Instructions

thermo Sphere

Electric Flow Boiler with Pump

Live well...

Contents

General information

These instructions contain information about the design and operation principles of ThermoSphere Electric Flow Boilers, and define the advised operation.

The required plumbing, electrical and control connections are also detailed.

The design of the heating and/or hot water system including the provision of appropriate safety devices and functional components is the sole responsibility of the installer.

Please read this guide in full before attempting to install and commission an Electric Flow Boiler.

Proper installation, commissioning and maintenance of the boiler will ensure its safe and reliable operation.

This appliance must not be used by children, vulnerable people or persons with a lack of experience and knowledge of plumbing and electrics.

Who can install the boiler?

This appliance must only be installed and maintained by professionals with the required knowledge and experience.

The boiler must be isolated from the electrical supply before the cover is removed for installation or maintenance. Failure to do so can result in serious injury or death.

This appliance must be safely earthed at all times and have a suitably rated, dedicated supply circuit.

Provision must be made to allow safe electrical isolation of the appliance.

What systems can it be used with?

Electric Flow Boilers are intended to heat the water (heat carrier) in pressurised, closed loop heating systems with pumped circulation.

The appliance can also be used to provide domestic hot water when used in conjunction with a pressurised indirect hot water storage cylinder.

Pressure

The rated pressure of the system must be no lower than 0.5 BAR and no greater than 2 BAR. 1.5 BAR is recommended.

Electrical supply connections

Electric Flow Boilers up to and including 12kW can be connected to either a single-phase (240V) or three-phase (400V) electrical supplies.

The jumper clip must be removed from the live supply terminals to allow separate connection of the three live phases.

It is the responsibility of the electrical installer to ensure that the cable and components used on the supply circuit are suitably rated to allow safe and reliable operation.

If you are in doubt about the required cable or circuit breaker specifications please consult your copy of the wiring regulations or contact the IEC.

The electrical installation must be compliant with all relevant local standards.

The plumbing installation must be compliant with all relevant local water and plumbing regulations.

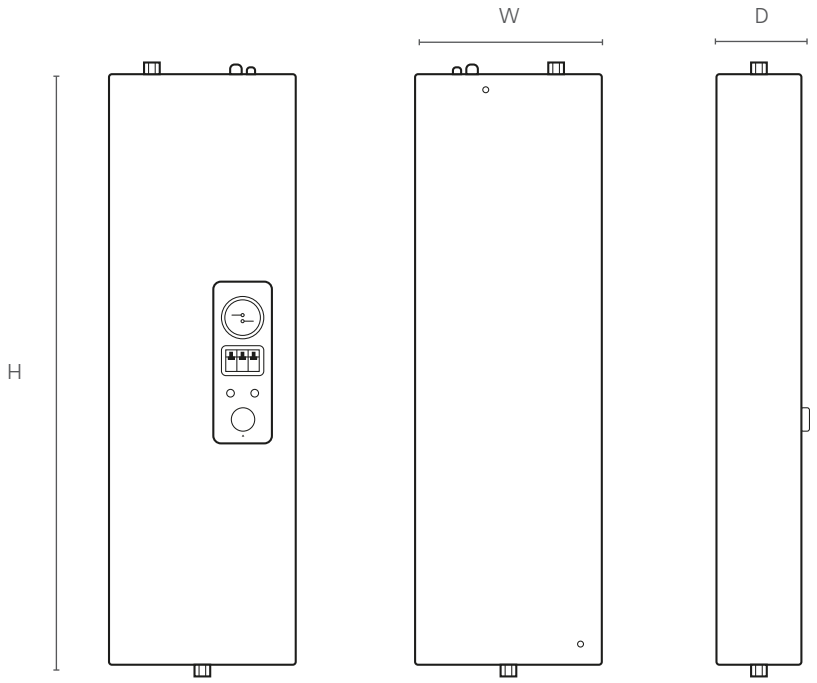
The Electric Flow Boiler is IP22 rated and must be installed in compliant locations only.

