QEED — QUALITY ELECTRONIC DESIGN

WWW.QEED.IT

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UNIVERSAL CURRENT / VOLTAGE CONVERTER
AC/DC Current / Voltage Analyzer

QE-CURRENT-485

MADE IN **ITALY** CE UKCA

The **QE-CURRENT-485 is the first CURRENT / VOLTAGE CONVERTER & ANALYZER ALL IN ONE - of the market**. It allow you to connect all isolated current sensors. It can read at the same time one temperature probe (PT100 or NTC). DIN rail mounting, suitable for all electrical panels. The device is equipped with a fully configurable Analog output, one digital output and the RS485 Modbus RTU. Free configuration software.

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

INPUT - CURRENT SENSOR
One of:
- ROGOWSKI probes.
- Current transformer with secondary 1A / 5A.
- Current / Voltage transformer with secondary ±10 Vpk or ± 1 Vpk.
- Current transformer with secondary 333 mV.
- Current transducer with secondary 100 mA AC / DC.
- HALL sensor, with his power supply (+/-15 Vdc).

INPUT - TEMPERATURE
- PT100 2-3 wires or NTC (10 k/ 100 kohm / custom) **not isolated.**

OUTPUT
- RS485 MODBUS RTU.
- 0...10 V / 0...20 mA (configurable).
- Optomos contact 50 mA max, 30 Vdc.

AVAILABLE VERSION
QE-CURRENT-485: Current / Voltage converter, Analog Output and RS485 Modbus serial; Measures RMS, AC and DC , average minimum and maximum measurements, frequency and Crest Factor. The temperature or the resistance measurement.

QE-CURRENT-485-H: Current / Voltage converter and ANALYZER, analog and serial output RS485 Modbus. With all the measurements of the basic version and harmonic analysis up to the 63rd, THD, I peak and measurement of internal temperature of the module (to understand the temperature of the panel).

POWER SUPPLY	10…30 Vdc, Protection against reverse polarity and over-temperature
ABSORPTION	2,5 VA max
PROTECTION INDEX	IP 20

AVAILABLE MEASUREMENTS

I rms	Irms MAX	Irms min	Irms mean	Ah of Irms
Idc	Idc MAX	Idc min	Idc mean	Ah of Idc
Iac	Iac MAX	Iac min	Iac mean	Ah of Iac
Frequency	Crest factor	I peak *	THD *	
Temperature (PT100 / NTC)		Internal Temp *	Resistance of PT100/NTC probe	
Harmonic analysis up to the 63rd harmonic *				

The measurements into the table are the same for the VOLTAGE.

* Available on version QE-CURRENT-485-H

| SAMPLING RATE	6400 Hz @ 50 Hz
ACCURACY OF ANALOG OUTPUT	< 0,1% F.S.
BAUD RATE	1200...115200 Baud (standard 9600)
TEMPERATURE COEFFICIENT	< 100 ppm/°C
WORKING TEMPERATURE	-10°C... +60°C
STORAGE TEMPERATURE	-40°C... +85°C
HUMIDITY	10...90% not condensing
ALTITUDE	Up to 2000 m s.l.m.
MOUNTING	Din rail mounting, designed for mounting on bus (connector not included)
CONNECTIONS	n°2 removable terminals 10 pole - 3,5 mm
CE STANDARDS	EN61000-6-3; EN61000-4-2; EN61000-4-3; EN61000-4-4; EN61000-4-5 ; EN61000-4-6; EN61010-1
DIMENSIONS	93 x 17,7 x 68,3 mm (terminal excluded)
WEIGHT	55 g
PLASTIC CASE	PBT, grey
DIP-SWITCH	2 pole (Baudrate and address)
LED	N°5: Power (Green), Comm (Yellow), TX e RX (Red), Dout (Green)
CONFIGURATION	With software FACILE QE-CURRENT-485 or via RS485 Modbus. Comunication to free interface program for: - configuration of all the available parameters; - possibility of firmware upgrade (if available).

