

Installation & Servicing Manual

MYSON

Velaire Pressure Jet Oil Fired Boilers 40/50, 50/70, 70/90

Manufactured by:
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A **MYSON** Company

Please keep near the Boiler

OIL

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USERS' OPERATING INSTRUCTIONS

WARNING: Do not attempt any cleaning or maintenance without first switching OFF the electricity and oil supply.

FUELS

It is recommended that your boiler is fired using

1. Commercial Grade KEROSENE with a viscosity of 28 seconds Redwood No.1 at 100°F.

It will however perform satisfactorily using

2. GAS Oil with a viscosity of 35 seconds Redwood No.1 at 100°F.

When operating the model 40/50 on gas oil the Riello burner may be equipped with a nozzle pre-heater for improved performance.

Please refer to the data label which will indicate for which fuel the installer has adjusted the burner.

This information should be passed on to your oil distributor when ordering fuel, to ensure that the correct grade is supplied.

Boilers fitted with a low level flue discharge must only be fired on Kerosene.

OPERATION OF THE BURNER

The burner is completely automatic and is controlled either by a boiler or room thermostat. It starts when the water or air temperature falls below that set on the thermostat and stops as soon as the desired temperature is reached.

Ancillary controls, i.e., room and cylinder thermostats should be installed to give additional economic operation.

BEFORE STARTING UP

- a) Make sure that there is fuel in the tank.
- b) See that the stop valves in the fuel supply line are open.
- c) Set the boiler thermostat knob to the 'OFF' position. Switch on the electricity supply to the boiler.

- d) If fitted, see that the programmer is set to the required programme. Ensure that the time switch is set to turn the burner ON and OFF at the required times and is set to the correct time of day, and that it is working.
- e) If the system is controlled externally by a room thermostat and/or hot water cylinder thermostat, set boiler thermostat to just below the maximum setting, i.e., about 4/5 of the way along the red indicator.

HOW TO STOP THE BURNER FOR SHORT PERIODS

Turn boiler thermostat to the 'OFF' position or, if fitted, set the programmer switch to position 'OFF'.

WHAT TO DO IF THE BURNER DOES NOT START

- 1) Wait 3 minutes for the boiler to clear itself of unburnt vapour, then reset control by pressing the lockout re-set button.
- 2) If the burner fails to start after re-setting 'ONCE', see that there is oil in the tank and that the stop valves in the fuel supply line are fully open.
- 3) Check that the programmer and/or time switch (if fitted) are working and are set to the required programme and correct time of day.
- 4) See that the thermostats are set to the desired temperature and are calling for heat.
- 5) Make sure that a fuse has not blown or that there is not a failure in the electricity supply.
- 6) Check that the high limit stat has not operated (see below).

AFTER CHECKING ITEMS 2 to 5 TRY ONCE MORE, AND IF IT STILL FAILS TO LIGHT TURN OFF THE MAIN SWITCH AND CONSULT YOUR MAINTENANCE ENGINEER.

HIGH LIMIT THERMOSTATS

On every Myson oil fired boiler a high limit thermostat is provided to protect the boiler and heating system in the unlikely event of a control malfunction.

This is a manual re-set type and its location on the boiler is on top of the control panel beneath the top cover indicated by a label. If this thermostat has operated the boiler will not operate until the small black (or green) plunger has been pressed in.

If this condition occurs notify your service agent. With this type of over heat thermostat the mains on light is unaffected and glows as long as there is electricity to the actual boiler.

SUGESSTION TO PREVENT OPERATION PROBLEMS:

THE FUEL TANK

Do not allow the level of the oil to fall to the bottom of the tank as sludge might be sucked into the fuel pipe. If possible, switch off the burner before any fresh supply of oil is delivered and start it again about one hour later to give any dirt in the tank a chance to settle.

THE AIR DAMPER ON THE BURNER

Please do not alter the setting of the air damper after the engineer has adjusted it (altering it could impair the efficiency of the boiler).

IF YOU SHUT DOWN THE BOILER FOR SUMMER:

- a) Switch off the electricity supply to the boiler.
- b) Close all stop valves in the fuel supply pipe.
- c) Clean flue and chimney.
- d) Clean boiler internal surfaces.

MAINTENANCE

It is most important that the boiler and burner are correctly serviced to ensure trouble free heating; this is best carried out by entering into a Service Contract with the Installer or Fuel Distributor.

For complete details consult the Installation & Servicing Manual, Section G. headed MAINTENANCE.

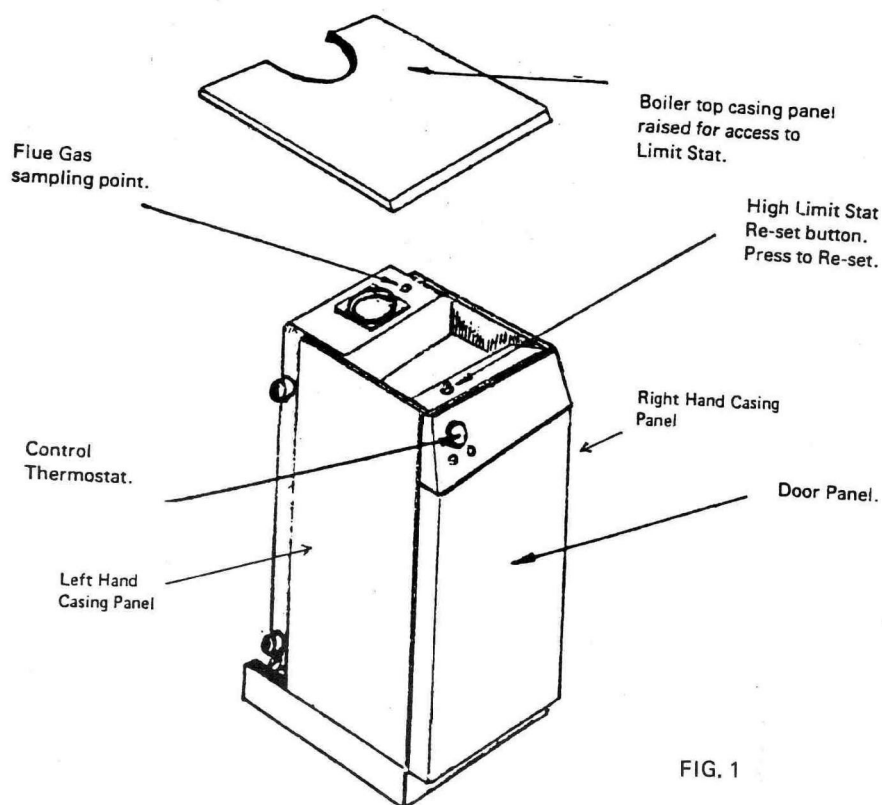
AFTER SALES BREAKDOWN SERVICE

If at any time you require After Sales service please contact as follows:

- 1) Contact your installer or maintenance firm and ask them to rectify the problem.
- 2) If you cannot get attention from your installer or maintenance firm, instruct them to contact the MYSON distributor from whom the boiler was bought. The distributor should be able to provide advice and/or assist as may be required.
- 3) If you still cannot get attention, please instruct your installer or maintenance firm to contact the service department of the Myson Group.

The address is:

Myson Parts & Service, Old Wolverton, Milton Keynes. Tel. 0908 320320, who you should provide with the name and address of everyone with whom you have been in contact. If this number is not obtainable, ring the factory direct on 051 546-3541, and ask for the Technical Liaison Department, clearly stating the nature of your business.



SECTION A.

BOILER GENERAL

A1.

The Myson Velaire boilers are horizontally fired, automatic pressure jet boilers. These boilers are intended for use on indirect central heating systems. Their use on direct systems is not recommended.

A2

The boiler has an easily removable top which gives quick access for cleaning. The maximum static head of water permissible is 90 ft. (27.44 metres).

Water flow and return connections are provided on each side of the boiler and an additional flow tapping for a pump is positioned at the top front of the boiler. Room is available within the casing for a pump and pump kits are available from Myson Group Marketing.

N.B. When installing the boiler, make sure that all unwanted tappings are blanked off.

A4. CASINGS

Standard boiler house models are supplied without casings or with a factory fitted insulated jacket. Casings are made from Color Coat material from which the protective film should be removed on completion of installation. All casings should be removed for installation of the boiler.

A5 BURNER

The burner is an automatic pressure jet type, pre-wired, with a photo-cell flame failure control.

At the time of going to print the standard burner fitted to model 40/50 is the Riello Mectron 2, and on the 50/70 and 70/90 boilers the Inter 10 & 11 burners are normally fitted. Myson Combustion Products reserve the right to fit any burner or controls which, in their opinion, are best suited to the boiler. Although every effort will be made to warn the trade well in advance this may not always be practicable.

Riello burners are used on boiler house models and in limited numbers on other models.

A6 BOILER THERMOSTATS

A pre-wired control thermostat is provided with each boiler.

This thermostat is calibrated to give a maximum boiler temperature of 180°F - 82°C and a minimum temperature of 130°F - 55°C. Under no circumstances should the boiler be operated below the minimum indicated setting, or below a return flow temperature of 130°F. For best operation it is suggested that the boiler should be operated at a setting just below maximum on the thermostat setting.

