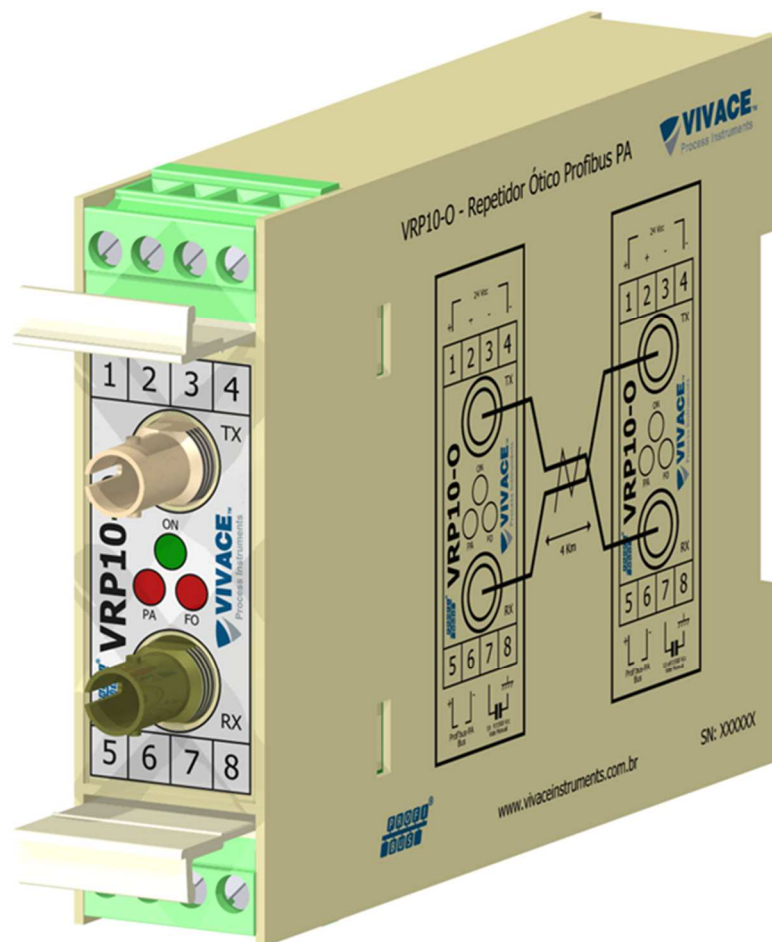


INSTALLATION, OPERATION AND CONFIGURATION MANUAL

September/2016

VRP10-O

PROFIBUS-PA OPTICAL REPEATER



COPYRIGHT

All rights reserved, including translations, reprints, complete or partial reproduction of this manual, patent concession or model register of use/project.

*No part of this publication may be reproduced, copied, processed or transmitted on any manner or any medium (photocopy, scanning, etc.) without the express permission of **Vivace Process Instruments Inc.**, not even for training or electronic systems.*

PROFIBUS® is a registered mark of PROFIBUS Nutzerorganisation.

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

1	<u>EQUIPMENT DESCRIPTION</u>	<u>6</u>
1.1.	IDENTIFICATION.....	6
1.2.	TECHNICAL AND PHYSICAL SPECIFICATIONS	7
1.3.	INSTALLATION.....	8
1.4.	HOUSING DIMENSION	10
1.5.	BLOCK DIAGRAM	11
2	<u>CONFIGURATION.....</u>	<u>12</u>
2.1.	CONFIGURATION DETAILS AND INDICATIVE LEDS	12
2.2.	CAPACITIVE GROUNDING.....	12
3	<u>MAINTENANCE</u>	<u>13</u>
1.1.	ORDERING CODE.....	13
4	<u>WARRANTY</u>	<u>14</u>
4.1.	GENERAL CONDITIONS.....	14
4.2.	WARRANTY PERIOD	14
	<u>APPENDIX</u>	<u>15</u>

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 PROCEDURE

- *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.*

SYMBOLOLOGY



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.

1 EQUIPMENT DESCRIPTION

Vivace VRP10 family of repeaters was developed for use in PROFIBUS-PA networks, allowing the extension of these networks. VRP10-O allows the interface between IEC61158-2 standard bus and optical fiber.

VRP10-O provides transmission via optical fiber with advantages such as electrical noise immunity, reaching long distances in control systems topologies and the addition of ability to work with different ground references.

It is powered by an external source of 24 Vdc. Connections, including power, grounding and PROFIBUS-PA network are available via electrical terminals.

