



INSTRUCTION TO SERVICE

ITS: 6496

SECTION:	241 Fuel System
WRITTEN BY:	Dwayne Peters
SUBJECT:	Part A: Inspect solenoid valves for function Part B: Replace defective solenoid valves

ITS6496

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- ⚠ WARNING:** Exercise caution when working around CNG installations located on the roof of vehicles. Wear appropriate safety harnesses and non-slip safety footwear.
- ⚠ WARNING:** Refer to “Maintenance Safety Procedures” in the General Information Section of this manual for general and system-specific safety procedures.
- ⚠ WARNING:** DO NOT vent gas directly from the purge line shut-off valve directly to atmosphere. Ensure that the discharged gas is connected to a recovery system or is safely redirected through a vent stack in accordance with local environmental regulations.

PROCEDURE:

Part A: Inspect solenoid valves for function. Figure 1.

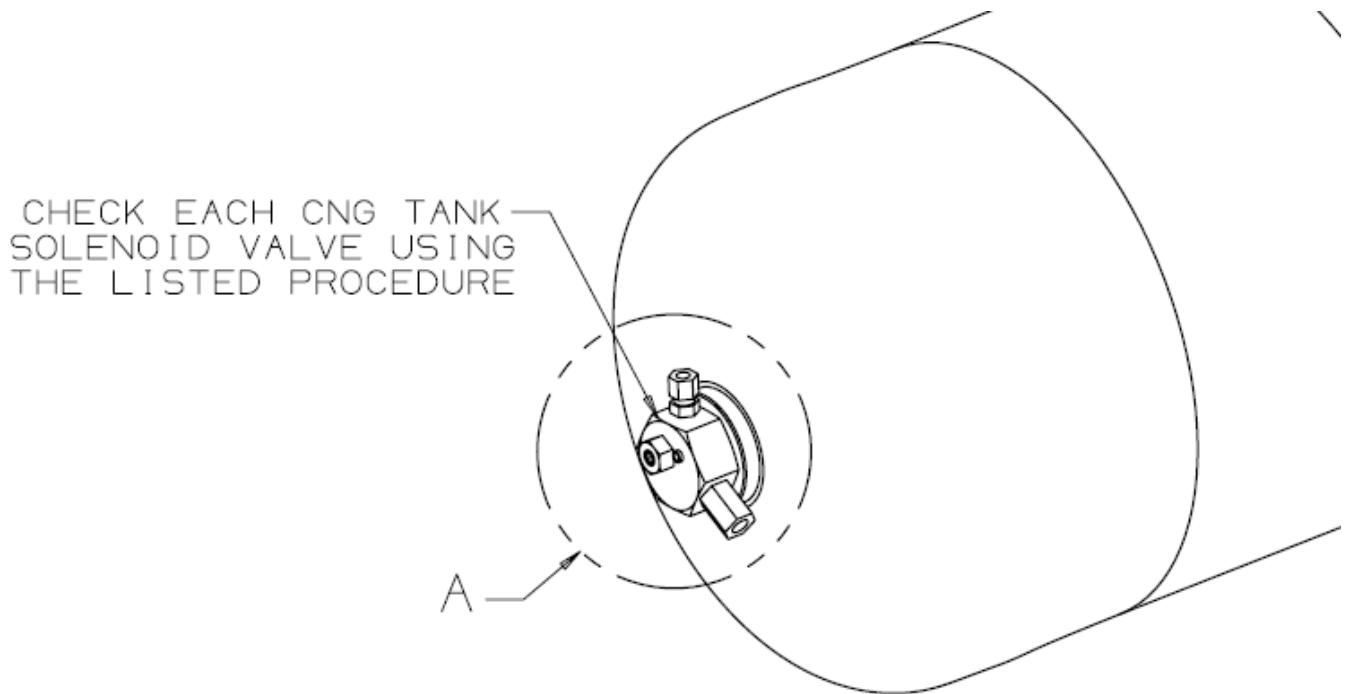


Figure 1: Solenoid Valve

1. Turn the main battery disconnect switch to the “OFF” position.
2. Inspect each of the solenoid valves as followed;
 - a. Disconnect all of the solenoid valve electrical connectors.
 - b. Close all solenoid manual shut-off valves with a 3/16" Allen key. Torque the lockdown stem (3/16" Allen or socket hex) to 60-84 in-lb. Figure 2.

