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W. S. DARLEY & CO. P-100 (L100N) PORTABLE PUMP UNIT TECHNICAL MANUAL

TECHNICAL MANUAL

OPERATION, MAINTENANCE, AND REPAIR WITH PARTS LIST

> **27 JUNE 2011** Rev B 13April2018

NOTICE:

Kerosene based jet fuel types such JP-5, JP-8, Jet A-1, Jet A ASTM D1655 and NATO F-34 have a chemical composition equivalent to JIS No.1 (Kerosene).

Due to lower viscosity, FIE (Fuel Injection Equipment) component cavitation, and exhaust emissions may occur. Lower viscosity levels increase crankcase oil dilution, fuel pump oil seepage, etc...

The following are caution notes in the occurrence of Jet Fuel usage:

In order to minimize crankcase oil dilution, engine oil maintenance must occur at shorter intervals compared to standard specifications (i.e. 150 hours instead of 250 hours).
Drain water from the Yanmar fuel and water separator(s) every 50

operation hours. - Avoid equipment use in an external environment that causes the fuel temperature to drop below -40 degrees Fahrenheit (-40 degrees

Engine Warranty Notice:

Celsius).

Jet fuels with lower lubricity characteristics will prematurely wear FIE and engine components. Therefore FIE parts may not covered under Yanmar's standard warranty when operated on JP-5, JP-8, Jet A-1, Jet A ASTM D1655 and NATO F-34 fuels.
Additional possible failures resulting from the above FIE fatigue include but are not limited to: melted fuel injection nozzle tips, seized fuel injection nozzle valves (needles), excessive piston temperatures, crankcase dilution, and severe combustion chamber and FIE deposits.

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CHAPTER 1

GENERAL INFORMATION AND SAFETY PRECAUTIONS

In order to ensure safe working conditions, be sure to read the precaution sections for safe operation of the pump unit.

Pay special attention to statements preceded by the following words.

WARNING:

Indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.

CAUTION:

Indicates a possibility of personal injury or equipment damage if instructions are not followed.

NOTE:

Provides helpful information.

SAFETY PRECAUTIONS

WARNING:

THE PUMP UNIT IS DESIGNED TO GIVE SAFE AND DEPENDABLE SERVICE PROVIDED THAT IT IS OPERATED ACCORDING TO INSTRUCTIONS. READ AND UNDERSTAND THE OPERATION MANUALS BEFORE OPERATING THE PUMP UNIT. FAILURE TO DO SO COULD RESULT IN PERSONAL INJURY OR EQUIPMENT DAMAGE.

PREVENTING FIRES

WARNING:

UNLESS IT IS A DIRE EMERGENCY, NEVER ADD FUEL TO THE FUEL TANK WHILE THE ENGINE IS RUNNING. WHEN EMERGENCY REFUELING BECOMES NECESSARY, A SECOND PERSON SHALL STANDBY WITH AN APPROPRIATE FIRE EXTINGUISHER. WIPE AWAY ALL FUEL SPILLS WITH A CLEAN CLOTH. KEEP GASOLINE, KEROSENE, MATCHES AND OTHER EXPLOSIVES AND INFLAMMABLES AWAY FROM THE ENGINE, BECAUSE THE TEMPERATURE AROUND THE EXHAUST MUFFLER IS VERY HIGH DURING OPERATION.

WARNING:

TO PREVENT FIRE HAZARDS AND TO PROVIDE ADEQUATE VENTILATION, KEEP THE PUMP UNIT AT LEAST THREE FEET (1 M) AWAY FROM BUILDINGS AND OTHER EQUIPMENT DURING OPERATION.

WARNING:

OPERATE THE PUMP UNIT ON A LEVEL SURFACE AS FAR AS POSSIBLE. THE ALLOWABLE INCLINATION OF THE ENGINE FOR CONTINUOUS USE IS WITHIN 20 DEGREES. THERE MAY BE FUEL SPILLAGE IF THE ENGINE IS TILTED BEYOND THAT LIMIT.

WARNING:

DO NOT PUT THE PUMP UNIT INDOORS WHILE THE ENGINE IS STILL HOT.

PREVENTING EXHAUST GAS INHALATION

EXHAUST GAS CONTAINS POISONOUS CARBON MONOXIDE. NEVER USE THE PUMP UNIT IN POORLY VENTILATED LOCATIONS, SUCH AS INDOORS AND INSIDE TUNNELS. IF INDOOR OPERATION IS UNAVOIDABLE, PROVIDE PROPER VENTILATION AND USE AN APPROVED EXHAUST HOSE ROUTED TO WEATHER.

WARNING:

PREVENTING BURNS

WARNING:

NEVER TOUCH THE MUFFLER, MUFFLER COVER OR ENGINE BODY WHILE THE ENGINE IS RUNNING OR HOT.

WARNING:

NEVER TOUCH THE HOT EXHAUST HOSE WHEN OPERATING THE PUMP UNIT WITHOUT USING FIREFIGHTER'S GLOVES. EXHAUST HOSE TEMPERATURES MAY CAUSE BURNS ON UNPROTECTED HANDS.

OTHER SAFETY TIPS

WARNING:

KNOW HOW TO STOP THE ENGINE QUICKLY AND UNDERSTAND HOW TO OPERATE ALL OF THE CONTROLS. NEVER PERMIT ANYONE TO OPERATE THE ENGINE WITHOUT PROPER INSTRUCTION.

WARNING:

KEEP AWAY FROM ROTATING PARTS WHILE THE ENGINE IS RUNNING.

CAUTION:

ONLY USE THE CORRECT TOOLS AND EQUIPMENT.



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CHAPTER 2

OPERATION

WARNING:

READ OPERATING INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO OPERATE THE PUMP UNIT!

2.1 LUBRICATION

Check engine lube oil for proper level prior to attempting to start the pump unit.

CAUTION:

WHEN CHECKING THE OIL LEVEL, MAKE SURE THAT THE PUMP UNIT IS SITTING LEVEL. IF IT IS TILTED, YOU MAY ADD EITHER TOO MUCH OR TOO LITTLE OIL. OVERFILLING THE RECOMMENDED OIL LEVEL MAY CAUSE THE ENGINE TO CONSUME TOO MUCH OIL AND THE OIL TEMPERATURE MAY BECOME DANGEROUSLY HIGH. OPERATION OF THE PUMP UNIT WITH THE OIL LEVEL BELOW THE RECOMMENDED LEVEL MAY CAUSE SEVERE DAMAGE TO THE ENGINE.

To check the oil level, simply unscrew, wipe, and dip the dipstick into the oil pan. Do not screw in the dipstick. Screwing the dipstick in will give a false reading indicating that the level is higher than the actual level present. For convenience, a dipstick is located on each side of the engine.



CAUTION:

NEVER CHECK THE ENGINE LUBE OIL LEVEL WHILE THE ENGINE IS RUNNING.

2.2 PREPARATION FOR PRIMING

Check coupling gaskets and connect hose lines with couplings properly tightened.

CAUTION:

THE SUCTION HOSE MAY REQUIRE SUPPORT TO PREVENT EXCESSIVE WEIGHT FROM STRESSING THE PUMP CASING, INBOARD HEAD, OR ENGINE. WHERE PRACTICAL, THE SUCTION HOSE SHOULD BE TIED TO SOME NEARBY STRUCTURE AND/OR BLOCKS SHOULD BE PLACED BENEATH THE SUCTION HOSE ADJACENT TO THE UNIT TO RELIEVE STRESS ON THE PUMP.

NOTE:

BE CERTAIN THAT THE SUCTION HOSE (OR PIPE) IS ABSOLUTELY AIR TIGHT. NEITHER THE PUMP NOR THE PRIMER WILL LIFT WATER IF THE SUCTION SIDE OF THE PUMP HAS THE SLIGHTEST AIR LEAK.

A strainer with openings not larger than 1/4" mesh must always be used on the end of suction line when pumping water from draft.

Avoid air traps in suction hose if possible.

Keep the suction intake strainer well above the bottom of the water source to prevent picking up soil and other foreign matter. If the strainer must lie on the bottom, a metal plate or pan should be laid under it.

NOTE:

WATER MAY BE DRAFTED FROM PONDS, LAKES, STREAMS, CISTERNS, TANKS, SEA WATER, AND/OR WELLS. WHATEVER THE SOURCE, THE STATIC LIFT MUST NOT EXCEED 20 FEET FROM THE CENTER OF THE PUMP TO THE SURFACE OF THE WATER. A LIFT NOT EXCEEDING 10 FEET IS RECOMMENDED. THE SOURCE OF SUPPLY SHOULD BE REASONABLY CLEAR AND FREE FROM FOREIGN MATTER.

Submerge the suction intake sufficiently into the water to prevent sucking in air. A cover laid over the top of the strainer will allow the pump to operate with a minimum of submergence.

Close drain valve and all other openings into pump casing.

Do not start the engine until everything is ready for pumping, with hose couplings properly tightened. Pump discharge check valve may be partly open during priming at lifts less than 10 feet, and completely closed for lifts of 10 feet and more. WARNING:

DO NOT OPERATE THE PUMP UNIT IN CONFINED SPACES UNLESS THE EXHAUST HOSE IS CONNECTED TO CARRY THE TOXIC ENGINE EXHAUST GASES TO WEATHER.

WARNING:

HEARING PROTECTION IS REQUIRED IN THE IMMEDIATE AREA OF THE PUMP UNIT WHILE IN OPERATION.

2.3 STARTING AND PRIMING THE PUMP UNIT

Set the fuel tank isolation value located under the fuel tank to "O" (open) position.

Set the engine throttle control to the "START" position.

Open the primer line shut-off valve between the primer jet, and the pump suction. (Valve is open when knob is in line with the air passage.)

Slowly pull on the recoil starter checking engine and pump for freedom of movement and priming the engine with lubricating oil. Depress the compression release lever ensuring that it remains depressed. The compression release lever will spring shut when the engine rotates during starting attempts.



Start the engine by pulling the recoil starter rope.

CAUTION:

A STRONG DELIBERATE PULL IS REQUIRED TO PREVENT ENGINE KICK-BACK AND POSSIBLE STARTING IN THE REVERSE ROTATIONAL DIRECTION. IF THIS DOES OCCUR, IMMEDIATELY SHUT DOWN THE ENGINE. OPERATION IN THE REVERSE DIRECTION IS CHARACTERIZED BY THE EVIDENCE OF EXHAUST GASES COMING OUT OF THE INTAKE FILTER. REVERSE OPERATION DOES NOT ALLOW FULL POWER OPERATION, POSITIVE PRIMING, AND WILL CAUSE DAMAGE TO THE UNIT.



Once the engine is running, set the engine throttle control to the "RUN" position.

CAUTION:

NEVER RUN THE PUMP AT HIGH SPEEDS, UNLESS IT IS DISCHARGING WATER.

CAUTION:

NEVER RUN THE PUMP WITHOUT WATER ANY LONGER THAN THE SHORT TIME REQUIRED FOR PRIMING.

NOTE:

START THE ENGINE AND RUN AT A FAST IDLE TO PRIME WITH LIFTS LESS THAN 10 FEET. START THE ENGINE AND RUN AT FULL THROTTLE TO PRIME WITH 10 TO 20 FOOT LIFTS.

NOTE:

WHEN PRIMING ON HIGH LIFTS, OR WHEN PUMPING DIRTY WATER, IT MAY BE NECESSARY TO SEAT THE DISCHARGE STOP-CHECK VALVE BY TIGHTENING DOWN GENTLY WITH THE HANDWHEEL. UNSCREW THE HANDWHEEL WHEN WATER IS DISCHARGED THROUGH THE EXHAUST JET.

CAUTION:

EXTENDED OPERATION WITHOUT PRIME MAY CAUSE SERIOUS DAMAGE TO THE PACKING GLAND, THE PUMP SHAFT, AND OTHER PUMP INTERNALS.

Shift the exhaust value to the prime position blocking the main exhaust opening. The exhaust value is in the prime position when the handle is horizontal.

When a steady stream of water appears at the discharge of the priming jet, close the primer line shut-off valve and return the engine exhaust valve to the normal position. Open the pump discharge valve.

Repeat the priming operation if the pump fails to hold its prime.

If the pump does not deliver water within two minutes, stop the engine and check for air leaks at suction connections and/or the pump packing gland, or failure of the priming jet to produce vacuum.

NOTE

THE PACKING GLAND SCREW SHOULD BE KEPT SUFFICIENTLY TIGHT TO PREVENT EXCESSIVE LEAKAGE ONLY. SLIGHT LEAKAGE IS ALWAYS REQUIRED DURING OPERATION TO COOL THE PACKING AND PREVENT DAMAGE TO THE IMPELLER SHAFT.

After priming the pump with water, start the pump and raise the discharge pressure to 50 psi. Tighten the packing screw using a 6" long 9/16" end wrench until drip rate is between 5 and 60 drops per minute -do not over-torque (24 in-lb torque). Continue operating the pump at 50 psi for 5 minutes to dissipate packing pressure against the shaft and permit cooling water to flow between the shaft and stuffing box hole. Make sure that water actually does come through before operating pump at any higher pressure. The normal drip rate may vary between 5 and 60 drops per minute.

Operate the pump for 10 minutes at the highest normal operating pressure flowing sufficient water to prevent overheating. Do not run the pump blocked tight. Lower discharge pressure to 50 psi. and repeat the packing screw tightening procedure outlined above.

The pump may now be operated for any time period required within its rated capacity, however, the drip rate should be monitored more frequently during the first few hours, and adjusted if necessary to achieve a stable flow rate. Several more adjustments may be required. All diesel engines must be throttled back by the operator in high load situations. This must be done to prevent over-fueling the engine as is evident by black exhaust smoke. Careful readjustment of the throttle will not cause a decrease in pump performance. Throttle back until pump performance just begins to decrease.

CAUTION:

OVER-FUELING THE ENGINE WILL CAUSE DILUTION OF THE ENGINE OIL AND PREMATURE WEAR ON THE CYLINDER WALLS AND BEARINGS.

While the pump unit is running, occasionally monitor the pump discharge gage and fuel tank level. For periods of extended operation, refueling may be necessary. Extreme caution is required when refueling a hot or running engine. An additional crew member must standby with an appropriate fire extinguisher (such as a portable AFFF) in the event that fuel is inadvertently spilled on hot engine parts.

2.4 SHUTDOWN.

To stop the pump unit, reduce engine speed to an idle speed and allow the engine to cool down for two minutes. Return the engine throttle control to the "STOP" position. If engine continues to run, shut the fuel tank isolation valve.

After Operating the P-100 Pump, if the pump has been used to pump seawater, the seawater must be drained from the pump by opening the pump casing drain valve. The pump must be flushed with fresh water to prevent corrosion and salt crystals from forming on close toleranced pump internals. After flushing the pump, apply a spray silicone compound to pump internals while slowly pulling the starter rope and replace hose connection caps.

Drain water out of pump casing immediately. The drain valve is located at the lowest point in the pump casing.

Do not forget to close all drain cocks after draining all water. If forgotten, trouble in priming will follow on the next run.

Check lubrication after every run.

Periodically inspect and run pumps used for fire service to ensure that they will be ready in an emergency.

2.5 HIGH SUCTION LIFT OPERATION

Install Vita Motivator eductor with foot valve and strainer on the submerged end of the suction line.

Suction line must slope down all the way from the pump to the water.

Hand priming with the Vita Motivator eductor can be easily achieved by filling the hose through a gated Wye connected to the 1-1/2" feed line. By filling through the feed line, the check valve does not have to be held open as the water from the feed line will fill up the suction line and open the check valve.

2.6 COLD WEATHER OPERATION

The first assurance against cold weather trouble is to keep fire apparatus stored in heated quarters.

When setting up for pumping, avoid unnecessary delays by thoroughly training pump operators. Be sure that primer lines are kept closed until ready for use. Have discharge lines ready so that pumping may be started as soon as it is primed.

Do not stop flow of water through the pump until ready to drain and return to the station.

Eliminate all water from pump casing and primer line between periods of operation.

CAUTION:

IN COLD WEATHER, IT IS IMPORTANT TO MAKE SURE THE TUBING LEADING FROM THE EXHAUST PRIMER TO THE PUMP CASING IS FREE FROM WATER TO PREVENT FREEZING. FREEZING OF THIS TUBING WILL RENDER THE EXHAUST PRIMER INOPERATIVE AND MAY DAMAGE TUBING AND FITTINGS.

To remove the water from the primer tubing: Restart the engine after disconnecting the suction line. Open primer line shut-off valve. Close engine exhaust valve tightly with lever at the side of exhaust primer.

After five seconds, open exhaust valve. Shut off engine.

