PRODUAL

RTX – Room transmitter

USER GUIDE

Made in Finland

5 years warranty

MANAGEMENT SYSTEM CERTIFICATION DNV ISO 9001 • ISO 14001

Contents

1 Introduction

RTX transmitters are very versatile room transmitters for measuring and controlling applications in building automation.

The transmitters options include:

- relative humidity measurement (-RH models)
- CO_2 concentration measurement (-CO2 models)
- VOC (Volatile Organic Compounds) measurement (-VOC models)
- occupancy detection (-PIR models)
- indicator light (-L models)
- relay output (-R models)
- Modbus RTU communication (-MOD models)
- BACnet MS/TP communication (-BAC models)

The -MOD models have Modbus RTU communication and -BAC models have BACnet MS/TP communication via the RS-485 connection.

You can commission devices using the MyProdual smartphone application and the MyTool® Connect dongle. You can also configure some basic settings via bus in -MOD and -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 room transmitters are intended to be used for measuring and controlling temperature, humidity, CO_2 and VOC in room environment.

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

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.

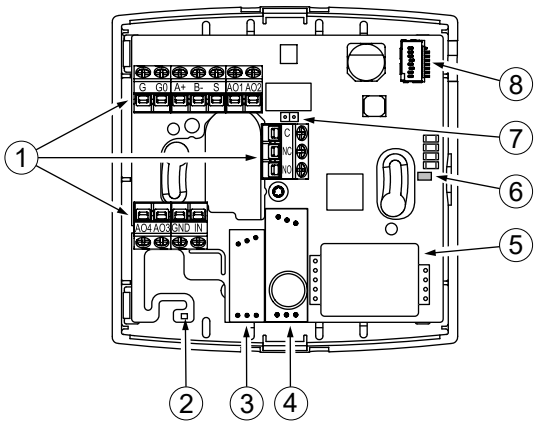
After installation, the product will be part of a system whose specifications and performance characteristics are not designed or controlled by Produal. Refer to national and local authorities to ensure that the installation is functional and safe.

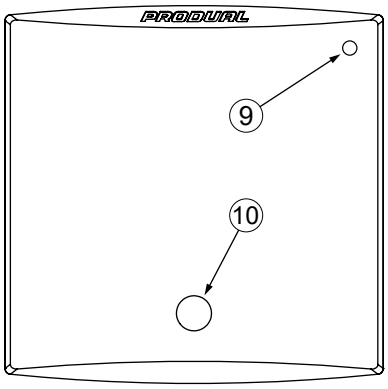
The product should only be used in professionally designed applications. Unauthorised modifications are not allowed. The product must not be used in relation with any equipment that in case of a failure may threaten, directly or indirectly, human health or life or result in danger to human beings, animals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

3 Main components





1	Terminal block	2	Temperature sensor / temperature and humidity sensor (-RH models)
3	VOC sensor (-VOC models)	4	Occupancy sensor (-PIR models)
5	CO_2 sensor (-CO2 models)	6	Communication indicator light (-MOD and -BAC models)
7	Communication bus termination jumper (-MOD and -BAC models)	8	MyTool® Connect dongle connector
9	Indicator light (-L models)	10	Occupancy sensor lens (-PIR models)

4 Functional description

4.1 Multifunctional input

The device has one multifunctional input. You can configure the input for several different purposes. You can configure the input via communication bus or by using the MyTool® Connect dongle and the MyProdual application.

You can connect the following measurements and connections to the input:

- NTC 10 temperature sensor
- PT 1000 temperature sensor
- resistive temperature sensor using a specific resistance chart
- resistance signal
- digital signal
- 0...10 Vdc signal

4.2 Multifunctional outputs

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

- analogue measurement output (freely scalable inside 0...10 Vdc)
- analogue control output (freely scalable inside 0...10 Vdc)
- two-state output (e.g. 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.

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
- bus communication

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

4.4 Control functions

The device has a 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 set 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, for example. Use the following registers for the setpoints:

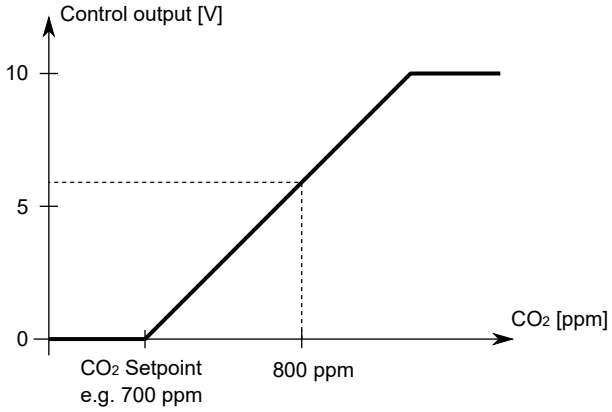
Holding register	Parameter description	Data type	Values	Range	Default
7	Controller temperature setpoint.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
8	Controller relative humidity setpoint.	U16	*0...10000*	0.00...100.00 %	*0*
9	Controller CO_2 setpoint.	U16	*0...10000*	0...10000 ppm	*0*
10	Controller 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*	0.00...100.00 %	*0*
2138	VOC setpoint default value.	U16	*0...10000*	0.00...100.00 %	*0*

