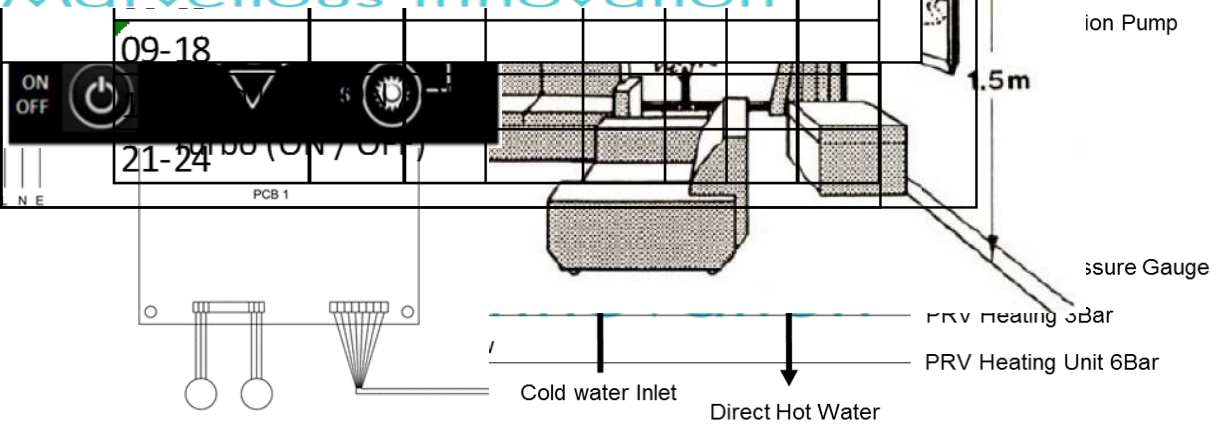




LOTUS VILLA MODEL COMBI BOILER MANUEL

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2. Introduction

Dear Customer,

Thank you for choosing the Lotus Villa model combi boiler unit intended to be used as part of the heating system and designed to be the primary source of heating and hot water. We hope that the unit will create an environment in which you will enjoy thermal comfort and all domestic hot water needs.

The Lotus Villa model combi boiler unit is the Turkey's first national electric heat source. It has the same features as a traditional combination boiler without the need for a direct gas / oil/solid fuel source. The boiler unit has no requirement for an external flue or an approved installation project, as there are zero products of combustion generated. The unit also has an inbuilt programmer that allows you to set your heating demand to suit your lifestyle by radiators and floor heating systems. We suggest to use combi device with aluminum radiators for the best result.

Having a high coefficient of thermal efficiency and an A+++ ErP (Energy-related Products) energy rating the Lotus® technology paves the way for zero emission home heating products.

The Combi Boilers are manufactured with state-of-the-art technology to guarantee reliability, safety and satisfy the specified requirements.

Please carefully read this manual before using the unit and follow its instructions.

Please follow the installation and maintenance basic requirements.

Please observe all the following warnings, recommendations and instructions.

1. Important Notes

The Lotus villa model combi boiler unit must be installed in accordance with the manufacturer's instructions and all relevant regulations in force at the time of installation.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of knowledge and experience, unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.

The Lotus villa model combi boiler unit should be installed and maintained by a competent person. Please read and understand these instructions before installing the Lotus villa model boiler unit. Following installation and commissioning the operation of the Lotus villa model boiler unit, the central heating system and associated controls should be explained to the customer and these instructions left with the end user for future reference.

The Lotus villa model combi boiler unit must be installed into heat isolated area in its heating capacity with a anti-Calc filter (can contain siliphose and resin)

The Lotus villa model combi boiler unit does not contain any substances harmful to health; it does not contain any asbestos. Small quantities of adhesives and sealants used in the manufacture of the product are cured and present no known hazards.



Notes on the Documentation

The following information is intended to help you throughout the entire documentation.
Further documents apply in combination with this installation and maintenance manual.
Lotus® assume no liability for any damage caused by non-observance of these manuals.

Applicable documents

The following additional documents are provided with the appliance:

For the owner of the system:

Brief user's instructions
Guarantee card

For the qualified technician:

Instructions for installation and servicing.

The manuals for any accessories and controllers used also apply.

Retention of documents

Please pass on this installation manual to the owner of the system. The owner should retain the manuals so that they are available when required.

Safety instructions and symbols

Please observe the safety instructions in this manual for the installation of the appliance!

Note: This boiler unit **must** be installed and maintained by a Lotus® authorised person.

Special Instructions and Building Regulations

This appliance must be fitted in accordance with the following instructions;

- The Local Building Regulations
- Local water bylaws at 2 bars minimum.
- The Electricity at Work Regulations
- Electrical Safety Regulations
- Combi Boiler Should be installed indoor places.

Materials used in the manufacture of this appliance are nonhazardous and no special precautions are required when fitting or servicing this appliance.

Mains cold water at 2bar minimum enters the boiler via its dedicated connection port with a 15mm full-bore isolation valve connected onto the ½ inch (BSP) connection thread at the rear of the boiler . Mains water



supply is only used for the DHW supply via the secondary side of the plate heat exchanger and to facilitate the heating system top up (only if reverse osmos filter fitted) via the fitted filling loop.

NOTE: A 2bar minimum pressure is required in the system otherwise the system safety will not allow it to operate.

The boiler unit itself is filled with water , the boiler unit is sealed and has a 6 bar pressure relieve vent to take any expansion within the heating unit body of the water and also an automatic air vent.

The boiler unit itself is a standalone unit from the mains water connection to the boiler and can be topped up via the filling loop (only if reverse osmos filter fitted) or by means of removing the air vent at the top of the cylinder by means of a pump or funnel till the top.

Electricity is then passed through the heating elements, from the mains supply, within the body of the heating unit by means of the contactors controlled by Lotus Series electric boiler unit PCBs.

The boiler unit is set to heat up to 80°C and has an immersed stat to obtain this temperature at the rear of the boiler unit and is manually preset. If this stat was to fail (open circuit) or go out or parameters the boiler would go into lockout, there is a further overheat stat set at 95°C which if activated drops the neutral feed to the contactor coils which feeds the heating elements and cuts power to the unit, to avoid the unit flashing to steam.

The hot boiler water within the boiler unit, is circulated by means of the internal pump through the flow and return assembly feeding the DHW plate heat exchanger and Heating plate heat exchanger on their primary side. With regards to the DHW it is supplied from the heating unit to all outlets via an internal flow switch , when flow is detected, by means of dedicated connection port with a 15mm full-bore isolation valve connected onto the ½ inch (BSP) connection thread at the rear of the boiler. The heating flow and return connections are of ¾ inch BSP connection thread at the rear of the boiler and connected to the system by means of 22mm full bore connections.

If the heating system pressure is too low the boiler will lock out and display an error code advising low system pressure. If room stat temp sensors go out of range or open circuit, again the boiler goes into lockout. The sealed side of the system heating has a 3bar mechanical pressure reducing valve (PRV) installed to overcome any overpressure issues on the sealed secondary circuit. The sealed side of the system has a 7 Litre feed and expansion tank with a 4 bar pressure relieve vent to take any expansion within the heating system body of the water as well as for the heating unit itself.

The sealed primary side of the system heating has a 6 bars mechanical pressure reducing valve (PRV) installed to overcome any overpressure issues on the sealed primary heating unit. The sealed side of the system has an integral 7 Litre feed and expansion tank with a 4bars pressure relieve vent to take any expansion within the boiler unit body of the water itself. The sealed primary side has a 10 bars air purge valve on the top of the body.

