



# Technical Service Information

## ALLISON MT545

### ELECTRIC MODULATOR OPERATION

**COMPLAINT:** The transmission shifts are too soft or too harsh. The transmission may have durability issues as far as burning the friction plates either before overhaul or prematurely, after overhaul.

**CAUSE:** One of the components in the electric modulator control system has failed.

**CORRECTION:** The electric modulator has only two positions, light throttle operation and heavy throttle operation. With light throttle the modulator is not energized, therefore, the transmission is using a set line pressure of approximately 155 psi. When the throttle is depressed to 80% or greater, the modulator is then energized and pressure is raised to insure proper clutch holding pressure. This is also important when the vehicle is fully loaded. It takes more throttle to move the vehicle thereby energizing the modulator to raise clutch pressure to insure durability. When the throttle is released to 60% or less, the modulator is released to avoid clunks on the downshifts.

The components involved are the vehicle's Engine Control Module, Accelerator Pedal Position Module, (See Figure 1), Modulator Control Relay, (See Figure 2), and the Electric Modulator, (See Figure 3).

The Accelerator Pedal Position Module sends its signal to the ECM. The ECM in turn energizes the normally open Modulator Control Relay which energizes the modulator. The modulator is provided with system voltage which depends on whether it is a 12 volt or 24 volt system. Once the modulator is energized its plunger shoots out and strokes the modulator valve. This system can be used in a non-computer controlled vehicle by the use of a throttle controlled ON/OFF switch.

The modulator can be mechanically faulty if it is stuck in or out, or, it can be electrically faulty if it is shorted or open.

The relay could be open which would not energize the modulator or it could be stuck closed which would result in the modulator not withdrawing.

If the APPM signal is faulty, the relay would not be energized or could be energized at all times.

The ECM could be faulty by not sending the necessary voltage to the relay or by sending all the time. The ECM in the vehicle is provided by the engine builder, (International, Cummins, Caterpillar, etc.). The relay and APPM is provided by the truck maker, (Ford, GMC, Freightliner, Mack, Etc.). The modulator is supplied by Allison.

The modulator has two wires, one is from the relay which provides electricity to the modulator. The other is ground which is usually grounded to the chassis nearby.

Check for system voltage to be present at the modulator on full throttle and no electricity when the throttle is released, (Refer to the wire diagram in Figure 4). In most cases the faulty component is usually the modulator or the relay.

#### SERVICE INFORMATION:

*12 Volt Electric Modulator.....29508036*  
*24 Volt Electric Modulator.....29508037*

