



# ..iversal controller rUVR1611 + Central controller rZR

## Technology - Installation - Operation



### **Important information!**

All information/images/drawings are subject to errors and changes.

The system planner or the company carrying out the work must observe and comply with the generally applicable and recognised rules of technology as well as the relevant local regulations and legal provisions.

Please read before installation, commissioning and operation. Failure to comply may void any warranty claims!

**ATTENTION!** Installation, wiring and operation – only by authorised specialist personnel.

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# Scope of delivery & accessories for rUVR + rZR



**rUVR controller with standard housing and bracket** for surface/wall mounting (also available in control cabinet version as an option)

- Input and output terminals
- 2 ground terminal strips
- 16 strain reliefs
- Wall mounting material
- Technical documentation
- Sensors



**rZR controller with ratiotherm housing and console (WxHxD 30x10x40cm)** for surface/wall mounting,

- 28 input and 25 output spring-loaded terminal strips up to 2.5 mm<sup>2</sup>
- 1 mains switch, 16 manual 0 automatic switches, 1 chimney sweep button
- 2 additional circuit board relays (pluggable)
- 1 pluggable special CAN-I/O44 expansion module raZM-03
- 1 strain relief block
- Wall mounting material and drilling template
- Technical documentation
- Sensor



**rUVR heat pump controller**  
"Control unit" (delivery Oskar-Max-Sol<sup>2</sup>/Oskar-Max)

- with 550 mm long connection cable to the power unit. Together with the power unit, the two parts form a fully-fledged UVR1611 control system with the usual operating, visualisation and bus options.



**rUVR heat pump controller**  
"Power unit" (delivery Oskar-Max-Sol<sup>2</sup>/Oskar-Max) for "control unit"

- 14 fully-fledged outputs (A12, 13 and 14 are all separately fused)



**Cable sensor**

- PT 1000 B (-40 to +180°C)
- 5 m silicone cable
- Sensor Ø 5.5 mm



**Collector sensor (for a solar system)**

- PT 1000 B (-40 to +180°C)
- 2.5 m silicone cable
- Sensor Ø 5.5 mm
- Overvoltage protection



**Pipe contact sensor (for drinking water circulation and heating circuits)**

- PT 1000 B (-40 to +180°C)
- 5.0 m silicone cable
- Mounting clamp
- Thermal paste

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Operating instructions rUVR1611/rZR D-2014/06

# Scope of delivery & accessories for rUVR + rZR



**PT 1000 B "ultra-fast" cable sensor (-40 to +180°C)**

- 2 m PVC cable
- Brass screw-in fitting ½" AG



**Outdoor sensor (\*supplied with rUVR and rZR controllers)**

- PT 1000 B (-40 to +180°C)
- Overvoltage protection



**Sensor designations (\*Delivery with rUVR and rZR controllers)**

For shrink fitting



**Strain reliefs (\*delivery with rUVR controller)**

and mounting hardware



**Room setpoint transmitter**

(optional)

- Room sensor (RAS)
- Potentiometer ( $\pm 5^\circ\text{C}$ )
- Operating mode selector switch



**Room remote control**

(optional)

- Room sensor
- Remote display



**CAN touch**

(optional)

- Remote display
- Setting user behaviour (time programming)

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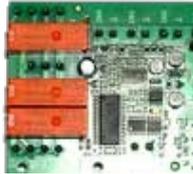
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# Scope of delivery & accessories for rUVR + rZR



## Electronic volume flow sensor EVS-DN 25

- **DN 10:** Flow rates between 2.0 and 32 litres per minute
- **DN 15:** Flow rates between 4.0 and 50 litres per minute
- **DN 20:** Flow rates between 5 and 85 litres per minute
- **DN 25:** Flow rates between 9 and 150 litres per minute
- Recording of medium temperatures from -40 to +125°C (PT1000)
- Output of measured values via DL bus



## Pluggable special CAN I/O44 module raZM-03 (\*for rZR V4/01; V4/ So)

- 4 inputs
- 3 switch outputs (230V~A3)
- 1 analogue output (0-10V)



## Flow switch AC 30

Included with TWK-70

- Max. voltage: 230V~
- Switching current < 30mA non-inductive!



## Flow sensor AC 1.5

Input signal for external control

- Max. voltage: 230V~
- Switching current max.: 1.5A
- Switching current min.: 50mA



## Additional relay

for version rUVR-1611-V2

- Outputs A12 + A13



## Bootloader

(optional)

with software and USB connection cable for PC



## Expansion module CAN I/O44

(optional)

- 4 inputs
- 3 switch outputs (230V~/3A)
- 1 analogue output (0-10V)



## Volume flow pulse generator VIG 1 or VIG 2

(optional)

For precise heat measurement, e.g. with a solar system VIG

1 with RAG 1/2"

VIG 2 with RAG 3/4

	DN		Nominal flow rate Qn m³/h	Maximum flow rate Qmax m³/h	Class B (horizontal + vertical)		Weight in kg
	mm	inch			Qt l/h	Qmin l/h	
<b>VIG 1</b>	15	E 1/2"	1.5	3.0	120	30	0.505
<b>VIG 2</b>	20	R 3/4"	2.5	5.0	200	50	0.530

At a flow rate of 3 l/h (horizontal), the measurement accuracy is ±10%.

Start-up horizontal < 1 l/h, start-up vertical < 4 l/h, pulse output (one pulse per 0.5 l), temperature range: 90°C

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# Technical data rUVR1611

Connection	230V~, 50 - 60 Hz, fuse protection with 6.3 A fast-acting fuse,
Power devices) consumption	max. 4 watts (without additional
Accuracy	Type 04 and max. $\pm 1^{\circ}\text{C}$ in the range from 0 - 100°C
speed control	30 speed stages result in a quantity change of max. 1 : 10 on absolute value, difference and absolute value on event
temperature	- 30°C to + 199°C with a resolution of 0.1 K display
CAN bus	Data rate 50 kb/sec. Power supply for external devices with 12V= / 100mA
Threshold values	Some with adjustable hysteresis or alternatively with separate switch-on and switch-off thresholds

## Inputs / sensors

All 16 inputs are suitable for standard **PT 1000** sensors or as digital inputs. In addition, the following inputs have special functions:

S8 Current loop (4-20 mA) or control voltage (0-10 V=) S15, S16  
Pulse input, e.g. for volume flow pulse generator

S1-S7 and S9- Voltage 0-5 V (max.) S16

### Probes/sensors – resistance values:

Temp. (°C)	-	-	0	10	20	25	30	40
PT1000 (Ω)	922	961	1000	1039	1078	1097	1117	1155
Temp. (°C)	50	60	70	80	90	100	110	120
PT1000 (Ω)	1194	1232	1271	1309	1347	1385	1423	1461

\*Probe designation: (A) = outdoor probe; (K) = collector probe; (R) = pipe contact probe; (U) = ultra-fast probe

## Live outputs

Output	Function with ratiotherm standard programming	Max. switching capacity
A	Speed-controllable output with integrated interference suppression filter for pumps, also suitable for controlling fans with phase angle control	0.7
A	Speed-controllable output for pumps and, with an externally connected mains filter, also for fan motors	1.0
A	Relay output – normally open contact – for any load	3.0
A	Relay output – normally closed and normally open contacts – for any load, preferably for valves without return spring	3.0 A
A5	Relay changeover contact "potential-free", - root, normally closed and normally open - for heat generator request	3.0
A	Speed-controllable output for pumps and, with externally connected mains filter, also for fan motors	1.0
A	Speed-controllable output for pumps and, with an external downstream mains filter, also for fan motors	1.0
A	Relay output – normally open contact – for any load, preferably to be used together with A 9 for mixer motors	3.0
A	Relay output – normally open contact – for any load, preferably to be used together with A 8 for mixer motors	3.0
A10	Relay output – normally open contact – for any load, preferably to be used together with A 11 for mixer motors	3.0
A11	Relay output – normally open contact – for any load, preferably to be used together with A 10 for mixer motors	3.0 A
A12	(only for version rUVR-V2/xx) Additional relay output – normally closed and normally open contacts – potential-free use possible with additional relay (HiRel 1611)	3.0 A
A13	(only for version rUVR-V2/xx) additional relay output – normally closed and normally open contacts – potential-free use possible via additional relay (HiRel 1611)	3.0
A14 / DL	Data output for simple converter module (bootloader) to PC, can also be used as a control output by parameterisation (additional relay required)	
A15 /PWM	Control output with a standardised voltage level of 0-10 volts = e.g. for speed control (referred to as analogue output A 15 in the user software) Volt = temperature (1V = 10°C)	0-10V
A16 /PWM	Control output with a standardised voltage level of 0-10 volts = e.g. for speed control (designated as analogue output A 16 in the user software)	0-10V
HiRel	Control line for relay module (outputs 12 + 13)	3.0 A
CAN H/L	Data bus for data exchange within the device family	
12	Power supply for external devices with 12 V DC	

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# Assembly instructions rUVR 1611

A1 K32	Relay output – normally closed and normally open contacts – for any load, preferably for valves without return spring (* only in conjunction with rZRV4 and rUVR with CAN-IO module)	3.0 A
A2 K32	Relay output – normally open contact – for any load, preferably to be used together with A 9 for mixer motors (* only in conjunction with rZRV4 and rUVR with CAN-IO module)	3.0
A3 K32	Relay output – normally open contact – for any load, preferably used together with A 9 for mixer motors (* only in conjunction with rZRV4 and rUVR with CAN-IO module)	3.0
A4 K32	Control output with a standardised voltage level of 0-10 volts = e.g. for speed control (referred to as analogue output A4 K32 in the user software)	

Attention! All switched outputs are programmed with normally open contacts as standard at the factory!



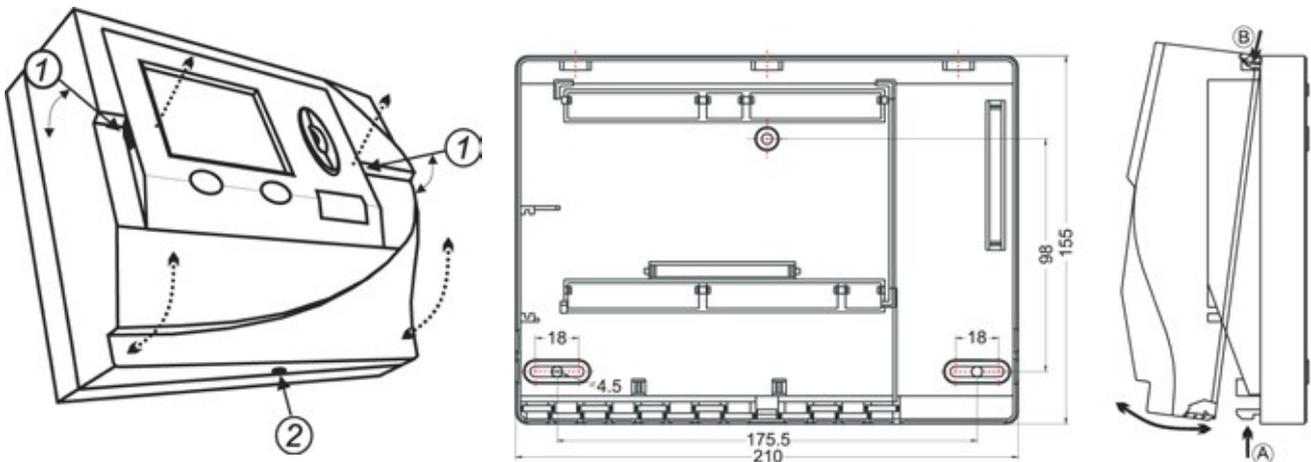
**Caution! Always disconnect the device from the mains before opening!**



The control unit housing is designed for surface/wall mounting and has a bracket (lower part of the unit) with integrated plug-in contact strips for the controller (microprocessor) and terminal strips for all input and output cables.

To mount the bracket, the housing must be opened. To do this, proceed as follows:

Use two small screwdrivers to press the locking claws (points "1" in the diagram below) inwards and pull the controller out of the housing, using two large screwdrivers if necessary.



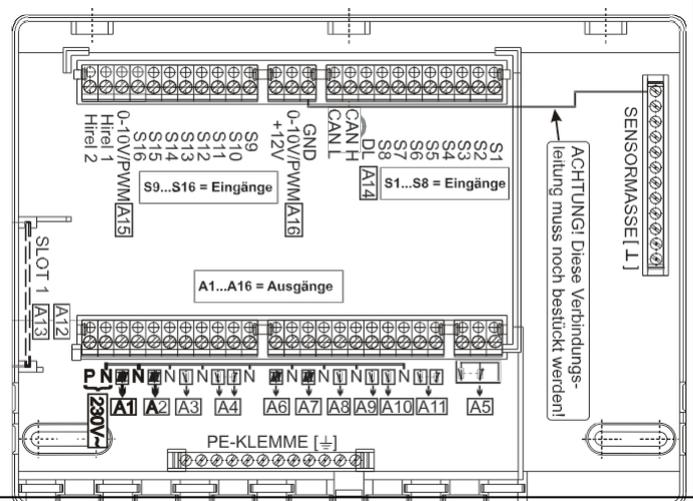
Using a small screwdriver, carefully press the locking claw (2) inwards and swing the housing cover upwards from below (A) upwards (B).

Before installing the console, break out the required number of cable entries. It is possible that the very small separating bars may break out break off, but this does not pose a safety problem, as each cable entry is provided with its own cable strain relief after the cables have been connected.

The bracket should be mounted at eye level (approx. 1.6 m) using the enclosed mounting materials on the wall, via the 3 holes/long slots provided in the rear wall of the bracket (see dimensional drawing above centre), with the cable entries facing downwards.

Ensure that the bracket is mounted completely free of torsion (which may be caused by an uneven wall or similar). Otherwise, complications may arise later when plugging in the controller and/or controller malfunctions.

**(Not covered by warranty!)**



Operating instructions rUVR1611/rZR D-2014/06

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# Electrical connection



**Caution! Always disconnect the device from the mains before opening it!**



The electrical connection is made inside the device console. To do this, the device housing must be opened. Please proceed as described on page 9.

Caution: The device may only be opened or assembled when it is disconnected from the power supply! Otherwise, there is a risk of accident (electric shock) and damage to the device.

The electrical connection may only be carried out by a specialist, in compliance with the relevant local regulations/provisions/guidelines, such as VDE guidelines.

Mains voltage cables and sensor/probe cables (safety extra-low voltage) must not be routed together in a single cable (observe standards/regulations!).

When laying mains voltage cables and sensor/probe cables in a common cable duct or installation pipe, ensure that suitable shielding (shielded cables) is provided.

Long cable ducts or installation pipes for mains voltage and sensor cables laid close together can transmit mains interference to the sensor cables, which can lead to significant controller malfunctions. To avoid such interference, a minimum distance of 10 cm between the two ducts is recommended.

Note: To protect against lightning damage, the system must be earthed in accordance with regulations. Sensor failures caused by thunderstorms or electrostatic charges are usually due to a lack of earthing.

All inputs – "sensors" – and outputs – "pumps, valves, mixers, etc." – must be positioned in the system hydraulics according to their designation/numbering and the corresponding ratiotherm system diagram, and connected to the terminal strips in the device console.

## Cables and connection of inputs:

A conductor cross-section of 0.75 mm<sup>2</sup> is sufficient for sensor cables up to 50 m. For cable lengths over 50 m, use 1.5 mm<sup>2</sup>. (Ensure that connections for cable extensions are secure and comply with the relevant standards/guidelines.)

All sensors have only one common ground connection "GND" available on the rUVR1611 standard housing on the protective low voltage side, on the sensor terminal strip at the top of the device console, which is connected at the factory to the sensor ground terminal strip at the top right of the device console. In the rZR, all input and output terminals are soldered onto the circuit board.

The sensor cables are routed through the separately provided cable gland and the cable duct on the right-hand side of the device console. The connection is made by clamping one pole to the corresponding terminal on the sensor terminal strip and the other pole to the sensor ground terminal strip.

In the mains voltage range (mains supply cable and outputs), with the exception of the mains supply cable, conductor cross-sections of 1-1.5 mm<sup>2</sup> "fine-stranded" are recommended.

Only one of the cable glands provided should be used for the mains supply cable and all output cables.

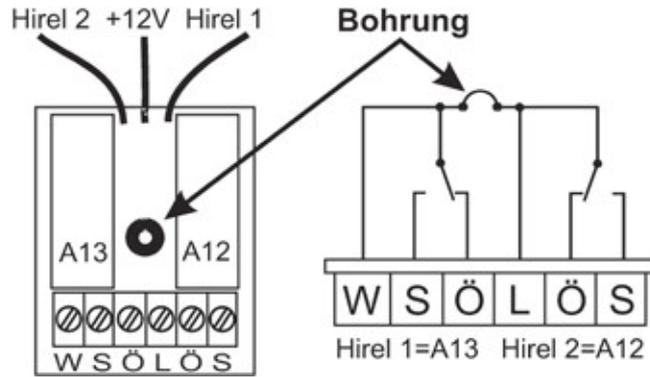
A terminal strip above the cable entries is available for connecting the protective earth conductors. This PE terminal strip can be removed to facilitate terminal work.

All cables can be secured in the cable entry immediately after clamping with a snap-in claw (strain relief). Snap-in claws can only be removed by cutting them off with side cutters, which is why more snap-in claws are included in the scope of delivery than are actually needed.

It is essential to ensure that all devices operated or controlled in conjunction with the controller are phase-matched. Failure to do so may result in a 400V short circuit, which could destroy the controller or the devices.

# Electrical connection

## Auxiliary relay for rUVR1611 (version V2)



The UVR1611 universal controller can be retrofitted with the HiRel1611. This allows for an expansion from 11 to 13 outputs. For this purpose, there are slots on the left side of the controller console (referred to as Slot 1 in the controller installation instructions).

The relay contacts are potential-free (with ratiotherm standard programming with a potential of 230V~), whereby both roots are connected at the factory. By drilling out the hole between the two relays to a minimum diameter of 6mm, the potential of both outputs is separated from each other in accordance with the standard. This allows one of the two outputs to be used as a switching output (e.g. for a pump) and the other as a potential-free contact (e.g. burner request).

### Delivery condition for rUVR1611 standard controllers:

The phase coming from the mains is connected to terminal L.

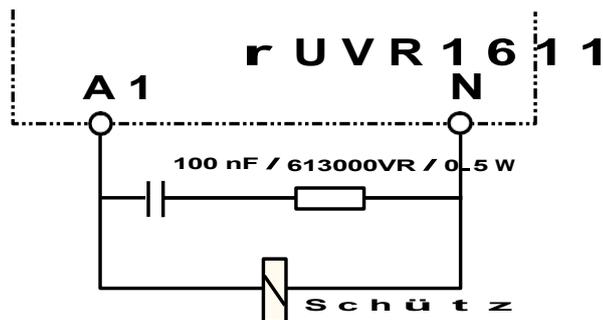
The neutral conductor (N) coming from the mains is connected directly to the consumers (e.g. pumps).

The switched phases of the consumers are always connected to the "S" (normally open contact) terminal as standard in ratiotherm.

L	Common phase, <u>without open borehole</u>	L / W	Root with <u>open borehole</u>
S	Closing contact	Ö	opener

**Special feature for speed-controlled outputs**

Speed-controlled outputs may not be able to reliably switch small loads (<5W, e.g. valves, contactors, etc.) under certain circumstances. This applies in particular to output A1 with its integrated mains filter, which can only be operated with a minimum load of  $\geq 20W$ . If only a small load is controlled with a speed-controlled output (A2, A6, A7), an additional parallel load or the RC circuit shown on the left is required for reliable switching.



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# Cable selection and network topology

Shielded twisted pair cable has become the standard for use in CANOpen networks. This is a cable with twisted conductor pairs and a common outer shield. This cable is relatively insensitive to EMC interference and can achieve extensions of up to 1000 m at 50 kbit/s. The cable cross-sections specified in the CANOpen recommendation (CIA DR 303-1) are shown in the following table.

