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USER GUIDE

TRI

Produal

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TRI - Touchscreen room unit

User Guide

This user guide is for devices with the software version 5.01 or newer.

PRODUAL
measure-be sure.

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1 Safety precautions

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

Read this user guide carefully before commissioning, using or servicing this device. To avoid any kind of damage to people or property, follow the instructions carefully. Produal is not liable for any hazards or damages to people or property which are caused by ignoring the using or installation instructions.

To avoid electrical shock or damage to equipment, disconnect power before installing or servicing the product. Use only a proper wiring rated for the full operating voltage and maximum current in the system even in the event of a fault.

The product condition must be checked before installation. Do not drop the product or use excessive force during installation. Do not use the product if any damages are visible.

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 kind of warnings and notes. The warning and note types are defined in the following table.

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

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2 Functional description

2.1 Operation modes

The device has six operation modes that have their own configurable settings. The operation modes are called comfort, eco, boost, lock, night and off modes. Additionally, a control mode selection button is available.

The operation modes can be controlled by the following functions:

- Using device's display buttons
- Using a digital input (e.g. occupancy detection)
- Using bus communication

2.1.1 Comfort mode

The comfort mode is the base operating mode that allows user to control the device functions. In comfort mode, the setpoint is adjusted by the user (or via the network) and viewed on the display. The user setpoint adjustment target and range can be set (default target is temperature and the range is 14.0...30.0 °C).

2.1.2 Eco mode

The device can be switched to eco mode via network or via digital input (e.g. occupancy detection).

In the eco mode, the device controls the temperature according to eco mode setpoint. The eco mode can be cancelled by pressing button in the main view. When the eco mode is cancelled, the device changes to comfort mode.

Note: Eco mode button can be disabled through the configuration settings. When the button is disabled the user can't cancel the eco mode.

2.1.3 Off mode

The device can be switched to off mode via network, via digital input (e.g. occupancy detection) or via display button.

In the off mode the setpoint view is dimmed and the setpoint buttons are hidden.

The off mode can be activated via additional settings view by pressing button. The off mode can be cancelled by pressing the button in the main view or in the additional settings view. When the off mode is cancelled, the device changes to comfort mode.

2.1.4 Lock mode

Lock mode locks the selected controls from the user. Lock mode can be activated by pressing button on the additional settings view.

The following options are available:

Selection	Description
Disabled	Function is disabled.
On/Off Only	Off mode, lighting and air conditioning buttons available.
Adjust Only	Setpoint buttons available.
No Input	All buttons unavailable.

A lock mode protection code can be set via the configuration mode. If the lock code is not 0000 (factory setting), the code is required to activate and deactivate the lock mode.

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The lock mode status doesn't change after power failure.

2.1.5 Boost mode

Boost mode activates the relay output manually for a period of time in -1R models. The device can be switched to boost mode via network or via display button ( ).

Note: If the relay is controlled via communication network, the boost mode has no effect on the relay.

The boost time can be adjusted to 0...480 minutes. If the time is set to 0, the boost mode is deactivated. Boost mode can be cancelled by pressing button or over the network. The remaining boost time is viewed on the display.

2.1.6 Control mode

The device has control mode button that can be used to change the control mode (network value). The modes can be changed by pressing the button.

Control mode button mode button is not active as a default. The button can be activated via configuration mode. The following options are available:

Selection	Description
Disabled	Function is disabled.
Htg/Clg	*HEAT*, *COOL* selections available.
Htg/Clg/Fan	*HEAT*, *COOL*, *FAN* selections available.
Auto/Htg/Clg	*AUTO*, *HEAT*, *COOL* selections available.
Auto/Htg/Clg/Fan	*AUTO*, *HEAT*, *COOL*, *FAN* selections available.
Auto/Htg/Fan	*AUTO*, *HEAT*, *FAN* selections available.
Auto/Clg/Fan	*AUTO*, *COOL*, *FAN* selections available.

2.1.7 Night mode

The device can be switched to night mode by using digital input. In the night mode the target display is dimmed, and the fan speed is set as to night fan speed value.

When the device returns from night mode to comfort mode, the setpoint is set to the nominal setpoint.

2.2 Inputs

2.2.1 Resistive inputs

RI1 and RI2 inputs can be used to connect NTC 10 sensor to device and the sensor information can be used for different control and display purposes. The measurements can be read also via communication network.

2.2.2 Digital inputs

The potential free contact input can be configured for different functions. The switching delay from active to passive can be adjusted.

The following options are available:

Selection	Description
Disabled	Input is disabled.
Close for ECO	The input is used for activating the eco mode. The eco mode activates when the contact closes.

Selection	Description
Open for ECO	The input is used for activating the eco mode. The eco mode activates when the contact opens.
Close for OFF	The input is used for activating the off mode. The off mode activates when the contact closes.
Open for OFF	The input is used for activating the off mode. The off mode activates when the contact opens.
DI Contact Alarm	When the contact closes, "DI Contact Alarm" alarm message is viewed on the display.
Network	The input is available over the communication network as digital input.
Close for Night	The input is used for activating the night mode. The night mode activates when the contact closes.

2.3 Outputs

2.3.1 Analogue outputs

TRI-3A models have three analogue outputs (0...10 Vdc) that can be used to deliver device measurements or other information to BMS, for example.

The following options are available:

Selection	Description
Network	The output is controlled via communication network.
Sensor 1	The output is controlled according to temperature sensor 1 value.
Sensor 2	The output is controlled according to temperature sensor 2 value.
Sensor 3	The output is controlled according to temperature sensor 3 value.
Setpoint	The output is controlled according to setpoint value.
Fan	The output is controlled according to selected fan speed value. The output is scaled to following voltages: • On/off fan: 0 = 0 %, 1 = 100 % • 2-speed fan: 0 = 0 %, 1 = 50 %, 2 = 100 % • 3-speed fan: 0 = 0 %, 1 = 33 %, 2 = 66 %, 3 = 100 % • 6-speed fan: 0 = 0 %, 1 = 17 %, 2 = 33 %, 3 = 50 %, 4 = 66 %, 5 = 83 %, 6 = 100 %
Humidity	The output is controlled according to humidity value.
CO2	The output is controlled according to CO_2 value.

2.3.2 Relay output

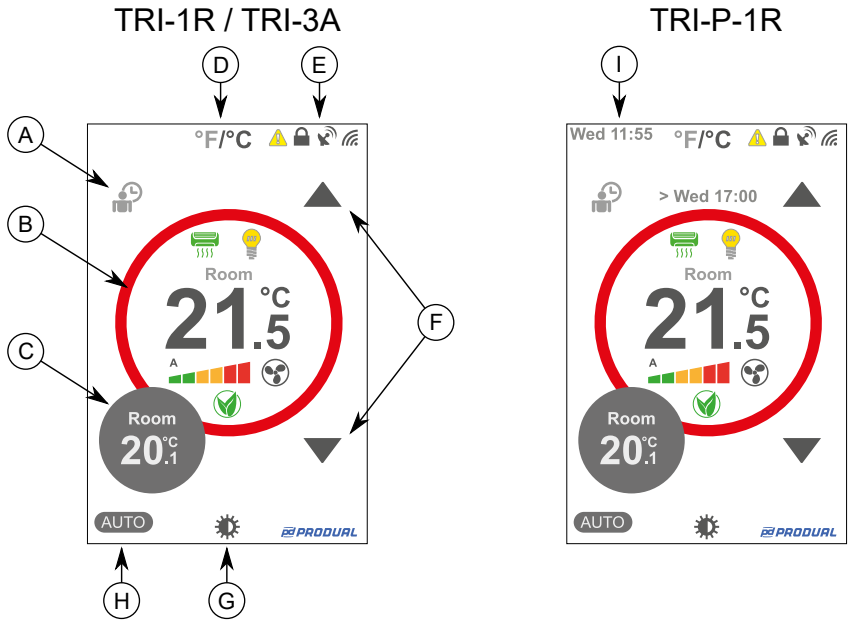
-1R models have a relay output that is controlled according to boost mode, calendar schedule or via communication network.

The following options are available:

Selection	Description
Control NC	Normally closed. Controlled according to boost mode and calendar schedule.
Control NO	Normally open. Controlled according to boost mode and calendar schedule.
Network	Controlled via communication network.

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2.4 User interface



A. Boost mode button
B. Main information view
C. Secondary information view and action button
D. Temperature unit selection button
E. Status information
F. Temperature setpoint adjustment buttons
G. Backlight level selection button
H. Controlling mode
I. Day and time

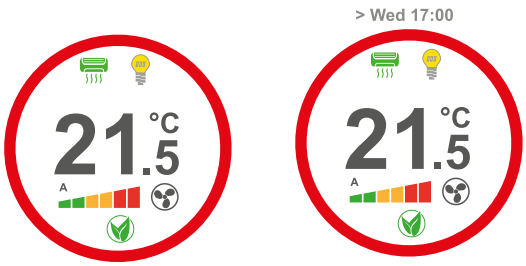
The user interface includes touch sensitive areas that can be used to change the device settings.

- Temperature setpoint adjustment buttons can be used to adjust the temperature setpoint.
- Backlight level selection button can be used to dim the display or turn it off.
- Main information screen has several touch areas that can be use adjust the settings, for example fan speed.
- Temperature unit selection button can be used to change the temperature unit on the display.
- Secondary information view works also as a button that is used to access additional settings view.

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2.4.1 Main information view

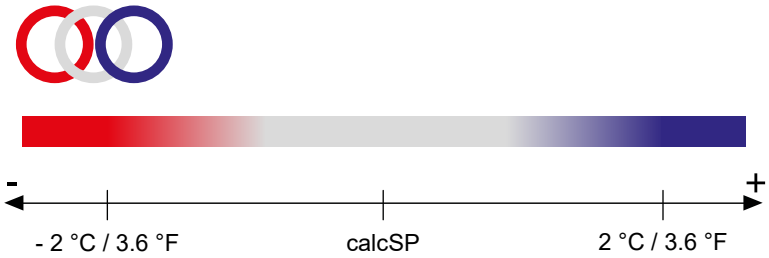
TRI TRI-P



Symbol	Description
	Energy ring. The energy ring colour illustrates how far the measured temperature is from the setpoint. The energy ring colour can also be set to a selected static colour.
	Air conditioning button. The button can be used to air conditioning (on/off).
	Lighting button. The button can be used to control lighting (on/off)
	Setpoint view. The next scheduled setpoint change is also displayed in -P models.
	Eco mode button. Eco mode can be cancelled with the button.
	Fan speed view and adjustment button.

