≋Vemer
SPA

Vemer S.p.A.
I - 32032 Feltre (BL) • Via Camp Lonc, 16
e-mail: info@vemer.it - web site: www.vemer.it
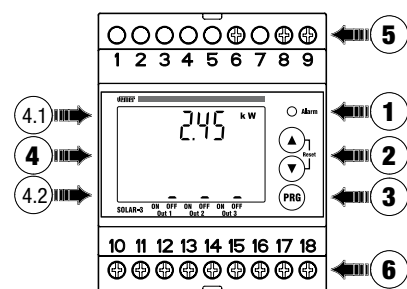
Mod. **SOLAR-3**

*Manuals download*
⬇ PDF

2 DIMENSIONS
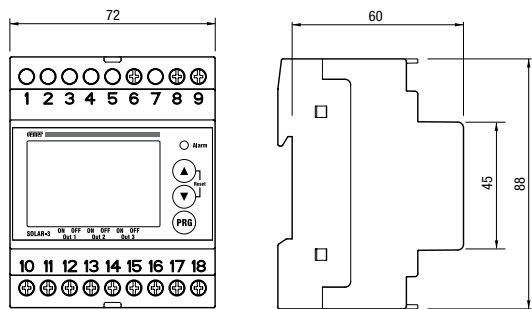
3 INSTRUMENT DESCRIPTION

① Red led: on if the consumed power is higher than that produced
② Keys increase/ decrease
③ Key PRG: instrument programming/confirmation
  - brief pressure = lower than 3 seconds
  - long pressure = higher than 3 seconds
④ Data view display
  4.1 Measured power generated or consumed
  4.2 Segments for loads status indication
     (disconnected = fixed on, connected = flashing)
⑤ Power supply terminals/inputs
  Terminals 6-8: voltage input/instrument power supply
  Terminals 8-9: current input through current transformer
⑥ Relays terminals for loads connection
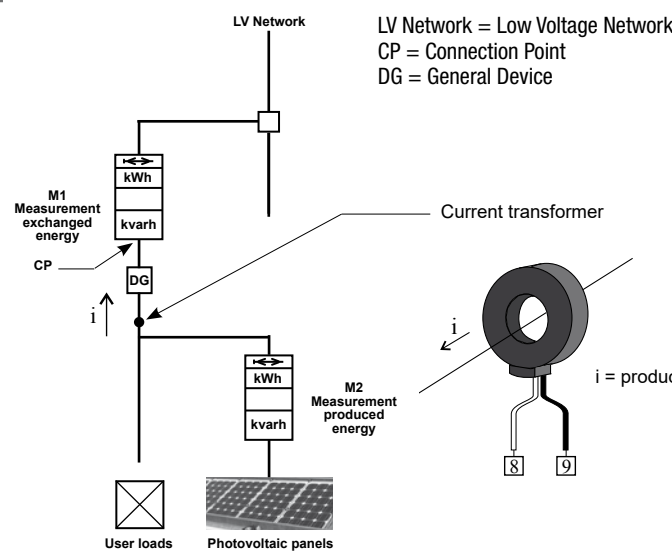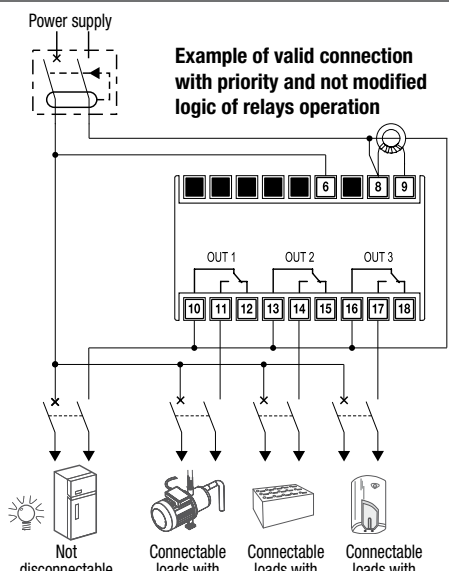
1 User Manual
LOADS CONTROL 3 RELAYS FOR ENERGY PRODUCTION
⚠ **Read all the instructions carefully**

Electronic instrument for the control of active power self-produced by your photovoltaic system.
If the power entered on the network (surplus of power, that is to say **produced power – consumed power**) is higher than a programmed threshold (setpoint) the SOLAR 3 provides for the connection of some loads that you can stop in order to maximize the own consumption of the produced power. It's possible to control until 3 loads (or groups of loads) through the command of as many relays, to whom is assigned a priority which sets the order with whom the loads are connected.

