RICCIUS+SOHN


# DDC-Regel U N I T 9X kompakt

## Operating Manual
## Part 1

release 2.1

R+S REGLER

**This operating manual consists of two parts:**

**Part 1: General information**
Construction, operation, mounting, installation, initialisation, maintenance, error messages, technical data (relevant for all types of controller)

**Part 2: type relevant information**
Control elements, system diagrams, terminal diagrams
(relevant only for a specific type of controller)

## Note on safety:


**Caution!**

Before removing the controller from the terminal socket:

**Switch off main voltage!**

# Table of contents

# 0 introduction

With the **DDC-Regel** UNIT **9X kompakt** you acquired a particularly capable and flexible heating controller for an exceptionally good price/performance ratio.

The controllers of the RU product group 9X compact are – depending on the type of controller - suitable for district heating or burner plants with up to two heating circuits and with a domestic hot water circuit for all possible DHW systems. The controller RU 98.1K-111 in addition can control a solar circuit for the DHW heating.
The controllers are designed as simple operable stand-alone-controllers for one and two family houses. But they can be also used as a DDC-substation in plants with the DDC-system R+S unit PLUS, supporting the full functionality of the unit PLUS energy management with demand oriented control of the energy source, 15-stage priority for load drop and optimisation of the system flow temperature.

These are some of the important features of the product group RU **9X kompakt**:

**Easy operation**
- Potentiometers for the adjustment of the set points
- Plain text display
- Information button
- Overtime buttons
- Chimney sweep button

**Wide range of functions**
- 50 preprogramed system diagrams
- reporting of errors, f.i. exceeding of the control deviations
- 4 yearly time switches, one can be used for free purposes
- Trend logging inside the controller

**Energy management**
- Control of the heat source through demand for a certain flow temperature and capacity of the heat source.
- Providing the right amount of the required energy and the optimal system flow temperature
- 15-stage priority for a load drop and the domestic hot water supply

**Communication capability**
- RS-232, RS485 interface card SSK for personal computer, modem (Remote control, maintenance, redirection of alarms), R+S control center via R+S Bus, optional
- CAN-Bus interface card for R+S remote control units, optional
- M-Bus interface card for heat meters, optional
- service interface in the front of the controller for printer and personal computer, standard

**variety of mounting, protection**
- wall mounting, panel-mounting or installations on a mounting plate
- spray water protection IP 54 (front-sided)
- standard cutout in control panel (138 x 92 DIN 43700)

# 1 construction

## 1.1 Front view

FRONT VIEW


cover sealing

removable key

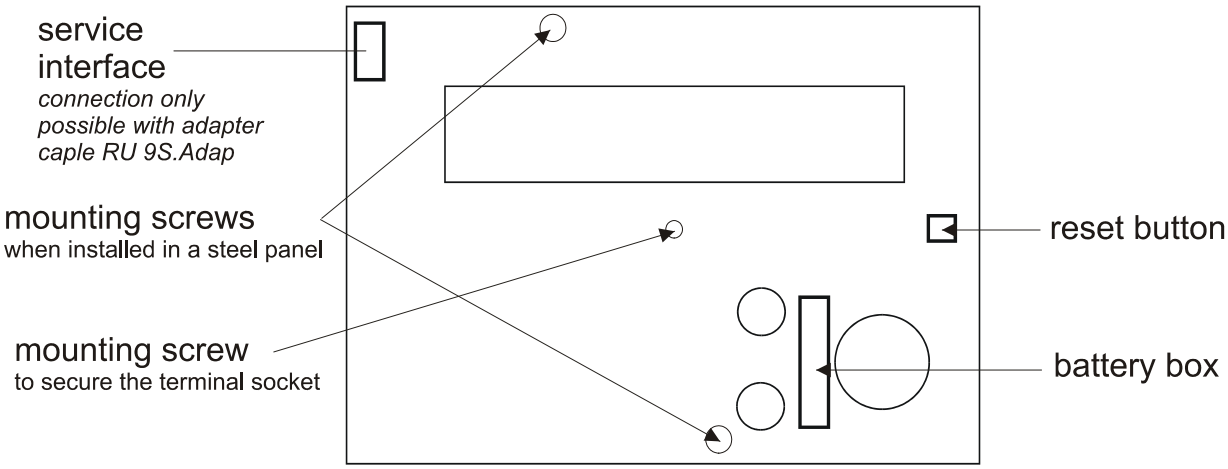
transparent cover
with low reflection

## 1.2 control elements

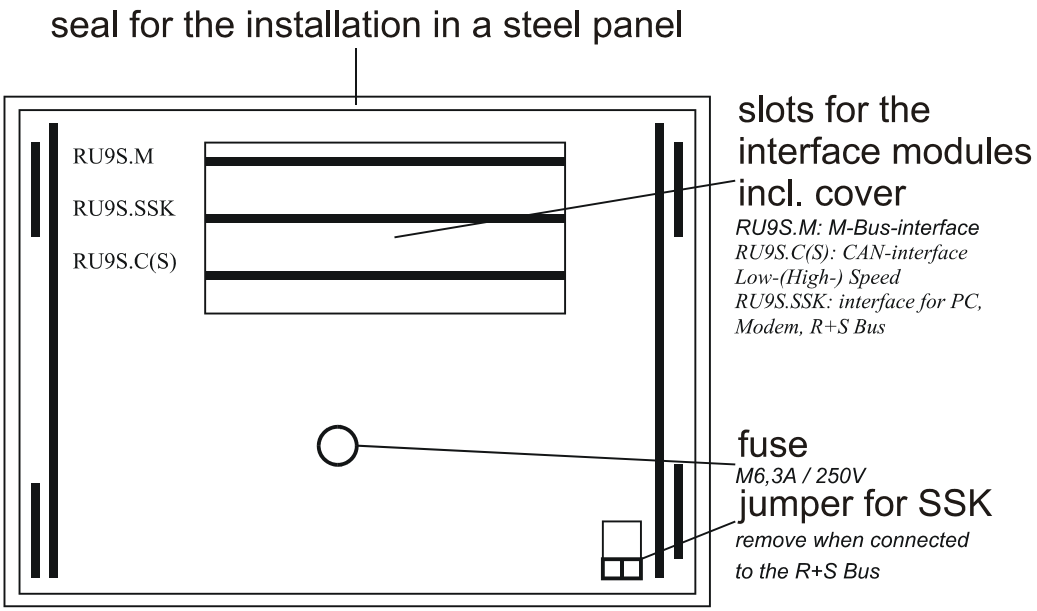
look at the operating manual, part 2

## 1.3 control elements of the service level

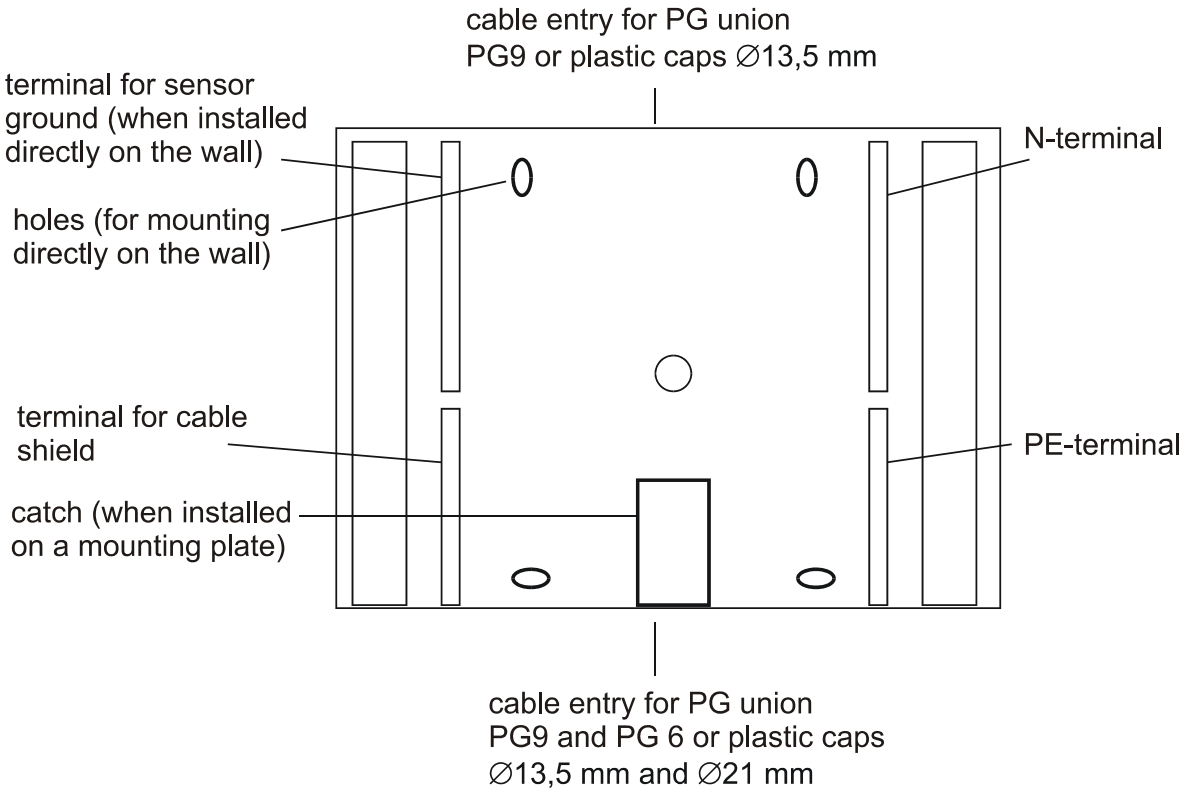
(accessible after removing the door and the front scale)



## 1.4 rear view


seal for the installation in a steel panel
RU9S.M
RU9S.SSK
RU9S.C(S)
slots for the interface modules incl. cover
RU9S.M: M-Bus-interface
RU9S.C(S): CAN-interface Low-(High-) Speed
RU9S.SSK: interface for PC, Modem, R+S Bus
fuse
M6,3A / 250V
jumper for SSK
remove when connected to the R+S Bus

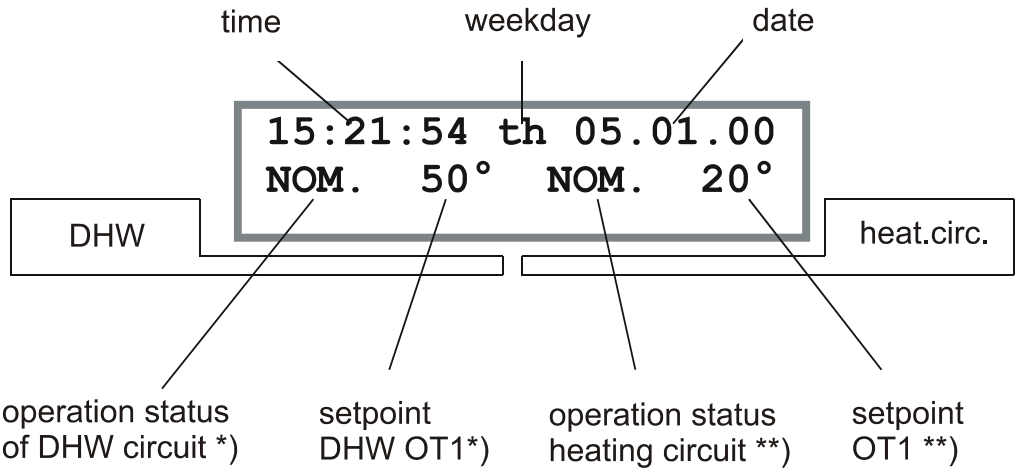
## 1.5 terminal socket



# 2 operation

## 2.1 standard display

The standard display shows the most important information about the current operating state of the heating system.
The standard display is shown automatically after the controller is turned on or after a certain time when no key was pressed.
You can reach the standard display from every point or level in the menu by pressing the key TIMER twice.




*) not existent in heating systems without domestic hot water control, in the controller 98.1F-120.2 (diagram 74) it is replaced by heating circuit 1
**) is valid only with diagrams with 2 heating circuits

**operating status of the domestic hot water circuit:**

| | |
|---|---|
| NOM. | Nominal operation, occupancy time |
| SUPP. | Supporting operation, non occupancy time |
| DOWN | Shut-down operation, frost protection acting |
| HEATUP | Warming up operation before begin of occupancy |
| THDIS | Thermal disinfection |
| FROST | The temperature has fallen below the frost protection limit |
| MANUAL | Manual operation |

**Domestic hot water (DHW) set point OT1**
Display of the set point for the domestic hot water temperature set by the potentiometer for occupancy time 1

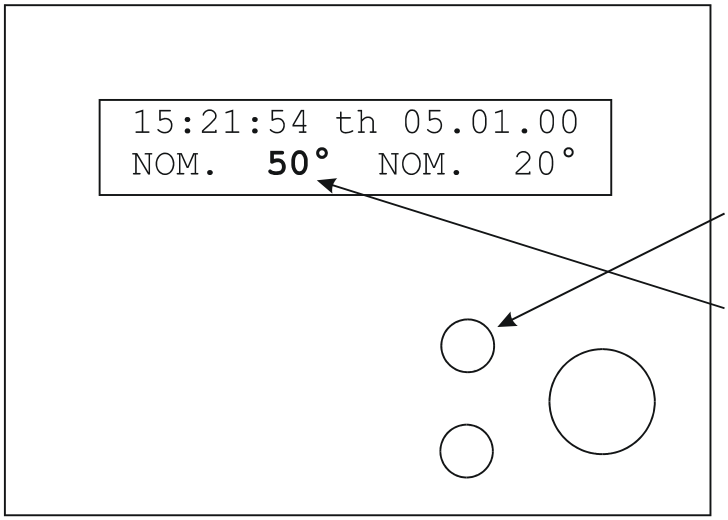
**Heating circuit operating status:**

| | |
|---|---|
| NOM. | Nominal operation, occupancy time |
| REDUC | Reduced operation, non occupancy time (without room sensors) |
| SUPPORT | Supporting operation, non occupancy time (with room sensor) |
| DOWN | Shut-down operation, frost protection activated |
| HEATUP | Warming up operation, before begin of occupancy |
| FROST | room temperature has fallen below the frost limit or building protection limit |
| MANUAL | Manual operation |

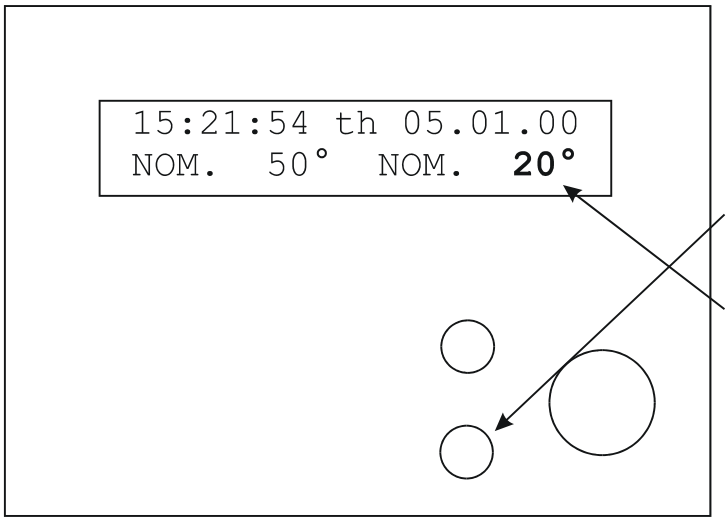
**Room temperature set point NZ1:**
Display of the set point of the room temperature set by the potentiometer for occupancy time 1

## 2.2 adjustment of the set point

### 2.2.1 adjustment of the set point for the domestic hot water temperature

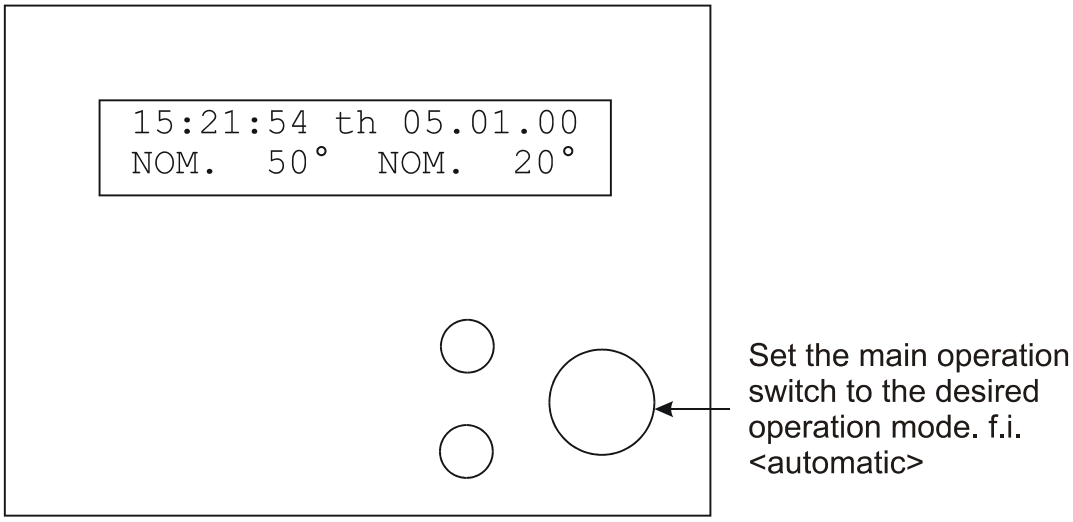



### 2.2.2 adjustment of the room temperature




*) If you are using a system diagram with two heating circuits the set point set at the potentiometer is valid for both heating circuits; but the set point shown in the display is only valid for heating circuit 2 In the controller RU 98.1F-120.2 (diagram 74) the set points of both heating circuits can be adjusted separately.