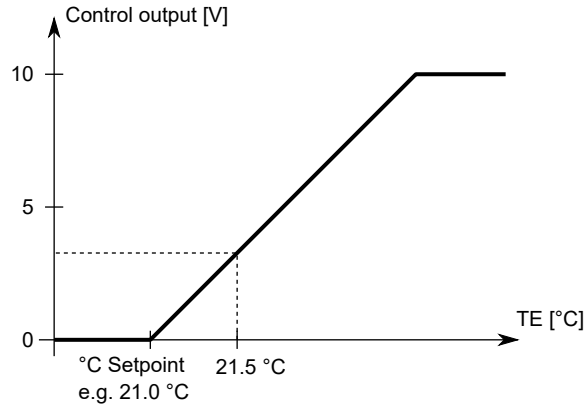
4.4.1 Maximum selection control

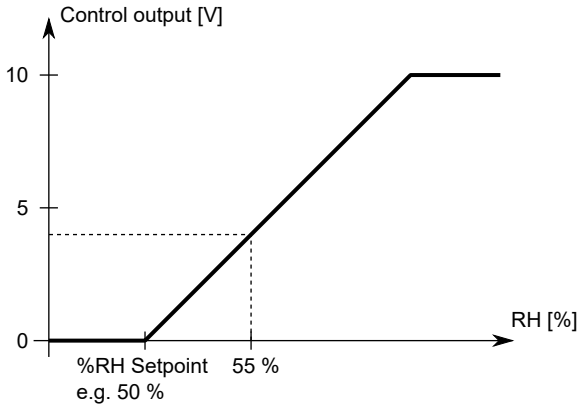
In the maximum selection control, the control output signal is formed according to the measurement that causes the highest control signal value. The maximum selection control is available for heating, ventilation and humidification control. You can select the measurements that are used for the control.

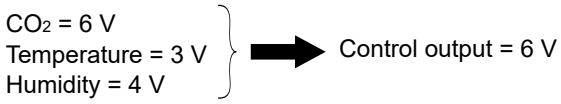
The figure below describes the following situation:

- Carbon dioxide concentration is 800 ppm.
- Temperature is 21.5 °C.
- Relative humidity is 55 %.









4.5 Condensation alarm

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.

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 alarm via communication bus (-MOD and -BAC models) or set it to control digital output, relay output (-R models) and indicator light (-L models).

4.6 Indicator lights

The -L models have an indicator light on the cover.

You can configure the cover indicator light for following functions:

- off
- internal temperature measurement level indication
- external temperature measurement level indication
- relative humidity level indication (-RH models)
- CO2 level indication (-CO2 models)
- VOC level indication (-VOC models)
- controller heating and cooling indication
- contact status indication
- communication bus traffic indication

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

- off
- data transmitting indication

- data receiving indication
- data transmitting and receiving indication

CAUTION: When the power supply is connected, be extra careful when handling the product without the cover.

5 Commissioning

5.1 Mounting the room transmitter

The device must be installed in dry environment. You can install the device on the wall surface or on a standard flush mounting box with screws. The recommended installation 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 sun light
- occupant proximity
- air flow coming from windows or doors
- air flow coming from ventilation nozzles
- air flow coming from the flush mounting box
- differential temperature caused by external wall

5.2 Wiring

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

WARNING: External power sources and power wiring must be protected with a fuse or circuit breaker. Rating depends on the overall system load, but the maximum rating for the external circuit breaker is 16 A (limited by internal structure of the product).

WARNING: The minimum power rating for the external power source must be 170 VA / 170 W to ensure proper operation of the internal fusing of the product in case of a failure condition. Otherwise, the overall system power consumption shall be less than 15 W also in the failure condition.

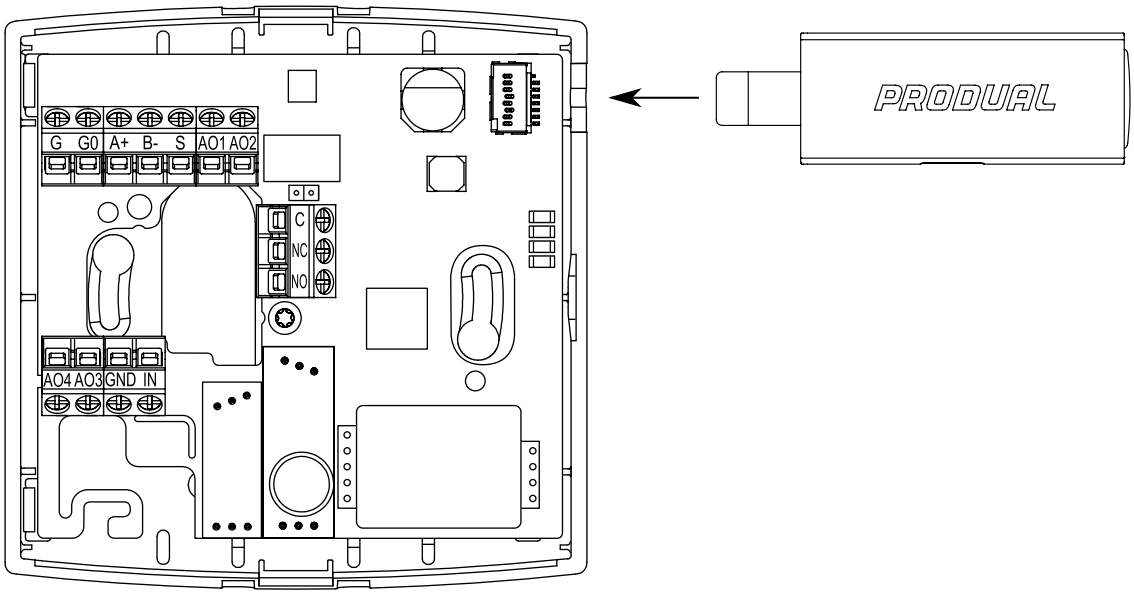
WARNING: This product is appliance class III product according to IEC 60664-1. The product may only be connected to SELV (separated extra low voltage) electricity network.

