# ENERGY PLUS

## ANALIZADOR DE RED MONOFÁSICO AC / DC (TRMS)

VAC IDC COSφ VRMS ARMS W HZ KW/H

10A
600Vac
1000Vdc

ac ~ dc =
V, i
RS485
USB
24V AC/DC

SOFTWARE DE CONFIGURACIÓN GRATUITO

REGISTRADOR POR PENDRIVE

Conexión microUSB

PROGRAMACIÓN POR CABLE

i ..10A

AC/DC ENTRADAS

V ..600VAC ..1000VDC

SALIDAS

0-4/20mA

RS485

0/10V

RELÉ

ALIMENTACIÓN 24VDC-AC

CARACTERÍSTICAS

- Analizador de red monofásico AC/DC (TRMS) aislado.
- Convertidor de señal 1000VDC / 600VAC, 10A AC/DC. ** versión -L (100VDC / 60VAC).*
- Medición de energía, tensión, intensidad, potencia, frecuencia, ..
- Configurable a través de USB, mediante software gratuito.
- Montaje en raíl DIN. Bornas enchufables.
- Alimentación 24VAC/DC.
- Salidas: analógica, de contacto de alarma y Modbus RS485.
- Registrador a través de memoria externa USB y posibilidad de descarga de datos en formato Excel.
- Reloj RTC integrado, con tiempo real.

Remberg®

# CONEXIONADO y CARACTERÍSTICAS

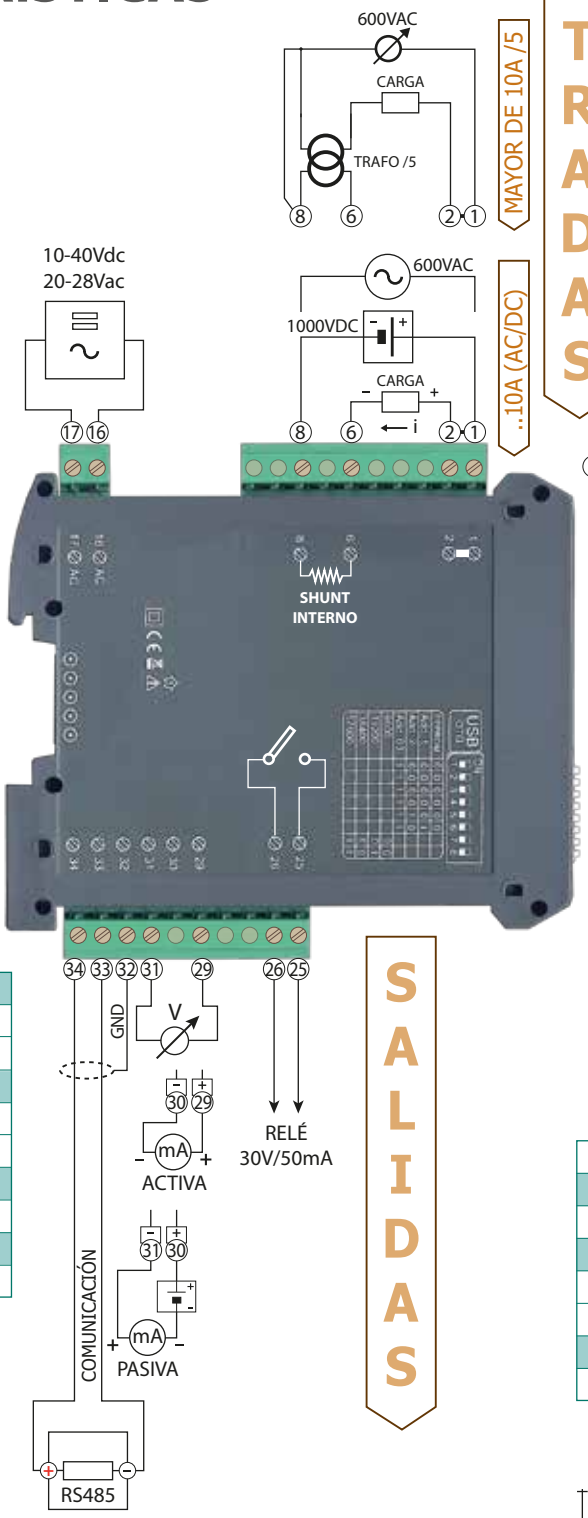
## ENTRADA

| TENSIÓN | versión -L |
|---|---|
| 0.. 1000Vcc / ..600Vac | 0.. 100Vcc / ..60Vac |
| **INTENSIDAD** | |
| 0.. 10A (AC) / 0.. 10A (DC) | |
| mayores DE 10A (AC) TRAFO /5 | |

## ALIMENTACIÓN

| | |
|---|---|
| DC | 10.. 40Vdc |
| AC | 20.. 28Vac |

**24VAC/DC**




## AISLAMIENTO

| |
|---|
| ENTRADA |
| ALIMENTACIÓN |
| RS485 Y USB |
| SALIDA ANALÓGICA Y DIGITAL |

4 vías

## REGISTRADOR CON RELOJ

** Pendrive opcional*

Pendrive micro USB
Exportación a Excel
(formato .csv)

## AMBIENTALES

| | |
|---|---|
| Temperatura de trabajo | - 15/+65ºC |
| Temperatura de almacenamiento | - 40/+85ºC |

| INTENSIDAD Pasiva / Activa | |
|---|---|
| 0-4/20mA configurable | |
| Resistencia de carga máxima | 600Ohm |
| **TENSIÓN** | |
| 0/10V configurable | |
| Resistencia de carga mínima | 2KOhm |
| **Relé de alarma** | |
| 30V/50mA SPDT programable por software | |
| **RS485 Modbus** | |
| Configurable | |

## SALIDA

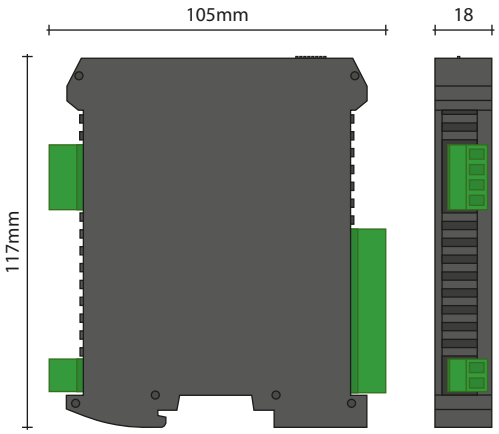
## FORMATO

| | |
|---|---|
| Protección | IP20 |
| Clase de combustibilidad Vo según UL94 | |
| Caja Ergonómica. Montaje rápido raíl EN50022 | |
| Material Poliamida | PA6.6 |
| Conexión: bornas enchufables por tornillo | |
| par de apriete tornillos(M3) | 0,5Nm |
| Cable conexión: <2,5mm², 12AWG 250V/12A | |
| Peso | 90 grs |


