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USER GUIDE

RTX-D

Produal

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PRODUAL

PART OF BEMSIQ GROUP

RTX-D touchscreen room transmitter

USER GUIDE

Made in Finland

5 years warranty

MANAGEMENT SYSTEM CERTIFICATION DNV ISO 9001 · ISO 14001 Finland

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1 Introduction

The RTX-D transmitters are very versatile room transmitters that can be equipped with several measurements. All transmitters are equipped with temperature measurement and 2.8" multicolour touchscreen display. You can use the touchscreen for viewing measurement information, adjusting setpoints and using VAV forcing function. The following options are also available:

- Humidity measurement (-RH models)
- CO_2 concentration measurement (-CO2 models)
- VOC (Volatile Organic Compounds) measurement (-VOC models)
- Occupancy detection (-PIR models)
- Relay output (-R models)
- Modbus RTU communication (-MOD models)
- BACnet MS/TP communication (-BAC models)

You can commission these transmitters using the MyProdual smartphone application and the MyTool Connect dongle. You can also configure all settings via bus in -MOD models and some settings in -BAC models.

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

RTX-D room transmitters are intended to be used for measuring and controlling temperature, humidity, carbon dioxide concentration and volatile organic compounds level in room environment.

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 the product or parts of product.

Read this user guide carefully before you commission, use or service this device. 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.

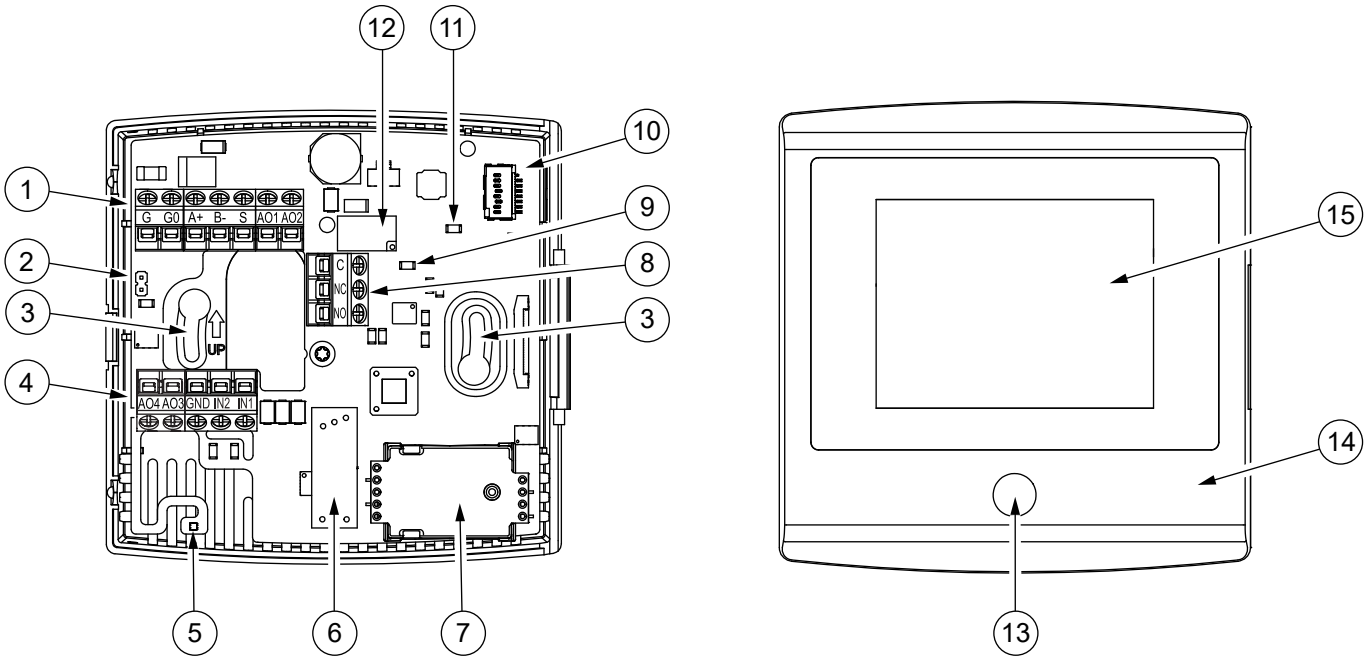
The product should only be used in professionally designed applications. Unauthorised modifications are not allowed. The product must not be used in relation with any equipment that in case of a failure may threaten, directly or indirectly, human health or life or result in danger to human beings, animals 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	Terminal block for power supply, Modbus (-MOD models), BACnet (-BAC models) and outputs 1 and 2	2	Communication bus termination jumper (-MOD and -BAC models)
3	Mounting point	4	Terminal block for inputs 1 and 2 and outputs 3 and 4
5	Temperature sensor / temperature and humidity sensor (-RH models)	6	VOC sensor (-VOC models)
7	CO_2 sensor (-CO2 models)	8	Terminal block for relay (-R models)
9	Power supply indicator light	10	MyTool Connect dongle connector
11	Communication indicator light (-MOD and -BAC models)	12	Relay (-R models)
13	Occupancy sensor lens (-PIR models)	14	Cover
15	Touchscreen display		

4 Functional description

This chapter introduces the main functions of the device.

4.1 Multifunctional inputs

This device has two multifunctional inputs. You can configure the inputs for several different purposes. You can configure the inputs via communication bus or by using the MyTool Connect dongle and the MyProdual application.

You can connect the following sensors and signals to input 1:

- NTC 10 temperature sensor
- PT 1000 temperature sensor
- resistance signal
- digital signal
- 0...10 Vdc signal

You can connect the following sensors and signals to input 2:

- NTC 10 temperature sensor
- resistance signal
- digital signal

4.2 Multifunctional outputs

This device has four configurable outputs. You can configure the outputs for the following purposes:

- analogue measurement output (freely scalable within 0...10 Vdc)
- analogue control output (freely scalable within 0...10 Vdc)
- two-state output (for example 0/10 Vdc)
- forwarding the input signal
- controlling the output via communication bus (-MOD and -BAC models)

You can use the two-state output for a simple thermostat-type control by setting the measurement value contact settings and selecting the measurement contact to control the output.

You can configure the outputs via communication bus or by using the MyTool Connect dongle and the MyProdual application.

The factory defaults for output settings depend on the product options. See the table below for the default output settings.

Options	Output 1	Output 2	Output 3	Output 4
Basic model	Temperature	-	-	-
-RH	Temperature	Relative humidity	-	-
-CO2	Temperature	CO_2	-	-
-VOC	Temperature	VOC	-	-
-CO2-RH	Temperature	CO_2	Relative humidity	-
-RH-VOC	Temperature	Relative humidity	VOC	-
-CO2-VOC	Temperature	CO_2	VOC	-
-CO2-RH-VOC	Temperature	CO_2	Relative humidity	VOC

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4.3 Relay output

The -R models have a change-over relay output (24 Vac, 1 A). You can control the output according to one or several measurements and functions. You can use the following functions and measurements:

- temperature measurement
- relative humidity measurement (-RH models)
- CO_2 measurement (-CO2 models)
- VOC measurement (-VOC models)
- occupancy detection (-PIR models)
- condensation detection
- input contact information
- ventilation forcing information
- bus communication

In multiple value control (*Multisource*), you can select any combination of the above functions. If you use measurements to control the relay, configure the contact on and off values in the measurement settings of the selected measurements.

4.4 Control functions

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

The controller can control heating and cooling according to temperature, humidification and dehumidification according to relative humidity (-RH models), and ventilation according to CO_2 (-CO2 models) or VOC (-VOC models) level. You can define the dead zones for control.

You can assign heating/cooling and humidification/dehumidification control signals to different outputs. Heating and humidification are the primary control signals. Cooling and dehumidification are the secondary control signals.

You can also set the multifunctional input or the occupancy detection (-PIR models) to switch the controller on and off.

When you control the setpoints via Modbus, the controller uses two holding registers to store each setpoint. The first register is for continuous update and the other is for the default value that is restored after a power failure. Use the following registers for the setpoints:

Holding register	Parameter description	Data type	Values	Range	Default
7	Controller temperature setpoint.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
8	Controller relative humidity setpoint.	U16	*0...10000*	0.00...100.00 %	*0*
9	Controller CO_2 setpoint.	U16	*0...10000*	0...10000 ppm	*0*
10	Controller VOC setpoint.	U16	*0...32767*	0...32767 µg/m^3	*0*
2105	Temperature setpoint default value.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
2116	Humidity setpoint default value.	U16	*0...10000*	0.00...100.00 %	*0*
2127	CO_2 setpoint default value.	U16	*0...10000*	0...10000 ppm	*0*
2138	VOC setpoint default value.	U16	*0...32767*	0...32767 µg/m^3	*0*

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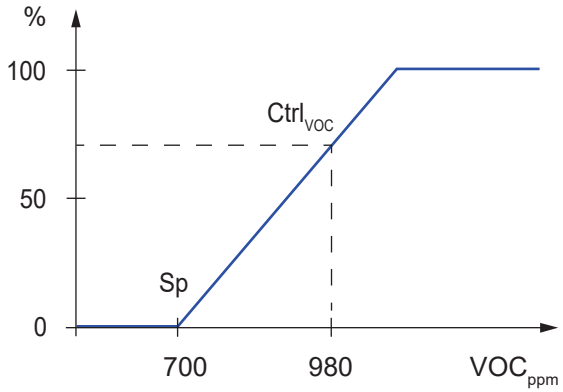
4.4.1 Maximum selection control

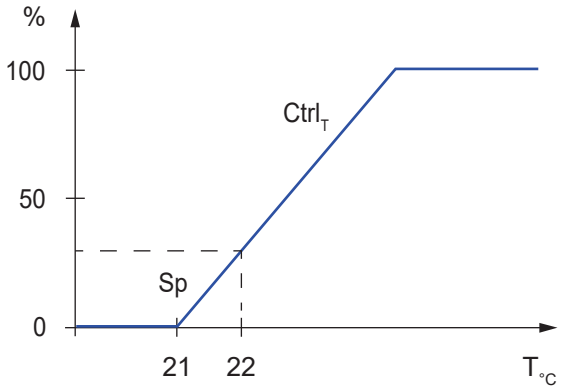
The maximum selection control includes temperature, humidity (-RH models), CO_2 (-CO2 models) and VOC (-VOC models) control. In the maximum selection control, the controller calculates control output values for all selected measurements as percentages. It forms the control signal for the control output according to the highest of these values.

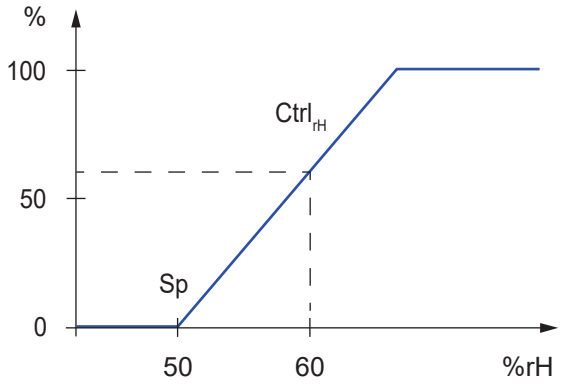
The figure below describes the following situation:

- 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.







%	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)

4.5 Condensation alarms

The -RH models have a condensation alarm function. Condensation alarm can be used, for example, to prevent water from condensating on a cooling water pipe. You can set up to two alarms.

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The condensation alarm function continuously calculates the dew point and compares it to the temperature that is connected to the multifunctional input. When the input temperature approaches the dew point alarm level, the alarm activates. You can set the limit values for the alarm activation and deactivation. You can read the condensation alarms via communication bus (-MOD and -BAC models) or set them to control digital output and relay output (-R models).

Condensation alarm 1 (*CA 1*) uses the measurement information from input 1 and condensation alarm 2 (*CA 2*) uses the measurement information from input 2.

4.6 Average temperature calculation

The device has average temperature calculation function. You can select the average temperature calculation source from the following options:

- internal temperature sensor
- input 1 temperature sensor
- internal temperature sensor and input 1 temperature sensor
- input 2 temperature sensor
- internal temperature sensor and input 2 temperature sensor
- input 1 and input 2 temperature sensor

4.7 Ventilation forcing function

The device has a ventilation forcing function that can be used to boost ventilation for a period of time. The user can control the function with a button on the display.

You can use the function information to control the relay (-R models) or read the information via bus (-MOD and -BAC models).

4.8 Indicator lights

These transmitters have an indicator light for power supply on the circuit board. The indicator light is on when the power supply is on.

The -MOD and -BAC models have a communication indicator light on the circuit board. You can configure the indicator light for the following functions:

- off
- data transmitting indication
- data receiving indication
- data transmitting and receiving indication

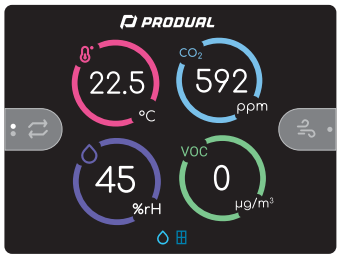
CAUTION: Be very careful if you touch the device when the power supply is connected and the cover is open.

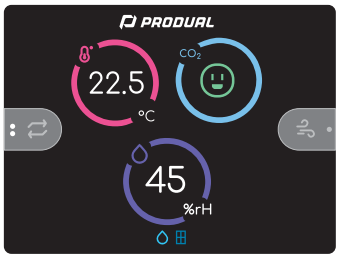
4.9 Touchscreen display

The RTX-D transmitter has a 2.8" capacitive multicolour touchscreen that provides a responsive and clear interface for visualising measurement information.

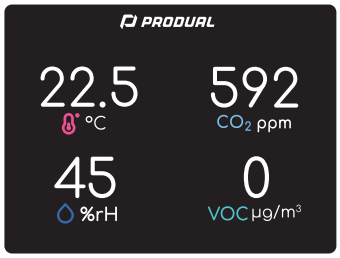
The display has several different ways of displaying measurement information in active and screensaver views. You can configure up to six different active views and one screensaver view. You can also configure a button for ventilation forcing function.

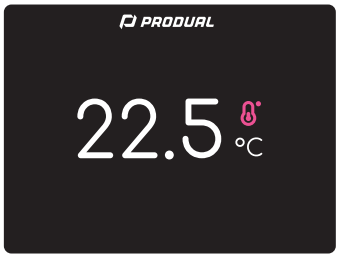
Active views





Screensaver view





You can configure the display via communication bus or by using the MyTool Connect dongle and the MyProdual application.

4.10 Installation quality score

Accurate temperature measurement is key for controlling heating, cooling and ventilation. The accuracy of a room transmitter depends greatly on the installation location. Airflow inside the transmitter housing increases the temperature measurement readings because the airflow pushes heat from the electronics to the sensors when it flows through the housing. The amount of measurement error depends on the amount of airflow inside the transmitter housing. Several factors can increase the airflow inside the transmitter housing, for example, draught from the flush mounting box, windows, doors or ventilation, and warm air from heaters, televisions and other electrical equipment.

The installer can minimize the measurement error by choosing an installation location where little or no air flows through the transmitter housing. Installation quality score (IQS) helps to verify that the installation location is ideal for accurate temperature measurement. Installation quality score also enables real-time monitoring of changes in the installation environment in the BMS system via Modbus communication.

The calculated installation quality score is proportional to the measured airflow inside the housing. The airflow is measured and calculated using patented temperature compensation method. The reference point for the installation quality score is a laboratory installation of the device. Installation quality score uses a scale from 4 to 1. When installation quality score (IQS) is 4, the installation location is ideal and temperature measurement accuracy is within the data sheet limits. However, even with a poor IQS value, the transmitter can measure accurately, but the temperature measurement has reduced stability and/or repeatability.

IQS	Accuracy	Installation quality
4	Excellent	The transmitter is installed correctly. Installation quality is excellent. Little or no airflow inside the housing.
3	Satisfactory	Installation quality is satisfactory. Some airflow inside the housing.
2	Moderate	Installation quality could be improved. Moderate airflow inside the housing.
1	Poor	The transmitter is not installed correctly. Installation quality is poor. High airflow inside the housing. See the mounting instructions for the typical measurement error factors and improve the installation.

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5 Commissioning

5.1 Mounting the device

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

1. Check that the product is not damaged during transportation.
2. Select the mounting position.

WARNING: Do not install this product near a life support equipment. This device may cause harmful interference to nearby life support equipment.

WARNING: Do not install this product into environment containing flammable or explosive substances.

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

Mount the device in dry surroundings (IP30) with pollution degree 1 or 2. The recommended mounting height is 150...180 cm.

Select the mounting position carefully. If possible, eliminate all the error factors that can affect the measurements. Typical measurement error factors include:

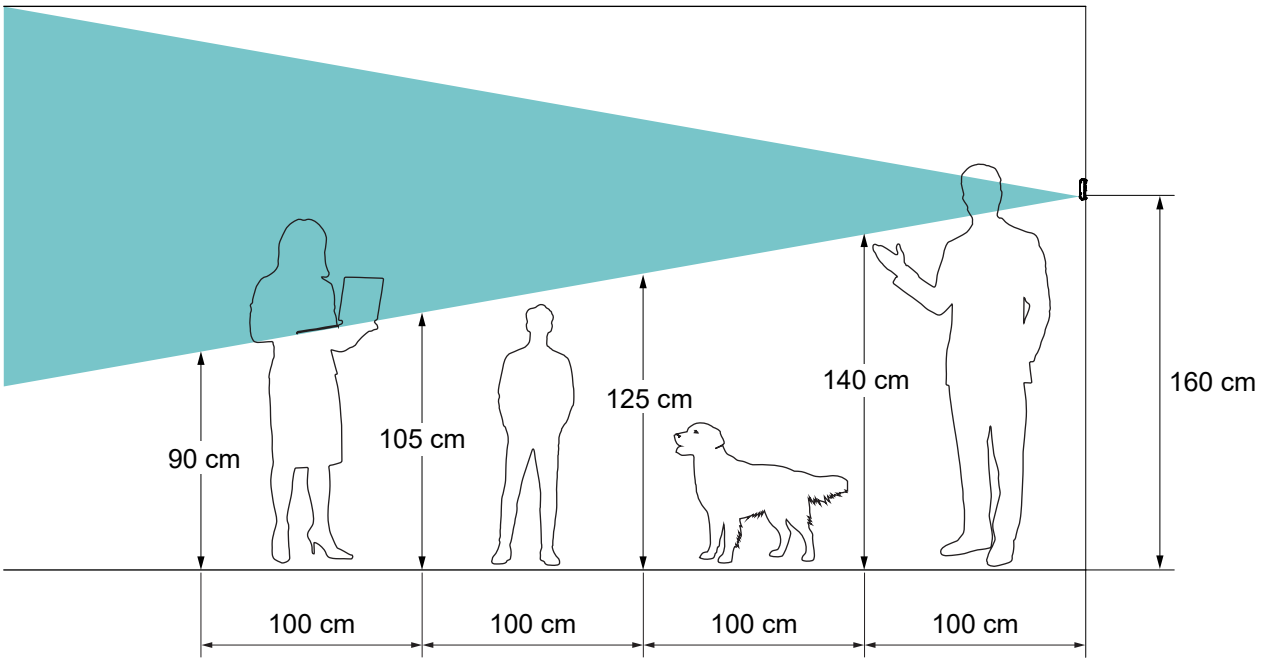
- direct sunlight
- occupant proximity
- airflow coming from windows or doors
- airflow coming from ventilation nozzles
- airflow coming from the flush mounting box
- differential temperature caused by an external wall
- warm air from heaters, televisions and other electrical equipment
- continuous presence of people near the device

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

Operating conditions

Temperature	0...60 °C
Temperature (-R models)	0...50 °C
Humidity	0...95 %rH (non-condensing)

3. If your device has an occupancy sensor (-PIR models, check that the sensor can cover the monitored area.

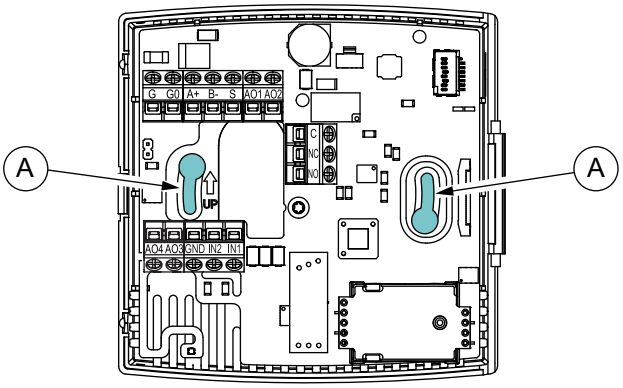


Note: You can mount the device lower than the recommended height (for example, to 140 cm) to improve detection coverage.

4. Open the cover.
   Cover opens from the left side. The hinge of the cover is on the right side of the housing.

Important: Do not remove the cover. The cover opening angle is 135°.

5. Mount the device using the mounting points.



A. Mounting points

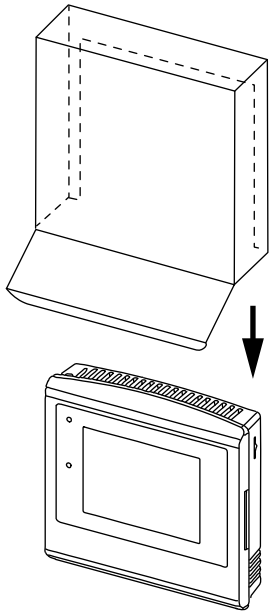
The maximum screw diameter is 3 mm. The maximum tightening torque for mounting screws is 0.6 Nm.

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

6. Connect the wires.
   See chapter Wiring on page 14 for instructions.
7. Close the cover carefully.
8. To use the product box as a dust cover during the construction phase, tear the front of the box off along the perforated lines.

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9. Put the product box over the device.



