VPO10
PROFIBUS PA TO ANALOG/DISCRETE OUTPUT CONVERTER

VIVACE™
Process Instruments

PROFI BUS®

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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.

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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

(i)	*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.

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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

VPO10 is a Profibus-PA converter for discrete and analog output. It has three output channels, where user can configure current output (4-20 mA) or discrete output with open collector (maximum current 400 mA, 24 Vdc).

VPO10 is a converter that provides connection of end elements such as control valve positioners and other final control elements to Profibus-PA systems. The converter generates, in proportion to the Profibus-PA network setpoint signals, 4-20 mA outputs, through analog output function blocks (AO block), or allows actuations in open collector loads.

It is powered by a 9 to 32 Vdc voltage source and uses Profibus-PA communication protocol for configuration, calibration, monitoring and diagnostics. Through a Profibus-PA configurator, Android platform or tools based on EDDI or FDT/DTM it is possible to configure the measurement scales, the work units, calibrate the instrument, monitor the measurement variables and check the equipment status. Another way to configure the VPO10 is by locally adjustment using a magnetic tool.

VPO10 installation can be done in the field through a bracket connected to a 2 "tube with U-clamp, it can also be installed in a wall or panel.

Prioritizing high performance and ruggedness, this converter is designed with the latest electronics and materials technologies, ensuring long-term reliability for systems of any scale.

1.1. BLOCK DIAGRAM

The modularization for converter components is described in the following block diagram.
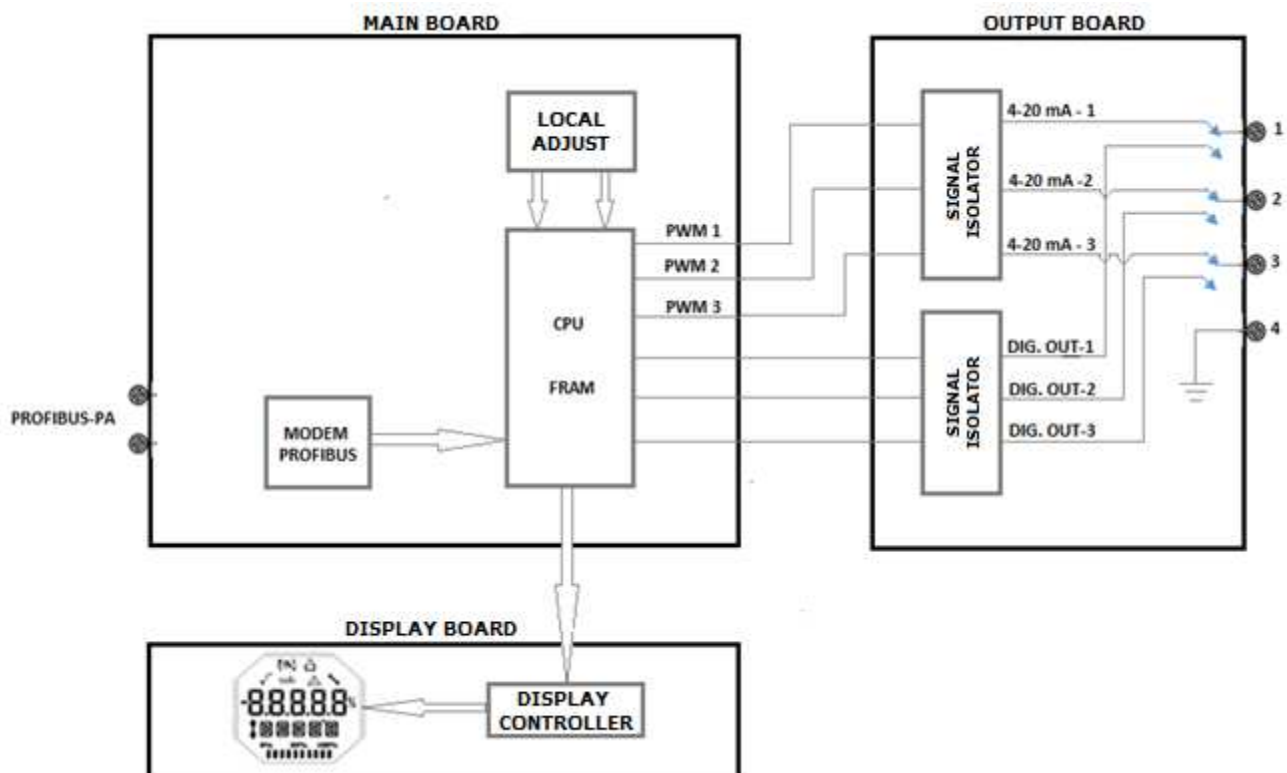
Figure 1.1 – Block diagram for VPO10.

The main board controls the main functions of the converter, the Profibus-PA Modem and the microcontroller (CPU). The output board receives the CPU signals converted to analog signals (4-20 mA) via PWM, isolated from the CPU, or the output board receives the converted CPU signals into discrete open collector digital signals (maximum current 400 mA , 24 Vdc), isolated from the CPU. The main board CPU performs all the logic of conversion and control of the settings through its firmware.

The CPU also receives the inputs of the local adjustment block (Hall type sensors) for the local configuration of the converter via magnetic switch.

Modem Profibus block interfaces CPU with Profibus-PA signals of the communication network.

The display board has the controller block that interfaces between the LCD and the CPU, adapting the messages to be displayed in the display.

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.

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

VPO10 converter is designed for field installation and therefore 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, provided that the cable gland or conduit of the electrical connection is correctly assembled and sealed with non-hardenable sealant. The covers should be tightly closed to prevent moisture from entering because 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 the electronic components.