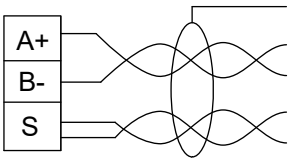
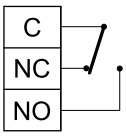
WARNING: The relay port is not protected internally against overload. The wiring of the relay port must be either protected with an external fuse with maximum current rating of 1 A slow blow or the power consumption of the connected external circuitry must be inherently limited to less than 15 W in both normal operation and failure condition.

WARNING: The relay port may be connected only to SELV (separated extra low voltage) circuitry.

Important: This product has no capability to detect an abnormal condition of output ports. External supervising (automated/human) may be needed depending on the application where this product is used.

CAUTION: The product may only be connected to overvoltage category I, II or III electricity network according to IEC 60664-1.



G	Supply, 24 Vac/dc, < 1 VA
G0	0 V
A+ *B-* *S*	 Modbus RTU, RS-485 (-MOD models). BACnet MS/TP, RS-485 (-BAC models). **Note:** Connector *S* can only be used for chaining the cable shield pair.
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, 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.
IN	Input, digital / resistance / 0...10 Vdc / NTC 10 / PT 1000 / universal temperature sensor.

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

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

CAUTION: Ensure that all covers are closed before you connect the supply voltage to the product. Do not remove the covers when the supply voltage is connected.

5.3 Configuring transmitter using the MyProdual application

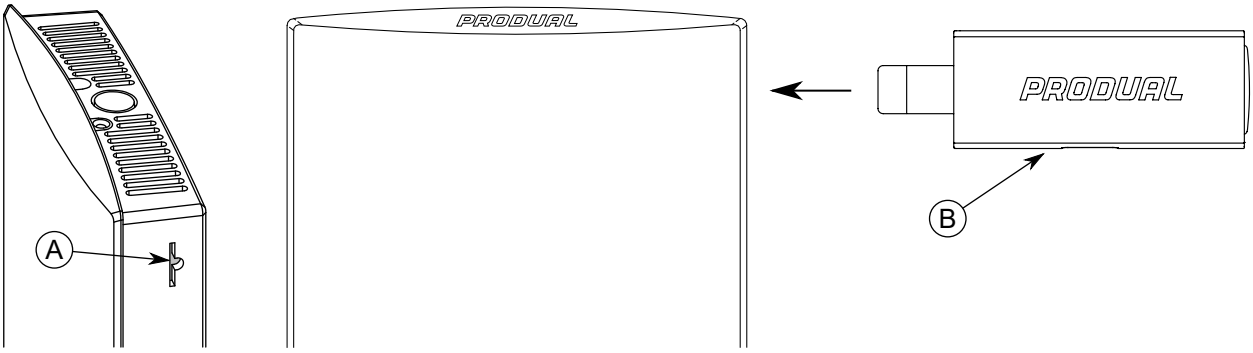
To configure the device, you first need to connect it to the MyProdual application. When the device is connected to the application, you can make changes to the configuration.

Note: You need the MyTool® Connect dongle for connecting the MyProdual application to the device.

1. Connect the supply voltage to the device.

   Note: You can also power the device by connecting a USB cable to the MyTool® Connect dongle.

2. Insert the MyTool® Connect dongle to the connector.



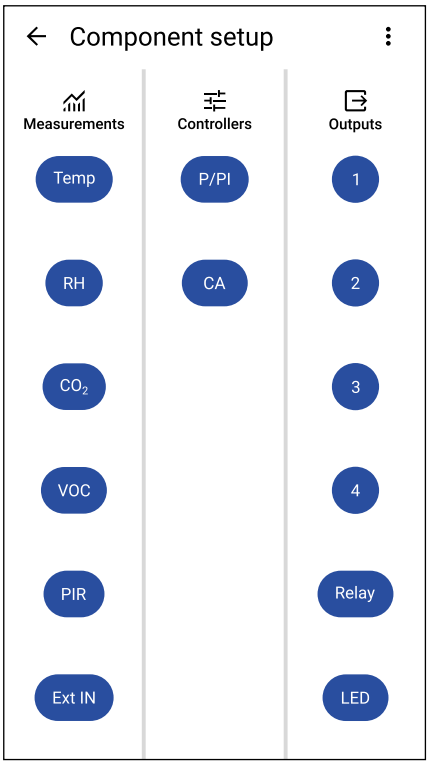
A. MyTool® Connect dongle connector
B. MyTool® Connect dongle

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 to from the list to connect.

   The indicator light on the MyTool® Connect dongle is illuminated continuously when the MyProdual application is connected to the device.
7. Tap the *Configuration* button.

8. Tap the *Component setup* button.



Component setup page is divided in sections:

Measurements	Set up measurements.
Controllers	Set up controllers.
Outputs	Set up outputs and indicator light.

See the following chapters for more information about the settings.

