BASE STATION NEA SMART 24 V
Installation Instructions

CONTENTS

More information on the Nea Smart control system and all documentation available for download can be found at

www.rehau.com/neasmart

1 SAFETY

1.1   Used symbols and important safety instructions

Electrical voltage! Danger to life! Safety instructions are marked with this symbol.

Note

1.2   Intended use

The base station Nea Smart 24 V is intended
- for a single room regulation system (readjustment) with a maximum of 8 zones for heating and cooling systems,
- for the connection of a maximum of 12 actuators UNI 24 V and 8 Nea Smart R room control units D or Nea Smart R room control units, a pump, a CO signalling unit, a humidity sensor with potential-free contact as well as an external timer,
- for a fixed installation.

Every other use is outside its intended use for which the manufacturer cannot be held liable.
Modifications and conversions are expressively forbidden and lead to dangers the manufacturer cannot be held liable for.

1.3   General safety warnings

Electrical voltage! Danger to life! The base station is live.
- Prior to opening always disconnect from the mains and secure in such a way that it cannot accidentally be switched on.
- Disconnect all external voltages connected to the unit, e.g. at the pump and the boiler contacts and ensure these cannot accidentally be switched live.

Emergency
In case of emergency, disconnect the complete control system from mains.

Retain this manual and provide it to future owners.

1.4   Requirements with regard to personnel

Authorised specialists
The electrical installations must be performed according to the current VDE regulations as well as according to the regulations of your local electric power utility company. These instructions are intended for use by a qualified person who is holding an official **certificate** in one of the following professions: electrician or electronics engineer (according to the profession designations officially announced in the Federal Republic of Germany, as well as according to comparable professions within the European Community Law).

1.5   Restrictions regarding use of product

This unit is not intended to be used by people (including children) with restricted physical, sensory or mental skills except if they are supervised by a person responsible for their safety or have received instructions on how to use this unit.

Children should be supervised in order to ensure that they do not play with the device.

1.6   Compliance

This product is labelled with the CE Marking and thus is in compliance with the requirements from the guidelines:
- 2004/108/EG with amendments "Council Directive on the approximation of the laws of the Member States relating to Electromagnetic Compatibility"
- 2006/95/EG with amendments "Council for Coordination of the Regulations of EU Member Countries regarding the electrical equipment for use within certain voltage limits"

Increased protection requirements may exist for the overall installation, the compliance of which is the responsibility of the installer.

2 VERSIONS

2.1 Box contents

1 x

1 x

1 x
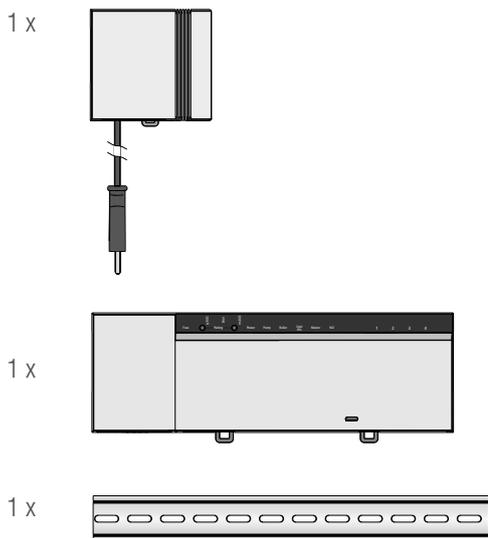
Fig. 2-1   Box contents

2.2 Indicators and operating buttons
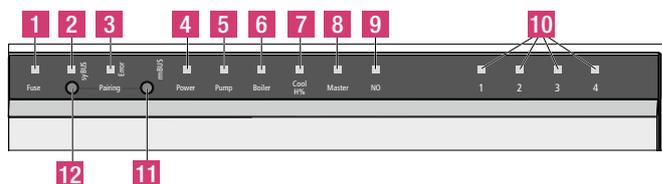
Fig. 2-2   Indicators and operating buttons

No.	Designation	LED	Status	Function
1	Fuse	red	permanent on	Fuse has blown
2	syBUS	yellow	permanent on	Shows syBUS activity
			Flashing	Write access on microSD-card
3	Error	red	permanent on	High temperature limiter active
4	Power	green	permanent on	Base station ready
5	Pump	green	permanent on	Pump output active
6	Boiler	green	permanent on	Lights up when boiler output is active if the boiler relay is used for boiler control
7	Cool H%	blue	permanent on	Cooling mode active
			Flashing	Condensation detected
8	Master	yellow	permanent on	Base station is defined as master
			Flashing	Base station is defined as slave
9	NO	yellow	permanent on	Installation is configured for NO actuators (normally open)
10	Heating zones 1 - x	green		Shows the respective status of the heating/cooling zones
11	rmBUS button	-		Button for the rmBUS functionality
12	syBUS button	-		Button for the syBUS functionality