SECTION B.
BOILER DATA

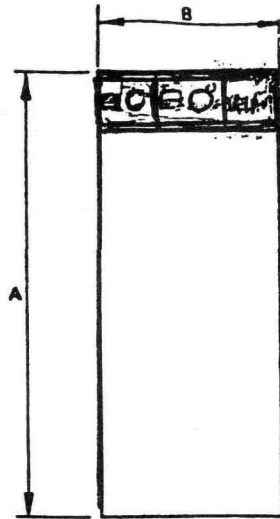


Fig. 2A

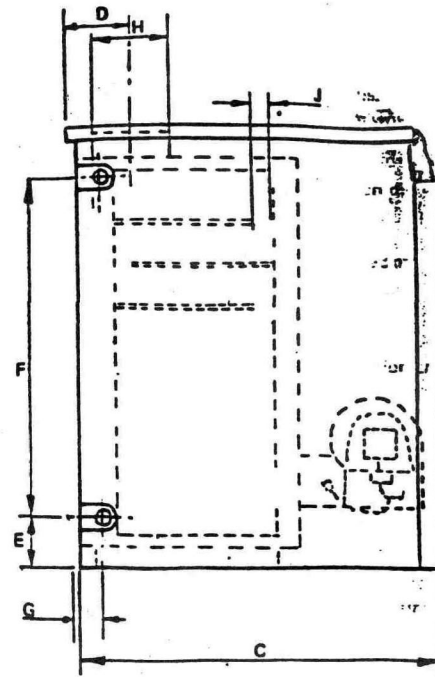
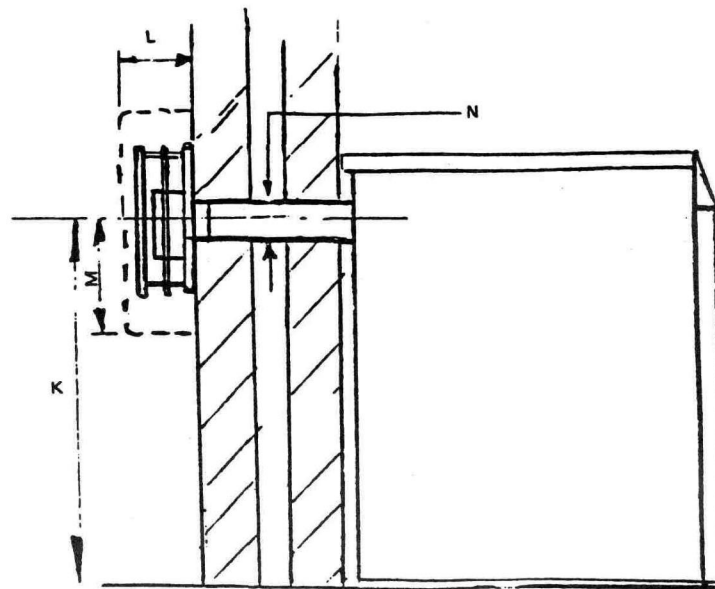


Fig. 2B

Fig. 2



LOW LEVEL FLUE (see also leaflet in flue pack)

Fig. 2C

BOILER DATA

Table 1.

MODEL	40/50		50/70		70/90	
	Imperial	Metric	Imperial	Metric	Imperial	Metric
Height	33.5	850	33.5	850	33.5	850
Width ins/mm	15.5	392	15.5	392	18.9	479
Depth ins/mm	2.30	586	23.0	586	26.5	672
From back to flue ins/mm	3.5	90	3.5	90	4.4	110
From floor to bottom water connection	3.4	87	34.	87	3.4	87
Distance between water connection	24.0	604	24.0	604	24.0	604
Distance of water connections from rear	1.7	42	1.7	42	1.7	42
Flue diameter	4.0	100	4.0	100	5.0	125
Low level flue dia. ins/mm	3.0	75	3.0	75	3.0	75
Of low level flue from floor ins/cm	30.8	782	30.8	782	30.8	782
Projection of low level flue guards ins/cm	10.3	260	10.3	260	10.3	260
Size number of back water connectors	4 x 1" BSP		4x1" BSP		4x1" BSP	
Water pump front top connection	¾" BSP		¾" BSP		¾" BSP	
Oil pump connection	3/8"		3/8"		3/8"	
Water content galls/litres	3.75	17.0	3.75	17.0	5.0	22.7
Dry weight cased lbs/kgs	218	99	218	99	290	132
Number of retarders	3	3	3	3	3	3
Retarders main gap ins/mm	0.8	20	0.8	20	0.8	20
Burner	RIELLO Mectron 2		Electro Oil Inter 10		Electro Oil Inter 11	
Combustion head			or INTER 99		or MECTRON 3	

NOTE: When installing the boiler, it is recommended that a minimum gap of 1" (25mm) should be left on each side of the boiler. At least 24" (600mm) above the boiler and 24" (600mm) in front of the boiler, or on larger models, sufficient room for the door to be opened.

TABLE 2
PERFORMANCE DATA

VELAIRE PERFORMANCE WITH VARIOUS NOZZLES. * indicates nozzle normally fitted ex works												
		MODEL 40/50				50/70			70/90			
HEAT INPUT	Btu/h x 1000	51.2	57.7	64.1	64.1	72.5	89.7	89.7	102	115.4		
	kw	15	16.9	18,8	18.8	22.5	26.3	26.3	30	33.8		
HEAT OUTPUT	Btu/h x 1000	40	45	50	50	60	70	70	80	90		
	kw	11.7	13.2	14.7	14.7	17.6	20.5	20.5	23.5	26.4		
FIRING RATE KEROSENE	NOZZLE	Make	MONARCH			DANFOSS			DANFOSS			
		U.S. GALLS	0.4	0.4	0.4*	0.4	0.5	0.55*	0.55	0.65*	0.75	
		SPRAY ANGLE	60°	60°	60°	80°	80°	80°	80°	80°	80°	
		TYPE	R	R	R	H	H	H	H	H	H	
	PUMP PRESSURE	P.S.I.	110	125	150	150	145	150	150	150	140	
		kg/cm ²	7.7	8.8	10.6	10.6	10.2	10.6	10.6	10.6	9.9	
	FLOW	GAL/h	0.33	0.37	0.41	0.41	0.5	0.6	0.6	0.66	0.74	
		L/h	1.5	1.68	1.86	1.86	2.28	2.64	2.64	3.0	3.08	
	FIRING RATE GAS OIL	NOZZLE	Make	MONARCH			DANFOSS			DANFOSS		
			U.S. GALLS	0.4	0.4	0.4*	0.4	0.5	0.55*	0.55	0.65	0.75
			SPRAY ANGLE	60°	60°	60°	80°	80°	80°	60°	60°	60°
			TYPE	R	R	R	H	H	H	S	S	S
PUMP PRESSURE		P.S.I.	120	130	140	140	130	140	140	135	130	
		kg/cm ²	8.4	9.1	9.9	9.9	9.1	9.9	9.9	9.5	9.1	
FLOW		GAL/h	0.31	0.35	0.4	0.4	0.47	0.55	0.55	0.63	0.7	
		L/h	1.4	1.6	1.8	1.8	2.12	2.5	2.5	2.86	3.18	

N.B. Equivalent Nozzles of Alternative make can be used.

SECTION C.

PRE-INSTALLATION REQUIREMENTS

C1 CHIMNEY

Every Myson boiler has a very high efficiency and care must be taken to ensure that the chimney is suitable.

Chimneys may have been already built and completed before a choice of appliance has been made. Alternatively, chimneys may be installed to suit the particular appliance chosen.

A factory made insulated chimney complying with the requirement of BS4543 may be considered as an alternative to a conventional structural chimney for both new and existing buildings. A further alternative may be a suitable form of insulated flue pipe normally positioned on a wall outside a building or, in the case of appliances where the flue gas temperature is less than 260°C when tested in accordance with BS4876, on a wall inside a building.

C.2 LEGAL REQUIREMENTS

Installation must comply with the current Building Regulations and local byelaws. Reference should also be made to the following British Standards BS 5410, BS 4543, BS 4876, BS 1181, and BS 715.

C3 DOWN DRAUGHT

In order to avoid down draught the chimney or flue must terminate in a position at least 1 metre (3.3ft) higher than the highest point of any roof, tree or building within a distance of 9 metres (30ft).

C4 CAPACITY

The chimney or flue must have a cross-sectional area throughout its whole length, that is at least the area of the flue outlet of the boiler and must be sealed at the boiler with fire clay or other suitable compounds. Whenever possible, the flue should terminate above the apex of the roof; if this is not possible, use an OH or similar cowl. As few bends as possible should be used and, where necessary, 135 bends are recommended.

C5 HEIGHT

The chimney or flue should be of sufficient height to provide a minimum draught of 0.035" w.g. measured at the test hole in the top of the boiler. Draught conditions that are excessive i.e. above 0.15" w.g. measured at the test hole in the top of the boiler, due to chimney height or location, should be controlled by means of a draught stabiliser fitted to the chimney.

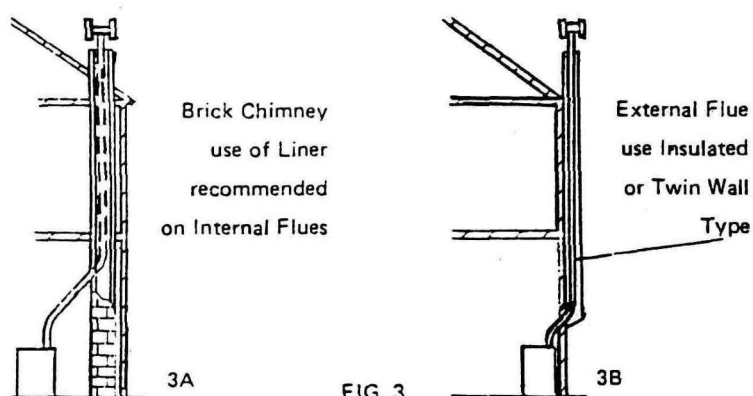
C6 EXTERNAL FLUES

All external flues of metal or other materials should have cleaning facilities, and be well insulated to maintain the correct draught conditions.

