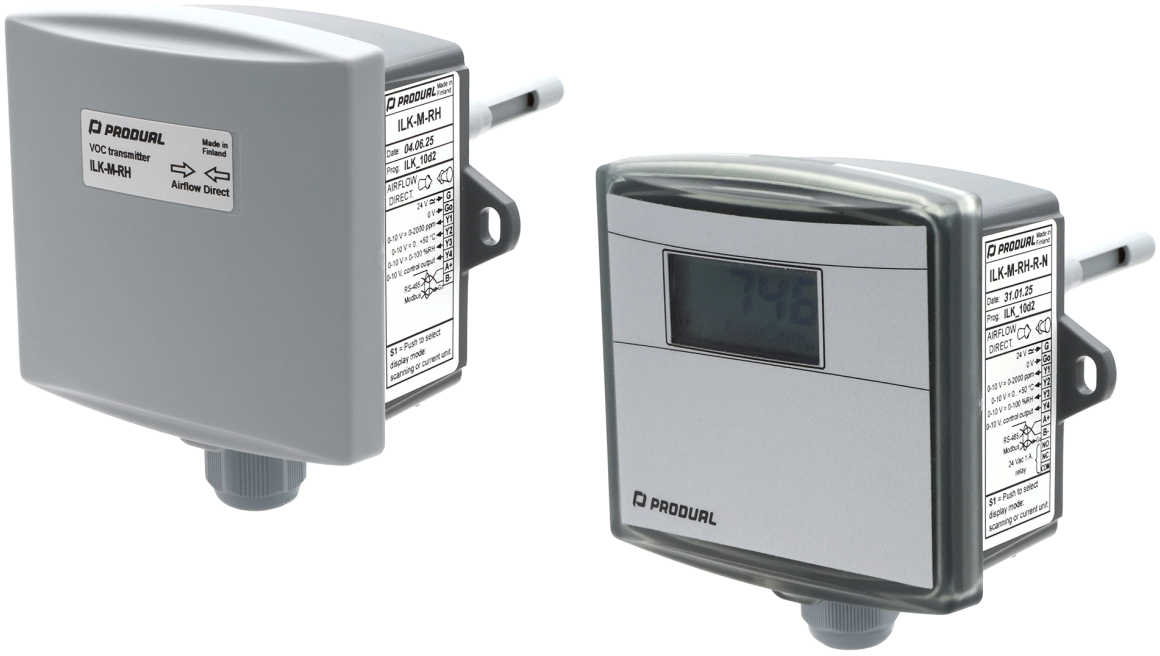
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USER GUIDE

ILK

Produal

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PRODUAL

PART OF BEMSIQ GROUP

ILK duct air quality transmitter

USER GUIDE

This user guide is for ILK transmitter's software version 1.1.0 released 5/2026.

Made in Finland

5 years warranty

MANAGEMENT SYSTEM CERTIFICATION DNV ISO 9001 · ISO 14001 Finland

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1 Introduction

The ILK duct air quality transmitters measure volatile organic compounds (VOC) level, temperature and relative humidity inside ventilation ducts.

The ILK transmitters can control the VOC level in room spaces by increasing ventilation when necessary. The metal oxide sensor technology (MOX) and four sensing elements ensure reliable VOC level measurement. The VOC sensor detects a wide variety of hydrocarbons, including cigarette smoke, exhaled breathing air, solvent vapours, building material emissions and cleaning agent vapours. The sensor uses automatic baseline correction to compensate for ozone and other oxidizing gases.

The transmitter has one voltage output for each measurement and one control output.

The transmitters options include:

- Display (-N models)
- Relative humidity measurement and control (-RH models)
- Relay output (-R model)
- Modbus RTU communication (-M models)

The measurement values scroll on the display of the -N models. You can also lock the display to show one of the values.

The -R models have a relay and a relay output. You can adjust the relay switching point. The relay switches according to one measurement value or according to all values. You can use the relay output, for example, to switch an alarm or a ventilation fan on and off.

The -M models have an RS-485 connection for Modbus RTU communication.

You can commission all models using the ML-SER commissioning tool. You can also configure the -M model transmitter settings via bus. However, Modbus communication settings must be configured with the ML-SER commissioning tool before you can access the transmitter settings via Modbus network.

1.1 About this user guide

This user guide contains important information about the installation, wiring, configuration and use of the product. Read this guide carefully before you install the product, connect the wires, or operate the product. Make sure that you fully understand all instructions before you start work. If you are not sure what the instructions mean, contact the seller or the manufacturer.

Follow all instructions in this user guide carefully. Always obey the applicable local rules and regulations.

The original instructions were written in English. If there are differences between the English instructions and the translations, refer to the English instructions.

If you find a mistake in the English instructions or in the translations, please send the details to the manufacturer.

1.2 Intended use

The ILK duct air quality transmitters are intended to be used for measuring volatile organic compounds level, humidity and temperature in ventilation ducts. They are intended to be used in non-condensing environments. If humidity condensates on the probe or dirt collects on the sensors, the expected lifetime of the transmitter decreases significantly.

These transmitters are intended to be connected to building automation systems in the HVAC/R industry.

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2 Safety precautions

The product is developed, manufactured and tested according to high quality standards. However, instructions for safe use must be followed when installing, using or disposing of the product or parts of the product.

To avoid any kind of damage to people or property, follow the instructions carefully. Produal is not liable for any hazards, injury to people, or damage to property caused by incorrect installation or misuse of the device.

To avoid electrical shock or damage to equipment, disconnect power before you install or service the product. Use only proper wiring that is rated for the full operating voltage and maximum current in the system. The wiring must also withstand fault conditions.

To avoid fire and/or explosion, do not use the product in potentially flammable or explosive atmosphere.

Make sure that the product is not damaged before installation. Do not drop the product or use excessive force during installation. Do not use the product if you can see any damages.

After installation, the product will be part of a system whose specifications and performance characteristics are not designed or controlled by Produal. Refer to national and local authorities to ensure that the installation is functional and safe.

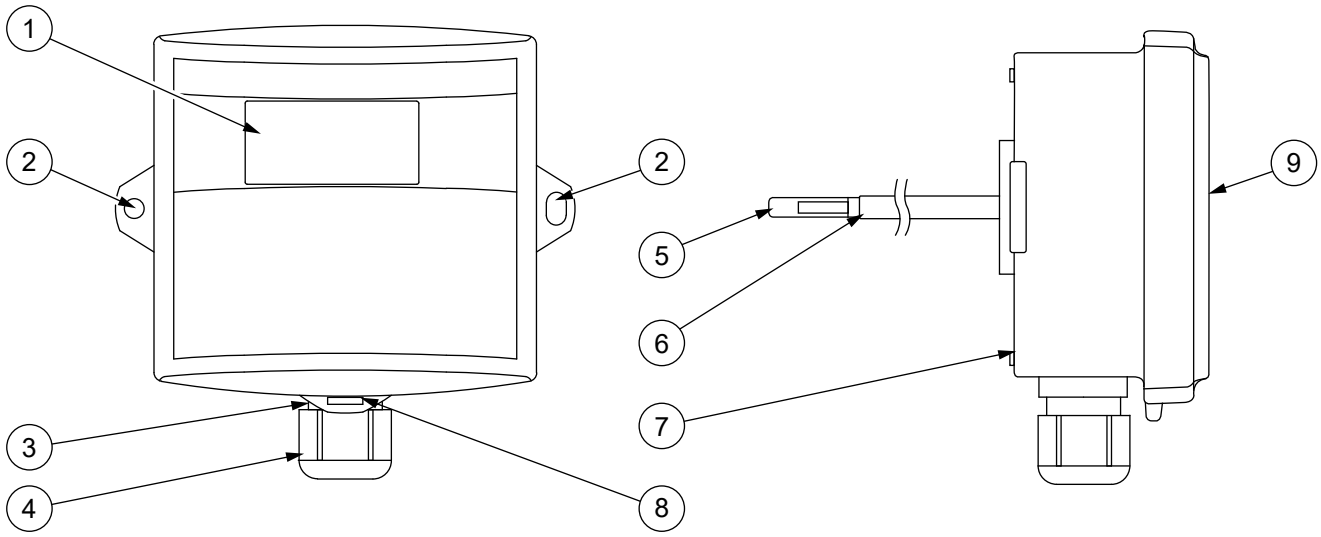
The product should only be used in professionally designed applications. Unauthorised modifications are not allowed. The product must not be used in relation to any equipment that in case of a failure may threaten, directly or indirectly, human health or life or result in danger to human beings, animals or property.

In this document, there are different warnings and notes. The warning and note types are defined in the following table.

