Profactor Armaturen GmbH

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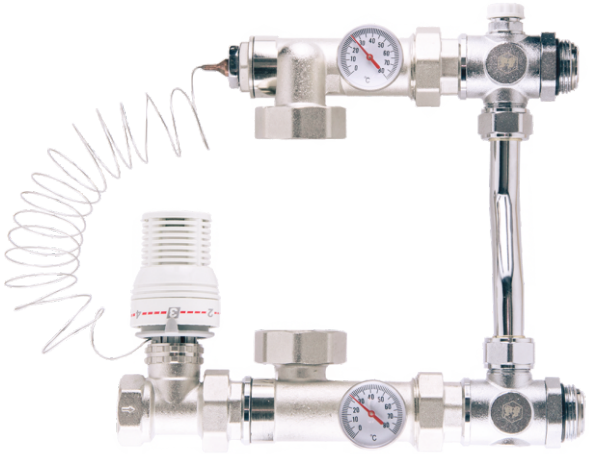
PROFACTOR®
DER DEUTSCHE QUALITÄTSSTANDARD

TECHNICAL DATA SHEET AND USER MANUAL



PRODUCT CODE

PF MB 840

PUMP-MIXING UNIT WITH THERMOSTATIC STABILIZATION

1. PURPOSE AND SCOPE

To create an autonomous circulation system for underfloor heating and radiator heating, modules consisting of pump-mixing units and manifold groups are used. The pump-mixing unit with thermostatic stabilization is a complete pre-assembled valve set (without a pump), designed for forced circulation, regulation, and maintenance of the desired heat carrier temperature in water-based underfloor heating systems.

The efficiency of a heating system based on a manifold group with a pump-mixing unit is achieved through the principle of multiple circulation of the heat carrier between the supply and return manifolds, with partial withdrawal of the heat carrier from the high-temperature source of the primary circuit and mixing with the return flow. The mixing unit is required only for the underfloor heating system since the same heat carrier circulates in both the underfloor loops and the radiators. However, the required temperature of the heat carrier for radiators (75°C – 95°C) is much higher than the maximum permissible temperature for underfloor heating pipes (35°C – 55°C).

The boiler heats the heat carrier to the temperature required for high-temperature radiators, and the pump-mixing unit is used to lower the temperature of the heat carrier entering the underfloor heating circuit. As the heat carrier, liquids non-aggressive to the product materials may be used, such as water or glycol-based solutions, with a maximum glycol concentration of up to 40%.

2. TECHNICAL SPECIFICATIONS

Product code	PF MB	840
Nominal size	DN	25
	G	1"
Pump connection external thread	G1	1½"
Pump installation length	mm	130
Maximum working pressure	bar	10
Minimum inlet pressure before the pump	bar	0,1
Maximum flow capacity Kvs at Δp = 1 bar	m^3/h	2,1
Maximum thermal power Q_{max} at ΔT = 10°C and heat carrier velocity of 1 m/s	kW	20
Maximum heat carrier temperature in the primary circuit	°C	95°C
Maximum ambient temperature	°C	40°C
Temperature setting range in the secondary circuit	°C	0°C to 80°C
Thermometer scale range	°C	0°C to 80°C
Weight	g	3195

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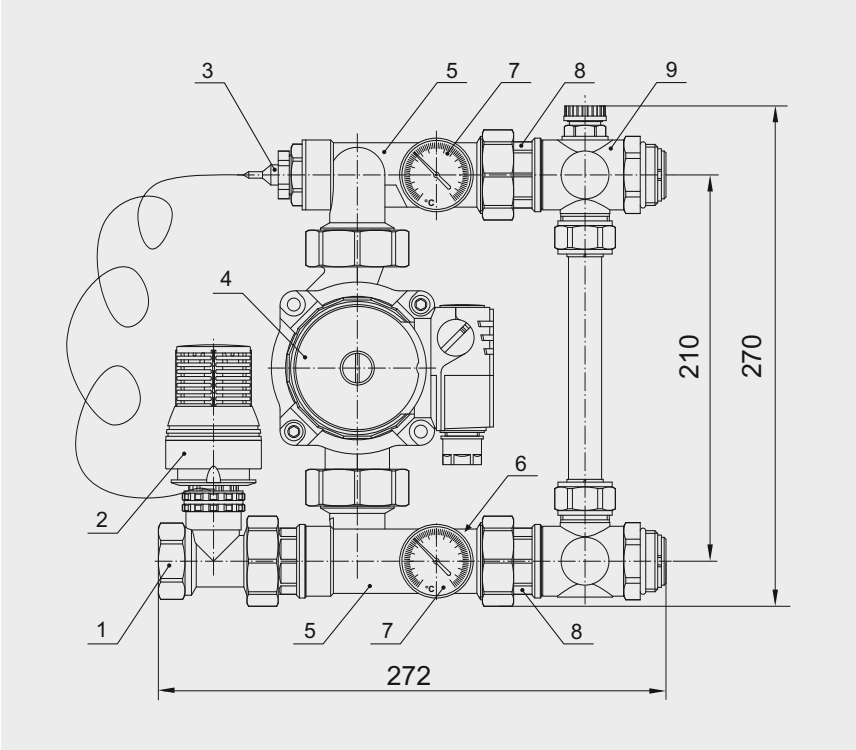
3. DESIGN



