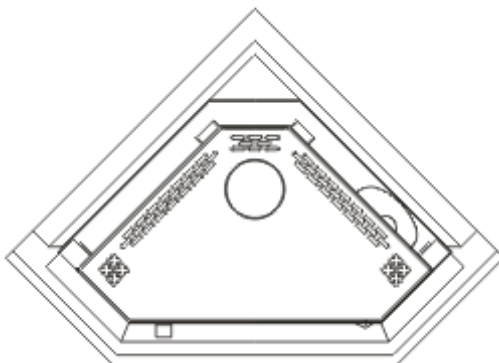
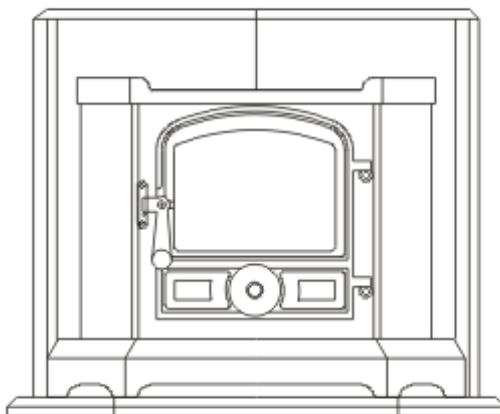


# USER INSTRUCTIONS

## CORNER OIL STOVE



ISSUE 30-06-22



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## INDEX

<b>1-0 INTRODUCTION</b> .....	<b>2</b>
1-0-1. WARNINGS .....	2
1-0-2. GENERAL INFORMATION ABOUT THE STOVE.....	3
1-0-3. SPACING FROM COMBUSTIBLES.....	3
1-0-4. FIREGUARDING.....	3
1-0-5. WARNING.....	3
1-0-6. DOOR GLASS.....	3
1-0-7. FASTENING DOWN.....	3
<b>2-0 OUTLINE OF CHIMNEY PROBLEMS</b> .....	<b>3</b>
2-0-1. DOWNDRAUGHTING .....	4
2-0-2. ATMOSPHERIC CONDITIONS.....	4
2-0-3. SUMMARY OF CHIMNEY PROBLEMS .....	4
2-0-4. MIN CHIMNEY HEIGHT FOR HIGH FIRE.....	4
2-0-5. MINIMUM HEIGHT FOR LOW FIRE RUNNING.....	4
<b>3-0 FUEL SUPPLY PROBLEMS</b> .....	<b>4</b>
3-0-1. WAXING .....	4
3-0-2. CHANGING OIL PRESSURE AT THE STOVE.....	5
3-0-3. POOR OIL FLOW PROBLEMS.....	5
3-0-4. OIL FEED SET UP.....	5
3-0-5. OIL LINE .....	5
<b>4-0 HOW IT WORKS</b> .....	<b>6</b>
4-9. THE COAL KIT.....	6
4-10. DESCALING CONTROL.....	6
4-11. STOVE COMPONENTS .....	6
<b>5-0 RUNNING THE STOVE</b> .....	<b>7</b>
5-1. OIL CONTROL VALVE DETAILS.....	7
5-2. LIGHTING.....	7
5-3. STOVES WITH BOILERS.....	7
5-4. CONTROLS ON STOVES WITH BOILERS.....	7
<b>6-0 FAULT FINDING</b> .....	<b>8</b>
WATER CONTAMINATION.....	8
6-1. RACING.....	8
6-2. FLUE VACUUM.....	8
6-3. BURNER RUNS SOOTY.....	8
6-8. OIL SMELLS.....	9
6-9. DEFLOODING A FLOODED POT.....	9
6-10. OIL LEAKS.....	9
<b>7.0 ROUTINE MAINTENANCE</b> .....	<b>9</b>
<b>8-0 WARRANTY</b> .....	<b>9</b>

### 1-0 INTRODUCTION

1. As its name implies, the Corner Bubble has been designed to fit into confined spaces.

2. A great deal of effort has gone into the development of this stove and it has been specifically designed for the narrow boat user.