## ELECTRIC MODULATOR OPERATION

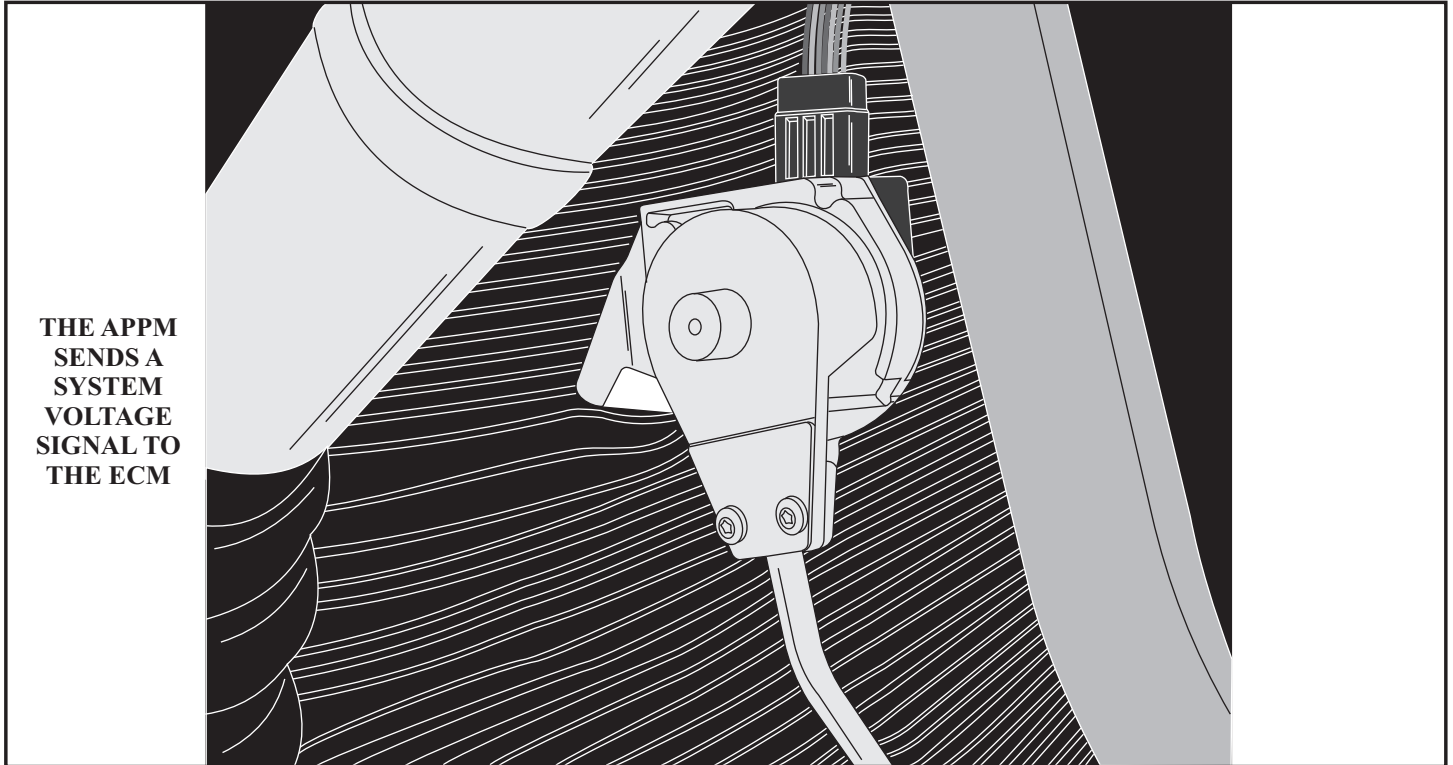


Figure 1

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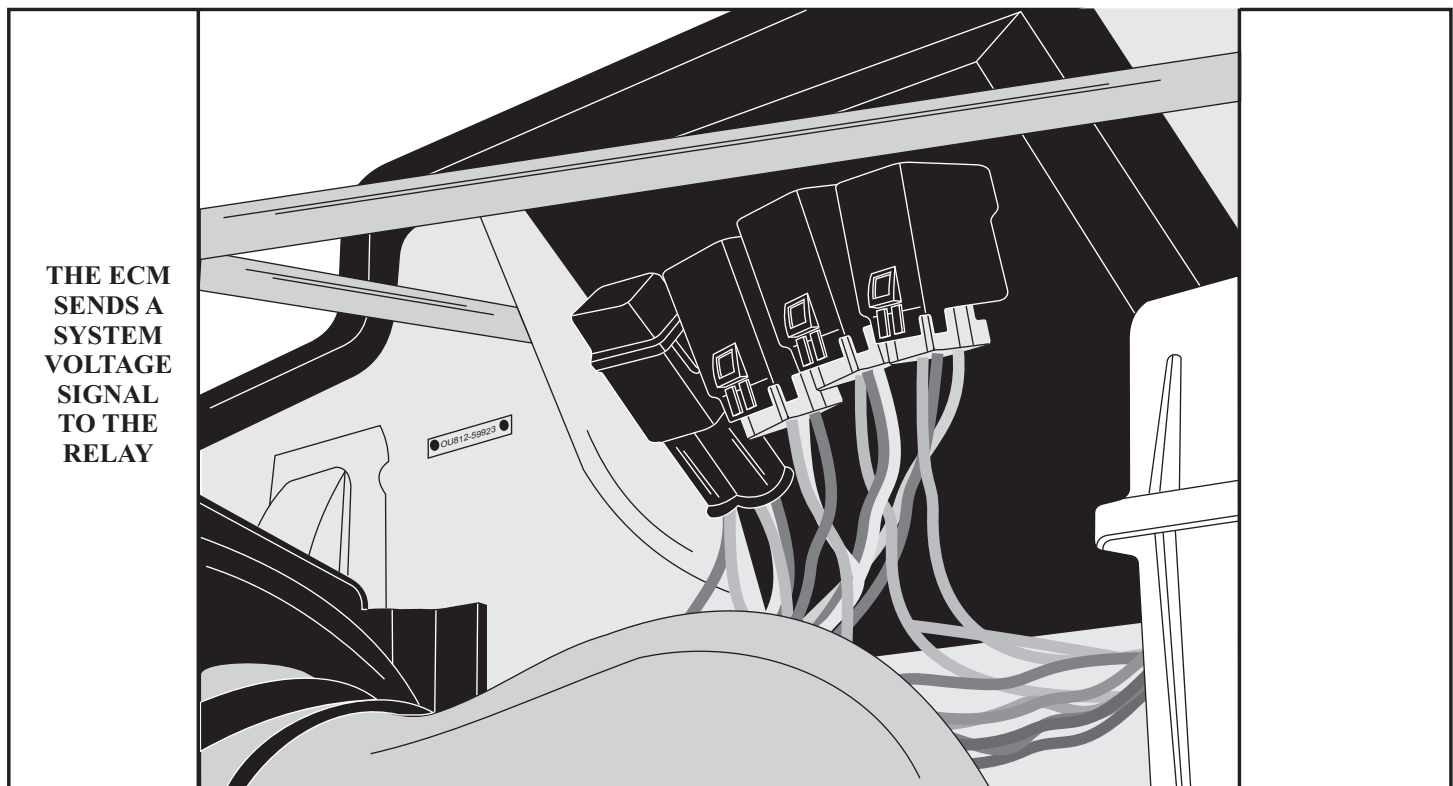