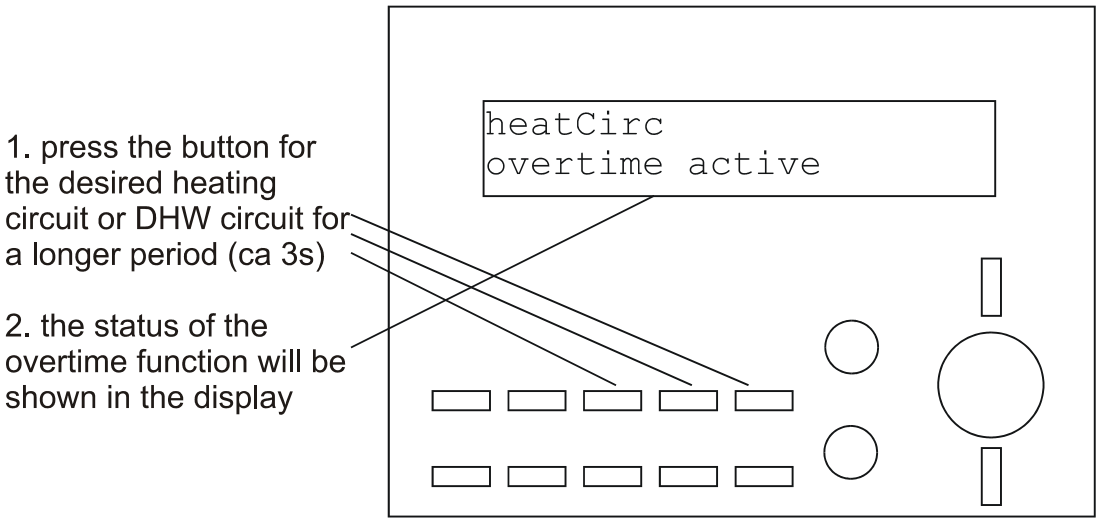
## 2.3 selecting the operating mode




**Operating modes:**

| | |
|---|---|
| OFF | Control program is off, frost protection is activated |
| AUTO | Automatic operation, operating mode is determined by the timer |
| SUN | Nominal operation, occupancy time 1 (OT1) |
| MOON | Reduced operation, nonoccupancy time (NOT) |
| SUMMER | summer operation, heating is off, domestic hot water circuit is activated |
| MANUAL | Manual operation |

## 2.4 overtime

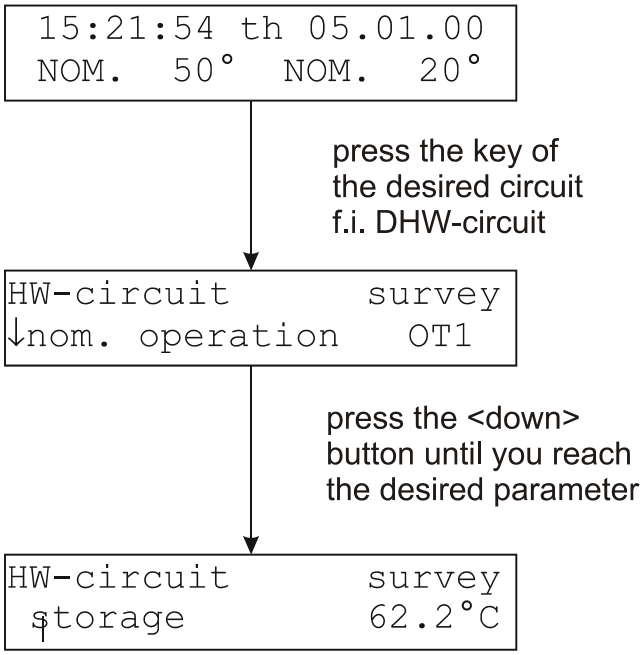



The current occupancy time is extended by pressing the overtime button by approx. 2 hours. If the overtime button is pressed during the reduced operation (non occupancy time), an occupancy time of approx. 2 hours is inserted.
The overtime function is deactivated if you press the overtime button again.

If a R+S remote control is connected and assigned to the heating circuit or the domestic hot water circuit (look at chap. 2.8), the overtime function is activated by pressing the overtime button of the remote control.

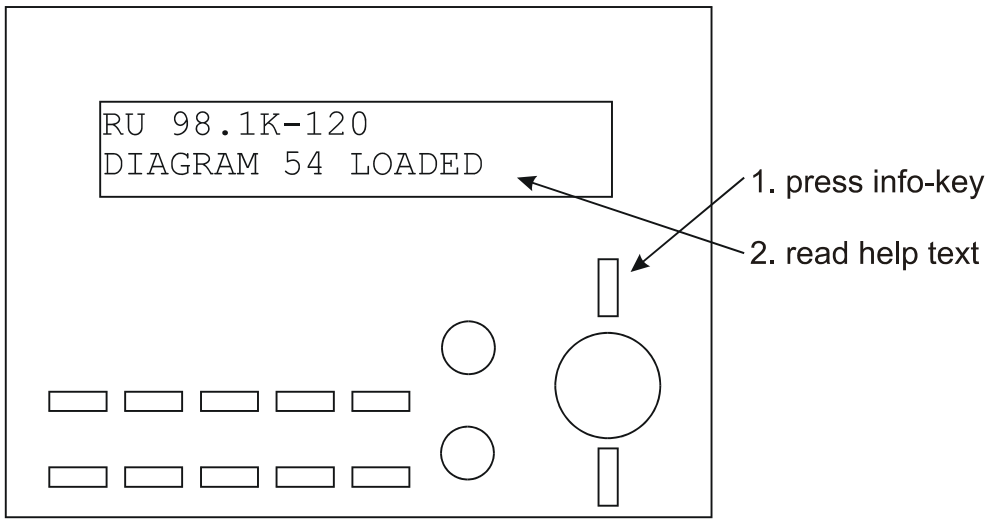
## 2.5 get an overview of the main parameters

The menu "survey" contains the most important parameters like actual values, set points and status. Here you will in a very fast way an overview of the state of your heating system. Among other things you will find the temperatures of the sensors.



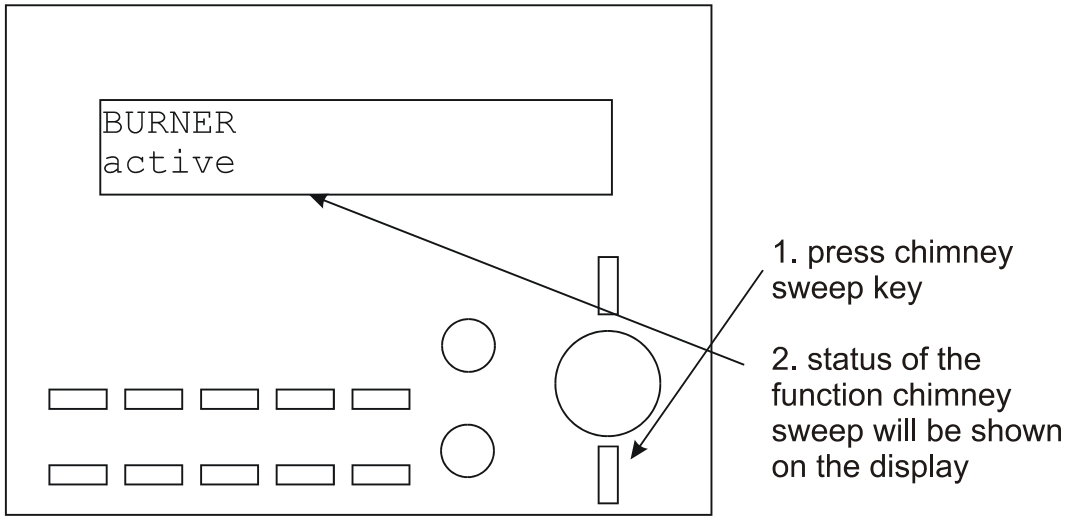
## 2.6 help button

Pressing the help button at any time will give you a quick help to the current parameter or the menu.
In the standard display the help button will show you the type of controller and the chosen system diagram.
Sometimes you have to press the help button twice in order to get first the help text and then the parameter number on the display.
Through repeated pressing of the help button you return to the initial parameter or menu.



## 2.7 chimney sweep button

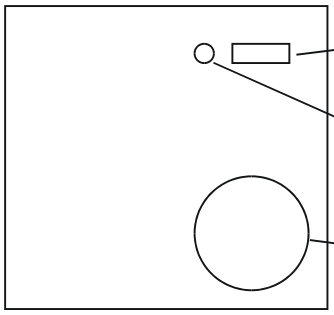
For maintenance and service operation the burner can be put manually into operation by pressing the chimney sweep button. This will give you approx. 15 minutes of operation with maximum power. After 15 minutes or after pressing the chimney sweep button again the controller switches back into the preceding operating state (only with controllers for burner plants RU 9x.1K-xxx).



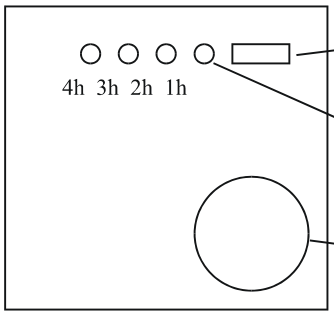
## 2.8 R+S remote control

If a R+S remote control unit is connected, the set point can be adjusted and the overtime function can be activated. With the rocker switch of the remote control unit FDR-C(S) the operating mode of the assigned heating circuit or domestic hot water circuit can be chosen.

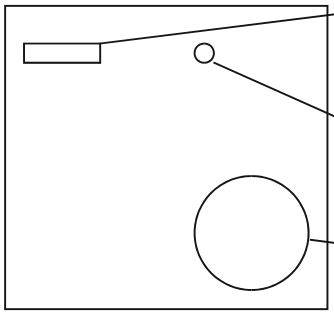
FTRx-C(S)




FRx-C(S)

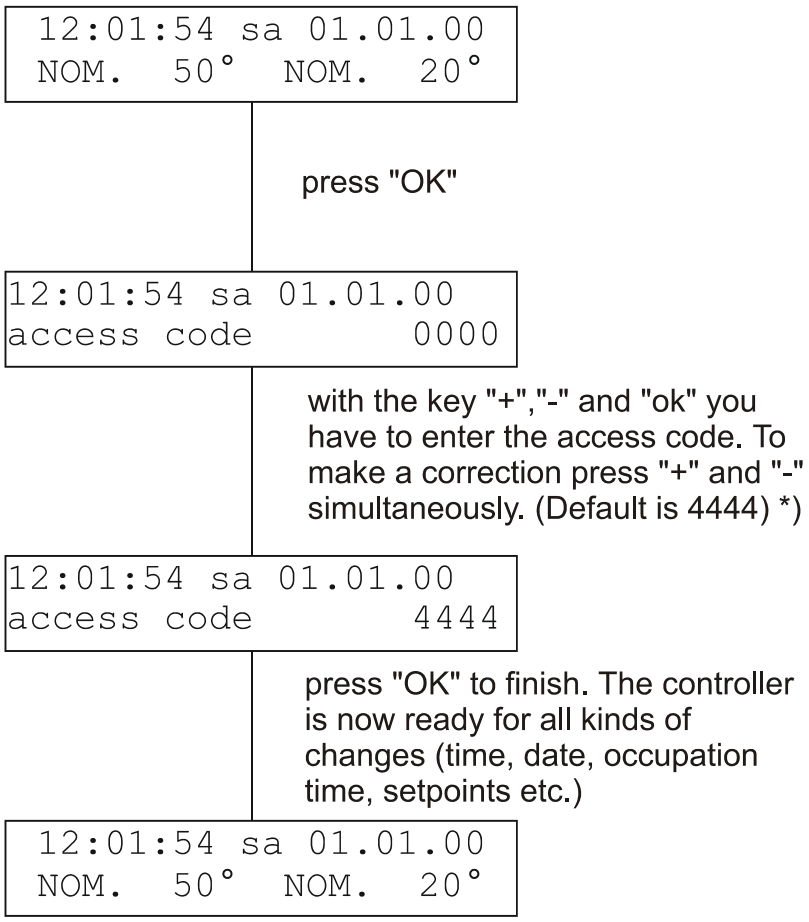



FDRx-C(S)



## 2.9 access code

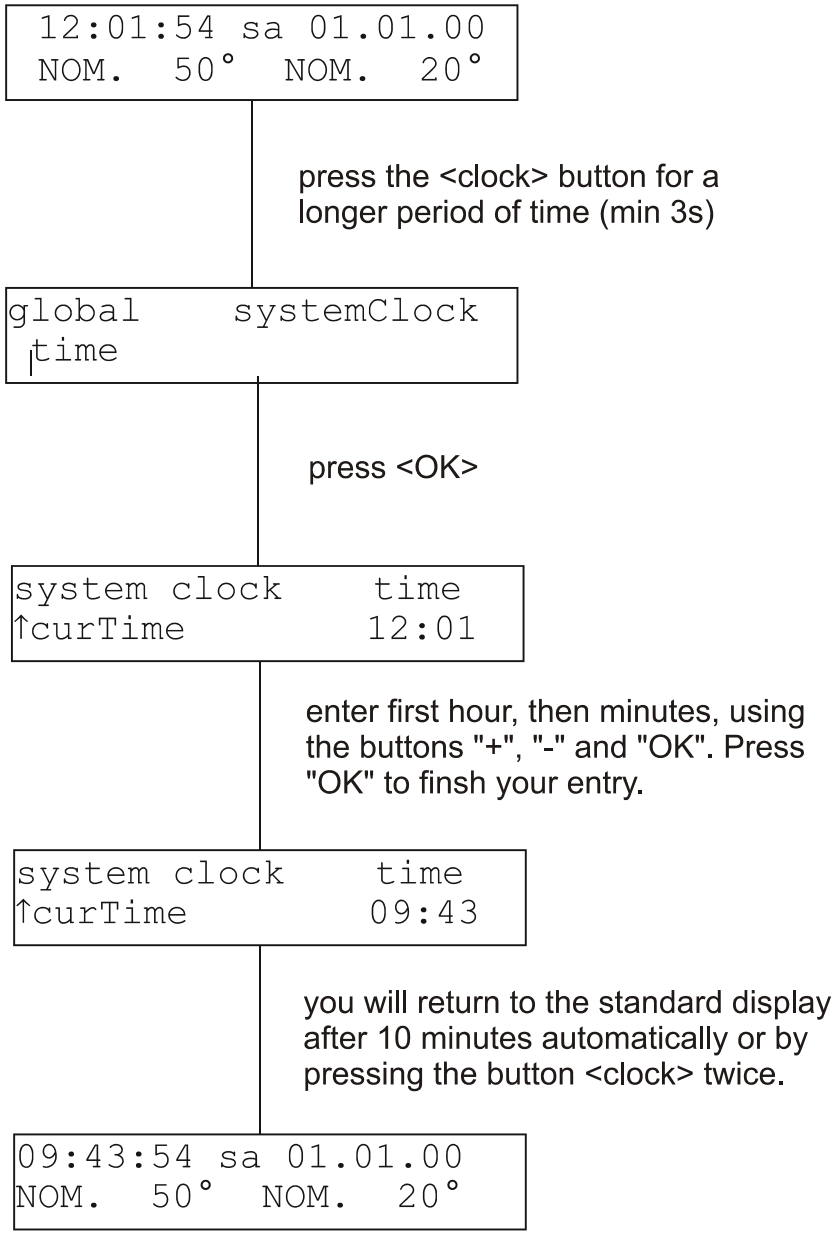
Before setting the date, time, occupancy times, set points and other parameters it is necessary to enter the access code for the desired menu level, if access protection against unauthorized access is activated.