*configuración para programar (neutra)*

## INDICACIÓN DE LEDS

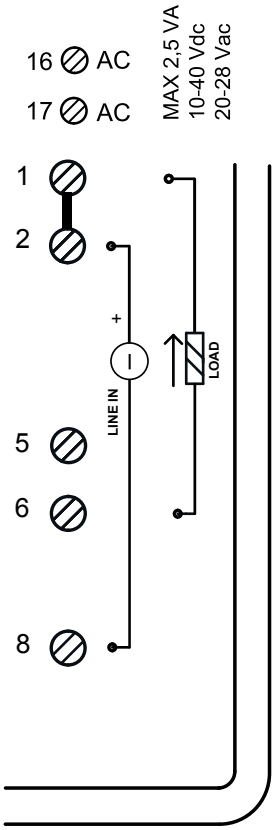
- **POWER** Alimentación correcta
- **FAIL** Fallo en el equipo
- **Rx / Tx** Comunicación RS485 activa (led parpadeante)
- **DOUT** Salida digital activa



## DESCRIPTION:

The ENERGY Plus is an isolated VOLTAGE and CURRENT converter and SINGLE PHASE NETWORK ANALYZER. The module has a programmable analog output (voltage or current) and a digital output (optomos). Thanks to the presence of the RS485 serial port can perform advanced functions such as I / O Module with Modbus RTU protocol. The ENERGY Plus behaves as a slave device by placing Current or Voltage Input, n°1 AO and n°1 DO.

## ELECTRICAL CONNECTIONS



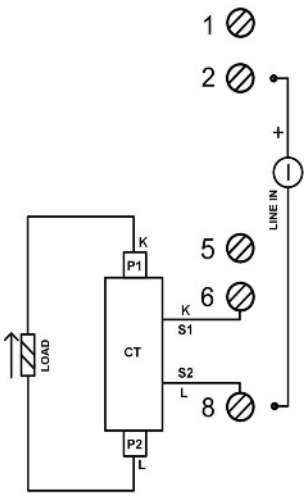

**POWER SUPPLY:**

10...40 Vdc or 20...28 Vac - Connectors 16 and 17, or by T-BUS connector (optional tool) on the base of the module (see the picture placed on the bottom of this page).

**VOLTAGE/CURRENT INPUT (DIRECT INSERTION):**

the input Voltage (LINE) has to be connected on terminals 2 (+) and 8, the Load has to be connected on terminals 1 (+) and 6.
FOR VOLTAGE: up to 600 VAC, 1000 VDC (up to 60 VAC, 100 VDC for LV version).
FOR CURRENT: up to 10 A AC/DC.
You can set the measurement range as per your need using the software or by RS485 using the modbus registers.

**INSERTION WITH EXTERNAL CURRENT TRANSFORMER (CT):**



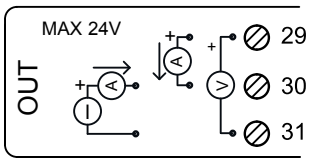

The input Voltage (LINE) has to be connected on terminals 2 (+) and 8 (as for the direct insertion).

The external CT (current transformer), must be connected as follows:

- S1 terminal of the CT connected to the terminal 6;
- S2 terminal of the CT connected to the terminal 8.

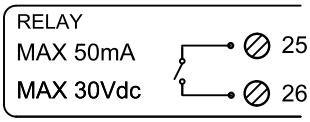
For the connection of the LOAD to the CT, follow the wiring diagram on the left side (INPUT P1 side and OUTPUT P2 side.

***WITH THIS CONFIGURATION, SET THE CURRENT RATIO VIA FACILE SOFTWARE (SEE PAGE 3)***.



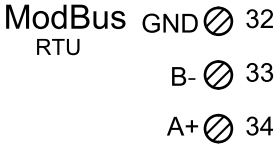

**ANALOG OUTPUT:**

for Voltage analog output, connect terminals 31 and 29 (positive).
For ACTIVE current analog output, connect terminals 29 (positive) and 30. For PASSIVE current analog output, connect terminals 30 (positive) and 31. Analog output supply: 13 Vdc, max 30 mA.



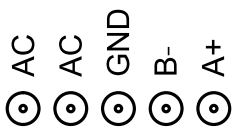

**DIGITAL OUTPUT:**

relay Output is an Optomos contact. Connection are with terminals 25 and 26. The contact can be used like an pulse output (you can set by FACILE the value of the pulse) or like Alarm contact (you can set the associated parameter by FACILE).




**SERIAL OUTPUT RS485:**

available on connectors 32 (GND), 33 (B-), 34 (A+), or by T-BUS connector to be mounted on the module.




**T-BUS CONNECTION** (OPTION), needs T-BUS connector:

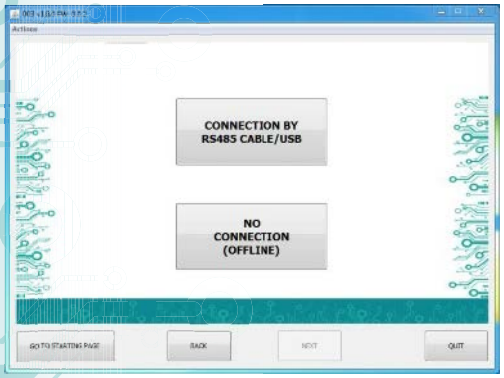
it may be affixed to the accessory T-BUS based on the module to bring both power and serial communication. The number of modules supported by the bus is a function of the power supply used (check the absorption of the modules).