2.4.1.1 Energy ring colours

As a default the colour of the energy ring indicates the heating/cooling demand. The energy ring is white, when the measured temperature is the same as the setpoint. The density of red/blue on the energy ring modulates based on how far from the setpoint (*calcSP*) the temperature is. When the difference is 2 °C / 3.6 °F the energy ring colour is at full density.



The ring colour can also be set to a static colour. The following colours are available:



2.4.1.2 Fan speed view and button

Fan speed can be displayed in several different ways. The fan display can be enabled through the configuration mode.

Following fan speed views are available:

Menu selection	Fan view style
Bar	
Bar & Fan	
Coloured Bar	

Menu selection	Fan view style
Coloured Bar & Fan	
Fan	
Disabled	Fan view disabled.

'A' is displayed above the bar when the fan speed control is automatic. The number of bars displayed depend on the fan speed.

Following fan speed selection options are available:

Menu selection	Description
Disabled	Function is disabled.
1-step	On/off fan.
2-step	2-speed fan.
3-step	3-speed fan.
6-step	6-speed fan.
1-step+Auto	On/off fan with automatic speed selection.
2-step+Auto	2-speed fan with automatic speed selection.
3-step+Auto	3-speed fan with automatic speed selection.
6-step+Auto	6-speed fan with automatic speed selection.
Advanced	6-speed fan with automatic speed selection and separate night mode speed.
CU-3-step+Auto	3-speed fan with automatic speed selection. Use with CU and CU-LH fan speed control.

The user can control the fan speed by using the fan speed view on the main information view. The wanted speed can be set by touching the view multiple times. When the manual fan speed is set, 'M' is displayed above the speed bar.

In eco mode, the manual speed setting is available. In off mode, the manual speed setting is disabled.

Note: The fan speed view can also be used to display and adjust some other functions by using views without the rotating fan symbol.

2.4.2 Secondary information view and action button

Secondary information view shows measurement information and remaining boost mode duration.

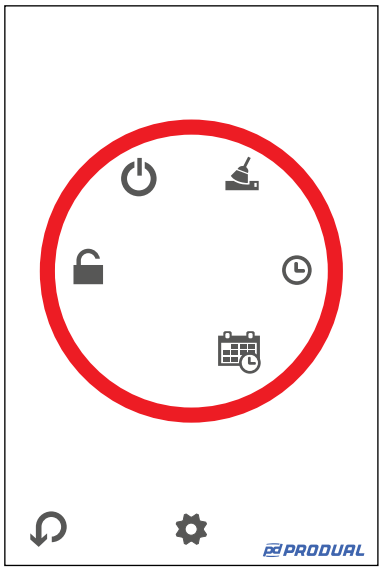


The secondary information view is also used as a button to access additional settings view. Entering the additional settings view can be protected by setting password in configuration mode (*Staff Code*). The password is 0000 by default, which means that the password is not required to access the additional settings view.

2.4.2.1 Additional settings view

The additional settings view can be accessed by pressing the secondary information view.

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Symbol	Description
	Cleaning mode button. The button is used to activate the cleaning mode.
	Locking button. The button is used to disable some of the display buttons.
	Time setting button. Only available in -P models.
	Calendar button. The button is used to access the calendar management view. Only available in -P models.
	Off mode button. The button is used to activate the off mode.
	Configuration mode button. The button is used to access configuration mode.
	Escape button. The button is used to exit the additional settings view.

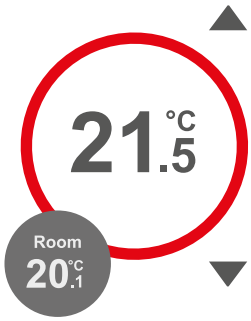
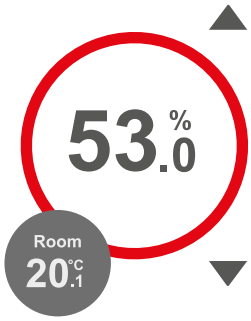
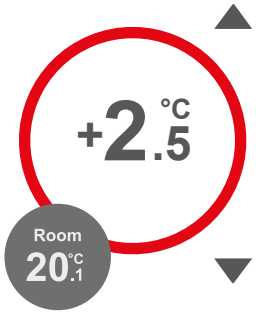
2.4.2.2 Cleaning mode

Cleaning mode can be activated via additional settings view by pressing button. The device enters to display cleaning mode, where all display presses are ignored and 30 second countdown timer is displayed. This allows cleaning the touchscreen display.



2.4.3 Setpoint views

As a factory setting, the main information view shows the temperature setpoint value. The following setpoint view options are available:

Selection	Description
Temperature	Main information view shows the setpoint as absolute temperature. 
Percentage	Main information view shows the setpoint as a percentage value. 
None	Main information view shows the measured temperature. If only the temperature measurement is available, ⚙ button is shown instead of the secondary information view. 
Temperature Rel.	Main information view shows the setpoint as relative temperature. 
State Select	Main information view shows the setpoint as a value without a unit. 

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2.4.4 Display backlight

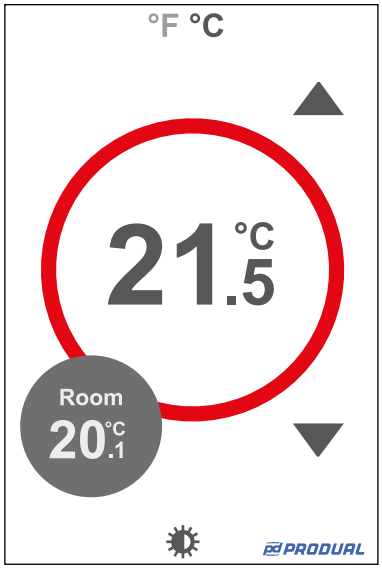
The display backlight has three levels, normal, stand-by, and off. The backlight is in normal level when the display is touched. The display dims to the stand-by level after the display is not touched for 30 seconds. If the backlight stand-by level is set to 0, the screen backlight switches off.

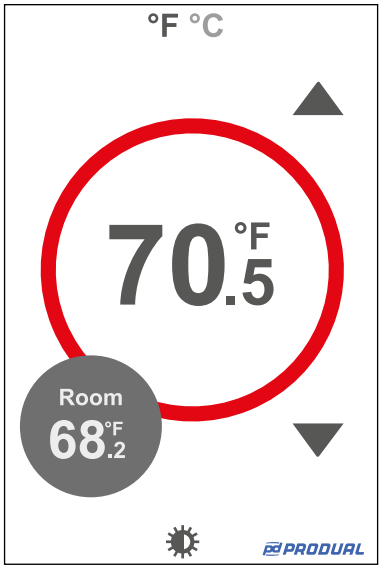
The backlight level can also be controlled by pressing button. Pressing the button when the display backlight is in normal level, the backlight changes to stand-by level. Pressing the button when the backlight is in stand-by level, the backlight switches off.

The display backlight stand-by level can be adjusted through the configuration mode.

2.4.5 Temperature unit in display

If temperature unit selection button (°F °C) is enabled through the configuration mode, it is possible to change the temperature unit by pressing the button. This option is particularly useful in hospitality applications where the client base is expected to be international.



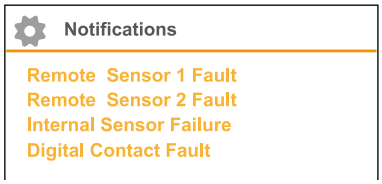


It is also possible to select temperature unit for the display at the commissioning through the configuration mode (*Native Units (Defaults)*).

Important: After changing the unit through the configuration mode, the controller reloads defaults for all settings. Select the native units when starting the commissioning.

2.4.6 Sensor fault view

The device shows error information about the connected sensors. The sensor faults are indicated with symbol. The error details can be viewed by pressing the secondary information view and then pressing symbol.



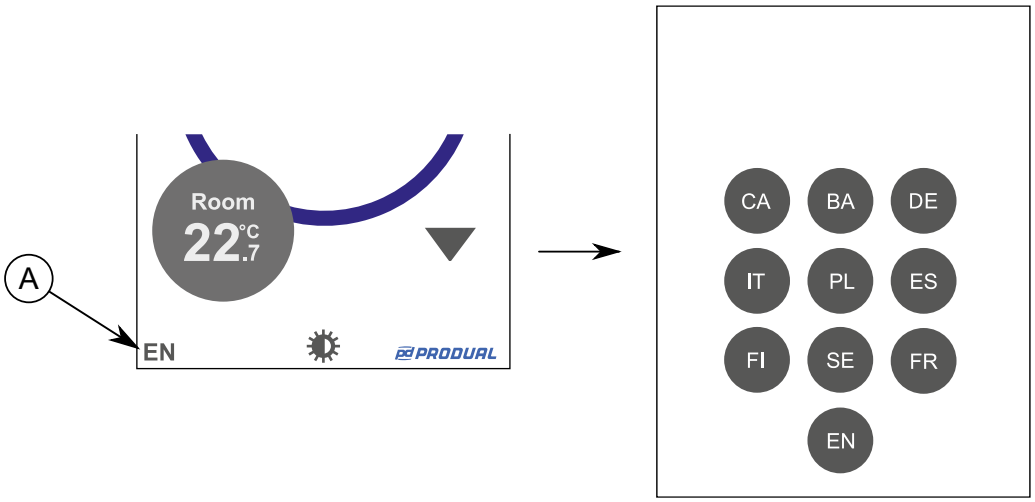
The typical alarms are listed in the following table.

Alarm	Reason
External sensor 1 fault	The RI1 sensor resistance is out of range.
External sensor 2 fault	The RI2 sensor resistance is out of range.
Internal sensor failure	The internal sensor is defective.
Digital contact fault	Digital input is defective.

Alarm	Reason
Time Lost	The real time clock has been reset. The real time clock is only in -P models.

2.4.7 Display language

The user interface can be displayed in different languages. The language can be selected via configuration mode or by using language selection button that can be activated for the user.



A. Language selection button

The following languages are available.

