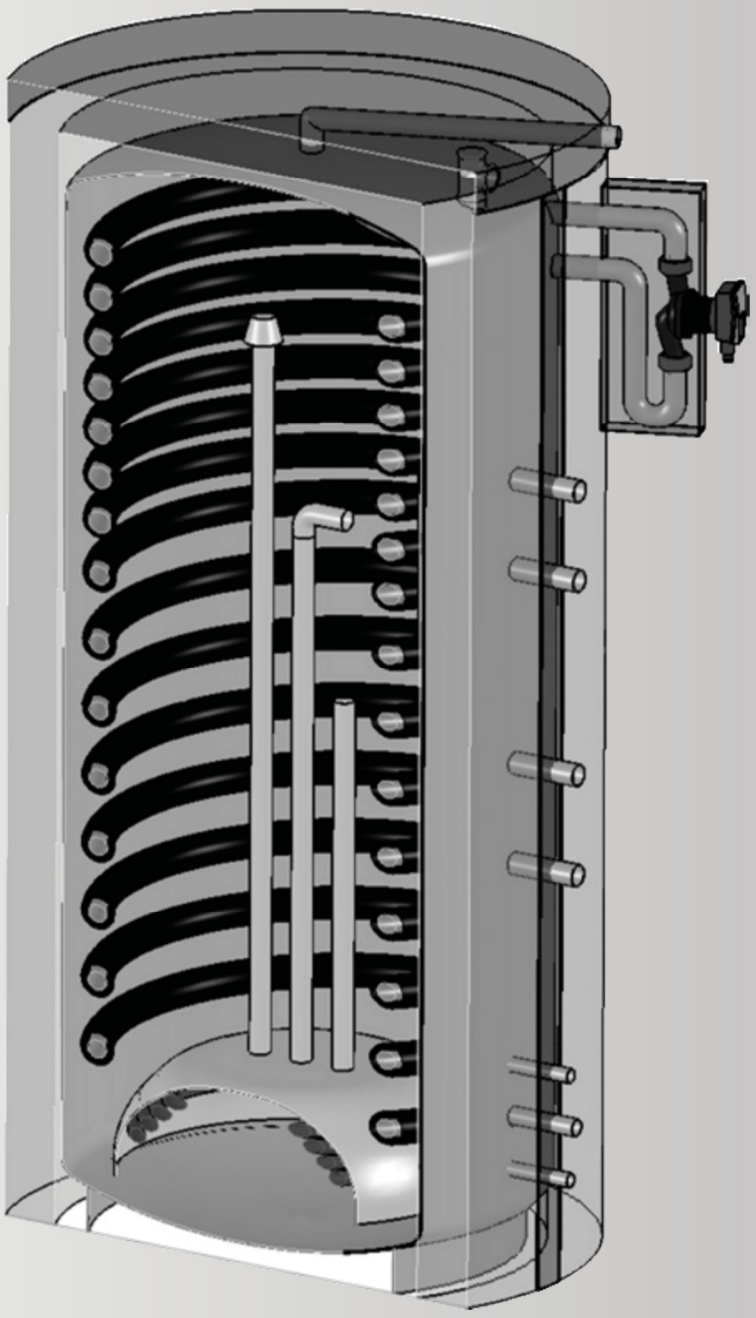
ZEEH

Heating technology and tank construction

Installation instructions

Buffer and multifunctional tank systems



As of July 2019

Important note
Before the product leaves our warehouse, it is checked for being in perfect condition and and for complete and perfect packaging.

If the product does not arrive in perfect condition, please proceed as follows:

- Make a note of any missing quantity or damage on the delivery note.
- Have any shortcomings confirmed in writing by the driver!
- Please do not alter or process damaged goods!
- Damages or missing quantities must be reported immediately to Heiztechnik und Behälterbau Joachim Zeeh GmbH.

Please note
The recipient will be under the obligation to produce evidence that the damage occurred during transport once he has confirmed acceptance by his signature.

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28 June 2019

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General notes on the installation instructions for buffer and multifunctional tank systems

Keeping documents

Provide these installation instructions and all other applicable documents and, if necessary, required auxiliary means to the plant operator.
The operator shall keep the instructions and auxiliary means so that they are at hand in case of need.

Other applicable documents

- During installation, it is essential to follow all installation instructions for parts and components of the system. Such installation instructions come with the respective parts of the system and supplementary components.
- Apart from that, observe all operating instructions that are enclosed with the components of the system.

Safety Instructions Intended use

The buffer and multifunctional tank system is built according to the state of the art and the recognised safety regulations. Nevertheless, improper and non-intended use can endanger the operator's or other person's life or damage the equipment and other material assets.

This equipment is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and/or knowledge, unless they are supervised by a person responsible for their safety or have received instructions from that person on how to use the appliance. Children must be supervised to ensure that they do not play with the appliance.

Any use other than that described in these instructions or any use that extends beyond the one described in these instructions is not considered to be in accordance with the regulations. The manufacturer/supplier is not liable for damages resulting from such improper use. The user alone bears the risk of such use.

The intended use includes

- Observance of the enclosed operating, installation and maintenance instructions of the product and other parts of the components of the installation.
- Compliance with all inspection and maintenance conditions specified in the instructions.

Attention
Any improper use is prohibited.

General safety instructions Installation and adjustment

Setting-up, adjustment, maintenance and repair of the buffer and multifunctional tank system may only be carried out by an acknowledged expert. This person is also responsible for the correct installation and initial commissioning.
We accept no liability for damage caused by failure to observe these instructions.

Danger of freezing

If the buffer and multifunctional tank system is left out of operation for a longer period (e.g. winter holidays) in an unheated room, the heating water in the buffer and multi-functional tank system and in the pipes may freeze.

Install the buffer and multifunctional tank system in a dry and continuously frost-free installation room or have the system emptied by an authorised expert. Please note: If the system is not filled for a longer period of time, corrosion damage to the metal parts can occur.

Damage due to improper use and/or unsuitable tools

Improper use and/or unsuitable tools may result in damage (e.g. water leakage)!
Always use matching spanners (open-ended wrenches), when you tighten or loosen screwed connections. Never use pipe wrenches, extensions etc.

Leaks due to mechanical tension

Improper installation may result in leaks.
- To prevent leaks, ensure that there is no mechanical tension on the pipes.
- Do not hang any loads from the pipes (e.g. clothes).

Changes to the buffer and multifunctional tank system

Do not make any changes to the equipment mentioned below that might affect the operational safety of the system:
- at the buffer and multifunctional tank system,
- at pipes, the solar charging station and the heater
- at the drain pipe and the safety valve for the heating water and solar fluid and at structural design.

Prevention/reduction of lime scale formation

Lime scale formation in pipes and drinking water heaters occurs depending on the following parameters:

- Composition of the drinking water, in particular total and carbonate hardness
  For the values please ask your local drinking water supplier.
- Operating conditions, particularly the temperature (the risk of lime scale formation increases significantly with rising temperatures) and the retention time of the water in the drinking water heater (absences due to weekends, holidays, vacation, public holidays) should be observed.
- Plate heat exchangers with high heat flux density and/or high heat flow temperatures.

Lime scale formation is particularly important in systems with CHP and solar connections or when using pellet and wood boilers because of the high buffer temperatures and the temperatures of the hot drinking water (TWW) to be expected.

The standards DIN 1988-200 (Table 6) and VDI 2035, Sheet 1, (Table 1) as mentioned below are to be taken into account.

According to that, lime scale formation is to be expected from a calcium carbonate concentration of 1.5 mol/l (corresponds to 8.4°dH) with temperatures (buffer or hot water tank) rising above 70 °C.

In addition, experience in the corresponding service area should be drawn upon.

If lime scale formation is to be expected, the following water treatment methods are available according to DIN 1988-200:

- Water softening by ion exchange
- Dosage of chemicals
- Lime scale protection equipment

When selecting the water treatment method, the temperatures must be taken into account. For example, chemical dosing is unsuitable if water temperatures of over 60 °C are expected. In these cases, water softening by ion exchange is recommended.

