



BB2

MARINE INSTALLER INSTRUCTIONS

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Read in conjunction with the appropriate: -

1. Oil control valve leaflet.

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## 1. BEFORE STARTING THE JOB.

### 1.FITTING OPTIONS.

There are normally three different situations that the installer may be faced with:-

A new build installation.

An established boat installation, (which has not had a oil stove fitted).

A replacement installation, where there has been a solid fuel stove fitted previously.

Each of the situations will present differing problems which will be:-

- Where to locate the stove.
- How to deal with fireplace design.
- Where to locate the oil tank.
- How to get an oil supply to the stove.
- How to fit the chimney.
- How to connect water to the stove.
- How to disconnect and remove the stove, easily.

The new build situation should be the easiest.

The established boat situation will require careful attention to the sighting of the stove in relation to flue positions and existing fittings positions.

In replacement situations it may well be necessary to blank off the existing through roof flue position and cut a fresh one to suit the new location.

## 2. ABOUT THE STOVE

3. The top of the stove can be used for warming and cooking.

5. Standard deck flanges and traditional chimney extensions can be used above deck.

6. The stove will provide space or combined space and water heating.

There are two choices of boiler either a 3 or 9kW and there are 2 x 1" BSP female sockets for water connections to be made at the rear of the stove as required.

8. The boilers are high water content and suitable for pumped or gravity systems, pressurised or open vented, **provided that the systems are correctly designed.**

## 3. OPERATING PRINCIPLES.

1. The stove is a space heater, which burns diesel oil in a controlled manner utilizing a chimney to discharge the products of combustion.

2. The stove generates heat from burning oil mixed with air in a vaporizing pot located in the bottom of the stove.

3. Once lit, oil goes into the pot at a steady and controlled rate via gravity flow, metered by the OIL CONTROL VALVE the oil flow can be controlled from minimum to maximum or any setting in between determined by where you set the oil flow control knob.

4. Air is sucked into the pot by the natural action of the negative pressure in the chimney and to allow the chimney to work correctly it is essential that you have adequate, unrestricted ventilation into the area where the stove is situated.

5. The amount of oil that can be successfully burned is directly proportional to the amount of air that the chimney can draw into the pot and so to achieve adequate combustion a balanced and appropriate flow

of both oil and air is required.

## 4. CONTROLS

The output of the stove is regulated by the amount of oil allowed to go into it and this function is controlled by the -:

OIL CONTROL VALVE (O.C.V.), which is situated at the rear of the stove.

Turning the knob anti clockwise controls the oil flow.

The knob is located at the top rear of the stove and is calibrated from off position (fully clockwise) through 6 graduations to maximum.

Controls for the stove will vary, depending on which valve is fitted to it.

Depending upon its intended use the stove could be fitted with either a ships valve (OCI 252 AY sea going) or a (Toby DVR inland water) valve.

**The control for the sea going ships valve comprises Oil flow control only. ( OCI 252AY Ships Valve)**

*For thermostatic control we recommend the use of a Teddington 90 deg C, KBB remote sensing fire valve, with the sensing file attached to the hot pipe of the appliance.*

**The control for the inland waterways version has controls which are-:**

Oil flow control.

Oil valve trip lever.

For boiler versions of the stove there are two additional controls.

Thermostat control.

Safety Stat reset control.

The Toby oil control valve used on boiler stoves has a built in, non electric, modulating thermostat control, which will put the fire on to low fire when the target temperature has been achieved.

In addition to this there is also a similar safety stat, which will shut the burner down, should the water exceed 80 deg C.

The safety stat re set control is lifted to reset the valve, should the stat trip. (For details see the separate booklet on oil valve details supplied with the stove.)

The Toby valve has to be tripped into action by lifting the trip lever on the side of the valve.

The flow of oil into the pot can be adjusted via the knob on top of extension rod rising up from the oil control valve.

8. With the increased flow of oil, extra heat is generated, which in turn stimulates the chimney to work harder and consequently draw more air into the pot to maintain an adequate fuel air ratio.

## 2. SAFETY.

Take care to make sure that safety and ventilation issues are adequately addressed.

### 1. FUMES

Here are the main causes of fume or smoke to leak from the stove.

- The chimney is blocked.
- There are too many bends in the chimney.
- The above deck chimney extension is not high enough.
- The boat is moored in a position near to high buildings or trees and downdraughting is occurring. (Note if downdraughting occurs open the front doors of the boat to equalise the pressure.)
- The chimney is not airtight.

### 2. FIRE

Fire can be caused by a variety of potential danger points and because of the space limitation on boats; this risk is ever present and must be adequately assessed.

The main danger is the effects of heat from the stove on combustible materials and boat occupants.

Make sure that all combustibles are adequately protected from the effects of heat radiation.

The stove must stand on a fireproof base of minimum thickness 25mm

Floors in front of the stove must have suitable fire protection.

If heat shields are used around the stove or flue pipe, space above them must be left clear to allow the heat to rise and dissipate.

### 3. BURNS

During normal, day-to-day use, many parts of this stove, pipe work, and chimney can become too hot to touch.

Where necessary, we recommend that suitable guards be fitted, to provide adequate protection from the heat generated by the stove.

