
STREBEL

LUGANO



ATMOSPHERIC GAS BOILER INSTALLATION, OPERATING AND MAINTENANCE MANUAL

WARNING

The boiler block is composed of single sections temporarily and solely assembled by means of the four tie bars for transit. At time of installation the boiler block must be dismantled section by section after removing the four tie bars ensuring that the sections are supported so that they do not fall over. The sections must be assembled in the same order for the holes of the pilot assemblies to be in the correct position.

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LUGANO INSTALLATION INSTRUCTIONS

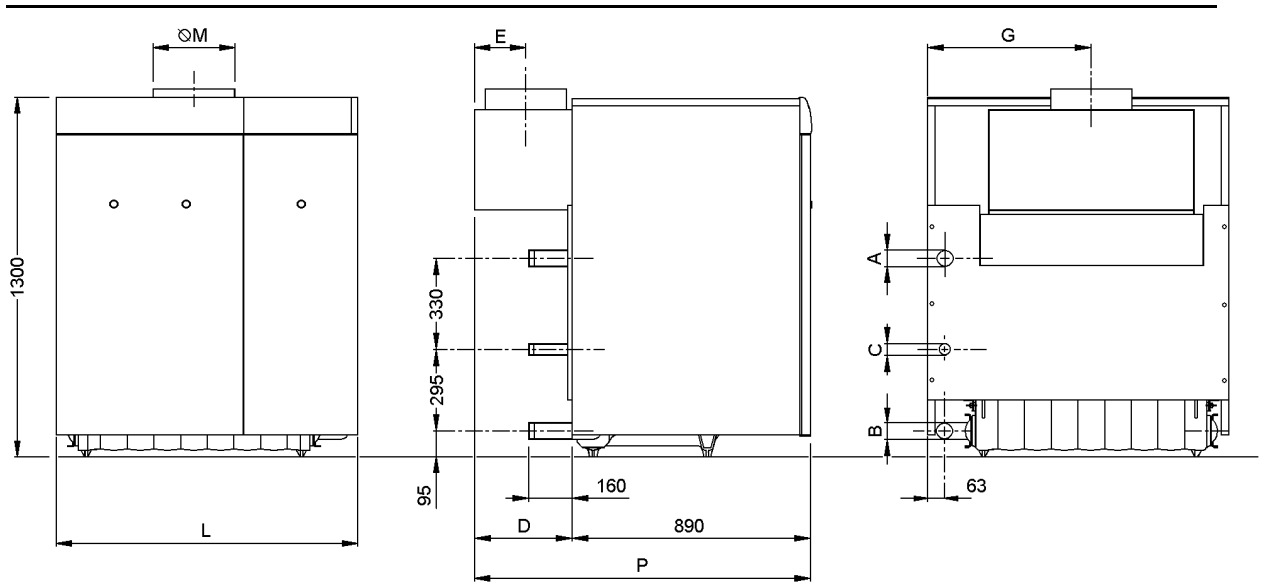
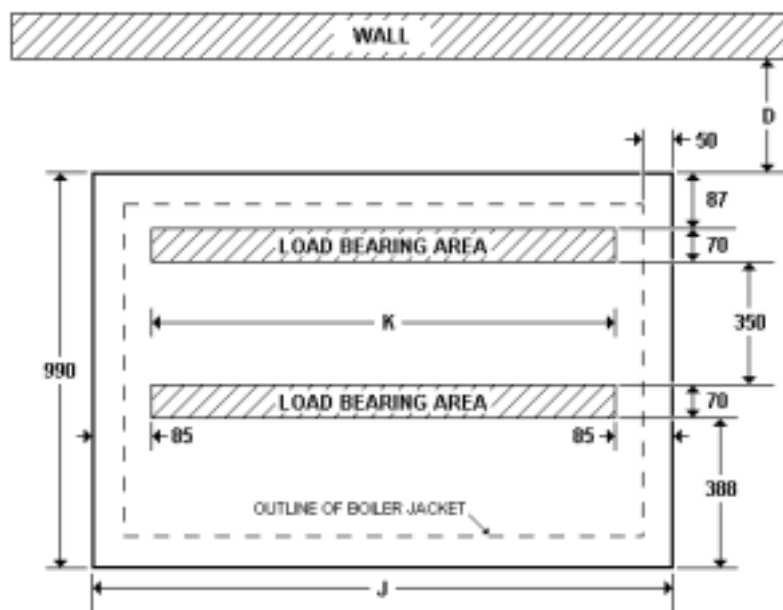


Diagram 1 – Lugano dimensions and connections

| TYPE | | L – 6 | L – 7 | L – 8 | L – 9 | L – 10 | L – 11 | L – 12 | L – 13 | L – 14 | L – 15 |
|---------------|--------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| L | mm | 925 | 925 | 1125 | 1125 | 1323 | 1323 | 1523 | 1523 | 1720 | 1720 |
| P | mm | 1200 | 1200 | 1250 | 1250 | 1250 | 1300 | 1300 | 1300 | 1300 | 1300 |
| D | mm | 310 | 310 | 360 | 360 | 360 | 410 | 410 | 410 | 410 | 410 |
| E | mm | 165 | 165 | 190 | 190 | 190 | 215 | 215 | 215 | 215 | 215 |
| G | mm | 462.5 | 512 | 562.5 | 612 | 661.5 | 711 | 761.5 | 811 | 860 | 910 |
| ØA Flow | inches | 2" | 2" | 2" | 2" | 2" | 2" | 2" | 2" | 2" | 2" |
| ØC Gas supply | inches | 1" | 1" | 1¼" | 1¼" | 1¼" | 1¼" | 1¼" | 1¼" | 1¼" | 1¼" |
| ØB Return | inches | 2" | 2" | 2" | 2" | 2" | 2" | 2" | 2" | 2" | 2" |
| ØM Flue size | mm | 250 | 250 | 300 | 300 | 300 | 350 | 350 | 350 | 350 | 350 |

LUGANO BOILER BASE DETAILS



| MODEL | J | K |
|--------|------|------|
| L – 6 | 1025 | 825 |
| L – 7 | 1025 | 825 |
| L – 8 | 1225 | 1025 |
| L – 9 | 1225 | 1025 |
| L – 10 | 1423 | 1223 |
| L – 11 | 1423 | 1223 |
| L – 12 | 1623 | 1423 |
| L – 13 | 1623 | 1423 |
| L – 14 | 1820 | 1620 |
| L – 15 | 1820 | 1620 |

ALL DIMENSIONS IN MM.