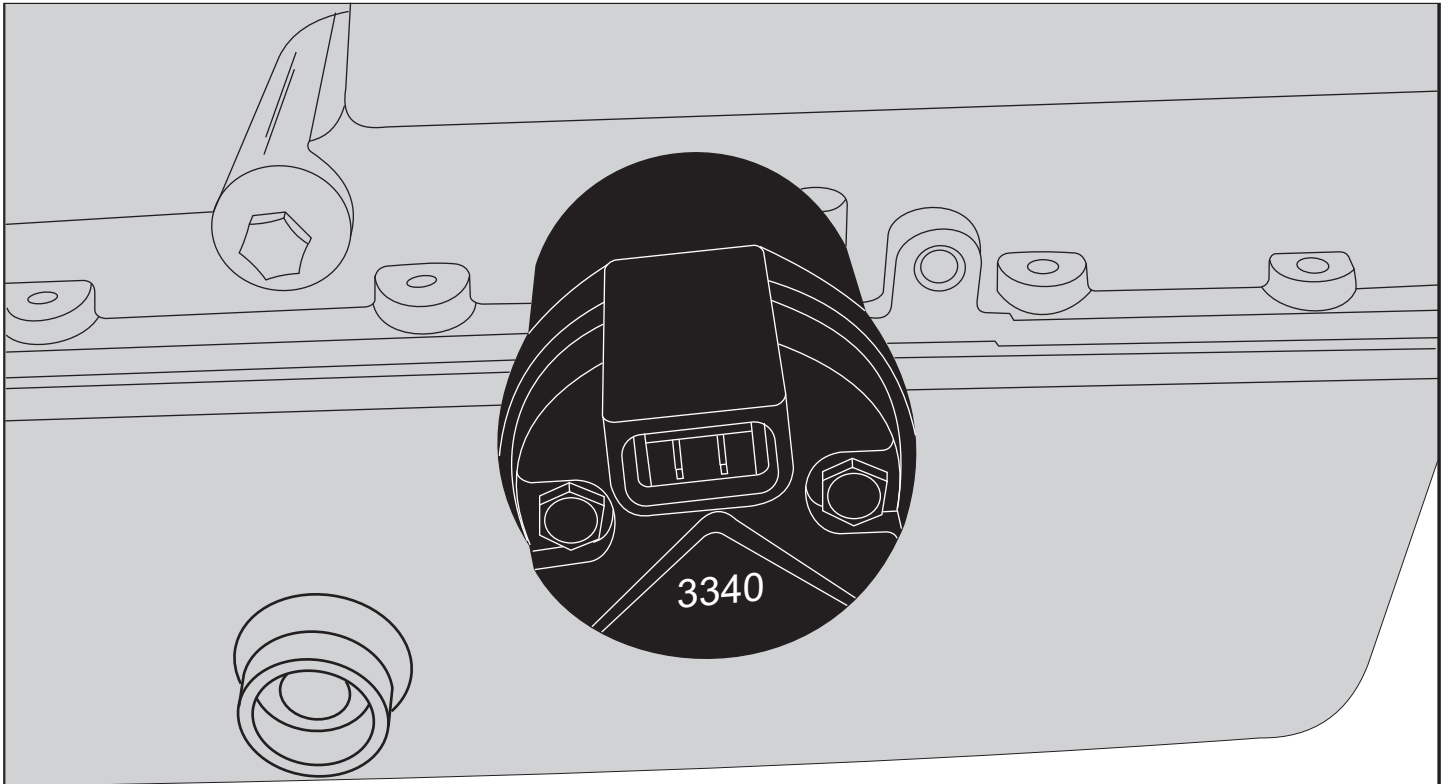
Figure 2

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## ELECTRIC MODULATOR OPERATION



