



termet®

INSTRUCTION MANUAL

INSTALLATION AND OPERATION

Instantaneous gas water heater

type:

open combustion chamber

TERMAQ ELECTRONIC ECO GE-19-02

TERMAQ ELECTRONIC ECO GE-24-02

TERMAQ AQUA POWER ECO GH-19-02

TERMAQ AQUA POWER ECO GH-24-02

CE 1450



DEAR CUSTOMER,

**Congratulations on choosing the termet product.
You have purchased a modern, economical and environment-friendly
product that complies with high EU quality standards.**

**Please take time to get yourself familiarised with this manual, as full
understanding of the product's functions, as well as knowledge of
manufacturer's recommendations is imperative for its smooth,
economical and safe operation.**

**Please keep this manual handy throughout the whole operational
lifetime of the water heater.**

We hope you will be satisfied with our product.

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1. INTRODUCTION

This instruction manual describes instantaneous gas water heaters, adapted for installations with one or more tap (eg. shower, sink etc.).

All drawings, specifications and another information included in this instruction are based on the up-to-date data of the product, available at the moment of issuing this instruction.

The manufacturer reserves the right to make changes in gas water heater design, without indicating them in the instruction, as far as the modifications do not have influence on the operational and technical features of the product.

Long-term operation of the product and its reliability most depend on proper installation and use as well as performing the maintenance in due time and in proper way.

1.1. IMPORTANT TIPS

Read this before any installation works or use.

- Gas appliances, that are permitted for use and signed with **CE** symbol are safe if they are being used appropriately and complying with specific rules of installation and use.
- This installation guide and user's manual is an integral part of the water heater unit and as such it should be kept at hand, and be studied carefully throughout, as it contains all the necessary information and precautions that need to be observed to ensure the safety of installation, usage and maintenance of this unit. In case of transferring the appliance to another user, this manual should be also attached.
- The installation and regulation works must be performed by an authorised company.
- A room that the unit will be installed in must provide:
 - flue conducting, through a pipe connected to an individual flue with a proper draught,
 - efficient supply - exhaust ventilation – in accordance with this instruction manual and the local regulations.

Non-observance of this requirements may be unsafe for a user and may also cause the product damage (i.e. example water system freezing).

- The unit may be assembled and started up only after all the other construction and installation works in its designated room are finished. It is strictly forbidden to assemble and use the unit in rooms where construction or other installation works are still under way.
- Gas and water systems should be equipped with appropriate filters, which are not included with the unit.
- The water heater can be operated only by adults.
- Do not perform any repairs or alterations to the water heater on your own.
- It is strictly forbidden to make any modifications that could reduce the clearance of air-intake holes (covering, blanking off etc.) or uptake and flue ducts in a room and in the appliance.
- Do not keep any containers with inflammable, aggressive or strongly corrosive chemicals close to the water heater.

- It is forbidden to keep or dry clothes or other inflammable objects on or nearby the appliance and flue ducts.
- The service and maintenance operations of the water heater can be only performed by an authorised company.
- Effects of not - observance the instructions included in this document by gas engineers or users are excluded from the warranty coverage.
- After exploitation of the boiler, disassembled product transfer to a specialized unit for utilization.

The manufacturer will not be liable for any damage or malfunction of the product caused by faulty installation or use, as the results of non-observance the manufacturer instructions and any relevant, official regulations.

Before you start up the water heater, concerning for your safety, make sure if:

1. Permanent air supply that is necessary for gas combustion is provided,
2. The appliance has been connected to an individual and efficient chimney duct,
3. The gravitational ventilation duct is not choked.

If you smell a gas:

1. Do not use electric switches likely to cause a spark.
2. Open the door and windows.
3. Shut down the main gas valve.
4. Contact the gas emergency service.
5. If the gas escapes from an untaught valve of a gas cylinder, shut down the valve, disconnect the cylinder and take it outside the building.
6. If the gas escaping from a leaky valve on the cylinder catches fire, throw a wet blanket on the cylinder in order to extinguish the fire, and then pour water on it in order to cooling down the cylinder and make possible to turn off the valve.

In a case of breakdown:

1. Turn off the gas supplying valve.
2. Turn off the water supply if there is a risk of flooding.
3. If there is a risk of water heater freezing, drain out the water from it.

If you smell fumes:

1. Switch off the heater by turning off the hot water tap or shut down the gas valve of water heater.
2. Open the door and windows.
3. After airing the room, switch on the heater for a while and check if the gas smell disappeared. If not, contact the fitter or the chimney service in order to check the exhaust system efficiency.

2. PRODUCT DESCRIPTION

2.1. Technical features

- Electronic ignition with a ionisation flame control
- Lack of chimney draught protection and fumes leak protection.
- Heat exchanger overheating protection.
- Proportional power regulation.
- Device adapted for water supply system from 20 to 1000 kPa (0,2 to 10,0 bar)

Gas instantaneous water heaters type GE-19-02, GE-24-02 and GH-19-02, GH-24-02 are manufactured as B_{11BS} installation type version, what means that they are intended to be connected to the individual flue chimney. Combustion products are taking out of the room by means of natural draught. The air for the combustion process is being taken directly from the room where the water heaters are installed. Water heaters are equipped with a protection against draught loss in a flue pipe and protection against fumes escape into a room.

The water heaters GE-19-02, GE-24-02 and GH-19-02, GH-24-02 are equipped with the most recent technical solutions which provide long-lasting, faultless and economic performance and the comfort of use.

The fittings used in the water heaters ensure proportional power regulation, which enables to get constant temperature of outflowing water.

Activation (burner ignition) of the water heater takes place with each opening of the tap. Shutdown takes place after closing the tap.

One of the main advantages of the water heaters is little water flow necessary to start up the appliance (about 3,2 l/min for GE-19-02, GH-19-02 and about 3,6 l/min for GE-24-02, GH-24-02).

Each water heater is destined to combust only one type of gas (for example 2H-G20) and the water heater must be fed only with this type of gas.

The water heater's type, the group and type of gas, as well as the service line pressure which the water heater was designed for, are marked on the packaging, in the instruction manual and on the marking plate.

The water heater can be converted to another type of gas only by an Authorized Service Center in accordance with point 5.

2.2. Water heater construction and technical data

2.2.1. Main components of the water heater

- 1 Burner
- 2 Electrode set
- 3 Water-gas fittings
- 4 Heat exchanger
- 5 Draught breaker
- 6 Spark generator
- 7 Battery compartment
- 8 Temperature limiter - protection against flue gas outflow into the room
- 9 Temperature limiter - protection against overheating of the heat exchanger.

