FRISTAR2-WP

Fresh water station
for heat pumps

Operating manual

Table of contents

Safety instructions

These instructions are intended exclusively for authorised professionals. To avoid accidents and damage due to incorrect operation, carefully read through these operating instructions before you start working with the freshwater station. If you carry out any alterations to the construction of the freshwater station or the safety devices, you may invalidate your right to make guarantee claims. Always observe the local regulations.

Intended use

The freshwater station may only be installed in heating systems between the buffer tank and the drinking water circuit. The technical limit values specified in this manual must be considered.
Incorrect use will result in the negation of any liability claims.

Electrical connection

Any electrical connections must be made by qualified electricians. Connection cables must be routed in the recesses provided in the insulated base in such a way that direct contact with the pump casing and the pipes is prevented.
Before switching on, check whether the supply voltage matches that stated on the power rating plates of the pump and the controller. All connections must correspond to the local regulations. Before opening the controller, all poles of the power supply must be isolated.
If you are connecting the FRISTAR 2 to an electrical system via a **residual current device** (RCD), use an RCD of **type A** which will **detect pulsating direct currents** and bears the following marking:
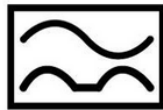
Checking using a high voltage insulation tester may cause damage to the pump and the control electronics.

Safety standards during installation, commissioning and maintenance

Installation, commissioning and maintenance may only be carried out by qualified persons who are familiar with these operating instructions.
Before you start work on the system, ensure that the system is switched off and all components are cooled down. When replacing the pump, turn the 4 ball valves into the closed position.
In multi-occupancy dwellings, legionella protection must be observed in accordance with the local regulations.

WARNING! Dependent on the pump and system operating conditions, the surface temperatures can be very high. Direct contact with the pump or pipes can result in burns!

Mode of operation

Through use of the instantaneous heating concept, drinking water is heated both hygienically and with low energy consumption in the **FRISTAR** freshwater station.

If water is drawn from the mains, the **primary circuit** pump transports tank water from a buffer tank through the plate heat exchanger.

On the **secondary side** of the heat exchanger the drinking water flowing through is heated to the set temperature. The cooled tank water is returned to bottom layer of the buffer tank.

The **speed control** of the primary circuit pump is performed in the **FRISTAR 2** controller based on the measurements made by the volume flow sensor in the cold water line (flow rate V_{KW} and temperature T_{KW}) and the temperature sensors in the hot water line (T_{WW}) and in the primary flow (T_{Pri}). The pumps are controlled by means of PWM signals. The optimum matching of the control behaviour to the pump and the heat exchanger guarantees perfect constant maintenance of the outlet temperature.

Hydraulic circuit diagram

Hot water temperature

Temperature Primary flow

Pre-mixer (recommended)

T_{WW}

T_{Pri}

V_{KW}

Volume flow sensor with temperature measurement

T_{KW}

Primary pump

Safety valve max. 6 bar

Components

Hot water
Secondary circuit

Cold water
Secondary circuit

Ball valve

Ball valve

Ventilation
primary circuit

Circulation Pipe
connection

Plate heat
exchanger

Volume flow
sensor

Hot water
sensor

Controller

Pump

Primary
sensor

Ball valve

Ball valve with
gravity brake

Flow primary
circuit

Return primary
circuit

Power cable

Installation

Preparation

♦ A **safety valve** (max. 6 bar) must be installed in the cold water supply corresponding to standards DIN 1988 and 4753, part 1 and TRD 721.
♦ If the cold water pressure > 6 bar, fit a **diaphragm pressure reducer** max. 6 bar.
♦ The installation of **flushing equipment** before and after the plate heat exchanger in the primary and secondary circuits is recommended for descaling or cleaning as necessary.

Special accessories: VMS pre-mixing set

If the tank is operated at a temperature higher than 70 °C a **pre-mixer** that restricts the temperature to less than 70 °C must be used in the primary circuit.

In order to prevent damage from calcification, the maximum pre-mixing temperature must be 70 °C with a water hardness of up to 10 °dH, 65 °C with up to 15 °dH and 60 °C at most with a hardness above 15 °dH.

The **VMS** pre-mixing set is suitable for both FRISTAR models (left pump, right pump).

Figure: Connection for FRISTAR with **right pump**

Thread 3/4"　　　　　　　　　　　　　　　　　　**Thread 3/4"**

Thread 1"　　　　　　　　　　　　　　　　　　**Thread 3/4"**
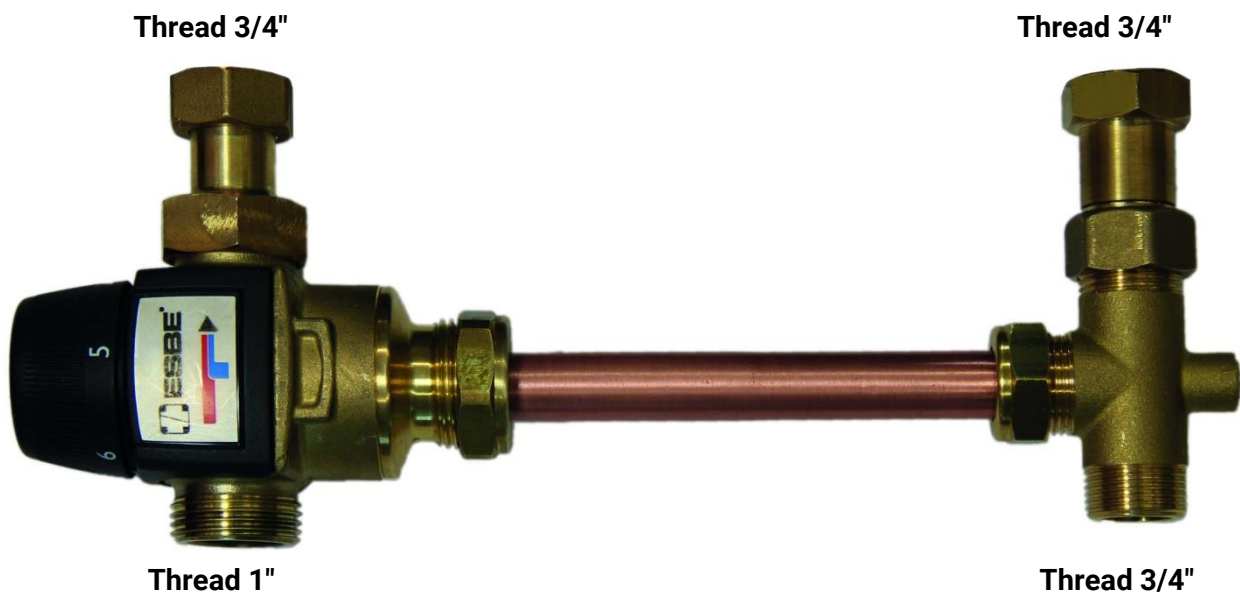
Technical data	
Maximum temperature of primary circuit	95 °C, short term: 100 °C
Setting range:	45 °C – 65 °C
Flow coefficient of mixing valve	4.5 m³/h
Connections for FRISTAR	¾"
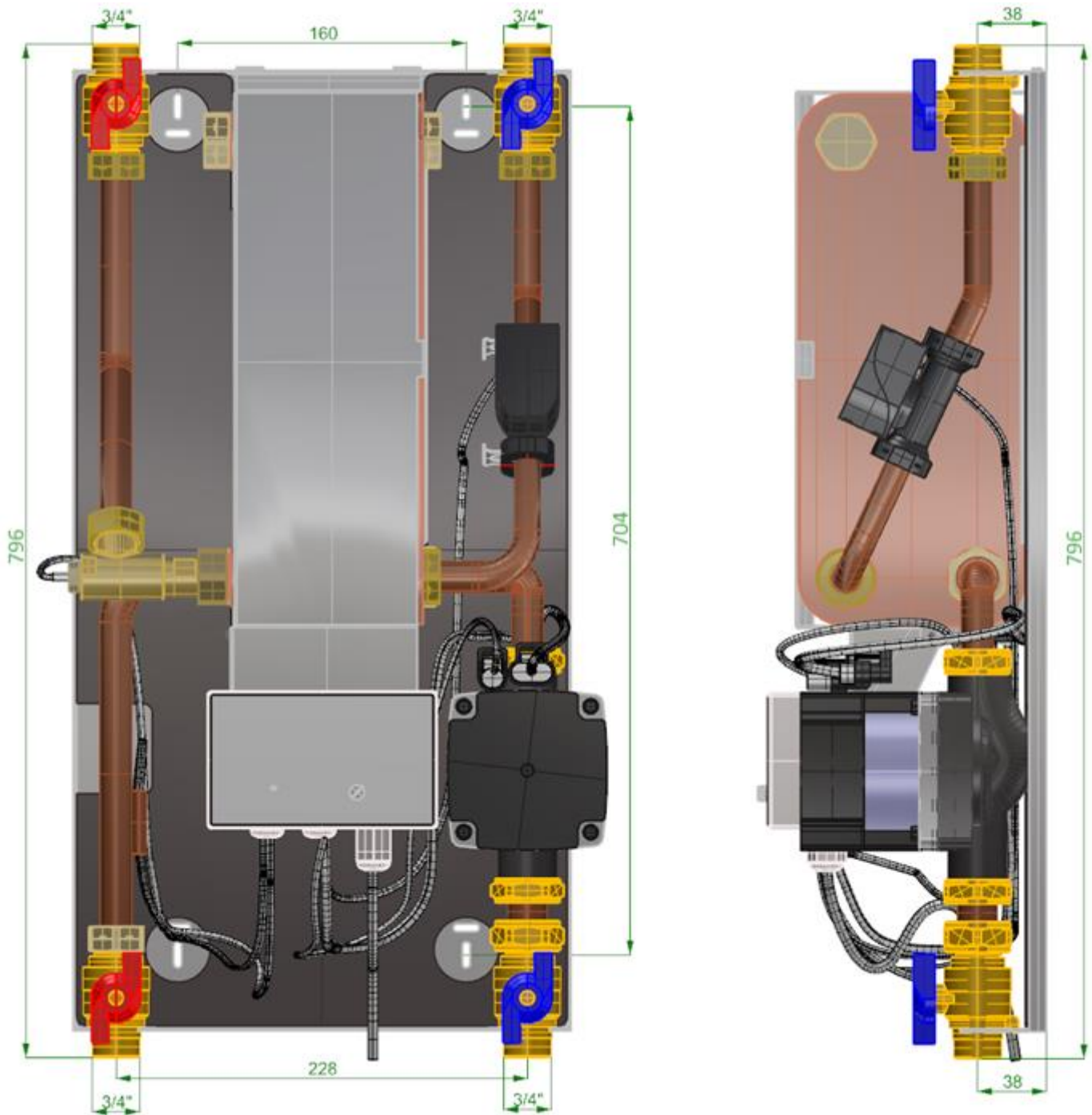
Dimensions