*) In case of a deviating access code please contact your service company.

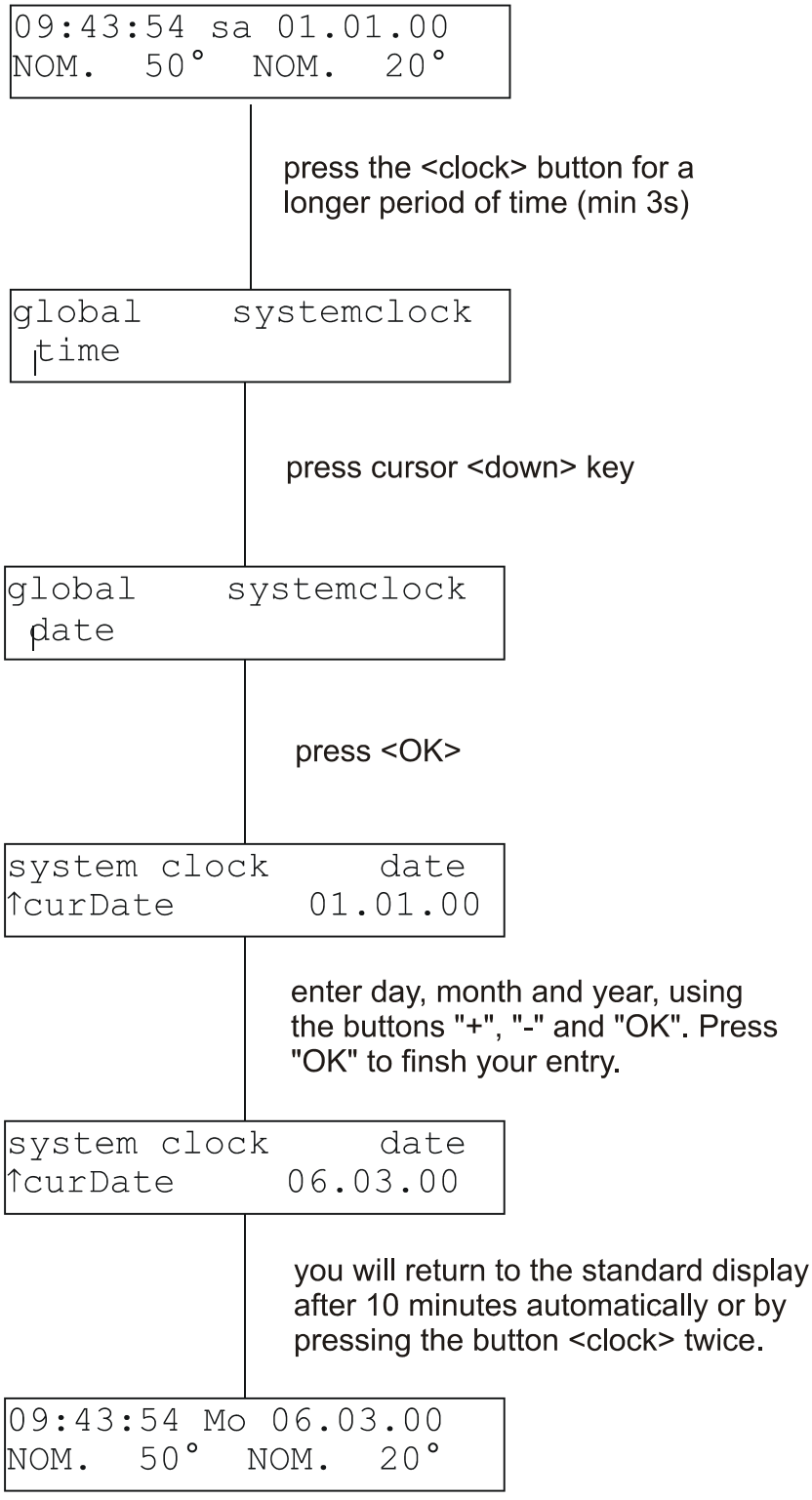
## 2.10 time

Normally, only at the initial startup of the controller, it is necessary to set the system time. The interchangeable battery guarantees a power reserve of the clock of a minimum of 100 days in case the main voltage is shut down.
Before setting the time the access code must be entered. (Only if the access protection function is activated.)(look at chap. 2.9).



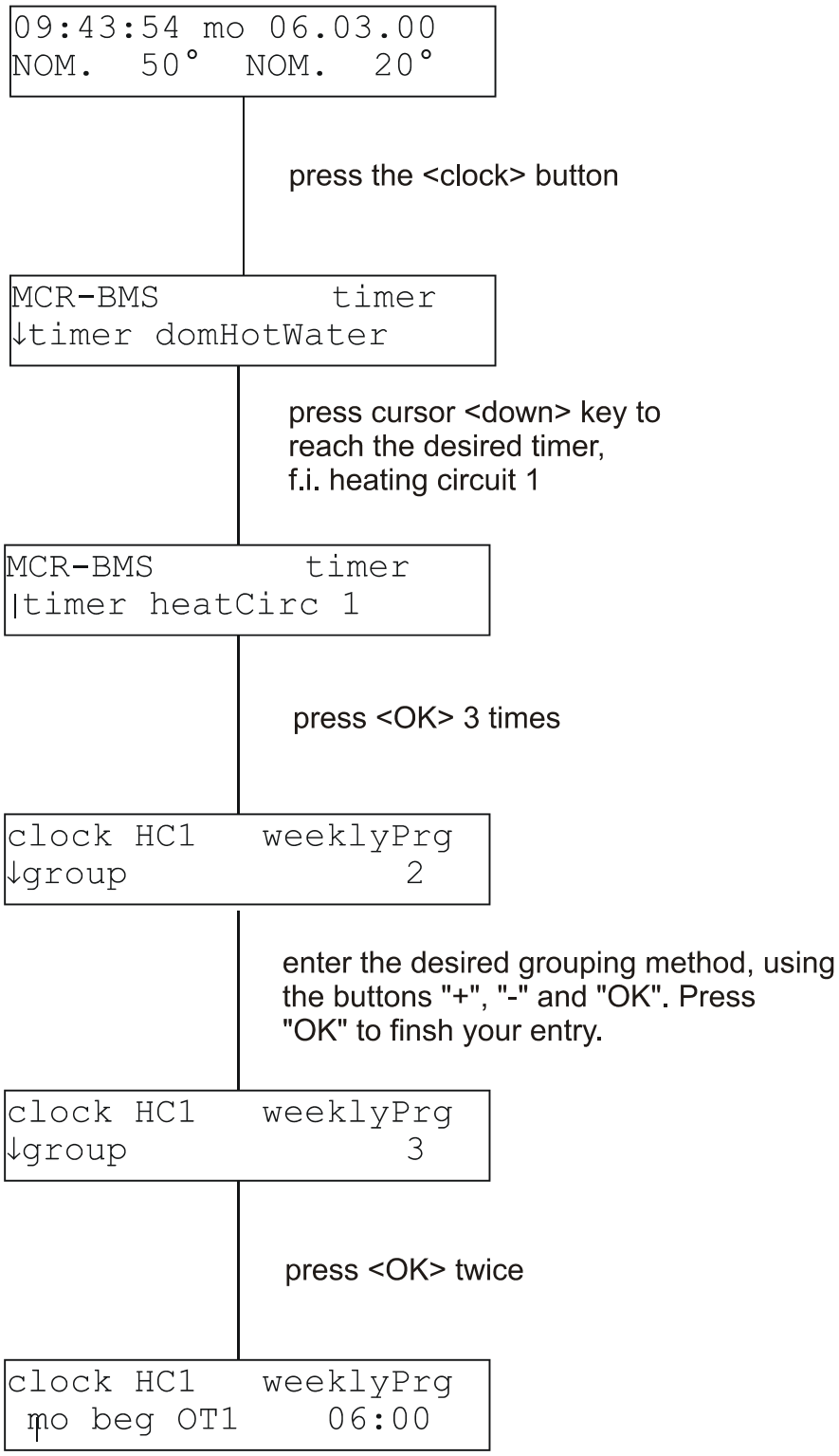
## 2.11 date

Normally, only at the initial startup of the controller, it is necessary to set the system date. The interchangeable battery guarantees a power reserve of the clock of a minimum of 100 days in case the main voltage is shut down.
Before setting the date the access code must be entered. (Only if the access protection function is activated.)(look at chap. 2.9).



## 2.12 occupancy times

Before setting the occupancy times the access code must be entered (Only if the access protection function is activated.)(look at chap. 2.9).



enter the beginning of the occupation time, first the hours, then the minutes, using the buttons "+", "-" and "OK". Press "OK" to finsh your entry.

```
timer HC1   weeklyPrg
 mo beg OT1    08:30
```

press <down> key

```
timer HC1   weeklyPrg
 mo end OT1    22:00
```

enter the end of the occupation time, first the hours, then the minutes, using the buttons "+", "-" and "OK". Press "OK" to finsh your entry.

```
timer HC1   weeklyPrg
 mo end OT1    18:45
```

if neccessary enter the other occupation times for the rest of the week days (if "group" < 3)

```
timer HC1   weeklyPrg
 tu beg OT1    06:00
```

you will return to the standard display after 10 minutes automatically or by pressing the button <clock> twice.

```
09:43:54 mo 06.03.00
NOM.  50°  NOM.  20°
```

## 2.13 key combinations

For specific control operations as well as short cuts to certain menus a combination of keys are available. Please press two buttons simultaneously in the second row of the keypad. To enter the menu level 1-5 the access code must be entered beforehand. (look at ch. 2.9).
A cold start is only possible, if the reset button is pressed (Remove front scale, look at ch. 1.3).

| **par.-no.** | **Menue item / function** | **key combinations** | | | | | |
|---|---|---|---|---|---|---|---|
| | | ▽ | △ | + | - | **OK** | **Reset** |
| 1. | global | ● | | | | ● | |
| 2.3.1 | E-manager | | ● | | | ● | |
| 3. | interface | | | ● | | ● | |
| 4. | configuration | | | | ● | ● | |
| 5. | system diagram | ● | | | ● | | |
| 2.6 | trend | | ● | | ● | | |
| | deletion / default value | | | ● | ● | | |
| | back one menue level | | ● | ● | | | |
| | cold start | ● | ● | | | | ● |

# 3 mounting

## 3.1 wall mounting

- Drill holes using the drilling template (look at appendix E), Caution! keep at least 25 mm minimum distance to the terminal socket of the neighboring controller.
- Attach plastic hoods to the cable entries of the terminal socket (plastic hoods 13,5 mm or 21 mm or use PG joints PG 9 or PG 16)
- Attach terminal socket to the wall, using the dowels and screws enclosed in a plastic back with the controller. Caution! Watch out for the marker “Open” (which means TOP) on the terminal socket.
- connect the electric cables (look at ch. 4)
- Install the interface card in the controller (look at ch. 3.3)
- Open and remove front door of the controller
- Remove front scale of the controller ( lift front scale with a small screwdriver and pull, look at illustration 3-1)
- Slide battery into the battery chamber (look at ch. 3.4)
- Attach the controllers onto the terminal socket
- Tighten bolt (in the middle of the controller) with a cross-point screwdriver (look at ch. 1.3)
- Attach the front scale and put the door back in its place.
- Turn on the main voltage

To dismantle the controller proceed in reverse order.

**Caution!**
Before the disconnecting
the controller from the terminal
socket you have to switch off the main voltage

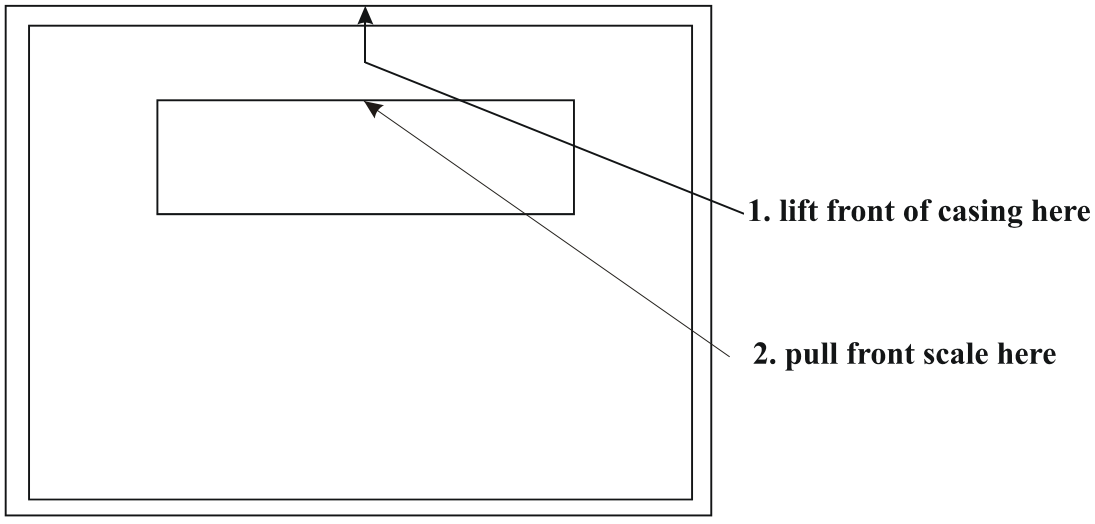



**Abb. 3-1 removing the front scale**

# 3.2 mounting in a control panel

## 3.2.1 mounting in the door of a control panel

- Make a cutout (A 138 x 92 DIN 43700) into the door. Caution: keep at least 25 mm minimum distance to the cutout of a neighboring controller
- Install the interface card in the controller (look at ch. 3.3)
- Open and remove the front door of the controller
- Remove front scale of the controller ( lift front scale with a small screwdriver and pull, look at illustration 3-1)
- Slide battery into the battery chamber (look at ch. 3.4)
- Set the controllers into the cutout of control panel and tighten the two sliders until the controller is pressed into the cutout (look at ch. 1.3)
- Caution: watch for a correct seat of the seal at the back of the front of the controller
- Attach plastic hoods to the cable entries of the terminal socket (plastic hoods 13,5 mm or 21 mm or use PG joints PG 9 or PG 16)
- connect the electric cables (look at ch. 4)
- Attach the terminal socket onto the controller
- Tighten bolt (in the middle of the controller) with a cross-point screwdriver (look at ch. 1.3)
- Attach the front scale and put the door back in its place, watch for the correct setting of the door seal.
- Turn on the main voltage

**To guarantee the front-sided protection level IP54 watch out for a correct setting of the seals!**

To dismantle the controller proceed in reverse order.

### 3.2.2 mounting on a mounting plate on the back of the control panel

- Attach plastic hoods to the cable entries of the terminal socket (plastic hoods 13,5 mm or 21 mm or use PG joints PG 9 or PG 16)
- Engage the terminal socket on the mounting plate in the back of the control panel, using the catch spring mechanism (look at fig. 3-2)
- connect the electric cables (look at ch. 4)
- Install the interface card in the controller (look at ch. 3.3)
- Open and remove the front door of the controller
- Remove front scale of the controller ( lift front scale with a small screwdriver and pull, look at illustration 3-1)
- Slide battery into the battery chamber (look at ch. 3.4)
- Attach the controller onto the terminal socket
- Tighten the bolt (in the middle of the controller) with a cross-point screwdriver (look at ch. 1.3)
- Attach the front scale and put the door back in its place, watch for the correct setting of the door seal.
- Turn on the main voltage

To dismantle the controller proceed in reverse order.

