# SUZUKI
# ECM 6.0
# APPLICATION

# Operator's Manual

**tech 1®**

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# APPLICATION

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# SOME THINGS YOU SHOULD KNOW

⚠ **CAUTION:**                                  **EXHAUST GAS**

**When performing any checks with the engine running in an enclosed space such as a garage, be sure there is proper ventilation. Never inhale exhaust gases; they contain carbon monoxide, a colorless, odorless extremely dangerous gas which can cause unconsciousness or death.**

⚠ **CAUTION:**

**To help avoid personal injury always set the parking brake securely and block the drive wheels before performing any checks or repairs on the vehicle.**

## DISCLAIMER

The TECH 1 is designed for use by trained service personnel only. It has been developed for the sole purpose of diagnosing and repairing automotive electronic systems. Every attempt has been made to provide complete and accurate technical information based on factory service information available at the time of publication. However, the right is reserved to make changes at any time without notice.

## FCC COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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# 1.0 SUZUKI ECM 6.0 APPLICATION DESCRIPTION

The Suzuki ECM 6.0 Application is used with the TECH 1 to diagnose and troubleshoot the engine systems controlled by the Engine Control Module (ECM) and the Engine and Automatic Transmission systems controlled by Powertrain Control Module (PCM) that are used on Suzuki vehicles (except OBD II vehicles that are for the North American market from 1996 to present).

The Suzuki ECM 6.0 Application and the TECH 1 team up to become a diagnostic tool which is both powerful and easy to use. With the TECH 1, you can select test modes which let you:

- read engine data parameters
- read diagnostic trouble codes
- clear diagnostic trouble codes
- diagnose intermittent problems by capturing and storing multiple samples of system data BEFORE AND AFTER THE PROBLEM OCCURS, then examining the data to determine the problem. This data is saved in the TECH 1 memory for at least one-half hour even if the power is removed from the TECH 1!
- control some actuators
- fix spark advance
- fix Idle Air Control Calibration (IAC CAL)
- print data and vehicle information

This information can be analyzed and displayed to assist service technicians in diagnosing engine and driveability problems.

The Suzuki ECM 6.0 Application is included in the Suzuki Mass Storage Cartridge. When used with the TECH 1 it is capable of monitoring and diagnosing the engine with ECM or engine/AT with PCM on the models listed in the chart on the following page.

# SUZUKI ECM 6.0 APPLICATION COVERAGE

## OTHER THAN NORTH AMERICAN MARKET

| MODEL | ENGINE TYPE | ECU TYPE | ECU MFG. | ECU NO. | REMARKS |
|-------|-------------|----------|----------|---------|---------|
| SE416 | TBI, 2 Valve/ Cylinder | ECM | MITSUBISHI | 1 | - |
| | MFI, 4 Valve/ Cylinder | ECM | DENSO | 2 | - |
| | SFI, 4 Valve/ Cylinder | ECM | MITSUBISHI | 3 | - |
| | | PCM | MITSUBISHI | 11 | 4ATonly/See NOTE |
| | | ECM | MITSUBISHI | 37 | Vehicle with HO2S-2 (rear) |
| SZ416 | SFI, 4 Valve/ Cylinder | ECM | MITSUBISHI | 3 | - |
| SV420G | SFI | ECM | HITACHI | 7 | For MT vehicle |
| | | PCM | HITACHI | 10 | For AT vehicle |
| SV620 | SFI | ECM | HITACHI | 7 | - |
| | | PCM | HITACHI | 10 | 4AT only/See NOTE |
| SQ416/420 | SFI | ECM | MITSUBISHI | 15 | For MT vehicle |
| | | PCM | MITSUBISHI | 15 | For AT vehicle |
| | | ECM | MITSUBISHI | 24,44 | For MT vehicle/See NOTE |
| | | PCM | MITSUBISHI | 24,44 | For AT vehicle/See NOTE |
| SQ625 | SFI | ECM | HITACHI | 16 | For MT vehicle |
| | | PCM | HITACHI | 16 | For AT vehicle |
| | | ECM | HITACHI | 25,43 | For MT vehicle/See NOTE |
| | | PCM | HITACHI | 25,43 | For AT vehicle/See NOTE |
| SF series | TBI (Bypass Air Type) | ECM | DENSO | 4 | - |
| | TBI (Throttle Position Type) | ECM | DENSO | 5 | - |
| | SFI/TBI | ECM | DENSO | 31 | For MT vehicle with HO2S-2 (rear) |
| | | PCM | DENSO | 31 | For AT vehicle with HO2S-2 (rear) |
| MF413 (SF413) | SFI | ECM | DENSO | 26 | For MT vehicle |
| | | PCM | DENSO | 26 | For AT vehicle |

| MODEL | ENGINE TYPE | ECU TYPE | ECU MFG. | ECU NO. | REMARKS |
|---|---|---|---|---|---|
| SY413/ 415/416 | MFI | ECM | DENSO | 5 | - |
| | | PCM | DENSO | 5 | 3AT/See NOTE |
| | SFI | ECM | DENSO | 13,18 | See NOTE |
| | | PCM | DENSO | 13,18 | 3AT only/See NOTE |
| | | ECM | DENSO | 29 | Vehicle with HO2S-2 (rear) |
| | | PCM | DENSO | 29 | Vehicle with HO2S-2 (rear) (3AT) |
| SY418 | SFI | ECM | HITACHI | 8 | - |
| | | | | 14 | Vehicle with step EGR |
| | | | | 36 | Vehicle with HO2S-2 (rear) |
| SY419 | DIESEL | SOV | LUCAS | 20 | - |
| MB308 (SB308) | SFI | ECM | DENSO | 27 | - |
| SH410 | TBI | ECM | MITSUBISHI | 6 | - |
| | MFI | ECM | MITSUBISHI | 9 | For MT vehicle |
| | | PCM | MITSUBISHI | 9 | For AT vehicle |
| | SFI | ECM | DENSO | 30 | Vehicle with HO2S-2 (rear) (MT) |
| | | PCM | DENSO | 30 | Vehicle with HO2S-2 (rear) (AT) |
| MH410 (SH410) | SFI | ECM | DENSO | 27 | For MT vehicle |
| | | PCM | DENSO | 27 | For AT vehicle |
| SR series | SFI | ECM | HITACHI | 12 | - |
| MRD410 (RD410) | SFI | ECM | DENSO | 27 | For MT vehicle |
| | | PCM | DENSO | 27 | For AT vehicle |
| RB series | SFI | ECM | DENSO | 21 | For vehicle with EGR |
| | | | | 22 | For vehicle without EGR |
| RG413 | SFI | ECM | DENSO | 23 | Vehicle with HO2S-2 (rear) |
| | | | | 42 | Vehicle without HO2S-2 (rear) |
| MRF series (RF series) | SFI | ECM | DENSO | 27 | For MT vehicle |
| | | PCM | DENSO | 27 | For AT vehicle |
| MG413W (SJ413W) | SFI | ECM | DENSO | 27 | - |

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| MODEL | ENGINE TYPE | ECU TYPE | ECU MFG. | ECU NO. | REMARKS |
|-------|-------------|----------|----------|---------|---------|
| SN413 | SFI | ECM | DENSO | 17 | - |
| | | | | 32 | Vehicle with HO2S-2 (rear) |
| | | | | 41 | SN413V / See NOTE |
| GA413 | SFI | ECM | DENSO | 19 | - |
| | | | | 35 | Vehicle with HO2S-2 (rear) |
| MT308 (ST308) | SFI | ECM | MITSUBISHI | 28 | - |

**NOTE: The ECUs of the following models are applicable to vehicles on and after the following VIN NOS.**

| ECU NO. | MODEL | For European Markets | For Other Markets |
|---|---|---|---|
| 5 | SY413 | X̄ JSAEGC11S00109522 X̄ ~ <br> X̄ JSAEGA11S00108641 X̄ ~ | - |
| 10 | SV620 | X̄ JSAETD11V00150001 X̄ ~ | TD11V-200001~ |
| 11 | SE416 | X̄ JSAETA02C01200001 X̄ ~ <br> X̄ JSAETA02V01200001 X̄ ~ <br> X̄ JSAETD01V01200001 X̄ ~ | TD01V-200001~ |
| 13 | SY413 | X̄ JSAEGA11S00140001 X̄ ~ <br> X̄ JSAEGC11S00140001 X̄ ~ <br> X̄ JSAEGC11W00140001 X̄ ~ | GA11S-140001~ <br> GC11S-140001~ |
| 13 | SY415 <br> SY416 | X̄ JSAEGA31S00140001 X̄ ~ <br> X̄ JSAEGB31S00140001 X̄ ~ <br> X̄ JSAEGC31S00140001 X̄ ~ <br> X̄ JSAEGC31SV5140001 X̄ ~ <br> X̄ JSAEGC31SW0140001 X̄ ~ <br> X̄ JSAEGD31S00140001 X̄ ~ <br> X̄ JSAEGC31W00140001 X̄ ~ <br> X̄ JSAEGC31WW0140001 X̄ ~ <br> X̄ JSAEGD31W00140001 X̄ ~ | GA31S-140001~ <br> GC31S-140001~ <br> GC31S-140001~ <br> GD31S-140001~ <br> JS2GA31S/W5140001~ <br> JS2GB31S/W5140001~ |
| 24 <br> 44 | SQ416 <br> SQ420 | X̄ JSAFTA03V00150001 X̄ ~ <br> X̄ JSAFTA03V10150001 X̄ ~ <br> X̄ JSAFTA03V14150001 X̄ ~ <br> X̄ JSAFTA52V00150001 X̄ ~ <br> X̄ JSAFTA52V14150001 X̄ ~ <br> X̄ JSAFTL52V00150001 X̄ ~ <br> X̄ JSAFTL52V10150001 X̄ ~ <br> X̄ JSAFTL52V14150001 X̄ ~ | JS3TA03V14150001~ <br> JS3TA52V14150001~ <br> JS3TL52V14150001~ <br> 2S2GTA03C00470001~ <br> 2S2GTA03C10470001~ <br> 2S2GTA03C16470001~ <br> 2S3TA03C16100001~ <br> 2S3TA52C16100001~ <br> 2S2GTA52C00470001~ <br> 2S2GTA52C10470001~ |
| 25 <br> 43 | SQ625 | X̄ JSAFTD62V00150001 X̄ ~ <br> X̄ JSAFTD62V10150001 X̄ ~ <br> X̄ JSAFTD62V14150001 X̄ ~ | JS3TD62V14150001~ |
| 32 <br> 41 | SN413V | X̄ JSAFJA43V00100001 X̄ ~ <br> X̄ JSAFJB43V00100001 X̄ ~ <br> X̄ JSAFJB43VY0100001 X̄ ~ <br> X̄ JSAFJB43V14100001 X̄ ~ | JS3JB43V14100001~ |

| MODEL | ENGINE TYPE | ECU TYPE | ECU MFG. | ECU NO. | REMARKS |
|-------|-------------|----------|----------|---------|---------|
| SE416 | TBI | ECM | MITSUBISHI | 1 | - |
|  | SFI | ECM | MITSUBISHI | 3 | - |
| SF series | TBI (Bypass Air Type) | ECM | DENSO | 4 | - |
|  | TBI (Throttle Position Type) | ECM | DENSO | 5 | - |
| SW series | TBI | ECM | DENSO | 5 | - |
| SY series | MFI | ECM | DENSO | 5 | - |

# HOW THE SUZUKI ECM 6.0 APPLICATION WORKS WITH THE TECH 1

The TECH 1 lets you monitor data and control ECM (or PCM) operation by communicating with the ECM (or PCM) via the serial data link connector (DLC) present in the vehicle. The TECH 1 consists of a microcomputer, which communicates with the ECM (or PCM) and controls its operation, a keypad to receive directions from you, and a display to provide the data you need to diagnose vehicle electronic problems. The TECH 1 communicates with the ECM (or PCM) by applying an electrical signal to a serial data link connector Enable pin, then reads the ECM (or PCM) data signal from the serial data link connector pins, and translates it into an intelligible data display. The Suzuki ECM 6.0 Application in the Suzuki Mass Storage Cartridge is the software program which performs all of the functions described in this operator's manual.

## 2.0 GETTING STARTED

Before operating the Suzuki ECM 6.0 Application with the TECH 1 the following steps must be performed:

1. Insert the Suzuki Mass Storage Cartridge including ECM 6.0 Application into the bottom slot of the TECH 1. Verify that no other master cartridge (e.g. SUZUKI 1995 ECM Cartridge) is installed in the top slot.

2. Make sure the vehicle ignition is OFF.

3. Locate the vehicle's serial Data Link Connector (DLC) and identify which type it is, 12-pin or 16-pin. The vehicle DLC is usually under the dash on the driver's side. Refer to the vehicle service manual if you are in doubt.

4. Connect the TECH 1 cable to the top of the TECH 1 as shown below.

**WHEN THE VEHICLE USES THE 12-PIN DLC**



14/26 or
26/26-PIN
DLC
CABLE

MASTER
CARTRIDGE

12/14 or
12/26-PIN
ADAPTER

2-1

## WHEN THE VEHICLE USES THE 16-PIN DLC
## TYPE 1

**14/26-PIN DLC CABLE**

**16/14-PIN DLC ADAPTER CABLE**

**MASTER CARTRIDGE**
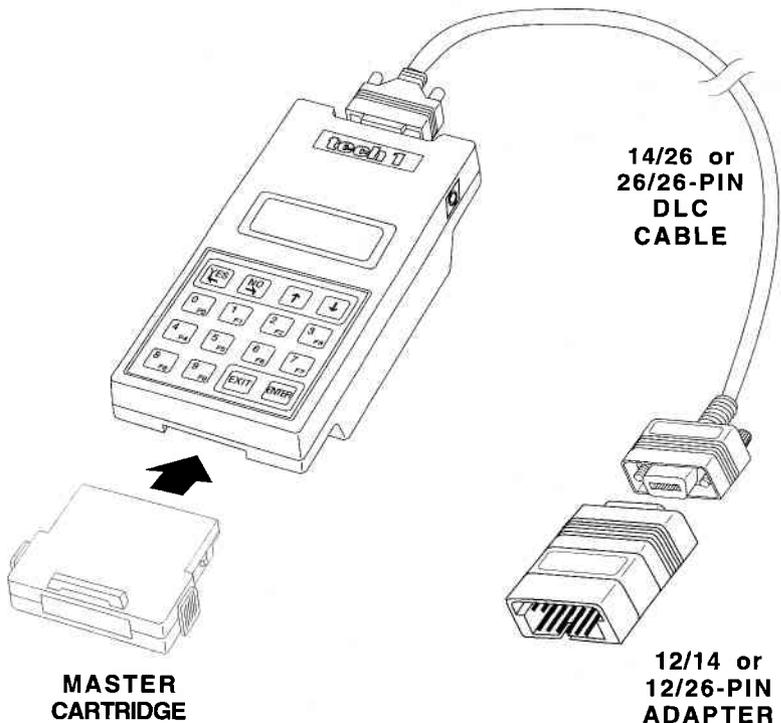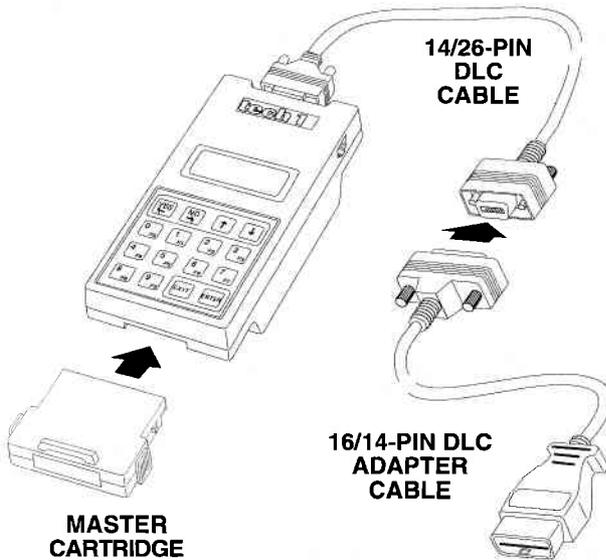
## WHEN THE VEHICLE USES THE 16-PIN DLC
## TYPE 2

*NOTE: Vehicles with ECU No. 19 , 21 through 45 are not applicable to Type 2. For applicable model corresponding to ECU Nos., see ECM Application Coverage described on pages 1-2 and 1-3.*

**14/26 or 26/26-PIN DLC CABLE**

**12/14 or 12/26-PIN ADAPTER**

**MASTER CARTRIDGE**

**16/12-PIN DLC ADAPTER**

2-2
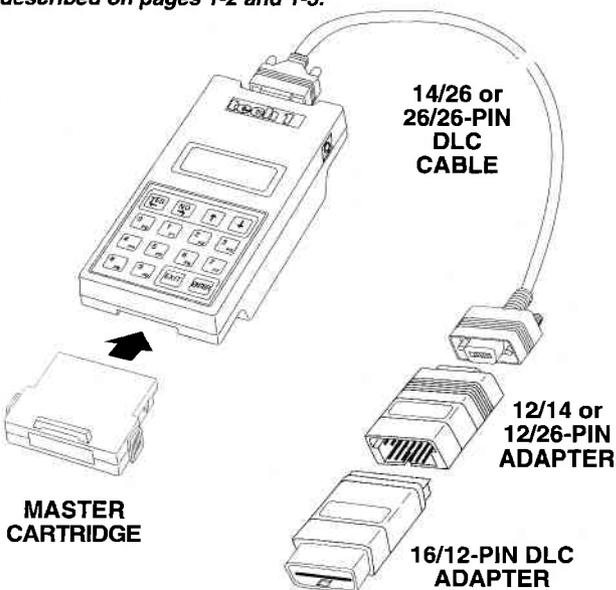
5. Plug the TECH 1 Cable into the vehicle's 12-pin or 16-pin DLC.

6. Turn the ignition switch on.

7. Verify that the tester displays the screen below.

```
SUZUKI
MASS STORAGE
CARTRIDGE - VX.X
<ENTER>
```

8. Press **ENTER** to display the APPLICATIONS menu.

```
APPLICATIONS ↑↓
F0: ECM 6.0
F1: BCM X.X
F2: ABS/AIRBAG X.X
```

Press the key to the left of ECM 6.0 to select the Suzuki ECM 6.0 Application from the APPLICATIONS menu. If more than three applications are available, use ↑ or ↓ to scroll the display.

If the TECH 1 display informs you that the companion application is missing, contact your TECH 1 distributor.

9. Verify that the tester displays the screen below, and then press **ENTER**.

```
SUZUKI
ECM 6.0

(ENTER)
```

10. After the application is selected, the Language Selection menu is displayed.

```
F0: ENGLISH ↑↓
F1: ニホンゴ "
F2: DEUTSCH
F3: FRANCAIS
```

```
F4: ESPAÑOL ↑↓
```
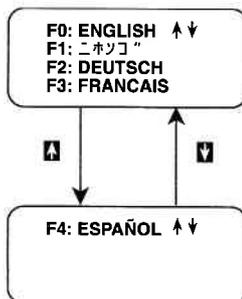
Press the function key to the left of the language you wish to select. After the language is selected, proceed to Section 4.0.

2-3

# 3.0 OPERATING PRECAUTIONS

## REMOVING THE CARTRIDGE WHILE POWER IS APPLIED

You should not remove or install master or auxiliary cartridges while power is applied. If you wish to change or add a cartridge, disconnect the power plug, install the cartridge, then reconnect the power plug.

## REMOVING OR CHANGING MASTER CARTRIDGES CONTAINING SNAPSHOT DATA

SNAPSHOT data that has been captured by a master cartridge can be printed on a TECH 1 (or compatible) printer, transferred to a computer for further analysis, or displayed on a terminal. The SNAPSHOT data will be retained within the TECH 1 memory for at least one-half hour, even if the TECH 1 is disconnected from the vehicle. However, IF YOU POWER UP THE TECH 1 WITHOUT A MASTER CARTRIDGE OR WITH A DIFFERENT MASTER CARTRIDGE, THE SNAPSHOT DATA WILL BE LOST.

## 4.0  SELECTING THE VEHICLE

Once you've connected the TECH 1 to the vehicle and selected a language, turn the key to the RUN position. The next step is to select the communication mode. Depending on the communication mode selected, other information such as the vehicle type (model) and transmission type may be required.

### SELECTING A COMMUNICATION MODE

The Communication Mode display lists two options; F0: EURO MODE and F1: SUZUKI MODE. The EURO MODE provides diagnosis of Suzuki vehicles equipped with emission-related systems (except for North American Market vehicles on and after 1996 model year) using EURO OBD methods. The SUZUKI MODE provides diagnostic functions and enhancements specific to Suzuki vehicles. Press the key to the left of the communication mode you wish to use.

```
SELECT MODE
F0: EURO MODE
F1: SUZUKI MODE
```

See the applicable Communication Mode chart on pages 4-3 and 4-4 for specific communication modes by vehicle ECU and model type.

### SELECTING A VEHICLE TYPE

If you selected F1: SUZUKI MODE, you need to input the type of vehicle you are testing.

```
SELECT VEHICLE ↑↓          SELECT VEHICLE ↑↓
F0: VITARA/X-90            F2: BALENO DIESEL
   (SE416/SZ416)             (SY419)
F1: ALTO (SH410)          F3: OTHER
```
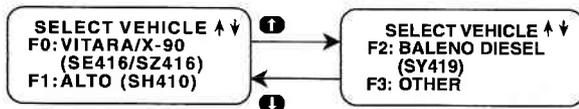
Press the key to the left of the vehicle you are testing. There may be a slight pause while the TECH 1 then attempts to establish communications with the vehicle and requests the vehicle identification.

If you selected F0: VITARA/X-90 (SE416/SZ416) from the Select Vehicle menu, the TECH1 will display a Select System screen. Press **YES** if the car you are testing has Throttle Body Injection, otherwise press **NO**.

```
SELECT SYSTEM
TBI (Throttle
Body Injection)?
(YES/NO)
```

4-1
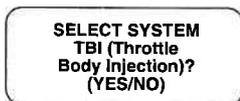
## SELECTING A TRANSMISSION TYPE

For some vehicles, the Transmission Type must be selected. Press the key to the left of the Transmission Type of the vehicle you are testing.

```
┌─────────────────┐        ┌─────────────────┐        ┌─────────────────┐
│ SELECT TRANS.   │   OR   │ SELECT TRANS.   │   OR   │ SELECT TRANS.   │
│                 │        │                 │        │                 │
│ F0: MT          │        │ F0: MT/4AT      │        │ F0: MT/AT (ECM) │
│ F1: AT          │        │ F1: 3AT         │        │ F1: AT (PCM)    │
└─────────────────┘        └─────────────────┘        └─────────────────┘
```

## SELECTING THE TEST MODES

If you selected F0: EURO MODE from the Communication Mode menu, or after selecting the type of vehicle you are testing, the TECH 1 will display the Select Mode menu. Detailed operating instructions for the various test modes listed on the menu are given in Section 5.0 of this manual.