UNIVERSAL CURRENT / VOLTAGE CONVERTER QE-CURRENT-485
AC/DC Current / Voltage Analyzer

IMPORTANT NOTE:
- IT REQUIRES **ISOLATED** PRIMARY CURRENT / VOLTAGE SENSOR;
- DURATION OF FLASH FOR DATA STORAGE: 3,5 YEARS.
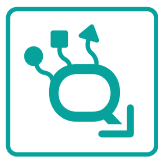
ACCURACY   QE-CURRENT-485

QE-CURRENT-485

ACCURACY

1/5 A CHANNEL

CREST FACTOR:	4 (RELATIVE OF 5 A)
RANGE: 50 mA < I < 250 mA	MAX ERROR: 1 %
RANGE: 250 mA < I < 5 A	MAX ERROR: 0,5 %
TEMPERATURE COEFFICIENT:	< 100 ppm/°C
BANDWIDTH (-3dB)	> 2 KHz

20/100 mA CHANNEL

CREST FACTOR:	4 (RELATIVE OF 100 mA)
RANGE: 1 mA < I < 5 mA	MAX ERROR: 1 %
RANGE: 5 mA < I < 100 mA	MAX ERROR: 0,5 %
TEMPERATURE COEFFICIENT:	< 100 ppm/°C
BANDWIDTH (-3dB)	> 2 KHz

±1 Vpk CHANNEL

RANGE: 10 mV < V < 50 mV	MAX ERROR: 1 %
RANGE: 50 mV < V < 1 V	MAX ERROR: 0,5 %
TEMPERATURE COEFFICIENT:	< 100 ppm/°C
BANDWIDTH (-3dB)	> 2 KHz

±10 Vpk CHANNEL

RANGE: 100 mV < V < 500 mV	MAX ERROR: 1 %
RANGE: 500 mV < V < 10 V	MAX ERROR: 0,5 %
TEMPERATURE COEFFICIENT:	< 100 ppm/°C
BANDWIDTH (-3dB)	> 800 Hz

CONDITION OF TEST: sinusoidal input 50-60 Hz, integrator disabled, temperature 25 °C.

CHANNEL OF TEMPERATURE

|			
PT100 CHANNEL	RANGE:	-200 °C .. +600 °C	
	ERROR:	± 1.2 °C on reading	
	TEMPERATURE COEFFICIENT:	< 100 ppm/°C	
NTC CHANNEL	RANGE:	200 Ω .. 20 KΩ	20 KΩ .. 300 KΩ
	ERROR:	± 1.2 °C on reading	± 1.6 °C on reading
	TEMPERATURE COEFFICIENT:	< 100 ppm/°C	

ELECTRICAL CONNECTIONS

POWER SUPPLY:

10...30 Vdc - Terminals 1 and 2, or via the T-BUS to be connected to the bottom of the device.
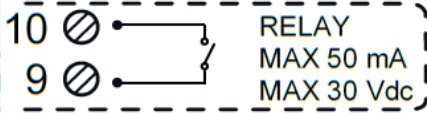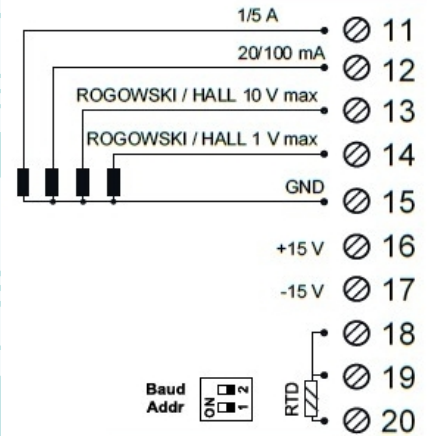
DIGITAL OUTPUT:

the output is a contact OptoMOS. The connection is between the terminals 10 and 9. The contact can be used as alarm contact (you can set the parameter associated with FACILE software).
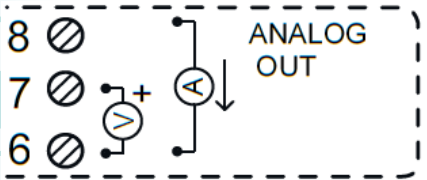
ANALOG OUTPUT:

for the analog output voltage, connect terminals 6 (negative) and 7 (positive). For analog output in current ACTIVE, connect terminals 8 (Iout) and 6 (Iin)

SENSOR AND TRANSDUCER INPUT

Depending on the type of sensor or the available signal, make the connections as the wiring diagram.

Sensor 1/5A: Between the terminals 11 and 15 (GND).
Sensor 20/100 mA: Between the terminals 12 and 15 (GND).
Sensor of ±10 V max: Between the terminals 13 and 15 (GND).
Sensor of ±1 V max: Between the terminals 14 and 15 (GND).
Sensor PT100 2 wires/ NTC: 18, 19 (connecting these two terminals to each other) and 20.
Sensor PT100 3 wires: Between the terminals 18, 19 and 20 (without make any kind of connection between terminals 18 and 19).