Diagram 2 – Lugano base details

LUGANO INSTALLATION INSTRUCTIONS

1.0 **GENERAL**

1.1 The Strebel Lugano is a cast iron sectional boiler with atmospheric burners and conventional flues

TECHNICAL DATA

| Type and No of Sections | | L-6 | L-7 | L-8 | L-9 | L-10 | L-11 | L-12 | L-13 | L-14 | L-15 |
|--------------------------------------|-------------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Nominal output | kW | 85 | 101 | 118 | 135 | 152 | 169 | 185 | 203 | 219 | 236 |
| Nominal input | kW | 94.4 | 112.2 | 131.1 | 150 | 168.8 | 187.5 | 205 | 225 | 243 | 262 |
| Maximum flow temperature | °C | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Minimum return temperature | °C | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Max. Working Pressure | bar | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Supply Pressure – Natural gas | mbar | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Burner Pressure – Natural gas | mbar | 11.6 | 12.0 | 11.4 | 12.0 | 12.6 | 11.5 | 12.0 | 12.5 | 12.5 | 12.8 |
| Burner injectors – Natural gas | mm | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 |
| Pilot injectors (x 2) – Natural gas | mm | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 |
| Gas consumption – Natural gas | M ³ /h | 9.995 | 11.879 | 13.880 | 15.88 | 17.871 | 19.851 | 21.704 | 23.821 | 25.726 | 27.73 |
| Water Resistance 10°C | mbar | 4.5 | 6.8 | 9.0 | 11.8 | 14.8 | 18.2 | 22.0 | 26.4 | 31.6 | 37.8 |
| Water content | Litres | 59 | 67.5 | 76.0 | 84.5 | 93.0 | 101.5 | 110 | 118.5 | 127 | 135.5 |
| Flue gas volume | G/s | 71 | 84 | 98 | 113 | 127 | 141 | 154 | 169 | 183 | 197 |
| Flue gas temperature | °C | 140 | 155 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| Electrical supply for unit | V/Hz | 230/50 | 230/50 | 230/50 | 230/5 | 230/50 | 230/50 | 230/50 | 230/50 | 230/50 | 230/5 |
| Wattage | W | | | | | | | | | | |
| Shipping weight | Kg | 453 | 509 | 564 | 622 | 678 | 733 | 789 | 844 | 900 | 955 |

2.0 **LOCATION**

2.1 The boiler must stand on a level non combustible base, which is capable of adequately supporting the weight of the boiler, water content an any ancillary equipment (See page 3).
The location chosen for the boiler must permit the provision of a satisfactory flue and termination. The boiler should be positioned to allow 50 mm between boilers and 500 mm at one end to allow access to pipework etc. There should also be 450 mm in front of the boiler for maintenance and the draught diverter should be at least 50 mm clear at the wall behind the boiler.

The location must also permit an adequate space for combustion and ventilation air purposes (see Section 3 on_Ventilation) and adequate space for servicing and air circulation around the boiler.

3.0 **VENTILATION**

3.1 It is important that there are sufficient areas of air inlet and ventilation provided to the boiler room detail recommendations for air supply are given in BS. 5440 part 2 & BS. 6644.

| VENTILATION DIRECT TO OUTSIDE AIR IN CM ² FOR THE LUGANO RANGE OF BOILERS | | | | | | | | | | |
|--|-----|-----|-----|-----|------|------|------|------|------|------|
| | L-6 | L-7 | L-8 | L-9 | L-10 | L-11 | L-12 | L-13 | L-14 | L-15 |
| HIGH LEVEL | 348 | 388 | 430 | 473 | 515 | 557 | 597 | 642 | 682 | 725 |
| LOW LEVEL | 695 | 775 | 860 | 945 | 1030 | 1114 | 1193 | 1283 | 1364 | 1449 |

3.3 **Mechanical Ventilation.**

The minimum quantity of air required for combustion and boiler house ventilation shall be supplied at a minimum flow rate in accordance with BS. 6644.

All air inlet and extract fans shall be fitted with automatic controls causing safety shut-down or lockout of the boiler(s) in the event of the inlet or extract air flow failing.

4.0 **GAS SUPPLY**

4.1 An existing meter should be checked preferably by the Gas Supplier, to ensure the meter is adequate to deal with the rate of gas required.

4.2 Pipework from the meter to the boiler must be of adequate size. Pipes of smaller size than the boiler inlet gas connection should not be used. All gas pipework should be fitted and on completion of installation tested, in accordance with BS. 6891 : IGE/UP/2 Gas Installation Pipework, Boosters and Compressors on Industrial and Commercial Premises.

4.3 Gas supply connections is as follows:

Lugano L-6 & L-7 = 1" BSP

Lugano L-8 to L-15= 1 1/4" BSP

4.4 A gas service cock must be fitted immediately adjacent to the boiler.

5.0 **FLUE SYSTEM**

5.1 Detail recommendations for flueing are given in B.G.C. Publications:- "Flues for commercial and Industrial Gas Fired Boilers and Air Heaters" 1M/11.

Reference should also be made to BS. 5440 Part 1 : BS. 6644 where applicable.

The following notes are intended to give general guidance.

5.2 The nominal flue size should not be less than that of the boiler flue connection, and must be at least equivalent to a vertical height above the boiler outlet of 1 M (3 ft 3 in), due allowance being made for any horizontal or inclined length, and consideration being given to the position of the outlet.

The boiler flue hood is not load bearing and the flue must be supported independently. The flue should be easily disconnected for servicing.

6.0 **WATER CIRCULATION SYSTEM**

6.1 Flow and return connections are from the back of the boiler with BSP connections.

6.2 In combined heating and hot water systems the hot water storage vessel must be of the indirect cylinder or calorifier type.

6.3 The boiler maximum working pressure is 4 Bar (58 Psi) .

6.5 **Hydraulic Resistance and Flow Rates**

The differential temperatures across the flow and return water connections to the boiler is recommended as 10°C temperature difference (Max. temperature difference 20°C).

Water flow rates and water pressure drops across the boilers are detailed on Table 1.

6.6 If three-way mixing or diverting valves are installed in the systems they should not be of such a type that the flow through the boiler is totally closed. If such valves are used, a by-pass should be fitted.

7.0 INSTALLATION

7.1 The boilers are delivered in a block composed of single sections temporarily and solely assembled by means of the four tie bars for transit. At time of installation the boiler block must be dismantled section by section after removing the four tie bars ensuring that the sections are supported so that they do not fall over. Accompanying this is a wooden crate containing the flue hood, instrument control panel, burner assembly, control line assembly nipples and all parts for the erection of the boiler body. There are also separate packages containing the boiler jackets and insulation.

7.2 Boiler Base

The boiler should be erected on a level foundation of brick or concrete, capable of supporting the weight of the boiler filled with water (See Page 3). Any discrepancies on the base should be corrected with shims

7.3 Water connections

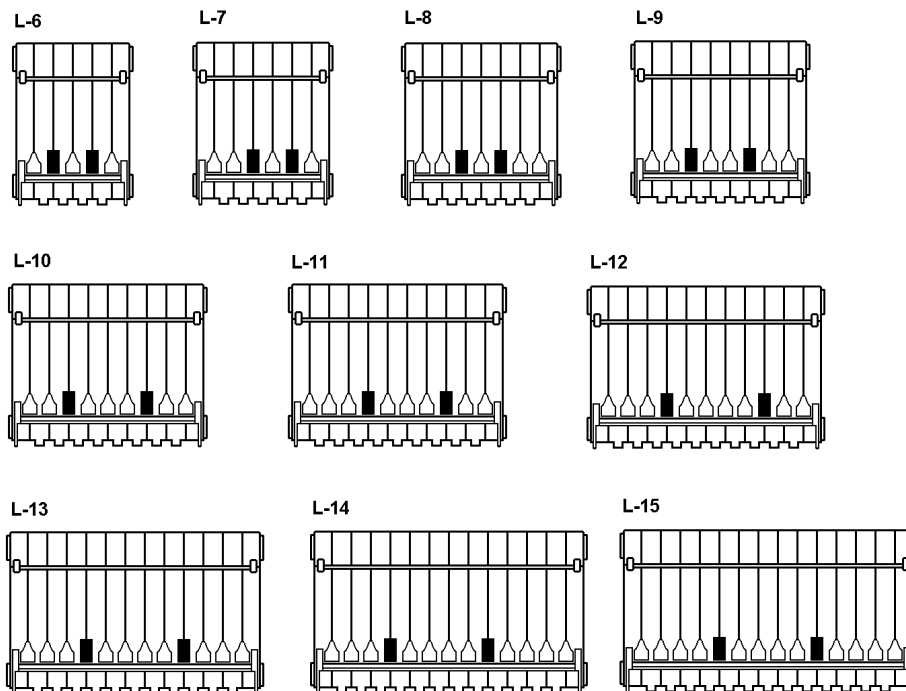
Flow and Return connections are screwed in 2" B.S.P, and are located on the right hand side of the boiler. Manifolds are then connected to these to bring the flow and return connections out the back of the boiler.

