akribis

USER GUIDE

TEHR LU M

Produal

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This user guide is for devices with the software version 1.1.7 or newer.

MOUNTING

The device can be installed in dry surroundings (IP20) by screws on the wall surface or on the standard flush mounting box. The recommended installation height is 150…180 cm.

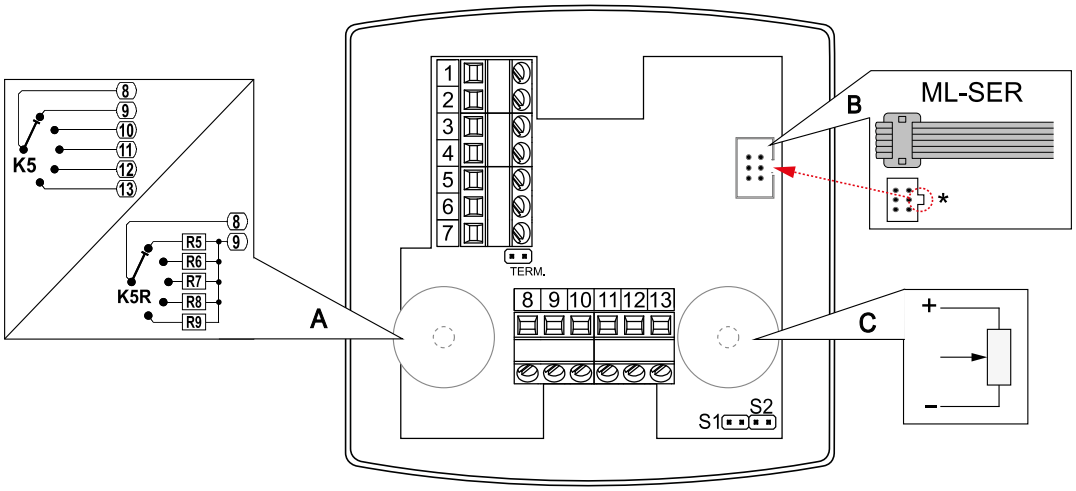
The device position should be selected carefully. All the error factors that can affect to the measurements should be eliminated as well as possible. The following list defines the typical measurement error factors.

- direct sun light
- occupant proximity
- air flow coming from windows or doors
- air flow coming from ventilation nozzles
- air flow coming from the flush mounting box
- differential temperature caused by external wall

WIRING

Caution

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



LU models	
1	24 Vac/dc
2	0 V
3	temperature / controller output
4	active potentiometer (PU)
5	potentiometer + (P)
6	potentiometer slide (P)
7	potentiometer - (P)
8	K5 / K5R switch
9	K5 switch position A / K5R out
10	K5 switch position 0
11	K5 switch position 1
12	K5 switch position 2
13	K5 switch position 3
A	K5 / K5R 5-stage switch (optional)
B	connector for display / ML-SER tool * from below of the connector
C	potentiometer (P / PU)

M models	
1	24 Vac/dc
2	0 V
3	temperature / controller output
4	active potentiometer (PU)
5	Modbus B-
6	Modbus COM
7	Modbus A+
8	K5 / K5R switch
9	K5 switch position A / K5R out
10	K5 switch position 0
11	K5 switch position 1
12	K5 switch position 2
13	K5 switch position 3
A	K5 / K5R 5-stage switch (optional)
B	connector for display / ML-SER tool * from below of the connector
C	potentiometer (PU)

Information is subject to change without prior notice.

SELECTING MEASURING RANGE

Measuring range can be selected with the jumpers:

* 0…+50 °C	0…+100°C	-50…+50 °C	-50…+150°C
S1 S2	S1 S2	S1 S2	S1 S2

* Factory setting.

