YANMAR

YANMAR
REPOWER GUIDE

PROVEN MARINE TECHNOLOGY

yanmar.com/marine/service/repower

INTRODUCTION

Repowering your boat is a major decision and there are several things to consider. We've collected some important information to help guide you through this decision and process. Connect with a certified YANMAR dealer or distributor when you are ready to make the next steps in your repower project.

BENEFITS OF REPOWERING

Installing a new, technologically advanced YANMAR engine will instantly breathe new life into your boat. With the right system, you will benefit from:

- Improved acceleration, power, and responsiveness
- Lower running costs, less maintenance,
- Enhanced fuel efficiency and lower environmental impact
- Upgrade options to the latest electronics, controls, and diagnostics with interconnectivity to modern multi-function display
- An overall smoother, quieter, and more pleasurable boating experience

WHEN TO CONSIDER REPOWERING

YANMAR marine engines are renowned for their durability and long lifespan. The point at which your YANMAR or other diesel system will need repowering cannot be determined based on the number of operational hours alone. An engine's longevity is often subject to how regularly and consistently you run your system. You should consider repowering if:

- Your existing engine is becoming increasingly unreliable
- You are losing horsepower
- The engine is consuming too much fuel
- Maintenance costs and downtime are rising
- You want to benefit from the advantages of modern engine technology

PLANNING

Depending on the complexity of the project, replacing an inboard engine can take between one to four weeks once it arrives at the yard. However, the more time and consideration that can be put into planning the repowering project beforehand will pay dividends when the installation starts.

- Choosing your installation center
- Selecting your new engine
- Choosing new accessories/technology you may wish to include
- Allocating delivery time for all needed materials
- Identifying any additional work that might be required

1 CHOOSING THE RIGHT INSTALLER

A successful repowering project relies on two key aspects: selecting the correct engine for your boat and commissioning a qualified installer. Finding a technician with the right level of expertise and skill will help achieve a great outcome. The following tips are a guide to how you can make this selection process as smooth as possible.

- Only commission an installer who has visited and inspected your vessel.
- A competent installer should ask relevant questions about your boat and how you operate it.
- Look for an installer who has repowered vessels and/or completed projects of a similar scale.
- Ask for references that you can visit or speak with, as well as research the overall reputation of the yard.
- Make sure that an installer's work conforms to all relevant regulations and legislation.
- Ensure that you receive a detailed quotation and a full breakdown of technical costs. On occasion, certain costs may be difficult to define upfront, such as converting a gasoline tank to diesel. However, these should be discussed in detail before work commences.

2 WHAT ENGINE DO I NEED?

When determining the engine best suited to your repowering needs, there will be a number of things to consider, centered around the type of boat you own, what you are looking to gain, and your engine room space and current engine footprint.

Displacement hull vessels will normally require a like-for-like power output while planing hull boats, more sensitive to weight, may benefit from the improved power to weight ratio offered by modern diesel engines.

With the advances in technology and materials used in YANMAR's modern engines, it is often possible to achieve the same or higher power output with a smaller and lighter engine, boosting both acceleration and top speed. However, keep in mind that a more powerful engine may require a different marine gear, stronger engine beds, larger prop shafts and propellers, additional fuel tank capacity, and reworking of the existing intake air and exhaust system.

It is best to consult with a certified YANMAR dealer to determine the right propulsion system for your needs.

REBUILD VS. REPOWER

Rebuilding an existing engine(s) is an alternative option to repowering. This route is commonly perceived to be an easier and less costly choice. However, this may not always be the case, and if it is, these may only be short-term benefits.

Many existing parts are often not replaced during a rebuild. These parts can include, but are not limited to, the alternator, starter, and water pump. The remaining life expectancy of these parts cannot be predicted and could require further maintenance, downtime, and expense. Rebuilding an engine could also take more time and could present additional, unexpected costs.

By contrast, the installation of a new YANMAR engine guarantees that all of the components are new and the system is covered by our extensive manufacturer's warranty. It will also likely incorporate the latest state-of-the-art technology, which will deliver rewards on both an economic and performance level.

Ultimately, the decision between the two options relies on individual circumstances and requirements. Consider this: if a rebuild is going to cost about 40% or more than the amount to install a new engine, then repowering may be a sounder investment.

COST VS. VALUE

Repower your boat because you plan to keep it and reap the benefits of the new engine yourself. The value of your boat will certainly increase with a new engine, but rarely enough to recoup the costs immediately if you are only repowering with the intent to sell. The same is generally true if you convert from gas to diesel. The boat's value will increase, but not likely enough to fully pay for the conversion.

