

8. INFORMATION FOR LPG

1. FOREWORD

This chapter describes the method of operation of HYUNDAI FORKLIFT that is powered by LPG (Liquefied petroleum gas).

This fuel is normally supplied in a gas tank and must be purchased locally by user.

It is important that the user thoroughly understands applicable laws and regulations concerning use of LPG tank and any information that may be attached to each tank by the supplier before operating this forklift.

There may be special laws or regulations regarding LPG powered forklifts then the user must fully be aware of such laws also.

2. STARTING ENGINE

1) STARTING ENGINE

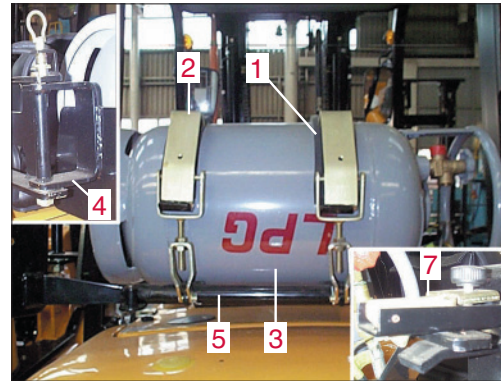
- (1) Open the out flow valve on the tank.
 - (2) Without stepping on the accelerator pedal, turn the start switch to the START position, to start the starter turning.
 - (3) Let the engine warm up for 5~6 minutes after starting.
- ※ **Avoid stepping down on the accelerator pedal.**
- ▲ **There is danger that the heat of vaporization of the LPG will freeze the regulator, causing harm to the engine.**



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3. LPG DEVICE COMPONENTS

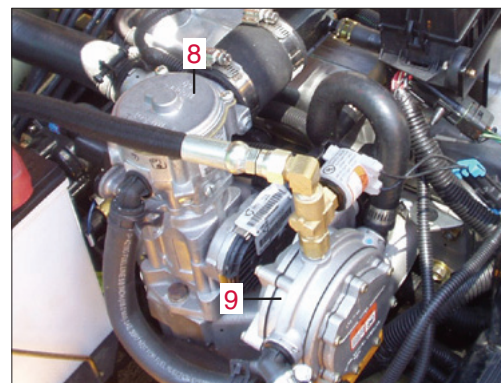
- 1 Band
- 2 Clamp
- 3 Tank
- 4 Tank bracket support
- 5 Tank bracket
- 6 Relief valve
- 7 Tank bracket support
- 8 LPG mixer and throttle body assy
- 9 LPG regulator assy



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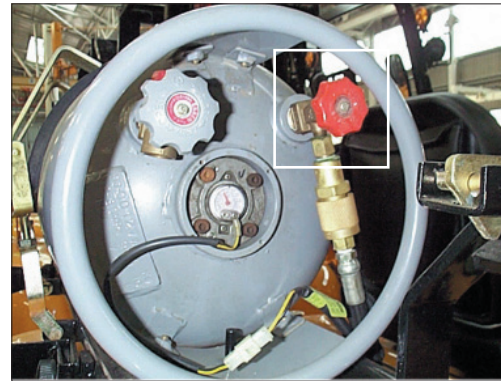
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4. LPG TANK AND RELATED PARTS

1) OUTFLOW VALVE

This valve controls the flow of LPG fuel from the LPG tank to the regulator.

To open the valve, turn it counterclockwise.

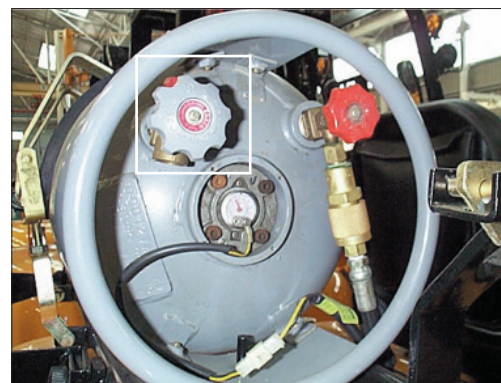


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2) INFLOW VALVE

LPG is filled in the tank through this valve. The tank must be filled by an LPG filling station attendant.

Be sure that this valve is shut tightly at times during use.



