



6LPA

series

OPERATION MANUAL

**6LPA-STP2
6LPA-STZP2**

P/N: 0A6LP-G00101

YANMAR
®

**MARINE
ENGINES**

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INTRODUCTION

Welcome to the world of Yanmar Marine! Yanmar Marine offers engines, drive systems and accessories for all types of boats, from runabouts to sailboats, and from cruisers to mega yachts. In marine leisure boating, the worldwide reputation of Yanmar Marine is second to none. We design our engines to respect nature. This means quieter engines, with minimal vibrations, cleaner than ever. All of our engines meet applicable regulations, including emissions, at the time of manufacture.

To help you enjoy your Yanmar 6LPA series engine for many years to come, please follow these recommendations:

- Read and understand this *Operation Manual* before you operate the engine to ensure that you follow safe operating practices and maintenance procedures.
- Keep this *Operation Manual* in a convenient place for easy access.
- If this *Operation Manual* is lost or damaged, order a new one from your authorized Yanmar marine dealer or distributor.
- Make sure this manual is transferred to subsequent owners. This manual should be considered a permanent part of the engine and remain with it.
- Constant efforts are made to improve the quality and performance of Yanmar products, so some details included in this *Operation Manual* may differ slightly from your engine. If you have any questions about these differences, please contact your authorized Yanmar marine dealer or distributor.
- The specifications and components (instrument panel, fuel tank, etc.) described in this manual may differ from ones installed on your vessel. Please refer to the manual provided by the manufacturer of these components.
- Refer to the Yanmar Limited Warranty Handbook for a complete warranty description.

INTRODUCTION

RECORD OF OWNERSHIP

Take a few moments to record the information you need when you contact Yanmar for service, parts or literature.

Engine Model: _____

Engine Serial No.: _____

Date Purchased: _____

Dealer: _____

Dealer Phone: _____

SAFETY

Yanmar considers safety of great importance and recommends that anyone that comes into close contact with its products, such as those who install, operate, maintain or service Yanmar products exercise care, common sense and comply with the safety information in this manual and on the engine's safety decals. Keep the decals from becoming dirty or torn and replace them if they are lost or damaged. Also, if you need to replace a part that has a decal attached to it, make sure you order the new part and decal at the same time.



This safety alert symbol appears with most safety statements. It means attention, become alert, your safety is involved! Please read and abide by the message that follows the safety alert symbol.

DANGER

Indicates a hazardous situation which, if not avoided, *will* result in death or serious injury.

WARNING

Indicates a hazardous situation which, if not avoided, *could* result in death or serious injury.

CAUTION

Indicates a hazardous situation which, if not avoided, *could* result in minor or moderate injury.

NOTICE

Indicates a situation which can cause damage to the engine, personal property and / or the environment or cause the equipment to operate improperly.

SAFETY PRECAUTIONS

General Information

There is no substitute for common sense and careful practices. Improper practices or carelessness can cause burns, cuts, mutilation, asphyxiation, other bodily injury or death. This information contains general safety precautions and guidelines that must be followed to reduce risk to personal safety. Special safety precautions are listed in specific procedures. Read and understand all of the safety precautions before operation or performing repairs or maintenance.

Before You Operate

DANGER

The safety messages that follow have **WARNING** level hazards.



NEVER permit anyone to install or operate the engine without proper training.

- Read and understand this Operation Manual before you operate or service the engine to ensure that you follow safe operating practices and maintenance procedures.
- Safety signs and labels are additional reminders for safe operating and maintenance techniques.
- See your authorized Yanmar marine dealer or distributor for additional training.

During Operation and Maintenance

DANGER

The safety message that follows has **DANGER** level hazards.

Crush Hazard



NEVER stand under hoisted engine. If the hoist mechanism fails, the engine will fall on you.

⚠ WARNING

The safety messages that follow have **WARNING** level hazards.