---

## ACTIVE TECH 1 KEYS

| | |
|---|---|
| ⬆ & ⬇ | Stop automatic menu scrolling, then used to manually control the menu display. |
| F0 - F9 | Select a menu item. |
| YES & NO | Answer questions on the TECH 1 display. |
| EXIT | Return to previous display. |

# APPLICABLE COMMUNICATION MODE
# OTHER THAN NORTH AMERICAN MARKET

The following tables list the communication modes for specific ECU and model types. For the details of ECU NO, see Application Coverage described in pages 1-2 and 1-3.

| MODEL | ECU NO. | SUZUKI MODE | EURO MODE |
|---|---|---|---|
| SE416 | 1 | X | |
| | 2 | X | |
| | 3 | X | |
| | 11 | X | |
| | 37 | X | |
| SZ416 | 3 | X | |
| SV420G | 7 | X | |
| | 10 | X | |
| SV620 | 7 | X | |
| | 10 | X | |
| SQ416/420 | 15 | X | |
| | 24 | X | X |
| | 44 | X | |
| SQ625 | 16 | X | |
| | 25 | X | X |
| | 43 | X | |
| SF series | 4 | X | |
| | 5 | X | |
| | 31 | X | X |
| MF413 (SF413) | 26 | X | |
| SY413/415/ 416 | 5 | X | |
| | 13, 18 | X | |
| | 29 | X | X |
| SY418 | 8 | X | |
| | 14 | X | |
| | 36 | X | X |
| SY419 | 20 | X | |
| MB308 (SB308) | 27 | X | |
| SH410 | 6 | X | |
| | 9 | X | |
| | 30 | X | X |
| MH410 (SH410) | 27 | X | |
| SR series | 12 | X | |

**X: Support**          **Blank: Not support**

4-3

## APPLICABLE COMMUNICATION MODE
## OTHER THAN NORTH AMERICAN MARKET
## (Continued)

| MODEL | ECU NO. | SUZUKI MODE | EURO MODE |
|-------|---------|-------------|-----------|
| MRD410 (RD410) | 27 | X | |
| RB series | 21 | X | X |
| | 22 | X | |
| RG413 | 23 | X | X |
| | 42 | X | |
| MRF series (RF series) | 27 | X | |
| MG413W (SJ413W) | 27 | X | |
| SJ413 | 33 | X | X |
| SN413 | 17 | X | |
| | 32 | X | X |
| | 41 | X | |
| GA413 | 19 | X | |
| | 35 | X | X |
| MT 308 (ST308) | 28 | X | |

## NORTH AMERICAN MARKET (1991-1995)
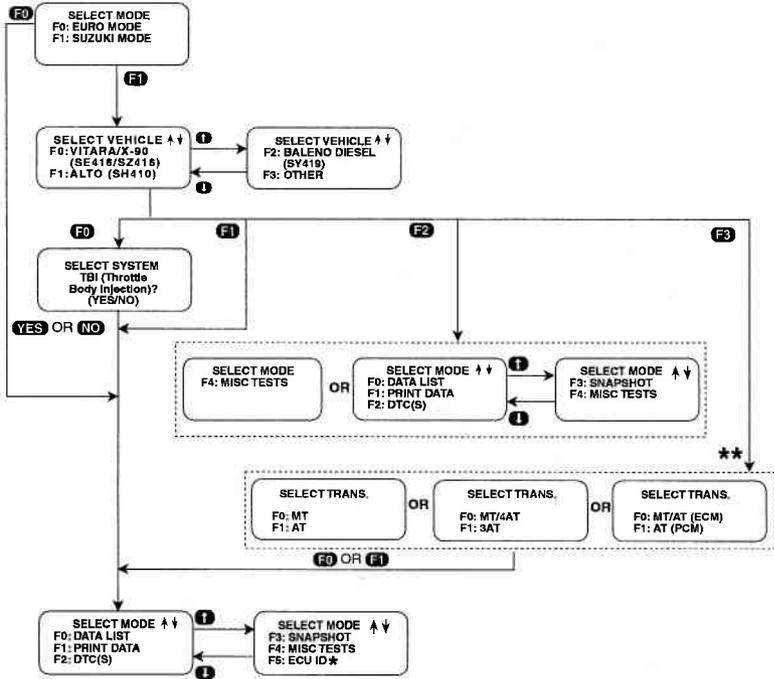
| MODEL | ECU NO. | SUZUKI MODE | EURO MODE |
|-------|---------|-------------|-----------|
| SE416 | 1 | X | |
| | 3 | X | |
| SF series | 4 | X | |
| | 5 | X | |
| SW series | 5 | X | |
| SY series | 5 | X | |

**X: Support        Blank: Not support**

4-4

# SELECTING THE VEHICLE



* ECU ID option not available for all vehicles
** SELECT TRANS. menus not available for all vehicles

## 5.0 SELECTING AND OPERATING THE TEST MODES

The TECH 1 will display test modes for the vehicle you have selected. Press the function key to the left of the test you wish to perform.

The following section contains a brief description of each test mode in the SUZUKI ECM 6.0 Application. A more detailed description of each test mode is given in the section discussing each test mode.

### MODE F0: DATA LIST
Monitor engine and/or automatic transmission data parameters from the ECM (or PCM).

### MODE F1: PRINT DATA
Send one data stream of information to a serial printer, terminal or smart device.

### MODE F2: DTC(S)
Display and/or clear stored Diagnostic Information.

### MODE F3: SNAPSHOT
Capture and store data parameters. Data is captured before and after a "trigger" point. Triggers can be on any DTC, a particular DTC, or manual TECH 1 key press. Captured data can then be displayed as well as DTC(S) (SUZUKI mode only).

### MODE F4: MISCELLANEOUS TESTS
Display sub-modes to operate single tests.

### MODE F5: ECU ID
Display the ECU number and the software version.

*While the TECH 1 is connected to the serial data link connector and conversing with the ECM (or PCM), the ECM (or PCM) ignores input signals from the TEST switch and the DIAG switch in the vehicle service connector (monitor coupler).*
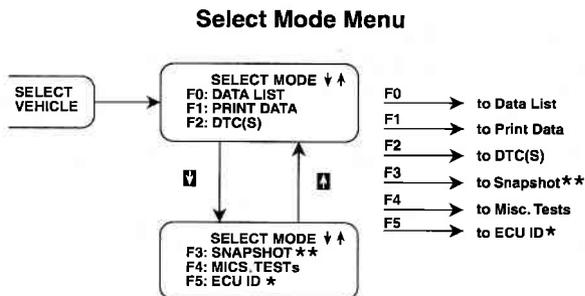
# SELECTING TEST MODES

The TECH 1 makes selecting the test mode easy by displaying a list of tests (a test mode "menu"). The menu also displays which key is used to select each test mode. An example test mode menu is shown below.

To select a test mode, simply press the TECH 1 key listed to the left of the test mode on the menu. Since there are six test modes, the keys **F0** - **F5** are used.

The first three test modes are shown as soon as the model is selected. The other test modes will automatically scroll onto the display after three seconds. The display will automatically scroll between the two screens. To stop the automatic scrolling, press either the **↑** or **↓** key. The menu may then be manually changed by pressing either the **↑** or **↓** key. All menus of more than three items scroll in this way.

**Regardless of which test modes are displayed, any test mode can be selected at any time from the menu**

### Select Mode Menu



```
┌──────────┐        ┌─────────────────────┐
│ SELECT   │───────▶│  SELECT MODE  ↓ ↑   │     F0
│ VEHICLE  │        │ F0: DATA LIST       │   ───────▶  to Data List
└──────────┘        │ F1: PRINT DATA      │     F1
                    │ F2: DTC(S)          │   ───────▶  to Print Data
                    └─────────────────────┘     F2
                                              ───────▶  to DTC(S)
                          ▲                     F3
                 ↓                 ↑          ───────▶  to Snapshot ★★
                                              F4
                          ▼                   ───────▶  to Misc. Tests
                    ┌─────────────────────┐     F5
                    │  SELECT MODE  ↓ ↑   │   ───────▶  to ECU ID ★
                    │ F3: SNAPSHOT ★★     │
                    │ F4: MICS. TESTs     │
                    │ F5: ECU ID ★        │
                    └─────────────────────┘
```

*NOT AVAILABLE FOR ALL VEHICLES

**NOT AVAILABLE FOR EURO MODE

The Miscellaneous Test mode is used to select a submenu of tests. Pressing **F4** displays the miscellaneous tests available. To return to the Select Mode menu just press **EXIT** .

*For the Diesel System only, F4: MISC TESTS appears on the SELECT MODE MENU.*

## ACTIVE TECH 1 KEYS

**F0** - **F5**    Select Test Mode.

**↑** & **↓**    Stop automatic menu scrolling, then used to manually control the menu display.

**EXIT**    Return to Vehicle Select step or return to Select Mode menu from Miscellaneous Tests menu.

# MAIN TEST MODES

The following tables list the test modes for specific ECUs. For applicable model corresponding to ECU Nos, see ECM Application Coverage described in pages 1-2 through 1-4.

## SUZUKI MODE

| SELECT MODE | SUB MENU | 1 | 2 | 3,4,8,9,11 | 5,12,17 | 6 | 7,10,14,15 | 13,16,18 | 20 | 22 | 26,27,28 | 41, 43, 44,45 | 42 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F0: DATA LIST | - | X | X | X | X | X | X | X |  | X | X | X | X | X |
| F1: PRINT DATA | - | X | X | X | X | X | X | X |  | X | X | X | X | X |
| F2: TROUBLE CODE |  | X | X | X | X | X | X | X |  | X | X | X | X | X |
| (CLEAR DTC) | - |  |  | X | X | X | X | X |  | X | X | X | X | X |
| F3: SNAPSHOT | ANY CODE | X | X | X | X | X | X | X |  | X | X | X | X | X |
|  | SINGLE CODE | X | X | X | X | X | X | X |  | X | X | X | X | X |
|  | MANUAL TRIG | X | X | X | X | X | X | X |  | X | X | X | X | X |
|  | REPLAY DATA | X | X | X | X | X | X | X |  | X | X | X | X | X |
| F4: MISC TEST | RPM CONTROL | X | X | X | X |  | X | X |  | X | X | X |  |  |
|  | FIXED SPARK | X | X | X | X | X | X | X |  | X | X | X | X |  |
|  | IAC CAL | X | X | X |  |  |  | X |  |  | X |  |  |  |
|  | EGR | X |  | X | X | X |  |  |  |  |  |  |  |  |
|  | STEP EGR |  |  |  |  |  | X | X |  |  | X |  |  |  |
|  | SOV TEST |  |  |  |  |  |  |  | X |  |  |  |  |  |
|  | EVAP CANI PURG (DUTY) |  |  |  |  |  |  |  |  | X |  |  |  |  |
|  | EVAP CANI PURG (ON/OFF) |  |  |  |  |  |  |  |  |  | X |  |  |  |
|  | FUEL PUMP CONT |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | MIL CONTROL |  |  |  |  |  |  |  |  | X |  |  |  |  |
|  | RADIATOR FAN |  |  |  |  |  |  |  |  | X |  | X |  |  |
|  | EGR VALVE #1 |  |  |  |  |  |  |  |  |  |  |  |  | X |
|  | EGR VALVE #2 |  |  |  |  |  |  |  |  |  |  |  |  | X |
|  | GLOW PLUG CONTROLLER |  |  |  |  |  |  |  |  |  |  |  |  | X |
|  | GLOW LAMP INDICATOR |  |  |  |  |  |  |  |  |  |  |  |  | X |
|  | MIL |  |  |  |  |  |  |  |  |  |  |  |  | X |
|  | TIMING CONTROL VALVE |  |  |  |  |  |  |  |  |  |  |  |  | X |

X: Support          Blank: Not support

| SELECT MODE | SUB MENU 1 | SUB MENU 2 | ECU NO. | | | | |
|---|---|---|---|---|---|---|---|
| | | | 21, 23, 31, 35 | 24, 25, 32, 38 | 29, 30, 34 | 36 | 33, 37 |
| F0: DATA LIST | - | - | X | X | X | X | X |
| F1: PRINT DATA | - | - | X | X | X | X | X |
| F2: TROUBLE INFO | F0: DTC | - | X | X | X | X | X |
| | F1: PENDING DTC | - | X | X | X | X | X |
| | F2: FREEZE DATA | - | X | X | X | X | X |
| | F3: CLEAR INFO | - | X | X | X | X | X |
| F3: SNAPSHOT | F0: ANY CODE | - | X | X | X | X | X |
| | F1: SINGLE CODE | - | X | X | X | X | X |
| | F2: MANUAL TRIG | - | X | X | X | X | X |
| | F3: REPLAY DATA | - | X | X | X | X | X |
| F4: MISC TEST | F0: OUTPUT TEST | RPM CONTROL | X | X | X | X | X |
| | | FIXED SPARK | X | X | X | X | X |
| | | IAC CAL | | | | X | |
| | | STEP EGR | X | X | X | X | X |
| | | EVAP CANI PURGE (DUTY) | X | X | X | X | X |
| | | FUEL PUMP CONT | X | X | X | X | X |
| | | MIL CONTROL | X | X | X | X | X |
| | | RADIATOR FAN | X | | X | X | |
| | | A/C COND FAN | | X | X | X | |
| | F1: READINESS TEST | - | X | X | X | X | X |
| F5: ECU ID | - | - | X | X | X | X | X |

**X: Support**          **Blank: Not support**

5-5

| SELECT MODE | SUB MENU 1 | ECU NO. 39 |
|---|---|---|
| F0: DATA LIST | - | X |
| F1: PRINT DATA | - | X |
| F2: TROUBLE INFO | F0: DTC | X |
| | F3: CLEAR INFO | X |
| F3: SNAPSHOT | F0: ANY CODE | X |
| | F1: SINGLE CODE | X |
| | F2: MANUAL TRIG | X |
| | F3: REPLAY DATA | X |
| F4: MISC TEST | DOUBLE RELAY | X |
| | A/C CUT OFF | X |
| | PRE/POST HEAT RELAY | X |
| | RAD FAN HIGH | X |
| | RAD FAN LOW | X |
| | 3RD PISTON DEACTIVATOR | X |
| | MIL | X |
| | GLOW INDICATOR LAMP | X |
| | COOLANT TEMP WARNING LAMP | X |

## EURO MODE
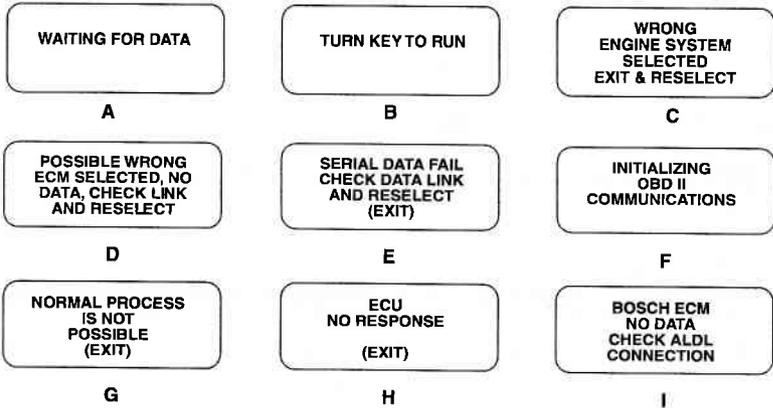
| SELECT MODE | SUB MENU 1 | |
|---|---|---|
| F0: DATA LIST | - | X |
| F1: PRINT DATA | - | X |
| F2: TROUBLE INFO | F0: DTC | X |
| | F1: PENDING DTC | X |
| | F2: FREEZE DATA | X |
| | F3: CLEAR INFO | X |
| F4: MISC TEST | F1: READINESS TST | X |
| F5: ECU ID | - | X |

**X: Support**          **Blank: Not support**

5-6

# TECH 1-ECM (OR PCM) COMMUNICATIONS STATUS DISPLAYS

Most TECH 1 test modes display data. Therefore, these test modes require the ECM (or PCM) to send data to the TECH 1. When you select a test mode, you may see one or more of the following TECH 1 ECM (or PCM) communications status displays.

| | | |
|---|---|---|
| WAITING FOR DATA | TURN KEY TO RUN | WRONG ENGINE SYSTEM SELECTED EXIT & RESELECT |
| A | B | C |
| POSSIBLE WRONG ECM SELECTED, NO DATA, CHECK LINK AND RESELECT | SERIAL DATA FAIL CHECK DATA LINK AND RESELECT (EXIT) | INITIALIZING OBD II COMMUNICATIONS |
| D | E | F |
| NORMAL PROCESS IS NOT POSSIBLE (EXIT) | ECU NO RESPONSE (EXIT) | BOSCH ECM NO DATA CHECK ALDL CONNECTION |
| G | H | I |

DISPLAY A:
This means that the TECH 1 cannot yet display data as it has not yet received a complete data message from the ECM (or PCM). This display is sometimes seen right after selecting a test mode.

DISPLAY B:
This is a reminder that the ignition key needs to be in the RUN position for the TECH 1 to communicate with the vehicle.

DISPLAY C:
This occurs when the TECH 1 determines that the data stream it receives from the ECM (or PCM) does not match the vehicle that you have selected. If this happens, return to the vehicle select step by pressing (EXIT). Double check your selection.

DISPLAY D, H, AND I:
This occurs when the TECH 1 has not received any data from the ECM (or PCM). In this case, you should verify that the ignition is ON and check the serial data link connections and then return to the vehicle select step by pressing **EXIT**. Double check your selection. **An incorrect engine type selection may also cause this condition.**

DISPLAY E, G, H, AND I:
This occurs when communication with a vehicle has failed after communication has already been established.

DISPLAY F:
If this screen flashes for more than 10 seconds, the Tech 1 cannot communicate with the vehicle using OBDII communications. Press **EXIT** to return to the communication mode selection menu and select a different communication mode.

| ACTIVE TECH 1 KEYS | |
|---|---|
| **EXIT** | Return to vehicle select mode. |

| MODE F0 | DATA LIST |

The purpose of the DATA LIST mode is to passively monitor data which is being transmitted from the ECM (or PCM) during normal operation of the vehicle. This mode does not affect vehicle operation and you can use it to read data to see if it is correct, or at least reasonable. The current value of the parameter is displayed with the parameter units. This means you don't have to hunt through manuals to find out what is being displayed.

The data parameters are displayed in pre-programmed pairs. You can also create your own pairs through the process explained on the following pages.

**OPERATING PROCEDURE:**

1. Press **F0** to select the DATA LIST mode from the Select Mode menu.

2. Select the data parameters to be displayed by scrolling through the parameters with the **YES** and **NO** keys.

3. You may return to the Select Mode menu at any time by pressing **EXIT**.

Operation of the DATA LIST mode is summarized in the flow diagrams on the following pages.

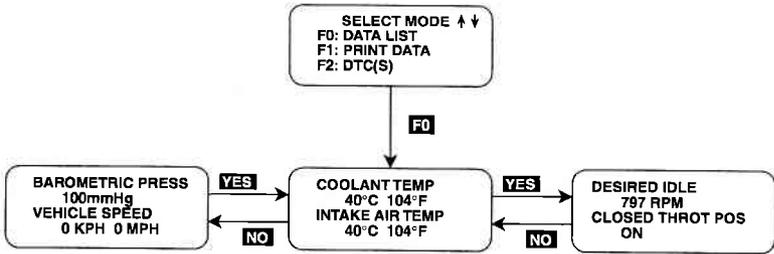| ACTIVE TECH 1 KEYS FOR DATA LIST |
|---|
| **YES** & **NO**  Scroll through displayed data parameters. |
| **F0**  Mark top displayed parameter as "fixed" for creating your own data pairs. |
| **F1**  Mark bottom displayed parameter as "fixed" for creating your own data pairs. |
| **F8**  Print Data List. |
| **EXIT**  Return to select mode menu. |

5-10

## VIEWING DATA PARAMETERS

In order to maximize the information that can be seen at one time, the TECH 1 displays data parameters in preassigned pairs. A typical first data pair which would be displayed after you press **F0** is shown in the figure below. Also shown is how to scroll through the Data List with the **YES** and **NO** keys and how to create your own data pairs with the **F0** and **F1** keys.

To see other preassigned pairs, press either the **YES** or **NO** key. The **YES** key will cause the TECH 1 to scroll forward through the list of preassigned pairs, while the **NO** key will cause scrolling backwards.

Section 8.0 contains descriptions of all engine data parameters.

```
                          ┌─────────────────────┐
                          │  SELECT MODE ↑ ↓    │
                          │  F0: DATA LIST      │
                          │  F1: PRINT DATA     │
                          │  F2: DTC(S)         │
                          └─────────────────────┘
                                    │
                                  [ F0 ]
                                    │
 ┌──────────────────┐  YES  ┌──────────────────┐  YES  ┌──────────────────┐
 │ BAROMETRIC PRESS │──────▶│  COOLANT TEMP    │──────▶│  DESIRED IDLE    │
 │    100mmHg       │       │  40°C  104°F     │       │    797 RPM       │
 │ VEHICLE SPEED    │◀──────│ INTAKE AIR TEMP  │◀──────│ CLOSED THROT POS │
 │  0 KPH  0 MPH    │  NO   │  40°C  104°F     │  NO   │      ON          │
 └──────────────────┘       └──────────────────┘       └──────────────────┘
```

## MODE F0 | DATA LIST

### CREATE YOUR OWN DATA PAIRS

You can create data parameter pairs which are different from the preassigned pairs. Any two parameters can be displayed as a pair by simply scrolling either the bottom or top display parameter, while the other display parameter is fixed. To "fix" the top parameter press **F0**, an asterisk will appear by the fixed parameter. Press **F1** to "fix" the lower parameter. The TECH 1 will not allow both the top and bottom parameters to be fixed at the same time.