Tab. 2-1   Indicators and operating buttons

2.3   Connections
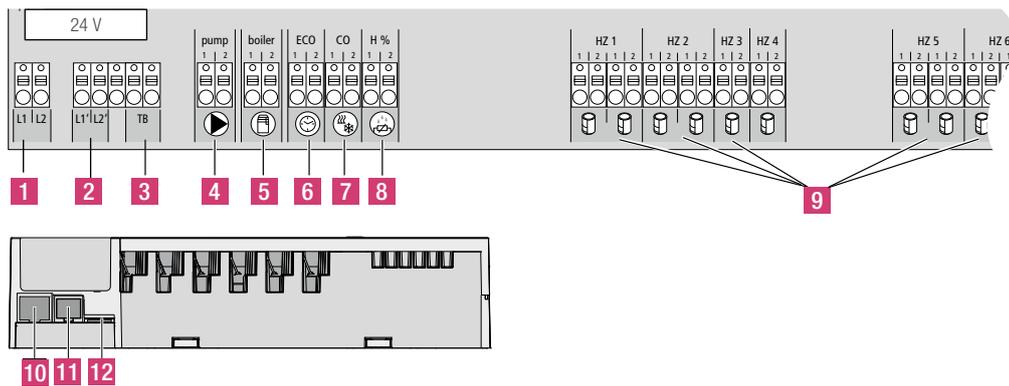
Fig. 2-3   Connections

No.	Terminals	Function
1	Mains transformer	Terminal for system transformer
2	Output 24 V	Output for the supply of e.g. high temperature limiter (to be provided by others)
3	High temperature limiter	Terminals for connecting high temperature limiter for protecting sensitive surfaces, to be provided by others (optional)
4	Pump	Terminal to switch pump
5	Boiler	Terminal to switch boiler or valves in case of CO mode
6	ECO	Potential-free input for external timer
7	Change over	Potential-free input (according to SELV) for external change-over signal
8	Dew point sensor	Potential-free input (according to SELV) for dew point sensor
9	Actuators	12 connections for thermal actuators UNI 24 V
10	RJ45 connection	Ethernet interface for the integration of the base station into the home network
11	RJ12 connection	Connection for active antenna
12	microSD card slot	Used for updating firmware and individual system settings.

Tab. 2-2   Connections

2.4   Technical data

	Base Station Nea Smart 24 V
Ethernet	x
Number of heating zones	8
Number of actuators	4x2 + 4x1
Max. nominal load of all actuators	24 W
Switching power per heating zone	max. 1 A
Pump output	8 A ohmsch, inductive max. 200 VA
Operating voltage	24 V / ±20 %
Mains connection	System transformer with mains plug
Power consumption (without pump)	50 W (limited by the system transformer)
Power consumption in idle operation/with transformer	1,1 W / 1,4 W
Protection class	II
Protection degree/overvoltage category	IP20 / III
Fuse	5 x 20 mm, T2A
Ambient temperature	0 °C – 60 °C
Storage temperature	-25 °C to +70 °C
Humidity	5 to 80%, not condensing
Dimensions	370 x 52 x 75 mm
Material	PC+ABS
Control accuracy of set point	±1 K
Hunting	±0,2 K
Max. line length	500 m
rmBUS connection	polarity reversal protected

Tab. 2-3   Technical data

3 INSTALLATION

3.1   Installation

⚡ Electrical voltage! Danger to life!
Only carry out installation work with all power disconnected

Installation
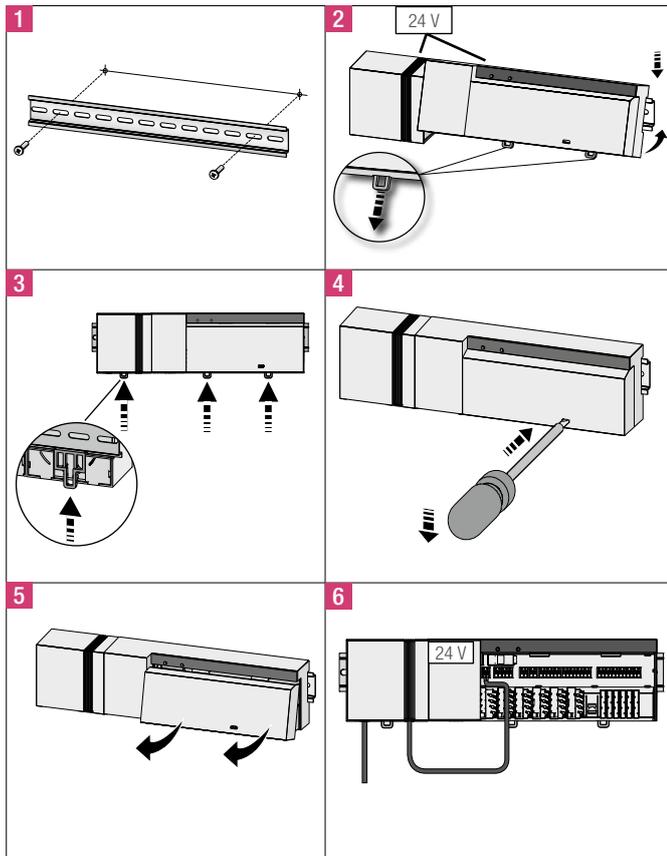
Fig. 3-1   Installation

3.2   Electrical connection

⚡ Electrical voltage! Danger to life!
Only carry out installation work with all power disconnected

The wiring of the control system depends on many factors and must be planned and carried out carefully by the installer. The following cable sizes are compatible with the terminals:
- solid cable: 0.5 – 1.5 mm²
- multiple stranded cable: 1,0 – 1,5 mm²
- 8 - 9 mm insulation stripped off the cable
- Actuators with factory-fitted cable sleeves can be used.