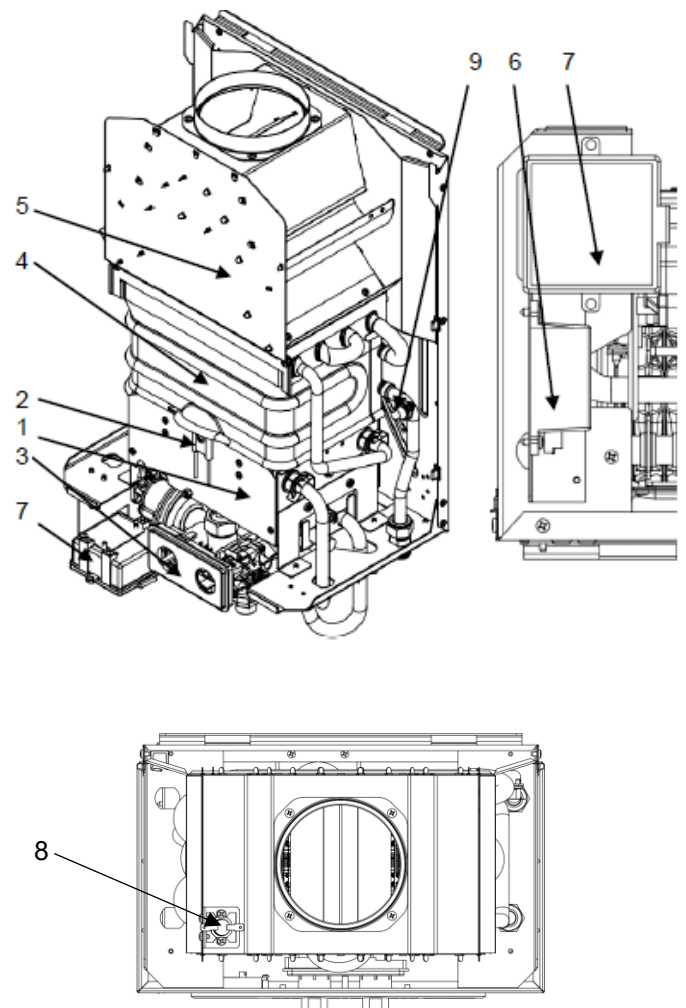
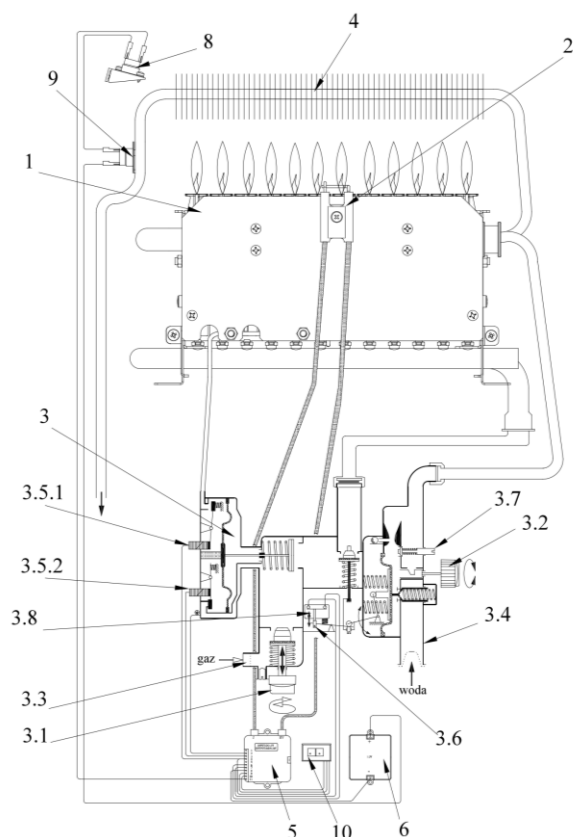


Fig. 2.2.1.1 Main components of the water heater

TERMAQ
ELECTRONIC Eco



TERMAQ
AQUA-POWER Eco

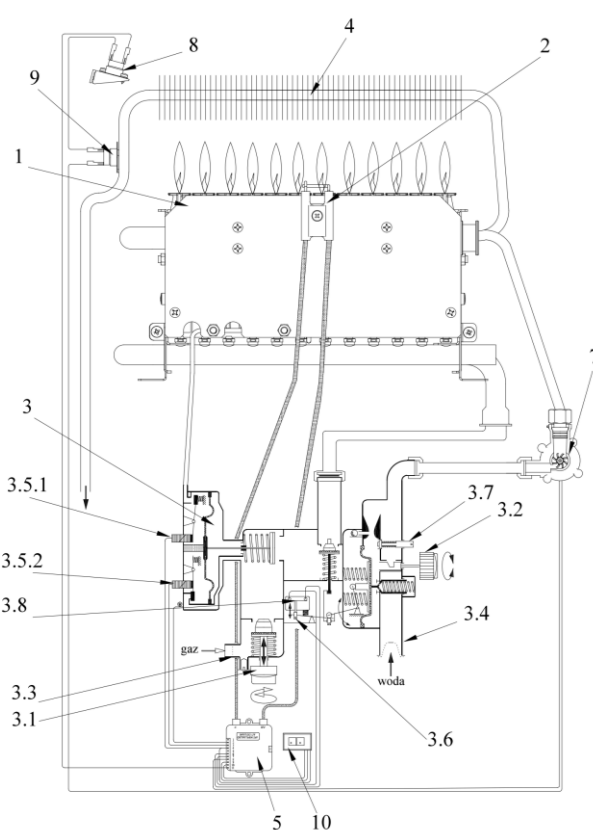


Fig. 2.2.1.2 Schematic diagram of the water heaters

1. Burner
2. Electrode set
 - 2.1. Igniting electrode
 - 2.2. Ionisation electrode
3. Water-gas fittings
 - 3.1. Gas flow knob
 - 3.2. Temperature selection knob
 - 3.3. Gas filter
 - 3.4. Water supply filter
 - 3.5. Differential pressure valve
 - 3.5.1. Coil I of the differential pressure valve
 - 3.5.2. Coil II of the differential pressure valve
 - 3.6. Regulating screw of the microswitch
 - 3.7. Regulating screw of the little water flow
 - 3.8. Microswitch
4. Heat exchanger
5. Spark generator
6. Battery compartment
7. Hydrogenerator
8. Temperature limiter - protection against flue gas outflow into the room
9. Temperature limiter - protection against the heat exchanger overheating
10. LED display
11. Cable assembly

