SUZUKI
BCM 5.0
APPLICATION

Operator's Manual

tech 1®

SUZUKI
BCM 5.0
APPLICATION

Operator's Manual

SOME THINGS YOU SHOULD KNOW

WARNING: 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, and 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 BCM 5.0 APPLICATION DESCRIPTION

The Suzuki BCM 5.0 Application is included in the Suzuki Mass Storage Cartridge and is used with the TECH 1 to diagnose and troubleshoot the Automatic Transmission (A/T), Continuous Variable Transmission (CVT), Antilock Brake System (ABS), Electrical Power Steering (EPS), Airbag, and Immobilizer systems used on the following models.

NORTH AMERICAN MARKET

YEAR	MODEL	SYSTEM	ECU MANUFACTURER	ECU NO.
95-98	ESTEEM 1600 (SY416)	4AT	AISIN A.W.	1
		ABS (4 CHANNEL)	SUMITOMO DENKO	2
		AIRBAG	SIEMENS AG.	3
96-98	SIDEKICK 1800 (SV418)	ABS (3 CHANNEL)	SUMITOMO DENKO	2

OTHER THAN NORTH AMERICAN MARKET

MODEL	SYSTEM	ECU MANUFACTURER	ECU	REMARKS
SY413/416/418	4AT	AISIN A.W.	1	
	ABS	SUMITOMO-DENKO	2/ 21	
	AIRBAG	SIEMENS AG.	3	
		DENSO	10	See note 1
SV620	ABS	SUMITOMO-DENKO	2	
SV420G	ABS	SUMITOMO-DENKO	2	
SV420D	ABS	SUMITOMO-DENKO	2	
	4AT	AISIN A.W.	4	See note 2
SE416	4AT	AISIN A.W.	4	See notes 3, 4
SZ416	4AT	AISIN A.W.	4	
SQ 416/420/625	ABS	SUMITOMO-DENKO	2/15	
	AIRBAG	DENSO	10	
SQ420WD	4AT	AISIN A.W.	4	
			26	See note 5
	ABS	SUMITOMO-DENKO	2/15	
	AIR BAG	DENSO	10	
SR SERIES	4AT	AISIN SEIKI	7	
	ABS	NISSHINBO	9	
	AIR BAG	TOKAI RIKA	11	
SF SERIES	AIR BAG	SIEMENS AG.	3	For Hungarian
	ABS	BOSCH	13	made vehicles
SN413V	4AT	AISIN SEIKI	7/ 25	
	ABS	DENSO	8/ 23	
	AIR BAG	MITSUBISHI	14/16	
	IMMOBILIZER	MITSUBISHI	24	See note 6
SN413Q	4AT	AISIN SEIKI	7/ 25	
	ABS	DENSO	8/ 23	
	AIR BAG	MITSUBISHI	14	
	IMMOBILIZER	MITSUBISHI	24	See note 6
GA413	ABS	SUMITOMO-DENKO	15	
	AIR BAG	MITSUBISHI	16	
	EPS	MITSUBISHI	17	
RB413	4AT	AISIN SEIKI	20	
	ABS	NISSHINBO	19	
	AIR BAG	SIEMENS AG.	18	
	EPS	MITSUBISHI	17	
	IMMOBILIZER	SIEMENS AG.	22	
RG413	A/T	AISIN SEIKI	20	
	ABS	NISSHINBO	19	
	AIR BAG	MITSUBISHI	16	
	EPS	MITSUBISHI	17	
	IMMOBILIZER	MITSUBISHI	24	

NOTE 1: The AIRBAG system of SY series is applicable to vehicles on and after the following VIN Nos.

SEDAN GA11S-140001~ GC11S-140001~ GA3AS-140001~ GC31S-140001~ JS2GA31S/W5140001~ JS2GB31S/W5140001~	JSAEGA11S00140001 ~ JSAEGC11S00140001 ~ JSAEGA31S00140001 ~ JSAEGB31S00140001 ~ JSAEGC31S00140001 ~ JSAEGC31SV5140001 ~ JSAEGC31SW0140001 ~ JSAEGD31S00140001 ~ JSAEGC41S00140001 ~
WAGON GC31W-140001~ GD31W-140001~ JS2GA31W/W5140001~	JSAEGC11W00140001 ~ JSAEGC31W00140001 ~ JSAEGC31WW0140001 ~ JSAEGD31W00140001 ~ JSAEGC41W00140001 ~

NOTE 2: The 4AT system of SV420D is applicable to vehicles on and after the following VIN No. and equipped with intercooler.

JSAETD31V00200001	

NOTE 3: The 4AT system of SE416 is applicable to vehicles on and after the following VIN Nos. and equipped with TCM.

JSAETA01C01110001 ~ JSAETA01CST100001 ~ JSAETA01V01110001 ~ JSAET101VST100001 ~ JSAET102C01120001 ~ JSAETA02V01120001 ~ JSAETD01V01100001 ~ JSAETD01VST100001 ~	TA01C-160001 ~ TA01V-160001 ~ TD01V-160001 ~

NOTE 4: The 4AT system of SE416 on and after the following VIN Nos. cannot be diagnosed by using this application. Use the ECM application on and after version 2.0 for diagnosis of the SE416 4AT system below.

JSAETA02C01200001 ~ JSAETA02V01200001 ~ JSAETD01V01200001 ~	TD01V-200001 ~

NOTE 5: The 4AT system of SV420D is applicable to vehicles of that VIN including TD72V.

NOTE 6: The immobilizer system is applicable to vehicles on and after the following vehicle identification numbers equipped with an air bag system.

- JSAFJA43V00100001
- JSAFJB43V00100001
- JSAFJB43VY0100001
- JSAFJB43V14100001
- JS3JB43V 14100001

HOW THE SUZUKI BCM 5.0 APPLICATION WORKS WITH THE TECH 1

The TECH 1 lets you monitor data and control ECU operation by communicating with the ECU via the serial Data Link Connector (DLC) present in the vehicle. The TECH 1 consists of a microcomputer, which communicates with the ECU 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 ECU by applying an electrical signal to the serial data link connector Diagnostic Enable pin, then reads the ECU data signal from one of the serial data link connector pins, and translates it into an intelligible data display. The Suzuki BCM 5.0 Application in the Suzuki Mass Storage Cartridge is the software program which performs all of the functions described in this operator's manual.

GENERAL TECH 1 KEY FUNCTIONS

YES & NO	Answer questions asked on TECH 1 display and select data parameters to monitor.
EXIT	Return to previous step.
↑ & ↓	Scroll through test mode selection menus and control display of captured data.
0 - 9	Designate trouble codes.
F0 - F9	Select and control test mode.
F6	On-board function menu (for details, refer to the Tech 1 Operator's Manual).
F8	Print Data List parameters.
ENTER	Enter designated trouble code and proceed to the next step.

2.0 GETTING STARTED

Before operating the Suzuki BCM 5.0 Application with the TECH 1 the following steps must be performed:

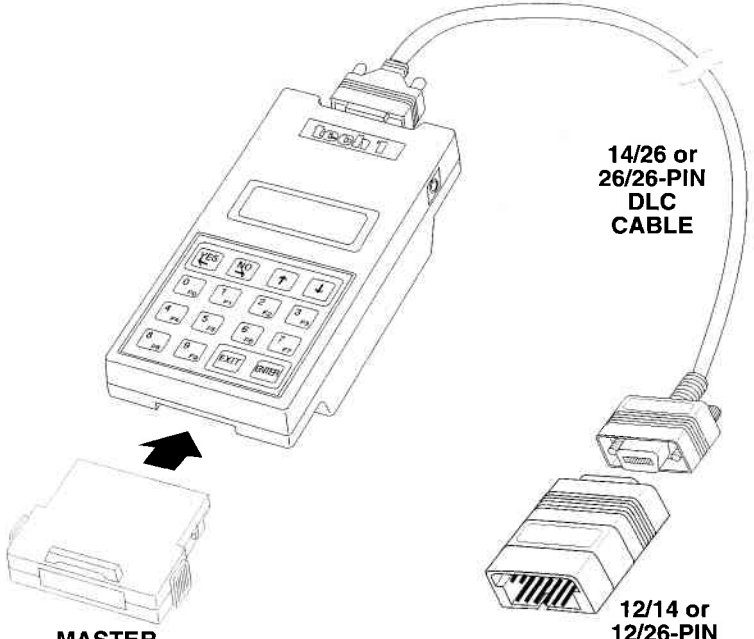
1. Insert the Suzuki Mass Storage Cartridge that contains the Suzuki BCM 5.0 Application into the bottom slot of the TECH 1. Verify that no other master cartridge is installed in the top slot.

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.

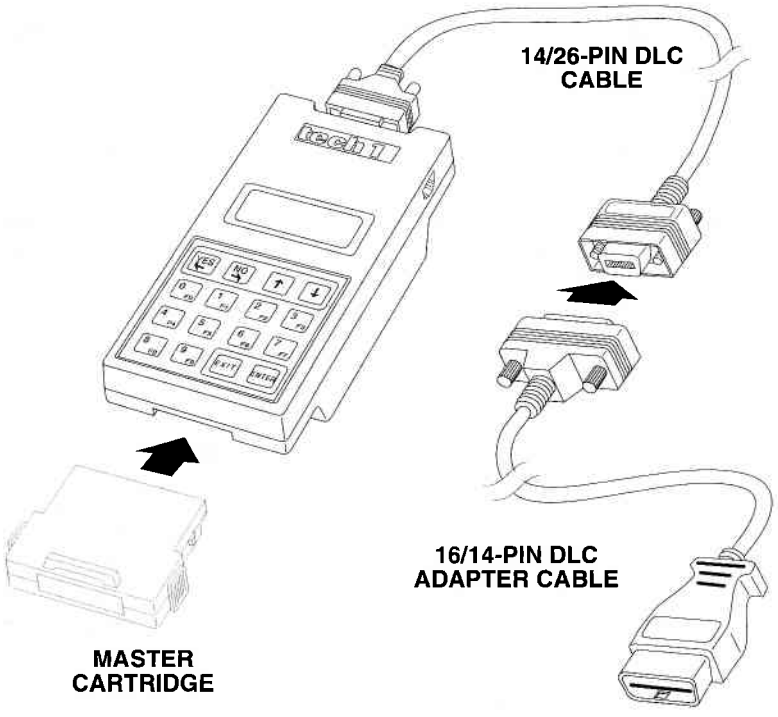
4. Connect the TECH 1 cable to the top of the TECH 1 as shown below.

WHEN THE VEHICLE USES THE 12-PIN DLC.

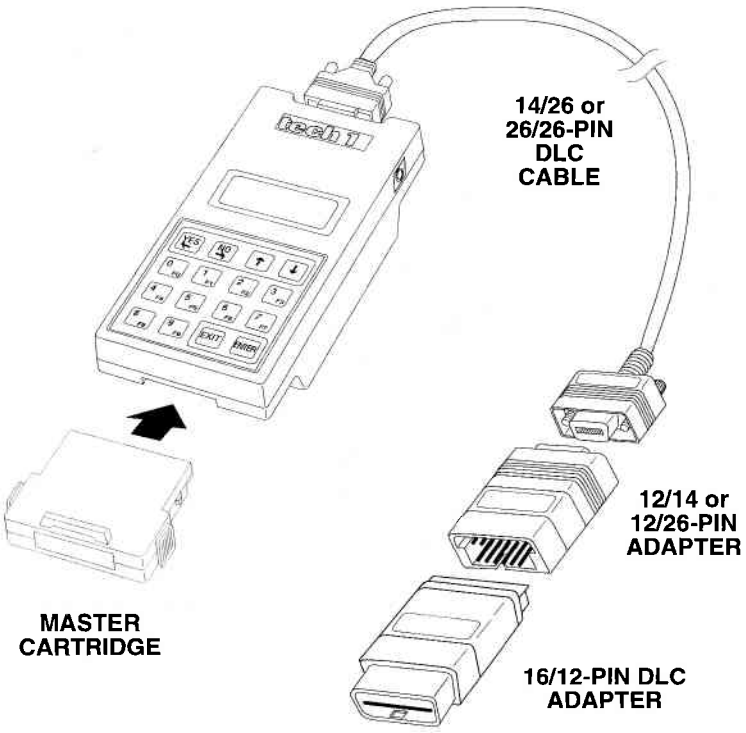


NOTE: The 16/12-pin adapter is not applicable to ECUs No. 13, 15, 16 and 17. For these models, use the 16/14-pin adapter cable when diagnosing the system.

WHEN THE VEHICLE USES THE 16-PIN DLC
TYPE 1



WHEN THE VEHICLE USES THE 16-PIN DLC
TYPE 2
(NOTE: ECM No. 18 (GA Series) is not applicable Type 2)



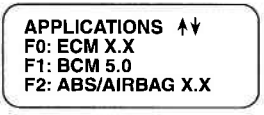
NOTE: The 16/12-pin DLC adapter is not applicable to ECUs No. 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, and 28.

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.

8. Press ENTER to display the APPLICATIONS menu.

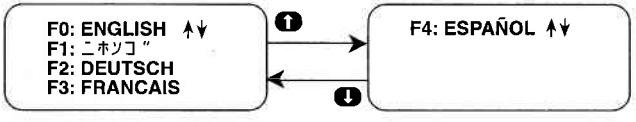


Press the key to the left of BCM 5.0 to select the Suzuki BCM 5.0 Application from the APPLICATIONS menu. If more than three applications are available, use ↑ or ↓ to scroll the display.

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, then press ENTER.

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



3.0 OPERATING PRECAUTIONS

CONNECTING AND DISCONNECTING THE TECH 1 WHILE THE IGNITION KEY IS ON

Due to the possibility of voltage spikes that could damage the ECU or TECH 1, you should not connect or disconnect the TECH 1 while the ignition key is ON or while the engine is running.

REMOVING THE CARTRIDGE WHILE POWER IS APPLIED

You should not remove or install master or auxiliary cartridges while the ignition key is ON, or while the engine is running. 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

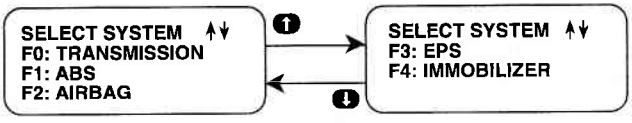
SNAPSHOT data that has been captured by a master cartridge can be printed on a TECH 1 (or compatible) printer, transferred to a computer for further analysis, or displayed on a terminal. The SNAPSHOT data will be retained within the TECH 1 memory for at least one-half hour, even if the TECH 1 is disconnected 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

When you have selected a language, the next step is to select a system to test.

SELECTING THE SYSTEM

The TECH 1 displays the systems available for testing. Press the key listed to the left of the system you wish to test.



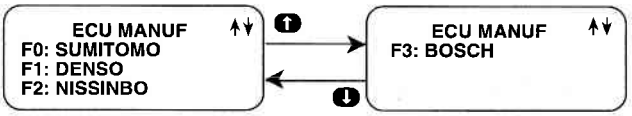
TRANSMISSION

When F0: TRANSMISSION is selected, the ECU Manufacturer must be identified.

Next, for vehicles equipped with AISIN-AW ECUs, the vehicle model must be selected. The Select Mode Menu is then displayed.

ABS

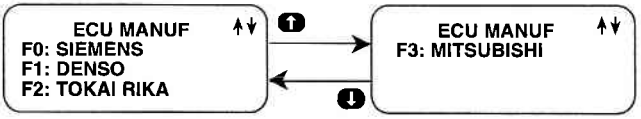
When F1: ABS is selected, the ECU Manufacturer must be identified.