As an example, let's say you wish to create a pair with ENGINE SPEED and SPARK ADVANCE. To do so, scroll through the preassigned pairs with the **YES** and **NO** key until you find a pair with ENGINE SPEED. Fix the ENGINE SPEED by pressing the **F0** key if ENGINE SPEED is the top parameter, or the **F1** key if it is the bottom. Then scroll the other half of the display with either the **YES** or **NO** key until SPARK ADVANCE is displayed.
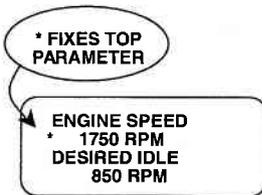
```
       ┌──────────────┐              ┌──────────────────┐
       │ * FIXES TOP  │              │  DESIRED IDLE    │
       │  PARAMETER   │              │    850 RPM       │
       └──────────────┘              │  ENGINE SPEED    │
         ┌────────────────┐          │ *   1750 RPM     │
         │ ENGINE SPEED   │          └──────────────────┘
         │ *   1750 RPM   │            ┌──────────────────┐
         │ DESIRED IDLE   │            │ * FIXES BOTTOM   │
         │   850 RPM      │            │   PARAMETER      │
         └────────────────┘           └──────────────────┘

         FIGURE  A                      FIGURE  B
```
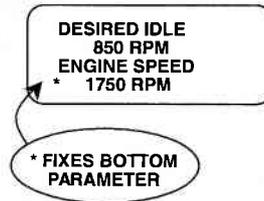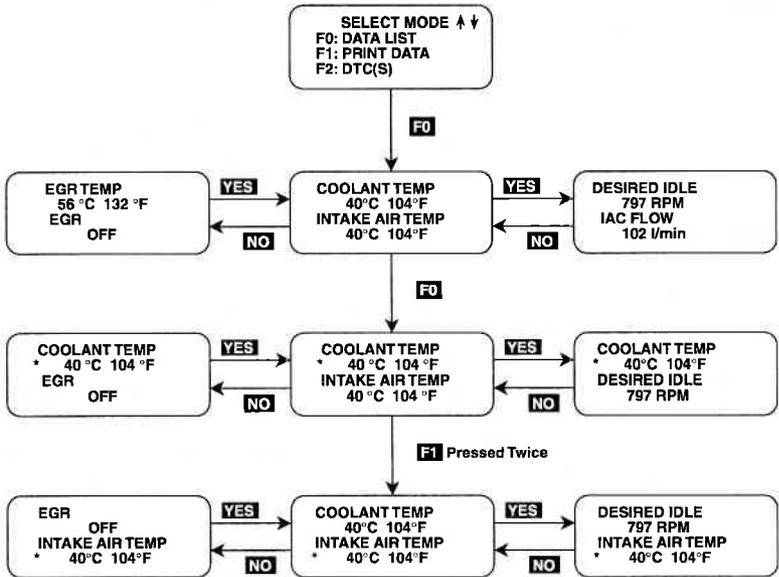
### RELEASE A "FIXED" PARAMETER

If the top parameter has been "fixed" with the **F0** key, press **F1** to release it and proceed scrolling through the preassigned data parameter pairs. Likewise, if **F1** has been pressed to "fix" the bottom parameter, press **F0** to release it.

### PRINTING DATA

The currently displayed sample may be printed if the TECH 1 is equipped with an RS232C I/F Cartridge (P/N TK05030A) connected to a compatible printer. To print the data, press **F8**. The TECH 1 keyboard is disabled while data is being sent to the printer.

*The RS232C I/F Cartridge is not required if you are using a TECH 1 Series A tester.*

5-12

SELECT MODE ↑ ↓
F0: DATA LIST
F1: PRINT DATA
F2: DTC(S)

**F0**

| EGR TEMP | | COOLANT TEMP | | DESIRED IDLE |
|---|---|---|---|---|
| 56 °C 132 °F | **YES** | 40°C 104°F | **YES** | 797 RPM |
| EGR | | INTAKE AIR TEMP | | IAC FLOW |
| OFF | **NO** | 40°C 104°F | **NO** | 102 l/min |

**F0**

| COOLANT TEMP | | COOLANT TEMP | | COOLANT TEMP |
|---|---|---|---|---|
| * 40 °C 104 °F | **YES** | * 40 °C 104 °F | **YES** | * 40°C 104°F |
| EGR | | INTAKE AIR TEMP | | DESIRED IDLE |
| OFF | **NO** | 40 °C 104 °F | **NO** | 797 RPM |

**F1** Pressed Twice

| EGR | | COOLANT TEMP | | DESIRED IDLE |
|---|---|---|---|---|
| OFF | **YES** | 40°C 104°F | **YES** | 797 RPM |
| INTAKE AIR TEMP | | INTAKE AIR TEMP | | INTAKE AIR TEMP |
| * 40°C 104°F | **NO** | * 40°C 104°F | **NO** | * 40°C 104°F |

## ACTIVE TECH 1 KEYS FOR CREATING DATA PAIRS

**YES** , **NO**    Scroll through displayed data parameters.

**EXIT**    Return to the Select Mode menu.

**F0** & **F1**    "FIX" the upper or lower parameter.

5-13

## MODE F1 | PRINT DATA

### PRINT DATA

When the RS232C I/F Cartridge is installed in the TECH 1, or if you are using a TECH 1 Series A tester, the Print Data mode allows you to print the VIN, engine type and Data List to a serial printer or terminal. This is the data list sent by the ECM (or PCM) to the TECH 1. (The data list parameters can be printed without printing the VIN or engine type by pressing the **F8** key in the Data List or Snapshot Replay mode.)

### OPERATING PROCEDURE:

1. Press **F1** to select the Print Data mode from the Select Mode menu. The VIN entry screen is the first screen displayed in this mode. Only the last 6 digits of the VIN are entered on this screen. This information is then printed out as part of the header information that accompanies each data list print out. The VIN is entered via the numeric portion of the key pad and the **ENTER** key is pressed to move to the next section of the print function.

2. The next screen requires the **ENTER** key to be pressed to start printing the data. This screen allows the cable to be connected between the RS232C Cartridge and the receiving device.

3. When the **ENTER** key is pressed the "WAITING TO PRINT DATA" screen is displayed until printing begins. If this screen is displayed for more than a few seconds, something is wrong with the set up. Check that all connections are secure, and that any receiving device is turned on and in the proper receive mode.

4. As printing begins, the TECH 1 displays the % COMPLETE of the print procedure. After the printing is 100% complete, the VIN screen is immediately displayed with the previously selected VIN. Pressing the **ENTER** key twice from this screen will cause another data stream to be buffered for printing as soon as the current data stream is output from the TECH 1.

5. Pressing the **EXIT** key at any point will cause the select mode menu to be displayed. If the **EXIT** key is pressed before printing is completed, only the data that has already been sent to the RS232C Cartridge will be printed. SOME DATA WILL BE LOST.

5-14

> PRINT DATA
> ENTER LAST 6 VIN
> DIGITS 000000
> THEN PRESS ENTER

**PRINT DATA VIN
ENTRY SCREEN**

> PRESS ENTER TO
> PRINT DATA

**SET UP RS232C
CARTRIDGE**

> RS232C NOT
> CONNECTED

**RS232C INTERFACE
CARTRIDGE
NOT CONNECTED**

> WAITING TO
> PRINT DATA

**PRINT
INITIALIZATION**

> 99% COMPLETE
> PRINT DATA

**PRINT IN PROGRESS
SCREEN**

---

### ACTIVE TECH 1 KEYS TO PRINT DATA

**ENTER**   Move to the next section of the Print Data function.

**0 - 9**   VIN entry keys.

**EXIT**    Terminate the Print Data mode and return to the Select Mode menu.

---

**PRINT SAMPLE**

```
            SUZUKI MOTOR CORPORATION
               ENGINE TYPE: TBI
                 VIN: 123456
               TECH 1 DATA LIST

      NO.  DESCRIPTION           VALUE

      1. COOLANT TEMP         82°C 180°F
      2. INTAKE AIR TEMP      21°C  70°F
      3. DESIRED IDLE           875 RPM
      4. IAC FLOW             102 l/min
      5. IAC ADJUST MONI          2%
```

## MODE F2 | DTC(S)

### DIAGNOSTIC TROUBLE CODES DESCRIPTION

Diagnostic Trouble Codes or DTC(S) are set by the ECM (or PCM) when an abnormal condition is detected. They are a key to diagnosing many of the problems which can occur in the vehicle. The DTC(S) mode allows you quick access to trouble codes for initial vehicle checks and to check that a repair procedure has been successful. TECH 1 displays for the DTC(S) mode are shown on the following pages.

The TECH 1 can clear all stored DTC(S) on vehicles except vehicles equipped with ECM Numbers 1 and 2 (SE416 [TBI] and SE416 [MFI]) as illustrated in the ECM Cartridge Coverage charts on pages 1-2 through 1-4. To clear DTC(S) on vehicles equipped with ECM Numbers 1 and 2, turn the ignition switch OFF, then turn it ON again.

TECH 1 Diagnostic Trouble Code display screens may vary from vehicle to vehicle. When F2: DTC(S) is selected from the SELECT MODE menu, some vehicles will display a TROUBLE INFO menu, while other vehicles will automatically display DTC information. The TECH 1 operating procedures for vehicles with the TROUBLE INFO menu are different from the operating procedures for vehicles without the TROUBLE INFO menu.
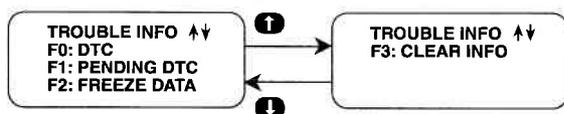


### VEHICLES WITHOUT A TROUBLE INFO MENU
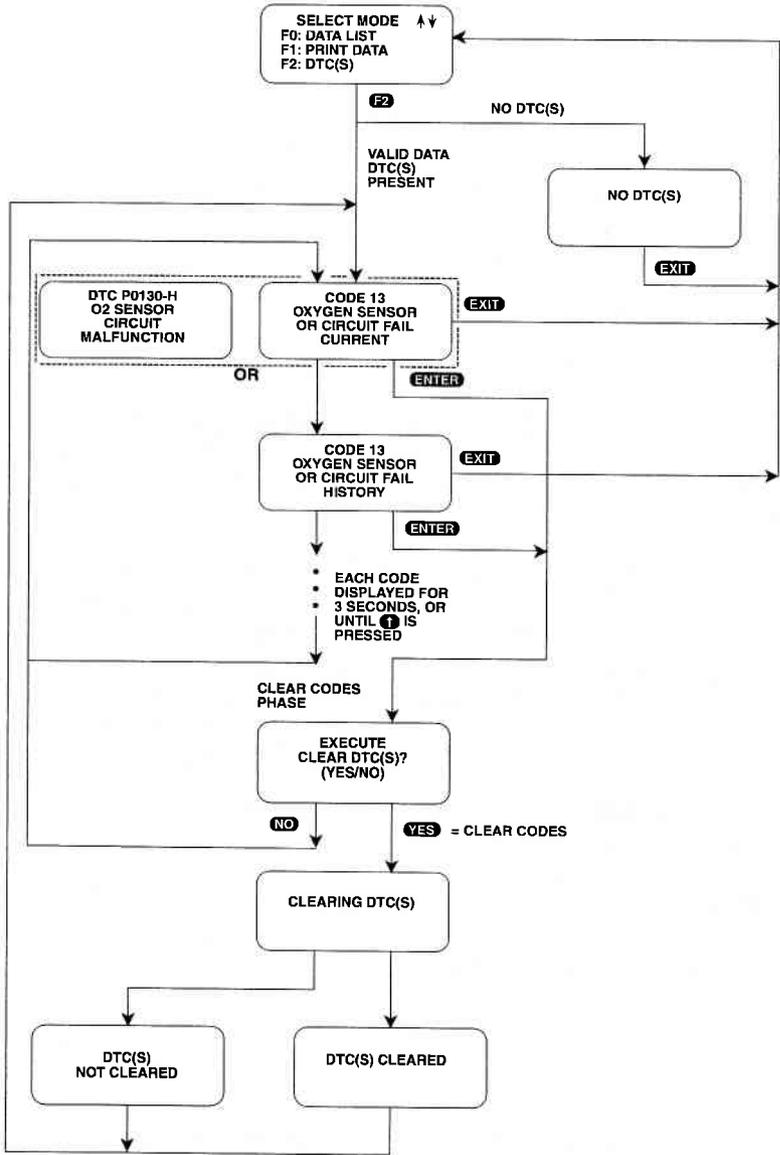
### OPERATING PROCEDURE:

1. Press **F2** to select the DTC(S) mode from the Select Mode menu.

   If no DTC(S) are present, the TECH 1 will display a message to that effect.

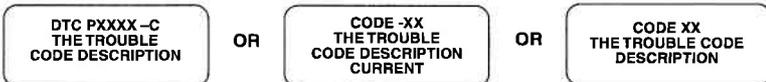2. If DTC(S) are present, the TECH 1 will automatically display each DTC for three seconds.

5-16

## VEHICLES WITHOUT A TROUBLE INFO MENU

SELECT MODE  ↑↓
F0: DATA LIST
F1: PRINT DATA
F2: DTC(S)

**F2**

NO DTC(S)

VALID DATA
DTC(S)
PRESENT

NO DTC(S)

**EXIT**

DTC P0130-H
O2 SENSOR
CIRCUIT
MALFUNCTION

CODE 13
OXYGEN SENSOR
OR CIRCUIT FAIL
CURRENT

**EXIT**

**OR**

**ENTER**

CODE 13
OXYGEN SENSOR
OR CIRCUIT FAIL
HISTORY

**EXIT**

**ENTER**

• EACH CODE
• DISPLAYED FOR
• 3 SECONDS, OR
• UNTIL ● IS
• PRESSED

CLEAR CODES
PHASE

EXECUTE
CLEAR DTC(S)?
(YES/NO)

**NO**

**YES** = CLEAR CODES

CLEARING DTC(S)

DTC(S)
NOT CLEARED

DTC(S) CLEARED

5-17

## MODE F2 | DTC(S)

3. The DTC(S) will be continuously displayed, wrapping around to the first code automatically after the last code has been displayed. DTC display screens will appear in one of the following formats:

```
┌─────────────────┐        ┌─────────────────┐        ┌─────────────────┐
│  DTC PXXXX –C   │        │    CODE -XX     │        │    CODE XX      │
│   THE TROUBLE   │   OR   │   THE TROUBLE   │   OR   │ THE TROUBLE CODE│
│ CODE DESCRIPTION│        │ CODE DESCRIPTION│        │   DESCRIPTION   │
│                 │        │     CURRENT     │        │                 │
└─────────────────┘        └─────────────────┘        └─────────────────┘
```

In both cases the status indication of the DTC will be displayed as follows:

C or Current
H or History
P or Pending

### CLEAR CODES PHASE

4. To clear all stored DTC(S), press **ENTER** to go to Clear Codes Phase. When the TECH 1 displays "EXECUTE CLEAR DTC(S)?", select either **YES** for clearing DTC(S) or **NO** for not clearing them.

When **YES** is pressed, TECH 1 will display a "CLEARING DTC(S)" message, followed by either a "DTC(S) CLEARED" or a "DTC(S) NOT CLEARED" message. After a few seconds the TECH 1 will automatically start displaying DTC(S) again. If no DTC(S) are present at this time the "NO DTC(S)" screen is displayed. When **NO** is pressed, the DTC(S) are retained in the ECM (or PCM) and the TECH 1 will start displaying DTC(S) again.

5. Pressing **EXIT** will terminate the DTC(S) mode returning you to the select mode menu.

### VEHICLES WITH A TROUBLE INFO MENU

### OPERATING PROCEDURE:

1. Press **F2** to select the DTC (S) mode from the Select Mode menu.

2. Rather than automatically displaying the DTC information, some vehicles will display the following menu:

5-18

```
┌─────────────────────────┐    ⬆    ┌──────────────────────┐
│ TROUBLE INFO ↑↓         │  ────▶  │ TROUBLE INFO ↑↓      │
│   F0: DTC               │         │ F3: CLEAR INFO       │
│ ★ F1: PENDING DTC       │  ◀────  │                      │
│ ★ F2: FREEZE DATA       │         │                      │
└─────────────────────────┘    ⬇    └──────────────────────┘
```
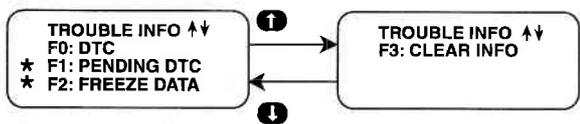
**\*** Pending DTC and Freeze Frame not available for all ECUs.

## F0: DTC

To view current or history DTC (S), press **F0** . The following screen will display the DTC number, the status of the DTC, and the DTC description. To scroll through multiple DTC(S), use **⬆** to advance the screen, and **⬇** to return to the previous screen.

```
┌──────────────────────┐
│   DTC P0130-C        │
│   O2S SENSOR         │
│   CIRCUIT            │
│   MALFUNCTION        │
└──────────────────────┘
```

The status of the DTC is indicated by a single letter as follows:

C for Current
H for History
P for Pending

## F1: PENDING DTC

To view any pending DTC(S), press **F1** . If any pending DTC(S) are present, they will be displayed in the format described above, and will have a "P" as the status indication. If there are no pending DTC(S) present, the TECH 1 will display a message to that effect.

## F2: FREEZE FRAME DATA

The vehicle's ECM saves diagnostic data information about the state of the vehicle when a Diagnostic Trouble Code (DTC) occurs. This data is referred to as Freeze Frame Data and can be read by the TECH1 using the FREEZE FRAME DATA mode. You can select this mode from the TROUBLE INFO menu.

## MODE F2 | DTC(S)

**FREEZE FRAME DATA DISPLAY**

```
Trouble Code
   P0130
Engine Speed
  1000 RPM
```

### For Vehicles with a Single Freeze Frame (EURO Mode)

The Freeze Frame Data is displayed in the same format as the Data List format described in the DATA LIST of the Current Data mode. The first parameter in the list is the DTC which caused the Freeze Frame Data to be saved. Note that Freeze Frame Data is only available for the first DTC which was detected by the vehicle.

```
F0: PXXXX
F1: PXXXX (1st)
F2: PXXXX (2nd)
F3: PXXXX (3rd)
```

### For Vehicles with Multiple Freeze Frames (SUZUKI Mode)

The PXXXX numbers are the DTCs for each frame. Once the Frame is selected, the Data List is displayed.

The ECM (or PCM) has 4 frames where the Freeze Frame Data can be stored. F0 displays the Freeze Frame Data of the malfunction which was detected first. However, the Freeze Frame Data in F0 is updated according to the priority described below.

| PRIORITY | FREEZE FRAME DATA IN FRAME 1 |
|----------|------------------------------|
| 1 | Freeze Frame Data at initial detection of malfunction among misfire detected (P0300 ~ P0304), fuel system too lean (P0171) and fuel system too rich (P0172) |
| 2 | Freeze Frame Data when a malfunction other than those in "1" above is detected. |

In F1 through F3, the Freeze Frame Data of each malfunction is displayed in the order as the malfunction is detected. These data are not updated.

### F3: CLEAR DATA

To get to the Clear Codes Phase, press **F3**. When the TECH 1 displays "CLEAR ALL DIAGNOSTIC INFO?", press **YES** to clear all information, or **NO** to retain the information.

When **YES** is pressed, the TECH 1 will display "ALL DIAGNOSTIC INFORMATION CLEARING". Following this display the TECH 1 will confirm whether the diagnostic information was successfully cleared by either displaying "ALL DIAGNOSTIC INFORMATION CLEARED" or "ALL DIAGNOSTIC INFORMATION NOT CLEARED". The TECH 1 will then return to the TROUBLE INFO menu.

When **NO** is pressed, all diagnostic information is retained in the ECM (or PCM) and the TECH 1 will return to the TROUBLE INFO menu.

3. Press **EXIT** while using any of the above functions to return to the TROUBLE INFO menu.

4. Press **EXIT** from the TROUBLE INFO menu to return to the SELECT MODE menu.

## VEHICLES WITH A TROUBLE INFO MENU
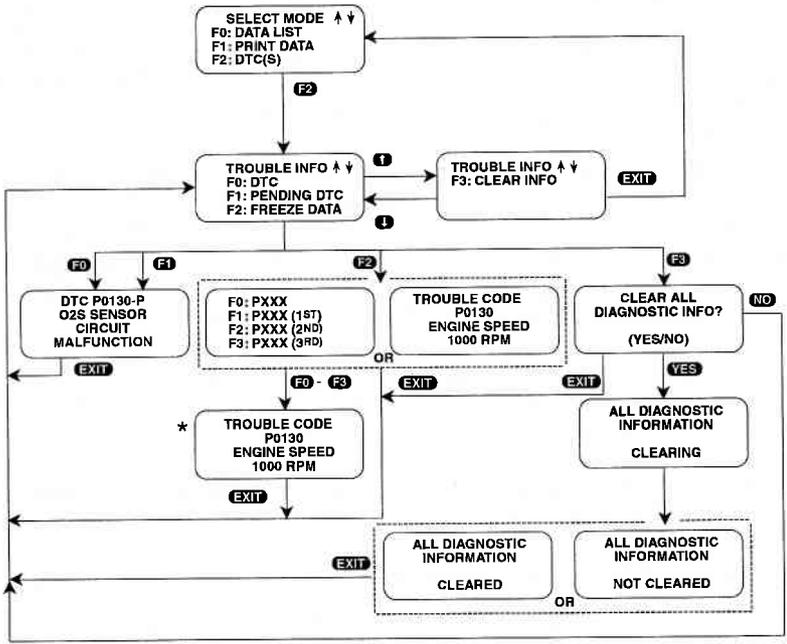


*The Freeze Frame display works like a Data List. You can cycle through parameter pairs using **YES** and **NO**. You can also use **F0** and **F1** to create your own data pairs. See the Data List section for more details.

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*NOTE: DTC(S) can also be displayed in SNAPSHOT mode.*

DTC(S) can also be printed in a tabular format using the Screen Print feature if the RS232C I/F Cartridge is installed or if you are using a TECH 1 Series A tester. Screen Print is enabled by pressing **F6** until an "RS232 SET-UP" menu is displayed. Press **F1** to enable the Screen Print function. Refer to the RS232C I/F or TECH 1 Series A Operators Manual for more detail.

### ACTIVE TECH 1 KEYS FOR DTC(S)

| | |
|---|---|
| **ENTER** | Clear all stored ECM (or PCM) DTC(S). |
| **YES** | Clear all stored ECM (or PCM) DTC(S). |
| **NO** | Return to display DTC(S). DTC(S) are not cleared. |
| **↑** | Display next DTC. |
| **F0** - **F3** | Selection keys. |
| **F6** (Hold) | Select "RS232C SET-UP" menu. |
| **F7** | Toggle unit conversions for applicable parameters between English and Metric. |
| **F8** | Print Freeze Frame Data (if equipped with serial printer. |
| **EXIT** | Terminate the DTC(S) display and return to the select mode menu. |

## MODE F3 | SNAPSHOT

The purpose of the SNAPSHOT test mode is to help you isolate an intermittent or transient problem by STORING ENGINE DATA PARAMETERS BEFORE AND/OR AFTER THE PROBLEM OCCURS.

When the TECH 1 is operating in SNAPSHOT mode, it is constantly storing information about data parameters and DTC(S). A time and position index for the stored information is also saved.

The TECH 1 stores all of the Data List parameters and DTC(S) for the vehicle selected. When the memory is full, the oldest (earliest) data collected is erased to make room for new information.

A "TRIGGER" tells the TECH 1 when to stop collecting data. You can specify a "TRIGGER CONDITION" so the TECH 1 collects data that will be most useful in diagnosing the current problem.

### TRIGGER CONDITION

The trigger condition defines the specific circumstances under which you want the trigger to be set. The possible trigger conditions are:

1) ANY DTC:             If any DTC is detected by the TECH 1, it will cause the trigger to be set.

