

Vehicle Communication Software Operator's Manual

February 2013

ZEESCGB234A Rev. U

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To the Reader

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Warning:

Before installing, maintaining or operating this unit, please read this manual carefully, paying extra attention to the safety warnings and precautions.



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Snap-on Diagnostics

Unit 1B, Boland Industrial Estate
Mallow Road
Cork
Ireland
Tel: +353.21.4211600
Fax: +353.21.4211601

Web-sites:

snapontools.com.au

www.snapon.com/diagnostics/uk

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1

Vehicle Communication Software

1.1 Vehicle Communication Software

The Vehicle Communication Software manual describes the basic Scanner/Cartridge operation and is based on a number of simple program flow diagrams.

The Overview Flow Diagram portrays a simple representation of the operation of the Scanner and Cartridge. It is sub-divided into further sub-flow diagrams each numbered for easy reference.

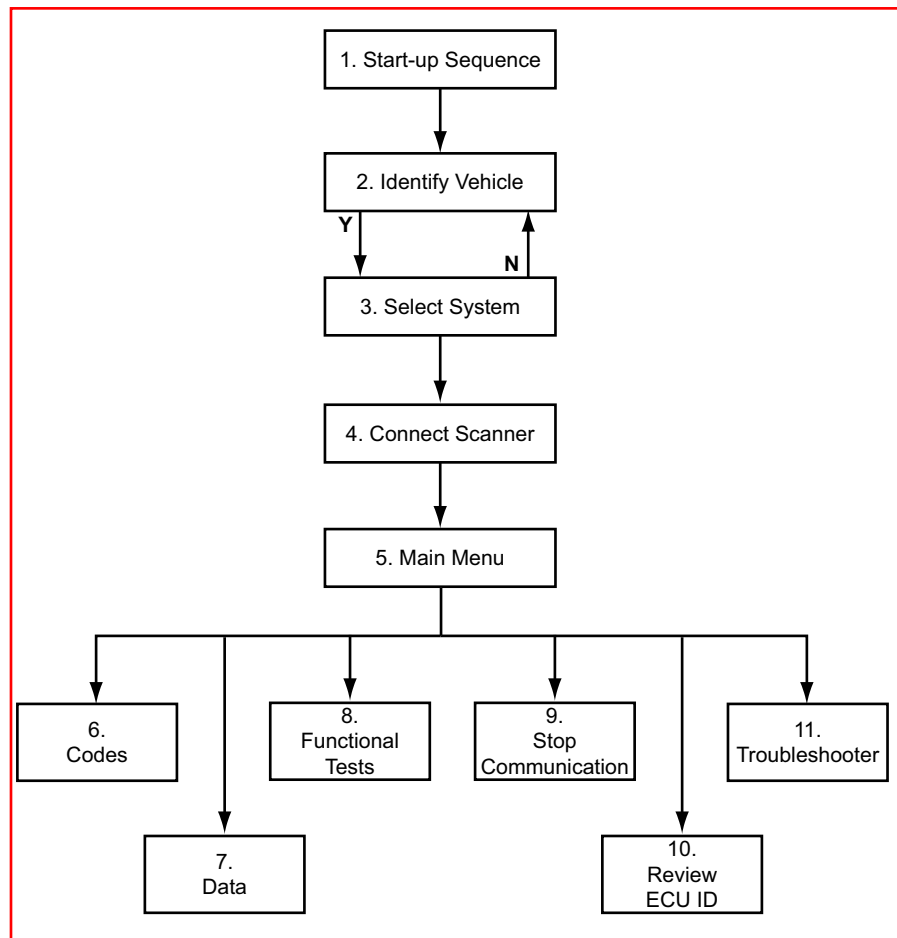
1.2 Adaptors Overview & Data Parameters

The Adaptors Overview & Data Parameters manual gives specific information concerning the Adaptors/Cables used for connecting the Scanner to the vehicle under test, a list of Abbreviations used within the cartridge and the Data Parameters information.