C7 INTERNAL FLUES

The exposed flue pipe between the boiler flue off-take and the chimney proper (either internally or externally) must not be of asbestos.

Vitreous Cast Iron, Steel or similar materials should be used.



C8 LOW LEVEL FLUES

In the case of low level flues, relaxation of Building Regulations must first of all be obtained. An application form is provided in the carton, with the kit of parts.

Note the essential free air requirements specified in section C.10.

C9 CHOICE OF MATERIALS

The materials used in the construction of chimneys and flues should be such that the construction is non-combustible, durable, resistant to the temperatures likely to be encountered, to rapid changes in temperature and resistant to external and internal corrosion.

Materials for lining flues should have a reasonably smooth finish and thus not unduly impede the flow of the combustion gas products. They should be resistant to potential attack by flue gases and to spalling.

Materials used should be resistant to temperatures in excess of 300°C.

C10 FREE AIR ENTRY

Provision for air for combustion and ventilation:

General. A sufficient permanent air supply to an appliance will be required.

- (a) for proper combustion of fuel and effective discharge of combustion products to the open air.
- (b) for the ventilation of any confined space in which an appliance is installed to prevent overheating of the appliance and any equipment in and near the appliance;
- (c) for the satisfactory operation of any draught break or stabilizer which may be fitted.

It should be both the architects or the installer's concern that the air required for these functions be introduced so as to cause as little discomfort as possible to building occupants and thus to offer them the least temptation for them to obstruct ventilators.

Air for combustion: This requirement will be satisfied if the room or space in which the appliance is installed has an opening or duct which is designed to allow the passage of air at all times equivalent, in total free area, to 550mm²/kW (2.5 in² per 10,000 Btu's.) of the appliance rating.

If the space containing the appliance has an extract ventilation fan fitted, the supply of air should be such that the operation of the appliance and flue is unaffected when the windows and doors are closed and the extractor fan is running.

Air for Ventilation: For an appliance in a confined space, care shall be taken to provide air for ventilation. A working guide to the minimum free area of openings to be provided in addition to that for combustion air is as follows:

- a) where the air is taken from a heated space, 1100 mm²/kW at high level and 1100 mm²/kW (5.0 ins² per 10000 Btu's) at low level.
- b) where the air is taken from outside, 550 mm²/kW at both high level and low level (2.5 in² per 10,000 Btu's.)

The above requirements are essential, in particular, for appliances which are installed with a low level discharge. The warranty for such boilers could be affected if proper free air requirements are not provided.

C11 FUEL TANK

Tanks may be situated externally to the building in which the appliance is installed or within the building itself. It is considered preferable that the oil storage tanks should be sited externally. In deciding the position of the tank it is essential that the burner manufacturer's recommendations regarding the maximum and minimum head of oil that may be imposed on the burner should be complied with. It is also important that the position selected should be such that the tank is easily accessible for deliveries or that a permanent pipe is laid from the storage tank to a convenient access point from which deliveries may be made. Sufficient space should be provided to enable maintenance to be carried out.

The size of the fuel tank depends upon individual requirements, but 500 gallon deliveries of oil are normally cheaper than the smaller quantities. This indicates a tank size of 600 gallon capacity. Check with your supplier.

The fuel tank should be unpainted on the inside but protected with paint on the outside. A galvanised tank should not be used. The tank should have a fall of $\frac{1}{4}$ " per foot length towards the sludge valve and have the following accessories:-

- a) An oil level gauge (not glass).
- b) A filling pipe with a weatherproof return bend not less than the filling pipe diameter.
- c) A vent pipe with a weatherproof return bend not less than the filling pipe diameter.
- d) A sludge valve at the lowest end of the tank and at the opposite end to the outlet.
- e) An outlet connection 75mm (3") above the bottom of the tank.
- f) A shut-off valve on the outlet pipe.

Whenever possible the bottom of the fuel tank should be above the fuel pump on the burner; if this is not possible a two-pipe system must be used. A two-pipe system consists of an additional return pipe to a low position in the fuel tank; this allows the fuel pump to operate at its maximum capacity of suction. (For full details of the fuel pipe see page 12 under "Installation Instructions - Fuel Pipes" and pages 11/12.

Methods of Tank Protection

It is considered unlikely that a fire will originate from the stored oil and it is the purpose of these recommendations, including Table 4, Page 19 to ensure that a fire which may originate from a building or other external source is not transmitted to the tank contents.

Adequate safety may be achieved in a number of ways, for example:

- a) protecting the tank by a physical barrier or isolating the tank by sufficient space;
- b) enclosing the tank by non-combustible fire resisting construction;
- c) in exceptional circumstances, burying the tank underground;

Requirements for tank accommodation:

Reference should be made to the relevant building regulations, by-laws, etc. In order to achieve a satisfactory degree of safety in relation to the methods of protection given in clause 27(a) to (c), the following conditions (see also table 4) should be met:

- a) If the tank is less than 1.8m from the dwelling the wall of the dwelling should be imperforate or a barrier should be sited between the tank and the building.

The wall of the building should have fire resistance to internal fire for not less than $\frac{1}{2}$ h.

The imperforate part of the wall of the building should extend for a distance of not less than 1.8m from any portion of the tank. Small openings in the wall of the building, for ventilation purposes, should not be considered as affecting the fire integrity of the wall.

The barrier should be non-combustible, so constructed to prevent the passage of direct radiated heat and should extend beyond the extremity of the tank in height and width to not less than 300mm.

C12 FUEL SUPPLY PIPES

Copper tube is recommended and should have a minimum outside diameter of $\frac{3}{8}$ " (10mm).

C13 HOT WATER STORAGE CYLINDER

The boiler should only be used with an indirect cylinder, which should be sized to individual requirements.

C14 FIRE VALVE

A fire valve should be installed in accordance with BSS CP 3002. This states that the valve should be installed as near to the fuel tank as possible, or if this is impracticable in the oil line where it enters the room in which the boiler is situated.

Suitable valves can be obtained from the Landon Kingsway Division of Myson Group, address P.O.Box 6, Kirkby Industrial Estate, Kirkby, Liverpool L33 7UJ. Tel: 051 546-3541.

C15 LOW LEVEL FLUES

Separate instruction documents will be found in the low level flue pack. Boilers with low level flue discharges must be sited so that the flues can pass through and external wall. The flue terminal must not be fitted in any position which would allow combustion products to feed back into adjacent doors and windows. Before installing a low level flue discharge, relaxation of the building regulations must be obtained. A form is provided in the low level kit.

Boilers fitted with low level discharges must only fire Kerosine and will not operate satisfactorily unless the free air requirements - ref. para C10 have been satisfied. In certain cases it may be advantageous for trouble free operation to purchase a post purge (fan run on after shut down) device from Myson Parts & Service Limited.

Consideration should be given to the texture of the Wall onto which the low level flue terminal is fixed. As with all heat emitting devices the warm air from the terminal will encourage the accumulation of dirt which will at some time require removal with a detergent based cleaning fluid.

C16

FLOOR TEMPERATURES

When installing the boiler, check that the hearth temperatures conform to the relevant regulations by reference to the list of DOBETA approvals. If in any doubts assume that they will be in the "above 100°C category". The floor should always be smooth and flat and if constructed of a material which is softened by oil, it is advisable to install an additional metal tray underneath the boiler for protection against accidental damage.

SECTION D

I N S T A L L A T I O N I N S T R U C T I O N S

D.1 SITUATION

If the boiler is to be installed under a working surface, a suitable portion of the work top should be removable to allow ready access to the boiler for cleaning and servicing.

When installing the boiler with a low level flue outlet, the instructions included within the flue pack should be consulted.

D.2. CASINGS

It is advisable to remove the casings during the installation of the boiler. This is done as follows:

- a) Remove top casing panel
- b) Remove door panel
- c) Unplug burner wiring on the underside of the control panel and remove thermostat phials from their pockets.
- d) Gently pull out control panel. **N.B.** On later models there is an additional retaining screw on a bracket at the back of the control box. This screw is located on the right hand side facing the boiler, to gain access remove the casing.
- e) Remove each casing panel by undoing the two retaining screws which secure them to the boiler flue box.

When positioning the boiler do not forget to allow for the rear overhang on the top panel.

The boiler should be put into position. Place the unit on a level non-inflammable base, ensuring that a space is left between the back of the boiler and the wall to allow room for cleaning. If it is considered that a draught stabilizer will be required, make sure sufficient room is left for it.

Once the boiler is installed, the casings may be assembled by reversing the above procedure. Make sure to fit the screw to retain the control panel. All panels should resist a 7lb pull.

The protective film may be easily removed once heat has been applied to the boiler.

During installation, make sure the panels and all screws are in a safe place.

IMPORTANT: Remember to insert the thermostat phials back into their pockets in the boiler, the control thermostat phial going in the top pocket.

D.3 CONNECTING THE CHIMNEY TO THE BOILER

Local Building Regulations and By Laws should be consulted for details of the chimney, use a 135° bend. 90° bends must not be used, due to their flow resistance and baffling characteristics. Ensure that flue pipe entering a brick chimney is cut off flush with the inside surface or at a small inclined angle to prevent droppings entering the flue connection. Provision for cleaning the chimney should be made below the flue pipe entry.

N.B. Allow sufficient room to re-fit the top covers and for cleaning the boiler.

D.4 WATER CONNECTIONS

Flow and return connections are provided on each side of the boiler, comprising two high level flow connections and two low level return connections. Connect the pipework to the selected connections and blank off the unused ones, including the pump tapping at the front of the boiler.

