Installation & Servicing Manual

MYSON

WF series Wallflame Domestic Oil Fired Boiler

Sales & Service:
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Merchant Division
Ongar Essex CM5 9RE
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Manufactured by:
Henry Wilson & Co. Ltd., P.O. Box 6, Kirkby,
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A MYSON Company

Please keep near the Boiler

F IV-125/1

Care of your Boiler

Your Wilson boiler is a piece of capital equipment. Please see that it is serviced regularly by entering into a Service Contract with your heating engineer, installer or oil supplier.

Warning

It is extremely important for you always to ensure that, when the boiler is firing, the temperature of the water returning to the boiler is not below 120° F for extended periods; otherwise, the life of the boiler will be drastically reduced by corrosion, due to condensation of the flue gases.

Obviously, when the boiler is starting up from cold, the return water will be below 120° F for a short time. This is unavoidable and is acceptable as the normal function of an automatic boiler. However, prolonged running with a low temperature return will cause irreparable damage.

Therefore, please ensure that the thermostat setting on the boiler is always sufficiently high to provide a ***return*** temperature in excess of 120° F. In this connection you should note that although the temperature drop on a small bore heating system is normally 20° F/25° F, systems are frequently designed to give much greater temperature difference than this between flow and return. Thus, a boiler thermostat setting of 140° F may not always prove to be adequate safeguard against low temperature corrosion, and if in doubt, you should obtain the advice of your heating engineer.

If you find that the boiler thermostat has to be set so high to avoid a low temperature return that your rooms become uncomfortably hot, you should leave the boiler thermostat at its high temperature and arrange to fit a room thermostat to control your heating system. This will ensure that your rooms are maintained at the temperature you require, and will also provide much more economical boiler operation.

Boiler Thermostats

Graduated and marked in numbers 1–5, these represent the following approximate temperatures.

Nos. 1)	145° F	(63° C)
2)	160° F	(71° C)
3)	175° F	(79° C)
4)	190° F	(88° C)
5)	205° F	(96° C)

The boiler should not be worked with the thermostat set in the red area.

High Limit Thermostat

A high limit thermostat is provided on the boiler to protect the boiler and heating system in the unlikely event of a control malfunction. It is self resetting and having switched off due to excessively high temperature it will re-set itself and allow the boiler to operate again when the temperature has dropped to a normal level. The operation of this thermostat is indicated by the extinguishing of the current ON lamp on the boiler control panel i.e. when the high limit thermostat switches OFF the light goes out. If this condition is found to occur consult your service agent and ask him to check your boiler controls.

OPERATING INSTRUCTIONS

WARNING DO NOT ATTEMPT ANY CLEANING OR MAINTENANCE WITHOUT SWITCHING OFF THE ELECTRICITY AND OIL SUPPLY.

Fuel

The recommended fuel is B.P. Domesticol approximately 28 secs. viscosity Redwood No. 1.

Standard Boiler—Operation of Burner

The burner is completely automatic and is controlled by the boiler temperature selector. It can be further controlled by a room thermostat and/or time clock. The burner will start when the temperature falls below the thermostat setting and will cut out when the desired temperature is reached.

Starting up the Boiler

Ensure that the fuel supply is on by checking all stop valves or fire valves in the Fuel Line and that there is an adequate oil supply in the tank. Switch on the main electricity supply ensuring that the plug is in the socket provided on the boiler. Select the temperature required on the boiler temperature selector turn additional thermostat, if fitted, to call for heat, switch on time clock, if fitted, boiler should now start.

Waterguard Controlled Boiler—Operation of Burner

The boiler is completely automatically, controlled. A time clock controls the ON/OFF periods of the heating system in conjunction with a room thermostat which controls the water circulating pump. A cylinder thermostat controls the hot water and over rides the clock to ensure hot water at all times. The boiler thermostat is set to act as a high limit safety control. The Waterguard enables the heating circuit to operate up to boiler thermostat temperature setting to meet the heat demands of the room thermostat. The burner will start at the demand from the cylinder thermostat at all times. The room thermostat will start the burner at the demand of the heating circuit if the time clock is on a call for heat cycle.

STARTING UP THE BOILER

1. Check that there is oil in the tank.
2. See that all valves are open in the oil line to the burner.
3. Depress lever on the oil float control to ON position.
4. Set Boiler Thermostat to 180°F, Cylinder Thermostat to 130°F to ensure a minimum hot water temperature of 130°F and the Room Thermostat to desired temperature (about 70°F).
5. Check Time Clock is on a call for heat cycle.
6. Switch on the main electricity supply. The amber light on the control panel should now glow and the burner motor should start. The burner should light within 90 seconds. For flame adjustments see pages 11 and 12.

What to do if the Burner does not start

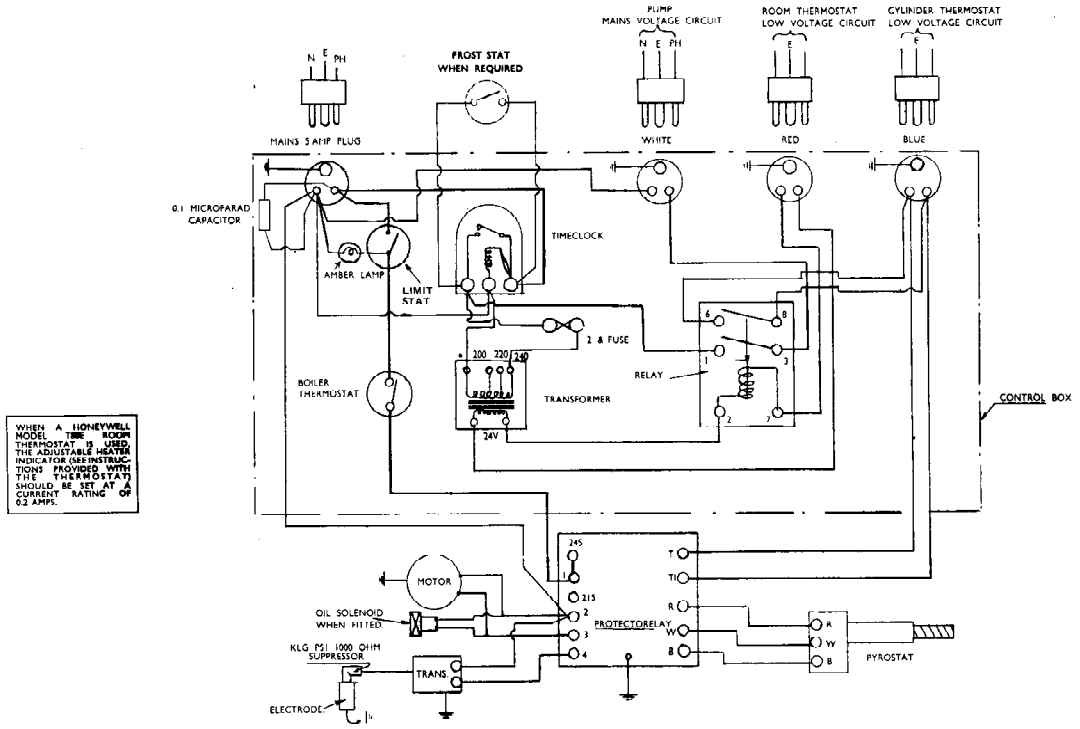
1. Check that the electricity is on (amber light should be glowing).
2. Check the oil control, if oil control lever has tripped up, move it up and down six or seven times to clear oil from safety trip chamber and reset.
3. Move the red lever on the control box over to the right. If the flame is still not established and the burner stops within 5 mins. turn off the main switch and send for the installer or service engineer.

Stopping the Boiler

Turn the Boiler Thermostat to OFF and/or switch off the electricity supply.

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 your heating engineer or installer. Alternatively, we recommend the Shell BP Service Scheme (where available). (See 'Sequence for Service' at the end of this manual).



WATERGUARD CONTROL WIRING DIAGRAM

The WILSON WATERGUARD control system provides completely AUTOMATIC COMFORT (with hot water) at MINIMUM FUEL COST by controlling the boiler at the points of heat usage, switching on when heat is called for and switching off at other times. The full set of controls includes:—

**Not supplied by Myson & Co. Ltd. (see note below)*

* **1. A ROOM THERMOSTAT** fixed on a living room wall and wired to switch the boiler and pump on and off in response to changing outdoor weather conditions. The selected comfort level is automatically maintained and, because the whole heating system is switched on and off, the temperature of other heated rooms throughout the house can also be maintained.

* **2. A CYLINDER THERMOSTAT** fitted to the domestic hot water cylinder and wired to switch the boiler on and off in response to demands for hot water at selected minimum temperature when the heating is switched off. A cylinder full of hot water is assured each morning and there is a substantial saving of fuel in summer because the boiler and piping can cool to room temperature for long periods when there is no hot water draw-off.

3. A WILSON WATERGUARD relay wired so that current flowing in the roomstat circuit will automatically isolate the cylinder-stat, preventing the cylinder-stat from switching the boiler off when heating is called for. When the room-stat switches off, control of the boiler is automatically returned to the cylinder-stat.