7.4 Tools and equipment

Standard heating engineers tools, metric spanners, wire brush, steel wool, emery cloth, linseed oil, pipe jointing (I.e. Boss White or equivalent), cleaning rags, putty knife, bolster, level bar, small paint brush, 2 x 30mm AF ring spanners, lubricating oil for threads and nuts.

7.5 Section Assembly

Attention: Pay particular attention to the assembling order of the sections in order for the holes for the pilot flame electrodes to be the correct position (See diagram 3)The sections must only be pulled together using the pulling up tool provided, inserted through the nipple holes



7.6 The boiler is erected using Diagram 3 – Boiler block assemblies (Areas in black are the pilot assembly holes) boiler using

- 7.7 Stand the right hand boiler section. Clean nipple holes and two nipples and coat with boiled linseed oil. Insert nipples ensuring that they are fitted squarely. Using a flat piece of wood and a mallet lightly tap in the nipples until they are secure.
- 7.8 Select an intermediate section (refer to page 6, diagram 3). Clean the nipple holes and apply boiler mastic in the groove of the right hand boiler section. Position the intermediate section on the nipples in the right hand section, taking care that the nipples remain correctly positioned.
- 7.9 Insert a pulling up rod through each nipple hole .Oil the threads and nuts to ensure they run easily. Fit a steel flange on each rod, each side of the sections (one flange is slotted for easy removal). Lock the threaded flange with an M20 nut. Locate the pulling up flanges centrally into the nipple ports, then run the other washer and M20 nut up the rod taking up the slack. (See diagram 4)

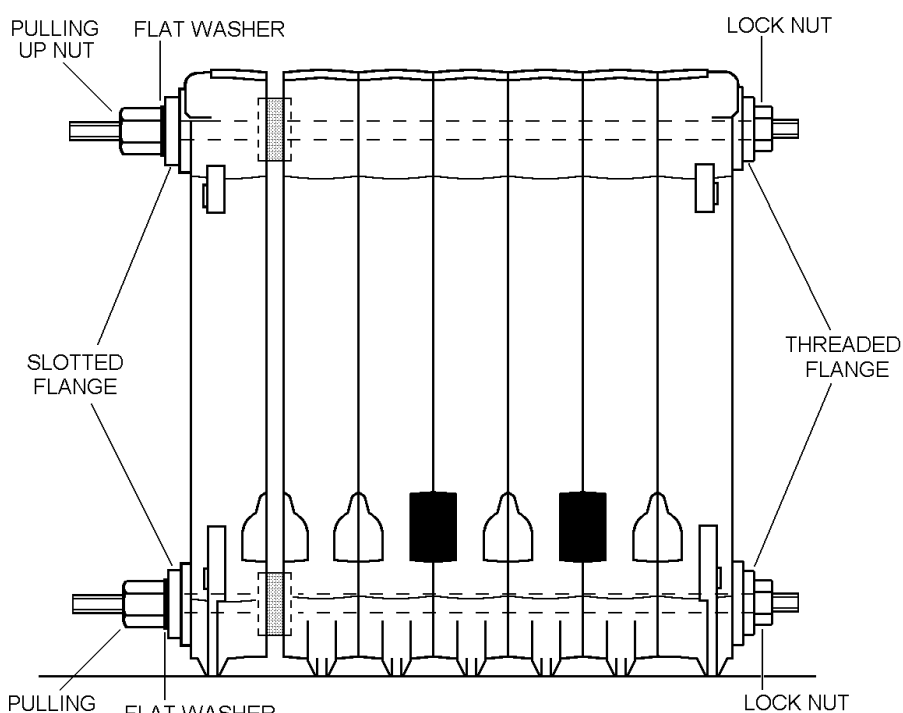


Diagram 4 – Section assembly

Tighten the nut on each rod evenly until the sections are pulled together as close as possible. The sealing exuding from the joint will indicate if the sections are pulled up evenly. When correctly assembled only a thin line of sealant should remain visible in the joint.

- 7.11 After assembling the first middle section to the end section, clean and oil the nipple holes, insert two nipples into the assembled intermediate section, place sealing mastic in position and locate the next intermediate section onto the nipples. Hold the section into position and insert the pulling up rods. Run the nuts taking up the slack and repeat as 7.10.
- 7.12 Repeat the operation until all the sections are assembled. (All screwed connections should be made using a suitable jointing compound).
- 7.14 **Fitting of the flue hood**
Place the flue hood in position on top of the boiler, making sure there is a good seal between the flue hood and the boiler. Using the nuts, bolts and washers provided, secure the draught diverter to the boiler block (See diagram 5)

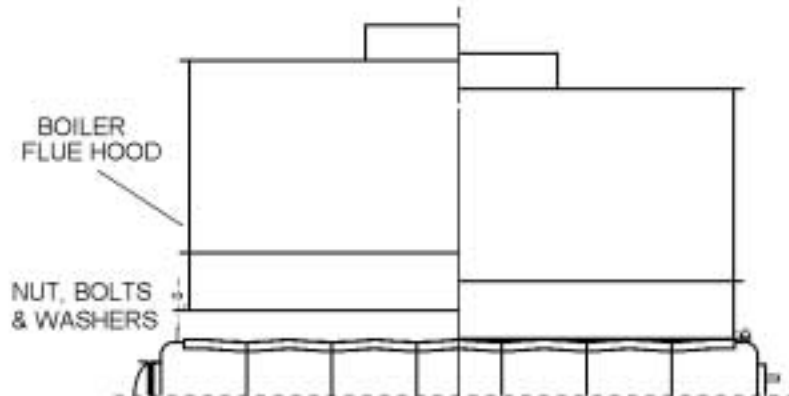


Diagram 5 – Attaching the flue hood

7.15 Fitting jacket supports

Fix the lower and upper, RH & LH jacket supports to the boiler body using the nuts, bolts and washers provided, ensuring that the jacket fixing studs are pointing upwards. (See diagram 6)

7.16 Pressure testing

The boiler block should now be pressure tested to ensure that the sections are sound. Fit two blank flanges and joint rings to the LH side of the boiler block. Then temporarily blank off the 2" flow and return connections on the RH side of the boiler (when viewed from the front). The test should be to 1.5 times the working pressure (The boiler is designed to have a maximum working pressure of 4 bar) and should not exceed 6 bar.

