MODBUS PROTOCOL

QPH-95 \\ QORP-95
QPH-95-TS \\ QORP-95-TS

Note: the 16-bit code of recognition of the type of probe is
obtained by reading the holding register at address 1. Are established
the following codes:
7E48H pH probe
7E58H Redox probe
For eventali other devices that use the same mechanism
recognition needs to be a code other than above.
Introduced Jul 2012 V1.8 serial probe

It is used to track the modbus protocol (RTU) serial 8N1 with speed 'set 9600, 19200, 38400 bps)
Are defined:
4 output registers (holding registers)
4 registers input.

WARNING MODBUS ADDRESS OF FACTORY FOR THE PROBES FOR PH is 5 THOSE REDOX is 7.

The following functions are supported:

func
3 Laws block of registers holding
4 laws input register block
6 write single holding register

The registers contain 16-bit integer (0 to 65535) with MSB-first coding.

The following registers are specified by its
address, the registers holding will be called HREG # where # denotes the address, for example HREG0 specifies the register to address 0.
So the 4 holding registers are HREG0-HREG3
Similarly, the four input registers are called IREG0-IREG3.

INPUT REGISTERS

Report number and information on the ADC:

IREG0 Report bits 19-16 of the serial number
IREG1 Report bits 15-0 of the serial
IREG2 in LSB value (0-4095) channel 0 (pH)
IREG3 in LSB value (0-4095) channel 1 (PT100)

The value of IREG2 L is the average of 4 readings of AD;
the value L is used for the determination of pH.
The value of IREG3 is the mean of 8 readings of AD and

it is determined from the temperature T

READ HOLDING REGISTERS

Report the following information:

HREG0 FW version: the number of units' specifies the smaller number, for example, 23 means V2.3
HREG1 device ID. The code specifies the type probe:

7E48H pH probe
7E58H Redox probe

HREG2 pH value measured in hundredths, for example the value 623 means pH = 6.23
HREG3 value measured by the temperature T expressed in tenths of a degree Celsius,
for example, the value 234 means T = 23.4 degrees

WRITE HOLDING REGISTERS

With the 6 you write a single holding register.
With it you can perform all the operations of setting and calibration.

HREG0 value of the sample of pH in hundredths:
for example the value of 623 means pH = 6.23 (used in the calibration to 2 points)
HREG1 This register is made the settings of the probe.
Will have the following values:

AYYYH Sets the 12-bit high YYY serial number
96XXH Set the low byte XX serial number and writes
the 20-bit serial number YYY: XX in the EEPROM (the 12-bit high
YYY have been previously written)
5AXXH Set the address of the probe XXH (00H
to FFH), initially the address is 5 (default) (the new
address is immediately operational)
4B00H Sets the baud rate of the probe at 9600 bps (default)
4B01H Sets the baud rate of the probe to 19200 bps
4B02H Sets the baud rate of the probe to 38400 bps
(New operating baud rate after reset of the probe)
3C00H Set the calibration factor (gain, offset)
default
3C01H Runs the 1-point calibration
3C02H Performs 2-point calibration
3C10H Sets the default for the temperature shift
3C11H Performs temperature calibration

HREG2 value of the sample of pH in hundredths: for example the
value of 623 means pH = 6.23 (used in the calibration
And 1 point in the 2-points)
HREG3 value of the sample temperature in tenths of degrees: to
example, the value 234 means 23.4 ° C (used in
temperature calibration)

A pH CALIBRATION POINT 1

In the 1-point calibration is determined only shift.
One proceeds as follows.

i) We introduce the probe into the sample and expects the readings are stable (equilibrium reached).
Is written in the register HREG2 the sample value (In cents, for example, if the sample has pH = 5.50 is writes the value 550)

ii) It is written in the register HREG1 value 3C01H (15,361 decimal) with previously collected data, the probe determines the new value of the shift and saves it in EEPROM, the value of the shift becomes immediately operational

If the calibration fails is emitted the exception 4 and is maintained the previous value of the shift
The calibration is considered failed if the calculated value of the parameter deviates too much from the default

2-POINT CALIBRATION pH

In the 2-point calibration are determined the slope and shift.
One proceeds as follows.

i) We introduce the probe into the sample and one expects the readings are stable (equilibrium reached).
Is written in the register HREG2 the value of sample 1 (In cents, for example, if the sample has pH = 4.00 is writes the value 400)

ii) We introduce the probe into the sample 2 and expects the readings are stable (equilibrium reached).
Is written in the register HREG0 the value of sample 2 (In cents, for example, if the sample has pH = 9.00 is writes the value 900)

iii) It is written in the register HREG1 value 3C02H (15,362 decimal) with previously collected data, the probe determines the new value of the slope and shift them saved in EEPROM, the values ??of these parameters are immediately operational

If the calibration fails is emitted the exception 4 and are maintained the previous values ??of the slope and the shift. The calibration is considered failed if the parameter value deviate too much from the default ones.

Note: The probe does not perform any check on the value of 2 samples and it is appropriate that the values ??of the sample 1 and sample 2 are not too close.