10. Remove the dust cover before operating the device.

5.2 Wiring

WARNING: Only connect wires and commission the device if you are qualified for electrical work and familiar with building automation products. Risk of electric shock and damage to the device.

WARNING: Always commission the device in a de-energised electricity network. Risk of electric shock.

WARNING: Protect the external power sources and power wiring with a fuse or circuit breaker. The maximum rating for the external circuit breaker is 16 A.

WARNING: Use an external power source that can provide at least 170 VA / 170 W to ensure proper operation of the device's internal fusing in case of a failure condition. If the power source cannot fulfill this requirement, the system's total power consumption should be less than 15 W also in the failure condition.

WARNING: Connect this device to SELV (separated extra low voltage) electricity network only. This device is 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.

WARNING: The maximum loop resistance of supply power wiring is 3 Ω.

CAUTION: Connect the device only to overvoltage category I, II or III electricity network according to IEC 60664-1.

Important: This product cannot detect an abnormal condition of input or output ports. External supervising (automated/human) can be necessary depending on the application where this product is used.

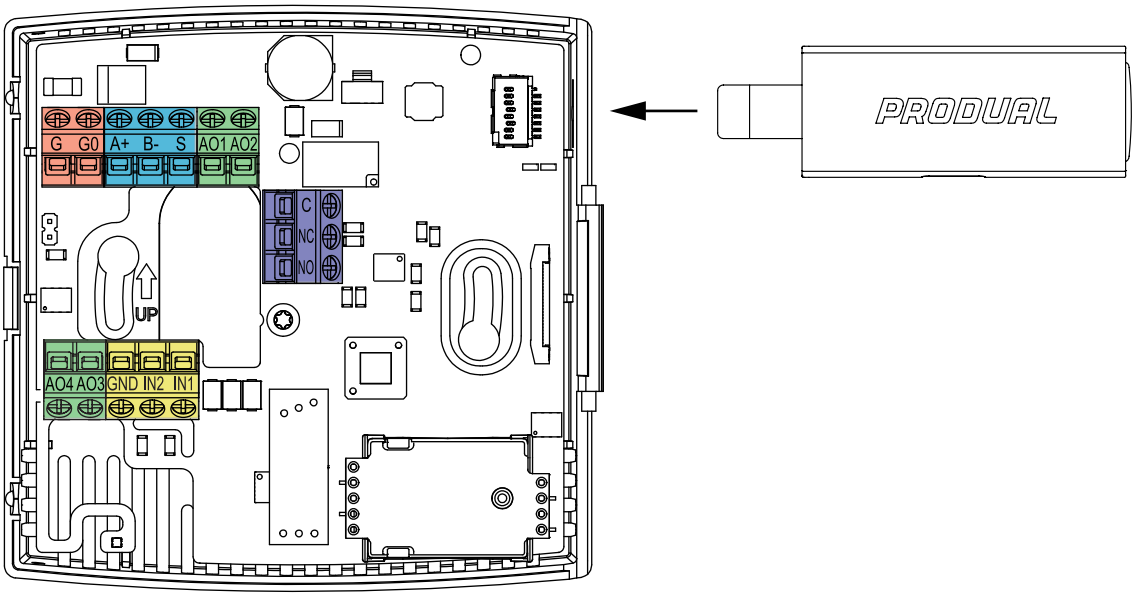
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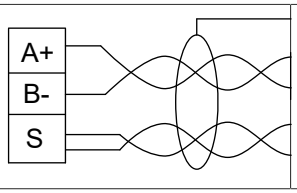
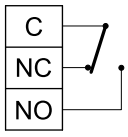
1. Open the cover.
   Cover opens from the left side. The hinge of the cover is on the right side of the housing.

   Important: Do not remove the cover. The cover opening angle is 135°.

2. Connect the wires to the screw terminal block according to the table below.

   Important: Do not use wire end sleeves.



G	Supply, 24 Vac/dc, < 3.2 VA
G0	0 V
A+ *B-* *S*	 Modbus RTU, RS-485 (-MOD models). BACnet MS/TP, RS-485 (-BAC models). **Note:** You can use the S connector only to chain the cable shielding.
AO1	Voltage output 1, 0...10 Vdc, < 2 mA (freely scalable within this range).
AO2	Voltage output 2, 0...10 Vdc, < 2 mA (freely scalable within this range).
C *NC* *NO*	 Relay output, 24 Vac/dc, 1 A res. (-R models).
AO4	Voltage output 4, 0...10 Vdc, < 2 mA (freely scalable within this range).
AO3	Voltage output 3, 0...10 Vdc, < 2 mA (freely scalable within this range).
GND	Ground.
IN2	Input 2, digital / resistance / NTC 10.
IN1	Input 1, digital / resistance / 0...10 Vdc / NTC 10 / PT 1000.

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.

CAUTION: Make sure that all covers are closed before you connect the supply voltage to the device. Do not open the covers when the supply voltage is connected.

3. Make sure that the cables or wires do not touch the display or get in between the cover and housing.
4. Close the cover.

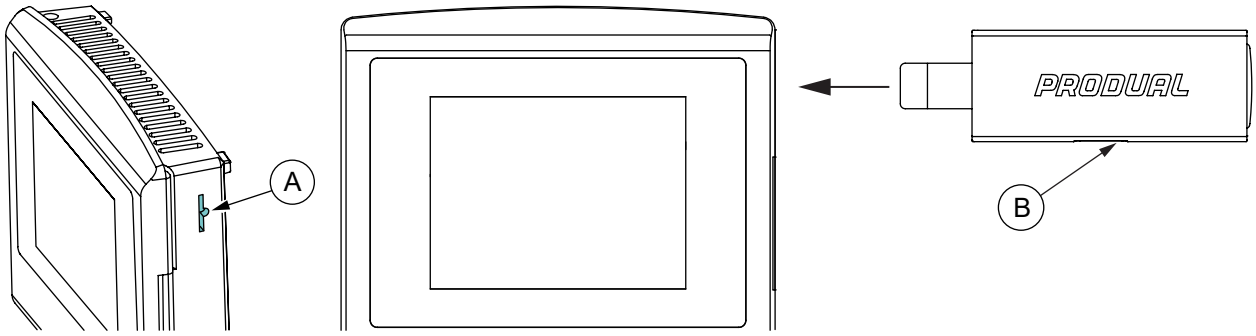
Make sure that all device functions operate correctly after the wiring is complete and the power supply is on.

5.3 Configuring the transmitter using the MyProdual application

To configure the device, you first need to connect it to the MyProdual application. When the device is connected to the application, you can make changes to the configuration.

Note: You need the MyTool Connect dongle to connect the MyProdual application to the device.

1. Connect the supply voltage to the device.
2. Insert the MyTool Connect dongle to the connector.



A. MyTool Connect dongle connector
B. MyTool Connect dongle

The indicator light on the MyTool Connect dongle flashes when the Bluetooth is ready for connecting.

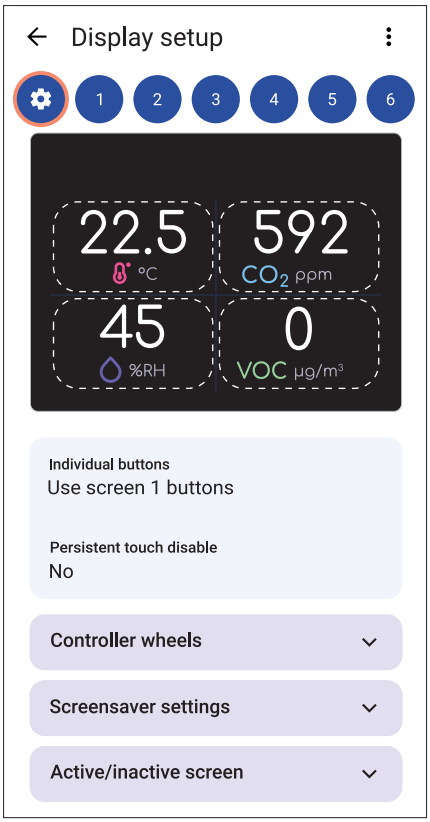
3. Start the MyProdual application.
4. Tap the *Quick access* button.
5. Tap the *Bluetooth connection* button.
   The device list shows the devices that have Bluetooth activated.
6. Tap a device on the list to connect.

   The indicator light on the MyTool Connect dongle is on when the MyProdual application is connected to the device.

   In addition, Produal logo is shown on the bottom section of the device's display.
7. Tap the *Configuration* button.

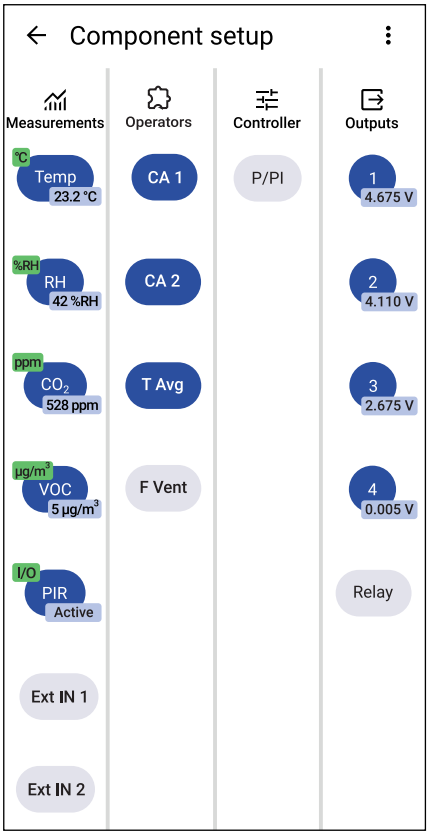
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8. Tap the *Display setup* button.



9. Configure the display settings.
   See the following chapters for more information about the settings.
10. Tap the arrow to go back to the *Configuration* page.

11. Tap the *Component setup* button.



The *Component setup* page is divided in sections:

Measurements	Set up measurements and inputs.
Operators	Set up condensation functions, temperature average calculations and ventilation forcing function.
Controller	Set up the controller.
Outputs	Set up outputs.

See the following chapters for more information about the settings.

12. Make the changes to the configuration.
13. In -MOD and -BAC models, tap the *General communication settings* button on the *Configuration* page to configure the communication settings.
14. Tap the *Install to device* button on the *Configuration* page to write the changes to the device.

Note: You can also tap the *Apply these settings to device* button on each setup page to save the changes to the device.

15. Tap the ← button.
16. Tap the connection info button to disconnect the device.

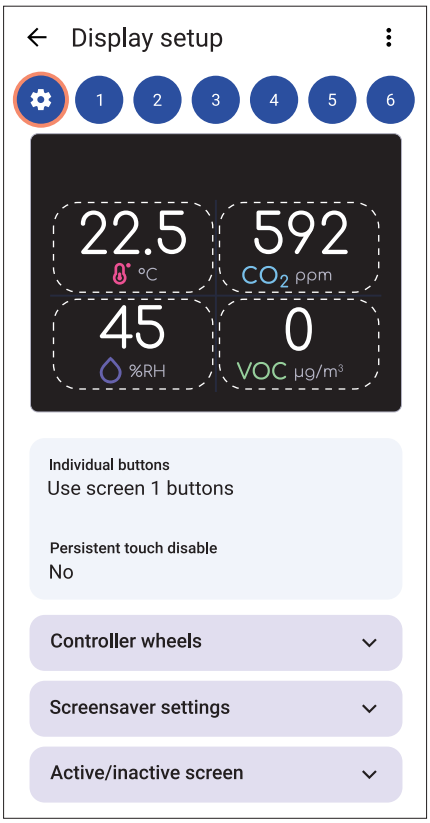


17. Remove the MyTool Connect dongle.

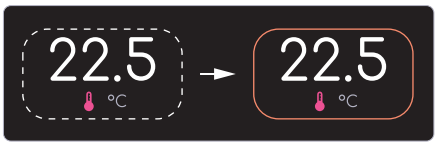
5.3.1 Configuring display settings

1. Tap the *Display setup* button on the *Configuration* page to open the *Display setup* page.

2. Configure the common settings for all screens.
   Tap a screen item on the *Display setup* page.

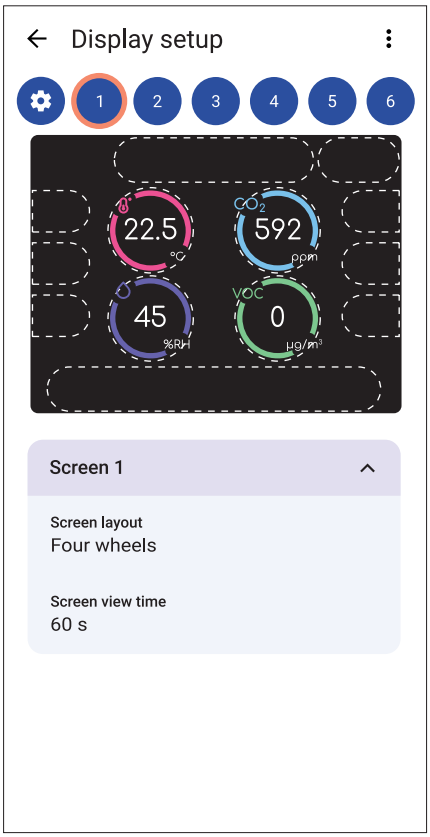


Configurable screen items are marked with dotted lines. When you tap the item, the dotted line changes to a red line and you can change the settings.

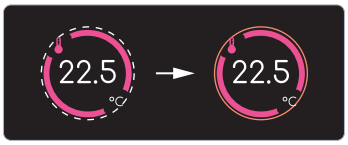


In this view, you can configure screensaver and other common settings for all screens. For more information about display's energy saving settings, see section Energy saving settings for the display on page 29.

3. Configure the settings for individual screens.
   Tap the number of the screen you are going to configure or tap the gear wheel symbol to return to the common settings view.



   Configurable screen items are marked with dotted lines. When you tap the item, the dotted line changes to a red line and you can change the settings.



4. Configure all required screens and save the settings to the device.

5.3.1.1 Common settings for all screens

Parameter name	Values	Default	Description
Individual buttons	*Use screen 1 buttons* *Individual buttons*	*Use screen 1 buttons*	Button configuration. *Use screen 1 buttons* — Screen 1 buttons are common for all screens *Use individual buttons* — Buttons are set individually for all screens
Persistent touch disable	*Yes / No*	*Yes*	Disable all touchscreen functions.

Parameter name	Values	Default	Description
Controller wheels			
Temperature			
Controller wheel visibility	*Measurement & setpoint* *Measurement* *Setpoint*	*Measurement & setpoint*	Controller wheel style. Select the information that is shown when the wheel content is controlled by temperature controller. *Measurement & setpoint* — The wheel shows measurement and setpoint. *Measurement* — The wheel shows measurement. *Setpoint* — The wheel shows setpoint.
Controller UI setpoint adjustment	*-1000.0...1000.0 °C*	*21.0 °C*	Temperature controller setpoint.
Relative humidity			
Controller wheel visibility	*Measurement & setpoint* *Measurement* *Setpoint*	*Measurement & setpoint*	Controller wheel style. Select the information that is shown when the wheel content is controlled by humidity controller. *Measurement & setpoint* — The wheel shows measurement and setpoint. *Measurement* — The wheel shows measurement. *Setpoint* — The wheel shows setpoint.
Controller UI setpoint adjustment	*0.00...100.00 %*	*50.00 %*	Humidity controller setpoint.
CO_2			
Controller wheel visibility	*Measurement & setpoint* *Measurement* *Setpoint*	*Measurement & setpoint*	Controller wheel style. Select the information that is shown when the wheel content is controlled by CO_2 controller. *Measurement & setpoint* — The wheel shows measurement and setpoint. *Measurement* — The wheel shows measurement. *Setpoint* — The wheel shows setpoint.
Controller UI setpoint adjustment	*0...10000 ppm*	*400 ppm*	CO_2 controller setpoint.

Parameter name	Values	Default	Description
VOC			
Controller wheel visibility	*Measurement & setpoint* *Measurement* *Setpoint*	*Measurement & setpoint*	Controller wheel style. Select the information that is shown when the wheel content is controlled by VOC controller. *Measurement & setpoint*: The wheel shows measurement and setpoint. *Measurement*: The wheel shows measurement. *Setpoint*: The wheel shows setpoint.
Controller UI setpoint adjustment	*0...10000 ppm*	*400 ppm*	VOC controller setpoint.
Screensaver settings			
Screensaver content	*One measurement* *Two measurements* *Three measurements* *Four measurements*	*Four measurements*	Screensaver view content. See more settings for screensaver from section Screensaver settings on page 24. *One measurement*: One measurement. *Two measurements*: Two measurements. *Three measurements*: Three measurements. *Four measurements*: Four measurements.
Screensaver delay	*No delay* *5... 3600 s* *Disabled*	*60 s*	Screensaver delay. *No delay*: No delay. *5...3600 s*: Screensaver delay. *Disabled*: Screensaver disabled.
Screensaver brightness	*Off* *1...100 %*	*30 %*	Screensaver brightness. *Off*: Display turns off when screensaver activates. *1...100 %*: Screensaver brightness.
Active/inactive screen			
Active screen brightness	*1...100 %*	*100 %*	Active display brightness.
Active screen time	*5...300 s*	*10 s*	Active display time.
Inactive screen brightness	*1...100 %*	*50 %*	Inactive display brightness.
Emoticon thresholds			
Temperature			
Poor -> moderate limit	*-100.0...100.0 °C*	*27.0 °C*	Temperature limit for switching from poor to moderate icon.

Parameter name	Values	Default	Description
Moderate -> poor limit	*-100.0...100.0 °C*	*28.0 °C*	Temperature limit for switching from moderate to poor icon.
Moderate -> good limit	*-100.0...100.0 °C*	*23.5 °C*	Temperature limit for switching from moderate to good icon.
Good -> moderate limit	*-100.0...100.0 °C*	*24.5 °C*	Temperature limit for switching from good to moderate icon.
Good -> excellent limit	*-100.0...100.0 °C*	*20.0 °C*	Temperature limit for switching from good to excellent icon.
Excellent -> good limit	*-100.0...100.0 °C*	*21.0 °C*	Temperature limit for switching from excellent to good icon.
Relative humidity			
Poor -> moderate limit	*0.00...100.00 %rH*	*50.00 %rH*	Humidity limit for switching from poor to moderate icon.
Moderate -> poor limit	*0.00...100.00 %rH*	*51.00 %rH*	Humidity limit for switching from moderate to poor icon.
Moderate -> good limit	*0.00...100.00 %rH*	*37.50 %rH*	Humidity limit for switching from moderate to good icon.
Good -> moderate limit	*0.00...100.00 %rH*	*38.50 %rH*	Humidity limit for switching from good to moderate icon.
Good -> excellent limit	*0.00...100.00 %rH*	*25.00 %rH*	Humidity limit for switching from good to excellent icon.
Excellent -> good limit	*0.00...100.00 %rH*	*26.00 %rH*	Humidity limit for switching from excellent to good icon.
CO_2			
Poor -> moderate limit	*0...10000 ppm*	*1100 ppm*	CO_2 limit for switching from poor to moderate icon.
Moderate -> poor limit	*0...10000 ppm*	*1200 ppm*	CO_2 limit for switching from moderate to poor icon.
Moderate -> good limit	*0...10000 ppm*	*850 ppm*	CO_2 limit for switching from moderate to good icon.
Good -> moderate limit	*0...10000 ppm*	*950 ppm*	CO_2 limit for switching from good to moderate icon.
Good -> excellent limit	*0...10000 ppm*	*600 ppm*	CO_2 limit for switching from good to excellent icon.
Excellent -> good limit	*0...10000 ppm*	*700 ppm*	CO_2 limit for switching from excellent to good icon.
VOC			
Poor -> moderate limit	*0…32767 µg/m³*	*1400 µg/m³*	VOC limit for switching from poor to moderate icon.
Moderate -> poor limit	*0…32767 µg/m³*	*1500 µg/m³*	VOC limit for switching from moderate to poor icon.
Moderate -> good limit	*0…32767 µg/m³*	*900 µg/m³*	VOC limit for switching from moderate to good icon.
Good -> moderate limit	*0…32767 µg/m³*	*1000 µg/m³*	VOC limit for switching from good to moderate icon.
Good -> excellent limit	*0…32767 µg/m³*	*400 µg/m³*	VOC limit for switching from good to excellent icon.

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Parameter name	Values	Default	Description
Excellent -> good limit	*0…32767 µg/m³*	*500 µg/m³*	VOC limit for switching from excellent to good icon.

5.3.1.2 Screensaver settings

Tap a screen item in the live view section to change screensaver settings.

Parameter name	Values	Default	Description
Screensaver measurement source 1	*Temperature* *Relative humidity* *CO₂* *VOC* *Controller temperature* *Controller relative humidity* *Controller CO₂* *Controller VOC* *Dew point* *Absolute humidity* *Mixing ratio* *Enthalpy* *TVOC ppb* *VOC CO₂ Eqv* *VOC AQI* *Average temperature*	*Temperature*	Screensaver value source. *Temperature* — Temperature measurement. *Relative humidity* — Relative humidity measurement. *CO₂* — CO_2 measurement. *VOC* — VOC measurement. *Controller temperature* — Temperature controller. *Controller relative humidity* — Humidity controller. *Controller CO₂* — CO_2 controller. *Controller VOC* — VOC controller. *Dew point* — Dew point. *Absolute humidity* — Absolute humidity. *Mixing ratio* — Mixing ratio of water vapour. *Enthalpy* — Enthalpy. *TVOC ppb* — VOC measurement (ppb). *VOC CO₂ Eqv* — VOC measurement (CO_2 equivalent). *VOC AQI* — VOC measurement (AQI). *Average temperature* — Average temperature.
Screensaver measurement source 2		*CO₂*	
Screensaver measurement source 3		*Relative humidity*	
Screensaver measurement source 4		*VOC*	
Icon color	*Default* *Custom*	*Default*	Icon colour. *Default* — Default colour. *Custom* — Custom colour. Set the colour using the *Custom icon color* parameter.