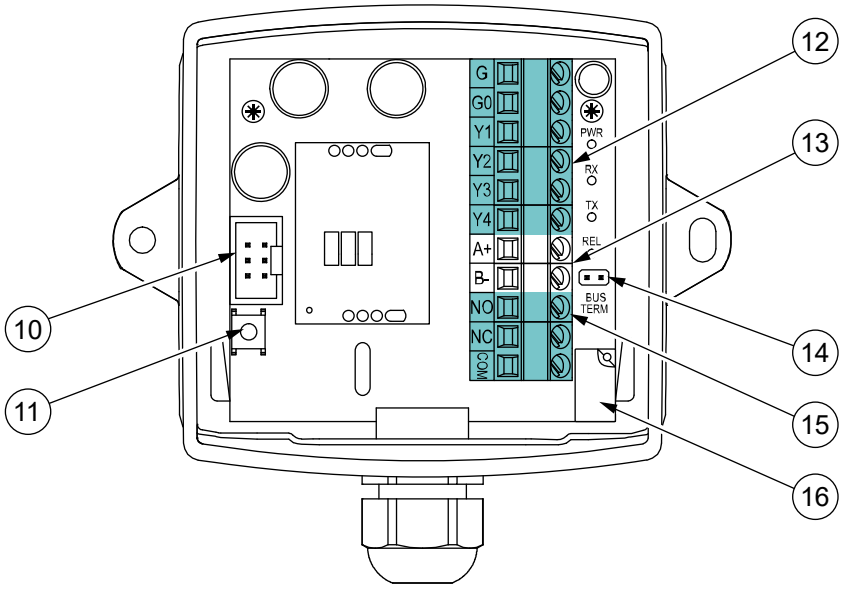
Sign	Description
WARNING:	The warning symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION:	The caution symbol indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.
Important:	The important symbol indicates a potentially hazardous situation which, if not avoided, could result in damage to the device or property.
Note:	The note symbol indicates a useful tip or a recommended way to complete a task. These notes also provide information that is useful but not critical to the user.

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3 Main components



1	Display (-N models)	2	Mounting point
3	Cable gland	4	Strain relief
5	Sensors	6	Probe
7	Housing	8	Slot for opening the cover
9	Cover		



10	Display connector	11	Display mode selection button *S1*
12	Terminal block	13	Modbus connector (-M models)
14	Modbus termination jumper (-M models)	15	Relay output connector (-R models)
16	Relay (-R models)		

4 Functional description

This chapter introduces the main functions of the device.

Note: Configure the Modbus communication settings for the -M model transmitters with the ML-SER commissioning tool to be able to access the transmitter settings via bus.

4.1 Analogue outputs

The transmitters have the following analogue outputs:

- 1 x VOC output
- 1 x temperature output
- 1 x control output
- 1 x relative humidity output (-RH models)

All analogue outputs are voltage outputs (0...10 V < 2 mA). The voltage outputs are not scalable.

If you configure the settings via bus (-M models), use the following holding registers.

Holding register	Parameter description	Data type	Values	Range	Default
0	Y1 output override	S16	*0...1000*	0...100.0 %	*0*
1	Y2 output override	S16	*0...1000*	0...100.0 %	*0*
2	Y3 output override	S16	*0...1000*	0...100.0 %	*0*
3	Y4 output override	S16	*0...1000*	0...100.0 %	*0*
8	Control output	S16	*0 - 1 - 2 - 3 - 4*	0. Off 1. VOC 2. Temperature 3. Humidity 4. Maximum selection	*1*

4.2 Relay output

The -R models have a relay output. You can use the relay output, for example, to switch an alarm or a ventilation fan on and off.

The relay switches on and off according to one measurement value or according to all values. The relay switching point is the sum of the setpoint value and the relay hysteresis value. If the transmitter controls the relay output according to one measurement value, the relay switches on when the measured value is more than the sum of the setpoint value and the relay hysteresis value. For example, if the relay setpoint for VOC level is 1000 ppm and the relay hysteresis is 10 %, the relay switches on when the measured VOC level goes above 1100 ppm. The relay switches off when the measured VOC level goes below the setpoint more than the relay hysteresis value. In the example above, the relay switches off when the measured VOC level goes below 900 ppm.

If the transmitter controls the relay output according to all values, the relay switches on when one of the measured values is more than the sum of its setpoint value and the relay hysteresis value.

You can adjust the relay setpoint and hysteresis using the ML-SER transmitter commissioning tool or via Modbus communication.

If you configure the settings via bus (-M models), use the following holding registers.

Holding register	Parameter description	Data type	Values	Range	Default
16	Relay setpoint, VOC	S16	*450...2000*	450...2000 ppm	*1100*
17	Relay hysteresis, VOC	S16	*0...100*	0...100 %	*5*
21	Relay setpoint, temperature	S16	*0...500*	0.0...50.0 °C	*230*
22	Relay hysteresis, temperature	S16	*0...200*	0.0...20.0 °C	*20*
23	Relay setpoint, humidity	S16	*0...100*	0...100 %rH	*50*
24	Relay hysteresis, humidity	S16	*0...50*	0...50 %	*5*
25	Relay function	S16	*0 - 1 - 2 - 3 - 4*	0. Off 1. VOC 2. Temperature 3. Humidity 4. All	*1*

4.3 Control functions

This transmitter has a P/PI controller. The controller can control the output according to one measurement value or according to the maximum selection of all values.

The controller can control the volatile organic compounds (VOC) level, temperature and relative humidity (-RH models). You can configure the setpoint, integration time and proportional band for the controller. Proportional band is the range of values within which the control output signal goes between 0 % and 100 % in proportion to the measured input value.

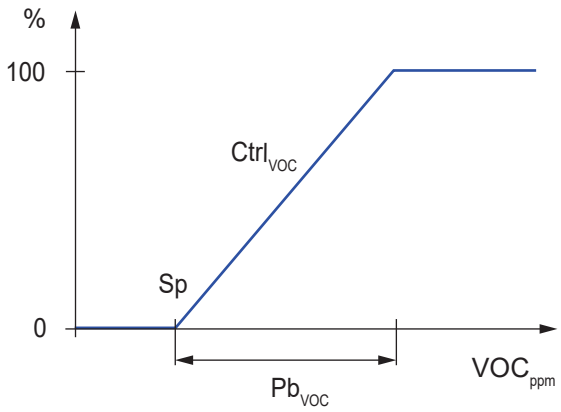
4.3.1 VOC control

The ILK transmitters can control the VOC level in room spaces by increasing ventilation when necessary. The VOC sensor detects a wide variety of hydrocarbons, including cigarette smoke, exhaled breathing air, solvent vapours, building material emissions and cleaning agent vapours. The sensor uses automatic baseline correction to compensate for ozone and other oxidizing gases.

Property	Value
Setpoint	450...2000 ppm, *700 ppm
Proportional band	100...2000 ppm, *500 ppm
Integration time	50...5000 s, *300 s
	* factory setting

The following figure shows how the VOC control signal increases while the VOC level increases. For example, if setpoint is 700 ppm and proportional band is 500 ppm, the VOC control signal starts to increase when the VOC level goes above 700 ppm. As the VOC level increases, the VOC control signal increases accordingly until it reaches 100 % when VOC level is at 1200 ppm.

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%	Control signal level
Sp	Setpoint
Pb_{VOC}	Proportional band for VOC
$Ctrl_{VOC}$	Control signal for VOC
VOC_{ppm}	VOC level

If you configure the settings via bus (-M models), use the following holding registers.

Holding register	Parameter description	Data type	Values	Range	Default
7	Control mode	S16	*0 - 1*	0. P 1. PI	*1*
8	Control output	S16	*0 - 1 - 2 - 3 - 4*	0. Off 1. VOC 2. Temperature 3. Humidity 4. Maximum selection	*1*
9	Setpoint, VOC	S16	*450...2000*	450...2000 ppm	*700*
12	Proportional band, VOC	S16	*100...2000*	100...2000 ppm	*500*
15	Integration time	S16	*50...5000*	50...5000 s	*300*

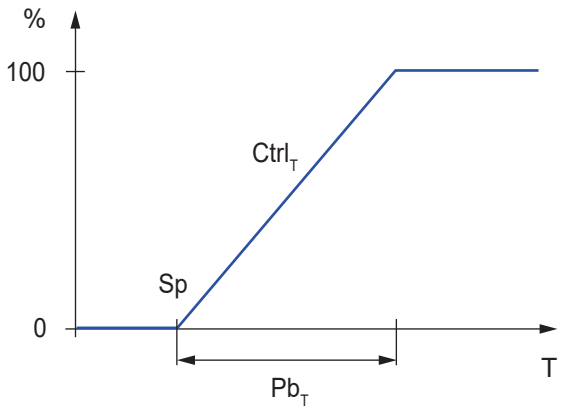
4.3.2 Temperature control

The controller can control heating. The control mode can be P or PI control.

