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QUALITY ELECTRONIC DESIGN

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SINGLE PHASE POWER METER
Isolated V/I converter -RS485 Modbus - Datalogger

QA-POWER-M

MADE IN ITALY CE

Single-phase power meter **RMS**, and Voltage/Current Isolated. **Signal Converter 1000 VDC / 600 VAC, 10 A AC/DC, Variable frequency measurement. Configurable via USB**, DIN rail mounting, **4 kV galvanic isolation,** universal supply AC/DC. Configurable alarm contact, **RS485 Modbus and Analog output. DATALOGGING via USB** with pen drive stick memory and download storage data on excel importable files. **RTC Real Time Clock** integrated.

POWER SUPPLY	10..40 Vdc, 20-28 Vac, 50-60 Hz
ABSORPTION	Maximum 2.5 VA
PROTECTION INDEX	IP20
ACCURACY	0,5% F.S.
MEASURE	Irms, Vrms, Watt, Var, Va, Vpk, Ipk, Frequency, Cosφ, Energy bidirectional, THD
WORKING FREQUENCY	DC or 1...400 Hz
TEMPERATURE COEFFICIENT	< 200 ppm/°C
WORKING TEMPERATURE	-15...+65°C
STORAGE TEMPERATURE	-40°C... +85°C
ISOLATION	4 kV input, 1.5 kV between output, RS485 and power supply.
HUMIDITY	10...90% not condensing
ALTITUDE	Up to 2000 m s.l.m.
MOUNTING	DIN rail mounting with removable terminals, RS485 bus and Supply connection ready on the base of module (connector not included, on request).
CONNECTIONS	Removable terminals 5.08 mm
CE STANDARDS	EN61000-6-4/2006 + A1 2011; EN64000-6-2/2005; EN61010-1/2010.
DIMENSIONS	17.5 x 100 x 112 mm (terminal excluded)

DATA LOGGER

Non-volatile memory. Log on USB OnTheGo port by Pen Drive stick memory. RTC Real Time Clock integrated allows you to manage the log with date and time.

CONFIGURATION

By free software FACILE QA-POWER-M to configure all of the conversion parameters like span, zero, alarm contact and log via USB port or via RS485. Dip-switch for setting modbus address and baudrate.

INPUT

VOLTAGE: Up to **1000 V DC / 600 V AC** fully configurable via USB.
CURRENT: Up to **10 A AC/DC** direct (more by using external CT).

OUTPUT

CURRENT: 0...20 mA programmable, max load 600 ohm.
VOLTAGE: 0...10 V programmable, min load resistence 2 kohm.
RS485 MODBUS: bus connection on the basis of the module or terminal, dip-switch for setting address and baudrate.
CONTACT OUTPUT: Optomos contact, programmable NO alarm contact by free interface software FACILE QA-POWER, retransmission or storage.

APPLICATION

Photovoltaic: parallel string voltage monitoring.
Energy Management: direct communication via RS485 Modbus to all Master Modbus devices.
High Voltage AC/DC converter.
High Current AC/DC converter using external CT.
Local and Remote monitoring at the same time.

SINGLE PHASE POWER METER
Isolated V/I converter -RS485 Modbus - Datalogger **QA-POWER-M**

**3-WAY GALVANIC ISOLATION**

POWER SUPPLY
OUTPUT
INPUT
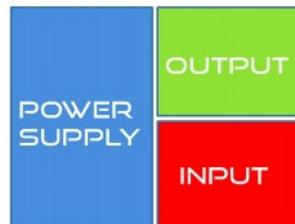
Pen Drive USB Datalogger !

DESCRIPTION:

The QA-POWER-M 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 QA-POWER-M behaves as a slave device by placing Current or Voltage Input, n°1 AO and n°1 DO.