9. Make the changes to the configuration.
10. In -MOD and -BAC models, tap the *General communication settings* button to configure the communication settings.
11. Tap *Install to device* button to write the changes to the device.

Note: You can also tap the *Save* button on each configuration page to save the changes to the device.

12. Tap the ← button.
13. Tap the connection info button to disconnect the device.

14. Remove the MyTool® Connect dongle.

5.3.1 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.

5.3.1.1 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.
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* *Rx* *Tx + Rx*	*Tx + Rx*	Communication indicator light function. *Off* — Indicator light is off *Tx* — Indicator light is on when the device transmits data to bus. *Rx* — 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.
Modbus slave ID	*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.
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.
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.

Parameter name	Values	Default	Description
Temperature unit	*Celsius* *Fahrenheit*	*Celsius*	BACnet temperature unit. This parameter is available only in -BAC models.

5.3.2 Configuring measurement settings

All device models include temperature measurement. Other measurements 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 PIR sensor settings. Available for -PIR models.
Ext IN	Set up external input 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 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	*60...3600 s*	*120 s*	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. Advanced settings.
Contact on level	*-100.0...100.0 °C*	*25.0 °C*	This temperature 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 temperature is higher than the value set for this parameter, then the output signal is at the maximum value set for the output.

Parameter name	Values	Default	Description
Contact off level	*-100.0...100.0 °C*	*24.0 °C*	This temperature 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 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. Advanced settings.
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. Advanced settings.
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. Advanced settings.
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. Advanced settings.
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. Advanced settings.
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.

Parameter name	Values	Default	Description
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 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%.
Time constant multiplier	*60...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. Advanced settings.
Contact on level	*0.00...100.00 rH%*	*50.00 rH%*	This humidity 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 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. This function works as a “software contact", and it can be linked to the digital output, controller (enable/disable), or relay. 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. Advanced settings.
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. Advanced settings.
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. Advanced settings.

Parameter name	Values	Default	Description
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. Advanced settings.
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. Advanced settings.
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*.
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 CO_2 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 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.

Parameter name	Values	Default	Description
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	*60...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 on level	*0...10000 ppm*	*1200 ppm*	This CO_2 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 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. This function works as a “software contact", and it can be linked to the digital output, controller (enable/disable), or relay. 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.
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. Advanced settings.
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. Advanced settings.
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. Advanced settings.
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. Advanced settings.
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. Advanced settings.
CO_2 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*.

Parameter name	Values	Default	Description
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*.
CO2 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.
CO2 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.
CO2 ambient pressure correction value	*700...1200 hPa*	*1013 hPa*	Set this value to the local ambient pressure. Shown if the *CO2 ambient pressure correction* parameter value is *Enabled*.

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 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*	*500 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.
Time constant multiplier	*60...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. Advanced settings.

Parameter name	Values	Default	Description
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. Advanced settings.
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. Advanced settings.
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. Advanced settings.
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. Advanced settings.
Measurement correction	*OffOffsetSpan*	*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. Advanced settings.
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.

Parameter name	Values	Default	Description
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 turn on delay	*0…65535 s*	*0 s*	The delay in seconds before the contact is turned on after movement is detected. Advanced settings.
Contact hold on time	*0…65535 s*	*0 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. Advanced settings.
Contact hold off time	*0…65535 s*	*0 s*	Contact hold off time (seconds). This time defines how long the contact stays off. Advanced settings.

5.3.2.6 External input settings

Tap the *Ext IN* button on the *Component setup* page to open the external input settings.

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

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

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

Parameter name	Values	Default	Description
Res HI scale max	*0...300000 Ω*	*300000 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.
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 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 *Controllers* column to open the P/PI controller settings or tap the *CA* button to open the condensation contact settings.

5.3.3.1 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.

Temperature

Parameter name	Values	Default	Description
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*	*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 overdrive 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*	*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.
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.

Parameter name	Values	Default	Description
Enable input	*Off* *Temperature contact* *RH contact* *CO_2 contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact* *Bus*	*Off*	Select an input contact to enable the controller. If the value is *Off*, the controller is always enabled.

Humidity

Parameter name	Values	Default	Description
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 overdrive 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*	*Bus*	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.
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.

Parameter name	Values	Default	Description
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.
Enable input	*Off* *Temperature contact* *RH contact* *CO_2 contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact* *Bus*	*Off*	Select an input contact to enable the controller. In *Off* mode, the controller is always enabled.

Carbon dioxide

Parameter name	Values	Default	Description
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 overdrive 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*	*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.

Parameter name	Values	Default	Description
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.
Enable input	*Off* *Temperature contact* *RH contact* *CO_2 contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact* *Bus*	*Off*	Select an input contact to enable the controller. In *Off* mode, the controller is always enabled.

Volatile organic compounds

Parameter name	Values	Default	Description
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 overdrive start value	*0...10000 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*	*External input*	Select the source for controller setpoint.
Setpoint start / fixed value	*0...10000 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...2000 µg/m³*	*1000 µg/m³*	Set the control range for ventilation.
Dead zone ventilation	*0...2000 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.

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

Maximum control

Parameter name	Values	Default	Description
Max control selection	*No selection* *Temperature* *Humidity* *CO₂* *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* *CO₂ contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact* *Bus*	*Off*	Select an input contact to enable the controller. In *Off* mode, the controller is always enabled.
Overdrive start value	*Disabled* *Enabled*	*Disabled*	Set the controller status after power failure or boot.