2.7 <u>TESTING EQUIPMENT FOR PRACTICE</u>

Frequently, operators of a fire apparatus, who are not thoroughly familiar with its operation become confused under the stress of the emergency and neglect details that may cause trouble or delay in getting the equipment into operation. We urge that practice tests be conducted repeatedly until operators are thoroughly trained. More than one individual in the department should be a competent operator.

Practice should include pumping from low lifts, high lifts with short and long suction lines, with suction line elevated to form an air trap, from hydrants, and at large and small capacities.

It is a good idea to note the effects of air leaks in hose, insufficient submergence and restriction of suction line. (Suction lines can be restricted by placing a can or other strong closure around the suction strainer.)

CAUTION:

NEVER BREAK OR RESTRICT SUCTION OR ADMIT AIR TO SUCTION LINE WHILE ENGINE IS OPERATING WITH THROTTLE OPEN. THIS WILL RELEASE THE LOAD AND POSSIBLY ALLOW THE ENGINE TO OVER-SPEED.

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CHAPTER 3 FUNCTIONAL DESCRIPTION

<u>**P-100 PUMP UNIT.</u>** The P-100 pump unit is a commercial diesel driven portable pump designed for firefighting, dewatering, and many utility functions. The design features of the pump unit are described in the following paragraphs. The pump unit consists of the engine, centrifugal pump, exhaust primer, discharge valve, recoil starter, attached fuel tank, and compound pressure gage.</u>

The pump unit measures 21''W X 23.5''L X 24.38''H. The wet weight of the pump unit is 164 pounds which includes fuel. The pump is designed to provide 100 GPM at 83 PSI while lifting 20 feet. In high lift operations, the pump unit will deliver 68 GPM at 45 PSI while lifting 39 feet.

ENGINE. The Yanmar L100N engine is an air cooled, single cylinder, four cycle diesel engine rated at 10 horsepower. Ignition is achieved by direct injection of fuel and compression is initially aided by a compression release lever to help overcome the compression ratio. The engine is started by a recoil type starter.

The fuel oil filter is a paper element type built into the attached fuel tank.

The engine utilizes forced lubrication and splash lubrication for valve rocker arm chamber. The lubricating oil filter is a resin, 60 mesh type. The engine lubricating oil capacity is 1.65 liters(0.44 gallons). The recommended oil for commercial use is SAE 10W30, API grade CD or higher for ambient temperatures less than 85 degrees F. The oil specified for Navy use is MIL-L-2104, equivalent to SAE 15W40.

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The air cleaner element is a dry paper element type. The engine is cooled by forced air generated by a flywheel fan.

Speed control is accomplished by an all speed type mechanical governor.

The engine dimensions, length, width, height, is 412 X 471 X 494 mm(16.2 X 18.5 X 19.4 inches)

<u>PUMP</u>. The Darley 2BE pump is a single suction, single stage centrifugal pump complete with a compound pressure gage, drain valve, and primer connection. The impeller is a closed design and the shaft is sealed by a unique pelletized packing gland. The shaft seal utilizes injection plastallic packing with a stuffing box. The suction and discharge connections have male threads which receive 3 inch and 2-1/2 inch hoses, respectively.

The pump casing is fabricated from a hard coat anodized aluminum alloy which is light weight and corrosion resistant.

The impeller is balanced and is of a bronze alloy construction. The wearing rings are a bronze labyrinth type.

EXHAUST PRIMER. The engine exhaust silencer is constructed to incorporate a jet type ejector and receive an insulated exhaust hose. When the primer is operated, the main exhaust port is blocked by the cylinder valve forcing the exhaust flow through the priming jet. The vacuum developed by the exhaust jet evacuates the air from the pump casing and suction hose. Because of the vacuum developed, atmospheric pressure forces water up through the suction hose and into the pump casing.

The exhaust hose is a dry 4.5" insulated hose which is available in 10' sections. The hose weighs only 1.7 pounds per linear foot and provides adequate protection for safe handling with firefighter's gloves during and after operation. The function of the exhaust hose is to safely route harmful exhaust gases to weather when indoor operation becomes necessary.

<u>FUEL TANK.</u> The fuel tank is mounted to the engine. The tank consists of the tank, fuel filter, isolation valve, injection valve, and a fuel tank cap.

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CHAPTER 4 TROUBLESHOOTING

The following are some basic points to check when problems are encountered during starting and priming evolutions.

When the engine will not start:

- (1) Is there enough fuel? Is it the correct type of fuel?
- (2) Is the fuel cock at the "OPEN" position?
- (3) Is diesel fuel reaching the fuel injection pump or nozzle?
- (4) Is the speed control lever in the "START" position?
- (5) Is the lube oil level correct?
- (6) Is the fuel injection nozzle working properly?
- (7) Is the recoil starter pulled sufficiently quick and firm?

CHECK LIST FOR DARLEY FIRE PUMP PRIMING FAILURES

1. **Problem:** Engine speed too low.

Solution: When priming, run engine at high RPM.

2. **Problem:** Air leak through packing (or excessive water leakage when primed).

Solution: Tighten packing while pumping at 50 psi by tightening packing screw. Adjust packing to 5 to 60 drops per minute. Do not allow packing to be drip free -- lubrication of the pump packing is necessary to prevent damage to the shaft. See Section 5.8, Injection Type Stuffing Box Adjustment, for complete instructions.

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3. **Problem:** Suction hose.

Solution: Make sure that the strainer at the end of the suction is fully emerged in the water, and free of debris. Air leaks through the suction hose gasket are the most common reason for failure to prime. Replace gasket if necessary.

4. **Problem:** Pump drain is open.

Solution: Check pump drain to make sure that it is closed when priming.

5. **Problem:** Primer line is closed.

Solution: Open primer line valve located near suction inlet and close once pump is primed.

The following trouble shooting guide provides a more detailed breakdown of possible problems that may be encountered.

IF FURTHER INFORMATION IS NEEDED, CALL W.S. DARLEY & CO. AT CHIPPEWA FALLS, WI. AT 800-634-7812 or 715-726-2650

TABLE 4-1 TROUBLESHOOTING GUIDE

PROBLEM	CAUSES	SUGGESTED CORRECTION
PUMP FAILS TO PRIME OR LOSES PRIME	AIR LEAKS	CLEAN AND TIGHTEN ALL SUCTION CONNECTIONS. CHECK CONDITION OF HOSES AND HOSE GASKETS. CLOSE ALL PUMP DRAINS. CHECK PACKING GLAND FOR PROPER ADJUSTMENT. RUN DRY VACUUM TEST AS FOLLOWS: A) CONNECT SUCTION HOSE TO PUMP AND CAP END. B) DRAIN PUMP. CLOSE ALL DISCHARGE AND DRAINS. C) ENGAGE PRIMER AND DRAW A VACUUM, PREFER 18-22". SHUT OFF PRIMER. D) IF VACUUM DROPS MORE THAN 10" HG. IN 10 MINUTES, EXCESSIVE LEAKAGE IS PRESENT. WITH ENGINE SHUT OFF, AIR LEAKS ARE SOMETIMES AUDIBLE.
	DISCHARGE CHECK VALVE LEAKS.	REMOVE DISCHARGE CHECK VALVES AND REPAIR OR REPLACE.
(U.S.NAVY USE ONLY)	FOOT VALVE DAMAGED OR DEFECTIVE.	LEAKING FOOT VALVE PREVENTS MAINTAINING PRIME. REPLACE FOOT VALVE GASKETS OR REPLACE FOOT VALVE.
PUMP FAILS TO PRIME OR LOSES PRIME CONTINUOUSLY.	SUCTION WHIRLPOOL.	PUMPING LARGE VOLUMES WITH SUCTION HOSE TOO SHALLOW IN WATER SUPPLY CAN CAUSE WHIRLPOOLS, ALLOWING AIR TO BE DRAWN INTO PUMP, LOSING PRIME. PLACE SUCTION HOSE DEEPER, OR LESSEN VOLUME BEING PUMPED.
	HIGH POINT IN SUCTION LINE.	LOWER SUCTION HOSE BELOW PUMP SUCTION, IF NOT POSSIBLE, REPRIMING SEVERAL TIMES MAY BE NECESSARY TO REMOVE AIR LOCK.
	TOO HIGH OF A SUCTION LIFT.	SOMETIMES TOO HIGH OF A LIFT IS NOT OBTAINABLE EXCEPT AT LOW ALTITUDES WITH THE BEST OF EQUIPMENT. TRY TO KEEP THE LIFT AS LOW AS POSSIBLE.
CAPACITY OF PUMP LOW.	SUCTION HOSE TOO SMALL.	USE THE PROPER SIZE SUCTION HOSE FOR THE RATING OF THE PUMP.
	DEFECTIVE SUCTION HOSE.	SUCTION HOSE LINER MAY BE COLLAPSING, RESTRICTING FLOW TO PUMP. TRY DRAFTING WITH A DIFFERENT SECTION OF SUCTION HOSE.
	PLUGGED SUCTION STRAINER OR SCREEN.	CLEAN DEBRIS OUT OF STRAINER AND SCREEN. SET UP SUCTION WITH FLOATING STRAINER TO AVOID DEBRIS ON BOTTOM OF DRAFTING WATER SUPPLY.
	WORN IMPELLERS AND SEAL RINGS.	REMACHINE OR REPLACE WORN IMPELLERS AND SEAL RINGS TO MEET W. S. DARLEY SPECIFICATIONS.
PRESSURE OUTPUT OF PUMP IS LOW.	ABOVE CAUSES OF LOW CAPACITY.	CHECK ALL OF THE ABOVE CAUSES OF LOW CAPACITY AS THEY CAN ALSO AFFECT PUMP PRESSURE.
	TOO MUCH CAPACITY.	CAPACITY AND PRESSURE ARE DIRECTLY PROPORTIONAL. IF TRYING TO PUMP A LARGE CAPACITY, PRESSURE WILL BE LIMITED. ALSO INCREASING PUMP PRESSURE DOES NOT MEAN A VOLUME INCREASE IN WATER PUMPED.
PACKING LEAKS.	IMPROPERLY ADJUSTED PACKING.	SEE STUFFING BOX ADJUSTMENT SECTION

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CHAPTER 5 SCHEDULED MAINTENANCE

5.1 PERIODIC CHECKS AND MAINTENANCE

See the Yanmar Engine Manual for periodic checks and maintenance related to the engine.

CAUTION:

Kerosene based jet fuel types such JP-5, JP-8, Jet A-1, Jet A ASTM D1655 and NATO F-34 have a chemical composition equivalent to JIS No.1 (Kerosene).

Due to lower viscosity, FIE (Fuel Injection Equipment) component cavitation, and exhaust emissions may occur. Lower viscosity levels increase crankcase oil dilution, fuel pump oil seepage, etc...

The following are caution notes in the occurrence of Jet Fuel usage:

- In order to minimize crankcase oil dilution, engine oil maintenance must occur at shorter intervals compared to standard specifications (i.e. 150 hours instead of 250 hr).

- Drain water from the Yanmar fuel and water separator(s) every 50 operation hours.

- Avoid equipment use in an external environment that causes the fuel temperature to drop below -40 degrees Fahrenheit (-40 degrees Celsius).

Engine Warranty Notice:

- Jet fuels with lower lubricity characteristics will prematurely wear FIE and engine components. Therefore FIE parts are not covered under Yanmar's standard warranty when operated on JP-5, JP-8, Jet A-1, Jet A ASTM D1655 and NATO F-34 fuels.

- Additional failures resulting from the above FIE fatigue include but are not limited to: melted fuel injection nozzle tips, seized fuel injection nozzle valves (needles), excessive piston temperatures, crankcase dilution, and severe combustion chamber and FIE deposits.

5.2 OPERATIONAL MAINTENANCE

5.2.1 Drain and Flush Pump Unit.

Each time the pump unit is used to pump seawater, or brackish water, the pump must be flushed with fresh water to prevent salt crystals and oxidation from binding the pump shaft and other pump components that fit together with minimal clearances.

To drain and flush the pump unit:

(a) Preferred method of flushing pump unit:

(1) Open Wye-gate discharge valve and release foot valve flapper to empty the suction hose.

(2) Open pump casing drain valve and allow pump to stand upright for 3 minutes.

(3) Close pump casing drain valve and Wye-gate valve.

(4) Route suction and discharge hoses to a clean 55 gallon drum filled with fresh water.

(5) Start and operate pump unit in accordance with Chapter 2, Operation. With a 50 psig minimum discharge pressure, operate pump unit for 3 to 5 minutes. Discharge water continuously during operation and replenish the water in the drum while flushing.

(6) Stop the pump unit and repeat steps (1) and (2) above.

(7) Disconnect and stow all hoses.

(8) If temperature is above 32 degrees F(0 degrees C), spray silicone lubricating compound into suction and discharge ports to coat impeller and pump volute.

(9) Close pump casing drain valve, and replace thread protector caps on suction and discharge fittings (if applicable).

(10) If temperature is below 32 degrees F(0 degrees C), restart pump unit without connecting the suction and discharge hoses. Open the primer line valve and shift the exhaust primer lever to the prime position for 5 seconds to evacuate any remaining water from the priming line. Immediately stop the pump unit.

(11) Close pump casing drain valve, and replace thread protector caps on suction and discharge fittings (if applicable).

(12) Return the pump unit to a state of readiness.

(b) Alternate method for flushing pump unit.

(1) Open Wye-gate discharge value and release foot value flapper to empty suction hose.

(2) Open pump casing drain valve and allow pump to stand upright for 3 minutes.

(3) Close pump casing drain valve and Wye-gate valve.

(4) Connect the pump unit to a fresh water source.

(5) While fresh water is flowing through the pump, depress the compression release lever and slowly pull the recoil starter rope. Repeat 7-10 times to adequately flush any residual seawater from the pump.

(6) Repeat steps (1) and (2) above.

(7) Disconnect and stow all hoses.

(8) If temperature is above 32 degrees F(0 degrees C), spray silicone lubricating compound into suction and discharge ports to coat impeller and pump volute.

(9) Close pump casing drain valve, and replace thread protector caps on suction and discharge fittings (if applicable).

(10) If temperature is below 32 degrees F(0 degrees C), restart pump unit without connecting the suction and discharge hoses. Open the primer line valve and shift the exhaust primer level to the prime position for 5 seconds to evacuate any remaining water from the priming line. Immediately stop the pump unit.

(11) Return the pump unit to a state of readiness.

5.2.2 Visually Inspect Pump Unit.

To visually inspect pump unit:

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a. Inspect pump unit frame.

(1) Inspect skids for cracks or damage.

(2) Inspect carrying handles for proper operation, damage, loose pins or loose mounting hardware.

(3) Inspect engine mounts for cracks, damage or loose bolted connections.

b. Inspect pump suction, discharge and exhaust threads for damage.

Inspect hoses, tubes, fittings and clamps.

(1) Inspect for loose or damaged clamps and fittings.

(2) Inspect hoses and tubes for signs of leaks, cracks, kinks, bulges or deterioration.

d. Inspect recoil starter.

(1) Inspect starter housing for cracks or loose mounting hardware.

(2) While holding the compression release lever down, slowly pull starter rope fully out and inspect the rope for wear.

(3) Inspect starter rope guide for cracks or damage.

e. Inspect the following controls and indicators for damage and proper operation:

(1) Engine speed lever and thumbscrew assembly.

(2) Throttle linkage assembly.

(3) Fuel cock valve.

(4) Exhaust primer shut off valve.

- (5) Pump drain valve.
- (6) Compound pressure gage.

(7) Fuel level tube.

f. Inspect exhaust priming assembly.

(1) Inspect primer exhaust valve assembly for damage.

(2) Inspect exhaust value discharge for damage or carbon buildup that would prevent exhaust priming.

(3) Inspect exhaust priming ejector is free from carbon buildup or obstructions.

g. Inspect air cleaner for damage or corrosion.

h. Inspect engine assembly

(1) Inspect for leaking gaskets, fittings or seals.

(2) Inspect for corrosion of engine castings, covers and mounting and assembly hardware. Inspect stiffening bracket for loose mounting hardware.

(3) Inspect flywheel cover and spray shield for damage, corrosion or loose mounting hardware.

5.2.3 Inspect Idle Equipment for Freedom of Movement.

To manually turn engine/pump shaft.

a. Ensure the fuel cutout valve at the bottom of the fuel tank is in the "S" (closed) position.

b. Ensure the throttle lever thumbscrew tightened in the STOP position.

