INSTALLATION, OPERATION, CONFIGURATION AND MAINTENANCE MANUAL

November/2019

VBP10

ADVANCED BUS PROTECTOR

PROFIBUS-PA / FOUNDATION™ fieldbus

VIVACE™ Process Instruments

FOUNDATION

PROFIBUS®

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 International Organization.

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.

1 EQUIPMENT DESCRIPTION

VBP10 is a bus protector for Profibus-PA and FOUNDATION ™ fieldbus networks according to IEC 61158-2, which ensures that a short circuit generated in their spurs not propagate to other spurs and to the main trunk. In short circuit condition (between + and - signs + or shield) the spur opens, preventing the short circuit. For each spur there is a LED which is activated in the short circuit condition. From time to time, VBP10 checks for current flowing in the spur, and if there is current, it is activated again. After leaving the short-circuit condition, the spur back to work and the protection circuit is disabled, erasing the LED.

Some segment protectors act as short circuit limiters, limiting the current in the range of 40 to 60mA per spur and in a short circuit situation, this current, depending on how the segment is sized, can shut it down (even more if more than one spur is in short circuir) due to excessive consumption and, consequently, to voltage drop.

The VBP10 uses the “FoldBack” technique, where in any situation that the spur consumes more than 48mA, it automatically shuts off the spur until the situation returns to normal. For this, it consumes less than 2mA per spur, which is an advantage over market segment protectors that maintain a permanent fault current, overloading the segment in case of multiple spurs short.

In addition, the VBP10 acts quickly, limiting the inrush current: when the Profibus-PA or Foudantion fieldbus device is powered, a large current flows and exceeds the current steady-state value. This current is called the inrush current. With the use segment protectors with low quality terminal blocks and in vibrating environments, some devices (due to poor contact on these terminal blocks or junction boxes) will turn off and on (contact peaks) and depending on the quality of the protection of this segment, the insrush current may be higher than the current supplied to the segment and "shut down" the bus or dramatically affect communication.

VBP10 has a LED to indicate that the module is powered and also an integrated bus terminator (BT).

The Trunk Input has surge protector, ensuring greater safety to VBP10 and spurs.

In normal operation, i.e. without short-circuit, each spur consumes less than 1 mA. Each spur has a maximum current of 40 mA.

Increase the availability and operational safety of your Profibus-PA or FOUNDATION ™ fieldbus network.

2 INSTALLATION

2.1. MECHANICAL ASSEMBLY

VBP10 is designed for panel mounting with DIN rail, but maintains good performance in temperature, humidity and vibration variations. It can also be purchased with an aluminum enclosure for field installation.

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

In the following figures are the dimensional drawings of the VBP10 for 4 and 8 channels.

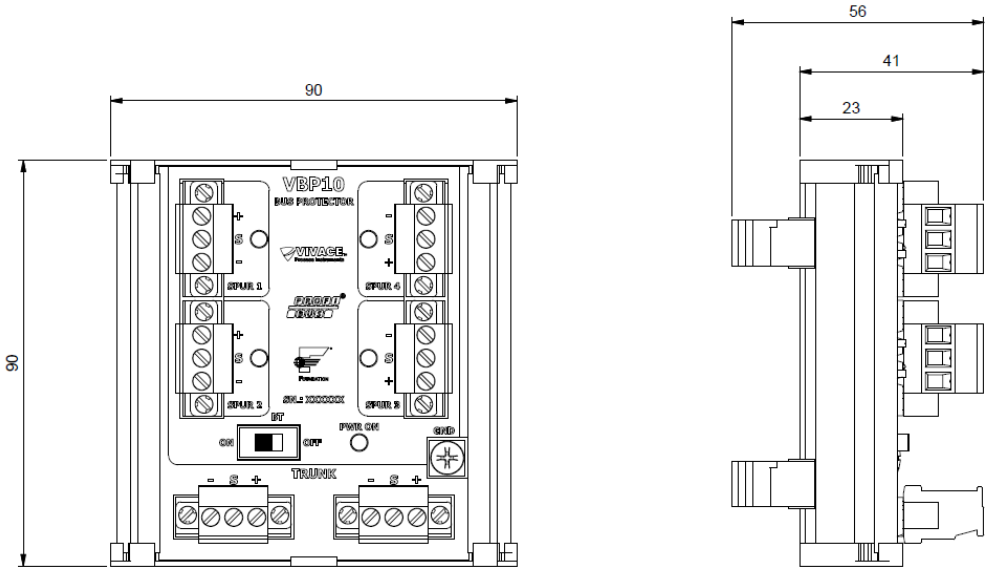

Figure 2.1 – Dimensional drawing for VBP10, 4-channel model.