Cables and other supporting materials for the installation are not supplied.

Specifications

Code	Output (Kw)	Output per element	No. of elements	Voltage	Current (A)	Working pressure (BAR)	Max working temp (°C)	Weight (Kg)
TSEFB-P4.5	4.5	1.5	3	230/400	21	2.0	65	14
TSEFB-P6	6.0	2.0	3	230/400	27	2.0	65	14
TSEFB-P9	9.0	3.0	3	230/400	40	2.0	65	14
TSEFB-P12	12.0	4.0	3	230/400	53	2.0	65	14
TSEFB-P15	15.0	5.0	3	400	22	2.0	65	14
TSEFB-P18	18.0	6.0	2	400	26	2.0	65	22
TSEFB-P24	24.0	9 + 15	2	400	35	2.0	65	22

Dimensions



	TSEFB-P4.5	TSEFB-P6	TSEFB-P9	TSEFB-P12	TSEFB-P15	TSEFB-P18	TSEFB-P24
W (mm)	215	215	215	215	215	350	350
H (mm)	730	730	730	730	730	730	730
D (mm)	122	122	122	122	122	122	122

Safety

This product should only be installed by a qualified and competent professional.

It is the installer's sole responsibility to ensure that the boiler and heating/hot water system is installed in a safe way, in compliance with all relevant local standards and regulations. This applies to both the electrical and plumbing aspects of the installation.

ThermoSphere Electric Flow Boilers are equipped with several safety devices which are designed to help prevent issues arising in relation to temperature and pressure.

Thermal cut-out

The thermal cut-out switch isolates the heating elements if a temperature over 75°C is detected.

Pressure switch

The pressure switch is designed to prevent the heating elements from switching on unless there is adequate flow of water (pumped version only).

Fused control circuit supply

The control circuit is protected by an internal 3 Amp fuse.

Electrical grounding

The boiler wiring features Earth grounding which must be connected to the mains Earth at all times.

IMPORTANT!

Do not connect or attempt to carry out maintenance or repairs while the boiler is connected to the mains power supply circuit. The boiler must be safely isolated from the supply before you remove the casing.

Before energising the boiler for the first time, it is advised that all electrical connections, including factory connections are checked.

The integrity of the internal earth connections and the connection with the earth terminal must also be checked before energising the boiler.

You must not turn the boiler on before the plumbing circuit filled with water and pressurised to the required level.

A temporary filling loop must be used to fill the heating/hot water circuit to the required pressure. According to UK water regulations the mains water and heating circuit must never be permanently connected.

A magnetic filter is recommended on plumbing circuits to catch any ferrous deposits and prevent them from entering the boiler.

The water in the heating and hot water coil circuits should be treated with a suitable corrosion inhibitor to prevent scaling and corrosion.

If the mains water supply is over 3 BAR a reducing valve must be fitted ahead of the boiler.

A suitably sized expansion vessel must be included in the plumbing circuit to allow for expansion of heated water.

If installing a pressurised hot water cylinder, a suitable temperature and pressure release valve must be installed at the cylinder.

Isolation valves must never be installed between the boiler and the expansion tank, air valve and temperature/ pressure release valve.

How the boiler works

Electric Flow Boilers use resistive electric heating elements to heat water up to a maximum of 65°C for the purposes of heating central heating radiators, underfloor heating circuits and domestic hot water cylinder coils.

The heating element cluster is housed in an insulated steel cylinder and there are flow and return plumbing connections at the top and bottom of the boiler.

Cold water is pumped through the lower pipe connection marked blue, and hot water leaves the boiler through the pipe connection at the top of the cylinder, marked red.

The boiler also has a pump set and temperature/pressure release valve located under the heating cylinder.

The operating temperature is set on the dial at the front of the boiler. Use the temperature gauge to set the temperature accurately.