ELECTRICAL CONNECTIONS:
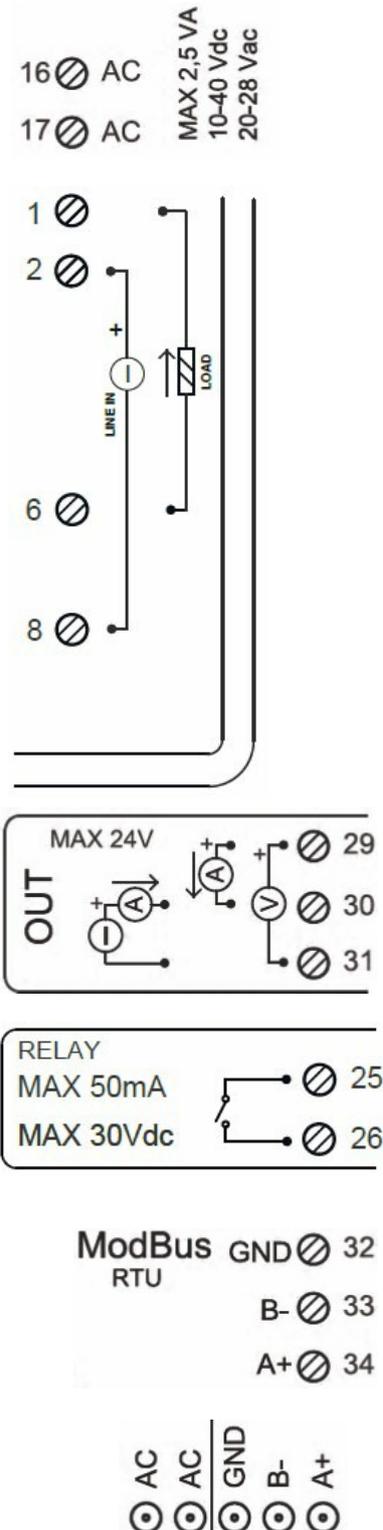
POWER SUPPLY:

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:

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 V AC, 1000 V DC.
FOR CURRENT: up to 10 A AC/DC.
You can set the measurement range as per your need using the FACILE QA-POWER-M software or by RS485 using the modbus registers.

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).

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## SETTING THE DEVICE VIA SOFTWARE   FACILE QA-POWER-M

The programming of the module QA-POWER-M may be performed in two different ways:

- via the interface program free FACILE QA-POWER-M through the microUSB port on the module or via RS485 connection;

- via the RS485 serial connection (from terminal or T-Bus).

The QA-POWER-M 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.
To use the program FACILE QA-POWER-M, log onto our website **www.qeed.it** in the PRODUCTS page, on the right menu, click on DOWNLOAD SOFTWARE and then click FACILE QA-POWER-M, you can install the program on your PC. Once downloaded, install it in the desired directory and run the program.

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 QA-POWER-M 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 QA-POWER-M. 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 FACILE QA-POWER-M software allow to to define the Current Ratio in case of external CT presence, otherwise you can measure direct current AC/DC up to 10 A.
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.

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SETTING THE DEVICE VIA SOFTWARE   FACILE QA-POWER-M

FACILE QA-POWER-M

SETTING THE DEVICE VIA SOFTWARE

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 QA-POWER-M has 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).

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.

Serial Number	Data (yyyy-mm-dd) & Time	Status ID	Vpk	Ipk	Vrms	Irms	P	Q	S	Cosφ	Freq	Energy Total	Energy +	Energy -	Output 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 QA-POWER-M 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 FACILE or via RS485.
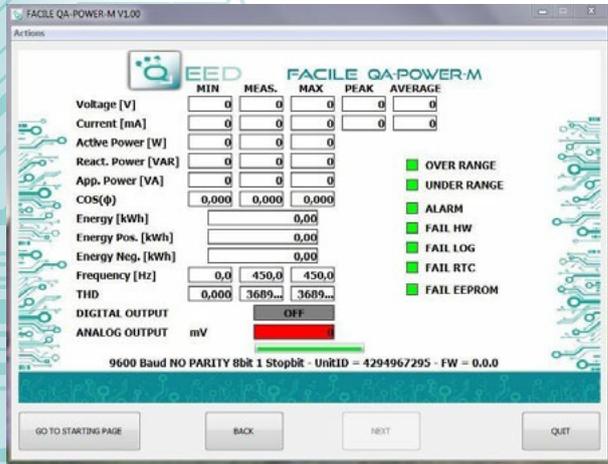
LIVE DATA USING FACILE QA-POWER-M:

once confirmed the configuration, the FACILE QA-POWER-M 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.

QA-POWER-M

QUICK GUIDE

USB OTG	ON 1 2 3 4 5 6 7 8							
EEPROM	0	0	0	0	0			
Add: 1	0	0	0	0	0	1		
Add: 2	0	0	0	0	1	0		
Add: 63	1	1	1	1	1	1		
9600							0	0
19200							0	1
38400							1	0
57600							1	1