POWER SUPPLY FOR HALL SENSORS
The terminals 16 (positivo) and 17 give dual power supply to Hall sensor (external), at both +15 V and -15V (MAX 50 mA).
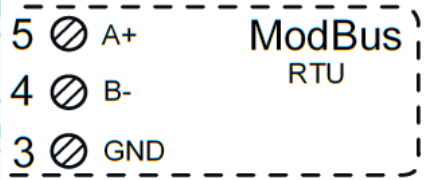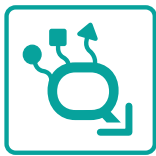
SERIAL OUTPUT RS485:

Available on terminals 3 (GND), 4 (B-), 5 (A+), or via the T-BUS throught connection to the bottom of the device.
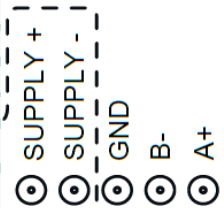
T-BUS CONNECTION (need T-BUS connector):

The T-BUS connection is used to give power and communication to the device. 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
QE-CURRENT-485

The programming of the QE-CURRENT-485 must be performed via the RS485 serial comunication (by terminals or T-Bus).

To use the configuration software for QE-CURRENT-485, please connect to the site www.qeed.it section DOWNLOAD / SOFTWARE AND DRIVERS / SIGNAL CONVERTERS / QE-CURRENT-485: CONFIGURATION SOFTWARE, you can install on your PC the program. Once downloaded, install it in the desired directory and run the program.
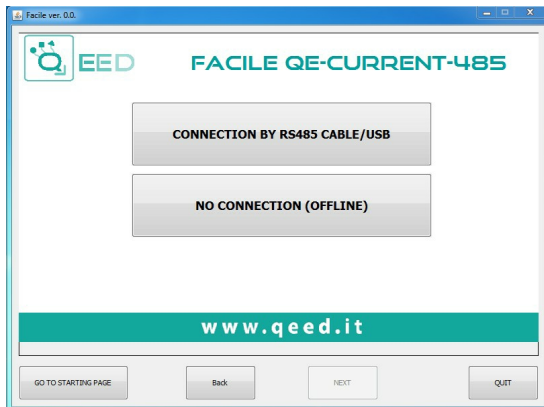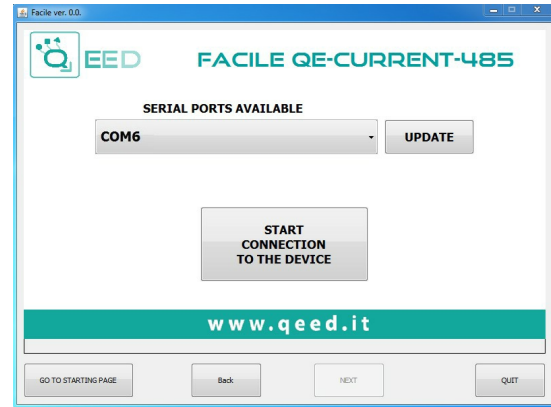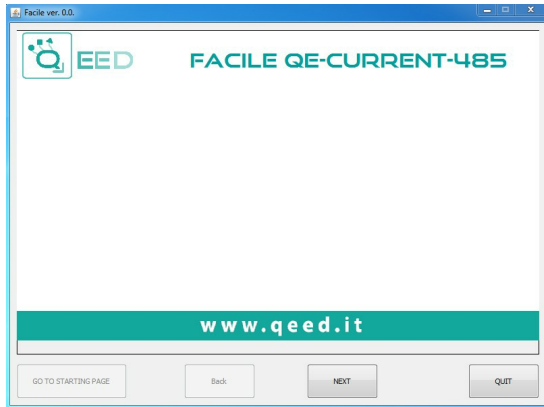
COMMUNICATION BETWEEN DEVICE AND PROGRAM

Once you open the program, click the "NEXT" button, so you can access the connections of the selection page. And it's possible to communicate with the QE-CURRENT-485 in real time by clicking on "CONNECTION BY CABLE RS485/USB" or OFFLINE mode by clicking on "NO CONNECTION (OFFLINE)".

In this mode, the user can interact with the FACILE software without being connected to the QE-CURRENT-485. The OFFLINE mode allows you to SAVE your choices of configuration settings on your PC in order that it be sent to the device at a later time.