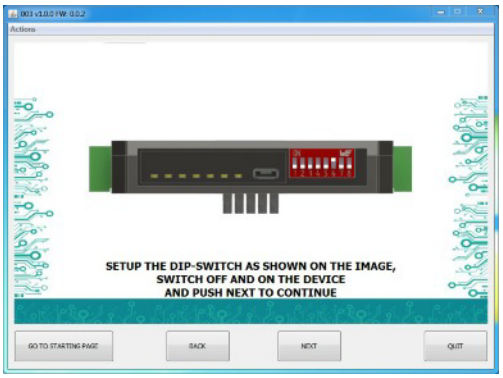
## SETTING THE DEVICE VIA SOFTWARE

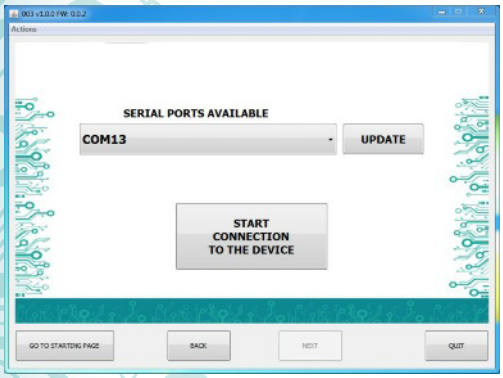
The programming of the module may be performed in two different ways:

- via the free interface program through the microUSB port on the module or via RS485 connection;
- via the RS485 serial connection (from terminal or T-Bus).

The ENERGY Plus has two microprocessors, you can configure the module by connecting it to the USB port of your PC without the power lead, this is possible because the microprocessor that manages the configuration is powered directly from the USB port.



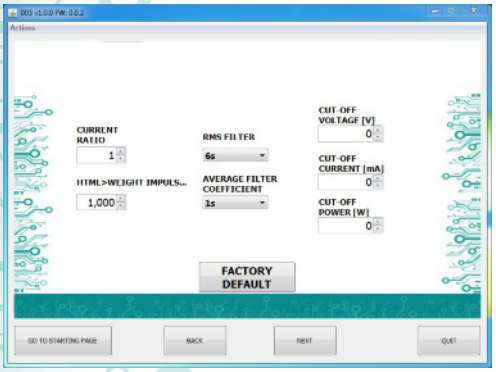




It is possible to use the program without connecting to the module, in this mode you can SAVE the configuration on your PC, which can then be sent to the ENERGY Plus at a later time.

**SERIAL PORTS AVAILABLE:**

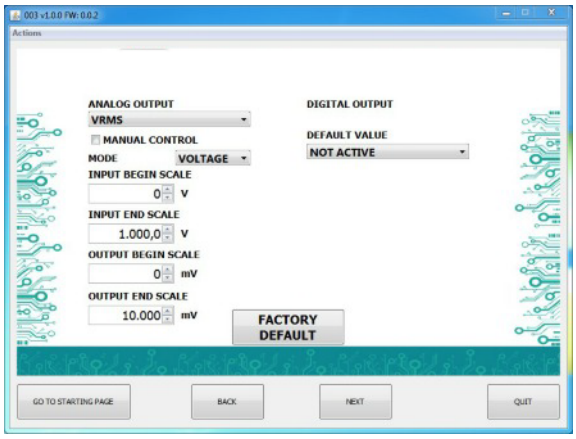
Check the available COM ports, press the UPDATE button. Your PC will assign a virtual COM connection with the ENERGY Plus. Press START CONNECTION WITH THE DEVICE. It will confirm you the connection was successful with the module. If the connection does not happen, please check the RS485 serial connection (A +, B-), the position of the dip-switches (switching off and on the device) and the COM generated automatically by the device. After connecting, you can proceed with the configuration of the device.

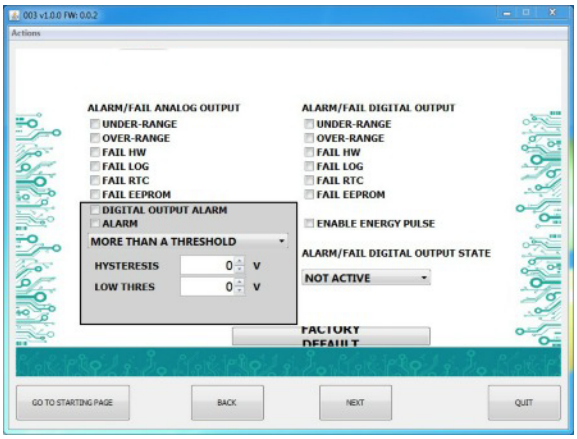



**CURRENT RATIO, PULSE MANAGEMENT, FILTERS & CUT-OFF SETTINGS:**

This step on the software allow to
to define the Current Ratio by setting “CURRENT RATIO”.
The Pulse weight of the digital output can be setted by the WEIGHT IMPULSE FOR ENERGY CALC (Wh).
RMS FILTER and AVERAGE FILTER COEFFICIENT are two different types of filters that allow you to introduce a delay of the answer in order to have more stabilty of the reading.
CUT OFF settings: you can set the cut off values for VOLTAGE, CURRENT and POWER measurement. Under these value setted the measurement will be Zero.

## SETTING THE DEVICE VIA SOFTWARE




**FAIL MESSAGE / ANOMALY:**

**FAIL HW:** problems in the measurement chain (electrical connections, microprocessor that manages the measurement, sensor disconnected or faulty).
**FAIL LOG:** problem on recording data (without the availability of stick usb memory stick usb not recognized).
**FAIL RTC:** problem on backup battery (dead or defective).
**FAIL EEPROM:** problem microprocessor configuration (not calibrated module, takes no configuration).

**MODBUS COMUNICATION:**

This is the last window of the device configuration. The left column contains the parameters to be set for the communication speed BAUDRATE (from 1200 to 115200), the PARITY (None, Odd, Even), the STOP BIT (1 or 2), the Modbus address to be assigned to the device. You do not need to configure these parameters for the use of the module with digital / analog output. It is possible to use the module with RS485 serial output with Modbus output analog and digital simultaneously.

**LOGGING :**

On the right side of the window you can enable the feature LOG for the acquisition of data on usb pendrive. You can name the log file by associating the extension .Xls, .Xlsx, .Csv, .Txt, .Dat, .Logs. The default file is in text format. The minimum sampling time is 1 second, the maximum is about 18 hours.

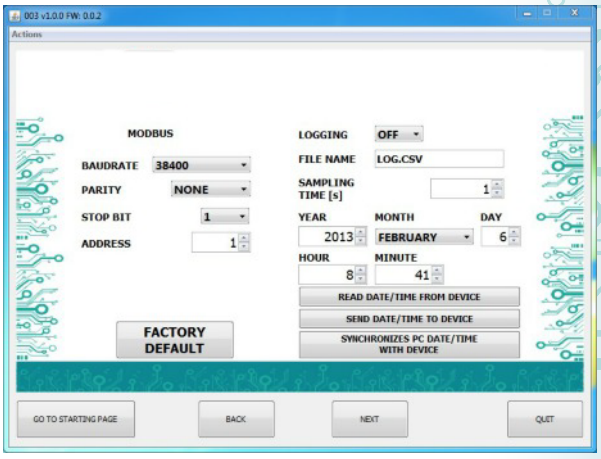
**ANALOG OUTPUT:** the first drop-down menu in the upper left allow you to associate the analog output to a single selectable **Vrms, Irms, Active Power, Reactive Power, Apparent Power, Cosφ, Frequency**. The mode of the analog output is VOLTAGE or CURRENT. The ENERGY Plus as the ability to scale the input and output as required, then select the measurement range of input (INPUT BEGIN SCALE and INPUT END SCALE) to assign to the analog output signal (OUTPUT BEGIN SCALE and OUTPUT END SCALE ). Depending on the choices made in the two menu will change the units of measurement values in the input and output. If you select the MANUAL CONTROL (via modbus), you can manage the module as if it were an AO (Analog Output), thus freeing the analog output from the input selected. The analog output will be handled via RS485 Modbus RTU (see register map).