Housing dimensions (thermal insulation cover)

W x H x D = 366 x 811 x 158 mm

Weight (freshwater module incl. controller and thermal insulation cover)

19,64 kg

Interchanging connections

For optimum matching of the pipelines to the freshwater station it is possible to interchange the connections (right/left). Doing this does not change the circulation line heat exchanger openings or the venting of the primary circuit.

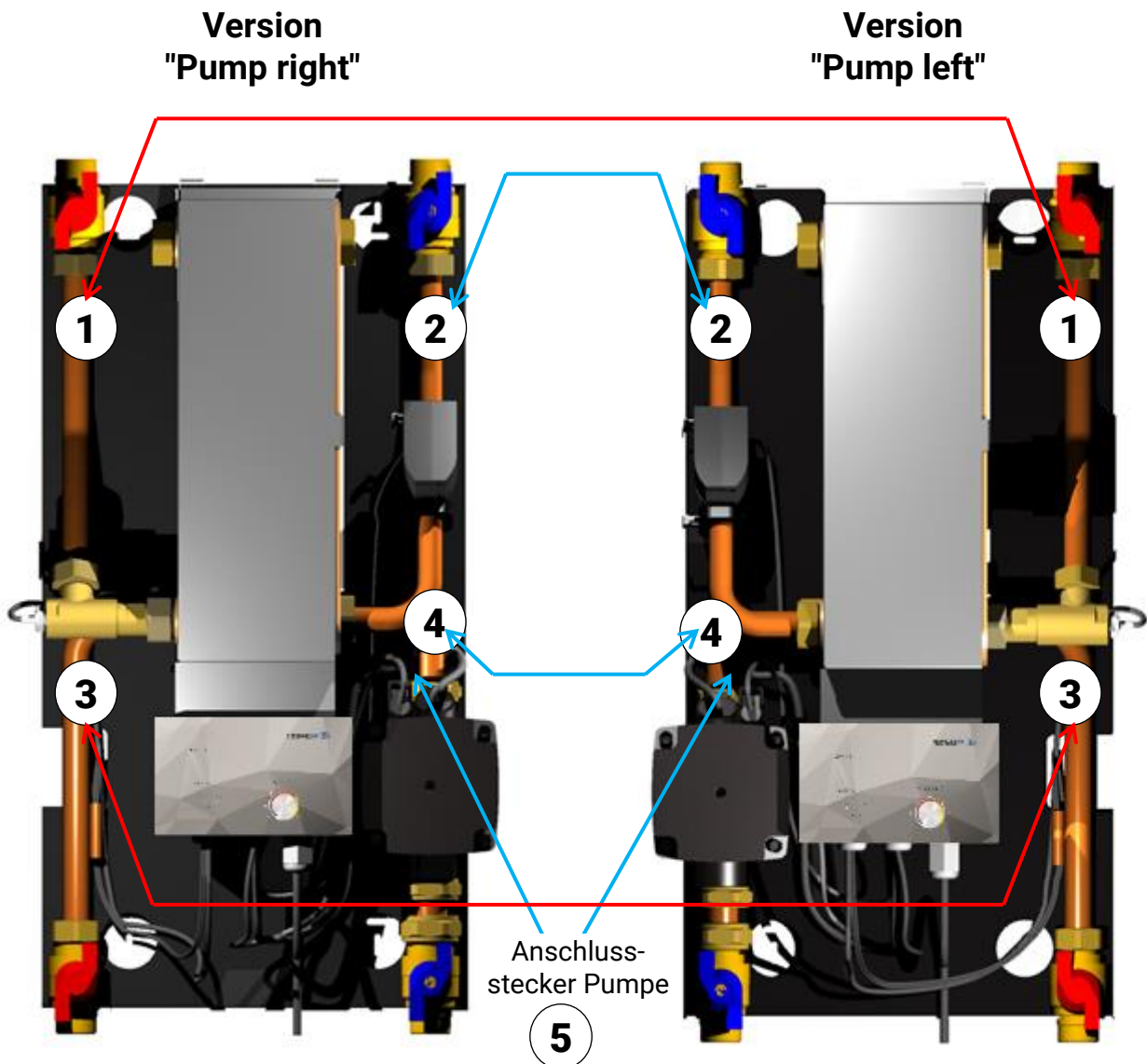**Version "Pump right"**　　　　　**Version "Pump left"**

Anschluss-stecker Pumpe

Procedure:

1. Demounting of pipe elements 1 - 4 including pump from the heat exchanger
2. Removal of the pump and installation in the correct position.
3. Remount pump connection plug 5 on the other side.
4. Mounting of pipe elements 1 - 4 and the pump on the heat exchanger (see figures above) on the other side, correct positional setup of the volume flow sensor
5. Commissioning according to the "Commissioning" chapter

Important: The primary and secondary connections must be exchanged together!

Installation

♦ Mounting position: Only **vertical**

♦ Installation with the heat exchanger at the top/above the controller (acc. to diagrams) is recommended.

♦ Pull off the cowling in a forwards direction.

♦ If necessary: Interchange the right/left connections (see chapter "Interchanging connections").

♦ Mark the fastening points, insert rawl plugs, fasten the station to the wall.

♦ Fitting and connection of the pipe connections (3/4" outside thread connector). Plan for as short as possible pipes in the primary circuit (tank -> freshwater station).

♦ Electrical connection

The freshwater station is pre-wired ready for installation, connection to the electricity mains takes place on site:

- using a plug in a wall socket or

- using a double pole isolator with a permanent connection.

Commissioning

♦ Before filling the system, thoroughly flush both the primary and secondary side systems. To do this the locking bolt of the return valve with the gravity brake is placed in a 45° position so that it is non-operational.

♦ **Slowly** fill the house system with drinking water via the secondary side ball valves.

♦ Vent the house system at the draw-off valves.

♦ **Slowly** fill the system with hot water via the ball valves in the primary flow.

♦ Vent the primary circuit using the venting opening of the plate heat exchanger.

♦ Set the pump to continuous operation and check pump running. Audible background noise during operation of the circulating pump indicates air in the system.
Warning! Only start the pump when it is filled.

♦ Check all connections, including in the freshwater station, for correct seating and leak-tightness. If necessary, retighten to the necessary torque.

♦ Activate the gravity brake at the primary system return valve (place locking bolt vertically)

♦ If a DHW circulation pump is used: Set the runtime on the potentiometer inside the controller. (Caution: switch off the 230 V power supply before opening the controller!)

♦ Place the cowling on the bottom part

♦ Set the pump in automatic mode and select the setpoint temperature.

