en

MANUAL

REGIO RTX SERIES

REGIN

THANK YOU FOR CHOOSING REGIN!

Regin provides comprehensive solutions for building automation, including intuitive BMS-solutions, freely programmable and pre-programmed controllers, field devices and more.

Regin's offer, in combination with DEOS and Industrietechnik, empower system integrators, installers, and property owners with a powerful toolbox, setting them in a position to create building automation solutions that save both energy and engineering time. Today, versatile building management, optimized room control, and effective workflows have become the pillars for leading property owners in realizing significant energy savings in properties. Regin shares the clear goal of the group; to make this challenge easier on the way towards a sustainable future.

DISCLAIMER

The information in this manual has been carefully checked and is believed to be correct. Regin makes no warranties about the contents of this manual and users are requested to report errors and discrepancies to Regin, so that corrections may be made in future editions. The information in this document is subject to change without prior notification.

Some product names mentioned in this document are used for identification purposes only and may be the registered trademarks of their respective companies.

Rev. A, 2025-11-25

PART OF
REGIN GROUP

Table of Contents

1 Introduction

1.1 About this manual

Special text formats used in the manual:

Note! This box, text, and symbol are used to highlight useful tips and tricks.

Caution! This box, text, and symbol are used to highlight cautions.

Warning! This box, text, and symbol are used to highlight warnings.

```
This box is used to show formulas and mathematical calculations
```

```
This box is used to
represent the display
window on the
controller
```

1.2 More information

- ✓ RTX-... - Product sheet
- ✓ RTX-..(C) - Product sheet
- ✓ RTX - Instruction
- ✓ RTX - Variable list
- ✓ RTX - Menu structure
- ✓ RCX-BL/RCX-BM - Instruction, (backplates)
- ✓ RTX - Manual (this document)

All the above documents are available for download from Regin's website, www.regincontrols.com.

Note! All settings and configurations of the RTX room transmitters should be done with the Regin:GO app or the Application tool 2 (only for room transmitters with communication, RTX-..(C)).

2 Information for the end user

2.1 Regio RTX series room transmitters

The Regio RTX series is a range of room transmitters designed for environmental control, including temperature regulation, via a controller running an application. They can also be used together with Regin's system controllers. The Regio RTX series transmitters can be connected to several different products and could, for example, be used to control an air handling unit running a ventilation application.

2.1.1 Applications

The RTX room transmitters have a discrete design and are easy to use, with an intuitive graphical LED matrix front and stylized touch button (depending on the model). They are suitable in buildings where you want optimal comfort and low energy consumption, such as offices, schools, shopping centres, airports, hotels, and hospitals.

In a room, the RTX room transmitter can measure and detect, for example:

- ✓ Temperature
- ✓ CO_2 level
- ✓ Relative humidity level
- ✓ Air quality (VOC)
- ✓ Motion of a user

2.1.2 Installation

The transmitter should be mounted in a location with good air circulation where it can be expected to give a representative reading. It can be mounted on a wall box or directly on the wall.

The room transmitters consist of the following parts:

- ✓ Front and PCB assembly
- ✓ Backplate assembly (including terminal)

Note! Backplate assemblies are sold separately.

- ✓ Low (for mounting over wall box), RCX-BL
- ✓ Mid (for on-wall mounting), RCX-BM

2.1.3 Mounting

The modular design, with a separate backplate for wiring, makes the whole Regio RTX series easy to install and commission. The room transmitters are mounted directly on a wall or over an appliance box (with a backplate).

The RTX room transmitter consists of the main part (article number RTX-T[H,C,V,P]-[C,D,E,R,X]) and the backplate assembly, with terminal. The low backplate (RCX-BL) is used when mounted over an appliance box, meaning less space for cables needed. The medium-sized backplate RCX-BM is selected when more room for cables is needed mounting the device directly on the wall. The backplates (RCX-BL, RCX-BM) are sold separately.

For more information, see *Table B-2 Backplate assembly models* in *Appendix B Model overview*.

For detailed installation instructions, see the RTX - Instruction, to be found at www.regincontrols.com. Or, see detailed information in *chapter 4.1 Installation*.

2.1.4 Communication

RS485

The RTX-..(C) models can be connected to a central SCADA-system via RS485 (EXOline, Modbus, or BACnet), and configured for a particular application using the Application tool 2, which can be downloaded free of charge at www.regincontrols.com. For more information, see section *3.2 Application tool 2*.

Bluetooth® Low Energy

Bluetooth

Communication is supported for all RTX room transmitters by Bluetooth® (Regin protocol compatible with the Regin:GO app).

The room transmitters can be connected to the Regin:GO app (iOS/Android) and a cloud back end via Bluetooth® Low Energy. For more information, see section *3.1.5 Bluetooth® activation* .

For Regin:GO default access level passwords, see section *3.1.4 Accessing, operation, and settings in the Regin: GO app*.

For more information, see section *3.1 Regin:GO app*.

2.2 Display, LEDs and buttons

2.2.1 User interface description

The user interface consists of one (1) display made up of a matrix of LEDs (25 x 5 pixels) with running presentation, in a plastic casing where the display can be seen through the plastic material. The RTX room transmitter has a constant on display, but it can be configured to turn off the display after some time. See section *3.3.1 Display settings*.

Note! LED display and button are not available on all models. For more information, see *Table B-1 Transmitter models* in section *Appendix B Model overview*.

Different examples of the RTX room transmitter user interfaces are shown in *Figure 2-1 RTX room transmitter with display and PIR sensor / RTX room transmitter with display and timer function*.

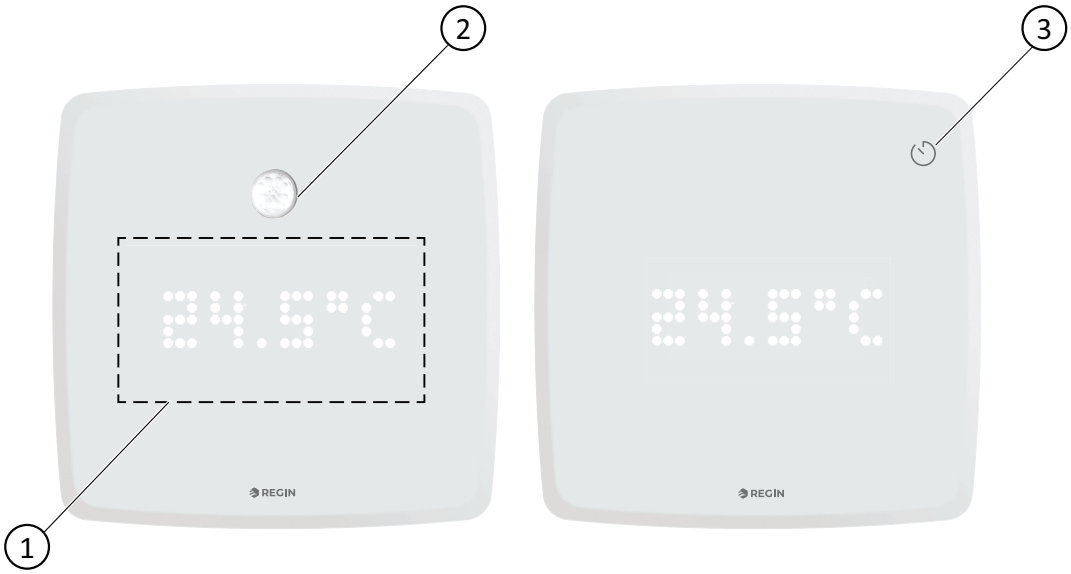


Figure 2-1 RTX room transmitter with display and PIR sensor / RTX room transmitter with display and timer function

① *LED matrix, running display board*
② *PIR sensor (on selected models)*
③ ***[Timer]** button*

Table 2-1 describes the buttons and LED matrix available on RTX room transmitters with display.

Table 2-1 Button and HMI descriptions for RTX room transmitters with display

Devices with display	
№	**Description**
1	LED matrix with value displayed
2	PIR sensor
3	**[Timer]** button (on selected models)

2.2.2 Relay

The RTX-TC-R model has a relay function, which enables to set the temperature and the CO_2 level On value for activating the relay, and set the Off value for deactivating the relay. Such as, On value 1000 ppm and Off value 1500 ppm for CO_2 level. This means that the relay will switch to On when reaching 1000 ppm and when the CO_2 level increase to 1500 ppm the relay will switch back to Off. For detailed information, see section *3.11 Relay control*.

2.2.3 Timer for Extended run

The RTX-T-CDE model have a *Timer* feature, which enables to extend the running of a function. An example of application is to be able to extend the running of an AHU after time schedule run out.

When you press the **[Timer]** button, a timer appears on the display. The default timer step setting is 15 minutes per button press and 7 steps, resulting in the sequence (15, 30, 45, 60, 75, 90, off). In the Regin:GO app or in Application tool 2 (in the **Display and menus** page), the step size can be changed up to 120 minutes for each press of the **[Timer]** button and the **Number of steps** can be set up to 25 steps. In the display the time interval counts down showing the remaining time in minutes (min.). For detailed information, see section *3.7 Timer*.

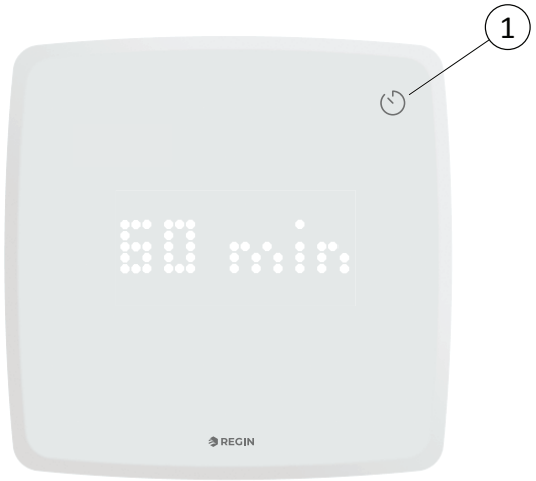


Figure 2-2 Timer button - RTX-T-CDE

① ***[Timer]** button*

2.3 Navigation - Room transmitter display

2.3.1 Models with display

For models with a display, the user interface consists of a display made up of a matrix of LEDs (25 x 5 pixels) with running presentation.

Note! A LED display is available on some models only. For more information, see section *Table B-1 Transmitter models*.

Figure 2-3 Room transmitter model with display and PIR sensor

Display indications

The display indications are shown and described in *Figure 2-4 Examples of indications in the room transmitter display* and *Table 2-2 Display indication descriptions*.

For models with display, the product name, product model, product version and addresses are shown at startup. The start-up information can also be configured in the Regin:GO app and Application tool 2.

Figure 2-4 Examples of indications in the room transmitter display

The display and function indications are described in *Table 2-2*.

Table 2-2 Display indication descriptions

Indication	Description
Actual temperature 24°C	The temperature of the room is presented in °C.
Relative humidity level 0% RH	The relative humidity level of the room is presented as a percentage.
CO_2 level 950 PPM	The system measures the amount of CO_2 in the room. The value is displayed in the unit parts per million (ppm).
VOC level 100 VOC	The system measures the VOC level in the room according to a VOC index. See section *3.12 VOC*.

2.3.2 Transmitters without display

Transmitters without a display have the same functionality with the built-in sensors (varies for different models). No display interaction can be made.

2.4 Detection sensor - PIR

2.4.1 Range

The detection range of the detection sensor (PIR sensor) is dependent on the difference between the object and the room temperature, and cannot be adjusted.

2.4.2 Detection pattern

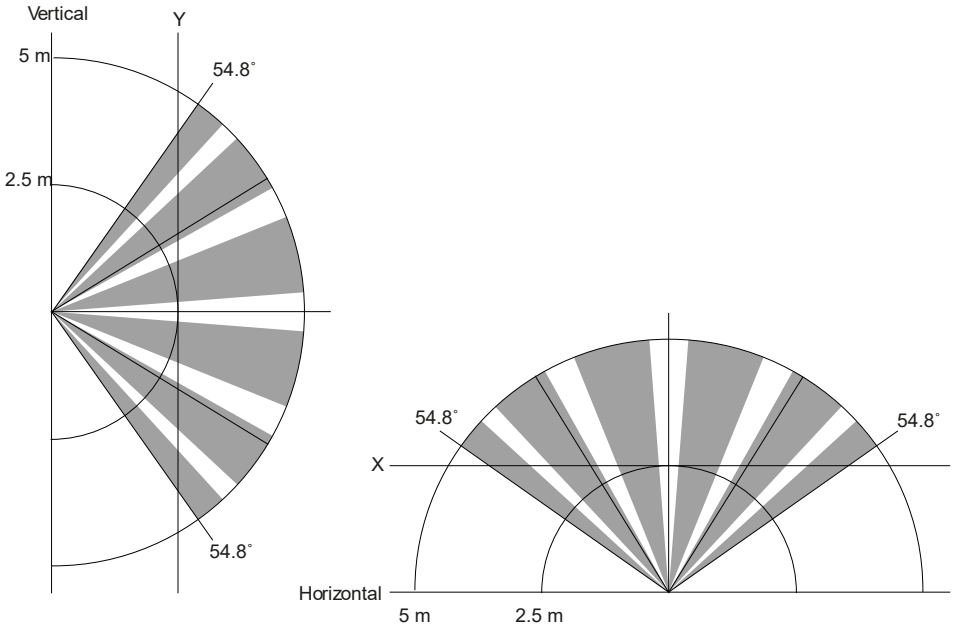


Figure 2-5 Detection pattern range PIR sensor - Vertical and Horizontal

2.5 CO_2 sensor

2.5.1 CO_2 sensor integration and measurement range

CO_2 regulation functionality is available when either an integrated or an external CO_2 sensor is connected. The integrated sensor supports a measurement range of 400 to 2000 ppm, within specified accuracy.

2.5.2 Automatic self-calibration

The integrated CO_2 sensor includes an automatic self-calibration feature designed to ensure long-term measurement stability. This function records the lowest CO_2 concentration detected each day and performs a weekly evaluation to adjust the baseline, either upward or downward, based on observed trends.

For optimal performance, the monitored space must be adequately ventilated and remain unoccupied for a minimum of four (4) hours daily. This calibration method is not recommended for continuously occupied environments such as greenhouses or hospital rooms. See also *3.15 CO_2 sensor calibration* .

Note! If inaccurate readings are suspected, allow a period of 7 to 14 days for the automatic self-calibration process to stabilize and adapt.

2.6 Configuration

You preferably use the Regin:GO app, to configure the RTX room transmitters. You can also use the Application tool 2 for devices with communication..

For more information, see section *3.1 Regin:GO app* and *3.2 Application tool 2*.

3 Information for the specialist

3.1 Regin:GO app

The Regio RTX series room transmitters are Bluetooth® compatible, and can be connected via the Regin:GO app. The Regin:GO app is available on Android and iOS. It is used for upgrading, configuring, and commissioning one or several Regio RTX series room transmitters. The Regin:GO app can also be used to upgrade the firmware. You can get the Regin:GO app from *App store* (iPhone and iPad) or *Google play* (Android).

3.1.1 Language

The language setting is inherited from the handheld device settings.

3.1.2 Application data

Updated application data will be asked for automatically the first time the app starts, but it must be updated periodically to get the latest firmware and settings.

3.1.3 Introduction Regin:GO app

Below you find screenshots and short descriptions of some of the basic functions of the menu pages in the Regin:GO app.

Note! Depending on your configuration, you will have different setting options.

