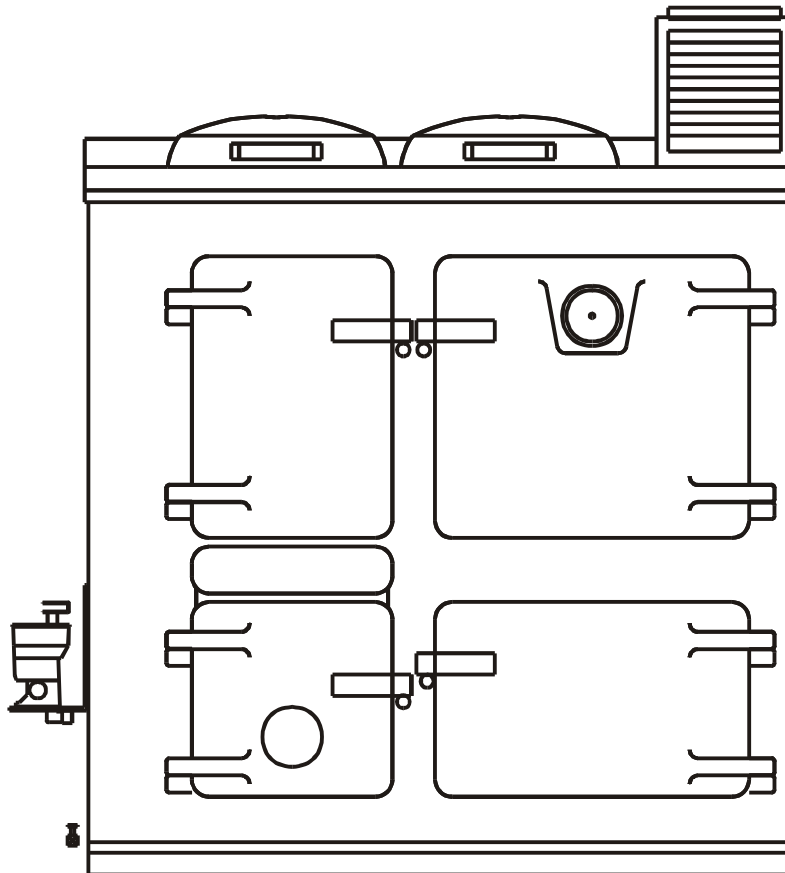




RAYBURN MF VAP CONVERSION
MARINE USER INSTRUCTIONS
ISSUE 2@06-06-05



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1-0 INTRODUCTION

The Rayburn MF was introduced by Rayburn as an extended development of the highly successful Royal.

Unlike the Royal it has a large, two sided, wrap around boiler giving it the ability to heat up to 4 average sized radiators plus domestic hot water.

For summer time cooking firebricks are fitted to left and rear of the internal boiler surfaces.

For wintertime running the firebricks are removed.

Although compact in size it is very heavy, being constructed mainly from cast iron.

It has a top oven and a lower warming oven with the cast iron hotplate for a variety of cooking utensils.

Two insulated lifting lids cover the hotplate and there is a towel rail running the full width of the cooker.

The top oven provides a variety of temperatures and the cook has to learn how to get the best from it.

The oven temperature gauge is positioned two-thirds up the oven.

The oven temperature gradient has about a forty-percent drop from top to bottom.

The oven is normally equipped with two wire trays and one scone tray.

There is a simple oven vent pipe in the top of the oven.

The converted cooker will hold a baking oven temperature at setting number 3, which equates to about 8-10 gallons of diesel per week on continuous running.

1-0-1. WARNINGS

1. DO NOT LIGHT THE APPLIANCE UNTILL THE HIGH AND LOW FIRE SCREWS HAVE BEEN CORRECTLY ADJUSTED.

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

3. Never try to light a flooded pot, when attempting to light a appliance 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.

4. If the burner does not run in blue flame combustion, turn it off and contact a service engineer.

5. Do not run the appliance with soot or smoke coming from the chimney terminal.

1-0-8. HOW IT WORKS

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

3. Once lit, oil goes into the pot at a steady and controlled rate via gravity flow and constantly 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.