Property	Value
Setpoint	0.0...50.0 °C, *21.0 °C
Proportional band	1.0...32.0 °C, *2.0 °C
Integration time	50...5000 s, *300 s
	* factory setting

The following figure shows how temperature control signal increases while temperature increases. For example, if setpoint is 21.0 °C and proportional band is 2.0 °C, the temperature control signal starts to increase when temperature goes above 21.0 °C. The control signal reaches 100 % at 23.0 °C.

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%	Control signal level
Sp	Setpoint
Pb_T	Proportional band for temperature
$Ctrl_T$	Control signal for temperature
T	Temperature

If you configure the settings via bus (-M models), use the following holding registers.

Holding register	Parameter description	Data type	Values	Range	Default
7	Control mode	S16	*0 - 1*	0. P 1. PI	*1*
8	Control output	S16	*0 - 1 - 2 - 3 - 4*	0. Off 1. VOC 2. Temperature 3. Humidity 4. Maximum selection	*1*
10	Setpoint, temperature	S16	*0...500*	0.0...50.0 °C	*210*
13	Proportional band, temperature	S16	*10...320*	1.0...32.0 °C	*20*
15	Integration time	S16	*50...5000*	50...5000 s	*300*

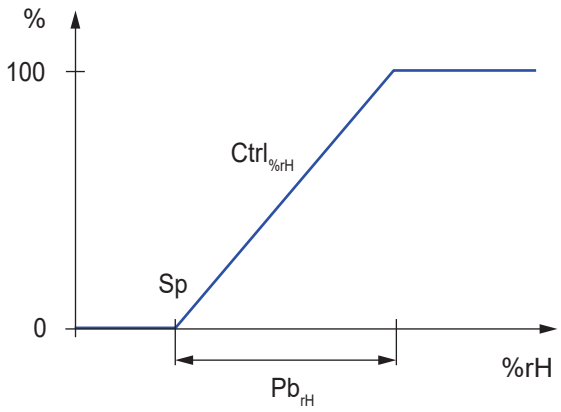
4.3.3 Humidity control

The -RH models can control relative humidity.

Property	Value
Setpoint	0...100 %rH, *50 %rH
Proportional band	10...100 %rH, *50 %rH
Integration time	50...5000 s, *300 s
	* factory setting

The following figure shows how the humidity control signal increases while relative humidity increases. For example, if setpoint is 50 %rH and proportional band is 30 %rH, the humidity control signal starts to increase when the relative humidity level goes above 50 %rH. As the relative humidity increases, the humidity control signal increases accordingly until it reaches 100 % when relative humidity is at 80 %rH.

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%	Control signal level
Sp	Setpoint
Pb_{rH}	Proportional band for relative humidity
$Ctrl_{\%rH}$	Control signal for relative humidity
%rH	Relative humidity

If you configure the settings via bus (-M models), use the following holding registers.

Holding register	Parameter description	Data type	Values	Range	Default
7	Control mode	S16	*0 - 1*	0. P 1. PI	*1*
8	Control output	S16	*0 - 1 - 2 - 3 - 4*	0. Off 1. VOC 2. Temperature 3. Humidity 4. Maximum selection	*1*
11	Setpoint, humidity	S16	*0...100*	0...100 %rH	*50*
14	Proportional band, humidity	S16	*10...100*	10...100 %rH	*50*
15	Integration time	S16	*50...5000*	50...5000 s	*300*

4.3.4 Maximum selection control

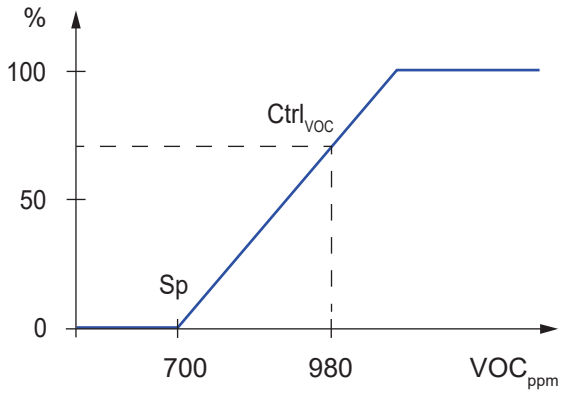
The maximum selection control includes VOC and temperature control. In -RH models, it also includes humidity control. In the maximum selection control, the controller calculates control output values for VOC level, temperature and relative humidity continuously as percentages. It forms the control signal for the control output according to the highest of these values.

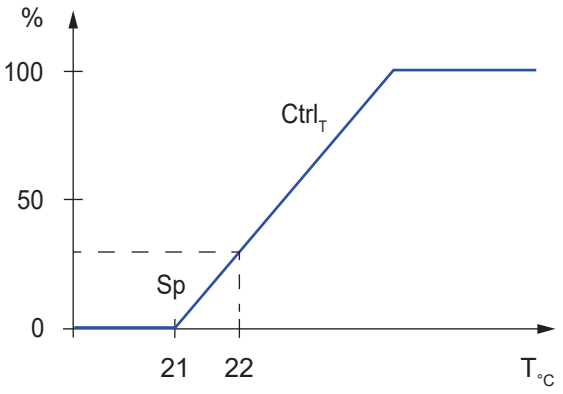
The figure below describes the following situation:

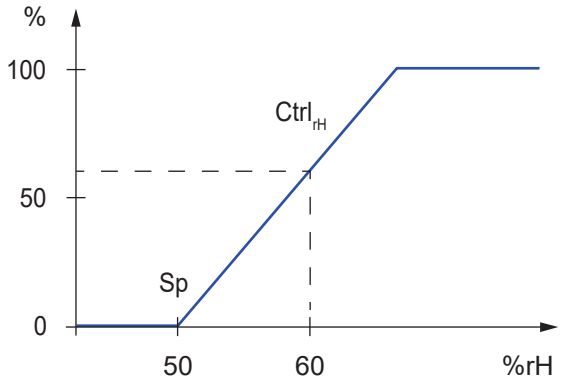
- VOC level is 980 ppm and the calculated value for the control output is 70 %.
- Temperature is 22 °C and the calculated value for the control output is 30 %.
- Relative humidity is 60 %rH and the calculated value for the control output is 60 %.

In this example, the calculated value for VOC level is higher than the calculated values for temperature and relative humidity. The controller forms the control signal based on the calculated value for VOC level. Since the voltage output range is 0...10 V, the 70 % VOC level equals to 7 V control signal.

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%	Sensor signal level
Sp	Setpoint
Ctrl$_{VOC}$	Control signal for VOC level
VOC$_{ppm}$	VOC level (ppm)
Ctrl$_{T}$	Control signal for temperature
T$_{°C}$	Temperature (°C)
Ctrl$_{rH}$	Control signal for relative humidity
%rH	Relative humidity (%rH)

If you configure the settings via bus (-M models), set the *Control output* parameter to *4*. See the table below for the holding registers.

Holding register	Parameter description	Data type	Values	Range	Default
7	Control mode	S16	*0 - 1*	0. P 1. PI	*1*
8	Control output	S16	*0 - 1 - 2 - 3 - 4*	0. Off 1. VOC 2. Temperature 3. Humidity 4. Maximum selection	*1*
9	Setpoint, VOC	S16	*450...2000*	450...2000 ppm	*700*
10	Setpoint, temperature	S16	*0...500*	0.0...50.0 °C	*210*
11	Setpoint, humidity	S16	*0...100*	0...100 %rH	*50*
12	Proportional band, VOC	S16	*100...2000*	100...2000 ppm	*500*
13	Proportional band, temperature	S16	*10...320*	1.0...32.0 °C	*20*

Holding register	Parameter description	Data type	Values	Range	Default
14	Proportional band, humidity	S16	*10...100*	10...100 %rH	*50*
15	Integration time	S16	*50...5000*	50...5000 s	*300*

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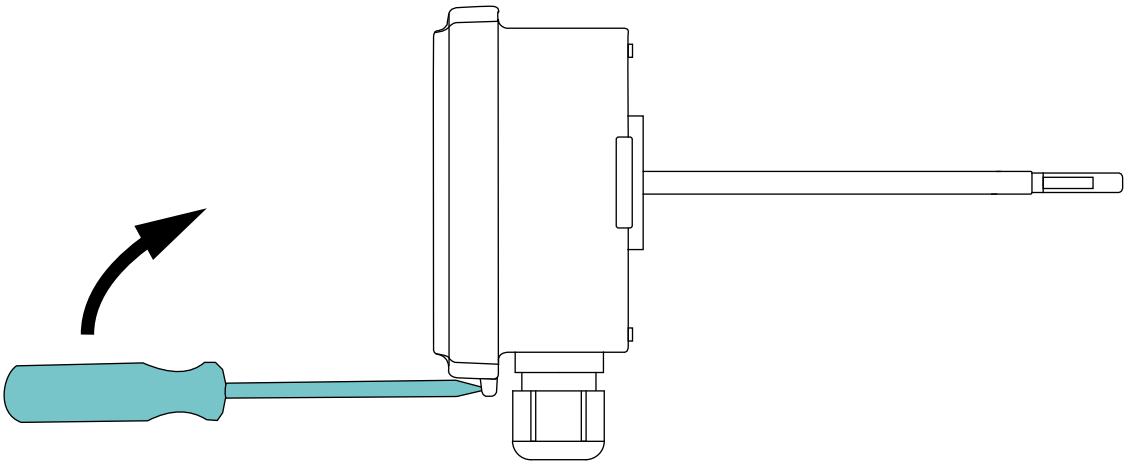
5 Commissioning

5.1 Opening the cover

CAUTION: Be very careful if you touch the device when the power supply is connected and the cover is removed.

