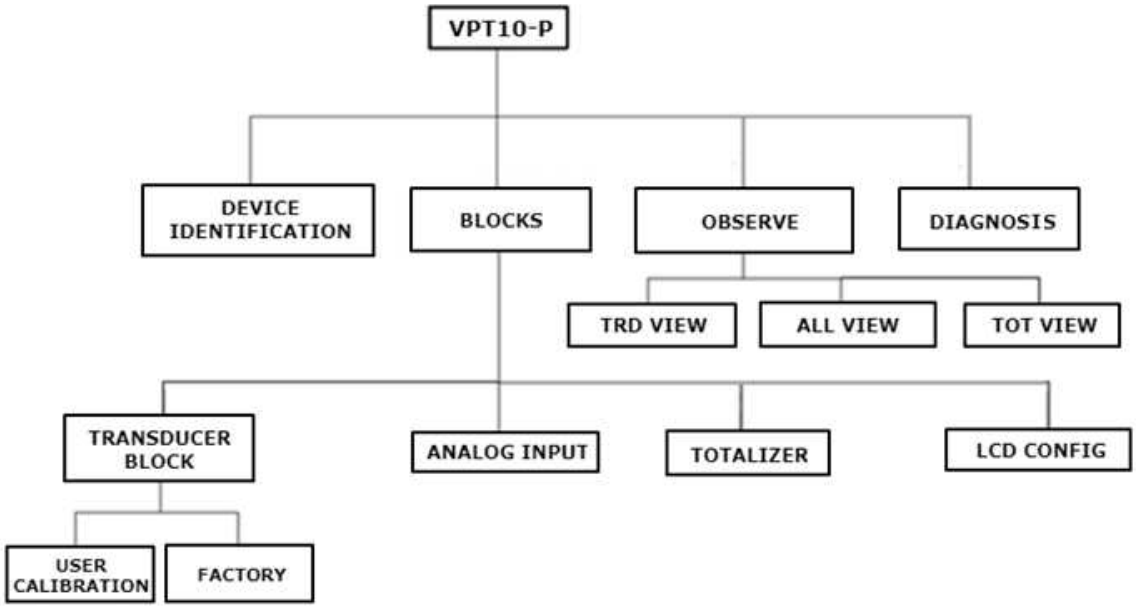


Figure 3.6 – VPT10-P programming tree.

Transducer Block - Here the transducer block is configured.

• **Settings** - This menu sets the primary type of measurement (Pressure or Flow) and the type of linearization (table, square root extraction, table + square root extraction).

• **Scales/Units** - The output scale (EU0% and EU100%), the pressure or flow measurement unit and the temperature unit (secondary measurement) are set here.

• **Simulate** - Allows user to simulate a pressure value.

• **Sensor Value** - Allows user to check the capacitive sensor reading and even sensor diagnostics. A 9999.9 reading on the Hi and Low capacitance parameters indicates sensor failure.

• **Sensor Info** - Allows you to check the sensor manufacturing information.

• **Calibration** - In this menu the lower and upper pressure settings are performed with reference, in addition to the temperature calibration. See the following Calibration topic.

• **Factory:**

- **Backup Restore** - In this parameter it is possible to restore the factory calibration, the last calibration, as well as make a backup of the factory calibration, the last calibration and the sensor data.
- **GSD** - In this menu user can select the identification of the GSD file (Profile Specific or Manufacturer Specific).
- **Reset** - In this menu user can perform the factory reset.
- **Write Protect** - Allows user to protect your computer against scripts.
- **Factory Sensor** - Area restricted to Vivace professionals and protected with password for access.

Analog Input - Here the parameters of the analog input block are configured.

• **Basic Settings** - In this menu the operating mode (automatic, manual or out of service), output scale (EU0% and EU100%), unit, channel and damping are set.

Damping

It is an electronic pressure reading filter that changes the response time of the transmitter to smooth the variations in the output readings caused by rapid variations in the input. The damping value can be set between 0 and 60 seconds and its appropriate value must be based on the process response time, the stability of the output signal and other system requirements. The default damping value is 0 s.

The value chosen for damping affects the response time of the transmitter. When this value is set to zero, the damping function will be disabled and the output of the transmitter will immediately react to changes in its input, so the response time will be as short as possible.

Increasing the damping value leads to an increase in the transmitter response time. At the time the damping time constant is defined, the output of the transmitter will go to 63% of the value of the change in the input and the transmitter will continue to approach the input value according to the damping equation.