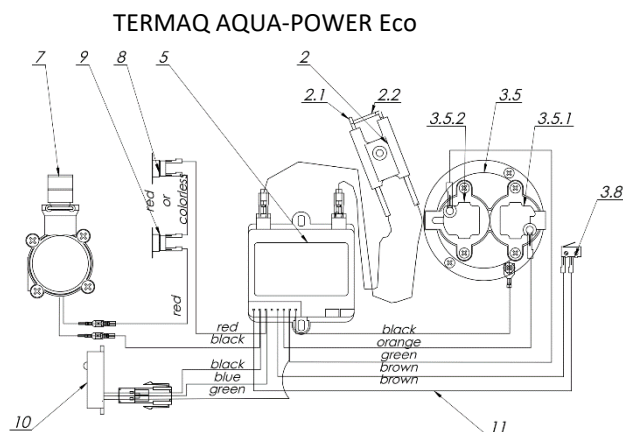
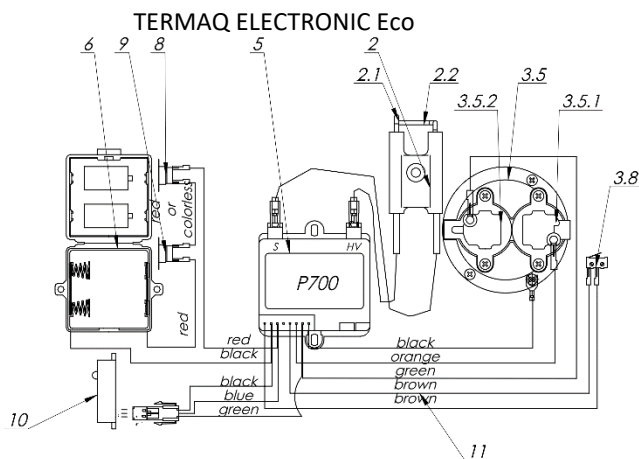


Fig 2.2.1.3 Electric diagram of the heater

2.2.2. Technical data

Parameter	Unit	GE-19-02 GH-19-02	GE-24-02 GH-24-02
Nominal input power	kW	2H-G20	
		19,2	24,0
		3B/P-G30	
		19,2	22,2
Minimal input power	kW	8,0	9,1
Nominal heat load	kW	2H-G20	
		21,8	27,3
		3B/P-G30	
		21,8	25,2
Minimal heat load	kW	9,1	10,5
Efficiency	%	88	
Nominal gas consumption ¹⁾ of a main burner, for:			
Natural gas: 2H-G20	m³/h	2,3	2,85
Liquefied gas: 3B/P-G30 – 30mbar	kg/h	1,69	2,09
¹⁾ Consumption of particular types of gas is given for reference gases, in reference conditions: (15°C, pressure 1013 mbar) allowing for 87% of water heater efficiency			
Rated gas kinetic pressure on the water heater connection with a gas supply, for: Natural gas: 2H-G20 Liquefied gas: 3B/P-G30 – 30mbar	kPa (mbar)	2,0 (20) 3,0 (30)	
Water operating pressure	kPa (bar)	20÷1000 (0,2÷10,0)	
Hot water outflow (Δt≤50°C)	dm³/min	3,2÷5,7	3,6÷7,0
Hot water outflow (Δt≤25°C)	dm³/min	5,7÷11,5	7,0÷14,0
Maximal temperature of outflow water	°C	65	
Flue connection (internal diameter)	mm	ø114	ø132
Overall dimensions: height / width / depth	mm	590/360/230	
Water weight	kg	10,7	12,1
Installation dimensions	mm	fig. 3.6.1	
Gas connection	Inch	G 1/2	G 3/4
Cold water connection	Inch	G 1/2	
Hot water connection	Inch	G 1/2	

2.3 Protection equipment

- **Protection against flue gas outflow into the room (case of draught loss)** consists of a temperature limiter (item 8) connected in series with electric supply. This protection unit shuts down the main gas valve in the water - gas fittings and cutting off the gas supply to the burner if the draught of the chimney duct is below 3 Pa or overpressure occurs.

After the protection switches off the water heater, **it is necessary to turn off a water tap**. After about 10 minutes (after cooling down the temperature limiter; this time depends, among others, on the room temperature), the protection is **automatically unlocked**. After turning on a water tap there will flow hot water.

If activation of this protection device repeats, it is necessary to contact proper chimney sweep service company in order to check-up the draught of a flue system.

Protection against a lack of chimney system draught must not be switched off.

The user must not make any modifications on the protection equipment.

Switching off or damaging the protection system may cause the leakage in a flue system.

- **Anti-outflow protection** – basing on ionization flame control - causes cutting off the gas supply to the burner by means of electric system - in the case of flame disappearance.
- **Protection against the heat exchanger overheating**, i.e. the temperature limiter (item 9) actuates if the water temperature in the heat exchanger exceeds 95°C, by cutting off the voltage in the supply system, and also closing the gas supply to the burner.

It is forbidden to make any modifications in the water heater protection systems.

3. WATER HEATER INSTALLATION

After all installation works are completed, it is necessary to check up if all gas and water connection are tight. Diagram of the water, gas and flue – gas discharge system is presented on the Fig. 3.1.3.1

NOTE:

The wires, water and gas connection elements (filters, valves), neither flue – gas discharge elements are not included in water heater equipment.

3.1 Main installation regulations

3.1.1 Location

- Water heaters cannot be installed in rooms where people stay most of the time.
- The room cubature – no less than 8 m³.
- The room height – no less than 2.2 m.

3.1.2 Ventilation

• Supply ventilation

In the room where the water heater is installed, there should be a non-closing hole of supply ventilation, of the surface not less than 200 cm², whose lower edge should be not higher than 30 cm above the floor level. It is admissible to supply the outside air from the adjacent rooms equipped with a non-closing hole of supply ventilation of the surface not less than 200 cm².

• Exhaust ventilation

In the room where the water heater is installed, there should be a non-closing hole of exhaust ventilation with the surface not smaller than 200 cm², placed as close to the ceiling as possible.

It is not allowed to use mechanical exhaust ventilation (e.g. kitchen ventilating hood).

