STANADYNE Diesel Systems

SERVICE BULLETIN

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OLDSMOBILE

SUBJECT: DB2 PUMP FEATURES FOR THE 1985 MODEL YEAR OLDSMOBILE 4.3 AND 5.7 LITER DIESELS

This bulletin outlines the new features for the DB2 pumps for 1985 Oldsmobile diesel engines. A typical pump is pictured below in Figure 1. Please note that this information does not pertain to the 1985 "C" car "pull-ahead" models released in the spring of 1984 which are basically the same as the 1984 models.

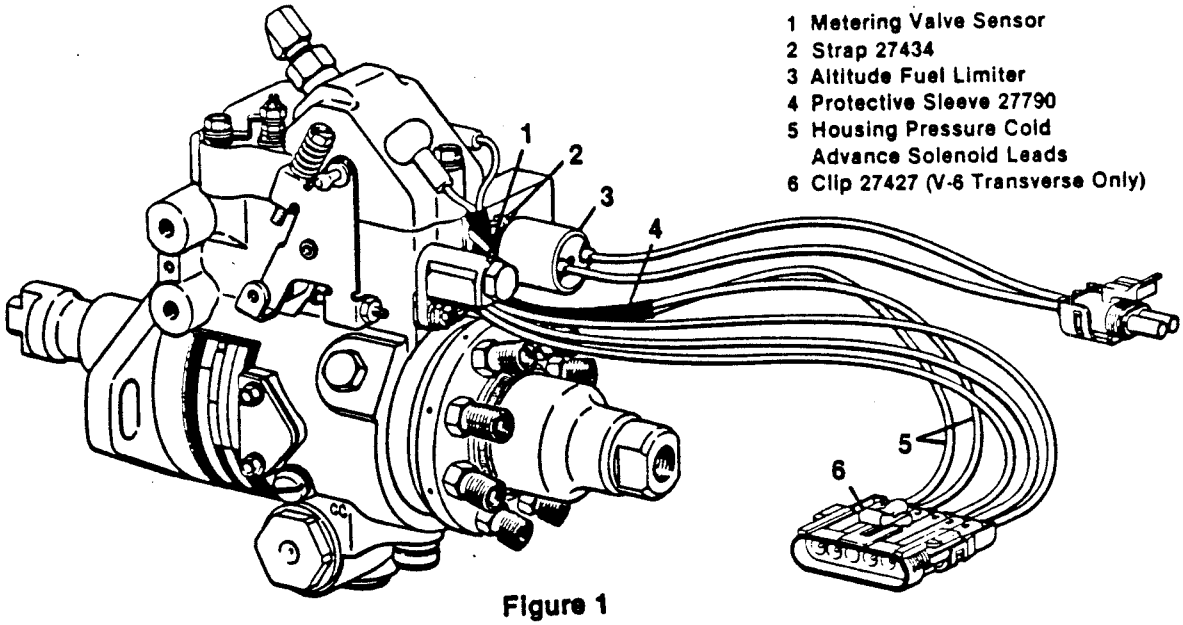

Figure 1

Housing, Drive Shaft and Throttle Levers

The pumps for the 5.7L V-8 engines will use the same housing as the V-6 pumps. This is a standardization and necessitates the use of a shorter drive shaft. Also required is a new throttle lever because of the different location of the throttle stop boss. The V-8 throttle lever change precludes the use of throttle lever setting gauge 21914. V-8 pump throttle levers will instead, be set in the low idle position at 41° CCW, by setting a dimension between the outside of the throttle connection ball and the face of the housing flange as shown below in Figure 2. This dimension is on the individual specification.

The V-6 throttle lever is different only in that the throttle connection stud has been shortened for clearance purposes. Throttle lever gauge 21914 may still be used to set the lever on the 6 cylinder pumps at 0° as outlined in S.B. 374.

