



ORION ITALIA

INSTRUCTION MANUAL

VPR-A

Voltage protection relay

Software rev.: VPR-A S1.50
Manual P/N: VPR-A GBM 06/11/2006



SAFETY NORMS AND GENERAL WARNINGS



For a proper installation of the unit the technicians must read carefully and understand the instructions provided by the Constructor

All the installation operations must be carried out by suitably qualified technicians with adequate knowledge of the unit and of the content of this manual.

1. Check that the installation room (spaces, segregation and environmental conditions) are suitable for the electrical and electronic apparatus and in particular that:
 - the room conditions are in compliance with the information contained in SPECIFICATION;
 - the ratings of the unit (voltages, frequencies, etc.) are coherent with the features of the electric system.
2. Make sure that the Standard and Legal requirements are followed during installation, service and maintenance, in order to construct installations according to good technical and safety working practices.



The unit must be used **EXCLUSIVELY** for the purposes described in the Chapter GENERAL INFORMATION.



Disconnect the unit before carrying out any hipot testing on the installation.



Do not carry out any installation/maintenance operations requiring the disassembling and the removal of the unit from the panel on which it is mounted when the unit is live: make sure it has been disconnected.

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SYMBOLS IN THE TEXT AND THEIR MEANINGS



It indicates an **OBLIGATION**, an operation that must be obligatory followed. Pay attention to the information signalled by this symbol, as it refers to situations that require **CAUTION AND WARNING**: any operations not in compliance with what is indicated could provoke damages to objects or people.



Pay particular **ATTENTION** to the parts indicated by this symbol: they are live.



It indicates a **DANGER**, a situation or operation requiring the **MAXIMUM ATTENTION**: any actions not in compliance with what is indicated could provoke really serious damages to objects and even mortal injuries to people.



It indicates **INFORMATION** or **REMARKS** that must be read with particular attention.

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1. General information

1.1 DESCRIPTION

The VPR-A voltage protection relay measures frequency, system line, phase and homopolar RMS voltages and can perform protection functions according to ANSI or IEC standards.

1.2 APPLICATIONS

- Protection of generators, motors and transformers against adverse system voltage conditions.
- Supervision of automatic transfer switching schemes.

1.3 PROTECTION AND FUNCTIONALITY

ANSI

- Programmable voltage inputs for nominal values of secondary VTs between 55 V and 254 V and of primary VTs between 0.1 kV and 650 kV.
- Timed and instantaneous undervoltage (selection of protection Inverse Curve or Definite Time)..... **27T / 27I**
- Residual undervoltage (selection of protection Inverse Curve or Definite Time).....**27R**
- Timed and instantaneous overvoltage..... **59T / 59I**
- Homopolar overvoltage **59N**
- Voltage unbalance..... **46**
- Overfrequency and underfrequency..... **81**
- Phase reversal **47**
- Six programmable output relays.
- Four programmable digital inputs.

Information

The following information concerns the use of the Actual values and the Setpoints.

UNDERVOLTAGE AND OVERVOLTAGE PROTECTION

VPR-A continuously checks the 3 phase voltages, the 3 line voltages and the homopolar voltage by means of its VTs and activates the relevant outputs when a value exceeds the set level (called *Pickup* level).

Up to 3 undervoltage setpoints and 3 overvoltage setpoints are available.

UNDERFREQUENCY AND OVERFREQUENCY PROTECTION

Thanks to the analysis of the voltage at the input A, VPR-A continuously checks the system frequency and intervenes whenever the setpoints are exceeded.

Up to 2 frequency setpoints can be set.

UNBALANCE – PHASE REVERSAL PROTECTION

VPR-A continuously calculates the unbalance and the sequence of the line voltages by activating the relevant outputs whenever exceeding the pickup value.

For the UNBALANCE protection, up to 2 pickup levels can be set.

1.4 DIGITAL MEASUREMENT

1. RMS line voltages
2. Line voltage unbalance
3. Average voltage
4. System frequency (measured at input A)
5. Phase sequence
6. RMS phase and $3V_0$ homopolar voltages (available for VTs connected in "wye-wye" configuration only)

1.5 SIGNALLING AND PROGRAMMING

- LCD & LED display indication
- Touchpad programming
- Indication and storage of fault conditions and their values
- Indication of the system status

SYSTEM STATUS	LED
- The LED lights up to indicate that a fault condition has occurred and that the event has been stored.	[MEMORY]
- Undervoltage 1 or undervoltage 2 fault condition	[PICKUP ANSI 27]
- Undervoltage 3 fault condition	[PICKUP ANSI 27R]
- Phase or homopolar overvoltage 1, 2, or 3 fault condition	[PICKUP ANSI 59/59N]
- Voltage unbalance 1 or unbalance 2 fault condition	[PICKUP ANSI 46]
- Underfrequency 1, Underfrequency 2, Overfrequency 1 or Overfrequency 2 fault condition	[PICKUP ANSI 81]

- Indication of the relay status

RELAY STATUS	LED
- AUX. 1 energized	[AUX. 1]
- AUX. 2 energized	[AUX. 2]
- AUX. 3 energized	[AUX. 3]
- AUX. 4 energized	[AUX. 4]
- AUX. 5 energized	[AUX. 5]
- relay "out of service" due to internal fault	[OUT OF SERVICE]

1.6 COMMUNICATION

- Remote communication using a PC or a PLC by 2 RS485 ports and 1 RS232 port
- Local and remote setting of the relay protections and features
- Fault and event recorder for statistical analysis
- Self-explicative program requiring no additional programming
- Remote opening or closing of the circuit breaker or disconnecter

1.7 TECHNICAL SPECIFICATIONS

SUPPLY VOLTAGE

24±310 Vdc, -15%, +10%
24±240 Vac, -15%, +10%, 50/60Hz

POWER CONSUMPTION

7 W or 15 VA (max.)

TEMPERATURE RANGES

Operation: from 0 °C to +50 °C
Storage: from -20 °C to +70 °C

RELATIVE HUMIDITY

max.: 90% (without condensation)

DIELECTRIC WITHSTAND VOLTAGE

2 KV 60 s

BURN IN

50° C for 48 hours

ENVIRONMENTAL FEATURES

The relay must be installed in a room with the following features:

- indoor,
- dry, not dusty and not corrosive atmosphere.

CONSTRUCTION

In compliance with VDE, UL, CEI standards.

DIGITAL INPUT

Type: Dry contacts
Output: 24 Vdc, 10 mA (stabilized)

COMMUNICATIONS

Type: 1 RS232 port + 2 2-wire RS485 ports, half duplex, 1200÷19200 baud
Protocol: Modbus RTU
Functions: Reading/Writing of setpoints
Reading of actual values
Executing of commands

FRAME

Auto-extinguishing ABS with frontal in polycarbonate (IP54).

DIMENSION

144 x 144 x 138 mm (→ Fig. 2.1 - Dimension of relay VPR-A)

WEIGHT

1.5 Kg

UNDERVOLTAGE PROTECTION

(27t, 27i, 27r)

Pickup level : 15% to 100% VT; Steps: 1%
Reset pickup level: 15% to 100% VT; Steps: 1%
Curve: *Inverse, Definite*
Delay: 0.0 to 600.0 s; Steps: 0.01/0.1/1 s
Pickup accuracy: ±1% of full scale ($15 \leq V \leq 60$)
±0,5% of full scale ($60 < V \leq 254$)
Reset accuracy: ±1% of full scale ($15 \leq V \leq 254$)
Time accuracy: ±3% of trip time or ±20ms (whichever is greater)
at 0ms time delay (no intentional delay) 60ms max
Operation Phases: Any one / Any two / All three
Minimum oper. level: 0% to 100% VT; Steps: 1%

VOLTAGE UNBALANCE PROTECTION

(46)

Pickup level : 1% to 100% VT; Steps: 1%
Reset pickup level: 1% to 100% VT; Steps: 1%
Delay: 0.0 to 600.0 s; Steps: 0.01/0.1/1 s
Pickup accuracy: 3 x voltage input error
Reset accuracy: 3 x voltage input error
Time accuracy: ±3% of trip time or ±20ms (whichever is greater)
at 0ms (no intentional delay) 40ms max

OUTPUT CONTACT

Load: resistive load (p.f. = 1)
inductive load (p.f. = 0.4; L/R = 7 ms)
Rated load: 250 Vac, 8 A or 30 Vdc, 8 A con p.f. = 1
250 Vac, 5 A or 30 Vdc, 5 A con p.f. = 0.4
Max. oper. voltage: 250 Vac, 125 Vdc
Max oper. current: 8 A
Capacity: 2000 VA, 240 W with p.f. = 1
1250 VA, 150 W with p.f. = 0.4

INDICATORS

Relay status: AUX.1, AUX.2, AUX.3, AUX.4, AUX.5, OUT OF SERVICE
System status: Memory, Pickup ANSI 27, Pickup ANSI 27R, Pickup ANSI 59/59N, Pickup ANSI 46, Pickup ANSI 81
Display (LCD): 16 x 2 digits

TERMINAL BLOCK

Fixed, for cables with section: 4 mm² (12 AWG).

MOUNTING

The relay has to be jointed to the structure fixing it by stirrup with screws.

FRONT PANEL CUTOUT

137 x 137 mm

APPLICABILITY

Mono-phase and 3 or 4-wire Three-phase system
Frequency: 50 and 60 Hz;
Voltage: max. 650 kV

OVERVOLTAGE PROTECTION

(59t, 59i) (59n only with VT in wye-wye)

Pickup level : 1% to 150% VT; Steps: 1%
Reset pickup level: 1% to 150% VT; Steps: 1%
Delay: 0.0 to 600.0 s; Steps: 0.01/0.1/1 s
Pickup accuracy: ±0,5% of full scale
Reset accuracy: ±1% of full scale
Time accuracy: ±3% of trip time or ±20ms (whichever is greater)
at 0ms time delay (no intentional delay) 50ms max
Operation Phases: Any one / Any two / All three / Homopolar

UNDER- AND OVERFREQUENCY PROTECTION

(81)

U/F – O/F ΔF pickup: 0.05 to 9.99 Hz; Steps: 0.01 Hz
Reset pickup level U/F: 0.01 to 5.00 Hz; Steps: 0.01 Hz
Delay: 0.1 to 600 s; Steps: 0.1/1 s
Pickup accuracy: ±0.1Hz
Reset accuracy: ±0.1Hz
Time accuracy: ±3% of trip time or ±20ms (whichever is greater)
Measured: by means of Phase A-N or A-B voltage

PHASE SEQUENCE PROTECTION

(47)

Correct sequence: A - B - C

Delay: 0.05 to 600 s; Steps: 0.01/0.1/1 s

EMISSIONS TEST

1. Radiated emissions

Reference norms: CEI EN 50081-2, CEI EN 55011
Port: enclosure; class A; 30÷230 MHz / 30dBuV/m QP at 30 m; 230÷1000 MHz / 37 dBu V/m QP at 30 m.