2) SINGLE DTC:      You can select a specific DTC that must be detected before the trigger will be set. Step 3 in the Operating Procedure tells you how to enter the code.

3) MANUAL TRIGGER: While operating the SNAPSHOT mode, you can always cause the trigger to be set by pressing the **ENTER** key.

Once the trigger occurs, the TECH 1 will retain data according to which trigger point you have selected.

### VIEWING CAPTURED DATA

By selecting F3: REPLAY DATA from the SNAPSHOT menu you
have the option of bypassing the Data Capture phase and display-
ing previously captured data. All data captured during SNAPSHOT
will be retained in the TECH 1 until it is overwritten by a new
SNAPSHOT, or if the TECH 1 is disconnected from the serial data
link connector or the cigarette lighter for at least one-half hour.

> *NOTE: Please note that all data captured during SNAP-
> SHOT will be erased from TECH1 once you select F0:
> EURO MODE in the communication mode display.*

### PRINTING CAPTURED DATA

In addition, you can print the captured data, providing a hard copy
of any selected data sample. A TECH 1 printer is required to support
this print function. See Step 11.

| MODE F3 | SNAPSHOT |

## OPERATING PROCEDURE:

The operation of SNAPSHOT mode is divided into three phases: Set-Up (Steps 1-3), Data Capture (Steps 4-7), and Data Display (Steps 8-12).

## SET-UP PHASE

1. Press **F3** to select the SNAPSHOT mode from the Select Mode menu.

2. The trigger condition and review data options are displayed next in a self-scrolling Snapshot Options menu.

   To select a trigger option, just press the Function Key displayed to the left of the desired trigger condition. To replay previously captured data, press **F3**.

3. To choose a specific DTC, press **F1** in the Snapshot Options menu.

   When the TECH 1 screen displays "SNAPSHOT MODE, ENTER DTC TO TRIGGER ON xx", use numeric keys **0** - **9** to enter the two digit DTC number that you have selected, then press the **ENTER** key. The TECH 1 will continue to store data until the specified DTC is detected, or until you press the **EXIT** key. If the DTC you enter does not exist for the engine type being tested, an "INVALID DTC" message will be displayed and the code will have to be reentered.

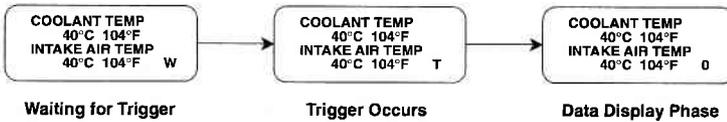| ACTIVE TECH 1 KEYS IN SNAPSHOT SET-UP PHASE | |
|---|---|
| **EXIT** | Return to Snapshot Options menu. |
| **F0** - **F2** | Select trigger condition. |
| **F3** | Select Replay Data. |
| **0** - **9** | Select specific DTC. |
| **ENTER** | Enter selected DTC. |

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## SNAPSHOT SET-UP PHASE (Select Trigger Condition or Display Previously Captured Data).

To select a trigger condition, press the function key to the left of the desired trigger condition. To bypass the Data Capture phase and review previously captured data, press **F3**.

SELECT MODE ↑↓
F3: SNAPSHOT
F4: MISC TESTS

**F3**

REPLAY PREVIOUSLY
CAPTURED DATA

SELECT SINGLE DTC

| COOLANT TEMP |
| 40°C 104°F |
| INTAKE AIR TEMP |
| 40°C 104°C     O |

**F3**

SNAPSHOT OPTIONS
F0: ANY DTC
F1: SINGLE DTC
F2: MANUAL TRIG
F3: REPLAY DATA

**F1**

SNAPSHOT MODE
ENTER DTC
TO TRIGGER ON XX
THEN PRESS ENTER

ENTER CODE,
THEN PRESS
**ENTER**

**F0** , **F2**

DATA CAPTURE
PHASE

COOLANT TEMP
40°C 104°F
INTAKE AIR TEMP
40°C 104°C     W

**YES**          **NO**

More Data Parameters

## MODE F3 | SNAPSHOT

### DATA CAPTURE PHASE

4. Once the trigger condition is specified, the TECH 1 begins storing engine (or transmission) data parameters and DTC(S) while displaying the Data List parameters.

5. The data is organized as a number of data 'samples'. The value or state of each parameter as well as all DTC(S) are saved for each sample. The data display will indicate the 'waiting for trigger' condition with a flashing 'W' in the lower right-hand corner of the display. While waiting for the selected trigger, the **ENTER** key can always be used to force a trigger.



| COOLANT TEMP | COOLANT TEMP | COOLANT TEMP |
| 40°C 104°F | 40°C 104°F | 40°C 104°F |
| INTAKE AIR TEMP | INTAKE AIR TEMP | INTAKE AIR TEMP |
| 40°C 104°F    W | 40°C 104°F    T | 40°C 104°F    0 |
| **Waiting for Trigger** | **Trigger Occurs** | **Data Display Phase** |

6. Once the trigger occurs, the TECH 1 will continue to save data samples until its memory is full. The data display indicates that the trigger has occurred by replacing the flashing 'W' with a flashing 'T'. As soon as the memory is full, the data capture terminates automatically and the TECH 1 goes to the Data Display phase.

7. Pressing **EXIT** will terminate the Data Capture phase. If the trigger has already occurred, the Snapshot mode will move to the Data Display Phase.

## ACTIVE TECH 1 KEYS IN
## SNAPSHOT DATA CAPTURE PHASE

**YES** & **NO**　Scroll through displayed data parameters.

**F0**　Mark top displayed parameter as "fixed" for creating your own data pairs.

**F1**　Mark bottom displayed parameter as "fixed" for creating your own data pairs.

**ENTER**　Manual trigger.

**EXIT**　Display captured data if trigger has already occurred.

## MODE F3 | SNAPSHOT

### DATA DISPLAY PHASE

8. The Data Display phase is indicated with a number (initially zero) in the lower right-hand corner of the display. Select the data to be displayed by using the **YES** and **NO** keys.

> *NOTE: During the Data Display phase, the DTC(S) present during each sample can be displayed by pressing* **F2**.
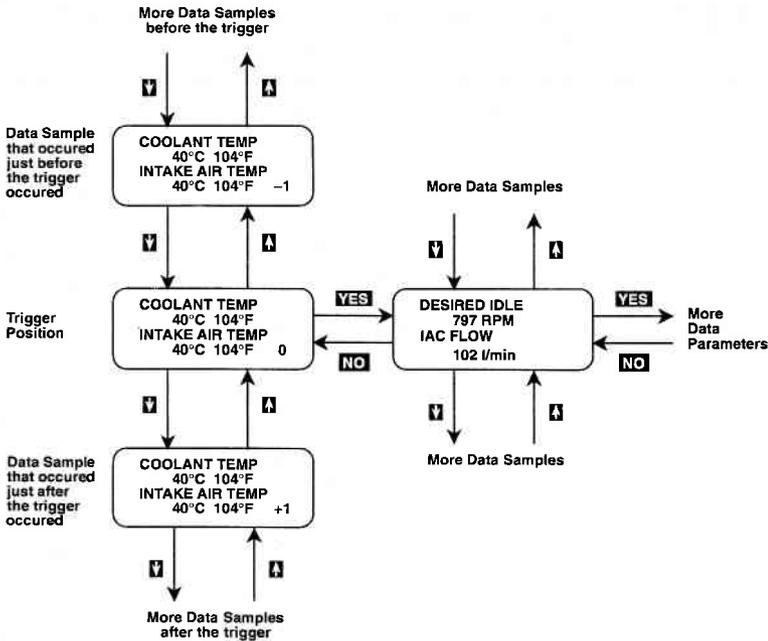
9. Use the ⬆ and ⬇ keys to select the desired sample. An index is displayed in the lower right-hand corner of the TECH 1 display. Sample "0" corresponds to the trigger sample; sample "–1" is the sample immediately preceding the trigger; sample "+1" is imme-diately after the trigger, and so on. The index range may be less than the maximum number of samples if not enough time was allowed for data capture before or after the trigger.

You can advance directly to the first, last, or trigger sample with the press of a button.

F4: Display first (earliest) sample
F5: Display trigger sample (0)
F6: Display last (most recent) sample

10. While in the data display phase, pressing **ENTER** will cause the TECH 1 to toggle between the sample index and sample time.
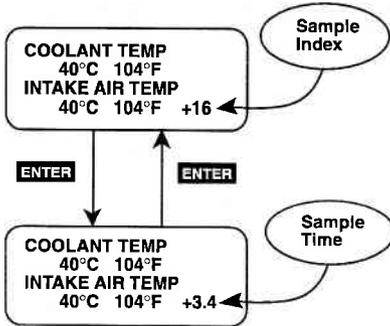


The sample time display gives the time in seconds (relative to the trigger sample) at which the TECH 1 received the currently displayed sample. For example, a sample time of +3.4 means the sample was received 3.4 seconds after the trigger sample. A sample time of –2.6 seconds means the sample was received 2.6 seconds before the trigger.

11. The currently displayed sample may be printed if the tester is connected to a compatible printer. To print the data, press **F8**. The TECH 1 keyboard will be disabled while data is being sent to the printer.

SNAPSHOT data can also be printed in a tabular format using the Screen Print feature if the RS232C I/F Cartridge is installed or if you are using a TECH 1 Series A tester. Screen Print is enabled by pressing **F6** until an "RS232 SET-UP" menu is displayed. Press **F1** to enable the Screen Print function. Refer to the RS232C I/F or TECH 1 Series A Operator's Manual for more detail.

12. When you are finished viewing the sampled data, press **EXIT** to return to the Snapshot Options menu. If you are finished with the SNAPSHOT mode, press **EXIT** again to return to the select mode menu.

---

**ACTIVE TECH 1 KEYS IN**
**SNAPSHOT DATA DISPLAY PHASE**

| | |
|---|---|
| **YES** & **NO** | Scroll through displayed data parameters. |
| **↑** & **↓** | Scroll through selected samples. |
| **F0** & **F1** | Fix top or bottom display parameter respectively. |
| **F2** | Display DTC(S) for current sample. |
| **F4** | Advance to first (earliest) sample. |
| **F5** | Advance to trigger sample (sample 0). |
| **F6** | Advance to last (most recent) sample. |
| **F6** (Hold) | Select "RS232C SET-UP" menu. |
| **F8** | Print current data sample (if equipped with RS232C I/F Cartridge or TECH 1 Series A and printer). |
| **ENTER** | Toggle between sample index and sample time display. |
| **EXIT** | Return to Snapshot Options menu. |

# SNAPSHOT MODE FLOW CHART

```
                    ┌─────────────────────┐
                    │ SELECT MODE    ↑↓   │
                    │ F3: SNAPSHOT        │
                    │ F4: MISC TESTS      │
                    └─────────────────────┘
                             │ F3
                             ▼
        [EXIT]      ┌─────────────────────┐
                    │ SNAPSHOT OPTIONS    │ F3    Review previously
                    │ F0: ANY DTC         │ ───▶  captured data.
                    │ F1: SINGLE DTC      │
                    │ F2: MANUAL TRIG     │                    ▲
                    │ F3: REPLAY DATA     │         YES │    │ NO
                    └─────────────────────┘             ▼    │
                       F0   F1   F2
                                            More Data Parameters
```

SET-UP
PHASE
(See Steps 1-3)

```
                    ┌─────────────────────┐
                    │ SNAPSHOT MODE       │
                    │ ENTER DTC           │
                    │ TO TRIGGER ON XX    │
                    │ THEN PRESS ENTER    │
                    └─────────────────────┘
                         ENTER
                         CODE
```

DATA
CAPTURE
PHASE
(See Steps 4-7)

```
        [EXIT]      ┌─────────────────────┐
                    │ COOLANT TEMP        │
                    │    40°C  104°F      │
                    │ INTAKE AIR TEMP     │
                    │    40°C  104°F    W │   FLASHING W =
                    └─────────────────────┘      WAITING FOR TRIGGER

                    USE YES AND NO TO
                    SELECT DIFFERENT
                    DATA PARAMETERS
```

```
                    ┌─────────────────────┐
                    │ COOLANT TEMP        │
                    │    40°C  104°F      │
                    │ INTAKE AIR TEMP     │
                    │    40°C  104°F    T │   FLASHING T = TRIGGER
                    └─────────────────────┘      HAS OCCURRED

                    TECH 1 MEMORY
                    FULL OR EXIT
```

DATA
DISPLAY
PHASE
(See Steps 8-12)

```
        [EXIT]      ┌─────────────────────┐
                    │ COOLANT TEMP        │
                    │    40°C  104°F      │
                    │ INTAKE AIR TEMP     │
                    │    40°C  104°F    0 │   0 = TRIGGER POSITION
                    └─────────────────────┘   – = BEFORE TRIGGER OCCURRED
                                               + = AFTER TRIGGER OCCURRED
                     YES          NO
```

Use YES and NO
to view different
Data Parameters.

Use F2 to display
DTC(S) for
the current sample.

OTHER DATA
LIST SCREENS

USE ↑ AND ↓ TO SCROLL
THROUGH SAMPLES.

Use ENTER to toggle between
SAMPLE INDEX and SAMPLE TIME
(See Step 10)

## MODE F4 | MISC TESTS

### MISC TESTS MODE ABORT CONDITIONS

The following chart lists the vehicle conditions that will cause the Miscellaneous Tests to abort (stop). If you are unable to perform the test or if the test aborts after it starts, confirm that none of the following conditions exists before starting the test again.

| ECM NO. | OUTPUT CONTROL | CONDITION |
|---|---|---|
| 1-5, 9, 11-13, 17 | RPM Control | Engine Speed greater than 2000 RPM. Vehicle speed detected. |
| 7, 8, 10, 14, 16 | RPM Control | Engine speed less than 500 RPM or greater than 2000 RPM. Vehicle speed detected. Coolant Temperature less than 70°C. CTP Switch (Closed Throttle Position) OFF. |
| 15 | RPM Control | CTP Switch (Closed Throttle Position) OFF. Vehicle speed detected. Diagnostic trouble code No. 24 is set. |
| 18, 21-38, 41-45 | RPM Control | CTP Switch (Closed Throttle Position) OFF. DTC(s) detected. Vehicle speed detected. Coolant Temperature less than 80°C. |
| 1-6, 9, 11-13, 17 | Fixed Spark | Engine Speed greater than 2000 RPM. Vehicle speed detected. |
| 7, 8, 10, 14, 16 | Fixed Spark | Engine Speed greater than 2000 RPM. Coolant Temperature less than 70°C. CTP Switch (Closed Throttle Position) OFF. |
| 15 | Fixed Spark | Engine Speed greater than 2000 RPM. |
| 18, 21-38, 41-45 | Fixed Spark | CTP Switch (Closed Throttle Position) OFF. DTC(s) detected. Vehicle speed detected. Coolant Temperature less than 80°C. |
| 1, 2, 3, 4, 9, 11 | IAC CAL | Engine Speed greater than 2000 RPM. |
| 7, 8, 10, 14 | IAC CAL | Coolant Temperature less than 70°C or greater than 105°C. |
| 15 | IAC CAL | Coolant Temperature less than 76°C. A/C Control Signal ON. Power steering pressure switch ON. Blower fan motor switch ON. Transmission range other than "P" or "N" range (for A/T vehicle). |
| 36 | IAC CAL | CTP Switch (Closed Throttle Position) OFF. DTC(s) detected. Vehicle speed detected. Coolant Temperature less than 80°C. |

## MISC TESTS MODE ABORT CONDITIONS

| | | |
|---|---|---|
| 1, 3, 4, 5, 6, 9 11, 12 | EGR Control | Engine Speed less than 1500 RPM or greater than 4000 RPM. Coolant Temperature less than 70°C. |
| 8 | EGR Control | Engine Speed less than 1500 RPM or greater than 4000 RPM. Coolant Temperature less than 70°C. CTP Switch (Closed Throttle Position) OFF. |
| 7, 10, 14 | Stepping EGR Control | Engine Speed less than 200 RPM. Coolant Temperature less than 70°C. CTP Switch (Closed Throttle Position) OFF. |
| 13 | Stepping EGR Control | Engine Speed less than 200 RPM. Coolant Temperature less than 55°C. CTP Switch (Closed Throttle Position) OFF. |
| 15 | Stepping EGR Control | Engine Speed greater than 3500 RPM. Vehicle speed detected. Coolant Temperature less than 76°C. |
| 16 | Stepping EGR Control | Vehicle Speed detected. Coolant Temperature less than 70°C. CTP Switch (Closed Throttle Position) OFF. |
| 17 | EGR Control | Engine Speed less than 1500 RPM. or greater than 4000 RPM. Vehicle Speed detected. |
| 18 | Stepping EGR Control | Engine Speed less than 3000 RPM. DTC(s) detected. Vehicle speed detected. Coolant Temperature less than 80°C. |
| 21, 23, 24, 25, 29-38, 41, 43-45 | Stepping EGR Control | Engine Speed greater than 3000 RPM. DTC(s) detected. Vehicle speed detected. |
| 21-38 | Cani Purge Valve | Engine speed detected. DTC(s) detected. Vehicle speed detected. |
| 21, 23, 24, 25, 29-38 | Fuel Pump Control | Engine speed detected. DTC(s) detected. Vehicle speed detected. Fuel tank less than 15%. |
| 21, 22, 23, 24, 25, 29-38 | MIL Control | Vehicle speed detected. |
| 24, 25, 29, 30, 32, 34, 36, 38 | A/C Condenser Fan | CTP Switch (Closed Throttle Position) OFF. DTC(s) detected. Vehicle speed detected. Coolant Temperature greater than 110°C. A/C Switch ON. |
| 21, 22, 23, 29, 30, 31, 34, 35, 36, 42 | Radiator Fan Control | CTP Switch (Closed Throttle Position) OFF. DTC(s) detected. Vehicle speed detected. Coolant Temperature greater than 110°C. A/C Switch ON. |

## MODE F4 | MISC TESTS

### SELECTING A MISCELLANEOUS TEST

Selection of a Miscellaneous Test or Output Control Test may vary from vehicle to vehicle. Some vehicles will allow you to choose between an Output Control Test and a Readiness Test from the MISC TEST menu.

```
      MISC TEST
F0: OUTPUT TESTS
F1: READINESS TST
```

From this TECH 1 display, press **F0** to view the Output Control Test menu. For a description of the READINESS TST see the Readiness Test section near the end of this section.

For some vehicles, the TECH 1 will display a menu of output tests immediately after you press F4: MISC TEST from the SELECT MODE menu.

The Miscellaneous Test or Output Control Test menu allows you to choose the control test you wish to perform on the vehicle.

```
      MISC TEST                    OUTPUT TESTS ↑↓
F0: RPM CONTROL                       RPM CONTROL
F1: FIXED SPARK                     * FIXED SPARK
F2: IAC CAL          OR               IAC CAL
```

To select a control test from the MISC TEST menu, press the TECH 1 key to the left of the test name.

From the OUTPUT TESTS menu, you can select the individual tests by using **↑** and **↓** to scroll through the list of tests until the ✱ is next to the test you want to perform, then press **ENTER**.

Detailed descriptions of the individual output control tests start on the following pages.

Press **EXIT** to return to the SELECT MODE menu from the MISC TEST menu.

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## ACTIVE TECH 1 KEYS

**F0** - **F9**    Selection Keys.

**↑** - **↓**    Scroll through menu.

**ENTER**    Selection Key.

**EXIT**    Return to Select Mode menu.

| MODE F4 | MISC. TESTS |
|---------|-------------|
| **RPM CONTROL** | |

RPM Control is not an engine test, but it allows you to control the RPM. If an elevated RPM or diagnosis of the IAC valve is required for any reason, this mode allows quick and easy control of the RPM from any area of the vehicle.

*NOTE: THIS TEST SHOULD ONLY BE RUN WITH THE PARKING BRAKE ON AND THE WHEELS ADEQUATELY SECURED. ANY OTHER MODE OF OPERATION IS NOT RECOMMENDED AND IS UNSAFE.*

**OPERATING PROCEDURE:**

1. Select RPM CONTROL from the Output Tests menu or the Misc. Test menu. The RPM CONTROL instruction screen is displayed, followed by the BLOCK WHEELS screen.

2. Block the wheels, set the parking brake, put the transmission in Park or Neutral, then start the engine. Warm the engine to operating temperature.

3. Press **ENTER** to begin the test.

4. The TECH 1 first automatically controls the engine speed to the current desired idle. When the RPM Control Testing Screen is displayed, you can increase the engine RPM by pressing the ⬆ key. To decrease the RPM, press the ⬇ key. Holding down either key will cause the RPM to change in the appropriate direction.

   If the TECH 1 detects any of the conditions listed on the Misc. Tests Mode Abort Conditions tables, the test will be terminated and the cause will be displayed.

5. While in the RPM CONTROL mode, parameters can be displayed as in the DATA LIST mode. RPM appears at the end of line 2 of the display, and the currently commanded value of RPM is displayed at the end of line 4. Data parameters can be scrolled and fixed as in the DATA LIST mode.

Indicates RPM being controlled.

```
COOLANT TEMP
  40°C  104°F    RPM
DESIRED IDLE
  760 RPM        760
```

RPM CONTROL value.
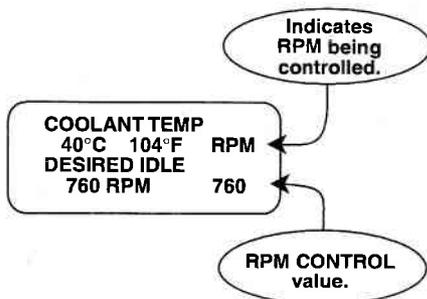
**RPM CONTROL MODE SCREEN**

6. To return to the initial desired idle control RPM, press the **ENTER** key.

7. Press the **EXIT** key to return control of the IAC valve to the ECM (or PCM) and to return to the Miscellaneous Tests menu.

| ACTIVE TECH 1 KEYS FOR RPM CONTROL | |
| --- | --- |
| ⬆ | Increase engine speed. |
| ⬇ | Decrease engine speed. |
| **YES** & **NO** | Scroll through displayed data parameters. |
| **F0** & **F1** | Mark top or bottom displayed parameter as fixed for creating your own data pairs. |
| **ENTER** | Advance to RPM control, provided vehicle is in Park or Neutral. Return to initial desired idle RPM control. |
| **EXIT** | Terminate the RPM CONTROL mode and return to the Miscellaneous Test menu. |

| MODE F4 | MISC. TESTS |
|---------|-------------|

| FIXED SPARK MODE |
|------------------|

The purpose of the Fixed Spark mode is to continuously monitor data parameters while commanding ECM (or PCM) operation in the fixed spark mode. The Fixed Spark mode allows you to set the ignition timing.

