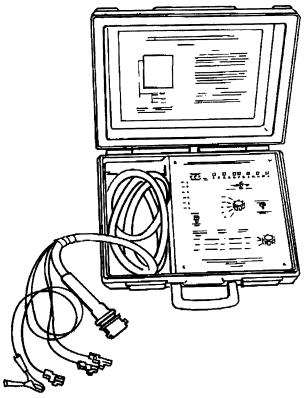
62TE Transmission Simulator Adapter Harness Manual

Kit Number 9944



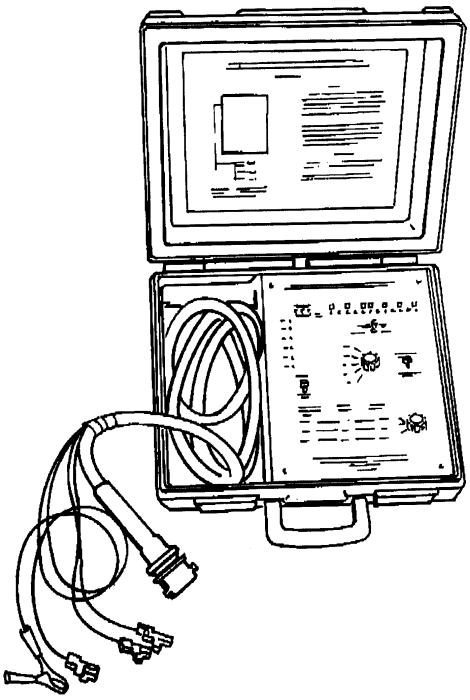
Used with the 8333 Transmission Simulator

Reference Guide

SPX MILLER SPECIAL TOOLS

541263
12/05/06

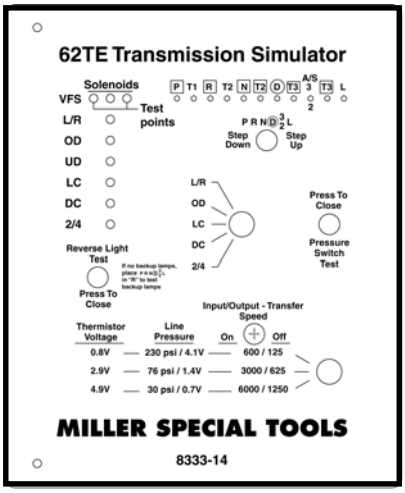
INTRODUCTION



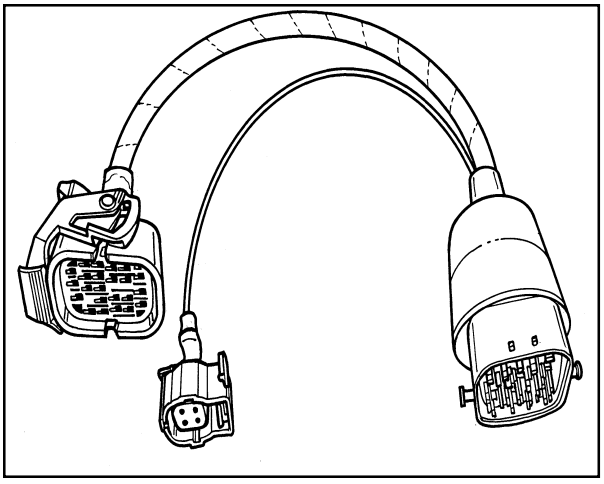
MILLER SPECIAL TOOLS 8333 TRANSMISSION SIMULATOR (USED ON 45RFE)

The following information covers the installation and use of the Miller Special Tools 9944 Transmission Simulator kit. The Transmission Simulator facilitates testing the transmission circuits and the control module under operating conditions. Proper use of the Simulator will result in quicker and more accurate diagnosis of transmission symptoms. Distinguishing between transmission electronic hardware failure and control module\wiring harness failures can be made easily and accurately. The Transmission Diagnostic Procedures can then be used to repair the identified wiring circuit or component.

The Transmission Simulator uses the vehicle wiring harness to supply all power requirements necessary to generate the signals sent to the control module. By receiving power from the vehicle harness, the Simulator allows testing of all the transmission circuits under actual circuit loads.



