



Instruction Manual

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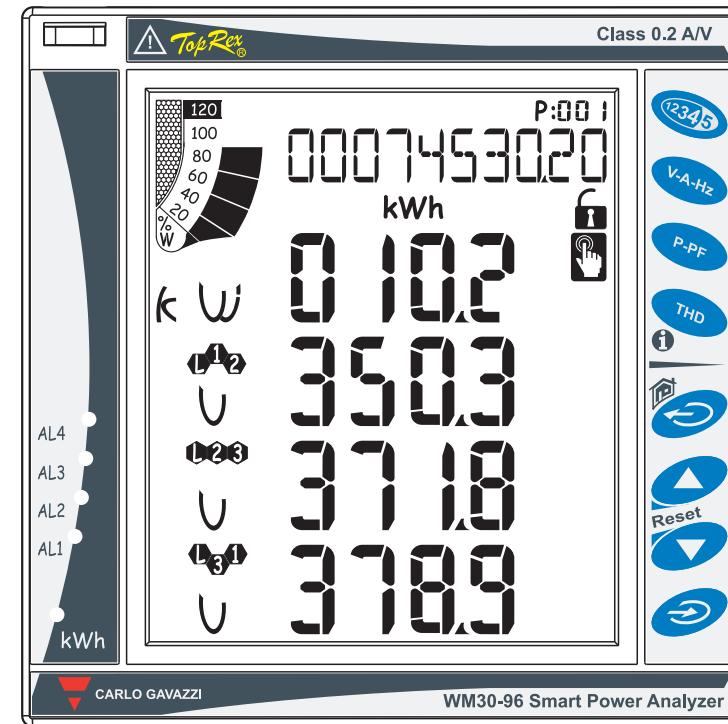
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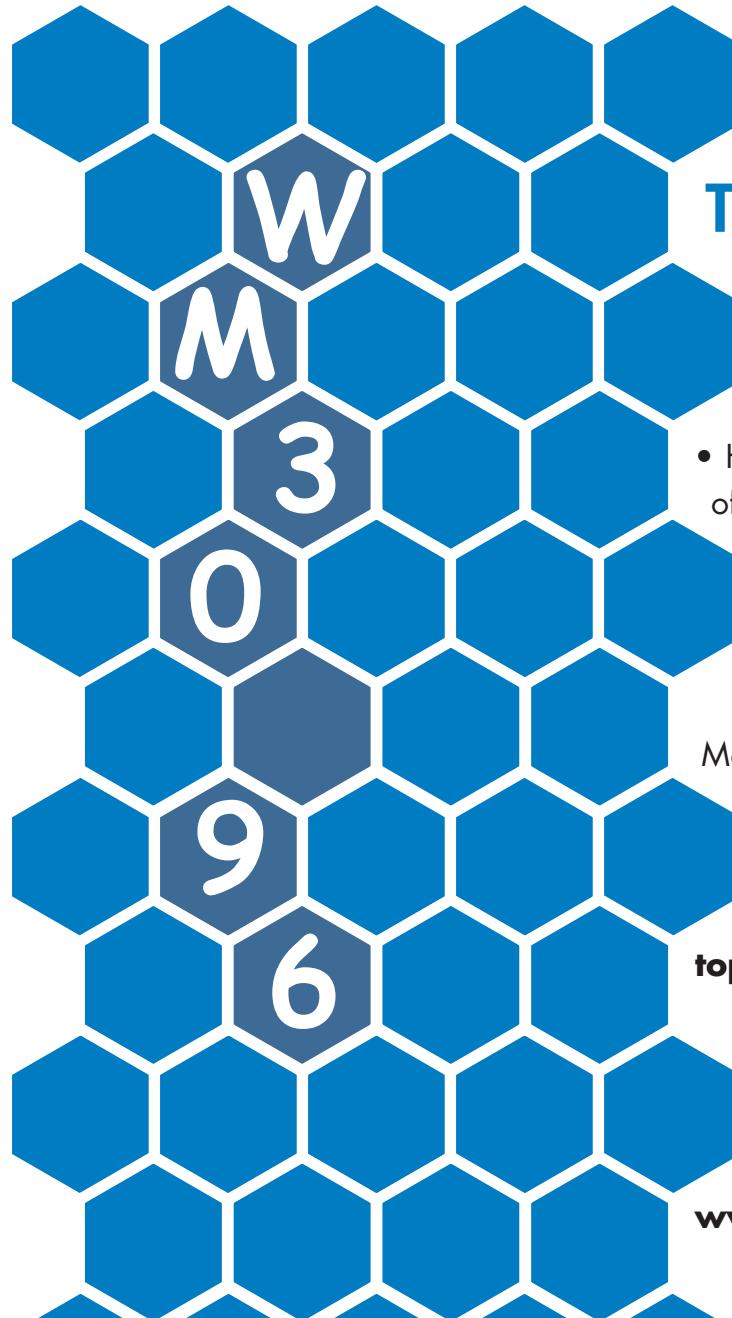
Display, Programming

Modular system

Class 0.2 A/V



Control



Thank you for choosing our products

WM30 96:

- High accuracy (class 0.2 A/V);
- High calculation performances for a fast analysis of the signal (FFT up to the 32nd harmonics);
- high connection capabilities.

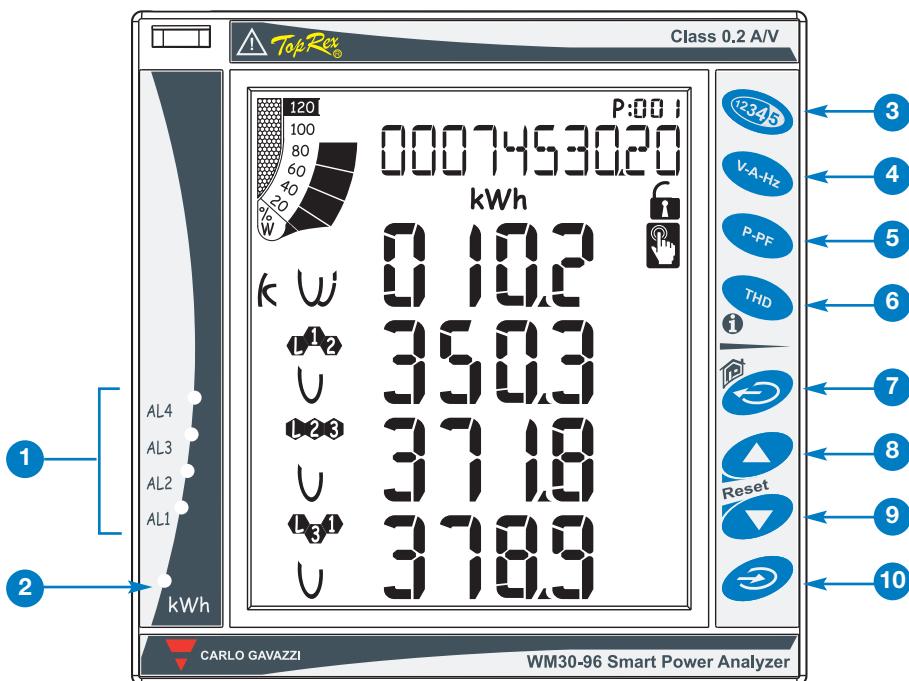
WM30-96 is the state-of-the-art technological answer to your needs of power quality analysis.

Moreover, you can count on a ISO9001/VISION 2000 certified company structure, an experience of many years and a wide-spread presence both in Europe and all over the world. All this in order to guarantee the customer with a **top-quality service** and the best products.

Welcome in Carlo Gavazzi and our compliments for your choice. You can evaluate the complete range of our products on the CARLO GAVAZZI web-site:

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INTRODUCTION TO WM30



DESCRIPTION OF THE INSTRUMENT

- 1 Active virtual alarms warners.
- 2 Current energy drain indicator (kWh) by means of flashing, proportional to the measured energy (the higher the flashing frequency, the higher the energy drained. Max. frequency 16Hz pursuant to standard EN5047-1).

The keyboard is divided into two areas, the top area is dedicated to the measurements with direct access to specific visualization screens.

- 3 Visualization of the counters screens: each pressure of the button corresponds to the visualization of a screen with counters related to different energies (see the table with the measurement screens below).
- 4 Visualization of the current voltage and frequency (see the table with the measurement screens below).
- 5 Visualization of the instant cosφ and powers (see the table with the measurement screens below).
- 6 Visualization of the harmonics (see the table with the measurement screens below).

The keyboard in the bottom area is especially dedicated to instrument programming.

- 7 Exits the submenus, exits programming.
- 8 "Up" button, enables to browse the menus and to increase the values to be set.
- 9 "Down" button, enables to browse the menus and to decrease the values to be set.
- 10 Access to the programming menu: **hold pressed for at least 2 seconds to access the programming menu.**

In measurement mode, buttons 8 and 9 enable to display the MAX and dmd values of the displayed variables.



The buttons are enhanced touch buttons. To check their actual engagement, a specific icon on the display turns on each time a button is pressed.

We recommend using your forefinger to activate the touch buttons.

ADDITIONAL FUNCTIONS OF THE BUTTONS

The buttons featuring a double icon have two functions, to access the secondary function, hold pressed for a long time the button corresponding to the desired secondary function.

Access to the instrument information screens: reference standards, firmware version, year of manufacturing.

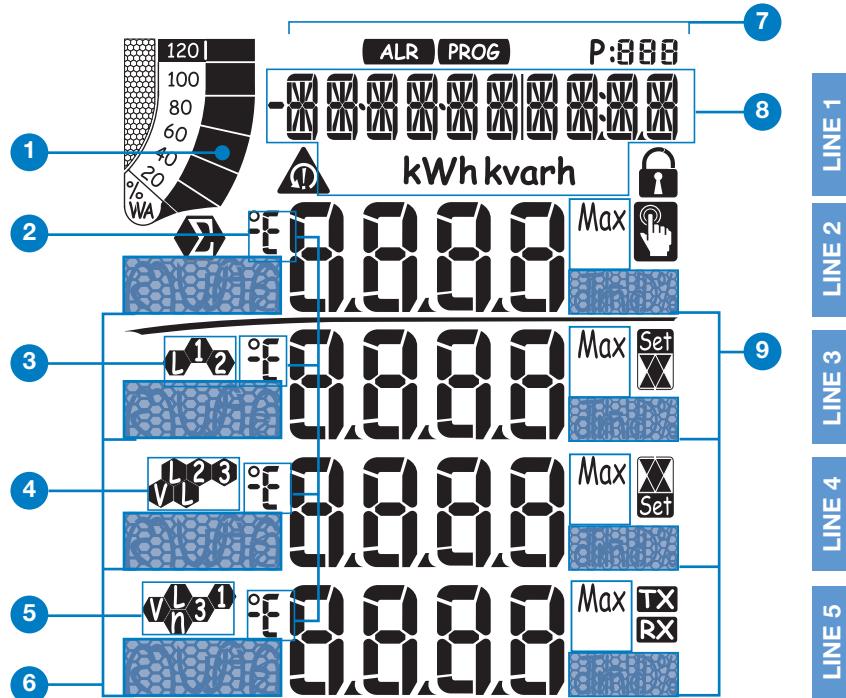
"Home" button: from any measurement screen, from any menu, returns to the main measurement screen (customizable by the user). **If you are in the programming menu, any data entered is lost.**

Holding pressed the button 8, you access the reset of the MAX of the displayed variables.

Holding pressed button 9, you access the reset of the dmd's of the displayed variables.

The reset must be confirmed by button 10.

INTRODUCTION TO WM30



ICONS OF THE DISPLAY



| ALARM SETPOINT | |
|----------------|-------------|
| | |
| Up alarm. | Down alarm. |

DESCRIPTION OF THE DISPLAY

- 1 Graphic bar which displays the active and the apparent power drained with relation to the installed power.
- 2 Indications of inductive phase displacement L, -L, or capacitive phase displacement C, -C.
- 3 Indication of the measurement phase-neutral L1 or phase-phase L12.
- 4 Indication of the measurement phase-neutral L2 or phase-phase L23 or of the asymmetry phase-phase VLL.
- 5 Indication of the measurement phase-neutral L3 or phase-phase L31 or of the asymmetry phase-neutral VLn.
- 6 Indication of the engineering unit and of the multiplier: k, M, V, W, A, var (VAr), PF (Pf), Hz, An.
- 7 ALR: the alarm display function is active. PROG: the programming function is active.
- 8 Area dedicated to the visualization of counters, text messages, date and time (format: dd.mm.yy/hh:mm). Energy counters (see table on the following screen).
- 9 Indication of: dmd, THD% or Max.
- 10 Indicates that all the instant values displayed are system values.
- 11 Phase sequence error alarm.
- 12 Instrument programming enabled.
- 13 Instrument programming disabled.
- 14 Data transmission (TX) and reception (RX), via network communication, in progress.

Notes: the display is backlit with lighting time programmable from 0 minutes (always on) to 255 minutes.

| Selection | Application | Note |
|-----------|---|---|
| A | Cost allocation | Imported energy metering |
| B | Cost control | Imported and partial energy metering |
| C | Complex cost allocation | Imported/exported energy (total and partial) |
| D | Solar | Imported and exported energy metering with some basic power analyzer function |
| E | Complex cost and power analysis | Imported/exported energy (total and partial) and power analysis |
| F | Cost and power quality analysis | Imported energy and power quality analysis |
| G | Advanced energy and power analysis for power generation | Complete energy metering and power quality analysis |

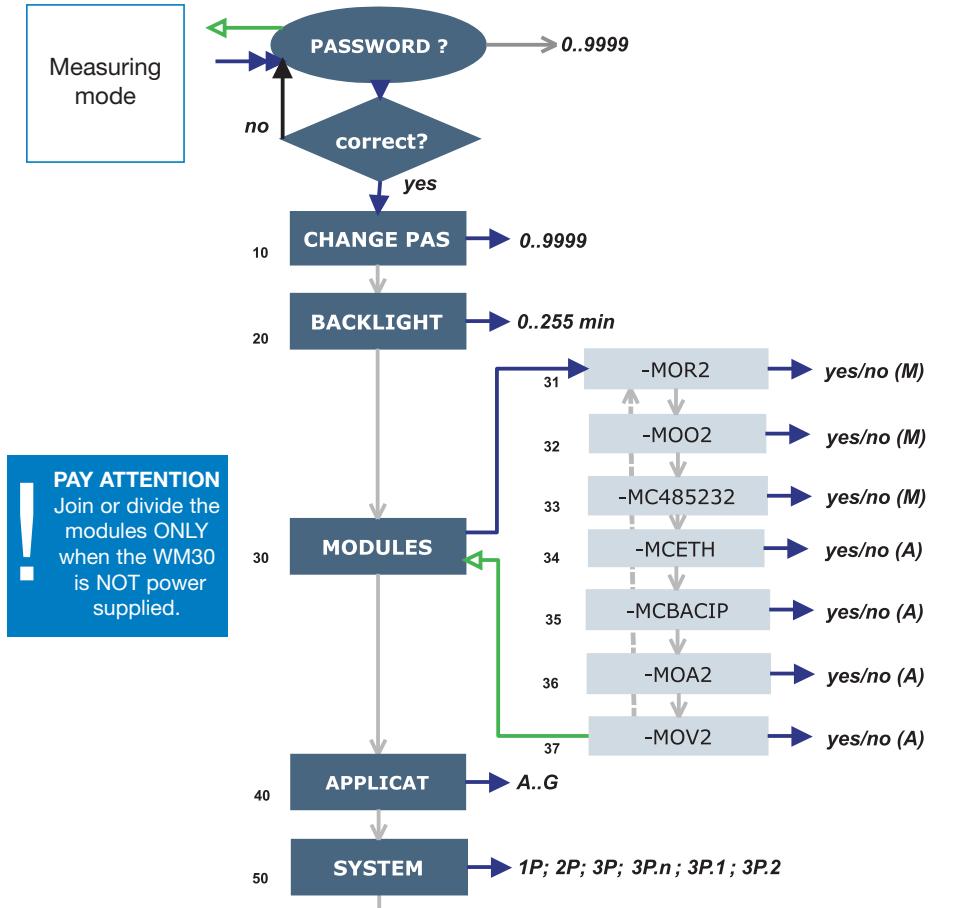
NOTE

WM30-96 is provided with the "Easy-prog" function which enables a simple, quick, clear and immediate visualization of the instrument measurements, making available only specific variables depending on the application of the instrument. The available applications are described above.