D5 FUEL PIPES

D5.1 The flexible fuel pipe should be connected to the burner and the other end to the fuel line. At this stage the connection should be left finger-tight as it will have to be disconnected before the burner is started in order to vent air from the line after the fuel has been turned on. Couple a filter to the rigid pipe and run pipework from the inlet of the filter to the tank. Ensure that the filter is positioned correctly and that it is easily accessible with sufficient clearance below it for cleaning or replacing the filter element.

D5.2 It is vital that all joints are completely oil tight - leaks may cause air locks in the fuel supply pipe and will almost certainly lead to complaints of oil odour.

D5.3 Fit the fire valve in the oil line.

D5.4 Where the tank position provides a gravity flow of oil to the burner, THE SINGLE PIPE SYSTEM should be used. The difference in "head", i.e. the distance vertically between the pump and the outlet of the tank, dictates the maximum length of oil supply pipe, including horizontal and vertical runs (see data page 19)

D5.5 When the tank outlet is below the level of the burner fuel pump, THE TWO PIPE SYSTEM MUST BE USED. Here a return line is piped from the pump back to the tank, finishing at least 3" above the bottom. This return pipe must end at the same level in the tank as the suction on so as to prevent loss of prime.

The ends of the two pipes should be well separated so that if sludge is disturbed by the return, it will not be pulled into the suction pipe. An elbow at the end of the return will ensure that the discharge is away from the suction. A non-return valve should be fitted as close as possible to the tank and at the lowest available point on the suction line. Avoid having the bottom of the tank more than 3m (10') below the burner. The difference in levels between the pump and the end of the suction and the return lines in the tank controls the maximum length of pipe, including horizontal and vertical runs (see data page 19).

D5.6 On two pipe systems, it will be necessary to fit the plug provided with the fuel pump. This plug is fitted into the top return part of the pump, indicated 'R' on the nameplate, and is necessary to enable the pump to raise the oil out of the tank. (Instructions for fitting the plug are given on the plastic bag containing the plug).

D5.7 It is advisable to consult the pump manufacturer for approval of two pipe systems. Problems can be encountered, with air collecting on shut down, if the fuel pump is situated at the highest point in the system.

D5.8 **WARNING**

VENT PIPES: Tall vent pipes can cause a restriction to the air being evacuated from the tanks during filling. This can result in an over pressurisation of the tanks which can be dangerous. Refer to BS 799 and BS 51975 for all relevant information.

D.6 **ELECTRICAL CONNECTIONS:**

D6.1 **EARTHING:** It is essential that the appliance be earthed.

D6.2 **CABLE CLIPS:** Attached to the top side panels of the casing are two cable clips. These may be removed and are to be used to secure the mains inlet cable, making sure it does not come into contact with the heat exchanger.

D6.3 **FUSING:** The appliance should be connected to the electrical supply through a fused plug and socket.

D6.4 **WIRING DIAGRAMS:** Refer to pages 24-28 for appropriate diagrams.

NOTE

D.7 Before refitting the casings and firing the boiler, check that the retarders are correctly fitted and that the target plate is correctly installed on the model 70/90.

ELECTRO-OIL BURNERS

TECHNICAL DATA

Detail	INTER 10	INTER 11
Motor	90w 1 Phase	2800 r.p.m.
Fan	108 x 42 x 8mm	120 x 42 x 8mm
Pump	Danfoss or Sunstrand	
Transformer	220/10000v. 20mA TV and radio suppressed	
Control Box	Danfoss or Satronic / Electro Oil TF 7018	
Mounting Flange	Standard SIS 89	
Ignition Electrodes	2 off 68 x 11mm with porcelain insulation	

Table 3.

COMBUSTION HEAD

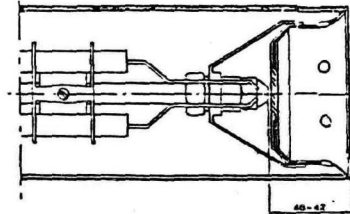


Fig. 3

ELECTRODE ADJUSTMENT

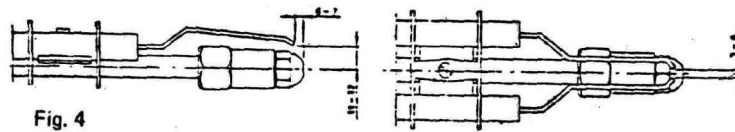


Fig. 4

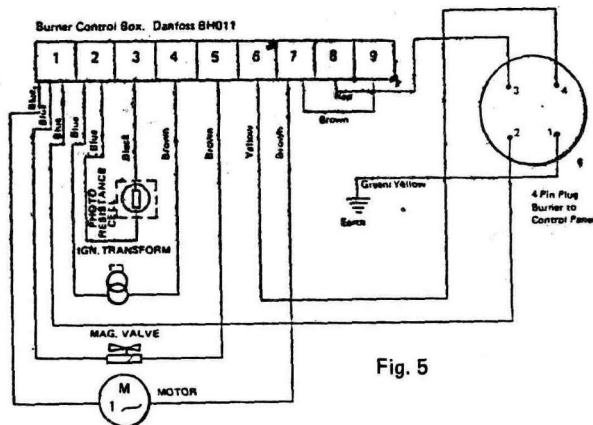


Fig. 5

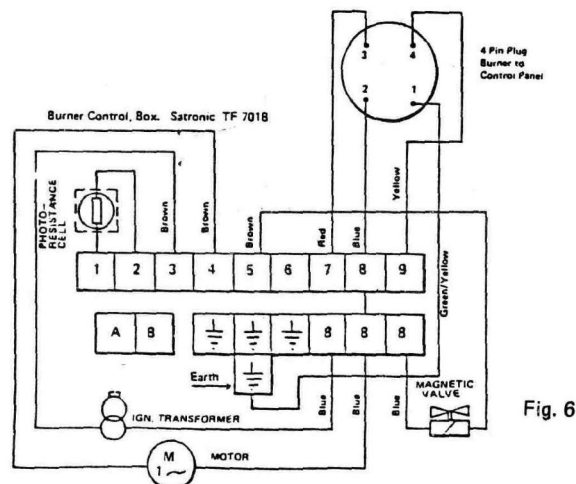


Fig. 6

DIAGRAMS TO SHOW CONNECTION OF BURNER CONTROL BOX TO BOILER CONTROL PANEL

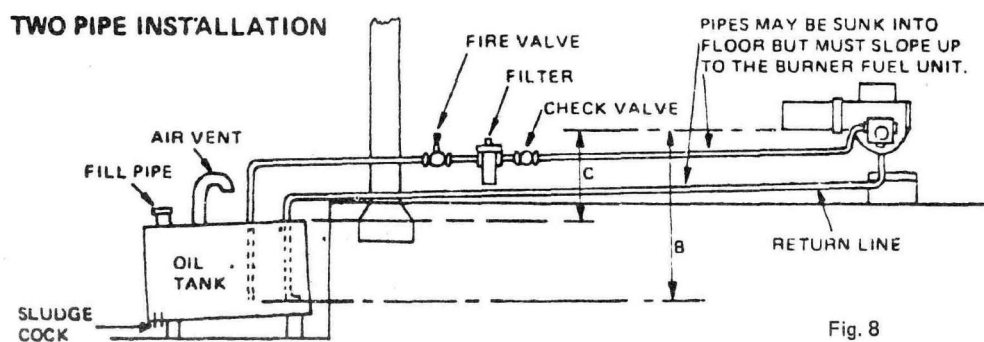
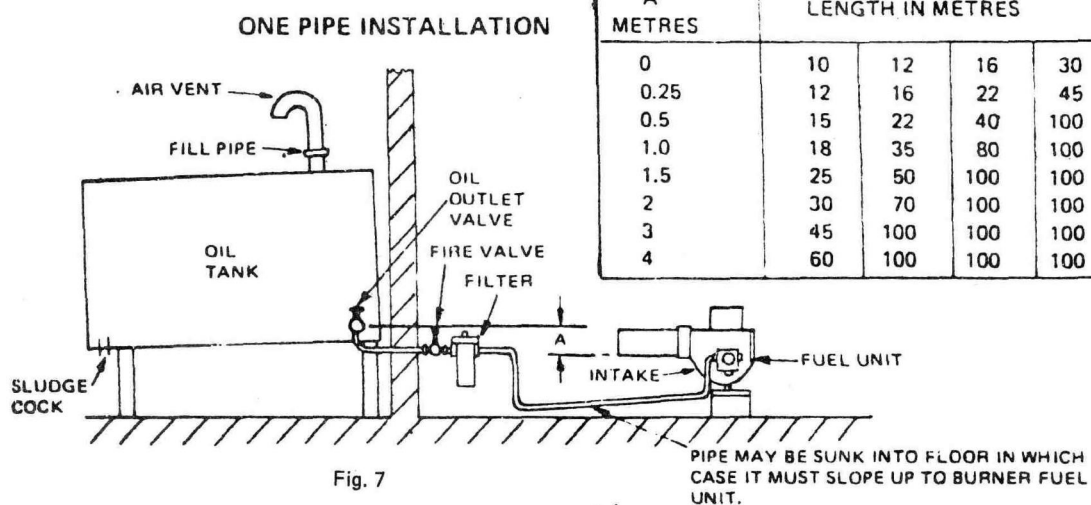


TABLE 4B				
PIPE INSIDE DIA MM.	8	10	12	15
B METRES	LENGTH METRES			
4	100	100	100	100
3	95	100	100	100
2	82	100	100	100
1.5	75	100	100	100
1.0	68	100	100	100
0.5	62	100	100	100
0	55	100	100	100
- 0.5	48	100	100	100
- 1.0	41	100	100	100
- 1.5	35	85	100	100
- 2.0	28	68	100	100
- 3.0	14	35	73	100
- 4.0	0	0	5	11

Details calculated for Danfoss type pump running at 2850 R.P.M. on 35 seconds Redwood No. 1 fuel oil.