50/125 or 62.5 micrometers optical fiber cables with ST connectors can be used in single or dual multimode.

Three LEDs indicate the operating status and possible functional problems, as shown below.

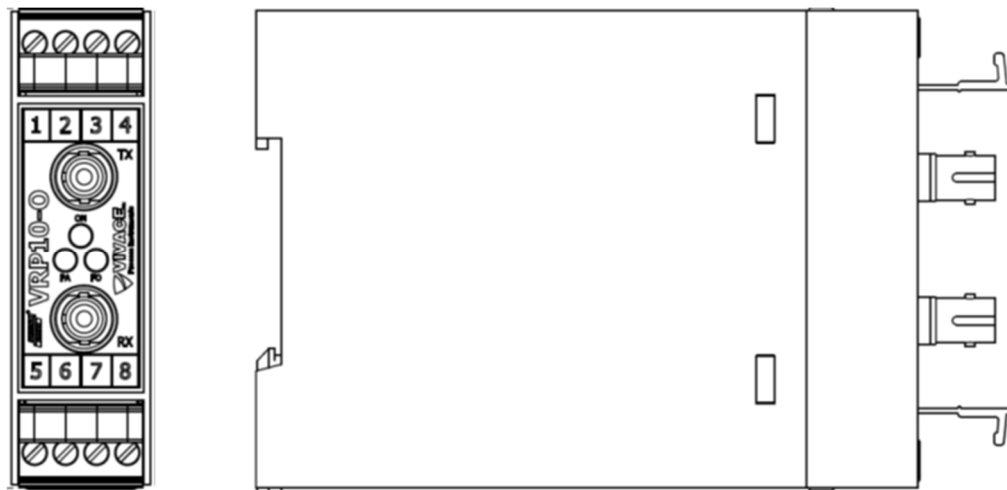


Figure 1.1 - VRP10-O 2D front and side view drawing.

1.1. IDENTIFICATION

VRP10-O has an identification label on the front face, specifying the model, manufacturer, electrical connections and indicative LEDs as shown on figure 1.1. It also has a side printed diagram with all connections available and its serial number.

PROFIBUS-PA connection indication using optical fiber is also indicated on this label.

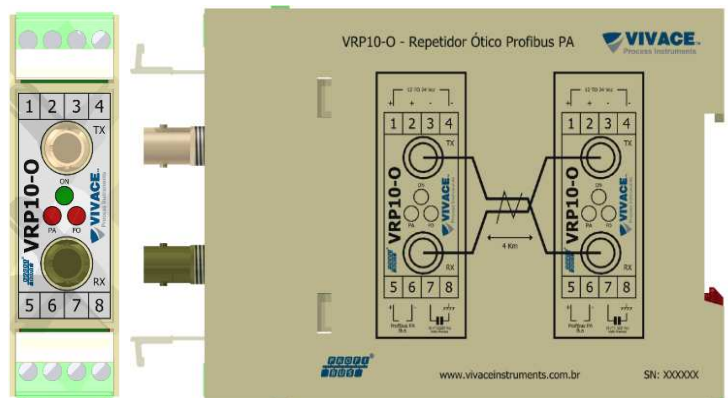


Figure 1.2 - Labels and diagrams for VRP10-O.

1.2. TECHNICAL AND PHYSICAL SPECIFICATIONS

The main technical and physical characteristics of VRP10-O are listed below. They are important references that must be analyzed before installation and use into control system, especially regard to power supply, temperature and mechanical connection.

TECHNICAL SPECIFICATIONS			
Input power supply / Iq	24V DC / 40 mA		
Communication Protocol / Baud rate	* IEC61158-2 (PROFIBUS-PA) / 31,25 kbits/s		
Hazardous Area Certifications	Intrinsically safe (pending)		
Ambient Temperature	0 to 60 °C (32 to 140 °F)		
Configuration	Automatic		
Optical connection	Single or multimode, 62.5 or 50/125 µm fiber, ST connector type		
Assembly type	DIN 43880 rail		
Protection degree	IP20		
Housing material	ABS Plastic		
Dimensions / Weight	75 x 23 x 105 mm (2.95 x 0.90 x 4.13 in) / 105 g		
Transmission Parameters:	Typical:	Max:	Unit:
Link Jitter	6,91	-	ns p-p
Transmitter Jitter	0,823	-	ns p-p
Logic Level "0" optical power	-12,2	-	dBm peak
Logic Level "1" optical power	-82,2	-	dBm peak
LED rising time	1,3	-	ns
LED falling time	3,08	-	ns
Mean difference	1,77	-	ns p-p
50% Duty Factor data format	32,0	-	MBd
Rising and falling time (10% to 90%)	4,0	6,5	ns
Rising and falling time (10% a 90%)	3,0	-	ns
Pulse Width Distortion	0,5	-	ns
Transmission / Reception Parameters	Typical:	Max:	Unit:
Provision of Optical Power- 62,5/125 µm fiber	15	-	dB
Low to High propagation delay	72,0	-	ns
High to Low propagation delay	46,0	-	ns
Bit error rate	10 ⁻⁹	-	ns
Distance Using Synthetic Fiber	-	4000	m

