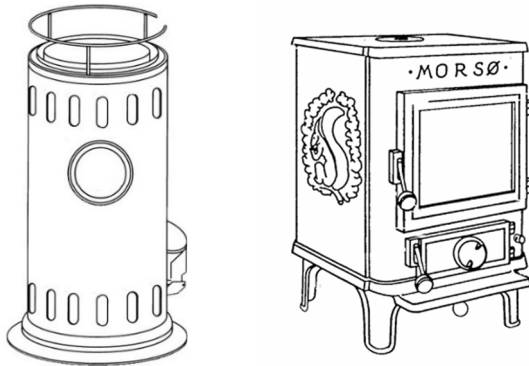




Lockgate
Refleks/Morso Diesel
User Operation Manual



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IMPORTANT – SAFETY PRECAUTIONS
NEVER LIGHT

A) A stove that has been extinguished and is still hot.

B) A stove that has any oil in the burner pot.

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IMPORTANT – SAFETY PRECAUTIONS

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A) A stove that has been extinguished and is still hot.

B) A stove that has any oil in the burner pot.

Priming the Stove

The priming procedure is only required when the stove is newly/first installed or the fuel tank has been allowed to run out of fuel.

- Turn on fuel tank tap
- Bleed fuel filter (if fitted)
- Turn on fuel tap/safety fuel tap fitted (if fitted) close to stove.
- Turn on fuel pump (if fitted)
- Remove burner net/spring and burner ring (if fitted) located in the burner pot
- Lift up the silver tab on the end of regulator. This is the float reset. (Not applicable on TOBY Marine Regulators) The tab is indicated on the regulator cover as 'Lift Open' and sits above the filter area. You may hear the floats inside the regulator drop, this will only happen once.
- Turn regulator control knob (grey knob) to maximum. (All the way anti-clockwise)
- Stoves fitted with a Thermocouple & Flame Failure Device (2000 Models & Morso Squirrel Conversions Only) – The red button will need to be held down for the duration of priming, until fuel can be seen in the burner pot.
- The fuel travels from the regulator through the copper pipe to the cleaning needle (see Page 14) and then through the feeder tube into the burner pot.
- When fuel can be seen flowing into the burner pot, (this can take a few minutes), switch the control knob to OFF.
- Replace burner net and ring
- The stove is now primed and ready to light.

Lighting Instructions - 2000 models & Morso Squirrel

Conversion Stove

We recommend lighting the stove with a firelighter for the first and second time (of lighting after installation) prior to moving over to meths. This is to give the meths something to wick into in the burner pot.

IMPORTANT

- Do not look down into burner pot when lighting the stove
- When lighting with meths, ensure you pour these directly into the burner pot, being sure to avoid any splashing to the sides.
- Be mindful that meths can be more volatile in warmer conditions i.e. if the meths have been stored in a warm environment, if the stove itself is warm etc. If in doubt, use firelighters to light the stove.

Firelighter method;

- Lift lid/open door and remove burner net (cylindrical mesh)
- Ensure burner pot is free of fuel and use cleaning needle
- Using 1 firelighter, break this into 2 smaller ½ inch cubes
- Crumble one half of the firelighter in the bottom of the burner pot
- Place the second half of firelighter at the inlet where the fuel comes in
- Light the firelighter at the fuel inlet using lit match or long lighter
- Once lit, replace burner net and close the lid/shut the door
- Turn the fuel on to number 2-3 via the grey knob on the regulator
- Allow to burn for 3-5 mins. You want the flame inside to be getting high enough that the probe inside the burner pot (thermocouple) recognises the flame.
- Press the red button and slowly release this. This has a pin inside that when pressed, will recognise the flame and allow fuel through
- Allow this to burn for up to 10 mins until you see the burner net glowing red with blue flames around the inside air holes and yellow centre flame
- At this point, press and slowly release the red button again
- Adjust the grey knob to the desired heat output
- For those fitted with a back boiler turn on your water circulation pump

Lighting Instructions - 2000 models & Morso Squirrel
Conversion Stove

Methylated Spirits method:

Important note

***NEVER LIGHT OR RELIGHT A HOT BURNER POT WITH
METHS***

**If the stove is to extinguish after a short time (even a few seconds)
with meths, you must allow the burner pot to go cold before lighting
again**