Table 3-1 App RTX pages

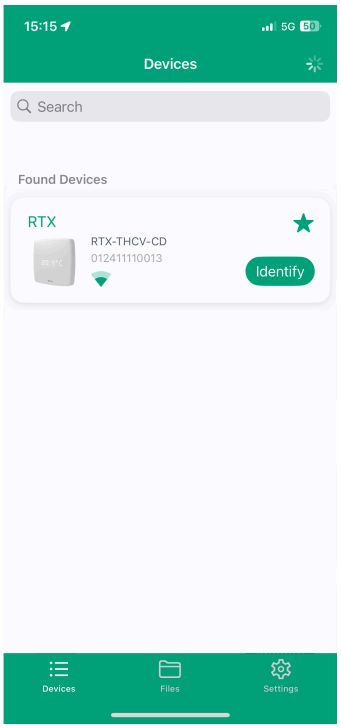
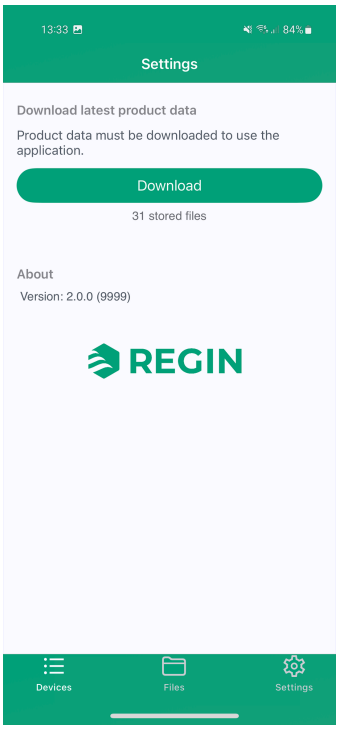
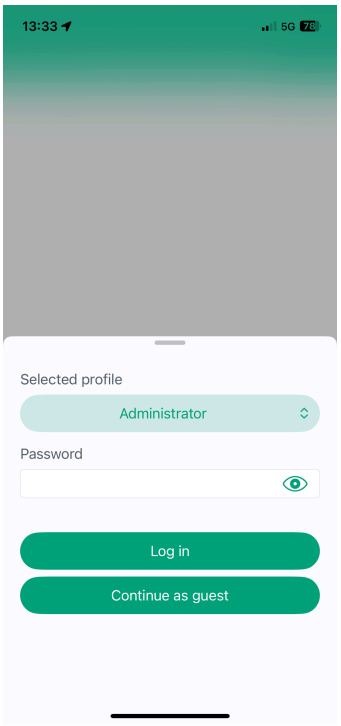
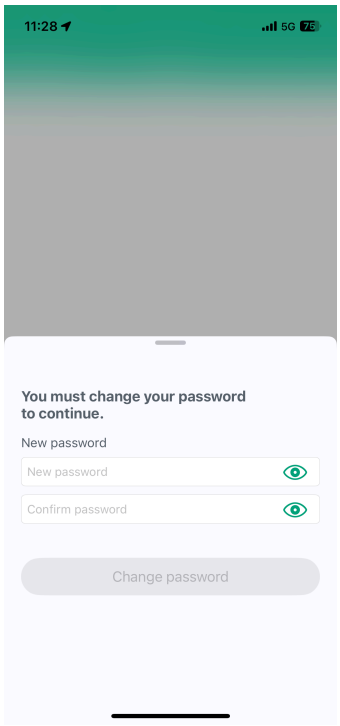
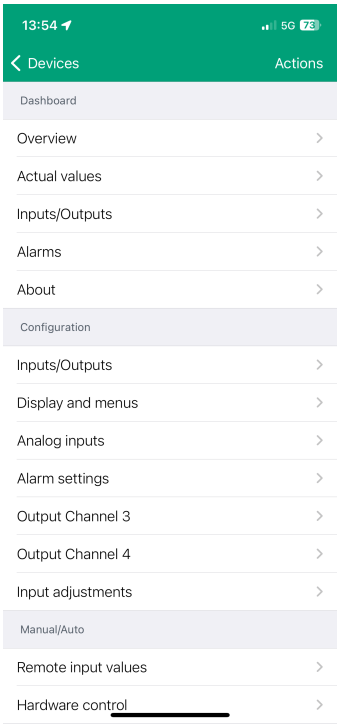
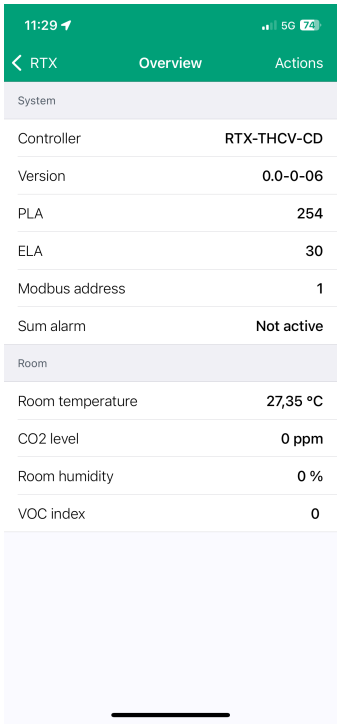
 **Devices** page This is the first page after the logo page. The **Devices** page lists all units found, with the possibility to identify new units and create favourites in a long list of units. The list presents a unit's name and serial number. When the **Identify** button is tapped in the Regin:GO app, the unit connection symbol is lit in blue for a few seconds and then turns blinking yellow to indicate which unit is selected.	 **Settings** page In this page it is possible to download the needed product data files. Tap **[Download]**.

Table 3-1 App RTX pages (continued)

<table>
<tr>
<td> 

Login pop up window
In the *Login* window you can choose the user login type, or to **Continue as guest**.
Administrator privileges are required to modify the unit name and address, perform backup and restore operations, and execute firmware updates.</td>
<td> 

New password pop up window
Upon initial login to a device using an *Administrator* account, the *New password* dialogue prompts the user to create and confirm a new password.</td>
</tr>
<tr>
<td> 

Menu page
This page is a menu page to navigate to other sub-menus, such as **Overview**, **Configuration**, and **Device** etc.</td>
<td> 

Overview page
This page is an overview page where you can see the actual values of *System* and *Room* settings and readings.</td>
</tr>
</table>

Table 3-1 App RTX pages (continued)

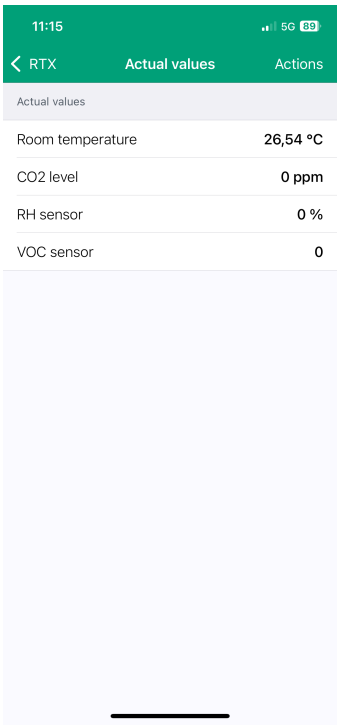
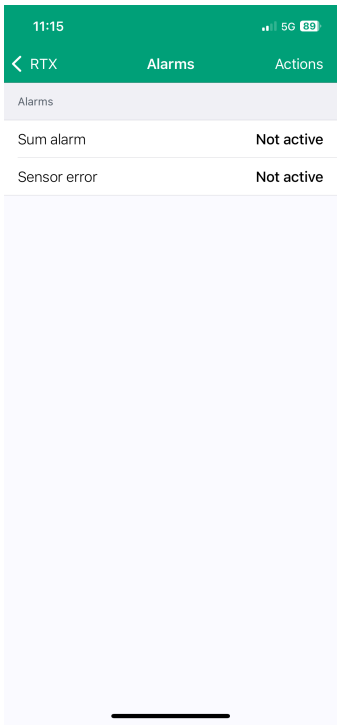
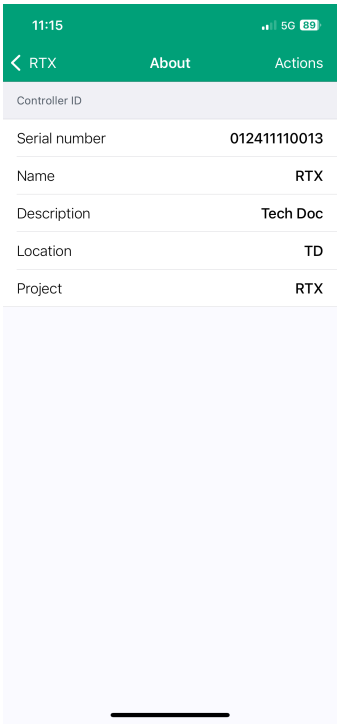
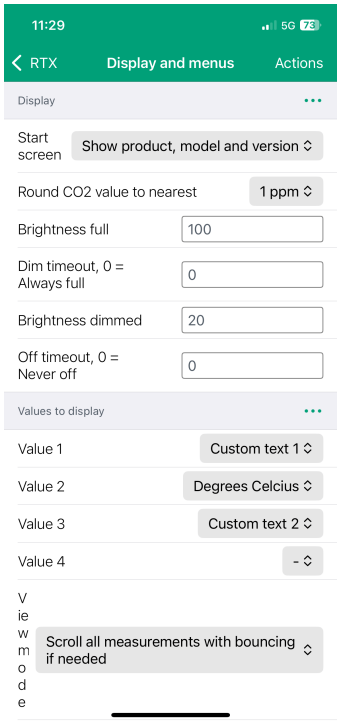
 **Actual values** page This page is an **Actual values** page where you can see actual values.	 **Alarms** page This page is an overview **Alarms** page of all alarms.
 **About** page This page is an overview **About** page of the device controller IDs.	 **Display and menus** page This page is a settings page for display and menu item settings. Also for models with timer, settings for timer can be made.

Table 3-1 App RTX pages (continued)

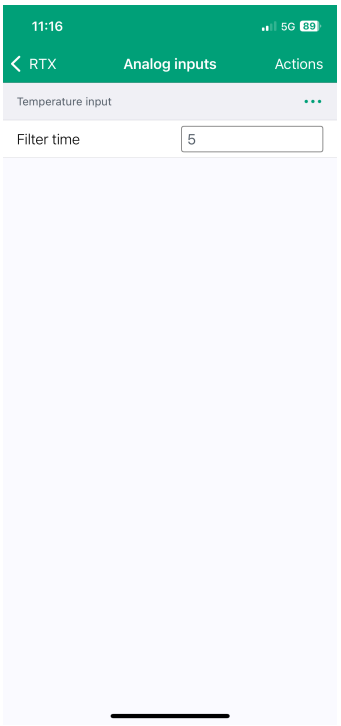
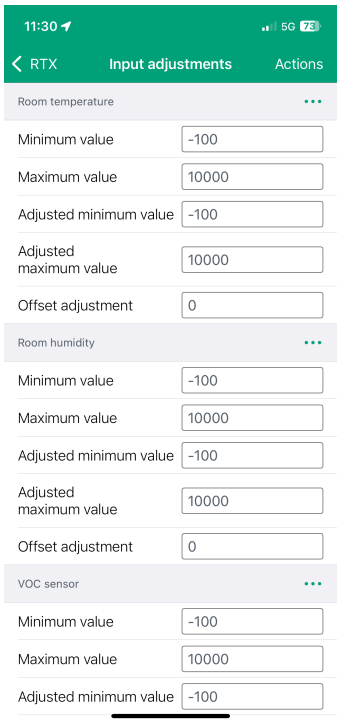
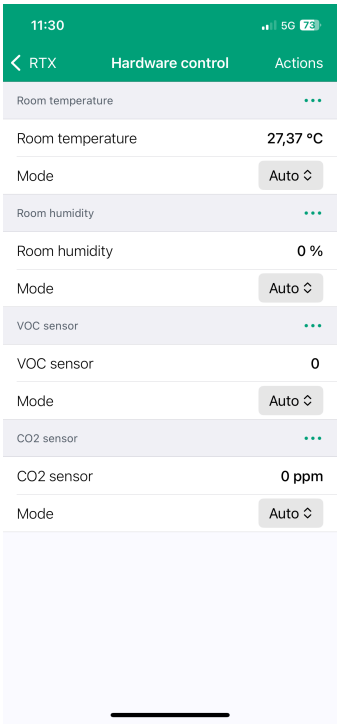
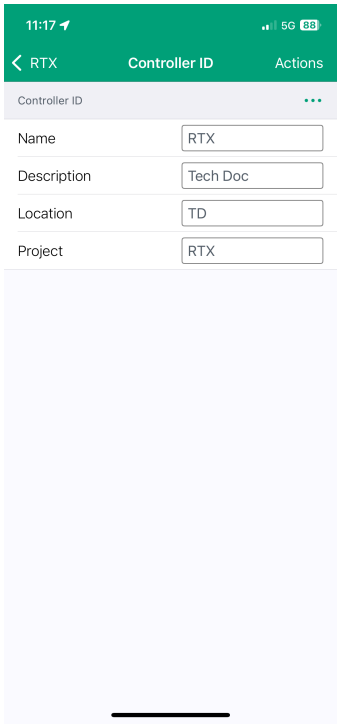
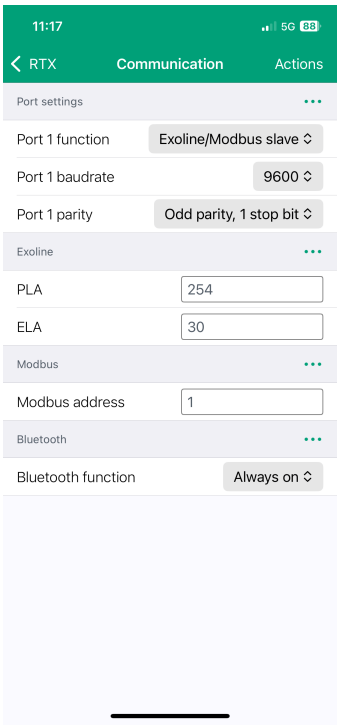
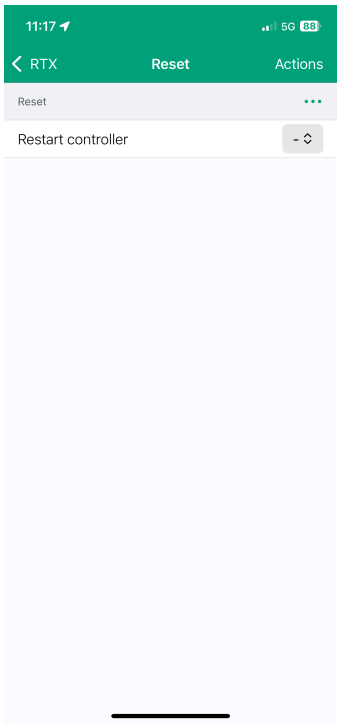
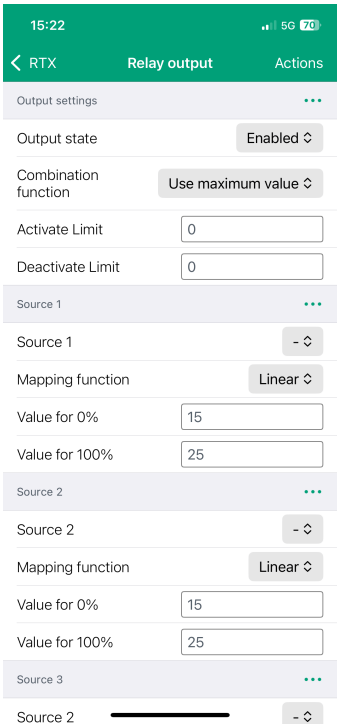
 **Analog inputs** page This page is a settings page for analog inputs.	 **Input adjustments** page This page is a settings page for adjustment of input values.
 **Hardware control** page This page is a settings page for hardware control adjustments. **Auto** or **Manual** mode etc.	 **Controller ID** page This page is a settings page for changing the *Controller ID* properties.

Table 3-1 App RTX pages (continued)

<table>
<tr>
<td> 

Communication page
This page is a settings page for changing the Communication settings.</td>
<td> 

Reset page
This page is a Reset page to restart the transmitter. Restart device, Reset application settings, Factory reset.</td>
</tr>
<tr>
<td> 

Relay output page
This page is a Relay output page to set relay output settings, sources, values and functions.</td>
<td></td>
</tr>
</table>

3.1.4 Accessing, operation, and settings in the Regin:GO app

To access and enable operations and settings in the Regin:GO app, a valid password is required. See the list of access rights below.

Access rights

Administrator - password: Admin

- ✓ Update firmware
- ✓ Reset to default values
- ✓ Save and import local configuration
- ✓ Change password
- ✓ Read and write all values that are possible to change, including all settings and configurations

Note! Make sure to change the default password after the first *Administrator* login. See section *Password handling*.