**DIGITAL OUTPUT**: the digital output default set is NOT ACTIVE. If you want to ACTIVE the digital output please set it on the right window.

**ALLARM / FAIL ANALOG OUTPUT:** it is possible to use the analog output to control any supervening anomaly Hardware HW FAIL, FAIL RTC Real Time Clock anomaly that stores the date and time, FAIL EEPROM for the anomaly on the microprocessor, FAIL LOG if an anomaly occurred during data acquisition, UNDER RANGE scale of measurement set, OVER RANGE scale of measurement set. It is possible to select multiple items in the menu. In case of alarm the analog output will go to 21 mA or 10.5 V depending on the selection made in the previous window.

**ALARM WINDOW:** you can activate the ALARM functionality (in the gray box), on the digital output or on the analog output, or both simultaneously. In this window you can manage HOW and WHEN activate the alarm by selecting the options from the dropdown menu: MORE THAN A THRESHOLD, LESS THAN A THRESHOLD, NOT BETWEEN TWO THRESHOLD, BETWEEN TWO THRESHOLD. We therefore have the possibility to insert the values of THRESHOLD and the value of HYSTERESIS. In the case where it is selected the value of a ***Higher threshold*** when the signal falls below, the alarm switched off at the threshold value minus the value of hysteresis. In the event that you have chosen the value of a ***Minor threshold***, when the value exceeds the threshold plus the hysteresis value, the alarm is disactivated. In the case where it is selected ***between two thresholds***, the hysteresis is external. In case you have selected ***Not included between two thresholds***, the hysteresis is internal.

**ALARM / FAIL DIGITAL OUTPUT:** it is possible to use the digital output to control any supervening anomaly Hardware HW FAIL, FAIL RTC Real Time Clock anomaly that stores the date and time, FAIL EEPROM for the anomaly on the microprocessor, FAIL LOG if an anomaly occurred during data acquisition, UNDER RANGE scale of measurement set, OVER RANGE scale of measurement set. It is possible to select multiple items in the menu. By clicking on the "ENABLE ENERGY PULSE" is enabled the pulse. STATE DIGITAL ALARM / FAIL allows you to define the status of contact in case of alarm (NOT ACTIVE or ACTIVE).



# DATALOGGER

| Serial Number | Data (yyyy-mm-dd) & Time | Status ID | Vpk | Ipk | Vrms | Irms | P | Q | S | Cosφ | Freq Total | Energy | Energy + | Energy - | Outpul Value | Output Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12345678 | 2015/03/12-14-23-25 | 0 | 270 | 0 | 123 | | 85,7 | | | 0,91 | 52 | 21 | 0 | | | |
| 12345678 | 2015/03/12-14-23-26 | 0 | 270 | 0 | 123 | | 88,3 | | | 0,92 | 52,6 | 21 | 0 | | | |
| 12345678 | 2015/03/12-14-23-27 | 0 | 273 | 0 | 123 | | 87,8 | | | 0,92 | 52,4 | 21 | 0 | | | |
| 12345678 | 2015/03/12-14-23-28 | 0 | 273 | 0 | 123 | | 88,1 | | | 0,93 | 52,1 | 21 | 0 | | | |

The ENERGY Plus provides, on a local memory type PEN DRIVE USB (USB KEY) connected to the module via the microusb port, a series of information concerning the operation of the module, alarm status, type of input, the output type, the reading of the measured data, the measure of the output value from the module.

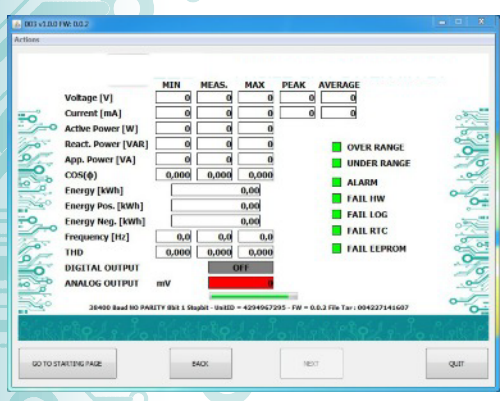
For each row correspond to a precise time reference. The module is equipped with an RTC Real Time Clock powered by a backup battery that lets you record data with YEAR / MONTH / DAY / HOUR-MIN-SEC.

The first number listed is the **SERIAL NUMBER** of the module, which allows it to be uniquely identified.

The second column give you information about: **DATE** (YEAR / MONTH / DAY / HOUR-MIN-SEC).

It is then reported the **STATUS ID** (Registry STATE) in binary mode to 16 bit. The binary number corresponds to the Modbus register 40005 that represents the state of the machine (Status: bit 0 = fail global, bit 1 = alarm, bit 2 = over range, bit 3 = under range, bit 4 = ?, bit 5 = dout status, bit 6 = fail hw, bit 7 = fail log, bit 8 = fail rtc, bit 9 = fail eeprom).

The following coloumns are **Vpk, Ipk, Vrms, Irms, Active Power (P), Reactive Power (Q), Apparent Power (S), Cosφ, Frequency, Energy Total, Energy +, Energy -, Output Value, Output type** ( bit 0=Voltage/Current, bit 1-4=input Vrms, Irms, Active Power, Reactive Power, Apparent Power, Cosφ, Frequency, bit 5 = fail ur, bit 6 = fail or, bit 7 = fail hw, bit 8 = fail log, bit 9 = fail rtc, bit 10 = fail eeprom, bit 11 = fail alarm, bit 12-13 = 1 threshold over/1 threshold min/2 thresholds external/2 threshold internal, bit 14 = Manual mode), this value follows the setting made via software or via RS485.

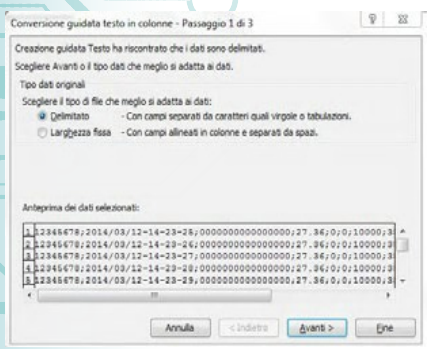


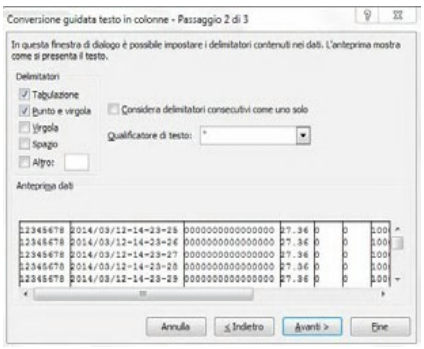

LIVE DATA USING SOFTWARE

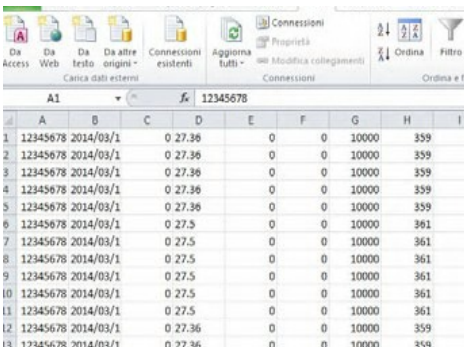
once confirmed the configuration, the software allow you to see the data reading by the device directly. Please remind that you have to supply the device by external power supply .

**HOW TO IMPORT LOG DATA FROM EXCEL VERSION BEFORE 2003:**

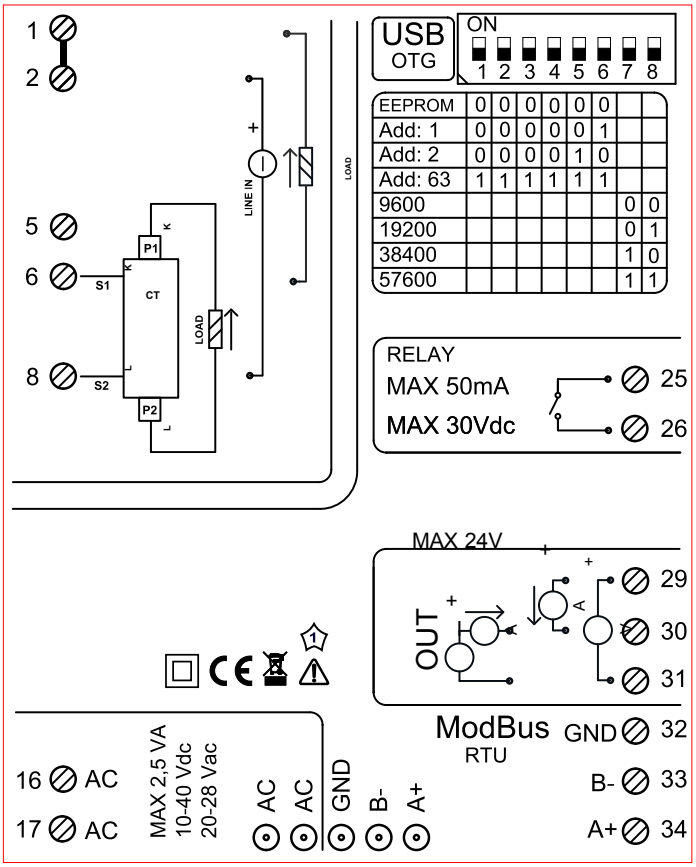
it's possible to import the data stored on the USB Memory Stick at any time (even if the log is not finished). Once you open the file with Excel (or Open Office), you will have to act on the functionality of the program for wrapping the data as described above. To do this, you can perform the following steps: select the first column, go to the option data, click on TEXT COLUMN, then choose the option that provides for the separation of the data by tabs or commas, the next step endorse the option POINT and COMMA.



## QUICK GUIDE




### MODBUS ADDRESS CONFIGURATION AND BAUD RATE BY DIP-SWITCH

Through the dip-switch on the front panel of the module, you can change the Modbus address and baud rate.
In the case in which all the dip switches are set to zero, the module will take the calibration from EEPROM, otherwise it will take parameters from a dip-switch.
In order to assign addresses more than 62 assignments you need to take advantage of the interface software
In order to assign values of
baud rates different from those selectable dip you should take advantage of the interface software..
For changing the addresses and the baud rate it can also be done by writing directly on the related registers.

### POWER SUPPLY

10...40 Vdc or 20...28 Vac - Connectors 16 and 17, or by T-BUS connector (optional tool) on the base of the module.

**POWER SUPPLY by T-BUS CONNECTION** (T-BUS connector required):
it is possible to mount the accessory T-BUS to carry both power and serial communication. The number of modules supported by the function of the power supply bus is used (check the absorption of the modules).

### INTERFACE PROGRAM

It is the configuration software for ENERGY Plus module. The software is free and downloadable from the website . To communicate with the module you have to connect via USB port directly on your PC.
You can configure the module via RS485 using the registers' map on the website.


### LEDS - FRONT SIGNALS:

**Power:** power presence on the device.
**Fail:** presence of a failure/error on the device. It is activated in the case have been activated by FAIL messages on software.
One or more events FAIL are active.
**Rx, Tx:** the module is communicating via RS485 (LED blinking).
**Dout:** digital output active.

### MOUNTING INSTRUCTIONS:

To mount the card on DIN rail, we recommend to place the top of the form on the edge of the bar omega, then pushing the bottom until it clicks. The module is equipped with a slider fastening that will be pushed forward in order to ensure the perfect fastening of the module on the bar.

**NOTE:** through the hole on the case of ENERGY Plus (shown in the figure), you can access an internal DIP SWITCH. Turning up the "DIP 1" you can activate the dynamic terminating of the Modbus.