- Check that the burner pot is dry and that the grey knob on the regulator is turned to 0 (off)
- Pour approx. 50ml of methylated spirits directly into the burner pot
- Close lid/shut the door
- Strike a match and ensure match is lit
- Lift the lid/open door approx. 1-2 inches and drop the lit match in and close the lid/shut the door
- Allow the meths to burn for 2-3 minutes. The mesh will glow red with blue flames from the air holes
- Turn the grey knob on the regulator to 1 1/2 – 2 and press the red button for a couple of seconds and slowly release this. This allows diesel into the burner pot.
- You will sometimes experience a frying sound. This is the diesel boiling. Once this noise has stopped, it is running purely on diesel.
- Allow this to burn for another couple of minutes before adjusting the temperature to suit via the grey knob.
- For those fitted with a back boiler turn on your water circulation pump

***Please note: After completing the lighting procedure, you should always
experience a clear heat haze coming from the chimney***

Lighting Instructions – All Other Stove Models (66,62,60,61,67)

Please note: The 62 Models are best lit with firelighters

IMPORTANT

- Do not look down into burner pot when lighting the stove
- When lighting with meths, ensure you pour these directly into the burner pot, being sure to avoid any splashing to the sides.
- Be mindful that meths can be more volatile in warmer conditions i.e. if the meths have been stored in a warm environment, if the stove itself is warm etc. If in doubt, use firelighters to light the stove.

Firelighter method;

- Lift lid
- Ensure the burner pot is free of fuel
- Turn the fuel on to maximum via the grey knob on the regulator
- Fuel will come into the burner pot from the fuel delivery tube.
- Allow enough fuel into the pot to be able to place a ½ inch cube of firelighter into.
- Turn the fuel off via the grey knob (0)
- Place the firelighter in the diesel you have allowed in
- Light the firelighter using a lit match or long lighter
- Close lid
- Allow the firelighter to burn for 1-2 minutes
- Turn the fuel on to number 2-3 via the grey knob on the regulator
- Allow this to burn for up to 10 minutes until you see the burner net/spring inside glowing red and low blue flames in the burner pot with some flickers of yellow.
- Adjust the grey knob to the desired heat output
- For those fitted with copper heating coil turn on your water circulation pump

Lighting Instructions – All Other Stove Models (66,62,60,61,67)

Please note: The 62 Models are best lit with firelighters

Methylated Spirits method;

Important note

***NEVER LIGHT OR RELIGHT A HOT BURNER POT WITH
METHS***

**If the stove is to extinguish after a short time (even a few seconds)
with meths, you must allow the burner pot to go cold before lighting
again.**

- Lift lid
- Ensure the burner pot is free of fuel and grey knob on the regulator is turned to off (0)
- Pour approx. 50ml of meths directly into the burner pot
- Close lid
- Strike match and ensure this is lit.
- Lift the lid slightly, allowing enough room to drop the lit match through
- Drop the match through gap and close lid
- Allow meths to burn for 2-3 minutes, until the burner net/spring is glowing red
- Turn the fuel on to setting 1 ½ - 2 via the grey knob on the regulator
- Over the next 3-5 minutes, the diesel will come into the pot.
- You will sometimes experience a frying sound. This is the diesel boiling. Once this noise has stopped, it is running purely on diesel.
- Adjust the grey knob to the desired heat output
- For those fitted with copper heating coil turn on your water circulation pump

***Please note: After completing the lighting procedure, you should always
experience a clear heat haze coming from the chimney***

To Turn off:

- Turn the grey knob all the way clockwise to 0
- This will take approx. 30 seconds to 1 minute to extinguish the flame

Changeover from Spirit to Fuel Oil/Diesel

We advise to allow a 2-3 minutes before making changes to the control knob after lighting. This allows the pot to heat up and set light to the vaporising fuel oil/diesel. The changeover from spirit to fuel oil is normally indicated by a spitting sound, which is the fuel oil boiling prior to the vaporising process starting.

Turning the regulator control up too soon on starting can cause the stove to over fuel which is caused by excess fuel in the burner pot. If this occurs, turn the regulator to OFF via the grey knob and allow the flame to subside, without letting the flame go out.

Once the excess fuel has burnt off, turn the regulator back on to desired setting

Fuel Temperature

The regulator flow rates i.e. cc/min, are calculated at a fuel temperature of 25 degrees Celsius. This 'working' temperature is achieved by heat transfer from the stove case and the ambient temperature of the cabin.

As the outside temperature drops, the viscosity of your fuel increases and the controller cannot deliver the same volume of the thicker fuel to the burner pot. At intermediate and higher settings, this has little operational effect, but at the lowest setting it can cause the burner to go 'off flame'. This is caused by a combination of a lower temperature, thicker fuel and a cooler stove case not being able to raise the incoming fuel temperature sufficiently.

As a general guide, when outside temperatures are low, upon lighting the stove, avoid using the lowest heat setting for at least the first hour and do not leave the stove to run for long periods on its lowest setting.