Always use heatproof gloves when working on or near to a hot stove.

Always wear heatproof gloves to operate the descaling device.

### 3. CLEARANCES

Combustibles must be a minimum distance of 200mm above the top of the stove (vertical clearance) and 300mm in front of and around the stove.

Any combustible material within these distances from

the stove must be protected by a suitable heat shield. Protection can be gained by the use of -:

- Sheet metal heat shields and spacers.
- Heat resistant boards.

Combustible materials can be:-

- Wooden furniture.
- Curtains.
- Wooden panels or frames adjacent to the flue pipe or where it passes through the deck of the boat.
- Carpet or flooring close to the stove.
- Items near to the stove, which could fall onto it and ignite, should the boat suffer a slight impact.

## 4. VENTILATION.

Ventilation plays a vital role in the fitting and sighting of any stove.

The provision of ventilation for this stove is adequately covered by the requirements of the boat safety scheme.

25cm<sup>2</sup> minimum permanent ventilation, directly to outside air, must be provided for this stove.

### WARNINGS

**1. Never try to relight a hot stove; wait until it has cooled down.**

**Hot oil vapour is explosive.**

**Never try to light a flooded pot.**

*When attempting to light a stove, make sure that the pot is not flooded with oil by looking into the base of the burner.*

*If it is flooded remove the excess oil as per instructions in the faultfinding section.*

2. The stove must be securely fastened down so that it can resist impact or collision and it must be level in both directions.

3. The stove must not be operated with the door glass panel cracked or damaged, or without the lighting port plug fitted.

**4. Unvented plumbing systems can only be installed by suitably qualified persons.**

4. A suitable and serviceable fire extinguisher should always be readily accessible near to the appliance.

## 5. CHIMNEY

This is the one of the most interesting problems the installer has to deal with and as the chimney affects most aspects of running the stove, we take time here to list the following information for your consideration.

The power, (suck or vacuum the chimney can develop)

depends upon the following:-

- THE HEIGHT.
- THE DIAMETER.
- THE TEMPERATURE OF THE GASSES IN IT.
- THE RESISTANCE OF THE INNER SURFACE OF THE FLUE PIPE OR PIPES.

It is obvious that on a boat all the above elements are in short supply.

Normally, we have low flues which are small in diameter and generally not very well insulated, coupled with all these problems we have another one, which is that the boat moves across constantly changing surroundings, through locks, into headwinds and crosswinds, all creating major opportunity for down draughting to occur.

Any bend in any part of the chimney or roughness on the internal chimney wall will slow down the velocity of rising gases and reduce the effectiveness of the chimney.

Any slight reduction in the flue gas temperature will reduce the chimney vacuum or pull, hence when the stove is slowed down for all night burning, as the flue gas cools down the chimney vacuum reduces and as the chimney vacuum drops, the stove may well start to burn sooty. This problem is highlighted even more during very cold weather when the chimney can cool down even faster.

To help control conditions of excessive vacuum the appliance has a built in swinging barometric damper designed to swing open and spill air into the chimney should the vacuum suddenly increase.

The swinging damper is located at the rear of the appliance.

#### 1-5. THE CHIMNEY RULES.

1. Always use a top outlet for flue pipe take off.
2. Never put any bends in the flue. *(To maintain a concentric fit, we will allow a slight kick off the stove and a similar kick into the deck flange).*
3. **Always try to get the stove as low as possible in the boat, this will allow installation of maximum length flue pipe.**
4. Always have two double walled, above deck extensions, short for cruising and long (28inch minimum) for mooring. Insulated extensions are a thing of the future but it is possible to fill the space using a vermiculite and cement mix sealed off with flexible fire putty.
5. Fit a rotating cowl to each extension or make one interchangeable.
6. Clean or have the chimney cleaned regularly.

(Frequency depends upon type of fuel and length of time used).

**Don't phone in and ask for dispensations on the rules.**

## 6. FUEL SUPPLY.

### 1. PREAMBLE

There are several problems relating to diesel fuel supply, which need be adequately addressed.

### 2. WAXING

Cold weather waxing or thickening alters the flow characteristics of diesel.

An adequate fuel feed supply can turn into an inadequate one when the temperature starts to fall.

The worst scenario is fuel feed pipe 50-60 feet long in 8mm dia pipe.

The best-case scenario is a fuel pipe 4 feet long in 10mm dia with insulated lagging.

### 3. TRIM

A minimum pressure head of out 8" is required.

This head is measured from the base of the oil tank to the top of the oil control valve. In some cases this head can be affected by the ballast or trim of the boat.

Take great care to try out all the different ballast and trim possibilities to make sure that adequate oil feed is always available at the outlet end of the fuel pipe before it enters the oil control valve at the stove.

### 4. TANK

If the stove is fitted at the bow of the boat, a bow tank is recommended.

The tank should comply with the requirements of the boat safety scheme and have:-

- A conveniently sized filler
- A means of venting.
- A conveniently located, easily visible, contents gauge.
- An isolation valve
- An easily replaceable cartridge filter.

Do not use glass filter bowls, they are not acceptable under the boat safety scheme.