2. Conducted emissions

Reference norms: CEI EN 50081-2, CEI EN 55011
Port: AC mains; class A; 0.15÷0.5 MHz / 79 dBuV QP; 0.5÷30 MHz / 73 dBu V QP.

MEASURED PARAMETERS

(Accuracies based on 100% U_n input)

Voltage: A-N(A-B)/B-N(B-C)/C-N(C-A) voltages

Accuracy: $\pm 0.5\%$ F.S. ($15 \leq V \leq 254$)

Frequency: Across Phase A-N(A-B) voltage

Range: 40.0 to 70.0 Hz

Accuracy: ± 0.05 Hz

IMMUNITY TESTS

1. Conducted disturbances induced by RF field

Reference norms: CEI EN 50082-2, CEI ENV 50141
Port: AC mains and signal lines; Level 3 (10 V/m rms not modulated); 0.15÷80 MHz; 80%AM (1 kHz).

2. Radiated electromagnetic field

Reference norms: CEI EN 50082-2, CEI ENV 50140 and CEI ENV 50240
Port: enclosure; Level 3 (10 V/m rms not modulated); 80÷1000 MHz; 80% AM (1 kHz); Impulse modulation: 900 \pm 5% MHz; 10 V/m; 50% duty cycle.

3. Electrostatic discharges

Reference norms: CEI EN 50082-2, CEI EN 61000-4-2
Port: enclosure; Level 2 (4 kV contact discharge); Level 3 (8 kV air discharge).

4. Fast transients

Reference norms: CEI EN 50082-2, CEI EN 61000-4-4
Port: AC mains and signal lines; Level 3 (2kV mains); Level 4 (2 kV signal lines); 5/50 ns Tr/Th; 5 kHz.

5. Power frequency magnetic field

Reference norms: CEI EN 50082-2, CEI EN 61000-4-8
Port: enclosure; Level 4 (30 A/m continuous field); Level 4 (300 A/m at 1 s)

6. Surge

Reference norms: CEI EN 50082-2, CEI EN 61000-4-5
Port: AC mains; Level 4 (4 kV line to ground); Level 2 (2 kV line to line); 1.2/50 μ s, 0.5 J

7. Voltage dips and short interruptions

Reference norms: CEI EN 50082-2, CEI EN 61000-4-11
Port: AC mains; Level 30% U_{non} at 10 ms; 60% U_{non} at 100 ms

1.8 HOW TO READ THE ORDER CODE

VPR – A X

MODEL:

1: Standard

X: Special version

2. Installing

2.1 IDENTIFICATION

On the plate on the rear side of the VPR-A you can find the following information:

ORION ITALIA	Manufacturer
PIACENZA 29100	Manufacturer's address
TEL.: 0523 – 591161	
FAX: 0553 – 593898	
<u>www.orionitalia.com</u>	Internet
MADE IN ITALY	
MODEL: VPR-A	Model name
SERIAL No.	Serial number of the relay
MFG. DATE	Date of manufacture

2.2 UNPACKING

The shipping container includes:

- VPR-A relay
- this instruction manual
- the fixing elements
- the Test certificate (if required)

As soon as you receive the unit, inspect it and inform ORION ITALIA of any damage. If reshipment is required, the original container and packing should be used.

2.3 MOUNTING

The mounting should be carried out as follows:

1. Install the relay in a place where the humidity and temperature are those for which it has been designed [→ § 1.7 – “Technical Specification”] and away from current conductors and sources of strong magnetic fields.
2. Put the relay inside a panel and place it so that the keypad is easily accessible and the display is visible.
3. Make a cutout in the panelboard of 137 x 137 mm [→ Fig. 2.1] and fix the relay by using the fixing elements provided with the relay.

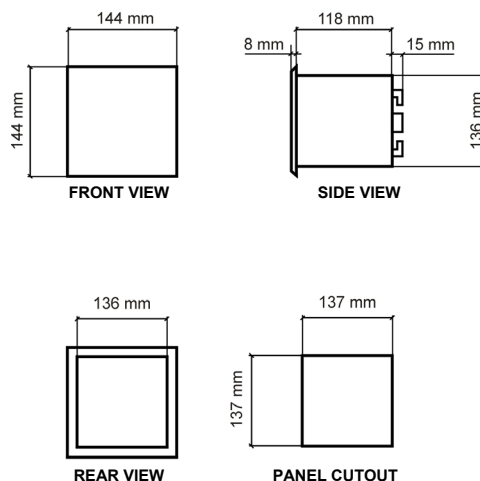


Figure 2.1 – VPR-A overall dimensions

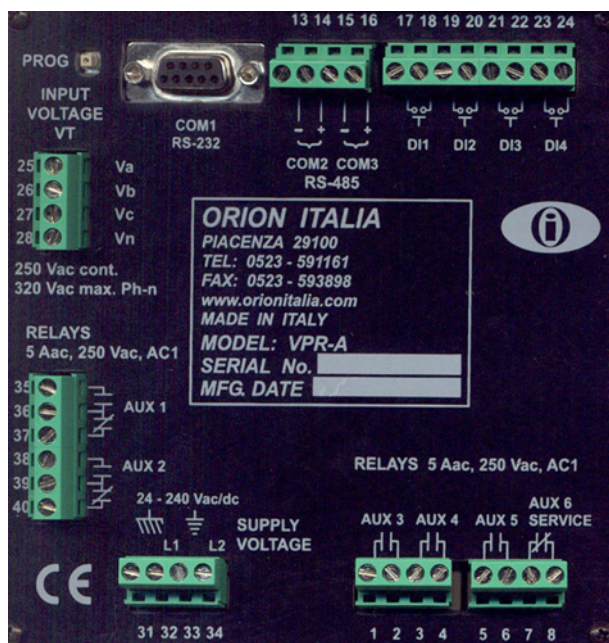
2.4 WIRING – OUTPUT RELAY AND DIGITAL INPUTS



Before carrying out the installation of the unit, it is necessary to read and understand the indications provided by the Constructor.

All the installation operations must be carried out by qualified personnel with adequate knowledge of the functioning of the unit and of the content of this manual.

Terminal blocks in the rear side of the unit make the electrical connections.



DIGITAL INPUT	TERMINAL No.
DIGITAL INPUT 1	17 – 18
DIGITAL INPUT 2	19 – 20
DIGITAL INPUT 3	21 – 22
DIGITAL INPUT 4	23 – 24

Figure 2.2 – Rear view

The 6 output relays on the VPR-A are the following:

Relay	Type	Note	Terminals
AUX 1	N.O. / N.C.	Programmable: “pulsed”, “latched”, “energized”, “autoreset”	35 - 36 - 37
AUX 2	N.O. / N.C.	Programmable: “pulsed”, “latched”, “energized”, “autoreset”	38 - 39 - 40
AUX 3	N.O.	Programmable: “pulsed”, “latched”, “energized”, “autoreset”	1 - 2
AUX 4	N.O.	Programmable: “pulsed”, “latched”, “energized”, “autoreset”	3 - 4
AUX 5	N.O.	Programmable: “pulsed”, “latched”, “energized”, “autoreset”	5 - 6
AUX 6 / SERVICE	N.C.	Programmable: “pulsed”, “latched”, “energized”, “autoreset” [if set as SERVICE: used for signalling any control power drop or internal fault]	7 - 8

- In Fig. 2.3 the relays contacts are represented in condition of no power supply.
- The service contact is failsafe: it is energized during normal functioning and it de-energizes when in stand-by position in case of control power drop or of internal fault of the unit. The contact is N.C. Connect the SERVICE relay to an external alarm system. For configuring AUX6 relay as a service relay: → “Setpoint Page 2 - OUT OF SERVICE ON AUX6”.



The digital inputs must be connected only to dry-contact circuits so as to avoid damaging the VPR-A. No external voltage should be applied to the corresponding terminals as they are internally energized from the VPR-A and opto-coupled to the sensing circuitry.

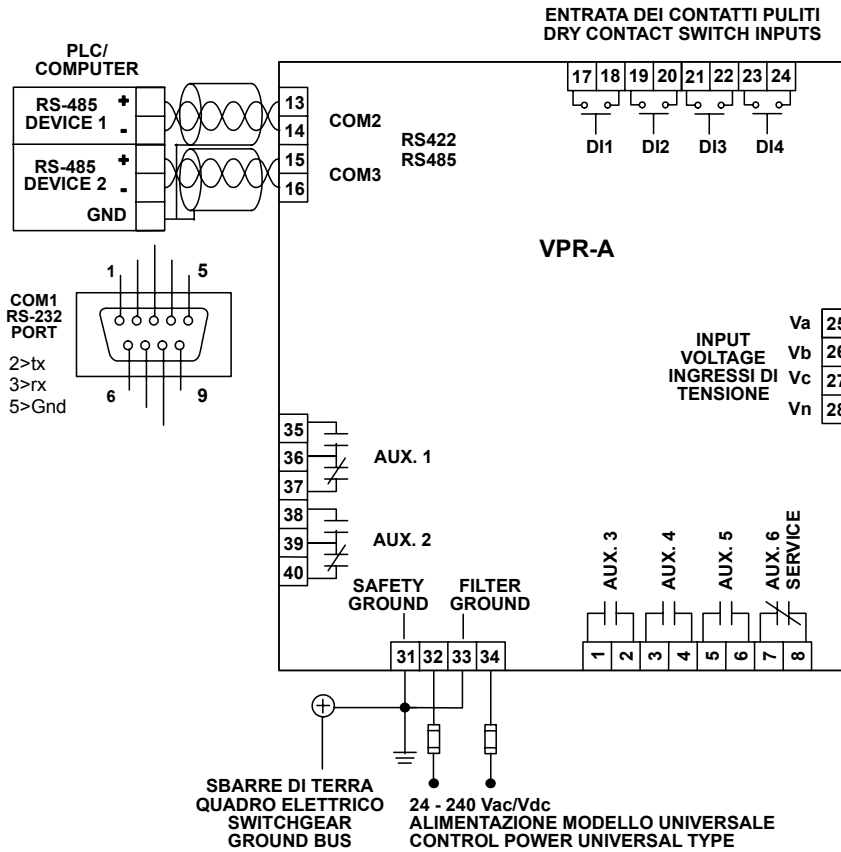
Digital outputs should be isolated from each other for correct operation. The maximum input impedance to these digital outputs is 2 kΩ.



The power supply must be connected to terminals **32** and **34**.



