GB

tuxhorn

tubra®- nemux-S/M

Fresh water module

Assembly and operating guide

Content

1 Introduction

This manual describes the installation, operation and maintenance of the **tubra®-nemux-S/M** fresh water station.
This manual is intended for trained specialists with an adequate level of expertise in handling heating systems, water pipe installations and electrical installations.
The installation and commissioning procedures should only be conducted by qualified, specialist personnel.
The fresh water station must only be installed and operated in dry areas that are protected from frost.
Read this manual carefully before starting any installation work.
Non-compliance will invalidate all claims under the guarantee and warranty.
Illustrations are symbolic and may differ from product to product.
Subject to technical changes and errors.
This installation and operating manual is to be handed over to the system operator and kept in close proximity to the device.

1.1 Intended use

The **tubra®-nemux-S/M** fresh water module is an electronically controlled hydraulic assembly for heating drinking water based on a flow principle.
The tapping flow rate is recorded via an electronic flow rate sensor. The required primary flow rate is determined from the temperature of the storage tank, the flow rate and the nominal temperature of the hot water. In order to achieve a constant hot water temperature, the speed of the primary pump is varied by means of a PWM signal.
The **tubra®-nemux-S/M** fresh water module should only be used to heat drinking water in accordance with the Drinking Water Ordinance. The primary circuit must be filled with heating water according to VDI 2035.

1.2 Safety instructions

In addition to country-specific guidelines and local directives, the following technical regulations must also be taken into account:

- DIN 1988 — Technical rules for drinking water installations
- DIN 18 380 — Heating systems and central water heating systems
- DIN 18 381 — Gas, water and wastewater installation work
- DIN 18 421 — Thermal insulation work on thermotechnical systems
- VDI 2035 — Prevention of damage in water heating installations
- DIN 4753 — Water heaters and water heating installations for drinking water and service water
- DIN 4708 — Central heating systems
- VDE 0100 — Installation of electrical equipment
- VDE 0190 — Main equipotential bonding of electrical systems
- TrinkwV — Drinking water ordinance
- DVGW W551 — Drinking water heating and drinking water pipeline systems
- BGV — Accident prevention regulations of workers' compensation associations

As the system can reach temperatures > 60 °C, there is a risk of scalding and burning through contact with the components.

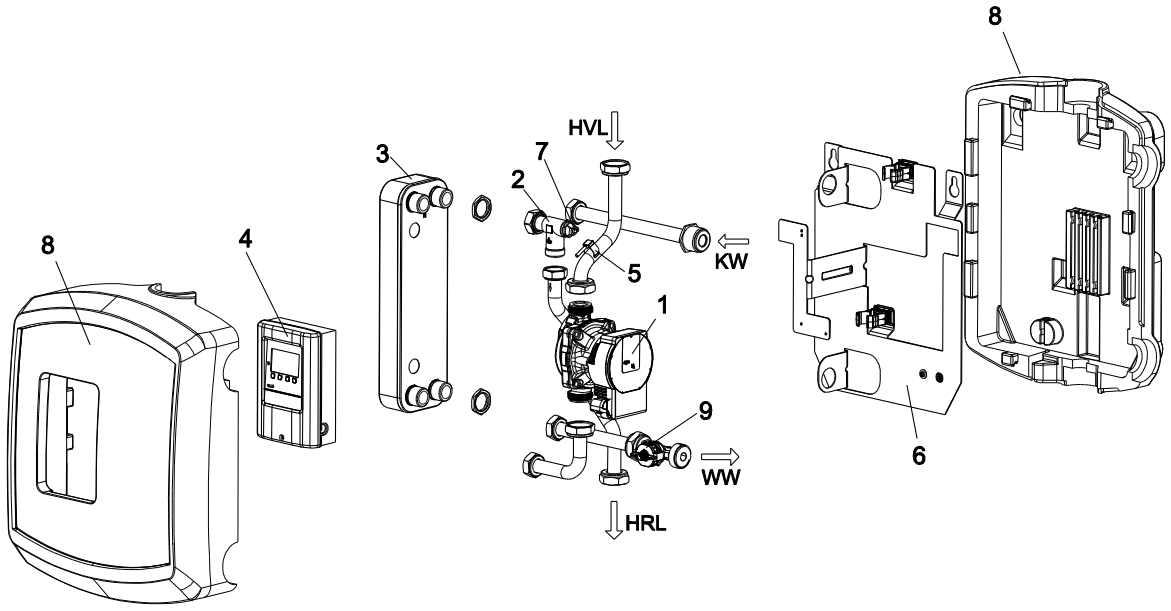
1.3 Applicable documents

Also observe the assembly and operating instructions for the various components used, such as the control unit

1.4 Delivery and transport

Check to make sure the product is complete and undamaged immediately after receipt. Any damage or complaints must be reported immediately.