It may be necessary to add a suitable proprietary antifreeze additive to the stove fuel for wintertime running.

### 5. OIL LINE

The oil feed line starts after the fuel filter and proceeds to the point of entry, which is where the oil line goes into the cab or saloon of the boat.

*The diameter of the oil line is dependant upon the*

length of run. See 4-2 on waxing and make sure that you have suitably sized compression fittings available. At this point it is necessary to fit a remote sensing fire valve, designed to shut off the oil supply, should a fire occur near to the stove.

If the bubble stove is fitted up to the first bulkhead it will be necessary to fit the isolation valve outside the cabin or saloon of the boat.

## 6. WATER CONTAMINATION

Because of the high risk of fuel contamination with water, we strongly recommend the fitting of a high volume water trap in the oil supply line.

## 7. REMOTE SENSING FIREVALVES



The oil feed line starts after the fuel filter and proceeds to the point of entry, which is where the oil line goes into the cab or saloon of the boat.

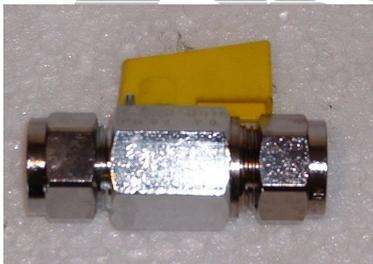
At this point it is necessary to fit a remote sensing fire valve, designed to shut off the oil supply, should a fire occur near to the stove.

If the bubble stove is fitted up to the first bulkhead it will be necessary to fit the isolation valve outside the cabin or saloon of the boat.

When fitting the fire valve make sure that where the capillary and oil line go through the bulkhead in separate sleeved tubes, so that the capillary can be withdrawn separately should it ever need replacing.

*For fitting of long oil feed lines which pass through bulkheads and various other parts of the boat it may well be necessary to fit more than one fire valve, especially where the oil line passes through an area where a fire could occur i.e. kitchen area etc.*

## 8. ISOLATION VALVES.



1. Two isolation valves are required, one fitted close to the appliance and easily accessible by the user.

This valve will allow you or the service person to turn the oil off should the need arise, and one on the oil tank fitted before the filter again to allow you or the service person to change the filter every year.

## 9. SLEEVING.

Where the oil line goes through the boat superstructure a bulkhead fitting must be used.

## 10 DRIP TRAY.

The stove must be fitted on a suitable impervious drip tray.

The drip tray must cover all areas beneath the stove and provide a catchment area for any oil leaks.

It must be made of a Non-combustible material and have an up stand of minimum height 12.5mm.

## 7. FIREPLACE.

Use materials, which are easy to keep clean and fireproof such as tiles, asbestolux or vermiculite boarding.

## THE HEARTH.

The hearth must be:-

**FLAT - SECURE - FIREPROOF AND LEVEL IN BOTH DIRECTIONS.**

## FIREPROOFING.

The vertical walls of the fireplace must be fireproof, suitable materials would be tiles, asbestolux sheet, compressed vermiculite board.

## FASTENING DOWN.

It is important to fix the drip tray down to the hearth but don't drill through it as this will allow oil to leak from it should a spill occur.

## 8. FITTING DRY STOVES.

1. SELECT LOCATION.
2. FIT OIL TANK.
3. RUN OIL LINE.
4. TRIAL FIREPLACE ASSEMBLY.
5. TRY STOVE IN POSTION.
6. ESTABLISH FLUE POSITION.
7. MARK AND CUT ROOF PLATE.
8. FIT DECK FLANGE.
9. FIT FIRESTOP SPACER.
10. TRIAL FIT FIRE.
11. TRIAL FIT EVERYTHING ELSE.
12. IF IT ALL FITS REFIT IT PERMANENTLY.

## 1. SELECT LOCATION.

The stove can be located in any suitable position.

It and the flue system must be securely fastened, so as to withstand the normal day-to-day situations, which will be encountered in a boat.

These could be:-

- Impact by other vessel.
- Impact into lock gate.
- The pitching and rolling effects of sailing.
- 

The location must have adequate protection from the effects of radiated and conducted heat as specified.

## 2. FIT OIL TANK.

The oil tank will be fitted and must comply with the requirements of the boat safety scheme.

## 3. RUN OIL LINE.

Run the oil line and fit all the required components as described.

## 4. TRIAL FIREPLACE ASSEMBLY.

The oil line and the fire valve sensor will have to pass through the fireplace, make sure that you make adequate provision for this and the remote sensing fire valve.

## 5. TRY STOVE IN POSITION.

Try the stove in position and make sure that the oil feed and remote sensing fire valve fit as required.

## 6. ESTABLISH FLUE POSITION.

Normally the stove will be fitted in a suitable fireplace, this will predict the angle or direction at which the flue pipe will have to be fitted.

It is important to make sure that the flue fits concentrically at both the stove end and as it passes through the fire stop spacer and deck flange.

## 7. MARK OUT AND CUT THE ROOF PLATE.

## 8. FIT DECK FLANGE.

## 9. FIT ABOVE DECK EXTENSION.

## 9. FITTING WET STOVES

### 1. PREAMBLE.

Installation of the wet stove will be the same as the dry except that when dealing with the location an extra element comes in to the equation and that is connecting the stove up to the heating circuit.