Guest - password: N/A

- ✓ Read values decided by Regin:GO app.

Activate an identification notification in the Regin:GO app

If the device has Bluetooth® Low Energy support and Bluetooth® Low Energy is turned on, it is possible to activate an identification notification in the Regin:GO app.

To activate the identification notification:

1. On any button, or on the right side of the top on devices without buttons, make a short press (<1.5 seconds (s)) to activate the identification notification
2. Search for a device in the app
3. The device, with an active notification, will show on the top of the list with a blinking frame around it

Password handling

Upon initial login to a device with administrative privileges, the system will prompt the user to update their password. It is recommended to select a strong and unique password. The updated credentials will be temporarily cached within the application for a duration of 8 hours, and will be auto-filled during this period. See section *3.1.3 Introduction Regin:GO app*.

Connecting to a RTX transmitter, with the Regin:GO app

To connect to a RTX transmitter with the Regin:GO app:

1. Make sure Bluetooth® Low Energy is On in the device. Press the lower right corner of the controller for five (5) seconds (press the lower right corner, if no **[Menu]** button). A blue LED indication is presented at On.
2. Open the Regin:GO app on your mobile device
3. In the **Search** field, in the **Devices** page (opens per default), type a transmitter serial number or wait until the Regin:GO app populates the transmitter by automatic detection
4. Tap the **Devices** area on the desired identified transmitter to connect to the device
5. In the **Log In** dialogue, tap the **Selected profile** list and select the desired profile type. Then tap and type the corresponding password in the **Password** field.
   For more information, see section *Password handling*.
6. Tap the **[Login as...]** button
7. The Regin:GO app is now connecting to the device

You can now navigate the menu in the Regin:GO app to view values or make configuration changes. For more information, see sections *3.1 Regin:GO app* .

3.1.5 Bluetooth® activation

There are two settings that control the activation of Bluetooth®. The configuration of the Bluetooth® functions and the turn off after an activation, as described in section *Bluetooth® function* and *Turn off after activation*.

Bluetooth® function

In *Table 3-2 Bluetooth® functions* the four (4) different activation functions are described, with the corresponding activation procedure.

Table 3-2 Bluetooth® functions

Function	Description
Off	Bluetooth® is disabled. Only serial line communication is possible.
Always On	Bluetooth® is always activated. LED indication is off.
On after start up	Bluetooth® is activated after power on for a configurable time. LED indication is On.
Activated by button (default)	Bluetooth® is activated by pressing the lower right part of the device for five (5) seconds (see pos. 2 in section *3.18 Factory reset*.) LED indication is On.

When Bluetooth® is temporarily activated (valid for the functions O*n after startup* or *Activated by button*), it is indicated with a blue LED flash every five (5) seconds.

Turn off after activation

Turn off after activation is only applicable for the Bluetooth® function options O*n after startup* and *Activated by button*, meaning the time in seconds that Bluetooth® should be activated. The permissible range for the setting value lies between 10 and 3600 seconds (default 120 s).

3.2 Application tool 2

The Application tool 2 is a PC-based configuration software tool. It is used for upgrading, configuring, and commissioning one or several RTX transmitters.

Warning! Always disconnect the device from the power supply before connecting or disconnecting any connectors on the device.

3.2.1 Open Application tool 2

The Application tool 2 opens a dialogue at startup where you can create an offline project, open an existing project, or connect to a RTX transmitter via an RS485 serial connection.

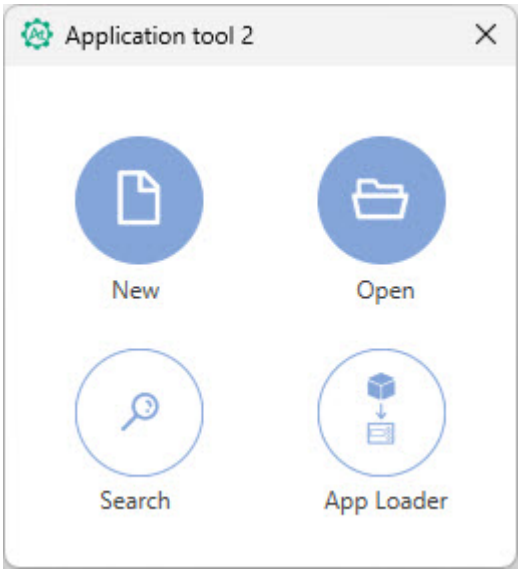


Figure 3-1 Application tool 2 start dialogue

To create and open a new offline project, click the **[New]** button.

To open an already existing project, click the **[Open]** button.

To search and connect to a transmitter, click the **[Search]** button.

The *App Loader* function can be used when you just want to upload the application to the transmitter. It is then not possible to configure the settings in the transmitter. Just send the application to the transmitter. Click the **[App Loader]** button, and upload the application to the transmitter.

Serial search

The **Search** window can also be opened by pressing **[F7]** on your keyboard, or from the **Tools** menu, via **Search**. Select **Search serial** and choose the serial port to be used.

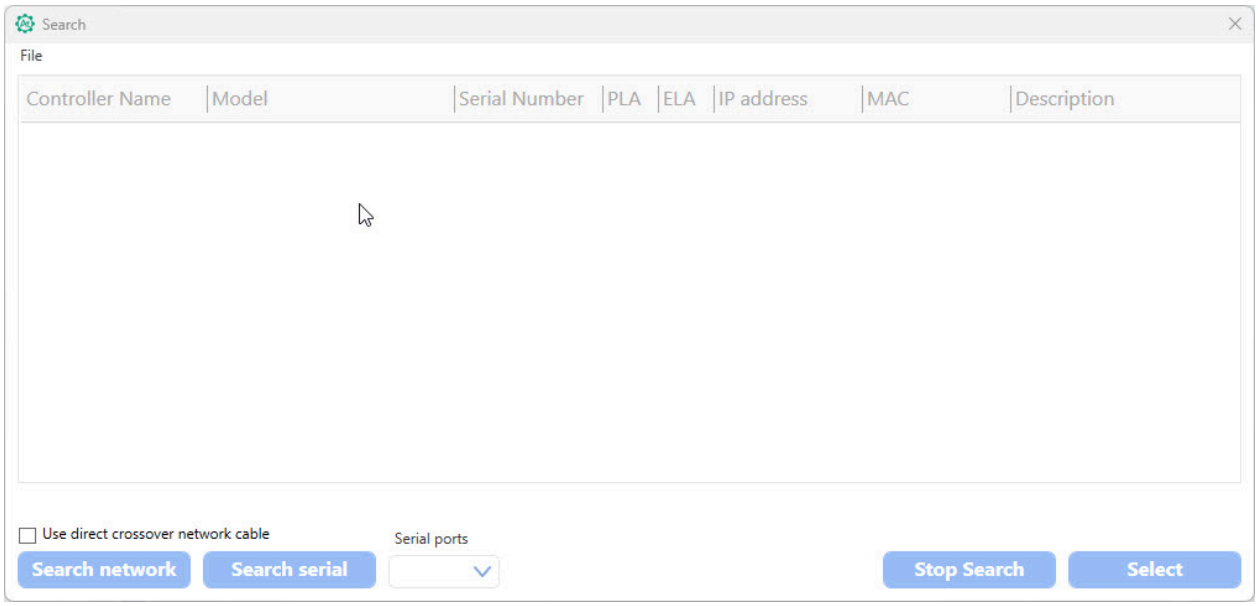
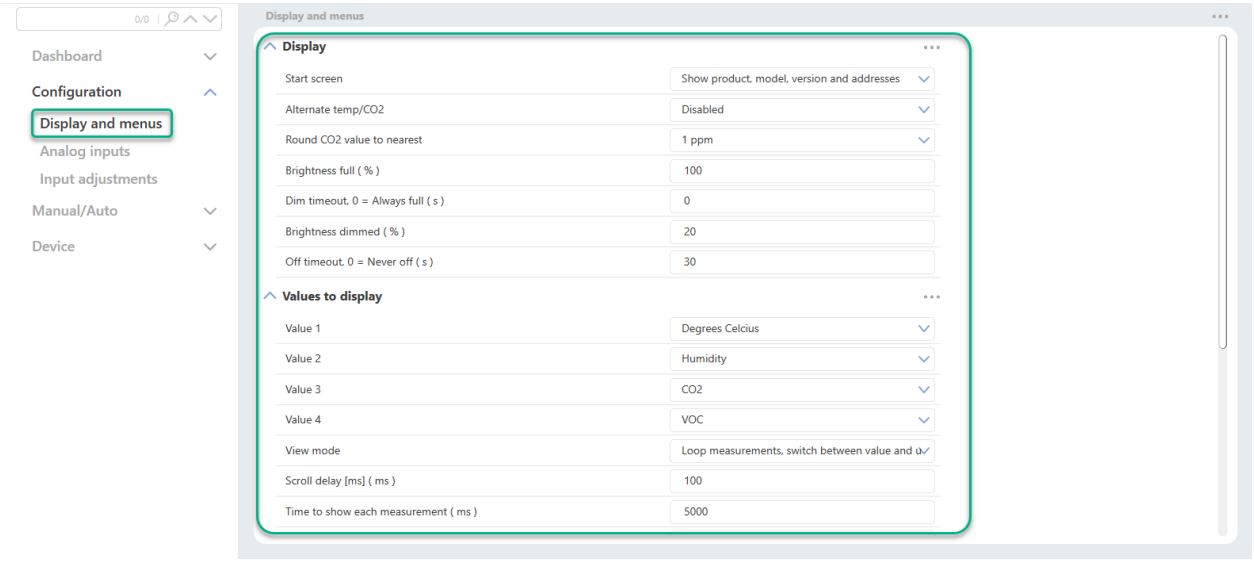


Figure 3-2 The Application tool 2 ***Search*** *window*

3.3 Display and menus



3.3.1 Display settings

The RTX room transmitter has a constant on display.

Table 3-3 Display settings list describes the LED brightness and time-out variables. You set the properties under **Display** in the **Display and menus** page in Regin:GO or Application tool 2.

Table 3-3 Display settings list

Configuration setting	Variable name	Description
Brightness full (%)	*Disp_BrightnessFull*	Display brightness setting (value between 0 and 100).
Start screen	*DisplayStartupMode*	Setting for what values are shown at start-up. The selectable values are: **No startup screen** **Show product** **Show product and model** **Show product, model and version** **Show product, model, version, and addresses**
Round CO2 value nearest	*RC_CO2Step*	1, 50, 100 ppm.

3.3.2 Values to display

You can select up to six (6) different values to show on the display. The selected values will alternate between each other, in different ways, depending on the *display_mode* variable setting.

You can make settings to adjust the behaviour of the display. Such as, time settings before changes. See *Table 3-4 Display mode settings values* and *Table 3-5 View mode variables*.

Table 3-4 Display mode settings values

Configuration setting	Variable name	Description
Value 1	*display_frame_1_value*	Select the first sensor value to display. See section *Display value settings*
Value 2	*display_frame_2_value*	Select the second sensor value to display. See section *Display value settings*
Value 3	*display_frame_3_value*	Select the third sensor value to display. See section *Display value settings*
Value 4	*display_frame_4_value*	Select the fourth sensor value to display. See section *Display value settings*
Value 5	*display_frame_5_value*	Select the fifth sensor value to display. See section *Display value settings*
Value 6	*display_frame_6_value*	Select the sixth sensor value to display. See section *Display value settings*
View mode	*display_mode*	Select the view mode. How the value and the unit will display on the LED. The settings are: **Loop measurements, switch between value and unit** **Loop measurements, scroll with wrapping if needed** **Loop measurements, scroll with bounce if needed** **Scroll all measurements with wrapping if needed** **Scroll all measurements with bouncing if needed** For detailed value names, see *Table 3-5*
Scroll delay (ms)	*display_scroll_speed*	Determines the time in milliseconds (ms) between scrolling one pixel. Decrease value to scroll faster. (50 - 1000 ms, Default: 100 ms)
Time to show each measurement (ms)	*display_toggle_time_ms*	Determines the duration for displaying each measurement before transition to the next one. Valid for configuration settings - *Loop measurement, switch between value and unit*, *Loop measurements, scroll with wrapping if needed*, and *Loop measurements, scroll with bounce if needed*. (50 - 30000 ms. Default: 5000 ms) See *Table 3-5 View mode variables*
Time to show each measurement value (ms)	*display_value_time_ms*	Determines the duration for displaying the value on the screen before transition to the unit. Note that the variable *display_toggle_time_ms* is independent of this setting and you must make sure that the value time and unit time fits at least once within the toggle time. Valid for configuration setting - *Loop measurement, switch between value and unit*. See *Table 3-5 View mode variables* (50 - 30000 ms. Default: 2000 ms)
Time to show each measurement unit (ms)	*display_unit_time_ms*	Determines the duration for displaying the unit on the screen before switching back to the value. Note that the variable *display_toggle_time_ms* is independent of this setting and you must make sure that the value time and unit time fits a least once within the toggle time. Valid for configuration setting - *Loop measurement, switch between value and unit*. See *Table 3-5 View mode variables* (50 - 30000 ms. Default: 600 ms)

Table 3-5 View mode variables

Configuration setting	Variable name	Description
Loop measurement, switch between value and unit	*ALTERNATE*	Alternate between available measurements and alternate between value and unit.
Loop measurements, scroll with wrapping if needed	*SCROLL_WRAP*	Alternate between available measurements and scroll value and unit with wrapping (from end to beginning of the text), if both does not fit.
Loop measurements, scroll with bounce if needed	*SCROLL_BOUNCE*	Alternate between available measurements and scroll value and unit bounce at end of unit if both does not fit.
Scroll all measurements with wrapping if needed	*SCROLL_ALL_WRAP*	Put all measurement in a long row that scrolls on the display, wrap from the end to the beginning.
Scroll all measurements with bouncing if needed	*SCROLL_ALL_BOUNCE*	Put all measurement in a long row that scrolls on the display, bounce at the ends.

Display value settings

The variables *display_frame_1_value* to *display_frame_4_value* are used to select the values to show in the display. There are a selection of allowed values.

Table 3-6 Display values, allowed

Setting values	Value	Variable name	Description
-	0	*NONE*	Do not show value
Degrees Celsius	1	*DEGC*	Temperature, (°C)
-	2	-	Not used
Humidity	3	*RH*	Relative humidity, RH (%)
CO2	4	*PPMCO2*	CO_2, (ppm)
VOC	5	*VOC*	VOC index (value between 0 and 500)
Count down timer	6	*EXTTIME*	Count down timer. Will show **Off**, if not active.
Custom text 1	7	*TEXT1*	Show custom text string 1. See section *Display Custom text*.
Custom text 2	8	*TEXT2*	Show custom text string 2. See section *Display Custom text*.
UI1	9	*UI1*	Value on universal input 1
UI2	10	*UI2*	Value on universal input 2
Count down timer, if active	11	*EXTTIMEACTIVE*	Count down timer, Will show only if active.

Display Custom text

You can configure two (2) display custom text variables to show your own custom text in the display. The below character map below is implemented in the device. See *Figure 3-3 Display character map*.