ES	Spanish
CA	Catalan
BA	Basque
FR	French
IT	Italian
PL	Polish
EN	English
FI	Finnish
SE	Swedish
DE	German

2.5 Calendar functions

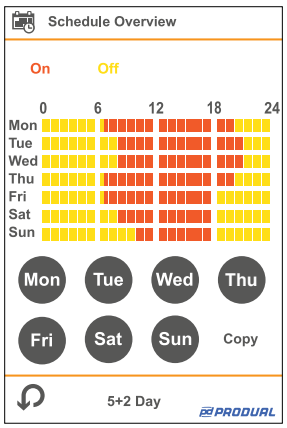
The -P models have up to five programmable switching times per day. The switching times can be set separately for all days, or to 5+2 day mode where the times are set separately for weekdays and weekends.

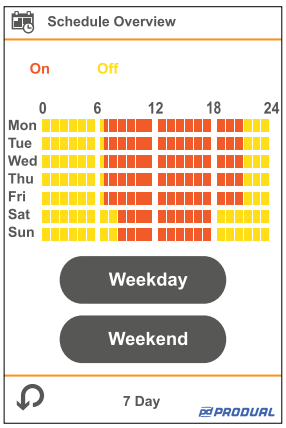
The function switches a network parameter value and relay output (-1R models) on or off. The following network parameters are used:

-MOD models	Discrete input register 102
-BAC models	Binary input 2 (*Schedule status*)

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Schedule overview display shows the current switching times.





The switching times can also be copied from one day to other day.

2.6 Connecting to CU and CU-LH control units

The -MOD models can integrated with the Produal CU and CU-LH control units. The device provides the following functionalities for the connected control units:

- Temperature measurement
- Humidity measurement (-RH models)
- CO_2 measurement (-CO2 models)
- Setpoint adjustment
- Fan speed adjustment
- Night and eco mode override

Refer to the Modbus register lists for the dedicated Produal control unit integration registers.

Note: The following configuration parameters must be set.

Parameter	Value
Setpoint Limit Mode	*Relative*
Fan Manual Control	*CU-3-step+Auto*
Fan Speed Display	*Coloured Bar & Fan*

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3 Commissioning

3.1 Mounting the product

Warning: Handle the product with care. Dropping the product may cause internal damage and unwanted functions in the connected system.

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

   Warning: Don't install this product near a life support apparatus.

   Warning: Don't install this product into a space containing flammable or explosive substances.

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

   The device can be located in dry surroundings (IP20) with pollution degree 1 or 2. The device is mounted by using screws on the standard flush mounting box. The recommended installation height is 150...180 cm.

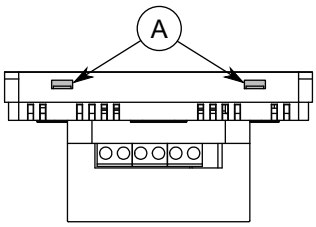
   The device location should be selected carefully. All the error factors that can affect to the measurements should be eliminated as well as possible. The following list defines the typical measurement error factors.

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

   Important: The product may only be installed in a location where the ambient conditions meet the operating condition requirements.

Operating conditions	
Temperature	0...50 °C (32...122 °F)
Humidity	0...95 %rH (non-condensing)

3. Remove the cover.
   a. Use a small flat head screwdriver to open the bottom locking clips.

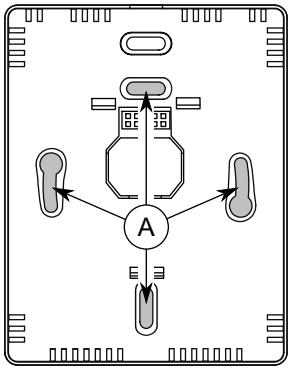


   A. Locking clips

   Important: Don't use excessive force when pushing the clips. The plastic cover is damaged easily.

   b. Carefully detach the cover from the bottom.
4. Make the wirings.

5. Mount the product on flush mounting box using the mounting points.

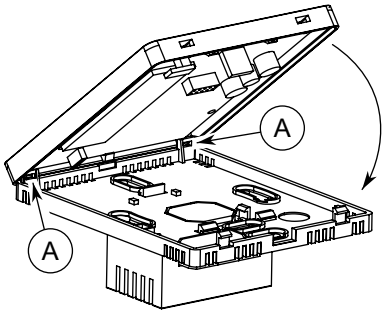


A. Mounting points

The maximum screw diameter is 4.3 mm.

Important: Don't use excessive force when tightening the mounting screws.

6. Carefully fit the cover.
Align the cover fixing clips with bottom part holes and close the cover.



A. Fixing clips and holes

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

CAUTION: The product may only be connected to overvoltage category I or II electricity network according to IEC 60664-1. Use external overvoltage protection if the device is connected to the overvoltage category III electricity network.

CAUTION: The used cables must have minimum of 230 Vac insulation for SELV wiring, if the mounting box includes also 230 Vac voltage wirings.

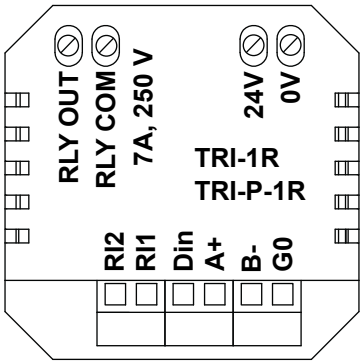
CAUTION: Use single stranded wires or use wire end sleeves if multi stranded wires are used.

CAUTION: Don't connect fan motors in parallel. One product can control only one fan motor.

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3.2.1 Wiring TRI-1R and TRI-P-1R

CAUTION: The relay connection wiring cross sections must be adapted to the overload protection conditions (max. 10 A). The wirings must always comply with local regulations.

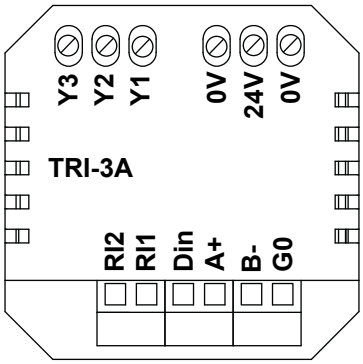


RLY OUT	Relay output, 230 Vac / 30 Vdc, 7 A
RLY COM	Relay output, common contact, 230 Vac / 30 Vdc, 7 A **Warning:** Add an external fuse to relay common connector. Use a time-lag fuse (max 10 A) that is in accordance with the standard IEC 60127-2. The product doesn't have an internal fuse for the relays.
24V	Supply, 24 Vac/dc
0V	0 V, common
RI2	External temperature sensor input 2, NTC 10
RI1	External temperature sensor input 1, NTC 10
Din	Digital input, potential free contact
A+	Modbus RTU / BACnet MS/TP, RS-485
B-	
G0	0 V, common

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3.2.2 Wiring TRI-3A

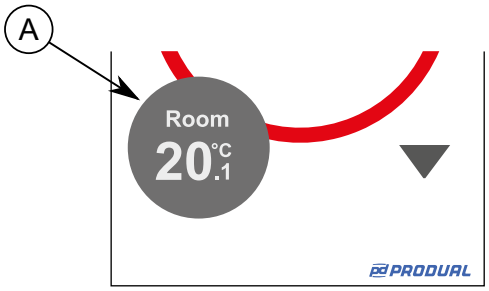
Important: The supply voltage source must be the same in the controller and in the connected 24 Vac devices.



0V	0 V, common
24V	Supply, 24 Vac/dc
0V	0 V, common
RI2	External temperature sensor input 2, NTC 10
RI1	External temperature sensor input 1, NTC 10
Din	Digital input, potential free contact
A+	Modbus RTU / BACnet MS/TP, RS-485
B-	
G0	0 V, common

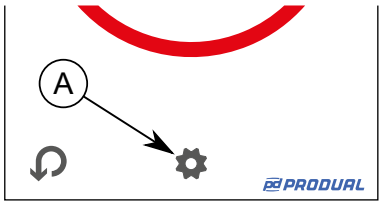
3.3 Configuring the device

1. Press the action button on the main view.



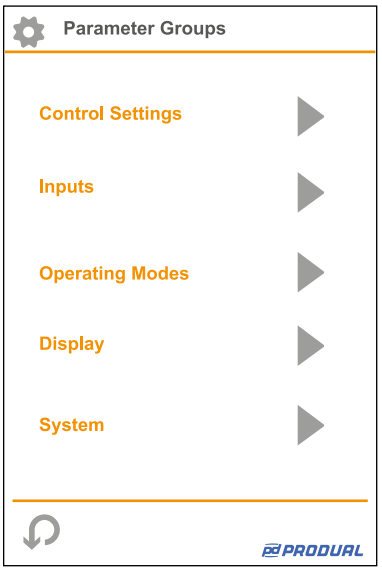
A. Action button

2. Press the configuration mode button.



3. Input the configuration mode password.
   The factory setting for the password is 6666.

4. Make the required settings.



You can navigate in the menu by pressing ▶, ▼ and ▲ buttons. The values can be changed by pressing the value. See the following chapters for more information about the available settings.

5. Exit the configuration mode by pressing ↺ button.

6. Return to main view by pressing ↺ button.
The device restarts before the main view is displayed.

3.3.1 Control settings menu

Menu item	Available values	Factory setting	Description
Nominal Setpoint	*0.0...95.0*	*21.0*	Nominal setpoint.
Setpoint Limit Mode	*Absolute / Relative*	*Absolute*	Setpoint limit setting method. *Absolute* — Set absolute limit temperatures to *Min. Setpoint Adj.* and *Max. Setpoint Adj.* parameters. *Relative* — Set relative limit temperatures to *Min. Setpoint Adj.* and *Max. Setpoint Adj.* parameters. Limits are relative to the *Nominal Setpoint* value.
Min. Setpoint Adj.	*0.0...95.0*	*14.0*	Setpoint adjustment low limit.
Max. Setpoint Adj.	*0.0...95.0*	*30.0*	Setpoint adjustment high limit.

3.3.2 Inputs & Outputs menu

Menu item	Available values	Factory setting	Description
Sensor 1 Source	*Network / Hardware*	*Network*	Temperature sensor 1 source. *Network* — Network value. *Hardware* — RI1 input value.