For further information: → § 1.7 – “Technical specifications”



COLLEGAMENTO DEI TV VT WIRING DIAGRAM

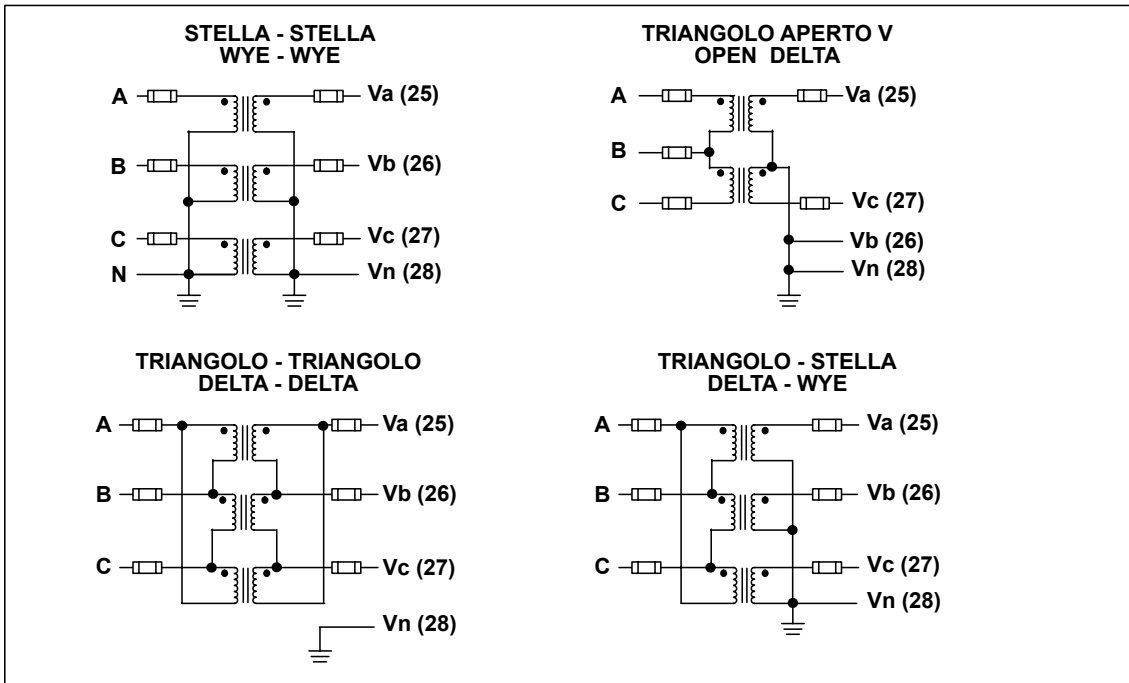


Figure 2.3 – Wiring diagram

2.5 COMMUNICATIONS

Thanks to the serial ports, a PC or PLC can make the monitoring and controlling of the relay.

Two-wire RS485 port \Rightarrow 1 conductors pair transmitting and receiving alternatively is used for the data TX and RX.

The ports **CANNOT** be used at the same time.

The serial port protocol is a subset of the AEG Modicon Modbus protocol.



For the RS-485 port use shielded, twisted-pair connecting wires to minimize communications errors from noise.

A suitable type of wire is:

BELDEN#9841 AWG 24 shielded and with an impedance of **120 Ω** .

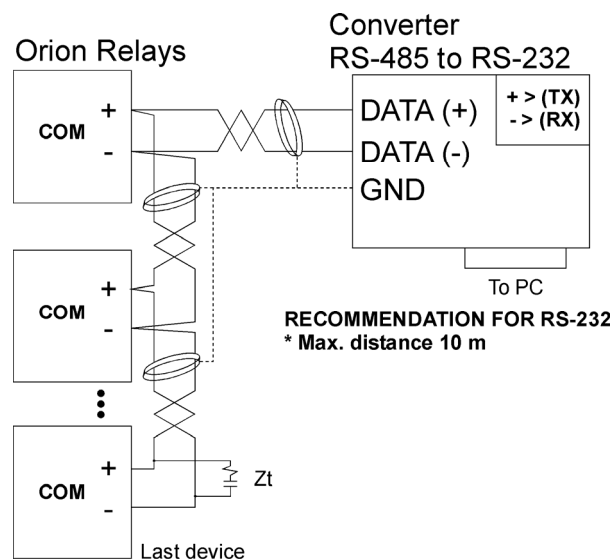
Ground the shield at one point only [\rightarrow Fig. 2.3] to avoid ground loops.

Correct polarity for RS485 \rightarrow Figure 2.4

The connections are cascade-type and end on the converter. Avoid star or loop connections.

A maximum of 32 relays can be daisy-chained together in parallel mode on a communication channel for a **MAXIMUM DISTANCE OF 1000 METERS**.

For increasing the number of relays on a single channel to more than 32 refer to ORION ITALIA.



RECOMMENDATION FOR RS-485
 * Use shielded twisted cable
 * Use only one (1) point of ground
 * Place a Zt in the last device
 (resistance 250 Ω , condensator 1 nF)
 * Max. distance 1000 m

Figure 2.4 – Communications diagram

2.6 CONTROL POWER

- Voltage ranges for **VPR-A** **20 ÷ 341 Vdc**
20 ÷ 264 Vac
- Power supply connection terminals **32 and 34.**



No internal or external adjustments are required to use any of the voltages included in the two indicated intervals.

For the external protection, VPR-A has no internal fuses.

2.7 SYSTEM GROUNDING

On the rear side of the relay there are two separate grounds [-> Fig. 2.2]:

- Internal metal chassis parts and external shield safety ground terminal **31**
- Surge suppression components ground terminal (grounded to separate filter ground) **33**

For reliable operation both grounds must be connected directly to the ground bus bars of the switchgear. Do not connect the ground connection to the switchgear metal frame because low impedance to ground cannot be guaranteed.

2.8 HIPOT TESTING

Hipot testing carried out by the Manufacturer:

- Voltage **2000 Vac, 50 Hz**
- Time (under voltage) **1 minute**



Disconnect the communication terminals and filter ground during dielectric strength testing (hipot) or damages to the internal surge protection devices may occur.

If hipot testing is to be performed on an installed relay for insulation verification, all remaining terminals except for:

- Safety ground terminal + external shield **31**
- Surge suppression components ground terminal (grounded to separate filter ground) **33**

should be connected in parallel.

3. How to use the menu

3.1 MENU STRUCTURE

VPR-A menu is a tree-structure type, consisting of:

- **PAGE** → function access;
- **LINE** → for each PAGE.

3.2 MENU ACCESS

You can have access to the menu by pressing one of the following keys:

- **SET POINTS** ⇒ *It activates the menu for setting functions and variables.*
- **ACTUAL VALUES** ⇒ *It activates the menu for selecting the actual values to be displayed.*

3.3 MENU SURFING

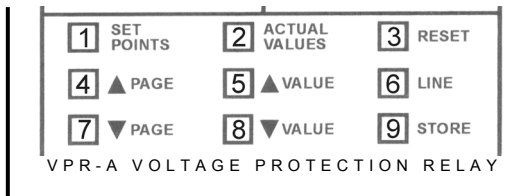
For menu surfing, use one of the following keys:

- ▲ **PAGE** ⇒ *Next PAGE.*
- ▼ **PAGE** ⇒ *Previous PAGE.*
- **LINE** ⇒ *Next LINE in the actual PAGE.*

3.4 SELECTING AND STORING KEYS

Use the following keys for selecting and storing data:

- ▲ **VALUE** ⇒ *For scanning the values or the options to the end of the actual range.*
- ▼ **VALUE** ⇒ *For scanning the values or the options to the beginning of the actual range.*
- **STORE** ⇒
 - *For storing the newly entered data.*



- *It requires the entering of the access code (111).*
- *It switches the keypad operation mode for entering the digits (1 to 9) positioned as shown in the figure.*

PROG key is positioned on the back of the relay. It can be used to enter new data in SETPOINTS or ACTUAL VALUES menu (range: YES/NO) without entering the access code.



Press **PROG** key instead of: **ENTER ACCESS CODE** + □ **STORE** Key

3.5 QUICK SURFING GUIDE

The operation mode of the **PAGE**, **LINE**, **VALUE** and **STORE** keys is described in details only in the description of the PAGE 1 of the SETPOINT Menu. As the mode for surfing is the same in the other pages, the use of these keys, starting from the second PAGE of the Menu, will not be repeated.

The following summary is intended to be a **QUICK SURFING GUIDE**:

PAGE: these two keys allow going from one PAGE to the next one [▲] or to the previous one [▼].

LINE: this key allows to go from one LINE to the next inside the same PAGE. At the last LINE of the PAGE, it allows to go to the next PAGE.

VALUE: these two keys allow to select range values, decreasing [▼] or increasing [▲], or to select two or more options [for example NO and YES].

STORE: this key allows to store the data and to enter the access code.
Any modifying not confirmed by STORE will be ignored.

3.6 SYMBOLS USED IN THE TEXT



The VPR-A display is represented by this figure.

Next to each Setpoint, on the right side of the display, "RANGE:" will be displayed and followed by digits or options separated by the following symbols:

Symbol	Meaning
;	You can select only among the elements of the list that are all clearly listed and separated by the "semi-colon".
÷	You can select among all values included in the limits indicated.

FOR EXAMPLE:

RANGE: 2; 3; 6 ⇒ you can select only one of the three digits: 2, or 3, or 6.

RANGE: 2 ÷ 6 ⇒ you can select 2, or 3, or 4, or 5, or 6.



In the SETPOINT Pages (except for PAGE 1), the value indicated in this manual in the 2nd line of the display has been set by the Manufacturer of the relay.



This symbol indicates the key that must be pressed.

3.7 MENU PAGES

The following page includes the complete structure of the VPR-A Menu Pages.

The following keys can activate the two menus represented:



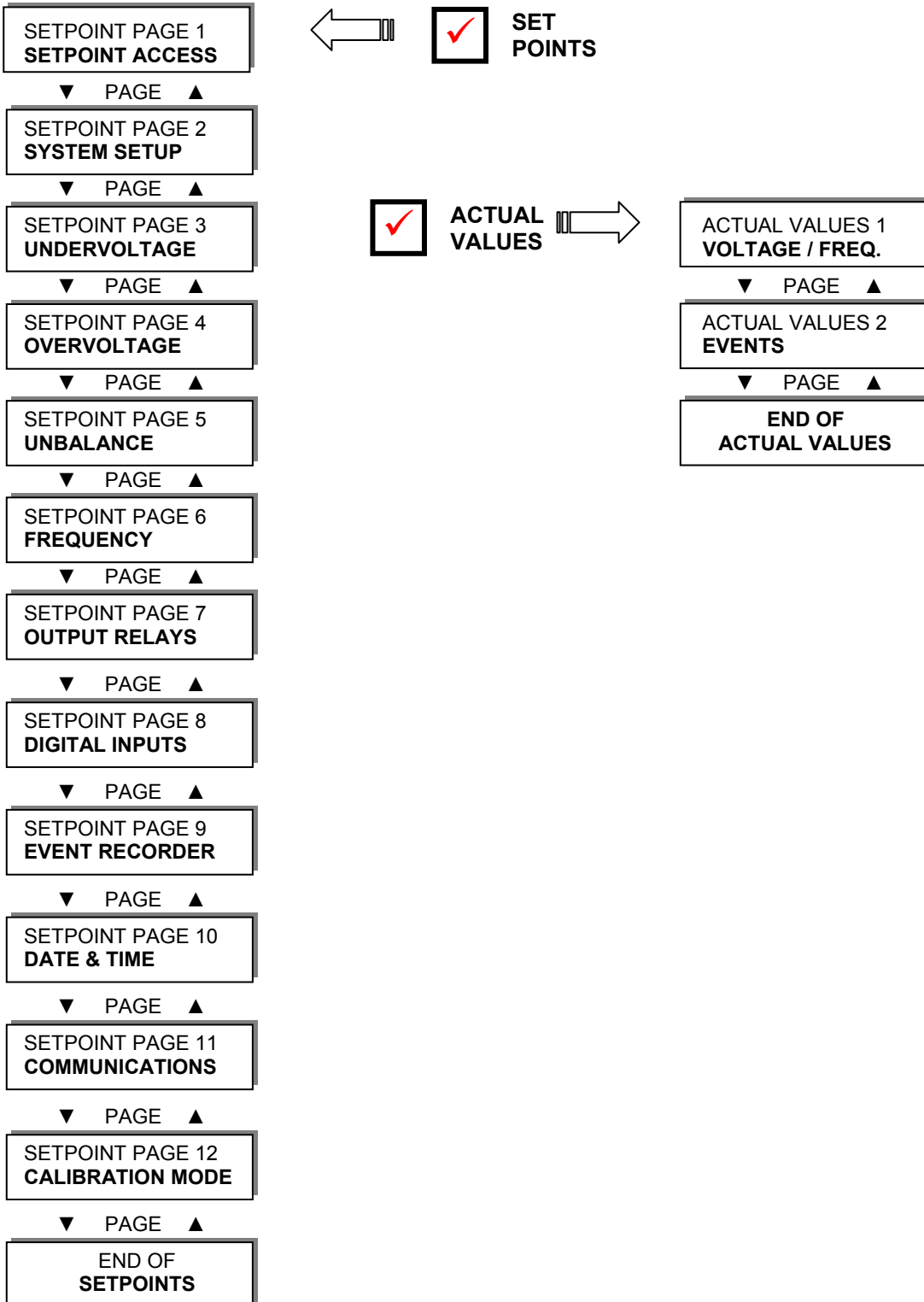
⇒ It allows programming the relay by setting the parameters and the electrical variables values.