The stove has an integral, boiler, which can be fitted to open vented or pressurised systems.

*When connecting stoves to pressurised systems make sure that the Toby oil control valve and matching aqua stat are fitted. Or in the case of a OCI ships valve fit a suitable KBB remote sensing fire valve to act as over boil protection.*

*Pressure vessels should be set @ 0.5 bar for static heads of 2 metres or less.*

To facilitate removal of the stove, make sure that there is

- Easy access to the boiler unions.
- Easy access to the drain down valve.
- Easy access to the oil connection.
- Easy access to the isolation valve.

Water can be connected to the stove via 2 x 1 inch BSP male sockets, welded into the boiler at the rear diagonal top and bottom.

Make sure that all the air has been vented from the boiler and heating system before firing the stove.

When installing water heating Bubble stoves, the space heating output will be reduced.

The boiler is high water content and suitable for pumped or gravity systems both open vented or pressurised.

**If you are not a suitably qualified person, arrange for a heating engineer to carry out the design and fitting work for you.**

## 2. CALORIFIERS.

Indirect calorifiers must be used on gravity or pumped systems.

On gravity systems the calorifiers must be located higher than the stove and as close as possible to it, obviously keeping horizontal runs as short as possible.

## 3. VENTING OF AIR.

Gravity or Pumped systems can be fitted with open vented or pressurised systems.

If open vented systems are used the feed and expansion tank must be as close as possible to the boiler and be fitted at the highest part of the circuit. Consult an experienced boat-heating engineer for advice on feed and expansion tanks.

To vent the system of air use automatic air vents on all possible air lock locations.

## 4. PIPE WORK.

All gravity pipe work must rise on flow and fall on return and be a minimum of 28mm dia. (35mm dia preferred)

To reduce resistance to flow:-

- Use swept bends, do not use elbows.
- Use copper pipe work.
- Use high water content radiators.

The primary circuit must have a total length of not more than 6 meters otherwise the recovery time of the calorifier will be increased beyond an acceptable period of time.

Primary circuit pipe work must not have valves or

other devices that can be used to interfere with the free flow of water.

## 5. PUMPED SYSTEMS

Always come off the stove with 28mm copper for a minimum run of 350 mm before dropping on to 22mm hep 2o

To ensure suitable flow of water through the primaries a suitable injector tee should be used. Great care should be taken with the positioning of the circulating pump and the feed and expansion tank to make sure that the water flows where it should and that over pumping does not occur.

The heating circuit must be piped in 15 or 22mm copper or Hep 2° with 15mm stubs to radiators. Where additional radiators are fitted as heat leaks, the pipe work must be kept as short as possible, rise on feed and fall on return.

## 6. SAFETY VALVE.

A 1" safety valve must be fitted as close to the boiler as possible (within 300mm) and the outlet from it must be directed to a safe location so as not to present any danger should the valve blow-off and exit steam or boiling water.

Note

Safe location could be through the side of the boat, with a deflector to stop any horizontal emission.

## 7. WATER TREATMENT.

To reduce the build up of lime scale in the primary circuit pipe work the temperature of the water should not be allowed to exceed 65 Deg C and a suitable water treatment should be added, suitable water treatment could be good quality auto antifreeze, which also contains rust inhibitor.

Note

12 or 24-volt water circulating pumps supplied by Harworth Heating will be damaged if suitable rust inhibitor is not used.

## 8. DRAIN DOWN.

A drain down valve should be fitted at the lowest point of the circuit.

## 9. CIRCULATING PUMP.

On pumped systems make sure that the circulating pump is fitted in such a way as to make it easily replaceable, this means lock shielded valves at either side and easy access.



When fitting these pumps to old established systems make sure that they are drained down and flushed out. After flushing add auto antifreeze which also contains rust inhibitor.

## 10. COMMISSIONING.

*If the stove has been fitted to an existing heating system, make sure that the system is adequately designed and complies with the details specified in this manual.*

*If the heating circuit does not comply, it must be modified, before attempting to light the stove. Make sure that old established systems are drained down and flushed out.*

After flushing add a good quality brand of auto antifreeze which also contains rust inhibitor.

Commissioning takes the following form:

1. PRE FIRING CHECKS.
2. LIGHTING.
3. COMMISSIONING.

SEC 1. Pre firing checks.

### FUEL SUPPLY TANK

Check for leaks-stability-height-position-vent.

### FUEL

Check for correct grade.

### FILTER

Is it fitted-check for function and leaks?



### **OIL LINE**

Check for function, positioning, material suitability and leaks.

### **FIRE VALVE**

Check for function and leaks.

### **ISOLATION VALVE**

Check for function, convenience of positioning and leaks.

Flush at least 5 litres of oil through the line to check for contamination and to clear the oil line of installation debris and trapped air.

Make sure that the oil feed supply pipe is level and has no potential for air locking. (Kinks, wavy runs, and sudden changes in level or slope).

### **ELECTRICAL**

Check for correct fusing, location and specification of any isolation devices.

### **VENTILATION**

Make sure that adequate ventilation is provided in line with boat safety scheme.