Connection of a circulation line

Activating the DHW circulation pump using the FRISTAR 2 controller

Hydraulic circuit diagram with circulation line

T_{Pri}

T_{WW}

V_{KW}

T_{KW}
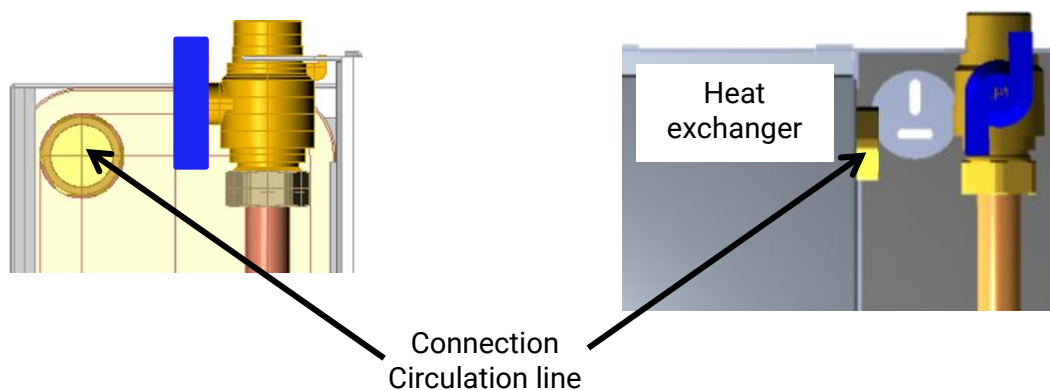
Primary pump
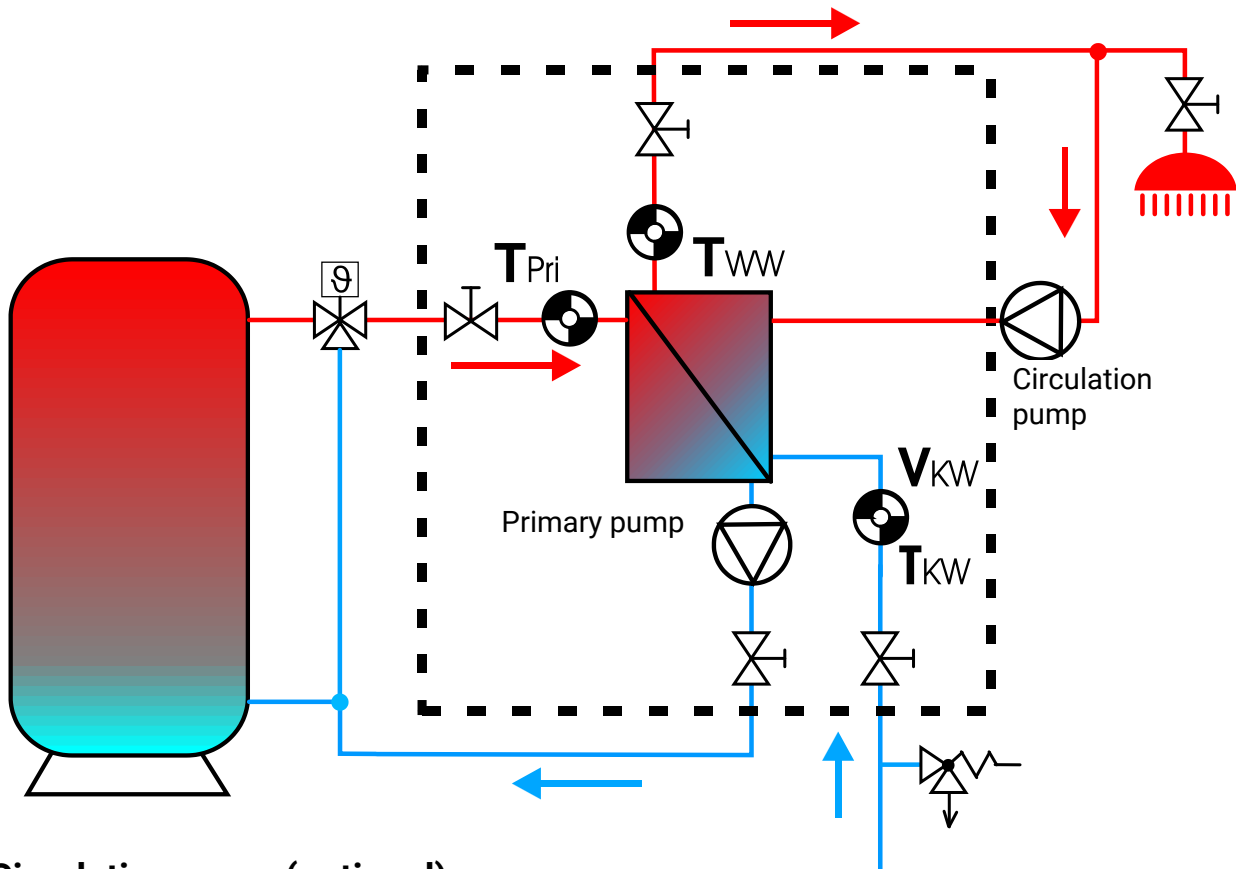
Circulation pump

Circulation pump (optional)

If an external DHW circulation pump is connected directly to the FRISTAR 2 controller, it will operate in **pulse mode**. When water is drawn off, the DHW circulation pump runs for the time set on the potentiometer (0 to approx. 10 minutes max.). After the end of the run time, pump start-up is permitted only after a 10 minutes break.

If a DHW circulation pump is not used, the potentiometer must be set to 0 (= factory setting), as otherwise the primary pump would run on for the set time after every draw-off.

The plate heat exchanger is provided with a connection for a circulation line. To lead the circulation line through to the heat exchanger, the isolation cap must be cut out to suitable dimensions.

Heat exchanger

Connection
Circulation line

Activating the DHW circulation pump using a different switching device

For the primary pump to be enabled when the DHW circulation pump is running, the DHW circulation return must be connected in the cold water inlet.

However, it must be ensured that the flow rate in the DHW circulation line is greater than the flow sensor minimum flow rate (2 l/min or 120 l/h).

Hydraulic circuit diagram with circulation line
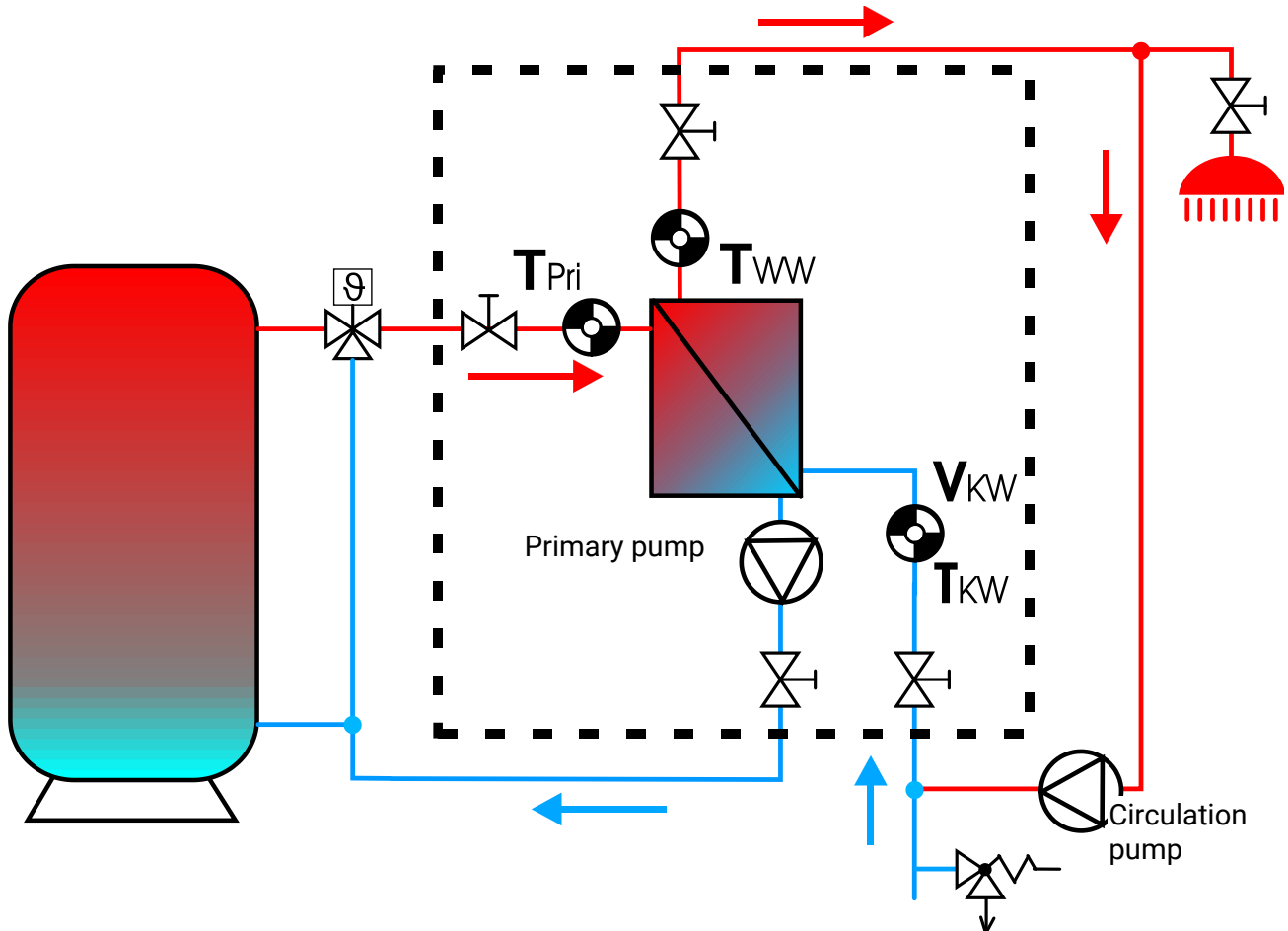
When the DHW circulation pump is switched on, the sensor (V_{KW}) measures the flow rate and the primary pump is enabled.

Cascade switching

The FRISTAR 2 is designed for a maximum water draw-off of 30 l/min. For a greater draw-off of domestic hot water, multiple freshwater stations can be used in a cascade.

The first module is fed directly, all others stations are added with stop valves, if necessary. These valves must open or close in at least 30 seconds. The **UDV** universal 3-way valve from Technische Alternative is excellent for this purpose.

Valves are added via overriding controller with a volume flow sensor that measures the total volume flow. With up to 3 modules, the FTS5-85DL sensor is adequate; with 4-5 modules, the FTS9-150DL sensor must be used.

The sensors in the FRISTAR stations should not be subjected to more than 30 litres per minute. The final station, however, should be flushed several times a day to prevent stagnant water from forming. This is ensured if the overriding controller increases the station number in stages of about 8-10 l/min. In the following "step-by-step" instructions, the first stage with 9 l/min was selected because sensor FTS9-150DL is activated properly starting at 9 l/min only.

A three circuit controller UVR61-3R (or UVR63) can switch the modules. Cascade control can of course also be integrated into the programs of the UVR1611, UVR16x2 or RSM610 controllers.