3.1.3 Flue gas offtake system

Water heater should be installed as close as possible to the individual chimney duct and in a place not exposed to frost. The cross-sections of the pipe as well as the flue duct should remain the same along the entire length. The flue duct should leave the appliance vertically (min. 220mm) to the first elbow. The horizontal section of the flue duct at the lift of 5% (ca. 3°), should not exceed the length of 2m (Fig. 3.1.3.1) The length of the flue duct, measured from the axis of the flue duct inlet to the edge of the duct outlet above the roof should not be less than 2m. The internal surface of the flue-gas duct should be corrosion-resistant.

- Water heater connection to the flue gas duct must be agreed with the proper chimney sweep company and should meet the requirements presented on Fig. 3.1.3.1.

For the correct water heater operation, the flue gas conducting system must provide the draught not less than 3 Pa (0.03 mbar) and not more than 15 Pa (0.15mbar).

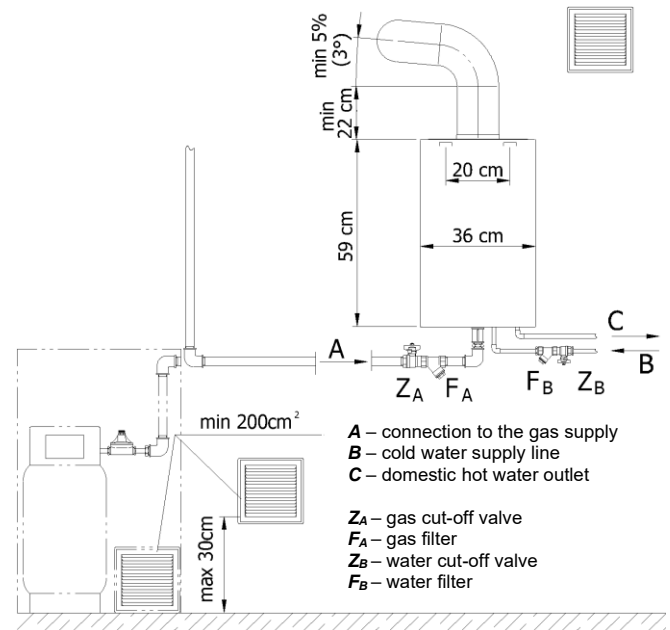


Fig. 3.1.3.1 Diagram of water, gas and flue – gas conducting systems

3.1.4 Gas system

Gas appliances should be permanently connected to steel or copper pipes of the gas system or by means of metal tubes.

Liquefied gas system

- Gas appliances fed with liquefied gas cannot be installed in rooms where the floor level is situated under the ground level.
- The cylinders should be situated in a distance not less than 1.5 m from heat radiating surfaces (radiators, stoves, etc.).
- The cylinders cannot be exposed to radiation of places with open fire.
- The cylinders should be situated in vertical position, protected against falls, beats, from children etc.
- The cylinders should be placed in a distance of at least 1 m from devices likely to cause electric sparking, e.g. electricity meters.
- The room temperature where the cylinder will be located cannot exceed +35°C.

Recommendation:

Because the one gas cylinder with the capacity of 11 kg in the exploitation of the water heater is sufficient for a short time, it is recommended to use a set of 11 kg cylinders, so called battery, or a bigger cylinder with the capacity above 11 kg. Such a battery or (max. 10 cylinders) or a larger cylinder should be placed outside the building.

3.2 Preliminary check-up operations

Before installation, it is necessary to check if:

- the purchased water heater is adapted for combustion the type of gas supplied from the gas mains which the appliance will be connected to. The type of gas the water heater has been adapted for is designated on the packaging and the marking plate placed on the front cover.
- the water system has been rinsed thoroughly with water, in order to get rid of possible rust, scale, sand or other foreign matter, which could disturb the proper operation of the water heater (e.g. increase the resistance of water flow in the system).

3.3 Water heater mounting

Water heater should be installed in a place not posing significant difficulties for a service team, on a wall made of non-flammable materials or isolated from an inflammable wall with a plate made of non-flammable material.

In case of building the water heater over in a furniture system, air supply necessary for proper gas combustion should be provided (Illus. 3.3.1).

Do not mount the water heater in the neighborhood of appliances likely to disturb its operating (e.g. over a cooker from which vapors rise).

Mount the water heater on the wall, on hooks permanently fixed in it, using two rectangular notches on the water heater back cover.

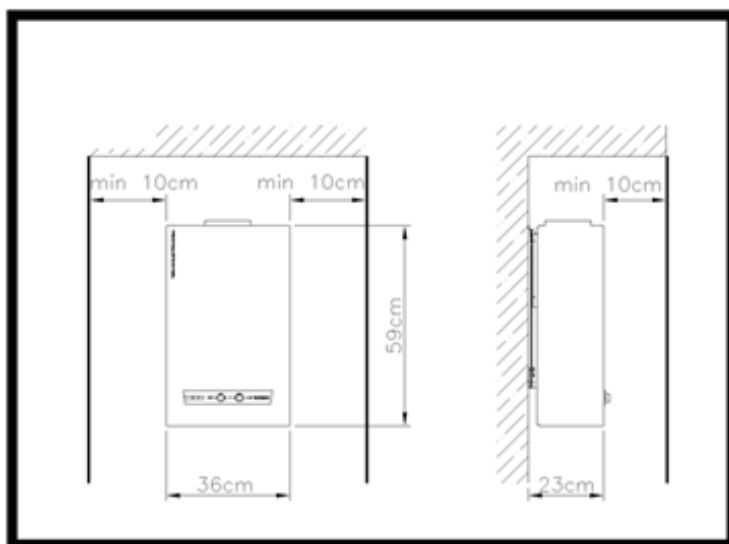


Fig. 3.3.1 Required mounting distances

3.4 Connecting to the gas supply

Fig.3.6.1 shows the connection diameters. For gas pipe, the diameter is G1/2 for GE-19-02, GH-19-02 and G3/4 for GE-24-02, GH-24-02.

Gas water heaters not equipped with gas flow stabilizer are adopted to be installed in the gas system equipped with individual mean pressure reducer. Cables with a valid certificate should be used for installation.

On the system pipe should be installed a cut off valve and a gas filter. Installing the gas filter is necessary for correct and long-lasting operation of the gas unit and the burner. Filter is not included in the installation kit.

3.5 Connecting to the water supply

Fig.3.6.1 shows the connection diameters. For water pipe, the diameter is G1/2. On the system pipe should be installed a cut-off valve.

