

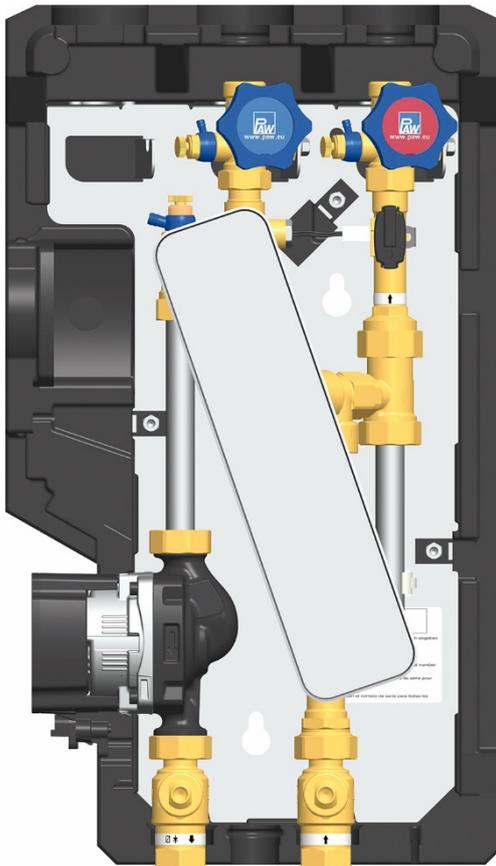


Installation and Operation Instructions

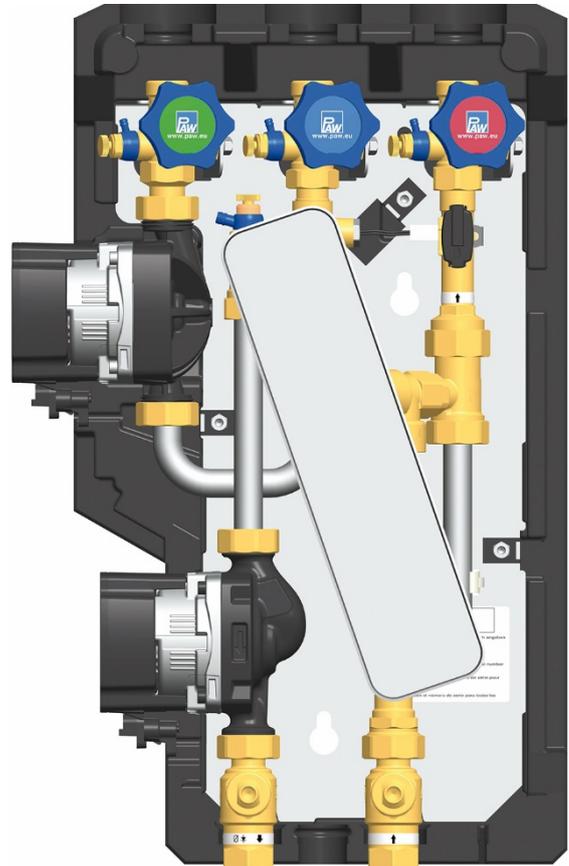
Domestic hot water module

FriwaMini - DN 15

FriwaMini with circulation - DN 15



FriwaMini



FriwaMini with circulation

Item no. 9964014xx-mub-en - Version V04 - Issued 2020/01

Translation of the original instructions

We reserve the right to make technical changes without notice!

Printed in Germany – Copyright by PAW GmbH & Co. KG

PAW GmbH & Co.KG

Böcklerstraße 11

31789 Hameln

Germany

Contents

1	General Information	4
1.1	Scope of these instructions	4
1.2	About this product	5
1.3	Designated use	5
2	Safety instructions	6
3	Product description	7
4	Dimensioning and planning	8
4.1	Dimensioning of the tank	9
4.2	Water quality requirements	10
5	Circulation mode	12
6	Mounting and installation [specialist]	13
7	Commissioning [specialist]	16
7.1	Filling the primary circuit	17
7.2	Commissioning of the controller	18
7.3	Maximum withdrawal flow rate	20
7.4	Adjustment of the temperature	22
8	Maintenance	24
9	Disposal	24
10	Spare parts [specialist]	25
10.1	Spare parts controller and insulation	25
10.2	Spare parts primary circuit	26
10.3	Spare parts secondary circuit	27
11	Technical data	29
11.1	Dimensional drawing	30
11.2	Pressure drop and pump characteristic curve	30
12	Commissioning report	31



Carefully read these instructions before installation and commissioning.
Save these instructions in the vicinity of the installation for future reference.

1 General Information

1.1 Scope of these instructions

These instructions describe the installation, commissioning, function and operation of the FriwaMini domestic hot water module. The chapters called [specialist] are intended for specialists only.

For other components of the system, such as tanks, controllers or pumps, please observe the instructions of the corresponding manufacturer.

Station	Item number	Controller FC4.13	Pump ' prim./sec.	Heat exchanger
FriwaMini	6401410		Prim: Grundfos UPM3 15-75 FlowEstimation	50 plates
FriwaMini with circulation	6401415		Prim: Grundfos UPM3 15-75 FlowEstimation	
			Sec: Grundfos UPM3 15-70 CIL3	
FriwaMini with coated heat exchanger	6401430		Prim: Grundfos UPM3 15-75 FlowEstimation	32 plates
FriwaMini with circulation and coated heat exchanger	6401435		Prim: Grundfos UPM3 15-75 FlowEstimation	
			Sec: Grundfos UPM3 15-70 CIL3	

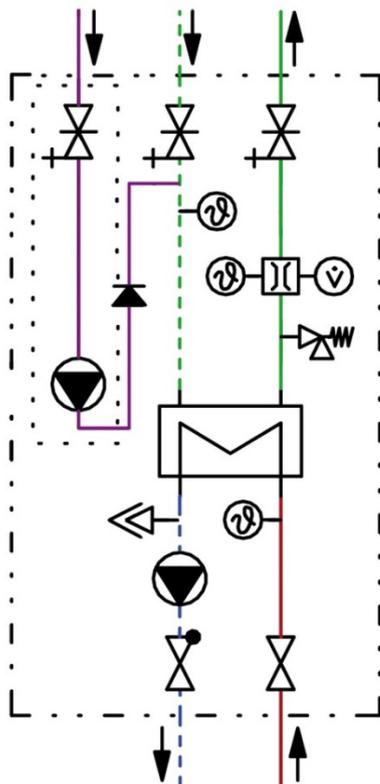
CE Declaration of Conformity

The domestic hot water module complies with the relevant directives and is therefore labelled with the CE mark. The Declaration of Conformity is available upon request, please contact the manufacturer.

1.2 About this product

The FriwaMini is a domestic hot water module operating on the principle of a flow-type water heater. The domestic hot water module is a premounted group of fittings checked for tightness and used to transfer the heat between the buffer tank and the domestic hot water circuit.

It contains a preset controller and important fittings for the operation of the system:



- Ball valves in the primary circuit
- Piston valves in the secondary circuit
- Pressure relief valve in the secondary circuit
- Premounted controller
- Temperature sensor at the cold water inlet
- Temperature sensor in the heating circuit flow line
- Flow meter at the domestic hot water outlet
- Primary and circulation pump, can be isolated
- Manual vent valve for venting the heat exchanger and the pump

1.3 Designated use

The domestic hot water module must only be mounted in heating installations between the buffer tank and the domestic hot water circuit. Due to its design, the station must be mounted and operated in a vertical position! The technical limit values specified in these instructions must be observed.

Only use PAW accessories with the domestic hot water module.

Using the station contrary to its designated use will invalidate all liability claims.

Do not put the module into operation in case of any visible damage.

2 Safety instructions

The installation and commissioning as well as the connection of electrical components require technical knowledge commensurate with a recognised vocational qualification as a fitter for plumbing, heating and air conditioning technology, or a profession requiring a comparable level of knowledge [specialist].

The following must be observed during installation and commissioning:

- relevant local and national regulations
- accident prevention regulations of the professional association
- instructions and safety instructions mentioned in these instructions

ATTENTION

Material damage due to mineral oils!

Mineral oil products cause permanent damage in the material, resulting in its sealing characteristics getting lost. We cannot be held liable for damage caused by seals damaged in this way, and nor will we give warranty replacement for such parts.

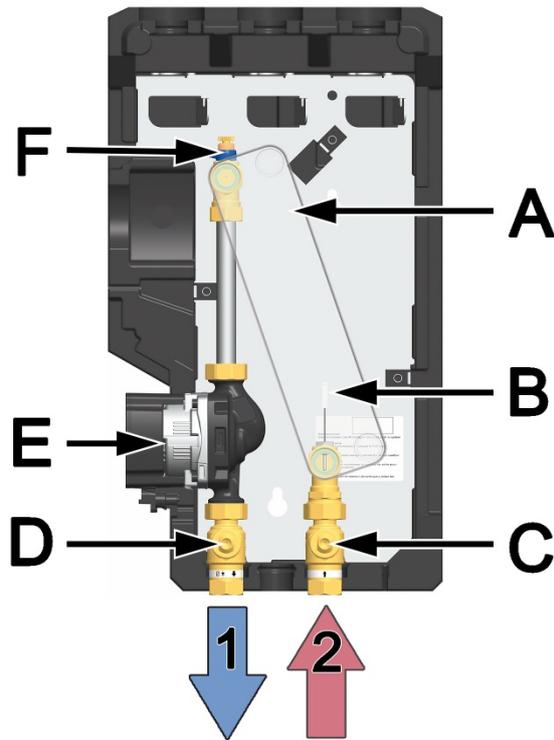
- It is imperative to prevent the EPDM sealing elements from making contact with substances containing mineral oils.
- Use a silicone- or polyalkylene-based lubricant free of mineral oil such as Unisilikon L250L and Syntheso Glep 1 from Klüber or a silicone spray.