Parameter name	Values	Default	Description
Screensaver icon	*Default* *None* *Temperature* *Water drop* *Digital input* *Heatflow* *Snowflake* *Airflow* *Average temperature* *Page switch* *Arrow* *Clean display* *Display off* *Sun* *Moon* *Leaf* *Fan* *On/off*	*Default*	Icon shown below the screensaver value.

5.3.1.3 Settings for individual screens

Parameter name	Values	Default	Description
Screen 1 / Screen 2 / Screen 3 / Screen 4 / Screen 5 / Screen 6			
Screen layout	*One wheel* *Two wheels* *Three wheels* *Four wheels*	*Four wheels*	Screen layout.
Screen view time	*Off, 1...65535 S*	*60 s*	Screen view time. *Off* — View is shown until the user taps the *Switch screen* button. *1... 65535 s* — Screen view time.
Buttons			
Left top button type	*None* *Switch screen* *Force ventilation*	*None*	Left top button style. *None* — No button. *Switch screen* — Screen switching button. *Force ventilation* — Ventilation forcing button.

Parameter name	Values	Default	Description
Left middle button type	*None* *Switch screen* *Force ventilation*	*None*	Left middle button style. *None* — No button. *Switch screen* — Screen switching button. *Force ventilation* — Ventilation forcing button.
Left bottom button type	*None* *Switch screen* *Force ventilation*	*None*	Left bottom button style. *None* — No button. *Switch screen* — Screen switching button. *Force ventilation* — Ventilation forcing button.
Right top button type	*None* *Switch screen* *Force ventilation*	*None*	Right top button style. *None* — No button. *Switch screen* — Screen switching button. *Force ventilation* — Ventilation forcing button.
Right middle button type	*None* *Switch screen* *Force ventilation*	*None*	Right middle button style. *None* — No button. *Switch screen* — Screen switching button. *Force ventilation* — Ventilation forcing button.
Right bottom button type	*None* *Switch screen* *Force ventilation*	*None*	Right bottom button style. *None* — No button. *Switch screen* — Screen switching button. *Force ventilation* — Ventilation forcing button.
Top centre section			
Display top center info	*None* *Show logo*	*Show logo*	Top centre section content. *None* — Nothing. *Show logo* — Produal logo.
Top right section			
Display top right info	*None* *Outdoor temperature*	*None*	Top right section content. *None* — Nothing. *Outdoor temperature* — Outdoor temperature.

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Parameter name	Values	Default	Description
Outdoor temperature source	*Bus* *External input 1* *External input 2*	*Bus*	Outdoor temperature source. *Bus* — Communication bus value.. *External input 1* — Input 1 measurement. *External input 2* — Input 2 measurement.
Bottom section icons			
Show heating/ cooling icon	*Yes / No*	*Yes*	Heating/cooling icon visibility setting.
Show humidifying/ dehumidifying icon	*Yes / No*	*Yes*	Humidifying/dehumidifying icon visibility setting.
Show ventilation icon	*Yes / No*	*Yes*	Ventilation icon visibility setting.
Show condensation icon	*Yes / No*	*Yes*	Condensation icon visibility setting.
Show open window icon	*Yes / No*	*Yes*	Open window icon visibility setting.
Show maintenance mode icon	*Yes / No*	*Yes*	Maintenance mode icon visibility setting.
Show configuration tool icon	*Yes / No*	*Yes*	Configuration tool icon visibility setting.
Source for condensation icon	*None* *External input 1* *External input 2* *Condensation 1* *Condensation 2*	*None*	Condensation icon control source.
Source for open window icon	*None* *External input 1* *External input 2*	*None*	Open window icon control source.

Parameter name	Values	Default	Description
Wheels			
Wheel source	*Temperature* *Relative humidity* *CO2* *VOC* *Controller temperature* *Controller relative humidity* *Controller CO2* *Controller VOC* *Dew point* *Absolute humidity* *Mixing ratio* *Enthalpy* *TVOC ppb* *VOC CO2 Eqv* *VOC AQI* *Average temperature*	*Temperature*	Wheel value source. *Temperature* — Temperature measurement. *Relative humidity* — Relative humidity measurement. *CO2* — CO_2 measurement. *VOC* — VOC measurement. *Controller temperature* — Temperature controller. *Controller relative humidity* — Humidity controller. *Controller CO2* — CO_2 controller. *Controller VOC* — VOC controller. *Dew point* — Dew point. *Absolute humidity* — Absolute humidity. *Mixing ratio* — Mixing ratio of water vapour. *Enthalpy* — Enthalpy. *TVOC ppb* — VOC measurement (ppb). *VOC CO2 Eqv* — VOC measurement (CO_2 equivalent). *VOC AQI* — VOC measurement (AQI). *Average temperature* — Average temperature.
Wheel color	*Default* *Custom*	*Default*	Icon colour. *Default* — Default colour. *Custom* — Custom colour. Set the colour using the *Wheel custom color* parameter.

Parameter name	Values	Default	Description
Wheel icon	*Default* *None* *Temperature* *Water drop* *Digital input* *Heatflow* *Snowflake* *Airflow* *Average temperature* *Page switch* *Arrow* *Clean display* *Display off* *Sun* *Moon* *Leaf* *Fan* *On/off*	*Default*	Icon for the value.
Wheel indicator	*Value* *Emoticon*	*Value*	Style of the value. *Value* — Measurement value. *Emoticon* — Emoticon.

5.3.1.4 Energy saving settings for the display

You can use the touchscreen display energy saving features to minimise the device power consumption. These features include the screensaver, and the display brightness settings. The default settings already decrease the power consumption to some extent, but you can optimise the settings further. These settings are common for all screens.

Parameter name	Values	Default	Description
Active/inactive screen			
Active screen brightness	*1...100 %*	*100 %*	Active display brightness. The display is active when the user is using the display and for the duration set in the *Active screen time* parameter after the user stops using the display. Decreasing the brightness slightly saves energy without affecting the user experience.

Parameter name	Values	Default	Description
Active screen time	*5...300 s*	*10 s*	Active display time. This setting controls how quickly the display goes to inactive mode after the user stops touching the display. When the inactive mode activates, the display brightness decreases to the level set in the *Inactive screen brightness* parameter. You can adjust this parameter to the lowest available value to minimise power consumption. If you prefer a longer delay before the inactive display activates, you can save energy by decreasing the inactive display brightness in the *Inactive screen brightness* parameter.
Inactive screen brightness	*1...100 %*	*50 %*	Inactive display brightness. You can decrease the brightness from the default value to save energy. You can also disable the inactive display by disabling the screensaver delay.
Screensaver settings			
Screensaver delay	*No delay* *5... 3600 s* *Disabled*	*60 s*	Screensaver delay. The display goes from inactive display to the screensaver mode after this delay. Using the screensaver saves energy. You can select the *No delay* option to disable the inactive display and to activate the screensaver directly after the time set in the *Active screen time* parameter ends. Alternatively, you can set the screensaver delay to 60 seconds or less. *No delay* — No delay. *5...3600 s* — Screensaver delay. *Disabled* — Screensaver disabled. Not recommended, because energy consumption increases.
Screensaver brightness	*Off* *1...100 %*	*30 %*	Screensaver brightness. The display is in the screensaver mode for most of the time. You can decrease the screensaver brightness to save energy. Alternatively, you can turn the display off to minimise power consumption. *Off* — Display turns off when screensaver activates. *1...100 %* — Screensaver brightness.

5.3.2 Configuring measurement and input settings

All device models include temperature measurement. Other measurements are available for configuration depend on the model.

1. Tap the *Component setup* button on the *Configuration* page to open the *Component setup* page.

2. Tap a button in the *Measurements* column for the measurement you want to configure.

   The *Measurements* column can have the following measurement settings available depending on the device model:

Temp	Set up temperature measurement settings.
RH	Set up relative humidity measurement settings. Available for -RH models.
CO2	Set up CO_2 measurement settings. Available for -CO2 models.
VOC	Set up settings for volatile organic compounds measurement. Available for -VOC models.
PIR	Set up occupancy detection settings. Available for -PIR models.
Ext IN 1	Set up input 1 settings.
Ext IN 2	Set up input 2 settings.

5.3.2.1 Temperature measurement settings

Tap the *Temp* button on the *Component setup* page to open the temperature measurement settings. Tap a parameter on the list to change its value.

The following parameters are available for configuration:

Parameter name	Values	Default	Description
Measurement scaling			
Measurement scale min	*-100.0...100.0 °C*	*0.0 °C*	Temperature measurement at 0 %. Set the value for temperature measurement when the transmitter output is 0 %. For example, if this value is 0 °C, then 0 % voltage is interpreted as 0 °C.
Measurement scale max	*-100.0...100.0 °C*	*50.0 °C*	Temperature measurement at 100 %. Set the value for temperature measurement when the transmitter output is 100 %. For example, if this value is 50 °C, then 100 % voltage is interpreted as 50 °C.
Time constant multiplier	*0...3600*	*120*	This value defines how quickly the transmitter responds to a rapid change in temperature. The measurement reaches 63 % of its final value by this time.
Contact			
Contact on level	*-100.0...100.0 °C*	*25.0 °C*	This temperature is interpreted as contact ON value. If the measured temperature is higher than the value set for this parameter, then the output signal is at the maximum value set for the output.
Contact off level	*-100.0...100.0 °C*	*24.0 °C*	This temperature is interpreted as contact OFF value. If the measured temperature is lower than the value set for this parameter, then the output signal is at the minimum value set for the output.
Contact turn on delay	*0…65535 s*	*0 s*	The delay in seconds before the contact is turned on after the *Contact on level* condition is fulfilled.
Contact hold on time	*0…65535 s*	*0 s*	Contact hold on time (seconds). This time defines how long the contact stays on even if the *Contact off level* condition is fulfilled.

Parameter name	Values	Default	Description
Contact turn off delay	*0…65535 s*	*0 s*	The delay in seconds before the contact is turned off after the *Contact off level* condition is fulfilled.
Contact hold off time	*0…65535 s*	*0 s*	Contact hold off time (seconds). This time defines how long the contact stays off even if the *Contact on level* condition is fulfilled.
Measurement correction			
Measurement correction	*Off* *Offset* *Span*	*Off*	You can use the measurement correction to adjust the temperature measurement values, if necessary. If you select *Offset*, you can set the temperature offset in degrees. The same offset is used at all temperatures. If you select *Span*, you can define two temperatures and a measurement correction value for each.
Temperature offset	*-100.0...100.0 °C*	*0.0 °C*	Temperature offset in degrees. Set the offset that will be used at all temperatures to correct the measurement values. Shown if *Offset* is selected in the *Measurement correction* parameter.
Point 1 measurement	*-100.0...100.0 °C*	*0.0 °C*	Temperature for point 1 measurement correction. Set the temperature at which the measurement correction is applied to the measurement. For example, if you want to correct the measurement by 0.5 °C at 20 °C, set this parameter value to 20.0 °C. Shown if *Span* is selected in the *Measurement correction* parameter.
Point 1 correction	*-100.0...100.0 °C*	*0.0 °C*	The corrected measurement for point 1. Set the corrected measurement in degrees. For example, if you want to correct the measurement by 0.5 °C at 20 °C, set this parameter value to 20.5 °C. Shown if *Span* is selected in the *Measurement correction* parameter.
Point 2 measurement	*-100.0...100.0 °C*	*0.0 °C*	Temperature for point 2 measurement correction. Set the temperature at which the measurement correction is applied to the measurement. For example, if you want to correct the measurement by -1 °C at 25 °C, set this parameter value to 25.0 °C. Shown if *Span* is selected in the *Measurement correction* parameter.
Point 2 correction	*-100.0...100.0 °C*	*0.0 °C*	The corrected measurement for point 2. Set the corrected measurement in degrees. For example, if you want to correct the measurement by -1 °C at 25 °C, set this parameter value to 24.0 °C. Shown if *Span* is selected in the *Measurement correction* parameter.

5.3.2.2 Relative humidity measurement settings

Relative humidity measurement settings are available for configuration in -RH models. Tap the *RH* button on the *Component setup* page to open the relative humidity measurement settings. Tap a parameter on the list to change its value.

The following parameters are available for configuration:

Parameter name	Values	Default	Description
Measurement scaling			
Relative humidity			
Measurement scale min	*0.00...100.00 rH%*	*0.00 rH%*	Relative humidity measurement at 0 %. Set the value for humidity measurement when the transmitter output is 0 %. For example, if this value is 0.00 rH%, then 0 % voltage is interpreted as 0 rH%.
Measurement scale max	*0.00...100.00 rH%*	*100.00 rH%*	Relative humidity measurement at 100 %. Set the value for humidity measurement when the transmitter output is 100 %. For example, if this value is 80.00 rH%, then 100 % voltage is interpreted as 80 rH%.
Dew point			
Measurement scale min	*-1000.0...1000.0 °C*	*-1000.0 °C*	Dew point measurement at 0 %. Set the value for dew point measurement when the transmitter output is 0 %. For example, if this value is 0.0 °C, then 0 % voltage is interpreted as 0.0 °C.
Measurement scale max	*-1000.0...1000.0 °C*	*1000.0 °C*	Dew point measurement at 100 %. Set the value for dew point measurement when the transmitter output is 100 %. For example, if this value is 50.0 °C, then 100 % voltage is interpreted as 50.0 °C.
Absolute humidity			
Measurement scale min	*0.0...100.0 g/m³*	*0.0 g/m³*	Absolute humidity measurement at 0 %. Set the value for absolute humidity measurement when the transmitter output is 0 %. For example, if this value is 0.0 g/m^3, then 0 % voltage is interpreted as 0.0 g/m^3.
Measurement scale max	*0.0...100.0 g/m³*	*100.0 g/m³*	Absolute humidity measurement at 100 %. Set the value for absolute humidity measurement when the transmitter output is 100 %. For example, if this value is 100.0 g/m^3, then 100 % voltage is interpreted as 100.0 g/m^3.
Mixing ratio			
Measurement scale min	*0.0...100.0 g/kg*	*0.0 g/kg*	Mixing ratio of water vapour at 0 %. Set the value for mixing ratio when the transmitter output is 0 %. For example, if this value is 0.0 g/kg, then 0 % voltage is interpreted as 0.0 g/kg.
Measurement scale max	*0.0...100.0 g/kg*	*100.0 g/kg*	Mixing ratio of water vapour at 100 %. Set the value for mixing ratio when the transmitter output is 100 %. For example, if this value is 100.0 g/kg, then 100 % voltage is interpreted as 100.0 g/kg.
Enthalpy			
Measurement scale min	*0.0...1000.0 kJ/kg*	*0.0 kJ/kg*	Enthalpy at 0 %. Set the value for enthalpy when the transmitter output is 0 %. For example, if this value is 0.0 kJ/kg, then 0 % voltage is interpreted as 0.0 kJ/kg.

Parameter name	Values	Default	Description
Measurement scale max	*0.0...1000.0 kJ/kg*	*1000.0 kJ/kg*	Enthalpy at 100 %. Set the value for enthalpy when the transmitter output is 100 %. For example, if this value is 1000.0 kJ/kg, then 100 % voltage is interpreted as 1000.0 kJ/kg.
Time constant multiplier	*0...3600*	*120*	This value defines how quickly the transmitter responds to a rapid change in relative humidity. The measurement reaches 63 % of its final value by this time.
Contact			
Contact on level	*0.00...100.00 rH%*	*50.00 rH%*	This humidity value is interpreted as contact ON value. If measured humidity is higher than the value set for this parameter, then the output signal is at the maximum value set for the output.
Contact off level	*0.00...100.00 rH%*	*49.00 rH%*	This humidity value is interpreted as contact OFF value. If measured humidity is lower than the value set for this parameter, then the output signal is at the minimum value set for the output.
Contact turn on delay	*0…65535 s*	*0 s*	The delay in seconds before the contact is turned on after the *Contact on level* condition is fulfilled.
Contact hold on time	*0…65535 s*	*0 s*	Contact hold on time (seconds). This time defines how long the contact stays on even if the *Contact off level* condition is fulfilled.
Contact turn off delay	*0…65535 s*	*0 s*	The delay in seconds before the contact is turned off after the *Contact off level* condition is fulfilled.
Contact hold off time	*0…65535 s*	*0 s*	Contact hold off time (seconds). This time defines how long the contact stays off even if the *Contact on level* condition is fulfilled.
Measurement correction			
Measurement correction	*Off* *Offset* *Span*	*Off*	You can use the measurement correction to adjust the humidity measurement values, if necessary. If you select *Offset*, you can set the humidity offset in rH%. If you select *Span*, you can define two humidity points and a measurement correction value for each.
Humidity offset	*-100...100 rH%*	*0 rH%*	Relative humidity offset. Set the offset that will be used at all humidity levels to correct the measurement values. Shown if *Offset* is selected in *Measurement correction*.
Point 1 measurement	*0...100 rH%*	*0 rH%*	Relative humidity for point 1 measurement correction. Set the humidity value at which the measurement correction is applied to the measurement. For example, if you want to correct the measurement by 2 rH% at 15 rH%, set this parameter value to 15 rH%. Shown if *Span* is selected in *Measurement correction*.

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Parameter name	Values	Default	Description
Point 1 correction	*0...100 rH%*	*0 rH%*	The corrected measurement for point 1. Set the corrected measurement in rH%. For example, if you want to correct the measurement by 2 rH % at 15 rH%, set this parameter value to 17 rH %. Shown if *Span* is selected in *Measurement correction*.
Point 2 measurement	*0...100 rH%*	*0 rH%*	Relative humidity for point 2 measurement correction. Set the humidity value at which the measurement correction is applied to the measurement. For example, if you want to correct the measurement by 3 rH% at 80 rH%, set this parameter value to 80 rH%. Shown if *Span* is selected in *Measurement correction*.
Point 2 correction	*0...100 rH%*	*0 rH%*	The corrected measurement for point 2. Set the corrected measurement in rH%. For example, if you want to correct the measurement by 3 rH % at 80 rH%, set this parameter value to 83 rH %. Shown if *Span* is selected in *Measurement correction*.

5.3.2.3 CO_2 measurement settings

CO_2 measurement settings are available for configuration in -CO2 models. Tap the CO2 button on the *Component setup* page to open the CO_2 measurement settings. Tap a parameter on the list to change its value.

The following parameters are available for configuration:

Parameter name	Values	Default	Description
Measurement scaling			
Measurement scale min	*0...10000 ppm*	*0 ppm*	CO_2 measurement at 0 %. Set the value for CO_2 measurement when the transmitter output is 0 %. For example, if this value is 0 ppm, then 0 % voltage is interpreted as 0 ppm.
Measurement scale max	*0...10000 ppm*	*2000 ppm*	CO_2 measurement at 100 %. Set the value for CO_2 measurement when the transmitter output is 100 %. For example, if this value is 2000 ppm, then 100 % voltage is interpreted as 2000 ppm.
Time constant multiplier	*0...3600*	*120*	This value defines how quickly the transmitter responds to a rapid change in CO_2 level. The measurement reaches 63 % of its final value by this time. Advanced settings.
Contact			
Contact on level	*0...10000 ppm*	*1200 ppm*	This CO_2 value is interpreted as contact ON value. If the measured CO_2 level is higher than the value set for this parameter, then the output signal is at the maximum value set for the output.
Contact off level	*0...10000 ppm*	*1100 ppm*	This CO_2 value is interpreted as contact OFF value. If the measured CO_2 level is lower than the value set for this parameter, then the output signal is at the minimum value set for the output.

Parameter name	Values	Default	Description
Contact turn on delay	*0…65535 s*	*0 s*	The delay in seconds before the contact is turned on after the *Contact on level* condition is fulfilled.
Contact hold on time	*0…65535 s*	*0 s*	Contact hold on time (seconds). This time defines how long the contact stays on even if the *Contact off level* condition is fulfilled.
Contact turn off delay	*0…65535 s*	*0 s*	The delay in seconds before the contact is turned off after the *Contact off level* condition is fulfilled.
Contact hold off time	*0…65535 s*	*0 s*	Contact hold off time (seconds). This time defines how long the contact stays off even if the *Contact on level* condition is fulfilled.
Measurement correction			
Measurement correction	*Off* *Offset* *Span*	*Off*	You can use the measurement correction to adjust the CO_2 measurement values, if necessary. If you select *Offset*, you can set the CO_2 offset in ppm. The same offset is used at all CO_2 levels. If you select *Span*, you can define two CO_2 levels and a measurement correction value for each.
CO₂ offset	*-10000...10000 ppm*	*0 ppm*	CO_2 offset in ppm. Set the offset that will be used at all CO_2 levels to correct the measurement values. Shown if *Offset* is selected in *Measurement correction*.
Point 1 measurement	*0...10000 ppm*	*0 ppm*	CO_2 level for point 1 measurement correction. Set the CO_2 level at which the measurement correction is applied to the measurement. For example, if you want to correct the measurement by 10 ppm at 420 ppm, set this parameter value to 420 ppm. Shown if *Span* is selected in *Measurement correction*.
Point 1 correction	*0...10000 ppm*	*0 ppm*	The corrected measurement for point 1. Set the corrected measurement in ppm. For example, if you want to correct the measurement by 10 ppm at 420 ppm, set this parameter value to 430 ppm. Shown if *Span* is selected in *Measurement correction*.
Point 2 measurement	*0...10000 ppm*	*0 ppm*	CO_2 level for point 2 measurement correction. Set the CO_2 level at which the measurement correction is applied to the measurement. For example, if you want to correct the measurement by 20 ppm at 900 ppm, set this parameter value to 900 ppm. Shown if *Span* is selected in *Measurement correction*.
Point 2 correction	*0...10000 ppm*	*0 ppm*	The corrected measurement for point 2. Set the corrected measurement in ppm. For example, if you want to correct the measurement by 20 ppm at 900 ppm, set this parameter value to 920 ppm. Shown if *Span* is selected in *Measurement correction*.
VOC CO₂ Eqv weight	*0.00...1.00*	*0.00*	Weight of the VOC CO_2 equivalent level. Shown if *Span* is selected in *Measurement correction*.