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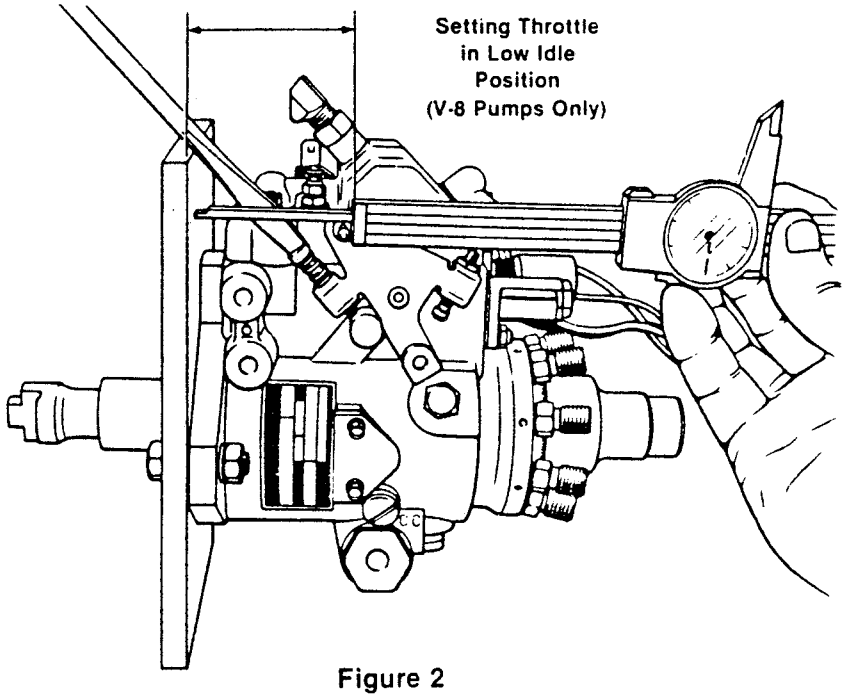


Figure 2

Electric Shutoff Solenoid (Ref. Figure 3)

A new electric shutoff solenoid is specified in the 1985 pumps for Oldsmobile. The solenoid is longer to provide greater forces, but operates, and is tested in the same manner as other automotive plunger-type solenoids. See S.B. 108 and individual specifications for service information and part numbers.

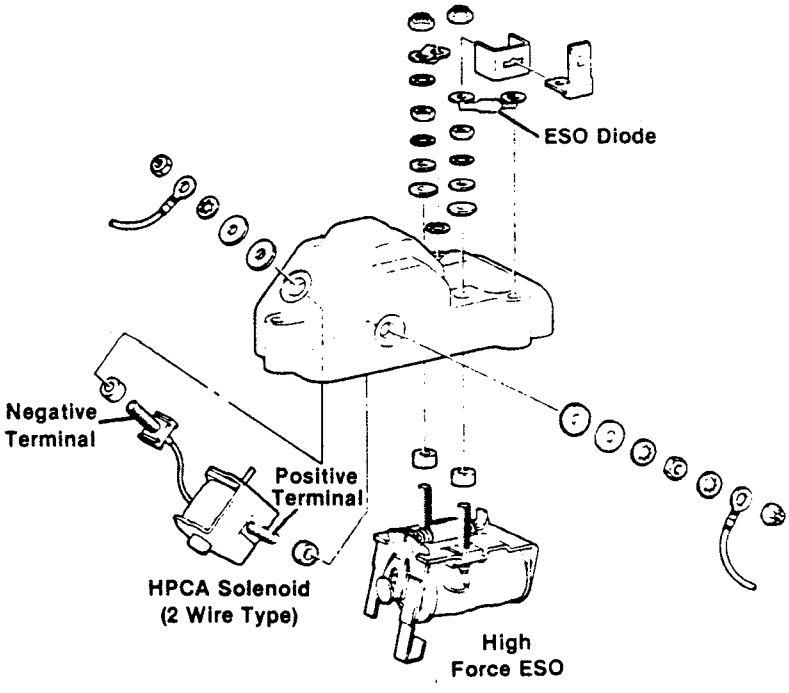
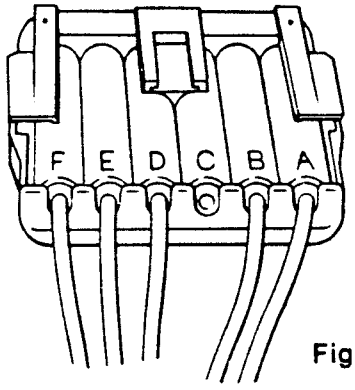


Figure 3

Housing Pressure Cold Advance Solenoid (HPCA)

The HPCA solenoid now has a separate ground wire and terminal located on the rear surface of the governor cover as shown in Figure 3. Grounding through a separate lead to the chassis rather than through the pump body was necessary due to interference with on-board electronic equipment. The two HPCA leads are connected to a Weatherpack 6 port connector, as shown in Figure 4, along with the 3 leads from the Metering Valve Sensor (See next section).