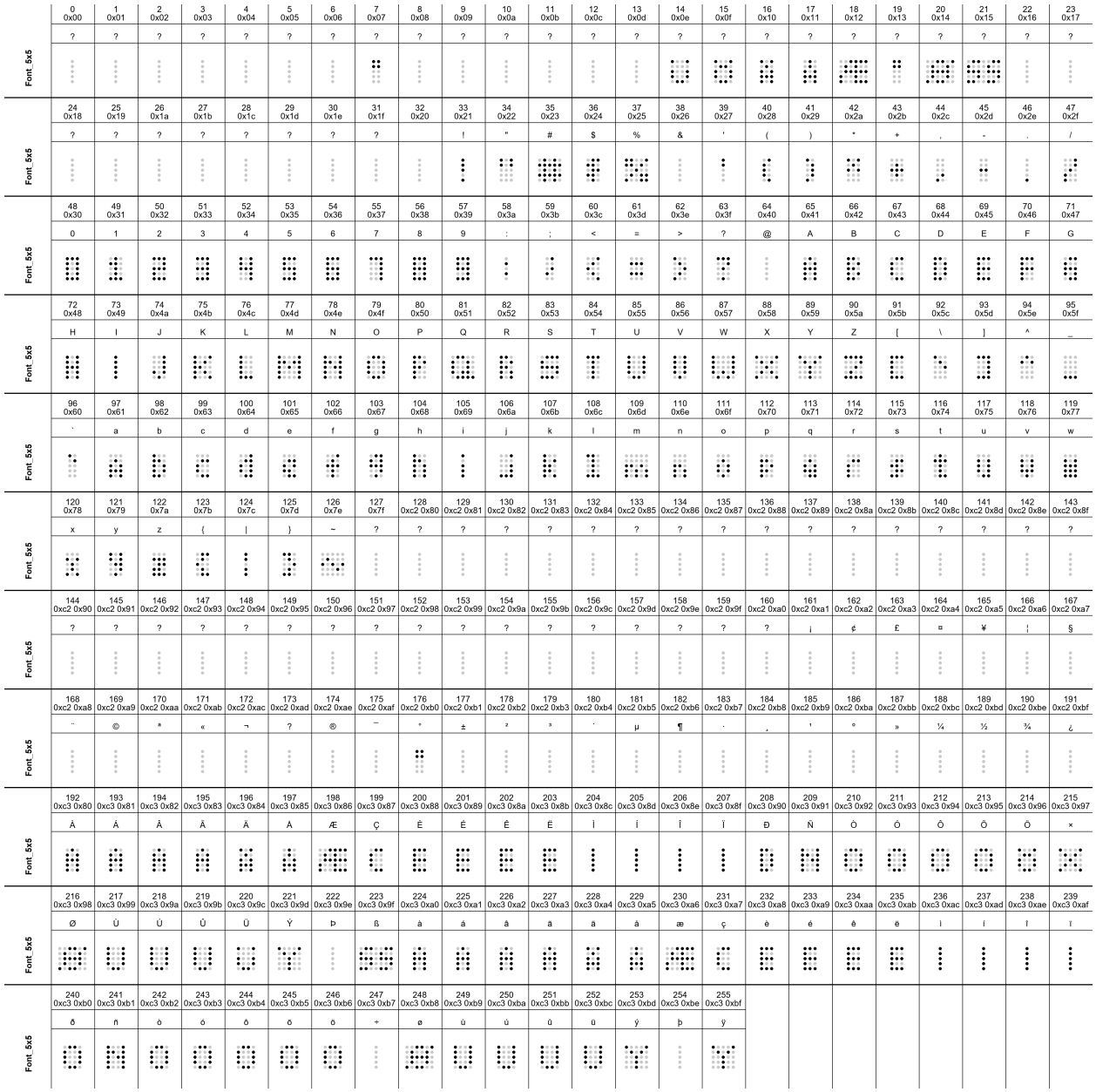


Figure 3-3 Display character map

You can set the texts for two separate strings in the display by configuration variables. The text string can be up to 64 characters in length. You can also set the visibility time and text scroll parameters, if needed.

Note! If both custom text strings (variable *rt_text_row_1* and *rt_text_row_2*) are selected together, they will show after each other.

Table 3-7 Custom text variables

Setting values	Variable name	Description
View mode	*rt_text_visability*	When to show the custom text: 1 = *ACTIVETIME*: Force display until remaining time is 0. 2 = *AS_MENU*: Show as a menu item as long as text is not empty.
Scroll mode	*rt_text_display_scroll_mode*	When to show the custom text 0 = *SCROLL_WRAP*: Scroll text if needed, wrap from end to beginning. 1 = *SCROLL_BOUNCE*: Bounce text in the end positions, if needed.
Scroll delay (ms)	*rt_text_display_scroll_speed*	Time in milliseconds (ms) between scrolling one pixel. Decrease value to scroll faster.
Custom text timer value (s)	*rt_text_timeleft*	Time in seconds (s) to show the custom text in the display. This variable will count down to 0. Set to any value to enable the custom text for that time.
Custom text 1	*rt_text_row_1*	String to show as **Custom text 1** in the display, when the text timer (*Active timer value*) is active. The string can be up to 64 characters (if special characters are used it might be less due to the UTF8 encoding).
Custom text 2	*rt_text_row_2*	String to show as **Custom text 2** in the display, if selected and when the text timer (*Active timer value*) is active. The string can be up to 64 characters (if special characters are used, it may be less due to the UTF8 encoding).

Special characters

There are some special character sequences that can be used to insert measurement values from the device into the custom text. See *Table 3-8 Special characters*.

Table 3-8 Special characters

Special string	Description
@00#	Current room temperature
@01#	Current room humidity
@02#	Current room CO_2 level
@03#	Current room VOC index
@04#	Universal input 1 value
@05#	Universal input 2 value
@06#	Controller name

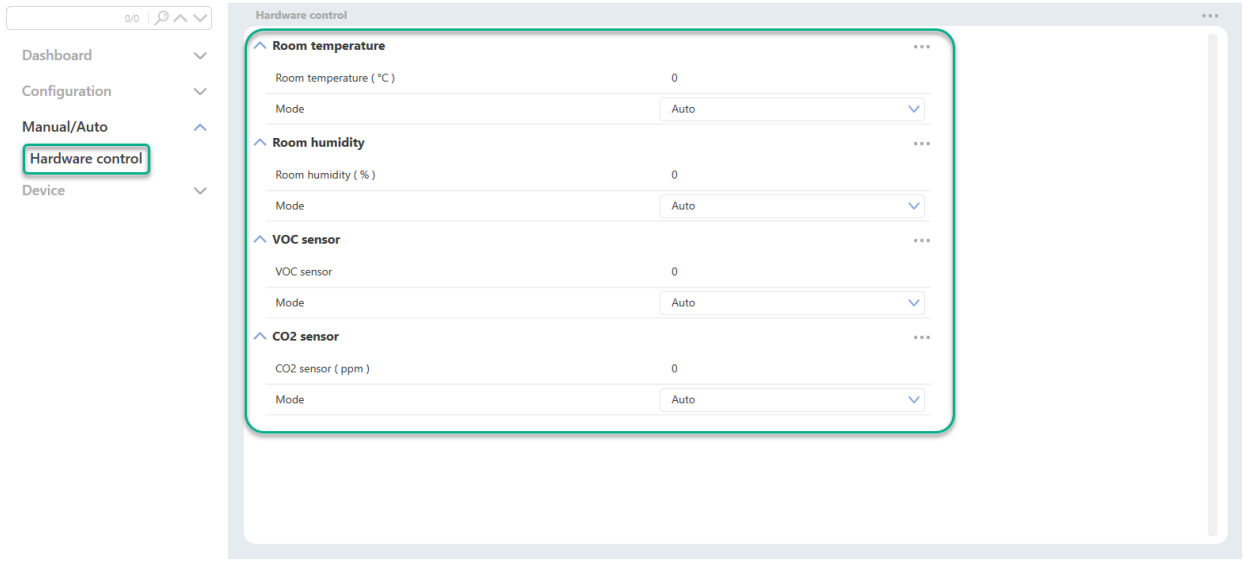
3.4 Filtering

The following variables can be used to set the measurement filtering for the internal sensors in the device.

Table 3-9 Filtering variables

Variable name	Description
RC_TempFilterTime	Filter time constant for the temperature value. (0 - 10000 s. Default: 5 s.)
RC_CO2FilterTime	Filter time constant for the CO_2 value. (0 - 10000 s. Default: 5 s.)
RC_VOCFilterTime	Filter time constant for the VOC value. (0 - 10000 s. Default: 5 s.)
RC_RHFilterTime	Filter time constant for the humidity value. (0 - 10000 s. Default: 5 s.)

3.5 Hardware control



3.5.1 Measured values

There are variables that can be used to override the measured values. That is, the set variable value is shown instead of the by the sensors measured value. You can set these values for Room temperature, Room humidity, VOC sensor, and CO_2 sensors.

Table 3-10 Override measurements variables

Setting values	Variable name	Description	Measured value
Room temperature (C)	*RC_RoomTempRemote*	Value to use for room temperature.	*IoAnaIn_5_value*
Room humidity (%)	*RC_HumidityRemote*	Value to use for room humidity.	*IoAnaIn_6_value*
VOC sensor	*RC_CO2LevelRemote*	Value to use for room CO_2.	*IoAnaIn_8_value*
CO2 sensor (ppm)	*RC_VOCRemote*	Value to use for room VOC.	*IoAnaIn_7_value*

3.5.2 In- and output values

In devices with analogue inputs and outputs, you can make overrides on the in- and output values. When used, the overridden values will be visible on the display and used for calculations. You can set these values for Room temperature, Room humidity, VOC sensor, and CO_2 sensor.

Table 3-11 Override analogue in- and output values

Setting values	Variable name	Description
Room temperature		
Mode	*RC_RoomTempRemoteSelect*	Set to 1 to enable override value.
Room humidity		
Mode	*RC_HumidityRemoteSelect*	Set to 1 to enable override value.
VOC sensor		
Mode	*RC_CO2LevelRemoteSelect*	Set to 1 to enable override value.
CO2 sensor		
Mode	*RC_VOCRemoteSelect*	Set to 1 to enable override value.

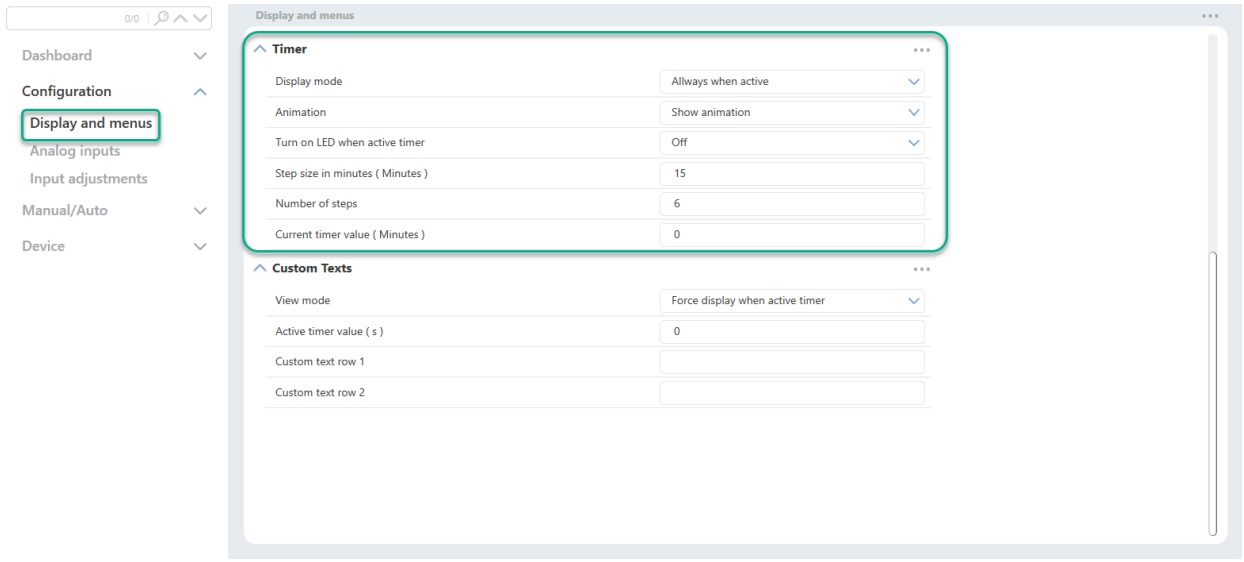
3.6 Sensor values via communication

The following variables can be used to get the measurements from the internal sensors in the device. See *Table 3-12*.

Table 3-12 Sensor measurement retrieval variables

Variable name	Description
RC_RoomTemp	The measured room temperature, (°C)
RC_Humidity	The measured room humidity. Relative humidity, RH (%)
RC_CO2Level	CO_2 level, (ppm)
RC_VOC	VOC (value between 0 and 500, where 100 is the last 24 hour average)
RC_Presence	Detected presence in the room. See section *2.4 Detection sensor - PIR*.

3.7 Timer



Some models has a function to start a count down timer when you press the **[Timer]** button. See section *2.2.3 Timer for Extended run*. The *Timer* function is customizable by a number of variables which can be set in Regin:GO and Application tool 2, including animation, LED, and timer steps etc.. See *Table 3-13 Timer variables*.

Table 3-13 Timer variables

Setting values	Variable name	Description
Display mode	*rt_exttime_mode*	0 = OVERRIDE: When the *Timer* is active always show only that value. 1 = AS_VALUE: Only show value for a short while when changing and use the normal display selection to show the value, if desired.
Animation	*rt_exttime_animate*	0 = Off: Show "min" after the displayed value. 1 = On: Show an animation after the value to indicate an active timer.
Turn on LED when active timer	*rt_exttime_indicate*	Show an active *Timer* function by turning on the green indication LED.
Step size in minutes (MInutes)	*rt_exttime_step_size*	How many minutes each press of the **[Timer]** button should increase the *Timer* function. Max. value 120 min. (minutes).
Number of steps	*rt_exttime_steps*	How many presses of the **[Timer]** button, until it wraps around to **Off** state. Max. value 25 steps (times 120 minutes => 3000 minutes).
Current timer value (Minutes)	*rt_exttime_timeleft*	Time remaining in minutes, can also be set externally to turn on the *Timer* function.
Timer state	*rt_exttime_state*	The current state of the timer. States *Active* / *Not active*

3.8 Output mapping

To set the input to *Output mapping* consists of two (2) main steps, adapting the source data and combining the sources into an output, as described in section *3.8.1 Adapting the source data (Step 1)* and *3.8.2 Combining the sources into an output (Step 2)*.

3.8.1 Adapting the source data (Step 1)

✓ To configure a channel (one (1) to four (4)) [number of available output channels, depending on model], first decide on the sources you would like to use. Up to four (4) different sources can be used for each output channel. See *Table 3-14 out_ch_<N>_source_1-4 value variable settings*.

Table 3-14 out_ch_<N>_source_1-4 value variable settings

Value	Variable name	Description
0	*NONE*	Entry will not be used to calculate output.
1	*DEGC*	Temperature (°C)
3	*RH*	Relative humidity, RH (%)
4	*PPMCO2*	CO_2 (ppm)
5	*VOC*	VOC (value between 0 and 500)

The source value will be converted to a value between 0 and 1, by using a mapping function selected by the *out_ch_<N>_source_X_map_function* variable.

The *Figure 3-4 out_ch_<N>_source_X_map_function. Example from when Map max. is 100 and map min. is 0.* shows an input value ranging from 0 to 100, where the maximum value is set to 100 and the minimum value is set to 0. The Y-axis is the translated value depending on the selected mapping function.