The Lotus villa model boiler unit is delivered in protective expanded polystyrene packaging with reinforced corner posts within a cardboard box on a pallet for shipping. The assembly is shrink wrapped in heavy duty polythene. The assembly must be stored upright, under cover in dry conditions.

Units must not be stacked. The packaging must be removed prior to installation.

Note the weight of the product and the handling instructions applied to the packaging. A handling device, e.g. pallet truck or similar, to manually move the Lotus villa model boiler unit must be use to avoid any manual handling injuries.





The Lotus villa model boiler unit must be handled by four-person utilising suitable manual handling techniques, handling devices and boiler unit wheels provided to move into position. Handholds are provided in all side panels and on top of the Lotus villa model boiler unit assembly to aid moving and removing panels as well as the sturdy external casing.

The packaging is recyclable and should be disposed of in accordance with environmental guidelines.

4. Technical Data Sheet

boiler unit & Primary Circuit	
Electrical input (max)	
Electrical supply voltage	
Electrical supply frequency	
Peak current intensity	
Absorbed electrical power	
Electrical supply rating	
RCD/ MCB rating	
Internal fuse rating	
Minimum Permitted Cable Diameter	
Electrical protection class	
Primary system type	
Primary system operating pressure minimum	
Primary system operating pressure	
Primary system operating temperature	
Primary system maximum design pressure	
Primary system pressure relief valve setting	
Primary system expansion vessel	
Frost Protection	
Frost Protection setting	
Primary flow temperature (radiator model)	80°C Flow & 70°C return
Primary flow temperature underfloor model	80°C Flow & 70°C return, must be fitted to a blending valve on circuit supply
Thermal cut-out	95°C
Automatic bypass valve	None

Primary circulating pump	WILO Para
Automatic air vent	Within pump housing and on top of boiler unit
Temporary filling loop	Connection points fitted within unit
Secondary system operating pressure minimum	1 bar
Secondary system operating pressure	2 bar
Secondary flow temperature (radiator model)	70°C Flow & 50°C return
Secondary flow temperature underfloor model	70°C Flow & 50°C return, must be fitted to a blending valve on circuit supply
Secondary Pressure reducing valve	3 bar
Check valve	None
Strainer	On cold water incoming
Hydraulic connections	
Heating Flow/ Return	3/4
Domestic Cold Inlet	1/2
Domestic Hot Outlet	1/2
Blow-Off (safety valve connection)	10mm Plastic tube connections x 3
Thermostat	
Electrical connection (Y/N)	Yes, Volt free switch on external stat
Wifi Connection	No
Max Distance from boiler if wired	25 meters
Minimum Permitted Cable Diameter	twin core cable of 0.5 mm ²
Max Distance from boiler if unwired (wifi)	N/A
Complete unit	
Unit Weight (empty) V500	170 kg
Unit weight (full) V500	330 kg
Packaged weight V500	177 kg
Unpackaged dimensions H x W x D V500	1200x600x600 1500x770x770 mm

The room where the boiler will be placed should be under normal indoor environmental conditions.

The boiler should not be installed in areas of high humidity, or places where there is a possibility of excessive heat or freezing.

The unit should be located on a solid, flat & level surface due to the weight of the unit and being on wheels. If required the wheels can be removed and the unit bolted to the solid floor for added security.

If there is any concerns about the base where the unit is to be located a separate structural assessment is advised.

Regarding protection and safety; it is referred to 1000mm minimum distances from flammable objects.

Observe these distances during installation.

We recommend keeping these distances wider for ease of service and replacement:

- 500 mm from the front
- 600 mm from above
- 500 mm from the sides
- 1000 mm from the rear

Unit Dimensions:

Model	Height	Width	Depth	Dry Weight
E300	770mm	460mm	300mm	30
E400	920 mm	570 mm	620 mm	45
V200	1200mm	600mm	630mm	100
V300	1300mm	700mm	730mm	120
V500	1500mm	770mm	770mm	170

Fig 2. Rear View of boiler unit

4.2. Hydraulic Installation

Thoroughly cleanse the heating system before connecting the appliance!

Connect the drain and hose from the pressure relief valves into the top of a tundish and use a 1^{1/4}" (one and a quarter inch) PVC pipe to connect to the premises drains.

Pipe Connections

	Connection	Pipe Diameter
1	Heating Return CH	¾" (Three Quarter Inch)
2	Cold Water Inlet	½" (Half Inch)
3	Hot Water Outlet	½" (Half Inch)
4	Heating Flow CH	¾" (Three Quarter Inch)

Fig 2. Pipe connections

Below Fig 3. is a simple flow diagram of the heating and hot water system identifying key areas of the Lotus villa model boiler unit.

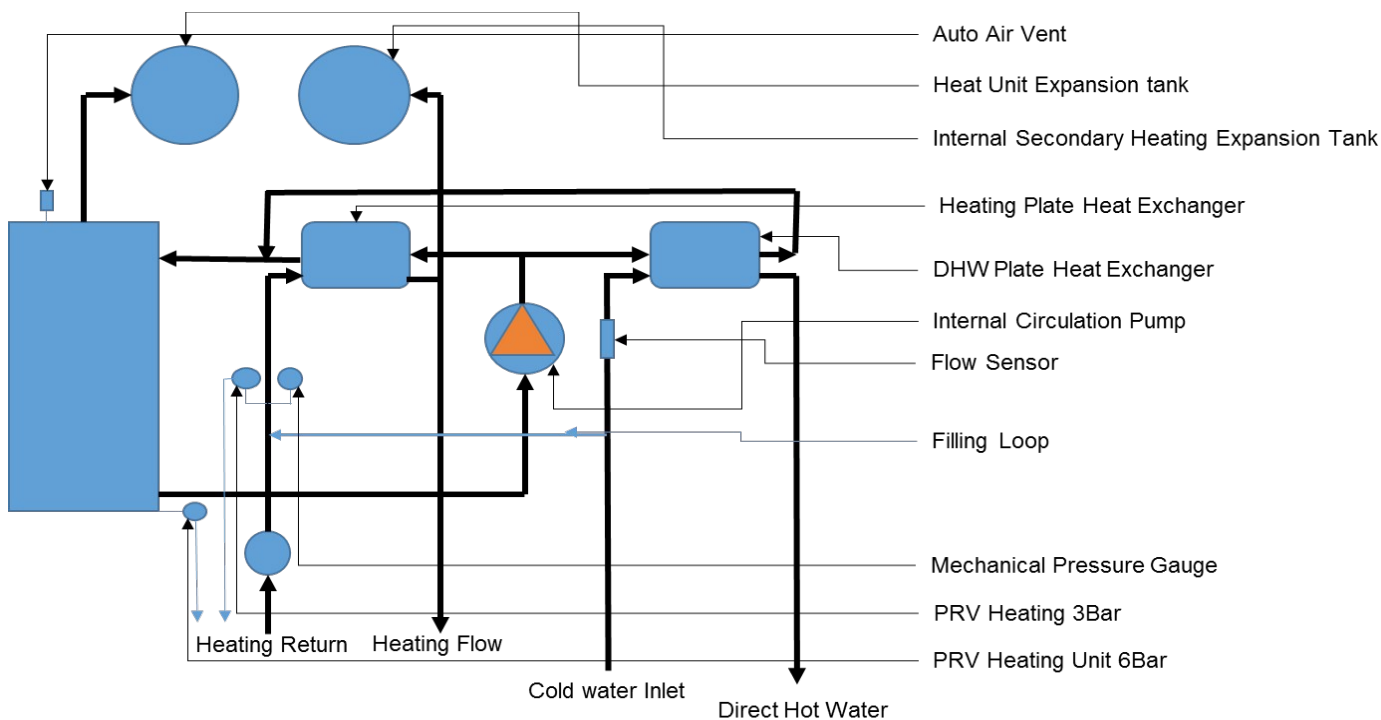


Fig 3. Simple Flow Diagram of Hydraulic system

4.3. Electrical installation

The following applications are mandatory;

Before assembling the boiler; The appropriate fuse, residual current protection relay and the cable (at the values specified in the technical table below) must be installed inside / outside the installation.