Figure 2.1 shows the dimensional design and assembly forms of VPO10.
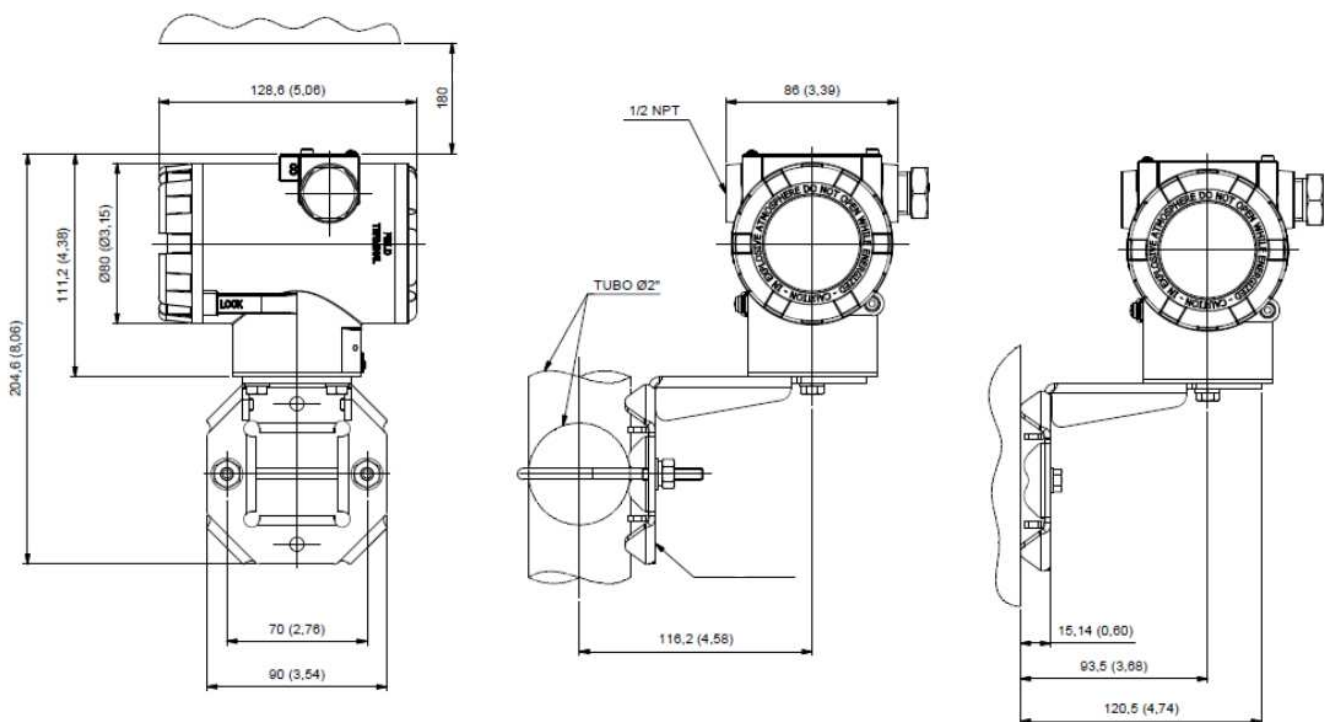
Figure 2.1 – Dimensional drawing and assembly scheme for VPO10.

To avoid the risk of involuntary loss of VPO10 covers due to vibration, for instance, it can be locked by screw, as shown on figure 2.2.

VPO10 is a field device, so it can be installed through a mounting bracket on a 2" tube attached with a U clip. The converter can also be attached with the same mounting bracket to a wall or panel.

For best LCD positioning device enables 4 x 90° housing rotation, as shown on figure 2.3.
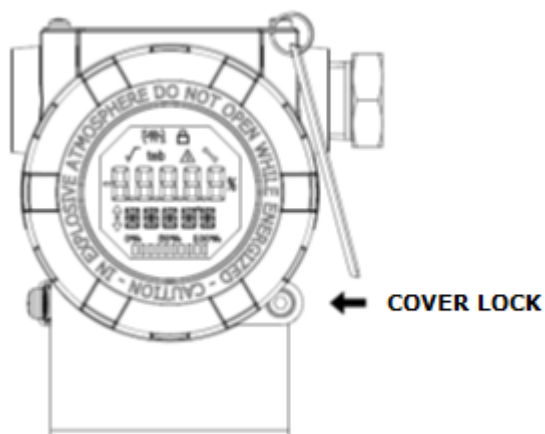
Figure 2.2 – Front cover lock.
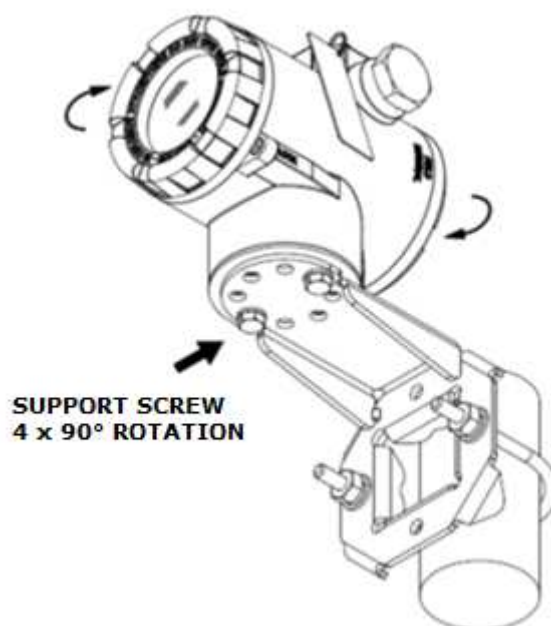
Figure 2.3 – Housing positioning.

VPO10 liquid crystal display can be rotate 4 x 90° so indication will be adequate for user visualization.

Figure 2.4 illustrates rotation possibilities for VPO10 LCD.
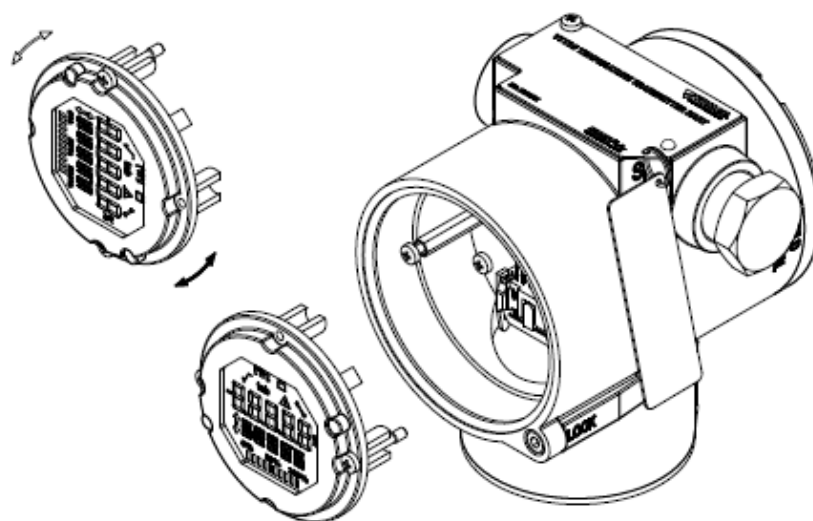
Figure 2.4 –4 x 90° LCD rotation.

2.2. ELECTRICAL CONNECTION

In order to access the terminal block user must remove VPO10 rear cover. First, loose cover lock screw (see figure 2.5) by turning it clockwise.
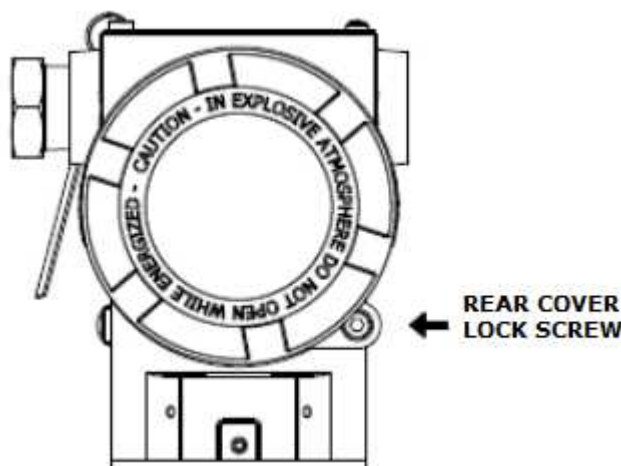
Figure 2.5 – Rear cover lock.