ATTENTION

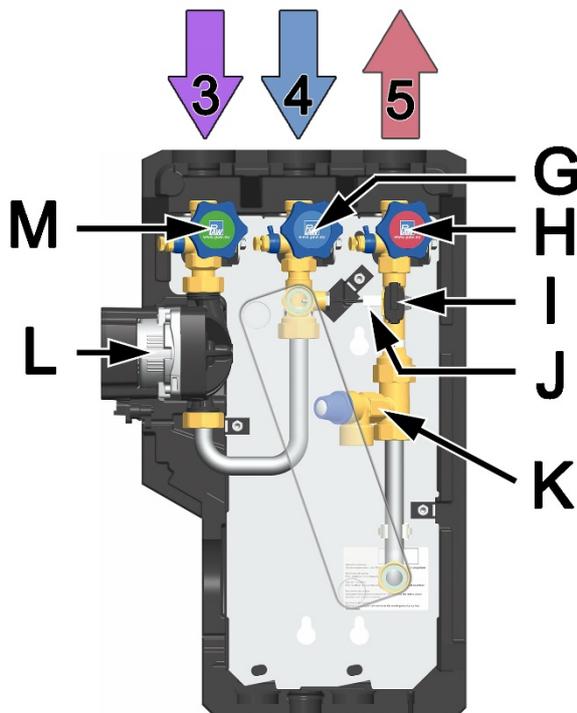
Malfunction!

- The domestic hot water module must be integrated in the potential equalisation of the electric installation. This can be guaranteed by establishing a potential equalisation connection to the main potential connection according to regulations or by the connected pipe system.

3 Product description



Primary circuit



Secondary circuit

Example: FriwaMini with circulation

Connections

- 1 Primary side/heating side:
Return to the buffer tank
- 2 Primary side/heating side:
Flow from the buffer tank
- 3 Secondary side/DHW side:
Hot water supply, circulation
- 4 Secondary side/DHW side:
Cold water supply
- 5 Secondary side/DHW side:
Hot water outlet

Equipment primary circuit

- A Heat exchanger
- B Temperature sensor Pt1000
- C Ball valve
- D Ball valve with check valve
- E Primary pump
- F Manual vent valve

Equipment secondary circuit

- G Piston valve with drain valve
(cold water inlet)
- H Piston valve with drain valve
(hot water outlet)
- I Analogue flow rate sensor, VFS 2-40 l/min
- J Temperature sensor Pt1000
- K Pressure relief valve 10 bars

Only for the protection of the station. Does not replace the pressure relief valve that has to be mounted on site!

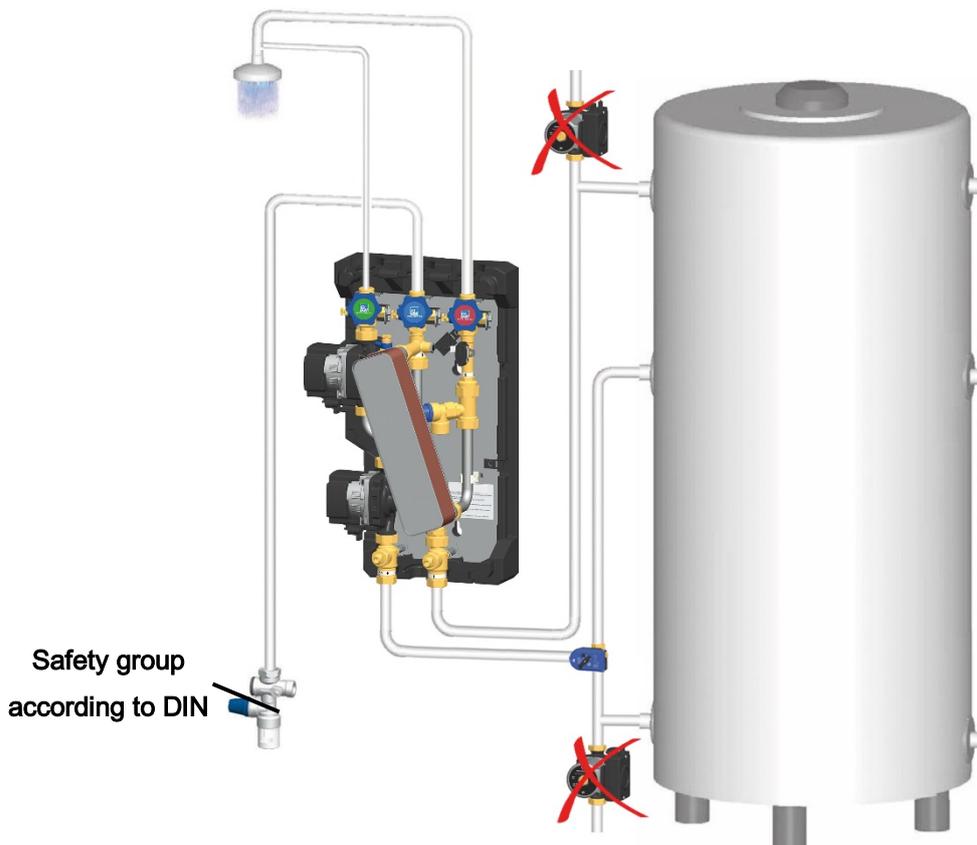
- L Circulation pump
- M Piston valve with drain valve (circulation)

4 Dimensioning and planning

The DHW module will only work flawlessly if the installation meets certain requirements. Please take some time to plan the assembly.

	WARNING
<p>Danger of scalding due to hot water!</p> <p>Undesirable circulation of water in the primary circuit can cause the exit of water of up to 90 °C at the withdrawal point.</p> <ul style="list-style-type: none"> ➤ External pumps must not be installed between the domestic hot water module and the buffer tank. ➤ The domestic hot water module must not be connected to a distribution manifold of a heating circuit. 	

Mounting example:



FriwaMini circulation with optional return distribution (item number 640425).

4.1 Dimensioning of the tank

The following table helps you to calculate the approximately required volume of the buffer tank.

Temperature in the buffer tank	Domestic hot water temperature set at the controller	Required tank volume per litre of hot water (heat exchanger uncoated)	Required tank volume per litre of hot water (heat exchanger coated)
50 °C	45 °C	1.6 litres	1.9 litres
60 °C*	45 °C	0.9* litres	1.1 litres
	50 °C	1.2 litres	1.5 litres
	55 °C	1.7 litres	2.1 litres
70 °C	50 °C	0.9 litres	1.0 litres
	55 °C	1.1 litres	1.2 litres
	60 °C	1.3 litres	1.6 litres
80 °C	50 °C	0.7 litres	0.8 litres
	55 °C	0.9 litres	0.9 litres
	60 °C	1.0 litres	1.1 litres

*Calculation example for the dimensioning of the buffer tank:

Temperature of the buffer tank: 60 °C

Maximum withdrawal quantity needed: 20 l/min

Domestic hot water temperature set at the controller: 45 °C

How large must the tank be to allow for a continuous withdrawal during 20 minutes without post-heating?

$$20 \text{ l/min} \times 20 \text{ min} = 400 \text{ l}$$

$$400 \text{ l} \times 0.9 = 360 \text{ l}$$

The heated part of the buffer tank must have a volume of 360 litres.

4.2 Water quality requirements

The domestic hot water modules constructively decrease the precipitation of chalk in the heat exchanger.

For installations with an elevated total hardness of the potable water and/or high temperatures, a water treatment is recommended.

The choice of the heat exchanger depends on the requirements of the installation location. Depending on the chemical composition of the water at the installation site, the adequacy of the plate heat exchanger has to be checked.

Please observe the following table:

Influence of the water quality on the corrosion resistance for domestic hot water applications

Water content	Concentration (mg/l or ppm)	Time limits	Heat exchanger with copper solder	Coated heat exchanger
Alkalinity (HCO ₃ ⁻)	< 70	within of 24 hours	0	+
	70-300		+	+
	> 300		0/+	+
Sulphate (SO ₄ ²⁻)	< 70	no limit	+	+
	70-300		0/-	+
	> 300		-	+
HCO ₃ ⁻ / SO ₄ ²⁻	> 1.0	no limit	+	+
	< 1.0		0/-	+
Electrical conductivity	< 10 µS/cm	no limit	0	+
	10-500 µS/cm		+	+
	> 500 µS/cm		0	+
pH value	< 6.0	within of 24 hours	0	+
	6.0-7.5		0	+
	7.5-9.0		+	+
	9.0-10		0	0
	> 10.0		0	-

4 Dimensioning and planning

Ammonium (NH ₄ ⁺)	< 2	within of 24 hours	+	+
	2-20		0	+
	> 20		-	-
Chloride (Cl ⁻)	< 100	no limit	+	+
	100-200		+	+
	200-300		+	+
	> 300		0/+	0
Free chlorine (Cl ₂)	< 1	within of 5 hours	+	+
	1-5		0	0
	> 5		0/-	0
Hydrogen sulphide (H ₂ S)	< 0.05	no limit	+	+
	> 0.05		0/-	0
Free (aggressive) carbon dioxide (CO ₂)	< 5	no limit	+	+
	5-20		0	+
	> 20		-	+
Total hardness (°dH)	4.0-8.5	no limit	+	+
Nitrate (NO ₃ ⁻)	< 100	no limit	+	+
	> 100		0	+
Iron (Fe)	< 0.2	no limit	+	+
	> 0.2		0	+
Aluminium (Al)	< 0.2	no limit	+	+
	> 0.2		0	+
Manganese (Mn)	< 0.1	no limit	+	+
	> 0.1		0	+

+ Good durability under normal conditions

0 Corrosion may occur, especially if further factors are evaluated with 0

- Use is not recommended

5 Circulation mode

The domestic hot water module is equipped with a circulation pump.