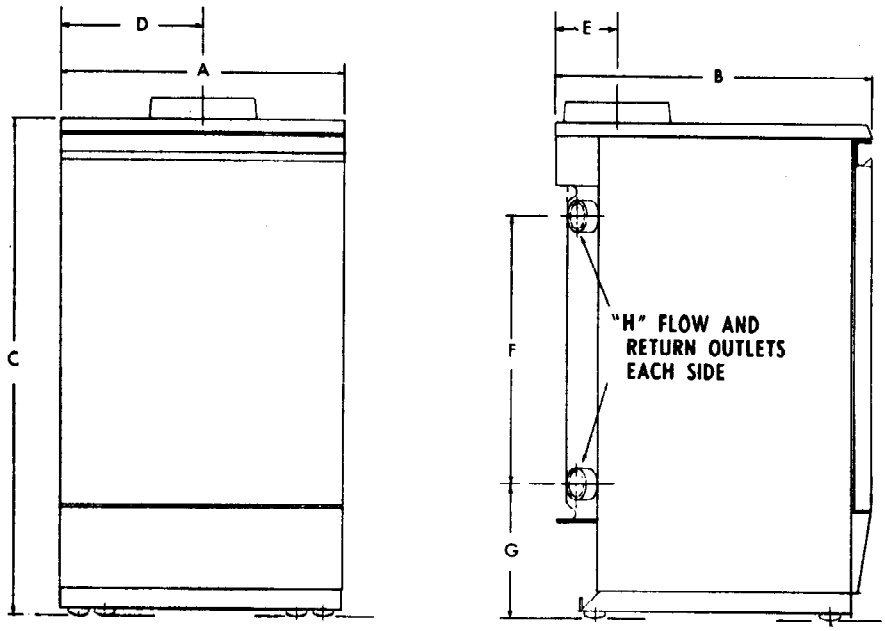
4 A TIME CLOCK wired into the room-stat circuit so that heating can be automatically switched off and on again for pre-determined periods to save fuel without loss of comfort.

A BOILER THERMOSTAT is fitted as standard and should be set at 180°F so that maximum heat output is available in response to calls for heat from room-stat or cylinder-stat. Radiators should be sized to deliver full boiler heat output into rooms warmer than required so that room-stat will operate before maximum boiler temperature is reached. If radiators are under size, the boiler-stat must operate to limit boiler heat input to maximum radiator heat output.

N.B. WF/W model boilers incorporate boiler thermostat, Wilson Waterguard relay, time clock, transformer (to permit low voltage wiring) and plug-in connections for room-stat, cylinder-stat, and pump. The room and cylinder thermostats (like the pump), are not supplied by Henry Wilson & Co. Ltd. However, the following theremostats are recommended for use with Wilson WF/W boilers: **Room—Honeywell Model T88E; Cylinder—Honeywell Model L697A.** Householders should consult their installer or local stockists for further details.

CONTENTS

WF



MODEL	A	B	C	D	E	F	G	H	FLUE SOCKET DETAILS	WATER CONTENT
WF 125	27″	31½″	39¾″	13½″	6⅛″	22¾″	10½″	1½″	9″ for 8″ BS Pipe	16.0 „
WF 150	28″	32¼″	43¾″	14″	6⅛″	25″	10½″	2″	9″ for 8″ BS Pipe	21.0 „

MODEL	TYPE OF BURNER	FAN NO.	DISTANCE ACROSS DISTRIBUTOR TUBES	FLOW SETTINGS		DEPTH OF OIL		NO. OF GRILLES
				FREE FLOW	BURNER RATE			
				CCS/MT.	CCS/MT.	DEPTH	TOL	
WF 125	J (MOD)	811	5″	78	77	⅝″	—1/16″	13—STANDARD
WF 150	OCA 10	275	5 1/16″	96	95	¾″	—1/16″	14—STANDARD

MODEL	RATED OUTPUT BTU'S PER HOUR	HOT WATER ONLY RECOMMENDED SIZE OF INDIRECT CYLINDER	HEATING ONLY RADIATOR HEATING SURFACE @ 170 BTU'S/ ″	MAX FUEL CONSUMPTION GALLS/HOUR
WF 125	125,000	250 „	735 „ „	1.00
WF 150	150,000	300 „	882 „ „	1.25

Because of our constant endeavour to improve design, details may vary slightly from these shown in this leaflet

Average emission figures taken at 170 B.T.Us per square foot and inclusive of equivalent pipe surface.
For Combined Central Heating and Domestic Hot Water, consult your Heating Engineer.
Voltage: 200/250 volts A.C.
Recommended Fuel: Commercial Grade Kerosene, approx. 28 secs. viscosity
Redwood No. 1

FIG. 1

SPECIFICATION AND INFORMATION

The Boiler This is of all steel welded construction for durability. Each Boiler has a full inside diameter flueway. An observation window is fitted for viewing the flame. For quick and complete all-round access to the top of the boiler, for cleaning purposes, an insulating material of unique properties is utilized.

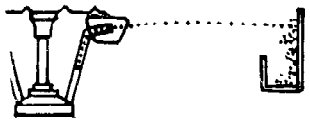
The Casing The pressed steel casing is finished in specially durable stove enamel applied after the steel has passed through a phosphating process to prevent rust and to provide an exceptional key for the paint, and consists of the following pressings : top, two sides, and door. The door is arranged for easy opening and the coloured facia strip is interchangeable to suit the decorative scheme of the room in which the boiler is installed.

Automatic Electric Ignition This is provided through a sequenced control box which controls a complete burner operation cycle. The method of ignition is by H.T. electric spark from an electrode located inside the burner hearthplate as described below.

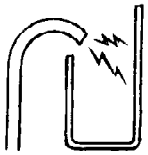
The Burner The Wallflame burner is fully automatic and is matched to suit the boiler. The burner is controlled by a Protectorelay oil burner control in conjunction with a Pyrostat flame detector to give protection against flame failure. A transformer housed within the boiler casing is wired to an electrode to provide the spark to ignite the oil vapour, the burner and controls are prewired within the casing of the boiler to a terminal block on the control panel.

The burner operating theory is explained in the diagram on the opposite side of this page.

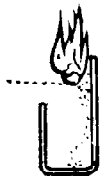
The thermostat dial on the Wilson WALLFLAME *gives finger-tip control. As soon as this calls for heat, the small electric motor spins the fan and the oil distributing tube.*



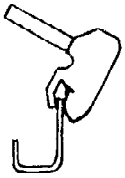
Oil droplets and air are immediately propelled out on to the steel flame rim, which is set around the wall of the boiler.



The automatic electric ignition now sparks into action to ignite this fuel mixture on the flame ring.



In about sixty seconds the flame rim is red hot and the fuel vapour is self-ignited. The ignition automatically cuts out, with consequent saving of electricity, until it is needed again.



Once the Wilson WALLFLAME *gets under way it is guided by the scientifically angled flame rim grilles lodged on the flame rim, which themselves become glowing hot to act as super-heaters. These grilles also help to compress the fuel mixture and produce a hotter, cleaner flame through their three slots.*

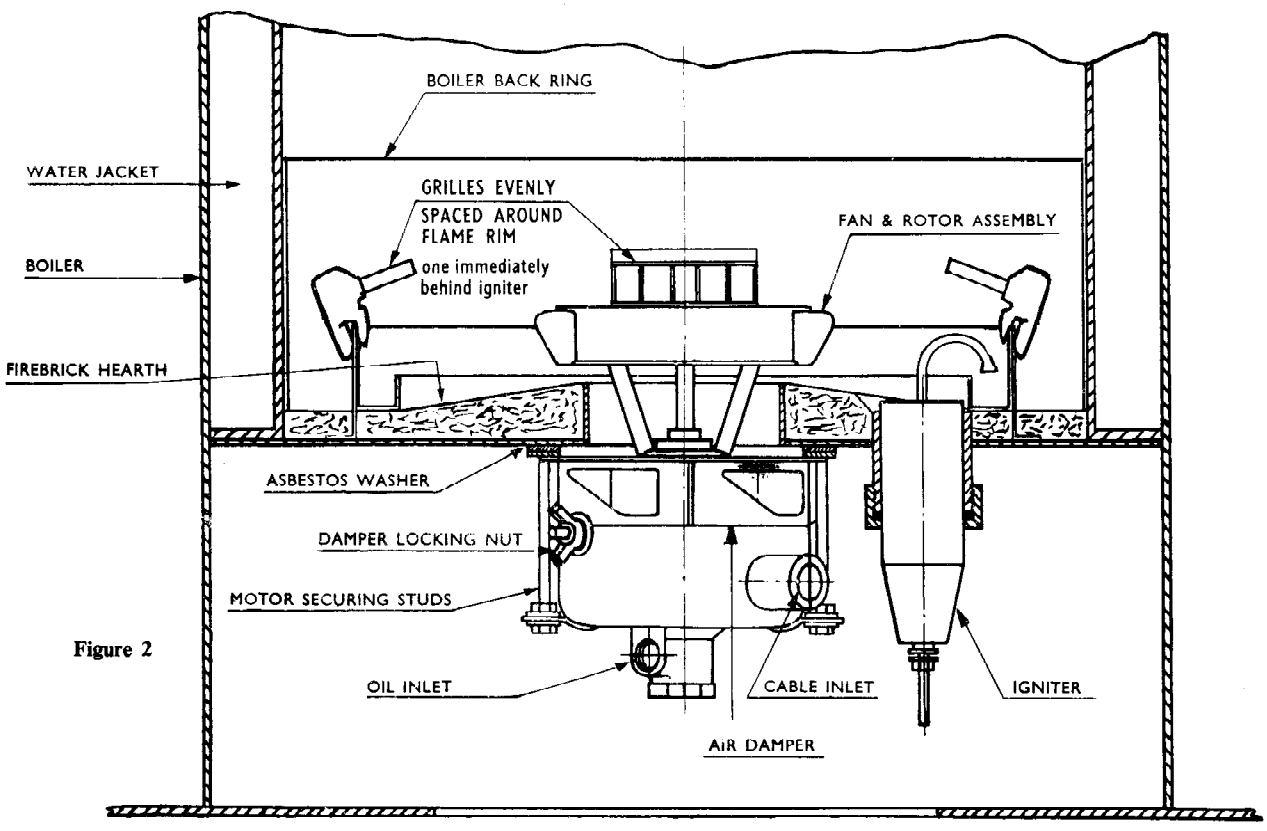
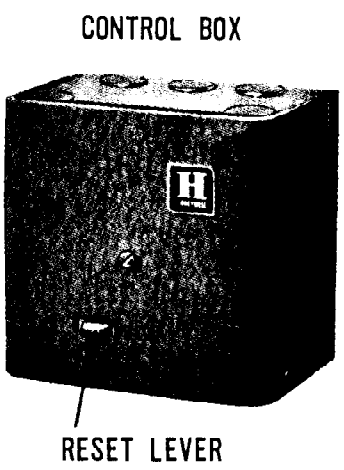


Figure 2

The burner gives blue flame combustion, free from carbonaceous soot. The advantages are :- smokeless combustion, ensuring long periods without the need for cleaning the boiler : long life is ensured by the extensive use of stainless steel burner components.