Table1.1 - VRP10-O technical specification.

*only for DP/PA couplers with configurable slot time (eg. Siemens).

1.3. INSTALLATION

VRP10-O repeaters are easy to install and allow users to extend a PROFIBUS-PA segment up to 4 km (2.5 mi). It can also be connected to different ground references, bringing an unprecedented advantage once one of the major problems in digital network on the factory floor are just noise and current flowing through the ground conductor due to ground differential between distant areas.

The figure below illustrates an application assembly between remote areas.

Occasionally, there might be adjustments in the PROFIBUS-DP master configuration, when communication is not established successfully. The solution is setting TSL (time slot) and TTR (Token Rotation Time). TSL is given in bit times and means the time PROFIBUS-DP master will wait for a slave response before re-sending a frame or even send a new frame. TTR is given in bit times and is usually calculated by the configuration tools. It is the time to pass the token across the network and return to its original master. When working with multiple masters this includes the total time for each master to complete its I/O cycle, pass the token to the next master and get token back to the original master. Some factors directly influence the TTR: baud rate, number of slaves with cyclic data exchange, total number of I/O during data exchange and quantity of masters.

It is possible to set several optical segments in cascade (a combination cable of PROFIBUS-PA + fiber optics + PROFIBUS-PA cable). Eventually it might be necessary to adjust TSL and TTR parameters on cyclic DP master configuration, as explained above. Figure below illustrates an application assembly between remote areas.

