



# Technical Service Information

## ISUZU 4L30-E

### SYSTEM VOLTAGE CONCERNS ON TROOPER/RODEO

**COMPLAINT:** Vehicle is in "Limp Mode" and code retrieval indicates a code 43 (Ground Control Relay circuit), or a *false* code 33 (Force Motor circuit shorted to ground) has been stored.

**Note:** *Shift or band apply solenoid codes can be stored when a Code 43 (Ground Control Relay Circuit) is stored. In addition to that, a Shift or Band Apply Solenoid fault may cause a Code 43 to be stored.*

After extensive wiring checks and solenoid circuits have been checked at the Transmission Control Module (TCM) connector, it is determined that the TCM will have to be replaced, because the Ground Control Relay is an internal component of the TCM. Unfortunately in many cases when the replacement TCM is installed, upon start up of the vehicle, the vehicle is once again in "Limp Mode" with the same code(s) stored.

***This means the newly replaced TCM has also been destroyed from the same cause.***

**CAUSE: (1) *Charging System Voltage Irregularities:*** The Isuzu vehicles are extremely susceptible to system voltage irregularities. The area of concern is charging system voltage. The Ground Control Relay circuit can be easily destroyed by charging system voltage that is too high.

This means that an electrical system check procedure should be established when this problem exists.

This begins with checking open post battery voltage, which should be approximately 12.6 volts, preferably after a load has been induced on the battery, as shown in Figure 1.

Next check the charging system voltage, on these vehicles it should not exceed 14.3 to 14.5 volts, as shown in Figure 2.

This can be caused by an overcharging alternator or, the incorrect alternator has been installed. Due to the heavy GM influence in Isuzu vehicles, an alternator made for a GM vehicle resembles the alternator found in Isuzu vehicles.

There is however, a major difference being, the average GM alternator usually puts out a charging system voltage of approximately 14.9 to 15.3 volts. This is too much voltage output for an Isuzu system, which is designed to operate within the 14.3 to 14.5 volt range. If the above checks are good, the shift and band apply solenoid circuits will have to be checked for resistance to insure circuit integrity.

In some cases the main case connector is at fault and can be replaced using the 4T60 square case connector.

**CAUSE: (2) *A Loss of Ground:*** The second cause indicates, that somewhere in the vehicle the TCM main ground has been lost. This can also be caused by a faulty negative battery cable.

The main TCM grounds in these vehicles are usually located in the most obscure places which is what makes them so easy to overlook.

**Continued on Page 2.**

Copyright © 2003 ATSG

## CORRECTION NO. 1:

Make certain the battery is in good condition. If alternator replacement becomes necessary, make certain that the replacement alternator indicates, somewhere on the alternator or its package, "**MADE FOR AMERICAN ISUZU MOTORS**", as shown in Figure 2, in order to avoid an over voltage problem for the TCM.

Utilizing the chart shown in Figure 3, ensure shift and band apply circuit integrity by checking solenoid resistance which will also check the integrity of the case connector.

## CORRECTION NO. 2:

Check the main TCM ground circuits, that are in different locations, depending on model year and vehicle. For Trooper vehicles, refer to Figures 4 and 5. For Rodeo vehicles, refer to Figures 6 and 7. Check the negative battery cable condition at both ends. Use the voltage drop method on all ground checks, and repair *any* ground circuit that contains 300 millivolts or higher, as shown in Figure 8.