Tendency to form lime scale in hot water heating systems, VDI 2035, Sheet 1/Table 1

Total alkaline earths in mol/m3	< 1.5	1.5...2.5	> 2.5
Total hardness in ° d	< 8.4	8.4...14	> 14
Lime scale formation$_{TWW}$ < 60 ° C	Low	Low	Low
Δ_{TWW} < 60...70 ° C	Low	Low	Medium
Δ_{TWW} > 70 ° C	Low	Medium	High

Water treatment measures to prevent lime scale formation depending on calcium carbonate mass concentration and temperature, DIN 1988-200/Table 6

Calcium carbonate mass concentration[1)] mmol/l	Measures at Δ ≤ 60 °C	Measures at Δ > 60 °C
< 1.5 (corresponds to < 8.4 °dH)	None	None
≥ 1.5 to < 2.5 (corresponds to ≥ 8.4 °dH to < 14 °dH)	None or stabilisation or softening	Stabilisation or softening recommended
≥ 2.5 (corresponds to ≥ 14 °dH)	Stabilisation or softening recommended	Stabilisation or softening

[1)] See Section 9 of the WRMG [*Washing and Cleaning Agents Law*] [12]

Nameplate

The nameplate comes with the documents for the tank system. Once you have installed the insulation, stick the nameplate to the outside of the insulation.

The nameplate provides the following information depending on the type:

- Manufacturer
- Type
- Tank capacity
- Manufacturer number
- Calendar week/manufacturing year
- Permissible tank, drinking water and solar operating pressure
- Permissible tank, drinking water, solar operating temperature

When setting up, installing and operating the buffer and multifunctional tank system any applicable local regulations, provisions, rules and guidelines must be observed including:

- of electric installation
- of the distribution system operator
- of the water supply company
- on the use of geothermal energy
- for the integration of heat source and heating systems
- on energy saving
- on hygiene

Example of nameplate for MTLS-WP multifunctional tank

Heiztechnik und Behälterbau Joachim Zeeh GmbH
Dorfbachweg 12
D - 08324 Bockau

Type	MTLS-WP	Capacity	750
Manufacturer No.	27517 3710	Year	47/2018

	Tank	Drinking water	Solar
Perm. oper. pressure	3 bar	6 bar	6 bar
Perm. oper. temp.	95°C	95°C	95°C

Example of nameplate buffer tank

Heiztechnik und Behälterbau Joachim Zeeh GmbH
Dorfbachweg 12
D - 08324 Bockau

Type	Buffer	Capacity	2000
Manufacturer No.	24720 605	Year	10/2019

	Tank	Drinking water	Solar
Perm. oper.pressure	3 bar		
Perm. temperature	95°C		

Commissioning instructions

The entire system must be flushed before the commissioning.

- Flushing the tanks
  When filling the tank for the first time, it must be filled with at least 50% water. Then drain the water as quickly as possible to remove any dirt that may have entered during installation!
- Buffer and multifunctional tank systems must be filled and vented on the heating and water side in accordance with VOB and VDI 2035.
- Check the heating up of the heating system.

Attention
Do not block the outlet of the safety valve, because expansion water may escape from the safety valve during heating.

- Before handing over the system to the owner, the installation expert must ensure that the fittings, pipes and connections work properly and that no water escapes from the system.
- The owner must be provided with a detailed explanation for operation and handling of the buffer and multifunctional tank system and the controller.
- Special attention should be given to regular maintenance of the plant.
- The air outlet pipe of the safety valves must always be open.
- Proper functioning of the safety valves must be maintained by regular venting.
- Check flush taps for proper functioning.

Laws, regulations, standards and notices

The following regulations apply in Germany for the design, installation and use.

When installing abroad, the respective national regulations must be observed.

The list below is in no way intended to represent all rules and regulations applicable. Any currently valid standards, rules and guidelines shall apply. Local and special design features cannot be taken into account.

- DIN 4708
  Part 1-3 Central water heating system

- DIN 1988-200
  Technical rule for drinking water installations (TRW)

- DIN 4753
  Part 1-11 Water heaters and water heating systems for drinking and process water

- VDE 0100
  Basic set of rules

- VDE 0110
  Provisions for the dimensioning of clearances and creepage distances of electrical equipment

- VDE 0116
  Electrical equipment of combustion plants

- VDI guidelines

- DVGW worksheet W270, W551, W552

Important notice
Set-up, installation and commissioning must be carried out by an authorised expert.

Setting up and installation

Delivery
Buffer/multifunctional tank unit and insulation are delivered separately.

Installation of tank
The surface where the tank unit is to be set up must be completely flat. The installation site must be protected against frost in accordance with DIN 4753.

Check whether the foot ring is insulated. If necessary, insert the foot ring insulation provided.

The tank must be positioned and aligned at the installation site. The minimum distances to surrounding walls or objects must be observed/measured. The recommended minimum distance to the wall is 20 cm.

Heating water installation
Before starting the installation, remove all external and internal sealing and protective caps. A shut-off device as well as inlet and venting facilities must be provided for all connections. The operating pressure must not exceed 3 bar (max. 6 bar for special tank units).
For the allocation of connection pieces, see connection example (schematic diagram).

On the heating side, the tanks must be equipped with an automatic vent valve (air bleed cock) to ensure that the countercurrent pump functions properly in multifunctional tanks with drinking water charging system.

It is also recommended to install a magnetite separator to protect the heating system.

Sensor installation
The sensors for the heating system must be assigned according to the system-specific hydraulics and the allocation of connections. (Allocation of connections for sensors, heating plant, drinking water (TW), hot water (WW), circulation heat exchanger (ZWT)) See system-specific connection example (schematic diagram).

Installation of drinking water and hot water connections for MT, MTL, MTS, MTLS, MTL-WP, MTLS-WP multi-functional tank units
Drinking water heaters can be connected to all kinds of pipe networks, whether plastic, galvanised steel, stainless steel or copper pipes. The drinking water connection must be in accordance with DIN 1988. When connecting to galvanised steel pipes, only transition pieces made of gunmetal should be used.

Also on the hot water side, fittings, plugs and caps made of gunmetal or stainless steel are only to be used here. Special attention must be paid to the correct sequence and dimensioning of the individual fittings and safety devices.

It is recommended to install an additional dirt filter in accordance with DIN 19632 in the drinking water supply line. According to the regulations of DIN 1988, an approved diaphragm safety valve, which cannot be shut off, with a maximum flow rate of 6 bar operating overpressure must be installed immediately before of the water heater. The connection diameter must be at least DN 15.

The dimensioning of the outlet side must have a nominal width that is at least one size larger than the connection diameter and must open into a frost-proof area.

Furthermore, according to the manufacturer's instructions, an unblockable flow-through expansion tank suitable for drinking water must be installed ahead of the cold water inlet to the tank. This is to be checked annually for sufficient gas-side admission pressure.

In case of hard drinking water, a flush tap should be provided for flushing the corrugated stainless steel pipe at the drinking and hot water connection side. It is also recommended to provide the tank with a potential equalisation or to connect a stationary softener station upstream (see also page 5).

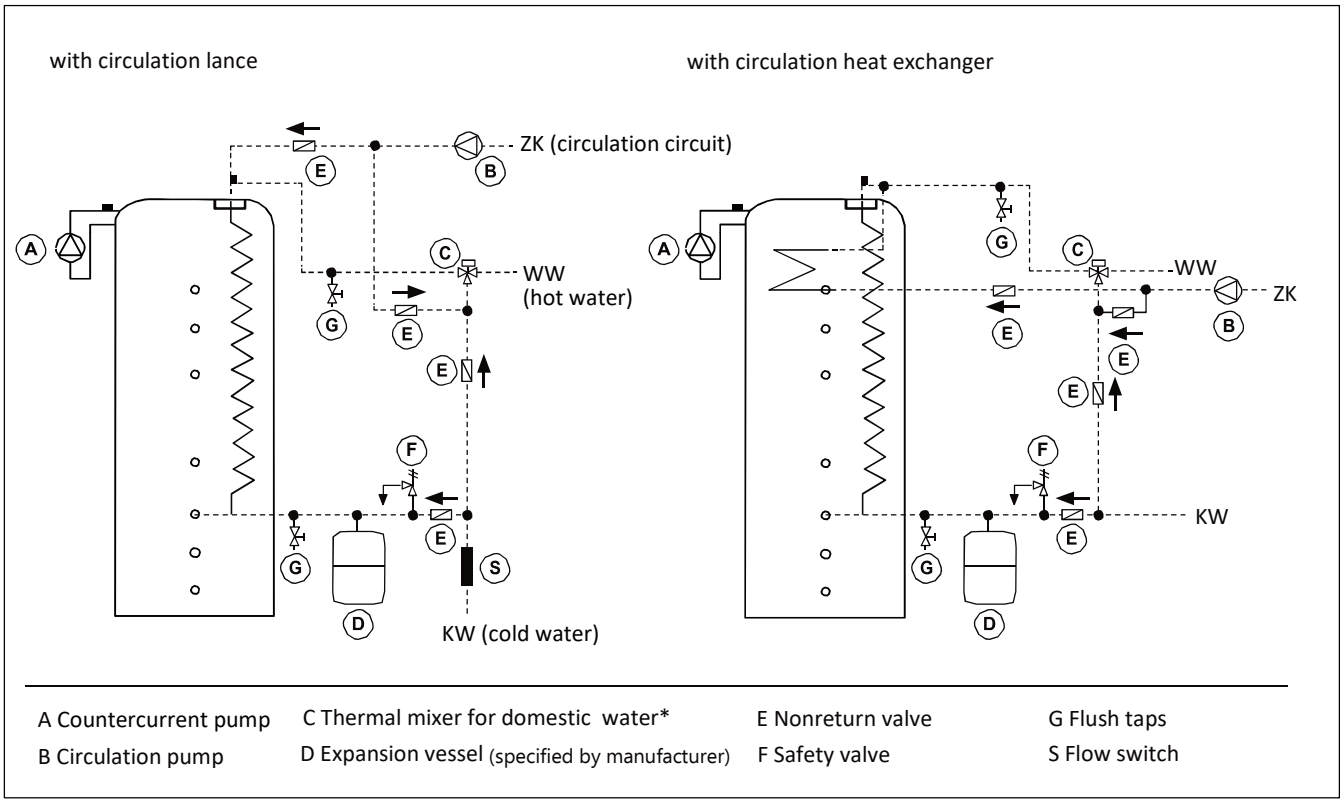
Equipment according to DIN (water side)
The drinking water side must be equipped in accordance with DIN 1988 to prevent dirt or germs from contaminating the drinking water. The use of a pressure-reducing valve is only necessary if the overpressure exceeds 5 bar.