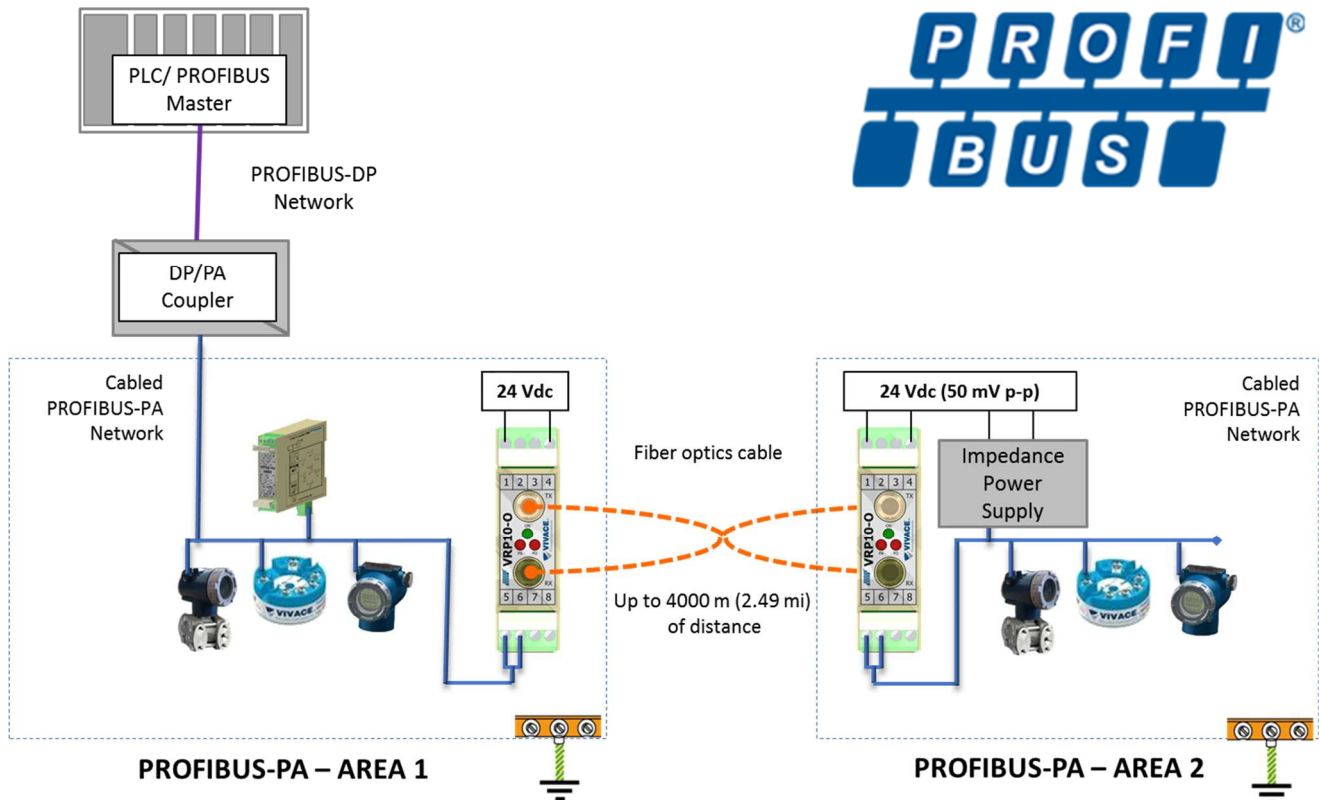


Figure 1.3 - VRP10-O insulating control networks, allowing different ground references.

Figure below shows the VRP10-O side schematic setup and its terminals for connections.

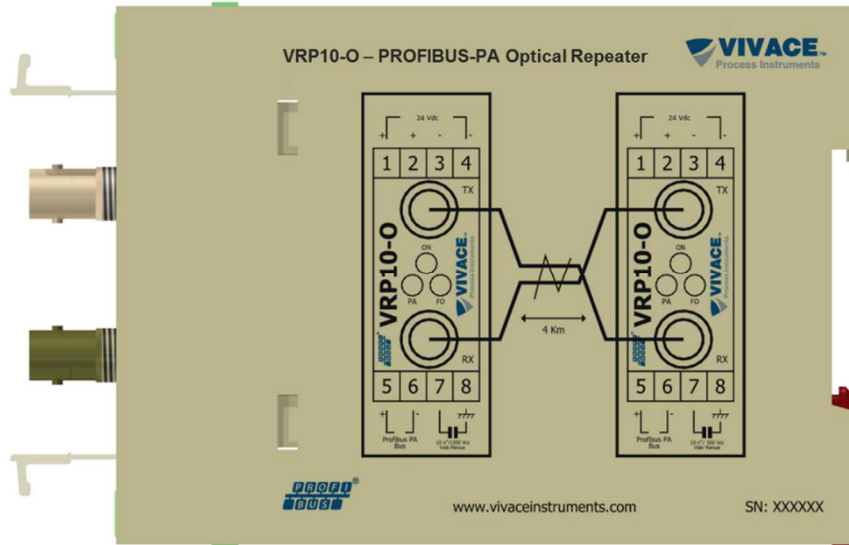


Figure 1.4 - VRP10-O schematic side diagram.

The figure and table below show the repeater connections.



LIST OF TERMINAL CONNECTIONS		
1	+	Positive of Power Supply input
2	+	
3	-	Negative of Power Supply input
4	-	
5	+	+ PA
6	-	- PA
7		Not used
8		Grounding reference

Figure 1.5 – Repeater frontal label. Table 1.2 - List of terminal connections for the VRP10-O repeater.

STEP BY STEP INSTALLATION:

- 1) Fix the two repeaters in their respective control panel DIN rails.
- 2) Remove protective cover from optical channels.
- 3) Connect modules using standard ST optical fiber.
- 4) Connect grounding.
- 5) Connect PROFIBUS-PA channel.
- 6) Connect 24 Vdc power supply.
- 7) Supply a impedance source to PROFIBUS-PA segment.



Make sure the voltage source that feeds the impedance source has a current capacity for all PA segment with the following minimum specifications: 24 Vdc \pm 10%; Ripple < 50 mV p-p.

Ensure that the optical plug faces are free of dirt or other contamination source.

Make sure that an optical input is connected to an optical output (crossover connection) and that the connector is firmly attached to the repeater socket.

Ensure there is enough strain relief in fiber optic cable and the minimum bending radius have been met.

Keep repeaters sockets protected by with protective plugs when they out of use.

Always respect the maximum length specified in Chapter 1.2.