It is mandatory to connect the boiler to the individual grounding line.

If this is not done, the device will not be commissioned by LOTUS authorized service, the device will be out of warranty and LOTUS shall not be liable for any possible damages / problems.

Recommended fuse size and cable diameters

Three Phase:

- 3.a) 1x415V + N + PE 5x6 mm² (min.)
- 3.b) Household Auto Fuse, 3 Pole 50 Amp per Phase, Trip rating 30mA

5. General Requirements

5.1. Location of the Lotus villa model boiler unit

The location chosen for the boiler unit must provide adequate space for servicing and air circulation around the boiler unit.

The boiler unit may be installed in any room except:

- Areas of high humidity
- Or places where there is a possibility of excessive heat or freezing and condensation.
- The Lotus villa model boiler unit must not be sited outside or in any location where it could be exposed to the weather.
- It must be installed in a dry and ideally a frost-free environment.

The Lotus villa model boiler unit must be mounted on a flat, level surface capable of supporting the “full” weight of the unit. When full the unit weighs a total of between 330 kg maximum depending on the model selected.

The location chosen must allow the discharge pipe from the safety valves to be correctly installed. Domestic hot water pipe runs should be kept as short as possible for maximum economy. Sufficient access must be allowed around the unit to allow removal of the front and top & rear panels for servicing and maintenance of the system.

Sufficient access must be provided around the rear of the unit as this is where all electronic and hydronic connections are made

5.2. Water Supply to the Lotus villa model boiler unit

Bear in mind that the mains water supply to the property will be supplying both the hot and cold water requirements simultaneously. It is recommended that the maximum water demand be assessed and the water supply be checked to ensure this demand can be satisfactorily met.

Wherever possible the mains water supply pipe should be in 22mm OD (copper) or 25mm OD (Blue MDPE). The minimum mains water supply requirements should be 1.5 bar pressure. At these values outlet flowrates may be poor if several outlets are used simultaneously, the higher the available pressure and flowrate the better the system performance will be.

In areas with high pressure flow rate it is advised that the unit be installed with a pressure reducing regulator on the mains supply to this unit regulated at 2 Bar pressure.

In some areas the water supply may have a high level of natural hardness. Whilst this is not detrimental to the quality of the water, in water heating systems the calcium carbonate which causes the water’s “hardness” can precipitate onto hot surfaces and in time adversely affect hot water performance. If the temporary hardness of the cold water mains supply exceeds 200mg/l (check with your water supply company) it is recommended that some form of water treatment is considered. Any device selected must be suitable for use and not unduly affect the flow rate capacity to the Lotus villa model boiler unit, consult the manufacturer of the device for details. If any anti calcification treatment is not applied, combi boiler device will be out of guarantee.

NOTE: All pipework, fittings and terminal fittings must be compatible with unvented systems and have a rated operating pressure of at least 6 bar. Where plastic pipe / fittings are being used the rated pressure must be achievable at outlet temperatures that can be expected within the hot water distribution pipework. If in doubt, consult the manufacturer of the fittings selected.

5.4. Treatment of the Primary (Central Heating) Circulating System

Primary water circulating systems will be subject to corrosion unless an appropriate water treatment is applied. Without treatment the efficiency of the system will be reduced over time as corrosion sludge accumulates within the system, risking damage to the pump, heat exchangers and valves, system noise and circulation problems.

5.5. Sealed Primary Systems

The Supply to the Lotus villa model boiler unit must be installed in a sealed primary system. All necessary primary system controls are supplied fitted to the Lotus villa model boiler unit. The sealed system expansion vessel fitted has a capacity of 7 litres for the boiler unit and another 7 litre expansion vessel on the sealed heating circuit. If in doubt the total secondary heating system volume must be calculated to determine if additional expansion volume is required.

The Lotus villa model boiler unit initial primary system cold needs to be filled completely.

The Lotus villa model boiler unit incorporates an automatic air vent at its highest point (fitted to the Heating unit directly). If any primary pipework is routed above the level of the Lotus villa model boiler unit additional air vents must be fitted to the highest points of the flow and return pipes and at any point where air is likely to collect.

6. Installation – General

6.1. Positioning the Lotus villa model boiler unit

Decide where the Lotus villa model boiler unit is to be installed. Reference must be made to the dimensions of the unit and the minimum access space requirements. For maintenance the boiler should be installed with a minimum distance of: 500mm between the sides of the boiler unit and the wall, 600mm between the top of the boiler unit and any obstruction overhead, 600mm from the front and 1000mm at the rear.

Consideration must also be taken of the routing of the pipework to the unit and provision of the discharge pipe. Pipework is connected to the rear of the unit at the designated ports.

The boiler unit is designed for home and commercial use. It should not be used for industrial use where continuous hot water is required.

Flammable materials shall not be stored near the boiler unit min clearance is 1000mm

Must be connected with a 32 amp three-phase switch

6.2. Removal of Panels

Note: For installation and commissioning the front, top & rear cover must be removed.

Note: Electrical Supplies must be isolated prior to removing any panels.

The front panel is secured by four screws behind the boiler unit door and is removed by undoing the screws, pulling up and forward using the fingers and lifting out of position. Front access provides access and maintenance to the control boards and electrical contactors.

Side panels can also be removed and is secured by four screws on either side panel, they are secured by spindle to the unit frame. To remove undo nuts and slide the panels outwards.

The rear can not be removed because of hose connection and is secured by four spring screws. Side access provides access to and maintenance of the internal circulation pump, plate heat exchanger, electrics, boiler unit drain off and pressure reducing valves. To remove, unscrew the six securing screws on the rear panel and then and slide the panels outwards after removing hose connection if necessary.

The top can be removed and is secured by four screws securing it by spindle to the frame. Top access allows access to and maintenance of the expansions tanks, automatic air vent and filling of the boiler unit itself. To remove, unscrew the two securing screws and lift out of position.

6.3. Programmable PCB Room Thermostat for the Lotus villa model boiler unit

The unit is fitted with a volt free connection point for a Building Management System (BMS) connection and built in time clock for programmable operation. An additional connection on the Control PCB is provided for a fixed wire room temperature sensor (not provided) or external temp sensor (not provided) for a commercial setting.

Auto Program Tab

5

Main Menu	Oper. Inf.	Auto Prog.	Fault Det.	Settings			
Time Zone	Mon	Tue	Wed	Thu	Fri	Sat	Sun
00-06							
06-09							
09-18							
18-21							
21-24							

Fig 6. Auto program screen with no time selected

Select operating time and day interval by means of the arrow keys  and confirm by pressing the enter

key  (center of arrow keys) the corresponding square will turn black and saved to memory. To deselect

again just highlight again by means of the arrow key and select it again by pressing the enter key  (center of arrow keys), this will clear the selection. Continue these steps to set all times and dates of operation. (see Fig 7 below, here you can see a winter timing selection where occupants are assumed not in during the day. As such only an early start and late afternoon/early evening slot is selected.)

