APAR – Sales Office
05-090 Raszyn, ul. Gałczyńskiego 6
phone. (+48) 22-101-27-31, 22-853-48-56, 22-853-49-30
fax (+48) 22-101-27-33
internet: www.apar.pl/en, e-mail: automatyka@apar.pl

USER MANUAL

version
with LCD display

version
without LCD display

ATMOSPHERIC PRESSURE, HUMIDITY AND TEMPERATURE TRANSDUCER AR253

Version 1.0.2
2023.01.13

Thank you for choosing our product.
This manual will enable proper handling, secure use and full use of the device.
Before assembling and starting the device please read and understand this manual.
If you have additional questions, please contact our technical consultant.

TABLE OF CONTENTS

1. SAFETY RULES 2
2. ASSEMBLY RECOMMENDATIONS 3
3. GENERAL CHARACTERISTICS OF THE TRANSDUCER 3
4. CONTENTS OF THE SET 4
5. TECHNICAL DATA 4
6. HOUSING DIMENSIONS AND ASSEMBLY DATA 5
7. DESCRIPTION OF CLAMPING RAILS AND ELECTRICAL CONNECTIONS 6
8. FUNCTIONS OF THE KEYS ON THE CONTROL PANEL 7
9. SETTING CONFIGURATION PARAMETERS 8
10. METHOD OF DISPLAYING MEASUREMENTS, MESSAGES AND ERROR SIGNALING 10
11. CONNECTING TO A COMPUTER AND AVAILABLE SOFTWARE 10
12. RS485 COMMUNICATION INTERFACE (according to EIA RS-485) 11
13. MODBUS–RTU SERIAL TRANSMISSION PROTOCOL (SLAVE) 11

This appliance is subject to warranty according to the general rules
of warranty available on the manufacturer's website www.apar.pl/en

Pay special attention to the texts marked with this sign

The manufacturer reserves the right to make changes to the design and software of the device without any deterioration of technical parameters (some functions may not be available in older versions).

1. SAFETY RULES

- before using the device, please read this manual carefully
- in order to avoid electric shock or damage to the device mechanical and electrical assembly should be commissioned to qualified personnel
- Before turning on the power, make sure that all cables have been connected correctly
- before making any modifications to the wiring connections, turn off the voltage supplied to the device
- ensure proper working conditions, in accordance with the technical specifications of the device (supply voltage, humidity, temperature) – see chapter 5

2. ASSEMBLY RECOMMENDATIONS

The device has been designed to provide an adequate level of resistance to most of the disturbances that can occur in industrial and home environments. In environments with an unknown level of interference, it is recommended to use the following measures to prevent any possible disruption of the device's operation:

a) do not supply power to the device from the same lines as large capacity devices without proper mains filters

b) use shielding of power, sensor and signal wires, and screen-grounding should be single-point, made as close as possible to the device

c) avoid laying measuring (signal) wires in the immediate vicinity and parallel to power and supply cables

d) it is recommended to twist signal wires in pairs or use a ready UTP wire

e) avoid the proximity of remotely controlled devices, moving iron meters, high power loads, loads with phase or group power control and other devices generating large impulse noise

f) ground or neutralize the metal rails on which the rail devices are mounted

Before starting working with the device, remove the protective foil of the LCD display.

3. GENERAL CHARACTERISTICS OF THE TRANSDUCER

- high-end digital sensor for atmospheric pressure (p) and humidity (RH) and air temperature (T) with protective filter (ABS material, 1mm gap width and 0.15 mm stainless steel mesh)
- probe integrated into the housing, on the wire or on the stainless steel tube
- 2 current outputs 4÷20 mA (2-wire with current loop power supply) or 2 voltage outputs 0÷10 V (3-wire) or RS485 interface
- for analog outputs, possible connection with any measured value
- programmable ranges of processing measured values
- LCD display with keyboard (optional) for viewing measurements and configuration of parameters
- parameter configuration from the keyboard via RS485 or PR port (AR956 or AR955 programmer) and a free ARsoft-CFG computer program that allows you to quickly set and copy all configuration parameters
- high stability of measurements
- IP65 protection level ensured by the housing, increasing work reliability thanks to high resistance to the penetration of water and dust as well as surface condensation of water vapor inside the device, IP40 probe (the measuring probe is not resistant to flooding or condensation of water vapor inside it)
- calculation of dew/frost point [°C], absolute humidity [g/m3] (calculation for atmospheric pressure 1013 hPa) with the possibility of linking the calculated values to an analog output
- for the transducer with RS485 all measurements and calculated values available for reading in the register map MODBUS

NOTE:

For humidity and temperature, it is recommended to periodically check / calibrate the device in accordance with the requirements binding at the installation site or every 12 months.