# Modbus Registers Map

| Register Name | Comment | Register Type | R/W | Default Value | Range | Modbus Address |
|---|---|---|---|---|---|---|
| **Machine ID** | Machine ID (1) | Unsigned short | R | 3 | | **40001** |
| **FW version** | Firmware version (0) | Unsigned short | R | | | **40002** |
| **STATUS** | Status : bit 0 = fail global, bit 1 = alarm, bit 2 = overrange, bit 3 = underrange, bit 4= ?, bit 5=dout status, bit 6 = fail hw, bit 7=fail log, bit 8=fail rtc, bit 9=fail eeprom | Unsigned short | R/W | | 0...65535 | **40005** |
| **Output Value** | mV or uA | Unsigned short | R/W | | 0...20000 | **40006** |
| **Digital Output** | bit 0=disabled/enabled | Unsigned short | R/W | 0 | | **40007** |
| **Dip switch status** | bit 0-7=dip switch status, pos 1=bit 7,..., pos 8=bit 0 | Unsigned short | R/W | | | **40008** |
| **Vrms** | Voltage measurement rms (V) | Float (MSW) | R/W | | 0...10000 | **40009** |
| | | | | | | **40010** |
| **Irms** | Current measurement rms (mA) | Float (MSW) | R/W | | 0...14000 | **40011** |
| | | | | | | **40012** |
| **P** | Active Power Measurement (W) | Float (MSW) | R | | | **40013** |
| | | | | | | **40014** |
| **Q** | Reactive Power Measurement (VAR) | Float (MSW) | R | | | **40015** |
| | | | | | | **40016** |
| **S** | Apparent Power Measurement (VA) | Float (MSW) | R | | | **40017** |
| | | | | | | **40018** |
| **Cosφ** | Cosφ Measurement | Float (MSW) | R | | 0...1 | **40019** |
| | | | | | | **40020** |
| **Frequency** | Frequency Measurement (Hz) | Float (MSW) | R | | | **40021** |
| | | | | | | **40022** |
| **THD** | THD Measurement | Float (MSW) | R | | | **40023** |
| | | | | | | **40024** |
| **Energy** | Totale Energy Measurement (Wh) | Float (MSW) | R/W | | | **40025** |
| | | | | | | **40026** |
| **Energy positive** | Only positive Energy Measurement (Wh) | Float (MSW) | R/W | | | **40027** |
| | | | | | | **40028** |
| **Energy negative** | Only negative Energy Measurement (Wh) | Float (MSW) | R/W | | | **40029** |
| | | | | | | **40030** |
| **V peak** | Instantaneous Voltage Peak (V) | Float (MSW) | R/W | | | **40031** |
| | | | | | | **40032** |
| **I peak** | Instantaneous Current Peak (mA) | Float (MSW) | R/W | | | **40033** |
| | | | | | | **40034** |
| **V MAX** | Max RMS Voltage (V) | Float (MSW) | R/W | | | **40035** |
| | | | | | | **40036** |
| **V min** | Min RMS Voltage (V) | Float (MSW) | R/W | | | **40037** |
| | | | | | | **40038** |
| **I MAX** | Max RMS Current (mA) | Float (MSW) | R/W | | | **40039** |
| | | | | | | **40040** |
| **I min** | Min RMS Current (mA) | Float (MSW) | R/W | | | **40041** |
| | | | | | | **40042** |
| **P MAX** | Max RMS Active Power (W) | Float (MSW) | R/W | | | **40043** |
| | | | | | | **40044** |
| **P min** | Min RMS Active Power (W) | Float (MSW) | R/W | | | **40045** |
| | | | | | | **40046** |
| **Q MAX** | Max Reactive Power (VAR) | Float (MSW) | R/W | | | **40047** |
| | | | | | | **40048** |
| **Q min** | Min Reactive Power (VAR) | Float (MSW ) | R/W | | | **40049** |
| | | | | | | **40050** |
| **S MAX** | Max Apparent Power (VA) | Float (MSW ) | R/W | | | **40051** |
| | | | | | | **40052** |
| **S min** | Min Apparent Power (VA) | Float (MSW ) | R/W | | | **40053** |
| | | | | | | **40054** |
| **Cosφ MAX** | Max Cosφ | Float (MSW ) | R/W | | | **40055** |
| | | | | | | **40056** |

# Modbus Register Map

| Register Name | Comment | Register Type | R/W | Default Value | Range | Modbus Address |
|---|---|---|---|---|---|---|
| **Cosφ min** | Min Cosφ | Float (MSW ) | R/W | | | **40057** |
| | | | | | | **40058** |
| **Frequency MAX** | Max Frequency (Hz) | Float (MSW ) | R/W | | | **40059** |
| | | | | | | **40060** |
| **Frequency min** | Min Frequency (Hz) | Float (MSW ) | R/W | | | **40061** |
| | | | | | | **40062** |
| **THD MAX** | Max THD | Float (MSW ) | R/W | | | **40063** |
| | | | | | | **40064** |
| **THD min** | Min THD | Float (MSW ) | R/W | | | **40065** |
| | | | | | | **40066** |
| **Vavg** | V average (V) | Float (MSW ) | R | | | **40067** |
| | | | | | | **40068** |
| **Iavg** | I average (mA) | Float (MSW ) | R | | | **40069** |
| | | | | | | **40070** |
| **Totalizer** | Total Pulse Dout | UINT 32 (MSW) | R | | | **40071** |
| | | | | | | **40072** |
| **data L** | Calibration data L | UINT 16 | R | | | **40073** |
| **data M** | Calibration data M | UINT 16 | R | | | **40074** |
| **data H** | Calibration data H | UINT 16 | R | | | **40075** |
| **Output Analog mode** | bit 0=Voltage/Current, bit 1-4=input Vrms,Irms, Active Power, Reactive Power, Apparent Power, cos (Φ), Frequency, bit 5 = fail ur, bit 6 = fail or, bit 7 = fail hw, bit 8 = fail log, bit 9 = fail rtc, bit 10 = fail eeprom, bit 11 = fail alarm, bit 12-13 = 1 threshold over/1threshold under/2thresholds external/2 thresholds internal , bit 14= Manual mode | UINT 16 | R/W | 0 | | **40101** |
| **Current Ratio** | Current Ratio | Float (MSW ) | R/W | 1 | | **40102** |
| | | | | | | **40103** |
| **Output Analog Input Begin Scale** | Output Analog Input Begin Scale | Float (MSW ) | R/W | 0 | | **40104** |
| | | | | | | **40105** |
| **Output Analog Input End Scale** | Output Analog Input End Scale | Float (MSW ) | R/W | 300 | | **40106** |
| | | | | | | **40107** |
| **Output Analog Begin Scale** | Output Analog Begin Scale | UINT 16 | R/w | 0 | | **40108** |
| **Output Analog End Scale** | Output Analog End Scale | UINT 16 | R/W | 10 | | **40109** |
| **Delta ENERGY** | Delta Energy (Wh) per pulse (50ms) | Float (MSW ) | R/W | 10 | | **40110** |
| | | | | | | **40111** |
| **Digital Output** | bit 0=default value, bit 1 = fail ur, bit 2 = fail or, bit 3 = fail hw, bit 4 = fail log, bit 5 = fail rtc, bit 6 = fail eeprom, bit 7 = fail alarm, bit 8-9 = manual/pulse/fail, bit 10=low/high | UINT 16 | R/W | 0 | | **40112** |
| **ALARM LOW** | Alarm Low Trip value | Float (MSW ) | R/W | 0 | | **40113** |
| | | | | | | **40114** |
| **ALARM HIGH** | Alarm High Trip value | Float (MSW ) | R/W | 0 | | **40115** |
| | | | | | | **40116** |
| **ALARM HYSTERESIS** | Alarm Hysteresis value | Float (MSW ) | R/W | 0 | | **40117** |
| | | | | | | **40118** |
| **Modbus Address + Parity + StopBits** | MSB modbus address, bit 0-1 = parity none/odd/even, bit 2=stop bits 1/2 | UINT 16 | R/W | 260 | | **40119** |
| **Modbus Baudrate** | value 0=1200,1=2400,2=4800,3=9600,4=19200,5=38400,6 =57600,7=115200 | UINT 16 | R/W | 5 | | **40120** |
| **Log Mode** | bit 0=disabled/enabled | UINT 16 | R/W | 0 | | **40121** |
| **Log Sample time** | Log sample time (s) | UINT 16 | R/W | 0 | | **40122** |
| **Log name** | Log name (15caratteri MAX) | UINT 16 | R/W | | | **40123** |
| **Log name** | Log name (15caratteri MAX) | UINT 16 | R/W | | | **40124** |
| **Log name** | Log name (15caratteri MAX) | UINT 16 | R/W | | | **40125** |
| **Log name** | Log name (15caratteri MAX) | UINT 16 | R/W | | | **40126** |
| **Log name** | Log name (15caratteri MAX) | UINT 16 | R/W | | | **40127** |
| **Log name** | Log name (15caratteri MAX) | UINT 16 | R/W | | | **40128** |
| **Log name** | Log name (15caratteri MAX) | UINT 16 | R/W | | | **40129** |
| **Log name** | Log name (15caratteri MAX) | UINT 16 | R/W | | | **40130** |
| **RMS Filter** | Coeff. Filter RMS (0.99990 – 0.99999) | Float (MSW ) | R/W | 0,99990 | | **40131** |
| | | | | | | **40132** |
| **Average measurement filter** | Average measurement filter (0.99990 – 0.99999) | Float (MSW ) | R/W | 0,9990 | | **40133** |
| | | | | | | **40134** |