To leverage all the capacities of the instrument, select the application G which enables a complete and detailed analysis of the electric energy.

| | No | Line 1 | Line 2 | Line 3 | Line 4 | Line 5 | Note | Application | | | | | | | | | | |
|--|----|----------------------------|--|---------|--------------------|--------------------|------|-------------|---|---|---|---|---|---|--|--|--|--|
| | | | | | | | | A | B | C | D | E | F | G | | | | |
| | 0 | Home page | Programmable | | | | | X | X | X | X | X | X | X | | | | |
| | 1 | Total kW (+) | Depending on the last displayed page of instantaneous variables. | | | | | X | X | X | X | X | X | X | | | | |
| | 2 | Total kvarh (+) | | | | | | X | X | X | X | X | X | X | | | | |
| | 3 | Total kWh (-) | | | | | | | | X | X | X | | X | | | | |
| | 4 | Total kvarh (-) | | | | | | | | X | X | X | | X | | | | |
| | 5 | kWh (+) part. | | | | | | | | X | X | | X | X | | | | |
| | 6 | kvarh (+) part. | | | | | | | | X | X | | X | X | | | | |
| | 7 | kWh (-) part. | | | | | | | | X | | X | | X | | | | |
| | 8 | kvarh (-) part. | | | | | | | | X | | X | | X | | | | |
| | 9 | Run Hours (99999999.99) | | | | | | | | X | X | X | X | X | | | | |
| | 10 | Phase seq. | VLN Σ | VL1 | VL2 | VL3 | | | | X | X | X | X | | | | | |
| | 11 | Phase seq. | VLN Σ | VL1-2 | VL2-3 | VL3-1 | | | | X | X | X | X | | | | | |
| | 12 | Phase seq. | An | AL1 | AL2 | AL3 | | | | X | X | X | X | | | | | |
| | 13 | Phase seq. | Hz | "ASY" | VLL sys (% asy) | VLL sys (% asy) | | | | X | X | X | X | | | | | |
| | 14 | Phase seq. | VA Σ | VA L1 | VA L2 | VA L3 | | | | | X | X | X | | | | | |
| | 15 | Phase seq. | var Σ | var L1 | var L2 | var L3 | | | | | X | X | X | | | | | |
| | 16 | Phase seq. | W Σ | WL1 | WL2 | WL3 | | | | | X | X | X | X | | | | |
| | 17 | Phase seq. | PF Σ | PF L1 | PF L2 | PF L3 | | | | | X | X | X | | | | | |
| | 18 | Phase seq. | | THD V1 | THD V2 | THD V3 | | | | | | X | X | | | | | |
| | 19 | Phase seq. | | THD V12 | THD V23 | THD V31 | | | | | | X | X | | | | | |
| | 20 | Phase seq. | | THD A1 | THD A2 | THD A3 | | | | | | X | X | | | | | |

| No | Line 1 | Line 2 | Line 3 | Line 4 | Line 5 | Note | Applications | | | | | | |
|----------|--------|--|-----------------------------------|----------------|--------|-------------------------|--------------|---|---|---|---|---|---|
| | | | | | | | A | B | C | D | E | F | G |
| i | 1 | Lot n. xxxx | Yr. xx | rEL | A.01 | 1...60 (min) "dmd" | | x | x | x | x | x | x |
| | 2 | Conn. xxx.x (3ph.n/3ph/3ph./3ph.2/1ph/2ph) | CT.rA | 1.0 ... 99.99k | Pt.rA | 1.0...9999 | | x | x | x | x | x | x |
| | 3 | LED PULSE kWh | 0.001 to 1000 kWh per pulse | | | | | x | x | x | x | x | x |
| | 4 | PULSE OUT1 kWh/kvarh | 0.001 to 1000 kWh/kvarh per pulse | +/- tot/PAr | | | | x | x | x | x | x | x |
| | 5 | PULSE OUT2 kWh/kvarh | xxxx kWh/kvarh per pulse | +/- tot/PAr | | | | x | x | x | x | x | x |
| | 6 | Remote out | out1 | on/oFF | Out2 | on/oFF | | x | x | x | x | x | x |
| | 7 | AL1 | variable | Set 1 | Set 2 | (measurement) | | | | x | x | x | x |
| | 8 | AL2 | variable | Set 1 | Set 2 | (measurement) | | | | x | x | x | x |
| | 9 | AL3 | variable | Set 1 | Set 2 | (measurement) | | | | x | x | x | x |
| | 10 | AL4 | variable | Set 1 | Set 2 | (measurement) | | | | x | x | x | x |
| | 11 | ANALOGUE 1 | Hi.E | 0.0 ... 9999k | Hi.A | 0.0 ... 100.0% | | | | x | x | x | x |
| | 12 | ANALOGUE 2 | Hi.E | 0.0 ... 9999k | Hi.A | 0.0 ... 100.0% | | | | x | x | x | x |
| | 13 | COM port | Add XXX | 1...247 | bdr | 9.6/19.2/ 38.4/115.2 | | x | x | x | x | x | x |
| | 14 | IP ADDRESS | XXX | XXX | XXX | XXX | | x | x | x | x | x | x |
| | 15 | XX•XX•XX XX:XX | dAtE | tiME | | | | x | x | x | x | x | x |



NOTE

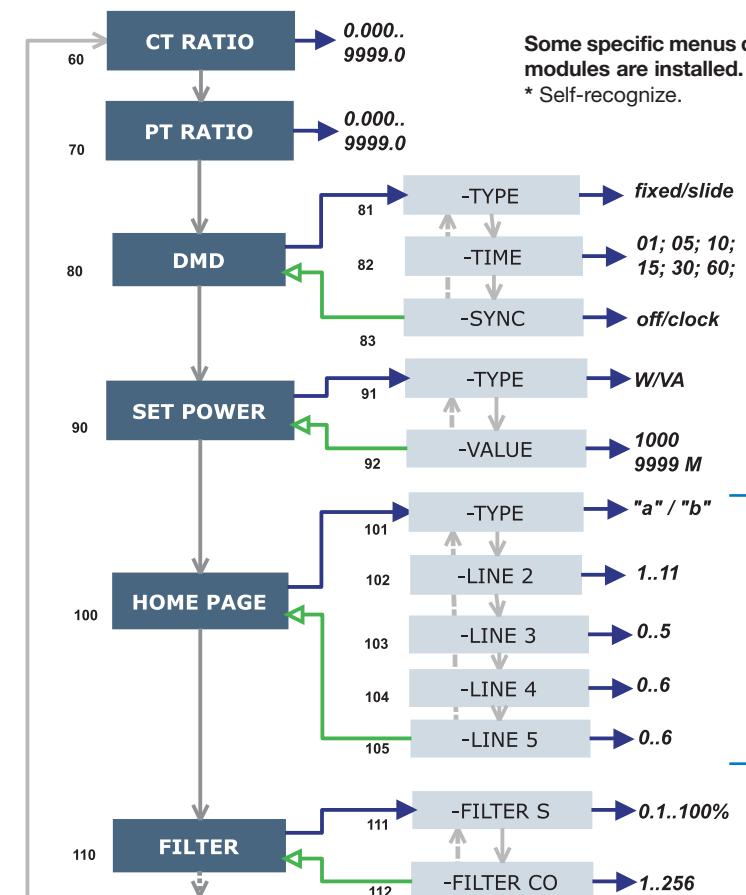
10 CHANGE PAS: this function allows the user to modify the PASS value with a new value (from 0 to 9999).

20 BACKLIGHT: backlight time from 0 (always on) to 255 minutes.

30 MODULES: the WM30 96 supports either automatic (A) or manual (M) acknowledgment of the installed modules depending on the kind of module.

40 APPLICAT: this function which enables a simple, quick, clear and immediate visualization of the instrument measurements, making available only specific variables (page 4/5) depending on the application of the instrument. **50 SYSTEM:** this function allows the user to select the type of electrical system. **60 CT RATIO:** this function allows the user to select the value of the CT ratio (primary/secondary ratio of the current transformer being used). Example: if the CT primary (current transformer) has a current of 300A and the secondary a current of 5A, the CT ratio corresponds to 60 (obtained using the following calculation: 300/5).

70 PT RATIO: this function allows you to select the value of the VT-PT ratio (primary/secondary ratio of the voltage transformer being used). Examples:



Some specific menus display only if the relevant modules are installed.

See details on the next page.

if the primary of the connected VT (voltage transformer/potential transformer) is 20kV and the secondary is 100V, then the VT-PT ratio corresponds to 200 (obtained carrying out the following calculation: 20000/100).

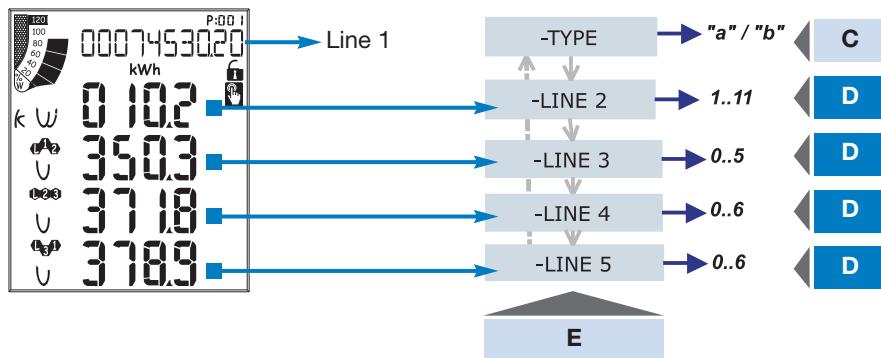
80 DMD: This function allows the user to select the calculation method of the DMD/AVG value of the selected variable. 81 TYPE: select the type of calculation mode to be used for the DMD/AVG calculation FIXED: if, for example, a time interval of 15 minutes has been selected, the instrument will calculate the AVG/DMD value of the measured variable and updates its value every 15 minutes, after that resets and starts a new calculation. SLIDE: if for example a time interval of 15 minutes has been selected, the instrument calculates the AVG/DMD value and updates its value at the beginning after the first 15 values and then after every minute, thus generating a window whose width is of 15 minutes and that moves forward every minute. 82 TIME: select the time interval for the DMD/AVG calculation 83 SYNC: select the synchronization mode, that is the method that controls the calculation method of the average/demand according to the selected time.

90 SET POWER: This menu allows you to set a power value (installed power) that, in the measuring phase, will represent 100% of the graph indicator.

100 HOME PAGE: This function allows the user to select the variables to be displayed on first page (home page). 101 TYPE: A, you can select the variable for each row. B, you can select a preset combination of variables (see relevant chapter to next page).

110 FILTER: with the digital filter it's possible to stabilize the measurements which are too instable when displaying the relevant values. 111 FILTER S: set the operating range (span) of the digital filter. The value is expressed as a % (filter to 0.0 means filter excluded). 112 FILTER CO: set the filtering coefficient of the instantaneous measures. By increasing the value, also the stability and the settling time of the measures are increased.

Some specific menus display only if the relevant modules are installed.



How to customize the home page of WM30-96

Menu "101 TYPE":

"a", you can select a "system" variable for each line.

"b", you can select a preset combination of variables which is split in line 2 (a system variable) and line 3 to 5 (single phase variables) .

Moreover, the selectable variables depend on the selected electric system, if 1P (one phase) system is selected, the available variables are different.

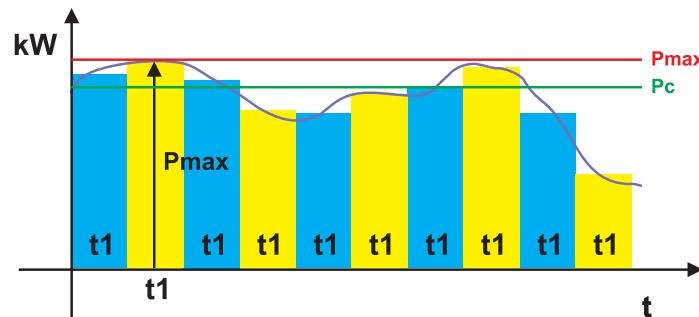
Note: when the B type is selected all the A selections on line 3, 4 and 5 are irrelevant.

| E | C | D | | | | | | | | | | | |
|--------|-------------------------|---|------------|--------------|--------------|-------------|-------------|----|----|----|----|----|----|
| | Type Selection | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Line 2 | Type "a" | An | W Σ | var Σ | VA Σ | PF Σ | Hz | An | An | An | An | An | An |
| | Type "a" with System 1P | V | A | W | var | VA | PF | Hz | V | V | V | V | V |
| | Type "b" | Select one of the preset combination of variables | | | | | | | | | | | |
| | Type "b" with System 1P | Select one of the preset combination of variables | | | | | | | | | | | |
| Line 3 | Type "a" | An | W Σ | var Σ | VA Σ | PF Σ | Hz | An | An | An | An | An | An |
| | Type "a" with System 1P | V | A | W | var | VA | PF | - | - | - | - | - | - |
| Line 4 | Type "a" | VL-L Σ | An | W Σ | var Σ | VA Σ | PF Σ | Hz | - | - | - | - | - |
| | Type "a" with System 1P | V | A | W | var | VA | PF | Hz | - | - | - | - | - |
| Line 5 | Type "a" | VL-L Σ | An | W Σ | var Σ | VA Σ | PF Σ | Hz | - | - | - | - | - |
| | Type a with System 1P | V | A | W | var | VA | PF | Hz | - | - | - | - | - |

| E | D | | | | | | | | | | | |
|--------|---|------------|-------------|---------|-----------------|-------------|--------------|------------|-------------|-----------|--------------|-----------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Line 2 | - | V Σ | V Σ | An | Hz | VA Σ | var Σ | W Σ | PF Σ | - | - | - |
| Line 3 | - | V L_1 | V L_{1-2} | A L_1 | "ASY" | VA L_1 | var L_1 | W L_1 | PF L_1 | THD V_1 | THD V_{12} | THD A_1 |
| Line 4 | - | V L_2 | V L_{2-3} | A L_2 | VLL sys (% asy) | VA L_2 | var L_2 | W L_2 | PF L_2 | THD V_2 | THD V_{23} | THD A_2 |
| Line 5 | - | V L_3 | V L_{3-1} | A L_3 | VLL sys (% asy) | VA L_3 | var L_3 | W L_3 | PF L_3 | THD V_3 | THD V_{31} | THD A_3 |

| E | D | | | | | | | | | | | |
|--------|----|---|---|---|---|---|---|---|---|-----|----|----|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Line 2 | V | | | | | | | | | VA | | |
| Line 3 | A | | | | | | | | | VAR | | |
| Line 4 | Hz | | | | | | | | | W | | |
| Line 5 | - | | | | | | | | | PF | | |

PROGRAMMING WM30-96



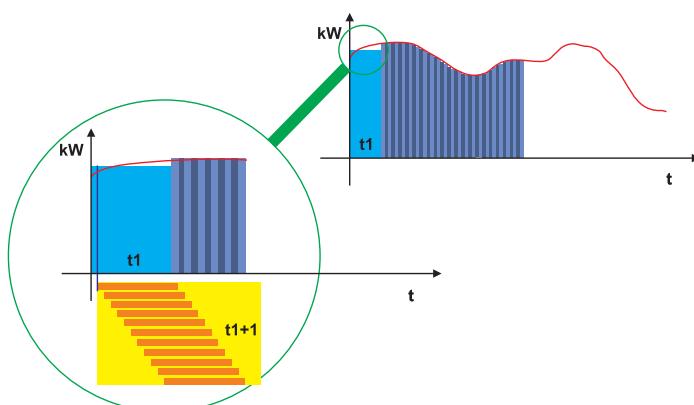
Where:

Pmax is the maximum power,

Pc is the contractual power,

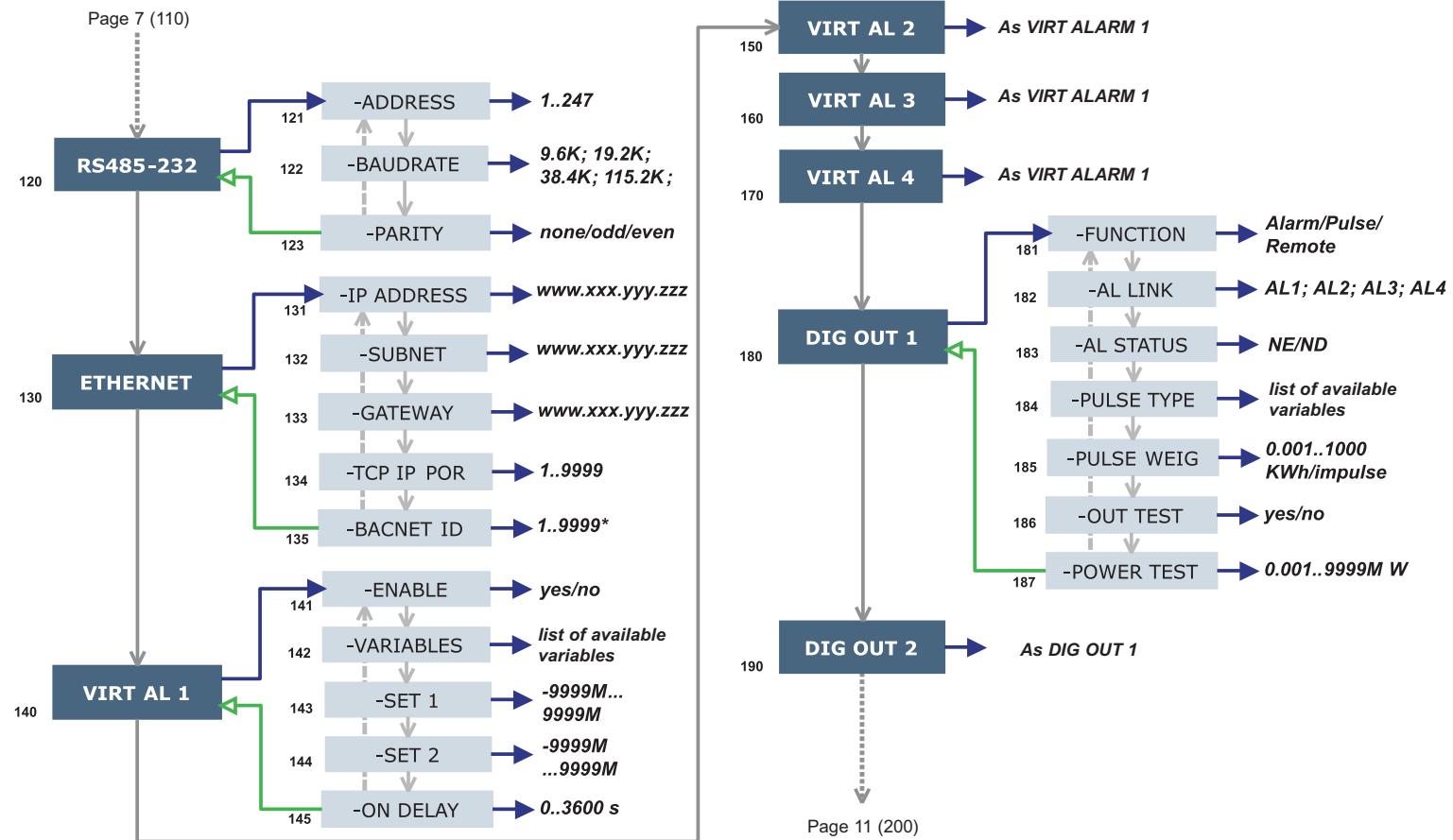
t1 is the selected time period for the calculation of the AVG/DMD value.

FIXED SELECTION: if, for example, a time interval of 15 minutes has been selected, the instrument will calculate the AVG/DMD value of the measured variable and updates its value every 15 minutes.



SLIDING SELECTION: if for example a time interval of 15 minutes has been selected, the instrument calculates the AVG/DMD value and updates its value at the beginning after the first 15 values and then after every minute, thus generating a window whose width is of 15 minutes and that moves forward every minute.

PROGRAMMING WM30-96



Key-pad



NOTE

120 RS232-458: This function allows the user to set the RS232 and RS485 serial communication ports.

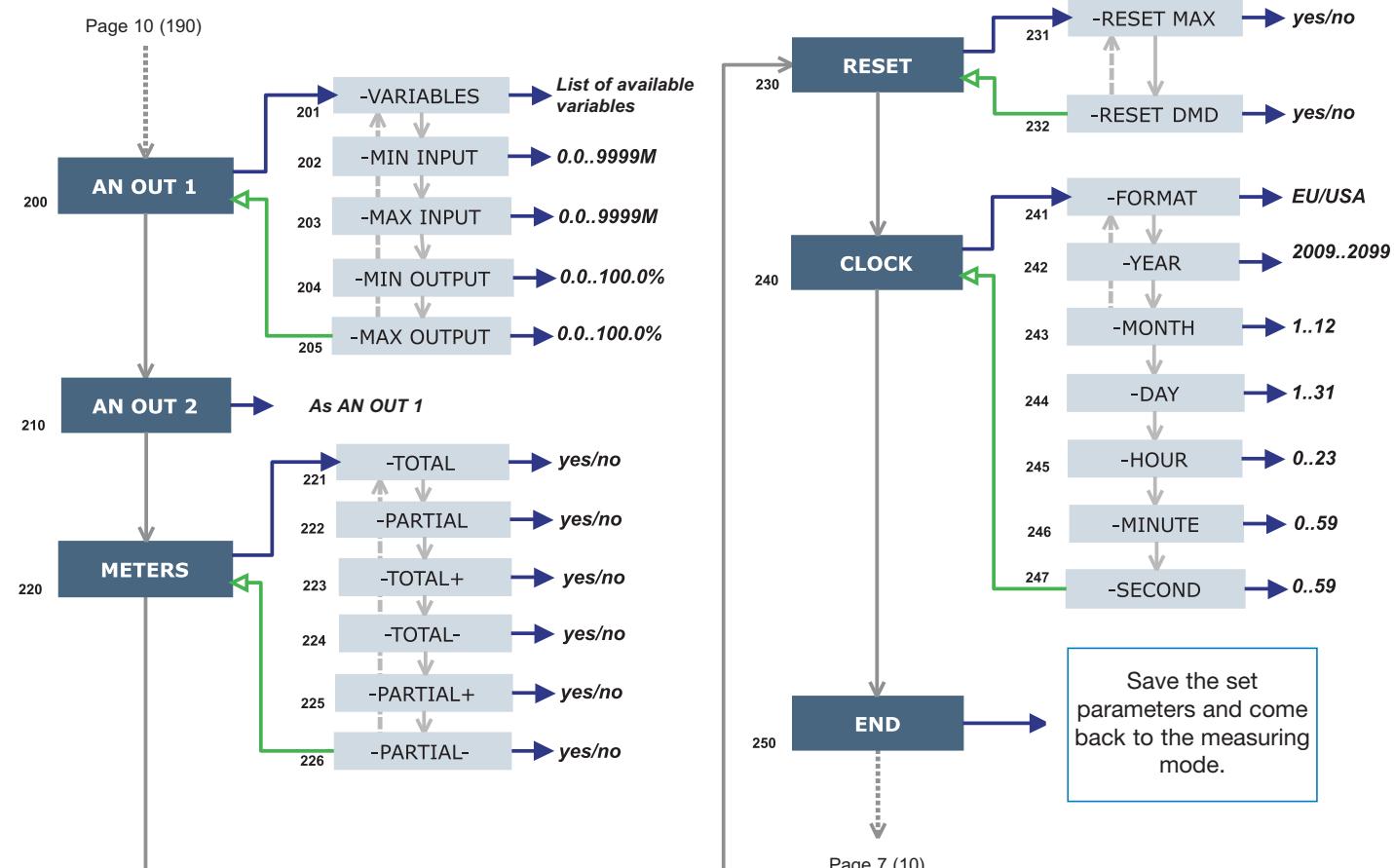
130 ETHERNET: This function allows the user to set the Ethernet communication port.

140 VIRT AL 1: This function allows you to set the alarm parameters. 141 ENABLE: enable (YES) or disable (NO) the alarm. 142 VARIABLES: set the variable to be linked to the alarm. 143 SET 1: set the on alarm set point of the variable. 144 SET 2: set the off alarm set point of the variable. 145 ON DELAY: set a delay on activation of the alarm.

180 DIG OUT 1: This function allows to link a virtual alarm to the digital output and to its working parameters. 181 FUNCTION: *Alarm*, the digital output is enabled only if the expected alarm status occurs. *Pulse*, the measured energy is retransmitted by the digital output by means of pul-

ses. *Remote*, the digital output can be enabled through a command sent by means of serial communication port. 182 AL LINK: select the virtual alarm to which it has to be linked. 183 AL STATUS: "ND" (normally de-energized relay) or "NE" (normally energized relay). 185 PULSE WEIG: selects the pulse weight (kWh per pulse). 186 OUT TEST: enables the TEST (YES), disables the TEST (NO). 187 POWER TEST: sets the simulated power value (kW) to which a proportional pulse sequence according to "PULSE WEIG" corresponds. The function is active until you remain within the menu and it is used when the output is connected to a PLC.

Some specific menus display only if the relevant modules are installed.

**NOTE**

200 AN OUT 1: this submenu allows the programming of the analogue outputs (0-20mA, 0-10V). **201 VARIABLES:** select the variable to be retransmitted by means of the analog output. **202 MIN INPUT:** minimum value of the variable input range to which the "MIN OUTPUT" value, retransmitted by the analogue output, will be linked. **203 MAX INPUT:** maximum value of the variable input range to which the "MAX OUTPUT" value, retransmitted by the analogue output, will be linked. **204 MIN OUTPUT:** set the value expressed as % of the output range (0-20mA, 0-10V) to be linked to the minimum measured value. **205 MAX OUTPUT:** select the value expressed as % of the output range (0-20mA, 0-10V) to be linked to the maximum measured value.

220 METERS: reset the ENERGY METERS choosing among: TOTAL, PARTIAL: resets all energy meters, both total and partial. TOTAL +: resets the total meters of imported energy. TOTAL -: resets the total meters of exported energy. PARTIAL +: resets the partial meters of imported energy.

PARTIAL -: resets the partial meters of exported energy.

230 RESET: carry out the reset of the MAX or dmd stored values.

240 CLOCK, 241 FORMAT: UE, set the European time format as 24h

(00:00) or the USA set the American time format as 12h (12:00 AM/PM).

242 YEAR: set the current year. **243 MONTH:** set the current month.

244 DAY: set the current day. **245 HOUR:** set the current hour.

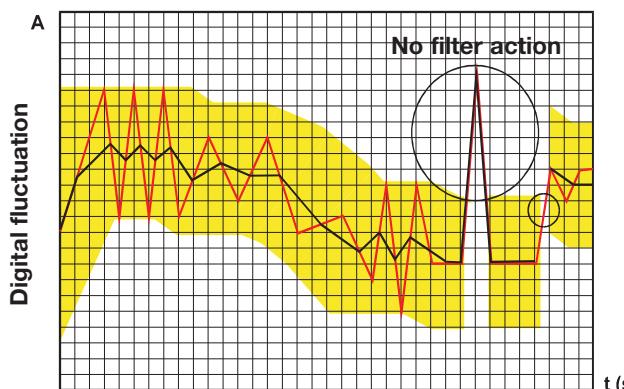
246 minute: set the current minute. **247 SECOND:** set the current second.

Some specific menus display only if the relevant modules are installed.

Key-pad



PROGRAMMING WM30-96



WHAT IS THE ACTION OF THE DIGITAL FILTER PARAMETERS ON THE MEASURE?

The first filter parameter is **FILTER S** and defines the operating range of the filter. This operating range is represented as a yellow band in figure on left side (each small square is one digit). Until the measured value (red curve in figure) is within this band, the filter is active; as soon as the value is external, the filter is deactivated and a new band will be active around the new value.

The range of the fluctuation (in digit) is a good starting value for such parameters.

The suggestion to set this parameter is to look at the size of the fluctuation (in digit) and use this value.

The second parameter is **FILTER CO** and represents the filtering coefficient. The higher is **FILTER CO**, the smoother is the curve of the displayed values (black in figure). There is not a theoretical rule to define this parameter, it is to be set on the field: however a rough suggestion is to start with the same value of the **FILTER S** coefficient and then increase it until the desired stability is reached.

The digital filter affects the values retransmitted both via serial communication and analogue output.

DIGITAL FILTER PROGRAMMING EXAMPLES

Example 1

How to stabilize the value of the VL-N variable displayed on the display, fluctuating from 222V and 228V.

The parameters of the digital filter have to be programmed as follows:
FILTER S: the variable has fluctuations within the mean value whose amplitude is equal to $\pm 0,75\%$ of the full scale rated value of the variable itself (obtained by the following calculation: $(228-222)/ 2 = \pm 3V$, then $\pm 3 * 100/400V = \pm 0,75\%$ where $400V$ is the phase-neutral rated value of an AV5 input). The "range" parameter, representing the action range of the digital filter, is to be programmed to a value which must be slightly higher than the percentage amplitude of the fluctuation: ex. 1.0%.

FILTER CO: if the new value measured by the instrument is within the action range of the filter, the new displayed value is obtained by adding algebraically the previous value to the variation divided by the filtering coefficient. As a consequence, a value higher than this coefficient implies a longer settling time and therefore a better stability. You generally obtain the best result by setting the filtering coefficient to a value equal to at least 10 times the range parameter value.

In the following example: $1,0 * 10 = 10$, the stability of the filtering coefficient can be improved by increasing the filtering coefficient, the allowed values are included within 1 and 255.

Example 2

How to stabilize the value of the displayed System Active Power ($W\Sigma$), fluctuating between 300kW and 320kW (the load is connected to the instrument by means of a 300/5A CT and a direct measure of the voltage).

The parameters of the digital filter must be programmed as follows:
FILTER S: the variable has fluctuations within the mean value whose amplitude is equal to $\pm 2,78\%$ of the full scale rated value of this variable. This value is obtained by the following calculation: $(320-300)/ 2 = \pm 10kW$, then $\pm 10 * 100/360kW = \pm 2,78\%$, where $360kW$ is the rated value of the System Active Power of an AV5 input, at the above mentioned CT and VT ratios and obtained by means of the following formula: $(320-300)/ 2 = \pm 10kW$, then $\pm 10 * 100/360kW = \pm 2,78\%$, where $360kW$ is the rated value of the System Active Power of an AV5 input at the above mentioned CT and VT ratios and obtained by means of the following formula: " $VLN * VT * IN * CT * 3^3$ " where VLN = rated input voltage (400V for the AV5 input), VT = primary/secondary ratio of the voltage transformer being used, IN = rated current (5A for the AV5 type input), CT = primary/secondary ratio of the voltage transformer being used (in this example $400 * 1 * 5 * 60 * 3 = 360kW$).

The RANGE parameter, representing the digital filtering coefficient action range, is to be programmed to a value which must be slightly higher than the percentage of the fluctuation: eg. 3.0%.

FILTER CO: if the new value acquired by the instrument is within the filtering action range, the new displayed value is obtained by adding algebraically the previous value to the variation divided by the filtering coefficient. As a consequence, a value higher than this coefficient implies an higher settling time and therefore a better stability. Generally speaking the best result is obtained setting the filtering coefficient to a value equal to at least 10 times the value of the range parameters. In the example: $3,0 * 10 = 30$. In order to improve the stability you can increase the filtering coefficient, the admitted values are included within 1 and 255.

Example 3.