For the operation of the circulation pump, three possible operation modes are stored in the controller (see controller instructions, page 21).

- **Pulse-controlled operation** (depending on the demand / requirements):

The short actuation of a hot water tap (tap pulse: ~2 sec.) starts the circulation pump. The circulation pump will then run for several minutes (adjustable).

- **Time-dependent operation:**

The operation of the circulation pump can be set on a week clock within freely selectable periods of time. In this operation mode, the circulation is activated at the beginning of the period of time chosen. The circulation will stop after the end of the chosen period of time.

- **Temperature-dependent operation:**

In this operation mode, the circulation is only activated if the adjustable minimum temperature at the circulation temperature sensor is not reached during the chosen period of operation. The circulation stops after the required temperature has been reached or after the end of the chosen period of time.

The operating modes can be combined with each other as wished, f. ex. the time- and the temperature-dependent operating modes. The circulation is only activated if the temperature at the circulation temperature sensor falls below the required value and if the time window is active.

Outside the time slot, the circulation pump can be activated by a tap pulse if the pulse-controlled operation mode is additionally activated.

ATTENTION

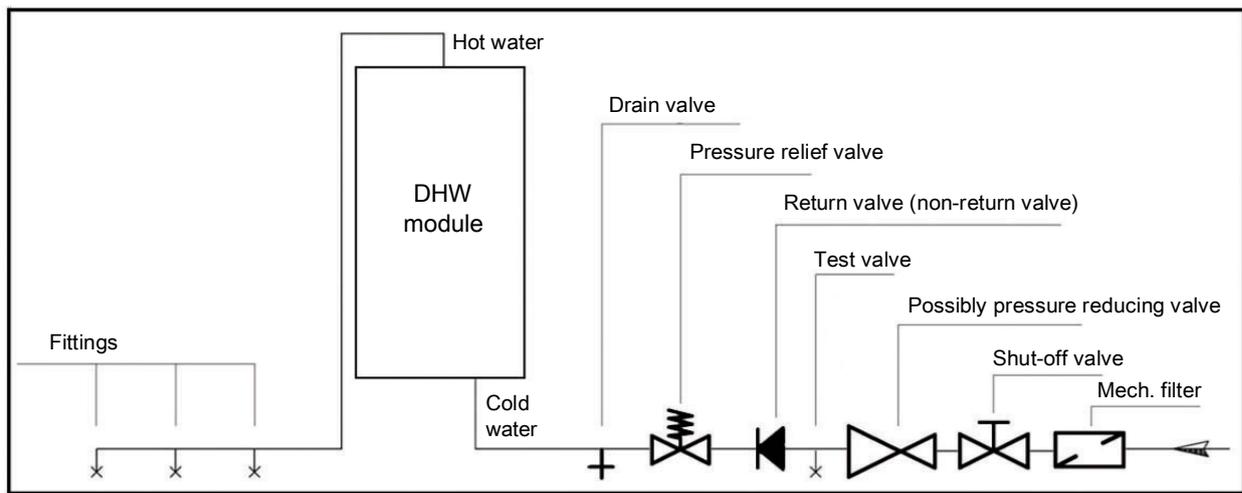
Damage to property!

When the domestic hot water module is delivered, the circulation is not activated (see controller instructions, page 15). During commissioning the operation mode must be selected and pre-set under all circumstances. The revolution speed of the circulation pump must be defined by the PWM signal (factory setting: 100 %).

6 Mounting and installation [specialist]

The domestic hot water module must only be connected with the storage tank by separate connections for the flow and return. External pumps must not be installed between the domestic hot water module and the buffer tank. The circulation of water causes considerable temperature fluctuations.

The domestic hot water connection must be carried out in accordance with the relevant norms (for example DIN 1988)!



ATTENTION

Damage to property!

The pressure relief valve integrated in the station does not replace the safety groups of the potable water connection as per DIN 1988. The pressure relief valve only protects the module from overpressures in case of servicing.

ATTENTION

Damage to property!

If there are water supplies that may cause pressure surges (for example flush valves, washing machines or dishwashers), connected to the same mains as the domestic hot water module, we recommend the installation of water hammer arresters close to the place where these pressure surges may be caused.

For example the make Flexofit S of the Flamco GmbH company or the make WD of the Reflex Winkelmann GmbH company.

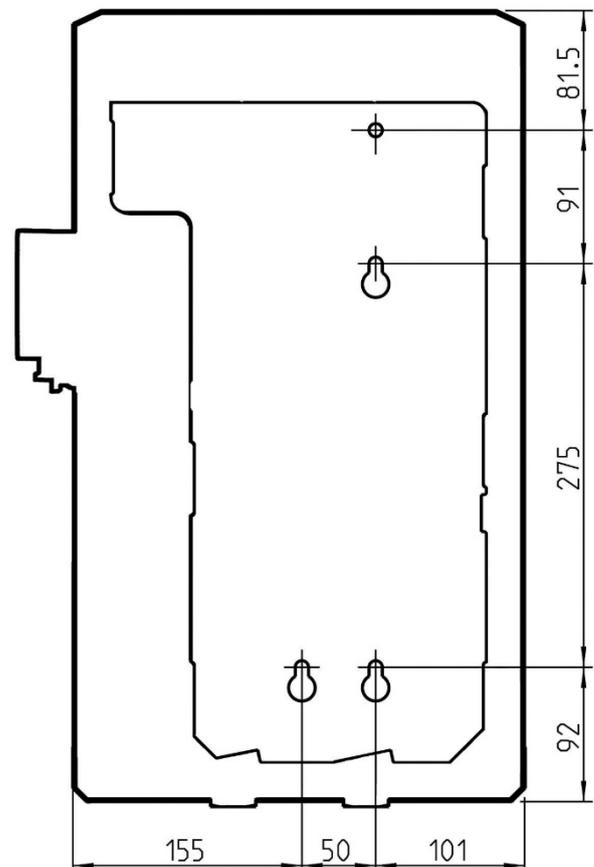
	WARNING
	<p>Risk to life and limb due to electric shock!</p> <ul style="list-style-type: none"> ➤ Prior to commencing electrical work on the controller, pull the mains plug! ➤ Only after completing all installation work, plug the mains plug of the controller into a socket. This avoids an unintentional start of the motors.

ATTENTION

Damage to property!

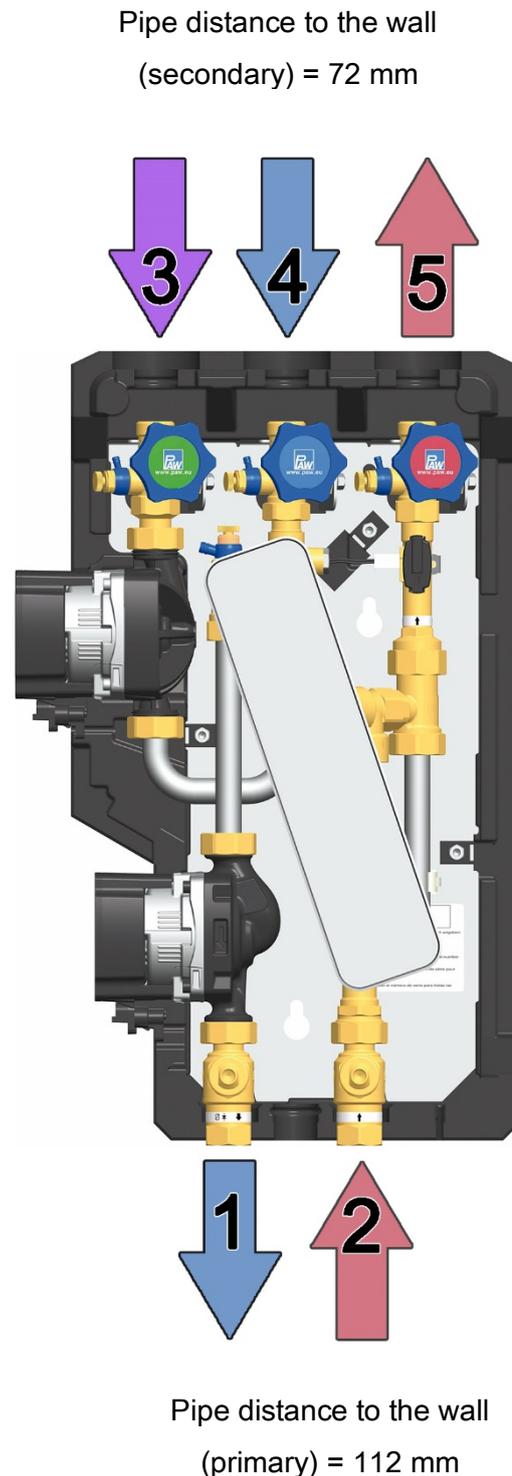
The installation site must be dry, stable, frost-proof and protected against ultraviolet radiation in order to prevent material damage of the installation.

