Engineering progress
Enhancing lives

NEA SMART 2.0 Service Manual

Manual for Designer, Installer and Service Partner

REHAU

Manual

This service manual “NEA SMART 2.0” is valid from March 2025. With its publication, the previous service manual no. 954647 (March 2021) is no longer valid.

The Technical Information is available for download under **www.rehau.com/TI**.

All dimensions and weights are approximate. Subject to errors and modifications.

Content

01 Security

Pictograms and logos

Safety instructions are marked with the listed symbols.

 Danger to life due to high voltage.

 Safety information

 Legal information

 Important information which must be observed

 Configurable parameter

Safety warnings and operating instructions
- For your own safety and the safety of other people, please read through all safety instructions and operating instructions carefully and completely before commencing assembly.
- Keep the operating instructions safe and have them available
- If you have not understood the safety instructions or any individual installation instructions or find them unclear, please contact your REHAU sales office.
- Non-compliance with the safety information may lead to damage to property and personal injury.

The electrical installation must comply with the applicable national regulations and the regulations of the local power supplier.

The use of a residual-current device, also known as residual-current circuit breaker or ground fault circuit interrupter is mandatory.
- In the event of a residual or leakage current to the ground the residual-current device rapidly interrupts the electrical circuit within milliseconds preventing prolonged electric shocks that could cause serious injury.

The use of a main switch with a miniature circuit breaker is mandatory.
- The main switch allows to disconnect the appliance from the mains in case of maintenance work or a fault in the appliance.
- The appliance is protected against overload and short circuit by a miniature circuit breaker.

Use in line with the specification
- The NEA SMART 2.0 control system must be configured, installed and operated only as described in this technical information and in the other installation manuals for the system. Any other use is not in accordance with the specification and is therefore not permitted.

- Observe all national and international routing, installation, accident prevention and safety regulations and the instructions in this technical information when installing piping systems and electrical components and equipment.

- Areas of application which are not covered by this technical information (special applications) must be discussed with our application department.

Contact your REHAU sales office.

Prerequisites for personnel
- This manual requires special knowledge corresponding to an officially recognised qualification in one of the following professions: Electrician or electrical engineer. In accordance with the international regulations as well as the comparable professions within your specific national legal framework.
- Our systems must only be installed by authorised and trained personnel.
- Only trained and authorised personnel may work on electrical installations or pipework components.

General precautions
- Keep your workplace clean and free of obstructions.
- Ensure that your work space has adequate lighting.
- Keep children, pets and unauthorised persons away from tools and installation areas. This particularly applies to renovations in occupied areas.

Requirements

Base
From software version V6.04. You can see the software version on the integrated websites in the "System" menu item and in the mobile App under "Settings", "General". If your system has an older software version, please perform an over-the-air update.

Room Units / Room Probes
From software version V1.7. No over-the-air update is possible for room control units.

Product conformity
Hereby, REHAU Industries SE & Co. KG declares that the NEA SMART 2.0 system complies with the following EU directives and UK regulations:

Non-radio equipment types:
- 2014/30/EU; UK: 2016 No. 1091
- 2014/35/EU; UK: 2016 No. 1101
- 2011/65/EU; UK: 2012 No. 3032

Radio equipment types
- 2014/53/EU; UK: 2017 No. 1206
- 2011/65/EU; UK: 2012 No. 3032

The full text of the EU and UK declarations of conformity is available at the following internet address:
www.rehau.com/neasmart2

Radio equipment types:

- Frequency: 869MHz
- Transmission power: max. +12dBm

Disposal
The batteries and all components of the NEA SMART 2.0 system must not be disposed with domestic waste. The user has the duty to dispose of the devices at designated collection points. The separate collection and orderly disposal of all materials will help to conserve natural resources and ensure recycling in a manner that protects human health and the environment. If you need information about collection points for your devices, please contact your local council or your local waste disposal services.

02 Introduction

Range of application
NEA SMART 2.0 is a modern and effective control system with a variety of functions for underfloor heating and cooling systems.

Important features are:
- Clear and high quality design of the Room Units
- Fully automated control of the complete installation
- Standard with WLAN/LAN interface
- For operation via web browser or App
- Smart functions that ensure a high level of comfort and ensure effective operation
- Suitable for new installations and retrofitting

Functions and control of the system

What can the NEA SMART 2.0 system?
The basic function of the system is to heat the rooms comfortably and economically.

Depending on the installed system many other functions are possible:
- Room cooling via the combined heating/cooling surfaces, switched or modulating Fan Coils
- Automatic or manual change between heating, neutral and cooling
- Control of the optimum temperature for the supply of heating/cooling surfaces („flow temperature control")
- Dehumidification of the rooms

Via timing programs and functions of the App, the set points of the room temperature – for heating and cooling – can be switched between comfort temperature (Normal mode) and Eco temperature (Reduced mode).

How to operate the system?
- Directly via the NEA SMART 2.0 Room Units (setting the required temperature, changing the operating mode) as well as either
- Locally via the browser of your smartphone, tablet or PC (only inside the house, use of the integrated webpages or
- Via Cloud of the NEA SMART 2.0 App – wherever you are

The NEA SMART 2.0 App offers many features that make the system a really smart system.

What can you adjust or look at?
Depending on installed options of the system, there are a variety of ways to set room temperatures, on-site or on-the-go, adapt the system to the needs, view statistics, or get hints and informations.
The table 02-1 gives an overview of the different possibilities.
It should be noted that during operating via the App (cloud connection), it does not matter where you are, while the operation via the integrated webpages only works within your home.

What can I do?	Room Unit	Webpages (local)	App (via cloud)
Read room temperature, read and adjust temperature set point	✓	✓	✓
Select "Timer Program", "Normal" or "Reduced" mode	✓	✓	✓
Set timer programs and assign them to the rooms		✓	✓
Assign room names		✓	✓
Define room temperature set points for timer programs		✓	✓
Select heating or cooling mode	✓	✓	✓
Use holiday mode		✓	✓
Automatic reduction of energy consumption during absence (geofencing)			✓
Check room temperature statistics			✓
In case of dehumidifier control: Set activation limits		✓	✓
In case of fan foil control: Select comfort level		✓	✓
In case of RAUCLIMATE Fan Coil control: Speed selection	✓	✓	✓
In case of switched Fan Coil control: Start or stop operation	✓	✓	✓
Reduce energy consumption automatically during absence			✓
Receive notifications about events and faults that have occurred	✓		✓
Get information about optimizations of the system			✓
Receive maintenance instructions			✓

Tab. 02-1 Possible adjustments on different devices

03 System overview

03.01 Range of Application

The NEA SMART 2.0 control system is a modular solution for radiant heating and cooling systems which can be configured for multiple systems.

The clear, high-grade Room Unit design discreetly blends into living spaces and offices. Due to its modular design, the system is suitable for individual room temperature control, as well as complex solutions for up to 60 rooms, including flow temperature control and integration of dehumidifier units and Fan Coils. The modular design of the system is achieved by incorporating additional NEA SMART 2.0 Bases, NEA SMART 2.0 R-Module and NEA SMART 2.0 U-Module.

The system can be conveniently operated using a smartphone, tablet or PC at home or when the user is away from home via a LAN/WLAN integrated into the central control units as standard.

Connecting the system to the cloud allows the user to enjoy optimisation, analysis and remote maintenance functions.

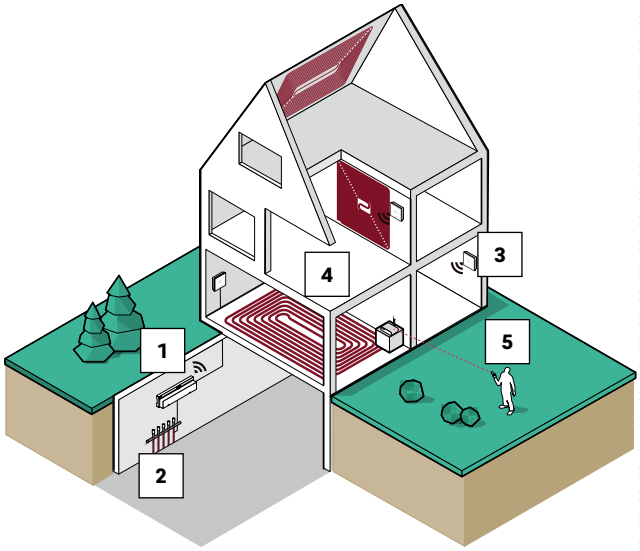
The Room Units are available as a wireless or wired option (based on bus technology). Hybrid technology in the central control unit allows both options to be connected to the base station with no need for additional components, ensuring both options can be mixed as required.
Since the wired technology used for the Room Units does not have any special requirements for the type and topology of the installed lines, the wired solution can normally also be installed as a retrofit alongside the wireless technology, which can always be used.

1 NEA SMART 2.0 Base

- Base for 8 rooms
- Hybrid technology: suitable for Bus- and Wireless Room Units/Room Probes
- WLAN/LAN as standard

2 Actuators UNI or BALANCE 230V

- Normally closed
- Energy-efficient: low power consumption



3 NEA SMART 2.0 Room Unit / Probe

- High quality design
- LED matrix display (only Room Units)
- Bus and wireless variant

4 Systems

- Floor
- Wall
- Ceiling
- CCT
- sCCT
- IFHC
- Dehumidifiers
- Switched Fan Coils
- Modulating RAUCLIMATE SILENT BREEZE Fan Coils

5 APP

- Configuration via smartphone/tablet
- Operation worldwide
- Remote maintenance and monitoring

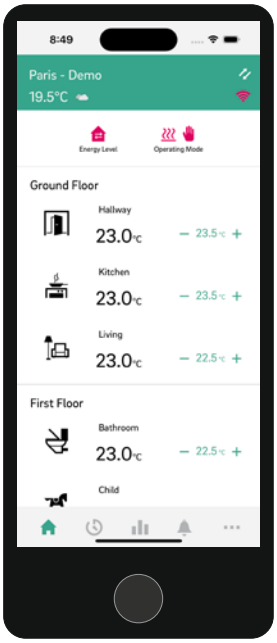


Fig. 03-1 System NEA SMART 2.0

03.02 System overview

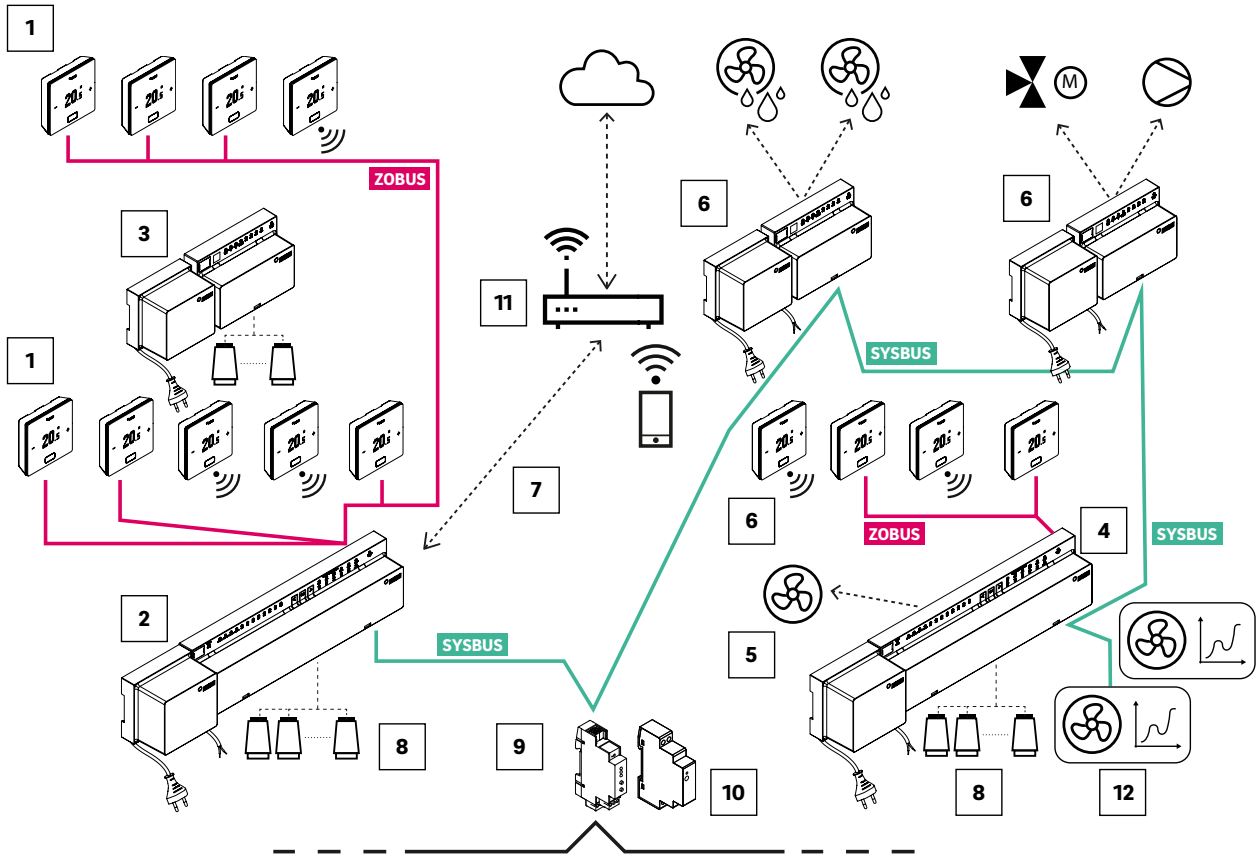


Fig. 03-2 System overview NEA SMART 2.0 24 V

SYSBUS System bus (4-wire bus, shielded cable)	4 NEA SMART 2.0 Base 24 V, central control unit (slave) with transformer; for up to 8 additional rooms	9 NEA SMART 2.0 KNX Gateway data exchange between the NEA SMART 2.0 system and a parent KNX system, e.g. BMS (Building Management System)
ZOBUS Zone bus (ZOBUS, 2-wire bus, cable type and topology largely freely selectable; polarity does not have to be considered)	5 Switched Fan Coils, controlled via NEA SMART 2.0 Base 24V	10 NEA SMART 2.0 Power Supply Gateway, generation of the auxiliary voltage for the SYSBUS (Modbus) of the NEA SMART 2.0 KNX Gateway
1 NEA SMART 2.0 Room Units with display (bus and wireless)	6 NEA SMART 2.0 U-Module 24 V, universal extension module for mixed circuit (with transformer for supplying the mixer motor), dehumidifier or Fan Coil	11 Router
2 NEA SMART 2.0 Base 24 V, central control unit (master) with transformer; for up to 8 rooms	7 WLAN / LAN interface to connect the system to router and cloud	12 Modulating RAUCLIMATE SILENT BREEZE Fan Coils
3 NEA SMART 2.0 R-Module 24 V, extension module room for 4 additional rooms (with transformer to power thermal actuators)	8 Thermal actuators 24 V to control the valves of the manifold	

Tab. 03-1 System overview NEA SMART 2.0 – Details

03.03 Components of the system

NEA SMART 2.0 Room Unit

Fig. 03-3 NEA SMART 2.0 Room Unit

Room Units with LED matrix display, for mounting on a flush mounting box or directly onto the wall.

- Operation with a central button and capacitive plus/ minus buttons
- Remote sensor for monitoring the room, floor, outdoor or core temperature or VL/RL remote sensor for monitoring the TABS return temperature
- Illuminated frame to emit display and provide backlighting for bus variant
- Flat housing

Variants:

- Bus or wireless technology
- With temperature or temperature/humidity sensor
- Housing color: white or black

NEA SMART 2.0 Room Probe

Fig. 03-4 NEA SMART 2.0 Room Probe

Room Probe for mounting on a flush mounting box or directly onto the wall.

- Remote sensor for monitoring the room, floor, outdoor or core temperature or VL/RL remote sensor for monitoring the TABS return temperature
- Flat housing

Variants:

- Bus or wireless technology
- With temperature or temperature/humidity sensor
- Housing color: white

NEA SMART 2.0 Base

Fig. 03-5 NEA SMART 2.0 Base

Central control unit for surface heating and cooling systems, concrete core temperation (CCT), concrete core temperation near to the surface (sCCT) and industrial floor heating/cooling (IFHC) for installation in heating / cooling circuit manifold cabinet.

- Hybrid technology for interconnecting a maximum of 8 NEA SMART 2.0 Room Units / Room Probes in bus or wireless technology
- Extension of 4 rooms with NEA SMART 2.0 R-Module
- System extension with up to 4 additional NEA SMART 2.0 Bases possible. Up to 60 rooms can be controlled.
- Control Areas for mean value calculation using multiple NEA SMART 2.0 Room Units / Room Probes in large rooms
- Monitoring of return and core temperatures in TABS application
- Time-controlled loading function for concrete core temperation (CCT)
- Control of 12 REHAU thermal actuators
- Control of up to 8 switched Fan Coils
- Control of up to 16 modulating RAUCLIMATE SILENT BREEZE Fan Coils
- WLAN/LAN interface for integrating the system into the home network
- WPS WLAN quick connection
- 4 relay outputs to actuate a pump, a hot or cold generator, a dehumidifier or other external units
- 4 digital inputs for connecting dew point sensors or for switching the operating mode
- Status LEDs integrated
- Screw less connection technology with clamped connectors
- Wall and DIN rail moun
- KNX connection via KNX Gateway
- Available in 24 V (power supply via NEA SMART 2.0 transformer) or 230 V version

NEA SMART 2.0 U-Module 24 V

Fig. 03-6 NEA SMART 2.0 U-Module 24 V

Universal extension module for NEA SMART 2.0 Base, configurable for:
- Control of a flow temperature or
- Control of up to 2 dehumidifiers or
- Control of up to 4 switched Fan Coils or
- Control of 2 dehumidifiers with hydraulic valve or
- Control of 2 dehumidifiers without hydraulic valve and 2 switched Fan Coils
- Connection to NEA SMART 2.0 Base via 4-wire system bus
- Connection option for a wired outdoor temperature sensor
- 4 analogue inputs
- 4 relay outputs
- 4 digital input
- 1 analogue output (0 – 10 V DC)
- Status LEDs integrated
- Wall and DIN rail mounting
- It can be used with the NEA SMART 2.0 Base 24 V or NEA SMART 2.0 Base 230 V

NEA SMART 2.0 R-Module

Fig. 03-7 NEA SMART 2.0 R-Module

Extension module for NEA SMART 2.0 Base to control 4 additional rooms or 4 switched Fan Coils.
- Connection to NEA SMART 2.0 Base via 2-wire Zone Bus (ZOBUS), polarity reversal protected
- 8 thermal actuators connectable
- 2 relay outputs to actuate a pump, a hot or cold generator, a dehumidifier or other external units
- 1 digital input to connect a dew point sensor or to switch operating mode
- Status LEDs integrated
- Wall and DIN rail mount
- Available in 24 V or 230 V versions

NEA SMART 2.0 Transformer

Fig. 03-8 NEA SMART 2.0 Transformer

24 V transformer to supply the NEA SMART 2.0 Base 24 V. For wall and DIN rail mounting.

NEA SMART 2.0 Outdoor sensor

Fig. 03-9 NEA SMART 2.0 Outdoor sensor

Wireless outdoor sensor, assignable to NEA SMART 2.0 Base. For wall mounting.

Remote sensor 3 m

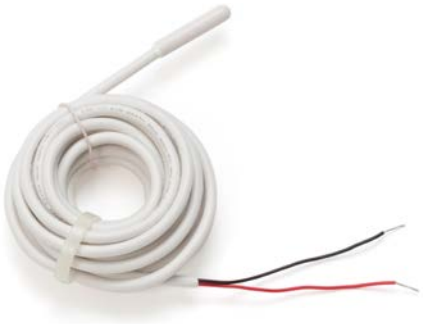


Fig. 03-10 Remote sensor 3 m

Temperature sensor for connection to: NEA SMART 2.0 U-Module for measuring the outdoor temperature

NEA SMART 2.0 Room Unit / Room Probe for monitoring the room, floor, outside temperature and for core temperature measurement in the TABS application

Remote sensor 10 m

Fig. 03-11 Remote sensor 10 m

Temperature sensor for connection to: NEA SMART 2.0 U-Module for measuring the outdoor temperature

NEA SMART 2.0 Room Unit / Room Probe for monitoring the room, floor, outside temperature and for core temperature measurement in the TABS application

NEA SMART 2.0 VL/RL sensor

Fig. 03-12 NEA SMART 2.0 VL/RL sensor

Temperature sensor connectable to NEA SMART 2.0 U-Module to measure the supply and return temperature of a mixed circuit.

NEA SMART 2.0 Antenna

Fig. 03-13 NEA SMART 2.0 Antenna

Antenna for optional connection to NEA SMART 2.0 Base to increase the range of the radio signal to the wireless NEA SMART 2.0 Room Units.

- Mounting the antenna outside the manifold cabinet.

Thermal actuator UNI

Fig. 03-14 Thermal actuator UNI

Thermal actuator to activate the valves on a manifold.

- Normally closed
- Energy-efficient, only 1 W power consumption
- Clear status display
- Can be installed in any position
- "First-open function" for operating in the construc-tion phase (before installation of controllers)
- Can be adjusted for different types of valves and manifolds
- Protection rating IP54
- Available in 24 V or 230 V versions

Actuator BALANCE 230 V

Fig. 03-15 Actuator BALANCE 230 V

The BALANCE 230 V is an intelligent, autonomous electro-thermal actuator NC with an operating voltage of 230 V for adaptive hydraulic balancing of the heating and cooling circuits on a circuit manifold of radiant heating and cooling systems with individual room control in new buildings and renovations.
The BALANCE 230 V actuator achieves temperature-based hydraulic balancing by adjusting the temperature difference between the flow and return of the heating and cooling circuits to a defined value as required. Manual adjustment of the control valves of the individual heating circuits when using this actuator is not necessary. All flow control devices on the respective heating circuits or on the manifold must remain fully open.

- Electrothermal actuator, de-energized closed
- Automatic commissioning
- Folding lever for easy unscrewing or manual opening of the de-energized thermostat valve.
- For installation on manifolds with at least 50 mm heating circuit distance and valve inserts with M30x1.5 external thread (valve closing dimension 11.8 mm).
- Integrated flow temperature limiter 60 °C
- Automatic flush function: At fixed intervals the thermostatic valve will be fully opened and closed once and the valve flow area cleaned of possible dirt particles.
- Temperature sensors for inlet flow and return flow pipe integrated in fastening clips
- Suitable for polymer pipes and metal-plastic composite pipes with an outer diameter from 12 to 20 mm
- Suitable for all 2-point and PWM room temperature controllers (230 V, 50 Hz) with bimetal, relay or semiconductor as switching element, with switching intervals greater than 3 minutes and the ability to switch capacitive loads
- Operating voltage: 230 V AC, 50 Hz

- Applicable options:

REHAU HKV and HKV-D manifolds in conjunction with the manifold cabinets UP 110 or AP 130 REHAU industrial manifold IM-D S32

NEA SMART 2.0 KNX Gateway

Fig. 03-16 NEA SMART 2.0 KNX Gateway

The NEA SMART 2.0 - KNX connection exchanges data (set points, actual values, operating modes and energy levels) between NEA SMART 2.0 and a centralised BMS System (KNX). The NEA SMART 2.0 KNX Gateway communicates with the NEA SMART 2.0 system via the SYSBUS, as a Modbus Slave. The assignment of KNX objects and Modbus registers can be configured via parameters in the ETS software (KNX license software). No additional software is required. The SYSBUS (Modbus) assignment required for the NEA SMART 2.0 control system can optionally imported via the provided example ETS project. The import of the SYSBUS (Modbus) assignments can be done in the office or on-site.

The SYSBUS (Modbus) connection is galvanic isolated from the KNX Bus. The NEA SMART 2.0 Power Supply Gateway is used for the auxiliary voltage of the SYSBUS (Modbus). The KNX-Bus is supplied via the other KNX components on-site.

The device is to be DIN rail mounted in permanent internal (dry location) installations only.

- KNX TP/Modbus RTU interface specification
- 250 Channels per KNX Gateway
- Maximum 2 Gateway per NEA SMART 2.0 System; up to 500 Channels
- Multiple NEA SMART 2.0 Systems per BMS (KNX) Installation are possible
- Configuration via the ETS Software (Licensed Software for KNX); no additional software is required
- Power Supply:
  - KNX nominal voltage 30 V DC
  - Auxiliary voltage on Modbus-side 12 ... 24 VDC
- In-line installation with 1 TE (18 mm)

For more than 30 rooms in the current functionality as described in the later data point list, an additional NEA SMART 2.0 KNX Gateway should be used. The maximum amount of Gateways per Master/Slave installation is two.

Further information (e.g., the manual, datasheet and CE declaration of the KNX Gateway) can be downloaded from the product website of the KNX Modbus RTU Gateway 886 (www.weinzierl.de).

The NEA SMART 2.0 system does not support the communication with KNX Room Units / Probes NEA SMART 2.0 Room Units / Probes must be installed in rooms that are to be connected and controlled directly by the NEA SMART 2.0 system. The KNX Gateway (Modbus) is directly connected to the SYSBUS clamps of NEA SMART 2.0 Base unit – Specific clamp details are mentioned further in the document.

NEA SMART 2.0 Power Supply Gateway

Fig. 03-17 NEA SMART 2.0 Power Supply Gateway

The NEA SMART 2.0 Power Supply Gateway is a DIN rail mounted power supply with a direct current output (DC). This AC/DC-power supply is used to transform the auxiliary voltage for the SYSBUS (Modbus) of the NEA SMART 2.0 KNX Gateways. The potentiometer adjusts the output voltage. The blue LED indicates operation. The power supply unit is suitable for building automation controls in commercial and private premises. The device is to be DIN rail mounted in permanent internal (dry location) installations only.

Power Supply Specification:
- Switching power supply
- Output voltage: 12 V DC
- Output voltage Adjustment range: 10.8 V DC to 13.8 V DC
- Output power: 15 W
- Operating voltage: 85 V to 264 V AC
- Protection: Short circuit /Overload / Over voltage
- DIN rail TS TS-35/7.5 or TS-35/15 mountable
- 1 Potentiometer
- 1 LED (blue); Power-On

The gateways and associated power supplies must be properly installed in suitable housings such as switch boxes or control cabinets. The applicable regulations must be observed. Work on electrical systems or parts of cables may only be carried out by trained and authorized persons.

Coupling relay 24 V / 230 V

Fig. 03-18 Coupling relay 24 V / 230 V

Coupling relay with screw terminals for the transfer of 24 V AC or 230 V AC switching signals of a heat or cooling generator or a superordinate building management system to digital inputs of the NEA SMART 2.0 control system
- Mounting on 35 mm DIN rail
- Coil voltage 24 V AC or 230 V AC
- 2 2-pole switches 8 A
- Hard gold plated contacts, maximum switching current 8 A
- LED indicator

Switching relay 24 V / 230 V

Fig. 03-19 Switching relay 24 V / 230 V

Switching relay 24 V / 230 V with screw terminals for connection to Triac outputs or relay outputs of the NEA SMART 2.0 control system for controlling external devices
- Mounting on 35 mm DIN rail
- Coil voltage 24 V AC/DC or 230 V AC/DC
- 2 normally open contacts for 25 A / 250 V AC
- Mechanical and LED indicator
- Selector for AUTO – ON – OFF mode

The relays must be properly installed in suitable housings such as switch boxes or control cabinets. The applicable regulations must be observed. Work on electrical systems or parts of cables may only be carried out by trained and authorized persons.

NEA SMART 2.0 Bus cable (10 / 50 m bundle)

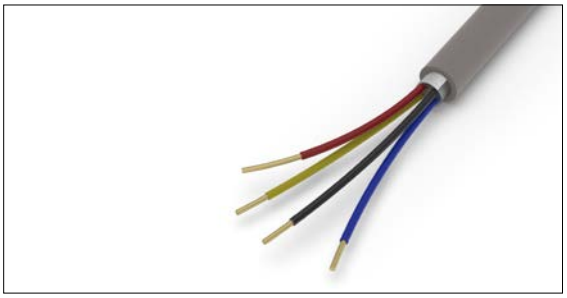


Fig. 03-20 NEA SMART 2.0 Bus cable (10 / 50 m bundle)

Shielded bus cable for System Bus and Zone Bus with 2 twisted pairs of wires
- Indoor installation cable, type J-Y(ST)Y 2 x 2 x 0.8 mm
- Solid bare copper conductor, PVC insulation
- static screen made of aluminum-laminated plastic film with copper drain wire
- Loop resistance max. 73.2 Ohm/km
- Flame retardant according to IEC 60332-1-2

03.04 Functions and Features

The software of the NEA SMART 2.0 system is continuously being developed and improved. An update via an internet connection is required to take advantage of all the new and improved functions. By activating automatic updates (OTA), the system can always be kept up to date.

03.04.01 Room temperature control (surface heating/cooling)

Room temperatures are controlled by the valves in the manifold being opened at specified times, respective of the temperature recorded by the Room Units and the target temperature (pulsewidth modulation process – PWM).

A suitable set of parameters is selected for the chosen heating/cooling system, such as underfloor heating, ceiling heating or cooling systems.

It is possible to use different heating/cooling systems in one room at the same time without using auxiliary components, such as relay circuits or gate valves upstream of the manifolds.

03.04.02 Room temperature control optimisation functions

The NEA SMART 2.0 control system permanently analyses the temperature sequences in individual rooms and then optimises the control mode. Such optimisation provides maximum comfort while ensuring ideal energy efficiency:
- Compensation can aid comfort controls
- Detection of temperature drop in heating mode, e.g. due to open window
- Extremely precise compliance with the target values thanks to automatic adaptation of control parameters
- Auto boost function to ensure prompt return from reduced mode
- Setting up a control area (CA) for control in large rooms with multiple Room Units.

03.04.03 Hybrid technology (bus/wireless), pairing of Room Units

The NEA SMART 2.0 Base offers the option of communicating with wired (bus technology) Room Units and wireless Room Units as standard. Room Units can be easily and reliably registered on the individual base channels (pairing). The process is identical for both technologies.

03.04.04 Integrated WLAN/LAN, operation via browser or App

The NEA SMART 2.0 Base has WLAN/LAN as well as a web server standard „on board". Systems used purely to control temperature (with a base) can be set up and operated using a standard web browser.

There is a user App available to end users featuring a series of easy-to-use functions to operate the system inside the house and while away from home. This App also offers analysis and maintenance information in a separate section for installer.

03.04.05 Smart functions

A series of smart functions are provided by the algorithms in the Room Units and bases and the option to evaluate temperature sequences and control mode in the cloud:
- Automatic detection of the users' presence or absence with geofencing
- Detection of temperature drop in heating mode, e.g. due to open window
- Energy-saving mode is triggered when users are absent temporarily or for a longer period
- Room temperature analysis, automatic triggering of measures to improve control mode

These smart functions are extended and improved on an ongoing basis.

03.04.06 Flow temperature control

The control of the flow temperature of the heating and cooling surfaces can be done via each NEA SMART 2.0 U-Module. Up to three mixed circuits may be installed in a single system.The flow temperature control is parametrised using pre-defined parameter sets, which are automatically selected based on the defined system, such as an underfloor heating or ceiling cooling system.

The flow temperatures are managed according to need. In addition to the characteristic values of outside temperature, energy requirements are also a factor in flow temperature management and are determined by the operating mode – normal, reduced or absence mode.

The room air humidity levels detected by the Room Units and the dew point calculated based on these levels play a decisive role in cooling applications.

03.04.07 Dehumidification

Dehumidifier units can be assigned to the individual areas in the installation, where each area can contain several rooms. The NEA SMART 2.0 components activate these units when relative humidity or dew point thresholds are reached.

Up to 9 dehumidifiers can be integrated into the system.

03.04.08 Fan Coil

One switched Fan Coil and up to 4 modulating RAUCLIMATE SILENT BREEZE Fan Coils can be assigned to each room or control area (CA). These Fan Coils can support the installed radiant heating/cooling system, but can also be used as a stand-alone system.

03.04.09 Over the air update (OTA)

Systems which are connected to the cloud via the Internet receive the latest version of the on demand or automatically without requiring intervention from the user.

03.05 System set-up

The system is conveniently put into operation using a smartphone, tablet or PC. A WLAN connection (access point mode) is established between the NEA SMART 2.0 Base and the device used to set up operation.

No router or connection to the internet is needed.

03.05.01 General procedure

The system set-up is generally divided into the following steps:

1. Installing the components, establishing all connections, testing
2. Assignment of Room Units to the base or base unit channels (pairing)
3. Setting system-specific values: target values, time programs, parameters

03.05.02 Assignment of Room Units / Room Probes (pairing)

The Room Units / Room Probes are assigned to one or more channels of the Base or R-Module. Several channels may be required, because a channel's connection potential for actuators is exhausted or different systems, such as underfloor heating or ceiling cooling, are present in a room.
Typically, one room controller/sensor is used per room. In very large rooms, it is possible to place up to 12 room controllers/sensors on the same base unit in a Control Area (CA) to achieve best measurement results.

Successful pairing is signalled on the Room Units / Room Probes and the base.

03.05.03 Set up and operate using integrated webpages

In systems comprising a NEA SMART 2.0 Base and, where required, a R-Module (usual application for room temperature control only), the system can be adapted to the system conditions and user preferences. The system can be operated using a web browser on a smartphone, tablet or laptop.

However, this option is only available locally when the browser-capable unit is connected directly to the base.

In complex systems the following steps are performed:
- Input of building-specific data, such as the number of valves or mixed circuits
- Determination of the system's hydraulic structure (connection to the valves in the mixed circuit)
- Detection of all R-Modules connected to the Bases (zone bus)
- Detection of all Bases (slave units), U-Modules, RAUCLIMATE SILENT BREEZE Fan Coils and KNX Modules connected to the system bus
- Displays for all Room Units assigned to the Base control channels
- Assignment of the Base control channels to the heating/cooling systems in the rooms
- Assignment of dehumidifiers to rooms and definition of electric connections
- Assignment of 2nd heat exchanger
- Assignment of switched and RAUCLIMATE SILENT BREEZE Fan Coils to the rooms
- Testing of all connected devices
- Issuing or adjustment of room names, target values, time programes
- Parametrisation adjustment

All installation data are stored on the Base and after Internet connection into the cloud.

03.06 Operation, monitoring and maintenance on App

The App can only be used if the control system is connected to the Internet via the router and is registered in the cloud. App communication takes place with the cloud only. It therefore does not matter whether you use it inside or outside the building.

The App is the convenient tool for:
- Specification of room temperature setpoints
- Create and modify timing programs
- Activate short or long (holiday) absence periods
- Analysis of room temperatures

The installer or the contracted maintenance firm can use the Apps expert section to:
- Check and change settings
- Received system messages for maintenance requirements
- Analyze the behavior of the system
- Trigger the software update using OTA

The maintenance and repair options make things easier, especially for larger systems or systems which are further away.
The App can be downloaded in its latest version from the App store (iOS) or Google Playstore (Android).

03.07 System limits

The maximum configuration of a NEA SMART 2.0 system consists of:
- 1 x NEA SMART 2.0 Base (master)
- 4 x NEA SMART 2.0 Base (slave)
- 5 x NEA SMART 2.0 R-Module (extension modules room, per base one R-Module possible)
- 9 x NEA SMART 2.0 U-Module (extension modules universal)

In this expansion, the system includes a maximum of:
- 60 rooms
- 3 mixed circles
- 9 dehumidifiers (5 dehumidifiers on the base units or the R-Modules, 4 dehumidifiers on 2 U-Modules)
- Up to 60 switched Fan Coils per complete system in the highest configuration stage
- Up to 8 switched Fan Coils per NEA SMART 2.0 Base
- Up to 12 switched Fan Coils per NEA SMART 2.0 Base and R-Module

The maximum number of switched Fan Coils is limited by:
- Number of NEA SMART 2.0 Room Unit used
- Number of available room zones (RZ)
- 1 switched Fan Coil per room or control area (CA)

Note: Each switched Fan Coil is assigned to only one room at a time. It is not possible to use one switched Fan Coil for multiple rooms.

Up to 30 modulating RAUCLIMATE SILENT BREEZE Fan Coils per complete system in the highest configuration stage
- up to 16 modulating RAUCLIMATE SILENT BREEZE Fan Coils per NEA SMART 2.0 Base
- up to 4 modulating RAUCLIMATE SILENT BREEZE Fan Coils per room or control area (CA)
- up to 5 wireless outdoor temperature sensors (1 sensor per base unit)
- up to 3 wired outdoor temperature sensors (over 3 U-Modules configured for mixed circuit control)
- up to 60 wired outdoor temperature sensors over Room Units

Note: It is not possible to use one RAUCLIMATE SILENT BREEZE Fan Coil for multiple rooms

Possible Combinations
A total of up to 5 Fan Coils (1x switched and 4x modulating) per room or control area (CA)
A maximum of 5 U-Modules can be used also with a single base.

The relay outputs of the NEA SMART 2.0 components are pre-assigned specific functions to some extent. This pre-assignment can be changed when configuring the system. This allows dehumidifiers or switched Fan Coil to be activated via the NEA SMART 2.0 Base or the NEA SMART 2.0 R-Modules as well as the NEA SMART 2.0 U-Module.

04 Function

In the following chapters you will find the description of all general and optional function of the system. The range of these functionalities is determined by the installed components and the system settings selected during commissioning or at a later stage.

The behaviour of the system is determined by the parameter settings.

All parameters can be modified by the installer or maintenance company, a subset of the parameters also by the user of the system.

At the end of each chapter there is an information block with the icon

which describes the path for webpage or NEA SMART 2.0 App, starting from the main menu to the sub-menu containing the relevant parameters for the specific function:

Examples:
Webpage:
Home → Installer → Settings → Heating / Cooling
App:
Settings → Heating / Cooling

All parameters have a default setting (factory setting), and may be changed only in a certain range.

A complete list of parameters you can find in chapter "9 PARAMETER".

04.01 Operating modes

Introduction
The term „operating mode" describes a combination of settings, which are made via the NEA SMART 2.0 App or website. The first setting determines the general operation of the system:
- Heating or
- Cooling or
- automatic activation of heating/cooling

The second setting determines which energy level is selected and how it is selected:
- permanently NORMAL (present) or
- REDUCED (absent) or
- controlled by timer program
- STANDBY, Holiday or PARTY mode

04.01.01 Heating / Cooling (automatic mode)

This mode is only possible in installations, where the system is capable to control the complete installation and has information about outside temperature (outside probe connected or weather information from internet service). During the setup sequence the installer may enable this option. See chapter 07.05.21.

In this mode, the system changes automatically between the general operating mode heating, cooling and inactive.

Activation of HEATING mode depends on
- applied heating limit
- filtered outside temperature
- hysteresis for heating limit
- heating period definition
- room temperature in pilot rooms
- time since last active cooling mode
- state of configured heating/cooling digital inputs

Activation of COOLING mode depends on cooling criterion, calculated out of:
- basic value current outside temperature
- basic value average outside temperature
- filtered outside temperature
- actual outside temperature
- temperature conditions in pilot rooms
- cooling period definition
- time since last active heating mode
- state of configured heating/cooling digital inputs

Both modes are subject to a minimum running time.

Activation of both modes is also influenced by
- the general energy level of the installation.

Selecting „Heat/Cool remote switching" allows external signals such as a central heating/cooling source (e.g. a heat pump), a BMS or a simple switch to override the system dependencies for activation of heating or cooling mode.

 Relevant parameters:

Webpage:
Home → Installer → Settings → Heating / Cooling Settings
App:
Settings → Installer → Control Parameters → Heating → General Parameters
Settings →Installer → Control Parameters → Cooling → General Parameters
Settings →Installer → Control Parameters → Filter time outside temperature

04.01.02 Only Heating / only Cooling

These operating modes follow the same rules as in HEATING / COOLING (automatic mode). The selected mode is activated as soon as the conditions are fulfilled.

Relevant parameters:

Webpage:
Home → Installer → Settings → Heating / Cooling Settings
App:
Settings → Installer →Control Parameters →Heating →General Parameters
Settings →Installer →Control Parameters →Cooling →General Parameters
Settings →Installer →Control Parameters →Filter time outside temperature

04.01.03 Heating / cooling manual

Selection of these modes overrides the above listed "soft" conditions (but not digital signals HEATING or COOLING coming from external) and the selected mode starts immediately.

These modes allow the user to start heating or cooling whenever it is possible in terms of available supply from boiler or chiller.

This mode can be used for testing during servicing and installation.

04.01.04 Energy levels

The energy level defines not only the temperature set points in the operating modes HEATING and COOLING, but also the operation of dehumidifiers and Fan Coils.

An energy level may be activated manually, by timing program or by the geofencing function of the App. An energy level is valid for the complete installation, a selection of rooms or a specific room.

The system optimizes the transitions between NORMAL and REDUCED mode to ensure comfortable conditions and to reduce energy consumption.

Please note also:
The installed heating or cooling systems have physical limits, which have to be considered, when set points and timer programs are defined.

- During summer, e.g., it is often not possible to reach a room temperature of e.g. 21 °C in cooling mode by means of an underfloor cooling system only
- It makes no sense to define short time spans per energy level trying to raise/or lower the temperature by 3 degrees for an hour and then to reverse it again because the underfloor system cannot respond that quickly

There are 4 different energy levels:

NORMAL
Energy level NORMAL should be active when the room is occupied.

- Default temperature set points:
  Heating: 21 °C
  Cooling: 24 °C

REDUCED
Energy level REDUCED should be active when the room is not occupied.

- Default temperature set points:
  Heating: 19 °C
  Cooling: 26 °C

PARTY
PARTY mode switches the energy level in the selected rooms to NORMAL for a default period of 4 hours. When selected via the App, the activation period can be freely chosen (2 hours, 4 hours or endlessly until manual deactivation).

HOLIDAY
Energy level HOLIDAY is activated for time spans, which are longer than 1 up to 3 days, (depending on insulation standard of the building).

- Default temperature set points:
  Heating: 15 °C
  Cooling: not active

The temperature set points for NORMAL, REDUCED mode (heating/cooling) and HOLIDAY mode (only heating) can be set on the room configuration pages of the App or on the webpages.

STANDBY
The energy level STANDBY is used for rooms, which are not used for an extended period of time.

- Default temperature set points:
  Heating: 5 °C (freeze protection)
  Cooling: not active

The ranking of energy levels in terms of comfort and energy usage is (from high to low):
NORMAL → REDUCED → HOLIDAY → STANDBY

04.01.05 Selection of energy levels

The above listed energy levels or the way how they are activated (manual override or by timer program) can be selected using the App or the webpages for all rooms (global) or for each room individually.

When the global mode is selected using the webpage, it is applied to all rooms. When the App is used, it is possible to exclude a set of rooms.

On each Room Unit with a display it is also possible to choose one of the energy levels for this room only.

Permanent selection
When a energy level is chosen, it is valid until it is changed.

Selection by timer program
The 5 weekly timing programs define the time spans for NORMAL and REDUCED.

The used weekly timer program can be selected for each room individually.

Automatic selection by geofencing
When this option is enabled, all rooms in timed mode will switch to REDUCED energy level if all users are at least 50km away from their home. When at least one user approaches, the rooms will switch back to NORMAL.

Geofencing does not activate rooms which are set permanently to one of the energy levels.

04.01.06 Rules for overriding individual energy levels by global setting

When the user selects a global energy level on the webpage, this energy level is applied to all rooms. If for one single room an individual energy level shall be activated, this can be done on the webpage of this room or on the Room Unit.

When the App is used, the application proposes a list of rooms, for the global settings based on the rules listed below:

- General rules (using the NEA SMART 2.0 App):
- Rooms which are running in timed mode are proposed to follow the global command
- Rooms which are set to permanent energy level normal, reduced or standby are not proposed to follow the global command
- Global command STANDBY proposes all rooms to follow
- Global command Party and holiday proposes all rooms which have been selected the last time

Example 1:
The user selected for his hobby room the energy level REDUCED. A room, which is only used from time to time for guests, is set to “holiday”. All other rooms are running in timed mode, the NORMAL level for these rooms is on working days from 06:00 h until 08:00 h and from 17:00 h till 23:00 h.

One working day, the user stays at home and he switches his installation to global mode NORMAL.

Reaction of the App:
The App proposes all rooms except hobby room and the room for guests to follow the global command NORMAL.

Example 2:
Some of the rooms in a house are used permanently or should by any reasons not be set to lower energy level.

The user is off for several days and activates the holiday function. The first time he must select the rooms where this function should be applied. The next time he can just confirm the last selection of rooms.

04.01.07 Temporary room temperature set point change (timed mode)

Room temperature set points of rooms, which are running in timed mode, can be changed on the Room Unit on webpage or by the App. This adjusted set point is valid until the next switching point of the timing program occurs.

04.01.08 Permanent room temperature set point change

When a room is in NORMAL or REDUCED, the room temperature set point modification overrides the previous set point. By this method, it is possible to (re)define the setpoints of room temperatures without using the room configuration pages on the App or on the webpages.

Procedure for Room Unit:

- Select energy level (normal or reduced mode)
- Modify set point
- Go to desired mode (timed, normal, reduced)
- New set point is stored and will be used from now on for this energy level.

04.02 Heating and cooling systems

04.02.01 Available systems

The following systems may be chosen during configuration sequence:
- Underfloor
- Wall
- Ceiling
- CCT: Concrete core tempering Surface
- sCCT: Surface near CCT - pipes are embedded close to the surface of the structural base
- IFHC: Industrial Floor Heating and Cooling
- Switched Fan Coils
- RAUCLIMATE SILENT BREEZE Fan Coils
- Dehumidifiers

Each system may be used for
- heating only
- heating and cooling
- cooling only

It is recommended for rooms equipped with TABS to have an additional system with lower thermal inertia for an effective room temperature control. The high thermal mass of TABS does not allow the influence of changing internal loads or rapid changes in external conditions to be compensated.

For the use of TABS, please refer to the manual
"NEA SMART 2.0 Control System Application TABS CCT – sCCT – IFHC
Application Control Area CA"
Print no. 954663.

04.02.02 Combination of systems

It is possible to combine all types of systems in all modes of operation in each room.

Example:
Room 1: Underfloor heating
Ceiling cooling
Switched Fan Coil
Room 2: Underfloor heating / cooling
Room 3: Underfloor heating
Ceiling heating
Room 4: Underfloor heating / cooling
Ceiling cooling
Room 5: Underfloor heating / cooling
sCCT heating / cooling
Modulating Fan Coil cooling

Note:
For each system in each room at least 1 channel (Room Zone, RZ) of the NEA SMART 2.0 Base is needed.

A combination of different systems (heating / cooling) in one room does not require additional measures like zone valves or external switch boxes to enable or disable valve actuators. All logical connections are done by the controller based on the definition of manifolds and connected systems during commissioning.

04.02.03 Use of switched Fan Coils

To each room 1 switched Fan Coil can be assigned, but a Fan Coil cannot be assigned to multiple rooms. Fan Coils can be defined for heating and cooling mode.
A Fan Coil is started when the actual room temperature deviates from the set point by a certain amount, depending on which of the levels „Comfort", „Normal" or „ECO" have been specified for the respective Fan Coil.

04.02.04 Use of RAUCLIMATE SILENT BREEZE Fan Coils

To each room can be assigned up to 4 modulating RAUCLIMATE SILENT BREEZE Fan Coils. The Fan Coils can be defined for heating and cooling mode with three speed limits „MIN", „MED" or „MAX".
Available „Comfort Cooling PLUS" smart function that automatically increases the comfort and well-being in the room when the RAUCLIMATE SILENT BREEZE Fan Coils are used in the cooling mode.

Fan Coils can be operated in two different configurations:
- as an additional support to a radiant heating / cooling system with defined tolerance levels „Comfort", „Normal" or „ECO"
- as a stand-alone heating / cooling system.

They cannot be assigned to multiple rooms.

For the configuration and use RAUCLIMATE SILENT BREEZE Fan Coils, please refer to the manual
"NEA SMART 2.0 Control System
Commissioning instructions for switched Fan Coils and modulating RAUCLIMATE SILENT BREEZE Fan Coils"
Print no. 954666.

In rooms operated with the autostart function, the Fan Coil is not started prematurely to take advantage of the possibilities offered by the other radiant systems in use.

04.02.05 Supply of systems

The NEA SMART 2.0 System can control up to 3 mixed circuits in heating and cooling mode, which can be selected for the available systems

- Underfloor
- Wall
- Ceiling
- CCT
- sCCT
- IFHC

For each type of application there is a set of parameters predefined which is automatically loaded when the type of mixed circuit is selected.

The system specific default parameters include the appropriate flow temperature control, system heat-up times and define the system response to changing outside temperatures.

Supply from external sources can be used, too. But in this case, the flow temperatures cannot be influenced.

 Relevant parameters:

Webpage:
Home → Installer → Settings → Mixed circuits
App:
Settings → Installer → Control parameter → Mixed circuits control

04.03 Heating mode

04.03.01 Start and stop of heating mode

Heating mode of the system may be started and stopped depending on the following conditions or parameters:

- Selected operating mode by user
- Defined heating or cooling period
- Filtered outside temperature, maximum outside temperature at which heating is deactivated and applied hysteresis function
- Temperature in rooms which are defined as “pilot rooms”
- External input signals which are defined as HEATING or COOLING

Selected operating mode
Heating mode can be started only when the system is set to HEATING / COOLING, only HEATING or MANUAL HEATING.

Defined heating or cooling period
When there is a definition for heating period, heating mode is started only during this period. Heating mode is also not started when system is in a defined cooling period.

This limitation is ignored when manual heating mode is selected. Freeze protection is always active.

Filtered outside temperature, heating limit and hysteresis.
The information about outside temperature may come from a wireless or wired probe which is installed outside the building. When the system is connected to internet there is the option to use weather service. The outside temperature is timely filtered with a time constant, by default set to 48 h.
When the filtered outside temperature drops below the heating limit, heating mode is started.

Relevant parameters:

Webpage:
Home → Installer → Settings → Heating / Cooling Settings
App:
Settings → Installer → Control parameter → Heating

Figure 04-1 shows an example of a 5-day period:

The heating limit is 15 °C during energy level NORMAL and 13 °C during REDUCED / ABSENCE (see next paragraph). The hysteresis is 0,5 K.

The filtered outside temperature is displayed in the blue dotted line.

Between day and night there is a temperature difference of around 8 K, in the early morning hours of day 1 and 2 the temperature is around 12 °C, at day it reaches more than 20 °C. The filtered outside temperature touches the heating limit, but the integrated hysteresis avoids start of heating mode.

In the night to day 3 there is a temperature drop down to 7 °C, the next 2 days reach in the afternoon almost 15 °C and then even 17 °C, but the tendency is to cooler days.

Heating mode is started in the morning of the third day.

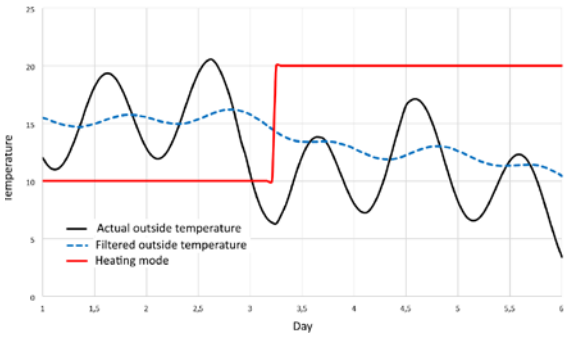


Fig. 04-1 Heating mode started by filtered outside temperature

Influence of energy level
The heating limit is shifted from 15 °C to 13 °C (both values are the default settings) when all rooms, which are defined as pilot rooms, are in reduced (absence) mode.

Influence of pilot rooms
The actual room temperature in the pilot rooms shifts the heating limit upwards (heating mode starts earlier), as soon as one of the pilot rooms is below his setpoint temperature. The „largest“ derivation to set point is taken, in default setting each Kelvin shifts the heating limit by 1 Kelvin.

The shift is limited to ±3 K.

External input signals HEATING, COOLING
When the NEA SMART 2.0 system is part of a super ordinated system – e.g. a heat pump which supplies several apartments – it must follow the overall operation mode.

This can be done by connecting potential free switches (dry contacts) to the digital inputs and configuring them for HEATING or COOLING.

Input HEATING		Input COOLING		Operating mode
exist	state	exist	state	
✓	OFF	✓	OFF	ST
✓	ON	✓	OFF	H or ST
✓	OFF	✓	ON	C or ST
✓	ON	✓	ON	ST
✓	OFF	-	-	ST
✓	ON	-	-	H or ST
-	-	✓	OFF	ST
-	-	✓	ON	C or ST

H - heating mode C - cooling mode ST - standby mode

Tab. 04-1 Control of operation modes

Example:
If the digital input HEATING is configured and state of the input is ON, the system will check the preconditions (heating period, outside temperature, state of pilot room). If the preconditions are met, the system will activate heating mode. If preconditions are not met, the system will remain in standby mode.

The 'Remote control heating/cooling' checkbox at the end of the commissioning wizard sequence allows the operating mode specified via the inputs to be forced without checking the preconditions.

Parametrization of mixed circuits in heating mode
The calculated set point for the flow temperature, which is controlled by the mixed circuit is influenced in heating mode mainly by the following values and parameters:
- Outside temperature, timely filtered
- Settings for heat curve
- Pilot room conditions

In the configuration sequence, each mixed circuit is selected for a specific heating system. The parameters which are pre-set for this application can be individually adapted to the characteristics of the supplied heating system, the needs of the building and the rooms to be supplied.

Here is some more detailed information about the relevant parameters.

Filter time constant for outside temperature:
a low filter time constant ("low" means short time, e.g. between 2 and 8 hours) allows a quick reaction to outside temperature jumps for fast reacting systems as ceiling system, underfloor system with thin heating elements or Fan Coils.

Minimum and maximum flow temperatures:
adaption to energy need or to special floor covering (wooden floor).

Starting point and slope of heat curve:
adaption to energy need.

Relevant parameters:

Webpage:
Home → Installer → Settings → Mixed circuits
App:
Settings → Installer → Control parameter → Heating → Mixed circuits

04.03.02 Influence of pilot rooms

Pilot rooms influence the set point of flow temperature in the following way:
- When one of the pilot rooms is „too cold", the flow temperature is increased
- When there is no pilot room which is really "too cold", the flow temperature is not adjusted
- When the pilot rooms are in general too warm, the flow temperature is reduced.

The degree of influence can be set by parameter.

Relevant parameters:

Webpage:
not available
App:
Settings → Installer → Control parameters → Heating → Heating circuits

04.03.03 Boost function

Depending on the calculated flow temperature, the system expects a certain level of return temperature.

When the temperature of the heating elements is too low, because there was a longer pause time of heating mode or the heating mode just has been started, the difference between flow and return temperature will be higher than the calculated limit value. If this situation continues for a time span of 30 minutes, the flow temperature is increased for 30 minutes to speed up the heat up process.

After these 30 minutes, the boost function is blocked for the next 30 minutes.

 Relevant parameters:

Webpage:
not available
App:
Settings → Installer → Control parameters → Heating - Boost Mode
Settings → Installer → Control parameters → Heating → Heating circuits

04.04 Cooling mode

Cooling mode of the system may be started and stopped depending on the following conditions or parameters:
- Selected operating mode by user
- Defined heating or cooling period
- Calculated cooling criterion
- External input signals which are defined as HEATING or COOLING

Selected operating mode
Cooling mode can be started only when the system is set to HEATING / COOLING, only COOLING or MANUAL COOLING.