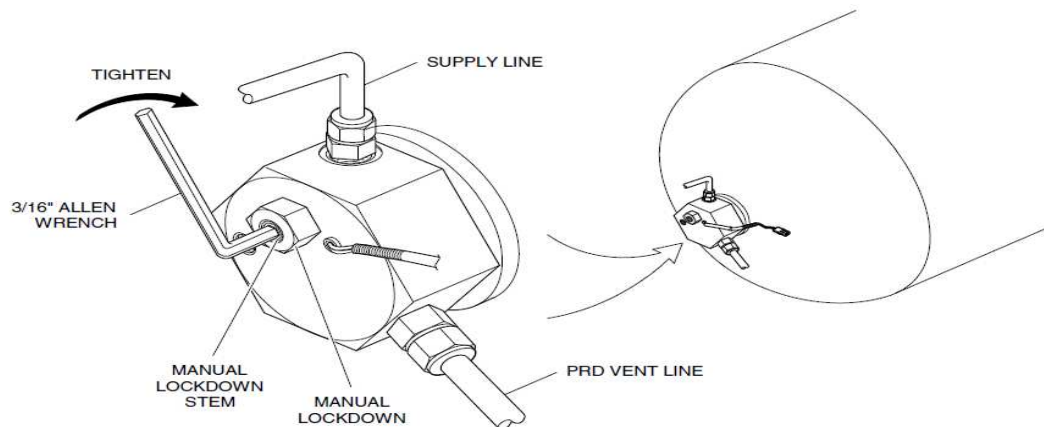


Figure 2: Manual Lock Down

- c. Turn the main battery disconnect switch to the "On" position.
- d. Ensure the main (emergency) shut-off valve and the manual fuel tank isolation shut-off valves (if equipped) are open.
- e. Turn the master switch off. Put in rear run and start engine and let it drain to 0 psi on HP and LP gauges until the engine stalls.
- f. Slowly rotate the purge line shut-off valve to the fully open (vertical) position to allow the remaining fuel in the lines to completely depressurize as indicated by a "zero" reading on the pressure gauges and no further flow through the vent line.
- g. Slowly rotate the purge line shut-off valve to the fully closed (horizontal) position.
- h. Slowly open the manual shut-off valve on one of the tanks. If pressure rises on gauges, close the manual shut-off valve and mark it as "not closing".
- i. If the pressure does not rise mark the valve as OK and close the manual shut-off valve.
- j. Repeat steps e – i for each tank. You will not need to restart the engine if pressure is still at 0 psi on the HP and LP gauges.
- k. Slowly open all manual shut-off valves.
- l. Reconnect all of the solenoid valve electrical connectors.
- m. R&R defective valve(s) marked as "not closing" as outlined in Part B.



Part B: Remove and replace solenoid valves.

⚠ WARNING: DO NOT vent gas directly from the purge line shut-off valve directly to atmosphere. Ensure that the discharged gas is connected to a recovery system or is safely redirected through a vent stack in accordance with local environmental regulations.

⚠ WARNING: Certain tanks in each fuel rack may be paired together and share a common pressure relief device. The interconnection of the PRD line will result in both tanks being vented simultaneously regardless of whether the manual lockdown device is closed on the second tank.

3. Minimize the pressure in the fuel tanks by driving the vehicle, if practical, to use up as much of the fuel as possible.
4. Vent the affected tank(s) as followed;
 - a. Set the Battery Disconnect switch to the "OFF" position.
 - b. Disconnect electrical power to all the tank solenoid valves by unplugging the electrical connector at each tank solenoid valve.
 - c. Close the manual lockdown device on all tank solenoid valves. Torque the lockdown stem (3/16" Allen or socket hex) 60-84 in-lb.

⚠ WARNING: All tank solenoid valves must be locked down during this procedure and remain locked down with the exception of the tank valve that is being vented or tested as indicated.

- d. Ensure the main (emergency) shut-off valve and the manual fuel tank isolation shut-off valves (if equipped) are open.
- e. Connect a line from the recovery system to the purge line shut-off valve.
- f. Slowly open the manual lockdown device on the tank(s) to be vented by turning the lockdown stem counter-clockwise until it stops.
- g. Connect the electrical connector to the tank solenoid valve to be vented.
- h. Set the Battery Disconnect switch to the ON position.
- i. Set the engine run switch in the engine compartment to the OFF position.
- j. Apply the parking brake.
- k. Position the Master Run switch to NIGHT-PARK.
- l. Press the start push button on the driver's side console momentarily and release.
- m. Slowly rotate the purge line shut-off valve towards the open (vertical) position until maximum flow is achieved without tripping the flow-limiting feature of the tank solenoid valve.