When there is a call for heat from the control circuit (if connected) or the temperature of the water is below the set point on the boiler thermostat (no controls connected) the boiler will begin to heat the water as it passes through the heat exchange cylinder.

The boiler will continue to heat the water to the set point temperature until the call for heat from the controls stops, or the set point temperature is satisfied.

When the temperature is satisfied, the pump will continue to run for a set period to ensure the hot water is circulated throughout the system and prevent thermal runaway.

Installing the boiler

Fixing to the wall

The boiler must be located in a area that is away from possible tampering, but allows safe and easy access for maintenance and servicing.

At least 500mm clearance is recommend on all sides of the boiler.

The wall that the boiler is fixed to must be strong enough to permanently hold the weight of the boiler. Fixings must be suitable the wall type.

1. Remove the front cover by unscrewing the fixings at the top and bottom of the boiler housing.
2. Place the cover aside somewhere it cannot be damaged.
3. Offer the boiler up to the wall in the position it is to be installed.
4. Check the boiler is level and that all plumbing and electrical connections can be made easily.
5. Mark the position of the fixing holes at the top and bottom of the boiler.
6. Place the boiler one side, somewhere it cannot be damaged.
7. Drill holes into the wall, sized to fit your desired fixings, and fit suitable wall anchors into the holes.
8. Wall fixings should go to a depth of at least 35mm and be strong enough to hold the full weight of the boiler.
9. Offer the boiler up to the wall and align with the mounting holes.
10. Secure the top fixings in place first, followed by the bottom fixings. The sue of washers is recommended. Do not over tighten the fixings as this can distort the casing.

Plumbing connections

1. The plumbing connections on the boiler are 3/4". You may need adaptor fittings depending on the pipes you are using.
2. Connect the cold water feed to the pipe connection at the bottom of the boiler, ahead of the pump.
3. Connect the hot water flow to the pipe connection at the top of the boiler.
4. The water in the plumbing circuit must be treated with a suitable level of inhibitor and a magnetic filter is recommended ahead of the boiler.
5. Isolation valves are recommended close to the cold feed and after the safety devices (expansion valve, automatic air valve) on the hot side. This is to allow easy isolation of the boiler for maintenance.

Electrical wiring connections

1. The boiler's electrical supply should be on a dedicated circuit, protected by a suitably rated circuit breaker at the distribution board.

1. The suitably sized electrical supply cable should enter the boiler through the gland at the top of the boiler.
2. The earth core should be insulated with earth sheath and connected to the earth terminal.
3. The neutral core should be connected to the neutral terminal.
4. If connecting to a **single-phase** supply, the live core should be connected to the central live terminal. Leave the jumper clip (covered with a white cap) in place for single-phase installation.
5. If connecting to a **three-phase** supply, first remove the jumper clip between the three live terminals. To do this, remove the white plastic cover and use a flat screwdriver to lever the clip out.
6. Connect each one of the three live phases to one of the live terminals.
7. Ensure all terminals are fastened securely with no possibility for cable movement. Also ensure that no copper is visible.
8. The pressure relief valve, located near the pump, must be connected to a length of high temperature hose, through a tundish, and plumbed to a waste pipe or outside according to your local plumbing regulations.