The TECH 1 Fixed Spark mode allows monitoring of data parameters in a manner identical to that of the Data List mode. Fixed spark operation is indicated by the letters "FXS" in the lower right corner of the TECH 1 display as shown on the following page.
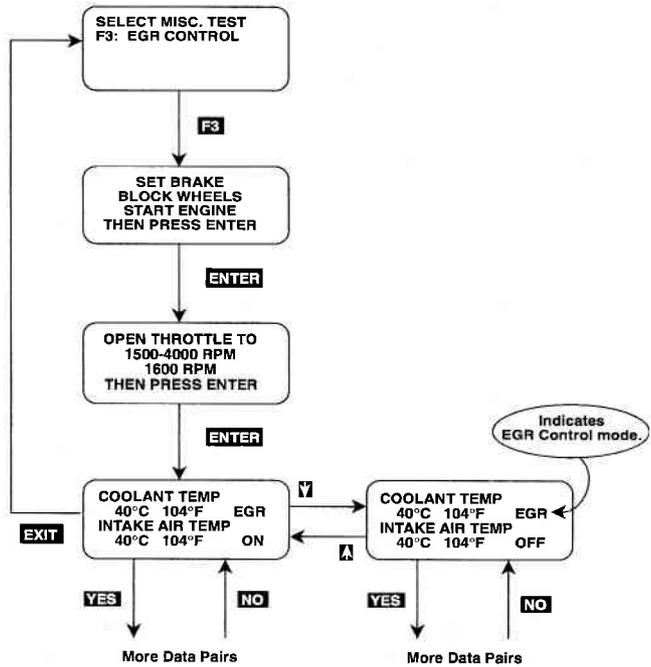
**OPERATING PROCEDURE:**

1. Select FIXED SPARK mode from the Output Tests menu or the Misc. Test menu.

2. Block the wheels, set the parking brake, put the transmission in Park or Neutral, and then start the engine. Warm the engine to operating temperature.

3. Press **ENTER** to begin the test and then check that the ignition timing is within the specification by using a timing light.

   Refer to the Service Manual for the specifications of initial ignition timings.

4. Select the data parameters to be displayed by scrolling through the parameters with the **YES** and **NO** keys.

   If the TECH 1 detects any of the conditions listed on the Misc. Tests Mode Abort Conditions tables, the test will be terminated and the cause will be displayed.

5. Press **EXIT** to terminate the Fixed Spark mode and return to the Miscellaneous Tests menu.

Indicates
Fixed Spark mode.

COOLANT TEMP
40°C   104°F
INTAKE AIR TEMP
40°C   104°F   FXS

**YES**                    **NO**
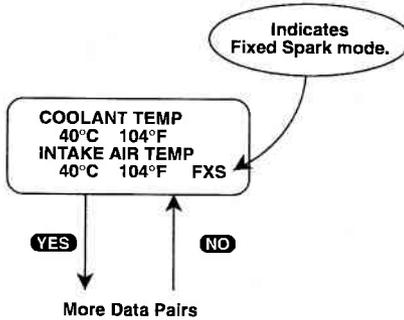
More Data Pairs

**FIXED SPARK MODE SCREEN**

| ACTIVE TECH 1 KEYS FOR FIXED SPARK MODE | |
| --- | --- |
| **YES** & **NO** | Scroll through displayed parameters. |
| **F0** | Mark top displayed parameter as "fixed" for creating your own data pairs. |
| **F1** | Mark bottom displayed parameter as "fixed" for creating your own data pairs. |
| **ENTER** | Advance to FIXED SPARK mode, provided vehicle is in Park or Neutral. |
| **EXIT** | Return to Miscellaneous Test menu. |

| MODE F4 | MISC. TESTS |
|---------|-------------|
| **IAC CAL** | |

The purpose of the IAC CAL mode is to set the duty of the IAC valve to a certain value at idle speed. This is done by adjusting the Idle adjustment screw in the throttle body. The IAC CAL mode allows monitoring of data parameters in a manner identical to that of the DATA LIST mode.

**OPERATING PROCEDURE:**

1. Select IAC CAL from the Output Tests menu or the Misc. Test menu.

2. Block the wheels, set the parking brake, and put the transmission in Park or Neutral.

3. Make sure the vehicle is in Park with the parking brake engaged, start the engine unless it is already running. Warm the engine to operating temperature.

4. Press **ENTER** to begin the test.

5. Select the data parameters to be displayed by scrolling through the parameters with the **YES** and **NO** keys. The letters "IAC" appearing at the end of line 2 of the display indicate that the IAC valve is being controlled. At the end of line 4 of the display, "CAL" (Calibrated Air) will be displayed.

   If the TECH 1 detects any of the conditions listed on the Misc. Tests Mode Abort Conditions tables, the test will be terminated and the cause will be displayed.

6. Press **EXIT** to return to the Miscellaneous Tests menu and return control of the IAC system to the ECM (or PCM).

5-42

Indicates
IAC CAL mode.

COOLANT TEMP
  40°C   104°F   IAC
INTAKE AIR TEMP
  40°C   104°F   CAL

**YES**          **NO**

**More Data Pairs**
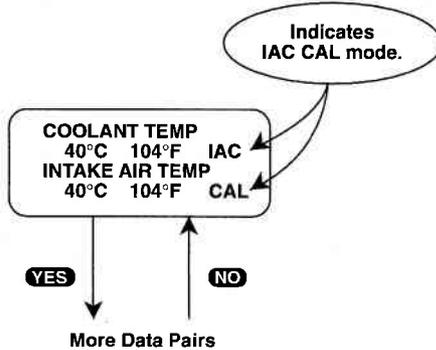
## IDLE AIR CONTROL CALIBRATION (IAC CAL) MODE SCREEN

| ACTIVE TECH 1 KEYS FOR IAC CAL | |
|---|---|
| **YES** & **NO** | Scroll through displayed data parameters. |
| **F0** | Mark top displayed parameter as "fixed". |
| **F1** | Mark bottom displayed parameter as "fixed". |
| **ENTER** | Advance to IAC Control, provided vehicle is in Park or Neutral. |
| **EXIT** | Return to Miscellaneous Test menu. |

5-43

The EGR Control mode allows you to continuously monitor Data List parameters while commanding the EGR control ON and OFF. When EGR control is ON, exhaust gas is introduced into the intake manifold. The engine should be warmed to control operating temperature before performing the EGR Control mode test.

**OPERATING PROCEDURE:**

1. Select the EGR Control mode from the Output Tests menu or the Misc. Test menu.

2. Block the wheels, set the parking brake, put the transmission in Park or Neutral, and then start the engine. Warm the engine to operating temperature.

3. Control the engine speed to 1500-4000 RPM, then press **ENTER**.

4. Select the data parameters to be displayed by scrolling through the parameters with the **YES** and **NO** keys. "EGR" is displayed at the end of line 2 and "ON" is displayed at the end of line 4 indicating that the EGR system is being controlled.

   If the TECH 1 detects any of the conditions listed on the Misc. Tests Mode Abort Conditions tables, the test will be terminated and the cause will be displayed.

5. The test begins with the EGR on. To control the EGR off, press the ⬇ key. To control EGR on again press the ⬆ key. The Data List display for monitoring the engine's response is available while the EGR is being controlled.

6. Press **EXIT** to return to the Miscellaneous Test menu and return EGR Control to the ECM (or PCM).

Operation of the EGR Control mode is summarized in the following flow diagram.

```
┌─────────────────────────┐
│ SELECT MISC. TEST       │
│ F3: EGR CONTROL         │
└─────────────────────────┘
            │
           F3
            │
┌─────────────────────────┐
│      SET BRAKE          │
│     BLOCK WHEELS        │
│     START ENGINE        │
│  THEN PRESS ENTER       │
└─────────────────────────┘
          ENTER
            │
┌─────────────────────────┐
│   OPEN THROTTLE TO       │
│    1500-4000 RPM         │
│      1600 RPM            │
│  THEN PRESS ENTER        │
└─────────────────────────┘
          ENTER
            │
```

Indicates
EGR Control mode.

```
┌──────────────────────┐        ┌──────────────────────┐
│ COOLANT TEMP         │        │ COOLANT TEMP         │
│   40°C  104°F   EGR  │ ──▶    │   40°C  104°F   EGR ◀│
│ INTAKE AIR TEMP      │        │ INTAKE AIR TEMP      │
│   40°C  104°F    ON  │  ◀──   │   40°C  104°F   OFF  │
└──────────────────────┘        └──────────────────────┘
   EXIT
  YES      NO                      YES      NO
   │        │                       │        │
More Data Pairs                  More Data Pairs
```

| ACTIVE TECH 1 KEYS FOR EGR CONTROL MODE |
| --- |

| | |
| --- | --- |
| **YES** & **NO** | Scroll through displayed data parameters. |
| **F0** | Mark top displayed parameter as "fixed". |
| **F1** | Mark bottom displayed parameter as "fixed". |
| **ENTER** | Advance to EGR Control, provided vehicle is in Park or Neutral. |
| **↑** | Switch EGR control on while viewing parameters. |
| **↓** | Switch EGR control off while viewing parameters. |
| **EXIT** | Return to Miscellaneous Test menu. |

5-45

| MODE F4 | MISC. TESTS |
|---|---|
| STEPPING EGR CONTROL | |

The Stepping EGR Control mode allows you to regulate the Stepping EGR opening in increments from 0 to 100, and displays the stepping EGR monitor value as a percentage. The TECH 1 initializes the Stepping EGR opening to the current value (=0%).
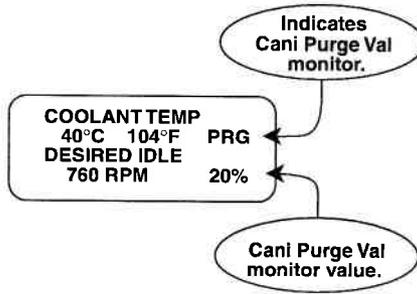
**OPERATING PROCEDURE:**

1. Select the STEPPING EGR Control mode from the Output Tests menu or Misc. Test menu.

2. Set the parking brake, block the wheels, put the transmission in Park or Neutral, then start the engine.

3. Press **ENTER** to begin the test.

4. "EGR" is displayed at the end of line 2 and the Stepping EGR value is displayed at the end of line 4. Press the ⬆ key to increase the Stepping EGR value. To decrease the Stepping EGR value, press the ⬇ key. The Stepping EGR value is displayed as a percentage (%).

   If the TECH 1 detects any of the conditions listed on the Misc. Tests Mode Abort Conditions tables, the test will be terminated and the cause will be displayed.

5. Press **EXIT** to return to the Miscellaneous Test menu.

Operation of the Stepping EGR Control mode is summarized in the following flow diagram.

5-46

```
┌─────────────────────┐
│ SELECT MISC. TEST   │
│ F4: STEP EGR        │
│         CONTROL     │
└─────────────────────┘
          │
        [F4]
          │
          ▼
┌─────────────────────┐
│ TEST OF             │
│ STEP EGR CONTROL    │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│ SET BRAKE           │
│ BLOCK WHEELS        │
│ START ENGINE        │
│ THEN PRESS ENTER    │
└─────────────────────┘
        [ENTER]
          │
          ▼
┌─────────────────────┐
│ STEP EGR CONTROL    │
│ ↑ = INCREASE   %    │
│ ↓ = DECREASE   %    │
└─────────────────────┘
          │
          ▼
```

```
┌──────────────┐      ┌──────────────────────┐
│ DATA  LIST   │──────│ ► COOLANT TEMP       │
│ PARAMETER    │      │ ► XXX        EGR  ◄  │
└──────────────┘      │ ► INTAKE AIR TEMP    │      ┌──────────────┐
                      │ ► XXX         0  ◄  │──────│ STEPPING EGR │
                      └──────────────────────┘      │   MONITOR    │
                                                     └──────────────┘
                                      ┌──────────────────────┐
                                      │ STEPPING EGR         │
                                      │ MONITOR VALUE        │
                                      └──────────────────────┘
```
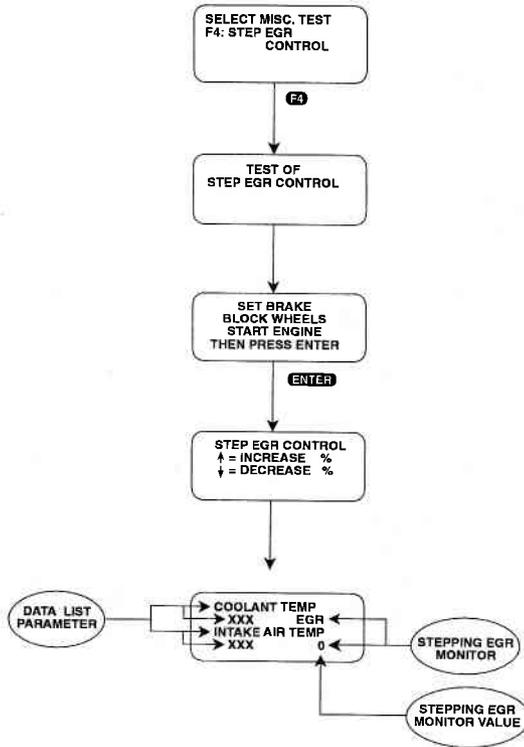
## ACTIVE TECH 1 KEYS FOR STEPPING EGR CONTROL MODE

**YES** & **NO**  Scroll through displayed data parameters.

**ENTER**  Advance to STEPPING EGR Control provided vehicle is in Park or Neutral.

**↑**  Increase STEPPING EGR control value while viewing parameters.

**↓**  Decrease STEPPING EGR control value while viewing parameters.

**EXIT**  Return to Miscellaneous Test menu.

| MODE F4 | MISC. TESTS |
|---------|-------------|
| SOV TEST | |

The SOV test mode allows you to check whether the valve turns on and off.

**OPERATING PROCEDURE:**

1. Confirm that the engine is stopped.

2. Select the SOV Test mode from the Output Tests menu or the Misc. Test menu.

3. Disconnect the immobilizer coupler at the immobilizer control module and then press ⬇.

4. Turn the ignition switch "OFF", and then "ON" again, and then press ⬇.

5. Wait three seconds for the SOV control to be enabled.

6. Press ⬆ to initiate the SOV Test.

7. When the test has concluded, the tester will either display CONTINUE or it will show one of four screens. The "COMPLETE WITHOUT ERROR" screen indicates that the SOV has been controlled. The "FAIL WITHOUT ERROR" screen indicates that SOV has not been controlled due to the fuel pump/immobilizer control module code not being matched. The "COMPLETE WITH ERROR" screen indicates that the SOV has not been controlled due to a fault in the SOV. The "FAIL WITH ERROR" screen indicates that the SOV has not been controlled due to a fault in the SOV, and the fuel pump/immobilizer control module code was not found either.

5-48

```
┌──────────────────┐
│   DISCONNECT     │
│  IMMOBI COUPLER  │
│ AT IMMOBI CONT ↓ │
└────────┬─────────┘
         ❶
┌────────┴─────────┐
│  TURN IG OFF,    │
│  AND THEN ON,    │
│               ↓  │
└────────┬─────────┘
         ❶
┌────────┴─────────┐
│      WAIT        │
│   3 SECONDS      │
└────────┬─────────┘
         │
┌────────┴─────────┐
│    SOV TEST      │
│   ↑ = START      │
└────────┬─────────┘
         ❶
```

| CONTINUE | COMPLETE WITHOUT ERROR | FAIL WITHOUT ERROR | FAIL WITH ERROR | COMPLETE WITH ERROR |
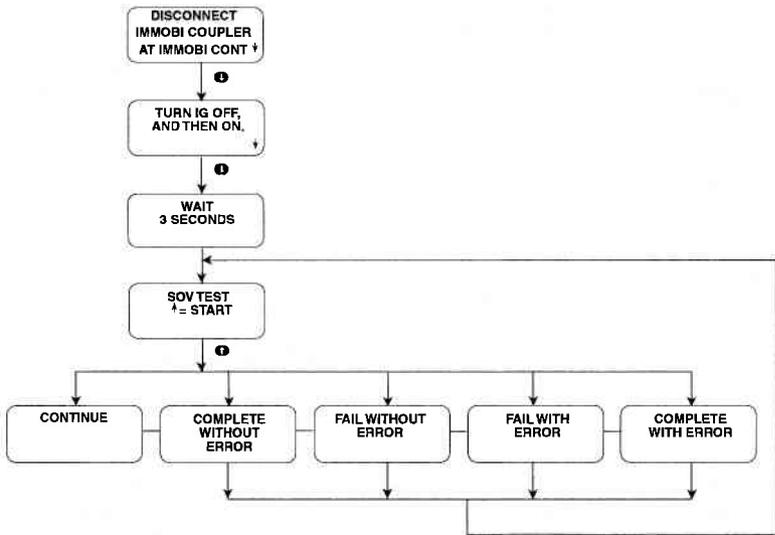
## ACTIVE TECH 1 KEYS FOR SOV TEST MODE

| | |
| :---: | :--- |
| ⬆ | Initiate the SOV test. |
| ⬇ | Scroll to next screen. |
| **EXIT** | Return to Miscellaneous Test menu. |

5-49

| MODE F4 | MISC. TESTS |
|---------|-------------|
| **CANI PURG VAL (DUTY TYPE)** | |

The canister purge valve output control mode allows you to regulate the valve opening in increments from 0 to 100 and displays the canister purge valve monitor value as a percentage.
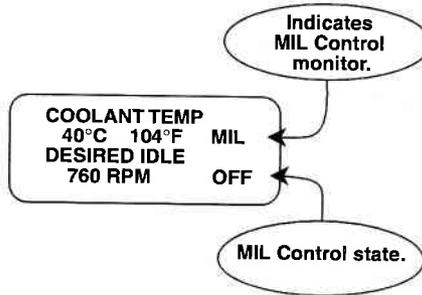
**OPERATING PROCEDURE:**

1. Select the CANI PURG VAL Test from the Output Tests menu or the Misc. Test menu.

2. Set the parking brake, stop the engine and turn the ignition to the on position.

3. Press **ENTER** to begin the test.

4. Press **YES** to acknowledge that the ⬆ means increase % and ⬇ means decrease %.

5. The test begins with the Cani purge valve at the current value. "PRG" is displayed at the end of line 2 and the cani purge valve value is displayed at the end of line 4. Press the ⬆ key to increase the cani purge valve value and the ⬇ key to decrease the value.

   If the Tech 1 detects any of the conditions listed on the Misc. Tests Mode Abort Conditions table, the test will be terminated and the cause will be displayed.

6. Press **EXIT** to return to the Output Tests menu.

7. Press **EXIT** to return to the Miscellaneous Test menu.

5-50

Indicates
Cani Purge Val
monitor.

COOLANT TEMP
40°C   104°F   PRG
DESIRED IDLE
760 RPM      20%

Cani Purge Val
monitor value.

### CANI PURG VAL CONTROL MODE SCREEN

| ACTIVE TECH 1 KEYS FOR CANI PURGE VAL CONTROL MODE | |
| --- | --- |
| ENTER | Select the CANI PURGE VAL Test and start the test. |
| YES | Acknowledge instruction screen. |
| ⬆ | Increase Cani Purge Value while viewing parameters. |
| ⬇ | Decrease Cani Purge Value while viewing parameters. |
| EXIT | Terminate the Cani Purge Value Control test and return to the Output Control menu or the Miscellaneous Test menu. |

5-51

| MODE F4 | MISC. TESTS |
|---------|-------------|
| **CANI PURG VAL (ON/OFF TYPE)** | |

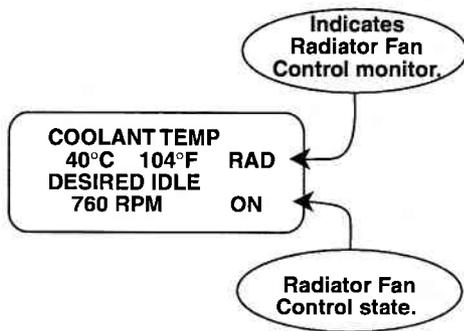The canister purge valve output control mode allows you to turn the canister purge valve ON (open) and OFF (closed).

**OPERATING PROCEDURE:**

1. Select the CANI PURG VAL Test from the Output Tests menu or the Misc. Test menu.

2. Set the parking brake, stop the engine and turn the ignition to the on position.

3. Press **ENTER** to begin the test.

4. Press **YES** to acknowledge that the ⬆ means ON and ⬇ means OFF.

5. "PRG" is displayed at the end of line 2 and the cani purge valve state is displayed at the end of line 4. Press the ⬆ key to turn the cani purge valve ON and the ⬇ key to turn the valve OFF.

   If the Tech 1 detects any of the conditions listed on the Misc. Tests Mode Abort Conditions table, the test will be terminated and the cause will be displayed.

6. Press **EXIT** to return to the Output Tests menu.

7. Press **EXIT** to return to the Miscellaneous Test menu.

Indicates
Cani Purge Val
monitor.

COOLANT TEMP
40°C    104°F    PRG
DESIRED IDLE
760 RPM         ON

Cani Purge Val
state.

**CANI PURG VAL CONTROL MODE SCREEN**

| ACTIVE TECH 1 KEYS FOR CANI PURGE VAL CONTROL MODE | |
|---|---|
| **ENTER** | Select the CANI PURGE VAL Test and start the test. |
| **YES** | Acknowledge instruction screen. |
| ⬆ | Turn on Cani Purge Valve. |
| ⬇ | Turn off Cani Purge Valve. |
| **EXIT** | Terminate the Cani Purge Value Control test and return to the Output Control menu or the Miscellaneous Test menu. |

5-53

| MODE F4 | MISC. TESTS |
|---------|-------------|
| **FUEL PUMP CONT** | |

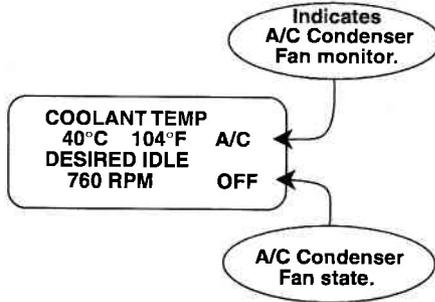The Fuel Pump Control mode allows you to turn the fuel pump relay on and off.

**OPERATING PROCEDURE:**

1. Select the FUEL PUMP CONT Test from the Output Tests menu or the Misc. Test menu.

2. Set the parking brake, stop the engine and turn the ignition to the on position.

3. Press **ENTER** to begin the test.

4. Press **YES** to acknowledge that the ⬆ means ON and ⬇ means OFF.

5. Press ⬆ to turn the fuel pump on and ⬇ to turn the fuel pump off. Notice the letters "FEL" displayed at the end of line 2 and the fuel pump state of operation (ON/OFF) is displayed at the end of line.

   If the Tech 1 detects any of the conditions listed on the Misc. Tests Mode Abort Conditions tables, the test will be terminated and the cause will be displayed.

6. Press **EXIT** to return to the Output Tests menu.

7. Press **EXIT** again to return to the Miscellaneous Tests menu.

Indicates
Fuel Pump Control
monitor.