- n. Allow the tank(s) to completely depressurize as indicated by a “zero” reading on the pressure gauge and no further flow through the vent line.
- o. De-energize the tank solenoid valve by disconnecting the electrical connector to the tank solenoid.
- p. Rotate the purge line shut-off valve to the closed (horizontal) position.
- q. Turn the main battery disconnect switch to the “OFF” position.

 **NOTE:** The following steps requires that a special manual override tool be installed in place of the manual lockdown device. The manual override tool is used to mechanically force the solenoid valve off its seat and allow the tank to vent completely. Figure 3.

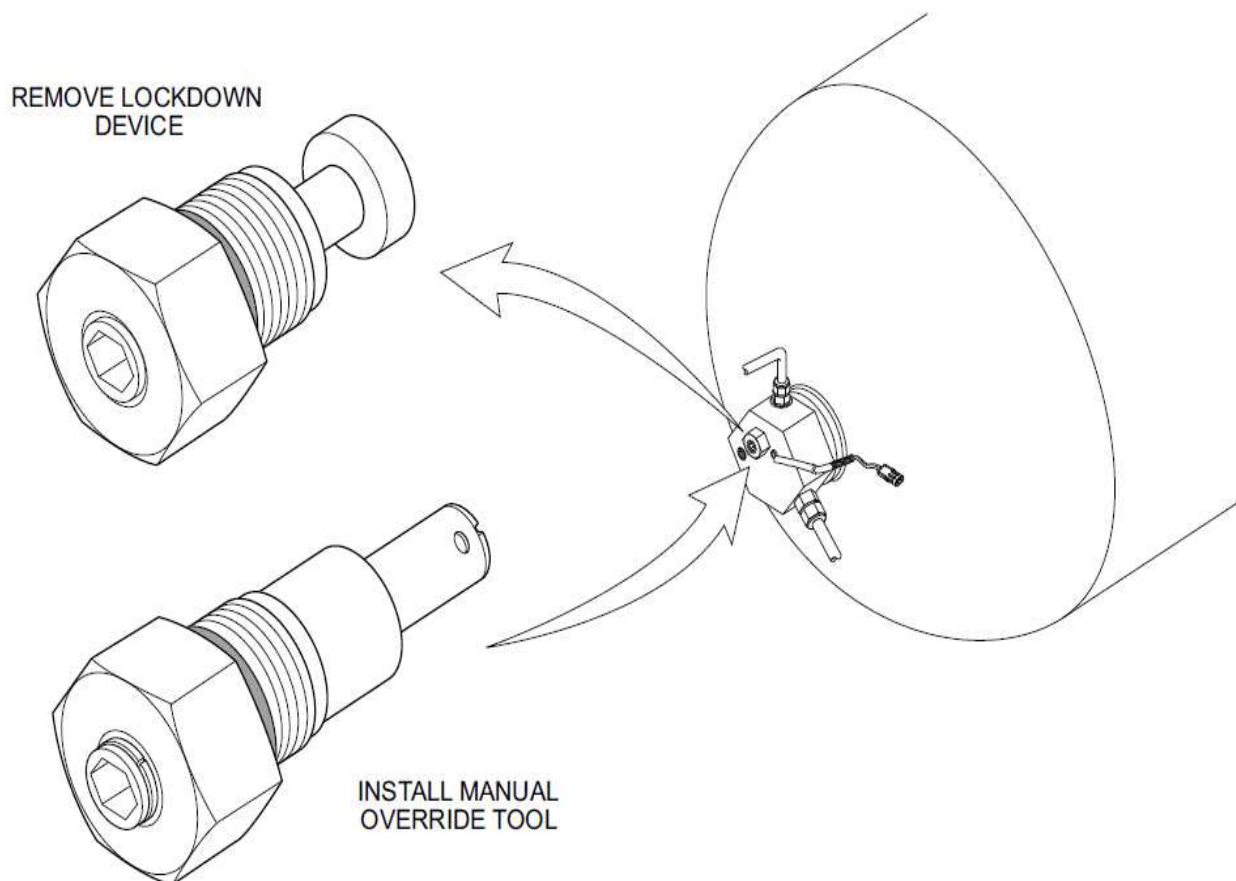


Figure 3: Lockdown/Override Tool Removal & Installation

- r. Obtain a manual override tool and confirm that it is the latest configuration. The correct tool will have a hole near the end of the stem. The diameter of stem will also be slightly reduced as compared to the earlier version. Refer to your New Flyer Parts Manual for correct tool part number.

