Introduction

The electrode boiler is one of the most advanced and confidently used developments in energy-efficient heating technology with a wide range of applications, and at the same time, as the long experience of successful operation shows, it is a simple, reliable and safe product. This is the result of using for peaceful purposes one of the best achievements of the national defence industry. The efficiency of electrode boilers reaches 98%. For many years the boilers of the "Company "Galan" SA have been successfully used in practically all regions of Russia and in countries near and far abroad.

All electrical wiring connections should be made by a qualified electrical fitter!

No	Boiler name	Power, kW	Voltage, V	Phase, F	Initial (start-up) boiler current 15oC, A	Maximum boiler current at temperature "return" 60oC, A
1	"Fire-2"	2	230	1F	4	9.1
2	"Fire-3"	3	230	1F	5	13.7
3	"Fire-5"	5	230	1F	10-12	22.7
4	"Fire-6"	6	230	1F	15-18	27.3
5	"Geyser-6"	6	230/ 380	1F/3F	5-6 A phase	9.1 A per phase
6	"Geyser-9"	9	380	3F	6-8 A phase	13.7 A per phase
7	"Geyser-15"	15	380	3F	8-10 A phase	22.7 A per phase
8	"Volcano-25"	25	380	3F	12-15A phase	37.9 A per phase
9	"Volcano-36"	36	380	3F	18-24A phase	54.6 A per phase
10	"Volcano-50"	50	380	3F	24-30A phase	75.8 A per phase

The use of water as a coolant.

The specific electrical resistance (hereafter referred to as resistance) of the source water (Table 1) may differ from that required to operate the boiler at rated output, so it may need to be adjusted to the lower or higher side (hereafter - adjustment). The adjustment ("regulation") is performed after filling the system with water, by adding a salt solution or water with high water resistance, thus obtaining the tabulated values of initial (starting) and maximum current (No. Table 2) Reverse flows at specific temperatures (hereinafter
"Entrance"). It is necessary to follow the instructions of our Guide as closely as possible:

- the temperature at the boiler inlet ("Inlet" sensor) should be 15 °C - 20 °C;
- the boiler activation time is not longer than 30 seconds.

Carrying out correction of water conductivity.

Switch on the boiler and after 30 seconds at a return water temperature of 15
°C - 20 °C measure the inrush current with an ammeter or current collectors. Switch off the boiler. There are 3 possible situations - the initial (starting) current is lower or higher than indicated in the table. No. 4 for your boiler, or equal to the table.

Dear customer!

In order to make full use of our boilers and avoid potential error troublesome during installation of the heating system, installation of boilers, for start-up and further operation, as well as the purpose of their application, please first carefully read this manual, which contains information about data, design, principle of operation, applications, installation of boiler rules, some basic requirements for the installation of heating systems, maintenance, repairs, safety measures, registration and maintenance of working documents, etc.

The boilers are designed for heating residential houses, including cottages, gazebos, multi-storey dwellings, garages, saunas, premises and buildings for public, commercial, public, industrial and agricultural purposes, as well as other structures in the absence or inefficiency of heating.

Electric boilers Electric heating water closed joint-stock company "Galan" Company "Fire", "Geyser", "Volcano" series (hereinafter - the boiler) are used only in closed heating systems with maximum permissible pressure not exceeding 3 bar, without hot water intake from the system for domestic, industrial or other purposes, with natural or forced (using a circulation pump) coolant circulation, with the most recommended economic mode - temperature at the boiler inlet 35 + 45°C. These boilers were developed by the Closed Joint Stock Company "Company "Galan" and are manufactured only in Russia.

The set temperature in the heated rooms is operated by means of automation, including a thermostat.

Operating mode - continuous.

The following conditions are necessary for normal boiler operation:

- Temperature of the room, where the boiler is installed, the limit temperature is from + 7°C to 40°C: It works from + 10°C to + 35°C If there are no other requirements;
- Relative humidity at 20°C - not more than 75%;
- The environment is non-explosive, free of corrosive gases and vapours that destroy metal and insulation, as well as industrial dust, in quantities that destroy or interfere with boiler operation.

There are no flammable materials in the design of the boilers, so our boilers are fireproof.