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Parameter name	Values	Default	Description
CO_2 ABC calibration	*Disabled* *Enabled*	*Enabled*	Automatic self-calibration of CO_2 measurement. If this function is enabled, it eliminates the possible long-term drift in CO_2 measurement accuracy.
CO_2 ambient pressure correction	*Disabled* *Enabled*	*Disabled*	Ambient pressure correction for CO_2 measurement. If this function is enabled, you can use the local ambient pressure for CO_2 measurement. If this function is disabled, the transmitter uses the ambient pressure at sea level.
CO_2 ambient pressure correction value	*700...1200 hPa*	*1013 hPa*	Set this value to the local ambient pressure. Shown if the *CO_2 ambient pressure correction* parameter value is *Enabled*.
CO_2 field calibration	-	-	CO_2 field calibration function.

5.3.2.4 VOC measurement settings

Volatile organic compound measurement settings are available for configuration in -VOC models. Tap the *VOC* button on the *Component setup* page to open the VOC measurement settings. Tap a parameter on the list to change its value.

The following parameters are available for configuration:

Parameter name	Values	Default	Description
Measurement scaling			
VOC @ ug/m3			
Measurement scale min	*0...10000 µg/m³*	*0 µg/m³*	VOC measurement at 0 %. Set the value for VOC measurement when the transmitter output is 0 . For example, if this value is 0 µg/m³, then 0 % voltage is interpreted as 0 µg/m³.
Measurement scale max	*0...10000 µg/m³*	*10000 µg/m³*	VOC measurement at 100 %. Set the value for VOC measurement when the transmitter output is 100 %. For example, if this value is 500 µg/m³, then 100 % voltage is interpreted as 500 µg/m³.
VOC @ TVOC ppb			
Measurement scale min	*0...10000 ppb*	*0 ppb*	VOC measurement at 0 %. Set the value for VOC measurement when the transmitter output is 0 . For example, if this value is 0 ppb, then 0 % voltage is interpreted as 0 ppb.
Measurement scale max	*0...10000 ppb*	*10000 ppb*	VOC measurement at 100 %. Set the value for VOC measurement when the transmitter output is 100 %. For example, if this value is 10000 ppb, then 100 % voltage is interpreted as 10000 ppb.
VOC @ CO2 equivalent			
Measurement scale min	*0...10000 ppm*	*0 ppm*	VOC measurement at 0 %. Set the value for VOC measurement when the transmitter output is 0 . For example, if this value is 0 ppm, then 0 % voltage is interpreted as 0 ppm.

Parameter name	Values	Default	Description
Measurement scale max	*0...10000 ppm*	*10000 ppm*	VOC measurement at 100 %. Set the value for VOC measurement when the transmitter output is 100 %. For example, if this value is 10000 ppm, then 100 % voltage is interpreted as 10000 ppm.
VOC @ Air Quality Index			
Measurement scale min	*1...5*	*1*	VOC measurement at 0 %. Set the value for VOC AQI when the transmitter output is 0 %. For example, if this value is 1, then 0 % voltage is interpreted as 1.
Measurement scale max	*1...5*	*5*	VOC measurement at 100 %. Set the value for VOC AQI when the transmitter output is 100 %. For example, if this value is 5, then 100 % voltage is interpreted as 5.
Time constant multiplier	*0...3600*	*120*	This value defines how quickly the transmitter responds to a rapid change in VOC level. The measurement reaches 63 % of its final value by this time.
Contact			
Contact on level	*0...10000 µg/m³*	*1000 µg/m³*	This VOC value is interpreted as contact ON value. This function works as a “software contact", and it can be linked to the digital output, controller (enable/disable), or relay. If the measured VOC level is higher than the value set for this parameter, then the output signal is at the maximum value set for the output.
Contact off level	*0...10000 µg/m³*	*900 µg/m³*	This VOC value is interpreted as contact OFF value. This function works as a “software contact", and it can be linked to the digital output, controller (enable/disable), or relay. If the measured VOC level is lower than the value set for this parameter, then the output signal is at the minimum value set for the output.
Contact turn on delay	*0…65535 s*	*0 s*	The delay in seconds before the contact is turned on after the *Contact on level* condition is fulfilled.
Contact hold on time	*0…65535 s*	*0 s*	Contact hold on time (seconds). This time defines how long the contact stays on even if the *Contact off level* condition is fulfilled.
Contact turn off delay	*0…65535 s*	*0 s*	The delay in seconds before the contact is turned off after the *Contact off level* condition is fulfilled.
Contact hold off time	*0…65535 s*	*0 s*	Contact hold off time (seconds). This time defines how long the contact stays off even if the *Contact on level* condition is fulfilled.

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Parameter name	Values	Default	Description
Measurement correction			
Measurement correction	*Off* *Offset* *Span*	*Off*	You can use the measurement correction to adjust the VOC measurement values, if necessary. If you select *Offset*, you can set the VOC offset as micrograms per cubic metre of air. The same offset is used at all VOC levels. If you select *Span*, you can define two VOC levels and a measurement correction value for each.
VOC offset	*-10000...10000 µg/m³*	*0 µg/m³*	VOC offset in micrograms per cubic metre of air. Set the offset that will be used at all VOC levels to correct the measurement values. Shown if *Offset* is selected in the *Measurement correction* parameter.
Point 1 measurement	*0...10000 µg/m³*	*0 µg/m³*	VOC level for point 1 measurement correction. Set the VOC level at which the measurement correction is applied to the measurement. For example, if you want to correct the measurement by 20 µg/m³ at 400 µg/m³, set this parameter value to 400 µg/m³. Shown if *Span* is selected in the *Measurement correction* parameter.
Point 1 correction	*0...10000 µg/m³*	*0 µg/m³*	The corrected measurement for point 1. Set the corrected measurement as micrograms per cubic metre of air. For example, if you want to correct the measurement by 20 µg/m³ at 400 µg/m³, set this parameter value to 420 µg/m³. Shown if *Span* is selected in the *Measurement correction* parameter.
Point 2 measurement	*0...10000 µg/m³*	*0 µg/m³*	VOC level for point 2 measurement correction. Set the VOC level at which the measurement correction is applied to the measurement. For example, if you want to correct the measurement by 40 µg/m³ at 1400 µg/m³, set this parameter value to 1400 µg/m³. Shown if *Span* is selected in the *Measurement correction* parameter.
Point 2 correction	*0...10000 µg/m³*	*0 µg/m³*	The corrected measurement for point 2. Set the corrected measurement as micrograms per cubic metre of air. For example, if you want to correct the measurement by 40 µg/m³ at 1400 µg/m³, set this parameter value to 1440 µg/m³. Shown if *Span* is selected in the *Measurement correction* parameter.

5.3.2.5 PIR settings

PIR settings are available for configuration in -PIR models. Tap the *PIR* button on the *Component setup* page to open the PIR settings. Tap a parameter on the list to change its value.

The following parameters are available for configuration:

Parameter name	Values	Default	Description
Sensor sensitivity	*Lowest* *Low* *Medium* *High* *Highest*	*Medium*	Passive infrared sensor sensitivity setting. If *Lowest* is selected, the sensor is least sensitive. If *Highest* is selected, the sensor is most sensitive. When the sensitivity increases, also the number of detection errors increases. This setting also has an effect on the detection range. The higher the setting, the shorter the range.
Contact			
Contact turn on delay	*0…65535 s*	*0 s*	The delay in seconds before the contact is turned on after movement is detected.
Contact hold on time	*0…65535 s*	*300 s*	Contact hold on time (seconds). This time defines how long the contact stays on.
Contact turn off delay	*0…65535 s*	*0 s*	The delay in seconds before the contact is turned off after movement stops.
Contact hold off time	*0…65535 s*	*0 s*	Contact hold off time (seconds). This time defines how long the contact stays off.

5.3.2.6 Input settings

Tap the *Ext IN 1* or *Ext IN 2* button on the *Component setup* page to open the input settings.

Tap the *Input type* field and select the type of the input. The parameters for the selected input type are shown on the page. The following input types are available for *Ext IN 1*:

- *Off*
- *0-10 V*
- *Temp. Sensor NTC10K*
- *Temp. Sensor PT1000*
- *Custom temp. sensor*
- *Temp. transmitter*
- *Humidity transmitter*
- *CO2 transmitter*
- *VOC transmitter*
- *Potentiometer*
- *Digital input*

The following input types are available for *Ext IN 2*:

- *Off*
- *Temp. Sensor NTC10K*
- *Custom temp. sensor*
- *Potentiometer*
- *Digital input*

The available parameters depend on the selected input type. All parameters are listed below:

Parameter name	Values	Default	Description
Override	*Disabled* *Enabled*	*Disabled*	Manual override of measurement. If *Enabled* is selected, the external input uses the bus.
Override start value	*0.00...100.00 %*	*0.00 %*	The start value for manual override of measurement.

Parameter name	Values	Default	Description
Speed	*Slow* *Fast*	*Slow*	Input speed. If *Fast* is selected, the number of reading errors can increase. *Fast* is usually used only for digital input with pulse counting functionality.
Voltage scale min	*0.000...10.000 V*	*0.000 V*	The minimum value for the input voltage scale. Shown if *0-10 V* is selected in the *Input type* field.
Voltage scale max	*0.000...10.000 V*	*10.000 V*	The maximum value for the input voltage scale. Shown if *0-10 V* is selected in the *Input type* field.
Temperature scale min	*-1000.00...1000.00 °C*	*0.00 °C*	The minimum value for temperature input scale. Shown if *Temp. Sensor NTC10K*, *Temp. Sensor PT1000*, *Custom temp. sensor* or *Temp. transmitter* is selected in the *Input type* field.
Temperature scale max	*-1000.00...1000.00 °C*	*1000.00 °C*	The maximum value for temperature input scale. Shown if *Temp. Sensor NTC10K*, *Temp. Sensor PT1000*, *Custom temp. sensor* or *Temp. transmitter* is selected in the *Input type* field.
Humidity scale min	*0.00...100.00 rH%*	*0.00 rH%*	The minimum value for humidity input scale. Shown if *Humidity transmitter* is selected in the *Input type* field.
Humidity scale max	*0.00...100.00 rH%*	*100.00 rH%*	The maximum value for humidity transmitter input scale. Shown if *Humidity transmitter* is selected in the *Input type* field.
CO2 scale min	*0...10000 ppm*	*0 ppm*	The minimum value for CO_2 input scale. Shown if *CO2 transmitter* is selected in the *Input type* field.
CO2 scale max	*0...10000 ppm*	*5000 ppm*	The maximum value for CO_2 input scale. Shown if *CO2 transmitter* is selected in the *Input type* field.
VOC scale min	*0...10000 µg/m³*	*0 µg/m³*	The minimum value for VOC input scale. Shown if *VOC transmitter* is selected in the *Input type* field.
VOC scale max	*0...10000 µg/m³*	*500 µg/m³*	The maximum value for VOC input scale. Shown if *VOC transmitter* is selected in the *Input type* field.
Res HI scale min	*0...300000 Ω*	*0 Ω*	Minimum resistance (high range) for the potentiometer that is connected to the input. Shown if *Potentiometer* is selected in the *Input type* field.
Res HI scale max	*0...300000 Ω*	*100000 Ω*	Maximum resistance (high range) for the potentiometer that is connected to the input. Shown if *Potentiometer* is selected in the *Input type* field.
Contact on level %	*0.00...100 %*	*0.00 %*	Contact on level. Set the input value that is interpreted as contact ON value. The function works as a “software contact”. It can be used to override an output at a certain input voltage level. Shown if *Digital input* is selected in the *Input type* field.

Parameter name	Values	Default	Description
Contact off level %	*0.00...100 %*	*0.00 %*	Contact off level. Set the input value that is interpreted as contact OFF value. The function works as a “software contact”. It can be used to release the output override at a certain input voltage level. Shown if *Digital input* is selected in the *Input type* field.
Contact turn on delay	*0…65535 s*	*0 s*	The delay in seconds before the contact is turned on. Shown if *Digital input* is selected in the *Input type* field.
Contact hold on time	*0…65535 s*	*0 s*	Contact hold on time (seconds). This time defines how long the contact stays on. Shown if *Digital input* is selected in the *Input type* field.
Contact turn off delay	*0…65535 s*	*0 s*	The delay in seconds before the contact is turned off. Shown if *Digital input* is selected in the *Input type* field.
Contact hold off time	*0…65535 s*	*0 s*	Contact hold off time (seconds). This time defines how long the contact stays off. Shown if *Digital input* is selected in the *Input type* field.
Effective range min	*0.00...100 %*	*0.00 %*	Effective control range minimum limit. Shown if *Digital input* is selected in the *Input type* field.
Effective range max	*0.00...100 %*	*100.00 %*	Effective control range maximum limit. Shown if *Digital input* is selected in the *Input type* field.

5.3.3 Configuring condensation alarm, average temperature and ventilation forcing settings

1. Tap the *Component setup* button on the *Configuration* page to open the *Component setup* page.
2. Tap a button in the *Operators* column for the measurement you want to configure.

   The *Operators* column has the following measurement settings available:

CA 1	Set up condensation alarm 1 settings. This alarm uses the information from input 1.
CA 2	Set up condensation alarm 2 settings. This alarm uses the information from input 2.
T Avg	Set up average temperature calculation settings.
F Vent	Set up ventilation forcing setting.

5.3.3.1 Condensation alarm settings

Condensation alarm settings are only available for configuration in -RH models. Condensation alarm can be used, for example, to prevent water from condensating on a cooling water pipe. The alarm function calculates the dew point using ambient temperature, relative humidity and external temperature (pipe temperature).

Tap the *CA 1* or *CA 2* button in the *Operators* column on the *Component setup* page to open the condensation alarm settings.

The following parameters are available:

Parameter name	Values	Default	Description
Contact on threshold	*0.0...1000.0 °C*	*2.0 °C*	Activation threshold for condensation alarm. This value is the temperature difference between the dew point and the external sensor temperature. For example, if this value is *2.0 °C*, condensation alarm is activated when the external sensor temperature is 2.0 °C above the dew point.
Contact off threshold	*0.0...1000.0 °C*	*3.0 °C*	Deactivation threshold for condensation alarm. This value is the temperature difference between the dew point and the external sensor temperature. For example, if this value is *3.0 °C*, condensation alarm is deactivated when the external sensor temperature is 3.0 °C above the dew point.
Contact turn on delay	*0…65535 s*	*0 s*	The delay in seconds before the alarm is turned on after activation threshold is reached.
Contact hold on time	*0…65535 s*	*0 s*	Contact hold on time (seconds). This time defines how long the alarm stays on.
Contact turn off delay	*0…65535 s*	*0 s*	The delay in seconds before the alarm is turned off after the deactivation threshold is reached.
Contact hold off time	*0…65535 s*	*0 s*	Contact hold off time (seconds). This time defines how long the alarm stays off before it can be turned on again.

5.3.3.2 Average temperature calculation settings

Tap the *T Avg* button in the *Operators* column on the *Component setup* page to open the average temperature calculation settings.

The following parameters are available:

Parameter name	Values	Default	Description
Temperature averaging setting	*Internal* *External input 1* *Int & Extin 1* *External input 2* *Int & Extin 2* *External inputs 1 & 2* *Int & Extin 1 & Extin 2*	*Int & Extin 1*	Select the average temperature calculation sources. *Internal* — Internal temperature measurement. *External input 1* — Input 1 temperature measurement. *Int & Extin 1* — Internal and input 1 temperature measurement. *External input 2* — Input 2 temperature measurement. *Int & Extin 2* — Internal and input 2 temperature measurement. *External inputs 1 & 2* — Input 1 and input 2 temperature measurement. *Int & Extin 1 & Extin 2* — Internal, input 1 and input 2 temperature measurement.

5.3.3.3 Ventilation forcing function settings

Tap the *F Vent* button in the *Operators* column on the *Component setup* page to open the ventilation forcing function settings.

The following parameters are available:

Parameter name	Values	Default	Description
Force ventilation time setting	*0...65535 min*	*0 min*	Select the ventilation forcing duration.

5.3.4 Configuring controller settings

1. Tap the *Component setup* button on the *Configuration* page to open the *Component setup* page.
2. Tap the *P/PI* button in the *Controller* column to open the P/PI controller settings.

5.3.4.1 P/PI controller settings

Tap the *P/PI* button on the *Component setup* page to open the P/PI controller settings.

Tap the *Controller type* field and select the controller type. The parameters for the selected controller type are shown on the page. Tap a parameter on the list to change its value.

The following controller types are available:

Off	The controller is disabled.
Temperature	The controller controls heating, cooling, or both.
Humidity	The controller controls humidification, dehumidification, or both.
CO_2	The controller controls ventilation.
VOC	The controller controls ventilation.
Max control	In the maximum selection control, the controller operates based on a combination of measurements selected. The control output signal is formed according to the measurement that causes the largest control signal value.

The available parameters depend on the selected controller type.

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Temperature

Parameter name	Values	Default	Description
Enable input	*Off* *Temperature contact* *RH contact* *CO₂ contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact* *Bus* *Condensation contact 2* *External input contact 2*	*Off*	Select an input contact to enable the controller. If the value is *Off*, the controller is always enabled.
Controller enable input inversion	*Disabled* *Enabled*	*Disabled*	Invert controller input. Shown if *Off* is not selected in the *Enable input* field.
Temperature settings			
Controller mode	*Heating* *Cooling* *Heating + cooling*	*Heating*	Select the controller mode. The controller can control heating, cooling, or both.
Measurement input	*Internal sensor (INT)* *External input (EXT)* *Average of INT and EXT* *Bus* *External input 2 (EXT2)*	*Internal sensor (INT)*	Select the measurement signal source. The measurement input signal can be read from internal sensor, external input or bus, or calculated from the internal and external sensor signals.
Measurement override start value	*-1000.0...1000.0 °C*	*0.0 °C*	Set the default bus value for temperature input. This value is set as the temperature value after a power failure or boot. Shown if *Bus* is selected in the *Measurement input* parameter.
Setpoint input	*External input* *Bus / Fixed* *Fixed* *UI* *External input 2*	*External input*	Select the source for controller setpoint.
Setpoint start / fixed value	*-1000.0...1000.0 °C*	*0.0 °C*	Fixed setpoint value for the controller. Shown if *Bus* is selected in the *Setpoint input* parameter.

Parameter name	Values	Default	Description
Integration time (I)	*Off* *1...5000 s*	*Off*	To activate the PI control, enable this parameter and set the common integration time in seconds.
Integration time cooling (I)	*Off* *1...5000 s*	*Off*	Set the integration time for cooling. If this parameter is disabled, the common value defined in the *Integration time (I)* parameter is used for cooling.
Control range heating (P)	*1.0...32.0 °C*	*16.0 °C*	Set the control range for heating. Shown if *Heating* or *Heating + cooling* is selected in the *Controller mode* parameter.
Control range cooling (P)	*1.0...32.0 °C*	*16.0 °C*	Set the control range for cooling. Shown if *Cooling* or *Heating + cooling* is selected in the *Controller mode* parameter.
Dead zone heating	*0.0...32.0 °C*	*1.0 °C*	Set the dead zone for heating. For example, if this value is 3 °C, heating control starts when the temperature drops 3 °C below the setpoint.
Dead zone cooling	*0.0...32.0 °C*	*1.0 °C*	Set the dead zone for cooling. For example, if this value is 3 °C, cooling control starts when the temperature rises 3 °C above the setpoint.
Controller setpoint center	*-1000.0...1000.0 °C*	*21.0 °C*	Set the controller setpoint centre.
Controller setpoint limit -	*-2000.0...0.0 °C*	*-3.0 °C*	Set the low limit for setpoint. This sets the limit how much you can adjust the setpoint below the setpoint centre.
Controller setpoint limit +	*0.0...2000.0 °C*	*3.0 °C*	Set the high limit for setpoint. This sets the limit how much you can adjust the setpoint above the setpoint centre.
Controller setpoint step	*0.0...1000.0 °C*	*0.5 °C*	Set the setpoint adjustment step. One tap of + or - button adjusts the setpoint by one step.

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Humidity

Parameter name	Values	Default	Description
Enable input	*Off* *Temperature contact* *RH contact* *CO₂ contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact* *Bus* *Condensation contact 2* *External input contact 2*	*Off*	Select an input contact to enable the controller. If the value is *Off*, the controller is always enabled.
Controller enable input inversion	*Disabled* *Enabled*	*Disabled*	Invert controller input. Shown if *Off* is not selected in the *Enable input* field.
Relative humidity settings			
Controller mode	*Humidification (HUM)* *Dehumidification (DEHUM)* *HUM + DEHUM*	*Humidification (HUM)*	Select the controller mode. The controller can control humidification, dehumidification, or both.
Measurement input	*Internal sensor (INT)* *External input (EXT)* *Average of INT and EXT* *Bus*	*Internal sensor (INT)*	Select the measurement signal source. The measurement input signal can be read from internal sensor, external input or bus, or calculated from the internal and external sensor signals.
Measurement override start value	*0.00...100.00 %*	*0.00 %*	Set the default bus value for relative humidity level. This value is set as the humidity value after a power failure or boot. Shown if *Bus* is selected in the *Measurement input* parameter.
Setpoint input	*External input* *Bus / Fixed* *Fixed* *UI*	*External input*	Select the source for controller setpoint.
Setpoint start / fixed value	*0.00...100.00 %*	*0.00 %*	Fixed setpoint value for the controller. Shown if *Bus* is selected in the *Setpoint input* parameter.
Integration time (I)	*Off* *1...5000 s*	*Off*	To activate PI control, enable this parameter and set the common integration time in seconds.