2 Layout – scope of delivery



*Display may vary depending on the version

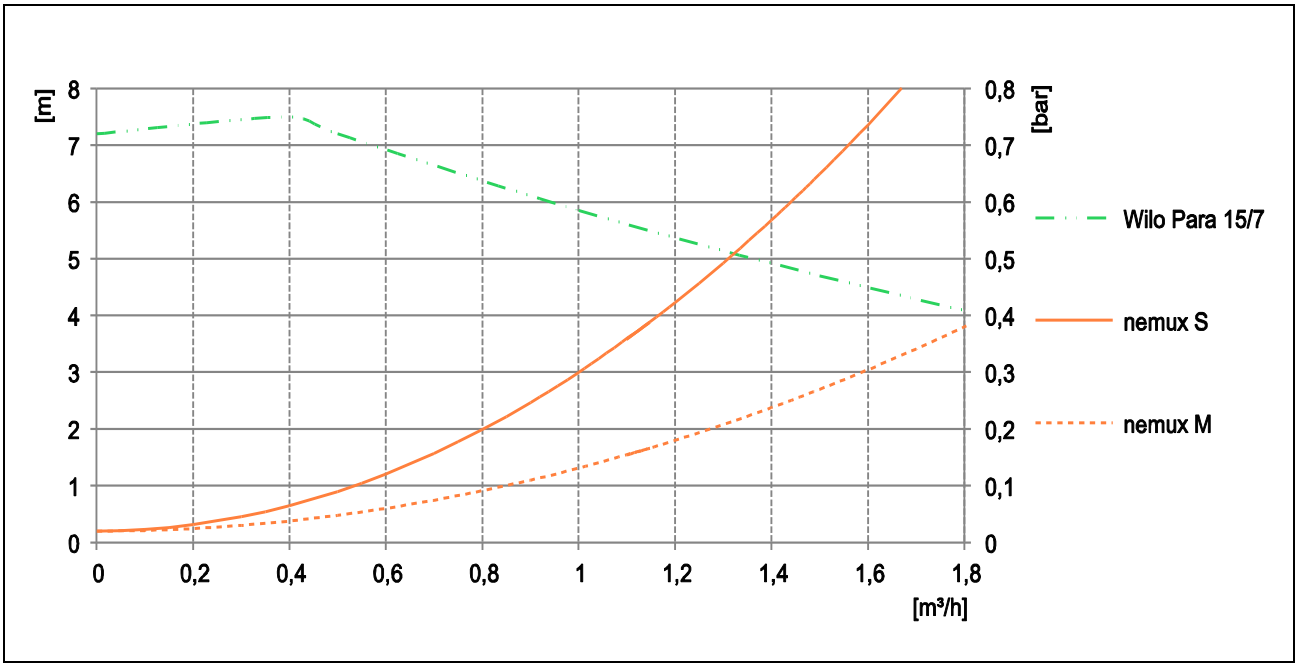
Item	Designation
1	Circulation pump
2	Heating return with integrated gravity brake
3	Plate heat exchanger
4	Control unit
5	Pipe clip sensor PT1000 (HVL)
6	Base plate
7	Manual vent valve
8	Heat insulating shell
9	Flow sensor
Optional: Ball valve set for single station Cascade ball valve set for cascade station	
KW	Cold water
WW	Hot water
HVL	Heating flow
HRL	Heating return