(There is a separate booklet on the oil valve supplied with the conversion; you should read this publication together with the oil valve booklet.)

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 appliance is situated, on boats this is normally catered for by the requirements of the boat safety scheme.

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. After reading the section on **outline of chimney problems** you will realise that the air side of the equation can vary with the changing performance of the chimney.

7. The flow of oil into the pot can be adjusted via the knob on top of the oil control valve.

2-0 RUNNING THE APPLIANCE

The converted appliance has a built in baffle system which can be manually adjusted for winter or summer running.

The appliance has left side and rear firebricks, which are designed to restrict the heat to water for summer time cooking.

With the firebricks fitted there is still a top left and top horizontal section of boiler exposed, this is designed to allow enough heating for the domestic hot water requirements.

The internals of the adjustable baffle system comprise of the following.

A stainless steel, sheet metal over oven baffle support, secured by an M5 fastener screwed into the over oven casting, Item 3 in Fig 2B

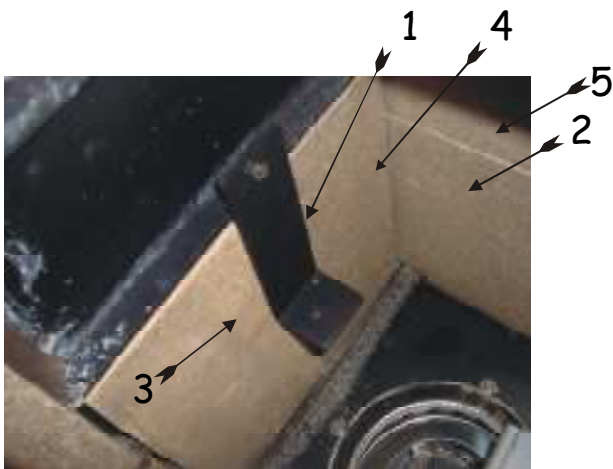
A bent steel bracket, Item 1 in Fig 2A.

A baffle plate with an adjustable slider designed to allow more or less flame through it, as the user requires, Items 2 and 4 in Fig 2B

For summer time running the heat to water can be shut down by fitting the left side and rear firebricks.

For winter time running the firebricks can be removed and the sliding damper (Item 2 in Fig 2B) closed to allow more heat to the boiler sides.

Fig 2A shows the baffle support bracket (Item 1) and the left side and rear firebricks.



- Fig2A-1 Left baffle support
- Fig2A-2 Rear firebrick lower
- Fig2BA3 Left front firebrick
- Fig2A-4 Left rear firebrick
- Fig2A-5 Rear firebrick upper

Fig 2B Shows the sliding damper used to allow more or less flame through.

- Fig2B-1 Fixed baffle plate
- Fig2B-2 Adjustable sliding baffle plate
- Fig2B-3 Over oven baffle support plate
- Fig2B-4 Fastener for sliding baffle 2
- Fig2B-5 Fastener for fixed baffle 1
- Fig2B-6 Fastener for left baffle support.

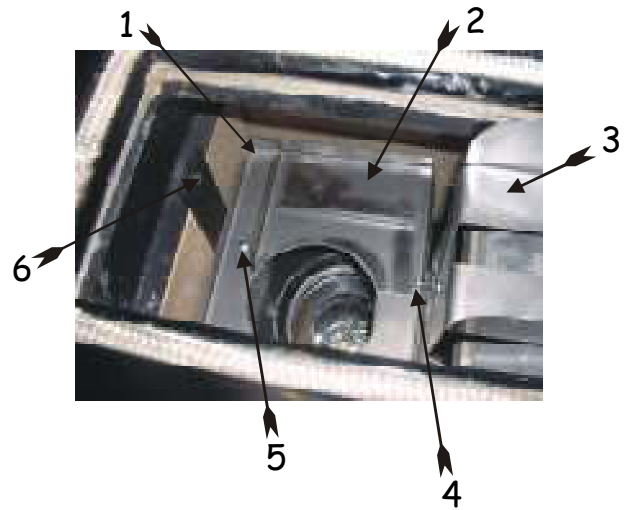


Fig 2C shows the left hand baffle support item 3 in Fig 2b



6. The output of the appliance is regulated by the amount of oil allowed to go into it and this function is controlled by the:

7. OIL CONTROL VALVE (O.C.V.), which is situated at the left hand side of the appliance and it is

calibrated from off position (fully clockwise) to pilot and then through 6 graduations to maximum.