The connection to the drinking water line must be made according to DIN 1988 using a suitable safety unit.

If the mains pressure is higher than permissible, it must be reduced to the permissible value with the aid of a pressure reducer.

Important note
All drinking and hot water connections must be extended before installation, depending on the insulation thickness of the storage unit.

Schematic diagram for drinking water (TW), hot water (WW) and circulation heat exchanger (ZWT) connections/JRGUMAT
(with MTL charging system)



A Countercurrent pump	C Thermal mixer for domestic water*	E Nonreturn valve	G Flush taps
B Circulation pump	D Expansion vessel (specified by manufacturer)	F Safety valve	S Flow switch

* Minimum distance from the thermomixer to the hot water outlet 1 m, install a thermosiphon at a distance < 1 m

Note: schematic diagram
Non-binding planning proposals do not replace a final construction planning.
This system diagram does not include all shut-off and safety devices required for correct installation.
Any applicable standards and directives must be observed.

Pressure loss DHW heat exchanger system according to NL number (performance indicator) for tanks with charging system

NL number MTL	Pressure loss hot water charging system (MTL, MTLS, MTL-WP, MTLS-WP)	Maximum discharge capacity l/min with WW 45 °C/ TW 10 °C/ tank 65 °C
1 – 4	80 mbar	27
5 – 10	80 mbar	45
11 – 20	160 mbar	62
21 – 30	330 mbar	80
31 – 45	530 mbar	100

Fitting sensors and insulation for buffer and multifunctional tank

1 Installing thermometer set (2 pieces) with capillary sensors

- Mark position of the thermometers on the insulation. The position of the thermometer set can be chosen freely.
- Make a 5 mm cut into the marked areas and carefully pierce them with a pointed object (e.g. screwdriver).
- Insert thermometer with capillary line (0.5 m) into pre-punched hole, place washer onto fixing pin of the thermometer, then fix it with clamping washer.
- Fix capillary sensor at desired position to sensor strip or in the sleeve of the contact disc. Readjustment possible in case of temperature deviations.
  The sensors for the heating system must be positioned on the sensor strip as shown in the connection example.

2 Fitting tank insulation

- Clip in the closure strip on the connection side.
- Place insulation loosely around the tank.
- Adjust the insulation by tapping with the flat of your hand, tap or stroke from behind in the direction of the hook closure strip until the closure parts are so close together that they can be closed easily. Make sure that the thermal insulation fits closely to the tank wall.
- Tighten the hook closure starting from the top until the thermal insulation fits tightly to the tank.
- The insulation is delivered in two parts. If there is sufficient space, the insulation can also be fitted after pipe installation in the case of tanks without a charging system.

All drinking and hot water connections must be extended before installation, depending on the thickness of the insulation.

3 Close the hook closure strip.

4 Install angled air vent (customer connection)

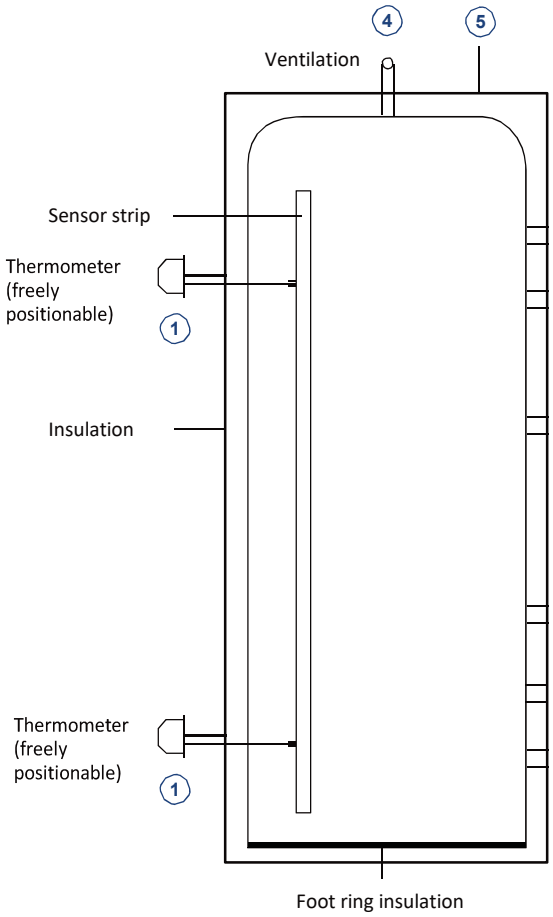
- optionally with or without vent pipe

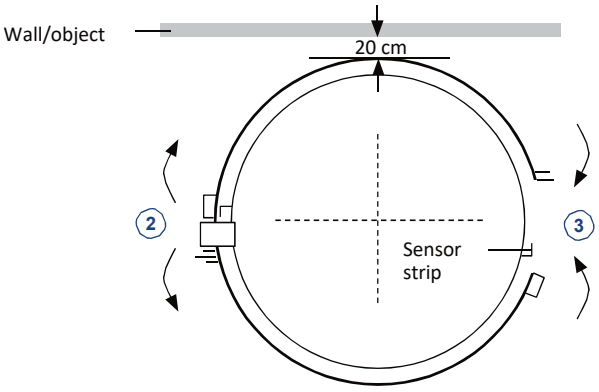
5 Tank cover

- Fit circular foam for the cover on top of the tank.
- Put on the thermo-formed hood.

Please note

Remove all external and internal sealing caps before starting the pipe installation!





Recommendation: minimum distance to the wall 20 cm
In confined spaces, the closure strip must be closed before pipe installation.

- A video tutorial can be found at www.zeeh-speicher.de/download.htm

Fitting charging system for multifunctional tank unit MTL, MTLS, MTL-WP, MTLS-WP

Charging system as delivered

(1) Disassembly of left or right part of the insulation carrier is done by removing the lower shell

Installing the charging system (pump unit)

(2) Loosen the union nut on the ball valve of the pre-assembled pipe unit

(3) Properly seal the bend with ball valve to the connection piece provided for this purpose

(4) Properly seal and install the ball valve to the lower bend

(5) Re-attach the pump using the union nuts (including seals).