A = HPCA Positive (+)	Pink w/Black Stripe
B = HPCA Negative (−)	Green w/Black Stripe
C = Not Used	
D = MVS Positive (+)	Gray
E = MVS Voltage Out	Blue
F = MVS Negative	Black

Figure 4

Oldsmobile has further requested that we route the HPCA leads down between the Metering Valve Sensor and the Altitude Fuel Limiter (AFL) as shown in Figure 1. This is to prevent the wires from being burned or pinched by the engine crossover manifold. This is accomplished by first installing protective sleeve 27790 (two layers) over the two HPCA leads to prevent their being cut on the sharp edge of the AFL. The leads are then strapped to the AFL using strap 27434 as shown in Figure 1. *NOTE: Sleeve 27790 may be easily installed over the two HPCA leads by using seal expander 18338.*

Metering Valve Sensor (MVS)

A newly designed MVS is used on the 1985 Oldsmobile pump models. It is flange mounted rather than threaded in, and the probe is kept in contact with the metering valve arm by means of a coupling spring rather than by magnestism. This design also eliminates the need for a return spring inside the adjusting hole plug. The new MVS is shown below in Figure 5.

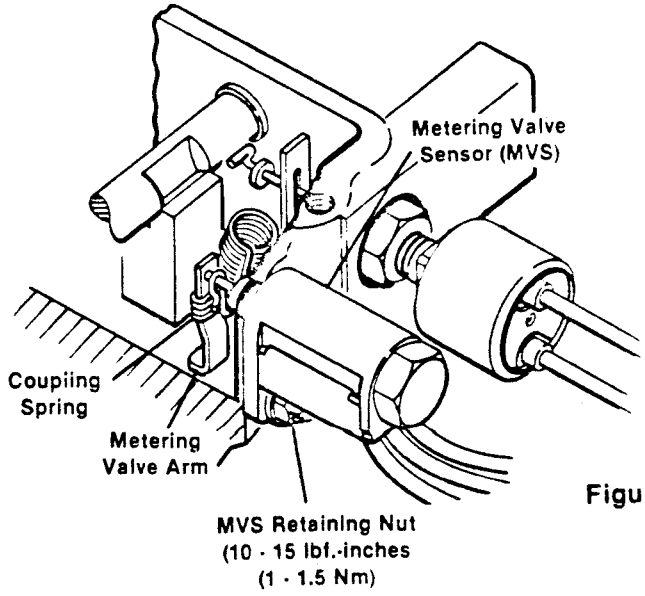


Figure 5

The new MVS (as well as the previous version) senses the position of the metering valve arm (which translates to fuel delivery), and sends a voltage signal to a vehicle mounted electronic control module. Fuel delivery, vehicle speed, barometric pressure, and several other variables are all fed into the control module which can then control optimum exhaust gas recirculation (EGR) and exhaust pressure regulator (EPR) valve openings as well as transaxle or torque converter clutch (TCC) operation.

To remove the new MVS, first remove the governor cover and disconnect the coupling spring from the MVS probe by pulling up on the spring with a thin, hook-shaped tool (e.g. a dental probe) or needle nose pliers as shown in Figure 6.

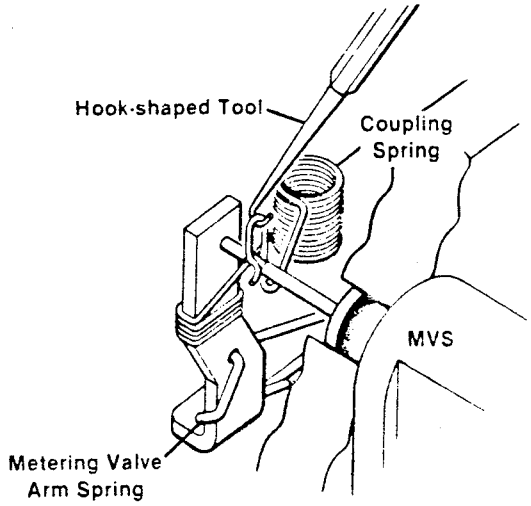


Figure 6

Next, lift the coupling spring off the metering valve arm. Finally, loosen and remove the retaining nut and washer from the stud and remove the MVS from the housing (do not pull on the wires). The 3 MVS leads and/or the 2 HPCA leads may be removed from the connector by using pin release tool P/N 27821 (Kent Moore J-28742-A), or equivalent.

