# Operation

This section of the manual will guide you through the three test modes (Solenoid Test, shift Test and Monitor Computer). Using a Ford E40D as an example, you will learn how to conduct each test, and how to measure values using your TranX 2000™.

Before you can do anything with the transmission, you must first identify it. Once you are confident you have done this, look up the test code sheet in this manual. Compare the data sheets to the tranmission you are working on to be sure you have selected the correct code.

*The Ford E40D test sheet is in the Ford section of the manual, the test code is **040.***

On the test sheet you will see the part number(s) for dedicated harness sets available for the transmission type. **Be sure to use the correct harness set.** Some transmissions have different wiring schematics for the same connector (GM 4T60E, Nissan/Jatco, etc.) Some connectors are used for different transmission with separate wiring (Ford AODE and AXODE/AX4N).

*The E40D has 2 harness sets. 04X203 is used on vehicles before 1995, 04X205 on model years 1995 and up.*

Once you have powered your TranX 2000™ and made your connections to the transmission you are ready to start testing. You can also use your snsor clip to connect to sensor (throttle position, speed, etc.) you wish to test through Sensor Module A, at this time. a wire chart at the beginning of each test section shows which clips go to which test point on Sensor Module A. Some transmissions have TOT and other sensors which are run through the case connector, so be careful not run more than 1 sensor through the same test point. The wiring chart on the back of each test sheet shows which sensor test points are being used through the dedicated harness sets.

*The E40D has TOT sensor which is run through the dedicated harness to Sensor Module A test points 5 and 6. Use the yellow and blue clips on the Sensor clip set to test any other sensor.*

# Operation

## SOLENOID TEST

Enter the transmission code for the transmission you are testing. Select **Solenoid Test** using the **Select Test** button. Be sure the engine is off whenever you run the solenoid test. Use the gear Up and Down arrows to isolate and select the solenoids. The transmission test sheet lists which channel setting is used for each solenoid. Use the Duty Cycle Up and Down arrows to adjust the pulsing of pulse width modulated (PWM solenoids) such as EPC and special function solenoids.

*The Ford E4OD has 5 solenoids: Shift solenoid 1, Shift solenoid 2, Lock-Up solenoid, Coast Clutch solenoid, and EPC solenoid. Use Gear 1, 2, 5, 6, and 7 to test these solenoids. Adjust the duty cycle for EPC using the Pressure % duty arrows.*

As you select each solenoid, the **Output Channel** will move to the solenoid selected. We recommend using Amps; however, you can measure Amps or Ohms for each solenoid by pressing the **Multimeter** button. Check each reading against the range given on the test sheet. If a solenoid reads within, or close to the range, it is within tolerance electrically. If the reading is 0 or is very high above the range, it is either open or shorted. Please note that you have not tested the hydraulic action of the solenoid. Just because the solenoid tests properly electrically does not mean that it is working hydraulically.

**NOTE:** Readings for variable duty solenoids are averaged. Ohms readings for these solenoids need to be multiplied by the % duty you are checking them at.

*Example: 40 Ohms at 50% duty is actually 20 Ohms (40 X .50=20 Ohms). It is best to test these solenoids measuring Amps. Amps measurements are also averaged; however, this is already accounted for in the test tables.*

# Operation

## SHIFT TEST

Once you are satisfied the solenoids are electrically working properly, it is time to drive the vehicle. Use the **Select Test** button to change to the **Shift Test** and start the engine. By using your TranX 2000™ to shift the vehicle you will quickly determine whether the problem is in the transmission or in the ECU.

To change gears simply press the **Gear Up** and **Gear Down** arrows. The gear you are in will be displayed. Using the table on the test sheet, you can verify that solenoids are energized by looking at the **Output Channel** LED's; which light when the solenoid is on. Use the **Select Channel** button to measure amps on any output channel.

*Using the truth table for the E4OD, you will see that in first gear Shift Solenoid 1 is on, while Shift Solenoid 2 is off. The LED indicator next to channel 1 will light green to show the solenoid is energized. Using the **Select Channel** button, you can move the multimeter reading to channel 1 and measure the current draw for the solenoid while it is on.*

Line pressure can be adjusted using the ***Pressure* % Duty** arrows to raise and lower the duty cycle in 1% increments. Press the **Min/Max** before pressing the up and down arrows to get to Maximum duty (minimum pressure) or Minimum duty (full line pressure) quickly. As you increase or decrease the duty cycle, the Channel 7 LED indicator will glow orange. This indicates that the solenoid is pulsing. You can measure current draw by using the **Select Channel** button to read amps on Channel 7. The 1% increments are useful when you are using a pressure gauge.

*The E4OD has an EPC solenoid. Use the **Pressure % Duty** arrows to increase duty (lower line pressure) or decrease duty (raise line pressure.)*

# Operation

Special functions, such as Lock-Up, are controlled using the **Function Buttons.** The shift/Monitor test sheet table indicates which button to use for every transmission's special functions. Press the key to turn the solenoid on, press it again to turn it off. Use the **Output Channel** LED indicator to monitor the solenoids. You can also use the **Select Channel** button to measure current on the specific solenoid channel.

Pulse width modulated solenoids (usually Lock-Up solenoids) can be adjusted using the **Function% Duty** arrows to increase or decrease duty in 1% increments. Like the Pressure % Duty controls, you can press the **Min/Max** button before pressing the **Up/ Down** arrows to get to minimum or maximum duty quickly.

*E4OD's have two special functions: Lock-Up and Coast Clutch. During the shift test, press the **Lock-Up** button to engage Lock-Up and press the **Function 3** button to engage the Coast Clutch. Neither of these are pulsed, so the* **Function% Duty** controls are blocked. Furthermore, you will notice the window that displays the duty is not illuminated. Reading the notes at the bottom of the test sheet, you will notice that Coast Clutch is forced off in 4th gear. To turn it back on after the 4-3 downshift, simply press the **Function 3** button again.

# COME TO A COMPLETE STOP AND TURN ENGINE OFF BEFORE CHANGING TO MONITOR COMPUTER TEST

# Operation

# MONITOR COMPUTER

To safely switch to the **Monitor Computer** test mode, come to a complete stop and turn the engine off. Once you have done this press the **Select Test** button to switch to **Monitor Computer** test mode and restart the engine. This will prevent any backlash from the ECU to the TranX 2000™ and vice versa. Now you can use your TranX 2000™ to monitor signals being sent from the ECU to the solenoids.

As you drive the vehicle, the gear it is in will be decoded and displayed in the **Gear** area of the transmission control section. If the vehicle has an EPC solenoid, the duty it is being run at will also be displayed. As the vehicle switches gears, the output channel LED's will indicate which solenoids are on. This is the best way to monitor shift and special function solenoids. Check these against the table provided on the test sheet. Additionally, you can use the **Select Channel** button to measure current on any output channel that contains a solenoid.

*For the E4OD:*

*Shift Solenoid 1 (Output channel 1) will be on in 1st and 2nd gears. Shift Solenoid 2 (output channel 2) will be on in 2nd and 3rd gears. When the ECU signals Lock-Up, output channel 5 will be on. In the same way, when the ECU signal for the Coast Clutch, channel 6 will be on. The EPC solenoid (output channel 7) should be pulsing throughout the Monitor Computer test. Use the* ***Select Channel*** *button to move from one output channel to the next, stopping to read current for any solenoid you wish to examine.*