### OPEN POST BATTERY VOLTAGE

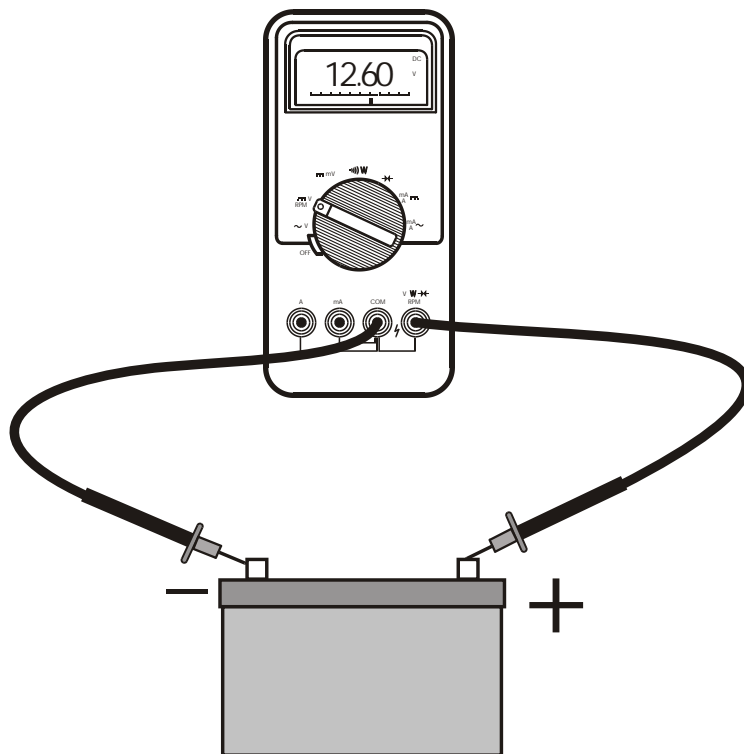


Figure 1

## ALTERNATOR MADE FOR ISUZU VEHICLES

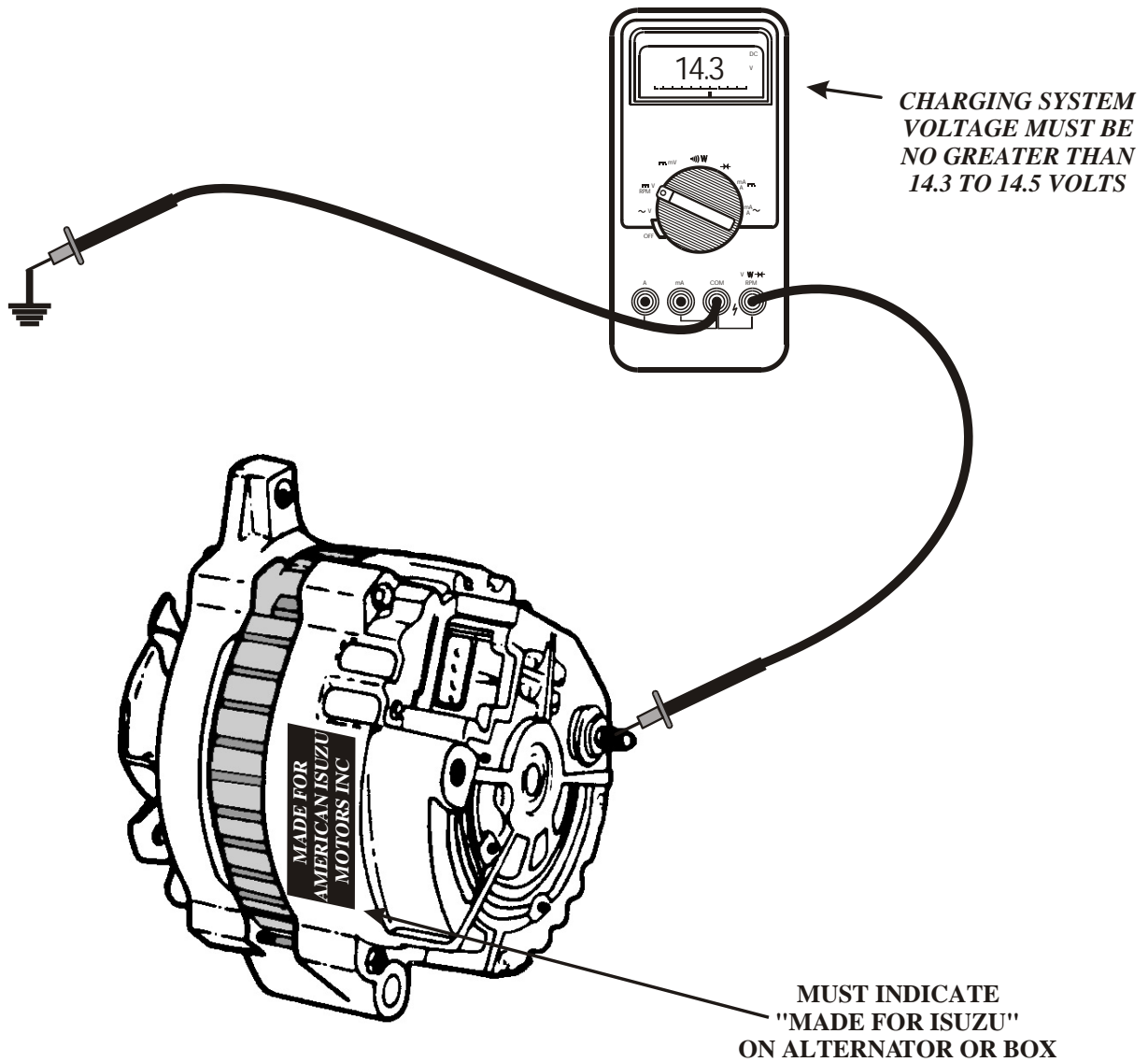
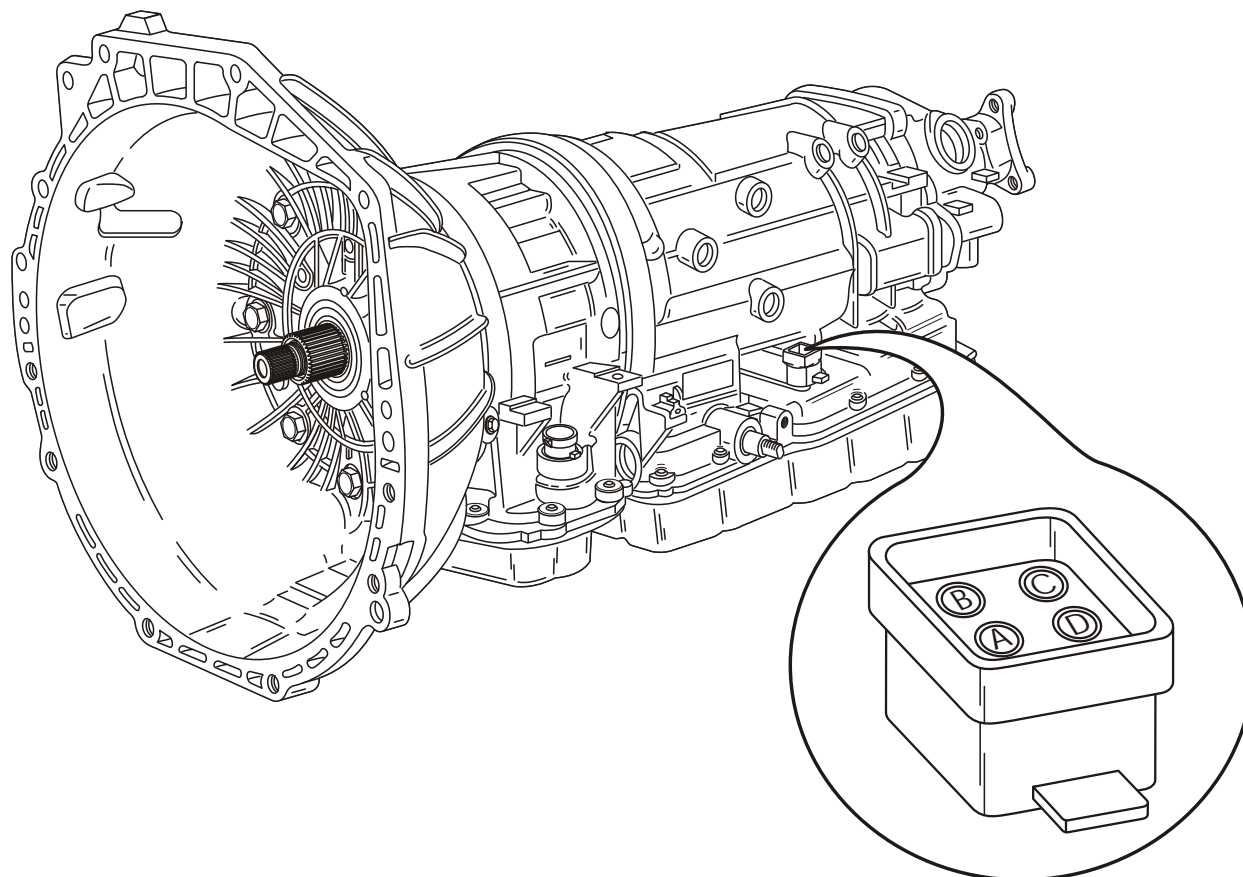


Figure 2

## CONNECTOR AND TERMINAL IDENTIFICATION

*As seen looking into the Main Case Connector, terminal "A" is toward the front outside of the case. Unlike most General Motors style case connectors, terminal "A" is not the 12 volt signal that is sent through the brake switch.*