Should the MVS mounting stud require replacement, it may be ordered separately. To install a new stud, clean and dry the housing threads with solvent and compressed air, install a new seal to the stud and apply a drop of Loctite 242 (P/N 20554) to the threads on the shorter end of the stud. Install the stud and tighten to 30-35 lbf.-inches (3.4-4.0 N-m). *NOTE: It may be necessary to grind some material off the end of a socket to attain sufficient engagement of the thin hex on the stud.* When reinstalling an MVS, always use a new seal and tighten the retaining nut to 10-15 lbf.-inches (1-1.5 N-m). Slip the coupling spring over the metering valve arm, pull the hooked end around in a counterclockwise direction with needle nose pliers and push it down onto the groove on the MVS probe.

Altitude Fuel Limiter (AFL)

The AFL solenoid is threaded into the rear of the housing as shown in Figure 7. It is energized when the vehicle is operated in a high altitude area by a signal from a vehicle mounted barometric pressure sensor. When energized, it restricts the maximum metering valve arm movement, and in this way, trims the WOT fuel delivery slightly at higher engine speeds. It serves the same purpose as a torque screw except that it operates automatically, thereby precluding the need to make manual adjustments to fuel pumps calibrated for low altitude vehicles that are operated in high altitude areas (or vice-versa).

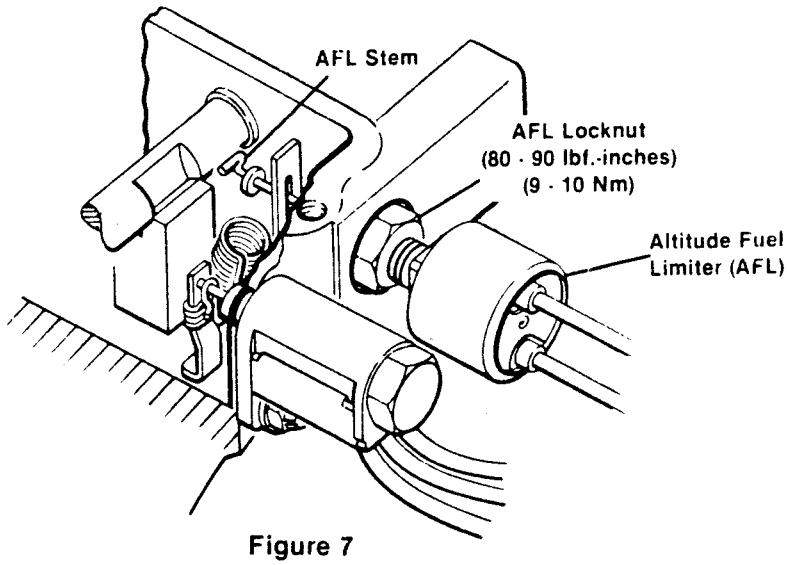


Figure 7

As shown in Figure 7, the AFL utilizes a stem with a small washer on the end. The stem engages a slot in the linkage hook and, when energized, is pulled in and slightly restricts the maximum opening of the metering valve.

To remove the AFL, first remove the governor cover. Using needle nose pliers, carefully grasp the AFL stem and push down on it to release it from the groove in the linkage hook. Loosen the locknut and unscrew the AFL from the housing. To install an AFL, thread the locknut onto the shaft until about 3 threads are visible between the solenoid and locknut. Install a new seal to the threaded shaft and thread the AFL into the housing until the nut contacts the housing. Snug the nut. During calibration the AFL will be energized and adjusted for a specified fuel delivery and the locknut will then be tightened to 80-90 lbf.-inches (9-10 N-m). Using needle nose pliers, carefully grasp the AFL stem and engage it to the slot in the linkage hook making certain that the washer is on the forward side of the hook (towards the drive shaft) as shown in Figure 7. *Exercise care not to bend the wire stem unnecessarily.*

Governor Weight Retainer

The 1985 pump models for the Oldsmobile diesels will be the first to employ the new Elastomer Insert Drive (EID) governor weight retainer, P/N 24295. This new retainer has 6 elastomer inserts which are captively assembled and provide the necessary cushioning between the governor components and the drive shaft. This design eliminates the need for a flexible retaining ring. **EID weight retainers should be cleaned only in calibrating fluid or diesel fuel and should never be immersed in caustic cleaning solutions or damage to the elastomer inserts could occur.** EID weight retainers are serviceable as complete assemblies only.