Connecting the water heater to the water supply system should be performed by means of flexible connectors or stiff pipes. These pipes are not included in the installation kit.

The connection to the water system should be made in such a way that the geometry of the water heater is maintained. Incorrect execution of the connection may cause distortion of the water heater, which may make it impossible to mount the knobs or lead to their blocking. ***In order to stop mechanical pollution, and thus, provide the water heater reliability and its long-term operation, a water filter should be installed on the supplying pipe. The filter must not cause any resistance for a water flow and should be easy cleaning. The filter is not included in the basic water heater equipment.***

3.6 Connecting to a flue system

Flue gases should be taken off from the water heater to an individual chimney duct, by means of a pipe with external diameter $\varnothing 112$ mm (GE-19-02, GH-19-02), $\varnothing 130$ mm (GE-24-02, GH-24-02) made of the material protected against corrosion.

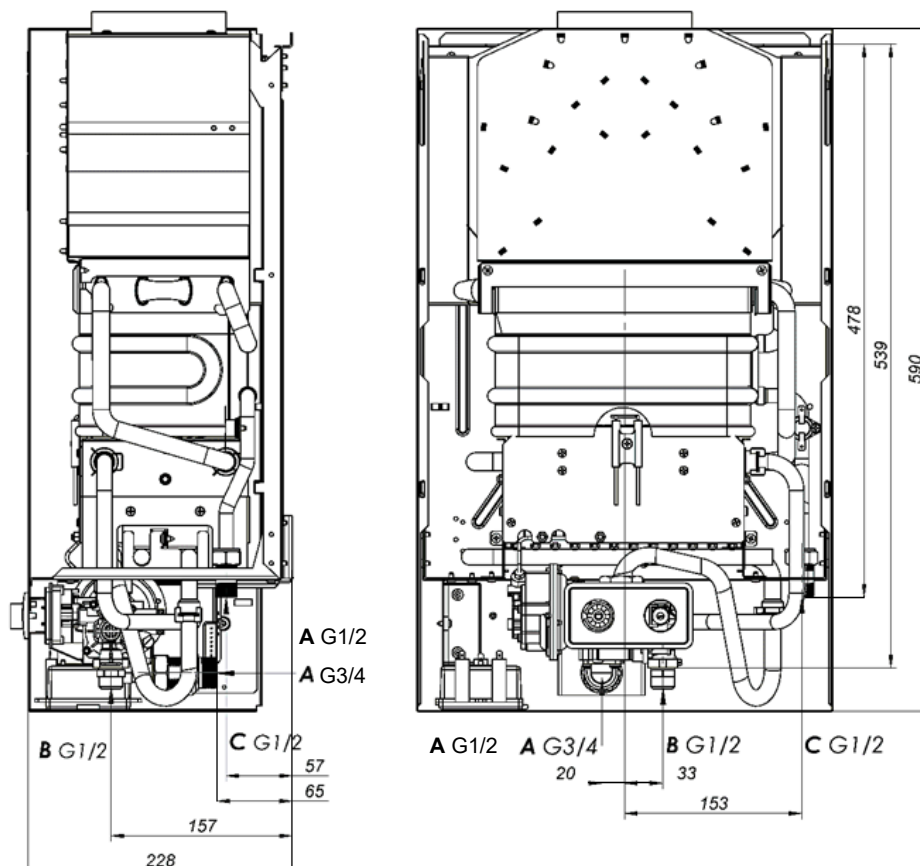


Fig. 3.6.1. Installation dimensions (mm)

3.7 Removing and installing the front cover

Removing the front cover:

1. Grab the bottom of the cover and pull it towards you.
2. Lift the cover upwards.
3. Remove the knobs.

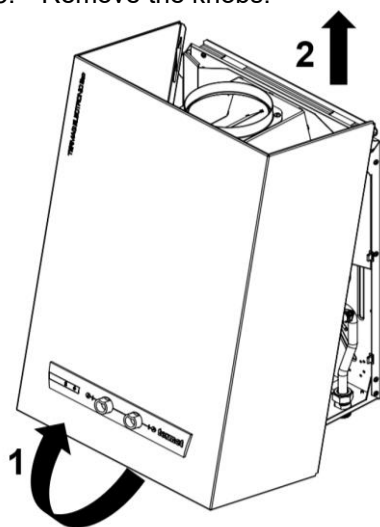


Fig. 3.7.1 Removing the cover

Installing the front cover:

1. Put the front cover on the hooks of the back cover.
2. Place the cover so that the openings of the panel and fittings are in the same position.
3. Mount the knobs.

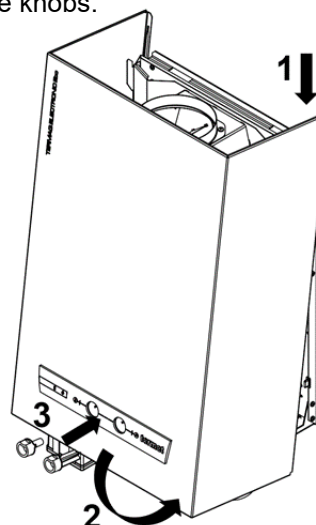


Fig. 3.7.2 Putting on the cover

4 WATER HEATER OPERATION

4.1 Preparing the water heater for the first start-up

Before proceeding with the first start-up of the water heater, it is necessary to:

- Fill the water system with water so as after turning on the water taps water may flow. This ensures that the water heater will be correctly filled with the water and it will be operating properly.
- Put on the gas flow knobs and the temperature selection knobs – push in the knobs drawing attention on their position in relation to the inside knobs.
- In water heaters GE-19-02, GE-24-02 TERMAQ ELECTRONIC Eco, open the batterie compartment and insert a R20 batteries drawing attention to its polarity. Next, close down the compartment.

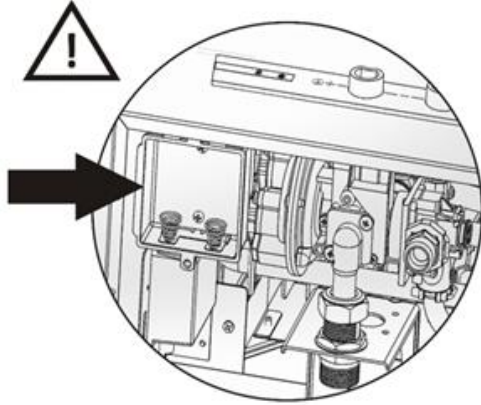


Fig. 4.1.1 Opening batterie compartment.