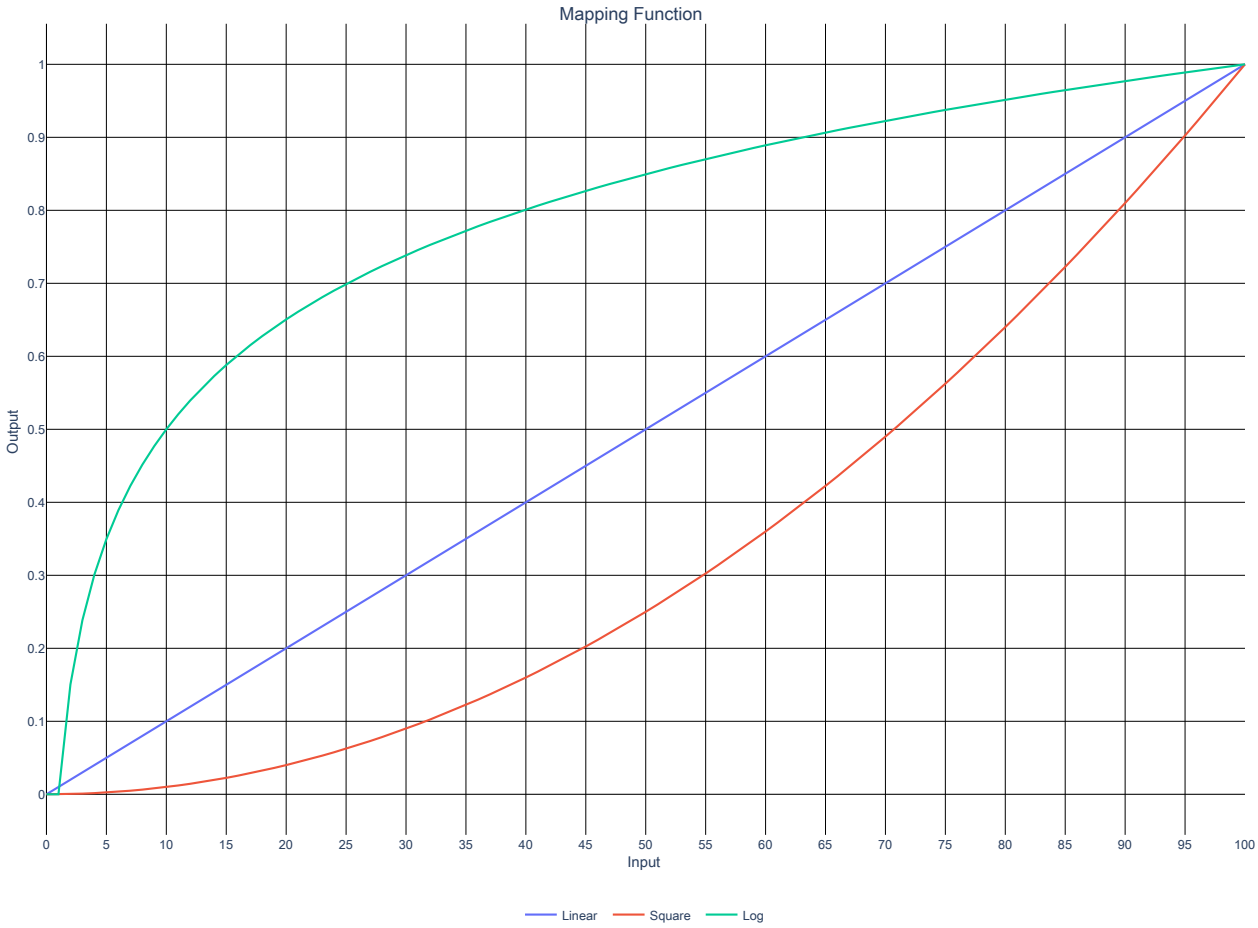


Figure 3-4 out_ch_<N>_source_X_map_function. Example from when Map max. is 100 and map min. is 0.

Table 3-15 Output mapping variables

Variable name	Description
out_ch_<N>_source_X_map_function	See *Figure 3-4*. 0 = LINEAR: Linear mapping 1 = LOG: Logarithmic mapping. 2 = SQUARE: Square mapping.
out_ch_<N>_source_X_map_max	Value that will map to a translated value of 1. It is OK to set the maximum value less then the minimum value, to be able to reverse the output mapping.
out_ch_<N>_source_X_map_min	Value that will map to a translated value of 0.
out_ch_<N>_source_calc_X	The calculated value based on the mapping function, and the minimum and maximum values.

3.8.2 Combining the sources into an output (Step 2)

✓ Combine up to four (4) source values into a value that controls the output. See *Table 3-16 Controlling output values*.

Table 3-16 Controlling output values

Variable name	Description
out_ch_<N>_enable	Set to 1 to make this channel active.
out_ch_<N>	The calculated value that will be set on the output, if the enabled variable is set to active.
out_ch_<N>_combine	How to combine the enabled source channels into this output. 0 = MAX: Use the maximum of the available values 1 = MIN: Use the minimum of the available values 2 = AVG: Use the average of the available values

3.8.3 Examples

Below you find some examples on how the mapping functionality works. See sections *Example 1 (Single value)* and *Example 2 (Combining values)*.

Example 1 (Single value)

By default, a single sensor is assigned to a specific output channel (in this case, channel 2). In this example, the output is configured to represent temperature, where 15 °C corresponds to 0 V and 35 °C corresponds to 10 V. See the diagram in *Figure 3-5 Example 1 (Single value) - Diagram*.

Configuration

1. Set *out_ch_2_source_1* = 1 [DEGC] and the other sources *out_ch_2_source_2-4* to 0 [NONE]
   This will configure the output channel 1 to only use one source, and that source is the temperature sensor.
2. Set *out_ch_2_source_1*_map_function = 0 [LINEAR]
   to make a linear map between the temperature range and the output. The value for the other three (3) sources does not matter as those are not used.
3. Set *out_ch_2_source_1*_map_min = 15 and *out_ch_2_source_1_map_max* = 35, to set the correct range for the input value between 15 °C and 35 °C.
4. Set *out_ch_2_combine* = 0 [MAX], or to any other valid value.
   As only one channel is used as source, the combine function does not matter.
5. Set *out_ch_2_enable* = 1 to enable the output mapping.

Table 3-17 Result - Example 1 (Single value)

Temperature (°C)	Output (V)	Comment
13.5	0	Below minimum value
20.0	2.5	25 % of the range [(20-15)/(35-15) = 0.25]
25.0	5	In the middle of the range
28.5	6.75	67.5 % of the range [(28.5 - 15)/(35 - 15) = 0.675]
35, or above	10	Above, or in the full range

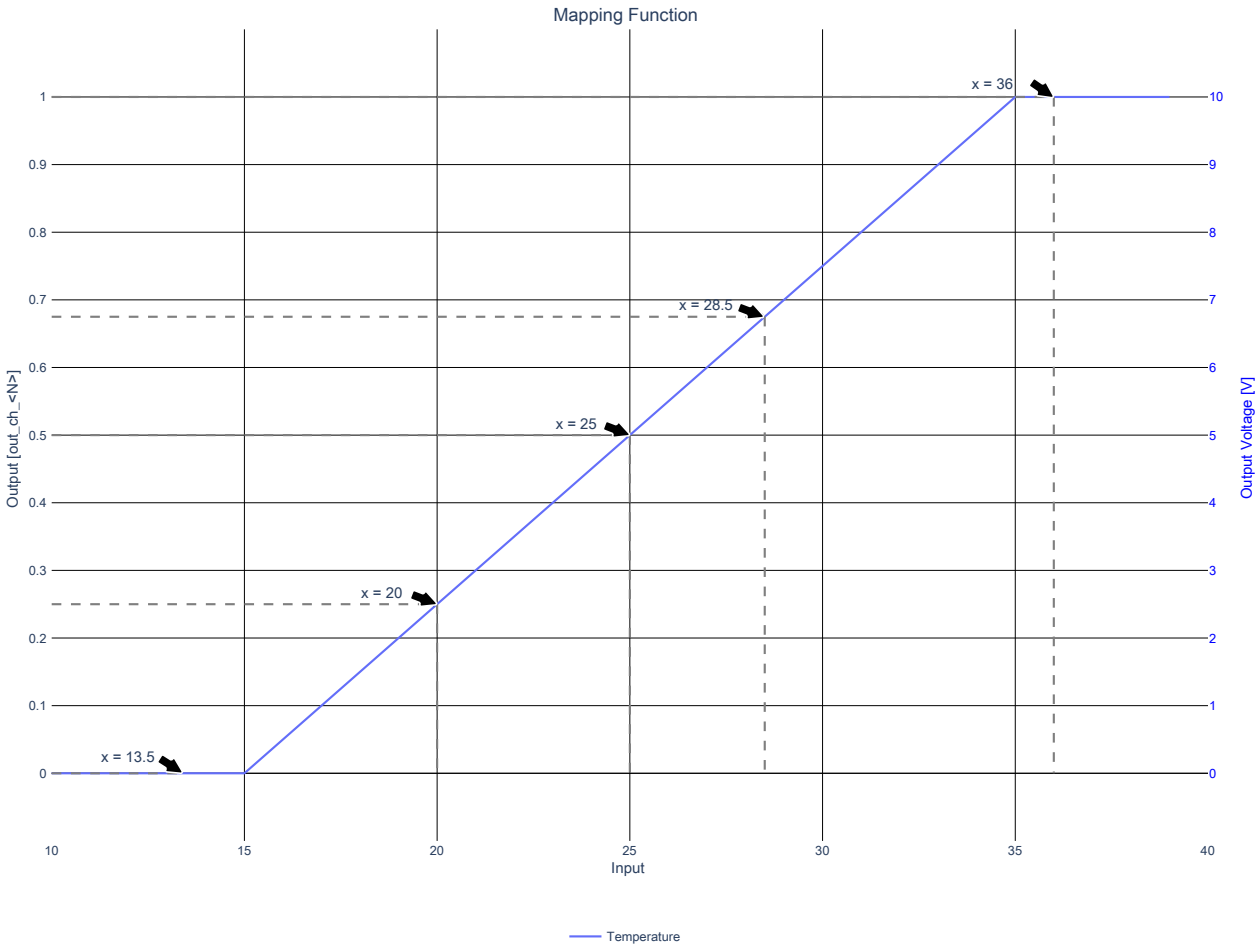


Figure 3-5 Example 1 (Single value) - Diagram

Example 2 (Combining values)

In this example, the humidity and the CO_2 is combined with a special condition, also on temperature. To make this example easier to understand, let us say the output is connected to a fan. See the diagram in *Figure 3-6 Example 2 (Combining values) - Diagram*.

The following conditions should be fulfilled:

- ✓ Run the fan at full speed, if CO_2 is above 1200 ppm, and linearly lower the fan speed down to 0 when CO_2 is below 800 ppm.
- ✓ Run the fan at full speed, if humidity is above 80 %, and linearly lower the fan speed until the humidity is below 50 %.
- ✓ Run the fan at full speed, if temperature is below 10 °C, and linearly lower the speed until the temperature gets above 15 °C.
- ✓ The highest requested fan speed of the three (3) sources should be used.

Configuration

1. Set *out_ch_2_source_1* = 1 [DEGC]
   to configure source 1 to use the temperature sensor.
2. Set *out_ch_2_source_1_map_function* = 0 [LINEAR]
   to make a linear map between the temperature range and the output.
3. Set *out_ch_2_source_1_map_min* = 15 and *out_ch_2_source_1_map_max* = 10
   to set the correct range for the input value between 15 °C and 10 °C.
4. Set *out_ch_2_source_2* = 3 [RH]
   to configure source 2 use the humidity sensor.
5. Set *out_ch_2_source_2_map_function* = 0 [LINEAR]
   to make a linear map between the humidity range and the output.
6. Set *out_ch_2_source_2_map_min* = 50 and *out_ch_2_source_2_map_max* = 80
   to set the correct range for the input value between 50 and 80 % RH.
7. Set *out_ch_2_source_3* = 4 [PPMCO2]
   to configure source 3 use the CO_2 sensor.
8. Set *out_ch_2_source_3_map_function* = 0 [LINEAR]
   to make a linear map between the CO_2 range and the output.
9. Set *out_ch_2_source_3_map_min* = 800 and *out_ch_2_source_2_map_max* = 1200
   to set the correct range for the input value between 50 and 80 % RH.
10. Set *out_ch_2_source_4* = 0 [NONE]
    to not use source 4.
11. Set *out_ch_2_combine* = 0 [MAX] .
    Use the maximum requested value as output for the fan.
12. Set *out_ch_2_enable* = 1 to enable the output mapping.

Table 3-18 Result - Example 2 (Combining values)

Temperature (°C)	RH (%)	CO_2 (ppm)	Output (V)	Comment
20	**70**	**900**	**6.67**	Controlled by RH
25	**45**	**900**	**2.5**	Controlled by CO_2
18	30	700	0	No request
11	**30**	**700**	**8**	Controlled by Temperature
19	30	1400	10	Controlled by CO_2
20	72	1025	7.3	Controlled by RH

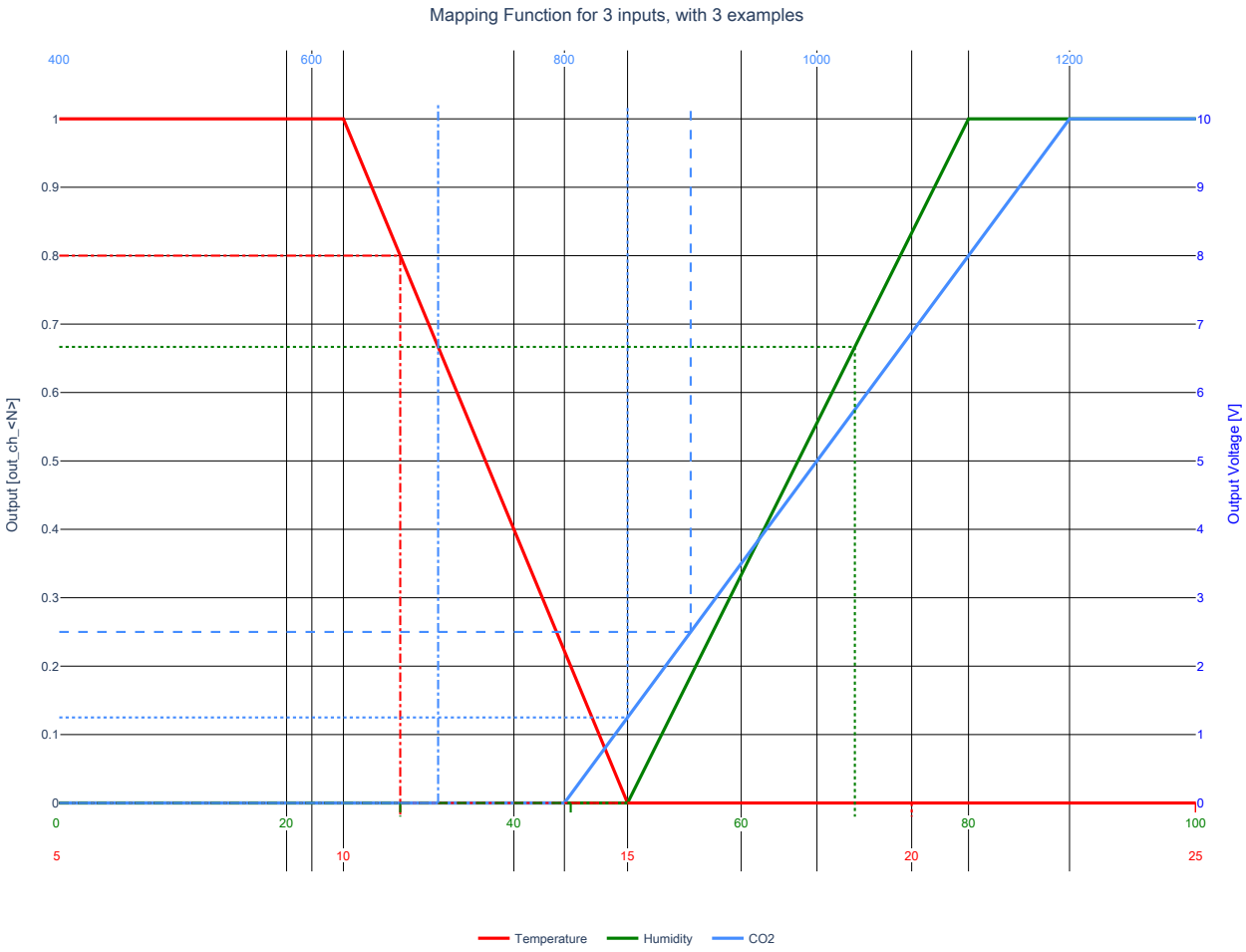


Figure 3-6 Example 2 (Combining values) - Diagram

The dotted lines equals row 1, the dashed lines equals row 2, and the dash-dotted lines equals row 4 - in Table 3-18 Result - Example 2 (Combining values).

3.9 Presence detection

The presence detection is based on two selectable inputs, the PIR sensor and/or the CO_2 sensor.

The calculated presence can be read in variable *RC_Presence*.

There are also settings for delays of setting and removing presence, these delays is set in minutes in the following variables: *RC_PresenceDelayOn* and *RC_PresenceDelayOff*.

3.9.1 PIR sensor input

The PIR sensor input can be overridden by the *RC_DIPresenceRemote* variable by setting the *RC_DIPresenceRemoteSelect* to **1**. The currently used value can be read in variable *RC_Presence*.

The current PIR sensor value is always available in *IoDiIn_4_value*.

