



PROFACTOR®
DER DEUTSCHE QUALITÄTSSTANDARD

EN

TECHNICAL DATA SHEET AND USER MANUAL



**PRODUCT
CODE**

PF MB 841

PUMPING-MIXING UNIT

1. PURPOSE AND SCOPE

The modules, consisting of a pumping-mixing units and of collector groups are used to create a system of autonomous circulation of underfloor. The pumping-mixing unit PROFACTOR® PF MB 841 is a ready set of assembled fittings (without pump), designed for forced circulation, adjustment and maintaining the desired temperature of the heat carrier in water underfloor.

The efficiency of the heating system, built on the basis of the collector group with the pumping-mixing unit, provided by the principle of continuous circulation of the heat carrier between the feed and return manifolds with a partial selection of the heat carrier from the high-temperature heat source of the primary circuit and the mixing of the heat carrier from the return line.

The mixing unit is only necessary for the system of underfloor, because it circulates the same heat carrier in the radiators. The required heat carrier temperature for radiators (75°C – 95°C) is much greater than the maximum allowable temperature of the pipes of the underfloor (35°C – 55°C). The boiler heats the heat carrier to that temperature which is required for high-temperature radiators, the pumping-mixing unit uses to lower the temperature of the heat carrier at the entrance to the loop of underfloor.

As the heat carrier can be liquid, non-corrosive to the materials of the products: water, solutions with glycol. The maximum content of glycol is up to 40%.

2. TECHNICAL SPECIFICATIONS

Nominal size: DN25

Connecting external thread G: 1"

Connecting external thread of the pump G1: 1½"

The installation length of the pump: 130 – 180 mm

Maximum operating pressure: 10 bar

Maximum pressure difference of the primary circuit $\Delta p_{\max}$: 1 bar

Throughput Kv (the bypass is in position 0): 3 m³/h

Throughput Kv (the bypass is in position 5): 4,8 m³/h

The heat capacity $Q_{\max}$ at $\Delta T=7^{\circ}\text{C}$ and $\Delta p=0.25$ bar (the bypass is in position 0): 10 kW

The heat capacity $Q_{\max}$ at $\Delta T=7^{\circ}\text{C}$ and $\Delta p=0.25$ bar (the bypass is in position 5): 12,5 kW

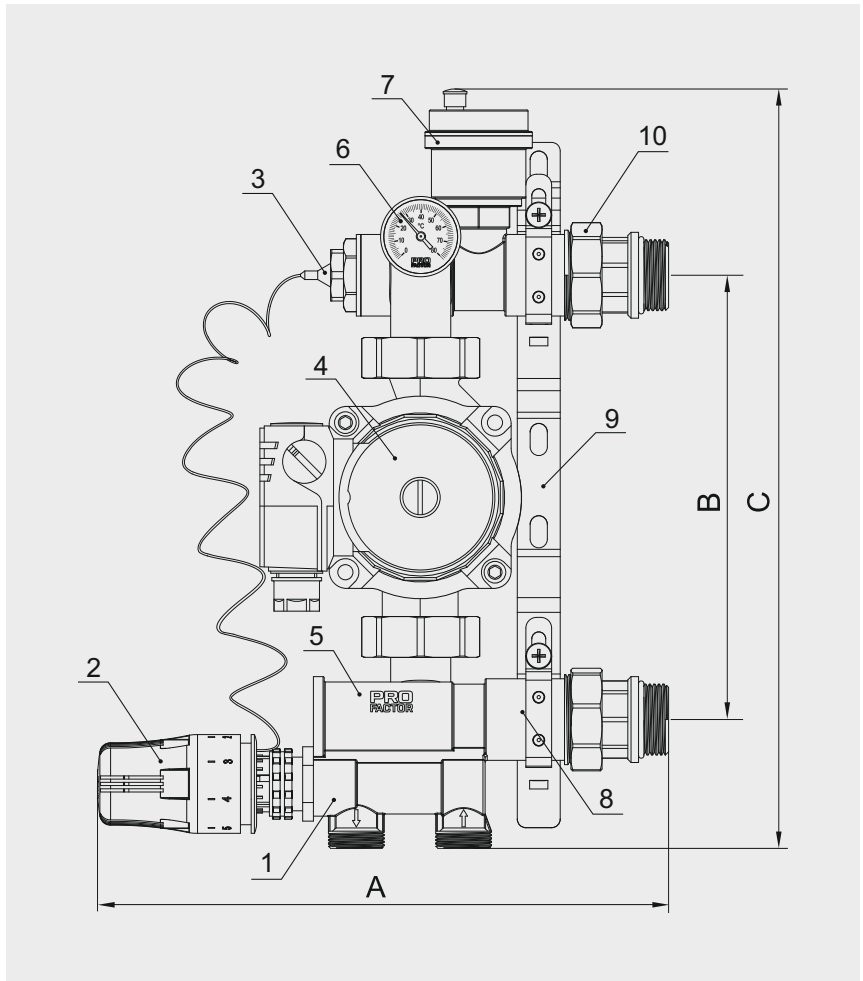
The maximum temperature of the heat carrier in the primary circuit: 90°C