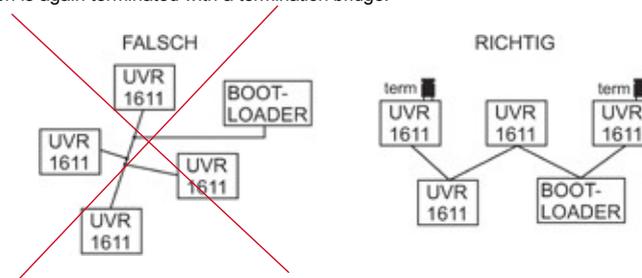
Bus length (m)	Length-related resistance (mΩ/m)	Cross-section (mm <sup>2</sup> )
0	70	0.25 ... 0.34
40 ... 300	< 60	0.34 ... 0.60
300 ... 600	< 40	0.50 ... 0.60
The maximum cable length also depends on the number of nodes (n) connected to the bus cable and the cable cross-section (mm <sup>2</sup> )		0.75 ... 0.80

Conductor cross-section (mm <sup>2</sup> )	Maximum length (m)	
	n = 32	n = 63
0.25	200	170
0.5	360	310
0.75	540	470

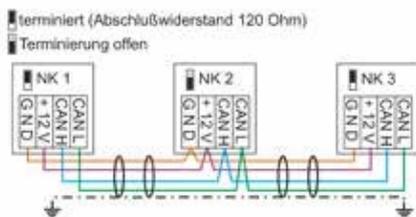
Recommendation: A 2x2-pin, twisted pair, shielded cable with a conductor cross-section of at least 0.5 mm<sup>2</sup>, a conductor-to-conductor capacitance of max. 60 pF/metre and a characteristic impedance of 120 Ω. The bus speed of the UVR1611 is 50 kbit/s.

This would allow a bus length of 500 m to ensure reliable transmission. This recommendation corresponds to the Lapp cable type **Unitronic®-Bus CAN 2x2x0.5 (1st pair = CAN-H, CAN-L, 2nd pair = GRND, 12V+)**.

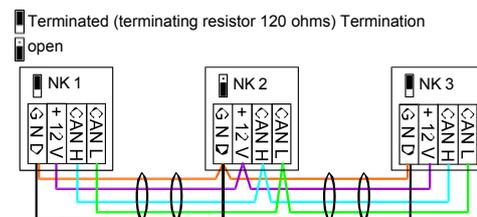
Wiring: A CAN bus should never be set up in a star configuration. The correct setup consists of a star cable from the first device (with termination) to the second and on to the third, etc. The last bus connection is again terminated with a termination bridge.



Example: Connecting three network nodes (NK) with a 2x2-pin cable and terminating the final network nodes.



**INCORRECT**

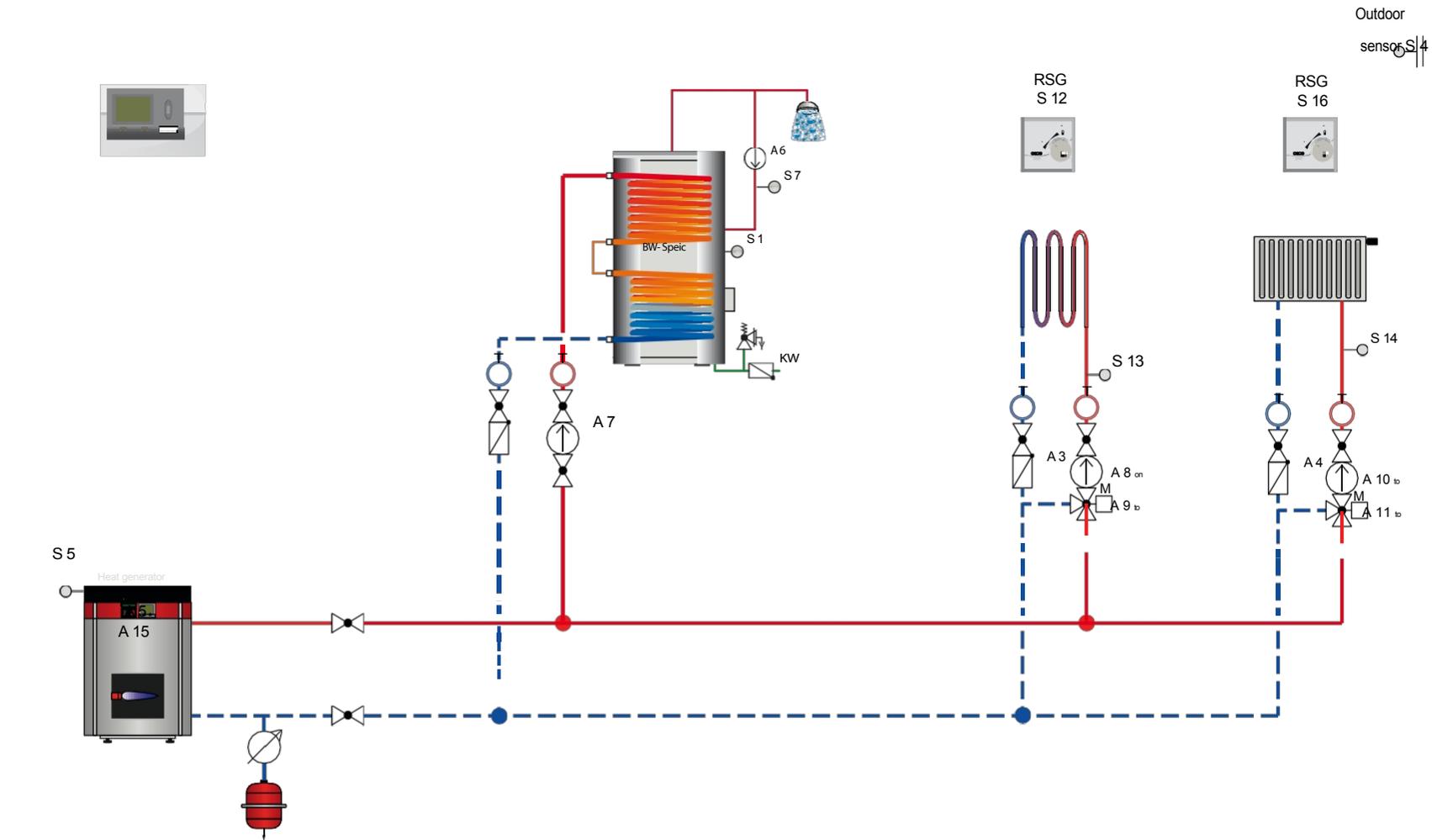


**RIGHT**

Each CAN network must be equipped with a 120 Ω bus connection at the first and last participants in the network (termination – carried out with a plug-in bridge). In a CAN network, there are therefore always two terminating resistors (one at each end). Branch lines or star-shaped CAN wiring are not permitted by the official specification.

As can be seen from the tables, reliable transmission depends on many factors (cable type, cross-section, length, number of nodes, etc.). However, all specifications can be considered relatively conservative, so that no problems should arise if the dimensions are reasonable. The shield conductor of the bus cable must be connected to the controller ground (GND) on both sides.

Grounding the shield to the protective earth conductor (⚡) leads to uncontrolled controller behaviour in the event of interference voltages of 2000 volts or more.



OUTPUTS

A 3 A4	Heating circuit 1 – pump	A 8	Heating circuit 1 - mixer on
(S)	Heating circuit 2 – pump	A 9	Heating circuit 1 - mixer closed
A 5 (W+S)	Heat generator 1 – Request Hot	A 10	Heating circuit 2 - mixer open
A 6	water circulation pump Boiler charging	A 11 (S)	Heating circuit 2 - mixer closed
A 7	pump	A 15 (0-10V)	Heat generator 1 - Request

SENSOR INPUTS

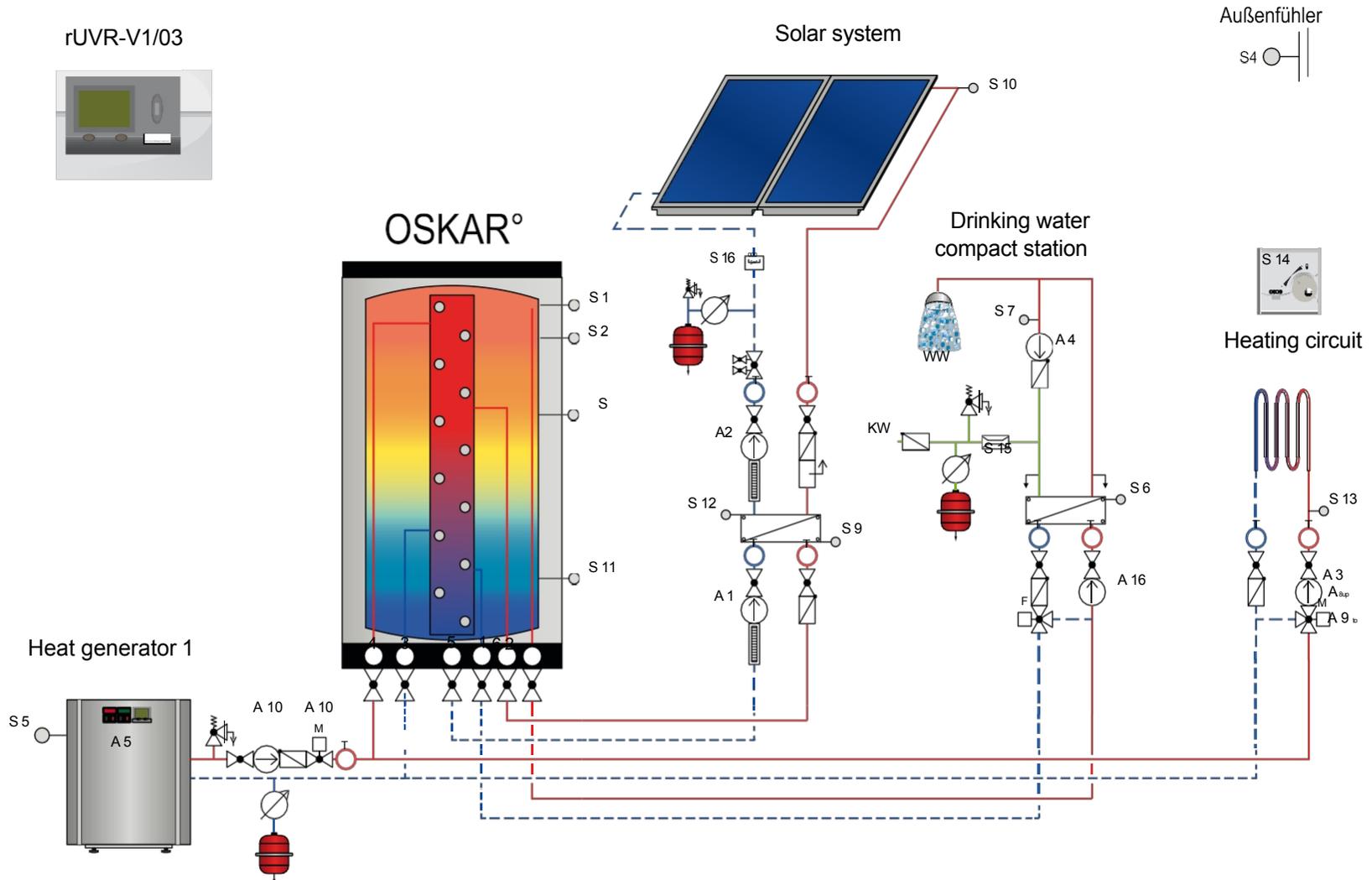
S 1	PT1000B	DHW storage tank charging on/off Outdoor	S 12	PT1000B	Heating circuit 1 – room setpoint
S	PT1000B	sensor	S 13	PT1000B	sensor Heating circuit 1 – flow
S 5	PT1000B	Heat generator 1 - Boiler sensor Hot water	S 14	PT1000B	sensor (R) Heating circuit 2 – flow
S 7	PT1000B	circulation - Return sensor (R)	S 16	PT1000B	sensor (R) Heating circuit 2 – room setpoint sensor

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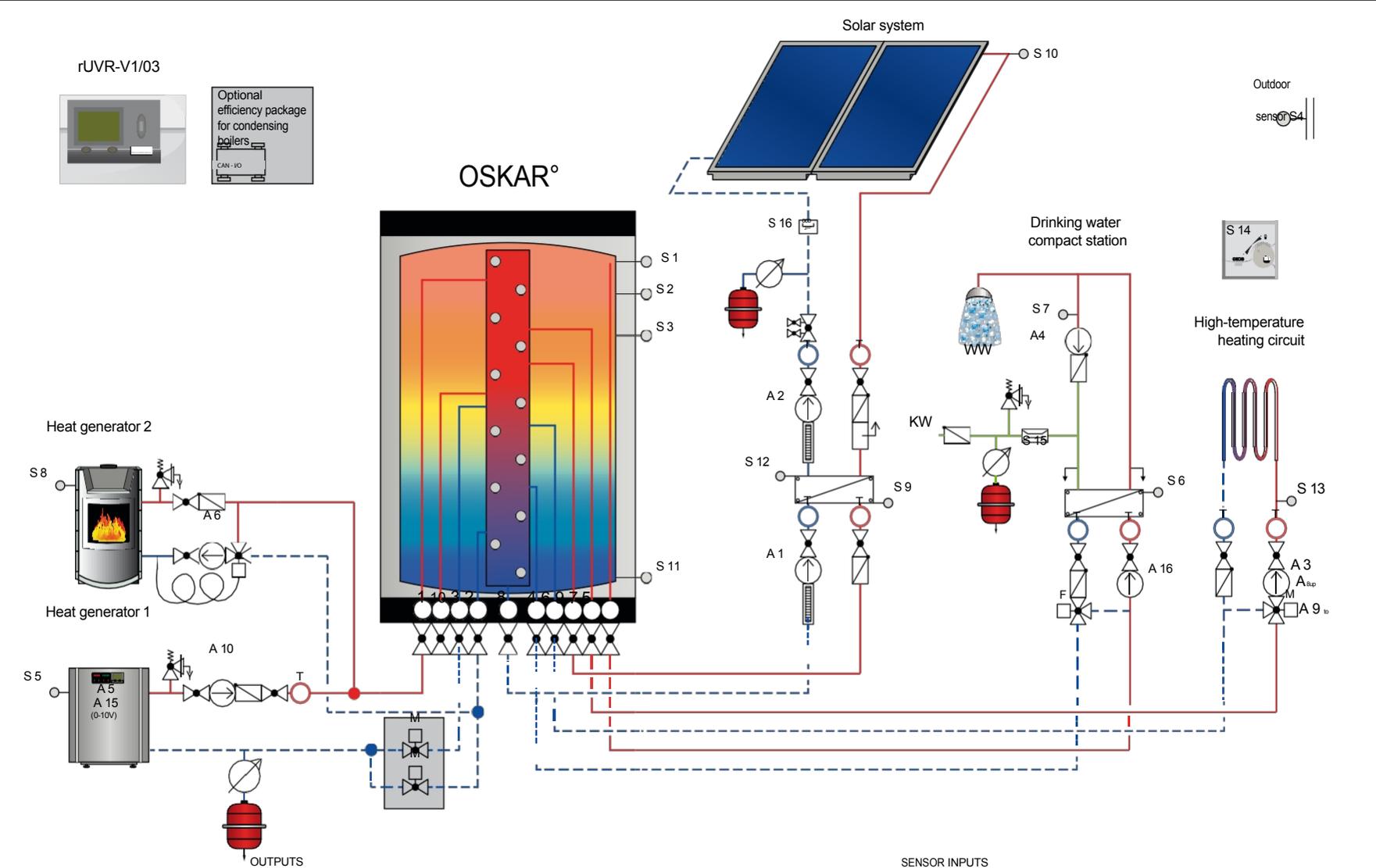
Operating instructions rUVR1611/-ZR D-2014/06

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OUTPUTS			
A 1	Solar pump secondary	A 6	Heat generator 2 - charging pump
A	Solar pump primary	A 7	Free
A	Heating circuit 1 - pump	A	Heating circuit 1 - mixer on
A 4 (S)	Hot water circulation pump	A 9	Heating circuit 1 - mixer closed
A 5 (W+S)	Heat generator 1 - Request	A 10	Heat generator 1 - Charging pump
A 15 (0-10V)	Heat generator 1 - Request	A	Hot water charging pump

SENSOR INPUTS					
S	PT1000B	Heating water supply for hot water preparation Minimum	S	PT1000B	Solar heat exchanger secondary flow
S	PT1000B	Heating water storage for DHW preparation Maximum.	S 10	PT1000B	Solar collector sensor (K)*
S	PT1000B	Heating water supply for heating system	S	PT1000B	Storage tank sensor for solar + heat generator 2
S4	PT1000B	Outdoor sensor (A)*	S 12	PT1000B	Solar heat exchanger primary return
S5	PT1000B	Heat generator 1 - boiler sensor	S 13	PT1000B	Heating circuit 1 - flow (R)*
S6	PT1000B	TWK-S70 - Hot water outlet (U)*	S 14	PT1000B	Heating circuit 1 - Room setpoint sensor (optional)
S	PT1000B	Hot water circulation return sensor (R)*	S 15	Vacuum switch	TWK-S70 Flow sensor
S	PT1000B	Heat generator 2 - Boiler sensor	S 16	Meter	Solar volume flow pulse generator

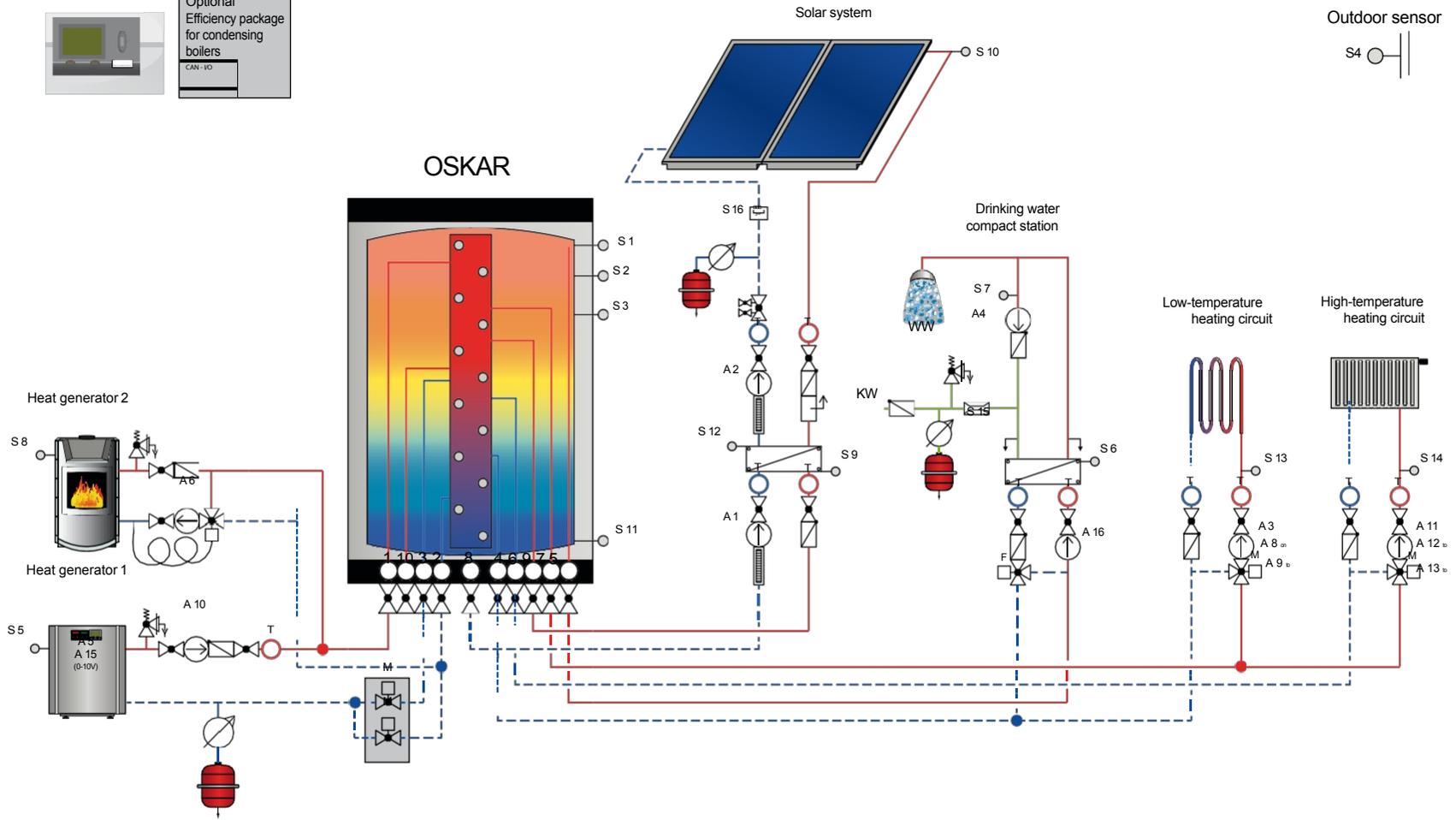
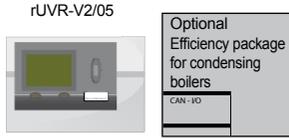