TABLE 5

Detail	RIELLO MEETRON 2
Motor	90W 1 Phase 2850 r.p.m
Fan	108 x 42 x 12m
Pump	RIELLO TYPE 3008037
Control Box	RIELLO TYPE 483
Mounting Flange	Standard S TS 89
Ignition Electrodes	RIELLO 3005721

ELECTRODE SETTING

ATTENTION: before mounting or removing the nozzle, loosen the screw (A) and move the electrodes ahead.

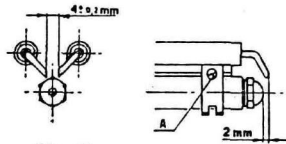


Fig. 9

ELECTRICAL WIRING

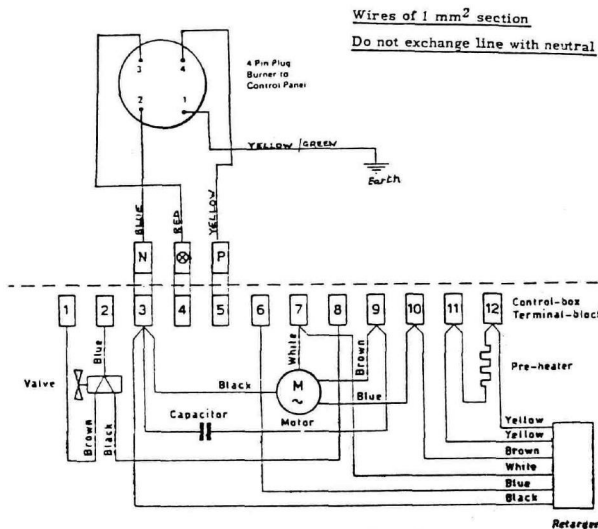


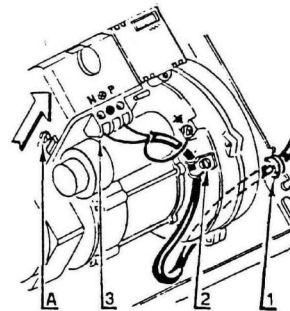
Fig. 10

To remove the control-box from the burner, loosen screw (A) (see figure) and pull towards the arrow.

The photoresistor is fitted directly onto the control-box (underneath the ignition-transformer) on a plug-in support.

TESTING

Check the shut-down of the burner by opening the thermostats, and lock-out in absence of flame.



Run of the electrical cable

- 1) Grommet
- 2) Cable-clamp
- 3) Terminal block

Fig. 11

FUEL HEATING

In order to obtain regular ignition and working, also at low capacities and temperatures, the burner is fitted with an electric pre-heater, which heats-up the gas-oil in the combustion-head.

Such resistance is switched on, at the closing of the thermostats. After a period, lying between a minute and a half and two minutes and a half, depending on room-temperature, the retarder (10, fig. 1) starts the motor. The resistance remains inserted and locks-out on the shut-down of the burner.

Attention: whenever it should be necessary to cut-off the electric pre-heater (when checking the burner, when not requested by the ambient-temperature, etc.) switch-over the switch on the retarder by introducing a screwdriver into the slit of the "switched-off" pre-heater setting. In this case, the burner start-up occurs when thermostats are switched on.

NOZZLE PRE-HEATER - GAS / OIL ONLY

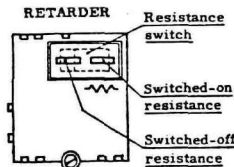
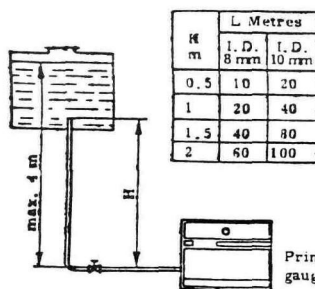


Fig. 12



Priming the pump: loosen the plug of the suction gauge (5, fig. 1) and wait until the oil flows out.

Fig. 13

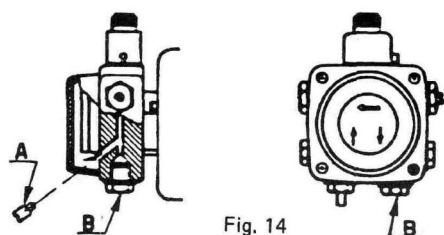
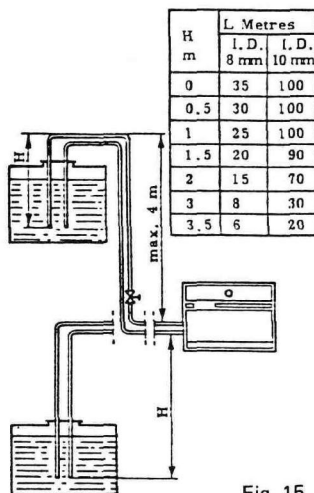


Fig. 14

For 2 Pipe Installations the by-pass plug should be fitted.



The pump suction should not exceed a maximum of 0.4 bar (30 cm Hg). Beyond this limit gas is released from the oil.

Oil lines must be completely airtight.

The return line should terminate within the oil tank at the same level as the suction line; in this case a non-return valve is not required.

Should however the return line arrive over the fuel level, the non-return valve is indispensable.

This solution however is less safe than the previous one, due to the possibility of leakage of the valve.

Priming the pump: start the burner and await priming. Should lock-out occur prior to the arrival of the fuel, await at least 20 seconds before repeating the operation.

Fig. 15

H = Difference of level; L = Length of the suction line; I.D. = Internal diameter

BURNER START-UP CYCLE

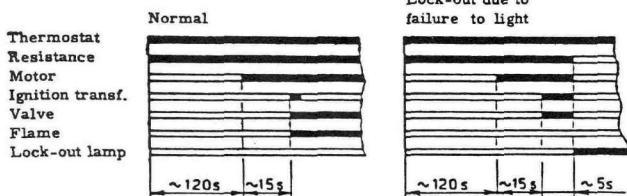


Fig. 16

MAINTENANCE POSITION

Insert the hole 1) (the one to the right or to the left, whichever is more convenient) on pin 2) and fix the burner with the nut 3) fitted wrong-side up.

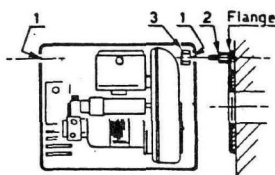
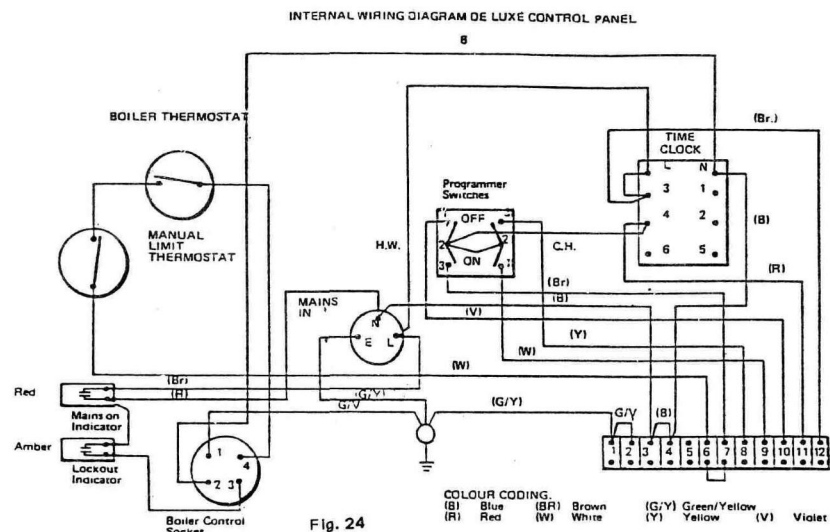
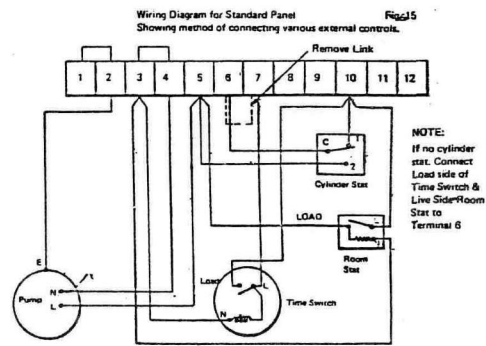
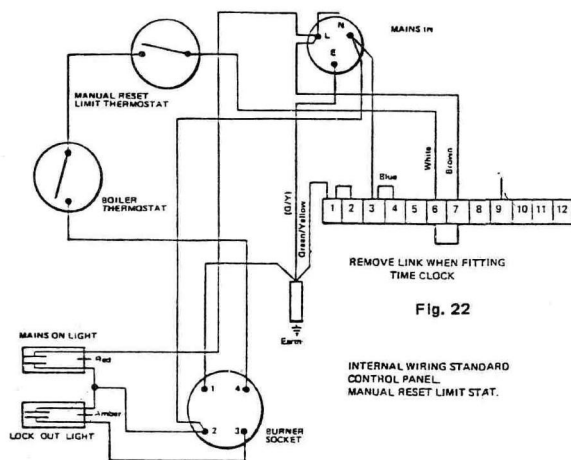
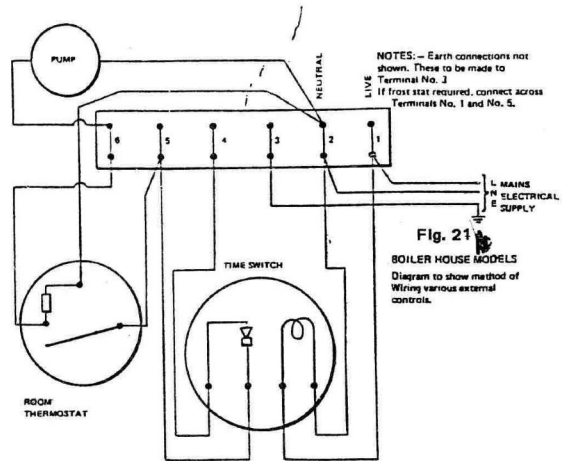
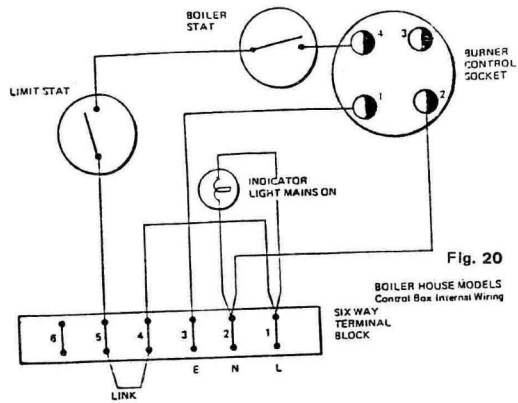
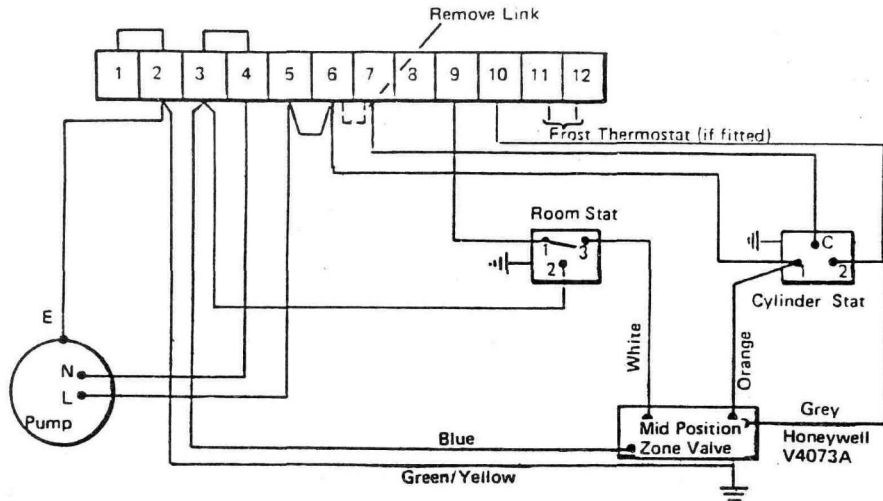