Hydraulic circuit diagram of a cascade with four FRISTAR fresh water stations

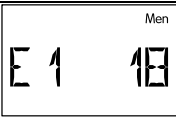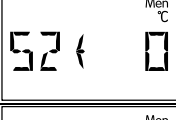Figure with fresh water stations version, version "Pump on the right"
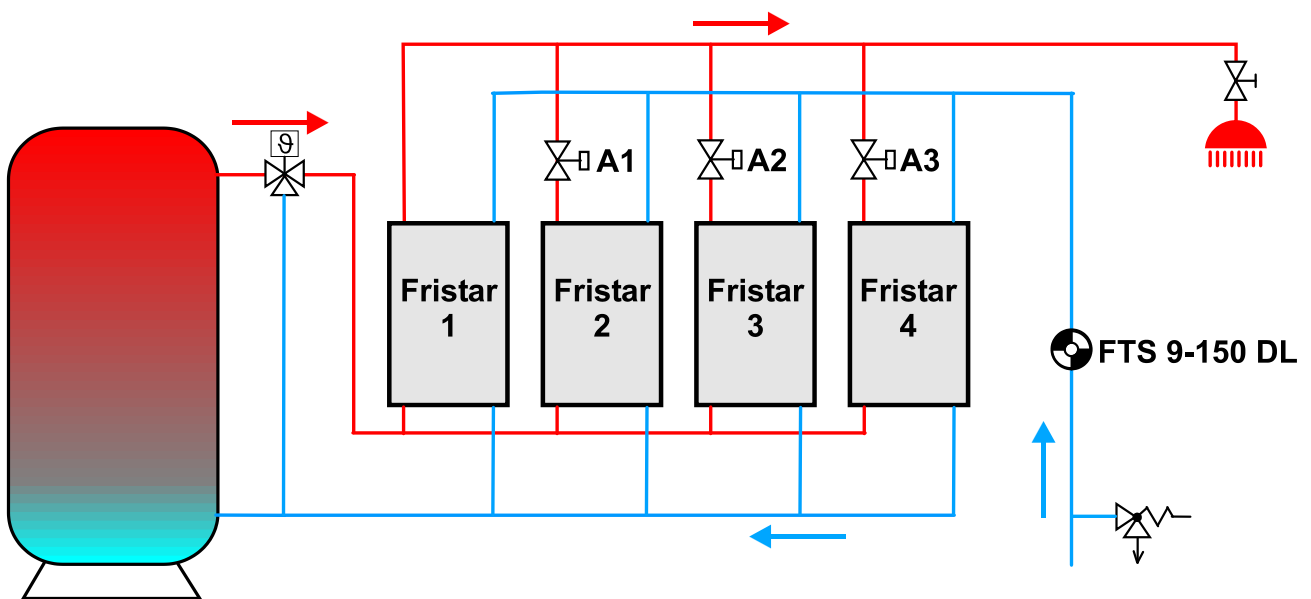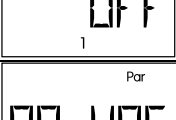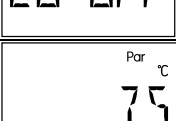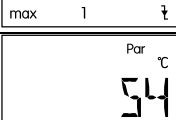
The initial designations for stop valves **A1** – **A3** refer to controllers UVR61-3R or UVR63.

Cascade switching control with UVR61-3R or UVR63

Controllers UVR61-3R and UVR63 have exactly the same settings.

Step-by-step instructions for UVR61-3R:

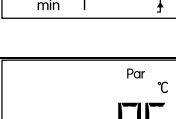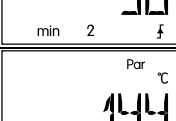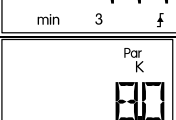|	Menu ENTER		Access to menu *Men* with Code 64, to menu *Par* with Code 32.
1	*Men* EXT DL	E 1 1B _{Men}	Adoption of the volume flow on sensor FTS9-150DL as external sensor **E1**. With use of FTS5-85DL, "**E1 17**" is entered.
2	*Men* SENSOR	S1(E1 _{Men}	Adoption of external sensor value **E1** on sensor **S1**
3	*Men* SENSOR	S2(0 _{Men °C}	Fixed temperature value **0 °C** on sensor **S2**
4	*Men* SENSOR	S3(E1 _{Men}	Adoption of external sensor value **E1** on sensor **S3**
5	*Men* SENSOR	S4(E1 _{Men}	Adoption of external sensor value **E1** on sensor **S4**
6	*Men* SYS PF / CET 1	CET 1 _{Men}	Selection of sub-menu CET 1 (collector excess temperature shutdown 1)
7	*Men* SYS PF / CET 1	OFF _{Men} ₁	Deactivation of excess temperature shutdown, activated in the factory settings
8	*Par*	PR 496 _{Par}	Selection of program **496**
9	*Par*	LO OFF _{Par}	The **LO OFF** setting remains set to factory setting
10	*Par*	75 _{Par °C} max 1	All three **max** input and output thresholds are left with factory settings 75/70 °C because they do not influence control.
11	*Par*	54 _{Par °C} min 1	Because the flow values of the sensors are displayed as temperatures, the switch-on value means "54 °C" 540 l/h (= 9 l/min) for threshold **min1**. The switch-off value of 49 °C is entered for **min1**. Output **A1** is switched via these thresholds.
12	*Par*	96 _{Par °C} min 2	Switch-on value "96 °C" (= 960 l/h = 16 l/min) for value **min2**. The switch-off value of 91 °C is entered for **min2**. Output **A2** is switched via these thresholds.
13	*Par*	144 _{Par °C} min 3	Switch-on value "144 °C" (=1440l l/h = 24 l/min) for value **min3**. The switch-off value of 139 °C is entered for **min3**. Output **A3** is switched via these thresholds.
	Par	80 _{Par K} diff1	All three **diff** input and output thresholds are left at factory settings 8.0/4.0 K because they do not influence control. All other settings in the *Par* menu are likewise left at factory settings.

Controller with UVR65

Step-by-step instructions

	Level/menu		Technician menu password **32,** expert menu PW **64**
1	**Expert** Ext. sensors	DL bus address `1` DL bus index `2`	Adoption of the flow rate at sensor FTS9-150DL as EXT input 1. When using an FTS5-85DL, the DL bus index is specified as **7**.
2	**Expert** Sensor menu → S1	Sensor `Sensor accept` Sensor assignment `Ext. sens. 1`	Adoption of EXT input 1 at sensor **S1.**
3	**Expert** Sensor menu → S3	Sensor `Sensor accept` Sensor assignment `Ext. sens. 1`	Adoption of EXT input 1 at sensor **S3.**
4	**Expert** Sensor menu → S4	Sensor `Sensor accept` Sensor assignment `Ext. sens. 1`	Adoption of EXT input 1 at sensor **S4.**
5	**Expert** System protection Excess temp. limiter 1	Enable `No`	Deactivation of collector excess temperature shutdown activated at the factory.
6	**Expert** Program settings	Program `496`	Selection of program **496.**
7	**Technician** Parameters	Max1 S2 `No`	The values **Max1, Max2** and **Max3** must be set to "No". This eliminates their influence on the control process.
8	**Technician** Parameters	Min1 S1 On Off `Yes` `54.0 °C` `49.0 °C`	The parameter **Min1** maintains its start threshold at **54.0 °C** (≙ 540 l/h = 9 l/min). The stop threshold is **49.0 °C**. These thresholds are used to switch output **A1**.
9	**Technician** Parameters	Min2 S3 On Off `Yes` `96.0 °C` `91.0 °C`	Start value **96.0 °C** (≙ 960 l/h = 16 l/min) for the value **Min2**. The stop threshold is **91.0 °C**. These thresholds are used to switch output **A2**.
10	**Technician** Parameters	Min3 S3 On Off `Yes` `144.0 °C` `139.0 °C`	Start value **144.0 °C** (≙ 1440 l/h = 24 l/min) for the value **Min3**. The stop threshold is **139.0 °C**. These thresholds are used to switch output **A3**.
11	**Technician** Parameters	Diff1 S1 - S2 `No`	The values **Diff1, Diff2** and **Diff3** must be set to "No". This eliminates their influence on the control process.

The 3 outputs **A1**, **A2** and **A3** for the shut-off valves are switched on if the corresponding flow rate thresholds **min1** (540 l/h), **min2** (960 l/h) and **min3** (1440 l/h) are exceeded.

The three outputs **A1**, **A2** and **A3** for the stop valves are switched on if the associated flow thresholds **min1** (540 l/h), **min2** (960 l/h) and **min3** (1440 l/h) are exceeded. The **min3** threshold can be set to a maximum of 150.0 °C (= 1500 l/h) in these controllers.

Control of cascade switching with UVR1611, UVR16x2 or RSM610

The outputs for the stop valves are switched on by comparison functions, with one comparison function for each valve. The relevant switch-on and switch-off thresholds should be chosen in the same way as for the UVR61-3R.