Control connections

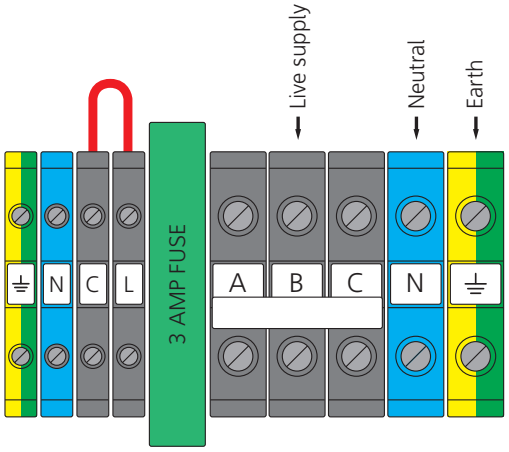
1. The boiler can be connected to external thermostatic controls or as part of an S Plan or Y plan control system.
2. If the boiler is not connected to external controls, leave the red jumper wire across the control terminals to provide a constant call for heat.
3. If the boiler is going to be connected to external controls, remove the red jumper wire before doing so.
4. The call for heat wire from the control circuit must be connected to the right-hand control terminal.
5. The boiler provides a 3Amp supply for the control circuit. This removes the need for installing a separate 3Amp fused spur for the controls.
6. The live supply to the control circuit can be connected to the left Live control terminal.
7. The control circuit supply neutral and earth can be connected to the neutral and earth control terminals.
8. Further control circuit connections should be made in the wiring centre, in accordance with the control manufacturer's instruction guide.
9. Once all connections are made, checked and verified, the front cover of the boiler must be fixed back in place using the screws.
10. It is advised that the electrical installer fits relevant safety labels to the front of the boiler to warn of live electrics inside the boiler enclosure.

Wiring diagrams

Single-phase (230V) without external controls

If no external controls are to be connected the red jumper wire must be left in place to provide a constant call for heat. In this case the boiler and pump will always be on unless the set temperature on the boiler thermostat dial is satisfied.

The live phase jumper must be left in to provide a live connection to all three live supply terminals.



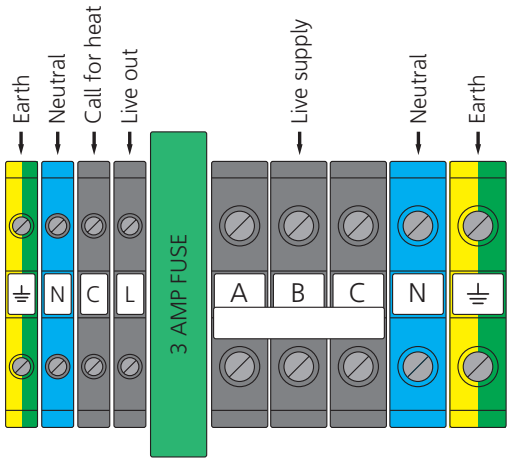
Leave live phase jumper clip in for single-phase connection
Leave red control jumper wire in when not using extra controls

Single-phase (230V) with external controls

When external controls are connected, the red jumper wire must be removed.

The control circuit can be supplied by the 3A control supply within the boiler.

The terminal labelled C is the call for heat terminal and should be connected to the call for heat/switched live at the wiring centre.

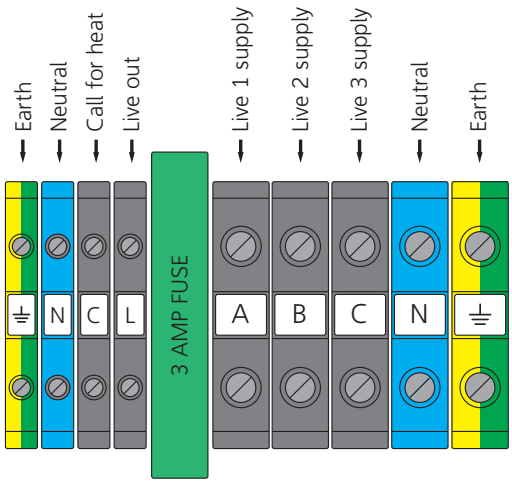


Remove red control jumper wire when connecting controls

Three-phase (400V) connection

For three-phase connections the live phase jumper must be removed to allow each phase to be connected to an individual live supply terminal.

The example shows three phase with external controls, however the electrical supply connections are the same if there are no external controls.



Remove live phase jumper clip for three-phase connection
Remove red control jumper wire when connecting controls

Commissioning the boiler

All installation, commissioning and maintenance should only be done by a competent, qualified professional.