There are 3 x 3hour operating time intervals, a 6-hour time interval and a 9-hour time interval for all day operation.

Please note, by altering the room set point the time clock is bypassed until the next interval and/or temperature sensor is satisfied. If not the time clock and runs to maintain set point.

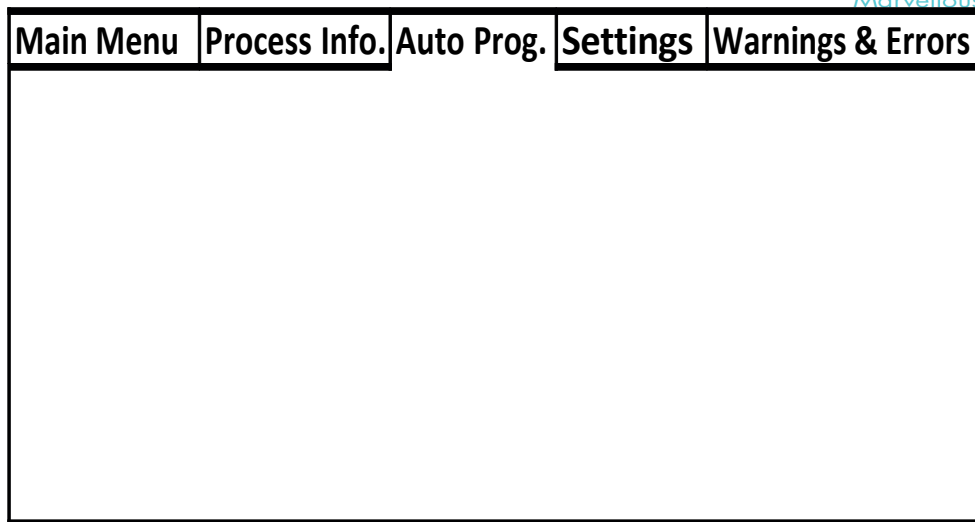


Fig 7. Auto program screen with winter timings selected

7. Installation – Plumbing

The pipework from the Lotus villa model boiler unit to the hot outlet fittings should be in 22mm pipe with short runs of 15mm pipe to showers and basins. Small bore pipe can be used to suit some taps but runs should be kept as short as possible. Pipe sizes may vary due to system design. Automatic air purge valves should be reminded to commission on the required lines

All pipework shall be insulated as operating within the temperature range -40°C to +700°C if PVC pipes are not available.

7.2. DHW (Domestic Hot Water) Outlets

It is recommended that all outlets for personal use connected to the system should be of blended type due to the temperatures supplied by the heating unit. Installing thermostatic mixing valves ensure that water is delivered at the required temperature, thereby reducing the risk of scalding accidents; it also reduces hot water consumption from the supply that is maintained at a higher temperature.

Blending valves can be omitted for washroom, kitchen sinks or appliances where higher temperatures are required for disinfection purposes.

7.3. Discharge Pipework

It is a requirement of Building Regulation that any discharge from an unvented system is conveyed to where it is visible but will not cause danger to persons in or about the building. The tundish and discharge pipes should be fitted in accordance with the requirements and guidance notes of Building Regulation Any discharge pipe connected to the pressure relief devices (expansion valve and temperature/pressure relief valve) must be installed in a continuously downward direction and in a frost-free environment.

Water may drip from the discharge pipe of the pressure relief device. This pipe must be left open to the atmosphere. The pressure relief device is to be operated regularly to remove lime deposits and to verify that it is not blocked.

G3 REQUIREMENT

“...there shall be precautions...to ensure that the hot water discharged from safety devices is safely conveyed to where it is visible but will not cause danger to persons in or about the building.”

Notes:

Discharge pipe-work D2 can now be a plastic pipe but only pipes that have been tested to a minimum 110°C must be used.

Discharge pipe D2 can now be plumbed into the soil stack but only soil stacks that can handle temperatures of 99°C or greater should be used.

Connections to the Lotus villa model boiler unit primary flow and return must be in 22mm o/dia. pipe.

. The maximum radiator and area capacity value declared on manufacturer catalogue and website should not be exceeded.

NOTE: The Lotus villa model boiler unit is dedicated to the space heating and the domestic hot water, so there is a requirement to allow a hot water loading factor in designing the primary system.

A filling loop is provided within the Lotus villa model boiler unit to fill the primary circuit directly from the cold- water supply ;(if reverse osmos filter fitted) and to top up the secondary heating circuit.

8. Installation – Electrical

8.1. Important Notes

NOTE: Exposed metal components within the case of the unit carry an electrical current, if any covers are removed or works undertaken the electrical supply must be isolated.

Before working on the appliance, TURN OFF the power supply and secure against restart.

The Lotus villa model boiler unit electrical installation must be carried out by a competent person in accordance with any relevant regulations in force at the time of installation and the requirements of these instructions to ensure correct operation.

The main incoming electrical supply to the property must be of sufficient current rating and voltage for the Lotus villa model heat and any other electrical requirements for the property.

NOTE: A 415 V, ~ 50 /60 Hz three phase electricity supply fused to 32 Amp per Phase with a 30mA Trip rating must be provided if utilising the three phase supply unit

The consumer unit must be fitted with a three pole RCD/MCB or RCBO with a trip sensitivity of 30mA capable of breaking the full load current.

The appliance must be earthed.

8.2. Boiler Connection

The supply cable must therefore be separate and dedicated to the boiler unit. The supply cable should be a minimum of 6 mm² cross sectional area, (check the IEE Wiring Regulations for correct cable sizing). It must be routed into the Lotus villa model boiler unit via the cable gland previously fitted.

The cable should be wired as set out below,

Three phase:

GREEN/YELLOW (EARTH) WIRE	boiler unit Earth Terminal
BLUE (NEUTRAL) WIRE	boiler unit Terminal N
BROWN (LIVE) WIRE	boiler unit Terminal L 1
	BLACK (LIVE) WIRE
	boiler unit Terminal L 2
GREY (LIVE) WIRE	boiler unit Terminal L 3

- 2.a) Connect the room thermostat or external temperature sensor with a twin core cable of minimum Cu 0.5 mm² of recommended diameter and 25 meter length maximum.
- 2.b) The wiring for the thermostat must be run separately from the mains supply, minimum separation is 10mm.
- 2.c) The room thermostat must be located away from the sun, radiators, electrical devices and/or other heat generators and approx. 1.5 m in height from the floor on an interior wall. (see Diagram 2, below)
- 2.d) The external temperature sensor must be located in the outside open air and installed to manufactures requirement.
- 2.e) External controls can be connected to terminals marked "CN_ROOM", no voltage is to be applied to these terminals.
- 2.f) If Lotus Combi will be used in boiler heating mode , the internal room temperature sensor should be connected in heating return line , and setting should be arrange related to required temperature in external supplying boiler.

