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PROGRAMMING and MODBUS REGISTER MAP..... 02/06

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USER MANUAL

CE

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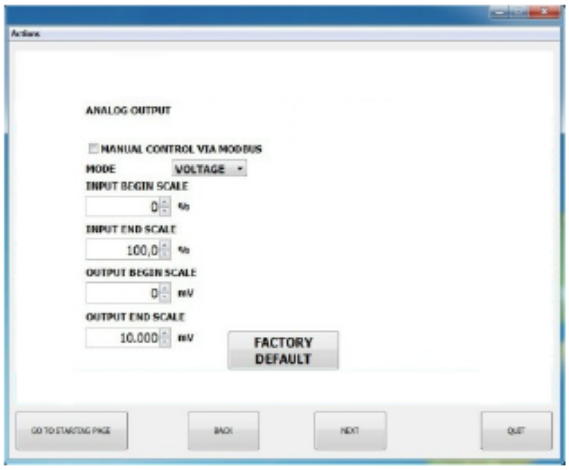
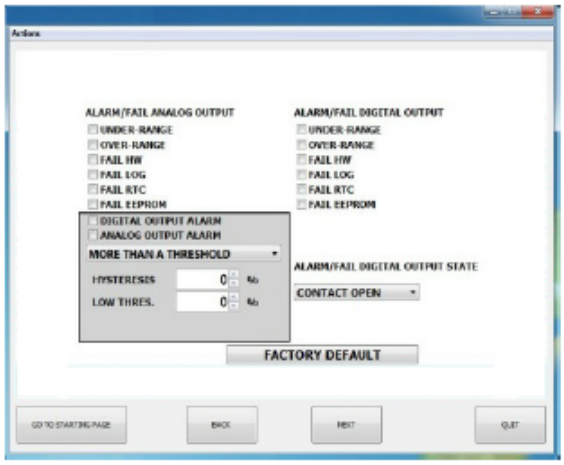
USER MANUAL - PROGRAMMING AND MODBUS REGISTER MAP

PROGRAMMING THE DEVICE BY 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).
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 assign a name to 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.

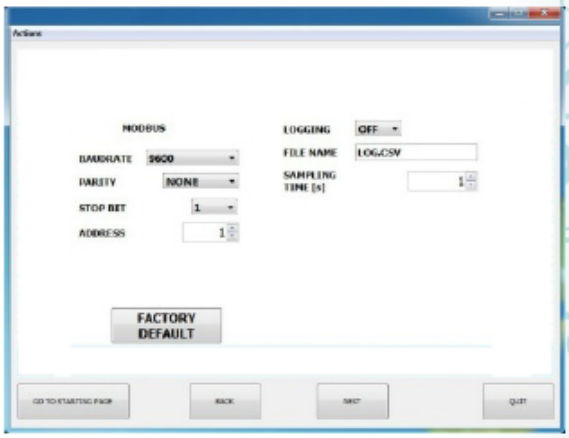
ANALOG OUTPUT: You can associate the analog output to a single INPUT (you have already performed the selection in the previous screen). The mode of the analog output could be VOLTAGE or CURRENT. The QA-TEMP has the ability to scale the inputs and outputs as required, then select the range of measurement inputs (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 you make will change the units of the values in the input and output. If you select MANUAL CONTROL VIA MODBUS, you can manage the module as an AO (Analog Output) or a DO (Digital Output), thus freeing the analog output and digital input selected.
The analog output will be handled via RS485 Modbus RTU (see register map).

DIGITAL OUTPUT: The digital output starting as OPEN CONTACT (that is if there is an alarm already set or active). If you want to change the initial status of the digital output select CONTACT CLOSED from the dropdown in the upper right.

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 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 switch off. 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. 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

The module provides, on a local memory type Pendrive USB connected 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 400ohm 2-wire RESISTOR input, one sample per minute, 0-10V output.

Serial Number	Data (yyyy-mm-dd) & Time	Status ID	Analog Input	Analog Output	Input type	Output type
12345678	2014/03/12-14-23-25	0	99.96	2499	3	0
12345678	2014/03/12-14-24-25	0	99.92	2498	3	0
12345678	2014/03/12-14-25-25	0	99.96	2499	3	0
12345678	2014/03/12-14-26-25	0	100	2500	3	0

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**: temperature, potentiometer or resistor.