3 Technical specifications

3.1 General

Designation/type		tubra®-nemux-S	tubra®-nemux-M
Nominal output at 10-45/65°C (CW-HW/HF) Tapping capacity at nominal output NL number at nominal output		70 kW 28,7 l/min 4,5	100 kW 41 l/min 9,5
Output at 10-60/75°C (CW-HW/HF) Tapping capacity at 10-60/75°C (incl. cascades)		75 / 143 / 214 / 285 kW 21,5 / 39 / 58,5 / 78 l/min	104 / 194 / 291 / 388 kW 30 / 56 / 84 / 112 l/min
Capacity at 10-60/75°C, mixed to 45°C HW Tapping capacity at 10-60/75°C, mixed to 45°C HW (incl. cascades) NL number at 10-60/75°C (incl. cascades)		69 kW 30 / 55/ 88 / 111 l/min 5 / 17 / 37 / 54	104 kW 43 / 80 / 120 / 160 l/min 10 / 32 / 62 / 96
Max. operating pressure	Heating circuit Drinking water	3 bar 10 bar	3 bar 10 bar
Max. operating temperature	Heating circuit Drinking water	85 °C 65 °C	85 °C 65 °C
Connections	Heating circuit Drinking water	1“ IG 1“ AG	1“ IG 1“ AG
Pressure loss on the service water side at nominal output		0,8 bar	0,67 bar
Max. pressure loss for piping on the heating side		50 mbar	50 mbar
Circulation pump Power input		Wilo PARA 15/7 iPWM2 3-45 W	Wilo PARA 15/7 iPWM2 3-45 W
Flow sensor (depending on version)		Huba Sensor Typ 235 2-40 l/min	Huba Sensor Typ 235 2-40 l/min
		Sika Sensor VTY20 1-60 l/min	Sika Sensor VTY20 1-60 l/min
Electrical connection (mains control unit)		230 V AC/ 50-60 Hz	230 V AC/ 50-60 Hz
Materials			
Housing/connecting components		CW617N (2.0402)	CW617N (2.0402)
Plate heat exchanger		Stainless steel, Cu soldered / Stainless stell, stainless stell soldered	Stainless steel, Cu soldered / Stainless stell, stainless stell soldered
Seals		AFM	AFM
Insulation		EPP foam 0.038 W/mK	EPP foam 0.038 W/mK

3.2 Pressure loss / pump characteristic curve



Specified pressure loss valid for heating side (primary) and drinking water side (secondary).

3.3 Corrosion protection

To prevent corrosion damage to plate heat exchangers, the following drinking water values must be observed:

	Copper-soldered	**Solid stainless steel**
Chloride[1] (CL^-)	< 250 mg/l at 50°C < 100 mg/l at 75°C < 10 mg/l at 90°C	
Sulphate[1] (SO_4^{2-})	< 100 mg/l	< 400 mg/l
Nitrate (NO_3-)	< 100 mg/l	No requirement
pH value	7.5 - 9.0	7,0 – 10,0
Electrical conductivity (at 20°C)	10 - 500 µS/cm	No requirement
Hydrogen carbonate (HCO_3^-)	70 - 300 mg/l	No requirement
Ratio HCO_3^- / SO_4^{2-}	> 1	No requirement
Ammonia (NH_4^+)	< 2 mg/l	No requirement
Free chlorine gas	< 0.5 mg/l	
Sulphite	< 1 mg/l	< 7 mg/l
Ammonium	< 2 mg/l	
Hydrogen sulphide (H_2S)	< 0.05 mg/l	No requirement
Free (aggressive) carbon dioxide (CO_2)	< 5 mg/l	No requirement
Iron (Fe)	< 0.2 mg/l	No requirement
Saturation index SI	-0.2 < 0 < 0.2	No requirement
Manganese (Mn)	< 0.05 mg/l	No requirement
Degree of hardness	4 – 14 $[Ca^{2+}; Mg^{2+}]/ [HCO_3^-] > 0.5$	
Total organic carbon (TOC)	< 30mg/l	No requirement

[1] If the limit values for copper-soldered plate heat exchangers are exceeded, a solid stainless steel plate heat exchanger must be used.

To prevent pitting corrosion in the domestic installation, no new galvanised iron material must be installed downstream in the hot water pipe of the copper-soldered plate heat exchanger without forming a protective layer.
Solid stainless steel plate heat exchangers must be used in mixed installations with zinc-coated iron materials (available on request).