1. Determine the mounting location of the domestic hot water module near the buffer tank. The pipes in the heating circuit must not exceed a length of 4 m for DN 20.
2. Copy the measures for the mounting holes to the wall.
You can find a corresponding drilling template (see on the right) on the paper board under the domestic hot water module.
3. Drill the holes and insert adequate wall plugs into the holes.
4. Turn the screws into the wall plugs in such a way that about 40 mm of each screw still stick out.
5. Remove the insulating front shell.
6. Hang the domestic hot water module onto the screws. Tighten the screws, so that the sides of the insulation are flush to the wall.



7. Connect the domestic hot water module with the installation by using the piping according to the adjacent figure.

- 1 **Primary side:**
return to the buffer tank,
connection: $\frac{3}{4}$ " internal thread,
pipes
at least DN 20: 22 x 1 mm,
recommended DN 25: 28 x 1.5 mm
- 2 **Primary side:**
flow from the buffer tank,
connection: $\frac{3}{4}$ " internal thread,
pipes
at least DN 20: 22 x 1 mm,
recommended DN 25: 28 x 1.5 mm
- 3 **Secondary side:**
hot water supply, circulation,
connection: $\frac{3}{4}$ " external thread,
flat sealing
- 4 **Secondary side:**
cold water inlet,
connection: $\frac{3}{4}$ " external thread,
flat sealing
- 5 **Secondary side:**
hot water outlet,
connection: $\frac{3}{4}$ " external thread,
flat sealing



7 Commissioning [specialist]

NOTICE

Slowly open the valves in the pipes and in the module in order to prevent pressure surges.

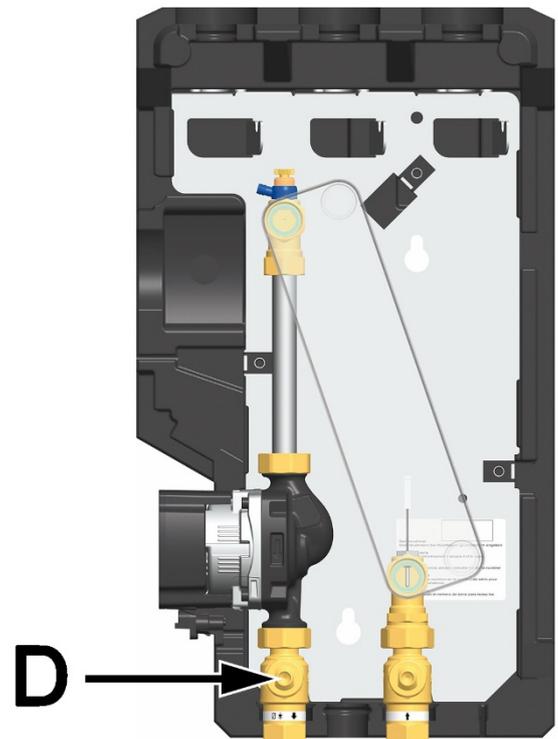
Functioning check valve

The primary circuit is equipped with a check valve in the ball valve (D), in order to avoid unwanted gravity circulation.

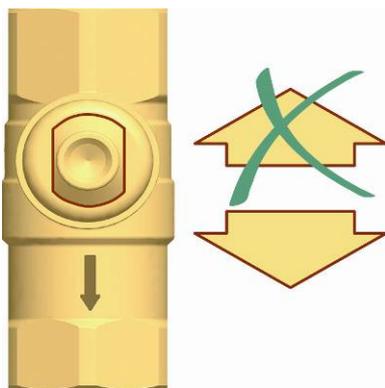
For venting and flushing the installation, the check valve must be open. For this purpose, turn the ball valve into the position 45° .

In this position, the check valve is not operating.

For the operation of the installation, all (ball) valves must be **completely** open (position 0°).

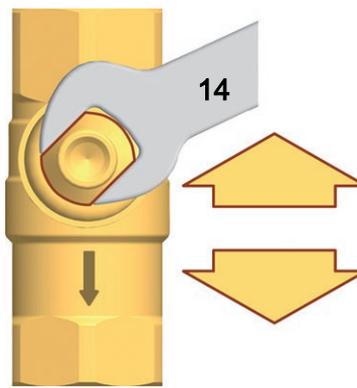


Position 0°



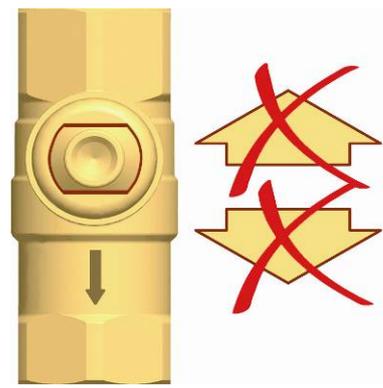
Check valve in operation, through-flow in flow direction only.

Position 45°



Check valve not in operation, through-flow in both directions.

Position 90°



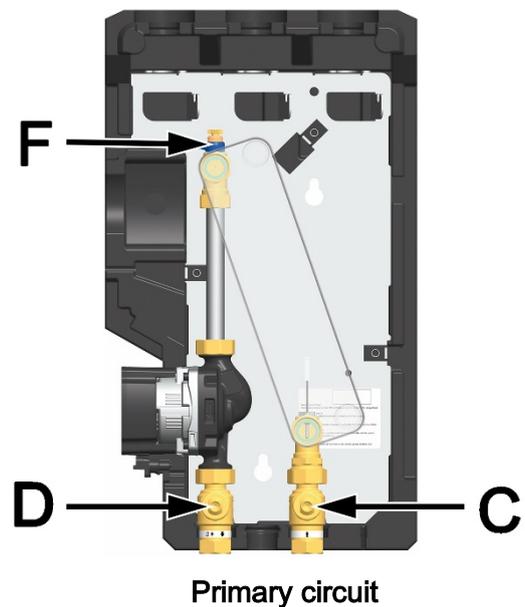
Ball valve closed, no through-flow.

7.1 Filling the primary circuit

	<p>! WARNING</p> <p>Danger of scalding due to hot water!</p> <p>The system is under pressure. By opening the vent valve, hot water with a temperature of up to 90 °C may exit and cause personal injury.</p> <ul style="list-style-type: none"> ➤ Open the vent valve slowly and with sufficient distance.
---	---

If the storage tank is (partly) filled

1. Slowly open the ball valve (C) by turning it into position 0°.
2. Fill the storage tank using the fill valves available on site until an operating pressure of about 1.5 bars* is reached. Use heating water compliant with the standards VDI 2035 / Önorm H5195-1.
3. Manipulate the vent valve (F) cautiously to let the air escape.
4. Close the vent valve (F).
5. Close the ball valve (C) by turning it into position 90°.
6. Slowly open the ball valve (D) by turning it into position 45°.
7. Manipulate the vent valve (F) cautiously to let the air escape.
8. Close the vent valve (F).
9. Check the operating pressure of the storage tank after the venting and increase the pressure if necessary.
10. Open the ball valves (C) and (D) completely by turning them into position 0°.



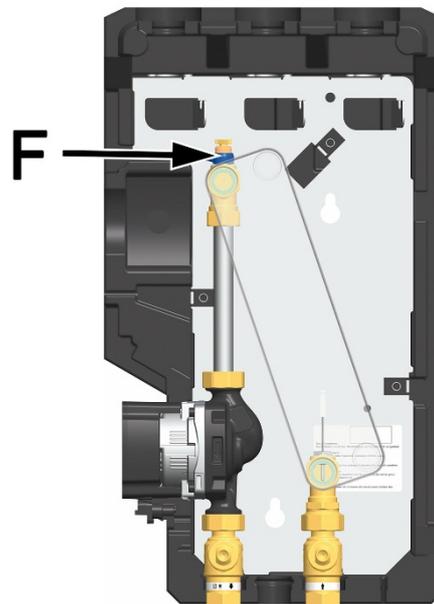
*1.5 bars in the primary circuit = recommended minimum value

The pressure depends on the individual system pressures and the components of the heating installation!

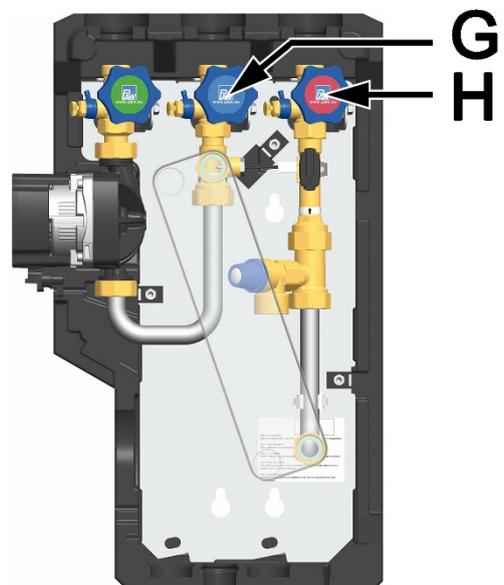
7.2 Commissioning of the controller

	WARNING
	<p>Risk to life and limb due to electric shock!</p> <ul style="list-style-type: none"> ➤ Check whether the sensors and pumps have been connected to the controller and the controller housing is closed. <p>Only under these circumstances, the mains plug of the controller can be plugged into a socket.</p>

1. Connect the domestic hot water module to the mains (230 V, 50 Hz) by using the premounted connection cable.
2. Select "Manual mode" in the main menu of the controller and set the pump to "HE1" (PWM signal = 100 %), see controller manual page 27.
3. Let the pump run for several minutes to vent the domestic hot water module.
4. When the air noises do not stop, carefully manipulate the vent valve (F) while the pump is still running and let the air escape.
5. If the air noises have stopped, the pump can be switched off.
6. To do so, select "Manual mode" in the main menu of the controller and set the pump to "AUTO".
7. Slowly open the piston valves on the secondary side (G and H).