⇒ This menu allows displaying or clearing some of the parameters monitored or calculated by the relay.



Before reading the map, study carefully the information in the previous paragraphs: 3.1; 3.2; 3.3; 3.4; 3.5 and 3.6.



3.8 HOW TO USE SETPOINTS AND ACTUAL VALUES KEYS

SET POINTS

SETPOINT PAGE 1
SETPOINT ACCESS



LINE



ENTER ACCESS
CODE: X X X

Available digits: 1÷ 9 (0 is NOT available)



SETPOINT ACCESS
ENABLED



LINE

ENTER NEW ACCESS
CODE: Y/N

⇒ Select NO or YES

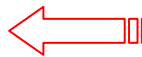
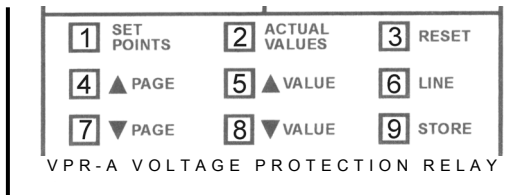


▲VALUE or ▼VALUE



ENTER NEW ACCESS
CODE: X X X

⇐ STORE (*)



PAY ATTENTION to position of digits!



LINE

FIRMWARE:
VPR-A – vX.XX



LINE

END OF PAGE



(*) If YES has been selected, by pressing **STORE** key, all the nine keys on the front panelboard modify their functions and allow to enter the digits from 1 to 9, according to the correspondence represented in the diagram.

4. "SETPOINTS" menu




Before carrying out the programming of the unit, it is necessary to read and understand the indications provided by the Manufacturer. All the programming must be carried out by qualified personnel with adequate knowledge of the functioning of the unit and of the content of this manual.

4.1 Setpoints page 1: SETPOINT ACCESS

**SETPOINTS PAGE 1
SETPOINT ACCESS**

This PAGE contains messages for Setpoint access.
Press **LINE** key to pass to next Line.

ENTER ACCESS
CODE: X X X

Enter the THREE-DIGIT access code using the digits from 1 to 9.
[→ § 3.8 ]. **Manufacturer code: 111.**

SETPOINT ACCESS
ENABLED

It indicates that the entered code is correct and that the SETPOINT values can be modified.

SETPOINT ACCESS
ONLY VIEW

It indicates that the entered code is incorrect and that the SETPOINT values can only be read.


ENTER NEW ACCESS
CODE? NO

RANGE:..... NO; YES

The user can enter his own customized access code.

- to confirm the code programmed by the Constructor.
 1. press **LINE** key to pass to **VPR-A RELAY: VPR-A – VX.XX**
- to replace the code programmed by the Constructor with the customized one:
 1. press **▲ VALUE** key → **YES** will be displayed (the following line will be displayed);
 2. press **STORE** key;
 3. enter the new code that is automatically confirmed after entering;
 4. press **LINE** key to pass to the following line.

ENTER NEW ACCESS
CODE: X X X

Enter the THREE-DIGIT access code using the digits from 1 to 9.
[→ § 3.8 - ]. **Manufacturer code: 111.**

Displayed only if "YES" has been selected in the previous line.

NEW ACCESS CODE
STORED = X X X

It indicates that the new access code has been stored.

FIRMWARE:
VPR-A – vX.XX

It indicates the VPR-A firmware version.

END OF PAGE

Last LINE of PAGE 1.

Press **LINE** or **▲ PAGE**, to pass to the first line of PAGE 2.

4.1.1 Relationship between Function and Output Relay

In the following pages the output relays must be selected for each protection function. Carry out the following procedure for selection:

(For explaining purposes reference is made to the function: UNDERVOLTAGE)

**UNDERVOLTAGE 1
RELAY: -----**

The 6 symbols "-----" are displayed and by **VALUE ▲** and **VALUE ▼** keys
 the 1st symbol can be changed in **1 = AUX1**
 the 2nd symbol can be changed in **2 = AUX2**
 the 3rd symbol can be changed in **3 = AUX3**
 the 4th symbol can be changed in **4 = AUX4**
 the 5th symbol can be changed in **5 = AUX5**
 the 6th symbol can be changed in **6 = AUX6**

PROCEDURE

- As soon as the selection of the outputs is required, the first symbol available starts blinking.
- Commutation of the 1st symbol:
 Press **VALUE ▲** or **VALUE ▼** and confirm by **STORE + ACCESS CODE** (if required). The cursor will blink in correspondence of the 1st symbol. Modify the selection, if necessary, or press **LINE** to pass to the second symbol.

Passage to the 2nd symbol without commuting the 1st one
 Press **LINE**.

- Repeat the procedure for all 6 symbols "-----".

Example: For selecting **1 - 3 - - -**

**UNDERVOLTAGE 1
RELAY: * - - - - -**

The first cursor blinks ⇒ Press **VALUE ▲** and **1** will be displayed.
 Press **STORE + ACCESS CODE** (if required) ⇒ **1** is confirmed and **1** will blink.

**UNDERVOLTAGE 1
RELAY: 1 * - - - -**

Press **LINE**: the second cursor will blink.

**UNDERVOLTAGE 1
RELAY: 1 - * - - -**

Press **LINE** to pass to the third cursor that will start blinking: press **VALUE ▲** and **3** will be displayed. Press **STORE + ACCESS CODE** (if required) ⇒ **3** is confirmed and **1** will blink.

**UNDERVOLTAGE 1
RELAY: 1 - 3 * - -**

Press **LINE** for 3 times ⇒ the fourth cursor will blink.

**UNDERVOLTAGE 1
RELAY: 1 - 3 - * -**

Press **LINE** ⇒ the fifth cursor will blink.

**UNDERVOLTAGE 1
RELAY: 1 - 3 - - ***

Press **LINE** ⇒ the sixth cursor will blink.

**UNDERVOLTAGE 1
RELAY: 1 - 3 - - -**

Press **LINE**: the selection **1 - 3 - - -** has been completed and you pass to the following Line of the active Setpoint.

4.2 Setpoints page 2: SYSTEM SETUP

SETPOINTS PAGE 2 SYSTEM SETUP

This page allows entering the VPR-A parameter values for the system in which it will operate.

SAMPLING
FREQUENCY: 50 Hz

RANGE:50 Hz; 60 Hz
Enter the system frequency.

VT CONNECTION
WYE

RANGE:.....WYE-WYE, DELTA-WYE, DELTA-DELTA, OPEN-DELTA
Enter the type of VT connection.

VT NOMINAL SEC
100 Vac

RANGE:.....55 ÷ 254 V
STEPS: 1 V
Enter the voltage nominal value of the secondary of the VT.

VT PRIMARY VOLTS
10.00 KV

RANGE:.....0.10 ÷ 650.000 KV
STEPS:..... 0.01 / 0.1 / 1.00 KV
Enter the voltage nominal value of the primary of the VT.

OUT OF SERVICE
ON AUX6: YES

RANGE:.....NO; YES
*When selecting YES AUX6 relay will perform the SERVICE function: once the power is applied, the relay will make AUX6 react and the related contact will be opened. In case of fault of the relay (OUT OF SERVICE led "On") or of loss of power supply, AUX6 will pass to stand-by position and close its contact.
When selecting NO AUX 6 will be managed as AUX1, AUX2, AUX 3, AUX 4 and AUX5.*

END OF PAGE

4.3 Setpoints page 3: UNDERVOLTAGE

SETPOINTS PAGE 3 UNDERVOLTAGE

This PAGE allows setting the undervoltage protection.

UNDERVOLTAGE 1 RELAYS: - - - - -

RANGE: any combination of AUX 1 ÷ AUX 6
Select the outputs to be activated by the UNDERVOLTAGE 1 protection.
Select at least one of AUX1÷AUX6 to enable the UNDERVOLTAGE 1 protection.

REMARK: The procedure for selection is described at page 4.2

UNDERVOLTAGE 1 LEVEL: 95% VT

If at least one relay
has been selected in
"UNDERVOLTAGE 1 RELAYS"

RANGE: 15% ÷ 100% TV
STEPS: 1% TV
Enter the UNDERVOLTAGE 1 LEVEL in percentage of the rated value of VT for the activation of the UNDERVOLTAGE 1 protection.

UNDERVOLTAGE 1 RESET: 97% VT

If at least one relay
has been selected in
"UNDERVOLTAGE 1 RELAYS"

RANGE: 15% ÷ 100% TV
STEPS: 1% TV
Enter the percentage value at which the faulty condition for UNDERVOLTAGE 1 drops out.

UNDERVOLTAGE 1 DELAY: 1.0 Sec

If at least one relay
has been selected in
"UNDERVOLTAGE 1 RELAYS"

RANGE: 0.00 ÷ 600 s
STEPS: 0.01 / 0.1 / 1 s
Enter the UNDERVOLTAGE 1 protection intervention delay.
If:
voltage decreases under the set level for a time < delay time selected
⇒ no intervention will be activated.