Defined heating or cooling period
When there is a definition for cooling period, cooling mode is started only during this period. Cooling mode is also not started when system is in a defined heating period.

04.04.01 Cooling criterion

The cooling criterion is a value derived from a set of different conditions – outside conditions and conditions in the pilot rooms – the overall need to start cooling mode.

The cooling criterion is calculated out of the following values:
- Outside temperature (current value) and a reference value for this
- Filtered outside temperature and a reference value for this
- Pilot room temperatures and their set points in cooling mode[1)]
- Trend of the pilot room temperatures[1)]
- Weighting parameters for the above named values

[1)] When no pilot rooms are defined, this influence does not exist.

By using the weighting parameters, it is possible to adapt the way that cooling mode is started to the needs of the user and the characteristics of the building.
Of course, the setting has a decisive influence on the energy usage of the building on one hand and the comfort conditions on the other hand.

A weighting parameter may also be set to zero to eliminate the influence of a certain value.

The standard reference values are:
Actual outside temperature: 24 °C
Filtered outside temperature: 18 °C

 Relevant parameters:

Webpage:
not available
App:
Settings → Installer → Control parameters → Cooling → General Parameters

Examples for cooling criterion settings

Example 1:
- Type of application:
  Good insulated office building with heavy internal loads.

- Demands:
  High importance of comfortable room temperatures.

- Conclusion:
  Outside temperature has no decisive influence, the focus is on the room temperatures.

- Setting:
  Reduce reference values for actual value of outside temperature to 20 °C, for filtered value to 16 °C. Reduce weighting factors for both. Increase weighting factor for pilot rooms.

Example 2:
- Type of application:
  Very well insulated residential building

- Demands:
  Energy usage for cooling mode should be reduced. Free cooling is preferred. Temporarily too high room temperatures can be accepted.

- Conclusion:
  Use cooling mode only when outside temperature is too high for free cooling.

- Setting:
  Reduce weighting factor for pilot rooms.

Example 3:
- Type of application:
  Show room with big glass fronts.

- Demands:
  Energy usage for cooling mode is not so relevant. Room temperatures have to be comfortable.

- Conclusion:
  Allow cooling mode all the time outside heating period.

- Setting:
  Set reference value for filtered outside temperature to 16 °C.

In order to avoid unnecessary energy consumption, a minimum running time for cooling mode (standard value 60 minutes), and a blocking time (default value 12 hours) for switching between heating and cooling mode is set.

04.04.02 Flow temperature set point in cooling mode

The calculation of flow temperature set point in cooling mode must take into account the following demands:
- Avoid condensation on cooled surfaces
- Ensure user comfort
- Cooling system characteristics

General limit
The lowest set point of flow temperature is defined by a system-specific parameter.

Condensation
The system receives from the installed Room Units with humidity sensor the information "relative humidity" and "dew point".

Both values are used for dehumidifier control, see chapter 9 Parameter.

The highest dew point from all rooms which belong to a mixed circuit is selected and a safety offset is added. Flow temperature may not drop below this limit.

 Relevant parameters:

Webpage
Home → Installer → Settings → Mixed circuits
App:
Settings → Installer → Control parameter → Cooling → Cooling Circuits

User comfort
Surfaces which are too cold will cause uncomfortable conditions, especially in floor cooling systems. To avoid this, the minimum flow temperature is set according to the cooling system characteristics.

Note:
An additional sensor can be connected to the Room Unit to monitor the temperature of the cooled surface. User may set a limit value; the temperature of the cooled element will not fall below this value in cooling mode.

A sufficient safety margin to calculated dew point must be selected according to the conditions in the installation.

It has to be taken into account that
- as a matter of principle, all measured values have a certain degree of inaccuracy
- the surface temperature of the cooled areas may be close to the flow temperature, depending on ambient conditions
- a correction of flow temperature due to a rapidly increasing room humidity has not an immediate effect on the surface temperature. Depending on the system used the reaction will only take place after a certain period of time
- condensation on cooled elements can damage structure, surface and appearance of these elements
- condensation on cooled floors can cause accidents due to slippery surface

04.04.03 Dew point monitor

The potential free output contacts of the dew point monitors can be connected to Base, R-Module and U-Modules configured for mixed circuit control.

They shall be installed on pipes which carry water with the lowest temperature. It must be ensured, that the mounting position allows air circulation and that the humidity conditions are representative for the cooled environment.

Triggering of a dew point monitor results in the following actions:
- if the dew point monitor is connected to an U-Module for mixed circuit, the mixed circuit is stopped and the valves of all rooms supplied by this mixed circuit are closed
- if the dew point monitor is connected to a NEA SMART 2.0 Base or a NEA SMART 2.0 R-Module, the valves of all rooms controlled by these units are closed
- all dehumidifiers that are assigned to affected rooms are started

04.04.04 Dehumidifiers

The system can control up to 9 dehumidifiers. Dehumidifiers can be controlled by the bases (each base 1 dehumidifier) and the U-Modules (2 dehumidifiers per U-Module).

Dehumidifiers are assigned to rooms, whereby several rooms may have access to the same dehumidifier. It is not possible to assign more than one dehumidifier to one room.

A dehumidifier is started when with at least one assigned room:
- Relative humidity is above a limit value, or
- Calculated dew point is above a limit value, or
- There is a dew point alarm by a dew point monitor

To reduce potential noise polution caused by running dehumidifiers at otherwise quiet times, a weekly program can be used to start the dehumidifiers during "quiet times" only when a 2nd, higher limit of relative humidity or dew point is exceeded.

Dehumidifier control
For each dehumidifier 2 outputs of the system may be used:

- **Valve:**
  This signal opens a valve which allows the supply of a heat exchanger which is integrated in the dehumidifier. The use of this signal is optional and depends on the type of dehumidifier used. This signal is activated first.

- **Compressor:**
  Starts the compressor. When the "hydraulic" signal is defined, the compressor signal is delayed for 3 minutes.

Dehumidifiers have minimum and maximum run time. After stopping a dehumidifier, there is a minimum pause time before restart.

A dew point alarm by dew point monitor always starts the dehumidifier.
Dehumidifiers are normally used only in cooling mode. For special applications as e.g. swimming halls dehumidifiers can be configured also to be operated outside cooling mode.

 Relevant parameters:

Webpage
Home → Installer → Settings → Devices
App:
Settings → Installer → Devices → Dehumidifiers

04.04.05 Summer compensation

To avoid an excessive difference between the outside temperature and the temperature in cooled rooms, the room temperature set point can be increased sliding up to a maximum value of 26 ° C when a certain outside temperature is exceed.

This is an option, which can be activated and adjusted by the user.

 Relevant parameters:

Webpage:
not available
App:
Settings → Heating / Cooling

04.05 Supply control of heat and cool media

This chapter describes how the system controls the supply of heated or chilled water for heating / cooling surfaces, dehumidifiers and Fan Coils.

The graph below shows the principle logical order of demand signals.

Starting point is the "energy consumer". This can be e.g. a room which is heating or a dehumidifier which demands cooling water.

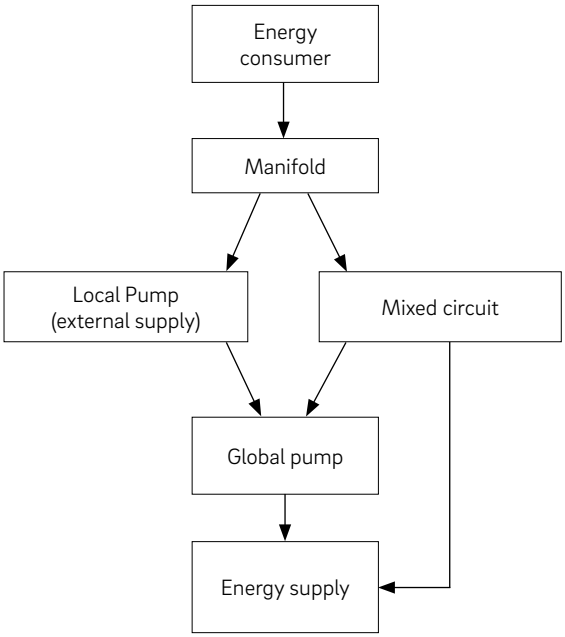


Fig. 04-2 Flow of energy demand signals

Not each element which is shown in the graph must be defined in system configuration.

04.05.01 Manifold selection

Each circuit of a room, the hydraulic connection of a dehumidifier or the supply of a Fan Coil is assigned to a specific manifold.

The manifold is assigned to a mixed circuit or to an external source.

04.05.02 Pump control

The following pumps can be controlled:
- Local pumps, controlled by Base or R-Module
  These pumps are assigned to the rooms, which are controlled by this Base and his R-Module
- Pumps of mixed circuits, controlled by U-Module
- One global pump, controlled by Base or R-Module
- Fan Coil pump as global pump that triggers any Fan Coil request in system
- Fan Coil local pump that triggers any Fan Coil on dedicated Base.

A local pump is started if this base or the associated R-Module is assigned
- to Rooms send a request or
- to dehumidifier operate the „hydraulic valve" in cooling mode

The global pump as a central supply pump is started, when one of the other pumps is running.

The pump run times are determined by the classification of the pump as conventional or high efficiency pump.

04.05.03 Mixed circuits

Up to 3 mixed circuits can be controlled by the system, each mixed circuit is controlled by an U-Module, configured for this use.

A mixed circuit can be configured for:
- Heating only
- Heating and cooling
- Cooling only

For the supply of the following systems:
- Underfloor
- Wall
- Ceiling
- CCT, sCCT, IFHC
- Fan Coils

The parameters which influence the flow temperature are set according to the operational purpose of the mixed circuit, but can be adapted individually.

Relevant parameters:

Webpage:
Home → Installer → Settings → Mixed circuits
App:
Settings → Installer → Control parameter → Cooling → Cooling Circuits

Settings → Installer → Control parameter → Heating → Heating Circuits

04.05.04 Boiler and chiller control

The boiler and chiller demand signal is an on/off signal coming from a potential free contact of the Base.

The signal is triggered at the end of the logical chain shown in figure 04-2 under consideration of minimum run time and pause time.

The demand signal of a mixed circuit is created only when the opening of the mixing valve exceeds a minimum level.

Relevant parameters:

Webpage:
Home → Installer → Settings → Devices
App:
Settings → Installer → Devices → various Submenus

04.06 Room temperature control

04.06.01 Adaption to used system

The parameters, which influence the control behavior, are pre-set automatically when the system (floor / wall / ceiling) is selected.

The parameters for the system in general can be adapted, but not for each room individually.

It is possible, that in one room there are different heating and cooling systems.
Each system has its own parameter set. This means, that in one room there are up to 3 PI control mechanism running independent from each other.

Relevant parameters:

Webpage:
Home → Installer → Settings → Control
App:
Settings → Installer → Control parameter → Room temperature control

04.06.02 Controller type: Proportional – Integral (PI)

Room temperature control works on base of a proportional – integral (PI) controller. The proportional part of the control signal gives an immediate reaction when the difference between set point and actual value changes.

The integral part changes slowly and has the objective to eliminate the remaining difference between set point and actual value. To avoid negative effects, caused by the thermal storage of the used system, there are special rules implemented, how the I-Part is calculated.

Relevant parameters:

Webpage
Home → Installer → Settings → Control
App:
Settings → Installer → Control parameter → Room temperature control

04.06.03 Valve control by PWM method

The calculated controls signal, which is a value from 0 % to 100 %, is transferred to the puls-width-modulation (PWM) method.

PWM method means, that the valves of the manifold, which control the flow of heating and cooling medium, are opened in a percentage of the PWM cycle time, which is equivalent to the control signal calculated by the PI controller.

Figure 04-3 shows a control signal of 100 %, 50 % and 20 % and the principle how it is transferred to a PWM signal.

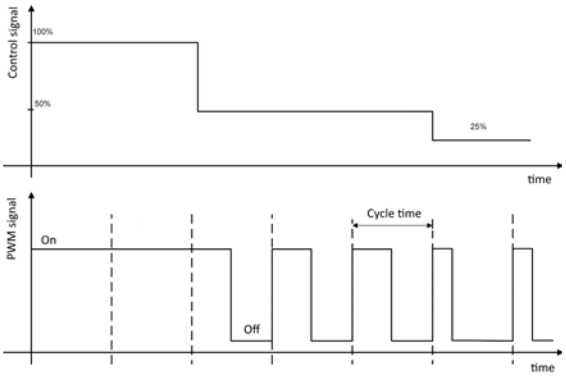


Fig. 04-3 Control signal and corresponding PWM signal

There are minimum times to switch the thermal actuators for the valves on or off which have its reason in the opening and closing times of the actuators.

Typical cycle times are 20 minutes for floor and wall systems, 10 minutes for ceiling systems.

Relevant parameters:

Webpage:
Home → Installer → Settings → Control
App:
Settings → Installer → Control parameter → Room temperature control

04.06.04 Timer programs

Daily and weekly programs are predefined but can be changed. From the 10 available daily programs, different weekly programs can be put together, with a different daily program for each day.

For typical applications, it is sufficient to use one or two of the weekly programs and assign them to the different rooms.

It is also possible to use for a room not one of the weekly programs, but for each day of the week one of the 10 daily programs.

When the room is in timer mode, the temperature set point is switched between normal and reduced set point. The normal and reduced set points can be set individually for each room in the room settings page. For details, see chapter 08.

See next chapter for optimization of transition between normal and reduced energy levels.

The energy level of the rooms determines the operating of the assigned mixed circuit. As long as there is a room in energy level NORMAL, the supply by the mixed circuit is running in the NORMAL condition.

04.06.05 Auto start function

The auto start function uses a permanently updated set of data, which contains the heat up/cool down gradient of room temperature for different outside temperatures. These gradients are individual for each room.

When activated the system tries to reach the next set point at the time which is defined in the timing program.

The auto start function is used in heating and in cooling mode.

Transition REDUCED → NORMAL:
Based on the gradient, which is valid at this time due to actual outside temperature, the system calculates the time which is needed to reach the desired set point, beginning from the actual room temperature value.

Example for heating mode:
The gradient corresponding to the outside temperature is 0.8 K/h. The current temperature in reduced mode is 19.4 °C. The set point for NORMAL is 21 °C, the „NORMAL" operation should start at 07:00 h. This means that the heating-up phase starts 2 hours earlier – plus a safety surcharge.

Transition NORMAL → REDUCED
Based on the calculated temperature drop gradient, the system will switch earlier to the reduced setpoint to achieve the desired temperature according to the timing program.

04.06.06 Pilot rooms

Rooms selected as pilot rooms impact on
- Heating limit
- Flow temperature in heating mode
- Cooling criterion

For details, how to select pilot room see chapter 07.06.02.
The number of pilot rooms is not limited. Only rooms which are regularly occupied / in use should be selected as pilot rooms.

Relevant parameters:

Webpage:
Home → Rooms
Home → Installer → Rooms
App:
Settings → Installer → Control parameter → Heating → General Parameters
Settings → Installer → Control parameter → Cooling → General Parameters

04.06.07 Control Area (CA)

For enclosed areas larger than 50m^2 it is recommended to use more than 1 Room Unit for more reliable measurement of room temperature, humidity or core temperature for TABS systems.
The Control Area gives the average room temperature and the highest humidity measured in the room. The room zones in the control area must be located on the same NEA SMART 2.0 Base and dedicated R-Module.

04.06.08 User settings and operation

The user can change set points, operating mode and parameters, which influence room temperature control, using:
- NEA SMART 2.0 App
- Integrated webpages
- NEA SMART 2.0 Room Units

Only with the NEA SMART 2.0 App is access to the full range of parameters possible. Important parameters can be modified using the webpages and only essential parameters can be accessed directly through the Room Units themselves.

Using the Room Units the following settings can be modified:

- **Temporary change of set point:**
  If the Room Unit is in TIMER mode, a change in setpoint will only remain effective until the next programmed temperature change.
- **Permanent change of set point for NORMAL or REDUCED mode:**
  If the room is in NORMAL or REDUCED mode, the selected new setpoint will be remain effective indefinite for the current mode
- **Change of energy level**
  Energy level can be changed between:
  NORMAL / REDUCED / STANDBY
  The selected energy level iremains active until the unit is switched into TIMER mode and a change in energy level is triggered.
- **Activation of TIMER program** (selection of energy level by weekly program)
- **Activation of PARTY mode:**
  PARTY mode uses NORMAL energy level for a time span of 4 h (default value), if you select party mode via the Room Unit
- **Changing the operating mode:**
  Switching between heating and cooling mode if conditions permits it and the Room Unit is configured for it.
- **Fan Coil activation:** Switch on / switch off
  For modulating Fan Coils, additionally switch the fan speed stages and, if available, activating the flap control

04.06.09 Remote temperature sensor for Room Units

All Room Units feature an additional input, which accepts a remote temperature sensor or a digital input. For digital inputs see chapter 04.07.01

With a remote temperature sensor the following functions is possible:

- **Limiting of minimum and maximum floor temperature:**
  minimum value for cooling and maximum value for heating – or – 2 minimum values for cooling or maximum value for heating
- **Additional room temperature input:**
  room temperature is taken as the average reading additional from Room Unit and remote sensor
- **Floor temperature control:**
  room is solely controlled via floor temperature
- **Condensation protection for chilled ceilings:**
  Remote sensor can be attached to chilled ceiling element or to flow pipe. Assigned valve is closed when temperature comes close to dew point of this room, more information are in chapter 7.4.6.
- **Room Unit from the software version 1.6 and higher**
  Core temperature measurement: With TABS, the sensor measures the core temperature of the heated/cooled element
  Return temperature measurement:
  With TABS, the sensor measures the return temperature of a heating/cooling circuit
- **Room Unit with the software version 1.7 and higher**
  Outdoor temperature measurement:
  Requires the connection of a compatible temperature sensor

04.06.10 Rooms with various heating / cooling systems

As described in chapter 04.02.01 and 04.02.02 a room may have different systems in terms of type (floor, wall, ceiling) and in terms of operating mode (heating, cooling, heating and cooling).

For each system there is an individual set of parameters which considers the specific properties for room temperature control.

Example:
A room with a floor system (heating only) and ceiling system (cooling only).

The ceiling system is based on plasterboard, the floor system is a common screed based system. The thermal masses of floor and ceiling system are very different. Because of this, the response time of the ceiling system is much faster. This is taken into consideration through the different pulse width cycle times for each system: default value for floor system is 20 minutes, for ceiling system 10 minutes.

For each system, a separate channel (Room-Zone, RZ) on the Base or the R-Module is required to ensure that:

- the valve actuators can be connected directly to the output of the Base without using any additional relays
- the valves can be supplied over the heating / cooling systems to their respective requirements.

With NEA SMART 2.0 it is possible to assign a single Room Unit to multiple channels across a base station and the directly connected R-Module. Each channel can then be assigned to a different system.
It is not possible to assign a Room Unit or Room Probe to more than one Base and the directly connected R-Module.

04.06.11 Geofencing

Geofencing is a smart function of the NEA SMART 2.0 system that enables automatic reduction of energy consumption when users are at a certain distance from their home.

The function can be enabled individually for each smart device on which the NEA SMART 2.0 App is installed and paired with the base.

This function is not active by default.

The energy-saving adjustment of the room temperature set-point is only applied to rooms that are in time-controlled mode. If the absence of all users is detected, the 'REDUCED' operating mode is activated for these rooms.

04.07 Digital input and output signals

The digital input and output signals of NEA SMART 2.0 System allow

- Activation of devices such as pumps, boiler, chiller, dehumidifier and switched Fan Coils
- Switching of valves
- Communication of status / operating mode
- Receiving warning / alarm information
- Receiving status information from a super ordinated system

This chapter describes customisable input/output signals which are not part of a pre-defined control function that exist for flow temperature and control of dehumidifiers.

04.07.01 Digital input signal

The digital inputs require a potential free switch (dry contact).

INPUT signal	Available on	Reaction
Dew point monitor Note: Dew point monitor signal is triggered when the potential free switch is **open**	Room Unit	Cooling of this room is stopped, associated dehumidifier is activated.
	Base, R-Module	Cooling of all rooms assigned to the base and to connected R-Module is stopped, associated dehumidifiers are activated.
	U-Module (mixed circuit)	The operation of mixed circuit is ended.
Window contact Note: Window contact signal is active when the potential free switch is **open**	Room Unit	Heating / cooling is stopped for 30 minutes. After this, energy level of this room is switched to REDUCED.
	Base, R-Module	For all rooms assigned to the base and to connected R-Module the same measures as described above apply.
HEATING	Base, R-Module	System is restricted to operating modes standby or heating. The mode heating / cooling (automatic mode) may be activated, but cooling will not start as long as the input signal HEATING is active.
COOLING	Base, R-Module	System is restricted to operating modes standby or cooling. Heating / cooling (automatic mode) may be activated, but heating will not start as long as the input signal COOLING is active.
Energy Level REDUCED LOCAL	Base, R-Module	All rooms[1)] which are in TIMER mode go to energy level REDUCED.
Energy Level REDUCED GLOBAL	Base, R-Module	All rooms[2)] which are in TIMER mode go to energy level REDUCED.
Energy Level ABSENCE	Base, R-Module	All rooms[2)] which are in TIMER mode go to energy level HOLIDAY.

Tab. 04-2 Available digital input signals and system reaction

[1)] Applied to all rooms assigned to this Base and R-Module

[2)] Applied to all rooms in the entire installation

04.07.02 Digital output signal

OUTPUT signal	Available on	Trigger
Pump local	Base, R-Module	A room assigned to this base or a connected R-Module has a current demand signal (heating or cooling) **or** a dehumidifier allocated to the base or connected R-Module triggers the "hydraulic" valve (only in cooling mode).
Pump global	Base, R-Module	Any room of the entire installation has a current demand signal (heating or cooling) **or** any of the dehumidifier triggers the "hydraulic" valve (only in cooling mode).
Pump mixed circuit	U-Module (configured for mixed circuit)	Demand signal for mixed circuit has been generated.
Boiler	Base, R-Module	A room of the entire installation not supplied via a mixed circuit triggers a heating demand signal **or** any of the mixed circuits causes the mixing valve to open by more than the pre-defined amount/level.
Chiller	Base, R-Module	Same as above, but for cooling demand signal.
HEATING	Base, R-Module	System is in heating mode. Can be used to control the operation mode „heating" to other devices or to a BMS.
COOLING	Base, R-Module	Same as above, but for cooling.
Valve dehumidifier	Base, R-Module, U-Module	Dehumidification sequence started. Valve opens before compressor starts.
Compressor dehumidifier	Base, R-Module, U-Module	Dehumidification started.
Switched Fan Coil	Base, R-Module, U-Module	Switched Fan Coil operation has been requested.
Fan Coil Pump	Base, R-Module	Global Fan Coil Pump. The global Fan Coil pump is activated as soon as one of the local Fan Coil pumps receives a request to run.
Fan Coil local Pump	Base, R-Module	A local Fan Coil pump is activated when one of the switched Fan Coils or RAUCLIMATE SILENT BREEZE Fan Coils assigned to this base requests to run.

Tab. 04-3 Available digital output signals and the condition to activate them

04.08 System operating and monitoring

There are 4 ways to operate and monitor the system:
- Via NEA SMART 2.0 App
- Via integrated webpages (only when user is in the building itself)
- Directly via the Room Units
- Via KNX Gateway

04.08.01 Using the Room Units

In addition to specifying the setpoints for the room temperature, room controllers can also be used for a variety of other settings. See chapter 04.06.08.

To avoid unwanted or inadmissible settings, minimum and maximum values for set points can be defined. Additionally, the buttons of the Room Units can be locked. For public areas, the remote Room Probes can be used which look identical to the Room Units but have no display or operating buttons.

04.08.02 Integrated webpages

The NEA SMART 2.0 Base has an integrated web server.

The webpages can be accessed by WLAN with any device by a web browser connected to the Master of an Installation via the access point.

The webpages can be used by the installer for setting up the system, check functionalities and modify important parameters.

The user can change energy level (for entire installation or for each room individually), operating mode, set points, timer programs and some parameters.

The webpages can be accessed only when the Base is in "access point mode". It is not possible to use the NEA SMART 2.0 App at the same time.

04.08.03 Installer only webpages – Commissioning wizard for global system set-up

To facilitate an easy, quick and reliable commissioning process, the system has got a built in wizard which guides the installer through the setup.

The correct running the Wizards ensures that
- all installed system components are detected and the system can access them
- all physical and logical connections between components and any external devices are checked and work correctly
- relevant settings and parameters are customised to the installation

Installations with only a single NEA SMART 2.0 Base station and one R-Module, the system can be initiated without using the wizard.
However, the following limitations will apply:
- the system can only control room temperatures
- only heating mode is possible
- Timing programs cannot be used (system date and time is not set)

It is recommended to always use the wizard.

Pre-requisites for running the wizard:
- Hardware installation completed
- All communication bus connections are made and checked
- Room Units, Room Probes and outside temperature sensors are paired

It is highly recommended to have all devices, such as pumps, actuators, boiler, chiller, dehumidifiers fully connected to the system to enable complete testing of all connections and functions.

The connection of sensors such as outside and flow temperature sensors, which are required for a mixed circuit, is mandatory. The wizard cannot be completed if important signals are missing.

To run the Wizard, the Master Base, is set to access point mode (point to point connection to one device only).

The master of the system is determined by setting the system bus address „0000“ on the DIP switches.

It is possible, to connect directly via access point mode via WLAN with the systems master. A smartphone, tablet or laptop can be used for configuration.

For details how to connect see chapter 7 System set up.

The wizard starts automatically when an unconfigured NEA SMART 2.0 system is switched on.
The commissioning wizard checks for consistency at preset point within the commissioning process and holds the process or prevents the system from starting up if the connected components do not match the entered configuration.

Main steps in wizard:
- Selection of language, type of installation, building type and energy standard. System date and time is taken from the connected smart device.
- Definition of connected devices, functions and number of manifolds and rooms.
- Automatic verification if desired functions are achievable within the defined hardware environment.
- Scanning and verification of components via System Bus or Zone Bus.
- Parameterisation of all U-Modules (control of mixed circuit, dehumidification control or switched Fan Coil).
- check of all the used inputs and outputs of U-Modules.
- Definition of rooms and their operating modes (heating/cooling), connection to manifolds.
- Definition of input and output signals of Base(s) and R-Modules.
- Final verification check if all desired functions are possible and activation of the system.

04.08.04 Installer only webpages – Room setup and parametrization

After successfully completing the commissioning wizard, an installer can assign room names, select from a range of extra options for the rooms (e.g. assign pilot role, enable auto start function, configuration of devices), modify and allocated timer programs.

The installer only webpages also give access to a selection of parameters. The complete set of parameters can be accessed via NEA SMART 2.0 App.

Room management and certain settings are accessible in user level, but with some restrictions.

04.08.05 User webpages

The user may operate the system via integrated webpages if they don’t want to connect their system to the cloud and use the NEA SMART 2.0 App.
In this case a tablet permanently connected to the NEA SMART 2.0 Master Base is the recommended solution.

Main functions:
- Select energy level for entire installation or for each room individually (NORMAL, REDUCED, HOLIDAY / ABSENCE)
- Select operating mode (heating manual, only heating, cooling manual, only cooling, automatic mode)
- Select PARTY mode
- Monitor actual room temperatures and humidity
- Define room temperature set points for above named operating modes and energy levels
- Change temporary room temperature set points
- Edit timing programs and assign them to rooms and dehumidifiers
- Control of switched and RAUCLIMATE SILENT BREEZE Fan Coils
- Define heating and cooling period
- Modify starting points for heating / cooling mode
- Define minimum / maximum values for floor temperature
- Manage access to cloud via router

04.08.06 NEA SMART 2.0 App

To use the NEA SMART 2.0 App, it is necessary to connect the Base (only the system master) to a router and to establish the connection to the cloud.

The NEA SMART 2.0 App is not only the most comfortable way for the user, to operate and monitor his system, it is also the most powerful tool for installers and service engineers, to analyse the behaviour of the system, optimize it and detect potential problems.

The App offers – beside all above listed features of the webpages – the following additional functions:
- Easy and intuitive operation of the system independent of location
- Automatic activation and deactivation of reduced energy level by locating user and identifying his distance to his home (geofencing)
- HOLIDAY function with calendar

- Statistics of room temperatures and humidity
- Advanced setting and parametrization

04.08.07 Warnings and alarm functions

The warning or alarms are displayed on the Room Unit via a symbol or error code e.g.:
- Open window detected
- Risk of condensation
- Low battery of wireless Room Units
- Connection failure of Room Unit
- Frost protection function activated
- Probe failure

04.09 System response in case of fault

When the system detects a problem e.g. a communication failure or a defective probe, a message is triggered, and the fail safe mode is activated.

The fail safe mode is designed to avoid any damages to the building and – if possible – ensure a minimum of comfort.

04.09.01 Communication problems

Communication loss with Room Unit
The communication failure may be caused by almost empty batteries in case of wireless Room Units or Room Probes or by a damaged Zone Bus system.

After 1 hour of communication loss the NEA SMART 2.0 Base reports this via a flashing LED corresponding to the channel experiencing the issue. The room will be heated in emergency mode (80 % of last heating power). Cooling is stopped.

Communication loss between system components (SYSBUS)
The System Bus connects the NEA SMART 2.0 Base units, the U-Modules and the RAUCLIMATE SILENT BREEZE Fan Coils.

The connected components enter a fail safe mode to avoid damages and to ensure comfortable conditions as far as possible. But it is not possible in this case to operate the complete system via App or integrated webpages.

04.09.02 Probe faults

Room temperature probe defective
Same reaction as “Communication loss of Room Unit”.

Room humidity probe defective
Cooling of this room is stopped to avoid condensation problems. In heating mode there is no reaction except the error message.

Outside temperature probe defective or no signal
The system reacts as if outside temperature would be 0 °C.

Flow temperature probe defective
In heating mode, the mixing valve is set to 10 % open, the mixed circuit keeps on running.

In Cooling mode the mixed circuit is closed.

04.09.03 Control issues

Heating mode: Flow temperature too high
As long as the flow temperature does not exceed the defined maximum value for this circuit, the mixed circuit keeps on running. When the flow temperature is above this value, the mixed circuit will be closed down. The magnitude of deviation determines how fast this is done.

If the flow temperature is 15 K above the maximum permissible value, the mixed circuit is stopped immediately.

Cooling mode: Flow temperature is below calculated dew point of one or more rooms
Valves of these rooms are closed.[1)] This prevents that one or more rooms are supplied with water, which could cause condensation problems.

[1)] It is possible that during commissioning the safety offset for the flow temperature in relation to the dew point was set to zero or even a negative offset. In such a case the valves would be closed every time the flow temperature drops below the set point.

Cooling: Flow temperature too low
If the calculated set point is permanently undershot, the mixed circuit is switched off after a period of time, the time to shutdown depends on how strong the deviation is.
If the flow temperature falls by more than 4 K below the minimum value defined for this circuit, the circuit is switched off immediately, as well as if the flow temperature rises more than 15 K above the maximum value defined for heating mode.

04.09.04 Other issues

Open window detected
It has to differentiated between these cases:

1. Automatic detection by Room Unit In heating and cooling mode, for 30 minutes heating and cooling is stopped and then continued with previous energy level.
2. Window dry contact connected to Room Unit In heating mode, for 30 minutes heating is stopped and then continued with REDUCED energy level. In cooling mode, cooling is stopped and not started again until the window is closed.
3. Window dry contact connected to base or R-Module In this case the window contact is assigned to a room and behaviour is the same as in case 2.

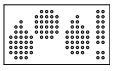
Function „Open window detection" can be disabled over APP or webpage.

Condensation problem detected
It has to be differentiated between these cases:

1. Detection by Room Unit (high humidity) or by a dew point monitor connected to Room Unit: Cooling of this room is stopped. Assigned dehumidifier is started.
2. Detection by dew point monitor connected to base or to R-Module: Cooling of all rooms connected to this Base and R-Module is stopped. Mixed circuits linked to this Base or R-Module are stopped. Assigned dehumidifiers are started.
3. Detection by dew point monitor connected to U-Module for mixed circuit:
   Mixed circuit is stopped. Cooling of all rooms connected to this mixed circuit is stopped.

Frost protection
The frost alarm symbol is shown when the room temperature drops below 5 °C.

When there is no heating mode active at this moment, (because e.g. system is in STANDBY), heating is started with a set point of 5 °C.

	Source of signal	NEA SMART 2.0 Room Unit				NEA SMART 2.0 Base	NEA SMART 2.0 U-Module for Mixed Circuit
Signal	Type of signal:	Relative humidity of Room Unit	Dew point calculated in Room Unit	Dew point monitor of Room Unit (input selection P6)	Remote sensor connected to Room Unit (input selection "Ceiling Protection" P8)	Dew Point monitor connected to digital input	Dew Point monitor connected to digital input
Limit	Limit or signal which causes reaction	Relative humidity is higher than threshold value (default value or dehumidifier trigger value)	Dew point is higher than threshold value (default value or dehumidifier trigger value)	Contact on external input opens (signal for condensation)	Temperature of ceiling surface is below dew point + 2K	Contact on digital input opens (signal for condensation)	Contact on digital input opens (signal for condensation)
Reactions	Reaction: Valves of circuits are closed (in cooling mode only)	-				 (all actuators of this Base)	 (actuators linked to this Mixed Circuit)
	Reaction: Dehumidifier is activated	 (dehumidifier linked to this zone)	 (dehumidifier linked to this zone)	 (dehumidifier linked to this zone)	-	 (all dehumidifiers linked to this Base)	-
	Reaction: Stop mixed circuit which supplies this room	-	-	-	-	C (all Mixed Circuits linked to this Base)	C (Mixed Circuit linked to this U-Module)
	Other reaction	-	-	 Error displayed on Room Unit	-	ERROR message displayed in App	ERROR message displayed in App

Tab. 04-4 System response to humidity and dew point problems

Valid for:
C = cooling or
H* heating, only when dehumidifier is active in heating mode

05 Component selection

05.01 Starting Point

The components of the NEA SMART 2.0 system allow a high degree of customization in regards of the requirements that can be found in the specific installation.

This flexibility allows – for example – the connection of a dehumidifier either to outputs of the Base, the R-Module or to a U-Module configured for this application.
The list below therefore does not show the exact and exclusive relationships.
The following information must be available to select the number and type of system components required:

- the number of rooms determines the number of Room Units
- for large rooms, several Room Units sensors can be used, which are then combined to form a control area (CA)
- the number of heating circuits as well as the number of manifolds and their position in the building determines the number of actuators and the number of Bases and R-Modules
- the number of mixed circuits determines the number of U-Modules
- the number of dehumidifiers and Fan Coils as well as their position in the building determines the number of bases, R- and U-Modules
- the number of relay outputs required for pumps, heat generators, cooling generators and other devices determines the number of Bases and R-Modules
- the number of digital signals from other devices such as dew point monitors or heat pumps determines the number of Bases and R-Modules

If the NEA SMART 2.0 is part of a heating and cooling installation clarification is to be sought on which system (NEA SMART 2.0 or another system in the installation, e.g. BMS), will take the lead in deciding the overall operating mode (heating or cooling ...) of the installation. Both scenarios are possible but the required inputs/outputs may differ.

Inputs and/or outputs required for optional functions are:

Digital Outputs for

- Global and local pumps
- Heat/cool generator
- Switching valves, e.g. for heating or cooling
- Change over signal heating / cooling
- Control of dehumidifiers, switched Fan Coils
- Any other devices
- Fan Coil pump

Digital Inputs for:

- External input to switch the NEA SMART 2.0 installation to reduced mode or absent mode
- Dew point monitor to give signal when condensation takes place
- External change over signal heating / cooling
- Any other devices

05.02 Minimum and maximum configurations

NEA SMART 2.0 Base

- Max. 8 rooms
- Max. 12 actuators
- Max. 4 digital outputs
- Max. 4 digital inputs

The maximum number of possible thermal actuators connected to each of the 8 Room Zones (RZ) is limited and starting from Room Zone in ascending order is as follows: 2-2-1-1-2-2-1-1.

Every NEA SMART 2.0 Base can have a maximum of one NEA SMART 2.0 R-Module connected to it.

NEA SMART 2.0 R-Module

- Max. 4 rooms
- Max. 8 actuators (two per Room Zone)
- Max. 2 digital outputs
- Max. 1 digital inputs

A single NEA SMART 2.0 U-Module can control the following:

- Flow temperature / mixed circuit or
- Up to 2 dehumidifiers
- Up to 4 switched Fan Coils or
- Up to 2 switched Fan Coils and 2 dehumidifiers (but without valve control)

The minimum configuration of a NEA SMART 2.0 systems is:

- 1 NEA SMART 2.0 Transformer (if Base 24 V is used)
- 1 NEA SMART 2.0 Base
- 1 NEA SMART 2.0 Room Unit
- 1 actuator

The maximum configuration of a NEA SMART 2.0 system is:

- 5 NEA SMART 2.0 Bases
- 5 NEA SMART 2.0 R-Modules (but not more than the number of base)
- 9 NEA SMART 2.0 U-Modules

In the maximum configuration the NEA SMART 2.0 can control:
- 60 rooms
- 3 mixed circuits
- 9 dehumidifiers (5 dehumidifiers on the base units, 4 dehumidifiers on the U-Modules or the R-Modules)
- The maximum number of 5 U-Modules can be used even if there is one Base
- Up to 60 switched Fan Coils (if only switched Fan Coils are used)
- Up to 30 RAUCLIMATE SILENT BREEZE Fan Coils

Control Areas CA maxium configuration:
- System: Max. 20 CA
- Base: Max. 4 CA
- Base + R-Module: Max. 6 CA
- 1 CA (Base): Max. 8 Room Zones
- 1 CA (Base + R-Module): Max. 12 Room Zones

Outdoor temperature sensors
- Wireless outdoor sensor: 1 sensor per base. I.e. in a system with max. expansion stage 5 sensors (1 x on the master + 1 x each on the slaves)
- Wired outdoor sensor on the U-Module - mixed circuit: 1 sensor per U-Module - mixed circuit. I.e. in a system with max. expansion stage 3 sensor
- Wired outdoor sensor on the Room Unit - configuration P11: 1 sensor per Room Unit.

The total number of outdoor sensors in the system is limited by the number of components that have an outdoor temperature reading capability.

05.03 Selection Process

05.03.01 Hydraulic Manifolds

Based on the number of rooms served and the associated pipe loops for each manifold, the NEA SMART 2.0 components can be selected using selection table 05-1.

Number of rooms (identical to Room Units)	1	...	8		9	...	12	
Number of pipe loops (identical to number of actuators)	1	...	12		13	...	20	
		↓				↓		
NEA SMART 2.0 Base				+	NEA SMART 2.0 R-Module			
NEA SMART 2.0 Transformer								

Tab. 05-1 Selection matrix

Any room (unit) can be assigned to any number of heating circuits / actuators on one NEA SMART 2.0 Base or R-Module. That means that one NEA SMART 2.0 Room Unit could be assigned to 20 heating circuits / actuators. However, in such a case the use of a zone valve, that controls the manifold as one, should considered instead.

Sometimes there can be two hydraulic manifolds supplying the same room. A meeting room in an office building may have an underfloor heating system as well as a chilled ceiling installed, each supplied by its own manifold. Placing the NEA SMART 2.0 Base station next to the underfloor heating manifold and the R-Module next to the one for the ceiling system would be possible to control both systems with a single Room Unit

Special attention is necessary, when within one room more than one system is installed and if the systems are used for heating and/or cooling. For example a room with
- underfloor heating only,
- wall heating and cooling
- ceiling cooling only.

In this case, only one Room Unit is required, which is assigned to 3 channels of the Base or the R-Module (one channel for each system).
If a NEA SMART 2.0 R-Module is used for ceiling cooling, an additional NEA SMART 2.0 Transformer should be used for this.

The NEA SMART 2.0 Base and R-Module should be placed close to each hydraulic manifold because the actuators for each pipe loop have a limited cable length.

This setup is repeated for every manifold. As a result, the overall number of NEA SMART 2.0 Bases and R-Modules are defined.

05.03.02 Mixed circuits

NEA SMART 2.0 can control mixed circuits only for heating, cooling or heating and cooling. Every mixed circuit will need one NEA SMART 2.0 U-Module. The maximum number of mixed circuits per installation is three.

The NEA SMART 2.0 U-Module should be placed close to the mixing valve to keep wiring to a minimum.

05.03.03 Dehumidifiers

There are the following ways to control dehumidifiers:
- via digital outputs of NEA SMART 2.0 Base or the R-Module (1 dehumidifier can be controlled per base or R-Module)
- via the digital outputs of a configured NEA SMART 2.0 U-Module (2 dehumidifiers, each with valve and compressor control can be controlled)
- via the digital outputs of a NEA SMART 2.0 U-Module configured for dehumidifier/ switched Fan Coil (2 dehumidifier, 2 switched Fan Coils can be controlled, but only the compressor for the dehumidifiers)

The decision to use the NEA SMART 2.0 Base or the NEA SMART 2.0 U-Module depends on the following:
- Number of digital outputs available at the NEA SMART 2.0 Base. This is important to know because some digital outputs may be used for other functions, such as change over heating / cooling or boiler demand signal.
- Distance between the dehumidifiers and the NEA SMART 2.0 Base and necessary wiring

The maximum number of dehumidifiers per installation is nine.

05.03.04 Fan Coils

Switched Fan Coils can be controlled:
- Via relay outputs of the base and the R-Module
- Via a U-Module configured for Fan Coil (up to 4 Fan Coils)
- via the digital outputs of an U-Module configured for dehumidifier / Fan Coil (2 Fan Coils))
- via the room zone outputs (RZ) of a Base, in combination with a switching relay

Modulating RAUCLIMATE SILENT BREEZE Fan Coils can be controlled over SYSUBUS.

05.03.05 Analog Inputs

Analog inputs can be used for the temperature sensors of the NEA SMART 2.0 system. The temperature sensors can be connected to the NEA SMART 2.0 Room Units (additional input for remote sensor) and to the NEA SMART 2.0 U-Module if it is configured for a mixed circuit (flow, return and outside temperature sensors).

Room Remote sensor
The Remote sensor can be connected to any NEA SMART 2.0 Room Unit and its function selected during system setup (according table 05-2).

Device	Possible Function
Remote sensor	Limiting floor temperature to a minimum and maximum value (lower limit valid for cooling, upper limit for heating). This function is useful, e.g. to protect wooden floors from overheating and to avoid that cooled surfaces are perceived as too cold (Parameter value: P1).
	Same as above with additional option to maintain a minimum surface temperature. This can be used as a comfort function in bathrooms or similar (Parameter value: P2).
	Remote room temperature sensor (room temperature control only by this value). This function is useful if the NEA SMART 2.0 Room Unit cannot be placed inside the room it has to control or if there is not enough space (Parameter value: P3).
	Floor temperature control **only**. The room is solely controlled via the floor temperature (Parameter value: P4).
	As an additional room temperature sensor (room temperature control using the mean value between the additional sensor and the sensor of the Room Unit. This function can be used if the room temperature shall be controlled using the mean value of the temperature at two positions in the room. In order to avoid interference, the cable of the remote sensor may only be extended by a maximum of 10 m (Parameter value: P5)
	Temperature sensor for cooled surfaces or pipes (stops cooling when dew point temperature is reached) (Parameter value: P8).
	Remote sensor for core temperature (TABS) (Parameter value: P9).
	Remote sensor for return temperature (TABS) (Parameter value: P10).
	Remote sensor for outdoor temperature (Parameter value: P11).

Tab. 05-2 Analog input Room Unit

The remote sensor is coming in 3m or 10m length.

The input of the NEA SMART 2.0 Room Unit can either be configured as analog (see table above) or digital (see table 05-4) but not as both simultaneously.

NEA SMART 2.0 U-Module when used for mixed circuit control

Device	Function
Flow temperature sensor	Must always be installed for the control of the flow temperature
Return temperature sensor	Is recommended to optimize the flow temperature control
Outdoor temperature sensor	A wired remote temperature sensor can be connected to the U-Module (instead of or in addition to the NEA SMART 2.0 wireless outdoor temperature sensors)

Tab. 05-3 Analog input U-Module

05.03.06 Digital Inputs

Digital Inputs can be used to receive information from other devices. Digital Inputs can be received either via the NEA SMART 2.0 Room Unit the NEA SMART 2.0 Base or the NEA SMART 2.0 R-Module.

NEA SMART 2.0 Room Unit
One of the functions described below can be defined during the setup of the system.

Device	Function
Window contact	A hard wired window contact can be used to avoid wasting energy with an open window: In the case of heating, the heating is interrupted and reduced after 30 minutes. In the case of cooling, the cooling of the room is stopped (Parameter value: P7).
Dew point sensor	A dew point monitor detects condensation on pipes or surface and stops cooling in this room (Parameter value: P8).

Tab. 05-4 Digital input Room Unit

NEA SMART 2.0 Base and R-Module
A maximum of four digital inputs can be configured for one NEA SMART 2.0 Base.

One digital input can be configured for the NEA SMART 2.0 R-Module.

Within a NEA SMART 2.0 Base (and optional R-Module), a function can only be assigned once. That means, it is not possible to assign the same function to more than one input.

INPUT signal	Available on	Reaction
Dew point monitor Note: Dew point monitor signal is triggered when the potential free switch is **open**	Room Unit	Cooling of this room is stopped, associated dehumidifier is activated.
	Base, R-Module	Cooling of all rooms assigned to the base and to connected R-Module is stopped, associated dehumidifiers are activated.
	U-Module (mixed circuit)	Mixed circuit is closed.
Window contact Note: Window contact signal is active when the potential free switch is **open**	Room Unit	Heating / cooling is stopped for 30 minutes. After this, energy level of this room is switched to REDUCED.
	Base, R-Module	For all rooms assigned to the base and to connected R-Module the same measures as described above apply.
HEATING	Base, R-Module	System is restricted to operating modes neutral or heating. The mode heating / cooling (automatic mode) may be activated, but cooling will not start as long as the input signal HEATING is active.
COOLING	Base, R-Module	System is restricted to operating modes neutral or cooling. Heating / cooling (automatic mode) may be activated, but heating will not start as long as the input signal COOLING is active.
Energy Level REDUCED LOCAL	Base, R-Module	All rooms[1)] which are in TIMER mode go to energy level REDUCED.
Energy Level REDUCED GLOBAL	Base, R-Module	All rooms[1)] which are in TIMER mode go to energy level REDUCED.
Energy Level ABSENCE	Base, R-Module	All rooms[2)] which are in TIMER mode go to energy level ABSENCE.

Tab. 05-5 Available digital input signals and system reaction
[1)] Applied to all rooms assigned to this Base and R-Module
[2)] Applied to all rooms in the entire installation

NEA SMART 2.0 U-Module
If the U-Module is used for controlling a mixed circuit, then one digital input can be used to connect a dew point monitor.

Device	Function
Dew point monitor (when U-Module is used for mixed circuit control)	A dew point monitor detects condensation on pipes or similar. The mixed circuit is stopped, the cooling of all rooms that are supplied via this circuit is ended. Dehumidifiers belonging to these rooms are activated.

Tab. 05-6 Digital input U-Module

05.03.07 Digital Outputs

Digital Outputs can be used to control other devices such as pumps or boiler. Digital Outputs can be used on the NEA SMART 2.0 Base, NEA SMART 2.0 R-Module and NEA SMART 2.0 U-Module.

NEA SMART 2.0 Base and R-Module
A maximum of four digital outputs can be configured on a single NEA SMART 2.0 Base.

Two outputs can be configured for the NEA SMART 2.0 R-Module.

Within a NEA SMART 2.0 Base (and optional R-Module), a function can only be assigned once. That means, it is not possible to assign the same function to more than one output.

OUTPUT signal	Available on	Trigger
Pump local	Base, R-Module	A room assigned to this base or a connected R-Module has a current demand signal (heating or cooling) **or** a dehumidifier allocated to the base or connected R-Module triggers the "hydraulic" valve (only in cooling mode).
Pump global	Base, R-Module	Any room of the entire installation has a current demand signal (heating or cooling) **or** any of the dehumidifier triggers the "hydraulic" valve (only in cooling mode).
Pump mixed circuit	U-Module (configured for mixed circuit)	Demand signal for mixed circuit has been generated.
Boiler	Base, R-Module	A room of the entire installation not supplied via a mixed circuit triggers a heating demand signal **or** any of the mixed circuits causes the mixing valve to open by more than the pre-defined amount/level.
Chiller	Base, R-Module	Same as above, but for cooling demand signal.
HEATING	Base, R-Module	System is in heating mode. Can be used to control the operation mode „heating" to other devives or to a BMS.
COOLING	Base, R-Module	Same as above, but for cooling.
Valve dehumidifier	Base, R-Module, U-Module	Dehumidification sequence started. Valve opens before compressor starts.
Compressor dehumidifier	Base, R-Module, U-Module	Dehumidification started.
Fan Coil	Base, R-Module, U-Module	Fan Coil operation has been requested.
Fan Coil Pump	Base, R-Module	Global Fan Coil Pump. The global Fan Coil pump is activated as soon as one of the local Fan Coil pumps receives a request to run.
Fan Coil local Pump	Base, R-Module	A local Fan Coil pump is activated when one of the switched Fan Coils or RAUCLIMATE SILENT BREEZE Fan Coils assigned to this base requests to run.

Tab. 05-7 Available digital output signals and the condition to activate them

NEA SMART 2.0 U-Module

Device	Function
Heating circuit pump (if the U-Module has been configured for mixed circuit)	The heating circuit pump is started as required
Dehumidifier valve (if the U-Module has been configured to control dehumidifiers)	The hydraulic valve, which is used to supply the dehumidifier, is switched on before the dehumidifier is activated
Compressor dehumidifier (if the U-Module has been configured for dehumidifiers or for combination dehumidifier/Fan Coil)	The compressor of the dehumidifier is started
Fan Coil (if the U-Module has been configured to control Fan Coils or for combination dehumidifier/Fan Coil)	The Fan Coil starts

Tab. 05-8 Digital output U-Module

05.04 Internet Connection

Although an internet connection is not required to run the NEA SMART 2.0 system, a connection is recommended to benefit from the following advantages:
- full control of the system even when not at home
- latest software version via over-the-air-updates (OTA) available
- have access to detailed evaluations of temperatures, humidity, flow temperature reports,
- Advanced functions such as geofencing are possible

The connection to the internet can be done
- Via WIFI network (2,4 GHz)
- Via Ethernet cable.

The recommended option is via cable as WIFI may not be available at the place of installation, e.g. basement.

The manual assignment of IP address and respective subnet is not supported on the device itself, however, NEA SMART 2.0 acts as an DHCP client. Therefore NEA SMART 2.0 can be used only within a Network with a running instance of a DHCP server.

In more complex installations with more than one NEA SMART 2.0 Bases, only the master base station requires an internet connection.

05.05 Wiring

Basics
The NEA SMART 2.0 communication architecture consists of two separate BUS systems.

The Zone Bus (ZOBUS) connects the components
- NEA SMART 2.0 Base
- NEA SMART 2.0 R-Module
- the bus Room Units belonging to this Base or R-Module

- Characteristics of the Zone Bus:
- only a 2-wire line required
- reverse polarity-proof
- any topology possible
- no bus cable required, existing lines can usually be used

Maximum length is 100 m in case J-Y(ST)Y 2 x 2 x 0.8 mm is used. Maximum length may differ if other cable types are used.

The System Bus (SYSBUS) connects the NEA SMART 2.0 Bases, NEA SMART 2.0 U-Modules and other SYSBUS devices. The following rules must be considered:
- Must be installed in series
- Requires shielded twisted pair line (NEA SMART 2.0 Bus cable, J-Y(ST)Y 2 x 2 x 0.8 mm).
- Maximum length between
  - Base and U-Module: 100 m
  - Base and Base: 250 m
  - Base and RAUCLIMATE Silent Breeze Fan Coil: 250 m
- Maximum total length: 500 m.

The use of existing wires is possible, but certain rules need to be followed.

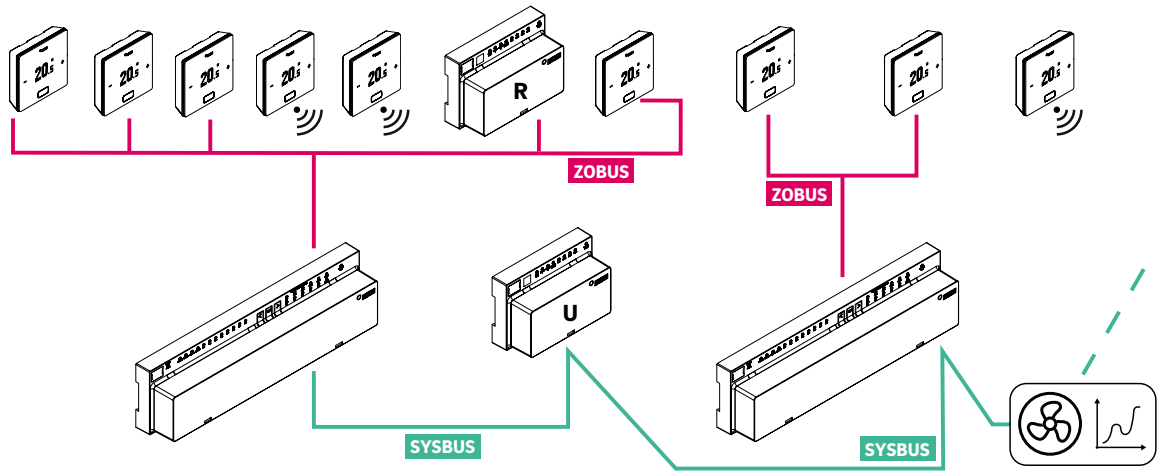


Fig. 05-1 Zone Bus (ZOBUS) and System Bus (SYSBUS)

Connection between device 1	device 2	Communication line	Cable type recommended / alternative	Topology / maximum length
Base	Room Unit (bus)	ZOBUS Zone Bus	NEA SMART 2.0 bus cable / J-Y(ST)Y 2 x 2 x 0.8 mm / existing 2-wire line	Any / 100 m
Room Unit (bus)	Room Unit (bus)	ZOBUS Zone Bus	NEA SMART 2.0 bus cable / J-Y(ST)Y 2 x 2 x 0.8 mm / existing 2-wire line	Any / 100 m
Base	R-Module	ZOBUS Zone Bus	NEA SMART 2.0 bus cable / J-Y(ST)Y 2 x 2 x 0.8 mm / existing 2-wire line	Any / 100 m
Base	Base RAUCLIMATE Silent Breeze	SYSBUS System Bus	NEA SMART 2.0 bus cable / J-Y(ST)Y 2 x 2 x 0.8 mm	Line / 250 m
Base	U-Module	SYSBUS System Bus	NEA SMART 2.0 bus cable / J-Y(ST)Y 2 x 2 x 0.8 mm	Line / 100m
ZOBUS Zone Bus	▪ Total length (sum of all partial lengths): max. 100 m			
SYSBUS System Bus	▪ Total length (sum of all partial lengths): max. 500 m ▪ Master does not necessarily have to be at the beginning of the line structure			

Tab. 05-9 Recommended cable types

The polarity of System Bus (SYSBUS) has to be strictly observed. A swapping of polarity causes damages at the base units U-Modules and RAUCLIMATE SILENT BREEZE Fan Coils!

If the existing wiring of previously installed Room Units is used for the Zone Bus, strict care must be taken to ensure that the existing lines are consistently disconnected from the mains power.