Batteries are not included in water heater equipment.

The producer recommends using batteries designed for RTV equipment.

Do not regenerate the discharged batteries in any way, do not heat them, do not throw them into a fire – risk of explosion.

Water heaters are ready to use after installation.

4.2 Water heater starting-up

In order to start-up the water heater it is necessary to:

- Turn on the gas knob on the water heater connection (for liquefied gas: to open the valve on the cylinder),
- Turn the gas flow knob from the “0” position into one of the 4 positions of the thermal power of boiler (stepwise movement of the knob). After turning on the domestic hot water tap, electric sparking on the igniting burner will be heard (6 sec.). After a while the gas will be ignited on the igniting burner and then on the main burner.

If the knob is placed in “0” position – spark generator produces a spark during 70 seconds, gas on the igniting burner and main burner will not be ignited.

During the first start-up, the system and the gas fittings should be vented. Because of this, the first start-up may last longer than 20 seconds.

Water heater is ready to operate.

After opening the hot water tap, automatic gas ignition takes place on the burner segment, and at the rest of segments - after a while hot water will flow out.

After turning off the hot water tap, the gas supply to the burner will be cut off.

4.3 Water temperature and water flow regulation

Water heaters are equipped with modern gas-water fittings ensuring proportional power regulation, what enables to receive constant water temperature. The fittings are equipped with a water flow limiter with a smooth regulation. If the water temperature selection knob (Illus. 4.3.1) is turned in its extreme right position, little water flow will be received (i.e. 5,7 dm³/min for GE-19-02, GH-19-02 and 7,0 dm³/min for GE-24-02, GH-24-02) with the highest temperature (gas flow knob in its extreme left position), smaller flow will be received by decreasing the flow by means of water tap.

If the temperature selection knob is turned into its extreme left position, a big water flow will be received (i.e. 11,5 dm³/min for GE-19-02, GH-19-02 and 14,0 dm³/min for GE-24-02, GH-24-02) with the lowest temperature (gas flow knob position as above).

After setting the temperature selection knob in its transitional positions, water temperature growths will change inversely proportional to the water flow. Decreasing the water flow in the water heater, by means of the temperature selection knob, from the 11.5 to 5.7 dm³/min for GE-19-02, GH-19-02 and from 14,0 to 7,0 dm³/min for GE-24-02, GH-24-02, water temperature growth changes from 25° to 50°C. Water temperature (in any operation positions of the water flow regulator) can be regulated by means of gas flow knob

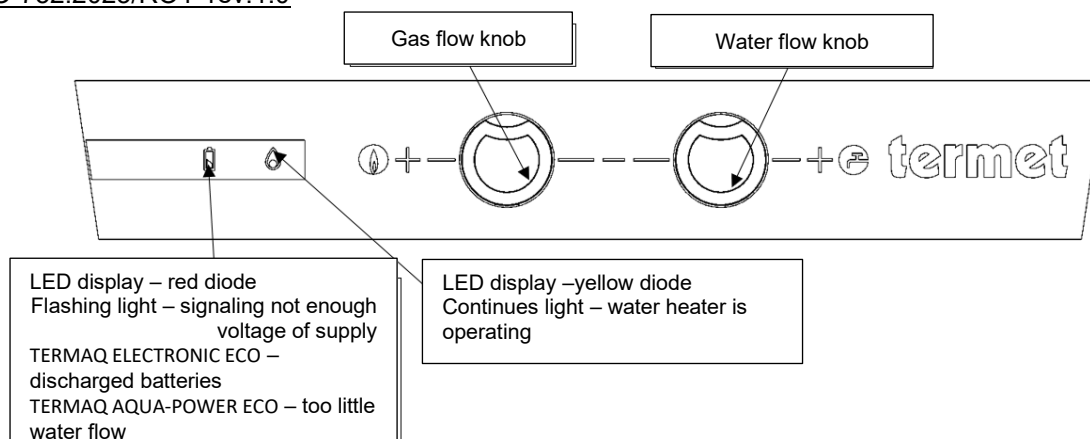


Fig. 4.3 1. Regulation and function elements

4.4 Water heater switching off

Switching off the water heater is made by turning the gas flow knob into its extreme right (position “0”) (Fig. 4.3.1)

In case of an anticipated long break in the water heater operation, the gas valve on the water heater connection or the valve on the liquefied gas cylinder, should be shut down.

If in a room, where the water heater has been installed, temperature may decrease below 0°C, it is necessary to drain the water heater out of water.

In order to do this, cut off the cold water supply, then undone the nut on the pipe supplying the water into the water unit and turn on the hot water tap.

5 ADAPTATION OF THE WATER HEATER TO COMBUST OTHER TYPES OF GAS

The water heater supplied by the manufacturer is designed for combustion of the gas indicated on the rating plate.

If it is necessary to supply the device with other gas than the one for which it was factory adapted, it is necessary to check for which gas it can be adapted.

Adaptation of the water heater to another type of gas can only be done by the AUTHORIZED SERVICE. This activity is not included in the scope of warranty repairs.

Gases to which the water heater can be adapted are given on the rating plate in the category designation of the device:

II_{2H3B/P} - which means that they are designed to combust gases from two categories

Gas category	Gas group	Gas type
second natural gas	H	G20
third liquid gas	B/P	G30

5.1 CO emissions

Gas type	GE-19-02, GH-19-02	GE-24-02, GH-24-02
	CO emissions [ppm] ¹⁾	CO emissions [ppm] ¹⁾
2H-G20	58 ± 5	95 ± 9
3P/B-G31	490 ± 155	145 ± 10

¹⁾ CO concentration for maximum gas pressure P_{max}.

5.2 Gas in destination country

Destination country	Appliance categories	Supply pressure
RO	II _{2H3B/P}	(20; 30) mbar

5.3 Gas consumption values

Gas type	Range of kinetic gas pressure in the gas network kPa (mbar)			GE-19-02, GH-19-02		GE-24-02, GH-24-02	
				Gas consumption ¹⁾ (dm ³ /min)		Gas consumption ¹⁾ (dm ³ /min)	
	p _{min}	p _{nom}	p _{max}	from	to	from	to
Natural: 2H-G20	1,6(16)	2,0(20)	2,5(25)	35,5	40,5	45,8	50,0
Liquid: 3B/P-G31	2,0(20)	3,0 (30)	3,5 (35)	11,0	12,0	13,8	15,0

¹⁾ Consumption of particular types of gas is given for reference gases, in reference conditions (15°C, pressure 1013 mbar) allowing for 88% of water heater efficiency

6 KEEPING IN THE RIGHT TECHNICAL CONDITION

In order to ensure the appropriate and long-lasting operation of the water heater, there should be performed periodical maintenance operations. Inspections and maintenance operations should be performed by an authorized company, at least once a year. The scope of the maintenance operations is presented below.