Fig. 2 shows a complete burner hearth assembly, and indicates the hearth-plate, the position of the grilles and the fan, motor, and rotor assembly.

For the number of grilles on each model see Fig. 1 page 5.



The Control Box (Protectorelay) This is a complete unit mounted inside the boiler casing and accessible when the door casing is removed. It operates from mains electricity supply, in conjunction with the boiler thermostat, to produce the spark ignition for the burner when heat is required. (All electrical controls are pre-wired within the boiler). Wiring diagram Fig. 3 shows the external circuit of the ancillary controls connected to the Protectorelay and also indicates the provision for the wiring in of a room thermostat and clock control (4-pole type).

The Control Box, transformer and terminal block are mounted on a removable panel inside the casing, the connecting wires being fitted with connectors in order that the control panel may easily be removed.

Water Guard Controls Where the boiler is fitted with the automatic "Waterguard" control please see the additional connection diagram and information of page 2.

Earth Connections Earth connections are provided as follows : on the mains supply, control box, transformer and on the motor. Always ensure that these are reconnected after servicing.

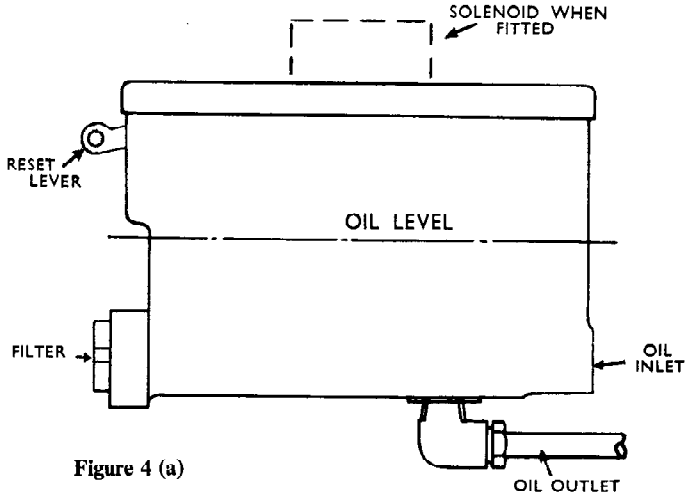


Figure 4 (a)

The Oil Control The oil level in the burner is maintained by an oil flow control similar to the carburettor on a motor-car.

The oil control used on the WF Boilers is the Kingsway Control, which is preset at works to give the necessary oil level in the burner, and has the oilflow setting calibrated as shown on Fig. 1 page 5.

The burning rate can be checked with an oil rate gauge as shown in Fig. 6 and explained below.

Adjustment of Oil Level The adjustment is factory set and should not be altered by the user unless advised by the Company's representative.

The only installation adjustment necessary is that of levelling the boiler on site by screwing the feet up or down see section on 'Installing the Boiler' (page 10).

The oil flow is governed by a needle valve operated by a float inside the control, which is connected to a starting lever situated outside the body of the control.

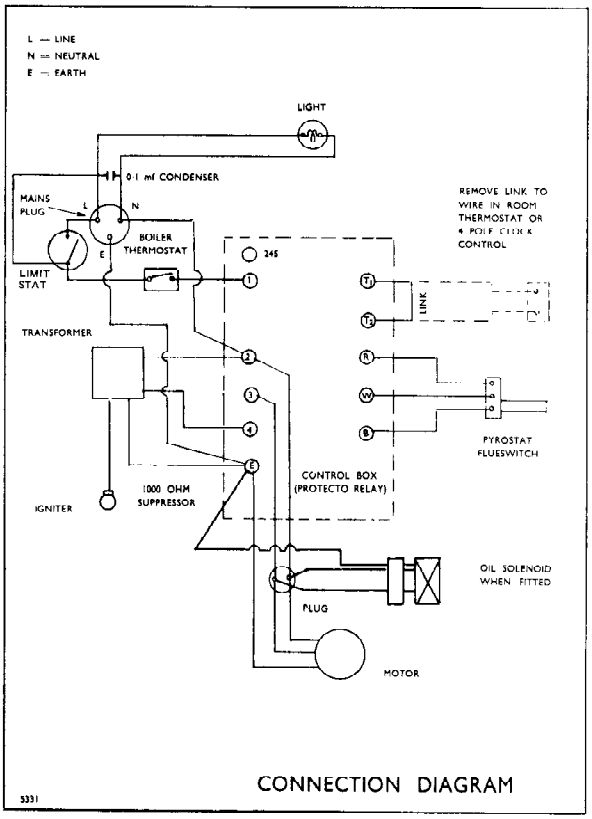
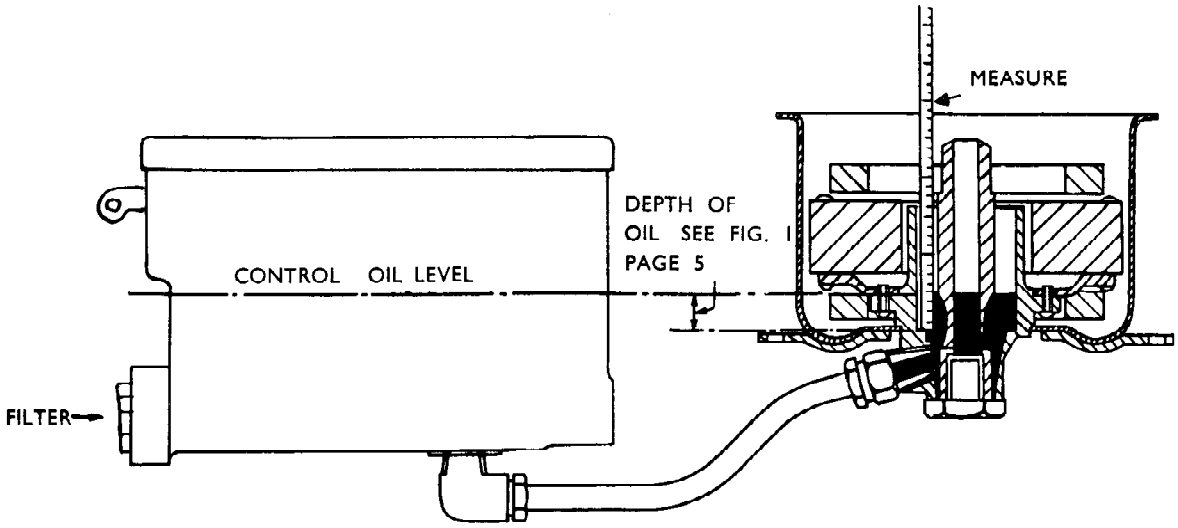


Figure 3

All oil controls have been thoroughly tested before leaving the factory and, should any fault be proved in one, it is advisable to exchange it for a new one rather than attempt to repair it. A new control may be obtained by your installer from the local Wilson Distributor.

The Thermostatic Temperature Control This is fixed to the control panel within the boiler (see Fig. 5). Desired boiler water temperatures are obtained by turning the thermostat control to any selected temperature reading between 140-180°F, the recommended maximum temperature setting is 180°F. The minimum setting is 140°F, below this, the boiler will not operate efficiently. (see Cycling of Burner page 11).



MEASURING DEPTH OF OIL IN WELL OF BURNER MOTOR **Figure 4**

Extra Equipment
Room thermostats for temperature control, cylinder thermostats and time switches can be supplied if required.

Clean Air Act
All models comply with statutory regulations.

Fuel
The recommended fuel is Commercial Grade Kerosene which has a viscosity of approximately 28 seconds Redwood No. 1—100°F.

Packaging
The boiler is supplied as a completely packaged unit.

PRE-INSTALLATION REQUIREMENTS
Chimney The Oilheat Boiler has a very high efficiency and care must be taken to ensure that the chimney is suitable. The following points should be observed :

Draught Required. The flue must have a draught measured in the cold condition, of a minimum of .01" w.g.

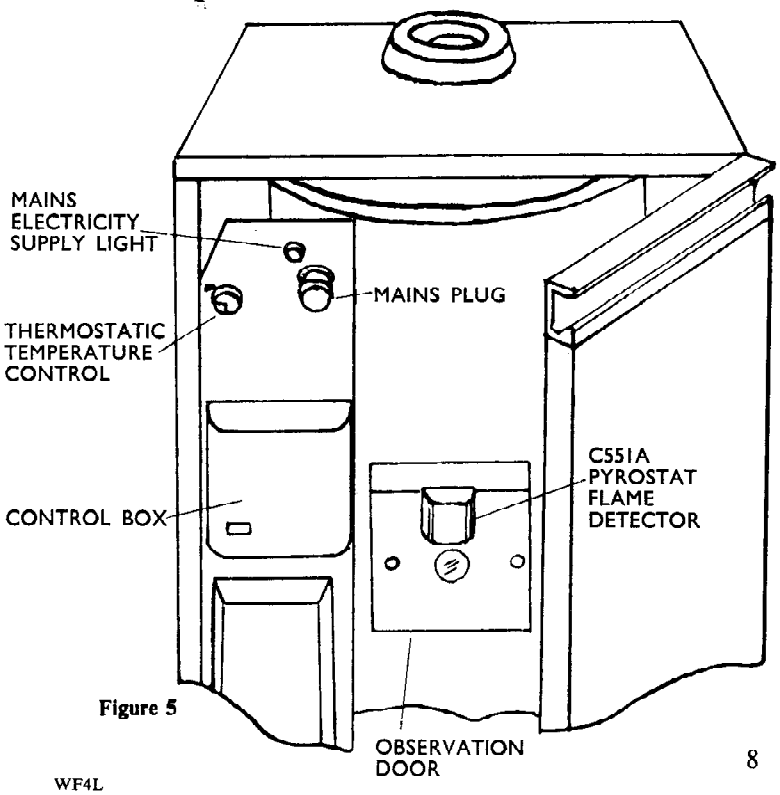


Figure 5

Down Draught The chimney or flue must terminate in a position at least 5 ft. higher than a flat or pitched roof, and 3 ft. higher than the ridge of the roof, tree or building within a distance of 30 ft. and be free from down draught.