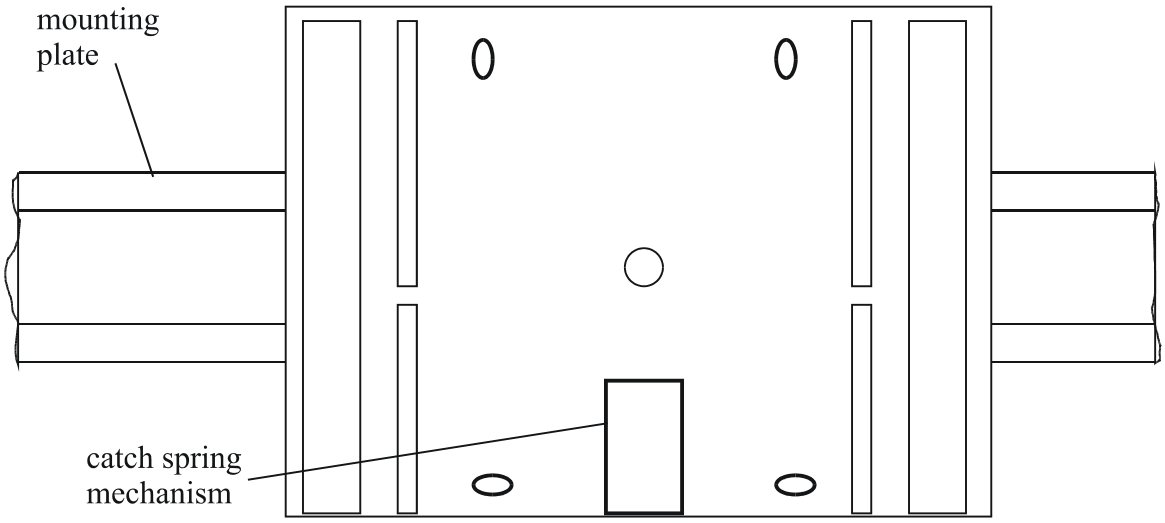



Abb. 3-2 mounting on a mounting plate

## 3.3 installing an interface card

If the RU **9X kompakt** was ordered with interface cards, they will be delivered separately and must be installed during the mounting of the controller. The interfaces can also installed at a later time without problems.
For the installation please proceed in the following order:

- Disconnect main voltage* Open and remove the front door of the controller
- Remove front scale of the controller ( lift front scale with a small screwdriver and pull, look at illustration 3-1)
- Loosen the bolt that holds the controller connected to the terminal socket (look at ch. 1.3)
- Separate the controller and the terminal socket
- Removing plastic cap at the rear of the housing of the controller revealing the slots for the interface cards
- Unpack the interface card and slide it into the slot designated for the interface card. Caution! Watch out, that use the right slot for the right interface card. (look at ch. 1.4). The component side of the interface card must show to the middle of the casing (to the main fuse).
- Press the interface card slowly down into the slot until the edge of the integrated circuit board is flush with the side edge of the rack.
- Put the plastic cap back over the interface compartment, so that the lid of the plastic cap shows to the outside of the controller (not to the middle of the controller). (look at fig. 3-3).
- Attach the controller back onto the terminal socket (look at ch. 3.1 or 3.2), * Tighten the bolt (in the middle of the controller) with a cross-point screwdriver (look at ch. 1.3)
- Attach the front scale and put the door back in its place
- Turn on the main voltage
- Carry out the basic installations (look at ch. 5.1)


**Caution!**
**Don't install the interface card the wrong way,**
**not into the wrong slot and don't use force!**
**The plug-and-socket connectors will not function,**
**if you plug and unplug the interface card to often (maximum 10 times).**

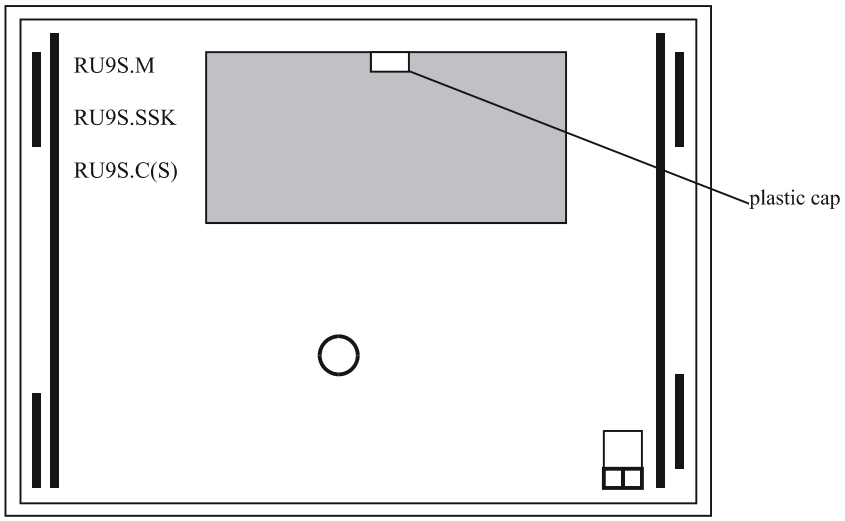



**Abb. 3-3 correct setting of the plastic cap**

## 3.4 Put in the battery

To keep the system clock running during power failure a battery is necessary. (item-nr. 1220 1000).
The battery guarantees a power reserve of approx. 100 days.
To install the battery please carry out following instructions:

- Open and remove the front door of the controller
- Remove front scale of the controller ( lift front scale with a small screwdriver and pull, look at illustration 3-1)
- Slide battery into the battery chamber next to the main operating mode switch (look at ch. 3.4)
- Attach the front scale and put the door back in its place

**Caution**
**possibility of a short circuit!**
**Don't touch the battery with electrically**
**conductive tools and not with your fingers!**

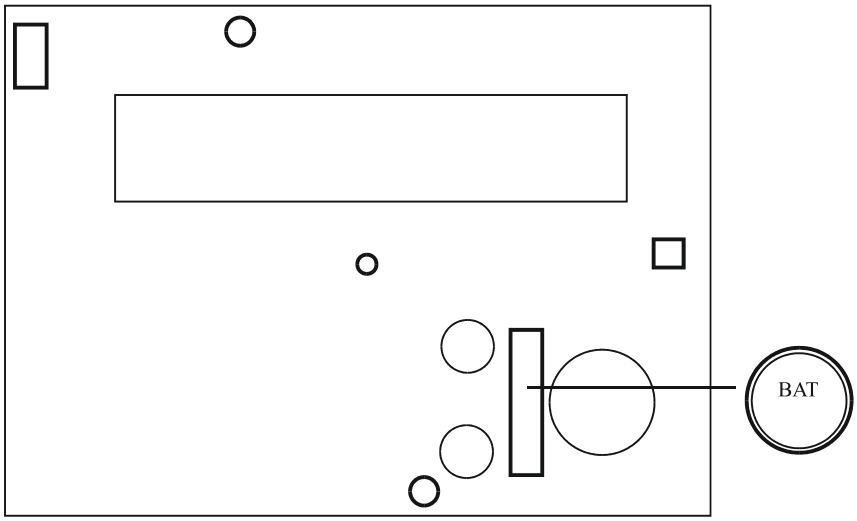



**Abb. 3-4 changing the battery**

# 4 installation

## 4.1 in general


Warning !

The mounting and installation of the electric connections of the **RU 9X kompakt** requires special knowledge about mounting of electrotechnical plants EN 60204 ( DIN of VDE 0100 / 0113 ) the knowledge of accident prevention rules and the specific rules for installation and initialisation. These tasks can only be carried out by qualified specialists.

4 For the connection of sensors only shielded wires should be used (Typ: Y(St)Y 2x2x0,8)
5 The shield should be connected with the reference potential (Ground of control panel) of the control panel or the terminal socket.
6 The cables of the sensors should be placed separately to cables with low voltage or high voltage.
7 To avoid troubles with the operation of the RU **9X kompakt** in the area of low-voltage installations with raised electro-magnetic emission we recommend the installation of a R+S net filter (Type: NF1).
8 To protect the bus interface SSK against overvoltage we recommend the use of a R+S overvoltage protection module (Type: ÜSBUS).
9 If electronic power modules (for example frequency transformer) are used you should make sure, that you have a spatial separation between the RU **9X kompakt** and the electronic power modules.
10 All sensors and actuators available by R+S are synchronized with the RU **9X kompakt**. Only with the use of these units you can achieve the full capability of your RU **9X kompakt**.
11 The cross section of the cables at the terminals should be max. 2,5 mm2 (single-wire) and/or 1,5 mm2 (multi-wire).

## 4.2 main voltage

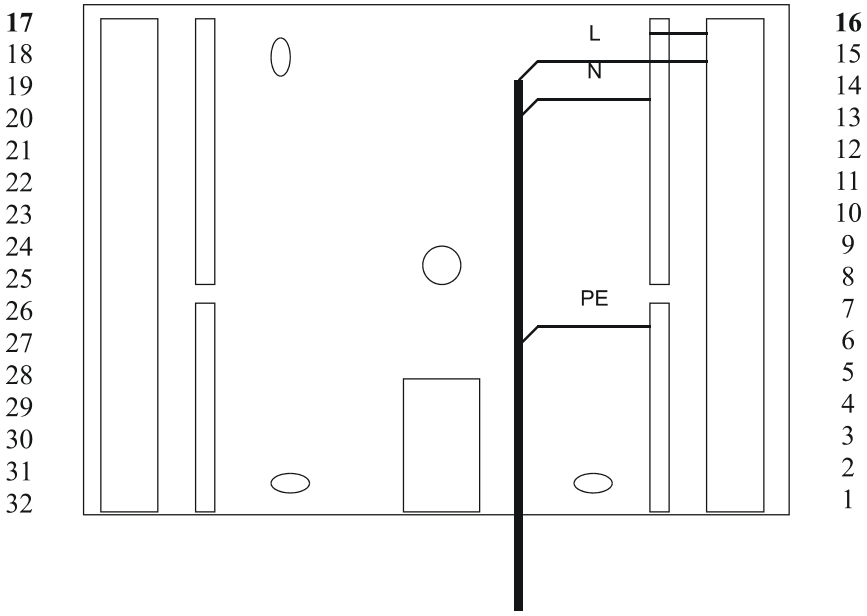



Abb. 4-1 connecting the main voltage

To guarantee shock protection in a mobile power net please note following following information:

! Caution!
Before separating regulator and terminal socket:
Switch off main voltage

## 4.3 sensor inputs

The RU **9X kompakt** is by default adjusted for the use of R+S M-sensors.
For special applications other sensors can be used (f.i. 0-10V Output (for example transformer), Pt1000-sensor (modified), potentiometer 0-10 kohms and signal contacts). The terminals 23 and 24 can be used for M-sensor inputs or as transistor outputs (Open Collector).
The terminal assignment depends on the chosen system diagram and can be found in the Operating Manual, part 2.

For the connection of sensors shielded, twisted pair cable (Type: Y(St)Y 2x2x0,8) should be used. The shield should be connected to the control panel or the terminal socket (ground of control panel). The cable of the sensors should be placed separately to cables with voltage or high voltage.

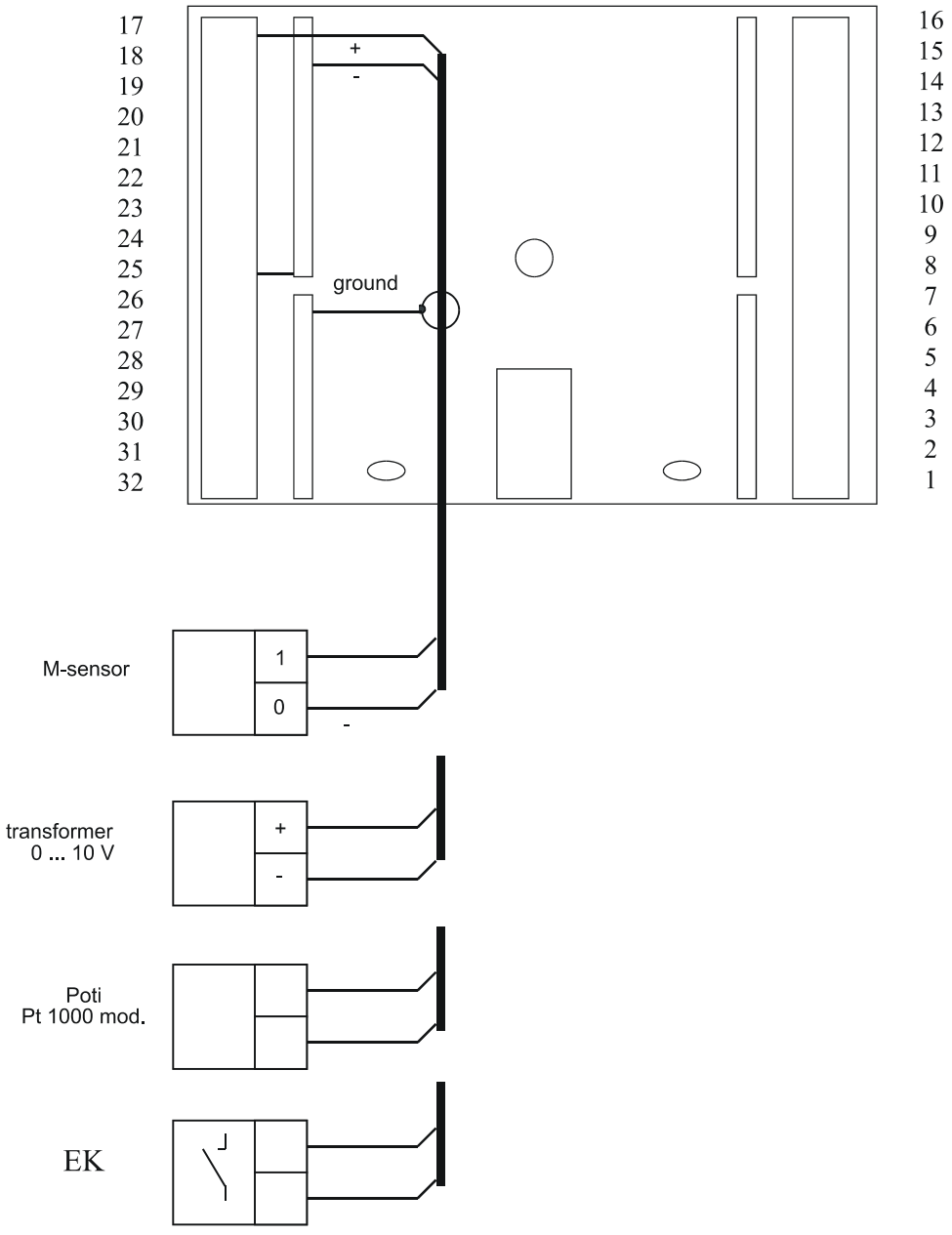



Abb. 4-2 connecting a sensor, transformer, poti or relais (example)

## 4.4 pumps

Pumps can be accessed directly via relay outputs of the RU **9X kompakt**, if the current consumption does not exceed 1A (Considering the starting current). Of the current consumption is higher, relays are necessary.
Electronic pumps can be run with a lower rotation speed during non occupancy time, if their input terminal “Ext. Min.” is connected to the corresponding transistor output of the RU **9X kompakt** **).
The terminal assignment depends on the chosen system diagram and can be seen in the Operating Manual, part 2