• **Alarm/Warning** - This menu sets the Upper and Lower Warning and Alarms Limits. The Hysteresis Limit is also configured. The measuring unit selected in "Basic Settings" is indicated in this menu, in addition to checking the current alarm status. The standard graphic of the process variable limits is also displayed.

• **Fail Safe** - This menu sets the fault safety type, the fault safety value and displays the unit of measure selected in "Basic Settings".

• **Simulate** - This menu enables or disables the Simulation function, sets the value of the position, shows the unit selected in "Basic Settings" and status.

• **Mode Block** - This menu shows Target operation mode (manual, automatic or out of service) and Real, the value of the output variable is set to the unit selected in "Basic Settings" and status. The alarm status of the position is also observed.

Totalizer - Here the totalizer block parameters are configured.

The Totalizer (TOT) block, as well as the AI block, receives a process value via channel with the transducer block. This value is totalized over time, for example in mass or volumetric flow measurements.

The TOT block supports the following operating modes:

• Auto: In this mode the block output is calculated and made available via cyclic communication to the controller, Profibus Class 1 master;

• OOS (Out of Service): In this mode, the block algorithm is not processed.

The algorithm of the TOT block applies to the value measured by the transducer block when the mode is set to Auto. This algorithm includes the treatment of errors and failures, selection of signals of the value to be totalized, as well as the treatment of alarms.

The TOT block totalizes the process variable as a function of time and its unit is supplied by the TRD block. Its algorithm converts the units of time into units per second.

The signal selection of totalized values is controlled by the parameter MODE_TOT. The resulting totalization is obtained by the sum of the values, considering its signals and what is configured in the MODE_TOT:

• Balanced - Negative and positive values are totaled;

• Positive Only - Only positive values are totaled. Negative values will be considered zero;

• Negative Only - Only negative values are totaled. Positive values will be considered zero;

• Hold - The algorithm is kept constant.

The TOTAL parameter is the quantity totalized by the block, whose unit is in accordance with the parameter UNIT_TOT and must be compatible with the input unit supplied by the Transducer block.

Operation of the TOT Block: check the flow configuration in advance, configure for square root extraction, TOT channel for PV and Mode Block for Auto. Make sure that the Transducer block has the output scale unit configured for flow, eg m^3/s, whereas the TOT block must be m^3, in this case. If the unit in the Transducer is different from a flow unit (%, for example), the status of the totalizer output should indicate "Bad Config". See further details on flow measurement and configuration in the Transducer block on the next page.

The totalization can be configured by the parameter SET_TOT, where the user can reset it with the option Reset, initialize it with a preset value by the PRESET_TOT parameter, choose the Preset option, or even start the totalization by setting the SET_TOT for the Totalize option.

LCD Config - Here the LCD screen is configured for up to 3 variables: Monit 1, Monit 2 and Monit 3.

- **Monit x** - These menus configure the Function Block (Physical, Transducer, Analog Input or Totalizer), Relative Index (Target Mode, Primary Value or User Index), Structure Element, Mnemonic, decimal number (1, 2, 3 or 4) enable or disable the alphanumeric field and display the value of the parameter monitored.
- **User Prmt** - In this menu the Function Block (Index, Transducer, Analog Input or Totalizer), index, central element, decimal number (1, 2, 3 or 4) are configured.
- **LCD Switch** - Here you can select how many parameters will be displayed on the LCD (1, 2 or 3).
- **LCD Bargraph** - In this menu the bargraph of the display is inhabited or disabled.

Observe - In this menu, the values and the status of the parameters of the TRD, AI and TOT blocks are monitored.

Diagnosis - User can check some diagnostics available for the capacitive sensor.

Calibration

Through the calibration menu, user can perform the calibration of the lower or higher pressure point. Prior to any calibration procedure, it is recommended to save the calibration using the standby parameter so that it can be recovered in case of an error during the process. In the same way, the Restore option can be used to restore the sensor data, including factory calibration.

VPT10-P intelligent pressure transmitter is factory calibrated before shipment to the customer. If it is necessary to recalibrate this transmitter in the field, be sure to use a calibrator at least three times more accurate than the specifications.

After installation, it is recommended to zero the transmitter, since the zero point may change due to the mounting position and the sensor.

Adjusting Pressure Zero: Apply zero input pressure to the transmitter before starting the zero adjustment calibration and wait until the zero reading stabilizes. Note that if the pressure transmitter is of the absolute type, an absolute zero pressure source must be used. If the model is differential, apply the same pressure on the high and low pressure sides, and finally, if it is the manometric model, open the valve installed to atmospheric pressure.