7.17 Fitting the flow and return manifolds

Place a joint ring over the boiler injector pipe (NOTE: L6 & L7 boilers do not have an injector pipe) and insert it into the return water connection. Place another joint ring on the flange of the injector pipe and secure the short return manifold to the boiler block using the nuts, washers and bolts provided. Attach the long flow manifold in the same way using the nuts, washers and bolts provided. (See diagram 6)

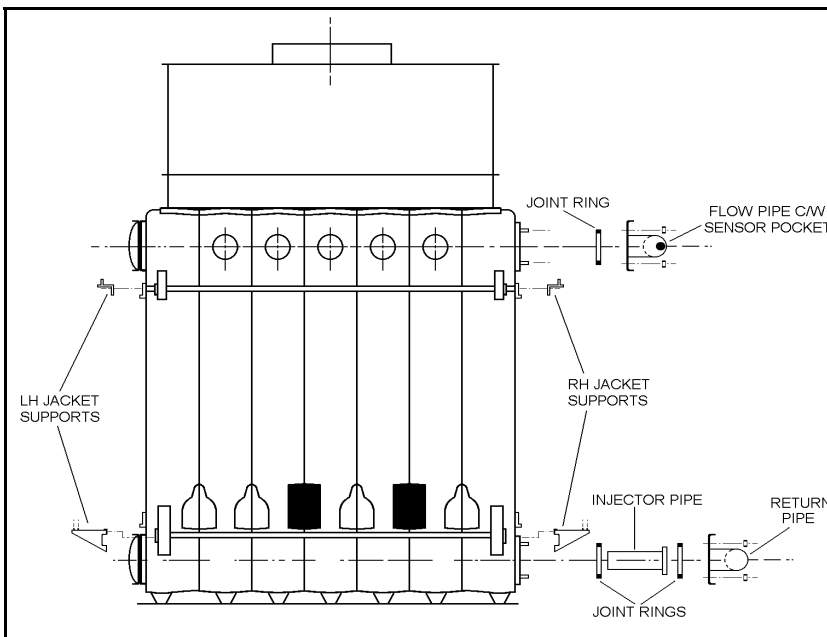


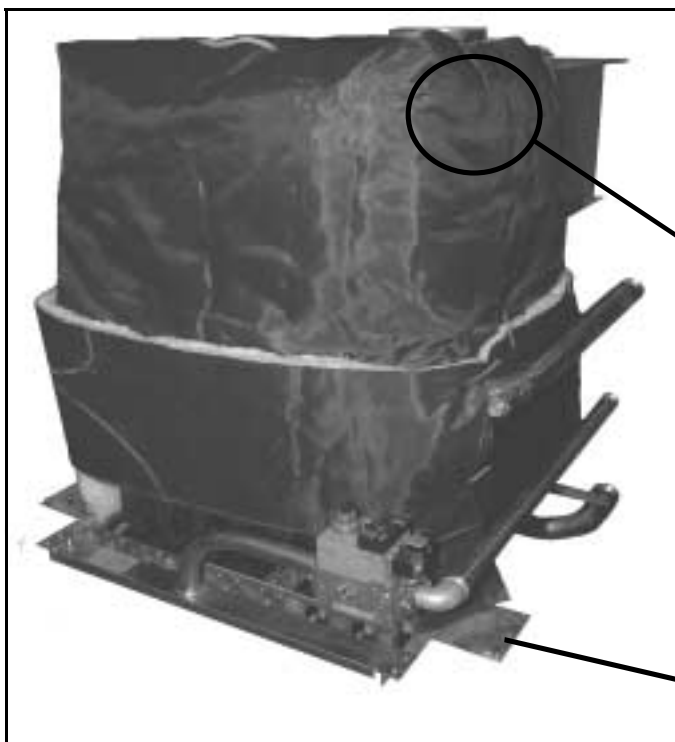
Diagram 6 – Attaching jacket supports and flow and return manifolds

7.18 Fitting The Boiler Insulation

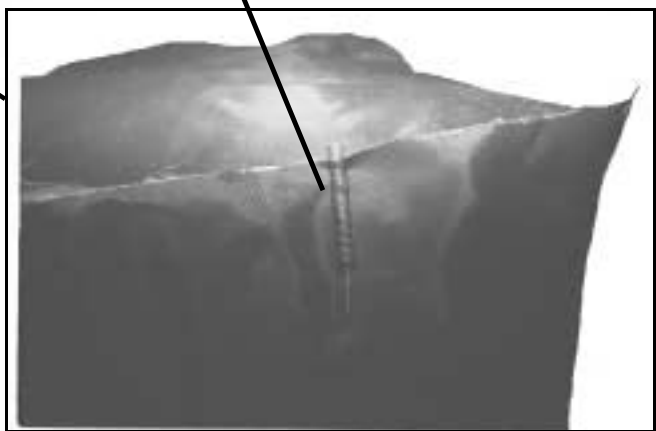
Lay the first section of mineral wool insulation over the front of the flue hood so that it covers the top and sides. The second section of mineral wool insulation should be fitted around the boiler block. Start at the front RH corner, covering the RH side, then across the back of the boiler, onto the LH side of the boiler and finally across the front of the boiler .

There is a cut-out in the insulation for burner bar access which must be at the front. The insulation should also sit on the lower RH & LH jacket supports. The insulation should be cut with a suitable knife to allow it to pass over the upper RH & LH jacket supports.

The insulation should be pulled tightly around the boiler block and secured with the spring clips provided. The flue hood insulation should then be pulled down and clipped to the boiler block insulation. The insulation should also be clipped at the front corners of the flue hood. The boiler block and flue hood should now be completely covered without any gaps in the insulation.



Boiler insulation and spring clips provided (inset).



Jacket supports

7.19 Fitting Inner Front Panel

Secure the inner front panel to the boiler block by locating it over the front studs of the jacket supports and securing it with nuts, bolts and washers provided.

7.20 Fitting the Burner Assembly

Carefully lift the burner assembly into the boiler block, ensuring that the gas control valve is on the right hand side. The burner bars and pilot assemblies should correspond with the access holes in the boiler block. Each burner bar has a stud which should be located in the holes at the back of the boiler block. Fix the burner manifold to the lower jacket supports using the nuts, bolts and washers provided. Finally fit the gas inlet pipe to the gas inlet connection.

7.21 Control Panel Housing

The control panel housing should be fitted to the inner front jacket using the self tapping screws. There is also a support bracket for the control panel housing which should be screwed to the flue hood. (The boiler insulation will require cutting to allow the support bracket to fix to the flue hood)

7.22 Fitting the RH & LH jacket panels and Rear Panel

Locate the RH & LH jacket panels over the mounting studs on the jacket support brackets and fix with the nuts and washers provided. The control panel support may now be fixed to the side jackets using self tapping screws. The rear panel should be fitted over the flow, gas and return pipes and fixed to the side jackets using self tapping screws.