3. The triangular shape allows the stove to be fitted with minimal use of space, allowing easy

access past it, better integration with internal decor and designed as an integral part of the boat, not just another add on.

4. The triangular base acts as a built in drip tray and positioning device to allow adequate clearances for air to circulate around the heater panels and convert heat into the boat.

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

6. The stove can also be supplied with or without a coal kit.

7. Standard deck flanges and traditional chimney extensions can be used above deck providing a suitable anti draught terminal is fitted.

8. The dry stove will provide space heating via convection together with limited cooking facilities on the top plate.

8a. The boiler version will provide the same with the addition of hot water and central heating.

9. We have found from our now extensive experience of existing installations that in most cases, existing Bubble 1 users only have to run their stoves on the lowest setting, even through the very coldest of weather.

With this in mind and the increasing cost of oil, we have designed the corner bubble using a more economical burner which will run at 4ccs (.24 of a litre per hour) on minimum firing rate and 10ccs (.6 of a litre per hour) on maximum firing rate equating to a consumption per 24 hours continuous running of 5.76 litres low fire and 14.4 litres high fire.

10. The stove incorporates a combustion air restrictor (C.A.R.) as opposed to the more traditional swinging barometric damper and also features a front mounted oil control valve with easy access to the control knob.

### 1-0-1. WARNINGS

1. Never try to relight a hot stove; wait until it has cooled down, hot oil vapour is explosive.

2. 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 fault finding section.

### 1-0-2. GENERAL INFORMATION ABOUT THE STOVE.

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. This stove is designed to run with or without a coal fired effect kit which when fitted will partially create the effect of a coal fired stove with all the pleasure that this can bring, but remove the need to constantly refuel and de ash.
3. Just like a solid fuel stove, coal effect will only be available when the stove is running at its higher output settings.

### 1-0-3. SPACING FROM COMBUSTIBLES.

1. The stove is designed to fit into a suitable fireplace, which in most cases will be triangular in shape.
2. The fireplace must be manufactured from fireproof materials.
3. For spacing from combustible materials the stove must be treated in the same way as a SOLID FUEL APPLIANCE and as such, whilst it is running, will become very hot and must not be touched.

### 1-0-4. FIREGUARDING.

4. To prevent the risk of injury through burning a suitable fireguard must be fitted and adequate provision made for guarding the exposed flue pipe where a potential danger is presented.

### 1-0-5. WARNING.

5. The stove must not be operated with the glass front door opened or cracked.

### 1-0-6. DOOR GLASS.

6. The door glass may require light cleaning occasionally depending upon the continuous running time of the stove.

### 1-0-7. FASTENING DOWN.

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

## 2-0 OUTLINE OF CHIMNEY PROBLEMS

See Fig 2 for preferred set up.

1. The fitting of any appliance, solid fuel, wood or oil burning, requiring a naturally generated chimney vacuum, into a traditional narrow boat creates

specific problems, which are mainly concerned with flues amongst other things.

2. Normally when fitting stoves into houses or bungalows although there are many problems, generally if the chimney comes out of the highest point of the property (normally the ridge of the highest roof) stoves will work well in most normal cases.

3. With boats the two major problems are -:

They move

By the nature of their shape, must have relatively low chimneys.

4. Whilst on the move the boat will travel through a variety of changing countryside which will have a dramatic effect on the atmospherics at the chimney terminal.

5. An example of this would be the transition of a boat down through a lock where the wind conditions at the outlet of the chimney will change dramatically as the boat descends into the lock to the lower water levels, severe down draught could occur.

6. Great care must be followed with chimneys on boats and it is critical to observe the following instructions.

7. To ensure satisfactory performance from the BUBBLE stove chimneys must be capable of maintaining a constant steady vacuum of not less than .04" Water Gauge when running on the high fire position and not less than .02" Water gauge when running on the low fire position; at all times and in all terminal conditions.