2

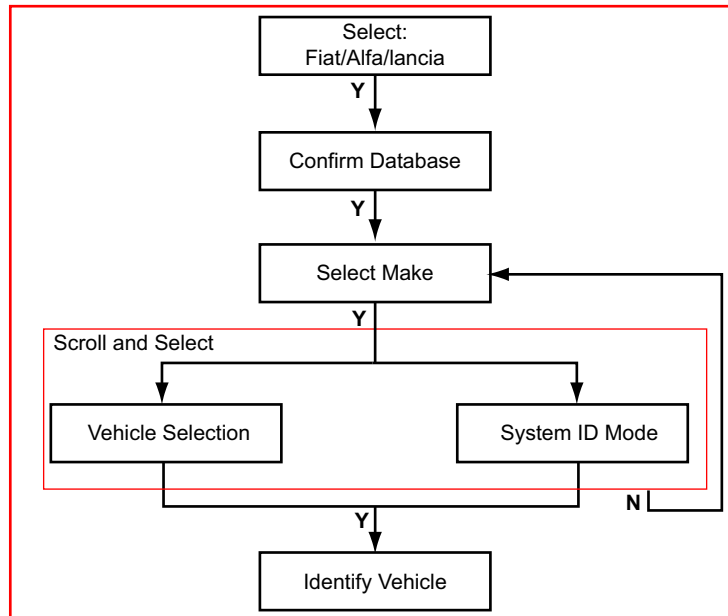
Alfa Romeo, Fiat, Lancia

Overview



This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

2.1 Start-up Sequence



2.1.1 Vehicle Selection

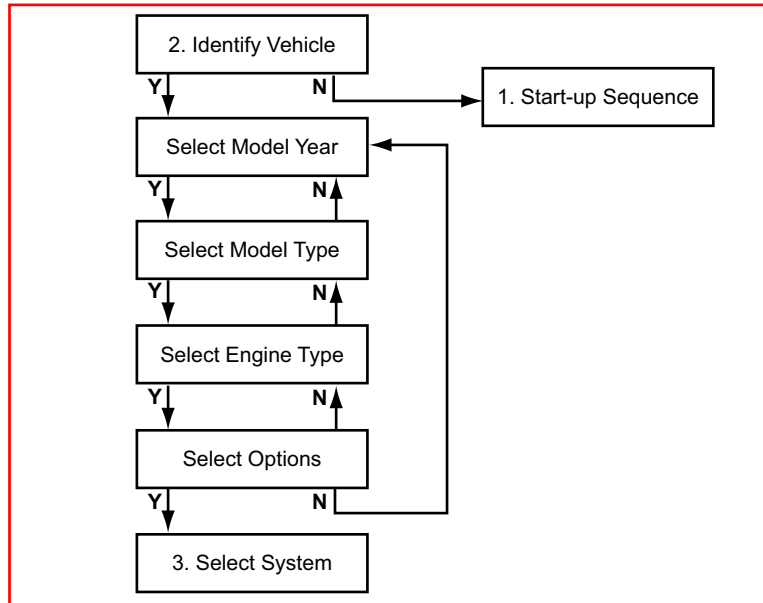
Allows you to identify the test vehicle by answering a series of questions:

- Model Year
- Model
- Engine
- Optional equipment

2.1.2 System ID Mode

Allows you to begin the vehicle identification by first selecting the system to be tested.

2.2 Identify Vehicle



2.2.1 Vehicle Selection Tips

Version Code, When the engine code is not enough to identify the engine management system, or when the engine code is hard to find, the Version Code (which is located on the VIN plate) is also listed in the Engine Descriptions.

An asterisk (*) in the engine code or version code denotes a “don’t care” position.

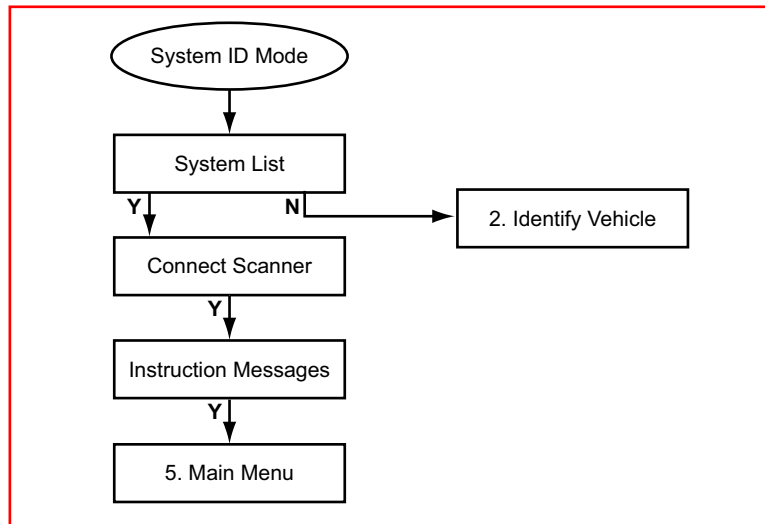
Air Bags, The Scanner can only communicate with an Air Bag if it has a connection to some diagnostic connector. Some Air Bags do not have this connection. These Air Bags can be identified by the presence of a LED on the right side of the steering wheel.

2.2.2 System ID Mode

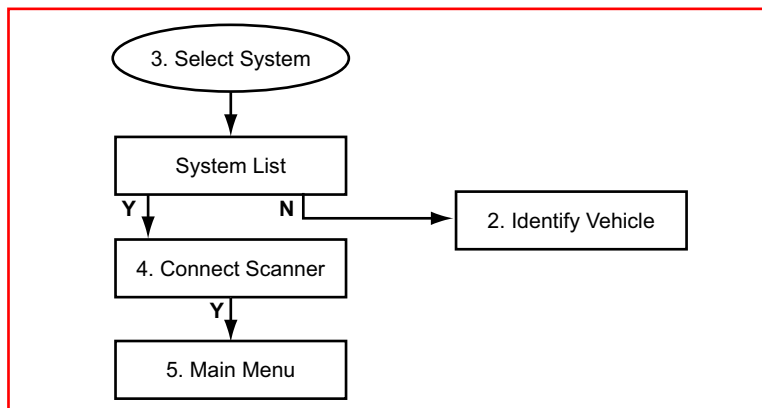
Use this mode if communication problems arise or if the vehicle has an unknown ECU type.

To use System ID Mode:

1. Select a system group from the list. Only fitted systems groups (engines, lights, seat, etc.) will be displayed.
2. After selecting the system group, select the system to be tested.
3. Connect the scanner and proceed testing.



2.3 Select System to be Tested



2.3.1 System List

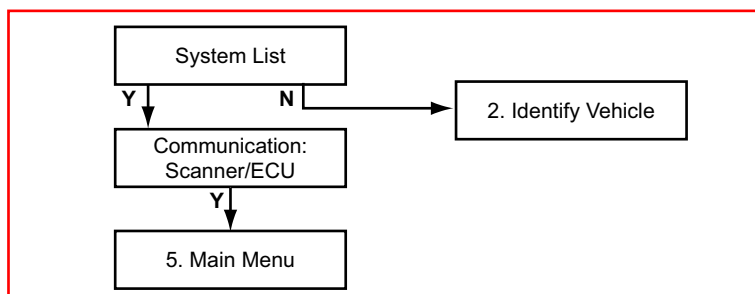
The System List displayed is dependent on the selected vehicle. The system list remains active until a new vehicle is selected. Scroll and confirm to select the system to be tested.