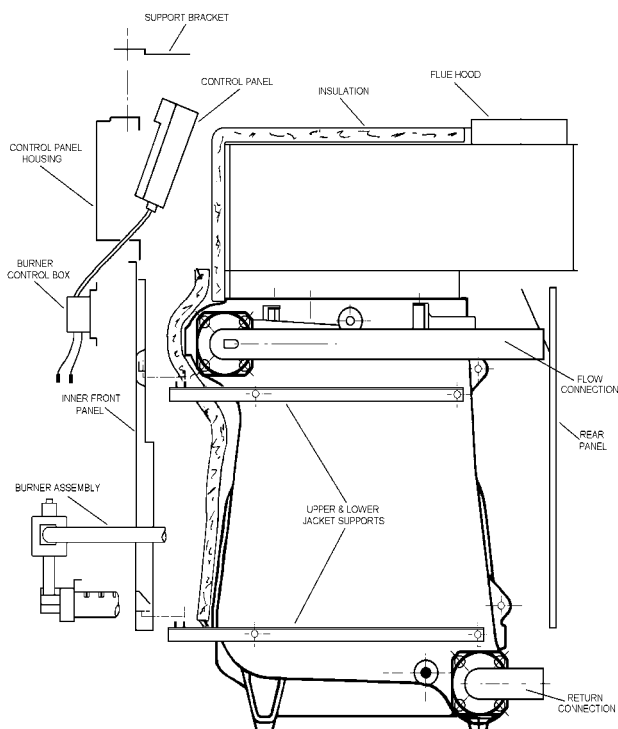


7.23 Fitting the Boiler Instrument Control Panel

Place the control panel behind the control panel housing and pass all the cables, capillaries and burner control box through the cut out in the bottom of the housing. The control panel can now be fixed into position using the self tapping screws. Fix the burner control box to the inner front panel. Connect the relevant cables to the gas valve ignition electrodes and detection electrodes. L6 – L7 connect gas pressure switch cables to terminal spades 2 and 3. (L8 – L15) The gas valve connector is fed from JP3 of the control box. The other connector is to be connected to the gas pressure switch.

ATTENTION: The earth connection from the control panel should be fixed to the earth post below the control panel housing. Firstly place a washer over the earth post screw, then place the earth terminal on top of this, then another washer and finally a securing nut.

Fit the four thermostat and thermometer sensor bulbs into the sensor pocket in the flow connection. The sensor bulbs should be fully inserted in the pocket and secured with the clip.



7.24 Fitting the Control Panel Fascia

Using the self tapping screws fix the LH fascia to the control panel housing. Place the hinge pins in the RH fascia (with the STREBEL logo) into the holes in the LH fascia and the holes in short RH end piece. Now fix the short RH end piece to the RH side panel. Lift the RH fascia (with the STREBEL logo) to reveal the boiler control panel.

7.25 Fitting the Front and Top Panels

Fix the front bottom rail to the side panels with the screws provided. Place the left hand front panel (with the two black locking discs) onto the bottom rail studs. Use a coin or broad screwdriver to turn the locking discs and lock the panel into position. Hang the right hand front panel by locating it on the bottom hinge pin and screwing the hinge plate to the RH panel. The door should now open and close to reveal the gas valve, burner control box and lower part of instrument panel. The door may be locked shut by using a coin or broad screwdriver to turn the locking discs. Lay the top panel across the top of the boiler, locating it on the four pegs (2 each side) and pushing down gently. The boiler assembly is now complete.

8.0 CONNECTION

8.1 Flue Connection

The boiler flue outlet is sized to accept heavy gauge flue pipe. The height above the flue must be equivalent to a vertical height of at least 1m (3ft in) above the boiler outlet, due allowance being made for any horizontal or inclined length, and consideration given to the termination. The flue outlet should be sealed to the boiler using a suitable sealing compound. The boiler flue outlet is not load bearing and the flue pipe should be supported independently. The flue should be easily disconnected for servicing.

8.2 Electrical Connections

The mains electrical supply should be taken from a switch fuse (fused at 5 amps) and connected to the terminals L, N and Earth in the boiler junction box. The junction box must be effectively earthed and all wiring must be installed in accordance with I.E.E regulations. Incoming cables should be suitable for a service temperature of 70°C and not less than 0.75 mm cross sectional area

8.3 Gas Connection

The size of the gas supply must be at least equal to the connection size of the gas control line of the boiler, and due consideration should be made to the length of pipe run from the meter and the gas consumption of the boiler in determining the size. To facilitate removal and replacement of the burner assembly, the final connection between the boiler inlet connection and the supply should be made after the burner assembly and gas control line are positioned. All dirt, swarf etc. should be removed from the gas supply lines before the final connection is made. The gas line should be purged of air, and tested for soundness.

9.0 COMMISSIONING AND TESTING

Before commencing to commission the boiler, check the following:-

9.1 Electrical

Electrical supply is switched off.
All electrical connections are sound and correctly made.
Electrical system is correctly earthed.

9.2 Gas Supply

Gas supply is purged of air, and tested for soundness as described in BS. 6891.
Gas Installation Pipework, Boosters and Compressors on Industrial and Commercial Premises.
All appliance gas cocks are turned off.
Gas supply is on at meter.

9.3 Water

Boiler and system have been flushed through and are filled, and circulating pumps operational.
Flow and return valves are open.

9.4 To Test Soundness of Safety Shut-Off Valve

- 1 Ensure that the main gas cock and electricity supply are turned OFF.
- 2 Remove plug from pressure test point on inlet side of the safety shut off-valve and connect pressure gauge.
- 3 Turn ON main gas cock to pressurise the system up to the seat of the safety shut-off valve.
- 4 Turn OFF main gas cock, leave for two minutes checking for any drop in pressure on the gauge. If any pressure loss is observed, re-pressurise by opening and closing the main gas cock, and test the assembly for leaks using a leak detector solution.
- 5 If no external leaks are detected and loss of pressure occurs, this is the result of a let-by at the safety shut-off valve.

9.5 To Light The Boiler

9.5.1 Fully Automatic Models

1. Connect pressure gauge to burner pressure test point.
2. Switch on mains electrical supply.
3. Turn ON main gas cock.
4. Depress reset button on limit thermostat to ensure that it is "made".
5. Set control thermostat to required temperature and push button "I" (on control panel) to the ON position
6. After switching on, ignition spark should appear, followed by ignition of the main burner at pilot setting. If flame is not established control box will lock out in approximately 5 seconds. This may occur in initial start due to air in the gas line. The control box may be reset after a delay of approximately 15 seconds by pressing the red button on the control panel, the red light should go out.

- 1 When pilot flame is satisfactory the gas valve will open to main flame.
- 2 Check main burner pressure (as per TABLE 1). Adjust burner pressure on gas control if necessary. Burner pressure should be rechecked after about 30 minutes of operation and adjusted if necessary.
- 3 Switch Off electrical supply with button "I" (on control panel). Check that main burners are extinguished. Remove pressure gauge and replace plug in test point.

9.6 **All Models**

After lighting the boiler as described above, the operation of the thermostat should be checked. All gas lines should be re-checked for soundness, using a leak detector solution. The gas rate should be checked at the meter, but unless this differs significantly from the rated heat input quoted in TABLE 1, the setting pressure given should be maintained.

10.0 **SERVICING**

Before servicing the boiler, switch off electricity supply and then turn off main gas cock.