Before starting the maintenance operations, the gas and water supply should be cut off, and then the water should be drain out from the appliance. Before cleaning the water heater, first disassembly the burner and then follow the same way with the heat exchanger. Heat exchanger cleaning (removing sediment and scale)

To ensure full gas combustion and retain maximum heat exchange efficiency in the water heater, it is recommended to keep the segments of the heat exchanger in permanent cleanliness.

6.1 Heat exchanger cleaning

Cleaning the heat exchanger out of sediments requires it to be disassembled from the water heater and rinsed with a strong water stream.

If there is a need of removing the boiler scale from the ducts of the heat exchanger, this operation should be performed with the use of agents available on market, according to the recommendations of agent producer. The scale can also be removed by means of 10-20% acetic acid, by keeping it in the heat exchanger for about 3 hours. After this operation, the exchanger should be thoroughly rinsed with clean water.

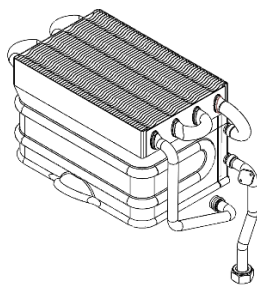


Fig. 6.1.1. Heat exchanger

Do not use the wire brushes, or another brushes with hard bristle

6.2 Burner maintenance

During the burner maintenance the plates on the segments should be cleaned by means of soft brush (not the wire one). Pay attention whether the plates or segments were not damaged.

6.3 Water filter cleaning

In case of notifying too small stream of water flowing out from the water heater and difficulty in igniting the burner, the water supply valve and the gas valve on the appliance connection should be shut down. Check up

and clean the water filter on the water pipes on the appliance connection. Sometimes may occur choking of the internal filter in the water assembly. Then fittings should be taken out from the water heater. The filter should be dismounted, cleaned and mounted again (Fig.6.4.1).

6.4 Gas filter cleaning

In case of finding too poor stream of gas flowing out of the main burner and difficulties in burner ignition, the valve on the water supply line and gas valve on the appliance connection with the gas supplying system should be shut down. Check up and clean the gas filter situated on the appliance connection with the gas supplying system. Occasionally may appear the situation of choking inside filter of gas – water fittings. In such case the fittings should be taken out the water heater. Then take out the filter, clean it and assembly again. (Fig. 5.4.1)

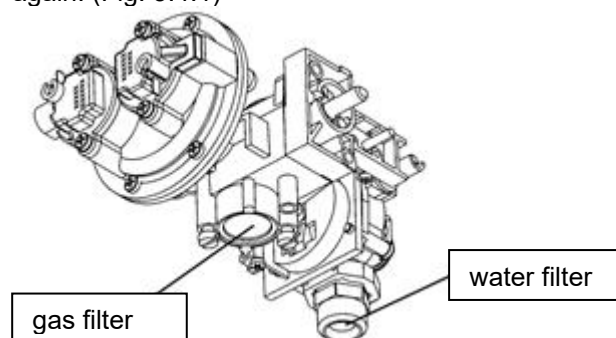


Fig.6.4.1 Water-gas fittings

6.5 Safety system checking

During every inspection correctness of the protection systems operation should be checked as well and tightness of the gas fittings as well.

6.5.1 Checking the protections against flue gas outflow into the room

Temperature limiter (Illus. 2.2.1.1 item 8) - protection against gas outflow into the room, is set for the temperature $85 \pm 3^\circ\text{C}$.

In order to verify the correctness of the limiter setting, the following operations should be performed:

- prepare a metal vessel with a thermometer,
- fill the vessel with a liquid,
- take the limiter out of the holder (unscrew the screws), put it into a vessel submerging in the liquid only the metal cap
- heat the liquid up to the temperature of 82°C – in such temperature the limiter should not actuate,
- heat the liquid up to 88°C – in such temperature the limiter should actuate.

A properly operating limiter should disconnect electric contacts in the temperature range from 82°C to 88°C .

6.5.2 Checking the protection against heat exchanger overheating

Temperature limiter (Fig. 2.2.1.2 item 9) - protection against exceeding the upper limit of water temperature – is set for the temperature 85°C . In order to verify the

correctness of the limiter setting, operations as above should be performed.

A properly operating limiter should disconnect electric contacts in the temperature range from 82°C to 88°C.

During every next re-assembly of the water and gas system, new seals should be used.

The actions mentioned in section 6 are not covered by warranty repairs.

7 DIAGNOSTICS

During and after the process of production, water heater is subjected to a whole range of partial and complex inspections.

In spite of this, during the water heater operation, some disturbances – that are not caused by the producer – may occur.

To make easier diagnostics of possible incorrectness in the water heater operation, in table below essential information has been collected. Using this information allows eliminating some unjustified operations during the water heater disassembly, and thus makes the time of repair shorter.

Before beginning the water heater repair, it should be checked if:

- water heater is adapted for the gas currently in use,
- gas pressure is at least minimal,
- negative pressure in chimney duct is within the range 3 – 15 Pa (0.03 - 0.15 mbar).
- battery voltage is adequate
(in TERMAQ ELECTRONIC water heater type)

7.1 Igniting system diagnostics

After turning on the water tap, water flowing through the water heater should initiate the process of burner igniting, which stages are presented below:

- clenching/short-circuit/ of the microswitch connectors, fig. 2.2.1.3 item 3.8,
- sparkling between igniting electrode item 2.1, and burner segment item.1,
- voltage occurrence on coil I, item 3.5.1 – valve I in the differential valve opens (valve I in release state is closed),
- gas ignition on one of the burner segment item 1 – ionisation current occurrence detected by the control electrode item.2.2,
- voltage occurrence in coil II item 3.5.2 – valve II in the differential pressure valve closes (valve II in release position is open),
- opening the main gas valve caused by pressure difference over and under the diaphragm in the differential pressure valve item 3.5,
- gas ignition on the whole burner item 1.