2.3.2 No Communication

If there is no communication to the selected System it is advisable to select the ECU type, if known, from the Test entry to determine if the ECU is communicating or not.

This can be found in the Vehicle ID selection by choosing 1987 /TEST / the ECU name. All available ECU types are located here.

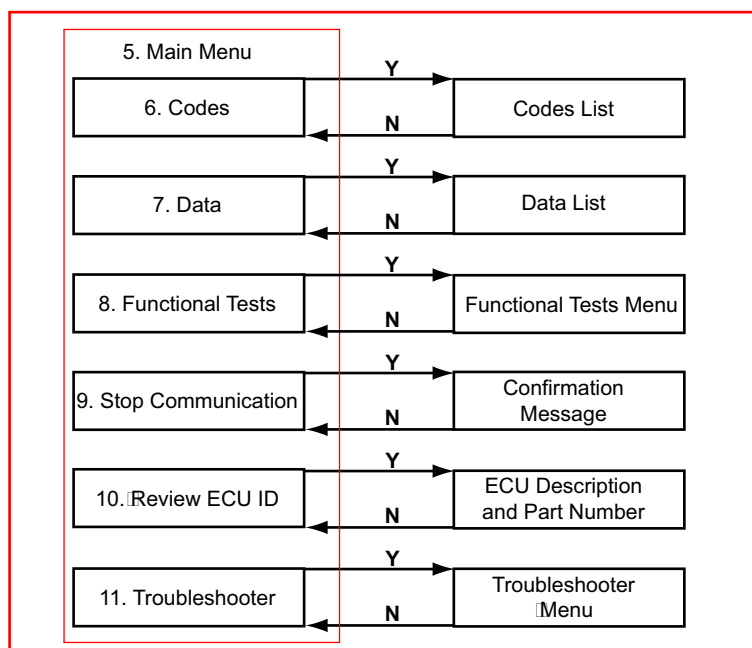
2.4 Connect Scanner



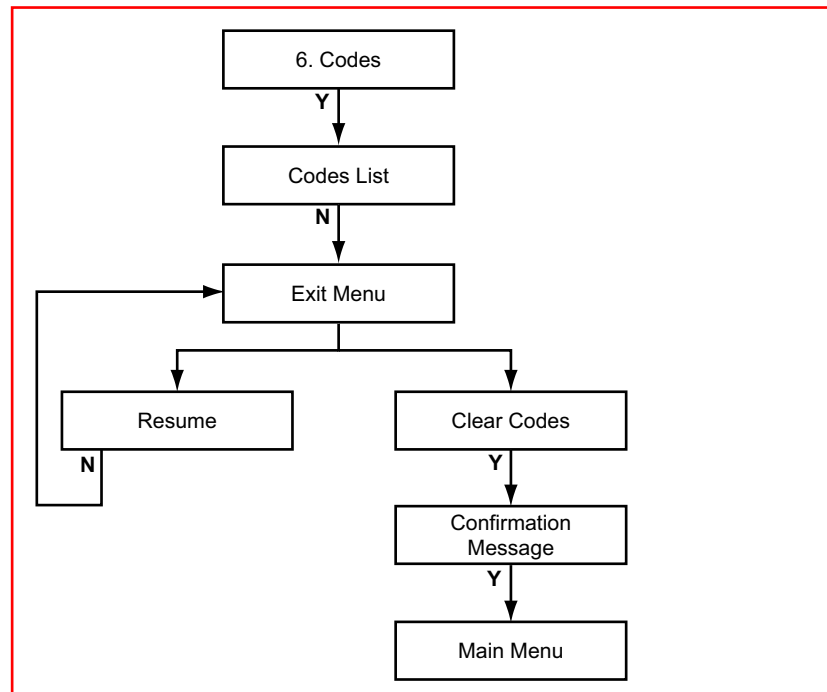
Note:

See the “Adaptors Overview & Data Parameters” manual for information.

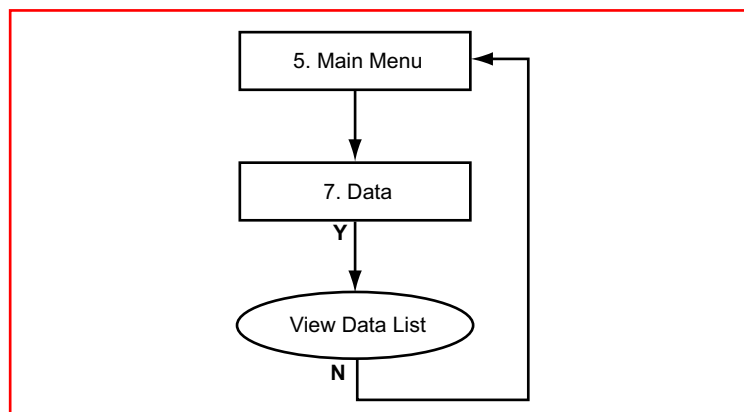
2.5 Main Menu



2.6 Codes



2.7 Data



2.8 Functional Tests

Selecting Functional Tests opens a menu that typically includes the following choices:

- Actuator Tests
- Special Functions



Note:

Only items available from the selected system on the test vehicle are displayed on the menu.