ESO Diode (Reference Figure 3)

This device is used on most of the 1985 pump models for Oldsmobile diesels and was also used on certain 1984 pump models. Diode 24657 is connected between the positive electric shut off (ESO) terminal and the adjacent governor cover screw. It is an electrical "one way check valve" which prevents the voltage spike, created when the ESO is de-energized, from flowing back into the vehicle electrical system and possibly damaging the on-board electronic equipment.

The ESO diode must be installed in such a way that it will not cause a short circuit from the positive ESO terminal to ground. For this reason it uses a different size ring terminal on each end. Pump models that have an ESO diode also use a terminal insulator with a larger opening to accomodate both the diode ring terminal and the positive ESO terminal.

Transfer Pump End Cap

The only change in the end cap is the inlet configuration. Oldsmobile has requested the new inlet with M14 × 1.5 threads instead of a 7/16-24 inverted flare connection. Sealing between the inlet tube and end cap is accomplished by an O-ring which rests on a formed shoulder between the nut and the end of the fuel inlet line. The inlet adapter that is used on the vehicles can also be used on the test stand and is available from General Motors dealers under part number 2253818. This type of inlet adapter will also be available from the major test stand manufacturers in the near future.

Snubbers

All DB2 pumps for the 1985 Oldsmobile V-6 diesel engines will employ a trailing port snubber rotor. This is an orifice machined in the rotor adjacent to the discharge port. As the rotor revolves, the orifice registers with the discharge port following the pumping event, and absorbs reflected pressure waves in the high pressure line.

The V-8 pump models will not use a trailing port snubber rotor, but will instead utilize a vented rotor (S.B. 334) and individual snubber valves in each discharge fitting. The individual snubber valves (pictured in Figure 8) are spring-loaded one way check valves with an orifice. They are also designed to dampen reflected pressure waves in the injection lines following each injection.

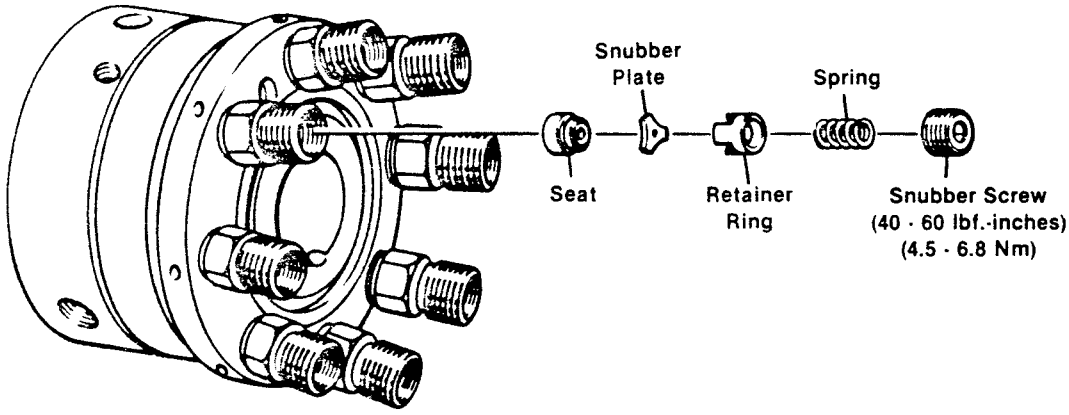


Figure 8

Test Bench Procedures

Testing of the DB2 pumps for the 1985 Oldsmobile diesels is basically the same as with previous automotive pump models. The specifications now contain setting and checking data for the AFL as well as the MVS. Pump mounting arrangements are the same as with previous V-6 models but electrical requirements are more complex with the addition of the new 2-wire HPCA and AFL solenoids.

In the interests of economy, all of the electrical devices, including the MVS, can be powered by one variable voltage supply*, however, if two separate supplies are available it is easier to test the devices since we recommend 10 volts input to the MVS, while the other solenoids require only 8.8 volts.

*This is a departure from S.B. 395 where we stated that a separate voltage supply was needed to energize the ESO while testing the MVS because of electrical interference. The interference has been found to be insignificant.

We recommend an input voltage of 10VDC to the MVS because the specifications give the MVS output voltage as a percentage of the input voltage. Therefore, when 10 volts input is used, it is a simple matter to calculate output voltage.

To test all the devices using only one voltage supply, all testing of the solenoids (AFL, ESO, HPCA) must be carried out at 8.8 volts before turning the voltage up to 10.0 volts to check the MVS. Make connections to a single voltage supply as shown in Figure 9.