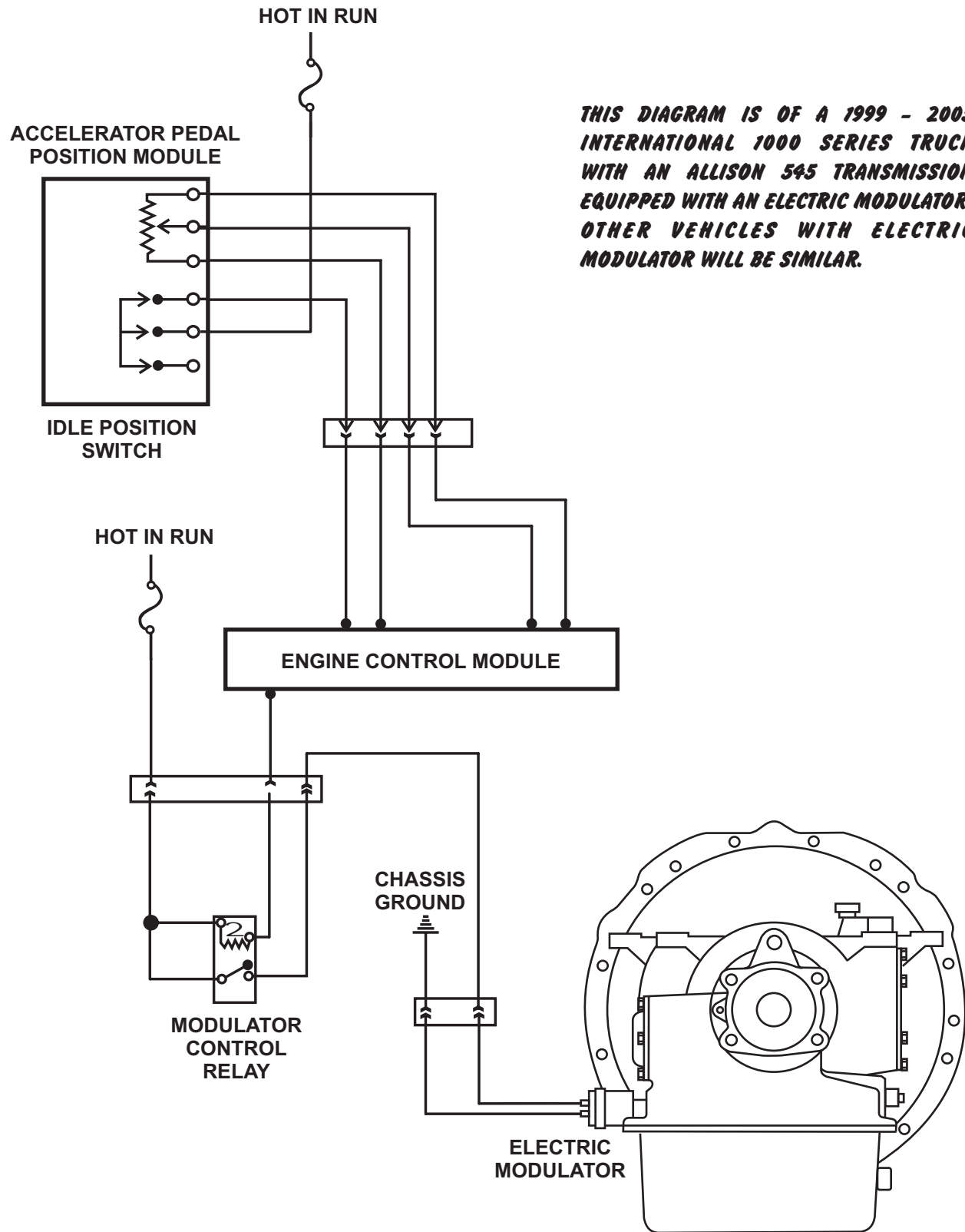
**THE RELAY SENDS A SYSTEM VOLTAGE SIGNAL TO THE MODULATOR**

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Figure 3

## ELECTRIC MODULATOR SYSTEM DIAGRAM

**THIS DIAGRAM IS OF A 1999 - 2005 INTERNATIONAL 1000 SERIES TRUCK WITH AN ALLISON 545 TRANSMISSION EQUIPPED WITH AN ELECTRIC MODULATOR. OTHER VEHICLES WITH ELECTRIC MODULATOR WILL BE SIMILAR.**



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Figure 4