Explosion Hazard

While the engine is running or the battery is charging, hydrogen gas is being produced and can be easily ignited. Keep the area around

the battery well-ventilated and keep sparks, open flames and any other form of ignition out of the area.

Fire and Explosion Hazard

Diesel fuel is flammable and explosive under certain conditions.

NEVER use a shop rag to catch the fuel.

Wipe up all spills immediately.

NEVER refuel with the engine running.

Store any containers containing fuel in a well-ventilated area, away from any combustibles or sources of ignition.

Fire Hazard

Undersized wiring systems can cause an electrical fire.

Sever Hazard

Rotating parts can cause severe injury or death. NEVER wear jewelry, unbuttoned cuffs, ties or loose fitting clothing and ALWAYS tie long

hair back when working near moving / rotating parts such as the flywheel or PTO shaft. Keep hands, feet and tools away from all moving parts.

Alcohol and Drug Hazard

NEVER operate the engine while under the influence of alcohol or drugs or feeling ill.

Exposure Hazard

To avoid injury, ALWAYS wear personal protective equipment including appropriate clothing, gloves, work shoes, eye and hearing

protection as required by the task at hand.

Entanglement Hazard

NEVER leave the key in the key switch when you are servicing the engine.

Someone may accidentally start the engine and not realize you are servicing it.

NEVER operate the engine while wearing a headset to listen to music or radio because it will be difficult to hear the warning signals.

Stop the engine before you begin to service it.

If you must service the engine while it is operating, remove all jewelry, tie back long hair, and keep your hands, other body parts and clothing away from moving / rotating parts.

WARNING

Piercing Hazard



Avoid skin contact with high-pressure diesel fuel spray caused by a fuel system leak such as a broken fuel injection line. High-pressure fuel can penetrate your skin and result in serious injury. If you are exposed to high-pressure fuel spray, obtain prompt medical treatment.

NEVER check for a fuel leak with your hands. ALWAYS use a piece of wood or cardboard. Have your authorized Yanmar marine dealer or distributor repair the damage.

Burn Hazard



Some of the engine surfaces become very hot during operation and shortly after shut-down. Keep hands and other body parts away from hot engine surfaces.

Sudden Movement Hazard

ALWAYS stop the engine before beginning service.

Exhaust Hazard



NEVER block windows, vents or other means of ventilation if the engine is operating in an enclosed area. All internal combustion engines create carbon monoxide gas during operation and special precautions are required to avoid carbon monoxide poisoning.

CAUTION

The safety messages that follow have CAUTION level hazards.

Poor Lighting Hazard

Ensure that the work area is adequately illuminated. ALWAYS install wire cages on portable safety lamps.

Tool Hazard

ALWAYS use tools appropriate for the task at hand and use the correct size tool for loosening or tightening engine parts.

Flying Object Hazard

ALWAYS wear eye protection when servicing the engine or when using compressed air or high-pressure water. Dust, flying debris, compressed air, pressurized water or steam may injure your eyes.

Coolant Hazard



Wear eye protection and rubber gloves when you handle Long Life engine coolant. If contact with the eyes or skin should occur, flush eyes and wash immediately with clean water.

NOTICE**The safety messages that follow have NOTICE level hazards.**

It is important to perform daily checks as listed in the *Operation Manual*.

Periodic maintenance prevents unexpected downtime, reduces the number of accidents due to poor engine performance and helps extend the life of the engine.

See your authorized Yanmar marine dealer or distributor if you need to operate the engine at high altitudes. At high altitudes the engine will lose power, run rough and produce exhaust gases that exceed the design specifications.



ALWAYS be environmentally responsible.

Follow the guidelines of the EPA or other governmental agencies for the proper disposal of hazardous materials such as engine oil, diesel fuel and engine coolant. Consult the local authorities or reclamation facility.

NEVER dispose of hazardous materials by dumping them into a sewer, on the ground or into ground water or waterways.