3.4 Calcification protection

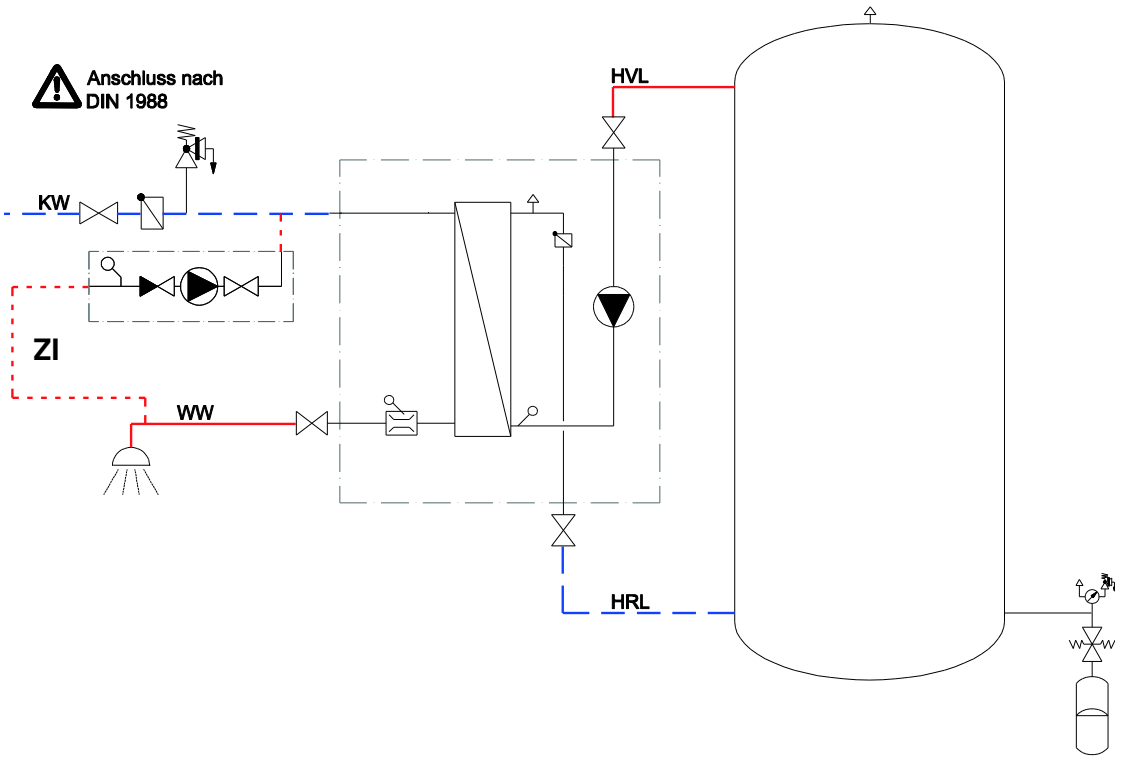
Limescale deposits from the water increase significantly at temperatures >55°C and a water hardness level over 8.5°dH. Because of that the hot water temperature should be set as low as possible taking the drinking water hygiene into account. If necessary reduce calcification by using water softeners or different suitable method.

For heating systems which have, due to preconditions, a low heating flow temperature over 65°C a premix to 65°C by a thermal control valve is expedient. This concerns especially biomass systems and solar thermal systems. Heat pumps have a low primary flow temperature anyways and can be used without a premix. Due to that a better tapping capacity can be reached.

Water treatment measures to prevent scale formation (water softening)		
	Fresh water modul with 50°C hot water-tapping temperature and	
Mass concentration of calcium carbonate	primary flow <65°C	primary flow >65°C
< 1.5 mmol/l (< 150 mg/l) < 8.4°dH (≙ 14,95°fH)	**None**	**None**
1.5 to 2.5 mmol/l (150 to 250 mg/l) 8.4°dH to 14°dH (≙14,95°fH to 24,92°fH)	**None**	**Recommended**
> 2.5 mmol/l (> 250 mg/l) > 14°dH (≙24,92°fH)	**Recommended**	**Required**

4 Hydraulic connection

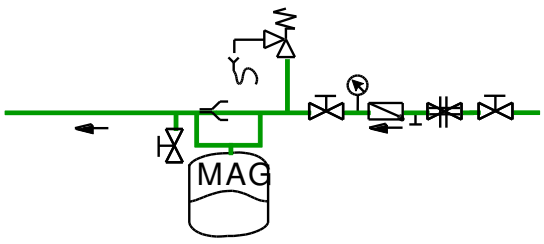
4.1 Hydraulic connection with accessories