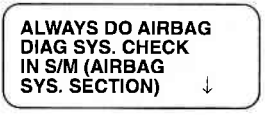
The Select Mode Menu is then displayed.

AIRBAG

When F2: Airbag is selected, the ECU Manufacturer must be identified.



Next, the following screen is displayed.



Perform the Airbag Diagnostic System Check as described in the Suzuki Service Manual, then press ⬇ to proceed to the Select Mode menu.

EPS

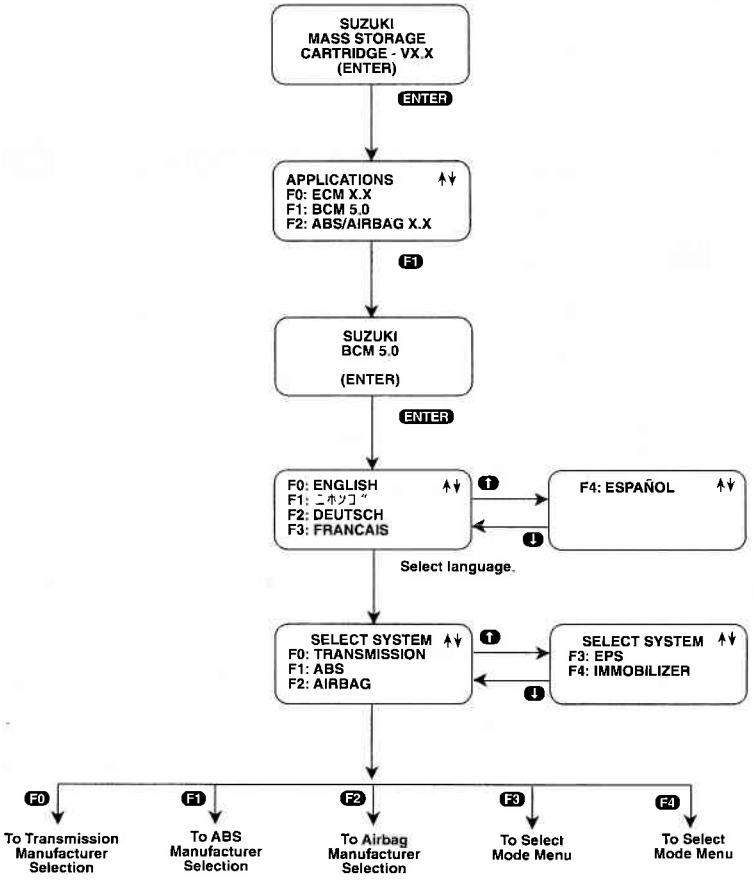
When F3: EPS is selected, the Select Mode Menu is displayed.

IMMOBILIZER

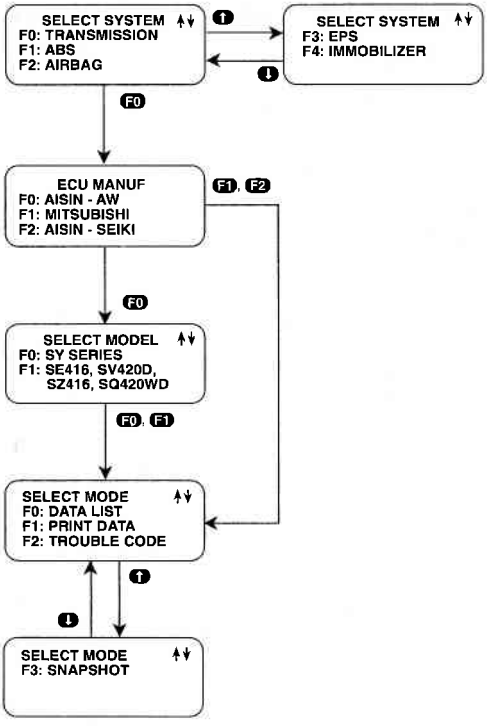
When F4: Immobilizer is selected, the Select Mode Menu is displayed.

ACTIVE TECH 1 KEYS	
F0 - F4	Select language.
F0 - F4	Select system or model.
YES - NO	Select vehicle with ABS or other vehicle.
↓	Proceed to the Select Mode menu.
↑ , ↓	Step automatic menu scrolling, then used to manually control the menu display.

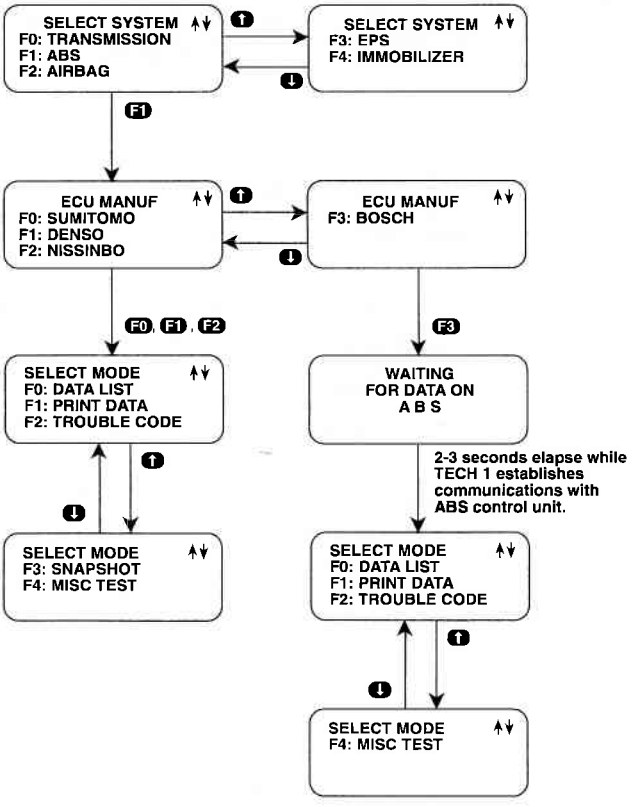
SELECT SYSTEM MENU



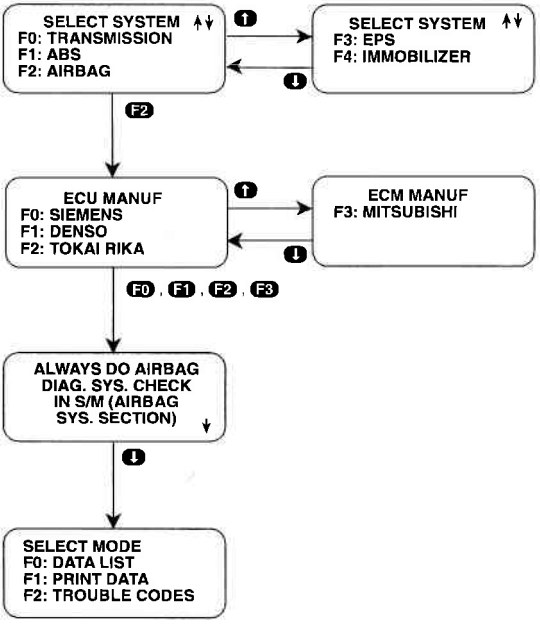
F0: TRANSMISSION MANUFACTURER SELECTION



F1: ABS MANUFACTURER SELECTION



F2: AIRBAG MANUFACTURER SELECTION



5.0 SELECTING AND OPERATING THE TEST MODES

The following section contains a brief description of each test mode available in the Suzuki BCM 5.0 Application. A more detailed description is included later in this section, along with the operating procedure for each test mode.

MODE F0: DATA LIST

Monitor data parameters from the ECU.

MODE F1: PRINT DATA

Send one data stream of information to a serial printer, terminal, or smart device.

MODE F2: TROUBLE CODES

Display stored trouble codes on all models and clear stored trouble codes on certain models.

NOTE: When checking and clearing trouble codes, be sure to follow the instructions in the Service Manual, or the correct reading or clearing of the DTC(s) may not occur.

MODE F3: SNAPSHOT

Capture and store ECU data parameters. Data is captured before and after a "trigger" point. Triggers can be on any trouble code, a particular trouble code, or manual TECH 1 key press. Captured data can then be displayed as well as trouble codes.

NOTE: The Snapshot mode is not available when testing the Airbag system.

MODE F4: MISC. TEST

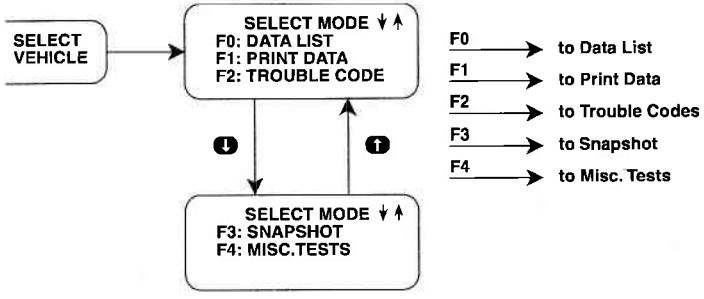
The Miscellaneous Test mode is used to select a submenu of tests. Pressing F4 displays the miscellaneous tests available. To return to the Select Mode menu, just press EXIT.

ECU NO.	SYSTEM	DATA LIST	PRINT DATA	TROUBLE CODE	SNAPSHOT	MISC TEST
1	A/T	•	•	•	•	
2	ABS	•	•	•	•	
3	AIRBAG	•	•	•		
4	A/T	•	•	•	•	
7	A/T	•	•	•	•	
8	AIRBAG	•	•	•		
9	ABS	•	•	•	•	•
10	AIRBAG	•	•	•		
11	AIRBAG	•	•	•		
12	EPS	•	•	•	•	
13	ABS	•	•	•		•
14	AIRBAG	•	•	•		
15	ABS	•	•	•	•	•
16	AIRBAG	•	•	•		
17	EPS	•	•	•	•	
18	AIRBAG	•	•	•		
19	ABS	•	•	•	•	•
20	A/T	•	•	•	•	
21	ABS	•	•	•	•	•
22	IMMOBI	•	•	•		
23	ABS	•	•	•	•	•
24	IMMOBI			•		
25	A/T	•	•	•	•	
26	A/T	•	•	•	•	
27	ABS	•	•	•	•	•
28	AIRBAG	•	•	•		

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.

Select Mode Menu



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 up to five test modes, the keys F0 - F4 are used.

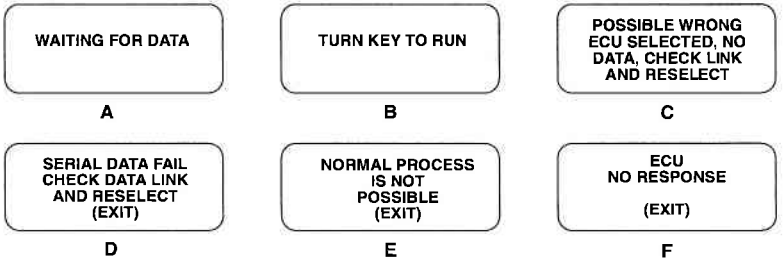
Up to three test modes are shown as soon as the ECU is selected. If other test modes are available, the display automatically scrolls to the next display after three seconds. The display automatically scrolls between the menu screens. To stop the automatic scrolling, press either the ↑ or ↓ key. The menu may then be manually changed by pressing either the ↑ or ↓ key. All multiple 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.

ACTIVE TECH 1 KEYS	
F0 - F4	Select Test mode.
↑ & ↓	Stop automatic menu scrolling, then used to manually control the menu display.
EXIT	Return to System Selection menu.

TECH 1- ECU COMMUNICATIONS STATUS DISPLAYS

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



Display A means that the TECH 1 has not yet received a complete data message from the ECU. This display is sometimes seen right after selecting a test mode.

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

Displays C and F occur when the TECH 1 has not received any data from the selected ECU. In this case, you should verify that the ignition is ON and check the serial data link connections.

Displays D and E occur when communication with a vehicle has failed after communication has already been established.

NOTE: If display C or D appears when the ABS control module is selected, the probable cause is a stop in the communication function on the ABS control module. To correct the problem, perform either of the following two steps:

1. Use a service wire to short between the diagnostic switch terminal of the diagnostic 2 monitor coupler for the ABS and the ground terminal of the diagnostic 1 monitor coupler. Refer to the applicable service manual for the location of each terminal position.

2. Spin one of the four wheels.

If the problem persists, refer to Item 5 in Appendix A.

ACTIVE TECH 1 KEYS	
EXIT	Return to vehicle select step.

MODE F0 | DATA LIST

The purpose of the DATA LIST mode is to passively monitor data which is being transmitted from the ECU 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 preprogrammed pairs. You can also create your own pairs through the process explained on the following pages.

OPERATING PROCEDURE:

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

   For ECU No. 2 (made by Sumitomo Denko)

   NOTE: When you are testing the ABS, if a current trouble code is present when Data List is selected, or if a current trouble code is detected while the Data List mode is active, the tester displays the following message.

   CURRENT TROUBLE
   CODE SET, DATA
   NO LONGER VALID
   (EXIT)

   For the ABS, current trouble codes cause the ABS control module to send invalid data to the tester. Therefore, data displayed in Data List, Print Data, and Snapshot modes is not valid and should not be used for diagnosing the vehicle. To clear the trouble codes, use Mode F2: TROUBLE CODES to display the current Trouble Codes. Repair the cause of the trouble code(s), then clear the codes using Mode F2. When all current trouble codes have been cleared, select F0: DATA LIST again to display vehicle data.

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

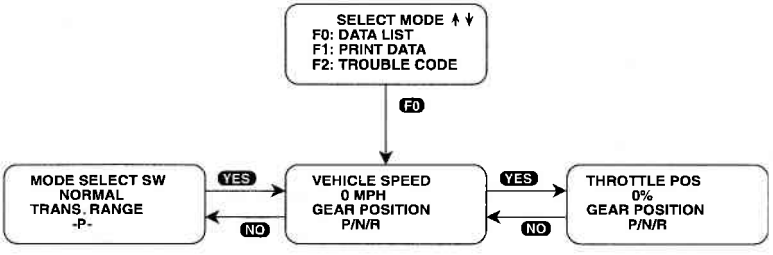
3. You may return to the select mode menu by pressing EXIT.

VIEWING ECU DATA PARAMETERS

In order to maximize the information that can be seen at one time, the TECH 1 displays data parameters in preassigned pairs. The first data pair 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 (For ECU No.13, press either ↓ or ↑ instead of YES or NO). The YES (or ↓) key will cause the TECH 1 to scroll forward through the list of preassigned pairs, while the NO (or ↑) key will cause scrolling backwards.

Section 8.0 contains descriptions of all data parameters.



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 VEHICLE SPEED and THROTTLE POS. To do so, scroll through the preassigned pairs with the YES and NO (↓ and ↑) key until you find a pair with VEHICLE SPEED. Fix the VEHICLE SPEED by pressing the F0 key if VEHICLE 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 (↓ and ↑) key until THROTTLE POS. is displayed.