3.9.2 CO_2 Presence detection

The CO_2 sensor can be used to detect presence, it uses the *RC_PresenceCO2Limit* and *RC_PresenceCO2Hyst* variables to check for presence, and the result can be read in *RC_CO2Presence* as long as the *RC_PresenceCO2Enable* is set to **1**.

3.10 CO_2 settings

There are some special settings connected to the CO_2 measurements. See *Table 3-19 CO_2 variables* .

Table 3-19 CO_2 variables

Variable	Description
RC_CO2SetIndication	0 = Off 1 = VALUEDISPLAY: Show colour indication on CO_2 level when the CO_2 value is displayed. 2 = ALWAYS: Always show colour indication of CO_2 level.
RC_CO2LevelYellow	CO_2 limit when you change from Green to Yellow indication
RC_CO2LevelRed	CO_2 limit when you change from Yellow to Red indication
RC_CO2Indicator	Currently calculated CO_2 indication colour. 0 = OFF 1 = Green 2 = Yellow 3 = Red
RC_CO2Level	The current measured CO_2 value
RC_CO2LevelRounded	Rounded version of the CO_2 value, based on the *RC_CO2Step* variable
RC_CO2Step	This is the smallest allowed step change in *RC_CO2LevelRounded* value, as an example set this to 20 and you will only get CO_2 values like 420, 440, 460 and so on.
RC_CO2FilterTime	Filter time constant for the CO_2 value.

3.11 Relay control

The function of the *Relay control* is very similar to the *Output mapping* function. The source channel selection and mapping is exactly the same in *Output mapping* and *Relay control*. See section *3.8 Output mapping* for reference, and the sections *3.11.1 Mapping the source data and set relay configurations (Step 1)* and *3.11.2 Combining the sources into control value of relay (Step 2)*.

3.11.1 Mapping the source data and set relay configurations (Step 1)

✓ Map the relay sources (sensors) and select relay ON/OFF limit values.

Table 3-20 Relay mapping variables

Variable	Description
out_relay_source_X	0 = NONE : Do not use this source, entry will not be used to calculate output. 1 = DEGC : Temperature in degrees Celsius (°C) 4 = PPMCO2 : CO_2 in PPM
out_relay_source_X_map_max	Value to be used as the turn ON limit
out_relay_source_X_map_min	Value to be used as the turn OFF limit

3.11.2 Combining the sources into control value of relay (Step 2)

This next step is to combine up to four (4) source values into a value that controls the relay.

✓ Combine up to four (4) source values into a value that controls the value of the relay.

Table 3-21 Relay configuration and combined sources

Variable	Description
out_relay_enable	Set to 1 to make the relay control active.
out_relay	The calculated value that will be compared to the limit 0 for turn OFF the relay and 1 for turning ON the relay.
out_relay_combine	How to combine the enabled source channels. 0: Any above = ON, All below = OFF 1: All above = ON, Any below = OFF 2: All above = ON, All below = OFF
out_relay_indicate	Show an active relay by turning on the Green indication LED.

3.11.3 Examples

Below are a few examples on how the relay functionality works. All examples use the default setting for: *out_relay_limit_OFF* = 0, *out_relay_limit_ON* = 1, and *out_relay_source_?_map_function* = 0 [LINEAR]. See sections *Example 1 (Single value)* and *Example 2 (Combining sources)*.

Example 1 (Single value)

As default, a single sensor is mapped to the relay. In this example the relay should be controlled by the CO_2 sensor and turn ON when the CO_2-level is above 1100 ppm, and turn OFF below 700 ppm.

1. Set *out_relay_source_1* = 4 [PPMCO2] and the other sources *out_relay_source_2-4* to 0 [NONE] to configure the relay to only use one source and that source is the CO_2 sensor.
2. Set *out_relay_source_1_map_min* = 700 and *out_relay_source_1_map_max* = 1100 to set turn ON at 1100 ppm and turn OFF at 700 ppm.
3. Set *out_relay_combine* = 2 [All above = ON, All below = OFF], or to any other valid value. As only one channel is used as source the combine function does not matter.
4. Set *out_relay_enable* = 1 to enable the relay.

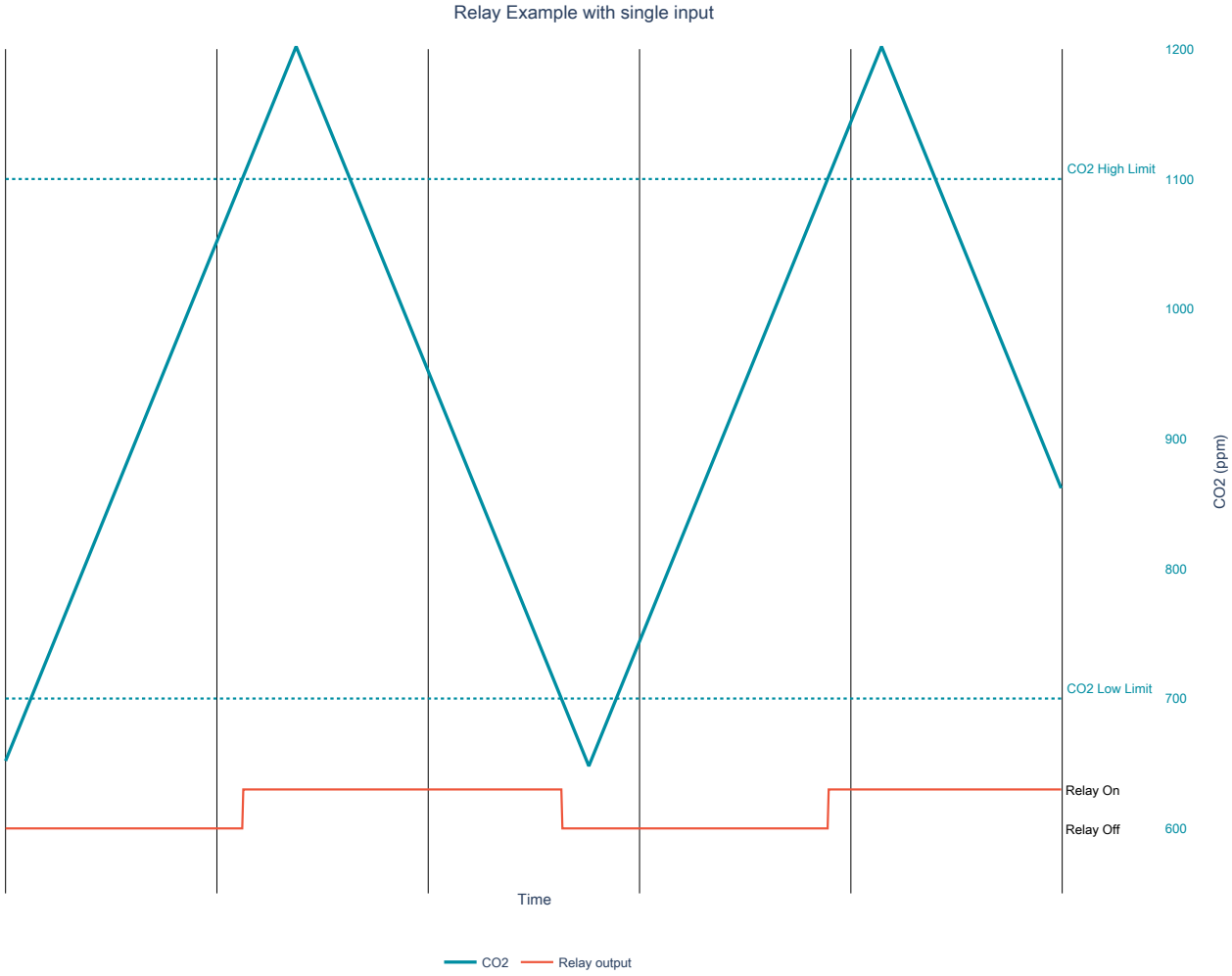


Figure 3-7 Relay example, single value

Example 2 (Combining sources)

In this example, the relay should be controlled by the CO_2 sensor and the temperature sensor. The relay should turn ON if CO_2 is above 900 ppm, or the temperature is above 25° (degrees).

The relay should then turn OFF when both CO_2 is below 650 ppm, and the temperature is below 23° (degrees).

It is also configured to see the relay state on the device, with a green indication while active.

1. Set *out_relay_source_1* = 4 [PPMCO2], *out_relay_source_2* = 1 [DEGC], and the other sources *out_relay_source_3-4* to 0 [NONE].
   to configure the relay to only use both CO_2 and temperature as control signals.
2. Set *out_relay_source_1_map_min* = 650 and *out_relay_source_1_map_max* = 900. Then set *out_relay_source_2_map_min* = 23 and *out_relay_source_2_map_max* = 25.
   This will set turn ON at 900 ppm and turn OFF at 650 ppm, and turn ON at 25° (degrees) and turn OFF at 23° (degrees).
3. Set *out_relay_combine* = 0 [Any above = On, All below = Off].
   This will turn ON the relay, if any of the inputs gets above its limit, and it requires all inputs to be below its turn OFF limit to turn OFF the relay.
4. Set *out_relay_enable* = 1 to enable the relay.
5. Set *out_relay_indicate* = 1, to enable a green LED indication when the relay is active.

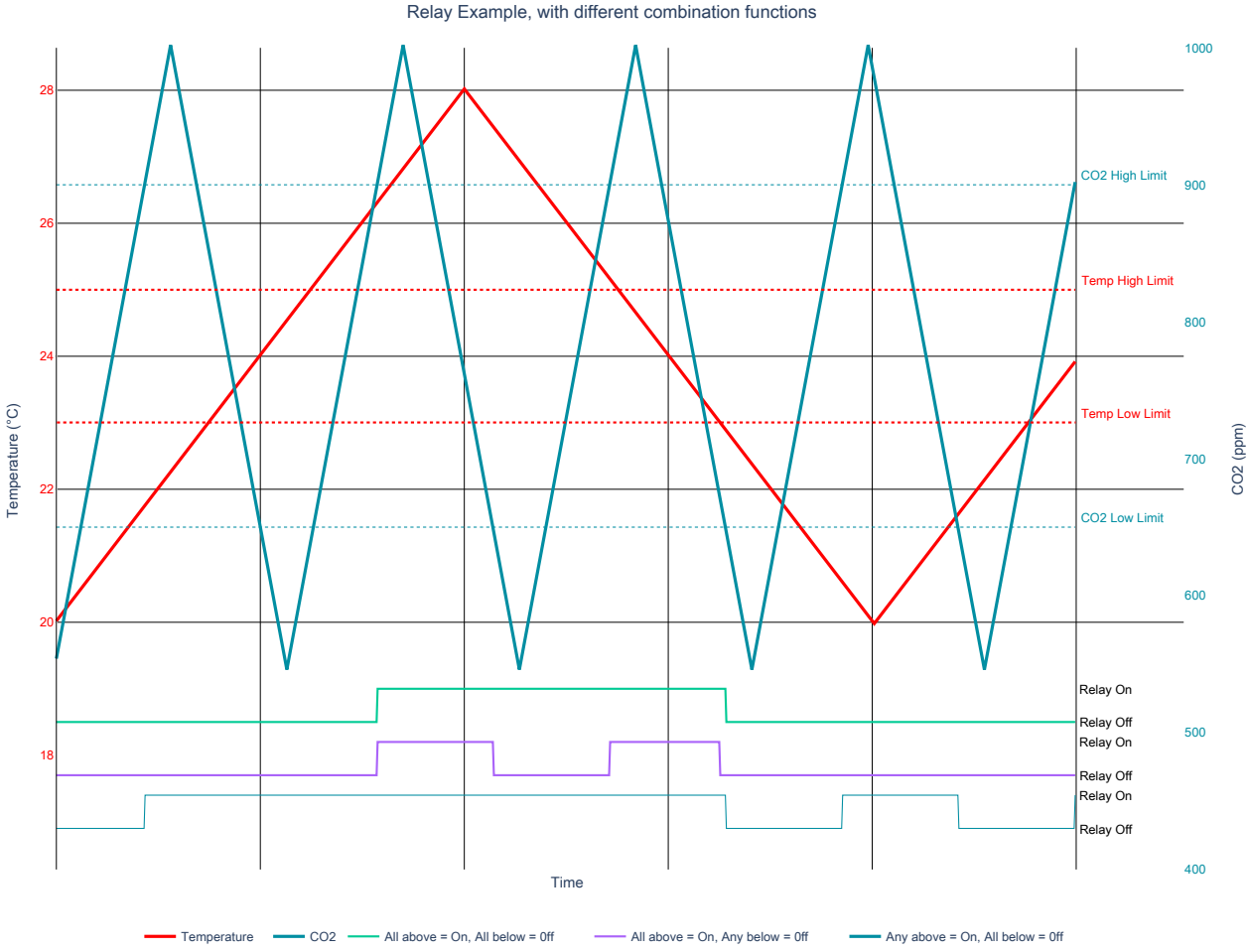


Figure 3-8 Relay example, combining sources

3.12 VOC

VOC's (Volatile Organic Compounds) are measured using specialized devices known as VOC monitors or VOC detectors. VOC detectors are designed to quantify the concentration of VOC's in the air, for RTX transmitters expressed in a index number, VOC Index. This index is relative, and does not measure the actual level of VOC's (tVOC).

VOC air pollutants can be breath, cosmetics, and other body odours from people, as well as different gases and fumes from furniture, paint, plastic, or gases from cleaning or cooking activities, or similar.

Examples of air pollutants and sources can be:

Exhalation

- ✓ breath gases (sulphur gases)
- ✓ CO_2 (carbon dioxide)

Harmful gases

- ✓ from paint and gluing compounds (acetone)
- ✓ from furniture, mattresses, or building products (toluene)

Other gases

- ✓ from alcohol, cleaning compounds, perfume (ethanol)

Odours

- ✓ from rotten food, farts (hydrogen sulphide, volatile sulfuric compounds)
- ✓ from pet pee (ammonia, amines)

Smoke

- ✓ from cigarettes (benzene, nitrosamine)

The VOC Index is a valuable tool for monitoring indoor air quality, specifically related to VOC's.

The VOC Index describes the current VOC status in a room relative to the sensor's recent history. Think of it like a human nose: When we enter a room, our nose uses the air composition outside as a baseline and alerts us if it detects higher or lower levels of VOC's indoors.

The VOC algorithm processes the raw signal from the sensor. It calculates an average value over the past 24 hours and assigns it a baseline VOC Index of 100. The VOC Index then maps measured values to a range from 0 to 500. This means that in a start-up phase of a sensor, or when a sudden big change in air quality, such as re-painting of a room or similar, will leave the VOC Index with a higher average value for some time before it will be stabilized.

The VOC algorithm initializes in two phases:

- ✓ 0…1.5 h: fast adaptation to the environment. Signal always initializes in level "typical". From the beginning, sensor-to-sensor-variation is excellent and fast VOC events are shown.
- ✓ >1.5 h: final, slow adaptation. Even very slow changes in chemical air pollution are now visualized for best user experience.

When the VOC sensor indicates poor air quality, individuals may be advised to take precautionary measures to reduce exposure to pollutants. VOC monitoring is crucial in various settings, including indoor environments (homes, offices, schools) to assess indoor air quality, industrial facilities to monitor emissions and comply with regulations, and environmental monitoring to understand outdoor air quality and potential health impacts on communities. Regular monitoring and control of VOC levels help ensure a safe and healthy environment for both humans and ecosystems.

The VOC sensor used in RTX transmitters is a MOX (Metal Oxide technology) based gas sensor for indoor air quality measurement.

Interpreting the VOC Index

A VOC Index above 100 indicates more VOC's than the average (for example, due to cooking, cleaning, or other events). A VOC Index below 100 suggests fewer VOCs than average (for example, fresh air from an open window). The VOC Index adapts its gain based on past 24-hour events, allowing consistent quantification on the same limited scale.

You can use the VOC index to trigger a higher amount of fresh air. Such as, by activating the *VOC Control* function with a setpoint for VOC index.

3.13 Regin:GO - Menu structure

The Regin:GO menu structure for the RTX application can be found in the RTX - Menu Structure document, available at www.regincontrols.com.

3.14 Communication

3.14.1 Networks, interfaces and protocols - Factory default

In *Table 3-22 Networks and interfaces, factory default status* and *Table 3-23 Protocols, factory default status (models with communication only)* you find the supported network interfaces and protocols, including the factory default settings.