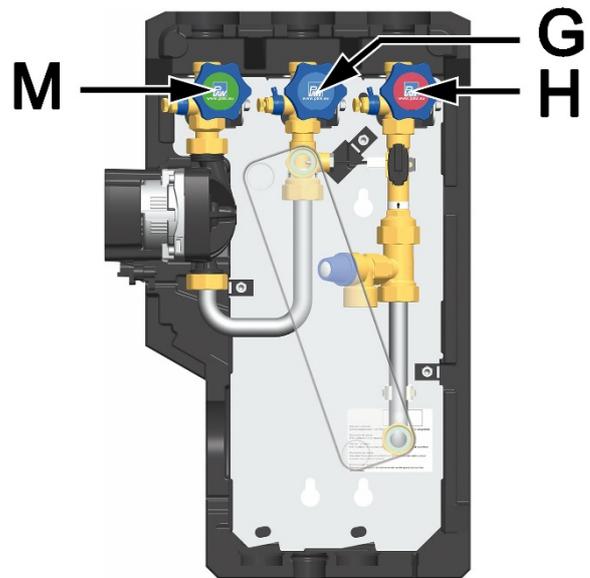


Primary circuit



Secondary circuit

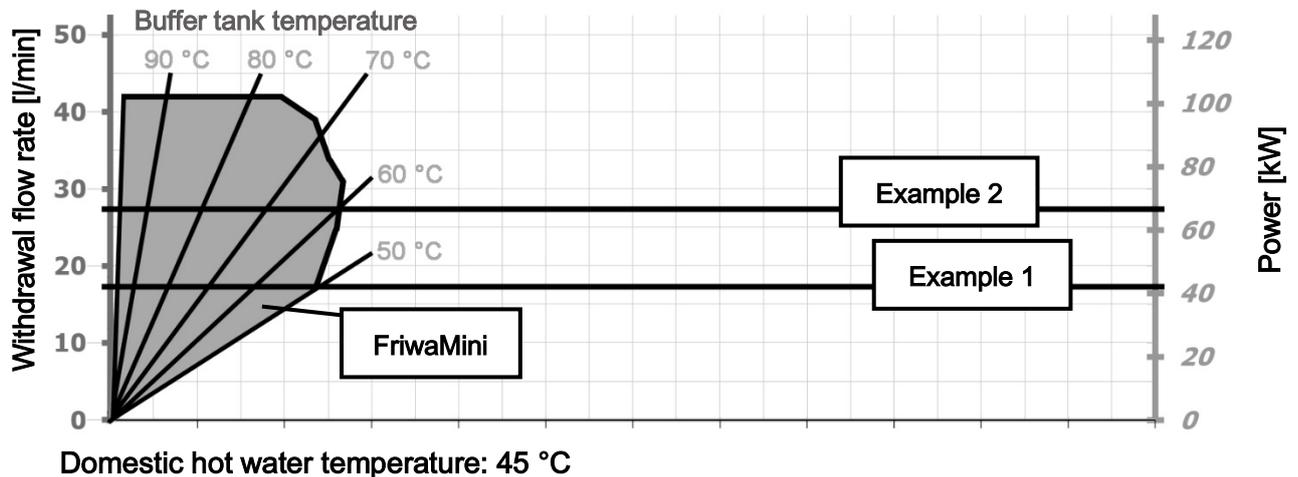
8. Open a withdrawal point for domestic hot water (for example a tap) with a flow rate of at least 10 l/min and let the water run for about 2 minutes to vent the secondary circuit. Close all withdrawal points of the secondary circuit afterwards.
9. Make sure that the domestic hot water module is correctly integrated into the potential equalisation of the installation.
10. Set the desired domestic hot water temperature at the controller (see page 22).
11. The domestic hot water module is now ready for operation.



Secondary circuit

7.3 Maximum withdrawal flow rate

The following diagram illustrates the maximum withdrawal flow rate depending on the tank temperature with a preset hot water temperature of 45 °C at the tap. The integrated control avoids temperature drops as long as the maximum flow rate is not exceeded.



Boundary conditions: Cold water temperature: 10 °C

Maximum pressure drop on the domestic hot water side of the DHW module: 1000 mbars

The following examples illustrate the correlation between the domestic hot water temperature, the withdrawal flow rate and the temperature of the buffer tank and show their impact on the heat transfer capacity of the DHW module.

Example 1

Domestic hot water temperature at the withdrawal point: 45 °C

Temperature in the buffer tank: 50 °C

→ DHW module: max. withdrawal flow rate: 18 l/min, heat transfer capacity: 41 kW

Example 2

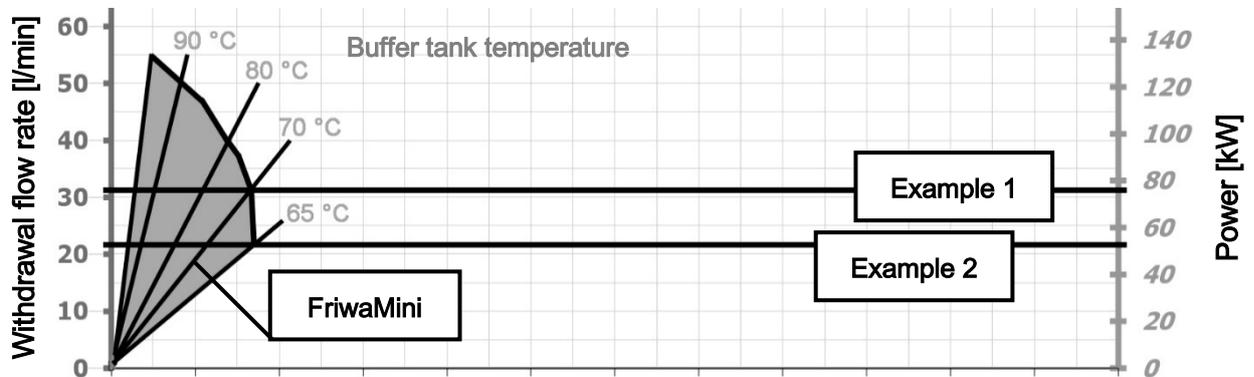
Domestic hot water temperature at the withdrawal point: 45 °C

Maximum withdrawal flow rate: 27 l/min

→ DHW module: temperature in the buffer tank: 60 °C, heat transfer capacity: 67 kW

The following diagram illustrates the maximum withdrawal flow rate at a domestic hot water temperature of 45 °C at the tap, after the addition of cold water of 10 °C.

The domestic hot water temperature set at the controller is of 60 °C.



Domestic hot water temperature: 45 °C, after heating to 60 °C and addition of cold water (10 °C)

Boundary conditions: Cold water temperature: 10 °C

Example 1

Domestic hot water temperature at the controller: 60 °C

Temperature in the buffer tank: 70 °C

→ DHW module: max. withdrawal flow rate: 31 l/min, heat transfer capacity: 77 kW

Example 2

Domestic hot water temperature at the controller: 60 °C

Maximum withdrawal flow rate: 21 l/min

→ DHW module: temperature in the buffer tank: ~65 °C, heat transfer capacity: 53 kW

7.4 Adjustment of the temperature

Set the desired (maximum) domestic hot water temperature at the controller under "Main menu / Hot water / T HW nom." (see controller instructions, page 19).

	<div style="background-color: yellow; padding: 5px;">! WARNING</div> <p>Danger of scalding due to hot water!</p> <p>In order to avoid scalding at the tap, the maximum domestic hot water temperature set at the controller must not exceed 60 °C.</p>
---	---

Primary side

The required temperature on the primary side in the buffer tank depends on the desired domestic hot water temperature and on the required tap quantity. The temperature in the buffer tank must be at least 5 K above the desired domestic hot water temperature.

Secondary side

The possible withdrawal flow rate [l/min] at the tap depends on the domestic hot water temperature adjusted at the controller and on the temperature available in the buffer tank.

The recommended maximum domestic hot water flow rate through the domestic hot water module is ~42 l/min.

The following table illustrates the correlation between the storage tank temperature and the maximum withdrawal flow rate at a water temperature of 45 °C at the tap (f. ex. single lever tap). If the domestic hot water temperature set at the controller is above 45 °C, the tap flow rate consists of a mixture of hot and cold water.

The indicated heat transfer capacity is necessary to heat up the water quantity of the withdrawal flow rate [l/min] from 10 °C to 45 °C.