REPOWER BECAUSE OF ENGINE FAILURE

When an engine goes down, you need to repower your vessel regardless of choice. Whether your boat is used for recreation or for light duty commercial purposes, our goal is to get you back on the water as quickly as possible.

What if I have multiple engines and only one goes down?

If one engine fails and needs repowering, consider the remaining life expectancy of the other engine. If the other engine is nearing its end of lifespan, it is best to replace both engines at the same time. When replacing both engines, we recommend upgrading to the latest engines to benefit from the performance and efficiency gained by the latest advances in technology. If the other engine still has about 60% or more life expectancy, replacing only the down engine might be the best choice.

EMISSION COMPLIANCE

If your boat has an engine(s) not currently compliant with the latest emissions regulations, there are several things to consider when repowering.

Is there a current emission compliant engine model that fits the power and space requirements of your boat?

- If yes, it is highly recommended by the emissions governing authorities to repower with engines meeting current emissions regulations. There are some cases where exceptions can be made. Please contact your regional dealer or distributor to inquire.
- If there is not a current emission compliant engine that fits your boat without significant modifications, then you might qualify for a non-compliant replacement engine.

Advantages to repowering with an emission compliant engine:

- Enjoy the benefits of a significantly more fuel-efficient system.
- Advances in performance and efficiency from the latest common rail technology provide a cleaner, smoother, quieter, and more powerful engine experience.
- See YANMAR engine data and real time diagnostic troubleshooting codes at a glance with advanced electronic controls and displays that come standard, or as an option, with all current YANMAR compliant engines.

WHY CHOOSE YANMAR?

YANMAR marine engines set the global standard in performance, efficiency, and endurance.

YANMAR's reliable engines are well known to have a low total cost of ownership.

YANMAR has the largest sales and service network in the marine industry, covering over 130 countries worldwide.

YANMAR is the only manufacturer to bring the benefits of common rail technology to smaller vessels, providing 5x Best in Class standards – Clean, Interconnective, Quiet, Powerful, & Fuel Efficient.

YANMAR is the inventor of the modern diesel engine and is continuing to innovate solutions that push the boundaries of marine propulsion into the next century. Meeting the demands of the evolving, modern consumer by providing advanced and sustainable technologies is proudly at the forefront of development at YANMAR Marine International.

WHAT ELSE DO YOU NEED TO CONSIDER?

While the choice of engine is a central consideration, equally important will be the compatibility of the associated systems and hardware. If you are considering a more powerful system for example, it is also important to determine whether your current equipment and boat structure can support it. This includes the marine gear, engine beds, prop shafts and propellers, fuel tank capacity, air intake and the exhaust system.

The following information provides some general direction in other areas that should be investigated during the early phases of your repowering project.

1 THE ENGINE MOUNT

Ideally, your new engine will mount directly on to the existing engine bed/mounts. If this is not possible, new mounts will need to be installed.

Your chosen installer should use engine mounts provided by or specified by the engine requirements. These have been specifically designed for each model to minimize the transfer of engine noise and vibrations to the hull. If you are experiencing significant noise and vibrations to the hull with your present engine, a drive shaft system that incorporates both a thrust bearing and CV joints could be a worthwhile consideration to your repowering project.

In addition, the fore and aft position of the engine must also be considered. Many new systems are shorter and therefore will not cause issues in this respect. However, certain scenarios, such as replacing a v-type engine with an inline engine may require further inspection from a clearance point of view. There must be sufficient clearance around the new engine for inspection and maintenance access.

2 EXHAUST, AIR INTAKE AND COOLING SYSTEM

Your intake, exhaust and cooling systems are crucial to the performance of your engine. Although you may be repowering with a similar size and output engine, be careful not to assume that these original systems will suffice. Engines benefit from unrestricted, fresh air for cooling and combustion. Also, engine power decreases as the temperature of its combustion air rises above 25˚C / 77˚F. Some older engine compartments may not maximize the benefits of the intake and cooling system needed by modern engines, therefore a careful review of the whole system is critical.

Equally important is the exhaust system. The back pressure and diameter of the existing system will need to be checked to ensure that it meets or exceeds the specified requirements of the new engine. These precautions are especially important when installing a turbocharged engine. Insist on a careful check of the integrity of any existing exhaust system components that will be retained. It is far less costly to replace parts or make repairs during the installation of the new engine than afterward.