Menu item	Available values	Factory setting	Description
Sensor 2 Source		*Network*	Temperature sensor 2 source. *Network* — Network value. *Hardware* — RI2 input value.
Sensor 3 Source		*Hardware*	Temperature sensor 3 source. *Network* — Network value. *Hardware* — Internal temperature sensor value.
Digital Input Mode	*Disabled / Close for ECO / Open for ECO / Close for OFF / Open for OFF / DI Contact Alarm / Network / Close for Night*	*Close for ECO*	Digital input usage. *Disabled* — The input is not in use. *Close for ECO* — Eco mode activates when the contact closes. *Open for ECO* — Eco mode activates when the contact opens. *Close for OFF* — Off mode activates when the contact closes. *Open for OFF* — Off mode activates when the contact opens. *DI Contact Alarm* — Alarm contact. *Network* — Network value. *Close for Night* — Night mode activates when the contact closes.
Digital Input Delay	*0...7200*	*0*	Input delay when the contact changes from active to passive (seconds).
Internal Sensor Cal.	*-10.0...10.0*	*0.0*	Internal temperature sensor tuning (°C/°F).
RI1 Cal.	*-10.0...10.0*	*0.0*	RI1 temperature sensor tuning (°C/°F).
RI2 Cal.	*-10.0...10.0*	*0.0*	RI2 temperature sensor tuning (°C/°F).
Humidity Cal.	*-10.0...10.0*	*0.0*	Humidity sensor tuning (%rH). Available only in -RH models.
CO2 Cal.	*-500...500*	*0*	CO_2 sensor tuning (ppm). Available only in -CO2 models.
Y1 Mode *Y2 Mode* *Y3 Mode*	*Network / Sensor 1 / Sensor 2 / Sensor 3 / Setpoint / Fan / Humidity / CO2*	*Fan* *Setpoint* *Sensor 3*	Y1/Y2/Y3 output control source. Available only in TRC-3A models. *Network* — The output is controlled via communication network. *Sensor 1* — The output is controlled according to temperature sensor 1 value. *Sensor 2* — The output is controlled according to temperature sensor 2 value. *Sensor 3* — The output is controlled according to temperature sensor 3 value. *Setpoint* — The output is controlled according to setpoint value. *Fan* — The output is controlled according to selected fan speed value. *Humidity* — The output is controlled according to humidity value. *CO2* — The output is controlled according to CO_2 value.

Menu item	Available values	Factory setting	Description
AO Temp. Scale	*0...100*	*50*	Temperature output value at 10 V. Available only in TRC-3A models.
AO CO2. Scale	*0...5000*	*5000*	CO_2 output value at 10 V. Available only in TRC-3A models.
Fan Night Speed	*0...6*	*0*	Fan speed in night mode.
AO SP Min	*0...100*	*0*	Setpoint output scaling, minimum limit. Available only in TRC-3A models.
AO SP Max	*0...100*	*0*	Setpoint output scaling, maximum limit. Available only in TRC-3A models.

3.3.3 Operating Modes menu

Menu item	Available values	Factory setting	Description
Lock Mode	*Disabled / On/ Off Only / Adjust Only / No Input*	*Disabled*	Lock mode. *Disabled* — Function is disabled. *On/Off Only* — Off mode, lighting and air conditioning buttons available. *Adjust Only* — Temperature setpoint buttons available. *No Input* — All buttons unavailable.
Lock Code	*0000...9999*	*0000*	Lock mode password (0000 = no password).
Relay Mode	*Control NC / Control NO / Network*	*Control NC*	Relay operating direction. Available only in -1R models. *Control NC* — Normally closed. *Control NO* — Normally open. *Network* — Controlled via communication network.
Fan Manual Control	*Disabled / 1-step / 2-step / 3-step / 6-step / 1-step+Auto / 2-step+Auto / 3-step+Auto / 6-step+Auto / Advanced / CU-3-step+Auto*	*Disabled*	Fan speed selection mode. *Disabled* — Function is disabled. *1-step* — On/off fan. *2-step* — 2-speed fan. *3-step* — 3-speed fan. *6-step* — 6-speed fan. *1-step +Auto* — On/off fan with automatic speed selection. *2-step +Auto* — 2-speed fan with automatic speed selection. *3-step +Auto* — 3-speed fan with automatic speed selection. *6-step +Auto* — 6-speed fan with automatic speed selection. *Advanced* — 6-speed fan with automatic speed selection and separate night mode speed. *CU-3-step +Auto* — 3-speed fan with automatic speed selection. Use with CU and CU-LH fan speed control.

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Menu item	Available values	Factory setting	Description
Party Mode (Boost) Time	*0...480*	*0*	Boost mode running time (minutes). If the value is 0, the boost mode is disabled.
Ring Colour	*Sensor 3*	*Sensor 3*	The operation mode that activates when the holiday mode is activated.

3.3.4 Display menu

Menu item	Available values	Factory setting	Description
Brightness	*0...20*	*5*	Display backlight brightness level.
Enable Lights	*Disabled / Enabled*	*Disabled*	Lights button visibility. *Disabled* Button is not viewed. *Enabled* Button is visible.
Enable AC	*Disabled / Enabled*	*Disabled*	Air conditioning button visibility. *Disabled* Button is not viewed. *Enabled* Button is visible.
Fan Speed Display	*Disabled / Bar & Fan / Bar / Fan / Coloured Bar & Fan / Coloured Bar*	*Disabled*	Fan speed button style. *Disabled* Button is not viewed. *Bar & Fan*  *Bar*  *Fan*  *Coloured Bar & Fan*  *Coloured Bar* 
Mode Icon	*Disabled / Htg/Clg / Htg/Clg/Fan / Auto/Htg/Clg / Auto/Htg/Clg/Fan / Auto/Htg/Fan / Auto/Clg/Fan*	*Disabled*	Control mode button visibility and functions on the main view. *Disabled* Button is not viewed. *Htg/Clg* *HEAT*, *COOL* selections available. *Htg/Clg/Fan* *HEAT*, *COOL*, *FAN* selections available. *Auto/Htg/Clg* *AUTO*, *HEAT*, *COOL* selections available. *Auto/Htg/Clg/Fan* *AUTO*, *HEAT*, *COOL*, *FAN* selections available. *Auto/Htg/Fan* *AUTO*, *HEAT*, *FAN* selections available. *Auto/Clg/Fan* *AUTO*, *COOL*, *FAN* selections available.
Off Icon	*Disabled / Enabled*	*Disabled*	Off button visibility on the main view. *Disabled* Button is not viewed. *Enabled* Button is visible.

Menu item	Available values	Factory setting	Description
Humidity Display	*Disabled / Enabled*	*Disabled*	Humidity measurement visibility. The selection is available only in -RH models. *Disabled* — Measurement is not viewed. *Enabled* — Measurement is visible on the secondary information view.
CO2 Display	*Disabled / Enabled*	*Disabled*	CO_2 measurement visibility. The selection is available only in -CO2 models. *Disabled* — Measurement is not viewed. *Enabled* — Measurement is visible on the secondary information view.
Show Unit Swap	*Disabled / Enabled*	*Disabled*	Measurement unit swap button visibility. *Disabled* — Button is not viewed. *Enabled* — Button is visible.
Sensor 1 Text	*Disabled / Room / Floor / Outside / Zone 1...3 / Bathroom / Sauna / Bedroom / Kitchen / Cooler / Flow / Hot Water / Tank / Pool / Cabin*	*Disabled*	RI1 temperature sensor text. See the texts in other languages from the chapter Display text translations on page 25.
Sensor 2 Text		*Disabled*	RI2 temperature sensor text.
Sensor 3 Text		*Room*	Internal temperature sensor text.
Setpoint Mode	*Temperature / Percentage / None / Temperature Rel. / Sate Select*	*Temperature*	Setpoint view. *Temperature* — Main information view shows the setpoint as absolute temperature. *Percentage* — Main information view shows the setpoint as a percentage value. *None* — Main information view shows the measured temperature. If only the temperature measurement is available, ⚙ button is shown instead of the secondary information view. *Temperature Rel.* — Main information view shows the setpoint as relative temperature. *State Select* — Main information view shows the setpoint as a value without a unit.
Disable ECO Button	*Disabled / Enabled*	*Disabled*	Eco mode button availability on the main view. *Disabled* — Only the symbol is viewed. *Enabled* — Symbol is viewed and button is enabled.

Menu item	Available values	Factory setting	Description
Setpoint text	*Disabled / Room / Floor / Outside / Zone 1...3 / Bathroom / Sauna / Bedroom / Kitchen / Cooler / Flow / Hot Water / Tank / Pool / Cabin / Extract*	*Disabled*	Setpoint text. See the texts in other languages from the chapter Display text translations on page 25.
Show Next Schedule	*Disabled / Enabled*	*Disabled*	Next scheduled switching time visibility. Only available in -P models. *Disabled* — Time not viewed. *Enabled* — Time is viewed above the main information view.