Temperature in the buffer tank	Hot water temperature set at the controller	Maximum flow rate from the DHW module with the set hot water temperature		Max. withdrawal flow rate at the tap with a temperature of 45 °C		Heat transfer capacity of the DHW module	
		Heat exchanger uncoated	Heat exchanger coated	Heat exchanger uncoated	Heat exchanger coated	Heat exchanger uncoated	Heat exchanger coated
50 °C	45 °C	18 l/min	16 l/min	18 l/min	16 l/min	44 kW	40 kW
	45 °C	31 l/min	28 l/min	31 l/min	28 l/min	76 kW	69 kW
	50 °C	24 l/min	22 l/min	27 l/min	24 l/min	67 kW	60 kW
60 °C	55 °C	17 l/min	15 l/min	21 l/min	19 l/min	53 kW	48 kW
	45 °C	39 l/min*	38 l/min	39 l/min	38 l/min	95 kW	93 kW
	50 °C	32 l/min	31 l/min	36 l/min	35 l/min	89 kW	87 kW
70 °C	55 °C	27 l/min	25 l/min	34 l/min	32 l/min	85 kW	79 kW
	60 °C	22 l/min	20 l/min	31 l/min	28 l/min	77 kW	69 kW
	45 °C	42 l/min*	42 l/min*	42 l/min	42 l/min	102 kW	102 kW
80 °C	50 °C	40 l/min*	40 l/min*	45 l/min	45 l/min	112 kW	111 kW
	55 °C	34 l/min	33 l/min	43 l/min	42 l/min	107 kW	105 kW
	60 °C	29 l/min	28 l/min	41 l/min	39 l/min	101 kW	98 kW
	45 °C	42 l/min*	42 l/min*	42 l/min	42 l/min	102 kW	102 kW

at a cold water temperature of 10 °C, reheating not considered

*maximum flow rate: 42 l/min, with pressure drop of the DHW module of 1000 mbars

(for hydraulic reasons, higher values are only partly possible, measuring limit of the flow rate sensor ~42 l/min)

8 Maintenance

Optimal operation of the station

In order to guarantee an optimal control, no additional hydraulic pressure losses should occur on the primary side (f. ex. due to the installation of a mud strainer, a strainer or a mixing valve).

NOTICE

Hygiene recommendation

At temperatures below 60 °C, legionella bacteria can occur. After a longer downtime such as holidays, it is recommended to thoroughly flush all pipes for some minutes.

Optical control

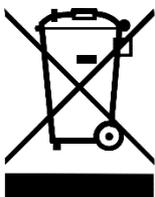
It is recommended to visually check the domestic hot water module every two months to ensure its proper operation. If you notice any problems on the system, consult a specialist.

Cleaning the station

Clean the station with a damp cloth without any detergent.

9 Disposal

Possibilities to return waste electrical and electronic equipment



Waste electrical and electronic equipment deriving from private households can be disposed at collection points of the public waste management authorities or at disposal points set up by manufacturers or distributors according to the ElektroG (Electrical and Electronic Equipment Act).

You find an online directory of all collection and disposal points here:
<https://www.ear-system.de/ear-verzeichnis/sammel-und-ruecknahmestellen.jsf>

Disposal of transport and packaging materials

The packaging materials are made of recyclable materials and can be disposed of with recyclable materials.

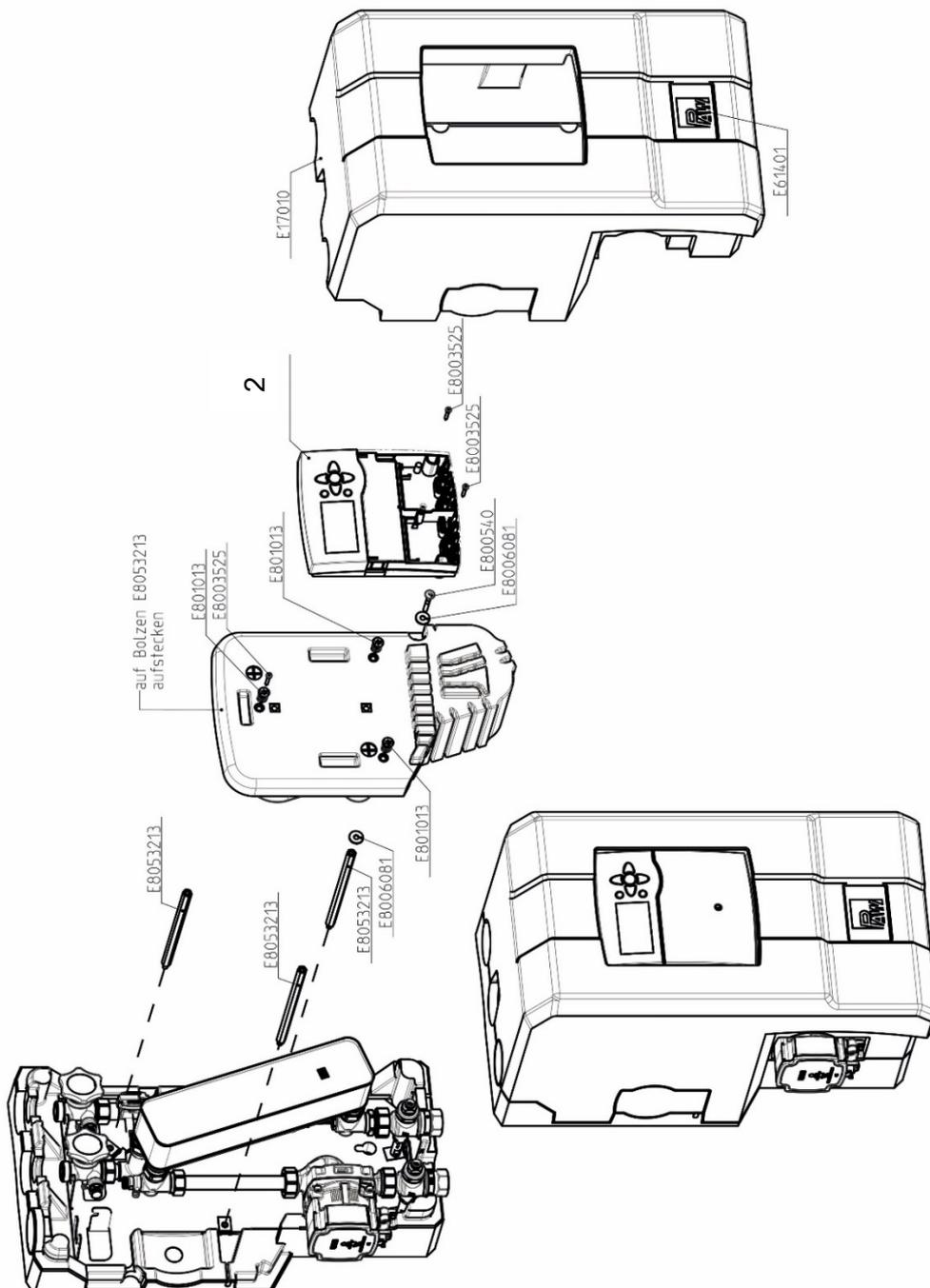
10 Spare parts [specialist]

NOTICE

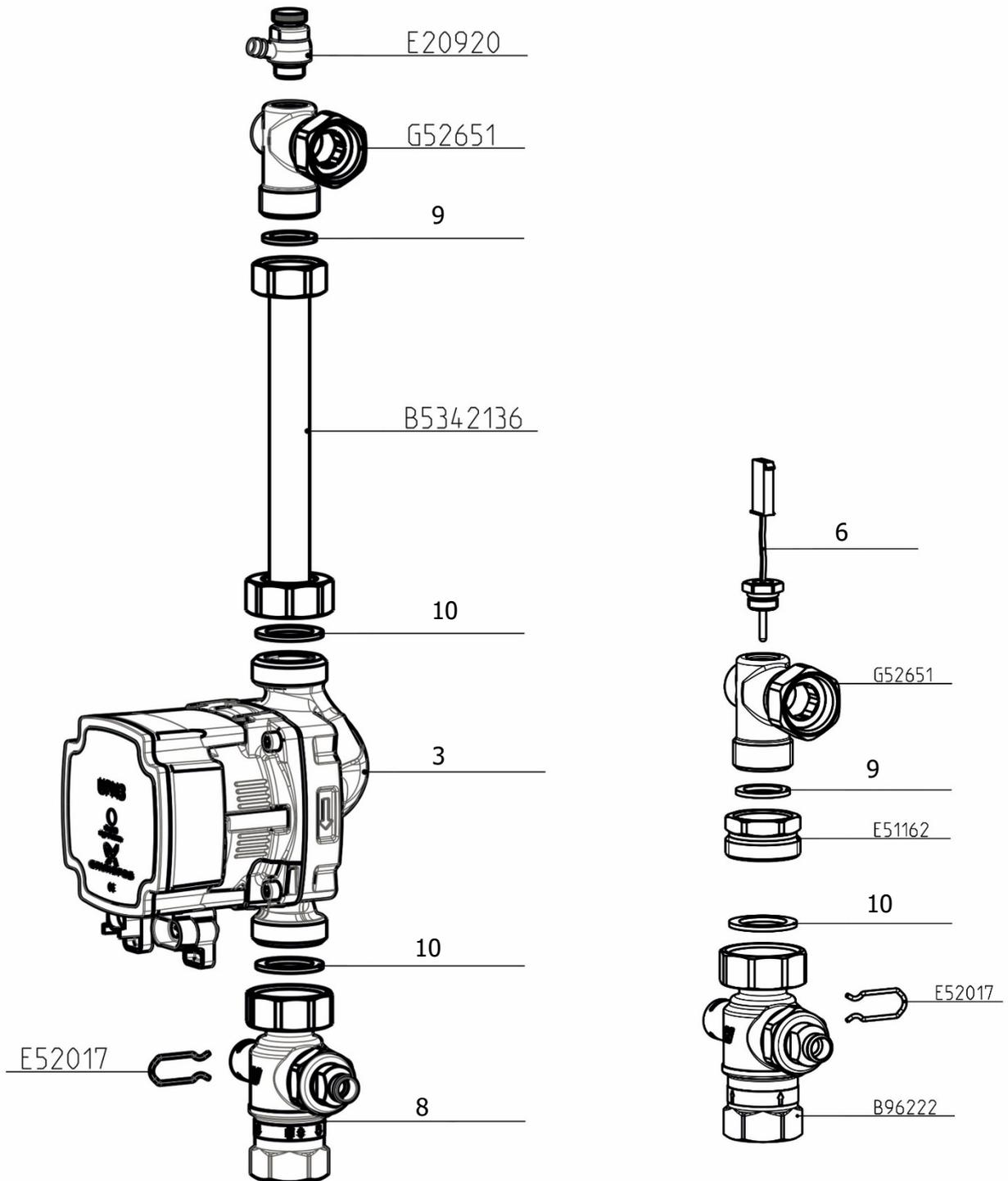
Complaints and requests/orders of spare parts will only be processed with information on the serial number!