OUTPUTS				SENSOR INPUTS					
A 1	Solar pump secondary Solar	A 6	Heat generator 2 - Charging pump	S 1	PT1000B	Heating water supply for DHW preparation minimum	S 9	PT1000B	Solar heat exchanger Secondary flow Solar -
A 2	pump primary Heating circuit 1	A 7	Free	S 2	PT1000B	Heating water supply for DHW preparation maximum	S 10	PT1000B	Collector sensor (K)*
A 3	pump	A 8	Heating circuit 1 - Mixer on	S 3	PT1000B	Heating water supply for heating system	S 11	PT1000B	Storage tank sensor for solar + heat generator 2
A 4 (S) A	Hot water circulation pump Heat	A 9	Heating circuit 1 - mixer closed	S 4	PT1000B	Outdoor sensor (A)*	S 12	PT1000B	Solar heat exchanger Primary return flow
5 (W+S)	generator 1 - Request Heat generator	A 10	Heat generator 1 - Charging pump	S 5	PT1000B	Heat generator 1 - boiler sensor	S 13	PT1000B	Heating circuit 1 - Flow (R)*
A 15 (0-10V)	1 - Request	A 16	Hot water charging pump	S 6	PT1000B	TWK-S70 - Hot water outlet (U)* Hot water	S 14	PT1000B	Heating circuit 1 - Room setpoint sensor (optional)
				S 7	PT1000B	circulation Return sensor (R)* Heat generator 2 -	S 15	vacuum	TWK-S70 flow sensor
				S 8	PT1000B	Boiler sensor	S 16	switch	Solar volume flow pulse generator
								Meter	

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Operating instructions rUVR1611/zR D-2014/06



OUTPUTS

A 1	Solar pump secondary	A 8	Heating circuit 1 - mixer on heating
A 2	Solar pump primary	A 9	circuit 1 - mixer to heat generator 1 -
A 3	Heating circuit 1 pump	A 10	charging pump Heating circuit 2 -
A 4 (S) A	Hot water circulation pump Heat	A 11	pump
5 (W+S)	generator 1 - Request Heat	A 12	Heating circuit 2 - Mixer to heating
A 6	generator 2 - Charging pump Free	A 13	circuit 2 - Mixer to heat generator 1 -
A 7	Hot water charging pump	A 15 (0-10V)	Request
A 16			

SENSOR INPUTS

S 1	PT1000B	Heating water supply for DHW preparation minimum	S 9	PT1000B	Solar heat exchanger Secondary flow Solar -
S 2	PT1000B	Heating water supply for DHW preparation maximum	S 10	PT1000B	Collector sensor (K)*
S	PT1000B	Heating water supply for heating system	S 11	PT1000B	Storage tank sensor for solar + heat generator 2
S 4	PT1000B	Outdoor sensor (A)*	S 12	PT1000B	Solar heat exchanger primary return
S 5	PT1000B	Heat generator 1 – boiler sensor	S 13	PT1000B	Heating circuit 1 - flow (NT) (R)* Heating
S 6	PT1000B	TWK-S70 – Hot water outlet (U)* Hot water	p. 14	PT1000B	circuit 2 - flow (HT) (R)*
S 7	PT1000B	circulation Return sensor (R)* Heat generator 2 –	S 15	Vacuum switch	TWK-S70 Flow sensor
S 8	PT1000B	Boiler sensor	S 16	Meter	Solar volume flow pulse generator

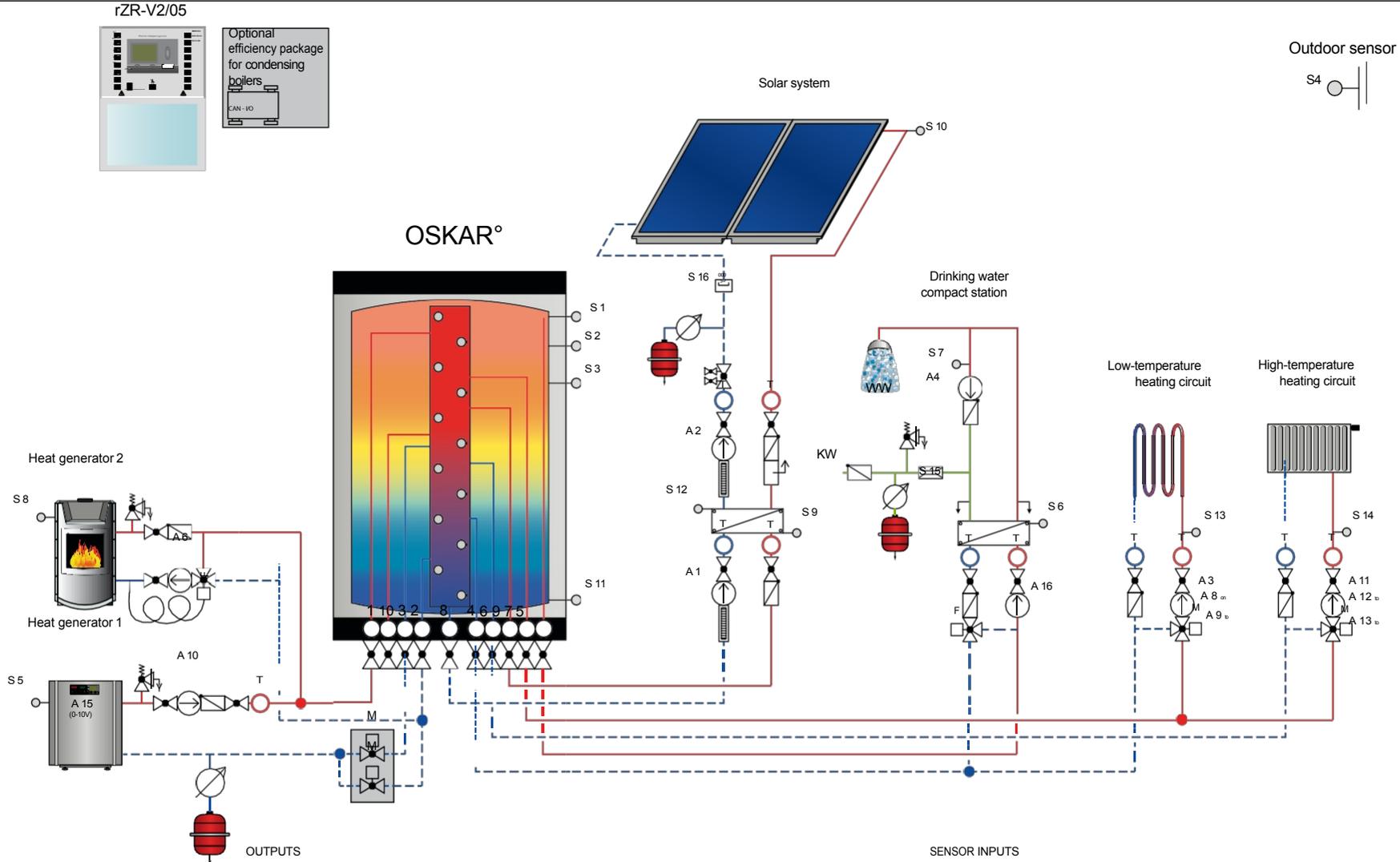
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Operating instructions rUVR1611 / ZR D-2014/06



OUTPUTS				SENSOR INPUTS					
A 1	Solar pump secondary	A 8	Heating circuit 1 - mixer on Heating	S 1	PT1000B	Heating water supply for DHW preparation minimum	S 10	PT1000B	Solar collector sensor (K)*
A 2	Solar pump primary	A 9	circuit 1 - mixer to heat generator 1	S 2	PT1000B	Heating water supply for DHW preparation maximum	S 11	PT1000B	Storage tank sensor for solar + heat generator 2
A 3	Heating circuit 1 pump	A 10	- charging pump Heating circuit 2 -	S	PT1000B	Heating water supply for heating system	S 12	PT1000B	Solar heat exchanger Primary return flow Heating
A 4 (S) A	Hot water circulation pump Heat	A 11	pump	S 4	PT1000B	Outdoor sensor (A)*	S	PT1000B	circuit 1 - flow (NT) (R)*
5 (W+S)	generator 1 - Request Heat	A 12	Heating circuit 2 - Mixer on	S 5	PT1000B	Heat generator 1 - boiler sensor	S 14	PT1000B	Heating circuit 2 - flow (HT) (R)*
A 6	generator 2 - Charging pump	A 13	heating circuit 2 - Mixer to	S 6	PT1000B	TWK-S70 - Hot water outlet (U)*	S 15	Vacuum switch	TWK-S70 Flow sensor
A 7	Free	A 15 (0-10V)	Heat generator 1 - Request	S	PT1000B	Hot water circulation Return sensor (R)*	S 16	Counter	Solar - Volume flow pulse generator
A 16	Hot water charging pump			S	PT1000B	Heat generator 2 - boiler sensor	S 1 k32	PT1000B	Heating circuit 1 - Room setpoint sensor
				S 9	PT1000B	Solar heat exchanger secondary flow	S 2 k32	PT1000B	(RSG) Heating circuit 2 - Room setpoint sensor (RSG)

Standard system diagram for rUVR1611 V2/04 with Oskar°-10/...

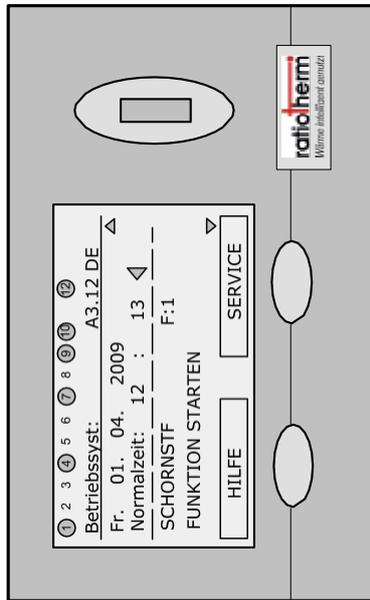
# Switch assignment rZR-V4/01



## Schornsteinfegertaster

### Schalterstellung-Beschreibung

I = EIN  
**Netz**AUS  
 II = Auto



heating circuit1-	A9	
Boiler charging pump Mischer ZU	A10	
Heating circuit 2 - pump (Heat generator 1)	A11	
Heating circuit 2 - Mixer ON	A12	
Heating circuit 2 - Mixer OFF	A13	
Free	A1 K32	
Free	A2 K32	
Free	A3 K32	

Solar - Secondary pump	A1	
Solar - Primary pump	A2	
Heating circuit 1 pump	A3	
Hot water circulation Pump	A4	
Boiler demand (Heat generator 1)	A5	
Boiler charging pump	A6	
Free (Heat generator 2)	A7	
Heating circuit 1 - Mixer ON	A8	

Operating instructions rUVR1611/rZR D-2014/06

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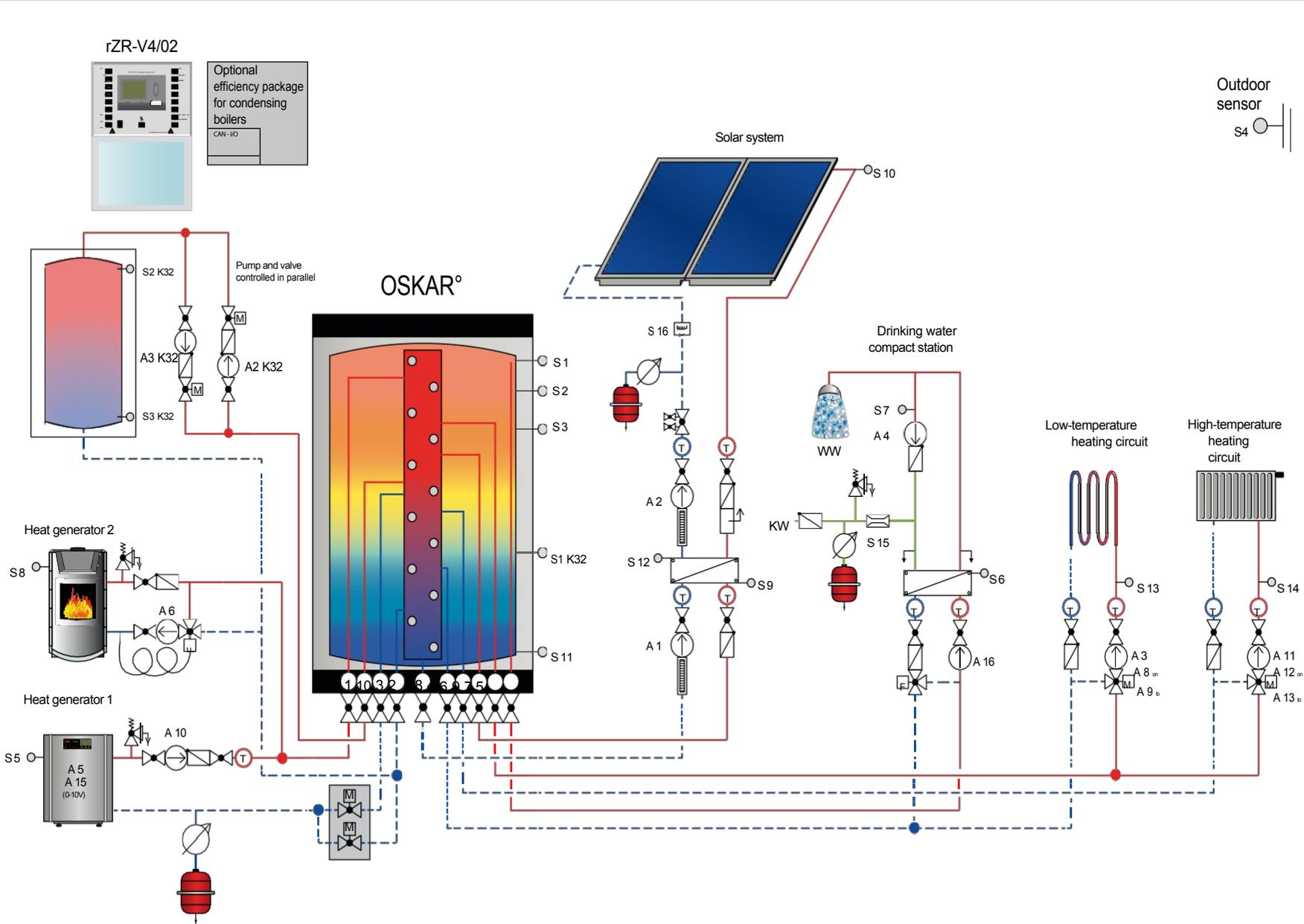
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As of 13 June 2014-wb



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Operating instructions rUVR1611/zR D-2014/06

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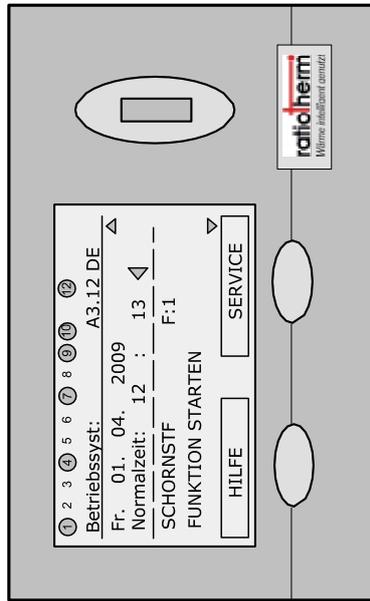


# Switch assignment rZR-V4/01



## Schalterstellung-Beschreibung

I = EIN  
O = AUS  
II = Auto



A9		heating circuit1- Mixer CLOSED Boiler charging pump
A10		(Heat generator 1)
A11		Heating circuit 2 - pump
A12		Heating circuit 2 - Mixer ON
A13		Heating circuit 2 - Mixer OFF
A1 K32		Fault signal output
A2 K32		Charging pump
A3 K32		Additional circulation pump
		Additional buffer

A1		Solar pump secondary
A2		Solar - Primary pump
A3		Heating circuit 1 pump
A4		Hot water circulation Pump
A5		Boiler request (Heat generator 1)
A6		Charging pump/Boiler (Heat generator 2)
A7		Free Heating circuit 1 - Mixer ON
A8		

Operating instructions rUVR1611/rZR D-2014/06

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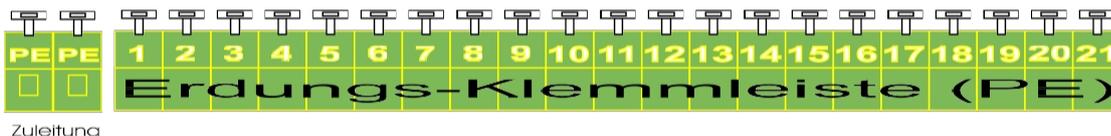
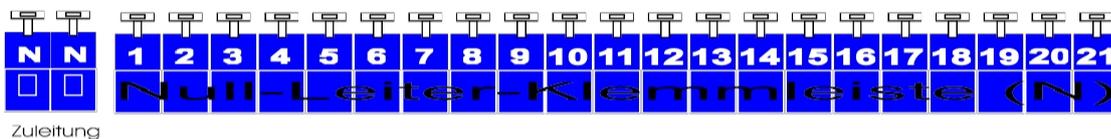
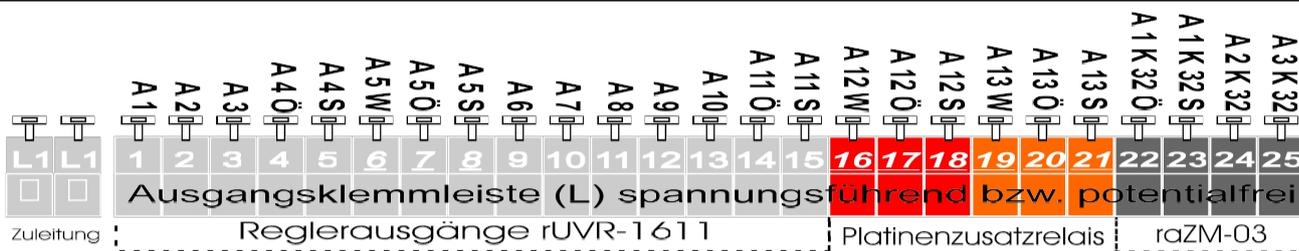
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As of 13 June 2014-wb

# Outputs rZR-V4/01

Anschluss-Klemmleisten



Terminal blocks	Controller outputs		Device / Function
	Designation	Max. power	
1 *1	A 1	0.7	Solar pump secondary
2 *1	A 2	1.0	Solar pump primary
3 *1	A 3	3.0	Heating circuit 1 pump
4 *1	A 4 (Ö)	3.0	Not assigned
5 *1	A 4 (S)	3.0	Hot water circulation pump
6 *3	A 5 (W)	3.0 A	Heat generator 1 - Changeover
7 *3	A 5 (Ö)	3.0	Not assigned
8 *3	A 5 (S)	3.0	Heat generator 1 - normally open contact
9 *1	A 6	1.0	Heat generator 2 - charging pump
10 *1	A 7	1.0	Free
11 *1	A 8	3.0	Heating circuit 1 – mixer motor ON
12 *1	A 9	3.0	Heating circuit 1 – mixer motor CLOSED
13 *1	A 10	3.0	Heat generator 1 – charging pump