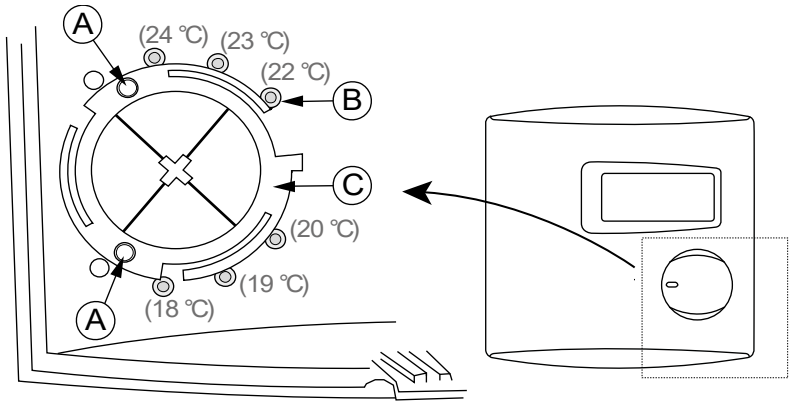
Corresponding signal values at different measurement value range are:

0…+50 °C	0…+100 °C	-50…+50 °C	-50…+150 °C	Signal
0 °C	0 °C	-50 °C	-50 °C	0 V
25 °C	50 °C	0 °C	50 °C	5 V
50 °C	100 °C	50 °C	150 °C	10 V

LIMITING POTENTIOMETER MOVEMENT

The potentiometer movement can be limited with two removable limiting pins.

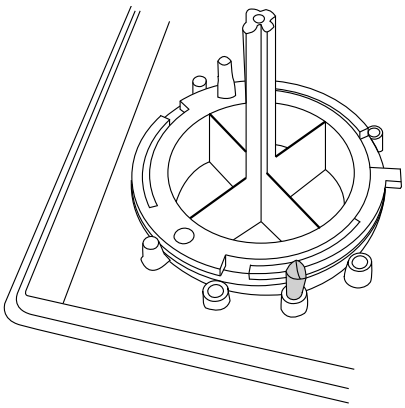
1. Remove the cover.
2. Remove the limiting pin by cutting.



A. Limiting pin
B. Limiting slot
C. Potentiometer knob

3. Fit the pin to the wanted limiting slot.

   There are six slots for the pin (18 °C…24 °C). The knob movement is limited to 19 °C in the following picture.



4. Place the potentiometer knob (to correct position).
5. Fit the cover.

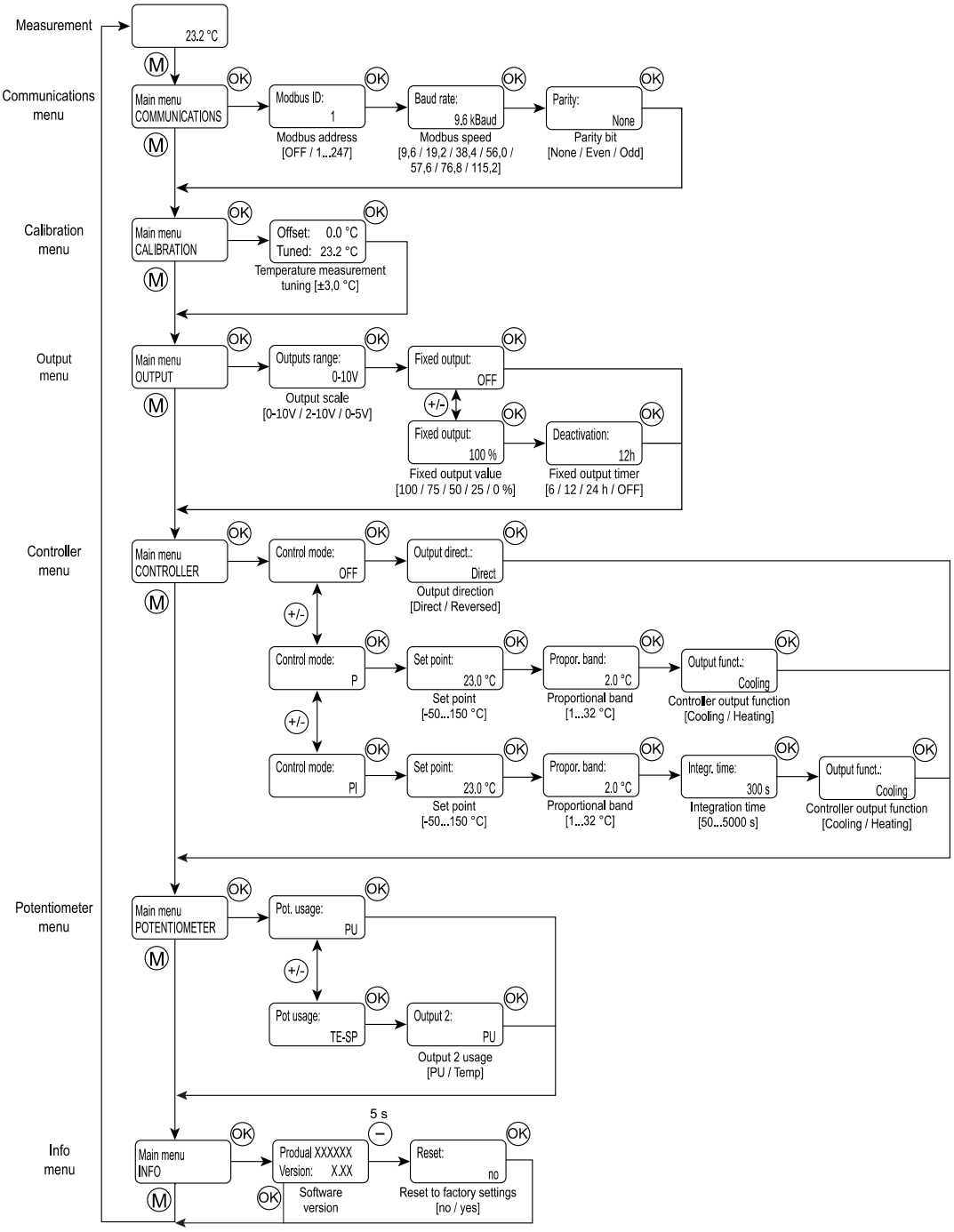
Information is subject to change without prior notice.