CAUTION:

MANUAL TURNING OF THE SHAFT IS PERFORMED TO REDUCE THE COMPRESSION OF THE PUMP SHAFT PACKING. DO NOT OPERATE THE PUMP UNIT DRY. DO NOT START THE PUMP UNIT WHEN MANUALLY TURNING THE ENGINE/PUMP SHAFT. IMMEDIATELY SECURE THE ENGINE IF THE ENGINE STARTS WHEN PERFORMING THIS PROCEDURE IN ACCORDANCE WITH EMERGENCY STOP PROCEDURES.

c. Slowly pull out starter recoil handle until strong resistance is felt and return handle to initial position.

d. Push down the compression release lever.

e. Slowly pull out the starter recoil handle for three full extensions of the starter rope.

f. Pull up the compression release lever.

g. Return pump unit to readiness condition.

5.2.4 Lubricate Pump Unit.

To lubricate pump unit:

a. Lubricate throttle pivot points:

(1) Apply a thin coat of grease to throttle lever pivot, governor lever pivot and compression release pivot.

(2) Operate throttle lever to work grease into pivot points. Operate compression release lever to work grease into pivot point.

(3) Remove excess lubricant.

b. Lubricate pump casing drain valve:

(1) Apply a thin coat of silicone compound on valve.

(2) Open and close valve several times to work in lubrication.

c. Lubricate suction and discharge connections by applying a thin coat of silicon compound to threads.

d. Return pump unit to readiness condition.

5.2.5 Test Operation of the Pump Unit

WARNING:

DO NOT OPERATE PUMP IN AN ENCLOSED AREA WITHOUT EXHAUST HOSE CONNECTED AND ROUTED SAFELY TO OUTSIDE ATMOSPHERE. EXHAUST GASES CONTAIN CARBON MONOXIDE, WHICH IS ODORLESS AND POISONOUS, AND CAN CAUSE INJURY OR DEATH WHEN INHALED.

CAUTION:

PERSONNEL SHALL WEAR APPROVED HEARING PROTECTIVE DEVICES WHEN ENGINE IS OPERATING.

5.2.5.1 Preliminary Set Up

a. Renew engine fuel prior to pump unit operation.

b. Move pump unit near water source; remove pump thread protector caps, if installed.

c. Inspect gaskets on suction and discharge female hose and valve connections. Inspect condition of all threaded connections prior to assembly.

NOTE:

CHECK SUCTION LIFT PRIOR TO RIGGING PUMP UNIT FOR OPERATION. SUCTION LIFT IS THE VERTICAL DISTANCE FROM THE PUMP SUCTION INLET TO THE FREE SURFACE OF THE WATER BEING PUMPED.

d. Check distance to water source. If suction lift (vertical height) exceeds 20' an eductor must be used.

CAUTION:

DO NOT ATTEMPT TO START OR OPERATE PUMP UNIT BEFORE READING AND THOROUGHLY UNDERSTANDING ITS OPERATION.

NOTE:

FOR AMBIENT TEMPERATURES BELOW 30 DEGREES F(0 DEGREES C), REFER TO CHAPTER 2, OPERATION, FOR STARTING AND OPERATING PROCEDURES.

5.2.5.2 Test Operate Pump Unit at Suction Lift < 20 Ft.

CAUTION:

A HIGH SPOT AND/OR CLOSE RADIUS BEND IN SUCTION LINE MAY FORM AN AIR TRAP AND PREVENT COMPLETE PUMP PRIMING. ALWAYS ATTACH SUCTION HOSE TO PUMP PRIOR TO PLACING HOSE IN WATER.

a. Using spanner wrench, attach a 3" suction line to pump suction fitting. Suction line must consist of required number of 10' lengths of suction hose with a foot valve/strainer unit on submerged end. Make sure all connections are secure. Carefully lower hoses into water making sure foot valve/strainer unit remains submerged at least 1 foot throughout operating period. Make sure suction line slopes continuously downward from pump intake to water.

b. Attach Wye-gate or Tri-gate to pump discharge fitting. Wye-gate or Tri-gate may be attached to pump discharge fitting by using a short 2-1/2" dia. x 18" extension hose.

c. Attach one or two 1-1/2 inch hoses and nozzles.

NOTE:

1-1/2 INCH NOZZLES HAVE A FLOW OF 95 TO 125 GPM AT 100 PSI.

WARNING:

DO NOT OPERATE PUMP IN AN ENCLOSED AREA WITHOUT EXHAUST HOSE CONNECTED AND ROUTED SAFELY TO OUTSIDE ATMOSPHERE. EXHAUST GASES CONTAIN CARBON MONOXIDE, WHICH IS ODORLESS AND POISONOUS, AND CAN CAUSE INJURY OR DEATH WHEN INHALED.

WARNING:

HIGH TEMPERATURES EXIST IN VICINITY OF EXHAUST HOSE CONNECTION AT ENGINE AND AT EXHAUST HOSE DISCHARGE. WEAR FIREFIGHTERS GLOVES AT ALL TIMES WHEN HANDLING EXHAUST HOSES. d. If pump unit is to be operated in a poorly ventilated area, attach a maximum of 20' of insulated exhaust hose to exhaust fitting. Do not submerge discharge end of exhaust hose in water. Regularly check exhaust hose connections for leaks.

CAUTION:

FUEL MUST BE FILTERED CLEAR AND BRIGHT.

CAUTION:

DO NOT FILL FUEL TANK BEYOND THE TOP OF THE RED PLUG INSIDE THE FUEL TANK STRAINER.

e. Inspect engine fuel level. Fill if low. Do not overfill. Do not put oil in fuel tank.

CAUTION:

INSPECT ENGINE OIL LEVEL ON A LEVEL SURFACE WITH ENGINE STOPPED. CHECKING OIL LEVEL ON A NON-LEVEL SURFACE WILL RESULT IN A FALSE READING. OVERFILLING WITH OIL WILL RESULT IN EXCESSIVE OIL CONSUMPTION, HIGH OIL TEMPERATURES, POSSIBLE CRANKCASE EXPLOSION AND ENGINE DAMAGE. INSUFFICIENT OIL LEVELS WILL RESULT ENGINE SEIZURE.

f. Inspect engine oil level. Fill if low. Do not overfill.

g. Close discharge valve at discharge head.

h. Set fuel isolation value at bottom of fuel tank to "O" (open) position.

i. Place throttle lever so indicator is in START position and tighten thumbscrew.

NOTE:

PRIMER SHUT-OFF VALVE IS OPEN WHEN LEVER IS IN LINE WITH HOSELINE.

j. Open primer line shut-off valve between primer ejector assembly and pump suction.

k. Slowly pull out starter recoil handle until strong resistance is felt and return handle to initial position.

1. Push down the compression release lever.

WARNING:

PERSONNEL SHALL WEAR APPROVED HEARING PROTECTIVE DEVICES WHEN ENGINE IS OPERATING.

m. Pull the recoil starting handle briskly with both hands to start engine.

n. If engine does not start repeat steps k. through m.

CAUTION:

DO NOT CONTINUE TO OPERATE THE PUMP UNIT IF PRIMING CAN NOT BE ACHIEVED WITHIN TWO MINUTES. SHUTDOWN ENGINE AND TROUBLESHOOT FOR CAUSE OF FAILURE TO ACHIEVE PRIME.

o. Once the engine is running, set the engine throttle control to the "RUN" position.

NOTE:

START THE ENGINE AND RUN AT A FAST IDLE TO PRIME WITH LIFTS LESS THAN 10 FEET. START THE ENGINE AND RUN AT FULL THROTTLE TO PRIME WITH 10 TO 20 FOOT LIFTS.

p. Shift the exhaust value to the prime position blocking the main exhaust opening. The exhaust value is in the prime position when the handle is horizontal.

q. When a steady stream of water appears at the discharge of the priming jet, close the primer line shut-off valve and return the engine exhaust valve to the normal position. Open the pump discharge valve.

r. Repeat the priming operation if the pump fails to hold its prime. If the pump does not deliver water within two minutes, stop the engine and check for air leaks at suction connections and/or the pump packing gland, or failure of the priming jet to produce vacuum.

CAUTION:

DO NOT OPERATE PUMP UNIT CONTINUOUSLY WITHOUT DISCHARGING WATER. OPERATION OF THE PUMP WITH A CLOSED DISCHARGE VALVE WILL RESULT IN OVERHEATING OF AND DAMAGE TO THE PUMP. AT A MINIMUM, BLEED A SMALL AMOUNT OF WATER FROM A SECONDARY DISCHARGE HOSE WHEN THE PUMP IS OPERATING AND THE PRIMARY HOSE AND NOZZLE ARE SECURED.

CAUTION:

OBSERVE EXHAUST SMOKE COLOR AFTER PRIMING HAS BEEN ACHIEVED AND PUMP IS DISCHARGING WATER. EXHAUST SMOKE COLOR SHOULD BECOME CLEAR OR LIGHT BLUISH AS THE ENGINE WARMS UP. IN HIGH LOAD SITUATIONS, THE CONTINUED APPEARANCE OF BLACK EXHAUST SMOKE AFTER THE ENGINE HAS WARMED UP INDICATES OVERFUELING OF THE ENGINE. OVERFUELING OF THE ENGINE WILL CAUSE FUEL DILUTION OF THE LUBE OIL AND ENGINE DAMAGE WITH CONTINUED OPERATION. ADJUSTMENT OF THE THROTTLE TO REDUCE ENGINE LOAD IS REQUIRED IF EVIDENCE OF ENGINE OVERFUELING IS OBSERVED.

s. Slowly open a single 1-1/2" hose discharge line on Wyegate or Tri-gate valve and discharge water from hose nozzle.

NOTE:

PUMP SHAFT PACKING DRIP RATE SHOULD BE 5-60 DROPS PER MINUTE (60 DROPS PER MINUTE MAXIMUM). LOWER DRIP RATE INDICATES EXCESSIVE TIGHTENING OF PUMP SHAFT PACKING. HIGHER DRIP RATE INDICATES INSUFFICIENT PACKING ADJUSTMENT. ADJUST PUMP PACKING DRIP RATE PER STUFFING BOX ADJUSTMENT SECTION.

t. Observe pump shaft packing drip rate with pump unit discharging water. Packing drip rate should be 5-60 drops per minute (60 drops per minute maximum).

u. Operate pump unit (5 minutes minimum) long enough to inspect for the following:

(1) Unusual noise or vibration.

(2) Proper discharge pressure (85-100 psig) when operating a single 1-1/2" fire hose with nozzle.

(3) Leakage from pump or accessories other than shaft packing gland drip. Secure pump unit as required to correct causes of leakage in accordance with the technical manual IF PUMP UNIT FAILS TO SHUTDOWN WHEN THROTTLE LEVER IS PLACED IN THE ``STOP'' POSITION, REFER TO STEP 3, EMERGENCY STOP PROCEDURES.

v. Secure the pump unit by loosening the throttle lever thumbscrew and moving the lever to the "Stop" position.

w. Drain and flush the pump unit, return it to the state of readiness. U.S. Navy users accomplish MRCs R-1 and R-18.

5.2.5.3 Test Operate Pump at Suction Lift > 20 Ft.

CAUTION:

A HIGH SPOT AND/OR CLOSE RADIUS BEND IN SUCTION LINE MAY FORM AN AIR TRAP AND PREVENT COMPLETE PUMP PRIMING. ALWAYS ATTACH SUCTION HOSE TO PUMP PRIOR TO PLACING HOSE IN WATER.

a. Attach 1-1/2" hose to eductor charging port, using 1-1/2" x 2-1/2" adapter if required.

b. Attach foot valve assembly to eductor inlet, using adapter if required.

c. Using a spanner wrench, attach 3" suction line to eductor outlet connection, using adapter if required.

d. Using spanner wrench, attach a 3" suction line to pump suction fitting. Suction line assembly must consist of required number of 10' lengths of suction hose, sufficient length of eductor charging hose and a foot valve/strainer unit and eductor on submerged end. Make sure all connections are secure. Carefully lower hoses into water making sure eductor and foot valve/strainer unit remains submerged at least 1 foot throughout operating period. Make sure suction line slopes continuously downward from pump intake to water.

e. Attach Tri-gate valve to pump discharge fitting. Tri-gate may be attached to pump discharge fitting by using a short 2-1/2" dia. x 18" extension hose.

f. Attach eductor charging hose to one of the 1-1/2" Tri-gate discharge ports. Leave eductor charging line cut out valve on Tri-gate open.

g. Ensure one 1-1/2'' port of Tri-gate is closed and fill the eductor charging hose and suction hose with water from firemain or potable water source through the remaining port.

NOTE:

1-1/2 INCH NOZZLES HAVE A FLOW OF 95 TO 125 GPM AT 100 PSI.

h. Attach a 1-1/2" hose with nozzle to Tri-gate valve.

i. Ensure 1-1/2" Tri-gate shut off valve is closed.

WARNING:

DO NOT OPERATE PUMP IN AN ENCLOSED AREA WITHOUT EXHAUST HOSE CONNECTED AND ROUTED SAFELY TO OUTSIDE ATMOSPHERE. EXHAUST GASES CONTAIN CARBON MONOXIDE, WHICH IS ODORLESS AND POISONOUS, AND CAN CAUSE INJURY OR DEATH WHEN INHALED.

WARNING:

HIGH TEMPERATURES EXIST IN VICINITY OF EXHAUST HOSE CONNECTION AT ENGINE AND AT EXHAUST HOSE DISCHARGE. WEAR FIREFIGHTERS GLOVES AT ALL TIMES WHEN HANDLING EXHAUST HOSES. j. If pump unit is to be operated in a poorly ventilated area, attach a maximum of 20' of insulated exhaust hose to exhaust fitting. Do not submerge discharge end of exhaust hose in water. Regularly check exhaust hose connections for leaks.

CAUTION:

FUEL MUST BE FILTERED CLEAR AND BRIGHT.

CAUTION:

DO NOT FILL FUEL TANK BEYOND THE TOP OF THE RED PLUG INSIDE THE FUEL TANK STRAINER.

k. Inspect engine fuel level. Fill if low. Do not overfill. Do not put oil in fuel tank.

CAUTION:

INSPECT ENGINE OIL LEVEL ON A LEVEL SURFACE WITH ENGINE STOPPED. CHECKING OIL LEVEL ON A NON-LEVEL SURFACE WILL RESULT IN A FALSE READING. OVERFILLING WITH OIL WILL RESULT IN EXCESSIVE OIL CONSUMPTION, HIGH OIL TEMPERATURES, POSSIBLE CRANKCASE EXPLOSION AND ENGINE DAMAGE. INSUFFICIENT OIL LEVELS WILL RESULT ENGINE SEIZURE.

1. Inspect engine oil level. Fill if low. Do not overfill.

m. Close discharge valve at discharge head.

n. Set fuel cutout valve at bottom of fuel tank to "O" (open) position.

o. Place throttle lever so indicator is in START position and tighten thumbscrew.

NOTE:

PRIMER SHUT-OFF VALVE IS OPEN WHEN LEVER IS IN LINE WITH HOSELINE.

p. Open primer line shut-off valve between primer ejector assembly and pump suction.

q. Slowly pull out starter recoil handle until strong resistance is felt and return handle to initial position.

r. Push down the compression release lever.

WARNING:

PERSONNEL SHALL WEAR APPROVED HEARING PROTECTIVE DEVICES WHEN ENGINE IS OPERATING.

CAUTION:

A STRONG DELIBERATE PULL IS REQUIRED TO PREVENT ENGINE KICK-BACK AND POSSIBLE STARTING IN THE REVERSE ROTATIONAL DIRECTION. IF THIS DOES OCCUR, IMMEDIATELY SHUT DOWN THE ENGINE. OPERATION IN THE REVERSE DIRECTION IS CHARACTERIZED BY THE EVIDENCE OF EXHAUST GASES COMING OUT OF THE INTAKE FILTER. REVERSE OPERATION DOES NOT ALLOW FULL POWER OPERATION, POSITIVE PRIMING, AND WILL CAUSE DAMAGE TO THE UNIT.

s. Pull the recoil starting handle briskly with both hands to start engine.

t. If engine does not start repeat steps q. through s. Once engine is running, set the throttle control to the "RUN" position.

CAUTION:

DO NOT CONTINUE TO OPERATE THE PUMP UNIT IF PRIMING CAN NOT BE ACHIEVED WITHIN TWO MINUTES. SHUTDOWN ENGINE AND TROUBLESHOOT FOR CAUSE OF FAILURE TO ACHIEVE PRIME.

NOTE:

START THE ENGINE AND RUN AT A FAST IDLE TO PRIME WITH LIFTS LESS THAN 10 FEET. START THE ENGINE AND RUN AT FULL THROTTLE TO PRIME WITH 10 TO 20 FOOT LIFTS.

u. Shift the exhaust value to the prime position blocking the main exhaust opening. The exhaust value is in the prime position when the handle is horizontal.

v. When a steady stream of water appears at the discharge of the priming jet, close the primer line shut-off valve and return the engine exhaust valve to the normal position. Open the pump discharge valve.

w. Repeat the priming operation if the pump fails to hold its prime. If the pump does not deliver water within two minutes, stop the engine and check for air leaks at suction connections and/or the pump packing gland, or failure of the priming jet to produce vacuum.