3.3.4.1 Display text translations

English	Finnish	Swedish	French	Polish	Italian	Spanish	Catalan	Basque	German
Room	*Huone*	*Rum*	*Pièce*	*Pokój*	*Stanza*	*Sala*	*Sala*	*Gela*	*Raum*
Floor	*Lattia*	*Golv*	*Plancher*	*Podłoga*	*Pavimento*	*Suelo*	*Terre*	*Lurzoruan*	*Ebene*
Outside	*Ulko*	*Utomhus*	*Ext*	*Zewnątrz*	*Esterno*	*Exterior*	*Exterior*	*Kanpo*	*Aussen*
Zone 1	*Vyöhyke1*	*Zon 1*	*Zone 1*	*Strefa 1*	*Zona 1*	*Zona 1*	*Zona 1*	*1. Gunea*	*Zone 1*
Zone 2	*Vyöhyke2*	*Zon 2*	*Zone 2*	*Strefa 2*	*Zona 2*	*Zona 2*	*Zona 2*	*2. Gunea*	*Zone 2*
Zone 3	*Vyöhyke3*	*Zon 3*	*Zone 3*	*Strefa 3*	*Zona 3*	*Zona 3*	*Zona 3*	*3. Gunea*	*Zone 3*
Bathroom	*Pesuh.*	*Badrum*	*SdB*	*Łazienka*	*Bagno*	*Baño*	*Bany*	*Bainugela*	*Bad*
Sauna	*Sauna*	*Bastu*	*Sauna*	*Sauna*	*Sauna*	*Sauna*	*Sauna*	*Sauna*	*Sauna*
Bedroom	*Makuuh*	*Sovrum*	*Chambre*	*Sypialnia*	*St. Letto*	*Habit.*	*Habit.*	*Logela*	*Schlafen*
Kitchen	*Keittiö*	*Kök*	*Cuisine*	*Kuchnia*	*Cucina*	*Cocina*	*Cuina*	*Sukaldea*	*Küche*
Cooler	*Jääkaappi*	*Kylare*	*Clim*	*Chłodnica*	*Cond.*	*Chiller*	*Chiller*	*Hotzgailua*	*Kühler*
Flow	*Virtaus*	*Flöde*	*Débit*	*Przepływ*	*Flusso*	*Caudal*	*Cabal*	*Ur-emarial*	*Fluß*
Hot water	*Käyttövesi*	*Vatten*	*Eau Ch.*	*Woda*	*Acq. Calda*	*A. Cal.*	*A. Cal.*	*Ur beroa*	*Warmw.*
Tank	*Tankki*	*Tank*	*Réservoir*	*Zasobnik*	*Serbatoio*	*Depósito*	*Dipòsit*	*Ur tanga*	*Boiler*
Pool	*Allas*	*Bassäng*	*Piscine*	*Basen*	*Piscina*	*Piscina*	*Piscina*	*Igerilegua*	*Pool*
Cabin	*Hytti*	*Hytt*	*Cabine*	*Kabina*	*Cabina*	*Cabina*	*Cabina*	*Aldagela*	*Zimmer*
Extract	*Asetus*	*Börvärde*	*Consigne*	*Cel*	*Set Point*	*Consigna*	*Punt d'ajust*	*Puntua*	*Zielwert*

3.3.5 System menu

Menu item	Available values	Factory setting	Description
Address	*0..247* (MOD models) / *0...127* (BAC models)	*1*	Communication bus address.

Menu item	Available values	Factory setting	Description
Baud Rate	*9600 / 19200 / 38400 / 57600 / 76800*	*9600*	Communication bus speed.
Parity	*None / Odd / Even*	*None*	Communication bus parity.
Stop Bits	*1 Stop Bit / 2 Stop Bit*	*1 Stop Bit*	Number of stop bits.
Device ID	*0...4194303*	*Auto*	Device ID (*Auto* = 651001). The setting is available only in BAC models.
Service Pin	*Disabled / Enabled*	*Disabled*	BACnet service pin. *Disabled* — Function is disabled. *Enabled* — The device sends BACnet I-AM message.
Maintenance Code	*0000...9999*	*6666*	Configuration mode password (0000 = no password).
Staff Code	*0000...9999*	*0000*	Additional settings view password (0000 = no password).
Language	*ES / CA / BA / FR / IT / PL / EN / FI / SE / DE*	*EN*	Display language. *ES* — Spanish *CA* — Catalan *BA* — Basque *FR* — French *IT* — Italian *PL* — Polish *EN* — English *FI* — Finnish *SE* — Swedish *DE* — German
Show Language Swap	*Disabled / Enabled*	*Disabled*	Language selection button visibility.
Screen Refresh Rate	*Fast / Medium / Slow*	*Fast*	Display refresh rate.
Native Units (Defaults)	*C / F*	*C*	Default temperature unit (Celsius / Fahrenheit). **Important:** After changing the unit through the configuration mode, the controller reloads defaults for all settings. Select the native units when starting the commissioning.
Reload Default	*Off / On*	*Off*	Reload factory settings. **Important:** The factory defaults are loaded immediately when pressing the menu item.
Version	*x.xx BACnet / x.xx Modbus*	-	Firmware version.

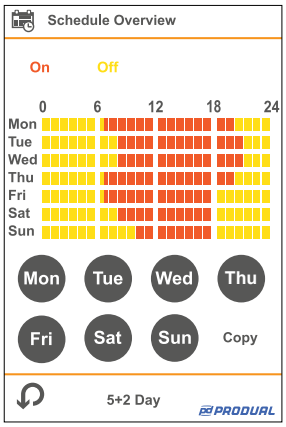
3.4 Using the calendar functions

1. Press the secondary information view to access additional settings view.

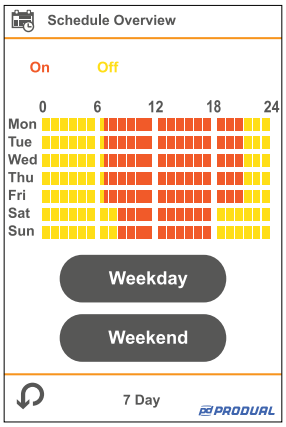
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2. Press button.
3. Select the calendar mode by pressing the mode text.
   There are two calendar modes available, *7 Day* and *5+2 Day*.

7 Day mode

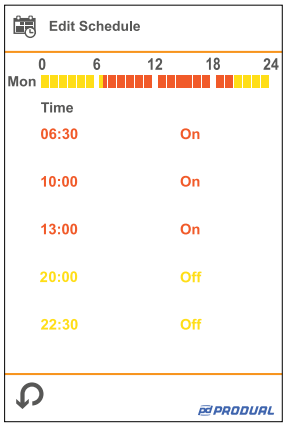


5+2 Day mode



Note: Switching from *7 Day* mode to *5+2 Day* mode will set the values to weekday/ weekend group settings if the values are changed. When changing back to seven day mode, the settings must be reset for each day.

4. Press the day or weekday/weekend button.
5. Set the switching times.



   a. Press the time value to set the switching time.
   b. Press the text to change the switching *On / Off*.

6. Press button to return to main calendar view.

Note: You can copy the settings from one day to other by using *Copy* button.

7. Press button to return to additional settings view.
8. Press button to exit from additional settings view.

4 Modbus

4.1 Modbus properties

The Modbus communication is available only in MOD models.

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

4.2 Modbus function codes

The device supports the following Modbus function codes.

Decimal	Hexa-decimal	Function
1	0x01	Read Coils
3	0x03	Read Holding Registers
4	0x04	Read Input Registers
5	0x05	Write Single Coil
6	0x06	Write Single Register
16	0x10	Write Multiple Registers

4.3 Modbus registers

4.3.1 Coils

Regis-ter	Parameter description	Data type	Values	Range	Default
100	Off mode override.	Bit	*0 - 1*	0. Off 1. On	*0*
101	Eco mode override.	Bit	*0 - 1*	0. Off 1. On	*0*
102	Frost symbol status.	Bit	*0 - 1*	0. Off 1. On	*0*
103	Boost mode symbol status.	Bit	*0 - 1*	0. Off 1. On	*0*

4.3.2 Discrete inputs

Register	Parameter description	Data type	Values	Range
100	Digital input 1 status (DI1)	Bit	*0 - 1*	0. Off 1. On
101	Relay output status	Bit	*0 - 1*	0. Off 1. On
102	Clock status	Bit	*0 - 1*	0. Off 1. On
103	Lighting symbol status	Bit	*0 - 1*	0. Off 1. On
104	Air conditioning symbols status	Bit	*0 - 1*	0. Off 1. On
105	Display locking status	Bit	*0 - 1*	0. Off 1. On
106	Screen locking status	Bit	*0 - 1*	0. Off 1. On
107	Boost status	Bit	*0 - 1*	0. Off 1. On
108	Eco mode status	Bit	*0 - 1*	0. Off 1. On
109	Low battery or time lost	Bit	*0 - 1*	0. Off 1. On
110	Fan status	Bit	*0 - 1*	0. Manual mode 1. Automatic mode

Additional registers for CU and CU-LH controller communication:

Regis-ter	Parameter description	Data type	Values	Range	Default
0	Man in house status.	Bit	*0 - 1*	0. In off mode. 1. Not in off mode.	*0*
1	Fan speed mode.	Bit	*0 - 1*	0. Manual fan speed 1. Automatic fan speed	*0*

4.3.3 Input registers

Register	Parameter description	Data type	Values	Range
100	Temperature measurement.	S16	*-400...3020*	-40.0...302.0 °C/°F
101	External temperature measurement, resistive input 1.	S16	*-400...3020*	-40.0...302.0 °C/°F
102	External temperature measurement, resistive input 2.	S16	*-400...3020*	-40.0...302.0 °C/°F
103	Current calculated setpoint.	S16	*-400...3020*	-40.0...302.0 °C/°F

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Register	Parameter description	Data type	Values	Range
104	Current function mode.	U16	*0 - 1 - 2 - 3*	0. Comfort 1. Eco 2. Off 3. Boost
105	Relative humidity measurement.	U16	*0...1000*	0.0...100.0 %rH
106	Alarm status.	U16	*0...256*	7-bit binary value. Bits are designated as follows: 0. Internal sensor 1. RI1 input 2. RI2 input 3. Humidity sensor 4. DI1 input 5. Not in use 6. Time lost The alarm value is the binary value + 1.
107	Discrete input registers.	U16	*0...65535*	Bit 0 = DI1, Bit 1 = relay...
108	Next scheduled switching time.	U16	*0...2400*	0...2400
109	Next scheduled switching day.	U16	*0 - 1 - 2 … - 6*	0. Monday 1. Tuesday 2. Wednesday 3. Thursday 4. Friday 5. Saturday 6. Sunday
110	Next scheduled switching setpoint.	U16	*0 - 1*	0. Off 1. On
111	Current fan speed.	U16	*0 - 1 - 2 … - 6*	0. Off 1. Speed 1 2. Speed 2 3. Speed 3 4. Speed 4 5. Speed 5 6. Speed 6
112	Control mode status.	U16	*0 - 1 - 2 - 3*	0. *AUTO* 1. *HEAT* 2. *COOL* 3. *FAN*
113	CO_2 measurement.	U16	*0...5000*	0...5000 ppm
200	Firmware version.	U16	-	-

Additional registers for CU and CU-LH controller communication:

Register	Parameter description	Data type	Values	Range
0	Temperature measurement.	S16	*-400...3020*	-40.0...302.0 °C/°F
1	Current calculated setpoint.	S16	*-400...3020*	-40.0...302.0 °C/°F