User Table

Used in measurement of level, volume or any other measurement that requires a personalized exit. VPT10-P has a user table with 21 points with input and output as a percentage (depending on the output scale of the Transducer block).

The user must configure at least two points in the table. The points will define the characterization curve.

It is recommended to select the points equally distributed on the desired track or on a part of the track where better accuracy is required. The table should be monotonically increasing, ie all points in the increasing order of x, as in the example in the following figure.

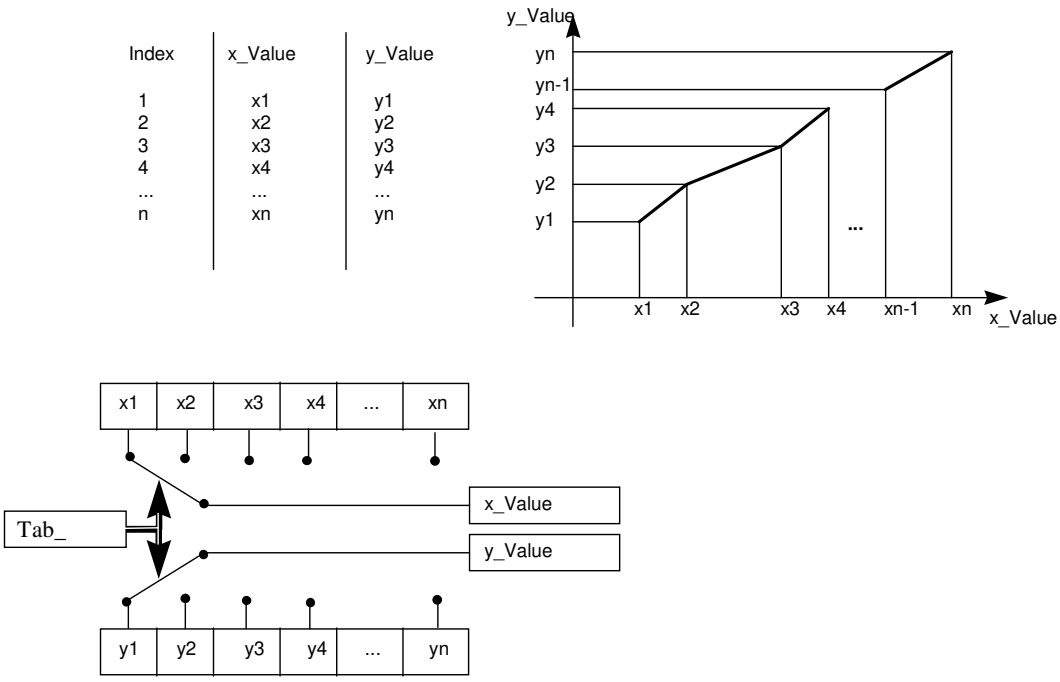


Figure 3.7 – User table.

Flow Measurement

VPT10-P can calculate mass or volumetric flow rate. For flow measurement, user must set the primary flow measurement and the linearization type for square root extraction (or Square Root + Extraction).

In addition, according to figure 3.8, note that there is a point to be defined, where there is a zero flow (Low Flow Cutoff) and also a point where the response of the flow measurement is no longer linear with the pressure and it starts to treat the square root extraction, according to the differential pressure applied (Flow Lin Sqr Point).

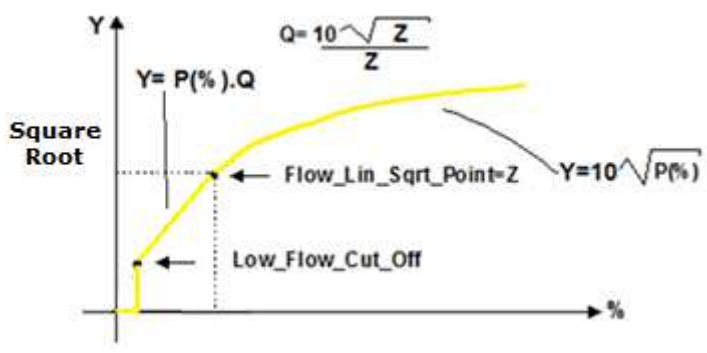


Figure 3.8 – Flow measurement and square root extraction.

Once the transfer function has been defined according to the application, the user can choose the output unit, with which the pressure or flow rate will be made available to the system master via block AI or TOT, respectively, to through cyclical data exchange services.