TRANSMISSION SIMULATOR PANEL OVERLAY



62TE TRANSMISSION ADAPTER HARNESS, p/n MLR-9944

PRELIMINARY DIAGNOSIS

The following steps and procedures must be performed prior to performing any diagnosis using the 8333 Transmission Simulator. Confirm the scan tool is functioning properly and the vehicle's communication bus is operational. Always diagnose and repair any BUS Communication problems before starting any diagnosis of the transmission system.

1) Remove the starter relay or the ignition switch feed fuse from the Totally Intergraded Power Module (TIPM).

⚠ Danger:
The vehicle's engine is able to start in any gear when the 8333 Transmission Simulator and 9944 adaptor cable are installed. Removal of the starter relay or the ignition switch feed fuse from the TIPM will prevent the vehicle from being started in gear. The starter relay or the ignition switch feed fuse must be removed; failure to do so can result in personal injury or death.

2) Place the vehicle gear selector lever in the **PARK** position.

3) Connect the scan tool to the vehicle data link connector.

4) Turn the ignition to the **ON** position.

5) Note the scan tool display.
   - If the scan tool display is blank or displays an internal error message, refer to any Diagnostic manual for corrective procedures.
   - Otherwise, proceed to the next step.

6) Using the scan tool, check for any engine diagnostic trouble codes (DTCs) or single trip failures stored in the control module.
   - If any DTCs are present, refer to the Powertrain Diagnostic Procedures to diagnose and repair any engine DTCs.
   - If no DTCs are present, proceed to the next step.

NOTE:
If the vehicle is equipped with a NGC4 controller, be aware that the NGC4 controller uses only one Central Processing Unit (CPU). Both the engine and transmission diagnostic trouble codes (DTCs) are listed under one selection on the scan tool. There is no separate Transmission selection unless the vehicle is equipped with a Transmission only NGC4 controller (diesel application).

SYMPTOM VERIFICATION

1) With the scan tool, select either PCM (NGC4) or Transmission from the scan tool menu and perform the Shift Lever Position Test. Follow the test instructions on the scan tool.
   - If the test did not pass, refer to the appropriate Transmission diagnostic procedure.
   - If the test passes proceed to the next step.

2) With the scan tool, check for transmission DTCs. This includes active (hard), one-trip, and stored DTCs. Record your findings. Note: It is highly recommended to also record the DTC Event Data for any DTCs that may be present. This information is proven to be highly beneficial in diagnosing transmission DTCs.

3) Using the scan tool, erase all DTCs .

4) Refer to the Transmission Diagnostic Procedures for information regarding the conditions required to set each DTC or one-trip failure.