Cascade switching with circulation line

Schematic diagram for activating the DHW circulation pump with the FRISTAR 2 controller

Figure with fresh water stations version, version "Pump on the right"
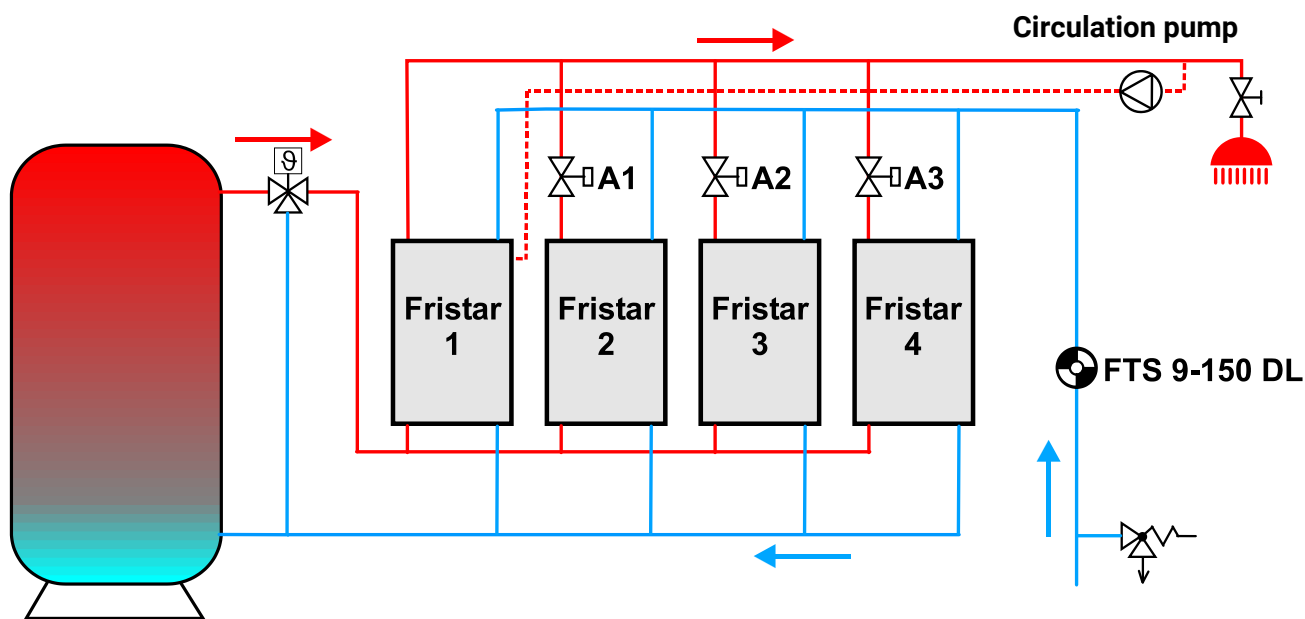
The circulation pump is connected only to the always ready **FRISTAR 2**.

Schematic diagram for activating the DHW circulation pump with a different switching device

If the DHW circulation pump is switched via a different controller, the DHW circulation return must be connected to the cold water supply line.

However, it must be ensured that the flow rate in the DHW circulation line is greater than the minimum flow rate of the flow sensor in the FRISTAR 2 (2 l/min or 120 l/h).
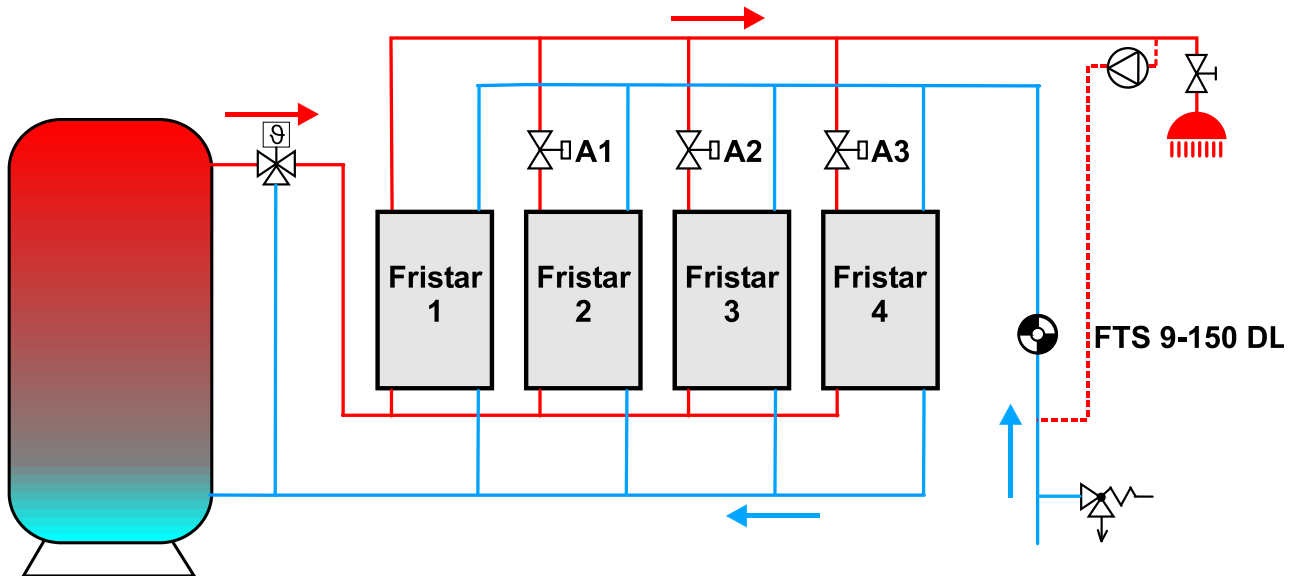
UVR61-3R or UVR63

If the DHW circulation pump is also to be switched on and off **according to temperature**, the maximum possible number of FRISTAR 2 modules is three. This is done using the program **480** for switching modules 2 and 3 on and off via outputs **A1** and **A2**. The DHW circulation pump can be switched at output **A3** via the differential **S5 − S4** (**S5** is unused, **S4** measures the DHW circulation temperature and switches off when the **max3** value is reached).

UVR1611, UVR16x2 or RSM610

The circulation pump can be controlled with the "**circulation**" function.

Data transfer with DL bus

The FRISTAR 2 controller can be connected to the DL bus. The DL bus allows the sensor values, the set value and the heat meter values to be adopted via DL inputs on the TA controllers. This also makes logging of the values possible.

With the UVR16x2 and RSM610 controllers, a set value can be issued via a DL **output** which will overwrite the setting on the FRISTAR controller.

Upon querying by the FRISTAR 2 controller (**ESR21**, **UVR61-3** and **UVR63H** from version 5.0, **ESR31**, **UVR63**, **UVR1611** from version A3.00 **and** serial number 13286 as well as **UVR16x2** or **RSM610**), the FRISTAR controller returns the corresponding measured value.

The request is made up of the **DL address** of the FRISTAR 2 controller and **index** of the value.

The **address** is specified on the PCB of the FRISTAR 2 controller by breaking the conductors which are labelled 1, 2 and 4. These are located on the outer PCB edge. If none of the conductors are cut, the FRISTAR 2 controller is assigned address 1 (factory setting). Provided no other sensors are connected to the DL bus, no change of address is required.

The new address is derived from address 1 (= factory setting) plus the sum of all the cut through values.

Example: required address 6   = 1 (from factory setting) + 1 + 4

= conductors 1 and 4 must be cut.

Terminals for DL bus

Disconnectable conductors on the circuit board for specification of the sensor address
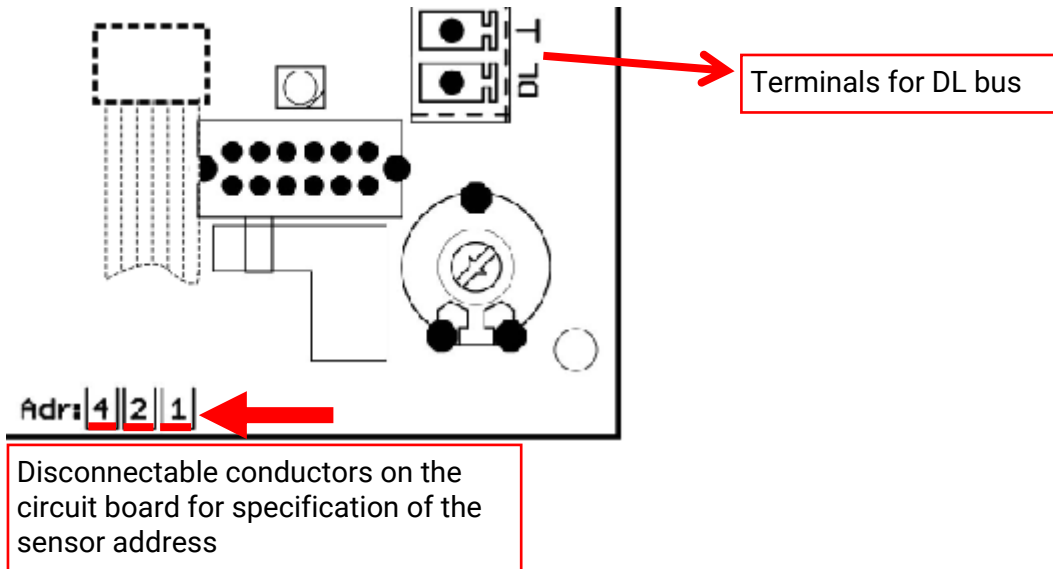
The **index** of the respective values is fixed:

Index:	Measurement:
1	Actual hot water temperature T_{ww} [0.1 °C]
2	Volume flow [1l/h]
3	Temperature cold water line T_{KW} [0.1 °C]
4	Current hot water set temperature [0.1 °C]
5	Current output [kW] (without DHW circulation)
6	Heat metering [kWh] (without DHW circulation)
7	Heat metering [MWh] (without DHW circulation)
8	Water meter [m³]
9	Temperature of primary flow T_{Pri} [0.1 °C] (only for devices with X2)
10	Pump speed in % (only for devices with x2 technology)

UVR16x2: The measured values are parameterised in the menu "**DL bus**" as DL inputs.

Example: Reading the actual DHW temperature (amend DL address!)