Code	Model	Description
VE474300	SOLAR-3	Loads control for systems of energy production 3 relays

SAFETY WARNINGS

During the installation and the operation of the instrument it's necessary to observe the following instructions:
1) The instrument must be installed by a qualified person by observing scrupulously the connection diagrams
2) The instrument must be installed and activated in compliance with current electric systems standards.
3) After installation, inaccessibility to the connection terminals without appropriate tools must be granted
4) Do not use the instrument for other purposes different from the one specified
5) The instrument must be installed in a closed electrical panel adequately protected
6) In the power supply network a bipolar disconnection must be present
7) A protection device against over-currents should be installed in the electrical system, upstream of the device.
8) Before accessing the connection terminals, verify that the leads are not live
9) Do not power on or connect the instrument if any part of it is damaged
10) In case of malfunction do not perform repairs and contact immediately the technical support
11) The instrument can be used in environments with category of measurement III and pollution degree 2, as per standards CEI EN 61010-1.
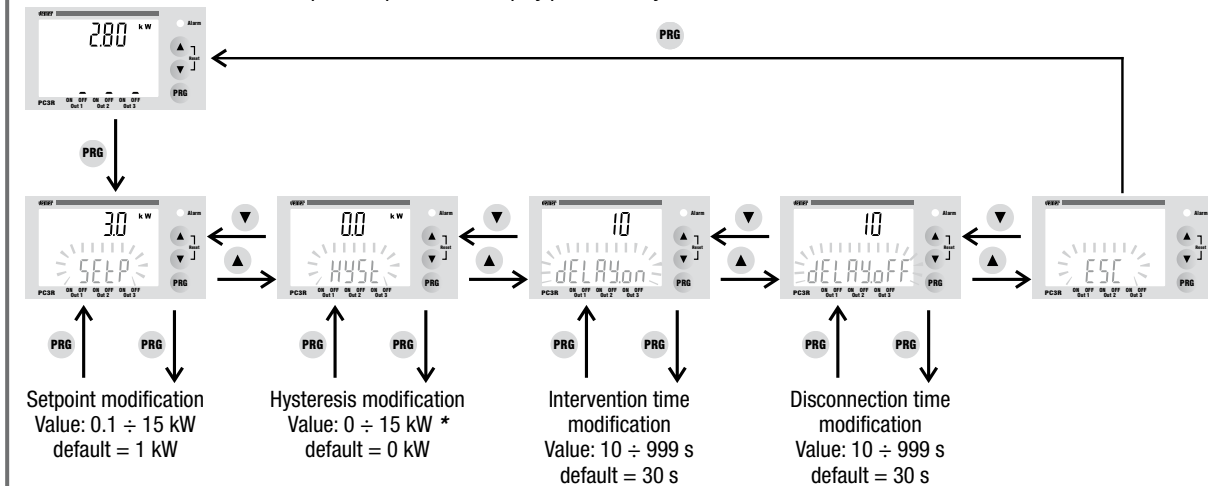
TECHNICAL CHARACTERISTICS
- Power supply: 230 Vac (-15% ÷ +10%) 50/60 Hz
- Maximum own consumption: 8 VA
- Voltage input consumption: < 2,5 VA
- Current input consumption: < 2,5 VA
- Measurement precision: 2% full scale
- Current connection until 60 A through current transformer
- Settable setpoint range: 0,1 ÷ 15 kW
- Settable hysteresis range: 0 ÷ 15 kW*
- Output: 3 monostable relays with exchange contact 16 A / 250 Vac
- Blocks for cables with maximum section of 6 mm²
- Operating temperature: -10°C ÷ 45°C
- Operating humidity: 10% ÷ 90% non condensing
- Storage temperature: -10°C ÷ 65° C
- Container: 4 modules DIN
- Protection degree: IP20 / IP51 (on the front panel)
- Insulation: reinforced between accessible parts (front panel) and all other terminals
- Type of actions: 1B

* For hysteresis set to 0 (zero) a hysteresis of 10 W is however implemented in regulation.
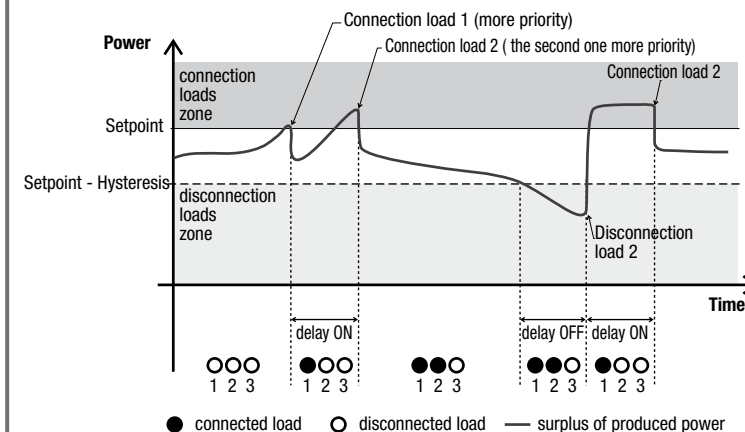
5 OPERATION