### **WATER SYSTEMS**

Should be pre-checked for leaks and tests must be made to make sure that water will flow freely through the boiler and that the boiler and pump is vented and free from trapped air.

### **CHIMNEY SYSTEM**

Should be checked to make sure that it complies with the relative standards, regulations and all other instructions given.

### **CHIMNEY HEIGHTS**

Must be a minimum of 1.8 meter for low fire use and 2.2 meter for high fire use.

### **CLEARANCE FROM COMBUSTIBLES**

Check the stove is fitted with adequate clearances from combustibles.

### **SWINGING BAROMETRIC DAMPER**

Check that the swinging barometric damper is swinging freely and then returning to its closed position.

The damper will only be brought into use under conditions of high chimney vacuum.

### **SEC 2. Lighting.**

When attempting to light the stove these are the rules, which must be followed.

1. Always make sure that the pot is not flooded with oil by looking down into the base of the pot.
2. Never try to light the stove if it is flooded with oil.
3. Always check that oil has not leaked into the drip tray.
4. Do not light the stove and leave it unattended until it is settled down and stabilized into constant blue flame combustion on low fire. (This could take 10 to 20 minutes.)

### **Two Ways to Light the Stove**

Through the lighting port.

or

Through the front door, directly into the base of the pot.

### **Lighting Into The base Of The Pot**

On the first light up you may find this option better, as you can see the oil trickle in to the pot more easily.

Use a heatproof glove when putting the catalysers back into the pot and it is important to replace them quickly whilst the flame is small.

Make sure that the oil is turned off.

Open the front door.

Carefully remove the coal kit,

Remove the upper catalyser and ring,

Remove the lower catalyser,

Turn the oil on and allow a small pool of oil to flow into the pot about the size of a small biscuit, **then turn the oil off**

Light a small piece of firelighter and drop it into the oil, allow a few seconds for it to get going and then replace the catalysers and coal kit, and close the door.

Wait for approx 1 minute until the pool of oil is alight and then **turn the oil on** to minimum setting no 1.

Watch the appliance for a few minutes and you will see the flame establish and settle down into blue flame combustion.

Allow the burner to run for a further 10 minutes before turning the appliance up to the higher settings.

**If at any time during the ignition process large amounts of flame can be seen, turn the oil off immediately and wait until the flames die down before putting the oil on again at minimum setting.**

### **Manual Lighting Through the Lighting Port**

Make sure that the oil safety cut off knob is lifted (tripped off) via an audible click.

Check that the isolation valve is turned on.  
Press the oil safety cut off knob down to trip the oil on via an audible click.

Open the front door.

Remove the lighting port plug by pulling it out of its tubular socket.

Turn the oil on to the first position via the flow control knob and allow a small pool of oil to flow into the pot about the size of a small biscuit.

#### **Turn the oil off.**

Cut a small piece of firelighter and stab it onto the spike.

Light it and push it into the lighting port tube, let the firelighter drop off the spike into the bottom of the pot.

Replace the lighting port plug back into the tube.

Close the front door.

#### **Turn the fuel flow on again at the lowest setting**

Watch the appliance for a few minutes until it settles down into blue flame combustion.

Allow the burner to run for a further 10 minutes before turning the appliance up to the higher settings.

If at any time during the ignition process large amounts of flame can be seen, turn the oil off immediately and wait until they die down before putting the oil on again.

We have regular problems with air locks located in the metering stem or in the feed pipe from the oil valve to the pot.

Read the relative valve booklet supplied with the stove to find out how the valve works.

Note there may be the occasional growl or audible vibration whilst the burner settles down into blue flame combustion.

#### **SEC 3. Commissioning the burner.**

*There are two types of valve fitted to Bubble stoves and access to the low fire adjustment is different.*

*On the OCI ships valve the plastic drive knob has to be removed to gain access to the low fire screw.*

*On the Toby valve the low fire screw is clearly visible as per TOBY MANUAL FIG 2*

The valve has been flow rated before leaving the factory and it should not need adjusting, if it does it is necessary to remove the plastic drive cover (OCI VALVE) which is held in place by a single fastener in the side face of the knob.

Once the knob has been removed the low fire adjusting screw is clearly visible.

When the burner has established good blue flame

combustion turn it up to half output. (Setting 3 on the fuel flow control knob) and let it stabilize.

Allow at least half an hour for the chimney to warm up thoroughly before making any adjustments to the high or low fire screws.

Turn the stove down onto minimum firing rate and let it stabilize.

After stabilization there should be a dull red glow in the lower catalyser with wispy blue flames flicking into and just over it.

If the flame falls into a dirty rolling yellow flame and the catalyser is not dull red then the low fire will need to be increased until it can support the required blue flame combustion.

To increase the low fire oil flow, screw the adjusting screw in by quarter turn increments.

When you are happy with the low fire, set the high fire.

Turn the oil flow knob up to setting 4, let the flame stabilize, and look at it, if it is stable and blue, turn it up slowly using the control knob, letting it stabilize after each movement, if the flame starts to go yellow with long flame combustion, it is running fuel rich and the high fire screw needs adjusting to reduce the flow of oil. (Screw the adjuster screw in to reduce the high fire oil flow.)