If a Yanmar Marine Engine is installed at an angle that exceeds the specifications stated in the Yanmar Marine Installation manuals, engine oil may enter the combustion chamber causing excessive engine speed, white exhaust smoke and serious engine damage. This applies to engines that run continuously or those that run for short periods of time.

If you have an installation with two or three engines and only one engine is operating, the water pickup (thru-hull) of the non-running engine(s) should be closed. This will prevent water from being forced past the seawater pump and eventually finding its way into the engine. The result of water entering the engine could cause seizure or other serious problems.

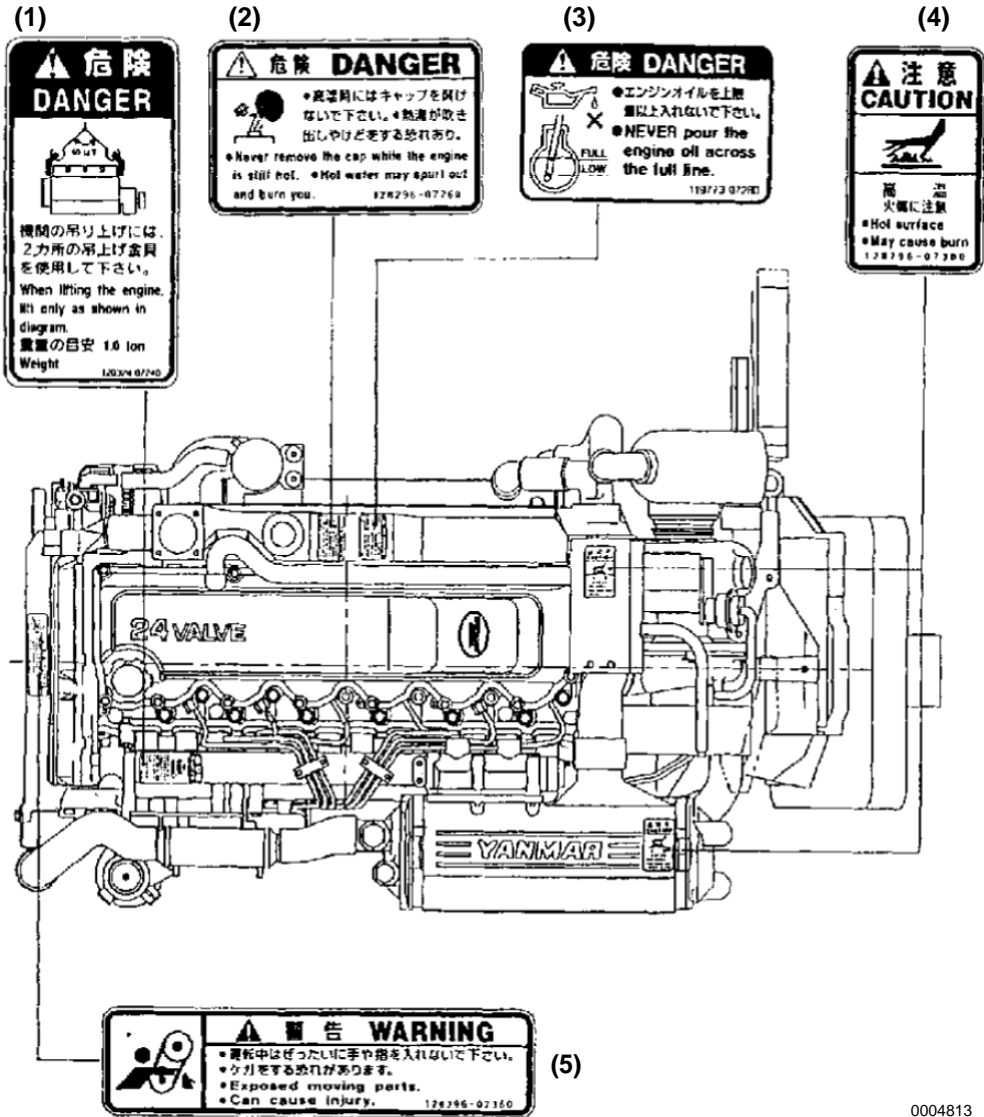
If you have an installation with two or three engines, and only one engine is operating, please note that if the propeller shaft thru-hull (stuffing box) is lubricated by engine water pressure and the engines are interconnected, care must be taken that water from the running engine does not enter the exhaust of the non-running engine(s). This water could cause seizure of the non-running engine(s). See your authorized Yanmar marine dealer or distributor for a complete explanation of this condition.