Capacity The chimney or flue must have a cross-sectional area that is at least the area of the flue outlet of the boiler. Preferably one size larger.

Existing brick chimneys should be inspected for cracks and, if necessary, repaired. They should be cleaned before installation of the boiler to ensure that there are no restrictions and falls of soot. It is an advantage, where possible, when fitting a boiler to a brick chimney stack, to line the stack with asbestos flue pipe, salt-glazed pipe, or suitable aluminium flexible liner. This ensures that the flue cannot become blocked with falling rubble, etc., and that the flue efficiency will be improved, thus reducing to a minimum the possibility of a cold flue and condensation.

External Flues
All external flues of metal or asbestos should have cleaning facilities and be well insulated to maintain the correct flue conditions. The most efficient method of insulation is to use a double jacketed flue which consists of two flue pipes, one within the other, suitably sealed at both ends to form a uniform air space. This double insulated flue pipe is available from builders' merchants. These flues should always be fitted with a terminal, open cone cap or equivalent. A good type of terminal available to prevent down draught in installations where these adverse conditions may occur, is an 'H' terminal. The responsibility for avoiding down-draught conditions must always remain with the installer. If the flue is suspected to have down-draught conditions, this should be rectified by extending the flue and fitting a cowl.

IMPORTANT—Free Air Entry
For the burner to operate correctly it is necessary to admit at low level, a minimum quantity of air equal to at least one and a half times the flue outlet area. This free air must be admitted into the room and be available to the burner at all times.

Air entry positions in the base of the boiler must always be kept clean.

Where air exhaust fans are fitted in the room, it is important to ensure that they do not interfere with the air supply to the boiler.

Oil Tanks

1. Oil tanks are available in all sizes, but when commercial paraffin is delivered in bulk quantities, the price per gallon is reduced. For deliveries over 200 gallons there is a reduction in price, and for deliveries over 500 gallons there is a further reduction.

An oil tank should be unpainted on the inside but painted on the outside.

To gain the benefit of these reductions, it is recommended that tanks of at least 275 gallons or 600 gallons capacity be installed.

2. Two standard types of tank can be obtained.

Tank No. 1. When the tank site is not adjacent to the tanker off-loading place. The tank should be fitted with the following :

(a) A level gauge (NOT glass, which can easily be broken and cause an oil flood), or a dipstick.

(b) A filling pipe with cap to suit the hose fittings of the oil company's delivery tanker, extended to a position where the tanker can off-load the oil.

(c) A vent pipe with weather-proof return vent and wire guard (the pipe to be as large as the inlet pipe—minimum size 1¼" B.S.P. on 275 gallons and 2" B.S.P. on 600 gallons).

The pipe must not be cross-connected with the filler-pipe or burner supply pipe, nor must it project inside the tank. The vent pipe must not be allowed to end near a window.

(d) An outlet connection 2" above the tank bottom to suit the oil pipe running from the tank to the boiler.

(e) A drain plug or valve at the opposite end to the outlet.

Tank No. 2. When the tank site is adjacent to the tanker off-loading place. The tank should be fitted with the following :

(a) A level gauge (NOT glass, which can easily be broken and cause an oil flood), or a dipstick.

(b) Loose, hinged-type manhole, which acts as both vent and filling point (performs duty of 'b' and 'c' in Tank 1).

(c) An outlet connection 2" above the tank bottom to suit the oil pipe running from the tank to the boiler.

(d) A drain plug or valve at the opposite end to the outlet.

NOTE : Galvanized tanks should not be used.

3. Whenever possible, the tank should be placed outside the building and should be easily accessible for filling.

4. The tank should be set with a fall of not less than ¼" per foot length, towards the drain plug or valve (Fig. 6).

5. If it is not possible to site the tank outside, it can be installed within the building. In this case, check on local fire regulations as there are special requirements in different areas.

6. The outlet of the oil tank must be at least 1'-6" above the level of the burner, and the top of the tank not more than 8 feet above this level.

Oil Fuel Pipe

Copper tube with a *minimum bore* of 5/16", inconjunction with flared fittings (such as Teddington) are recommended for fuel lines. Copper tube is easy to work, is scale-free, and the flared fittings ensure good joints.

Galvanized pipes and fittings should never be used.

Indirect Hot Water Storage Cylinders

The boiler must only be used with an indirect cylinder which should be sized to individual requirements (see Fig. 1 for guidance).

MOST IMPORTANT

If the boiler is intended at any time to heat hot water storage supply only, it is advisable in order to obtain the maximum fuel economy and highest boiler efficiency that *the boiler is controlled by a cylinder thermostat.* The boiler thermostat may then be used as a limit thermostat, and the cylinder thermostat—supplied on request as an extra—direct immersion or surface clamp-on type (with isolating switch in circuit) may be used to control the desired cylinder water storage temperature. A greater economy of fuel is made, due to the less frequent demands on the boiler caused by temperature change.

Constant Head Valve

If the head of oil exceeds 8 feet (see Fig. 6) it is necessary to use a constant head valve to provide and maintain a constant pressure head of oil in the supply line to the burner. This valve must be installed so that the oil will be continuously supplied to the float chamber of the oil control, so permitting the action of the float and needle-valve mechanism to maintain the proper oil level.

Fire Valve

British Standard No. 799 PT 2, in the interest of safety, requires a fire valve with a cut-off temperature of 155°F to be fitted in the oil supply line. In single family dwellings a capillary type valve is recommended. British Standard Code of Practice No. CP 3002 PT 2. The boiler is provided with a clip to take the phial of the capillary type fire valve.

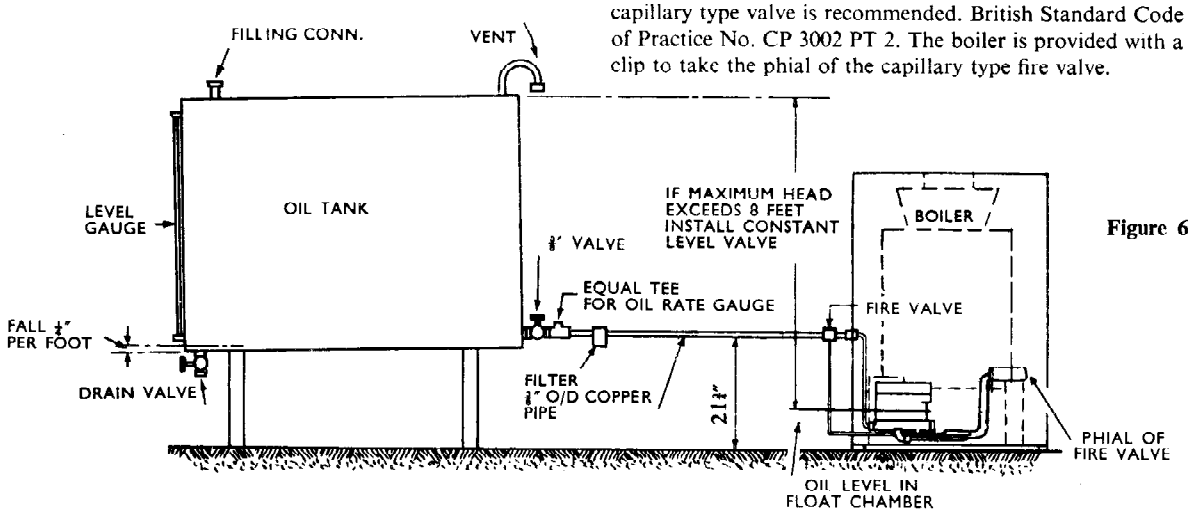


Figure 6

OIL STORAGE TANK INSTALLATION DETAILS

INSTALLING THE BOILER

General It is recommended that the installation of automatic domestic boilers be carried out in accordance with the regulations of the authorities having jurisdiction over such installations (i.e., Water Board, Fire Service, Insurance, British Standard and local authorities).

Positioning the Boiler Place the boiler on a non-inflammable base as near to the chimney as possible in order to minimize the number of elbows and bends in the flue pipe.

Level the boiler and burner with a spirit level across the motor centre brass bearing with the rotor out (3″ spirit level). Four adjustable feet below the boiler baseplate are provided to enable this to be done.

Burner will not work properly unless it has been properly levelled along with the oil control.

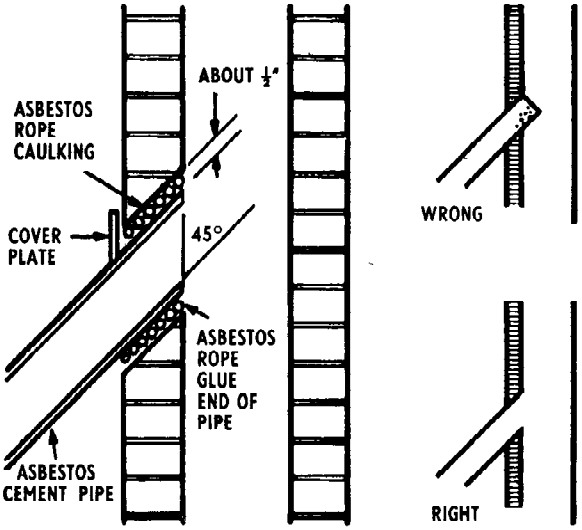


Figure 7

Connecting the Chimney Connect the flue outlet of the boiler to the chimney in accordance with building regulations (see Fig. 7). The connection pipe should have an accessible cleaning door. A flue break is incorporated in the boiler.