It is not permitted to run in the Zone Bus line simultaneously 230 V or 24 V supply voltage.

The country-specific standards and regulations must always be observed!

Use of existing wiring (retrofit)
If the existing wiring for previously installed room thermostats is used, it is very important to ensure that the existing lines are fully disconnected from the mains power.
A 230 V power supply voltage and 24 V voltage must not share the same line.
You must always observe country-specific standards and regulations!

05.06 Application Examples

General Remarks:
The following chapters show typical applications for 24 V installations. They are meant to give a general overview of the system structure. More detailed design can be found in the chapter "Schemes".

05.06.01 Heating system with mix of wireless and wired Room Units (up to eight rooms)

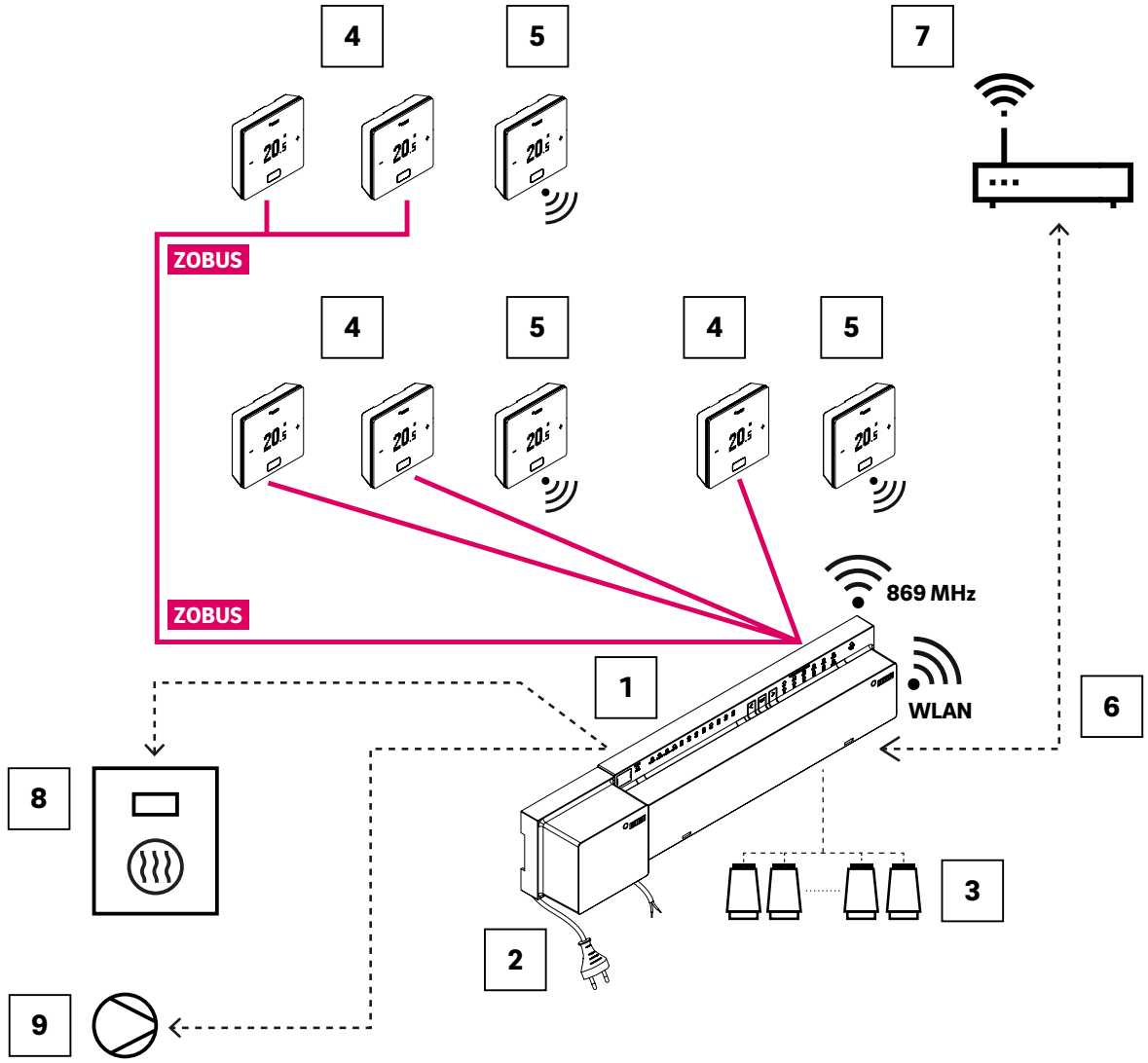


Fig. 05-2 NEA SMART 2.0 system, room control for heating

ZOBUS	Zone bus to connect the Room Unit	5	NEA SMART 2.0 Room Unit wireless
1	NEA SMART 2.0 Base 24 V, central control unit (master); for up to eight rooms	6	WLAN/LAN interface to connect the system to router and cloud
2	NEA SMART 2.0 Transformer 24 V	7	Router for WLAN/LAN home network and connection to cloud
3	Actuators 24 V on manifold	8	Output signal from the Base to heat generators
4	NEA SMART 2.0 Room Unit wired	9	Output signal from the Base to pump

Tab. 05-10 Heating system with mix of Room Units up to 8 rooms

05.06.02 Heating and Cooling system with mix of wireless and wired Room Units and R-Module (up to twelve rooms)

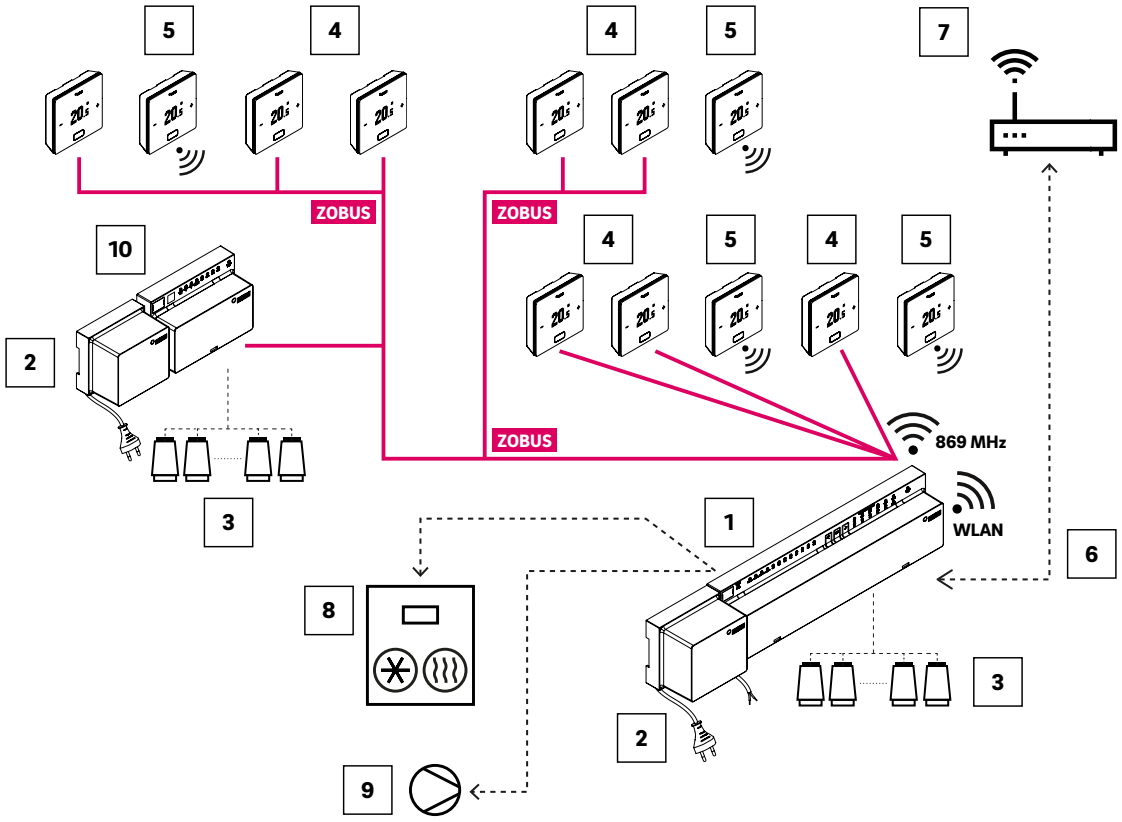


Fig. 05-3 NEA SMART 2.0 system, room control for heating/cooling for up to 12 rooms

ZOBUS	Zone bus to connect the Room Units and R-Module	6	WLAN/LAN interface to connect the system to router and cloud
1	NEA SMART 2.0 Base 24 V, central control unit (master); for up to eight rooms	7	Router for WLAN/LAN home network and connection to cloud
2	NEA SMART 2.0 Transformer 24 V	8	Output signal from the Base to heat / cold generators
3	Actuators 24 V on manifold	9	Output signal from the Base to pump
4	NEA SMART 2.0 Room Unit wired	10	NEA SMART 2.0 R-Module 24 V, R-Module for four additional rooms
5	NEA SMART 2.0 Room Unit wireless, to measure the room temperature and room air humidity		

Tab. 05-11 Heating and Cooling system with mix of Room Units and R-Module up to 12 rooms

05.06.03 Heating and Cooling system with mix of wireless and wired Room Units and slaves (up to twenty four rooms)

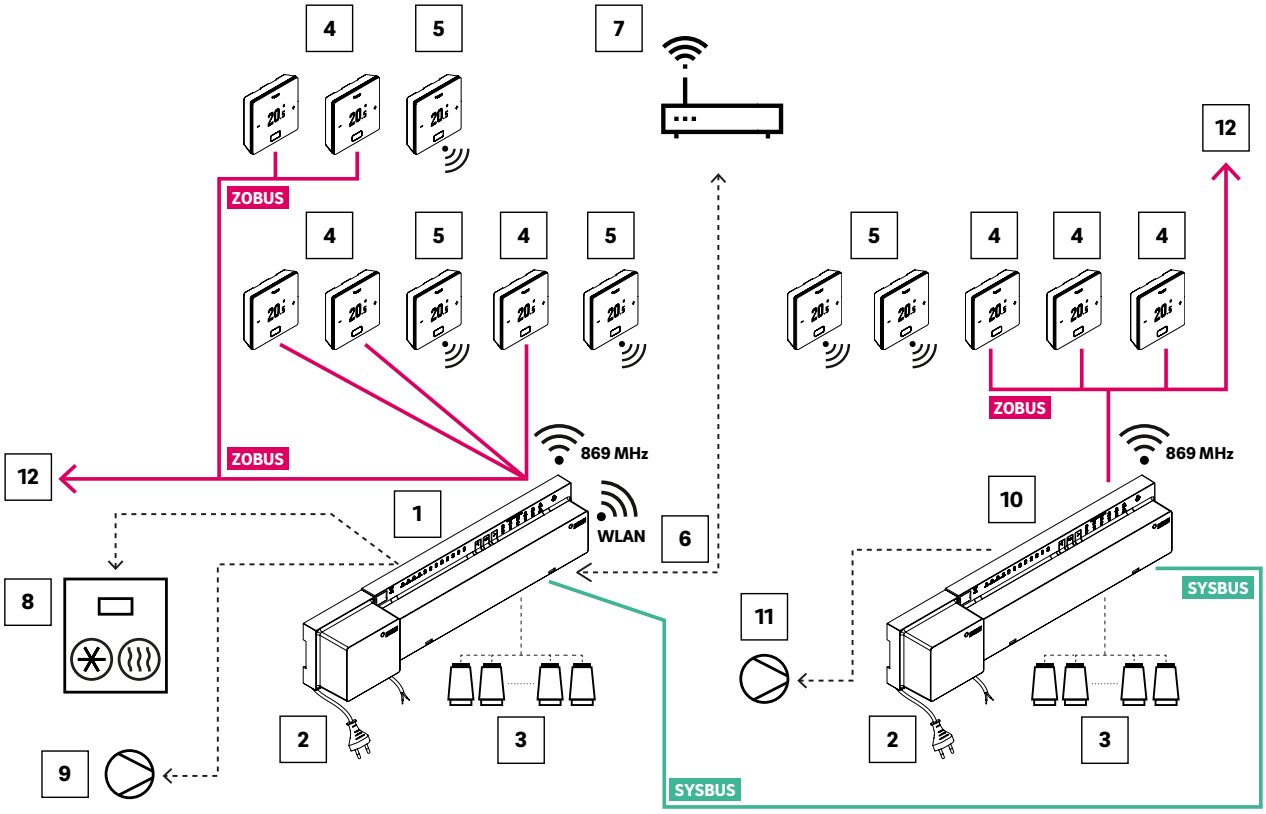


Fig. 05-4 NEA SMART 2.0 system, room control for heating/cooling for up to 24 rooms

ZOBUS	Zone bus to connect the Room Units	6	WLAN/LAN interface to connect the system to router and cloud
SYSBUS	System bus to connect slave units or U-Modules	7	Router for WLAN/LAN home network and connection to cloud
1	NEA SMART 2.0 Base 24 V, central control unit (master); for up to eight rooms	8	Output signal from the Base to heat / cold generators
2	NEA SMART 2.0 Transformer 24 V	9	Output signal from the Base to (global) pump
3	Actuators 24 V on manifold	10	NEA SMART 2.0 Base 24 V, central control unit (slave); for up to eight rooms
4	NEA SMART 2.0 Room Unit wired, to measure the room temperature and room air humidity	11	Output signal from the Base (slave) to local pump
5	NEA SMART 2.0 Room Unit wireless, to measure the room temperature and room air humidity	12	Continuation of the ZOBUS to more Room Units or NEA SMART 2.0 R-Module

Tab. 05-12 Heating and Cooling system with mix of Room Units and slaves up to twenty four rooms

05.06.04 Heating and Cooling system with mix of wireless and wired Room Units , U-Module and Fan Coils

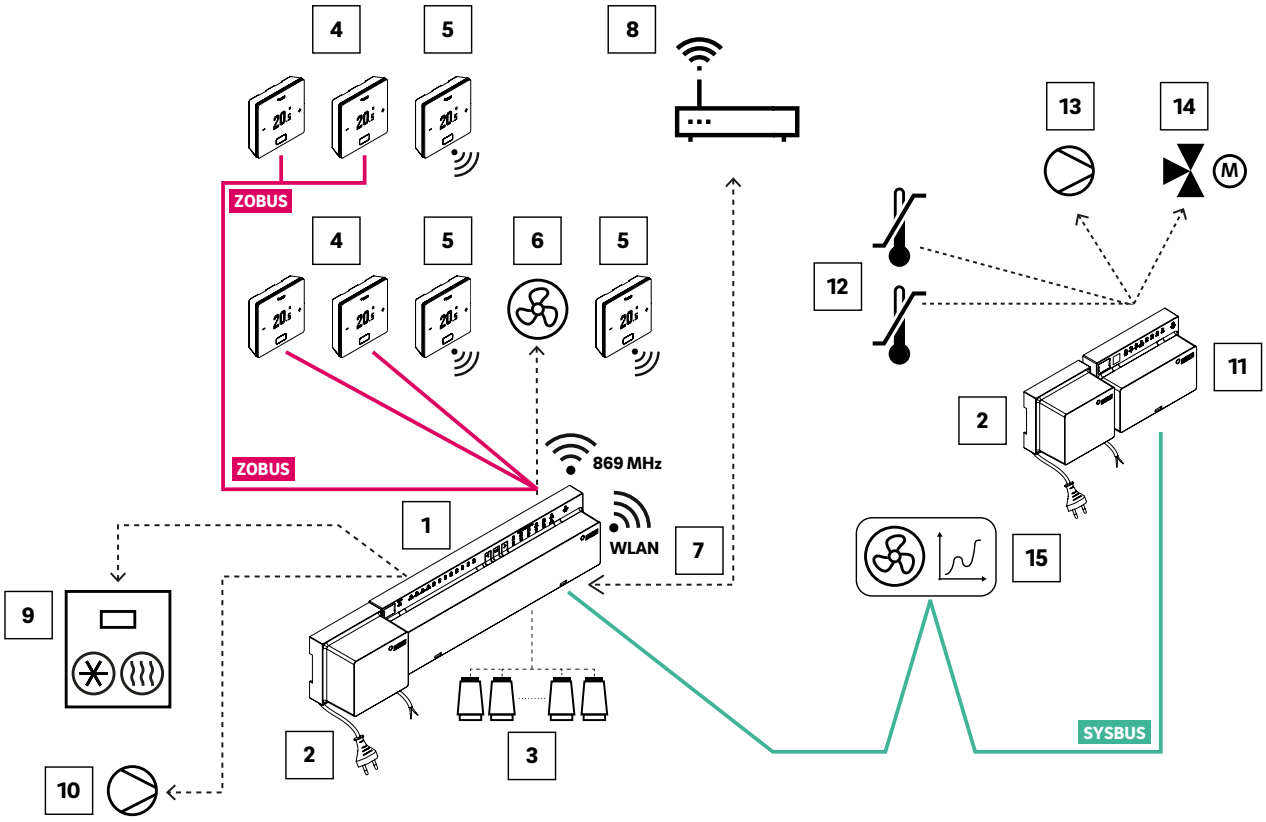


Fig. 05-5 NEA SMART 2.0 system, room control for heating/cooling with control for a mixed circuit

ZOBUS	Zone bus to connect the Room Units	8	Router for WLAN/LAN home network and connection to cloud
SYSBUS	System bus to connect slave units or U-Modules	9	Output signal from the Base to heat / cold generators
1	NEA SMART 2.0 Base 24 V, central control unit (master); for up to eight rooms	10	Output signal from the Base to (global) pump
2	NEA SMART 2.0 Transformer 24 V	11	NEA SMART 2.0 U-Module for mixed circuit
3	Actuators 24 V on manifold	12	VL/RL sensor, temperature sensor to measure flow and return temperature
4	NEA SMART 2.0 Room Unit wired, to measure the room temperature and room air humidity	13	Pump for mixed heating circuit
5	NEA SMART 2.0 Room Unit wireless, to measure the room temperature and room air humidity	14	3-way mixing valve with 0 ... 10 V actuator (24 VAC, 0 ... 10 V actuation)
6	Switched Fan Coil, assigned to a room as an additional system, controlled via the relay output of the NEA SMART 2.0 Base or via NEA SMART 2.0 Switching relays, connected to the triac output	15	RAUCLIMATE SILENT BREEZE Fan Coils
7	WLAN/LAN interface to connect the system to router and cloud		

Tab. 05-13 Heating and Cooling system with mix of Room Units and U-Module for mixed circuit

06 Installation

06.01 Leaflets

The installation of the individual components is described in the leaflets that come with the devices.

All leafleats can also be found at
www.rehau.com/neasmart2

07 System set up

After installation of all components, finalization and accurate check of system wiring the set up may start.

07.01 General remarks to set up procedure

07.01.01 Preparation

Before set up is started, it is necessary to have all schemes and tables ready to hand, which describe all connections and relations in the installation, that has to be set up, e.g. hydraulic schemes.

07.01.02 Different complexity of systems (class A, B, C)

In terms of complexity and functionality, 3 classes of NEA SMART 2.0 system can be differed:

Class A – room temperature control heating only (1 Base)
Simple system with one NEA SMART 2.0 Base only, optional with R-Module. Used for room temperature control in heating mode only.

Class B – room temperature control heating and cooling (1 Base)
Simple system with one NEA SMART 2.0 Base only, optional with R-Module, for room temperature control in heating and cooling mode.

Class C – system with more functions
System with one or more additional system bus components (Bases or U-Modules) with full functionality.

It is possible to drive devices such as pumps, heat/cold generator and others in all classes.

It is possible, to set up a system of class A without connecting a smart phone or tablet to the Base and using the Wizard. But it is strictly recommended to do this, because this is the most easiest way to check the configuration and to allow essential functions like timed mode.

07.01.03 Flow chart of set up procedure

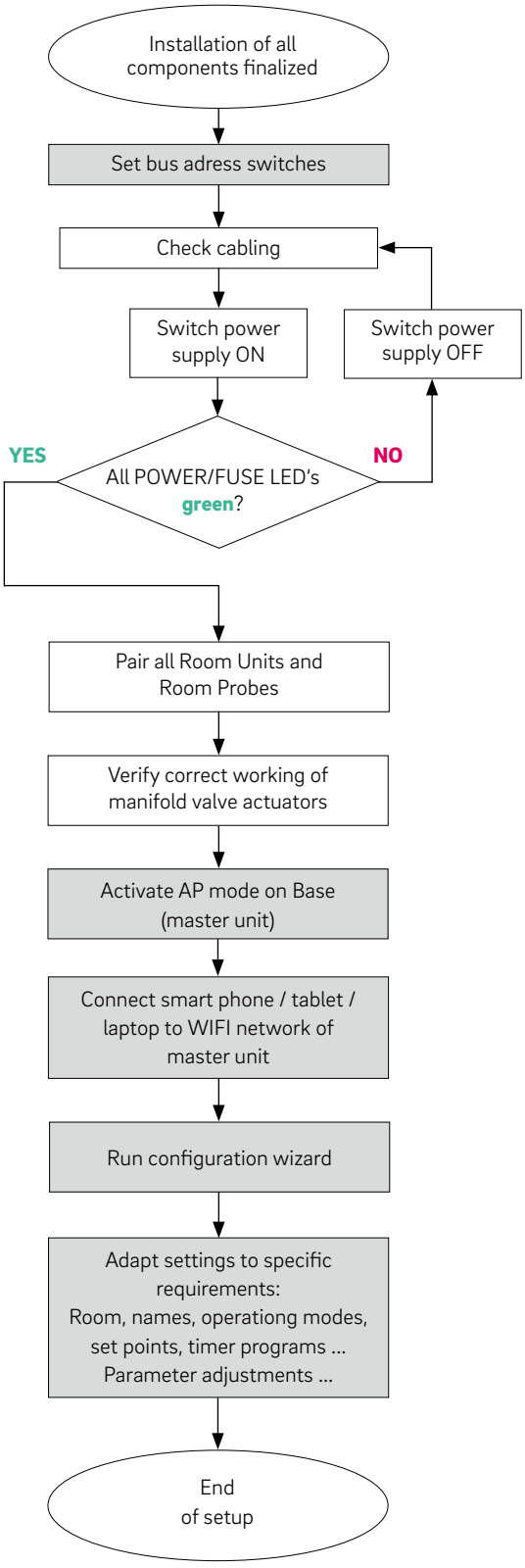


Fig. 07-1 Set up procedure

07.02 Set system bus addresses

The following components are using the system bus to communicate:

- NEA SMART 2.0 Base units (one Master and up to 4 Slaves)
- NEA SMART 2.0 U-Module (up to 9 modules)
- RAUCLIMATE SILENT BREEZE Fan Coils (up to 30 modulating Fan Coils in the highest configuration stage)

Each of these devices needs an individual address. Double addresses block the bus communication.

Note:
The NEA SMART 2.0 Base with address setting "0" is the master of the system. Only the master is communicating via WLAN or LAN to router or to a tablet / smartphone / laptop.

Address settings for NEA SMART 2.0 Base (DIP switches are below the front cover):

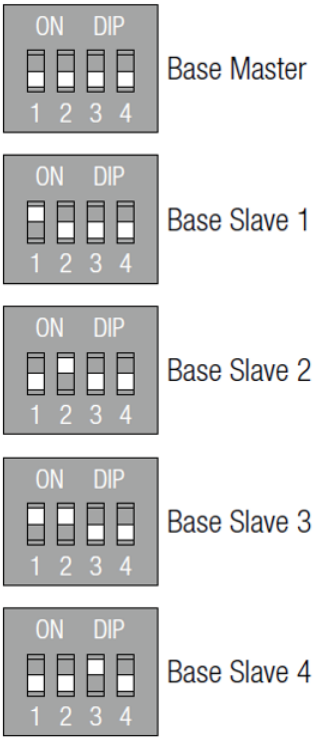


Fig. 07-2 DIP switches on Base

The address setting of the NEA SMART 2.0 U-Modules starts with the 1st module with address "0" (all dip-switches set to 0, see below). The address setting of the U-Modules is not in conflict with the addresses of the NEA SMART 2.0 Base units, even when the DIP switches have the same position. For the SYSBUS configuration of RAUCLIMATE SILENT BREEZE Fan Coils, please refer to the manual "NEA SMART 2.0 Control System Commissioning instructions for switched Fan Coils and modulating RAUCLIMATE SILENT BREEZE Fan Coils"
Print no. 954666.

Für NEA SMART 2.0 U-Module:

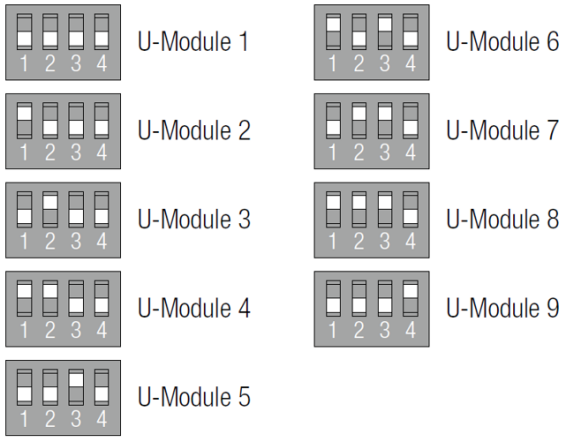


Fig. 07-3 DIP switches on U-Module

07.03 Switch on power supply

Before you switch on the power supply, check again the wiring. Especially take care, that the wires of the system bus cable (SYSBUS) are correctly connected.

GND, VDC, 1 and 2 must be connected with the same terminals on the other units, otherwise the devices will be damaged!

07.03.01 Check POWER / FUSE LED's

After switching on the power supply, check the POWER/FUSE LED's of all components!
The table below provides troubleshooting tips.

If one of the LED's does not show, what has been expected, please:
- switch off power supply
- check and correct cabling
- replace defective fuses (only use correct fuse types!)
- switch power supply on

NEA SMART 2.0 device	**LED green**	**LED red**	**LED off**
Base	Power supply OK	Power supply is connected, fuse is defective Check **wiring of Base**	No power supply connected **Check power supply connection**
R-Module	Power supply from Zone Bus is OK, Additional power supply for actuators is connected	Power supply from Zone Bus is OK, Additional power supply for actuators is not connected **Connect power supply for actuators**	No power supply from Zone Bus **Check Zone Bus connection**
U-Module for mixed circuit	VDC power supply from system bus cable is OK, Additional power supply for mixing valve actuator is connected	VDC power supply from system bus cable is OK, Additional power supply for mixing valve actuator is not connected **Connect power supply for actuator**	VDC power supply from system bus cable is not present. **Check system bus cable connection**
U-Module for dehumidifier	VDC power supply from system bus cable is OK, Additional power supply which is not needed, is connected **Check additional power supply**	VDC power supply from system bus cable is OK, Additional power supply which is not connected (and not needed)	VDC power supply from system bus cable is not present. **Check system bus cable connection**

Tab. 07-1 LED's on devices

07.03.02 Check zone bus LED's

The zone bus LED of the NEA SMART 2.0 Base is blinking, when there is a zone bus component (NEA SMART 2.0 R-Module or bus-based Room Unit) connected.

07.03.03 Check manifold actuators

For the first 5 times, the NEA SMART 2.0 Base is switched on, the outputs of the channels, where the manifold actuators are connected, are switched on one after the other for about 10 minutes.

This is done to open the actuators completely and to unlock the "first open function" of the actuators.

During this time span, the correct operating of all actuators can be checked.

Note:
This function can be stopped by pressing the OK button.
During this time span, all other outputs of the NEA SMART 2.0 Base are blocked.

07.04 Pairing

07.04.01 General notes

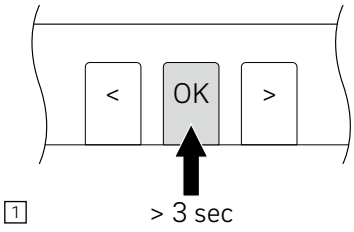
Pairing is the logical connection of a Room Unit, a Room Probe or an outdoor temperature sensor to one or more channels of the NEA SMART 2.0 Base.

Note:
It is possible, to pair a device to one or more channels, but it is not possible, to pair more than one device to one channel of the NEA SMART 2.0 Base.

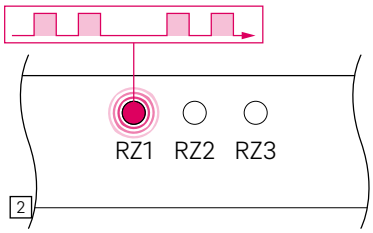
Each new paired device deletes the previous pairing of another device, if it is done on the same channel.

07.04.02 Start pairing procedure on Base

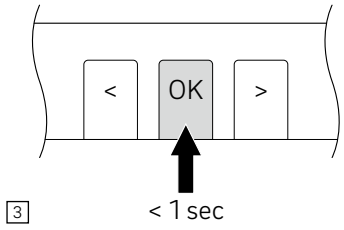
Start pairing procedure:



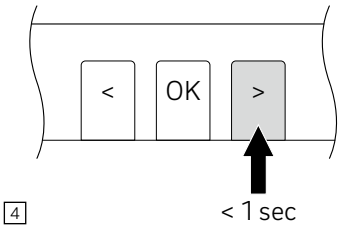
Press OK for > 3 seconds



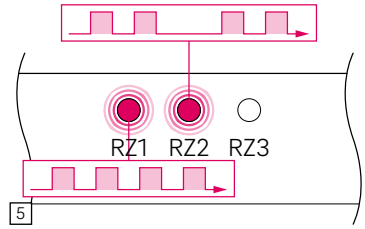
The LED of the first zone, which is ready for pairing, is blinking fast



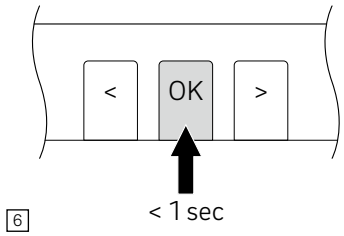
Select the zone(s) for pairing: onfirm this zone by pressing OK short

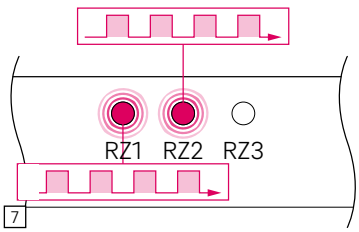


or move to another zone by using the keys "<"or">"



Confirm all zones you want to pair to one Room Unit by pressing OK short





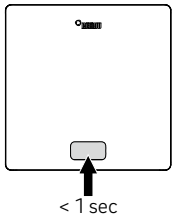
All selected zones are blinking continuously

Now you can pair the Room Unit. The NEA SMART 2.0 Base stays in the pairing mode for 3 minutes.

07.04.03 Pairing of NEA SMART 2.0 Room Units

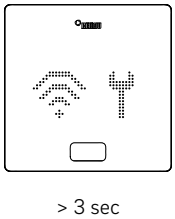
The below listed pairing functions are only available in the first 48 hours after the Room Unit / Room Probe is powered.
This 48 hour time span starts again if the Room Unit / Room Probe gets unpowered and repowered again.
See chapter 07.04.06 for detals.

For wireless Room Units (with display):



8

- Insert the batteries
- Close cover
- Press Home button

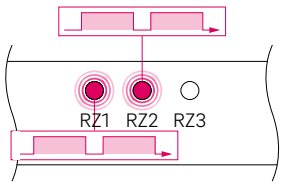


9

The Room Unit shows first the start up sequence and then the radio waves and a tool symbol

10

After successful pairing, the display shows as a confirmation a hook and then the numbers of the paired channels are shown

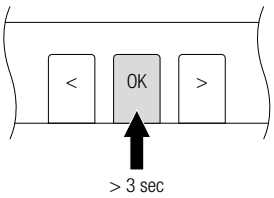


11

On the NEA SMART 2.0 Base, blinking of the paired channels changes to a slower blinking

For pairing the next units, move with the < and > keys to the next channel you want to pair and perform the steps describe above.

12



13

To leave the pairing mode, press OK button of the NEA SMART 2.0 Base again for 3 secs

When pairing failed, the display shows the radio wave symbol and an exclamation mark.

In this case:
- Verify, that the Base was still in pairing mode
- Check whether the distance between Room Unit and NEA SMART 2.0 Base is not too big or
- Whether there are shielding elements between Room Unit and base which avoid communication.

In this case whether another place for the Room Unit can be used.

Note:
If the batteries have been already inserted for a longer time, press OK for about 3 seconds to start the pairing process.

For wired Room Units (with display):
Press OK for less than a second to start the pairing process.

The reaction of the wired Room Unit is exactly the same as for wireless Room Units.

07.04.04 Pairing of NEA SMART 2.0 Room Probes

The Room Probes have no display or key on the front side, only a red LED in the middle of front plate.

Pairing is done by using a screw driver and pressing an internal button on the right bottom side. Waiting for pairing is displayed by blinking shortly twice, and a 1-sec pause.

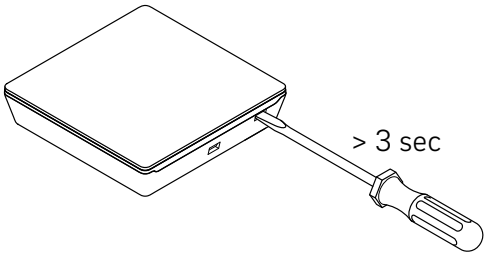


Fig. 07-4 Pairing procedure on Room Probes

Pairing is confirmed by blinking slowly 2 times. Pairing failure is 3 times blinking fast and a 1-sec pause.

07.04.05 Pairing of NEA SMART 2.0 outdoor sensor

Note:
The wireless outdoor sensor is paired to any channel of the NEA SMART 2.0 Base, no matter whether this channel is used already or not.

- Open the cover of the sensor
- remove the isolation stripe of the battery
- press the small button for 3 seconds

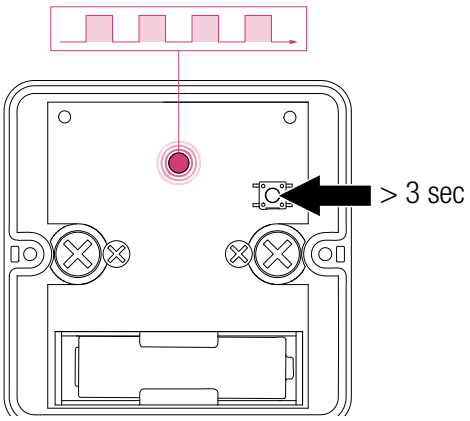


Fig. 07-5 Pairing outdoor sensor

Successful pairing is signaled on the NEA SMART 2.0 Base by simultaneous flashing of all channel LEDs.

07.04.06 Further settings on NEA SMART 2.0 Room Units

Remark:
The below listed menu points are only available in the first 48 hours after pairing the Room Unit.

If you want to use these features after this time span:

- Open front plate
- For wireless Room Units remove one of the batteries
- Press home button several times
- For wireless Room Units: insert the batteries
- Close front plate

[1] Press OK

After this procedure, the Room Unit shows:

[2] Start up sequence
[3] Connected channels
[4] Room temperature value

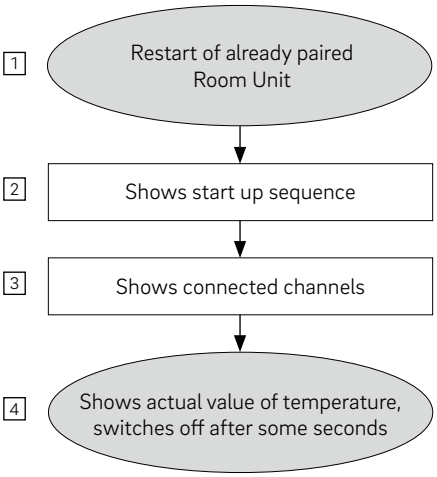


Fig. 07-6 Settings NEA SMART 2.0 Room Units

If you have an already paired Room Unit (not longer than 48 hours ago or prepared as described in last paragraph), you can use some features shown in the flow chart below.

[1] By pressing OK long you jump to
[2] Installer level

To show the already paired channels, press minus symbol [3].

To start pairing sequence again (NEA SMART 2.0 Base must be in pairing mode), press plus symbol [4].

By pressing OK, the next screen appears. You leave this mode by double clicking OK (or wait some time).

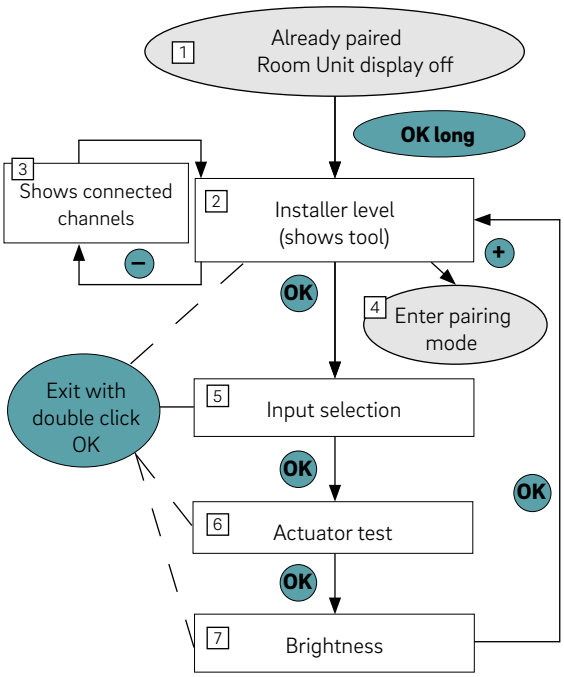


Fig. 07-7 Settings NEA SMART 2.0 Room Units

5 Input selection
The remote sensor or contact connected to the additional input of the Room Units can be defined here (or later in the configuration wizard).

The parameters are:
P0: Not used
P1: Floor temperature sensor for minimum and maximum value monitoring (minimum value valid for cooling, maximum value for heating). Not allowed in control area (CA).
P2: Floor temperature sensor for minimum and maximum value monitoring (minimum value valid for cooling and heating, maximum value for heating). Not allowed in control area (CA).
P3: External room temperature sensor (room temperature control only by this value).
P4: External floor temperature sensor (floor temperature control). Not allowed in control area (CA).
P5: External room temperature sensor (room temperature control by mean value of external and internal sensor). Not allowed in control area (CA).
P6: Dew point sensor (closed when there is no condensation)
P7: Window contact (closed when window is closed). Not allowed in control area (CA).
P8: Temperature sensor for cooled surfaces or pipes (stops cooling when dew point temperature is reached). Not allowed in control area (CA).
P9: Remote sensor for core temperature (TABS)
P10: Remote sensor for return temperature (TABS)
P11: Remote sensor for outdoor temperature

6 Actuator test
The actuators of all channels which are paired to this Room Unit can be switched ON or OFF.
This state remains for 30 minutes.

7 Display brightness view and adapt
The brightness of the display may be set to 20 % (default value), 40 %, 60 %, 80 % or 99 %.

07.05 Configuration - Wizard

07.05.01 Introduction

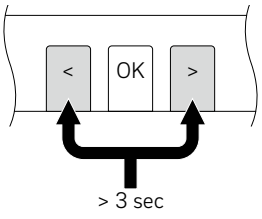
The Configuration Wizard is a tool for setting up a system for simple applications such as room temperature control for heating only up to complex installations with multiple NEA SMART 2.0 Bases, including mixed circuits, dehumidification and Fan Coils. The wizard guides you through the various steps of the configuration and ensures that all components required in the system are configured.
To use the wizard, a smartphone, a tablet or a laptop with internet browser is required.

07.05.02 Preparation

The NEA SMART 2.0 Base has an integrated WLAN(WiFi)/LAN module. To use the configuration wizard, you have to connect your device (smart phone, tablet, etc.) to the NEA SMART 2.0 Base in Access Point (AP) mode via the WLAN.

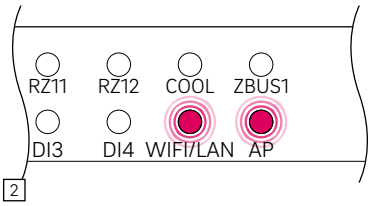
Note:
The configuration wizard of the NEA SMART 2.0 Base can only be accessed via a WLAN connection in AP mode. Only 1 device can be connected in AP mode. Access to the cloud server (cloud mode) is possible via a LAN or WLAN connection.
In delivery state, the WLAN/LAN module of the NEA SMART 2.0 Base is switched off.

Follow these steps:



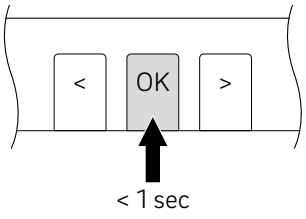
1

Activate WIFI/LAN functionality by simultaneous-ly pressing < and > for 3 secs



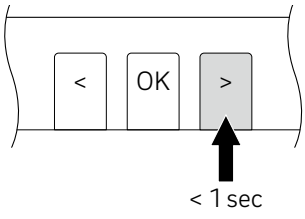
2

LEDs WIFI/LAN and AP are blinking simultaneously



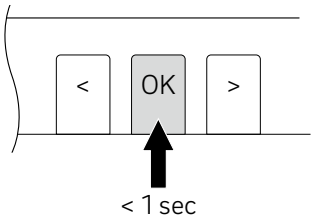
3

Confirm by pressing OK



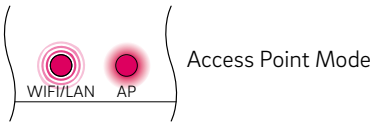
4

Change operating mode by pressing > to AP mode: WIFI/LAN LED is blinking, AP LED is ON. You can change between the different modes by pressing > or <



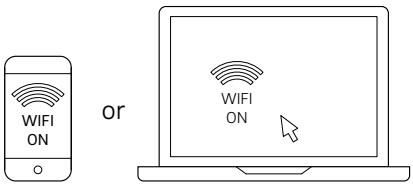
5

Confirm WIFI/LAN AP mode by pressing OK



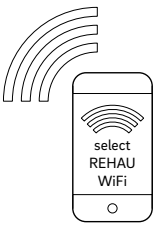
6

WIFI/LAN LED is blinking, AP LED is ON



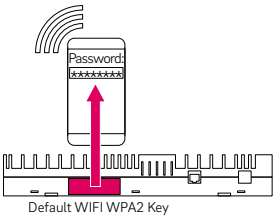
7

Prepare your device: Go to settings, then to WIFI/WLAN settings



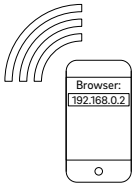
8

Select the network NEASMART2-XX..XXX



9

Insert WPA2 key. The default key is shown on the label of the base and on the sticker that can be found on the front page of the instruction manual. After connection the WiFi/LAN LED is continuously ON.



10

Start your browser and enter in the web address line the IP address 192.168.0.2. Follow wizard instructions in browser.

To access the installation via the NEA SMART 2.0 App, the base unit must be connected to the Internet cloud service.
To connect, use the WPS function as described in Chapter 08.03 "Operating via NEA SMART 2.0 App" or go to IT Settings and enter the router SSID and password of your WIFI network.

07.05.03 Example for configuration

The following configuration sequence is based on an installation with

- 1 NEA SMART 2.0 Base
- 1 NEA SMART 2.0 R-Module
- 2 NEA SMART 2.0 U-Modules

Characteristics:

- There are 4 rooms: 2 of them have underfloor heating and ceiling cooling, the other 2 only under floor heating.
- The 2 rooms which are cooled have each one a dehumidifier
- 1 mixed circuit supplies one manifold for underfloor heating and one manifold for ceiling cooling
- Actuators installed on the manifold for underfloor heating are connected to NEA SMART 2.0 Base
- Actuators installed on the manifold for ceiling cooling are connected to NEA SMART 2.0 R-Module, which is installed directly beside the manifold

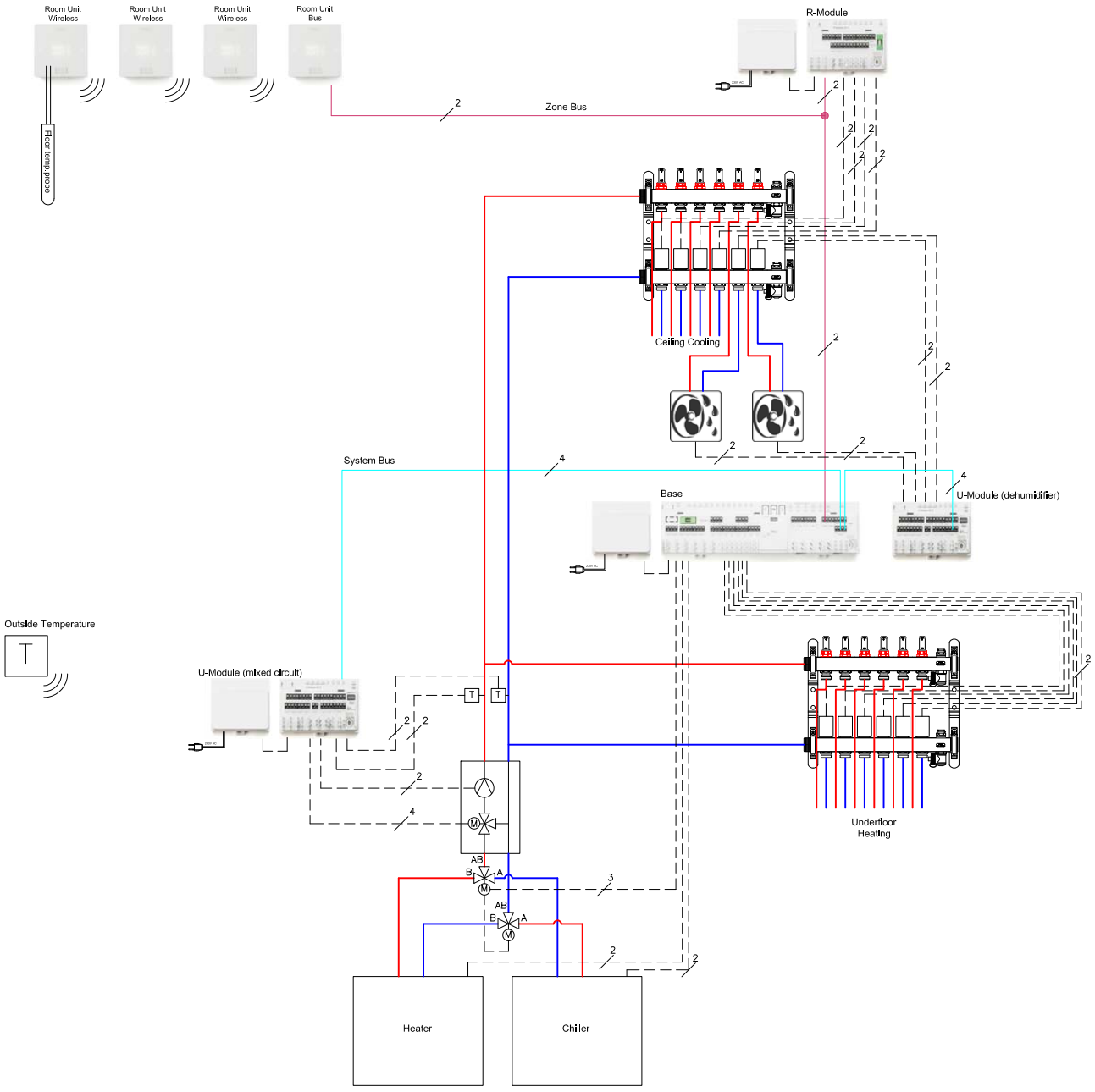


Fig. 07-8 Scheme for example configuration

07.05.04 General settings

The wizard automatically starts once your browser opens the page 192.168.0.2.

Please follow the instructions in the browser and avoid going back and forward.

On first screen you may set:
- Your language
- Building type (residential or commercial): This selects the appropriate daily programs for weekly program#1 for the room temperature set points.
- Building type standard or low energy
- Date of installation and system date and time are taken from the device which is used for configuration

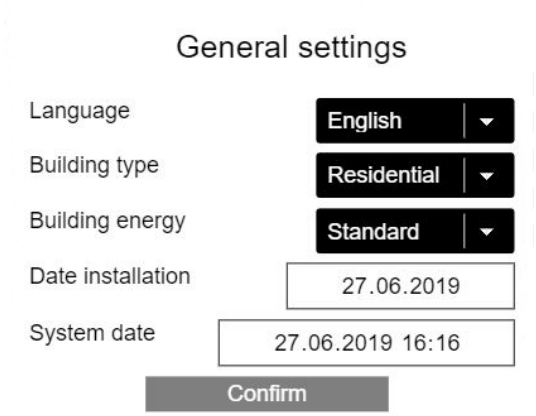


Fig. 07-9 Webpage: General settings

07.05.05 Choose system type

Before continuing, please ensure that the conditions listed on this page are fulfilled.
- Simple installations have only 1 NEA SMART 2.0 Base, optionally with one NEA SMART 2.0 R-Module
- Installation with at least 1 system bus component (U-Module or another Base) are complex installations

If you choose simple installation, the wizard continues at point 7.5.17.

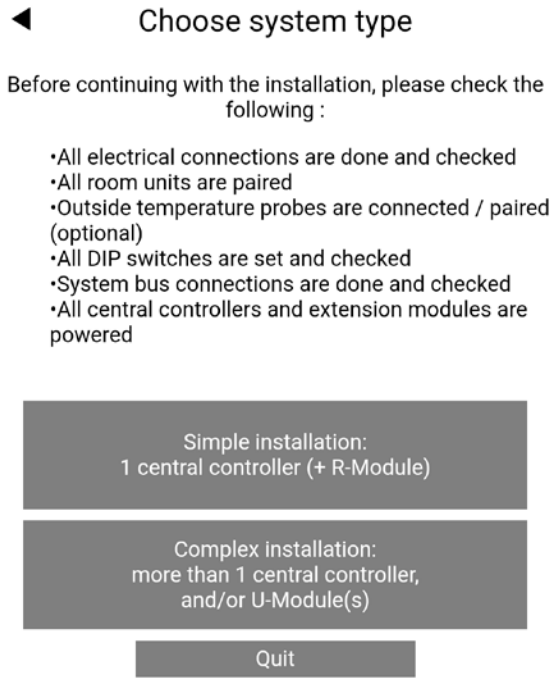


Fig. 07-10 Webpage: Choose system type

07.05.06 Enter system components and functions

System components
The inputs on this page are used to check in terms of
- what will be found, when the components of the system are scanned later
- what you define during the wizard run

Number of outside sensors
In case that more than one remote sensor is used, an average value is calculated.

Outside temperature from the server used:
Instead of a wireless or wired remote sensor (local sensor), this information can be transferred from the server. If there are additional local probes, an average value of the local probes is calculated and an average is formed from this value and the value inherited from the server.

Please note:
To use outside temperature from the server, the system has to be on-line and the address of the installation has to be set in the NEA SMART 2.0 App.

Heating mode: Central control of flow temperature
Select this checkbox if the mixing circuit only needs to control the maximum allowed flow temperature and the external water supply system is responsible for the correct flow temperature.

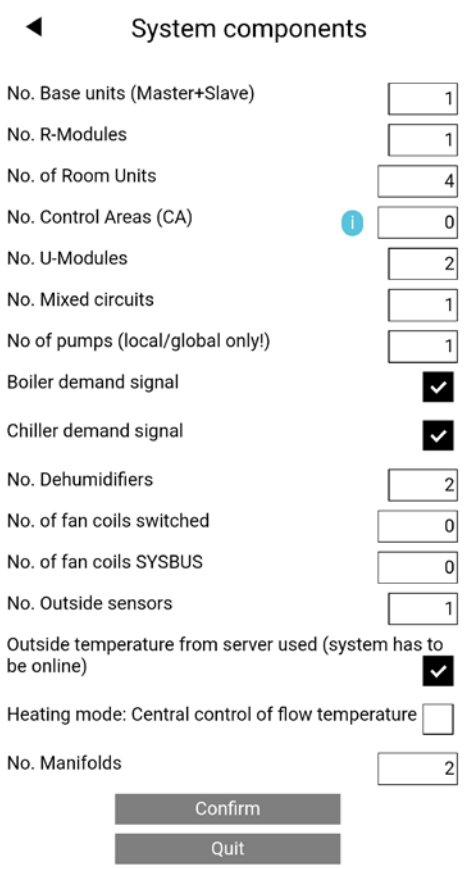


Fig. 07-11 Webpage: System components

If you choose a system configuration which is not possible, you will get an error message:

Fig. 07-12 Webpage: Too many rooms

Maximum number of rooms is 12, because one Base works with 8 rooms and the R-Module works with additional 4 rooms.

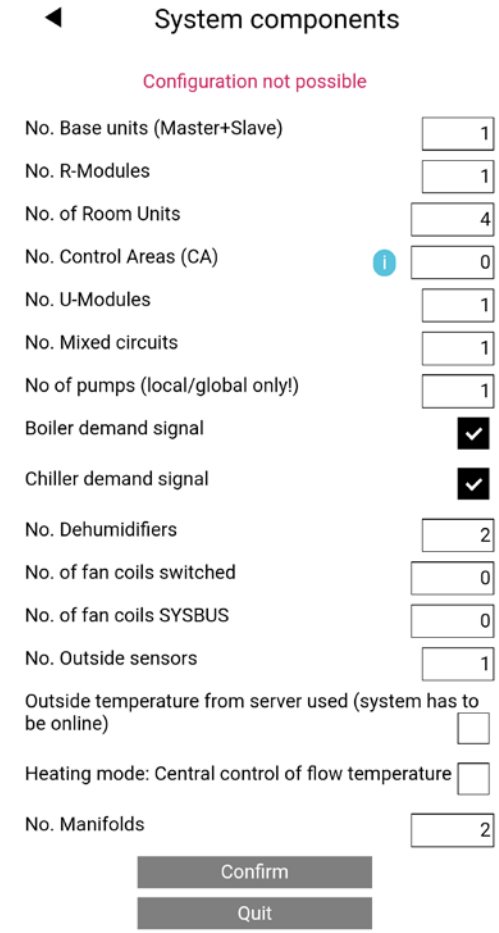
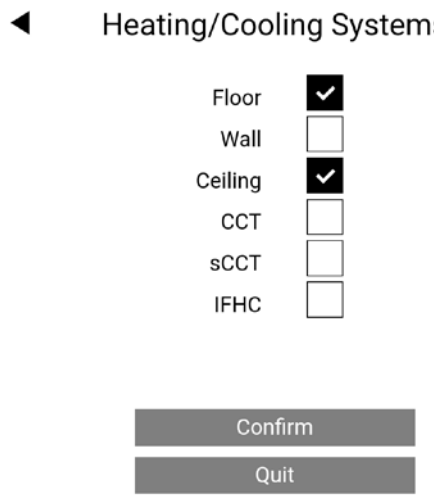


Fig. 07-13 Webpage: Configuration not possible

For 1 mixed circuit and 2 dehumidifiers, there are 2 U-Modules needed!

07.05.07 Selection of heating/cooling systems

Select all available heating/cooling systems connected to the base unit. Selecting different systems activates the control and additional parameters for those systems.



07.05.08 System bus scan

The system bus scan checks all system bus members which components are connected to the system bus:

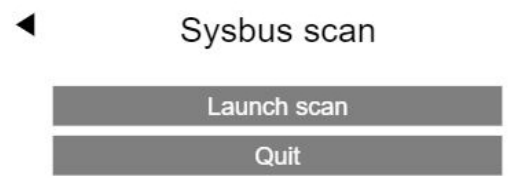


Fig. 07-14 Webpage: Sysbus scan

The result is shown on this page. The graphic on the right side show the setting of the DIP switches of the system bus members addresses.

