

Principles of Operation - ESOFF - Electronic Shift on the Fly

The four-wheel drive electronic shift on the fly feature electrically shifts the vehicle transfer case between 2WD, 4X4 HIGH, and 4X4 LOW. The system mode is selected by the operator through a three-position rotary switch on the instrument panel. The operator is informed which mode the system is in by two cluster indicator lamps, one for 4WD HIGH, and one for 4WD LOW (in 4WD LOW, both the lamps are on). Shifts into 4X4 HIGH can be made at any speed. When shifting into or out of **LOW range**, the generic electronic module (GEM) requires that the vehicle speed be **less than 5 km/h (3 mph)**, the **brake applied**, and the **transmission in NEUTRAL** (A/T) or the clutch pedal be depressed (M/T). (The digital transmission range (TR) sensor informs the GEM when the transmission is in the **NEUTRAL range position**.)

The electronic shift motor is mounted externally on the transfer case. It drives a rotary cam which moves the mode fork and the range fork within the transfer case between the 4X4 HIGH, 4X4 LOW, and 2WD range positions.

The 4X4 shift motor uses two relays (see pic page 2) & (2002-2003 may have only one relay) which, under control of the GEM, shift the transfer case shift motor between 4X4 HIGH, 4X4 LOW, and 2WD modes.

The GEM accomplishes shifts system modes by interpreting inputs from:

- 4X4 selector switch.
- Vehicle speed signal (transmitted from the ABS system).
- Transfer case.
- Brake switch.
- Digital transmission range (TR) sensor (automatic transmission).
- Clutch pedal position switch (manual transmission).
- Ignition switch.

Based on these inputs, the GEM controls the shifts into 2WD, 4X4 HIGH, or 4X4 LOW with the following outputs:

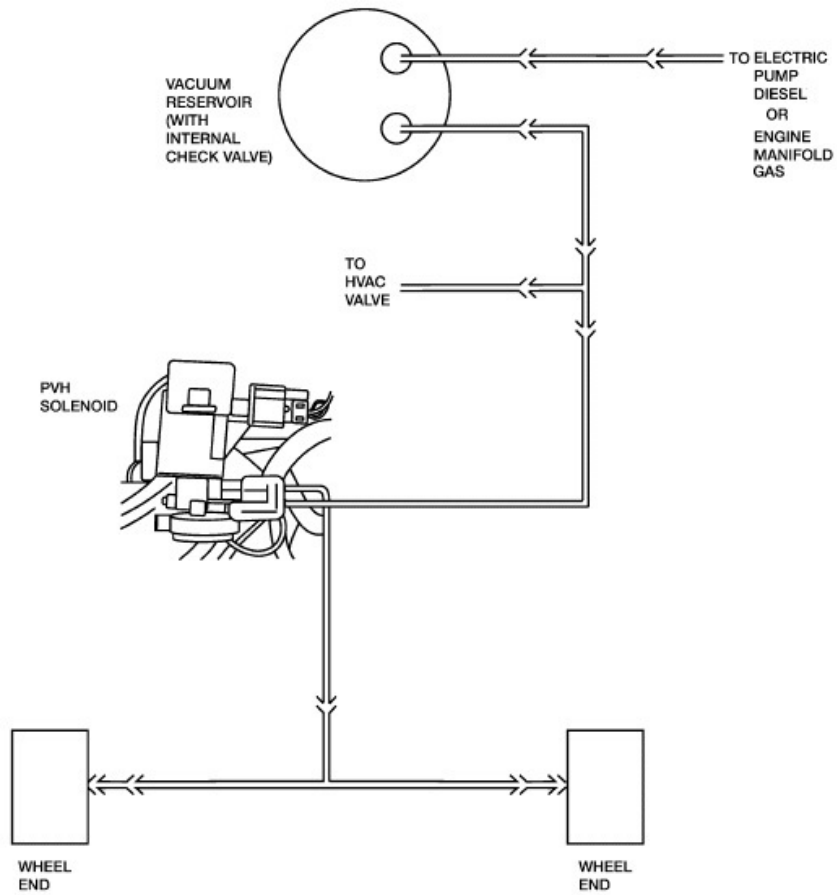
- Low to high relay.
- High to low relay.
- Vacuum hub lock solenoid.
- Transfer case shift motor.

The ESOFF system has a feature which allows the driver to override the vacuum operated hubs. When the front hubs are manually turned to the LOCK position, the hubs are locked at all times, overriding the vacuum operated system. If the front hubs are manually turned to the AUTO FREE position, the hubs can only be locked by turning the 4WD mode switch to one of the 4WD positions.

If the front hubs are unable to be unlocked by use of the 4WD mode switch, the hubs may be unlocked by turning the manual locking hub from the AUTO FREE position to the LOCK position and back to AUTO FREE.

See Next Page for ESOFF Vacuum Schematic & ESOFF Relays

Electrical Shift on the Fly (ESOF) Vacuum Schematic



GC1828-B

ESOF Relays