ONE VOLTAGE SUPPLY

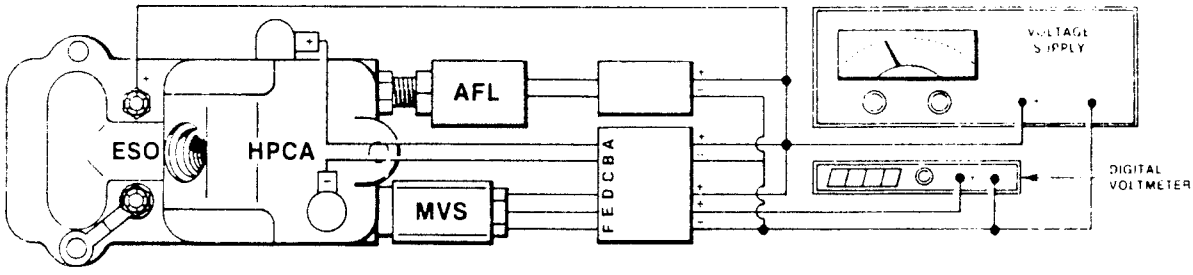


Figure 9

When two voltage supplies are available, connect them as shown in Figure 10 and set the one for the MVS to 10.0 volts. Set the other supply to 8.8 volts for the other devices.

TWO VOLTAGE SUPPLIES

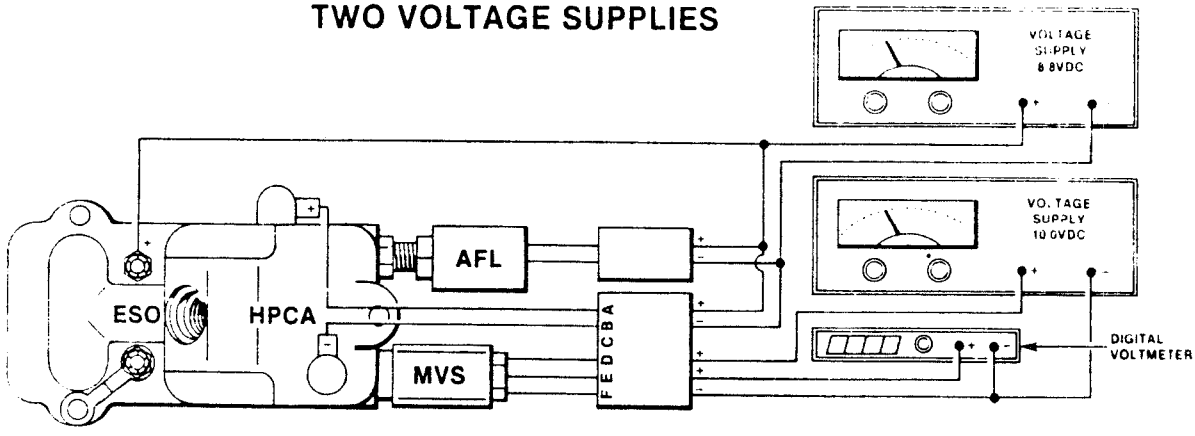


Figure 10

To perform solenoid tests, connect a digital voltmeter to the ESO terminals and with the pump operating and the ESO energized, adjust the voltage to 8.8 (Ref. S.B. 108). To check the other solenoids, connect a jumper wire with alligator clips on both ends between the positive ESO terminal and the positive HPCA terminal (side of cover), or the positive AFL terminal (either lead) as required, according to the specification. A second jumper wire will be required to ground the AFL and HPCA solenoids. Connect it between any convenient ground on the pump or test bench and the negative HPCA terminal (rear surface of governor cover), or the negative AFL terminal. If connection to the AFL proves difficult because of limited accessibility to the terminals within the connector, push a 21284 vacuum module drive pin into each AFL terminal to allow easy connection of alligator clips.

Make MVS connections as shown in Figure 9 when using one voltage supply or as shown in Figure 10 when using two.

The AFL solenoid is adjusted while energized, with the pump operating at the speed indicated on the specification and the throttle in the wide open position. *NOTE: After energizing the solenoid, the throttle must be cycled once to the low idle position and then back to WOT to allow the solenoid to pull in.* To adjust the fuel delivery to specification, loosen the locknut and rotate the solenoid body clockwise to increase fuel or counterclockwise to decrease fuel delivery. When set, tighten the locknut to 80-90 lbf.-inches (9-10 N-m). Be sure to de-energize the AFL before going on to the next step on the specification. When one voltage source is used, raise the voltage to 10.0 when the MVS and AFL are checked simultaneously.

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