It's necessary to stabilize the value of the displayed variable AL 1 (phase current 1), fluctuating within 470V and 486V.

To be able to manage the alarm function and activation and deactivation of the relay, this value is not to be subject to continuous fluctuations. In this example we have considered using a 500/5A CT. The parameters of the digital filter is to be programmed as follows:

FILTER S: the variable has fluctuations within the mean value whose amplitude is equal to $\pm 1,60\%$ of the full scale rated value of this variable (obtained by means of the calculation: $(486-470)/ 2 = \pm 8A$, then $\pm 8 * 100/500A = \pm 1,60\%$ where $500A$ is the value referred to the primary of the transformer being used). The "range" parameter, which represents the action range of the digital filter, is to be programmed to a value slightly higher than the pourcentage amplitude of the fluctuation: for example 2.0%.

FILTER CO: if the new value acquired by the instrument is within the filtering action range, the new displayed value is calculated algebraically adding to the previous value the variation divided by the filtering coefficient. As a consequence, a higher value of this coefficient implies a higher settling time and therefore a better stability. Generally speaking, the best result is obtained setting the filtering coefficient at a value equal to at least 10 times the value of the range parameter. In the example: $2,0 * 10 = 20$. To improve the stability you can increase the filtering coefficient, the admitted values are within 1 and 255.

PROGRAMMING EXAMPLES OF THE ANALOGUE OUTPUTS

Power retransmission by means of a 0-20mA analogue output.

It's necessary to measure a consumed power up to 100kW and retransmit this value by means of a signal from 4 to 20 mA: the module to be used is MOV2 (2x from 0 to 20mA), the instrument is to be programmed as follows:

VARIABLE: $W\Sigma$ (system active power).

MIN OUT: 20.0% means 4 mA. The calculation to be carried out is the following: $(100 \text{ minimum output}) / \text{fullscale output} = 100 * 4 \text{ mA} / 20 \text{ mA} = 20\%$.

MAX OUT: 100.0% means 20mA. The calculation to be carried out is: $(100 \text{ maximum output}) / \text{fullscale output} = 100 * 20 \text{ mA} / 20 \text{ mA} = 100$.

MIN INPUT: 0,0k; the multiple k,M,G can be selected on the instrument according to the chosen VT and CT values.

MAX INPUT: 100.0k; the k, M, G multiples can be selected on the instrument according to the selected VT and CT values.

Retransmission of the POWER FACTOR (PF) by means of the 0-20mA analog output.

It's necessary to retransmit the whole range of the allowed values for the PF with a signal from 0 to 20mA. Particular attention must be paid to the value of the PF variable which may vary from C0,001 and L0,000 (for each phase): these values will be retransmitted and will then correspond to 0 and 20 mA. When the PF will have a value equal to 1, being in the middle between C0,001 and L0,000, the value of the output will correspond to the middle of the scale, that is 10mA. As a consequence, the instrument will have to be programmed as follows:

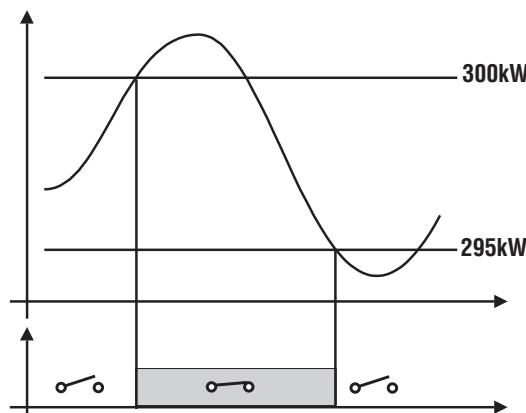
VARIABLE: PF L1 (or L2 or L3 or $PF\Sigma$).

MIN OUT: 0,0%.

MAX OUT: 100,0%.

MIN INPUT: C0,001 (the C symbol shows a CAPACITIVE value).

MAX INPUT: L0,001 (the L symbol shows an INDUCTIVE value). L0,001 has been chosen as minimum value to be set in order to avoid any undesirable swifiting of the repeated outputs.

EXAMPLE OF ALARM PARAMETERS PROGRAMMING

It is required the disconnection of a load when a set value of absorbed power occurs. For example when 300kW are exceeded, the alarm occurs and the set load is disconnected.

An "UP" alarm is selected, below you'll find the recommended programming:

ENABLE: YES

VARIABLES: W system ($W\Sigma$)

SET POINT 1: 300kW

SET POINT 2: 295kW

ON DELAY: set the desired number of seconds: "5 seconds".



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Control



Instruction Manual Base Instrument

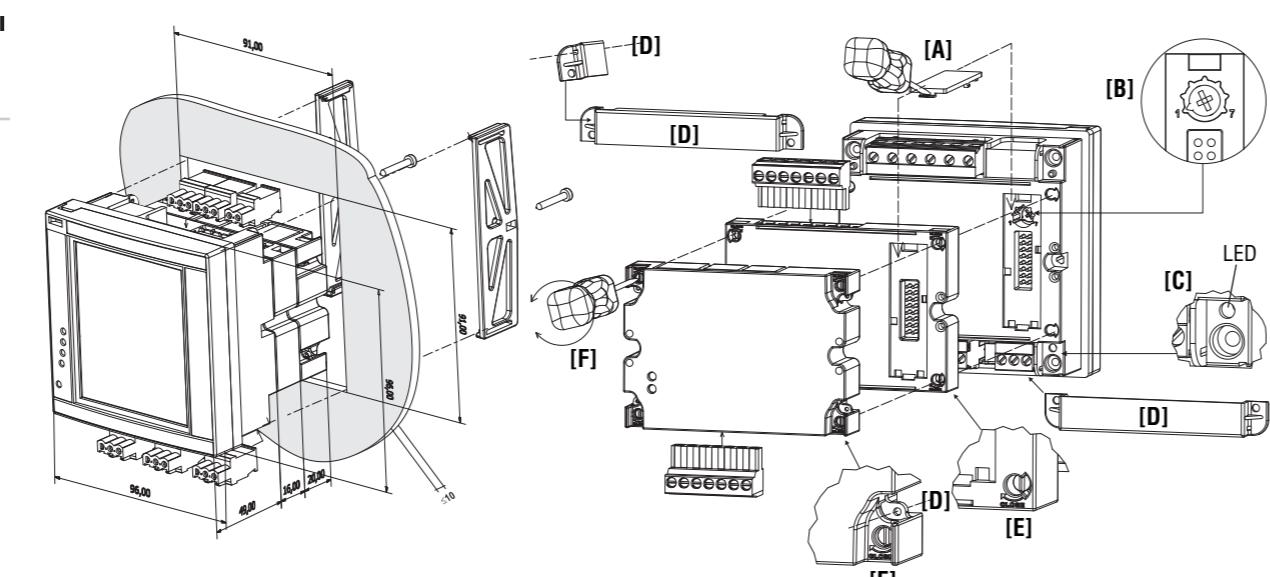
Thank you
for choosing our products.

Grazie
per aver scelto i nostri prodotti.

Wir danken
Ihnen dafür, dass Sie unsere
Produkte gewählt haben.

Gracias
por elegir nuestros productos.

Merci
d'avoir choisi nos produits.



ENGLISH

!
Read carefully the instruction manual. If the instrument is used in a manner not specified by the producer, the protection provided by the instrument may be impaired. **Maintenance:** make sure that the connections are correctly carried out in order to avoid any malfunctioning or damage to the instrument. To keep the instrument clean, use a slightly damp cloth; do not use any abrasives or solvents. We recommend to disconnect the instrument before cleaning it.

WARNING: to make sure that the screw tightening torque is 0.5Nm. ALL THE MOUNTING AND DISASSEMBLY OPERATIONS OF THE INSTRUMENT AND MODULES HAVE TO OCCUR WHEN POWER SUPPLY AND THE LOADS ARE NOT CONNECTED.

Preliminary operations: if necessary remove the protection cover of the contacts [A], using a properly screwdriver.

Lock the programming and LED of power supply on: to lock the access to the programming of the instrument turning (clockwise) the rotary switch [B] to position 7. To unlock the programming come-back the rotary switch to the position 1. The green LED [C] on warns that the instrument is power supplied.

The instrument and modules sealing: to lock the modules turning (clockwise) the properly fixing elements on the corners [E], using a properly screwdriver [F]. To seal the instrument use the dedicated covers and holes [D].

■ WIRING DIAGRAMS

- [1] 3-ph, 2-wire, balanced load, 1-CT connection
- [2] 3-ph, 2-wire, balanced load, 1-CT and 1-VT/PT connections
- [3] 3-ph, 4-wire, unbalanced load, 3-CT connection
- [4] 3-ph, 4-wire, unbalanced load, 3-CT and 3-VT/PT connections
- [5] 3-ph, 3-wire, unbalanced load, 3-CT connection
- [6] 3-ph, 3-wire, unbalanced load, 3-CT and 2-VT/PT connections
- [7] 3-ph, 3-wire, unbalanced load, 2-CT connections (ARON)
- [8] 3-ph, 3-wire, unbalanced load, 2-CT and 2-VT/PT connections ARON
- [9] 3-ph, 3-wire, balanced load, 1-CT connections
- [10] 3-ph, 3-wire, balanced load, 1-CT and 3-VT/PT connections
- [11] 3-ph, 3-wire, balanced load, 1-CT and 2-VT/PT connections
- [12] 2-ph, 3-wire, 2-CT connection
- [13] 2-ph, 3-wire, 2-CT and 2-VT/PT connections
- [14] 1-ph, 2-wire, 1-CT connection
- [15] 1-ph, 2-wire, 1-CT and 1-VT connections
- [16] Power supply 90 to 260VAC/DC. F=250V [T] 630mA.
Power supply 18 to 60VAC/DC. F=250V [T] 3.15A.

DEUTSCH

Die Betriebsanleitung aufmerksam lesen. Sollte das Gerät nicht gemäss der Herstellerangaben verwendet werden, könnte der vom Gerät vorgesehene Schutz beeinträchtigt werden. **Wartung:** Das Gerät mit einem feuchten Tuch reinigen; keine Scheuer- oder Lösemittel verwenden. Das Gerät vor der Reinigung ausschalten

ACHTUNG: Darauf achten, dass das Anzugsmoment der Klemmschrauben 0,5Nm beträgt. SOWOHL BEI DER MONTAGE, ALS AUCH BEIM AUSBAU DES GERÄTES UND DER MODULE MÜSSEN STROMVERSORGUNG UND STROMLAST STETS VORHER ABGETRENNT WERDEN.

Vorbereitung: Gegebenenfalls das Schutzfenster der Kontakte [A] mit einem Schlitzschraubenzieher entfernen.

Programmierungssperre und LED Stromversorgung vorhanden: Um die Programmierung des Gerätes zu sperren, den Drehschalter [B] im Uhrzeigersinn auf Position 7 drehen, für die erneute Freigabe auf Position 1. Das Leuchten der grünen LED [C] zeigt an, dass das Gerät mit Strom versorgt wird.

Versiegelung der Module und des Geräts: Die Befestigung der Module erfolgt (durch Drehen derselben im Uhrzeigersinn) über die an den Ecken vorgesehenen Befestigungselemente [E], mit Hilfe eines passenden Schlitzschraubenziehers [F]. Das Siegel wird über die hierfür vorgesehenen Löcher und Klemmendeckel [D] angebracht.

ITALIANO

Leggere attentamente il manuale di istruzioni. Qualora l'apparecchio venisse adoperato in un modo non specificato dal costruttore, la protezione prevista dall'apparecchio potrebbe essere compromessa. **Mantenimento:** Per mantenere pulito lo strumento usare un panno inumidito; non usare abrasivi o solventi. Si consiglia di scolare lo strumento prima di eseguire la pulizia.

ATTENZIONE: assicurarsi che la coppia di serraggio applicata alle viti dei morsetti sia di: 0,5Nm. TUTTE LE OPERAZIONI DI MONTAGGIO E SMONTAGGIO DELLO STRUMENTO E DEI MODULI VANNO ESEGUITE CON ALIMENTAZIONE E CARICO SCOLLEGATI.

Operazione preliminare: smontare, se necessario, la finestra di protezione dei contatti [A], utilizzando un apposito cacciavite a taglio.

Blocco della programmazione e LED di presenza alimentazione: per bloccare la programmazione dello strumento agire (ruotandolo in senso orario) sul commutatore rotante [B] portandolo nella posizione 7, per sbloccare la programmazione portarlo nella posizione 1. Il LED verde acceso [C] avvisa che lo strumento è alimentato.

Sigillatura dei moduli e dello strumento: per bloccare i moduli agire (ruotandoli in senso orario) sugli appositi elementi di fissaggio posti agli angoli dei moduli stessi [E], utilizzando un adeguato cacciavite a taglio [F]. Il sigillo va apposto utilizzando i fori e i copri morsetti dedicati [D].

■ COLLEGAMENTI ELETTRICI

- [1] 3 fasi, 2 fili, carico equilibrato, connessione con 1 TA
- [2] 3 fasi, 2 fili, carico equilibrato, connessione con 1TA e 1 TV
- [3] 3 fasi, 4 fili, carico equilibrato, connessione con 3 TA
- [4] 3 fasi, 4 fili, carico squilibrato, connessione con 3 TA e 3 TV
- [5] 3 fasi, 3 fili, carico squilibrato, connessione con 3 TA
- [6] 3 fasi, 3 fili, carico squilibrato, connessione con 3 TA e 2 TV
- [7] 3 fasi, 3 fili, carico squilibrato, connessione con 2 TV (ARON)
- [8] 3 fasi, 3 fili, carico squilibrato, connessione con 2 TA e 2 TV (ARON)
- [9] 3 fasi, 3 fili, carico equilibrato, connessione con 1 TA
- [10] 3 fasi, 3 fili, carico equilibrato, connessione con 1 TA e 3 TV
- [11] 3 fasi, 3 fili, carico equilibrato, connessione con 1 TA e 2 TV
- [12] 2 fasi, 3 fili, connessioni con 2 TA
- [13] 2 fasi, 3 fili, connessioni con 2 TA e 2 VT
- [14] 1 fase, 2 fili, connessione con 1 TA
- [15] 1 fase, 2 fili, connessione con 1 TA e 1 TV
- [16] Alimentazione da 90 a 260VCA/CC. F=250V [T] 630mA.
Alimentazione da 18 a 60VCA/CC. F=250V [T] 3.15A.

■ ELEKTRISCHE ANSCHLÜSSE

- [1] 3 Phasen, 2 Adern, symmetrische Last, Anschluss mit 1 TA
- [2] 3 Phasen, 2 Adern, symmetrische Last, Anschluss mit 1 TA und 1 TV
- [3] 3 Phasen, 4 Adern, symmetrische Last, Anschluss mit 3 TA
- [4] 3 Phasen, 4 Adern, unsymmetrische Last, Anschluss mit 3 TA und 3 TV
- [5] 3 Phasen, 3 Adern, unsymmetrische Last, Anschluss mit 3 TA
- [6] 3 Phasen, 3 Adern, unsymmetrische Last, Anschluss mit 3 TA und 2 TV
- [7] 3 Phasen, 3 Adern, unsymmetrische Last, Anschluss mit 2 TV (ARON)
- [8] 3 Phasen, 3 Adern, unsymmetrische Last, Anschluss mit 2 TA und 2 TV (ARON)
- [9] 3 Phasen, 3 Adern, symmetrische Last, Anschluss mit 1 TA
- [10] 3 Phasen, 3 Adern, symmetrische Last, Anschluss mit 1 TA und 3 TV
- [11] 3 Phasen, 3 Adern, symmetrische Last, Anschluss mit 1 TA und 2 TV
- [12] 2 Phasen, 3 Adern, Anschlüsse mit 2 TA
- [13] 2 Phasen, 3 Adern, Anschlüsse mit 2 TA und 2 VT
- [14] 1 Phase, 2 Adern, Anschluss mit 1 TA
- [15] 1 Phase, 2 Adern, Anschluss mit 1 TA und 1 TV
- [16] Stromversorgung von 90 bis 260VAC/DC. F=250V [T] 630mA.
Stromversorgung von 18 bis 60VAC/DC. F=250V [T] 3.15A.