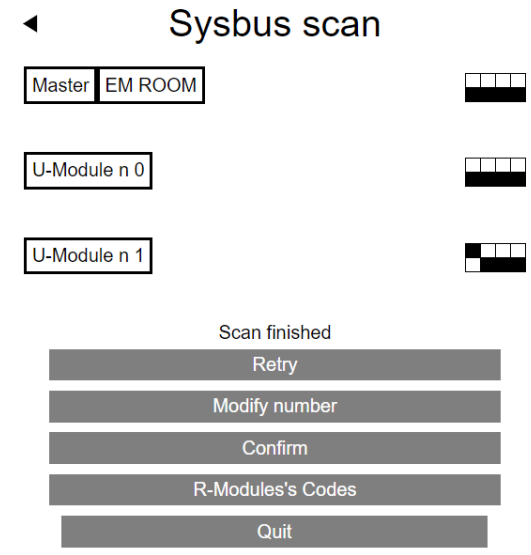


Fig. 07-15 Webpage: Sysbus scan, DIP switches

If the result of the system bus scan differs from what has been defined, an error message is displayed.
Please proceed as follows:

- Check the type and number of components entered
- Check the settings of the bus address switches
- Check the SYSBUS and ZOBUS LED of all components

Note:
The SYSBUS LED only flashes when the System Bus is active.

To check this, a second person has to start the system bus scan several times
→ Turn off power supply and check the bus cabling

07.05.09 Define function of system bus components

In this example, there are 2 U-Modules, one of them has to be used for the mixed circuit.

U-Module1 (address 00) shall be used for the mixed circuit, U-Module2 (address 04) is used for 2 dehumidifiers.

The term “Dehumidification n 1” means the 1st group of dehumidifiers.

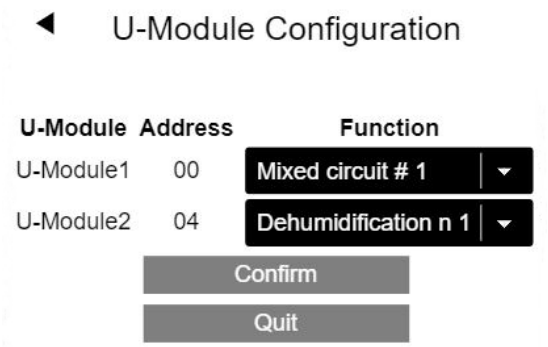


Fig. 07-16 Webpage: U-Module configuration, dehumidification

07.05.10 Input / output assignment of U-Modules for mixed circuit

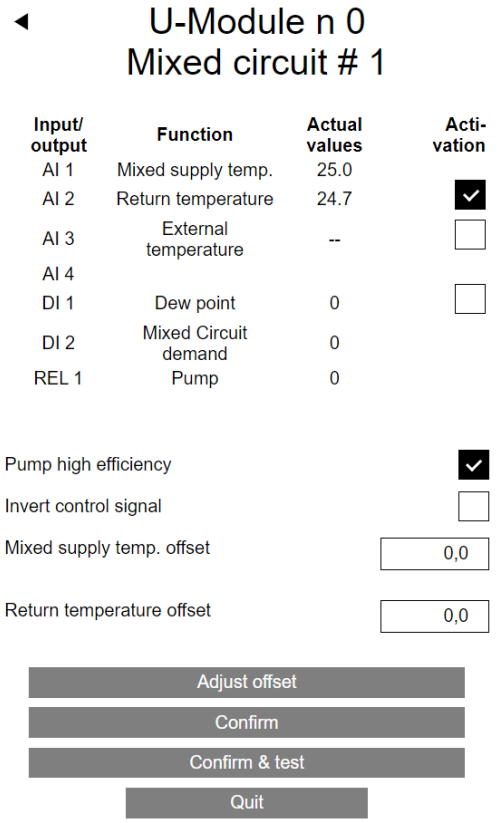


Fig. 07-17 Webpage: U-Module, input / output

Options:

- Return temperature sensor, allows the boost mode in the heating up phase
- Digital input for dew point sensor
  Note:
  Contact is closed in „OK“ state.

- Pump as high-efficiency pump:
  Increases the minimum running time of the pump (pump may run for a while when the mixing valve is in bypass mode)
- Adjust temperature measurement

Note:
The analogue input 3 is reserved for a wired outdoor temperature sensor (later use).
If the offset values are modified, use “adjust offset” to verify the result.

Remark:
To improve the boost function, it is recommended to verify that flow and return temperature show the same value when

- Some manifold valves are opened
- The pump is running
- The Mixing valve is closed

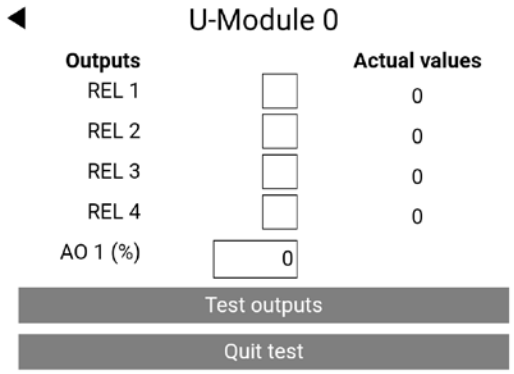


Fig. 07-18 Webpage: U-Module, Mixed circuit output test

The relay outputs and the analog output for the drive of the mixing valve can be operated via this website.

07.05.11 Definition of mixed circuit operating

The mixed circuit can be used for different systems in heating and cooling mode.

The setting influences parameters for
- Minimum and maximum temperature in heating and cooling mode
- Slope of the heat curve

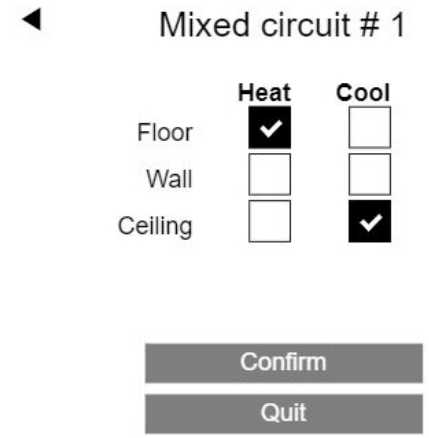


Fig. 07-19 Webpage: Mixed circuit

07.05.12 Links between mixed circuits and manifolds

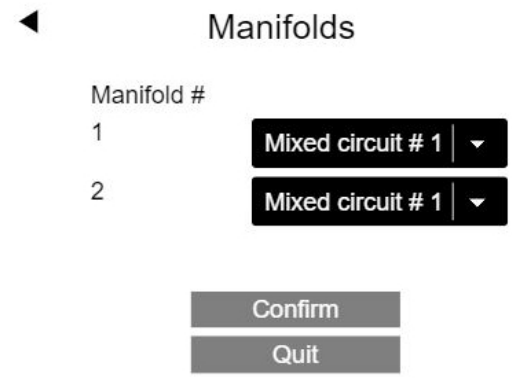


Fig. 07-20 Webpage: Mixed circuits and manifolds

In this example, manifold 1 is used for underfloor heating, manifold 2 for ceiling cooling.

Note:
It is not a problem, that both manifolds are directly connected to the mixed circuit. There is no need to install valves which close one of the pipes in heating and another pipe in cooling mode. It would be also possible, to use one manifold for heating and cooling.

07.05.13 Input / output assignment of U-Modules for dehumidifiers

One U-Module can control 2 dehumidifiers.

When dehumidifiers are used which have an additional coil for cooling the intake air, REL 1 and REL 3 are used for opening a valve for each dehumidifier.

The manifold to which these valves belong have to be defined.

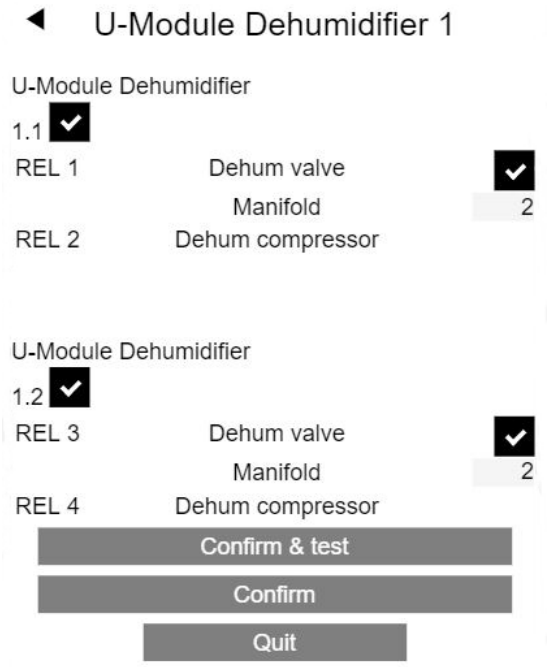


Fig. 07-21 Webpage: U-Module Dehumidifier

When you use "Confirm & test", the outputs can be switched:

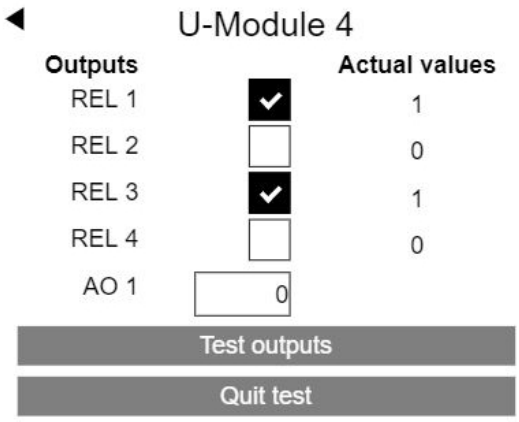


Fig. 07-22 Webpage: U-Module, Dehumidifier output test

07.05.14 Input / output assignment of U-Modules for switched Fan Coils

A U-Module, configured for switched Fan Coil, can control up to 4 switched Fan Coils.

When a switched Fan Coil is later assigned to a room, the switched Fan Coil can be identified by the number selected in this step.

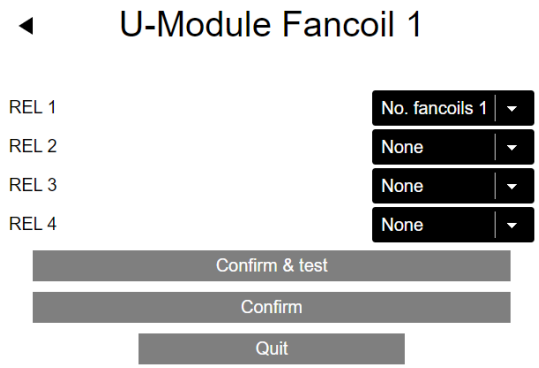


Fig. 07-23 Webpage: U-Module switched Fan Coils

07.05.15 Input / output assignment of U-Modules for switched Fan Coil / Dehumidifier

A U-Module, configured for the combined use of switched Fan Coils and dehumidifiers, has a fixed assignment of the output relays:
Relay 1: Fan Coil
Relay 2: Compressor dehumidifier
Relay 3: Fan Coil
Relay 4: Compressor dehumidifier

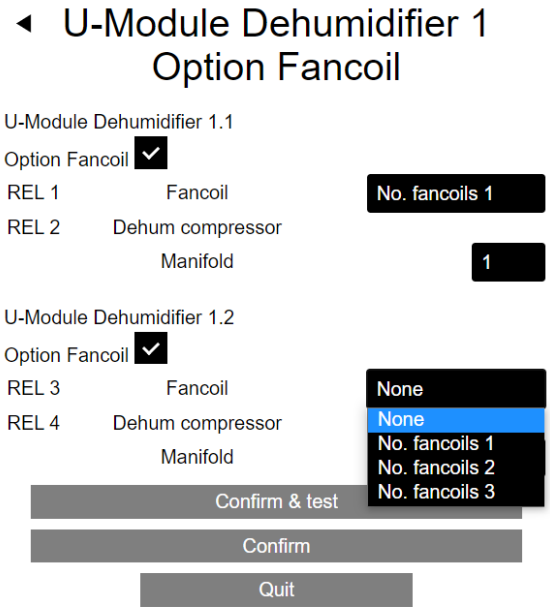


Fig. 07-24 Webpage: U-Module for dehumidifier and switched Fan Coils

In this case, it is not possible to control the valve for the hydraulic supply of the dehumidifier separately.

07.05.16 Overview of Base units

The next screen shows the present state of all existing NEA SMART 2.0 Base units.
Example
Master Base unit with
- connected R-Module
- paired outside sensor
- predefined functions (here connected pump, boiler, chiller)

Slave 1 Base unit with
- connected R-Module

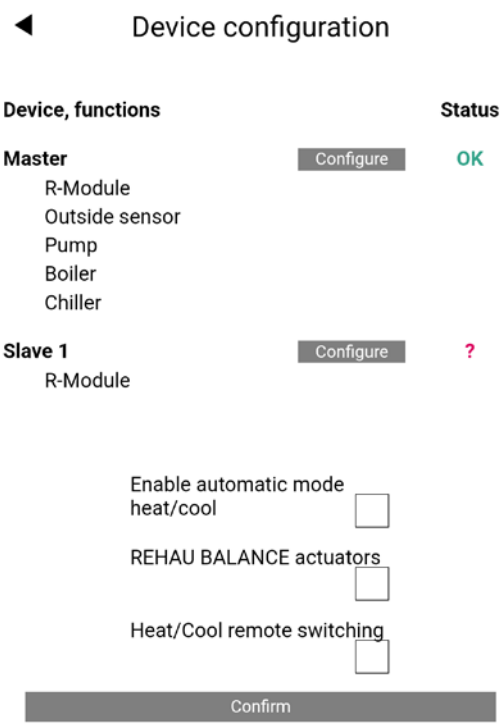


Fig. 07-25 Webpage: Device configuration

„Status" indicates that the Master Base has been configured and that Slave 1 Base needs to be configured.

07.05.17 Definition of room operating modes

If the CA (control area) is configured, pressing the „Configure" button displays first the assignment of Room Units to CA (see Fig. 07-26). If not it displays the configuration page of the Base unit (see Fig. 07-27).

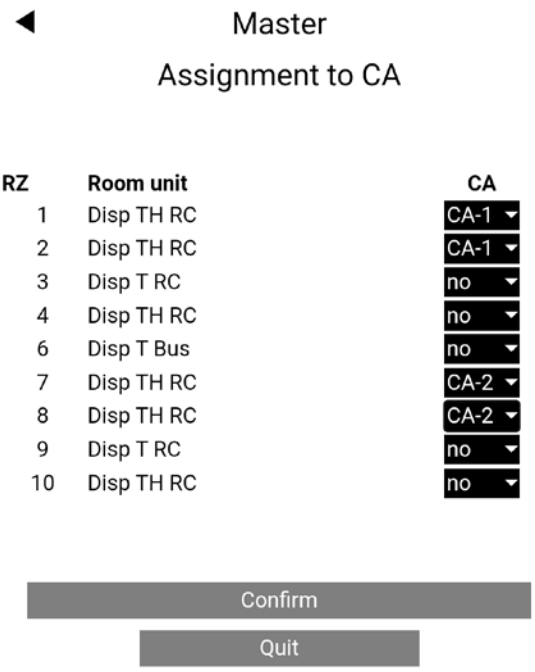


Fig. 07-26 Assignment of Room Units to CA

In Device Configuration you can:
- Check which type of room controller has been paired with which channel (RZ) (e.g. Disp TH RC is a wireless room controller with display and temperature/humidity sensor)
- see the main RZ – this is the 1st channel with which the room controller was paired (this number is used to identify the rooms: the provisional names are Master-1, Master-4, where 1 and 4 are the main RZ)
- set which system is used (floor/ wall / ceiling / CCT / sCCT / IFHC)
- select the manifold whichsupplies the heating/ cooling system of this channel.
- set the operating mode of this channel: (H C , H C , H C)

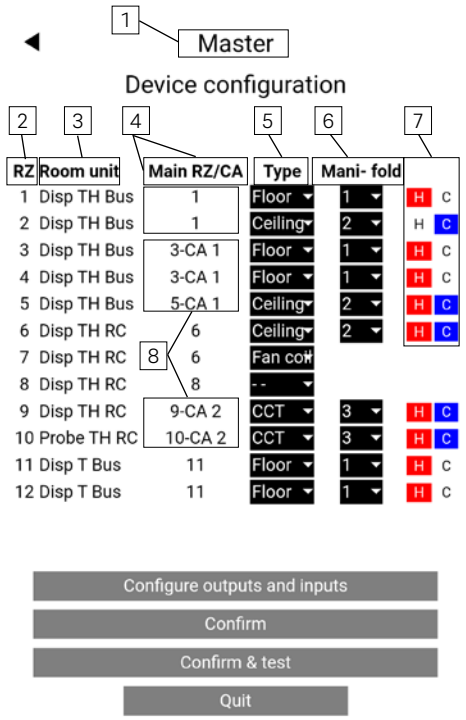


Fig. 07-27 Webpage: Overview Device configuration

1 Defined NEA SMART 2.0 Base (Master, Slave 1, Slave 2, ...)

2 Room Zone: Channel number

3 Type of NEA SMART 2.0 Room Unit connected to this channel

4 Main Room Zone (RZ) is the 1st channel number to which this Room Unit is connected

5 Used heating / cooling system of channel

6 Manifold which supplies the heating / cooling system of this channel

7 Enable heating or cooling mode or both of this channel

8 Activated control area (CA)

After configuration of the room zones, the page shows the following:

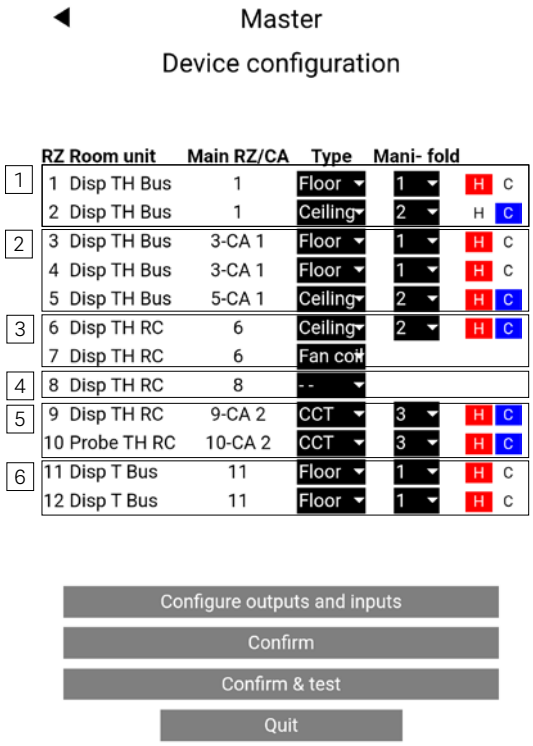


Fig. 07-28 Webpage: Settings according to the example

Next step is to configure the outputs and inputs.

1 Room Unit "Disp TH Bus" on "Main RZ 1" is paired to: zone 1 - underfloor heating on manifold 1 and zone 2 - ceiling cooling on manifold 2. In heating mode, the Room Unit controls underfloor heating and in cooling mode ceiling cooling.

2 Room Unit "Disp TH Bus" on "Main RZ 3" is paired to: zones 3 and 4 - underfloor heating on manifold 1. Room Unit "Disp TH Bus" on "Main RZ 5" is paired to: zone 5 - ceiling heating and cooling on manifold 2. Room Units are configured in control area "CA 1". In heating mode, Room Units in control area "CA 1" take an average temperature and highest humidity to control underfloor an ceiling heating and in cooling mode ceiling cooling.

3 Room Unit "Disp TH RC" on "Main RZ 6" is paired to: zone 6 - ceiling heating and cooling on manifold 2 and zone 7 – switched Fan Coil control. In heating and cooling mode, the Room Unit controls ceiling heating and cooling. Switched Fan Coil can support ceiling in heating and cooling mode.

4 Room Unit "Disp TH RC" on "Main RZ 8" is paired to: zone 8 – no radiant system is selected. Room Unit can control a RAUCLIMATE SILENT BREEZE Fan Coils as standalone device.

5 Room Unit "Disp TH RC" on "Main RZ 9" is paired to: zone 9 – CCT (Concrete core tempering) heating and cooling on manifold 3. Room Probe "Probe TH RC" is

paired to: zone 10 - CCT (Concrete core tempering) heating and cooling on manifold 3. It can be used for measuring of concrete core, flow or return temperature. Room Units are configured in " CA 2" control area

6 Room Unit "Disp T Bus" on "Main RZ 11" is paired to: zone 11 and 12 - underfloor heating on manifold 1. Only in heating mode Room Unit controls underfloor heating.

07.05.18 Definition of Switched Fan Coils at Room Zones (RZ)

It is possible to assign a switched Fan Coil directly to a channel of a Base Room Zone (RZ), which is paired to a Room Unit 1.

In this case, the Fan Coil is automatically assigned to the Room Unit which is paired with this room zone.

There is no Fan Coil number that needs to be selected. The options "Manifold", "Heating" and "Cooling" do not appear.

The switched Fan Coil can only be controlled by means of an additional REHAU switching relay.

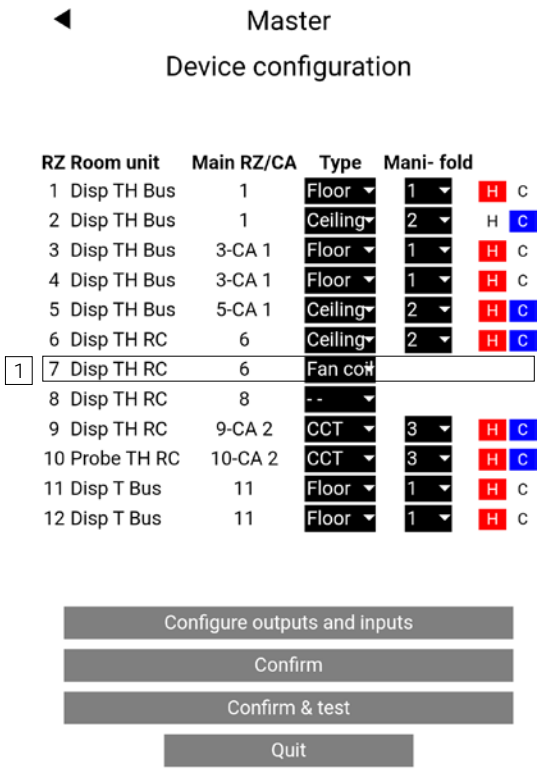


Fig. 07-29 Webpage: Settings switched Fan Coil

07.05.19 Definition of outputs of the Base

The screen below shows the default output configuration of a master. The function of each of the below options is described in chapter 5.3.7.

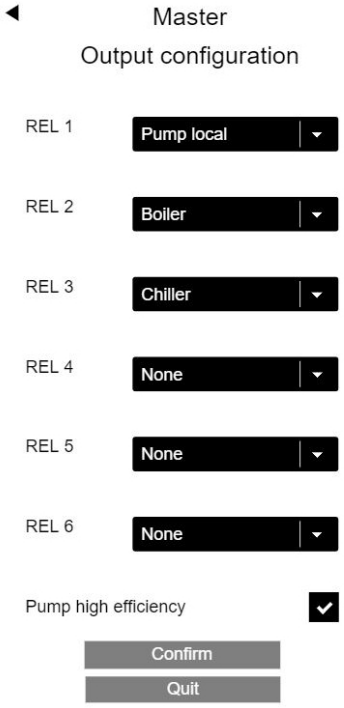


Fig. 07-30 Webpage: Master, output configuration

In our example, additional output signals are added:

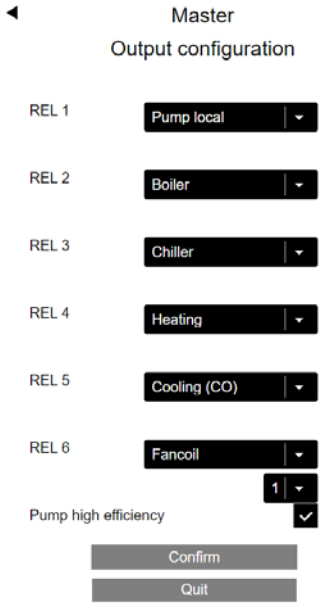


Fig. 07-31 Webpage: Master, output configuration (Heating, Cooling)

The signals "Heating" and "Cooling" may be used to control valves which open or close the supply pipes coming from boiler and chiller.

07.05.20 Definition of inputs of the Base

By default, there are no input signals defined. The options are shown below. The function of each of the below options is described in chapter 05.03.06.

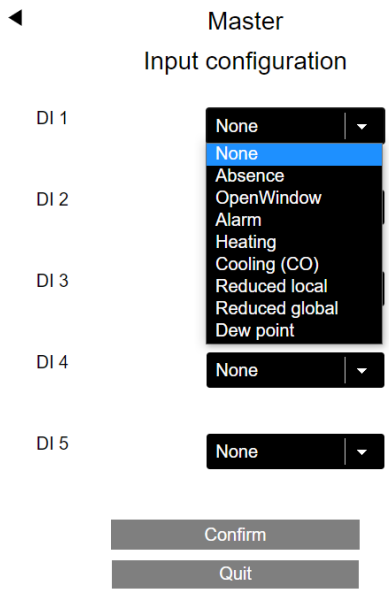


Fig. 07-32 Webpage: Master, input configuration

In our example, these input signals have been added.

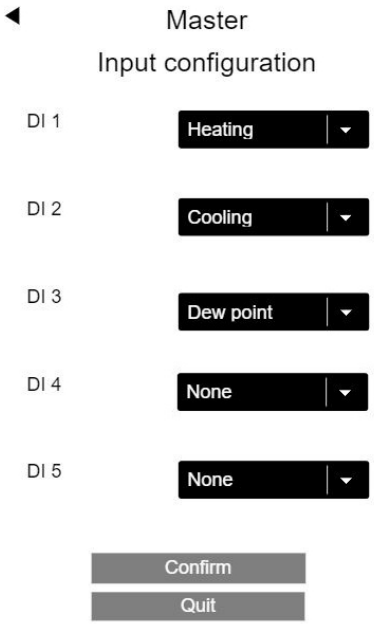


Fig. 07-33 Webpage: Master, input configuration

Note:
Dew point signal and "Window open" are defined to be OK (no dew point alarm, window is closed) when the signal is active.

This means, the potential free contact connected to this input is closed in OK state.

07.05.21 Automatic mode and remote control of the operating mode

When the base(s) are configured, the wizard returns to the page where the overview appears and now displays the OK status.

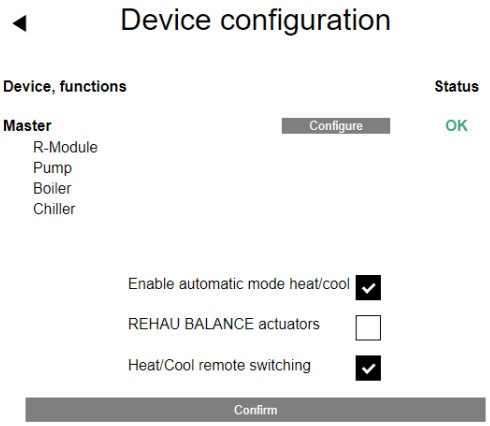


Fig. 07-34 Webpage: Configuration Devices

Depending on the configuration the following checkboxes appear (only for heating and cooling systems):

- Enable automatic mode heat/cool
  This option is only displayed if an input signal "Heating" or „Cooling" or an output signal „Heating" or „Cooling" is defined. How to adjust automatic mode heat/cool switchover see chapter 08.03.05.
- Heat/Cool remote switching
  This option is only displayed if an input signal "Heating" or „Cooling" is defined

		Input HEATING		Input COOLING		Operating mode
H/C AM	H/C RS	exist	state	exist	state	
X	X	✓	0	✓	0	ST
X	X	✓	1	✓	0	H
X	X	✓	0	✓	1	C
X	X	✓	1	✓	1	H
X	X	✓	0	-	-	C
X	X	✓	1	-	-	H
X	X	-		✓	0	H
X	X	-		✓	1	C
X		✓	0	✓	0	ST
X		✓	1	✓	0	H or ST
X		✓	0	✓	1	C or ST
X		✓	1	✓	1	ST
X		✓	0	-	-	C or ST
X		✓	1	-	-	H or ST
X		-		✓	0	H or ST
X		-		✓	1	C or ST

H/C AM - Enable automatic mode heat/cool selected
H/C RS - Heat/Cool remote switching selected
H - heating mode C - cooling mode ST - standby mode

Tab. 07-2 System control mode dependencies

The option „Heat/Cool remote switching“ allows the switching of heating/cooling operating modes via a potential-free contacts, which are connected to an inputs defined as „Heating“ or „Cooling“. If the „Heat/Cool remote switching“ is selected, the NEA SMART 2.0 system follows the input signals without delay and checking the preconditions.

If none of the above conditions in a heating/cooling system are fulfilled, the following message appears.

Warning:
This installation is configured for heating and cooling. There are no output signals or input signals defined to ensure proper change between heating and cooling mode. You have to ensure by other means to avoid damage or problems when the system is switched between heating and cooling.

The automatic switching between heating and cooling is deactivated in this case.

At the end you get a confirmation, that the system configuration is completed.

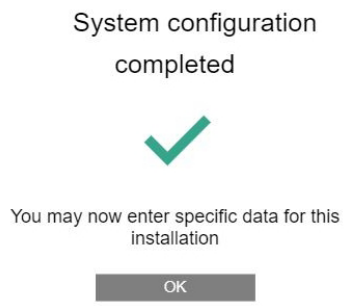


Fig. 07-35 Webpage: System configuration completed

After pressing OK you exit to the installer area for further settings.

Warning:
Each time you launch the wizard, you must go through all the steps to confirm that the system configuration has been successfully completed. If the wizard is interrupted at any stage, the old configuration in some cases may not be restored.

Once the system configuration is done, there is a time delay of about 10 minutes before the NEA SMART 2.0 system will start working. During this time, all data from all components is processed and analysed.

07.06 Installer main menu

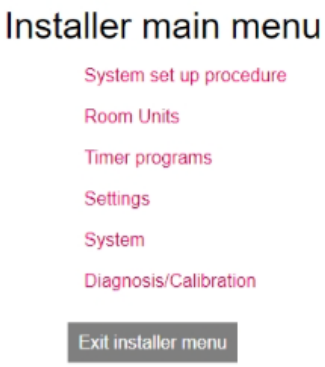


Fig. 07-36 Webpage: Installer main menu

The installer main menu offers the following options:
- Go back to System set up procedure (Wizard)
- Set room names, define set points, declare room as pilot room, set function of external input of Room Unit ...
- Modify weekly and daily timer programs
- Adjust all parameters
- Set language, define heating and cooling period ...
- System components, state of inputs and outputs of all components, calibrate sensor inputs

07.06.01 Timer programs

Fig. 07-37 Webpage: Timer programs

There are 5 weekly programs and 10 daily programs.

For each day of the week, a different daily program can be chosen.
The weekly programs are applied for the room temperature set points, for the Fan Coils and for the dehumidifiers.

Fig. 07-38 Webpage: Daily program selection

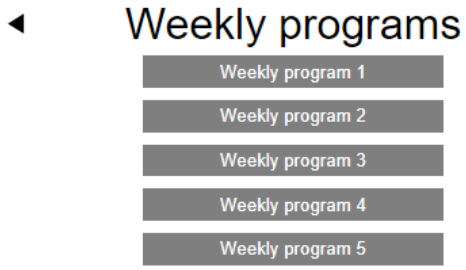


Fig. 07-39 Webpage: Weekly program selection

Daily program set up

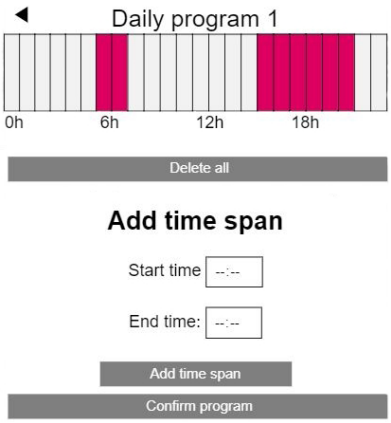


Fig. 07-40 Webpage: Set up daily program

The standard program for working days is defined as follows:

Normal mode from 06:00 h to 08:00 h and from 16:00 h to 22:00 h.

The rest of the day is reduced mode.

All normal mode time spans can be deleted, additional time spans can be added:

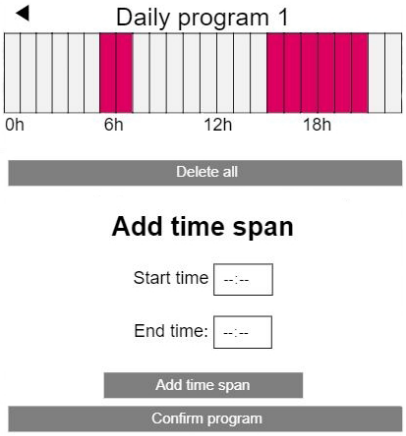


Fig. 07-41 Webpage: Set up daily program, delete

Note:
When Autostart function is enabled in room configuration, the system tries to reach the set points for normal mode in time at the begin of the defined time period.

The time span determined for the autostart function is continuously updated.

During this period, Fan Coils continue to work with the value specified in the time program in order to give priority to the other systems.

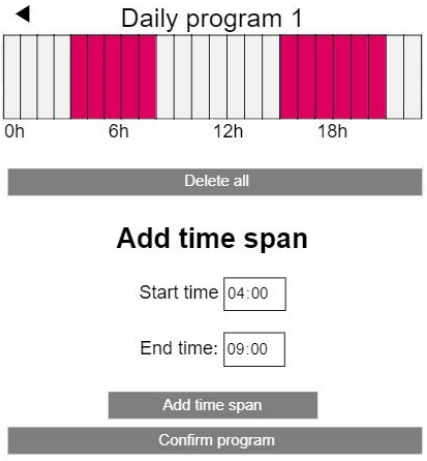


Fig. 07-42 Webpage: Set up daily program, new time span

After confirmation the normal mode time span in the morning is enlarged.

07.06.02 Room set up

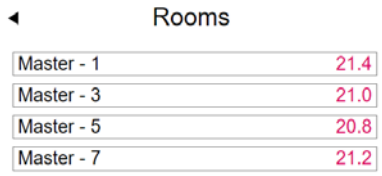


Fig. 07-43 Webpage: Room set up

When you enter the menu for rooms, the room names are corresponding to the Main RZ (Master-1 is RZ 1, see paragraph 07.05.17).

Installer page for room

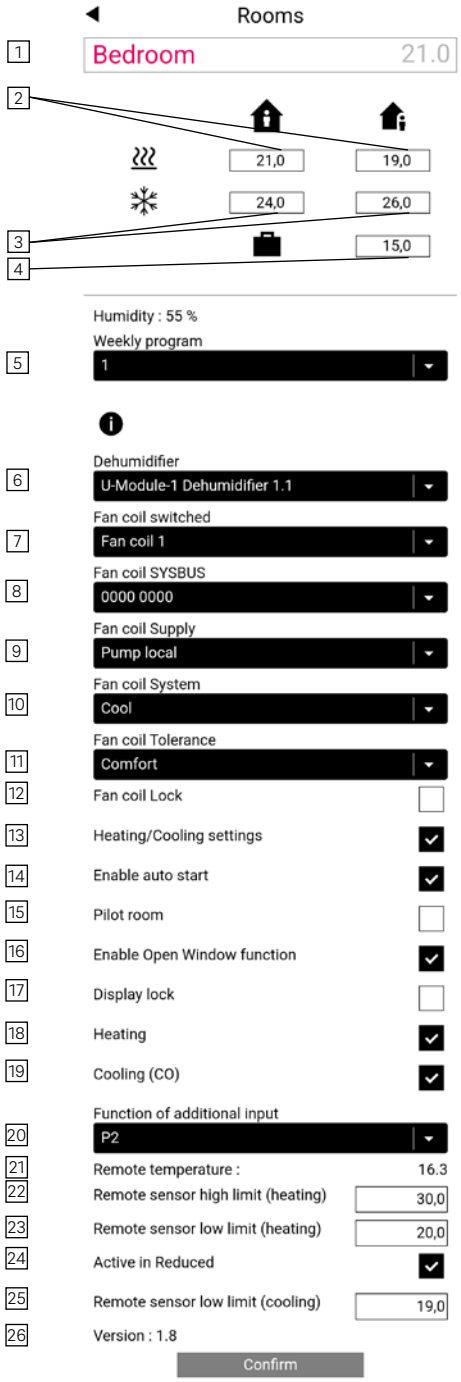


Fig. 07-44 Webpage: Installer page for room

The actual values of room temperature and humidity are shown on this page.

1 Change room name
2 Define room temperature set points for Heating normal / reduced mode
3 Define room temperature set points for Cooling normal / reduced mode
4 Define room temperature set points for Holiday mode
5 Select weekly program for room temperature set points
6 Assign dehumidifier to the room
7 Assign switched Fan Coil to the room
8 Assign modulated RAUCLIMATE SILENT BREEZE Fan Coils with defined modbus address
9 Select supply of Fan Coils (switched and modulated)
10 Selecting heating, cooling or heating / cooling mode for the Fan Coils
11 Select comfort level for switched and modulated Fan Coil
12 Lock for switched and modulated Fan Coils (on the Room Unit Fan Coil in OFF state)
13 Activation of Heating/Cooling mode switchover via the Room Unit
14 Enable auto start function
15 Select room as a pilot room. Important rooms, such as the living room, should be pilot rooms, as they influence the start and end of the heating/cooling mode and the flow temperature.
16 Enable open window detection in the room
17 Lock of control over Room Unit display.
18 Enable room temperature set point in Heating mode
19 Enable room temperature set point in Cooling mode
20 Select function of external input (P2 = floor temperature sensor), see all functions of additional input in chapter 07.04.06
21 Shows the actual temperature of external sensor (depends on selected function 20)
22 Define high limit of floor temperature - heating (depends on selected function 20)
23 Define low limit of floor temperature - heating (depends on selected function 20)
24 Enable floor temperature in reduced mode (depends on selected function 20)
25 Define low limit of floor temperature - cooling (depends on selected function 20)
26 Room Unit firmware version

07.06.03 System data

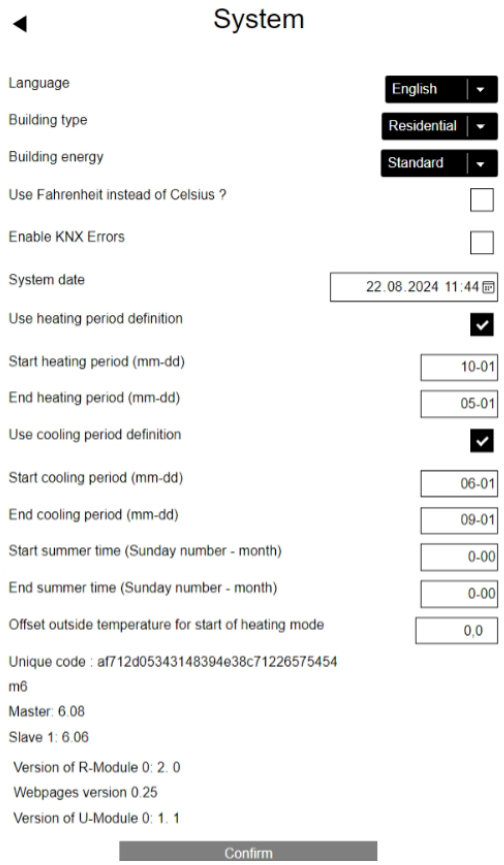


Fig. 07-45 Webpage: System data

Note:
The "System" page is present in the user area, too.

Some of the settings are already done during wizard run, as language, building type and building energy class, but can be modified here.

Temperature unit can be switched between Fahrenheit and Celsius System date and time has been set during wizard and can be adjusted here.

If system is using KNX communication you can enable KNX errors; for indication of communication loss to the KNX Gateway to the App.

The time spans for heating (1st of October until 1st of may) and cooling period (1st of June until 1st of September) are predefined.

They can be adjusted or completely disabled.

Note:
The defined time span is the permission for the system to enter this mode.

Depending on the system configuration it is also possible, to overrule the defined periods.

The summertime (daylight saving time) is disabled, when 00-00 is entered.

Heating mode starts, when the average value of the outside temperature falls below 15 °C. This limit can be increased or decreased.

Unique code is the identifier for the base in cloud connection Software versions of installed components.

Note:
The software of the base will automatically updated via the server if this option has been enabled in the NEA SMART 2.0 App.

07.06.04 Diagnosis / probe calibration

Fig. 07-46 Webpage: Diagnosis

The Diagnosis page is for the installer.

System statistics show the runtime of the system and other values.
Configuration overview lists the components of the system.

State of inputs / outputs can be used to verify correct operating of connected devices and the digital and analogue inputs / outputs of system components.

07.06.05 Settings (Parameters)

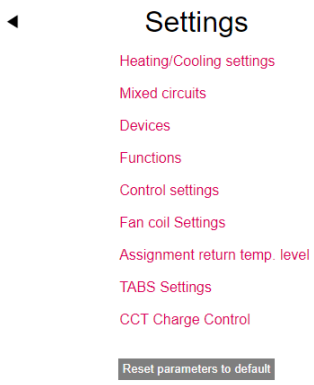


Fig. 07-47 Webpage: Settings

Settings page contains the most relevant parameters, additional parameters can be modified in the NEA SMART 2.0 App.

Activation limits of heating cooling mode.

Flow temperature setting and control behaviour of mixed circuits.

Pump, boiler, chiller minimum run times, pause times ...

Pump and valve kick ...

Parameter for room temperature control.

Activation limits of dehumidifiers.

Fan Coil settings:
Running times for switched Fan Coils
Speed adaptation for modulating Fan Coils[1)]

Assignment of return temperature level:
Only valid for TABS [2)]

TABS settings
Only valid for TABS [2)]

CCT load control
Only valid for CCT [2)]

[1)] see "NEA SMART 2.0 Control System
Commissioning instructions for switched Fan Coils and modulating"
RAUCLIMATE SILENT BREEZE Fan Coils
Print no. 954666

[2)] see "NEA SMART 2.0 Control System
Application TABS CCT – sCCT – IFHC
Application Control Area CA
Function – Configuration – Operating"
Print no. 954663

The listed points are examples.
For detailed information about the parameters which are available here and the complete set of parameters available in the NEA SMART 2.0 App see chapter 8.

07.07 Reset functions

07.07.01 Delete pairing of all channels (RZs) on a base

- Start the pairing sequence by pressing OK for > 3 sec.
- Base switches on LEDs of all paired channels
- 1st not paired channel is blinking in a “slow sequence”
- Channel, that shall be deleted, can be selected by < or > key
- Confrim channel by pushing OK less than a second
- < and > is pressed together for > 3 secs
- This paired channel starts fast blinking
- Pairing of this channel is deleted, LED is switched OFF
- Push OK button for 3 seconds to leave pairing mode

07.07.02 Delete pairing of outside temperature probe

- Start the pairing sequence by pressing OK for > 3 sec.
- Base switches on LEDs of all paired channels, OK button shall be released during maximum 2 secs
- Do not press OK to select the blinking channel
- < and > is pressed together for > 3 secs
- All channels are blinking as a confirmation
- Push OK button for 3 seconds to leave pairing mode

07.07.03 Reset Controller to initial state

- Press OK for 3 secs
- Controller enters pairing sequence
- Press <, OK and > together for > 10 secs
- All LED’s are flashing, controller restarts

07.07.04 Reset Room Unit

For wireless Room Unit: Remove battery, push home button several times (to drain remaining current) and place batteries back. Proceed with steps described below.
For bus wired Room Unit open Room Unit to unpower, push home button several times (to drain remaining current) and close Room Unit again. Proceed with steps described below.

Reset procedure:
- Push home button, and immidieately after the area where + and – are
- Room Unit will show a circle
- Release + and – area
- Push Home button until display turns off

07.07.05 Reset Room Probe

- For wireless Room Probe:
  Open housing and remove battery
  Press button at the bottom of the housing several time, insert battery, press the button immediately long (more than 5 seconds)
  Flashing of the LED stops
- For bus based Room Probe
  Open housing
  Press button at the bottom of the housing several time, close housing, press the button immediately long (more than 5 seconds)
  Flashing of the LED stops

07.07.06 Reset WIFI Key to default setting

- Press < and > for 3 secs
- LED “WIFI” is flashing, independent of previous state of WIFI
- Press <, OK and > for 10 secs
- As a confirmation of successful reset of WIFI key the LED of WIFI and WIFI/AP are blinking alternating for 5 secs

Tutorials for the functions described above can be found at: **www.rehau.com/neasmart2**

08 Operating of NEA SMART 2.0 System

The NEA SMART 2.0 System can be operated and monitored by user, installer and service company using

- the NEA SMART 2.0 Room Units (change set points, operating mode, ...)
- Integrated webpages (set up, parametrization, timer programs, room set points..)
- NEA SMART 2.0 App (all parameters adjustable, display of statistics)

The widest range of possibilities and highest comfort offers the NEA SMART 2.0 App. To use the App, the system must be connected to internet.

The integrated webpages can be accessed by one device only. Internet connection is not needed, and in this mode also not possible.

Operating by Room Units is always possible and does not exclude, to operate the system in parallel by App or webpages.

The table below gives an overview about the features and limits of the different operating methods.

Feature	Room Unit	Webpage	App
Change actual temperature set points, select normal / reduced / standby / party mode for one room	YES	YES	YES
select normal / reduced / standby / party and holiday mode for all or a group of rooms	NO	YES, with some restrictions	YES
Manage timer programs, room temperature set points in timed mode	NO, but predefined set points can be changed	YES	YES
Heating / cooling mode changeover	YES, If configured	YES	YES
Manage dehumidifiers	NO	YES	YES
Switched Fan Coil on / off Modulating Fan Coil on / off / speed change / flap control / filter clean	YES	YES	YES
Set up a system	Only room temperature control heating without timer functions	YES	NO, configuration must be done with webpages
Change parameters	NO	YES, with some restrictions	YES
Get error messages	Only critical as condensation	Only error codes	YES
Display of statistics, temperature curves, etc.	NO	NO	YES
Use smart functions as geofencing	NO	NO	YES

Tab. 08-1 Operating via different devices

08.01 Operating by NEA SMART 2.0 Room Units

08.01.01 Display information

Fig. 08-1 NEA SMART 2.0 Room Unit

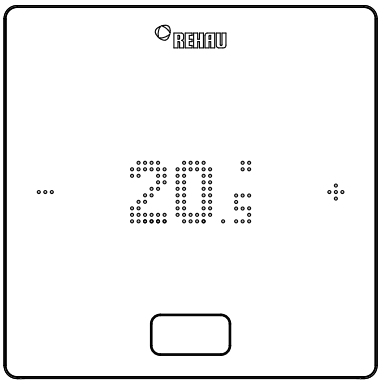
The Room Unit is operated using the Home Button and the +/- symbols.

The display is switched off when in sleep mode. It is activated by pressing the Home button. Only then the plus/minus symbols become visible. Flashing symbols or numbers can be modified.

The Room Units (room controller with LED matrix display from SW version 1.7) allow the user:

- Switching the operating mode of the NEA SMART 2.0 system between heating, cooling or automatic switching between heating and cooling on enabled Room Units
- Basic settings for the operation of Fan Coils such as selection of the Fan Coil operating status ON, OFF and the fan speed stages STANDBY, MIN, MED, MAX as well as the activation / deactivation of the Fan Coil flap (on / off) to switch between oscillating and directional airflow

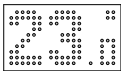
MINUS SYMBOL
- Reduce the desired temperature
- Previous menu item



PLUS SYMBOL
- Increase the desired temperature
- Next menu item

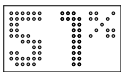
HOME BUTTON
- Activate display
- Next menu item
- Confirm

Display of temperature



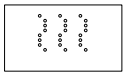
Shows the current room temperature or the desired room temperature.

Display of room humidity[1)]

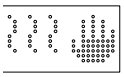


Shows the relative humidity in the room.

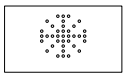
Display of the operating mode



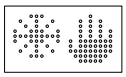
Heating mode – automatic start



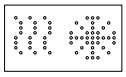
Heating mode – manual



Cooling mode – automatic start

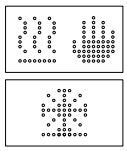


Cooling mode – manual



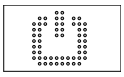
Heating / cooling mode – automatic switching

Stautus indicator of operating mode



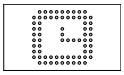
The status "Heating active" and "Cooling active" is indicated by an underscore below the heating icon (wave) or cooling icon (ice crystal).

Operating status / Energy levels



Standby mode

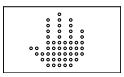
When Standby mode is selected, automatic frost protection is active. As soon as the temperature drops below a limit temperature, which can be individually set, the heating valve is activated. The default ot the limit temperature is 5 °C.



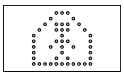
Automatic mode
The selected timer programme for the room is active.

When the symbol for automatic mode is displayed, the set energy level is displayed afterwards (Normal or Reduced).

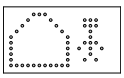
[1)] Only for Room Units with humidity measurement.



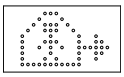
Manual
User has changed the desired temperature; valid until the next switching point.



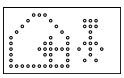
Normal mode (Present mode)
Operating mode Normal is active
Standard desired temperature 22 °C



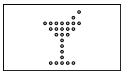
Reduced mode (Absent mode)
Operating mode Reduced is active (energy-saving mode)
Standard desired temperature 18 °C



Transitional phase Normal
Transitional phase Normal to Reduced operating mode

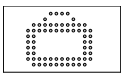


Transitional phase Reduced
Transitional phase Reduced to Normal operating mode



Party mode
Party mode is active

The party mode allows the user to switch from the reduced operating mode to the normal operating mode for a period of time. The thermostat automatically returns to the reduced operating mode when the party time has elapsed.



Holiday mode
Holiday mode is active

- Holiday mode / Vacation mode can only be activated with the App or on the web page.
- The vacation symbol only appears on the display when holiday mode / vacation mode is active.

Display of Fan Coil speed stages[1)]

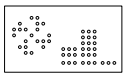
Fan Coil is manually stopped (OFF) or permanently deactivted

Fan Coil is manually started (ON)
Fan Coil is only active (fan running) when the conditions (setpoints, actual values, settings) allow it

When using RAUCLIMATE SILENT BREEZE Fan Coils:

STANDBY

MIN – lowest speed stage

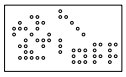


MED – medium speed stage

MAX – highest speed stage

Display of Fan Coil flap mode[1)]

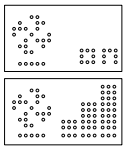
When using RAUCLIMATE SILENT BREEZE Fan Coils with flap:



Flap OFF: airflow is directional

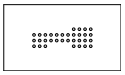
Flap ON: airflow is oscillating

Status indicator Fan Coil in operation[1)]



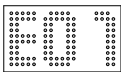
Fan Coil in operation is indicated by an underscore below the fan icon

Room Unit locked



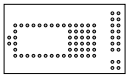
Buttons are locked

Error message

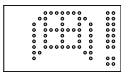


Displays an error number – see chapter 09

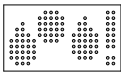
Warning message



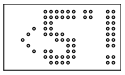
Low battery
The battery of the Room Unit must be replaced.



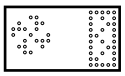
Window open
An open window has been detected in this room.



Condensation
High humidity – risk of condensation

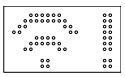


Frost protection active
Frost protection has been activated as the temperature has fallen below 5 °C; the heating valve is activated.



Filter cleaning indicator
The filter cleaning indicator notifies the user to clean the filter when using RAUCLIMATE SILENT BREEZE Fan Coils. After cleaning the filter, press the HOME Button for 5 seconds to reset the message.

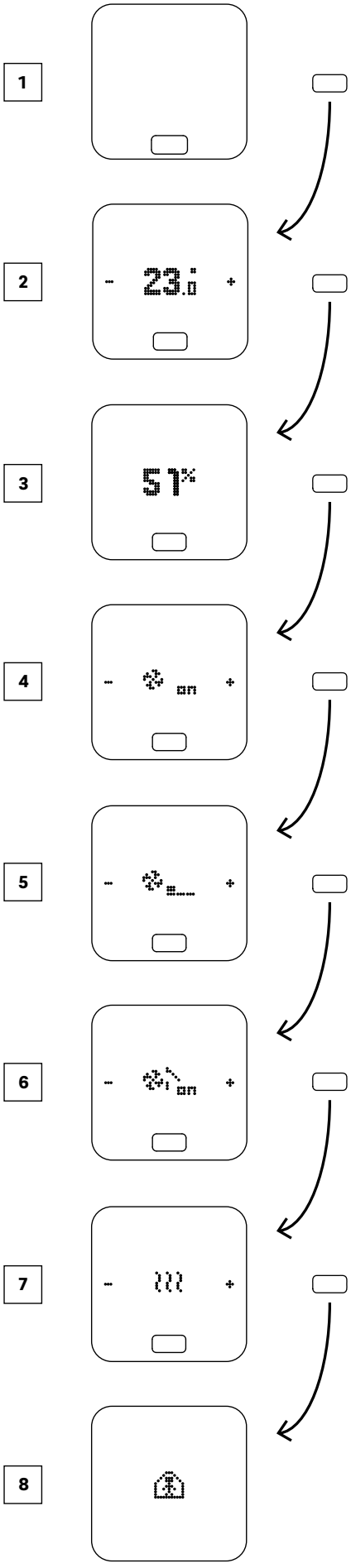
Connection status



No connection
There is no connection to the Base.

[1)] Is displayed if switched Fan Coils and / or modulating RAUCLIMATE SILENT BREEZE Fan Coils are installed.