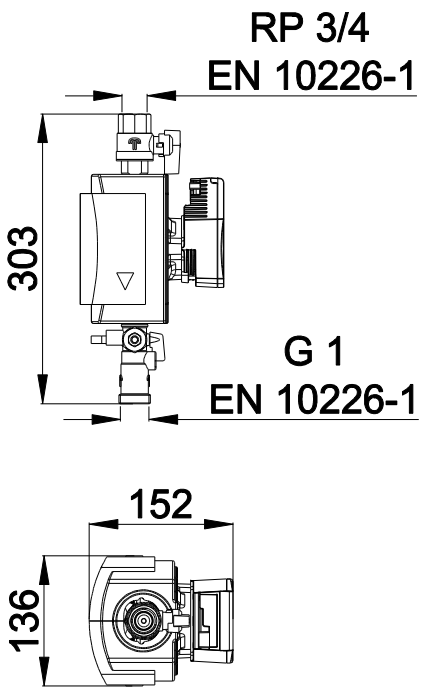
Sample illustration with optional accessories (circulation unit, ball valve set)
Additionally available accessories: cold water connection set, piping set for the storage tank.
This illustration does not claim to be exhaustive; it is not a replacement for specialist planning.

Designation	Description
WW	Hot water
KW	Cold water
HVL	Heating flow
HRL	Heating return
ZI	Circulation

If the fresh water station is installed in accordance with DIN1988-200, a cold water expansion vessel (minimum water hammer damper) must be provided in addition to a safety valve in order to avoid pressure surges in the stations. Pressure surges can lead to a defect in the sensor system in the fresh water station and thus disable the fresh water heating system.



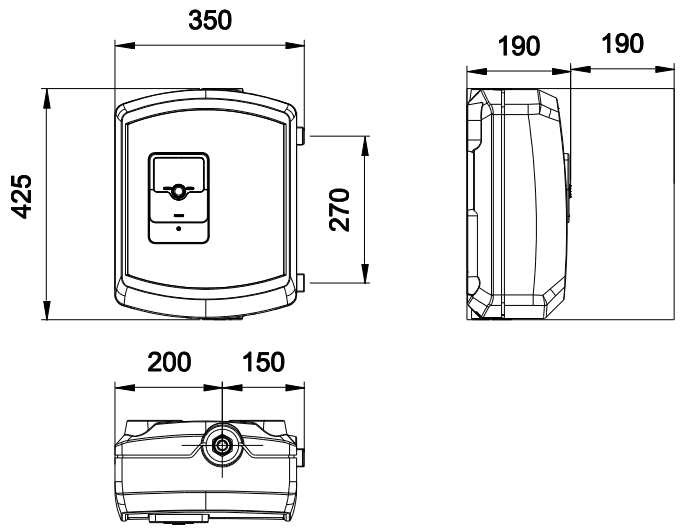
4.2 Optional circulation set



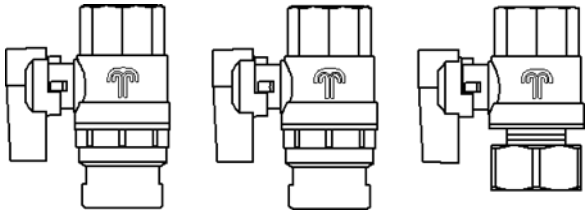
Description:
The circulation set with Wilo Para Z BZ15/7-130-SC and PT1000 temperature sensor is an optional accessory for the **tubra®-nemux-S/M**. It consists of the circulation pump, a shut-off ball valve with non-return valve, a further shut-off valve with flushing valve and a thermowell for the enclosed Pt1000 sensor. A mounted temperature sensor is always required in the circulation line for all circulation methods. For further information, e.g. on space requirements, flushing or pump settings, please refer to the installation instructions for the circulation set.

5 Assembly

5.1 Dimensions / required space



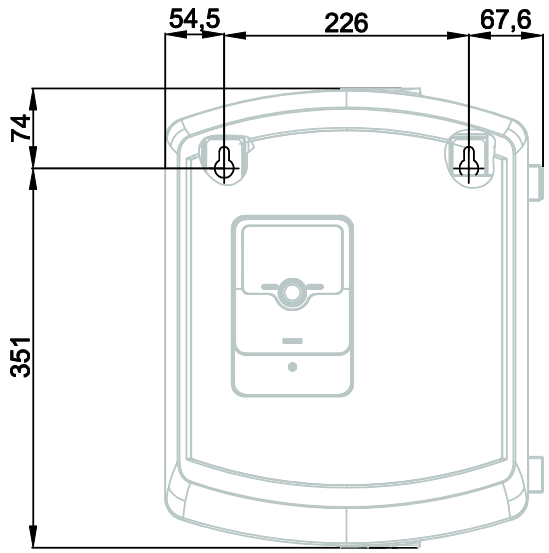
Dimensions and minimum space required for assembly and maintenance work



Optional accessories (ball valve Set):
Mount storage tank flow, storage tank return and HW ball valves with a flat seal

Execute the HW connection according to DIN 1988.