ℹ️ Both L1/L1' terminals share a rail and both L2/L2' terminals share a rail.
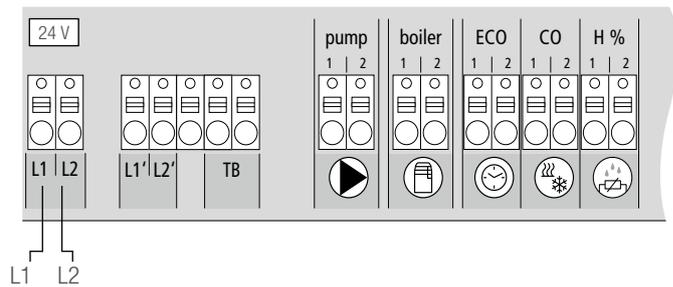
Fig. 3-2   Electrical connection

3.2.1   External change-over signal
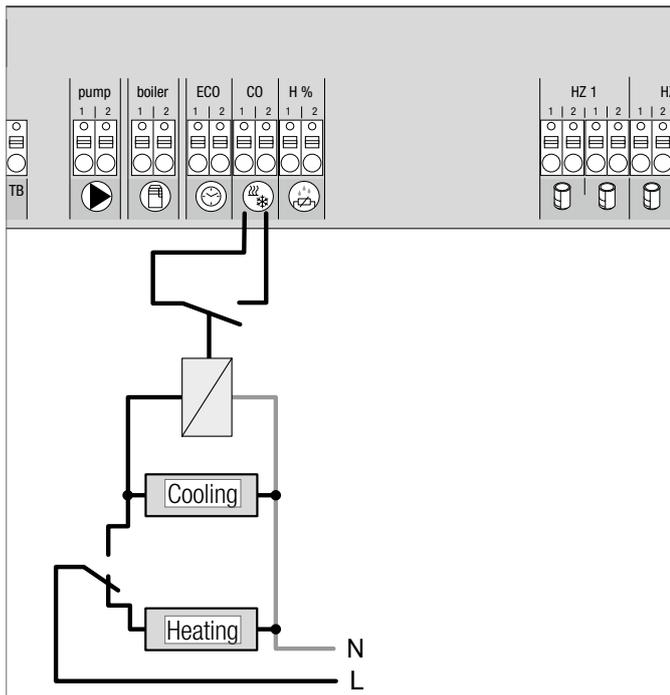
Fig. 3-3   Terminal change-over signal

If an external change-over signal is used, the overall installation switches accordingly between heating and cooling.

3.2.2   Pump/boiler/chiller
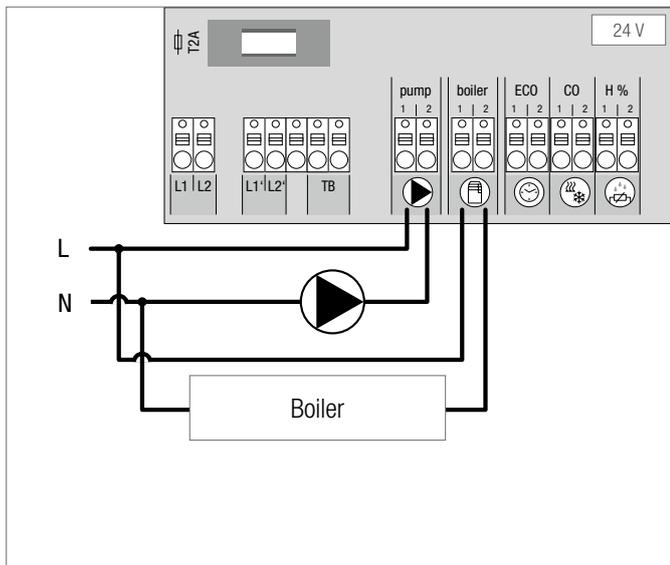
Fig. 3-4   Terminal for pump and boiler

The boiler terminal switches a boiler or chiller. Additionally, a pump can be supplied directly with power and switched.
The use of a relay to switch a pump is recommended.

3.2.3   Optional dew point sensor
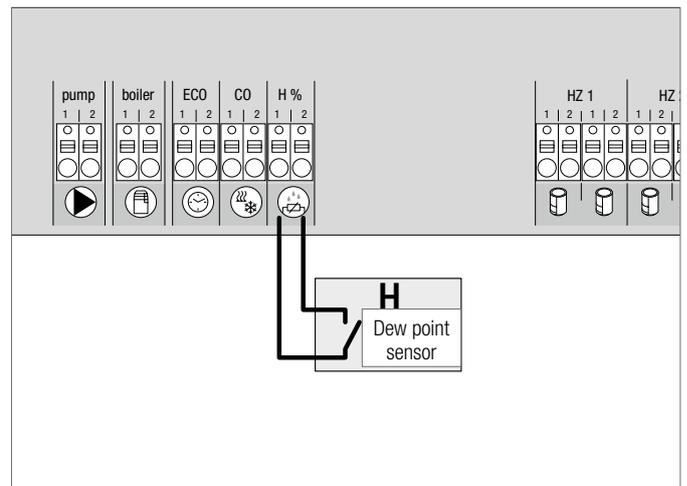
Fig. 3-5   Terminal for dew point sensor

Dew point sensors (to be provided by others) are used to prevent condensation when in cooling mode.
The dew point alarm is triggered when the contact of the dew point sensor is **closed**.