Boiler technical conditions - Technical conditions 3468-001-17289826-12,

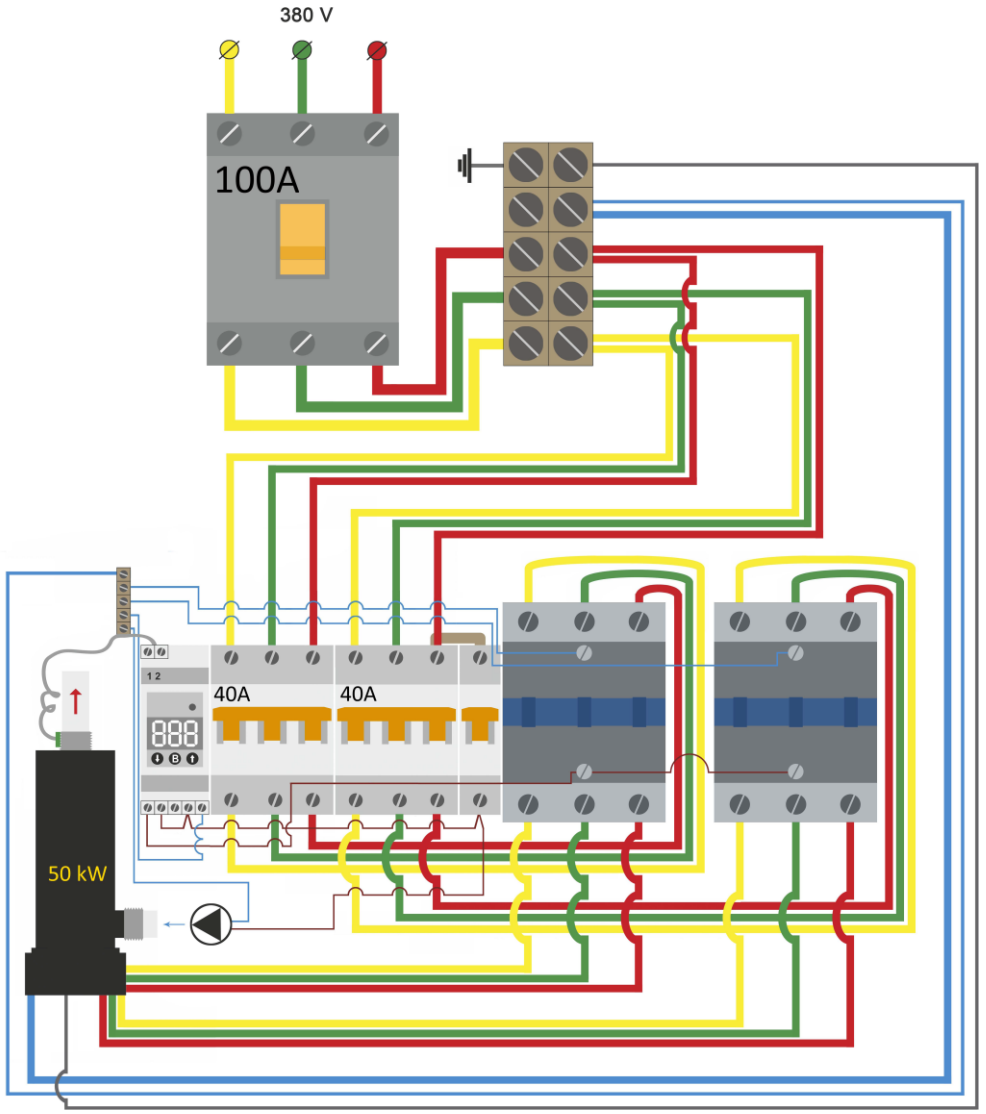
Designations when ordering: - Electrode boiler "Galan-xxxx No" (xxxx - boiler name). Note: No. boiler capacity according to table 1. Example: -

Electrode boiler "Galan-Fire 6" - boiler name
"Bonfire", power 6 kW.