1 – Thermostatic valve PF RVT 855
2 – Thermostatic head PF RVT 631
3 – Immersion sensor
4 – Circulation pump
5 – Pipe with union nut
6 – Check valve integrated into the pipe
7 – Thermometer
8 – Union with coupling nut
9 – Adjustable manifold bypass valve

The pump-mixing unit with thermostatic stabilization consists of a thermostatic valve (1), a thermostatic head (2) with an immersion sensor (3), supply and return pipes (5), a check valve (6) integrated into the return pipe, thermometers (7), unions with coupling nuts (8), and an adjustable bypass (9).

The circulation pump (4) is not included in the package. The unit is compatible with pumps having an installation length of 130 mm and an external connection thread of 1½".

The thermostatic valve is equipped with an internal cylindrical thread of 1" for connection to the supply pipeline, a union with external cylindrical thread of 1" and a ring seal, as well as a metric thread M30×1.5 for installing a thermostatic head with an immersion sensor. The sensor is placed in a special well (pocket) immersed in the supply pipe.

The pipes are designed with internal cylindrical thread 1" on one end and external cylindrical thread 1¼" on the other. Each pipe also features an outlet with a union nut and internal cylindrical thread 1½" for connecting the pump, and two side outlets with internal cylindrical thread ½" — one closed with a plug, and the other fitted with a socket containing an axial thermometer. A check valve is installed inside the return pipe.

The sensor pocket in the supply pipe is secured using a 1"×½" adapter bushing. The adjustable bypass is connected to the pipes via unions with coupling nuts (8). At the opposite ends, it is equipped with nuts having 1" external cylindrical threads and sealing rings for connection to the manifold group.

The pipes, union nuts, unions, thermostatic valve body, adapter bushings, plugs, and bypass pipes are made of brass CW617N (according to DIN EN 12165-2011) with nickel-plated surfaces.The check valve body and thermometer sockets are made of brass CW614N (DIN EN 12165-2011).

The handle of the thermostatic head, as well as the seat insert and valve plug of the check valve, are made of impact-resistant engineering thermoplastic (acrylonitrile butadiene styrene, ABS). The springs are made of stainless steel AISI 304 (DIN EN 10088-2005. The thermometer body is made of stainless steel AISI 201 (DIN EN 10088-2005). The thermometer scale is made of aluminum and covered with acrylic glass.

All connections are sealed with O-rings made of ethylene-propylene rubber (EPDM).

All cylindrical pipe threads are in an accordance with ISO 228-1:2000, DIN 259, and all metric threads are in an accordance with (ISO 261:1998).

More detailed descriptions of the individual components included in this unit can be found in their respective technical passports.

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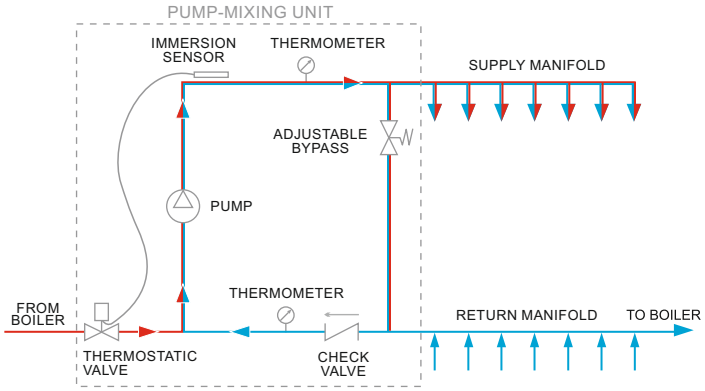
4. OPERATING PRINCIPLE

Operating diagram of the pump-mixing unit with thermostatic stabilization:



The PF MB 840 pump-mixing unit with thermostatic stabilization is a sequential-type mixing assembly. The main advantage of this type of mixing is that the entire pump flow rate is directed to the consumer.