Before adjusting the high fire screw, turn the flame down and let it stabilize in blue flame combustion, adjust the high fire screw by half a turn in and try turning the fuel flow up, if it is still fuel rich repeat the process until the high fire flame is running blue with just flicks of yellow in the tips.

If the burner does not run well check that the seals in the stove are good and that there is no ingress of air into the stove flue ways.

Seals in stove mean:

The pot to closure plate seal.

The door seal.

Check that the correct fuel oil is being used.

## **11. FAULT FINDING HEATING SYSTEM.**

If the system does not perform well check the following-:

**THE CIRCUIT DESIGN.**

**AIR LOCKED CIRCULATING PUMP.**

**AIR LOCKED PIPEWORK.**

**INOPERATIVE CIRCULATING PUMP.**

**INADEQUATE PIPE SIZEING.**

**INADEQUATE CALORIFYER DESIGN.**

## **INCORRECT STOVE LOCATION.**

The stove is fitted out of level, allowing an air pocket to build up in the top of the boiler, causing subsequent kettling and damage to thermostat sensing phial on TOBY DVD valves.

Check the flow of water through:-  
THE BOILER.

THE CALORIFYER.

THE RADIATORS.

Inadequate water circulation through the boiler check:-

## **OVER PUMPING.**

The system is not over pumping due to bad location of the cold feed and expansion vessel.

If water were just circulating thro the feed and expansion this would indicate incorrect circuit design.

## **LACK OF PRESSURE RELEASE SAFETY VALVES.**

Make sure that pressure release valve are fitted in the correct position as close as possible to the boiler.

## **12. FAULT FINDING COMBUSTION.**

### **1. RACING.**

1. Audible vibrations generated by the flame caused allowing by too much oil in the pot, too quickly.

1-1. Turn off the oil flow until the burner has settled down to a steady burn rate and then turn the fuel on again but don't let the flame go out otherwise the burner **MUST** be allowed to cool down fully before a re ignition is attempted.

### **2. FLUE VACUUM.**

1. The pot type burner is extremely sensitive to flue vacuum variations.  
2. Good combustion will not be possible unless our instructions on chimneys and flue vacuum are followed. See fig1

3. If the burner does not burn with a blue flame, recheck the chimney vacuum and oil flow rate.

4. If the burner does not run well check that the seals in the stove are good and that there is no ingress of air into the stove flue ways.

5. Check that the correct fuel oil is being used.

6. Check the levels.

### **3. BURNER RUNS SOOTY.**

Comments made on this subject assume that the stove has been running normally for some time.

If the stove soot's up this indicates that there is not

adequate air for blue flame combustion or there is an excess of fuel.

Check that the chimney is working correctly. (This means pulling enough air into the burner to allow correct blue flame combustion to occur.

Check that the fuel is the correct type and quality. Check that the flow rates are correct.

Where burners are run at high fuel flow rates on low chimney vacuums, long unsatisfactory yellow flame combustion and bad sooting will occur.

To rectify this problem reduce the high fire flow rate screw on the Oil Control Valve until blue flame combustion occurs.

Never switch from low settings to high settings; a longer burner life will be achieved if the regulator is moved only by one number at a time leaving approx. one minute between each setting change.

### **4. BURNER DOES NOT LIGHT EASILY.**

Read the instructions in the lighting section of this publication.

### **5. OIL WILL NOT ENTER THE POT.**

Is there oil in the fuel tank?

Has the fire valve tripped?

Has the isolation valve been accidentally turned off?

Is the oil turned on at the oil flow control knob on the valve?

Is the oil feed pipe from the valve to the pot?

Blocked. (Unlikely)

Has the water stat tripped off on the aqua stat?

Has the aqua-stat been damaged by overheating.

*To check this out, remove the aqua-stat from the valve and remove the phial from the boiler, re cock the valve and test fire the appliance. See Fig 4 Toby Valve document.*

*Note this type of damage is not covered by the warranty.*

### **6. OIL SMELLS.**

Visual check on all joints for obvious leaks.

Check that the descalling lever packing gland nut is adjusted.

### **7. DEFLOODING A FLOODED POT.**

To carry out this procedure you will need -:

a. A small leak proof plastic bag.

b. A small sponge.

c. A larger plastic bag for disposal of the residue.

d. A pair of disposable plastic gloves.

If the pot becomes flooded, de flood it is as follows -:

Put a small plastic bag into the stove and sponge from the pot into the bag, when the excess oil has been removed put the plastic bag and sponge into another

plastic bag and dispose of it.

### 8. OPERATING OIL FLOW RATES.

OIL Flow rates in cc per minute.

Min	Max
4cc	16cc

### 13. ROUTINE MAINTENANCE.

Continuous running assumed.

#### 1. EVERY 4 WEEKS-:

Operate the descaling lever by turning it completely two or three times.



#### 2. AS REQUIRED -:

Clean inside of door glass.

#### 3. EVERY EIGHT WEEKS -:

Clean the burner completely by removing all the inner components as follows,

1. Open the front door.
2. Remove the coal kit if it has been supplied with the stove.

3. Remove the burning ring.

4. Remove the upper and lower catalysers.

Scrape the bottom of the pot and remove all carbon build up.