7.2 Igniting system checking

In the case of incorrect ignition, it is recommended to check the ignition system, according to following instructions:

1. Check the correctness of electric connections,
2. Connect a voltmeter to the „-“ pole:
- In TERMAQ ELECTRONIC ECO water heaters - spring in battery compartment item 6,

- In TERMAQ AQUA-POWER ECO water heaters – hydrogenerator' s wire (white, item 7),

3. Connect a voltmeter to the „+“ pole:

- In TERMAQ ELECTRONIC ECO water heaters – metal plate in battery compartment item 6,

- In TERMAQ AQUA-POWER ECO water heaters – hydrogenerator' s wire (red, item 7),

4. Measure the voltage:

- In TERMAQ ELECTRONIC ECO water heaters – the battery voltage -1,5V (DC)

- In TERMAQ AQUA-POWER ECO water heaters – the hydrogenerator's voltage hydrogenerator' s at resistance load 10Ω and at the flow 3l/min - 1,3÷1,6V (DC)

5. Measure the supply voltage after loading with the operating ignition system (correct system operation at the voltage of 0.9-1.5V (DC),

6. Check the voltage on the protection against flue gas outflow into the room item 8 (voltage like on battery),

7. Check the voltage on the protection against heat exchanger overheating item 9 (voltage like on battery),

8. Check the voltage on terminal 9 of the spark generator, item 5 (voltage like on battery),

9. Close the microswitch connectors item 3.8. Shorted connectors should cause sparkling between igniting electrode item 2.1 and burner segment item 1,

- check the voltage on coil terminals I, item 3.5.1 (correct operation of the system at voltage 0.9-1.5V),

- after detecting the ionisation current by the control electrode (after flame appearance), check the voltage on the clamps of coil II, item 3.5.2 (correct operation of the system at voltage 0.9-1.5V).

7.3 Checking the coils of differential pressure valve

Inspection of possible defects on the electric coils of the differential pressure valve may be performed by checking the resistance of the coils.

Method of taking the resistance of the coils:

- take off the muffs from the coils,
- one of the ohmmeter wire connect to the body of the differential pressure valve,
- the other wire connect to one, and then to the next muff of the inspected coils, every time taking the value of the resistance.

Correct resistance values:

Coil I - 39Ω ± 20%

Coil II - 58Ω ± 20%

8 DEFECTS - CAUSES AND METHODS OF REMOVING

No.	Symptoms	Causes	Action
1	2	3	4
1.	No spark (no ignition during water taking)	Electrode wire is disconnected	Correct the connection
		Damaged electrode	Check - replace
		Spark generator damaged	Check - replace
		Dead battery or damaged hydrogenerator	Check - replace
		Microswitch wrongly regulated	Regulate the microswitch by means of screwing the screw on microswitch lever. Pay attention if after regulating do not appear sparkling with no water flow
		Water filter clogged (limited flow)	Remove pollutions
		Elements in the water-gas fittings damaged Water diaphragm damaged Control system mechanism of valve head damaged	Replace fittings or damaged elements
2.	Igniting burner does not ignite from the spark	No gas supply (damaged electrode)	Open the cut-off valve supplying the gas into the water heater
		Vented gas system	Vent the system
		Dead battery or damaged hydrogenerator	Replace
3.	Flame does not spread throughout the whole burner	Control electrode wire is disconnected	Correct the connection
		Damaged control electrode	Check - replace
		Damaged spark generator	Check - replace
		Damaged differential pressure valve	Check - replace
4.	Trials of ignition at no water flow	Microswitch wrongly regulated	Regulate the microswitch by means of screwing the screw on microswitch lever. Pay attention if after regulating do not appear delayed ignition (sparking) during starting-up the water heater
5	Water heater does not heat water enough	Poor flame on the burner	Check the gas pressure in gas supply network Check the setting of the gas flow stabiliser according to p. 5.4
		Polluted burner	Remove pollution from the welts and nozzles of the burner
		Polluted radiator in the heat exchanger	Remove pollution from the radiator fins Remove the boiler scale
		Incorrect gas composition	Check if the main burner, igniting burner and the fittings are adapted for the gas currently in use
		Excessive water flow	Check the small water flow – if water flow exceeds 5,7dm ³ /min, it is recommended to correct it by means of regulating screw
		Damaged elements of the water-gas fittings	Replace fittings or damaged elements
6	Water heater overheats water	Gas flow stabiliser incorrectly set	Regulate the stabiliser, acc. to p. 5.5
		Incorrect gas composition	Check if the main burner, igniting burner and water-gas fittings are adapted for the gas currently in use
		Too little water flow	Check the small water flow – if water flow exceeds 5,7dm ³ /min, it is recommended to correct it by means of regulating screw
		Control system mechanism of valve head is mechanically damaged	Replace damaged elements
7.	Water heater does not stop operating after turning off the water flow	Elements of water-gas fittings are mechanically damaged	Replace fittings or damaged elements

8.	Explosive burner ignition	Too small flame on the igniting segment	Pipe of igniting burner is choked – clean it up or, if necessary, replace
		In water-gas fittings: gas flow canal to igniting segment is choked Damaged differential valve	Replace fittings or differential pressure valve
9.	Leakage occurring in gas system of the water heater	Gasket ring on the inlet to water-gas fittings is damaged	Replace gasket with a new one
		One of the gaskets on the outlet from water-gas fittings or on the inlet to burner is damaged	Replace gasket with a new one
		Water-gas fittings is mechanically damaged	Replace fittings or damaged elements
10.	Leakage occurring in water system of the water heater	Gasket on the inlet to water-gas fittings is damaged	Replace gasket with a new one
		Gasket on the outlet from water-gas fittings is damaged	Replace gasket with a new one
		One of the gaskets on heat exchanger connections is damaged	Replace gasket with a new one
		Water-gas fittings is mechanically damaged	Replace fittings or damaged elements
11.	Water heater switches off during its operating (during taking the water)	Protection against flue gas inflow into the room actuates	Check the limiter – if damaged, replace
			Check if vacuum in the chimney duct is correct
		Protection against exceeding the upper limit of the water temperature actuates	Check the limiter – if damaged, replace
			Water heater overheats water – action as above
12	Heat exchanger fins get dirty in a short time	Wrong chimney draught	Check the chimney ducts
		Yellow flame	Check the gas type
		Polluted burner (wrong combustion)	Clean the burner

The logo for Termet, featuring the word "termet" in a bold, white, sans-serif font with a registered trademark symbol (®) to the upper right, set against a dark gray rounded square background.

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