



Sheppard Service Manual

**16B
Engine**

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Service Manual

SH-S-ENG16B

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SPECIFICATIONS

BORE	4 1/2"
STROKE	5"
CYLINDERS	4
PISTON DISPLACEMENT — CUBIC INCHES.....	318
PISTON SPEED @ 1200 R.P.M. — F.P.M.....	1000
STANDARD GOVERNOR REGULATION	7%
FULL PRESSURE LUBRICATION	YES
FORCED CIRCULATION COOLING	YES
CAMSHAFT	GEAR DRIVEN
ELECTRIC STARTING SYSTEM	12 VOLT
EXHAUST PIPE DIAMETER	2"
NUMBER OF MAIN BEARINGS	5
DIAMETER OF MAIN AND CRANK PINS.....	3 3/16"
CRANKCASE OIL CAPACITY	16 QTS.
WEIGHT — FAN TO FLYWHEEL.....	1375
WEIGHT — STANDARD POWER UNIT.....	1575
WEIGHT — ENCLOSED POWER UNIT.....	1725

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wrapping with asbestos or other heat resisting material. This wrapping will prevent excessive condensation in the pipe. This is particularly important where the pipe runs vertical to and above the engine. Excessive condensation might run back into the engine. Water collecting in the cylinder may cause bending of the connecting rod as well as damage to rings and cylinder.

Sections of flexible exhaust tubing can be obtained from the factory for use in making long bends or for use when the engine is mounted on vibration dampers.

2. HEAT EXCHANGER COOLED UNITS —

When a heat exchanger cooled engine is installed on shipboard, the exhaust pipe should be 3" in diameter, insulated its full length and passed out through the hull with a heat insulated connection. If the length of 3" pipe used exceeds 10 feet, it will be desirable to increase the size of the pipe to 3 1/2" or more, most particularly if any bends are essential. Under no circumstances should anything but long turn 90° or 45° ells be used. Whenever possible, turns should be limited to 45°. If sea water is passed out through the exhaust pipe, the diameter of the pipe should be increased one size at the point where the water enters the exhaust line. Wherever the exhaust line passes through the hull at a point subject to being covered by water when the vessel rolls, a check valve or water trap should be supplied. Water in the cylinder may lead to connecting rod bending as well as damage to rings and cylinder.

In general, it is necessary to insure that the exhaust line is as short as is conveniently possible and that the end of the pipe or the pipe itself is so arranged that water cannot enter the pipe and run back toward the engine when it is not operating.

D. FUEL SUPPLY SYSTEM

1. GRAVITY FEED—The following illustration (Fig. 3) may be referred to for the proper connections of the gravity feed fuel system. If the tank is not mounted on the engine the bottom of the fuel tank should be located at least one foot above the valve cover of the engine but the upper fuel level should not be more than ten to fifteen feet above the valve cover. Higher tanks than this may cause fuel to leak through the check valves into the engine cylinder. This will cause a smoky exhaust, or when the engine is not running may fill the cylinder with fuel thus causing breakage when the engine is started. You will note the line runs from the tank through a valve to the fuel filter and from the fuel filter to the fuel injection pump manifold.

2. FUEL TRANSFER PUMP—The fuel piping is illustrated in (Fig. 3A). The diaphragm type fuel transfer pump is mounted on the drive end of the fuel pump and governor assembly. It is driven by means of a pushrod and cam follower, which rides a cam on the fuel pump outer shaft. This pump con-