Figure 2.6 shows the power terminals (PWR BUS) and the connection terminals of the VPO10 conversion outputs, in addition to ground terminals (one internal and one external) and communication terminals. To power the equipment it is recommended to use Profibus-PA type AWG18 certified cables with shield (capacitance < 30 pF).
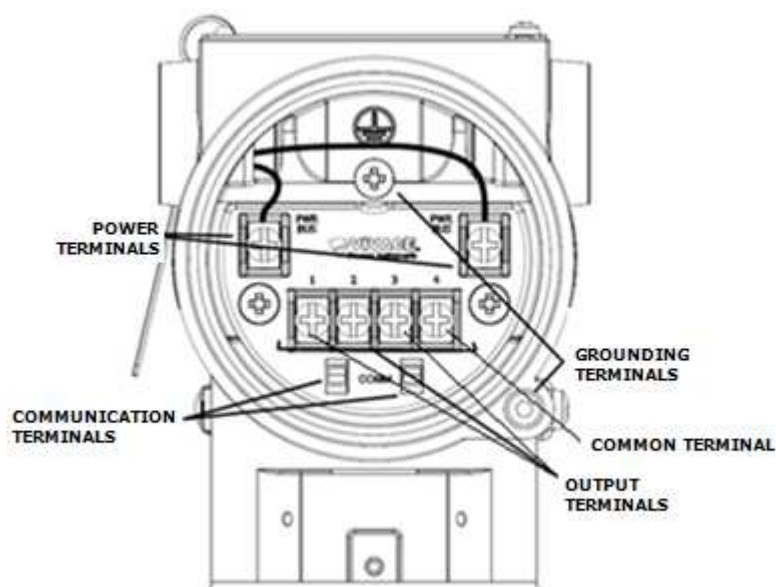
Figure 2.6 – Connections and terminal description for VPO10.

Table 2.1 shows terminal description for VPO10.

Terminal Description
Power Terminals - PWR BUS 9-32 Vdc not polarized
Grounding Terminals - 1 internal and 1 external
Communication Terminals – PROFIBUS-PA communication with configurator
Terminals 1, 2 and 3 – Current (4-20 mA) or discrete outputs, configurable
Terminal – 4 – Common – Negative of Power Supply

Table 2.1 – Terminal description for VPO10.

| NOTE |
|---|
| ⚠ All cables used for connecting VPO10 with PROFIBUS-PA network must be shielded to avoid interference or 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.

Conduits used for power cables must be assembled in order to avoid water entrance in the device terminal block. Conduit screws must be sealed according to specific area required standards.

Non-used electrical connection must be sealed with appropriate cover.

Figure 2.7 shows the correct installation for conduit, in order to avoid the entrance of water or any corrosive material that may cause damage to the device.

Figure 2.7 – Conduit assembly.

2.3. PROCESS CONNECTION

The following are possible connections of VPO10 in the process:

Figure 2.8 – Process connection example for VPO10.
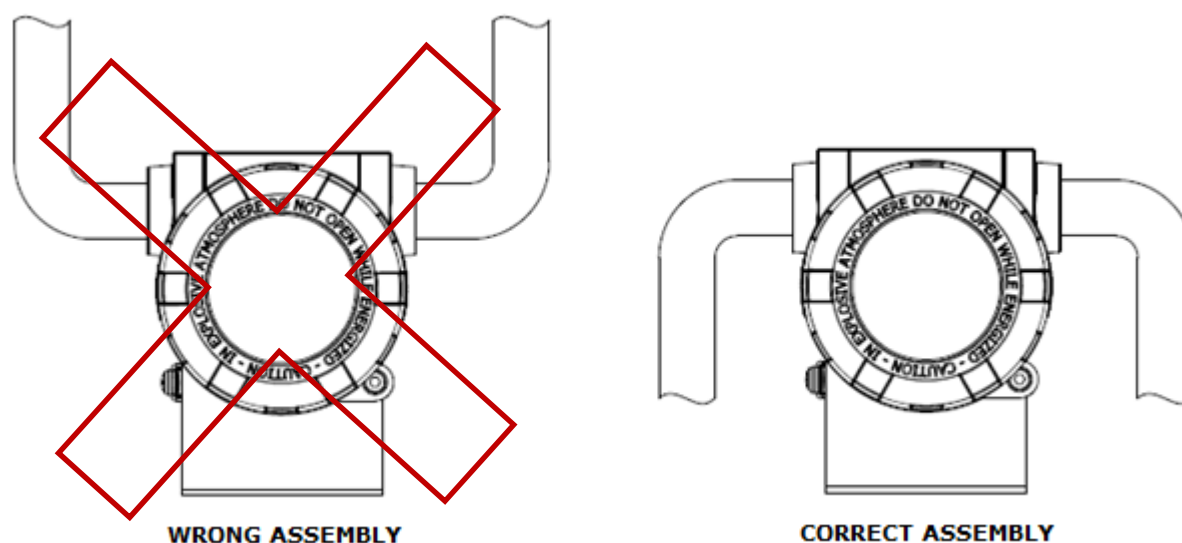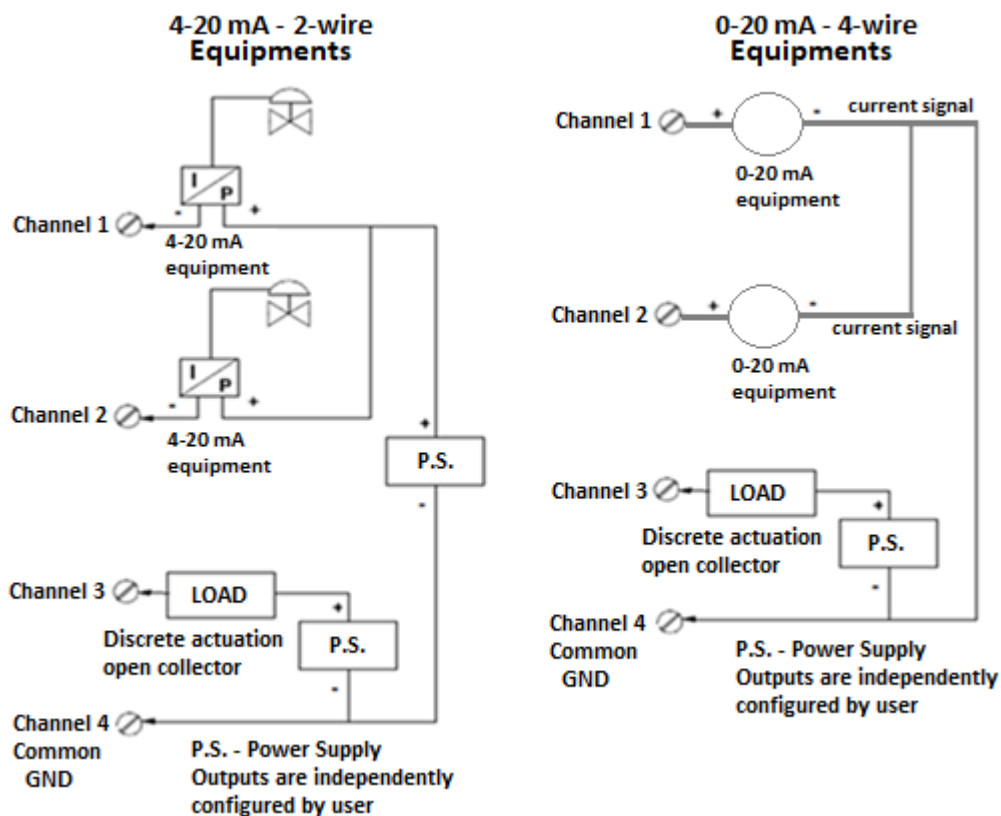
2.4. PROFIBUS-PA NETWORK CONNECTION