3 THE FUEL SYSTEM

Diesel-powered vessels

If your boat is already diesel-powered, you will likely only need to perform a general check over the fuel system condition. Replace any worn or deteriorated components, and if necessary, flush and clean the tanks. Install a fuel water separator / prefilter and priming pump, if none existed previously. Your new engine will have an integral final fuel filter, so there is no need to install an excessively fine filter element in the prefilter. Instead, use a 30 micron filter element in the prefilter. This, in combination with the typical 5 to 10 micron filter on the engine, will fully protect your new fuel injection system while maximizing filter life

Switching from gasoline to diesel

Repowering a gasoline powered boat to diesel will require some necessary additional work, most importantly, converting the fuel system. Fuel return lines must be fitted from the engine(s) to the tank(s), as well as new fuel lines, water separators/filters, and priming pumps will need to be installed. You will also need to check if your tank is compatible with diesel fuel.

Diesel engines typically produce more torque than gas engines, so your prop shafts may need to increase in size. Rotation speed differences between diesel and gas engines may require a new transmission and similarly, it may be necessary to install new propellers to properly match the new diesel's power.

Consult your local YANMAR dealer or distributor to help guide you through this process.

4 INSTRUMENTS AND CONTROLS

Depending on your repower, it may or may not be necessary to upgrade your controls and displays.

New YANMAR engines are supplied with new panels – either traditional mechanical tachometers or electronic panels depending on the model of engine. You may also have upgrade options available for electronic controls, including joystick steering for both stern- and shaft-drive twin applications. Also, with advances in YANMAR technology, panel upgrades will give you access to all engine data as well as troubleshooting codes for real-time diagnostics. Modern YANMAR engines are also purpose engineered to connect easily to any multi-function display or chart plotter.

If your current controls and displays are compatible with the new engine and you want to maintain your existing helm, this is a good time to thoroughly check all wiring and cables to make sure they are in good working order.

Either way, explore your options and know what you want to achieve with your new system in advance so you can plan your repower accordingly.

5 ALTERNATORS AND ENGINE-POWERED EQUIPMENT

Many new YANMAR engines come with large alternators or with the option to upgrade to a larger and/or secondary alternator. Occasionally engine repowers are accompanied by upgrades in other engine-powered equipment onboard. Therefore, it is important to know the output needed for onboard equipment requiring engine power so that you can chose your alternator and accessories accordingly. Improperly applied external loads can damage the front bearing of an engine. A special mounting frame may be required to properly power external, front of engine loads.

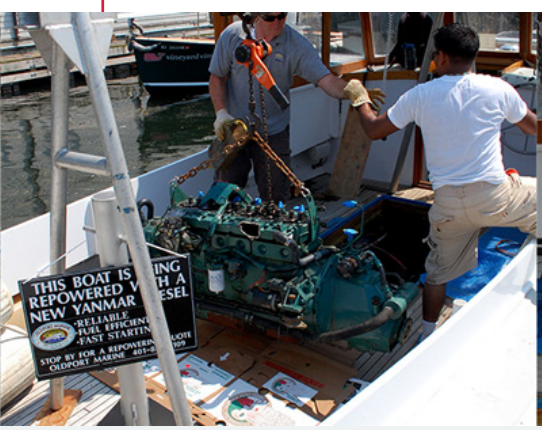
6 PROP SHAFT AND PROPELLER

Depending on the specification of the replacement engine, it may be necessary to install a larger propeller shaft, shaft log, and strut. For planing hull boats, a new propeller may also be required if the power or weight of the new system differs significantly from the one being replaced.

In some single engine boats, the engine is purposely installed at a slight angle from the longitudinal centerline in order to offset the asymmetric thrust produced by a propeller rotating on an inclined shaft. If this is the case, the new engine's rotation direction should be the same as the original installation. When necessary, this can be accomplished by choosing a gear box capable of operating with the same gear ratio and efficiency in either direction.

7 RAW WATER INTAKE

An engine's raw water intake must be equipped with the proper seacock coupled with a raw water strainer, preferably one that can be opened easily without tools, and which can reseal without the need for a new gasket.




8 SEA TRIAL

A new engine installation isn't complete until its performance has been checked on the water, and the operator has become familiar with new engine. The sea trial must include operation at all power levels, a careful check of cooling system operation, exhaust system performance and back-pressure, adequacy of combustion air supply and maintenance of acceptable engine compartment temperature, ability to draw from all fuel tanks, ease of starting, shifting, and the RPM at wide open throttle and shut down. The initial operating procedures detailed in the operation manual should be well understood before sea trial. Be sure to also check with the engine's requirements for operation during the initial 100 hours. New engines can be damaged by being operated at insufficient power levels during their initial use period, when moderately high-power operation is critical to proper seating of the piston rings.

With everything considered in coordination with your installer, you are ready to repower. YANMAR proactively supports our extensive worldwide service network, so you can repower with:

Support
Quality
Reliability
Expertise
Performance
Confidence

YANMAR

Ready to Get Started?

Find your local authorized YANMAR distributor or service center by visiting:
www.yanmarmarine.com/network