

Getting Started - with our rescue boats

Some background.

The club rescue boat engines are getting on a bit now, particularly the 30 HP 2-stroke on the RIB. In "the good old days" a 2-stroke engine was deemed perfect for powering a boat as its power to weight ratio was much better than that of a 4 stroke. The downside was that any oil used to lubricate the engine was consumed in the combustion process along with the fuel, and as many engine exhaust systems lead to below water to attenuate the noise there was often a trail of oil smear on the water surface. This is far from ideal especially when your motoring around people in the water or on a source of drinking water as are we. I must say though, I miss the wonderfully distinctive smell of burnt Castrol 2-stroke oil that accompanied boats and motorcycles everywhere in the 70's and 80's. Halcyon days indeed!

As emissions legislation tightened up, manufactures were forced to develop engines that could run on an ever-diminishing amount of oil. The most modern 2-strokes run on 100 parts of petrol to 1 part of oil; far from the 25:1 of earlier machines. How they survive on this whiff of oil I don't know - they are quite amazing machines. Even at this lean figure, they still consume more oil than their 4-stroke counterpart, so it was only a matter of time before the cull in 2-stroke manufacture was announced. As well as through burning oil, the burning of the fuel itself generates pollutants too. Until the mid 1980's the mainstream mechanism for presenting a fuel/air mixture to an engine was by means of a device known as a carburettor. A carburettor produced a compromise solution. It could be tuned to be very good at one set of load and speed conditions but it would be worse at others. In a quest to overcome this limitation, a system known as fuel injection was developed with the promise of providing optimum mixture control over a wide range of operating conditions. As well as that, an engine is optimised to run at a specific temperature, but before it gets there we need to make it run at the cooler ambient that can be quite cold in winter. This presented a problem.

In order to support combustion inside a petrol engine the fuel and air needs to be atomised, i.e. made into a fine mist of minute droplets in a ratio of approximately 14 parts air to 1 part fuel by weight. In a warm engine, the hot metallic parts this mixture passes over en-route to the combustion chamber help to vaporise the mixture, but in a cold engine the fuel tries to condense out of the air onto the cold surfaces much like steam from your iron on a cold window. In order to make sure there are enough airborne particles to support combustion, extra fuel is added. In the days of carburettors this was known as "choking" as you would essentially restrict, or choke the amount of air flowing through the carburettor, forcing the instrument to supply an enriched mixture. As the internal parts warm up we are able to gradually decrease the choking effect and allow the mixture to return to the nominal 14:1 ratio. That's it simplistically, and what led therefore to the choke lever / knob we have on our old boat engines. With the more modern fuel injection equipped engines in boats and cars alike, the engine management computer measures the temperature of the engine and injects extra fuel through the warm up period and we do not even have to think about it. One day we might even get one, but until then it might help to understand what's going on when we start the engines, and that's why I wrote this.

Lots of us struggle starting the rescue boat engines. They *can* be quite temperamental, so don't feel too bad about it. The RIB seems the worst, and when it eventually does fire it is often rewarded with a dose of full throttle, just to "make sure it keeps running". I cringe when I hear an engine rev hard with no load, especially when it's cold. There is little worse you could do to an engine short of running it without any lubricating oil. The extra fuel in the cold start mix washes the lubricating oil from the cylinder bores and as the internal parts have not expanded to their normal operating tolerances they rattle around causing all sorts of damage.

At the recent service it was identified that through excessive cranking and pulling, the starting mechanisms on both engines are worn past their best, and in the case of the RIB, the flywheel and starter motor gear will need replacing soon at a considerable cost. There is therefore a financial reward to understanding the problem and addressing it also.

Part of the problem is that many members drive the boats so infrequently, they never really get chance to learn their idiosyncrasies and soon forget what worked last time. The meat and potatoes of the rest of this article will therefore be summarised, laminated and a copy put in each boat to provide an "in the boat" reference guide.

The Pre-Launch Check.

Before launching, **familiarise yourself with the controls**, including the method for raising and lowering the engine. **Each Engine is different**, and as we each only use the boats occasionally it is no embarrassment to spend a few moments reminding ourselves how each works **before we go on the water**. The **Jenneau will only lift if it is in forward gear**. The **Rib needs to be in neutral**. The lifting/ shallow drive latch on the back operates differently on each boat too. Practice each one on dry land where it's easiest before launching. It will save your back!

For the Jenneau, Check that the **internal bung is in place**, or, **in the case of the RIB, that the external bung is removed and the self-sealing one-way valve is present and not fouled** with leaves, twigs, food wrappers etc keeping it open. **If it is missing there is a spare in the small black waterproof box in the bow**.

Being a 4 Stroke we need to **occasionally Check the engine oil level in the Jenneau**. You need to remove the cowl to view the dipstick much as you would in your car. Top it up as necessary with the **4-stroke engine oil** that is available in the container.

Check that there is **sufficient fuel** for the duties you are about to perform, and if you need to top up, **be sure to use the correct fuel**. **Straight unleaded petrol** for the **4-Stroke Jenneau**, and **Petrol - Oil mix** (50 parts Unleaded to 1 part two cycle oil **for the 2-Stroke RIB**).

Check that the **engine kill cord** is fitted.

It would not hurt to check that the first aid kit is present and contains all it is supposed to.

Starting the Jenneau Engine

The starting technique changes depending upon whether the engine is cold or warm. **So, what is a "cold" engine?**

It's a relative term, but as a guide **an engine is "cold" if the cylinder head** (next to the spark plug) **feels cooler than your hand**. This is of course inside the cover and nobody really expects you to remove the cover to check. You need to best guess **based on ambient temperatures and time since last run**. **As temperatures rise, you need to reduce the degree of "choke" accordingly**.

