

TH sensor

Temperature Humidity

Contents:

- 1. Design**
- 2. Hardware**
 - 2.1 Hardware parameters
 - 2.2 Sending parameters to RS485 after RESET
- 3. Wiring**
- 4. ModBus RTU communication protocol**
 - 4.1 Command 0x03 Read Registers
 - 4.2 Command 0x03 Read Configuration Registers
 - 4.3 Command 0x06 Write Registers
 - 4.4 Default parameters
 - 4.5 Range of addresses
- 5. Examples for Modbus RTU**
 - 5.1 Set the communication speed from 115200 Bd to 9600 Bd
 - 5.2 Set the communication speed from 9600 Bd to 115200 Bd
 - 5.3 Read 8 registers from register 100
 - 5.4 Getting the current address with universal address 0xff
 - 5.5 Setting the new address
 - 5.6 Changing the address from 1h to 2h
 - 5.7 Reading measured values
- 6. Used sensors**
 - 6.1 Humidity and Temperature Sensor IC
- 7. Dimensions**



1. Design

Name	MPL3115A2 Sensor	HWS version	Comment
TH_X	YES	TH_x*	

2. Hardware

2.1 Hardware parameters			
Measurement	Value	Range	Comments
	Temperature	-30°C ÷ 60°C	In tenth of °C
	Relative Humidity	0 ÷ 99.9%	In tenth of %
Power	6 - 26V DC/ max 1.2 mA or 1 mW		
Interface	RS485 - MODBUS RTU		
Hardware	SHT35 TH sensor		
Comm. Speed	9600 or 115200 Bd		
Dimension	Φ15 x 106 mm		
Design	Interior, Exterior		
Setup	Via software Bootloader or via ModBus directly		

2.2 Sending parameters to RS485 after RESET		
	Parameter	Comments
1.row	112:RESET=4<cr><lf>	112 – address (dec), 4 – com. Protocol
2.row	112:SHT=1<cr><lf>	112 – address (dec), SHT35 – OK, 0 – NOOK

3. Wiring, standard cable length: 3 m

3.1 Wire color	Comment
Green	Ground
White	12-24V DC
Yellow	RS485 +
Brown	RS485 -

4. ModBus RTU communication protocol

4.1 Command 0x03 Read Registers	
Register Number	Parameter
0	Temperature in tenth of degrees from SHT35
1	Relative humidity in tenth of % from SHT35
2	Dew point in tenth of degrees from SHT35

4.2 Command 0x03 Read Configuration Registers			
Register Number	Register name	Description	Units/Notes
100	Address	1 – 247	
101	Communication speed	0–115200, 1–9600	Bd
102	HWS version 0	Read Only	TH
103	HWS version 1	Read Only	—
104	HWS version 2	Read Only	x*
105	HWS version 3	Read Only	:1
106	HWS version 4	Read Only	.0
107	Communication protocol		1 ÷ 5

4.3 Command 0x06 Write Registers			
Register Number	Register name	Description	Units/Notes
100	Address	1 – 247	
101	Communication speed	0 – 115200, 1 - 9600	Bd
102-106	Read Only		
107	Comm. Protocol	1 - INGSIMON 2 - HTML 3 - MODBUS ASCII 4 – MODBUS RTU 5 – MODBUS TCP	Default: MODBUS RTU (4)

4.4 Default parameters		
Parameter	Value	Comment
Address	0x70h (112d)	
Communication speed	115200, N, 8,1	
Communication Protocol	0x04	MODBUS RTU

4.5 Range of address	
Address [dec]	Comment
1 - 247	For sensors
248 - 254	Reserve
255	Universal address – used only to read registers Writing to registers does not work with this address

5. Examples for Modbus RTU

Example 5.1

Set the communication speed from 115200 Bd to 9600 Bd for Address 0x70 (112 dec)

Poll	70 06 00 65 00 01 52 F4	The response is at 115200 Bd. In the next communication will use 9600 Bd
Response	70 06 00 65 00 01 52 F4	

Example 5.2

Set the communication speed from 9600 Bd to 115200 Bd for Address 0x70 (112 dec)

Poll	70 06 00 65 00 00 93 34	The response is at 115200 Bd. In the next communication will use 9600 Bd
Response	70 06 00 65 00 00 93 34	

Example 5.3

Read 8 registers from 100 from Address 0x70 (112 dec)

Poll	70 03 00 64 00 08 0F 32
Response	70 03 10 00 70 00 00 54 48 5F 5F 78 2A 3A 31 2E 30 00 04 CE 5C

Meaning:

Byte [hex]	Description	Comment
70	Address	
03	function code	Read holding register
10	count of bytes (16 dec)	
00 70	Address	

00 00	communication speed	115200 Bd
54 48	TH	Temperature, Humidity
5F 5F	—	—
78 2A	x*	version, * - reserve
3A 31	:1	
2E 30	.0	
00 04	communication protocol	4 - MODBUS RTU
CE 5C	CheckSum	

Example 5.4

Getting the current address from a sensor with the unknow address with universal address 0xff
Be aware, that only 1 equipment is connected to the Modbus network.

Poll	FF 03 00 64 00 01 D0 0B	Read register 100
Response	FF 03 02 00 70 90 74	70 – equipment’s address

Example 5.5

How to set the address. Changing the address from 70h to 1h.

Be aware, that only 1 equipment is connected to the Modbus network.

Poll	70 06 00 64 00 01 03 34	Write to register 100 value 1
Response	70 06 00 64 00 01 03 34	01 – equipment’s new address

The next communication with the equipment will be at address 1

Example 5.6

How to set the address. Changing the address from 1h to 2h.

Be aware, that only 1 equipment is connected to the Modbus network.

Poll	01 06 00 64 00 02 49 D4	Write to the register 100 value 2
Response	01 06 00 64 00 02 49 D4	02 – equipment’s new address

The next communication with the equipment will be at address 2

Example 5.7

Reading measured values from 0. register, 3 registers. Address 70h.

Poll	70 03 00 00 00 03 0F 2A	Read 3 registers
Response	70 03 06 01 21 01 5F 00 6E 44 F3	

Meaning:

70 – address

03 – function

06 – count of bytes

01 21 → $1*256 + 2*16 + 1 = 289 \rightarrow 28.9 \text{ }^\circ\text{C}$

01 5F → $1*256 + 5*16 + 15 = 351 \rightarrow 35.1 \text{ \%Rh}$

00 6E → $0*256 + 6*16 + 14 = 110 \rightarrow 11.0 \text{ }^\circ\text{C dew point}$

44 73 CRC

6. Used sensors

6.1 Humidity and Temperature Sensor IC

- Accuracy tolerance ± 2 %RH
- Repeatability ± 0.1 %RH
- Hysteresis ± 1 %RH
- Nonlinearity < 0.1 %RH
- Operating Range extended 0 to 100 %RH
- Long Term Drift 5 Typ. < 0.25 %RH/year



7. Dimensions - holders

Example:

