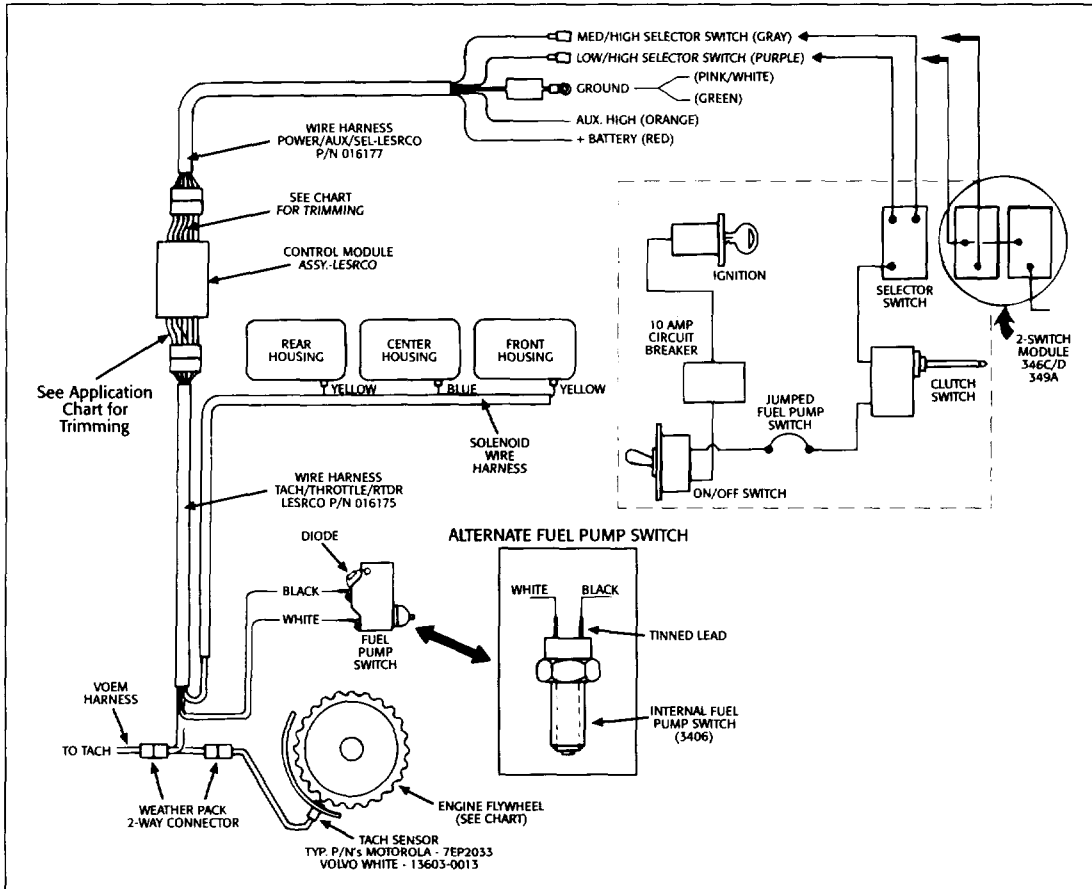




# Low Engine Speed Retarder Cutoff



## Application Chart

Engine Make & Model	Flywheel Teeth	Cutoff Speed (RPM)	Trim Required
Mack, Cummins NT	118	850	Cut both GREEN/YELLOW and BLUE/WHITE
Cummins 10 Liter	105	950	Cut both GREEN/YELLOW and BLUE/WHITE
CAT 3406	113	880	Cut both GREEN/YELLOW and BLUE/WHITE
CAT 3406	113	1060	Cut GREEN/YELLOW only
CAT 3306	132	910	Cut GREEN/YELLOW only
CAT 3306	156	960	Cut BLUE/WHITE only

Referring to the chart above, select the engine make and model and the desired cutoff speed (RPM) and cut the Control Module wires accordingly. Install caps on the ends of wires for insulation.

TROUBLESHOOTING

# Troubleshooting Instructions

## Low Engine Speed Retarder Cut-off

### Problem: Engine Brake will not operate.

**Probable Cause:** Power supply wire (RED) disconnected, not energized.

**Correction:** Check that the connector between the vehicle power supply and the red line to the Jacobs® control module is tight and free of any corrosion or oil. With the vehicle ignition turned on, +12 VDC must be measured at the red wire (Fig. 2). If not, continue with checks.

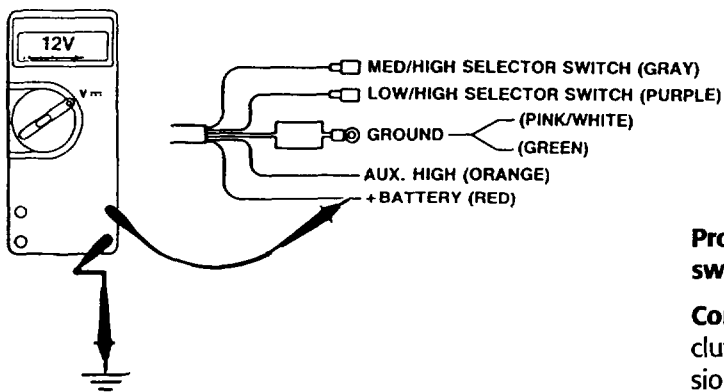


FIG. 2

**Probable Cause:** Blown fuse or circuit breaker.

**Correction:** Replace fuse (10 amp) or reset circuit breaker. Search for cause of blown condition.

**Probable Cause:** Disconnected or bad fuel pump switch.

**Correction:** Check that connections are made and are tight. Check for corrosion on terminals and clean as required. Check function of fuel pump switch. With the switch open, the VOM should register an "O.L." condition (Fig. 3). With the switch closed (plunger released), the VOM should register continuity. Replace as needed.

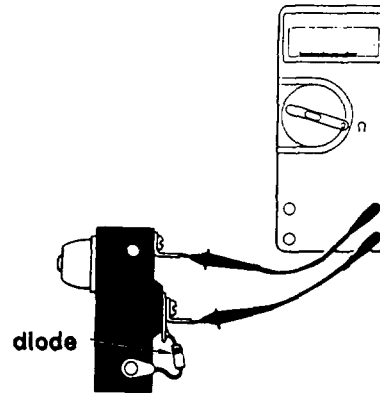


FIG. 3

**Probable Cause:** Disconnected or failed clutch switch.

**Correction:** Check that connections are tight on the clutch switch terminals. Check that there is no corrosion on connectors. Clean or replace as required. Check the clutch switch. With ignition ON and the Jacobs ON/OFF switch ON, measure the voltage at "A" (Fig. 4). VOM should read +12.5 VDC. At position "B" with switch closed, VOM should measure +12.5 VDC; with switch open, 0 VDC at position "B".

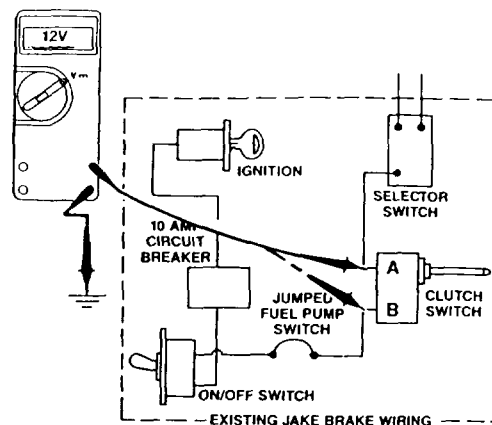


FIG. 4

# Problem: Engine Brake will not operate (cont.)

**Probable Cause: Disconnected or failed selector switch.**

**Correction:** Selector switch LO: 12.5 +/- 1 VDC must be applied to the PURPLE wire to activate the BLUE solenoid output wire.

Selector switch MED/HI: 12.5 +/- 1 VDC must be applied to the GRAY wire to activate the YELLOW solenoid output wire.

**Probable Cause: ORANGE wire grounded.**

**Correction:** ABS (Aux) connection High: ORANGE wire for normal operation is not used. If connected to VOM, reading should be +5 VDC. If connected to ground, engine brake will not operate.

**Probable Cause: PINK/WHITE wire not grounded.**

**Correction:** PINK/WHITE wire is connected to ground with the GREEN wire. If not connected to ground, brakes will not operate. VOM reading when not connected should be +5 VDC (Fig. 5).

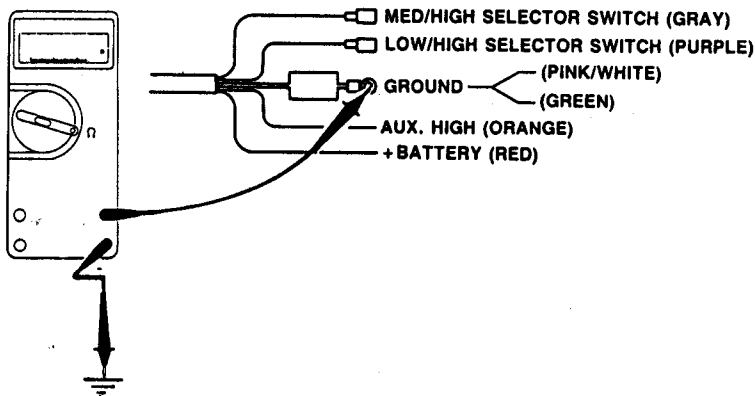


FIG. 5

**Probable Cause: GREEN wire not grounded or inadequately grounded.**

**Correction:** Ground reference must be 1 ohm or less measure with VOM.

**Probable Cause: Trim wires not properly cut.**

**Correction:** Check application chart (Fig. 1) for proper wires to be cut.

**Probable Cause: Failed or disconnected tach sender.**

**Correction:** Check that connections are tight with no evidence of corrosion. Disconnect harness at the control module. Measure resistance between tach sender wires; 50 - 300 ohms is a good reading (Fig. 6). The Motorola 7EP2033 or Volvo/White 13603-0013 will read 245-255 ohms.

Readings outside the accepted range indicate a short circuit or broken wire.

The sensor must be properly adjusted to manufacturers' specifications to generate the proper signal.

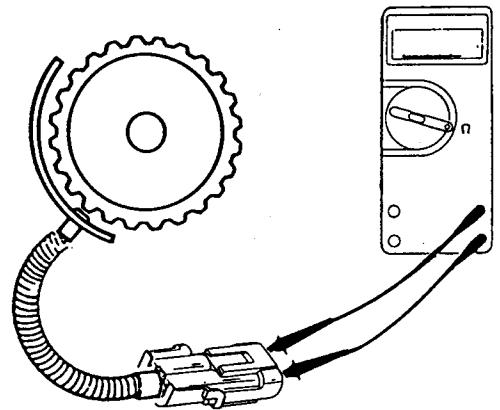


FIG. 6

**Probable Cause: Bad control module.**

**Correction:** If all the above steps check OK, replace control module.

# Problem: Brake modulation does not work properly.

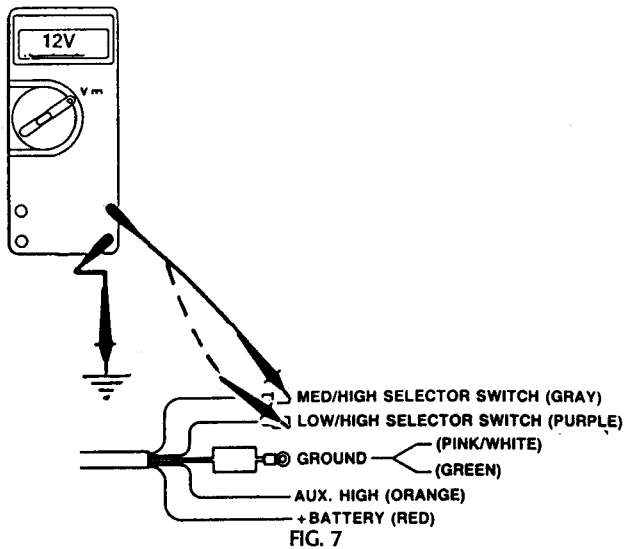
**Probable Cause:** GRAY and PURPLE input wires not connected or improperly connected to switch.

**Correction:** Check for tight connections and no corrosion.

- GRAY wire to MED/HIGH selector position.
- PURPLE to LO selector position.

**Probable Cause:** Selector switch failure.

**Correction:** With the selector switch in LO position, ignition ON and ON/OFF switch ON, measure voltage output at purple wire (Fig. 7). Proper reading should be 12.5 +/- 1 VDC. Measure output at gray wire. Output should be 0 VDC. Select HI position on selector. VOM should read 12.5 +/- 1 VDC at each output terminal.



**Probable Cause:** Blue and yellow output wires disconnected or reversed.

**Correction:** Check to be sure connectors are tight and there are no signs of corrosion. Check that the blue wire is attached to the center housing (3-housing installation) or the rear housing (2-housing installation). Insure the yellow harness is attached to the front or first and third housings.