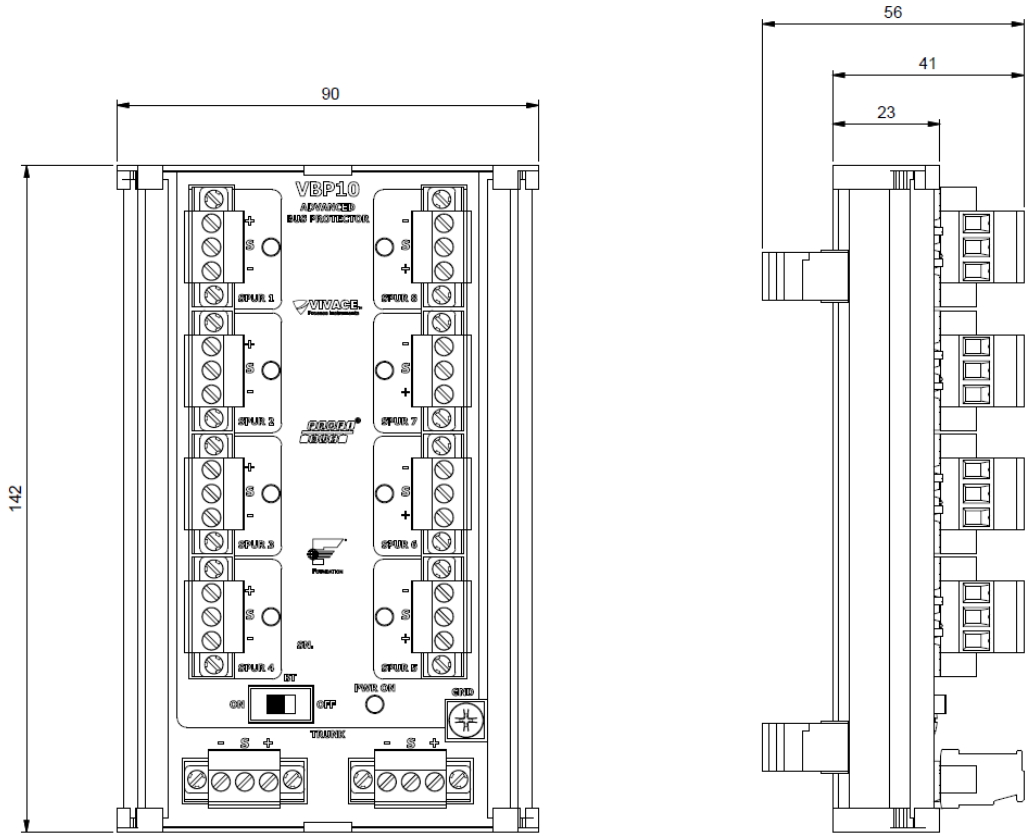

Figure 2.2 – Dimensional drawing for VBP10, 8-channel model.

To mount the VBP10 on the DIN rail, one side of VBP10 must be inserted into the rail bracket and the other side must be lightly pressed until it snaps into place, as shown in the next figure (top view).

To remove VBP10 from the DIN rail, press one side of VBP10 forward (relative to the DIN rail) and tilt it out of the rail bracket until the other side is completely released.

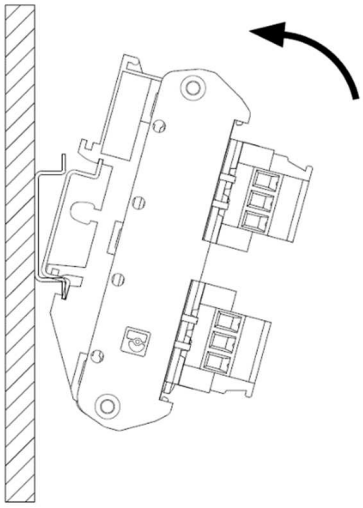

Figure 2.3 – VBP10 assembly on DIN rail.

2.2. ELECTRICAL CONNECTION

VBP10 electrical connection is made through side connectors, reserved for spurs connections, and the bottom connectors, reserved for trunk connection.

The following figure identifies VBP10 protector connectors.

Note that spur connections (4 or 8 channels) are made by the side connectors, with the Negative (-), Shield (S) and Positive (+) cables in this order. The trunk connections are made by the bottom connectors, with the same cable connection sequence (Negative, Shield, Positive).

In addition, there is a key to enable (ON) or disable (OFF) the bus terminator (BT) by the user.

The "PWR ON" LED (green) indicates to the user that the equipment is powered by the bus.