3.2.4   Pilot function for change-over heating/cooling
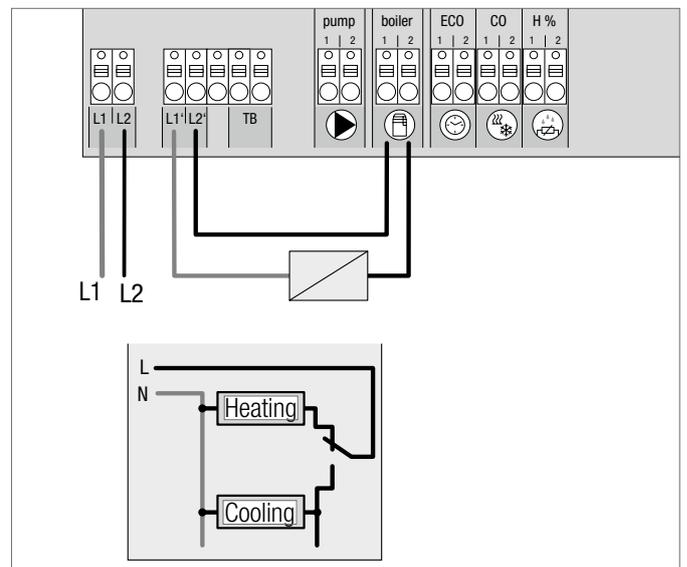
Fig. 3-6   Usage of the "Boiler" output as a pilot signal for change over

If no external change-over signal is available, the internal pilot function of the base station can be used for switching the overall installation between the operating modes Heating and Cooling. A relay used by the base station for switching over is used for this.

3.2.5 External timer
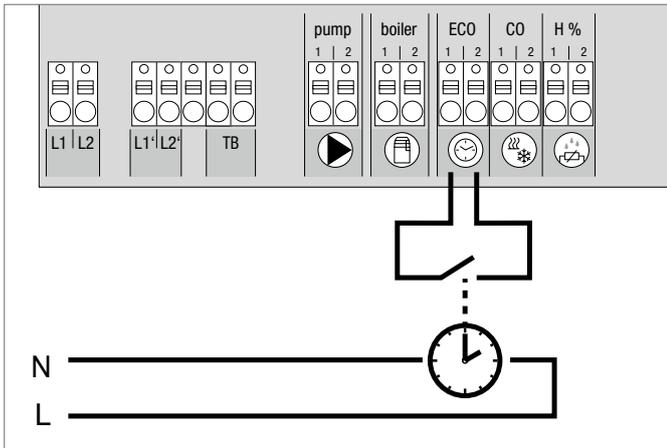
Fig. 3-7   Connection of an external timer

The base station is equipped with an ECO input for connecting an external timer in case the timers of the Nea Smart room control unit D are not be used. When the input is activated by the external timer, the heating zones are switched into set back.

3.2.6 Room BUS
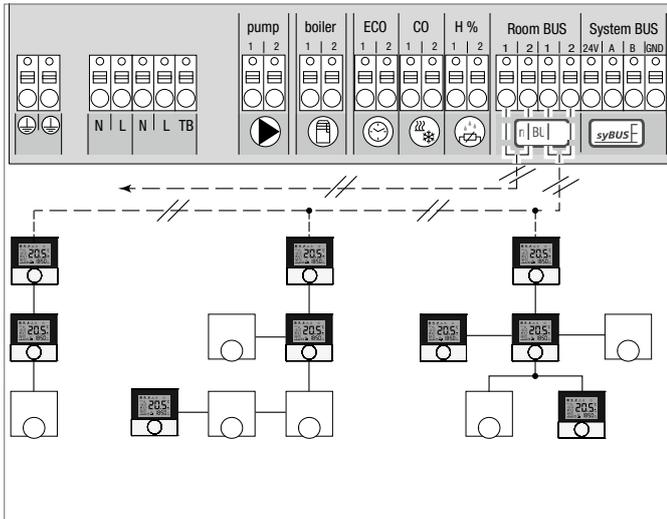
Fig. 3-8   Connection of Nea Smart room control units with base station Nea Smart

Eight room control units can be connected to the Room Bus (rmBUS). The connection of the room control units is protected against polarity reversal and can be executed in the topologies "line", "tree", or "star". An installation line I (Y) x Y 2 x 2 x 0.8 mm should ideally be used. However, it is also possible to use an existing line with at least 2 wires. The country-specific standards and regulations must always be observed, however!

3.2.7 System BUS
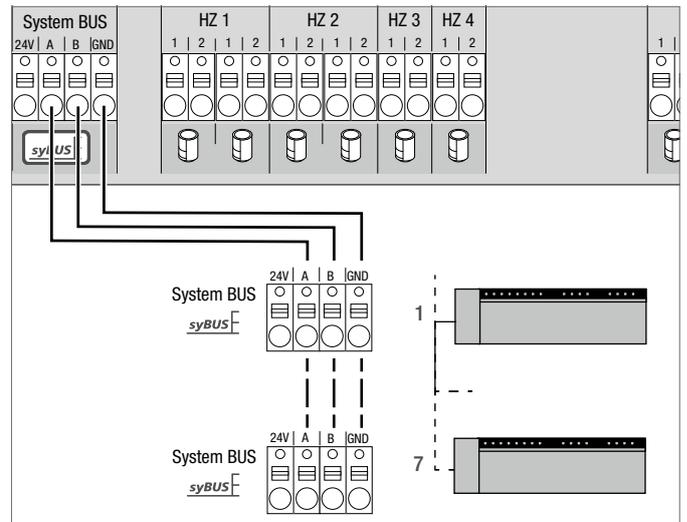
Fig. 3-9   Base station connection via system BUS

Line to be used: I (Y) St Y 2 x 2 x 0,8 mm.
Connect the shield to device earth (Gnd) on both sides!
A maximum of seven base stations can be interconnected via the system BUS (syBUS) in order to exchange global system parameters. After completing the wiring, the base stations must be paired – see section 4.2. For cable sizes <6 mm, a strain relief is necessary (to be provided by others).