Water Pipe Connections Make the flow and return connection to the most convenient tappings on the boiler, plugging up those not used. The boiler should only be used with an indirect cylinder for domestic hot water.

Oil Fuel Pipes Fuel pipes must be 100% oil-tight. Leaks, no matter how small, are detectable by oil stains and by smell, and will cause immediate complaints. Before using any jointing compound, check that it is suitable for commercial paraffin (Foliac Red Jointing Compound gives good results). After an unsatisfactory compound has been used, leaks will develop over the weeks and cause air-locks and subsequent troubles with the burner. (Do not use boss-white jointings).

Avoid running the pipework with sharp bends, etc., which might cause air-locks.

Fig. 6 gives a typical layout for oil tanks and supply line. The fittings required on an oil supply line are :

(a) Copper tube or iron pipe 3/8″ or 5/16″ inside diameter *minimum.*

(b) Manual shut-off valve at tank outlet.

(c) A manual shut-off valve at boiler (optional to facilitate servicing, etc.).

(d) A Fire Valve is supplied with each boiler (as an extra) and provision is made on the boiler for it. It should be positioned as in Fig. 6. The shut-off temperature is 150°F. The phial should be located in the clip provided on the front right hand leg and the valve should be fitted as near to the oil pipe entry into the building as the capillary will allow.

(e) Small line filter (strongly recommended to save servicing of control filter).

When the supply line has been run from the tank to the boiler, the oil installation work is complete.

Oil Connection The main oil supply pipe should be connected into the oil control and then the control checked with a spirit level to see that it is still level in both directions. If it is not, adjust the bracket accordingly maintaining the correct oil depth in the motor as Fig. 4.

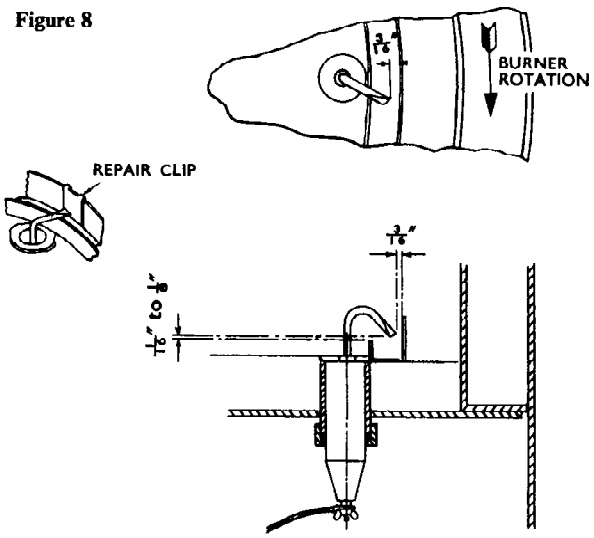
Installation of a Room Thermostat 24 volt Type In the case of small bore systems heating only, a room thermostat is recommended for more economical running. It should be wired across terminals T & T1 on diagram Fig. 3 page 7, not forgetting to remove the link fitted when the boilers are despatched from works.

Time Controls Time clock control can be wired into the Wallflame circuits, to give greater economy.

If the clock is of the independent motored type (i.e. 4 poles)it is wired across terminals T & T1 on diagram Fig. 3, page 7 and in series with any room thermostat being used. If the clock is not of the independently motored type (i.e. 3 poles) it is wired across the incoming main L to terminal 1 on diagram Fig. 3 and on page 7.

Electrical Connection A plug and socket is provided inside the boiler at the top of the control panel and mains supply 200–250 volts A.C. should be connected to this.

Figure 8



Burner

After removing the front inspection door, check that the igniter height is 1/8" above the low step of the flame rim and 3/16" from the high step of the flame rim (see Fig. 8). Check that the hearth backing ring is seating down onto the hearth then set the air damper half open ready for the trial start.

Float Control Valve Adjustment The sketch Fig. 4 shows the relative position of the valve to the motor, the motor having an oil well in which a supply of oil is always maintained. The amount of oil in the oil well is determined by the height of the oil level in the control valve. For proper operation the depth of oil should be as given on Fig. 1 page 5, and this depth should be checked as levelling of the boiler may alter the setting. A slotted bracket on the oil control is provided to permit adjustments being made if necessary.

When a unit has too much oil in the well, the distributor will pick up the excess oil on the start, resulting in a high fire that levels off only after the excess oil has been burnt; this condition will give rise to oil odours and noise. Further, due to a lack of air on start, the flame will have a tendency to float and may even snuff out, causing a safety shut-down.

A unit with insufficient oil in the well will cause a fluctuating fire which cannot be corrected by increasing the flame rate. Ignition will be slow, and the burner may go to safety lockout as there may not be sufficient oil to promote proper combustion.

Grilles Instal the grilles on the flame rim in the low position, with the channels up. Always place the first grille immediately behind the igniter and equally space the remainder of the grilles around the flame rim (see Fig. 2).

Oil Distributor Inspect the cone of the distributor to see if it is clean and has not been damaged or nicked. Check the fan on the distributor, making certain that the oil tube lines up with the letter 'T' stamped on the top side of the fan. Replace the distributor in the motor and spin it to make sure that it is free (see Fig. 10).

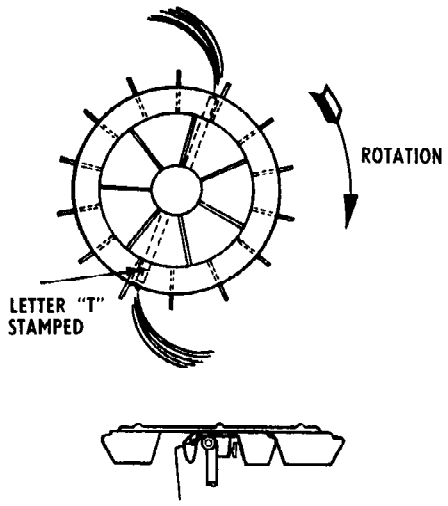


Figure 10

Adjustment of Oil Level The adjustment is factory set and should not be altered by the user unless advised by the Company's representative.

ROUTINE FOR STARTING UP

Check over before starting :

(a) that the oil tank is filled with the recommended fuel ;
(b) that all valves are open in the oil line ;
(c) depress lever on oil control to the 'ON' position.
(d) Check that mains supply, 5 amp. 200/250 volts A.C. has been connected to the mains plug on the control panel and that the correct voltage has been selected on the control box.
(e) Set the boiler thermostat to 180°F, cylinder thermostat to the desired temperature (about 130°F) see operating instructions pages 1 and 2.
(f) Check that all oil pipes and connections are oil tight.
(g) Check that the air damper is half open.

STARTING UP THE BOILER

Ensure that the fuel supply is on by checking all stop valves or fire valves in the fuel line. See that there is an adequate oil supply in the tank. Select the temperature required on the thermostatic temperature control or controls. Check that the lever on the oil float control is depressed to the 'ON' position. Switch on the main electricity supply. The amber light should now glow and the burner should start.

For the trial start, the air damper on the motor (see Fig. 2) should be half open. After the burner has been in operation for a short time, adjustments as detailed below should be made in order to obtain a blue fame with yellow tongues burning from the top of the grilles.

If the burner should fail to ignite from cold, this can be confirmed by :

1. Opening the casing door to observe if the burner is lit.
2. Checking whether the flue pipe is warm.

WHAT TO DO IF THE BURNER DOES NOT START

1. Check that main electricity supply is on (amber light on the control panel). If the light is not on, check the main fuses.

2. Move the red lever on the control box over to the right.

3. If the burner again goes to lock out and no flame is established, check that oil is reaching the burner and that the supply line is not air-locked.

4. If the oil control lever has tripped up, move it up and down six or seven times, to clear oil from safety trip chamber and thus re-set.

5. If oil is present at the oil control, re-start the burner as at '2' and, if the flame is still not established and the burner stops, turn off the main switch and send for the installer or service engineer.

Air Adjustment When the boiler has warmed up, adjust the air damper until the flame burns from the top of the grilles. If the flame burns in the rim, close the air shutter slightly. If the flame is high and is drawn over the fan, open the air shutter still further. The proper setting should be between these limits so that the flame burns cleanly from the grilles without excessive re-circulation over the fan. After adjustment, clamp the air shutter firmly with the wing nut located just to the left of the burner motor and again observe the flame to see that in clamping the shutter no movement has taken place. (See 'Flame Appearance' below).

The CO_2 measured at the test hole in the top of the boiler should, normally, read between 11% and 12%. Never set the burner higher than 13%.

Cleaning the Strainer Sleeve in the Oil Control

1. Turn off oil supply at the main oil stop-valve.
2. Unscrew strainer cap at front of control (see Fig. 4).
3. Clean strainer and replace tightly.

N.B.—When the burner is off there is no oil flow.

Oil Impingement After flame adjustments have been made, the level of oil impingement on the flame rim should be checked. This is done by placing several pieces of asbestos paper, 3″ wide by 1½″ high, vertically against the outer step of the flame rim. Operate the burner for about two minutes or at least 30 seconds after the ignition has cut off. After the burner has stopped, remove the asbestos pieces and examine the white band shown across them. This white band should be approximately ¼″ wide and should lie between ⅝″ and 1¼″ from the bottom. Under no circumstances should the bottom of the strike band be lower than ⅛″. The oil stream from the distributor should strike the flame rim below its top edge and above the electrode tip. Correct oil placement on a normal installation can be obtained by vertical adjustment of the burner motor.