1. Turn off all 3 heating element switches on the front of the boiler.
2. Set the boiler thermostat dial to zero.
3. Verify that there is heat carrier (water treated with inhibitor) in the system.
4. Check that all isolation valves on the plumbing system are open.
5. Check that the pressure reading on the front of the boiler is at 1.5 BAR. The boiler requires at least 0.5 BAR to operate.
6. Check the whole plumbing system for leaks and repair as required.
7. Check the electrical circuit is connected safely and that all necessary safety devices are in place.
8. Switch the electrical supply circuit on.
9. Set the boiler thermostat dial to the desired temperature (Max 65°C).
10. Set any external controls (room or cylinder thermostats) to the desired temperature.
11. Switch the first element switch on and check the operation of the pump. If everything is operating correctly, switch the 2nd and 3rd element switches on in succession.
12. Check that the water reaches the required temperature and the heating elements switch off. The pump should stay on for a period of time to circulate the heat, after the call for heat has ceased.
13. Verify the heating system is working as designed and rectify any issues if they become apparent.

Troubleshooting the boiler

Issue	Possible cause	Things to try
Boiler won't turn on	Power fault	When the boiler has an active power supply the power light will be illuminated. The power light is on the control panel on the front of your boiler and if it is illuminated then your boiler has an active power supply.
		Check isolation switches and distribution board. If there is no power the light will be off and you need to check that any isolation switches are on and also that the MCB, RCBO or RCD is switched on at the distribution board. If all of these are on and you expect power at the boiler, the next thing to do is check the wiring inside the boiler.
		Isolate the electrical supply again and remove the boiler cover. Check the wiring connections in the supply terminals at the top of the boiler. There should be a live (brown), neutral (blue) and earth connected. The boilers require quite large power supplies so the cables will be quite thick. Check the connections in the boiler and make sure they match the relevant wiring diagram.
		If the wiring is correct, the next thing to do is check for voltage. To do this you will need to switch the power supply on again. This check should only really be done by a professional electrician because the boiler could be live at this point. Using a multimeter, check for a voltage across the L & N supply terminals. You should get a reading of around 230~240V if connected to UK single phase mains. If you do detect a voltage but the light is off, then the power light has failed. Contact us for a replacement. If there is no voltage at this point you will need to check the electrical supply circuit for faults and restore power to your boiler.

Issue	Possible cause	Things to try
Boiler is not heating	Temperature settings	It sounds obvious, but you should check that the thermostatic dial is turned up to request a temperature that is higher than the measured temperature on the gauge. The boiler will only heat up if the water inside it is cooler than the set temperature on the thermostatic dial. When you turn the thermostatic dial up and pass the measured temperature you should hear a click and then hear the relays and the pump switch on. You will then see the temperature and pressure begin to rise. Check the temperature readings on the gauge because the dials are not always positioned correctly, and the numbers are not always reliable. You can also use a separate thermometer to verify the temperature if there is any doubt.
	Over temp protection switch	Each boiler is equipped with a high temperature cut off switch (or over temperature switch) which, depending on your model, will be set to turn the boiler off if temperatures over 75°C are detected. This is a safety feature designed to prevent overheating. The high temperature cut-off switches must be manually reset before the boiler will start working again. To reset the switch, you need to isolate the electrical supply and remove the boiler casing. You will see the cut-off switch located on the water cylinder inside the boiler and you can identify it by the small red button. Press the small red button to reset the switch. Replace the boiler cover and turn the power supply back on. The boiler should now operate as normal. If this switch activates and turns the boiler off a lot, you will need to turn the operating temperature down to a stable level.
	Control wiring or setting	The boiler requires a 230V call for heat signal into the control terminal in order to fire up the boiler. This usually comes from a switched live connection from the wiring centre. Check that any external controls are wired correctly and that the temperature on the dial is set higher than the current measured temperature. Use a multimeter to check for 230V at the call for heat terminal inside the boiler, when a call for heat is expected.
Pressure warning light (Pumped version only)	Low system pressure	Your boiler will not operate unless there is sufficient water pressure of at least 0.5 Bar. This protects the boiler from heating up when there is no water inside it. Low pressure is indicated by the pressure warning light on the control panel on the front of the boiler. You will also be able to read the pressure gauge to verify the low pressure. You need to check the whole plumbing circuit for leaks to ensure you are not losing water anywhere. Once you've fixed any leaks you can re-pressurise the system. Use the temporary filling loop to top up the system to 1.5 Bar. When you have topped up the system the pressure warning light should turn off and the system should then run normally.