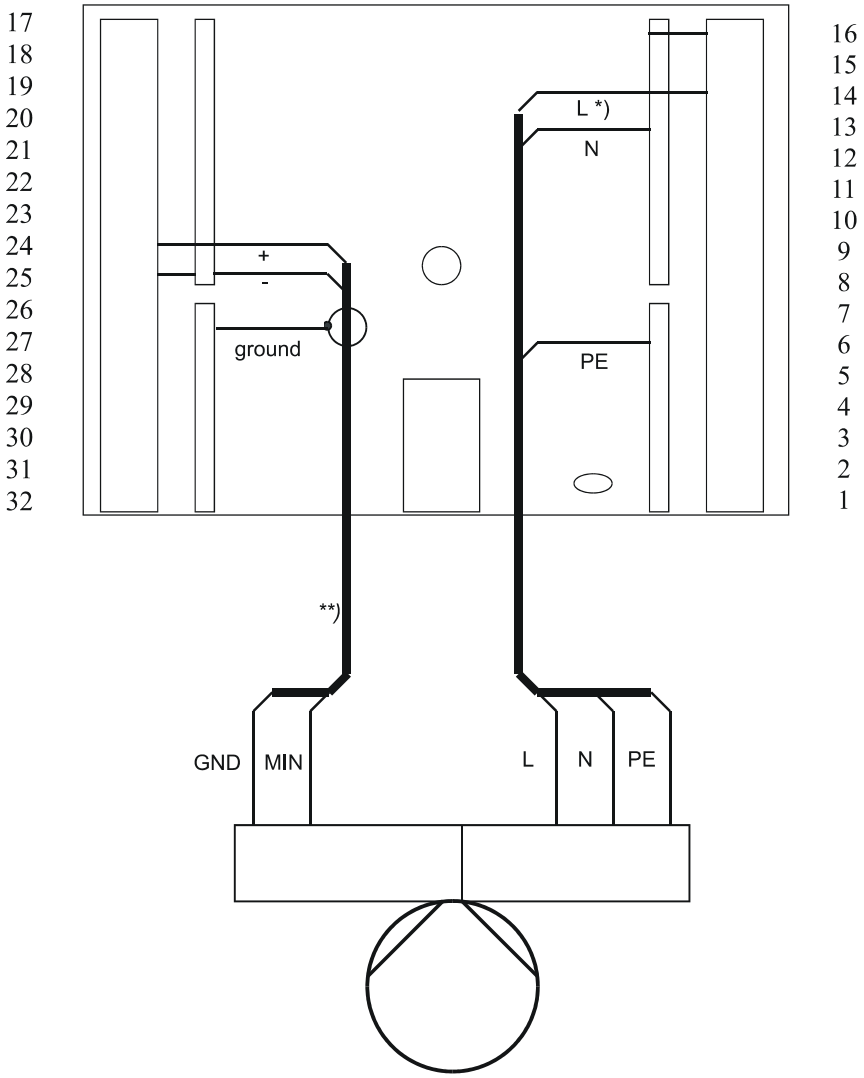



Abb. 4-3 connecting a pump (example)

*) terminal assignment in accordance with system diagram (look at Operatzing Manual, part 2)
**) This cable should be positioned separately to the power lines.

## 4.5 valves and mixers

Valves and mixers with 3-point-actuators can be accessed drectly through the relay outputs of the RU **9X kompakt**, if the current consumption does not exceed 1A (Considering the starting current). If the current consumption is higher, relays are necessary.
The terminal assignment depends on the chosen system diagram and can be seen in the Operating Manual, part 2

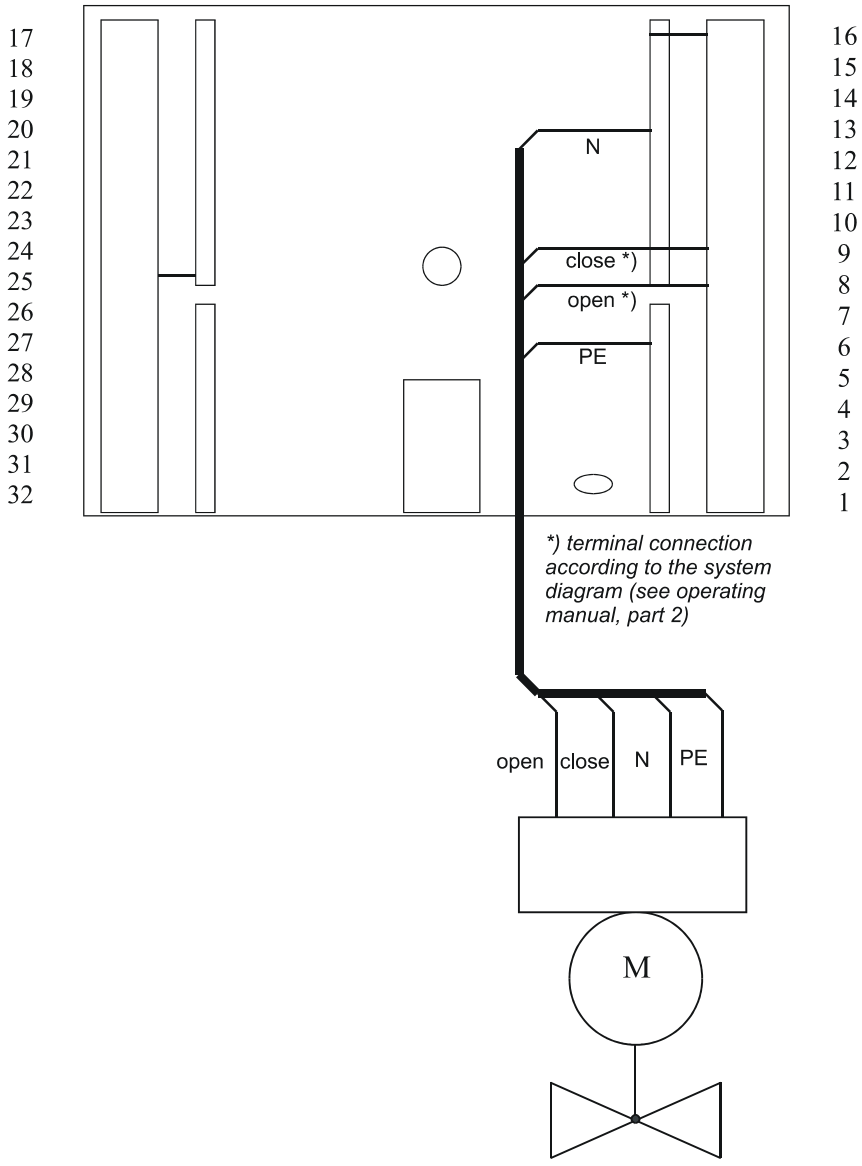



Abb. 4-4 connecting an actuator or valve (example)

## 4.6 R+S remote control units with CAN-interface

If the RU **9X kompakt** is equipped with a CAN-interface card RU9S.C or RU9S.CS, you can connect up to two R+S remote control units with CAN-interface.
The CAN-interface card RU9S.CS can only be connected the remote control units FxRx-CS (high speed), the CAN-interface card RU9S.C can only be connected with the remote control units FxRx-C (low speed). The shorting plugs "A" and "B" at the back of the controller must be positioned according to the default factory setting(look at fig. 4-8). The bus addresses of the CAN-remote control units must be set by means of the shorting plugs or dip switches to 0 and/or 1 (look at fig. 4-5). Shielded telephon cable (Type: JY(St)Y x 2 x 0,8) or bus cable R+S KBUS-E or KBUS-F should be used. Permissible cable lengths are

| **bus cable** | **CAN-interface** | |
|---|---|---|
| | *RU9S.C**S*** | *RU9S.C* |
| JY(St)Y 2 x 2 x 0,8 | 150 m | 25 m |
| KBUS-E/KBUS-F | 450 m | 60 m |

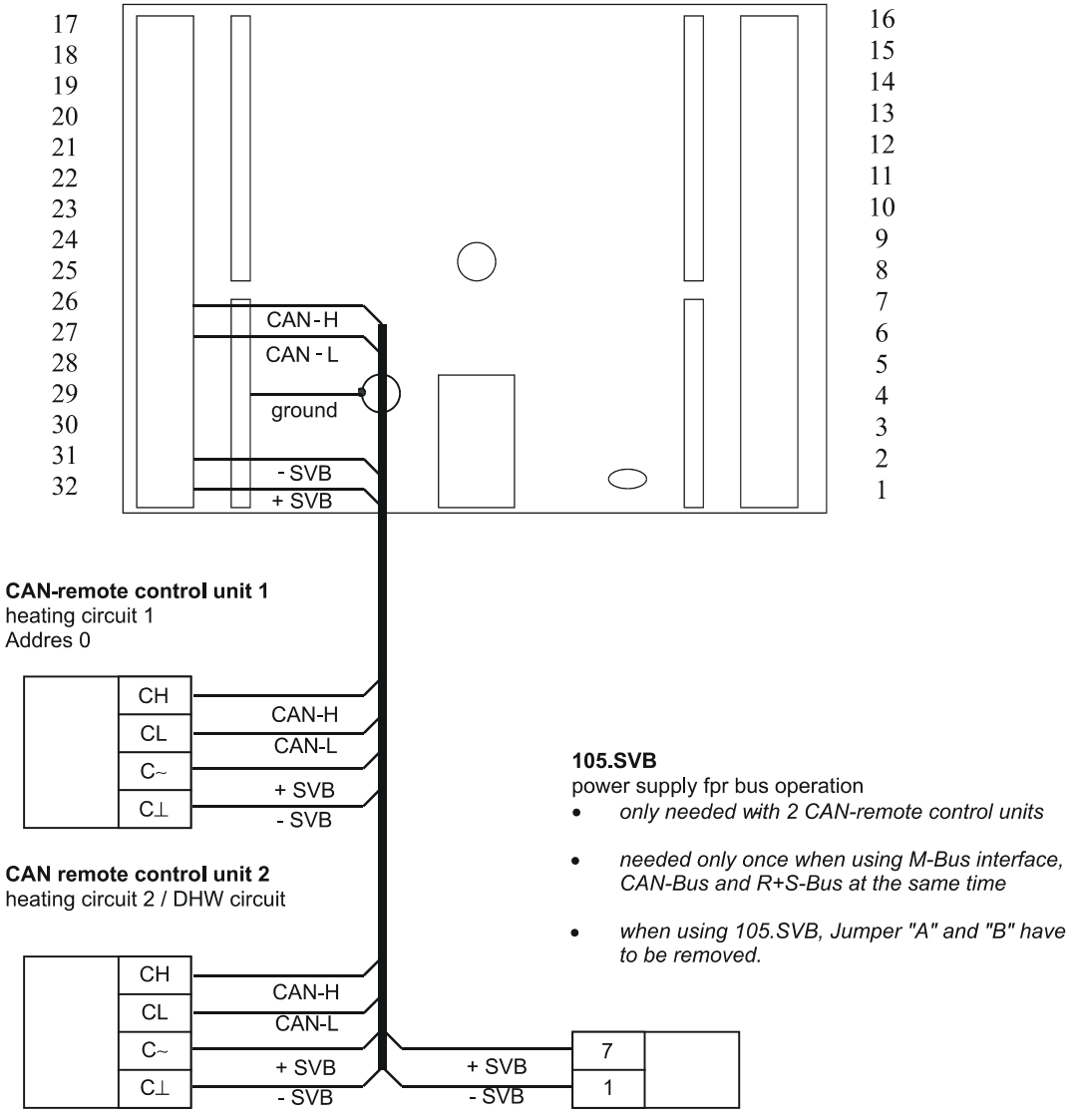



**Abb. 4-5 connecting a R+S remote control unit**

## 4.7 M-Bus interface

If the RU **9X kompakt** is equipped with a M-Bus interface, up to two M-Bus counters can be connected.
The shorting plugs "A" and "B" at the rear of the regulator housing must be positioned corresponding to the default factory setting of the controller (look at fig. 4-8). The addresses of the M-Bus counters must be set to 1 and 2 (must be specified at time of order, look at fig. 4-6). Shielded telephone cable (Type: JY(St)Y x 2 x 0,8) should be used. Permissible cable lengths is 50 m.

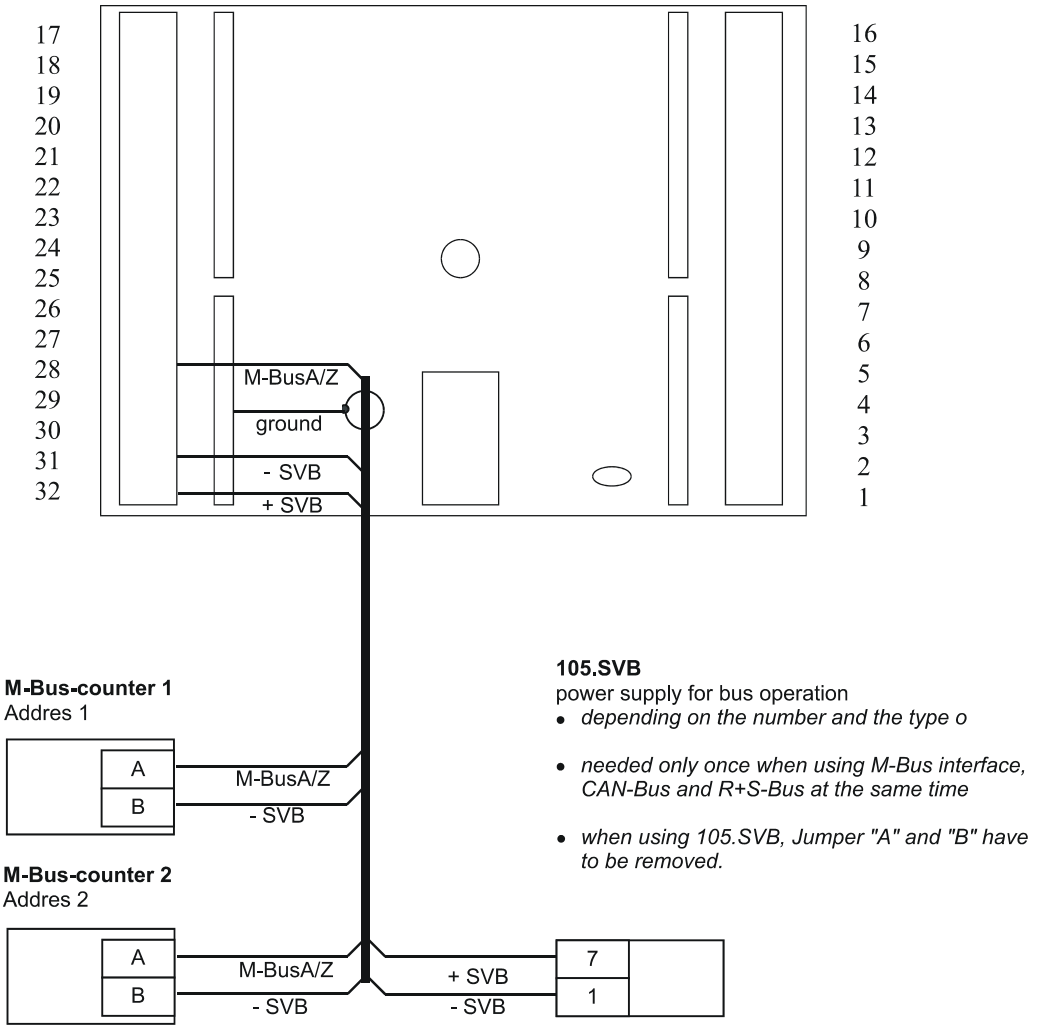



**Abb. 4-6 connecting M-Bus counter**

## 4.8 personal computer / R+S control station

If the RU **9X kompakt** is equipped with an interface card RU9S.SSK, it can be connected with a personal computer and/or with a R+S control station. The connection can be done directly (RS-232, a maximum cable length is 15 m), via R+S-Bus (RS-485, a maximum length of 1200 m, look at ch. 4.10) or via a modem (look at ch. 4.9).
The cable K2PC9ST1 is used for the direct connection (look at fig. 4-7). The shorting plugs (Jumper) at the rear of the housing must be placed according to the default factory setting (look at fig. 4-8).
Using the service adapter RU 9S.Adap you can do a PC link-up via the service interface at the front of the controller (look at ch. 5.6). No interface card is needed for that.