Parameter name	Values	Default	Description
Integration time dehumidification (I)	*Off* *1...5000 s*	*Off*	Set the integration time for dehumidification. If this parameter is disabled, the common value defined in the *Integration time (I)* parameter is used for dehumidification.
Control range humidification (P)	*1.00...100.00 %*	*50.00 %*	Set the control range for humidification. Shown if *Humidification (HUM)* or *HUM + DEHUM* is selected in the *Controller mode* parameter.
Control range dehumidification (P)	*1.00...100.00 %*	*50.00 %*	Set the control range for dehumidification. Shown if *Dehumidification (DEHUM)* or *HUM + DEHUM* is selected in the *Controller mode* parameter.
Dead zone humidification	*0.00...100.00 %*	*2.5 %*	Set the dead zone for humidification. For example, if this value is 2.5 %, humidification control starts when the relative humidity level drops 2.5 % below the setpoint.
Dead zone dehumidification	*0.00...100.00 %*	*2.5 %*	Set the dead zone for dehumidification. For example, if this value is 2.5 %, dehumidification control starts when the relative humidity level rises 2.5 % above the setpoint.
Controller setpoint center	*0.00...100.00 %*	*50.00 %*	Set the controller setpoint centre.
Controller setpoint limit -	*-100.00...0.00 %*	*-50.00 %*	Set the low limit for setpoint. This sets the limit how much you can adjust the setpoint below the setpoint centre.
Controller setpoint limit +	*0.00...100.00 %*	*50.00 %*	Set the high limit for setpoint. This sets the limit how much you can adjust the setpoint above the setpoint centre.
Controller setpoint step	*0.00...50.00 %*	*5.00 %*	Set the setpoint adjustment step. One tap of + or - button adjusts the setpoint by one step.

Carbon dioxide

Parameter name	Values	Default	Description
Enable input	*Off* *Temperature contact* *RH contact* *CO2 contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact* *Bus* *Condensation contact 2* *External input contact 2*	*Off*	Select an input contact to enable the controller. If the value is *Off*, the controller is always enabled.

Parameter name	Values	Default	Description
Controller enable input inversion	*Disabled* *Enabled*	*Disabled*	Invert controller input. Shown if *Off* is not selected in the *Enable input* field.
CO_2 settings			
Controller mode	*Ventilation*	*Ventilation*	Controller mode is ventilation.
Measurement input	*Internal sensor (INT)* *External input (EXT)* *Average of INT and EXT* *Bus*	*Internal sensor (INT)*	Select the measurement signal source. The measurement input signal can be read from internal sensor, external input or bus, or calculated from the internal and external sensor signals.
Measurement override start value	*0...10000 ppm*	*0 ppm*	Set the default bus value for carbon dioxide level. This value is set as the carbon dioxide value after a power failure or boot. Shown if *Bus* is selected in the *Measurement input* parameter.
Setpoint input	*External input* *Bus / Fixed* *Fixed* *UI*	*External input*	Select the source for controller setpoint.
Setpoint start / fixed value	*0...10000 ppm*	*0 ppm*	Fixed setpoint value for the controller. Shown if *Bus* is selected in the *Setpoint input* parameter.
Integration time (I)	*Off* *1...5000 s*	*Off*	To activate PI control, enable this parameter and set the common integration time in seconds.
Control range ventilation (P)	*100...10000 ppm*	*600 ppm*	Set the control range for ventilation.
Dead zone ventilation	*0...10000 ppm*	*50 ppm*	Set the dead zone for ventilation. For example, if this value is 50 ppm, the ventilation control starts when the carbon dioxide level rises 50 ppm above the setpoint.
Controller setpoint center	*0...10000 ppm*	*400 ppm*	Set the controller setpoint centre.
Controller setpoint limit -	*-10000...0 ppm*	*-100 ppm*	Set the low limit for setpoint. This sets the limit how much you can adjust the setpoint below the setpoint centre.
Controller setpoint limit +	*0...10000 ppm*	*400 ppm*	Set the high limit for setpoint. This sets the limit how much you can adjust the setpoint above the setpoint centre.
Controller setpoint step	*0...5000 ppm*	*50 ppm*	Set the setpoint adjustment step.

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Volatile organic compounds

Parameter name	Values	Default	Description
Enable input	*Off* *Temperature contact* *RH contact* *CO₂ contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact* *Bus* *Condensation contact 2* *External input contact 2*	*Off*	Select an input contact to enable the controller. If the value is *Off*, the controller is always enabled.
Controller enable input inversion	*Disabled* *Enabled*	*Disabled*	Invert controller input. Shown if *Off* is not selected in the *Enable input* field.
VOC settings			
Controller mode	*Ventilation*	*Ventilation*	Controller mode is ventilation.
Measurement input	*Internal sensor (INT)* *External input (EXT)* *Average of INT and EXT* *Bus*	*Internal sensor (INT)*	Select the measurement signal source. The measurement input signal can be read from internal sensor, external input, or bus, or calculated from the internal and external sensor signals.
Measurement override start value	*0...32767 µg/m³*	*0 µg/m³*	Set the default bus value for VOC level. This value is set as the VOC level value after a power failure or boot. Shown if *Bus* is selected in the *Measurement input* parameter.
Setpoint input	*External input* *Bus / Fixed* *Fixed* *UI*	*External input*	Select the source for controller setpoint.
Setpoint start / fixed value	*0...32767 µg/m³*	*0 µg/m³*	Fixed setpoint value for the controller. Shown if *Bus* is selected in the *Setpoint input* parameter.
Integration time (I)	*Off* *1...5000 s*	*Off*	To activate PI control, enable this parameter and set the common integration time in seconds.
Control range ventilation (P)	*150...32767 µg/m³*	*1000 µg/m³*	Set the control range for ventilation.
Dead zone ventilation	*0...32767 µg/m³*	*50 µg/m³*	Set the dead zone for ventilation. For example, if this value is 50 µg/m³, the ventilation control starts when the VOC level rises 50 µg/m³ above the setpoint.

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Parameter name	Values	Default	Description
Controller setpoint center	*0...32767 µg/m³*	*400 µg/m³*	Set the controller setpoint centre.
Controller setpoint limit -	*-32767...0 µg/m³*	*-100 µg/m³*	Set the low limit for setpoint. This sets the limit how much you can adjust the setpoint below the setpoint centre.
Controller setpoint limit +	*0...32767 µg/m³*	*400 µg/m³*	Set the high limit for setpoint. This sets the limit how much you can adjust the setpoint above the setpoint centre.
Controller setpoint step	*0...16383 µg/m³*	*50 µg/m³*	Set the setpoint adjustment step. One tap of + or - button adjusts the setpoint by one step.

Maximum control

Parameter name	Values	Default	Description
Max control selection	*No selection* *Temperature* *Humidity* *CO_2* *VOC*	*No selection*	Select the measurements to be used for maximum control. The control output signal is formed according to the measurement that causes the largest control signal value.
Enable input	*Off* *Temperature contact* *RH contact* *CO_2 contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact* *Bus* *Condensation contact 2* *External input contact 2*	*Off*	Select an input contact to enable the controller. If the value is *Off*, the controller is always enabled.
Override start value	*Disabled* *Enabled*	*Disabled*	Set the controller status after power failure or boot.

5.3.5 Configuring output settings

1. Tap the *Component setup* button on the *Configuration* page to open the *Component setup* page.

2. Tap a button in the *Outputs* column for the output you want to configure.

   The *Outputs* column can have the following measurement settings available depending on the device model:

1	Output 1 settings.
2	Output 2 settings.
3	Output 3 settings.
4	Output 4 settings.
Relay	Relay output settings.

3. Tap the *Output type* field.

   Note: Relay output setting does not have output type selection.

4. Select the output type and tap the *Ok* button.
   The following output types are available:

Off	Not in use.
Analog	Analogue output.
Digital	Digital output.

5. Configure the settings for the output.
   See the following chapters for more information about the settings.

5.3.5.1 Analogue output settings

Tap the output number button on the *Component setup* page to open the output settings. Select *Analog* in the *Output type* field. Tap a parameter on the list to change its value.

The following parameters are available for configuration:

Parameter name	Values	Default	Description
Analog output source	*Temperature @ °C* *Humidity @ %rH* *CO_2 @ ppm* *VOC @ µg/m³* *Controller primary outp.* *Controller secondary outp.* *External input* *Bus* *Dewpoint @ °C* *Absolute humidity @ g/m³* *Mixing ratio @ g/kg* *Entalphy @ kJ/kg* *VOC @ TVOC ppb* *VOC @ CO2 equivalent* *VOC @ Air Quality Index* *Condensation prediction*	*Temperature @ °C*	Analogue output source.
Analog output digital control	*Enabled / Disabled*	*Disabled*	Analogue output digital control.
Dew point prediction range	*Disabled, 0.1...16.0 °C*	*Disabled*	Dew point prediction range. Shown if *Condensation prediction* is selected in the *Analog output source* parameter.
External input selection (analog)	*External input 1* *External input 2*	*External input 1*	Input for the output signal. Shown if *External input* or *Condensation prediction* is selected in the *Analog output source* parameter.
Bus control start value	*0.00...100.00 %*	*0.00 %*	Bus control start value. Shown if *Bus* is selected in the *Analog output source* parameter.
Output scaling	*0-10 V* *2-10 V* *0-5 V* *Custom*	*0-10 V*	Analogue output signal range.
	0.000...10.000 V	-	Custom analogue output voltage range.
	0.00...100.00 %	-	Custom analogue output effective range.

5.3.5.2 Digital output settings

Tap the output number button on the *Component setup* page to open the output settings. Select *Digital* in the *Output type* field. Tap a parameter on the list to change its value.

The following parameters are available for configuration:

Parameter name	Values	Default	Description
Digital output selection	*Temperature contact* *RH contact* *CO_2 contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact* *Bus* *Force ventilation*	*Temperature contact*	Digital output control source.
External input selection (digital)	*External input 1* *External input 2*	*External input 1*	Input for the output signal. Shown if *External input* is selected in the *Digital output selection* parameter.
Bus control start value	*0.00...100.00 %*	*0.00 %*	Bus control start value. Shown if *Bus* is selected in the *Digital output selection* parameter.
Output scaling	*0-10 V* *2-10 V* *0-5 V* *Custom*	*0-10 V*	Digital output signal range.
	0.000...10.000 V	-	Custom digital output voltage range.
	0.00...100.00 %	-	Custom digital output effective range.

5.3.5.3 Relay output settings

Tap the *Relay* button on the *Component setup* page to open the relay output settings. Tap a parameter on the list to change its value.

The following parameters are available for configuration:

Parameter name	Values	Default	Description
Relay source	*Off* *Temperature contact* *RH contact* *CO₂ contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact* *Fixed / Bus* *Multisource* *Condensation contact 2* *External input contact 2* *Force ventilation*	*Off*	Relay control source.
Fixed / bus control start value	*Disabled* *Enabled*	*Disabled*	Manual relay control. You can set the default relay status with this parameter. The default setting is used when the device restarts. The selection is available if the parameter *Relay source* value is *Fixed / Bus*.
Multisource selection	*Temperature contact* *RH contact* *CO₂ contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact* *Bus* *Condensation contact 2* *External input contact 2* *Force ventilation*	-	Relay control sources (multiple selections). The selection is available if the parameter *Relay source* value is *Multisource*.

5.3.6 Configuring communication settings

1. Tap the *General communication settings* button on the *Configuration* page to open the *Communication settings* page.
2. Tap a parameter on the list to change its value.

5.3.6.1 Communication settings

The following parameters are available for configuration:

Parameter name	Values	Default	Description
Communication mode	*Off* *Modbus RTU* *Bacnet MSTP*	*Modbus RTU* (-MOD models) *Bacnet MSTP* (-BAC models)	Communication mode. **Note:** You can use either Modbus or BACnet communication in -BAC models.
RS485 baud rate	*9600* *14400* *19200* *38400* *56000* *57600* *76800* *115200*	*9600*	Bus speed.
Parity	*None* *Even* *Odd*	*None*	Bus parity.
Stop bits	*1 bit* *2 bits*	*1 bit*	Stop bits.
Communication led mode	*Off* *Tx - Transmit* *Rx - Receive* *Tx + Rx*	*Tx + Rx*	Communication indicator light function. *Off* — Indicator light is off *Tx - Transmit* — Indicator light is on when the device transmits data to bus. *Rx - Receive* — Indicator light is on when the device receives data from bus. *Tx + Rx* — Indicator light is on when the device transmits data to bus or receives data from bus. When this option is selected, the transmit hold on time is ten times the hold on time setting.
Communication led hold on time	*5...1000 ms*	*25 ms*	Communication indicator light hold on time.
BMS RS-485 Address	*1...247*	*1*	Modbus address. This parameter is available only in -MOD models.
Modbus broadcast	*Disabled* *Enabled*	*Disabled*	Modbus broadcast. This parameter is available only in -MOD models.
BACnet device instance	*0...4194303*	*10000*	BACnet device instance. This parameter is available only in -BAC models.
Mac address	*0...127*	*0*	BACnet MAC address. This parameter is available only in -BAC models.

Parameter name	Values	Default	Description
Maximum number of masters	*1...127*	*127*	Maximum number of BACnet masters. This parameter is available only in -BAC models.
Maximum number of infoframes	*1...255*	*16*	Maximum number of BACnet infoframes. This parameter is available only in -BAC models.
Temperature unit	*Celsius* *Fahrenheit*	*Celsius*	BACnet temperature unit. This parameter is available only in -BAC models.

5.3.7 Saving and uploading configurations

If you have several devices to configure, you can save the configuration and then upload it to other devices. Configurations are model-specific.

You can save configurations to MyCloud cloud service or locally to your smartphone.

5.3.7.1 Saving the configuration to the MyCloud cloud service

1. After you have configured the settings, tap the three dots in the upper right corner of the *Configuration* page.
2. Tap *Save to MyCloud* to save the new configuration to MyCloud.
3. Enter a name for the configuration in the *Configuration name* field.
4. If necessary, enter an optional description in the *Description* field.
5. Tap *Next* to select the saving location.
6. Select *Personal workspace* or *Shared workspace*, if your company has a shared workspace.
7. Tap *Save* to save the configuration.

5.3.7.2 Uploading a saved configuration to a transmitter from the MyCloud cloud service

1. Tap the cloud icon on top of the *Configuration* page.
2. Tap a saved configuration on the *Open configurations* page to select it.
3. Tap the *Open* button in the top right corner.
4. Select the settings you want to import in the *Import settings* popup.
5. Tap the *Import* button to import the configuration settings.
6. Tap the *Install to device* button at the bottom of the *Configuration* page to upload the settings to the device.

5.3.7.3 Saving the configuration locally

You can save configurations locally to your smartphone.

1. After you have configured the settings, tap the three dots in the upper right corner of the *Configuration* page.
2. Tap *Save configuration locally* to save the configuration to the smartphone MyProdual is installed in.
3. Enter a name for the configuration in the *Configuration name* field.
4. If necessary, enter an optional description in the *Description* field.
5. Tap *Next* to select the saving location.
6. Navigate to the correct folder.
   a. In Android, tap the Save button to save the configuration file.
   b. In iOS, tap Open to save the configuration file.

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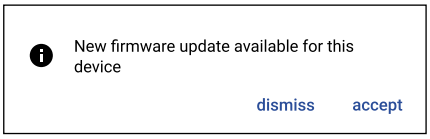
5.3.7.4 Uploading a locally saved configuration to a transmitter

1. Tap the three dots in the upper right corner of the *Configuration* page.
2. Tap *Open local file* in the menu.
3. Tap a saved configuration to select it.
4. Select the settings you want to import in the *Import settings* popup.
5. Tap the *Import* button to open the configuration settings.
6. Tap the *Install to device* button at the bottom of the *Configuration* page to upload the settings to the device.

5.3.8 Updating device firmware

You can update the device firmware when the MyProdual application notifies you about the update.

1. Start the MyProdual application.
2. Connect the device to the MyProdual application.
3. Tap the *Accept* button on the update notification.



4. Review the update details and tap the *Install* button to start the update.
5. Wait for the firmware installation process to complete.

   Important: Keep the smartphone near the device to keep the Bluetooth connection active. If the connection is lost, the firmware update process cannot complete.

6. Tap the *Ok* button in the firmware update completion dialog.
7. Tap the *Close* button.
8. Tap the connection info button to disconnect the device.



9. Remove the MyTool Connect dongle.

6 Maintenance

6.1 Cleaning the device

Dust and grease can accumulate on the housing surfaces and on the touchscreen. Regular cleaning keeps the device tidy and prevents dust from blocking the ventilation holes.

Important: Do not use scouring pads, paper towels or other abrasive materials.

If necessary, you can use mild detergents (pH 7.0) for cleaning the housing and the touchscreen.

1. Clean the housing surface gently with a damp, clean cloth.
   Make sure that the cloth is not wet.
2. Clean the touchscreen with a soft microfiber cloth.
   a. Gently wipe the touchscreen in circular motions.
   b. Avoid excessive pressure and rubbing.
   c. If smudges remain, wipe the screen with a slightly damp cloth.

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7 Modbus

The -MOD models are equipped with Modbus RTU communication via RS-485 connection.

7.1 Modbus properties

Protocol	RS-485 Modbus RTU
Bus speed	9600*/14400/19200/38400/56000/57600/76800/115200 bit/s
Data bits	8
Parity	none*/odd/even
Stop bits	1* / 2
Modbus ID	1*
Unit load	1/8 UL
	* factory setting

Important: This device writes the Modbus register values to non-volatile memory unless otherwise specified in this document. The non-volatile memory durability is 100000 write cycles.

7.2 Modbus function codes

The device supports the following Modbus function codes.

Decimal	Hexadec-imal	Function
3	0x03	Read Holding Registers
4	0x04	Read Input Registers
6	0x06	Write Single Register
16	0x10	Write Multiple Registers
23	0x17	Read/Write Multiple Registers

7.3 Modbus registers

The device uses the full Modbus register range from 1 to 65535. Holding registers and input registers are not tied to the classic 4xxxx and 3xxxx ranges. The device has also many registers that have the same register number but the function depends on the register type (e.g. input register 18 and holding register 18).

Important: To use the full Modbus register range, you may need to update the communication settings in some BMS systems. Contact the system vendor for support, if necessary.

The registers are grouped as described in this user guide. You can only read or write registers from one group with the same Modbus command.

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7.3.1 Input registers

7.3.1.1 Input registers for measurements

Input register	Parameter description	Data type	Values	Range
0	Temperature measurement (°C).	S16	*-10000...10000*	-1000.0...1000.0 °C
1	Relative humidity measurement.	U16	*0...100*	0...100 %
2	CO_2 measurement.	U16	*0...10000*	0...10000 ppm
3	VOC measurement (TVOC).	U16	*0...32767*	0...32767 µg/m^3
4	Occupancy detection.	U16	*0 - 1*	0. Not detected 1. Detected
5	Input voltage.	U16	*0...10000*	0.000...10.000 V
6	Input resistance (low)	U16	*0...20000*	0.0...2000.0 Ω
7	Input resistance (high)	U16	*0...30000*	0...300000 Ω
8	Input temperature (°C).	S16	*-10000...10000*	-1000.0...1000.0 °C
9	Input relative humidity.	U16	*0...100*	0...100 %
10	Input CO_2.	U16	*0...10000*	0...10000 ppm
11	Input VOC.	U16	*0...32767*	0...32767 µg/m^3
12	Digital input status.	U16	*0 - 1*	0. Inactive 1. Active
13	Voltage output 1.	U16	*0...10000*	0.000...10.000 V
14	Voltage output 2.	U16	*0...10000*	0.000...10.000 V
15	Voltage output 3.	U16	*0...10000*	0.000...10.000 V
16	Voltage output 4.	U16	*0...10000*	0.000...10.000 V
17	Average temperature (°C), calculated from internal and external temperature measurement.	S16	*-10000...10000*	-1000.0...1000.0 °C
18	Dew point (°C).	S16	*-10000...10000*	-1000.0...1000.0 °C
19	Relative humidity with one decimal.	U16	*0...1000*	0.0...100.0 %
20	Relative humidity with two decimals.	U16	*0...10000*	0.00...100.00 %
21	Absolute humidity.	U16	*0...1000*	0.0...100.0 g/m^3
22	Mixing ratio of water vapour.	U16	*0...1000*	0.0...100.0 (g/kg)
23	Enthalpy.	U16	*0...10000*	0.0...1000.0 kJ/kg
24	TVOC value (ppb).	U16	*0...32767*	0...32767 ppb
25	VOC value as CO_2 equivalent.	U16	*0...10000*	0...10000 ppm
26	VOC AQI value.	U16	*1...5*	1...5
27	Occupancy detection (fast hold).	U16	*0 - 1*	0. Not detected 1. Detected
28	Pulse counter 1 value (most significant word)	U16	*0...65535*	0...65535
29	Pulse counter 1 value (least significant word)	U16	*0...65535*	0...65535
30	Input relative humidity with one decimal.	U16	*0...1000*	0.0...100.0 %

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Input register	Parameter description	Data type	Values	Range
31	Input relative humidity with two decimals.	U16	*0...10000*	0.00...100.00 %
32	Temperature measurement (°F).	S16	*-17680...18320*	-1768.0...1832.0 °F
33	Input temperature (°F).	S16	*-17680...18320*	-1768.0...1832.0 °F
34	Average temperature (°F), calculated from internal and external temperature measurement.	S16	*-17680...18320*	-1768.0...1832.0 °F
35	Dew point (°F).	S16	*-17680...18320*	-1768.0...1832.0 °F
36	Installation quality score.	U16	*1...4*	1...4