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Register	Parameter description	Data type	Values	Range
2	User fan speed.	U16	*0 - 1 - 2 - 3*	0. Off 1. Speed 1 2. Speed 2 3. Speed 3
3	Current operation mode.	U16	*0 - 1 - 2 - 3*	0. Off 1. Day mode (comfort mode) 2. Night mode (off mode) 3. Eco mode
4	CO_2 measurement.	U16	*0...5000*	0...5000 ppm
5	Relative humidity measurement.	U16	*0...1000*	0.0...100.0 %

4.3.4 Holding registers

Regis-ter	Parameter description	Data type	Values	Range	Default
100	Nominal temperature setpoint.	U16	*0...950*	0.0...95.0 °C/°F	*210*
101	Setpoint unit.	U16	*0 - 1 - 2 - 3 - 4*	0. Temperature 1. Percentage 2. No setpoint 3. Relative temperature 4. Value without unit	*0*
102	Sensor 3 source.	U16	*0 - 1*	0. Internal sensor 1. Network sensor	*0*
103	Sensor 3 network value.	S16	*-580...1220*	-58.0...122.0 °C/°F	*0*
104	Minimum setpoint.	U16	*0...950*	0.0...95.0 °C/°F	*140*
105	Maximum setpoint.	U16	*0...950*	0.0...95.0 °C/°F	*300*
106	Energy ring colour.	U16	*0 - 1 - 2 … - 10*	0. White 1. Red 2. Blue 3. Green 4. Orange 5. Yellow 6. Magenta 7. Cyan 8. Sensor 1 9. Sensor 2 10.Sensor 3	*10*
107	Sensor 1 source.	U16	*0 - 1*	0. Connected sensor (RI1) 1. Network sensor	*0*
108	Sensor 1 network value.	U16	*-580...1220*	-58.0...122.0 °C/°F	*0*

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Register	Parameter description	Data type	Values	Range	Default
109	Manual fan control mode.	U16	*0 - 1 - 2 … - 10*	0. Disabled 1. On/off fan 2. 2-speed fan 3. 3-speed fan 4. 6-speed fan 5. On/off fan with automatic selection 6. 2-speed fan with automatic selection 7. 3-speed fan with automatic selection 8. 6-speed fan with automatic selection 9. 6-speed fan with automatic selection and separate night mode speed 10. 3-speed fan with automatic selection. Use with CU and CU-LH fan speed control.	*0*
110	Fan speed button style.	U16	*0 - 1 - 2 - 3 - 4 - 5*	0. Disabled 1.  2.  3.  4.  5. 	*0*
111	Fan speed override.	U16	*0 - 1 - 2 … - 6*	0. Off 1. Speed 1 2. Speed 2 3. Speed 3 4. Speed 4 5. Speed 5 6. Speed 6	*0*
112	Control mode button.	U16	*0 - 1 - 2 … - 6*	0. Disabled 1. *HEAT / COOL* 2. *HEAT / COOL / FAN* 3. *AUTO / HEAT / COOL* 4. *AUTO / HEAT / COOL / FAN* 5. *AUTO / HEAT / FAN* 6. *AUTO / COOL / FAN*	*0*

Register	Parameter description	Data type	Values	Range	Default
113	Digital input mode.	U16	*0 - 1 - 2 ... - 8*	0. Disabled 1. Close for Eco mode 2. Open for Eco mode 3. Close for Off mode 4. Open for Off mode 5. Alarm contact 6. Network DI 7. Close for night mode	*1*
114	Digital input delay.	U16	*0...7200*	0...7200 s	*0*
115	Enable lighting button.	U16	*0 - 1*	0. Disabled 1. Enabled	*0*
116	Enable air conditioning button.	U16	*0 - 1*	0. Disabled 1. Enabled	*0*
117	Lock mode.	U16	*0 - 1 - 2 - 3*	0. Disabled 1. Off mode, boost, lighting and air conditioning buttons available. 2. Temperature setpoint buttons available. 3. All buttons unavailable	*0*
118	Swap temperature unit button.	U16	*0 - 1*	0. Disabled 1. Enabled	*0*
119	Internal temperature measurement tuning.	S16	*-100...100*	-10.0...10.0 °C/°F	*0*
120	RI1 input tuning.	S16	*-100...100*	-10.0...10.0 °C/°F	*0*
122	RI2 input tuning.	S16	*-100...100*	-10.0...10.0 °C/°F	*0*
122	Humidity measurement tuning.	S16	*-100...100*	-10.0...10.0 %rH	*0*
123	Humidity display.	U16	*0 - 1*	0. Disabled 1. Enabled	*1*
124	Override control mode button. To release the override, set the value to 0.	U16	*0 - 1 - 2 - 3 - 4*	0. None 1. *AUTO* 2. *HEAT* 3. *COOL* 4. *FAN*	*0*
125	Boost mode duration.	U16	*0...480*	0 = disabled, 1...480 min	*0*
126	Display backlight level.	U16	*0...20*	0...20	*5*
127	Relay operating mode.	U16	*0 - 1 - 2*	0. Normally open 1. Normally closed 2. Network control	*0*
128	Lock mode password.	U16	*0...9999*	0000...9999	*0000*

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Register	Parameter description	Data type	Values	Range	Default
129	Configuration mode password.	U16	*0...9999*	0000...9999	*6666*
130	Override air conditioning. To release the override, set the value to 0.	U16	*0 - 1 - 2*	0. None 1. Override on 2. Override off	*0*
131	Override lighting. To release the override, set the value to 0.	U16	*0 - 1 - 2*	0. None 1. Override on 2. Override off	*0*
132	Override lock mode.	U16	*0 - 1 - 2*	0. None 1. Lock mode on 2. Lock mode off	*0*
133	Off mode button.	U16	*0 - 1*	0. Disabled 1. Enabled	*1*
134	Fan speed override when the register 109 value is 9.	U16	*1 - 2 … - 8*	1. Register 135 value 2. Speed 1 3. Speed 2 4. Speed 3 5. Speed 4 6. Speed 5 7. Speed 6 8. Register 111 value	*0*
135	Fan speed in night mode.	U16	*0 - 1 - 2 … - 6*	0. Off 1. Speed 1 2. Speed 2 3. Speed 3 4. Speed 4 5. Speed 5 6. Speed 6	*0*
136	Relay output network override.	U16	*0 - 1 - 2*	0. None 1. Override relay on 2. Override relay off	*0*
137	Staff mode password.	U16	*0...9999*	0000...9999	*0000*
138	Language.	U16	*0 - 1 - 2 ... - 9*	0. English 1. Finnish 2. Swedish 3. French 4. Italian 5. Polish 6. Spanish 7. Catalan 8. Basque 9. German	*0*

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Register	Parameter description	Data type	Values	Range	Default
139	Sensor 1 text on the display.	U16	*0 - 1 - 2 ... - 16*	0. Disabled (value is not shown on the display) 1. *Room* 2. *Floor* 3. *Outside* 4. *Zone 1* 5. *Zone 2* 6. *Zone 3* 7. *Bathroom* 8. *Sauna* 9. *Bedroom* 10.*Kitchen* 11.*Cooler* 12.*Flow* 13.*Hot water* 14.*Tank* 15.*Pool* 16.*Cabin*	*0*
140	Sensor 2 text on the display.	U16	*0 - 1 - 2 ... - 16*		*0*
141	Sensor 3 text on the display.	U16	*0 - 1 - 2 ... - 16*		*1*
142	Sensor 2 source.	U16	*0 - 1*	0. Connected sensor (RI2) 1. Network sensor	*0*
143	Sensor 2 network value.	S16	*-580...1220*	-58.0...122.0 °C/°F	*0*
144	Current hour.	U16	*0...23*	0...23	-
145	Current minute.	U16	*0...59*	0...59	-
146	Current day.	U16	*1...31*	1...31	-
147	Current month	U16	*1...12*	1...12	-
148	Current year.	U16	*2015...2099*	2015...2099	-
149	Current hour update register.	U16	*0...23*	0...23	-
150	Current minute update register.	U16	*0...59*	0...59	-
151	Current day update register.	U16	*1...31*	1...31	-
152	Current month update register.	U16	*1...12*	1...12	-
153	Current year update register.	U16	*2015...2099*	2015...2099	-
154	Update time and date.	U16	*0 - 1*	0. No action 1. Update	*0*
159	Eco button local control.	U16	*0 - 1*	0. Enabled 1. Disabled	*0*
160	CO_2 measurement tuning.	U16	*-500...500*	-500...500 ppm	*0*
161	Y1 output mode.	U16	*0 - 1 - 2 ... - 7*	0. Network value 1. Sensor 1 (RI1) 2. Sensor 2 (RI2) 3. Sensor 3 (internal) 4. Setpoint 5. Fan 6. Humidity 7. CO_2	*5*
162	Y2 output mode.	U16	*0 - 1 - 2 ... - 7*		*4*
163	Y3 output mode.	U16	*0 - 1 - 2 ... - 7*		*3*
164	Y1 output override value.	U16	*0...1000*	0.0...100.0 % (0.00...10.00 V)	*0*

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Register	Parameter description	Data type	Values	Range	Default
165	Y2 output override value.	U16	*0...1000*	0.0...100.0 % (0.00...10.00 V)	*0*
166	Y3 output override value.	U16	*0...1000*	0.0...100.0 % (0.00...10.00 V)	*0*
167	CO_2 display.	S16	*0 - 1*	0. Enabled 1. Disabled	*0*
168	Setpoint limit mode.	S16	*0 - 1*	0. Absolute 1. Relative	*0*
169	Analogue output temperature scale.	U16	*0...100*	0...100 °C/°F	*50*
170	Analogue output CO_2 scale.	U16	*0...5000*	0...5000 ppm	*5000*
171	Setpoint reset. Resets the calculated setpoint to nominal setpoint.	S16	*0 - 1*	0. Normal operation 1. Reset	*0*
172	Night mode override.	S16	*0 - 1 - 2*	0. Normal operation 1. Enter night mode 2. Leave night mode	*0*
175	Analogue output value at setpoint minimum.	U16	*0...100*	0...100 % (0.0...10.0 V)	*0*
176	Analogue output value at setpoint maximum.	U16	*0...100*	0...100 % (0.0...10.0 V)	*100*
200	Monday / weekday switching time 1	U16	*0...2400*	0...2400	*0600*
201	Monday / weekday switching time 2	U16	*0...2400*	0...2400	*1000*
202	Monday / weekday switching time 3	U16	*0...2400*	0...2400	*1300*
203	Monday / weekday switching time 4	U16	*0...2400*	0...2400	*1700*
204	Monday / weekday switching time 5	U16	*0...2400*	0...2400	*2200*
205	Monday / weekday switching time 1 target	U16	*0 - 1*	0. Off 1. On	*0*
206	Monday / weekday switching time 2 target	U16	*0 - 1*	0. Off 1. On	*0*
207	Monday / weekday switching time 3 target	U16	*0 - 1*	0. Off 1. On	*0*
208	Monday / weekday switching time 4 target	U16	*0 - 1*	0. Off 1. On	*0*
209	Monday / weekday switching time 5 target	U16	*0 - 1*	0. Off 1. On	*0*
210	Tuesday / weekend switching time 1	U16	*0...2400*	0...2400	*0600*
211	Tuesday / weekend switching time 2	U16	*0...2400*	0...2400	*1000*
212	Tuesday / weekend switching time 3	U16	*0...2400*	0...2400	*1300*

