This user guide is for devices with the software version 1.0.0 or newer.

MOUNTING

Device is installed to air duct measuring point by help of flange. Assembly location of the device should be chosen with care. All error factors which affects to the measurement, must be prevented well as possible. The following list defines the typical measurement error factors.

- Ambient temperature is too low or high.
- Ambient humidity is too high.
- Exposure to vibration.
- Assembly location is too close to heat source.
- Too tight assembly location. Device should be installed so, that it is easy to service.

IMPORTANT: Remove the device before cleaning the duct.

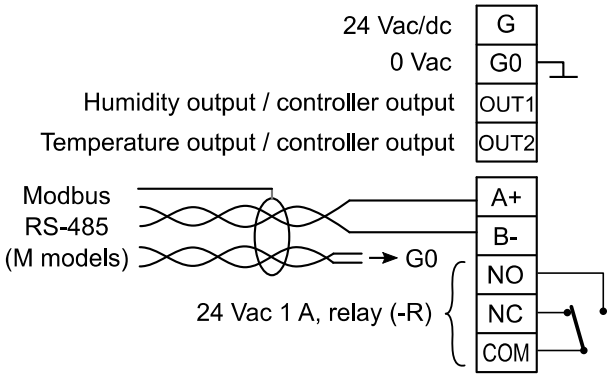
Selecting the output format

The output signals can be selected at the commissioning to be either 0…10 V or 4…20 mA signals. More output signal possibilities are available by using the ML-SER tool.

	Vdc	mA
OUT1		
OUT2		

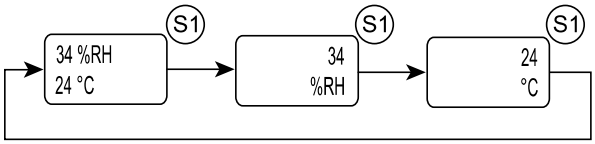
Wiring

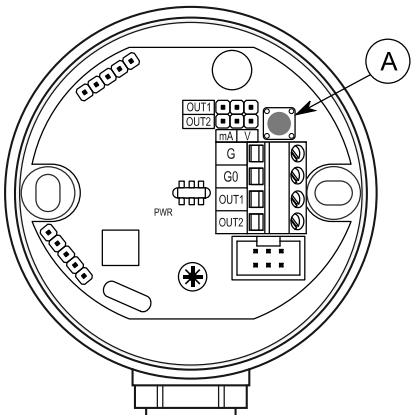
Device wiring and commissioning can only be carried out by qualified professionals. Always make the wirings while the power is switched off.



SELECTING THE MEASUREMENT INFORMATION TO BE VIEWED ON THE DISPLAY

The measurement values are shown on the N model display simultaneously. Press S1 button to select different measurement view. The following views are available:





A. S1 button

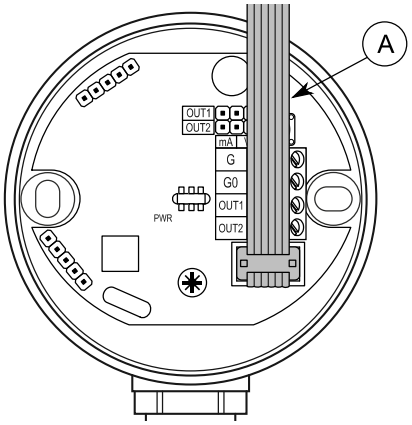
NOTE: In M models, the shown measurement information can be selected also via Modbus.

ML-SER TOOL

With the ML-SER tool you can change the device settings, controller and Modbus settings for example.