CAUTION:

DO NOT OPERATE PUMP UNIT CONTINUOUSLY WITHOUT DISCHARGING WATER. OPERATION OF THE PUMP WITH A CLOSED DISCHARGE VALVE WILL RESULT IN OVERHEATING OF AND DAMAGE TO THE PUMP. WHEN OPERATING WITH AN EDUCTOR, RECIRCULATION OF WATER THROUGH THE EDUCTOR CHARGING LINE IS SUFFICIENT TO ENSURE FLOW IS MAINTAINED UNTIL WATER IS DISCHARGED FROM THE 1-1/2" HOSE AND NOZZLE.

CAUTION:

OBSERVE EXHAUST SMOKE COLOR AFTER PRIMING HAS BEEN ACHIEVED AND PUMP IS DISCHARGING WATER. EXHAUST SMOKE COLOR SHOULD BECOME CLEAR OR LIGHT BLUISH AS THE ENGINE WARMS UP. IN HIGH LOAD SITUATIONS, THE CONTINUED APPEARANCE OF BLACK EXHAUST SMOKE AFTER THE ENGINE HAS WARMED UP INDICATES OVERFUELING OF THE ENGINE. OVERFUELING OF THE ENGINE WILL CAUSE FUEL DILUTION OF THE LUBE OIL AND ENGINE DAMAGE WITH CONTINUED OPERATION. ADJUSTMENT OF THE THROTTLE TO REDUCE ENGINE LOAD IS REQUIRED IF EVIDENCE OF ENGINE OVERFUELING IS OBSERVED.

x. Slowly open a single 1-1/2" hose discharge line on Trigate valve and discharge water from hose nozzle.

NOTE:

PUMP SHAFT PACKING DRIP RATE SHOULD BE 5-60 DROPS PER MINUTE (60 DROPS PER MINUTE MAXIMUM). LOWER DRIP RATE INDICATES EXCESSIVE TIGHTENING OF PUMP SHAFT PACKING. HIGHER DRIP RATE INDICATES INSUFFICIENT PACKING ADJUSTMENT.

y. Observe pump shaft packing drip rate with pump unit discharging water. Packing drip rate should be 5-60 drops per minute (60 drops per minute maximum).

z. Operate pump unit (5 minutes minimum) long enough to inspect for the following:

(1) Unusual noise or vibration.

(2) Proper discharge pressure (85-100 psig) when operating a single 1-1/2" fire hose with nozzle.

(3) Leakage from pump or accessories other than shaft packing gland drip. Secure pump unit as required to correct for causes of leakage in accordance with the technical manual

NOTE:

IF PUMP UNIT FAILS TO SHUTDOWN WHEN THROTTLE LEVER IS PLACED IN THE STOP POSITION, EMERGENCY SHUTDOWN PROCEDURES.

aa. Secure the pump unit by loosening the throttle lever thumbscrew and moving the lever to the "Stop" position.

bb. Drain and flush the pump unit, return it to the state of readiness.

5.2.5.4 Emergency Shutdown Procedures

NOTE:

PERFORM EMERGENCY SHUTDOWN PROCEDURES IN THE ORDER PROVIDED. PERFORM CORRECTIVE MAINTENANCE TO FIND CAUSE OF FAILURE OF ENGINE TO SHUTDOWN IN ACCORDANCE WITH THE TECHNICAL MANUAL BEFORE ATTEMPTING TO OPERATE THE PUMP UNIT.

a. Close fuel cut out valve at base of fuel tank.

b. If necessary, push down engine compression release lever.

c. If necessary, loosen high pressure fuel pipe on the fuel pump.

5.3 STOW FOR LONG TERM SHUTDOWN.

CAUTION:

AVOID PROLONGED CONTACT WITH, OR INHALATION OF, CLEANING SOLVENTS. AVOID USE NEAR HEAT OR OPEN FLAME AND PROVIDE ADEQUATE VENTILATION.

To stow for long term shutdown:

- a. Drain and flush pump
- b. Clean oil filter/ Renew lube oil

c. Clean suction and discharge adapter with solvent degreaser. Replace thread protector caps.

WARNING:

FUEL VAPORS ARE COMBUSTIBLE. WHEN WORKING ON ANY PART OF FUEL SYSTEM, PROVIDE ADEQUATE VENTILATION AND AVOID HIGH HEAT AND OPEN FLAME.

d. Drain fuel from fuel tank through fuel tank drain plug.

e. Wipe clean engine, frame and pump assemblies with solvent degreaser.

f. Wrap pump unit in fire resistant paper and seal thoroughly using pressure sensitive tape.

g. Place pump unit in storage area.

5.3.1 To Restore Unit Readiness After Long Term Storage.

To remove protective cover.

- a. Remove pump unit from storage.
- b. Remove fire resistant paper from exterior of pump unit.

c. Remove thread protector caps from pump suction and discharge adapters.

d. Lubricate pump unit.

CAUTION:

FUEL MUST BE FILTERED CLEAR AND BRIGHT.

CAUTION:

DO NOT FILL FUEL TANK BEYOND THE TOP OF THE RED PLUG INSIDE THE FUEL TANK STRAINER.

- e. Fill engine fuel tank with fuel.
- f. Return pump unit to readiness condition.

5.4 INJECTION TYPE STUFFING BOX ADJUSTMENT

Only use Garlock style #926-AFP plastallic packing material. It is made of shredded composition lead foil, non-asbestos fibers, and a special bonding compound containing lubricant and graphite. W. S. Darley compresses this material into 5/8" dia. x 1" long pellets (3817102) which are packed 23 to a box. It is Darley part no. 3817101.

It is important that the stuffing box is completely filled solid with packing and compressed firm during adjustment to prevent formation of voids and excessive leakage.

To pack the stuffing box when empty and assembled in the pump, remove the packing screw and nut assembly, and insert pellet form packing into the packing plunger guide. Replace the packing screw assembly and use a hand speed wrench to force the pellets into the gland. DO NOT USE A POWER TOOL! Repeat pellet additions while turning the impeller shaft by hand until resistance to turning is felt when the stuffing box is almost full. Continue turning packing screw by hand using a standard 6" long 9/16" end wrench until 4 lb. of force is felt at the end of the wrench. This is equivalent to 2 ft-lb or 24 in-lb torque. Continue turning until a few flakes of packing are extruded out the opening between the impeller shaft and the stuffing box hole. A 2BE10YDN pump unit requires six 3817102 packing pellets. The gland is now ready for pressure testing or pumping.

After priming the pump with water, start the pump and raise the discharge pressure to 50 psi. Tighten the packing screw using a 6" long 9/16" end wrench until 4 lb. force is felt at the end of the wrench (24 in-lb torque). Continue operating the pump at 50 psi for 5 minutes to dissipate packing pressure against the shaft and permit cooling water to flow between the shaft and stuffing box hole. Make sure that water actually does come through before operating pump at any higher pressure. The normal drip rate may vary between 5 and 60 drops per minute.

Operate the pump for 10 minutes at the highest normal operating pressure flowing sufficient water to prevent overheating. Do not run pump blocked tight. Lower discharge pressure to 50 psi. and repeat the packing screw tightening procedure outlined above.

The pump may now be operated for any time period required within its rated capacity. However, the drip rate should be monitored more frequently during the first few hours, and adjusted if necessary to achieve a stable flow rate. Several more adjustments may be required.

5.5 CORROSION PROTECTION

The pump end of the P-100 is constructed entirely of light weight, corrosion resistant materials. It is expected that no special treatment will be required to maintain the pump end, in terms of corrosion protection.

The standard Yanmar engine requires corrosion protection measures to ensure that it will withstand the rigors of the marine environment. The fuel tank, fan case, and recoil starter have been primed with a phosphorized oxidized iron primer followed by two coats of Melamine Alkyd enamel. The air cleaner has been primed with a phosphorized oxidized iron primer and finished with a baked on epoxy top coat by Yanmar.

The aluminum engine block, fuel injector, injector pump, and all other engine components not treated by Yanmar have been subjected to the DuPont IMRON paint system. The IMRON coating system is a commercially available, four step process; cleaning, conditioning, priming, and top coating. A specific DuPont product and application procedure is used for each step. This product offers up to three times the protection of conventional air dry enamels and therefore, it is not recommended to use other paints to touch up any scrapes or scratches occurring during operation.

Periodically inspect pump unit for scrapes, scratches, peeling, or corrosion. Repaint only when necessary, especially on heat transfer surfaces such as the engine block. Refer requests for repainting of paint units to Intermediate Maintenance Activity. Onboard stowage of the IMRON coating is not authorized.

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CORRECTIVE MAINTENANCE

SOME CARE AND HANDLING INSTRUCTIONS

1. Avoid unnecessary force and rough handling of parts during disassembly and reassembly.

2. Clean parts thoroughly and maintain free from abrasive foreign matter.

3. Keep bearings in original containers until ready to install.

4. Work with clean tools in clean surroundings during reassembly.

5. Do not bump or abrade machined surfaces, giving special care to wearing surfaces, shaft shoulders, gear and impeller hub faces, etc.

6. Use an arbor press for forcing press fits whenever possible. If necessary to use a hammer, use one having soft plastic heads.

7. Use suitable machined and fitted sleeves or bars for forcing or pressing part having press fits.

8. When forcing or pressing parts onto a tight fitting shaft, the part must be started square with the shaft and forced on squarely all the way.

9. Clean and oil parts having press fits to prevent galling.

10. Keep loose parts marked or otherwise identified to avoid errors in assembly.

11. Do not use this pump unit for hose testing.

IF FURTHER INFORMATION IS NEEDED, CALL W.S. DARLEY & CO. AT CHIPPEWA FALLS, WI. AT 800-634-7812 or 715-726-2650

6.1 PUMP END DISASSEMBLY FOR OVERHAUL (Refer to Drawing DBM0001)

1. Disconnect primer hose (2) at the primer shut off valve (3).

2. Remove four 3/8"NC nuts (14), and remove the discharge head assembly and gasket (59) from pump casing (8).

3. Remove eight 3/8"NC nuts (14). Remove pump casing (8) from inboard head (24). Discard casing gasket (22).

4. If necessary to replace, remove seal ring (16) from pump casing (8).

5. Remove stainless steel cotter key (17), impeller nut (18), and impeller washer (19) from impeller shaft (26).

6. To remove impeller (20) from impeller shaft (26), use two flat bars or large screwdrivers on opposite sides of impeller. Bear against impeller where vanes provide support.

7. Loosen packing gland nut (52).

8. Remove four M8 x 1.25 x 25mm hex head cap screws (25) and slide the inboard head (24) away from the engine (32) and off the impeller shaft (26). Keep the inboard head (24) square with the engine (32) to avoid damaging parts.

9. If necessary to replace, remove stationary seal ring (16) from inboard head (24).

10. If necessary to replace, remove impeller shaft (26) from the engine (32) by driving the 3/16'' spring pin (27) out of the impeller shaft and the engine shaft. Use a propane torch to heat the impeller shaft (26) uniformly to soften the Loctite 243 Threadlocker Compound. Pull the impeller shaft (26) off the engine.

11. If impeller shaft (26) is removed, the oil seal (28) must be replaced. The oil seal is installed with Loctite 380 (Black Max) adhesive. Care must be taken not to damage engine bore when removing this oil seal.

6.1.1 PARTS INSPECTION AND MEASUREMENT

1. Clean all parts and examine carefully for wear or deterioration. Replace any questionable parts.

2. Measure the impeller seal rings and seal ring for wear. Use the following table for comparison.

Impeller Seal Ring O.D	3.304" - 3.303"
Seal Ring I.D.	3.315" - 3.314"
Clearance - original	0.010" - 0.012"

3. If clearance exceeds 0.025" on diameter, replace impeller and stationary seal rings.

4. The impeller shaft diameter at the packing area is 1.244 to 1.245", and the stuffing box bore diameter is 1.2500 to 1.2510'' original, 1.2570'' max. allowed. If shaft clearance exceeds 0.013", or if the pump cannot hold packing, either the impeller shaft, or the stuffing box, or both should be replaced depending on which part is out of tolerance.

5. The original impeller shaft diameter under the impeller is 0.8740 to 0.8745". The original impeller bore is 0.8745 to 0.8750" providing 0.0000 to 0.0010" clearance. The parts are still serviceable up to 0.0015" clearance.

6.2 RE-ASSEMBLY OF PUMP END

(Refer to Drawing DBM0001)

NOTE:

APPLY LOCTITE 243 THREADLOCKER TO ALL PUMP RELATED THREADED FASTENERS.

Original impeller shaft installation

1. To install original impeller shaft (26), slide impeller shaft onto engine shaft to check 3/16'' pin holes for alignment. If holes do not line up, rotate impeller shaft 180 degrees. Apply a coating of Loctite 243 Threadlocker to engine shaft, and slide impeller shaft onto engine shaft. Align drive pin holes in impeller shaft with drive pin hole in engine shaft. Tap a 3/16"x 1-1/2" <u>STAINLESS STEEL</u> spring pin (27) into impeller shaft and engine shaft.

2. Clean the oil seal bore to remove any foreign matter. Clean bore with isopropyl alcohol or a suitable solvent.

3. Apply a light coating of grease to impeller shaft under the oil seal area.

4. Slide oil seal (28) into engine bore. Clean O.D. of oil seal with isopropyl alcohol or a suitable solvent.

5. Apply a coating of Loctite 380 (Black Max) to O.D. of oil seal. The concave side of the seal must face away from the engine. Pulling the starter rope to rotate the shaft will help apply the Loctite 380 (Black Max).

6. Press the oil seal (28) into the engine bore. The oil seal will extend out of the cavity 1/8 inch.

NOTE:

WIPE OFF ANY EXCESS LOCTITE 380 (BLACK MAX), USE CARE NOT TO GET ANY ONTO OIL SEAL LIP.

7. Fill the spring pin (27) with clear silicone to seal it closed.

Replacement impeller shaft installation

1. Slide impeller shaft (26) onto engine shaft.

2.. Align the pre-drilled 3/16 inch hole in the impeller shaft with the hole in the engine shaft. Use a 3/16 inch drill to drill through the impeller shaft. Remove impeller shaft and remove all burs from both shafts.

3. Apply a coating of Loctite 243 Threadlocker to engine shaft, and slide impeller shaft (26) onto engine shaft. Align drive pin hole in the impeller shaft with the drive pin hole in the engine shaft. Tap a $3/16" \times 1-1/2"$ STAINLESS STEEL spring pin (27) through impeller shaft and engine shaft.

4. Clean the oil seal bore to remove any foreign matter. Clean bore with isopropyl alcohol or a suitable solvent.

5. Apply a light coating of grease to impeller shaft under the oil seal area.

6. Slide oil seal (28) onto impeller shaft (26). Clean O.D. of oil seal with isopropyl alcohol or a suitable solvent.

7. Apply a coating of Loctite 380 (Black Max) to O.D. of oil seal. The concave side of the seal must face away from the engine. Pulling the starter rope to rotate the shaft will help apply the Loctite 380 (Black Max).

8. Press the oil seal (28) into the engine bore. The oil seal will extend out of the cavity 1/8 inch.

NOTE:

WIPE OFF ANY EXCESS LOCTITE 380 (BLACK MAX), USE CARE NOT TO GET ANY ONTO OIL SEAL LIP.

9. Fill the spring pin (27) with clear silicone to seal it closed.

Reassembly of pump end

1. Apply Loctite 609 to the outside diameter of stationary seal ring (16). Press seal ring into inboard head (24) until seated.

NOTE:

WIPE OFF ANY EXCESS LOCTITE 609.

2. Slide inboard head (24) assembly over impeller shaft (26) and engage with pilot on engine. Attach to engine with four M8 x 1.25 x25mm hex head cap screws (25). Torque to 13 ft-lbs.

3. Apply a coating of oil to impeller shaft (26). Place impeller key (21) in impeller shaft keyway. Align keyslot in impeller (20) with impeller key, and press impeller onto impeller shaft until impeller is tight against the shaft shoulder.

4. Place impeller washer (19) onto impeller shaft (26).

5. Clean and dry shaft threads and impeller nut (18), removing dirt, grease, and oil. (Loctite Klean N' Prime, Part No. 2556, can be used to clean parts and shorten Loctite cure time.)