FRANÇAIS

Lire attentivement le manuel de l'utilisateur. Si l'appareil est utilisé dans des conditions différentes de celles spécifiées par le fabricant, le niveau de protection prévu par l'instrument peut être compromis. **Entretien:** Pour nettoyer l'instrument, utiliser un chiffon humide; ne pas utiliser d'abrasifs ou de solvants. Il faut déconnecter le dispositif avant de procéder au nettoyage.

ATTENTION: s'assurer que le couple de serrage appliquée aux vis des bornes soit de : 0,5Nm. POUR TOUTES LES OPÉRATIONS DE MONTAGE ET DÉMONTAGE DE L'INSTRUMENT ET DES MODULES IL FAUT QUE L'ALIMENTATION ET LA CHARGE SOIENT DÉBRANCHÉES.

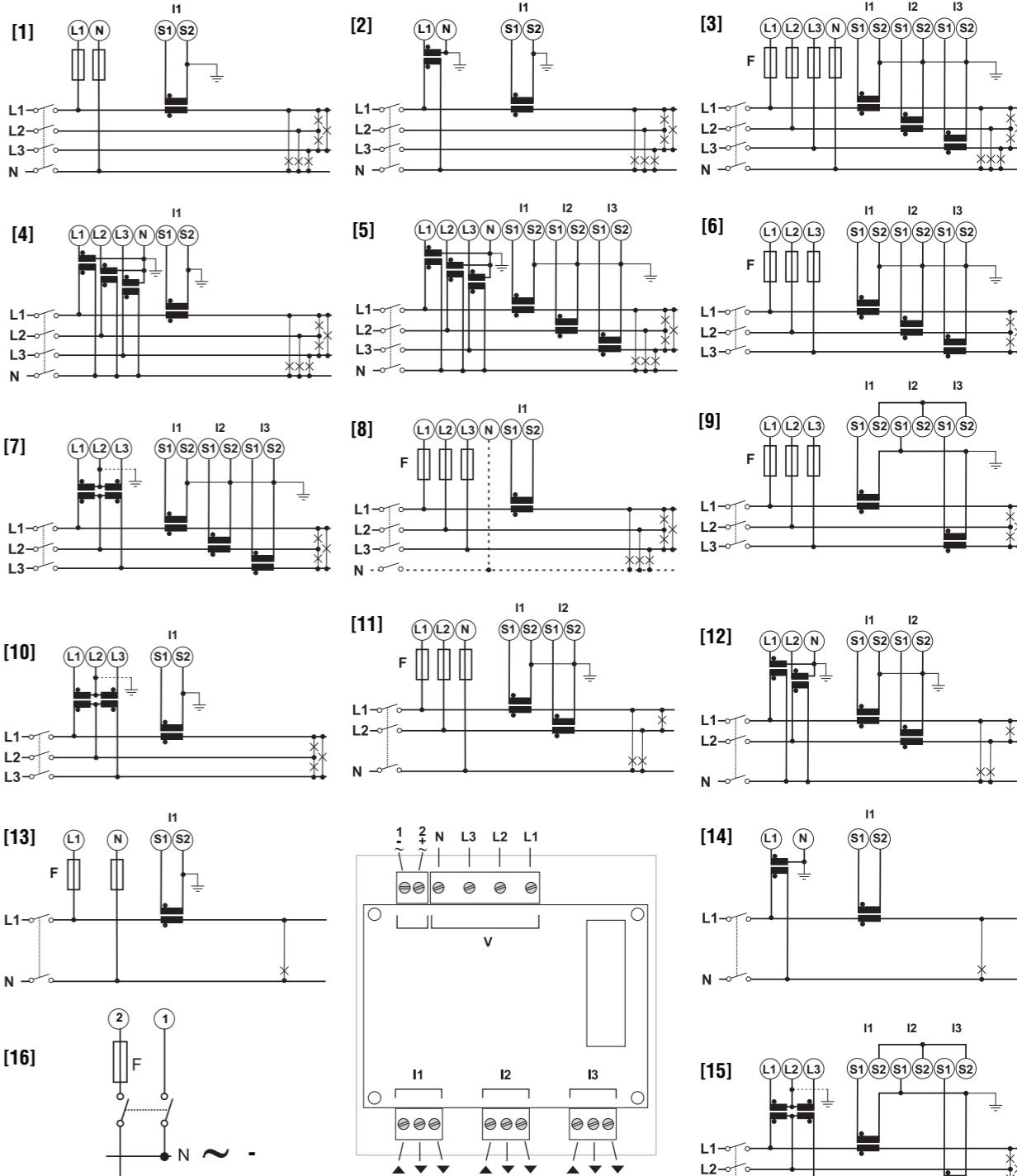
Opération préliminaire: démonter, si nécessaire, la fenêtre de protection des contacts [A], en utilisant un tournevis plat approprié.

Bloccage de la programmation et LED pour la présence d'alimentation: pour bloquer la programmation de l'instrument, agir (en le tournant dans le sens des aiguilles d'une montre) sur le commutateur rotatif [B] en le mettant sur la position 7, pour débloquer la programmation, le mettre sur la position 1. Le LED vert allumé [C] signale que l'instrument est alimenté.

Sceller les modules et l'instrument: pour bloquer les modules, agir (en les tournant dans le sens des aiguilles d'une montre) sur les éléments de fixation prévus à cet effet, situés aux angles des modules mêmes [E], en utilisant un tournevis plat adéquat [F]. Le sceau doit être posé en utilisant les trous et les couvre-bornes prévus pour à cet effet [D].

■ BRANCHEMENTS ÉLECTRIQUES

- [1] 3 phases, 2 fils, charge équilibrée, connexion avec 1 TA
- [2] 3 phases, 2 fils, charge équilibrée, connexion avec 1TA et 1 TV
- [3] 3 phases, 4 fils, charge équilibrée, connexion avec 3 TA
- [4] 3 phases, 4 fils, charge déséquilibrée, connexion avec 3 TA et 3 TV
- [5] 3 phases, 3 fils, charge déséquilibrée, connexion avec 3 TA
- [6] 3 phases, 3 fils, charge déséquilibrée, connexion avec 3 TA et 2 TV
- [7] 3 phases, 3 fils, charge déséquilibrée, connexion avec 2 TV (ARON)
- [8] 3 phases, 3 fils, charge déséquilibrée, connexion avec 2 TA et 2 TV (ARON)
- [9] 3 phases, 3 fils, charge équilibrée, connexion avec 1 TA



ESPAÑOL

Lea atentamente el manual de instrucciones. Si el instrumento se usa de modo distinto al indicado por el fabricante, la protección de seguridad ofrecida por el instrumento podrá resultar dañada. **Mantenimiento:** para limpiar el equipo utilizar siempre un trapo ligeramente humedecido, nunca productos abrasivos o disolventes. Se recomienda desconectar siempre el instrumento antes de limpiarlo.

CUIDADO: asegúrese de que el par de apretamiento aplicado a los tornillos de los borne sea de: 0,5Nm. TODAS LAS OPERACIONES DE MONTAJE Y DESMONTAJE DEL INSTRUMENTO Y DE LOS MÓDULOS DEBE REALIZARSE CON LA ALIMENTACIÓN Y LA CARGA DESCONECTADAS.

CONEXIONES ELÉCTRICAS

- [1] 3 fases, 2 hilos, carga equilibrada, conexión con 1 TA
- [2] 3 fases, 2 hilos, carga equilibrada, conexión con 1TA y 1 TV
- [3] 3 fases, 4 hilos, carga equilibrada, conexión con 3 TA
- [4] 3 fases, 4 hilos, carga desequilibrada, conexión con 3 TA y 3 TV
- [5] 3 fases, 3 hilos, carga desequilibrada, conexión con 3 TA
- [6] 3 fases, 3 hilos, carga desequilibrada, conexión con 3 TA y 2 TV
- [7] 3 fases, 3 hilos, carga desequilibrada, conexión con 2 TV (ARON)
- [8] 3 fases, 3 hilos, carga desequilibrada, conexión con 2 TA y 2 TV (ARON)
- [9] 3 fases, 3 hilos, carga equilibrada, conexión con 1 TA
- [10] 3 fases, 3 hilos, carga equilibrada, conexión con 1 TA y 3 TV
- [11] 3 fases, 3 hilos, carga equilibrada, conexión con 1 TA y 2 TV
- [12] 2 fases, 3 hilos, conexiones con 2 TA
- [13] 2 fases, 3 hilos, conexiones con 2 TA y 2 VT
- [14] 1 fase, 2 hilos, conexión con 1 TA
- [15] 1 fase, 2 hilos, conexión con 1 TA y 1 TV
- [16] Alimentación de 90 a 260VCA/CC. F=250V [T] 630mA.
Alimentación de 18 a 60VCA/CC. F=250V [T] 3.15A.

ción de la agujas del reloj) en el commutador giratorio [B] llevándolo a la posición 7, para desbloquear la programación llévelo a la posición 1. El LED verde encendido [C] avisa de que el instrumento está alimentado. **Sellado de los módulos y del instrumento:** para bloquear los módulos actúe (girándolos en la dirección de las agujas del reloj) en los específicos elementos de fijación ubicados en los ángulos de los mismos módulos [Y], utilizando un adecuado destornillador de punta plana [F]. El sellado va aplicado utilizando los orificios y los cubre-borneas dedicados [D].

■ CONEXIONES ELÉCTRICAS

- [1] 3 fases, 2 hilos, carga equilibrada, conexión con 1 TA
- [2] 3 fases, 2 hilos, carga equilibrada, conexión con 1TA y 1 TV
- [3] 3 fases, 4 hilos, carga equilibrada, conexión con 3 TA
- [4] 3 fases, 4 hilos, carga desequilibrada, conexión con 3 TA y 3 TV
- [5] 3 fases, 3 hilos, carga desequilibrada, conexión con 3 TA
- [6] 3 fases, 3 hilos, carga desequilibrada, conexión con 3 TA y 2 TV
- [7] 3 fases, 3 hilos, carga desequilibrada, conexión con 2 TV (ARON)
- [8] 3 fases, 3 hilos, carga desequilibrada, conexión con 2 TA y 2 TV (ARON)
- [9] 3 fases, 3 hilos, carga equilibrada, conexión con 1 TA
- [10] 3 fases, 3 hilos, carga equilibrada, conexión con 1 TA y 3 TV
- [11] 3 fases, 3 hilos, carga equilibrada, conexión con 1 TA y 2 TV
- [12] 2 fases, 3 hilos, conexiones con 2 TA
- [13] 2 fases, 3 hilos, conexiones con 2 TA y 2 VT
- [14] 1 fase, 2 hilos, conexión con 1 TA
- [15] 1 fase, 2 hilos, conexión con 1 TA y 1 TV
- [16] Alimentación de 90 a 260VCA/CC. F=250V [T] 630mA.
Alimentación de 18 a 60VCA/CC. F=250V [T] 3.15A.

ENGLISH

Rated inputs, system type: 1, 2 or 3-phase. Galvanic insulation by means of built-in CTs. Current range (by CT) AV5 and AV6: 5(6)A; AV4 and AV7: 1(2)A. Voltage (by direct connection or VT/PT) AV4, AV5: 400/690VLL; AV6, AV7: 100/208VLL. **Accuracy** (Display + RS485) (@25°C ±5°C, R.H. ≤60%, 48 to 62 Hz). In: see below, Un: see below AV4 model In: 1A, Imax: 2A; Un: 160 to 480VNL (277 to 830VLL). AV5 model In: 5A, Imax: 6A; Un: 160 to 480VNL (277 to 830VLL). AV6 model In: 5A, Imax: 6A; Un: 40 to 144VNL (70 to 250VLL), AV7 model In: 1A, Imax: 2A; Un: 40 to 144VNL (70 to 250VLL). Current AV4, AV5, AV6, AV7 models from 0.01In to 0.05In: ±(0.5% RDG +2DG). From 0.05In to Imax: ±(0.2% RDG +2DG). Phase-neutral voltage: In the range Un: ±(0.2% RDG +1DG). Phase-phase voltage: In the range Un: ±(0.5% RDG +1DG). Frequency: ±0.1Hz (45 to 65Hz). Active and Apparent power: 0.01In to 0.05In, PF 1: ±(1%RDG+1DG). From 0.05In to Imax PF 0.5L, PF1, PF0.8C: ±(0.5%RDG+1DG). Power Factor ±[0.001+0.5%(1.000 - "PF RDG")]. Reactive power 0.1In to Imax, senφ 0.5L/C: ±(1%RDG+1DG). 0.05In to 0.1In, senφ 0.5L/C: ±(1.5%RDG+1DG), 0.05In to Imax, senφ 1: ±(1%RDG+1DG) 0.02In to 0.05In, senφ 1: ±(1.5%RDG+1DG). Active energy, class 0.5 according to EN62053-22, ANSI C12.20, class C according to EN50470-3. Reactive energy class 1 according to EN62053-23, ANSI C12.1. Start up current AV5, AV6: 5mA. Start up current AV4, AV7 1mA. **Energy additional errors**: according to EN62053-22, ANSI C12.20. Influence quantities, class B or C according to EN50470-3, EN62053-23, ANSI C12.1. **Total Harmonic Distortion (THD)** ±1% FS (FS: 100%). AV4: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV5: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV6: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV7: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. **Temperature drift** ≤200ppm/°C. **Sampling rate** 3200 samples/s @ 50Hz, 3840 samples/s @ 60Hz. Method TRMS measurements of distorted wave forms. Coupling type by means of CT's. **Crest factor**, AV5, AV6: ≤3 (15A max. peak), AV4, AV7: ≤3 (3A max. peak). **Current Overloads**, continuous (AV5 and AV6) 6A, @ 50Hz. Continuous (AV4 and AV7) 2A, @ 50Hz. For 500ms (AV5 and AV6) 120A, @ 50Hz. For 500ms (AV4 and AV7) 40A, @ 50Hz. **Voltage Overloads**, continuous 1.2 Un. For 500ms 2 Un. **Input impedance**, 400VL-L (AV4 and AV5) >1.6MΩ; 208VL-L (AV6 and AV7) >1.6MΩ. 5(10)A (AV5 and AV6) <0.2VA. 1(2)A (AV4 and AV7) <0.2VA. **Frequency** 40 to 440 Hz. **Meters**. Total 4 (9+1 digit). Partial 4 (9+1 digit). **Pulse output** connectable to total and/or partial meters. **Energy meter recording**, storage of total and partial energy meters. Energy meter storage format (EEPROM) Min. -9,999,999,999.9 kWh/kvarh, Max. 9,999,999,999.9 kWh/kvarh. **Energy Meters**, total energy meters +kWh, +kvarh, -kWh, -kvarh. Partial energy meters +kWh, +kvarh, -kWh, -kvarh. **Analysis principle FFT**. **Harmonic measurement**. Current up to the 32nd harmonic. **Type of harmonics** THD (VL1 and VL1-N). The same for the other phases: L2, L3. **System**: the harmonic distortion can be measured in 3-wire or 4-wire systems. Tw: 0.02 sec@50Hz without filter. **Power supply**: H: 90 to 260VAC/DC; L: 18 to 60VAC/DC (48 to 62Hz). Power consumption AC: 6 VA; DC: 3.5 W. **Operating temperature** -25°C to +55°C (-13°F to 131°F) (R.H. from 0 to 90% non-condensing @ 40°C) according to EN62053-21, EN50470-1 and EN62053-23. **Storage temperature** -30°C to +70°C (-22°F to 158°F) (R.H. < 90% non-condensing @ 40°C) according to EN62053-21, EN50470-1 and EN62053-23. **Installation category** Cat. III (IEC60664, EN60664). **Dielectric strength** 4000 VRMS for 1 minute. **Noise rejection** CMRR 100 dB, 48 to 62 Hz. **EMC** according to EN62052-11. Electrostatic discharges: 15kV air discharge. Immunity to irradiated: test with current: 10V/m from 80 to 2000MHz. Electromagnetic fields: test without any current: 30V/m from 80 to 2000MHz. Burst: on current and voltage measuring inputs circuit: 4kV. Immunity to conducted disturbances: 10V/m from 150KHz to 80MHz. Surge: on current and voltage measuring inputs circuit: 4kV; on "L" auxiliary power supply input: 1kV. Radio frequency suppression: according to CISPR 22. **Standard compliance**: safety: IEC60664, IEC61010-1 EN60664, EN61010-1 EN62052-11. Metrology EN62053-21, EN62053-23, EN50470-3. Pulse output: DIN43864, IEC62053-31. **Approvals**: CE, cULus "Listed". **Connections**: Screw-type. Screw-type. Cable cross-section area: max. 2.5 mm². Min./max. Screws tightening torque: 0.4 Nm / 0.8 Nm. Suggested: 0.5 Nm. Module holder: 96x96x50mm. "A" and "B" type modules: 89.5x63x16mm. "C" type module: 89.5x63x20mm. Max. depth behind the panel. With 3 modules (A+B+C): 81.7 mm. Material, ABS, self-extinguishing: UL 94 V-0. **Protection degree**, front: IP65, NEMA4x, NEM12. Screw terminals: IP20.