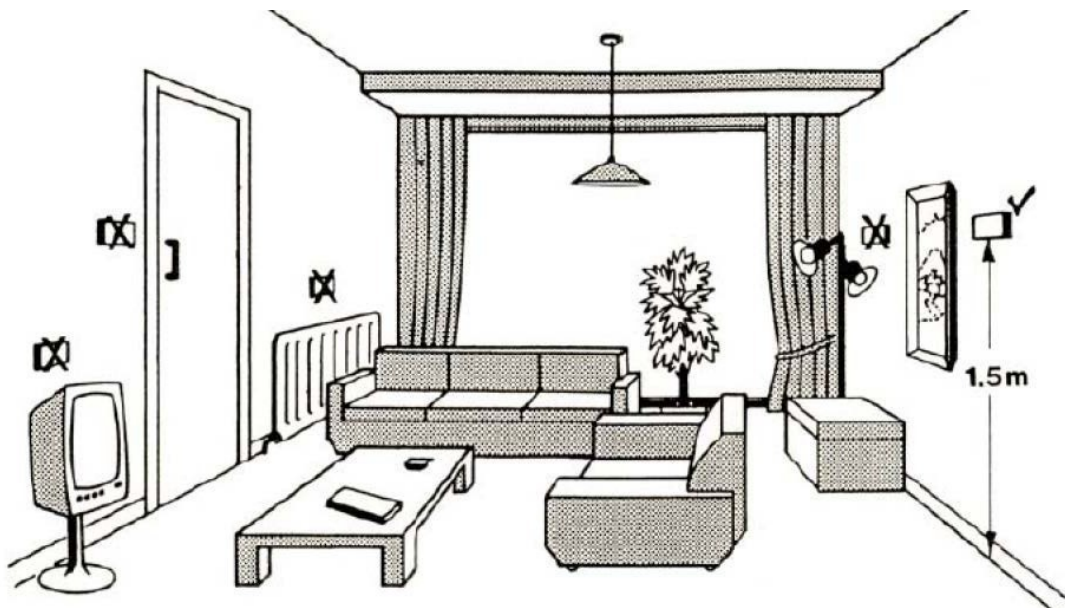


Diagram 2. Correct thermostat positioning

8.Pre Commissioning

- a) Check the electrical installation by carrying out short circuit, earth continuity and heating elements to earth tests when the boiler is empty.
- b) Check all electrical connections are tight. Loose connections can cause over-heating of terminals and the possibility of a fire.
- c) Check all earth bonding links are connected, are tight and un-damaged.

Starting up of the boiler is only carried out by LOTUS authorised service personnel.

Starting up of the boiler should only be carried out by authorised professional companies or service personnel who have a valid agreement with the manufacturer and distributor. The Authorised Service List is as attached.

The company or the person starting up the boiler has an obligation to repair any defects or defects during the guarantee period. If this company no longer operates, the guarantee repair will be performed by your nearest authorised service agent listed on the list.

The commissioner has taken over the following obligations:

- Heating Unit should be dosed with proper filtered water via air purge valve once complete the air purge valve should be replaced back into its operational position.
- An external pump should be connected to the heating return line with both side valves.
- Mains cold water should be connected to the water inlet line via a valve and trough an anti -calc filter.
- Heating line should be connected to the heating outlet via a valve
- Heating return line should be connected to external pump inlet and the pump connected on the heating return line into the heating unit.Pump's pumping way must be towards to boiler unit.
- DHW line should be connected to hot water distribution line via a valve and blending apparatus.
- No water leakage should be observed.
- Floor area must be dry from visible leaks.
- Internal room temperature sensor should be located to 1.5 meters height where can sense the room temperature correctly.
- Boiler should be observed that is full of required water via automatic air purge valve house when boiler is still below 30 °C degrees. Heating line should be pressurised to 2 bar by observing on the screen when the heating line is still below 30 °C degrees.
- All covers should be replaced and locked into position.

- informing the user of the operation, control and maintenance of the boiler
- informing the user of the distance of the boiler to flammable materials, fire protection and safety gaps to be left from the walls

To meet the requirements for safe and economic operation of the boiler, the following conditions must be met:

- The electrical network must be suitable for installation.
- Assessment of connection of the heating system and the electric boiler requirements
- The boiler must only be installed in a suitable environment for the intended use.
- Modification, operation, use, control and maintenance of the boiler is prohibited unless it complies with the rules and directives of this manual.

NOTE: Removing of safety devices or components in the boiler is particularly prohibited.

MODEL	Heating Capacity for Heat Isolated Areas	Heating Capacity for Radiators
V200	Max 150 m ²	9 linear meters iron, 12 linear meters aluminum
V300	Max 200 m ²	13 linear meters iron, 15 linear meters aluminum
V500	Max 300 m ²	18 linear meters iron, 20 linear meters aluminum

9.Commissioning

Commissioning of the boiler unit must only be carried out by a Lotus® approved installer.

9.1. Filling the Lotus villa model boiler unit

Cold Water Supply

Open all domestic hot water taps supplied by the boiler , turn on the mains water supply to the boiler and open the mains water isolating valve on DHW outlet line on the boiler unit. Water will now flow through the boiler unit to the hot taps. Starting with the lowest tap supplied, turn the hot taps off one at a time until the hot water pipework is purged of air. Check all hot and cold-water pipework for leaks.

Fill the heating system as follows:

- a) Set the boiler filling to the top level by observing on the boiler.
- b) Check if both isolation valves on cold water inlet line and filling line of boiler unit (if reversed osmosed filter fitted) on the boiler unit are open.(otherwise use item c to fill it up)
- c) Fill the boiler unit heating circuit from the filling loop (if reverse osmosed filter fitted) or use a funnel to fill the boiler up. Check that the auto air vent on top of the pump is open, bleed all radiators etc.
- d) Fill the heating system to the system with distilled or mains water, by means of the filling loop at the right side and rear of the unit. Approximately 40-160 litre total on unit specified.



Note: The water in the expansion tank has a current running through it, do not touch the water unless the electrical supply is isolated.

- e) Check that boiler takes required power and ampere as manufactured.
- f) Turn on the electrical supply, the circulation pump will run for 8 minutes to clear any air from the system. “
- g) Check that the probe sets are being called for and have an electrical supply to them, measure the amps to the unit, it should be 45 Amps (for V500) when the boiler temperature near 75-80°C degrees to boiler upper operation limit, if current is low or high , an authorized service should check the device.
- h) Check for correct flow and temperature of hot water to the radiators
- i) Check all connections and the entire system for leaks.
- j) Open a hot tap and check for correct water flow and temperature
- k) Make sure that there is a heating demand.
- l) Inform the user of the operation, control and maintenance of the boiler

- m) Inform the user of the distance from the boiler of flammable materials and safety gaps to be around the boiler.

9.2. Filling the Sealed System Secondary Circuit

- a) The secondary system must be flushed if used for any other heating system.
- b) Connect the primary filling loop and tighten connections
- c) Check all radiator valves are in the open position.
- d) Open the filling loop isolating valves and allow primary system to fill until the level on the screen of the Lotus villa model boiler unit reads approx. 2.0 bar.
- e) Purge air from all radiators and air vent points in the primary system.
- f) Check the primary system pressure. This should be between 1.5 and 2 bar. If lower, open filling loop isolating valves until level approx. 2.0 bar. Repeat air purging operation. This sequence may need to be repeated several times to ensure all air is purged from the system.
- g) Check primary system for leaks and rectify as necessary.
- h) Check secondary system for leaks and rectify as necessary
- i) When the pressure gauge remains steady at between 1.5 and 2 bar ensure both filling loop isolating valves are closed and remove filling loop flexible hose from the primary system connection point.

NOTE: System protection: Failure to protect the system will invalidate the manufacturer's warranty.

- j) Fill the system with cold mains water to the recommended pressure 1.5 to 2 bar and check for leaks, then drain the system thoroughly making sure all drain cocks are fully open and that the system is completely drained.
- k) We recommend inhibitor levels are checked on an annual basis (usually during the service) or sooner if the system content is lost.