3.7. FDT/DTM CONFIGURATION

FDT/DTM-based tools (Ex. PACTware®, FieldCare®) can be used for device information, configuration, monitoring, calibration and diagnosis with Profibus PA technology. Vivace offers the DTM files for all of its devices (HART® and Profibus PA).

PACTware® is property of *PACTware Consortium* and can be found on http://www.vega.com/en/home_br/Downloads.

The following figures exemplify DTM configuration screens for VPT10-P using Vivace's VCI10-UH interface and PACTware®.

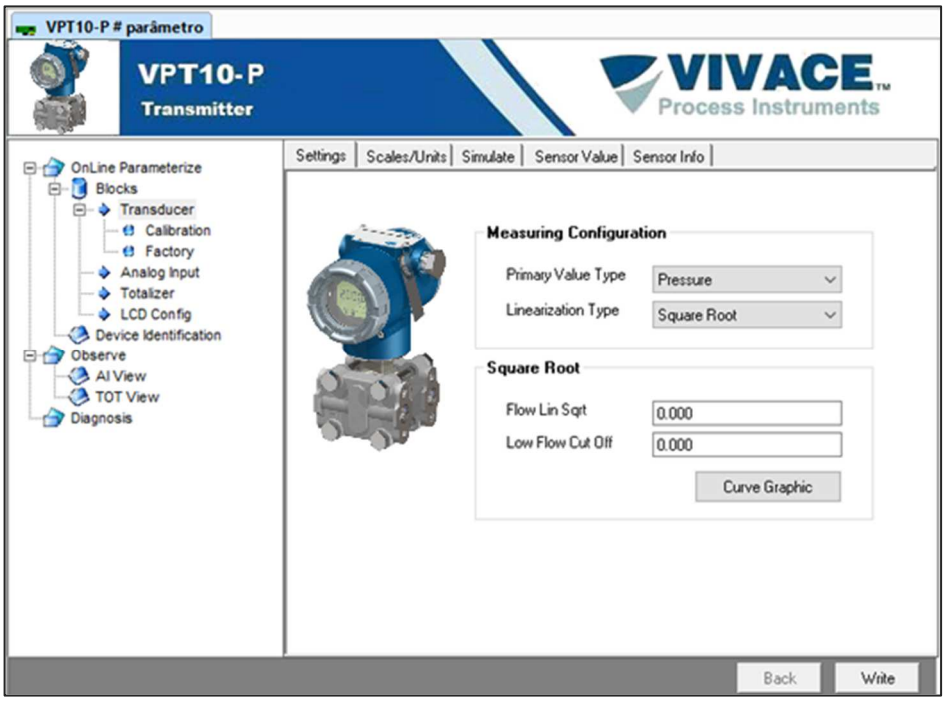


Figure 3.9 – Configuration screen for VPT10-P on PACTware.

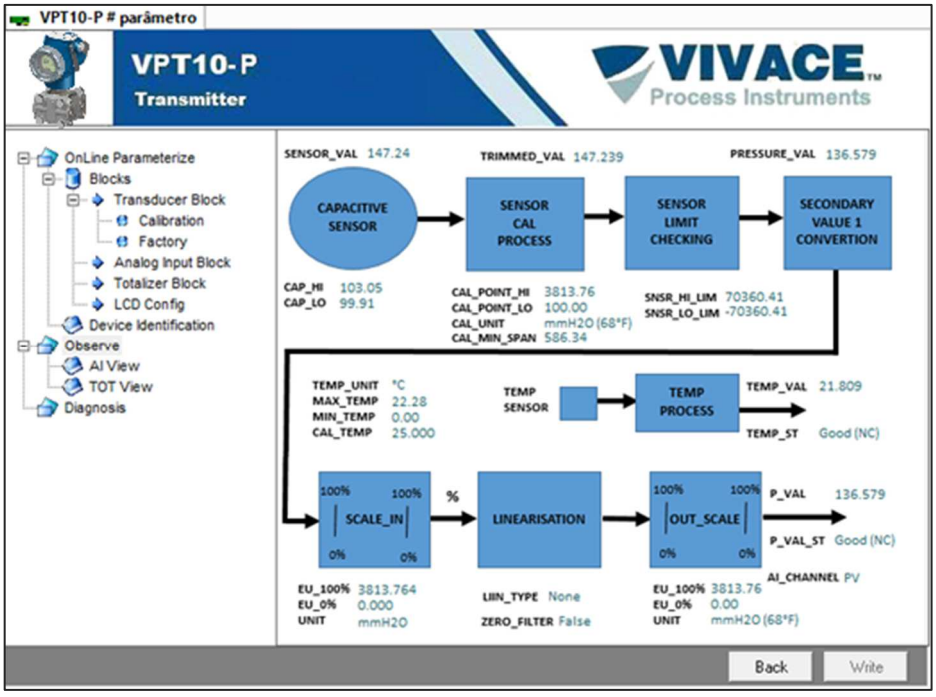


Figure 3.10 – Monitoring screen for VPT10-P on PACTware.