Series terminals	Controller outputs		Device / Function
	Designation	Max. power	
14 *1	A 11 (Ö)	3.0	Not assigned
15 *1	A 11 (S)	3.0	Heating circuit 2 – pump
16 *2	A 12 (W)	3.0	Not assigned
17 *2	A 12 (Ö)	3.0	Not assigned
18 *2	A 12 (S)	3.0 A	Heating circuit 2 – mixer ON
19 *2	A 13 (W)	3.0	Not assigned
20 *2	A 13 (Ö)	3.0	Not assigned
21 *2	A 13 (S)	3.0	Heating circuit 2 – mixer CLOSED
Terminals occupied via special CAN I/O44 module raZM- 03 (K32)			
22 *1	K32 A 1 (Ö)	3.0	Not assigned
23 *1	K 32 A 1 (S)	3.0 A	Alarm contact 230V~ output
24 *1	K 32 A 2	3.0 A	Additional buffer - loading pump
25 *1	K 32 A 3	3.0 A	Additional buffer - return pump

**Explanation of footnotes (terminal blocks) on pages 20 and 21:**

- \*1 = Terminal with potential 230 V~
- \*2 = Terminal factory-set with potential 230 V~ Option: potential-free through on-site modification of the wiring
- \*3 = Terminal potential-free
- \*4 = Terminal only occupied if optional special CAN-I/O44 module RAZM-03 has been installed
- \*5 = Terminal with low voltage 0-12 volts

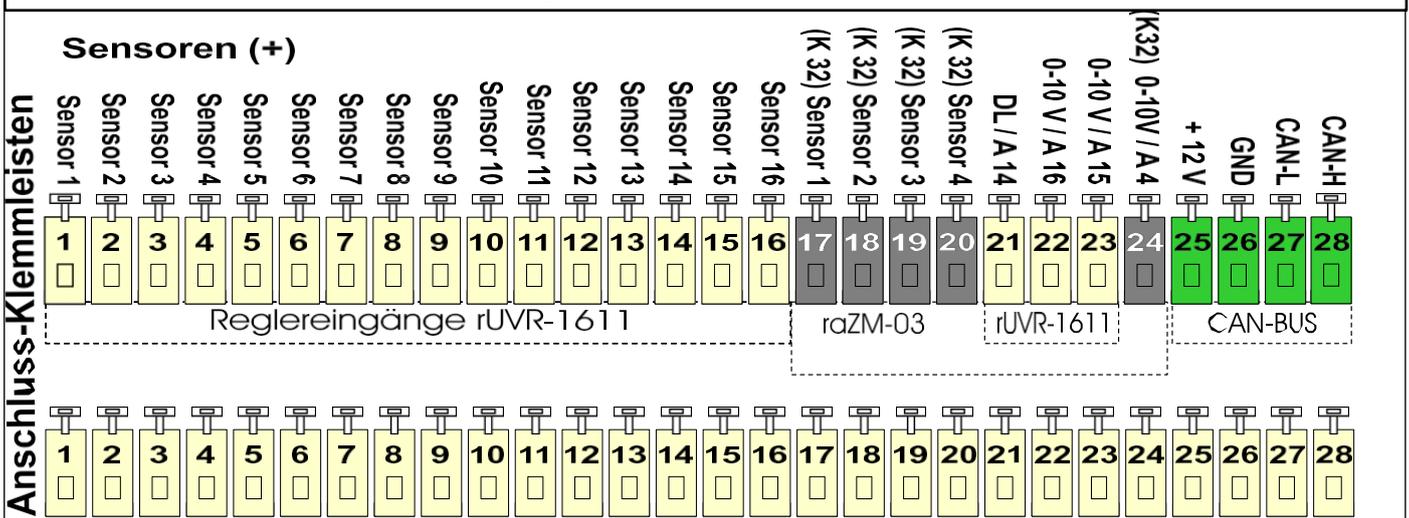
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Operating instructions rUVR1611/rZR D-2014/06

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# Inputs rZR-V4/01



## Sensoren (-) GND

Terminal blocks	Controller inputs		Device / Function
	Designation	Type	
1	S 1	PT1000B	Heating water supply for hot water preparation MIN
2	S 2	PT1000B	Heating water supply for hot water preparation MAX
3	S 3	PT1000B	Heating water supply for heating system
4	S 4	PT1000B	Outdoor sensor (A)*
5	S 5	PT1000B	Heat generator 1 – boiler sensor
6	S 6	PT1000B	TWK-S70 - Hot water outlet (U)*
7	S 7	PT1000B	Hot water circulation return sensor (R)*
8	S 8	PT1000B	Heat generator 2 – boiler sensor
9	S 9	PT1000B	Solar heat exchanger secondary - flow
10	S 10	PT1000B	Solar collector sensor (K)*
11	S 11	PT1000B	Solar storage sensor bottom + heat generator 2
12	S 12	PT1000B	Solar heat exchanger primary return
13	S 13	PT1000B	Heating circuit 1 – flow (NT) (R)*
14	S 14	PT1000B	Heating circuit 2 - flow (HT) (R)*

Series terminals	Controller inputs		Device / Function
	Designation	Type	
15	S 15	Vacuum switch	TWK-S70 Flow sensor
16	S 16	Counter	Solar volume flow pulse generator
17 *4	K32 S 1	PT1000B	Removal – reference sensor in OSKAR
18 *4	K 32 S	PT1000B	Storage memory at the top
19 *4	K 32 S 3	PT1000B	Off-site storage below
20 *4	K 32 S 4	Button	Chimney sweep - measuring operation
21	A 14 DL		Not programmed
22 *5	A 16	0-10 V	PWM drinking water charging pump
23 *5	A 15	0-10 V	WE 1 Request parallel with A5 Volts = temperature (1V = 10°C)
24 *5	K32 A 4	0-10 V	Not programmed
25 *5	+ 12 V	CAN bus	see page 11
26	GND	CAN BUS	see page 11
27	CAN-L	CAN-BUS	see page 11
28	CAN-H	CAN-BUS	see page 11

### Probes / sensors - Resistance values:

Temp. (°C)	-	-	0	10	20	25	30	40	50	60	70	80	90	100	110	120
PT1000B (Ω)	922	961	1000	1039	1078	1097	1117	1155	1194	1232	1271	1309	1347	1385	1423	1461

Operating instructions rUVR1611/rZR D-2014/06

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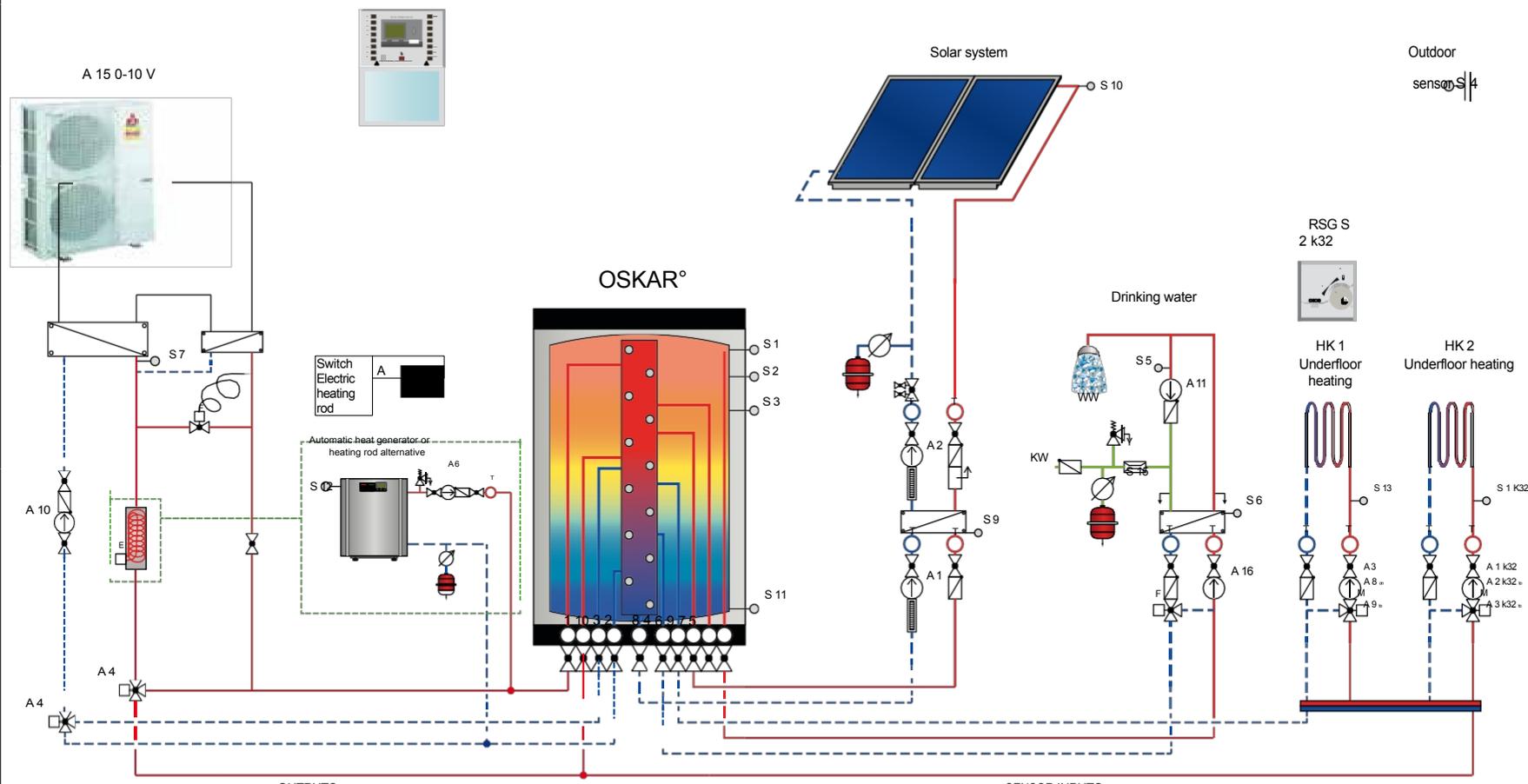
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# Hydraulic diagram Oskar° 10-MAX-Air



OUTPUTS			SENSOR INPUTS						
A 1	Solar pump secondary Solar	A 10	Heat generator 1 - Charging pump	S 1	PT1000B	Heating water supply for DHW preparation minimum	S 9	PT1000B	Solar heat exchanger Secondary flow Solar -
A 2	pump primary Heating circuit 1	A 11	Circulation pump	S 2	PT1000B	Heating water supply for DHW preparation maximum	S 10	PT1000B	Collector sensor (K)*
A 3	pump	A 12	Free	S 3	PT1000B	Heating water supply for heating system	S 11	PT1000B	Storage tank sensor for solar + heat generator 2
A 4 (S) A	Heating/DHW changeover valve	A 13	Free	S 4	PT1000B	Outdoor sensor (A)*	S 12	PT1000B	Boiler sensor 2 Heat generator
5 (W+S)	Electric heating element request	A 15 (0-10V)	Heat generator 1 - Request S 5 Drinking	S 5	PT1000B	Hot water circulation Return sensor (R)* TWK-S70	S 13	PT1000B	heating circuit 1 - flow (NT) (R)*
A 6	Heat generator 2 - charging pump	A 16	water charging pump	S 6	PT1000B	- Hot water outlet (U)* Heat pump return (R)*	S 14	PT1000B	EVU contact (WP internal)
A 7	TWK-S70 - charging pump Heating			S 7	PT1000B	Defrosting (internal heat pump)	S 15	Vacuum switch	TWK-S70 Flow sensor
A 8	circuit 1 - mixer open Heating circuit			S 8	PT1000B		S 16	Meter	Solar - Volume flow pulse generator
A 9	1 - mixer closed								

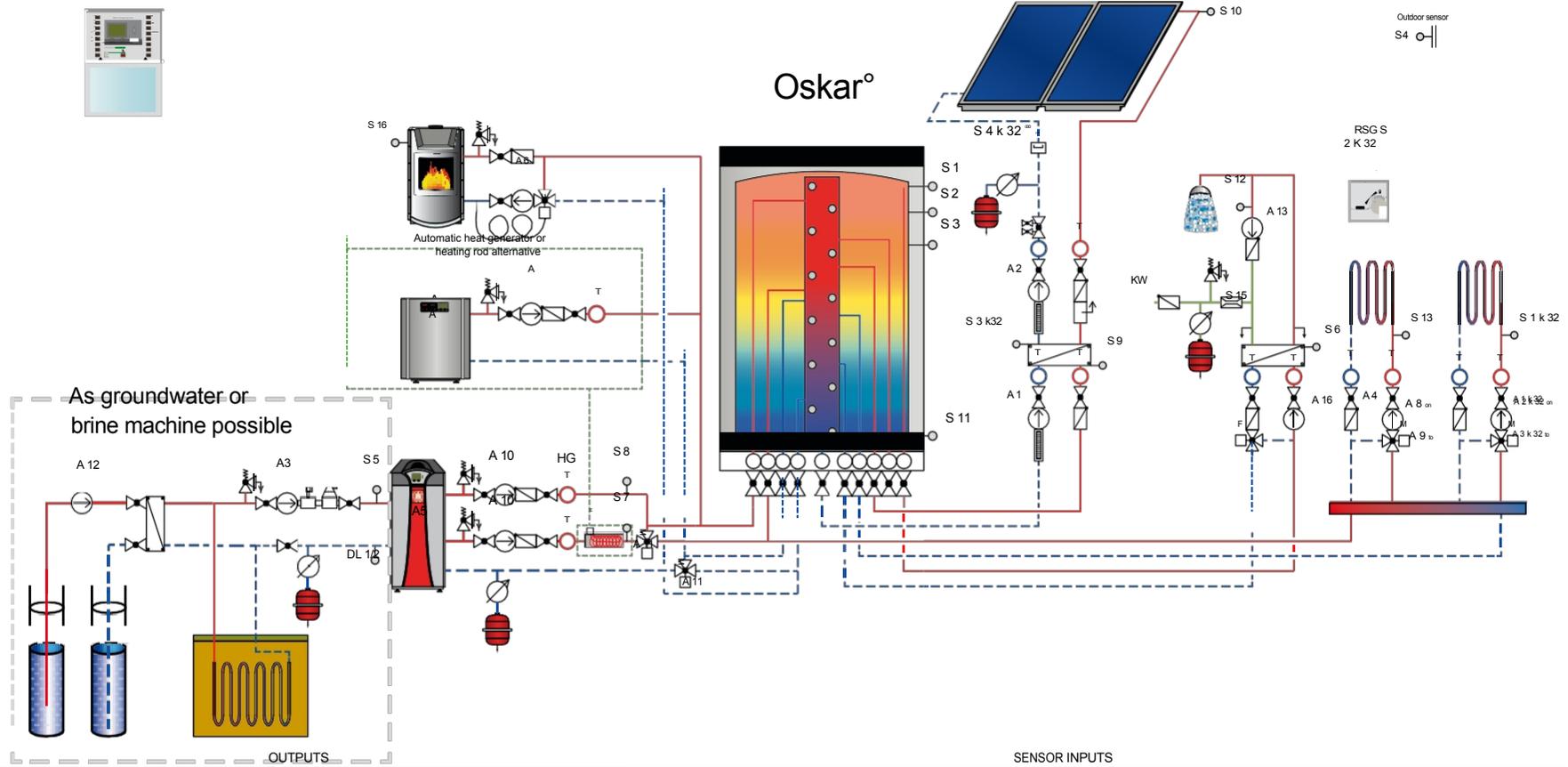
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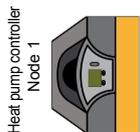
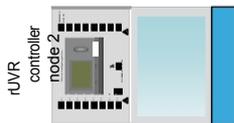
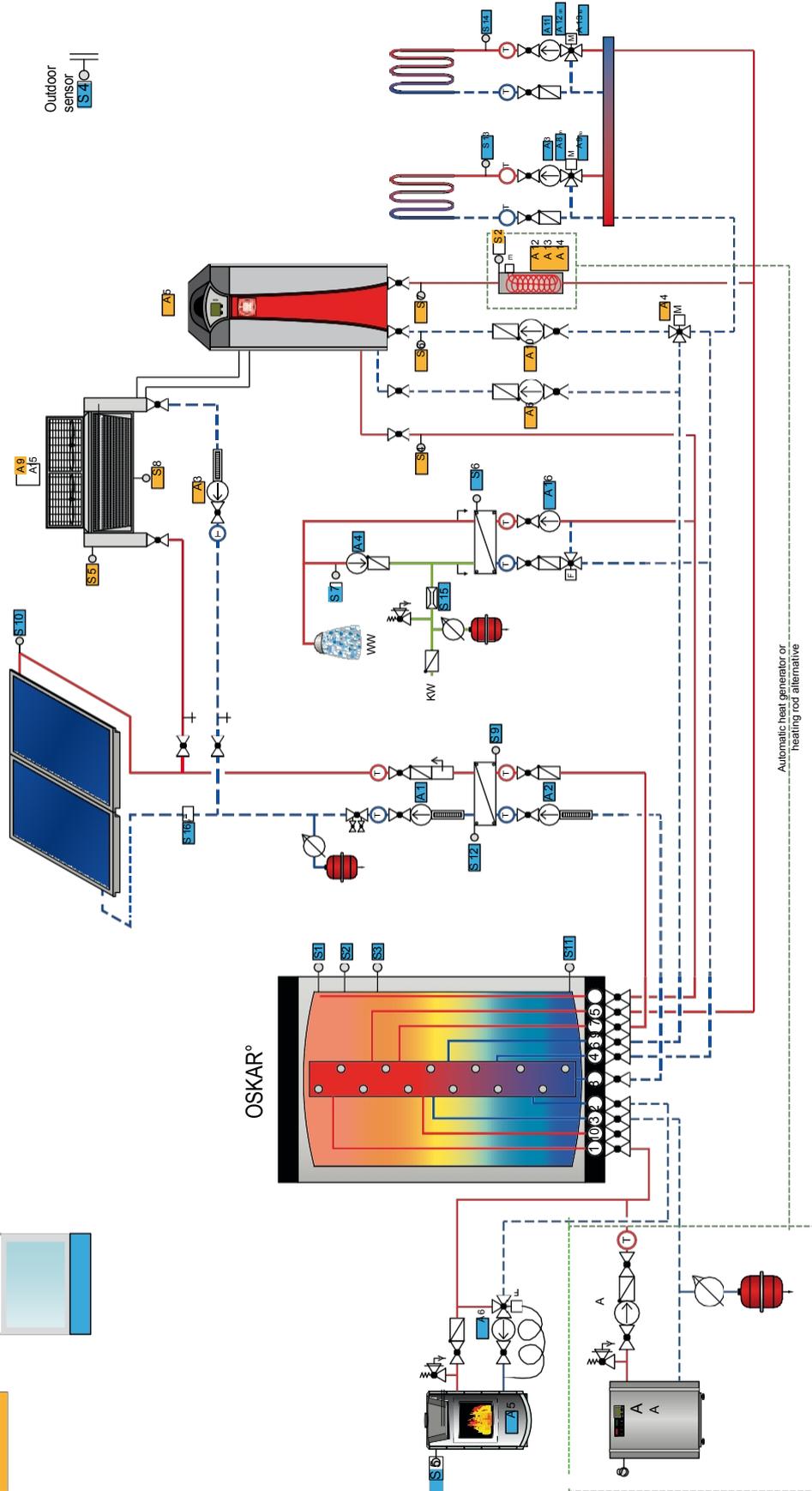
OUTPUTS			SENSOR INPUTS						
A	Solar pump secondary	A 10	Heat pump - charging pump	S 1	PT1000B	Heating water supply for DHW preparation minimum	S 12	PT1000B	Hot water circulation Return sensor (R)*
A	Solar pump primary Brine	A 11	Switching valve Heating/DHW	S 2	PT1000B	Heating water supply for DHW preparation maximum	S 13	PT1000B	Heating circuit 1 - flow (NT) (R)*
A 3	pump	A 12	Free	S 3	PT1000B	Heating water supply for heating system	S 14		EVU contact (WP internal)
A	Heating circuit 1 pump Heat	A 13	Circulation pump E-	S 4	PT1000B	Outdoor sensor (A)*	S 15	Vacuum	TWK-S70 Flow sensor Boiler sensor 2
A 5 (W+S)	pump Request Pump 2nd heat	A 14	rod	S 5	PT1000B	Brine inlet (R)*	S 16	switch	Heat generator Flow heating circuit 2
A 6	generator Free	A 15 (0-10V)	Heat generator 1 - Request	S 6	PT1000B	TWK-S70 - Hot water outlet (U)*	S 1 k 32	PT1000B	(R)* Room sensor heating circuit 1
A 7	Heating circuit 1 - mixer on	A 16	charging pump Hot water pump	S 7	PT1000B	Heat pump flow (R)*	S 2 k 32	PT1000B	Solar heat exchanger primary return solar -
A 8	Heating circuit 1 - mixer off	A 1 k 32	Heating circuit 2	S 8	PT1000B	Heating gas flow (R)*	S 3 k 32	PT1000B	volume flow pulse generator return brine (R)*
A 9		A 2 k 32	Heating circuit 2 - Mixer on Heating	S 9	PT1000B	Solar heat exchanger secondary flow Solar -	S 4 k 32	PT1000B	Brine pulse
		A 3 k 32	circuit 2 - Mixer off	S 10	PT1000B	collector sensor (K)*	DL 1/2	Counter	
				S 11	PT1000B	Storage tank sensor for solar + heat generator 2	DL 1/0	PT1000B	
								Counter	

