



UNIVERSAL SIGNAL CONVERTER
4 way isolated - RS485 MODBUS- Datalogger

QA-OMNI



Advanced UNIVERSAL SIGNAL CONVERTER, USB configurable, DIN rail mounting, 4-way galvanically isolated, universal power supply AC/DC, Programmable alarm contact, RS485 Modbus. DATALOGGING via USB with pen drive stick memory and download storage data on excel importable files. RTC Real Time Clock integrated. CURRENT, VOLTAGE, FREQUENCY, POTENTIOMETER, TEMPERATURE (RTD and TC all types).



The images/schemes proposed are to be considered indicative and not binding

INPUT

VOLTAGE:

up to 10 Vdc programmable, input impedance 100 KOhm, 1mV resolution.

CURRENT:

up to 20 mA programmable, input impedance 20 Ohm, max resolution 2µA.

TEMPERATURE:

RTD: Pt100, Pt500, Pt1000, Ni100. 2,3 or 4 wire measure, automatic detection of cable interruption.

TC Types: J, K, R, S, T, B, E, N; automatic detection of cable interruption (-10mV to 70mV).

POTENTIOMETER: from 1000 Ohm to 10 KOhm.

FREQUENCY:

from 0,001 Hz to 9,99KHz, mechanical contact, npn 2 and 3 wires, pnp 3 wires with supply of 24 Vdc, namur, photoelectric, Hall sensor, variable reluctance, pulse 24 V, TTL.

OUTPUT

CURRENT:

0...20mA programmable, max load resistance 600 ohm.

VOLTAGE:

0...10V programmable, min load resistance 2 kohm.

CONTACT ALARM:

5A 230Vac SPDT relay fully programmable by FACILE QA-OMNI.

RS485 MODBUS:

bus connection on the base of module by adapter (option) or on terminals. Dip-switch for setting address and baudrate.

Table with technical specifications: POWER SUPPLY, RETRANSMISSION OUTPUT, ABSORPTION, PROTECTION INDEX, ACCURACY, RESOLUTION, THERMAL STABILITY, WORKING TEMPERATURE, STORAGE TEMPERATURE, ISOLATION, HUMIDITY, ALTITUDE, MOUNTING, CONNECTIONS, CE STANDARDS, DIMENSIONS, DATA LOGGER, CONFIGURATION.

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4 WAY GALVANIC ISOLATION





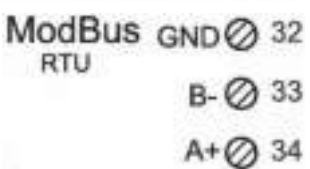
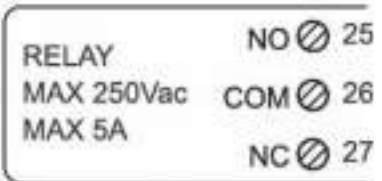
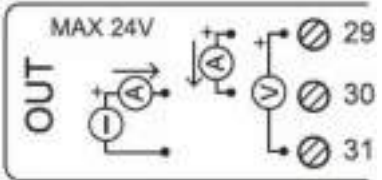
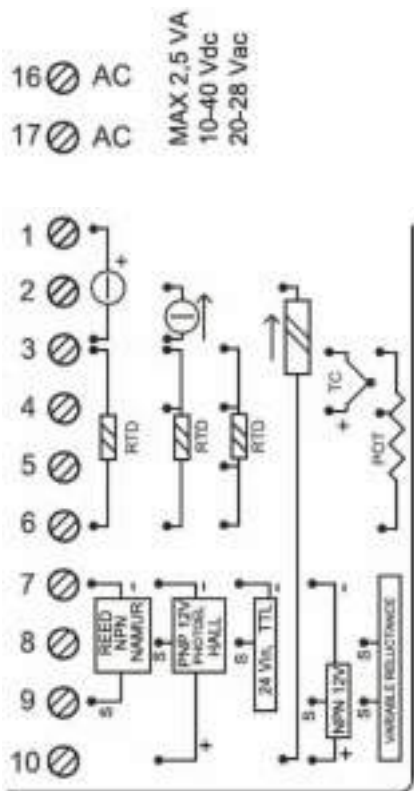
# INSTRUCTION MANUAL QA-OMNI

## DESCRIPTION:

The QA-OMNI is an isolated universal signal converter, with an analog input (voltage, current, temperature, potentiometer) and a digital input . The module has a programmable analog output (voltage or current) and a digital output (relay). Thanks to the presence of the RS485 serial port can perform advanced functions such as I / O Module with Modbus RTU protocol. The QA-OMNI behaves as a slave device by placing No. 1 AI, No. AO No. 1, No. 1 DI and No.1 DO.