If you have an installation with two or three engines, and only one engine is operating, it is important to limit the amount of throttle applied to the running engine. If you observe black smoke or movement of the throttle does not increase engine rpm, you are overloading the engine that is running. Immediately throttle back to approximately 2/3 throttle or to a setting where the engine performs normally. Failure to do so may cause the running engine to overheat or cause excess carbon buildup which may shorten the engine's life.

NEVER attempt to adjust the low or high idle speed limit screw. This may impair the safety and performance of the engine and shorten its life. Modifications of this type may void the warranty. If adjustment is ever required, contact your authorized Yanmar marine dealer or distributor.

LOCATION OF SAFETY DECALS

Figure 1 shows the location of safety decals on Yanmar 6LPA series marine engines.



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Figure 1

- 1 – Part Number: 120324-07240
- 2 – Part Number: 128296-07260
- 3 – Part Number: 119773-07280

- 4 – Part Number: 128296-07300
- 5 – Part Number: 128296-07360

Note: Figure 1 shows an overhead view of the 6LPA engine.

PRODUCT OVERVIEW

YANMAR 6LPA FEATURES AND APPLICATIONS

The 6LPA series are 6-cylinder, 4-stroke direct injection diesel engines equipped with liquid coolant systems.

The 6LPA-STP2 engines are equipped with a marine gear (ZF63A1 or KMH50A).

The 6LPA-STZP2 engines are equipped with a stern drive (MerCruiser Bravo).

These engines are designed for pleasure craft use.

It is recommended that new vessels be propped so the engines can operate at 100 - 200 rpm above the rated power output (3800 rpm) to allow for future added weight and hull resistance. The engine must be able to reach the rated power output rpm under full load at all times.

Failure to do so can lead to reduced vessel performance, lead to increased smoke levels and cause permanent damage to your engine.

The engine must be installed correctly with coolant lines, exhaust gas lines and electrical wiring. Any auxiliary equipment attached to the engine should be easy to use and accessible for service. To handle the drive equipment, propulsion systems (including the propeller) and other onboard equipment, always observe the instructions and cautions given in the operation manuals supplied by the shipyard and equipment manufacturers.

The 6LPA series engines are designed to be operated at maximum throttle (3800 rpm) for less than 5% of total engine time (30 minutes out of every 10 hours) and cruising speed (2800 - 3600 rpm or less) for less than 90% of total engine time (9 hours out of every 10 hours).

The laws of some countries may require hull and engine inspections, depending on the use, size and cruising area of the boat. The installation, fitting and surveying of this engine all require specialized knowledge and engineering skills. See Yanmar's local subsidiary in your region or your authorized Yanmar marine dealer or distributor.

New Engine Break-In

As with all reciprocating engines, the way your engine is operated during its first 50 hours of operation plays a very significant role in determining how long it will last and how well the engine will perform over its lifetime.

PRODUCT OVERVIEW

A new Yanmar diesel engine must be operated at suitable speeds and power settings during the break-in period to make the sliding parts, such as piston rings, break in properly and to stabilize engine combustion.

During the break-in period, the engine coolant temperature gauge should be monitored, temperature should be between 71° - 87°C (160° - 190°F).

During the first 10 hours of operation, the engine should be run at maximum rpm minus 400 - 500 rpm (approximately 60 - 70% of load) most of the time. This will ensure the sliding parts break in properly. During this period, avoid operating at maximum engine speed and load to avoid damaging or scoring sliding parts.