Reassemble in the reverse order.

#### 4. EVERY 24 WEEKS-:

Tighten up the gland nut on the descaling device to stop oil smells.



#### 5. ONCE PER YEAR-:

Have your service man replace or clean all the filters in the oil supply line.

#### 6. EVERY TWO YEARS -:

Have your service man clean the filter in the Oil Control Valve and check the function of all the safety equipment associated with the stove, oil supply and plumbing system.

Remove and clean out the oil supply pipe from the valve to the pot.

#### 7. AS REQUIRED -:

Keep the Coals, Coal kit, and burner inners in good condition, replace as necessary.

### 14. WARRANTY.

*You are advised that if Harworth Heating Ltd are called out to appliances under warranty claims, where no appliance fault can be found, charges will be made at the rate of £35.00 per hour, including travelling time.*

Fill in the warranty form and returned it to us, the information recorded on the warranty form helps us to deal with any problems you may encounter.

Where we do not hold returned warranty forms replacement parts would only be issued when we are sure that the stove has not been damaged by improper use or installation.

The warranty covers PARTS ONLY for a period of ONE YEAR and is conditional upon all the requirements of our installation instructions being fully adhered to.

### 15. WARRANTY ITEMS NOT COVERED.

DOOR GLASS.

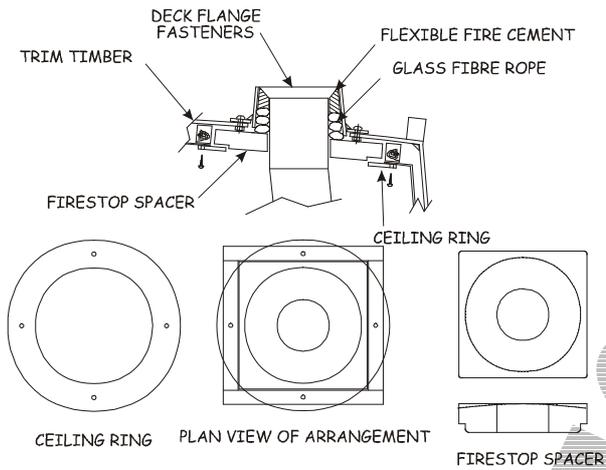
LABOUR COSTS.

TRAVELING COSTS.

CONSEQUENTIAL LOSS.

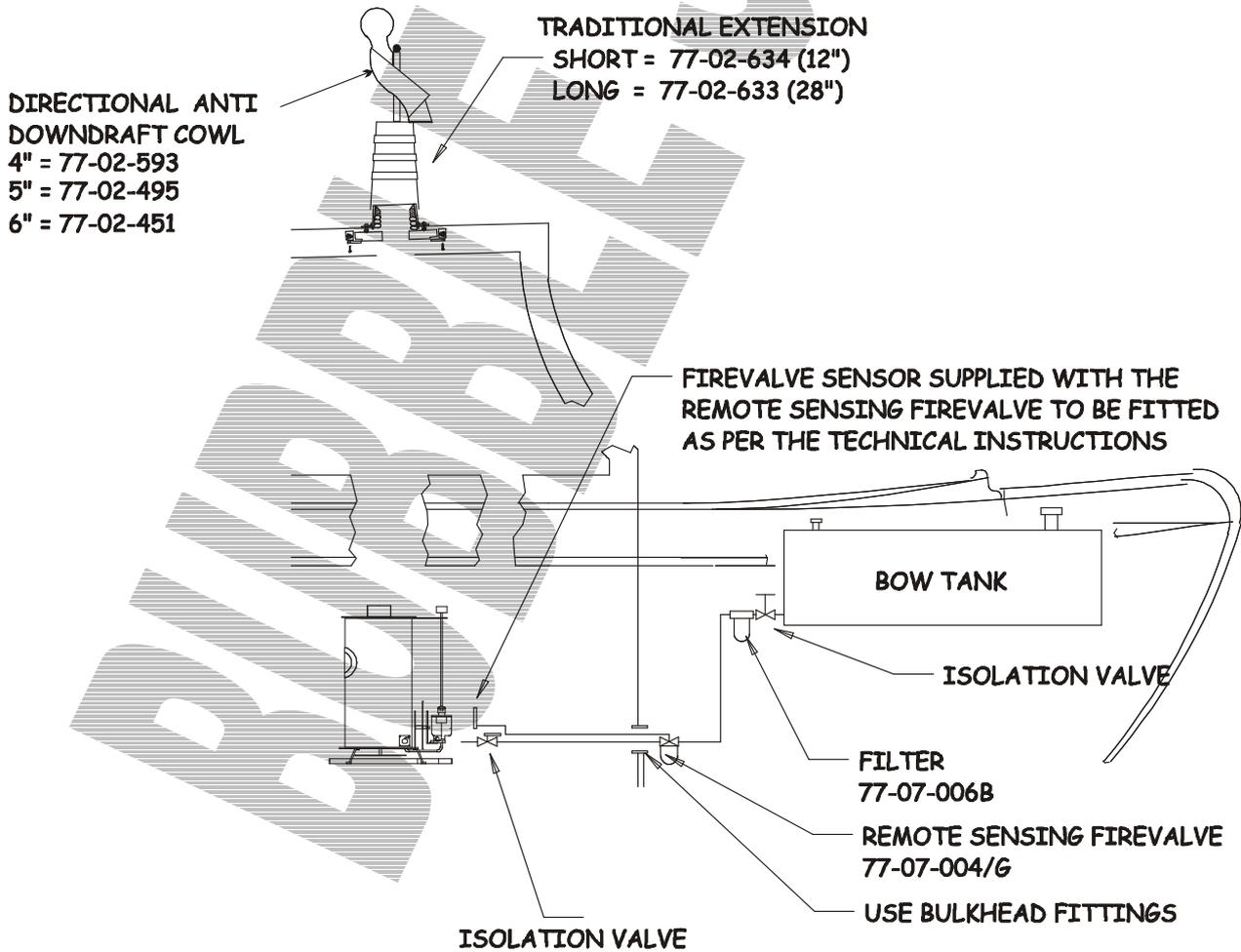
CONSEQUENTIAL DAMAGE.