Issue	Possible cause	Things to try
Boiler is tripping RCBO or MCB	Overloaded circuit	The first thing to check is the total load on the circuit that the boiler is connected to. The boiler must be fed by a dedicated supply circuit with suitably sized cable and circuit breaker. Check the total load of your boiler, you can find this in the technical data table in the instructions or on our website and check the load of the circuit that the boiler is fed by. The MCB or RCBO that feeds the boiler should be rated higher than the maximum current of your boiler. For example, if your boiler needs 21 Amps you should use a 25Amp MCB. The boiler should be fed by a dedicated circuit but if this is not the case, you should turn off and disconnect every other appliance that is connected to the circuit. Try the boiler again and if the MCB holds you know the problem lies with overloading or another appliance and not the boiler. Consult an electrician to rectify the issue.
Boiler is tripping RCD	Leak to earth	A leak to earth could be caused by damaged heating elements or damage to one of the cables supplying the boiler. To verify the cause of the leak to earth isolate the electrical supply and remove the boiler cover. Disconnect the supply cables from the terminals inside the boiler and make safe. Try to re-energise the supply circuit. If the RCD still trips, with the boiler disconnected, then the boiler is OK and external wiring should be investigated and rectified by a competent electrician. If the RCD now holds then the fault is within the boiler and is likely to be caused by a failed element. To verify this (while the supply cables are still disconnected) switch off the boiler MCBs on the control panel and perform an insulation resistance test between the element terminals and the main earth terminal. A fault to earth will be identified by a low reading. This is generally a reading below 499 Mega Ohms depending on the tester being used. Contact us on 0800 019 5899 for advice on repair and replacement.
Boiler looks to be functioning normally there is no heat output	Heating element issue	An electrician will be able to use a current clamp to measure the current being drawn by the boiler when it is on and calling for heat. This can be done by placing the clamp over the live supply cable (or cables in a three-phase installation) and recording the reading the meter gives. Check the meter reading against the expected current values in the data table in the instruction manual. A lower current reading than expected could indicate that one or more of the heating elements within the boiler may have expired. Contact us on 0800 019 5899 for advice on repair and replacement.
Pump is not running	Wiring or failed pump	You will notice 2 LEDS on the pump timer relay. The red LED switches on when the relay is on/flashing and sending power to the pump. If the pump is not running while the red LED is on/flashing you need to use a volt meter to verify 230V at terminal 18 on the timer relay. If there is 230V present but the pump is not working, then the pump is likely to have failed and must be replaced. If there is no voltage, there is likely to be a fault with the control wiring which must be investigated.
Pump is on constantly but I have external controls connected	Control jumper still in place	If you have connected external controls the boiler and pump will only fire up when there is a call for heat from the controls. If the boiler and pump are running constantly the jumper wire across the control terminals must be removed.

Warranty information

Thermogroup Ltd (T/A ThermoSphere) will repair or, if necessary, at its sole discretion, replace a faulty ThermoSphere Electric Flow Boiler, which falls within the Warranty Periods and Territory specified below, subject to the warranty conditions and the warranty exclusions.

Warranty Period within the United Kingdom is 3 years from the date of purchase by the installer/consumer as defined by the Competition and Consumer Act 2010.

Our goods come with guarantees that cannot be excluded under the UK Consumer Law. You are entitled to a replacement or refund for a major failure that occurs because of a manufacturing fault or manufacturing defect. It is the responsibility of the end user to provide proof of purchase within the Territory, to initiate a warranty claim.