10.1 **To Clean Boiler**

- 1 Remove jacket front panel.
- 2 Disconnect pilot line. Fully Automatic Models: Disconnect leads for ignition and probe electrodes
- 3 Remove nuts retaining burner door and assembly.
- 4 Withdraw burner assembly from boiler.
- 5 Remove jacket top panel and insulation.
- 6 Remove the access plate from the top of flue hood.
- 7 Clean burner
- 8 Clean boiler flueways from the top with flue brush. After cleaning, sweep all debris from under the boiler.
- 9 Check ignition and probe electrodes (fully automatic models) for correct alignment.
- 10 Re-assembly is a reversal of the above procedure

10.2 **To Clean Burners**

- 1 Remove burner assembly from boiler
- 2 Release screws holding burners.
- 3 Lift burners at rear and withdraw off injectors.
- 4 Brush out inside of burners and clean off outside surfaces.
- 5 Inspect injectors and sealing washers on manifold. Replace if necessary.
- 6 Re-assembly is reversal of the above procedure.
- 7 Check electrical connections to electrodes, and electrodes for correct alignment.

10.3 **Test Soundness of Safety Shut-Off Valve**

Proceed as detailed in 9.4

10.4 Re-commission boiler as described in Section 9.5.1

11.0 **FAULT FINDING**

1. Boilers does not attempt to light. Control box does not lock out
 - (a) No electrical supply to boiler, time switch and other external controls.
 - (b) Limit thermostat tripped.
 - (c) Control thermostat set to low.
 - (d) Control fuse blown.
 - (e) Faulty thermostat connections.
 - (f) Faulty control box.

2. Ignition sparks. Pilot stage does not light and control box locks out.
 - (a) Gas supply turned off at meter.
 - (b) Air in gas supply line.
 - (c) Solenoid valve or connections.
 - (d) Lead not plugged into junction box.

3. No ignition spark. Control box lock out.
 - (a) H.T. lead disconnected or faulty.
 - (b) Ignition electrode incorrectly set. Distance between ignition and ground electrode should be about 3 mm.
 - (c) Faulty electrode.
 - (d) Faulty igniter or connections.
 - (e) Faulty control box.

4. Pilot stage lights, Control box locks out.
 - (a) Probe lead not connected to electrode.
 - (b) Earth lead to burner not connected.
 - (c) Loose connections on probe lead or earth lead in junction box, control panel or plugs and sockets.
 - (d) Faulty Control box.
 - (e) No earth connection on incoming supply.

Note: The probe circuit may be tested with a micro ammeter connected in the probe lead. A reading of at least 10 micro-amps should be recorded when the burner is alight.

5. Pilot stage lights. Main burners do not light. Control box does not lock out.
 - (a) Faulty connections to main valve.
 - (b) Faulty main gas valve.
 - (c) Faulty control box.

6. Noisy burner ignition
 - (a) Improper distance between electrode and burner.
 - (b) Faulty electrical connection of the electrode.
 - (c) Low gas pressure at the burner.

11.2 All Models

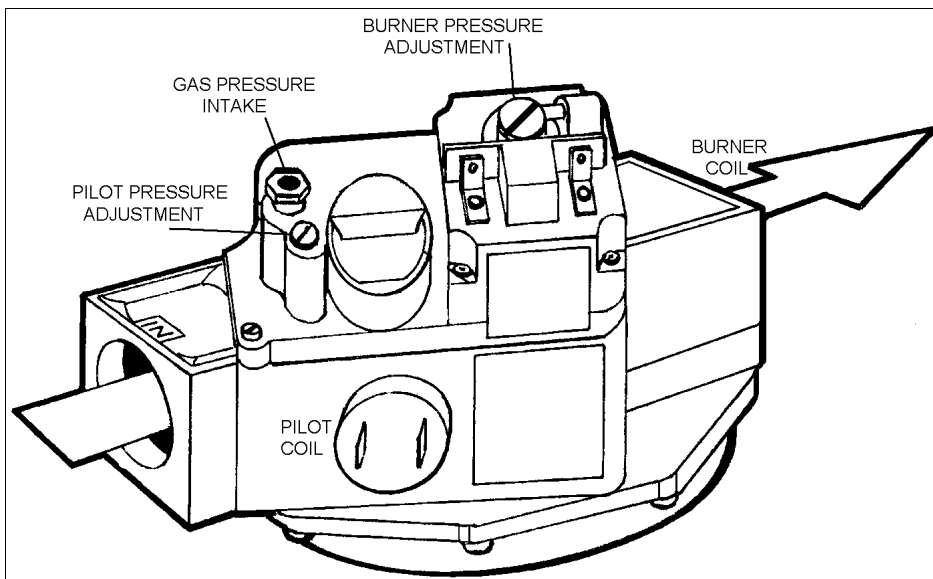
1. Presence of flue gases in the room.
 - (a) Flue size inadequate.
 - (b) Restriction in the flue.

 2. Presence of un-burnt fuel in the room.
 - (a) Boiler needs cleaning.
 - (b) Insufficient room ventilation.

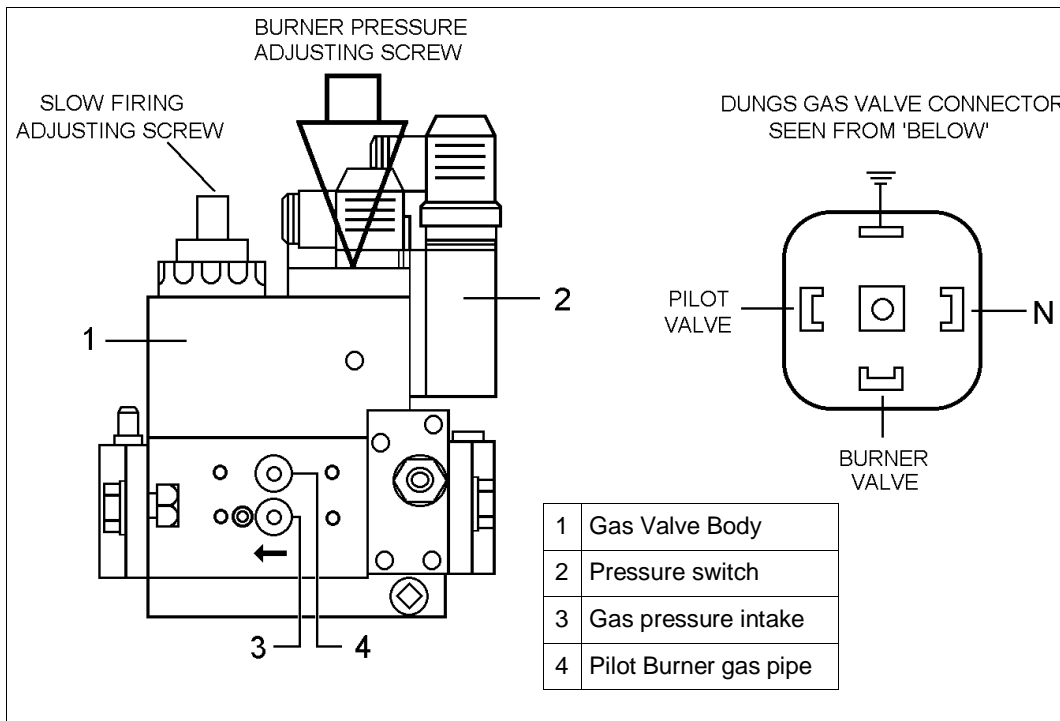
 3. Early soot formation in the boiler.
 - (a) Excessive consumption.
 - (b) Insufficient air supply.