ITALIANO

Ingressi di misura. Sistema: 1, 2 o 3 fasi. Isolamento galvanico mediante TA integrati. Portata corrente (TA) AV5 e AV6: 5(6)A. AV4 e AV7: 1(2)A. Tensione (connessione diretta o TV) AV4, AV5: 400/690VLL; AV6, AV7: 100/208VLL. **Precisione** (Display + RS485) (@25°C ±5°C, R.H. ≤60%, 48 to 62 Hz). In: vedere sotto, Un: vedere sotto, Modello AV4, In: 1A, Imax: 2A; Un: 160 to 480VNL (277 to 830VLL). Modello AV5, In: 5A, Imax: 6A; Un: 160 to 480VNL (277 to 830VLL). Modello AV6 In: 5A, Imax: 6A; Un: 40 to 144VNL (70 to 250VLL). Modello AV7 In: 1A, Imax: 2A; Un: 40 to 144VNL (70 to 250VLL). Corrente, modelli AV4, AV5, AV6, AV7 Da 0,01In a 0,05In: ±(0,5% RDG +2DG). Da 0,05In a 0,5In: ±(0,2% RDG +2DG). Da 0,5In a Imax: ±(0,2% RDG +1DG). Tensione fase-neutro, nel campo Un: ±(0,2% RDG +1DG). Tensione fase-fase, nel campo Un: ±(0,5% RDG +1DG). Frequenza: ±0,1Hz (45 to 65Hz). Attiva e Apparente: 0,01In a 0,05In, PF 1: ±(1%RDG+1DG). Da 0,05In a 0,5In, cosφ 1: ±(1% RDG +1DG), da 0,05In a Imax, cosφ 0,5L, cosφ 1, cosφ 0,8C: ±(0,5% RDG +1DG). Fattore di potenza: ±[0,001+0,5%(1.000 - "PF RDG")]. Potenza reattiva, da 0,1In a Imax, senφ 0,5L/C: ±(1%RDG+1DG). 0,05In a 0,1In, senφ 0,5L/C: ±(1.5%RDG+1DG), 0,05In a Imax, senφ 1: ±(1%RDG+1DG) 0,02In a 0,05In, senφ 1: ±(1.5%RDG+1DG). Energia attiva: Classe 0,5 secondo EN62053-22, ANSI C12.20 classe C secondo EN50470-3. Energia reattiva Classe 1 secondo EN62053-23, ANSI C12.1. Start up current AV5, AV6: 5mA. Start up current AV4, AV7 1mA. **Errori addizionali**: according to EN62053-22, ANSI C12.20. Influence quantitativi, classe B o C secondo EN50470-3, EN62053-23, ANSI C12.1. **Distorsione armonica totale (THD)**: ±1% FS (FS: 100%). AV4: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV5: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV6: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV7: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. **Deriva termica**: ≤200ppm/°C. **Frequenza di campionamento**: 3200 campioni/s @ 50Hz, 3840 campioni/s @ 60Hz. **Misure**, metodo TRMS misura delle forma d'onda distorte. Tipo di accoppiamento Mediante TA. **Fattore di cresta** AV5, AV6: ≤3 (15A max. picco), AV4, AV7: ≤3 (3A max. picco). **Sovraccarico corrente**: continuo (AV5 and AV6) 6A, @ 50Hz. Continuo (AV4 and AV7) 2A, @ 50Hz. Per 500ms (AV5 and AV6) 120A, @ 50Hz. Per 500ms (AV4 and AV7) 40A, @ 50Hz. **Voltage Overloads**, continuo 1.2 Un. Per 500ms 2 Un. **Input impedance**, 400VL-L (AV4 and AV5) >1.6MΩ; 208VL-L (AV6 and AV7) >1.6MΩ. 5(10)A (AV5 and AV6) <0.2VA. 1(2)A (AV4 and AV7) <0.2VA. **Frequency** 40 to 440 Hz. **Meters**. Total 4 (9+1 digit). Partial 4 (9+1 digit). **Pulse output** connectabile to total and/or partial meters. **Energy meter recording**, storage of total and partial energy meters. Energy meter storage format (EEPROM) Min. -9,999,999,999.9 kWh/kvarh, Max. 9,999,999,999.9 kWh/kvarh. **Energy Meters**, total energy meters +kWh, +kvarh, -kWh, -kvarh. **Contatori di energia**: totali, +kWh, +kvarh, -kWh, -kvarh. **Principio dell'analisi FFT**. **Harmonic measurement**. Current up to the 32nd harmonic. **Type of harmonics** THD (VL1 and VL1-N). The same for the other phases: L2, L3. **System**: the harmonic distortion can be measured in 3-wire or 4-wire systems. Tw: 0.02 sec@50Hz without filter. **Power supply**: H: 90 to 260VAC/DC; L: 18 to 60VAC/DC (48 to 62Hz). Power consumption AC: 6 VA; DC: 3.5 W. **Operating temperature** -25°C to +55°C (-13°F to 131°F) (R.H. from 0 to 90% non-condensing @ 40°C) according to EN62053-21, EN50470-1 and EN62053-23. **Storage temperature** -30°C to +70°C (-22°F to 158°F) (R.H. < 90% non-condensing @ 40°C) according to EN62053-21, EN50470-1 and EN62053-23. **Installation category** Cat. III (IEC60664, EN60664). **Dielectric strength** 4000 VRMS for 1 minute. **Noise rejection** CMRR 100 dB, 48 to 62 Hz. **EMC** according to EN62052-11. Electrostatic discharges: 15kV air discharge. Immunity to irradiated: test with current: 10V/m from 80 to 2000MHz. Electromagnetic fields: test without any current: 30V/m from 80 to 2000MHz. Burst: on current and voltage measuring inputs circuit: 4kV. Immunity to conducted disturbances: 10V/m from 150KHz to 80MHz. Surge: on current and voltage measuring inputs circuit: 4kV; on "L" auxiliary power supply input: 1kV. Radio frequency suppression: according to CISPR 22. **Standard compliance**: safety: IEC60664, IEC61010-1 EN60664, EN61010-1 EN62052-11. Metrology EN62053-21, EN62053-23, EN50470-3. Pulse output: DIN43864, IEC62053-31. **Approvals**: CE, cULus "Listed". **Connections**: Screw-type. Screw-type. Cable cross-section area: max. 2.5 mm². Min./max. Screws tightening torque: 0.4 Nm / 0.8 Nm. Suggested: 0.5 Nm. Module holder: 96x96x50mm. "A" and "B" type modules: 89.5x63x16mm. "C" type module: 89.5x63x20mm. Max. depth behind the panel. With 3 modules (A+B+C): 81.7 mm. Material, ABS, self-extinguishing: UL 94 V-0. **Protection degree**, front: IP65, NEMA4x, NEM12. Screw terminals: IP20.

DEUTSCH

Messeingänge: Phasensystem: Systemcode: 1, 2 oder 3. Strommessung: Galvanische Isolation durch integrierte Stromwandler. Strombereich (Stromwandler) AV5 und AV6: 5(6)A. AV4 und AV7: 1(2)A. Spannung (Direktmessung oder Spannungswandler) AV4, AV5: 400/690VLL; AV6, AV7: 100/208VLL. **Precisione** (Display + RS485) (@25°C ±5°C, R.H. ≤60%, 48 to 62 Hz) In: vedere sotto, Un: vedere sotto, Modello AV4, In: 1A, Imax: 2A; Un: 160 to 480VNL (277 a 830VLL). Modello AV5, In: 5A, Imax: 6A; Un: 160 to 480VNL (277 a 830VLL). Modello AV6 In: 5A, Imax: 6A; Un: 40 to 144VNL (70 a 250VLL). Modello AV7 In: 1A, Imax: 2A; Un: 40 to 144VNL (70 a 250VLL). Corrente, modelli AV4, AV5, AV6, AV7 Da 0,01In a 0,05In: ±(0,5% RDG +2DG). Da 0,05In a 0,5In: ±(0,2% RDG +2DG). Da 0,5In a Imax: ±(0,2% RDG +1DG). Tensione fase-neutro, nel campo Un: ±(0,2% RDG +1DG). Tensione fase-fase, nel campo Un: ±(0,5% RDG +1DG). Frequenza: ±0,1Hz (45 a 65Hz). Attiva e Apparente: 0,01In a 0,05In, PF 1: ±(1%RDG+1DG). Da 0,05In a 0,5In, cosφ 1: ±(1% RDG +1DG), da 0,05In a Imax, cosφ 0,5L, cosφ 1, cosφ 0,8C: ±(0,5% RDG +1DG). Fattore di potenza: ±[0,001+0,5%(1.000 - "PF RDG")]. Potenza reattiva, da 0,1In a Imax, senφ 0,5L/C: ±(1%RDG+1DG). 0,05In a 0,1In, senφ 0,5L/C: ±(1.5%RDG+1DG), 0,05In a Imax, senφ 1: ±(1%RDG+1DG) 0,02In a 0,05In, senφ 1: ±(1.5%RDG+1DG). Energia attiva: Classe 0,5 secondo EN62053-22, ANSI C12.20 classe C secondo EN50470-3. Energia reattiva Classe 1 secondo EN62053-23, ANSI C12.1. Start up current AV5, AV6: 5mA. Start up current AV4, AV7 1mA. **Errori addizionali**: according to EN62053-22, ANSI C12.20. Influence quantitativi, classe B o C secondo EN50470-3, EN62053-23, ANSI C12.1. **Distorsione armonica totale (THD)**: ±1% FS (FS: 100%). AV4: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV5: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV6: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV7: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. **Deriva termica**: ≤200ppm/°C. **Frequenza di campionamento**: 3200 campioni/s @ 50Hz, 3840 campioni/s @ 60Hz. **Misuren**, metodo TRMS misura delle forme d'onda distorte. Tipo di accoppiamento Mediante TA. **Fattore di cresta** AV5, AV6: ≤3 (15A max. picco), AV4, AV7: ≤3 (3A max. picco). **Sovraccarico corrente**: continuo (AV5 and AV6) 6A, @ 50Hz. Continuo (AV4 and AV7) 2A, @ 50Hz. Per 500ms (AV5 and AV6) 120A, @ 50Hz. Per 500ms (AV4 and AV7) 40A, @ 50Hz. **Voltage Overloads**, continuo 1.2 Un. Per 500ms 2 Un. **Input impedance**, 400VL-L (AV4 and AV5) >1.6MΩ; 208VL-L (AV6 and AV7) >1.6MΩ. 5(10)A (AV5 and AV6) <0.2VA. 1(2)A (AV4 and AV7) <0.2VA. **Frequency** 40 a 440 Hz. **Meters**. Total 4 (9+1 digit). Partial 4 (9+1 digit). **Pulse output** connectabile a totali e/o parziali. **Registrazione dei contatori**: memorizzazione dei contatori parziali e totali. Formato dei contatori memorizzati (EEPROM) Min. -9,999,999,999.9 kWh/kvarh. Max. 9,999,999,999.9 kWh/kvarh. **Contatori di energia**: totali, +kWh, +kvarh, -kWh, -kvarh. **Principio dell'analisi FFT**. **Harmonic measurement**. Current up to the 32nd harmonic. **Type of harmonics** THD (VL1 and VL1-N). The same for the other phases: L2, L3. **System**: la distorsione armonica è misurabile sia in un sistema 3 fili che 4 fili. Tw: 0,02 sec@50Hz senza filtro. **Alimentazione**: H: da 90 a 260VAC/DC; L: da 18 a 60VCA/CC (da 48 a 62Hz). Autoconsumo CA: 6VA; CC: 3,5W. **Eingangsimpedanz**: 400VL-L (AV4 und AV5) >1,6MΩ. 208VL-L (AV6 und AV7) >1,6MΩ. **Sampling rate**: 3200 Abtastwertes/s bei 50Hz, 3840 Abtastwertes/s bei 60Hz. **Abtaststrom**: 3200 Abtastwertes/s bei 50Hz, 3840 Abtastwertes/s bei 60Hz. **Verzerrung (THD)**: ±1% BE (BE: 100%). AV4: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV5: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV6: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV7: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. **Gesamte Harmonische Verzerrung (THD)**: ±1% BE (BE: 100%). AV4: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV5: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV6: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. AV7: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Umax: 585Vp. **Derive termiche**: ≤200 ppm/°C. **Frequenza di campionamento**: 3200 campioni/s @ 50Hz, 3840 campioni/s @ 60Hz. **Medidas**, método: medida TRMS de formas d'ondas deformadas. Tipo de conexión: mediante CT. **Factor de cresta**: AV5, AV6: 5mA. AV7: 1mA. **Errores adicionales de energía**: según norma EN62053-22, ANSI C12.20. Influencia: Clase B o C según norma EN50470-3, EN62053-23, ANSI C12.1. **Distorsión armónica total (THD)**: ±1% f.e. (f.e.: 100%). AV4: Imin: 5mARMS; Imax: 15Ap; Umin: 30VRMS; Vmax: 585Vp. AV5: Imin: 5mARMS; Imax: 15Ap; Vmin: 30VRMS; Vmax: 585Vp. AV6: Imin: 5mARMS; Imax: 15Ap; Vmin: 30VRMS; Vmax: 585Vp. AV7: Imin: 5mARMS; Imax: 15Ap; Vmin: 30VRMS; Vmax: 585Vp. **Dérive de température**: ≤200 ppm/°C. **Taux d'échantillonnage</**

**Instruction Manual
Modules WM30**

Thank you
for choosing our products.

Grazie
per aver scelto i nostri prodotti.

Wir danken
Ihnen dafür, dass Sie unsere
Produkte gewählt haben.

Gracias
por elegir nuestros productos.

Merci
d'avoir choisi nos produits.

**ENGLISH**

Read carefully the instruction manual. If the instrument is used in a manner not specified by the producer, the protection provided by the instrument may be impaired. **Maintenance:** make sure that the connections are correctly carried out in order to avoid any malfunctioning or damage to the instrument. To keep the instrument clean, use a slightly damp cloth; do not use any abrasives or solvents. We recommend to disconnect the instrument before cleaning it.

WARNING: it allows to mount only one module per type, for a maximum of 3 modules in total. To avoid any damage respect the position of the modules as shown on table 1. To make sure that the screw tightening torque is 0.5Nm. ALL THE MOUNTING AND DISASSEMBLY OPERATIONS OF THE INSTRUMENT AND MODULES HAVE TO OCCUR WHEN POWER SUPPLY AND THE LOADS ARE NOT CONNECTED.

WIRING DIAGRAMS

- [1] 2 static opto-mosfet outputs.
- [2] 2 relays outputs.
- [3] 2 analogue outputs 20mA DC.
- [4] 2 analogue outputs 10V DC.
- [5] RS485 serial port. **IMPORTANT:** additional devices provided with RS485 are connected in parallel. The termination of the serial output is carried out only on the last instrument of the network, by means of a jumper between B+ and T.
- [6] RS232 serial port. **IMPORTANT:** the termination must be done by means of a jumper between B+ and T.