8. This obviously means that it is essential to fit a suitable anti down draft device to the terminal of the chimney.

10. The chimney vacuum is directly proportional to the following factors:

The height of the chimney.

The resistance of the chimney. (Bends. terminals. etc.)

The cross sectional area of the chimney (diameter)

The Flue gas temperature.

The availability of replenishment air (ventilation)

The integrity of the chimney (does it leak)

## 2-0-1. DOWNDRAUGHTING

1. The contents of the chimney are equal to a cylinder of hot air which depending upon its temperature and volume wants to move vertically, with some force.
2. Stopping it moving vertically. Are resistance such as?

Smoothness of internal wall of chimney.

Chimney bends.

Chimney terminals.

Lack of ventilation. (Air going out must be replaced by air coming in).

## 2-0-2. ATMOSPHERIC CONDITIONS.

Atmospheric conditions at the chimney terminal that could be affected by where the boat is moored.

*The boat is moored in a position near to high buildings, high trees or higher surrounding land and downdraughting is occurring.*

*This can be a serious problem, if there are any of the above in the immediate location (within 100 - 200 yards) of the boat.*

*Under changing and fluctuating wind conditions downdraughting will occur.*

*If you have to moor in situations where the above-mentioned criteria exist, and the stove is running, you must let it go out.*

*Don't leave the appliance running and unattended.*

Don't leave the appliance in running overnight.

## 2-0-3. SUMMARY OF CHIMNEY PROBLEMS

1. Hot air in large volumes = plenty of chimney pull. (Vacuum)
2. Cold air in small volumes = little chimney pull.
3. Bends and chimney terminals create resistance to hot air flow thus reducing potential maximum chimney vacuum.
4. Because it is not possible to use high chimneys it is critical to observe the following instructions.
5. The chimney system must be designed so as to be easily extendible.
6. The chimney can have a minimum inside diameter of 90mm.

7. Outside the boat, the chimney should be twin wall and insulated to keep the flue gasses as hot as possible.

8. The chimney and stove must be adequately guarded to prevent the risk of injury through burning.

9. When moored extend the chimney if you want the appliance to be run at its maximum output, if you are happy with the output of the stove running at up to setting 3, then it will not be necessary to add the chimney extension.

10. The chimney terminal must be fitted with a terminal that will resist down draughting in all terminal conditions.

## 2-0-4. MIN CHIMNEY HEIGHT FOR HIGH FIRE.

1. MINIMUM HEIGHT FOR HIGH FIRE RUNNING IS 2.2 METRES (long extension)
2. When cruising reduce the chimney height and turn the stove down to match the reduced chimney height.
3. Do not cruise with the stove turned up on full output.

## 2-0-5. MINIMUM HEIGHT FOR LOW FIRE RUNNING

1. MINIMUM HEIGHT FOR LOW FIRE RUNNING IS 1.8 METERS. (Short extension)
2. When mooring pay particular attention to the surroundings and remember that close objects such as high buildings, trees or adjacent walls may well cause down or up draughting.
3. Typical flue set ups can be seen in the illustrations showing the flue pipe fitting into a standard cast iron deck flange topped of with a traditional twin wall chimney, terminating with a rotating cowl.

## 3-0 FUEL SUPPLY PROBLEMS

(Fig 1 Illustrates preferred set up.)

There are several problems relating to fuel supply of which you need be informed.

WAXING - TRIM - ROLL

### 3-0-1. WAXING

1 Diesel has a nasty habit of waxing up when the temperature gets down to or lower than freezing,

This waxing or thickening alters its flow characteristics and consequently what was an

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

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

3 The best-case scenario is a fuel pipe 4 feet long in 15mm dia with good insulated lagging.

### **3-0-2. CHANGING OIL PRESSURE AT THE STOVE.**

1. Because of the layout of a boat it is not possible to provide a high pressure oil supply, in most cases a pressure head of out 18" is all that is available and as the tank empties this head of pressure will reduce, and may alter the flow characteristics of the fuel.