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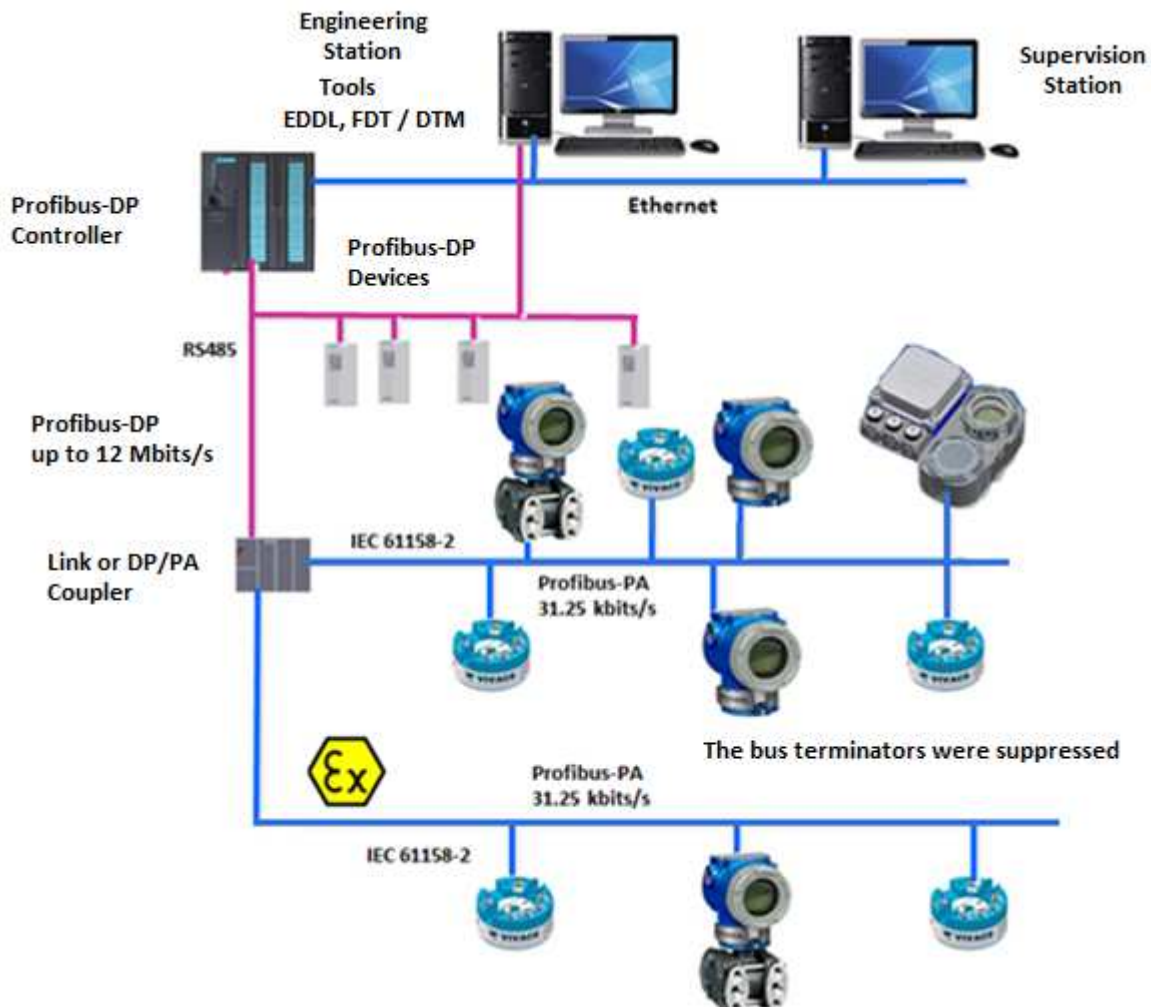

Figure 2.9 – Connecting a Profibus-PA device to the bus.

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3   CONFIGURATION

The configuration of VPO10 can be done through a programmer compatible with Profibus-PA technology. Vivace offers the interfaces of VCI10-P line (USB,and Bluetooth) as a solution for configuration and monitoring of the Profibus-PA line equipment. User can also configure the VPO10 by local adjustment using a Vivace magnetic key.

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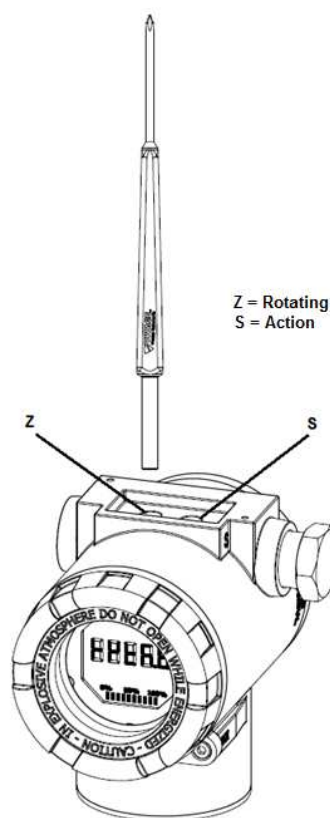
Equipment's local configuration is executed by using Vivace's magnetic screwdriver on Z and S orifices, located at housing superior side, under identification plate. Orifice Z starts local configuration and changes the field to be configured. Orifice S is responsible for changing and saving the new value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

Z = Rotating
S = Action

Figure 3.1 – Z and S orifices and magnetic screwdriver.