A: the communication RS232 and RS485 ports **can't** be connected and used simultaneously.

To connect the ethernet or BACnet-IP modules using the RJ45 connector.

[G] The communication modules are provided with LED indicating the communication status RX o TX.

Preliminary operations: remove the protection cover of the contacts [D], using a properly screwdriver.

Lock and sealing the modules: to lock the modules turning (clockwise) the properly fixing elements on the corners [E], [F], using a properly screwdriver [H]. To seal the instrument use the dedicated holes [F].

ITALIANO

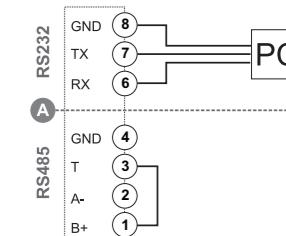
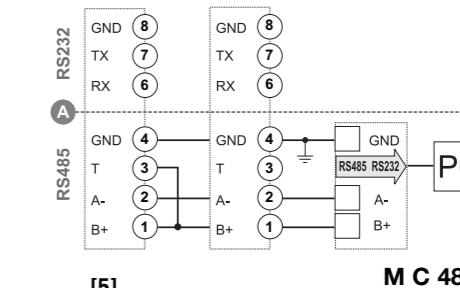
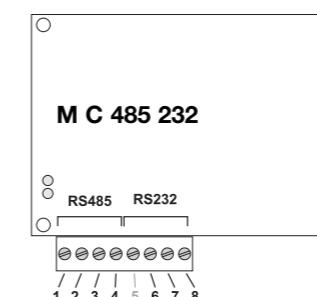
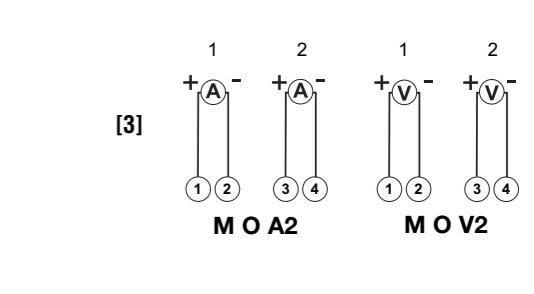
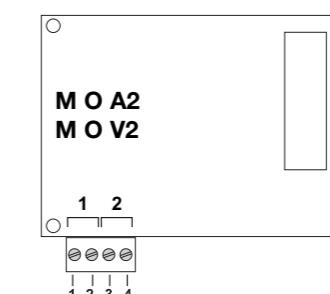
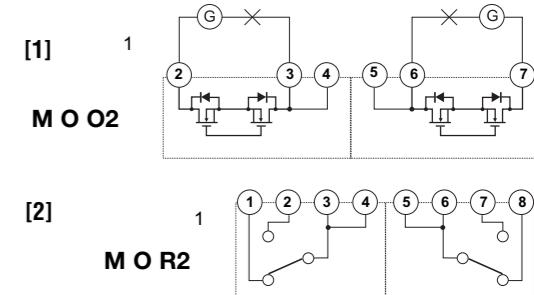
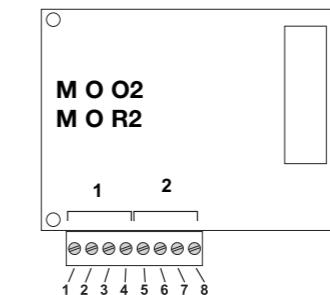
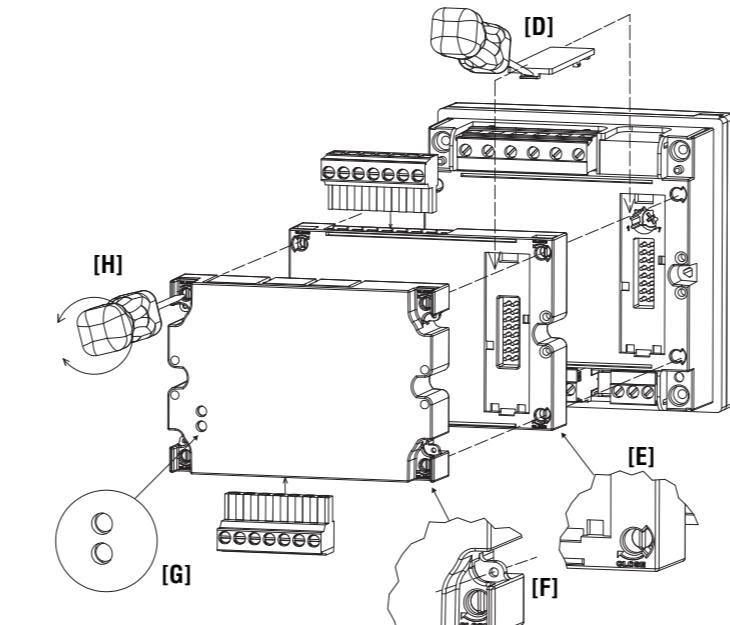
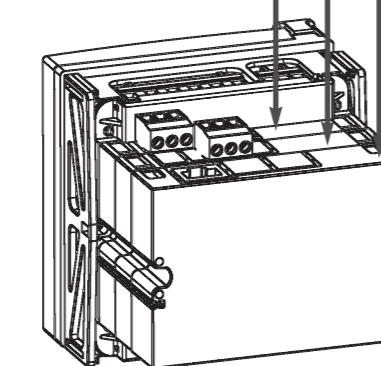
Leggere attentamente il manuale di istruzioni. Qualora l'apparecchio venisse adoperato in un modo non specificato dal costruttore, la protezione prevista dall'apparecchio potrebbe essere compromessa. **Manutenzione:** Per mantenere pulito lo strumento usare un panno inumidito; non usare abrasivi o solventi. Si consiglia di scollare lo strumento prima di eseguire la pulizia.

ATTENZIONE: è possibile montare un unico modulo per tipo, per un massimo di tre moduli in totale. Per evitare malfunzionamenti rispettare la posizione dei moduli come indicato dalla tabella 1. Porre attenzione alla coppia di serraggio applicata alle viti dei morsetti che sia di: 0,5Nm. TUTTE LE OPERAZIONI DI MONTAGGIO E SMONTAGGIO DELLO STRUMENTO E DEI MODULI VANNO ESEGUITE CON ALIMENTAZIONE E CARICO SCOLLEGATI.

COLLEGAMENTI ELETTRICI

- [1] Doppia uscita statica a opto-mosfet.
- [2] Doppia uscita statica a relè.

| Tab.1 | A | B | C |
|---------------|---|---|---|
| M O R2 | X | | |
| M O O2 | X | | |
| M O A2 | | X | |
| M O V2 | | X | |
| M C 485 232 | | | X |
| M C ETH | | | X |
| M C BACnet-IP | | | X |



Vorbereitung: Das Schutzfenster der Kontakte [D] mit einem Schlitzschraubenzieher entfernen.

Befestigung und Versiegelung der Module: Die Befestigung der Module erfolgt über die an den Ecken derselben vorgesehenen Befestigungselemente [F], [E], mit Hilfe eines passenden Schlitzschraubenziehers [H]. Das Siegel wird über die hierfür vorgesehenen Löcher [F] angebracht.

FRANÇAIS

Lire attentivement le manuel de l'utilisateur. Si l'appareil est utilisé dans des conditions différentes de celles spécifiées par le fabricant, le niveau de protection prévu par l'instrument peut être compromis. **Entretien:** Pour nettoyer l'instrument, utiliser un chiffon humide; ne pas utiliser d'abrasifs ou de solvants. Il faut déconnecter le dispositif avant de procéder au nettoyage.

ATTENTION: il est possible de monter un module unique par type, avec un maximum de trois modules au total. Afin d'éviter les dysfonctionnements, respecter la position des modules comme l'indique le tableau 1. Faire attention à ce que le couple de serrage appliqué aux vis des bornes soit de : 0,5Nm. POUR TOUTES LES OPÉRATIONS DE MONTAGE ET DÉMONTAGE DE L'INSTRUMENT ET DES MODULES IL FAUT QUE L'ALIMENTATION ET LA CHARGE SOIENT DÉBRANCHÉES.

BRANCHEMENTS ÉLECTRIQUES

- [1] Double sortie statique à opto-mosfet.
- [2] Double sortie statique à relé.
- [3] Double sortie analogique de 20mA CC.
- [4] Double sortie analogique à 10V CC.
- [5] Sortie ports série RS485. **IMPORTANT:** d'autres instruments pourvus de RS485 sont branchés en parallèle. La terminaison de la sortie série doit se faire uniquement sur le dernier instrument du réseau au moyen d'un cavalier entre les bornes B+ et T.
- [6] Sortie ports série RS232. **IMPORTANT:** procéder à la terminaison au moyen d'un cavalier entre les bornes B+ et T.

A: les ports de communication RS232 et RS485 ne peuvent pas être utilisés et branchés ensemble.

Pour BRANCHER les modules avec sortie Ethernet ou BACnet-IP utiliser le connecteur RJ45 prévu à cet effet.

[G] Le module de communication est pourvu de LED spécifiques qui signalent l'état de communication RX ou TX.

Opération préliminaire: démonter la fenêtre de protection des contacts [D], en utilisant un tournevis plat approprié.

Bloquer et sceller les modules: pour bloquer les modules, agir sur les éléments de fixation prévus à cet effet, situés aux angles des modules mêmes [F], [E], en utilisant un tournevis plat approprié [H]. Poser le sceau en utilisant les trous spécifiques prévus [F].

ESPAÑOL

Lea atentamente el manual de instrucciones. Si el instrumento se usa de modo distinto al indicado por el fabricante, la protección de seguridad ofrecida por el instrumento podrá resultar dañada. **Mantenimiento:** para limpiar el equipo utilizar siempre un trapo ligeramente humedecido, nunca productos abrasivos o disolventes. Se recomienda desconectar siempre el instrumento antes de limpiarlo.

| Tab. 2 | A | B | C | D | E | F |
|--------|-----|-----|-----|-----|-----|-----|
| A | - | 4kV | 4kV | 4kV | 4kV | 4kV |
| B | 4kV | 2kV | NA | 4kV | 4kV | 4kV |
| C | 4kV | NA | 2kV | 4kV | 4kV | 4kV |
| D | 4kV | 4kV | 4kV | - | 4kV | 4kV |
| E | 4kV | 4kV | 4kV | 4kV | 0kV | 4kV |
| F | 4kV | 4kV | 4kV | 4kV | 4kV | - |

A: Measuring input - Ingressi di misura - Messeingänge - Entrées de medida.

B: Relay outputs - Uscita relè - Relaisausgänge - Sorties à relais - Salidas de relé.

C: Static outputs - Uscita statica - Statische Ausgänge - Sorties statiques - Salidas estáticas.

D: Communication port - Porta di comunicazione - Kommunikations-Schnittstelle - Port de commun - Puerto de comunicación.

E: Analogue outputs - Uscite analogiche - Analoge Ausgänge - Sorties analogiques - Salidas analógicas.

F: Power supply - Alimentazione - Hilfstromversorgung - Alimentación auxiliar - Alimentación aux.

ENGLISH

Relay outputs (M O R2). Physical outputs 2 (max. one module per instrument). Purpose for either alarm output or pulse output. Type, relay, SPDT type, AC 1-5A @ 250VAC; AC 15-1.5A @ 250VAC, DC 12-5A @ 24VDC; DC 13-1.5A @ 24VDC. Configuration, by means of the front key-pad. Function, the outputs can work as alarm outputs but also as pulse outputs, remote controlled outputs, or in any other combination. Alarms up alarm and down alarm linked to the virtual alarms. Min. response time ≤200ms, filters excluded. Set-point on-time delay: "0 s". Pulse: signal retransmission: Total: +kWh, -kWh, +kvarh, -kvarh. Partial: +kWh, -kWh, +kvarh, -kvarh. Pulse duration, programmable from 0.001 to 10.00 kWh/kvarh per pulse. ≥100ms <120msec (ON), ≥120ms (OFF), according to EN62052-31. Remote controlled outputs: the activation of the outputs is managed through the serial communication port.

Static outputs (M O 02). Opto-Mosfet type. Physical outputs: 2 (max. one module per instrument). Purpose, for either pulse output or alarm output. Signal: VON:2.5VAC/DC/max.100mA, VOFF: 260VAC/DC max. Configuration, by means of the front key-pad. Function: the outputs can work as alarm outputs but also as pulse outputs, remote controlled outputs, or in any other combination. Alarms: up alarm and down alarm linked to the virtual alarms. Min. response time ≤200ms, filters excluded. Set-point on-time delay: "0 s". Pulse: signal retransmission: Total: +kWh, -kWh, +kvarh, -kvarh. Partial: +kWh, -kWh, +kvarh, -kvarh. Pulse duration, programmable from 0.001 to 10.00 kWh/kvarh per pulse. ≥100ms <120msec (ON), ≥120ms (OFF), according to EN62052-31. Remote controlled outputs: the activation of the outputs is managed through the serial communication port.

Uscite statiche (M O 02). Tipo Opto-Mosfet. Uscite fisiche 2 (max. un modulo per strumento). Utilizzo, uscita allarme o impulsi. Segnale VON: 2,5VAC/CC/max. 100mA. VOFF: 260VCA/CC max. Configurazione, mediante tastiera frontale.

Funzione: l'uscita può funzionare come uscita allarme ma anche come uscita impuls, controllo remoto o in qualsiasi altra combinazione. Allarme in salita, allarme in discesa associate agli allarmi virtuali. Tempo min di risposta: ≤200ms, filtro escluso. Ritardo all'attivazione: "0 s". Impulsi, ritrasmissione segnale totale: +kWh, -kWh, +kvarh, -kvarh. Parziale: +kWh, -kWh, +kvarh, -kvarh. La lista di variabili può essere associata ad ogni uscita. Durata impulso programmabile da 0,001 a 10,00 kWh/kvarh per impulso. ≥100ms <120msec (ON), ≥120ms (OFF), secondo EN62052-31. Controllo remoto, l'attivazione delle uscite è gestita mediante la porta seriale di comunicazione.

Uscite statiche (M O 02). Tipo Opto-Mosfet. Uscite fisiche 2 (max. un modulo per strumento). Utilizzo, uscita allarme o impulsi. Segnale VON: 2,5VAC/CC/max. 100mA. VOFF: 260VCA/CC max. Configurazione, mediante tastiera frontale.

Funzione: l'uscita può funzionare come uscita allarme ma anche come uscita impuls, controllo remoto o in qualsiasi altra combinazione. Allarme in salita, allarme in discesa associate agli allarmi virtuali. Tempo min di risposta: ≤200ms, filtro escluso. Ritardo all'attivazione: "0 s". Impulsi, ritrasmissione segnale totale: +kWh, -kWh, +kvarh, -kvarh. Parziale: +kWh, -kWh, +kvarh, -kvarh. La lista di variabili può essere associata ad ogni uscita. Durata impulso programmabile da 0,001 a 10,00 kWh/kvarh per impulso. ≥100ms <120msec (ON), ≥120ms (OFF), secondo EN62052-31. Controllo remoto, l'attivazione delle uscite è gestita mediante la porta seriale di comunicazione.

20mA analogue outputs (M O A2). Number of outputs 2 (max. one module per instrument). Accuracy (@ 25°C ±5°C, R.H. <60%) ±0,2%FS. Range 0 to 20mA. Configuration: by means of the front key-pad. Signal retransmission: the signal output can be connected to any instantaneous variable available. Scaling factor: programmable within the whole range of retransmission; it allows the retransmission management of all values from 0 to 20 mA. Response time ≤400 ms typical (filter excluded). Ripple ≤1% (according to IEC 60688-1, EN 60688-1). Total temperature drift ≤500 ppm/C. Load≤600Ω.