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

INPUT TYPE: refered to the Modbus Register 101 that indicate the type of the Input sensor (Analog Input type : 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: refered 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)

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.

MODBUS REGISTER MAP

REMARKS:
- Modbus connections: A+ and B-;
- Modbus Register reference: with reference to the logical address, for ex. 40010, corresponds to physical address n°9 as per Modbus RTU standard;
- 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.

Register Name	Comment	Register Type	R/W	Default Value	Range	Modbus Address
Machine ID	Machine ID	UNIT16	R	10		**40001**
Firmware ID	Firmware ID	UNIT16	R	0		**40002**
ID	Serial Number	UNIT16	R		0...65535	**40003 (MSW)** **40004 (LSW)**
Status	Status Register: **bit 0** = fail global, **bit 1** = alarm, **bit 2** = over range, **bit 3** = under range, **bit 4**= din status, **bit 5**=dout status, **bit 6** = fail hw, **bit 7**=fail log, **bit 8**=fail rtc, **bit 9**=fail eeprom, **bit 10**=fail sensor	UNIT16	R			**40005**
Input Value	Input Value Normalized	UNIT16	R		-32768...32767	**40006**
Totalizer	Totalizer	UNIT32 (MSW)	R/W		0...4294967295	**40007** **40008**
Output Value	Output Value (mV or uA)	UNIT16	R/W		0...65535	**40009**
Input Value	Input Value	Float (MSW)	R			**40010** **40011**
	NOT USED					**40012** **40013**
	NOT USED					**40014** **40015**
Cold Junction Temp	Cold Junction Temperature	Float (MSW)	R			**40016** **40017**
TC read	TC uV readed	Float (MSW)	R			**40018** **40019**
Digital Output	Digital Output: bit 0= disabled/enabled	UNIT16	R/W			**40020**
Dip-switch status	DIPSW status : **bit 0-7**=dip switch status, pos 1=bit 8,..., pos 8=bit 1	UNIT16	R			**40021**
Third wire resistance	Third wire Resistence Ohm	FLOAT (MSW)	R/W			**40022** **40023**
Analog input type	Analog Input type : 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	UNIT16	R/W	2	2...28	**40101**
	NOT USED					**40102**
Temperature mode	Temperature mode : **bit 0-1** = unit measure °C/°F, **bit 7-15** analog filter value	UNIT16	R/W	1	MSB: 1...32	**40103**
	NOT USED					**40104**
	NOT USED					**40105**
Output Analog mode	Output Analog mode : **bit 0**=Voltage/Current, **bit 1-2**=analog input, frequency, period,totalizer, **bit 3** = fail ur, **bit 4** = fail or, **bit 5** = fail hw**bit 6** = fail log, **bit 7** = fail rtc, **bit 8** = fail eeprom, **bit 9** = fail alarm, **bit 10-11** = 1threshold greater/1threshold less/2thresholds external/2thresholds inside, **bit 12**=Manual mode	UNIT16	R/W	0		**40106**