1.4. HOUSING DIMENSION

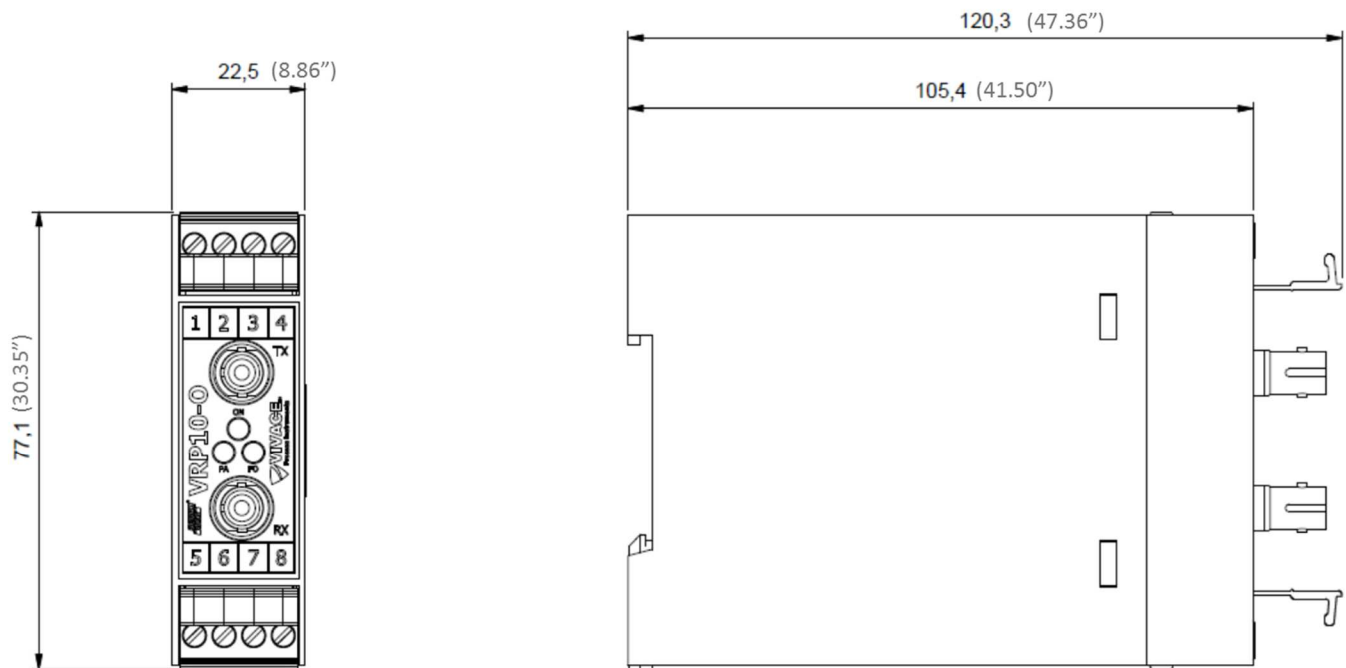


Figure 1.6 - VRP10-O dimensional drawing.

1.5. BLOCK DIAGRAM

The repeater components modularization is described in the following block diagram.

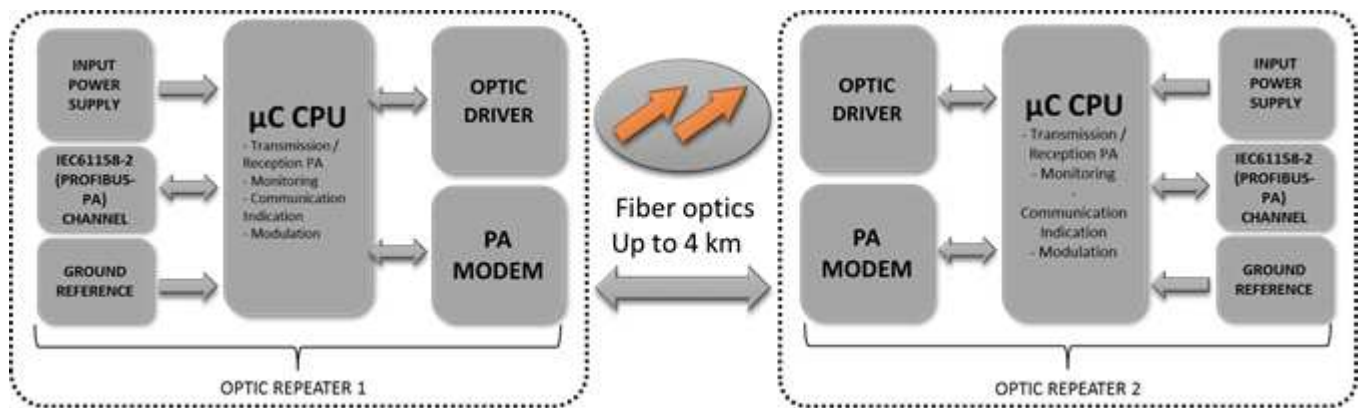


Figure 1.7 - Block diagram for VRP10-O.