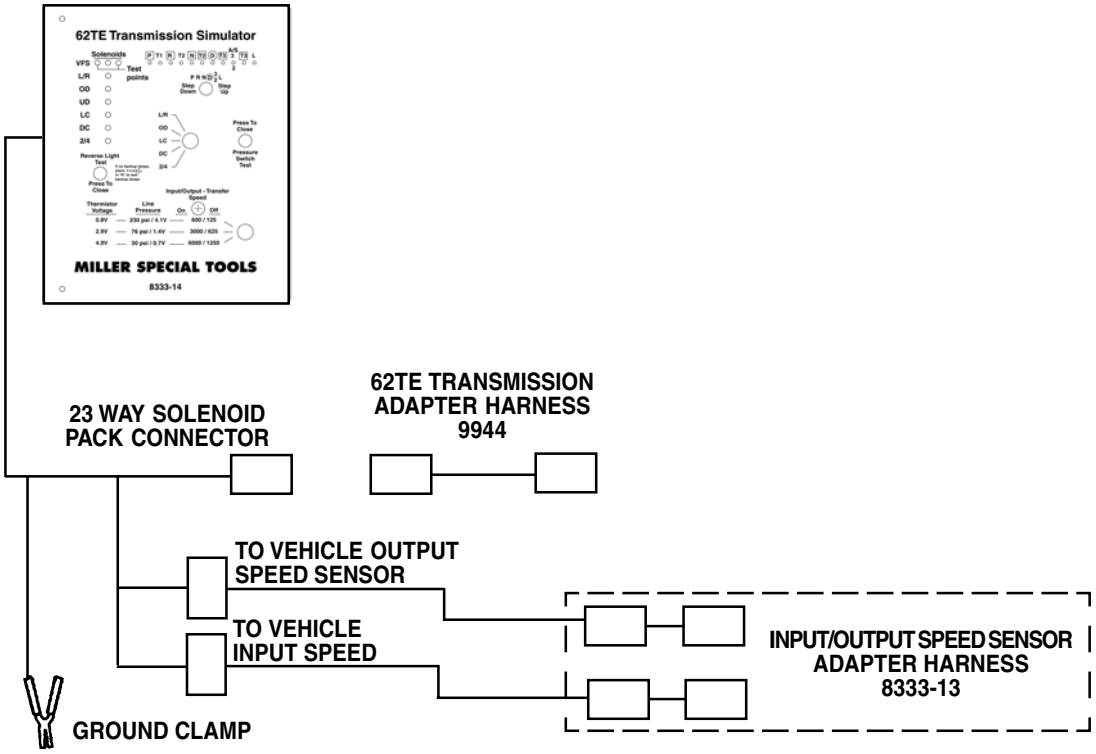
5) Perform the applicable instructions and attempt to reset each recorded DTC or one-trip failure.

6) Any DTC or one-trip failure that can be repeated is considered a **HARD CODE**.

7) Any DTC or one-trip failure that cannot be repeated is considered an **INTERMITTENT CODE**.

*Once the **Preliminary Diagnosis** and **Symptom Verification** procedures are complete, you know the scan tool and the control module are communicating over an operational vehicle communication bus. You also know whether the DTCs or one-trip failures, which have been stored in the control module, are hard or intermittent codes. The Transmission Simulator can now be installed.*

TRANSMISSION SIMULATOR INSTALLATION



1) Ensure the vehicle ignition is in the **LOCK** position.

NOTE:
*If the transmission solenoid/TRS assembly harness connector is removed while the ignition is in the **ON** or **RUN** position, a DTC will be set indicating that the control module has seen an invalid state. If this DTC is set, it must be erased prior to any further testing.*

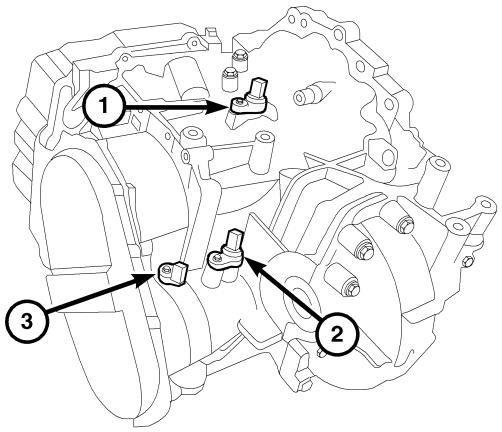
2) Raise the vehicle on a suitable hoist.

3) Inspect all transmission connectors and wiring for visible damage or corrosion. Repair and retest as necessary.

4) Disconnect the input speed sensor harness connector and either the output speed sensor or transfer speed sensor harness connector.

NOTE:
There are three speed sensors used on the 62TE transmission however there are only two possible connections on the Transmission Simulator. Only two speed sensors can be tested using the transmission simulator at one time. The output and transfer speed sensors share the same output speed sensor connector. The input speed sensor should always be connected to the transmission simulator input speed sensor connector. When connecting either the output or transfer speed sensor connector to the simulator, it is necessary to leave the remaining sensor connected to the vehicle harness to avoid setting a DTC.