FUNCTION	TERMINAL	WIRE COLOR		RESISTANCE IN OHMS
		INSIDE	OUTSIDE	
2-3 SOLENOID 12 VOLT POWER	"A"	White	Brown & Black	Between "A" and "C" 17.5W - 18.5W
1-2/3-4 SOLENOID 12 VOLT POWER	"D"	Black	Brown & Red	
SOLENOID GROUND CONTROL	"C"	Brown	Brown & White	
BAND APPLY SOLENOID 12 VOLT POWER	"B"	Blue	Brown & Yellow	Between "B" and "C" 9.5W - 10.5W

## 1990-1991 TROOPER

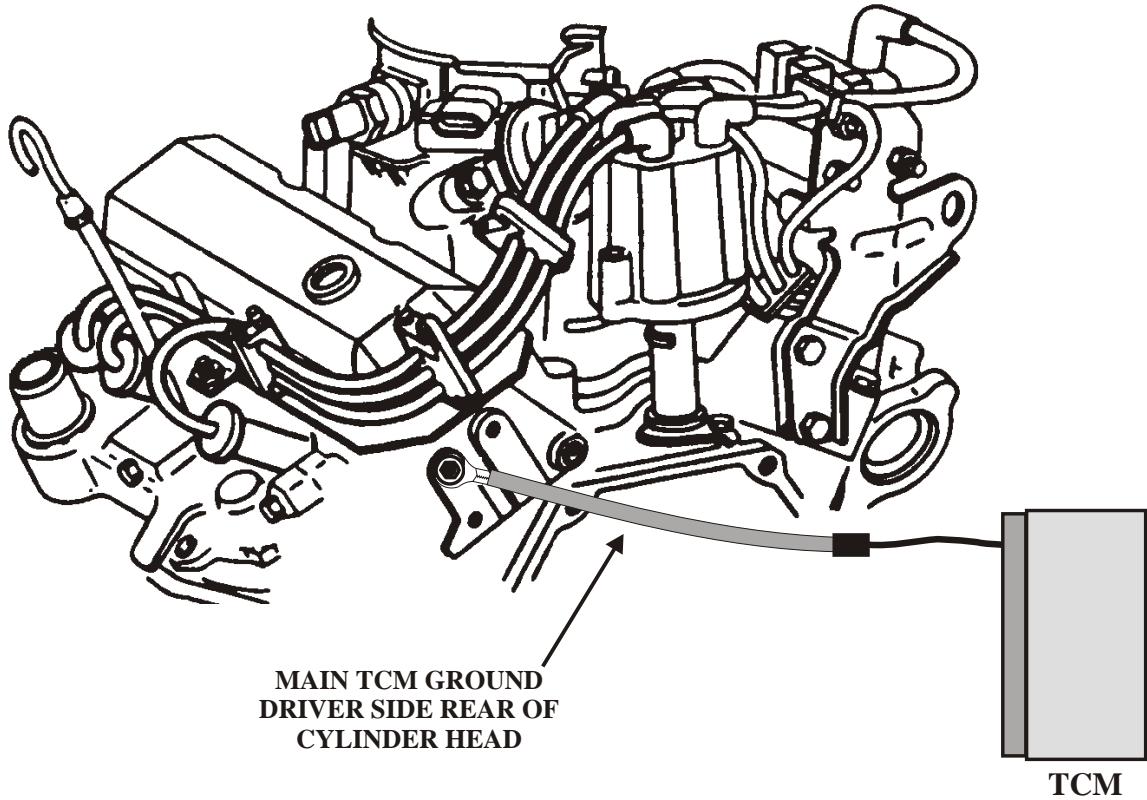


Figure 4

## 1992-1993 TROOPER

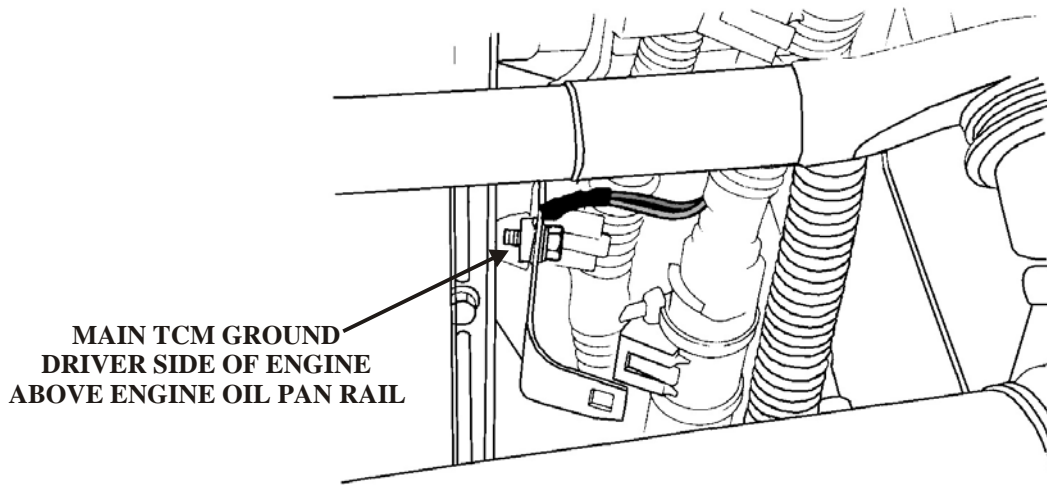