2.8.1 Actuator Tests

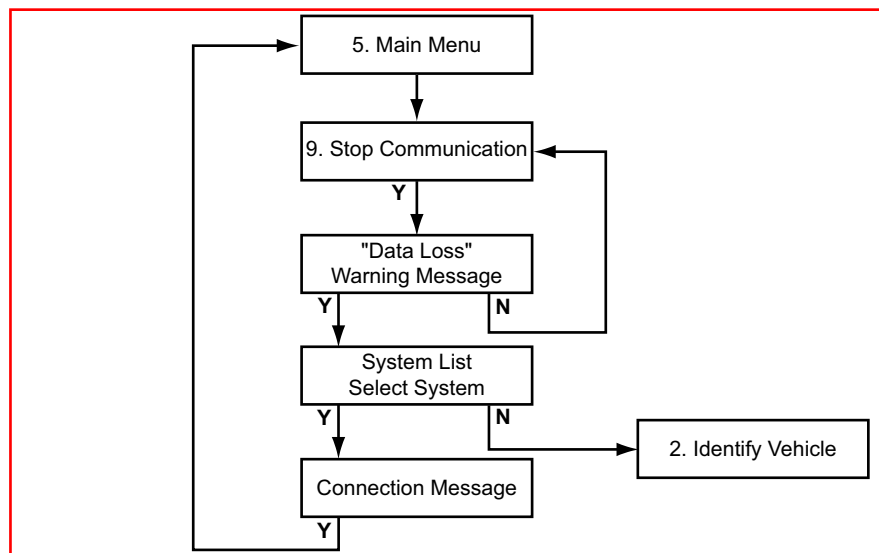
Actuator Tests allow you to switch certain system components on and off to check their operation. Selecting Actuator Tests opens a list of actuators available for testing. The number of actuators that can be activated is dependent on the ECU under test and the vehicle itself.

The Scanner energizes the selected actuator for 30 seconds, then automatically switches it off to prevent overheating or other damage to the component or system. For most actuators, the test can be cancelled at any time by the operator.

2.8.2 Special Functions

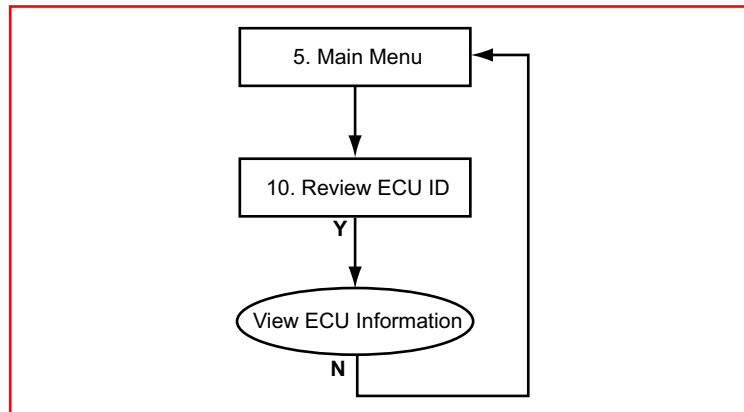
The Special Functions option displays when the ECU under test supports reprogramming adaptive, or learned, values with the Scanner. A menu of available options displays when Special Functions is selected. Select from the menu and follow the on-screen instructions.

2.9 Stop Communication



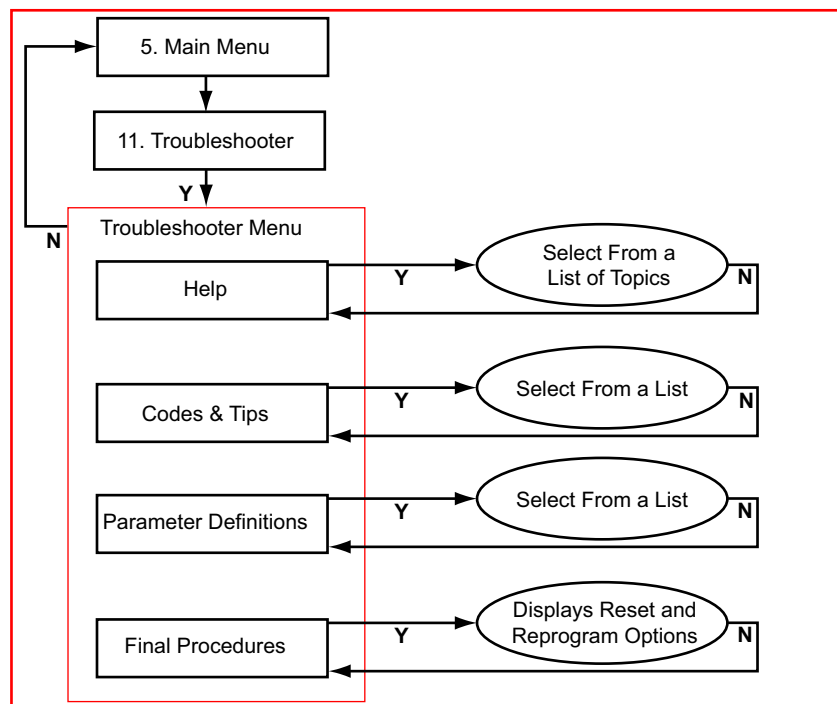
Use stop communication to stop communication with the ECU, or to exit and return to the Main Menu to select another system to test.

2.10 Review ECU ID



This selection displays pertinent information, such as the part and model numbers and the manufacturer, about the ECU under test.