7.3.1.2 Input registers for control values

Input register	Parameter description	Data type	Values	Range
37	Measured temperature power.	U16	*0...10000*	0.00...100.00 %
38	Measured humidity power.	U16	*0...10000*	0.00...100.00 %
39	Measured CO_2 power.	U16	*0...10000*	0.00...100.00 %
40	Measured VOC power.	U16	*0...10000*	0.00...100.00 %
41	External input power.	U16	*0...10000*	0.00...100.00 %
42	Effective external input power.	U16	*0...10000*	0.00...100.00 %
43	Condensation power.	U16	*0...10000*	0.00...100.00 %
44	Controller primary power.	U16	*0...10000*	0.00...100.00 %
45	Controller secondary power.	U16	*0...10000*	0.00...100.00 %
46	Output 1 power.	U16	*0...10000*	0.00...100.00 %
47	Output 1 effective power.	U16	*0...10000*	0.00...100.00 %
48	Output 2 power.	U16	*0...10000*	0.00...100.00 %
49	Output 2 effective power.	U16	*0...10000*	0.00...100.00 %
50	Output 3 power.	U16	*0...10000*	0.00...100.00 %
51	Output 3 effective power.	U16	*0...10000*	0.00...100.00 %
52	Output 4 power.	U16	*0...10000*	0.00...100.00 %
53	Output 4 effective power.	U16	*0...10000*	0.00...100.00 %

7.3.1.3 Input registers for contacts

Input register	Parameter description	Data type	Values	Range
54	Measured temperature contact.	U16	*0 - 1*	0. Inactive 1. Active
55	Measured humidity contact.	U16	*0 - 1*	0. Inactive 1. Active
56	Measured CO_2 contact.	U16	*0 - 1*	0. Inactive 1. Active

Input register	Parameter description	Data type	Values	Range
57	Measured VOC contact.	U16	*0 - 1*	0. Inactive 1. Active
58	External input contact.	U16	*0 - 1*	0. Inactive 1. Active
59	Condensation contact.	U16	*0 - 1*	0. Inactive 1. Active
60	Output 1 contact.	U16	*0 - 1*	0. Inactive 1. Active
61	Output 2 contact.	U16	*0 - 1*	0. Inactive 1. Active
62	Output 3 contact.	U16	*0 - 1*	0. Inactive 1. Active
63	Output 4 contact.	U16	*0 - 1*	0. Inactive 1. Active
64	Relay contact.	U16	*0 - 1*	0. Inactive 1. Active

7.3.1.4 Input registers for device status

Input register	Parameter description	Data type	Values	Range
65	Device status.	U16	*0 - 1*	0. Ok 1. Fault
66	Temperature sensor status.	U16	*0 - 1*	0. Ok 1. Fault
67	Humidity sensor status.	U16	*0 - 1*	0. Ok 1. Fault
68	CO_2 sensor status.	U16	*0 - 1*	0. Ok 1. Fault
69	VOC sensor status.	U16	*0 - 1*	0. Ok 1. Fault
70	Occupancy sensor status.	U16	*0 - 1*	0. Ok 1. Fault
71	External temperature sensor status.	U16	*0 - 1*	0. Ok 1. Fault

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Input register	Parameter description	Data type	Values	Range
72	VOC sensor detailed status.	U16	*0 - 1 - 2 - 3*	0. Operating normally 1. Warm-up sequence 2. Initial start-up 3. No valid output
73	Combined CO_2 and VOC CO_2 equivalent value.	U16	*0...10000*	0...10000 ppm
74	Measured power of dew point.	U16	*0...10000*	0.00...100.00 %
75	Measured power of absolute humidity.	U16	*0...10000*	0.00...100.00 %
76	Measured power of mixing ratio.	U16	*0...10000*	0.00...100.00 %
77	Measured power of enthalpy.	U16	*0...10000*	0.00...100.00 %
78	Measured power of TVOB ppb.	U16	*0...10000*	0.00...100.00 %
79	Measured power of CO_2 equivalent.	U16	*0...10000*	0.00...100.00 %
80	Measured power of air quality index.	U16	*0...10000*	0.00...100.00 %
81	Condensation prediction power in output 1.	U16	*0...10000*	0.00...100.00 %
82	Condensation prediction power in output 2.	U16	*0...10000*	0.00...100.00 %
83	Condensation prediction power in output 3.	U16	*0...10000*	0.00...100.00 %
84	Condensation prediction power in output 4.	U16	*0...10000*	0.00...100.00 %
85	Input 2 resistance, high.	U16	*0...30000*	0...300000 Ω
86	Input 2 temperature.	S16	*-10000...10000*	-1000.0...1000.0 °C
87	Input 2 digital status.	U16	*0 - 1*	0. Inactive 1. Active
88	Ambient light sensor value.	U16	*0…65535*	0…65535 lx
89	Pulse counter 2 value (most significant word)	U16	*0…65535*	0…65535
90	Pulse counter 2 value (least significant word)	U16	*0…65535*	0…65535
91	Input 2 temperature (°F).	U16	*-17680…18320*	-1768.0…1832.0 °F
92	Input 2 power.	U16	*0...10000*	0.00...100.00 %
93	Input 2 effective power.	U16	*0...10000*	0.00...100.00 %
94	Condensation 2 power.	U16	*0...10000*	0.00...100.00 %
95	Input 2 contact status.	U16	*0 - 1*	0. Inactive 1. Active
96	Condensation contact 2 status.	U16	*0 - 1*	0. Inactive 1. Active
97	Input 2 temperature measurement status.	U16	*0 - 1*	0. Ok 1. Fault

7.3.1.5 Input registers for display

Input register	Parameter description	Data type	Values	Range
98	Display fault.	U16	*0 - 1*	0. Ok 1. Fault
99	Temperature control setpoint on the display (°C).	S16	*-10000...10000*	-1000.0...1000.0 °C
100	Humidity control setpoint on the display.	U16	*0...10000*	0...100.00 %rH
101	CO_2 control setpoint on the display.	U16	*0...10000*	0...10000 ppm
102	VOC control setpoint on the display.	U16	*0...32767*	0...32767 µg/m^3
103	Temperature control setpoint on the display (°F).	S16	*-17680...18320*	-1768.0...1832.0 °F
104	User activity status.	U16	*0 - 1*	0. Inactive 1. Active
105	Ventilation status.	U16	*0 - 1*	0. Inactive 1. Active
106	Not in use.	-	-	-
107	Heating/cooling icon status.	U16	*0 - 1*	0. Invisible 1. Visible
108	Humidification/dehumidification icon status.	U16	*0 - 1*	0. Invisible 1. Visible
109	Ventilation icon status.	U16	*0 - 1*	0. Invisible 1. Visible
110	Condensation icon status.	U16	*0 - 1*	0. Invisible 1. Visible
111	Open window icon status.	U16	*0 - 1*	0. Invisible 1. Visible
112	Maintenance mode icon status.	U16	*0 - 1*	0. Invisible 1. Visible
113	Configuration tool icon status.	U16	*0 - 1*	0. Invisible 1. Visible
114	Temperature unit.	U16	*0 - 1*	0. Celsius 1. Fahrenheit
115	Remaining time in ventilation forcing timer.	U16	*0...65535*	0...65535 min

7.3.1.6 Input registers for installation quality score

Input register	Parameter description	Data type	Values	Range
7990	Installation quality score.	U16	*1...4*	1...4
7991	Installation quality score average during last hour.	U16	*0...100*	0...100

Input register	Parameter description	Data type	Values	Range
7992	Latest installation quality score value.	U16	*0...100*	0...100
7993	Standard deviation of installation quality score during last hour.	U16	*0...100*	0...100

7.3.2 Holding registers

7.3.2.1 Holding registers for control values in Celsius

Note: These register values are stored in the volatile memory. The volatile memory allows more write cycles than the non-volatile memory. These registers are reset to factory settings after a power failure.

Holding register	Parameter description	Data type	Values	Range	Default
0	Temporary override timer.	U16	*0...1440*	0 = override disabled, 1...1440 = override enabled in minutes	*0*
1	Temporary override selection.	U16	*0...65535*	16-bit binary value. Bits are designated as follows: 1. Input power 2. Controller temperature input 3. Controller humidity input 4. Controller CO_2 input 5. Controller VOC input 6. Controller temperature setpoint 7. Controller humidity setpoint 8. Controller CO_2 setpoint 9. Controller VOC setpoint 10. Enable controller 11. Output 1 power 12. Output 2 power 13. Output 3 power 14. Output 4 power 15. Relay 16. Indicator light colour	*0*
2	External input power.	U16	*0...10000*	0.00...100.00 %	*0*
3	Controller temperature input.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
4	Controller relative humidity input.	U16	*0...10000*	0.00...100.00 %	*0*
5	Controller CO_2 input.	U16	*0...10000*	0...10000 ppm	*0*
6	Controller VOC input.	U16	*0...32767*	0...32767 µg/m^3	*0*

Holding register	Parameter description	Data type	Values	Range	Default
7	Controller temperature setpoint.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
8	Controller relative humidity setpoint.	U16	*0...10000*	0.00...100.00 %	*0*
9	Controller CO_2 setpoint.	U16	*0...10000*	0...10000 ppm	*0*
10	Controller VOC setpoint.	U16	*0...32767*	0...32767 µg/m^3	*0*
11	Enable controller.	U16	*0 - 1*	0. Disabled 1. Enabled	*0*
12	Output 1 power.	U16	*0...10000*	0.00...100.00 %	*0*
13	Output 2 power.	U16	*0...10000*	0.00...100.00 %	*0*
14	Output 3 power.	U16	*0...10000*	0.00...100.00 %	*0*
15	Output 4 power.	U16	*0...10000*	0.00...100.00 %	*0*
16	Relay status.	U16	*0 - 1*	0. Off 1. On	*0*
17	Not in use.	U16	-	-	*0*
18	Pulse counter reset.	U16	*0 - 1*	0. - 1. Reset	*0*
19	External input power override value.	U16	*0...10000*	0.00...100.00 %	*0*
20	Controller temperature input override value.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
21	Controller relative humidity input override value.	U16	*0...10000*	0.00...100.00 %	*0*
22	Controller CO_2 input override value.	U16	*0...10000*	0...10000 ppm	*0*
23	Controller VOC input override value.	U16	*0...32767*	0...32767 µg/m^3	*0*
24	Controller temperature setpoint override value.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
25	Controller relative humidity setpoint override value.	U16	*0...10000*	0.00...100.00 %	*0*
26	Controller CO_2 setpoint override value.	U16	*0...10000*	0...10000 ppm	*0*
27	Controller VOC setpoint override value.	U16	*0...32767*	0...32767 µg/m^3	*0*
28	Enable controller override value.	U16	*0 - 1*	0. Disabled 1. Enabled	*0*
29	Output 1 power override value.	U16	*0...10000*	0.00...100.00 %	*0*
30	Output 2 power override value.	U16	*0...10000*	0.00...100.00 %	*0*
31	Output 3 power override value.	U16	*0...10000*	0.00...100.00 %	*0*
32	Output 4 power override value.	U16	*0...10000*	0.00...100.00 %	*0*
33	Relay status override value.	U16	*0 - 1*	0. Off 1. On	*0*

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Holding register	Parameter description	Data type	Values	Range	Default
34	Not in use.	-	-	-	*0*
35	Input 2 power.	U16	*0...10000*	0.00...100.00 %	*0*
36	Input 2 power override.	U16	*0...10000*	0.00...100.00 %	*0*
37	Temporary override 2 target.	U16	*0..1*	1-bit binary value. Bits are designated as follows: 1. Input 2 power	*0*

7.3.2.2 Holding registers for communication

Note: The transmitter must be restarted before the changes to the communication settings take effect.

Holding register	Parameter description	Data type	Values	Range	Default
100	Communication mode.	U16	*0 - 1 - 2*	0. Off 1. Modbus RTU 2. BACnet MS/TP	*1*
101	Bus speed.	U16	*0 - 1 - 2 ... - 7*	0. 9600 bit/s 1. 14400 bit/s 2. 19200 bit/s 3. 38400 bit/s 4. 56000 bit/s 5. 57600 bit/s 6. 76800 bit/s 7. 115200 bit/s	*0*
102	Bus parity.	U16	*0 - 1 - 2*	0. None 1. Even 2. Odd	*0*
103	Stop bits.	U16	*1 - 2*	1. 1 stop bit 2. 2 stop bits	*1*
104	Communication indicator light mode.	U16	*0 - 1 - 2 - 3*	0. Off 1. Tx 2. Rx 3. Tx and Rx	*3*
105	Communication indicator light hold time.	U16	*5...1000*	5...1000 ms	*25*
106	Modbus address.	U16	*1...247*	1...247	*1*
107	Modbus broadcast status.	U16	*0 - 1*	0. Disabled 1. Enabled	*0*
108	BACnet device instance identifier, first two digits.	U16	*0...63*	0...63	*0*
109	BACnet device instance identifier, last five digits.	U16	*0...65535*	0...65535	*10000*
110	BACnet MAC address.	U16	*0...127*	0...127	*0*

Holding register	Parameter description	Data type	Values	Range	Default
111	Maximum BACnet address of a master device.	U16	*1...127*	1...127	*127*
112	Maximum number of BACnet information frames that a node can send before it has to pass the token.	U16	*1...32*	1...32	*16*
113	BACnet temperature unit.	U16	*0 - 1*	0. Celsius 1. Fahrenheit	*0*

7.3.2.3 Holding registers for temperature measurement settings

Holding register	Parameter description	Data type	Values	Range	Default
300	Temperature measurement scale, minimum limit.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
301	Temperature measurement scale, maximum limit.	S16	*-10000...10000*	-1000.0...1000.0 °C	*500*
302	Temperature measurement time constant multiplier.	U16	*0...60*	0...3600	*2*
303	Temperature contact, on level.	S16	*-10000...10000*	-1000.0...1000.0 °C	*250*
304	Temperature contact, off level.	S16	*-10000...10000*	-1000.0...1000.0 °C	*240*
305	Temperature contact, turn on delay.	U16	*0...65535*	0...65535 s	*0*
306	Temperature contact, hold on time.	U16	*0...65535*	0...65535 s	*0*
307	Temperature contact, turn off delay.	U16	*0...65535*	0...65535 s	*0*
308	Temperature contact, hold off time.	U16	*0...65535*	0...65535 s	*0*
309	Temperature measurement correction method.	U16	*0 - 1 - 2*	0. Off 1. Offset 2. Span	*0*
310	Temperature offset.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
311	Measured temperature, point 1.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
312	Corrected temperature, point 1.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
313	Measured temperature, point 2.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
314	Corrected temperature, point 2.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*

7.3.2.4 Holding registers for relative humidity measurement settings

Holding register	Parameter description	Data type	Values	Range	Default
400	Relative humidity measurement scale, minimum limit.	U16	*0...10000*	0.00...100.00 %	*0*
401	Relative humidity measurement scale, maximum limit.	U16	*0...10000*	0.00...100.00 %	*10000*

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Holding register	Parameter description	Data type	Values	Range	Default
402	Relative humidity measurement time constant multiplier.	U16	*0...60*	0...3600	*2*
403	Relative humidity contact, on level.	U16	*0...10000*	0.00...100.00 %	*5000*
404	Relative humidity contact, off level.	U16	*0...10000*	0.00...100.00 %	*4900*
405	Relative humidity contact, turn on delay.	U16	*0...65535*	0...65535 s	*0*
406	Relative humidity contact, hold on time.	U16	*0...65535*	0...65535 s	*0*
407	Relative humidity contact, turn off delay.	U16	*0...65535*	0...65535 s	*0*
408	Relative humidity contact, hold off time.	U16	*0...65535*	0...65535 s	*0*
409	Relative humidity measurement correction method.	U16	*0 - 1 - 2*	0. Off 1. Offset 2. Span	*0*
410	Relative humidity offset.	S16	*-10000...10000*	-100.00...100.00 %	*0*
411	Measured relative humidity, point 1.	U16	*0...10000*	0.00...100.00 %	*0*
412	Corrected relative humidity, point 1.	U16	*0...10000*	0.00...100.00 %	*0*
413	Measured relative humidity, point 2.	U16	*0...10000*	0.00...100.00 %	*0*
414	Corrected relative humidity, point 2.	U16	*0...10000*	0.00...100.00 %	*0*

7.3.2.5 Holding register for mixing ratio settings

Holding register	Parameter description	Data type	Values	Range	Default
450	Air pressure value in mixing ratio calculation.	U16	*0 - 1*	1. 1013 hPa 2. Holding register 517 value	*0*

7.3.2.6 Holding registers for CO_2 measurement settings

Holding register	Parameter description	Data type	Values	Range	Default
500	CO_2 measurement scale, minimum limit.	U16	*0...10000*	0...10000 ppm	*0*
501	CO_2 measurement scale, maximum limit.	U16	*0...10000*	0...10000 ppm	*2000*
502	CO_2 measurement time constant multiplier.	U16	*0...60*	0...3600	*2*
503	CO_2 contact, on level.	U16	*0...10000*	0...10000 ppm	*1200*
504	CO_2 contact, off level.	U16	*0...10000*	0...10000 ppm	*1100*

Holding register	Parameter description	Data type	Values	Range	Default
505	CO_2 contact, turn on delay.	U16	*0...65535*	0...65535 s	*0*
506	CO_2 contact, hold on time.	U16	*0...65535*	0...65535 s	*0*
507	CO_2 contact, turn off delay.	U16	*0...65535*	0...65535 s	*0*
508	CO_2 contact, hold off time.	U16	*0...65535*	0...65535 s	*0*
509	CO_2 measurement correction method.	U16	*0 - 1 - 2*	0. Off 1. Offset 2. Span	*0*
510	CO_2 offset.	S16	*-10000...10000*	-10000...10000 ppm	*0*
511	Measured CO_2, point 1.	U16	*0...10000*	0...10000 ppm	*0*
512	Corrected CO_2, point 1.	U16	*0...10000*	0...10000 ppm	*0*
513	Measured CO_2, point 2.	U16	*0...10000*	0...10000 ppm	*0*
514	Corrected CO_2, point 2.	U16	*0...10000*	0...10000 ppm	*0*
515	ABC calibration function.	U16	*0 - 1*	0. Off 1. On	*1*
516	Ambient pressure correction function.	U16	*0 - 1*	0. Off 1. On	*0*
517	Ambient pressure correction value.	U16	*700...1200*	700...1200 hPa	*1013*

7.3.2.7 Holding registers for VOC measurement settings

Holding register	Parameter description	Data type	Values	Range	Default
600	VOC measurement scale, minimum limit.	U16	*0...32767*	0...32767 µg/m^3	*0*
601	VOC measurement scale, maximum limit.	U16	*0...32767*	0...32767 µg/m^3	*10000*
602	VOC measurement time constant multiplier.	U16	*0...60*	0...3600	*2*
603	VOC contact, on level.	U16	*0...32767*	0...32767 µg/m^3	*1000*
604	VOC contact, off level.	U16	*0...32767*	0...32767 µg/m^3	*900*
605	VOC contact, turn on delay.	U16	*0...65535*	0...65535 s	*0*
606	VOC contact, hold on time.	U16	*0...65535*	0...65535 s	*0*
607	VOC contact, turn off delay.	U16	*0...65535*	0...65535 s	*0*
608	VOC contact, hold off time.	U16	*0...65535*	0...65535 s	*0*
609	VOC measurement correction method.	U16	*0 - 1 - 2*	0. Off 1. Offset 2. Span	*0*
610	VOC offset.	S16	*-10000...10000*	-10000...10000 µg/m^3	*0*
611	Measured VOC, point 1.	U16	*0...32767*	0...32767 µg/m^3	*0*
612	Corrected VOC, point 1.	U16	*0...32767*	0...32767 µg/m^3	*0*

Holding register	Parameter description	Data type	Values	Range	Default
613	Measured VOC, point 2.	U16	*0...32767*	0...32767 µg/m^3	*0*
614	Corrected VOC, point 2.	U16	*0...32767*	0...32767 µg/m^3	*0*
615	CO_2 equivalent value weight compared to CO_2 value.	U16	*0...100*	0...100	*0*

7.3.2.8 Holding registers for occupancy detection settings

Holding register	Parameter description	Data type	Values	Range	Default
700	Occupancy detection sensitivity.	U16	*1 - 2 ... - 5*	1. Lowest 2. Low 3. Medium 4. High 5. Highest	*3*
701	Occupancy contact, turn on delay.	U16	*0...65535*	0...65535 s	*0*
702	Occupancy contact, hold on time.	U16	*0...65535*	0...65535 s	*300*
703	Occupancy contact, turn off delay.	U16	*0...65535*	0...65535 s	*0*
704	Occupancy contact, hold off time.	U16	*0...65535*	0...65535 s	*0*

7.3.2.9 Holding registers for condensation alarm 1 settings

Holding register	Parameter description	Data type	Values	Range	Default
800	Condensation alarm 1, on threshold.	S16	*-10000...10000*	-1000.0...1000.0 °C	*20*
801	Condensation alarm 1, off threshold.	S16	*-10000...10000*	-1000.0...1000.0 °C	*30*
802	Condensation alarm 1, turn on delay.	U16	*0...65535*	0...65535 s	*0*
803	Condensation alarm 1, hold on time.	U16	*0...65535*	0...65535 s	*0*
804	Condensation alarm 1, turn off delay.	U16	*0...65535*	0...65535 s	*0*
805	Condensation alarm 1, hold off time.	U16	*0...65535*	0...65535 s	*0*

7.3.2.10 Holding registers for condensation alarm 2 settings

Holding register	Parameter description	Data type	Values	Range	Default
830	Condensation alarm 2, on threshold.	S16	*-10000...10000*	-1000.0...1000.0 °C	*20*
831	Condensation alarm 2, off threshold.	S16	*-10000...10000*	-1000.0...1000.0 °C	*30*
832	Condensation alarm 2, turn on delay.	U16	*0...65535*	0...65535 s	*0*

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Holding register	Parameter description	Data type	Values	Range	Default
833	Condensation alarm 2, hold on time.	U16	*0...65535*	0...65535 s	*0*
834	Condensation alarm 2, turn off delay.	U16	*0...65535*	0...65535 s	*0*
835	Condensation alarm 2, hold off time.	U16	*0...65535*	0...65535 s	*0*