Do not remove the asbestos gasket on WF150 boilers. On WF125 boilers one gasket can be removed and an extra one fitted. Distributor tubes are adjusted at the factory to give correct oil placement. If the tubes are bent due to mishandling, the oil distributors should be returned to the factory for replacement on an overhaul basis.

Draught An automatic draught regulator is incorporated in the boiler which under normal flue conditions obviates the use of a stabilizer. In checking draught conditions an accurate gauge is necessary and taken through the test hole in the top of the boiler, the draught reading should not exceed .02″ W.G.

CYCLING OF BURNER

The burner should not be ON-OFF for shorter periods than 8 minutes, with the full heating load on.

Any boiler that is installed in circumstances where it is called upon to operate ON-OFF at shorter intervals, cannot possibly give a good running efficiency. Boilers operating on such short ON-OFF periods give conditions that can lead to trouble and we advise you to pay particular care to the following :—

1. DO NOT instal a boiler with less than 50 sq. ft. of single panel radiation surface or the equivalent (see table below), per 10,000 BTUs. rating.

EQUIVALENT HEATING SURFACES

	Equivalent Square feet
18″ HIGH Wilson Single Panel ...	1.00
,, ,, Double ,, ...	1.24
,, ,, Three ,, ...	1.36
,, ,, Four ,, ...	1.39
*Copper Pipe feet ½ ins.	3.5
,, ,, ,, ¾ ,,	2.7
,, ,, ,, 1 ,,	2.2
Steel Pipe feet ½ ins.	3.6
,, ,, ,, ¾ ,,	2.9
,, ,, ,, 1 ,,	2.4
,, ,, ,, 2 ,,	1.4
,, ,, ,, 4 ,,	0.8

*Copper pipes painted.

2. DO NOT instal a boiler on a poor circulating gravity central heating system.

3. DO NOT instal a boiler for hot water supply only, unless the cylinder is correctly sized to the boiler see table on page 5.

It is in the user's interest, especially, that some means of thermostatic control is applied to any automatic boiler system and it is of interest to us, as boiler manufacturers, to use every opportunity we can to try and increase the following practice which will also protect the burner from cutting in-and-out on too short a time cycle.

1. Fix room-stat or indirect temperature control. This saves fuel and decreases the cycling ON-OFF of boilers generally. Allows the boiler-stat to become a safety limit thermostat with consequent additional safety feature.
2. Fix cylinder thermostat (clamp-on type or immersion). This saves fuel (up to 40% on water heating costs) and decreases the number of ON-OFF boiler operations. This also allows the boiler-stat to be used as a limit stat.
3. For combined hot water and central heating systems, the use of room-stat, cylinder stat and clock control gives an ideal method of control. The Wilson Waterguard reconciles these duties automatically and is supplied as an integral part of the boiler or can be added to a standard boiler.

Flame Appearance With the correct draught conditions measured at the boiler top test (.02″ w.g.), the flame shape that should be obtained is one of blue flame approximately 2″—3″ long, burning from the top of the flame grilles with yellow tips spreading vertically, approximately 4″ 5″ high above the blue base flame. The flame should appear clean-looking above the level of the top of the fan and the yellow flame tips, with no tendency for re-circulation to take place—i.e., the flame tips should not appear to incline inwards towards the fan in the centre of the chamber.

The flame shape should never be finally adjusted until at least fifteen minutes after start-up. The tendency for flickers of flame to drop and curl down below the grilles on the outside of the flame rim is a perfectly normal characteristic.

The combustion test characteristics on test sampling should give 11%—12% CO_2 with a smoke number 0—1. The 12% CO_2 should NOT be exceeded and with relatively stable draught conditions which can be obtained by use of the draught break, the described flame shape and combustion setting ensure that the wallflame is set for trouble-free running.

When the boiler has been operating for one hour, carry out flue gas and combustion tests. Fill in the test card (which is packed with the boiler) and return to Henry Wilson & Co. Ltd. The CO_2 should be between 11% and 12% and the smoke number of a maximum between 0 and 1. A true flue temperature cannot be taken in the test hole position due to reflected radiation.

The overall combustion efficiency of the boiler is set by reference to the smoke number and the CO_2 reading. The output efficiency of the boiler can only be checked by measuring the oil-burning rate (see Specification Fig. 1)

Oil Rate The oil rate is factory-set, but should it be necessary to check the oil rate, proceed as follows :—Instal an oil rate gauge (obtainable from Henry Wilson & Co. Ltd.) in the tapping provided for this purpose in the 'T' fitted in the oil line between the tank shut-off valve and the constant level valve. After filling the gauge to above the zero mark, start the burner, and as the oil level passes the zero mark time for two minutes, after which time the actual oil rate will be indicated.

Oil rate is adjusted by turning the metering stem in the oil control, turning the screw clockwise decreases the flow. The oil rate must be constant, as an unstable flow will cause the flame to fluctuate or change in size and make it impractical to maintain proper air-oil balance.

The changing rate of oil delivery may be due to air pockets in the supply line caused by improper piping. Dirty strainers can cause the oil flow to gradually decrease.

A burner operating under insufficient oil pressure head may also cause the flow to vary as the height in the tank changes (see recommendations on page 8).

Stopping the Burner Switch the boiler thermostat to the 'OFF' position and switch off the main electricity supply.

MAINTENANCE

It is 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. It is recommended that the boiler is serviced twice a year.

On such service visits, the following procedure should be carried out :—

1. Clean all flueways and all the inside surfaces of the boiler.
2. Remove and clean the oil distributor.
3. Clean all grilles and the flame rim.
4. Clean igniter.
5. Clean air intakes on motor.
6. Clean all filters.
7. Clean contacts in burner control and flue-switch.

If the Boiler is to be Shut-down for the Summer

1. Switch off the main electricity supply.
2. Turn off the boiler by means of the temperature selector thermostat.
3. Carry out a normal service, as above.
4. Close all stop-valves in the oil supply pipe.
5. Lightly lubricate internal surfaces of boiler.

A SEQUENCE FOR CARRYING OUT A MAINTENANCE SERVICE

This may prove helpful to those concerned and, if followed, will most certainly ensure the boiler gives satisfaction at all times. After observing the installation in operation, with particular reference to the colour and shape of the flame, proceed as under :—

1. Turning the Boiler Off.

Turn the temperature selector thermostat to the 'OFF' position and close stop-valve in the oil supply line.

2. Electricity Supply

Switch off the electricity supply at the main switch.

3. Cleaning the Boiler

Access may be gained to the top interior of the boiler by first removing the top casing panel, which will expose the insulating boiler top cover. The cover can now be removed and the retarder withdrawn, or cleaned.

Take out all the grilles and throughly clean. Remove rotor assembly by lifting vertically until it is clear of the motor. Cover rotor bearing with a rag. Clean and examine rotor to see that it has not been damaged. Check that the fan is correctly lined up with the oil tube as shown in Fig. 10. All the internal surfaces of the boiler, together with the retarder, should be cleaned of deposit with a cleaning brush.

4. Remove any carbon which has formed on the igniter and check that the setting is as shown in Fig. 8.
5. Remove any dust or dirt which has collected on the air intakes on the motor.
6. Clean all the oil filters and if any are found to be damaged they should be replaced.
7. Clean the relay contacts in the burner control box and flue-switch by sliding a hard-finish paper such as a business card between the contacts. Never lubricate the controls, and do not bend any of the relay contact blades or stops.

Reassembling

1. Check that the boiler backing ring is seating down onto the hearth-plate.
2. Replace the grilles on the flame rim, starting with one immediately behind the igniter and evenly spacing the others around the rim.
3. Replace the rotor assembly after removing rag from bearing and spin to make sure that it is free.
4. Replace retarder if it has been removed, insulated boiler top and casing top.
5. Open the main oil valve and depress the starting lever on the oil control.
6. Switch on the main current ; the amber light on the facia panel should then glow.
7. Restart the burner as instructed in 'Starting the Boiler', and check the operation of all controls after the boiler has warmed up.
8. Test figures should now be taken with instruments to ensure that the boiler is working at its maximum efficiency CO_2 between 11% and 12%. Smoke No. 0—1. Draught 0.02 ins. w.g. max.

HOW TO CHANGE FAULTY CONTROLS

Before changing any parts always see that the mains switch serving the boiler is 'OFF'.

How to Change a Faulty Protectorelay Control Box

Disconnect all leads from the control panel and remove panel by removing securing screw at bottom and lifting panel off bracket. Remove the cover of the box and disconnect all cables. The interior of the box is removable from the case to facilitate this. By releasing the four spring catches the interior is released and can be replaced by a new interior, which should be re-wired in accordance with the diagram Fig. 3.

How to Change a Faulty Pyrostat Flue Switch. (High Temperature Type C551A/1030).

This is fitted to the combustion chamber observation door. with the insertion tube extending into the combustion chamber. The cover is removable for access to the cables, which should be disconnected before removing the Pyrostat. Instructions for removing and replacing are given on page 18.

How to Change a Motor Assembly

It is first necessary to remove the rotor assembly from inside the boiler. Remove front inspection door lift the rotor assembly vertically and remove through boiler front door opening.

There are two electrical and one earth connections from the motor assembly and these should be disconnected

The oil feed-pipe to the motor assembly should be broken at the connection below the base of the assembly.

The motor assembly is supported free from the hearth plate by two studs with running nuts. By releasing these nuts the motor assembly can be dropped and removed, the asbestos washers are fitted between the motor assembly and the hearth plate and these must be carefully replaced on reassembly.

ALWAYS TAKE CARE to replace all parts in their correct order and check them for performance in accordance with the instructions given previously under 'Starting the Boiler'.

For further information regarding the installation and operation of the Protectorelay Control and the Pyrostat Flue-switch, see page 6.

How to reverse the thrust pad or to replace it with a new thrust pad: on a 'J' model motor.