3.8. CYCLIC CONFIGURATION

VPT10-P has 2 functional blocks, being an AI (analog input) and a TOT (totalizer). It also has the empty module (Empty Module) for applications where you want to configure only one block.

According to the type of application, the appropriate cyclic configuration must be made, respecting the following cyclic order of the blocks: AI and TOT. When the user does not work with a functional block, for example, it will only work with the AI, then you must use the empty module: AI, Empty Module.

Most Profibus configurators use two directories where the GSD and BITMAP files from the various manufacturers are located. The GSD and BITMAPS for Vivace equipment are available on the website (*www.vivaceinstruments.com.br*).

Follow the procedure below to integrate the VPT10-P into a Profibus system (these steps apply to all Profibus PA Vivace line devices).

- Copy the GSD file of the VPT10-P to the directory where all the GSD files of the Profibus configurator, usually called "GSD" are located;
- Copy the BITMAP file of the VPT10-P to the directory where all the BMP files of equipment of the Profibus configurator, usually called "BMP";
- After choosing the PROFIBUS-DP master, set the communication rate. Do not forget that DP/PA couplers can have the following communication rates: 45.45 kbits/s (Siemens), 93.75 kbits/s (P+F) and 12 Mbit/s), SK3). The IM157 device link can have up to 12 Mbits/s;
- Add the VPT10-P and specify its address on the bus;
- Select the cyclic configuration through the parameterization, according to the GSD file, which depends on the application, as seen previously. For the AI block, the VPT10-P provides the master with the value of the process variable in 5 bytes, the first four in the floating point format (IEEE-754) and the fifth byte forming the status that the information of the quality of this measurement.
- Some devices support the cyclic modules in the "long" and "short" formats. If there is a failure in the cyclic communication, check if by changing the chosen format, the communication is established successfully.
- For the TOT block, you can choose the totalization value (Total) and additionally, the totalization is done taking into account the mode of operation through the selection of the parameter Mode_Tot, where you can define how totalization will be done (only positive values of flow, only negative values of flow, both values). You can also reset totalization and set an initial value (preset) through the Set_Tot parameter.
- If necessary, it activates the watchdog condition, which causes the equipment to assume a safe fault condition upon detection of a loss of communication between the slave device and the Profibus-DP master.

Check byte swap condition (MSB with LSB inversion and, in some cases, nibble inversion), as for some systems it will be necessary on handling cyclic data.

The VPT10-P has the GSD identifier number equal to 0x0FB3 (Manufacturer Specific) and can still work with the value 0x9740 (Profile Specific).

DD, DTM and GSD for VPT10-P can be found on the website: www.vivaceinstruments.com.br

For further information on the Profibus PA technology, refer to the Vivace website in the Installation, Operation and Configuration Manual - Profibus PA - blocks, parameters and structure.

DP/PA Link

In a Profibus DP network it is common to have Link Devices DP/PA to provide an increase of the communication rate up to 12 Mbits/s and even increase the addressing capacity, since these devices are slaves in the Profibus-DP network and teachers in the Red Profibus PA network. Each Link Device may have connected several DP/PA couplers.

Siemens has a Link device DP/PA which is the model IM157. This device works with a DP/PA adapter at a communication speed of 31.25 kbits/s and in the Profibus-DP network from 9.6 kbits/s to 12 Mbits/s. The IM157 and each coupler are powered with 24 Vdc. The maximum number of field devices per link is limited to 30 or 64 computers, but this depends on the model and the number of bytes exchanged cyclically.

When using the Link Device it is necessary to verify that the cyclic modules for Vivace Process Instruments equipment are included in your GSD file.

If not, these should be included. To do so, access the Siemens website and download the GSD tool. This is a tool that allows you to extend the GSD file of Siemens link devices (IM157, IM53) by adding the modules of new Profibus PA devices that are not in the GSD file. You must have the GSD of the link device and Vivace team in the directory where the GSD Tool was installed and when running, choose the option to extend the GSD file of the link device, choose the link template and the GSD of the team and run. After execution, note that a section has been created for the Vivace device with its cyclic modules.