5.2 Wall-mounted assembly



Mark and drill two ∅ 10mm holes as per the adjacent illustration and insert expansion anchors.
Locate the top screw and washer and tighten until the screw head protrudes approx. 1cm from the wall.
Suspend the station, align it horizontally and secure it in place using a second screw and washer.
Evenly tighten both screws.

6 Electrical connection

6.1 General instructions

Only authorised, specialist personnel are permitted to open electrical housings and work on the electrical system after de-energising the equipment. When establishing connections, make sure the terminal assignments and polarity are correct. Protect the control unit and electrical components against excess voltage.

Danger!	**Danger – Electric shock!:** → Risk of fatal electric shock as a result of incorrect electrical connections. → Electrical connections must exclusively be created by electricians approved by energy suppliers and as per the locally applicable regulations. → Disconnect the supply voltage prior to conducting any work.

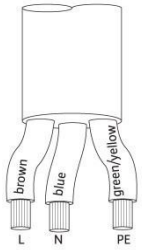
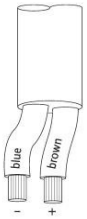
6.2 Control unit connections

The fresh water station control unit is pre-wired.
Only the power supply needs to be connected.
Where applicable, connect circulation (pump and temperature sensor).
Refer to the separate control unit operating manual for more detailed information.

6.3 Equipotential

The terminal point must be properly connected to the building potential equalization on the mounting plate.

6.4 Electrical connection pump

Electrical connection pump 	L = brown N = blue PE = green/yellow
PWM connection 	+ = brown - = blue
PWM connection 	+ = brown - = blue

6.5 Installing the servomotor

The motor may only be opened by the manufacturer. It does not contain any parts that are replaceable or repairable by the user.
The cable must not be removed.
Additionally, observe the safety instructions in the manual for the **tubra®-nemux- S/M** freshwater module.

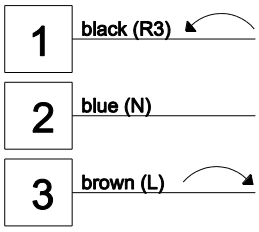
DANGER!

Make sure the polarity is correct.
Risk of fatal electric shock as a result of incorrect electrical connections.

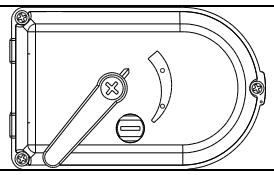
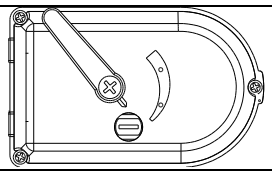
- → Electrical connections must exclusively be created by electricians approved by energy suppliers and as per the locally applicable regulations.
- → Disconnect the supply voltage prior to conducting any work.

The type of current and voltage of the mains supply must correspond to the data given on the identification plate or the motor housing.

CONTROL 2-POINT	1 / 0

Terminal assignment servo-motor	
	1 = Switching phase (black) R3 connection to the controller 2 = Neutral conductor (blue) 3 = Permanent phase (brown)

Caution Risk of fatal injury!

Max. position, turn counterclockwise = ball valves open	Min. position, turn clockwise = ball valves closed
	