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# Hydraulic diagram Oskar°-MAX-SOL<sup>2</sup>



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Operating instructions rUVR1611/rZR D-2014/06

# Output and input assignment WP controller

## Anschlussbelegung Netzmodul NM1611E



	Main controller	+ I/O module K32		+ I/O module K33
<b>Output</b>		<b>E-rod only</b>	<b>or electric rod + 2nd WE</b>	<b>2nd heating circuit</b>
A1	Solar pump secondary	Electric rod stage 1	Electric rod stage 1	HK 2 (NT) pump
A2	Solar pump primary	E-rod stage 2	E-rod stage 2	HK 2 (NT) Mixer ON
A3	Solar pump to outdoor unit	E-rod stage 3	2nd WE request	HK 2 (NT) Mixer CLOSED
A4 (S)	HK 1 (HT) Pump			
A5 (W+S)	WP request			
A6	Hot gas pump			
A7	Free			
A8	HK 1 (HT) Mixer ON			
A9	HK 1 (HT) Mixer CLOSED			
A10	Hot gas valve			
A11 (S)	4-way valve			
A12 (S)	WE 2 pump			
A13 (S)	Circulation pump			
A14	Fan, external unit, 230 volts			
A15 (0-10V)	Fan outdoor unit speed signal			
A16	Hot water charging pump			

	Main controller	+ I/O module K32		+ I/O module K33
<b>Inputs</b>		<b>E-rod only</b>	<b>or electric rod + 2nd WE</b>	<b>2nd heating circuit</b>
S1	Stratified storage tank top 1	Hot gas Cold	Hot gas Cold	HK 2 (NT) Flow
S2	Stratified storage tank top 2	WE 2 VL sensor	E-rod VL sensor	HK 2 (NT) RSG
S3	Stratified storage tank centre	Circulation RL sensor	Circulation RL sensor	Solar RL sensor
S4	Outdoor sensor	E-rod switch	E-rod switch	Solar flow meter VIG
S5	Outdoor evaporator sensor			
S6	TWK Hot water outlet sensor			
S7	Heat pump VL sensor			
S8	E-rod			
S9	Solar heat exchanger			
S10	Collector sensor			
S11	Stratified storage tank, bottom			
S12	External pressure chamber defrosting			
S13	HK1 (HT) VL sensor			
S14	Hot gas VL and EVU			
S15	TWK flow switch			
S16	Heat pump fault			

Operating instructions rUVR1611/rZR D-2014/06

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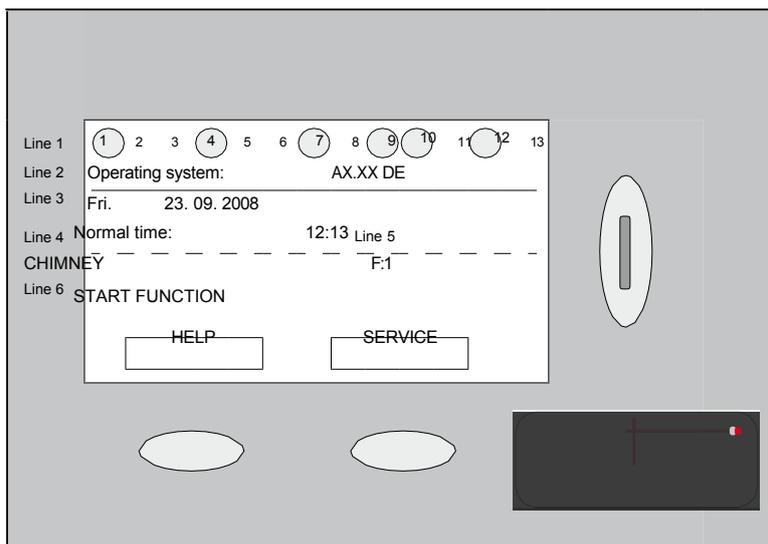
# Operating the rUVR1611

## Commissioning, switching the controller on and off

Initial commissioning must be carried out by qualified personnel!

Depending on the installation, the 230 V~, 50 Hz power supply for the controller is switched on and off by operating an externally installed operating switch or the heating emergency switch.

## The display



## The display information

Line 1: The numbers (max. 1-13) in the first line provide the following information about the outputs:

- How many and which outputs are parameterised/usable with this controller
- What is the current switching status or operating status the respective outputs or connected actuators/pumps/heat generators/etc.

The display representations/symbols used for the 5 possible switching/operating states of the outputs are explained below using the example of output "5":



Output 5 – AUTOMATIC OPERATION – ON

5

Output 5 - AUTOMATIC OPERATION - OFF



Output 5 - MANUAL OPERATION - ON



5

Output 5 - MANUAL OPERATION - OFF



Empty space in position 5 = Output 5 has not been parameterised (not available)

Lines 2-4: Lines 2-4 provide information about the current version of the controller operating system, the day of the week, the current date and the time with the current time zone (e.g. summer time).

lines 5+6: The function overview begins at line 5 (with the chimney controller function as standard). By turning the "scroll wheel" (see 1.4.0), you can scroll through the "user operating level" function overview and view and select all important functions.

# Operating the rUVR1611

## The buttons



The two buttons located directly below the display, whose respective functions are shown immediately above the buttons on the display, can be used to perform the following operating steps:

### keys "left"

HELP
* 10
BROWSE

A brief description explains the most important operating elements

This allows you to change values in increments of 10 using the scroll wheel. Pressing the button and turning the scroll wheel at the same time = other menu level

### Buttons "right"

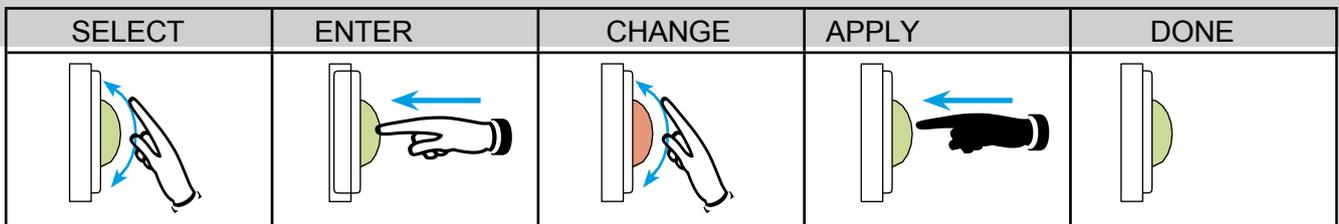
MENU
BACK
CANCEL
SERVICE

Back to the main menu

Return to the next higher menu level

The current entry or change to a value is cancelled Switch from the function overview to all other menus

## The scroll wheel



The scroll wheel can be used to move a position indicator "◀" on the display.

If a parameter is to be changed, the position indicator "◀" must be moved to the desired position by turning the scroll wheel.

Pressing the scroll wheel changes the background lighting of the frame from "green" to "orange" to indicate that the parameter is ready to be set.

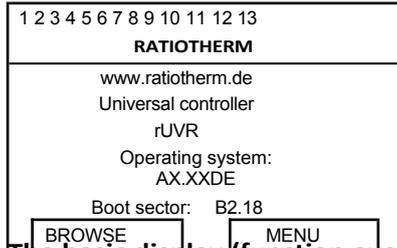
The value of the parameter can now be changed by turning the scroll wheel (if necessary, also using the "\*10" key, see 1.3.0).

Pressing the scroll wheel again transfers the new value to the control programme and the backlight changes back to "green" as a confirmation signal.

*Please always ensure that the position indicator "◀" does not move to another position when you press the scroll wheel!*

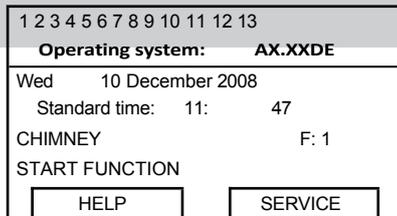
# Operation of the rUVR1611

## The start window



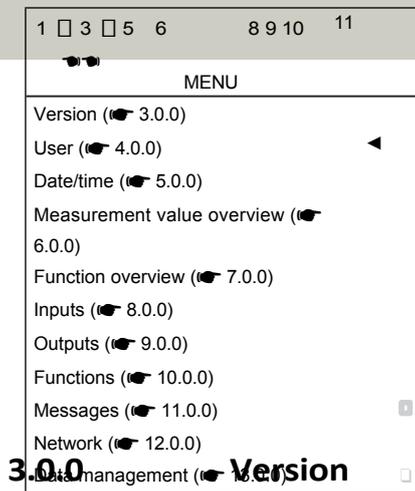
After switching on, the control system starts up in accordance with the system diagram and the specified standard factory settings or specific system settings, and a welcome page appears on the display.

## The basic display (function overview)



If no operation/adjustment/etc. is made on the controller for longer than 2 minutes, the display automatically switches to the standard display/function overview (user operating level).

## The MENU level

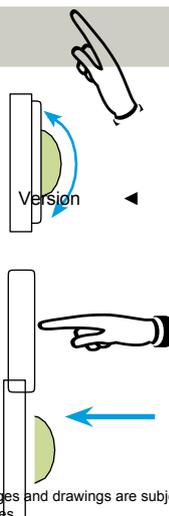
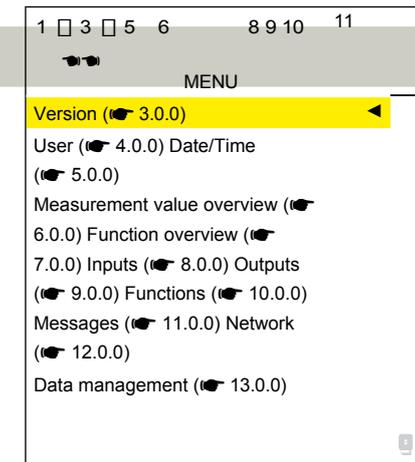


Turn the scroll wheel to move the position indicator "◀" to the desired submenu.

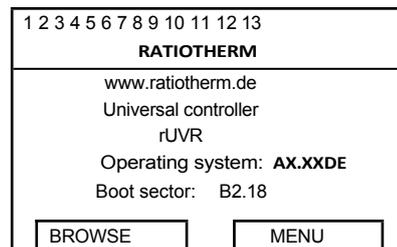
Press the scroll wheel to enter the respective submenu.

Press the "BACK" button to return to the main menu.

If no input is made for more than 2 minutes, the controller automatically switches to the standard display and the function overview.



The following display appears:



Our sketches are not exact representations of the products. Dimensions in mm

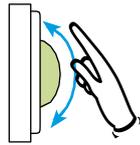
All information, images and drawings are subject to errors and changes

Operating instructions rUVR1611/rZR D-2014/06

# Settings on the rUVR1611

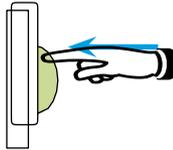
## 4.0.0 User

1	3	5	6	8	9	10	11
MENU							
Version (3.0.0)							
User (4.0.0) ◀							
Date/Time (5.0.0)							
Measurement Overview (6.0.0) Function Overview (7.0.0) Inputs (8.0.0) Outputs (9.0.0) Functions (10.0.0) Messages (11.0.0) Network (12.0.0) Data management (13.0.0)							



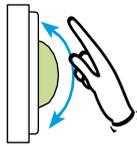
The operating mode can be set by selecting the "User" menu level.

User ◀

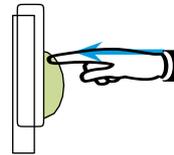


Certain parameters can only be changed if "Expert" has been selected in the operating mode.

1	2	3	4	5	6	7	8	9	10	11	12	13
USER												
OPERATING MODE:												
user ✓												
Professional ◀												
Expert												

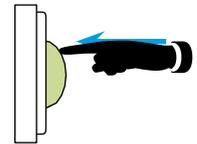
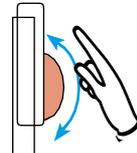
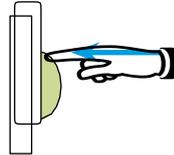
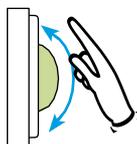


Professional ◀



To confirm (✓) the "Expert" operating mode, the "Expert code" must be entered first:

1	3	5	6	8	9	10	11
EXPERT CODE							
ENTER: *							
BACK							



1	2	3	4	5	6	7	8	9	10	11	12	13
USERS												
OPERATING MODE:												
User												
Professional ✓ ◀												
Expert												



By continuing to turn the scroll wheel ◀, the following additional settings can be changed in the "User" menu level:

- Contrast
- Display brightness
- Time limit for display backlighting
- Automatic switch to function overview
- Automatic standard/summer time

# Settings on the rUVR1611

## 5.0

### Date + time

1 3 5 6 8 9 10 11

MENU

Version (3.0.0)

User (4.0.0)

**Date/time (5.0.0)**

Measurement value overview (6.0.0)

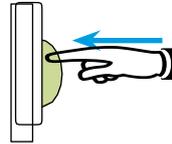
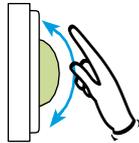
Function overview (7.0.0)

Inputs (8.0.0) Outputs (9.0.0)

Functions (10.0.0)

Messages (11.0.0) Network (12.0.0)

Data management (13.0.0)



1 2 3 4 5 6 7 8 9 10 11 12 13

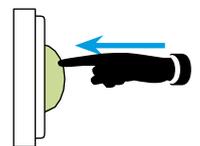
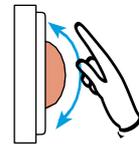
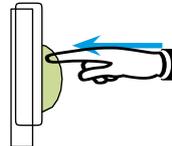
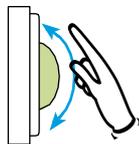
DATE / TIME

Wednesday

**10 December 2008**

Standard time: 12:51

BROWSE BACK



By moving the position indicator to the respective parameter, it can then be changed by pressing, turning and pressing the scroll wheel again.

## 6.0.0

### Measured value overview (actual value overview of all inputs)

1 3 5 6 8 9 10 11

MENU

Version (3.0.0)

User (4.0.0)

Date/time (5.0.0)

**Measurement value overview (6.0.0)**

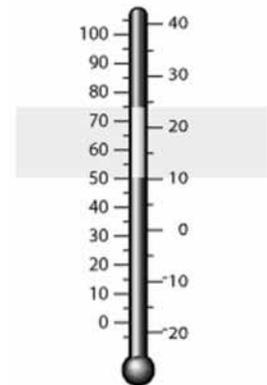
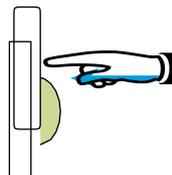
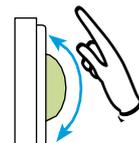
Function overview (7.0.0)

Inputs (8.0.0) Outputs (9.0.0)

Functions (10.0.0)

Messages (11.0.0) Network (12.0.0)

Data management (13.0.0)

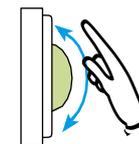


12 3 4 5 7 8 9 10 11 12 13

MEASUREMENT VALUE OVERVIEW

1:	62 °C	59 °C
3:	55 °C	12 °C
5:	45 °C	22 °C

BROWSE BACK



All sensor values are listed here

Our sketches do not represent an exact representation of the products. Dimensions in mm

All information, images and drawings are subject to errors and changes.

Operating instructions rUVR1611/rZR D-2014/06

# Settings on the rUVR1611

## 7.0.0 FUNCTION OVERVIEW

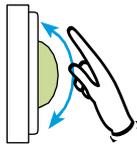
1 3 5 6 8 9 10 11

MENU

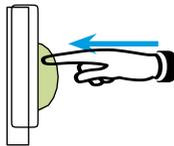
Version (☛ 3.0.0) User (☛ 4.0.0) Date/time (☛ 5.0.0) Measurement value overview (☛ 6.0.0)

**Function overview (☛ 7.0.0) ◀**

Inputs (☛ 8.0.0) Outputs (☛ 9.0.0) Functions (☛ 10.0.0) Messages (☛ 11.0.0) Network (☛ 12.0.0) Data management (☛ 13.0.0)



Function overview ◀



1 2 3 4 5 6 7 8 9 10 11 12 13

**Operating system: AX.XXDE**

Wed. 10 December 2008 ◀  
Normal time: 11: 47 ◀

START  
**START FUNCTION ◀**

Status: OFF  
Runtime: X min  
Total duration: 20 min

**INCOMING ◀**

T.SSP.top °C ◀  
T.SSP.middle °C ◀  
T.SSP.bottom °C ◀  
T.K collector °C ◀  
Outside temp. °C ◀

**WMZ SOLAR ◀**

FLOW: X l/h  
POWER: X.XX kW  
HEAT OUTPUT: X.X kWh

**BTR.H.BR ◀**

Operating time: X hours  
Daily counter previous day: X hours X min

HEATING CIRCUIT 1  
**OPERATION: TIME/AUTO ◀**  
NORMAL  
T.room.LOWER: XX °C ◀  
TIME PROGRAM: ◀

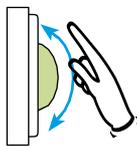
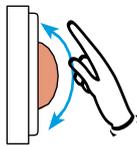
**MAX FUNCTION ◀**

WW START  
T.ww.MIN: XX °C ◀  
TIME PROGRAM: ◀

HYG.WW-B.1  
T.abs.TARGET: XX °C ◀

CIRC  
TIME PROGRAM: ◀

SERVICE



Options for setting/changing:

- Date + time (☛ 7.1.0)
- Start/stop chimney sweep function (☛ 7.2.0)
- INPUTS (☛ 7.3.0)
- WMZ SOLAR (☛ 7.4.0) Change values (☛ 7.4.1)
- Operating hours auto WE (☛ 7.5.1)
- Heating circuit 1 (☛ 9.0.0)
- Heating circuit 2 (☛ 9.0.0)
- DHW start (☛ 9.0.0)
- HYG.DHW-B1 (☛ 9.0.0)
- CIRC (☛ 9.0.0)

INPUTS =

List of connected sensors and their values (☛ 7.3.0)



Remaining displays are for visual information only

Operating instructions rUVR1611/rZR D-2014/06

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Our sketches do not represent an exact representation of the products. Dimensions in mm

**ratiotherm**  
Wärme intelligent genutzt

The plant designer or the company carrying out the work must apply the generally accepted rules of technology and the relevant local regulations and legal provisions.

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Status 13 June 2014-wb

# Settings on the rUVR1611

## 7.1.1 Date + time

1 2 3 4 5 6	7 8 9 10 11 12 13
Operating system: AX.XXDE	
Wed 10 December 2008 47	
Standard time: 11: ◀	
CHIMNEY F: 1	
START FUNCTION	
HELP	SERVICE

5.0

## 7.1.2 Chimney sweep

1 2 3 4 5 6 7 8 9 10 11 12 13
Operating system: AX.XXDE
CHIMNEY
FUNCTION START ◀
Status: OFF
Runtime: 18 min
Total runtime: 20 min



The chimney sweep function is used to switch on a heat generator for emission control measurements.