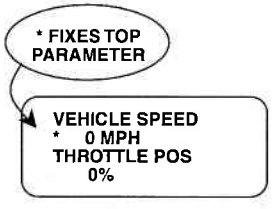


FIGURE A

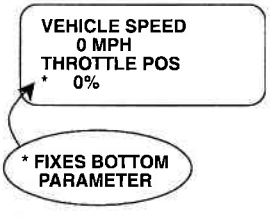
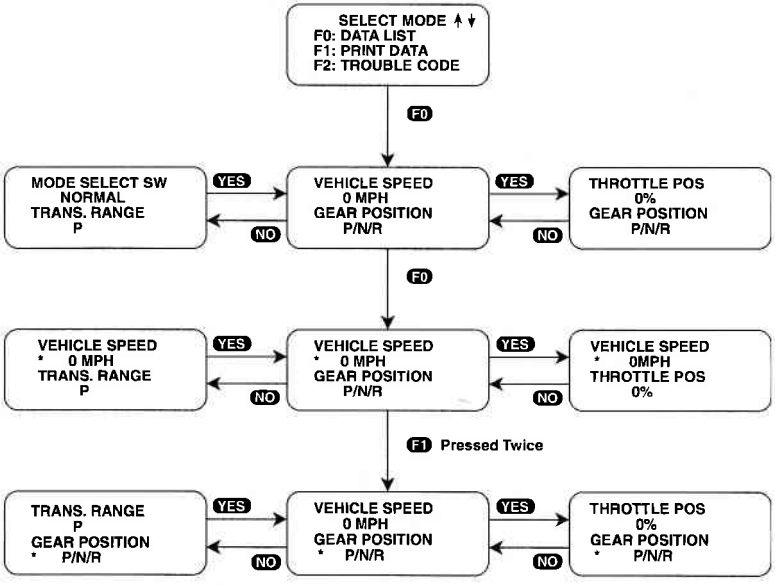


FIGURE B

PRINTING DATA

The currently displayed sample may be printed if the TECH 1 is equipped with an RS232C I/F Cartridge connected to a compatible printer. The RS232C I/F Cartridge is not required if you are using a TECH 1 Series A tester. To print the data, press F8. The TECH 1 keyboard is disabled while data is being sent to the printer.

EXAMPLE OF SELECTING AND DISPLAYING DATA PAIRS



ACTIVE TECH 1 KEYS FOR DATA LIST

YES & NO	Scroll through displayed data parameters.
↓ & ↑	Scroll through displayed data parameters for ECU No.13.
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.
F6 (hold)	Select "RS232C Set-Up" menu.
F8	Print data list parameters.
EXIT	Return to the Select Mode menu.

MODE F1 | 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, system type and Data List to a serial printer or terminal. This is the data list sent by the ECU to the TECH 1. The data list parameters can be printed without printing the VIN or type by pressing the F8 key in the Data List or Snapshot Replay mode.

OPERATING PROCEDURE:

1. Press F1 to select Print Data from the Select Mode menu.

   For ECU No. 2 (made by Sumitomo-Denko)

   NOTE: When you are testing the ABS, if a current trouble code is present when Print Data is selected, or if a current trouble code is detected while the Print Data mode is active, the tester displays the following message.

   CURRENT TROUBLE
   CODE SET, DATA
   NO LONGER VALID
   (EXIT)

   For the ABS, current trouble codes cause the ABS control module to send invalid data to the tester. Therefore, data displayed in Data List, Print Data, and Snapshot modes is not valid and should not be used for diagnosing the vehicle. To clear the trouble codes, use Mode F2: TROUBLE CODES to display the current Trouble Codes. Repair the cause of the trouble code(s), then clear the codes using Mode F2. When all current trouble codes have been cleared, select F1: PRINT DATA again to print the vehicle data.

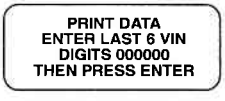
2. The VIN entry screen is the first screen displayed in this mode. Use the 0 - 9 keys on the tester keypad to enter the last six digits of the vehicle's VIN, then press ENTER. This information is printed out as part of the header information that accompanies each Data List print out.

3. 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.

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

5. 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 number. 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.

6. 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.

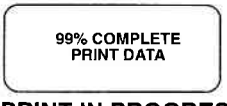


PRINT DATA VIN ENTRY SCREEN

SET UP RS232 CARTRIDGE

RS232 INTERFACE CARTRIDGE NOT CONNECTED

PRINT INITIALIZATION



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.
F6 (hold)	Select "RS232C Set-Up" menu.
EXIT	Terminate the Print Data mode and return to the select mode menu.

MODE F2 | TROUBLE CODES

Trouble codes or diagnostic codes are set by the ECU when an abnormal condition is detected. They are a key to diagnosing many of the problems which can occur in the vehicle. The F2 mode allows you quick access to trouble codes for initial vehicle checks and to check that a repair procedure has been successful.

Displays for the Trouble Codes mode are shown on the following page.

NOTE: Trouble codes can also be displayed in Snap-shot replay mode.

OPERATING PROCEDURE:

NOTE: When checking and clearing trouble codes, be sure to follow instructions in the Service Manual, or correct reading or clearing of the DTC(s) may not occur.

1. Press F2 to select the TROUBLE CODES mode from the Select Mode menu.

   The TECH 1 informs you if no trouble codes are present.

   AIRBAG SYSTEM

   For ECU No. 3 (made by Siemens)

   When testing the Airbag system, the following menu is displayed.

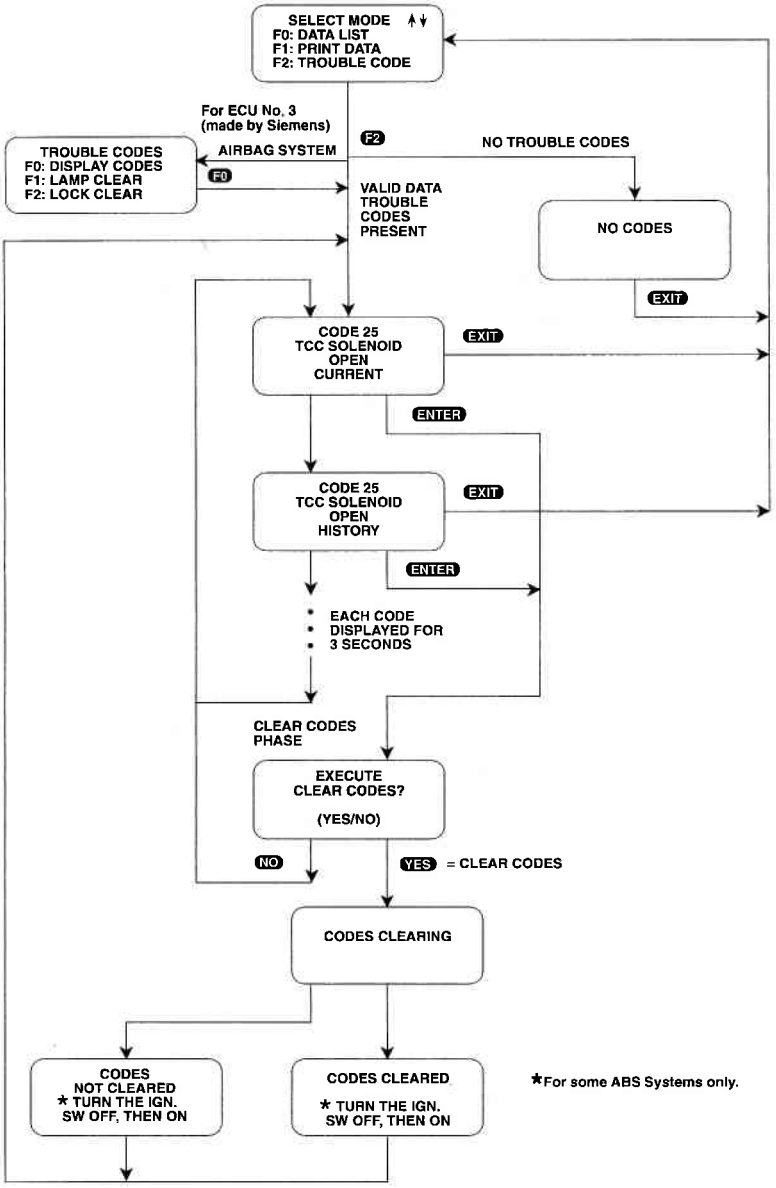
   ```
   TROUBLE CODES
   F0: DISPLAY CODES
   F1: LAMP CLEAR
   F2: LOCK CLEAR
   ```

   Press F0 to display the Airbag system codes.
   Press F1 to clear the Airbag Warning Lamp.
   Press F2 to clear the Near-Deploy Lock.

2. When F0 is selected, if trouble codes are present, the TECH 1 automatically displays each trouble code for three seconds.

3. The trouble codes are continuously displayed, wrapping around to the first code automatically after the last trouble code has been displayed. First, a listing of all Current trouble codes is displayed, followed by History trouble codes. Current or History is displayed indicating the type of code.

TROUBLE CODES MODE FLOW CHART FOR A/T, CVT, ABS, EPS, AND AIRBAG F0: DISPLAY CODES



CLEAR CODES PHASE

NOTE: ECU No. 24 Immobilizer does not support the Clear Codes Phase.

4. To clear stored trouble codes, press the E key to go to Clear Codes Phase. The TECH 1 will display "EXECUTE CLEAR CODES?". Press Y to clear the codes, or press N to return to the trouble code display without clearing the codes.

   When Y is pressed, the TECH 1 displays a "CLEARING CODES" message, followed by either a "CODES CLEARED" or a "CODES NOT CLEARED" message. After a few seconds the TECH 1 automatically starts displaying trouble codes again. If no trouble codes are present, the "NO CODES" screen is displayed.

   When the N key is pressed, the trouble codes are retained in the ECU and the TECH 1 starts displaying trouble codes again.

LAMP CLEAR AND LOCK CLEAR FOR AIRBAG SYSTEM

For ECU No. 3 (made by Siemens)

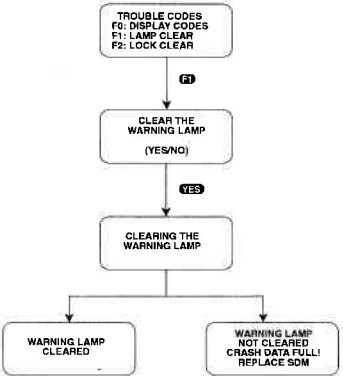
For the Airbag system, after the trouble codes are displayed, press EXIT to return to the Trouble Codes menu.

LAMP CLEAR
Select F1: Lamp Clear from the Trouble Codes menu, then press YES when the tester asks if you wish to clear the Warning Lamp. The tester attempts to clear the codes and informs you if the clearing was successful. If the Warning Lamp was not cleared, the tester informs you and instructs you to replace the SDM. Press EXIT to return to the Trouble Codes menu.

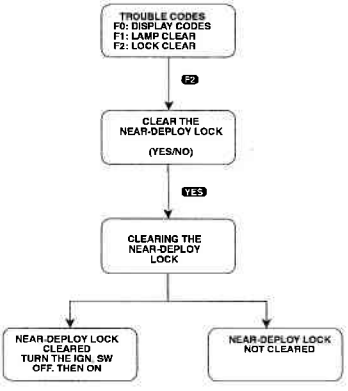
LOCK CLEAR
Select F2: Lock Clear from the Trouble Codes menu, press YES when the tester asks if you wish to clear the Near-Deploy Lock. The tester attempts to clear the Near-Deploy Lock, then informs you if the clearing was successful or not. If the clearing was successful, the tester instructs you to turn the ignition switch off, then on. Press EXIT to return to the Trouble Codes menu.

5. Press EXIT to terminate the trouble codes mode and return to the Select Mode menu.

F1: LAMP CLEAR



F2: LOCK CLEAR



ACTIVE TECH 1 KEYS FOR TROUBLE CODES

F6 (hold)	Select "RS232C Set-Up" menu.
ENTER	Clear all stored ECU trouble codes.
YES	Clear all stored ECU trouble codes.
NO	Return to display trouble codes. Codes are not cleared.
↑ , ↓	Stop automatic display scrolling, then used to manually control the display.
EXIT	Terminate the trouble code display and return to the Select Mode menu.

MODE F3 | SNAPSHOT

The SNAPSHOT mode is not available when testing Airbag systems or ABS ECU No. 13 (made by BOSCH).

The purpose of the SNAPSHOT test mode is to help you isolate an intermittent or transient problem by storing data parameters before and or after the problem occurs.

NOTE: For ABS with ECU No. 2 (made by Sumitomo-Denko), the tester stops saving data when a current trouble code occurs.

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

The TECH 1 stores all of the Data List parameters and trouble codes for the selected system. 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. For the SUZUKI BCM Application, a trigger occurs when any trouble code is detected by the ECU.

TRIGGER CONDITION

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

F0: ANY CODE — If any trouble code is detected by the ECU, it will cause the trigger to be set.

F1: SINGLE CODE — For A/T systems you can select a specific trouble code that must be detected before the trigger will be set. Step 3 in the Operating Procedure tells you how to enter the code. **F1: Single Code is not available when testing ABS ECU No. 2 (made by Sumitomo-Denko).**

F2: MANUAL TRIGGER — While operating the SNAPSHOT mode, you can always cause the trigger to be set by pressing ENTER.

VIEWING CAPTURED DATA

By selecting F3: REPLAY DATA from the SNAPSHOT menu you have the option of bypassing the Data Capture phase and displaying 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.

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.

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).

SETUP PHASE

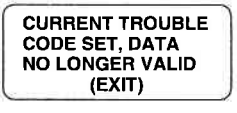
1. Press F3 to select the SNAPSHOT mode from the Select Mode menu.

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 £.

   For ECU No. 2 (ABS made by Sumitomo-Denko)

   NOTE: When you are testing the ABS, if a current trouble code is present when Snapshot Trigger Condition is selected, the tester displays the following message.

To clear the trouble code(s), use Mode F2: TROUBLE CODES to display the current Trouble Codes. Repair the cause of the trouble code(s), then clear the codes using Mode F2. When all current trouble codes have been cleared, select F3: SNAPSHOT again to capture or display vehicle data.

3. To choose a specific ECU trouble code, press F1 in the Snapshot Options menu. How to enter the code is explained below.

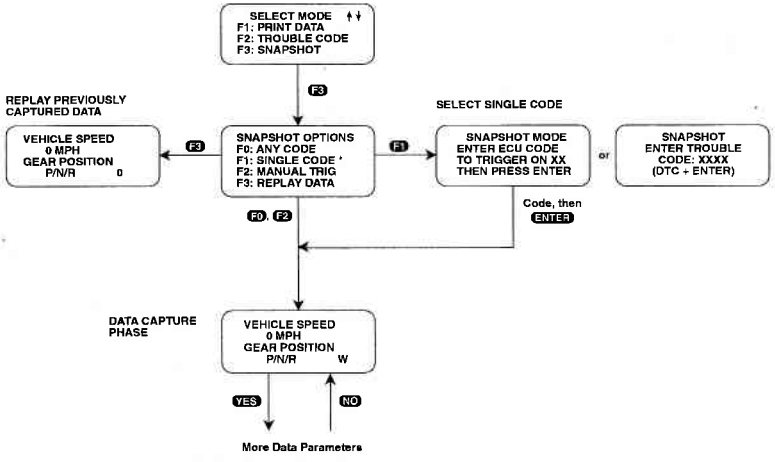
   NOTE: This selection is not available when testing the ABS with ECU No. 2 (made by Sumitomo-Denko).

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

ACTIVE TECH 1 KEYS IN SNAPSHOT SETUP PHASE	
F0 - F2	Select trigger condition.
F3	Select Replay Data.
F6 (hold)	Select "RS232C Set-Up" menu.
0 - 9	Select specific trouble code.
ENTER	Enter selected trouble code.
EXIT	Return to Snapshot Options menu.

SNAPSHOT SETUP 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: REPLAY DATA.



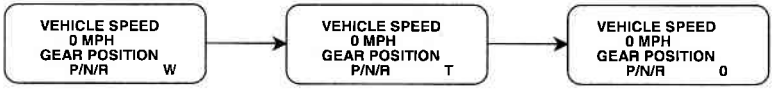
* For ABS with ECU No. 2 (made by Sumitomo-Denko), "F1: NOT AVAIL." is displayed.