TEMPERATURE CALIBRATION

In the calibration of the temperature is determined only the shift. One proceeds as follows.

i) We introduce the probe into the sample and expects the reading is stable (equilibrium reached).
Is written in the register HREG3 the value of the sample (in tenths of a degree, for example, if the temperature is 23.4 ° C writes the value 234)

ii) It is written in the register HREG1 value 3C11H: with previously collected data will be 'given the new value of the shift and will be 'saved in EEPROM and the value the shift becomes immediately operational.

If the calibration fails is emitted the exception 4 and is maintained the previous value of the parameter.
The calibration is considered failed if the value of the parameter deviates too much from the default

********** REDOX **********

Redox-Sonde QORP-90

Note: the 16-bit code of recognition of the type of probe is obtained by reading the holding register at address 1. Are established the following codes:
7E48H pH probe
7E58H Redox probe
For any other devices that use the same mechanism recognition needs to be a code other than above.
Introduced Jul 2012 V1.4 serial probe

It is used to track the modbus protocol (RTU) serial 8N1 with speed 'set 9600, 19200, 38400 bps)
Are defined:
4 output registers (holding registers)
4 registers input.

WARNING MODBUS ADDRESS OF FACTORY FOR THE PROBES AND PH 'FOR 5 REDOX AND THOSE '7.

The following functions are supported:

func
3 Laws block of registers holding
4 laws input register block
6 write single holding register

The registers contain 16-bit integer (0 to 65535) with MSB-first coding.

The following registers are specified by its
address, the registers holding will be called HREG # where #denotes the address, for example HREG0 specifies the register to address 0.
So the 4 holding registers are HREG0-HREG3
Similarly, the four input registers are called IREG0-IREG3.

INPUT REGISTERS

Report number and information on the ADC:

IREG0 Report bits 19-16 of the serial number
IREG1 bits 15-0 of the serial
IREG2 in LSB value (0-4095) channel 0 (Redox)
IREG3 in LSB value (0-4095) channel 1 (PT100)

The value of IREG2 is the average of 4 readings of AD;
the value L is used for the determination of Redox.
The value of IREG3 is the mean of 8 readings of AD and
it is determined from the temperature T

READ HOLDING REGISTERS

Report the following information:

HREG0 FW version: the number of units' specifies the smaller number, for example, 23 means V2.3
HREG1 device ID. The code specifies the type probe:

7E48H pH probe
7E58H Redox probe

HREG2 Measured value of the Redox expressed in mV bias 10000;
for example the value 10 623 means Redox = 623 mV; the
value = -150 mV Redox means 9850

HREG3 value measured by the temperature T expressed in
tenths of a degree Celsius, for example, the value 234
means T = 23.4 degrees
WRITE HOLDING REGISTERS

With the 6 you write a single holding register.
With it you can perform all the operations of setting and calibration.

HREG0	Not used
HREG1	This register is made the settings of the probe. Will have the following values:
AYYYH	Sets the 12-bit high YYY serial number
96XXH	Set the low byte XX serial number and writes the 20-bit serial number YYY: XX in the EEPROM (the 12-bit high YYY have been previously written)
5AXXH	Set the address of the probe XXH (00H to FFH), initially the address is 7 (default) (the new address is immediately operational)
4B00H	Sets the baud rate of the probe at 9600 bps (default)
4B01H	Sets the baud rate of the probe to 19200 bps
4B02H	Sets the baud rate of the probe to 38400 bps (New operating baud rate after reset of the probe)
3C00H	Set the calibration factor (shift) default
3C01H	Performs calibration
3C10H	Sets the default for the temperature shift
3C11H	Performs temperature calibration
HREG2	value of the sample ORP mV bias of 10000, for example the value 10 623 means Redox = 623 mV (used in the calibration.
HREG3	value of the sample temperature in tenths of degrees: to example, the value 234 means 23.4 ° C (used in temperature calibration)

CALIBRATION OF REDOX

In the calibration is determined by the shift.
One proceeds as follows.

i) We introduce the probe into the sample and expects the readings are stable (equilibrium reached).
Is written in the register HREG2 the sample value (In mV with bias 10000, for example, if the sample has Redox = 550 mV it writes the value to 10550, and if the sample ORP = -200 mV writes the value 9800)

ii) It is written in the register HREG1 value 3C01H (15,361 decimal) with previously collected data, the probe determines the new value of the shift and saves it in EEPROM, the value of the shift becomes immediately operational

If the calibration fails is emitted the exception 4 and is maintained
the previous value of the shift. The calibration is considered failed if the calculated value of the parameter deviates too much from the default

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TEMPERATURE CALIBRATION

In the calibration of the temperature is determined only the shift. One proceeds as follows.

i) We introduce the probe into the sample and expects the reading is stable (equilibrium reached).
Is written in the register HREG3 the value of the sample (in tenths of a degree, for example, if the temperature and '23.4 ° C writes the value 234)

ii) It is written in the register HREG1 value 3C11H: with previously collected data will be determined by the new value of the shift and will be 'saved in EEPROM and the value the shift becomes immediately operational.

If the calibration fails is emitted the exception 4 and is maintained the previous value of the parameter. The calibration is considered failed if the value of the parameter deviates too much from the default