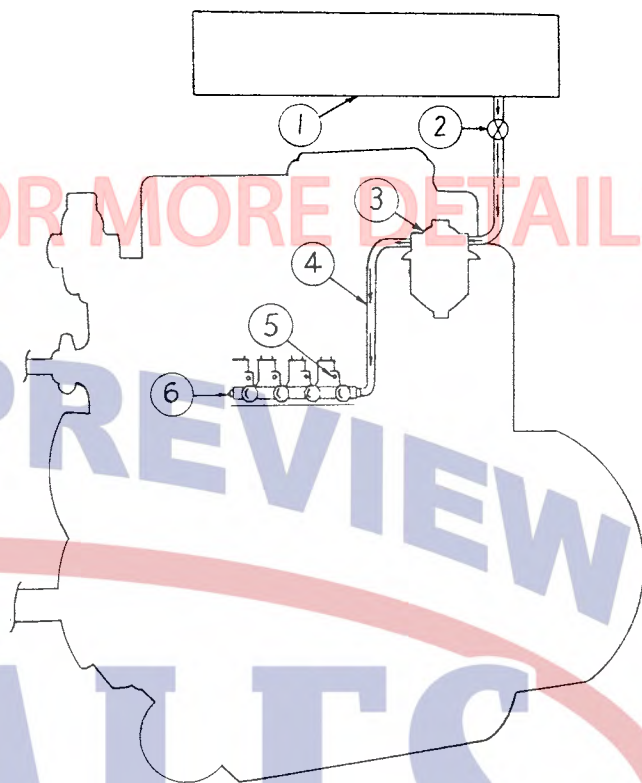


Figure 3 — Fuel Supply Piping, Gravity Feed

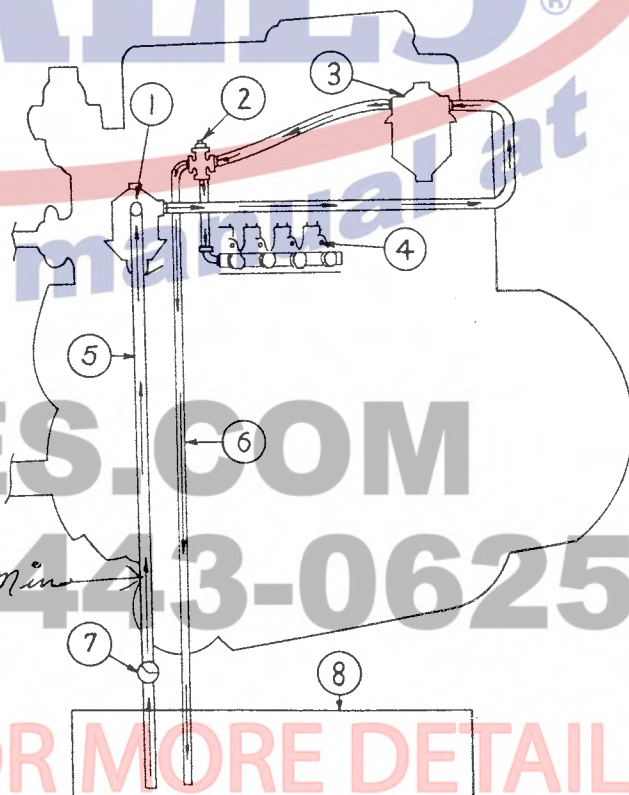


Figure 3A — Fuel Supply Piping, Fuel Transfer Pump

tains a valve which may be opened to remove water as necessary.

Your attention is called to the fact the illustration shows both suction and return lines going to the bottom of the fuel tank with a ball check valve located in the suction line. If the lines are not installed in this manner, some difficulty in starting the engine may be experienced, since over a period of time the fuel may drain from the suction line. The bypass line connecting into the tee located on top of the fuel pump manifold contains a restrictor fitting with a .070" orifice which acts as a continuous bleed to remove any small amount of air trapped in the fuel.

E. ELECTRICAL SYSTEM—The batteries should be placed in a box raised several inches from the floor and placed as close to the engine as possible. 3-0 battery cable should be used when the batteries are located within three to four feet of the engine and for longer runs, 4-0 should be used. The starting motor is a 12 volt motor. Therefore, two 6 volt batteries or one 12 volt battery are necessary. The batteries normally supplied are of 200 ampere hour