MODE F3 | SNAPSHOT

DATA CAPTURE PHASE

4. Once the trigger condition is selected, the TECH 1 begins storing A/T or ABS data parameters and trouble codes 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 trouble codes 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.



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.

   For the ABS, if a current trouble code is detected while the Snapshot mode is active, a trigger automatically occurs and the tester advances to the data display phase. The trouble code that caused the trigger can be viewed by selecting sample +1.

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.
F6 (hold)	Select "RS232C Set-Up" menu.
ENTER	Manual trigger.
EXIT	Display captured data if trigger has already occurred.

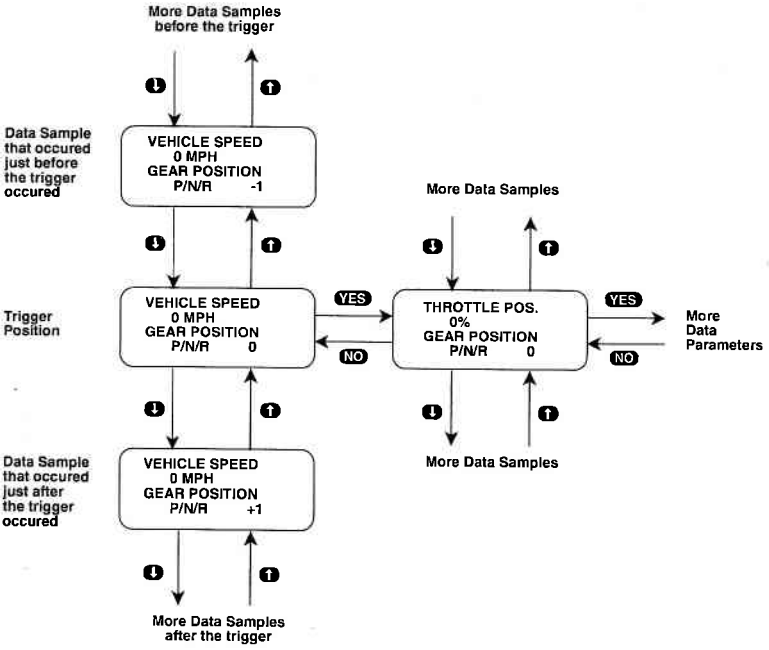
MODE F3	SNAPSHOT

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 trouble codes 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.

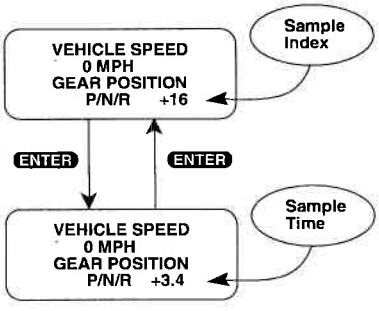
   The trigger occurs between samples 0 and +1. Sample "0" is the sample immediately preceding the trigger; sample "-1" is the second sample preceding the trigger, and so on. The trouble code that caused the trigger can be viewed in sample +1. For ABS systems, parameter data displayed in sample +1 is invalid.

   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.

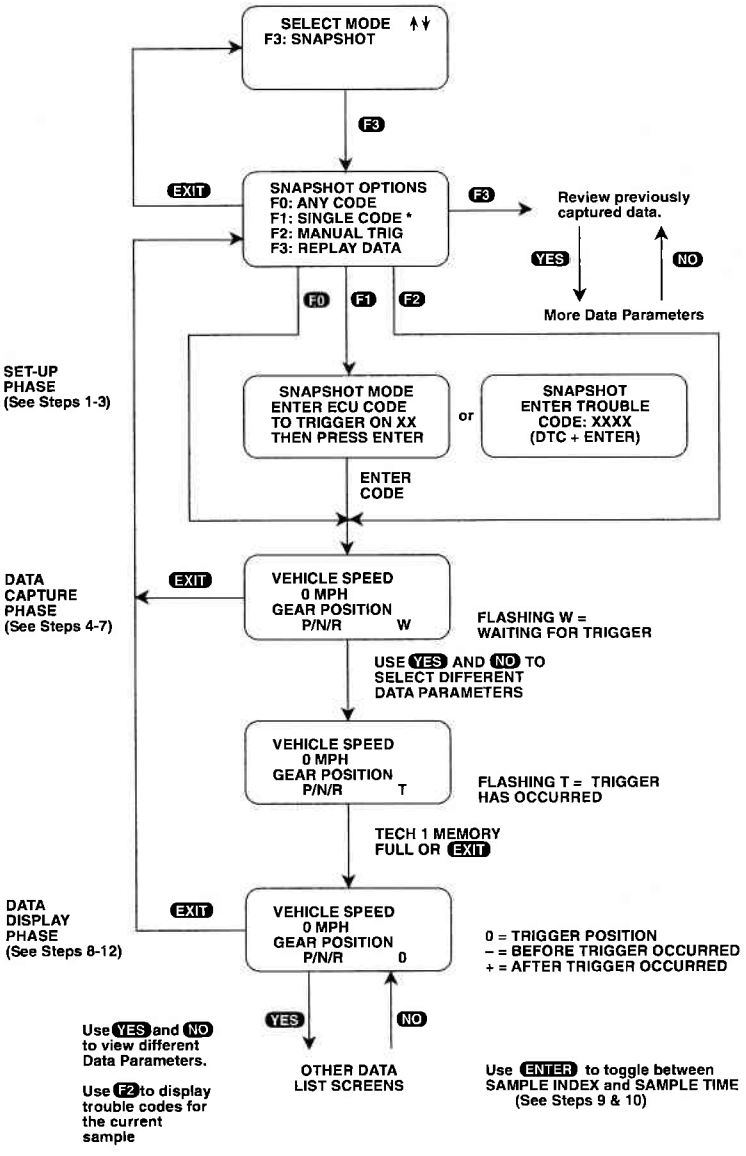
11. The currently displayed sample may be printed if the tester connected to a compatible printer. To print the data, press F8. The TECH 1 keyboard will be disabled while data is being sent to the printer.

    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 SETUP" 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.

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 trouble codes 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



* For ECU No. 2 (ABS made by Sumitomo-Denko), "F1: NOT AVAIL." is displayed.

MODE F4	MISC. TEST
SUBMODE F0	HYDRAULIC CONTROL

WARNING

To perform the following test, both vehicle drive wheels must be securely raised and the engine must be off, or there will be unintended vehicle movement that could result in injury.

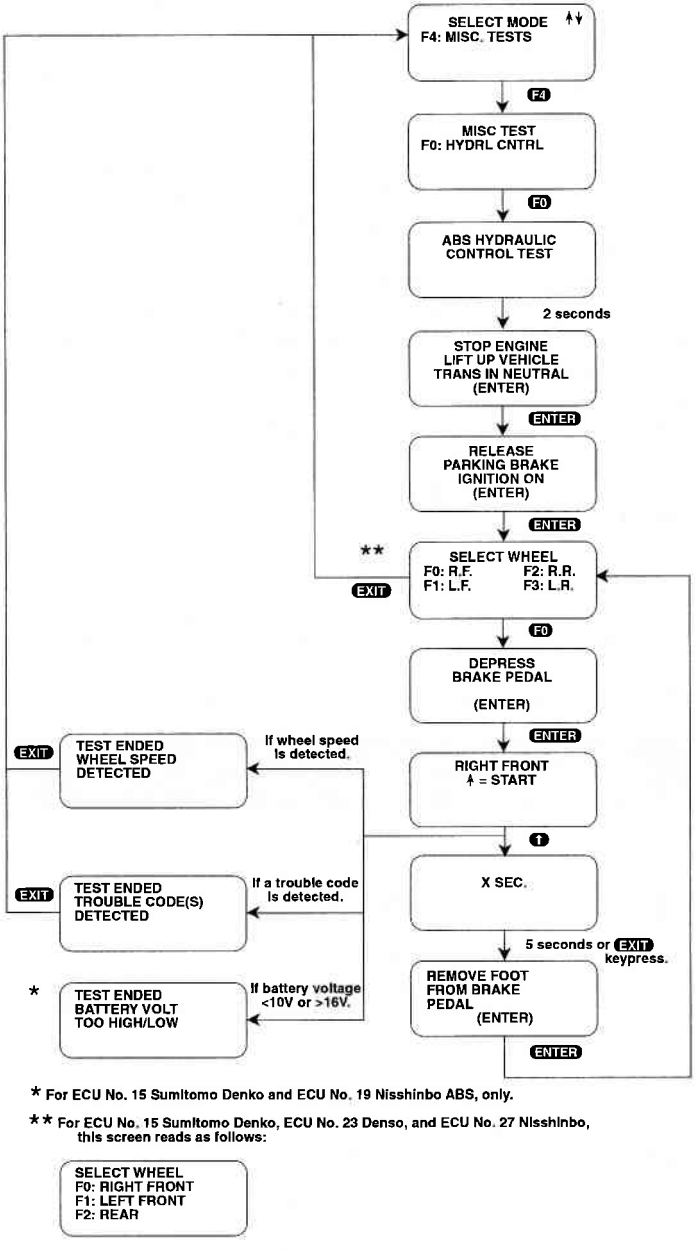
The HYDRAULIC CONTROL mode allows you to manually perform the APPLY and RELEASE ABS functions for brake system diagnosis. **For the following:**

ECU NO.	MANUFACTURER
8	Denso
9	Nisshinbo
15	Sumitomo - Denko
19	Nisshinbo
21	Sumitomo - Denko
23	Denso
27	Nisshinbo

OPERATING PROCEDURE:

1. Before performing this test, check the following items:
   - Basic brake system other than ABS is in good condition.
   - Battery voltage is 11V or higher.
2. Press F4 to select Misc. Tests from the Select Mode menu.
3. Press F0 to select the Hydraulic Control test.
4. The tester display confirms that you are in the ABS Hydraulic Control Test and waits for 2 seconds before instructing you to stop the engine, raise the vehicle, put the transmission in neutral. Press ENTER when these instructions are completed.
5. Release the parking brake, turn the ignition on, and then press ENTER.
6. Press F0 - F3 to select the wheel to test, or press EXIT to return to the Select Mode menu.

MISC. TEST	MODE F4
HYDRAULIC CONTROL	SUBMODE F0



* For ECU No. 15 Sumitomo Denko and ECU No. 19 Nisshinbo ABS, only.

** For ECU No. 15 Sumitomo Denko, ECU No. 23 Denso, and ECU No. 27 Nisshinbo, this screen reads as follows:

SELECT WHEEL
F0: RIGHT FRONT
F1: LEFT FRONT
F2: REAR

MODE F4	MISC. TEST
SUBMODE F0	HYDRAULIC CONTROL

7. Depress the brake pedal and then press ENTER.

8. The tester will display the wheel that you have selected to test. Press ↑ to start the test and perform the following checks with the help of another person:
   - The operational sound of the solenoid is heard and the wheel turns only about 0.5 sec (brake force is depressurized).
   - The operational sound of the pump motor is heard and pulsation is felt at the brake pedal.

   NOTE: If a wheel speed is detected on two or more tires, or if a trouble code is detected, the test will end and a corresponding screen will be displayed. Press x to return to the Select Mode menu. If neither of these conditions is detected, the tester will count down from 5 seconds. If the ABS unit is No. 15, made by Sumitomo Denko or unit No. 19 made by Nisshinbo, and the battery voltage is >16V or <10V, the test will end and a corresponding screen will be displayed.

9. When instructed, remove your foot from the brake pedal and press ENTER to return to the Select Wheel menu. If necessary, repeat steps 6, 7, and 8 until all four wheels are checked.

10. Press EXIT to return to the Select Mode menu.

ACTIVE TECH 1 KEYS IN HYDRAULIC CONTROL TEST PHASE	
↑	Start the test.
F0 - F4	Select a menu item.
ENTER	Proceed to the next screen.
EXIT	Stop the test or return to the Select Mode menu.
↓	Continue with test.
NO	Indicate failure.
YES	Continue with test.

MISC. TEST	MODE F4
HYDRAULIC CONTROL	SUBMODE F0

WARNING

To perform the following test, both vehicle drive wheels must be securely raised and the engine must be off, or there will be unintended vehicle movement that could result in injury.

For ECU No.13 (made by BOSCH)

OPERATING PROCEDURE:

1. Before performing this test, check the following items:
   - Basic brake system other than ABS is in good condition.
   - Battery voltage is 11V or higher.
2. Press F4 to select Misc. Tests from the Select Mode menu.
3. Press F0 to select the Hydraulic Control test.
4. The tester display confirms that you are in the ABS Hydraulic Control Test and waits for 2 seconds before instructing you to stop the engine, raise the vehicle, put the transmission in neutral. Press ENTER when these instructions are completed.
5. Release the parking brake, turn the ignition on, and then press ENTER.
6. Press F0 - F3 to select the wheel to test, or press EXIT to return to the Select Mode menu.
7. Release the brake pedal, manually spin the wheel, and then press ↓ (the Tech 1 commands the ABS unit to maintain hydraulic pressure).
8. Depress the brake pedal. If the wheel is not free to turn, the test has failed. Press NO and the failure message will appear.

MODE F4	MISC. TEST
SUBMODE F0	HYDRAULIC CONTROL

9. If the wheel is free to turn, press YES. The test will continue.

10. Continue to depress the brake pedal. Manually spin the wheel, then press ↓ (the Tech 1 commands the ABS unit to apply hydraulic pressure).

11. If the wheel is not locked, the test has failed. Press NO, and a failure message will appear.

12. If the wheel is locked, press YES and the test will continue.

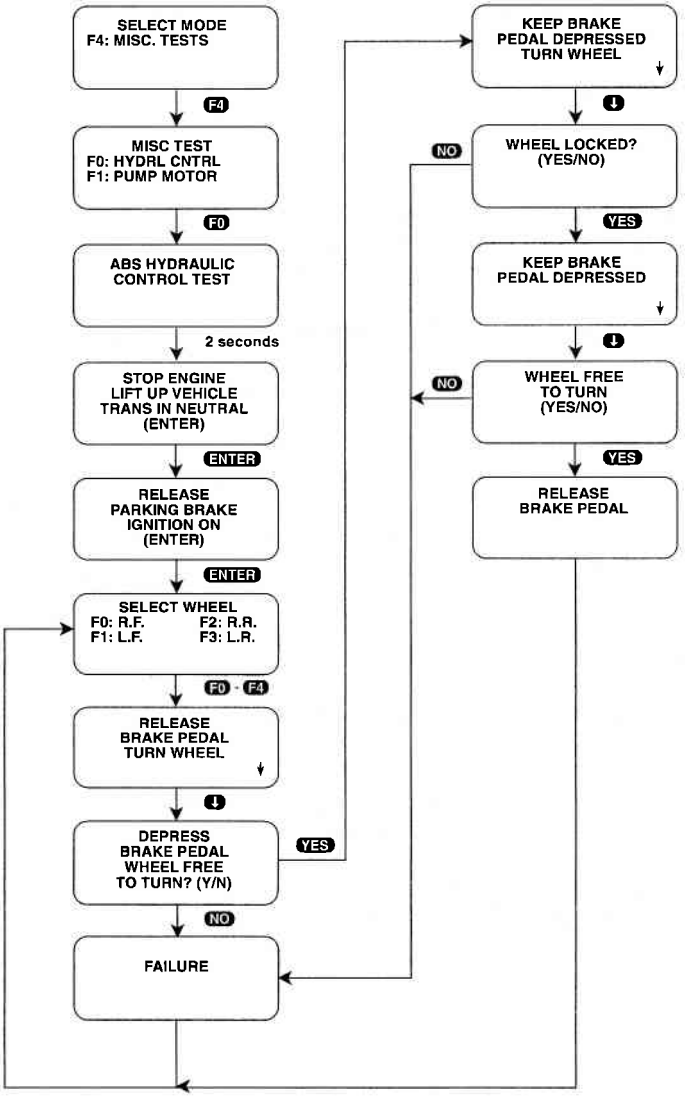
13. Continue pressing the brake pedal, and press ↓ (the Tech 1 commands the ABS unit to release hydraulic pressure).