5.3.3.2 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* button in the *Controllers* column on the *Component setup* page to open the condensation alarm settings.

Tap the *Condensation guard state* field and select *Enabled* to enable the condensation alarm.

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.

5.3.4 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.
LED	Indicator light settings.

3. Tap the *Output type* field.

   Note: Relay output and indicator light setting do 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.

5.3.4.1 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	*T measurement* *RH measurement* *CO₂ measurement* *VOC measurement* *Controller primary output* *Controller secondary output* *External input* *Bus*	*T measurement*	Analogue output source.
	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.

5.3.4.2 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* *CO₂ contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact* *Bus*	*Temperature contact*	Digital output control source.
	0-10 V *2-10 V* *0-5 V* *Custom*	*0-10 V*	Digital output signal range.

Parameter name	Values	Default	Description
	0.000...10.000 V	-	Custom digital output voltage range.
	0.00...100.00 %	-	Custom digital output effective range.

5.3.4.3 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*	*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*	-	Relay control sources (multiple selections). The selection is available if the parameter *Relay source* value is *Multisource*.

5.3.4.4 Indicator light settings

Tap the *LED* button on the *Component setup* page to open the indicator light settings. Tap a parameter on the list to change its value.

The available parameters depend on the selected operating mode (*Indicator led operating mode*). The available modes are:

Parameter name	Description
Off	Not in use.
Controller heating / cooling	Indicates the controller heating and cooling functions.
Internal T level	Indicates the internal temperature level.
External T level	Indicates the external sensor's temperature level.
RH level	Indicates the relative humidity level. Available in -RH models.
CO2 level	Indicates the CO2 level. Available in -CO2 models.
VOC level	Indicates the VOC level. Available in -VOC models.
Contact	Indicates a contact status.
Communication	Indicates the communication traffic. Available in -MOD and -BAC models.

The following parameters are available for configuration:

Controller heating / cooling

Parameter name	Values	Default	Description
From red to yellow limit	*-1000.0...1000.0 °C*	*0.0 °C*	Limit for changing the indicator light colour from red to yellow.
From yellow to red limit	*-1000.0...1000.0 °C*	*0.0 °C*	Limit for changing the indicator light colour from yellow to red.
From yellow to green limit	*-1000.0...1000.0 °C*	*0.0 °C*	Limit for changing the indicator light colour from yellow to green.
From green to yellow limit	*-1000.0...1000.0 °C*	*0.0 °C*	Limit for changing the indicator light colour from green to yellow.
Brightness	*1...100 %*	*50 %*	Indicator light brightness.

Internal T level

Parameter name	Values	Default	Description
From red to yellow limit	*-1000.0...1000.0 °C*	*0.0 °C*	Limit for changing the indicator light colour from red to yellow.
From yellow to red limit	*-1000.0...1000.0 °C*	*0.0 °C*	Limit for changing the indicator light colour from yellow to red.
From yellow to green limit	*-1000.0...1000.0 °C*	*0.0 °C*	Limit for changing the indicator light colour from yellow to green.
From green to yellow limit	*-1000.0...1000.0 °C*	*0.0 °C*	Limit for changing the indicator light colour from green to yellow.
Brightness	*1...100 %*	*50 %*	Indicator light brightness.

External T level

Parameter name	Values	Default	Description
From red to yellow limit	*-1000.0...1000.0 °C*	*0.0 °C*	Limit for changing the indicator light colour from red to yellow.
From yellow to red limit	*-1000.0...1000.0 °C*	*0.0 °C*	Limit for changing the indicator light colour from yellow to red.
From yellow to green limit	*-1000.0...1000.0 °C*	*0.0 °C*	Limit for changing the indicator light colour from yellow to green.

Parameter name	Values	Default	Description
From green to yellow limit	*-1000.0...1000.0 °C*	*0.0 °C*	Limit for changing the indicator light colour from green to yellow.
Brightness	*1...100 %*	*50 %*	Indicator light brightness.

RH level

Parameter name	Values	Default	Description
From red to yellow limit	*0.00...100.00 rH%*	*0.00 rH%*	Limit for changing the indicator light colour from red to yellow.
From yellow to red limit	*0.00...100.00 rH%*	*0.00 rH%*	Limit for changing the indicator light colour from yellow to red.
From yellow to green limit	*0.00...100.00 rH%*	*0.00 rH%*	Limit for changing the indicator light colour from yellow to green.
From green to yellow limit	*0.00...100.00 rH%*	*0.00 rH%*	Limit for changing the indicator light colour from green to yellow.
Brightness	*1...100 %*	*50 %*	Indicator light brightness.

CO_2 level

Parameter name	Values	Default	Description
From red to yellow limit	*0...10000 ppm*	*0 ppm*	Limit for changing the indicator light colour from red to yellow.
From yellow to red limit	*0...10000 ppm*	*0 ppm*	Limit for changing the indicator light colour from yellow to red.
From yellow to green limit	*0...10000 ppm*	*0 ppm*	Limit for changing the indicator light colour from yellow to green.
From green to yellow limit	*0...10000 ppm*	*0 ppm*	Limit for changing the indicator light colour from green to yellow.
Brightness	*1...100 %*	*50 %*	Indicator light brightness.