(6) Put left part of the insulating case against pipe unit

(7) Guide the conneting cables of the pump through the upper opening of the insulating case

(8) Connect right part of the insulating case with left part

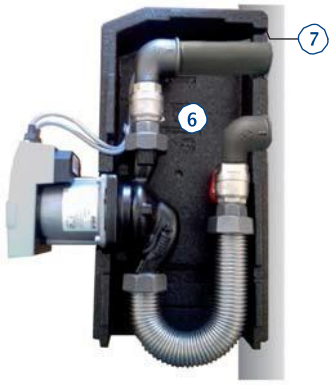
(9) Finally, re-attach the bottom shell

Important note on the electrical connection

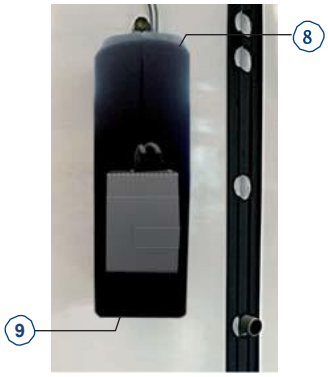
Three-core cable is used for permanent power supply of the pump only.
For speed-controlled activation of the pump by means of a PWM signal from the controller another cable is needed.
- For Speck Inova NH 25/55 pump connect the brown and blue wire (no need to observe polarity)
- For Speck Inova NH 25/75 pump connect the white and brown wire (no need to observe polarity)
(black and blue as optional fault signalling contact)

- a video tutorial can be found at www.zeeh-speicher.de/download.htm

The pump unit comes pre-assembled ready for use.



Fully assembled charging system (pump unit)



Functional description Hot water charge control (ESR 21-R) for multifunctional tank unit (MTL, MTLS, MTL-WP, MTLS-WP)

Design: with charging system
with circulation lance
with flow switch

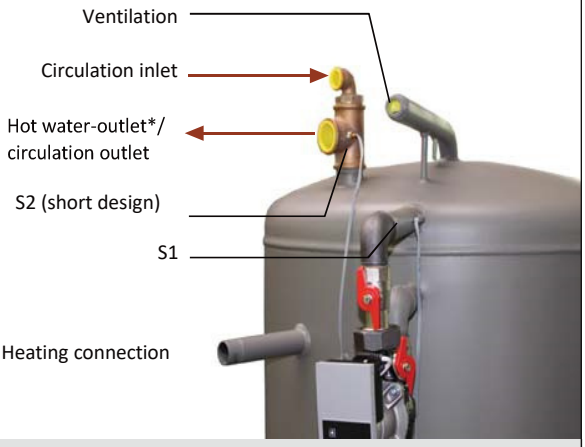
If the hot water outlet temperature S2 falls below 50 °C (SWA 50 °C -variable) and the difference to the temperature in the upper tank zone S1 is > 2.5 K, the countercurrent pump starts in a speed-controlled manner. The greater the difference, the greater the speed (indicated in the display under ANS from 0 to 100). The description of the hot water charging control ESR 21-R is enclosed.

Parameter setting hot water charge control ESR 21-R (default setting)

Display Enter Par. / Code 32		
Setpoint	**SWA**	50 °C
Differential control	**SWD**	2.5 K
Program 17		

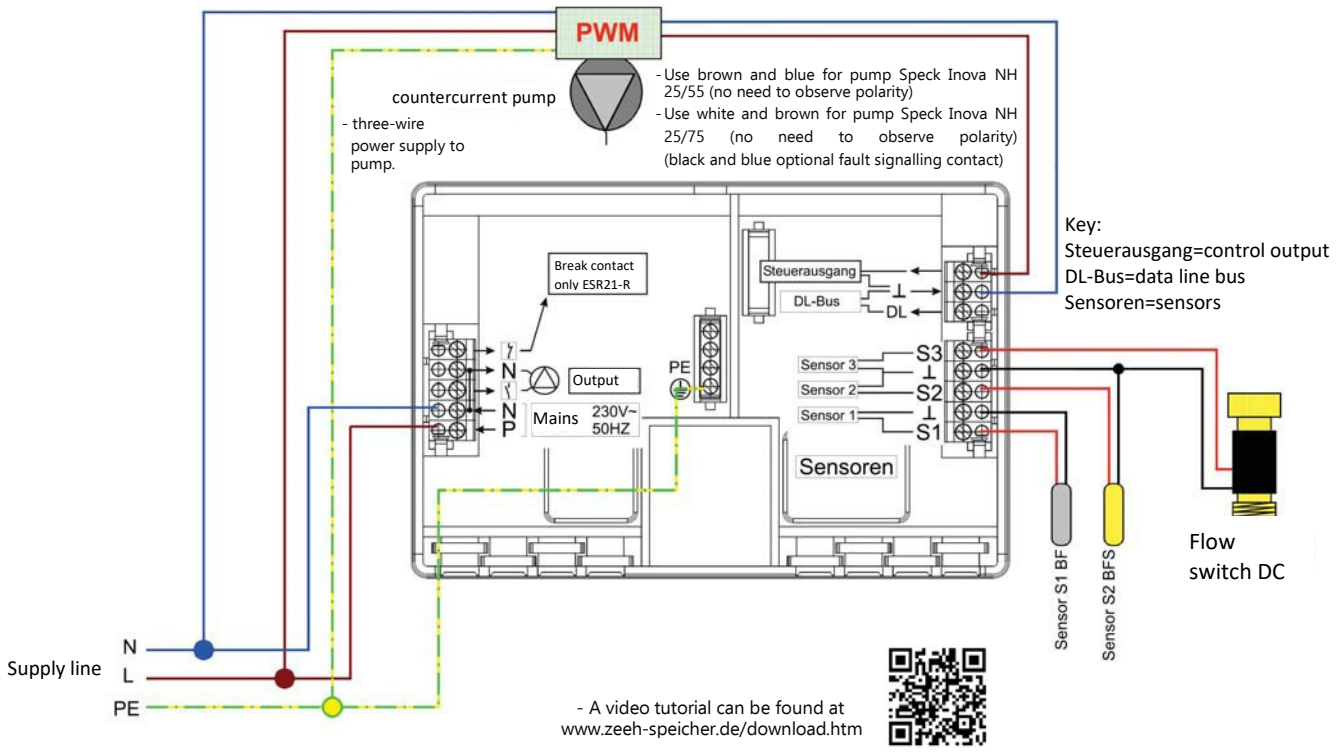
Display Enter Men. / Code 64		
Control output STAG switches with output 1		
Signal type	PWM	0 – 100
Absolute value control	AR	I 2
Setpoint	SWA	50 °C
Differential control	SWD	2.5 K
Differential control	DR	N 12
Event regulation	E	–
Threshold value	SWE	60 °C
Setpoint	SWR	130 °C
Proportional part	PRO	3
Integral part	INT	2
Differential part	DIF	1
Minimum speed		0
Maximum speed		100
ALV		0
Sensor type SENSOR		
Sensor S1... _____/ we = PT 1000 Average MW1... _____s / we = 1.0 s		
Sensor S2... _____/ we = PT 1000 Average MW2... _____s / we = 0.3 s		
Sensor S3... _____/ we = –		
Sensor assignment or sensor positioning		
Sensor S1	in connecting piece sleeve of countercurrent pump	
Sensor S2	in hot water outlet T-piece (with brass tip)	
Sensor S3	flow switch DC	
In the main menu the temperature and speed can be read using the keys ◂ or ▸.		

Allocation of connections and sensor assignment of multifunctional tank **MTL, MTLS, MTL-WP, MTLS-WP**

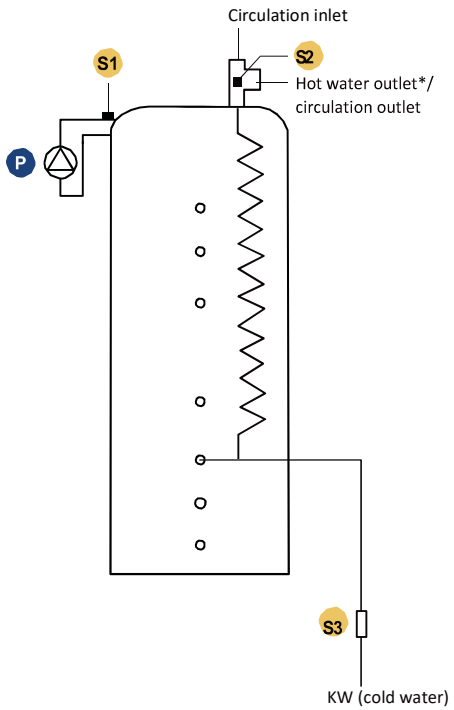


* Depending on the system, a domestic water mixer must be connected downstream (see schematic diagram on page 9).