Fig. 17



EXTERNAL WIRING DIAGRAMS FOR PROGRAMMER CONTROLLED MODELS ONLY

EXTERNAL WIRING DIAGRAMS FOR PROGRAMMER CONTROLLED MODELS ONLY



Wiring Diagram for Diverter Valve, Pumped Central Heating and Primary Hot Water Fig. 25

HONEYWELL Y PLAN

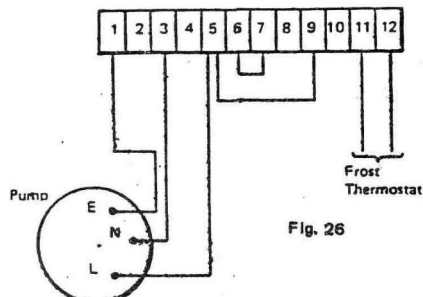
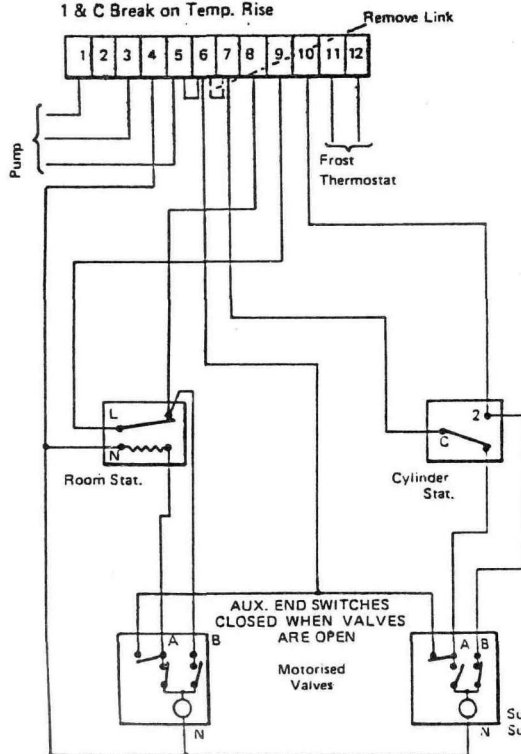


Fig. 26

Wiring Diagram showing Pump & Frost Thermostat.
CYLINDER STAT. CONTACTS
2 & C Make on Temp. Rise
1 & C Break on Temp. Rise



Wiring Diagram for Motorised Zone Valve System Pumped Heating and Primary Hot Water.

Fig. 28

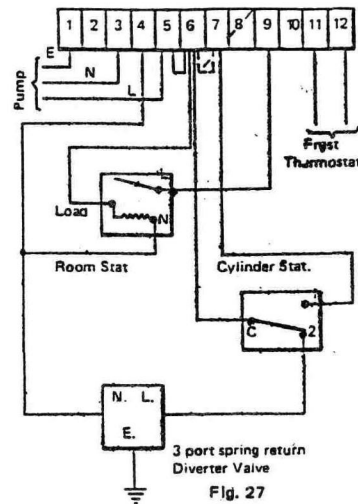


Fig. 27

Wiring Diagram for diverter valve, Pumped Central Heating and Primary Hot Water, Priority to Domestic Hot Water.

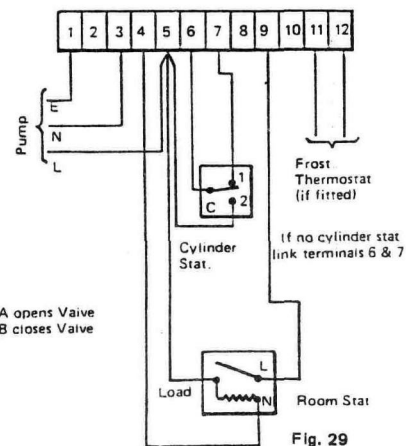


Fig. 29

Wiring Diagram for Pumped Central Heating and Gravity Domestic Hot Water

ASSEMBLY OF BOILER CONTROL BOX

UNCASED BOILER HOUSE MODELS

On these boilers the boiler control box is included with the burner in a separate carton. The mains input to the box is wired into a terminal block, the burner lead is equipped with a plug, to which is inserted into the socket in the control box. The box is mounted to the bracket on the front of the boiler and the following procedure is recommended :-

- 1) Remove the two screws from the bracket on the front of the boiler.
- 2) Remove the two screws at the sides of the control box, to expose the interior.
- 3) Secure box to bracket through the two holes in the back of the control box.
- 4) Feed in mains lead through grommet and wire into terminal block.
- 5) Replace front of control box.
- 6) Position thermostats into pockets, on the top right hand side of lead. The control thermostat goes into the top pocket, the limit thermostat into the lower pocket.

SECTION E

ROUTINE FOR STARTING UP

Check the following points:-

E.1 GENERAL

- a) There is oil of the correct grade in the tank.
- b) That all pipe connections are oil tight.
- c) That all the unused water connections on the boiler have been plugged
- d) The boiler is full of water.
- e) That all valves in the fuel line are open and that the filter and oil pump purged of air.
- f) That any time switches the programmer and/or room thermostats associated with the boiler are in the 'on' position.
- g) The electrical wiring is correctly made; refer if necessary to the relevant pages of this manual.
- h) That the correct nozzle for required output and grade of oil has been fitted.

After this, run the boiler for about twenty minutes and then take two consecutive smoke readings. The air damper is then adjusted, if necessary, until a smoke number of between 1 - 2 maximum is obtained; it will then be found that CO^2 is $10\frac{1}{2}\%$ and the flue gas temperatures approximately $300^{\circ}C$. A flue gas sampling point is included on the right hand side of the boiler, near to the flue outlet. Access to it is gained by removing the top casing panel.

With flue gas readings as above, the efficiency of the combustion will be correct.

Under no circumstances should the air damper be adjusted to give a smoke number in excess of 2.

Great care should be taken to ensure that all air is extracted from the heating system. This should be done before the system is balanced. Air can be a cause of noise and on its own, or together with foreign bodies, particularly copper swarf, lead to premature corrosion of system components.

SECTION F

MYSON PRESSURE JET BOILERS

F.1 GENERAL:

On the underside of the control box you will find :-

1. A mains inlet plug into which you wire the electrical supply.
2. A socket for plugging in the burner.
3. A twelve-way, female with detachable male component terminal block, into which ancillary controls are wired (see fig. 21 onwards).

F.1.1 It must be understood that before the boiler will light it must be switched on at the mains supply and the boiler thermostat, room thermostat, cylinder thermostat (if fitted) must all be set to temperatures higher than those of the water and air they control, the time clock must also be in an 'on' position of its cycle.

F.2 DE LUXE MODELS FITTED WITH PROGRAMMER

Time Clock

The basis of the programmers is a 24 hour clock which can be set to operate the boiler continuously over a 24 hour period, or provide either on or two periods of daily operation by moving small tappets around the clock dial until they point to the times at which these periods are required to start and finish. The start times are indicated by red tappets, the off times by blue tappets.