10VDC analogue outputs (M O V2). Number of outputs 2 (max. one module per instrument). Accuracy (@ 25°C ±5°C, R.H. ≤60%) ±0,2%FS. Range 0 to 10 VDC. Configuration: by means of the front key-pad. Signal retransmission: the signal output can be connected to any instantaneous variable available. Scaling factor: programmable within the whole range of retransmission; it allows the retransmission management of all values from 0 to 20 mADC. Response time ≤400 ms typical (filter excluded). Ripple ≤1% (according to IEC 60688-1, EN 60688-1). Total temperature drift ≤500 ppm/C. Load≤600Ω.

Uscita analogica 20mA (M O A2). Numero di uscite 2 (max. un modulo per strumento). Precisione (@ 25°C ±5°C, R.H. ≤60%) ±0,2%FS. Campo da 0 a 20mA. Configurazione: mediante tastiera frontale. Ritrasmissione segnale, il segnale d'uscita può essere associato ad ogni variabile istantanea disponibile. Fattore di scala programmabile all'interno di tutto il campo di ritrasmissione; permette la gestione della ritrasmissione di tutti i valori da 0 a 20 mA. Tempo di risposta ≤400 ms tipico (filtro escluso). Ripple ≤1% (secondo IEC 60688-1, EN 60688-1). Deriva termica totale ≤500 ppm/C. Carico ≤600Ω.

20mA Analogue outputs (M O A2). Anzahl der Ausgänge 2 (max. 1 Modul pro Netzwerk). Genauigkeit (bei 25°C ±5°C, R.F. ≤60%) ±0,2%BE. Bereich: 0 bis 20mA. Konfiguration, Durch die vordere Tastatur. Signalweiterübertragung: Der Signalausgang kann mit einer beliebigen unmittelbaren Variable. Skalierungsfaktor: Programmierbar innerhalb des gesamten Bereichs der Weiterübertragung; gestaltet die Verwaltung der Weiterübertragung aller Werte von 0 bis 20 mADC. Ansprechzeit ≤400 ms typisch (ohne Filter). Wellenform: ≤1% (gemäß IEC 60688-1, EN 60688-1). Temperaturdrift insgesamt: ≤500 ppm/C. Letz: ≤600Ω.

10VDC Analogue outputs (M O V2). Anzahl der Ausgänge 2 (max. 1 Modul pro Netzwerk). Genauigkeit (bei 25°C ±5°C, R.F. ≤60%): ±0,2%BE. Bereich: 0 bis 10 VDC. Konfiguration: Durch die vordere Tastatur. Signalweiterübertragung: Der Signalausgang kann mit einer beliebigen unmittelbaren Variable. Skalierungsfaktor: Programmierbar innerhalb des gesamten Bereichs der Weiterübertragung; gestaltet die Verwaltung der Weiterübertragung aller Werte von 0 bis 20 mADC. Tempo di risposta: ≤400 ms tipico (filtro escluso). Ripple: ≤1% (secondo IEC 60688-1, EN 60688-1). Deriva termica totale: ≤500 ppm/C. Carico: ≥10kΩ.

RS485/RS422 port. Type: multidrop, bidirectional (static and dynamic variables). Connections: 2-wire. Max. distance 1000m, termination directly on the module. Addresses: 247, selectable by means of the front key-pad. Protocol: MODBUS/JBUS (RTU). Data (bidirectional), dynamic (reading only). Static (reading and writing only) all the configuration parameters. Data format: 1 start bit, 8 data bit, no/even/odd parity, 1 stop bit. Baud-rate, selectable: 9.6k, 19.2k, 38.4k, 115.2k bit/s. Driver input capability 1/5 unit load. Maximum 160 transceivers on the same bus.

RS232 port (on request). Type: bidirectional (static and dynamic variables). Connections: 3 wires. Max. distance 15m. Protocol: MODBUS RTU /JBUS. Data (bidirectional), dynamic (reading only). Static (reading and writing only), all the configuration parameters. Data format: 1 start bit, 8 data bit, no/even/odd parity, 1 stop bit. Baud-rate, selectable: 9.6k, 19.2k, 38.4k, 115.2k bit/s. Driver input capability 1/5 unit load. Maximum 160 transceivers on the same bus.

Ethernet/Internet port (on request). Protocols: Modbus TCP/IP. IP configuration: Static IP / Netmask / Default gateway. Port selectable (default 502). Client connections: Max 5 simultaneously. Connections: RJ45 10/100 BaseTX. Max. distance 100m. Data (bidirectional): dynamic (reading only) system and phase variables. Static (reading and writing only): all the configuration parameters.

BACnet-IP (on request). Protocols: BACnet-IP (for measurement reading purpose) and Modbus TCP/IP (for measurement reading purpose and for programming parameter purpose). IP configuration: Static IP / Netmask / Default gateway. BACnet-IP Port. Fixed: BAC0h. Modbus Port Selectable (default 502). Client connections: modbus only; max 5 simultaneously. Connections: RJ45 10/100 BaseTX. Max. distance 100m. Data dynamic (reading only). System and phase variables

(Static (reading and writing only), all the configuration.

Operating temperature -25°C to +55°C (-13°F to 131°F) (R.H. from 0 to 90% non-condensing, at 40°C) according to EN62053-21, EN50470-1 and EN62053-23.

Storage temperature -30°C to +70°C (-22°F to 158°F) (R.H. < 90% non-condensing) according to EN62053-21, EN50470-1 and EN62053-23. Installation category Cat. III (IEC60664, EN60664).

Dielectric strength 4000 VRMS for 1 minute. **Noise rejection CMRR 100 dB**, 48 to 62 Hz. **EMC** according to EN62052-11. **Lagertemperatur**: -30°C bis +70°C (-22°F bis 140°F) (R.F. < 90% ohne Kondensat bei 40°C) secondo EN62053-21 und EN62053-23. **Categoria di installazione**: Cat. III (IEC60664, EN60664). **Isolamento (per 1 minuto)** 4000 VRMS tra ingressi di misura ed alimentazione. 4000 VRMS tra alimentazione e RS485/uscite digitali. **Rigidità dielettrica**: 4000 VRMS per 1 minuto. **Reiezione** CMRR 100 dB, da 48 a 62 Hz. **EMC** secondo EN62052-11. Scariche elettrostatiche 15kV scarica in aria; Immunità campi elettromagnetici irradianti, provato con corrente applicata: 10V/m da 80 a 2000MHz; provato senza corrente applicata: 30V/m da 80 a 2000MHz. Immunità ai transitori veloci, sui circuiti degli ingressi di misura in corrente e tensione: 4kV. Immunità ai radiodisturbi condotti: 10V/m da 150kHz a 80MHz. Immunità ad impulso, sui circuiti degli ingressi di misura in corrente e tensione: 4kV; sull'alimentazione "L": 1kV. Emissioni in radiofrequenza: secondo CISPR 22. **Conformità alle norme**: sicurezza IEC60664, IEC61010-1 EN60664, EN61010-1 EN62052-11. Metrologia: EN62053-21, EN50470-1, EN62053-23. **Installationskategorie**: Kat. III (IEC60664, EN60664). **Durchschlagfestigkeit**: 4kVAC RMS für 1 Minute. **Rauschdrückungsverhältnis**: GTUV 100 dB, 48 bis 62 Hz. **EMC**: According to EN62052-11. Elektrostatische Entladungen: 15kV air discharge; Strahlungsmimmunität: Test mit angelegten Strom: 10V/m von 80 bis 2000MHz; Elektromagnetfeld. Test ohne angelegten Strom: 30V/m von 80 bis 2000MHz. Ladungsimpuls: Am Strom- und Eingangsspannungsmesskreis: 4kV. Leiterstörungsmimmunität: 10V/m von 150kHz bis 80MHz. Überspannungsfestigkeit: Strom- und Eingangsspannungsmesskreis: 4kV; an „L“ Hilfstromversorgungseingang: 1kV; Störstrahlung Gemäß CISPR 22.

Sicherheit: IEC60664, IEC61010-1 EN60664, EN61010-1 EN62052-11. Messungen: EN62053-21, EN62053-23, EN50470-3. **Mittel**: MID "Anhang MI-003". **Impulsausgang**: DIN43864, IEC62053-31. **Zulassungen**: CE, cULus "Listed".

Anschlüsse: Schraubklemmen, Kabelquerschnitt: 2,5 mm². Min./Max. Anzugsmoment: 0,4 Nm / 0,8 Nm. Coupling moment: 0,4 Nm / 0,8 Nm. Dimensions (LxHxD): "A" and "B": 89,5x63x16mm. Modulo tipo "C": 89,5x63x20mm. Ingombro massimo dietro il pannello: C03 3 moduli (A+B+C): 81,7 mm. Materiale: nylon PA66, autoextinguibile: UL 94 V-0. Montaggio a pannello. **Grado di protezione**: frontale: IP65, NEMA4x, NEM12. Morsetti: IP20.

Protection degree, front: IP65, NEMA4x, NEM12. Screw terminals: IP20.

ITALIANO

Uscite relè (M O R2). Uscite fisiche, 2 (max. un modulo per strumento). Utilizzo, uscita allarmi o impulsi. Relè, tipo SPDT, CA 1-5A @ 250VCA; CA 15-1,5A @ 250VAC; AC 15-1,5A @ 250VAC, DC 12-5A @ 24VDC; DC 13-1,5A @ 24VDC. Configuration, mediante tastiera frontale. Funzione, l'uscita può funzionare come uscita allarme ma anche come uscita impuls, controllo remoto o in qualsiasi altra combinazione. Allarme in salita, allarme in discesa associate agli allarmi virtuali. Tempo min di risposta: ≤200ms, filters excluded. Set-point on-time delay: "0 s". Pulse: signal retransmission: Total: +kWh, -kWh, +kvarh, -kvarh. Partial: +kWh, -kWh, +kvarh, -kvarh. Pulse duration, programmable from 0.001 to 10.00 kWh/kvarh per pulse. ≥100ms <120msec (ON), ≥120ms (OFF), according to EN62052-31. Remote controlled outputs: the activation of the outputs is managed through the serial communication port.

Uscite statiche (M O 02). Tipo Opto-Mosfet. Uscite fisiche 2 (max. un modulo per strumento). Utilizzo, uscita allarme o impulsi. Segnale VON: 2,5VCA/CC/max. 100mA. VOFF: 260VCA/CC max. Configurazione, mediante tastiera frontale.

Funzione: l'uscita può funzionare come uscita allarme ma anche come uscita impuls, controllo remoto o in qualsiasi altra combinazione. Allarme in salita, allarme in discesa associate agli allarmi virtuali. Tempo min risposta: ≤200ms, filtro escluso. Ritardo all'attivazione: "0 s". Impulsi, ritrasmissione segnale totale: +kWh, -kWh, +kvarh, -kvarh. Parziale: +kWh, -kWh, +kvarh, -kvarh. Pulse duration, programmabile da 0,001 a 10,00 kWh/kvarh per impulso. ≥100ms <120msec (ON), ≥120ms (OFF), secondo EN62052-31. Controllo remoto, l'attivazione delle uscite è gestita mediante la porta seriale di comunicazione.

Uscite statiche (M O 02). Tipo Opto-Mosfet. Uscite fisiche 2 (max. un modulo per strumento). Utilizzo, uscita allarme o impulsi. Segnale VON: 2,5VCA/CC/max. 100mA. VOFF: 260VCA/CC max. Configurazione, mediante tastiera frontale.

Funzione: l'uscita può funzionare come uscita allarme ma anche come uscita impuls, controllo remoto o in qualsiasi altra combinazione. Allarme in salita, allarme in discesa associate agli allarmi virtuali. Tempo min risposta: ≤200ms, filtro escluso. Ritardo all'attivazione: "0 s". Impulsi, ritrasmissione segnale totale: +kWh, -kWh, +kvarh, -kvarh. Parziale: +kWh, -kWh, +kvarh, -kvarh. Pulse duration, programmabile da 0,001 a 10,00 kWh/kvarh per impulso. ≥100ms <120msec (ON), ≥120ms (OFF), secondo EN62052-31. Controllo remoto, l'attivazione delle uscite è gestita mediante la porta seriale di comunicazione.

Uscite statiche (M O 02). Tipo Opto-Mosfet. Uscite fisiche 2 (max. un modulo per strumento). Utilizzo, uscita allarme o impulsi. Segnale VON: 2,5VCA/CC/max. 100mA. VOFF: 260VCA/CC max. Configurazione, mediante tastiera frontale.

Funzione: l'uscita può funzionare come uscita allarme ma anche come uscita impuls, controllo remoto o in qualsiasi altra combinazione. Allarme in salita, allarme in discesa associate agli allarmi virtuali. Tempo min risposta: ≤200ms, filtro escluso. Ritardo all'attivazione: "0 s". Impulsi, ritrasmissione segnale totale: +kWh, -kWh, +kvarh, -kvarh. Parziale: +kWh, -kWh, +kvarh, -kvarh. Pulse duration, programmabile da 0,001 a 10,00 kWh/kvarh per impulso. ≥100ms <120msec (ON), ≥120ms (OFF), secondo EN62052-31. Controllo remoto, l'attivazione delle uscite è gestita mediante la porta seriale di comunicazione.

Uscite statiche (M O 02). Tipo Opto-Mosfet. Uscite fisiche 2 (max. un modulo per strumento). Utilizzo, uscita allarme o impulsi. Segnale VON: 2,5VCA/CC/max. 100mA. VOFF: 260VCA/CC max. Configurazione, mediante tastiera frontale.

Funzione: l'uscita può funzionare come uscita allarme ma anche come uscita impuls, controllo remoto o in qualsiasi altra combinazione. Allarme in salita, allarme in discesa associate agli allarmi virtuali. Tempo min risposta: ≤200ms, filtro escluso. Ritardo all'attivazione: "0 s". Impulsi, ritrasmissione segnale totale: +kWh, -kWh, +kvarh, -kvarh. Parziale: +kWh, -kWh, +kvarh, -kvarh. Pulse duration, programmabile da 0,001 a 10,00 kWh/kvarh per impulso. ≥100ms <120msec (ON), ≥120ms (OFF), secondo EN62052-31. Controllo remoto, l'attivazione delle uscite è gestita mediante la porta seriale di comunicazione.

Uscite statiche (M O 02). Tipo Opto-Mosfet. Uscite fisiche 2 (max. un modulo per strumento). Utilizzo, uscita allarme o impulsi. Segnale VON: 2,5VCA/CC/max. 100mA. VOFF: 260VCA/CC max. Configurazione, mediante tastiera frontale.

Funzione: l'uscita può funzionare come uscita allarme ma anche come uscita impuls, controllo remoto o in qualsiasi altra combinazione. Allarme in salita, allarme in discesa associate agli allarmi virtuali. Tempo min risposta: ≤200ms, filtro escluso. Ritardo all'attivazione: "0 s". Impulsi, ritrasmissione segnale totale: +kWh, -kWh, +kvarh, -kvarh. Parziale: +kWh, -kWh, +kvarh, -kvarh. Pulse duration, programmabile da 0,001 a 10,00 kWh/kvarh per impulso. ≥100ms <120msec (ON), ≥120ms (OFF), secondo EN62052-31. Controllo remoto, l'attivazione delle uscite è gestita mediante la porta seriale di comunicazione.

Uscite statiche (M O 02). Tipo Opto-Mosfet. Uscite fisiche 2 (max. un modulo per strumento). Utilizzo, uscita allarme o impulsi. Segnale VON: 2,5VCA/CC/max. 100mA. VOFF: 260VCA/CC max. Configurazione, mediante tastiera frontale.

Funzione: l'uscita può funzionare come uscita allarme ma anche come uscita impuls, controllo remoto o in qualsiasi altra combinazione. Allarme in salita, allarme in discesa associate agli allarmi virtuali. Tempo min risposta: ≤200ms, filtro escluso. Ritardo all'attivazione: "0 s". Impulsi, ritrasmissione segnale totale: +kWh, -kWh, +kvarh, -kvarh. Parziale: +kWh, -kWh, +kvarh, -kvarh. Pulse duration, programmabile da 0,001 a 10,00 kWh/kvarh per impulso. ≥100ms <120msec (ON), ≥120ms (OFF), secondo EN62052-31. Controllo remoto, l'att