Table 3-22 Networks and interfaces, factory default status

Network/Interface	Status from factory default	Description
RS485	ON (models with communication only)	Serial interface with differential signal levels, allowing for reliable data exchange between transmitters, sensors, and actuator over a bus with multiple other devices. Connection for SCADA configurations.
Bluetooth® **Low Energy**	Activated by button	The Bluetooth® Low Energy interface is a wireless interface used to temporarily connect to the device from a mobile phone, or tablet. The interface is used with the Regin:GO app for installation, configuration and maintenance of the device.

Caution! When you configure the device exclusively via RS485 using Application tool 2, it is recommended to disable Bluetooth® Low Energy (BLE) during setup. If BLE remains enabled, the device may still be accessed and reconfigured via Regin:GO using the default password. Note that this password can only be changed within the Regin:GO interface.

Table 3-23 Protocols, factory default status (models with communication only)

Protocol	Status from factory default	Used in interface	Description
EXOline	ON	RS485	Regin specific protocol. EXOline is used for communication and reliable, real-time data exchange between transmitters, sensors, and other field devices within Regin's EXO system and SCADA. Here used for device configuration, system maintenance, communication with other devices, SCADA etc. The difference compared to Modbus and BACnet, is that EXOline allows more configuration and is used by Regin's own tools (such as, Application tool 2).
Modbus	OFF	RS485	Modbus standardized protocol. Used for communication with other devices and/or SCADA systems.
BACnet	OFF	RS485	BACnet standardized protocol. Used for communication with other devices and/or SCADA systems.

3.14.2 Communication settings

In the **Device - Communication** page, you can set port settings, the Modbus address, and the Bluetooth® function settings.

The port 1 settings can be altered between the EXOline, Modbus, BACnet communication protocols, or be disabled.

For EXOline, you can set the PLA and ELA addresses (in Regin:GO) [1].

For the Modbus protocol, the Modbus address can be set here. And for BACnet the properties can be set. You can also change the Bluetooth® connection settings, for how and when the connection is made.

Communication fail settings can also be set from this page. For more information, see *Table 3-24 Communication settings*.

Table 3-24 Communication settings

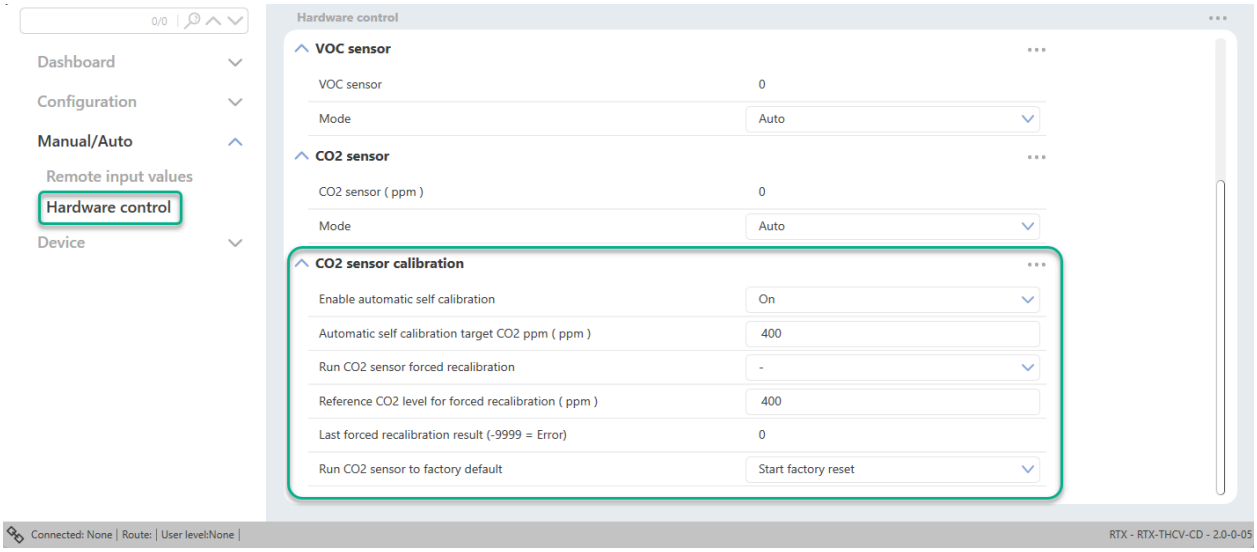
Setting values	Variable name	Description
Port 1 function	*RC_Port1Mode*	Setting of the port 1 function: **Disabled** **EXOline slave** (default) **Modbus slave** **EXOline/Modbus slave** **BACnet**
Port 1 baudrate	*RC_Port1Baud*	Setting of the port 1 baudrate: **9600** (default) **19200** **38400** **76800**
Port 1 parity	*RC_Port1Format*	Parity bit settings: **No parity, 1 stop bit** **Odd parity, 1 stop bit** (default) **Even parity, 1 stop bit** **No parity, 2 stop bits** **Odd parity, 2 stop bits** **Even parity, 2 stop bits**
PLA	*QSystem.PLA*	Address according to the PLA address on the device label.[1]
ELA	*QSystem.ELA*	Address according to the ELA address on the device label. [1]
Modbus address	*QServices.ModbusUnitID*	The same setting as ELA (default)
BACnet MSTP address	*QServices.BACnetMstpMAC_Port_1*	Setting of the BACnet MSTP address. Default set to a number between 64 and 127 (default).
MSTP max master address	*QServices.BACnetMstpMax-MasterAddr_Port_1*	Setting of the MSTP max master address. 127 = (default)
BACnet device ID	*QServices.BACnetDeviceID*	Setting of the BACnet Device ID. Set to the last 6 digits of the serial number (default).
BACnet device object name	*QServices. BACnetDeviceObjectName*	Setting of the BACnet device object name. Device name with the serial number appended to the end, “RTX012509111234” (default).
Password	*QServices.BACnetPassword*	Setting of a BACnet password. Need to be set by user (default).
Bluetooth® function	*BleButtonMode*	Setting on when the Bluetooth® function is activated or inactivated: **Off** **Always on** **On after startup** **Activated by button** (default)
Turn off after (s)	*BleButtonTimeout*	Setting of when the Bluetooth® connection is turned off. 120 = (default)

Table 3-24 Communication settings (continued)

Setting values	Variable name	Description
Fail action	*RC_OfflineFunction*	Setting of action(s) if communication fails: **No action** (default) **State to fallback state** **Outputs to default values** **Outputs to default, start offline**
Timeout (s)	*RC_OfflineTimeout*	Setting of an offline timeout threshold. 10 = (default)
Fallback state	*RC_ControllerStateFail*	Setting of desired fallback state (at loss of communication): **Off** **Unoccupied** **Standby** (default) **Occupied** **Forced ventilation**
Status	RC_Offline	Status description of the current communication status.

1. Note! In Application tool 2, the EXOline PLA and ELA addresses are changed from the Tools menu, in Change controller address.

3.15 CO_2 sensor calibration



The Automatic Sensor Calibration (ASC) algorithm ensures long-term measurement stability without requiring manual recalibration. It analyses historical sensor data and assumes exposure to a known minimum CO_2 concentration at least once during each calibration cycle. By default, the algorithm presumes the sensor is exposed to outdoor air with a CO_2 concentration of 400 ppm for a minimum of three (3) minutes every seven (7) days.

Setting values	Variable	Description
Enable automatic self calibration	*SCD40_ASC_enable*	Activates or deactivates the automatic calibration function for the CO_2 sensor. 0 = Off 1 = On (default)
Automatic self calibration baseline [ppm]	*SCD40_ASC_target*	Defines the baseline CO_2 concentration (in ppm) used by the ASC algorithm as the expected minimum background level during each calibration cycle. This value represents the lower bound to which the sensor is assumed to be regularly exposed. Value 300 to 1200 (ppm), 400 (default)
Run CO2 sensor forced recalibration	*SCD40_FRC_enable*	Forced Recalibration (FRC) allows the sensor to be manually calibrated using a known reference CO_2 concentration. This method is recommended when ASC is not sufficient or when immediate correction is required. Before initiating FRC, ensure the sensor is placed in an environment with a stable and homogeneous CO_2 concentration for at least three (3) minutes. Set this parameter to 1 to begin a manual recalibration of the CO_2 sensor. The value will automatically reset to 0 upon completion. 0 = Off (default) 1 = Run calibration
Reference CO2 level for forced recalibration [ppm]	*SCD40_FRC_target*	Specifies the CO_2 concentration (in ppm) to be used as the reference value during forced recalibration. This should reflect the actual CO_2 level at the sensor's location during calibration. Value 300 to 1200 (ppm), 400 (default)

Setting values	Variable	Description
Last forced recalibration offset (-9999 = Error)	*SCD40_FRC_result*	Displays the correction value applied during the most recent FRC operation (in ppm). A value of -9999 indicates that the calibration attempt failed. Value = 0 (default) Value = -9999 (calibration attempt failed)
Start factory reset	*SCD40_factory_reset*	Set this parameter to 1 to reset the CO_2 sensor to its original factory configuration. The value will revert to 0 once the reset is complete. This command erases all user-defined settings and clears the history of both ASC and FRC algorithms. 0 = Off (default) 1 = Reset to factory default

3.16 Update software

When there is a software update available for the device, you will be prompted to update the software in Regin:GO. You can also manually update the device software in Regin:GO whenever you need through the **Action** menu, if you are connected to the device.

3.16.1 Updating the device software in Regin:GO

1. In the Regin:GO menu, tap the **[Actions]** button.
2. In the drop down menu, tap **[Update software]**.
3. In the **Update software** page, tap **[Available software]**.
4. Select the desired software version.
5. Tap the **[Update software]** button.
6. In the **Update software** dialog, choose **[Save settings]**, **[Continue with update]**, or **[Cancel]**.

Note! Regin recommend to save your settings before a software update. The update can cause the settings to be reset to default, and then you can use the saved file to restore your settings.

7. To continue with device software update, tap **[Continue with update]**. You will be prompted with the update process progression.

Caution! Do not leave the **Update software** page during the update process. This may cause settings loss.

8. When the software update is finished, in the **Update software** dialog, tap **[Return to device]** list.

3.17 Reset

In the **Device - Reset** page, you can set the variable *product_reset* to **Restart device**, **Reset application settings**, or **Factory reset**, in order to initiate a restart instantly. For more information, see *Table 3-25 Reset types*.

Table 3-25 Reset types

Reset type	Description
Restart device	Restart the device. Similar to a power cycle.
Reset application settings	Restart the device and set all parameters to the default factory state, except some communication settings such as: ELA, PLA, Modbus address, serial port settings (baud rate, mode, parity, timeouts) and BACnet configuration (Device ID, Device object name, password, MSTP MAC, timeouts)
Factory reset	Restart the device and set all parameters to the default factory state.

3.18 Factory reset

You can reset the device to factory settings with use of unmarked touch buttons. To reset the device with these unmarked touch buttons, follow the procedure *3.18.1 Resetting the device to factory settings* within the first 60 seconds after starting the device.

3.18.1 Resetting the device to factory settings

1. Make sure that the device has been turned off
2. Start the device
3. Press and hold on the upper right part of the device (keep active during the full sequence), within the first 60 seconds after starting the device
4. Press and hold the lower right part of the device for approximately 10 seconds. During this time the indication will be green, and when done it will change to red.
5. Release the lower right part of the device
6. Press and release (short press (<1.5 seconds (s)) the lower right part of the device three (3) times in 10 seconds
7. The LED flashes in green for a short time to confirm a successful factory reset, and the device restarts with default settings

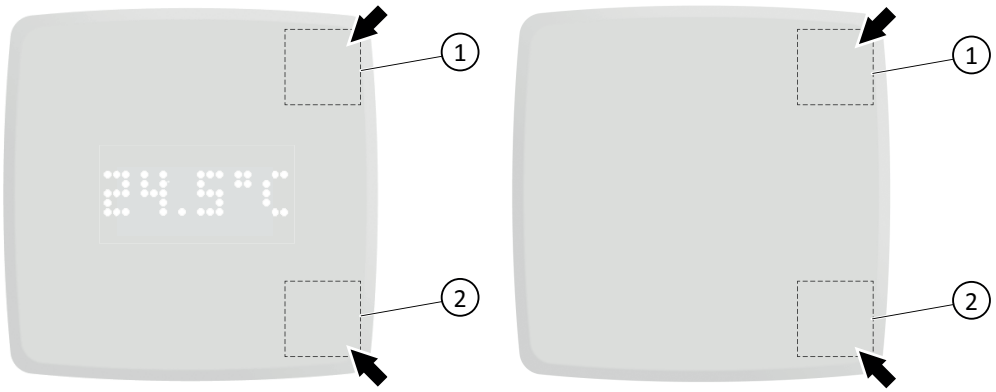


Figure 3-9 Factory reset press areas (with/without display)

① *Upper right part of the device* ② *Lower right part of the device*

If you have not succeeded in pressing the lower right part of the device (2) three (3) times during ten (10) seconds in step 6., or you release the upper right part of the device (1), the reset operation is interrupted and the LED returns to what it showed before. Start with step 3. anew, if you still want to make a factory reset.

4 Information for the installer

4.1 Installation

4.1.1 Installation preparations

The transmitter should be mounted in a location with good air circulation, where it can be expected to give a representative reading. It may be mounted on a wall box or directly on the wall.

See the RTX - Instruction, to be found at www.regincontrols.com .

4.1.2 Mounting

Caution! If the device is mounted over electrical installation pipes, it is important that the airflow is obstructed. If there is a risk for this, you need to plug the pipe.

1. With surface-mounted cabling, break out suitable holes from the marks in the plastic
2. Find a location that has a temperature representative for the room. A suitable location is approximately 1.6 m above floor level in a place with unobstructed air circulation
3. Select suitable holes and mount the backplate onto the wall or a wall box with fastening screws, so that the arrows on the backplate point upwards
   The backplate has several fixing hole combinations

Note! Do not tighten the fastening screws too hard

4. Place the terminal in the sliding slots on the backplate
5. Connect the cables needed to the terminal, according to the terminal list

For more information, see the RTX-... and RTX-..(C) Instruction, to be found at www.regincontrols.com.

4.1.3 Removing cover

To remove the front cover:

1. Depress the locking tongue in the lower part of the casing using a 3 mm flat-blade screwdriver
2. Press in and pull up the screwdriver and at the same time pull the bottom part of the front outwards
3. When the bottom end of the front is free from the bottom part of the casing, slide the cover towards the top of the casing to free the hooks holding the upper edge of the front cover.

4.1.4 Wiring

All units that share the same transformer and communication loop must use the same transformer-pole for G (terminal 1) and G0 (terminal 2). On the communication loop, the A-terminal (terminal 3) should only be connected to another A-terminal, and the B-terminal (terminal 4) to another B-terminal. Otherwise, the communication will not work.

The communication cable must be a screened twisted pair cable. The shield must be connected to G0 on one (and only one) device in each separate power supply loop with 24 V AC. If the length of the loop exceeds 300 m, a repeater is required. See *Figure 4-1 Wiring example - communication cable*.