6. Apply Loctite 243 Threadlocker to shaft threads and nut threads.

7. Tighten impeller nut (18) until it contacts impeller washer (19), then turn to the next cotter key hole.

8. Install a $3/32'' \ge 3/4''$ stainless steel cotter key (17) into impeller shaft cotter key hole.

9. Apply Loctite 609 to the outside diameter of seal ring (16). Press seal ring into pump casing (8) until seated.

NOTE:

WIPE OFF ANY EXCESS LOCTITE 609.

10. Place casing gasket (22) into position on inboard head (24).

11. Slide pump casing (8) into position on inboard head (24). Attach to inboard head with eight 3/8'' NC nuts (14). Torque to 23 ft-lbs.

12. Attach discharge head assembly and gasket to pump casing (8) with four 3/8''NC nuts (14). Torque to 23 ft-lbs.

13. Connect primer hose (2) at primer shut off valve (3).

Discharge head maintenance

The discharge head assembly requires a minimal amount of maintenance. If some leakage occurs around the valve stem (70) and the gland nut (74), tighten the gland nut until it stops leaking. If leaking does not stop, the valve needs to be repacked.

1. Remove the jam nut (77). lockwasher (76) and the handwheel (75).

2. Remove the gland nut (74). Valve stem packing (73), stuffing box washer (72), stuffing box gasket (71) will stay together

during gland nut removal. Separate the parts and remove valve stem packing (73).
3. Install gland nut (74) onto valve stem (70), with the threads of the nut facing away from the discharge head body (67).

4. Wrap a 13'' length of rope packing (73) around the valve stem (70). Push the rope packing (73) into the gland nut (74) as the packing is being wrapped around the valve stem (70).

5. Slide the stuffing box washer (72) onto the valve stem and push the packing tightly into the gland nut (74).

6. Slide the rubber stuffing box washer (71) onto the valve stem (70).

7. Slide the gland nut assembly off of the valve stem (70). Turn the assembly over and slide over the valve stem (70). Tighten the gland nut assembly onto the discharge head (67) until the packing is snug against the valve stem (70), but does not prevent the stem from turning freely.

8. Install the handwheel (75). lockwasher (76), and jam nut (77).

IF FURTHER INFORMATION IS NEEDED, CALL W. S. DARLEY & CO. AT CHIPPEWA FALLS, WI AT 800-634-7812 OR 715-726-2650

FIGURE 7-1 PUMP DISCHARGE HEAD



REF NO.	PART NO.	DESCRIPTION	QTY
1	3800800	DISCHARGE HEAD GASKET	1
2	3606208	S.S. STUD 3/8NC X 1 1/2 LG.	4
3	5260001	CHECK VALVE SEAT	1
4	5300003	CHECK VALVE DIFFUSER	1
5	3800203	CHECK VALVE RUBBER	1
б	5280202	CHECK VALVE PLATE	1
7	5403204	S.S. JAM NUT 5/16NF	2
8	5240103	CHECK VALVE STEM	1
9	1001600	THREAD PROTECTOR	1
10	1602400	DISCHARGE ADAPTER	1
11	2800509	DISCHARGE HEAD	1
12	5240005	VALVE STEM	1
13	3800400	DISCHARGE HEAD STUFFING BOX GASKET	1
14	3603701	STUFFING BOX WASHER	1
15	4404000	CHECK VALVE STEM PACKING 1/8" X 13"	1.08
16	2150601	GLAND NUT	1
17	5402603	SOCKET SET SCREW, .25-20 NC	1
18	3001801	HANDWHEEL	1
19	1962102	DECAL - OPEN/CLOSE	1

TABLE 7-1 PUMP DISCHARGE HEAD



FIGURE 7-2 PUMP UNIT EXPLODED VIEW (DRAWING DBM0001)

TABLE 7-2 2BE10YD MATERIAL LIST Reference Drawing DBM0001

REP NO.	NAME OF PART	QTY	PART NO.	MATERIAL	STANDARDS
1	ADAPTER - 1/4 NPT X 3/8 TUBE X 90	1	3501505	360 BRASS	ASTM B16
2	PRIMER HOSE	1	4430913	PARKER HI-TEMP 836-6	SAE J516, J517
3	SHUT OFF VALVE	1	5200600	NICKEL PLATED FORGED BRASS	
4	CLOSE NIPPLE - 1/4 NPT	1	1081005	360 BRASS	ASTM B16
5	PRIMER SUCTION FITTING	1	4417201	360 BRASS	ASTM B16
6	PIPE PLUG	1	1080535	18-8 STAINLESS STEEL	ASTM A167, A240
7	LANYARD	2	4421500		
8	PUMP CASING	1	2050807	AL 319	ASTM SC64D MIL-A-8625F
9	SUCTION ADAPTER	1	1603600	BRONZE SAE 660	ASTM B505 MIL-B-16261-2
10	1/4" DRAIN COCK	1	5203600	360 HEX BRASS	ASTM B16
11	HYDRANT STRAINER	1	1121387	360 BRASS	ASTM B16
12	THREAD PROTECTOR	1	1001900	H.I. STYRENE	ASTM D 638
13	S.S. STUD 3/8NC X 1 1/4 LG.	8	3606202	18-8 STAINLESS STEEL	ASTM A167, A240
14	S.S. HEX NUTS 3/8 NC	12	5403003	18-8 STAINLESS STEEL	ASTM A167, A240
15	DISCHARGE PRESSURE GAUGE	1	2603026	2 1/2" LIQUID FILLED	
16	STATIONARY SEAL RING	2	3407000	BRONZE SAE 660	ASTM B505 MIL-B-16261-2
17	S.S. COTTER KEY 3/32 X 3/4 LG.	1	3605201	18-8 STAINLESS STEEL	ASTM A167, A240
18	IMPELLER NUT	1	5403434	18-8 STAINLESS STEEL	ASTM A167, A240
19	IMPELLER WASHER	1	3603319	303 STAINLESS STEEL	ASTM A581
20	IMPELLER	1	2907300	BRONZE 85-5-5-5	ASTM 62-82
21	IMPELLER KEY	1	3602405	316 STAINLESS STEEL	ASTM A276
22	PUMP CASING GASKET	1	3801800	CLOTH INSERTED NATURAL RUBBER	ASTM D2000-4AA515A13B13
23	STUFFING BOX	1	2156400	BRONZE SAE 660	ASTM B505 MIL-B-16261-2
24	INBOARD HEAD	1	2801207	AL319	ASTM SC64D MIL-A-8625F
25	S.S. HEX HEAD CAP SCREW M8 X	4	5400807	18-8 STAINLESS STEEL	ASTM A167, A240
	1.25 X 25MM				
26	WATER SHIELD	1	3203700	316 STAINLESS STEEL	ASTM A276
27	IMPELLER SHAFT	1	5000904	316 STAINLESS STEEL	ASTM A276
28	S.S. RETAINING PIN - SPRING PIN 3/16 X 1 1/2 .	1	3605024	18-8 STAINLESS STEEL	ASTM A167, A240
29	OIL SEAL	1	3600557	CLIPPER 0150-09831	
30	S.S. HEX HEAD CAP SCREW 5/16NC X 7/8 LG.	8	5400640	18-8 STAINLESS STEEL	ASTM A167, A240
31	MOUNTING PAD	4	4021300	MOLDED HARDCAST 116 PLASTIC	ASTM D638, D648, D790

32 S.S. HEX NYLOC NUTS 5/16 NC 8 5403400 18-8 STAINLESS STEEL ASTM A167, A240 33 DIESEL ENGINE 1 4215912 YANMAR L100N ASTM A167, A240 34 S.S. HEX NUTS 3/8 NC 4 5403003 18-8 STAINLESS STEEL ASTM A167, A240 35 S.S. FLAT WASHER 3/8 2 3603809 18-8 STAINLESS STEEL ASTM A167, A240 36 S.S. HEX HEAD CAP SCREW 3/8NC X 4 5400619 18-8 STAINLESS STEEL ASTM A167, A240 37 BASE 1 1683000 6061T6 ALUM TUBE & ANGLE ASTM B241 & B210 38 EXHAUST GASKET 1 3819700 YANMAR 114650-13200 39 LOCKWASHER, M8 4 3603528 18-8 STAINLESS STEEL ASTM A167, A240 40 S.S. HEX NUT M8 2 5403105 18-8 STAINLESS STEEL ASTM A167, A240	
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38 EXHAUST GASKET 1 3819700 YANMAR 114650-13200 39 LOCKWASHER, M8 4 3603528 18-8 STAINLESS STEEL ASTM A167, A240 40 S.S. HEX NUT M8 2 5403105 18-8 STAINLESS STEEL ASTM A167, A240	
39 LOCKWASHER, M8 4 3603528 18-8 STAINLESS STEEL ASTM A167, A240 40 S.S. HEX NUT M8 2 5403105 18-8 STAINLESS STEEL ASTM A167, A240	
40 S.S. HEX NUT M8 2 5403105 18-8 STAINLESS STEEL ASTM A167, A240	
41EXHAUST SILENCER11220901316 STAINLESS STEELASTM A276	
42 SAFETY WIRE, .041 X 14" 2 4423600 302/304 STAINLESS STEEL QQ-W-423B MS-2099	
43 HEX BOLT, ¼-20NC X 1.25 4 5400635 GRADE 8 STEEL ASTM A354	
44 LEVER NUT - TOP LOCK - S.S. 1/2NC 1 5403457 18-8 STAINLESS STEEL ASTM A167, A240	
45 LEVER 1 3009400 316 STAINLESS STEEL ASTM A276	
46 PACKING NUT 1 5403458 360 BRASS ASTM B16	
47PACKING RING23603913GRAPHITE PACKINGASTM F104 F517100B	МЗ
48 PRIMER BODY 1 2055700 81-3-7-9 CAST BRASS ASTM B505-82A	
49 PRIMER GASKET 1 3805601 S1200 CARBON FIBER ASTM F104-F112231-1	7
50 PRIMER JET 1 4416704 81-3-7-9 CAST BRASS ASTM B505-82A	
51 PRIMER PLUG 1 4421600 360 BRASS ASTM B16	
52 END CAP 1 1002000 81-3-7-9 CAST BRASS ASTM B505-82A	
53 PRIMER THROAT 1 4416806 360 BRASS ASTM B16	
54 S.S. HEX HEAD CAP SCREW 2 5400801 18-8 STAINLESS STEEL ASTM A167, A240	
M8X1.25X16MM	
55PACKING SCREW12156200303 STAINLESS STEELASTM A581	
56 GLAND NUT 1 2150300 360 HEX BRASS ASTM B16	
57GLAND STUD PISTON12154500303 STAINLESS STEELASTM A581	
58 SCREW- DRIVE, #4 X 1/4 4 5402820 ALUMINUM	
59S.S. SOCKET HEAD CAP SCREW1540140018-8STAINLESS STEELASTM A167, A2401/4NC X 3/8 LG11540140018-8STAINLESS STEELASTM A167, A240	
60 IDENTIFICATION TAG 1 1969000 BRASS ASTM B36-91A	
61 PACKING, PLASTALLIC COMPOSITE 6 3817104 DARLEY PLASTALLIC PACKING NA	
62 PACKING CYLINDER 1 2150800 360 HEX BRASS ASTM B16	
63 SUPPORT BRACKET 1 4026300 316 STAINLESS STEEL ASTM A276	
64 DISCHARGE HEAD GASKET 1 3800800 CLOTH INSERTED NATURAL RUBBER ASTM D2000-4AA515A	3B13
65 S.S. STUD 3/8NC X 1 1/2 LG. 4 3606208 18-8 STAINLESS STEEL ASTM A167, A240	
66 CHECK VALVE SEAT 1 5260001 360 BRASS ASTM B16	

REP NO.	NAME OF PART	QTY	PART NO.	MATERIAL	STANDARDS
67	CHECK VALVE DIFFUSER	1	5300003	316 STAINLESS STEEL	ASTM A276
68	CHECK VALVE RUBBER	1	3800203	CLOTH INSERTED NATURAL RUBBER	ASTM D2000-4AA515A13B13
69	CHECK VALVE PLATE	1	5280202	316 STAINLESS STEEL	ASTM A276
70	S.S. JAM NUT 5/16NF	2	5403204	18-8 STAINLESS STEEL	ASTM A167, A240
71	CHECK VALVE STEM	1	5240103	316 STAINLESS STEEL	ASTM A276
72	THREAD PROTECTOR	1	1001600	H.I. STYRENE	ASTM D 638
73	DISCHARGE ADAPTER	1	1602400	60-0-2-38 BRASS	ASTM B124-86
74	DISCHARGE HEAD	1	2800509	AL 319	ASTM SC64D MIL-A-8625F
75	VALVE STEM	1	5240005	360 BRASS	ASTM B16
76	DISCHARGE HEAD STUFFING BOX GASKET	1	3800400	CLOTH INSERTED NATURAL RUBBER	ASTM D2000-4AA515A13B13
77	STUFFING BOX WASHER	1	3603701	360 BRASS	ASTM B16
78	CHECK VALVE STEM PACKING 1/8" X 13"	1.08	4404000	GARLOCK STYLE 8909	NA
79	GLAND NUT	1	2150601	360 HEX BRASS	ASTM B16
80	SOCKET SET SCREW, .25-20 NC	1	5402603	18-8 STAINLESS STEEL	ASTM A167, A240
81	HANDWHEEL	1	3001801	ZINC	
82	DECAL - OPEN/CLOSE	1	1962102	LEXAN	
83	EXHAUST HOSE AND CLAMP	2	4402311		



FIGURE 7-2 PUMP UNIT EXPLODED VIEW (DRAWING DBM0001)

TABLE 7-2 2BE10YD MATERIAL LIST Reference Drawing DBM0001

REP NO.	NAME OF PART	QTY	PART NO.	MATERIAL	STANDARDS
1	ADAPTER - 1/4 NPT X 3/8 TUBE X 90	1	3501505	360 BRASS	ASTM B16
2	PRIMER HOSE	1	4430913	PARKER HI-TEMP 836-6	SAE J516, J517
3	SHUT OFF VALVE	1	5200600	NICKEL PLATED FORGED BRASS	
4	CLOSE NIPPLE - 1/4 NPT	1	1081005	360 BRASS	ASTM B16
5	PRIMER SUCTION FITTING	1	4417201	360 BRASS	ASTM B16
6	PIPE PLUG	1	1080535	18-8 STAINLESS STEEL	ASTM A167, A240
7	LANYARD	2	4421500		
8	PUMP CASING	1	2050807	AL 319	ASTM SC64D MIL-A-8625F
9	SUCTION ADAPTER	1	1603600	BRONZE SAE 660	ASTM B505 MIL-B-16261-2
10	1/4" DRAIN COCK	1	5203600	360 HEX BRASS	ASTM B16
11	HYDRANT STRAINER	1	1121387	360 BRASS	ASTM B16
12	THREAD PROTECTOR	1	1001900	H.I. STYRENE	ASTM D 638
13	S.S. STUD 3/8NC X 1 1/4 LG.	8	3606202	18-8 STAINLESS STEEL	ASTM A167, A240
14	S.S. HEX NUTS 3/8 NC	12	5403003	18-8 STAINLESS STEEL	ASTM A167, A240
15	DISCHARGE PRESSURE GAUGE	1	2603026	2 1/2" LIQUID FILLED	
16	STATIONARY SEAL RING	2	3407000	BRONZE SAE 660	ASTM B505 MIL-B-16261-2
17	S.S. COTTER KEY 3/32 X 3/4 LG.	1	3605201	18-8 STAINLESS STEEL	ASTM A167, A240
18	IMPELLER NUT	1	5403434	18-8 STAINLESS STEEL	ASTM A167, A240
19	IMPELLER WASHER	1	3603319	303 STAINLESS STEEL	ASTM A581
20	IMPELLER	1	2907300	BRONZE 85-5-5-5	ASTM 62-82
21	IMPELLER KEY	1	3602405	316 STAINLESS STEEL	ASTM A276
22	PUMP CASING GASKET	1	3801800	CLOTH INSERTED NATURAL RUBBER	ASTM D2000-4AA515A13B13
23	STUFFING BOX	1	2156400	BRONZE SAE 660	ASTM B505 MIL-B-16261-2
24	INBOARD HEAD	1	2801207	AL319	ASTM SC64D MIL-A-8625F
25	S.S. HEX HEAD CAP SCREW M8 X	4	5400807	18-8 STAINLESS STEEL	ASTM A167, A240
	1.25 X 25MM				
26	WATER SHIELD	1	3203700	316 STAINLESS STEEL	ASTM A276
27	IMPELLER SHAFT	1	5000904	316 STAINLESS STEEL	ASTM A276
28	S.S. RETAINING PIN - SPRING PIN 3/16 X 1 1/2 .	1	3605024	18-8 STAINLESS STEEL	ASTM A167, A240
29	OIL SEAL	1	3600557	CLIPPER 0150-09831	
30	S.S. HEX HEAD CAP SCREW 5/16NC X 7/8 LG.	8	5400640	18-8 STAINLESS STEEL	ASTM A167, A240
31	MOUNTING PAD	4	4021300	MOLDED HARDCAST 116 PLASTIC	ASTM D638, D648, D790