Programme Selector Switch

Adjacent to the clock is a programme selector switch. Panels Ref: fig. 41

The programmes are indicated as follows:

1. 1.4 Boiler operates for one period per day, coming on at the time indicated by the red knob marked 1 and going off at the time indicated by the blue tappet marked 4.
- 2) 1.2) Boiler operates for two periods per day, coming on at the time 3.4) indicated by the red tappets and market 1 and 3 going off at the times indicated by the blue tappets market 2 and 4.
- 3) 24 hour Boiler runs continuously.
- 4) Off Boiler shut down.

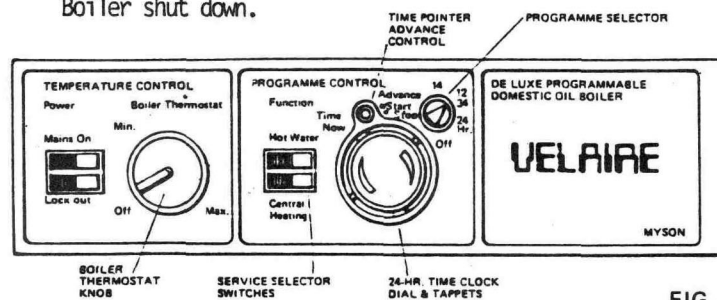


FIG. 4 4

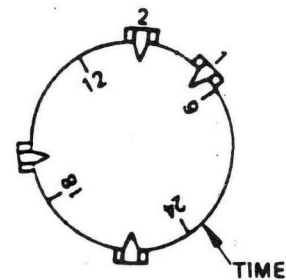
b) Setting the Time Clock

Set the tappets on the time clock to the required heating periods during the day by pushing them in and moving them until they point at the times when these periods should begin and end. The Red No.1 is the first 'ON' tappet and Blue No.2 the first 'OFF' - set these first, followed by Red No.3 and Blue No.4.

Set the time of the clock to the time of the day. This is done by turning the central knob round clockwise until the actual time of day coincides with the time pointer on the panel.

The advance control switch allows a single timed programme to be altered without disturbing the setting on the clock. For example, if the clock is in an 'off' period and the heat is required, push in the advance control switch and turn it clockwise against the stop and the heat will come on at once and remain on until the next 'off' tappet is reached. This will work in reverse if the time clock is in an 'on' period and it is required to be 'off'.

At the next tappet after the one that has been overridden by the advance control, the programmer will automatically return to the normal heating periods set on the clock.



EXAMPLE:

- 'on' - 6.30 a.m.
- 'off' - 10.00 a.m.
- 'on' - 4.30 p.m.
- 'off' - 10.30 p.m.

FIG. 5

FROST PRECAUTION

A boiler which is shut down for several hours in very cold weather may be in danger of freezing due to its position (i.e. it may be in the outhouse, etc.) or part of the pipework of the system may be vulnerable to frost. To avoid freezing, protection should be provided by adequate insulation, taking care not to impede the fresh air supply to the boiler. It may also be advisable to run the boiler at times when normally it would be shut off, or, alternatively, to fit a low limit thermostat which will automatically bring the boiler on when the outside temperature drops dangerously low.

Service Selector Switches

The panel also includes two service selector switches. Depending upon the system it may be necessary for both these switches to be in the 'ON' position in order to provide central heating. i.e., if hot water heating is by gravity circulation. On fully pumped systems it is possible to run independantly hot water and central heating. The house holders must be advised on the operation of their system.

SECTION G

MAINTENANCE

To ensure trouble-free heating, it is most important that the boiler and burner are correctly serviced. This is best carried out by entering into a Service Contract with the Installer or Fuel Distributor.

Conditions of operation will vary, but with normal usage the following is strongly advised :-

G.1 At the end of Winter

- G.1.1) Clean the flueways and all the inside surfaces of the boiler.

G.2 At the end of Winter (on boilers used for central heating only)

- G.2.1) Switch off main switch
- G.2.2) Close all stop valves in the oil supply pipes
- G.2.3) Clean flue and chimney
- G.2.4) Clean all boiler internal surfaces

G.3 At the end of Summer

A thorough check over, as outlined below 'A Sequence for Service' should be carried out.

G.4. A Sequence for Service

This may prove helpful to those concerned, and if followed will most certainly ensure that the boiler gives satisfaction at all times.

G.4.1) Efficiency Test

Take the following readings :-

Stroke number

CO²

Temperature of flue gas

G.4.2) SWITCH OFF ELECTRICITY SUPPLY AT MAIN ISOLATING SWITCH TO THE BOILER

This is often neglected and failure to switch off could result in injury and/or damage to equipment.

G.4.3) CAREFULLY REMOVE PHOTO-CELL

Remove all soot particles and clean photo-cell eye.

G.4.4) CHECK CONTROL BOX

Remove all dust and dirt with a soft brush; check contacts and clean if necessary; check terminals; replace and set in start position.

G.4.5) CLOSE STOP VALVE IN FUEL SUPPLY LINE

This is to enable the filter and fuel pump to be serviced.

G.4.6) DE-SLUDGE THE FUEL TANKS

There should be a sludge valve fitted to the tank.

G.4.7) REPLACE CARTRIDGE IN MAIN FILTER

If the paper micronic cartridge has been in service for more than one heating season, a replacement should be fitted. Ensure that the filter bowl is thoroughly cleaned out before replacement.

G.4.8) Remove the burner

G.4.9) CLEAN THE BOILER

This is required as follows if the boiler was not cleaned at the end of the heating season:-

Remove all the top casing from the boiler, then take off the front top insulated cover. Remove the retarders and clean the soot and any hard deposits from the boiler surface.

G.4.10) GASKETS

It is advisable to replace all gaskets which have been disturbed unless it is certain that they are in excellent condition.

G.4.11) CHECK ALL THERMOSTATS

Test all thermostats to ensure that they are working correctly. Remove all dust with a soft brush and make sure that accessible contacts are clean.

G.4.12) SERVICING THE ELCTRO OIL BURNER

Reference diagrams on page 18.

G.4

G4.12.1.

Clean combustion head

- a) Switch off electricity
- b) Undo the screws and remove the aluminium end plate (Inter Burners).
- c) Withdraw photoresistor
- d) Undo union nut
- e) Withdraw oil pipe assembly sufficiently to unclip ignition leads then withdraw fully.
- f) Clean ignition electrodes and flame stabiliser.
- g) Wipe other parts clean. The nozzle should not normally require attention at this interval, but any carbon on the outside may be wiped off (use a clean rag or tissue soaked in petrol), but great care must be taken not to touch the orifice itself or wipe anything across it.
- h) Re-assemble in reverse order.
- i) Switch on burner and check flame visually.

12.1.2

Check combustion

Check CO² and smoke if necessary, make adjustments as under.

12.1.3

Check operation of safety control

- a) Run burner for a few minutes
- b) Remove photoresistor and cover it to prevent exposure to light
- c) After about 15 seconds the burner should stop and the neon 'lock-out' light should glow
- d) Replace photoresistor
- e) Wait two minutes then press the red button when the burner should start up normally

G.5

EVERY TWELVE MONTHS

Carry out service as detailed

G.5.1) Replacing atomising nozzle

- a) Remove oil pipe assembly
- b) Unscrew nozzle from its holder with a correctly fitting box spanner to avoid damage to hexagon.
- c) Re-assemble oil pipe into the burner

G.5.2 Clean burner thoroughly

Remove burner from appliance and thoroughly clean all parts to remove any dust, fluff or deposits. To clean the air impeller it may be necessary to undo the motor retaining bolts and withdraw the motor and impeller as a unit. When re-assembling make sure that the coupling engages properly.

G.6 EVERY TWO YEARS

In addition to all service attention detailed above, clean oil filters.

G.6.1 Oil supply filter (Crossland)

- a) Turn off the oil supply from the tank
- b) Unscrew bowl retaining bolt, and lower bowl
- c) Remove paper element and replace with a new one of the correct type (Crossland No.499).
- d) Re-assemble bowl
- e) Turn on oil, check that bowl is oil tight and bleed off any air through the bleed screws on top of the body

G.6.2 Oil pump filter

- a) Undo four socket screws which retain pump end cover
- b) Remove end cover carefully, avoiding damage to gasket
- c) Remove filter element and clean with paraffin
- d) Re-assemble element and end cover

G.7 REPLACE BURNER IN BOILER

G.7.1 Check operation of Flame Failure Device

By removing the photo-cell from the burner and shielding it from any external source of light (lockout should occur within 10 seconds).

G.7.2) Adjust Flame

- a) Set burner to obtain a good CO² reading combined with a low smoke number, i.e. less than No.2
- b) To increase CO² decrease air supply by adjusting the air damper to a lower number on the adjustment scale. Normally No.5 is a satisfactory initial setting.

G.7.3 Before starting up

- a) Make sure that there is fuel in the tank
- b) See that the stop valves in the fuel supply line are open
- c) Set the thermostat to the desired temperature
- d) If fitted, check that the time switch and/or programmer is set to turn the burner on and off at the required time and is set to the correct time of day.

G.7.4 Riello Burners

For details of construction, parts and assembly refer to exploded drawing and parts list pages.

FAULT FINDING

IMPORTANT: Before handling any parts of the electrical circuit be sure that the MAIN SWITCH is in the 'OFF' position.