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

VPO10 has two jumpers on its main board to protect data writing (WP) and enabling/disabling local adjust (ADJL). Figure 3.2 presents those jumpers.
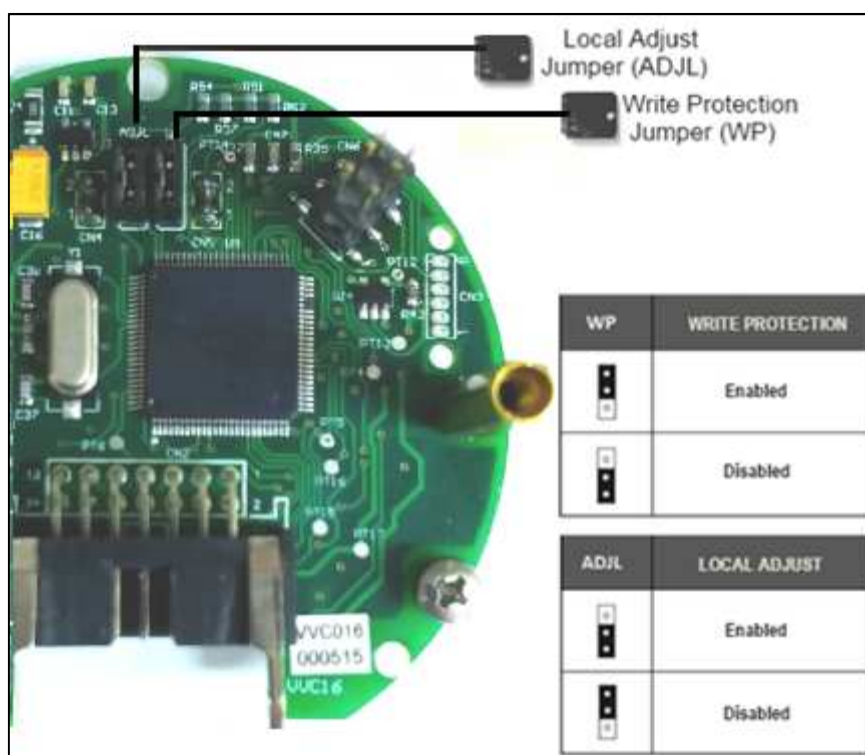

Figure 3.2 – Jumpers WP (write protection) and ADJL (local adjust) on VPO10 main board.

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

3.3. LIQUID CRYSTAL DISPLAY (LCD)

Main information related to converter are indicated on its liquid crystal display (LCD). Figure 3.3 shows the LCD with all its indication fields. Numerical field has 5 digits and is used mainly for monitored variable indication. Alphanumerical field indicates which variable is being monitored, units or auxiliary messages. Each indication icon use is described on table 3.2.

Figure 3.3 – LCD fields and icons.

SYMBOL	DESCRIPTION
⊾ⱴ	Sending Communication
ⱴ	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
▮▮▮▮▮▮▮	Bargraph to indicate the measured variable range

Table 3.2 – LCD icon description

3.4. LOCAL ADJUST CONFIGURATION TREE

Figure 3.4 shows available fields for local configuration and the sequence they are presented by magnetic screwdriver actuation on Z and S orifices.

ADDR – In this menu, the address of the equipment in the PA network is configured. Address 126 is the default value (factory default). User can configure the slave address from 0 to 126, usually master devices in Profibus-PA network are configured with addresses 0, 1 and 2, so we recommend configuring slave devices between 3 and 125.

GSDId – Here the "GSD Identification Number" is set as Profile Specific or Manufacturer Specific (factory default).

CHNL1, 2 e 3 – Here user can configure the units for channels 1, 2 and 3: Current or Voltage.

LCD1, 2 e 3 – Here user can configure what will be displayed on LCD1, 2 and 3: PV_1, PV_2, PV_3, OUT_1, OUT_2 or OUT_3.
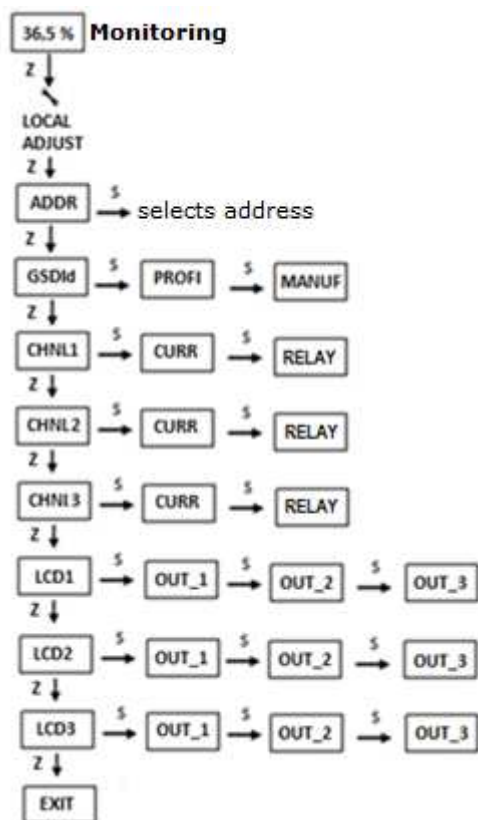
Figure 3.4 – Local adjustment programming tree for VPO10.

3.5. PROFIBUS PROGRAMMER

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

Figure 3.5 shows the wiring diagram for configuring VPO10 using Vivace VCI10-UP USB interface, which feeds the device in local mode, with a personal computer that has PACTware configurator software.

Figure 3.5 – Configuration diagram of VPO10 with VCI10-UP.

3.6. PROFIBUS-PA CONFIGURATOR PROGRAMMING TREE

The programming tree is a tree-shaped structure with a menu of all available software features, as shown in Figure 3.6

To configure converter online make sure that it is properly installed, with the proper power supply voltage, required for communication.
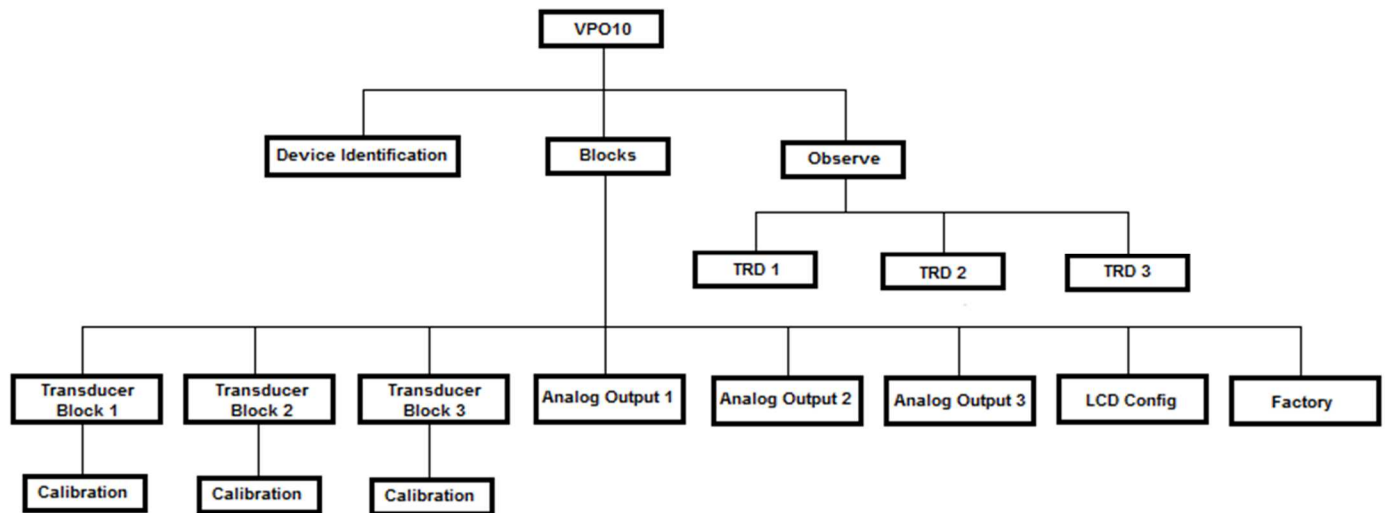
Figure 3.6 – Programming tree for VPO10.