VOC level

Parameter name	Values	Default	Description
From red to yellow limit	*0...10000 µg/m³*	*1400 µg/m³*	Limit for changing the indicator light colour from red to yellow.
From yellow to red limit	*0...10000 µg/m³*	*1500 µg/m³*	Limit for changing the indicator light colour from yellow to red.
From yellow to green limit	*0...10000 µg/m³*	*400 µg/m³*	Limit for changing the indicator light colour from yellow to green.
From green to yellow limit	*0...10000 µg/m³*	*500 µg/m³*	Limit for changing the indicator light colour from green to yellow.
Brightness	*1...100 %*	*50 %*	Indicator light brightness.

Contact

Parameter name	Values	Default	Description
Contact source	*Temperature contact* *Humidity contact* *CO_2 contact* *VOC contact* *PIR contact* *Condensation contact* *External input contact*	*Temperature contact*	Indicator light contact source.
LED colour contact OFF / Tx	*Off* *Red* *Green* *Blue* *Yellow* *Cyan* *Purple* *White*	*Off*	Indicator light colour when the contact is off.
LED colour contact ON / Rx	*Off* *Red* *Green* *Blue* *Yellow* *Cyan* *Purple* *White*	*Green*	Indicator light colour when the contact is on.
Brightness	*1...100 %*	*50 %*	Indicator light brightness.

Communication

Parameter name	Values	Default	Description
LED colour contact OFF / Tx	*Off* *Red* *Green* *Blue* *Yellow* *Cyan* *Purple* *White*	*Off*	Indicator light colour when the device transmits data to bus.

Parameter name	Values	Default	Description
LED colour contact ON / Rx	*Off* *Red* *Green* *Blue* *Yellow* *Cyan* *Purple* *White*	*Green*	Indicator light colour when the device receives data from bus.
Brightness	*1...100 %*	*50 %*	Indicator light brightness.

5.3.5 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.

5.3.5.1 Saving the configuration to MyCloud®

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.

5.3.5.2 Uploading a saved configuration to a transmitter from MyCloud®

1. Connect the transmitter to MyProdual application.
   See section Configuring transmitter using the MyProdual application on page 11 for the connection instructions.
2. Tap the cloud icon on top of the *Configuration* page.
3. Tap a saved configuration on the *Open configurations* page to select it.
4. Tap the *Open* button in the top right corner.
5. Select the settings you want to import in the *Import settings* popup.
6. Tap the *Open* button to open the configuration settings.
7. Tap the *Install to device* button at the bottom of the *Configuration* page to upload the settings to the device.

5.3.5.3 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.

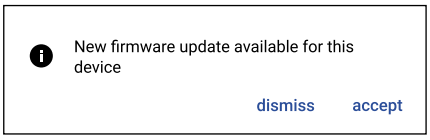
5.3.5.4 Uploading a locally saved configuration to a transmitter

1. Connect the transmitter to MyProdual application.
   See section Configuring transmitter using the MyProdual application on page 11 for the connection instructions.
2. Tap the three dots in the upper right corner of the *Configuration* page.
3. Tap *Open local file* in the menu.
4. Tap a saved configuration to select it.
5. Select the settings you want to import in the *Import settings* popup.
6. Tap the *Open* button to open the configuration settings.
7. Tap the *Install to device* button at the bottom of the *Configuration* page to upload the settings to the device.

5.4 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 MyProdual.
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 mobile phone near the device to keep Bluetooth 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.

6 Modbus

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

6.1 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

6.2 Modbus function codes

The device supports the following Modbus function codes.

Decimal	Hexadecimal	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

6.3 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 are 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 register range, it may be necessary to update the 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.

6.3.1 Input registers

6.3.1.1 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

Input register	Parameter description	Data type	Values	Range
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...10000*	0...10000 µg/m^3
12	Digital input status.	U16	*0 - 1*	0. Off 1. On
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*	0.0...100.0 %
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...10000*	0...10000 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 value (most significant word)	U16	*0...65535*	0...65535
29	Pulse counter value (least significant word)	U16	*0...65535*	0...65535
30	Input relative humidity with one decimal.	U16	*0...1000*	0.0...100.0 %
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

6.3.1.2 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 %

6.3.1.3 Input registers for contacts

Input register	Parameter description	Data type	Values	Range
54	Measured temperature contact.	U16	*0 - 1*	0. Off 1. On
55	Measured humidity contact.	U16	*0 - 1*	0. Off 1. On
56	Measured CO_2 contact.	U16	*0 - 1*	0. Off 1. On
57	Measured VOC contact.	U16	*0 - 1*	0. Off 1. On
58	External input contact.	U16	*0 - 1*	0. Off 1. On
59	Condensation contact.	U16	*0 - 1*	0. Off 1. On
60	Output 1 contact.	U16	*0 - 1*	0. Off 1. On
61	Output 2 contact.	U16	*0 - 1*	0. Off 1. On

Input register	Parameter description	Data type	Values	Range
62	Output 3 contact.	U16	*0 - 1*	0. Off 1. On
63	Output 4 contact.	U16	*0 - 1*	0. Off 1. On
64	Relay contact.	U16	*0 - 1*	0. Off 1. On

6.3.1.4 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
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

6.3.2 Holding registers

6.3.2.1 Holding registers for control values in Celsius

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*

Holding register	Parameter description	Data type	Values	Range	Default
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...10000*	0...10000 µg/m^3	*0*
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*