Connecting ML-SER tool to the device

1. Remove the display.
2. Connect the ML-SER cable to the connector.



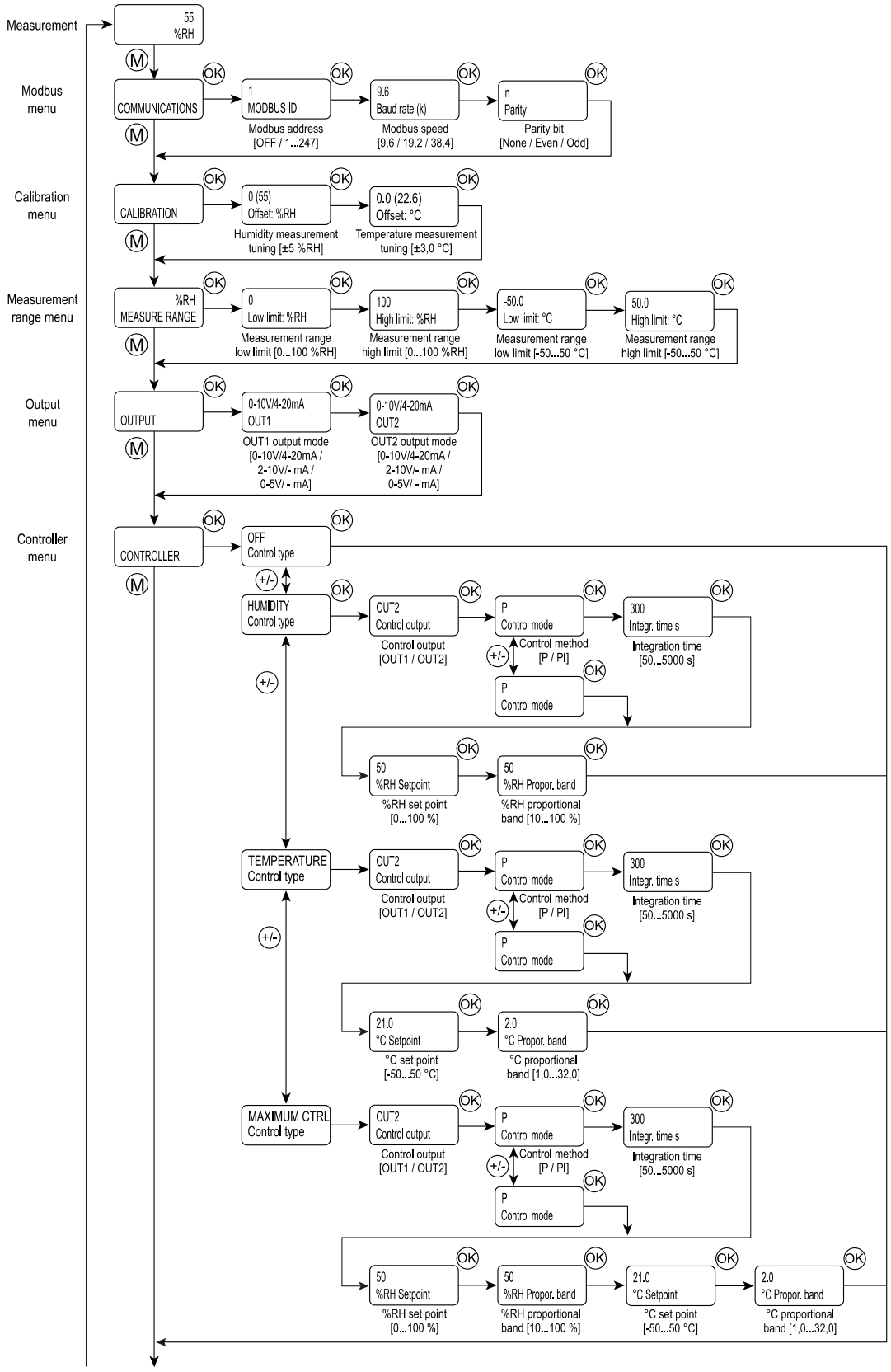
A. ML-SER cable

Measurement values are shown in turns on the ML-SER tool display.