08.01.02 Order of the displayed information

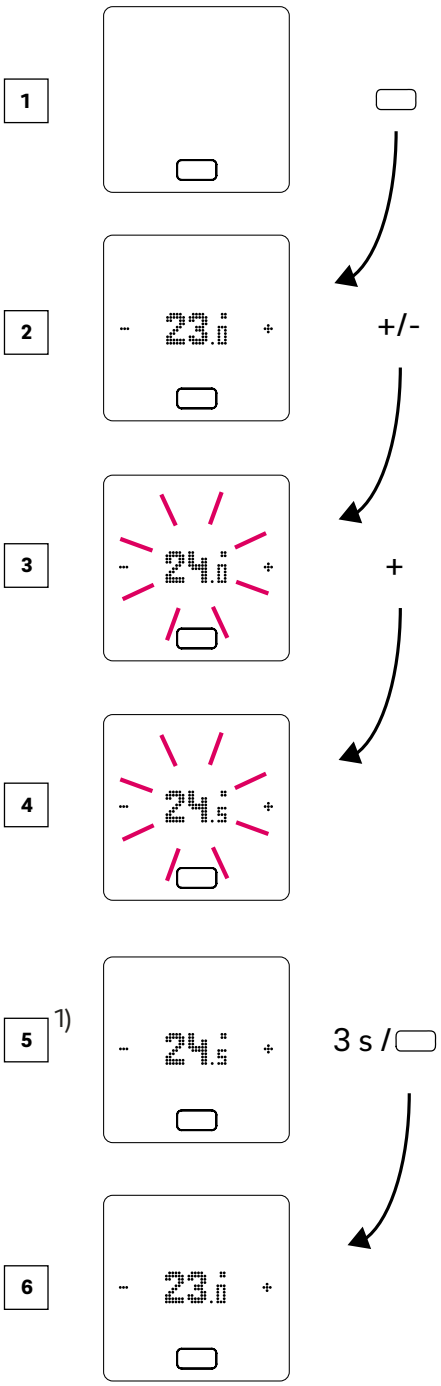


1 Initial state
2 Display of current room temperature
3 Display of current humidity in the room
4 Display of Fan Coil operation mode[1)]
5 Display of Fan Coil speed stage[2)]
6 Display of Fan Coil flap mode[3)]
7 Display of Operation Mode
Options: Heating, Cooling
7 Display of Energy Levels
Options: Normal, Reduced, Standby, Automatic with Timer, Party

[1)] Displayed if switched Fan Coils and / or modulating RAUCLIMATE SILENT BREEZE Fan Coils are configured
[2)] Displayed if modulating RAUCLIMATE SILENT BREEZE Fan Coils are configured
[3)] Displayed if modulating RAUCLIMATE SILENT BREEZE Fan Coils with flap are configured

08.01.03 Setting the desired temperature

To activate the display, press the Home button once.
To see the setpoint value, press +/- once

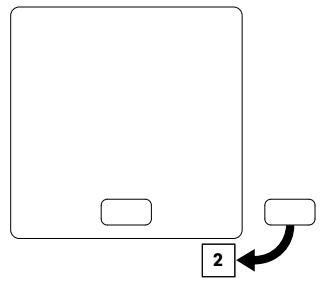


1 Initial state
2 Display of current room temperature
3 Display of the setpoint of the room temperature
4 Display of the setpoint of the room temperature during operation
5 Display of the final setpoint for the room temperature
6 Display of current room temperature

1) Optional: If the Room Unit has a light ring, it flashes additionally for confirmation

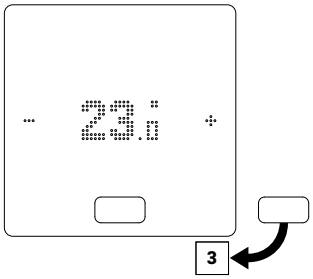
08.01.04 Operating procedure (Fan Coils, Operation Mode, Energy Level)[1)]

1 **Initial state**

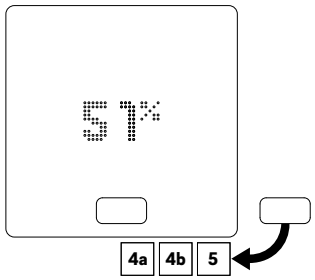


2 **Display of current room temperature and setpoint**

- To display the setpoint (desired temperature), press + or – once. Each additional keystroke to + or – increases or decreases the setpoint



3 **Display of current humidity** for Room Units with humidity measurement

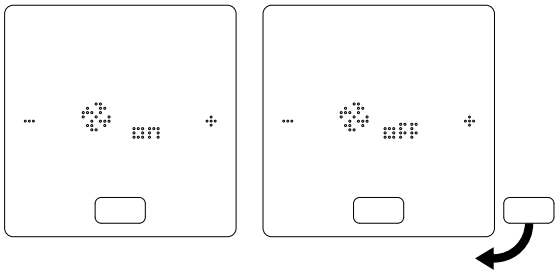


Depending on the configuration, different display options appear after pressing the HOME button:

4a Room with switched Fan Coil
4b Room with modulating RAUCLIMATE SILENT BREEZE Fan Coils also in combination with one switched Fan Coil
5 Room without Fan Coil

4a **Room with switched Fan Coil**

- By pressing + or – the switched Fan Coil is manually started (ON) or stopped (OFF)

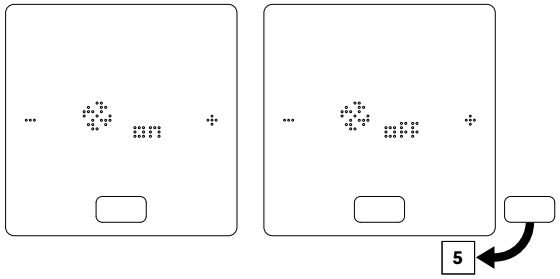


[1)] Note:

- The available selection options depend on the system configuration, the conditions (room temperature setpoints, actual values, ...) and the system settings.
- The current setting is always displayed first

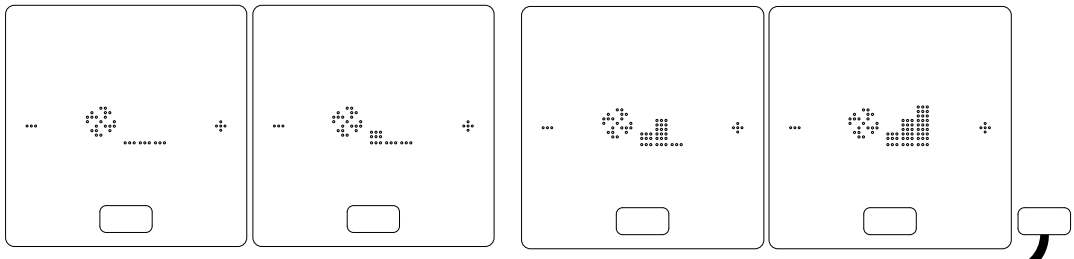
4b Room with modulating RAUCLIMATE SILENT BREEZE Fan Coils also in combination with one switched Fan Coil

- Switched Fan Coils and RAUCLIMATE SILENT BREEZE Fan Coils are permanently deactivated when the setting is OFF
- Switching is made by pressing + or –



When the Fan Coil is switched off, there is no selection option for operating mode and Fan Coil flap.

- Changing the Fan Coil operating mode is done by pressing + or –



STANDBY	MIN Lowest speed stage	MED Medium speed stage	MAX Highest speed stage

Switched Fan Coils and RAUCLIMATE SILENT BREEZE Fan Coils are with the setting

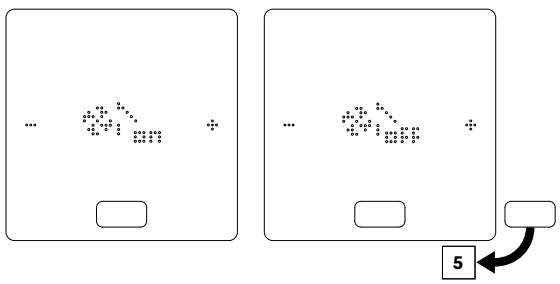
- OFF – permanently disabled
- STANDBY deactivated until the next switching point of a time program arrives or the energy level is manually changed. In this case the default setting for energy level REDUCED / NORMAL is applied.

RAUCLIMATE SILENT BREEZE Fan Coils are in the setting

- MIN / MED / MAX operated in the selected mode until the next switching point of a time program arrives or the energy level is manually changed. In this case the default setting for energy level REDUCED / NORMAL is applied.

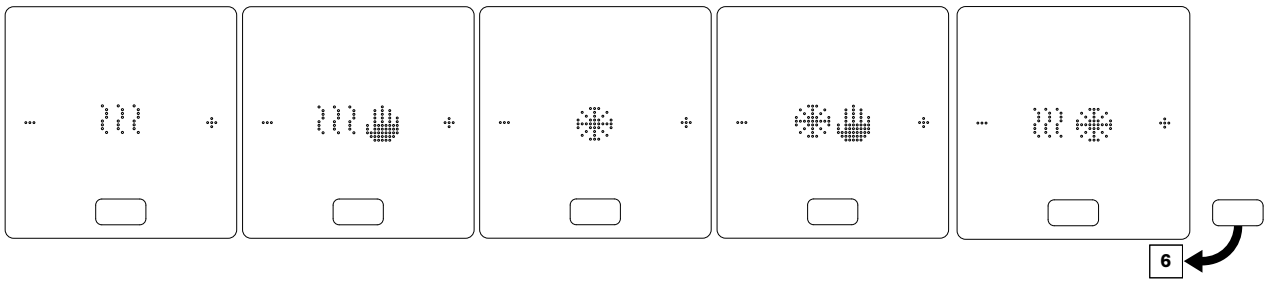
Without the use of timers, the Fan Coil remains in the selected energy level

- When RAUCLIMATE SILENT BREEZE Fan Coils with flap are used, the flap can be switched between oscillating (ON) and directional (OFF) airflow by pressing + or –



5 **Display and switching of the Operation Mode (Heating / Cooling Mode switch via the Room Unit)**

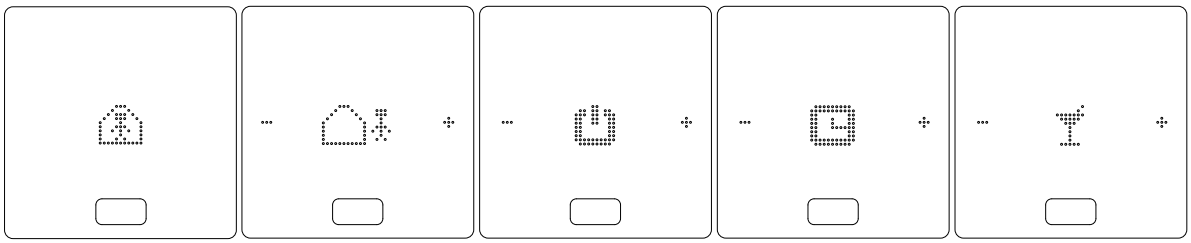
- Switching of operation mode is only available on Room Units which have been activated for this purpose in the installer area.
- Only if switching of operation mode is enabled, the +/– signs appear to allow switching.
- The configuration of the system and the actual conditions determine the modes of operation which may be selected by the user.



Heating mode automatic start | Heating mode manual | Cooling mode automatic start | Cooling mode manual | Heating / cooling mode automatic switching

6 **Display and switching of Energy Levels**

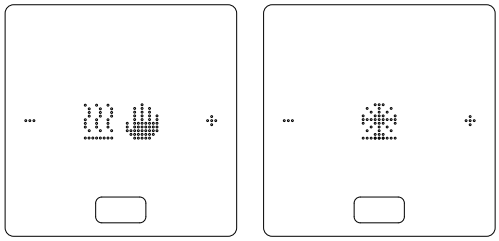
- The energy level can be changed by pressing +/–
- The current operating status is always displayed first.



Normal mode (Present mode) | Reduced mode (Absent manual) | Standby mode | Automatic mode (Timed mode) | Party mode

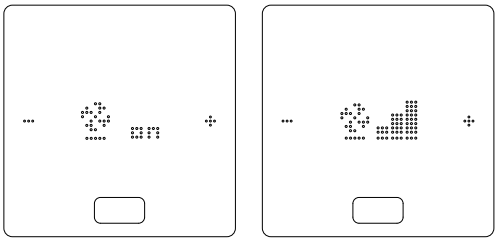
Status indicator of Operation Mode

- The status "Heating active" and "Cooling active" is indicated by an underscore below the heating icon (wave) or cooling icon (ice crystal).



Status indicator Fan Coil

- The status indicator "Fan Coil in operation" is indicated by an underscore below the fan icon.



08.02 Operating by webpages

08.02.01 Connect a device

The procedure how to connect a smartphone, tablet or laptop with the NEA SMART 2.0 Base is described in chapter 7 of this manual.

08.02.02 User area

Depending on the type of system, the integrated webpages offer the following options:

- Selection of the operating modes of the system: Heating/cooling
- Selection of Energy Level: via time program or continuously in normal, reduced or standby mode
- Managing the timer programs
- Specification and management of room temperature
- Using the party or holiday function
- Specification of the mode of operation of the dehumidifiers
- Connecting the system to the Internet to use the App
- Additional setting options

Main menu

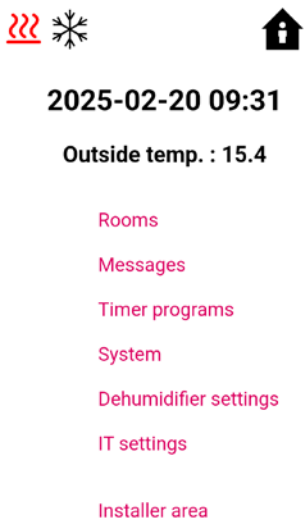


Fig. 08-2 Webpage: Main menu

In the main menu, you can see the current operating mode – shown here: Heating active in heating/cooling automatic mode and "normal" mode (person in the house).
By clicking the symbols, the different operating modes can be selected (depending on the present conditions):

- Heating mode, manual
- Cooling mode, manual
- Heating mode, automatic start
- Cooling mode, automatic start
- Heating/Cooling, automatic start

and:

- Operation via time programme
- Permanent "normal" or "reduced" mode
- System switched off (standby)

In order to ensure comfortable conditions and an energy-efficient operation, we recommend that you select the timed operating mode.

Click the menu items to access the respective submenus.

Room selection

Fig. 08-3 Webpage: Room selection

Here, you can see the individual rooms with their current room temperatures. Clicking a room takes you to the individual room pages.

Room page

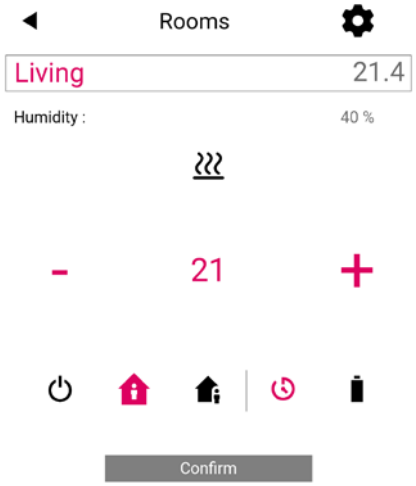


Fig. 08-4 Webpage: Adaptions in Room

Here, the current setpoint and actual temperature and the operating mode (here: heating mode, via time program, currently "normal" mode) are displayed.

The room temperature setpoint value can be changed using the plus and minus symbols.

The room page layout may change if additional systems are available for this room.

Note:
- Changes to the room temperature setpoint value during timed operating mode are valid until the next switching point of the time program
- Changes during fixed “normal” or “reduced” mode are set as new standard values for this mode.
- By clicking the gear symbol, you can access the advanced settings

Extended room page

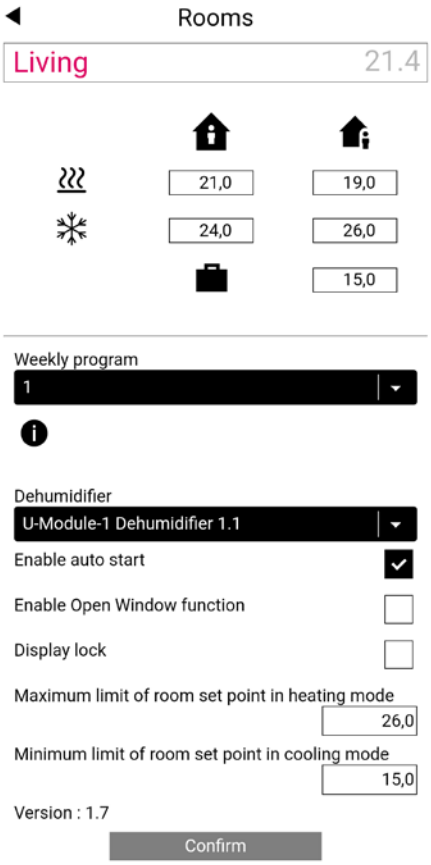


Fig. 08-5 Webpage: Detailed adaptions in room

The standard values for heating/cooling can be managed here for “normal” or “reduced” mode as well as for holiday mode.

There are five weekly programs available. By clicking the info symbol, you will see a preview of the selected timer program.

The auto-start function ensures that the desired room temperature is reached at the defined point in time.
If the auto-start function is not selected, the room is only heated or cooled to the new default value from the point in time selected in the timer program.

Rooms that are also equipped with a Fan Coil should be operated with the activated autostart function. The autostart function gives the surface heating / cooling system the opportunity to bring the room to the desired temperature according to the timer program in the most energy-saving and also noiseless manner without starting the Fan Coil prematurely.
Enable Open Window function for the room to detect a drop in temperature and stop heating for 30 min. to reduce energy consumption.

Using the display lock, the operation via the Room Unit can be blocked.

If a ground temperature sensor is installed, the limit values to be observed for heating and cooling mode can be specified.

Timer programs

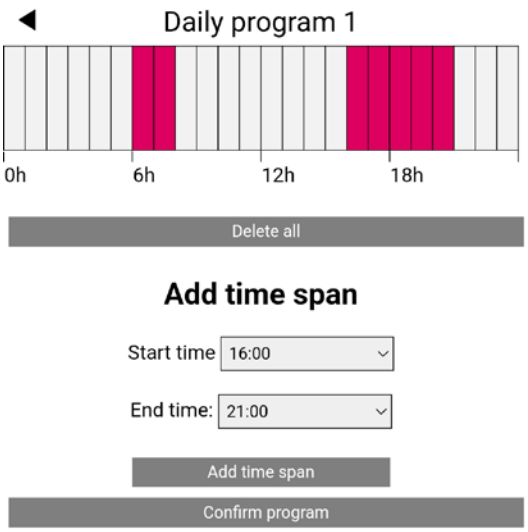


Fig. 08-6 Webpage: Timer program

The 5 weekly programs consist of daily programs for the individual days. There are 10 daily programs that can be defined in a 15-minute time grid.
The displayed sections are rounded to one hour.

The areas marked in red indicate the periods of time defined for “normal” mode.

Note:
A number of programs are predefined but can be changed at any time. Based on the selection of the building type (residential building, office building), the appropriate timer programs are selected automatically.

System

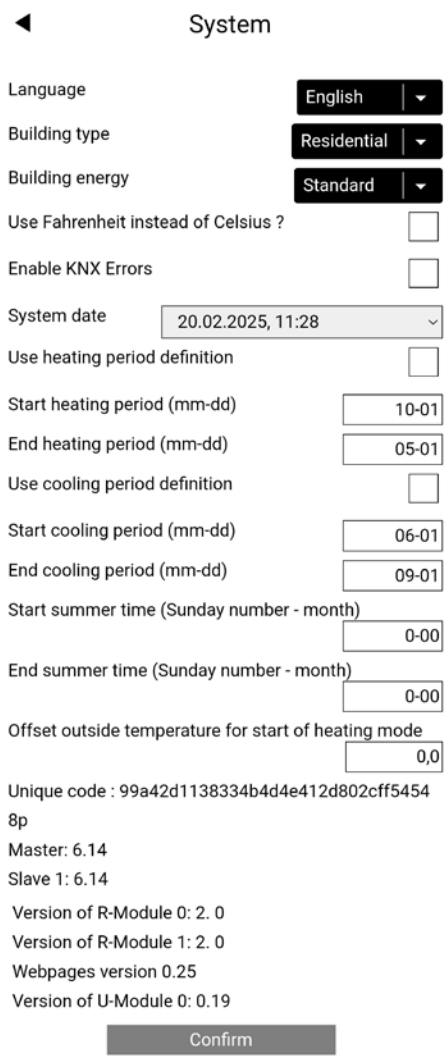


Fig. 08-7 Webpage: System

On the system page, you can make additional settings:

- Language
- Classification of the building's energy requirements
- Enable KNX errors diagnostics
- Time and date
- Determination of permissible times for heating and cooling mode
- Changing the start-up criteria for heating mode

Note:
Depending on the present system, some standard values may not be effective.

On other webpages, you can make additional IT settings and settings for other components.

Dehumidifier
Dehumidifiers are required depending on climatic conditions.

The dehumidifiers are assigned to individual rooms in the extended part of the room page.

If your system is equipped with dehumidifiers, you can configure them starting from the main menu in the „Dehumidifier" menu.

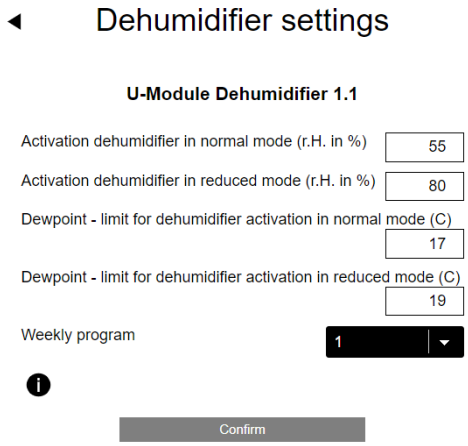


Fig. 08-8 Webpage: Dehumidifier

The dehumidifiers are controlled by a weekly program, which switches between normal and reduced operation, same as it is with the setpoints for the room temperature. The reduced operation, usually during the night, reduces the impairment caused by the inevitable operating noise of the devices.
The values for reduced operation have therefore been intentionally chosen in such a way that in this phase the dehumidifiers are only started when it cannot be avoided.

Default values:
Relative humidity (r.H.):
normal / reduced operation: 55 % r.H. / 80 % r.H.

The relative humidity indicates the extent to which the air is saturated with moisture. Too high humidity is perceived as unpleasant, and it can even lead to condensation on cool surfaces. Too low humidity can lead to skin irritation and breathing problems. Ideal is a humidity in the range of 40 % to 50 %. The setting value for the reduced operation is therefore the absolute upper limit, which should not be exceeded.

Dew point:
normal / reduced operation: 15 °C / 17 °C

The dew point indicates at which surface temperature condensation occurs on this surface (at the current relative humidity). In a radiant cooling system, the cooled surfaces have a temperature of about 17 °C to 23 °C, depending on type of installation and settings. In order to avoid condensation on these surfaces, again, the limit value for reduced operation is the absolute upper limit.

Changes should not be made without consulting the installer. Correct setting values of the dehumidifiers ensure safe operation of surface cooling and they also have a decisive influence on efficiency.
Inappropriate settings may lead to condensation on the cooled surfaces. In this case there is a risk of slipping, as well as damage to the surfaces or the entire components.

IT settings:
This is where the settings are made that allow the system to connect to the router via WLAN. The system must be connected to the Internet in order to use the NEA SMART 2.0 App. To connect automatically to a WiFi network, use the WPS function described in chapter 08.03.01 or use manual configuration.

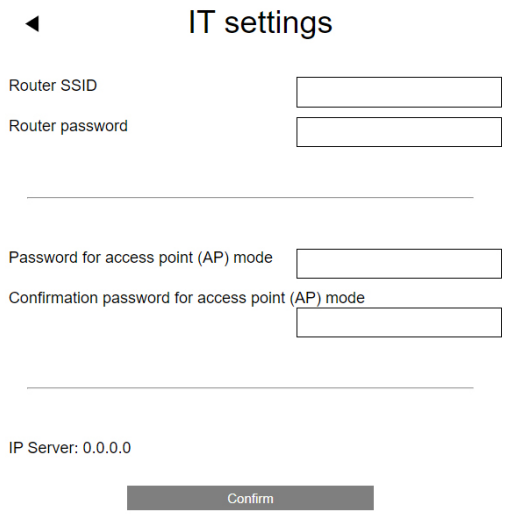


Fig. 08-9 Webpage: IT settings

Router SSID:
Insert here the WiFi network name of your router

Router password:
Password (WPA2 key) of your router

Password for access point (AP) mode
NEA SMART 2.0 base unit access point password

Confirmation password for access point (AP) mode
Confirmation of NEA SMART 2.0 base unit access point password

The factory default access point password is printed on the base label. In the event of an initial reset, the custom access point will be reset to the factory default access point password.

Insert CA hash:
In case that the certificate of the system is expired, the CA hash of the new certificate must be entered here. The certificate will only expires if the Base has not been online for several years.

Connect and Update NEA SMART 2.0 Base:
For NEA SMART 2.0 Base with firmware version below 5.00, use the guide at the following link:
https://migrationupgradeguide.neasmart2.aws.rehau.cloud/

Further information under
www.rehau.com/neasmart2

08.02.03 Installer area

The graph below shows the complete installer menu structure.

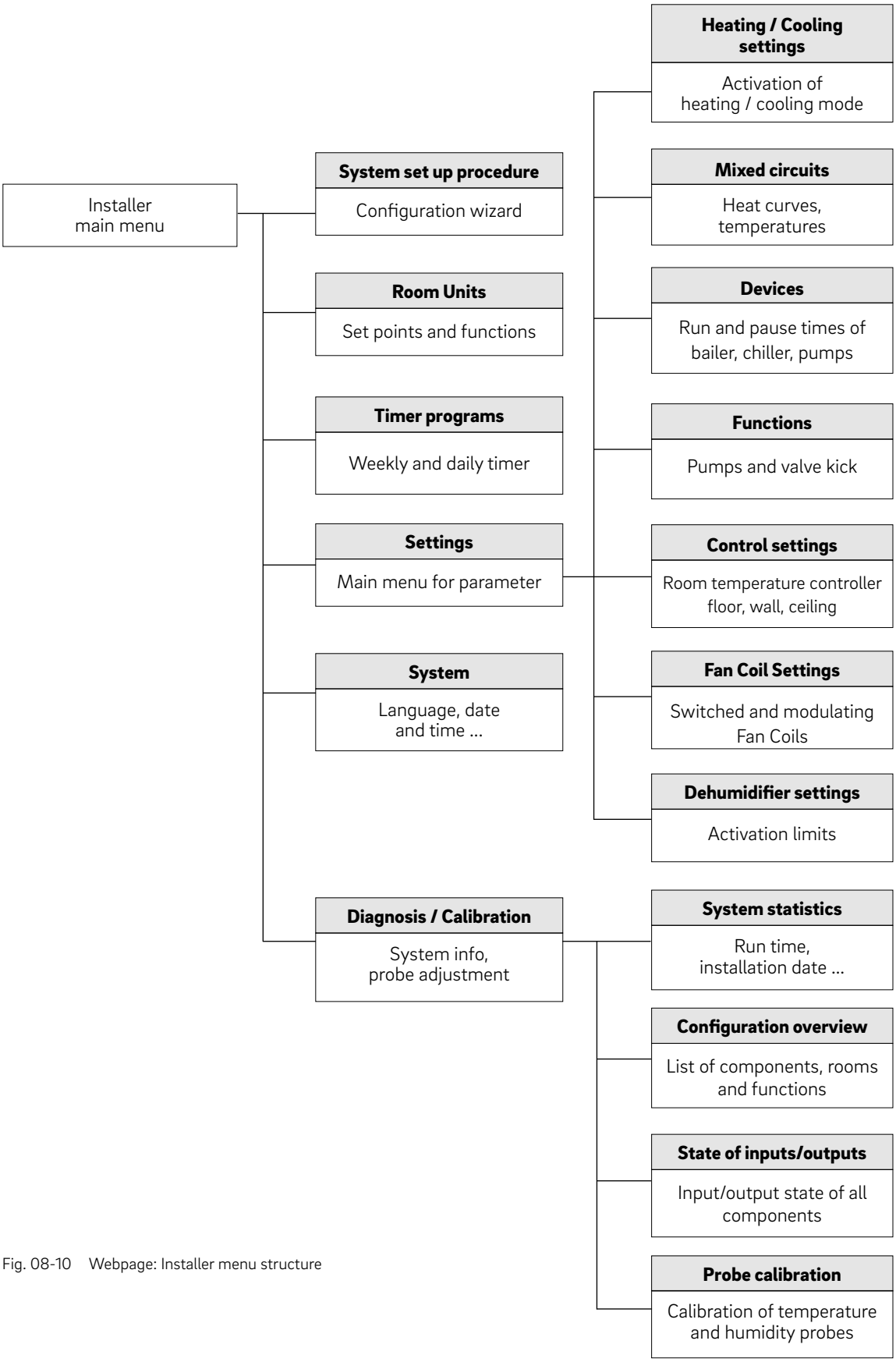


Fig. 08-10 Webpage: Installer menu structure

Access to installer main menu
The installer area may be entered from user menu:

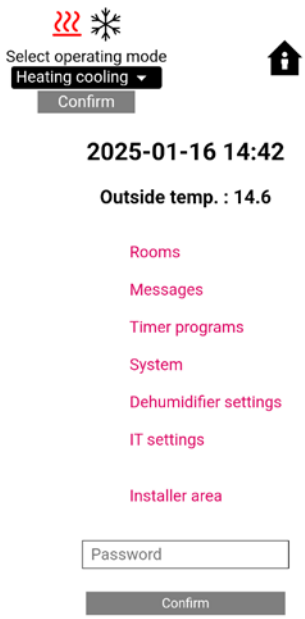


Fig. 08-11 Webpage: User menu

The password is the first 8 characters of the unique ID controller code. The unique ID code can be found:
- on the label that is at the bottom of the NEA SMART 2.0 Base, or
- on the webpage "System" under Unique code

Installer main menu:

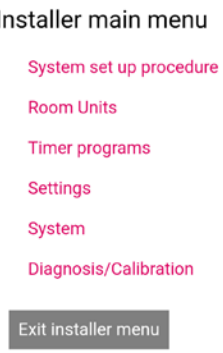


Fig. 08-12 Webpage: Installer main menu

The following pages show the installer menus as they exist in the example described in the installation sequence in chapter 7.
For detailed information about the displayed parameters see chapter 9.

In this chapter the following menu items are not described:
- "System set up procedure":
  This starts the wizard again
  This can be used to see the detailed configuration of the system also without changing anything.
  See chapter 7
- "Rooms"
  see chapter 07.06.02
- "Timer programs"
  see chapter 07.06.01

Settings

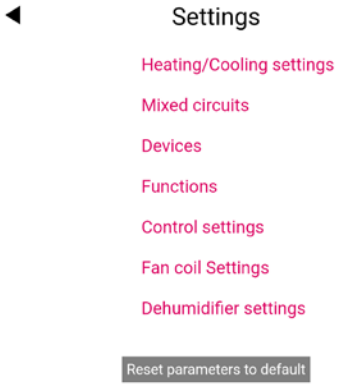


Fig. 08-13 Webpage: Settings

Heating / Cooling settings

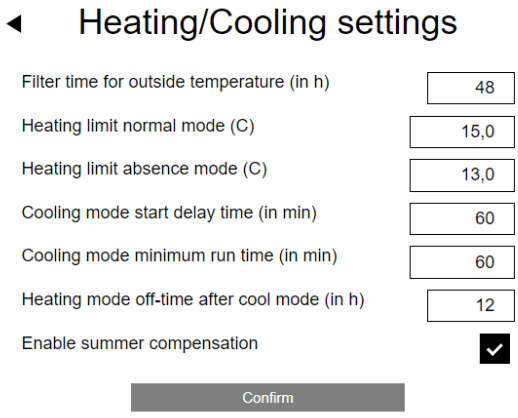


Fig. 08-14 Webpage: Heating / Cooling settings

Mixed circuits

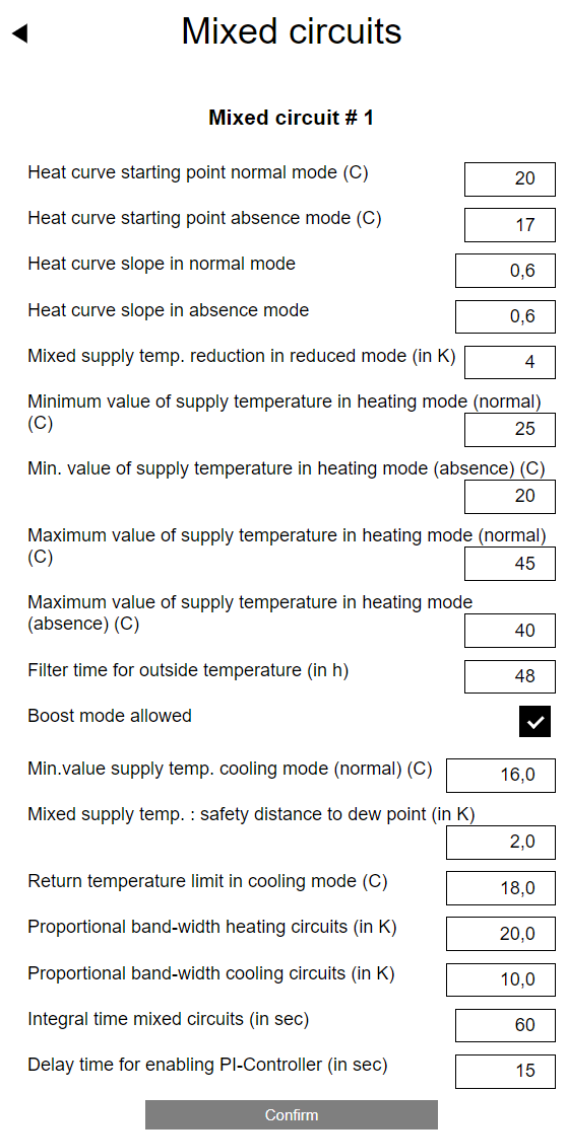


Fig. 08-15 Webpage: Mixed circuits settings

Devices

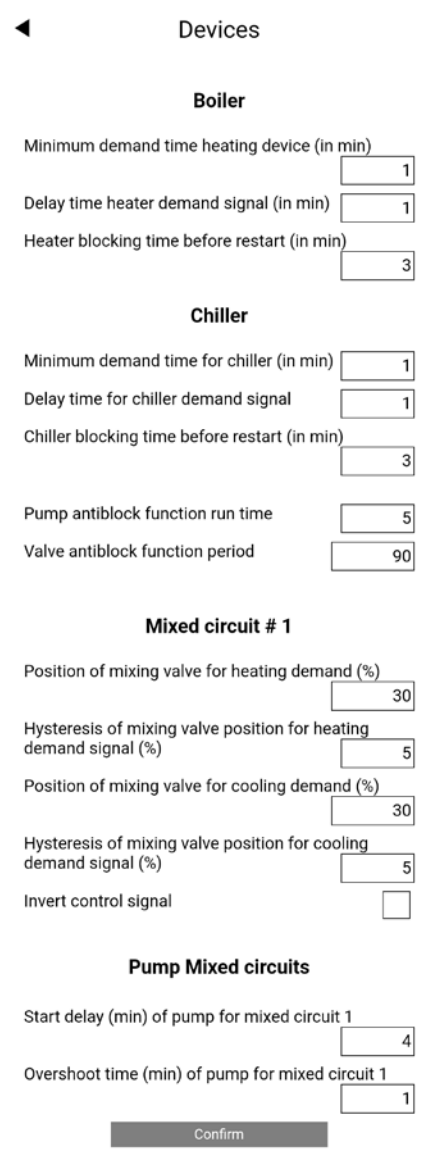


Fig. 08-16 Webpage: Devices settings

Functions

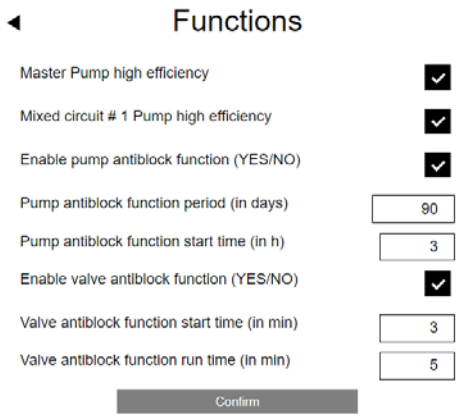


Fig. 08-17 Webpage: Functions settings

Control settings (here shown for floor only)

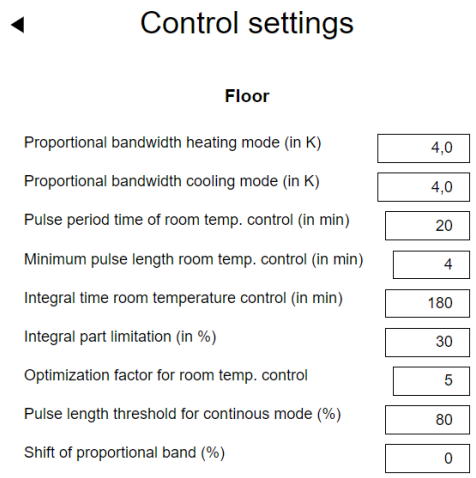


Fig. 08-18 Webpage: Control settings

Fan Coil settings

On this page the minimum and maximum runtimes of the switched Fan Coils can be defined.
Fan Coil system configuration gives an overview of all the Fan Coils in the system and the rooms to which they are assigned.
Fan Coil speeds are available if the system has modulating RAUCLIMATE SILENT BREEZE Fan Coils.
Each speed level can be adjusted if required.

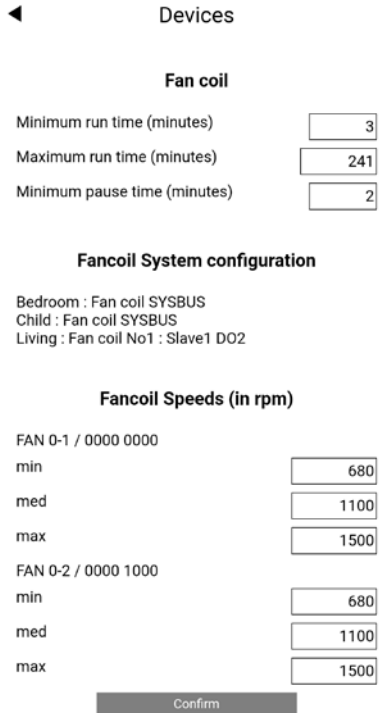


Fig. 08-19 Webpage: Fan Coil settings

How to configure Fan Coils, see “NEA SMART 2.0 Control System Commissioning instructions for switched Fan Coils and modulating RAUCLIMATE SILENT BREEZE Fan Coils“.
Print no. 954666

Dehumidifier settings

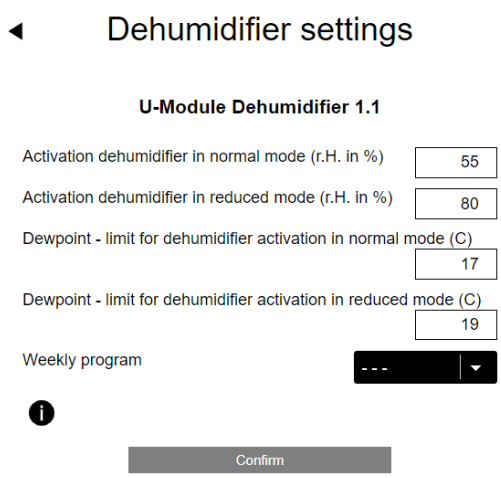


Fig. 08-20 Webpage: Dehumidifier settings

The naming of the dehumidifiers is:

U-Module	Dehumidifier	1	1
Device to which dehumidifier is connected		Adress of U-Module	1st or 2nd dehumidifier on U-Module

Please note:
The pre-defined settings for reduced mode were chosen so, that during this phase dehumidifiers should not run under normal conditions. The idea behind that is to avoid noise pollution during the night.

If noise is not a problem, the settings for reduced mode should be modified or the weekly program should be deactivated.

Diagnosis / Calibration

Fig. 08-21 Webpage: Diagnosis / Calibration

Configuration overview

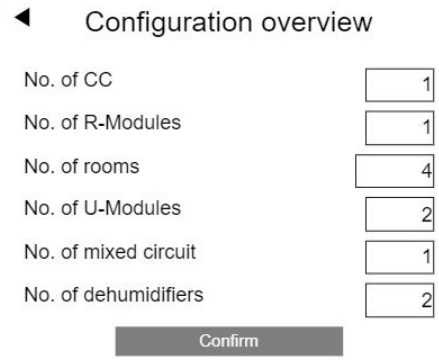


Fig. 08-22 Webpage: Configuration overview

State of inputs / outputs

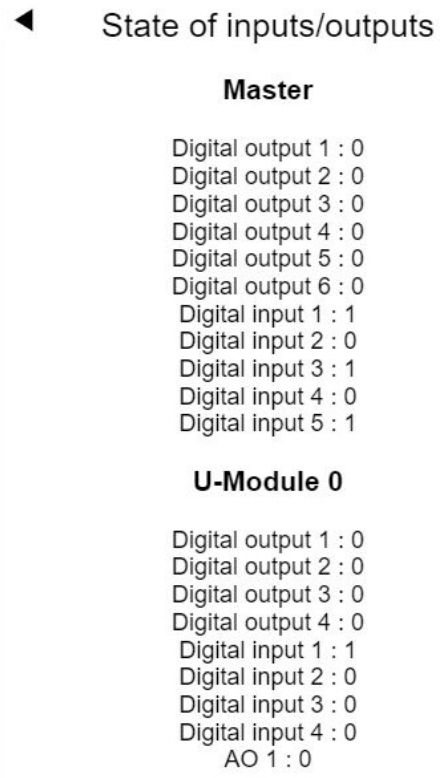


Fig. 08-23 Webpage: State of inputs / outputs

Probe calibration

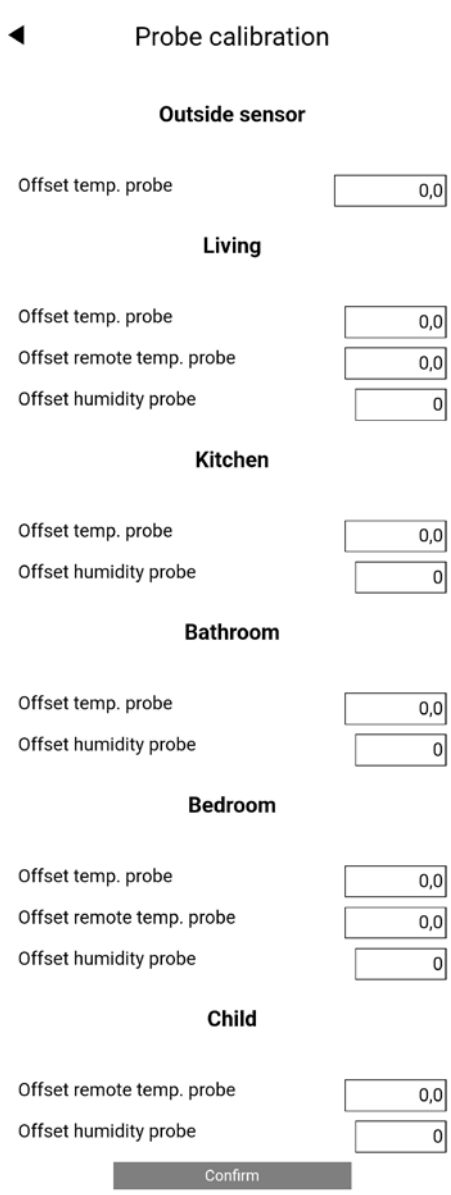


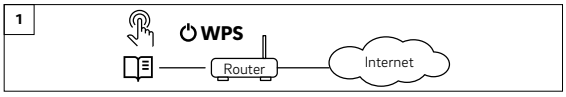
Fig. 08-24 Webpage: Probe calibration

08.03 Operating via NEA SMART 2.0 App

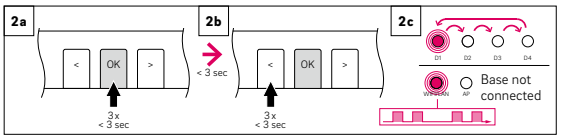
08.03.01 NEA SMART 2.0 internet cloud access

To access the installation via the NEA SMART 2.0 App, an Internet connection with cloud service must be established.
The WPS function is an easy way to establish a permanent WIFI connection between the router and the base unit.

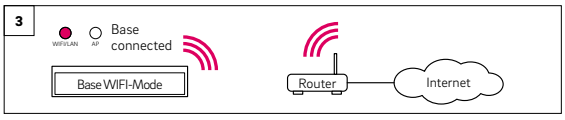
STEP 1: Activate WPS (Wi-Fi Protected Setup) function on your router.
Please refer to your router's manual to enable the WPS function.



STEP 2: Activate WPS function on your base unit.
Check proper LED status of base unit.



STEP 3: Check internet connection status of base unit



The WIFI Internet connection can be configured manually in the IT settings via the AP mode (see Chapter 07.05. Configuration - Wizard).

08.03.02 Installation of the App

The NEA SMART 2.0 App can be downloaded from the Apple App Store (iOS) or Google Play Store (Android).

DEMO Mode
The APP features a DEMO mode. This mode can be accessed by pushing the "DEMO MODUS" button at the bottom part of the start screen.

To leave DEMO mode, go to "More" and then to "Account Management" and push "Log Off".

08.03.03 Setting up the App

There are two steps necessary to set up the App once it has been downloaded:
1. Create User Account
2. Pair your NEA SMART 2.0 installation to the App

The necessary steps are shown in the figures below.

Please make sure that the NEA SMART 2.0 installation is connected to internet.

Step 1:
After opening the App, the start screen appears.
A personal account must be set up under the "Create account" menu item.

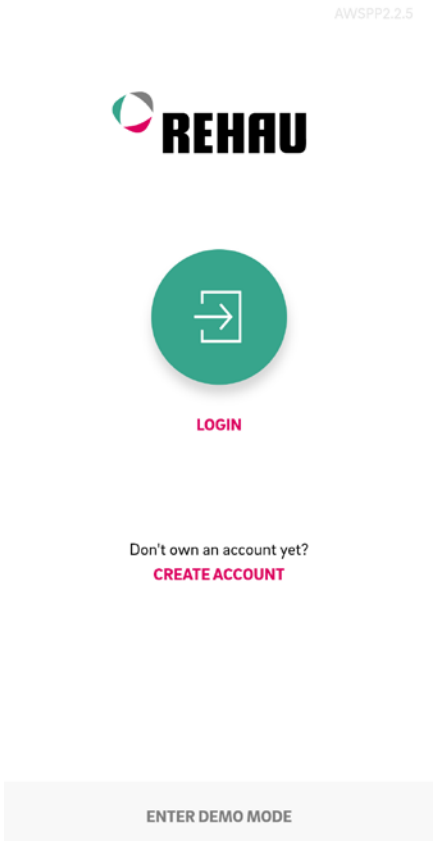


Fig. 08-25 App: Login page

Step 2:
You are required to enter your name, email address and specify a password. The password must be at least 10 characters long, contain at least one uppercase and one lowercase letter, a number and a special character.

Then confirm.

Once the "Sign up" field has been confirmed, an email is sent to the specified address, for verification. The "Terms and conditions" are confirmed by checking the box. You can read through the "Terms and conditions" by clicking the text highlighted in red.

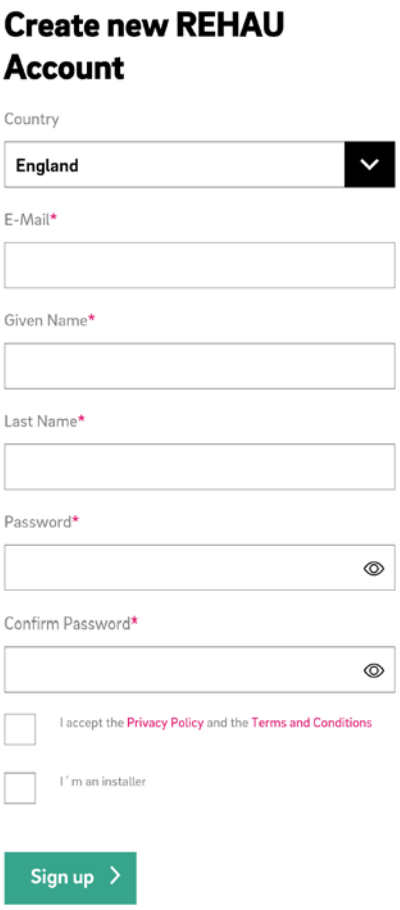


Fig. 08-26 App: Create Account

Step 3:
Upon successful completion of the registration, the base station must be registered with the App. There are two ways to do this:

1. Scanning the QR code that is printed on the base station.
2. Entering the identification number and confirming.

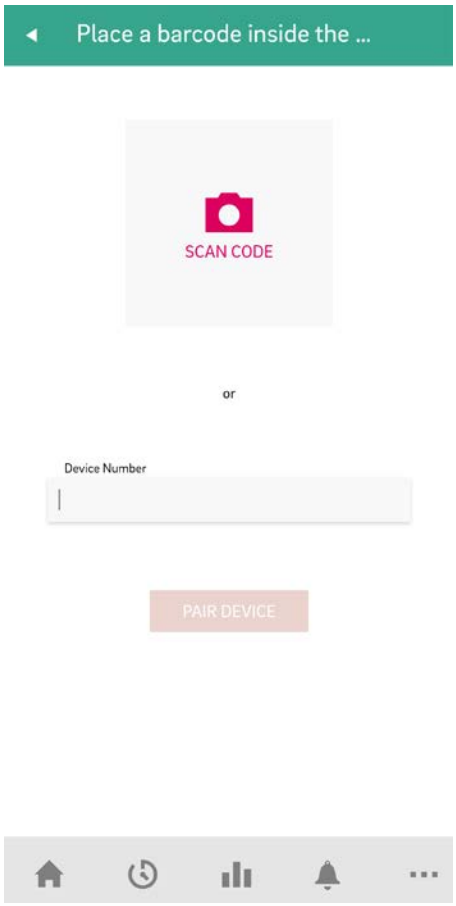


Fig. 08-27 App: Scan code on the base

If the request is unsuccessful, check the NEA SMART 2.0 Base's internet connection. In this case, you can access Pairing Support for troubleshooting.
https://pairingsupport.neasmart2.aws.rehau.cloud/

Step 4:
Upon successful request, the Pairing Tutorial screen will appear. It describes how to complete the pairing process.

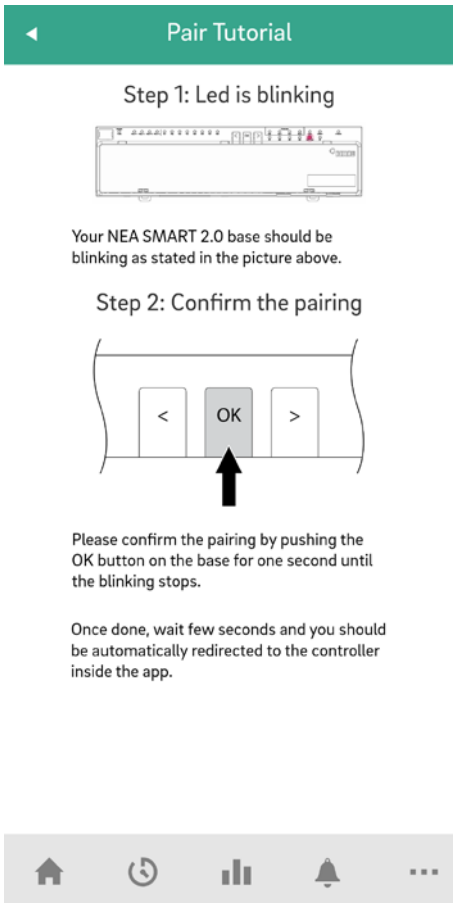


Fig. 08-28 Pairing Tutorial

Step 5:
Confirm by briefly pressing the OK button on the NEA SMART 2.0 Base. After successful pairing, the App will display the main dashboard with the room overview.

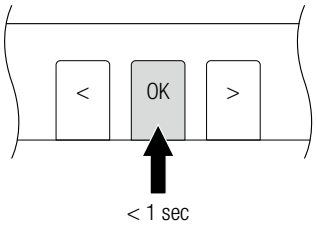


Fig. 08-29 App: Confirm

08.03.04 Getting to know the App

After successful pairing of the App with NEA SMART 2.0 installation, the App will show the start screen with all the rooms of you installation.

The main navigation bar at the bottom of the screen guides you through the four main areas of the App:
- Home
- Timing programs
- Statistics
- Messages
- More

Home:
The Home screen displays (from top to bottom)
- Name of the Installation
- Current outside temperature
- Information on current energy level, operating mode and WiFi connection
- Overview of all rooms
- Main navigation bar

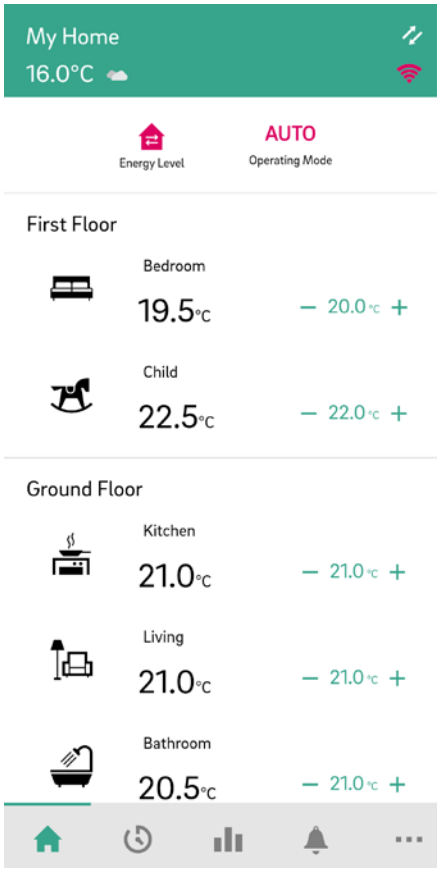


Fig. 08-30 App: Homescreen

Timing programs

The Timing program screen displays (from top to bottom)

- Daily/ weekly program, vacation/ party
- Main navigation bar

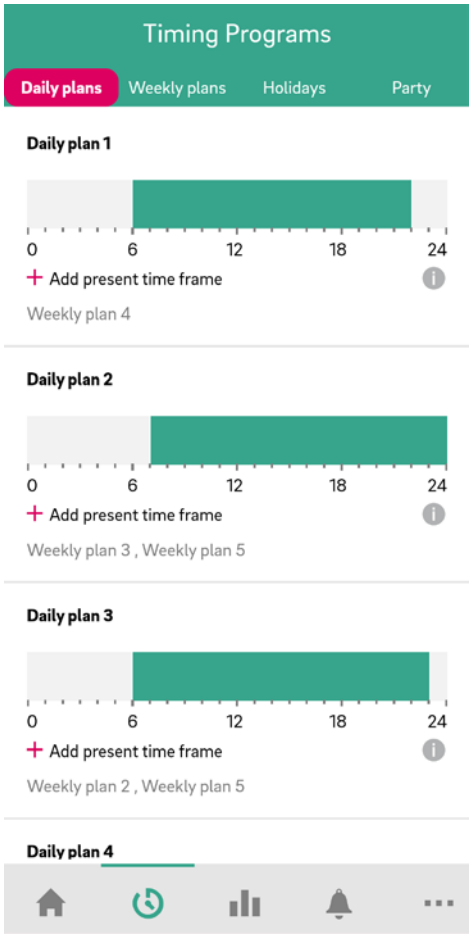


Fig. 08-31 App: Timing programs screen

Diagnostics

The Diagnostics screen displays (from top to bottom)

- Position of users (if activated)
- Different tiles to display statistics and information
- Main navigation bar

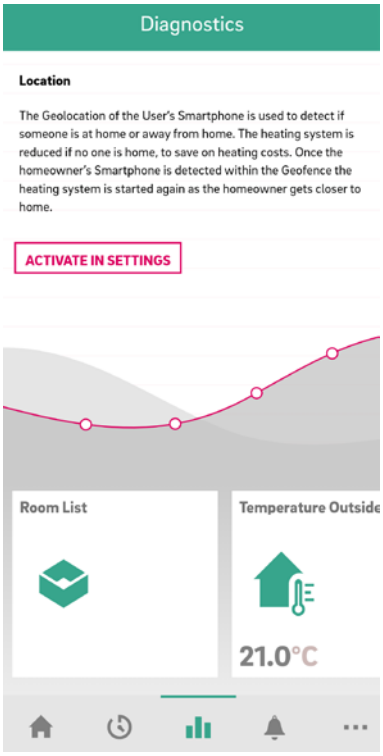


Fig. 08-32 App: Diagnostics screen

Messages

The Messages page shows alarms, warnings and general information about system events. The messages can be filtered, e.g. so that only new messages are displayed.