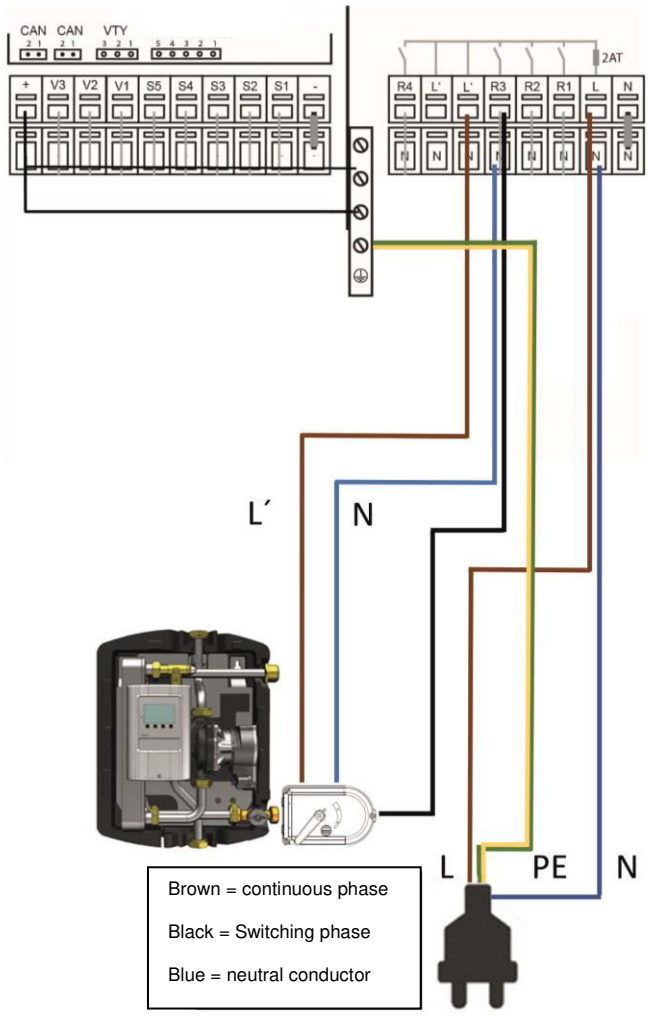
The permanent phase must be connected to the mains power supply in the freshwater controller.

6.6 Connection cascade with circulation

Circulation is connected to the station1 (master) and adjusted via the master.

For this purpose, observe the separate operating instructions for the control unit.

6.7 Electrical connection of the cascade valve - Sorel



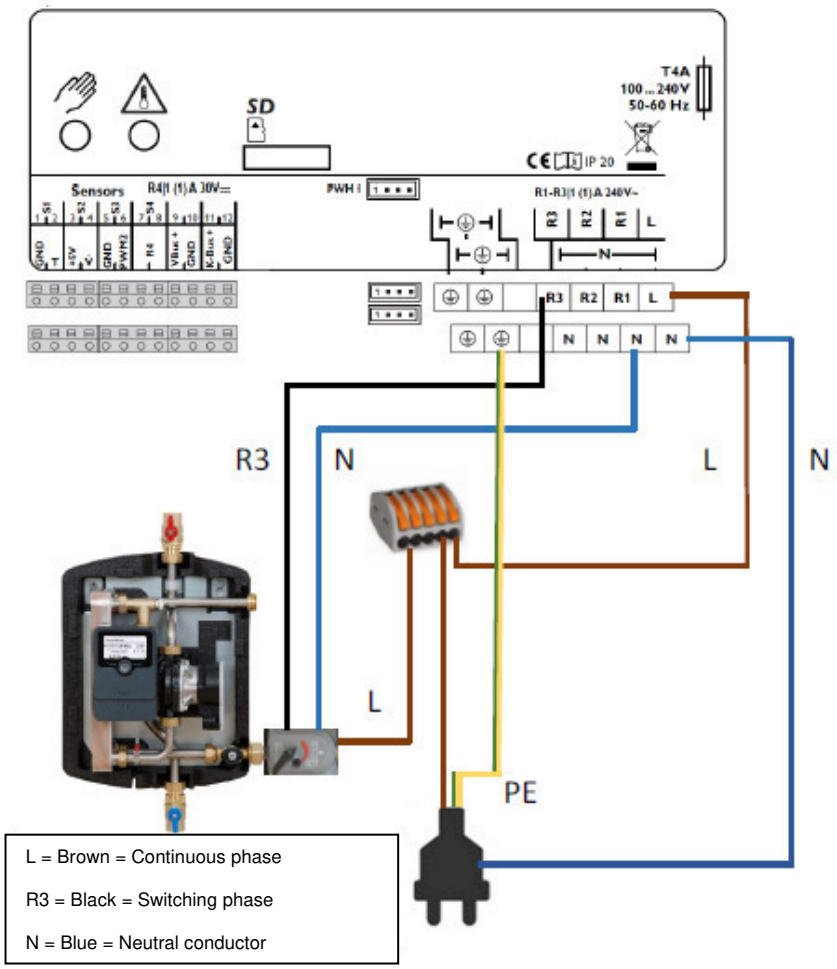
Disconnect system from mains!

Observe the controller instructions!

Regardless of the controller type, the control line of the servomotor must always be connected to R3.

If no free connection terminal is available for the continuous phase of the servomotor, the continuous phase of the servomotor must be connected to L/mains.

6.8 Electrical connection of the cascade valve - Resol



Disconnect system from mains!

Observe the controller instructions!