DL   Input 1 (1 / 1)
T.DHW

DL inputs - Input 1 - T.DHW		✕
Drawing object:	Input 1 - T.DHW	⌄

Parameters

Des. group	Temperature actual value
Designation	T.DHW
Des. index	
General	
Type	Analogue
Address	1
Index	1
Unit	
Measured variable	Automatic
Unit	
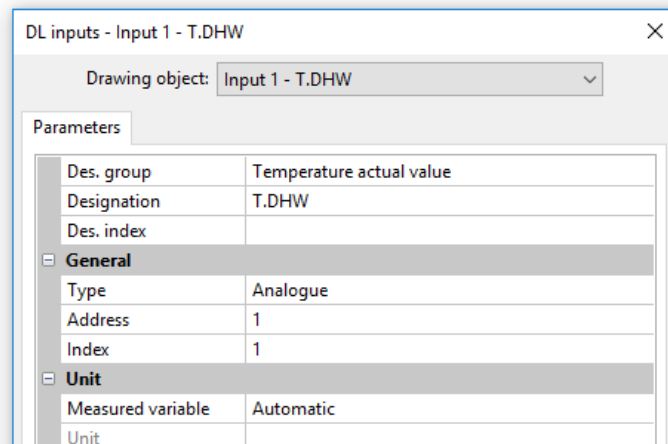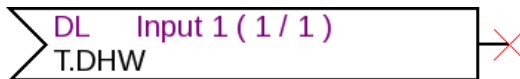
A set value can also be specified through a DL output.

Example: Specification of the set temperature via the function "Time switch"

Time switch	1
Time program, DHW	

Enable function   Status time cond
Blocking input   Set value 1
Derivative time   Set value 2
Set val.1 (en.=off)
Set val.2 (en.=off)

DL   Output 1 (1 / 1)
T.DHW
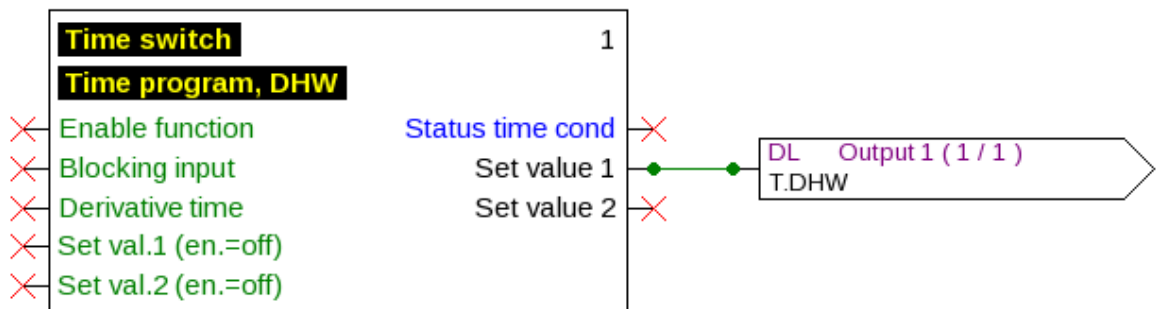
UVR1611: The measurements are parameterised as **analogue** network inputs:

```
NW.node:              DL address
Anal. netw.outp.:     Index of the measured value
Source:               DL
```

TAPPS 2 – Programming UVR1611:
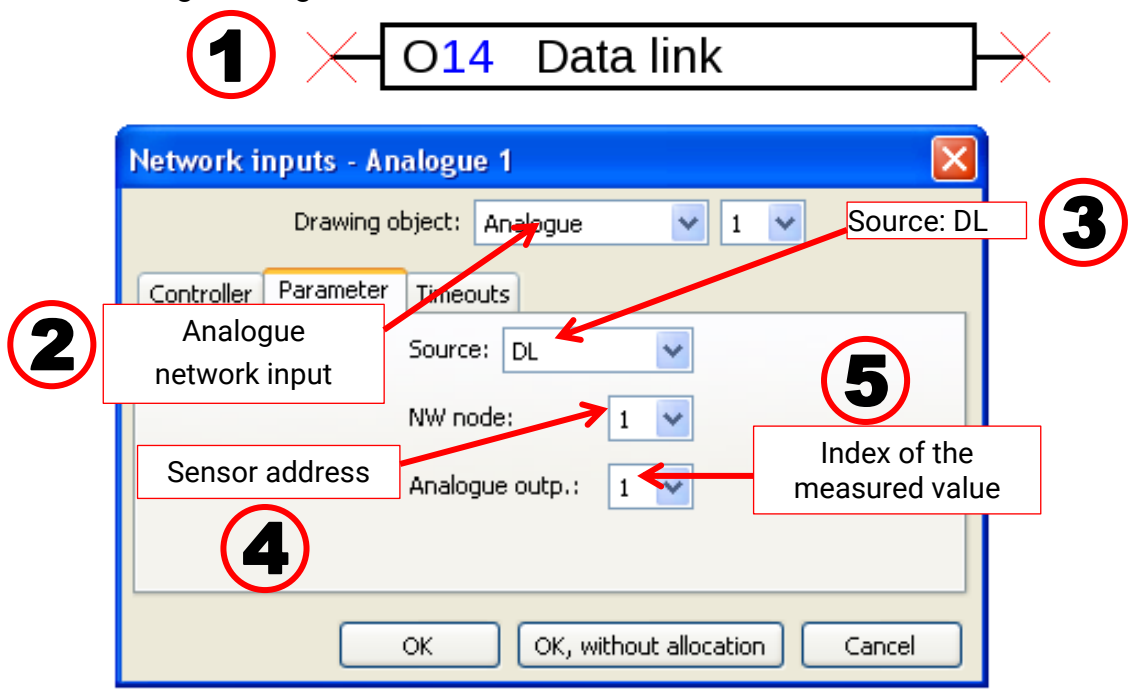
A still unused network input variable must be selected for each new value.

ESR21, ESR31, UVR61-3, UVR63, UVR63H:

Adjustment of the measurements takes place in the menu **EXT DL** (external sensors)

Example: The external sensor 1 has address 1; the value of the volume flow should be adopted (index 2).

UVR65

In the expert level under "Ext. sensors", DL bus is specified as the source for one of the inputs and the DL address of the FRISTAR2-WP controller is specified. The required index according to the table on the previous page should be entered underneath.

Electrical connection

Optional: Circulation pump

Primary pump

Mains 230 V AC

P N N P N P

PWM 0-10V

Fuse 3.15A quick-acting

Connections for DL bus, sensors and PWM signal

IN OUT PWM
⊥ S2
⊥ S1
DL ⊥

0 min **10 min**

Adr: |4||2||1|

Volume flow sensor connection

Disconnectable conductors for specification of the sensor address

Runtime setting for DHW circulation pump
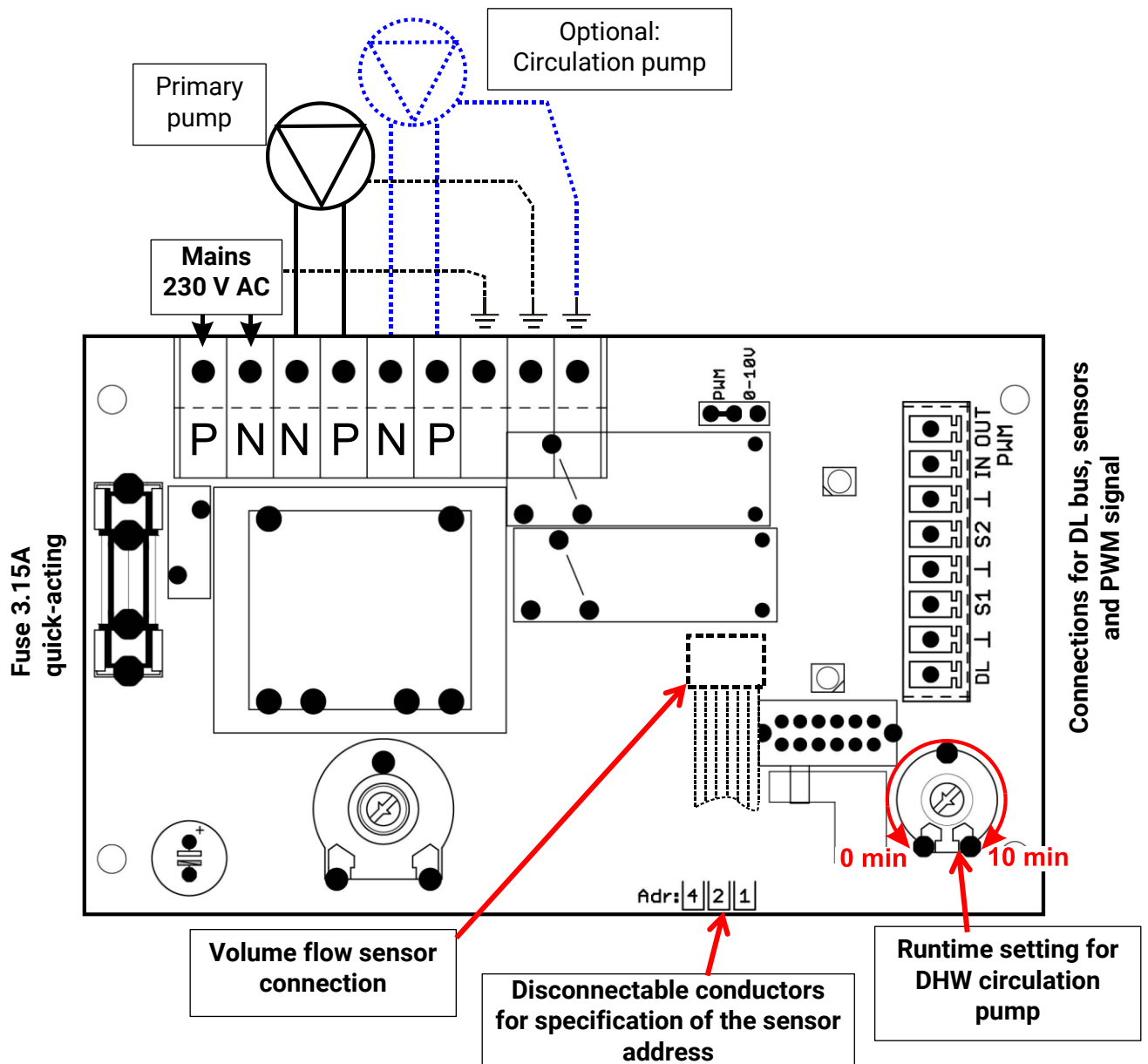
Connection S1: Primary flow sensor TPri

Connection S2: Hot water sensor TWW

The polarity of the DL bus connections (DL and "Earth") is **not** interchangeable and must be observed.