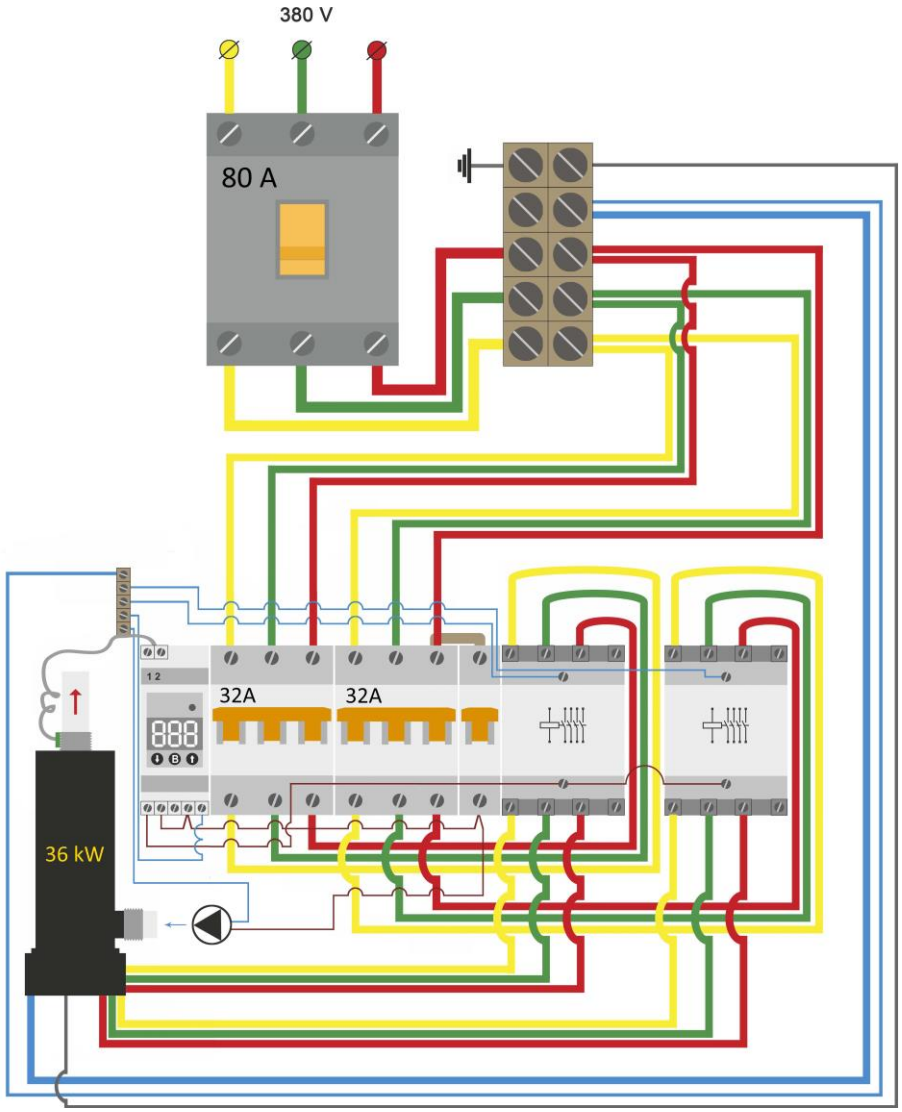
TECHNICAL CHARACTERISTICS OF THE BOILERS

"GALAN Company" SA

Lp.	Boiler characteristics			
1	Rated voltage +-10% (m3)		80	120
2	Rated power consumption (kW)		2	3
3	Rated voltage +-10% (V)		230	230
4	Maximum boiler current for each phase (A). Frequency 50 Hz		9,1	13,7
5	Rated current of automatics. Electromechanical version (A)		10	16
6	Cross section of the copper connection cable (mm2)	230 V	4	4
		380 V		
7	Recommended coolant volume in the heating system (l)		20-40	25-50
8	Du connectors for the connection of the boiler to the heating system (mm). D connections "Inlet" and "outlet" of the boiler (mm)		25	25



13) Wulkan 50 boiler connection diagram



12) Wulkan 36 boiler connection diagram

Name of boilers							
175	200	250	340	550	850	1200	1650
5	6	6	9	15	25	36	50
230	230	230/380	380	380	380	380	380
22,7	27,3	9,1	13,7	22,7	37,9	2x27,3	2x27,3
25	32	3x10	3x16	3x25	3x40	2x3x32	2x3x40
6	6						
		2,5	4	6	6	2x6	2x6
30-60	35-70	35-70	50-100	100-200	150-400	200-400	300-500
25	25	32	32	32	32	32	32

Advantages of electrode boilers

Boilers manufactured by "Firma Galan" SA exclusively in Russia (8 types, Table 1) are not only cheaper than power boilers of all other types, including foreign ones, but have several very important advantages:

Significant energy savings thanks to the extremely high efficiency of electrode boilers, which is up to 98%, much higher. Existing heating boilers of other types. It is achieved by means of direct conversion of electrical energy into heat energy directly in the cooling liquid during the flow of electric current through the heating medium by ionization of molecules, the temperature of the coolant and conductivity increases, the increase of electric current, passing from electrode to electrode, the boiler quickly reaches the rated power.

Installation(s) of an electronic boiler in a heating system

Heating system projects work and installation of boilers, automation, electrical connection (including ground), commissioning, repairs, condition survey must be carried out by the organisation.