9.3. Check the Operation of the Safety Valves

- a) For the primary system pressure relief valve observe that not dripping or leaking
- b) For the primary system pressure relief valve observe that not dripping or leaking
- c) Check water discharged runs freely away through the tundish and discharge pipework. Close valve ensures water flow stops and valve reseats correctly.
- d) After this operation check that the primary system pressure has not dropped below 1.0 bar. If it has re-connect the filling loop and refill until the gauge reads between 1.5 and 2 bar for the boiler unit and secondary heating circuit respectively. Always close filling loop isolating valves and remove hose from the primary system.

9.4. Set the Programmable PCB Thermostat

NOTE: As per section 6.4



Select operating time interval by means of the arrow keys and confirm by pressing the enter key



(center of arrow keys) the corresponding square will turn black and saved to memory. To deselect



again just highlight again by means of the arrow key and select it again by pressing the enter key (center of arrow keys), this will clear the selection. Continue these steps to set all times and dates of operation.

There are 3 x 3hour operating time intervals a 6 hour time interval and a 9 hour time interval for all day operation.

Please note, by altering the room set point the time clock is bypassed until the next interval and/or temperature sensor is satisfied. If not the time clock and runs to maintain set point.

10.Demonstration to User

Following commissioning any panels or covers removed must be replaced and fully secured in place. The system, its function and control should be fully explained to the user. This must include:

- a) DHW supply – Explain how the complete Lotus villa model boiler unit is used to provide only heated hot water. Central Heating – Explain how the central heating system works. Explain the operation of the programmable PCB thermostat and the settings that have been programmed. Explain how the programmable PCB thermostat can be over-ridden if required.
- b) System malfunction – Explain what to do if the system malfunctions or the “alarm” indicators are illuminated.
- c) System maintenance – Explain the necessity for the system to receive regular maintenance to ensure its continued safe and efficient operation.
- d) User Instructions – Hand over the Lotus villa model boiler unit Installation Instructions and User Instructions.

10. Secondary Pump (External to the boiler unit on heating return)

A secondary pump must be fitted on the heating return line of the secondary side of the plate heat exchanger, this is not supplied.

The flow rate of the secondary pump must not exceed 1.6 m³/h and follow the plate heat exchanger parameters, detailed below.

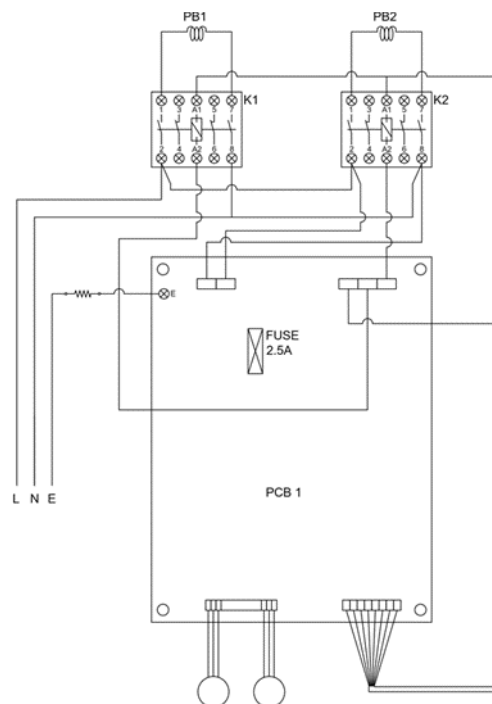


Fig 8. PCB1 External Pump connection point P2

The pump can be linked with the Lotus villa model boiler unit under position P1 of the main control board (see Fig. 4,5 & 8) this will provide a 230V when required, following manufactures instruction of the pump. If a larger pump is required due to supply constraints, the pump must be connected to its own mains supply via a contactor and manufactures instructions must be followed.

11. Maintenance and Servicing

11.1 Maintenance Requirements

To ensure the continued optimum performance of the Lotus villa model boiler unit it should be regularly maintained. Maintenance should be carried out by a competent person and any replacement parts used should be authorised Lotus villa model boiler unit spare parts. It is recommended that maintenance is carried out annually and should include the checks detailed in the sections below.

Failure to have annual full maintenance carried out will invalidate the warranty.



Removing the any covers cover is NOT allowed other than by a Lotus® authorised person.

The user can wipe the surface of the door with detergent and check the operating modes or fill the heating system with water if the pressure gauge (on the screen) is low.

Operating times and maintenance dates are recorded in the microprocessor. When maintenance is due, the user is advised via the main front display.

11.2. Annual Full Maintenance Procedures

During regular inspection and maintenance, the following checks must be undertaken, recorded and held on file.

- a) Check all electrical connections, checks the tightness of all connections and any signs of overheating after isolating the input power.
- b) Check the boiler unit is still maintaining the required Amps/ kW input as set at commissioning
- c) Check the level of the water in the heating system when the boiler is cold situation.
- d) Clean the water filter and water pump. Check the operation of the system, including valves and the start-up function of the boiler unit.
- e) Visual checks (Wear, tarnishing, burning etc.).Check the pressure of the expansion vessels and re-pressurise if necessary.
- f) Inspect and check the mechanical components for signs of leaks.
- g) Measure and record the boiler unit's electrical performance.
- h) Drain the boiler unit completely and follow the commissioning instructions to reinstate with new water if necessary.
- i) Measure and record the current drawn from the boiler unit when operating in heating mode. Ensure the current drawn as required amps. If the current drawn is outside of this parameter, consult to an authorized service to check the device.
- j) Interior cleaning.
- k) Read error codes, correcting the error (record the error and send it to the Lotus technical support if necessary).
- l) Software update if necessary (Card replacement is done in service and not software download).

11.3.Operation of Primary System Safety Valve (6 bar boiler unit)

- a) Ensure the primary flow valve is closed from the filling loop connection
- b) Check the safety vent is not dripping.

11.4.Operation of Secondary System Safety Valve (3 bar boiler unit)

- a) Ensure the secondary flow valve is closed from the filling loop connection
- b) Check the safety vent is not dripping.

11.5. Primary System Expansion Vessels Charge Pressure

- a) Remove the dust cap from the primary system expansion vessel when the boiler is cold.
- b) Check the charge pressure of the vessel using a tyre pressure gauge. The pressure (with system de-pressurised) should be 1.0 to 1.2 bar. If lower than the required setting it should be re-charged using a tyre pump (Schrader valve type). DO NOT over charge. Re-check the charge pressure and when correct replace the dust cap.

11.6. Secondary System Expansion Vessels Charge Pressure

- c) Remove the dust cap from the primary system expansion vessel when the boiler is cold.
- d) Check the charge pressure of the vessel using a tyre pressure gauge. The pressure (with system de-pressurised) should be 1.0 to 1.2 bar. If lower than the required setting it should be re-charged using a tyre pump (Schrader valve type). DO NOT over charge. Re-check the charge pressure and when correct replace the dust cap.

11.7.Electrical Checks

- a) Inspect all electrical terminations for signs of over-heating after isolating input power.
- b) Check all earth bonding.
- c) Check all terminations are tight.
- d) Check cable glands are tightened and grip cables securely.
- e) Replace all panels before re-starting system.

11.8. Mechanical Thermostat

- a) With the unit in operation adjust the mechanical thermostat to a set position (85°C)
- b) The boiler unit once achieving this temperature should drop the contactors to disconnect and the unit supply should isolate, protecting the unit failing to the safe position.
- c) Reset the boiler unit module and reset the mechanical thermostat to 85 °C (normal operation)
- d) The boiler unit is ready to be put back into operation following a successful test.