Safety instructions

If you are connecting the FRISTAR 2 to an electrical system via a **residual current device** (RCD), use an RCD of **type A** which will **detect pulsating direct currents** and bears the following marking:
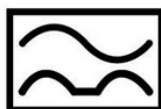
Checking using a high voltage insulation tester may cause damage to the pump and the control electronics.

Operation of the controller and LED indicators

Operation of the controller has been kept as simple as possible, so that it can also be operated by inexperienced users.

Status LED indicator

Pump LED indicator

Manual-automatic Changeover switch

Temperature selection

The temperature can only be selected on the FRISTAR controller if no set value has been issued by a UVR16x2 or RSM 610 controller via the DL bus.

Manual-automatic changeover switch

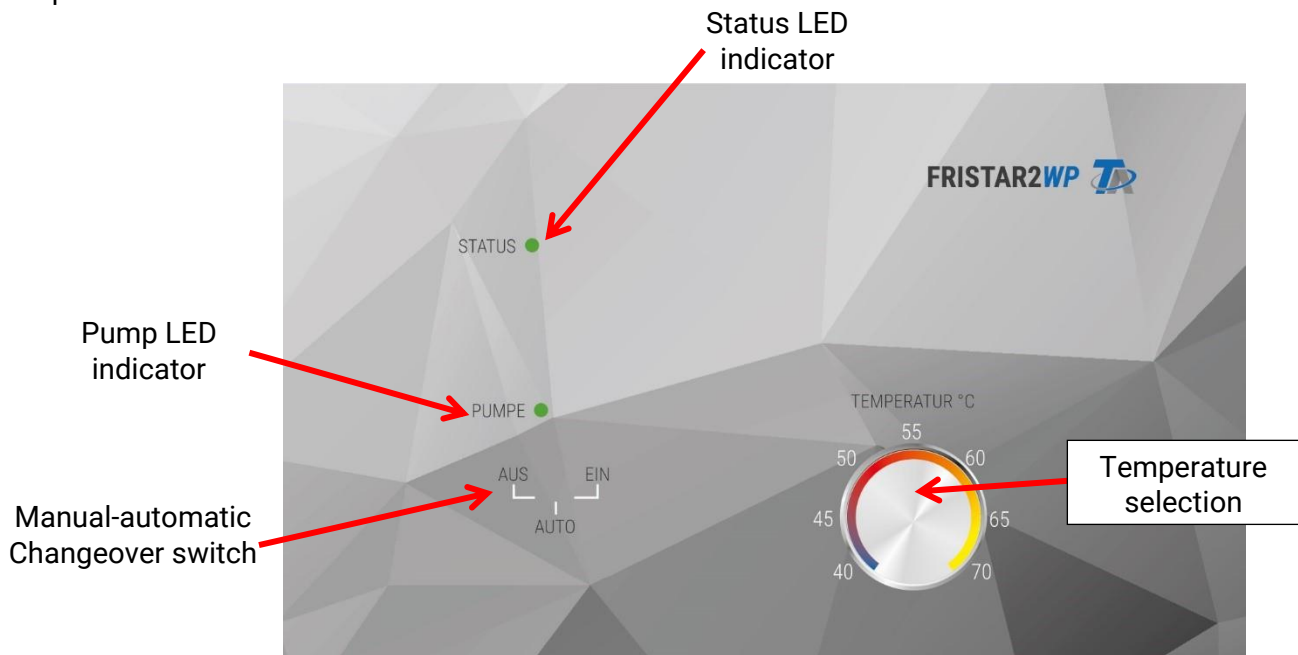| OFF (AUS)	The pump is permanently switched off.
AUTO	The pump runs according to the controller settings.
ON (EIN)	The pump is switched on continuously **at full speed**, independent of the control temperature.

Status LED indicator

This LED indicates the functional status of the sensors.

Green	All sensors are working properly
Flashing green	EEPROM of the **controller** faulty
Red	Sensor for actual hot water temperature TWW **faulty**
Flashing red	Primary pump **faulty**
Orange	Sensor for inlet temperature TKW (in volume flow sensor) **faulty**
Flashing orange	Sensor for primary temperature TPri **faulty**

Pump LED indicator

| Off	Pump is switched off. If the "Pump" LED indicator is not lit up even though hot water is being drawn off, either the volume flow sensor or the controller is faulty.
Green	Primary pump is active
Flashing green	Primary pump and DHW circulation pump are active

Technical data

Rated power	70 kW
Min. flow	2 l /min
Max. flow for 65 °C tank and 45 °C outlet temperature	30 l/min
Max. permissible flow	30 l/min
Max. operating pressure primary side (tank water)	4 bar
Max. operating pressure secondary side (cold water)	3 bar
Max. permissible water hammer pressure	15 bar
Rated temperatures primary flow / return	65 / 20 °C
Rated temperatures secondary flow / return	45 / 10 °C
Max. operating temperature primary/secondary	90 °C
Setting range for hot water temperature	40 – 70 °C
Pressure loss secondary side (Kv value)	2.60 m³/h
Connection thread primary, secondary, circulation Pipe	G ¾" external thread
DL bus load	10 %
Maximum electrical rating, pump + controller	54 W
Materials (all parts in contact with potable water comply with DVGW/W270)	
Fittings	Brass CW617N
Heat exchanger	Stainless steel 1.4401, copper soldered
Pipes	Copper 99.96 %
Seal material	PTFE, EPDM, Klingersil C-4324
Pump primary circuit	Grundfos UPM3 15-70 130
Volume flow sensor	Huba Typ 200 2-32 l/min
Primary sensor	PT1000
Controller	FWR22

Transmission power with different flow and outlet temperatures:

Buffer flow [°C]	Return [°C]	Cold water supply [°C]	Hot water outlet [°C]	Power [kW]	Flow [l/h]
50,0	16,5	13,5	39,2	55,2	1850
49,2	16,0	13,9	40,0	14,5	480
50,2	16,5	13,7	41,1	30,5	960
41,3	21,9	13,7	39,4	33,4	1120
60,7	25,2	13,7	56,7	55,9	1120
60,1	15,4	13,5	40,0	69,2	2250
70,0	16,8	13,5	50,0	91,9	2170

Pressure loss characteristic curve of plate heat exchanger
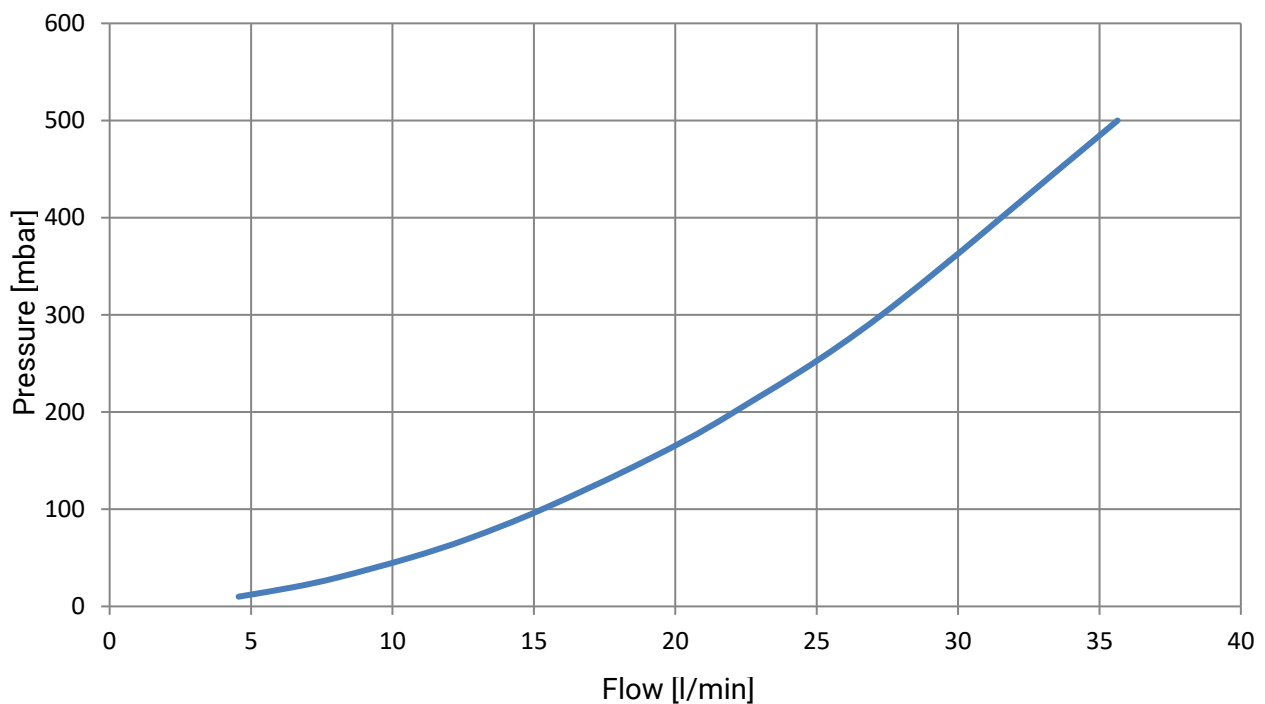
Pump curve