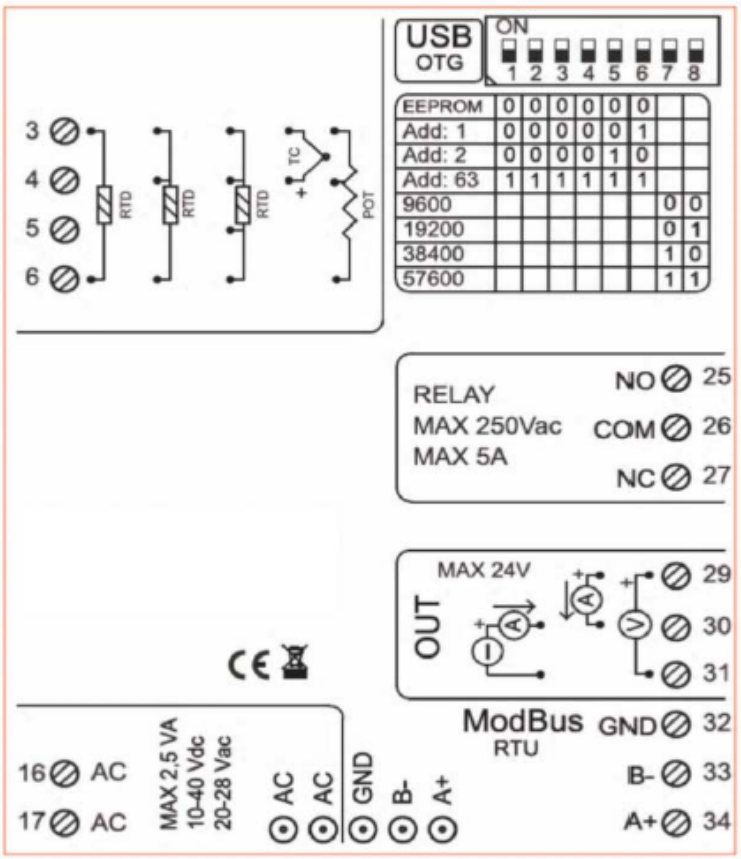
MODBUS REGISTER MAP

Register Name	Comment	Register Type	R/W	Default Value	Range	Modbus Address
Output Analog Input Begin scale	Output Analog Input Begin Scale	FLOAT (MSW)	R/W	0.0		**40107**
						40108
Output Analog Input End scale	Output Analog Input End Scale	FLOAT (MSW)	R/W	10000.0		**40109**
						40110
Output Analog Begin scale	Output Analog Begin Scale	UNIT16	R/W	0	0...65535	**40111**
Output Analog End scale	Output Analog End Scale	UNIT16	R/W	10000	0...65535	**40112**
Digital Output	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**	UNIT16	R/W	0		**40113**
Alarm Low Trip value	Alarm Low trip value	FLOAT (MSW)	R/W	0.0		**40114**
						40115
Alarm High Trip value	Alarm High trip value	FLOAT (MSW)	R/W	0.0		**40116**
						40117
Alarm Hysteresis value	Alarm Hysteresys value	FLOAT (MSW)	R/W	0.0		**40118**
						40119
Modbus Address	Modbus address +parity +stopbits : MSB Modbus address, **bit 0-1** =parity none/odd/even, **bit 2**=stop bits 1/2	UNIT16	R/W	256		**40120**
Modbus Baudrate	Modbus Baudrate : value 0=1200, 1=2400, 2=4800, 3=9600, 4=19200, 5=38400, 6=57600, 7=115200	UNIT16	R/W	3	0...7	**40121**
Log mode	Log mode : bit 0=disabled/enabled	UNIT16	R/W	0		**40122**
Log sample time	Log sample time (sec)	UNIT16	R/W	1	1...65535	**40123**
Log name	Log name 15 letters max	UNIT16	R/W	0		**40124**
Log name	Log name 15 letters max	UNIT16	R/W	0		**40125**
Log name	Log name 15 letters max	UNIT16	R/W	0		**40126**
Log name	Log name 15 letters max	UNIT16	R/W	0		**40127**
Log name	Log name 15 letters max	UNIT16	R/W	0		**40128**
Log name	Log name 15 letters max	UNIT16	R/W	0		**40129**
Log name	Log name 15 letters max	UNIT16	R/W	0		**40130**
Log name	Log name 15 letters max	UNIT16	R/W	0		**40131**
RTC Year	RTC Year	UNIT16	R/W		2000...2099	**41001**
RTC Month	RTC Month	UNIT16	R/W		1...12	**41002**
RTC Day	RTC Day	UNIT16	R/W		1...31	**41003**
RTC Hour	RTC Hour	UNIT16	R/W		1...23	**41004**
RTC Minute	RTC Minute	UNIT16	R/W		0...59	**41005**
RTC Second	RTC Second	UNIT16	R/W		0...59	**41006**
Command	Command : value 1=Reset, 2=Save Cfg to EEPROM, 3=Set Factory CFG,	UNIT16	R/W			**42001**
Command 1	Command parameter 1	UNIT16	R/W			**42002**
Command 2	Command parameter 2	UNIT16	R/W			**42003**

Upgrade FIRMWARE:

The QA-TEMP is designed to upgrade the firmware via the USB port using a standard pen drive where the file will be placed.
The firmware will allow you to implement the functionality of the card and correct any anomalies that may occur.
In order to upgrade the firmware simply, remove power from the module, insert the pen drive with the file, restore power, at this point the card will automatically discharge the file and update the firmware without altering the configuration loaded during programming.
During the update phase the LED light will be intermittent FAIL.

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.

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)

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

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.

It is possible to configure the module via RS485 through the register map contained on this manual.

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.

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