The circulation pump drives the heat carrier through the underfloor heating loops, drawing it from the return manifold and delivering it to the supply manifold. From the supply manifold, the heat carrier flows through the underfloor heating circuits and then back into the return manifold. This secondary circuit cycle repeats continuously until the water cools down.

On the supply pipe from the boiler, a thermostatic valve with a thermostatic head and an immersion sensor is installed, with the sensor embedded in the supply pipe. The immersion sensor continuously monitors the temperature of the heat carrier entering the supply manifold.

When the heat carrier temperature drops below the setpoint of the thermostatic head, the thermostatic valve opens, allowing hot fluid from the boiler to mix into the system. At the same time, the excess volume of heat carrier is discharged from the return manifold back to the boiler (primary circuit).

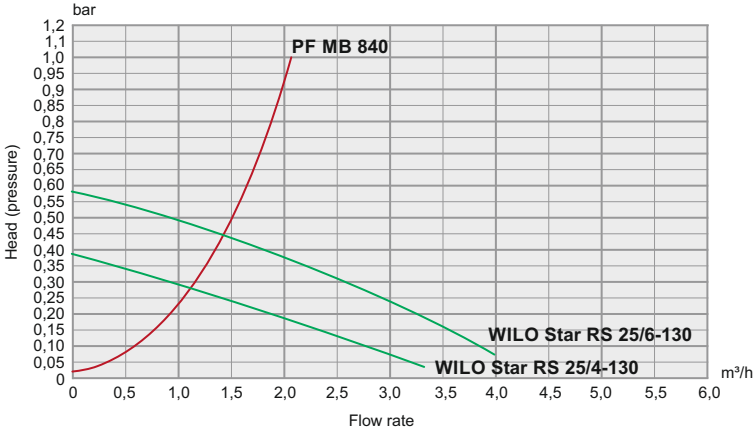
Thus, the cooled heat carrier from the return manifold circulates constantly, while the hot heat carrier is supplied only when needed, regulated automatically by the thermostatic valve. This design prevents overheating of the underfloor heating system and extends its service life.

The thermostatic valve has a low flow capacity, which ensures smooth temperature regulation without sharp fluctuations. The check valve prevents hot heat carrier from the boiler from entering the return manifold.

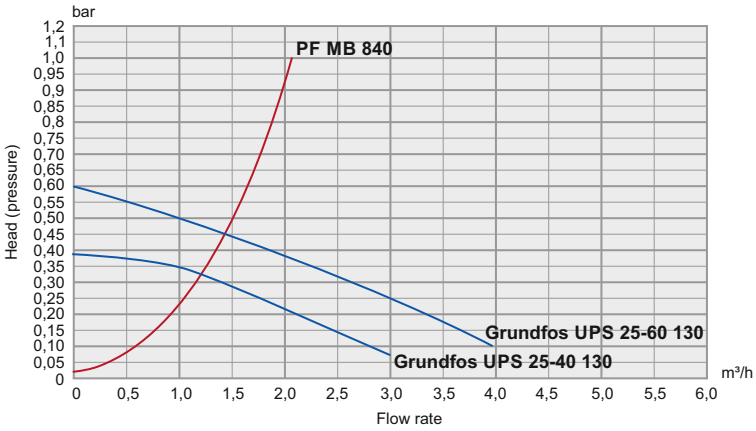
The adjustable bypass protects the unit from overload.If the underfloor heating loops are closed, the circulation of the heat carrier in the secondary circuit continues through the adjustable bypass. This ensures continuous operation of the pump and stable pressure within the system, preventing overheating and extending the service life of all components.

5. HYDRAULIC CHARACTERISTICS

Hydraulic characteristic of the PF MB 840 pump-mixing unit in comparison with WILO pump characteristics:



Hydraulic characteristic of the PF MB 840 pump-mixing unit in comparison with Grundfos pump characteristics:



6. INSTALLATION INSTRUCTIONS

Before installing the pump-mixing unit, the pipeline must be cleaned of rust, dirt, scale, sand, and any foreign particles that could affect the performance of the product. After installation, heating and heat supply systems must be flushed with water until it flows clear and free of mechanical impurities.

First, the manifold group should be connected to the pump-mixing unit using the union nuts on the bypass with external threads. The supply manifold is mounted on the upper pipe of the unit, and the return manifold on the lower pipe. The connection is sealed with O-rings and does not require additional sealing materials.

The assembled structure should be installed vertically, at a height of at least 300 mm above the floor, using mounting brackets fixed to the body of the manifold group — either inside a manifold cabinet or mounted directly to the wall. The connection to the pipeline is made using cylindrical pipe threads. The supply pipe must be connected to the thermostatic valve of the pump-mixing unit, while the return pipe connects to the free end of the return manifold.