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Regis-ter	Parameter description	Data type	Values	Range	Default
213	Tuesday / weekend switching time 4	U16	*0...2400*	0...2400	*1700*
214	Tuesday / weekend switching time 5	U16	*0...2400*	0...2400	*2200*
215	Tuesday / weekend switching time 1 target	U16	*0 - 1*	0. Off 1. On	*0*
216	Tuesday / weekend switching time 2 target	U16	*0 - 1*	0. Off 1. On	*0*
217	Tuesday / weekend switching time 3 target	U16	*0 - 1*	0. Off 1. On	*0*
218	Tuesday / weekend switching time 4 target	U16	*0 - 1*	0. Off 1. On	*0*
219	Tuesday / weekend switching time 5 target	U16	*0 - 1*	0. Off 1. On	*0*
220	Wednesday switching time 1	U16	*0...2400*	0...2400	*0600*
221	Wednesday switching time 2	U16	*0...2400*	0...2400	*1000*
222	Wednesday switching time 3	U16	*0...2400*	0...2400	*1300*
223	Wednesday switching time 4	U16	*0...2400*	0...2400	*1700*
224	Wednesday switching time 5	U16	*0...2400*	0...2400	*2200*
225	Wednesday switching time 1 target	U16	*0 - 1*	0. Off 1. On	*0*
226	Wednesday switching time 2 target	U16	*0 - 1*	0. Off 1. On	*0*
227	Wednesday switching time 3 target	U16	*0 - 1*	0. Off 1. On	*0*
228	Wednesday switching time 4 target	U16	*0 - 1*	0. Off 1. On	*0*
229	Wednesday switching time 5 target	U16	*0 - 1*	0. Off 1. On	*0*
230	Thursday switching time 1	U16	*0...2400*	0...2400	*0600*
231	Thursday switching time 2	U16	*0...2400*	0...2400	*1000*
232	Thursday switching time 3	U16	*0...2400*	0...2400	*1300*
233	Thursday switching time 4	U16	*0...2400*	0...2400	*1700*
234	Thursday switching time 5	U16	*0...2400*	0...2400	*2200*
235	Thursday switching time 1 target	U16	*0 - 1*	0. Off 1. On	*0*
236	Thursday switching time 2 target	U16	*0 - 1*	0. Off 1. On	*0*
237	Thursday switching time 3 target	U16	*0 - 1*	0. Off 1. On	*0*
238	Thursday switching time 4 target	U16	*0 - 1*	0. Off 1. On	*0*

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Regis-ter	Parameter description	Data type	Values	Range	Default
239	Thursday switching time 5 target	U16	*0 - 1*	0. Off 1. On	*0*
240	Friday switching time 1	U16	*0...2400*	0...2400	*0600*
241	Friday switching time 2	U16	*0...2400*	0...2400	*1000*
242	Friday switching time 3	U16	*0...2400*	0...2400	*1300*
243	Friday switching time 4	U16	*0...2400*	0...2400	*1700*
244	Friday switching time 5	U16	*0...2400*	0...2400	*2200*
245	Friday switching time 1 target	U16	*0 - 1*	0. Off 1. On	*0*
246	Friday switching time 2 target	U16	*0 - 1*	0. Off 1. On	*0*
247	Friday switching time 3 target	U16	*0 - 1*	0. Off 1. On	*0*
248	Friday switching time 4 target	U16	*0 - 1*	0. Off 1. On	*0*
249	Friday switching time 5 target	U16	*0 - 1*	0. Off 1. On	*0*
250	Saturday switching time 1	U16	*0...2400*	0...2400	*0600*
251	Saturday switching time 2	U16	*0...2400*	0...2400	*1000*
252	Saturday switching time 3	U16	*0...2400*	0...2400	*1300*
253	Saturday switching time 4	U16	*0...2400*	0...2400	*1700*
254	Saturday switching time 5	U16	*0...2400*	0...2400	*2200*
255	Saturday switching time 1 target	U16	*0 - 1*	0. Off 1. On	*0*
256	Saturday switching time 2 target	U16	*0 - 1*	0. Off 1. On	*0*
257	Saturday switching time 3 target	U16	*0 - 1*	0. Off 1. On	*0*
258	Saturday switching time 4 target	U16	*0 - 1*	0. Off 1. On	*0*
259	Saturday switching time 5 target	U16	*0 - 1*	0. Off 1. On	*0*
260	Sunday switching time 1	U16	*0...2400*	0...2400	*0600*
261	Sunday switching time 2	U16	*0...2400*	0...2400	*1000*
262	Sunday switching time 3	U16	*0...2400*	0...2400	*1300*
263	Sunday switching time 4	U16	*0...2400*	0...2400	*1700*
264	Sunday switching time 5	U16	*0...2400*	0...2400	*2200*
265	Sunday switching time 1 target	U16	*0 - 1*	0. Off 1. On	*0*
266	Sunday switching time 2 target	U16	*0 - 1*	0. Off 1. On	*0*

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Register	Parameter description	Data type	Values	Range	Default
267	Sunday switching time 3 target	U16	*0 - 1*	0. Off 1. On	*0*
268	Sunday switching time 4 target	U16	*0 - 1*	0. Off 1. On	*0*
269	Sunday switching time 5 target	U16	*0 - 1*	0. Off 1. On	*0*
300	Bus address.	U16	*0...247*	0...247	*1*
301	Bus speed.	U16	*0 - 1 - 2 - 3 - 4 - 5*	0. 9600 bits/s 1. 19200 bits/s 2. 38400 bits/s 3. 57600 bits/s 4. 76800 bits/s 5. 115200 bits/s	*0*
302	Bus parity.	U16	*0 - 1 - 2*	0. None 1. Odd 2. Even	*0*
303	Stop bits.	U16	*0 - 1*	0. 1 stop bit 1. 2 stop bits	*0*
304	Display refresh rate.	U16	*0 - 1 - 2*	0. Fast 1. Medium 2. Slow	*0*
308	Show language changing button on display.	U16	*0 - 1*	0. Disabled 1. Enabled	*0*
400	Reset device.	U16	*0 - 1*	0. N/A 1. Reset device	*0*
401	Non volatile memory update.	U16	*0 - 1*	0. N/A 1. Update memory	*0*
403	Reset to factory defaults.	U16	*0 - 1*	0. N/A 1. Reset to defaults	*0*

Additional registers for CU and CU-LH controller communication:

Register	Parameter description	Data type	Values	Range	Default
1	Setpoint centre (nominal setpoint).	U16	*0...990*	0.0...99.0 °C/°F	*210*
2	Setpoint limits. Register 168 value must be 1.	U16	*0...990*	±0.0...99.0 °C/°F	*140*
3	Fan speed override.	U16	*0 - 1 - 2 - 3 - 4*	0. Off 1. Speed 1 2. Speed 2 3. Speed 3 4. Automatic	*0*
4	Automatic fan speed view.	U16	*0 - 1 - 2 - 3*	0. Off 1. Speed 1 2. Speed 2 3. Speed 3	*0*

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Regis-ter	Parameter description	Data type	Values	Range	Default
5	Operating mode override.	S16	*0 - 1 - 2 - 3*	0. Off 1. Day mode (comfort mode) 2. Night mode (off mode) 3. Eco mode	*0*

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5 BACnet

5.1 BACnet properties

The BACnet communication is available only in BAC models.

Protocol	BACnet MS/TP
Device profile	BACnet Application specific controller (B-ASC)
Bus speed	9600*/19200/38400/57600/76800/115200 bit/s
Stop bits	1
Unit load	1/2 UL
	* factory setting

5.2 Analog input objects

Object name	Values	Resolution	Units
Sensor 3	*-40...302*	*0.1*	*degrees-celsius (62)*
Setpoint	*-40...302*	*0.1*	*degrees-celsius (62)*
Humidity	*0...100*	*0.1*	*percent-relative-humidity (29)*
Sensor 1	*-40...302*	*0.1*	*degrees-celsius (62)*
Sensor 2	*-40...302*	*0.1*	*degrees-celsius (62)*
CO2	*0...5000*	*1.0*	*parts-per-million (96)*

5.3 Analog value objects

Object name	Values	Resolution	Units
Nominal Setpoint	*0...95*	*0.1*	*degrees-celsius (62)*
BMS Sensor 1	*-58...122*	*0.1*	*degrees-celsius (62)*
BMS Sensor 2	*-58...122*	*0.1*	*degrees-celsius (62)*
BMS Sensor 3	*-58...122*	*0.1*	*degrees-celsius (62)*
Brightness	*0...20*	*1.0*	*no-units (95)*
Y1	*0...100*	*0.1*	*percent (98)*
Y2	*0...100*	*0.1*	*percent (98)*
Y3	*0...100*	*0.1*	*percent (98)*

5.4 Binary input objects

Object name	Values	Inactive/Active_Text	Default
DI_1	*0 - 1*	0. Off 1. On	*0*

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Object name	Values	Inactive/Active_Text	Default
Boost Status	*0 - 1*	0. Off 1. On	*0*
Schedule Status	*0 - 1*	0. Off 1. On	*0*
Time Lost	*0 - 1*	0. Off 1. On	*0*
Auto Fan	*0 - 1*	0. Off 1. On	*0*