2.11 Troubleshooter

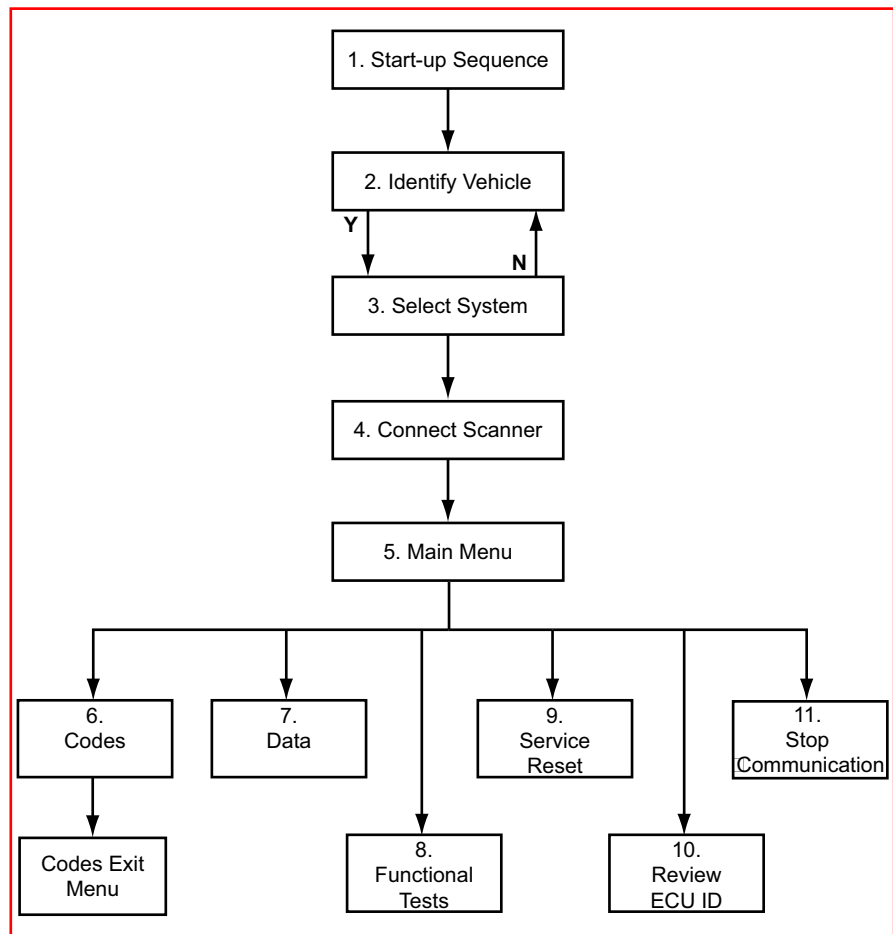


The Troubleshooter selection is on the system Main Menu only if information is available for the test vehicle. Troubleshooter is a database of information designed to assist you in diagnosing vehicle problems. Troubleshooter menus vary by make, model, and system.

3

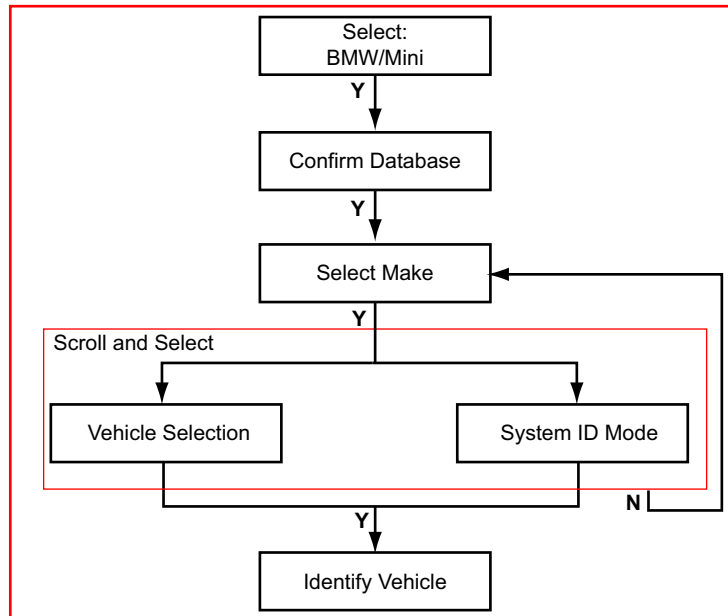
BMW, Mini

Overview



This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

3.1 Start-up Sequence



3.1.1 Vehicle Selection

Allows you to identify the test vehicle by answering a series of questions:

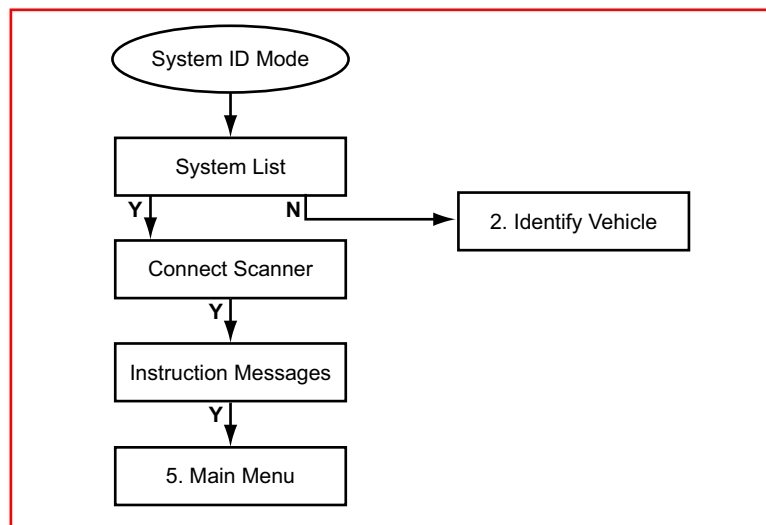
- Model Year
- Model
- Engine
- Optional equipment