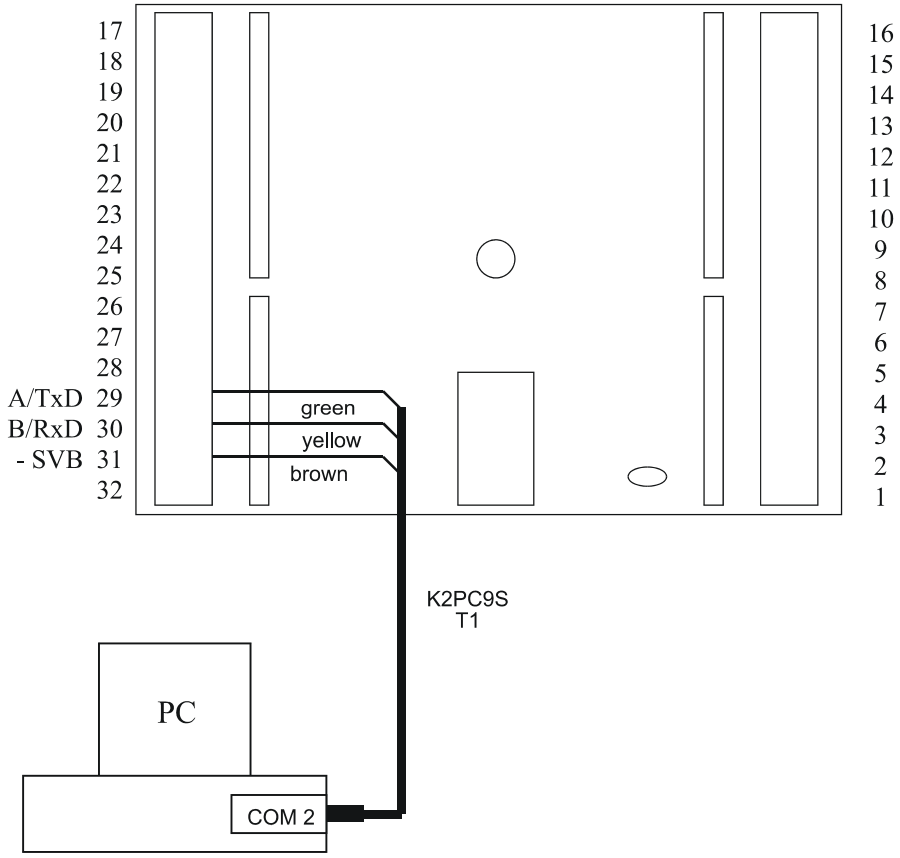



Abb. 4-7 connecting a PC

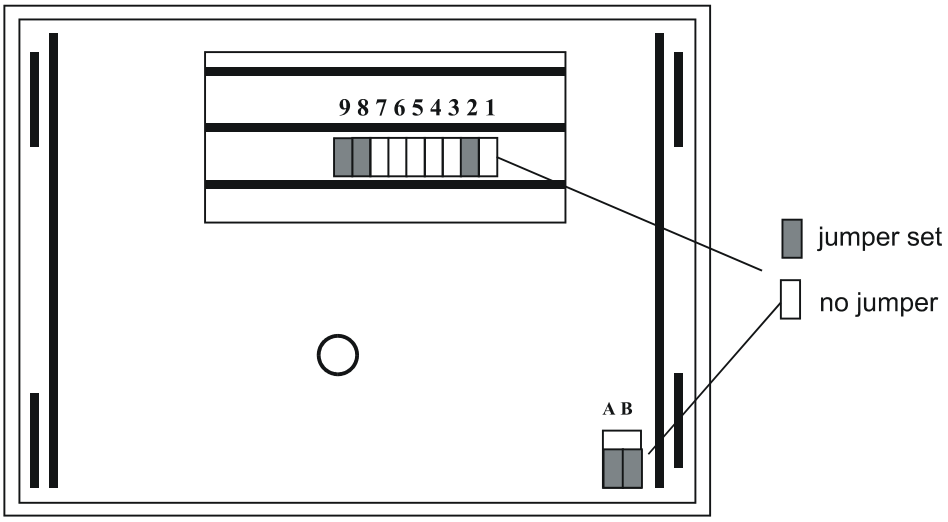



**Abb. 4-8 position of the jumpers for PC or modem operation**

## 4.9 modem

If the RU **9X kompakt** is equipped with an interface card RU9S.SSK, it can be connected with a personal computer and/or with a R+S control station. The connection can be done directly (RS-232, maximum cable length is 15 m), via R+S-Bus (RS-485, a maximum length of 1200 m, look at ch. 4.10) or via a modem. R+S offers a range of suitable modems, for example MOD 1-R, MOD 3-R and MOD 5-R. The cable K2MOD9ST1 is used to connect the modem to the controller. (look at fig. 4-9). The shorting plugs (Jumper) at the rear of the housing must be placed according to the default factory setting (look at fig. 4-8).

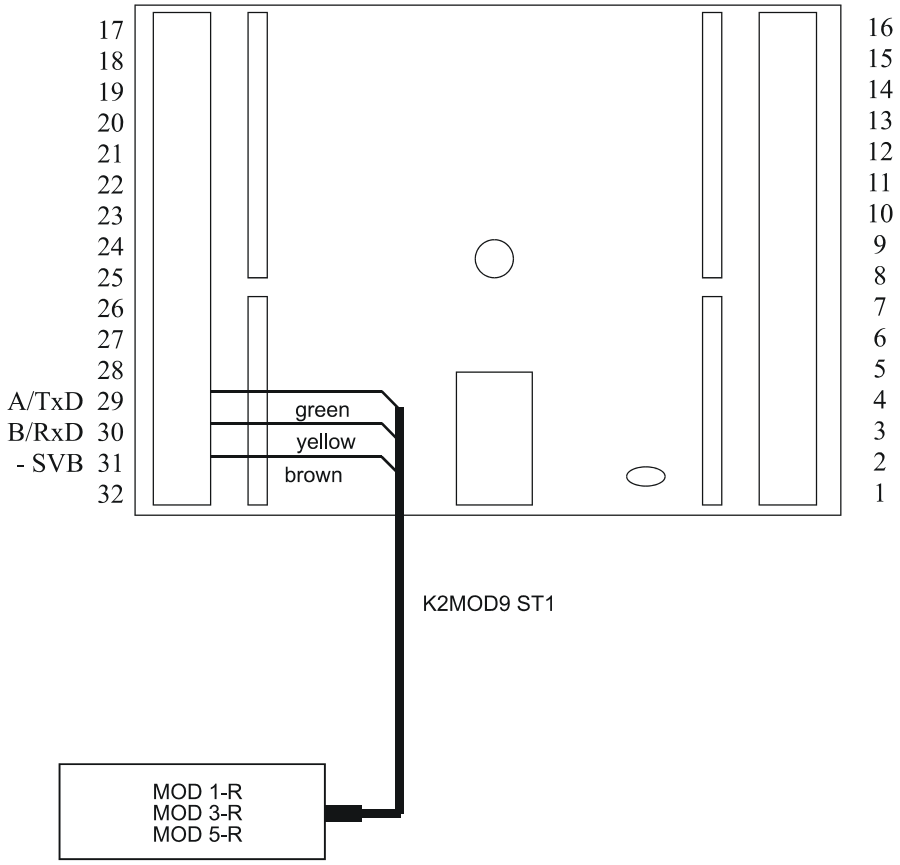



Abb. 4-9 connecting a modem

## 4.10 R+S Bus (control station / UP) 39

If the RU **9X kompakt** is equipped with an interface card RU9S.SSK, it can be connected with a personal computer and/or with a R+S control station. The connection can be done directly (RS-232, a maximum cable length is 15 m)(look at ch. 4.8), via R+S-Bus (RS-485, a maximum length of 1200 m) or via a modem (look at ch. 4.9).
127 R+S DDC-units via 4 lines can be connected to a personal computer/control station. A R+S interface converter SSU or SSU-1 transforms the signals between the R+S Bus and the pc/control station. (look at fig. 4-10). In case of a cable length of more than 100 m between two R+S DDC units a R+S bus power supply (105.SVB) is necessary.

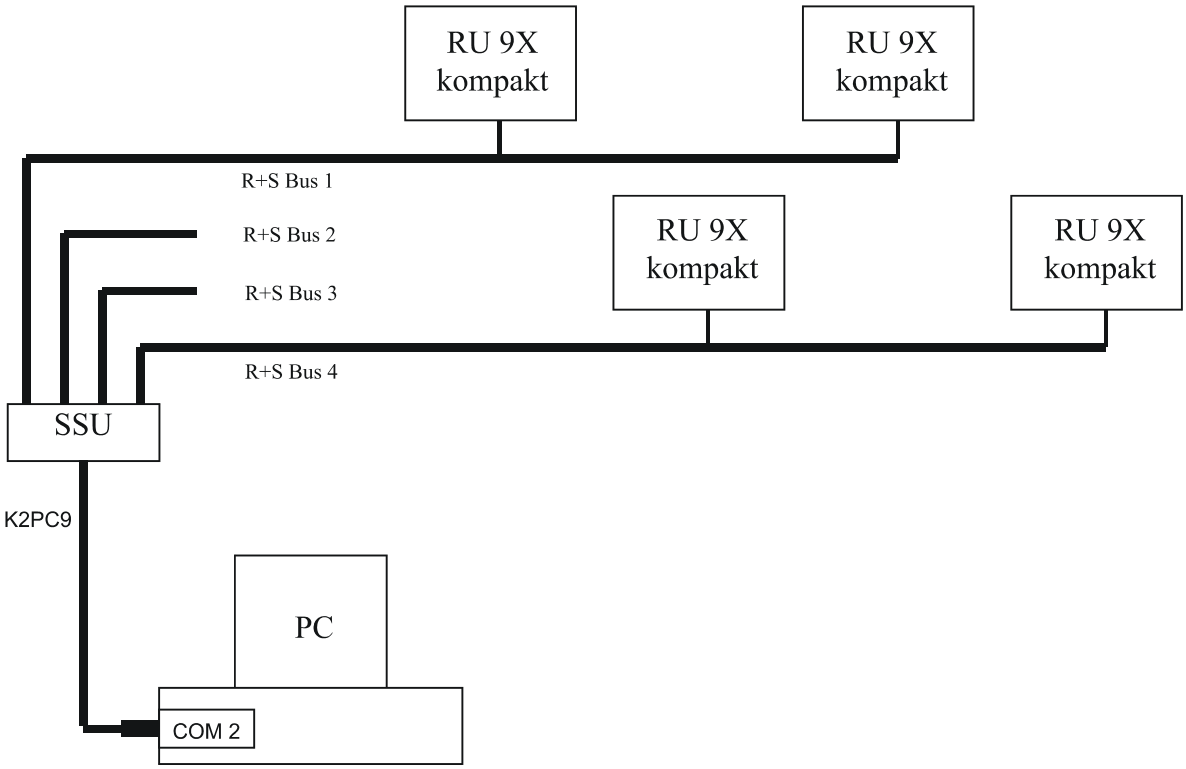
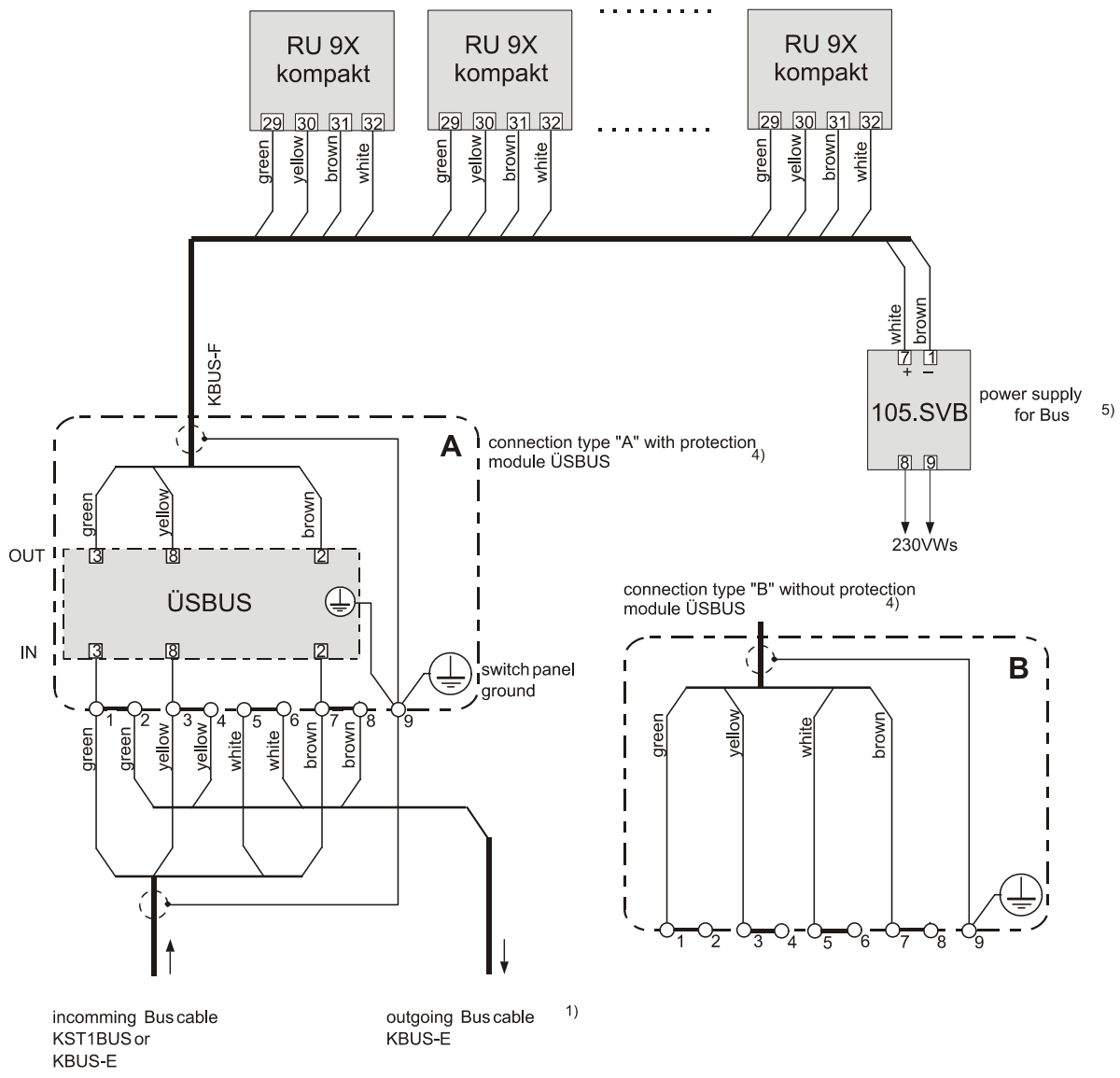



Abb. 4-10 bus operation via a PC /BMS

Via the R+S-Bus it is also possible to connect your RU **9X kompakt** to a master-bus-interface of a unit PLUS controller, f.i. to transmit a temperature or capacity demand to the energy manager of the unit PLUS (look at fig. 4-11). In case of a cable length of more than 100 m between two R+S DDC units a R+S bus power supply (105.SVB) is necessary.


Abb. 4-11 bus operation via **unit** PLUS

The bus wiring between several RU **9X kompakt** inside a control panel is done according to fig. 4-12.
The shorting plugs (jumper) have to be positioned according to fig. 4-13.




1) not set, if the control panel is at the end of the bus cable
4) use the R+S coarse and microfuse element ÜSBUS at danger of lightning
5) not set, if the cable length to the next SVB, SSU or SSKM is less than 100 m. In case of diagram type "A" and in a system with more than 32 members on the bus a 105.SVB is always necessary.