CAUTION

- before using the device, read this user manual and correctly perform electrical and mechanical installation and parameter configuration.

- when setting transducer parameters using the AR955, AR956 programmer it is necessary to configure the ARsoft-CFG program properly

A detailed description of the transducer configuration parameters is available in chapter 9.

4. CONTENTS OF THE SET

- tranducer
- user manual

5. TECHNICAL DATA

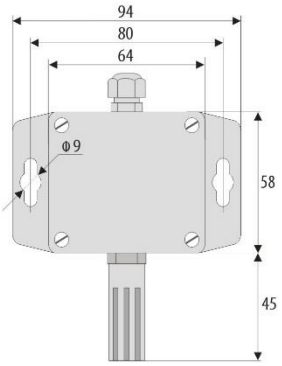
Measuring range for the probe (Sensirion and Bosch sensors)			0÷100 %RH, -30÷80 °C, 300÷1100 hPa **do not pour the water over the measurement probe**
Sensor cover			cover made of ABS material, gap width 1mm and stainless steel mesh, 0.15 mm mesh
Measurement accuracy		humidity	typically ±2 % RH in the whole measurement range, maximum ±2,5 %RH in the range of 0÷90 %RH **(1)**
		temperature	typically ±0.3°C, max. ±0.4°C in the whole measurement range **(1)**
		pressure	typically ±1 hPa, max. ±2 hPa in the whole measurement range
Additional errors	hysteresis		±0.8%RH
	repeatability		±0,1 %RH, ±0,1 °C
	long-term stability		< 0,25 %RH / year **(2)**, < 0.03 °C / year, ±1 hPa / year
Response time (τ 63%) to the step change in the measured value			8s **(for air flow >3,6 km/h)**
Measurement period			1s
LCD display (optional)			4 digits, 10mm high, without backlighting
Reading measurement resolution			programmable: 0,1 or 1 [%RH, °C, g/m^3], constant for pressure measurement: 1 [hPa]
Analog outputs (without galvanic isolation from the power supply)	current 4÷20mA (powered in current loop)		maximum resolution ~14,5µA, ampacity R_o [Ω] < (Usup - 12)V / 22 mA
	voltage 0÷10V		max resolution ~9,1mV, ampacity Io<4,5mA (Rw>2,5kΩ)
	output error		basic, <0,1%, additional ±0,01%/°C of the output range
Communication interfaces (RS485 and PR, do not use simultaneously)	PR programming connector, standard		- 2,4 kb/s speed (0,6÷115,2 kb/s for the version with RS485) - 8N1 character format (8 bits of data, 1 bit of stop, no parity bit) - MODBUS-RTU protocol (SLAVE) - without galvanic isolation from the supply voltage
	RS485, only in RS version		
Power supply (power consumption by LCD display is negligible)	version 4÷20mA		12÷36 Vdc, (2-wire, 2P) current loop power supply
	version 0÷10V		18÷30 Vdc, current consumption without output load max. ~8mA
	RS485 version		9÷28 Vac or 9÷36 Vdc, current consumption ~6 mA
Rated operating conditions	without LCD	-30 ÷ 80 °C	**for humidity < 95 %RH (without condensation, do not pour water over the probe)**
	with LCD	-20 ÷ 70 °C	
Working environment			air and neutral gases
Enclosure protection rating and mounting method			IP65 (transducer), IP40 (sensor), wall mounting
Operating position			any (or sensor cover towards the ground when the transducer is exposed to contact with water, water splashes)
Weight			~120 g (with integrated probe and LCD)
Electromagnetic compatibility (EMC)			resistance: according to PN-EN 61000-6-2 norm
			emissivity: according to PN-EN 61000-6-4 norm

Notes: **(1)** - The sensor manufacturer performs factory calibration and guarantees typical measurement accuracy measurement accuracy for 90% of its products.
(2) - it is recommended to periodically calibrate the device in accordance with the requirements binding at the installation site or every 12 months

6. HOUSING DIMENSIONS AND ASSEMBLY DATA

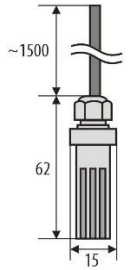
a) general data and dimensions for the standard version (integrated probe)