# Modbus Registers Map

| Register Name | Comment | Register Type | R/W | Default Value | Range | Modbus Address |
|---|---|---|---|---|---|---|
| **Cut off Voltage** | Cut off Voltage (V) | Float (MSW ) | R/W | 0 | | **40135** |
| | | | | | | **40136** |
| **Cut off Current** | Cut off Current (mA) | Float (MSW ) | R/W | 0 | | **40137** |
| | | | | | | **40138** |
| **Cut off P** | Cut off P (W) | Float (MSW ) | R/W | 0 | | **40139** |
| | | | | | | **40140** |
| **Vrms SW** | Vrms (V) | Float (LSW ) | R | | | **40201** |
| | | | | | | **40202** |
| **Irms SW** | Irms (mA) | Float (LSW ) | R | | | **40203** |
| | | | | | | **40204** |
| **P SW** | Active Power (W) | Float (LSW ) | R | | | **40205** |
| | | | | | | **40206** |
| **Q SW** | Reactive Power (VAR) | Float (LSW ) | R | | | **40207** |
| | | | | | | **40208** |
| **S SW** | Apparent Power (VA) | Float (LSW ) | R | | | **40209** |
| | | | | | | **40210** |
| **Cosφ SW** | Cosφ | Float (LSW ) | R | | | **40211** |
| | | | | | | **40212** |
| **Frequency SW** | Frequency (Hz) | Float (LSW ) | R | | | **40213** |
| | | | | | | **40214** |
| **THD SW** | THD | Float (LSW ) | R | | | **40215** |
| | | | | | | **40216** |
| **TOTAL ENERGY SW** | Total Energy (Wh) | Float (LSW ) | R/W | | | **40217** |
| | | | | | | **40218** |
| **Positive Energy SW** | Positive Energy (Wh) | Float (LSW ) | R/W | | | **40219** |
| | | | | | | **40220** |
| **Negative Energy SW** | Negative Energy (Wh) | Float (LSW ) | R/W | | | **40221** |
| | | | | | | **40222** |
| **Vpeak SW** | Vpk (V) | Float (LSW ) | R/W | | | **40223** |
| | | | | | | **40224** |
| **Ipeak SW** | Ipk (mA) | Float (LSW ) | R/W | | | **40225** |
| | | | | | | **40226** |
| **Vrms MAX SW** | Vrms MAX (V) | Float (LSW ) | R/W | | | **40227** |
| | | | | | | **40228** |
| **Vrms min SW** | Vrms MIN (V) | Float (LSW ) | R/W | | | **40229** |
| | | | | | | **40230** |
| **Irms MAX SW** | Irms MAX (A) | Float (LSW ) | R/W | | | **40231** |
| | | | | | | **40232** |
| **Irms min SW** | Irms MIN (mA) | Float (LSW) | R/W | | | **40233** |
| | | | | | | **40234** |
| **P MAX SW** | Active Power MAX (W) | Float (LSW) | R/W | | | **40235** |
| | | | | | | **40236** |
| **P min SW** | Active Power MIN (W) | Float (LSW) | R/W | | | **40237** |
| | | | | | | **40238** |
| **Q MAX SW** | Reactive Power MAX (VAR) | Float (LSW) | R/W | | | **40239** |
| | | | | | | **40240** |
| **Q min SW** | Reactive Power MIN (VAR) | Float (LSW) | R/W | | | **40241** |
| | | | | | | **40242** |
| **S MAX SW** | Apparent Power MAX (VA) | Float (LSW) | R/W | | | **40243** |
| | | | | | | **40244** |
| **S min SW** | Apparent Power MIN (VA) | Float (LSW) | R/W | | | **40245** |
| | | | | | | **40246** |
| **Cosφ MAX SW** | Cosφ MAX | Float (LSW) | R/W | | | **40247** |
| | | | | | | **40248** |
| **Cosφ min SW** | Cosφ min | Float (LSW) | R/W | | | **40249** |
| | | | | | | **40250** |
| **Frequency MAX SW** | Frequency MAX (Hz) | Float (LSW) | R/W | | | **40251** |
| | | | | | | **40252** |
| **Frequency MIN SW** | Frequency MIN (Hz) | Float (LSW) | R/W | | | **40253** |
| | | | | | | **40254** |

# Modbus Registers Map



| Register Name | Comment | Register Type | R/W | Default Value | Range | Modbus Address |
|---|---|---|---|---|---|---|
| **THD MAX SW** | THD MAX | Float (LSW) | R/W | | | **40255** |
| | | | | | | **40256** |
| **THD min SW** | THD MIN | Float (LSW) | R/W | | | **40257** |
| | | | | | | **40258** |
| **Vrms x 100** | Vrms (V) x 100 | SIGNED LONG(MSW) | R | | | **40301** |
| | | | | | | **40302** |
| **Irms x 100** | Irms (mA) x 100 | SIGNED LONG(MSW) | R | | | **40303** |
| | | | | | | **40304** |
| **P x 100** | Active Power (W) x 100 | SIGNED LONG(MSW) | R | | | **40305** |
| | | | | | | **40306** |
| **Q x 100** | Reactive Power (VAR) x 100 | SIGNED LONG(MSW) | R | | | **40307** |
| | | | | | | **40308** |
| **S x 100** | Apparent Power (VA) x 100 | SIGNED LONG(MSW) | R | | | **40309** |
| | | | | | | **40310** |
| **Cosφ x 100** | Cosφ x 100 | SIGNED LONG(MSW) | R | | | **40311** |
| | | | | | | **40312** |
| **Frequency x 100** | Frequency (Hz) x 100 | SIGNED LONG(MSW) | R | | | **40313** |
| | | | | | | **40314** |
| **THD x 100** | THD x 100 | SIGNED LONG(MSW) | R | | | **40315** |
| | | | | | | **40316** |
| **ENERGY x 100** | Energy (Wh) x 100 | SIGNED LONG(MSW) | R/W | | | **40317** |
| | | | | | | **40318** |
| **Positive Energy x 100** | Positive Energy (Wh) x 100 | SIGNED LONG(MSW) | R/W | | | **40319** |
| | | | | | | **40320** |
| **Negative Energy x 100** | Negative Energy (Wh) x 100 | SIGNED LONG(MSW) | R/W | | | **40321** |
| | | | | | | **40322** |
| **V peak x 100** | Vpk (V) x 100 | SIGNED LONG(MSW) | R/W | | | **40323** |
| | | | | | | **40324** |
| **I peak x 100** | Ipk (mA) x 100 | SIGNED LONG(MSW) | R/W | | | **40325** |
| | | | | | | **40326** |
| **Vrms MAX x 100** | Vrms MAX (V) x 100 | SIGNED LONG(MSW) | R/W | | | **40327** |
| | | | | | | **40328** |
| **Vrms min x 100** | Vrms MIN (V) x 100 | SIGNED LONG(MSW) | R/W | | | **40329** |
| | | | | | | **40330** |
| **Irms MAX x 100** | Irms MAX (mA) x 100 | SIGNED LONG(MSW) | R/W | | | **40331** |
| | | | | | | **40332** |
| **Irms min x 100** | Irms MIN (mA) x 100 | SIGNED LONG(MSW) | R/W | | | **40333** |
| | | | | | | **40334** |
| **P MAX x 100** | Active Power MAX (W) x 100 | SIGNED LONG(MSW) | R/W | | | **40335** |
| | | | | | | **40336** |
| **P min x 100** | Active Power MIN (W) x 100 | SIGNED LONG(MSW) | R/W | | | **40337** |
| | | | | | | **40338** |
| **Q MAX x 100** | Reactive Power MAX (VAR) x 100 | SIGNED LONG(MSW) | R/W | | | **40339** |
| | | | | | | **40340** |
| **Q min x 100** | Reactive Power MIN (VAR) x 100 | SIGNED LONG(MSW) | R/W | | | **40341** |
| | | | | | | **40342** |
| **S MAX x 100** | Apparent Power MAX (VA) x 100 | SIGNED LONG(MSW) | R/W | | | **40343** |
| | | | | | | **40344** |
| **S min x 100** | Apparent Power MIN (VA) x 100 | SIGNED LONG(MSW) | R/W | | | **40345** |
| | | | | | | **40346** |
| **Cosφ MAX x 100** | Cosφ MAX x 100 | SIGNED LONG(MSW) | R/W | | | **40347** |
| | | | | | | **40348** |
| **Cosφ min x 100** | Cosφ MIN x 100 | SIGNED LONG(MSW) | R/W | | | **40349** |
| | | | | | | **40350** |
| **Frequency MAX x 100** | Frequency MAX (Hz) x 100 | SIGNED LONG(MSW) | R/W | | | **40351** |
| | | | | | | **40352** |
| **Frequency min x 100** | Frequency MIN (Hz) x 100 | SIGNED LONG(MSW) | R/W | | | **40353** |
| | | | | | | **40354** |

# Modbus Registers Map Q

| Register Name | Comment | Register Type | R/W | Default Value | Range | Modbus Address |
|---|---|---|---|---|---|---|
| **THD MAX x 100** | THD MAX x 100 | SIGNED LONG(MSW) | R/W | | | **40355** |
| | | | | | | **40356** |
| **THD min x 100** | THD MIN x 100 | SIGNED LONG(MSW) | R/W | | | **40357** |
| | | | | | | **40358** |
| **RTC YEAR** | RTC : year (2000-2099) | UINT16 | R/W | | | **41001** |
| **RTC MONTH** | RTC : month (1-12) | UINT16 | R/W | | | **41002** |
| **RTC DAY** | RTC : day month (1-31) | UINT16 | R/W | | | **41003** |
| **RTC HOUR** | RTC : hour (0-23) | UINT16 | R/W | | | **41004** |
| **RTC MINUTE** | RTC : minute (0-59) | UINT16 | R/W | | | **41005** |
| **RTC SEC** | RTC : second (0-59) | UINT16 | R/W | | | **41006** |

**REMARKS:**

- Modbus connections: A+ and B- as per Modbus RTU standards;
- Modbus Register reference: with reference to the logical address, for ex. 40010, corresponds to physical address n°9 as per Modbus RTU standard;
- Dip Switch Settings: the setting is not enabled if the first sixth dip-switches are set to 000000, the rest of dip-switch are disabled. All settings coming from EEPROM.
- Modbus functions supported: 3 (Read multiple registers), 6 (Write single), 16 (Write multiple).
- **Any changes made by dip-switch required to switch off the power supply**