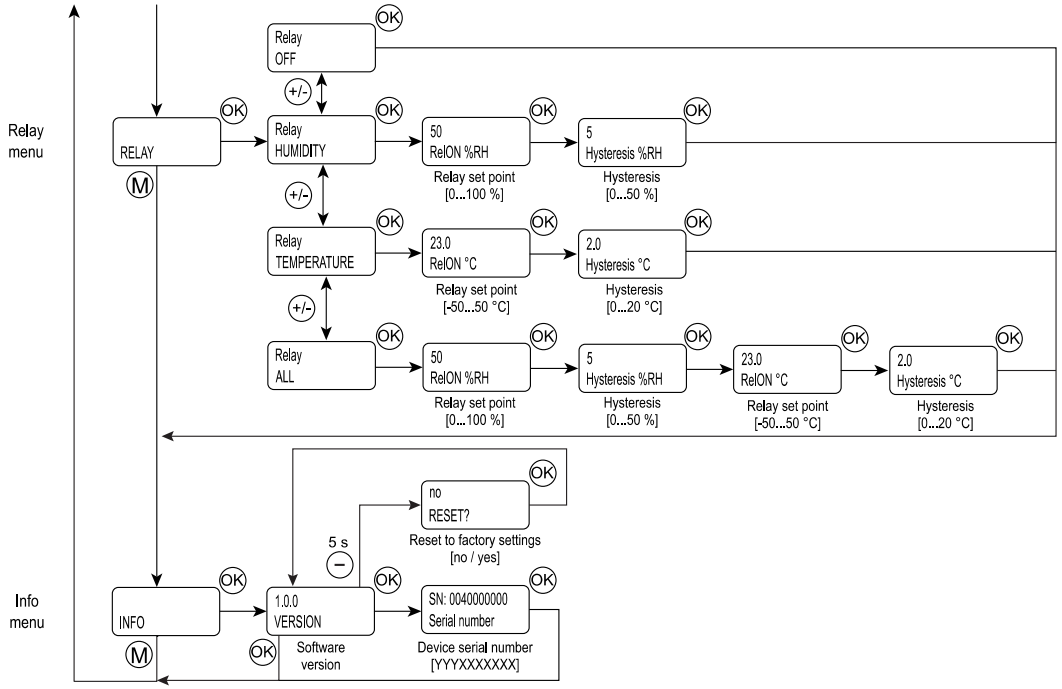
ML-SER menu

ML-SER menu opens by pressing the M button. The values can be changed with the ”+” and ”-” buttons. The menu is device-specific and the content depends on the device and installed options.

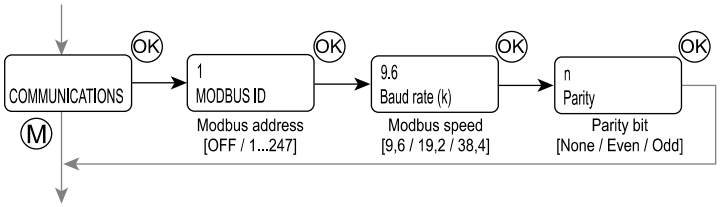
The following menu structure contains the factory settings.



The diagram continues on the next page.

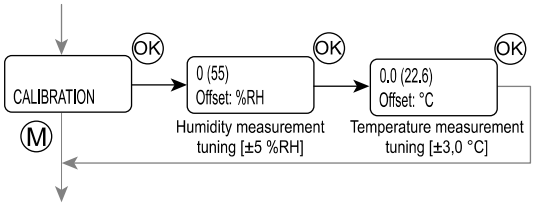


Modbus menu



Modbus menu is available in M models. The bus settings can be changed through the menu.

Calibration menu

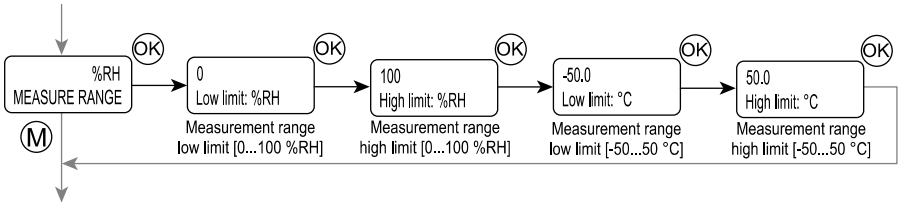


All the measurements can be tuned through the calibration menu.