Terminal assignment of hot water charge controller ESR 21-R (with high-efficiency pump)

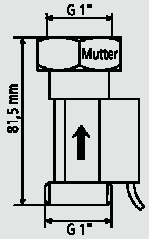


Sensor assignment of multifunctional tank with charging system MTL, MTLS, MTL-WP, MTLS-WP



S3 Flow switch
vertical installation,
union nut upwards, flow direction towards union nut

Maximum switching capacity for
MTL, MTLS, MTL-WP, MTLS-WP
STS01 DC 30 V ~/10 mA



P
Countercurrent pump

S1 (BF)
Sensor in sleeve on the connecting piece

S2 (BFS)
Sensor at hot water outlet T-piece, short design with brass tip

S3
Flow switch DC

Functional description Hot water charge control (ESR 21-R) for multifunctional tank unit (MTL, MTLS, MTL-WP, MTLS-WP)

Design: with charging system
with circulation heat exchanger
without flow switch

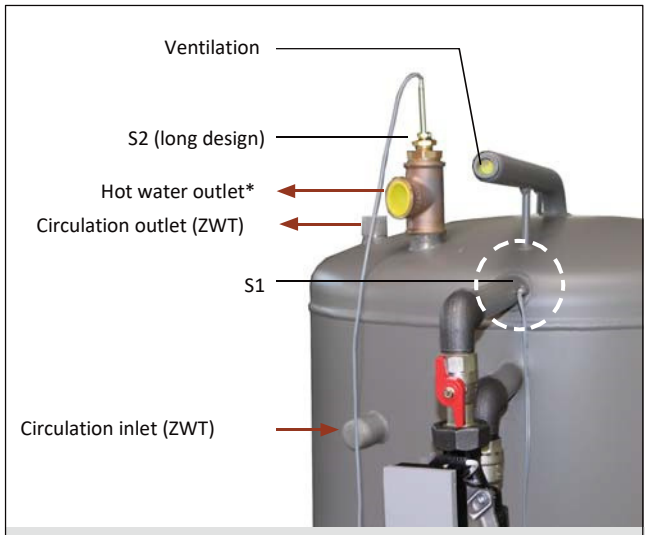
If the hot water outlet temperature S2 falls below 60 °C (SWA 60 °C -variable) and the difference to the temperature in the upper tank zone S1 is > 2.5 K, the countercurrent pump starts at a speed-controlled rate. The greater the difference, the greater the speed (shown in the display under ANS from 0 to 100). The description of the hot water charging control ESR 21-R is enclosed.

Parameter setting hot water charge control ESR 21-R (default setting)

Display Enter Par. / Code 32		
Setpoint	SWA	60 °C
Differential control	SWD	2.5 K
Program **16**		

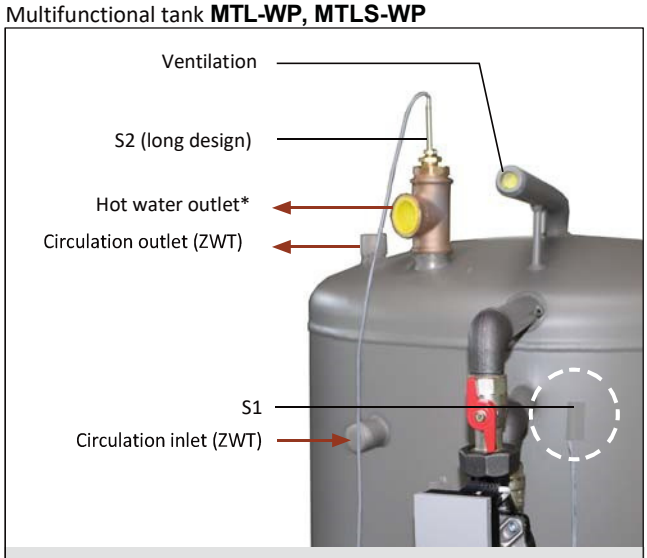
Display Enter Men. / Code 64		
Control output STAG switches with output 1		
Signal type	PWM	0 – 100
Absolute value control	AR	I 2
Setpoint	SWA	60 °C
Differential control	SWD	2.5 K
Differential control	DR	N 12
Event regulation	E	–
Threshold value	SWE	60 °C
Setpoint	SWR	130 °C
Proportional part	PRO	3
Integral part	INT	2
Differential part	DIF	1
Minimum speed		0
Maximum speed		100
ALV		0
Sensor type SENSOR		
Sensor S1... ____/ we = PT 1000 Average MW1... ____s / we = 1.0 s		
Sensor S2... ____/ we = PT 1000 Average MW2... ____s / we = 0.3 s		
Sensor S3... ____/ we = –		
Sensor assignment or sensor positioning		
Sensor S1	in connecting piece sleeve countercurrent pump	
Sensor S2	in hot water outlet T-piece (with brass tip)	
In the main menu the temperature and speed can be read using the keys ◀ or ▶.		

Allocation of connections and sensor assignment
Multifunctional tank **MTL, MTLS**



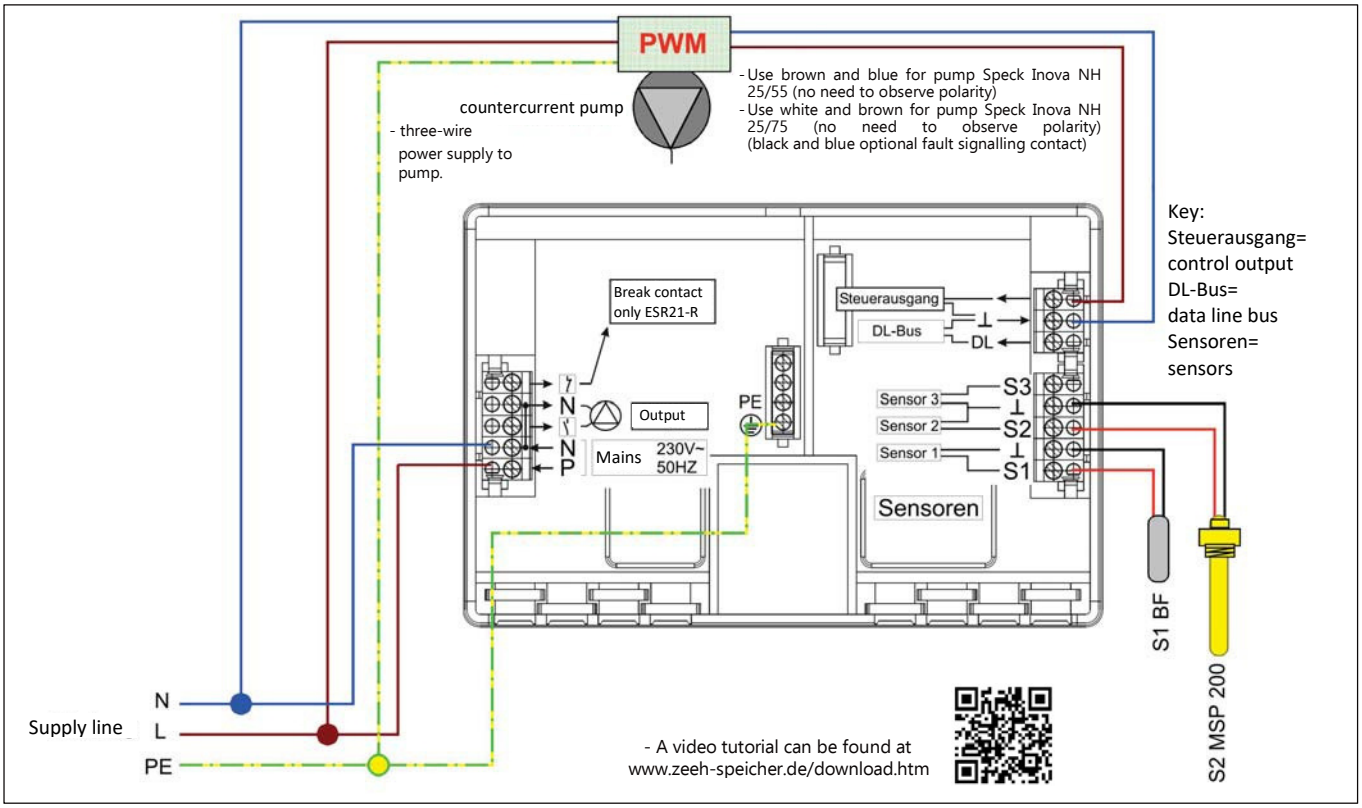
* Depending on the system, a domestic water mixer must be connected downstream (see schematic diagram on page 9).