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3) RELIEF VALVE

This valve prevents explosion that might be caused when the LPG pressure rises above a normal level or when the hose becomes deteriorated.



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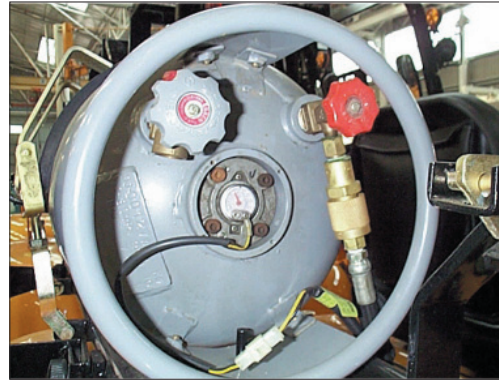
5. CHANGING THE LPG TANK

Under no circumstances what so ever may the LPG tank replacement be performed near a lighted cigarette, lighted match, gas stove burner, or any other electric appliance that emits sparks, flame or any type of fire.

1) REMOVING THE LPG TANK

When changing liquefied petroleum gas (LPG) tanks, follow these basic rules:

- Change only in well ventilated areas.
- Never allow open flames.
- Turn the starting switch to the OFF position.
- Check for leaks.
- Make sure tank is on locating pin.
- Make sure tank latches are securely fastened.
- Store tanks according to local fire codes.

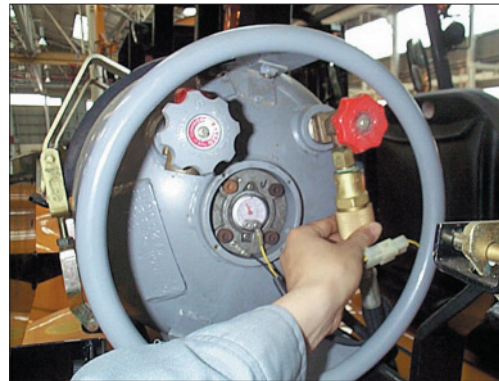


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(1) Stop the engine and remove the key

- ① Turn the LPG cylinder out flow valve clockwise to shut the fuel supply.
- ② Let the engine stop naturally so that any LPG fuel in the piping doesn't leave the system.

(2) Remove the piping from the tank.



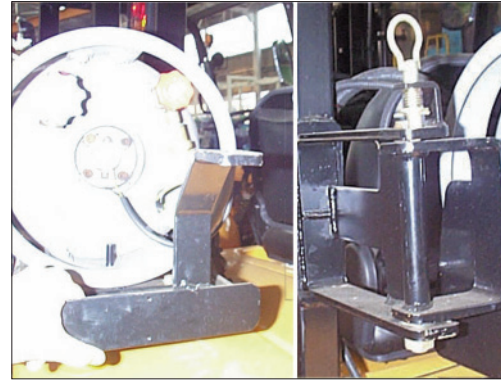
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(3) Turn counterclockwise the stopper knob located on the right side tank bracket, and remove the tank bracket stopper.



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- (4) Turn the tank bracket backwards around the left side tank bracket, and fix it with a set pin.



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- (5) Pull the tank bracket clamp toward you, and unlock the band.



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- (6) Set two bands forward, and remove the tank.



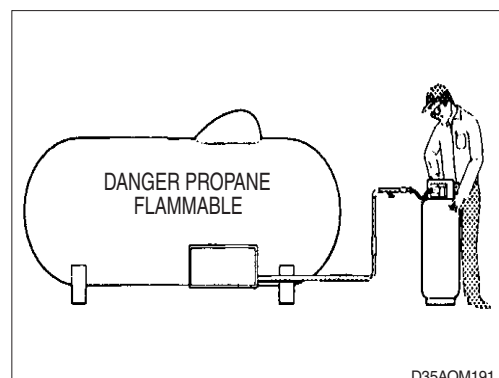
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2) REFILL LPG TANK

- Make sure you know and understand the proper procedure for filling an LPG tank.
- If you have any questions on refilling LPG tanks, please ask your supervisor.

▲ LPG IS HEAVIER THAN AIR. It settles on your clothes and the ground around you, displacing oxygen vital for breathing. Open flame can cause flash fires.