(1 kPa = 10 mbar)
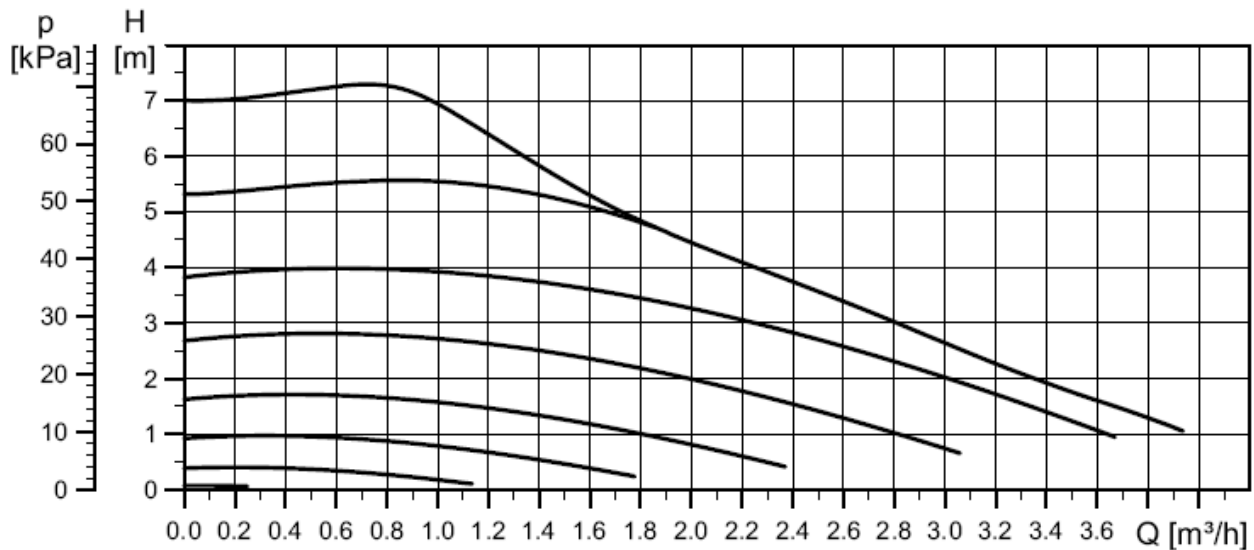
The pump operates in heating mode, meaning that at a 5 % PWM value, the pump will run at full speed. A break in the PWM lead therefore results in full pump speed.

The eight curves shown correspond to the following PWM values: 5 % (max.), 20 %, 31 %, 41 %, 52 %, 62 %, 73 %, 88 % (min.).

Information on the Eco-design Directive 2009/125/EC

Product	Class[1,2]	Energy efficiency[3]	Standby max. [W]	Power consumption typ. [W][4]	Max. power consumption [W][4]
FWR22	1	1	1.2	0.92 / 0.99	1.2 / 1.3

[1] Definitions according to Official Journal of the European Union C 207 dated 03/07/2014

[2] The classification applied is based on optimum utilisation and correct application of the products. The actual applicable class may differ from the classification applied.

[3] Contribution of the temperature controller to seasonal central heating efficiency in percent, rounded to one decimal place

[4] No output active = standby / all outputs active

Plate heat exchanger corrosion resistance

Water containing material		Water containing material	
Chloride	See diagram	Saturation index SI	-0.2 < 0 < +0.2
Iron	< 0.2 mg/l	Total hardness	6 – 15 °dH
Manganese	< 0.1 mg/l	Filterable substances	< 30 mg/l
Ammonia	< 2 mg/l	Free chlorine	< 0.5 mg/l
pH value	7 - 9	Hydrogen sulphide	< 0.05 mg/l
Electrical conductivity	10 - 500 µS/cm	Hydrogen carbonate/sulphate	> 1 mg/l
Free carbonic acid	< 20 mg/l	Hydrogen carbonate	< 300 mg/l
Nitrate	< 100 mg/l	Sulphide	< 1 mg/l
Sulphate	< 100 mg/l	Nitrite	< 0.1 mg/l

The corrosion behaviour of stainless steel and copper solder must be considered.
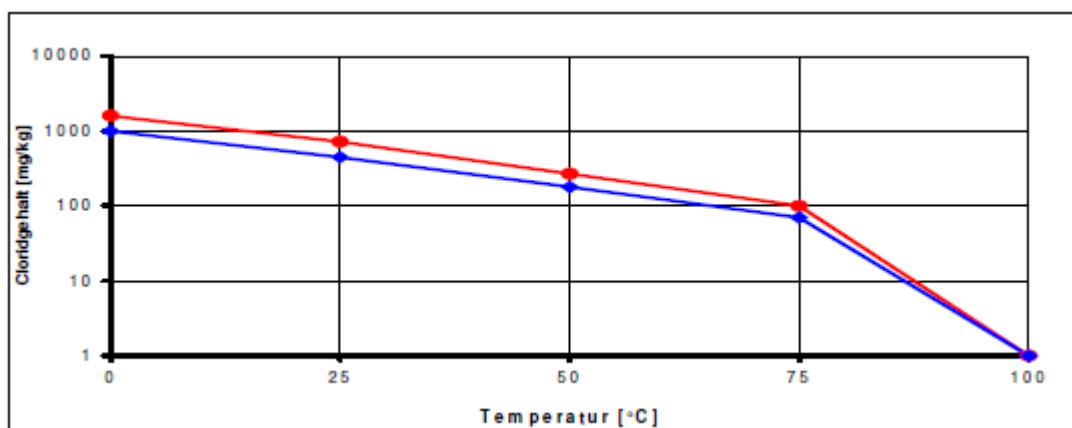
We reserve the right to make technical changes. © 2018

Tips on troubleshooting

The following troubleshooting approaches may help in the event of faulty operation, but before working on the freshwater module, it is always important to ensure that it is at zero volt and that no hot pipe temperatures can occur.

Status LED illuminated?	— Not illuminated →	Check power supply, check circuit breaker, check connecting cable and clamping
	— Illuminated/flashing differently →	See table "LED status indication" on page 21

Illuminated green ↓

Is the pump running in manual mode?	— Not running →	Check pump cable (power supply and PWM) to pump and terminal, check pump for seizing (corrosion)

Running ↓

Is DHW available after manual mode?	— DHW avail. →	Check flow switch cable

DHW not avail. ↓

Vent primary side, check valves

Other possible solutions:
- Check temperature sensors (sensors and wiring)
- Check cable connection between controller and flow sensor
- Check water pressure on secondary side
- Check flow sensor for contamination
- Check position of set value adjuster (may be twisted by 180°)

EU Declaration of conformity

Document- Nr. / Date: TA18002 / 25.06.2018

Company / Manufacturer: Technische Alternative RT GmbH

Address: A- 3872 Amaliendorf, Langestraße 124

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product name: FRISTAR 2-WP

Product brand: Technische Alternative RT GmbH

Product description: Fresh water station

The object of the declaration described above is in conformity with Directives:

2014/35/EU	Low voltage standard
2014/30/EU	Electromagnetic compatibility
2011/65/EU	RoHS Restriction of the use of certain hazardous substances
2009/125/EC	Eco-design directive

Employed standards:

EN 60730-1: 2011	Automatic electrical controls for household and similar use – Part 1: General requirements
EN 61000-6-3: 2007 +A1: 2011 + AC2012	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN 61000-6-2: 2005 + AC2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 50581: 2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

For Grundfos pump: EN 60335-1:2012/AC:2014, EN 60335-2-51:2003/A1:2008/A2:2012, EN 55014-1:2006/A1:2009, EN 55014-2:1997/A1:2001/A2:2008, EN 16297-1:2012, EN 16297-2:2012, EN 16297-3:2012

Position of CE - label: On packaging, manual and type label

$C \epsilon$

Issuer: Technische Alternative RT GmbH
A- 3872 Amaliendorf, Langestraße 124

This declaration is submitted by

Dipl.-Ing. Andreas Schneider, General manager,
02/02/2017

This declaration certifies the agreement with the named standards, contains however no warranty of characteristics.

The security advices of included product documents are to be considered.

Guarantee conditions

Note: The following guarantee conditions do not in any way limit the legal right to a guarantee, rather expand your rights as a consumer.

1. The company Technische Alternative RT GmbH provides a two-year guarantee from the date of purchase for all the devices and parts which it sells. Defects must be reported immediately upon detection and within the guarantee period. Technical support knows the correct solution for nearly all problems. In this respect, contacting us immediately will help to avoid unnecessary expense or effort in troubleshooting.

2. The guarantee includes the free of charge repair (but not the cost of on-site fault-finding, removal, refitting and shipping) of operational and material defects which impair operation. In the event that a repair is not economically worthwhile according to the assessment of Technische Alternative, the goods will be replaced.

3. Not included is damage resulting from the effects of overvoltages or abnormal ambient conditions. Likewise, no guarantee liability can be accepted if the device defect is due to: transport damage for which we are not responsible, incorrect installation and assembly, incorrect use, non-observance of operating and installation instructions or incorrect maintenance.

4. The guarantee claim will expire if repairs or actions are carried out by persons who are not authorised to do so or have not been so authorised by us or if our devices are operated with spare, supplementary or accessory parts which are not considered to be original parts.

5. The defective parts must be sent to our factory with an enclosed copy of the proof of purchase and a precise description of the defect. Processing is accelerated if an RMA number is applied for via our home page www.ta.co.at. A prior clarification of the defect with our technical support is necessary.

6. Services provided under guarantee result neither in an extension of the guarantee period nor in a resetting of the guarantee period. The guarantee period for fitted parts ends with the guarantee period of the whole device.

7. Extended or other claims, especially those for compensation for damage other than to the device itself are, insofar as a liability is not legally required, excluded.

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