 4. Condensation
 - (a) Insufficient boiler output
 - (b) Boiler control thermostat setting to low.
 - (c) Main burner pressure to low.
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12.0 GAS VALVE ADJUSTMENT



Robertshaw Gas Valve
Lugano L-6 & L-7



Dungs Gas Valve
Lugano L-8 to L-15

WIRING DIAGRAMS

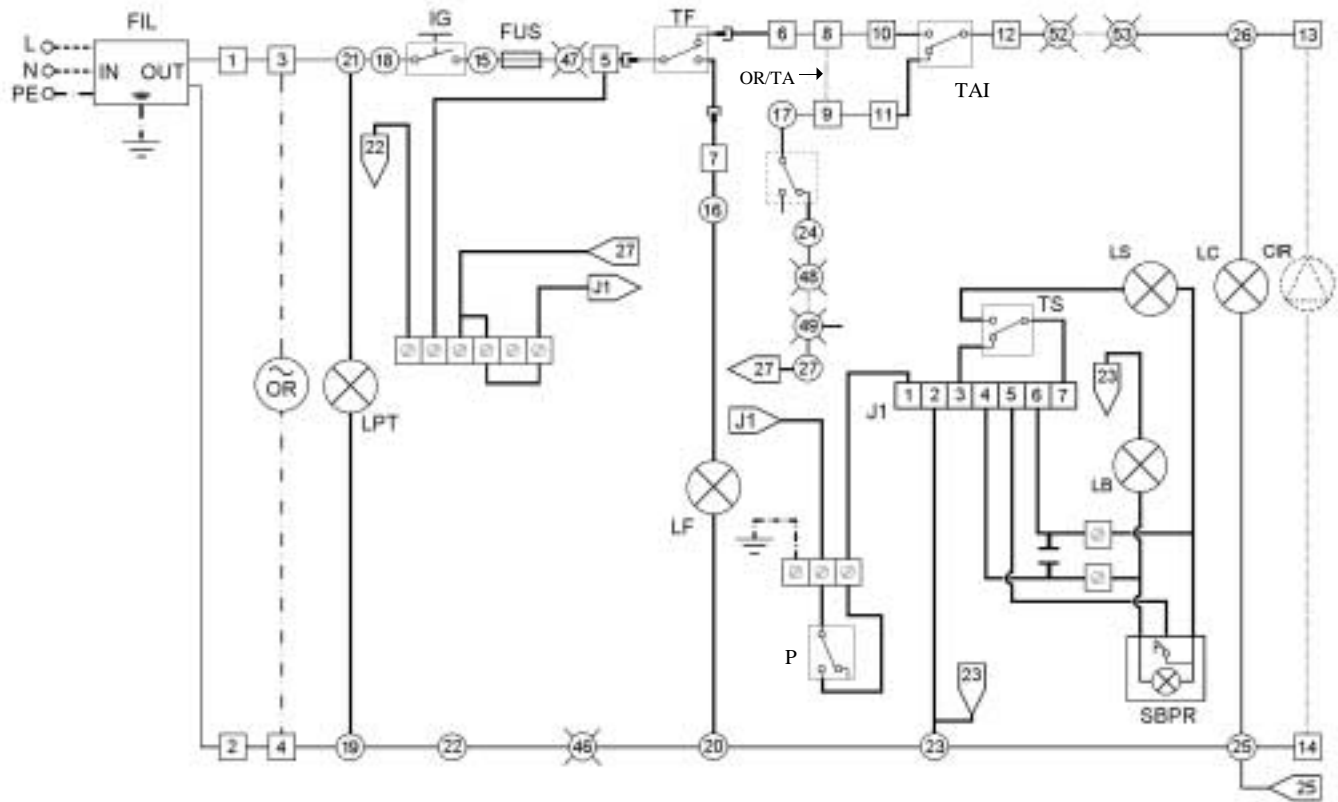
Section 13

Lugano L-6 & L-7 Wiring Diagram

ELECTRICAL SUPPLY

The electrical supply should be 230V , 50 Hz, and fused at 10 Amps. A suitable independent switch fuse should be installed for each boiler, adjacent to the boiler.

| | |
|---------|--|
| FIL | Noise Suppressor |
| FUS | Fuse (4 Amp) |
| IG | Boiler On/Off Switch |
| J1 - J8 | Control Box Connections |
| LB | Burner Lock-out Lamp |
| LBP | Boiler Lockout Lamp & Reset Button |
| LF | Flue Spillage Lamp |
| LPT | Mains Power Indicator Lamp |
| LS | High Limit Lock Out Lamp |
| OR | External Time Clock Connections |
| P | Low Gas Pressure Switch (L6 & L7) |
| SBPR | Burner Lockout LED & Reset Button |
| TA | Room Thermostat - On/Off Control Connections |
| TAI | Thermal Pump Overrun Thermostat (Not supplied) |
| TF | Flue Spillage Thermostat Reset Button |
| TR | Boiler Control Thermostat |
| TS | High Limit Thermostat |
| VG | Main Gas Valve Solenoid |
| VP | Safety Gas Valve Solenoid |
| CIR | Heating circulation pump connections |
| LC | Heating circulation pump "ON" Lamp |