If the device has a display, be very careful when you open the cover. The display board is connected to the circuit board with a cable.

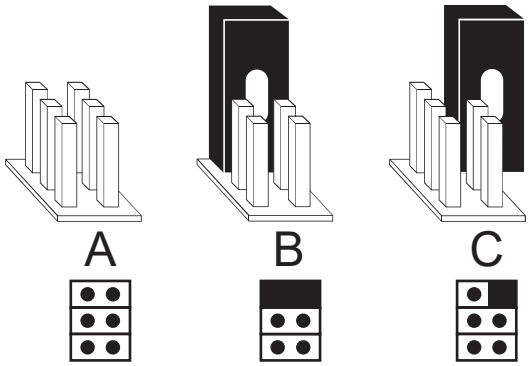
1. Put the tip of a flat-head screwdriver into the slot on the cover.
2. Hold the cover and push the screwdriver handle towards the device to open the cover.



5.2 Setting the jumpers

Important: Set the jumpers in the correct position before you turn on the power.

Install the jumpers as shown in the figure below to close the circuit or to store the jumper while the circuit remains open.



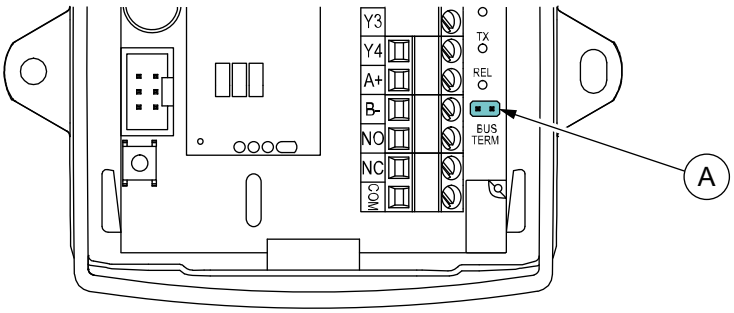
A. No jumper: circuit open
B. Jumper installed: circuit closed
C. Jumper stored: circuit open

5.2.1 Terminating Modbus

The -M models have pins for a Modbus termination jumper. Insert the termination jumper in the last device of the network to terminate the Modbus network.

1. Disconnect the device supply voltage.

2. Open the cover. See section Opening the cover on page 14 for instructions.
3. Insert the termination jumper in position on the circuit board.



A. Termination jumper

4. Align the cover with the housing and press the cover until it clicks closed.

5.3 Mounting

WARNING: Handle the product with care. Dropping the product can damage it internally and cause unwanted functions in the connected system.

CAUTION: Place the device outside the reach of children and animals.

Important: Remove the device from the ventilation duct before cleaning the duct.

Important: Only install this device in a location where the ambient conditions meet the operating condition requirements.

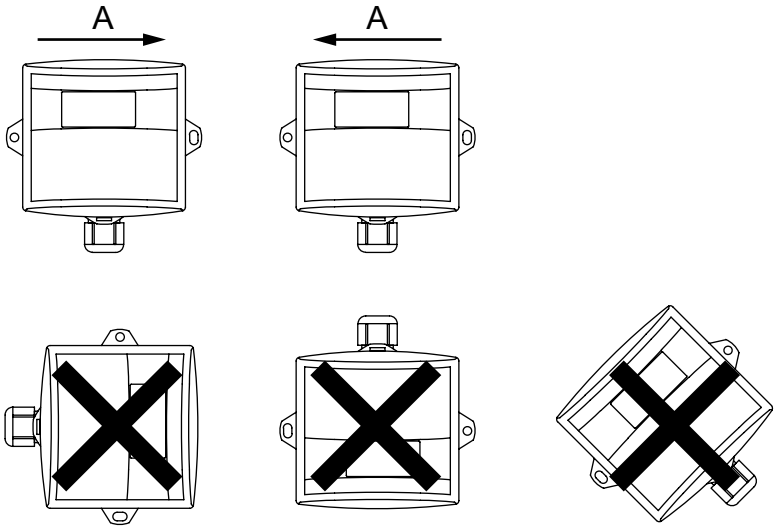
The transmitter is installed to a ventilation duct. Select the mounting position carefully. Make sure that the transmitter is easy to remove from the ventilation duct for cleaning. If possible, eliminate all the error factors that can affect the measurements. Typical measurement error factors include:

- Ambient temperature is too high or too low.
- Ambient humidity is too high.
- Condensation forms on the probe or in the duct.
- The device is exposed to vibration.
- The device is adjacent to a source of heat.
- Dust has collected in the ventilation duct.

Operating conditions	
Temperature	0...50 °C
Humidity	0...85 %rH (non-condensing)

1. Check that the product is not damaged during transportation.
2. Select the mounting position on a straight duct.
3. Drill the screw holes and the probe hole on the duct.
   The maximum screw diameter is 4.5 mm.
4. Push the transmitter probe into the duct through the drilled hole.

5. Make sure that the cable gland points down.
   See the figure below for the correct mounting orientation.



A. Air flow direction

6. Mount the device on the duct with screws.

5.4 Wiring

WARNING: Device wiring and commissioning can only be carried out by qualified professionals. Always make the device wirings in de-energised electricity network.

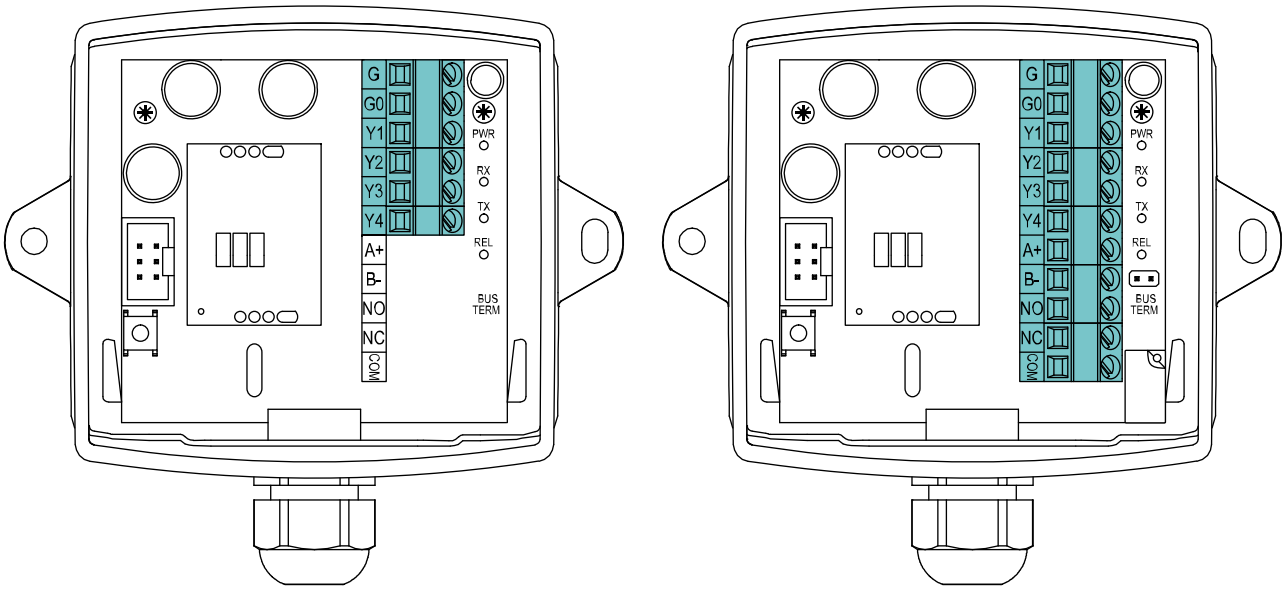
WARNING: Connect this device to SELV (separated extra low voltage) electricity network only. This device is an appliance class III product according to IEC 60664-1.