SETTING THE DIP SWITCH:

put the DIP SWITCH on circuit board as shown in the left-side picture, holding up the DIP 1 and press the "Next" button.

AVAILABLE SERIAL PORT:

In order to communicate with the QE-CURRENT-485, check COM PORT available by clicking on the "UPDATE" button. Your PC will assign a virtual COM to communicate with the QE-CURRENT-485.

Click on the button "START CONNECT TO DEVICE", you will see a window where you will be asked if you are connected to the device. Then click this button on this window "CONTINUE". After you have connected, you can proceed with the configuration of the device in the respective settings pages described below.
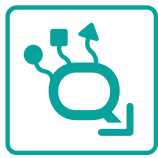
SETTING THE DEVICE VIA SOFTWARE
QE-CURRENT-485
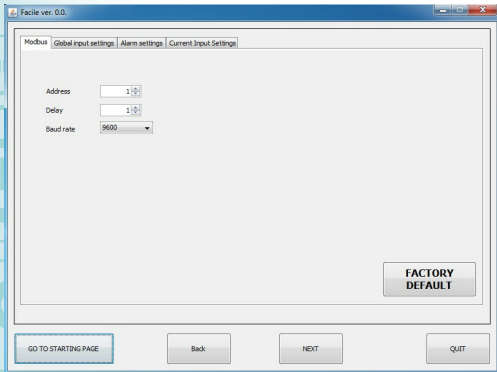
COMMUNICATION PARAMETERS MODBUS:

this is the device configuration page where the parameters are to be set for:

1. The Modbus "ADDRESS" to be assigned to the device;
2. The "DELAY" on response;
3. The speed communication "BAUDRATE" (from 1200 to 115200);

N.B. The parity is always None

To use the default settings, click the "FACTORY DEFAULT" key (the values that appear are those in the image at right).
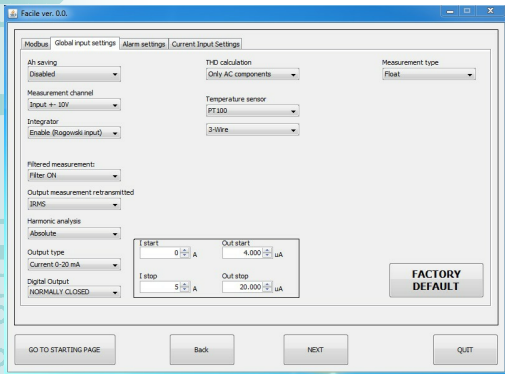
PAGE SETTING INPUT:

Ah SAVING: enabled the saving on flash of Ah.
MEASUREMENT CHANNEL: input selection to operate. You need to select the voltage input and enable the integrator for the Rogowski input.
OUTPUT MEASUREMENT RETRANSMITTED: drop-down menu for selecting the input connected to to have the analogue output.
HARMONIC ANALYSIS: absolute harmonic analysis, or on the first harmonic.
OUTPUT TYPE: analog output selection in voltage or current. In the next frame, the user can set the input and output ranges.
DIGITAL OUTPUT: management of the alarm contact (NO or NC).
THD CALCULATION: inclusion of the component in the AC or DC for the calculation of THD.
TEMPERATURE SENSOR: selection of the temperature sensor. If you select the PT100, automatically appears a further drop-down menu (see side image) where the user can choose the option of resistance to 2 or 3 wires.
If NTC STEINHART-HART is selected, automatically appears a box where you can set the NTC coefficients used.
MEASUREMENT TYPE: this drop-down menu is used to set the type of the reading in use (from reg. 40149 to Reg. 40326). Possible values are float, float swapped, hundredth, hundredth swapped.
FILTERED MEASUREMENT: enables filtering of the measurements.

In QE-CURRENT-485, there are two types of selectable alarms, one using LED and the other through contact (SWITCH).

LED ALLARM:

check for the presence of anomalies, the user can select to enable of FAIL LED by checking one or more of the following flag:
FAIL EEPROM: problem on the CONFIGURATION of the microprocessor (not calibrated module, does not hold the configuration).
INPUT UNDER RANGE / INPUT OVER RANGE: advise you when the input value is UNDER or OVER of the set input. E.g. if we have an Hall's Current probes +/- 1V, if the input value is +1,5V or -2V, you see the LED indication in the front of the device. It informs you about potential SATURATION of the Current probes.
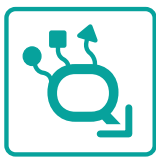**RTD OUT OF THE RANGE:** RTD outside temperature scale (-200 .. +600 ° C for PT100).
RTD THIRD WIRE ERROR: third wire not connected (R> 20 Ω).
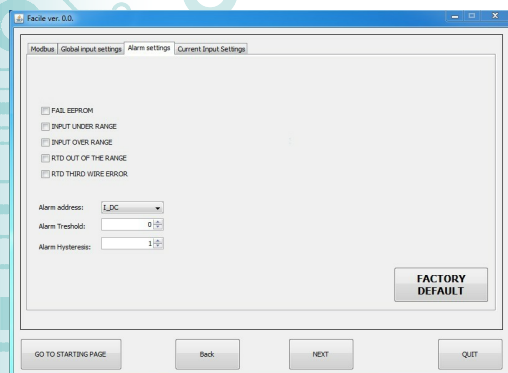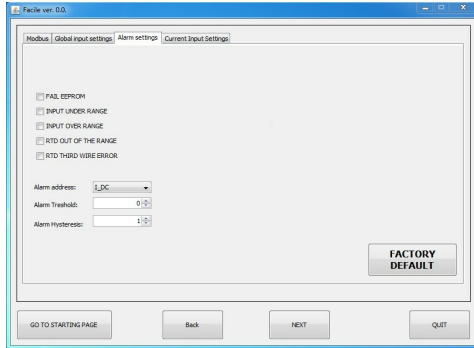
ENGLISH

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## SETTING THE DEVICE VIA SOFTWARE
QE-CURRENT-485

SWITCH ALARM:

selecting the desired parameter in the dropdown menu, you set the threshold and hysteresis value to activate the alarm on digital output. ***The alarm is always active***.

Depending on the choice of set DIGITAL OUTPUT alarm contact (see previous page) the device behaves as follows:

- if set to the NO contact, the alarm is above the threshold, with negative hysteresis;
- if you set the NC contact, the alarm is below the upper threshold with positive hysteresis.
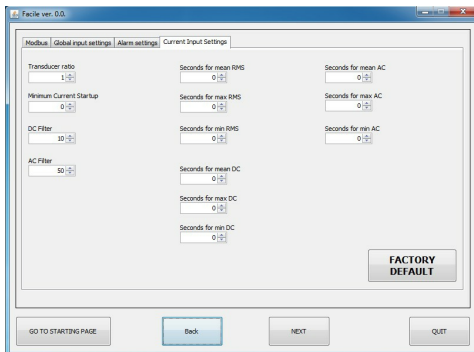
PAGE SETTINGS OF ANALOG INPUT PARAMETERS:

TRANSDUCER RATIO: set the transformer ratio.

If the input is 1A / 5A or 20mA / 100mA → of the current transformer ratio M / N
Example:
TA 600: 5 → TRANSDUCER RATIO = 120;
TA 1000: 1 → TRANSDUCER RATIO = 1000.

If the input is 1V, 10V → 1 / Sensitivity [V / A]
Example:
Probe 100mV / 1KA → TRANSDUCER RATIO = 10000;
Probe 4V / 400A → TRANSDUCER RATIO = 100.

MINIMUM STARTUP CURRENT: serves to set the minimum read current.

DC FILTER: number of tenths of seconds for the RMS calculation in DC. This parameter sets the response speed of the machine into DC. The higher the number, the more precise and slow the calculation in DC.

AC FILTER: number of zero-crossings for the calculation of the RMS AC. This parameter set the response speed of the AC machine. The higher the number, the more precise and slow the calculation in AC.

SETTINGS "SECONDS FOR MEAN/MAX/MIN":