Cold Starts.

- 1) Ensure that the bottom of the engine is in **sufficient depth of water to cover the cooling pump impeller** (about 8 cm above the water intake slots) and that the **propeller is clear of the bottom**. Set it on the shallow drive position if necessary.
- 2) Ensure that the **vent valve** on top of the filler cap is open.
- 3) **Compress the bulb** in the fuel line until it becomes hard.
- 4) Ensure that the engine **gear selector is in neutral**.
- 5) Put the twist grip **throttle in the start position** as indicated by the illustration on the tiller handle.
- 6) Ensure that the **engine kill cord is in place and connected to you!**
- 7) Pull the **choke knob out fully**.

- 8) Grab the **starter cord** and give it a good hard pull.

If the engine starts you may **slightly increase the throttle** and after a few seconds **slowly start to return the choke to the off position. DO NOT REV THE ENGINE EXCESSIVELY WHEN IT IS COLD**, especially when the choke is still on as it will cause accelerated wear.

If the engine fails to start, have a second attempt and maybe a third. If it has shown no signs of firing check 2- 8 again paying particular attention to the kill cord. If all the above was correct, then follow the instructions below for starting a flooded engine.

The Jenneau's engine requires choke for a lot longer than the rib before it will idle nicely with none. Be sure though to **remember to turn it off completely once it's warm** as failure to do so **can cause damage and increases fuel consumption dramatically**.

Flooded engine

- 1) Follow steps 1 – 4 above.
- 2) Open the **throttle to about ¾ open**
- 3) **Close the choke fully**
- 4) Pull the starter cord, but **be prepared to close the throttle almost all the way immediately** if it fires.

If it fires then starts to die, pull the choke out again a little way and **balance the throttle / choke** until it will idle with no choke.

Warm Start

As per "**Cold Start**" above, but **skip step 7**.

Starting the RIB Engine

The starting technique changes depending upon whether the engine is cold or warm. See "**So what is a cold engine**" above. **With the RIB you may need two hands on the remote control box**. The **Right hand for the key/choke switch, and the left one on the fast idle lever**.

Unlike the Jenneau engine whose choke is variable, **the RIB choke is either on or off. There is no "in between state"**. Consequently it is more finicky.

Cold Starts.

- 1) Ensure that the bottom of the engine is in **sufficient depth of water** to cover the cooling pump impeller (about 8 cm above the water intake slots on the lower leg)) and that the **propeller is clear of the bottom**. Set it on the shallow drive position if necessary.
- 2) Ensure that the **vent valve** on top of the fuel filler cap is open.
- 3) **Compress the bulb** in the fuel line until it becomes hard.
- 4) Ensure that the engine **gear selector is in neutral**.
- 5) **Lift the fast idle lever** on top of the control box **just a little**.
- 6) Ensure that the **engine kill cord is in place and connected to you!**
- 7) **Push the key in**. You should hear a quiet click from the engine, which signifies "**choke on**".
- 8) **Turn the key** and crank the engine for about 5 seconds.

As soon as the engine fires allow the key to come back out (Choke off), but continue to crank - Key turned - (within reason as you do with your car) until it is running properly. If it continues to run you may **slightly increase the throttle** using the fast idle lever or **play it up (not too far) and down** until it will idle by itself.

If the engine fails to start, try cranking again using varying amounts of fast idle but **without pushing the key in**. We find that **this engine requires very little choke** and almost certainly doesn't need any once it has fired initially. Please **DO NOT REV THE ENGINE EXCESSIVELY** when it is cold, as it **will cause accelerated wear**.

Please note that **there is a choke lever similar to that on the Jenneau engine fitted on the front of the Rib engine. This should never be used** where remote controls are fitted.

Flooded engine

- 5) Follow steps 1 – 4 above.
- 6) Open the **throttle to about ¾ open**
- 7) **Do not operate the choke** by depressing the key
- 8) **Crank the engine, but be prepared to close the throttle straight away** if it fires.

If it fires then starts to die, you may momentarily press the key in to give it a shot of extra fuel but do not overdo it. Again play the fast idle lever until it will idle by itself.

Warm engine

As per "**Cold Starts**" above, but **skip step 7**.

Moving off

Please **do not rev the engine too fast before selecting forward or reverse gear**, and when you do select a gear, **be purposeful** with it. Clunk it in rather than gently slide it as it will actually do less harm. You will sometimes see that the RIB engine smokes excessively, especially when cold. This is due to the ratio of the pre-mixing of the petrol and lubrication oil, and the extra fuel/oil mix injected at start up. The start up smoke is normal, though we need to be careful when pre mixing the fuel and oil not to overdo it in order to limit emissions during normal running.

Looking after our assets.

Never run the engine out of water. As well as cooling, the water provides lubrication for the pump impeller. Though it would not overheat during a short run, the lack of lubrication **WILL QUICKLY CAUSE IRREVERSIBLE DAMAGE** to the impeller. As with our sailing boats, it is contact with land that causes the most damage, so please be **careful when approaching shallow water and launching from the trailer.** Twice last season the cage around the RIB propeller was damaged and required welding. The one on the rib is distorted so badly that it only just fits now. It is wedged on there. Despite the cage's presence, the propellers seem to be getting damaged. There is a new propeller on the Jenneau now but the rib prop looks like it's seen better days. Please be careful.