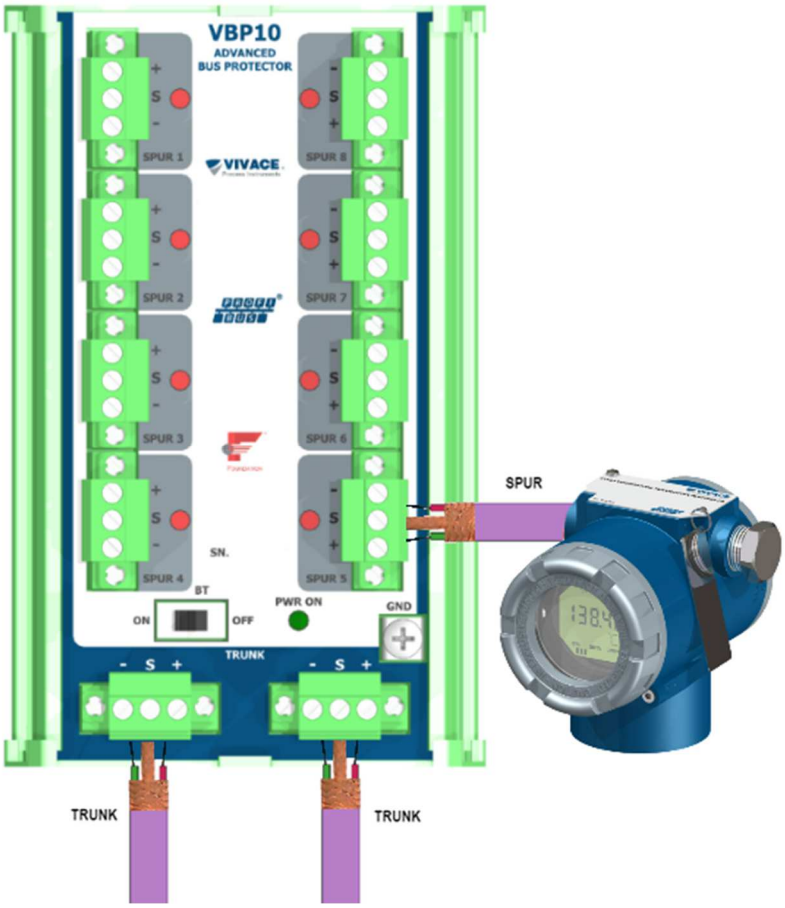

Figure 2.4 – Connection and description of VBP10 terminals.

The red LEDs indicate short-circuit occurrence on each spur. In the event of a short-circuit between POSITIVE and NEGATIVE or POSITIVE and SHIELD signals of spur, its current will be limited to a value under 5 mA and the circuit will stay active, waiting for signal normalization.

NOTE
All the cables used for the connection between VBP10 and Profibus-PA network must be shielded to avoid interference and noise.

3 MAINTENANCE

3.1. SPARE PARTS

The list of spare parts of the VBP10 that can be purchased directly from Vivace Process Instruments are listed in Table 3.1.

SPARE PART LIST	
DESCRIPTION	**CODE**
BLOCK PLUG 3 POSITION TERMINAL	2-10095

Table 3.1 – Spare part list for VBP10.

4 CERTIFICATION

VBP10 is designed to meet national and international standards for intrinsic safety. Certificates are pending.

5 TECHNICAL CHARACTERISTICS

5.1. IDENTIFICATION

VBP10 has a tag that identifies the spurs and trunk connections to the equipment, the BT terminator, in addition to its model and serial number, as shown in Figure 5.1.

5.2. PROTECTION BOX

VBP10 bus protector can be purchased with a stainless steel protection box for field mounting (2" tube with 'U' clip).

This option is available for 4 and 8 channel models, with IP66 protection degree and differentiation of the cable glands for spurs and trunk.

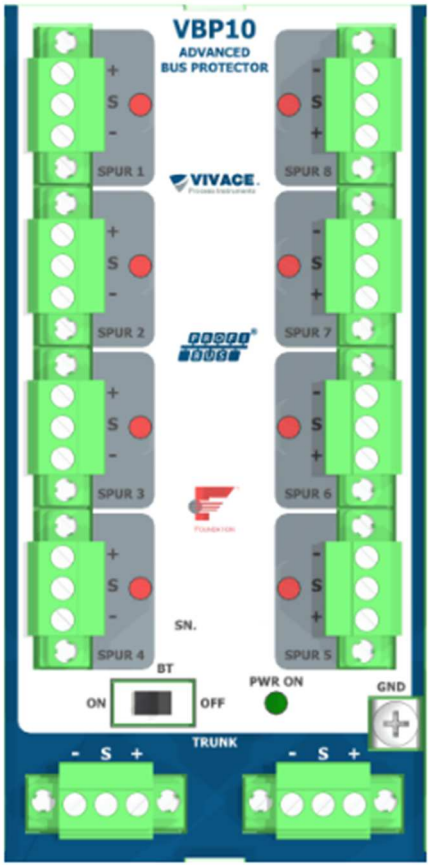

Figure 5.1 – Identification tag for VBP10 (8 channel model).