Housing type	industrial IP65
Material	polycarbonate
Housing dimensions	58 x 94 x 35 mm
Mounting	2 holes Φ9 mm, 80mm spacing, narrower part of the hook holder with a max diameter 5 mm
Cross-sections of wires	1,5 mm^2

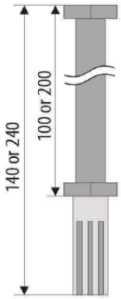


b) dimensions for probes in various designs (order option)

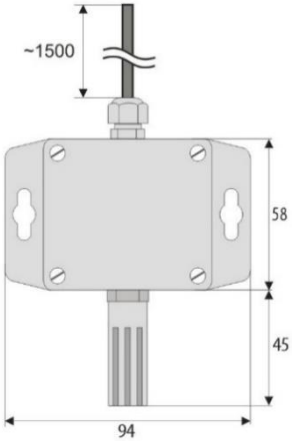
b.1) An external probe with a wire AR252/2



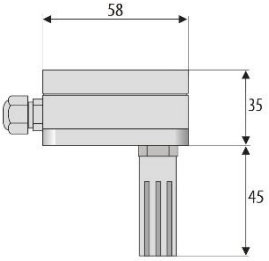
b.2.) A probe on a stainless steel pipe AR253/L150 or AR253/L250



b.3) An external probe in an enclosure with a wire AR253/3



b.4) A probe integrated with the enclosure in the rear (channel) version AR253/T



c) wiring assembly

- before any changes in the wiring, disconnect the supply voltage

- unscrew 4 screws in the transducer front cover and remove it from the device
- in LCD version **carefully** remove the display from the bolt connectors (perpendicularly to the front surface)
- connectors for connecting power, output and signal cables become accessible, chapter 7

- insert electrical wires into the housing through cable glands
- after completing activities connected with mounting the device and installation of the wiring carefully assemble the device in the reverse order to that described above
- obtaining IP65 tightness class requires precise tightening of cable gland nuts and housing cover

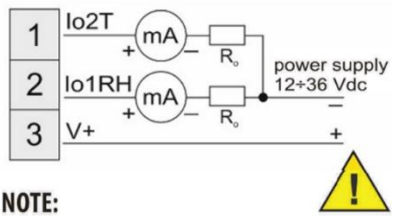
NOTE:

To avoid possible mechanical and electrostatic damage, special care should be taken during assembly activities inside the device.

7. DESCRIPTION OF CLAMPING RAILS AND ELECTRICAL CONNECTIONS

Table 7.1. Numbering and description of clamping rails, version with current output

Clamps	Description
1	Io2 current output (4÷20mA) configurable by parameter 7: out2, chapter 9, Table 9.1,
2	Io1 current output (4÷20mA) configurable by parameter 6: out1, chapter 9, Table 9.1,
3	power supply input V+



NOTE:

The current loop Io1RH must ALWAYS be closed, even when it is not in use

Table 7.2. Numbering and description of terminal strips, version with voltage output

Clamps	Description
1	voltage output Uo2 (0÷10V) configured with parameter 7: out2, chapter 9, Table 9.1
3	voltage output Uo1 (0÷10V) configurable by parameter 6: out1, chapter 9, Table 9.1
2, 4, 5	common ground (minus for outputs and power supply)
6	power supply input V+

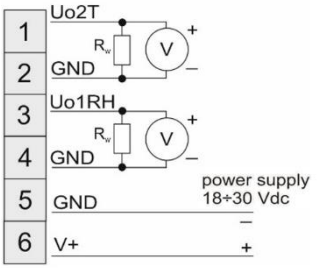
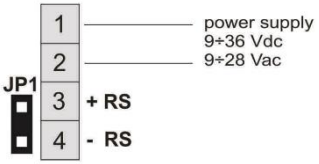


Table 7.3. Numbering and description of terminal strips, RS485 version

Clamps	Description
1-2	Vac, Vdc power supply input
3	+ RS
4	- RS
JP1	electrical jumper terminating the line of the RS485 interface with a 120 Ω resistor (termination is on when the JP1 is shorted)



V+ - power supply voltage
(mA) - measuring device (milliamperometer)
(V) measuring device (voltmeter)
Ro, Rw - load resistance, internal of the meter, controller, etc.