To enable quick and easy access, the function has been placed at the top of the function overview (user interface) after the date and time display.

To activate the chimney sweep function, move the position indicator to "START FUNCTION"

1 2 3 4 5 6 7 8 9 10 11 12 13
Operating system: AX.XXDE
CHIMNEY
FUNCTION STOP ◀
Status: ON
Runtime: 18 min
Total runtime: 20 min

Press the scroll wheel to start the function and the status information will change from "Status – OFF" to "Status – ON".

The chimney sweep function triggers a burner/heat generator request via output "A5" and at the same time outputs "A3" and "A11" are activated for the heating circuit pumps.

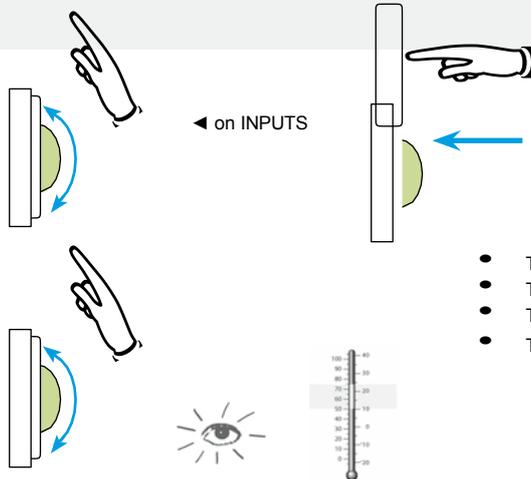
This function remains active for a maximum of 20 minutes unless it is stopped earlier by pressing the scroll wheel again.

With rZR = analogue function via chimney sweep button on the front of the housing.

## 7.2.3 System control INPUTS (sensors)

1 2 3 4 5 6 7 8 9 10 11 12 13
Operating system: AX.XXDE
Total time: 20 min
INCOMING ◀
WMZ SOLAR

1 2 3 4 5 6 7 8 9 10 11 12 13
Operating system: AX.XXDE
1: T.SSP.top 9999 °C
2: T.WW.SSP 9999 °C
HELP SERVICE



- T.SSP.top °C
- T.WW.SSP °C
- T.SSP.middle °C
- Temp.Outside °C etc. ◀

Our sketches are not exact representations of the products. Dimensions in mm

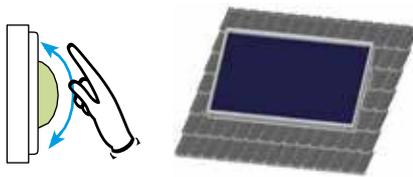
All information, images and drawings are subject to errors and changes.

Operating instructions rUVR1611/rZR D-2014/06

# Settings on the rUVR1611

## 7.2.4 Heat quantity measurement Solar

1 2 3 4 5 6 7 8 9 10 11 12 13
Operating system: AX.XXDE
WMZ SOLAR
FLOW: X l/h
POWER: X.XX kW
HEAT OUTPUT: X.X kWh
SERVICE



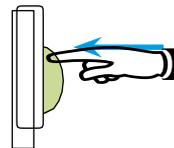
- Current flow rate in the collector circuit
- Current output
- Total heat quantity

## Heat quantity measurement Solar (settings)

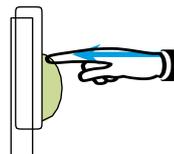
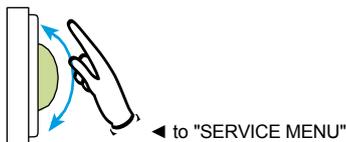
1 3 4 5 6 7 8 9 10 11 12 13
HEAT METER
REF: WMZ SOLAR
INPUT VARIABLE: SERVICE
MENU:
Status: UNCALIBRATED
BROWSE SERVICE



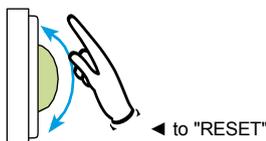
Change of name



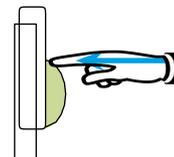
1 2 3 4 5 6 7 8 9 10 11 12 13
HEAT QUANTITY Z.
REF: WMZ SOLAR
INPUT VARIABLES:
SERVICE MENU:
Status: UNCALIBRATED
FLIP SERVICE



1 2 3 4 5 6 7 8 9 10 11 12 13
SERVICE MENU
WMZ SOLAR
METER
RESET: No
0.0 kWh
BACK



no =  
yes =



1 2 3 4 5 6 7 8 9 10 11 12 13
SERVICE MENU
CALIBRATION
START: No
Status: UNCALIBRATED
BACK

During the calibration process, it is very important that both sensors (flow and return) measure the same temperatures. To do this, both sensor tips are tied together with a piece of tape or wire. Furthermore, both sensors should already be equipped with the subsequent cable extensions. When using the collector sensor, the required cable length must be estimated and integrated. In addition, two containers (> 1 litre) must be prepared, one filled with cold water >20°C and the other with hot water >60°C.

1 2 3 4 5 6 7 8 9 10 11 12 13
SERVICE MENU
CALIBRATION
START: Yes
Status: UNCALIBRATED
BACK

The calibration process is started via "START yes"

Operating instructions rUVR1611/rZR D-2014/06

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Our sketches do not represent an exact representation of the products. Dimensions in mm

The plant designer or the executing company must apply the generally applicable and recognised rules of technology as well as the relevant local regulations and legal provisions.

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# Settings on the rUVR1611

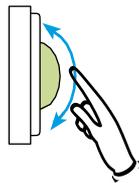
## Frost protection

1 2 3 4 5 6 7 8 9 10 11 12 13	
<b>HEAT QUANTITY</b>	
<b>FROST PROTECTION:</b>	40% ◀
T. supply:	XXXX °C
Return	XXXX °C
temp.: DIFF:	X.X K
FLOW:	X l/h
FLIP	BACK ◀

Specify the frost protection percentage (%) (factory setting 40%)

## Automatic operating hours counter for heat generator (WE1)

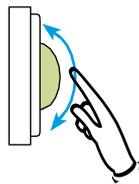
1 2 3 4 5 6	7 8 9 10 11 12 13
<b>Operating system:</b>	
AX.XXDE	
<b>BTR.H.BR</b>	◀
Operating time:	X hours
Daily counter previous day	
X hours	X min
	SERVICE ◀



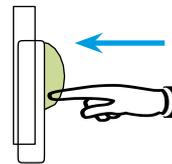
- Total operating hours
- Previous day's counter

## Operating hours counter (WE1) Settings

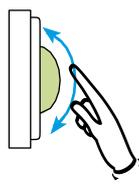
1 2 3 4 5 6	7 8 9 10 11 12 13
<b>Operating system:</b>	
AX.XXDE	
<b>BTR.H.BR</b>	◀
Operating time:	X hours
Daily counter Previous day	
X hours	X min
	SERVICE ◀



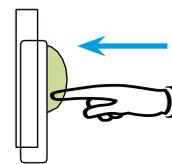
◀ on "BTR.H.BR"



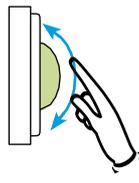
1 2	4 5 6 7 8 9	10 11 12 13
<b>COUNTER</b>		
REF:	BTR.H.BR	
INPUT VARIABLE:		
<b>SERVICE MENU:</b>	◀	
Mode:	OPERATING TIME	
FLOOD	SERVICE ◀	



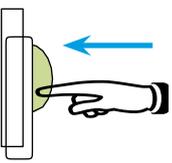
◀ to "SERVICE MENU"



1 2 3 4 5 6 7 8 9 10	11 12 13
<b>SERVICE MENU</b>	
BTR.H.BR	
COUNTER	
<b>RESET:</b>	No ◀
Operating time:	
	BACK ◀



◀ on "RESET"



no =  
yes =

Our sketches do not represent an exact representation of the products. Dimensions in mm

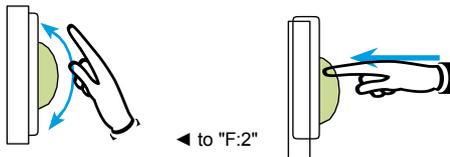
All information, images and drawings are subject to errors and changes.

Operating instructions rUVR1611/rZR D-2014/06

# Settings on the rUVR1611

## Settings for heating circuit 1 (analogous to heating circuit 2 ...)

1	2	3	4	5	6	7	8	9	10	11	12	13
Operating system:						AX.XXDE						
HEAT QUANTITY: 0.0 kWh												
HEATING CIRCUIT 1 ◀												
OPERATION: TIME/AUTO												
NORMAL												
T.room.LOWER: 16°C												
ROOM TEMPERATURE NORMAL: 20°C												
TIME PROGRAM:												
HEATING CURVE:												
FLOW TEMPERATURE: 60°C												
ACTUAL FLOW TEMPERATURE: 70°C												
T.prel.TARGET: 70°C												
SWITCH-OFF CONDITION:												
HEB SERVICE												

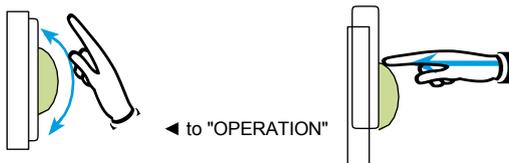


The "Heating circuit 1" function block (analogous to "Heating circuit 2") contains all parameters that can be set for the operation of the respective heating circuit.

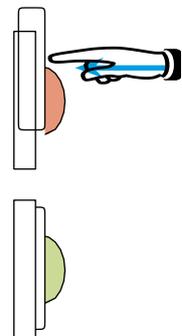
**Note:** Changing specific parameters is reserved for "specialists"! These parameters can be viewed, but can only be changed by entering the "specialist code" in the "User" submenu.

## Setting/changing the operating modes

1	2	3	4	5	6	7	8	9	10	11	12	13
Operating system:						AX.XXDE						
HEATING CIRCUIT 1												
OPERATION: TIME/AUTO ◀												
NORMAL												
ROOM TEMPERATURE REDUCTION: 16°C												
ROOM TEMPERATURE NORMAL: 20°C												
TIMER PROGRAM: ◀												
1	2	3	4	5	6	7	8	9	10	11	12	13
Operating system:						AX.XXDE						
HEATING CIRCUIT 1												
OPERATION: TIME/AUTO ◀												
NORMAL												
ROOM TEMPERATURE REDUCTION: 16°C												
ROOM TEMPERATURE NORMAL: 20°C												
TIME PROGRAM: ◀												



- **TIME/AUTO** = according to current time programme
- **NORMAL** = continuous day operation
- **LOWERED** = continuous night mode
- **PARTY** = Day mode until the set time XX.XX
- **HOLIDAY** = night mode until specified date XX.XX.XXXX
- **HOLIDAY** = Controller uses the time programme for Sunday
- **STANDBY** = Controller function switched off (frost protection active)
- **RAS Time/Auto** (only with connected room sensor / remote control)



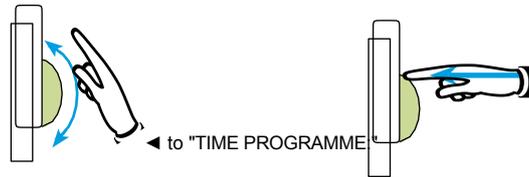
# Settings on the rUVR1611

## Setting/changing the room setpoints

1	2	3	4	5	6	7	8	9	10	11	12	13
Operating system: <b>AX.XXDE</b>												
HEATING CIRCUIT 1												
OPERATION: NORMAL												
NORMAL												
ROOM											16°C	◀
TEMPERATURE												
REDUCTION:												
ROOM											20	
TEMPERATURE												
NORMAL												
1	2	3	4	5	6	7	TIME PROGRAM: 13					
Operating system: <b>AX.XXDE</b>												
HEATING CIRCUIT 1												
OPERATION: NORMAL												
NORMAL												
ROOM											16°C	
TEMPERATURE												
REDUCTION:												
ROOM											20°C	◀
TEMPERATURE												
NORMAL												
1	2	3	4	5	6	7	8	9	10	11	12	13
Operating system: <b>AX.XXDE</b>												
HEATING CIRCUIT 1												
OPERATION: NORMAL												
NORMAL												
T.room.LOWER:											16°C	
ROOM TEMPERATURE NORMAL												
											20°C TIME	
PROGRAM:											◀	◀

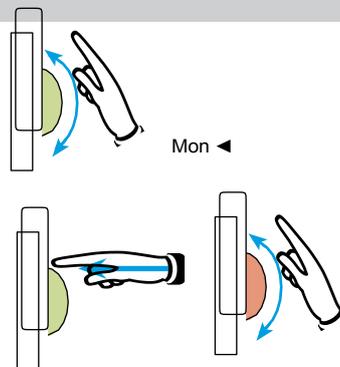
Room setpoint in reduction mode

Room setpoint in normal mode



## Setting/changing the days of the week

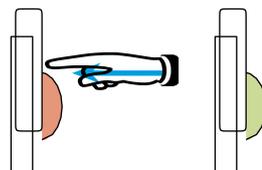
1	2	3	4	5	6	7	8	9	10	11	12	13
<b>TIMER PROGRAM HEATING CIRCUIT 1</b>												
Mon	Tue	Wed	Thu	Fri	Sat	Sun						
06:00	-	22:00	20	°C								
00:00	-	00	20	°C								
00	-	00.00	20	°C								



1	2	3	4	5	6	7	8	9	10	11	12	13
<b>TIMER PROGRAM HEATING CIRCUIT 1</b>												
Mon	Tue	Wed	Thu	Fri	Sat	Sun						
06:00	-	22:00	20	°C								
00:00	-	00	20	°C								
00	-	00.00	20	°C								

grey background = active no

background = inactive



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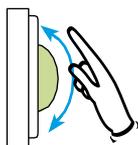
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Operating instructions rUVR1611/rZR D-2014/06

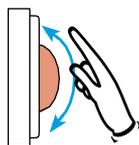
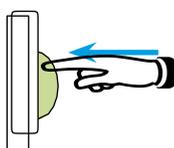
# Settings on the rUVR1611

## Setting/changing the switching times

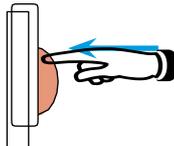
1	2	3	4	5	6	7	8	9	10	11	12	13
<b>TIME PROGRAM HEATING CIRCUIT 1</b>												
Mon	Tue	Wed	Thu	Fri	Sat	Sun						
06:00	00	00.00	-	22:00	-	00:00	20	20	20			



06:00 ◀



08:00 ◀



1	2	3	4	5	6	7	8	9	10	11	12	13
<b>TIMER PROGRAM HEATING CIRCUIT 1</b>												
Mon	Tue	Wed	Thu	Fri	Sat	Sun						
08:00	00	00.00	-	22:00	-	00:00	20	20	20			

### NOTE:

Only two heating programmes are activated in the factory settings:

- "Mon" to "Fri" with heating times from 06:00 to 22:00
- "Sat" to "Sun" with heating times from 07:00 to 23:00.

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>TIMER PROGRAM HEATING CIRCUIT 1</b>												
Mon	Tue	Wed	Thu	Fri	Sat	Sun						
08:00	00	00.00	-	22:00	-	00:00	20	20	20			

**BACK**

- Room setpoint in time/automatic mode

Press the back button to return to the higher-level menu.



# Settings on the rUVR1611

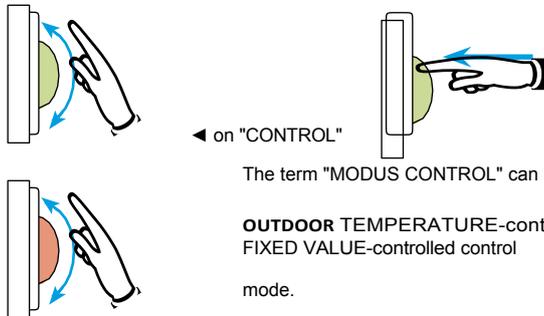
## Setting/changing the heating curves

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Operating system:</b>						<b>AX.XXDE</b>						
HEAT QUANTITY: 0.0 kWh												
HEATING CIRCUIT 1												
OPERATION: TIME/AUTO												
NORMAL												
ROOM TEMPERATURE REDUCTION: 16°C												
ROOM TEMPERATURE NORMAL: 20°C												
TIME PROGRAM:												
<b>HEATING CURVE: ◀</b>												
FLOW TEMPERATURE: T.flow												
ACTUAL: 60°C												
T.supply.SOLL: 70°C												
SWITCH-OFF CONDITION:												
HELP						SERVICE ◀						



◀ on "HEATING CURVE"

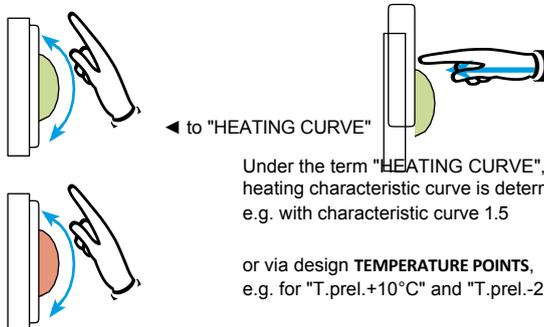
1	2	3	4	5	6	7	8	9	10	11	12	13
<b>HEATING CURVE</b>												
HEATING CURVE 1												
MODE:												
<b>CONTROL: Outside temp. ◀</b>												
HEATING CURVE: Temp.												



◀ on "CONTROL"

The term "MODUS CONTROL" can be used to distinguish between **OUTDOOR TEMPERATURE**-controlled or a **FIXED VALUE**-controlled control mode.

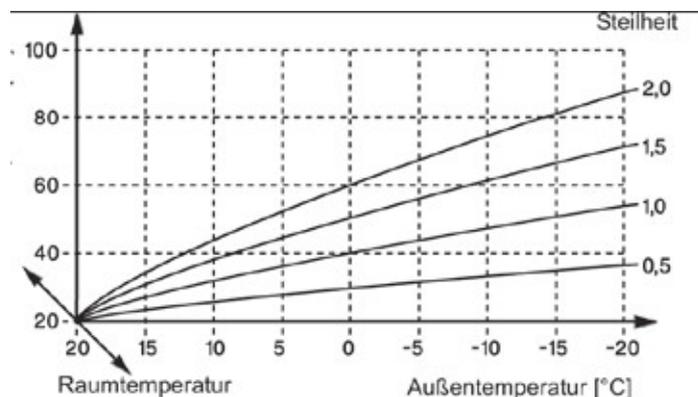
1	2	3	4	5	6	7	8	9	10	11	12	13
<b>HEATING CURVE</b>												
HEATING CURVE 1												
MODE:												
CONTROL: Outside temp.												
<b>HEATING CURVE: Temp. ◀</b>												



◀ to "HEATING CURVE"

Under the term "HEATING CURVE", you can choose whether the heating characteristic curve is determined by entering a **SLOPE**, e.g. with characteristic curve 1.5 or via design **TEMPERATURE POINTS**, e.g. for "T.prel.+10°C" and "T.prel.-20°C".