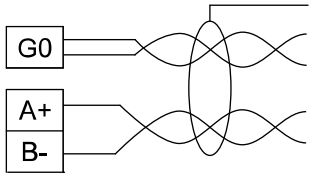
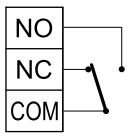
WARNING: Protect the relay port with an external slow blow fuse with maximum current rating of 1 A. Alternatively, you can limit the power consumption of the connected external circuitry to less than 15 W in both normal operation and failure condition. The relay port is not protected internally against overload.

WARNING: Only connect the relay port to SELV (separated extra low voltage) circuitry.

CAUTION: Use single-stranded wires if possible. If you use multi-stranded wires, always install wire end sleeves to the wires to prevent short circuits and ensure secure attachment.

Important: For CE and UKCA compliance, use correctly grounded, shielded cable.



G	Power supply, 24 Vac/dc	
G0	0 V	
Y1	VOC output	
Y2	Temperature output	
Y3	Humidity output (-RH models)	
Y4	Control output	
A+ *B-*		Modbus RTU, RS-485 (-M models)
NO *NC* *COM*		Relay output, 24 Vac/dc, max. 1 A res. (-R models)

The nominal tightening torque for wiring terminal screws is 0.4 Nm.

Important: Do not use excessive force when you tighten the wiring terminal screws.

5.5 Selecting the display mode (-N models only)

The display shows the measurement values one after the other by default. You can also set the display to show only one measurement.

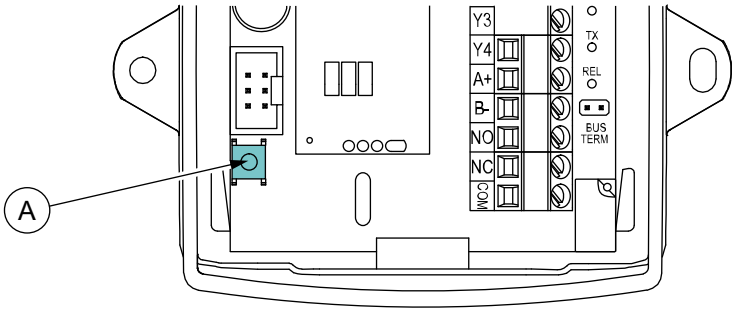
Note: In -M models, you can also select the measurement shown on the display via Modbus.

1. Make sure that the wires are correctly connected.
2. Turn on the power.
3. Open the cover.

   See section Opening the cover on page 14 for instructions. Be very careful when you open the cover. The display board is connected to the circuit board with a cable.

4. When the cycling display shows the measurement you want to select, press the *S1* button to select that measurement.

   Do not touch the wires.



   A. *S1* button

5. If you want to set the display to the cycling mode or select another measurement, press the *S1* button again.
6. Close the cover.

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6 Configuring transmitter using the ML-SER commissioning tool

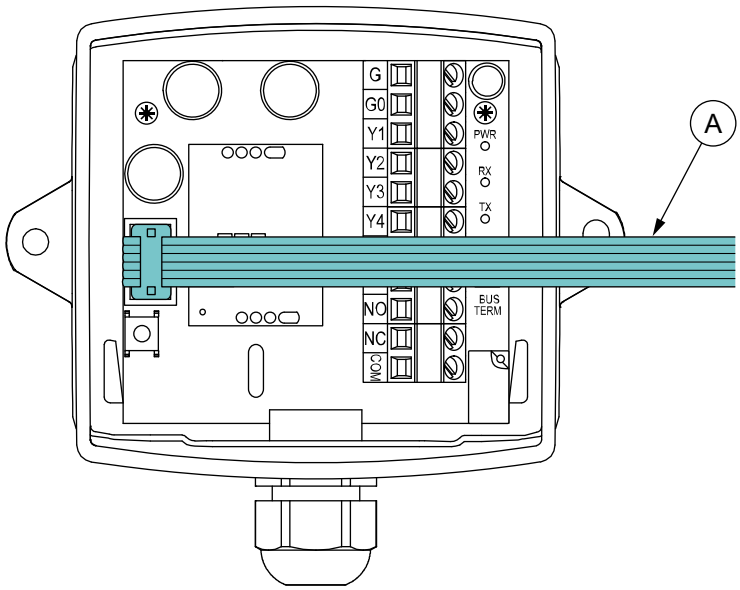
You can configure all transmitter settings using the ML-SER transmitter commissioning tool.

6.1 Connecting the ML-SER tool to the device

1. Open the cover. See section Opening the cover on page 14 for instructions.

   CAUTION: Be very careful if you touch the device when the power supply is connected and the cover is removed.

2. If the device has a display, remove the display cable from the display connector on the circuit board.
3. Connect ML-SER commissioning tool's cable to the display connector.



A. ML-SER cable

4. Wait until the ML-SER commissioning tool has initialised.

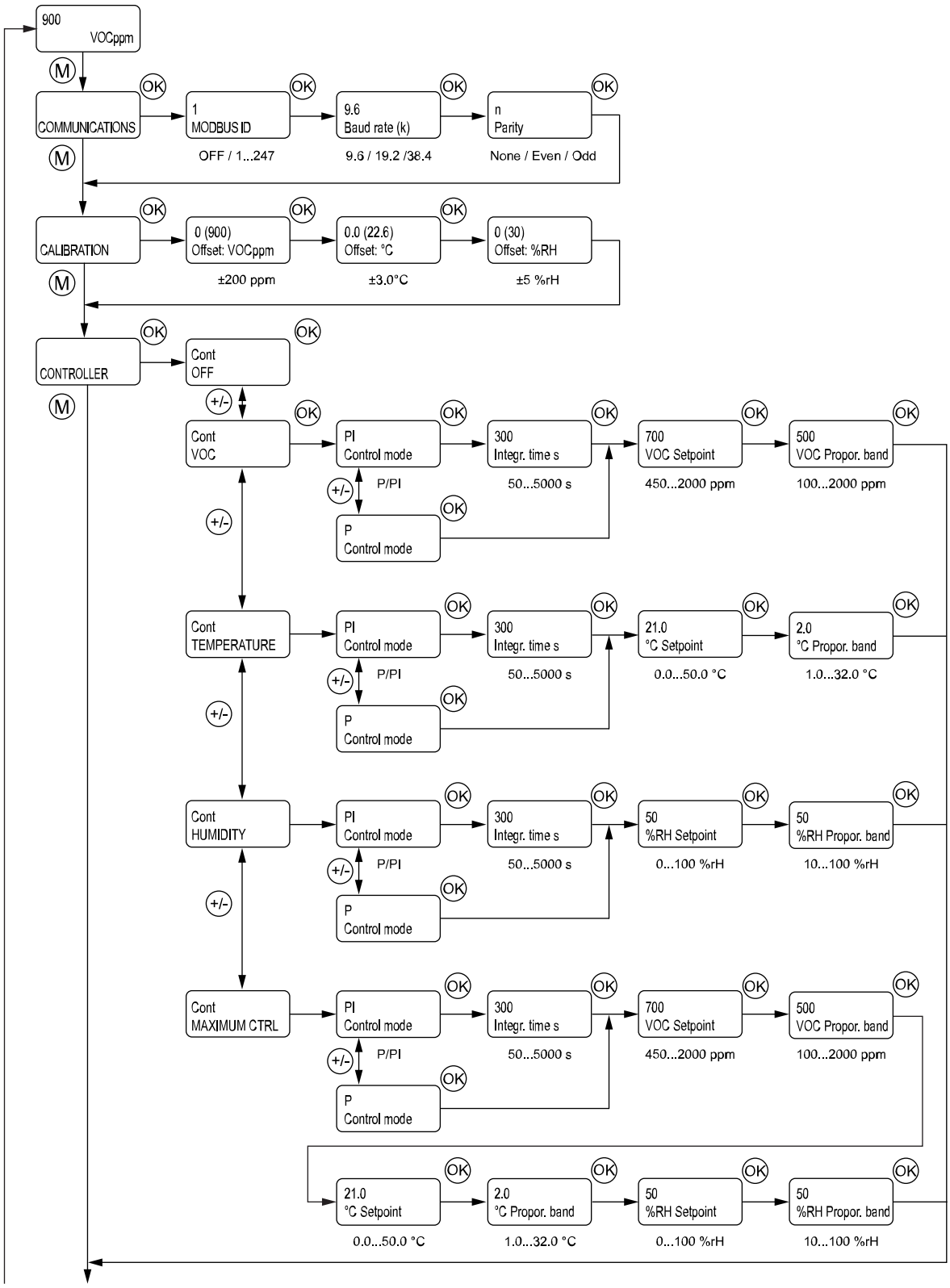
After initialisation, the ML-SER commissioning tool shows the measurement values one by one.