2. In some cases this head can also be affected by the ballast or trim of the boat, the changing level of the boat due to addition removal of ballast, fuel or water can have an effect on the position of the oil tank in relation to the stove and the angle at which the oil line is established.

3. Take great care to monitor all the effects of the different ballast and trim possibilities.

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.

### **3-0-3. POOR OIL FLOW PROBLEMS.**

1. Bubble stoves have a very accurate oil flow control valve, which is set up to give a precise oil flow at high and low fire.

3. For example the stove is flow rated at 3cc per minute on low fire and 6cc per minute on high fire.

a. The test flow through the supply pipe should be well in excess of the maximum flow rate of 6ccs even when the temperature is below freezing and the boat is adversely trimmed.

### **3-0-4. OIL FEED SET UP.**

1. If the stove is fitted forward at the bow end of the boat, to keep the oil feed supply as short as possible, a forward mounted oil tank is recommended.

3. The tank should have insulating material around it for protection from the effects of cold weather.

4. Always add a suitable proprietary antifreeze additive to the stove fuel for wintertime running.

5. The tank should have conveniently sized filler and it must be vented.

6. The tank should have:

6-2. An isolation valve before an easily replaceable cartridge filter.

### **3-0-5. OIL LINE**

1. The oil feed line starts after the fuel filter and proceeds to the point of entry, where the oil line goes into the cab of the boat, at this point there will be a remote sensing fire valve which is designed to do two jobs

1. Shut off the oil supply should a fire occur near to the stove. (Fire safety valve)

2. Shut off the oil supply should the flame be blown out. (Flame failure device)

This valve has a reset button, which allows you to re-cock the valve should it trip off.

2. The fire valve has a capillary tube on the end of which is a temperature sensitive phial; the phial is fitted into 15mm pipe clips in front of the drip tray on the fireplace hearth, directly in front of the combustion air restrictor.

3. Should the wind ever blow down the chimney, hot air flowing out of the combustion air restrictor will trip the remote sensing valve and automatically close down the fuel supply to the appliance.

In this case the valve is acting as a flame failure device.

The oil control valve also acts as a further safety device in as much as it cuts off the supply of fuel after a flame out.

4. The sensing phial will be visible through the bottom of the fender.

5. If the bubble stove is fitted up to the first bulkhead the isolation valve may well be fitted outside the cabin or saloon of the boat and you should make sure that you know where it is and how to operate it.

6. 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.

We have had to attend breakdowns on several occasions where the diesel tank has had 50% water contamination.

7. If there is a water trap fitted, make sure that you are fully familiar with its operation and service requirements.

8. In case of emergencies, a suitable and serviceable fire extinguisher should always be readily accessible near to the appliance.

#### **4-0 HOW IT WORKS**

1. 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.

6. As stated earlier, the air side of the equation can vary wildly with the changing performance of the chimney and so to compensate for this the appliance has a built in combustion air restrictor designed to maintain a steady and constant supply of combustion air to the burner.

7. 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.

#### **4-9. THE COAL KIT**

1. The key to the success of the coal effect is the patented coal support system specially developed for use on BUBBLE STOVES.

2. The coals are located on the coal support bars, which are designed to glow red in the flame, passing on the incandescence into the coals.

3. The front fret is designed to allow incandescent glow and flicker through to add to the effect.

4. Care must be taken when positioning the coals on the spikes.

5. The whole system is designed so that it can be removed in its entirety without the need to disturb the coals making routine leaning and servicing very easy.

6. To remove it turn the stove off and when it is cooled down, undo the front door knob, open the door and lift it out using the front fret.

7. Take care not to drop any coals into the pot.

#### **4- 10. DESCALING CONTROL**

##### **NOTE WELL**

The descaling lever must not be touched whilst the stove is running; it gets very hot and if touched, will cause severe burning.