Maximum ambient temperature: 40°C

The temperature adjusting range in the secondary circuit: 20°C to 60°C

The scale range of the thermometer: 20°C to 80°C

3. DESIGN



- 1 – Mixing thermostatic valve
- 2 – Thermostatic head
- 3 – Submersible sensor
- 4 – Circulation pump
- 5 – Flow regulating valve (the bypass)

- 6 – Thermometer
- 7 – Automatic air vent valve
- 8 – Integrated check valve
- 9 – Bracket
- 10 – Threaded bushing with coupling nut

The circulation pump (4) is not included! The unit is compatible with pumps with installation length of 130 – 180 mm and an outer connection thread 1½".

Thermostatic mixing valve (1), flow regulating valve (5) and check valve (8) mounted in a single unit with taps with cylindrical external thread 1" for connection to feed and return piping, metric thread M30x1.5 to install the thermostatic head (2) with submersible sensor (3) and the outer cylindrical thread 1¼" to join threaded bushing with coupling nut (10).

The sensor (3) placed in a special sleeve that is immersed in the feed nozzle which equipped with an automatic air vent valve (7) and thermometer (6) and also having a cylindrical outer thread 1¼" to join threaded bushing with coupling nut (10).

Mixing block of the thermostatic valve and the feed nozzle are also have outlets with a coupling nut with an internal cylindrical thread 1½" and flat sealing ring for connection of pump. Threaded bushings with coupling nuts (10) have outer cylindrical threaded 1" with O-rings to attach manifold group.

Unit of the mixing valve, feed nozzle, coupling nuts, threaded bushings, the body of the air vent valve are made of brass grade CW617N (European standard DIN EN 12165-2011), with nickel-plated surfaces. Handle of the thermostatic head, the resistant insert and the slide of the check valve are made of high impact technical thermoplastic resin (Acrylonitrile butadiene styrene, ABS). The material of the thermometer's body — stainless steel AISI 201 according to DIN EN 10088-2005. The scale of the thermometer is made of aluminum and closed by acrylic glass. All connections are sealed using O-rings made of ethylene-propylene rubber, EPDM.

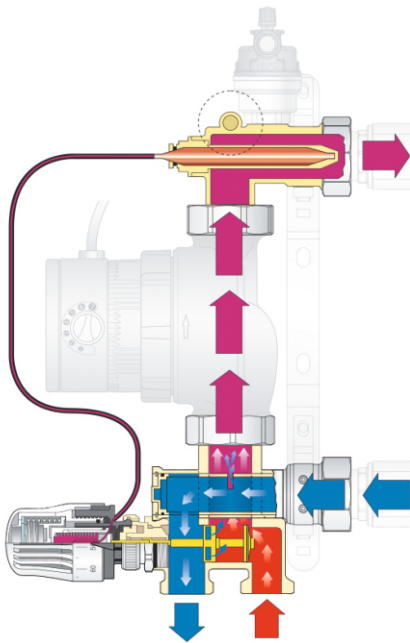
All cylindrical pipe threads are in an accordance with ISO 228-1:2000, DIN 259, and all metric threads — ISO 261:1998.