UNDERVOLTAGE 1 CURVE: DEFINITE

If at least one relay
has been selected in
"UNDERVOLTAGE 1 RELAYS"

RANGE: DEFINITE; INVERSE
Enter the UNDERVOLTAGE 1 protection curve shape required:
- DEFINITE TIME: definite-time curve; the pick-up delay is the one defined in UNDERVOLTAGE 1 DELAY
- INVERSE: inverse-time curve, the pick-up delay is $T = D / (1 - V/V_{lev})$ where:
V = measured voltage
 V_{lev} = pick up level selected in UNDERVOLTAGE 1 LEVEL
D = delay time selected in UNDERVOLTAGE 1 DELAY

PHASE FOR U/V 1 OPER.: ANY ONE

If at least one relay
has been selected in
"UNDERVOLTAGE 1 RELAYS"

RANGE: ANY ONE; ANY TWO; ALL THREE
Select the min. number of phases on which the faulty condition has to occur for UNDERVOLTAGE 1 intervention.

MINIMUM OPER. LEVEL: 0% VT

If at least one relay
has been selected in
"UNDERVOLTAGE 1 RELAYS"

RANGE: 0% ÷ 100% TV
STEPS: 1% TV
Enter the limit voltage value under which the UNDERVOLTAGE 1 protection is disabled.

UNDERVOLTAGE 2 RELAYS: - - - - -

RANGE: any combination of AUX 1 ÷ AUX 6
Select the outputs to be activated by the UNDERVOLTAGE 2 protection.
Select at least one of AUX1÷AUX6 to enable the UNDERVOLTAGE 2 protection.

REMARK: The procedure for selection is described at page 4.2

UNDERVOLTAGE 2 LEVEL: 95% VT

If at least one relay
has been selected in
"UNDERVOLTAGE 2 RELAYS"

RANGE: 15% ÷ 100% TV
STEPS: 1% TV
Enter the UNDERVOLTAGE 2 LEVEL in percentage of the rated value of VT for activation of the UNDERVOLTAGE 2 protection.

**UNDERVOLTAGE 2
RESET: 97%**

If at least one relay
has been selected in
"UNDERVOLTAGE 2 RELAYS"

**UNDERVOLTAGE 2
DELAY: 1.0 SEC**

If at least one relay
has been selected in
"UNDERVOLTAGE 2 RELAYS"

**UNDERVOLTAGE 2
CURVE: DEFINITE**

If at least one relay
has been selected in
"UNDERVOLTAGE 2 RELAYS"

**PHASES FOR U/V 2
OPER.: ANY ONE**

If at least one relay
has been selected in
"UNDERVOLTAGE 2 RELAYS"

**MINIMUM OPER.
LEVEL: 0% VT**

If at least one relay
has been selected in
"UNDERVOLTAGE 2 RELAYS"

**UNDERVOLTAGE 3
RELAYS: - - - - -**

**UNDERVOLTAGE 3
LEVEL: 95% VT**

If at least one relay
has been selected in
"UNDERVOLTAGE 3 RELAYS"

**UNDERVOLTAGE 3
RESET: 97% VT**

If at least one relay
has been selected in
"UNDERVOLTAGE 3 RELAYS"

**UNDERVOLTAGE 3
DELAY: 1.0 SEC**

If at least one relay
has been selected in
"UNDERVOLTAGE 3 RELAYS"

RANGE: 15% ÷ 100% TV
STEPS: 1% TV
Enter the percentage value at which the faulty condition for UNDERVOLTAGE 2 drops out.

RANGE: 0.00 ÷ 600 s
STEPS: 0.01 / 0.1 / 1 s
Enter the UNDERVOLTAGE 2 protection intervention delay.
If:
voltage decreases under the set level for a time < delay time selected
⇒ no intervention will be activated.

RANGE: DEFINITE; INVERSE
Enter the UNDERVOLTAGE 2 protection curve shape required:
- DEFINITE TIME: definite-time curve; the pick-up delay is the one defined in UNDERVOLTAGE 2 DELAY
- INVERSE: inverse-time curve, the pick-up delay is $T = D / (1 - V/V_{lev})$ where:
V = measured voltage
 V_{lev} = pick up level selected in UNDERVOLTAGE 2 LEVEL
D = delay time selected in UNDERVOLTAGE 2 DELAY

RANGE: ANY ONE; ANY TWO; ALL THREE
Select the min. number of phases on which the faulty condition has to occur for UNDERVOLTAGE 2 intervention.

RANGE: 0% ÷ 100% TV
STEPS: 1% TV
Enter the limit voltage value under which the UNDERVOLTAGE 2 protection is disabled.

RANGE: any combination of AUX 1 ÷ AUX 6
Select the outputs to be activated by the UNDERVOLTAGE 3 protection.
Select at least one of AUX1÷AUX6 to enable the UNDERVOLTAGE 3 protection.

REMARK: The procedure for selection is described at page 4.2

RANGE: 15% ÷ 100% TV
STEPS: 1% TV
Enter the UNDERVOLTAGE 3 LEVEL in percentage of the rated value of VT for the activation of the UNDERVOLTAGE 3 protection.

RANGE: 15% ÷ 100% TV
STEPS: 1% TV
Enter the percentage value at which the faulty condition for UNDERVOLTAGE 3 drops out.

RANGE: 0.00 ÷ 600 s
STEPS: 0.01 / 0.1 / 1 s
Enter the UNDERVOLTAGE 3 protection intervention delay.
If:
voltage decreases under the set level for a time < delay time selected
⇒ no intervention will be activated.

**UNDERVOLTAGE 3
CURVE: DEFINITE**

If at least one relay
has been selected in
"UNDERVOLTAGE 3 RELAYS"

RANGE:DEFINITE; INVERSE

Enter the UNDERVOLTAGE 3 protection curve shape required:

- *DEFINITE TIME: definite-time curve; the pick-up delay is the one defined in UNDERVOLTAGE 3 DELAY*
- *INVERSE: inverse-time curve, the pick-up delay is $T = D / (1 - V/V_{lev})$ where:
V = measured voltage
 V_{lev} = pick up level selected in UNDERVOLTAGE 3 LEVEL
D = delay time selected in UNDERVOLTAGE 3 DELAY*

**PHASES FOR U/V 3
OPER.: ANY ONE**

If at least one relay
has been selected in
"UNDERVOLTAGE 3 RELAYS"

RANGE:ANY ONE; ANY TWO; ALL THREE

Select the min. number of phases on which the faulty condition has to occur for UNDERVOLTAGE 3 intervention.

**MINIMUM OPER.
LEVEL: 0% VT**

RANGE:0% ÷ 100% TV

STEPS: 1% TV

Enter the limit voltage value under which the UNDERVOLTAGE 3 protection is disabled.

END OF PAGE

Last LINE of PAGE 3.

*Press **LINE** or **▲PAGE**, to pass to the first line of PAGE 4.*

4.4 Setpoints page 4: OVERVOLTAGE

SETPOINTS PAGE 4 OVERVOLTAGE

This PAGE allows setting the overvoltage protection.

OVERVOLTAGE 1 RELAYS: - - - - -

RANGE: any combination of AUX 1 ÷ AUX 6
Select the outputs to be activated by the OVERVOLTAGE 1 protection.
Select at least one of AUX1÷AUX6 to enable the OVERVOLTAGE 1 protection.

REMARK: The procedure for selection is described at page 4.2

OVERVOLTAGE 1 LEVEL: 105% VT

If at least one relay
has been selected in
"OVERVOLTAGE 1 RELAYS"

RANGE: 1% ÷ 150% TV
STEPS: 1% TV
Enter the OVERVOLTAGE 1 LEVEL in percentage of the rated value of VT for the activation of the OVERVOLTAGE 1 protection.

OVERVOLTAGE 1 RESET: 103% VT

If at least one relay
has been selected in
"OVERVOLTAGE 1 RELAYS"

RANGE: 1% ÷ 150% TV
STEPS: 1% TV
Enter the percentage value at which the faulty condition for OVERVOLTAGE 1 drops out.

OVERVOLTAGE 1 DELAY: 1.0 SEC

If at least one relay
has been selected in
"OVERVOLTAGE 1 RELAYS"

RANGE: 0.00 ÷ 600 s
STEPS 0.01 / 0.1 / 1 s
Enter the OVERVOLTAGE 1 protection intervention delay.
If:
voltage increases above the set intervention value for a time < delay time selected,
⇒ no intervention will be activated.

PHASES FOR O/V 1 OPER.: ANY ONE

If at least one relay
has been selected in
"OVERVOLTAGE 1 RELAYS"

RANGE: ANY ONE; ANY TWO;
ALL THREE; HOMOPOLAR
Select the min. number of phases on which the faulty condition has to occur for OVERVOLTAGE 1 intervention.

REMARK: If selecting "Homopolar", OVERVOLTAGE 1 protection works as 59N protection.

OVERVOLTAGE 2 RELAYS: - - - - -

RANGE: any combination of AUX 1 ÷ AUX 6
Select the outputs to be activated by the OVERVOLTAGE 1 protection.
Select at least one of AUX1÷AUX6 to enable the OVERVOLTAGE 2 protection.

REMARK: The procedure for selection is described at page 4.2

OVERVOLTAGE 2 LEVEL: 105% VT

If at least one relay
has been selected in
"OVERVOLTAGE 2 RELAYS"

RANGE: 1% ÷ 150% TV
STEPS: 1% TV
Enter the OVERVOLTAGE 2 LEVEL in percentage of the rated value of VT for the activation of the OVERVOLTAGE 2 protection.

OVERVOLTAGE 2 RESET: 103% VT

If at least one relay
has been selected in
"OVERVOLTAGE 2 RELAYS"

RANGE: 1% ÷ 150% TV
STEPS: 1% TV
Enter the percentage value at which the faulty condition for OVERVOLTAGE 2 drops out.

OVERVOLTAGE 2 DELAY: 1.0 SEC

If at least one relay
has been selected in
"OVERVOLTAGE 2 RELAYS"

RANGE: 0.00 ÷ 600 s
STEPS 0.01 / 0.1 / 1 s
Enter the OVERVOLTAGE 2 protection intervention delay.
If:
voltage increases above the set intervention value for a time < delay time selected,
⇒ no intervention will be activated.

**PHASES FOR O/V 2
OPER.: ANY ONE**

If at least one relay
has been selected in
"OVERVOLTAGE 2 RELAYS"

RANGE: ANY ONE; ANY TWO;
ALL THREE; HOMOPOLAR

Select the min. number of phases on which the faulty condition has to occur for OVERVOLTAGE 2 intervention.

REMARK: If selecting "Homopolar", OVERVOLTAGE 2 protection works as 59N protection.

**OVERVOLTAGE 3
RELAYS: - - - - -**

RANGE: any combination of AUX 1 ÷ AUX 6

Select the outputs to be activated by the OVERVOLTAGE 3 protection.
Select at least one of AUX1÷AUX6 to enable the OVERVOLTAGE 3 protection.

REMARK: The procedure for selection is described at page 4.2

**OVERVOLTAGE 3
LEVEL: 105% VT**

If at least one relay
has been selected in
"OVERVOLTAGE 3 RELAYS"

RANGE: 1% ÷ 150% TV

STEPS: 1% TV
Enter the OVERVOLTAGE 3 LEVEL in percentage of the rated value of VT for the activation of the OVERVOLTAGE 3 protection.