12. Fault Finding and Servicing

12.1 Fault Finding



Any suspected faults should be brought to the attention of your Lotus® authorised person for investigation and rectification if necessary. Investigation of faults is NOT permitted by the user.

If the boiler unit emits a buzzing noise (from internal pump and boiler air purge valve)and experiences reduced performance, it is likely that the boiler unit is short of water and requires topping up. This must be done in accordance with the commissioning instructions previously outlined.

Always check the current draw after topping up and adjust the water to obtain the correct current.

When a hot tap is opened the TAP pictogram should appear on the screen. If this TAP pictogram fails to appear, check the flow sensor and internal circulation pump are connected and working correctly.

12.2. Codes

Fault Code	Description
1113	boiler unit temperature sensor error
1121	Room temperature sensor error
1151	System pressure sensor error

12.3. System check

After first energizing the device, model number will be appeared below of LOTUS brand.

If it didnt appear ,

TURN OFF the electrical supply.

Press and hold the SET & WINTER buttons while the electrical supply is turned back on. Use the related button to select and apply the correct model. After starting up, if any faults are present you will not be able to move on and repairs must be undertaken by a competent person.



Press SET to complete.

The system check comprises of the following parameters;

Boiler unit Temp Sensor	-5C – 115C
Room Temp Sensor	-5C – 115C
Pressure Sensor	2 Bars
Flow Sensor	ON/OFF
Recirculation pump test	Yes/No
Contactors Test	Yes/No
Model Selection	V500,V400,V300,V200,

12.4. Summary Safety Features

2 x 7 Litre feed and expansion tank with a 2 bar pressure relieve vent	To take any expansion within the heating system body of the water and boiler unit itself (7Ltr@2Bar)	This vessel contains air, as well as water from the central heating system. As the water heats up in the central heating system and boiler unit, it expands within this tank. Acting like a spring, the air that is present in the vessel compresses. In this way, it absorbs the extra pressure, helping to keep the system stable during operation and filling of the unit
Automatic Air Vent	To take any expansion air within the heating unit body of the water and discharge to atmosphere.	
3 bar mechanical pressure reducing valve (PRV)	To overcome any overpressure issues on the sealed circuit side	Seal lifts and discharges over pressure and water to outside the unit by means of tundish.
6 bar mechanical pressure reducing valve (PRV)	To overcome any overpressure issues on the sealed boiler unit	Seal lifts and discharges over pressure and water to outside the unit by means of tundish.
2 Amp fuse (PCB) (F1)	To protect on-board electronics and connections from main power surges.	Fuse will fail and cut power to the Main PCB and rest of heating unit.
Boiler Temperature Sensor (S3)	To sense the temperature within the heating unit. Set at 80°C if deviate from set point, fault is generated.	The boiler will lock out and display an error code advising sensor error (Fault Code 1113)

Overheat Thermostat 85°C (T1)

To sense excessive temperature and protect the heating unit in the event of a fault, potential failure of Boiler Temperature Sensor (S3)

The boiler will lock. Secondary safety measure which if activated drops the neutral feed to the contactor coil, which feeds the heating elements and cuts power to the unit.

Room Temp Sensor (S2)

To sense room temperature or environment,

if sensor goes out of range or open circuit, the boiler goes into lockout

Heating System Pressure Sensor (S6)

To sense system pressure, if the heating system pressure is too low the boiler will lock out and display an error code.

a) Protection Function 1: Freeze protection of the boiler

This function protects the boiler unit against frost. The device must be energized for this feature to be active. If the boiler temperature drops below 5 °C, the circulation pump and the boiler run for 5 minutes.

a) Protection Function 2: Switching on the heating system protection

If the circulation pump does not run for more than 24 hours, the protection will trip and prevent the pump or valve from being pinched. This function extends the life of the pump in STAND-BY mode by preventing the pump from jamming. The pump runs once a day for 10 seconds.

b) Protection Function 4: Protection against overheating

The boiler unit has an overheating safety thermostat set to 90 °C. In case of overheating of the boiler unit, the boiler unit electricity is switched off independently of the control unit. It requires resetting and manual intervention by an authorised service agent.

c) Protection Function 5: Protection against low water pressure

The boiler unit should be ON. When the mains water is cut off, a Check Valve is placed at the boiler unit cold water inlet to prevent discharge in the boiler or installation. When the pressure is low, an error message as "Low pressure in the heating system" is displayed.

d) Protection Function 6: Combination protection against high and low voltage in the mains.

The controller is equipped with a function that deactivates the boiler if the voltage is less than 150 V or higher than 250 V. When the voltage is in the 150-250 V range, the boiler unit returns to normal operation.

The boiler will lock out and display an error code advising sensor error (Fault Code 1121)

The boiler will lock out and display an error code advising sensor error (Fault Code 1121)

e) Protection Function 1: Freeze protection of the boiler

This function protects the boiler unit against frost. The device must be energized for this feature to be active. If the DHW temperature (NTC 17) drops below 5 °C, the circulation pump and the boiler run for 5 minutes.

f) Protection Function 2: Switching on the heating system protection

If the circulation pump does not run for more than 24 hours, the protection will trip and prevent the pump or valve from being pinched. This function extends the life of the pump in STAND-BY mode by preventing the pump from jamming. The pump runs once a day for 10 seconds.

g) Protection Function

4: Protection against overheating

The boiler unit has an overheating safety thermostat set to 90 °C. In case of overheating of the boiler unit, the boiler unit electricity is switched off independently of the control unit. It requires resetting and manual intervention by an authorised service agent.

h) Protection Function 5: Protection against low water pressure

The boiler unit should be ON. When the mains water is cut off, a Check Valve is placed at the boiler unit cold water inlet to prevent discharge in the boiler or installation. When the pressure is low, an error message as “Low pressure in the heating system” is displayed.

i) Protection Function 6: Combination protection against high and low voltage in the mains.

The controller is equipped with a function that deactivates the boiler if the voltage is less than 150 V or higher than 250 V. When the voltage is in the 150-250 V range, the boiler unit returns to normal operation.

12.6. Pump Failure Detection

Pump failure	Probably reason	Solution
Noisy pump	Cavitation due to insufficient suction pressure	Increase the system pressure within the permissible range
		Check the delivery head and set it to a lower head if necessary
Building does not warm up	Thermal output of the heating surfaces is too low	Increase setpoint
		Change the control mode from Δp -c to Δp -v
although the power supply is switched on	No voltage supply at pump	Rectify the power interruption

Fault signals

- The fault signal LED indicates a fault.
- The pump switches off (depending on the fault) and attempts a cyclical restart.

LED	Faults	Causes	Remedy
Lights up red	Blocking	Rotor blocked	Activate manual restart or contact customer service
	Contacting/winding	Winding defective	
Flashes red	Under/overvoltage	Power supply too low/high on mains side	Check mains voltage and operating conditions, and request customer service
	Excessive module temperature	Module interior too warm	
	Short-circuit	Motor current too high	
Flashes red/green	Generator operation	Water is flowing through the pump hydraulics, but there is no mains voltage at the pump	Check the mains voltage, water quantity/pressure and the ambient conditions
	Dry run	Air in the pump	
	Overload	Sluggish motor, pump is operated outside of its specifications (e.g. high module temperature). The speed is lower than during normal operation	

13. User Manual

13.1. Winter/ Summer Mode

Short self-test is performed at the moment of initial power-up. At the time of the first power-up, everything is closed, except "Protection function 1 and 2" (section 12.5: Protection features)

WINTER MODE:

Operate the boiler if the conditions are appropriate (see Operation lower and upper threshold table).