(Companies) who have the appropriate licence to maintain them. If the above work is carried out, the documentation for the heating systems as well as for the operation must be observed:

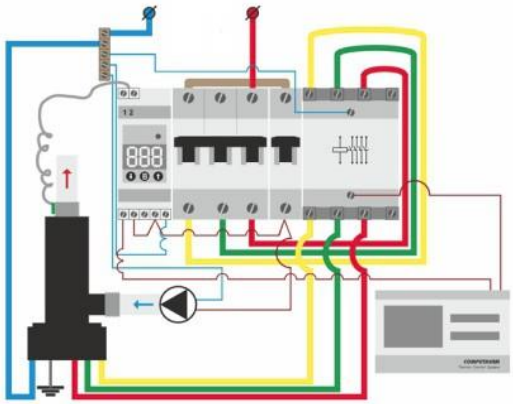
- "Interdisciplinary principles for electrical installations" (HSS);
- "Rules for the technical functioning of consumer electrical installations" (PTE of consumer electrical installations);
- "Safety rules for the operation of electrical installations";
- "Principles of arrangement and safe operation of electric boilers and electric boilers";
- This manual.

It is also necessary to comply with the relevant SniP, "Fire safety regulations of the Russian Federation".

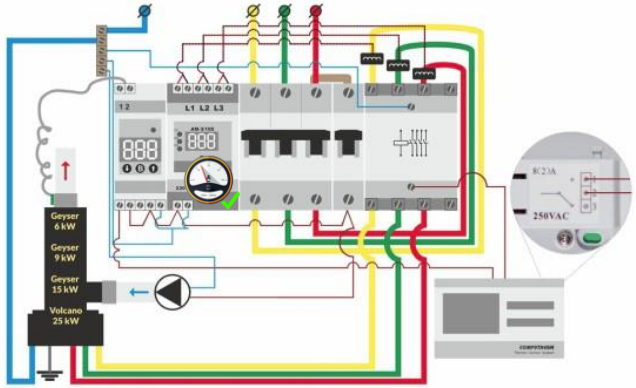
To connect the boilers, automatic control of the heating systems installation, their maintenance, including repairs needed electrical specialists or devices of appropriate qualification constitutes the proof of ated and approved to work in electrical installations up to 1000 W having the electrical safety group no less than 3. For installation, operation and repair of heating systems, heating experts are needed. The above-mentioned specialists should be familiar with the "Principles of safe operation and use of electric boilers and electric generators", also with this manual.

When working with corrosion inhibitor, liquid, washing and cleaning agents and follow their safe use.

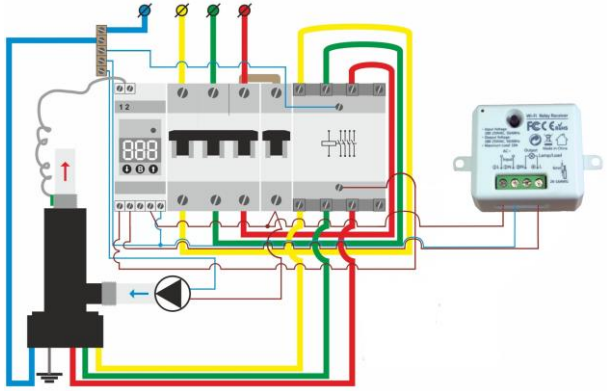
Upon completion of the above mentioned works listed with (firm), these works must be carried out, makes an entry in the Bulletin that is certified