Holding register	Parameter description	Data type	Values	Range	Default
17	Indicator light colour.	U16	*0 - 1 - 2 … - 7*	0. Off 1. Red 2. Green 3. Blue 4. Orange 5. Cyan 6. Purple 7. White	*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...10000*	0...10000 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*
34	Indicator light colour override value.	U16	*0 - 1 - 2 … - 7*	0. Off 1. Red 2. Green 3. Blue 4. Yellow 5. Cyan 6. Purple 7. White	*0*

6.3.2.2 Holding registers for communication

Holding register	Parameter description	Data type	Values	Range	Default
100	Communication mode.	U16	*0 - 1 - 2*	0. Off 1. Modbus RTU 2. BACnet MSTP	*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*	0. 1 stop bit 1. 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*
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*

6.3.2.3 Holding registers for indicator light settings

Holding register	Parameter description	Data type	Values	Range	Default
200	Indicator light operating mode.	U16	*0 - 1 - 2 ... - 9*	0. Off 1. Controller (heating / cooling) 2. Temperature level 3. External temperature level 4. Relative humidity level 5. CO_2 level 6. VOC level 7. Contact status 8. Communication 9. Bus	*0*
201	Contact source.	U16	*0 - 1 - 2 ... - 6*	0. Temperature 1. Relative humidity 2. CO_2 3. VOC 4. Occupancy 5. Condensation alarm 6. Input	*0*
202	Temperature limit for change from red to yellow.	S16	*-10000...10000*	-1000.0...1000.0 °C	*270*
203	Temperature limit for change from yellow to red.	S16	*-10000...10000*	-1000.0...1000.0 °C	*280*
204	Temperature limit for change from yellow to green.	S16	*-10000...10000*	-1000.0...1000.0 °C	*200*
205	Temperature limit for change from green to yellow.	S16	*-10000...10000*	-1000.0...1000.0 °C	*210*
206	Relative humidity limit for change from red to yellow.	U16	*0...10000*	0.00...100.00 %	*5000*
207	Relative humidity limit for change from yellow to red.	U16	*0...10000*	0.00...100.00 %	*5100*
208	Relative humidity limit for change from yellow to green.	U16	*0...10000*	0.00...100.00 %	*2500*
209	Relative humidity limit for change from green to yellow.	U16	*0...10000*	0.00...100.00 %	*2600*
210	CO_2 limit for change from red to yellow.	U16	*0...10000*	0...10000 ppm	*1100*
211	CO_2 limit for change from yellow to red.	U16	*0...10000*	0...10000 ppm	*1200*
212	CO_2 limit for change from yellow to green.	U16	*0...10000*	0...10000 ppm	*600*
213	CO_2 limit for change from green to yellow.	U16	*0...10000*	0...10000 ppm	*700*
214	VOC limit for change from red to yellow.	U16	*0...10000*	0...10000 µg/m^3	*1400*
215	VOC limit for change from yellow to red.	U16	*0...10000*	0...10000 µg/m^3	*1500*

Holding register	Parameter description	Data type	Values	Range	Default
216	VOC limit for change from yellow to green.	U16	*0...10000*	0...10000 µg/m^3	*400*
217	VOC limit for change from green to yellow.	U16	*0...10000*	0...10000 µg/m^3	*500*
218	Indicator light colour, when the contact is off / device transmits information to bus.	U16	*0 - 1 - 2 ... - 7*	0. Off 1. Red 2. Green 3. Blue 4. Yellow 5. Cyan 6. Purple 7. White	*2*
219	Indicator light colour, when the contact is on / device receives information from bus.	U16	*0 - 1 - 2 ... - 7*	0. Off 1. Red 2. Green 3. Blue 4. Yellow 5. Cyan 6. Purple 7. White	*4*
220	Indicator light brightness.	U16	*1...100*	1...100 %	*50*

6.3.2.4 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	*1...60*	60...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*

Holding register	Parameter description	Data type	Values	Range	Default
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*

6.3.2.5 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*
402	Relative humidity measurement time constant multiplier.	U16	*1...60*	60...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*

6.3.2.6 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*

Holding register	Parameter description	Data type	Values	Range	Default
502	CO_2 measurement time constant multiplier.	U16	*1...60*	60...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*
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	*1030*

6.3.2.7 Holding registers for VOC measurement settings

Holding register	Parameter description	Data type	Values	Range	Default
600	VOC measurement scale, minimum limit.	U16	*0...10000*	0...10000 µg/m^3	*0*
601	VOC measurement scale, maximum limit.	U16	*0...10000*	0...10000 µg/m^3	*10000*
602	VOC measurement time constant multiplier.	U16	*1...60*	60...3600	*2*
603	VOC contact, on level.	U16	*0...10000*	0...10000 µg/m^3	*1000*
604	VOC contact, off level.	U16	*0...10000*	0...10000 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*

Holding register	Parameter description	Data type	Values	Range	Default
611	Measured VOC, point 1.	U16	*0...10000*	0...10000 µg/m^3	*0*
612	Corrected VOC, point 1.	U16	*0...10000*	0...10000 µg/m^3	*0*
613	Measured VOC, point 2.	U16	*0...10000*	0...10000 µg/m^3	*0*
614	Corrected VOC, point 2.	U16	*0...10000*	0...10000 µg/m^3	*0*

6.3.2.8 Holding registers for occupancy detection settings

Holding register	Parameter description	Data type	Values	Range	Default
700	Occupancy detection sensitivity.	U16	*0 - 1 - 2 ... - 5*	0. Lowest 1. Low 2. Medium 3. High 4. 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*