- The temperature value can be adjusted by 0,1 °C steps.
- The humidity value can be adjusted by 1 % steps.

ML-SER tool display shows how much the current value is tuned.

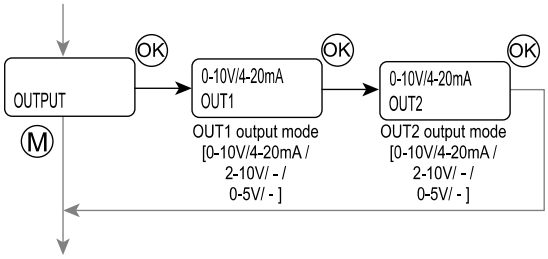
Measurement range menu



You can set a custom output range for both measurements through the measurement range menu.

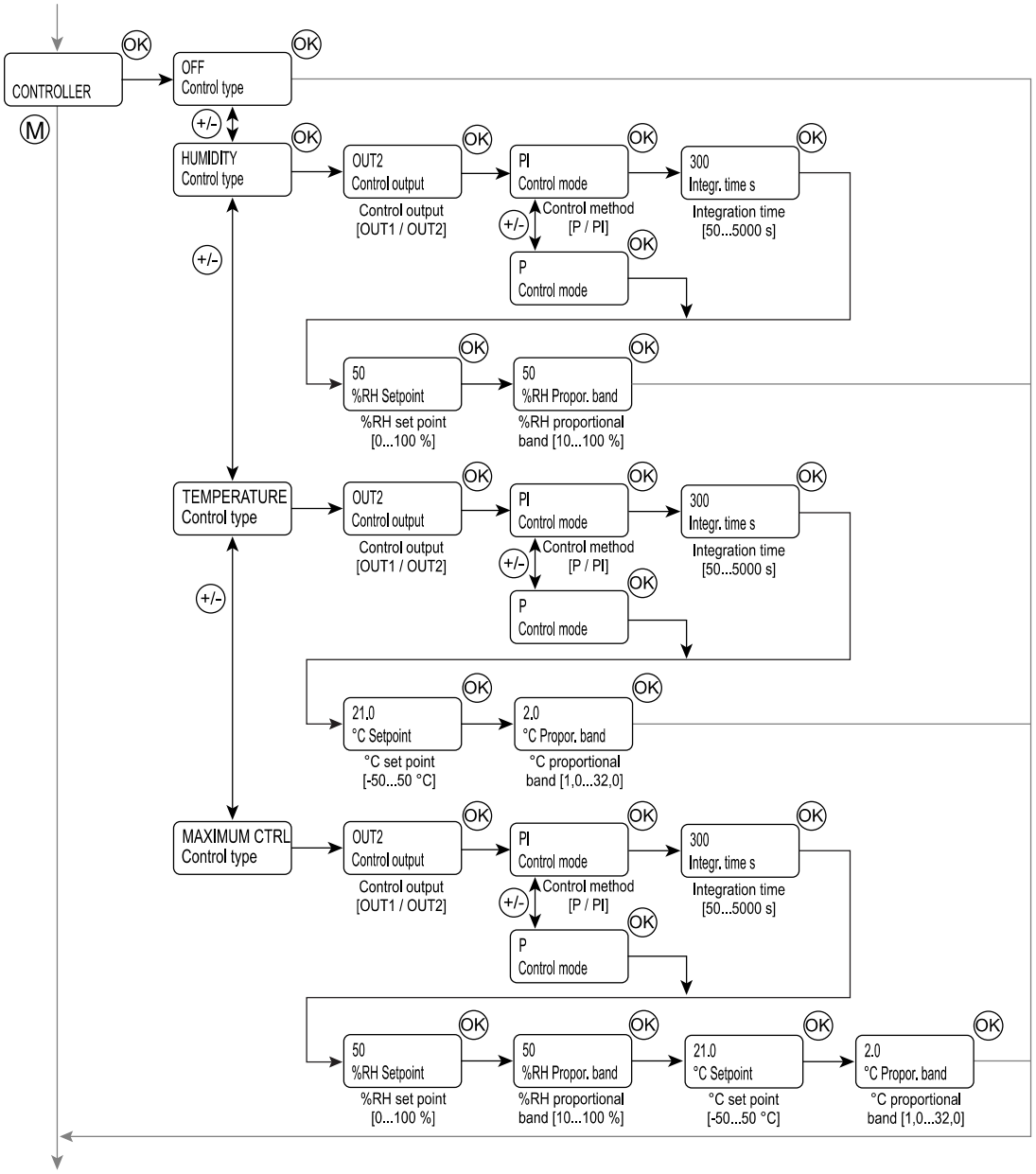
- The temperature value can be adjusted by 0,1 °C steps.
- The humidity value can be adjusted by 1 % steps.