32 S.S. HEX NYLOC NUTS 5/16 NC 8 5403400 18-8 STAINLESS STEEL ASTM A167, A240 33 DIESEL ENGINE 1 4215912 YANMAR L100N ASTM A167, A240 34 S.S. HEX NUTS 3/8 NC 4 5403003 18-8 STAINLESS STEEL ASTM A167, A240 35 S.S. FLAT WASHER 3/8 2 3603809 18-8 STAINLESS STEEL ASTM A167, A240 36 S.S. HEX HEAD CAP SCREW 3/8NC X 4 5400619 18-8 STAINLESS STEEL ASTM A167, A240 37 BASE 1 1683000 6061T6 ALUM TUBE & ANGLE ASTM B241 & B210 38 EXHAUST GASKET 1 3819700 YANMAR 114650-13200 39 LOCKWASHER, M8 4 3603528 18-8 STAINLESS STEEL ASTM A167, A240 40 S.S. HEX NUT M8 2 5403105 18-8 STAINLESS STEEL ASTM A167, A240	
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37 BASE 1 1683000 6061T6 ALUM TUBE & ANGLE ASTM B241 & B210 38 EXHAUST GASKET 1 3819700 YANMAR 114650-13200 39 LOCKWASHER, M8 4 3603528 18-8 STAINLESS STEEL ASTM A167, A240 40 S.S. HEX NUT M8 2 5403105 18-8 STAINLESS STEEL ASTM A167, A240	
38 EXHAUST GASKET 1 3819700 YANMAR 114650-13200 39 LOCKWASHER, M8 4 3603528 18-8 STAINLESS STEEL ASTM A167, A240 40 S.S. HEX NUT M8 2 5403105 18-8 STAINLESS STEEL ASTM A167, A240	
39 LOCKWASHER, M8 4 3603528 18-8 STAINLESS STEEL ASTM A167, A240 40 S.S. HEX NUT M8 2 5403105 18-8 STAINLESS STEEL ASTM A167, A240	
40 S.S. HEX NUT M8 2 5403105 18-8 STAINLESS STEEL ASTM A167, A240	
41EXHAUST SILENCER11220901316 STAINLESS STEELASTM A276	
42 SAFETY WIRE, .041 X 14" 2 4423600 302/304 STAINLESS STEEL QQ-W-423B MS-2099	
43 HEX BOLT, ¼-20NC X 1.25 4 5400635 GRADE 8 STEEL ASTM A354	
44 LEVER NUT - TOP LOCK - S.S. 1/2NC 1 5403457 18-8 STAINLESS STEEL ASTM A167, A240	
45 LEVER 1 3009400 316 STAINLESS STEEL ASTM A276	
46 PACKING NUT 1 5403458 360 BRASS ASTM B16	
47PACKING RING23603913GRAPHITE PACKINGASTM F104 F517100B	МЗ
48 PRIMER BODY 1 2055700 81-3-7-9 CAST BRASS ASTM B505-82A	
49 PRIMER GASKET 1 3805601 S1200 CARBON FIBER ASTM F104-F112231-1	7
50 PRIMER JET 1 4416704 81-3-7-9 CAST BRASS ASTM B505-82A	
51 PRIMER PLUG 1 4421600 360 BRASS ASTM B16	
52 END CAP 1 1002000 81-3-7-9 CAST BRASS ASTM B505-82A	
53 PRIMER THROAT 1 4416806 360 BRASS ASTM B16	
54 S.S. HEX HEAD CAP SCREW 2 5400801 18-8 STAINLESS STEEL ASTM A167, A240	
M8X1.25X16MM	
55PACKING SCREW12156200303 STAINLESS STEELASTM A581	
56 GLAND NUT 1 2150300 360 HEX BRASS ASTM B16	
57GLAND STUD PISTON12154500303 STAINLESS STEELASTM A581	
58 SCREW- DRIVE, #4 X 1/4 4 5402820 ALUMINUM	
59S.S. SOCKET HEAD CAP SCREW1540140018-8STAINLESS STEELASTM A167, A2401/4NC X 3/8 LG11540140018-8STAINLESS STEELASTM A167, A240	
60 IDENTIFICATION TAG 1 1969000 BRASS ASTM B36-91A	
61 PACKING, PLASTALLIC COMPOSITE 6 3817104 DARLEY PLASTALLIC PACKING NA	
62 PACKING CYLINDER 1 2150800 360 HEX BRASS ASTM B16	
63 SUPPORT BRACKET 1 4026300 316 STAINLESS STEEL ASTM A276	
64 DISCHARGE HEAD GASKET 1 3800800 CLOTH INSERTED NATURAL RUBBER ASTM D2000-4AA515A	3B13
65 S.S. STUD 3/8NC X 1 1/2 LG. 4 3606208 18-8 STAINLESS STEEL ASTM A167, A240	
66 CHECK VALVE SEAT 1 5260001 360 BRASS ASTM B16	

REP NO.	NAME OF PART	QTY	PART NO.	MATERIAL	STANDARDS
67	CHECK VALVE DIFFUSER	1	5300003	316 STAINLESS STEEL	ASTM A276
68	CHECK VALVE RUBBER	1	3800203	CLOTH INSERTED NATURAL RUBBER	ASTM D2000-4AA515A13B13
69	CHECK VALVE PLATE	1	5280202	316 STAINLESS STEEL	ASTM A276
70	S.S. JAM NUT 5/16NF	2	5403204	18-8 STAINLESS STEEL	ASTM A167, A240
71	CHECK VALVE STEM	1	5240103	316 STAINLESS STEEL	ASTM A276
72	THREAD PROTECTOR	1	1001600	H.I. STYRENE	ASTM D 638
73	DISCHARGE ADAPTER	1	1602400	60-0-2-38 BRASS	ASTM B124-86
74	DISCHARGE HEAD	1	2800509	AL 319	ASTM SC64D MIL-A-8625F
75	VALVE STEM	1	5240005	360 BRASS	ASTM B16
76	DISCHARGE HEAD STUFFING BOX GASKET	1	3800400	CLOTH INSERTED NATURAL RUBBER	ASTM D2000-4AA515A13B13
77	STUFFING BOX WASHER	1	3603701	360 BRASS	ASTM B16
78	CHECK VALVE STEM PACKING 1/8" X 13"	1.08	4404000	GARLOCK STYLE 8909	NA
79	GLAND NUT	1	2150601	360 HEX BRASS	ASTM B16
80	SOCKET SET SCREW, .25-20 NC	1	5402603	18-8 STAINLESS STEEL	ASTM A167, A240
81	HANDWHEEL	1	3001801	ZINC	
82	DECAL - OPEN/CLOSE	1	1962102	LEXAN	
83	EXHAUST HOSE AND CLAMP	2	4402311		

W.S.Darley&Co. Darley Pump Standard Limited Warranty

replace, in whole or in part, any Darley Pump (hereafter, Pump") which Darley determines to be defective in materials or workmanship produced or performed by Darley, for a period commencing on the date such Pump is shipped to Customer from Darley's plant (the "Ship Date") and ending on the earlier of (one) year or 1000 hours of pump usage following the ship N.S. Darley & Co.("Darley") warrants to the original purchaser (the" Customer") only, subject to the terms and conditions of this Limited Warranty, that Darley will, at its option, repair or date (the "Warranty Period"). Darley may also, at its discretion, elect to refund the purchase price to the Customer in lieu of any repair or replacement. Original Equipment Manufacturer "0EM") Customers may transfer this warranty to their end purchasers without the written consent of Darley, provided such 0EMs identify such customers by written notice to Darley. This warranty does not cover any parts or equipment which may be included in a Pump, but which are not manufactured by Darley, and such non-covered items shall carry only such warranties, if any, made by their respective manufacturers and assignable to Customer. This warranty further excludes any coverage of damage or loss to any equipment or structures in which a Pump in incorporated or to which a Pump may be attached, as well as any damage to or failure of Pump caused by or related to misuse, accident, failure to maintain or service, abuse, negligence, applications which exceed Darley's recommended limitations, or in the event of Customer's unauthorized or improper modification(s) of a Pump (and regardless of any actual or constructive knowledge Darley may have of such modifications), or in the event a Pump has been repaired, altered, or treated by anyone other than Darley-trained technicians. The following repairs or replacement expenses are specifically excluded from the scope of this warranty: non-defective parts worn, exhausted or consumed through normal usage; consumable parts subject to routine replacement, including but not limited to pump packing, O-rings, gaskets, intake screens, anotes or filters; and routine maintenance specified in the operator's manual. Customer shall notify Darley in writing within the Warranty Period of any claim under this Warranty, to Darley's Itasca, Illinois office (except as otherwise directed), and the Customer shall comply with Darley's reasonable claim documentation and processing according to Darley's Returned Good's Authorization form and procedures, which should be requested when making a warranty claim.

other expenses of repairing or replacing defective products or workmanship, all such costs of which shall be billed to Customer. Any repaired Pumps or replacement parts shall also be Within 30 days of Customer's receipt of a Returned Goods Authorization, Customer shall return the Pump or claimed defective component thereof to Darley F.O.B Darley's designated plant. Customer shall bear all of its own costs of dismantling, removing, shipping, storing, insuring and reinstalling Pumps or parts thereof which are submitted to Darley for warranty or refund the price thereof. The amount of any refund shall not exceed Customer's purchase price. No reimbursement or allowance will be made to Customer for Darley's labor costs or evaluation. Darley shall within a reasonable time examine the returned item and determine whether such item is defective, and at Darley's election, whether to repair, replace, recondition covered by this limited warranty, subject to the same original Warranty Period (which shall not be extended by reason of any repair or replacement). This limited warranty shall be Customer's sole & exclusive contractual remedy for any defect or failure of a Pump or component, and as such excludes any remedy or cause of action in tort or contract against Darley or any of its suppliers or distributors for liability to Customer or to any other person for any incidental, consequential, or other damages (including but not imited to personal injury; death; property damage due to fire, water or any other cause; loss of crops, timber or wildlife; loss of time or interruption of operations or related costs; delays; regardless of the reason for such damage, loss or injury. Under no circumstance will Darley's liability for any claim hereunder, including for breach of warranty or any cause of action demurrage; lost profits; or indirect or special damages) arising out of or relating to the use (including any malfunction) or inability to use any original, repaired, replaced, or substitute Pump, related to an alleged breach of this warranty, exceed Customer's purchase price for the Pump or component thereof which is the subject of this warranty. THIS LIMITED WARRANTY IS THE ONLY WARRANTY MADE BY DARLEY, AND IS IN LIEU OF ANY OTHER WARRANTIES, WETHER EXPRESS OR IMPLIED, ANY OF WHICH ARE DISCLAIMED, INCLUDING NOT LIMITED TO WARRANTIES OF MECHANTIBILTY, OF FITNESS FOR A PARTICULAR PURPOSE, OR FREEDOM FROM THE PATENT INFRINGMENT. CUSTOMER ASSUMES ALL RISK OF USING ALL PUMPS FOR ALL FORSEEN AND UNFORSEEN PURPOSES. CUSTOMER'S REMEDIES CONTAINED HEREIN ARE EXCLUSIVE.

modifications to this standard limited warranty agreed to by Darley and Customer (including but not limited to the Darley Pump Premium Protection Plan). Any bad faith invocation of a All terms of this limited warranty are subject to the standard W.S. Darley & Co. purchase contract standard terms and conditions in effect at the time if sale, and to any written warranty claim, or customer's breach of purchase contract (including OEM breaches), will void Darley obligations to Customer hereunder. The scope and operation this limited warranty shall be interpreted under Illinois law.

W.S. Darley and Company · 325 Spring Lake Drive · Itasca, IL 60143-2072



Warranty Activation & Extended Warranty Application

Fire De	pt./Purchasers name:		
Contact	t: Pho	ne:() -	
	Optional F	ax: <u>()</u> -	
Address	S:		
City:		_ State: Zip Code:	
Country	y:		
Pump M	Model:	Pump serial number:	
Date pu	Imp shipped:	_Date placed into service:	
Manufa (not require Warrant	ty Type:		
0	Standard - 3 Year		
0	1 Year Warranty		
0	2 Year Warranty		
Premiur	m Protection Plans		
0	Darley 5 Year Plan - \$2,000. ⁰⁰		
0	Darley Platinum Plan - Lifetime - \$	65,000. <u>00</u>	
Purchas	se Authorizing Signature:	Date:	
Please mak	the full payment to Darley & Co. in U.S. dollars by	valid Check or Money Order. Please mail this application,	& full

Please make full payment to Darley & Co. in U.S. dollars by valid Check or Money Order. Please mail this application, & full payment (if applicable) to the Darley & Co. Extended warranty purchases will not be processed until full payment has been made. To validate warranty, or to purchase an extended warranty, this application must be filled out, & received by Darley & Co. within 90 days of purchase.

For product & quality improvement, please make comments below:_____





PUM	IP OUFSTIONAIRE
End User name:	
Address:	
City:	State: Zip Code:
Contact:	Title:
Phone ()	Fax (
Delivery Date:	Pump Model:
Manufacturer of truck body:	
Pump Serial #	_
s this your first Darley Pump? Ye	es () No ()
f no, how many do you have?	
How satisfied are you with your pu	<pre>ump(s) Completely () Very () Somewhat ()</pre>
f you are not satisfied with your pu	ump(s) please explain:

Thank You. Please return to: Darley Company C/O Jim Darley



PARTS CATALOG

Published

2011/1 (Jan.)

0CW10-G70600

PREFACE

- 1. This Parts Catalog carries all parts incorporated in YANMAR Model L100N6CF1T1AA engine manufactured since January, 2011.
- 2. Each illustration corresponds to the parts list on the following page.
- 3. When ordering parts, clearly write down the engine model and serial number, as well as the name and number of each part in your order sheet. This will help insure reliable delivery of the parts you have ordered.

Directions for the Parts Catalog.

- 1. The parts stipulated in this Parts Catalog are not necessarily standard equipped parts.
- 2.Parts may change without prior notice.
- 3. The following is an example of the Parts Catalog format.

		PARTS NO		DESCRIPT	(C)=4JH-DTZP	ļ		(E)= (F)= Q'	TY	21		¥
				DECONT		(Å)	(B)	(C)	(D)	(E)	(F)	•
1	1	729595-51390	FUEL IN	JECTION PUMP		1	1	1	1	1		
1-1	1	729595-51391	FUEL IN	JECTION PUMP		1	1	1	1	1		Ν
	(Å=E00	<u>(B=E0</u>)	00200)									
3	1 2	26022-060162	SCREW	/ M 6X 16		9	9	9	9	9		
3-1	(4) 2	26022-060162	SCREW	/ M 6X 16		4	4	4	4	4		Κ
	(A=E00	(B=E0	00156)	(C=E00156)	(D=E00156)	(E	=E001	56)				
4	2	129470-51040	CAMSH	IAFT		1	1	1	1	1		
5	2	122710-51050	BEARIN	IG, ROLLER		2	2	2	2	2		
6	2	129470-51060	RETAIN	IER		1	1	1	1	1		

1 Ref. No.

The Ref. No. listed may not be in accordance with the illustration Ref. No.

List Ref No.

1 (Before change) – 1-1 (After change)

For interchangeable symbols N, R and K, illustrations for new parts may be abbreviated.

2 Lev. (Level)

(Ex.)

Level indication

The numbers below indicate the level of relativity towards the main part.

1 ----- Main parts (Assembly parts)

Illustration No.

2 ----- Sub component included in " 1 ".

3 ----- Sub component included in " 2 ".

Note) Parts that are not for sale are partially illustrated but not listed.

③Interchangeability Mark

When a part change takes place, one of the following interchangeability symbols is indicated beside the part.

Symbol	Interchangeability	Contents note
Ν	$Old \xrightarrow{Yes} New$	New Part is interchangeable for Old Part but Old Part is not interchangeable for New Part.
Q	$Old \xrightarrow{No} New$	New Part is not interchangeable for Old Part but Old Part is interchangeable for New Part.
R	$Old \xrightarrow[Yes]{Yes} New$	New/ Old Parts are both interchangeable.
S	Old $\xrightarrow{N_0}$ New	New/ Old Parts are both not interchangeable.
W		Part newly added.
Z		Part discontinued.
F		Not interchangeable by a single part but interchangeable together with related parts.
K		Changes only for used parts quantities.

(4) Effective Machine No.

When a part changes, the effective Machine No. will be indicated in the (A)-(F) column.