2 CONFIGURATION

2.1. CONFIGURATION DETAILS AND INDICATIVE LEDs

VRP10-O is dedicated to the conversion of signals H1 (IEC61158-2) with fixed 31.25 kbits/s rate, so there is no additional configuration needed for it. For convenience, there are three indicative LEDs.



INDICATIVE LEDs		
1	ON	Green = Repeater is energized
2	PA	Blink red = PROFIBUS-PA network is active
3	FO	Blink red = Optical drive is running

Table 2.1 - VRP10-O indicative LEDs.

2.2. CAPACITIVE GROUNDING

! VRP10-O also allows user to do the capacitive ground. With this possibility, user can connect a capacitor (10 nF / 1500 V DC, internal to the repeater) to the ground.

! Therefore, it is necessary to change the internal jumper position. The jumper is located in the board just below the optical fiber plugs as shown in the figure below. Even in this condition, user must connect the external ground reference in the terminal 8.

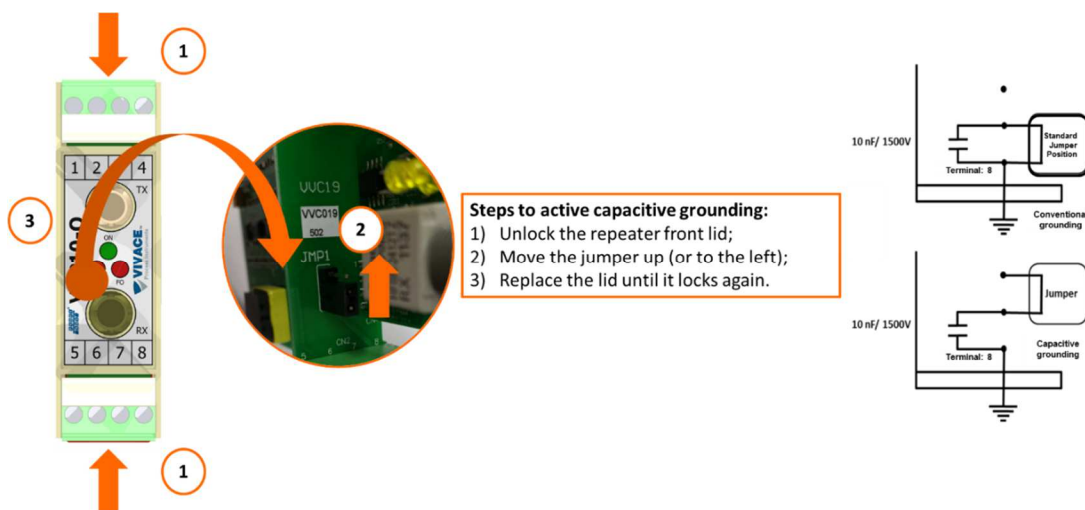


Figure 2.1 - Enabling the capacitive grounding.

3 MAINTENANCE

3.1. ORDERING CODE

VRP10-O *Profibus PA Optical Repeater*

Certification Type	0	NO CERTIFICATION
	1	INTRINSICALLY SAFE

Certification Body	0	NO CERTIFICATION
	1	INMETRO

Ordering Code Example:

VRP10-O	-	0	0
---------	---	---	---

4 WARRANTY

4.1. GENERAL CONDITIONS

Vivace ensures its equipments 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 equipments 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.

4.2. 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

		FSAT Technical Analysis Solicitation Form	
		Company:	
Unit/Department:		Shipping Invoice n°:	
Standard Warranty: ()Yes ()No		Extended Warranty: ()Yes ()No	
		Buying Invoice n°:	
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 (°C)		Work Temperature (°C)	
Min:	Max:	Min:	Max:
Operation Time:		Fail Date:	
FAIL DESCRIPTION: Here user should describe in detail the observed behaviour of product, frequency of fail occurrence and repeatability. Also, should inform operational system version and a quick description of control system architecture where the equipment was installed.			
ADDITIONAL OBSERVATION:			