3.9. SENSOR DIAGNOSTICS

VPT10-P allows the user to identify some problem conditions related to the sensor through the Diagnosis Menu:

- "Sensor Good"
- "Sensor Fail"
- "Sensor Not Initialized"
- “Sensor Initialized"
- "Sensor Not Connected"
- "Sensor Connected"
- “Fail on Capacitance Hi”
- “Fail on Capacitance Low”

When in fault, the capacitance value read will be of 9999.9.

4 MAINTENANCE

VPT10-P transmitter, like all Vivace products, is rigorously evaluated and inspected before being sent to the customer. However, in case of a malfunction, a diagnosis can be made to check whether the problem is located in the installation, in the configuration of the equipment or if there is a problem in the transmitter.

4.1. ASSEMBLY AND DISASSEMBLY PROCEDURES

Figure 4.1 shows in detail all components of the VPT10-P. Before disassembling the equipment, it must be switched off. Maintenance of electronic boards should not be performed under penalty of loss of equipment warranty.

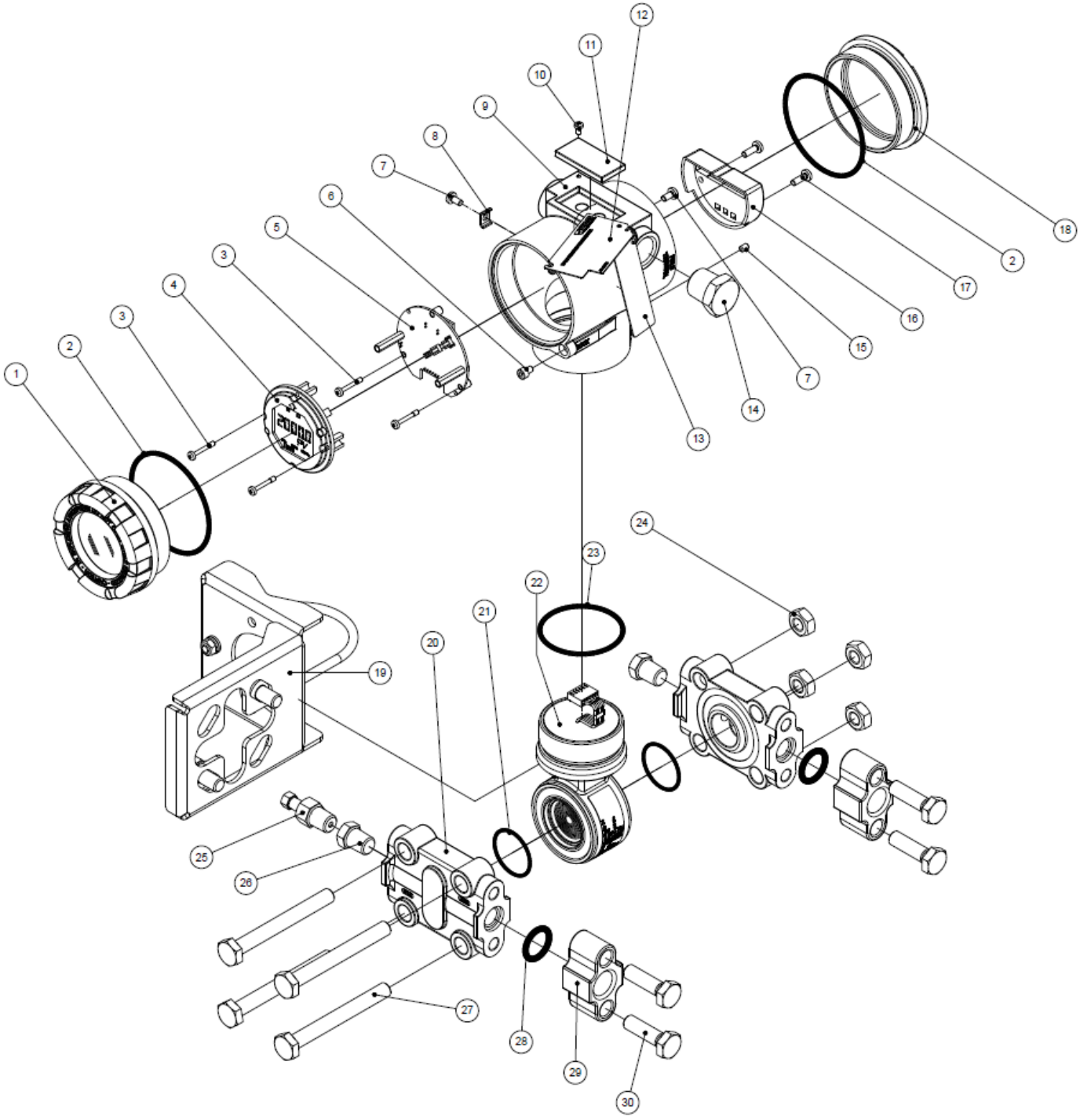


Figure 4.1 – Exploded view for VPT10-P.