COOLANT TEMP
40°C   104°F   FEL
DESIRED IDLE
760 RPM           ON

Fuel Pump
Control state.
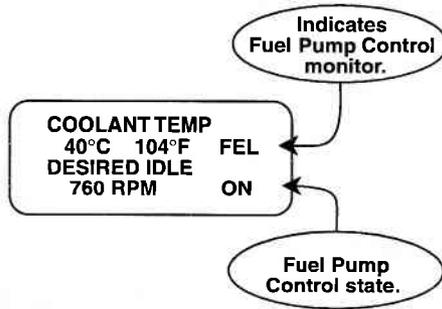
**FUEL PUMP CONTROL MODE SCREEN**

| ACTIVE TECH 1 KEYS FOR FUEL PUMP CONTROL MODE | |
|---|---|
| **ENTER** | Select the FUEL PUMP CONTROL Test and start the test. |
| **YES** | Acknowledge instruction screen. |
| **↑** | Turn on the Fuel Pump. |
| **↓** | Turn off the Fuel Pump. |
| **EXIT** | Terminate the Fuel Pump Control test and return to the Output Control menu or the Miscellaneous Test menu. |

| MODE F4 | MISC. TESTS |
|---------|-------------|
| MIL CONTROL | |

The MIL Control mode allows you to turn the MIL on and off.

**OPERATING PROCEDURE:**

1. Select the MIL Control test from the Output Tests selection menu or the Misc. Test menu.

2. Set the parking brake, and securely block the wheels of the vehicle.

3. Press **ENTER** to begin the test.

4. Press **YES** to acknowledge that ⬆ means ON and ⬇ means OFF.

5. Press ⬆ to turn the MIL ON and ⬇ to turn the MIL OFF. Notice the letters "MIL" displayed at the end of line 2 and the MIL Control state of operation (ON/OFF) is displayed at the end of line 4.

   If the Tech 1 detects any of the conditions listed on the Misc. Tests Mode Abort Conditions tables, the test will be terminated and the cause will be displayed.

6. Press **EXIT** to return to the Output Tests menu.

7. Press **EXIT** again to return to the Miscellaneous Tests menu.

Indicates
MIL Control
monitor.

```
COOLANT TEMP
   40°C   104°F    MIL
DESIRED IDLE
   760 RPM         OFF
```

MIL Control state.

## MIL CONTROL MODE SCREEN

| ACTIVE TECH 1 KEYS FOR MIL CONTROL MODE | |
| --- | --- |
| **ENTER** | Select the MIL CONTROL Test and start the test. |
| **YES** | Acknowledge instruction screen. |
| ↑ | Turn on the MIL Control. |
| ↓ | Turn off the MIL Control. |
| **EXIT** | Terminate the MIL Control test and return to the Output Control menu or the Miscellaneous Test menu. |

| MODE F4 | MISC. TESTS |
|---------|-------------|
| **RADIATOR FAN CONTROL** | |

Radiator Fan Control mode allows you to turn the radiator fan relay on and off.

## OPERATING PROCEDURE:

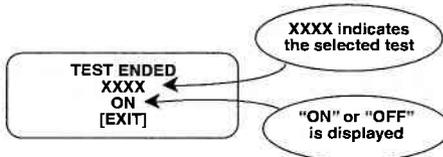1. Select the RAD FAN CTL test from the Output Tests selection menu or the Misc. Test menu.

2. Set the parking brake, and securely block the wheels of the vehicle.

3. Press **ENTER** to begin the test.

4. Press **YES** to acknowledge that ⬆ means ON and ⬇ key means OFF.

5. Press ⬆ to turn the Radiator Fan ON and ⬇ to turn the Radiator Fan OFF. Notice the letters "RAD" displayed at the end of line 2 and the Radiator Fan state of operation (ON/OFF) is displayed at the end of line 4.

   If the Tech 1 detects any of the conditions listed on the Misc. Tests Mode Abort Conditions tables, the test will be terminated and the cause will be displayed.

6. Press **EXIT** to return to the Output Tests menu.

7. Press **EXIT** again to return to the Miscellaneous Tests menu.

Indicates
Radiator Fan
Control monitor.

COOLANT TEMP
40°C   104°F   RAD
DESIRED IDLE
760 RPM        ON

Radiator Fan
Control state.

**RADIATOR FAN CONTROL MODE SCREEN**

| ACTIVE TECH 1 KEYS FOR RADIATOR FAN CONTROL MODE | |
|---|---|
| **ENTER** | Select the RADIATOR FAN CONTROL Test and start the test. |
| **YES** | Acknowledge instruction screen. |
| ⬆ | Turn on the Radiator Fan. |
| ⬇ | Turn off the Radiator Fan. |
| **EXIT** | Terminate the Radiator Fan Control test and return to the Output Control menu or the Miscellaneous Test menu. |

| MODE F4 | MISC. TESTS |
|---|---|

| A/C CONDENSER FAN |
|---|

The A/C Condenser Fan Control mode allows you to turn the A/C condenser fan control relay on and off.

**OPERATING PROCEDURE:**

1.  Select the A/C COND FAN test from the Output Tests menu or the Misc. Test menu.

2.  Set the parking brake, and securely block the wheels of the vehicle.

3.  Press **ENTER** to begin the test.

4.  Press **YES** to acknowledge that 🔼 means ON and 🔽 means OFF.

5.  Press 🔼 to turn the A/C Condenser Fan ON and 🔽 to turn the A/C Condenser Fan OFF. Notice the letters "A/C" displayed at the end of line 2 and the A/C Condenser Fan state of operation (ON/OFF) is displayed at the end of line 4.

    If the Tech 1 detects any of the conditions listed on the Misc. Tests Mode Abort Conditions tables, the test will be terminated and the cause will be displayed.

6.  Press **EXIT** to return to the Output Tests menu. Press **EXIT** again to return to the Miscellaneous Tests menu.

Indicates
A/C Condenser
Fan monitor.

COOLANT TEMP
40°C   104°F   A/C
DESIRED IDLE
760 RPM        OFF

A/C Condenser
Fan state.

**A/C CONDENSER FAN CONTROL MODE SCREEN**

## ACTIVE TECH 1 KEYS FOR
## A/C CONDENSER FAN CONTROL MODE

**ENTER**   Select the A/C CONDENSER FAN CONTROL Test and start the test.

**YES**   Acknowledge instruction screen.

**↑**   Turn on the A/C Condenser Fan.

**↓**   Turn off the A/C Condenser Fan.

**EXIT**   Terminate the A/C Condenser Fan Control test and return to the Output Control menu or the Miscellaneous Test menu.

| MODE F4 | MISC. TESTS |
|---------|-------------|

## ECU NO. 39 ALL OUTPUT TESTS

**OPERATING PROCEDURE:**

1. Select the test you want from the Output Tests menu.

2. Set the parking brake, stop the engine, and turn the ignition to the ON position.

3. Press **YES** to begin the test.

4. The Tech 1 displays one of the following messages:

IN PROGRESS OR TEST OPERATING
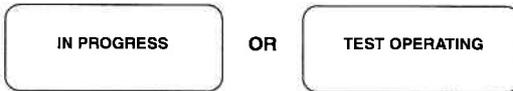
5. Within about 10 seconds, the Tech 1 displays one of the following messages:

TEST ENDED OR TEST INTERRUPTED
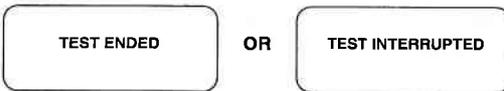
6. After the "TEST ENDED" or "TEST INTERRUPTED" message is displayed, the Tech 1 returns to the Output Tests menu.

## OPERATING PROCEDURE:

1. Select the test you want from the Output Control menu. The Tech 1 displays:
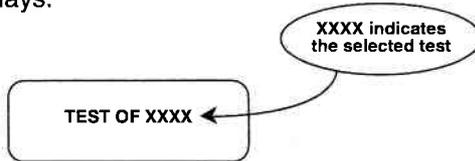
    XXXX indicates the selected test

    TEST OF XXXX ◄

2. Set the parking brake, and securely block the wheels of the vehicle.

3. Press **ENTER** to begin the test. The Tech 1 displays:

    XXXX indicates the selected test

    XXXX ◄
    ↑ = ON
    ↓ = OFF
    [YES]
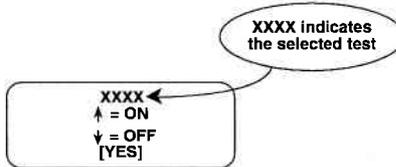
4. Press **YES**. The Tech 1 displays a data list, as well as information about the test status on the right side of the screen.

    XXX indicates the selected test

    ENGINE SPEED
    1833 RPM   XXX ◄
    START OF INJECT.
    9.3 deg.   ON ◄

    "ON" or "OFF" is displayed
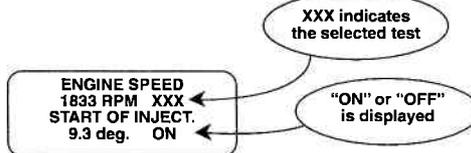
5. Press ⬆ or ⬇ to toggle the ECU function ON or OFF. The Tech 1 displays:

    XXXX indicates the selected test

    TEST ENDED
    XXXX ◄
    ON ◄
    [EXIT]

    "ON" or "OFF" is displayed

6. Press **EXIT** to return to Step 4.

7. After the test runs for 30 seconds, the Tech 1 returns to the Output Tests menu.

## MODE F4    MISC. TESTS
## READINESS TEST

### READINESS TESTS

The Readiness Test mode allows you to monitor the state of various on-board tests, which are performed by the vehicle's ECM.

Press **F1** to select READINESS TST from the MISC TEST menu.

```
        MISC TEST
F0: OUTPUT TESTS
F1: READINESS TST
```

The first three items on the Readiness Test display indicate the vehicle's monitoring capability for continuously monitoring systems:
• Misfire Monitoring
• Fuel System Monitoring
• Comprehensive Component Monitoring
These are indicated as either being SUPPORTED or NOT SUPPORTED, depending on the vehicle's ECM.

The other display items indicate the status of the tests. These tests can be COMPLETE, INCOMPLETE, or NOT SUPPORTED. Press the ⬆ key to advance the screen and the ⬇ key to return to the previous screen when viewing these tests.

```
        MISC TEST            MISFIRE  :SUPPORT        EVAP SYS :COMPLET
F0: OUTPUT TESTS    F1      FUEL SYS :NOT SUP         O2 SENS  :INCOMPL
F1: READINESS TST           COMPRHE :NOT SUP          O2S HEAT :NOT SUP
                            CATALYST :COMPLET         EGR SYS  :COMPLET
```

### ACTIVE TECH 1 KEYS FOR READINESS TESTS

**F0** - **F1**      Selection keys.

| ECU ID | MODE F5 |

ECU ID mode is NOT available for all vehicles.

The ECU ID mode allows you to view the ECU identification number, as well as the Software Version number.

Select the ECU ID mode from the Select Mode menu by pressing **F5**.

```
SELECT MODE ↑↓        ❶      SELECT MODE ↑↓
F0: DATA LIST          →      F3: SNAPSHOT
F1: PRINT DATA         ←      F4: MISC TESTS
F2: DTC(S)            ❶      F5: ECU ID
```
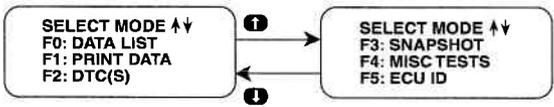
The TECH 1 will display the following screen.

```
ECU NO.
XXXXX-XXXX*
SOFTWARE VERSION
XXX
```

To return to the Select Mode menu, press **EXIT**.

## 6.0  FINISHING UP

After using the Suzuki ECM 6.0 Application, a few simple steps will insure that you get the most life out of your diagnostic tool.

First, remove power to the TECH 1 by disconnecting the serial data link cable from the serial data link connector. You may want to inspect the cable and connector for any damage or corrosion.

Next, unplug the cartridge and store it and the cable in the travelling case.

If the TECH 1 should become dirty you may wipe it off with a clean cloth and mild detergent or hand soap. Avoid using harsh solvents such as petroleum based cleaning agents, Benzene, Trichloroethylene, etc. Although the TECH 1 is water resistant it is not waterproof so be sure to thoroughly dry off the TECH 1 prior to storage.

# 7.0 DTC(S)

Listed below is a brief description for all DTC(S) that can be displayed with the Suzuki ECM 6.0 Application.

| ECM TROUBLE CODE | TECH 1 DISPLAY DESCRIPTOR | TROUBLE CODE DESCRIPTION |
|---|---|---|
| 1 | ENGINE POSITION SENSOR CKT MALF | Engine position sensor circuit open. |
| 3 | COOLANT TEMP. SENSOR CKT MALF (HIGH VOLTAGE) | Coolant temp. sensor circuit open. |
| 3 | COOLANT TEMP. SENSOR CKT MALF (LOW VOLTAGE) | Coolant temp. sensor circuit short. |
| 4 | THROTTLE POS SENSOR CKT MALF (HIGH VOLTAGE) | Throttle position sensor circuit open. |
| 4 | THROTTLE POS SENSOR CKT MALF (LOW VOLTAGE) | Throttle position sensor circuit short. |
| 12 | NO CODES | No Codes. |
| 13 | OXYGEN SENSOR OR CIRCUIT FAIL | Oxygen sensor or circuit malfunction. |
| 13 | OXYGEN SENSOR B1 OR CIRCUIT FAIL | Bank 1 Oxygen Sensor or circuit malfunction. |
| 13 | BAROMETRIC PRES. SENSOR CKT MALF (HIGH VOLTAGE) | Barometric pressure sensor failure. |
| 13 | BAROMETRIC PRES. SENSOR CKT MALF (LOW VOLTAGE) | Barometric pressure sensor failure. |
| 14 | ECT SENSOR OR CIRCUIT OPEN | Engine coolant temperature sensor or circuit open. |
| 14 | NEEDLE MOVEMENT SENSOR MALF | Needle movement sensor failure. |
| 14 | NEEDLE MOVEMENT SENSOR CKT MALF | Needle movement sensor circuit open or short. |

| ECM Trouble Code | Tech 1 Display Descriptor | Trouble Code Description |
|---|---|---|
| 15 | ECT SENSOR OR CIRCUIT SHORT | Engine coolant temperature sensor or circuit short. |
| 16 | SOI GOVERNING | Actual start of injection deviates from the command by a certain amount for a given period of time. |
| 17 | BATTERY VOLTAGE SENSING CKT MALF (HIGH VOLTAGE) | Battery supply voltage input is too high. |
| 17 | BATTERY VOLTAGE SENSING CKT MALF (LOW VOLTAGE) | Battery supply voltage input is too low. |
| 21 | TP SENSOR VOLTAGE HIGH | Throttle position sensor signal voltage too high. Throttle position sensor or circuit failure. |
| 22 | TP SENSOR VOLTAGE LOW | Throttle position sensor signal voltage too low. Throttle position sensor or circuit failure. |
| 22 | GLOW PLUG FEEDBK CKT MALF (LOW VOLTAGE) | Glow plug control monitor voltage low when control voltage should be high. |
| 23 | IAT SENSOR OR CIRCUIT OPEN | Intake air temperature too low. Intake air temperature sensor or circuit open. |
| 23 | GLOW PLUG CONTROL CKT MALF (OPEN CIRCUIT) | Glow plug control circuit open or short to power supply circuit. |
| 23 | GLOW PLUG CONTROL CKT MALF (SHORT CIRCUIT) | Glow plug control circuit short to ground. |
| 24 | VSS NO SIGNAL | Vehicle Speed Sensor signal not received by the ECM (or PCM). Vehicle speed sensor circuit failure. |
| 24 | VSS (METER) NO SIGNAL | Vehicle Speed Sensor signal from the Meter Cluster not received by the ECM (or PCM). |

| ECM Trouble Code | Tech 1 Display Descriptor | Trouble Code Description |
|---|---|---|
| 25 | IAT SENSOR OR CIRCUIT SHORT | Intake air temperature too high. Intake air temperature sensor or circuit short. |
| 26 | OXYGEN SENSOR B2 OR CIRCUIT FAIL | Bank 2 Oxygen Sensor or Circuit malfunction. |
| 31 | MAP SENSOR VOLTAGE HIGH | Manifold Absolute Pressure sensor signal voltage too high. MAP sensor or circuit failure. |
| 31 | MAP SENSOR VOLTAGE LOW | Manifold Absolute Pressure sensor signal voltage too low. MAP sensor or circuit failure. |
| 32 | MAP SENSOR VOLTAGE LOW | Manifold Absolute Pressure sensor signal voltage too low. MAP sensor or circuit failure. |
| 32 | MAP SENSOR VOLTAGE HIGH | Manifold Absolute Pressure sensor signal voltage too high. MAP sensor or circuit failure. |
| 32 | GLOW PLUG FEEDBK CKT MALF (HIGH VOLTAGE) | Glow plug control monitor voltage high when control voltage should be low. |
| 33 | AIR FLOW SENSOR VOLTAGE HIGH/LOW | Volume Air Flow sensor voltage too high or too low. MAF sensor or circuit failure. |
| 33 | MAF SENSOR VOLTAGE HIGH | Mass Air Flow sensor voltage too high. MAF sensor or circuit failure. |
| 33 | EGR 1 CIRCUIT MALFUNCTION (OPEN CIRCUIT) | EGR valve 1 circuit open. |
| 33 | EGR 1 CIRCUIT MALFUNCTION (SHORT CIRCUIT) | EGR valve 1 circuit short. |
| 34 | MAF SENSOR VOLTAGE LOW | Mass Air Flow sensor voltage too low. MAF sensor or circuit failure. |

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| TROUBLE<br>CODE | TECH 1 DISPLAY<br>DESCRIPTOR | TROUBLE CODE<br>DESCRIPTION |
|---|---|---|
| 34 | SOI ACTUATOR<br>CKT MALF<br>(OPEN CIRCUIT) | SOI actuator circuit open. |
| 34 | SOI ACTUATOR<br>CKT MALF<br>(SHORT CIRCUIT) | SOI actuator circuit short. |
| 36 | EGR 2 CIRCUIT<br>MALFUNCTION<br>(OPEN CIRCUIT) | EGR valve 2 circuit open. |
| 36 | EGR 2 CIRCUIT<br>MALFUNCTION<br>(SHORT CIRCUIT) | EGR valve 2 circuit short. |
| 37 | A/C CONTROL<br>RELAY CKT MALF<br>(OPEN CIRCUIT) | A/C control relay circuit open. |
| 37 | A/C CONTROL<br>RELAY CKT MALF<br>(SHORT CIRCUIT) | A/C control relay circuit short. |
| 38 | MALF INDICATOR<br>LAMP CKT MALF<br>(OPEN CIRCUIT) | MIL circuit open. |
| 38 | MALF INDICATOR<br>LAMP CKT MALF<br>(SHORT CIRCUIT) | MIL circuit short. |
| 39 | GLOW PLUG<br>LAMP CKT MALF<br>(OPEN CIRCUIT) | Glow plug lamp circuit open. |
| 39 | GLOW PLUG<br>LAMP CKT MALF<br>(SHORT CIRCUIT) | Glow plug lamp circuit short. |
| 41 | IGNITION SIGNAL<br>FAIL | Ignition signal not received by the ECM. Ignition system problem. |
| 42 | CMP SENSOR<br>NO SIGNAL | Camshaft Position sensor signal not received by the ECM (or PCM). CMP sensor or circuit failure. |

| Code | Descriptor | Description |
|---|---|---|
| 42 | CKP SENSOR NO SIGNAL | Crankshaft Position sensor signal not received by the ECM (or PCM). CKP sensor or circuit failure. |
| 43 | KNOCK SENSOR OR CIRCUIT OPEN | Knock Sensor failure or circuit open. |
| 43 | KNOCK SENSOR OR CIRCUIT SHORT | Knock Sensor failure or circuit short. |
| 44 | CTP SWITCH OR CIRCUIT OPEN | CTP Switch failure or circuit open. |
| 45 | CTP SWITCH OR CIRCUIT SHORT | CTP Switch failure or circuit short. |
| 46 | ISC SYSTEM FAIL | Idle Speed Control system failure. |
| 47 | CMP SENSOR NO SIGNAL | Camshaft Position sensor signal not received by the ECM (or PCM). CMP sensor or circuit failure. |
| 51 | EGR SYSTEM FAIL | Exhaust gas recirculation system malfunction. |
| 51 | EGR SYSTEM FAIL EGRT SENS. SHORT | Exhaust gas recirculation temperature sensor or circuit short. |
| 51 | EGR SYSTEM FAIL EGRT SENSOR OPEN | Exhaust gas recirculation temperature sensor or circuit open. |
| 51 | EGR VALVE CIRCUIT OPEN | EGR valve circuit open. |
| 52 | INJECTOR FAIL | Fuel Injector failure. |
| 53 | ECM WRONG ASSEMBLY | Improper ECM installation. ECM other than California (USA) Version installed. |
| 53 | GND CIRCUIT OPEN/ ECM WRONG ASSEM | Ground circuit for 1991-93 California spec. vehicle is open. Wrong ECM installed in a 1994 USA spec. vehicle. |

| TROUBLE CODE | TECH 1 DISPLAY DESCRIPTOR | TROUBLE CODE DESCRIPTION |
|---|---|---|
| 61 | SHIFT SOLENOID NO. 1 OPEN | Shift solenoid No. 1 circuit open. |
| 62 | SHIFT SOLENOID NO. 1 SHORT | Shift solenoid No. 1 circuit short. |
| 63 | SHIFT SOLENOID NO. 2 OPEN | Shift solenoid No. 2 circuit open. |
| 64 | SHIFT SOLENOID NO. 2 SHORT | Shift solenoid No. 2 circuit short. |
| 65 | TCC SOLENOID OPEN | Torque Converter Clutch circuit open. |
| 65 | PRESS REGULATOR SOLENOID OPEN | Pressure Regulator circuit open. |
| 66 | PRESS REGULATOR SOLENOID SHORT | Pressure Regulator circuit short. |
| 66 | TCC SOLENOID SHORT | Torque Converter Clutch circuit short. |
| 72 | TRANS. RANGE SWITCH FAIL | Transmission Range switch failure |
| 75 | VSS (TRANS.) NO SIGNAL | Signal of the Vehicle Speed Sensor in transmission not received by ECM (or PCM). |
| 76 | INPUT SHAFT SPEED SEN. FAIL | Input Shaft Speed Sensor failure. |
| 127 | ECU FAULT | ECU internal failure. |

* For Powertrain Diagnostic Trouble Codes of the Pxxxx format, see the related vehicle service manual provided by Suzuki.

# 8.0  DATA LIST PARAMETER DESCRIPTIONS

The TECH 1 is capable of displaying a wide variety of ECM (or PCM) parameters in Data List, Snapshot, RPM Control and Output Test modes. The ECM (or PCM) sends the TECH 1 information regarding the state of the engine (and transmission) as the ECM (or PCM) sees it. The TECH 1 'translates' and displays this information in the form of parameters selected by the service technician. This section describes those parameters.