Figure 5

## 1991-1992 RODEO

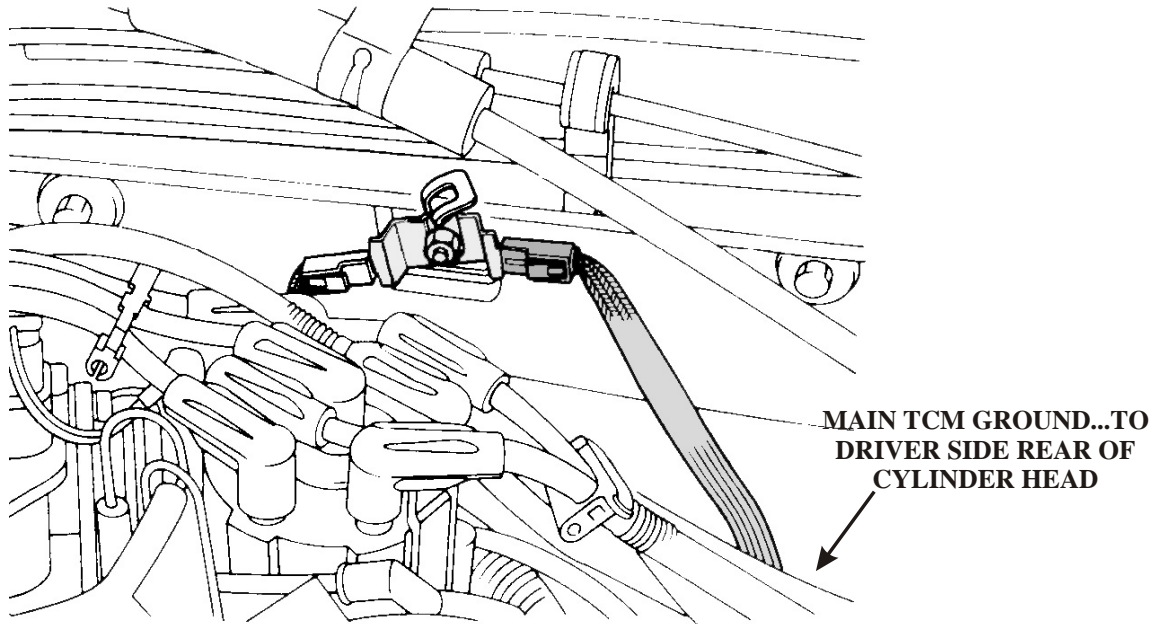


Figure 6

## 1993 RODEO

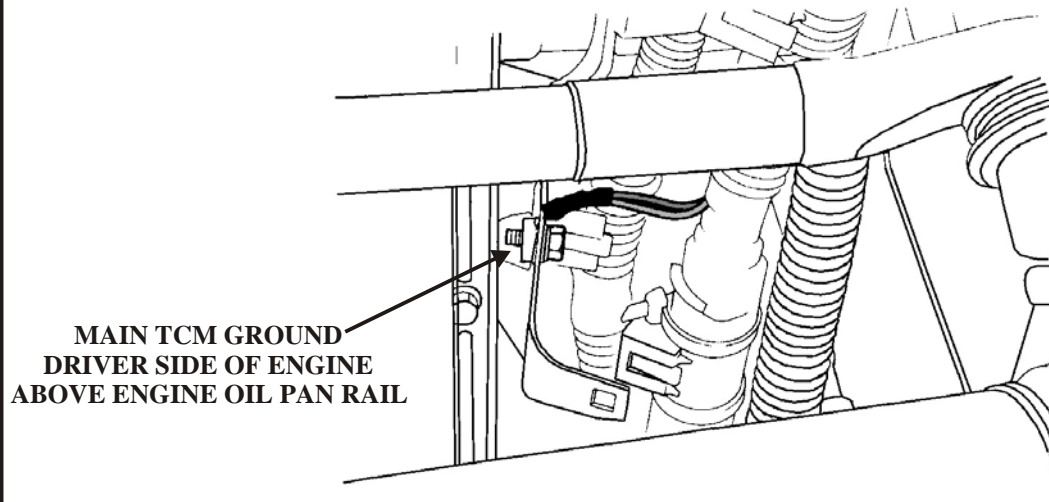


Figure 7

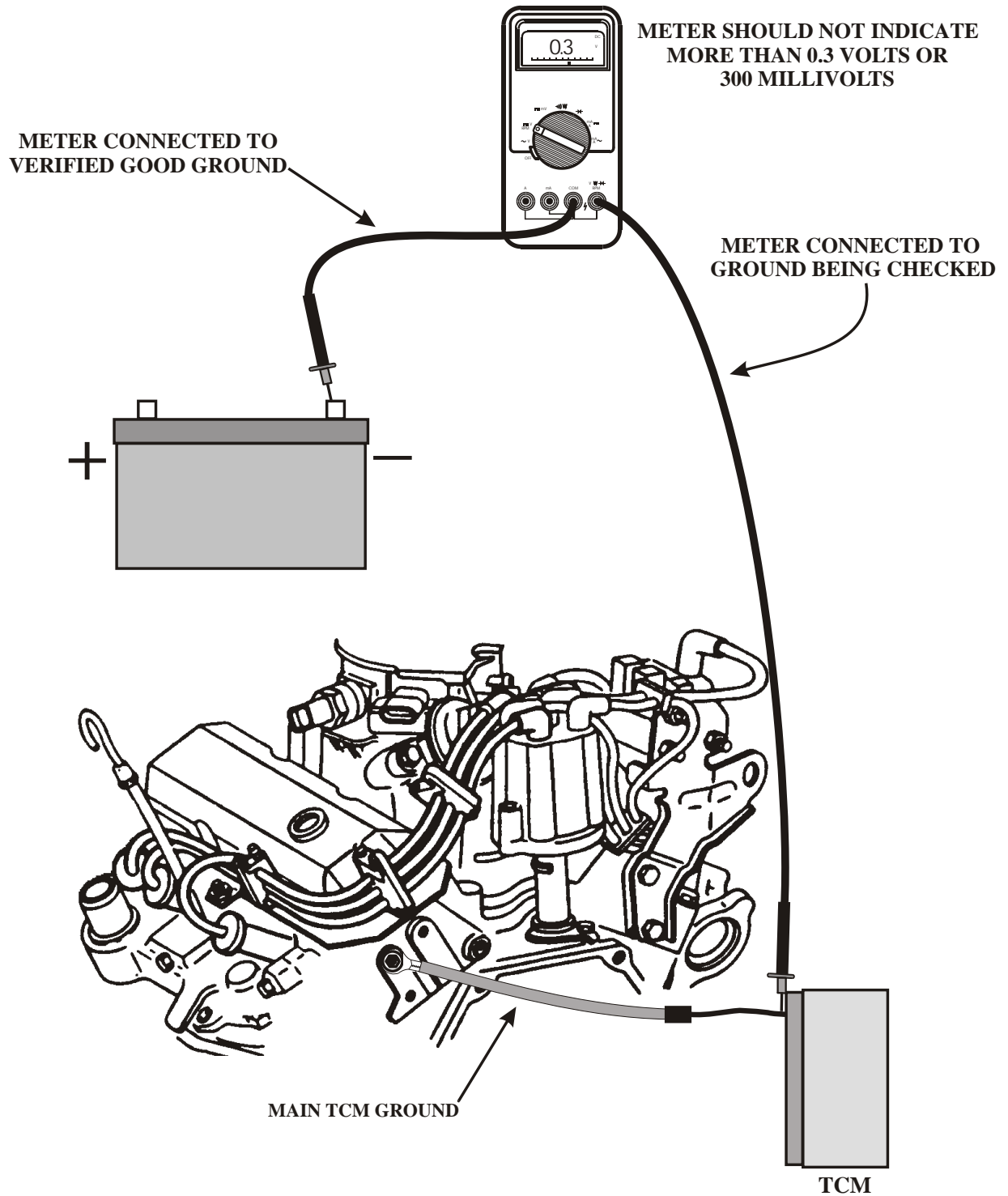


Figure 8