Following are the steps for disassembling the pressure transmitter for maintenance and repair of the parts. The values in parentheses indicate the part identified in the exploded view (Figure 4.1). To mount VPT10-P simply follow the reverse sequence of the steps.

1 Remove the back cover (18);
2 Remove power from the transmitter by removing all wiring through the side holes;
3 Remove the front cover (1) and remove the securing screws from the main electronic board (3);
4 Disconnect the power and sensor cables connected to the main board (5);
5 Unscrew the sensor (22) from housing (9);
6 Loosen the nuts (24) and remove the screws (27) to remove the flanges (20).

Vivace does not recommend any kind of maintenance on pressure sensor by user.

4.2. SPARE PARTS

The list of spare parts of the VPT10-P that can be purchased directly from Vivace Process Instruments are listed in tables 4.1 and 4.2.

VPT10-P - SPARE PARTS CODES		
DESCRIPTION	**POSITION FIG. (4.1)**	**CODE**
COVER WITH WINDOW (includes o´ring)	1	2-10002
COVER (includes o´ring)	18	2-10003
O´RING (covers)	2	1-10001
HOUSING WITH TERMINAL BLOCKS AND FILTERS	9	2-10030
DISPLAY (includes screws)	4	2-10006
MAIN BOARD (includes screws and spacers)	5	2-10087
DISPLAY AND MAIN BOARD SCREWS	3	1-10002
TERMINAL BLOCK COVER (includes screws)	16	2-10040
TERMINAL BLOCK SCREWS	17	1-10003
SENSOR FLANGE	20	2-10059
O´RING (sensor)	21	* See Table 4.2
EXTERNAL GROUND TERMINAL (includes screws)	8 e 7	2-10010
PLUG OF THE ELECTRICAL CONNECTION	14	1-10005
MOUNTING BRACKET (includes U clamp, bolts, nuts and washers)	19	2-10060
COVERS LOCK SCREWS	6	1-10006
PROTECTION RUBBER OF Z and S	11	2-10015
IDENTIFICATION PLATE SCREW	10	1-10007
HOUSING LOCK SCREWS	15	1-10008
CAPACITIVE SENSOR* (see figure 4.2)	22	2-10061
O´RING (sensor neck)	23	1-10015
FLANGES SCREWS (includes nuts)	27 e 24	1-10016
DRAIN/VENT VALVE	25	2-10083
PLUG OF THE FLANGE	26	1-10017
O´RING (adapter)	28	1-10018
1/2 NPT ADAPTER	29	2-10084
1/2 NPT ADAPTER SCREWS	30	1-10019
IDENTIFICATION PLATE	12	2-10088
TAG PLATE (includes ring)	13	2-10086

Table 4.1 – Spare parts available for VPT10-P.

* SENSOR O'RINGS - TABLE CODES	
1-10014	O'RING - BUNA N
1-10020	O'RING - VITON
1-10021	O´RING - TEFLON

Table 4.2 – Sensor o´rings spare parts.

2-10061 *Capacitive Sensor Pressure*

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

Spare Part Code Example:

2-10061	-	S	D	1	I	S	

NOTE 1: Only available for Differential and Gauge models.

Figure 4.2 – Sensor spare parts.

5 CERTIFICATION

VPT10-P was projected to attend national and international regulation for explosion proof and intrinsic safety.

The transmitter is certified by INMETRO for intrinsic safety and explosion proof – dust ignition (Ex tb) and flame (Ex db).

6 TECHNICAL CHARACTERISTICS

6.1. IDENTIFICATION

VPT10-P has an identification plate affixed to the top of the housing, specifying the model and serial number, as shown in Figure 6.1.