1	2	3	4	5	6	7	8	9	10	12	13	
<b>HEATING CURVE</b>												
HEATING CURVE:												
Steepness												
Room influence 0												
Switch-on 0												
Excess:												
<b>Steepness: 1.5 ◀</b>												
T.max: 55 °C												
T. min: 20 °C												



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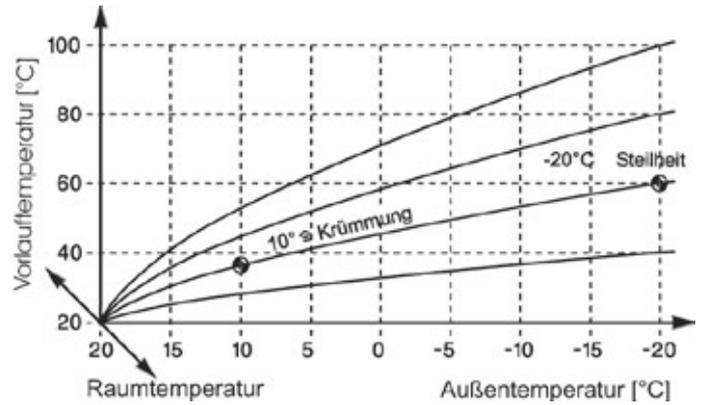
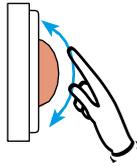
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Operating instructions rUVR1611/rZR D-2014/06

# Settings on the rUVR1611

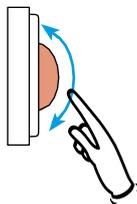
Factory setting for HK 1 (e.g. underfloor heating NT)

1	2	3	4	5	6	7	8	9	10	11	12	13
HEATING CURVE												
HEATING CURVE: Temp.												
Room influence 0												
Switch-on increase: 0%												
T. supply + 10C: 30 °C ◀												

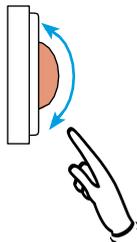


Factory setting for HK 2 (e.g. HT radiator heating)

1	2	3	4	5	6	7	8	9	10	11	12	13
HEATING CURVE												
HEATING CURVE: Temp.												
Room influence 0												
Switch-on increase: 0%												
T. supply + 10C: 40 °C ◀												
T. prev. - 20C: 80 °C												
T. max: 80 °C												

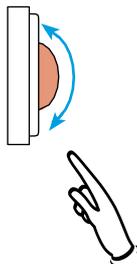


1	2	3	4	5	6	7	8	9	10	11	12	13
HEATING CURVE												
HEATING CURVE: Temp.												
Room influence 0 ◀												
Switch-on increase: 0%												



Room influence in %  
(when using a room sensor RSG / RFB)

1	2	3	4	5	6	7	8	9	10	11	12	13
HEATING CURVE												
HEATING CURVE: Temp.												
Room influence 0												
Switch-on Excess: 0% ◀												



leads to a temporary increase in the flow temperature  
in connection with the preceding reduction period.

**BACK**



Press the back button to return to the higher-level menu

# Settings on the rUVR1611

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Operating system:</b>						<b>AX.XXDE</b>						
HEAT QUANTITY: 0.0 kWh												
HEATING CIRCUIT 1 F: 2												
OPERATION: TIME/AUTO												
NORMAL												
ROOM TEMPERATURE REDUCTION: 16°C												
ROOM TEMPERATURE NORMAL: 20°C												
TIME PROGRAM: HEATING CURVE:												
FLOW TEMPERATURE: ACTUAL FLOW TEMPERATURE: 60°C												
T.vorl.SOLL: 70°C												
<b>Operating system:</b>						<b>AX.XXDE</b>						
SHUT-DOWN CONDITION: ◀												
HEAT QUANTITY: 0.0 kWh												
HELP SERVICE ◀												
<b>HEATING CIRCUIT 2</b>						◀						
OPERATION: TIME/AUTO												
NORMAL												

In the "Switch-off conditions" submenu, specific switch-off criteria can be selected for the heating circulation pump of the respective heating circuit.

By default, the heating circuit pumps are blocked during daytime operation via the "MAX FUNCTION" comparison function when the outside temperature exceeds the threshold of 20°C.

During reduced operation times, the outdoor temperature threshold of 12°C is entered in the "Switch-off condition" for the respective heating circuit.

Scrolling further down takes you to the settings for "Heating circuit 2" (if available), which are to be made in the same way as for "Heating circuit 1".

Settings/changes in heating circuit 2 (if available) analogous to heating circuit 1

## MAX FUNCTION = Summer/winter switchover

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Operating system:</b>						<b>AX.XXDE</b>						
MAXFUNCT.												
VALUE b: 20 °C ◀												
DIFF.ON: 1.0 K ◀												
DIFF.OFF: 0.5 K ◀												

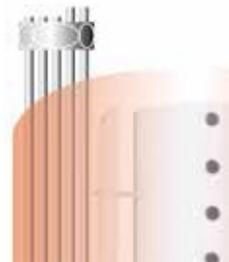
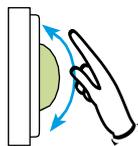


Temperature-dependent summer/winter switchover via the adjustable outside temperature Factory setting 20°C - hysteresis 1°K



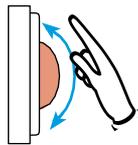
## WW-ANF Heating water supply in the storage tank – for hygienic hot water preparation

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Operating system:</b>						<b>AX.XXDE</b>						
WW-ANF F: 6												
T.ww.MIN: 40°C												
T.ww.SOLL: ◀						TIME PROGRAM: ◀						



Reference sensor  
S1 = Switch-on sensor  
S2 = Switch-off sensor

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>TIME PROGRAM WW START</b>												
Mon	Tue	Wed	Thu	Fri	Sat	Sun						
06:30	-	09:00	55°C	◀								
11:00	-	14:00	55°C									
17:30	-	22:30	55°C									



Settings:  
Weekday, time, target temperature in the storage tank

Scroll further to:  
◀ 3. TIME PROGRAM "DHW START"  
◀ 4. TIME PROGRAM "DHW START"  
◀ 5. TIME PROGRAM "DHW START"

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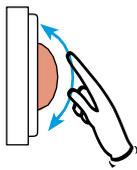
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Operating instructions rUVR1611/rZR D-2014/06

# Settings on the rUVR1611

## HYG-WWB Hygienic hot water preparation

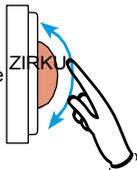
1 2 3 4 5 6 7 8 9 10 11 12 13
Operating system: AX.XXDE
HYG.WW-B.1 F: 7
ABSOLUTE VALUE CONTROL:
T.abs.SOLL 45°C ◀



Hot water outlet temperature at the heat exchanger

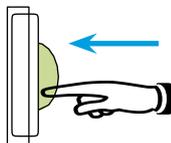
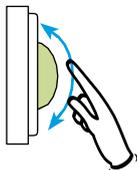
## CIRC Hot water - circulation

1 2 3 4 5 6 7 8 9 10 11 12 13
Operating system: AX.XXDE
Operation: Time/Pulse
ZIRKU.RETURN:
T.zrl.SOLL 40°C ◀
TIME PROGRAM:



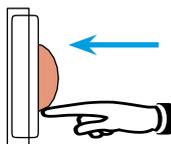
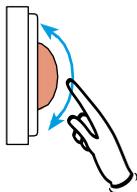
Runtime limitation via the temperature at the circulation return sensor  
 . Factory setting 40 °C.

1 2 3 4 5 6 7 8 9 10 11 12 13
Operating system: AX.XXDE
CIRC
CIRC.RETURN:
T.zrl.SOLL 40°C
TIME PROGRAM: ◀



Change in circulation times

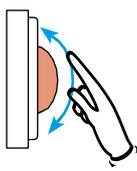
1 2 3 4 5 6 7 8 9 10 11 12 13
TIME PROGRAMME CIRC
Mon Tue Wed Thu Fri Sat Sun
05:00 - 08:00 ◀



DayandTime

## Settings

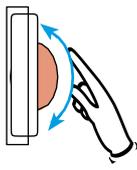
1 2 3 4 5 6 7 8 9 10 11 12 13
Operating system: AX.XXDE
CIRCULATION
CIRC.RETURN:
T.zrl.SOLL 40°C
TIME PROGRAM:
DIFF.ON: -4.0K ◀
DIFF.OFF: 0-0K
Runtime: 5.0 min
Pause time: 15 min



Outside the registered operating times, the circulation pump only when the flow switch (STS01AC-30) is activated, i.e. only when hot water is drawn, provided that the specified setpoint Actual temperature is below the setpoint.

Cooling of the pipe (measured at the circulation return sensor "S7") by 2.5K causes the circulation pump to switch on again inTime mode.

1 2 3 4 5 6 7 8 9 10 11 12 13
Operating system: AX.XXDE
CIRCULATION
CIRCULATION
RETURN:
T.zrl.SOLL 40°C
TIME PROGRAM:
DIFF.ON: -4.0 K
DIFF.OFF: 0-0 K ◀
Runtime: 5.0 min
Break time: 15 min



Operating instructions rUVR1611/rZR D-2014/06

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**ratiotherm**  
 Wärme intelligent genutzt

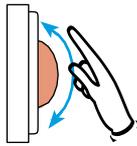
The system planner or the company carrying out the work must apply the generally accepted rules of technology as well as the relevant local regulations and legal provisions.

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Status 13.06.2014-wb

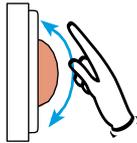
# Settings on the rUVR1611

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Operating system:</b>						<b>AX.XXDE</b>						
CIRCUS												
CIRCUS.RETURN:												
T.zrl.SOLL						40°C						
TIME PROGRAM:												
DIFF.ON:						-4.0 K						
<b>DIFF.OFF:</b>						<b>0-0 K</b>						
Runtime:						5.0 min ◀						
Break time:						15 min ◀						



Max. operating time

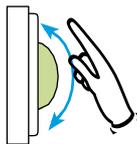
1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Operating system:</b>						<b>AX.XXDE</b>						
CIRCUS												
CIRCUS.RETURN:												
T.zrl.SOLL						40°C						
TIME PROGRAM:												
DIFF.ON:						-4.0 K						
DIFF.OFF:						0-0 K						
Runtime:						5.0 min						
<b>Break time:</b>						<b>15 min ◀</b>						



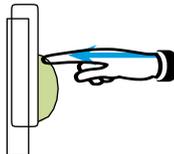
Repeated starting of the circulation pump during dispensing within the set pause time is prevented in pulse mode.

## 8.0.0 ENTRANCES

1	3	5	6	8	9	10	11
MENU							
Version (☛ 3.0.0) User (☛							
4.0.0) Date/Time (☛ 5.0.0)							
Measurement value overview (☛ 6.0.0)							
Function overview (☛ 7.0.0)							
<b>Inputs (☛ 8.0.0) ◀</b>							
Outputs (☛ 9.0.0) Functions (☛							
10.0.0) Messages (☛ 11.0.0)							
Network (☛ 12.0.0)							
Data management (☛ 13.0.0)							

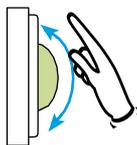


Inputs ◀



## 8.1.0 System control Inputs

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>INCOME</b>												
<b>1: T.SSP.top</b>												
<b>9999 °C</b>												
<b>2: T.WW.SSP</b>												
<b>9999 °C</b>												
HELP						SERVICE ◀						



- T.SSP.top °C
- T.WW.SSP °C
- T.SSP.middle °C
- Temp.Outside °C etc. ◀

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Operating instructions rUVR1611/rZR D-2014/06

# Settings on the rUVR1611

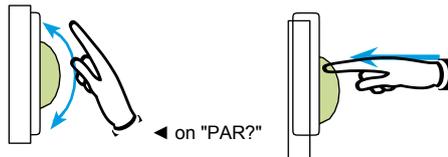
## 8.2.0 Changing the specific input parameters

1	2	3	4	5	6	7	8	9	10	11	12	13
Operating system: AX.XXDE												
INPUTS												
1:	T.SSP.top 9999 °C											
2:	T.WW.SSP 9999 °C											
HELP				SERVICE								



1	2	3	4	5	6	7	8	9	10	11	12	13
INCOME												
1:	T.SSP.top 9999 °C											
2:	T.WW.SSP 9999 °C											
3:	T.SSP.centre											
HELP				SERVICE								

Access the submenu for the respective sensors



1	2	3	4	5	6	7	8	9	10	11	12	13
INPUT 1												
TYPE: ANALOG												
MEASUREMENT: Temperature												
DESIGNATION												
GROUP:	Custom											
REF:	T.SSP.top											
SENSOR: Pt 1000												
SENSOR CHECK: no												
SENSOR CORR.: 0.0 K												
AVERAGE: 1.0 sec												
FLIP				BACK								

PULSE = e.g. VIG  
 ANALOGUE = e.g. sensor value  
 DIGITAL = e.g. switching signal  
 MEASUREMENT VALUE = e.g. temperature

### BEZ

- Change in sensor designation

### SENSOR

- Pt 1000
- KTY 10
- RAS = Room setpoint transmitter RSG

### SENSORCHECK

An active sensor check automatically generates an error message in the function overview in the event of a short circuit or interruption.

- no = sensor check off
- Yes = Sensor check on

### SENSOR CORR

With a sensor correction of, for example, 0.5 K and a measured temperature of 60.0°C, 60.5°C is displayed. This corrected value is then also used internally for all calculations.

- Change -50 to +80K

### AVERAGE

Time averaging of the measured values. The smaller the time value, the faster the response of the display and the device, but fluctuations in the value must be expected.

- Change 0 to 6 sec.

Analogue procedure for all INPUTS ...

# Settings on the rUVR1611

## 9.0.0 OUTPUTS

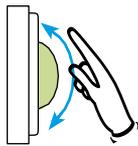
1 3 5 6 8 9 10 11

MENU

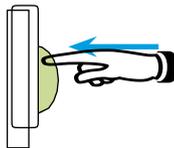
Version (3.0.0) User (4.0.0) Date/Time (5.0.0)  
 Measurement value overview (6.0.0)  
 Function overview (7.0.0)  
 Inputs (8.0.0)

**Outputs (9.0.0)**

Functions (10.0.0)  
 Messages (11.0.0)  
 Network (12.0.0)  
 Data management (13.0.0)



Outputs ◀



1 2 3 4 5 6 7 8 9 10 11 12 13

**OUTGOINGS**

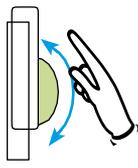
1: Pu.Sol.Sek.  
**Auto/Off** ◀ PAR? ◀  
 RPM: 0

2: Pu.Sol.Prim..  
**Auto/Off** ◀ PAR?  
 Speed control:

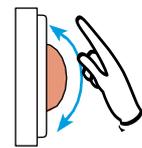
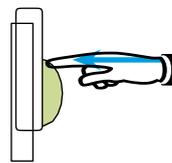
3: Pump Hzkr1  
**Auto/Off** ◀ PAR?

4: Pump Circu2  
**Auto/Off** ◀ PAR?

5: Start boiler  
**Auto/Off** ◀ PAR?



◀ to "Auto/Off"



Select operating mode

Auto/Off or Auto/On = Controller determines output status

Manual/Off = Manual operation Output permanently OFF  
 Manual/On = Manual operation Output permanently ON

For speed output, the speed level can be selected in Manual/On mode. 30 = 100%

To operate the mixer in manual mode, the operating mode must be set to Manual.

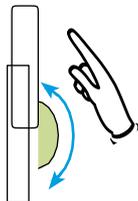
Then move the arrow to the desired position and press the scroll wheel until the desired mixer setting is reached.

1 2 3 4 5 6 7 8 9 10 11 12 13

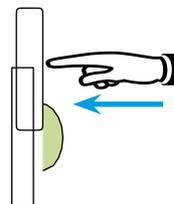
**OUTPUTS**

1: Pu.Sol.Sek.  
 Auto/Off Speed **PAR?** ◀  
 level: 0

2: Pu.Sol.Prim..  
 Auto/Off PAR?



◀ on "PAR?"



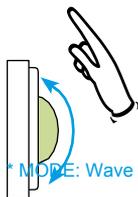
1 2 3 4 5 6 7 8 9 10 11 12 13

**OUTPUT 1**

OUTPUT STATUS  
 TYPE: **ROTATION SPEED.**

DESIGNATOR  
 GROUP: User-defined  
 REF: Pu.Sol.Sek.

MODE: **Wave packet\***  
 DELAY: X sec  
 DRAW: X sec



Option - switching or speed output

\* MODE: Wave packet only appears when set to SPEED.

DELAY = time delay for output response RUN-ON = time delay after output is switched off

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Operating instructions rUVR1611/rZR D-2014/06

# Settings on the rUVR1611

## Anti-lock protection

1	2	3	4	5	6	7	8	9	10	11	12	13
ANTI-LOCK PROTECTION												
Mon Tue Wed Thu Fri Sat Sun at												
06:00 ◀												
OUTPUT												
1	2	3	4	5	6	7	8					
9	10	11	12	13	14							

Parameters for preventing pumps from seizing up during prolonged periods of inactivity. At the set time, the selected pumps (outputs) are activated for 30 seconds.

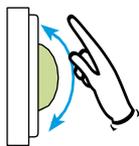
e.g. every Monday at 6 a.m. outputs 3, 4, 6, 10

## 10.0.0 FUNCTIONS (example controller version V1)

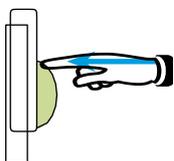
1	3	5	6	8	9	10	11
MENU							
Version (☛ 3.0.0)							
User (☛ 4.0.0)							
Date/time (☛ 5.0.0)							
Measurement value overview (☛ 6.0.0)							
Function overview (☛ 7.0.0)							
Inputs (☛ 8.0.0)							
Outputs (☛ 9.0.0)							
Functions (☛ 10.0.0) ◀							
Messages (☛ 11.0.0)							
Network (☛ 12.0.0)							
Data management (☛ 13.0.0) □							

1	2	3	4	5	6	7	8	9	10	11	12	13
FUNCTIONS												
1:	MAINTENANCE FUNCTION											
	CHIMNEY											PAR?
2:	HEATING CIRCUIT REG.											
	HEATING CIRCUIT 1											PAR?
3:	COMPARE											
	MAX FUNCTION.											PAR?
4:	COMPARE											
	MIN FUNCTION											PAR?
5:	TIMER FUNCTION											
	DELAY											PAR?
6:	REQUIREMENT WW											
	WW_START.											PAR?
7:	PID CONTROL											
	HYG.WW-B.1											PAR?
8:	PID CONTROL											
	HYG.WW-B.2											PAR?
9:	TIMER FUNCTION											
	TIMER1											PAR?
10:	CIRCULATION											
	CIRC											PAR?
11:	START HEATING											
	HZ_START.1											PAR?
12:	START HEATING											
	HZ_START.2											PAR?
13:	START HEATING											
	HZ_ANF.3											PAR?
14:	CHARGING PUMP											
	LDPUMP1											PAR?
15:	CHARGING PUMP											
	LDPUMP2											PAR?
16:	TIMER FUNCTION											
	TIMER2											PAR?
17:	PID CONTROL											
	DRZREG.											PAR?
18:	PROFILE FUNCTION											
	FB-DRY.											PAR?
	FLIP											BACK ◀

1	2	3	4	5	6	7	8	9	10	11	12	13
FUNCTIONS												
19:	COOLING FUNCTION											
	COOLING FUNCTION											
20:	MIXER CONTROL FUNCTION.											
	M CONTROL 1											PAR?
21:	MIXER CONTROL FUNCTION.											
	M-REG.2											PAR?
22:	SOLAR CONTROL											
	SOLAR1											PAR?
23:	SOLAR CONTROL											
	SOLAR2											PAR?
24:	PID CONTROL											
	PID-SOLAR1											PAR?
25:	PID CONTROL											
	PID-SOLAR2											PAR?
26:	START FUNCTION											
	SOLSTART											PAR?
27:	HEAT QUANTITY CONTROL.											
	WMZ SOLAR											PAR?
28:	METER											
	BTR.H.BR											PAR?
29:	FUNCTION CHECK											
	SOL CHECK											
30:	FUNCTION CHECK											
	CONTROL FUN2											PAR?
31:	SOLAR CONTROL											
	SOLAR											PAR?
32:	COMPARISON											
	COMP.2											PAR?
33:	COMPARISON											
	COMP.3											PAR?
34:	COMPARE											
	COMP.4											PAR?
35:	COMPARISON											
	COMP.5											PAR?
36:	LOGIC FUNCTION											
	OR											EQUAL?
	BROWSE											BACK



Functions ◀



List of all functions used in the programme  
The specific parameters of all functions can be changed here.

Operating instructions rUVR1611/rZR D-2014/06

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# Settings on the rUVR1611

## Cooling function (solar surplus)

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>FUNCTIONS</b>												
Pause time		15 min										
COOLING FUNCTION 1		◀										
COOLING FUNCTION 2		◀										

Function disabled at factory! To activate, set status to "ON"

The cooling function is used to remove excess heat, mainly due to excess solar energy, from the stratified storage tank via heating circuit 1 (for version V2=HK2).