Product Symbol	Product No.	Product Symbol	Product No.
С	Clutch No. Compressor No.	F	Machine No. (Agricultural Equip.)
D	Drive No.	Μ	Machine No.
E	Engine No.		

Note 1) A date may follow the symbol. (Ex.) 1996.01

- Note 2) " XXXXX " and " ZZZZZ " are for parts that could not be predicted or for engine models that could not be identified.
- Note 3) (A=E00185) is the E (Engine Serial Number) for the column (A) model (in this case 4JH-DT) after the parts design change.

(5) Remarks Mark

Figures or alphabets (symbols) are entered in the remarks column.

The comments (remarks) on parts that are indicated at the bottom of the illustration are the same symbols as those stated above.

CONTENTS

Fig.No. GROUP NAME

L100N6CF1T1AA

1. CYLINDER BLOCK

2. CYLINDER HEAD & BONNET

3. AIR CLEANER & MUFFLER

4. CRANKSHAFT, PISTON & CAMSHAFT

5. LUB.OIL PUMP & GOVERNOR

6. COOLING & STARTING DEVICE

7. F.I.PUMP & F.I.VALVE

8. FUEL TANK & FUEL PIPE

9. TOOL, LABEL & GASKET SET

Fig.No. GROUP NAME

OCW10-G70600 Fig.1. CYLINDER BLOCK



0C	W10-G7	0600 ·	1. CYLINDE	R BLOCK							
				()	A)=L100N6CF1T1AA		(D)=				
				(1	3)=		(E)=				
				((-(c) =		(F)=				
	REF.	LEV.	PARTS NO.	DESCRIPTIO	N (A)					Ι	R
	4	4	444040.04000		(A)	(B)	(C) (D)	(E)	(F)		
	1	1	114310-01020	COVER (EO DUMP	1						
	5	1	114299-01030		1						
	0	1	114099-01360		1						
	0	1	114250-01841		1						
	0	1	114299-01600		2						
	9	1	26226-060182	STUD M 6X 18 PLATED	1						
	10	1	26226-060222	STUD M 6X 22 PLATED	2						
	11	1	26366-060002		3						
	12	1	114299-35150	PIPE, L.O. INLET	1						
	13	1	26106-080352	BOLT M 8X 35 PLATED	16						
	14	1	114299-01690	PLUG M16	2						
	15	1	114699-01760	CAP ASSY, LO SUPPLY	2						
	17	2	114299-01950	O-RING	2						
	18	1	22190-160002	WASHER, 16	2						
	19	1	114299-02030	RETAINER, BEARING	1						
	20	1	114650-02150	BALL BEARING	1						
	21	1	24162-152220	NEEDLE, 152220	1						
	22	1	24423-355008	SEAL, OIL	1						
	23	1	24423-355008	SEAL, OIL	1						
	24	1	26106-080122	BOLT M 8X 12 PLATED	1						
	25	1	114650-02200	MAIN BEARING US=0.25	1						2
	26	1	114650-02210	MAIN BEARING US=0.50	1						3
	27	1	114695-01341	GASKET, HEAD 0.5	1						
	28	1	114299-01800	SHIM SET	1						
	39	1	114699-01410	GASKET, CRANK CASE	1						
	40	1	114310-01450	COVER(D, CRANK CASE	1						
	43	2	114650-02100	BEARING, MAIN	1						1
	45	1	23876-010000	PLUG PT1/8,SCREW	1						
	46	1	22312-040080	PARALLEL PIN, M4X8	2						
	47	1	23875-020000	PLUG PT1/4,STEEL	1						
	48	1	114399-01700	COVER, STARTER	1						
	49	1	26106-100122	BOLT M10X 12 PLATED	2						

Remarks (1)Spare parts. (2)Under sized(U.S.=0.25)parts. (3)Under sized(U.S.=0.50)parts.

N:Old ^{Yes} New, Q:Old ^{No}→ New, R:Old ^{Yes} New, S:Old ^{No→} New, W:Add, Z:Discontinued, F:Interchangeable by set, K:Q'ty Change (C)Copy Rights YANMAR CO.,LTD.

OCW10-G70600 Fig.2. CYLINDER HEAD & BONNET



0CW10-G7	0600	2. CYLINDE	R HEAD & BONNET								
			(A)=	L100N6CF1T1AA		(D)=					
			(B)= (C)=	-		(E)= (E)=					
DEE				•		(') O''	тγ				Р
KEF.	LEV.	PARIS NO.	DESCRIPTION	(A)	(B)	(C)	(D)	(E)	(F)	I	ĸ
1	1	114310-01200	BOLT, CYL.HEAD A	2	<u> </u>	(-)					
2	1	114310-01210	BOLT, CYL.HEAD B	2							
3	1	114320-11020	HEAD ASSY, CYLINDER	1							
8	1	11431C-11100	VALVE, INTAKE	1							
9	1	11431C-11110	VALVE, EXHAUST	1							
10	1	114310-11120	SPRING, VALVE	2							
11	1	114310-11180	RETAINER, SPRING	2							
12	1	114310-11930	COTTER ASSY	2							
14	1	11431C-11250	SUPPORT ASSY, ROCKER	1							
15	2	11431C-11260	SUPPORT, ROCKER ARM	1							
16	2	22242-000150	CIRCLIP 15	2							
17	2	11431C-11650	ARM ASSY, INTAKE	1							
19	3	114250-11240	SCREW, VALVE ADJUST.	1							
20	3	26856-060002	NUT, M6	1							
21	2	11431C-11660	ARM ASSY, EXHAUST	1							
23	3	114250-11240	SCREW, VALVE ADJUST.	1							
24	3	26856-060002	NUT, M6	1							
25	1	114650-11340	SEAL, VALVE STEM	2							
26	1	104211-11370	CAP, VALVE	2							
27	1	114240-11450	PROTECTOR, NOZZLE	1							
28	1	114240-11550	SEAT, NOZZLE	1							
29	1	114699-11600	WASHER	2							
30	1	114210-11901	RETAINER, NOZZLE	1							
31	1	22351-040008	SPRING PIN 4X 8	1							
32	1	114310-11290	BOLT, SUPPORT	2							
33	1	26226-060552	STUD M6X 55 PLATED	2							
34	1	26366-060002	NUT M 6	2							
35	1	114310-11310	GASKET, BONNET	1							
36	1	114310-11950	BONNET ASSY, HEAD	1							
38	2	114210-03590	DECOMPRESSION ASSY	1							
41	2	114299-03640	SPRING, DECOMP.	1							
43	2	22312-030160	PARALLEL PIN, M3X16	1							
47	1	26106-060652	BOLT M 6X 65 PLATED	3							

N:Old <u>Ves</u> New, Q:Old <u>No</u> New, R:Old <u>Ves</u> New, S:Old <u>No</u> New, W:Add, Z:Discontinued, F:Interchangeable by set, K:Q'ty Change (C)Copy Rights YANMAR CO.,LTD.

Fig.3. AIR CLEANER & MUFFLER



0C	W10-G7	0600 (3. AIR CLEA	NER & MUFFLER								
					(A)=L100N6CF1T1AA		(D)=					
					(B)= (C)=		(E)=					
					(0)-		(,)-	τv				-
	REF.	LEV.	PARTS NO.	DESCRIPTI	ON (A)	(B)	(C)	(D)	(E)	(F)	I	R
	1	1	114310-12210	GASKET AIR CLEANER	1	(8)	(0)	(8)	(=)	(1)		
	2	1	114299-12300	U-NUT	3							
	3	1	114320-12550	CLEANER ASSY, AIR	1							
	4	2	114310-12010	BODY ASSY, AIR CLNR	1							
	8	2	114220-12500	COVER ASSY, AIR CLNR	. 1							
	11	2	114210-12560	NUT, WING	1							
	12	2	114210-12590	ELEMENT ASSY	1							
	15	2	114210-12600	LOCKING KNOB	1							
	16	1	26106-060402	BOLT M 6X 40 PLATED	1							
	17	1	26226-060352	STUD M 6X 35 PLATED	3							
	18	1	114310-13200	GASKET, MUFFLER	1							
	19	1	11431C-13550	MUFFLER ASSY	1							
	20	2	11431C-13560	MUFFLER	1							
	21	2	11431C-13700	COVER, MUFFLER A	1							
	22	2	11431C-13710	COVER, MUFFLER B	2							
	23	2	11431C-13720	BOLT, M6X6 FLANGE	10							
	24	1	26106-080202	BOLT M 8X 20 PLATED	2							
	25	1	26216-080182	STUD M 8X 18 PLATED	2							
	26	1	26366-080002	NUT M 8	2							
	27	1	114699-13800	EXTENSION, EXH.	1							

N:Old $\frac{\chi_{\text{res}}}{No^{+}}$ New, Q:Old $\frac{\chi_{\text{res}}}{\chi_{\text{res}}}$ New, R:Old $\frac{\chi_{\text{res}}}{\chi_{\text{res}}}$ New, S:Old $\frac{\chi_{NO}}{No^{+}}$ New, W:Add, Z:Discontinued, F:Interchangeable by set, K:Q'ty Change (C)Copy Rights YANMAR CO.,LTD.

ocw10-g70600 Fig.4. CRANKSHAFT, PISTON & CAMSHAFT



			(A)=L (B)=	100N6CF1T1AA	(D)= (E)=	:				
			(C)=		(F)=					
REF.	LEV.	PARTS NO.	DESCRIPTION		Q	ΤY			Т	R
				(A) (I	B) (C)	(D)	(E)	(F)		
1	1	71432C-14010	CAMSHAFT ASSY	1						
6	1	114310-14200	TAPPET	2						
 7	1	114210-14300	TAPPET ASSY, ROLLER	1						
12	1	114310-14400	ROD ASSY, PUSH	2						
13	1	11431C-21730	CRANKSHAFT ASSY,E-D	1						
 21	1	114699-21220	NUT	1						
22	1	114699-21550	WASHER, FLYWHEEL	1						
23	1	114699-21600	FLYWHEEL ASSY, DE	1						
 26	2	114699-21630	RING, GEAR	1						
27	1	22512-050140	KEY, 5X14	1						
28	1	160842-21150	KEY, 6.3X50	1						
29	1	160842-21250	BOLT 7/16-20UNF	1						
30	1	160842-21260	WASHER	1						
31	1	714320-22720	PISTON W/RINGS (D	1						
 33	2	714310-22500	RING SET, PISTON	1						
39	1	114699-22300	PIN, PISTON	1						
40	1	114310-22500	SEEGER RING, J23	2						
 41	1	71431C-23010	ROD ASSY, CONNECTING	1						
44	3	124060-23100	BUSH, PISTON PIN	1						
45	3	119810-23200	BOLT, CONNECTING ROD	2						
 46	2	714650-23600	BEARING, CRANKPIN	1						
48	1	714310-28510	SHAFT ASSY, BALANCER	1						
53	1	24101-063040	BALL BEARING	2						
54	1	714320-22620	PISTON W/RING .250S	1						1
56	2	714310-22540	RING SET O.S=0.25	1						1
60	1	714320-22580	PISTON W/RING .500S	1						2
62	2	714310-22550	RING SET O.S=0.50	1						2
66	1	714650-23610	BEARING,PIN(U.S=0.25	1						3
68	1	714650-23620	BEARING,PIN(U.S=0.50	1						4

^{0CW10-G70600} 4. CRANKSHAFT, PISTON & CAMSHAFT

Remarks (1)Over sized(U.S.=0.25)parts. (2)Over sized(U.S.=0.50)parts. (3)Under sized(U.S.=0.25)parts. (4)Under sized(U.S.=0.50)parts.

N:Old ^{Yes} New, Q:Old ^{No}→ New, R:Old ^{Yes} New, S:Old ^{No→} New, W:Add, Z:Discontinued, F:Interchangeable by set, K:Q'ty Change (C)Copy Rights YANMAR CO.,LTD.

Fig.5. LUB.OIL PUMP & GOVERNOR



				(A)=L100N6CF1T1A (B)=	A		(D)= (E)=					
				(C)=			(F)=					
REF.	LEV.	PARTS NO.	DESCRIPT	ON			Q'T	Υ			I	R
					(A)	(B)	(C)	(D)	(E)	(F)		
1	1	114650-32010	PUMP ASSY, LUB.OIL		1							
7	1	114299-32070	COVER, LUB. OIL PUMP		1							
8	1	114299-32570	O-RING, COVER		1							
9	1	22312-030160	PARALLEL PIN, M3X16		1							
10	1	26106-060122	BOLT M 6X 12 PLATED		3							
11	1	114299-35110	FILTER CMP, LUB.OIL		1							
13	2	24341-000224	O-RING 1A S-22.4		1							
14	1	26106-060162	BOLT M 6X 16 PLATED		1							
15	1	114311-61500	LEVER ASSY, GOVERNO	DR	1							1
24	2	22322-030200	TAPER PIN, 3X20		1							
25	1	714210-61701	GOVERNOR ASSY		1							
26	2	114210-61290	WEIGHT ASSY, GOVERN	OR	1							
31	1	114770-61520	BEARING,NEEDLE		2							
32	1	114299-61600	SEAL, OIL		1							
33	1	114770-61610	WASHER, THRUST		1							
34	1	114299-61190	WASHER, GOVERNOR		1						-	
35	1	714210-66100	SPEED CTRL, THAI		1							
36	2	114210-66060	HANDLE ASY, REGULAT	OR	1							
39	3	26117-050089	BOLT, M5X8		1							
40	2	114210-66100	BRACKET, REGULATOR		1							
41	2	114299-66440	BOLT, ADJUSTING		1							
42	2	114299-67080	BOLT. ADJUSTING		1							
43	2	160725-78350	KNOB, M6X15		1							
44	2	26347-060002	U-NUT M 6		1							
 45	2	26757-060002	NUT M 6		2							
46	1	114299-66250	SPRING. RETURN		1							
47	1	26106-060142	BOLT M 6X 14 PLATED		1							
48	1	26106-060202	BOLT M 6X 20 PLATED		1						-	
49	1	114320-66010	SPRING, REGULATOR		1							
50	1	114299-66200	SPRING, RETURN		1							
51	1	114320-66600	LIMITER ASSY, FUEL		1							
56	1	26776-100002	LOCK NUT M10 PLATED		1							
57	1	114780-61090	TIN		2							
58	1	22451-060000	WIRE, 0.6		2							

Remarks (1)On a guarantee of quality component part shall not be sold.

N:Old ^{4Yes} New, Q:Old ^{4No}/_{Yes} New, R:Old ^{4Yes}/_{Yes} New, S:Old ^{4No}/_{No} New, W:Add, Z:Discontinued, F:Interchangeable by set, K:Q'ty Change (C)Copy Rights YANMAR CO.,LTD.