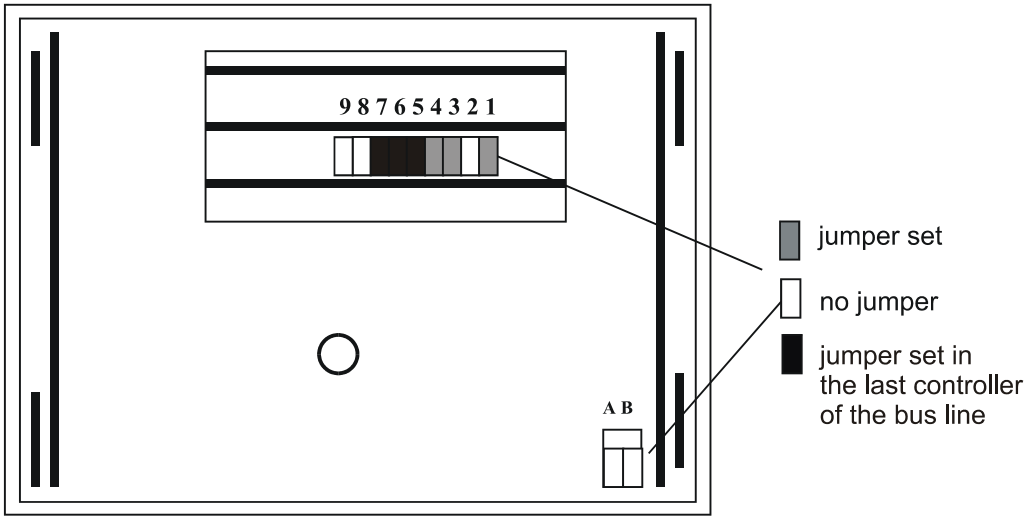



**Abb. 4-13 position of the jumpers for R+S bus operation**

# 5 initialisation

## 5.1 initialising the interfaces

If the controller has an interface card (look at ch. 3.3), they must be initialised. If no interface card is present you can skip this section and go to the next chapter. (look at 5.2).

### 5.1.1 SSK

If the interface card RU9S.SSK for personal computer, modem and bus operation is present (look at ch. 3.3) it has to be initialised in the following way:
The shorting plugs (jumper) must be positioned correctly (look at ch. 4.8 to 4.10).

- Enter the access code if access protection is activated (look at ch. 2.9)
- Press the buttons <Down> and <OK> simultaneously and you will reach the menu level “global”
- Scroll down until you reach the menu item "structure", press <OK> twice
- set the parameter "SSK" to 1 (which means SSK is present)
- Press the buttons <+> and <OK> simultaneously and you will reach the menu item "interface"
- Go to menu item "SSK" – press <OK>
- Go to menu item "general characteristic values" – press <OK>
- Set the parameter active = 1. Now the controller can communicate via the interface card SSK, not anymore, however, via the front-sided service interface. They both exclude themselves mutually (look at ch. 5.7)
- Go back to the menu item “SSK” – press <OK>
- Go to menu item “modem” – press <OK>
- Set the parameter active = 1 if the communication via a modem is requested.
- Set the parameter “modemTyp” = 2 if the controller is supposed to dial the R+S control station by himself, if an alarm occurs. In this case, the telephone numbers telNoBMS and telNoOwn must be entered.
- Go back to the menu item “SSK” – press <OK>
- Go to menu item “bus” – press <OK>
- Set the parameter active = 1, if bus operation via the R+S Bus is requested. The controller bus address has to be entered into the parameter contrAddr

### 5.1.2 CAN-interface

If the interface card RU9S.C or RU9S.CS is present (look at ch. 3.3) to connect R+S CAN-remote control units, the controller has to be initialised as follows:

- Enter the access code if access protection is activated (look at ch. 2.9)
- Press the buttons <Down> and <OK> simultaneously and you will reach the menu level “global”
- Scroll down until you reach the menu item "structure" - press <OK> twice
- Set the parameter "numOfCAN" to 2 (that means maximum 2 CAN-Bus-members)

For further initialisations look at ch. 5.2.

### 5.1.3 M-Bus interface

If the interface card RU9S.M is present (look at ch. 3.3) to connect M-Bus heat meters, the controller has to be initialised as follows:

- Enter the access code if access protection is activated (look at ch. 2.9)
- Press the buttons <Down> and <OK> simultaneously and you will reach the menu level “global”
- Scroll down until you reach the menu item "structure" - press <OK> twice
- Set the parameter "numOfMBus" to 2 (that means maximum 2 M-Bus members)

For further initialisations look at ch. 5.2.

## 5.2 system diagram

With the function "system diagram" an automatic selfparameterization of the controller is carried out during the initial startup. According to the chosen system diagram (see Operating Manual 9X UNIT kompakt, part 2) all input and output terminals are allocated automatically in accordance with the terminal diagram; all important controller functions are activated and initialised automatically. The R+S CAN-remote control unit will be initialised automatically, if requested. The controller is then immediately fully operative if the field units (motor, pump, sensor…) where connected according to the terminal diagram. Naturally the automatically made parameter setting can be modified or changed manually.
In the factory setting, there is usually no system diagram loaded, that means, that the control programs are not active and running. If the loading of the system diagram is repeated, all previous parameter settings will be lost.
This is how you load a system diagram:

- Select the desired system diagram (look at Operating Manual 9X UNIT kompakt, part 2)
- Enter access code if the access protection is activated (look at ch. 2.9)
- Press the buttons <Down> and <-> simultaneously and you will reach the menu level “system diagrams".
- Set the parameter "sysDiagram" to the number of the selected system diagram (for example ""61"")
- Set the parameter “burner” to the desired burner type (1 = one-stage, 2 = two-stage, 3 = modulating) (only with burner controllers)
- If the domestic warm water circuit is supposed to be controlled via a R+S CAN-remote control unit, please enter the item number of the desired remote control at the parameter "CAN-DHW". You will find a number of possible entries in appendix C.
- If desired, a CAN-remote control unit or a CAN-room sensor MR-C(S) can be used with the heating circuit 1 and/or heating circuit 2. Enter the item number of the desired CAN unit in the parameter "CAN-HC1" and/or "CAN-HC2". Please remember, that a maximum number of two CAN-units is permitted. The CAN-unit 1 is always assigned to the heating circuit 1, the CAN-unit 2 is always assigned either to the heating circuit 2 or the domestic warm water circuit.
- If you want to assign a M-Bus heat meter to the district heating circuit you have to set the parameter “MbusTyp” to the desired type. (Look at appendix D)
- Setting the parameter “MBusLim” = 1 will activate the function “capacity limitation with M-Bus”
- The design capacities of the burner/district heating circuit, the domestic warm water circuit and the heating circuit have to be entered in the parameter "Q-confBu", "Q-confDH", … and so on. To enter the right values is very important for the exact function of the “energy manager. (Releasing the required capacity of heat from the heat source, 15-stage load drop with priority, domestic hot water priority)
- If the design capacities are not known during the initialisation, the factory settings should be maintained.
- Initiate a cold start by pressing the buttons <down>, <up> and <Reset> simultaneously.
- Answer the question “delete all parameters” by pressing the <ok> button. enter the highest access code. On the display you will see the message “diagram xx loaded”. Press the <ok>-button and the controller will start working. The system diagram is loaded. If you press the <?> button while the standard display is visible you can see the type of controller and the current system diagram. For further details of the system diagram see appendix A.

## 5.3 further adjustments

The following adjustments must be carried out after the loading of the system diagram:

- set system time and date (look at ch. 2.10 and 2.11)
- set occupancy times (look at ch. 2.12)
- set the set points (look at ch. 2.2)
- The heating circuits are set to 70/55°C using radiators. If you have a different heating system you have to adjust the parameters for every heating circuit in the following way:
- Look at the possible choices in appendix B.
- Enter the access code (look at ch. 2.9).
- Go to “Heating circuit 1”-"Service" - "system data" and change the parameter “heatSystTyp” to the selected number (see appendix B)
- To adapt the controller to the special condition of system you can make further adjustments, for example assignment of other sensors or motors, activation of additional functions, etc.(look at the system manual DDC-Regel UNIT **9X kompakt**).

# 5.4 functional test

## 5.4.1 sensors

The measured values of all connected sensors are shown in the menu "survey" (look at ch. 2.5). Missing, intermittent or short-circuited entries will produce error messages on the display. Please eliminate all errors caused by faulty cables. If there are sensors, that are not used, according to the system diagram, you have to deactivate them in the menu “control circuit” (button in the first row = burner/district heating/heating/DHW circuit) - "service" - "ass. input" by setting the parameter to 0. Or you can deactivate the error message for this sensor in the menu “configuration” – “input” by setting the parameter “termxx sensor/message” to 0.

After completing the functional test no error messages should be visible on the display.

## 5.4.2 pumps, valves, motors and mixers

To determine the proper function of all pumps, valves, motors and mixers via the manual operation you have to:

Turn the operation mode switch onto “manual operation”

- Enter the access code if access protection is activated (look at ch. 2.9)
- In the menu “control circuit” (button in the first row = burner/district heating/heating/DHW circuit) - "manual oper." - "valve", "pump", etc. the parameter “active manOp” has to be set to 0,1,… (On/Off, Oben/Close/Halt etc.) depending on the order you want to give to the unit. (press the <?>-button for more information )
- Check out the unit, if the command is carried out correctly.
- turn the “operating mode switch” back to “automatic”. The manual operation is deactivated.

## 5.5 trend

To proof the correct function of the controller you can activate an automatic trend logging of selected sensor values. The values are stored in the memory of the RU **9X kompakt**. They can be displayed on the display of the controller or can be transmitted to the PC via the software R+S TP0 and printed on your printer.
A maximum of 5 sensors can be selected. For every sensor up to 50 measured values can be recorded. If the memory for one sensor is fully loaded, the controller starts to save the values at the beginning of the memory, so the value which is longest in memory is overwritten.(round-robin) The pointer to the latest (freshest) value is stored in the parameter "curNumReco". This is how the trend logging is started:

- Enter the access code, if access protection is activated (look at ch. 2.9)
- By pressing the buttons <Up> and <-> simultaneously you reach the menu "Trend"
- Select the desired trend number with the cursor buttons and confirm by pressing <OK>
- Enter the terminal number of the sensor you would like to record at the menu "trendx" - "service" - "ass. input".(for example "17". Only analog inputs can be recorded!)
- Go back to the menu “trendx” – “function” and set the parameter “active” = 1. You can then set the recording interval “intReco” to the desired value (in minutes).
- Now you can look at the recorded values in the menu “trendx" - "S/I/O”" – “trend”.

## 5.6 service interface

The basic installation of the controller can also be carried out via the service interface at the front of the controller. To do so, please proceed as follows:

- Open and remove the front door of the controller
- Remove front scale of the controller ( lift front scale with a small screwdriver and pull, look at illustration 3-1)
- Start your computer with the software R+S “TP0 WIN” or "GLT-WIN". Connect the PC, using a free COM-Port, with the serial interface at the front of the controller with the R+S "RU 9S.Adap" (item-nr. 1410 1000)(look at ch. 1.3).
- The SSK - interface must be deactivated, otherwise communication via the service interface is not possible.(look at ch. 5.1.1).
- You can now change parameters either by executing the function “remote control” in your pc-program (TP0-WIN or GLR-WIN) or by executing the function “project management”. With the function “project management” you can download and upload parameter groups or whole backup images of controllers. This function is often used to make a backup of your controller configuration.
- When you are finished with the changes on your controller, activate the SSM (if necessary), remove the PC-Adapter and reassemble the front scale and the front door.

# 6 maintenance

The controller shows "System Error! battery empty!" if the battery should be changed. The battery should then be changed immediately, otherwise the correct time and date will be lost, if the operating voltage fails.
For change of the battery look at ch. 3.4.

# 7 error messages

The controller recognizes automatically a great number of error conditions and shows these errors on the display or sends a message to the R+S control station.
Following error messages can occur:

**Error messages of the control programs:**

| error message | explanations |
|---|---|
| FP-system | frost protection, flow temperature dropped below frost limit |
| FP-stor | frost protection of storage tank, storage tank temperature dropped below frost limit |
| BP-FrRoom | frost protection room, room temperature dropped below frost limiterature |
| Xw-flow | max. deviation of flow temperature exceeded |
| Xw – room | max. deviation of room temperature exceeded |
| Xw-stor | max. deviation of storage tank temperature exceeded |
| Xw-storFl | max. deviation of storage tank flow temperature exceeded |
| Xw-loadFl | max. deviation of loading flow temperature exceeded |
| ULimStor | upper limit of storage tank temperature exceeded |
| ULimColl | upper limit of solar collector temperature exceeded |
| ULimFlow | upper limit of flow temperature exceeded |
| ULimExhaus | upper limit of exhaust temperature exceeded |
| ThermDis | thermal disinfection mot successful |
| TI-system | system error message (input of TI-system is active) |
| TI-inp | input error (Short circuit or break in cable) |

**System error messages:**

| error message | explanations |
|---|---|
| broken sensor cable at term.xx | sensor power circuit xx open |
| short circuit at term.xx | sensor power circuit xx short-circuited |
| battery empty ! | change battery, power backup of the clock is not guaranteed any-more |
| battery almost empty | battery must be changed soon |
| MBUS | M-Bus faulty |
| CAN | CAN-Bus faulty |
| global overload | real-time error |

The error message disappears if the reason for error was eliminated.

# 8 technical data

| | |
|---|---|
| **operating voltage** | 230 V ±10 % / 50 hertz |
| **power consumption** | 5 VA (without load) |
| **ambient temperature** | +5 to +40°C (in operation)<br>-20 to +65°C (transportation and storage) |
| **protection class** | II of EN 60730-1 |
| **type of protection:** | IP 54 EN 60529 (at the front, when installed in a steel case)<br>IP 40 EN 60529 (normally) |
| **CE-Certification** | given due to the conformity with following standards |
| EN 50081 / DIN EN 50081 | standard for radiation and interference |
| EN 50082 / DIN EN 50082 | standard for interference immunity |
| EN 55022 class B | radio interferences |
| IEC 801-2 | interference immunity against discharge of static current to the casing |
| IEC 801-3 | interference immunity against transmitted radio frequency |
| IEC 801-4 | interference immunity against transient bursts on signal-, control- or network cables |
| IEC 65 A / 77B (SEC) 120 | interference immunity against high-energy transient (surge) on network interfaces, power outputs and sensor cables. |
| **dimension** | 151 mm x 98 mm x 160 mm, mounting depth 118 mm |
| **installation** | wall mounting, panel-mounting or installations on a mounting plate |
| **preservation time of the data at power failure** | 10 years |
| **Backup battery for timer** | BAT (item-nr. 1220 1000, changeable) |
| **Power reserve** | 100 days without change of the battery) |
| **Min. time interval** | 1 min |
| **terminal** | terminals up to 2,5 mm2 (single cable)<br>1,5 mm2 (more than one cable) |

**Outputs**

| | RU 98.xx-xxx | RU 96.xx-xxx | RU 94.xx-xxx |
|---|---|---|---|
| terminal 12-14: relay output 230VAC / 1 A (ind.) for pumps and valves | 3 | 3 | 1 |
| terminal 3-9: relay outputs 230VAC / 1 A (ind.) for pumps and valves, protection class II EN 60730 | 4 | 2 | 2 |
| terminal 1: relay output 230VAC / 1 A (ind.) for burner release or pumps, protection class II EN 60730, minimum load 25 VA | 1 | 1 | 1 |
| terminal 23-24: transistor outputs (OC) 24 VDC / 10 mA *) | | 1 | |

| | | |
|---|---|---|
| Max. amounts of switching of the relay outputs | actuator: | 800 000 |
| | burner: | 300 000 |
| | pumps: | 30 000 |

**Inputs**

| | RU 98.1x-xxx | RU 96.1x-xxx | RU 94.1x-xxx |
|---|---|---|---|
| R+S M-sensor -60 to +160°C, 0 to 10 V, Poti 10 kOhm, Pt 1000 (modified) or EK input 12 VDC/1,2 mA | 6 | 6 | 6 |
| R+S M-sensor -60 to +100°C | | 1 | |
| counter input 20 V / 20 mA / min. 40 ms **) | 1 | 1 | 1 |

*) transistor outputs (Open-collector outputs) for the direct control of electronic pumps, (watch for overcurrent!)
**) only with controllers without M-Bus interface.