**OVERVOLTAGE 3
RESET: 103% VT**

If at least one relay
has been selected in
"OVERVOLTAGE 3 RELAYS"

RANGE: 1% ÷ 150% TV

STEPS: 1% TV
Enter the percentage value at which the faulty condition for OVERVOLTAGE 3 drops out.

**OVERVOLTAGE 3
DELAY: 1.0 SEC**

RANGE: 0.00 ÷ 600 s

STEPS: 0.01 / 0.1 / 1 s

Enter the OVERVOLTAGE 3 protection intervention delay.

If:

voltage increases above the set intervention value for a time < delay time selected,

⇒ no intervention will be activated.

**PHASES FOR O/V 3
OPER.: ANY ONE**

If at least one relay
has been selected in
"OVERVOLTAGE 3 RELAYS"

RANGE: ANY ONE; ANY TWO;
ALL THREE; HOMOPOLAR

Select the min. number of phases on which the faulty condition has to occur for OVERVOLTAGE 3 intervention.

REMARK: If selecting "Homopolar", OVERVOLTAGE 3 protection works as 59N protection.

END OF PAGE

Last LINE of PAGE 4.

Press **LINE** or **▲PAGE**, to pass to the first line of PAGE 5.

4.5 Setpoint page 5: UNBALANCE

SETPOINT PAGE 5 UNBALANCE

This PAGE allows setting the unbalance and phase reversal protections.

UNBALANCE 1
RELAYS: - - - - -

RANGE: any combination of AUX 1 ÷ AUX 6
Select the outputs to be activated by the UNBALANCE 1 protection.
Select at least one of AUX1÷AUX6 to enable the UNBALANCE 1 protection.

REMARK: The procedure for selection is described at page 4.2

UNBALANCE 1
LEVEL: 10% VT

If at least one relay
has been selected in
"UNBALANCE 1 RELAYS"

RANGE: 1% ÷ 99%
STEPS: 1%
Enter the UNBALANCE 1 LEVEL in percentage of the rated value of VT for the activation of the UNBALANCE 1 protection.

UNBALANCE 1
RESET: 8%

If at least one relay
has been selected in
"UNBALANCE 1 RELAYS"

RANGE: 1% ÷ 99%
STEPS: 1%
Enter the percentage value at which the faulty condition for UNBALANCE 1 drops out.

UNBALANCE 1
DELAY: 1.0 Sec

If at least one relay
has been selected in
"UNBALANCE 1 RELAYS"

RANGE: 0.00 ÷ 600 s
STEPS: 0.01 / 0.1 / 1 s
Enter the UNBALANCE 1 protection intervention delay.
If:
the unbalance increases above the set UNBALANCE 1 LEVEL for a time < delay time selected,
⇒ no intervention will be activated.

UNBALANCE 2
RELAYS: - - - - -

RANGE: any combination of AUX 1 ÷ AUX 6
Select the outputs to be activated by the UNBALANCE 2 protection.
Select at least one of AUX1÷AUX6 to enable the UNBALANCE 2 protection.

REMARK: The procedure for selection is described at page 4.2

UNBALANCE 2
LEVEL: 10% VT

If at least one relay
has been selected in
"UNBALANCE 2 RELAYS"

RANGE: 1% ÷ 99%
STEPS: 1%
Enter the UNBALANCE 2 LEVEL in percentage of the rated value of VT for the activation of the UNBALANCE 2 protection.

UNBALANCE 2
RESET: 8% VT

If at least one relay
has been selected in
"UNBALANCE 2 RELAYS"

RANGE: 1% ÷ 99%
STEPS: 1%
Enter the percentage value at which the faulty condition for UNBALANCE 2 drops out.

UNBALANCE 2
DELAY: 1.0 Sec

If at least one relay
has been selected in
"UNBALANCE 2 RELAYS"

RANGE: 0.00 ÷ 600 s
STEPS: 0.01 / 0.1 / 1 s
Enter the UNBALANCE 2 protection intervention delay.
If:
the unbalance increases above the set UNBALANCE 2 LEVEL for a time < delay time selected,
⇒ no intervention will be activated.

PHASE REVERSAL
RELAYS: - - - - -

RANGE: any combination of AUX 1 ÷ AUX 6
Select the outputs to be activated by the PHASE REVERSAL protection.
Select at least one of AUX1÷AUX6 to enable the PHASE REVERSAL protection.

REMARK: The procedure for selection is described at page 4.2

PHASE REVERSAL
DELAY: 1.0 Sec

If at least one relay
has been selected in
"PHASE REVERSAL RELAYS"

RANGE: 0.00 s ÷ 600 s

STEPS: 0.05 / 0.1 / 1 s

Enter the PHASE REVERSAL protection intervention delay.

If:

PHASE REVERSAL condition occurs for a time < delay time selected,

⇒ no intervention will be activated.

END OF PAGE

Last LINE of PAGE 5.

Press **LINE** or **▲PAGE**, to pass to the first line of PAGE 6.

4.6 Setpoint page 6: FREQUENCY

SETPOINT PAGE 6
FREQUENCY

This PAGE allows setting the underfrequency and the overfrequency protections.

FREQUENCY 1
RELAYS: - - - - -

RANGE: any combination of AUX 1 ÷ AUX 6

Select the outputs to be activated by the FREQUENCY 1 protection.

Select at least one of AUX1÷AUX6 to enable the FREQUENCY 1 protection.

REMARK: The procedure for selection is described at page 4.2

FREQUENCY 1
MODE: O/F+U/F

If at least one relay
has been selected in
"FREQUENCY 1 RELAYS"

RANGE: O/F+U/F; O/F; U/F

Select the FREQUENCY 1 protection mode.

O/F → OVERFREQUENCY

U/F → UNDERFREQUENCY

O/F+U/F → OVERFREQUENCY + UNDERFREQUENCY

FREQUENCY 1
LEVEL: 1.00 Hz

If at least one relay
has been selected in
"FREQUENCY 1 RELAYS"

RANGE: 0.05 ÷ 9.99 Hz

STEPS: 0.01 Hz

Enter the absolute value of the maximum variation of the frequency beyond which the FREQUENCY 1 protection is activated.

FREQUENCY 1
RESET: 0.50 Hz

If at least one relay
has been selected in
"FREQUENCY 1 RELAYS"

RANGE: 0.01 ÷ 5.00 Hz

STEPS: 0.01 Hz

Enter the absolute value of the frequency variation (in relation to the rated frequency) at which the condition of overfrequency 1 or underfrequency 1 drops out.

FREQUENCY 1
DELAY: 1.0 Sec

If at least one relay
has been selected in
"FREQUENCY 1 RELAYS"

RANGE: 0.1 ÷ 600 s

STEPS: 0.1 / 1 s

Enter the FREQUENCY 1 protection intervention delay.

If:

frequency is different from the rated value, by exceeding the set variation, for a time < delay time selected,

⇒ no intervention will be activated.

FREQUENCY 2
RELAYS: - - - - -

RANGE: any combination of AUX 1 ÷ AUX 6

Select the outputs to be activated by the FREQUENCY 2 protection.

Select at least one of AUX1÷AUX6 to enable the FREQUENCY 2 protection.

REMARK: The procedure for selection is described at page 4.2

FREQUENCY 2
MODE: O/F+U/F

If at least one relay
has been selected in
"FREQUENCY 2 RELAYS"

RANGE: O/F+U/F; O/F; U/F

Select the FREQUENCY 2 protection mode.

O/F → OVERFREQUENCY

U/F → UNDERFREQUENCY

O/F+U/F → OVERFREQUENCY + UNDERFREQUENCY

**FREQUENCY 2
LEVEL: 1.00 Hz**

If at least one relay
has been selected in
"FREQUENCY 2 RELAYS"

RANGE: 0.05 ÷ 9.99 Hz
STEPS 0.01 Hz
Enter the absolute value of the maximum variation of the frequency beyond which the
FREQUENCY 2 protection is activated.

**FREQUENCY 2
RESET: 0.50 Hz**

If at least one relay
has been selected in
"FREQUENCY 2 RELAYS"

RANGE: 0.01 ÷ 5.00 Hz
STEPS 0.01 Hz
Enter the absolute value of the frequency variation (in relation to the rated frequency) at
which the condition of overfrequency 2 or underfrequency 2 drops out.

**FREQUENCY 2
DELAY: 1.0 Sec**

If at least one relay
has been selected in
"FREQUENCY 2 RELAYS"

RANGE: 0.1 ÷ 600 s
STEPS 0.1 / 1 s
Enter the **FREQUENCY 2** protection intervention delay.
If:
frequency is different from the rated value, by exceeding the set variation, for a time <
delay time selected,
⇒ no intervention will be activated.

END OF PAGE

Last LINE of PAGE 6.
Press **LINE** or **▲ PAGE**, to pass to the first line of PAGE 7.

4.7 Setpoint page 7: OUTPUT RELAYS

**SETPOINT PAGE 7
OUTPUT RELAYS**

This PAGE allows setting the features of the relay output contacts.

**AUX1 NON-OP
STATE: DE-ENERG.**

RANGE: DE-ENERG.; ENERG.
You can select the **NON-OP.** state of the **AUX. 1** relay contacts.

**AUX1 RELAY
TYPE: LATCHED**

RANGE: LATCHED; PULSED; AUTORESET

- PULSED operation:
In case of fault condition due to which the related output must activate, this output will be energized for a time as the one set in **AUX1 RELAY PULSE TIME**; after this time the output relay will de-energize and the contact will return to the stand-by condition.
- LATCHED operation:
In case of fault condition due to which the related output must activate, this output will be energized for an indefinite time. The output relay will de-energize only when the fault condition is no more present and the unit is **RESET**.
- AUTORESET OPERATION:
The relay is energized for the whole duration of the faulty condition; as soon as the faulty condition is solved, the relay is energized for a period of time corresponding to **AUX1 RESET TIME**, then it de-energizes.

**AUX1 RESET
TIME: 5.0 Sec**

If AUTORESET
has been selected in
"AUX 1 RELAY TYPE"

RANGE: 0.1 ÷ 6500.0 s
STEPS: 0.1 s
Enter the time during which the relay is energized before it de-activates after the faulty condition has been solved.

**AUX1 RELAY PULSE
TIME: 0.2 Sec**

If PULSED
has been selected in
"AUX 1 RELAY TYPE"

RANGE: 0.1 ÷ 2.0 s
STEPS: 0.1 s
Enter the delay time at **AUX1** relay de-activating.

AUX2 NON-OP
STATE: DE-ENERG.

RANGE: DE-ENERG.; ENERG.
You can select the NON-OP. state of the **AUX. 2** relay contacts.