Do not operate the engine at low idle or at low speed and light load for more than 30 minutes at a time. Since unburned fuel and engine oil will adhere to the piston rings when operating at low speeds for long periods, this will interfere with proper movement of the rings and the lube oil consumption may increase. Low idle speed does not allow break-in of sliding parts.

If operating engine at low speed and light load, you must race the engine to clean the carbon from the cylinders and fuel injection valve.

Perform this procedure in open waters:

- With the clutch in NEUTRAL, accelerate from the low speed position to the high speed position briefly.
- Repeat this process five times.

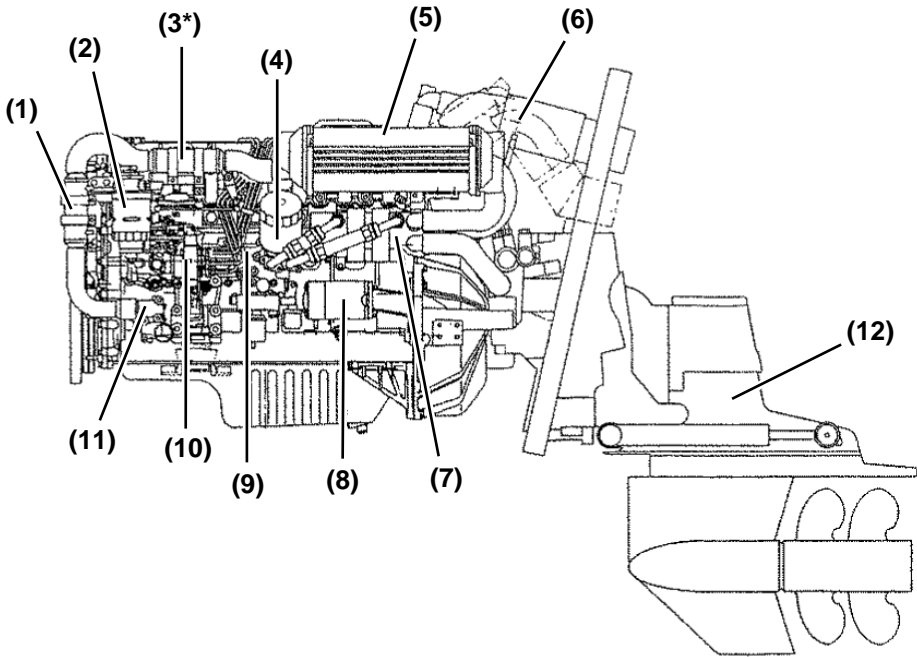
Once past the initial 10 hours until 50 hours, the engine should be used over its full operating range, with special emphasis on running at relatively high power settings. This is not the time for an extended cruise at idle or low speed. The boat should be run at maximum speed minus 400 rpm most of the time (approximately 70% load), with a 10 minute run at maximum minus 200 - 300 rpm (approximately 80% load) every 30 minutes and a 4 - 5 minute period of operation at WOT (wide open throttle) once each 30 minutes. During this period, be sure not to operate your engine at low speed and light load for more than 30 minutes. If operating engine at low speed and light load by necessity, just after the low idle operation, be sure to race the engine.

To complete engine break-in, perform *After Initial 50 Hours* maintenance procedures. See *Periodic Maintenance Schedule* on page 54.

COMPONENT IDENTIFICATION

Service Side (Left Side as Viewed from Propeller)

Note: 6LPA-STZP2 with stern drive shown. Components marked with an * are for 6LPA-STZP2 only.