3.1.2 System ID Mode

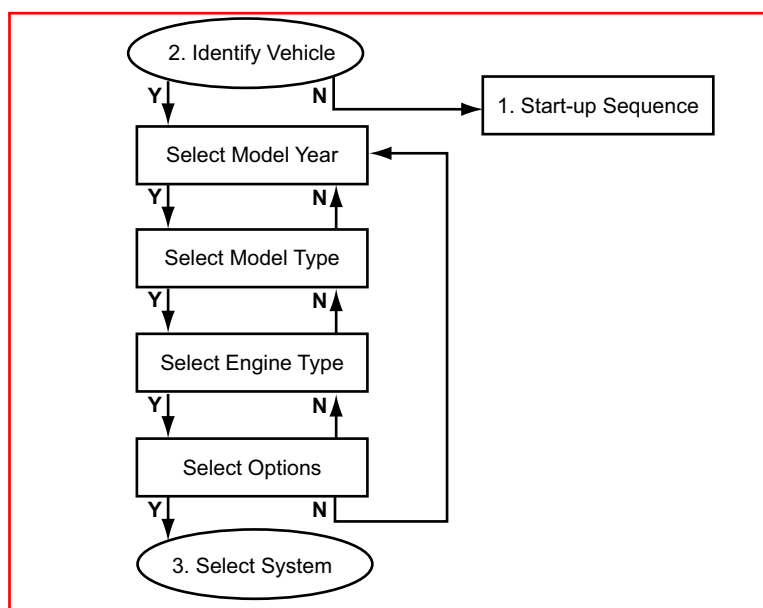
Allows you to begin the vehicle identification by first selecting the system to be tested. Use this mode if communication problems arise or if the vehicle has an unknown ECU type.

To use System ID Mode:

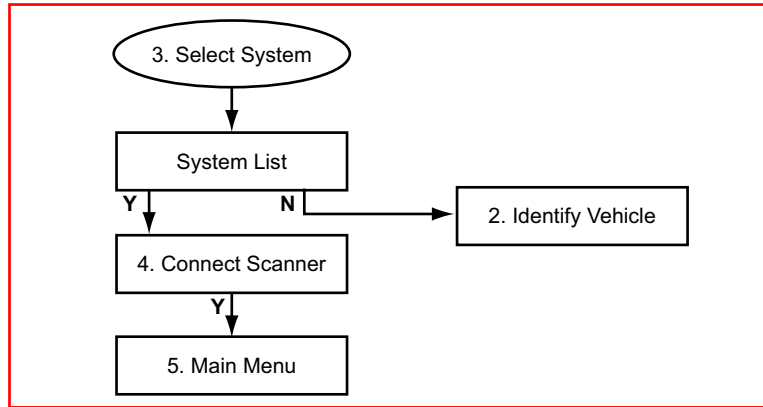
1. Select a system group from the list. Only fitted systems groups (engines, lights, seat, etc.) are displayed.
2. After selecting the system group, select the system to be tested.
3. Connect the scanner and proceed with testing.



3.2 Identify Vehicle



3.3 Select System to be Tested



3.3.1 System List

The System List displayed is dependent on the selected vehicle.

Listed below are all of the possible systems that can be found in BMW vehicles:

- Engine
- Engine, (Right)
- Engine, (Left)
- Engine, (Master)
- Engine, (Slave)
- EML/EMS
- VANOS
- Airbag
- Anti-lock Brakes
- Transmission
- AIRCO
- Instrument Panel
- Service Interval

The Engine (Right) and Engine (Left) selections are used on 12-cylinder engines that have two ECUs controlling the engine, one for each bank of cylinders.

The Engine (Master) and Engine (Slave) selections are used on 8-cylinder diesel engines that have two ECUs controlling the engine.

The EML/EMS selection is used on vehicles that have a drive-by-wire (electronic throttle) system.

The VANOS is a system that is used for controlling the position of the camshaft(s) on certain vehicles.

3.3.2 System Test Tips

Keep the following in mind when performing system tests:

- When testing a BMW with certain Motronics, (M1.1, M1.2, M1.3) communication problems may occur when the engine speed is above 2000 rpm. In this case communication cannot be built up. Once communication has been established, the engine may be revved above 2000 rpm.
- When testing EML or Automatic Gearbox systems the engine must be off and the gearbox must be in Park or Neutral in order to establish communications. Once communication is built up, the engine may be started and the gearbox can be set into Drive.

3.3.2.1 No Communication

If there is no communication to the selected system it is advisable to select the ECU type, if known, from the test entry to determine if the ECU is communicating or not.

This can be found in the Vehicle ID selection by choosing 1987 /Test (System) / the type of ECU or system name. All available ECU types are divided into separate groups and are located here.

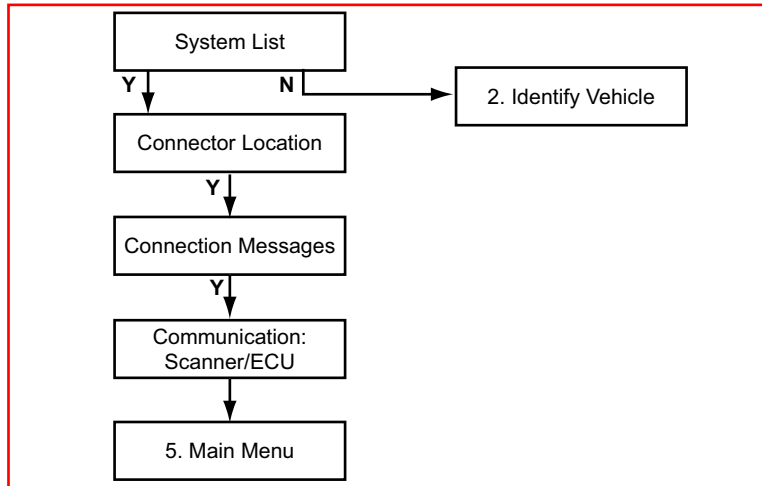
3.3.2.2 Communication Problems

When the Scanner is unable to establish communication with the ECU in the vehicle under test, or when the communication is interrupted, a message is displayed.