7.3.2.11 Holding register for temperature average calculation sources

Holding register	Parameter description	Data type	Values	Range	Default
840	Temperature average calculation sources.	U16	*1 - 2 - 3 ... - 7*	1. Internal temperature 2. Input 1 3. Internal temperature and input 1 4. Input 2 5. Internal temperature and input 2 6. Input 1 and input 2 7. Internal temperature, input 1 and input 2	*3*

7.3.2.12 Holding register for ventilation forcing timer

Holding register	Parameter description	Data type	Values	Range	Default
850	Ventilation forcing timer.	U16	*0...65535*	0 = no timer 1...65535 min	*0*

7.3.2.13 Holding registers for input 1 settings

Holding register	Parameter description	Data type	Values	Range	Default
1100	Input type.	U16	*0 - 1 - 2 ... - 10*	0. Off 1. 0...10 V 2. NTC 10K 3. Pt1000 4. Custom thermistor 5. Temperature transmitter 6. Humidity transmitter 7. CO_2 transmitter 8. VOC transmitter 9. Potentiometer 10. Digital input	*2*

Holding register	Parameter description	Data type	Values	Range	Default
1101	Input override.	U16	*0 - 1*	0. Disabled 1. Enabled	*0*
1102	Input override start value.	U16	*0...10000*	0.00...100.00 %	*0*
1103	Input speed.	U16	*0 - 1*	0. Slow 1. Fast	*0*
1104	Voltage range, minimum value.	U16	*0...10000*	0.000...10.000 V	*0*
1105	Voltage range, maximum value.	U16	*0...10000*	0.000...10.000 V	*10000*
1106	Temperature range, minimum value.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
1107	Temperature range, maximum value.	S16	*-10000...10000*	-1000.0...1000.0 °C	*1000*
1108	Relative humidity range, minimum value.	U16	*0...10000*	0.00...100.00 %	*0*
1109	Relative humidity range, maximum value.	U16	*0...10000*	0.00...100.00 %	*10000*
1110	CO_2 range, minimum value.	U16	*0...10000*	0...10000 ppm	*0*
1111	CO_2 range, maximum value.	U16	*0...10000*	0...10000 ppm	*2000*
1112	VOC range, minimum value.	U16	*0...32767*	0...32767 µg/m^3	*0*
1113	VOC range, maximum value.	U16	*0...32767*	0...32767 µg/m^3	*3000*
1114	Resistance range (high), minimum value.	U16	*0...30000*	0...300000 Ω	*0*
1115	Resistance range (high), maximum value.	U16	*0...30000*	0...300000 Ω	*1000*
1116	Contact, on level.	U16	*0...10000*	0.00...100.00 %	*0*
1117	Contact, off level.	U16	*0...10000*	0.00...100.00 %	*0*
1118	Contact, turn on delay.	U16	*0...65535*	0...65535 s	*0*
1119	Contact, hold on time.	U16	*0...65535*	0...65535 s	*0*
1120	Contact, turn off delay.	U16	*0...65535*	0...65535 s	*0*
1121	Contact, hold off time.	U16	*0...65535*	0...65535 s	*0*
1122	Effective range, minimum value.	U16	*0...10000*	0.00...100.00 %	*0*
1123	Effective range, maximum value.	U16	*0...10000*	0.00...100.00 %	*10000*

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7.3.2.14 Holding registers for input 2 settings

Holding register	Parameter description	Data type	Values	Range	Default
1200	Input type.	U16	*0 - 1 - 2 ... - 10*	0. Off 1. Not available 2. NTC 10K 3. Not available 4. Custom thermistor 5. Not available 6. Not available 7. Not available 8. Not available 9. Potentiometer 10. Digital input	*2*
1201	Input override.	U16	*0 - 1*	0. Disabled 1. Enabled	*0*
1202	Input override start value.	U16	*0...10000*	0.00...100.00 %	*0*
1203	Input speed.	U16	*0 - 1*	0. Slow 1. Fast	*0*
Registers 1204...1213 are not in use.					
1214	Resistance range (high), minimum value.	U16	*0...30000*	0...300000 Ω	*0*
1215	Resistance range (high), maximum value.	U16	*0...30000*	0...300000 Ω	*1000*
1216	Contact, on level.	U16	*0...10000*	0.00...100.00 %	*0*
1217	Contact, off level.	U16	*0...10000*	0.00...100.00 %	*0*
1218	Contact, turn on delay.	U16	*0...65535*	0...65535 s	*0*
1219	Contact, hold on time.	U16	*0...65535*	0...65535 s	*0*
1220	Contact, turn off delay.	U16	*0...65535*	0...65535 s	*0*
1221	Contact, hold off time.	U16	*0...65535*	0...65535 s	*0*
1222	Effective range, minimum value.	U16	*0...10000*	0.00...100.00 %	*0*
1223	Effective range, maximum value.	U16	*0...10000*	0.00...100.00 %	*10000*

7.3.2.15 Holding registers for controller settings

Holding register	Parameter description	Data type	Values	Range	Default
2100	Controller type.	U16	*0 - 1 - 2 ... - 5*	0. Off 1. Temperature 2. Relative humidity 3. CO_2 4. VOC 5. Maximum selection control	*0*

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Holding register	Parameter description	Data type	Values	Range	Default
2101	Temperature control mode.	U16	*0 - 1 - 2*	0. Heating 1. Cooling 2. Heating and cooling	*0*
2102	Temperature measurement source.	U16	*0 - 1 - 2 - 3 - 4*	0. Internal sensor 1. Input 1 2. Average from external and internal sensor 3. Bus value 4. Input 2	*0*
2103	Temperature measurement default value.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
2104	Temperature setpoint source.	U16	*0 - 1 - 2 - 3 - 4*	0. Input 1 1. Bus value 2. Fixed value 3. User interface 4. Input 2	*0*
2105	Temperature setpoint default value.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
2106	Temperature control integration time, common.	U16	*0...5000*	0 = P control, 1...5000 s	*0*
2107	Temperature control integration time, cooling.	U16	*0...5000*	0 = use common value, 1...5000 s	*0*
2108	Temperature control range, heating.	U16	*10...320*	1.0...32.0 °C	*20*
2109	Temperature control range, cooling.	U16	*10...320*	1.0...32.0 °C	*20*
2110	Temperature control, heating dead zone.	U16	*0...320*	0.0...32.0 °C	*10*
2111	Temperature control, cooling dead zone.	U16	*0...320*	0.0...32.0 °C	*10*
2112	Humidity control mode.	U16	*0 - 1 - 2*	0. Humidification 1. Dehumidification 2. Humidification and dehumidification	*0*
2113	Humidity measurement source.	U16	*0 - 1 - 2 - 3*	0. Internal sensor 1. External input 2. Average from external and internal sensor 3. Bus value	*0*
2114	Humidity measurement default value.	U16	*0...10000*	0.00...100.00 %	*0*

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Holding register	Parameter description	Data type	Values	Range	Default
2115	Humidity setpoint source.	U16	*0 - 1 - 2 - 3*	0. Input 1 1. Bus value 2. Fixed value 3. User interface	*0*
2116	Humidity setpoint default value.	U16	*0...10000*	0.00...100.00 %	*0*
2117	Humidity control integration time, common.	U16	*0...5000*	0 = P control, 1...5000 s	*0*
2118	Humidity control integration time, dehumidification.	U16	*0...5000*	0 = use common value, 1...5000 s	*0*
2119	Humidity control range, humidification.	U16	*100...10000*	1.00...100.00 %	*5000*
2120	Humidity control range, dehumidification.	U16	*100...10000*	1.00...100.00 %	*5000*
2121	Humidity control, humidification dead zone.	U16	*0...10000*	0.00...100.00 %	*250*
2122	Humidity control, dehumidification dead zone.	U16	*0...10000*	0.00...100.00 %	*250*
2123	CO_2 control mode.	U16	*0*	0. Ventilation	*0*
2124	CO_2 measurement source.	U16	*0 - 1 - 2 - 3*	0. Internal sensor 1. External input 2. Average from external and internal sensor 3. Bus value	*0*
2125	CO_2 measurement default value.	U16	*0...10000*	0...10000 ppm	*0*
2126	CO_2 setpoint source.	U16	*0 - 1 - 2 - 3*	0. Input 1 1. Bus value 2. Fixed value 3. User interface	*0*
2127	CO_2 setpoint default value.	U16	*0...10000*	0...10000 ppm	*0*
2128	CO_2 control integration time.	U16	*0...5000*	0 = P control, 1...5000 s	*0*
2129	Not in use.	U16	-	-	*0*
2130	CO_2 ventilation control range.	U16	*100...10000*	100...10000 ppm	*600*
2131	Not in use.	U16	-	-	*0*
2132	CO_2 control dead zone.	U16	*0...10000*	0...10000 ppm	*50*
2133	Not in use.	U16	-	-	*0*
2134	VOC control mode.	U16	*0*	0. Ventilation	*0*
2135	VOC measurement source.	U16	*0 - 1 - 2 - 3*	0. Internal sensor 1. External input 2. Average from external and internal sensor 3. Bus value	*0*

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Holding register	Parameter description	Data type	Values	Range	Default
2136	VOC measurement default value.	U16	*0...32767*	0...32767 µg/m^3	*0*
2137	VOC setpoint source.	U16	*0 - 1 - 2 - 3*	0. Input 1 1. Bus value 2. Fixed value 3. User interface	*0*
2138	VOC setpoint default value.	U16	*0...32767*	0...32767 µg/m^3	*0*
2139	VOC control integration time.	U16	*0...5000*	0 = P control, 1...5000 s	*0*
2140	Not in use.	U16	-	-	*0*
2141	VOC control range.	U16	*150...32767*	150...32767 µg/m^3	*1000*
2142	Not in use.	U16	-	-	*0*
2143	VOC control dead zone.	U16	*0...32767*	0...32767 µg/m^3	*50*
2144	Not in use.	U16	-	-	*0*
2145	Maximum selection control values.	U16	*0...15*	4-bit binary value. Bits are designated as follows: 1. Temperature 2. Humidity 3. CO_2 4. VOC	*15*
2146	Controller enable input.	U16	*0 - 1 - 2 ... - 10*	0. Off 1. Temperature contact 2. Humidity contact 3. CO_2 contact 4. VOC contact 5. Occupancy contact 6. Condensation contact 1 7. Input 1 contact 8. Bus 9. Condensation contact 2 10. Input 1 contact	*0*
2147	Controller enable override start value.	U16	*0 - 1*	0. Inactive 1. Active	*0*
2148	Controller enable input inversion.	U16	*0 - 1*	0. Inactive 1. Active	*0*

7.3.2.16 Holding registers for output settings

Table reading instruction: The register numbers include an X in the middle. Replace the X with the output number you are adjusting.

Holding register	Parameter description	Data type	Values	Range	Default
3X00	Output type.	U16	*0 - 1 - 2*	0. Off 1. Analogue 2. Digital	[1]*1*
3X01	Analogue output source.	U16	*0 - 1 - 2 ... - 15*	0. Temperature 1. Relative humidity 2. CO_2 3. VOC 4. [2]Controller primary output 5. [3]Controller secondary output 6. Input 1 7. Bus 8. Dewpoint 9. Absolute humidity 10. Mixing ratio 11. Entalphy 12. VOC (ppb) 13. VOC (CO_2 equivalent) 14. VOC (AQI) 15. Condensation prediction	[1]*0*
3X02	Digital output source.	U16	*0 - 1 - 2 ... - 8*	0. Temperature contact 1. Relative humidity contact 2. CO_2 contact 3. VOC contact 4. Occupancy contact 5. Condensation alarm 6. External input contact 7. Bus 8. Ventilation forcing	*0*
3X03	Bus control start value.	U16	*0...10000*	0.00...100.00 %	*0*
3X04	Effective range, minimum value.	U16	*0...10000*	0.00...100.00 %	*0*
3X05	Effective range, maximum value.	U16	*0...10000*	0.00...100.00 %	*10000*
3X06	Voltage range, minimum value.	U16	*0...10000*	0.000...10.000 V	*0*
3X07	Voltage range, maximum value.	U16	*0...10000*	0.000...10.000 V	*10000*
3X08	Analogue output digital control.	U16	*0 - 1*	0. Off 1. On	*0*
3X09	Dew point prediction range.	U16	*0...160*	0...16.0 °C	*0*
3X10	Analogue input selection.	U16	*0 - 1*	0. Input 1 1. Input 2	*0*

Holding register	Parameter description	Data type	Values	Range	Default
3X11	Digital input selection.	U16	*0 - 1*	0. Input 1 1. Input 2	*0*

[1] The default value depends on the product variant.

[2] Heating, humidification, ventilation

[3] Cooling, dehumidification

7.3.2.17 Holding registers for relay settings

Holding register	Parameter description	Data type	Values	Range	Default
3500	Relay control source.	U16	*0 - 1 - 2 ... - 12*	0. Off 1. Temperature contact 2. Humidity contact 3. CO_2 contact 4. VOC contact 5. Occupancy contact 1 6. Condensation alarm 1 7. External input contact 1 8. Bus 9. Multiple sources 10. Condensation alarm 2 11. External input 2 contact 12. Ventilation forcing function	*0*
3501	Bus control start value.	U16	*0 - 1*	0. Off 1. On	*0*

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Holding register	Parameter description	Data type	Values	Range	Default
3502	Multiple sources. The register 3500 value must be 9.	U16	*0...2047*	11-bit binary value. Bits are designated as follows: 1. Temperature contact 2. Humidity contact 3. CO_2 contact 4. VOC contact 5. Occupancy contact 1 6. Condensation alarm 1 7. External input contact 1 8. Bus 9. Condensation alarm 2 10. External input 2 contact 11. Ventilation forcing function	*0*

7.3.2.18 Holding registers for common display settings

Holding register	Parameter description	Data type	Values	Range	Default
10000	Display brightness in active mode.	U16	*1...100*	1...100 %	*100*
10001	Active mode duration.	U16	*5...300*	5...300 s	*10*
10002	Display brightness in inactive mode.	U16	*1...100*	1...100 %	*50*
10003	Screensaver delay.	U16	*0, 5...3600, 65535*	0 = Inactive mode disabled, 5...3600 s = screensaver delay, 65535 = screensaver disabled	*60*
10004	Screensaver brightness.	U16	*0...100*	0 = Inactive mode, 1...100 % = screen brightness	*30*
10005	Not In use.	U16	-	-	*0*
10006	Screensaver content.	U16	*0 - 1 - 2 - 3*	0. 1 measurement 1. 2 measurements 2. 3 measurements 3. 4 measurements	*0*

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Holding register	Parameter description	Data type	Values	Range	Default
10007	Screensaver measurement 1.	U16	*0 - 1 - 2 ... - 17*	0. Temperature 1. Humidity 2. CO_2 3. VOC 4. Temperature controller 5. Humidity controller 6. CO_2 controller 7. VOC controller 8. Input 1 9. Input 2 10. Dew point 11. Absolute humidity 12. Mixing ratio 13. Enthalpy 14. VOC (ppb) 15. VOC (CO_2 equivalent) 16. VOC (AQI) 17. Average temperature	*0*
10008	Screensaver measurement 2.				*0*
10009	Screensaver measurement 3.				*0*
10010	Screensaver measurement 4.				*0*
10011	Not In use.	U16	-	-	*30*
10012	Not In use.	U16	-	-	*0*
10013	Top centre info.	U16	*0 - 1*	0. None 1. Produal logo	*1*
10014	Top right info.	U16	*0 - 1*	0. None 1. Outdoor temperature	*0*
10015	Outdoor temperature source.	U16	*0 - 1 - 2*	0. Bus 1. Input 1 2. Input 2	*0*
10016	Not in use.	-	-	-	*1*
10017	Heating/cooling icon status.	U16	*0 - 1*	0. Enabled 1. Disabled	*1*
10018	Humidification/dehumidification icon status.	U16	*0 - 1*	0. Enabled 1. Disabled	*1*
10019	Ventilation icon status.	U16	*0 - 1*	0. Enabled 1. Disabled	*1*
10020	Condensation icon status.	U16	*0 - 1*	0. Enabled 1. Disabled	*1*
10021	Open window icon status.	U16	*0 - 1*	0. Enabled 1. Disabled	*1*
10022	Maintenance mode icon status.	U16	*0 - 1*	0. Enabled 1. Disabled	*1*

Holding register	Parameter description	Data type	Values	Range	Default
10023	Configuration tool icon status.	U16	*0 - 1*	0. Enabled 1. Disabled	*1*
10024	Condensation icon control source.	U16	*0 - 1 - 2 - 3 - 4*	0. None 1. Input 1 2. Input 2 3. Condensation contact 1 4. Condensation contact 2	*0*
10025	Open window icon control source.	U16	*0 - 1 - 2*	0. None 1. Input 1 2. Input 2	*0*
10026	Button configuration.	U16	*0 - 1*	0. Screen 1 buttons are common for all screens 1. Buttons are set individually for all screens	*0*
10027	Colour of the screensaver measurement 1.	U16	*0 - 1*	0. Default 1. Custom	*0*
10028	Custom colour of the screensaver measurement 1.	U16	*0...65535*	0...65535	*0*
10029	Icon of the screensaver measurement 1.	U16	*0 - 1 - 2 ... - 17*	0. Default 1. None 2. Temperature 3. Water drop 4. Digital input 5. Heatflow 6. Snowflake 7. Airflow 8. Average temperature 9. Page switch 10. Arrow 11. Clean display 12. Display off 13. Sun 14. Moon 15. Leaf 16. Fan 17. On/off	*0*
10030	Colour of the screensaver measurement 2.	U16	*0 - 1*	0. Default 1. Custom	*0*
10031	Custom colour of the screensaver measurement 2.	U16	*0...65535*	0...65535	*0*

Holding register	Parameter description	Data type	Values	Range	Default
10032	Icon of the screensaver measurement 2.	U16	*0 - 1 - 2 ... - 17*	0. Default 1. None 2. Temperature 3. Water drop 4. Digital input 5. Heatflow 6. Snowflake 7. Airflow 8. Average temperature 9. Page switch 10. Arrow 11. Clean display 12. Display off 13. Sun 14. Moon 15. Leaf 16. Fan 17. On/off	*0*
10033	Colour of the screensaver measurement 3.	U16	*0 - 1*	0. Default 1. Custom	*0*
10034	Custom colour of the screensaver measurement 3.	U16	*0...65535*	0...65535	*0*
10035	Icon of the screensaver measurement 3.	U16	*0 - 1 - 2 ... - 17*	0. Default 1. None 2. Temperature 3. Water drop 4. Digital input 5. Heatflow 6. Snowflake 7. Airflow 8. Average temperature 9. Page switch 10. Arrow 11. Clean display 12. Display off 13. Sun 14. Moon 15. Leaf 16. Fan 17. On/off	*0*
10036	Colour of the screensaver measurement 4.	U16	*0 - 1*	0. Default 1. Custom	*0*
10037	Custom colour of the screensaver measurement 4.	U16	*0...65535*	0...65535	*0*

Holding register	Parameter description	Data type	Values	Range	Default
10038	Icon of the screensaver measurement 4.	U16	*0 - 1 - 2 ... - 17*	0. Default 1. None 2. Temperature 3. Water drop 4. Digital input 5. Heatflow 6. Snowflake 7. Airflow 8. Average temperature 9. Page switch 10. Arrow 11. Clean display 12. Display off 13. Sun 14. Moon 15. Leaf 16. Fan 17. On/off	*0*
10039	Persistent touch prevention.	U16	*0 - 1*	0. Disabled 1. Enabled	*0*

7.3.2.19 Holding registers for individual screen settings

Table reading instruction: The register numbers include an X in the middle. Replace the X with the screen number you are adjusting.