A pump with a base length of 130 mm and external thread on mating flanges of 1½" must be installed in the designated position. The connection is made using union nuts, and flat sealing gaskets must be used to ensure leak-tightness. The unit must be installed so that the pump motor shaft is positioned horizontally.

The electrical connection box must not be located at the bottom. The pump flow direction should be upward, toward the supply manifold. It is not recommended to mount the unit directly on load-bearing structures or elements to avoid possible transmission of noise or vibration. The unit must be protected from mechanical damage and from contamination by construction materials or mixtures.

It is recommended to install manual shut-off ball valves at the inlet of the pump-mixing unit and at the outlet of the return manifold. Ensure that air vents are positioned strictly vertically at the highest point of the system. The size of the manifold cabinet will vary depending on the number of manifold outlets and the dimensions of the pump-mixing unit.

The autonomous circulation system must not be subjected to mechanical stress from the pipeline, such as bending, compression, tension, twisting, misalignment, vibration, or uneven tightening of fasteners.

The misalignment of connected pipelines must not exceed 3 mm per 1 meter of length, plus 1 mm for each additional meter.

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All components of the system must be securely connected to the pipeline, using PTFE-tape sealing (polytetrafluoroethylene), polyamide thread with silicone, or flax fiber as sealing materials.It is important to ensure that excess sealing material does not enter the shut-off or regulating mechanisms of valves, cocks, or fittings, as this can lead to loss of functionality. After installation, check the correctness of assembly.

Upon completion, the system must undergo a pressure (manometric) leak test .

This test ensures the system's tightness and prevents potential leaks or damage resulting from them. Before testing, make sure that all union nuts are securely tightened.

When the autonomous circulation module is used in systems with a high concentration of mechanical impurities in the fluid, a mechanical filter must be installed upstream of the pump-mixing unit.

7. OPERATING AND MAINTENANCE

The pump-mixing unit must be operated without exceeding the pressure and temperature values specified in the technical specifications table.

Installation and removal of the unit, as well as any repair or adjustment operations, must be carried out only when the system is depressurized. Allow the equipment to cool down to ambient temperature before performing any maintenance.

Before starting the pump, open the shut-off ball valves, fill the system with the heat carrier, expel all air, and set the required temperature of the heat carrier.

The temperature in the underfloor heating loops is adjusted using the thermostatic head. By turning the knob of the thermostatic head, set the desired temperature value. The set temperature can be monitored using the thermometer located on the supply pipe of the unit.

Attention: Due to the inertia of the process, the set temperature will not be reached immediately but only after a certain period of operation. During operation, regularly check the system for absence of leaks and abnormal noises in the pump operation.

8. WARRANTY OBLIGATIONS

The warranty period is 24 months from the date of sale to the end consumer. Throughout the entire warranty period, the manufacturer guarantees the proper functioning of the product and its compliance with safety requirements, provided that the consumer follows the rules for storage, transportation, installation, operation, and maintenance of the product. The warranty covers all defects arising through the manufacturer's fault.

The warranty does not cover defects resulting from:

— Violation of storage, transportation, installation, operation, or maintenance conditions;
— Exposure to substances aggressive to the materials of the product;
— Signs of mechanical damage;
— Damage caused by fire, natural disasters, or other force majeure circumstances;
— Damage caused by improper actions of the user;
— Evidence of unauthorized interference with the product design.

The product described in this technical manual is a technically complex device that must be installed by a qualified specialist with appropriate experience working with this type of equipment.

Installation and commissioning must be carried out by an authorized and certified company.

Profactor Armaturen GmbH reserves the right to make changes to the product design that do not affect its technical characteristics or functional features.

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INTERNATIONAL WARRANTY CARD

NAME OF THE PRODUCT _____

PRODUCT CODE, SIZE _____ **QUANTITY** _____

SELLER NAME AND ADDRESS _____

DATE OF PURCHASE _____

SELLER STAMP

SELLER SIGNATURE _____

For the warranty term refer to the Warranty obligation clause in the technical manual

FOLD LINE FOLD LINE

In case of any claims to the product quality the following documents should be submitted:

1. Application with customer and product detailes:
- Name of the customer, actual address and phone number
- Article of the product
- Reason for the claim and photo
- Plumbing system where installed (name, address, phone number)

2. Invoice copy and receipt

3. Warranty card

RETURN/EXCHANGE COMMENTS _____

DATE _____ **SIGNATURE** _____

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