6.2 The ML-SER commissioning tool menu

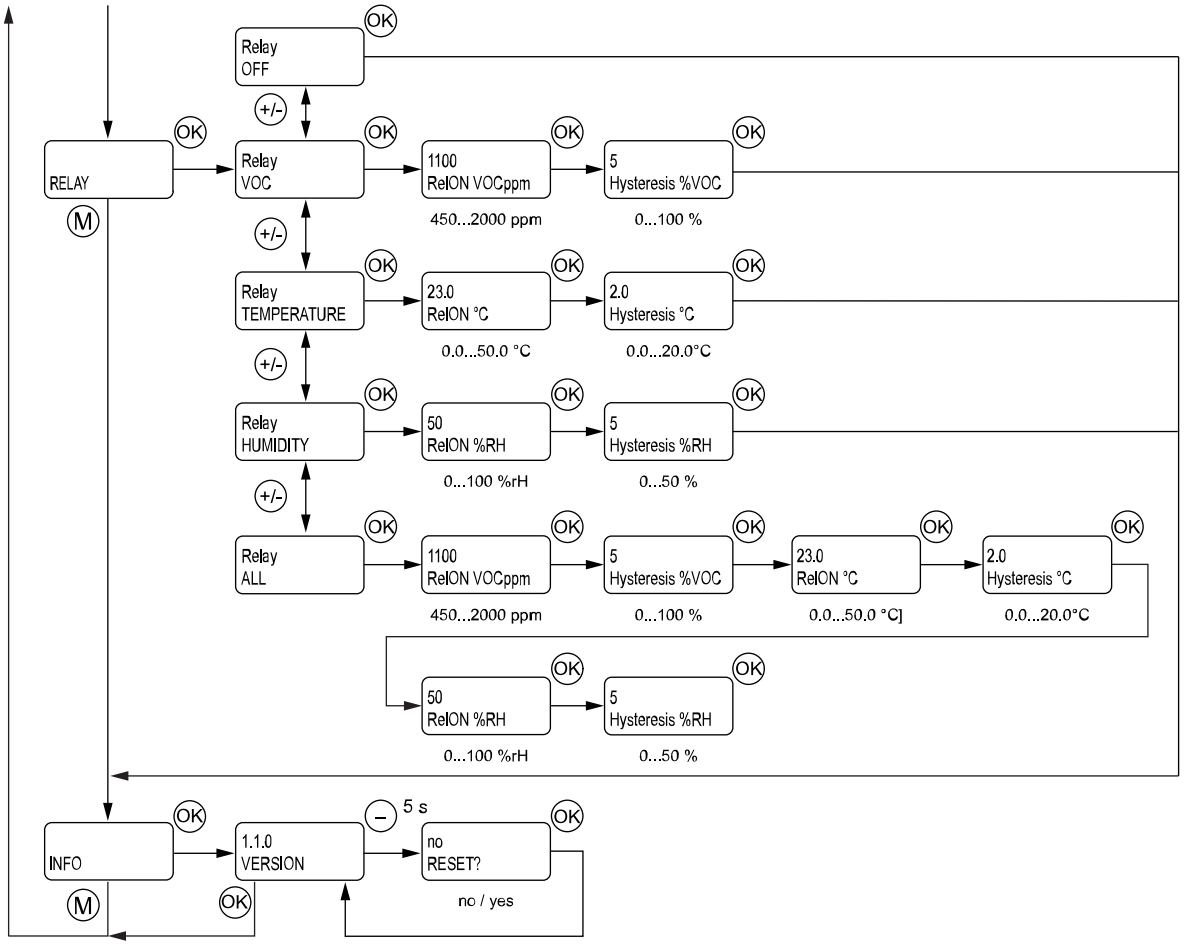
This menu is device-specific. Menu content depends on the device model and the installed options.

See the figure below for the full menu structure that shows the menu options and the factory settings for all models. See the following chapters for detailed explanations of the menu options.

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The menu structure continues on the next page.



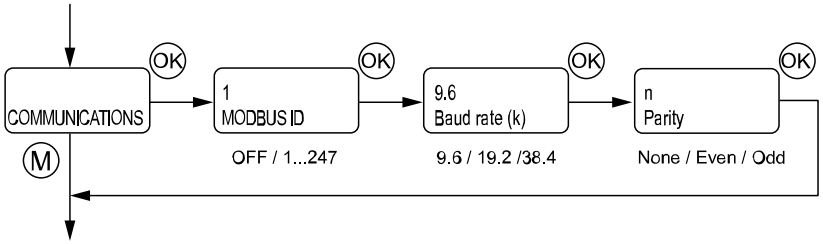
6.3 Using the ML-SER commissioning tool

1. Press the Ⓜ button on the ML-SER commissioning tool to open the main menu.
2. Press the Ⓜ button again to go to the next item in the main menu.
3. Press the OK button to open a submenu.
4. Change the parameter values with the ⊕ and ⊖ buttons.
   One button press increases or decreases the value by one small step, for example, by 0.1 °C. If you press the button again and again faster, the value increases or decreases in larger steps.
5. Press the OK button to accept the new parameter value.
6. Press the OK button repeatedly to go back to the main menu.
7. Press the Ⓜ button repeatedly to exit the main menu.

6.4 The Communications menu (Modbus)

This menu is available in -M models. You can change the bus settings in this menu.

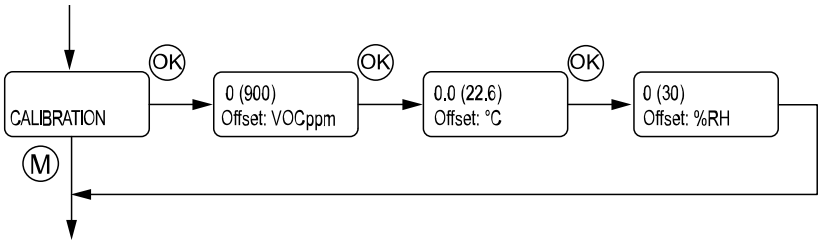
Note: Modbus communication settings must be configured with the ML-SER commissioning tool before you can access the transmitter settings via bus.



Parameter name	Values	Default	Description
Modbus ID	*OFF / 1...247*	*1*	Modbus address.
Baud rate	*9.6 / 19.2 / 38.4*	*9.6*	Modbus speed (kbit/s).
Parity	*n / E / 0*	*n*	Bus parity. • n = none • E = even • 0 = odd

6.5 The Calibration menu

In this menu, you can tune the humidity and temperature measurement values.