Output menu



You can change the output (OUT1 and OUT2) scales through the output menu.

Controller menu

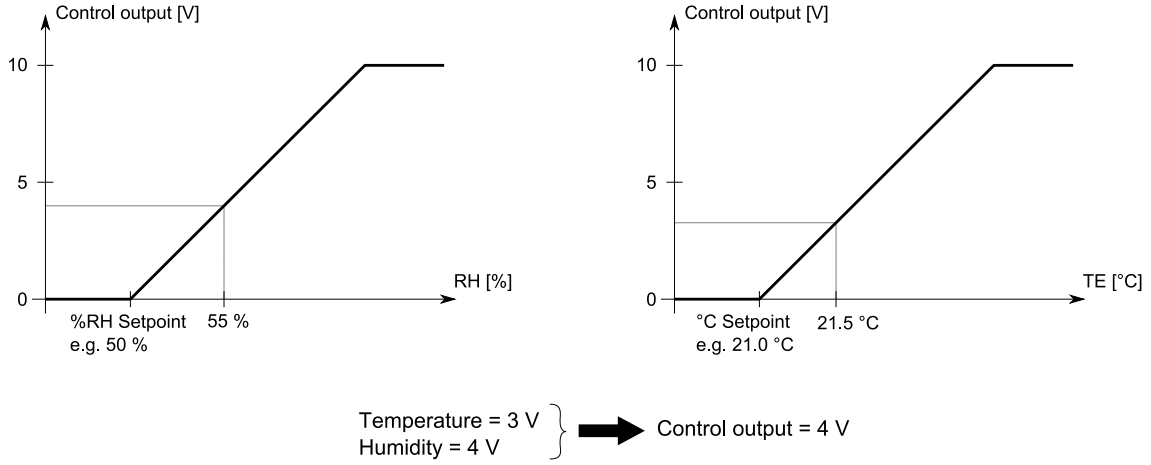


The control output (OUT1 or OUT2) can be controlled either according to a one measurement value or according to the maximum selection of all values.