Fig 2D



2-2. LIGHTING.

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

Open the ash pit door.

Turn the oil on at full rate for 30 seconds and then turn the oil off.

DO NOT ALLOW ANY DEPTH OF OIL TO BUILD UP.

Remove the lighting port plug and impale a small piece of firelighter upon the spike.

Fig 2E

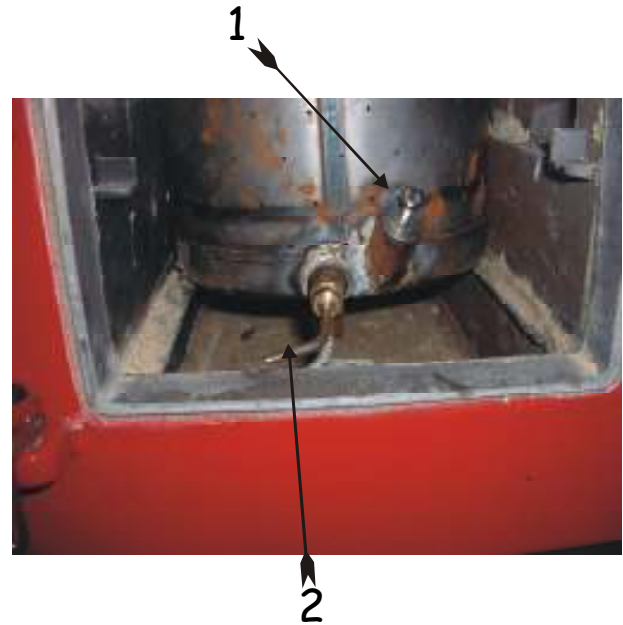


Fig2E-1 Lighting port plug.

Fig2E-2 Descaling lever

Push the firelighter down into the pot and replace the plug back into the lighting port.

After one minute the oil should catch fire and you should be able to see yellow flames through the holes in the side of the pot when looking through the ashpit door as illustrated in Fig 2E

When the oil has ignited turn the oil back on at minimum setting **(PILOT) on the valve. (Pilot setting applies only to OCI 252 ay ships valve.)**

After a few minutes, the flame should then slowly change from yellow into blue flame combustion and settle down to a steady burn. (This can be observed by looking through the inspection glass or through the holes in the side of the pot.)

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 flow control knob 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.

2-3. CONTROLS

The Converted Rayburn is a constantly running appliance and this means that you will have to learn how to adjust the controls to suit your particular requirements and the changing seasons.

For summer time use all the firebricks will be fitted and the sliding baffle would be fully open.

This should give a good hot plate and oven with minimum heat to water.

For wintertime running the bricks can be removed and the baffle closed a little to allow more heat to water.

Control items which can effect the way the appliance works are listed as follows:-

The baffle system.

This can be set from fully open to closed and any point in between, the slider is held in place by a small fastener see fig2b-4.

The Firebricks

See Fig2a, two left and two rear.

These can be used or not depending upon the season.

To remove them first take out the baffle system .

The left side bricks are held in place by the hanging baffle support fig2b-6.

The oil control valve

This can be used to increase or decrease the burner output from minimum to maximum, anticlockwise for maximum oil flow and clockwise for minimum oil flow.

Remote sensing oil safety valves

Your installer will fit two, re settable, automatic oil valves on the appliance, one is designed to shut the oil off if there is a fire in the locality and the other is designed to shut the oil off if the water in the appliance boiler becomes over heated. (Over boil protection.)

If the water-circulating pump fails, the water temperature will increase and cause the valve to shut the appliance down and prevent boiling.

Your installer will be able to show you these two safety devices and the resetting procedure.