Terminals 8 and 9 are boiler control circuit

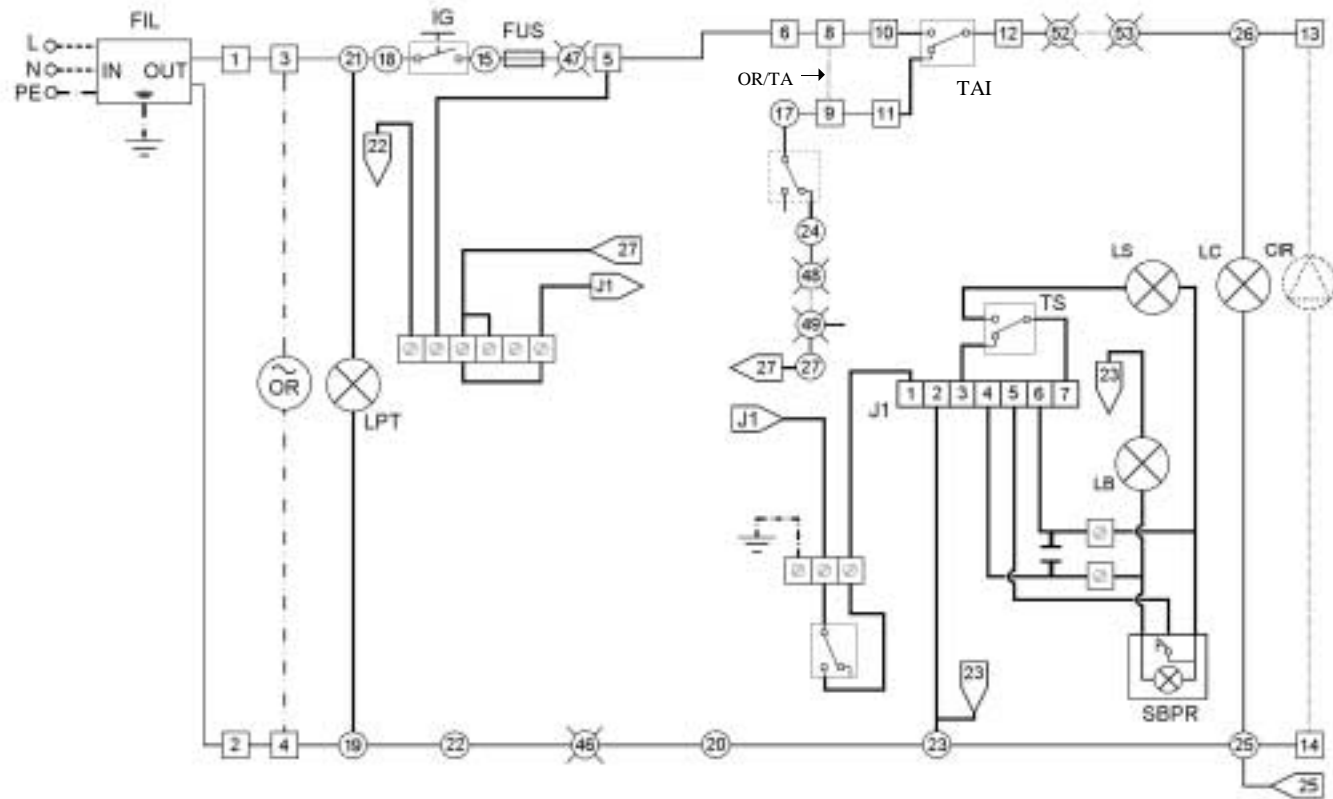
Section 14

Lugano L-8 to L-15 Wiring Diagram

ELECTRICAL SUPPLY

The electrical supply should be 230V , 50 Hz, and fused at 10 Amps. A suitable independent switch fuse should be installed for each boiler, adjacent to the boiler.

| | |
|---------|--|
| FIL | Noise Suppressor |
| FUS | Fuse (4 Amp) |
| IG | Boiler On/Off Switch |
| J1 - J8 | Control Box Connections |
| LB | Burner Lock-out Lamp |
| LBP | Boiler Lockout Lamp & Reset Button |
| LF | Flue Spillage Lamp |
| LPT | Mains Power Indicator Lamp |
| LS | High Limit Lock Out Lamp |
| OR | External Time Clock Connections |
| P | Low Gas Pressure Switch (L6 & L7) |
| SBPR | Burner Lockout LED & Reset Button |
| TA | Room Thermostat - On/Off Control Connections |
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| VG | Main Gas Valve Solenoid |
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| CIR | Heating circulation pump connections |
| LC | Heating circulation pump "ON" Lamp |



Terminals 8 and 9 are boiler control circuit

15.0 USERS OPERATING AND MAINTENANCE INSTRUCTIONS

To light the Boiler

- 1 Check that the boiler gas supply valves are turned ON and that the gas supply is ON at the meter.
- 2 Set the thermostat to the required temperature.
- 3 Switch on the electricity supply.
- 4 Pilot burner will light followed by main burners.
- 5 If red lock out light shows on control panel (No1), reset by pressing red light (No11) after approximately one minute, then the red light will go out and boiler will restart.

If the boiler malfunctions repeatedly contact a competent boiler servicing engineer

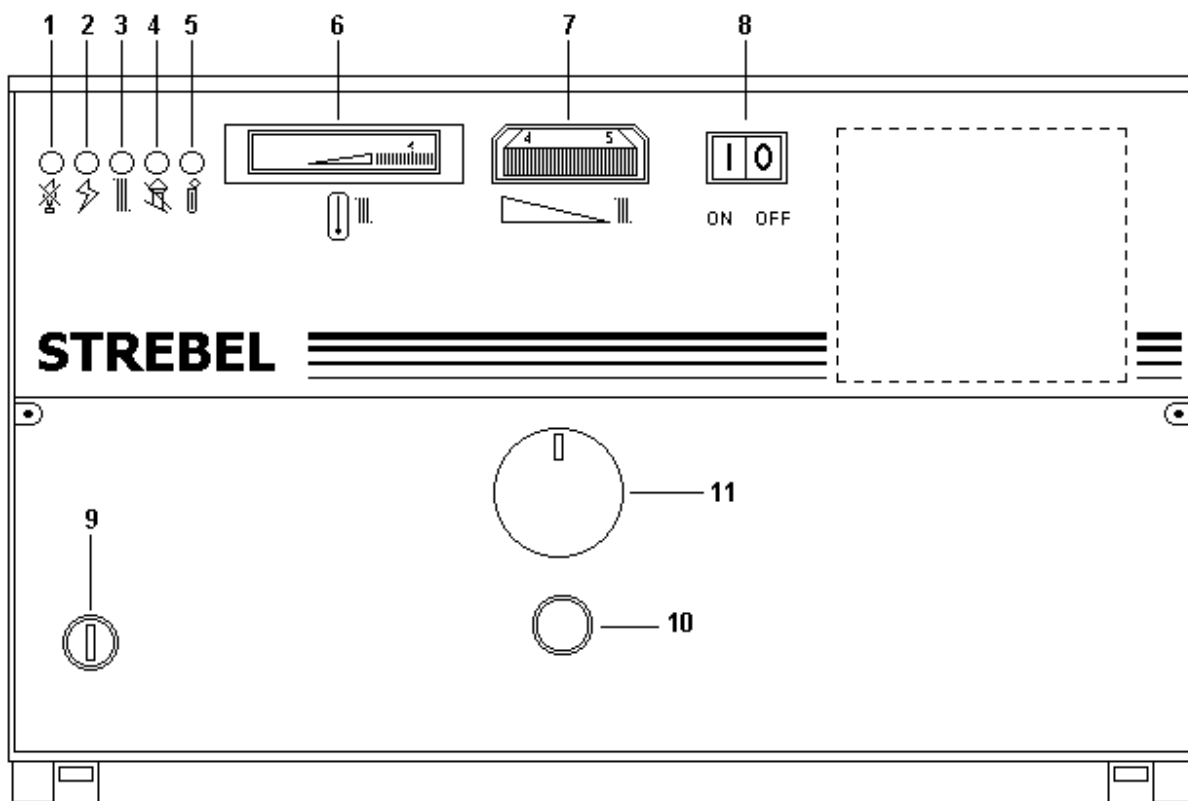
To shut down Boiler.

1. Switch OFF electricity supply
2. If shutting down for an extended period, also turn OFF the gas supply isolating valve.

Maintenance

We recommend that the boiler is serviced at least annually by a competent boiler servicing engineer

Control Panel Layout



| | |
|--------------------------------|--|
| 1. Burner Lockout Lamp | 7. Boiler Control Thermostat |
| 2. Run Lamp | 8. On / Off Switch |
| 3. Heating Pump Lamp | *9. High Temperature Limit Thermostat Reset* |
| 4. Flue spillage Lamp | *10. Burner Lockout LED & Reset Button * |
| 5. High Temperature Limit Lamp | 11. |
| 6. Boiler Thermometer | * Remove cover and press button |

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