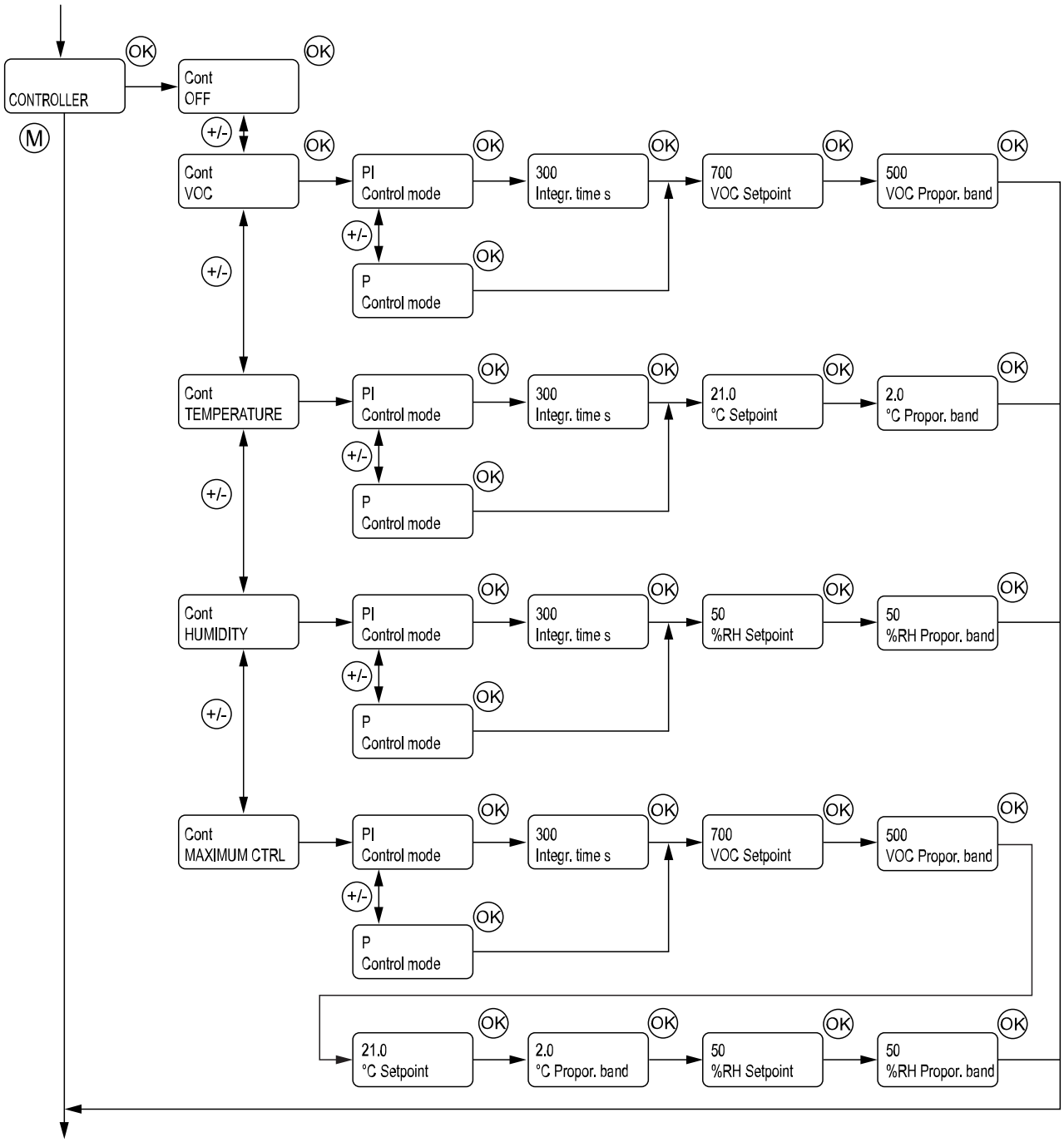
Parameter name	Values	Default	Description
Offset VOCppm	*-200...200 ppm*	*0 ppm*	VOC measurement tuning. You can adjust this value by 10 ppm steps.
Offset °C	*-3.0...3.0 °C*	*0.0 °C*	Temperature measurement tuning. You can adjust this value by 0.1 °C steps.
Offset %RH	*-5...5 %RH*	*0 %RH*	Humidity measurement tuning. You can adjust this value by 1 % steps.

You can see the tuning result in brackets after the tuning value on the ML-SER tool display.

6.6 The Controller menu

The controller can control devices based on VOC level, temperature, or both measurements. In the **-RH** models, the controller can control devices based on VOC level, temperature, relative humidity, or all measurements. The controller uses all available measurements in the maximum selection control mode.

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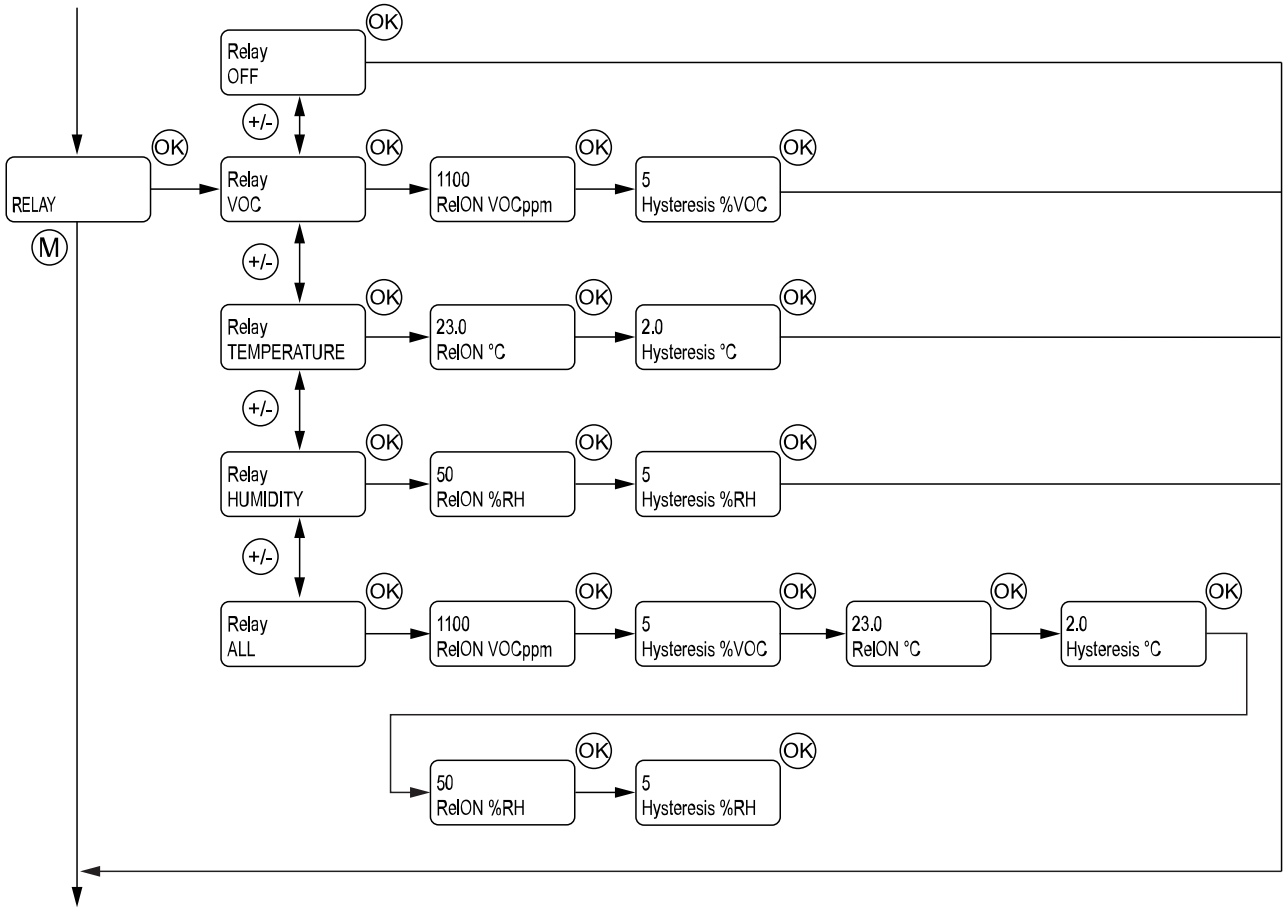


Parameter name	Values	Default	Description
Control type	*OFF / VOC / TEMPERATURE / HUMIDITY / MAXIMUM CTRL*	*OFF*	Controlled value. *OFF* — Controller off *VOC* — Volatile organic compounds *TEMPERATURE* — Temperature *HUMIDITY* — Relative humidity *MAXIMUM CTRL* — Maximum selection control. See section Maximum selection control on page 11 for more information.
Control mode	*P / PI*	*PI*	Control method.

Parameter name	Values	Default	Description
Integr. time s	*50...5000 s*	*300 s*	Integration time (s). You can adjust this value by 1 s steps.
VOC Setpoint	*450...2000 ppm*	*700 ppm*	Setpoint for VOC level (ppm). You can adjust this value by 10 ppm steps.
VOC Propor. band	*100...2000 ppm*	*500 ppm*	Proportional band for VOC level (ppm). You can adjust this value by 10 ppm steps.
°C Setpoint	*0...50.0 °C*	*21.0 °C*	Setpoint for temperature (°C). You can adjust this value by 0.1 °C steps.
°C Propor. band	*1.0...32.0 °C*	*2.0 °C*	Proportional band for temperature (°C). You can adjust this value by 0.1 °C steps.
%RH Setpoint	*0...100 %RH*	*50 %RH*	Setpoint for relative humidity (%rH) in -RH models. You can adjust this value by 5 % steps.
%RH Propor. band	*10...100 %RH*	*50 %RH*	Proportional band for humidity (%rH) in -RH models. You can adjust this value by 5 % steps.

6.7 The Relay menu

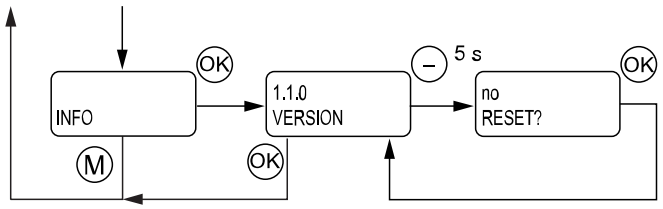
This menu is available in -R models. In this menu, you can adjust the relay setpoint and hysteresis to change the relay switching point.