5.5 Binary output objects

Object name	Values	Inactive/Active_Text	Default
Relay	*0 - 1*	0. Off 1. On	*0*
Off Status	*0 - 1*	0. Off 1. On	*0*
ECO Status	*0 - 1*	0. Off 1. On	*0*
Lights	*0 - 1*	0. Off 1. On	*0*
A/C	*0 - 1*	0. Off 1. On	*0*
Lock	*0 - 1*	0. Off 1. On	*0*
Frost Icon	*0 - 1*	0. Off 1. On	*0*
Nonvol Update	*0 - 1*	0. Off 1. On	*0*
Boost	*0 - 1*	0. Off 1. On	*0*
Reset Setpoint	*0 - 1*	0. Off 1. On	*0*
Night	*0 - 1*	0. Off 1. On	*0*

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5.6 Multi state value objects

Object name	Values	State text	Default
Ring Colour	*1 - 2 ... - 11*	1. White 2. Red 3. Blue 4. Green 5. Orange 6. Yellow 7. Magenta 8. Cyan 9. Sensor 1 10. Sensor 2 11. Sensor 3	*1*
ModeIconOverride	*1 - 2 - 3 - 4 - 5*	1. *AUTO* 2. *HEAT* 3. *COOL* 4. *FAN* 5. None	*1*
FanAutoSpeed	*1 - 2 ... - 7*	1. Speed 0 2. Speed 1 3. Speed 2 4. Speed 3 5. Speed 4 6. Speed 5 7. Speed 6	*1*
Device Mode (read-only)	*1 - 2 - 3 - 4*	1. Comfort 2. Eco 3. Off 4. Boost	*1*
Alarm	*1 - 2 ... - 256*	7-bit binary value. Bits are designated as follows: 0. Internal sensor 1. RI1 input 2. RI2 input 3. Humidity sensor 4. DI1 input 5. Not in use 6. Time lost The alarm value is the binary value + 1.	*1*
Mode (read-only)	*1 - 2 - 3 - 4*	1. *AUTO* 2. *HEAT* 3. *COOL* 4. *FAN*	*1*
FanSpeed (read-only)	*1 - 2 ... - 7*	1. Speed 0 2. Speed 1 3. Speed 2 4. Speed 3 5. Speed 4 6. Speed 5 7. Speed 6	*1*

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5.7 Proprietary objects

5.7.1 App. Config object

Required object properties:

Property name	Properties	Value
Object identifier	Read	proprietary-128
Object name	Read / write	App. Config
Object type	Read	proprietary-128

Optional properties: none

Proprietary properties:

Property ID	Values	Default	Description
40100	*0.0...95.0*	*21.0*	Nominal setpoint (°C/°F).
40101	*0 - 1 - 2 … - 5*	*0*	Setpoint unit. 0. Temperature 1. Percentage 2. No setpoint 3. Relative temperature 4. Value without unit
40102	*0 - 1*	*0*	Sensor 3 source. 0. Internal sensor 1. Network sensor
40104	*0.0...95.0*	*14.0*	Minimum setpoint (°C/°F).
40105	*0.0...95.0*	*30.0*	Maximum setpoint (°C/°F).
40107	*0 - 1*	*0*	Sensor 1 source. 0. Connected sensor (RI1) 1. Network sensor
40109	*0 - 1 - 2 … - 10*	*0*	Manual fan control mode. 0. Disabled 1. On/off fan 2. 2-speed fan 3. 3-speed fan 4. 6-speed fan 5. On/off fan with automatic selection 6. 2-speed fan with automatic selection 7. 3-speed fan with automatic selection 8. 6-speed fan with automatic selection 9. 6-speed fan with automatic selection and separate night mode speed 10.3-speed fan with automatic selection. Use with CU and CU-LH fan speed control.

Property ID	Values	Default	Description
40110	*0 - 1 - 2 … - 5*	*0*	Fan speed button style. 0. Disabled 1.  2.  3.  4.  5. 
40112	*0 - 1 - 2 … - 6*	*0*	Control mode button. 0. Disabled 1. *HEAT / COOL* 2. *HEAT / COOL / FAN* 3. *AUTO / HEAT / COOL* 4. *AUTO / HEAT / COOL / FAN* 5. *AUTO / HEAT / FAN* 6. *AUTO / COOL / FAN*
40113	*0 - 1 - 2 … - 7*	*0*	Digital input mode. 0. Disabled 1. Close for Eco mode 2. Open for Eco mode 3. Close for Off mode 4. Open for Off mode 5. Alarm contact 6. Network DI 7. Close for night mode
40114	*0...7200*	*0*	Digital input delay (seconds).
40115	*0 - 1*	*0*	Enable lighting button. 0. Disabled 1. Enabled
40116	*0 - 1*	*0*	Enable air conditioning button. 0. Disabled 1. Enabled
40117	*0 - 1 - 2 - 3*	*0*	Lock mode. 0. Disabled 1. Off mode, lighting air conditioning buttons available. 2. Temperature setpoint buttons available. 3. All buttons unavailable
40118	*0 - 1*	*0*	Swap temperature unit button. 0. Disabled 1. Enabled
40119	*-10.0...10.0*	*0.0*	Internal temperature measurement tuning (°C/°F).
40120	*-10.0...10.0*	*0.0*	RI1 input tuning (°C/°F).
40121	*-10.0...10.0*	*0.0*	RI2 input tuning (°C/°F).
40122	*-10.0...10.0*	*0.0*	Humidity measurement tuning (%rH).
40123	*0 - 1*	*0*	Humidity display. 0. Disabled 1. Enabled
40125	*0...480*	*0*	Boost mode duration (minutes). 0 = disabled, 1...480 min

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Property ID	Values	Default	Description
40126	*0...20*	*5*	Display backlight level.
40127	*0 - 1 - 2*	*0*	Relay operating mode. 0. Normally open 1. Normally closed 2. Network control
40128	*0000...9999*	*0000*	Lock mode password.
40129	*0000...9999*	*6666*	Configuration mode password.
40133	*0 - 1*	*0*	Off mode button. 0. Disabled 1. Enabled
40135	*0 - 1 - 2 … - 6*	*0*	Fan speed in night mode. 0. Off 1. Speed 1 2. Speed 2 3. Speed 3 4. Speed 4 5. Speed 5 6. Speed 6
40137	*0000...9999*	*0000*	Staff mode password.
40138	*0 - 1 - 2 … - 9*	*0*	Language. 0. English 1. Finnish 2. Swedish 3. French 4. Italian 5. Polish 6. Spanish 7. Catalan 8. Basque 9. German
40139	*0 - 1 … - 16*	*0*	Sensor 1 text on the display. 0. Disabled (value is not shown on the display) 1. *Room* 2. *Floor* 3. *Outside* 4. *Zone 1* 5. *Zone 2* 6. *Zone 3* 7. *Bathroom* 8. *Sauna* 9. *Bedroom* 10.*Kitchen* 11.*Cooler* 12.*Flow* 13.*Hot water* 14.*Tank* 15.*Pool* 16.*Cabin*

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Property ID	Values	Default	Description
40140	*0 - 1 - 2 … - 16*	*0*	Sensor 2 text on the display. 0. Disabled (value is not shown on the display) 1. *Room* 2. *Floor* 3. *Outside* 4. *Zone 1* 5. *Zone 2* 6. *Zone 3* 7. *Bathroom* 8. *Sauna* 9. *Bedroom* 10.*Kitchen* 11.*Cooler* 12.*Flow* 13.*Hot water* 14.*Tank* 15.*Pool* 16.*Cabin*
40141	*0 - 1 - 2 … - 16*	*1*	Sensor 3 text on the display. 0. Disabled (value is not shown on the display) 1. *Room* 2. *Floor* 3. *Outside* 4. *Zone 1* 5. *Zone 2* 6. *Zone 3* 7. *Bathroom* 8. *Sauna* 9. *Bedroom* 10.*Kitchen* 11.*Cooler* 12.*Flow* 13.*Hot water* 14.*Tank* 15.*Pool* 16.*Cabin*
40142	*0 - 1*	*0*	Sensor 2 source. 0. Connected sensor (RI2) 1. Network sensor
40159	*0 - 1*	*0*	Eco button local control. 0. Enabled 1. Disabled
40160	*-500...500*	*0*	CO_2 measurement tuning (ppm).
40161	*0 - 1 - 2 ... - 7*	*5*	Y1 output mode. 0. Network value 1. Sensor 1 (RI1) 2. Sensor 2 (RI2) 3. Sensor 3 (internal) 4. Setpoint 5. Fan 6. Humidity 7. CO_2

Property ID	Values	Default	Description
40162	*0 - 1 - 2 ... - 7*	*4*	Y2 output mode. 0. Network value 1. Sensor 1 (RI1) 2. Sensor 2 (RI2) 3. Sensor 3 (internal) 4. Setpoint 5. Fan 6. Humidity 7. CO_2
40163	*0 - 1 - 2 ... - 7*	*3*	Y3 output mode. 0. Network value 1. Sensor 1 (RI1) 2. Sensor 2 (RI2) 3. Sensor 3 (internal) 4. Setpoint 5. Fan 6. Humidity 7. CO_2
40167	*0 - 1*	*0*	CO_2 display. 0. Enabled 1. Disabled
40168	*0 - 1*	*0*	Setpoint limit mode. 0. Absolute 1. Relative
40169	*0...100*	*50*	Analogue output temperature scale (°C/°F).
40170	*0...5000*	*5000*	Analogue output CO_2 scale.
40175	*0...100*	*0*	Analogue output value at setpoint minimum. 0...100 % (0.0...10.0 V)
40176	*0...100*	*100*	Analogue output value at setpoint maximum.0...100 % (0.0...10.0 V)
40300	*0...127*	*1*	Bus address.
40301	*0 - 1 - 2 … - 5*	*0*	Bus speed. 0. 9600 bits/s 1. 19200 bits/s 2. 38400 bits/s 3. 57600 bits/s 4. 76800 bits/s 5. 115200 bits/s
40304	*0 - 1 - 2*	*0*	Display refresh rate. 0. Fast 1. Medium 2. Slow
40400	*0 - 1*	*0*	Reset device. 0. N/A 1. Reset device
40401	*0 - 1*	*0*	Non volatile memory update. 0. N/A 1. Update memory

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Property ID	Values	Default	Description
40403	*0 - 1*	*0*	Reset to factory defaults. 0. N/A 1. Reset to defaults

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6 Disposal

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

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

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

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