Terminal assignment and sensor assignment
Multifunctional tank **MTL-WP, MTLS-WP**

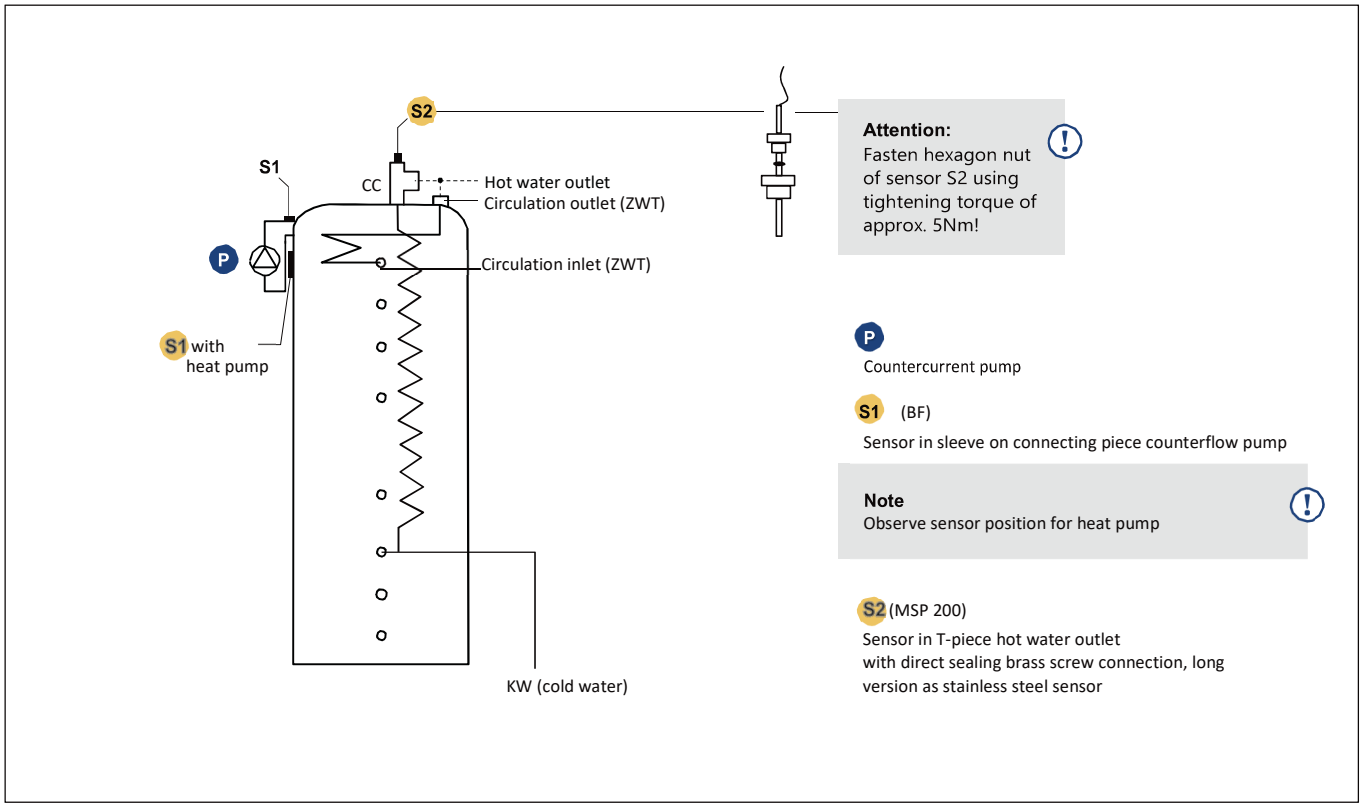


* Depending on the system, a domestic water mixer must be connected downstream (see schematic diagram on page 9).

Terminal assignment of hot water charge controller ESR 21-R (with high-efficiency pump)



Sensor assignment of multifunctional tank with charging system MTL, MTLS, MTL-WP, MTLS-WP



Functional description Hot water and buffer charge control with photovoltaics (UVR 61-3) for multifunctional tank unit (MTL, MTLS, MTL-WP, MTLS-WP)

Design: with photovoltaic (E-cartridge)
with charging system
with circulation lance
with flow switch

Water heating:
If the hot water outlet temperature S5 falls below 50 °C (SWA 50°C -variable) and a difference to the temperature in the upper tank part S1 is > 2.5 K, the countercurrent pump starts at a speed-controlled rate. The greater the difference, the greater the speed (shown in the display under ANS from 0 to 100)

Shifting to photovoltaics
When the target temperature of 65°C is reached at sensor S1, the countercurrent pump P2 pumps cold water from the lower zone up to the hot upper zone via the countercurrent heatexchanger through the countercurrent pump P1 until it is cooled down to 60°C. The description of the hot water control system UVR 61-3 is enclosed.

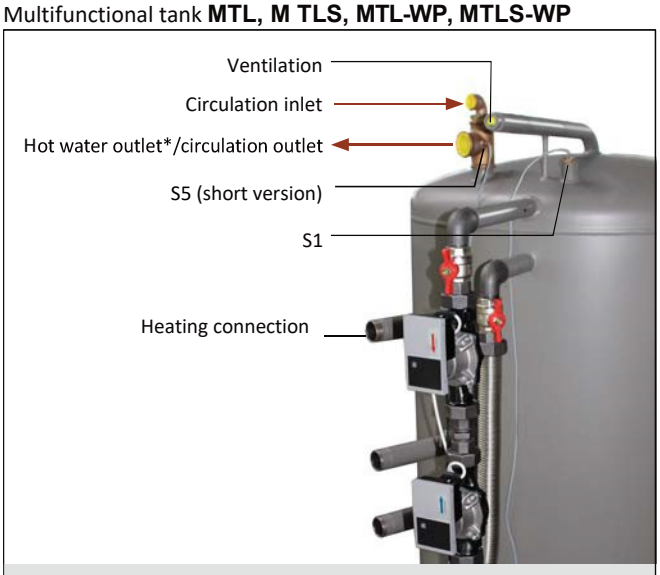
Parameter setting hot water charge control UVR 61-3 (default setting)

Display Enter Par. / Code 32 (Overview STAG1)				
		Pump speed control PDR	Control output STAG 1 ON PWM	2 ON PWM
Setpoint	SWA	50°C	50°C	50°C
Setpoint	SWD	2.5 K	2.5 K	10 K
Program **641**				
max 1 ↓ off	90°C	max 1 ↑ on	85 °C	
max 2 ↓ off	75°C	max 2 ↑ on	70 °C	
min 3 ↓ off	–°C	max 3 ↑ on	– °C	
min 1 ↑ on	70°C	min 1 ↓ off	68 °C	
min 2 ↑ on	5°C	min 2 ↓ off	0 °C	
min 3 ↑ on	– K	min 3 ↓ off	– K	
diff 1 ↑ on	8 K	diff 1 ↓ off	4 K	
diff 2 ↑ on	8 K	diff 2 ↓ off	4 K	
diff 3 ↑ on	– K	diff 3 ↓ off	– K	

Display Enter Men. / Code 64 (overview STAG2)				
		Pump speed control PDR	Control output STAG 1 ON PWM	2 ON PWM
Signal type	WP	–	–	–
Release	AG	–	1	3
Absolute value	AR	I 5	I 5	–
Differential control	DR	N 15	N 15	–
Event regulation	E	–	–	–
Threshold value	SWE	60 °C	60 °C	60 °C
Setpoint	SWR	130 °C	130 °C	130 °C
Proportional part	PRO	2	3	5
Integral part	INT	2	2	0
Differential part	DIF	1	1	0
Minimum speed		0	0	0
Maximum speed		30	100	100
ALV		0	0	0