If the stove is burning cleanly and using the full circumference of the burner pot it is operating above the 'off flame' level.

Please see 'Flame Patterns' on Page 11 – 12 for more information on how the flame should look on the different settings.

Flame Patterns

2000 Models & Morso Squirrel Diesel Conversion

On a low setting;

You should have blue flames coming from the air holes onto the mesh which should be glowing red and will have flicker of yellow flame in the centre

Low setting should be as above. Low and majority yellow flame will create soot and not be burning efficiently. Any black smoke from the chimney is too low. If you experience this, turn the stove up until you experience the blue flames from the air holes and a red mesh

On a mid setting;

As before with the low setting, but the centre yellow flame increases

On a high setting;

The mesh should be glowing red, but not quite as red as on the low setting.

More of a high yellow flame

Please note:

- In windier conditions, we advise turning the stove up slightly to counteract downdraft
- Whilst cruising with a lower flue, we recommend turning the stove up to allow for the reduced updraft
- In cold conditions, we recommend using setting number 2 as a minimum to allow for thicker fuel

Flame Patterns

For all other Stove Models (66,62,60,61,67)

On a low setting;

You should have majority low blue flames and the spring/coil should be glowing red You will likely experience flickers of yellow

Low setting should be as above. Low and majority yellow flame will create soot and not be burning efficiently. Any black smoke from the chimney is too low. If you experience this, turn the stove up until you experience the blue flames and red mesh

On a mid setting;

The blue flames will become higher and the burnernet/spring should still be glowing red You should experience a flicker of yellow on top

On a high setting;

Higher blue/yellow flames and the mesh will not glow as red as the previous settings

Please note:

- In windier conditions, we advise turning the stove up slightly to counteract downdraft
- Whilst cruising with a lower flue, we recommend turning the stove up to allow for the reduced updraft
- In cold conditions, we recommend using setting number 2 as a minimum to allow for thicker fuel

Thermocouple & Flame Failure Device

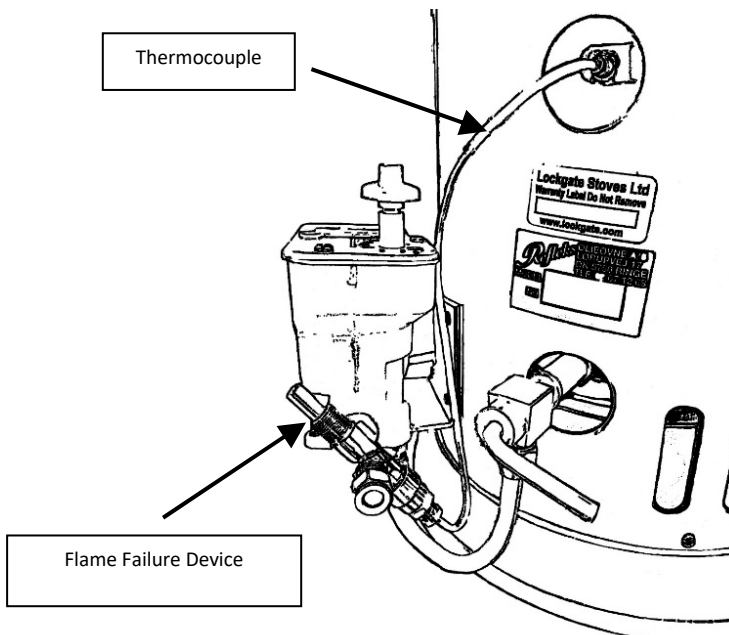
Fitted to 2000 Models & Morso Squirrel Diesel Conversion Only

Stove fitted with Thermocouple Flame Failure Device

The thermocouple flame failure device is fitted as a precautionary measure to recognise when there is no flame within the burner pot and as a result, the thermocouple will recognise this and shut off the fuel.

Once you have achieved high flame in the ignition sequence i.e. mesh glowing red, press and hold the red button (see image below) for a couple of seconds. This will latch the mechanism and open the fuel supply feed pipe to the stove.

The probe for this device is located in the top row of air holes in the burner pot. Care should be taken when cleaning the stove not to damage or dislodge this probe.



Cleaning Needle

The cleaning needle is located in the brass T-piece at the end of the fuel feed tube that goes into the burner pot. It is a 6mm stainless steel pin, travelling through a 8mm hole. The end of the pin is bent at 90 degrees.

When the stove is in use, the pin should be pulled back approx. 4" so that the end is not protruding into the inside of the burner pot.