The serial number is placed in the lower right corner of the support sheet of the station.

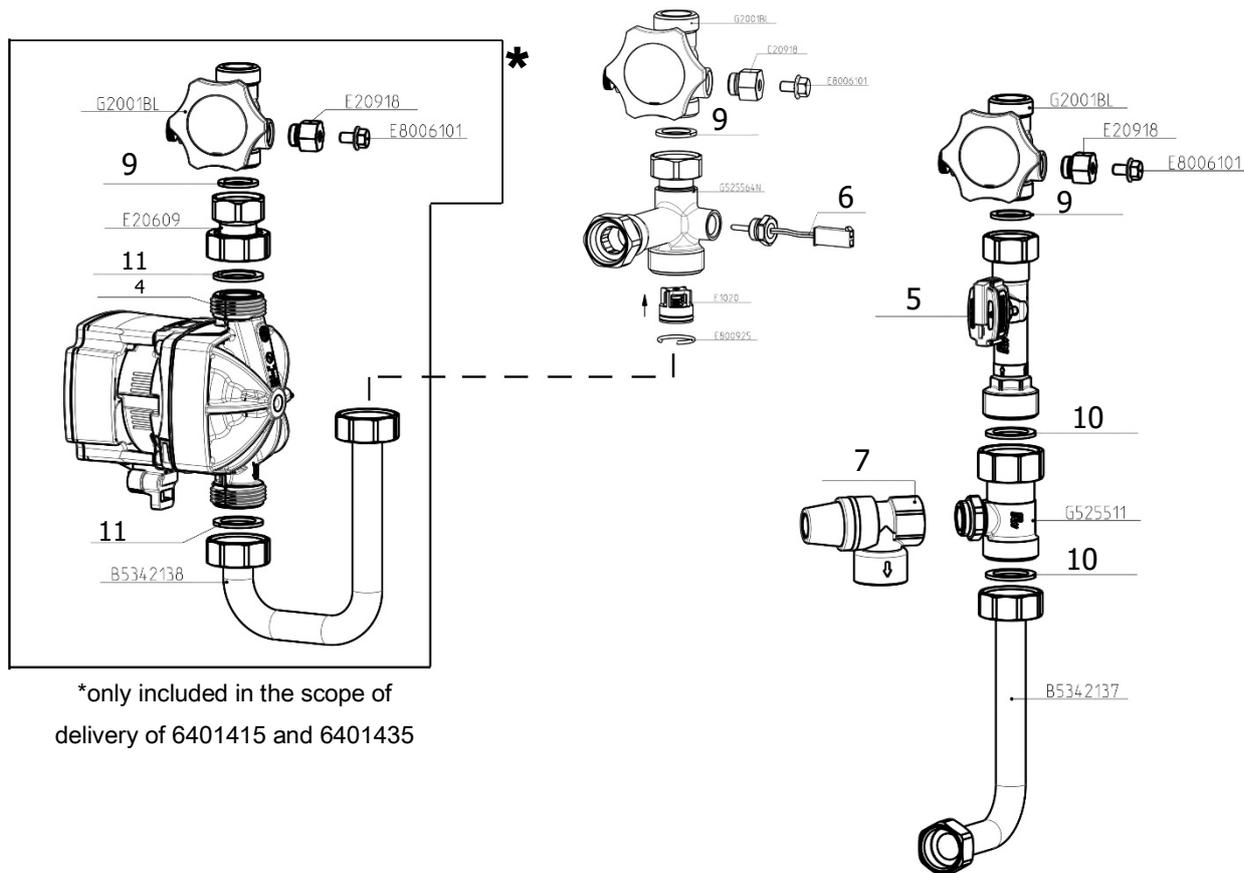
10.1 Spare parts controller and insulation



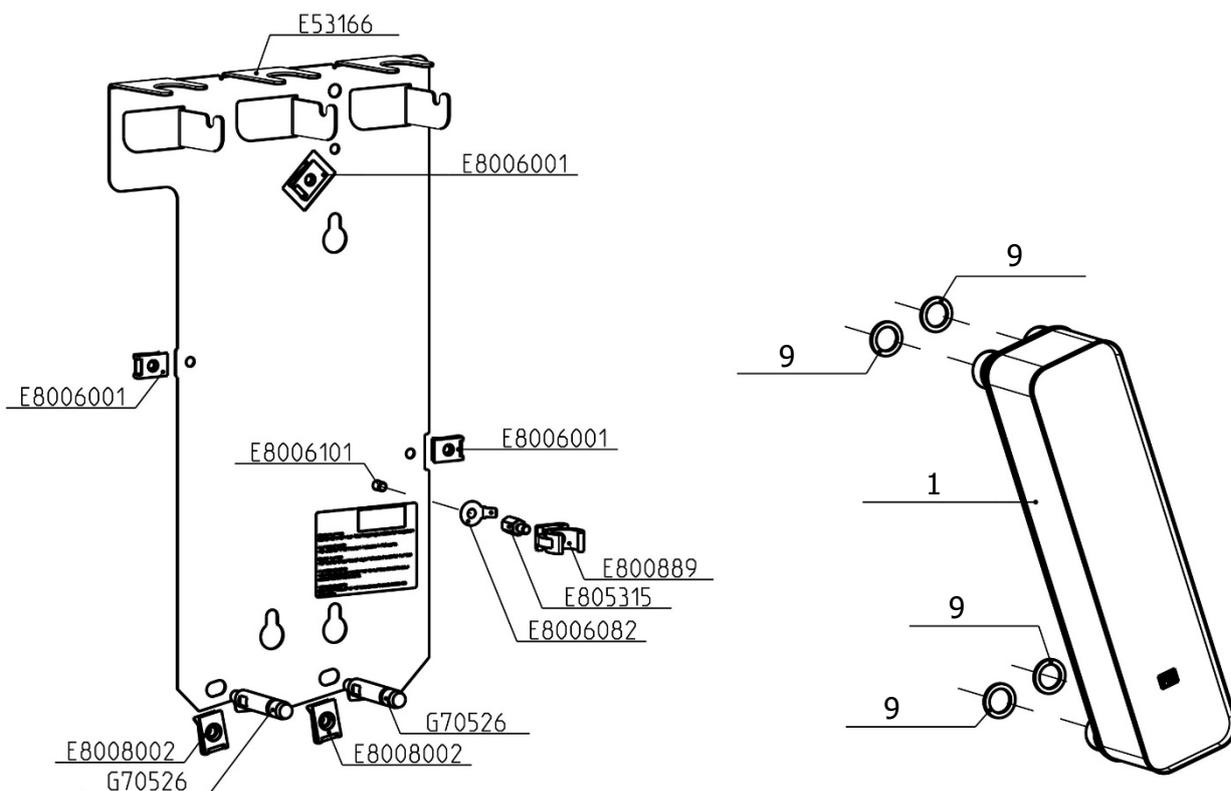
10.2 Spare parts primary circuit



10.3 Spare parts secondary circuit



*only included in the scope of delivery of 6401415 and 6401435



Pos. no.	Spare part	Item no.
1	Heat exchanger, copper solder, for 6401410 + 6401415, with seals	N00010
	Coated heat exchanger for 6401430 + 6401435, with seals	N00255
2	Controller FC4.13 with wiring harness	N00001
3	Primary pump Grundfos UPM3 15-75, with seals	N00004
4	Circulation pump Grundfos UPM3 15-70 CIL3, with seals	N00003
5	VFS sensor, 2-40l/min, with sensor cable analogue	N00026
6	Temperature sensor Pt1000-B, with connection cable	N00005
7	Pressure relief valve 1/2" x 3/4", MSV 10 bars	N00008
8	Thermometer ball valve with check valve	N00282
9	Seal 24.0 x 17.0 x 2.0, 1/4", for thread connection 3/4", AFM, 10 pieces	N00030
10	Seal 30.0 x 21.0 x 2.0, 1/2", for thread connection 1", AFM, 10 pieces	N00024
11	Seal 30.0 x 21.0 x 2.0, 1/2", for thread connection 1", EPDM, 10 pieces	N00129