9) Same diagram as number 4, only with air thermostat

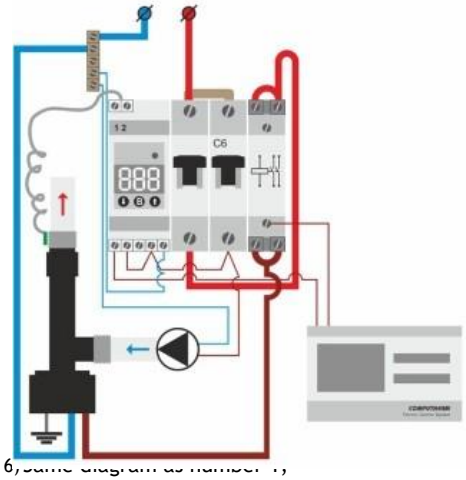


10) Same diagram as number 5, only with air thermostat

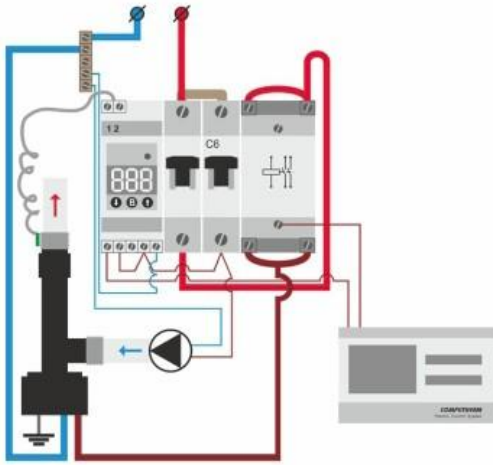


11) This diagram shows how to connect a wi-fi relay to control a boiler

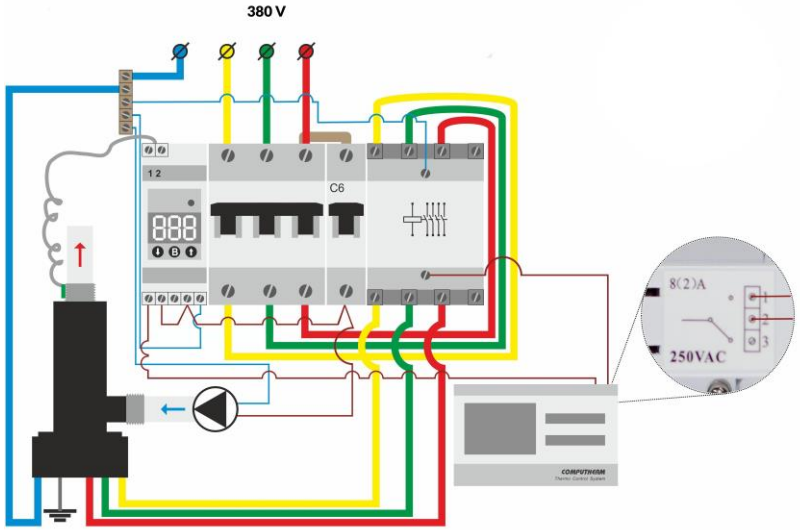
ELECTRICAL DIAGRAM FOR CONNECTION OF BOILERS



6) Same diagram as number 1, only with air thermostat



7) Same diagram as number 2, only with air thermostat



8) This is a wiring diagram showing how to connect an air thermoregulator (same diagram as number 3) to an existing control unit with a TR-16 temperature controller installed. For example, there is a Computherm q7, but any air temperature controller can be used.

by the responsible works contractor and the organisation's stamp.

Attention, please! Warranty obligations apply to a boiler installed in accordance with the above requirements, with proper recording of the work performed. The warranty does not apply to a boiler installed not by an unauthorised project or organisation, nor by unauthorised specialists.

Visual observation of the operation of the boiler can be carried out at least by persons of 18 years of age, who have the appropriate instructions in this manual, the boiler equipment and the rules of safe supervision of its operation.

Connecting the boilers to the mains supply organisation.

If the allocated power is insufficient, the boiler is connected in a predetermined order.

It should be noted that this order is subordinate to the electricity used for all messages, e-mails, ektrokotlow other types where it is not specific only to the data of electric boilers.

Grounding

By the time the boiler is installed, the heating installation must already have a fully completed and tested ground. The size of the resistance to earth of the boiler, heating installation must not be greater than 4 Ом. As a conductor for earthing a copper wire of 4-mm cross-section is used. (table no. 1).

The design of the protective earthing must comply with the electrical safety regulations, "rules for the installation and safe operation of electric and galvanised boilers".

All open electrically conductive parts of the boiler and heating system, including cold metal pipes and the hot heat carrier must be earthed.

Grounding conductors entering the building, the structure must be marked with an identification sign.

Earthing devices

Earthing devices shall comply with PUE requirements.

The design and construction of the earthing switch must ensure the required value of the resistance to earth of the boiler, heating system - not more than 4 Ohms.

The period for periodic inspection of the condition of the earth electrode is 12 years. Wear due to corrosion and should not exceed 50%.

It is prohibited to paint an earthing structure to protect it from corrosion by removable or permanent dielectric and cracks. For example plastic, rubber, shielding.

Installation of boilers in a heating system

Before installation, the boiler must be inspected and checked for completeness.

The boiler is installed vertically in the heating system. In this

In case the terminal group (boiler current wires) for the connection to the mains, protected from external influences, accidental contact with the protective cover (hood), should be placed from the bottom. **Connection of boiler connections to the heating system pipelines is made by means of sanitary fittings of diameter not smaller than the indicated DN.**

When designing a heating system, it must be provided:

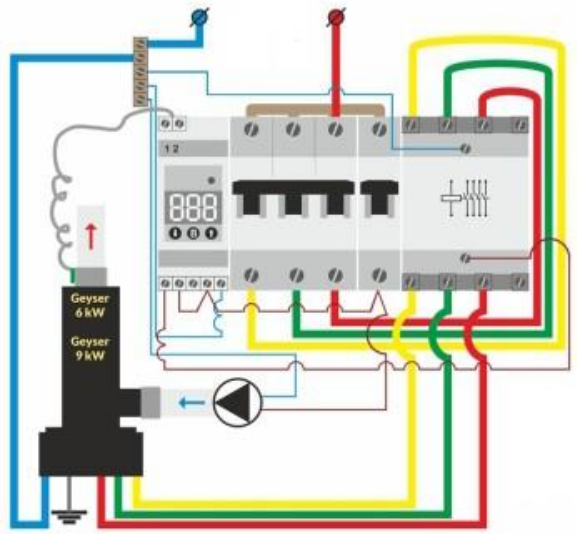
• The boiler must be installed as low as possible in relation to the radiators as this increases the pressure on the boiler outlet. It is desirable to provide a vertical clearance from the boiler to the floor sufficient to allow the electrode group to be freely pulled out of the boiler, inspected and its internal surfaces cleaned. The vertical diameter of the riser above the boiler, as well as the diameters of all heating system pipework, must strictly comply with the design of your heating system. The height of the vertical riser above the boiler is at least 2 m. This is one of the conditions for not using the circulation pump. During installation, the boiler must be fixed to the wall, regardless of how it is connected to the heating system.

In Figures 1, 2, 3, 4, 5 and 6 are the basic circuits for making heating installations.

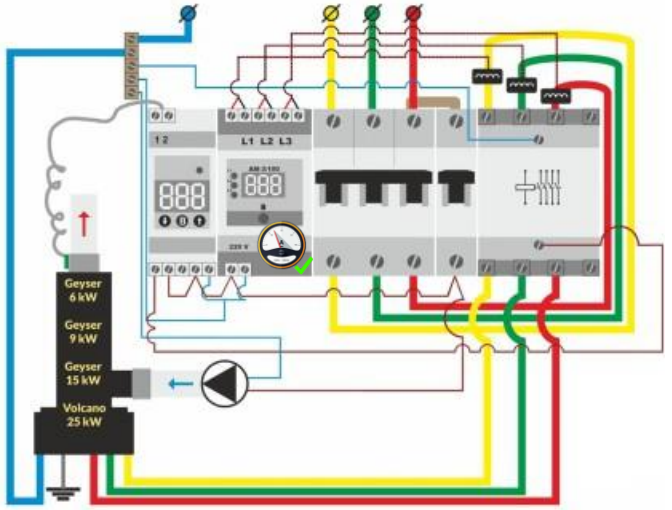
For convenient operation of the heating system, install stopcocks on the pipework immediately after the expansion tank and before the boiler return pipe (see Figures 1, 2, 3, 4, 5, 6).

It is permitted to install a closed heating system to install a sealed connection to the expansion tank, provided there is a safety group immediately after the boiler. A closed type expansion tank in this case is recommended back to the boiler.

1

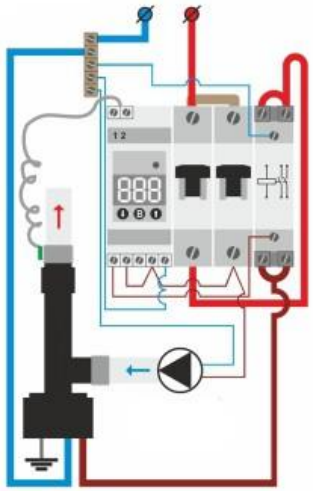


4) This diagram shows how to connect a three-phase boiler (for example a Geyser 9 or Geyser 6) to a single-phase mains electricity supply. It is useful if you only have 230 volts and the heated area is over 250 m3 The distinguishing feature of this diagram is that instead of one three-pole automatic switch, we establish three single-pole switches. This makes it possible to control the boiler in three stages of heating. For example: A Geyser 6 - three levels for 2 kW on each level. And Geyser 9 - three levels for 3 kW on each level.

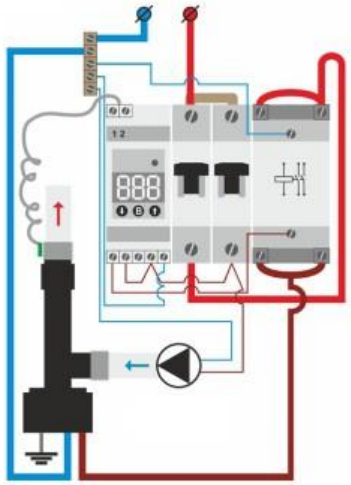


5) An ammeter has been added to this diagram. For three-phase boilers: Geyser 6, Geyser 9 Geyser 15 and Volcano 25.