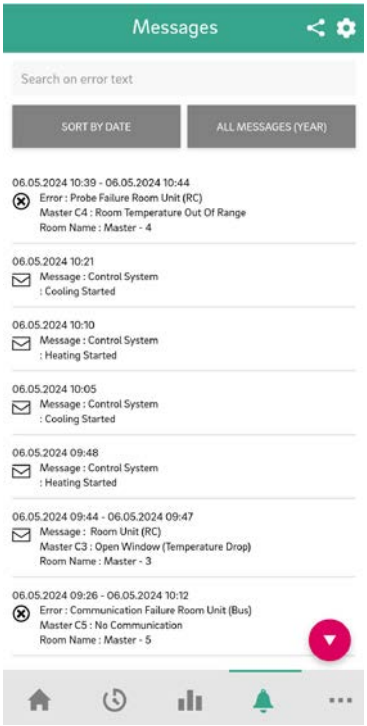


Fig. 08-33 App: Message screen

More

The More screen displays (from top to bottom):

- Account Management
- Settings
- Rooms/ Zones
- Pop up/Push Notification Management
- Legal
- Help
- Explore REHAU
- Icon to change between installations (only if more than one installation is linked to the account) App version
- Main navigation bar

Fig. 08-34 App: More screen

08.03.05 First steps in the App

Set location

In order to receive the weather data for the location where the installation is located, the location must be set. For this purpose, the installation for which the location is to be set must be selected under More → Account Management → Buildings / Apartments.

If the location function of the used smart device is activated, you can click on the magenta-colored box. Then the current location of the used device is entered. You can also enter the location manually in the predefined lines. At the end, the entry must be confirmed on the bottom of the page.

Personalize rooms

Each room can be personalized with an own name and an individual icon.

The rooms will be named Master-1, Master-2 and so on unless they have been given names already during the set up on the webpage of the NEA SMART 2.0 installation.

To change the name of the room, choose the room in the main screen. The main room screen will be displayed:

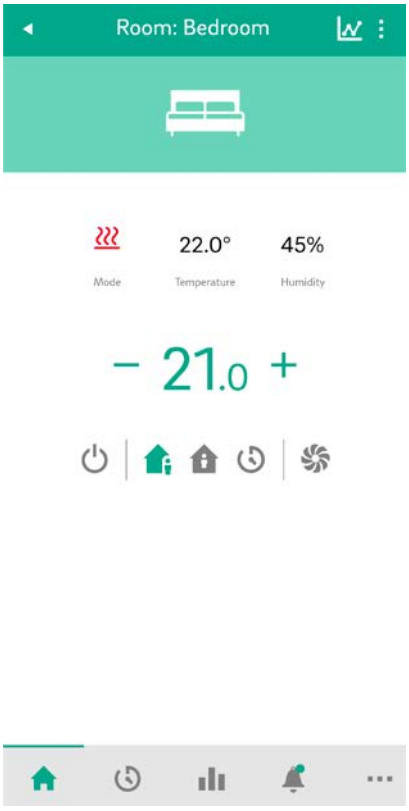


Fig. 08-35 App: Main room screen

Push the three dots on the upper right part of the screen and choose “Settings” and then “General” to get to the screen to change name and icon of the room.

Create zones and include rooms. In some cases, several rooms may be put into one zone, e.g. main floor and first floor. To do so, got to “More” in the main screen, then chose “Rooms/Zone”. New zones can be created after pushing the “Plus” icon. Rooms can be added to a zone once the new zone is created.

Choose Energy Level for rooms

Rooms can have the following energy levels:

- **Timed mode:** rooms will follow the timing programs assigned to this rooms and will switch automatically between normal and reduced mode
- **Normal mode:** rooms will follow the set point that has been set for normal mode (Present mode)
- **Reduced mode:** rooms will follow the set point that has been set for reduced mode (Absent Mode)
- **Standby mode:** Rooms will not follow any set point. Only frost protection is active and rooms will be heated, once their temperature drop below 5 °C
- **Holiday mode:** Rooms will follow the set point that has been given for vacation.
- **Party mode:** Room will follow the set point for normal mode for the time choosen for party mode.

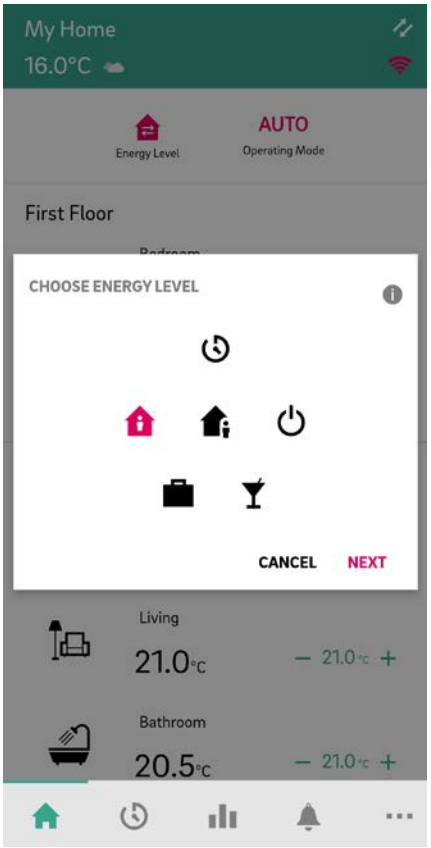


Fig. 08-36 App: Energy levels for rooms

The different levels can be assigned to the rooms either:

- In the main screen by pushing the Energy Level button
- Inside the main rooms screens

Choose set points for temperature in timed mode

For each room, there can be a set point defined for normal mode and reduced mode. To change these set points, choose the individual room in the start screen, push the three dots on the upper right part of the screen and choose “Settings” and then “Set points Room Temperature”. In this screen, the set points can be adjusted.

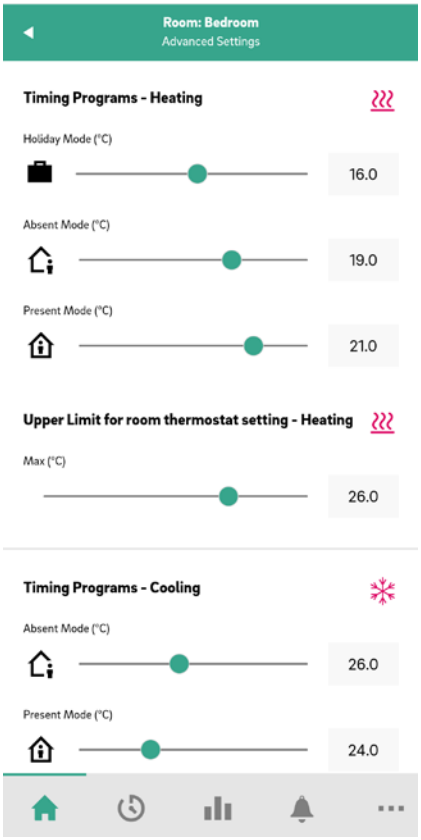


Fig. 08-37 App: Adjustment of set points

Define timing programs

NEA SMART 2.0 offers the option of creating five different weekly programs. These weekly programs can be combined from ten different daily programs. Each room can get assigned:

- One of the five weekly programs
- An even more customized timing program where every room has its individual day-by-day program.

To define the daily programs, go to “Timing programs” in the main menu bar. The daily plans are shown and can be adjusted. The option “Weekly Program” gives the possibility to combine the daily programs to a weekly program. The weekly program can be assigned to individual rooms when pushing the “+” button at the bottom of the “Weekly program” screens.

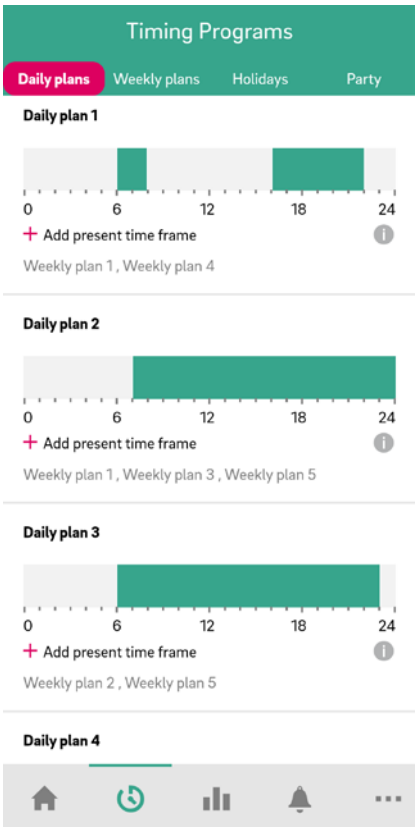


Fig. 08-38 App: Setting daily programs

Choose Operating Mode

The operating mode is valid for the complete NEA SMART 2.0 installation. There are five different choices:

- **Auto:** NEA SMART 2.0 changes automatically between heating, cooling or passive operating mode depending on outside conditions, rooms conditions and heating/cooling periods (if defined).
- **Heating:** NEA SMART 2.0 will heat only, depending on the room conditions, outside conditions and heating period (if defined).
- **Manual Heating:** NEA SMART 2.0 will heat depending on the room conditions, regardless of any heating period or outside condition.
- **Cooling:** NEA SMART 2.0 will cool only, depending on the room conditions, outside conditons and cooling period (if defined).
- **Manual Cooling:** NEA SMART 2.0 will cool depending on the room conditions, regardless of the cooling period and outside condition

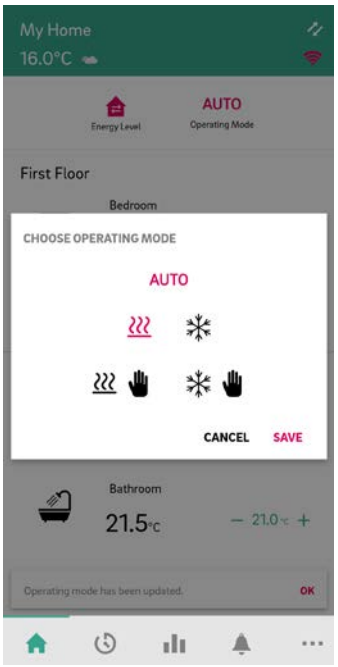


Fig. 08-39 App: Operating Modes

Auto Mode and Cooling/ Cooling Manual is only available if your NEA SMART 2.0 system is configured for cooling. The heating and cooling modes can also be enabled or disabled depending on the control signals applied to the system.

Automatic activation of heating/cooling mode

Heating mode activation depends on:

- applied heating limit in normal mode (HG1) and reduced-absent mode (HG2)
- filtered outside temperature - filter time outside temp. (FTO)
- hysteresis for heating limit (HG3)
- definition of the heating season
- room temperature in pilot rooms and pilot rooms influence factor (HG6)
- time since last active cooling mode (C03)
- state of configured heating/cooling digital inputs

The heating mode activation preconditions are:

- the filtered outside temperature is below the defined heating limit including hysteresis.
- the heating limit can be influenced by the pilot room temperature deviation between actual and set temperature. The greater the deviation, the higher is the heating limit and the earlier the heating mode is activated.
- system is in heating season or season is disabled
- the state of the heating/cooling digital inputs that allow the heating mode to be activated (see. Tab. 07-2.

Cooling mode activation depends on:
- value of current outside temperature (C07,C09)
- value of average (filtered) outside temperature (C08,C10)
- filtered outside temperature - filter time outside temp. (FTO)
- pilot room temperature gradient (C04, C05,C06)
- definition of the cooling season
- time since last active cooling mode, delay and run time (C01,C02,C03)
- state of configured heating/cooling digital inputs

The cooling mode activation preconditions are:
- the actual outside temperature is above the defined value of the current outside temperature or the filtered outside temperature is above the defined value of the average (filtered) outside temperature. The influence of the actual and average outside temperature can be adjusted with deviation factors. Pilot room influence with temperature deviation between actual and set temperature and temperature gradient.
- system is in cooling season or season is disabled
- the state of the heating/cooling digital inputs that allow the cooling mode to be activated (see. Tab. 07-2).

The system is in standby mode if the preconditions for heating or cooling mode are not met.

Selecting „Heat/Cool remote switching" function in the wizard overrides all preconditions, and the system immediately switches to the defined heating/cooling mode according to the status of the digital inputs.

Relevant parameters:
App:
Settings→Installer → Control Parameters → Heating → General Parameters

Settings →Installer → Control Parameters → Cooling → General Parameters

Settings →Installer → Control Parameters → Filter time outside temperature

08.03.06 Smart function Geofencing

The Geolocation function of the User's Smartphone is used to detect if someone is at home or away from home. To use the function, the position of the installation must be known. For this purpose, the installation for which the location is to be set must be selected under More → Account Management → Buildings / Apartments. If the location function of the used smart device is activated, the location button can be clicked. This can be found next to the address line. The current location of the used device is entered.

The heating system is reduced if no one is home, to save on heating costs. Once the homeowner's Smartphone is detected within the Geofence the heating system is started again as the homeowner gets closer to home.

Geofencing is a useful function if all home users have a smart phone and usually carry it with them when they leave home. It only works for rooms that are in timed mode. If the room is in timed mode "Normal" and no one is at home, the room will be switched to Reduced mode.

Geofencing should not be activated on tablets that stay at home.

08.03.07 Account Management

The first person, except an installer, that pairs the NEA SMART 2.0 installation to the App is the manager of the system. The manager can invite more people to access the installation via the App. To do so, go to More → Account Management → Buildings & Apartments. In the upper right part of the screen you can access the menu "Manage Users".

Above the line shown on the screen, all users are visible that belong to the family and have access to the installation. Below the line, installers with access to the installation are shown. The manager can invite new persons or delete them form the installation

08.03.08 Useful tips

Display weather data for the location of the installation
In order to display the weather data for the location of your installation, the location must be stored. To do this, go to the following page of your APP:

More → Account management → Buildings / Apartments → Installation xy

and select your installation.

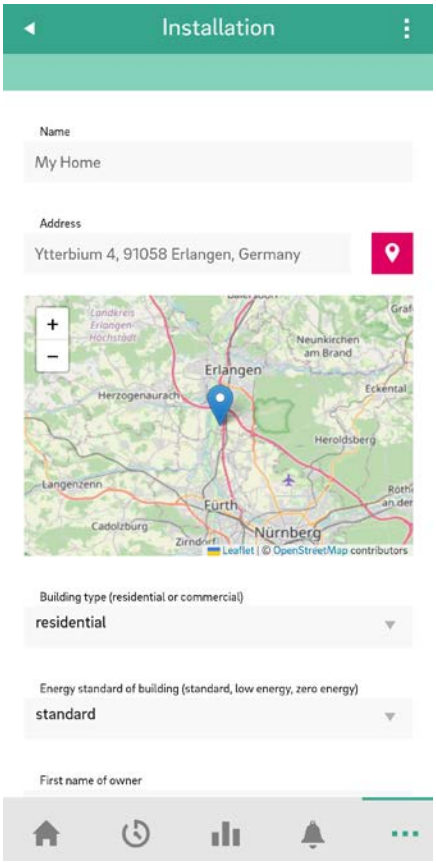


Fig. 08-40 App: Location of installation

Please press the magenta location button

to have your current location entered automatically. This ensures that the correct position is adopted. Then confirm the entries with Save at the end of the page.

Automatic update of the NEA SMART 2.0 Controller Software (OTA)

In order to have the latest version of the Controller Software on your NEA SMART 2.0 base, we recommend activating the button for automatic updates (OTA). By default new Installations will have this activated.

You can find this under:
More → Settings → General

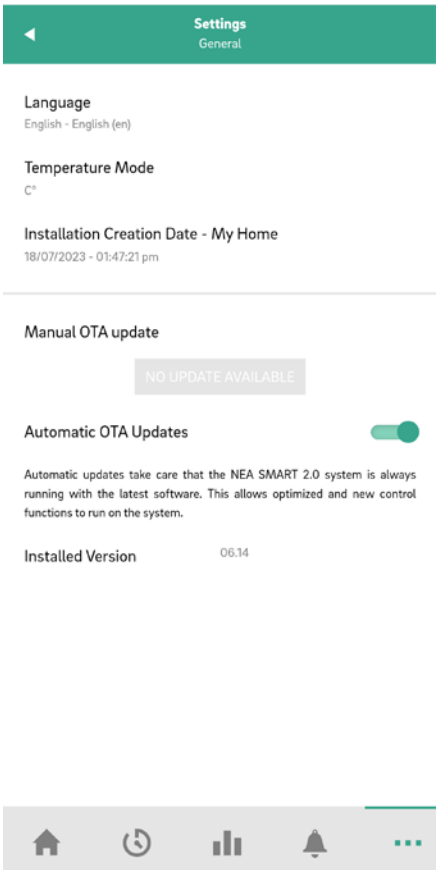


Fig. 08-41 App: Activating OTA

Manual update of the selected Installation in the NEA SMART 2.0 App

Pull the green bar from top to bottom on the home screen, the app will then update automatically the selected installation. An indication of successful completion see Fig. 08-43.

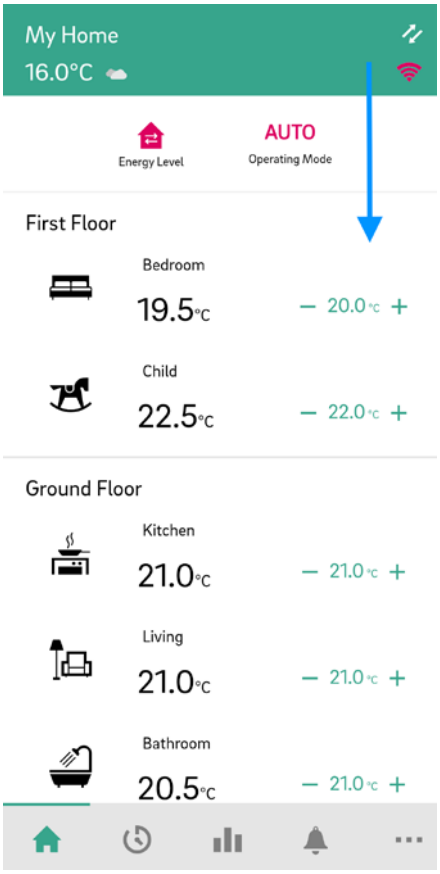


Fig. 08-42 App: Update – drag it down

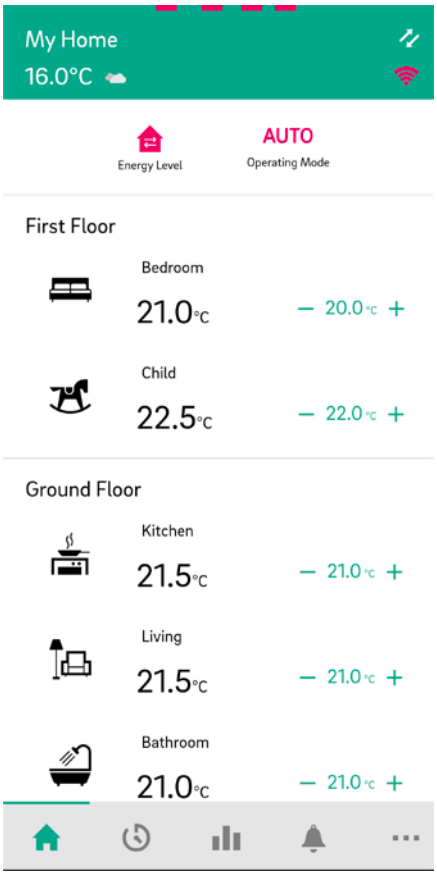


Fig. 08-43 App: Update – waiting for update

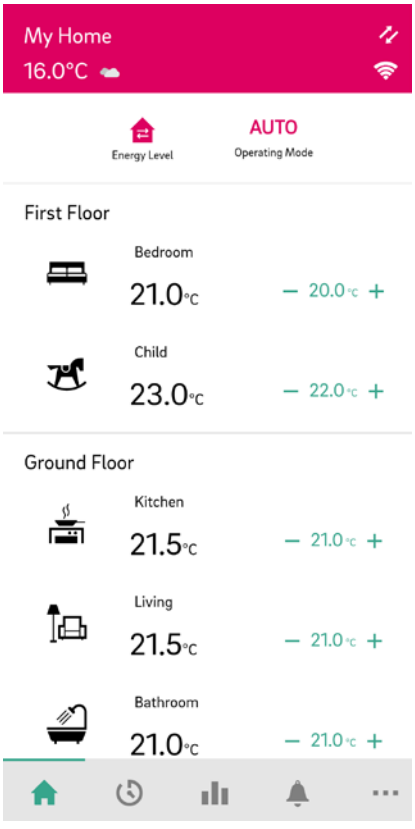


Fig. 08-44 App: Update – successfully completed

08.04 FAQ's and troubleshooting

08.04.01 Problems and potential causes

The room doesn't get warm enough:
- Setpoint is set too low
- Room is in reduced mode
- An open window has been detected, so the heating is temporarily stopped or in reduced mode
- The battery of the Room Unit is empty, so no data/ commands can be sent to the base
- In the BUS version, the power supply may be interrupted, there is no contact to the base
- The heating system is not in heating mode or switched off
- Other cause that can be fixed only by your installer

The room is too warm
- Setpoint is too high, therefore the system continues to heat up

The Room Unit does not react to key presses
- Battery is empty. Please replace the batteries
- Room Unit is defective, please contact your installer
- In the BUS version, the power supply may be interrupted, please contact your installer

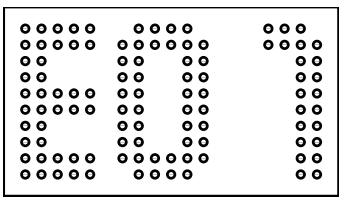
A radio wave is displayed on the controller
- The Room Unit has lost connection to the base. Please have your installer clarify the cause. The use of an additional antenna may be necessary.

A window icon appears on the display
- An open window or a rapid temperature drop was detected in the room. In order to save energy, the heating of the room is reduced.

Drops are displayed on the display
- The humidity in the room is very high. There is a risk that condensation will occur on cold surfaces. Please note: If this happens more often, there is a risk of mould.

E01 ... E99 is displayed on the Room Unit
- This is an error code, please check the error list and contact the installer if necessary...

08.04.02 Error-codes on NEA SMART 2.0 Room Units



The following error messages can be displayed on the display of the room controller.

Please contact your installer to solve the problem:

E 01 Room temperature sensor outside measuring range
E 02 Room temperature sensor defective (interruption)
E 03 Room temperature sensor defective (short circuit)
E 04 Humidity outside the measuring range
E 05 Humidity sensor defective (interruption)
E 06 Humidity sensor defective (short circuit)
E 07 Remote temperature sensor outside measuring range
E 08 Remote sensor defective (interruption), check cable
E 09 Short-circuit of remote sensor, check supply line
E 10 Connection error between base and R-/U-Module
E 50 RAUCLIMATE SILENT BREEZE Fan Coils: Communication error between base and Fan Coil
E 51 RAUCLIMATE SILENT BREEZE Fan Coils: Motor fault
E 52 RAUCLIMATE SILENT BREEZE Fan Coils: Fan Coil Stop – difference between air and T2 water temperature too large
E 53 RAUCLIMATE SILENT BREEZE Fan Coils: Sensor T2 water temperature defective (short-circuit / interruption)
E 54 RAUCLIMATE SILENT BREEZE Fan Coils: T2 Water temperature too cold for heating or too warm for cooling
E 56 RAUCLIMATE SILENT BREEZE Fan Coils: Fan Coil in fault mode
E 90 Communication error between Base and several R-Modules
E 99 Indication of a message that is displayed only on the NEA SMART App

08.04.03 Change batteries of Room Units and Probes

If you have opted for a radio-controlled system, you will see the battery status of the individual Room Units in the NEA SMART 2.0 App.

When the battery life comes to an end, you will be notified, and you should replace the batteries.

Please use two AAA 1.5 V Micro LR03 batteries.

The BUS Room Units in the NEA SMART 2.0 App battery status page will display a power plug instead of a battery symbol. There are no batteries to be changed.

If the “battery weak” message occurs, the batteries must be changed.

To do this, open the housing of the NEA SMART 2.0 Room Unit with a screwdriver (recommended width: 5 mm).

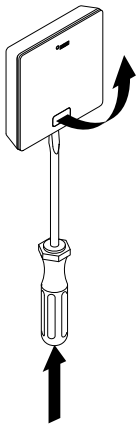


Fig. 08-45 Opening the NEA SMART 2.0 Room Unit

Remove the batteries from the holder and insert new batteries (type AAA). Observe polarity! See imprint on the board.

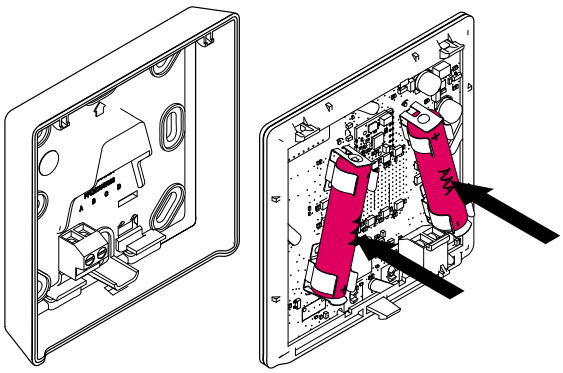


Fig. 08-46 NEA SMART 2.0 Room Unit battery change

Then close the front panel again.

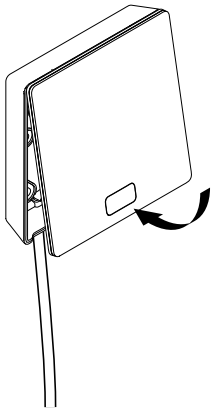


Fig. 08-47 NEA SMART 2.0 Room Unit: Close front panel

Depending on the installation place and the use of the Room Units a battery change of the radio-operated Room Units is necessary approximately every 2 years. The upcoming battery change is indicated by a symbol on the display of the Room Unit as well as an icon in the NEA SMART 2.0 App.

09 Parameter

This chapter describes all parameters that can be set. There are two ways to access the parameter:

1 - Installer area of the webpage
2 - NEA SMART 2.0 App

The webpage shows the most important parameters whereas the App gives access to all parameters.

However, only installers can access the parameters. Access to the parameters on the webpage is protected by a password. Access to the parameters inside the App is only given if the user is registered as an installer.

Please contact your local sales team for more information.

09.01 Heating General Parameters

 To find in App:
Home → More → Settings → Installer → Control Parameters → Heating → General Parameters

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
HG1	Heating Limit Normal Mode	When the timely filtered outside temperature undercuts this value, the heatmode starts. Applies to normal mode (not absence mode).	5	25	15	° C
HG2	Heating Limit Absence Mode	Like HG1, but in absence mode.	5	25	13	° C
HG3	Hysteresis Start/Stop	Value, by which the value of heating limit has to be undercut or exceeded to start or stop the heating mode.	0.1	5	0.5	K
HG4	Temperature Freeze Protection	Flow temperature for the freeze protection mode (building protection).	5	40	7	° C
HG5	Temperature Outside Limit Reduced	The reduced mode defined in the timing programs will not be executed when the outside temperature is below this value. By this a to slow heating up of the building is avoided.	–30	15	–10	° C
HG6	Pilot Room Influence Heating Limit Circuit	The average deviation of the pilot room affects, weighted with this parameter, the start/end of heating mode (shift of heating limit)	0	5	1	° C

Tab. 09-1 Parameters: Heating General Parameters

09.01.01 Heating Circuits

The parameters are used as
- Default values if a mixed circuit is specified during the configuration
- Reference values during supply of heating system (e.g. ceiling) via a heating circuit, which was parameterized for different system (e.g. floor)

Application:
Building is equipped with floor heating, only one or a few rooms have ceiling heating and are supplied by the same circuit)

The for each heating circuit (1-5) individual parameterisation of the flow temperature can be found in this parameter area.

During the start-up, a parameter set is created for each heating circuit in line with the utilisation of the heating circuit (floor, wall, ceiling, TABS).

The following additional parameters are specified individually for each circuit:

Legend for Base value:
0 : Floor
1 : Wall
2 : Ceiling

 To find in App:
Home → More → Settings → Installer → Control Parameters → Heating → Heating Circuits

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
MIXH01	Heat Curve Starting Point Normal Mode	The heat curve starts at this point, the value for the flow temperature is equal to the outside temperature here. Valid for normal mode (not absence mode).	10	40	0 : 20 1 : 20 2 : 20	° C
MIXH02	Heat Curve Starting Point Absence Mode	Like MIXH01, but for absence mode.	10	40	0 : 17 1 : 16 2 : 16	° C
MIXH03	Slope Normal Mode	Defines the slope of the heating curve. Valid for normal mode (not absence mode).	0	5	0 : 0.6 1 : 0.5 2 : 0.5	
MIXH04	Slope Absence Mode	Like MIXH03, but for absence mode.	0	5	0 : 0.5 1 : 0.4 2 : 0.4	
MIXH05	Minimum Value of Supply Temperature in Heating Normal Mode	Minimum value for flow temperature at start of heating mode, independent from heat curve function. Valid for normal mode (not absence mode).	15	50	0 : 25 1 : 25 2 : 25	°C
MIXH06	Minimum Value of Supply Temperature in Heating Absence Mode	Like MIXH05, but for absence mode.	15	50	0 : 20 1 : 20 2 : 20	° C
MIXH07	Maximum Value of Supply temperature in Heating Normal Mode	Maximum limit for flow temperature at very low outside temperatures, independent from heating curve function. Valid for normal mode (not absence mode).	20	70	0 : 45 1 : 40 2 : 40	° C
MIXH08	Maximum Value of Supply Temperature in Heating Absence Mode	Like MIXH07, but in absence mode.	20	70	0 : 40 1 : 35 2 : 35	° C
MIXH09	Filter Time Outside Temperature	For start and end of heating mode and for the calculation of flow temperature not the actual value of outside temperature, but the timely filtered value is used.	0	99	0 : 48 1 : 48 2 : 48	h

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
MIXH011	Flow Temperature Reduction in Absence Mode	In absence mode (economy mode) the flow temperature is reduced by this value.	0	10	0 : 4 1 : 4 2 : 4	°C
MIXH012	Room Temperature Compensation Factor	Influence of the deviation between set point and actual value of room temperatures on flow temperature.	0	5	0 : 1 1 : 1 2 : 1	
MIXH013	Boost Mode Allowed	The boost mode function is allowed. Should be individual for each circuit.	0	1	0 : 1 1 : 1 2 : 1	

Tab. 09-2 Parameters: Heating Circuits

09.01.02 Boost Mode

To find in App:
Home → More → Settings → Installer → Control Parameters → Heating → Boost Mode

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
BO01	Nominal slope reduction for return	The expected return temperature outside of the heating-up phase is a result of a re-calculation of the heating curve with a reduced slope. The percentual reduction of slope is set here.	10	70	40	%
BO02	Measure time for boost mode	The expected return temperature has to be undercut at least for this time span (see also BO03).	0	99	10	min
BO03	Hysteresis for boost mode	The expected return temperature has to be undercut at least for this value	0	4	1	K
BO04	Compensation factor for boost mode	The deviation to the expected return temperature multiplied with compensation factor gives the increase of the flow temperature (boost mode) for the time defined in BO05.	0	5	2	
BO05	Boost mode cycle time	Time period for the boost mode.	10	120	30	min
BO06	Boost mode pause time	Pause time after a cycle time in boost mode.	10	120	30	min

Tab. 09-3 Parameters: Boost Mode

The function “Boost mode” is released separately for each heating circuit.

09.02 Cooling General Parameters

 To find in App:
Home → More → Settings → Installer → Control Parameters → Cooling → General Parameters

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
C01	Cooling Mode Start Delay Time	Delay of start of cooling mode in minutes after cooling criterion is fulfilled.	0	1440	60	min
C02	Cooling Mode Minimum Run Time	Minimum run time of cooling mode after start in minutes.	0	1440	60	min
C03	Blocking Time Heating to Cooling Mode	Blocking time for heating mode, starting after end of cooling mode in hours.	0	96	12	h
C04	Calculated Gradient for Temperature in Pilot Room	Cooling criterion: Time period for the calculation of temperature increase (or reduction) in pilot room.	10	120	30	min
C05	Calculated Average Gradient for Temperature in Pilot Room	Cooling criterion: Period for the calculation of average of pilot room temperature.	10	120	30	min
C06	Factor Deviation Pilot Room Temperature	Cooling criterion: Weighting factor for the influence of pilot room temperature.	0	10	2,5	
C07	Basic Value Current Outside Temp.	Cooling criterion: Reference value for actual outside temperature (start cooling mode).	10	30	24	° C
C08	Basic Value Average Outside Temp.	Cooling criterion: Reference value for the timely filtered outside temperature (start cooling mode).	10	30	18	° C
C09	Factor Deviation Current Outside Temp.	Cooling criterion: Weighting factor for the influence of actual outside temperature.	0	10	1.5	
C10	Factor Deviation Average Outside Temp.	Cooling criterion: Weighting factor for the influence of the timely filtered outside temperature.	0	10	1.5	
C11	Pilot Room Factor for Gradient	Cooling criterion: Weighting factor for the influence of pilot room temperature.	0	10	3	
C13	Summer Compensation Outside Temp. Start	Starting point of outside temperature, at which the room temperature set point is increased up to the in C13 defined value (at outside temperature C15).	24	32	30	° C
C14	Summer Compensation Outside Temp. End	At this outside temperature the room temperature set point reaches the value defined in parameter C13. A further increase will not take place.	26	38	36	° C

Tab. 09-4 Parameters: Cooling General Parameters

09.02.01 Cooling Circuits

Legend for Base value:
0 : Floor
1 : Wall
2 : Ceiling

 To find in App:
Home → More → Settings → Installer → Control Parameters → Cooling → Cooling Circuits

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
CAn	Min. Cooling Temp. Supply Normal Mode	Minimum value of flow temperature in normal mode (not reduced mode).	8	25	0 : 16 1 : 16 2 : 16	° C
CBn	Dew Point Safety Distance	The flow temperature always has this safety distance to the worst (highest) value of the dew point temperature.	–5	10	0 : 2 1 : 2 2 : 2	K
CCn	Temp. Limit Cooling Mode Element	The temperatue of cooled elements must not be below this value in cooling mode.	15	25	0 : 20 1 : 20 2 : 20	° C
CDn	Temp. Limit Cooling Mode Return	The return temperatur must not be below this value in cooling mode.	10	25	0 : 18 1 : 18 2 : 18	°C
CEn	Flow Temp Cooling Increased Reduced Circuit	In reduced mode (energy safe mode) the flow temperature will be increased by this value.	0	10	0 : 1 1 : 1 2 : 1	K

Tab. 09-5 Parameters: Cooling Circuits

09.03 Mixing Circuit Control

To find in App:
Home → More → Settings → Installer → Control Parameters → Mixed Circuit Control

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
MIXG1	Mix. Circuit Heating Prop. Band	Proportional band of PI-Controller. Affects the strenght of the immediate reaction to temperature change. The wider the band, the weaker the reaction.	2	80	20	K
MIXG2	Mix. Circuit Cooling Prop. Band	Proportional band of PI-Controller. Affects the strenght of the immediate reaction to temperature change. The wider the band, the weaker the reaction.	2	80	10	K
MIXG3	Mix. Circuit Integral Time	Integral time in secs of controller in heating- and cooling mode. Affects the reaction to permanent deviation to the set point. The longer the time, the slower the reaction. 0 means OFF.	0	999	60	sec
MIXG4	Mix. Circuit Min. Control Signal	Minimum value of control signal for the actuator of mixing circuit.	0	100	0	%
MIXG5	Mix. Circuit Max. Control Signal	Maximum value of control signal for the actuator of mixing circuit.	0	100	100	%
MIXG6	Mix. Circuit Control Delay Time	Delay for enabling the PI-controller after activation of the heating circuit pump.	0	999	15	sec
MIXG7	Mix. Circuit Control Signal Inverted		0	1	0	
HFO	Offset Flow Temperature	Offset Flow Temperature in heating/cooling mode	0	5	0	K
HRO	Offset Return Temperature	Offset Return Temperature in heating/cooling mode	0	5	0	K

Tab. 09-6 Parameters: Mixing Circuit Control

09.04 Room Temperature Control

Legend for Base value:
0 : Floor
1 : Wall
2 : Ceiling

To find in App:
Home → More → Settings → Installer → Control Parameters → Room Temperature Control

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
RO1(n)	Prop. Band Width Heating Mode	Proportional band of room temperature control in heating mode. The proportional band affects the immediate reaction to temperature change. The bigger the band, the weaker the reaction.	0	10	0 : 4 1 : 2 2 : 2	K
RO2(n)	Prop. Band Width Cooling Mode	Proportional band of room temperature control in cooling mode. The proportional band affects the immediate reaction to temperature change. The bigger the band, the weaker the reaction.	0	10	0 : 4 1 : 2 2 : 2	K
RO3(n)	Pulse Period Room Temp. Control	Time period of the pulse width modulation signal used for room temperature control.	10	120	0 : 20 1 : 10 2 : 10	min
RO4(n)	Min. Pulse Length Room Temp. Control	Pulses below this value will be restrained.	0	30	0 : 4 1 : 3 2 : 3	min
RO5(n)	Integral Time Room Temperature Control	Integral time in minutes of controller in heating- and cooling mode. Affects the reaction to permanent deviation to the set point. The longer the time, the slower the reaction. 0 means OFF.	0	600	0 : 180 1 : 90 2 : 90	min
RO6(n)	Integral Part Limitation	Limitation of integral part in control signal in %.	0	100	0 : 30 1 : 30 2 : 30	%
RO7(n)	Optimization Room Temperature Control	Level of room temperature control optimization.	0	10	0 : 5 1 : 5 2 : 5	%
RO8(n)	Pulse Length Threshold for Continuous Signal	Pulses with a length above this limit (percentage of pulse width period) result in a permanent activation of drives (continuous signal).	50	100	0 : 80 1 : 80 2 : 80	%
RO9(n)	Prop. Band Shift Room Temp. Control	Defines the middle position of p-band. 0% means symmetrical to set point. Can be reduced to –25% or more in case of well adjusted flow temperatures and well insulated buildings.	-50	50	0 : 0 1 : 0 2 : 0	%

Tab. 09-7 Parameters: Room Temperature Control

09.05 Devices Control

09.05.01 Heating Unit

To find in App:
Home → More → Settings → Installer → Devices → Heating Unit

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
DH1	Heater Min. Demand Time	Minimum time the heating device gets started for in minutes.	0	20	1	min
HE2	Heater Mixed Valve Threshold	The opening of mixing valve of mixed circuit has to exceed this value before the heating device is demanded. See also HE3.	0	100	50	%
HE3	Heater Mixed Valve Hysteresis	Symmetric hysteresis layed around the value HE2 for start and stop of demand signal.	0	25	5	%
DH4	Heater Demand Signal Delay	Pause time before demand signal for heating device.	0	10	1	min
DH5	Heater Blocking Time	After end of operation of heating device the next demand signal will be soonest after this delay time.	0	15	3	min

Tab. 09-8 Parameters: Heating Unit

09.05.02 Cooling Unit

To find in App:
Home → More → Settings → Installer → Devices → Cooling Unit

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
DC1	Chiller Min. Demand Time	Minimum duration for the chiller demand signal.	0	20	1	min
DC2	Chiller Mixed Valve Threshold	The opening of mixing valve of mixed circuit has to exceed this value before the chiller is demanded. See also DC3.	0	100	50	%
DC3	Chiller Mixed Valve Hysteresis	Symmetric hysteresis layed around the value DC2 for start and stop of demand signal.	0	25	5	%
DC4	Chiller Demand Signal Delay	Pause time before demand signal for chiller.	0	10	1	min
DC5	Chiller Blocking Time	After end of operation of chiller the next demand signal will be soonest after this delay time.	0	15	3	min

Tab. 09-9 Parameters: Cooling Unit

09.06 Dehumidifiers

To find in App:
Home → More → Settings → Installer → Devices → Dehumidifiers

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
DeWePr(n)	Dehumidifiers Weekly Programs	Select weekly program for dehumidifier	0	5	0	
DE3	Hysteresis Relative Humidity	One-sided hysteresis around the switching threshold.	0	20	5	%
DE4(n)	Dewpoint-Limit for Activation of Dehumidifier in Normal Mode	When this dew point value is exceeded the assigned dehumidifier will be started.	10	25	15	°C
DE5	Hysteresis Dew Point	One-sided hysteresis around the switching threshold (switch off point is by this value below DE4).	0	2	0,5	K
DE6	Minimum Runtime Dehumidifier	Minimum demand time for dehumidifier.	0	20	10	min
DE7	Blocking Time Before Restart	After end of operation of dehumidifier the next demand signal will be soonest after this delay time.	0	20	10	min
DE8(n)	Dehumidifying Outside Cooling Mode Allowed	Dehumidification is also allowed outside of cooling period (Y/N).	0	1	0	
DE9	Maximum Runtime Dehumidifier	Maximum run time for dehumidifier.	30	999	240	min
DE10(n)	Dewpoint-Limit for Activation of Dehumidifier in Reduced Mode	When this dew point value is exceeded the assigned dehumidifier will be started outside the enable time of his timing program.	10	25	17	° C
DHAN(n)	Activation Dehumidifier in Normal Mode	When this value of relative humidity is exceeded, the dehumidifier is started during the enable time of his timing program.	30	90	55	%
DHRN(n)	Activation Dehumidifier in Reduced Mode	When this value of relative humidity is exceeded, the dehumidifier is started during the enable time of his timing program.	50	90	80	%

Tab. 09-10 Parameters: Dehumidifiers

09.07 Pumps

To find in App:
Home → More → Settings → Installer → Devices → Pumps

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
PU3(n)	Enable Pump Antiblock Function (YES/NO)	Enable pump antiblock function (YES/NO).	0	1	0	
PU4	Pump Antiblock Function Period	Pump antiblock function is activated after x days, when the pump has not been started.	1	200	90	d
PU5	Pump Antiblock Function Start Time	Pump antiblock function is started at this time (hours).	0	24	3	h
PU6	Pump Antiblock Function Run Time	Pump antiblock function is running for this time (minutes).	1	30	5	min
PU7(n)	Start Delay of Pump for Mixed Circuit	delay time for pump request, starting from the activation of the manifold valves.	0	15	4	min
PU8(n)	Overshoot Time of Pump for Mixed Circuit	Overrun time of pump, starting from the de-activation of the manifold valves.	0	15	1	min
PU9	Minimum Run Time of Pump (standard)	Minimum run time of pump in minutes (standard version).	0	15	1	min
PU10	Minimum Run Time of Pump (high efficiency)	Minimum run time of pump in minutes (high efficiency).	0	120	30	min
PU11	Minimum Pause Time of Pump (standard)	Minimum pause time of pump in minutes (standard).	0	15	1	min
PU12	Minimum Pause Time of Pump (high efficiency)	Minimum pause time of pump in minutes (high efficiency).	0	60	1	min

Tab. 09-11 Parameters: Pumps

09.08 Fan Coil - Switched

To find in App:
Home → More → Settings → Installer → Devices → Fan Coil - Switched

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
FCMT	Minimum Run Time for Fan Coil	Minimum time a Fan Coil has to run after start	0	20	3	min
FCKT	Maximum Run Time for Fan Coil	Maximum time a Fan Coil has to run after start	10	241	241	min
FCPT	Pause Time for Fan Coil	Time span for Fan Coil to pause before he may be restarted	0	24	2	min

Tab. 09-12 Parameters: Fan Coil - Switched

09.09 Valves

To find in App:
Home → More → Settings → Installer → Devices → Valves

Key	Text in parameter menu	Comment	Min	Max	Base value	Unit
VA1	Enable Valve Antiblock Function (YES/NO)	Enable valve antiblock function (YES/NO).	0	1	1	
VA2	Valve Antiblock Function Period	Valve antiblock function is activated after x days, when the valve has not been opened.	1	200	90	days
VA3	Valve Antiblock Function Start Time	Valve antiblock function is started at this time.	0	24	3	h
VA4	Valve Antiblock Function Run Time	Valve antiblock function is running for at this time (minutes).	1	30	5	min
VA5	Valve Run Time	Run time of the valves at the manifolds.	0	10	4	min
VA6	Switching Valve Run Time	Run time of the switching valves for heating / cooling.	0	10	4	min

Tab. 09-13 Parameters: Valves

09.10 Eu.bac - Energy-optimized settings

For energy-optimized operation of the NEA SMART 2.0 control system, the following parameter have been changed compared to the standard values:

Application underfloor heating (Water Floor Heating System):

R01(0)	Proportional band in heating mode (K):	3.5 K
R05(0)	Integral time room temperature control (min):	150 min
R04(0)	Minimum pulse length room temperature control (min):	2 min

Application chilled ceiling (Ceiling System Cooling):

R05(2)	Integral time room temperature control (min):	60 min
R04(2)	Minimum pulse length room temperature (min):	2 min
R09(2)	Shifting the proportional band (%):	–15 %

The CA values specified for the NEA SMART 2.0 control system (for underfloor heating application CA = 0.3 K, chilled ceiling application CA = 0.6 K) refer to these values.

Find inside the webpages:
Installer → Settings → Control parameter → Floor or → Ceiling

Find inside the App:
More → Settings → Installer → Control Parameter → Room temperature control

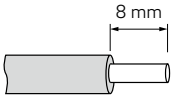
Application	for	CA value in K	License number
WATER FLOOR HEATING SYSTEM	NEA SMART 2.0 Base 230 V	0.3	220956
CEILING SYSTEM COOLING	NEA SMART 2.0 Base 230 V	0.6	220956
WATER FLOOR HEATING SYSTEM	NEA SMART 2.0 Base 24 V	0.3	20957
CEILING SYSTEM COOLING	NEA SMART 2.0 Base 24 V	0.6	20957

Tab. 09-14 License number Eu.bac

10 Data

10.01 Electrical termination

Solid cable	0.5 – 1.5 mm²
Multiple stranded cable	1.0 – 1.5 mm²



10.02 Factory settings

Some of the In- and Outputs of the NEA SMART 2.0 system are already predefined.

The definition of those In- and Outputs can be changed on the integrated Webpages of the system.

10.02.01 Base

Digital Outputs

Connection	Signal type	Pre-defined allocation	Possible allocation
RELAY 1	Switch	Pump Local	Pump local Pump global Boiler Chiller Dehumidifier valve Dehumidifier compressor Heating Cooling (CO) Fan Coil Fan Coil pump Fan Coil local pump Weekly program
RELAY 2	Switch	Boiler	
RELAY 3	Switch	Chiller	
RELAY 4	Switch	-	
RZ1-8	Switch	Valves room 1-8	
Digital Inputs			
DI 1	-	-	Absence Open Window Heating Cooling (CO) Reduced local Reduced global Dew point
DI 2	-	-	
DI 3	-	-	
DI 4	-	-	

Tab. 10-1 Factory Settings and possible allocations Base

10.02.02 R-Module

Digital Outputs

Connection	Signal type	Pre-defined allocation	Possible allocation
RELAY 1	Switch	-	Pump local Pump global Boiler Chiller Dehumidifier valve Dehumidifier compressor Heating Cooling (CO) Fan Coil Fan Coil pump Fan Coil local pump Weekly program
RELAY 2	Switch	-	
RZ9-12	Switch	Valves room 9-12	
Digital Inputs			
DI 1	-	-	Absence Open Window Heating Cooling (CO) Reduced local Reduced global Dew point

Tab. 10-2 Factory Settings and possible allocations R-Module

10.02.03 U-Module (Defined as Mixed circuit)

Digital Outputs

Connection	Signal type	Pre-defined allocation	Possible allocation
RELAY 1	Switch	Pump mixed circuit	-
RELAY 2	Switch	-	
RELAY 3	Switch	-	
RELAY 4	Switch	-	
Digital Inputs			
DI 1	-	Dew point sensor	-
DI 2	-	Requirement mixed circuit	
Analogue Inputs			
AI 1	NTC	Supply temperature	-
AI 2	NTC	Return temperature	
AI 3	NTC	Outdoor temperature	
AI 4	NTC	-	
Analogue Outputs			
0/10 V	0-10 V	Regulation signal mixing valve	

Tab. 10-3 Factory Settings U-Module when defined as Mixed Circuit

10.02.04 U-Module (Defined for Dehumidifier)

Connection	Signal type	Pre-defined allocation	Possible allocation
Digital Outputs			
RELAY 1	Switch	Dehumidifier 1 valve	-
RELAY 2	Switch	Dehumidifier 1 compressor	
RELAY 3	Switch	Dehumidifier 2 valve	
RELAY 4	Switch	Dehumidifier 2 compressor	
Digital Inputs			
DI 1	-	-	-
DI 2	-	-	
DI 3	-	-	
DI 4	-	-	
Analogue Inputs			
AI 1	NTC	-	-
AI 2	NTC	-	
AI 3	NTC	-	
AI 4	NTC	-	
Analogue Outputs			
0/10 V	0-10 V	-	

Tab. 10-4 Factory Settings U-Module when defined for dehumidifier

10.02.05 U-Module (defined for Fan Coil)

Connection	Signal type	Pre-defined allocation	Possible allocation
Digital Outputs			
RELAY 1	Closer relay	Fan Coil 1	-
RELAY 2	Closer relay	Fan Coil 2	
RELAY 3	Closer relay	Fan Coil 3	
RELAY 4	Closer relay	Fan Coil 4	
Digital Inputs			
DI 1	-	-	-
DI 2	-	-	
DI 3	-	-	
DI 4	-	-	
Analogue Inputs			
AI 1	NTC	-	-
AI 2	NTC	-	
AI 3	NTC	-	
AI 4	NTC	-	
Analogue Outputs			
0/10 V	0-10 V	-	

Tab. 10-5 Factory setting U-Module, defined for Fan Coil

10.02.06 U-Module (defined for dehumidifiers and Fan Coil)

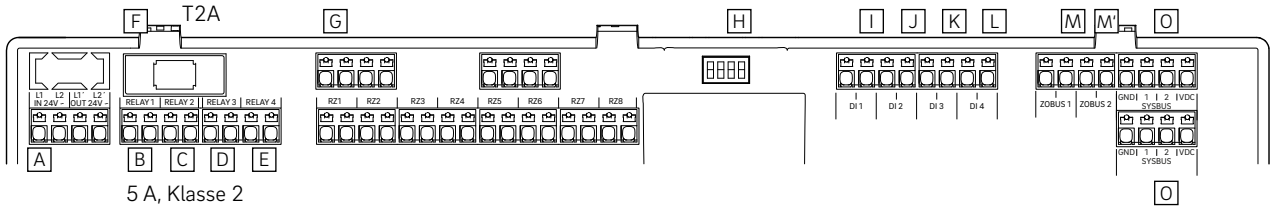
Digital Outputs

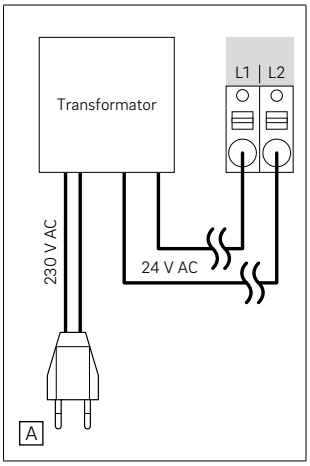
Connection	Signal type	Pre-defined allocation	Possible allocation
RELAY 1	Closer relay	Fan Coil 1	-
RELAY 2	Closer relay	Dehumidifier 1 compressor	
RELAY 3	Closer relay	Fan Coil 2	
RELAY 4	Closer relay	Dehumidifier 2 compressor	
Digital Inputs			
DI 1	-	-	-
DI 2	-	-	
DI 3	-	-	
DI 4	-	-	
Analogue Inputs			
AI 1	NTC	-	-
AI 2	NTC	-	
AI 3	NTC	-	
AI 4	NTC	-	
Analogue Outputs			
0/10 V	0-10 V	-	

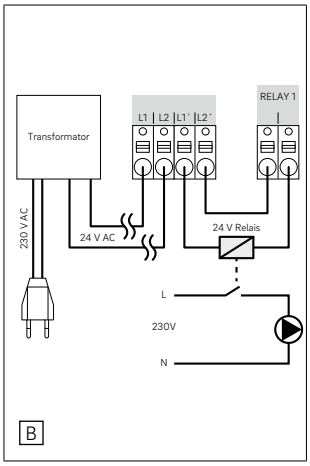
Tab. 10-6 Factory setting U-Module, defined for Fan Coil and dehumidifier

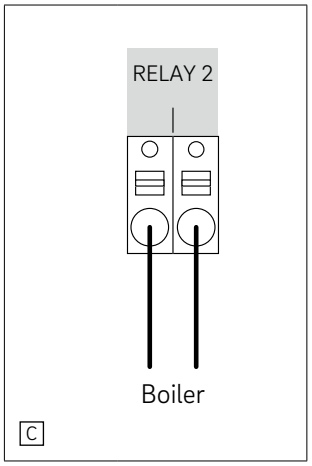
10.03 Allocation of the clamps

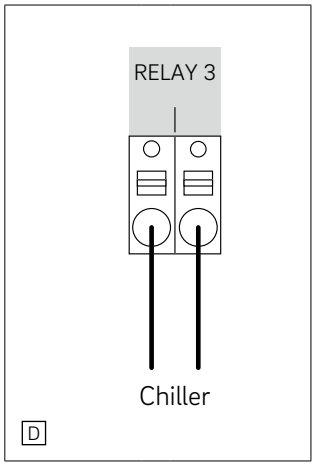
10.03.01 NEA SMART 2.0 Base 24 V

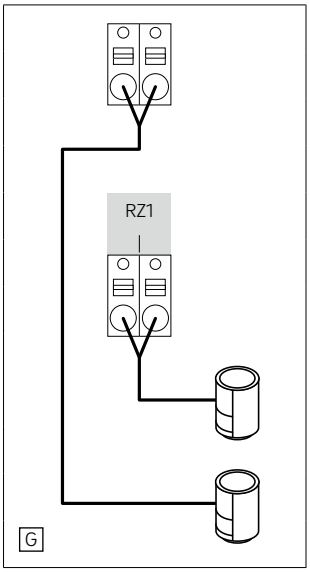


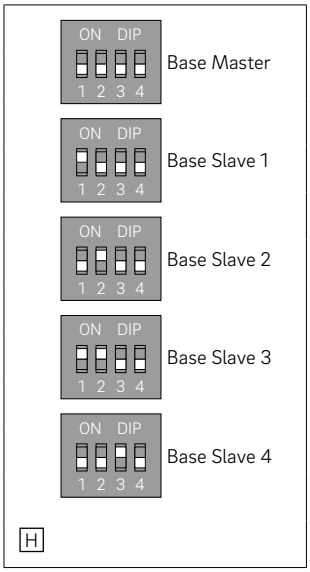




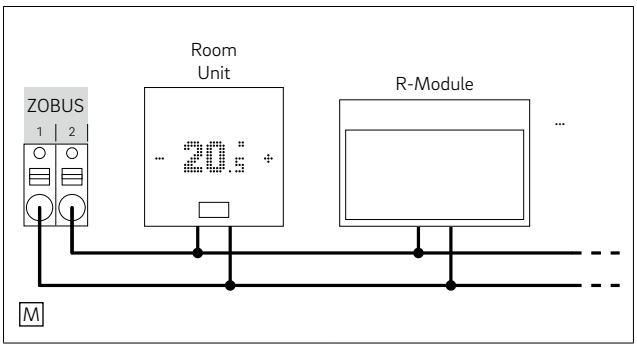








A Power supply
B Relay 1 – pump
C Relay 2 – boiler
D Relay 3 – chiller
E Relays 4
F Fuse T2 A
G Room zone 1 – 8
H DIP switch for SYSBUS address
I – L Digital input 1 – 4
M / M' Zone Bus for R-Modules and Room Unit
O / O' System Bus for U-Module and additional Bases (slaves)
E, J – L Freely configurable



