FORKLIFT

SERVICE MANUAL

HLF15-5

HYUNDAI

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Trouble symptom	Probable cause	Remedy
Lamps dimming even at max engine speed.	· Faulty wiring.	· Check for loose terminal and disconnected wire.
Lamps flicker during engine operation.	· Improper belt tension.	· Adjust belt tension.
Charge lamp does not light during normal engine operation.	· Charge lamp defective. · Faulty wiring.	· Replace. · Check and repair.
Alternator makes abnormal sounds.	· Alternator defective.	· Replace
Starting motor fails to run.	· Faulty wiring. · Insufficient battery voltage.	· Check and repair. · Recharge battery.
Starting motor pinion repeats going in and out.	· Insufficient battery voltage.	· Recharge battery.
Excessively low starting motor speed.	· Insufficient battery voltage. · Starting motor defective.	· Recharge battery. · Replace
Starting motor comes to a stop before engine starts up.	· Faulty wiring. · Insufficient battery voltage.	· Check and repair. · Recharge battery.
Heater signal does not become red.	· Faulty wiring. · Glow plug damaged.	· Check and repair. · Replace
Engine oil pressure caution lamp does not light when engine is stopped. (with starting switch left in "ON" position).	· Caution lamp defective. · Caution lamp switch defective.	· Replace · Replace

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Description and Operation of the Fuel Systems

Propane Fuel System

The primary components of the propane fuel system are the fuel storage tank, low pressure regulator (LPR), fuel mixer module with throttle control device, electric fuel lock-off solenoid, engine control unit (ECM) fuel trim valve (FTV) pressure trim valve (PTV) and three way catalytic (TWC) converter. The system operates at pressures which range from 355.60 mm (14.0 inches) of water column up to 21.5 BAR (312 psi).

LPG Fuel Tank

1. Liquid Outage valve w/quick disconnect coupling	11. Vapor Withdrawal Tube (when applicable)
2. Filler Valve	12. 80% Limiter Tube
3. Pressure Relief Valve	13. Fuel Level Float
4. Liquid Outage Fill Check Valve	14. Liquid Withdrawal Tube
5. Fuel Gauge	

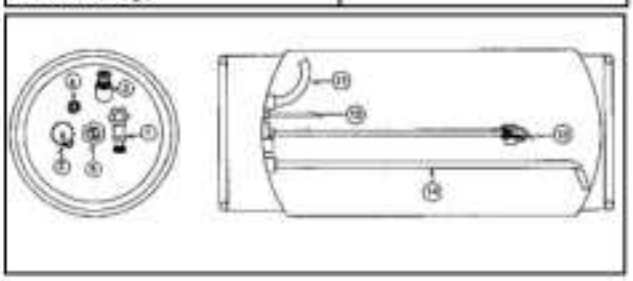


Figure 2 Typical Propane Fuel Tank

Propane is stored in the fuel tank as a liquid. The approximate pressure of the fuel in the tank is 16.5 bar (240 psi) when the tank is full at an ambient temperature of 27° C (81°F). The boiling point, (temperature at which the liquid fuel becomes vapor) is approximately -40° C (-40° F). When the fuel changes from liquid to vapor the fuel expands and creates pressure inside the tank. When the tank service valve is opened the pressure inside the tank forces the liquid fuel out though the pick up tube located near the bottom of the fuel cylinder. Because the propane is stored under pressure the tank is equipped with a safety valves which are normally set at 25.8 bar (375 psi) to prevent tank rupture due to over-pressurization of the cylinder. The service valve mounted in the end of the cylinder controls the flow of fuel from the tank.

By turning the handle to its "open" position, fuel flows out of the tank and into the service line. The service valve is also equipped with a safety feature called an "excess flow check valve". This feature reduces the flow from the service valve in the event of a rupture of the fuel line or any down stream component.