Device Identification - In this menu (Physical Block) the main information about the equipment can be accessed, such as: Tag, Manufacturer ID, Device ID, Order Code and Firmware Version.

Transducer Block 1/2/3 - Here transducer block 1, 2 or 3 is configured, respectively.

- **Basic Settings -** In this menu user can configure the output (discrete output or current output), the measurement scale (EU0% and EU100%) and configure SP rates and limits.

- **Relay -** Here user can select the relay (Low, High or Deviation), its value and hysteresis.

  o **Calibration -** In this menu the lower and upper adjustment of the variable is executed.

Analog Output 1/2/3 - Here the parameters of output blocks 1, 2 and 3 are configured respectively.

- **Basic Settings -** In this menu user can configure the PV Scale (EU0%, EU100%), the Input Unit (% or mA), the Output Scale (EU0% and EU100%), (% or mA).

- **Mode Block -** In this menu the Setpoint is configured as follows:

  o **Man -** In this option the Target parameter must be set to Manual and user can set the value of the setpoint to the output (OUTPUT MAN).
  o **Setpoint -** In this option the Target menu must be set to Automatic and user can set the Setpoint from Operator value.
  o **Remote -** In this option the Target menu must be in Rcas (Remote Cascade) and the Setpoint value will come from the remote controller.

- **Fail Safe -** This menu configures the Safe Position, Last Setpoint or Safe Value, Fault Safety Value and Fault Safety Time.

- **Return from TRD Blk -** This parameter monitors the return value of the transducer block, the position of the discrete control valve and the deviation value of the setpoint.

- **Simulate -** This menu enables or disables the Simulation function. With the menu enabled, user can manually set the transducer value and the status.

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

- **Monit x -** In these menus user can configure the Function Block (Physical, Transducer 1, Transducer 2, Transducer 3, Analog Output 1, Analog Output 2 or Analog Output 3), Relative Index (Target Mode, Primary Value or User Index) Structure Element, Mnemonic, decimal point (1, 2, 3 or 4) and the alphanumeric field is enabled or disabled.

- **User Prmt -** In this menu user can configure the Function Block (Physical, Transducer 1, Transducer 2, Transducer 3, Analog Output 1, Analog Output 2 or Analog Output 3), Relative Index (User Index) is selected here, corresponding to the parameter to be displayed, Structure Element, Mnemonic and the decimal point (1, 2, 3 or 4).

- **LCD Switch -** This selects how many parameters to switch on the LCD (1, 2 or 3).

- **LCD Bargraph -** In this menu the bargraph of the display is enabled or disabled.

Factory - The following settings are possible in this menu:

- **GSD -** in this parameter the identification of the GSD file (Profile Specific or Manufacturer Specific) is selected,

- **Reset -** Factory Reset - this parameter allows the device to be reset by the user. Several levels of reboots are possible.

  - o **Factory Reset Parameters -** This parameter resets the machine to default values, it works as a factory default.
  - o **Warm Startup -** This parameter resets the machine to the latest values in its memory.
  - o **Factory Reset Address -** Starts the device with address 126.

Backup Restore TRD1/TRD2/TRD 3 - Through this menu user can restore the following data from the Transducer Blocks:

- **Initial Value -** Restores the initial value.

- **Restore Factory Calibration -** Restores factory calibration.

- **Restore Trd Blk Default Data -** Restores the default data of the transducer block.

- **Save Factory Calibration -** Saves Factory Calibration.

Observe - In this menu the values of the parameters of the TRD blocks (TRD 1, TRD 2 or TRD 3) are monitored.

3.7. FDT/DTM CONFIGURATION

FDT/DTM-based tool (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 VPO10 using Vivace's VCI10-UP interface and PACTware®.
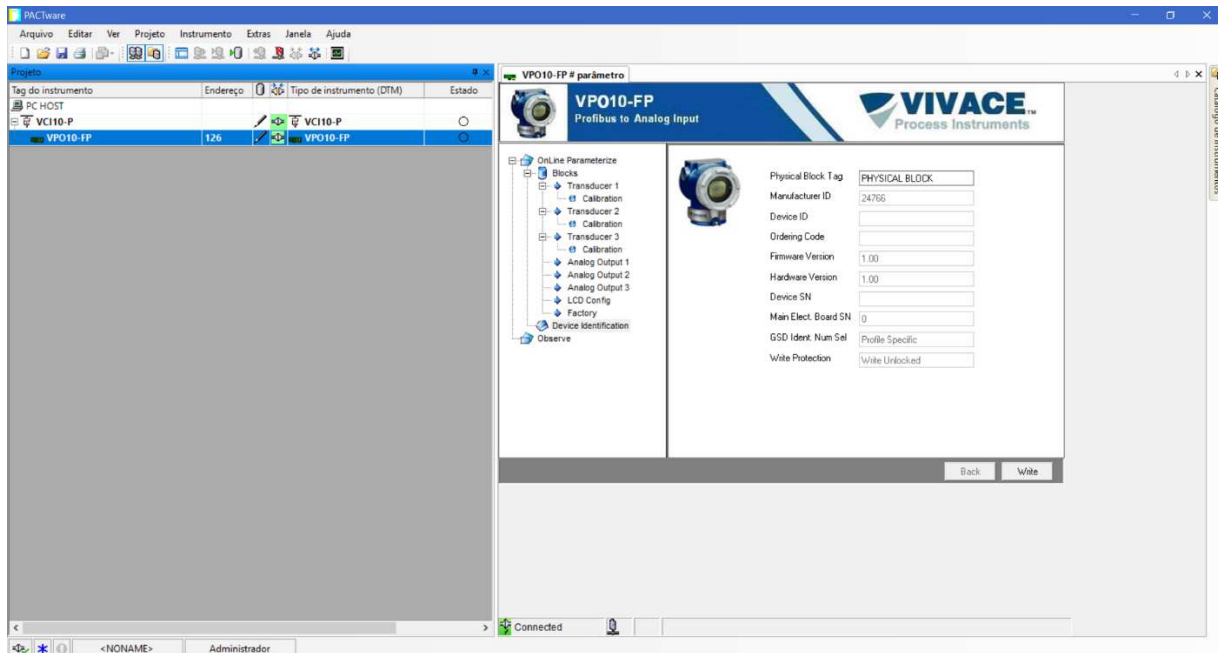