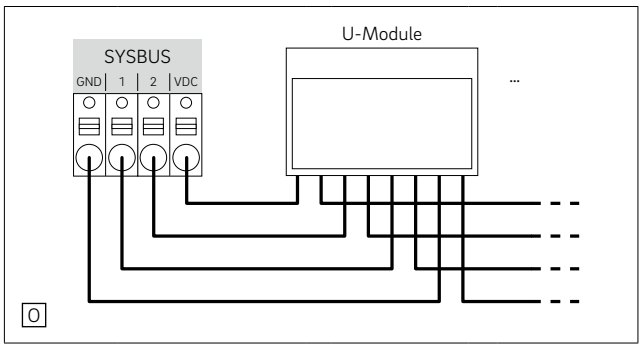
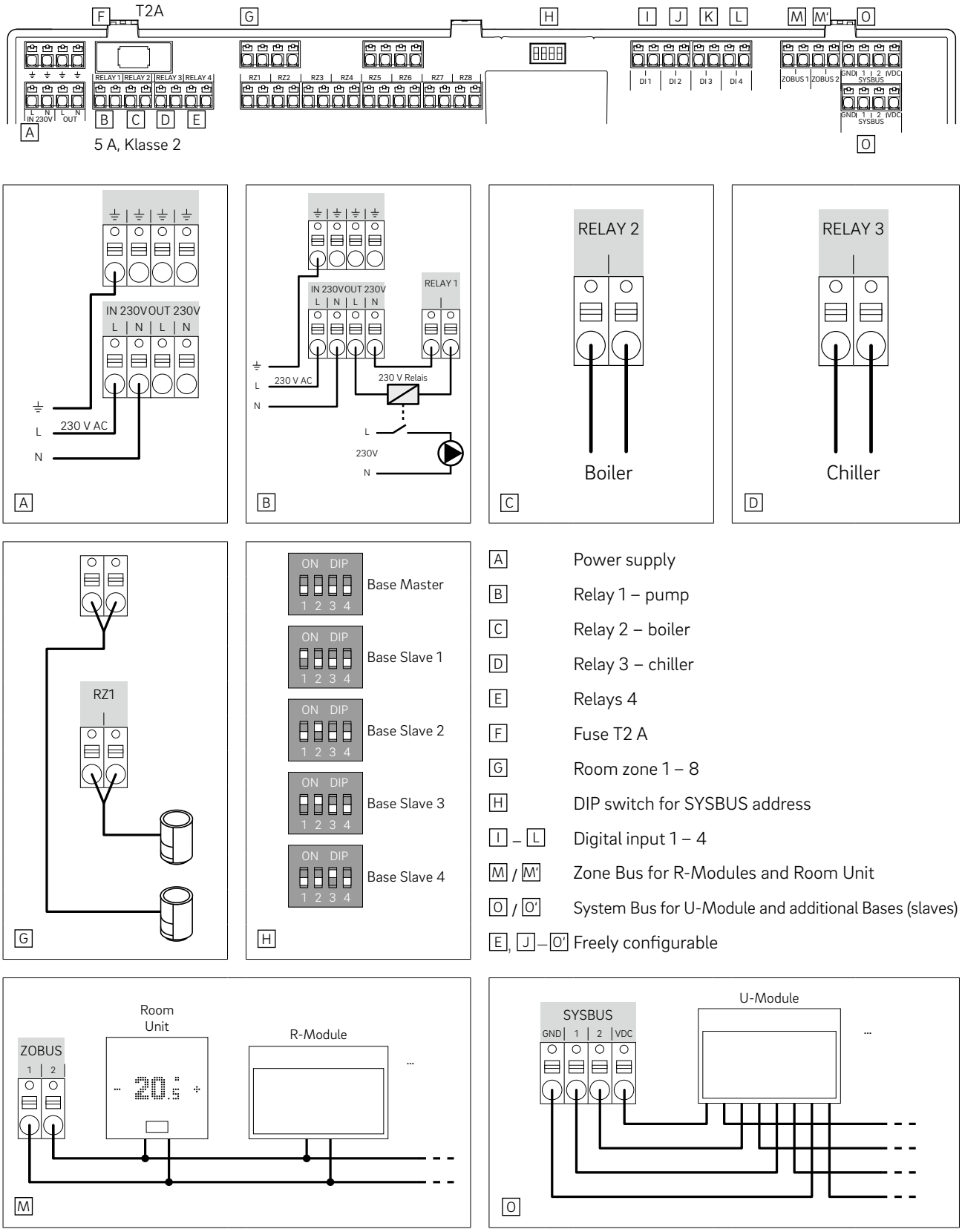


Fig. 10-1 Allocation of the clamps – NEA SMART 2.0 Base 24 V

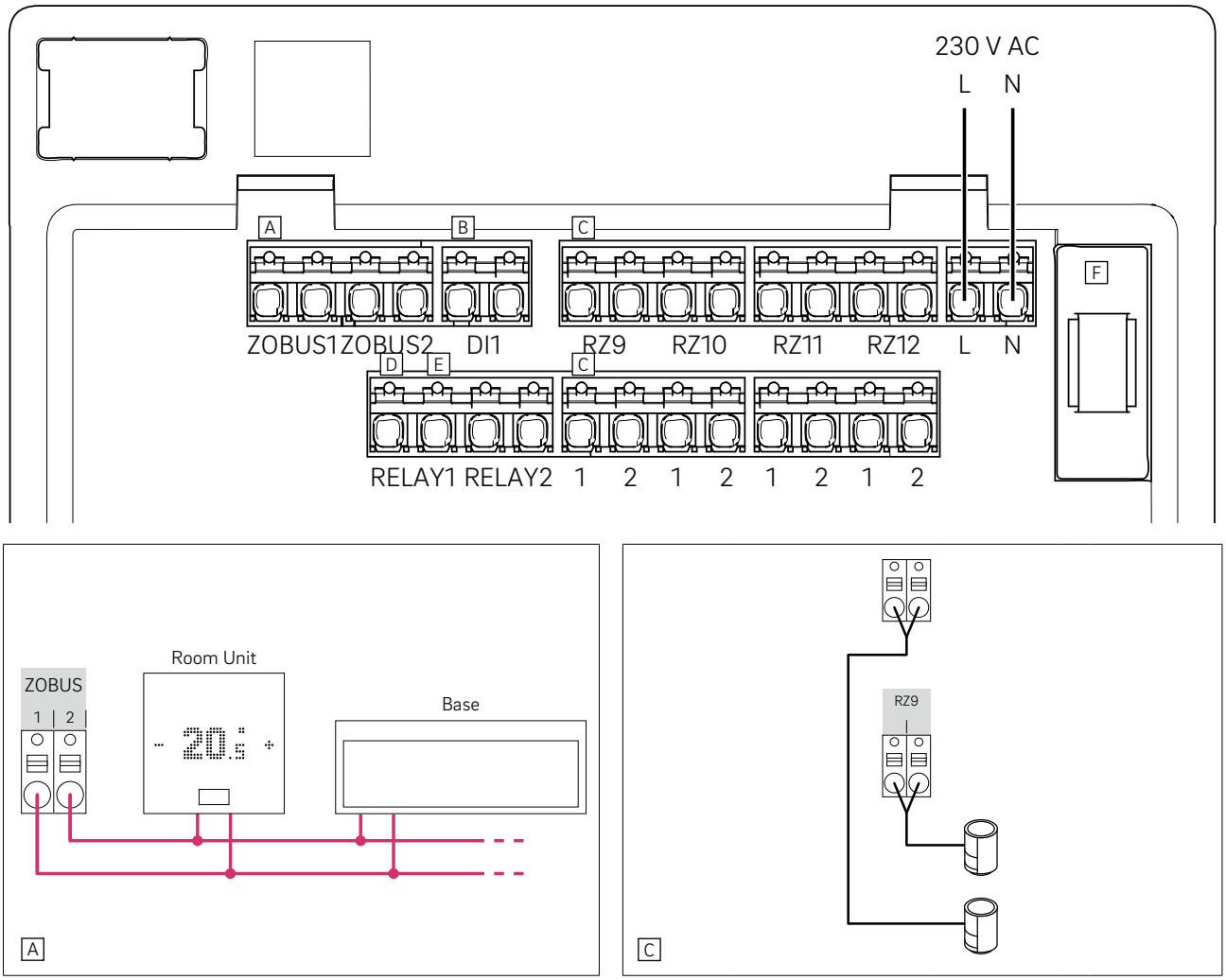
10.03.02 NEA SMART 2.0 Base 230 V



A	Power supply
B	Relay 1 – pump
C	Relay 2 – boiler
D	Relay 3 – chiller
E	Relays 4
F	Fuse T2 A
G	Room zone 1 – 8
H	DIP switch for SYSBUS address
I – L	Digital input 1 – 4
M / M'	Zone Bus for R-Modules and Room Unit
O / O'	System Bus for U-Module and additional Bases (slaves)
E, J – O'	Freely configurable

Fig. 10-2 Allocation of the clamps – NEA SMART 2.0 Base 230 V

10.03.03 NEA SMART 2.0 R-Module 230 V



A Zone Bus

B Digital Input 1

C Zone 9 – 12

D Relay 1, 5 A, Class 2

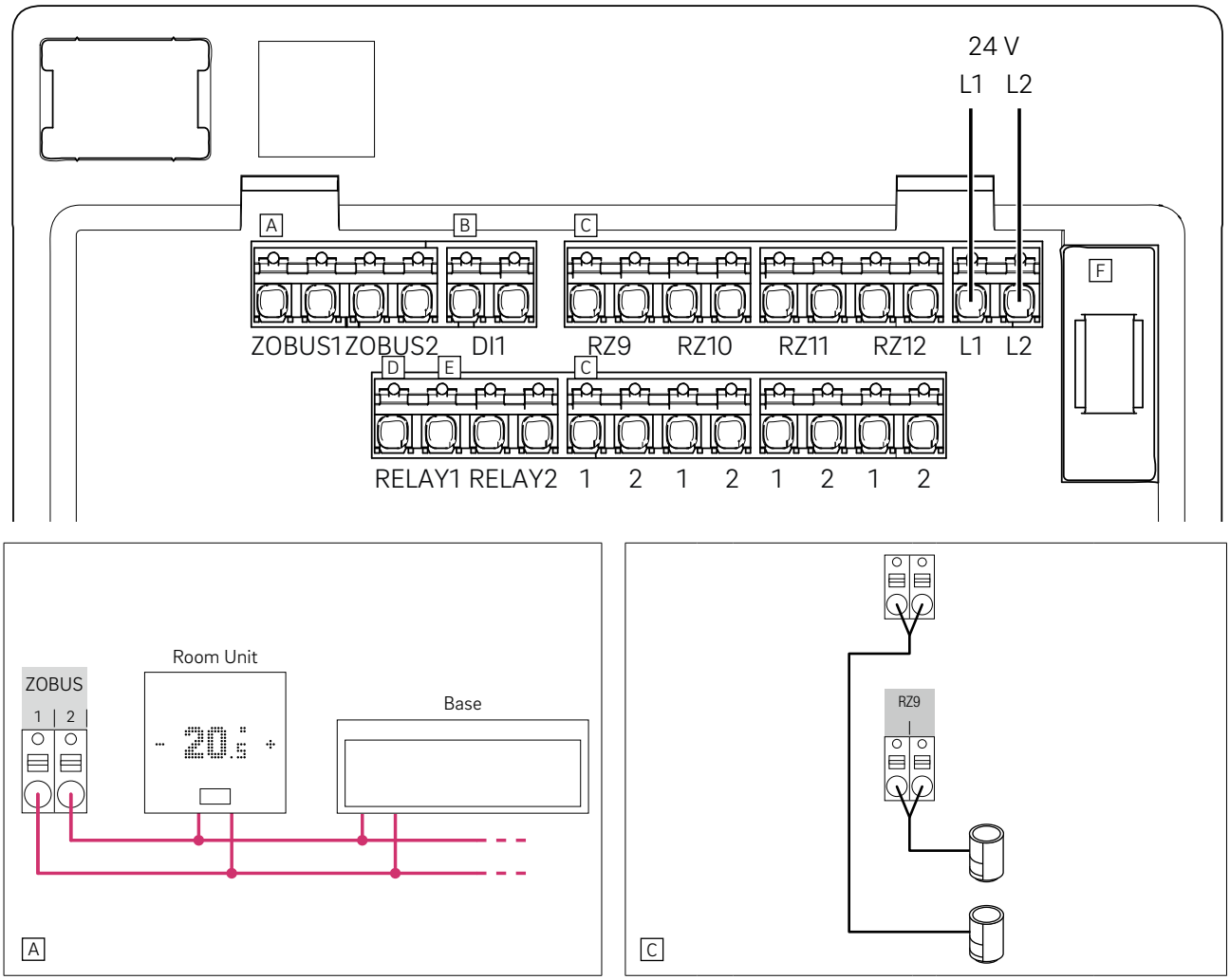
E Relays 2, 5 A, Class 2

F Fuse T2 A

B, D–E Freely configurable

Fig. 10-3 Allocation of the clamps - NEA SMART 2.0 R-Module 230 V

10.03.04 NEA SMART 2.0 R-Module 24 V



A Zone Bus

B Digital Input 1

C Zone 9 – 12

D Relay 1, 5 A, Class 2

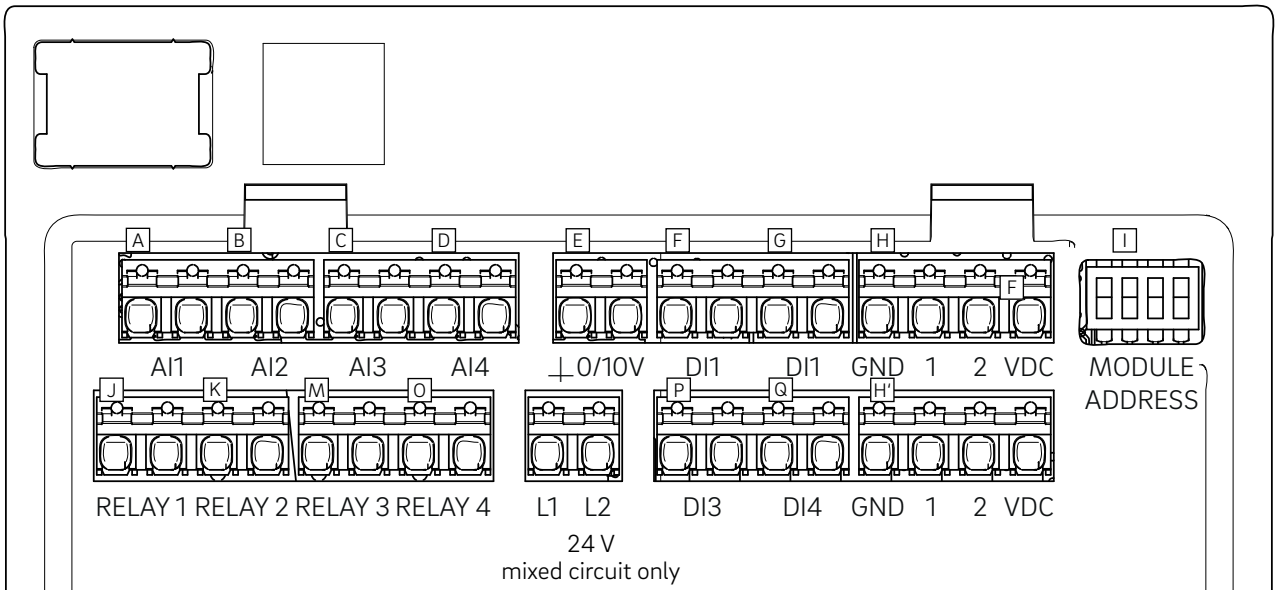
E Relays 2, 5 A, Class 2

F Fuse T2 A

B, D–E Freely configurable

Fig. 10-4 Allocation of the clamps - NEA SMART 2.0 R-Module 24 V

10.03.05 NEA SMART 2.0 U-Module 24 V



A – D Analogous Input: 1 ... 3 NTC 10K

E Analogous Output: 0 – 10 V

F – G
P – Q Digital Input 1 – 4

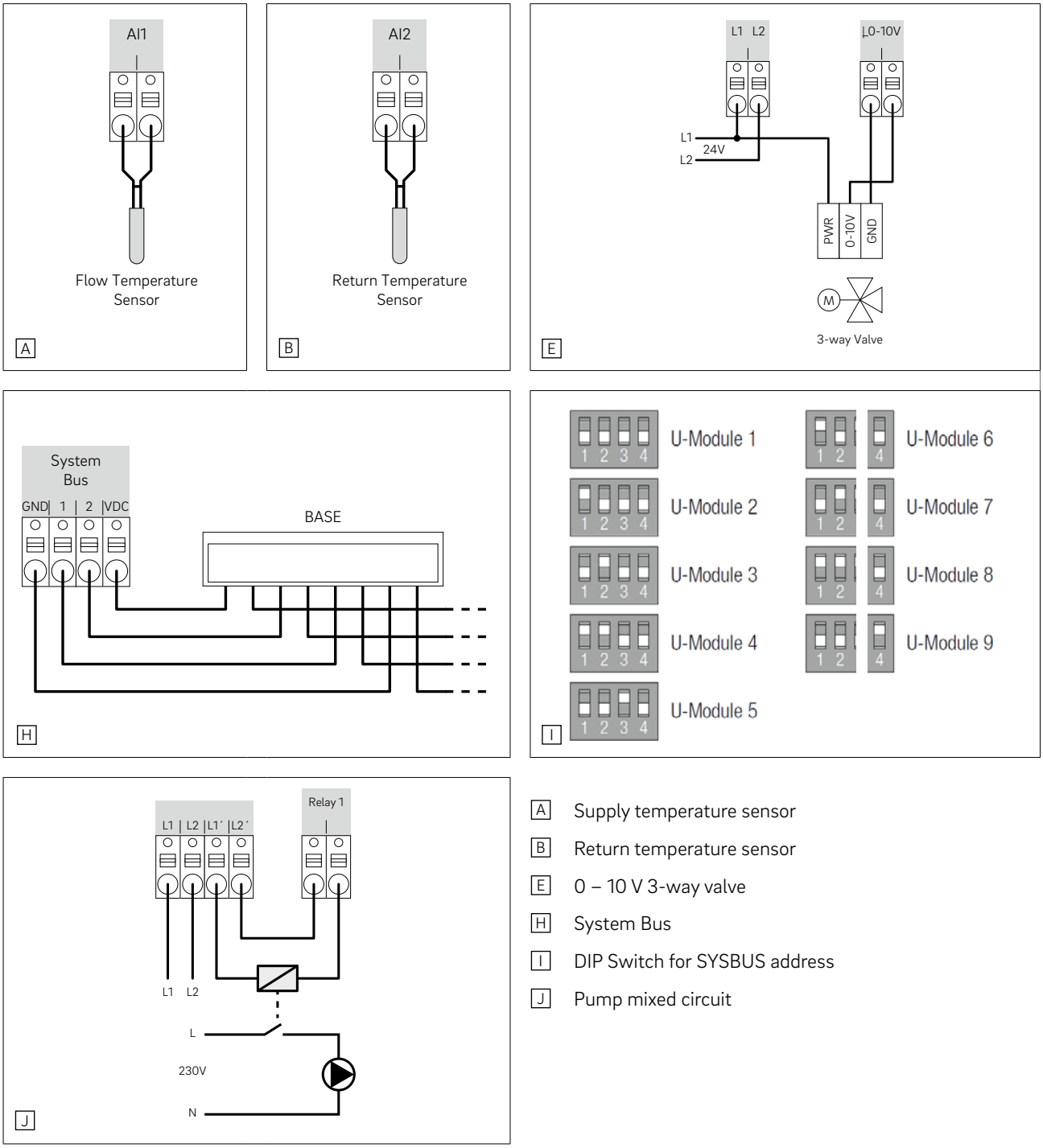
H System Bus

I DIP Switch for SYSBUS address

J ... O Relais 1 – 4, 5 A, Class 2

Fig. 10-5 Allocation of the clamps - NEA SMART 2.0 U-Module 24 V

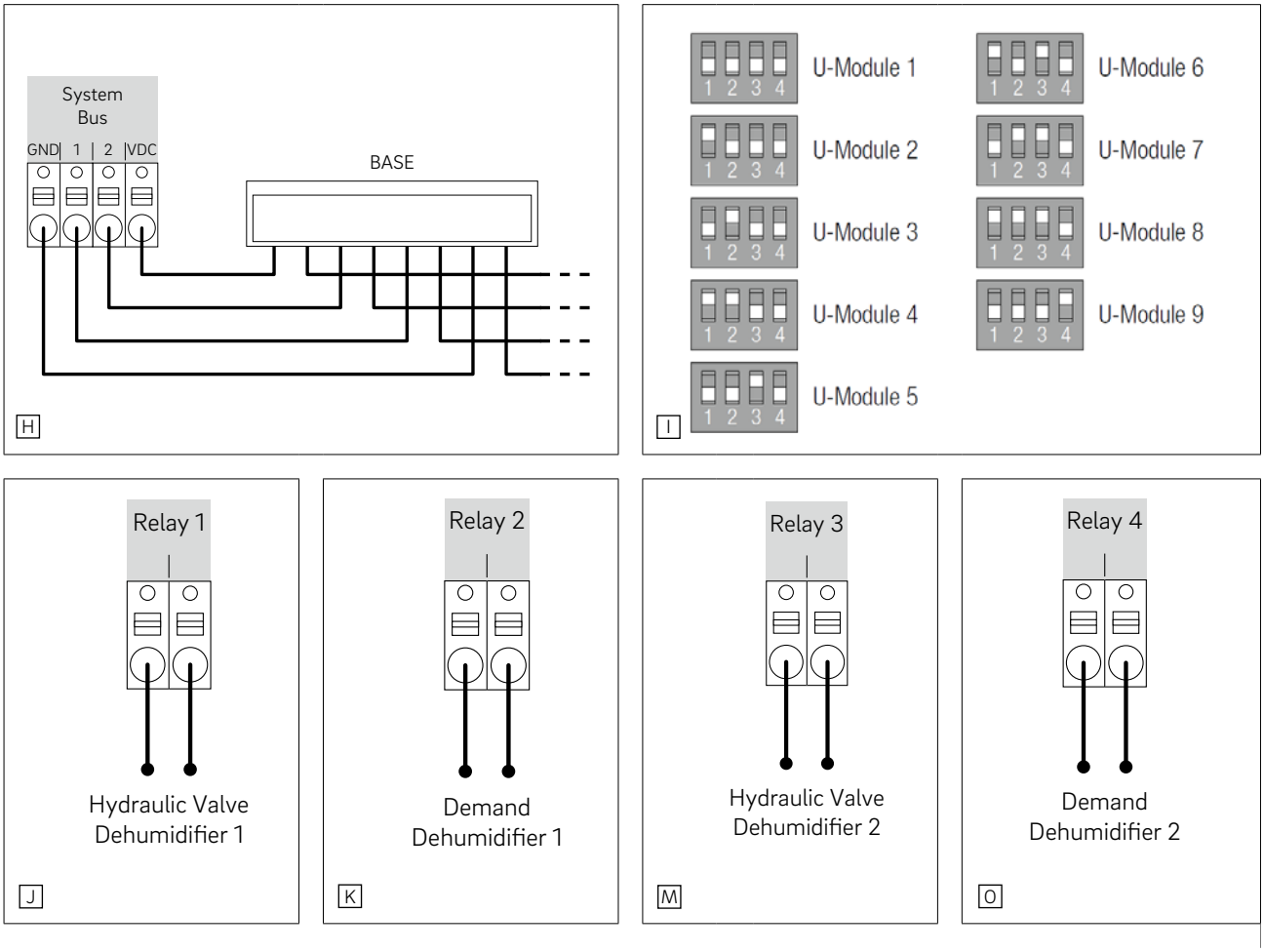
10.03.06 NEA SMART 2.0 U-Module 24 V – Mixed Circuit



- A Supply temperature sensor
- B Return temperature sensor
- E 0 – 10 V 3-way valve
- H System Bus
- I DIP Switch for SYSBUS address
- J Pump mixed circuit

Fig. 10-6 Allocation of the clamps - NEA SMART 2.0 U-Module 24 V - Mixed circuit

10.03.07 NEA SMART 2.0 U-Module 24 V - Dehumidifier



H System Bus

I DIP switch for SYSBUS address

J Hydraulic valve dehumidifier 1

K Compressor dehumidifier 1

M Hydraulic valve dehumidifier 2

O Compressor dehumidifier 2

Fig. 10-7 Allocation of the clamps - NEA SMART 2.0 U-Module 24 V - Dehumidifier

11 Scheme

The following schemes are based on the NEA SMART 2.0 components in 24 V version.

11.01 Overview

No	Description	Systemtype	Place	Base	R-Module	U-Module	Sensor Sets
1	Simple Room Temperature Control	Underfloor heating	House/ Apartment with single floor	1	-	-	-
2	Enlarged Room Temperature Control	Underfloor heating	House/ Apartment with two floors	1	1	-	-
3	Enlarged Room Temperature Control with chilled ceiling	Underfloor heating + chilled ceiling	House/ Apartment with single floor	1	1	-	-
4	Simple Room Temperature Control with mixed circuit	Underfloor heating and cooling	House/ Apartment with single floor	1	-	1	1
5	Simple Room Temperature Control with mixed circuit and two dehumidifiers	Underfloor heating and cooling	House/ Apartment with single floor	1	-	2 (1x mix. heating circuit + 1 x 2 dehumi-difier)	2
6	Simple Room Temperature Control with mixed circuit	Underfloor heating and cooling	House/ Apartment with two floors	2	-	1	1
7	Room Temperature Control with chilled ceiling, mixed circuit and two dehumidifiers	Underfloor heating + chilled ceiling + dehumidifier	House/ Apartment with two floors	2	2	2	-
8	Simple Room Temperature Control with chilled ceiling, mixed circuit and dehumidifiers	Underfloor heating + chilled ceiling + dehumidifier	House with three floors	3	3	2	-
9	Large Room Temperature Control	Underfloor heating	Light Commercial	4	0	0	0

Tab. 11-1 Overview - Scheme

11.01.01 Simple Room Temperature Control

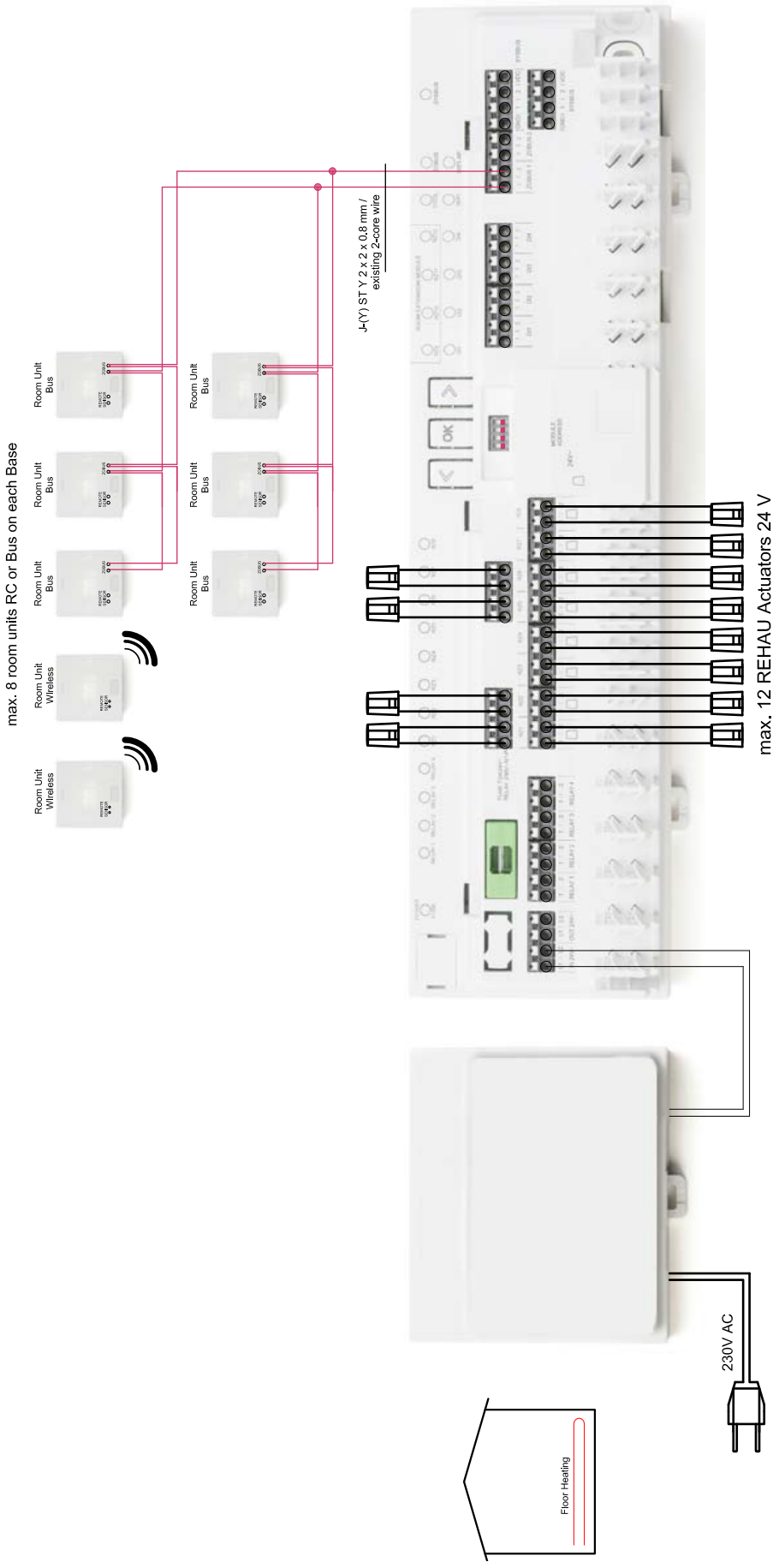


Fig. 11-1 Simple Room Temperature Control - Underfloor heating - House/ Apartment with single floor

11.01.02 Enlarged Room Temperature Control

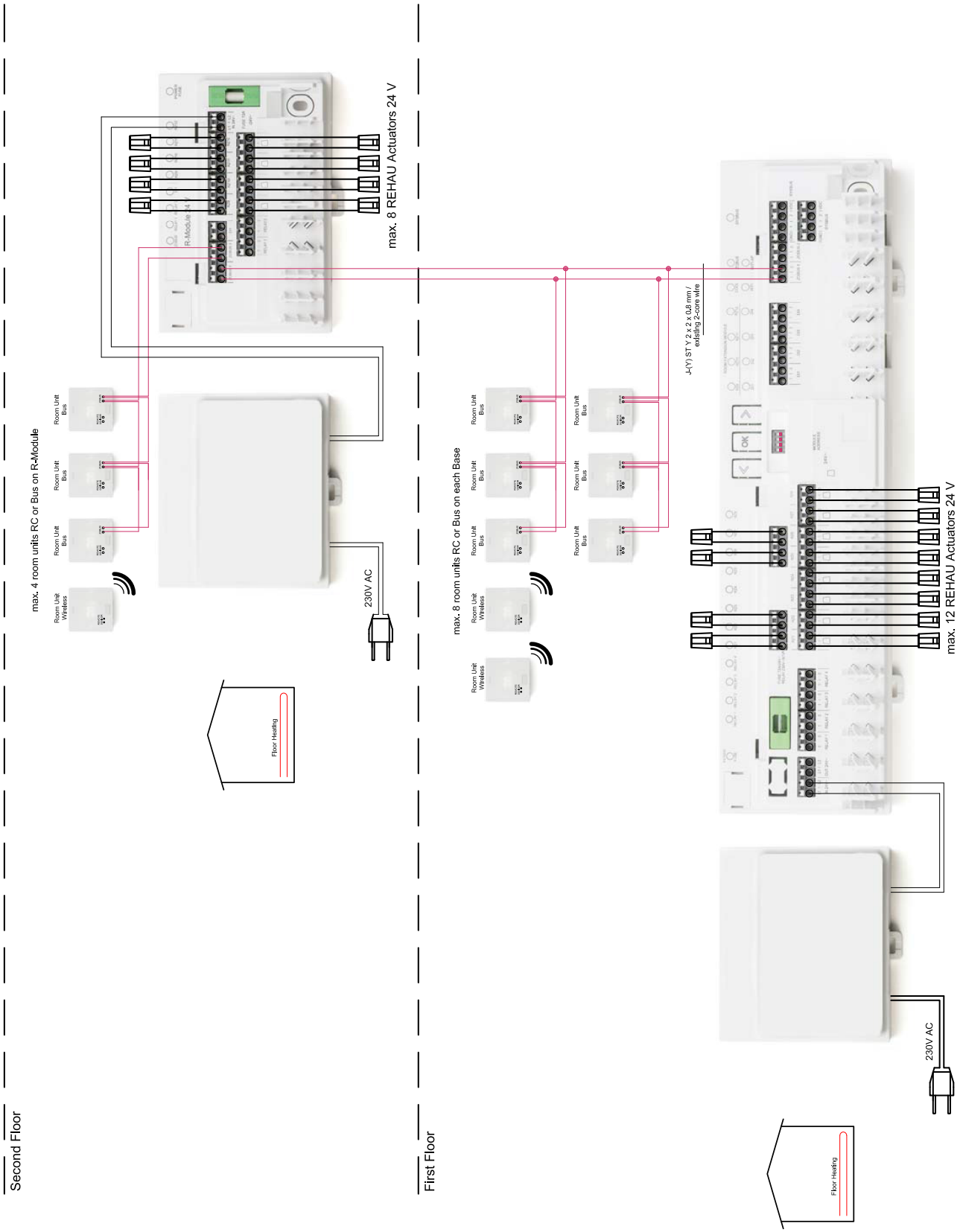


Fig. 11-2 Enlarged Room Temperature Control - Underfloor heating - House/ Apartment with two floors

11.01.03 Enlarged Room Temperature Control with chilled ceiling

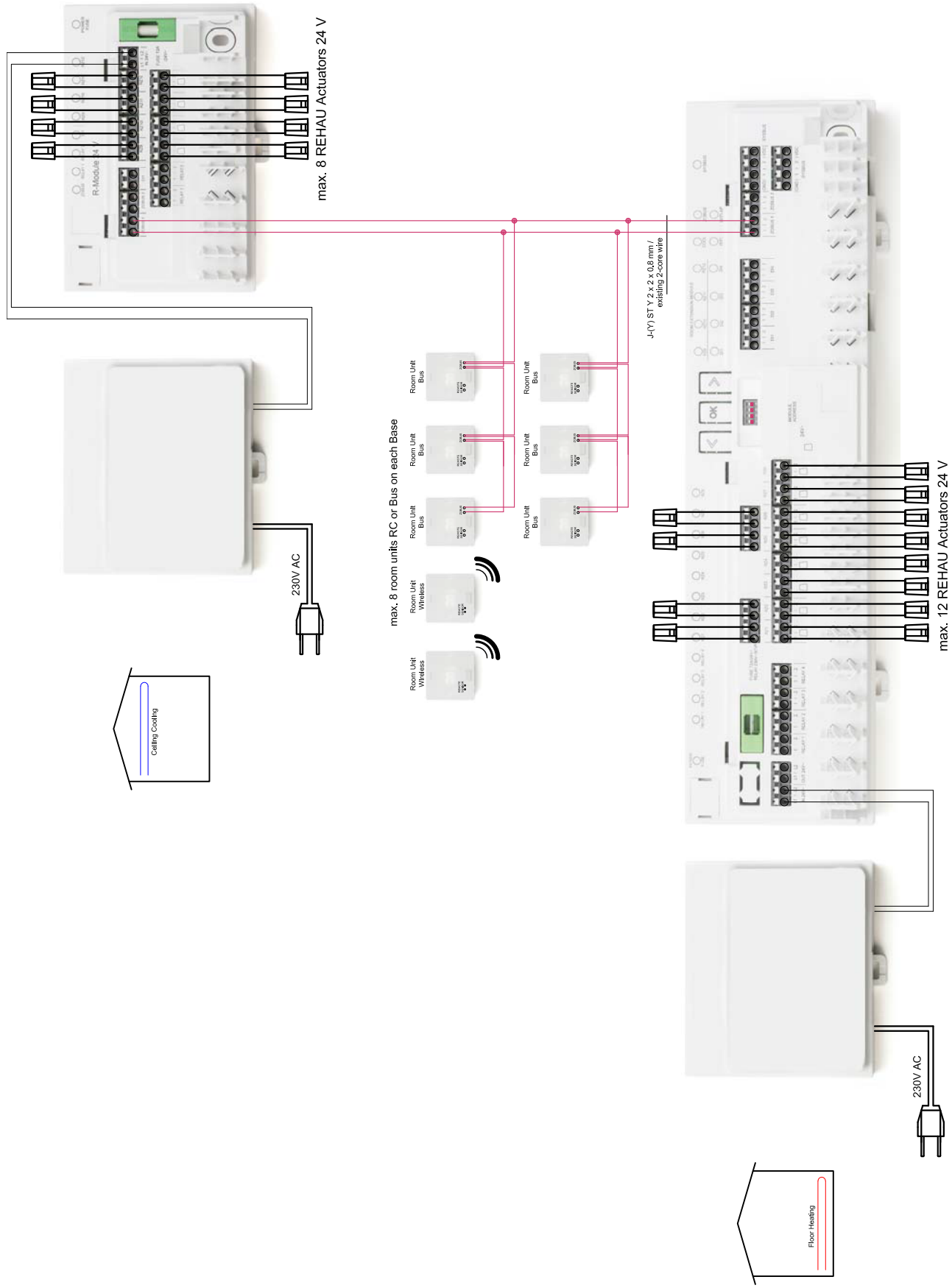


Fig. 11-3 Enlarged Room Temperature Control with chilled ceiling - Underfloor heating + chilled ceiling - House/ Apartment with single floor

11.01.04 Simple Room Temperature Control with mixed circuit

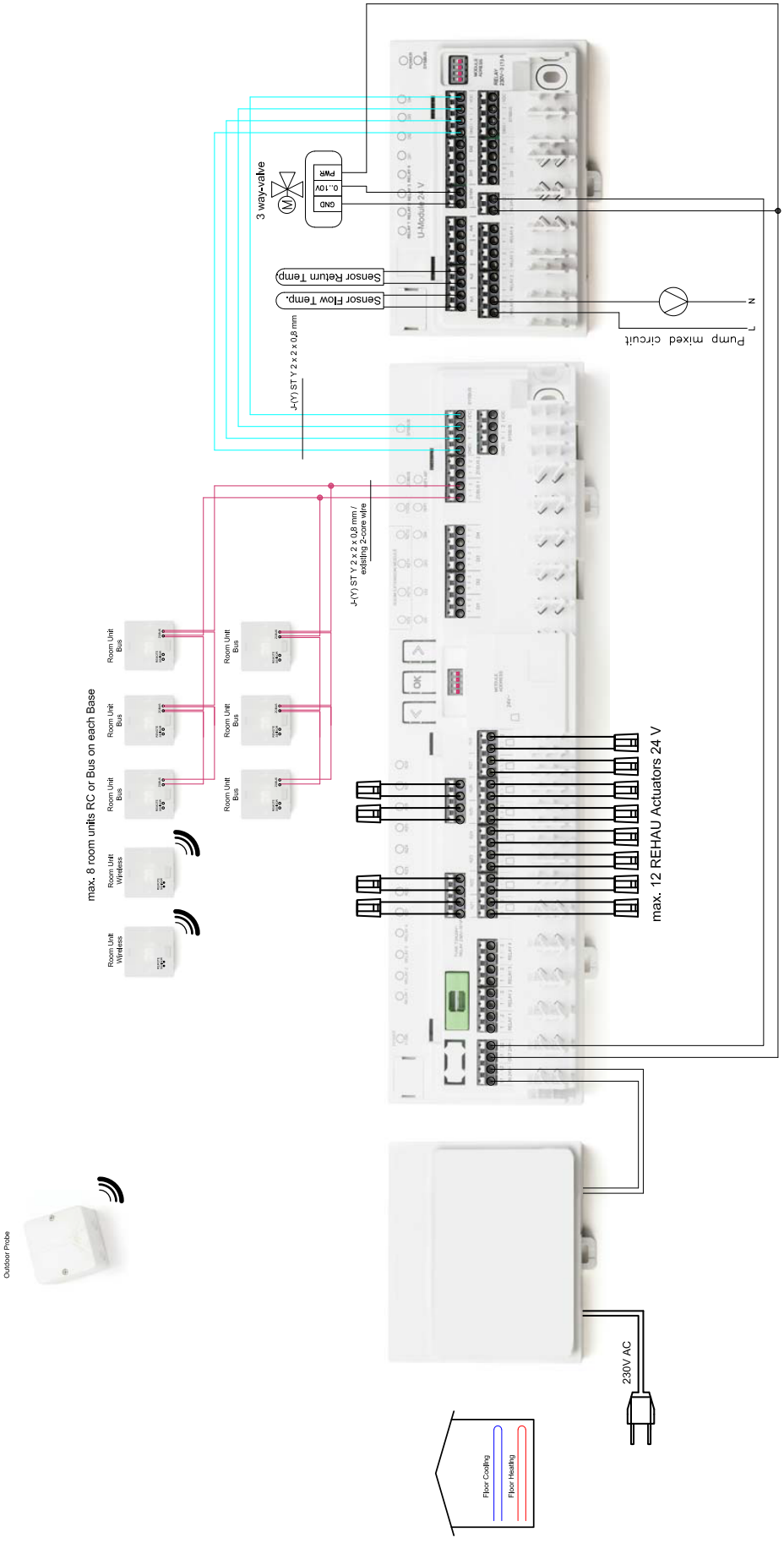


Fig. 11-4 Simple Room Temperature Control with mixed circuit - Underfloor heating and cooling - House/ Apartment with single floor

11.01.05 Simple Room Temperature Control with mixed circuit and two dehumidifiers

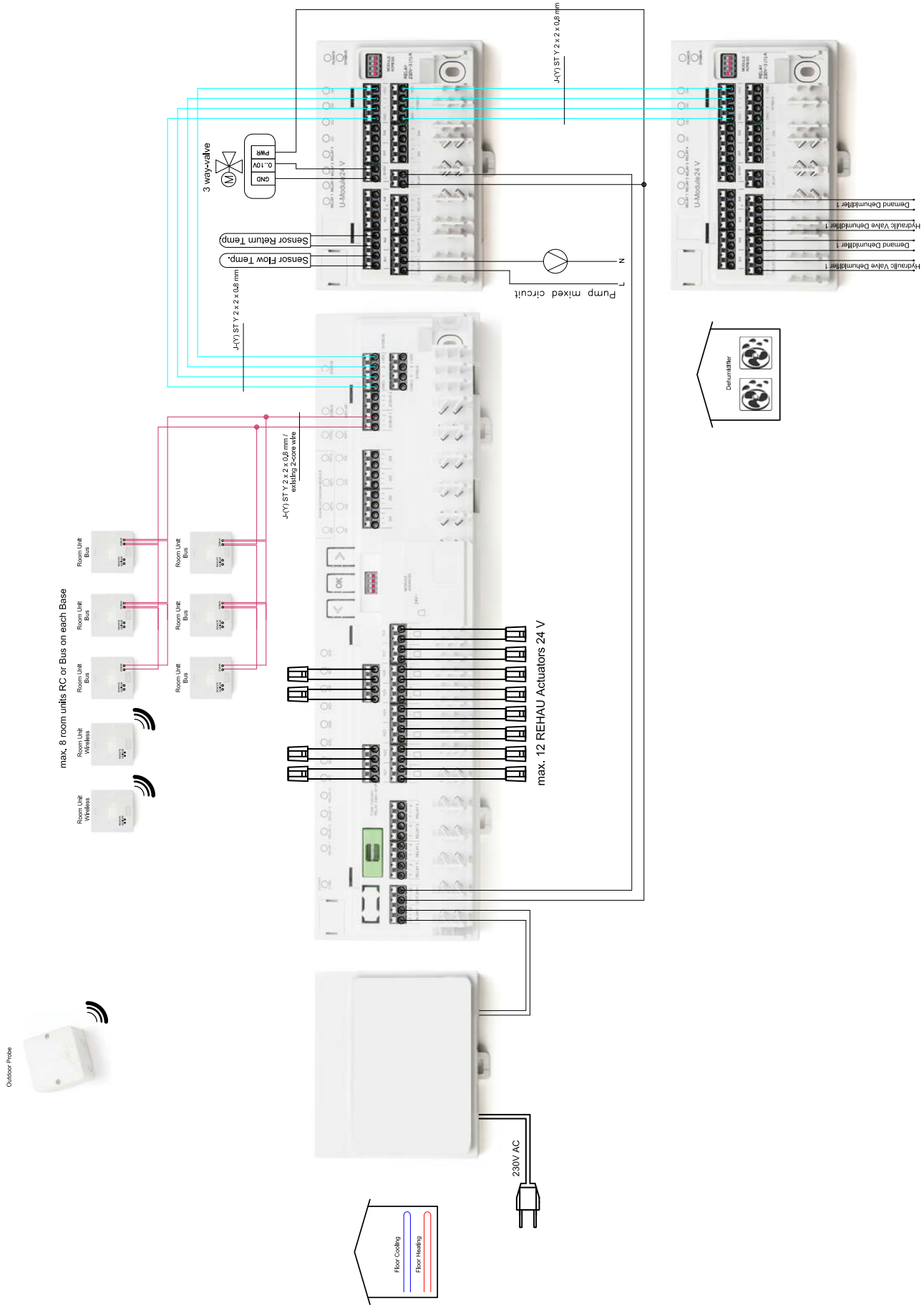


Fig. 11-5 Simple Room Temperature Control with mixed circuit and two dehumidifiers - Underfloor heating and cooling - House/ Apartment with single floor

11.01.06 Simple Room Temperature Control with mixed circuit

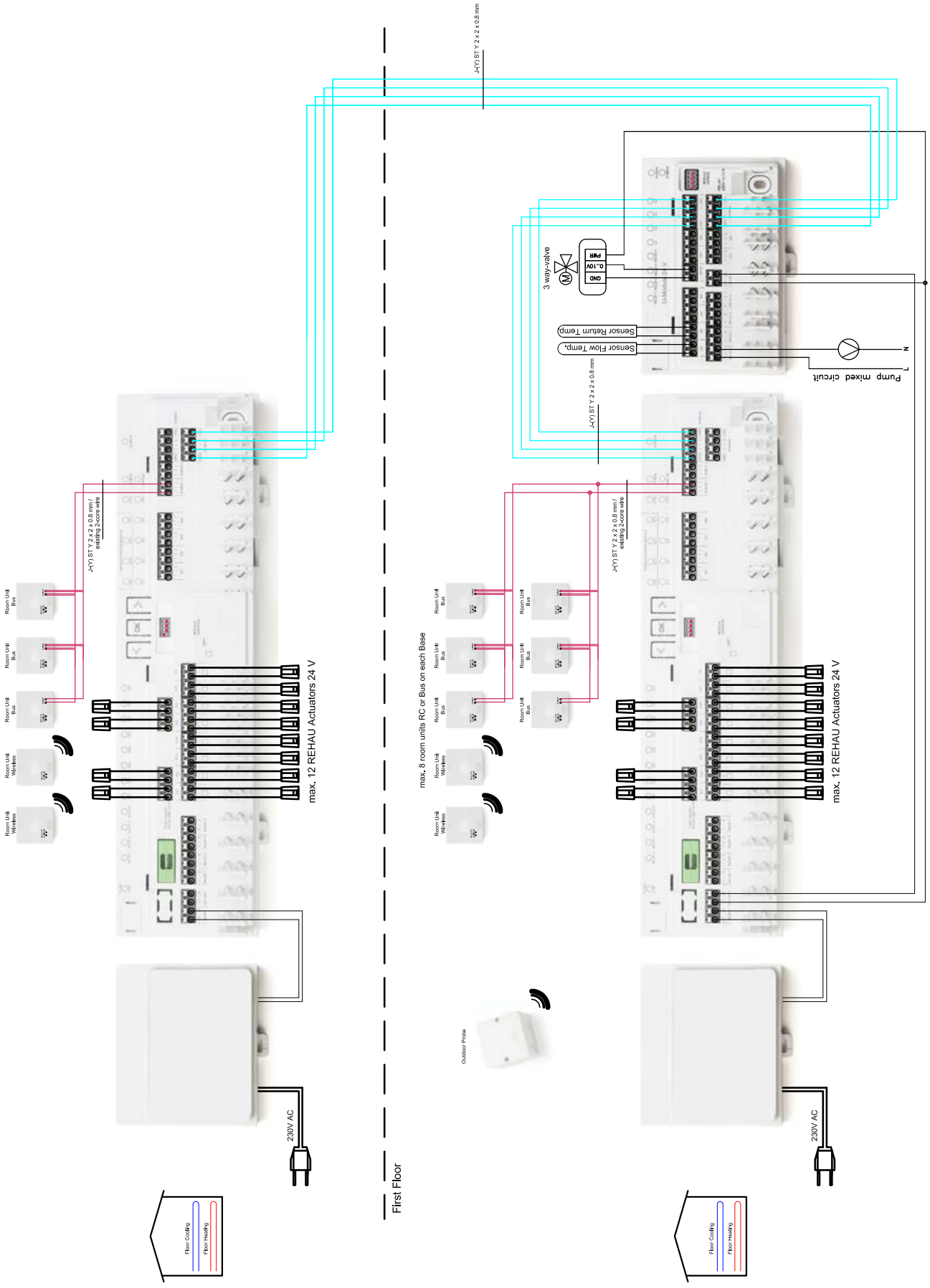


Fig. 11-6 Simple Room Temperature Control with mixed circuit - Underfloor heating and cooling - House/ Apartment with two floors

11.01.07 Room Temperature Control with chilled ceiling, mixed circuit and two dehumidifiers

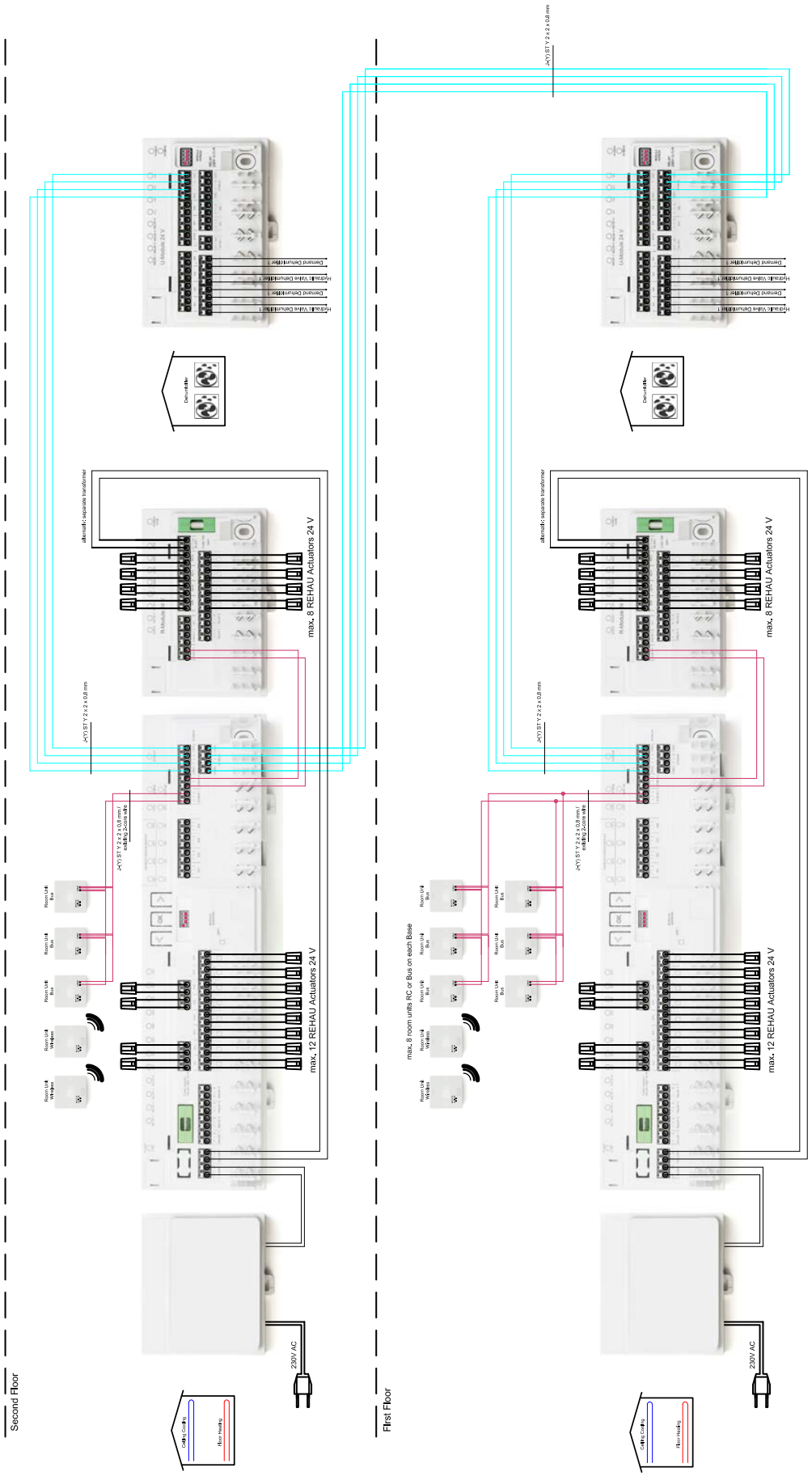


Fig. 11-7 Room Temperature Control with chilled ceiling, mixed circuit and two dehumidifiers - Underfloor heating + chilled ceiling + dehumidifier - House/ Apartment with two floors