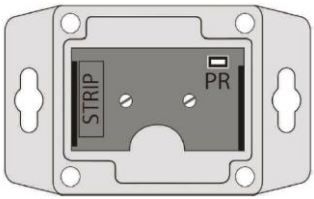


Fig. 7. Location of the terminal strip and the **PR** programming socket

8. FUNCTIONS OF THE KEYS ON THE CONTROL PANEL

Fig. 8. Description of the control panel

a) button functions in the measurement display mode

Key	**Description** [and the method of marking in the content of the manual]
▲ + ▼	**[UP]** and **[DOWN]** (simultaneously): input in the parameter configuration menu (after hold time longer than 1s), chapter 9

b) key functions in the parameter configuration menu (chapter 9)

Key	**Description** [and the method of marking in the content of the manual]
SET	**[SET]** : - selection of the item displayed in the configuration menu (entering a lower level) - edits the current parameter (the parameter value blinks) - approving and saving the edited parameter value
▲ lub ▼	**[UP]** or **[DOWN]**: - moves to the next or previous parameter (submenu) - changing the value of the edited parameter
▲ + ▼	**[UP]** and **[DOWN]** (simultaneously): - canceling changes to the edited value (the blinking stops) and return to the previous menu (one level above) - returns to the measurement display mode (after hold time longer than 0,5s)

NOTE:

Connecting other devices than the AR955 or AR956 programmer to the PR socket may result in damage to the connected device and the transducer.

9. SETTING CONFIGURATION PARAMETERS

All the configuration parameters of the device are stored in the non-volatile internal memory.
There are two ways to configure the parameters:

1. From the keyboard on the control panel (available only with LCD version):
- from the mode where the input measurements are displayed in the configuration menu (press **[UP]** and **[DOWN]** buttons simultaneously for more than 1 second) until the **CONF** message appears
- after entering the configuration menu (with the message **CONF**) display shows the mnemonic parameter name (**dot** <-> **FILt** <-> **dISP** <-> etc.)
- with the **[UP]** or **[DOWN]** keys go to the appropriate parameter
- to change the value of the current parameter, briefly press the **[SET]** key (flashing in edit mode)
- change the value of the parameter being edited using the **[UP]** or **[DOWN]** keys
- confirm the changed parameter value with the **[SET]** key or cancel with the **[UP]** and **[DOWN]** keys (simultaneous, short press) - press **[UP]** and **[DOWN]** again to return to the main configuration menu (one level above)
- exit configuration: long pressing the **[UP]** and **[DOWN] keys** or waiting for approx. 2 min

2. Use the AR955/AR956 programmer and the ARSOFT-CFG software (additional description in chapter 11):
- connect the device to a computer port and to start and configure the ARSOFT-CFG application
- after the connection has been established, the current measured values are displayed in the software's window
- setting and viewing of the device parameters is possible in the parameter edition window
- new parameter values must be confirmed with the ***Approve changes*** key
- the current configuration can be saved to a file or set with values read from the file

NOTICE:
- before disconnecting the device from the computer, use ***the Disconnect the device*** (ARSOFT-CFG) key
- in the absence of a response:
  - check in the configuration edition, port number, MODBUS ***address of the device*** (default baud rate for the version with RS485 is 2400 bit/s, MODBUS address=1),
  - make sure that the serial port drivers in the computer have been properly installed for AR955/AR956 programmer
  - disconnect for a few seconds and then reconnect the AR955/AR956 programmer
  - restart the computer

If a difference is found between the indications and the actual measured values, it is possible to tune the zero for the specific sensor: parameters **CO-H**, **CO-t**, **CO-P** (calibration of the zero point).

In order to restore the default settings you can use the file with the default configuration in the ARSOFT-CFG software.

NOTICE:
Default transmission parameters (for version with RS485) in the ARSOFT-CFG software: 2400 bit/s, MODBUS address = 1

Table 9.1. Configuration parameters for versions with 4÷20mA current output or 0÷10V voltage output

Parameter	Range of parameter variability and description		Default settings
0: display resolution **(1)**	**0**	resolution **1** [%RH, °C, g/m³, hPa]	**1**
	1	resolution **0.1** [%RH, °C, g/m³]	
1: **FILt** filtration **(2)**	**1** ÷ **10**	digital filtration of measurements (response time)	**5**
2: **dISP** 1st displayed value	**rEHu**	measured relative humidity [%RH]	**rEHu** [%RH]
	tEMP	measured sensor temperature [°C]	