14. If the wheel is not free to turn, the test has failed. Press NO, and a failure message appears on the screen.

15. If the wheel is free to turn, the test has passed. Release the brake pedal and select another wheel.

ACTIVE TECH 1 KEYS IN BOSCH ABS TEST PHASE	
↑	Start the test.
F0 - F4	Select a menu item.
ENTER	Proceed to the next screen.
EXIT	Stop the test or return to the Select Mode menu.
↓	Continue with test.
NO	Indicate failure.
YES	Continue with test.

MISC. TEST	MODE F4
HYDRAULIC CONTROL	SUBMODE F0



MODE F4	MISC. TEST
SUBMODE F1	PUMP MOTOR CONTROL

The PUMP MOTOR CONTROL mode allows you to test the functioning of the ABS unit pump motor.

For ECU No.13 (made by BOSCH)

OPERATING PROCEDURE:

1. Before performing this test, check the following items:
   - Basic brake system other than ABS is in good condition.
   - Battery voltage is 11V or higher.

2. Press F4 to select Misc. Tests from the Select Mode menu.

3. Press F1 to select Pump Motor Control.

4. The tester display confirms that you are in the ABS Pump Motor Control test and waits for 2 seconds before instructing you to stop the engine and turn the ignition on. When ready, press ENTER (the Tech 1 commands the ABS unit to turn the pump motor on).

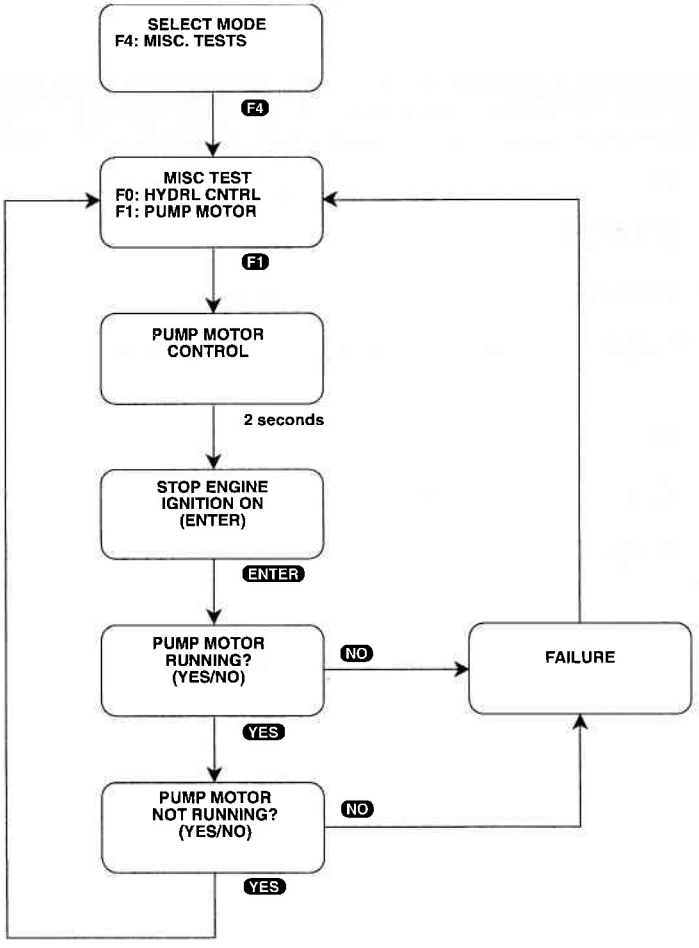
5. If the pump motor is not running, the test has failed. Press NO and a failure message appears.

6. If the pump motor is running, press YES (the Tech 1 commands the ABS unit to turn the pump motor off).

7. If the pump motor is still running, the test has failed. Press NO and a failure message appears.

8. If the pump motor has stopped running, the test has passed. Press YES to return to the Misc. Test menu.

MISC. TEST	MODE F4
PUMP MOTOR CONTROL	SUBMODE F1



MODE F4	MISC. TEST
SUBMODE F1	PUMP MOTOR CONTROL

ACTIVE TECH 1 KEYS IN PUMP MOTOR CONTROL TEST PHASE	
↑	Start the test.
F0 - F4	Select a menu item.
ENTER	Proceed to the next screen.
EXIT	Stop the test or return to the Select Mode menu.
↓	Continue with test.
NO	Indicate failure.
YES	Continue with test.

6.0 FINISHING UP

After using the Suzuki BCM 5.0 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 TROUBLE CODE DESCRIPTIONS

All trouble codes that can be displayed with the Suzuki BCM 5.0 Application, along with a brief description of each code, are listed on the following pages.

TRANSMISSION TROUBLE CODES

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
14	TURBINE SHAFT REV. SENSOR FAIL	Voltage at Turbine Shaft Rev. Sensor signal input terminal of TCM too high or too low.
17	SHIFT SOL NO. 1 PERF/STUCK OFF	Actual gear position (ratio) does not agree with gear position commanded from TCM to A/T.
18	VSS & REV SENSOR SIG. TOO DIFF	Vehicle Speed Sensor signal input too high or too low as compared with Turbine Shaft Rev. Sensor signal input.
21	SHIFT SOLENOID NO. 1 OPEN	Shift Solenoid No. 1 open.
22	SHIFT SOLENOID NO. 1 SHORT	Shift Solenoid No. 1 short.
23	SHIFT SOLENOID NO. 2 OPEN	Shift Solenoid No. 2 open.
24	SHIFT SOLENOID NO. 2 SHORT	Shift Solenoid No. 2 short.
25	TCC SOLENOID OPEN	TCC Solenoid open.
26	TCC SOLENOID SHORT	TCC Solenoid short.
27	TORQUE REDUCTION CKT MALF	Voltage at torque reduction signal circuit is low while torque reduction signal OFF is commanded.

TRANSMISSION TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
28	SHIFT SOL NO. 2 PERF/STUCK OFF	Actual gear position (ratio) does not agree with gear position commanded from TCM to A/T.
29	TCC SYSTEM PERF/STUCK OFF	TCC is not locked up while TCC solenoid ON is commanded. Or TCC is locked up while TCC solenoid OFF is commanded.
31	VSS NO SIGNAL	Vehicle Speed Sensor signal not received by the TCM. Vehicle Speed Sensor circuit failure.
31	VSS (TRANS.) NO SIGNAL	No vehicle speed signal fed even though the driving range is selected, the idle switch is ON, the brake switch is OFF, and the engine speed signal is fed.
32	THROTTLE POS. SIGNAL HIGH	Throttle Position Signal too high. Throttle Position Sensor or circuit failure.
32	THROTTLE POS. SIGNAL LOW	Throttle Position Signal too low. Throttle Position Sensor or circuit failure.
33	THROTTLE POS. SIGNAL LOW	Throttle Position Signal too low. Throttle Position Sensor or circuit failure.
33	THROTTLE POS. SIGNAL FAIL	Throttle Position Signal failure. Throttle Position Sensor or circuit failure.
34	TRANS. RANGE SWITCH FAIL	Two transmission range signals or more fed to the TCM. Transmission range switch or circuit failure.

TRANSMISSION TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
35	ENGINE SPEED INPUT CKT MALF	No engine speed signal inputted while engine running.
35	ENGINE SPEED SIGNAL FAIL	No engine speed signal is fed even though both vehicle speed signal and throttle signal input are higher than the specified level.
35	IGNITION SIGNAL FAIL	No ignition (engine speed) signal is fed even though the vehicle speed signal and throttle signal input are higher than the specified level.
36	ATF TEMP SEN CKT MALF (HIGH VOLT)	Voltage at sensor terminal of TCM is high.
36	VSS (TRANS. & METER) NO SIGNAL	Vehicle Speed Sensor (Transmission & Meter) Signal not received by the TCM. Vehicle Speed Sensor (Transmission & Meter) circuit failure.
36	OIL TEMPERATURE SENSOR FAIL	Oil Temperature Sensor input signal does not vary even though the engine speed signal input is higher than the specified level.
37	INPUT REVOLUTION SENSOR FAIL	Input Revolution Sensor signal not received by the TCM. Input Revolution Sensor circuit failure.
38	ATF TEMP SEN CKT MALF (LOW VOLT)	Voltage at sensor terminal of TCM is low.
41	PRESS. CONT. SOL OPEN	Pressure Control Solenoid open.
42	PRESS. CONT. SOL SHORT	Pressure Control Solenoid short.

TRANSMISSION TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
43	SHIFT SOLENOID NO. 3 OPEN	Shift Solenoid No. 3 open.
44	SHIFT SOLENOID NO. 3 SHORT	Shift Solenoid No. 3 short.
45	SHIFT SOLENOID NO. 4 OPEN	Shift Solenoid No. 4 open.
46	SHIFT SOLENOID NO. 4 SHORT	Shift Solenoid No. 4 short.
51	COOLANT TEMP. SIGNAL FAIL	Coolant Temperature Signal is held low too long. Coolant Temperature Signal system or circuit problem.
52	MEMORY CHECK SUM ERROR	Power supply relay voltage monitor in the TCM fails to comply with the command from the CPU.
P0602	CONTROL MODULE PROGRAM. ERROR	Programming procedure for TCM has failed
P0702	TRANS. CONTROL SYS. ELECTRICAL	Power supply relay voltage moni tor in the TCM fails to comply with the command from CPU.
P0705	TRANS. RANGE SNSR CKT MALF (PRNDL)	More than two or no transmission range signals fed to the TCM. Transmission range switch or circuit failure.
P0710	TFT SNSR CKT MALF (HIGH VOLT)	Transmission fluid temperature sensor signal does not vary even though the engine speed signal input is higher than the specified level.
P0710	TFT SNSR CKT MALF (LOW VOLT)	Transmission fluid temperature signal is not inputted.

TRANSMISSION TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
P0710	TRANS FLUID TEMP SNSR CKT MALF	Transmission fluid temperature signal voltage is too low or does not go down although engine runs.
P0715	INPUT/TURB SPEED SNSR CKT MALF	Input signal voltage from input shaft speed sensor (input revolution sensor) is too high or too low.
P0720	OUTPUT SHAFT SPD SNSR CKT MALF	Input signal voltage from A/T output shaft speed sensor is too high or too low.
P0725	ENGINE SPEED INPUT CKT MALF	No engine speed signal (engine revolution signal) inputted even though standard value of vehicle speed signal and throttle opening signal.
P0730	INCORRECT GEAR RATIO	Input vehicle speed signal is too high or too low when compared to input shaft speed sensor signal.
P0741	TCC SYSTEM PERF OR STUCK OFF	Input vehicle speed signal is too high or too low when compared to engine speed signal.
P0743	TCC SYSTEM ELEC. (HIGH VOLT)	TCC solenoid output voltage too high even though ECM orders to turn off.
P0743	TCC SYSTEM ELEC. (LOW VOLT)	TCC solenoid output voltage too low even through ECM orders to turn on.
P0748	PCS ELECTRICAL (HIGH VOLT)	Pressure Control Solenoid output voltage too high.
P0748	PCS ELECTRICAL (LOW VOLT)	Pressure Control Solenoid output voltage too low.

TRANSMISSION TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
P0753	SHIFT SOL A ELEC (HIGH VOLT)	Shift solenoid output voltage too high even though ECM orders to turn off.
P0753	SHIFT SOL A ELEC (LOW VOLT)	Shift solenoid output voltage too low even though ECM orders to to turn on.
P0758	SHIFT SOL B ELEC (HIGH VOLT)	Shift solenoid output voltage too high even though ECM orders to turn off.
P0758	SHIFT SOL B ELEC (LOW VOLT)	Shift solenoid output voltage too low even though ECM orders to turn on.
P0763	SHIFT SOLENOID C ELECTRICAL	Shift solenoid circuit open or short or dropping register circuit shorted to ground.
P0763	SHIFT SOL C ELEC (HIGH VOLT)	Shift solenoid output voltage too high even though ECM orders to turn on.
P0763	SHIFT SOL C ELEC (LOW VOLT)	Shift solenoid output voltage too low even though ECM orders to turn off.
P0768	SHIFT SOLENOID D ELECTRICAL	Shift solenoid circuit open or short or dropping register circuit shorted to ground.
P0768	SHIFT SOL D ELEC (HIGH VOLT)	Shift solenoid output voltage too high even though ECM orders to turn on.
P0768	SHIFT SOL D ELEC (LOW VOLT)	Shift solenoid output voltage too low even though ECM orders to turn off.

TRANSMISSION TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
P0773	SHIFT SOLENOID E ELECTRICAL	Shift solenoid circuit open or short or dropping register circuit shorted to ground.
P1700	TP SIGNAL INPUT MALF (HIGH VOLT)	Throttle opening signal is fixed to high, throttle opening signal circuit open.
P1700	TP SIGNAL INPUT MALF (LOW VOLT)	Throttle opening signal is fixed to low, throttle opening signal circuit shorted to ground.
P1702	MEMORY CHECK SUM ERROR	Power supply relay voltage monitor in the TCM fails to comply with the command from CPU.
P1709	ECT SIGNAL INPUT MALF	Engine coolant temp. signal is too high or low, signal circuit is open or short.
P1730	ENGINE TORQUE SIGNAL CKT MALF	Engine torque signal too high or low, signal circuit is open or short.
P1887	TRANSFER SIGNAL	Difference in detected vehicle speed between A/T output shaft speed sensor and VSS is too large.

ABS TROUBLE CODES

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
C1013	ABS CONT MODULE WRONG ASSEMBLY	ABS control module of wrong specification installed.
15 or C1015	G SENSOR FAIL	A failure condition is detected in the G sensor or its circuit. (4WD ONLY)
16	STOP LAMP SWITCH OPEN	Stop lamp switch open.
C1016	STOP LAMP SWITCH CIRCUIT OPEN	Stop lamp switch open
18	SENSOR ROTOR FAIL	ABS control time error is detected in the sensor rotor of one of the four wheels.
18	WRONG TOOTHED WHEEL (one of 4 wheels)	Wrong toothed wheel detected.
19	ABS OPERATING SIGNAL FAIL	Idle-up signal is abnormal, or ABS control-time lasts too long.
21	RF WHEEL SPEED SENSOR OPEN	Right front wheel speed sensor or circuit open. Unusual data is detected.
21	RF WSS OPEN OR SHORT	Right front wheel speed sensor or circuit open or short.
C1021	RF WHEEL SPEED SENSOR FAIL	Right front wheel speed sensor or circuit has failed.
22	RF WHEEL SPEED SENSOR SHORT	Right front wheel speed sensor or circuit short. Unusual data is detected.
22	RF WSS SIGNAL FAIL	Right front wheel speed sensor signal input is abnormal, or ABS control time of the right front wheel lasts too long.
C1022	RF WHEEL SPEED SEN. SIGNAL FAIL	Right front wheel speed sensor signal input is abnormal.