3.2.8 Use of high temperature limiter
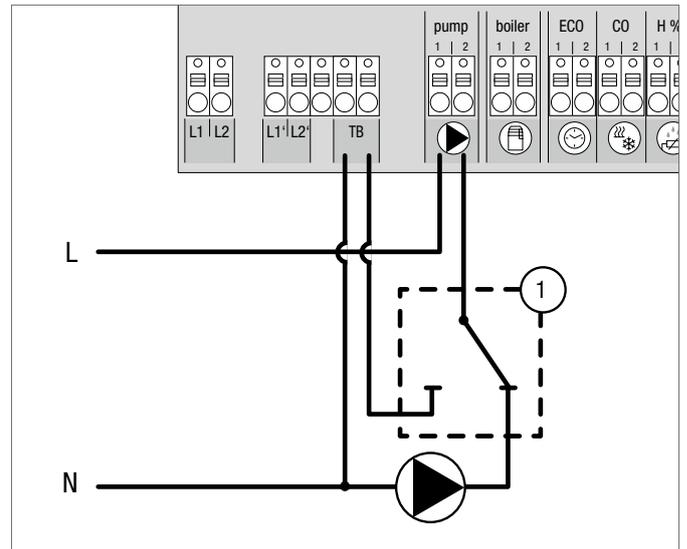
Fig. 3-10   Terminal for high temperature limiter

Connecting a high temperature limiter (1) (supplied by others). When triggered this input cuts the power to the pump and switches the input TL if any excessive flow temperatures into the floor heating are detected. If the TL input is switched, the base station automatically closes all actuators.

3.2.9   Ethernet connection

The Nea Smart base station 24 V is equipped with a RJ45 interface and an integrated web server for the control and configuration of the system via PC/laptop and over the Internet.
- Integration of the base station into the network via network cable, or direct connection to PC/laptop

Set-up in the home network:
- Open the router menu (see manual of the respective device) via the address bar in the web browser (Internet Explorer, Firefox, …).
- Open an overview of all devices in the network.
- Compare to the MAC address (see type sign) in order to find out the IP address allocated to the base station.
- Note the IP address of the base station and enter it into the address bar of the web browser in order to open the web interface.

Direct connection to PC/laptop:
- Open the network settings in the PC/laptop and assign the IP address **192.168.100.1** as well as
  the subnet mask **255.255.0.0** manually to the PC.
- Access to the web interface can be gained by entering the IP address 192.168.100.100 in the address bar of your web browser.

You can find further information on the set-up as well on worldwide access via the Internet under www.rehau.com/neasmart.

4 COMMISSIONING

4.1 First commissioning

The base station is in installation mode during the first 30 minutes after switching on the mains power. The target and actual temperatures are compared in this mode, all other functions are deactivated. If the actual temperature is below the target temperature, the output allocated to the respective room control unit is activated at the base station. In this initial time all signals are activated instantly making it possible to check the correct pairing of room control units and heating zones.

- Switch on the mains power.
  - The base station is in installation mode for 30 minutes.
  - If the base station is configured for NC actuators, all heating zones are activated for 10 minutes in order to unlock the first-open function of the NC actuators.
  - The power LED (operation display) lights up permanently.

4.2 Connecting (pairing) / separating base stations

If several base stations are used in one heating system, a maximum of seven units can be connected with each other (paired) for the exchange of global system parameters via system bus (syBUS). Communication is done according to the master/slave principle. Requirements and status messages are exchanged between the units. The master unit centrally controls the directly connected functions/components:

- CO input/output (if the pilot function is activated)
- Boiler output
- Pump output
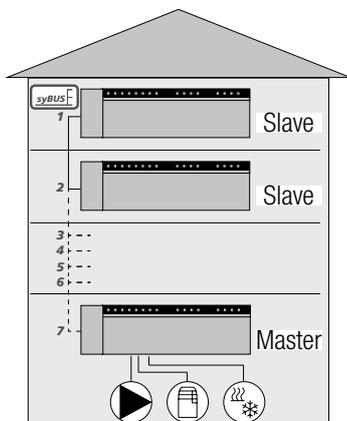
Fig. 4-1   System with multiple base units

ℹ The base station to which the components are connected must be configured as master. Further base stations can only be paired with the master.

The pairing of base stations is done as follows:
1. Press the syBUS button of the base station to be configured as master for three seconds in order to start the pairing mode.
   - The LED "syBUS" flashes.
   - For three minutes, the pairing mode is ready to receive the pairing signal of another base station.
2. Press the syBUS button of the base station to be configured as slave two times consecutively for one second, in order pair it with the master.
   - The paring mode ends automatically after the process has finished.
   - The LED "Master" **lights** up permanently at the master base station.
   - The LED "Master" **flashes** if the base station has been configured as slave.
3. Repeat the process for paring another base station.

Disconnecting a base station is done as follows:
4. Press the syBUS button of the base station to be separated for three seconds in order to start the pairing mode.
   - The LED "syBUS" flashes.
5. Press the syBUS button again for approx. 10 seconds.
   - The base resets and the LED "Master" is off.