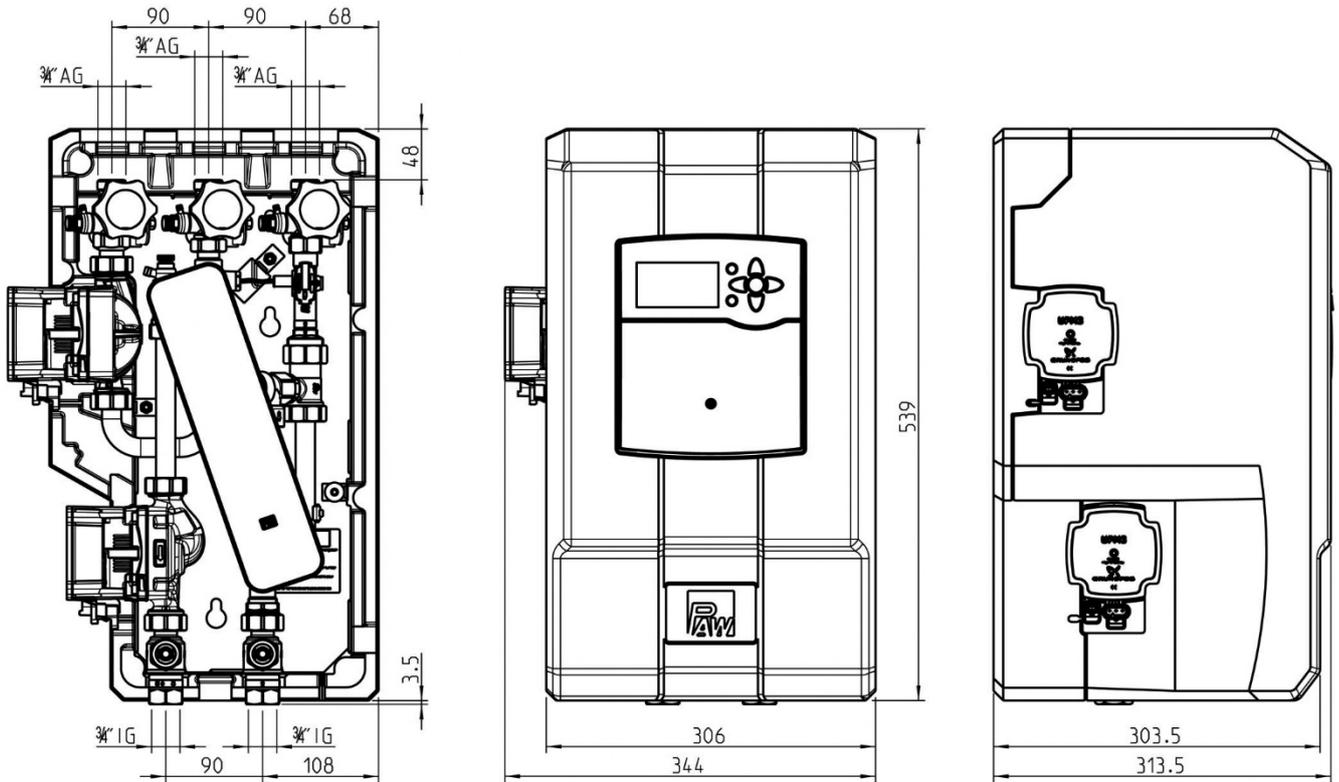
Optional accessories

Illustration	Scope of delivery	Item no.
	Return distribution set DN 25 3-way valve with actuator, K _{vs} value: 11	640425
	Safety group for domestic hot water tank DN 20, opening pressure 7 bars, brass body, chromed	563907
	Withdrawal valve flame-resistant, 1/4" ext. thread, self-sealing, 5 mm square-head wrench Note: One withdrawal valve is required for each piston valve.	640422
	Circulation set for internal retrofitting with high-efficiency pump Grundfos UPM3 15-70 CIL3 with piston valve	6404111

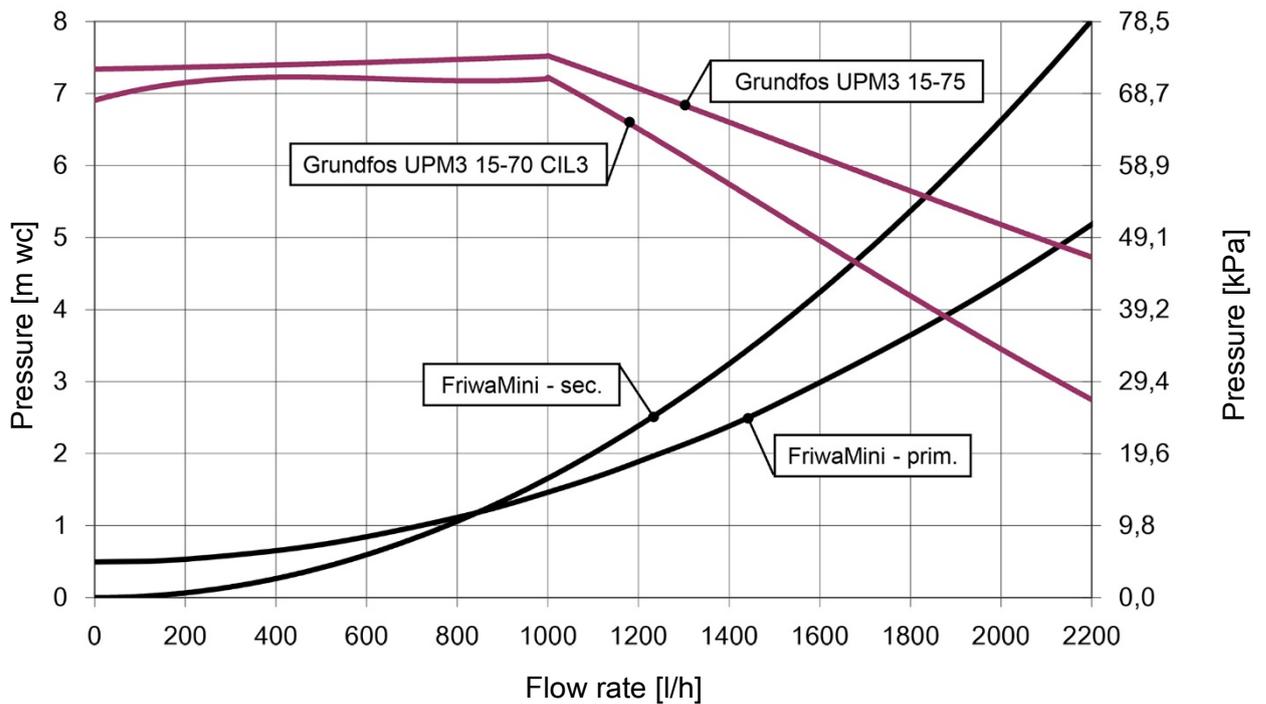
11 Technical data

Dimensions	FriwaMini	FriwaMini with circulation
Height (with insulation)	539 mm	
Width	306 mm	344 mm
Depth (with insulation)	314 mm	
Centre distance prim./sec.	90 mm	
Pipe connections		
Primary circuit (storage tank circuit)	¾" internal thread	
Secondary circuit (DHW circuit)	¾" external thread, flat sealing	
Secondary circuit (circulation)	—	¾" external thread, flat sealing
Operating data		
Max. admissible pressure	primary: 3 bars, secondary: 10 bars	
Operating temperature	2 – 95 °C	
K _{vs} value primary	3.1	
K _{vs} value secondary	2.4	
Equipment		
Check valve	1 x 400 mm wc	
Primary pump	High-efficiency pump with PWM control, 2-60 W	
Secondary pump	—	High-efficiency pump with PWM control, 2-52 W
Heat exchanger	uncoated: 50 plates coated: 32 plates	
Flow rate sensor	1 x VFS 2-40 l/min	
Temperature sensor	2 x Pt1000, rapid	
Materials		
Valves and fittings	Brass	
Seals: o-rings	EPDM	
Flat sealings	AFM34, asbestos-free	
Plate heat exchanger	uncoated: stainless steel 1.4401 / solder: 99.99% Cu coated: SiO ₂	
Insulation	EPP	
Check valve	Hostaform	

11.1 Dimensional drawing



11.2 Pressure drop and pump characteristic curve



12 Commissioning report

Installation operator _____

Location of installation _____

Serial numbers:

Domestic hot water module _____

Flow rate sensor _____

Controller _____

Software version _____

Pipes primary $\varnothing =$ mm | = m

Pipes secondary $\varnothing =$ mm | = m

Pipes circulation $\varnothing =$ mm | = m

Other additionally installed components Return distribution set Other

Have both circuits been flushed and vented correctly?

(no air noises in the pump)

Vented

Are all shut-off valves open in the cold water line?

Open

Is there a pressure of at least 1.5 bars on the primary side?

Checked

Is there a pressure of at least 2.5 bars on the secondary side?

Checked

Is the potential equalisation processed according to regulations?

Checked

Is there an error message on the display?

No message

Installation company

Date, signature

PAW GmbH & Co.KG
Böcklerstraße 11
31789 Hameln - Germany

www.paw.eu
Phone: +49 (0) 5151 9856 - 0
Fax: +49 (0) 5151 9856 - 98