ABS TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
25	LF WHEEL SPEED SENSOR OPEN	Left front wheel speed sensor or circuit open. Unusual data is detected.
25	LF WSS OPEN OR SHORT	Left front wheel speed sensor or circuit open or short.
C1025	LF WHEEL SPEED SENSOR FAIL	Left front wheel speed sensor or its circuit has failed.
26	LF WHEEL SPEED SENSOR SHORT	Left front wheel speed sensor or circuit short. Unusual data is detected.
26	LF WSS SIGNAL FAIL	Left front wheel speed sensor signal input is abnormal, or ABS control time of the left front wheel lasts too long.
C1026	LF WHEEL SPEED SEN. SIGNAL FAIL	Left front wheel speed sensor signal input is abnormal.
31	RR WHEEL SPEED SENSOR OPEN	Right rear wheel speed sensor or circuit open. Unusual data is detected.
31	RR WSS OPEN OR SHORT	Right rear wheel speed sensor or circuit short. Unusual data is detected.
C1031	RR WHEEL SPEED SENSOR FAIL	Right rear wheel speed sensor or its circuit has failed.
32	RR WHEEL SPEED SENSOR SHORT	Right rear wheel speed sensor or circuit short. Unusual data is detected.
32	RR WSS SIGNAL FAIL	Right rear wheel speed sensor signal input is abnormal, or ABS control time of the right rear wheel lasts too long.
C1032	RR WHEEL SPEED SEN. SIGNAL FAIL	Right rear wheel speed sensor signal input is abnormal.

ABS TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
35	LR WHEEL SPEED SENSOR OPEN	Left rear wheel speed sensor or circuit open. Unusual data is detected.
35	LR WSS OPEN OR SHORT	Left rear wheel speed sensor or circuit short. Unusual data is detected.
C1035	LR WHEEL SPEED SENSOR FAIL	Left rear wheel speed sensor or its circuit has failed.
36	LR WHEEL SPEED SENSOR SHORT	Left rear wheel speed sensor or circuit short. Unusual data is detected.
36	LR WSS SIGNAL FAIL	Left rear wheel speed sensor signal input is abnormal, or ABS control time of the left rear wheel lasts too long.
C1036	LR WHEEL SPEED SEN. SIGNAL FAIL	Left rear wheel speed sensor signal input is abnormal.
41	RF SOLENOID FAIL	A failure condition is detected in the right front solenoid.
41 or C1041	RF INLET SOLENOID FAIL	Monitor voltage of RF inlet solenoid and the CPU command fail to agree.
42 or C1042	RF OUTLET SOLENOID FAIL	Monitor voltage of RF outlet solenoid and the CPU command fail to agree.
45	LF SOLENOID FAIL	A failure condition is detected in the left front solenoid.
45 or C1045	LF INLET SOLENOID FAIL	Monitor voltage of LF inlet solenoid and the CPU command fail to agree.
46 or C1046	LF OUTLET SOLENOID FAIL	Monitor voltage of LF outlet solenoid and the CPU command fail to agree.

ABS TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
51	RR SOLENOID FAIL (4 CHANNEL ONLY)	A failure condition is detected in the right rear solenoid.
51 or C1051	RR INLET SOLENOID FAIL	Monitor voltage of RR inlet solenoid and the CPU command fail to agree.
52 or C1052	RR OUTLET SOLENOID FAIL	Monitor voltage of RR outlet solenoid and the CPU command fail to agree.
55	LR SOLENOID FAIL (4 CHANNEL ONLY)	A failure condition is detected in the left rear solenoid.
55 or C1055	LR INLET SOLENOID FAIL	Monitor voltage of LR inlet solenoid and the CPU command fail to agree.
C1055	REAR INLET SOLENOID FAIL	Monitor voltage of rear inlet solenoid and the CPU command fail to agree.
56	REAR SOLENOID FAIL (3 CHANNEL ONLY)	A failure condition is detected in the rear solenoid.
56 or C1056	LR OUTLET SOLENOID FAIL	Monitor voltage of LR outlet solenoid and the CPU command fail to agree.
C1056	REAR OUTLET SOLENOID FAIL	Monitor voltage of rear outlet solenoid and the CPU command fail to agree.
57 or C1057	POWER SUPPLY FAIL	The voltage of the power supply has fallen.
57	LOW VOLTAGE CONDITION	ABS has detected low voltage or over voltage.
61	PUMP MOTOR FAIL	A failure condition is detected in the pump motor (open, short).

ABS TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
C1061	PUMP MOTOR RELAY FAIL	A failure condition is detected in the pump motor relay.
63 or C1063	FAIL-SAFE RELAY FAIL	A failure condition is detected in the fail-safe relay (open, short).
71 or C1071	ABS CONTROL MODULE FAIL	A failure condition is detected in the ABS control module.

AIRBAG TROUBLE CODES

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
13 or B1013	SDM WRONG ASSEMBLY	SDM of wrong specification installed.
15	PASSENGER INI. RES. TOO HIGH	Passenger airbag initiator circuit resistances too high or open circuit.
15 or B1015	PSG AIRBAG INI. RES. TOO HIGH	Passenger airbag initiator circuit resistances too high or open circuit.
16	PASSENGER INI. RES. TOO LOW	Passenger airbag initiator circuit resistances too low.
16 or B1016	PSG AIRBAG INI. RES. TOO LOW	Passenger airbag initiator circuit resistances too low.
18	PSG. INI. RES. SHORT TO GROUND	Passenger airbag initiator circuit short to ground.
18 or B1018	PSG. AIRBAG INI. SHORT TO GROUND	Passenger airbag initiator circuit short to ground.
19	PSG. INI. RES SHORT TO BATTERY	Passenger airbag initiator circuit short to battery.
19 or B1019	PSG. AIRBAG INI. SHORT TO BATTERY	Passenger airbag initiator circuit short to battery.
21	DRIVER INITIATOR RES. TOO HIGH	Driver airbag initiator circuit resistance is too high or open circuit.
21 or B1021	DRV AIRBAG INI. RES. TOO HIGH	Driver airbag initiator circuit resistance is too high or open circuit.
22	DRIVER INITIATOR RES. TOO LOW	Driver airbag initiator circuit resistance is too low.
22 or B1022	DRV AIRBAG INI. RES. TOO LOW	Driver airbag initiator circuit resistance is too low.
24	DRV. OR PSG. INI. SHORT TO GROUND	Driver or passenger airbag initiator circuit short to ground.

AIRBAG TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
24	DRV. INI. RES. SHORT TO GROUND	Driver airbag initiator circuit short to ground.
24 or B1024	DRV AIRBAG INI. SHORT TO GROUND	Driver airbag initiator circuit shor to ground.
25	DRV. OR PSG. INI. SHORT TO BATTERY	Driver or passenger airbag initiator circuit short to battery voltage.
25	DRV. INI. RES. SHORT TO BATTERY	Driver airbag initiator circuit short to battery voltage.
25 or B1025	DRV. AIRBAG INI. SHORT TO BATTERY	Driver airbag initiator circuit short to battery.
31	IGNITION VOLTAGE TOO HIGH	Ignition voltage is too high.
B1031	POWER SUPPLY VOLTAGE TOO HIGH	Power supply voltage to SDM is too high.
32	IGNITION VOLTAGE TOO LOW	Ignition voltage is too low.
B1032	POWER SUPPLY VOLTAGE TOO LOW	Power supply voltage to SDM is too low.
B1035	FRONT G SENSOR OPEN	Front G sensor (forward sensor) circuit is open or shorted to power supply circuit.
B1035	FRONT G SNSR OPEN (RIGHT)	Front G sensor (right side) circuit is open or shorted to power supply circuit.
B1036	FRONT G SENSOR SHORT	Front G sensor (forward sensor) circuit is short to ground.
B1036	FRONT G SNSR SHORT (RIGHT)	Front G sensor (right side) circuit is short to ground.
37	LOW PRES. SENSOR CIRCUIT SHORT	Low pressure sensor circuit short to ground or battery voltage or short in wiring.

AIRBAG TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
B1037	FRONT G SNSR OPEN (LEFT)	Front G sensor (left side) is open or shorted to ground.
38	LOW PRES. SENSOR CIRCUIT OPEN	Low pressure sensor open (faulty inflator) or circuit open.
B1038	FRONT G SNSR SHORT (LEFT)	Front G sensor (left side) circuit is shorted to ground.
41	DRIVER PRETEN RES. OPEN	Driver pretensioner circuit open.
41 or B1041	DRV PRETEN INI. RES. TOO HIGH	Resistance of driver pretensioner initiator circuit is too high.
42	DRIVER PRETEN RES. SHORT	Driver pretensioner initiator circuit short.
42 or B1042	DRV PRETEN INI. RES. TOO LOW	Resistance of driver pretensioner initiator circuit is too low.
43	DRV. PRETEN RES. SHORT TO GROUND	Driver pretensioner initiator circuit short to ground.
43 or B1043	DRV. PRETEN INI. SHORT TO GROUND	Driver pretensioner initiator circuit short to ground.
44	DRV. PRETEN RES. SHORT TO BATTERY	Driver pretensioner initiator circuit short to battery.
44 or B1044	DRV. PRETEN INI. SHORT TO BATTERY	Driver pretensioner initiator circuit short to battery.
45	PASSENGER PRETEN RES. OPEN	Passenger pretensioner initiator circuit open.
45 or B1045	PSG PRETEN INI. RES. TOO HIGH	Resistance of passenger pretensioner initiator circuit is too high.
46	PASSENGER PRETEN RES. SHORT	Passenger pretensioner initiator circuit short.
46 or B1046	PSG PRETEN INI. RES. TOO LOW	Resistance of passenger pretensioner initiator circuit is too low.

AIRBAG TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
47	PSG. PRETEN RES. SHORT TO GROUND	Passenger pretensioner initiator circuit short to ground.
47 or B1047	PSG. PRETEN INI. SHORT TO GROUND	Passenger pretensioner initiator circuit short to ground.
48	PSG. PRETEN RES. SHORT TO BATTERY	Passenger pretensioner initiator circuit short to battery.
48 or B1048	PSG. PRETEN INI. SHORT TO BATTERY	Passenger pretensioner initiator circuit short to battery.
51 or B1051	CRASH RECORDED	SDM recorded crash condition.
B1053	MODULE ACTIVATE SIGNAL OUTPUTTED	SDM outputted the system activation (deployment) command. Replace SDM.
B1053	A/B MODULE DISPOSED	Airbag module has already been arranged for disposition.
61 or B1061	WARNING LAMP DEFECT	A failure condition is detected in the warning lamp circuit.
71 or B1071	SDM FAIL	A failure condition is detected in the SDM. Replace SDM.

CVT TROUBLE CODES

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
14	ACCELERATOR SW. CIRCUIT OPEN	Accelerator switch circuit is open even though the throttle opening signal input indicates the throttle open state.
16	IDLE-UP SIGNAL CIRCUIT OPEN	Idle-up signal circuit open.
21	MAGNETIC CLUTCH OPEN OR SHORT	Magnetic clutch circuit open or short.
22	LINE PRESS. SOL. OPEN OR SHORT	Line pressure solenoid circuit open or short.
31	VSS NO SIGNAL	Vehicle Speed Sensor signal not received by the CVT controller. Vehicle Speed Sensor circuit failure.
32	THROTTLE POS. SIGNAL FAIL	Throttle Pos. signal remains High or Low for longer than the specified time when the ignition switch is ON.
34	TRANS. RANGE SWITCH FAIL	Two transmission range signals or more have been fed to the CVT controller. Transmission range switch or circuit failure.
35	ENGINE SPEED SIGNAL FAIL	No engine speed signal has been fed, even though both the vehicle speed signal and the throttle signal input are higher than the specified level.
53	ABS SIG. CIRCUIT OPEN OR SHORT	ABS signal circuit open or short.

EPS TROUBLE CODES

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
11 or C1111	TORQUE SENSOR MAIN FAIL	Torque sensor main malfunction, open or short.
13 or C1113	TORQUE SENSOR MAIN-SUB TOO DIF	Signal difference between the main and sub torque sensors is too large.
14	TORQUE SENSOR POWER SUPPL FAIL	Power supply voltage of torque sensor is too high or too low.
C1114	TORQUE SENSOR 5V SUPPL FAIL	Voltage of 5V power supply circuit for torque sensor is too high or too low.
15 or C1115	TORQUE SENSOR SUB FAIL	Torque sensor sub malfunction, open or short.
C1116	TORQUE SENSOR 8V SUPPL FAIL	Voltage of 8V power supply circuit for torque sensor is too high or too low.
21	VSS FAIL (OVER 60 SEC)	No vehicle speed signal is fed for over 60 seconds, although the engine is running at a speed exceeding the specified level.
C1121	VSS FAIL	No vehicle speed signal is fed for over 60 seconds, although the engine is running at a speed exceeding the specified level.
22	IGNITION SIGNAL FAIL	Engine speed is lower than the specified level.
C1122	ENGINE SPEED CIRCUIT FAIL	Engine speed signal is abnormal, or engine speed signal circuit has failed.
23	VSS FAIL (OVER 30 SEC)	No vehicle speed signal is fed for over 30 seconds and is detected 3 times continuously, although the engine is running at a speed exceeding the specified level.

EPS TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
C1123	VSS FAIL	No vehicle speed signal is fed for over 30 seconds and is detected 3 times continuously, although the engine is running at a speed exceeding the specified level.
24	VSS FAIL (DECELERATION)	No vehicle speed signal is fed for over the specified time after deceleration is detected exceeding the standard level.
C1124	VSS FAIL	No vehicle speed signal is fed over the specified time after deceleration is detected exceeding the standard level.
41	MOTOR VOLTAGE FAIL	Motor current monitor value is too high.
C1141	MOTOR FAIL	Motor control command of CPU and the motor voltage monitor fail to agree.
42	MOTOR FEEDBACK CURRNT FAIL	Voltage at the motor terminal is too high or too low.
C1142	MOTOR MONITOR CURRENT FAIL	Difference between the motor current control value and the monitor value is too large.
43 or C1143	MOTOR CURRENT TOO HIGH	The monitor value for motor-control current is too large.
44 or C1144	MOTOR LOCK UP	Motor fails to run.
45	MOTOR FAIL	Motor current monitor value is lower than the specified value even in the power assist mode.
45 or C1145	MOTOR CURRENT TOO LOW	The monitor value is smaller than the motor current control value.
51 or C1151	CLUTCH FAIL	Clutch control command of CPU and the clutch voltage monitor fail to agree.

EPS TROUBLE CODES (cont.)

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
52	FAIL-SAFE RELAY FAIL	Fail-safe relay OFF command of CPU and the fail-safe relay voltage monitor fail to agree.
C1152	EPS CONTROL MODULE FAIL	There is an internal failure in the EPS control module.
C1153	BATTERY VOLTAGE TOO LOW	Power supply voltage to EPS control module is too low.
54	BATTERY VOLTAGE TOO LOW	Power supply voltage to EPS control module is too low.
C1154	EPS CONTROL MODULE FAIL	There is an internal failure in the EPS control module.
55	EPS CONT. MODULE INTERNAL FAIL	There is an internal failure in the EPS control module.
C1155	EPS CONTROL MODULE FAIL	There is an internal failure in the EPS control module.