DEFINITION AND MODIFICATION OF OPERATION PARAMETERS

- **Setpoint** [kW] represents the activation threshold that is to say the minimum value of surplus of power necessary for connect the load according to the priority.
- **Hysteresis** (or differential) (kW) represents the value to subtract from the setpoint to determine the disconnection zone (that is to say the zone where the loads are disconnected). This value can be set higher than the setpoint value. This setting of SOLAR-3 allows the use of all self-produced power and the use of the remaining power from the low voltage grid.
  Example 1: if the setpoint = 3 Kw and differential = 0.5 kW the loads eventually connected are disconnected if the value of measured absorbed power is lower than 2.5 kW.
  Example 2: if the setpoint = 3 Kw and differential = 4 kW the loads eventually connected are disconnected if the value of measured absorbed power is lower than "-1kW" (1kW taken from the low voltage network). In this way the loads will use all the self-produced power and the power of 1 kW from the low voltage grid.
- **Delay On** [s] represents the minimum time which must elapse from the last connection (or disconnection) of one load before connecting another one. This time is valid also at start-up that is to say , even if the surplus of power allowed, no load is connected before Delay seconds elapse from the switch on.
- **Delay Off** [s] represents the delay of disconnection, that is to say how long the surplus of power must result lower than the **setpoint – hysteresis** before the instrument disconnects one load.
- **Reset** the device reset can be performed by pressing simultaneously the keys ▲ and ▼ : the loads are disconnected and then reconnected according to the set priority.

To access the modification or the operation parameters display press the key PRG.

Setpoint modification
Value: 0.1 ÷ 15 kW
default = 1 kW

Hysteresis modification
Value: 0 ÷ 15 kW *
default = 0 kW

Intervention time modification
Value: 10 ÷ 999 s
default = 30 s

Disconnection time modification
Value: 10 ÷ 999 s
default = 30 s

OPERATION LOGIC

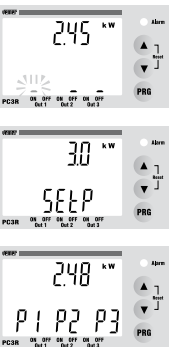● connected load   ○ disconnected load   — surplus of produced power

The SOLAR-3 switches on with the disconnected loads; every **Delay On** seconds one load is connected (if the surplus of power is higher than the setpoint).

During the normal operation the instrument shows the surplus of produced power (expressed with two decimals) and relays status (segment on fixed if disconnected load, flashing segment if connected load)

The programmed setpoint can be showed for three seconds by pressing the key ▼ .

Configuration relays (normally open or normally closed) can be showed by pressing the key ▲ and then relays priority. Each display is visible for 3 seconds.

4 INSTALLATION

LV Network = Low Voltage Network
CP = Connection Point
DG = General Device

i = produced current

Picture 1   **Picture 2**

Example of valid connection with priority and not modified logic of relays operation

Picture 3

The positioning of the current transformer is essential for the correct operation of the instrument.
- The correct position of the current transformer within the electrical system is shown in the picture 1
- The direction of the produced current (i) is shown in the picture 2 (incoming current in the current transformer form the side indicated on the label)
- The current transformer must be connected to the terminals 8 and 9 of SOLAR-3:
  - terminal 8: white thread
  - terminal 9: black thread

Four loads or groups of loads must be located:
not disconnectable loads, that is to say the loads which are always connected to the electrical line and which will not disconnect by SOLAR-3 if the production of energy is lower than necessary (their consumption must be counted anyway by SOLAR-3 to determine the total consumption)
connectable loads with priority 1, which will be connected for first if the surplus of power is higher than the setpoint
connectable loads with priority 2
connectable loads with priority 3

07-2023

REFERENCE STANDARDS

Conformity to the EU directives:
2014/35/EU (LVD) 2014/30/EU (EMCD)
is declared with reference to the following harmonized standard:
• EN 61010-1 • EN 61000-6-2 • EN 61000-6-3
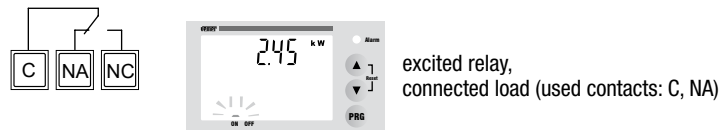• EN 62052-11 • EN 62053-21 (metrological requirements)

To access the advanced programming press the key (PRG) for **3 seconds** at least

This menu allows: the firmware version display, the modification of the logic of relays operation, the modification of relays priority, the setting of the instrument backlighting.