Regardless of the controller type, the control line of the servomotor must always be connected to R3.

If no free connection terminal is available for the continuous phase of the servomotor, the continuous phase of the servomotor must be connected to L/mains.

6.9 Electrical connection return flow switchover

With **tubra®-nemux**, the return flow switchover is implemented with a 3-way valve. This is installed and connected in such a way that the buffer return flow is routed to the lower storage tank area when de-energized.
The separate operating instructions for the control unit should be consulted for all further details.

7 Commissioning

Complete installation of all hydraulic and electrical components is a precondition for commissioning.

7.1 Leak testing and filling the system

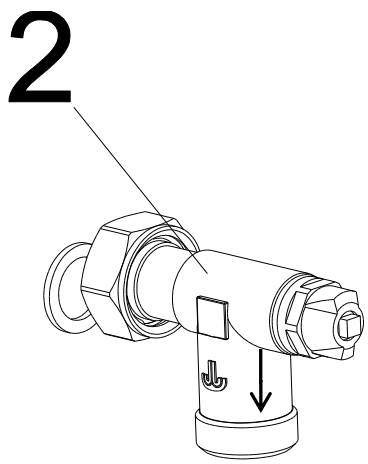
Check all system components, including all pre-fabricated elements and stations, to ensure they are leak-tight; seal any detected leaks accordingly. When doing this adapt the test pressure and test duration to match the respective piping system and the respective operating pressure.

Drinking water side
Fill the drinking water side with clean drinking water as per DIN 1988 only; bleed the air from the system by gradually increasing the pressure. Open all taps and fully bleed the drinking water side.

Note:
If the flow velocities in the filling process are too high, cavitation can occur which can damage the flow sensor. Furthermore, pressure surges caused by e.g. sudden opening of fittings must be avoided.

Heating side
Only fill the heating system, including the primary side of the fresh water system, with filtered, possibly treated water as per VDI 2035; bleed the system completely.

7.2 Gravity brake



A gravity brake is installed in the heating return to prevent incorrect circulation. (see fig.)

The heat exchanger is to be vented during the commissioning process by using the manual vent valve.

7.3 First start-up

Please observe the corresponding instructions for the control unit.

Task	Procedure	OK
Preparation and inspection	• Visual inspection of the installation. • Are all of the sensors installed and connected at the correct locations? • Are all outputs connected?	☐ ☐ ☐
Switch on the control unit	Supply power to the control unit	☐
Set up the control unit	Please observe the instructions for the control unit. • Set the fresh water temperature (hot water temperature). • Adjust the circulation (optional). • Adjust the return stratification (optional) • Configure the cascades (optional)	____ _ ____ __
Additional settings	• Adjust the pre-mix valve (optional)	____ __
Test the outputs	Activate all of the outputs individually in sequence and check to make sure the pumps switch correctly.	☐
Check function	• Check the functionality of the hot water supply. • Check the functionality of the circulation (optional). • Check functionality of the return stratification (optional) • Check functionality of the cascades (optional)	☐ ☐

7.4 Control unit

Observe the installation and operating instructions for the control unit used.

8 Malfunctions/troubleshooting

If an error message is output, it appears on the control unit display.
Please observe the corresponding instructions for the control unit.

Malfunction	Possible cause	Remedy
Pump noise	Air in the system	Bleed
Insufficient tapping quantity	Insufficient water pressure	Check pressure, increase if necessary
	Calcification in heat exchanger	Decalcify/replace
Insufficient tapping temperature	Incorrect adjustment on the control unit	Check settings
	Excessive pressure loss in the piping on the heating side	Check the piping, change if necessary
Drinking water does not heat up	Control unit not in operation.	Check control unit
	Air in the system.	Bleed
	HW flow sensor not connected correctly, or defective.	Check, replace if applicable
	Heating flow temperature sensor not connected correctly or faulty.	Check, replace if applicable
	Pump faulty	Check, replace if applicable

9 Maintenance

The manufacturer recommends having the system serviced annually by authorised, specialist personnel.

10 Decommissioning

If the **tubra®-nemux-S/M** is decommissioned for a prolonged period, the power supply must be disconnected.
For final decommissioning of the **tubra®-nemux-S/M** the power supply for all of the corresponding system components must be disconnected; all of the relevant pipes and components must be completely drained.
The decommissioning, dismantling and disposal processes should only be conducted by qualified, specialist personnel. Components and materials must be disposed of in accordance with the current applicable regulations.

Reseller	
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