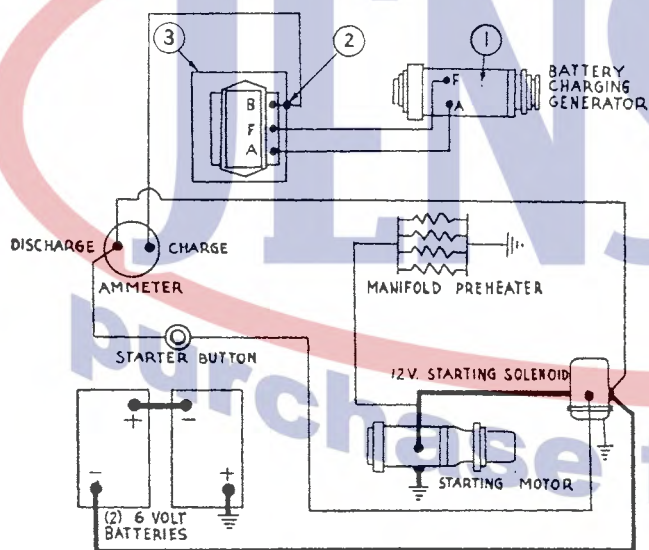


Figure 4 — Wiring Diagram

capacity. If the engine is going to be used under very cold starting conditions, batteries with larger capacity will give more rapid starting. In making the battery connections, reference should be made to the wiring diagram (Fig. 4) to insure proper connections.

F. SAFETY CONTROLS — The safety controls should be installed with the solenoid valve located in the fuel supply line between the fuel filter and the fuel injection pump. The electrical connections for this control are illustrated on the wiring diagram Fig. 5.

G. ENGINE SPEED CONTROL—The engine may be provided with one of two types of throttle con-

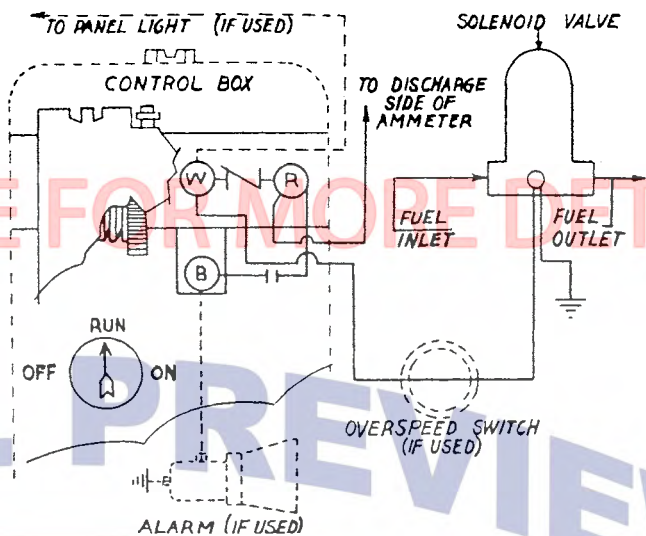


Figure 5 — Wiring Diagram, Safety Controls

trols. The first is a lever type throttle (Fig. 1 - No. 13) which is the most satisfactory where variable speeds are required. The lever type throttle is set so that when the throttle is pulled fully out, it will operate at rated RPM under full load. The lever type throttle is provided with friction washers, which allow it to be positioned at any desired speed from full speed to stop. Where remote starting is desired for the engine either to the load demand, remote station starting, or manual remote station starting control panel, a hydraulic throttle is supplied with the engine. This hydraulic throttle operates from the engine oil pressure. The cranking of the engine builds up sufficient oil pressure to move the throttle in. The engine starts and then operates at its original speed setting, whatever it might be. For 110 volt 60 cycle current on a generator set, this would be 1200 or 1800 RPM. For other speeds it would have exact setting desired.

If safety controls are installed in conjunction with a hydraulic throttle only the high water temperature shutoff connected in series with the hydraulic throttle solenoid valve is necessary. Lack of oil pressure will allow the hydraulic throttle to shut the engine down. The high water temperature cutoff will open the solenoid valve circuit thus shutting off the supply of oil to the throttle and cause stopping of the engine.

The engine may also be operated and governed at speeds lower than 1800 RPM. It is practical to run the engine as low as 1000 RPM if only part of its power is desired, as this engine is governed at all operating speeds.