

Connection ramp

Wall mounting is possible with the help of a suspension ramp, which is part of the delivery of the boiler, making installation of the boiler quicker and simpler.

Make use of the wide offer of the original accessories of the Protherm company.

Room regulators

Use of a suitable room regulator achieves greater comfort and more economical operation.

DHW Tanks

Protherm offers indirect domestic hot water (DHW) tanks with volumes of 60-200 litres and suitable components for connection between the boiler and tank.

Connection of electric boilers to cascade

For boilers with outputs of 21 and 24 kW it is possible to connect a further source to a cascade.

In the case of connection of more than two boilers it is always necessary to combine only boilers designed for cascade connection (type 21kW, 24kW). The last boiler in the range can be any from the Ray range. The reason is that only the 21 kW and 24 kW types are fitted with clamps which enable connection of a further source to the cascade. The boiler is then controlled as a single source. Switching of output levels is with a time delay of approx. 20 seconds. This prevents excessive load of electricity network. In the transition period it is possible to mechanically reduce the maximum power for each boiler in the cascade.

Connection of electric boiler to tank

Ray electric boilers can be connected to indirect DHW tank PROTHERM. In order to ensure correct communication between the boiler and tank it is necessary to use a 3-way motor valve

Main features

- pump run-down
- built-in safety valve and expansion vessel 10 L
- switching on-off according the remote signal MRC
- possibility to set up four output levels
- gradual output switching

Type	Unit.	Ray 9 – 24 K
Input	kW	9, 12, 15, 18, 21, 24
Effectiveness	%	99,5
Electrical voltage / frequency		3 x 400V / 230V, 50Hz
Electrical current max. 24 kW	A	3 x 36 A
Level of electrical protection	IP	40
Min. / Max. pressure of HW	kPa	100 / 300
Max. operational temperature of HW	°C	85
Volume of expansion vessel	l	10
Weight without water	kg	34

HW – heating water

The manufacturer reserves the right to make technical changes.

Direct-heating electric boilers



3 - 9 kW **6 - 18 kW**
6 - 12 kW **12 - 21 kW**
6 - 15 kW **12 - 24 kW**

- Modern design
- Easy operation
- Gradual output switching
- Minimum noise level
- Boiler remote control by MRC system
- Connection to cascades possible
- External control of output levels

Ray – clean energy



The elegant range of direct-heating electric boilers PROTHERM RAY offers modern heating for flats and family houses. Operation of the boiler requires practically no attendance and makes almost no noise. On leaving the production shop, boilers are completely equipped with all operational and safety elements, including regulation. In contrast with ordinary electric boilers, RAY boilers are equipped as standard with a switching system using mass remote control (MRC).

Advantages of electrical energy

- The entire Slovak Republic has electrical connection
- Electric boilers produce no emissions, which is an advantage for use e.g. in protected natural areas or in areas threatened by frequent climatic inversions
- Electric boilers do not require a chimney or any other equipment for exhaust of combustion gases. They also do not require air for combustion in the same way as boilers which use other fuels
- Easy regulation of operation, quick reaction to immediate need for heat with direct heating by electric boiler

- Very comfortable operation

Electronic control block

- Ray electric boilers are equipped with electronic control with the function of gradual output on/off switching in increments/decrements of 6 kW max. (2kW per each phase), with a delay of approx. 20 seconds, in order to avoid undesirable impacts in the electrical mains network upon switching the boiler on and off.
- The circulating-water pump is in operation only for the essentially necessary time, thus saving energy and reducing mechanical consumption.

- The pump remains in operation for a further 2 minutes after switching off the electric boiler, in order to use also hot water, which remains in the body of the boiler and the distribution system after switching off.

Boiler body

- Boilers are equipped with a cylindrical steel exchanger with resistance heating elements.