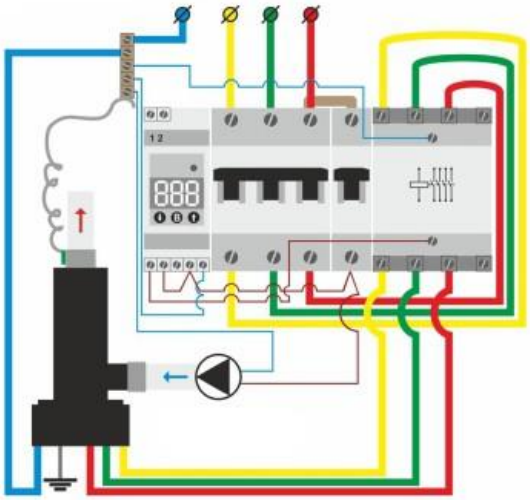
ELECTRICAL DIAGRAM FOR CONNECTION OF BOILERS



1) This is a simple wiring diagram for single phase boilers up to 3 kW.



2) For single-phase boilers of 5 and 6 kW. It differs from the previous scheme with another magnetic contactor (stronger, up to 40A) and another main switch (from 25A to 32A).



3) This is the classic connection diagram for three-phase electrode boilers. Such as: Geyser 9, Geyser 15 and Wulkan 25

HYDRAULIC DIAGRAM

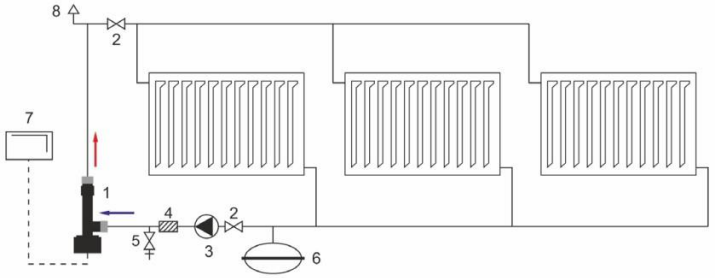


Fig. 1
1. Electrode boiler
2. Ball faucet
3. Circulation pump
4. Filter
5. Blow-off valve
6. Expansion tank
7. Boiler control
8. Vent

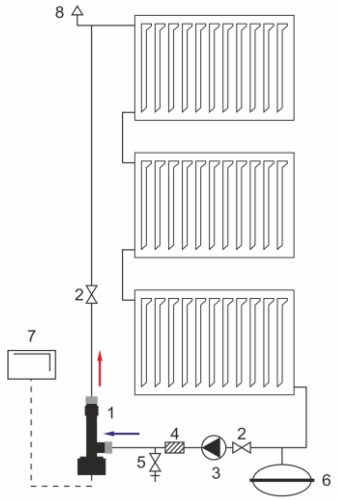


Fig. 2
1. Electrode boiler
2. Ball faucet
3. Circulation pump
4. Filter
5. Blow-off valve
6. Expansion tank
7. Boiler control
8. Vent

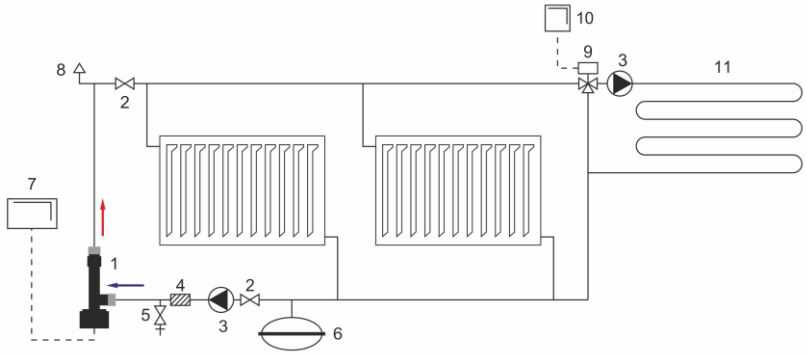


Fig. 3
1. Electrode boiler
2. Ball faucet
3. Circulation pump
4. Filter
5. Blow-off valve
6. Expansion tank
7. Boiler control
8. Vent
9. Three-way valve
10. Regulator temperatures
11. Underfloor heating

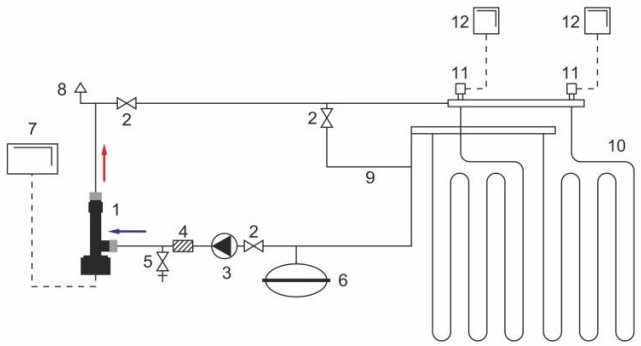


Fig. 4
1. Electrode boiler
2. Ball faucet
3. Circulation pump
4. Filter
5. Blow-off valve
6. Expansion tank
7. Boiler control
8. Vent
9. Three-way valve
10. Underfloor heating
11. Distributor
12. Temperature controller

