YANMAR

HINSH-HB019

SERVICE MANUAL

MARINE DIESEL ENGINE

4LHA-ST(Z)E

2000.3.10

FORWARD

This service manual has been compiled for engineers engaged in sales service, inspection and maintenance. Accordingly, descriptions of the construction and functions of the engine are emphasized in this manual while items which should already be common knowledge are omitted.
One characteristic of a marine diesel engine is that its performance in a vessel is governed by its applicability to the vessel's hull construction and its steering system.
Engine installation, fitting out and propeller selection have a substantial effect on the performance of the engine and the vessel. Moreover, when the engine runs unevenly or when trouble occurs, it is essential to check a wide range,of operating conditions—such as installation on the hull and suitability of the ship's piping and propeller—and not just the engine itself. To get maximum performance from this engine, you should completely understand its functions, construction and capabilities, as well as proper use and servicing.
Use this manual as a handy reference in daily inspection and maninte-nance,and as a text for engineering guidance.



These products have been developed, designed and manufactured in the facilities certified by the Standards for Quality systems of ISO 9001.

Printed in Japan
HINSHI-H9019

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Model 4LHA-STE

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				Document No.	HINSHI-H9-019-2
History of Correction				Page No.	1
Manual Name:		YANMAR SERVICE MANUAL FOR YANMAR MARINE DIESEL ENGINE 4LHA			
Engine Model:		4LHA-STE/STZE			
No. of Correction	Date of Correction	Cause for Correction	Outline of Correction	Corrected Item Number.	Corrected by:
Revision 2 (Jan. 1999) 4LHA-STZE series added, and document number revised to 2.					

CHAPTER 0

FOR SAFETY

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1. For Safe Servicing

- Most accidents are caused by failing to observe basic safety rules and precautions. To prevent accidents, it is important to recognize the signs of approaching problems, and eliminate the problems in the early stage before they can cause accidents.
  Please read this manual carefully before starting repairs or maintenance to fully understand safety precautions and appropriate inspection and maintenance procedures. Attempting a repair or maintenance job without sufficient knowledge may cause an unexpected accident.

- It is impossible to cover every possible danger in repair or maintenance in the manual. Sufficient consideration for safety is required in addition to the matters marked ⚠ CAUTION. Especially for safety precautions in a repair or maintenance job not described in this manual, receive instructions from a knowledgeable leader.

- Safety marks used in this manual and their meanings are as follows:

⚠ DANGER	**DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**
⚠ WARNING	**WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**
⚠ CAUTION	**CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

- Any matter marked [NOTICE] in this manual is especially important in servicing. If not observed, the product performance and quality may not be guaranteed.

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2. Precaution For Safe Servicing

(A) Service Shop (place)

⚠ WARNING ● **Place allowing sufficient ventilation**



Jobs such as engine running, part welding and polishing the paint with sandpaper should be done in a well-ventilated place.

[Failure to Observe]

Very dangerous for human body due to the possibility of inhaling poisonous gas or dust.

⚠ CAUTION ● **Sufficiently wide and flat place**

The floor space of the service shop for inspection and maintenance should be sufficiently wide and flat without any holes.

[Failure to Observe]

An accident such as a violent fall may be caused.

⚠ CAUTION ● **Clean, orderly arranged place**

No dust, mud, oil or parts should be left on the floor surface.

[Failure to Observe]

An unexpected accident may be caused.

⚠ CAUTION ● **Bright, safety illuminated place**



The working place should be illuminated sufficiently and safely.

For a job in a dark place where it is difficult to see, use a portable safety lamp.

The bulb should be covered with a wire cage for protection.

[Failure to Observe]

The bulb may be broken accidentally causing ignition of leaking oil.

⚠ CAUTION ● **Place equipped with a fire extinguisher**



Keep a first aid kit and fire extinguisher close at hand in preparation for fire emergencies.

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(B) Working Wear

⚠ CAUTION ● **Wears for safe operation**



Wear a helmet, working clothes, safety shoes and other safety protectors suited to the job. It is especially important to wear well-fitting work clothes.

[Failure to Observe]

A serious accident such as trapping by a machine may occur.

(C) Tools to be Used

⚠ WARNING ● **Appropriate holding and lifting**

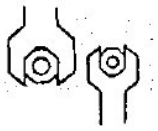
Never operate when the engine is supported with blocks or wooden pieces or only with a jack.

To lift and hold the engine, always use a crane with a sufficient allowance in limit load or a rigid jack.

[Failure to Observe]

A serious accident may occur.

⚠ WARNING ● **Use of appropriate tools**



Use tools appropriate for the jobs to be done. Use a correctly sized tool for loosening or tightening a machine part.

[Failure to Observe]

A serious injury or engine damage may occur.

(D) Use of Genuine Parts, Oil and Grease

⚠ CAUTION ● **Always use genuine parts.**

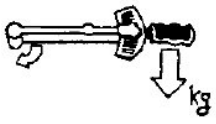


[Failure to Observe]

Shortening of engine libe or an unex pected accicdent may arise.

(E) Bolt and Nut Tightening Torque

⚠ WARNING ● **Always tighten to the specified torque if designated in the manual.**



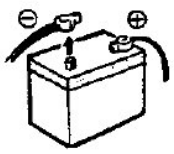
[Failure to Observe]

Loosening or falling may cause parts damage or injury.

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(F) Electrical Parts

⚠ WARNING ● **Harness short-circuit**



Disconnect the battery negative ⊖ terminal before starting the service job.
[Failure to Observe]
Short-circuiting of a harness may occur to start a fire.

⚠ WARNING ● **Battery charging**



Since flammable gas is generated during battery charging, keep anything which could cause a fire away from the battery.
[Failure to Observe]
Explosions may occur.

⚠ WARNING ● **Battery electrolyte**



Since the electrolyte is diluted sulfuric acid, do not let it be splashed onto the clothes or skin.
[Failure to Observe]
The clothes or skin may be burnt.

(G) Waste Treatment

⚠ CAUTION **Observe the following instructions with regard to waste disposal. Negligence of each instruction will cause environmental pollution.**

- Waste fluids such as engine oil and cooling water shall be discharged into a container without spillage onto the ground.
- Do not let waste fluids be discharged into the sewerage, a river or the sea.
- Harmful wastes such as oil, fuel, solvents, filter elements and battery shall be treated according to the respective laws and regulations. Ask a qualified collecting company for example.

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(H) Handling the Product

⚠ WARNING ● **Supplying the Fuel**



When supplying the fuel, always keep any fire source like a cigarette or match away.

[Otherwise]

A fire or explosion may arise.

⚠ WARNING ● **Pay attention to hot portions.**



Do not touch the engine during running or immediately after it is stopped.

[Failure to Observe]

Scalding may be caused by a high temperature.

⚠ WARNING ● **Pay attention to rotating parts.**



Never allow clothes or a tool too close to the rotating part during engine running.

[Failure to Observe]

Injury may be caused by entrapping.

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