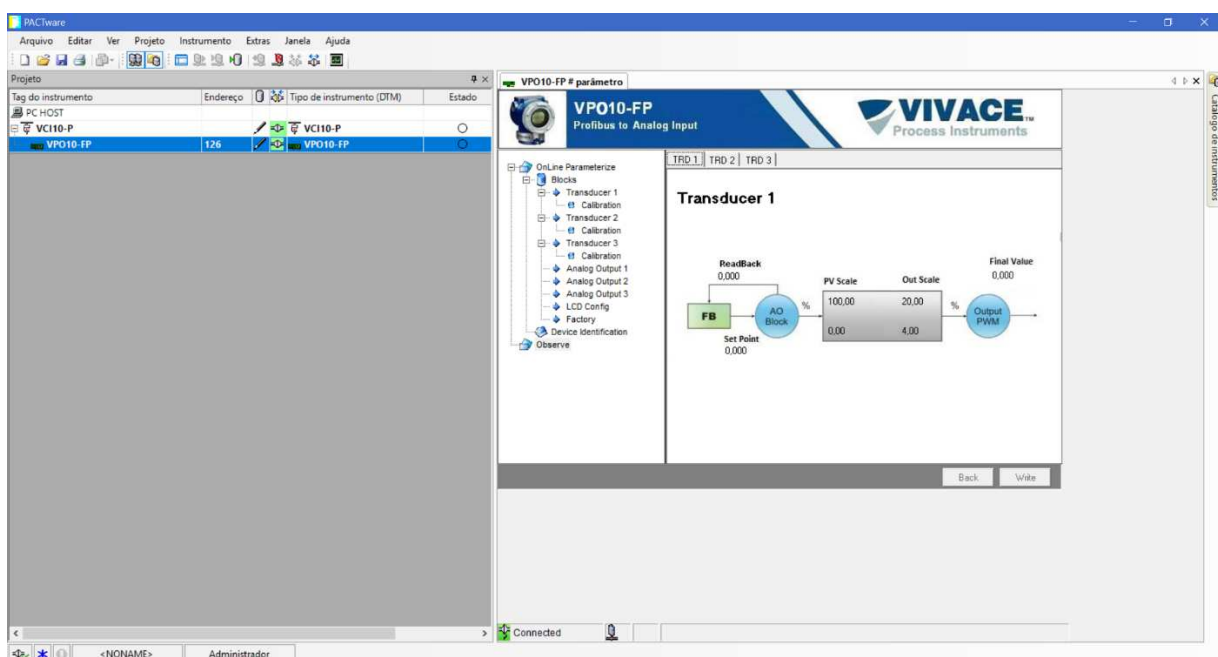Figure 3.7 – VPO10 Information screen on PACTware.

Figure 3.8 – VPO10 TRD 1 monitoring screen on PACTware.

3.8. CYCLIC CONFIGURATION

VPO10 has 3 functional blocks of analog output (03 AO - Analog Output Block). It also has the empty module (Empty Module) for applications where you want to configure only a few blocks.

According to the type of application, the convenient cyclic configuration must be performed. The following cyclic order of blocks must be respected: AO1, AO2 and AO3.

When user does not work with some output channel of the VPO10 he must use the corresponding empty module, for example, suppose that channel 2 is not used, like this: AO1, Empty Module, AO3.

Floating-point and status values are 5 bytes, the first four in floating-point format (IEEE-754) and the fifth byte forming the status that brings the quality information of this measurement.

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

Follow the procedure below to integrate VPO10 into a Profibus system (these steps apply to all Profibus-PA Vivace line devices).

• Copy the GSD file from VPO10 to the directory where all the GSD files of the Profibus configurator are located, usually called "GSD";

• Copy the BITMAP file from VPO10 to the directory where all the BMP files of the Profibus configurator equipment, usually called "BMP", are located;

• 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 (P+F, SK3). The IM157 link device can have up to 12 Mbits/s;

• Add the VPO10 and specify its address on the bus;

• Choose the cyclic configuration via parameterization, according to the GSD file, which depends on the application, as seen previously. As for the AO block, consider the operating mode. If the AO block is set to AUTO then the VPO10 will receive the value and status for the setpoint of the Profibus class 1 master and the user can write to this value via the Profibus master class 2. In this case, the status of the setpoint should always be equal to "Good" (0x80) and you can choose the following settings:

    - SP
    - SP / CKECKBACK
    - SP / READBACK / POSD
    - SP / READBACK / POSD / CKECKBACK

If the AO block is in RCAS, the VPO10 will receive the value and status for the setpoint only via Profibus class 1, with the status always equal to 0xC4 ("IA"). You can choose the following settings:

    - SP
    - SP / CKECKBACK
    - SP / READBACK / POSD
    - SP / READBACK / POSD / CKECKBACK
    - RCASIN / RCASOUT
    - RCASIN / RCASOUT / CKECKBACK
    - SP / READBACK / RCASIN / RCASOUT / POSD / CHECKBACK

• 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.

• If necessary activate the watchdog condition, which causes the equipment to assume a safe fault condition when it detects 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.

VPO10 has the GSD identifier number equal to 0x60BE (Manufacturer Specific) and can still work with the value 0x9712 (Profile Specific).

The DD, the DTM and the GSD of the VTT10-MP can be found on the website: www.vivaceinstruments.com.br

For further details on the functional blocks and their cyclic parameters and Profibus PA technology, refer to the installation, operation and configuration manual - Profibus PA - blocks, parameters and structure.

NOTE
When setting the "discrete output" mode, be careful that the selected output is not connected to the input of any analog card to prevent it from being burned. In this mode, there is no current control, which limits the current is the load connected to the output. Do not apply voltage directly to the outputs when they are in "discrete output" mode.

Link DP/PA

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

Siemens has a Link device DP/PA which is the IM157 model. This device works with DP/PA coupler at a communication rate 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 must be supplied with 24 Vdc. The maximum number of field devices per link is limited to 30 or 64 devices, 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 they are not, they 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 from Siemens links 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 the Vivace device 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 model and GSD of the device and run. After execution, note that a section has been created for the Vivace equipment with its cyclic modules**.**

4 MAINTENANCE

VPO10 converter, like all Vivace products, is rigorously evaluated and inspected before being sent to the customer. However, in the 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 with the converter.