ML-SER MENU

All transmitter settings can be changed by using the ML-SER tool. You can proceed in the menu by pressing the M and OK buttons. The values can be changed with the ”+” and “–“ buttons. The value is accepted with the OK button. The following menu structure contains the factory settings.

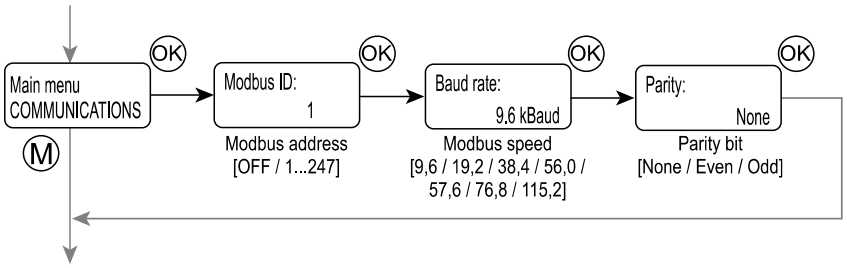
NOTE: Settings are saved when returning to main menu.

NOTE: When ML-SER is connected, the device is disconnected from the Modbus network.



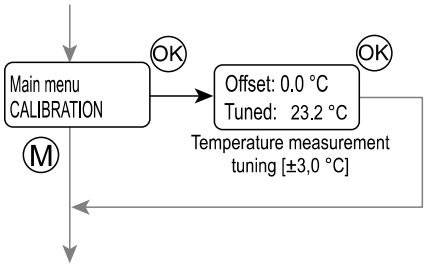
Information is subject to change without prior notice.

Communications menu



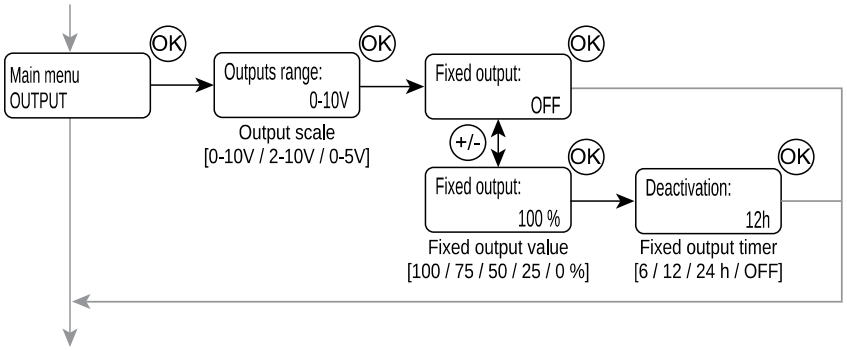
Communications menu is available in M models. The bus settings can be changed through the menu.