4.3 Allocation of a room control unit to a heating zone (pairing)

1. Press the rmBUS button of the base station for three seconds in order to start the pairing mode.
   - The LED "Heating zone1" flashes.
2. Select the desired heating zone by pressing again briefly.
   - For three minutes, the selected heating zone is ready to receive the pairing signal of a room control unit.
3. Activate the pairing function at the room control unit (see Room Control Unit Manual).
   - The pairing mode ends automatically after establishing a successful connection.
   - The LED of the heating zone previously selected will light up for 1 minute.
4. Repeat the process for allocating more room control units.

ⓘ One Room Control Unit can be allocated to various heating zones. The allocation of several room control units to one zone is not possible.

4.4 Perform connection test

The connection test can be used to test the communication between the base station and the room control unit.

The base station must not be in pairing mode.
1. Start the connection test on the room control unit (see manual of the room control unit).
   - The heating zone allocated to the room control unit is activated for one minute and is switched off or on depending on its current operating status.
2. If there is no activation, the signal is interrupted. Check
   - wether the room control unit is paired with the base station
   - wether all connections have full contact
   - wether the communication bus wiring is not damaged.

4.5 System configuration

The base station is configured either via microSD card, the base station web interface or the service level on the Nea Smart room control unit D.

4.5.1 System configuration with microSD card

Individual settings can be made via the EZR Manager SD Card under www.ezr-home.de and transferred to the base station via the microSD card. As of software version 01.70, the base station accepts microSD cards >2 GB in the formats FAT16 or FAT32.

1. Open www.ezr-home.de via the web browser on your PC, select EZR Manager SD Card and follow the instructions online.
2. Insert the microSD card with the updated data into the base station.
   - The transfer process will start automatically and copy the updated data into the base station.
   - The LED "syBUS" flashes during the transfer process.
   - After a successful data transmission, the LED "syBUS" stops flashing.

4.5.2 Configuration with Nea Smart room control unit D

The Service level of the Nea Smart room control unit D is protected with a PIN code and may only be used by authorized specialists.

⚡ **Faulty configuration leads to errors and damages the installations.**

1. Press the control knob.
2. Select the menu "Service Level" and confirm by pressing.
3. Enter the 4-digit PIN (standard: 1314) by rotating and pressing.
4. Select parameters (PAr) by pressing again and enter the number code of the desired parameter (see following table).
5. Change parameters as required and confirm by pressing.

4.6   Resetting the factory settings

Attention! All user settings will be lost.

1. If present, remove the microSD Card from the base station and delete the parameter file "params_usr.bin" using a PC.
2. Press the rmBUS button on the base station for three seconds in order to start the pairing mode.
   - The LED "Heating zone1" flashes.
3. Press the rmBUS button again for 10 seconds.
   - All heating zone LEDs flash simultaneously; press the rmBUS button for another 5 seconds.
   - the LEDs light up simultaneously, and then go out.

Now the base station is reset to factory settings and behaves as it did during the first commissioning (see section 4).

Previously allocated room control units must be paired again, see section 4.3.

No.	Parameters	Description	Default Settings	Unit
010	Used heating system	Adjustable per heating zone: Floor heating (FBH) standard / FBH low energy / radiator / convector passive / convector active	1	FBH St.=0 FBH NE=1 RAD=2 KON pas.=3 KON act.=4
020	Deactivate heating/cooling	Deactivating the switching outputs depending on the selected operating mode (heating/cooling)	0	normal=0 Heating deactivated=1 Cooling deactivated=2
030	Tamper Proof function (child safety lock)	Password required for deactivate the tamper proof function	0	Deactivated=0 Activated=1
031	Password for tamper proof function	Determine PIN if parameter 30 is set to active	–	0000..9999
040	External sensor connected to the room control unit	Register an additional sensor for monitoring the floor temperature (FBH), the room temperature or the dew point	2	no sensor=0 Dew point sen.=1 Temp FBH=2 Temp room=3
050	Backlit	Adjustable per room control unit: Duration that the display continues to be lit after operation	15	0 ... 30 s default 15 s
051	Brightness	Adjustable per room control unit: adjusts the brightness of the back light of the display	50	10 ... 100 % default: 50 %
052	Contrast	Adjustable per room control unit: Sets the display contrast.	3	0 ... 7 default: 3
060	Temperature calibration of actual values	A correction factor is applied to the actual temperature	0,0	-2.0...+2.0 K in 0.1 increments
110	Control direction switched output	Change between NC and NO actuators (only globally)	0	NC=0 / NO=1
115	Use as setback input	Change-over between use of the ECO input for setback or holiday function of the room control unit. The holiday function cannot be activated any longer via the room control unit if this parameter has been set to 1.	0	ECO=0 Holiday=1
120	Unit of temperature display	Toggle the display between degree Celsius and degree Fahrenheit	0	°C=0 °F=1
Pump configuration				
130	Pump output	Use the control of a local recirculation pump (in the heating circuit distributor) or a global recirculation pump (heating installation).	0	local=0 global=1
131	Pump type	Selection of the used pump: Conventional Pump (KP) / High efficiency Pump (HP)	1	CP=0 HP=1
132	Pump delay	Time delay between demand signal and acutal activation of pump.	4 min	[min]
133	Pump overrun	Time between closing of actuators and switching off pump.	2 min	[min]
134	Control direction switched output	The control direction can be reversed if the pump relay is used as control output	0	normal=0 reversed=1
135	Minimum running time	The minimum running time indicates how long the HP must run until it may be switched off again.	30 min	[min]
136	Minimum standstill time	High efficiency pump: The pump may only be switched off if a minimum standstill time can be ensured.	10 min	[min]
Configuration of change-over functionality / boiler relay				
140	Function of relay boiler / CO output	Selection whether the switching output shall serve for controlling a pump relay, or as CO pilot	0	Boiler=0 CO pilot=1
141	Boiler delay	Boiler delay for conventional pump Pump	5 min	[min]
142	Overrun	Boiler overrun time for conventional pump Pump	1 min	[min]