1. **INPUT SPEED SENSOR**
2. **OUTPUT SPEED SENSOR**
3. **TRANSFER SPEED SENSOR**

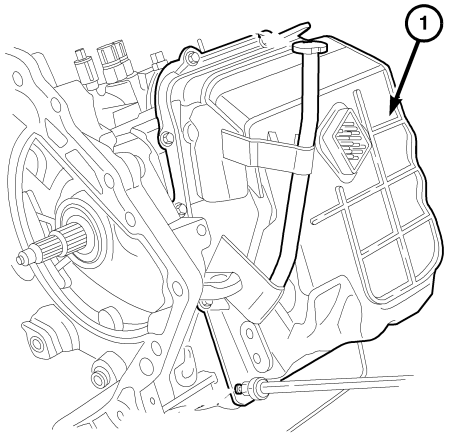


62 TE Transaxle - Side 1

5) Inspect the speed sensor connectors and the speed sensors for terminal damage, deformation, or corrosion. Repair and retest as necessary.

6) Disconnect the transmission solenoid/TRS harness connector.

1. **TRANSMISSION SOLENOID/TRS ASSEMBLY**



62TE Transaxle - Side 2

7) Inspect the transmission solenoid/TRS assembly harness connector for terminal damage, deformation, or corrosion. Repair and retest as necessary.

8) Connect the 62TE transmission adapter harness (MLR-9944) and the Input/output speed sensor adapter harness (8333-13) to the vehicle harness.

9) Install the 62TE transmission simulator panel overlay (8333-14) onto the face of the Transmission Simulator (Special Tool 9944).

10) Connect the Transmission Simulator to the vehicle wiring harness.

11) Connect the Transmission Simulator ground cable to a suitable vehicle ground.

NOTE:
*Ensure that the Simulator ground clamp is secure. If the ground clamp loses contact with the vehicle ground once the ignition is moved to the **ON** or **RUN** position, the Simulator will power down and a DTC will be set.*

12) Turn On the ignition to the **RUN** position.

13) If the transmission relay does not power on, the Transmission Simulator will not power on either. The red **PARK** LED in the TRS portion on the Simulator control panel will not be illuminated.

14) If the Transmission Simulator is not powered on, the source of the DTC is still present. Diagnose the control module\wiring using the Transmission Diagnostics Procedures.

15) If the transmission relay powers on, the Transmission Simulator will power up with a single red **PARK** LED illuminated.

*With the Transmission Simulator correctly installed and ready for use, you can evaluate possible causes of the DTC retrieved from the control module. Perform **ONLY** the following tests, which are necessary to implicate or exonerate the suspect component/circuit. Refer to the chart at the rear of this document to determine which tests are necessary for a particular DTC. Use the Test Checklist at the end of this document to record the results of any tests performed.*

SHIFT LEVER POSITION TEST

1) With the scan tool, perform the **SHIFT LEVER POSITION TEST**.

2) Use the Step Up/Step Down momentary contact toggle switch on the Transmission Simulator control panel to step through the shift lever positions per the scan tool test directions.

3) When directed by the scan tool, activate the **AUTOSTICK®** up and down feature to complete the shift lever position test.

4) Did the **SHIFT LEVER POSITION TEST** pass?
   - If the test did not pass, proceed to the Transmission Range Sensor Test.
   - If the test passed with the Simulator connected, but did not pass with the transmission connected, proceed to the Test Interpretation section at the end of this document.
   - If the test passed with the Simulator connected and with the transmission connected, proceed with any other necessary tests.

TRANSMISSION RANGE SENSOR TEST

1) Display the TRS signal line states on the scan tool screen. The signal lines are displayed T1, T3, T41, T42, etc.

2) Use the Step Up/Step Down momentary contact toggle switch on the Transmission Simulator control panel to select each shift lever position. Using the TRS switch state tables provided below, compare the switch states displayed on the scan tool to the states in the table.

SLP	T41 (C1)	T42 (C2)	T3 (C3)	T1 (C4)
P	CLOSED	CLOSED	CLOSED	OPEN
R	OPEN	CLOSED	OPEN	OPEN
N	CLOSED	CLOSED	OPEN	CLOSED
OD	OPEN	OPEN	OPEN	CLOSED
3	OPEN	OPEN	CLOSED	OPEN
L	OPEN	CLOSED	CLOSED	CLOSED

3) Record the values displayed by the scan tool for each signal line on the checklist. Note whether or not a particular signal line never switches states.

