Operator's Instruction Manual

310 E Utility Crawler Diesel Engine

(Also applies to Model 420 C Crawler)

This Supplemental Manual to be Used in Conjunction with
Model 310E Gasoline Crawler Operator's Instruction Manual

9-70312

J. I. CASE CO. RACINE, WISCONSIN U.S.A.

FUEL SYSTEM

Fuel Injection Pump	Roosa-Master
Fuel Injectors	Long Stem Multi-Hole — C.A.V.
Fuel Transfer Pump	Vane Type (Integral Part of Injection Pump)
Governor	Mechanical, Flyweight (Integral Part of Injection Pump)
Fuel Filters	Replaceable Elements
Moisture Trap	Sediment Bowl under Fuel Tank
Cold Weather Starting Aid	Electric Heat Plugs
Fuel Required	No. 2 Diesel Fuel
Pump Timing	8° B.T.D.C.
Nozzle Opening Pressure (new)	2500 P.S.I.
(after 50 hours use)	2250 P.S.I.

ELECTRICAL SYSTEM

Type of System	12 Volt — Positive Ground
Batteries (dry charge type - 2 req.)	6 Volt, 105 Amp. Hr., Group I, Connected in Series
Generator (2 brush type)	12 Volt, With Full Ventilation
Electrical Switch	Includes Key Starting
Starting Motor	12 Volt with Attached Solenoid Switch
Voltage Regulator	12 Volt — Automatic Type
Manifold Heaters (4)	12 Volt — 450 Watt (ea.)
Lights	12 Volt

APPROXIMATE CAPACITIES

U.S. Measure

Cooling System	12 Quarts
Crankcase	5-1/2 Quarts
(with filter change)	6 Quarts
Air Cleaner Oil Cup	1 Quart
Fuel Tank	17 Gallons
(Backhoe Models)	10 Gallons

IMPORTANT: J. I. Case Company reserves the right to change these specifications without notice and without incurring any obligation relating to such changes.

tions result in moisture condensation in the engine which unites with the sulphur to form destructive acids. High sulphur content in the fuel will cause:

1. Excessive engine wear;

2. Formation of harmful deposits on valves, rings, pistons, and cylinder sleeve walls;

3. Possible corrosive damage to the fuel system.

EXTRA HEAVY DUTY MOTOR OIL: To keep the engine free of harmful deposits and to counteract any destructive acids that may be formed, an "Extra Heavy Duty", additive-type, crankcase oil must be used. Use a good grade crankcase oil meeting A.P.I. service designation DS (Series 3) under all types of operating conditions.

USE SERVICE DS MOTOR OIL ONLY

Ash

Ash is the percentage of harmful non-combustible material in the Diesel fuel. A fuel containing a higher maximum ash content than 0.01% can damage the extremely close fitting parts in the fuel injection system.

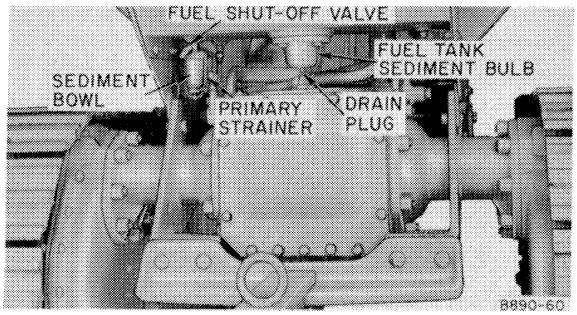

Figure 11 - Fuel Shut-Off Valve and Sediment Bowls

Careful attention must be given to proper "run-in" procedure. Piston rings and cylinder sleeves may be damaged in a new engine, if "run-in" instructions are not followed. The following procedure is recommended:

LOAD. For the first 50 hours, maintain a normal load. Do not "baby" the engine, but under no conditions "lug" it. Engine must not be "lugged" down below its full governed engine speed.

ENGINE SPEED. During "run-in" period always operate the engine at full governed R.P.M. (throttle wide open). Avoid idling at reduced speed.

OPERATING TEMPERATURE. Maintain temperature at recommended levels. Low operating temperatures contribute to the formation of destructive acids and harmful deposits in the engine.

CRANKCASE OIL. Drain "run-in" oil and remove crankcase oil filter cartridge after the first 20 hours of operation. Install new filter cartridge and refill crankcase with recommended grade of oil.

GENERAL PRECAUTIONS

A Diesel Engine is relatively simple in operation. The principle, in brief, is the high compression of the Diesel, heats the air to approximately 900^{O} to 1000^{O} F. The injection pump, dispenses a metered charge of fuel at the precise instant the piston is in its proper position. The charge of Diesel Fuel is instantly ignited when released into this heated air.

Therefore, because of the simplicity of the Diesel Engine in operation, there are only three things to keep in mind, however, these three are extremely important:

1. CLEAN FUEL. Store, strain (filter) and handle Diesel Fuel carefully. Prevent any dirt, moisture, etc., from getting into the fuel system. Be sure to wipe away all dirt from fuel tank cap, filling nozzles, container, and funnel. HANDLE THIS FUEL AS THROUGH YOU WERE GOING TO CONSUME IT YOURSELF.

Final Stage Filter

This filter consists of a filter body (with air vent plug) secured to the side of the engine block, a replacement element (with two gaskets) and a sediment bowl (with drain plug).

Drain water from sediment bowl EACH MORNING, see Figures 15 and 16. In cold weather, drain bowl at end of each day's operation to prevent moisture from freezing in bowl.

Loosen drain plug enough to allow accumulated moisture to escape, then retighten BY HAND.

To replace the filter element, close the shut-off valve under the fuel tank, see Figure 11. Unscrew the sediment bowl by hand — DO NOT USE WRENCH OR PLIERS.

Carefully wipe all traces of dirt or grit from lower face of filter body, being extremely careful not to force foreign matter into outlet opening. Clean and inspect transparent bowl — replace if nicks are noted around rim of bowl.

Install a new filter element (with gaskets in place), under filter body. Push filter element upward and rotate several times to ensure a proper seat against the body, while the bowl is being installed. Do not attempt to tighten this assembly by using a wrench or pliers on drain plug.

Open shut-off valve and allow fuel to run out until a bubble-free flow is observed. If excessive air has entered system, it may be necessary to bleed the entire fuel system, see "Priming the Fuel System".

COOLING SYSTEM

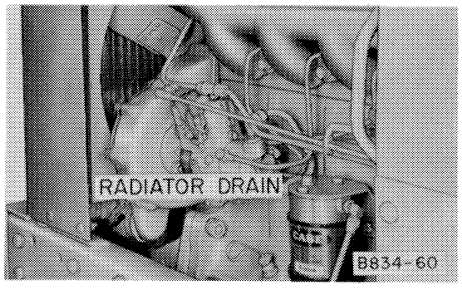

Figure 19 - Radiator Drain

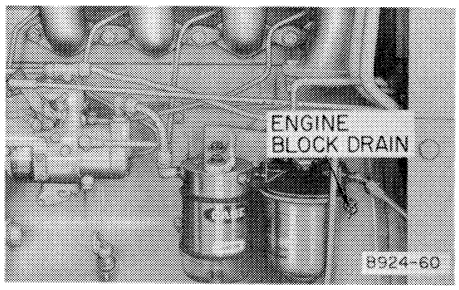

Figure 20 - Engine Block Drain

See Figures 19 and 20 for location of Radiator and Engine Block Drains.

Refer to the gasoline Crawler Operator's Instruction Manual for additional information on the cooling system.