- s. Ensure that the valve stem on the manual override tool is fully retracted prior to insertion. This is performed by turning the stem on the override valve counter-clockwise with a 3/16" Allen (hex socket) wrench until no gap exists between the fitting threads and flange. Figure 4.

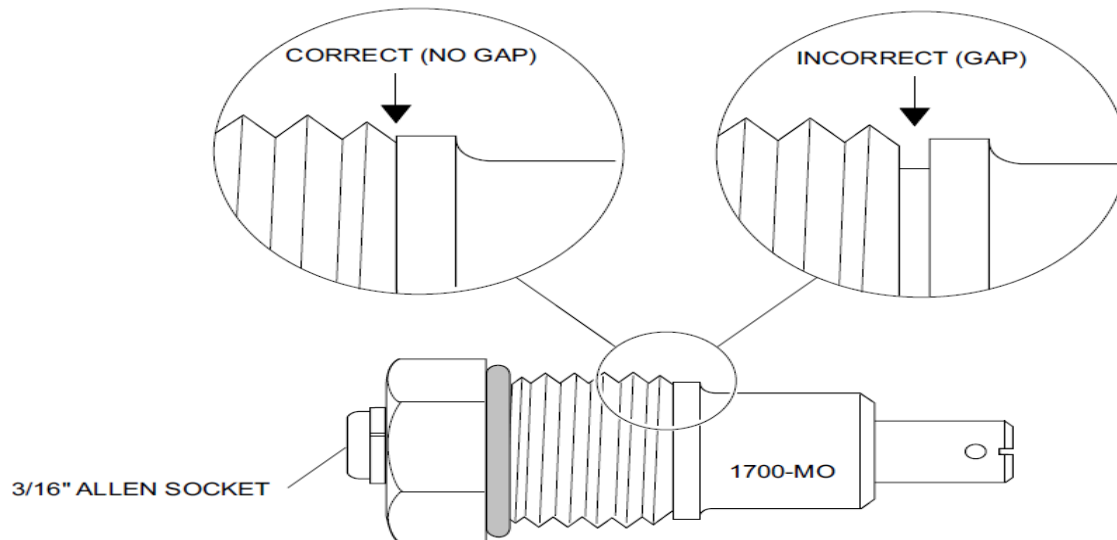


Figure 4: Manual Override Vent Tool

⚠ WARNING: Ensure that all lines connected to the tank solenoid valve are fully depressurized before removing the manual lockdown device from the solenoid valve with the exception of the PRD lines which will be vented when the tank(s) are vented.

- t. Remove the manual lockdown device from the solenoid valve from the tank to be vented.
- u. Lightly lubricate the O-ring on the manual override tool with NF # 400081 Parker Super O-Lube.
- v. Immediately install the manual override tool.
- w. Torque hex nut of manual override tool 28-32 ft-lb.

👉 NOTE: Do not over tighten the manual override tool stem. Forcing the stem may cause damage to the override tool.

- x. Slowly turn the stem on the manual override tool clockwise (using a 3/16" Allen or hex socket wrench) until the stem stops (approximately one full turn). This action will mechanically force the solenoid valve off its seat and allow the tank to vent completely.
- y. Slowly rotate the purge line shut-off valve to the fully open (vertical) position.
- z. Allow the gas in the tank to completely depressurize as indicated by a "zero" reading on the pressure gauge and no further flow through the vent line.
- aa. After the tank is fully vented, turn the stem on the manual override vent tool counter clockwise (using a 3/16" Allen wrench) until the tool is fully retracted.



5. Remove the defective solenoid valve as followed;

⚠ WARNING: Should the solenoid valve remain installed on the tank for a period of time after venting the tank repeat the venting procedure to relieve any residual pressure before removing the tank solenoid valve(s).

- a. Disconnect the electrical connector of the solenoid valve of the tank being serviced.
- b. Using a backing wrench to hold the adaptor body hex, disconnect the Swagelok fittings from the adaptors leaving the adaptors in place. Proceed carefully to avoid any residual pressurization which may be in the tank.
- c. Remove the solenoid tank valve using hand tools only (do not use impact tools). Unthread the valve from the tank.
- d. Examine mating threads in tank 2.00" port for condition.

6. Install the new solenoid valve on tank as followed;

👉 NOTE: For proper installation the valve must be correctly installed by properly trained maintenance personnel.

👉 NOTE: If any resistance is felt during the valve installation, remove the valve, inspect, clean the threads and reinstall the tank valve.