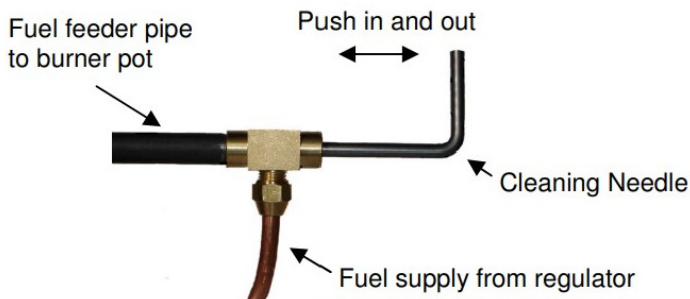
Failure to pull the pin back will result in heat transmitting down the pin and damaging the O-ring in the T-piece. It will also cause the fuel to prematurely ignite on entry to the burner pot causing an irregular flame pattern.

The cleaning pin is used to keep the fuel entry to the burner pot clear of combustion scale, to do this, push the pin in and out two/three times.

This should be done at least every third day of continuous running.

Please note: There is nothing to stop the cleaning needle coming out completely from the brass housing when pulled. If this is to happen, re-insert immediately and check for any diesel spillage.

NEVER RUN THE STOVE WITH THE CLEANING NEEDLE REMOVED



Maintenance

The stove requires cleaning when;

1. The stove will not burn with a clean flame and combustion deposits occur in the burner pot
2. The stove extinguishes itself without reason

For standard usage, we recommend cleaning once a month

Cleaning the stove (Manually)

Window

- The window can be cleaned from the inside using a damp cloth or sponge. For tougher deposits, stove glass cleaner can be used.

Stove body

- For those with Copper or Brass body stoves, a Copper or Brass polish can be used to clean the external body
- For those with stainless steel stoves, a stainless steel polish can be used or a cloth

Flue Pipe

- The flue pipe should rarely need cleaning if the stove is burning correctly.
A flue/chimney brush can be used if desired, ensuring care is taken
Deposits can be seen at the 90 degree knee bend in the back of the stove, and can be removed from here.
Those fitted with a back boiler or water coil will find this slightly more difficult to access.

Cleaning Tablets

We supply cleaning tablets (packets of 8) designed for vaporising burner pot stoves. The tablets chemically clean the stove and flue system and help to maintain the cleanliness and reduce build up in the stove when used as advised.

- You would first complete the cleaning procedures mentioned below to clean the burner pot
- Place a cleaning tablet in the base of the burner pot and light the stove normally.
- When the stove is vaporising and running on the fuel oil, (the stove will burn with green flames), turn up to half power.
- Allow to run at this level for 30 minutes, then turn to low heat for 15 minutes, then to high heat for 15 minutes.
- Return to medium heat until the flames return to normal colour.
- This procedure will clean all segments of the burner pot.

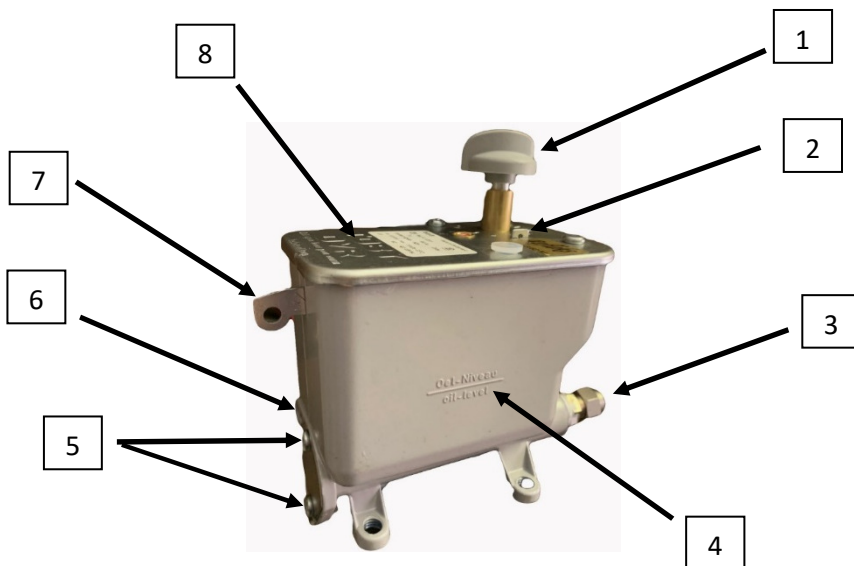
Cleaning the burner pot (Manually)

- Remove the burner net/spring and burner ring from the burner pot
- Clean the burner pot using a wire brush and a scraper of sorts for the inside base (ensure this does not damage the burner pot)
- The top row of air holes around the burner pot are clearly visible and normally never need cleaning.
- In the side wall of the burner pot are a series of approx.. 2mm air holes. These should be visible when looking into the burner pot from above. These should be cleared with a small rod/drill held between two fingers.
- If air holes cannot be seen, a wire brush can be used to reveal these.
- The use of a mirror is helpful to allow you to inspect whether the holes are clear or not.
- All loose combustion scale should be removed from the floor of the burner pot. (A vacuum cleaner can be used but be aware the impact this will have on the cleaner)
- Once you have done this, use your cleaning needle before lighting the stove.