## ELECTRICAL CONNECTIONS:

QA-OMNI INSTRUCTION MANUAL



### 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).

### ANALOG INPUT:

depending on the type of sensor or signal available, make the connection as shown. For example, to connect a 3-wire RTD sensor requires a connection to terminals 3, 4 and 6. The Thermocouple, whatever it is, it requires the connection between terminals 3 and 4.

To connect a potentiometer use terminals 3, 4 and 6.

To make resistance measurements at 2, 3 and 4 wires to follow the wiring diagram for the RTD.

For ACTIVE current input use the connectors 2 (positive) and 3. For PASSIVE current input use connectors 2 (positive) and 10 . For Voltage input use connectors 1 (positive) and 3.

### DIGITAL INPUT:

the QA-OMNI accepts the input pulses from 0,001 Hz to 9,99 KHz, from mechanical contact, NPN 2 and 3 wire, PNP 3-wire with power supply 24 Vdc, namur, photoelectric sensor, Hall, variable reluctance, pulse 24 V, TTL. For the connection, refer to the diagram as shown.

### 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 30mA.

### DIGITAL OUTPUT:

relay Output SPDT. Connect terminal 25 for Normally Open mode, terminal 26 for Normally Close. The default setting is Normally Open (NO).

### SERIAL OUTPUT RS485:

available on connectors 32, 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).





### PROGRAMMING THE DEVICE BY SOFTWARE

### FACILE QA-OMNI

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

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

The QA-OMNI 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-OMNI, go on our website [www.qeed.it](http://www.qeed.it) section DOWNLOAD / SOFTWARE AND DRIVERS / SIGNAL CONVERTERS / QA-OMNI: CONFIGURATION SOFTWARE, 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-OMNI 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-OMNI. 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.

**ANALOG INPUT:** on the left you find the pull-down menu where you can select the type of input signal: VOLTAGE, CURRENT, POTENTIOMETER, RESISTANCE 400ohm and 4kohm 2, 3, 4 wires, Ni100, PT100, PT500, PT1000 2, 3, 4 wires, TC type J, K, R, S, T, B, E, N.

The QA-OMNI sampled data every 100 msec, you can choose to mediate the input value up to a maximum of 32 samples.

**DIGITAL INPUT:** at the top right you find the pull-down menu where you can select the type of digital input: REED, NPN 2-wire, 3-wire NPN 24V, 24V 3-wire PNP, NAMUR, PHOTOELECTRIC, HALL, INPUT 24V, TTL, variable reluctance.

**TOTALIZER:** in the management of the digital input function is always available a TOTALIZER / COUNTER. You can choose totalizer in RISING EDGE or FALLING EDGE of the pulse, the totalizer limit is  $2^{32}$  pulses. If you exceed this limit, the totalizer will restart from Zero and give you, in the same time, an alarm message. It's possible to select the MAXIMUM RATE OF ACQUISITION (value max 10,000 Hz), a parameter useful in case you do not want to consider the presence of fast pulses during an acquisition at low frequency. Please consider that the Totalizer don't save the pulse in the device memory, so if you switch off the device the counter will restart from Zero (not retentive memory).

FACILE QA-OMNI

PROGRAMMING THE DEVICE BY SOFTWARE



**PROGRAMMING THE DEVICE BY SOFTWARE****FACILE QA-OMNI****FACILE QA-OMNI****PROGRAMMING THE DEVICE BY SOFTWARE**

**ANALOG OUTPUT:** The first drop-down menu in the upper left allow you to associate the analog output to a single selectable ANALOG INPUT (V, I, Temperature), FREQUENCY, PERIOD, TOTALIZER. The mode of the analog output is VOLTAGE or CURRENT. The QA-OMNI 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).