There are two basic types of parameters: discrete and analog. Discrete parameters are 'bits' of information and can be in only one of two distinct states (on/off, open/closed, etc.). Switches and solenoids are examples of discrete parameters. Analog parameters are used to represent quantities and are displayed as a value with appropriate units. Examples of analog parameters include Engine Speed, Coolant Temperature, Oxygen Sensor Voltage, etc.

Parameters are grouped by ECM (or PCM) function. The categories are:

1) General and Electrical

2) Fuel Delivery and Spark Control

3) Emissions & Driveability

4) Transmission

5) Miscellaneous

# CATEGORY DESCRIPTIONS

1) General Parameters are those that effect or are affected by many different ECM (or PCM) systems. Included are: Engine Speed, Vehicle Speed, Engine Coolant Temperature and Charging Efficiency related parameters.

   Electrical Parameters can be used to help diagnose vehicle electrical problems and include Battery Voltage, Electric Load.

2) Fuel Delivery Parameters describe the ECM (or PCM) fuel control system in action. After the engine has warmed up, the ECM (or PCM) controls the air/fuel mixture ratio based on the values of certain engine sensor inputs. Examples of such inputs include Intake Air Temperature and Pressure, and Oxygen Sensor Voltage. The output signals of the fuel control system depend on the fuel delivery system.

   Spark Control Parameters are associated with spark timing calculations. Engine sensor values are used by the ECM (or PCM) to increase or decrease (retard) spark advance.

3) Emissions & Driveability refer to all parameters that are related to improvements in performance or air pollution reduction.

   Systems included are:
   Idle Air Control/Idle Speed Control
   Exhaust Gas Recirculation
   Evaporative Emission Control

4) Transmission Parameters represent signals from the transmission to the ECM (or PCM).

5) The Miscellaneous Parameters include the states of various switches.

# DESCRIPTOR FORMAT

Following is a description of every parameter that can be displayed with the Suzuki ECM 6.0 Application. Included is: 1) a listing of all the parameters available for each category; 2) a description, and the units of the analog parameters.

**GENERAL**
Calc. Load
Charging Efficiency
ECT Sensor Voltage
Engine Coolant Temperature
Engine Load
Engine Speed
Fuel Temperature
Vehicle Speed
VSS (METER)

**ELECTRICAL**
Battery Positive Voltage
Battery Voltage
Electric Load

**SPARK CONTROL**
Ignition Advance
Ignition Timing Level
Spark Advance
Spark Advance Switch

**FUEL DELIVERY**
Air Flow
Barometric Pressure
Barometric Sensor Voltage
EGR Throttle
Fuel Cut
Fuel Pressure Control Valve
Fuel Pump
Fuel Rail Pressure
Fuel System B1, B2
Fuel System Status
Fuel Tank Level
Injector Flow 1, 2, 3, 4
Injector Pulse Width, B1, B2
Intake Air Temperature
Long Ft B1, B2
Manifold Absolute Pressure (MAP)
Mass Air Flow (MAS)
Mixture Control Dwell, B1, B2
Mixture Control Learn, B1, B2

Mixture Control Monitor, B1, B2
Needle Sensor Voltage
O2S Activation, B1, B2
O2S B1 S1
O2S B1 S2
O2S B2 S1
O2S B2 S2
O2S Signal
Oxygen Sensor, B1, B2
Pedal Pos Sensor
Rail Pressure Regulator
Rich/Lean Monitor, B1, B2
Short Ft B1, B2
Start of Injection
Throttle Angle
Throttle Opener Solenoid
Throttle Position
Throttle Position Sensor
Total Ft B1, B2
Total Fuel Trim
TP Sensor Volt
Turbo Pressure

## EMISSIONS & DRIVEABILITY PARAMETERS
Canister Purge Duty
Canister Purge Solenoid
Closed Throttle Position
CTP Switch
Desired Idle Speed
EGR
EGR Temperature
EGR Valve
EVAP Canist
EVAP Purge Duty
EVAP Solenoid Purge (SP) Valve
IAC Adjust Monitor
IAC Duty
IAC Flow
IAC Flow Duty
IAC/ISC Duty
IAC Motor Position
Power Steering Pressure (PSP) Switch
Power Steering Solenoid Vacuum
 (PS SV) Valve

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## TRANSMISSION PARAMETERS
4WD-L Switch
D-Range Shift Switch
Gear Position
Gear Position CON, MON
Input Shaft
Inp. Shaft Speed
Mode Select Switch
O/D OFF Switch
PNP Signal
Pressure Regulator Solenoid
  CON, MON
Shift Solenoid #1 CON, MON
Shift Solenoid #2 CON, MON
TCC Solenoid CON, MON
Throttle Open Rate
Throttle Position Level
Trans Range
Trans. Range
VSS (A/T)
VSS (TRANS)

## MISCELLANEOUS PARAMETERS
ABS Switch
A/C Condenser Fan
A/C Control Signal
A/C Cooling Fan
A/C Evaporator Temperature
A/C Magnetic Clutch
A/C Pressure Switch
A/C Switch
Blower Fan Switch
Brake Switch
Heater Fan
Radiator Fan
Starter

# PARAMETER INDEX

# GENERAL PARAMETERS

## CALC LOAD

| UNITS |
|-------|
| % |

CALC LOAD is engine load displayed as a percentage. Its value is calculated mathematically using the following formula: actual (current) intake air volume ÷ maximum possible intake air volume x 100%.

## CHARGING EFFICIENCY

| UNITS |
|-------|
| % |

Charging efficiency is calculated using data from the mass air flow and camshaft position sensors. A higher charging efficiency indicates a larger engine load.

## ECT SENSOR VOLTAGE

| UNITS |
|-------|
| V |

Engine coolant temperature sensor is a temperature variable resistor. The ECM receives the output signal to use various controls.

## ENGINE COOLANT TEMPERATURE

| UNITS |
|-------|
| DEGREES C |
| DEGREES F |

Engine Coolant Temperature is an analog input to the ECM (or PCM). The Coolant Temperature sensor is a temperature variable resistor in series with a fixed resistor in the ECM (or PCM) and biased with a reference voltage. The ECM (or PCM) reads the voltage across the Coolant Temperature sensor and converts this voltage into temperature.

## ENGINE LOAD

| UNITS |
|-------|
| mg/str |

Engine load value is calculated from throttle position and engine speed. Load is referred to in terms of fuel quantity per stroke.

# GENERAL PARAMETERS

## ENGINE SPEED

| UNITS |
|---|
| RPM |

Engine speed is an ECM (or PCM) internal parameter. It is computed by reference pulses from the Camshaft Position Sensor (or Crankshaft Position Sensor) and is used by virtually all ECM (or PCM) systems.

## FUEL TEMPERATURE

| UNITS |
|---|
| DEGREES C |
| DEGREES F |

Fuel temperature is an internal ECM parameter and is installed on common rail. This parameter controls fuel injection.

## VEHICLE SPEED
## VSS (METER)

| UNITS |
|---|
| km/h or KPH |
| MPH |

Vehicle Speed Sensor (VSS) parameter is an ECM (or PCM) internal parameter. It is computed by timing pulses coming from the vehicle speed sensor. Vehicle speed is used for the IAC/ISC control in the ECM (or PCM).

# ELECTRICAL PARAMETERS

## BATTERY POSITIVE VOLTAGE
## BATTERY VOLTAGE

| UNITS |
|-------|
| V |

Battery Positive Voltage is an analog input signal read by the ECM (or PCM). This parameter is used for voltage correction of the fuel injection quantity.

## ELECTRIC LOAD

| STATES |
|--------|
| OFF/ON |

The electrical system load affects the engine load, which causes variations in engine speed. The Electric Load parameter will read ON or OFF depending on the state of certain electrical components (such as the radiator fan motor, head lights, parking lights, blower fan motor, rear defogger, brake lights, etc.) The ECM (or PCM) uses the ON or OFF signal to compensate for variations in engine load by controlling the IAC valve/ISC motor.

# SPARK CONTROL PARAMETERS

## IGNITION ADVANCE
## SPARK ADVANCE

**UNITS**

**DEGREES**

The Ignition Spark Advance angle references cylinder #1 top dead center. It is calculated by comparing the relationship between the crankshaft position sensor (Ne) and crankshaft position sensor (G) signals. The two missing teeth on the (Ne) timing rotor identify #1 cylinder TDC. The (G) signal identifies the approach of the #1 cylinder compression stroke, occurring at 90° BTDC.

## IGNITION TIMING LEVEL

**STATES**

**OFF/ON**

This parameter indicates which ignition timing adjust resistor is installed. The function of an ignition timing adjust resistor is to correct basic ignition timing advance. If no adjust resistor is installed in the vehicle, "225" appears here.

## SPARK ADVANCE SWITCH

**STATES**

**OFF/ON**

This parameter indicates whether or not the test switch terminal (on the monitor coupler) circuit is grounded.
ON:  Test switch terminal (on the monitor coupler) circuit is grounded.
OFF: Test switch terminal (on the monitor coupler) circuit is not grounded.

*While communication with the TECH 1 is active, the IGNITION ADVANCE is not fixed even if the test switch terminal (on the monitor coupler) circuit is grounded. The TECH 1 indicates the test switch terminal (on the monitor coupler) circuit condition only.*

# FUEL DELIVERY PARAMETERS

## AIR FLOW

| UNITS |
|-------|
| l/min |

The Air Flow sensor measures the rate of volume air flow into the intake manifold in liters per minute.

## BAROMETRIC PRESSURE

| UNITS |
|-------|
| inHg |
| KPa |
| mmHG |

This parameter represents a measurement of barometric air pressure and is used for altitude correction of the fuel injection quantity and IAC valve control.

## BAROMETRIC SENSOR VOLTAGE

| UNITS |
|-------|
| V |

This parameter represents a measurement of barometric air pressure and is used for altitude correction of the fuel injection quantity.

## EGR THROTTLE

| UNITS |
|-------|
| % |

EGR throttle value indicates the opening duty of the valve.

## FUEL CUT

| STATES |
|--------|
| OFF/ON |

This parameter reflects the ON/OFF status of the deceleration program in the ECM. The signal will be ON whenever deceleration fuel cut is commanded as a result of a closed throttle position with engine spin above fuel cut speed.

## FUEL PRESSURE CONTROL VALVE

| STATES |
|--------|
| OFF/ON |

This parameter shows the state of the fuel pressure control valve installed on intake manifold to control fuel pressure.

# FUEL DELIVERY PARAMETERS

## FUEL PUMP

| STATES |
|---|
| OFF/ON |

ON is displayed when the ECM (or PCM) activates the fuel pump via the fuel pump relay switch.

## FUEL RAIL PRESSURE

| UNITS |
|---|
| Bar |

This parameter shows the fuel pressure at the fuel rail captured at the fuel temp sensor.

## FUEL SYSTEM STATUS
## FUEL SYSTEM B1
## FUEL SYSTEM B2

| STATES |
|---|
| OPEN/CLOSED/OPEN-DRIVE CONDITION |
| OPEN SYS. FAULT/CLOSED-ONE O2S/ RESERVED |

Status of the air/fuel ratio feedback loop is displayed as either an open or a closed loop. Open indicates that the ECM ignores feedback from the exhaust oxygen sensor. Closed indicates that the injection duration is corrected for oxygen sensor feedback.

## FUEL TANK LEVEL

| UNITS |
|---|
| % |

The fuel tank level indicates the approximate fuel level in the fuel tank. The detectable range of the fuel level sensor is set as 0 to 100%; however, vehicles with smaller fuel tank capacity may have an indicated fuel level of only 70% when the fuel tank is full.

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# FUEL DELIVERY PARAMETERS

**INJECTOR FLOW 1**
**INJECTOR FLOW 2**
**INJECTOR FLOW 3**
**INJECTOR FLOW 4**

| UNITS |
|:-----:|
| mm$^3$ |

These parameters show the volume of fuel injected at the injector of each cylinder.

**INJECTOR PULSE WIDTH**
**INJECTOR PULSE WIDTH B1**
**INJECTOR PULSE WIDTH B2**
**B1:BANK1 (LH BANK)**
**B2:BANK2 (RH BANK)**

| UNITS |
|:-----:|
| mSEC |

The Pulse Width is the length of time (in milliseconds) the ECM (or PCM) is commanding the fuel injectors on. Injector 'on' time is how EFI systems control fuel mixture. A longer 'on' time yields a richer mixture.

**INTAKE AIR TEMPERATURE**

| UNITS |
|:-----:|
| DEGREES C |
| DEGREES F |

Intake Air Temperature is needed to determine the amount of air passing into the intake manifold as air density varies with temperature.

**LONG FT B1    B1: BANK 1 (LH BANK)**
**LONG FT B2    B2: BANK 2 (RH BANK)**

| UNITS |
|:-----:|
| % |

This parameter provides learned value (adaptive memory) correction to the air/fuel ratio feedback control system for Bank 1 or Bank 2. It is the percentage of rich or lean correction that has been applied to the basic injection duration calculation.

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# FUEL DELIVERY PARAMETERS

### MANIFOLD ABSOLUTE PRESSURE (MAP)

| UNITS |
|---|
| inHg |
| KPa |
| mmHG |

The Manifold Absolute Pressure sensor voltage is read by the ECM (or PCM) and is used (among other things) to compute engine load.

### MASS AIR FLOW (MAF)

| UNITS |
|---|
| g/sec. |
| lb/min. |

Certain engines have a Mass Air Flow (MAF) sensor which measures air flow into the intake manifold. This data is used by the ECM (or PCM) in determining engine load.

### MIXTURE CONTROL DWELL
### MIXTURE CONTROL DWELL B1 & B2
### B1:BANK1 (LH BANK)
### B2:BANK2 (RH BANK)

| UNITS |
|---|
| NONE |

Mixture Control Dwell value represents short term corrections to the air/fuel mixture computation. A value of 0 indicates no correction, a value greater than 0 means an enrichment correction, and a value less than 0 implies an enleanment correction. If "***" appears in the tester screen, the vehicle being tested is not equipped with this sensor.

### MIXTURE CONTROL LEARN
### MIXTURE CONTROL LEARN B1 & B2
### B1:BANK1 (LH BANK)
### B2:BANK2 (RH BANK)

| UNITS |
|---|
| NONE |

The Mixture Control Learn Value represents long term corrections to the air/fuel mixture computation. A value of 0 indicates no correction, a value greater than 0 means an enrichment correction, and a value less than 0 implies a deficiency correction. If "***" appears in the tester screen, the vehicle being tested is not equipped with this sensor.

# FUEL DELIVERY PARAMETERS

**MIXTURE CONTROL MONITOR**
**MIXTURE CONTROL MONITOR B1 & B2**
**B1:BANK1 (LH BANK)**
**B2:BANK2 (RH BANK)**

| UNITS |
| --- |
| NONE |

The value of Mixture Control Monitor is obtained by combining the values of the Mixture CONTROL DWELL and MIXTURE CONTROL LEARN values. This value indicates the necessary correction to keep the air/fuel mixture stoichiometrical.

If "***" appears in the tester screen, the vehicle being tested is not equipped with this sensor.

**NEEDLE SENSOR VOLTAGE**

| UNITS |
| --- |
| V |

The ECM detects the start of needle movement by triggering on the rising edge of the needle movement sensor signal.

**O2S ACTIVATION**
**O2S B1 ACTIVATION**
**O2S B2 ACTIVATION**
**O2S SIGNAL**
**B1:BANK1 (LH BANK)**
**B2:BANK2 (RH BANK)**

| STATES |
| --- |
| ACTIVATION/DEACTIVATION |
| ACTIVE/INACTIVE |

ACTIVATION is displayed when the oxygen sensor is operating within the activation temperature range and producing the expected output over a certain period of time. The oxygen sensor is deactivated by the ECM (or PCM) and DEACTIVATION is displayed if it does not reach the activation temperature or if it does not produce an adequate reading over a certain period of time.

# FUEL DELIVERY PARAMETERS

**O2S**
**OXYGEN SENSOR**
**OXYGEN SENSOR B1**
**OXYGEN SENSOR B2**
**B1:BANK1 (LH BANK)**
**B2:BANK2 (RH BANK)**

**O2S B1 S1**
**O2S B1 S2**
**O2S B2 S1**
**O2S B2 S2**

| UNITS |
|-------|
| mV |
| V |

The Oxygen Sensor, located in the exhaust stream, is the primary input to the fuel delivery system. A high voltage indicates a rich mixture while a low voltage indicates a lean mixture. After the ECM (or PCM) is in the closed loop mode of operation the fuel mixture is adjusted based upon the voltage of this sensor.
If "***" appears in the tester screen, the vehicle being tested is not equipped with this sensor.

*The oxygen sensor must be hot (>260 deg C, >500 deg F) before it will function properly.*

## PEDAL POS SENSOR

| UNITS |
|-------|
| % |

Pedal position (TP) sensor reading provides pedal position information in the form of voltage. This information is used for calculating engine load and A/C control.

## RAIL PRESSURE REGULATOR

| UNITS |
|-------|
| % |

This parameter shows the fuel pressure regulator opening cycle ratio.

**RICH/LEAN MONITOR**
**RICH/LEAN MONITOR B1**
**RICH/LEAN MONITOR B2**
**B1:BANK1 (LH BANK)**
**B2:BANK2 (RH BANK)**

| STATES |
|--------|
| RICH/LEAN |

This parameter tells whether the oxygen sensor voltage is above or below a programmed threshold. The threshold is normally computed to be the oxygen sensor voltage corresponding to an intake air/fuel ratio of 14.7 or about 450 mV. An Oxygen sensor voltage reading above the threshold means the intake mixture is rich whereas an oxygen sensor voltage below the threshold corresponds to a lean mixture.

# FUEL DELIVERY PARAMETERS

**SHORT FT B1**      **B1: BANK 1 (LH BANK)**
**SHORT FT B2**      **B2: BANK 2 (RH BANK)**

| UNITS |
|:-----:|
| % |

Bank #2 provides the air/fuel ratio feedback correction value for Bank #1. It is the percentage of rich or lean correction being applied to correct injection duration. Short fuel trim is based on rapidly switching exhaust oxygen sensor values. A positive value indicates that fuel delivery is being increased to correct for a lean air/fuel ratio. A negative value indicates that fuel delivery is being decreased to correct for a rich air/fuel ratio.

## START OF INJECTION

| UNITS |
|:-----:|
| deg. |

**For ECU Number 39:** Start of injection control is performed by calculating an optimal desired start of injection and closing the loop on it. ECM controls the injection start timing.
**For ECU Number 40:** Start of injection control is performed by calculating an optimal desired start of injection and closing the loop on it. A control valve in the fuel pump is the actuation mechanism for controlling the start of injection.

## THROTTLE ANGLE

| UNITS |
|:-----:|
| DEGREE |

The Throttle Angle parameter displays the throttle position related to the fully closed position. 0-0.5 refers to a fully closed throttle while about 80 is a wide open throttle.

## THROTTLE OPENER SOLENOID

| STATES |
|:------:|
| ON/OFF |

The Throttle Opener Solenoid Vacuum Valve improves starting ability by opening the throttle valve slightly at the engine start. When this signal is ON, the solenoid valve turns ON to open the throttle valve. Once the engine has started, the solenoid valve turns OFF and the throttle valve closes completely after a programmed time.

# FUEL DELIVERY PARAMETERS

## THROTTLE POSITION

| UNITS |
|:-:|
| % |

This parameter displays the throttle opening rate.

## THROTTLE POSITION SENSOR
## TP SENSOR VOLT

| UNITS |
|:-:|
| V |

The Throttle Position Sensor reading provides throttle valve opening information in the form of voltage. This information is used for correction, such as enrichment correction during acceleration.

The voltage reading should increase as the throttle is opened. 0 V indicates a broken or shorted sensor.

## TOTAL FUEL TRIM    B1: BANK 1 (LH BANK)
## TOTAL FT B1        B2: BANK 2 (RH BANK)
## TOTAL FT B2

| UNITS |
|:-:|
| % |

This parameter displays the total fuel trim correction applied to the injectors that feed cylinder banks 1 and 2, respectively. Values less than 0% indicate a reduction in fuel injection duration to correct for an overall rich condition. Values greater than 0% indicate an increase in fuel injection duration to correct for an overall lean condition.

## TURBO PRESSURE

| UNITS |
|:-:|
| HPa |

Turbo pressure value indicates air pressure compressed by the turbo charger.

# EMISSIONS AND DRIVEABILITY PARAMETERS

## CANISTER PURGE SOLENOID
## CANISTER PURGE DUTY

| UNITS |
|-------|
| % |

The Canister Purge Solenoid parameter displays the degree to which the purge valve is either open or closed. 0% means that the purge valve is completely closed while 100% is fully open valve.

## CLOSED THROTTLE POSITION

| STATES |
|--------|
| ON/OFF |

The Closed Throttle Position parameter indicates whether the throttle position is in the idle state or not. "ON" means that the throttle position is within the range for the idle state and "OFF" indicates that the throttle position is not within the idle state range.

## CTP SWITCH

| STATES |
|--------|
| ON/OFF |

The CTP Switch parameter will read ON when the throttle valve is fully closed, or OFF when the throttle is not fully closed.

## DESIRED IDLE SPEED

| UNITS |
|-------|
| RPM |

The Desired Idle Speed is an ECM (or PCM) internal parameter which indicates the ECM (or PCM) requested idle. If the engine is not running, this number is not valid.

# EMISSIONS AND DRIVEABILITY PARAMETERS

**EGR**
**EGR VALVE**

| STATES |
|--------|
| ON/OFF |

**For vehicles with ECU Numbers 7, 10, 11, 13, 14 and 20 as described in the ECM Cartridge Coverage chart on Pages 1-2 and 1-3:** ON is displayed when the EGR valve is not fully closed (when EGR gas flows into the intake manifold), and OFF is displayed when the EGR valve is fully closed (when EGR gas does not flow into the intake manifold. The EGR gas flow is regulated according to driving conditions by the stepper motor, which is operated by signals from the ECM.

**For all other vehicles:** ON is indicated when the EGR SV valve turns on (when EGR gas flows into the intake manifold), and OFF is displayed when the EGR SV valve turns off (when EGR gas does not flow into the intake manifold). The EGR gas flow is regulated according to driving conditions by the EGR modulator and the solenoid vacuum valve, which switches the vacuum passage to the diaphragm of the EGR valve.

### EGR TEMPERATURE

| UNITS |
|-------|
| DEGREES C |
| DEGREES F |

EGR Temperature is an internal ECM (or PCM) parameter. The EGR temperature sensor is installed on the EGR valve. When the EGR valve opens and EGR gas flows, the temperature parameter should rise. If the temperature does not rise, the EGR system is faulty.

### EVAP CANIST

| STATES |
|--------|
| ON/OFF |

EVAP Canist displays the state of the evaporative purge canister valve

### EVAP PURGE DUTY

| UNITS |
|-------|
| % |

The EVAP Purge Duty is used to control the EVAP solenoid purge valve. 0% means that the purge valve is completely closed while 100% is a fully open valve.