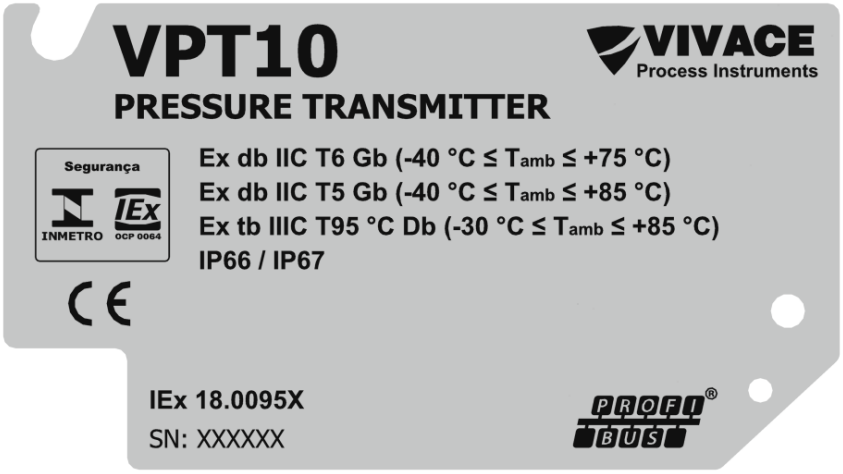


Figure 6.1 –Identification plate for VPT10-P.

The sensor also has its own identification label, containing the manufacturing data, such as Model, Pressure Range and Serial Number, among others. The sensor identification tag is shown in Figure 6.2.

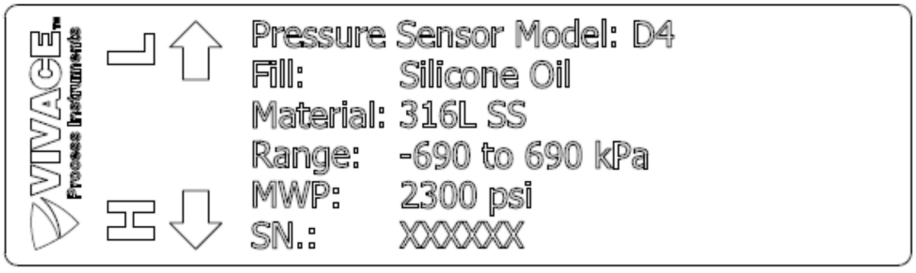


Figure 6.2 –Identification label for capacitive sensor.

6.2. TECHNICAL SPECIFICATION

Accuracy	Standard Model: ± 0.075% High Performance Model: ± 0.05%
Communication Protocol	Profibus PA - IEC 61158-2 (H1), 31.25 Kbits/s with bus supply.
Sensor Type	Capacitive sensor with microprocessor, digital reading and 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) For model H: 31,2 MPa (318,15 kgf/cm^2)
Stability	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	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 platforms. 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	3,5 Kg

Table 6.1 – Technical specification for VPT10-P.

6.3. 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	INTRİNSICALLY 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

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

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)*

7 WARRANTY

7.1. GENERAL CONDITIONS

Vivace ensures its equipment from any defect on manufacturing or component quality. Problems caused by misuse, improper installation or exposure to extreme conditions are not covered by this warranty.

The user can repair some equipment by replacing spare parts, but it is strongly recommended to forward it to *Vivace* for diagnosis and maintenance in cases of doubt or impossibility of correction by the user.

For details about the product warranty, see the general term warranty on Vivace website: www.vivaceinstruments.com.br.

7.2. WARRANTY PERIOD

Vivace ensures the ideal operating conditions of their equipment by a period of two years, with full customer support regarding to installation, operation and maintenance for the best use of the equipment.

It is important to note that even after warranty period expires, *Vivace* assistance team is ready to assist customer with the best support service, offering the best solutions for the installed system.

APPENDIX

VIVACE Process Instruments	**FSAT** **Technical Analysis Solicitation Form**		
Company:	**Unit/Department:**	**Shipping Invoice nº:**	
Standard Warranty: ( )Yes ( )No	**Extended Warranty: ( )Yes ( )No**	**Buying Invoice nº:**	
COMMERCIAL CONTACT			
Complete Name:		**Position:**	
Phone and Extension:		**Fax:**	
e-mail:			
TECHNICAL CONTACT			
Complete Name:		**Position:**	
Phone and Extension:		**Fax:**	
e-mail:			
EQUIPMENT DATA			
Model:		**Serial Num.:**	
PROCESS INFORMATION			
Environment Temperature (ºC)		**Work Temperature (ºC)**	
Min:	**Max:**	**Min:**	**Max:**
Operation Time:		**Fail Date:**	
FAIL DESCRIPTION: Here user should describe in detail the observed behaviour of product, frequency of fail occurence and repeatability. Also, should inform operational system version and a quick description of control system architecture where the equipment was installed.			
ADDITIONAL OBSERVATION:			