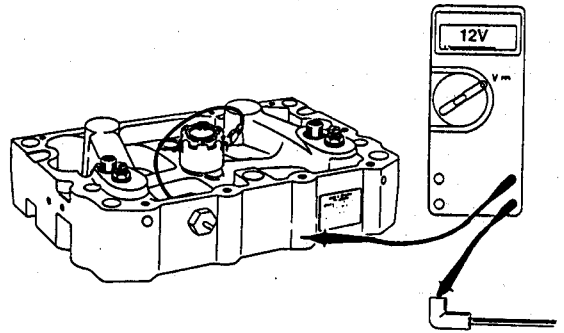


FIG. 8

With the engine operating, transmission in neutral, dash switch on, selector switch on high, accelerate engine to high idle and then release throttle. The VOM readings at the blue and yellow wires should be 12 VDC (Fig. 8).

Check that 12 VDC is present at housing connector(s). If engine brake does not operate, remove valve cover(s).

**Probable Cause:** Solenoid valve does not function.

**Correction:** Check to be sure solenoid harness is properly connected.

With electrical power OFF, check resistance of solenoid coil. VOM should read 9.75 - 10.75 ohms (Fig. 9). If it does not, replace solenoid valve.

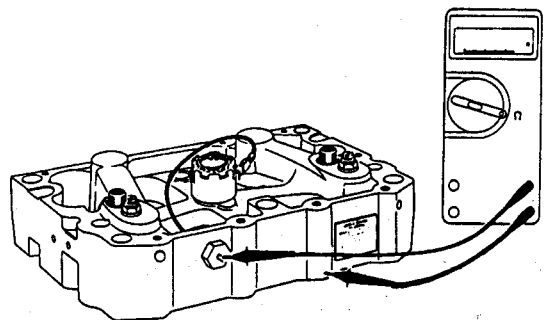


FIG. 9

# Problem: Engine Brake operation erratic.

## Probable Cause: Improper ground.

**Correction:** Using the VOM, measure the resistance from the point the GREEN wire is grounded to the engine block. Resistance must be no greater than 1 ohm. If resistance is greater than 1 ohm, the ground wire must be repositioned to the engine block.

The GREEN ground and the PINK/WHITE wire must be grounded alone. Grounding with other components at a common point may lead to "phantom" signals causing erratic operation.

## Probable Cause: Improper or insufficient tach signal.

NOTE:

ENGINE MUST NOT BE RUNNING FOR THIS TEST.

**Correction:** Disconnect Weather Pack connector from Jacobs® control module. Measure the resistance between the two wires from the tach sender (Fig. 10). An acceptable reading will be from 50 to 300 ohms. The Motorola 7EP2033 or Volvo/White 13603-0013 will read between 245-255 ohms. Readings outside this range indicate a short circuit or broken wires.

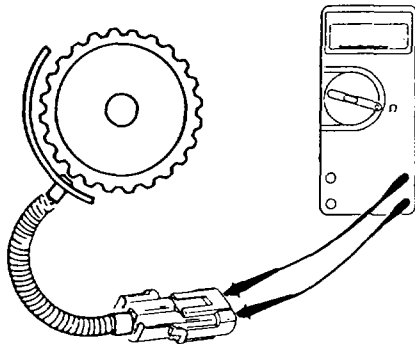


FIG. 10

## Probable Cause: Check that the tach sender is properly adjusted.

**Correction:** With engine running, measure AC voltage signal between 500-800 RPM and record reading (Fig. 11). Above 1000 RPM, the VAC should be greater. If it is not, replace the sending unit.

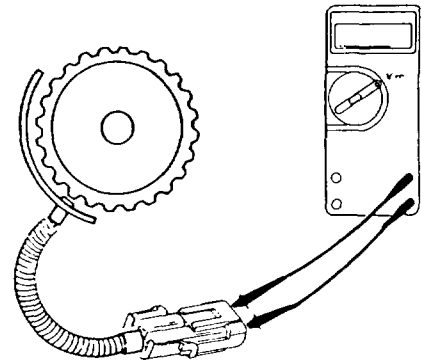


FIG. 11

## Probable Cause: Insufficient tach ground

**Correction:** Measure the resistance of each tach sender wire to ground (Fig. 12). The one wire with a reading of 0 ohms is at ground potential. This wire should be cut and the two ends insulated. If the problem continues, add a separate sending unit for the low speed signal.

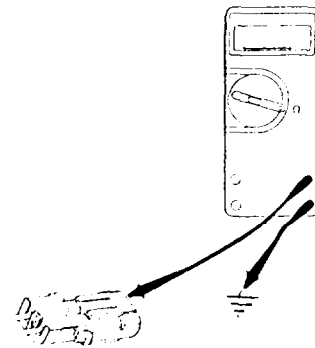


FIG. 12

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