1. Shut off the oil supply by tripping the float control.
2. Remove the rotor and fan assembly from the boiler.
3. Remove hexagon bearing sleeve screw, allowing thrust disc spring, and the thrust pad to fall free.
4. To replace assembly place spring in housing of bearing sleeve screw and place thrust pad on top of spring with unblemished side uppermost. It will assist replacement if the thrust pad is held in position on spring with a small blob of thick grease. Check that the gasket, is not damaged. If it is replace it.
5. After tightening the bearing sleeve screw replace the rotor assembly and press on top of fan to check action of spring. If the rotor assembly cannot be pressed down against a distinct spring pressure then slacken bearing sleeve screw to allow the thrust plug to reseat, then retighten. Under no circumstances attempt to run Burner without first checking that the pad is free to move.

During this last operation it may be found that the bearing sleeve rotates when adjusting the unit. It is quite sufficient to steady the bearing sleeve with the hand when tightening.

Do not attempt to use grips, otherwise damage to the end of the main bearing sleeve bore may occur.

6. Spin rotor and fan assembly to ensure freedom of movement in main bearing sleeve.
7. Reset oil level control lever and refire Burner.

Should the old thrust plug be considered unusable then replacements may be obtained from ourselves or the Burner manufacturers.

How to reverse or change a thrust pad on an O.C.A. 10 Burner Motor.

1. Shut off the oil supply by tripping the float control.
2. Remove rotor and fan assembly from the boiler.
3. Pull out electrical lead plug to motor.
4. Disconnect oil pipe between oil control and bottom of motor.
5. Undo the 2 clamp nuts securing motor to hearth plate take out motor carefully to avoid damaging the asbestos joint.
6. Unscrew brass rotor bearing using a spanner on the flats provided. Do not use grips.
7. Lift out thrust pad and reverse or change for a new one.
8. Reassemble in reverse order ensuring that the spring below the thrust pad is correctly fitted.
9. Spin rotor and fan assembly to ensure freedom of movement in main bearing sleeve.
10. Reset oil level control lever and refire burner.
11. Check oil strike height, which if requires adjusting, is done by raising or lowering the motor stator after first slackening the clamp screw at the base of the motor. (It is not necessary to add or subtract asbestos washers as on the 'J' burner motor) ensure clamp screw is retightened after strike height has been set.

FAULT FINDING

IMPORTANT. Before handling any parts of the electrical curcuit be sure that the **MAIN SWITCH** is in the **OFF** position.

Fault	*Cause*	*Remedy*
1. No Ignition.	(a) Carbon formation at spark gap.	Remove carbon, check adjustment of electrode Inspect for air leaks.
	(b) Hole burned through flame rim.	Repair by fitting repair clip, as shown in figure 8.
	(c) Electrode burned short.	Readjust or replace.
	(d) Scale in groove or insulator gap.	Remove the scale and also clean inside the boiler.
	(e) Broken or cracked insulator.	Replace.
	(f) Defective transformer.	Test by connecting a wire to H.T. terminal and adjusting a $\frac{1}{2}$" gap between wire and transformer case. If no spark occurs transformer is faulty and should be replaced. Do not hold by hand when testing.
	(g) Defective wiring.	Usually detected by sparking or burning at the point of failure. Replace wire.
2. Slow Ignition.	(a) Oil rate too low.	Clean strainers at filter, oil control valve and constant level valve. Reset oil rate.
	(b) Weak ignition spark.	Check electrode adjustment, replace insulator or high-tension wire if necessary. Make certain H.T. wire and earth wire are securely attached. Check transformer and replace if necessary.
	(c) Incorrect oil placement.	Check oil placement with asbestos paper so that the oil placement is above spark gap with top of oil strike $1\frac{1}{8}$" to $1\frac{1}{4}$" from bottom of outer step of flame rim.
	(d) Flame establishes but goes out before ignition cuts out.	Check ignition timing, which should be approximately 70 secs., adjust if necessary or replace control box.
	(e) Poor oil.	If suspect, have sample gallon tested and advise Suppliers if necessary.
3. Motor and Ignition will not Start.	(a) Boiler thermostat set too low.	Advance boiler thermostat.
	(b) Main switch open (amber light does not glow.)	Close switch.
	(c) Master control on Safety.	Operate re-set switch on master control (move red lever to right). Allow 5 mins. before resetting a second time.
	(d) Fuse blown.	Replace fuse. If fuse blows again, inspect for short circuit.
	(e) Dirty control contacts.	Clean contacts on master control, thermostat, limit control using a hard-finish paper. Place between contacts, press together, and draw paper through. Never use a file or sandpaper.
	(f) Broken or loose wire.	Locate and repair or replace wire.
	(g) Defective controls.	Repair or replace.
	(h) Flue switch out of step.	Remove cover of flue switch and push the positioning lever backward, and observe that the contacts make (see installation Instructions on p. 18.).

Fault	*Cause*	*Remedy*
4. Motor Fails to Start, but igniters spark.	(a) Motor seized.	Open main switch and see if rotor can be turned by hand. If not, remove, clean and oil bearing. If damaged, replace.
	(b) Motor winding burned out.	Replace.
	(c) Motor does not start but will run after being spun by hand.	Starting winding is defective. Replace or renew motor.
	(d) Motor lead broken or disconnected.	Repair.
	(e) Motor contact on relay not making contact.	Examine and clean or repair as necessary.
5. Motor and Ignition Start but no oil is delivered.	(a) Oil tank empty.	Check tank to see if gauge is stuck, and refill.
	(b) Shut-off valve on tank closed.	Open valve.
	(c) Dirty strainers.	Remove and clean all strainers, main filter, constant level valve, oil control.
	(d) Constant level valve stuck.	Close main oil valve and clean.
	(e) Oil distributor blocked.	Remove fan and distributor and clean tubes. If distributor cannot be cleaned properly, replace. Never bend tubes.
	(f) Main oil supply pipe blocked.	Disconnect pipe and clean thoroughly.
	(g) Control tripped out.	Move starting lever on oil control up and down 6 or 7 times to expel oil from Safety Trip Chamber.
6. Motor and Ignition Start, oil is delivered but no flame develops.	(a) Insufficient oil rate.	Check oil strainers and clean if necessary. Reset oil rate. Check depth of oil in well and adjust if necessary.
	(b) Faulty ignition spark.	Check electrode setting. Replace defective igniter or H.T. wire. Test transformer and replace if necessary.
	(c) Incorrect oil placement.	Oil spray may be striking flame rim too high or too low. Check with asbestos tape and adjust as necessary so that top of strike band is between $1\frac{1}{8}$" and $1\frac{1}{4}$" from bottom of flame rim. Readjust
	(d) Excessive air.	air shutter to give CO_2 reading between 11% and 12%.
7. Flame established but snuffs out, puffs or is slow to stabilize during starting.	(a) Insufficient air supply.	Adjust air shutter as at 6(d).
	(b) Oil rate too low.	Adjust as at 6(a).
	(c) Bad draught condition.	Clean boiler and flues.
	(d) Ignition timing too short.	Check that ignition timing is at least 70 secs. If timing cannot be lengthened sufficiently, replace control box.
	(e) Depth of oil in well too high which causes an extra surge of oil at start which is likely to cause puffing.	Check depth of oil in well and set to correct depth if necessary (see Fig. 1 page 4).

Fault	*Cause*	*Remedy*
8. Burner starts normally, flame is established normally, but burner shuts off in short time.	(a) Low oil rate, causing insufficient heat to reach flue switch to put it into the running position.	Check for dirty strainers. Check oil rate and adjust if necessary.
	(b) Dirty contacts on flue switch.	Clean contacts.
	(c) Soot on flue switch element, causing slow operation.	Remove flue switch and clean element. Check that spindle moves freely.
9. Carbon Formation.	(a) Soft carbon or soot, due to oil not being completely burned.	Check oil rate. Check air shutter setting. Check that flame is not burning in the rim. Check that there are no air leaks into the boiler or igniter, edge of hearth, or fire door.
	(b) Hard carbon due to insufficient heat at flame rim.	Check condition of hearth wall ring and replace if necessary. Check oil rate. Check operation of all thermostats, making sure that they do not operate too quickly. Have sample of oil tested.
	(c) Varnish or resin formation.	Remedies as for hard carbon.
10. Pulsating Fire.	(a) Rapid pulsation.	Too much air, adjust air shutter. Check draught, which should not exceed .02″ W.G. If maximum firing rate is not required for the connected load, reduce the oil rate to not less than 80% of the maximum and readjust flame.
	(b) Slow pulsation.	Usually due to insufficient air supply : adjust air shutter.
11. Fluctuating Fire.	(a) Slow ignition, causing oil to pool on hearth which burns and gives excess volume of fire.	Correct slow ignition.
	(b) Dirty distributor.	Remove rotor and clean oil tube. If damaged, replace.
	(c) Faulty oil pickup.	Inspect rotor for nicks or dirt which might prevent steady oil pickup.
	(d) Air trapped in oil line.	Clear all air locks. Use 3/8″ pipe drop from tank to floor. To purge air from line, disconnect oil line at outlet of oil control and open metering stem to maximum. Allow oil to flow freely, then reconnect and adjust oil rate.
	(e) Improper oil depth in well.	Adjust oil depth to correct depth as on Fig. 1 page 5
12. Oil Odours.	(a) Leaking oil joints.	Break all leaking joints and re-make, using a good pipe-jointing compound.
13. Puffing and Fumes during starting period.	(a) Inadequate chimney conditions.	Check that chimney is free from obstruction and that it is high enough to give good conditions.
	(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 the gases out of the boiler.
	(c) Slow ignition.	Correct.
	(d) Oil-soaked hearth, due to slow ignition.	Check that the thermostats are not operating too quickly and preventing the burner operating sufficiently long to burn the oil on the hearth.

R867 PROTECTORELAY* AND C551A PYROSTAT*

(Used with Wallflame Burner)

These instructions are confined to the provision of an Electric supply, and the setting of the controls into operation, all installation work and necessary wiring within the boiler case having been carried out by the manufacturers.