- The boiler temperature (regardless of the set point) is kept constant in the 70-80 range. (This value can be changed in the Factory Setting menu by an authorized service only)
- The circulation pump runs until the room temperature reaches the set point
- The set point is referenced to the NTC / room thermostat.
- When the set point is reached, the circulation pump stands by (Hysteresis + 2 C).
- "If the water flow switch is on when dhw required, heating line pump stops, Internal circulation pump runs along with the boiler.
- When the set point is reached, heating line pump stops (Hysteresis + 2 C).
- If the conditions do not match, a Warning and / or Error code is sent to the display screen.

SUMMER MODE:

- Operate the boiler unit if the conditions are appropriate (see Operation lower and upper threshold table 2, below).
- The boiler unit temperature (regardless of the setpoint) is kept constant in the range 70-80. (This value can be changed in the Factory Setting menu by an authorized service only.)
"If the water flow switch is on when dhw required, Internal circulation pump runs along with the boiler.
- If the conditions do not match, a Warning and / or Error code is sent to the display screen.

	Type	Distance	Bottom Working Limits	Top Working Limits	Unit
Water Flow Switch (10)	On/off		0	1	
Central Heating Temperature Sensor (11)	NTC-100	0-10K		65	C
Boiler temperature sensor (13)	NTC-100	0-10K		90	C
Central Heating Pressure Sensor (24)			1	2,5	B
Central Heating / Room Temperature Sensor (27)	NTC-100	0-10K		65	C
Boiler Temperature Limit Thermostat				105	
Feeding Voltage			380	415	V
Boiler Pressure Valve Mechanical				6	B
Heating Pressure Valve Mechanical				3	B

Table 2. Operation lower and upper threshold

13.2 General Controls





When the ON / OFF button is pressed [ON]:

- The LED of the corresponding button lights up.
- All functions and buttons are available.



Press the ON / OFF button again [OFF]:

- The LED of the corresponding button goes out.
- All functions and buttons are disabled, except for protection functions 1 and 2.



When SET button is pressed:

- The display shows only the heating temperature value. (Room thermostat icon, if available)
- Heating temperature adjustment is done with upper-lower buttons.
- Pressing the SET button once returns to the main screen.
- Activate the last setting if the "Maintain my last settings" option in the Settings menu is active. Initial start set value is 22 C.



When WINTER MODE button is pressed

- The LED of the corresponding button lights up.
- If the conditions do not match, send the Warning and / or Error code to the screen.



When the SUMMER MODE button is pressed

- The LED of the corresponding button lights up.
- If the conditions do not match, send the Warning and / or Error code to the screen.
- If one of the WINTER and SUMMER MODE buttons is pressed, the other button is deactivated.



If WINTER and SUMMER MODE buttons are pressed together for 1 sec.;

- The LED of both buttons flash 3 times.
- Reset The processor is reset.
- Both buttons (mode) are deactivated.

If the WINTER and SUMMER MODE buttons are pressed together for 1 s while the child lock is activated, only the lock is released, and the pictogram goes away.

Pressing the ENTER button  (navigation centre) switches to the MENU screen. Pressing it again will bring up the main display screen.

Switch to Delay Mode after 30 seconds of inactivity.

Delay Mode 10 min. active, then dimming until any key is pressed.

When the ENTER button (Navigation/Centre) is pressed, the MENU screen is displayed. Pressing it again or after 30 seconds of inactivity displays the main display screen. Switching among menus are done with the navigation keys. The preferences are shown in contrasts.

Main Menu	
Selection	Mode
Boiler Status	ON / OFF
Pump Status	ON / OFF
Automatic Prog. Status	ON / OFF
Room Thermostat	ON / OFF
Overdrive mode (Turbo)	ON / OFF

Operational Information	
Display	Unit
Boiler temperature	°C
Heating temperature	°C
Water temperature	°C
Total Working Time	h/m/s
Total Boiler Operation Time	h/m/s
Future Maintenance Date	dd/mm/yyyy

Main Menu	Process Information	Auto Prog.	Settings	Warnings & Errors
Heat Unit Temperature ... Room Stat Temperature ... Operational Time ... HU Working Time ... Last Service ... Next Service ...				
Auto Programme				
Description				
Select operating time interval and day of operation with built in time clock. There are 3 x 3hour operating time intervals a 6-hour time interval and a 9 hour time interval for all day operation. By altering the room set point overrides the time clock and runs to maintain set point.				

Auto Program Tab

Main Menu | **Oper. Inf.** | **Auto Prog.** | **Fault Det.** | **Settings**

Time Zone	Mon	Tue	Wed	Thu	Fri	Sat	Sun
00-06							
06-09							
09-18							
18-21							
21-24							

Settings

Customer Setup

Display	Mode
Keep recent settings	Y / N
Clock Setting	hh/mm/ss
Language Selection	EN / EN
Temperature Display	°C / °F
Restore Factory Settings	Y / N

14. GUARANTY

This guarantee is valid for 2 years from the date of commissioning. (There may be a maximum of 30 days between delivery date and commissioning date.) For this guarantee to be valid, the first operation and interim periodical maintenance must be performed by authorised services. The warranty documents of the devices shall not be covered by the warranty unless they have been completed and approved by the Authorized Service Center.

The entire product, including all parts, is covered by the guarantee during the guarantee period. The maximum repair period is 20 (twenty) business days from the date of notification of the failure.

Existing legal regulations and rules must be followed exactly when selecting the installation location. The manufacturer cannot be held responsible for any negative conditions arising from non-compliance.

The guarantee covers against faulty materials or manufacture provided that:

- a) It has been correctly installed as per this document and all the relevant standards, regulations and codes of practice in force at the time.
- b) It has not been modified in any way, other than by LOTUS.
- c) It has not been misused, tampered with or subjected to neglect.
- d) It has only been used for the production of potable water and space heating.
- e) The unit has been serviced annually.
- f) The benchmark service record has been filled in after each annual service.
- g) The guarantee period starts from the date of purchase which should be registered with LOTUS.
- h) The extended guarantee is not transferable, and rests with the original householder.
- i) The system is fed from a public mains water supply via a permuttite
- j) Store temperatures do not exceed 70°C.
- k) Installations are made only in countries that an authorized distributor is available.
- l) The water supply does not have a Chloride content greater than 250ppm.
- m) Units are not installed with uncontrollable heat sources (E.g. Wood Burning Stoves).
- n) The guarantee card must be completed and sent back to LOTUS as soon as possible for registration.

Guarantee Exclusions

- a) Damage to the boiler from poor or incorrect installation work.
- b) Call out charges that have not been organised by LOTUS.
- c) Water leaks into the boiler. All plumbing connections must be checked at installation and commissioning.
- d) Damage caused to parts & equipment by scale build up or system debris / contamination is not covered by this guarantee.
- e) The unit has been installed in accordance with the Installation and service instructions and all relevant codes of practice and regulations in force at the time of installation, and that all necessary controls and safety valves have been fitted correctly.
- f) Any valves and controls fitted are of LOTUS recommended type and specification.
- g) The unit has not been modified or tampered with in any way and has been regularly maintained as detailed in these instructions.
- h) The primary water circuit has been flushed and treated with a suitable inhibitor and is used only for domestic heating purposes.
- i) Within 60 days of installation the user completes and returns the guarantee

Registration card supplied with the unit in order to register the product.

Periodic loss of charge pressure from the expansion vessels is normal (indicated by an intermittent discharge of water from the expansion or primary pressure relief valves) and is not covered under the product guarantee.



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