Wait to see whether communication is established again or interrupted.

Switching off-and-on the ignition and a re-enter the ID may reset this.

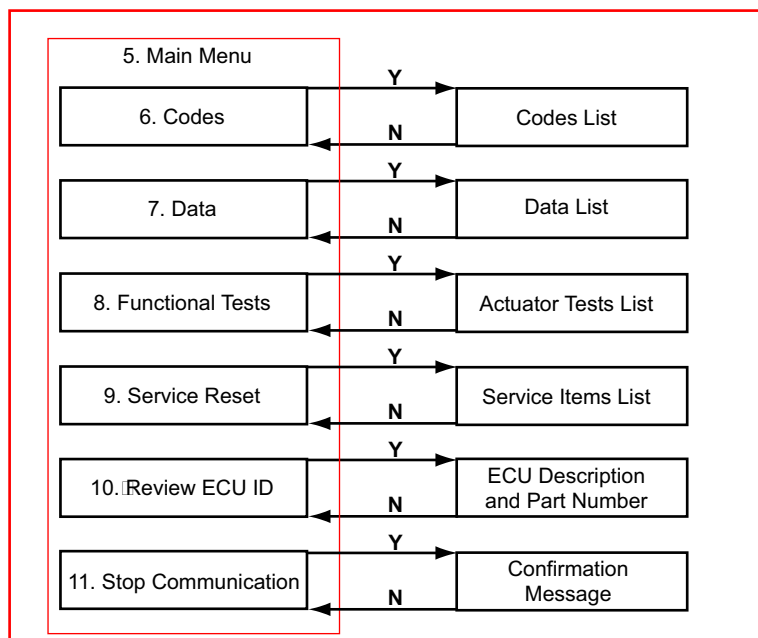
3.4 Connect Scanner



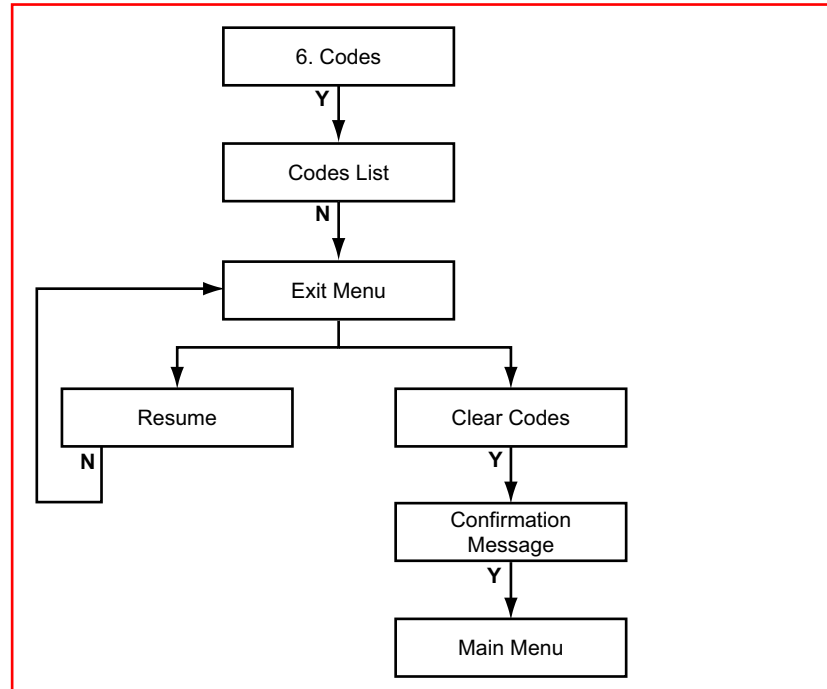
Note:

Refer to the “Adaptors Overview & Data Parameters” manual for connection information.

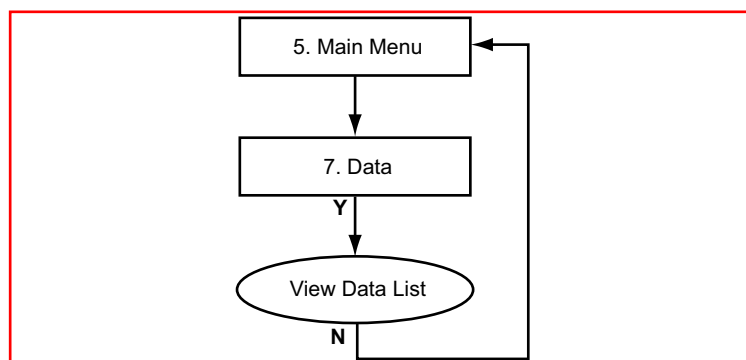
3.5 Main Menu



3.6 Codes



3.7 Data



0



Note:

The ECU will only output some correct parameter values/readings under certain circumstances, these are as follows:

- Engine Running.
- Engine Temperature has reached working temperature.
- All electrical consumers including air-conditioning are switched off

Check these circumstances if the displayed parameters seem incorrect.