6.3.2.9 Holding registers for condensation alarm settings

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

6.3.2.10 Holding registers for input 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*
1101	Input override.	U16	*0 - 1*	0. Disabled 1. Enabled	*0*
1102	Input override start value.	U16	*0...10000*	0...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...10000*	0...10000 µg/m^3	*0*
1113	VOC range, maximum value.	U16	*0...10000*	0...10000 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*

6.3.2.11 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*
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*	0. Internal sensor 1. External input 2. Average from external and internal sensor 3. Bus value	*0*
2103	Temperature measurement default value.	S16	*-10000...10000*	-1000.0...1000.0 °C	*0*
2104	Temperature setpoint source.	U16	*0 - 1 - 2*	0. External input 1. Bus value 2. Fixed value	*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	*160*
2109	Temperature control range, cooling.	U16	*10...320*	1.0...32.0 °C	*160*
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*

Holding register	Parameter description	Data type	Values	Range	Default
2115	Humidity setpoint source.	U16	*0 - 1 - 2*	0. External input 1. Bus value 2. Fixed value	*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*	0. External input 1. Bus value 2. Fixed value	*0*
2127	CO_2 setpoint default value.	U16	*0...10000*	0.00...100.00 %	*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*
2136	VOC measurement default value.	U16	*0...32767*	0...32767 $\mu g/m^3$	*0*

Holding register	Parameter description	Data type	Values	Range	Default
2137	VOC setpoint source.	U16	*0 - 1 - 2*	0. External input 1. Bus value 2. Fixed value	*0*
2138	VOC setpoint default value.	U16	*0...10000*	0.00...100.00 %	*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...2000*	150...2000 µg/m^3	*1000*
2142	Not in use.	U16	-	-	*0*
2143	VOC control dead zone.	U16	*0...2000*	0...2000 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 ... - 8*	0. Off 1. Temperature contact 2. Humidity contact 3. CO_2 contact 4. VOC contact 5. Occupancy contact 6. Condensation contact 7. External input contact 8. Bus	*0*
2147	Controller enable override start value.	U16	*0 - 1*	0. Off 1. On	*0*

6.3.2.12 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*

Holding register	Parameter description	Data type	Values	Range	Default
3X01	Analogue output source.	U16	*0 - 1 - 2 … - 7*	0. Temperature 1. Relative humidity 2. CO_2 3. VOC 4. [2]Controller primary output 5. [3]Controller secondary output 6. External input 7. Bus	[1]*0*
3X02	Digital output source.	U16	*0 - 1 - 2 … - 7*	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	*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*	0.00...100.00 %	*0*
3X07	Voltage range, maximum value.	U16	*0...10000*	0.00...100.00 %	*10000*

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

[2] Heating, humidification, ventilation

[3] Cooling, dehumidification

6.3.2.13 Holding registers for relay settings

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

Holding register	Parameter description	Data type	Values	Range	Default
3502	Multiple sources. The register 3500 value must be 9.	U16	*0...255*	8-bit binary value. Bits are designated as follows: 1. Temperature contact 2. Humidity contact 3. CO_2 contact 4. VOC contact 5. Occupancy contact 6. Condensation alarm 7. External input contact 8. Bus	*0*

7 BACnet

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

7.1 BACnet properties

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

7.2 Object descriptions

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

7.2.1 Binary input objects

ID	Object name	Values	Default
4	*PIR*	*0 - 1*	*0*

7.2.2 Binary value objects

ID	Object name	Values	Default
12	*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-CONTACT*	*0 - 1*	*0*
59	*CONDENSATION-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*
1011	*CONTROLLER-ENABLE*	*0 - 1*	*0*
1016	*RELAY-STATE*	*0 - 1*	*0*
1018	*PULSE-COUNTER-RESET*	*0 - 1*	*0*

7.2.3 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...10000	1.0	micrograms-per-cubic-meter (219)
5	EXT-IN-VOLTAGE	0...10	0.001	volts (5)
6	EXT-IN-RESISTANCE	0...30000	0.1	ohms (4)
8	EXT-IN-TEMPERATURE	-1000...1000	0.1	degrees-celsius (62) / degrees-fahrenheit (64)
9	EXT-IN-HUMIDITY	0...100	1.0	percent-relative-humidity (29)
10	EXT-IN-CO2	0...10000	1.0	parts-per-million (96)
11	EXT-IN-VOC	0...10000	1.0	micrograms-per-cubic-meter (219)

7.2.4 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
15	OUTPUT3-VOLTAGE	0...10	0.001	volts (5)	0
16	OUTPUT4-VOLTAGE	0...10	0.001	volts (5)	0
17	EXT-INT-TEMP-AVERAGE	-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	PULSE-COUNTER	0...4294967295	1.0	no-units (95)	0
36	INSTALLATION-QUALITY-SCORE	1...4	1.0	no-units (95)	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-POWER	0...100	0.01	percent (98)	0

ID	Object name	Values	Reso-lution	Units	Default
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*
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*

7.2.5 Multi state value objects

ID	Object name	Values	State text	Default
72	*VOC sensor detailed status*	*1...4*	1. Operating normally 2. Warm-up sequence 3. Initial start-up 4. No valid output	*1*
1017	*Led color*	*1...8*	1. Off 2. Red 3. Green 4. Blue 5. Yellow 6. Cyan 7. Purple 8. White	*1*

7.2.6 Network port objects

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

8 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.