10-1. The descaling device is situated behind the left hand side panel, which has to be removed to gain access.

10-2. After removal of the panel you will see a brass tee piece where the oil line is connected to the bottom of the pot.

10-3. Protruding out from the tee piece is a bent lever, which is used for descaling carbon build up from the inside of the oil inlet connection.

10-4. Rotate the lever occasionally to remove any carbon build up at the point of oil entry into the pot.

10-5. The descaling device has a gland packing nut which must be tightened occasionally to stop oil fume leak. The sealing gland will need to be replaced every second year.

#### **4-11. STOVE COMPONENTS**

The stove has the following components, which can be removed for cleaning or servicing.

The top frame x1

The stainless insert for the top frame x1

The small rear infill part of the stainless insert x1

The hot places x2

The side panels 1 x left and 1 x right hand sides

The front fender

The top frame is secured to the top of the stove by one m6 fastener.

The side panels fit at either side of the stove and are fastened by two m6 countersunk fasteners.

## 5-0 RUNNING THE STOVE

1. We use different valves on dry stoves as opposed to stoves with boilers.
2. We supply the appropriate literature packed in each stove.
3. You must familiarise yourself with all aspects of control detailed within the booklet.

### 5-1. OIL CONTROL VALVE DETAILS

1. 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 right hand side of the stove, behind the right hand side panel.

On dry stoves the oil flow is controlled by turning the knob anti clockwise from its off position.

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

### 5-2. LIGHTING.

Lighting the stove takes a little time and patience; the following procedure should be adopted

Open the front door via the circular brass knob.

Remove the coal kit if it has been supplied with the stove.

Remove the inner mesh catalyser

Remove the lower burning ring.

Turn the oil on at full rate and allow oil to flow into the bottom of the pot to form a pool about the size of a digestive biscuit and then turn the oil off.

DO NOT ALLOW ANY DEPTH OF OIL TO BUILD UP.

Light a small piece of firelighter (about the size of a pineapple chunk) and place it into the centre of the pot.

Replace the lower burning ring, the mesh catalyser and the coal kit and then leave the door slightly open whilst the firelighter gets the oil going.

You will notice the flame start to establish itself and spread around the bottom of the pot, after one minutes it will start to die down at this stage turn the oil flow on to setting 1 and close the door.

The flame should then slowly change from yellow into blue flame combustion and settle down to a steady burn.

Watch the flame during and after the lighting process and if it starts to grow and become yellow turn the oil off immediately and wait until the flame starts to die down, when the flame starts to die down turn the oil control on to setting 1 and the burner should then settle down into blue flame combustion.

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

Do not turn the oil control knob up by any more than one increment.

Allow 2 minutes for the burner to stabilize at each adjustment.

### 5-3. STOVES WITH BOILERS

1. Stoves with hot water boilers are run in exactly the same way as stoves without.

There are extra controls, which are detailed in the oil valve booklet supplied with the stove.

### 5-4. CONTROLS ON STOVES WITH BOILERS

1. There are extra controls provided on stoves with boilers and these are as follows:

Looking at the stove from the front left to right

2. The first control is a black circular knob which should be lifted to turn the oil on to the valve all that is required is to lift the knob and release it.

See fig 4 in booklet (TRIP LEVER.)

(The oil trip mechanism will trip off, if the oil level in the valve is disturbed by excessive boat movement.)

3. The next control is the thermostat (See set temperature in fig 9) to set the water temperature fully clockwise is minimum temperature and fully anticlockwise is maximum temperature. Experience

will allow you to learn where to set this for your own requirements.

4. The next control is a black circular knob, which should be lifted to arm the safety thermostat, all that is required is to lift the knob and release it. (See fig 9 safety shut down bubble)

(If the water temperature gets over 80 deg C this stat will shut the oil supply off and allow the stove to go out.)