8-23

# EMISSIONS AND DRIVEABILITY PARAMETERS

## EVAP
## SOLENOID PURGE (SP) VALVE

| STATES |
|--------|
| ON/OFF |

The EVAP Canister is used to trap gasoline vapors from the fuel tank. When the EVAP Solenoid Purge Valve is ON, gas fumes can flow from the canister to the intake manifold. When the solenoid valve is OFF, fumes are trapped in the canister.

## IAC ADJUST MONITOR

| UNITS |
|-------|
| % |

IAC flow must be adjusted to a specified standard when adjusting idle speed. The IAC adjust monitor indicates the amount by which the current IAC flow is deviated from its standard value for idle adjustment. This value is effective only in the idle adjust mode (IAC CAL MODE). Therefore, 0% indicated in any other mode than IAC CAL MODE is meaningless.

## IAC DUTY

| UNITS |
|-------|
| % |

The IAC Valve uses a duty solenoid valve. It controls the engine idle speed by varying the valve open time within a certain set cycle and thus controls the amount of bypass air.

Idle Air Control Duty is obtained by using T on ÷ T x 100 (%)
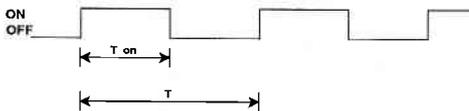


## IAC FLOW

| UNITS |
|-------|
| l/min |

This parameter represents the quantity of the bypass air flow in liters per minute through the IAC valve.

## IAC FLOW DUTY

| UNITS |
|-------|
| % |

This parameter indicates the open or closed percentage of the IAC valve. The IAC valve is driven by the stepping motor which is controlled by signals from the ECM . 100% indicates that the valve is fully open and 0% indicates that it is completely closed.

8-24

# EMISSIONS AND DRIVEABILITY PARAMETERS
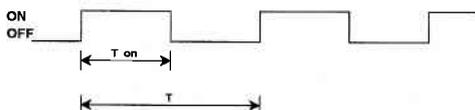
## IAC/ISC DUTY

| UNITS |
|-------|
| % |

### BYPASS AIR TYPE
The IAC Valve uses a duty solenoid valve. It controls the engine idle speed by varying the valve open time within a certain set cycle and thus controls the amount of bypass air.

Idle Air Control Duty is obtained by using T on ÷ T x 100 (%)



### THROTTLE POSITION TYPE
For ISC systems, engine idle speed is controlled by the ISC motor which is attached to the throttle body. The ISC motor moves the throttle valve by the ECM based on engine speed and throttle opening signals . The ISC DUTY parameter indicates the opening of the throttle valve in terms of percentage to the opening controllable by the ISC motor.

Idle Speed Control Duty is obtained by using
ISC DUTY = (TAS −10*) ÷ TAMAX x 100 (%)
TAS:         Throttle Angle for ISC
TAMAX:     Controllable opening
10*:          Offset

## IAC MOTOR POSITION

| UNITS |
|-------|
| STEP |

This parameter represents the position of the IAC valve driven by the stepping motor. "0 step" means that the IAC valve is closed. When the step value is large, it means that the IAC valve opening is large.

# EMISSIONS AND DRIVEABILITY PARAMETERS

**POWER STEERING
PRESSURE (PSP) SWITCH**

| STATES |
| --- |
| ON/OFF |

The Power Steering Pressure Switch parameter displays ON when the steering wheel is cranked all the way to the right or left.

**POWER STEERING
SOLENOID VACUUM (PS SV)
VALVE**

| STATES |
| --- |
| ON/OFF |

The PSP ON signal is fed to the ECM (or PCM), which actuates the IAC Valve and PS SV for compensating idle speed. This control is effective at both idling and driving.

# TRANSMISSION PARAMETERS

### 4WD-L SW

| STATES |
|---|
| OFF/ON |

This parameter indicates the state of the 4-wheel drive low gear switch. ON indicates the Low or Neutral position, and OFF indicates the 4WD high or 2WD high position. This signal is used to prevent the gear change into Overdrive and TCC lockup.

### GEAR POSITION

|  | STATES |
|---|---|
| 4AT | 1st / 2nd / 3rd / 4th / INVALID |
| 3AT | 1st / 2nd / 3rd / INVALID |

This parameter indicates the A/T gear position which is computed on signals from the Transmission Range Switch, VSS, TP Sensor, and so forth.

### GEAR POSITION CON

| STATES |
|---|
| 1st / 2nd / 3rd / INVALID |

This parameter indicates the A/T gear position which is computed on signals from the Transmission Range Switch, VSS, TP Sensor, and so forth.

### GEAR POSITION MON

| STATES |
|---|
| 1st / 2nd / 3rd / INVALID |

The monitor result of the A/T gear position computed on shift solenoid (#1 and #2) position is displayed.

### INPUT SHAFT
### INP. SHAFT SPEED

| UNITS |
|---|
| RPM |

The Input Shaft parameter is a PCM internal parameter. It is computed by reference pulses from the input shaft speed sensor and is used for torque reduction control in the PCM.

# TRANSMISSION PARAMETERS

## MODE SELECT SWITCH

| STATES |
| --- |
| **POWER/NORMAL** |

This parameter indicates the position of the Power/Normal change switch and is used to select the automatic gear shift schedule, Power or Normal mode.

## O/D OFF SWITCH

| STATES |
| --- |
| **OFF/ON** |

This parameter indicates the state of the O/D OFF Switch (Overdrive cut switch). When this switch is ON, the gear position is not shifted to 4th.

## PNP SIGNAL

| STATES |
| --- |
| **P/N RANGE** |
| **D RANGE** |

PNP Signal displays the transmission gear range based on the state of the Park Neutral Position signal.

## PRESSURE REGULATOR SOLENOID-CON

| STATES |
| --- |
| **OFF/ON** |

This parameter indicates the PCM has commanded the pressure regulator solenoid ON or OFF.

## PRESSURE REGULATOR SOLENOID-MON

| STATES |
| --- |
| **OFF/ON** |

The monitor result of the pressure regulator solenoid circuit is displayed.
ON:  Electricity is being passed to the pressure regulator solenoid.
OFF:  Electricity is not being passed to the pressure regulator solenoid.

# TRANSMISSION PARAMETERS

## SHIFT SOLENOID #1 - CON
## SHIFT SOLENOID #2 - CON

| STATES |
| --- |
| OFF/ON |

This parameter indicates the PCM has commanded the shift solenoid ON or OFF.

## SHIFT SOLENOID #1 - MON
## SHIFT SOLENOID #2 - MON

| STATES |
| --- |
| OFF/ON |

The monitor result of the shift solenoid circuit is displayed.
ON: Electricity is being passed to the shift solenoid.
OFF: Electricity is not being passed to the shift solenoid.

## TCC SOLENOID - CON

| STATES |
| --- |
| OFF/ON |

This parameter indicates that the PCM has commanded the Torque Converter Clutch (TCC) Solenoid ON or OFF.

## TCC SOLENOID - MON

| STATES |
| --- |
| OFF/ON |

The monitor result of the TCC solenoid circuit is displayed.
ON: Electricity is being passed to the TCC solenoid.
OFF: Electricity is not being passed to the TCC solenoid.

## THROTTLE OPEN RATE

| UNITS |
| --- |
| % |

This parameter represents the signal which ECM outputs to TCM to inform the throttle opening. Receiving a signal from the TP sensor, ECM converts it into this parameter. The parameter value increases as the throttle opening increases.

# TRANSMISSION PARAMETERS

## THROTTLE POSITION LEVEL

| UNITS |
|-------|
| NONE |

This parameter indicates the level (zone) of the throttle valve opening. The throttle opening is divided into 8 levels (zones) from "0" (about idle position) to "7" (about full open) and signals are assigned to each opening level (zone). The PCM controls the automatic gear changes of the automatic transmission by using these signals according to the signal from the TP sensor.

## TRANS RANGE
## D-RANGE SHIFT SWITCH

| STATES |
|--------|
| D RANGE/P-N RANGE |

The Trans Range parameter reads D RANGE when the transmission is shifted to any drive range (R, D, 2, or L range). This signal informs the ECM (or PCM) that a load has been applied to the engine so the ECM (or PCM) can adjust fuel compensation and IAC accordingly.

The Trans Range shift signal is also indicated for manual transmissions but should be ignored.

## TRANS. RANGE

| STATES |
|--------|
| P / R / N / D / 2 / L |

This parameter indicates the position of the transmission range switch. It is used as one of the signals to control the fuel injector, IAC valve and automatic transmission.

## VSS (TRANS)
## VSS (A/T)

| UNITS |
|-------|
| KPH |
| MPH |
| km/h |

The PCM controls the automatic gear changes of the automatic transmission by using these signals according to the signal from the Vehicle Speed Sensor (VSS) in the automatic transmission.

# MISCELLANEOUS PARAMETERS

## ABS SWITCH

| STATES |
| --- |
| OFF/ON |

This parameter indicates the state of the ABS operation signal which is input to the ECM (or PCM) from the ABS control module.
ON is displayed when the ABS is operating.
OFF is displayed when the ABS is not operating.
This parameter is used for the engine speed control in the ECM (or PCM).

## A/C CONDENSER FAN

| STATES |
| --- |
| OFF/ON |

This parameter indicates the state of the A/C Condenser Fan control signal.

## A/C CONTROL SIGNAL

| STATES |
| --- |
| OFF/ON |

This parameter indicates the state of the A/C Control Signals, that is, ON when outputting A/C ON command and OFF when not outputting.

## A/C COOLING FAN

This parameter indicates the state of the A/C condenser control

| STATES |
| --- |
| OFF/ON |

signal. ON is indicating when the A/C condenser is operating (signal is outputting) and OFF when the A/C condenser is not operating (signal is not outputting).

## A/C EVAPORATOR TEMPERATURE

| UNITS |
| --- |
| DEGREES C |
| DEGREES F |

This parameter is an analog input to the ECM (or PCM) from the A/C evaporator thermistor and is used to prevent the A/C evaporator from frosting or icing.

# MISCELLANEOUS PARAMETERS

## A/C MAGNETIC CLUTCH

| STATES |
| --- |
| OFF/ON |

This parameter indicates the state of the A/C magnetic clutch control signal. ON is indicated when the A/C compressor is operating (signal is outputting) and OFF when the A/C compressor is not operating (signal is not outputting).

## A/C PRESSURE SWITCH

| STATES |
| --- |
| OFF/ON |

This parameter indicates the state of the A/C dual pressure switch.

## A/C SWITCH

| STATES |
| --- |
| OFF/ON |

This parameter indicates the state of the A/C ON signal which is input to the ECM (or PCM).
ON is displayed when all of the A/C related switches (A/C switch, fan switch, pressure switch, etc.) are turned ON.
OFF is displayed when one of the above switches is turned OFF.

## BLOWER FAN SWITCH

| STATES |
| --- |
| OFF/ON |

This parameter indicates the state of the blower fan motor switch.

## BRAKE SWITCH

| STATES |
| --- |
| OFF/ON |

This parameter indicates the state of the Brake Switch.

# MISCELLANEOUS PARAMETERS

## HEATER FAN

| STATES |
|--------|
| OFF/ON |

This parameter indicates the state of the heater fan motor switch.

## RADIATOR FAN

| STATES |
|--------|
| OFF/ON |

This parameter indicates the state of the Radiator Fan.

## STARTER

| STATES |
|--------|
| OFF/ON |

This parameter indicates the state of the starter signal.

# APPENDICES

**A. UNDERSTANDING SUZUKI ECMs**

**B. IF YOU'RE HAVING A PROBLEM**

**C. GLOSSARY OF TERMS**

# A. UNDERSTANDING SUZUKI ECMs

The serial data link uses message-oriented transmissions with a UART type data format. The communication is via a single-wire half-duplex bus using a master/slave protocol. The serial data link can be used for communications during normal operation or as an interface to a test device for diagnostic operations. If there is no requirement for data sharing between the vehicle's components during normal operation, the link can be implemented as a diagnostics only link. Numerous diagnostic modes provide a maximum of system flexibility.

Interface to the serial data link can be implemented using standard UART type devices communicating at a 7812 or 15625 baud rate. The interface devices required for this phase are available as stand-alone devices or integrated with CPU's (or MPU's) in a large number of micro-controllers.

Network access is via a master/slave protocol. The serial data link can have at most one device functioning as the master at any point in time. The TECH 1 controls all communications on the serial data link. A slave device (ECM) can transmit data only after it has been interrogated by the master device. A typical operating scenario is for the master device to periodically send a polling message to one or more of the slave devices. The slaves can then send a response message (containing, for example, the states of the slave's inputs or internal parameters) back to the master.

Once the TECH 1 has gotten control of the serial data link, it can perform diagnostics on any of the devices connected to serial data link which support serial data diagnostics. It is important to note that the tester can only perform diagnostics which were provided for in the design of the various components. "Hooks" in the software of the on-board components must be provided in order to allow diagnostics to be performed. The more "hooks" that are provided, the more sophisticated the diagnostics which can be performed. Some components might implement minimum diagnostics such as trouble code and diagnostic parameter readout. Other components might implement high-end diagnostics including provision for extensive control over the operation of the component and override of internal parameters. This can be used to exercise specific circuits in order to assist in the isolation of faults.

A-1

# B. IF YOU'RE HAVING A PROBLEM

Although the TECH 1 was designed to give you years of trouble-free service, occasional problems may occur that require special attention. Some of these problems may be corrected with a few simple steps. Examples of most of the displays which you might see under abnormal conditions are shown. In addition, the most likely cause for the condition is given as well as other possible causes and recommendations on how to isolate or eliminate the problem. If the problem appears to be in the TECH 1, perform the Self-test (described in the TECH 1 Operators Manual.)

1.

**Blank Screen**

**MOST LIKELY CAUSE:**
- Ignition switch OFF.

**OTHER POSSIBLE CAUSES:**
- Faulty cable.
- TECH 1 power supply is malfunctioning.
- No power is applied to the TECH 1.

**RECOMMENDATIONS:**
- Plug the TECH 1 into another vehicle to verify proper operation.

**2.**



## MOST LIKELY CAUSE:
- Two master cartridges are installed.

## OTHER POSSIBLE CAUSES:
- Master cartridge is malfunctioning.
- TECH 1 is malfunctioning.

## RECOMMENDATIONS:
- Make sure that only one master cartridge is installed in the TECH 1.
- Remove all cartridges and see if "MASTER CARTRIDGE MISSING OR MALFUNCTIONING" message is displayed. If it is, try installing another master cartridge.

**3.**



MASTER CARTRIDGE
IS MISSING OR
MALFUNCTIONING

## MOST LIKELY CAUSE:
- Master cartridge is not installed.

## OTHER POSSIBLE CAUSES:
- Dirty contacts on the master cartridge connector.
- Two master cartridges installed.

## RECOMMENDATIONS:
- Verify that a master cartridge is installed.
- Clean contacts on master cartridge connector with alcohol.
- Try a different master cartridge.

**4.**

| SUZUKI MASS STORAGE CARTRIDGE - VX.X <ENTER> | or | F0: ENGLISH F1: ニホンゴ " F2: DEUTSCH F3: FRANCAIS |

### Keyboard or display locked up or program sporadically returns to first page

## MOST LIKELY CAUSE:
• Serial data link cable loose or bad.

## OTHER POSSIBLE CAUSES:
• Master Cartridge loose or dirty contacts.
• TECH 1 malfunction.

## RECOMMENDATIONS:
• Cycle power to the TECH 1 (unplug & replug the serial data link connector).
• Check TECH 1 cartridge socket and cartridge edge connector.
• Check serial data link cable & connector for wear or corrosion.

**5.**

| POSSIBLE WRONG ECM SELECTED, NO DATA, CHECK LINK AND RESELECT | SERIAL DATA FAIL CHECK DATA LINK AND RESELECT [EXIT] | ECU NO RESPONSE [EXIT] | BOSCH ECM NO DATA CHECK ALDL CONNECTION |

### TECH 1 is not receiving data

## MOST LIKELY CAUSE:
• ECM (or PCM) serial data link connector cable problems.
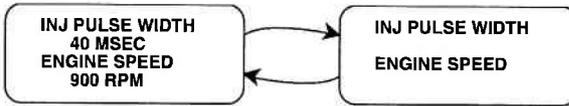
## OTHER POSSIBLE CAUSES:
• Serial data link cable loose or bad or connector pins loose or corroded.
• Bad ECM (or PCM).

## RECOMMENDATIONS:
• Verify a good serial data link cable connection.
• Cycle power to the TECH 1.
• Run the TECH 1 Self-test.

**6.**

```
┌─────────────────────┐        ┌─────────────────────┐
│  INJ PULSE WIDTH    │ ─────▶ │  INJ PULSE WIDTH    │
│     40 MSEC         │        │                     │
│   ENGINE SPEED      │ ◀───── │   ENGINE SPEED      │
│     900 RPM         │        │                     │
└─────────────────────┘        └─────────────────────┘
```

**Data List parameters flash on and off.**

## MOST LIKELY CAUSE:
- Serial data link cable loose or bad.

## OTHER POSSIBLE CAUSES:
- Serial data link cable connector pins loose or corroded.
- ECM (or PCM) serial data link connector cable problems.
- Intermittent ECM (or PCM) problem.

## RECOMMENDATIONS:
- Verify a good serial data link cable connection.
- Cycle power to the TECH 1.

**7.**

```
┌──────────────────┐
│   COMPANION      │
│   APPLICATION    │
│    MISSING       │
└──────────────────┘
```

## MOST LIKELY CAUSE:
- ECM Application is not installed in the Mass Storage Cartridge.

## OTHER POSSIBLE CAUSES:
- Mass Storage Cartridge is not installed correctly.
- Wrong cartridge is installed in the tester.

## RECOMMENDATIONS:
- Confirm that the Suzuki Mass Storage Cartridge is correctly installed in the bottom cartridge slot of the tester.
- Confirm that no other Master or Mass Storage Cartridge is installed in the top cartridge slot.
- Contact your **TECH 1** distributor to have the application installed in the Mass Storage Cartridge.

B-4

# C. GLOSSARY OF TERMS

| | |
|---|---|
| **A/C** | Air Conditioning |
| **A/T** | Automatic Transmission |
| **ACCEL** | Accelerator |
| **ADV** | Advance |
| **BTDC** | Before Top Dead Center |
| **C** | Centigrade |
| **CAL** | Calibration |
| **CAM** | Camshaft |
| **CANI** | Canister |
| **CANIST** | Canister |
| **CARB** | California Air Resource Board |
| **CKT** | Circuit |
| **CLUT** | Clutch |
| **CMP** | Camshaft Position |
| **COHER** | Coherence |
| **COMM** | Communication |
| **CON** | Control |
| **COND** | Condition |
| **CONDENS** | Condenser |
| **CONT** | Control |
| **CONTR** | Control |
| **CTP** | Closed Throttle Position |
| **CTRL** | Control |
| **D** | Drive |
| **DEFIC** | Deficient |
| **DEG** | Degrees |
| **DIFF** | Difference |
| **DLC** | Data Link Connector (SDL connector) |
| **DTC** | Diagnostic Trouble Code |
| **ECM** | Engine Control Module |
| **ECT** | Engine Coolant Temperature |
| **ECU** | Electronic Control Unit |
| **EFI** | Electronic Fuel Injection |

C-1

| | |
|---|---|
| **EFFI** | Efficiency |
| **EGR** | Exhaust Gas Recirculation |
| **EGRT** | Exhaust Gas Recirculation Temperature |
| **ENG** | Engine |
| **EVAP** | Evaporative Emission |
| **F** | Fahrenheit |
| **FCC** | Federal Communications Commission |
| **FLT** | Fault |
| **FREQ** | Frequency |
| **FRZ** | Freeze |
| **FT** | Fuel Trim |
| **FUNC** | Function |
| **FXS** | Fixed Spark Mode |
| **g** | Grams |
| **GND** | Ground |
| **IAC** | Idle Air Control |
| **IAT** | Intake Air Temperature |
| **IGN** | Ignition |
| **INJ** | Injector |
| **INP** | Input |
| **INTERN** | Internal |
| **ISC** | Idle Speed Control |
| **KPH** | Kilometers Per Hour (km/h) |
| **L/min** | Liters Per Minute |
| **LEV** | Level |
| **LITT** | Little |
| **MAF** | Mass Air Flow |
| **MALF** | Malfunction |
| **MANI** | Manifold |
| **MAP** | Manifold Absolute Pressure |
| **MAX** | Maximum |
| **MC** | Mixture Control |
| **MFI** | Multiport Fuel Injection |
| **MIL** | Malfunction Indicator Lamp |

C-2

| | |
|---|---|
| **MISC** | Miscellaneous |
| **mmHg** | Millimeters of Mercury |
| **MON** | Monitor |
| **MONIT** | Monitor |
| **MPH** | Miles Per Hour |
| **MPU** | Micro Processing Unit |
| **mSEC** | Milliseconds |
| **MT** | Manual Transmission |
| **mV** | Millivolt |
| **OBD** | On Board Diagnostic |
| **O/D** | Overdrive |
| **O2S** | Oxygen Sensor |
| **P/N** | Park/Neutral |
| **PCM** | Powertrain Control Module (= ECM + TCM) |
| **PERF** | Performance |
| **PNP** | Park Neutral Position |
| **POS** | Position |
| **PRESS** | Pressure |
| **PRG** | Purge |
| **PS SV Valve** | Power Steering Solenoid Vacuum Valve (Power Steering Vacuum Switching Valve, PS VSV) |
| **PSP** | Power Steering Pressure |
| **RAD** | Radiator |
| **REF** | Reference |
| **REG** | Regulator |
| **RL** | Rich Lean |
| **RPM** | Revolutions Per Minute |
| **RS232C** | Standard Serial Communication interface |
| **SDL** | Serial Data Link |
| **SEC** | Seconds |
| **SEN** | Sensor |
| **SENS** | Sensor |
| **SFI** | Sequential Multiport Fuel Injection |

C-3

| | |
|---|---|
| **SOI** | Start of Injection |
| **SOL** | Solenoid |
| **SOV** | Shut Off Valve |
| **SP valve** | Solenoid Purge Valve |
| **SPEC** | Specification |
| **SPD** | Speed |
| **S/W** | Software |
| **SW** | Switch |
| **SYS** | System |
| **TBI** | Throttle Body Fuel Injection |
| **TCC** | Torque Converter Clutch |
| **TCM** | Transmission Control Module |
| **TEMP** | Temperature |
| **THROT** | Throttle |
| **TP** | Throttle Position |
| **TRANS** | Transmission |
| **TRIG** | Trigger |
| **TST** | Test |
| **UART** | Universal Asynchronous Receiver Transmitter |
| **V** | Volts |
| **VAF** | Volume Air Flow |
| **VAL** | Valve |
| **VIM** | Vehicle Interface Module |
| **VIN** | Vehicle Identification Number |
| **VLV** | Valve |
| **VSS** | Vehicle Speed Sensor |
| **WID** | Width |