4.1. ASSEMBLY AND DISASSEMBLY PROCEDURES

Figure 4.1 shows in detail all components of the VPO10. Before disassembling the equipment, it must be switched off. Maintenance should not be carried out on the electronic boards under penalty of loss of warranty of the equipment.
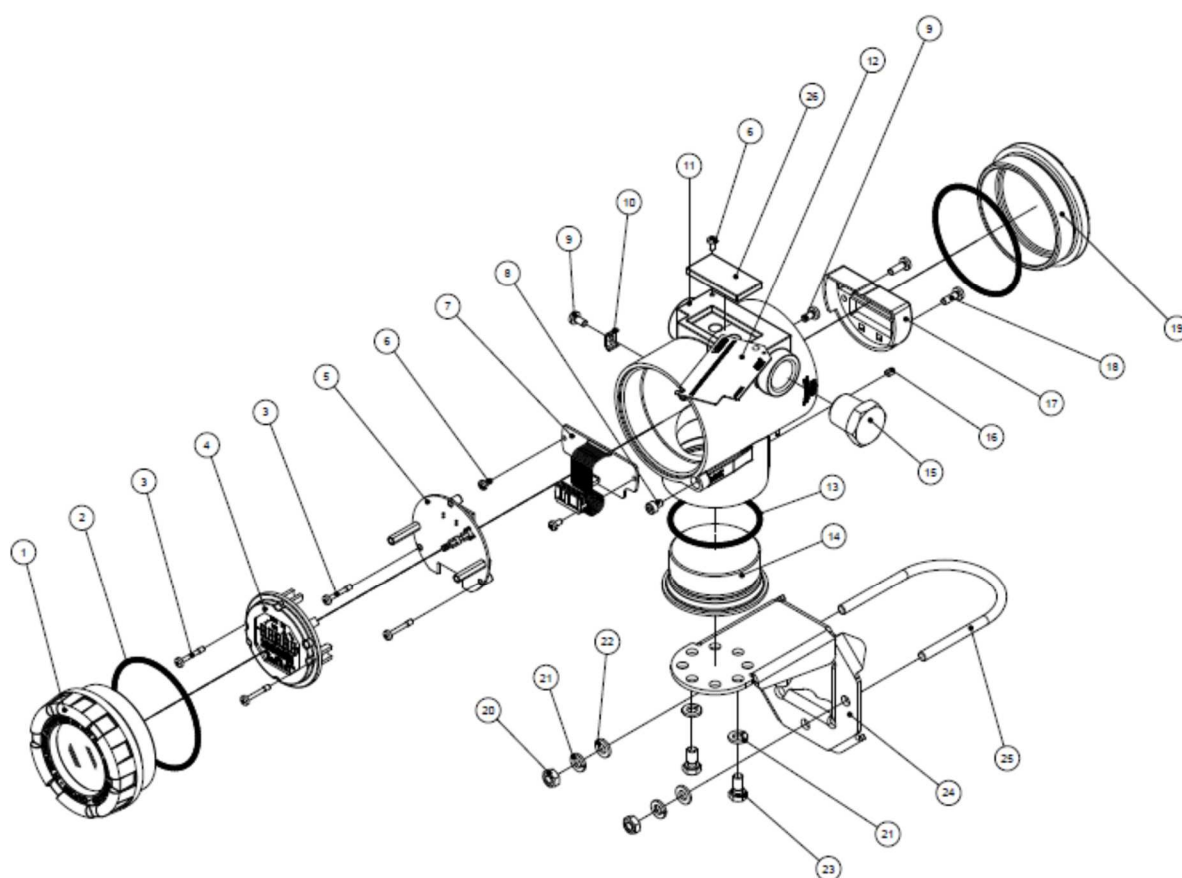
Figure 4.1 – Exploded view for VPO10.

4.2. SPARE PARTS

The list of spare parts of the VPO10 that can be purchased directly from Vivace Process Instruments are listed in Table 4.1.

VPO10 – SPARE PARTS		
DESCRIPTION	REFERENCE FIG.4.1	CODE
FRONT COVER (includes o'ring)	1	2-10002
REAR COVER (includes o'ring)	19	2-10003
O'RING (cover)	2	1-10001
HOUSING WITH TERMINAL BLOCK	11	2-10032
DISPLAY (includes screws)	4	2-10006
MAIN BOARD (includes screws and spacers)	5	2-10054
ANALOG BOARD (includes screws)	7	2-10055
TERMINAL BLOCK COVER (includes screws)	17	2-10039
HOUSING INFERIOR COVER (includes o'ring)	14	2-10008
INFERIOR COVER O'RING	13	1-10004
MOUNTING SUPPORT (includes U clip and screws)	24	2-10009
HOUSING PLUG	15	1-10005
EXTERNAL GROUND (includes screws)	10	2-10010
COVER LOCK SCREW	8	1-10006
IDENTIFICATION PLATE AND ANALOG BOARD SCREW	6	1-10007
HOUSING LOCK SCREW	16	1-10008
TERMINAL BLOCK COVER SCREW	18	1-10003
DISPLAY AND MAIN BOARD SCREW	3	1-10002
MAGNETIC TOOL	-	3-10001

Table 4.1 – Spare parts list for VPO10.

5   CERTIFICATION

VPO10 is designed to meet national and international standards 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

VPO10 has an identification plate affixed to the top of the housing, specifying the model and serial number, as shown in Figure 6.1.
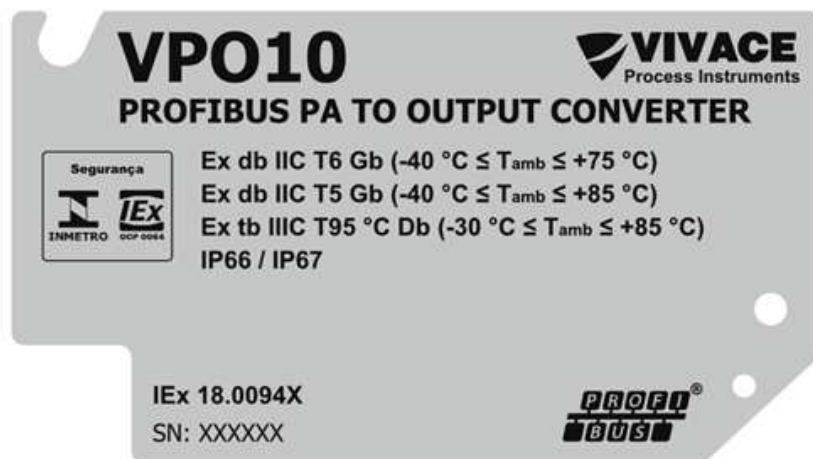

Figure 6.1 – Identification plate for VPO10.

6.2. TECHNICAL SPECIFICATION

In the table below are the technical specifications of VPO10:

Accuracy	± 0.1%
Power Supply / Quiescent Current	9 to 32 Vdc, with no polarity / 12 mA
Communication Protocol / Function Blocks	Profibus PA, according to IEC 61158-2 (H1), voltage mode 31.25 Kbits/s with bus power supply / 3 Analog Output Blocks (AO)
Certification in Hazardous Area	Explosion-proof and Intrinsically Safe
Ambient Temperature Limits	- 40 to 85 ° C
Configuration	Remote configuration through tools based on EDDL, FDT / DTM, as well as Android platform. Local configuration via magnetic tool.
Mounting	In field, with 2" mounting bracket
Protection degree	IP67
Output Load Limit	Outputs configured independently by the user: Signals 4-20mA: External Output Voltage 3-45 Vdc. Load (discrete drive): max. 400 mA, 24 Vdc
Housing Material	Aluminum
Approximate Weight with Bracket	1.2 Kg

Table 6.1 – Technical specification for VPO10.

6.3. ORDERING CODE

VPO10 *Profibus PA to Analog Output Converter*

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:

VPO10	-	0	0	A	1	1	0

*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:

contato@vivaceinstruments.com.br
www.vivaceinstruments.com.br

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