in the settings box "Seconds for ..." you set a value in seconds (max 30). According to the set value, the AVERAGE, MAX or MIN value will be updated (for example every 10 seconds).
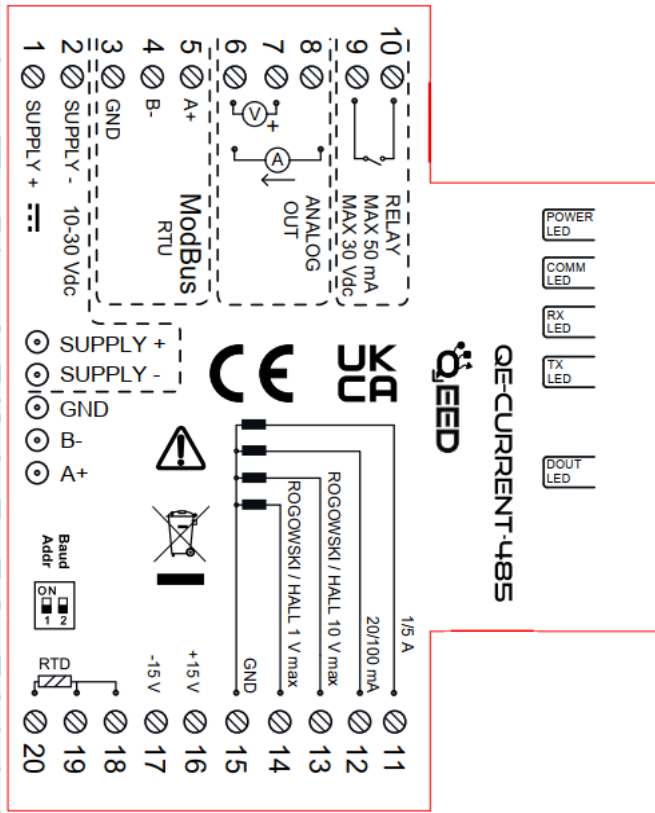
If the default value 0:

- Mean: The value is not averaged.
- Low: the absolute value is taken.
- MAX: the absolute value is taken.
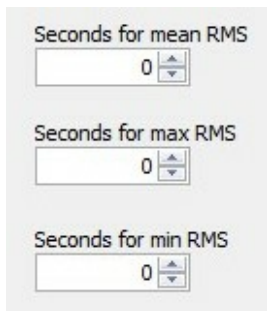
QUICK GUIDE — QE-CURRENT-485

POWER SUPPLY TERMINALS
10 ... 30 Vdc - Terminals 1 and 2, or via the T-BUS accessory to be connected to the bottom of the device.

POWER SUPPLY VIA T - BUS
(Requires accessory T-BUS optional):
connecting the T-BUS accessory to the bottom of the module you can feed multiple modules. This will bring into communication multiple devices using a single RS485.

CONFIGURATION VIA FACILE QE-CURRENT-485
FACILE QE-CURRENT-485 is the configuration software of the QE-CURRENT-485 modules.
It is free and downloadable from the website: http://www.qeed.it
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 map of the registers on the site www.qeed.it in the QE-CURRENT-485 device page.
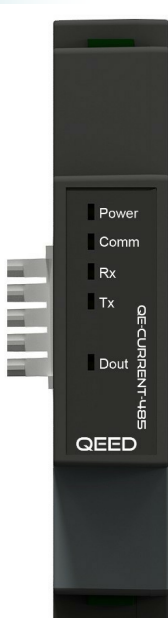
LEDS - FRONT SIGNALS:

Power: power presence on the device.
Comm: the presence of a fault / error on the form. It will be activated if the FAIL messages have been activated. One or more cases of FAIL are active. If the boot loader is loaded, the LED blinks.
**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 enclosure of the QE-CURRENT-485 (visible in the picture on the right), you can access an internal DIP SWITCH. From here can be set the baud rate and the module address (see the table on the right).
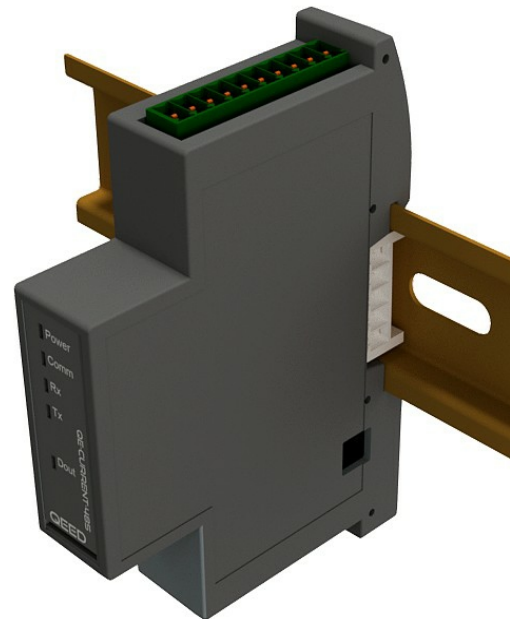
SETTING OF DIP SWITCH	BAUD RATE
Dip 1 = 0 / Dip 2 = X	EEPROM
Dip 1 = 1 Dip 2 = 0	ADDRESS 1 BAUD RATE = 9600
Dip 1 = 1 Dip 2 = 1	ADDRESS 1 BAUD RATE = 38400