5. The next control is the oil flow control, anticlockwise for maximum oil flow and clockwise for minimum oil flow.

## 6-0 FAULT FINDING

### WATER CONTAMINATION

A major problem on boats is water contaminated fuel.

Because of changing temperature, condensation droplets can build up on the inside of the fuel tank.

These droplets along with other sources of water contamination can cause a serious problem if not attended to.

Always keep an eye out for water in the oil.

Make sure that you check the filter bowl regularly.

If your stove is fitted with a Toby DVR oil control valve, It can be drained off without removal from the appliance.

The small drain screw is located at the bottom of the valve.

### 6-1. 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.

### 6-2. 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.

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 appliance flue ways.

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

7. Check the levels.

### 6-3. BURNER RUNS SOOTY.

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

1. If the stove soots up this indicates that there is not adequate air for blue flame combustion or there is an excess of fuel.

1-1. Check that the chimney is working correctly. (This means pulling enough air into the burner to allow correct blue flame combustion to occur.

1-2. Check that the fuel is the correct type and quality.

1-3. Check that the flow rates are correct.

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

2-1. To rectify this problem call your service engineer.

3. Never switch from low settings straight up to high settings, a longer burner life will be achieved if the oil flow control knob is moved only by one number at a time leaving approx. two minutes between each setting change.

6-4. Burner does not light easily

Read the instructions in the lighting section of this publication.

6-5. Oil will not enter the pot

All stoves

1. Is there oil in the fuel tank?

2. Has the fire valve tripped.

3. Has the isolation valve been accidentally turned off?

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

6. Is the oil feed pipe from the valve to the pot blocked. (Unlikely)



## (STOVES WITH BOILERS)

7. Has the oil trip lever tripped off?

8. Has the boiler stat tripped off?

6-7. Operating oil flow rates

OIL Flow rates in cc per minute.

min	max
-----	-----

4cc	10cc
-----	------

Oil Flow Rates In litres Per hour.

.24 litres	.6 litres
------------	-----------

Oil Flow Rates In litres Per 24 hours.

5.76 litres	14.4 litre
-------------	------------

Oil Flow Rates In litres Per 7 x 24 hours.

40.32 litres	100.8 litres
--------------	--------------

To achieve optimum burner performance at these flow rates you will need to have matching flue vacuums as stated.

### 6-8. OIL SMELLS

Visual check on all joints for obvious leaks.

Check that the descaling lever packing gland nut is adjusted.

### 6-9. DEFLOODING A FLOODED POT

If the stove is blown out by severe down draughting oil will run into the pot to a depth of approx 15mm and then stop. If this has occurred do not attempt to light the pot until it has been de flooded.

To carry out this procedure you will need:

A small, leak proof plastic bag.

b. A small sponge.

A larger plastic bag for disposal of the residue.

A pair of disposable plastic gloves.

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.

### 6-10. OIL LEAKS

If the stove has blown out, flooded oil should not leak from the pot, if it has leaked into the drip tray it will have come from the descaling seal or the boat could have been subject to heavy movement causing

the oil to splash around and leak through the air holes in the side of the pot.

## 7.0 ROUTINE MAINTENANCE

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 via the circular brass knob.

2. Remove the coal kit if it has been supplied with the stove.

3. Remove the inner mesh catalyser

4. Remove the lower burning ring.

Scrape the bottom of the pot clean 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 out the filter 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.

## 8-0 WARRANTY

1. 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.

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

3. 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.

4. LABOUR, TRAVELING OR CONSEQUENTIAL LOSS OR DAMAGE IS NOT COVERED.

We will attend to any legitimate warranty claims (which must be made in writing) but we will make a charge for travelling and labour at cost.

4-1 Glass is not covered under the warranty.