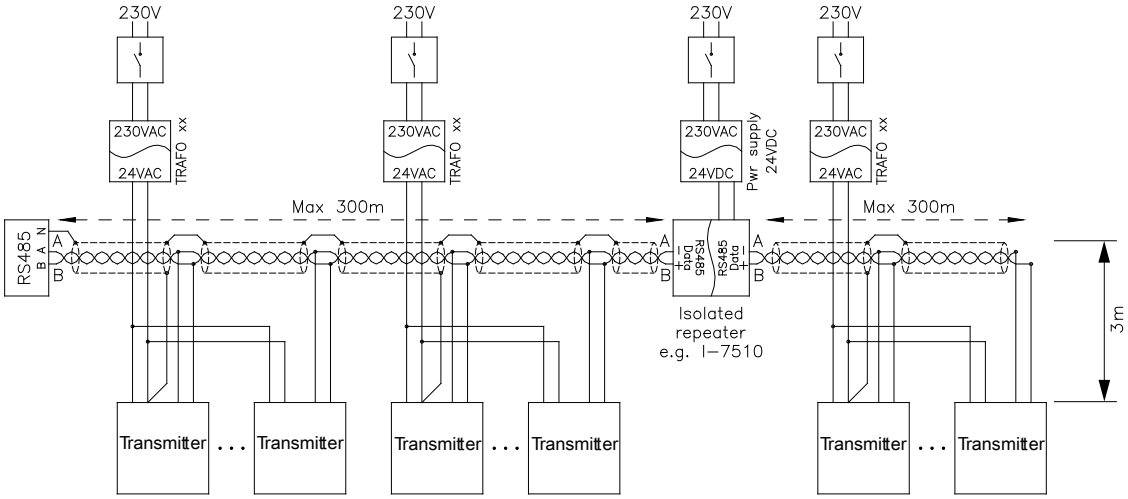


Figure 4-1 Wiring example - communication cable

Caution! In installations with wires entering the device from the side, the wires must be firmly attached to the surrounding wall to relieve the wires from strain and twisting, as there are no internal strain relief.

4.1.5 Wiring - RTX-...

Perform the connections according to the electrical wiring diagram.

Note! GND and G0 are internally connected. Screw the bottom part of the casing to the wall.

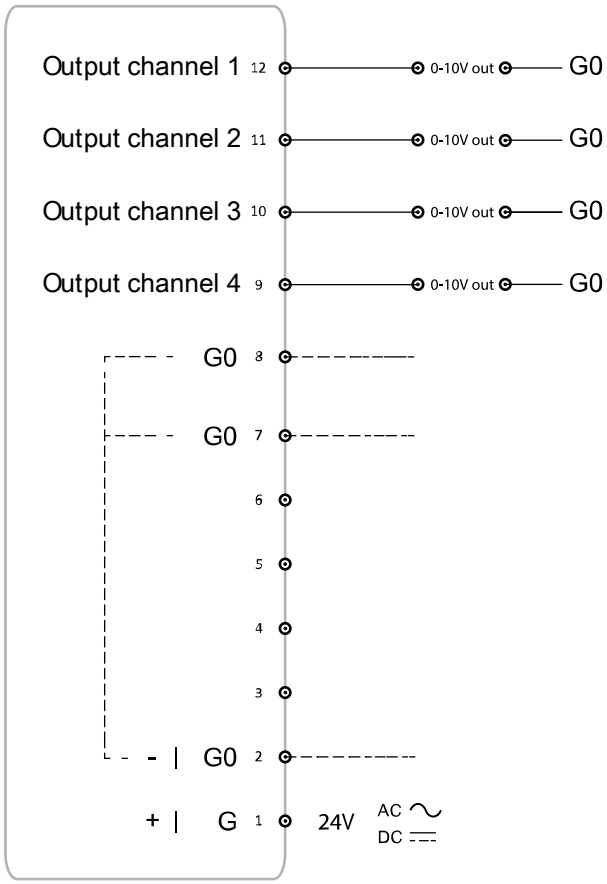


Figure 4-2 RTX-... wiring diagram

4.1.6 Wiring - RTX-..(C)

Connect the wires to the terminals according to the wiring diagram.

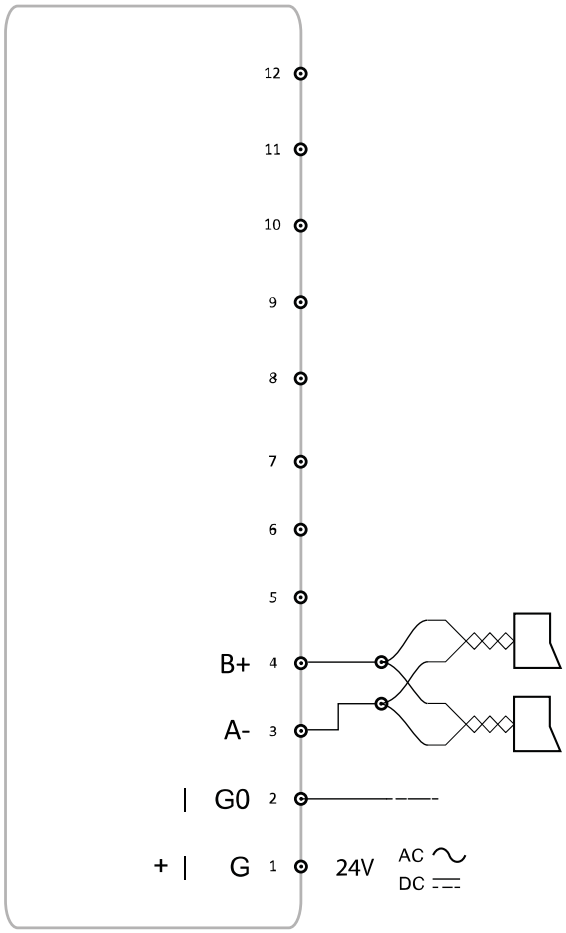


Figure 4-3 RTX-..(C) wiring diagram

4.1.7 Wiring - RTX-THCV-CDX

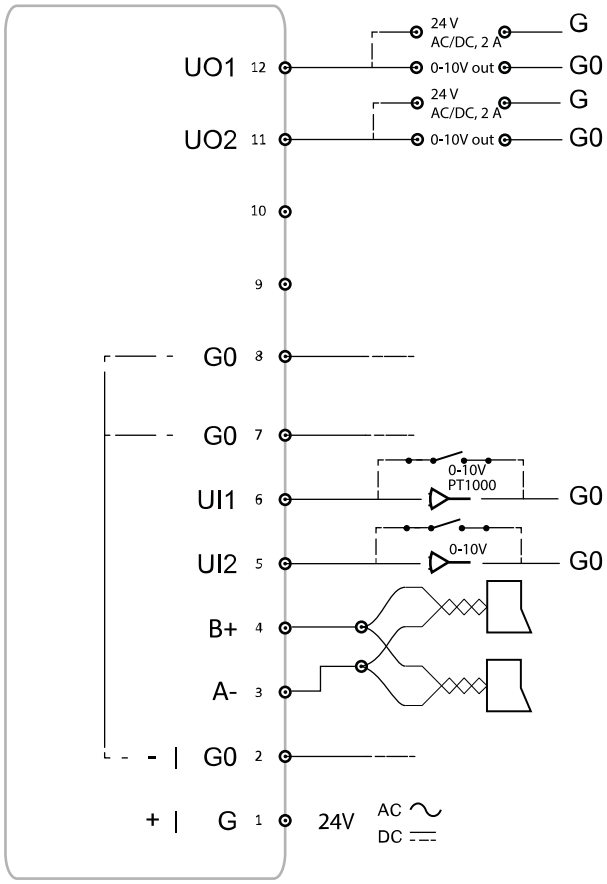


Figure 4-4 RTX-THCV-CDX wiring diagram

4.1.8 Wiring - RTX-TC-R

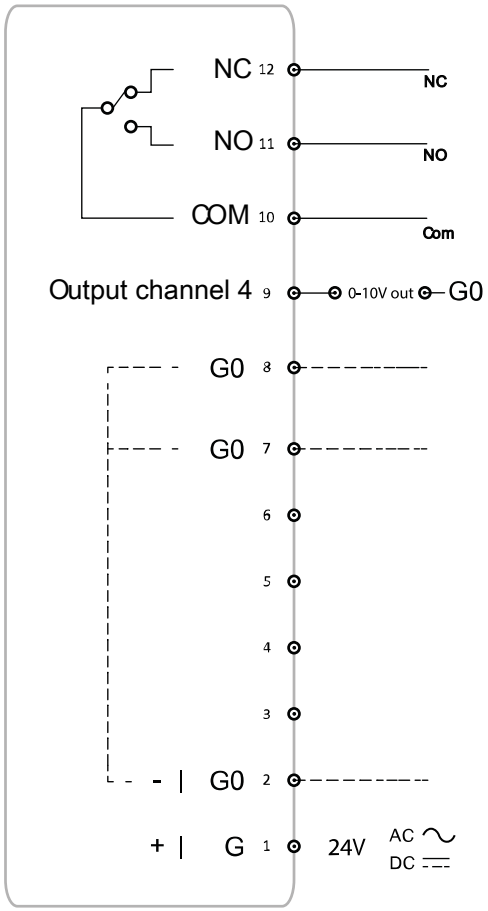


Figure 4-5 RTX-TC-R wiring diagram

4.1.9 Using labels

On the back of the electronics cassette, there is a set of labels which make it easier to install a large number of RTX room transmitters. By using the labels as carriers of information for the installation engineer, much time will be saved and you can keep wiring errors at a minimum.

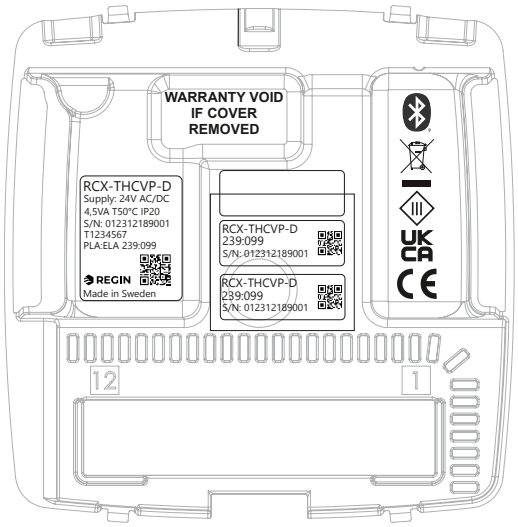


Figure 4-6 Labels on the back of the room transmitter (example label illustrated, may vary)

The three-piece label can be split and the two (2) smaller label parts to the right can be fastened to the installation drawing and the backplate of the room transmitter. The labels carry information on the communication address etc., and have QR codes and a note area where you can enter a reference number to the connection diagram.

4.1.10 Troubleshooting

It is possible to detach the terminal from the backplate when troubleshooting, and perform measurements on the terminal while the room transmitter is connected.

5 Conformity

Hereby, Regin declares that the radio equipment type RTX is in compliance with Directive 2014/53/EU.

Regio RTX series complies with EN IEC 60730-1 as a class A control.

This radio equipment device is approved for use in all countries within the European union.

CE

This product carries the CE-mark. More information is available at www.regincontrols.com.

Appendix A Technical data

A.1 General data

Supply voltage	24 V AC (50...60 Hz) or DC (tolerance: 18…28 VAC, 18..30 VDC)
Display	25 x 5 pixels
Power consumption	< 2.5 VA
Ambient temperature	0...50 °C
Ambient humidity	Max. 90 % RH
Storage temperature	-20…+70 °C
Terminal blocks	Pluggable screw terminal, for cable cross-section <= 2.1 mm^2
Protection class	IP30
Material casing	Polycarbonate (PC) (white)
Colour	Cover: RAL9003 (signal white) Backplate: RAL9003 (signal white)
Measuring range, temperature	0…50 °C
Temperature accuracy	±0.5°C at 15...30°C
Humidity sensor accuracy	2,5 %RH @ 25°C full range
CO_2 sensor	0…40000 ppm Update frequency: 5 s
CO_2 sensor accuracy	±50 ppm + 5 % (measured value, MV) @400...2000 ppm
PIR sensor, detection range	Detection angle 110°, distance 5 m at 8 °C temp. difference = up to 7 m at 4 °C temp. difference = up to 5 m (Target conditions: movement 1.9 m/s, object size approx. 700 x 250 mm) **Note!** Depending on the temperature difference between the target and the surroundings, detection range will change.
VOC sensor	VOC Index, range 0...500 (100 = 24 h average)
Mounting	Room/Wall
Weight	115 g
Dimensions	with backplate assembly: 94.6 x 94.6 x 21 mm

A.2 Communication

RS485 (RTX-..(C))	For EXOline (with automatic detection), Modbus (with automatic detection), or BACnet. 8 bits, 1 or 2 stop bits. Odd, even or no parity.
Communication speed	9600, 19200, 38400, or 76800 bps (for all protocols)
Communication cable length, maximum	1200 m, with repeater
Bluetooth® Low Energy	Bluetooth® communication.

A.3 Inputs & outputs

The RTX room transmitters have the possibilities of universal inputs (UI), universal outputs (UO), and analog outputs (AO). See table *1 RTX-... - output list* and table *2 RTX-THCV-CDX - input and output list*.

A.3.1 Outputs - RTX-...

1 RTX-... - output list

Output channel 1	0…10 V, 2 mA
Output channel 2	0…10 V, 2 mA
Output channel 3	0…10 V, 2 mA
Output channel 4	0…10 V, 2 mA

A.3.2 Inputs & outputs - RTX-THCV-CDX

2 RTX-THCV-CDX - input and output list

Universal Output 1	AO: 0…10 V, 2 mA DO: 24 V /max 2 A (switches to G0) **Note!** The maximum current is 2 A in total for Output 1 and Output 2.
Universal Output 2	AO: 0…10 V, 2 mA DO: 24 V /max 2 A (switches to G0) **Note!** The maximum current is 2 A in total for Output 1 and Output 2.
Universal Input 1	0…10 V PT1000 (0…50 °C)
Universal Input 2	0…10 V

Appendix B Model overview

Table B-1 Transmitter models

Article	Display	Commu-nication	Tempera-ture sensor	Humidity sensor	CO_2 sensor	VOC sensor	PIR sensor	Relay	Timer for Extended run
RTX-TH			✓	✓					
RTX-TH-D	✓		✓	✓					
RTX-TC			✓		✓				
RTX-TC-R			✓		✓			✓	
RTX-THC			✓	✓	✓				
RTX-THCV			✓	✓	✓	✓			
RTX-TV			✓			✓			
RTX-TC-D	✓		✓		✓				
RTX-TH-C		✓	✓	✓					
RTX-TC-C		✓	✓		✓				
RTX-THCV-C		✓	✓	✓	✓	✓			
RTX-THCV-CD	✓	✓	✓	✓	✓	✓			
RTX-T-CDE	✓	✓	✓						✓
RTX-TP-C		✓	✓				✓		
RTX-THCV-CDX	✓	✓	✓	✓	✓	✓			

Table B-2 Backplate assembly models

Article	Comments
RCX-BL	Backplate Low (signal white)
RCX-BM	Backplate Medium (signal white)

Appendix C Input and Output list

Table C-1 Input and Output list for Models

Article	0…10 V out	2 Universal Outputs	2 Universal Inputs
RTX-TH	2	-	-
RTX-TH-D	2	-	-
RTX-TC	2	-	-
RTX-TC-R	1	-	-
RTX-THC	3	-	-
RTX-THCV	4	-	-
RTX-TV	2	-	-
RTX-TC-D	2	-	-
RTX-TH-C	-	-	-
RTX-TC-C	-	-	-
RTX-THCV-C	-	-	-
RTX-THCV-CD	-	-	-
RTX-T-CDE	-	-	-
RTX-TP-C	-	-	-
RTX-THCV-CDX	-	✓	✓

Appendix D Terminal list

D.1 Wiring - Terminal list, RTX-...

For more information about wiring, see section *4.1 Installation*.

Terminal	I/O
1	Power supply G +24 VAC
2	Power supply G0 -24 VAC
3	Not used
4	Not used
5	Not used
6	Not used
7	G0
8	G0[1]
9	Channel 4, Analog output 0...10V
10	Channel 3, Analog output 0...10V
11	Channel 2, Analog output 0...10V
12	Channel 1, Analog output 0...10V

D.2 Wiring - Terminal list, RTX-..(C)

For more information about wiring, see section *4.1 Installation*.

Terminal	I/O
1	Power supply G +24 VAC
2	Power supply G0 -24 VAC
3	Communication A-
4	Communication B+

D.3 Wiring - Terminal list, RTX-THCV-CDX

For more information about wiring, see section *4.1 Installation*.

Terminal	I/O
1	Power supply G +24 VAC
2	Power supply G0 -24 VAC
3	Communication A-
4	Communication B+
5	Universal input 2, 0...10 V + DI
6	Universal input 1, PT1000 + DI
7	G0
8	G0[1]
9	Not used
10	Not used
11	Universal output 2, 0...10 V or 24 V AC/DC, 2 A
12	Universal output 1, 0...10 V or 24 V AC/DC, 2 A

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