

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, 24 and 28 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 and 28 kW). The last boiler in the range can be any from the Ray range. The reason is that only the 21 kW, 24 kW and 28 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 6 – 28 K
Input	kW	6, 9, 12, 15, 18, 21, 24, 28
Effectiveness	%	99,5
Electrical voltage / frequency		3 x 400V / 230V, 50Hz
Electrical current max. 28 kW	A	3 x 43 A
Level of electrical protection	IP	40
Min. / Max. pressure of HW	kPa	80 / 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 - 6 kW	6 - 18 kW
3 - 9 kW	12 - 21 kW
6 - 12 kW	12 - 24 kW
6 - 15 kW	14 - 28 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. (7kW for 28K), with a delay from 0 to 75 seconds according the boiler output, 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 three-speed pump remains in operation for a further 4 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. In order to provide better air ventilation the exchanger is equipped with a built in air-vent.

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
6 K	0	3	3	6
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
28 K	14	21	21	28

- Boilers, in addition, are also equipped with a separate output for installation of external equipment, via which it is possible to control the individual output levels of the boiler according to the mains load.
- In practice for instance it is switched on an electrical stove. The boiler is automatically switching off one or two output levels of the boiler in order not to overload the main circuit breaker. This manner of control is used where

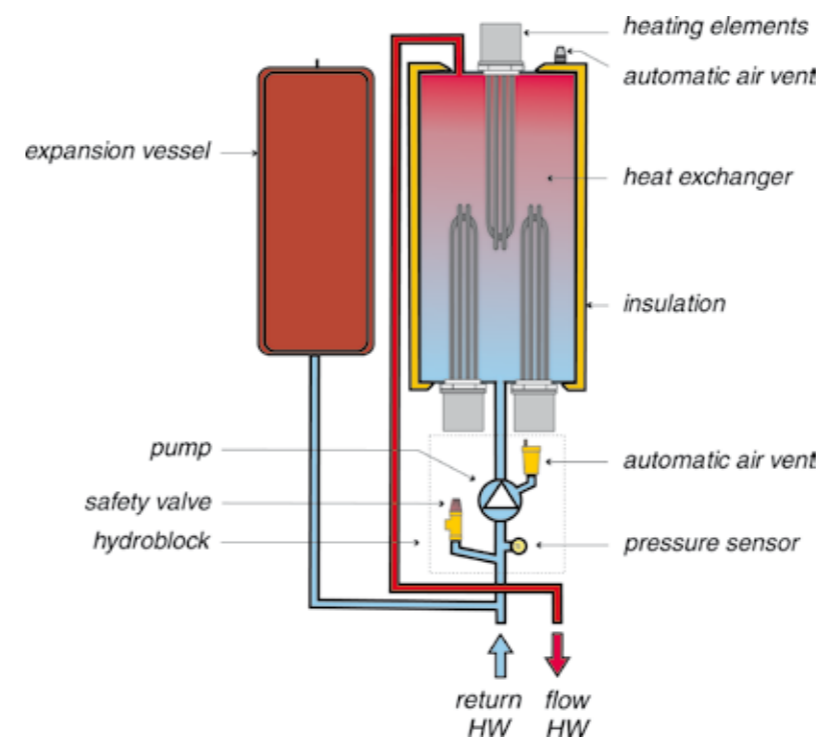
it is not possible to increase the value of the main circuit breaker of the given building.

Connection to electricity network

- Electric boilers are designed for constant connection to a fixed, three-phase electricity distribution system of network voltage (Version 6K and 9K can be connected to a 1-phase electricity system providing to observe special connection terms). 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)
6 K	10 (32*)	1,5 (6*)
9 K	16 (50*)	1,5 (10*)
12 K	25	2,5
15 K	25	2,5
18 K	35	4
21 K	35	4
24 K	50	6
28 K	50	10



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.

* valid for boilers 6K and 9K connected to 1-phase

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