AUX2 RELAY
TYPE: LATCHED

RANGE: LATCHED; PULSED; AUTORESET

- PULSED operation:
*In case of fault condition due to which the related output must activate, this output will be energized for a time as the one set in **AUX2 RELAY PULSE TIME**; after this time the output relay will de-energize and the contact will return to the stand-by condition.*
- LATCHED operation:
In case of fault condition due to which the related output must activate, this output will be energized for an indefinite time. The output relay will de-energize only when the fault condition is no more present and the unit is RESET.
- AUTORESET OPERATION:
*The relay is energized for the whole duration of the faulty condition; as soon as the faulty condition is solved, the relay is energized for a period of time corresponding to **AUX2 RESET TIME**, then it de-energizes.*

AUX2 RESET
TIME: 5.0 Sec

If AUTORESET
has been selected in
"AUX 2 RELAY TYPE"

RANGE: 0.1 ÷ 6500.0 s
STEPS: 0.1 s
Enter the time during which the relay is energized before it de-activates after the faulty condition has been solved.

AUX2 RELAY PULSE
TIME: 0.2 Sec

If PULSED
has been selected in
"AUX 1 RELAY TYPE"

RANGE: 0.1 ÷ 2.0 s
STEPS: 0.1 s
Enter the delay time at AUX2 relay de-activating.

AUX3 NON-OP
STATE: DE-ENERG.

RANGE: DE-ENERG.; ENERG.
You can select the NON-OP. state of the **AUX. 3** relay contacts.

AUX3 RELAY
TYPE: LATCHED

RANGE: LATCHED; PULSED; AUTORESET

- PULSED operation:
*In case of fault condition due to which the related output must activate, this output will be energized for a time as the one set in **AUX3 RELAY PULSE TIME**; after this time the output relay will de-energize and the contact will return to the stand-by condition.*
- LATCHED operation:
In case of fault condition due to which the related output must activate, this output will be energized for an indefinite time. The output relay will de-energize only when the fault condition is no more present and the unit is RESET.
- AUTORESET OPERATION:
*The relay is energized for the whole duration of the faulty condition; as soon as the faulty condition is solved, the relay is energized for a period of time corresponding to **AUX3 RESET TIME**, then it de-energizes.*

AUX3 RESET
TIME: 5.0 Sec

If AUTORESET
has been selected in
"AUX 2 RELAY TYPE"

RANGE: 0.1 ÷ 6500.0 s
STEPS: 0.1 s
Enter the time during which the relay is energized before it de-activates after the faulty condition has been solved.

AUX3 RELAY PULSE
TIME: 0.2 Sec

If PULSED
has been selected in
"AUX 3 RELAY TYPE"

RANGE: 0.1 ÷ 2.0 s
STEPS: 0.1 s
Enter the delay time at AUX3 relay de-activating.

AUX4 NON-OP
STATE: DE-ENERG.

RANGE: DE-ENERG.; ENERG.
You can select the NON-OP. state of the **AUX. 4** relay contacts.

AUX4 RELAY
TYPE: LATCHED

RANGE: LATCHED; PULSED; AUTORESET

- PULSED operation:
*In case of fault condition due to which the related output must activate, this output will be energized for a time as the one set in **AUX4 RELAY PULSE TIME**; after this time the output relay will de-energize and the contact will return to the stand-by condition.*
- LATCHED operation:
In case of fault condition due to which the related output must activate, this output will be energized for an indefinite time. The output relay will de-energize only when the fault condition is no more present and the unit is RESET.
- AUTORESET OPERATION:
*The relay is energized for the whole duration of the faulty condition; as soon as the faulty condition is solved, the relay is energized for a period of time corresponding to **AUX4 RESET TIME**, then it de-energizes.*

AUX4 RESET
TIME: 5.0 Sec

If AUTORESET
has been selected in
"AUX 4 RELAY TYPE"

RANGE: 0.1÷ 6500.0 s
STEPS: 0.1 s
Enter the time during which the relay is energized before it de-activates after the faulty condition has been solved.

AUX4 RELAY PULSE
TIME: 0.2 Sec

If PULSED
has been selected in
"AUX 1 RELAY TYPE"

RANGE: 0.1÷ 2.0 s
STEPS: 0.1 s
Enter the delay time at AUX4 relay de-activating.

AUX5 NON-OP
STATE: DE-ENERG.

RANGE: ON; OFF
You can select the NON-OP. state of the **AUX. 5** relay contacts.

AUX5 RELAY
TYPE: LATCHED

RANGE: LATCHED; PULSED; AUTORESET

- PULSED operation:
*In case of fault condition due to which the related output must activate, this output will be energized for a time as the one set in **AUX5 RELAY PULSE TIME**; after this time the output relay will de-energize and the contact will return to the stand-by condition.*
- LATCHED operation:
In case of fault condition due to which the related output must activate, this output will be energized for an indefinite time. The output relay will de-energize only when the fault condition is no more present and the unit is RESET.
- AUTORESET OPERATION:
*The relay is energized for the whole duration of the faulty condition; as soon as the faulty condition is solved, the relay is energized for a period of time corresponding to **AUX5 RESET TIME**; then it de-energizes.*

AUX5 RESET
TIME: 5.0 Sec

If AUTORESET
has been selected in
"AUX 5 RELAY TYPE"

RANGE: 0.1÷ 6500.0 s
STEPS: 0.1 s
Enter the time during which the relay is energized before it de-activates after the faulty condition has been solved.

AUX5 RELAY PULSE
TIME: 0.2 Sec

If PULSED
has been selected in
"AUX 5 RELAY TYPE"

RANGE: 0.1÷ 2.0 s
STEPS: 0.1 s
Enter the delay time at AUX5 relay de-activating.

The following lines will be displayed only if "NO" has been selected in **OUT OF SERVICE ON AUX6**, in the SETPOINT PAGE 2 – SYSTEM SETUP.

**AUX6 NON-OP
STATE: DE-ENERG.**

RANGE:..... DE-ENERG.; ENERG.
*You can select the NON-OP. state of the **AUX. 6** relay contacts.*

**AUX6 RELAY
TYPE: LATCHED**

RANGE:..... LATCHED; PULSED; AUTORESET

- PULSED operation:
*In case of fault condition due to which the related output must activate, this output will be energized for a time as the one set in **AUX6 RELAY PULSE TIME**; after this time the output relay will de-energize and the contact will return to the stand-by condition.*
- LATCHED operation:
In case of fault condition due to which the related output must activate, this output will be energized for an indefinite time. The output relay will de-energize only when the fault condition is no more present and the unit is RESET.
- AUTORESET OPERATION:
*The relay is energized for the whole duration of the faulty condition; as soon as the faulty condition is solved, the relay is energized for a period of time corresponding to **AUX6 RESET TIME**; then it de-energizes.*

**AUX6 RESET
TIME: 5.0 Sec**

If AUTORESET
has been selected in
"AUX 6 RELAY TYPE"

RANGE:..... 0.1÷ 6500.0 s
STEPS:..... 0.1 s
Enter the time during which the relay is energized before it de-activates after the faulty condition has been solved.

**AUX6 RELAY PULSE
TIME: 0.2 Sec**

If PULSED
has been selected in
"AUX 6 RELAY TYPE"

RANGE:..... 0.1÷ 2.0 s
STEPS:..... 0.1 s
Enter the delay time at AUX6 relay de-activating.

END OF PAGE

*Last LINE of PAGE 7.
Press **LINE** or **▲PAGE**, to pass to the first line of PAGE 8.*

4.8 Setpoint page 8: DIGITAL INPUTS

**SETPOINT PAGE 8
DIGITAL INPUTS**

This PAGE allows setting the digital inputs.

**INPUT 1 FUNCTION
NONE**

RANGE:..... NONE; ACTIVATE AUX1;
ACTIVATE AUX2; ACTIVATE AUX3; ACTIVATE AUX4;
ACTIVATE AUX5; ACTIVATE AUX6; EXTERNAL RESET

Select the function to be associated with INPUT 1.

**INPUT 1 ACTIVE
WHEN: CLOSED**

RANGE:..... CLOSED; OPENED

*Configure digital input INPUT 1:
CLOSED ⇒ INPUT 1 will be active when the related contacts are closed.
OPENED ⇒ INPUT 1 will be active when the related contacts are open.*

**INPUT 2 FUNCTION
NONE**

RANGE:..... NONE; ACTIVATE AUX1;
ACTIVATE AUX2; ACTIVATE AUX3; ACTIVATE AUX4;
ACTIVATE AUX5; ACTIVATE AUX6; EXTERNAL RESET

Select the function to be associated with INPUT 2.

**INPUT 2 ACTIVE
WHEN: CLOSED**

RANGE:..... CLOSED; OPENED

*Configure digital input INPUT 2:
CLOSED ⇒ INPUT 2 will be active when the related contacts are closed.
OPENED ⇒ INPUT 2 will be active when the related contacts are open.*

INPUT 3 FUNCTION
NONE

RANGE:.....NONE; ACTIVATE AUX1;
ACTIVATE AUX2; ACTIVATE AUX3; ACTIVATE AUX4;
ACTIVATE AUX5; ACTIVATE AUX6; EXTERNAL RESET

Select the function to be associated with INPUT 3.

INPUT 3 ACTIVE
WHEN: CLOSED

RANGE:.....CLOSED; OPENED

Configure digital input INPUT 3:

CLOSED ⇒ INPUT 3 will be active when the related contacts are closed.

OPENED ⇒ INPUT 3 will be active when the related contacts are open.

INPUT 4 FUNCTION
NONE

RANGE:.....NONE; ACTIVATE AUX1;
ACTIVATE AUX2; ACTIVATE AUX3; ACTIVATE AUX4;
ACTIVATE AUX5; ACTIVATE AUX6; EXTERNAL RESET

Select the function to be associated with INPUT 4.

INPUT 4 ACTIVE
WHEN: CLOSED

RANGE:.....CLOSED; OPENED

Configure digital input INPUT 4:

CLOSED ⇒ INPUT 4 will be active when the related contacts are closed.

OPENED ⇒ INPUT 4 will be active when the related contacts are open.

END OF PAGE

Last LINE of PAGE 8.

Press **LINE** or **▲PAGE**, to pass to the first line of PAGE 9.

4.9 Setpoint page 9: EVENT RECORDER

SETPOINT PAGE 9 OUTPUT RELAYS	<i>This PAGE allows to enable/disable the recording of the events, up to 10 max., according to FIFO (First-In, First-Out) mode. Once 10 events are stored, the oldest event is cleared by the new one occurred.</i>
UNDervoltage EVENTS: ON	RANGE: ON; OFF <i>It enables/disables undervoltage protection events recording.</i>
OVERvoltage EVENTS: ON	RANGE: ON; OFF <i>It enables/disables overvoltage protection events recording.</i>
UNBALANCE EVENTS: ON	RANGE: ON; OFF <i>It enables/disables unbalance protection events recording.</i>
FREQUENCY EVENTS: ON	RANGE: ON; OFF <i>It enables/disables frequency protection events recording.</i>
SYSTEM EVENTS: ON	RANGE: ON; OFF <i>It enables/disables system protection events recording.</i>
OUTPUT RELAYS EVENTS: OFF	RANGE: ON; OFF <i>It enables/disables output relay protection events recording.</i>
DIGITAL INPUT EVENTS: OFF	RANGE: ON; OFF <i>It enables/disables digital input protection events recording.</i>
END OF PAGE	<i>Last LINE of PAGE 9. Press LINE or ▲PAGE, to pass to the first line of PAGE 10.</i>

4.10 Setpoint page 10: DATE & TIME

SETPOINT PAGE 8 DATE & TIME	<i>This PAGE allows setting date and time.</i>
Jun 9, 2001 16:54:02.10	<i>Actual date and time are displayed.</i>
SET DATE & TIME? NO	RANGE: YES; NO <i>It asks if you want to modify date and time:</i> <ul style="list-style-type: none"> • <u>to confirm the actual data:</u> <ol style="list-style-type: none"> 1. Press LINE to pass to END OF PAGE – SETPOINT VALUES • <u>to modify date and time:</u> <ol style="list-style-type: none"> 1. Press ▲VALUE → YES will be displayed; 2. Press STORE and enter access code (if required) 3. Modify the blinking data by using ▲VALUE and ▼VALUE; 4. Press LINE to pass to next lines; 5. Press STORE after modifying.
Jun 9, 2001 16:54:02.10	RANGE: JAN ÷ DEC.