WARRANTY CONDITIONS

This warranty is applicable only for ThermoSphere Electric Flow Boilers (herein referred to as "The boiler").

The boiler must be installed in accordance with the ThermoSphere Installation Instructions, supplied with the boiler and/or available as a digital download, and in accordance with all relevant statutory and local regulations of the Territory in which the boiler is installed.

Where a failed component or boiler is replaced under warranty, the balance of the original warranty period will remain effective. The replaced part or boiler does not carry a new warranty.

Where a failed component is replaced or repaired under warranty, ThermoSphere will incur costs associated with shipping and repair at its sole discretion, if the unit is installed within the UK. If the unit is outside the UK, the associated costs are the responsibility of the owner.

Where the heating system is installed in a position that does not allow safe, ready access, the cost of accessing the site safely, including the cost of additional materials handling and/ or safety equipment, shall be the owner's responsibility.

The warranty applies to the boiler only and, therefore, does not cover any electrical, plumbing heating or hot water parts supplied by others that are not an integral part of the boiler, for example but not limited to; valves, cylinders, pipes, expansion vessels.

The benefits of this warranty are in addition to other rights and remedies of the consumer under laws in relation to the goods and services to which the warranty relates.

PROCEDURE FOR HONOURING WARRANTY

To initiate a claim for a warranty against defects, the consumer must contact: Thermogroup Ltd T/A ThermoSphere, Bridge House, Pattenden Lane, Marden, Kent, TN12 9QJ, United Kingdom.

hello@thermosphere.com. 0800 0195899.

The process will then follow the ThermoSphere Product Warranty Flow Chart to assess whether the product is under warranty.

WARRANTY EXCLUSIONS

Repair and replacement work will be carried out as set out in the ThermoSphere warranty. However, the following exclusions may cause the ThermoSphere warranty to become void and may incur a service charge and/or cost of parts:

Accidental damage to the boiler or any component, including: Acts of God; failure due to misuse, abuse, fire or flood damage; incorrect installation; damage as the result of transportation, removal or storage; attempts to repair the boiler other than by a ThermoSphere Accredited Service Agent, the ThermoSphere Service Department or a repairer not approved by ThermoSphere.

Where it is found there is nothing wrong with the boiler; where the complaint is related to circumstances where there is no power supply due to faulty electrics; where faults are related to the electrical supply or incorrect installation; where the fault lies on the wider plumbing system, not the within the boiler and not the boiler or boiler components; where there is a failure of electricity supply; where the supply of electricity does not comply with relevant standards, codes or acts, ThermoSphere may then charge the consumer/installer a nominal service charge if a site visit is carried out and inspection reveals no fault with the heating system.

If the boiler or boiler component has failed directly or indirectly as a result of accidental damage, incorrect installation that does not comply with the ThermoSphere Installation Instructions or relevant statutory requirements, the warranty id void and any repairs or replacements will be fully chargeable.

Subject to any rights you have under UK Consumer Law or other statutory provisions to the contrary, this warranty excludes any and all claims for damage to property, building fabric, possessions or any other consequential loss either directly or indirectly due to damage from the heating system, workmanship or other.

Maintaining the boiler

All maintenance should only be done by a competent, qualified professional.

The boiler and complete heating and hot water system should be checked annually for signs of wear and to ensure the safety devices are operational.

The water drain that the temperature and pressure relief valve is connected to should be checked every 6 months.

All electrical connections should be checked to make sure they are tight and there are no loose cables.

Any parts of the heating or hot water system that are not manufactured by ThermoSphere must be installed, checked and maintained in accordance with the manufacturer's recommendations.

If there are any signs of faults or wear and tear with the boiler, contact ThermoSphere for advice on spare parts and repairs.

If there are any signs of faults or wear and tear with other components in the heating or hot water system please consult the manufacturer for advice.

Do not attempt repair without speaking to ThermoSphere.

Notes

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