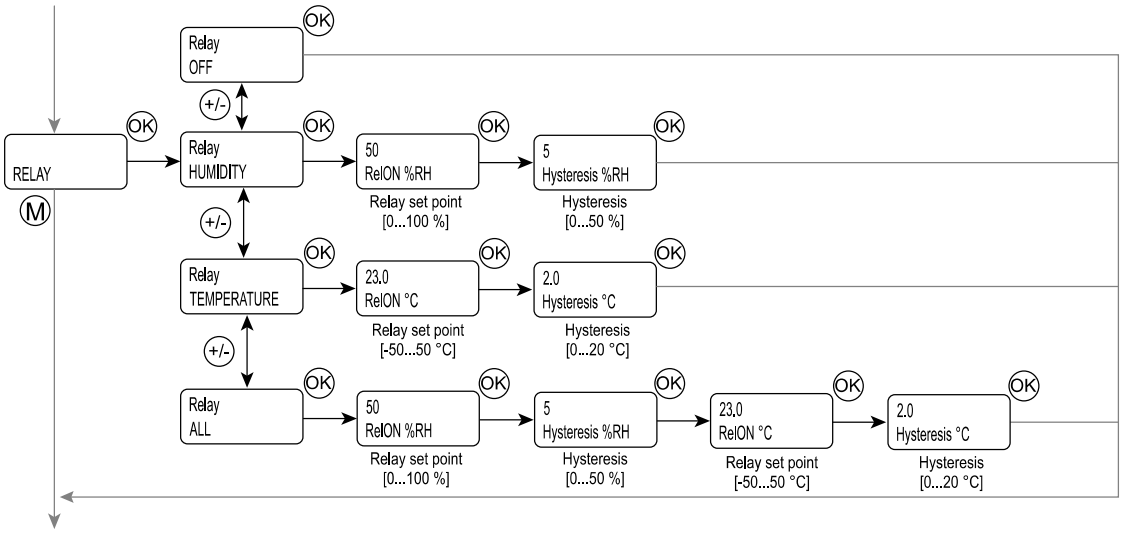
- The temperature values can be adjusted by 0.1 °C steps.
- The humidity values can be adjusted by 5 % steps.

In the maximum selection control, the control output signal is formed according to the measurement that causes the largest control signal value. The following situation is in the example figure:

- Humidity is 55 %
- Temperature is 21,5 °C



Relay menu



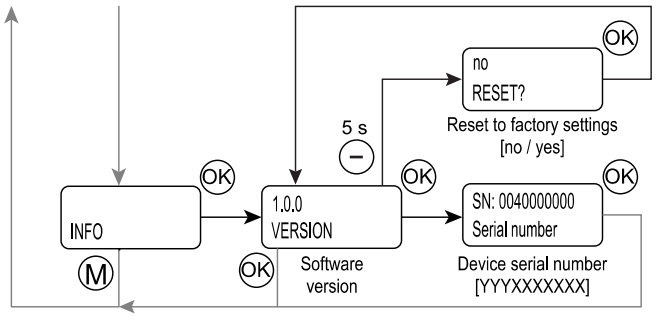
Relay menu is available if relay option is installed. The relay switching point and hysteresis can be changed through the menu.

The relay output can be controlled either according to a one measurement value or according to the all values.

- The temperature value can be adjusted by 0,1 °C steps.
- The humidity value can be adjusted by 1 % steps.

When the output is controlled according to the all values, the relay activates when one measured value exceeds the set point.

Info menu



The info menu can be used for checking the serial number and software version, and resetting to the factory settings.

Resetting to the factory settings

1. Press the "-" button for five seconds in the Software version display.
2. Change the resetting dialog answer to "yes".
3. Press OK button.

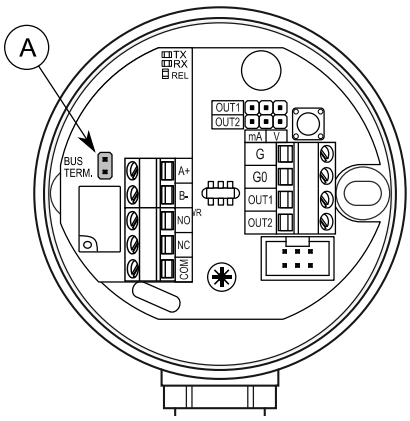
   The factory settings are now reset.

MODBUS

The parameter memory durability allows at least 1 million writing cycles.

Bus termination

The Modbus can be terminated by placing the BUS TERM. jumper.



A. BUS TERM. jumper

Modbus function codes

The device supports the following Modbus function codes.