Holding register	Parameter description	Data type	Values	Range	Default
11100	Screen layout, screen 1.	U16	*1 - 2 - 3 - 4*	1. 1 wheel 2. 2 wheels 3. 3 wheels 4. 4 wheels	*1*
11X00	Screen layout, screens 2..6.	U16	*0 - 1 - 2 - 3 - 4*	1. None 2. 1 wheel 3. 2 wheels 4. 3 wheels 5. 4 wheels	*0*

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Holding register	Parameter description	Data type	Values	Range	Default
11X01	Wheel 1 source.	U16	*0 - 1 - 2 ... - 17*	0. Temperature 1. Humidity 2. CO_2 3. VOC 4. Temperature controller 5. Humidity controller 6. CO_2 controller 7. VOC controller 8. Input 1 9. Input 2 10. Dew point 11. Absolute humidity 12. Mixing ratio 13. Enthalpy 14. VOC (ppb) 15. VOC (CO_2 equivalent) 16. VOC (AQI) 17. Average temperature	*0*
11X02	Wheel 1 colour.	U16	*0 - 1*	0. Default 1. Custom	*0*
11X03	Wheel 1 custom colour.	U16	*0...65535*	0...65535	*0*
11X04	Wheel 1 icon.	U16	*0 - 1 - 2 ... - 17*	0. Default 1. None 2. Temperature 3. Water drop 4. Digital input 5. Heatflow 6. Snowflake 7. Airflow 8. Average temperature 9. Page switch 10. Arrow 11. Clean display 12. Display off 13. Sun 14. Moon 15. Leaf 16. Fan 17. On/off	*0*
11X05	Wheel 1 content.	U16	*0 - 1*	0. Value 1. Icon	*0*

Holding register	Parameter description	Data type	Values	Range	Default
11X06	Wheel 2 source.	U16	*0 - 1 - 2 ... - 17*	0. Temperature 1. Humidity 2. CO_2 3. VOC 4. Temperature controller 5. Humidity controller 6. CO_2 controller 7. VOC controller 8. Input 1 9. Input 2 10. Dew point 11. Absolute humidity 12. Mixing ratio 13. Enthalpy 14. VOC (ppb) 15. VOC (CO_2 equivalent) 16. VOC (AQI) 17. Average temperature	*0*
11X07	Wheel 2 colour.	U16	*0 - 1*	0. Default 1. Custom	*0*
11X08	Wheel 2 custom colour.	U16	*0...65535*	0...65535	*0*
11X09	Wheel 2 icon.	U16	*0 - 1 - 2 ... - 17*	0. Default 1. None 2. Temperature 3. Water drop 4. Digital input 5. Heatflow 6. Snowflake 7. Airflow 8. Average temperature 9. Page switch 10. Arrow 11. Clean display 12. Display off 13. Sun 14. Moon 15. Leaf 16. Fan 17. On/off	*0*
11X10	Wheel 2 content.	U16	*0 - 1*	0. Value 1. Icon	*0*

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Holding register	Parameter description	Data type	Values	Range	Default
11X11	Wheel 3 source.	U16	*0 - 1 - 2 ... - 17*	0. Temperature 1. Humidity 2. CO_2 3. VOC 4. Temperature controller 5. Humidity controller 6. CO_2 controller 7. VOC controller 8. Input 1 9. Input 2 10. Dew point 11. Absolute humidity 12. Mixing ratio 13. Enthalpy 14. VOC (ppb) 15. VOC (CO_2 equivalent) 16. VOC (AQI) 17. Average temperature	*0*
11X12	Wheel 3 colour.	U16	*0 - 1*	0. Default 1. Custom	*0*
11X13	Wheel 3 custom colour.	U16	*0...65535*	0...65535	*0*
11X14	Wheel 3 icon.	U16	*0 - 1 - 2 ... - 17*	0. Default 1. None 2. Temperature 3. Water drop 4. Digital input 5. Heatflow 6. Snowflake 7. Airflow 8. Average temperature 9. Page switch 10. Arrow 11. Clean display 12. Display off 13. Sun 14. Moon 15. Leaf 16. Fan 17. On/off	*0*
11X15	Wheel 3 content.	U16	*0 - 1*	0. Value 1. Icon	*0*

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Holding register	Parameter description	Data type	Values	Range	Default
11X16	Wheel 4 source.	U16	*0 - 1 - 2 ... - 17*	0. Temperature 1. Humidity 2. CO_2 3. VOC 4. Temperature controller 5. Humidity controller 6. CO_2 controller 7. VOC controller 8. Input 1 9. Input 2 10. Dew point 11. Absolute humidity 12. Mixing ratio 13. Enthalpy 14. VOC (ppb) 15. VOC (CO_2 equivalent) 16. VOC (AQI) 17. Average temperature	*0*
11X17	Wheel 4 colour.	U16	*0 - 1*	0. Default 1. Custom	*0*
11X18	Wheel 4 custom colour.	U16	*0...65535*	0...65535	*0*
11X19	Wheel 4 icon.	U16	*0 - 1 - 2 ... - 17*	0. Default 1. None 2. Temperature 3. Water drop 4. Digital input 5. Heatflow 6. Snowflake 7. Airflow 8. Average temperature 9. Page switch 10. Arrow 11. Clean display 12. Display off 13. Sun 14. Moon 15. Leaf 16. Fan 17. On/off	*0*
11X20	Wheel 4 content.	U16	*0 - 1*	0. Value 1. Icon	*0*
11X21	Left top button function.	U16	*0 - 1 - 2*	0. None 1. Switch screen 2. Force ventilation	*0*

Holding register	Parameter description	Data type	Values	Range	Default
11X22	Left middle button function.	U16	*0 - 1 - 2*	0. None 1. Switch screen 2. Force ventilation	*0*
11X23	Left bottom button function.	U16	*0 - 1 - 2*	0. None 1. Switch screen 2. Force ventilation	*0*
11X24	Right top button function.	U16	*0 - 1 - 2*	0. None 1. Switch screen 2. Force ventilation	*0*
11X25	Right middle button function.	U16	*0 - 1 - 2*	0. None 1. Switch screen 2. Force ventilation	*0*
11X26	Right bottom button function.	U16	*0 - 1 - 2*	0. None 1. Switch screen 2. Force ventilation	*0*
11X27	Screen view time.	U16	*0...65535*	0 = automatic switching disabled, 1...65535 s = screen view time	*10*

7.3.2.20 Holding registers for controller user interface settings

Table reading instruction: The register numbers include an X in the middle. Replace the X with the controller number you are adjusting.

1. Temperature controller
2. Humidity controller
3. CO_2 controller
4. VOC controller

Holding register	Parameter description	Data type	Values	Range	Default
12X00	Controller wheel style.	U16	*0 - 1 - 2*	0. Measurement and setpoint 1. Measurement 2. Setpoint	*0*
12X01	Not in use.	U16	-	-	*0*
12X02	Temperature controller setpoint centre.	S16	*-10000...10000*	-1000.0...1000.0 °C	*210*
12X03	Temperature controller setpoint low limit.	S16	*-20000...0*	-2000.0...0.0 °C	*-30*
12X04	Temperature controller setpoint high limit.	U16	*0...20000*	0.0...2000.0 °C	*30*
12X05	Temperature controller setpoint step.	U16	*0...10000*	0.0...1000.0 °C	*5*

Holding register	Parameter description	Data type	Values	Range	Default
12X06	Humidity controller setpoint centre.	U16	*0...10000*	0.00...100.00 %	*5000*
12X07	Humidity controller setpoint low limit.	S16	*-10000...0*	-100.00...0.00 %	*-5000*
12X08	Humidity controller setpoint high limit.	U16	*0...10000*	0.00...100.00 %	*5000*
12X09	Humidity controller setpoint step.	U16	*0...5000*	0.00...50.00 %	*500*
12X10	CO_2 controller setpoint centre.	U16	*0...10000*	0...10000 ppm	*400*
12X11	CO_2 controller setpoint low limit.	S16	*-10000...0*	-10000...0 ppm	*-100*
12X12	CO_2 controller setpoint high limit.	U16	*0...10000*	0...10000 ppm	*400*
12X13	CO_2 controller setpoint step.	U16	*0...5000*	0...5000 ppm	*50*
12X14	VOC controller setpoint centre.	U16	*0...32767*	0...32767 µg/m^3	*400*
12X15	VOC controller setpoint low limit.	S16	*-32767...0*	-32767...0 µg/m^3	*-100*
12X16	VOC controller setpoint high limit.	U16	*0...32767*	0...32767 µg/m^3	*400*
12X17	VOC controller setpoint step.	U16	*0...16383*	0...16383 µg/m^3	*50*

7.3.2.21 Holding registers for emoticon thresholds

Holding register	Parameter description	Data type	Values	Range	Default
13000	Temperature limit from poor to moderate icon.	S16	*-10000...10000*	-1000.0...1000.0 °C	*270*
13001	Temperature limit from moderate to poor icon.	S16	*-10000...10000*	-1000.0...1000.0 °C	*280*
13002	Temperature limit from moderate to good icon.	S16	*-10000...10000*	-1000.0...1000.0 °C	*235*
13003	Temperature limit from good to moderate icon.	S16	*-10000...10000*	-1000.0...1000.0 °C	*245*
13004	Temperature limit from good to excellent icon.	S16	*-10000...10000*	-1000.0...1000.0 °C	*200*
13005	Temperature limit from excellent to good icon.	S16	*-10000...10000*	-1000.0...1000.0 °C	*210*
13006	Humidity limit from poor to moderate icon.	U16	*0...10000*	0.00...100.00 %	*5000*
13007	Humidity limit from moderate to poor icon.	U16	*0...10000*	0.00...100.00 %	*5100*
13008	Humidity limit from moderate to good icon.	U16	*0...10000*	0.00...100.00 %	*3750*
13009	Humidity limit from good to moderate icon.	U16	*0...10000*	0.00...100.00 %	*3850*
13010	Humidity limit from good to excellent icon.	U16	*0...10000*	0.00...100.00 %	*2500*
13011	Humidity limit from excellent to good icon.	U16	*0...10000*	0.00...100.00 %	*2600*

Holding register	Parameter description	Data type	Values	Range	Default
13012	CO_2 limit from poor to moderate icon.	U16	*0...10000*	0...10000 ppm	*1100*
13013	CO_2 limit from moderate to poor icon.	U16	*0...10000*	0...10000 ppm	*1200*
13014	CO_2 limit from moderate to good icon.	U16	*0...10000*	0...10000 ppm	*850*
13015	CO_2 limit from good to moderate icon.	U16	*0...10000*	0...10000 ppm	*950*
13016	CO_2 limit from good to excellent icon.	U16	*0...10000*	0...10000 ppm	*600*
13017	CO_2 limit from excellent to good icon.	U16	*0...10000*	0...10000 ppm	*700*
13018	VOC limit from poor to moderate icon.	U16	*0...32767*	0...32767 µg/m^3	*1400*
13019	VOC limit from moderate to poor icon.	U16	*0...32767*	0...32767 µg/m^3	*1500*
13020	VOC limit from moderate to good icon.	U16	*0...32767*	0...32767 µg/m^3	*900*
13021	VOC limit from good to moderate icon.	U16	*0...32767*	0...32767 µg/m^3	*1000*
13022	VOC limit from good to excellent icon.	U16	*0...32767*	0...32767 µg/m^3	*400*
13023	VOC limit from excellent to good icon.	U16	*0...32767*	0...32767 µg/m^3	*500*

7.3.2.22 Holding registers for user interface control

Note: These register values are stored in the volatile memory. The volatile memory allows more write cycles than the non-volatile memory. These registers are reset to factory settings after a power failure.

Note: If the register is marked with an asterisk (*), the value is reset to 0 after a successful writing cycle.

Holding register	Parameter description	Data type	Values	Range	Default
19000	*Reset view.	U16	*0 - 1*	0. - 1. Reset view	*0*
19001	*Set temperature unit.	U16	*0 - 1 - 2*	0. - 1. Default 2. °C	*0*
19002	*Activate screensaver.	U16	*0 - 1*	0. - 1. Screensaver on	*0*
19003	*Turn off display.	U16	*0 - 1*	0. - 1. Display off	*0*
19004	Touching status.	U16	*0 - 1*	0. Touch enabled 1. Touch disabled	*0*

Holding register	Parameter description	Data type	Values	Range	Default
19005	*Force screen refreshing.	U16	*0 - 1*	0. - 1. Refresh screen	*0*

7.3.2.23 Holding register for outdoor temperature

Note: This register value is stored in the volatile memory. The volatile memory allows more write cycles than the non-volatile memory. This register is reset to factory setting after a power failure.

Holding register	Parameter description	Data type	Values	Range	Default
19100	Outdoor temperature.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*

7.3.2.24 Holding registers for controller user interface setpoints

Note: These register values are stored in the volatile memory. The volatile memory allows more write cycles than the non-volatile memory. These registers are reset to factory settings after a power failure.

Holding register	Parameter description	Data type	Values	Range	Default
19200	Temperature controller setpoint.	S16	*-10000...10000*	-1000.0...1000.0 °C	*210*
19201	Humidity controller setpoint.	U16	*0...10000*	0.00...100.00 %	*5000*
19202	CO_2 controller setpoint.	U16	*0...10000*	0...10000 ppm	*400*
19203	VOC controller setpoint.	U16	*0...32767*	0...32767 µg/m^3	*400*

7.3.2.25 Holding register for ventilation forcing control

Note: This register value is stored in the volatile memory. The volatile memory allows more write cycles than the non-volatile memory. This register is reset to factory setting after a power failure.

Holding register	Parameter description	Data type	Values	Range	Default
19700	Ventilation forcing status.	U16	*0 - 1*	0. Forcing disabled 1. Forcing enabled	*0*

8 BACnet

The -BAC models are equipped with BACnet MS/TP communication via **RS-485** connection.

8.1 BACnet properties

Protocol	BACnet MS/TP
Device profile	BACnet Application specific controller (B-ASC)
Bus speed	9600*/14400/19200/38400/56000/57600/76800/115200 bit/s
Stop bits	1
Unit load	1/8 UL
	* factory setting

8.2 Object descriptions

Note: Objects become visible based on the device configuration. All objects cannot be visible at the same time.

8.2.1 Binary input objects

ID	Object name	Values	Default
4	*PIR*	*0 - 1*	*0*
87	*EXTERNAL-INPUT-2-DI-STATE*	*0 - 1*	*0*

8.2.2 Binary value objects

ID	Object name	Values	Default
12	*EXTERNAL-INPUT-1-DI-STATE*	*0 - 1*	*0*
27	*PIR-FAST-HOLD*	*0 - 1*	*0*
54	*MEASURED-TEMPERATURE-CONTACT*	*0 - 1*	*0*
55	*MEASURED-RH-CONTACT*	*0 - 1*	*0*
56	*MEASURED-CO2-CONTACT*	*0 - 1*	*0*
57	*MEASURED-VOC-CONTACT*	*0 - 1*	*0*
58	*EXTERNAL-INPUT-1-CONTACT*	*0 - 1*	*0*
59	*CONDENSATION-1-CONTACT*	*0 - 1*	*0*
60	*OUTPUT-1-CONTACT*	*0 - 1*	*0*
61	*OUTPUT-2-CONTACT*	*0 - 1*	*0*
62	*OUTPUT-3-CONTACT*	*0 - 1*	*0*
63	*OUTPUT-4-CONTACT*	*0 - 1*	*0*
64	*RELAY-CONTACT*	*0 - 1*	*0*
65	*UNIT-FAULT*	*0 - 1*	*0*
95	*EXTERNAL-INPUT-2-CONTACT*	*0 - 1*	*0*
104	*USER-ACTIVITY*	*0 - 1*	*0*

ID	Object name	Values	Default
1011	CONTROLLER-ENABLE	0 - 1	0
1016	RELAY-STATE	0 - 1	0
1018	PULSE-COUNTER-RESET	0 - 1	0
19000	RESET-VIEW	0 - 1	0
19001	CURRENT TEMPERATURE-UNIT	0 - 1	0
19002	ACTIVATE-SCREENSAVER	0 - 1	0
19003	DISPLAY-OFF	0 - 1	0
19004	DISABLE-TOUCH	0 - 1	0
19700	VENTILATION-STATUS	0 - 1	0
19900	SHOW CUSTOM STATUS-ICON-1	0 - 1	0
19901	SHOW CUSTOM STATUS-ICON-2	0 - 1	0
19902	SHOW CUSTOM STATUS-ICON-3	0 - 1	0
19903	SHOW CUSTOM STATUS-ICON-4	0 - 1	0

8.2.3 Analog input objects

ID	Object name	Values	Resolution	Units
0	TEMPERATURE	-1000...1000	0.1	degrees-celsius (62) / degrees-fahrenheit (64)
1	HUMIDITY	0...100	1.0	percent-relative-humidity (29)
2	CO2	0...10000	1.0	parts-per-million (96)
3	TVOC	0...32767	1.0	micrograms-per-cubic-meter (219)
5	EXTERNAL-INPUT-1-VOLTAGE	0...10	0.001	volts (5)
6	EXTERNAL-INPUT-1-RESISTANCE	0...30000	0.1	ohms (4)
8	EXTERNAL-INPUT-1-TEMPERATURE	-1000...1000	0.1	degrees-celsius (62) / degrees-fahrenheit (64)
9	EXTERNAL-INPUT-1-HUMIDITY	0...100	1.0	percent-relative-humidity (29)
10	EXTERNAL-INPUT-1-CO2	0...10000	1.0	parts-per-million (96)
11	EXTERNAL-INPUT-1-VOC	0...10000	1.0	micrograms-per-cubic-meter (219)
85	EXTERNAL-INPUT-2-RESISTANCE	0...30000	0.1	ohms (4)
86	EXTERNAL-INPUT-2-TEMPERATURE	-1000...1000	0.1	degrees-celsius (62) / degrees-fahrenheit (64)

8.2.4 Analog value objects

ID	Object name	Values	Resolution	Units	Default
13	OUTPUT1-VOLTAGE	0...10	0.001	volts (5)	0
14	OUTPUT2-VOLTAGE	0...10	0.001	volts (5)	0

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ID	Object name	Values	Reso-lution	Units	Default
15	OUTPUT3-VOLTAGE	0...10	0.001	volts (5)	0
16	OUTPUT4-VOLTAGE	0...10	0.001	volts (5)	0
17	AVERAGE TEMPERATURE	-1000...1000	0.1	degrees-celsius (62) / degrees-fahrenheit (64)	0
18	DEW-POINT	-1000...1000	0.1	degrees-celsius (62) / degrees-fahrenheit (64)	0
21	ABSOLUTE-HUMIDITY	0...100	1.0	grams-per-cubic-meter (217)	0
22	MIXING-RATIO	0...100	0.1	grams-per-kilogram (210)	0
23	ENTHALPY	0...1000	0.1	kilojoules-per-kilogram (125)	0
24	VOC-TVOC-PPB	0...10000	1.0	parts-per-billion (97)	0
25	VOC-CO2-EQV-PPM	0...10000	1.0	parts-per-million (96)	0
26	VOC-AQI	1...5	1.0	no-units (95)	0
28	EXTERNAL-INPUT-1-PULSE-COUNTER	0...4294967295	1.0	no-units (95)	0
36	INSTALLATION-QUALITY-SCORE	1...4	1.0	no-units (95)	0
73	COMBINED-VOC-CO2	0...10000	1.0	parts-per-million (96)	0
88	AMBIENT-LIGHT-SENSOR-VALUE	0…65535	1.0	luxes (37)	0
89	EXTERNAL-INPUT-2-PULSE-COUNTER	0...4294967295	1.0	no-units (95)	0
115	FORCE-VENTILATION-TIMER-VALUE	0…65535	1.0	minutes (72)	0
206	CONFIGURABLE-BUTTON-1-TIMER	0…65535	1.0	seconds (73)	0
207	CONFIGURABLE-BUTTON-2-TIMER	0…65535	1.0	seconds (73)	0
208	CONFIGURABLE-BUTTON-3-TIMER	0…65535	1.0	seconds (73)	0
209	CONFIGURABLE-BUTTON-4-TIMER	0…65535	1.0	seconds (73)	0
210	CONFIGURABLE-BUTTON-5-TIMER	0…65535	1.0	seconds (73)	0
211	CONFIGURABLE-BUTTON-6-TIMER	0…65535	1.0	seconds (73)	0
1000	BUS-TEMPORARY-OVERDRIVE-TIMER	0...1440	1.0	minutes (72)	0
1001	BUS-TEMPORARY-OVERDRIVE-SELECTION	0...65535	1.0	no-units (95)	0
1002	BUS-EXTERNAL-INPUT-1-POWER	0...100	0.01	percent (98)	0
1003	BUS-CONTROLLER-INPUT-T	-1000...1000	0.1	degrees-celsius (62) / degrees-fahrenheit (64)	0
1004	BUS-CONTROLLER-INPUT-RH	0...100	0.01	percent-relative-humidity (29)	0
1005	BUS-CONTROLLER-INPUT-CO2	0...10000	1.0	parts-per-million (96)	0
1006	BUS-CONTROLLER-INPUT-CO2-VOC	0...10000	1.0	micrograms-per-cubic-meter (219)	0
1007	BUS-CONTROLLER-SETPOINT-T	-1000...1000	0.1	degrees-celsius (62) / degrees-fahrenheit (64)	0

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ID	Object name	Values	Reso-lution	Units	Default
1008	BUS-CONTROLLER-SETPOINT-RH	0...100	0.01	percent-relative-humidity (29)	0
1009	BUS-CONTROLLER-SETPOINT-CO2	0...10000	1.0	parts-per-million (96)	0
1010	BUS-CONTROLLER-SETPOINT-VOC	0...10000	1.0	micrograms-per-cubic-meter (219)	0
1012	BUS-OUTPUT1-POWER	0...100	0.01	percent (98)	0
1013	BUS-OUTPUT2-POWER	0...100	0.01	percent (98)	0
1014	BUS-OUTPUT3-POWER	0...100	0.01	percent (98)	0
1015	BUS-OUTPUT4-POWER	0...100	0.01	percent (98)	0
1035	BUS-EXTERNAL-INPUT-2-POWER	0...100	0.01	percent (98)	0
19100	OUTDOOR-TEMPERATURE-BUS-VALUE	-1000...1000	0.1	degrees-celsius (62) / degrees-fahrenheit (64)	0
19200	SETPOINT-TEMPERATURE	-1000...1000	0.1	degrees-celsius (62) / degrees-fahrenheit (64)	0
19201	SETPOINT-RH	0...100	0.01	percent-relative-humidity (29)	0
19202	SETPOINT-CO2	0...10000	1.0	parts-per-million (96)	0
19203	SETPOINT-VOC	0...32767	1.0	micrograms-per-cubic-meter (219)	0
19800	CONFIGURABLE-BUTTON-1-STATE	0...5	1.0	no-units (95)	0
19801	CONFIGURABLE-BUTTON-2-STATE	0...5	1.0	no-units (95)	0
19802	CONFIGURABLE-BUTTON-3-STATE	0...5	1.0	no-units (95)	0
19803	CONFIGURABLE-BUTTON-4-STATE	0...5	1.0	no-units (95)	0
19804	CONFIGURABLE-BUTTON-5-STATE	0...5	1.0	no-units (95)	0
19805	CONFIGURABLE-BUTTON-6-STATE	0...5	1.0	no-units (95)	0

8.2.5 Multi-state value objects

ID	Object name	Values	State text	Default
72	VOC-DETAILED-STATUS	1...4	1. Operating normally 2. Warm-up sequence 3. Initial start-up 4. No valid output	1
1017	BUS-LED-COLOR	1...8	1. Off 2. Red 3. Green 4. Blue 5. Yellow 6. Cyan 7. Purple 8. White	1

8.2.6 Network port object

With the network port object, you can set the communication settings. The available settings are:

- bus speed
- MAC address
- maximum number of masters
- maximum number of infoframes

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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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