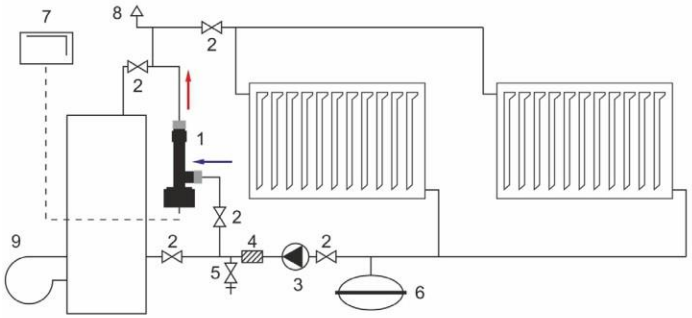


Fig. 5
1. Electrode boiler
2. Ball faucet
3. Circulation pump
4. Filter
5. Blow-off valve
6. Expansion tank
7. Boiler control
8. Vent
9. Solid fuel boiler

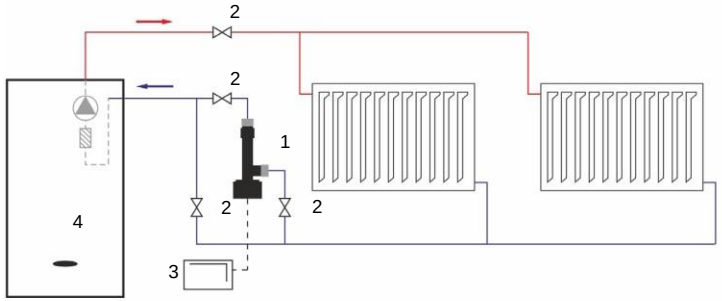


Fig. 6
1. Electrode boiler
2. Ball faucet
3. Boiler control
4. Gas boiler

ELECTRICAL DIAGRAM FOR CONNECTION OF BOILERS

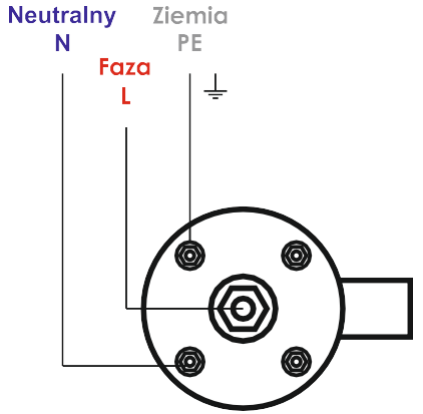


Fig. 7
Connection diagram for single-phase boilers of the following types: Campfire-2, Campfire-3, Campfire-5. Campfire-6

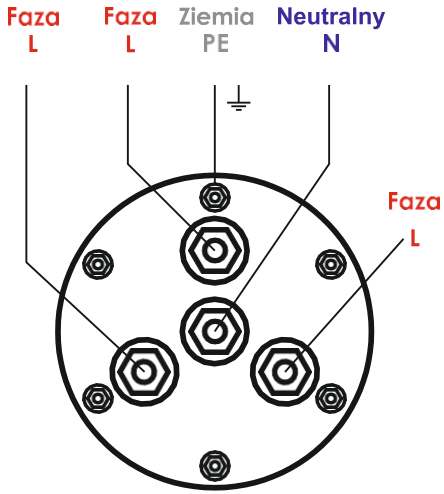


Fig. 8
Connection diagram for three-phase boilers: Geyser-6, Geyser-9, Geyser-15, Wulkan-25

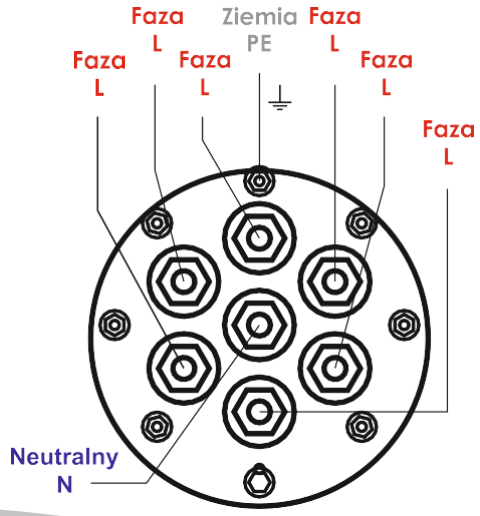


Fig.9
Connection diagram for three-phase boilers: Wulkan-36, Wulkan-50