**FIG 2**



**Fig 4**

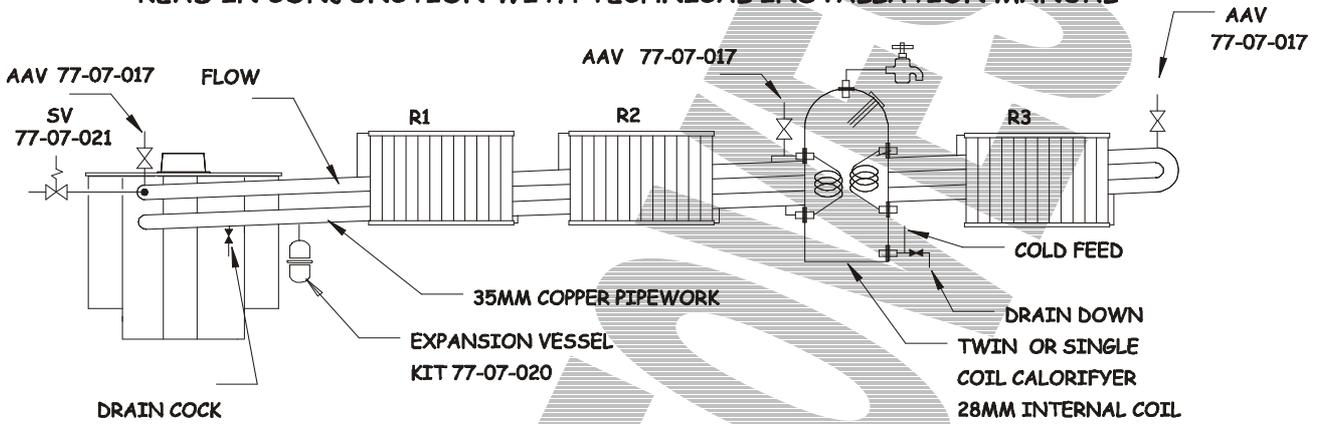
**OIL STOVE OIL SUPPLY LAYOUT ISS 2**



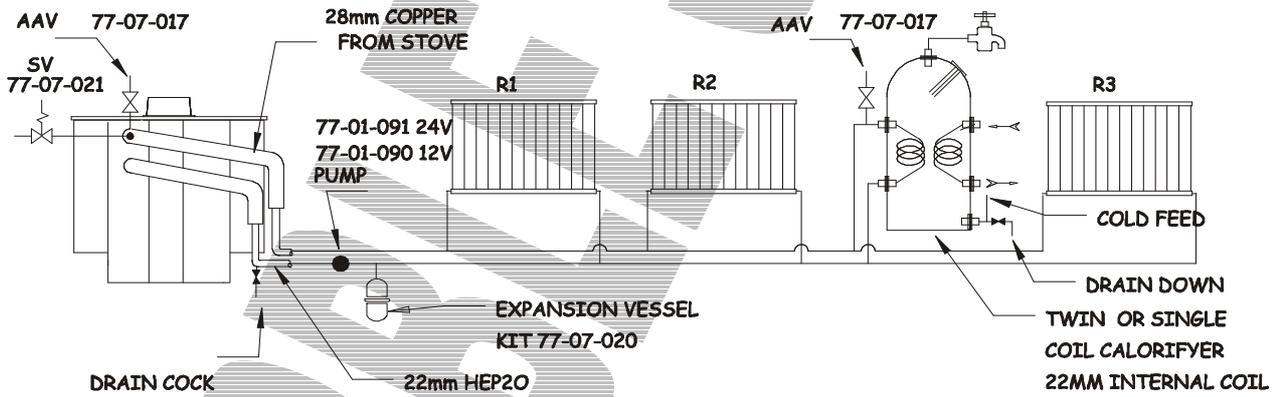
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FIG5

**SCHEMATIC GRAVITY SYSTEM ISS1 OF 08-07-01**  
**READ IN CONJUNCTION WITH TECHNICAL INSTALLATION MANUAL**



**SCHEMATIC PUMPED SYSTEM ISS1 OF 08-07-01**



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