USE GLOVES WHEN CLEANING THE INSIDE OF THE BURNER POT

TOBY DVR Regulator

[*See our website for a detailed video explaining the TOBY DVR Regulator*](#)



1. **Control Knob** – Controls the flow rate of diesel into the burner pot
2. **Actuating pin (Top Pin)** – Tells you where the main jet is without removing the top plate
3. **Fuel Inlet**
4. **Level Marker** – This is where the fuel level should be inside the reg
5. **Filter Screws** – Removing the 2 screws, the silver plate and black gasket allows removal of the filter for cleaning.
6. **Draining Screw** – Drains regulator without removing lid
7. **Float Reset** – This resets the floats inside to allow fuel to flow into the regulator. If triggered, lift to reset.
8. **Top Plate (Lid)**

Cleaning the Regulator Filter

When cleaning the stove, we recommend to also clean the filter within the regulator

Expect approx. 100ml of fuel to come out of the filter housing when completing the below. Ensure to have something ready to catch this

To clean;

- The filter is located behind the silver plate as can be seen in the TOBY DVR Diagram on Page 17
- Unscrew the 2 screws depicted by label Number 5 in the diagram
- Remove the silver plate & the black gasket situated behind this
- You will see a small horizontal piece of plastic, this is the filter. You will need to use a screwdriver or something similar in order to pop this out
- This is a washable filter, so can be removed, washed and replaced.
- Make sure that the filter is dry before placing it back in
- When replacing the filter, this will only go back in one way due to having a small tab on one side. If placed in the wrong way, this will not sit flush.
- Once complete, replace the black gasket, silver plate and 2 silver screws

Float Reset

This can trigger for 2 reasons

- The regulator has detected excess movement
- The overboil has detected the water temperature it is set for (if fitted)

Re-set by lifting the Float Lever once. You will hear the floats inside drop and fuel will continue to flow.

Main Jet Cleaning

Located below the grey knob is the main jet, this can be seen protruding through the top plate (Label number 2 on the diagram on Page 17).

This is what regulates the fuel from the TOBY DVR into the burner pot. Due to being a very small slit, this can become blocked with dirt over time.

To clean;

- Ensure fuel supply to the regulator is switched off
- Turn the grey knob to the first notch (number 1) This prevents the spring mechanism from popping out when removing the top plate
- Remove the two silver screws in the top plate and remove top plate lid
- The main jet is positioned directly beneath the grey knob and should be able to be lifted out easily
- You will notice at the end of the brass barrel (tube) of the grey knob, there is a small slit. This can become blocked with dirt.
- Use the corner of a piece of paper or similar to clear this
- When holding the slit up to the light, you should be able to see clearly through it.
- To replace the main jet, ensure the spring sits on top of the nipple located inside and the main jet tab slots through the hole in the top plate.

Decommissioning the Stove

If the stove is to be left for long periods without use, the following procedure should be adopted;

With the stove running

- Switch off the fuel at fuel tank.
- Switch off fuel tap/safety tap (if fitted) close to the stove.
- Turn regulator control knob to maximum (all the way anti-clockwise) and wait for the stove to extinguish.

NOTE: The stove will need to be primed for next use after it has been decommissioned. See 'Priming the stove' on Page 5

Guarantee

- 1) 12 month guarantee against material failure and manufacturing faults from date of purchase
- 2) The guarantee covers only spare parts unless the product is sent carriage paid to Lockgate Stoves Ltd (Valid only if the product is purchased in the UK)
- 3) The guarantee does not cover mistreatment of the product and the guarantee on regulators is invalid if the seals on the adjusting screws are broken (unless specified otherwise)
- 4) If the product is purchased in a country other than the UK, details of the guarantee should be obtained from the distributor.

Please do not hesitate to contact us directly with any questions or queries you may have;

Tel: 0115 99 88 304

Mob: 07545 394 384

Email: info@lockgate.com

Or

Via the 'Contact Us' form on our website;

www.lockgate.com

Notes

Notes