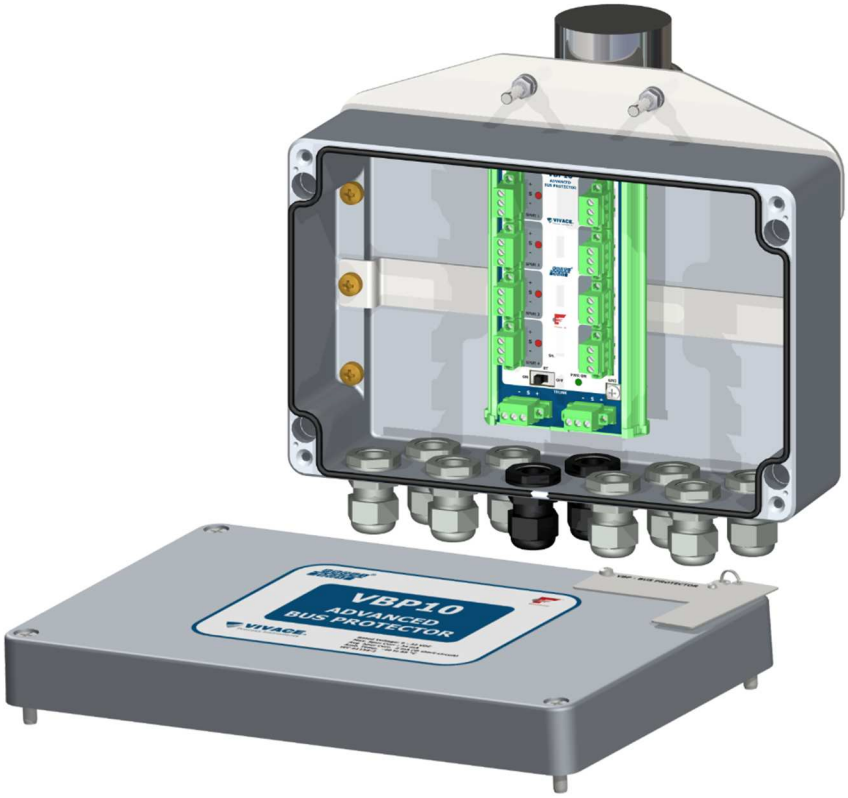

Figure 5.2 – VBP protection box (8 channel model).

5.3. TECHNICAL SPECIFICATION

In the table below are the technical specifications of VBP10:

Physical Layer	According to IEC 61158-2
Protocol	Profibus-PA / FOUNDATION™ fieldbus
Number of Spurs	4 or 8
Power Supply	9 to 32 Vdc
Quiescent Current / Max. per Spur	< 10 mA / 50 mA (@24Vdc)
Max. Trunk Current	2.5 A
Max. Spur Voltage Drop	< 0.5 V @ 20 mA
Spur Current (Short-Circuit)	< 5 mA
Stabilization Time after Short-Circuit Removal	~7 s
Input Surge Protector	1500 W, 62 V cutoff
Spur Connection	Removable bornes with 3 x 2.5 mm² screws
Classified Areas	Intrinsically Safe (pending)
Environment Temperature Limits	-40°C to 85°C
Relative Humidity	0-95% not condensed
Mounting	DIN-rail or Aluminum Protection Housing
Dimension (mm) / Weight	Without Protection Housing: VBP10-4: 90 x 90 x 56 (C x L x A) / 200 g VBP10-8: 142 x 90 x 56 (C x L x A) / 400 g With Protection Housing: VBP10-4: 245 x 180 x 168 (C x L x A) / 2.6 kg VBP10-8: 245 x 280 x 168 (C x L x A) / 4.0 kg

Table 6.1 – Technical specification for VBP10.

5.4. ORDERING CODE

VBP10 *Bus Protector*

Number of Spurs	**4**	FOUR
	8	EIGHT
Certification Type	**0**	NO CERTIFICATION
	1	INTRINSICALLY SAFE
	2	EXPLOSION PROOF
Certification Body	**0**	NO CERTIFICATION
	1	CEPEL
	2	FM
	3	EXAM
Protection Housing	**0**	NO PROTECTION HOUSING
	A	ALUMINUM
Mounting Bracket	**0**	NO BRACKET
	1	SS 304 BRACKET

Ordering Code Example:

VBP10	**4**	**0**	**0**	**0**	**0**

6 WARRANTY

6.1. 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.

6.2. 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
VIVACE™ Process Instruments