Service Line

Propane flows from the fuel tank to the electric lock via the service line. The service line is connected to the tank utilizing a quick coupler. The other end of the service line is connected to a "bulkhead connector" mounted on the equipment sheet metal. This bulkhead connector allows for a safe means of passing through the equipments engine compartment sheet metal and into the engine compartment. If a bulkhead connector is used a pressure relief device is mounted in the service line or the connector itself to prevent over pressurization of the service line. The service line is made of high pressure hose with special material or possibly tubing which is friendly to the LPG fuel and should always be replaced with an OEM supplied part.

⚠ CAUTION

The bulkhead assembly should never be removed and a service line run through the sheet metal.

Fuel Filter

Propane fuel like all other motor fuels is subject to contamination from outside sources. Refueling of the equipments tank and removal of the tank from the equipment can inadvertently introduce dirt and other foreign matter into the fuel system. It is therefore necessary to filter the fuel prior to entering the fuel system components down stream of the tank. An inline bulkhead fuel filter is utilized in the fuel system to remove the dirt and foreign matter from the fuel. The filter is replaceable. Maintenance of the filter is critical to proper operation of the fuel system and should be replaced as

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Step	Action	Value(s)	Yes	No
7	• Using a DVOM check for voltage at ECM wire harness connector between ECM FPP signal pin 38 and engine ground Do you have voltage between them?		Repair the circuit as necessary. Refer to Wiring Repairs in Engine Electrical.	Intermittent problem Go to Intermittent section
8	• Key OFF • Disconnect FPP sensor from wire harness • Key ON Does DSC display FPP voltage less than 0.2 volts?		Go to Step (11)	Go to Step (9)
9	• Disconnect ECM wire harness connector C001 • Using a DVOM check for voltage between the ECM FPP signal pin 38 and engine ground Do you have voltage between them?		Repair the circuit as necessary. Refer to Wiring Repairs in Engine Electrical.	Go to Step (10)
10	• Replace ECM Is the replacement complete?		Go to Step (15)	-
11	• Probe FPP sensor connector ground circuit pin B with a test light connected to battery voltage Does the test light come on?		Go to Step (12)	Go to Step (14)
12	• Key OFF • Disconnect ECM wire harness connector • Inspect the ECM wire harness connector terminals for damage, corrosion or contamination Did you find a problem?		Repair the circuit as necessary. Refer to Wiring Repairs in Engine Electrical.	Go to step (13)
13	• Replace FPP sensor Is the replacement complete?		Go to step (15)	-

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COOLING SYSTEM



It is important to remember that the cooling system of this engine be maintained properly to insure the longevity of the engine. Maintenance of the cooling system is critical to not only the engine but the fuel system as well. Because the LPR is connected into the cooling system low coolant levels and restricted or plugged radiator cores can impact the performance of the fuel system. Therefore proper maintenance of the cooling system should include removing dust, dirt and debris from the radiator core on regular intervals. To properly maintain the cooling system follow the recommend maintenance schedule in this section.

Cooling System inspections should be performed as prescribed when inspecting the cooling system check for the following:

- Plugged or restricted radiator core clean with compressed air, blow dust and debris from the core and the fan shroud
- Check the radiator cap to insure proper sealing if damage replace
- Check for coolant leaks at the radiator tank seams and inlet joints repair or replace as necessary
- Check for leaks at the radiator hose connections, tighten hose clamps if necessary
- Check Radiator hoses for swelling, separation, cracks deterioration in the hoses, or hardening, if any of these conditions exist the hose should be replaced with the OEM replacement parts
- Check coolant level if low add with 50/50 mixture, Do not add plain water
- Replace coolant per the recommended schedule in this section

Checking the Coolant Level

Do not remove the cooling system pressure cap when the engine is hot. Allow the engine to cool and then remove the cap slowly allowing pressure to vent. Hot coolant under pressure may discharge violently.