The output from the menu of advanced programming restarts the microcontroller. This means that the loads eventually connected are disconnected and then reconnected one at time every **Delay.On** seconds (only if the power production allow this).
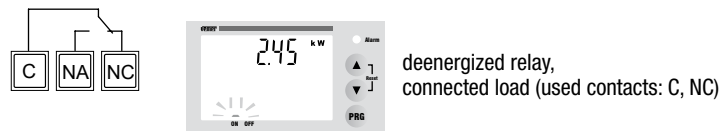
PRG

⧗ > 3s
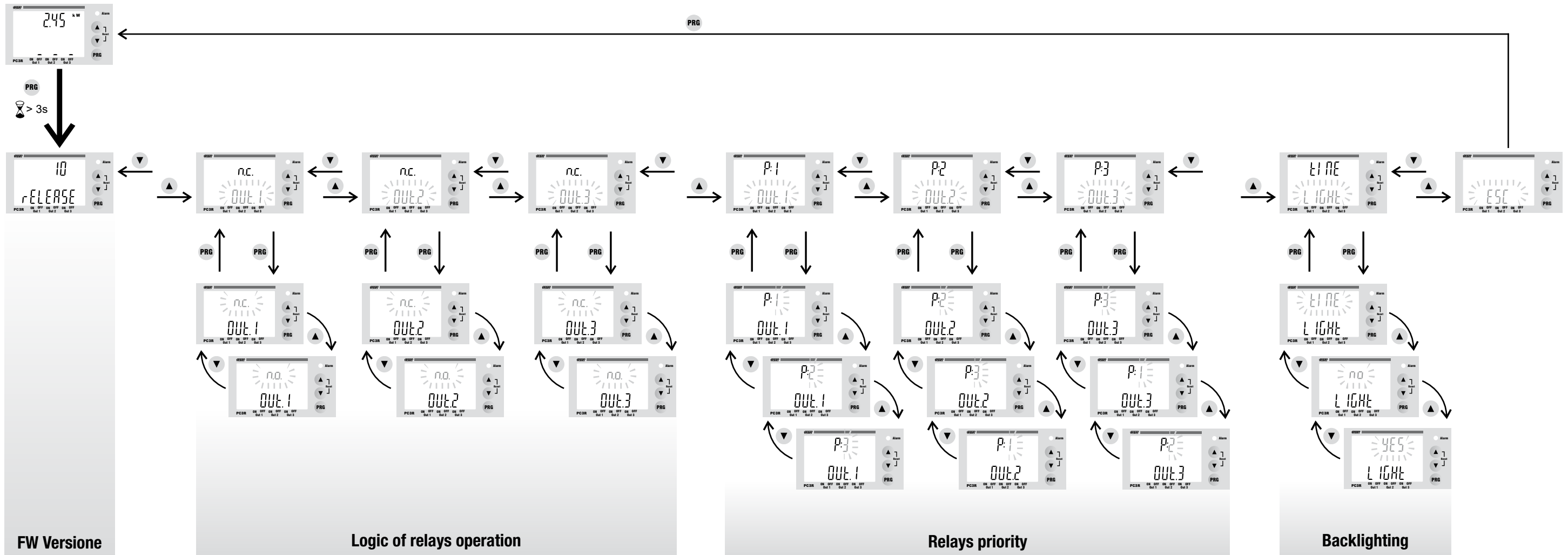
FW Versione

It displays the firmware version of the instrument. Not modifiable field.

Logic of relays operation

Normally closed (N.C.) (default setting)

| C | NA | NC | deenergized relay, disconnected load (used contacts: C, NA) |

| C | NA | NC | excited relay, connected load (used contacts: C, NA) |

Normally open (N.O.)

| C | NA | NC | excited relay, disconnected load (used contacts: C, NC) |

| C | NA | NC | deenergized relay, connected load (used contacts: C, NC) |

Relays priority

It allows to change the priority of relays outputs, that is to say the order with whom the loads are connected and disconnected in case of surplus of power.
If not modified the priority is the following:

- OUT1 = P1 (the most priority output , that is to say the one which will be connected for first if the surplus of produced power is higher than the Setpoint).
- OUT2 = P2
- OUT3 = P3

Attention: if by pressing the keys ▲ or ▼ you can't go to the next menu (backlighting) or to the previous menu (relays logic) it's probable that the same priority P has been assigned to two different outputs OUT. Correct by assigning different priorities to the three outputs.

Backlighting

It allows to set the backlighting:

- TIME = backlighting on for 60 seconds from the pressure of one key
- NO = backlighting always off
- YES = backlighting always on