RELAY
MAX 50mA
MAX 30Vdc
◯ 25
◯ 26

QA-POWER-M
QEED

MAX 24V
OUT
◯ 29
◯ 30
◯ 31

ModBus GND ◯ 32
RTU
B- ◯ 33
A+ ◯ 34

LINE IN

1
2
6
8

16 AC
17 AC
MAX 2,5 VA
10-40 Vdc
20-28 Vac
AC AC GND B- A+

CE
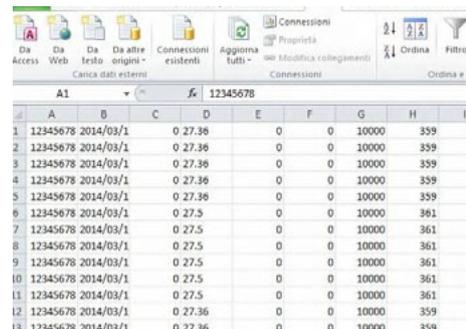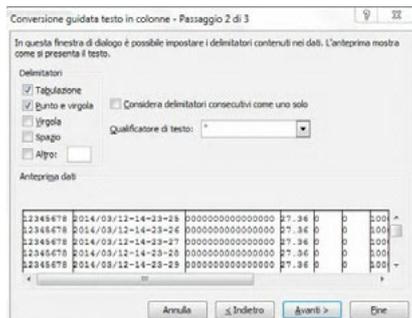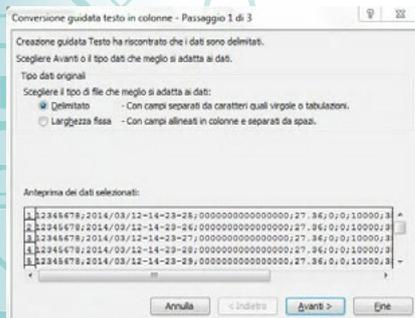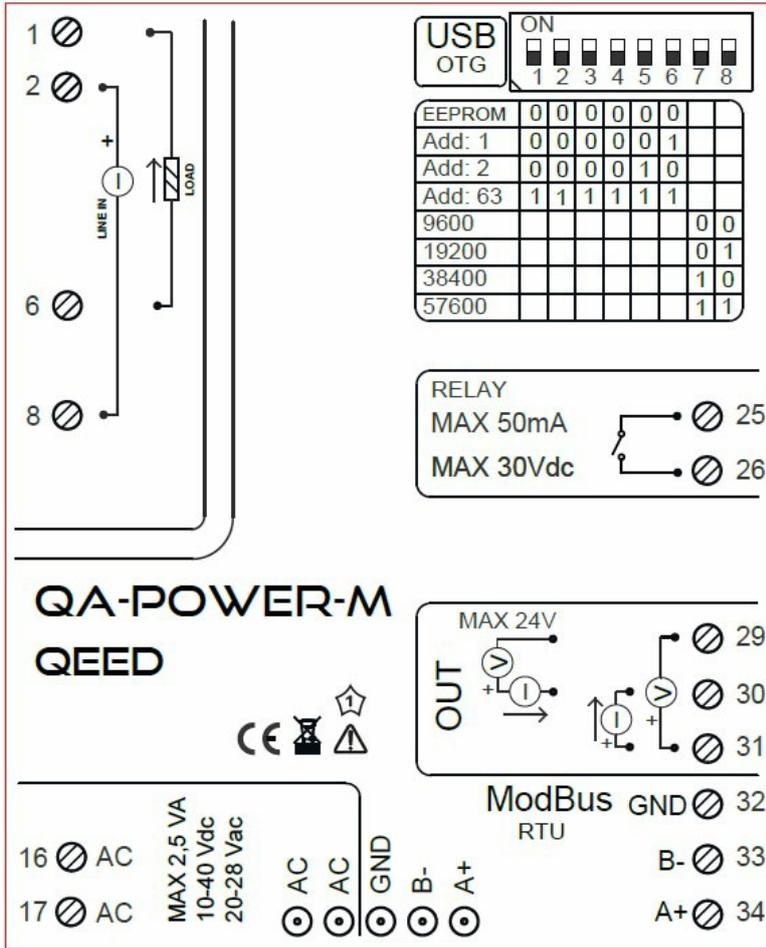
MODBUS ADDRESS CONFIGURATION AND BAUD RATE BY DIP-SWITCH

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 FACILE QA-POWER-M. In order to assign values of baud rates different from those selectable dip you should take advantage of the interface software FACILE QA-POWER-M. 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 FACILE QA-POWER-M

FACILE QA-POWER-M is the configuration software for QA-POWER-M module.

The software is free and downloadable from the website: www.qeed.it/category/software/facile-qa-power-m/ .

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 www.qeed.it at the page of device QA- POWER- M.

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 FACILE QA-POWER-M. 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 QA - POWER - M (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 .