4) Proceed to the Test Interpretation section at the end of this document.

REVERSE LIGHT SWITCH TEST

1) Depress the reverse light switch test button on the Simulator control panel.

2) Check to see if the vehicle reverse lights illuminate while the switch is depressed.

3) May need to shift toggle switch to R (reverse).

4) Proceed to the Test Interpretation section at the end of this document.

PRESSURE SWITCH TESTS

1) Display the transmission pressure switch states on the scan tool screen.

2) Use the Pressure Switch rotary knob on the Simulator control panel to select the pressure switch to be tested.

3) Depress and hold the Pressure Switch Test button on the Simulator control panel.

4) View the selected pressure switch state on the scan tool, and note if the pressure switch state display switches to **CLOSED** when the test button is depressed and held.

NOTE:

Due to the scan tool update rate, it may take a moment for the display to toggle states after the switch is depressed.

5) Use the Pressure Switch rotary knob to select each of the remaining pressure switches, and repeat steps 3 and 4 until all switches have been tested. Record the results of each pressure switch test on the checklist.

6) Proceed to the Test Interpretation section at the end of this document

SENSOR TESTS

1) Verify that the Input-Output / Transfer Speed sensor switch on the Simulator control panel is in the **ON** position.

NOTE:

*With the switch in the **OFF** position, the scan tool will display zero output speed; and the input speed will be displayed as selected by the rotary knob position.*

NOTE:

There are three speed sensors on the 62TE transmission but only two connections on the Transmission Simulator. This means two speed sensors are tested with each setup.

a) Connect the input speed sensor to the transmission simulator input speed sensor connector.

b) The output and transfer speed sensors share the same output speed sensor connector. When connecting either the output or transfer speed sensor connector to the simulator, it is necessary to leave the remaining sensor connected to the vehicle harness to avoid setting a DTC.

2) Rotate the Sensor Value rotary knob on the Simulator control panel to the top position.

3) Use the scan tool to view the Input and Output or Transfer Speed sensor, Variable Line Pressure (VLP) transducer, and transmission temperature (thermistor) voltage readings.

4) Compare the scan tool readings to the values on the Simulator control panel. Record the sensor values displayed by the scan tool on the checklist.

NOTE:

It is normal for the Input and Output or Transfer Speed speed sensor readings to vary from the Simulator panel by a few rpm.

5) Switch to each of the remaining sensor value positions on the Simulator, repeat steps 3 and 4.

6) Proceed to the Test Interpretation section at the end of this document.

SHIFT SOLENOID ACTUATOR TESTS

1) Choose the **ACTUATORS** selection from the scan tool menus.

2) Verify the Input-Output / Transfer Speed sensor switch on the Simulator control panel is in the **OFF** position.

NOTE:
The control module will not permit the actuator tests to run if the control module "sees" an output speed signal greater than zero rpm.

3) Select the solenoid to be tested from the scan tool menu and begin actuation.

4) The green LED on the Simulator control panel next to the selected solenoid will begin to flash if the vehicle is capable of supplying the current and voltage to turn on a correctly functioning transmission shift solenoid.

NOTE:
To prevent the possibility of having three clutch elements applied at once when this test is performed with the transmission connected and the engine running, the control module turns on the normally applied transmission solenoids, OD and 2-4. This means that three LEDs (OD, 2-4, and the selected solenoid) may be illuminated at the same time.

5) Note if any solenoid does not respond to the actuation command from the scan tool or if any LED repeatedly flashes differently from the other LEDs. Record the results of the tests on the checklist.

6) Proceed to the Test Interpretation section at the end of this document.

TEST INTERPRETATION

1) If the DTC was a **HARD** code, and the above diagnostics showed no discrepancies between the expected reading/response from the Simulator and the displayed reading/response of the scan tool,

   - The source of the DTC is the transmission component associated with the DTC.

2) If the DTC was a **HARD** code, and the above diagnostics showed discrepancies between the expected reading/response from the Simulator and the displayed reading/response of the scan tool,

   - The source of the DTC is the vehicle wiring/control module.
   - Analyze the test where the discrepancy was noted to isolate the source of the DTC to an individual circuit or the control module.
   - Refer to the Transmission Diagnostics for corrective procedures.