Parameter	Available values	Description
Relay	*OFF / VOC / TEMPERATURE / HUMIDITY / ALL*	Relay function. *OFF* — Relay is not in use. *VOC* — The relay switches on when the measured VOC level is more than the sum of the VOC setpoint value and the relay hysteresis value. *TEMPERATURE* — The relay switches on when the measured temperature is more than the sum of the temperature setpoint value and the relay hysteresis value. *HUMIDITY* — The relay switches on when the measured relative humidity is more than the sum of the humidity setpoint value and the relay hysteresis value. Available in -RH models. *ALL* — All measurement values. The relay switches on when one of the measured values is more than the sum of its setpoint value and the relay hysteresis value.
RelON VOCppm	*450...2000 ppm*	Setpoint for VOC level (ppm). You can adjust this value by 10 ppm steps.
Hysteresis %VOC	*0...100 %*	Hysteresis for VOC level (ppm). You can adjust this value by 1 % steps.
RelON °C	*-0.0...50.0 °C*	Setpoint for temperature (°C). You can adjust this value by 0.1 °C steps.
Hysteresis °C	*0.0...20.0 °C*	Hysteresis for temperature (°C). You can adjust this value by 0.1 °C steps.
RelON %RH	*0...100 %rH*	Setpoint for relative humidity (%rH). You can adjust this value by 1 % steps. Available in -RH models.
Hysteresis %RH	*0...50 %*	Hysteresis for relative humidity (%rH). You can adjust this value by 1 % steps. Available in -RH models.

6.8 The Info menu

You can check the device software version and reset the device to factory settings in this menu.



Parameter name	Values	Description
VERSION	*X.X.X*	Device software version.
RESET?	*no / yes*	Reset to factory settings. Press the ⊖ button for 5 seconds in the *VERSION* view. Select *yes* in the *RESET?* view. Press the OK button. The ML-SER commissioning tool resets the device settings to factory settings.

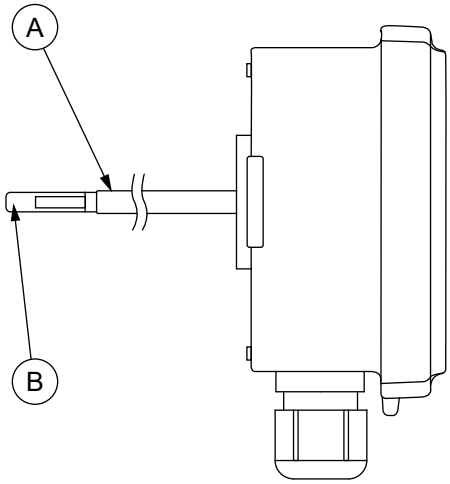
7 Maintenance

7.1 Cleaning the probe and the sensor element

Dust, grease and other dirt can accumulate on the sensor element over time and decrease the measurement accuracy of the sensors. Clean the probe and the sensor element regularly. The required cleaning interval depends on the air cleanliness.

Do not clean the sensor element with detergents or other chemicals.

1. Disconnect the device supply voltage. For the -R models, disconnect the device supply voltage and the relay mains supply voltage.
2. Clean the probe with a soft cloth.



A. Probe
B. Sensor element

3. Clean the sensor element with compressed air carefully.

   Apply compressed air lightly to the sensor element to prevent damage.

   Important: Do not use too high pressure, touch the sensor element or use other cleaning methods that cause mechanical stress. Mechanical stress damages the sensor element and changes the measurement accuracy of the sensors.

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8 Modbus

Note: Configure the Modbus communication settings with the ML-SER commissioning tool to be able to access the transmitter settings over Modbus network.

8.1 Modbus properties

Protocol	RS-485 Modbus RTU
Bus speed	9600*/19200/38400 bit/s
Data bits	8
Parity	none*/even/odd
Stop bits	1
Modbus ID	1*
Unit load	max. 1/4 UL
	* factory setting

8.2 Modbus function codes

This device supports the following Modbus function codes.

Decimal	Hexadec-imal	Function
1	0x01	Read Coils
2	0x02	Read Discrete Inputs
3	0x03	Read Holding Registers
4	0x04	Read Input Registers
5	0x05	Write Single Coil
6	0x06	Write Single Register
15	0x0F	Write Multiple Coils
16	0x10	Write Multiple Registers

8.3 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.

Example:

1. The register value range is -500…500.
2. You try to write the value 600 to the register.
3. The value 500 is written to the register.

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8.3.1 Coils

Register	Parameter description	Data type	Values	Range	Default
0	Y1 output override activation	Bit	*0 - 1*	0. Off 1. On	*0*
1	Y2 output override activation	Bit	*0 - 1*	0. Off 1. On	*0*
2	Y3 output override activation	Bit	*0 - 1*	0. Off 1. On	*0*
3	Y4 output override activation	Bit	*0 - 1*	0. Off 1. On	*0*
4	Relay override activation	Bit	*0 - 1*	0. Off 1. On	*0*
5	Relay override	Bit	*0 - 1*	0. Off 1. On	*0*

8.3.2 Discrete inputs

Register	Parameter description	Data type	Values	Range
0	Relay status	Bit	*0 - 1*	0. Off 1. On

8.3.3 Input registers

Register	Parameter description	Data type	Values	Range
0	VOC measurement (CO_2 equivalent)	S16	*0…2000*	0...2000 ppm
1	Temperature measurement	S16	*0...500*	0.0...50.0 °C
2	Humidity measurement	S16	*0...100*	0...100 %rH
3	Y1 output voltage	S16	*0...1000*	0.00...10.00 V
4	Y2 output voltage	S16	*0...1000*	0.00...10.00 V
5	Y3 output voltage	S16	*0...1000*	0.00...10.00 V
6	Y4 output voltage	S16	*0...1000*	0.00...10.00 V

8.3.4 Holding registers

Register	Parameter description	Data type	Values	Range	Default
0	Y1 output override	S16	*0...1000*	0...100.0 %	*0*
1	Y2 output override	S16	*0...1000*	0...100.0 %	*0*
2	Y3 output override	S16	*0...1000*	0...100.0 %	*0*
3	Y4 output override	S16	*0...1000*	0...100.0 %	*0*
4	VOC measurement tuning (offset)	S16	*-200...200*	-200...200 ppm	*0*

Register	Parameter description	Data type	Values	Range	Default
5	Temperature measurement tuning (offset)	S16	*-30...30*	-3.0...3.0 °C	*0*
6	Humidity measurement tuning (offset)	S16	*-5...5*	-5...5 %rH	*0*
7	Control mode	S16	*0 - 1*	0. P 1. PI	*1*
8	Control output	S16	*0 - 1 - 2 - 3 - 4*	0. Off 1. VOC 2. Temperature 3. Humidity 4. Maximum selection	*1*
9	Setpoint, VOC	S16	*450...2000*	450...2000 ppm	*700*
10	Setpoint, temperature	S16	*0...500*	0.0...50.0 °C	*210*
11	Setpoint, humidity	S16	*0...100*	0...100 %rH	*50*
12	Proportional band, VOC	S16	*100...2000*	100...2000 ppm	*500*
13	Proportional band, temperature	S16	*10...320*	1.0...32.0 °C	*20*
14	Proportional band, humidity	S16	*10...100*	10...100 %rH	*50*
15	Integration time	S16	*50...5000*	50...5000 s	*300*
16	Relay setpoint, VOC	S16	*450...2000*	450...2000 ppm	*1100*
17	Relay hysteresis, VOC	S16	*0...100*	0...100 %	*5*
18	Measurement shown on the display	S16	*0 - 1 - 2 - 3*	0. VOC 1. Temperature 2. Humidity 3. Cycling display	*3*
19	Not in use				*1*
20	Not in use				*0*
21	Relay setpoint, temperature	S16	*0...500*	0.0...50.0 °C	*230*
22	Relay hysteresis, temperature	S16	*0...200*	0.0...20.0 °C	*20*
23	Relay setpoint, humidity	S16	*0...100*	0...100 %rH	*50*
24	Relay hysteresis, humidity	S16	*0...50*	0...50 %	*5*
25	Relay function	S16	*0 - 1 - 2 - 3 - 4*	0. Off 1. VOC 2. Temperature 3. Humidity 4. All	*1*

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9 Disposal

This device is considered as electrical and electronic equipment for disposal in terms of the applicable European Directive. At the end of life, the product must enter the recycling system at an appropriate collection point.

- The device must be disposed through channels provided for this purpose.
- The disposal must be completed according to the local and currently applicable laws and regulations.

Generally all metals can be recycled as material. Plastics and cardboard packaging material can be used in energy recovery. Printed circuit boards need selective treatment according to IEC 62635 guidelines. To aid recycling, plastic parts are marked with an appropriate identification code. Contact your local Produal distributor for further information on environmental aspects and recycling instructions for professional recyclers.



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