0x01	Read Coils
0x02	Read Discrete Inputs
0x03	Read Holding Registers
0x04	Read Input Registers
0x05	Write Single Coil
0x06	Write Single Register
0x0F	Write Multiple Coils
0x10	Write Multiple Registers
0x17	Read/Write Multiple Registers

Modbus registers

NOTE: If you try to write a parameter value that is beyond the parameter value range, the value will be replaced by the nearest acceptable value. For example, if you write 270 to the register 40011, the value will be replaced by 260.

Coils

Register	Parameter description	Data type	Values	Range	Default
1	OUT1 output overdrive activation	Bit	0 - 1	0 = Off, 1 = On	0
2	OUT2 output overdrive activation	Bit	0 - 1	0 = Off, 1 = On	0
3	Relay overdrive activation	Bit	0 - 1	0 = Off, 1 = On	0
4	Relay overdrive	Bit	0 - 1	0 = Off, 1 = On	0
5	Controller output connector	Bit	0 - 1	0 = OUT2 1 = OUT1	0

Discrete inputs

Register	Parameter description	Data type	Values	Range
10001	Relay status	Bit	0 - 1	0: Off, 1: On

Input registers

Register	Parameter description	Data type	Values	Range
30001	Humidity measurement	Signed 16	0…100	0…100 %
30002	Temperature measurement	Signed 16	-500…500	-50,0…50,0 °C
30003	OUT1 output percentage	Signed 16	0…1000	0…100,0 %
30004	OUT2 output percentage	Signed 16	0…1000	0…100,0 %

Holding registers

Register	Parameter description	Data type	Values	Range	Default
40001	OUT1 output overdrive	Signed 16	0…1000	0…10.00 V	0
40002	OUT2 output overdrive	Signed 16	0…1000	0…10.00 V	0
40003	Humidity measurement tuning (offset)	Signed 16	-5…5	-5…5 %	0
40004	Temperature measurement tuning (offset)	Signed 16	-30…30	-3,0…3,0 °C	0
40005	Control method	Signed 16	0 - 1	0 = P 1 = PI	1
40006	Controller output	Signed 16	0 - 1 - 2 - 3	0 = OFF 1 = humidity 2 = temperature 3 = maximum selection	0
40007	Set point, humidity	Signed 16	0…100	0…100 %	50
40008	Set point, temperature	Signed 16	-500…500	-50,0…50,0 °C	210
40009	Proportional band, humidity	Signed 16	10…100	10…100 %	50
40010	Proportional band, temperature	Signed 16	10…320	1,0…32,0 °C	20
40011	Integration time	Signed 16	50…5000	50…5000 s	300
40012	Value shown on the display	Signed 16	0 - 1 - 2	0 = humidity 1 = temperature 2 = scrolling	2
40013	Relay set point, humidity	Signed 16	0…100	0…100 %	50
40014	Relay set point hysteresis, humidity	Signed 16	0…50	0…50 %	5
40015	Relay set point, temperature	Signed 16	0…500	0,0…50,0 °C	230
40016	Relay set point hysteresis, temperature	Signed 16	0…200	0,0…20,0 °C	20

Register	Parameter description	Data type	Values	Range	Default
400**17**	Relay function	Signed 16	0 - 1 - 2 - 3	0 = OFF 1 = humidity 2 = temperature 3 = all	1
400**18**	Humidity measurement range, low limit	Signed 16	0…100	0…100 %	0
400**19**	Humidity measurement range, high limit	Signed 16	0…100	0…100 %	100
400**20**	Temperature measurement range, low limit	Signed 16	-500…500	-50,0…50,0 °C	-500
400**21**	Temperature measurement range, high limit	Signed 16	-500…500	-50,0…50,0 °C	500
400**22**	OUT1 output mode	Signed 16	0 - 1 - 2	0 = 0…10 V / 4…20 mA 1 = 2…10 V / - mA 2 = 0…5 V / - mA	0
400**23**	OUT2 output mode	Signed 16	0 - 1 - 2	0 = 0…10 V / 4…20 mA 1 = 2…10 V / - mA 2 = 0…5 V / - mA	0