Calibration menu



The temperature measurement can be tuned through the calibration menu. The temperature value can be adjusted by 0,1 °C steps. ML-SER tool display shows the tuned value.

Output menu

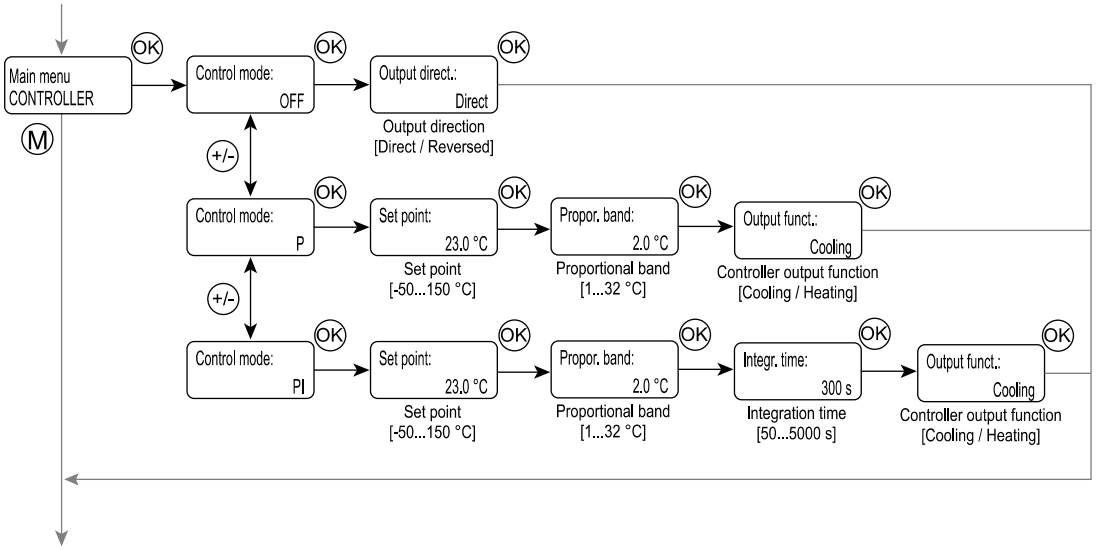


You can change the output scaling through the output menu. Also, the fixed output value and duration can be selected through the menu.

NOTE: If you set the *Deactivation* time to “OFF”, the output stays on the fixed value until you deactivate the fixed output manually.

Information is subject to change without prior notice.

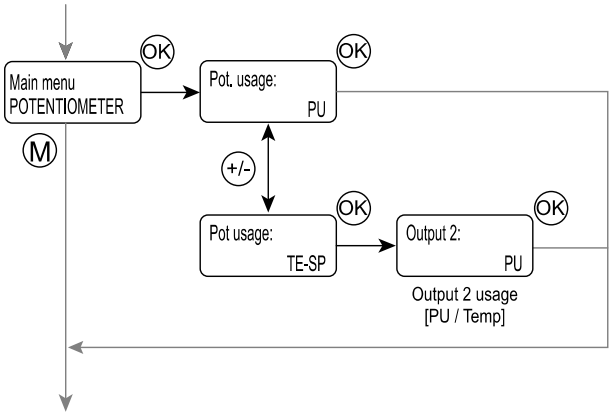
Controller menu



In controller menu the temperature output can be changed to controller output. You can also change the controller settings in the menu.

When the controller is not used the output direction can be selected via the controller menu.

Potentiometer menu

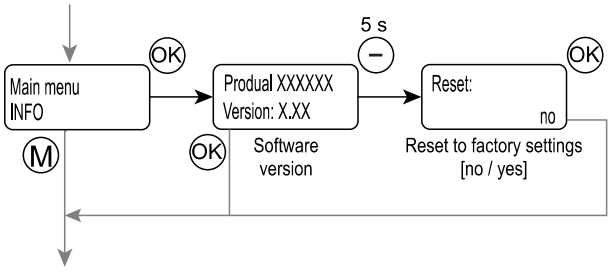


Potentiometer menu is available in PU models. You can set the potentiometer for changing the internal controller's set point or use it to control the output 2 (connector 4).

If the controller's set point is adjusted with the potentiometer, it cannot be adjusted via Modbus.