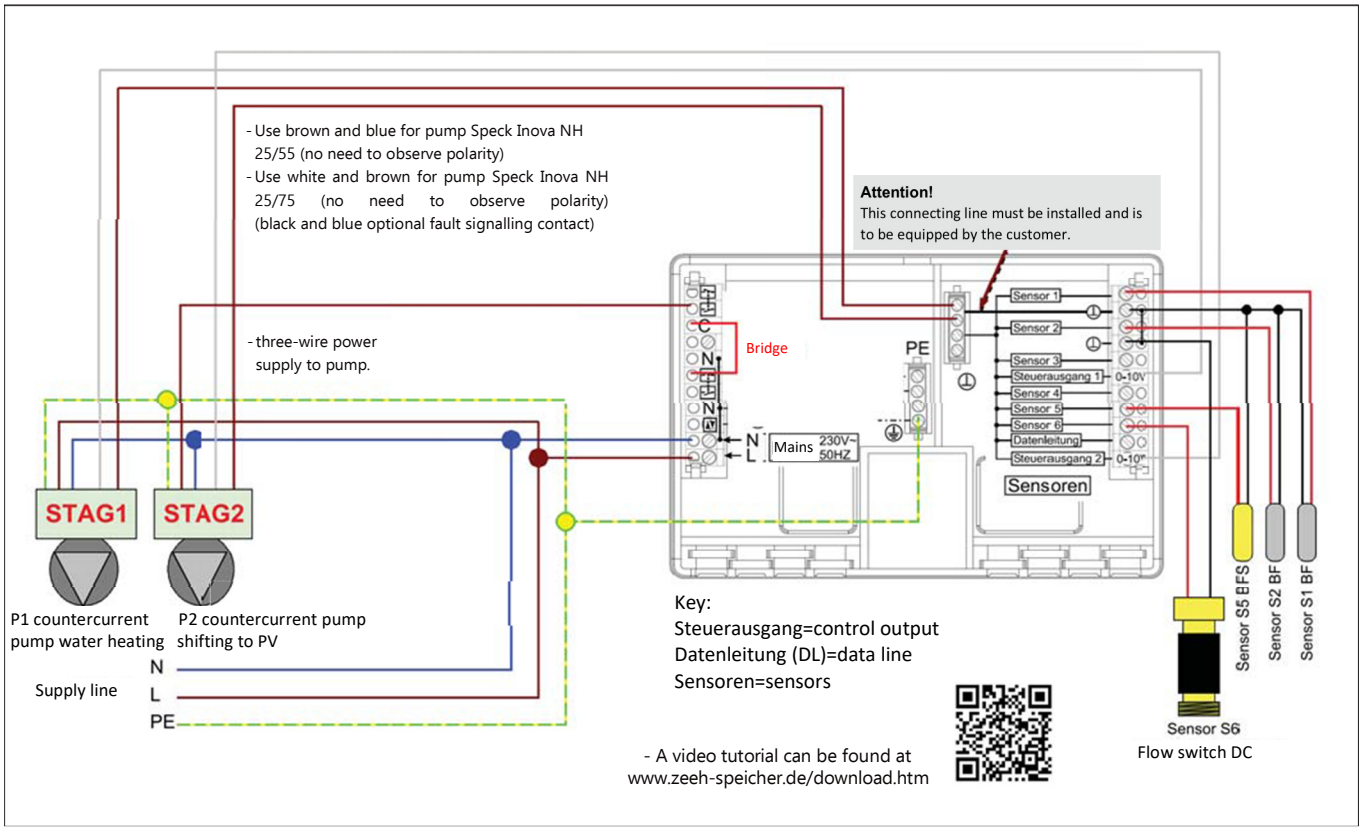
Sensor type SENSOR	
Sensor S1... _____/ we = PT 1000 Average MW1... _____s / we = 1.0 s	
Sensor S2... _____/ we = PT 1000 Average MW2... _____s / we = 1.0 s	
Sensor S3... _____/ we = PT 1000 Average MW3... _____s / we = 1.0 s	
Sensor S4... _____/ we = PT 1000 Average MW4... _____s / we = 1.0 s	
Sensor S5... _____/ we = PT 1000 Average MW5... _____s / we = 0.3 s	
Sensor S6... _____/ we = Dig. Average MW6... _____s / we = 1.0 s	
Sensor assignment or sensor positioning	
Sensor S1	in tank cover sleeve
Sensor S2	on terminal strip at the bottom of the tank
Sensor S3	fixed value 50 °C
Sensor S4	fixed value 35 °C
Sensor S5	at hot water outlet t-piece (with brass tip)
Sensor S6	flow switch DC
In the main menu the temperature and speed can be read using the keys ◂ or ▸.	

Allocation of connections and sensor assignment
Multifunctional tank **MTL, M TLS, MTL-WP, MTLS-WP**

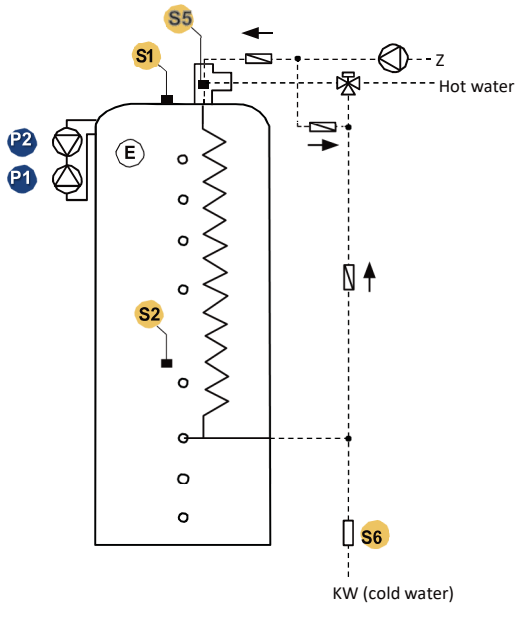


* Depending on the system, a domestic water mixer must be connected downstream (see schematic diagram on page 9).

Terminal assignment of UVR 61-3 hot-water charging controller (with high-efficiency pump)



Sensor assignment of multifunctional tank with charging system



P1
Countercurrent pump water heating

P2
Countercurrent pump shifting to PV

E
E-cartridge

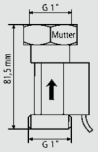
S1 (BF)
Sensor in sleeve on cover at the top of the tank

S2 (BF)
Sensor on terminal strip at the bottom of tank

S5 (BFS)
Probe in T-piechot water outlet, short version with brass tip

S6
Flow switch DC

Vertical installation, union nut upwards, flow direction towards union nut



Functional description Buffer charge control with photovoltaics (ESR 21-R) for buffer and multifunctional tank unit (P, MS, MT, MTS)

Design: Photovoltaic version (with E-cartridge) without charging system

When the set temperature of 70 °C is reached at sensor S1, the countercurrent pump pumps cold water from the lower zone of the tank up to the hot upper zone until it has cooled down to 65 °C.

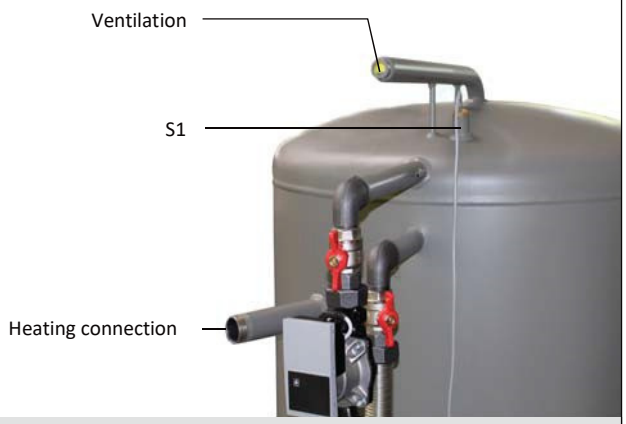
The description of the buffer charge control ESR 21-R is enclosed.

Parameter setting buffer load control ESR 21-R (default setting)

Display Enter Par. / Code 32			
Setpoint		SWA at 32	50°C
Setpoint		SWD at 32	10 K
Program 4			
max 1 ↓ off	90 °C	max 1 ↑ on	85°C
max 2 ↓ off	– °C	max 2 ↑ on	– °C
min 1 ↓ off	70 °C	min 2 ↑ on	65°C
diff 1↑ on	5 °C	diff 1↓ off	2 K