FAULT	CAUSE	REMEDY
1. Boiler will not start	a) No oil in tank	Refill tank
	b) Fuel valve shut	Open valve
	c) Fuse blown	Replace
	d) Failure in electrical supply	Rectify
	e) Thermostats set too low	Reset stats
	f) High limit stat has tripped	Reset
2. No ignition	a) Incorrect electrode setting	Adjust to correct setting
	b) Carbon formation at spark gap	Remove carbon, check adjustment of electrode. Inspect for air leaks.
	c) Electrode burned short	Re-adjust or replace
	d) Broken or cracked Insulator	Replace electrode
	e) Defective wiring	Usually detected by sparking or burning at the point of failure. Replace wire.
3. Slow Ignition	a) Fuel rate too low	Check oil pressure; clean nozzle; clean strainers at filter.
	b) Weak ignition spark	Check electrode adjustment; replace electrode or high tension wires if necessary. Make certain H.T. wires are securely attached. Check transformer and replace if necessary.
	c) Dirty or wrong grade of oil	If suspect, have sample gallon tested and advise supplier if necessary.
4. Motor and Ignition will not start	a) Room stat and/or boiler set too low	Advance boiler thermostat
	b) Fuse blown	Replace fuse; if fuse blows again, inspect for short circuit.
	c) Dirty control contacts	Clean contacts in burner control box, using a hard-finish paper. Place between contacts, press together and draw paper through. Never use a file or sandpaper.

	d) Broken or loose wires	Locate and repair or replace wire.
	e) Defective controls	Repair or replace
5. Motor and ignition start but no oil is delivered	a) Fuel tank empty	Check to see if gauge is stuck and refill.
	b) Shut-off valve in fuel supply line is closed	Open valve
	c) Dirty strainers	Remove and clean all strainers, main filter and fuel pump filter.
	d) Dirty nozzle	Clean and replace, take care not to disturb electrodes.
6. Motor and ignition start, oil is delivered but no flame develops	a) Insufficient fuel flow	Check oil strainers and nozzle; clean if necessary; check pressure.
	b) Faulty ignition spark	Check electrode setting. Replace defective electrodes or H.T. wires. Test transformer and replace if necessary
	c) Excessive air	Adjust air shutter to give CO ² reading between 10% and 11%
7. Flame establishes but snuffs out, puffs, or is slow to stabilise during starting	a) Insufficient air supply	Adjust air shutter
	b) Oil rate too low	Adjust fuel pressure
	c) Bad draught condition	Clean boiler and flues
8. Pulsating fire		
i) Rapid pulsation	a) Too small a chimney	Check draught
	b) Too much air	Adjust air shutter
ii) Slow pulsation	Insufficient air supply	Adjust air shutter
9. Oil odours	Leaking fuel line joints	Break all leaking joints and re-make using a good pipe-jointing compound
10. Puffing and fumes during starting	a) Inadequate chimney conditions	Check that chimney is free from obstruction and that it is high enough to give good draught condition
	b) Kitchen exhaust fan	Make sure that there is an adequate air supply near to the burner and that the exhaust fan does not draw gases out of the boiler.

N.B. NOZZLES

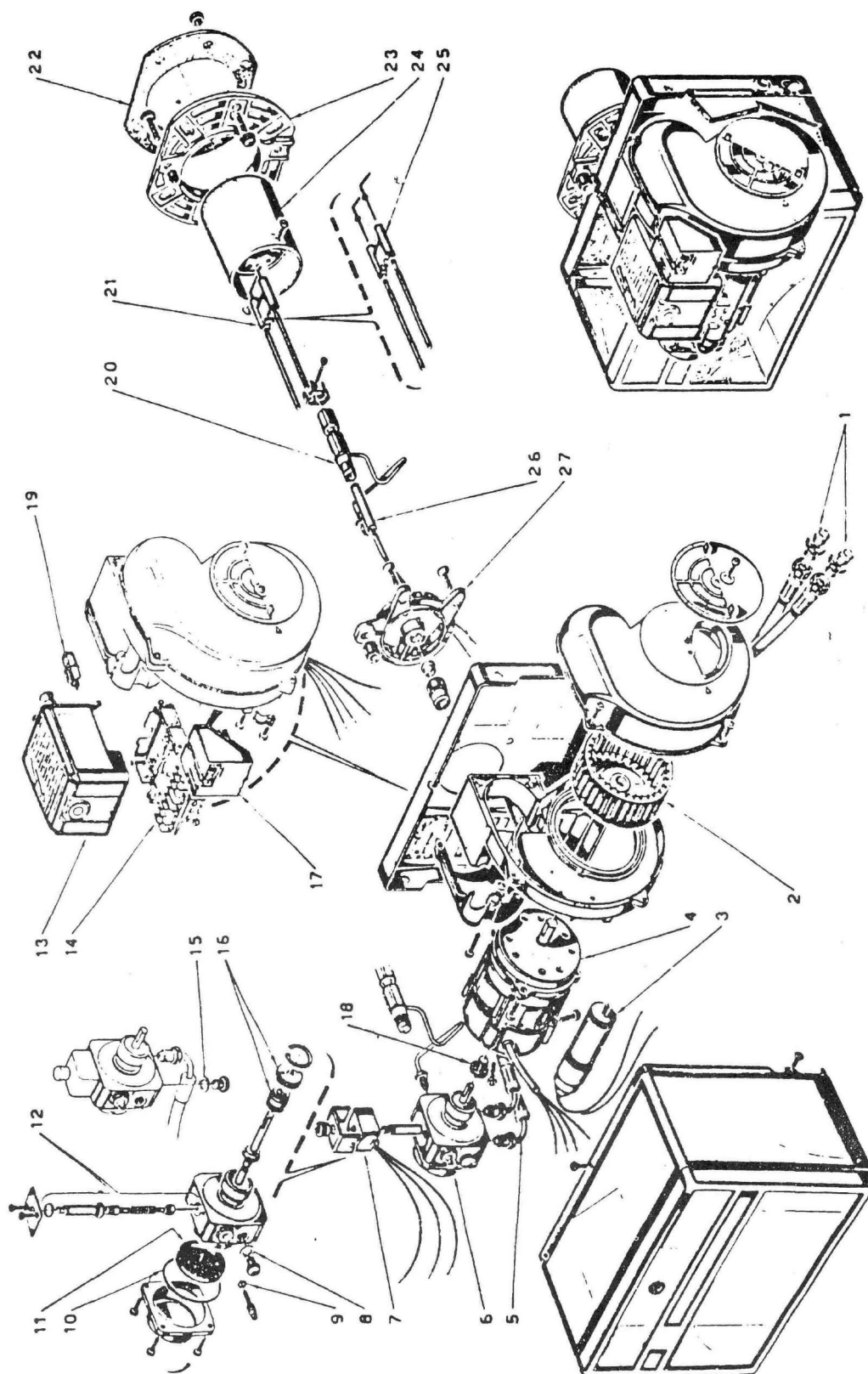
If any fault is traceable to a faulty nozzle, it should be replaced with an equivalent new one. If this is not possible, and the only course of action is to attempt to clean the old one, great care should be exercised. Under no circumstances should metal objects be used, nor should the nozzle be dismantled. The nozzle may be washed in Kerosine and blown out with an air line or foot pump.

SPARE PARTS LIST

<u>ITEM</u>	<u>PART NO./MODEL</u>	
	<u>50/70</u>	<u>70/90</u>
Standard Control Panel	2400/11536	2400/11537
Deluxe Control Panel	2400/11538	2400/11539
Boiler House Control Box	2400/10854	2400/10854
Inter 10 Burner	2400/11344	-
Inter 11 Burner	-	2400/11345
Door Panel Assembly with Insulation	2400/11543	2400/11544
L/H Casing with Insulation	2400/11545	2400/11546
R/H Casing with Insulation	2400/11547	2400/11548
Top Casing with Insulation	2400/11549	2400/11550
Flue Dress Ring	2400/10944	2400/10945
Retarders	2400/10821	2400/10822
Boiler Thermostat C26	2200/8471	2200/8471
Limit Thermostat	2400/11403	2400/111403
Combustion Chamber Top Gasket	RM39112	RM39112
Front Cover Plate Insert	2400/11399	2400/11400
Front Cover Plate Base	2400/11394	2400/11395
M8 Smoke Box Nut	58176	58176
M8 Plain Washer	58727	58727
M8 x 50 Set Screws	99/0010/69	99/0010/69

ELECTRO-OIL BURNER PARTS

Transformer and HT Leads	20/0582/01	20/0582/01
Motor	20/0582/01	20/0581/01
Electrodes	20/0583/01	20/0583/01
Outer Oil Pipe	20/0584/01	20/0584/01
Inner Fuel Pipe Assembly	20/0585/01	20/0585/01
PL1 Blast Tube	20/0587/01	-
PLC Blast Tube	-	20/0588/01
Fan	20/0589/01	20/0590/01
Danfoos MSLA Pump L/H Rotation	20/0591/01	20/0591/01



MLCTRON 2

	<u>PART NO.</u>	<u>DESCRIPTION</u>
1.	3009068	Connector
2.	3005708	Fan
3.	3005758	Condenser
4.	3005757	Motor
5.	3005720	Flexible Pipe
6.	3005705	Pump
7.	3002279	Coil
8.	3007077	Gasket
9.	3007028	Ring
10.	3007162	Ring
11.	3005719	Filter
12.	3005718	Valve Assembly
13.	3001124	Control Box
14.	3002278	Terminal Board
15.	3007079	Gasket
16.	3000439	Sealing Organ
17.	3002281	Timer
18.	3000443	Joint
19.	3002280	Photoresistor
20.	3005765	Nozzle Holder
21.	3005721	Electrode Assembly
22.	3005787	Asbestos Joint
23.	3005786	Aluminium Front Plate
24.	3005775	Special Combustion Head
25.	3005712	Insulator
26.	3005774	Resistance
27.	3005762	Collar