11.01.08 Simple Room Temperature Control with chilled ceiling, mixed circuit and dehumidifiers

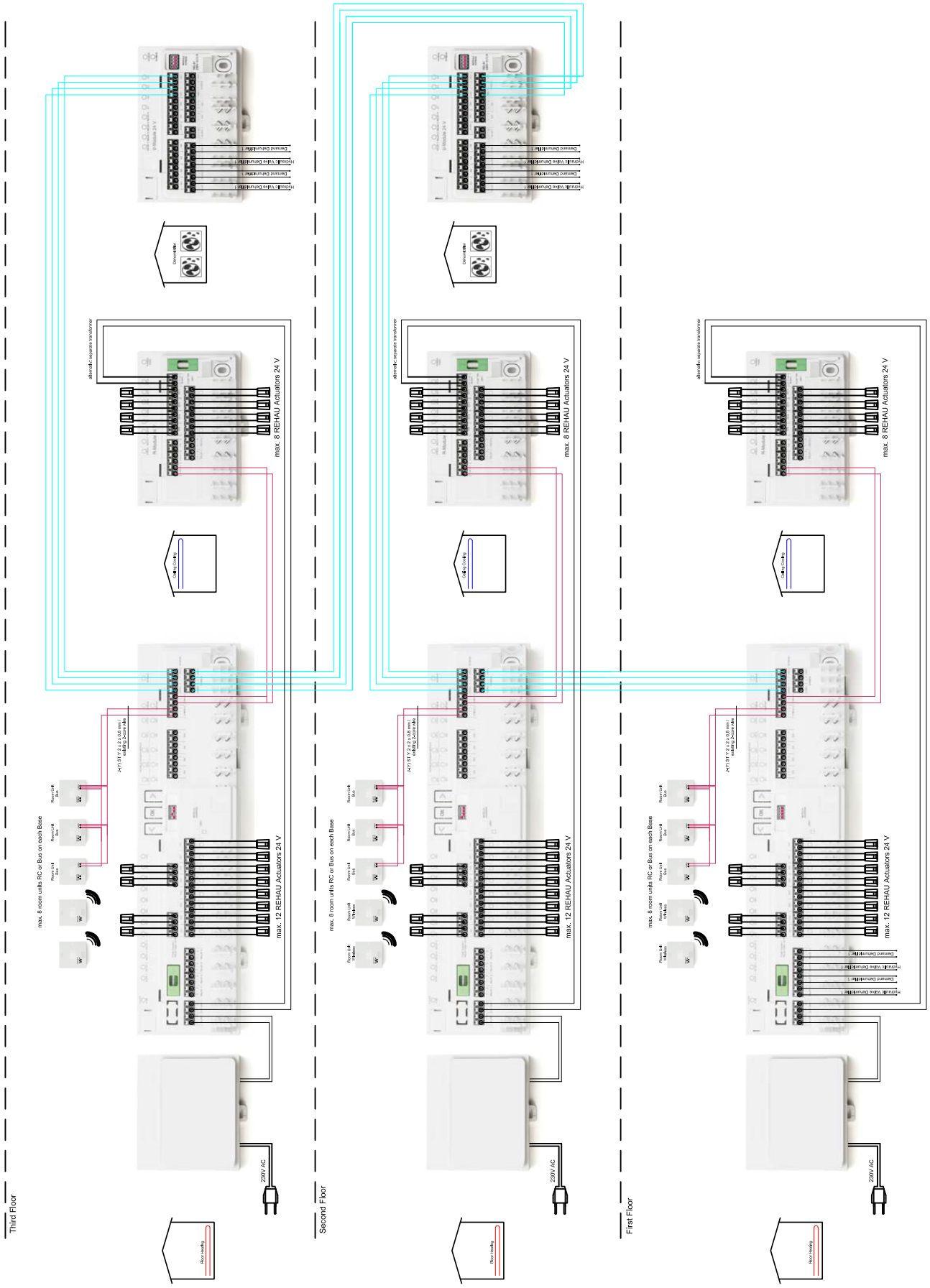


Fig. 11-8 Simple Room Temperature Control with chilled ceiling, mixed circuit and dehumidifiers - Underfloor heating + chilled ceiling + dehumidifier - House with three floors

11.01.09 Large Room Temperature Control

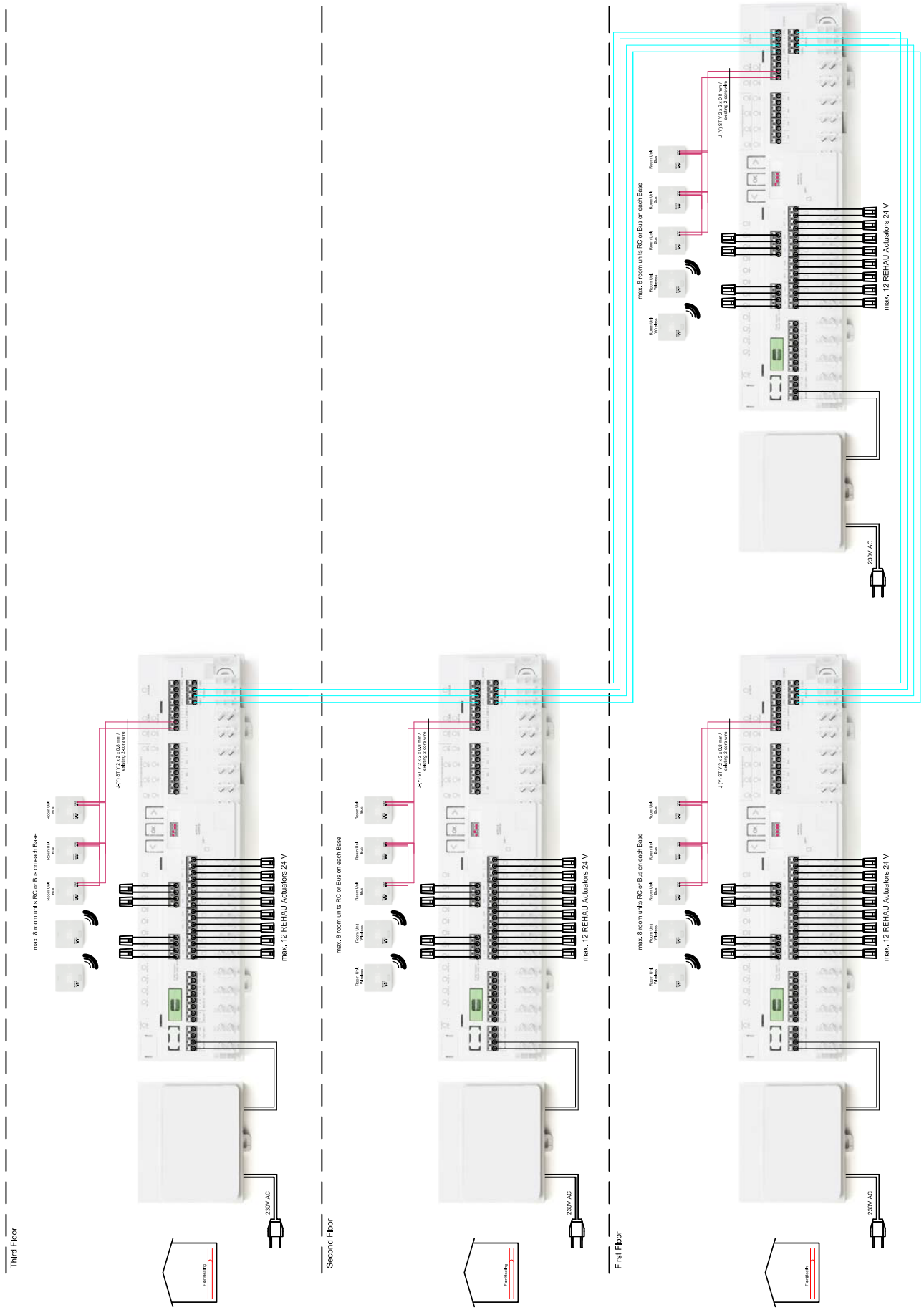


Fig. 11-9 Large Room Temperature Control - Underfloor heating - Light Commercial

12 Nomenclature

12.01 NEA SMART 2.0 Room Unit

The NEA SMART 2.0 Room Unit's functional features are indicated by a suffix, such as TRW or HRB.
The following naming system is used:

NEA SMART 2.0 Room Unit XXX

Housing colour
W: white,
B: black

Technology
B: bus technology,
R: wireless technology

Sensor
T: temperature sensor,
H: temperature and humidity sensor

Features on the available variants

NEA SMART 2.0 Room Unit	Temperature	Temperature and humidity	Wired	Wireless	Housing, white	Housing, black	Illuminated frame
TBW	X		X		X		X
HBW		X	X		X		X
HBB		X	X			X	X
TRW	X			X	X		
HRW		X		X	X		
HRB		X		X		X	

Tab. 12-1 Functional features on the NEA SMART 2.0 Room Unit variants

12.02 NEA SMART 2.0 Room Probe

The NEA SMART 2.0 Room Probe's features are indicated by a suffix, such as TBW or HBW.
The following naming system is used:

NEA SMART 2.0 Room Probe XXX

Housing colour
W: white

Technology
B: bus technology,
R: wireless technology

Sensor
T: temperature sensor,
H: temperature and humidity sensor

Features on the available variants

NEA SMART 2.0 Room Probe	Temperature	Temperature and humidity	Wired	Wireless	Housing, white
TBW	X		X		X
HBW		X	X		X
TRW	X			X	X
HRW		X		X	X

Tab. 12-2 Functional features of the NEA SMART 2.0 Room Probe variants

12.03 NEA SMART 2.0 Room Unit TBW

Material number: 13280001004

Functional description
Bus based Room Unit for NEA SMART 2.0 control system, with temperature measurement and white LED dot-matrix display. Light ring for signalization and ambient light.

This device can be used only with NEA SMART 2.0 Base 24 V or 230 V, optional in combination with NEA SMART 2.0 R-Module 24 V or 230 V.

Technical data:

Power supply	Via zone bus (ZOBUS)
Output	-
Input	Analogue: NTC 10 K - Remote temperature sensor or NEA SMART 2.0 VL / RL sensor; Digital: Window contact; Dew point sensor
Analogue outputs	-
Accuracy of temperature measurement	±0.8 K in temperature range +15 °C to +25 °C ±1 K in temperature range 0 °C to +45 °C
Temperature measurement range	–10 °C to 45 °C (displayed: 0 °C to 45 °C)
Protection class/protection rating	III/IP20
CE conformity as per	EN 60730
Degree of contamination	2 (IEC 60664-1)
Rated impulse voltage	2 kV (IEC61000-4-5)
Dimensions (W x H x D in mm)	86 x 86 x 21
Housing material	ABS/PC
Housing color	White (similar RAL 9003)
Weight	0.077 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r.H., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.04 NEA SMART 2.0 Room Unit TRW

Material number: 13280101004

Functional description
Wireless operating Room Unit for NEA SMART 2.0 control system, with temperature measurement and white LED dot-matrix display.

This device can be used only with NEA SMART 2.0 Base 24 V or 230 V, optional in combination with NEA SMART 2.0 R-Module 24 V or 230 V.

Technical data:

Power supply	2 x LR03 (AAA) alkaline battery
Battery lifetime	2 years
Transmission frequency	869 MHz
Operating range	100 m outdoor, typical 25 m in buildings
Output	-
Input	Analogue: NTC 10 K - Remote temperature sensor or NEA SMART 2.0 VL / RL sensor; Digital: Window contact; Dew point sensor
Accuracy of temperature measurement	±0.8 K in temperature range +15 °C to +25 °C ±1 K in temperature range 0 °C to +45 °C
Temperature measurement range	–10 °C to 45 °C (displayed: 0 °C to 45 °C)
Protection class/protection rating	III/IP20
CE conformity as per	EN 60730
Degree of contamination	2 (IEC 60664-1)
Rated impulse voltage	2 kV (IEC61000-4-5)
Dimensions (W x H x D in mm)	86 x 86 x 21
Housing material	ABS/PC
Housing color	White (similar RAL 9003)
Weight	0.1 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r.H., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.05 NEA SMART 2.0 Room Unit HBW

Material number: 13280041004

Functional description
Bus based Room Unit for NEA SMART 2.0 control system, with temperature and humidity measurement and white LED dot-matrix display. Light ring for signalization and ambient light.

This device can be used only with NEA SMART 2.0 Base 24 V or 230 V, optional in combination with NEA SMART 2.0 R-Module 24 V or 230 V.

Technical data:

Power supply	Via zone bus (ZOBUS)
Output	-
Input	Analogue: NTC 10 K - Remote temperature sensor or NEA SMART 2.0 VL / RL sensor; Digital: Window contact; Dew point sensor
Accuracy of temperature measurement	±0.8 K in temperature range +15 °C to +25 °C ±1 K in temperature range 0 °C to +45 °C
Temperature measurement range	–10 °C to 45 °C (displayed: 0°C to 45 °C)
Accuracy of humidity measurement	±3 %RH in the range 20 - 80 %RH at 20 °C ±5 %RH outside this range
Humidity measurement range	0 – 100 %
Protection class/protection rating	III/IP20
CE conformity as per	EN 60730
Degree of contamination	2 (IEC 60664-1)
Rated impulse voltage	2 kV (IEC61000-4-5)
Dimensions (W x H x D in mm)	86 x 86 x 21
Housing material	ABS/PC
Housing color	White (similar RAL 9003)
Weight	0.077 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r.H., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.06 NEA SMART 2.0 Room Unit HRW

Material number: 13280121004

Functional description
Wireless operating Room Unit for NEA SMART 2.0 control system, with temperature and humidity measurement and white LED dot-matrix display.

This device can be used only with NEA SMART 2.0 Base 24 V or 230 V, optional in combination with NEA SMART 2.0 R-Module 24 V or 230 V.

Technical data:

Power supply	2 x LR03 (AAA) alkaline battery
Battery lifetime	2 years
Transmission frequency	869 MHz
Operating range	100 m outdoor, typical 25 m in buildings
Output	-
Input	Analogue: NTC 10 K - Remote temperature sensor or NEA SMART 2.0 VL / RL sensor; Digital: Window contact; Dew point sensor
Accuracy temperature measurement	±0.8 K in temperature range +15 °C to +25 °C ±1 K in temperature range 0 °C to +45 °C
Temperature of measurement range	–10 °C to 45 °C (displayed: 0 °C to 45 °C)
Accuracy of humidity measurement	±3 %RH in the range 20 - 80 %RH at 20 °C ±5 %RH outside this range
Humidity measurement range	0 – 100 %
Protection class/protection rating	III/IP20
CE conformity as per	EN 60730
Degree of contamination	2 (IEC 60664-1)
Rated impulse voltage	2 kV (IEC61000-4-5)
Dimensions (W x H x D in mm)	86 x 86 x 21
Housing material	ABS/PC
Housing color	White (similar RAL 9003)
Weight	0.1 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r.H., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.07 NEA SMART 2.0 Room Unit HBB

Material number: 13280051004

Functional description
Bus based Room Unit for NEA SMART 2.0 control system, with temperature and humidity measurement and white LED dot-matrix display. Light ring for signalization and ambient light.

This device can be used only with NEA SMART 2.0 Base 24 V or 230 V, optional in combination with NEA SMART 2.0 R-Module 24 V or 230 V.

Technical data:

Power supply	Via zone bus (ZOBUS)
Output	-
Input	Analogue: NTC 10 K - Remote temperature sensor or NEA SMART 2.0 VL / RL sensor; Digital: Window contact; Dew point sensor
Accuracy of temperature measurement	±0.8 K in temperature range +15 °C to +25 °C ±1 K in temperature range 0 °C to +45 °C
Temperature measurement range	–10 °C to 45 °C (displayed: 0 °C to 45 °C)
Accuracy of humidity measurement	±3 %RH in the range 20 - 80 %RH at 20 °C ±5 %RH outside this range
Humidity measurement range	0 – 100 %
Protection class/protection rating	III/IP20
CE conformity as per	EN 60730
Degree of contamination	2 (IEC 60664-1)
Rated impulse voltage	2 kV (IEC61000-4-5)
Dimensions (W x H x D in mm)	86 x 86 x 21
Housing material	ABS/PC
Housing color	Black (similar RAL 9011)
Weight	0.077 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r.H., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.08 NEA SMART 2.0 Room Unit HRB

Material number: 13280131004

Functional description
Wireless operating Room Unit for NEA SMART 2.0 control system, with temperature and humidity measurement and white LED dot-matrix display.

This device can be used only with NEA SMART 2.0 Base 24 V or 230 V, optional in combination with NEA SMART 2.0 R-Module 24 V or 230 V.

Technical data:

Power supply	2 x LR03 (AAA) alkaline battery
Battery lifetime	2 years
Transmission frequency	869 MHz
Operating range	100 m outdoor, typical 25 m in buildings
Output	-
Input	Analogue: NTC 10 K - Remote temperature sensor or NEA SMART 2.0 VL / RL sensor; Digital: Window contact; Dew point sensor
Accuracy of temperature measurement	±0.8 K in temperature range +15 °C to +25 °C ±1 K in temperature range 0 °C to +45 °C
Temperature measurement range	–10 °C to 45 °C (displayed: 0°C to 45 °C)
Accuracy of humidity measurement	±3 %RH in the range 20 - 80 %RH at 20 °C ±5 %RH outside this range
Humidity measurement range	0 – 100 %
Protection class/protection rating	III/IP20
CE conformity as per	EN 60730
Degree of contamination	2 (IEC 60664-1)
Rated impulse voltage	2 kV (IEC61000-4-5)
Dimensions (W x H x D in mm)	86 x 86 x 21
Housing material	ABS/PC
Housing color	Black (similar RAL 9011)
Weight	0.1 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r.H., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.09 NEA SMART 2.0 Room Probe TBW

Material number: 13280061003

Functional description
Bus based Room Unit for NEA SMART 2.0 control system, with temperature measurement.

This device can be used only with NEA SMART 2.0 Base 24 V or 230 V, optional in combination with NEA SMART 2.0 R-Module 24 V or 230 V.

Technical data:

Power supply	Via zone bus (ZOBUS)
Output	-
Input	Analogue: NTC 10 K - Remote temperature sensor or NEA SMART 2.0 VL / RL sensor; Digital: Window contact; Dew point sensor
Accuracy of temperature measurement	±0.8K in temperature range +15°C to +25°C ±1K in temperature range 0°C to +45°C
Temperature measurement range	–10°C to 45°C (displayed: 0°C to 45°C)
Protection class/protection rating	III/IP20
CE conformity as per	EN 60730
Degree of contamination	2 (IEC 60664-1)
Rated impulse voltage	2kV (IEC61000-4-5)
Dimensions (W x H x D in mm)	86 x 86 x 21
Housing material	ABS/PC
Housing color	White (similar RAL 9003)
Weight	0.077 kg
Ambient temperature	0°C to +50°C
Ambient humidity	< 95% r.H., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.10 NEA SMART 2.0 Room Probe HBW

Material number: 13280081004

Functional description
Bus based Room Unit for NEA SMART 2.0 control system, with temperature and humidity measurement.

This device can be used only with NEA SMART 2.0 Base 24 V or 230 V, optional in combination with NEA SMART 2.0 R-Module 24 V or 230 V.

Technical data:

Power supply	Via zone bus (ZOBUS)
Output	-
Input	Analogue: NTC 10 K - Remote temperature sensor or NEA SMART 2.0 VL / RL sensor; Digital: Window contact; Dew point sensor
Accuracy of temperature measurement	±0.8 K in temperature range +15 °C to +25 °C ±1 K in temperature range 0 °C to +45 °C
Temperature measurement range	–10 °C to 45 °C (displayed: 0 °C to 45 °C)
Accuracy of humidity measurement	±3 %RH in the range 20 - 80 %RH at 20 °C ±5 %RH outside this range
Humidity measurement range	0 – 100 %
Protection class/protection rating	III/IP20
CE conformity as per	EN 60730
Degree of contamination	2 (IEC 60664-1)
Rated impulse voltage	2 kV (IEC61000-4-5)
Dimensions (W x H x D in mm)	86 x 86 x 21
Housing material	ABS/PC
Housing color	White (similar RAL 9003)
Weight	0.077 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r.H., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.11 NEA SMART 2.0 Room Probe TRW

Material number: 13280141003

Functional description
Wireless operating Room Unit for NEA SMART 2.0 control system, with temperature measurement.

This device can be used only with NEA SMART 2.0 Base 24 V or 230 V, optional in combination with NEA SMART 2.0 R-Module 24 V or 230 V.

Technical data:

Power supply	2 x LR03 (AAA) alkaline battery
Battery lifetime	2 years
Transmission frequency	869 MHz
Operating range	100 m outdoor, typical 25 m in buildings
Output	-
Input	Analogue: NTC 10 K - Remote temperature sensor or NEA SMART 2.0 VL / RL sensor; Digital: Window contact; Dew point sensor
Accuracy of temperature measurement	±0.8 K in temperature range +15 °C to +25 °C ±1 K in temperature range 0 °C to +45 °C
Temperature measurement range	–10 °C to 45 °C (displayed 0 °C to 45 °C)
Protection class/protection rating	III/IP20
CE conformity as per	EN 60730
Degree of contamination	2 (IEC 60664-1)
Rated impulse voltage	2 kV (IEC61000-4-5)
Dimensions (W x H x D in mm)	86 x 86 x 21
Housing material	ABS/PC
Housing color	White (similar RAL 9003)
Weight	0.1 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r.H., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.12 NEA SMART 2.0 Room Probe HRW

Material number: 13280161004

Functional description
Wireless operating Room Unit for NEA SMART 2.0 control system, with temperature and humidity measurement.

This device can be used only with NEA SMART 2.0 Base 24 V or 230 V, optional in combination with NEA SMART 2.0 R-Module 24 V or 230 V.

Technical data:

Power supply	2 x LR03 (AAA) alkaline battery
Battery lifetime	2 years
Transmission frequency	869 MHz
Operating range	100 m outdoor, typical 25 m in buildings
Output	-
Input	Analogue: NTC 10 K - Remote temperature sensor or NEA SMART 2.0 VL / RL sensor; Digital: Window contact; Dew point sensor
Accuracy of temperature measurement	±0.8K in temperature range +15 °C to +25 °C ±1 K in temperature range 0 °C to +45 °C
Temperature measurement range	–10 °C to 45 °C (displayed 0 °C to 45 °C)
Accuracy of humidity measurement	±3 %RH in the range 20 - 80 %RH at 20 °C ±5 %RH outside this range
Humidity measurement range	0 – 100 %
Protection class/protection rating	III/IP20
CE conformity as per	EN 60730
Degree of contamination	2 (IEC 60664-1)
Rated impulse voltage	2 kV (IEC61000-4-5)
Dimensions (W x H x D in mm)	86 x 86 x 21
Housing material	ABS/PC
Housing color	White (similar RAL 9003)
Weight	0.1 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r.H., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.13 NEA SMART 2.0 Base 24 V

Material number: 13280241001

Functional description
Central controller for NEA SMART 2.0 control system for energy efficient operating of radiant heating and cooling systems in combination with radiators, flow temperature control, dehumidifiers.

Suitable for all NEA SMART 2.0 Room Units and Probes in Bus- and RC technology (hybrid technology).

Operating and monitoring of system functions by the NEA SMART 2.0 App, connected to the NEA SMART 2.0 cloud.

Room temperature control of up to 8 rooms, up to 12 actuators can be connected.

Expendable via zone bus (ZOBUS) by R-Module for 4 additional rooms, system expansion via system bus by up to 4 additional NEA SMART 2.0 Base 24 V, this allows up to 60 rooms to be controlled.

Additional functions by NEA SMART 2.0 U-Module: flow temperature control or control of dehumidifiers.

4 relay outputs (dry contacts) for control of pump, dehumidifier, boiler and chiller, 4 digital inputs for change over signal, dew point monitor, mode selection

Communication possibilities:
- ZOBUS (2-wire bus for NEA SMART 2.0 Room Units) and 869 MHz RC network for NEA SMART 2.0 Room Units
- System bus for connection of extension modules and NEA SMART 2.0 Base 24 V
- WLAN and LAN for connection to router and internet, integrated webpages for installation and operating by web browser.

Technical data:

Operating voltage	24 V AC ±15 % / 50 Hz
Power consumption	3 W (without actuators, without R-Module, without U-Module)
Digital outputs	8 Triac outputs for REHAU actuators, switching capacity 1 A, 24 VAC, maximum load per output: 4 REHAU Actuator 24 V, 4 relay outputs (dry contacts) 230 V, 5 A, Class II
Fuse	T2A
Digital inputs	4 inputs for dry contacts
Analogue inputs	-
Analogue outputs	-
Radio frequency	869 MHz; 2,4 GHz
Radio range	100 m outdoor, typical 25 m in buildings
Bus system 1	Zone bus (ZOBUS): 2-wire bus system, polarity free, maximum length 100 m, no twisted pair or shielded cable needed
Bus system 2	System bus (SYSBUS): 3-wire RS 485 bus system, maximum length between 2 Bases 250 m, absolute maximum length is 500 m. Twisted pair and shielded cable needed. Recommendation J-Y(ST)Y 2 x 2 x 0.8 mm
WLAN	IEEE 802.11n, WPA2
LAN	IEEE 802.3 10/100 Base-T
Protection class/protection rating	II/IP20
CE conformity according to	EN 60730
Degree of contamination	2 (IEC 60664-1)
Rated impulse voltage	2 kV (IEC61000-4-5)
Dimensions (W x H x D in mm)	317 x 83,5 x 52,6
Housing material	ABS/PC
Housing color	white (similar RAL 9003)
Weight	0.535 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r.H., non-condensing
Actual time retention	6 hours in case of power failure (automatic time synchronization in on-line mode)
Storage/transport temperature	–25 °C to +60 °C
Area of application	In enclosed rooms

12.14 NEA SMART 2.0 Base 230 V

Material number: 13282301001

Functional description
Central controller for NEA SMART 2.0 control system for energy efficient operating of radiant heating and cooling systems in combination with radiators, flow temperature control, dehumidifiers.

Suitable for all NEA SMART 2.0 Room Units and Probes in Bus- and RC technology (hybrid technology).

Operating and monitoring of system functions by the NEA SMART 2.0 App, connected to the NEA SMART 2.0 cloud.

Room temperature control of up to 8 rooms, up to 12 actuators can be connected.

Expendable via zone bus (ZOBUS) by R-Module for 4 additional rooms, system expansion via system bus by up to 4 additional NEA SMART 2.0 Base 230 V, this allows up to 60 rooms to be controlled.

Additional functions by NEA SMART 2.0 U-Module: flow temperature control or control of dehumidifiers.

4 relay outputs (dry contacts) for control of pump, dehumidifier, boiler and chiller, 4 digital inputs for change over signal, dew point monitor, mode selection.

Communication possibilities:
- ZOBUS (2-wire bus for NEA SMART 2.0 Room Units) and 869 MHz RC network for NEA SMART 2.0 Room Units
- System bus for connection of extension modules and NEA SMART 2.0 Base 24 V
- WLAN and LAN for connection to router and internet, integrated webpages for installation and operating by web browser.

Technical data:

Operating voltage	230V AC ±15 % / 50 Hz
Power consumption	3,5 W (without actuators, without R-Module, without U-Module)
Digital outputs	8 Triac outputs for REHAU actuators, switching capacity 0.5 A non inductive, 230 VAC, maximum load per output: 4 REHAU Actuator 230 V, 4 relay outputs (dry contacts) 230 V, 5 A, Class II
Fuse	T2A, 5 x 20 mm
Digital inputs	4 inputs for dry contacts
Analogue inputs	-
Analogue outputs	-
Radio frequency	869 MHz; 2,4 GHz
Radio range	100 m outdoor, typical 25 m in buildings
Bus system 1	Zone bus (ZOBUS): 2-wire bus system, polarity free, maximum length 100 m, no twisted pair or shielded cable needed
Bus system 2	System bus (SYSBUS): 3-wire RS 485 bus system, maximum length between 2 Bases 250 m, absolute maximum length is 500 m. Twisted pair and shielded cable needed. Recommendation J-Y(ST)Y 2 x 2 x 0.8 mm
WLAN	IEEE 802.11n, WPA2
LAN	IEEE 802.3 10/100 Base-T
Protection class/protection rating	II/IP20
CE conformity according to	EN 60730
Degree of contamination	2 (IEC 60664-1)
Rated impulse voltage	2 kV (IEC61000-4-5)
Dimensions (W x H x D in mm)	317 x 83,5 x 52,6
Housing material	ABS/PC
Housing color	white (similar RAL 9003)
Weight	0.65 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r.H., non-condensing
Actual time retention	6 hours in case of power failure (automatic time synchronization in on-line mode)
Storage/transport temperature	–25 °C to +60 °C
Area of application	In enclosed rooms

12.15 NEA SMART 2.0 R-Module 24 V

Material number: 13280201001

Functional description
Extension module to increase the number of control channels of a NEA SMART 2.0 Base 24 V by 4 additional channels. This device works only with a NEA SMART 2.0 Base 24 V. Only 1 NEA SMART 2.0 R-Module 24 V may be connected to a NEA SMART 2.0 Base 24 V.

Suitable for all NEA SMART 2.0 Room Units and Probes in Bus- and RC technology (hybrid technology of NEA SMART 2.0 Base).

2 relay outputs (dry contacts) for control of pump, dehumidifier, boiler and chiller, 1 configurable digital input.

Communication to NEA SMART 2.0 Base 24 V by ZOBUS (2-wire bus).

Technical data:

Power supply	Via ZOBUS (from NEA SMART 2.0 Base 24 V)
Power supply for thermal actuators	24 V AC ±15 %/50 Hz
Digital outputs	4 triac outputs for REHAU actuators, switching capacity 1 A non-inductive, 24 VAC, maximum load per output: 4 REHAU 24 V actuators 2 relay outputs (potential-free contacts) 230 V, 5 A, Class II
Fuse	T2A
Digital inputs	1 input for potential-free contact
Bus system	Zone bus (ZOBUS): 2-wire bus system; no need to take polarity into account; maximum length 100 m; no shielded or twisted pair cable required
Protection class/protection rating	II/IP20
CE conformity as per	EN 60730
Dimensions (W x H x D in mm)	125.5 x 83.5 x 52.6
Housing material	ABS/PC
Housing colour	White (similar to RAL 9003)
Weight	0.235 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r. m., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.16 NEA SMART 2.0 R-Module 230 V

Material number: 13280211001

Functional description
Extension module to increase the number of control channels of a NEA SMART 2.0 Base 230 V by 4 additional channels. This device works only with a NEA SMART 2.0 Base 230 V. Only 1 NEA SMART 2.0 R-Module 230 V may be connected to a NEA SMART 2.0 Base 230 V.

Suitable for all NEA SMART 2.0 Room Units and Probes in Bus- and RC technology (hybrid technology of NEA SMART 2.0 Base).

2 relay outputs (dry contacts) for control of pump, dehumidifier, boiler and chiller, 1 configurable digital input.

Communication to NEA SMART 2.0 Base 230 V by ZOBUS (2-wire bus) NEA SMART 2.0 U-Module 24 V.

Technical data:

Power supply	Via ZOBUS (from NEA SMART 2.0 Base 24 V)
Power supply for thermal actuators	230 V AC ± 15 %/50 Hz
Digital outputs	4 triac outputs for REHAU actuators, switching capacity 0.5 A non-inductive, 230 VAC, maximum load per output: 4 REHAU 230 V actuators 2 relay outputs (potential-free contacts) 230 V, 5 A, Class II
Fuse	T2A
Digital inputs	1 input for potential-free contact
Bus system	Zone bus (ZOBUS): 2-wire bus system; no need to take polarity into account; maximum length 100 m; no shielded or twisted pair cable required
Protection class/protection rating	II/IP20
CE conformity as per	EN 60730
Dimensions (W x H x D in mm)	125.5 x 83.5 x 52.6
Housing material	ABS/PC
Housing colour	White (similar to RAL 9003)
Weight	0.260 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r. m., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.17 NEA SMART 2.0 U-Module 24 V

Material number: 13280221001

Functional description
Universal extension module with configurable functions:

Control of 1 mixed circuit or control of up to 2 dehumidifiers.
4 relay outputs (dry contacts), for control of pump and dehumidifier.

4 configurable digital inputs.

3 analogue inputs NTC 10 K.

All inputs/outputs are predefined according to selected function.
This device works only in the system bus network of NEA SMART 2.0 Base 24 V.

Technical data:

Power supply	SYSBUS (from NEA SMART 2.0 Base 230 V or NEA SMART 2.0 Base 24 V)
Additional power supply	24 V AC ±15 %/50 Hz (required for analogue output 0 ... 10 V output)
Digital outputs	4 relay outputs (potential-free contacts) 230 V, 5 A, Class II
Digital inputs	4 inputs for potential-free contact
Analogue inputs	AI1, AI2, AI3: NTC 10 K AI4: ---
Analogue outputs	1 output 0 ... 10 V
Bus system	System bus (SYSBUS): 3-wire RS-485 bus system; maximum total length of the bus line 500 m; shielded or twisted wire pair cable required
Protection class/protection rating	II/IP20
CE conformity as per	EN 60730
Dimensions (W x H x D in mm)	125.5 x 83.5 x 52.6
Housing material	ABS/PC
Housing colour	White (similar to RAL 9003)
Weight	0.235 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r. m., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.18 NEA SMART 2.0 Transformer

Material number: 13280191001

Functional description
Safety transformer for NEA SMART 2.0 system components.
Primary voltage 230 VAC, secondary voltage 24 V AC with maximum power 60 VA.

Technical data:

Primary voltage	230 V AC ±15 %/50 Hz
Secondary voltage	24 V AC ±15 %/50 Hz
Performance	60 VA
Power loss when idle	< 2.5 W
Integrated fuse	Thermal fuse @130 °C
Protection class/protection rating	II/IP20
CE conformity as per	EN 61558
Dimensions (W x H x D in mm)	94 x 83.5 x 66.4 mm
Housing material	ABS
Housing colour	White (similar to RAL 9003)
Weight	1.8 kg
Ambient temperature	–25 °C to +50 °C
Ambient humidity	< 95 % r. m., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.19 Remote sensor 3 m

Material number: 13280331001

Functional description

Temperature sensor for connection to NEA SMART 2.0:

- U-Module for measuring outdoor temperature
- Room Unit / Room Probe for monitoring floor temperature, room temperature, outdoor temperature and measuring core temperature in TABS applications.

Technical data:

Sensor type	NTC 10K
Sensor accuracy	R 25 °C = 10KΩ±5 %
Protection rating	IP67
CE conformity as per	EN 60730
Sensor element dimensions (W x H x D in mm)	28 x 6 x 6
Cable length	3 m
Housing material	PBT for sensor housing, PVC for cable (UL2517)
Housing colour	White (similar to RAL 9003)
Weight	0.065 kg
Ambient temperature	–20 °C to +60 °C
Ambient humidity	< 95 % r. m., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.20 Remote sensor 10 m

Material number: 13750661001

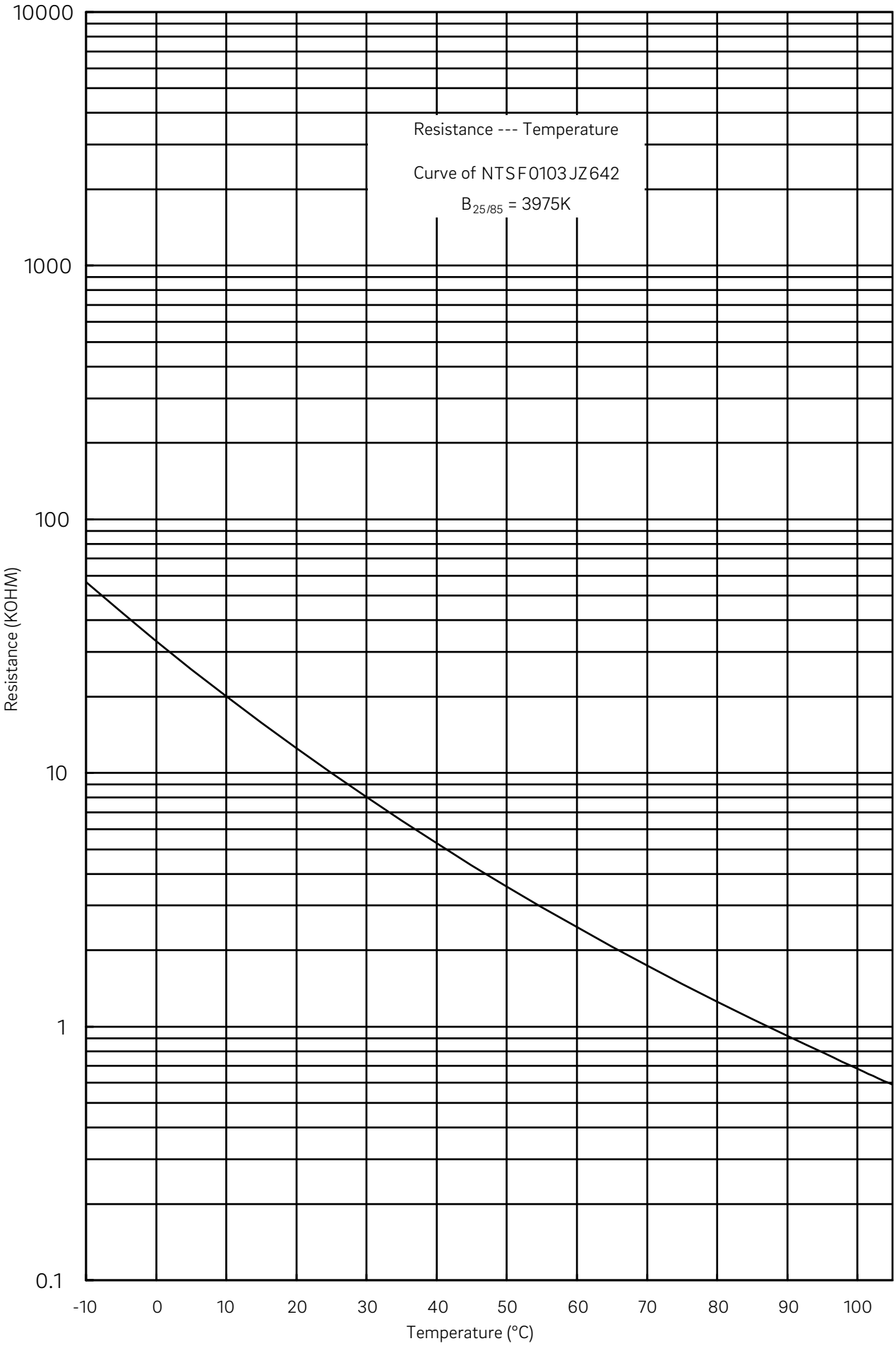
Functional description

Temperature sensor for connection to NEA SMART 2.0:

- U-Module for measuring outdoor temperature
- Room Unit / Room Probe for monitoring floor temperature, room temperature, outdoor temperature and measuring core temperature in TABS applications

Technical data:

Sensor type	NTC 10K
Sensor accuracy	R 25°C = 10KΩ±1%
Degree of protection	IP68
CE conformity according to	EN 60730, Class II Protection
Sensor element dimensions (W x H x D in mm)	30x6x6
Cable length	10 m
Housing material	TPE sensor housing, 6395N TPE Cable
Housing color	Black (similar RAL 9005)
Weight	0,11 kg
Ambient temperature	-20°C to +60°C
Storage/transport temperature	-40°C to +110°C
Usage environment	Indoors only


Resistance --- Temperature
Curve of NTSF0103JZ642
$B_{25/85}$ = 3975K
10000
1000
100
10
1
0.1
Resistance (KOHM)
-10
0
10
20
30
40
50
60
70
80
90
100
Temperature (°C)

12.21 NEA SMART 2.0 VL/RL sensor

Material number: 13280391001

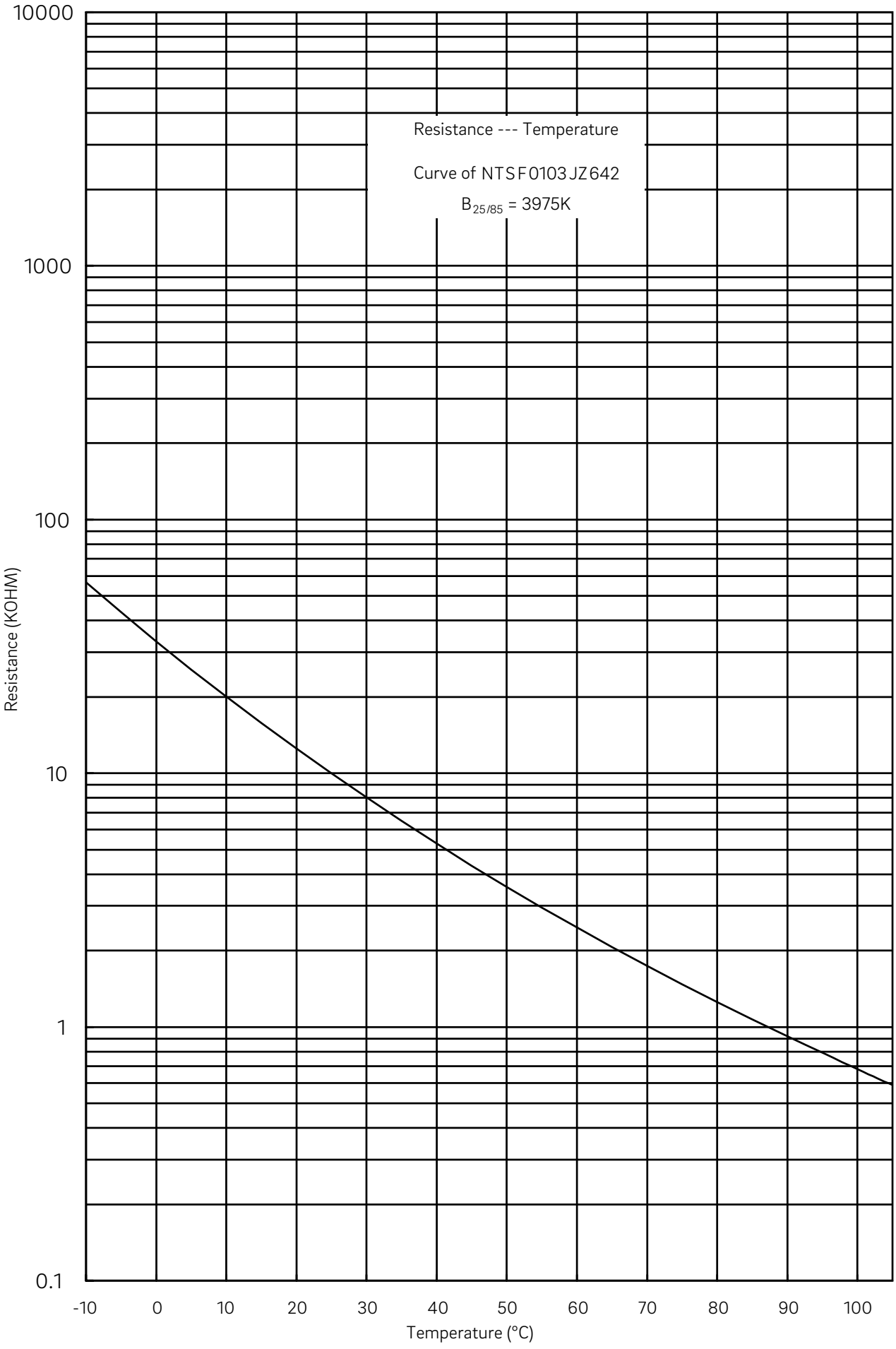
Functional description

Temperature sensor for connection to NEA SMART 2.0:

- U-Module for measuring flow (supply) and return temperature in a mixed heating circuit
- Room Unit / Room Probe for measuring return temperature in TABS application

Technical data:

Sensor type	NTC 10K
Sensor accuracy	R 25 °C = 10KΩ±5 %
Protection rating	IP67
CE conformity as per	EN 60730
Sensor element dimensions (W x H x D in mm)	45 x 5 x 5
Cable length	3 m
Housing material	Stainless steel for sensor, PVC for cable (UL2517)
Housing colour	White (similar to RAL 9003)
Weight	0.065 kg
Ambient temperature	–20 °C to +60 °C
Ambient humidity	< 95 % r. m., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only


Resistance --- Temperature
Curve of NTSF0103JZ642
$B_{25/85}$ = 3975K
10000
1000
100
10
1
0.1
Resistance (KOHM)
-10
0
10
20
30
40
50
60
70
80
90
100
Temperature (°C)

12.22 NEA SMART 2.0 Outdoor sensor

Material number: 13280341001

Functional description
Wireless operating outside temperature probe for NEA SMART 2.0 control system.

This device can be used only with NEA SMART 2.0 Base 24 V.

Technical data:

Power supply	1 x LR06 (AA) lithium battery 3.6 V
Radio frequency	869 MHz
Radio range	180 m outdoors, 30 m in buildings (typical)
Precision of temperature measurement	±0.5 K in the temperature range 15 to 30 °C
Temperature measuring range	–20 °C to +50 °C
Protection class/protection rating	III/IP45
CE conformity as per	EN 60730
Dimensions (W x H x D in mm)	79.6 x 79.6 x 49
Housing material	ABS
Housing colour	White
Weight	0.114 kg (including battery)
Ambient temperature	–50 °C to +65 °C
Ambient humidity	< 95 % r. m., non-condensing
Storage/transport temperature	–25 °C to +60 °C

12.23 NEA SMART 2.0 Antenna

Material number: 13280351001

Functional description
External antenna for NEA SMART 2.0 Base for radio communication to NEA SMART 2.0 Room Units (869 MHz).

Technical data:

Power supply	From NEA SMART 2.0 Base
Radio frequency	869 MHz
Radio range	25 m in buildings
Protection class/protection rating	III/IP30
CE conformity as per	EN 60730
Dimensions (W x H x D in mm)	186 x 22 x 11
Housing material	PVC
Housing colour	White (similar to RAL 9010)
Weight	0.060 kg
Ambient temperature	0 °C to +50 °C
Ambient humidity	< 95 % r. m., non-condensing
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.24 Thermal actuator UNI 24 V

Material number: 13992761001

Functional description
To actuate the control valves in the REHAU manifold and the thermostatic valves in the REHAU industrial manifold.

Technical data:

Operating voltage	24 V AC/DC, +20 % ... –10 %, 0 – 60 Hz
Operating output	1 W
Inrush peak current	≤ 300 mA @ 120 s
Actuating range	5.0 mm
Actuating force	100 N ±10 %
Protection class/protection rating	III / IP54
CE conformity as per	EN 60730
Dimensions (W x H x D in mm)	39 x 53 (+8) x 50
Cable length	1 m
Housing material	Polyamide
Housing colour	Light grey (RAL 7035)
Weight	0.105 kg
Ambient temperature	0 °C to +60 °C
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.25 Thermal actuator UNI 230 V

Material number: 13992751001

Functional description
To actuate the control valves in the REHAU manifold and the thermostatic valves in the REHAU industrial manifold.

Technical data:

Operating voltage	230 V AC +10 % ... –10 %, 50/60 V
Operating output	1 W
Inrush peak current	≤ 375 mA @ 100 ms
Actuating range	5.0 mm
Actuating force	100 N ±10 %
Protection class/protection rating	II/IP54
CE conformity as per	EN 60730
Dimensions (W x H x D in mm)	39 x 53 (+8) x 50
Cable length	1 m
Housing material	Polyamide
Housing colour	Light grey (RAL 7035)
Weight	0.105 kg
Ambient temperature	0 °C to +60 °C
Storage/transport temperature	–25 °C to +60 °C
Usage environment	Indoors only

12.26 Actuator BALANCE 230 V

Material number: 13950401001

Functional description
Intelligent autonomous electrothermal actuator 230 V NC for adaptive hydraulic balancing of each circuit of a manifold for REHAU radiant heating and cooling systems with individual room control.

- Normally closed.
- The folding lever of the normally closed actuator is used for ease mounting or to open the thermostatic valve manually.
- Integrated flow temperature limiter 60 °C.
- For installation on heating circuit manifolds with at least 50 mm heating circuit spacing and valve inserts with M30 x 1.5 external thread (closing dimension 11.8 mm).
- Temperature sensors for flow and return pipe integrated in fastening clips for polymer pipes and metal-plastic composite pipes with an outer diameter of 12 to 20 mm.

Technical data:

Voltage	230 V AC, 50 Hz
Power consumption	1,7 W
Inrush current	130 mA for max. 200 msec
Power factor λ	0,1 to 0,99 (capacitive acting)
Version	Normally closed
Travel range	≥ 3,5 mm
Actuating force	110 N
Closing/ opening time	ca. 3 min
Valve connection	Union nut M 30 x 1.5
Valve closing dimension	11,8 mm
BALANCE 230 V closing dimension	10,8 mm
Fluid temperature	10 to 60 °C (flow temperature limitation is active when lever is closed)
Mounting position	Any position
Protection type / class	IP 54 / II
CE conformity	EN 60730; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-4-11; EN 61000-6-2; EN 61000-6-3
Dimensions (W x H x D in mm)	47 x 74,2 x 53,1 (closed lever) 47 x 74,2 x 82,2 ((opened lever)
Cable length	Connection cable: 1 m Sensor cables: 0.4 m
Pipe outside diameter	12 mm to 20 mm
Housing / Housing color	Polyamide / grey
Weight	180 g (including cables and sensors)
Ambient temperature	0 °C to 50 °C
Air humidity	10 to 100 % non-condensing
Storage temperature	–25 °C to 60 °C
Usage environment	Indoors only

12.27 Coupling relay 24 V / 230 V

Material number:
13388021001 Coupling relay 24 V
13388031001 Coupling relay 230 V

Functional description
Suitable for passing 24 V AC or 230 V AC switching signals to digital inputs of the NEA SMART 2.0 or NEA control system.

Technical data:

Coil voltage	24 V AC / 230 V AC
Contacts, maximum continuous current	8 A
Conformity	DIN VDE 0815, 2014/35/EU
Dimensions (W x H x D in mm)	18 x 62 x 75
Weight	70 g
Ambient temperature	–40 °C ... 85 °C
Usage environment	Indoors only

12.28 Switching relay 24 V / 230 V

Material number:
13388041001 Switching relay 24 V
13388061001 Switching relay 230 V

Functional description
Suitable for connection to triac or relay outputs of control system NEA SMART 2.0 24 V and for connection to outputs of control system NEA 24 V or 230 V. The switching relays allow controlling external devices, to switch additional actuators, or to transmit signals to other building technology units.

Technical data:

Coil voltage	24 V AC / 230 V AC
Contacts, maximum continuous current	25 A
Conformity	DIN VDE 0815, 2014/35/EU
Dimensions (W x H x D in mm)	18 x 62 x 85
Weight	88 g
Ambient temperature	–40 °C … 85 °C
Usage environment	Indoors only

Switching relay load
- Switching Relay 230 V max load:
  60 Thermal actuator UNI 230 V
- Switching Relay 24 V max load:
  60 Thermal actuator UNI 24 V

12.29 NEA SMART 2.0 KNX Gateway

Material number: 13388001001

Range of Application:
The NEA SMART 2.0 - KNX connection exchanges data (set points, actual values, operating modes and energy levels) between NEA SMART 2.0 and a centralised BMS System (KNX). The NEA SMART 2.0 KNX Gateway communicates with the NEA SMART 2.0 system via the SYSBUS, as a Modbus Slave. The assignment of KNX objects and Modbus registers can be configured via parameters in the ETS software (KNX license software). No additional software is required. The SYSBUS (Modbus) assignment required for the NEA SMART 2.0 control system can optionally imported via the provided example ETS project. The import of the SYSBUS (Modbus) assignments can be done in the office or on site.
The SYSBUS (Modbus) connection is galvanic isolated from the KNX Bus. The NEA SMART 2.0 Power Supply Gateway is used for the auxiliary voltage of the SYSBUS (Modbus). The KNX-Bus is supplied via the other KNX components on-site.
The device is to be DIN rail mounted in permanent internal (dry location) installations only.

Technical data:

KNX operating voltage	KNX nominal voltage 30 V DC
KNX bus current consumption	approx. 4 mA
Auxiliary voltage Modbus / SYSBUS	12 ... 24 V DC
Current consumption Modbus / SYSBUS	ca. 5 mA
Installation	DIN rails installation: Mounting rail
Housing	DIN series installation with 1 HP (18 mm)
Operating elements	2 buttons and 1 KNX programming button
Indicators	3 LEDs, multi-colour and programming LED (red)
Connector for KNX Bus	Red / black
Connector for Modbus / SYSBUS	Pluggable screw connector (3 poles) for Modbus
Connector for Modbus / SYSBUS auxiliary voltage	Pluggable screw connector (3 poles) for power supply
Cross-section of connectors	0.34 ... 2.5 mm^2
Modbus / SYSBUS	Type: RTU (RS-485), Slave / Up to 250 channels
Degree of protection (acc. EN 60529)	IP 20
CE conformity / standards	EMC directive 2014 / 30 / EU RoHS directive 2011 / 65 / EU EN 50491-3: 2009 EN 50491-5-1: 2010 EN 50491-5-2: 2010 EN 50491-5-3: 2010 EN 61000-6-2: 2005 EN 61000-6-3: 2007 + A1: 2011 EN 50581: 2012
Dimensions (W x H x D in mm)	17.5 x 59.8 x 89.8
Housing material	Cover: PC Base plate: PA 66/6
Housing colour	Cover: Light grey RAL 7035 Base plate: Graphite black RAL 9011
Weight	50 g
Ambient temperature	–5 °C to +45 °C
Storage temperature	–25 °C to +70 °C
Ambient humidity	5 % to 93 % r.m., non-condensing
Usage environment	Indoors only

12.30 NEA SMART 2.0 Power Supply Gateway

Material number: 13388011001

Range of Application:
The NEA SMART 2.0 Power Supply Gateway is a DIN rail mounted power supply with a direct current output (DC).
This AC/DC-power supply is used to transform the auxiliary voltage for the SYSBUS (Modbus) of the NEA SMART 2.0 KNX Gateways. The potentiometer adjusts the output voltage. The blue LED indicates operation. The power supply unit is suitable for building automation controls in commercial and private premises. The device is to be DIN rail mounted in permanent internal (dry location) installations only.

Technical data:

Operating voltage	85 V to 264 V AC
Frequency range	47 – 63 Hz
Current consumption	0.25 A / 230 V AC
Inrush current, max.	45 A / 230 V AC
Efficiency	85 %
Output voltage	12 V DC
Output voltage – Adjustment range	10.8 V DC to 13.8 V DC
Output current	0 to 1.25 A
Output power	15 W
Type	Switch Mode
Operating time max.	1166000 h
Ripple	120 mV ss
Load regulation	1 %
Installation	DIN rails installation: 1 HP; mounting rail TS-35/7.5 or TS-35/15
Operating elements	1 potentiometer
Indicator	1 LED (blue); Power-On
Special features	Short-circuit, overvoltage and overload protection
Cross-section of connectors	0.5 mm^2 to 2.5 mm^2
Protection class / protection rating	II / no IP assigned
CE conformity / standards UL approval	RoHS-conform, EN 60950-1; EN 6155-2-16; EN50178; UL 508; UL 60950-1 EMC EN55032 (CISPR32) Class B; EN61000-3-2 Class A; EN61000-3-3; EN61000-4-2, -3, -4, -5, -6, -8, -11
Dimensions (W x H x D in mm)	17.5 x 93 x 58.4
Weight	78 g
Ambient temperature	–30 °C to +70 °C
Storage temperature	–40 °C to +85 °C
Ambient humidity	20 % to 90 % r.m., non-condensing
Storage humidity	10 % to 95 % r.m., non-condensing
Usage environment	Indoors only

12.31 NEA SMART 2.0 Bus Cable (10 / 50 m bundle)

Material number:
13280411001 NEA SMART 2.0 Bus Cable 10 m
13280421001 NEA SMART 2.0 Bus Cable 50 m

Functional description
Cable to connect via System Bus and Zone Bus components of NEA SMART 2.0 system.

Technical data:

Cable type	J-Y(ST)Y 2 x 2 x 0.8 mm
Conformity	DIN EN 50441, VDE 0815
Loop resistance	max. 73.2 Ohm/km
Conductor cross-section	0.8 mm
Outer diameter	7 mm
Length	10 m / 50 m
Weight	6 kg per 100 m
Ambient temperature	–5 °C … 50 °C
Usage environment	Indoors only

www.rehau.uk

Rheniumhaus
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954647 EN 03.2025