IMMOBILIZER TROUBLE CODES

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
11	TRANSPONDER CODE NOT MATCHED	Transponder code from ignition key and that registered in immobilizer control module are not matched
12	FAULT IN IMMOBI CONTROL MODULE	Internal fault in immobilizer control module is detected.
14	COIL ANTENNA CIRCUIT MALFUNCTION	Antenna is broken or antenna cir cuit is open or short.
13	NO TRANSP CODE TRANSMITTED FROM IGNITION KEY	Immobilizer control module cannot read transponder code from the ignition key even when the coil antennae is energized.
21	ECU CODE NOT MATCHED	ECM/immobilizer control module code transmitted from ECM and that registered in immobilizer control module not matched.
22	IGNITION SWITCH CIRCUIT MALF	No ignition signal input is detected by immobilizer control module.
23	NO ECU CODE TRANSMITTED FROM ECM/PCM	ECM/immobilizer control module code is not transmitted from ECM.
31	TRANSPONDER CODE NOT REGISTERED	There is no transponder code registered in immobilizer control module.
32	TRANSPONDER CODE NOT MATCHED	Transponder code from ignition key and that registered in immobilizer control module are not matched.
41	ECM NOT REGISTERED	ECM/immobilizer control module code not registered in ECM.
42	SERIAL DATA CIRCUIT MALF	Serial data line for immobilizer control module is open or faulty ECM.

IMMOBILIZER TROUBLE CODES

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
43	ECU CODE NOT MATCHED	ECM/immobilizer control module code transmitted from ECM and that registerd in immobilizer control module are not matched.
B1000	IMMOBI CONT MOD. INTERNAL FAIL	There is internal failure in the immobilizer control module.
B3040	W-LINE COMM FAIL	W-line (ECM to immobilizer con trol module line) circuit open or immobilizer control module fail to communicate with ECM.
B3042	W-LINE CKT MALF (SHORT TO GND)	W-line circuit shorted to ground.
B3043	W-LINE CKT MALF (SHORT TO BATT)	W-line circuit shorted to power supply circuit.
B3045	ANTITHFT SYS CKT MALF (LOW VOLT)	Anti-theft system circuit malfunc-tion. Low voltage.
B3048	ANTITHFT SYS CKT MALF (HIGH VOLT)	Anti-theft system circuit malfunc-tion. High Voltage.
B3050	STR. CUT RLY CKT MALF (LOW VOLT)	Starter cut relay circuit malfunc-tion. Low Voltage.
B3053	STR. CUT RLY CKT MALF (HIGH VOLT)	Starter cut relay circuit malfunc-tion. High voltage.
B3055	NO TRANSPONDER	Ignition key with built in transpon-der is not detected.
B3056	NO TRANSPONDER CODE REGISTERED	FIX CODE of the ignition key with built in transponder inserted to key cylinder is not registered in immobilizer control module.
B3057	NO PASSWORD REGISTERED	Password is not programmed in immobilizer control module.

IMMOBILIZER TROUBLE CODES

ECU TROUBLE CODE	TECH 1 DISPLAY DESCRIPTOR	TROUBLE CODE DESCRIPTION
B3059	NO REQUEST FROM ECM	Immobilizer control module is not initialized correctly or MIL circuit between ECM and immobilizer control module is open or short.
B3060	INCORRECT TRANSP DETECTED	Ignition key with transponder is not registered correctly. FIX CODE is not matched or not registered.
B3061	TRANSPONDER COMM FAIL	SKC is not registered in ignition key with built in transponder or not matched with registered.
B3077	READ-ONLY TRANSP DETECTED	Ignition key without transponder is detected or immobilizer control module fail to communicate with transponder.

8.0 DATA LIST PARAMETER DESCRIPTIONS

The TECH 1 is capable of displaying a wide variety of data parameters in Data List and Snapshot modes. The ECU sends the TECH 1 information regarding the state of the ECU and 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 ECU 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 Vehicle Speed, Throttle Position, Battery Voltage, etc.

Parameters are grouped by ECU function. The parameters are listed in alphabetical order within each category. The categories are:

1) General

2) Electrical

3) Miscellaneous

CATEGORY DESCRIPTIONS

1) General Parameters are those that affect or are affected by many different ECU systems such as Vehicle Speed, Coolant Temp. Signal, and Wheel Speed.

2) Electrical Parameters can be used to help diagnose vehicle electrical problems and include Battery Voltage and Pump Motor Voltage.

3) The Miscellaneous Parameters section includes parameters such as Brake Switch, Warning Lamp, and Gear Position.

DESCRIPTOR FORMAT

Following is a description of all parameters that can be displayed with the Suzuki BCM 5.0 Application. Included is: 1) a listing of all the parameters available for each category; 2) a description of the parameter; 3) the units, and the range of the analog parameters; 4) the state of the discreet parameters.

The parameters are listed below according to category. The ECU related to the parameter is also indicated.

TRANSMISSION

General Parameters	**System**
ATF Temp.	A/T
Barometric Pressure	A/T
Coolant Temp.	A/T
Coolant Temp. Signal	A/T
Engine Speed	A/T
Engine Torque	A/T
Input Revolution	A/T
Oil Temperature	A/T
Output Shaft Revolution	A/T
Pressure Control Solenoid	A/T
Throttle Position	A/T
Vehicle Speed	A/T

Electrical Parameters	**System**
Battery Voltage	A/T

Miscellaneous Parameters	**System**
4WD-L Switch	A/T
A/C Switch	A/T
Brake Switch	A/T
Gear Position	A/T
Mode Select Switch	A/T
O/D Off Switch, CON, MON	A/T
Park/Neutral Position Signal	A/T
Requested Gear	A/T
Shift Solenoid No. 1 & No. 2	A/T
Solenoid Duty 1,2,3,4,5	A/T
TCC Solenoid	A/T
TCC Solenoid Duty	A/T
Transmission Range	A/T

ABS

General Parameters	System
Wheel Speed (RF, LF, RR, LR)	ABS
Wheel Speed Monitor (RF, LF, RR, LR)	ABS

Electrical Parameters	System
Battery Voltage	ABS
DNS Terminal Input	ABS
Fail-Safe Relay	ABS
G-Sensor	ABS
Inlet Solenoid Voltage (RF, LF, REAR)	ABS
Motor Relay	ABS
Outlet Solenoid Voltage (RF, LF, REAR)	ABS
Pump Motor Relay	ABS
Pump Motor Voltage	ABS
Pump Motor	ABS

Miscellaneous Parameters	System
2WD/4WD ID	ABS
4WD Switch	ABS
Brake Switch	ABS
Brake Switch Circuit	ABS
Diagnosis Switch	ABS
Differential Switch	ABS
Hydraulic System	ABS
Hydraulic Unit Switch	ABS
Solenoid Valve (IRF, ORF, ILF, OLF IRR, ORR, ILR, OLR)	ABS

AIRBAG

Electrical Parameters	System
Backup Voltage	AIRBAG
Battery Voltage	AIRBAG
Condenser Voltage	AIRBAG
Driver Airbag Initiator Resistance	AIRBAG
Driver Initiator Resistance	AIRBAG
Driver Pretensioner Initiator Resistance	AIRBAG
Ignition Voltage	AIRBAG
Passenger Airbag Initiator Resistance	AIRBAG
Passenger Initiator Resistance	AIRBAG
Passenger Pretensioner Initiator Resistance	AIRBAG
System ID	AIRBAG

Miscellaneous Parameters	System
Warning Lamp	AIRBAG

EPS

General Parameters	System
Engine Speed	EPS
Vehicle Speed	EPS

Electrical Parameters	System
Assist Torque	EPS
Battery Voltage	EPS
Main Torque Sensor	EPS
Motor (CON)	EPS
Motor (MON)	EPS
Motor Current (Control)	EPS
Motor Current (Monitor)	EPS
Motor Power Supply	EPS
Motor Voltage	EPS
Power Assist	EPS
Sub-Torque Sensor	EPS
Torque Sensor Main Torque	EPS
Torque Sensor Power Supply	EPS
Torque Sensor Power Voltage	EPS
Torque Sensor Sub Torque	EPS

Miscellaneous Parameters	System
Clutch (CON)	EPS
Clutch (MON)	EPS
Clutch Control	EPS
Clutch Monitor	EPS
EPS System Power	EPS
Ignition Switch	EPS

CVT

General Parameters	System
Engine Speed	CVT
Gear Ratios	CVT
Magnetic Clutch	CVT
Magnetic Clutch Monitor	CVT
Throttle Angle	CVT
Vehicle Speed	

Miscellaneous Parameters	System
ABS Signal	CVT
Accelerator Switch	CVT
Clutch Control Mode	CVT
Clutch Signal	CVT
Idle-Up Signal	CVT
Line Pressure Solenoid	CVT

IMMOBILIZER

Miscellaneous Parameters	System
Fix Code	IMMOBI
Ignition Switch	IMMOBI
Number of FC	IMMOBI
Password	IMMOBI
Transponder	IMMOBI
Trans SKC	IMMOBI
Wait-Loop	IMMOBI
Wait Time	IMMOBI

TRANSMISSION
General Parameters

ATF TEMPERATURE

UNITS
°C
°F

This parameter indicates the temperatures of the Automatic Transmission fluid.

BAROMETRIC PRESSURE

UNITS
Kpa
in.Hg

This parameter represents a measurement of barometric air pressure

COOLANT TEMP

UNITS
°C
°F

Engine coolant temperature signal is inputted from ECM. It is used for the shift change control in the transmission

COOLANT TEMP SIGNAL

STATES
HIGH/LOW

Coolant Temperature Signal is used for the overdrive control. When this signal is LOW, the gear position is not shifted to 4th.

ENGINE SPEED

UNITS
RPM

Engine speed is obtained by computing the ignition signal from the Igniter and it is used for trouble diagnosis of the AT system and fail-safe control.

ENGINE TORQUE

UNITS
Nm

Engine torque value at the engine crankshaft output transmitted from ECM.

TRANSMISSION
General Parameters (cont.)

INPUT REVOLUTION
INPUT SHAFT REVOLUTION
TURBINE SHAFT REV

UNITS
RPM

Input shaft revolution is the revolution of the input shaft (torque converter turbine shaft) in the transmission case. It is computed by reference pulses coming from the input shaft revolution sensor or turbine shaft revolution sensor in the transmission.

OIL TEMPERATURE

UNITS
°C

Oil temperature is decided by the signal from the oil temperature sensor installed in the valve body. It is used for the shift change control in the transmission.

OUTPUT SHAFT REVOLUTION

UNITS
RPM

Output shaft revolution is the revolution of the counter driven gear (output shaft) in the transmission case. It is used for the shift change control and detection for diagnostic trouble code.

PRESSURE CONTROL SOLENOID

UNITS
%

Pressure Control Solenoid is used for the shift change control in the transmission. It is operated by timing pulses coming from the TCM.

THROTTLE POSITION

UNITS
%

Throttle Position is a TCM internal parameter. It is computed by duty signal coming from the ECM. Throttle Position is used for the shift solenoid control in the TCM.

TRANSMISSION
General Parameters (cont.)

VEHICLE SPEED

UNITS
KPH
MPH

Vehicle speed is a TCM internal parameter. It is computed by timing pulses coming from the vehicle speed sensor for A/T. Vehicle speed is used for the shift solenoid control in the TCM.

TRANSMISSION
Electrical Parameters

BATTERY VOLTAGE

UNITS
VOLTS

Battery Voltage is an analog input signal read by the TCM.

TRANSMISSION
Miscellaneous Parameters

4WD-L SWITCH

STATES
OFF/ON

4WD-L signal is fed to the TCM from the 4WD-L switch. This switch signal is used for timing of shift change.

A/C SWITCH

STATES
OFF/ON

This parameter is fed to the TCM from ECM to monitor A/C system for operating.

BRAKE SWITCH

STATES
OFF/ON

This switch signal informs the TCM whether the brake is active or not.

TRANSMISSION
Miscellaneous Parameters (cont.)

GEAR POSITION

STATES
R/P or N/1/2/3/4/***

This parameter indicates the current gear position. It is computed by the throttle position coming from the ECM and the vehicle speed.

MODE SELECT SWITCH

STATES
NORMAL/POWER/SNOW

The Mode signal is fed to the TCM from the Mode Select Switch. This switch signal is used for timing of the shift change.

O/D OFF SWITCH
CON: CONTROL
MON: MONITOR

STATES
OFF/ON

O/D Off Switch is used for the over drive control. When this signal is ON, the gear position is not shifted to 4th.

PARK/NEUTRAL POSITION SIGNAL

STATES
R/D/2/L or P/N

This parameter indicates whether the D, R, 2, L-range position is selected or if P, N-range is selected. When this signal is ON, the idle speed is increased.

REQUESTED GEAR

STATES
R/P or N/1/2/3/4/ * * *

This parameter is the monitored value that TCM requests to shift.

TRANSMISSION
Miscellaneous Parameters (cont.)

SHIFT SOLENOID NO. 1
SHIFT SOLENOID NO. 2

STATES
OFF/ON

Shift Solenoid is used for shifting the transmission up and down. It is turned ON or OFF by a signal from the TCM. Gear position is decided by combination of ON or OFF.

SOL 1 DUTY
SOL 2 DUTY
SOL 3 DUTY
SOL 4 DUTY
SOL 5 DUTY

UNITS
%

This parameter indicates the ON percentage of the shift control solenoid.

TCC SOLENOID

STATES
OFF/ON

TCC Solenoid is used for the TCC Control mode. It is turned ON or OFF by a signal from the TCM.

TCC SOLENOID DUTY

UNITS
%

This parameter indicates the ON percentage of the torque converter clutch solenoid.

TRANSMISSION RANGE

STATES
P/R/N/D/2/L/FAIL

Transmission Range is fed to the TCM from the transmission range switch. This signal indicates when the gear is shifted to each range.

ABS
General Parameters

RF WHEEL SPEED
LF WHEEL SPEED
RR WHEEL SPEED
LR WHEEL SPEED

UNITS
KPH
Km/h
MPH

Wheel speed is an ABS control module internal parameter. It is computed by reference pulses from the Wheel Speed Sensor.

WHEEL SPEED MONITOR (RF, LF, RR, LR)

UNITS
VOLTS

This parameter indicates the DC voltage value of the Wheel Speed Sensor (which is constant at approximately 1V regardless of the vehicle speed when the ignition switch is ON in the normal mode).

ABS
Electrical Parameters

BATTERY VOLTAGE

STATES
LOW/HIGH
VOLTS

Battery Voltage is an analog input signal read by the ABS control module. Certain ABS control module functions will be modified if the Battery Voltage falls below or rises above programmed thresholds.

DNS TERMINAL INPUT

STATES
GROUND/OPEN

GROUND: Diagnosis terminal of monitor connector is shorted to ground.
OPEN: Diagnosis terminal of monitor connector is not shorted to ground.

FAIL-SAFE RELAY (ABS)

UNITS
VOLTS

This parameter indicates the voltage applied to the coil of the fail-safe relay.

ABS
Electrical Parameters (cont.)

FAIL-SAFE RELAY (for ECU No. 13)

STATES
ACTIVE/INACTIVE

This parameter indicates the voltage applied to the coil of the fail-safe relay.

FAIL-SAFE RELAY

STATES
DRIVE/STOP

This parameter indicates the operational condition of the fail-safe relay.

G-SENSOR

UNITS
VOLTS
G

The G-Sensor converts G's during the vehicle acceleration/deceleration into a voltage signal and transmits it to the controller. Based on this signal, the controller judges the road surface conditions and controls the ABS while running in the 4WD mode.

MOTOR RELAY

STATES
DRIVE/STOP

This parameter indicates the operational condition of the Pump Motor Relay.

PUMP MOTOR RELAY

UNITS
VOLTS

This parameter indicates the voltage applied to the relay coil.