NOTE: When the potentiometer is used for setting the internal controller's temperature set point (TE-SP), the potentiometer adjustment range is ±3 °C around the set point centre.

Info menu



The info menu can be used for checking the 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.

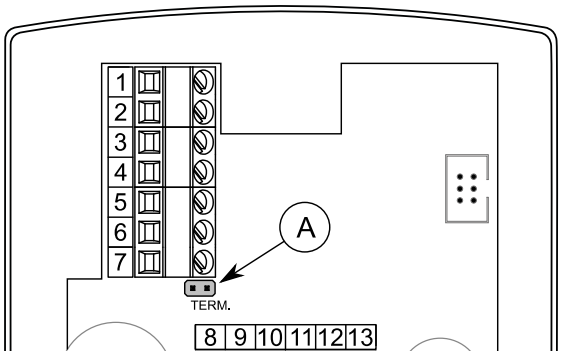
MODBUS

Bus properties

Protocol	RS-485 Modbus RTU
Bus speed	9600/19200/38400/56000/57600/76800/115200 bit/s
Data bits	8
Parity	none/odd/even
Stop bits	1
Network size	up to 127 devices per segment

Bus termination

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



A. TERM. jumper

Supported Modbus functions

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

Data type:

bit	= 0 or 1
unsigned	= unsigned integer (0…65535)
signed	= integer (-32768…32767)

Information is subject to change without prior notice.

Coils (readable / writable)

Register	Parameter description	Data Type	Values	Range	Default
1	Controller output function	Bit	0 - 1	0 = Cooling 1 = Heating	0
2	Potentiometer usage	Bit	0 - 1	0 = Potentiometer output 1 = Temperature set point	0
3	Output 2 function (connector 4)	Bit	0 - 1	0 = Potentiometer 1 = Temperature	0
4	Output 1 overdrive activation	Bit	0 - 1	0: Off, 1: On	0
5	Output 2 overdrive activation	Bit	0 - 1	0: Off, 1: On	0

Input register (only readable)

Register	Parameter description	Data type	Value	Range
3000**1**	Temperature measurement	signed	-500…+1500	-50…+150.0°C
3000**2**	Analogue output 1 voltage	unsigned	0…100	0…100,0 % of the output range
3000**3**	Potentiometer position	signed	-30…30	-3.0…3.0°C
3000**4**	Analogue output 2 voltage	unsigned	0…100	0…100,0 % of the output range
3000**5**	Effective set point	signed	-500…+1500	-50.0…150.0°C
300**11**	Temperature measurement (=30001)	signed	-500…+1500	-50…+150.0°C
300**13**	Analogue output 1 voltage (=30002)	unsigned	0…100	0…100,0 % of the output range

Holding register (readable / writable)

Controls marked with * are stored in the volatile memory. These controls are returned to factory defaults after a power failure.

Register	Parameter description	Data type	Value	Range	Default
4000**1**	One-point field calibration (offset)	signed	-30…+30	-3.0…3.0°C	0
4000**2**	Control mode	signed	0 - 1 - 2	0 = off 1 = P 2 = PI	0
4000**3**	Set point	signed	-500…+1500	-50.0…150.0°C	230
4000**4**	Proportional band	signed	10…320	1.0…32.0°C	20
4000**5**	Integration time	signed	50…5000	50…5000 s	300
4000**6**	*Output 1 overdrive value	signed	0…1000	0…100,0 % of the output range	0
4000**7**	*Output 2 overdrive value	signed	0…1000	0…100,0 % of the output range	0
4000**8**	Output range	signed	0 - 1 - 2	0 = 0…10 V 1 = 2…10 V 2 = 0…5 V	0
4000**9**	*Fixed control output value	signed	0 - 1 - 2 - 3 - 4 - 5	0 = OFF 1 = 100 % 2 = 75 % 3 = 50 % 4 = 25 % 5 = 0 %	0
400**10**	*Fixed control output timer	signed	0 - 1 - 2 - 3	0 = 6 h 1 = 12 h 2 = 24 h 3 = OFF	1
400**11**	*Fixed control time left	signed	0…1440	0…1440 min	0

NOTE: To set the fixed output time more accurately, write the output value to register 40009 and the required time to register 40011.

Information is subject to change without prior notice.