Isolation devices

The oil supply can be turned off manually at the cooker and at the oil tank.

Cooker isolation is to allow service work on the burner.

Oil tank isolation is to allow service work on the oil filter.

3-0 OUTLINE OF CHIMNEY PROBLEMS

1. The fitting of any appliance, solid fuel, wood or oil burning, requiring a naturally generated chimney vacuum, into a boat creates specific problems, which are mainly concerned with flues.

2. Normally when fitting appliances 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) appliances 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 appliance 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)

3-0-1. 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).

3-0-2. 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 appliance is running, you must let it go out or move to a more suitable mooring.

Don't leave the appliance running and unattended.

Don't leave the appliance in running overnight.

3-0-3. 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 125mm.

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 appliance 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 appliance 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.

3-0-4. 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 appliance down to match the reduced chimney height.

3. Do not cruise with the appliance turned up on full output.

3-0-5. 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.

4-0 FUEL SUPPLY PROBLEMS

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

WAXING - TRIM - ROLL

4-0-1. WAXING

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.

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 15mm dia with good insulated lagging.

When you buy fuel oil make sure that it comes from a reliable and well-used supply.

Suppliers who are selling a lot of diesel should always supply fuel with correct additives for the differing seasons.

Check this out with your oil supplier.

If you are unsure add a suitable proprietary antiwaxing additive to the appliance fuel for wintertime running.

Suitable additives can be obtained from Fuel Care Ltd 01527 879600

4-0-2. CHANGING OIL PRESSURE AT THE APPLIANCE.

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 appliance 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 appliance.

4-0-3. POOR OIL FLOW PROBLEMS.

1. Bubble appliances 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 appliance 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.

4-0-5. 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 appliance. (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 near to the source of potential downdraft.

3. Should the wind ever blow down the chimney, hot air flowing out of the cooker should 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.

5. If the appliance 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.

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- 10. DESCALING CONTROL

NOTE WELL

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

10-1. The descaling device is situated behind the lower ashpit door.

10-2. After opening the door 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.

5-0 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.

5-1. 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.

5-2. 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 appliance 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.

5-3. BURNER RUNS SOOTY.

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

1. If the appliance soots up, this indicates that there is not an adequate flow of oil into the pot.

This situation is generally caused by a build up of carbon deposit around the oil inlet.

In some more severe cases it can lead to the whole of the bottom of the pot becoming carboned up.

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.

5-4. BURNER DOES NOT LIGHT EASILY

Read the instructions in the lighting section of this publication and check that the oil flow is good and there is no contamination in the fuel.

Operate the descaling lever.

5-5. OIL WILL NOT ENTER THE POT

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)

5-6. OIL FLOW RATES

In cc's per minute.

min	max
4cc	16cc

5-7. OIL SMELLS

Visual check on all joints for obvious leaks.

Check that the descaling lever packing gland nut is adjusted.

5-8. DEFLOODING A FLOODED POT

If the appliance is blown out by severe 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 deflooded.

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.

1. Remove the hotplate.
2. Remove the baffle system.

3. Remove the upper and lower catalysers.

4. Put a small plastic bag into the appliance 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.

5-10. OIL LEAKS

If the appliance 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.

5-11. BURNER GOES OUT.

(Following comments refer to Ships Valves 252 AY)

1. Turn the oil valve to the off position.
2. Check that the fuel supply tank is full
3. Check that the remote sensing firevalve has not tripped off.
4. Check that the overboil protection device has not tripped off.
5. Check that the oil is not contaminated with water and that water is not flowing through the oil valve.

6.0 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. Remove the hotplate
2. Remove the baffle system
3. Remove the upper catalyser and burning ring.
4. Remove the lower catalyser.

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 appliance, oil supply and plumbing system.

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

7. As required:

Keep the burner inners in good condition, replace as necessary.

7-0 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 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 ARE NOT COVERED.**
- 4-1 Glass is not covered under the warranty.
5. ARRANGE FOR SERVICE visits with a service engineer.

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Only approved personnel, WHO HAVE BEEN SUITABLY TRAINED, must carry out maintenance on this product.

Notes