	AbHu	calculated absolute humidity [g/m³] **(3)**	
	dEPt	calculated dew/frost point [°C] **(3)**	
	PrES	atmospheric pressure measurement [hPa]	
3: d.S2 2nd displayed value	rEHu ÷ PrES	analogously to parameter 2: d.S1	tEMP [°C]
4: d.S3 3rd displayed value	rEHu ÷ PrES	analogously to parameter 2: d.S1	PrES [hPa]
5: dPEr switching time of displayed values	10 ÷ 100	display time of values selected with parameters 2: d.S1 , 3: d.S2, 4: d.S3 **(4)**	40 s
6: out1 control signal for output 1, Io1 or Uo1	rEHu ÷ PrES	selection of the measured value to control output 1, analogously to parameter 2: d.S1	PrES
7: out2 control signal for output 2, Io2 or Uo2	rEHu ÷ PrES	selection of the measured value to control output 2, analogously to parameter 2: d.S1	rEHu
8: Lo1 lower value of the measurement range of the Io1 or Uo1 output	-50 ÷ 2000	indication for 4 mA or 0 V on output 1, unit depending on the setting of parameter 6: out1	300 [hPa]
9: H.1 upper value of the measurement range of the Io1 or Uo1 output	-50 ÷ 2000	indication for 20 mA or 10 V on output 1, unit depending on the setting of parameter 6: out1	1100 [hPa]
10: Lo2 lower value of the measurement range of the Io2 or Uo2 output	-50 ÷2000	indication for 4 mA or 0 V on output 2, unit depending on the setting of parameter 8: out2	0 [%RH]
11: H.2 upper value of the measurement range of the Io2 or Uo2 output	-50 ÷ 2000	indication for 20 mA or 10 V on output 2, unit depending on the setting of parameter 8: out2	100 [%RH]
12: co-H zero point calibration for humidity [%RH]	-200 ÷ 200	zero point offset for relative humidity	00 [%RH]
13: co-t zero calibration for temperature [°C]	-200 ÷ 200	zero point offset for the sensor's temperature	00 [C]
14: co-P zero point calibration for atmospheric pressure [hPa]	-200 ÷ 200	zero point offset for atmospheric pressure measurement	00 [hPa]

Table 9.2. Configuration parameters for the RS485 version

Parameter	Range of parameter variability and description		Default settings
0: display resolution **(1)**	0	resolution **1** [%RH, °C, g/m³]	1
	1	resolution **0.1** [%RH, °C, g/m³]	
1: FiLt filtration **(2)**	3 ÷ 10	digital filtration of measurements (response time)	5
2: d.S1 1st displayed value	rEHu	measured relative humidity [%RH]	rEHu [%RH]
	tEMP	measured sensor temperature [°C]	
	AbHu	calculated absolute humidity [g/m³] **(3)**	
	dEPt	calculated dew/frost point [°C] **(3)**	
	PrES	atmospheric pressure measurement [hPa]	
3: d.S2 2nd displayed value	rEHu ÷ PrES	analogously to parameter 2: d.S1	tEMP [°C]

4: d.S3 3rd displayed value	rEHu ÷ PrES	analogously to parameter 2: d.S1	PrES [hPa]
5: dPEr switching time of displayed values	10 ÷ 100	display time of values selected with parameters 2: d.S1, 3: d.S2, 4: d.S3 **(4)**	40 s
6: co-H zero point calibration for humidity [%RH]	-200 ÷ 200	zero point offset for relative humidity	00 [%RH]
7: co-t zero calibration for temperature [°C]	-200 ÷ 200	zero point offset for the sensor's temperature	00 [C]
8: co-P zero point calibration for atmospheric pressure [hPa]	-200 ÷ 200	zero point offset for atmospheric pressure measurement	00 [hPa]
9: Addr MODBUS address	1 ÷ 247	MODBUS address of the device	1
10: br baud rate	0.6 ÷ 115.2	baud rate [kb/s], for RS485 and AR955 programmer 0.6, 1.2, 2.4, 4.8, 9.6, 14.4, 19.2, 38.4, 57.6, 115.2 [kb/s]	2.4 [kb/s]

Notes: **(1)** - only for displaying data on the control panel, not for pressure measurement (fixed position of dot 0)