No.	Parameters	Description	Default Settings	Unit
143	Control direction switched output	If used as a control output the relay function can be reversed.	0	normal=0 reversed=1
160	Frost protection	Activation of control outputs for $T_{actual} <x$ °C	1	Deactivated=0 Activated=1
161	Minimum temperature in frost protection mode	Limit room temperature at which frost protection mode is activated	8 °C	[°C]
170	Smart Start	Adaptive self learning of the temperature behaviour of each individual heating zones	0	Deactivated=0 Activated=1
Safe mode operation				
180	Time until activated	Delay until safe mode is activated	180 min	[min]
181	PWM cycle duration in safe mode	Duration of a PWM cycle in safe mode	15 min	[min]
182	Cycle duration PWM heating	Control duration in heating operation	25 %	[%]
183	Cycle duration PWM cooling	Control duration in cooling operation	0 %	[%]
Valve exercise				
190	Time until activated	Running time since last activation	14 d	[d]
191	Duration of valve exercise	Duration of valve exercise (0= function deactivated)	5 min	[min]
Pump exercise				
200	Time until activated	Running time since last activation	3 d	[d]
201	Time until activated	Activation duration (0 = function deactivated)	5 min	[min]
210	First open function (FO)	Activation of all actuator outputs in installation mode	10 min	[min] Off=0
220	Automatic switching between summer and winter time	If activated, time switching follows automatically the CET guidelines	1	Deactivated=0 Activated=1
230	Setback temperature differential	In case of activation of the setback via the external input	2 K	[K]

Tab. 4-1   Parameters

5   EXERCISE FUNCTIONS AND SAFE MODE

5.1   Exercise functions

The base station is equipped with many exercise functions for avoiding damage to the overall system.

5.1.1   Pump exercise

In order to avoid damage by prolonged standstill times, the pump is regularly activated in pre-set intervals. The LED "pump" lights up during these periods (see parameters 200/201).

5.1.2   Valve exercise function

During prolonged periods without valve activation (e. g. outside the heating period) all heating zones with a paired room control unit are regularly activated to prevent setting of the valves (see parameters 190/191).

5.1.3   Frost protection

Independent from the operating mode, every switched actuator output has a frost protection. When the actual room temperature falls below the preset min frost protection temperature, the corresponding actuators are opened until the min frost protection temperature is reached again in the room. The frost protection temperature can be set via the microSD card, via the software surface of the Ethernet variant or via the service level of the RBG display (parameter 161).

5.1.4   Dew point monitoring

If the installation is equipped with a dew point sensor (provided by others), the valves of all heating zones are closed if condensation is detected in order to avoid damage due to moisture. The dew point sensor input is only used during cooling operation.
The alarm is triggered when the contact is **closed**.

5.1.5   High temperature limiter

If an optional high temperature limiter is used, all valves are closed when a preset temperature is exceeded in order to avoid damage to sensitive floor coverings.

5.2   Safe mode

If the base station is unable to establish a connection to a room control unit allocated to a heating zone for a preset time, the safe mode is activated automatically. In safe mode, the switched outputs at the base station are activated with a modified PWM cycle duration (parameter 181) independent from the heating system in order to avoid complete cooling of the rooms (in heating operation) or condensation (in cooling operation).

6 TROUBLESHOOTING AND CLEANING

6.1 Error messages and error handling
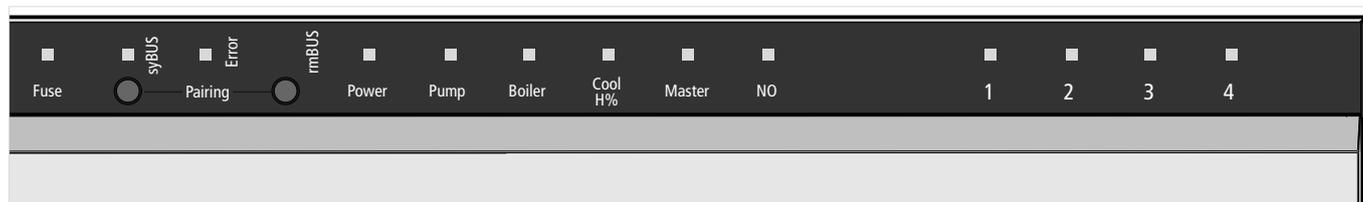
Fig. 6-1   Indicators and operating buttons

Signal code of the LEDs	Meaning	Handling
Fuse		
Duration in seconds — Fuse — 0 1 2 3 4	Fuse defective	Change the fuse (see section 6.2)
Error / Pump		
Duration in seconds — Pump / Error — 0 1 2 3 4	High temperature limiter active, valves are closed	The normal control operation is automatically resumed when the temperature drops again below the preset limit
„Cool H%" (only cooling operation)		
Duration in seconds — Cool — 0 1 2 3 4	Condensation detected, valves are closed	The normal control operation is automatically resumed when no condensation is detected any more.
Heating zone		
Duration in seconds — HZ — 0 1 2 3 4	Safe mode active	Check bus line for interruptions. Carry out a connection test. Replace a defective room control unit.

Tab. 6-1   Troubleshooting

- ■ LED on
- □ LED off

6.2　Fuse change

⚠ Electrical voltage! Danger to life!
　The base station is live.
- Prior to opening always disconnect from the mains and secure in
  such a way that it cannot accidentally be switched on.
- Prior to replacing the fuse and connecting the power again, always
  check the wiring and connected components for any faults.
- Only use the specified fuse for this unit T2A, 5 x 20 mm.
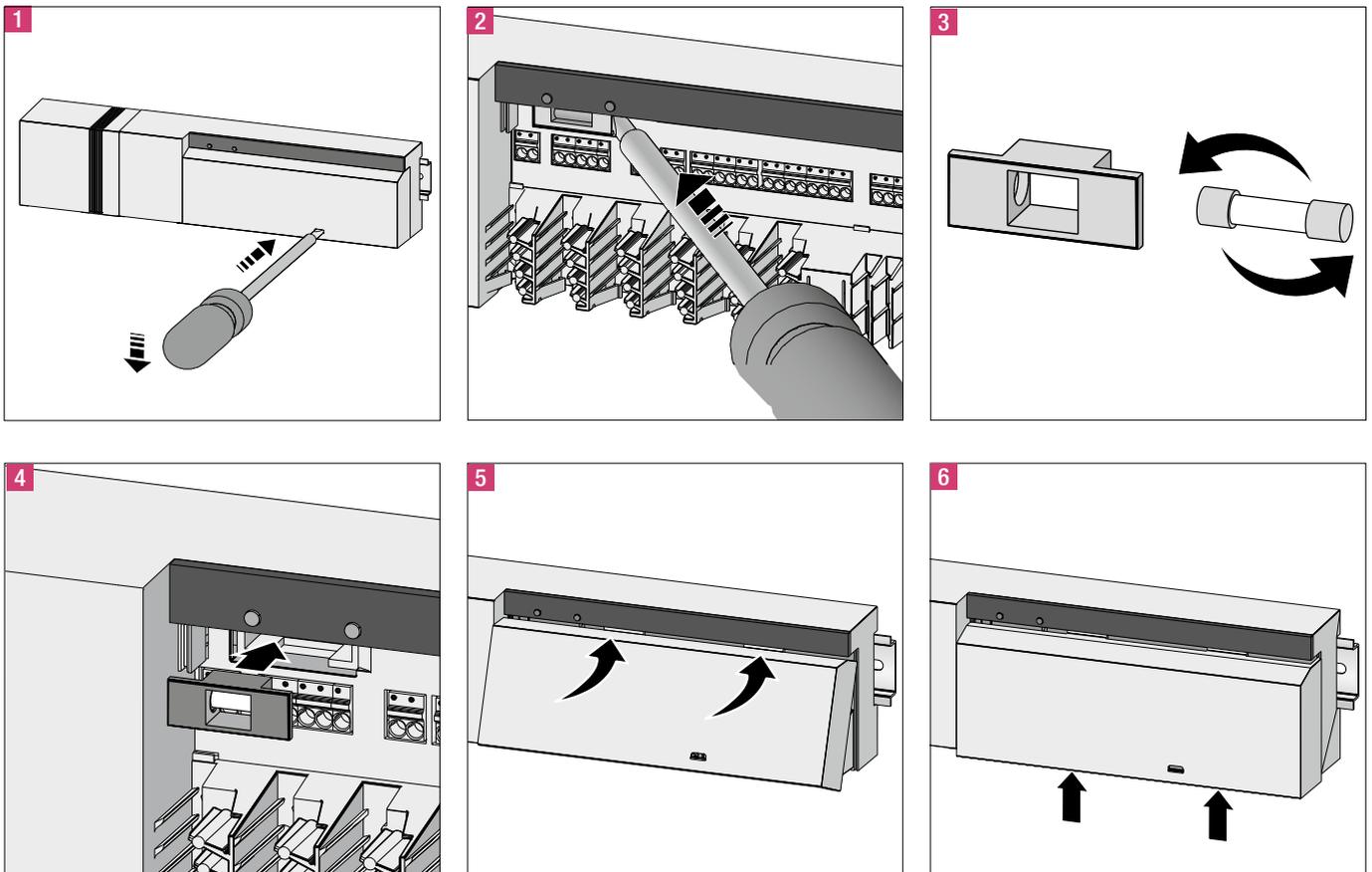
Fig. 6-2　Changing the fuse

6.3　Cleaning

Only use a dry and solvent-free, soft cloth for cleaning.

7 DECOMMISSIONING

7.1   Decommissioning

Electrical voltage! Danger to life! The base station is live.
-   Prior to opening always disconnect from the mains and secure in such a way that it cannot accidentally be switched on.
- Disconnect all external voltages connected to the unit, e.g. at the pump and the boiler contacts and ensure these cannot accidentally be switched live.

7.2   Disposal

The base stations must not be disposed of with domestic waste. The operator has the duty to dispose of the units through appropriate collection points. The separate collection and orderly disposal of all materials will help to conserve natural resources and ensure a 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 municipality or your local waste disposal services.

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Insofar as the intended application deviates from that described in the relevant Technical Information brochure, the user must consult REHAU and must receive express written consent from REHAU before commencing this utilization. If the user fails to do so, the sole responsibility for the utilization shall lie with the individual user. In this case, the application, use and processing of products are beyond our control. Should a case of liability arise, however, this shall be limited to the value of the goods delivered by us and used by you in all cases of damage. Claims arising from granted guarantees shall become invalid in the case of intended applications that are not described in the Technical Information brochures.