4. DIMENSIONS

Product code	DN	G	G1	A, mm	B, mm	C, mm	Weight, g
PF MB 841	25	1"	1½"	230	210	365	2230

5. PRINCIPLE OF OPERATION

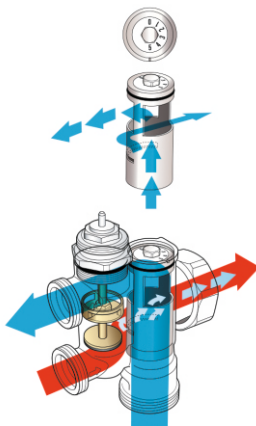
The pumping-mixing unit PF MB 841 is a unit of sequential type of mixing. The advantage of this type of mixing is that the whole flow rate of the heat carrier passing through the pump goes to the consumer.



Circulating pump drives the heat carrier through the loops of underfloor, taking it from the return manifold and directing it in the feed. From the feed manifold the heat carrier flows into the contours of the floor, and then in the return manifold. This loop (secondary circuit) repeats until the water has cooled.

Submersible sensor (3) constantly monitors the temperature of the heat carrier flowing in the feeding manifold. During the cooling of the heat carrier below the temperature set on the thermostatic head, thermostatic mixing valve opens and the mixing of the hot heat carrier comes from the boiler. At the same time, the excess volume of the heat carrier is discharged from the return manifold into the boiler (primary circuit).

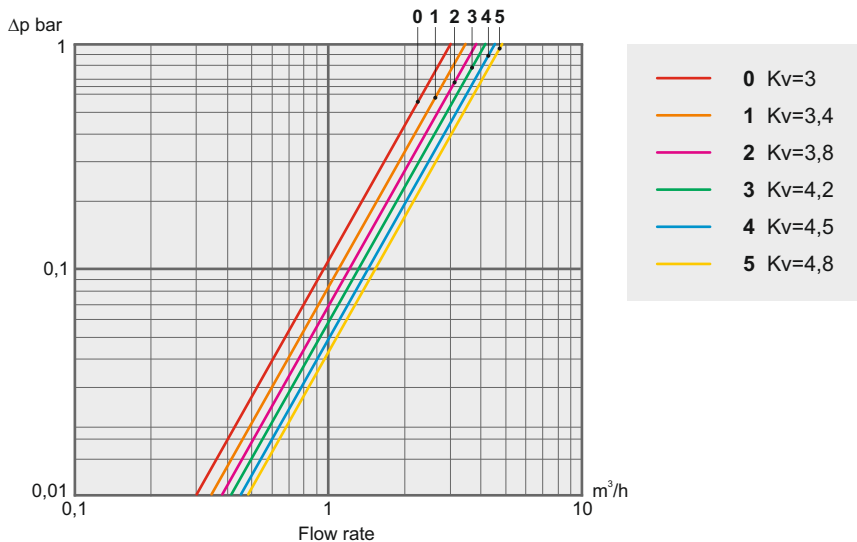
Thus, the heat carrier from the return manifold is fed continuously, and the hot heat carrier is supplied only when it's necessary, its flow is controlled by a thermostatic valve. This avoids overheating of the underfloor and extend its service life. The check valve prevents getting of the hot heat carrier coming from the boiler into the return manifold.



Unit of the thermostatic mixing valve also has a flow regulating valve (the bypass) that allows the heat carrier to flow from the return manifold directly into the mixed heat carrier before entering the pump. This lowers the temperature of the mixed heat carrier, which regulated by submersion sensor and opens the thermostatic mixing valve, letting pass more of hot heat carrier from the primary circuit into the mixing zone and increases the temperature of the heat carrier in the secondary circuit and the systems thermal power.