Jun 9, 2001 16:54:02.10	RANGE:..... 1 ÷ 31
Jun 9, 2001 16:54:02.10	RANGE:..... 2000 ÷ 2099
Jun 9, 2001 16:54:02.10	RANGE:..... 0 ÷ 23
Jun 9, 2001 16:54:02.10	RANGE:..... 0 ÷ 59
Jun 9, 2001 16:54:02.10	RANGE:..... 0 ÷ 59
END OF PAGE	<i>Last LINE of PAGE 10. Press LINE or ▲PAGE, to pass to the first line of PAGE 11.</i>

4.11 Setpoint page 11: COMMUNICATIONS

SETPOINT PAGE 9 COMMUNICATIONS	<i>This PAGE allows setting the features for the communications between VPR-A and other devices.</i>
MODBUS ADDRESS 1	RANGE:..... 1 ÷ 247 <i>Assign its own address to the relay in order to differentiate it from other relays connected to the same communication network.</i>
COM1 RS-232 BAUDRATE 9600	RANGE:..... 1200; 2400; 4800; 9600; 19200 <i>Select the Baud rate (port: COM1).</i>
COM2 RS-485 BAUDRATE 9600	RANGE:..... 1200; 2400; 4800; 9600; 19200 <i>Select the Baud rate (port: COM2).</i>
COM3 RS-485 BAUDRATE 9600	RANGE:..... 1200; 2400; 4800; 9600; 19200 <i>Select the Baud rate (port: COM3).</i>
END OF PAGE	<i>Last LINE of PAGE 11. Press LINE or ▲PAGE, to pass to the first line of PAGE 12.</i>

4.12 Setpoint page 12: CALIBRATION MODE

**SETPOINT PAGE 12
CALIBRATION MODE**

This PAGE allows testing the operation of the inputs and the output relays.

**RELAYS TEST
NONE**

RANGE:.....AUX1; AUX2; AUX3; AUX4; AUX5; AUX 6 (Service); ALL
Select the involved output for testing the correct operation of the output relays by using VALUE ▲ and VALUE ▼ and press STORE. Press RESET to return to the normal condition.

**DIGITAL INPUT 1
DEACTIVATED**

RANGE:.....DEACTIVATED; ACTIVATED
This message allows controlling the status (DEACTIVATED or ACTIVATED) of external contact DIGITAL INPUT 1.

**DIGITAL INPUT 2
DEACTIVATED**

RANGE:.....DEACTIVATED; ACTIVATED
This message allows controlling the status (DEACTIVATED or ACTIVATED) of external contact DIGITAL INPUT 2.

**DIGITAL INPUT 3
DEACTIVATED**

RANGE:.....DEACTIVATED; ACTIVATED
This message allows controlling the status (DEACTIVATED or ACTIVATED) of external contact DIGITAL INPUT 3.

**DIGITAL INPUT 4
DEACTIVATED**

RANGE:.....DEACTIVATED; ACTIVATED
This message allows controlling the status (DEACTIVATED or ACTIVATED) of external contact DIGITAL INPUT 4.

**DIGITAL INPUT 4
DEACTIVATED**

RANGE:.....DEACTIVATED; ACTIVATED
This message allows controlling the status (DEACTIVATED or ACTIVATED) of external contact DIGITAL INPUT 4.

**UPDATE FIRMWARE?
NO**

RANGE:.....YES; NO
By selecting YES the relay firmware can be updated by RS-232 serial port. Before confirm YES, read the Upgrading Instruction. The instruction will be given by Orion Italia for each available upgrade

**END OF
SETPOINTS**

5. "ACTUAL VALUES" Menu

5.1 Actual values 1: VOLTAGE / FREQ.

**ACTUAL VALUES 1
VOLTAGE / FREQ.**

It indicates the actual value of voltages and frequency.

AB: 00.0 BC: 00.0
AC: 00.0 V

It indicates the RMS value of line voltages.

AN: 00.0 BN: 00.0
CN: 00.0 V

It indicates the RMS value of phase voltages.

VOLTAGE $3V_0$
0.00 V

It indicates the RMS value of the $3V_0$ homopolar voltage.

FREQUENCY
50.0 Hz

It indicates the value of the frequency.

PHASE SEQUENCE
A-B-C

RANGE: A-B-C, A-C-B, NONE

A-B-C ⇒ *right phase sequence*

A-C-B ⇒ *phase reversal*

NONE ⇒ *the relay cannot detect the sequence due to its wrong insertion or to one or more voltages with too low value.*

AB: 00.0 BC: 00.0
AC: 00.0 %UNB

It indicates the % unbalance of V_{AB} , V_{BC} and V_{CA} voltages.

Each value is calculated by dividing the deviation as to it by the average value.

VOLTAGE AVERAGE
0.00 V

It indicates the average of the 3 RMS values of the line voltages.

END OF PAGE

*Last LINE of PAGE 1. Press **LINE** or **▲PAGE**, to pass to the first line of PAGE 2.*

5.2 Actual values 2: EVENTS

**ACTUAL VALUES 2
EVENTS**

It displays the events [→ Chapter 7 – EVENT RECORDER].

In case of no control power supply, the cause, the electrical variables values related to each event and the moment of the fault would not be lost.

EVENT 10
EVENT CAUSE

It indicates the number of the event and its cause.



VALUE ▲ or **VALUE ▼** ⇒ *It displays the latest events or previous ones.*



STORE ⇒ *(keep it pressed) It displays the line voltages.*



LINE ⇒ *It displays the line voltage (at the event time).*



LINE ⇒ *It displays the $3V_0$ homopolar voltage (at the event time)*



LINE ⇒ *It displays the frequency (at the event time)*

CLEAR ALL EVENTS
NO

Confirm any clearing of events.

YES ⇒ events clearing

NO ⇒ events are not cleared

STORE ⇒ to confirm the selection

END OF
ACTUAL VALUES

End of Actual Values.

6. AUTOMATIC FUNCTIONING

6.1 CONDITION OF AUTOMATIC FUNCTIONING

When starting the VPR-A or after 5 minutes from the last operation carried out on the front keyboard, the relay cyclically displays the following information:

- line voltages
- phase voltages
- $3V_0$ homopolar voltage.

When supplying the power to the VPR-A, the following message is displayed:

ORION ITALIA
VPR-A RELAY

and then the following will be displayed:

AB: 00.0 BC: 00.0
AC: 00.0 V

It indicates the RMS value of line voltages.

AN: 00.0 BN: 00.0
CN: 00.0 V

It indicates the RMS value of phase voltages.

VOLTAGE $3V_0$
0.00 V

It indicates the RMS value of the $3V_0$ homopolar voltage.



If any fault has caused the protection relay intervention and consequently the device turning off due to voltage loss, when the power supply is restored the relay will activate and light the MEMORY led. This indication signals that the device has switched off due to a fault condition.

Press RESET to turn off the signalling.

7. Events recorder

Press ACTUAL VALUE and select the page: EVENT [→ Actual value 2: EVENTS] to display the last 10 events.

7.1 DEFINITION OF “EVENT” AND STORING

VPR-A is equipped with an Event recorder in which the following data are stored:

- intervention for overvoltage or undervoltage,
- intervention for overfrequency or underfrequency,
- intervention for voltage unbalance or phase reversal,
- changing of status of an output contact,
- changing of status of a digital input,
- system events and other events, not included in the previous points, which have occurred during the operational running of the relay.

All events, up to 10 max., will be stored in a memory buffer operating in FIFO (First-In, First-Out) mode. Once 10 events are stored, the oldest event is cleared by the new one occurred.

7.2 EVENT FORMAT

Each event is characterized by the line parameters values when the event is occurring. The stored parameters are the following:

- description of the event,
- the line voltages (V_{AB} , V_{BC} , V_{CA})
- $3V_0$ homopolar voltage,
- frequency
- event date and time.

8. Troubleshooting

PROBLEM	SOLUTION	REFERENCE
The display does not turn on.	<ol style="list-style-type: none"> 1. Check the power supply to the auxiliary terminals. 2. Check the power supply voltage is the same as the one indicated on the plate (on the back of the relay). 	<i>Wiring diagram</i>
The display is "On" but no message is displayed.	<ol style="list-style-type: none"> 1. Check the power supply voltage is the same as the one indicated on the plate (on the back of the relay). 	<i>Wiring diagram</i>
Wrong displaying of the voltages read or of the phases sequence.	<ol style="list-style-type: none"> 1. Verify the settings in "SETPOINT PAGE 2 – SYSTEM SETUP" [→ Chapter 4]: the VTs used, the type of connection and the system frequency. 2. Measure the voltages at the input terminals Va, Vb, Vc and Vn. 	
The outputs appear not to work properly.	<ol style="list-style-type: none"> 1. Verify the settings of modes and times in "SETPOINT PAGE 7 – OUTPUT RELAYS" [→ Chapter 4] 2. Verify the proper working by means of the functions in "SETPOINT PAGE 14 – CALIBRATION MODE" [→ Chapter 4] 	

9. Warranty

ORION ITALIA warrants that the materials and the labouring of every relay have no faults with normal use and working conditions for a period of 12 months starting from the date of shipping from the manufacturer.

In case of fault included in the warranty conditions, ORION ITALIA takes full responsibility for repairing or replacing the product without any extra fees for the buyer. The warranty is always considered free-port to our head office in Piacenza.

The costs to be paid by the Buyer are the following:

- the round-trip shipping for the repairing or the overhauling of the relay;
- the travelling expenses for the technician in charge of the repairing and the overhauling.

In case of controversy, the place of jurisdiction is the one of Piacenza.

This warranty is not valid for any device that has been subject to incorrect use, negligence, accidents, incorrect installation or that has not been used in accordance with the instructions, or for any device tampered outside the factory. ORION ITALIA will not be responsible for the consequences of any damages, even indirect, for the loss of gain or for the eventual costs deriving from any malfunctioning or from any incorrect use or setting of our devices.

ORION ITALIA reserves the right to modify the device and/or replace what is described in this manual without any previous notice.



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