**ALARM/ 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 21mA 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 THRESHOLDS, BETWEEN TWO THRESHOLDS. We therefore have the possibility to insert the values of THRESHOLD (Upper and Lower) and the value of HYSTERESIS. In the case where it is selected the value of **Higher threshold** is 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** exceeds the threshold plus the hysteresis value, the alarm switch off. In the case where it is selected, the **between two thresholds** case you have selected **Not included between two thresholds**, the hysteresis is internal.

**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).

**EEPROM FAIL:** problem microprocessor configuration (not calibrated module, takes no configuration).

**MODBUS COMMUNICATION:**

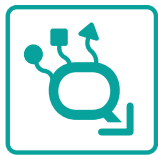
This is the last window of the device configuration. The left column contains the parameters to be set for the communication speed BAUDRATE (from 1200 to 115200), the PARITY (None, Odd, Even), the STOP BIT (1 or 2), the Modbus address to be assigned to the device. You do not need to configure these parameters 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.

**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. The alarm can be associated with the state of the digital input (HIGH or LOW) for up to 15 cycles per minute. STATE DIGITAL ALARM / FAIL allows you to define the status of contact in case of alarm (CONTACT OPEN or CLOSED).





DATA LOGGING

QA-OMNI

The QA-OMNI provides, on a local memory type PEN DRIVE USB (USB KEY) connected to the module via the microUSB, 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.

EXAMPLE OF LOG FILE: for Thermocouple sensor type J, 0-10V output, one sample per second:

Table with 10 columns: Serial Number, Data (yyyy-mm-dd) & Time, Status ID, Analog Input, Totalizer, Period (usec), Frequency (Hz), Analog Output, Input type, Output type. It contains 5 rows of data.

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 1 = fail global, bit 2 = alarm, bit 3 = OVER RANGE, bit 4 = UNDER RANGE, bit 5 = din status, bit 6 = dout status, bit 7 = fail hw, bit 8 = fail log, bit 9 = fail RTC, bit 10 = fail EEPROM, bit 11 = fail sensor).

The fourth column we find the information from ANALOG INPUT: voltage, current, temperature, potentiometer or resistor.

ANALOG OUTPUT: the value uA or in mV output of the module. This value follows the setting made via FACILE.

TOTALIZER: show you the number of pulse received from digital input.

PERIOD MEASUREMENT: Period measurement in usec. Without any connection on digital input this value converges to infinity.

FREQUENCY MEASUREMENT : Obtained from the measurement of the period, expressed in Hz. If it is not connected to the input frequency will lead to zero.

INPUT TYPE: referred to the Modbus Register 101 that indicate the type of the Input sensor (Analog Input type : value 0=Voltage,1=Current, 2=Potentiometer, 3=Resistor400-2W,4=Resistor400-3W,5=Resistor400-4W, 6=Resistor4000-2W,7=Resistor4000-3W,8=Resistor4000-4W, 9=NI100-2W, 10=NI100-3W, 11=NI100-4W, 12=PT100-2W, 13=PT100-3W, 14=PT100-4W, 15=PT500-2W, 16=PT500-3W, 17=PT500-4W, 18=PT1000-2W, 19=PT1000- 3W, 20=PT1000-4W, 21=TC J, 22=TC K, 23=TC R, 24=TC S, 25=TC T, 26=TC B, 27=TC E, 28=TC N).

OUTPUT TYPE: referred to the Modbus Register 106 that indicate the output configuration (Output Analog mode: bit 0=Voltage/Current, bit 1-2=analog input,frequency, period, totalizer, bit 3 = fail UNDER RANGE, bit 4 = fail OVER RANGE, bit 5 = fail hardware, bit 6 = fail log, bit 7 = fail RTC, bit 8 = fail EEPROM, bit 9 = fail alarm, bit 10-11 = 1 threshold high/1 threshold low/2 thresholds external/2 thresholds internal , bit 12 = Manual mode).

AVAILABLE ON THE WEBSITE www.qeed.it the MACRO for charge the .csv file logged directly on a Excel file.

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. Following the procedure as soon as you get the data displayed in columns.

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DATALOGGING