The corresponding heating circuit pump is activated and the mixers run at a fixed flow setpoint of 40°C. The function can be limited via a time window.

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>FUNCTIONS</b>												
Break time		15 min										
COOLING FUNCTION 1		◀										
COOLING FUNCTION 2		◀										

Function switched off at the factory! To activate, set status to "ON".

The cooling function is used to remove excess heat, mainly from surplus solar energy, from the stratified storage tank via the collector.

Outputs A1 and A2 are activated so that the excess heat can be dissipated via the collector at night. The function can be limited to a specific time window.

## Screed heating programme

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>FUNCTIONS</b>												
Pause time		15 min										
COOLING FUNCTION		◀										
FB drying		◀										

The "FB drying" profile function is a higher-level function for controlled screed heating via HK 1, which is activated via the "Start profile" setting.

The number of stages and their setpoints can be viewed or changed under the "Parameters" setting. Fourteen stages are stored at the factory.

The function can be terminated prematurely using the "Stop profile" setting.

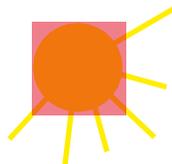
In the event of a power failure, the programme will resume at the last point it was running. The profile

function interrupts all other heating circuit functions while it is activated.

The hot water preparation function is not affected by this.

## SOLAR 2 (primary circuit) + SOLAR 1 (secondary circuit)

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>FUNCTIONS</b>												
FB-Dry.		◀										
SOLAR1		◀										
SOLAR2		◀										



Specific switch-on and switch-off conditions for solar secondary circuit pump (output A1) and solar primary circuit pump (output A2).

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>FUNCTIONS</b>												
SOLAR 2		◀										
COLLECTOR TEMPERATURE:		◀										
T.coll.MAX:		160°C ◀										
REFERENCE TEMPERATURE:		◀										
T.ref.MAX		95°C ◀										



T.coll.MAX =  
Maximum temperature of the collector measured by sensor S10



T.ref.MAX =  
Maximum temperature of the stratified storage tank "bottom" measured at sensor S 11

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>FUNCTIONS</b>												
DIFF COLL-REF		◀										
DIFF.ON		6.0K ◀										
DIFF.OFF		3.0 K ◀										

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Operating instructions rUVR1611/rZR D-2014/06

# Settings on the rUVR1611

## PID SOLAR 1 + 2 (solar charging temperature control)

1 2 3 4 5 6 7 8 9 10 11 12 13
<b>FUNCTIONS</b>
PID Solar 1 ABSOLUTE VALUE CONTROL T.abs.SOLL: 60°C



Charge temperature control for solar 2 (primary circuit) A2

1 2 3 4 5 6 7 8 9 10 11 12 13
<b>FUNCTIONS</b>
PID Solar 2 ABSOLUTE VALUE CONTROL T.abs.SOLL: 50°C

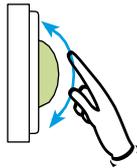


Charging temperature control for Solar 1 (secondary circuit) A1

1 2 3 4 5 6 7 8 9 10 11 12 13
<b>FUNCTIONS</b>
DIFF COLL-REF DIFF.ON 6.0K DIFF.OFF 3.0 K

## SOLSTART (start-up function for tubes)

1 2 3 4 5 6 7 8 9 10 11 12 13
<b>FUNCTIONS</b>
SOLSTART COMP.2



Boost function for collector circuit pump A2 for flushing the SOLAR2 collector sensor S10. Optimised switch-on behaviour for "heat pipe tube collectors" or collector fields that are mounted too flat and other systems with low momentum.

1 2 3 4 5 6 7 8 9 10 11 12 13
<b>INPUT VARIABLE</b>
SOLSTART START FUNCTION RELEASE User Status: OFF

Function disabled at factory!  
Set status to "ON" to activate Source:

1 2 3 4 5 6 7 8 9 10 11 12 13
<b>START FUNCTION</b>
REF.: SOLSTART INPUT VARIABLE OUTPUT VARIABLE 08:30 - 17:00 Runtime: 15 sec Interval: 20 min

Function setting options Activation time:

## Function check Solar

1 2 3 4 5 6 7 8 9 10 11 12 13
<b>FUNCTIONS</b>
Solar function check

Solar circuit differential check  
Difference between S10 and S9 >50°C over 60 minutes

Operating instructions rUVR1611/rZR D-2014/06

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**ratiotherm**  
Wärme intelligent genutzt

The system planner or the company carrying out the work must apply the generally accepted rules of technology as well as the relevant local regulations and legal provisions.

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Status 13.06.2014-wb

# Settings on the rUVR1611

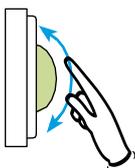
## Min function (hot water min comfort)

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>FUNCTIONS</b>												
MIN FUNCT.												
VALUE b: 25 °C ◀												
DIFF.ON 0.0 K ◀												
DIFF.OFF: -1.0 K ◀												

Heating circuit shutdown when the temperature falls below a critical threshold at sensor S1 (top of storage tank) to ensure hot water preparation

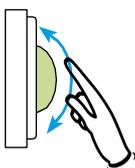
## VERGL.2 (Reheat block during solar operation)

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>FUNCTIONS</b>												
SOLAR2												
SOLSTART												
COMPARE2 ◀												



Function disabled at the factory!  
To activate, set status to "ON"

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>FUNCTIONS</b>												
MIN FUNCT.												
VALUE a: 15.2 kW												
VALUE b: 5.0 kW ◀												
DIFF.OUT: 0.5 K ◀												

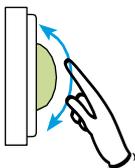


When the collector output is appropriate (value a), the reheating of heat generator 1 is reduced to the set value of DHW-MIN.

Activation via input variable Status "ON"

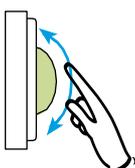
## LDPUMP 1 (heat generator 1) analogue LDPUMP 2

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>FUNCTIONS</b>												
COMPARE 2												
LDPUMP1 ◀												
LDPUMP2												

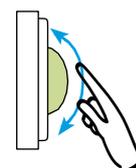


Special settings for temperature conditions and temperature difference differences for charging pump 1 (boiler circuit pump WE1)

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>FUNCTIONS</b>												
PUMP 1												
FEED TEMPERATURE												
T.supp.MIN 30°C ◀												
REFERENCE TEMPERATURE:												
T.ref.MAX 80°C ◀												



1	2	3	4	5	6	7	8	9	10	11	12	13	CHARGING
<b>FUNCTIONS</b>													
DIFFERENCE FEED-REF.													
DIFF.ON 5.0K ◀													
DIFF.OFF 2.0 K ◀													



## Timer 2 (boiler lockout)

1	2	3	4	5	6	7	8	9	10	11	12	13
<b>FUNCTIONS</b>												
COMPARE 2												
TIMER2 ◀												

Function disabled at the factory!

To activate, set status to "ON" LDPUMP2

When feed pump A6 is "ON", then output aut. WE A5 is "OFF" (blocked).

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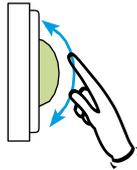
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Operating instructions rUVR1611/rZR D-2014/06

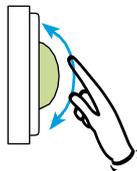
# Settings on the rUVR1611

## LDPUMP 3 (outsourcing) \*only rZR

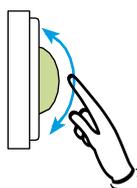
1 2 3 4 5 6 7 8 9 10 11 12 13	<b>FUNCTIONS</b>
LDPUMP2	
LDPUMP4	



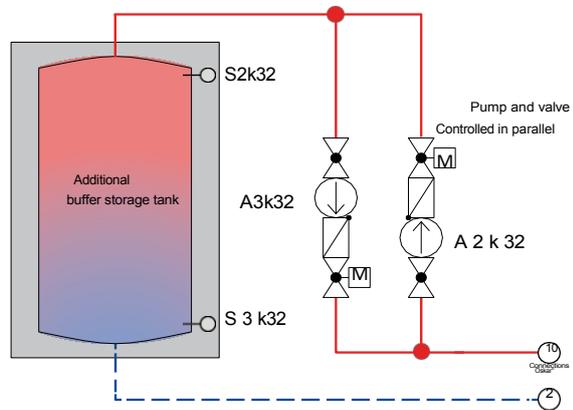
1 2 3 4 5 6 7 8 9 10 11 12 13	<b>FUNCTIONS</b>
CHARGING PUMP 3	
FEED TEMPERATURE	
T.supp.MIN 70°C	
REFERENCE TEMPERATURE:	
T.ref.MAX 95°C	



1 2 3 4 5 6 7 8 9 10 11 12 13	<b>FUNCTIONS</b>
DIFFERENCE FROM REF:	
DIFF.ON 5.0K	
DIFF.OUT 2.0 K	

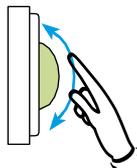


Same procedure as for LDPUMP 1 LDPUMP3

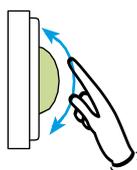


## LDPUMP 4 (reverse charge) \*only rZR

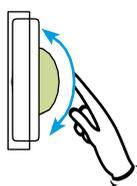
1 2 3 4 5 6 7 8 9 10 11 12 13	<b>FUNCTIONS</b>
LDPUMP3	



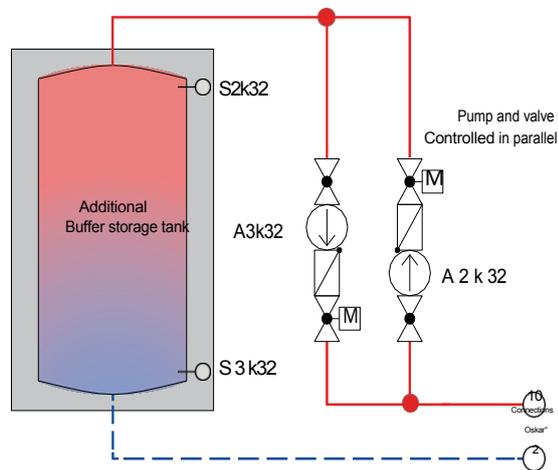
1 2 3 4 5 6 7 8 9 10 11 12 13	<b>FUNCTIONS</b>
CHARGING PUMP 4	
FEED TEMPERATURE	
T.min 30°C	
REFERENCE TEMPERATURE:	
T.ref.MAX 60°C	



1 2 3 4 5 6 7 8 9 10 11 12 13	<b>FUNCTIONS</b>
DIFFERENCE FROM REF:	
DIFF.ON 5.0K	
DIFF.OUT 2.0 K	

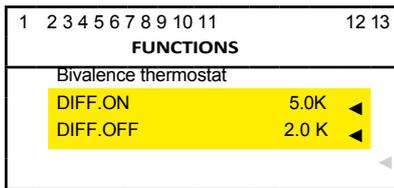


Same procedure as for LDPUMP 1 LDPUMP4



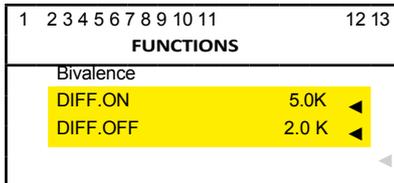
# Settings on the rUVR1611

## Bivalence thermostat \* Heat pump controller only



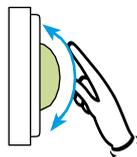
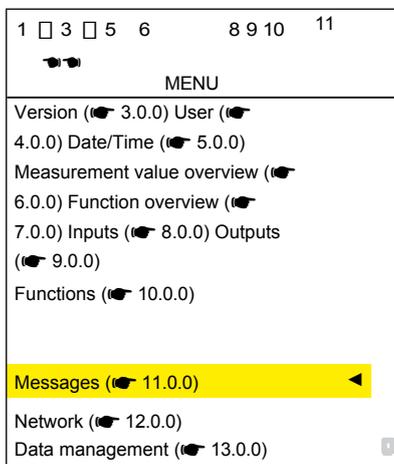
At what outside temperature is a specific additional heat generator required (oil/gas boiler, heating element, etc.)?

## Interval control of heating circuits \* only heat pump controller

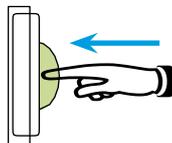


During the WW demand in the storage tank, the heating circuit pump is temporarily switched on at certain intervals to prevent the rooms from cooling down.

## 11.0.0 MESSAGES



Messages ◀



Generation of error/fault messages if these occur for longer than 10 seconds.

Triggered messages are automatically entered in the function overview.

Messages can be displayed on the controller and/or on the RFB acoustically and/or optically.

<b>Standard messages:</b>	(rUVR1611 and rZR)
Solar Max	Maximum limit of the collectors >150°C exceeded
Storage tank max	Maximum limit of the storage tank bottom >95°C exceeded
Storage Min	Minimum temperature in stratified storage tank undershot (minimum function)
Diff Solar	Difference between S10 and S12 <3K
Collective fault (only with rZR)	Freely definable collective fault signal output (A1K32), requires programming knowledge, but can also be programmed at the factory for an additional charge
<b>Standard messages:</b>	(WP controller)
WP fault	High pressure or low pressure fault
HZ start eom	Heat pump ON due to heating demand
DHW start on	Heat pump ON due to hot water demand

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# Settings on the rUVR1611

E-rod	Electric heating rod request Evaporator in
defrosting	defrost mode
Frost protection	Condenser frost protection during defrosting process High-pressure protection of the heat pump through targeted heat dissipation EVU lockout
HD protection	time active – no heat pump operation possible

EVU lock

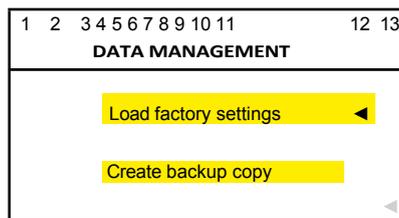
## 12.0.0 NETWORK

This menu contains all the information and settings required to set up a CANopen network. Please note the entry: **Cable selection and network topology (page 11)**

### Access to the I/O module via rUVR1611:

Go to the "Network" menu > Go to the "Network nodes" submenu > A list of all nodes active in the network appears > Select the node of the CAN I/O module > Load the menu page (expert login required!)

## 13.0.0 DATA MANAGEMENT



In "Expert" operating mode, you can create a **backup copy** of the specific system data and reload it if necessary.

Furthermore, the **factory settings** can be reproduced.

All other functions are used for data communication and are reserved for "expert mode".

# Troubleshooting on the rUVR1611

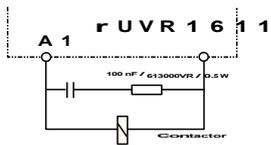
No display:	Indicates a power failure. Check the power supply – if OK, check the device fuse (6.3 A; fast-acting), which protects the device and the outputs (pumps, valves, etc.) against short circuits and, in conjunction with the integrated overvoltage protection, against overvoltage.
Realistic temperature values in the event of system malfunction:	indicate incorrect settings or clamping. If the outputs can be switched ON and OFF in manual mode, the device is functional and all settings and clamping should be checked.
	If no fault can be found in the system, it is recommended to install a data logger (bootloader) on the system and to log the temperature curves and switching states. Output 14 must be set to data line.
Sensor display: -999:	Sensor short circuit or incorrect sensor type set (KTY, PT1000, RAS, GBS, etc.)
Sensor display: 9999	Sensor interruption or incorrect sensor type set (KTY, PT1000, RAS, GBS, etc.)

Checking the sensors with a multimeter (ohmmeter) must yield the following values:

**Sensor resistance values:**

Temp. (°C)	-	-	0	10	20	25	30	40
PT1000 (Ω)	922	961	1000	1039	1078	1097	1117	1155
Temp. (°C)	50	60	70	80	90	100	110	120
PT1000 (Ω)	1194	1232	1271	1309	1347	1385	1423	1461

\*Sensor designation: (A) = outdoor sensor, (K) = collector sensor, (R) = pipe contact sensor, (U) = ultra-fast sensor

Manual switching of outputs not possible:	If it is a speed-controllable output (A1, A2, A6 and A7) and this is actually set to speed control, the speed level in manual mode should be observed when HAND/ON is set to duf. To test the basic function of the pump, it is best to set it to level 30.
	Electronic pumps cannot be speed-controlled due to their internal design! However, connection to one of the outputs A1, A2, A6 or A7 as a switching output is possible.
	If a valve or contactor is to be controlled with a speed-controllable output (also parallel to a pump), this output must be parameterised as a switching output, as speed control cannot function on such a consumer!
	Speed-controllable outputs may not be able to reliably switch small loads (<5W, e.g. valves, contactors, etc.) under certain circumstances. This applies in particular to output A1 with its integrated mains filter, which can only be operated with a minimum load of ≥20W. If only a small load is controlled with a speed-controllable output (A2, A6, A7), an additional parallel load or the RC circuit shown on the left is required for reliable switching.
Timeout	If expected information is not received from the network for more than 60 minutes, this message appears. Check the CAN bus connection!
No stable network - incorrect values	Check the network cable (was the recommended network cable used?)
Setpoints are not reached at the expected time	Check that the date and time are set correctly

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The system planner or the company carrying out the work must apply the generally accepted and recognised rules of technology as well as the relevant local regulations and legal provisions.

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# Notes

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# ratiotherm Service Accompanying document

Company	Street:
Postcode/town:	Contact
Customer number:	Telephone:
Email:	

Device details:

Item description:	Serial number:	RE or LS number:	Commission:
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Reason for return:      ◀ Repair Fault      ◀ Replacement      ◀ Update      ◀ Other

description:

.....

.....

.....

When does the error occur?      ◀ always      ◀ Reproducible      ◀ random      ◀ during commissioning

Have you experienced the error with one of our technicians      ◀ No ?      ◀ Yes      ◀ Technician's name

Should a chargeable repair be carried out if the defect is not covered by the warranty?      ◀ No      ◀ Yes      However, up to a maximum of €

Location      Date      Stamp/signature

# WARRANTY STATEMENT

ratiotherm provides a warranty for material and manufacturing defects in its products, unless otherwise agreed in writing, as follows:

- |  |                  |
|--|------------------|
| • Product:   | Warranty period: |
| • OSKAR series stratified storage heater               | 60 months        |
| • Accessories for OSKAR series stratified storage tank | 24 months        |
| • Compact stations and accessories                     | 24 months        |
| • Heating circuit assemblies and accessories           | 24 months        |
| • Control/regulator units and accessories              | 24 months        |

The warranty period begins on the date of installation (invoice date of the installation company), but no later than 6 months after the date of manufacture (invoice date of ratiotherm). The warranty period is not extended if the product is returned for repair or replacement.

The following are excluded from warranty coverage:

- Damage caused by shipping/transport, as well as improper installation, use/operation
- Wear parts such as signal lamps, fuses, etc.
- The warranty expressly excludes consequential costs, in particular removal and installation costs, as well as further costs such as claims for damages.

As a rule, a warranty claim only becomes active if the handover/acceptance protocol for quality assurance, dated and signed by the customer and the installation company, is available to ratiotherm,

company, is submitted to ratiotherm no later than 6 weeks after handover/acceptance.

The terms and conditions of

**ratiotherm GmbH & Co. KG**  
**Wellheimer Street 34                      D-91795 Dollnstein (Upper Bavaria)**

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# Competence and skill



## Energy saving begins in the mind.

That is why ratiotherm combines research, development and production under one roof. Vision and practice are tested to perfection in numerous model trials – by long-standing employees who all have practical experience. Our own test bench, which is also used by external companies, is the key to our success. For the first time, complete systems can be tested under real conditions.

The result is highly efficient end products:

- Thermohydraulic stratified storage tank "Oskar°-10"
- Thermohydraulic stratified storage tank "Oskar°-06"
- Thermohydraulic compact systems "SYST-1/400" to "SYST-4/1000"
- Compact drinking water heaters for hygienic drinking water heating in continuous flow systems
- Drinking water cascade heater for hygienic drinking water heating even with high hot water demand, e.g. in residential complexes, hospitals, retirement homes and sports clubs
- Universal control system "rUVR"
- Central controller "rZR"
- Oskar°-MAX-SOL<sup>2</sup> hybrid heat pump
- ratiotherm flat-plate collector RA251-4

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