6. HYDRAULIC CHARACTERISTICS

Pressure loss in the mixing unit:



7. INSTALLATION INSTRUCTION

Before installation of pumping-mixing unit, the pipeline should be cleaned of rust, dirt, scale, sand and other foreign particles that affect the performance of the product. Heating systems, heating supply systems at the end of their installation should be rinsed with water to release it without mechanical suspensions.

The first step is to attach the manifold group to the pumping-mixing unit using threaded bushings with coupling nuts (10). In this case the feed manifold is mounted on the upper branch pipe of the unit, and a return manifold on the lower! The connection is sealed with O-rings and requires no additional seals.

The resulting structure should be mounted vertically at a height of not less than 300 mm from the floor by means of brackets, which are mounted on body of manifold groups and pumping-mixing unit in the manifold cabinet or on the wall, with connection to the pipeline by the pipe cylindrical thread. On the seat for the pump it is necessary to mount a suitable pump with an outer mounting thread on the counter flanges 1½". Accession shall be effected by means of coupling nuts and encapsulated by two flat washers.

The unit is set so that the motor shaft of the pump was in a horizontal plane. Box of the electrical connection should not be located in the lower position. The flow of the pump should be directed upwards, to the feed manifold.

It is not recommended to mount the unit directly to the supporting structures and elements to avoid possible spread on them of a sound or vibration. Avoid mechanical damage to the mixing unit and splashing its by construction mixtures.

Recommended installation of a manual shutoff ball valves on the inlet and outlet of the pumping-mixing unit. You must make sure that the air vent valve was located vertically at the highest point of the system. The size of the manifold cabinet can change depending on the number of taps of manifold and size of the pumping-mixing unit.

When using the module of autonomous circulation in the system of moving environment with a high content of mechanical impurities, a mechanical filter should be installed before pumping-mixing unit.

The system of Autonomous circulation should not experience stress from the pipeline (bending, compression, tension, torsion, misalignment, vibration, misalignment of the pipe branches, uneven tightening fastener). If necessary, the supports or compensators should be provided, which reduce the pipeline load to the unit. Misalignment of connected pipelines should not exceed 3 mm at a length of 1 m plus 1 mm on each following meter.

The entire system must be securely fastened to the pipeline, using as a winding sealing material PTFE – tape (Teflon sealing material), polyamide yarns with silicone or linen. It is necessary to track that excess of this material does not get into shutoff and control mechanisms of the valves, taps, faucets. This may lead to loss of operability.

Check the installation. After mounting the system should conduct a pressure integrity test. This test allows you to protect the system against leaks and damage associated with them. Before the test you must ensure that all coupling nuts are tight.

Attention! The heating of the underfloor system is allowed only after maturation screeds (at least 28 days, if the cement screed). Before laying floor coverings it is necessary to start the system by setting the temperature of the heat carrier of 25°C and support for three days. Then increase on 5°C every 3 days up to 50°C that should be supported for four days.

8. OPERATION AND MAINTENANCE

The pumping-mixing unit must be operated without exceeding the pressure and temperature given in the table of the technical specifications.

Installation and dismantling of the product as well as any operations on repair and adjustment must be carried out in the absence of pressure in the system. Allow equipment to cool to the ambient temperature.

Before turning on the pump, you must open the shutoff ball valves, fill the system with heat carrier pushing out all the air and set the required temperature of the heat carrier.

Setting the temperature of the heat carrier in the circuits of underfloor is carried out by using the thermostatic head. By turning the handle of the thermostatic head, set the desired temperature value. The temperature setting can be checked with a thermometer on the inlet of the unit.

Attention: because of the inertia of the process, the set temperature will not be reached immediately, but after some time.

When the unit is working it is necessary to monitor the absence of leaks and the absence of noise in the pump.

9. 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.



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 details:

- 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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