**Inputs/outputs**

| | RU 98.1x-xxx | RU 96.1x-xxx | RU 94.1x-xxx |
|---|---|---|---|
| 0<br>R+S M-sensor -60 to +100°C or Transistor outputs (OC) 24 VDC / 10 mA *) | 2 | | |

**Interfaces**

service interface at the front of the controller for personal computer or printer, connection only possible with adapter cable RU 9S.Adap

| | |
|---|---|
| RU 9S.SSK | Interface card for personal computer, modem, R+S bus (RS232, RS485) |
| RU 9S.C | CAN-Bus interface card (low speed) for max. 2 remote control units. R+S Fxx-C, max. length of cable: 25 m. If you connect 2 remote control units a bus power supply 105.SVB is necessary. |
| RU 9S.CS | CAN-Bus interface card (high speed) for max. 2 remote control units. R+S Fxx-C, max. length of cable: 150 m. If you connect 2 remote control units a bus power supply 105.SVB is necessary. |
| RU 9S.M | M-Bus interface card for max. 2 M-Bus heat meters. The need for an external bus power supply depends on the model and the amount of M-Bus meters connected |

*) transistor outputs (Open-collector outputs) for the direct control of electronic pumps. (watch for overcurrent!!)

# Appendix:

# Appendix A: factory setting

After setting the system diagram (look at ch. 5.2) following functions are active.

| Par.-Nr. | Menu | active functions | Remarks |
|---|---|---|---|
| 1.3.7 | global - service | projectmanagement | recording is active |
| 2.1 | timer | occupation times are set to: mo-fr, 6:00-22:00 | |
| 2.2.3.2.7 | district heating circuit (only with RU 9x.1F-xxx) - regulating | return temperature limitation | normally = 60°C, with domestic hot water loading = 80°C, in system diagram 66 = 45°C |
| 2.2.3.7.1 | district heating circuit (only with RU 9x.1F-xxx) – energy management | capacity rating | |
| 2.2.3.7.2 | district heating circuit (only with RU 9x.1F-xxx) – energy management | capacity boost | |
| 2.2.6.4/5 | district heating circuit (only with RU 9x.1F-xxx) - service | Assignment of the input and output terminals | according to the system diagram |
| 2.3.1.3.2.1 | energy manager -heatHe | DHW circuit determines system flow temperature | in a system diagram without DHW valve |
| 2.3.1.3.2.1 | energy manager -heatHe | load drop(DHW priority) | except in case of DHW flow system |
| 2.3.1.6.2 | energy manager - EM-strat. | DHW circuit primary / secondary fed | according to the system diagram |
| 2.4.2.2 | DHW circuit - Set points | boost | according to the system diagram |
| 2.4.3.2.4 | DHW circuit - regulating | remote control | according to the system diagram |
| 2.4.3.2.6 | DHW circuit - regulating | controller parameter | according to the system diagram |
| 2.4.3.3.3 | DHW circuit - controlling | start / switchOff-delay | according to the system diagram |
| 2.4.3.3.3 | DHW circuit - controlling | release of circ.-pump | in the case of DHW flow system |
| 2.4.3.4 | DHW circuit - monitoring | operating time | |
| 2.4.3.7.2 | DHW circuit – energy management | max demand of flow temp. maxDemFl-T | in the case of DHW flow system |
| 2.4.6.1 | DHW circuit - system data | Type of system | according to the system diagram |
| 2.4.6.4/5 | DHW circuit - service | assignment inputs / outputs | according to the system diagram |
| 2.4.6.6 | DHW circuit - service | assignment of CAN remote control | according to the system diagram |
| 2.5.1.3.2.7 | heating circuit 1 – regulating | remote control | according to the system diagram |
| 2.5.1.3.2.9 | heating circuit 1 – regulating | room compensation | when room sensor is assigned |
| 2.5.1.3.3.3 | heating circuit 1 – controlling | pump switch off delay | |
| 2.5.1.3.4.5 | heating circuit 1 – monitoring | operating time | |
| 2.5.1.3.5.1 | heating circuit 1 – calculate/optimise | switch on optim. | |
| 2.5.1.3.5.5 | heating circuit 1 – calculate/optimise | property manager | |
| 2.5.1.3.5.6 | heating circuit 1 – calculate/optimise | delayed outsideTemp | |

| Par.-Nr. | Menu | active functions | Remarks |
|---|---|---|---|
| 2.5.1.3.7.3 | heating circuit 1 – energy management | load drop (DHW priority) | |
| 2.5.1.6.1 | heating circuit 1 – system data | controller / pump output | according to the system diagram |
| 2.5.1.6.1 | heating circuit 1 – system data | heating system: radiators (70/55) | |
| 2.5.1.6.2 | heating circuit 1 – control strategy | with room sensor | |
| 2.5.1.6.4/5 | heating circuit 1 – service | assignment inputs / outputs | according to the system diagram |
| 2.5.1.6.6 | heating circuit 1 – service | assignment of CAN remote control | according to the system diagram |
| 2.5.2.3.2.7 | heating circuit 2 – regulating | remote control | according to the system diagram |
| 2.5.2.3.2.9 | heating circuit 2 – regulating | room compensation | when room sensor is assigned |
| 2.5.2.3.3.3 | heating circuit 2 – controlling | delay of pump switch off | |
| 2.5.2.3.4.5 | heating circuit 2 - monitoring | operating time | |
| 2.5.2.3.5.1 | heating circuit 2 – calculate/optimise | switch on optim. | |
| 2.5.2.3.5.5 | heating circuit 2 - calculate/optimise | property manager | |
| 2.5.2.3.5.6 | heating circuit 2 - calculate/optimise | delayed outsideTemp | |
| 2.5.2.3.7.3 | heating circuit 2 – energy management | load drop (DHW priority) | |
| 2.5.2.6.1 | heating circuit 2 - system data | controller / pump output | according to the system diagram |
| 2.5.2.6.1 | heating circuit 2 - system data | heating system: radiators (70/55) | |
| 2.5.2.6.2 | heating circuit 2 – control strategy | with room sensor | |
| 2.5.2.6.4/5 | heating circuit 2 – service | assignment inputs / outputs | according to the system diagram |
| 2.5.2.6.6 | heating circuit 2 – service | assignment of CAN remote control | according to the system diagram |
| 3.2 | interface - SSK | SSK-S | SSK not active |
| 3.4 | interface - M-Bus | M-Bus 1 | providing it was activated during selection of a system diagram(5.2) |
| 3.5 | interface - CAN | CAN-Bus 1 and 2 | providing it was activated during selection of a system diagram(5.2) |
| 4.1 | configuration - inputs | Error messages to all assigned inputs | |

# Appendix B: type of heating system

With **heatSystTyp** you can select the type of heating system. This will lead to an automatic configuration of the following parameters:

- the heating curve will be adjusted according to the selected heating system (radiator exponent, design flow and return temperature).
- flow temperature limitation
- max. temperature demand

When the system diagram was selected heatSystTyp will be set to 1 (radiators).

If you want to select other values for the preconfigured parameters you should select heatSystTyp=0. You can than adjust the heating curve to your own special needs by either setting the parameter Rr-Exp and the design temperatures or by setting each point of the heating curve manually. (look at the system manual ch. 3.2.3 – functions, regulating, heating curve and 3.7.2 functions - energy management - heat).

| **heatSystTyp**<br>**Parameter-no.** | **Rr-Exp**<br>**6.1.9** | **desFl-T 3.7.2.5**<br>**3.2.3.2** | **desRetT 3.7.2.6** | **maxFl 3.2.13.3** | **maxDemFl**<br>**3.7.2.8** |
|---|---|---|---|---|---|
| **0** free definition | | | Manual input | | |
| **1** radiators | 1,3 | 70°C | 55°C | 80°C | 80°C |
| **2** convectors | 1,4 | 70°C | 55°C | 80°C | 80°C |
| **3** underfloor heating | 1,1 | 45°C | 35°C | 50°C | 50°C |
| **4** air heaters | 1,1 | 90°C | 70°C | 90°C | 90°C |
| **5** ceiling heating | 1,6 | 60°C | 50°C | 70°C | 70°C |

# Appendix C: CAN-remote controls and CAN-room sensors

Following CAN-units can be used with the RU **9X kompakt**:

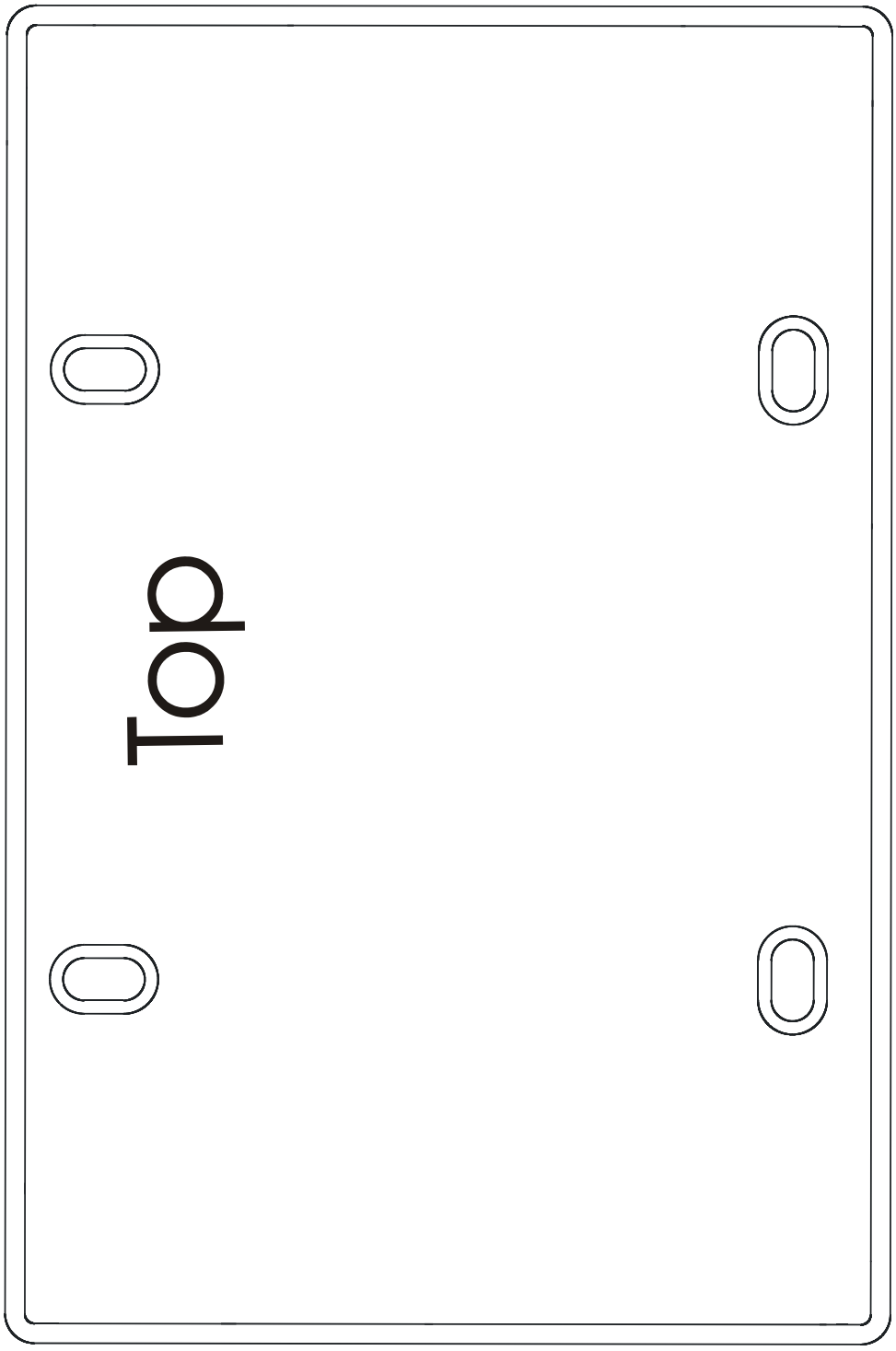
| model | item-nr. | Description |
|---|---|---|
| MR-C | 2104-1210 | room temperature sensor 10 ... 40°C with CAN-Bus interface, short distance, wall mounting |
| MR-CS | 2104-1220 | room temperature sensor 10 ... 40°C with CAN-Bus interface, long distance area, wall mounting |
| MR-C/U | 2104-2210 | room temperature sensor 10 ... 40°C with CAN-Bus interface, short distance, for flush socket |
| MR-CS/U | 2104-2220 | room temperature sensor 10 ... 40°C with CAN-Bus interface, long distance area, for flush socket |
| FR1-C | 3401-1210 | Remote control with room temperature sensor 10 ... 40°C, button, 4 LEDs, short distance, wall mounting |
| FR1-CS | 3401-1220 | Remote control with room temperature sensor 10 ... 40°C, button, 4 LEDs, long-distance area, wall mounting |
| FR2-C | 3401-1230 | remote control with controller, room temperature sensor 10 ... 40°C, short distance, wall mounting |
| FR2-CS | 3401-1240 | remote control with potentiometer, room temperature sensor 10 ... 40°C, long-distance area, wall mounting |
| FR3-C | 3401-1250 | remote control with potentiometer, room temperature sensor 10 ... 40°C, button, 4 LEDs, short distance, wall mounting |
| FR3-CS | 3401-1260 | remote control with potentiometer, room temperature sensor 10 ... 40°C, button, 4 LEDs, long-distance area, wall mounting |
| FTR1-C | 3401-3210 | remote control with room temperature sensor 10 ... 40°C, button, LED, short distance, wall mounting |
| FTR1-CS | 3401-3220 | remote control with room temperature sensor 10 ... 40°C, button, LED, long-distance area, wall mounting |
| FTR2-C | 3401-3230 | remote control with potentiometer, room temperature sensor 10 ... 40°C, button, LED, short distance, wall mounting |
| FTR2-CS | 3401-3240 | remote control with potentiometer, room temperature sensor 10 ... 40°C, button, LED, long-distance area, wall mounting |
| FDR1-C | 3401-4210 | remote control with room temperature sensor 10 ... 40°C, counter, LED, day/night/automatism, short distance, wall mounting |
| FDR1-CS | 3401-4220 | remote control with room temperature sensor 10 ... 40°C, counter, LED, day/night/automatism, long-distance area, wall mounting |
| FDR2-C | 3401-4230 | remote control with potentiometer, room temperature sensor 10 ... 40°C, counter, LED, day/night/automatism, short distance, wall mounting |
| FDR2-CS | 3401-4240 | remote control with potentiometer, room temperature sensor 10 ... 40°C, counter, LED, day/night/automatism, long-distance area, wall mounting |
| FR2-C/U | 3402-1230 | remote control with potentiometer, room temperature sensor 10 ... 40°C, short distance, for flush socket |
| FR2-CS/U | 3402-1240 | remote control with potentiometer, room temperature sensor 10 ... 40°C, long-distance area, for flush socket |
| FR3-C/U | 3402-1250 | remote control with potentiometer, room temperature sensor 10 ... 40°C, button, 4 LEDs, short distance, for flush socket |
| FR3-CS/U | 3402-1260 | remote control with potentiometer, room temperature sensor 10 ... 40°C, button, 4 LEDs, long-distance area, for flush socket |
| FTR2-C/U | 3402-3230 | remote control with potentiometer, room temperature sensor 10 ... 40°C, button, LED, short distance, for flush socket |
| FTR2-CS/U | 3402-3240 | remote control with potentiometer, room temperature sensor 10 ... 40°C, button, LED, long-distance area, for flush socket |
| FDR2-C/U | 3402-4230 | remote control with potentiometer, room temperature sensor 10 ... 40°C, day/night/automatism counter, short distance, for flush socket |
| FDR2-CS/U | 3402-4240 | remote control with potentiometer, room temperature sensor 10 ... 40°C, day/night/automatism counter, long-distance area, for flush socket |

# Appendix D: M-Bus heat meter

Following M-Bus heat meters can be used with your RU **9X kompakt**:

| **"MBusType"** | **Heat meter** | **Manufacturer** | **Remarks** |
|---|---|---|---|
| 10 | Pollustat | SPX | |
| 61 | Delta Kompakt II | Techem | no capacity limitation |
| 70 | Multidata S1 | Zenner | no capacity limitation, the use of a bus power supply 105.SVB is necessary (look at ch. 4.7) |
| 71 | Multidata S1 | Zenner | short protocol, adjustable |
| 90 | 2WR4 | Siemens | |

# Appendix E: drilling template for wall mounting



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