▲ Check all connections for damage or leaks. If the truck will not start after you change tanks, get a qualified mechanic to check the truck.



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6. RECOMMENDED SAFETY MAINTENANCE PROCEDURES

▲ LPG is a combustible fuel that is heavier than air.

Escaping gas may accumulate in low areas. The fuel cylinder should be mounted so that it does not extend outside the truck and should also be properly positioned by using the locating pin or key way.

The fuel valve should be turned off when the truck is not in service. Cast fittings should not be used in the LPG system.

Use only underwriters laboratories or factory mutual listed LPG hose assemblies where pressure fuel lines are required.

All pipe threaded fittings should be installed using an approved sealing compound.

Fuel lines should be supported by clamps to minimize chafing and wear.

The LPG solenoid valve should be wired to an automatic shut off switch (oil pressure or vacuum) to prevent leakage of gas in the event the ignition is on without the engine running.

Check the LPG solenoid or vacuum shut-off valve for leakage as follows.

- 1) Turn fuel tank valve off, start and run engine until it stops.
- 2) Install a 0 to 30 psi pressure gauge per instruction A or B.
 - A. To primary test port of single units consisting of primary and secondary regulators.
 - B. Between the primary and secondary stage regulators when the LPG system consists of two regulators.
- 3) Turn the tank fuel valve on. The pressure gauge should maintain a zero reading. If it does not, the solenoid valve or vacuum shut-off valve must be repaired or replaced. An odor is added to LPG to help indicate leaks. If you detect gas odor, you should turn off the fuel tank supply valve and stop the engine. Remove all sources of ignition, and ventilate the area. Make all of the necessary repairs before you turn the fuel supply on. The complete LPG system should be inspected periodically. Check all hoses for wear, connections for leaks, and all parts for damage.

NOTE : Fuel hoses have a limited life expectancy. They should be checked for cracking and drying due to age. Hoses with visible signs of age should be replaced. Use only Underwriters Laboratories or Factory Mutual listed LPG parts for replacements.

※ Service work should be performed by qualified personnel only.

7. INSTALLATION

- 1) Place the tank on the bracket.
Align the boss of tank bracket with the hole of tank.



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- 2) Put the band on the tank, hook the clamp to the band, and push up the clamp.



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- 3) Lift the stopper plate, then rotate the tank bracket.



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- 4) Turn clockwise the stopper knob located on the right side tank bracket.



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- 5) Connect the piping to the tank out flow valve.
- 6) Wet the part of the pipe that is connected to the tank with soapy water or neutral detergent, open the out flow valve and check to see that there are no gas leaks. Be sure to wipe the soapy water or detergent off after this inspection is completed.



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8. MAINTENANCE ON REGULATOR

- ※ During the course of normal operation for LPG engines oil may build inside the secondary chamber of the regulator.
- ※ We recommend the regulator be drained at every engine oil change if contaminated or sub-standard fuel is suspected or known to have been used or in use with the emission complaint fuel system.

To drain the regulator follow the steps below:

- 1) Move the truck to a well ventilated area and ensure no external ignition sources are present.
- 2) Start the engine.
- 3) With the engine running close the manual valve.
- 4) When the engine runs out of fuel turn OFF the key when the engine stops and disconnect the negative battery cable.
- ※ A small amount of fuel may still be present in the fuel line, use gloves to prevent burns, wear proper eye protection. If liquid fuel continues to flow from the connections when loosened check to make sure the manual valve is fully closed.
- 5) Loosen the hose clamp at the inlet and outlet hoses and remove the hoses.
- 6) Remove the regulator mounting bolts.
- 7) Place a small receptacle in the engine compartment.
- 8) Rotate the regulator to 90° so that the outlet fitting is pointing down into the receptacle and drain the regulator.
- 9) Inspect the secondary chamber for any large dried particles and remove.
- 10) Remove the receptacle and reinstall the regulator retaining bolts and tighten to specifications.
- 11) Reinstall the fuel hoses.
- 12) Reconnect any other hoses removed during this procedure.
- 13) Slowly open the manual service valve.
- ※ The fuel cylinder manual valve contains an "Excess flow check valve" open the manual valve slowly to prevent activating the "Excess flow check valve."
- 14) Check for leaks at the inlet and outlet.