Integrated hydraulic block

- A modern element used for gas boilers, which contains a pump with an automatic air vent, a pressure sensor for heating water, a safety valve and connection of a 10-litre expansion vessel of the heating system.
- Boilers have an electronic switching block and enable selection of the output of the electric boiler with the help of three switches.

For certain types it is possible to select up to 4 output levels, see table.

Type / Level	I	I+II	I+III	I+II+III
9 K	0	3	6	9
12 K	0	6	6	12
15 K	6	9	12	15
18 K	6	12	12	18
21 K	12	15	18	21
24 K	12	18	18	24

- Boilers with the indication v.12 are also equipped with separate outputs, via which it is possible to control the individual output levels of the boiler by means of the external equipment. For this manner of control it is possible to use e.g. a "Three-phase electrical current excess circuit breaker guard". In practice the boiler acts together with this equipment so as to ensure automatic switching off of separate output levels of the boiler following the increased load in the electricity network (washing machine, cooker, kettle etc.). After load decrease in the electricity network the separate output levels of the boiler

are gradually re-connected. This manner of control is used where it is not possible to increase the value of the main circuit breaker of the given building.

Connection to electricity network

- Electric boilers are designed for constant connection to a fixed, three-phase electricity distribution system of network voltage. Since this requires large power inputs it is necessary to select an appropriate value of the circuit breaker and power supply cables, see table.

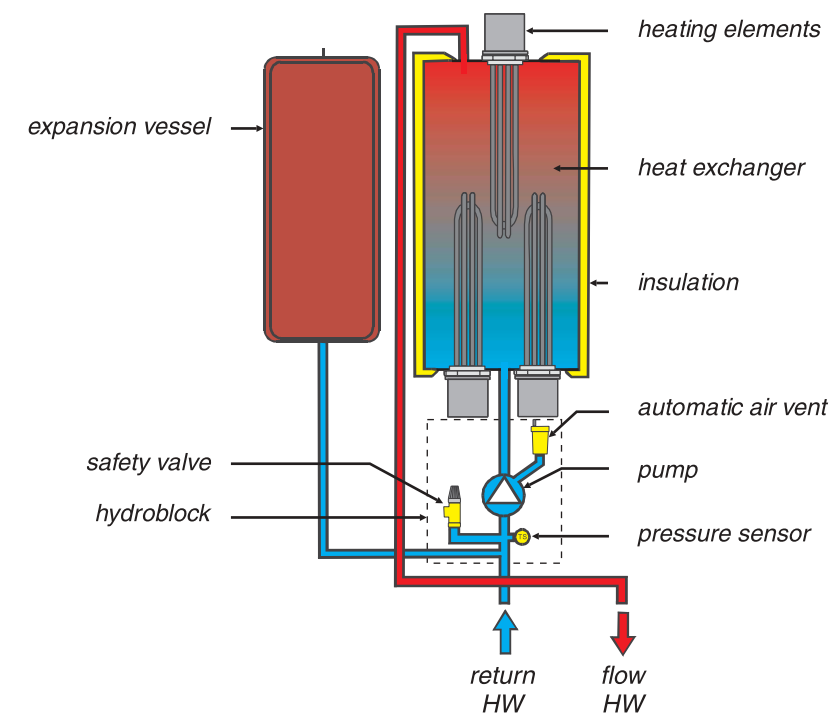
Recommended value of circuit breakers and cross-sections of wires

Type	Circuit breaker value (A)	Cross-sectional area of Cu conductor (sq.mm)
9 K	16	1,5
12 K	25	2,5
15 K	25	2,5
18 K	35	4
21 K	35	4
24 K	50	6



MRC – Mass Remote Control

- MRC enables electricity plants to provide customers with not only electricity but also various signals relating to switching rates on an electricity meter and operation of certain appliances. The price of electricity for small consumers is not constant throughout the course of the day, and double-tariff rates are used (high and low tariff). The electricity plant also switches electrical heating appliances on and off together with switching tariffs.



Development and manufacture of PROTHERM boilers is certified according to the international quality standard ISO 9001.