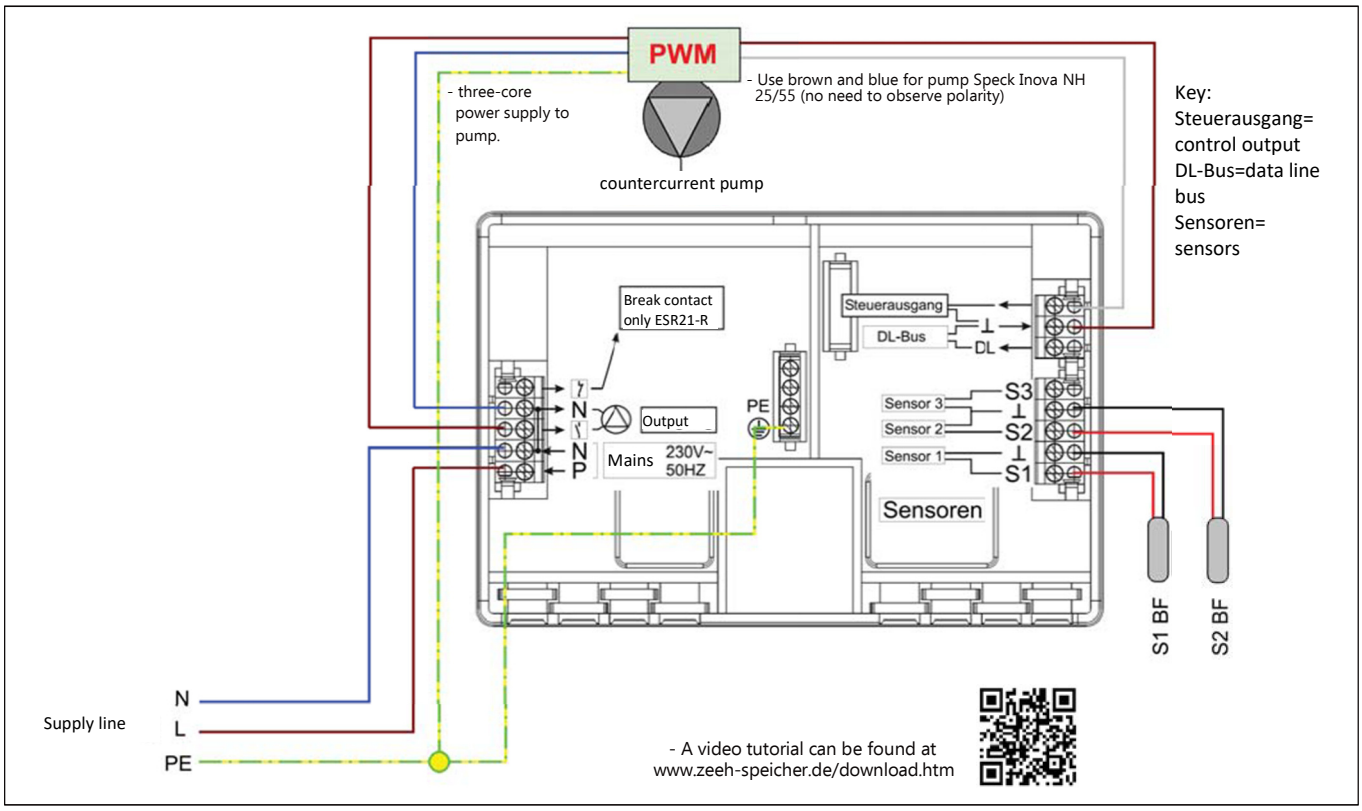
Display Enter Men. / Code 64		
Control output	STAG/AG1/ PWM	
Signal type	WP	–
Absolute value control	AR	–
Setpoint	SWR	130 °C
Differential control	DR	–
Event regulation	E	–
Threshold value	SWE	60 °C
Proportional part	PRO	5
Integral part	INT	0
Differential part	DIF	0
Minimum speed		0
Maximum speed		100
ALV		0
Sensor type SENSOR		
Sensor S1... _____/ we = PT 1000 Average MW1... _____s / we = 1.0 s		
Sensor S2... _____/ we = PT 1000 Average MW2... _____s / we = 1.0 s		
Sensor assignment or sensor positioning		
Sensor S1	in tank cover sleeve	
Sensor S2	on terminal strip at the bottom of the tank	
In the main menu the temperature and speed can be read using the keys ◂ or ▸.		

Allocation of connections and sensor assignment
Multifunctional tank **P, MS, MT, MTS**

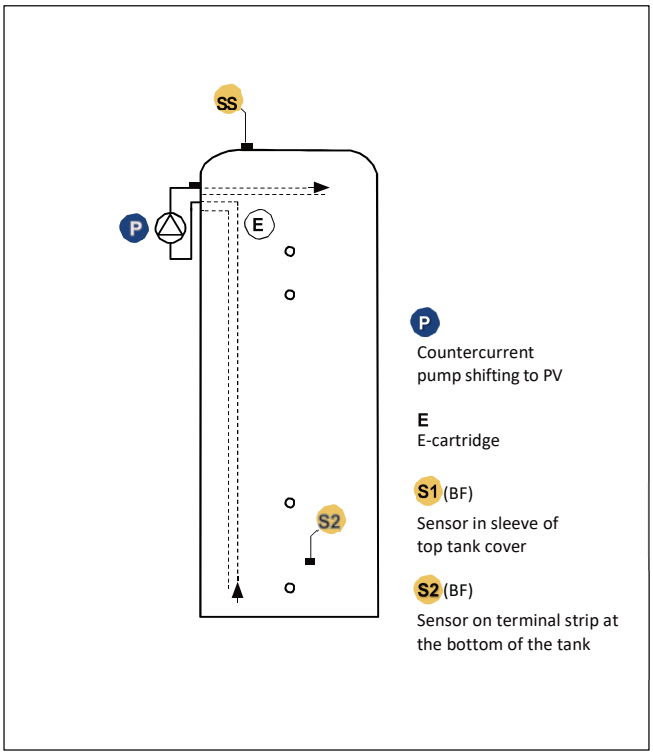


* Depending on the system, a domestic water mixer must be connected downstream (see diagram on page 9).

Terminal assignment of buffer charging control ESR 21-R (with high-efficiency pump)



Sensor assingment of buffer and multifunctional tank without charging system



Tips and tricks for troubleshooting and error correction of drinking water charging system

Follow the installation instructions of the pump: flow direction according to diagram, pump on level III, connecting pipe must be completely vented (install automatic air vent).

Check the installation position of the flow switch: (vertical, union nut upwards, flow direction towards union nut).

Check the function of the flow switch:
Display under T3 D0 - no drawing-off of water,
Display under T3 D1 – drawing off of water

Check if sensor S1 > S2 (pump runs at difference > 2.5 K S2 < 50 °C (without flow switch 60 °C), check if sensors have been interchanged).

Check if pump is connected to 230 V mains and that the control cable is connected to the control output

Check the hot water outlet temperature S2 in connection with temperature at the taps (e.g. domestic water mixer might interfer)

Care and maintenance

Regular external cleaning and maintenance is a prerequisite for a long service life of the buffer and multifunctional tank system.

In case of hard water, regular descaling of the corrugated stainless steel pipe (only for types MT, MTL, MTLS, MTL-WP, MTLS-WP) is necessary or a stationary softener unit must be installed upstream.

All connections must be checked for leaks, especially the cold water, hot water and circulation connections, as these are located inside the tank insulation.

When installing expansion tanks, it might happen that the safety valve becomes clogged after some time, therefore the proper functioning must be checked regularly.
In addition, the expansion vessel in the cold water supply line of the tank facility shall be checked annually for sufficient inlet pressure on the gas side.

If no frost protection is guaranteed for the appliance, the heating and hot water system must be drained by an authorised expert. Please note: If the system is not filled for a long time, corrosion damage to the metal parts can occur.

We recommend that the maintenance of the buffer and hot water tank system be included in the regular maintenance of the heating system.

Heiztechnik und Behälterbau Joachim Zeeh GmbH

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Recycling and disposal

The buffer and hot water tank system of the company Heiztechnik und Behälterbau Joachim Zeeh GmbH and the associated transport packaging consist mainly of recyclable raw materials.

Ensure that the equipment and any accessories and transport packaging are disposed of properly.

All components of the buffer and hot water tank system and also all accessories must not be disposed off with the domestic waste.

Observe the legal regulations and local ordinances.

Manufacturer's warranty Company Heiztechnik und Behälterbau Joachim Zeeh GmbH

The company Heiztechnik und Behälterbau Joachim Zeeh GmbH provides the following manufacturer's warranty for all its products:

- Obvious defects must be reported by the buyer within two weeks of delivery of the contractual object. The defect must be reported to the manufacturer in writing.
- The Company shall be liable for material defects in accordance with the statutory provisions of the German Civil Code [BGB].
- Slight colour deviations inherent in the system, which are due to the use or combination of different materials, are considered to be in accordance with the contract.
- If the customer is a trader, the provisions of the German Commercial Code [HGB] in conjunction with those of the German Civil Code [BGB] shall apply to the contractor's liability for material defects.

The following is agreed for the liability for material defects:
- The warranty for wearing parts (electrical and moving parts) is 12 months, starting on the day of delivery.
- Material and work defects will be eliminated free of charge during this period.
- The manufacturer/contractor grants a 12-month warranty on the tank (container).
- No other warranty claims exist.
- The manufacturer/contractor shall not be liable for any claims arising from damage, improper installation, incorrect operation and improper use.

The following conditions void the warranty:
- faulty installation,
- installation of foreign parts,
- improper, unprofessional maintenance,
- incorrect operation

07/19 · Subject to technical and content changes· No liability accepted for accuracy of the information.