(2) the response time depends on the degree of filtration . A higher degree of filtration means a smoothened value of the measurement and longer response time. Response time = sensor response + filtration level / 2 [s]

(3) – values calculated on the basis of relative humidity measurement %RH and temperature °C for atmospheric pressure P = 1013hPa

(4) - in order to display the value of only one quantity, the following condition must be met: d.S1 = d.S2 = d.S3

10. METHOD OF DISPLAYING MEASUREMENTS, MESSAGES AND ERROR SIGNALING

a) examples of displaying measured values and units (dot position 1):

41.2	relative humidity 41,2 %RH (unit indicator - horizontal line at the top of the display)
6.3	absolute humidity 6.3 g/m^3 (no unit indicator, empty segment on the right side of the display)
15.8_	temperature 15.8 °C or dew point temperature 15.8 °C (unit indicator - horizontal line at the bottom of the display)
998	atmospheric pressure is 998 hPa (no unit indicator, value adjusted to the right side of LCD)

b) measurement errors:

Code	Possible causes of the error
----	exceeding the measuring range from the top
____	exceeding the measuring range from the bottom
----	no communication with the sensor (sensor damage or interruption of electrical connections)

c) other messages:

Code	Description of the message
Conf	entry in the parameter configuration menu

11. CONNECTING TO A COMPUTER AND AVAILABLE SOFTWARE

Connecting the transducer to a computer may be useful (or necessary) to configure parameters or to copy settings to other transducers of the same type. As a standard, the transducers are equipped with a **PR** port enabling connection to a computer via the AR955, AR956 programmer using the MODBUS-RTU communication protocol. The following application is available for download from the ***www.apar.pl/en*** website in the "*Download*" section, for Windows 7/8/10 operating systems):

Name	Description of the program
ARsoft-CFG (free of charge)	- display of current measurement data from the connected device - setting configuration parameters such as the type of measurement signal, range of indications, options, display, etc. - creation the disc a file with the extension "cfg" containing the current configuration of parameters for reuse (copying of configuration) - the program requires communication with the device via the **PR** port (AR956 or AR955)

NOTE:

Before establishing the connection, make sure that the transmission speed (applies to the version with RS485) and the MODBUS address in the options of the ARsoft program are the same with the device settings. In addition, in the ARSoft options, select the serial COM port used (for the AR956/AR955 programmer or RS485/USB converter, this is the name given by the operating system during the installation of the drivers).

12. RS485 COMMUNICATION INTERFACE (according to EIA RS-485)

The installation specification for the interface in the RS485 standard is as follows:

- maximum cable length - 1 km (follow installation guideliness, chapter 2, sub-items b, c, d)
- maximum number of devices in a RS485 line - 30, in order to increase the number, use RS485/RS485 amplifiers
- termination and polarizing resistors when the MASTER is at the start of the line (Fig.12):
  - at the start of the line - 2 x 820Ω to the ground and +5V MASTER-A and 150Ω between lines
  - at the end of the line - 150Ω between lines
- termination and polarizing resistors when the MASTER is in the centre of the line:
  - at the converter - 2 x 820Ω, to the ground and +5V to the converter
  - at both ends of the line - 150Ω each between the lines

Equipment from different manufacturers that form the RS485 network (e.g. RS485/USB converters) may have integrated polarizing and terminating resistors; in such case there is no need to use external elements.

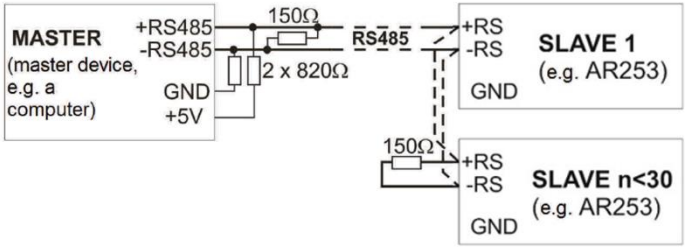


Fig. 12. Pictorial diagram of the RS485 network

13. MODBUS–RTU SERIAL TRANSMISSION PROTOCOL (SLAVE)

Character format : 8 bits, 1 stop bit, no parity bit
Available functions : READ - 3 or 4, WRITE – 6

Table 13.1. Query frame format for the READ function (frame length - 8 bytes):

address of the device	function 4 or 3	address of register to be read: 0 ÷ 30 (0x001E)	number of registers to be read: 1 ÷ 31 (0x001F)	CRC checksum
1 byte	1 byte	2 bytes (HB-LB)	2 bytes (HB-LB)	2 bytes (LB-HB)