^{0CW10-G70600} 5. LUB.OIL PUMP & GOVERNOR

OCW10-G70600 Fig.6. COOLING & STARTING DEVICE



0CW10-G7	⁷⁰⁶⁰⁰ (6. COOLING	& STARTING DEVICE						
			(A)=L	100N6CF1T1AA		(D)=			
			(B)= (C)=			(E)= (E)=			
DEE						(')- O'TY			Б
KEF.	LEV.	FARTS NO.	DESCRIPTION	(A)	(B)	(C) (D)	(E)	(F)	ĸ
1	1	11432C-45200	TOP COVER ASSY	1	. /			_ , ,	
2	2	114220-07120	LABEL, DECOMPRESSION	1					
3	2	183720-55210	GROMMET	4					
4	2	11431C-45300	COVER, TOP (BLACK) (13)	1					
5	3	11431C-45310	DAMPER	1					
6	2	114350-45340	COLLAR	4					
7	1	11431C-45260	COVER B, SIDE (13)	1					
8	1	11431C-45270	COVER A, SIDE (13)	1					
9	1	114399-45320	RUBBER, SEAL	1					
10	1	114399-45340	COLLAR, CYL.COVER	1					
11	1	114310-45350	SPACER, TOP COVER	1					
12	1	114310-45360	STUD BOLT, TOP COVER	1					
13	1	114299-45220	GROMMET, TANK	1					
14	1	26106-060082	BOLT M 6X 8 PLATED	4					
15	1	26106-060202	BOLT M 6X 20 PLATED	4					
16	1	26366-060002	NUT M 6	1					
17	1	11431C-45100	FAN CASE (GRAY)(2K)	1					
18	1	114299-45301	RUBBER, CUSHION	4					
19	1	114299-45310	COLLAR, FAN CASE	4					
20	1	114699-45331	SEAL, FAN CASE	1					
21	1	114299-45350	BOLT, FAN CASE	4					
23	2	114699-76251	RECOIL ASSY	1					
24	3	114699-76510	CASE, STARTER	1					
25	3	114699-76521	REEL, RECOIL	1					
27	3	114699-76531	RATCHET	2					
28	3	114399-76540	SPRING, SPIRAL	1					
29	3	114699-76551	GUIDE, RATCHET	1					
30	3	114699-76560	SPRING, FRICTION	1					
31	3	114399-76620	KNOB, STARTER	1					
32	3	114699-76630	ROPE, STARTER	1					
33	3	114699-76650	SPRING, RETURN	1					
34	3	114699-76660	RETAINING RING	1					
35	3	114699-76670	WASHER	1					
36	3	114699-76680	WASHER IN NYLON	1					
37	2	114699-76592	PULLEY, STARTER	1					
38	1	26106-060082	BOLT M 6X 8 PLATED	4					
39	1	26106-060122	BOLT M 6X 12 PLATED	3					

N:Old $\frac{Ves}{No^{+}}$ New, Q:Old $\frac{Vo}{Yes^{+}}$ New, R:Old $\frac{Ves}{Yes^{+}}$ New, S:Old $\frac{Vo}{No^{+}}$ New, W:Add, Z:Discontinued, F:Interchangeable by set, K:Q'ty Change (C)Copy Rights YANMAR CO.,LTD.

oCW10-G70600 Fig.7. F.I.PUMP & F.I.VALVE



				(A)=L100N6CF1T1AA (B)=		(D)= (E)=					
				(C)=		(E)=					
REF.	LEV.	PARTS NO.	DESCRIPTI	ON		Q'	TΥ			Т	R
				(A)	(B)	(C)	(D)	(E)	(F)	-	
1	1	714339-51200	F.I.PUMP ASSY	1							
2	2	105546-51020	GASKET	1							
3	2	114250-51080	PLATE	1							
4	2	114339-51100	BODY ASSY, PUMP	1							
10	4	22351-020006	SPRING PIN 2X 6	2							
11	2	114250-51160	SPRING, PLUNGER	1							
12	2	114650-51300	VALVE ASSY, DELIVERY	1							
15	2	105546-51330	SPRING, DELIVERY	1							
16	2	114250-51340	HOLDER, DELIVERY	1				-			
17	2	124550-51350	GASKET, DELIVERY	2							
18	2	114250-51600	LEVER ASSY, CONTROL	. 1							
19	2	114250-51640	SEAT, SPRING A	1							
20	2	114250-51650	SEAT, SPRING B	1							
21	2	22351-030008	SPRING PIN 3X 8	1							
22	1	714339-53200	FUEL INJECTOR	1							
23	2	114250-53080	NUT, CASE	1							
24	2	114339-53100	HOLDER ASSY, NOZZLE	1							
28	3	22351-025005	SPRING PIN 2.5AX 6	1							
29	2	114250-53120	SPRING, NOZZLE	1							
30	2	114250-53130	SEAT, SPRING	1							
31	2	114250-53140	PLATE, STOP	1							
32	2	114339-53200	NOZZLE ASSY	1							
35	2	114250-53210	PIN	2							
36	2	114250-53400	SHIM SET	1							

^{0CW10-G70600} 7. F.I.PUMP & F.I.VALVE

OCR10-G76200 Fig.8. FUEL TANK & FUEL PIPE



0CR10-G7	6200 (B. FUEL TAI	NK & FUEL PIPE							
				(A)=L100N5EF1C1JA (B)=		(D)≕ (E)=				
				(C)=		(F)=				
REF.	LEV.	PARTS NO.	DESCRIPT	ION		QTY			1	R
1	1	714310-55710	TANK ASSY FUEL OIL	(A)	(5)	(U) (U)	(E)	(F)		
3	3	114299-55080	PLUG DRAIN	1						
4	3	23414-080000	GASKET & ROUND	1						
5	2	114288-55041	CAP ASSY FUEL TANK	1				-		
7	3	114288-55081	VALVE	1						
8	2	114299-55100	FILTER, FUEL OIL	. 1						
9	2	114650-55150	PIPE, GAUGE							
10	2	114250-55201	DAMPER FUEL TANK	4						
11	2	114299-55450	CLIP. HOSE	2						
12	1	114250-55121	FILTER ASSY FUEL							
13	2	114250-55130	GASKET	1						
14	1	114210-55210	STAY A. FUEL TANK	1						
15	1	114310-55230	STAY B. FUEL TANK							
16	1	114250-55301	COCK ASSY, FUEL	1						
17	2	24341-000150	O-RING 1A S-15,0	1						
18	1	114210-55810	BOLT, LIFTING	1						
19	1	22117-080000	WASHER 8	1						
20	1	26106-060162	BOLT M 6X 16 PLATED	2						
21	1	26106-080452	BOLT M 8X 45 PLATED	1						
22	1	26366-060002	NUT M 6	2						
. 23	1	114780-59010	PIPE ASSY, FUEL OIL	1						
24	2	114780-59060	PIPE, FUEL OIL	1						
25	2	23080-014000	CLAMP 14	2						
26	1	114339-59300	PIPE ASSY, RETURN	1						
27	2	124722-59050	CLIP, HOSE	1						
28	2	114310-59060	PIPE, FUEL RETURN	1						
29	2	124066-59100	CLIP, HOSE	1						
30	2	114310-59310	HOSE, PROTECT	1						_
31	2	121750-59890	CLAMP 140	1						
32	1	114310-59800	PIPE ASSY, INJECTION	1						
38	1	114699-59850	SUPPORT, PIPE	1						_

N:Old ^{4Ves}/_{No}⊧ New, Q:Old ^{4No}/_{Yes} New, R:Old ^{4Ves}/_{Yes} New, S:Old ^{4No}/_{No}⊧ New, W:Add, Z:Discontinued, F:Interchangeable by set, K:Q'ty Change (C)Copy Rights YANMAR CO.,LTD. OCW10-G70600 Fig.9. TOOL, LABEL & GASKET SET



^{0CW10-G70600} 9. TOOL, LABEL & GASKET SET											
		,,	(A)	=L100N6CF1T1AA		(D)=					
			(B)	=		(E)=					
			(0	(F)=	T \/				_		
REF.	LEV.	PARTS NO.	DESCRIPTION	(Δ)	(B)	(C)	יז ו (D)	(E)	(F)	I	R
1	1	11/200-07100		(/\)	(D)	(0)	(D)	(Ľ)	(1)		
2	1	114299-07110	LABEL, AIR COOLED	1							
3	1	114220-07100	LABEL. CAUTION	1							
4	1	114220-07110	LABEL HOW TO START-E	1							
6	1	114299-07160	LABEL, DIESEL	1							
8	1	114220-07130	LABEL, HOT SURFACE	1							
9	1	114220-07160	LABEL, THAI	1							
10	2	114299-92590	TOOL ASSY	1							
11	2	114299-92600	TOOL BAG	1							
12	2	114299-92710	WRENCH	1							
13	2	114299-92720	WRENCH	1							
14	2	114299-92730	DRIVER	1							
15	1	114299-92740	FITTING, FUEL	1							
16	2	114320-92600	GASKET SET	1							1
17	3	114695-01330	GASKET ASSY,CYL.HEAD	1							
23	2	114699-01380	O-RING	1							
24	2	114699-01410	GASKET, CRANK CASE	1							
25	2	114299-01950	O-RING	2							
26	2	114250-01841	GASKET, COVER	1							
27	2	22190-160002	WASHER, 16	2							
28	2	114650-11340	SEAL, VALVE STEM	2							
29	2	114771-11461	GASKET, NOZZLE	1							
30	2	114310-11310	GASKET, BONNET	1							
31	2	114310-12210	GASKET, AIR CLEANER	1							
32	2	114310-13200	GASKET, MUFFLER	1							
33	2	114299-32570	O-RING, COVER	1							
34	2	23414-080000	GASKET 8, ROUND	1							
35	2	24341-000224	O-RING 1A S-22.4	1							
36	2	24341-000150	O-RING 1A S-15.0	2							
37	2	129100-77510	GASKET, AIR HEATER	3							
38	2	114699-12210	GASKET, CLEANER	2							
39	2	114399-21980	GASKET	1							
40	2	23414-120000	GASKET 12, ROUND	1							
41	2	160393-55050	GASKET, TANK CAP	4							
42	2	24311-000400	O-RING 1A P-40.0	1							
43	2	183671-13211	GASKET, PIPE	1							

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Remarks (1)Optional parts.

Part Number Index

All parts are stipulated in the order of part numbers.

(Depending on the area in which the part is used.)

This index will display the location of the part according to each part number.

MODEL : L100N6CF1T1AA PC NO : 0CW10-G70600

PARTS No. INDEX

PARTS No.	Fig.	Ref.No.		PARTS No.	Fig.	Ref.No.	PARTS No.	Fig.	Ref.No.	PARTS No.	Fig.	Ref.No.
104211-11370	2	26		114299-07100	9	1	114310-59060	8	24	114699-01380	9	23
105546-51020	7	2		114299-07110	9	2	114310-59310	8	26	114699-01410	1	39
105546-51330	7	15		114299-07160	9	6	114310-59800	8	28		9	24
114210-03590	2	38		114299-12300	3	2	114311-61500	5	15	114699-01760	1	15
114210-11901	2	30		114299-32070	5	7	11431C-11100	2	8	114699-11600	2	29
114210-12560	3	11		114299-32570	5	8	11431C-11110	2	9	114699-12210	9	38
114210-12590	3	12			9	33	11431C-11250	2	14	114699-13800	3	27
114210-12600	3	15		114299-35110	5	11	11431C-11260	2	15	114699-21220	4	21
114210-14300	4	7		114299-35150	1	12	11431C-11650	2	17	114699-21550	4	22
114210-55210	8	10		114299-45220	6	13	11431C-11660	2	21	114699-21600	4	23
114210-55810	8	14		114299-45301	6	18	11431C-13550	3	19	114699-21630	4	26
114210-61290	5	26		114299-45310	6	19	11431C-13560	3	20	114699-22300	4	39
114210-66060	5	36		114299-45350	6	21	11431C-13700	3	21	114699-45331	6	20
114210-66100	5	40		114299-55040	8	5	11431C-13710	3	22	114699-59850	8	34
114220-07100	9	3		114299-55080	8	3	11431C-13720	3	23	114699-76251	6	23
114220-07110	9	4		114299-55100	8	6	11431C-21730	4	13	114699-76510	6	24
114220-07120	6	2		114299-61190	5	34	11431C-45100	6	17	114699-76521	6	25
114220-07130	9	8		114299-61600	5	32	11431C-45260	6	7	114699-76531	6	27
114220-07160	9	9		114299-66200	5	50	11431C-45270	6	8	114699-76551	6	29
114220-12500	3	8		114299-66250	5	46	11431C-45300	6	4	114699-76560	6	30
114240-11450	2	27		114299-66440	5	41	11431C-45310	6	5	114699-76592	6	37
114240-11550	2	28		114299-67080	5	42	11431C-55710-1	8	1	114699-76630	6	32
114250-01841	1	7		114299-92590	9	10	114320-11020	2	3	114699-76650	6	33
	9	26		114299-92600	9	11	114320-12550	3	3	114699-76660	6	34
114250-11240	2	19		114299-92710	9	12	114320-66010	5	49	114699-76670	6	35
		23		114299-92720	9	13	114320-66600	5	51	114699-76680	6	36
114250-51080	7	3		114299-92730	9	14	114320-92600	9	16	114770-61520	5	31
114250-51160	7	11		114299-92740	9	15	11432C-45200	6	1	114770-61610	5	33
114250-51340	7	16		114310-01020	1	1	114339-51100	7	4	114771-11461	9	29
114250-51600	7	18		114310-01200	2	1	114339-53100	7	24	114780-59010	8	19
114250-51640	7	19		114310-01210	2	2	114339-53200	7	32	114780-59060	8	20
114250-51650	7	20		114310-01450	1	40	114339-59300	8	22	114780-61090	5	57
114250-53080	7	23		114310-11120	2	10	114350-45340	6	6	119810-23200	4	45
114250-53120	7	29		114310-11180	2	11	114399-01700	1	48	121750-59890	8	27
114250-53130	7	30		114310-11290	2	32	114399-21980	9	39	124060-23100	4	44
114250-53140	7	31		114310-11310	2	35	114399-45320	6	9	124066-59100	8	25
114250-53210	7	35			9	30	114399-45340	6	10	124550-51350	7	17
114250-53400	7	36		114310-11930	2	12	114399-76540	6	28	124722-59050	8	23
114250-55121	8	8		114310-11950	2	36	114399-76620	6	31	129100-77510	9	37
114250-55130	8	9		114310-12010	3	4	114650-02100	1	43	160393-55050	9	41
114250-55201	8	7		114310-12210	3	1	114650-02150	1	20	160725-78350	5	43
114250-55301	8	12			9	31	114650-02200	1	25	160842-21150	4	28
114299-01600	1	8		114310-13200	3	18	114650-02210	1	26	160842-21250	4	29
114299-01690	1	14			9	32	114650-11340	2	25	160842-21260	4	30
114299-01800	1	28		114310-14200	4	6		9	28	183671-13211	9	43
114299-01830	1	5		114310-14400	4	12	114650-32010	5	1	183720-55210	6	3
114299-01950	1	17		114310-22500	4	40	114650-51300	7	12	714210-61701	5	25
444000 00000	9	25		114310-45350	6	11	114695-01330	9	17	/14210-66100	5	35
114299-02030	1	19		114310-45360	6	12	114695-01341	1	27	/14310-22500	4	33
114299-03640	2	41	J	114310-55230	8	11	114699-01380	1	6	714310-22540	4	56

MODEL : L100N6CF1T1AA PC NO : 0CW10-G70600

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714310-2250 4 62 714310-2350 4 48 714310-2350 4 60 714320-22520 4 54 714320-22520 4 54 714320-22520 4 51 714320-22520 4 51 714320-22520 4 51 714320-22520 7 12 714320-22520 7 22 714320-22520 7 22 714320-22520 7 22 714320-22520 7 22 714820-23620 7 22 714850-23620 4 68



YANMAR CO.,LTD.

					Appendix A					
-			Allowable	Fuel Usage Table f	or Yanmar Indus	strial Engines, Fuel	Type (US)			
Diesel Diesel Fuel Type Ultra Low Sulfur Low Sulfur (ULSD) (LSD) (LSD)		Diesel Regular Sulfur	Heavy Distillate Fuel	Biodiesel	Blended Biodiesel (more than 20% mixed with LSD)	Blended Biodiesel (more than 5% but less or equal to 20% mixed with LSD)	Blended Biodiesel (less or equal to 5% mixed with LSD)	Jet Fuel (Kerosene type)	Jet Fuel (Gasoline type)	
Commercial Name in US	No.2-D S15 No.1-D S15	No.2-D S500 No.1-D S500	No.2-D S5000 No.1-D S5000	No.4-D	B100	B21 - B99	B6 - B20	B1 - B5	JP-8 JP-5	JP-4
Standard	ASTM D-975	ASTM D-975	ASTM D-975	ASTM D-975	ASTM D-6751	ASTM D-6751 ASTM D-975	ASTM D-6751 ASTM D-975	ASTM D-6751 ASTM D-975	MIL-T-83133 MIL-T-5624	MIL-T-5624
Industry Fuel Spec for Sulfur Content	< 15ppm < 0.0015%	< 500ppm < 0.05%	< 5000ppm < 0.5%	undefined	< 500ppm < 0.05%	< 500ppm < 0.05%	< 500ppm < 0.05%	< 500ppm < 0.05%	> 3000ppm > 0.3%	> 3000ppm > 0.3%
Yanmar Accepted Limits for Sulfur Content	< 100 < 0	00ppm 0.1%	< 5000ppm < 0.5%	n/a	n/a	n/a	< 1000ppm < 0.1%	< 1000ppm < 0.1%	< 5000ppm < 0.5%	n/a
Tier II										
NV1			•	-	-	-	Δ	•	Θ	-
NV2			•	-	-	-	Δ	•	Θ	-
NV3		•	•	-	-	-	Δ	•	Θ	-
All L-Series		•	•	-	-	-	Δ	•	Θ	-
Tier III & IT4										
NV1			•	-	-	-	Δ	•	Θ	-
NV2 w/o EGR		•	•	-	-	-	Δ	•	Θ	-
NV2 w/ EGR			-	-	-	-	Δ	•	-	-
NV3			-	-	-	-	Δ	•	-	-
All L-Series			•	-	-	-	Δ	•	Θ	-
•	Allowed									
•	Allowed with Restriction	ne *2								
Α	Allowed with Warranty	Exceptions *3								
-	Not Allowed									
*1 See section on Sulfur Co	ontent.									
*2 See section on Biodiese	I Fuel Usage.									
*3 See section on Jet Fuel	usage.									