ELECTRIC SUPPLY

All wiring must conform to I.E.E. or other applicable codes and regulations.

R867A. ELECTRICAL RATING OF CONTACTS

Burner Motor - 230-volt 3.7-amp. full load current.
22.2-amp. starting current.

Ignition - - 500-VA.

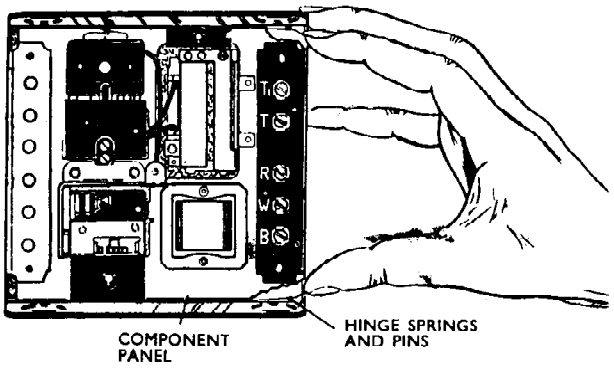


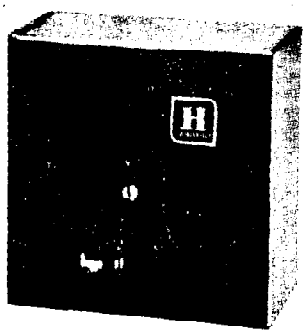
Fig. 1. Operating the hinge spring

If the control has to be replaced it is only necessary to replace the internal component panel which can be removed after disconnecting the electrical leads as shown in fig 1.

INITIAL START UP

The following instructions assume that both the electric supply and oil supply are switched through to the boiler, and that the trip on the B.M. oil control has been re-set:–

1. Turn the Thermostat to a high setting, i.e., calling for heat.
2. Re-set lockout switch by moving the red button on the front of the relay case to the right and releasing.



3. If the supply voltage is above 220 volts and up to 250 volts, place the link between terminal 1 and the 245-volt terminal.

If it is necessary to connect the incoming electric supply direct to the Protectorelay in the absence of a terminal strip on the boiler, ensure that line is fed to terminal 1 and neutral to terminal 2. A ground terminal is provided at the bottom of the Protectorelay case.

INSTALLATION INSTRUCTIONS

Application

The C551A is a mechanical flame detector for use with Protectorelay* oil burner controls R8142 and R8143. This one-piece insertion-type detector mounts outside the combustion chamber with the sensing element extending through the furnace wall into the area above the flame.

Installation

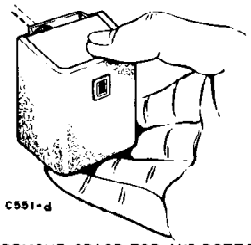
Follow the appliance manufacturer's instructions whenever provided for a specific installation. The following general directions are intended for jobs on which no other instructions are available.

LOCATION: The detector should be located so that the insertion tube extends into an area above the flame, not in the flame. Equilibrium temperatures in the space around the tube should be within 800-1200°F for 12 inch element or 900-1200°F for the 9 inch element for best flame response time.

REMOVE COVER:

The wrap-around cover for this device snaps on, and latches on each side.

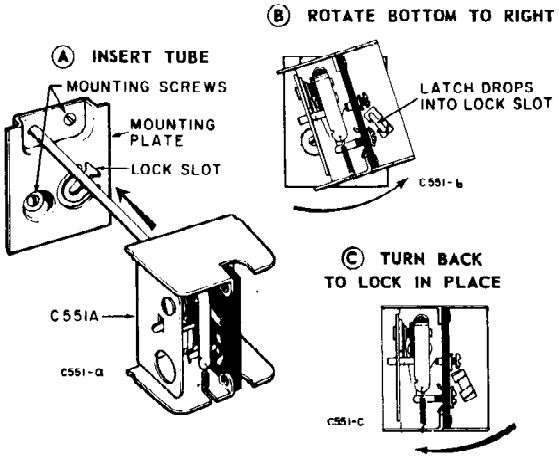
To remove the cover, grasp the top and bottom front with the fingertips, and pull straight outward as shown below. Avoid squeezing and pulling the cover at the sides since this does not allow it to unlatch.



TO REMOVE: GRASP TOP AND BOTTOM COVER AT FRONT AND PULL

MOUNT DETECTOR:

See illustration below. Insert and slide the tube all the way in (A), rotate the detector slightly (move bottom to right ⟶) until the latch drops into the lock slot (B). Turn back to lock the detector in place (C).



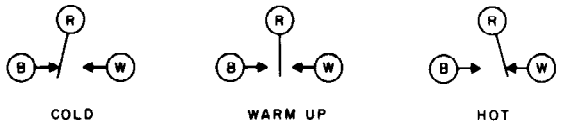
C551A PYROSTAT* FLAME DETECTOR

Operation

SWITCHING ACTION:

Normal Start—

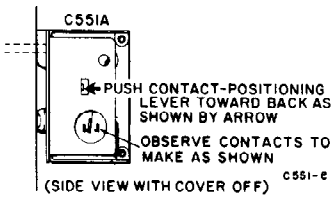
1. At starting position, the detector contacts are made R-B (cold contacts). See also, "PLACING CONTACTS IN STEP", below.
2. During the initial warm up, the contacts break R-B.
3. On further increase in temperature, the contacts make R-W (hot contacts) for the remainder of the normal run.



PLACING CONTACTS "IN STEP":

During a long burner shutdown, of several days or weeks, the detector contacts may drop out of starting position. If this happens, the burner cannot be started until the detector contacts are put back "in step" (in starting position).

To place the contacts in step, remove cover, push the positioning lever backward, and observe that the contacts make as illustrated in the side view, below.



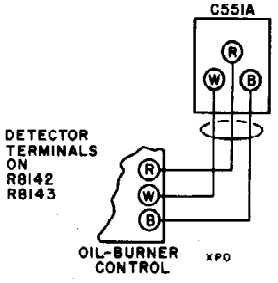
Checkout

CHECKING FLAME FAILURE RESPONSE:

1. Start the burner (turn up room thermostat setting or jumper T-T terminals on the primary control).
2. Manually turn off the valve in the oil supply line.
3. Wait until the flame goes out. Then immediately begin keeping time and observing the burner relay on the primary control. It should drop out in less than 30 seconds.

WIRING:

All wiring must conform to applicable electrical codes. Connect the detector to the oil-burner-primary control, letter-to-letter, as shown in the diagram below.



INSTALLATION OF WILSON WATERGUARD AUXILIARY COMPONENTS

(1) ROOM THERMOSTAT

Fix room-stat in living room about 5 ft. from floor on inside wall at least 3 ft. from junction with outside wall in position where cold draughts, direct sunlight or heat from radiator, electrical appliances etc. are unlikely to upset the operation of the room-stat by switching heat on or off prematurely.

(2) CYLINDER THERMOSTAT

Thermostat should be firmly clamped to the cylinder with the band and clips supplied. If band is not long enough spring curtain wire can be substituted.

Position cylinder-stat at one-quarter to one-third of the cylinder height up from the bottom and away from the cold water feed so that the cylinder-stat will not operate each time a cup full of hot water is drawn off. Keep lagging ½ in. clear of cylinder thermostat.

(3) WIRING

On panel mounted waterguard boilers the wiring to the room thermostat and the cylinder thermostat can be carried out in 24 volt roll wiring to local regulations. The room stat is wired to the red plug on panel and the cylinder stat to the blue plug.

On the small separately mounted waterguard relay box the connections are all on mains voltage and only mains voltage cable should be used.

(4) PUMP

Wire circulating pump into white plug on control panel using mains voltage cable and in accordance with local regulations.

(5) PREVENTION OF GRAVITY CIRCULATION WHEN PUMP IS OFF

Gravity circulation in the heating circuits, with pump stopped, must be killed by dropping the heating flow-pipe from the boiler before rising, or by fitting a check valve which requires pump pressure to open.

(6) COMMISSIONING WATERGUARD

Set time clock so that boiler can fire, usually between 6 a.m. and 11.30 p.m.

Set boiler-stat to 180°F., cylinder-stat to 130°F, and room-stat off.

Switch on and fire boiler until it switches off. Raise boiler-stat to maximum. If boiler fires again, it shows that cylinder cannot accept full boiler heat input. Lower boiler-stat to 180°F. and repeat at the end of the next firing period until the boiler does not fire when the boiler-stat is raised to maximum. This will indicate that the cylinder-stat has operated and that the cylinder is full of hot water. Leave the boiler-stat set at 190°F.

Raise the room-stat to the desired room temperature (usually 70°F.). The boiler should fire and these are the conditions obtained each morning when the time-clock switches on the heating, except that the boiler is already hot. The system will warm up fairly quickly but there will be plenty of time to make final burner adjustments and to make flue gas tests. Air will be expelled from the water in the system as it heats up, so go around bleeding the air cocks. When the room with the thermostat reaches the desired temperature, the boiler should switch off and remain off until the next call for heat from the room-stat or the cylinder-stat. Note whether room temperatures have risen evenly. If not, turn the radiator valve down halfway in the room which warmed up quickest. Explain to the householder that, from now on, the operations will be completely automatic but final adjustment of room temperatures to his own liking may take several days and that the best way is to turn down radiator valves half way in rooms which warm up too quickly and see what effect it has next day. If the adjustment was too much or too little, open up or turn down a quarter and watch results and so on with an eighth or less adjustment, until the whole house is as he wishes it to be.

Advise the householder not to touch the boiler-stat or cylinder-stat and that the room-stat need only be adjusted if he wants the house to be a little warmer or a little cooler (the humidity is higher in mild weather and 68°F. may be more comfortable than the 70°F. required in colder weather).

A check should be made a week or so after the installation has been completed to ensure that the householder is completely satisfied.