Example 13.1. Reading of a register with address 0: 0x01 - 0x04 - 0x0000 - 0x0001 - 0x31CA

Table 13.2. Query frame format for the WRITE function (frame length - 8 bytes):

address of the device	function 6	register address to be written: 0 ÷ 30 (0x001E)	register value to be written	CRC checksum
1 byte	1 byte	2 bytes (HB-LB)	2 bytes (HB-LB)	2 bytes (LB-HB)

Example 13.2. Writing a register with address 10 (0xA) with the value 0: 0x01 - 0x06 - 0x000A - 0x0000 - 0xA9C8

Table 13.3. Response frame format for the READ function (minimum frame length - 7 bytes):

address of the device	function 4 or 3	number of bytes in the data field (max. 31*2=62 bytes)	data field - register value	CRC checksum
1 byte	1 byte	1 byte	2 ÷ 64 bytes (HB-LB)	2 bytes (LB-HB)

Example 13.3. Response frame for register value equal to 0: 0x01 - 0x04 - 0x02 - 0x0000 - 0xB930

Table 13.4. Reply frame format for the WRITE function (frame length - 8 bytes):

copy of the query frame for the WRITE function (Table 13.2)

Table 13.5. Specific answer (errors: function field = 0x84 or 0x83, in case of the READ function and 0x86 in case of the WRITE function):

Error code (HB-LB in data field)	**Error description**
0x0001	non-existing register address
0x0002	incorrect register value to be written
0x0003	incorrect function number

Example 13.5. Error frame for a non-existing register address to be read:
0x01 - 0x84 - 0x02 - 0x0001 –0x5130

Table 13.6. Maps of registers for the MODBUS-RTU protocol for the transducer version with the RS485

Register address HEX (DEC)	**Value (HEX or DEC)**	**Description of register and access type** (R- read only register, R/W - read and write register)		
0x00 (0)	-	not used or reserved		**R**
0x01 (1)	2530 ÷2539	device ID		**R**
0x02 (2)	0 ÷ 99	software version		**R**
0x03 ÷ 0x05	-	not used or reserved		**R**
0x06 (6)	0 ÷ 1000	measured value of the relative humidity [%RH]	value in the U2 code, no comma **(resolution 0,1)** [%RH, °C, g/m³]	**R**
0x07 (7)	-300 ÷ 800	measured value of the temperature [°C]		**R**
0x08 (8)	0 ÷ 999	calculated value of the absolute humidity [g/m³]		**R**
0x09 (9)	-300 ÷ 1000	calculated value of the dew /frost point [°C]		**R**
0x0A (10)	3000 ÷ 11000	measured atmospheric pressure value [hPa]	value in the U2 code, no comma **(resolution 0,1)** [hPa]	**R**
0x0B ÷ 0x13	-	not used or reserved		**R**
Configuration parameters (chapter 9, table 9.2)				
0x14 (20)	0 ÷ 1	parameter 0: dot dot position, display resolution		**R/W**
0x15 (21)	3 ÷ 10	parameter 1: FiLt degree of digital filtration		**R/W**
0x16 (22)	0 ÷ 8	parameter 2: dis1 1st displayed value		**R/W**
0x17 (23)	0 ÷ 8	parameter 3: dis2 2nd displayed value		**R/W**

0x18 (24)	0 ÷ 8	parameter 4: d.S3 2nd displayed value	**R/W**
0x19 (25)	10 ÷ 100	parameter 5: d.S3 switching time of displayed values	**R/W**
0x1A (26)	-200 ÷ 200	parameter 6: d.S3 zero point calibration for relative humidity	**R/W**
0x1B (27)	-200 ÷ 200	parameter 7: d.S3 zero point calibration for sensor temperature	**R/W**
0x1C (28)	-200 ÷ 200	parameter 8: d.S3 zero point calibration for atmospheric pressure measurement	**R/W**
0x1D (29)	1 ÷ 247	parameter 9: d.S3 MODBUS address	**R/W**
0x1E (30)	0 ÷ 9	parameter 10: d.S3 baud rate 0 = 0.6, 1 = 1.2, 2 = 2.4, 3 = 4.8, 4 = 9.6, 5 = 14.4, 6= 19.2, 7 = 38.4, 8 = 57.6, 9 = 115.2 [kb/s]	**R/W**