- a. Installation tools required include a torque wrench, 2 1/2" hex socket wrench and NF # 400081 Parker Super O-Lube.
- b. Apply with NF # 400081 Parker Super O-Lube sparingly to the new tank solenoid valve O-ring.
- c. Carefully engage the valve body threads to the CNG tank 2.00" port fitting.
- d. Manually thread the valve onto the tank. Install the solenoid tank valve using hand tools only (do not use impact tools).
- e. Torque the valve to 190-208 ft-lb.
- f. Transfer the adaptors and plug from the old solenoid valve to the new solenoid valve using new O-rings and apply with NF # 400081 Parker Super O-Lube sparingly and torque as shown in Figure 5.

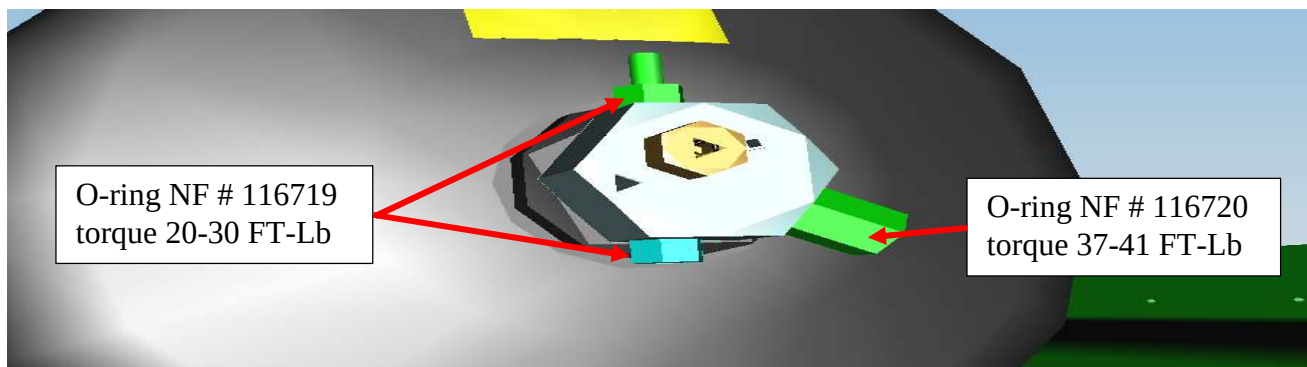


Figure 5: Adaptors



g. Rotate the tank as required to align plumbing ports with the fuel lines.

☞ **NOTE:** **ALWAYS** use new strap rubber pads and lock nuts if the tank is rotated. Make sure the rubber pads on the mounting brackets and retaining straps are even with no overlaps, are not damaged or overly flattened. If these conditions are present, the ribbed pads must be replaced.

☞ **NOTE:** After tightening and torquing the lock nuts, a gap of 1/8 to 1 1/4" (6.25 to 32 mm) should be present between the strap tabs and the bracket bases. **DO NOT** retorquer after the limit of 45 ± 5 ft-lb. is reached.

- h. When replacing straps and lock nuts install the retaining straps at each end of the tank(s) thread the new locknuts onto the retaining bolts, finger tight. Alternately and evenly tighten and torque the nuts to 45 ± 5 ft-lb.
- i. Install the Swagelok fittings to the adaptors finger tight only avoiding cross threading.
- j. Tighten the Swagelok fittings using a backing wrench on the adapter body hex. Rotate the Swagelok nuts to previously pulled up position with a wrench until snug. At this point an increase of resistance will be encountered. Then tighten slightly with a wrench.
- k. Slowly open the manual lockdown device on all tank solenoid valves starting with the empty tank(s) first.
- l. Connect the electrical connector to the tank solenoid valve.
- m. Check all of the tank system connections and fittings for leaks. Use a Liquid solution SNOOP®. **DO NOT** use make-shift soapy water solutions.
- n. Remove all tools and debris and return the bus to service condition.
- o. Turn the main battery disconnect switch to the "ON" position.

LABOUR ESTIMATE

	Operation	Men	Hours	Labour Time M X HR
1	Inspection	2	1.0	2.0

LABOUR ESTIMATE

	Operation	Men	Hours	Labour Time M X HR
2	Remove and replace solenoid valve	1	6.0	6.0

PARTS REQUIRED

Item	Part Number	Description	Qty. per Coach	Units	Notes
1	048913	VALVE-SOLENOID	1	EA	
2	116719	O.RING BUNA 90D 9/16-18	2	EA	
3	116720	O-RING BUNA 90D 3/4-16	1	EA	
4	400081	LUBE-O-RING SUPER O LUBE	.01	EA	