1. Check coolant level in coolant recovery tank. Add specified coolant as required.

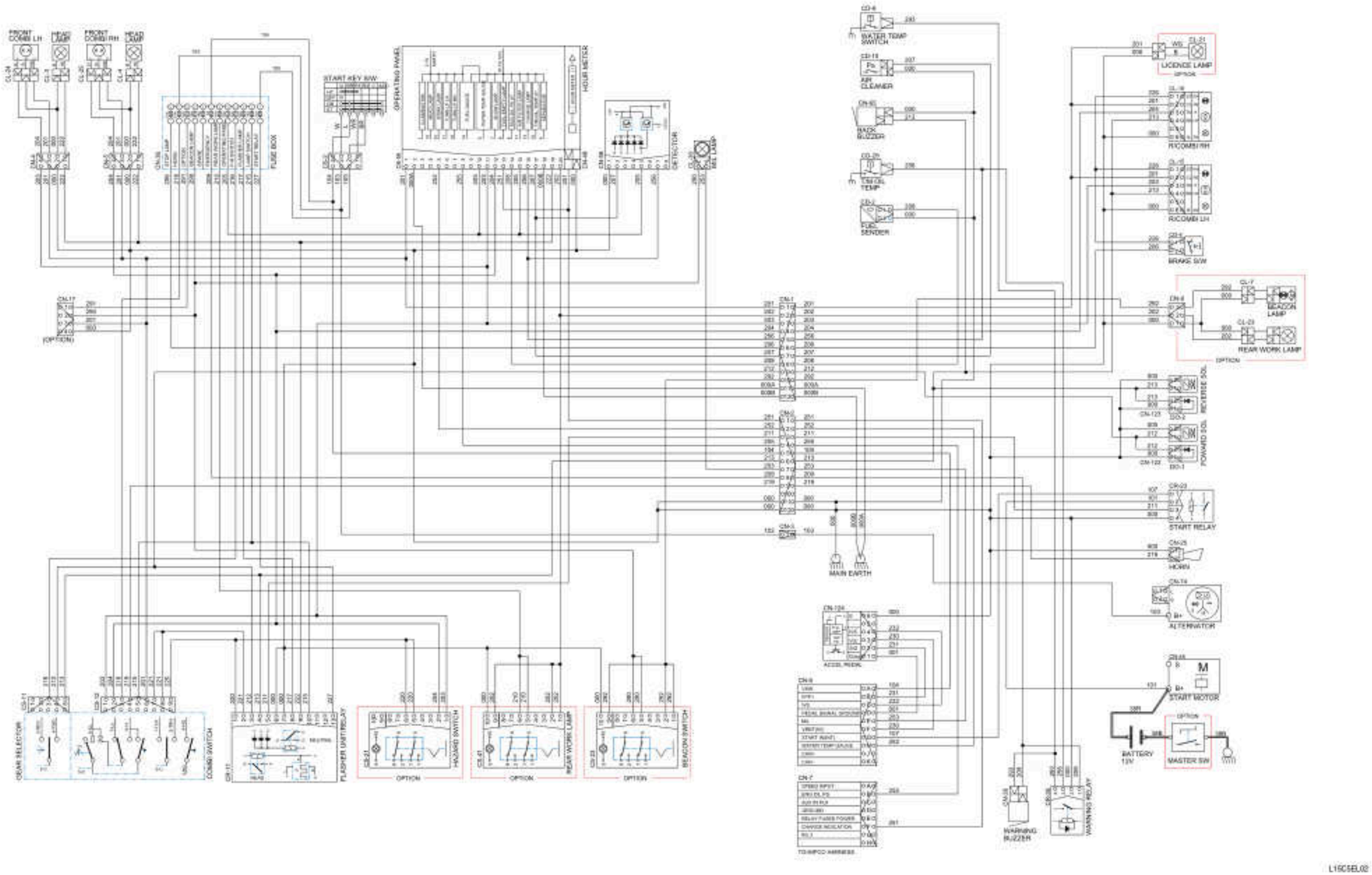
IMPORTANT:
Engine manufacturers and the fuel system supplier do not recommend the use of "stop leak" additives to repair leaks in the cooling system. If leaks are present the radiator should be removed and repaired.

If the radiator requires repair insure that the radiator core repairs did not result in a significant reduction in the cooling capacity of the radiator.

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GROUP 2 ELECTRICAL CIRCUIT

(1) HLF15/18-5



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