3) If the DTC was an **INTERMITTENT** code, and the above diagnostics showed discrepancies between the expected reading/response from the Simulator and the displayed reading/response of the scan tool,

   - Refer to the DTC event date to help duplicate the same conditions when the DTC was originally set.
   - The source of the DTC is the vehicle wiring/control module.
   - Analyze the test where the discrepancy was noted to isolate the source of the DTC to an individual circuit or the control module.
   - Refer to the Transmission Diagnostics for corrective procedures.

4) If the DTC was an **INTERMITTENT** code, and the above diagnostics showed no discrepancies between the expected reading/response from the Simulator and the displayed reading/response of the scan tool,

   - The source of the DTC cannot yet be determined.
   - Continue testing until the DTC can be duplicated.
   - The Transmission Simulator can be used to create an operating load in a circuit to facilitate further testing, such as harness wiggle and connector movement tests.

62TE TEST CHECKLIST

TRS Switch States

SLP	T41 (C1)	T42 (C2)	T3 (C3)	T1 (C4)
P	CLOSED	CLOSED	CLOSED	OPEN
R	OPEN	CLOSED	OPEN	OPEN
N	CLOSED	CLOSED	OPEN	CLOSED
OD	OPEN	OPEN	OPEN	CLOSED
3	OPEN	OPEN	CLOSED	OPEN
L	OPEN	CLOSED	CLOSED	CLOSED

REVERSE LIGHT TEST	
PASSED?	

PRESSURE SWITCH TEST	
SWITCH	**PASSED?**
L/R	
OD	
LC	
DC	
2-4	

SPEED SENSOR TEST	
DESIRED	**DISPLAYED**
600/125	
3000/625	
6000/1250	

62TE TEST CHECKLIST, CONTINUED

TEMPERATURE THERMISTOR TEST	
DESIRED	**DISPLAYED**
0.8V	
2.9V	
4.9V	

SOLENOID TEST						
SOLENOID	**L/R**	**OD**	**UD**	**LC**	**DC**	**2-4**
PASSED?						

VLP TEST	
DESIRED	**DISPLAYED**
0.8V	
2.9V	
4.9V	

TEST DETERMINATION TABLE

TEST DETERMINATION	
NAME OF CODE	**RECOMMENDED TEST**
CHECK SHIFTER SIGNAL	TRS
LOSS OF PRIME	PRESSURE SWITCH
GEAR RATIO ERROR IN REVERSE	SENSOR OR SOLENOID
GEAR RATIO ERROR IN 1ST	SENSOR OR SOLENOID
GEAR RATIO ERROR IN 2ND	SENSOR OR SOLENOID
GEAR RATIO ERROR IN 3RD	SENSOR OR SOLENOID
GEAR RATIO ERROR IN 4TH	SENSOR OR SOLENOID
INPUT SPEED SENSOR ERROR	SENSOR
OUTPUT SPEED SENSOR ERROR	SENSOR
TRANSFER SPEED SENSOR	SENSOR
SPEED SENSOR GROUND ERROR	SENSOR
TEMPERATURE SENSOR	SENSOR
L/R PRESSURE SWITCH SENSE	PRESSURE SWITCH
2-4 PRESSURE SWITCH SENSE	PRESSURE SWITCH
OD PRESSURE SWITCH SENSE	PRESSURE SWITCH
2-4 HYDRAULIC PRESSURE TEST FAILURE	PRESSURE SWITCH
OD HYDRAULIC PRESSURE TEST FAILURE	PRESSURE SWITCH
2-4/OD HYDRAULIC PRESSURE TEST FAILURE	PRESSURE SWITCH
L/R SOLENOID CIRCUIT	SOLENOID
2-4 SOLENOID CIRCUIT	SOLENOID
OD SOLENOID CIRCUIT	SOLENOID
UD SOLENOID CIRCUIT	SOLENOID
LC PRESSURE SWITCH	PRESSURE SWITCH
DC PRESSURE SWITCH	PRESSURE SWITCH

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