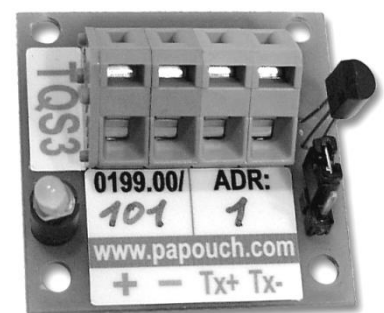




TQS3 MODBUS

Description of product modification with
MODBUS RTU



TQS3 MODBUS

MODBUS protocol

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INTRODUCTION

This document is about modification of TQS3 thermometer, with MODBUS RTU communication protocol.

In case you want to order TQS3 with MODBUS protocol, is necessary make a specification during order reservation. Additional (user's) change to the MODBUS protocol is not possible.

Default communication parameters:

Communication line default parameters are:

Speed.....	9600 Baud
Number of data bits.....	8
Parity.....	none
Number of stop-bits.....	1
Device ID	0x31

MODBUS – FUNCTION CODES OVERVIEW

0x03Read holding register

0x04Read input register

0x06Single write holding register

MEANING OF FUNCTIONAL CODES**0x03 – Read holding register****Read configuration enable**

Instruction reads status about permission for configuration changes.

Request:

Function code	1 Byte	0x03
Starting address	2 Bytes	0x0000
Quantity of Registers	2 Bytes	1

Reply:

Function code	1 Byte	0x03
Number of bytes	1 Byte	2
Register value	2 Bytes	0x0000 = permission for config. changes isn't accepted 0x00FF = permission for config. changes is granted

Error:

Error code	1 Byte	0x83
Exception code	1 Byte	01 or 02 or 03 or 04

Read device ID

Instruction reads device identification. Default is 0x31.

Request:

Function code	1 Byte	0x03
Starting address	2 Bytes	0x0001
Quantity of Registers	2 Bytes	1

Reply:

Function code	1 Byte	0x03
Number of bytes	1 Byte	2
Register value	1 Byte	ID values are in interval 1 to 247

Error:

Error code	1 Byte	0x83
Exception code	1 Byte	01 or 02 or 03 or 04

Read serial communication speed

Instruction reads actual communication speed.

Request:

Function code	1 Byte	0x03
Starting address	2 Bytes	0x0002
Quantity of Registers	2 Bytes	1

Reply:

Function code	1 Byte	0x03
Number of bytes	1 Byte	2
Register value	2 Bytes	Communication speed (baud) – code value: 1200 - 0003H 2400 - 0004H 4800 - 0005H 9600 - 0006H (<i>default setting</i>) 19200 - 0007H 38400 - 0008H 57600 - 0009H 115200 - 000AH

Error:

Error code	1 Byte	0x83
Exception code	1 Byte	01 or 02 or 03 or 04

0x04 – Read input register**Status**

Instruction reads status register of measured-out temperature.

Request:

Function code	1 Byte	0x04
Starting Address	2 Bytes	0x0000
Quantity of Input Registers	2 Bytes	1

Reply:

Function code	1 Byte	0x04
Number of bytes	1 Byte	2
Input Registers	2 Bytes	0x0000 = value is valid 0x0003 = Error – device error

Error:

Error code	1 Byte	0x84
Exception code	1 Byte	01 or 02 or 03 or 04

Temperature

Instruction executes single measurement of temperature.¹

Request:

Function code	1 Byte	0x04
Starting Address	2 Bytes	0x0001
Quantity of Input Registers	2 Bytes	0x0001

Reply:

Function code	1 Byte	0x04
Number of bytes	1 Byte	2
Input Registers	2 Bytes	Integer value. Result value equation : $temperature = value / 10$ Resultant temperature have a resolution 0,1°C.

Error:

Error code	1 Byte	0x84
Exception code	1 Byte	01 or 02 or 03 or 04

¹ Thermometer TQS3 dynamically changes internal time period (measure period) in accordance with read periode. In case you want to minimize device power consumption, use period longer than 30 sec. (Internal temperature conversion takes about 700 ms. During this conversion is TQS3 power consumption increased up 0.5 mA.)

0x06 – Single write holding register**Permission for configuration changes**

This instruction set up a permission for configuration changes. This instruction must be executed before writing instruction (write device ID, write serial communication speed). Permission is valid only for one following instruction. Instruction can be used with “broadcast” address.

Request:

Function code	1 Byte	0x06
Register Address	2 Bytes	0x0000
Register Value	2 Bytes	0x00FF = permission for config. changes is granted

Reply:

Function code	1 Byte	0x06
Register Address	2 Bytes	0x0000
Register Value	2 Bytes	0x0000 = permission for config. changes denied 0x00FF = permission for config. changes is granted

Error:

Error code	1 Byte	0x86
Exception code	1 Byte	01 or 02 or 03 or 04

Device ID settings

Instruction sets up device ID. Instruction can be executed after permitting configuration see [Permission for configuration changes](#) on page 8. Default ID is 0x31.

Request:

Function code	1 Byte	0x06
Register Address	2 Bytes	0x0001
Register Value	2 Bytes	New ID device, values in interval 1 to 247 (0x0001 to 0x00F7)

Reply:

Function code	1 Byte	0x06
Register Address	2 Bytes	0x0001
Register Value	2 Bytes	New ID device, values in interval 1 to 247 (0x0001 to 0x00F7)

Error:

Error code	1 Byte	0x86
Exception code	1 Byte	01 or 02 or 03 or 04

Serial communication speed settings

Instruction sets up communication line speed. Instruction can be executed after permitting configuration see [Permission for configuration changes](#) on page 8.

Processing of this command takes 1 second (response will be sent in 10 ms).

Request:

Function code	1 Byte	0x06
Register Address	2 Bytes	0x0002
Register Value	2 Bytes	Communication speed (baud) – code value: 1200 - 0003H 2400 - 0004H 4800 - 0005H 9600 - 0006H (<i>default setting</i>) 19200 - 0007H 38400 - 0008H 57600 - 0009H 115200 - 000AH

Reply:

Function code	1 Byte	0x06
Register Address	2 Bytes	0x0002
Register Value	2 Bytes	Communication speed (baud) – code value.

Error:

Error code	1 Byte	0x86
Exception code	1 Byte	01 or 02 or 03 or 04

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Industrial data communications, data line convertors, protocol convertors, RS232 / 485 / 422 / USB / Ethernet / GPRS / WiFi, data acquisition modules, intelligent temperature sensors, I/O modules, custom electronics applications and design according to requests.

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