5. ARRANGE FOR SERVICE visits with a service engineer.

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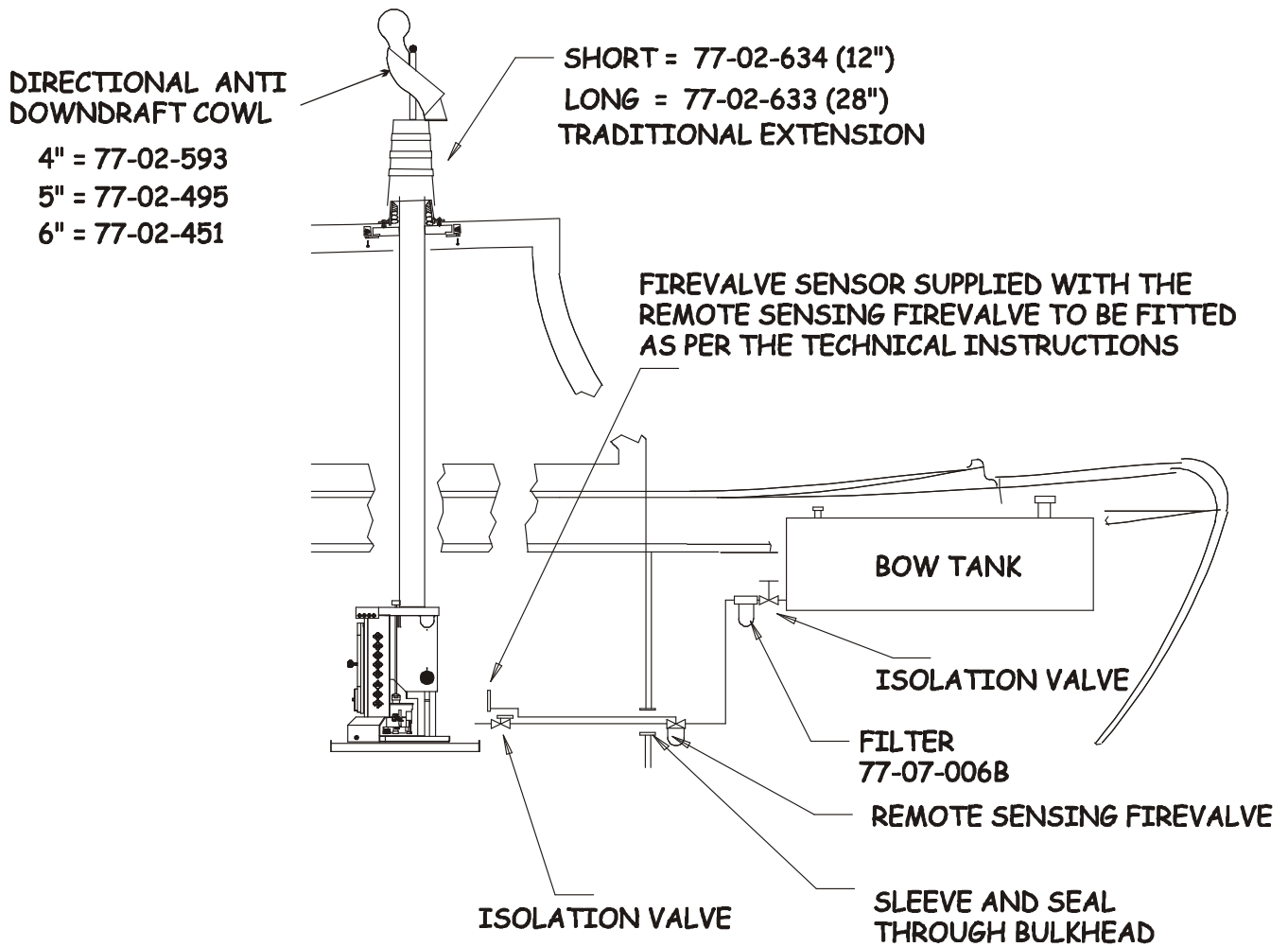
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**FIG 1 Preferred Oil Layout.**



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**FIG 2 Flue Layouts**