PUMP MOTOR VOLTAGE

STATES
LOW/HIGH

Pump Motor Voltage is an analog input signal read by the ABS control module. Certain ABS control module functions will be modified if the Pump Motor voltage falls below or rises above programmed thresholds.

ABS
Electrical Parameters (cont.)

PUMP MOTOR (for ECU No. 13)

STATES
ACTIVE/INACTIVE

This parameter indicates the pump motor is running.

RF INLET SOLENOID
LF INLET SOLENOID
REAR INLET SOLENOID

STATES
OFF/ON

This parameter indicates the application of power supply for each solenoid valve.

RF OUTLET SOLENOID
LF OUTLET SOLENOID
REAR OUTLET SOLENOID

STATES
OFF/ON

This parameter indicates the application of power supply for each solenoid.

ABS
Miscellaneous Parameters

2WD/4WD ID

STATES
2WD/4WD

This parameter indicates the driving mode selection based on the 4WD switch input signal.

4WD SWITCH

STATES
OFF/ON

This parameter indicates whether 4WD switch is activated or not.

ABS
Miscellaneous Parameters (cont.)

BRAKE SWITCH

STATES
OFF/ON

This switch signal informs the ABS control module whether the brake is active or not.

BRAKE SWITCH (for ECU No. 13)

STATES
ACTIVE/INACTIVE

This parameter informs the ABS control module whether the brake is active or not.

BRAKE SWITCH CIRCUIT

STATES
OPEN/NORMAL

This parameter indicates whether the Brake Switch input circuit is open or not.

DIAGNOSIS SWITCH

STATES
OFF/ON

This parameter indicates whether the diagnosis switch terminal is grounded (ON) or open (OFF).

DIFFERENTIAL SWITCH

STATES
OFF/ON

This switch detects failure in the brake line.

HYDRAULIC SYSTEM

STATES
OPERATING/NOT OPERATING

This parameter indicates whether the ABS is functional or not.

HYDRAULIC UNIT SWITCH

STATES
OFF/ON

This parameter indicates whether the ABS is functional or not.

ABS
Miscellaneous Parameters (cont.)

SOLENOID VALVE (IRF, ORF, ILF, OLF, IRR, ORR, ILR, OLR)

STATES
LOW/HIGH

The ABS brake pressure is controlled in 3 modes: increased, reduced and retained, according to the combination of opened/ closed conditions of the inlet and outlet solenoid valves included in each brake line. This parameter indicates the continuity condition of each solenoid valve to the solenoid.

AIRBAG
Electrical Parameters

BATTERY VOLTAGE

UNITS
VOLTS

Battery Voltage is an analog input signal read by the SDM.

CONDENSER VOLTAGE
BACKUP VOLTAGE

UNITS
VOLTS

This parameter indicates the capacity of the backup condenser installed to maintain the ignition current (as much as possible) even when the power supply that ignites the inflator is shut off.

DRIVER INITIATOR RESISTANCE
DRIVER AIRBAG INITIATOR RESISTANCE

UNITS
OHMS (Ω)

This parameter indicates the resistance of the driver's airbag initiator circuit.

DRIVER PRETENSIONER INITIATOR RESISTANCE

UNITS
OHMS (Ω)

This parameter indicates the resistance of the driver's seatbelt pretensioner initiator circuit.

AIRBAG
Electrical Parameters (cont.)

IGNITION VOLTAGE

UNITS
VOLTS

Ignition Voltage is an analog input signal read by the SDM.

PASSENGER INITIATOR RESISTANCE
PASSENGER AIRBAG INITIATOR RESISTANCE

UNITS
OHMS (Ω)

This parameter indicates the resistance of the passenger's airbag initiator circuit.

PASSENGER PRETENSIONER INITIATOR RESISTANCE

UNITS
OHMS (Ω)

This parameter indicates the resistance of the passenger's seatbelt pretensioner initiator circuit.

SYSTEM ID

This parameter indicates where the airbag and seatbelt pretensioner are installed.

STATES
AIRBAG ID
DRIVER/PASSENGER
DRIVER ONLY
PRETENSIONER ID
DRIVER/PASSENGER

SYSTEM ID (for ECU No. 16)

STATES
1CH/2CH/4CH

This parameter indicates the number of initiator circuits.

SYSTEM ID (for ECU No. 18)

STATES
3CH/4CH/ * * *

This parameter indicates the number of initiator circuits.

AIRBAG
Electrical Parameters (cont.)

SYSTEM ID
(for ECU No. 28)

STATES
1CH/4CH/***

This parameter indicates the number of initiator circuits.

AIRBAG
Miscellaneous Parameters

WARNING LAMP

STATES
OFF/ON

This parameter tells whether the warning lamp is ON or OFF.

EPS
General Parameters

ENGINE SPEED

UNITS
RPM

Engine speed signal is fed from the ECM so that it can be used for trouble diagnosis of the Electric Power Steering System.

VEHICLE SPEED

UNITS
KPH
MPH

The AC voltage signal produced by the Vehicle Speed Sensor is divided and adjusted by the speedometer and thus the vehicle speed signal is obtained. The EPS controller determines the power assist amount based on this vehicle speed signal and the torque sensor signal.

EPS
Electrical Parameters

BATTERY VOLTAGE

UNITS
VOLTS

Battery Voltage is an analog input signal read by the ECU.

MAIN TORQUE SENSOR
TORQUE SENSOR MAIN TORQUE

UNITS
VOLTS
N•m

The Torque Sensor is installed to detect the steering force and the steering direction. It consists of two potentiometers and the main torque sensor is one of these.

MOTOR CURRENT (CONTROL)
MOTOR (CON)

UNITS
AMPERES

Based on the input signal, EPS controller determines the assist amount and controls the current to the motor suitable for that assist amount. This parameter indicates that control value.

MOTOR CURRENT (MONITOR)
MOTOR (MON)

UNITS
AMPERES

This parameter indicates the actually measured value of the current flowing to the motor. The motor circuit condition is diagnosed by comparing this parameter with the Motor Current (Control) parameter described previously.

MOTOR POWER SUPPLY

STATES
OFF/ON

This parameter indicates the condition of the power supply to the motor.

MOTOR VOLTAGE

UNITS
VOLTS

This parameter indicates the voltage between motor terminals.

EPS
Electrical Parameters (cont.)

POWER ASSIST
ASSIST TORQUE

UNITS
VOLTS
N•m

This parameter is an internal parameter of the EPS controller. It is obtained by computing the torque sensor input signal.

SUB-TORQUE SENSOR
TORQUE SENSOR SUB TORQUE

UNITS
VOLTS
N•m

Torque Sensor is installed to detect the steering force and the steering direction. It consists of two potentiometers and the sub-torque sensor is one of these. Its output characteristics are compared with those of the Main Torque Sensor.

TORQUE SENSOR POWER VOLTAGE
TORQUE SENSOR POWER SUPPLY

UNITS
VOLTS

This parameter indicates the power supply voltage which the EPS Controller supplies to the Torque Sensor.

EPS
Miscellaneous Parameters

CLUTCH CONTROL
CLUTCH (CON)

STATES
OFF/ON

This parameter indicates whether EPS controls the motor clutch or not.

CLUTCH MONITOR
CLUTCH (MON)

STATES
OFF/ON

This parameter indicates the connection condition of the clutch from the clutch voltage monitored by the EPS controller.

EPS
Miscellaneous Parameters (cont.)

EPS SYSTEM POWER

STATES
OFF/ON

This parameter indicates whether the EPS system is ready to operate or not.

IGNITION SWITCH

STATES
OFF/ON

This parameter indicates the condition of the power supply through the ignition switch.

CVT
General Parameters

ENGINE SPEED

UNITS
RPM

Engine speed is obtained by computing the ignition signal from the Igniter and it is used to control the clutch engage/disengage function for correcting the clutch torque and preventing forced engagement.

GEAR RATIOS

UNITS
NONE

Gear ratio is obtained by computing the engine speed and the vehicle speed (therefore, an error occurs when the clutch slips). This can be used to diagnose if mechanical gear change is controlled properly.

MAGNETIC CLUTCH

UNITS
mA

A magnetic clutch is one of the CVT components that transmits the engine power to the transmission. The amount of engine power being transmitted is determined by the amount of the current flowing to the magnetic clutch and controlled by the TCM. This parameter indicates the above control current value.

MAGNETIC CLUTCH MONITOR

UNITS
mA

This parameter indicates the current flowing to the coil of the magnetic clutch. The condition of the clutch coil circuit can be diagnosed by comparing this parameter data and the Magnetic Clutch parameter data described in the Magnetic Clutch parameter description.

THROTTLE ANGLE

UNITS
°(DEGREES)

ECM converts the throttle opening signal from the throttle position sensor into the voltage duty signal and transmits it to TCM. This parameter is obtained by calculating this signal. Together with the line pressure and engine speed data, it is used to correct the clutch torque.

VEHICLE SPEED

UNITS
KPH
MPH

Vehicle speed is a CVT controller internal parameter. It is computed from the timing pulse coming from the vehicle speed sensor for CVT. Vehicle speed is used for the gear ratio control in the CVT controller.

CVT
Miscellaneous Parameters

ABS SIGNAL

STATES
OFF/ON

This parameter indicates whether the ABS is working or not according to the signal fed from the ABS controller.
This signal is also used to select ON/OFF for the magnetic clutch and to require the ECM for idle-up.

ACCELERATOR SWITCH

STATES
OFF/ON

The state of the Accelerator switch parameter is related to the state of the Throttle Valve. There are three possible combinations:

ACCELERATOR SWITCH	THROTTLE VALVE
1. OFF	OFF (accelerator pedal not depressed at all)
2. ON	OFF (accelerator pedal depressed, but not more than a specific angle)
3. ON	ON (accelerator pedal depressed more than a specific angle)

CLUTCH CONTROL MODE

STATES
EXCIT or 0/REV. EXCIT

This system uses an electromagnetic clutch. When electric current flows through the electromagnetic coil, electromagnetic force is generated and it causes the clutch to engage. The state with electromagnetic force generated is called "excitation." With this system, once the clutch is engaged, it remains in that state even without electric current flow. For this reason, to disengage the clutch, electric current in the reverse direction is used to generate electromagnetic force in the reverse direction and this state with electromagnetic force generated is called "reverse excitation."

CVT
Miscellaneous Parameters (cont.)

CLUTCH SIGNAL

STATES
OFF/ON

This signal is fed to the ECM to require idle-up during clutch control.

IDLE-UP SIGNAL

STATES
OFF/ON

This parameter indicates the idle-up requirement condition from the TCM to the ECM.

LINE PRESSURE SOLENOID

STATES
LOW/HIGH

The Line Pressure Solenoid Valve adjusts the line pressure in 2 levels according to the engine load, and this parameter indicates the LOW/HIGH condition of the line pressure at the Line Pressure Solenoid Valve according to the ON/OFF control condition of the Line Pressure Solenoid.

IMMOBILIZER
Miscellaneous Parameters

FIX CODE

STATES
REGISTERED
NOT REGISTERED

This parameter indicates whether the FIX CODE of the ignition key with built-in transponder is registered in the immobilizer control module.

IGNITION SWITCH

STATES
OFF/ON

This parameter indicates whether ignition key switch is in the ON or OFF position.

NUMBER OF FC

UNITS
PCS

The number of registered FIX CODES in the immobilizer control module.

PASSWORD

STATES
PROGRAMMED
NOT PROGRAMMED

This parameter indicates whether the password is programmed or not.

TRANSPONDER

STATES
DETECTED
NOT DETECTED

This parameter indicates whether the ignition key with the built-in transponder and calculating function is detected or not.

IMMOBILIZER
Miscellaneous Parameters (cont.)

TRANS SKC

STATES
REGISTERED
NOT REGISTERED

This parameter indicates whether the SKC is registered in the ignition key with built-in transponder.

WAIT-LOOP

STATES
ACTIVE
INACTIVE

This parameter indicates the condition of the security system. If this is ACTIVE, the security system is active because the password was inputted wrong. Inputting the password is denied for the specified time, represented by WAIT TIME.

WAIT TIME

UNITS
SECONDS
MINUTES

This parameter is the time waited before the password can be inputted again.

APPENDICES

A. IF YOU'RE HAVING A PROBLEM

B. GLOSSARY AND ABBREVIATIONS

A. 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.

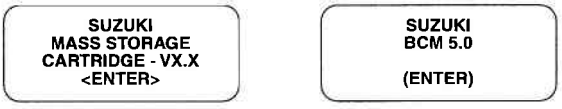
3.

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.



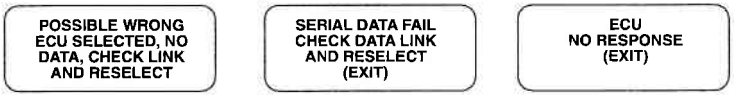
Keyboard or display locked up or program sporadically returns to first page

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.



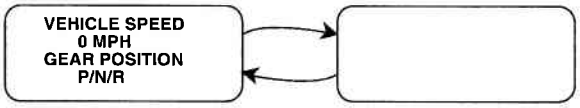
TECH 1 is not receiving data

MOST LIKELY CAUSE:
- ECU-serial data link connector cable problems.
- Stop in ABS control module communication function (refer to the NOTE on Page 5-3).

OTHER POSSIBLE CAUSES:
- Serial data link cable loose or bad or connector pins loose or corroded.
- Bad ECU.

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

6.



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.
- ECU-serial data link connector cable problems.
- Intermittent ECU problem.

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

7.

MOST LIKELY CAUSE:
- BCM 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. GLOSSARY AND ABBREVIATIONS

4WD	Four wheel drive
A/B	Airbag
A/T	Automatic Transmission
ABS	Antilock Brake system
ATF	Automatic Transmission Fluid
CKT	Circuit
CNTL	Control
CON	Control
CONTR	Control
CVT	Continuous Variable Transmission
DIFF	Differential
DIFFEREN	Differential
DLC	Data Link Connector (SDL connector)
DNS	Diagnosis
DRV	Driver
ECU	Electronic Control Unit
ECT	Engine Coolant Temperature
ELEC	Electrical
EPS	Electrical Powersteering System
FC	Fix Code
ID	Identification
IMMOBI	Immobilizer
IN HG	Inches Mercury
INI	Initiator
KPA	Kilopascals
LF	Left Front
LR	Left Rear
MALF	Malfunction
MON	Monitor
O/D	Overdrive
P/T	Pretensioner
PCS	Pressure Control Solenoid
PERF	Performance
POS	Position
PRES	Pressure
PRESS	Pressure
PRETEN	Pretensioner

GLOSSARY AND ABBREVIATIONS (cont.)

PSG	Passenger
RES	Resistance
REV	Revolution
RF	Right Front
RLY	Relay
RPM	Revolutions Per Minute
RR	Right Rear
RS232C	Standard Serial Communication interface
SDL	Serial Data Link
SDM	Sensing and Diagnostic Module
SENS	Sensor
SNSR	Sensor
SKC	Secret Key Code
SIG	Signal
SOL	Solenoid
SPD	Speed
STR	Starter
SW	Switch
SYS	System
TCC	Torque Converter Clutch
TCM	Transmission Control Module
TEMP	Temperature
TFT	Transmission Fluid Temperature
THROT	Throttle
TOS	Torque Sensor
TP	Throttle Position
TRANS	Transmission (Transmission)
TRANS	Transponder (Immobilizer)
TURB	Turbine
VIN	Vehicle Identification Number
VOLT	Voltage
VSS	Vehicle Speed Sensor
WSS	Wheel Speed Sensor