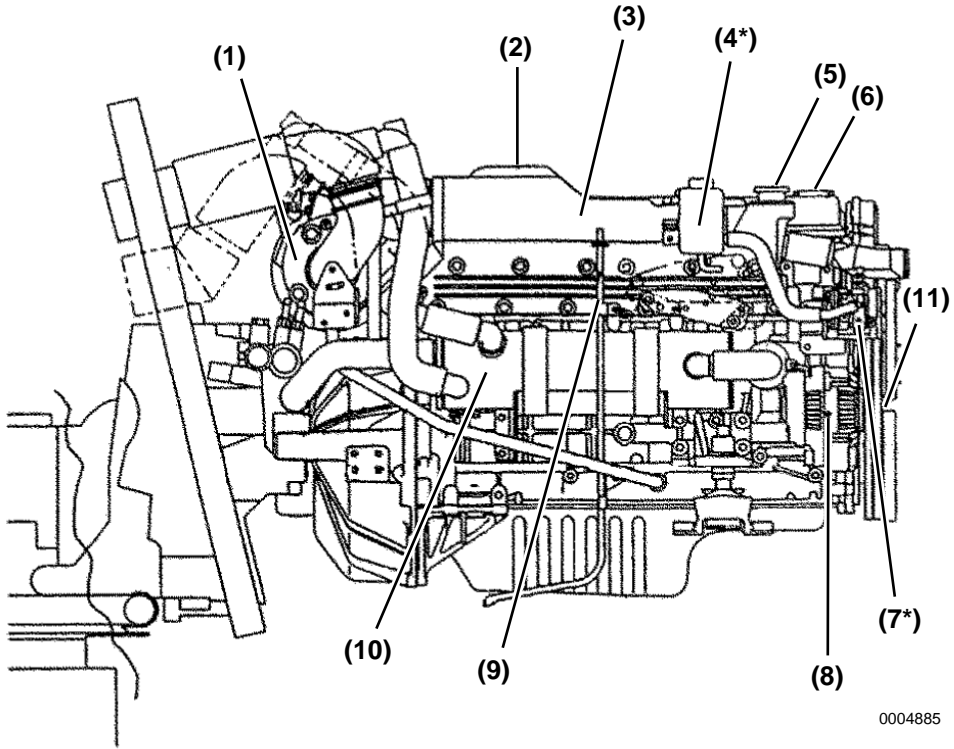
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Figure 1

- | | |
|--------------------------------|--------------------------|
| 1 – Fuel Cooler | 7 – Engine Oil Cooler |
| 2 – Fuel Filter | 8 – Starter |
| 3 – Power Steering Oil Cooler* | 9 – Engine Oil Cooler |
| 4 – Engine Oil Filter | 10 – Fuel Injection Pump |
| 5 – Intercooler | 11 – Seawater Pump |
| 6 – Mixing Elbow | 12 – Stern Drive |

PRODUCT OVERVIEW

Non-Service Side

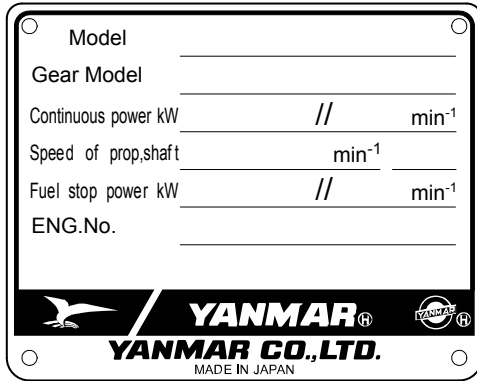


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Figure 2

- | | |
|--|------------------------------|
| 1 – Turbocharger | 7 – Power Steering Oil Pump* |
| 2 – Engine Nameplate (on rocker arm cover) | 8 – Alternator |
| 3 – Fresh Water (Coolant) Tank | 9 – Engine Oil Dipstick |
| 4 – Power Steering Oil Tank* | 10 – Fresh Water Cooler |
| 5 – Fresh Water Filler Cap | 11 – V-Belt |
| 6 – Engine Oil Filler Cap | |

ENGINE NAMEPLATE



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Figure 3

The nameplate of Yanmar 6LPA series engines is shown in **Figure 3**. The nameplate is located on the engine rocker arm cover. Check the engine's model, output, rpm and serial number on the nameplate. Replace if damaged or lost.

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