Note:

When checking some BMW systems, such as DDE1, DDE2 and Motronic M1.1 and M1.3, a maximum of 5 Fault codes can be displayed. To be able to display the remaining Fault Codes (if any), the first Fault Codes must be repaired first.

3.8 Functional Tests

Functional Tests allow you to switch certain system components on and off to check their operation. From the system main menu, select **Functional Tests > Actuator Tests** to open a list of actuators available for testing. The number of actuators that can be activated is dependent on the ECU under test and the vehicle itself.

The Scanner energizes the selected actuator for 30 seconds, then automatically switches it off to prevent overheating or other damage to the component or system. For most actuators, the test can be cancelled at any time by the operator.



Note:

Carefully follow all on-screen messages and instructions that display while performing functional tests.

3.8.1 Actuator Test Tips

Keep the following points in mind while performing actuator tests:

- Often a certain actuator may not be present on a vehicle, although according to the manuals it should be. Therefore, check this first after failing to hear a reaction from the actuator under test.
- Have the engine running only when instructed to do so by the Scanner and always follow the instructions displayed on the Scanner.
- Some actuators cannot be stopped during the 30 seconds period, wait for the 30 seconds to end the test.
- With some engines, such as those with Motronic 1.7 and 1.7.2, it is very difficult to hear the injectors click. Use a multi meter or scope to make sure the injectors are activated properly.
- Some actuators are only activated for a short time, instead of 30 seconds. For example, the injectors will be activated for only five seconds, this is for safety reasons.

3.9 Service Reset

This function is used to reset or check the status of the service indicator lamps on the instrument cluster and the internal service monitors. Selecting Service Reset typically opens a menu with two choices:

- Check Status of Service Items
- Reset Service Items

Check Status of Service Items opens a report of current conditions for the related monitored items. Use this function to determine what items need to be serviced or replaced.

Reset Service Items reprograms the ECU service intervals. Use this function to calibrate the instrument cluster lamps and ECU monitors after servicing the vehicle. Selecting Reset Service Items opens a list that includes:

- Reset Engine Oil
- Reset Diesel Particulate Filter
- Reset Spark Plugs
- Reset Front Brake
- Reset Rear Brake
- Reset Brake Fluid
- Reset Micro (Pollen) Filter
- Reset Vehicle Check
- Set Vehicle Inspection Due Date
- Set Exhaust Emission Check Date

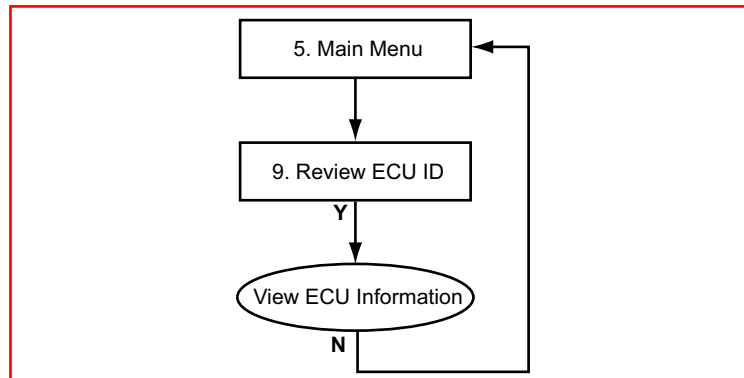
Select a test and follow the on-screen instructions.

3.9.1 Service Reset Tips

Keep the following in mind when performing Service Resets:

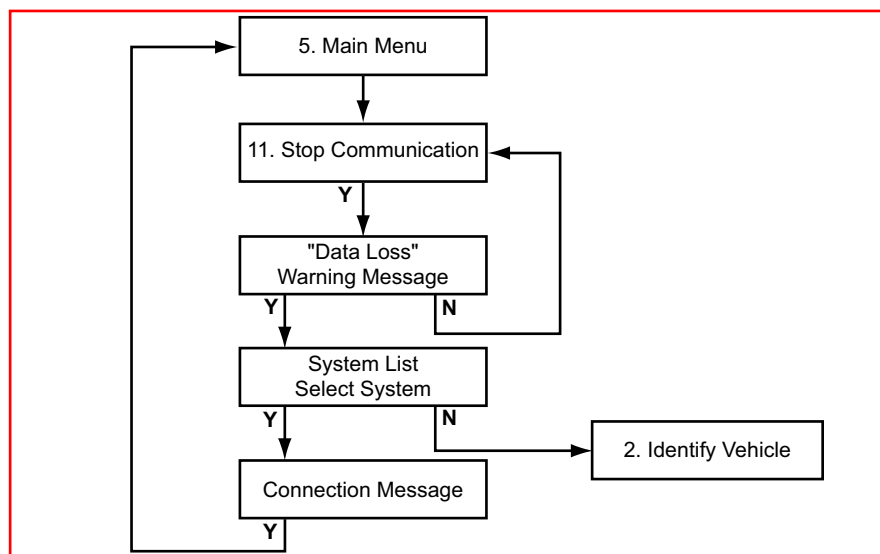
- The Scanner extinguishes the Oil Service or Inspection Service lamps and illuminates all of the green service indicator bar LEDs. Once the Scanner has reset these lamps they can not be returned to their previous states. Make sure that these lamps need to be reset before performing this function.
- The resetting process may take up to 30 seconds. Wait for the “Reset Complete” message to display before pressing any Scanner buttons.

3.10 Review ECU ID



This selection displays pertinent information about the ECU under test, such as the part and model numbers and the manufacturer.

3.11 Stop Communication



Use stop communication to stop communication with the ECU, or to exit and return to the Main Menu to select another system to test.



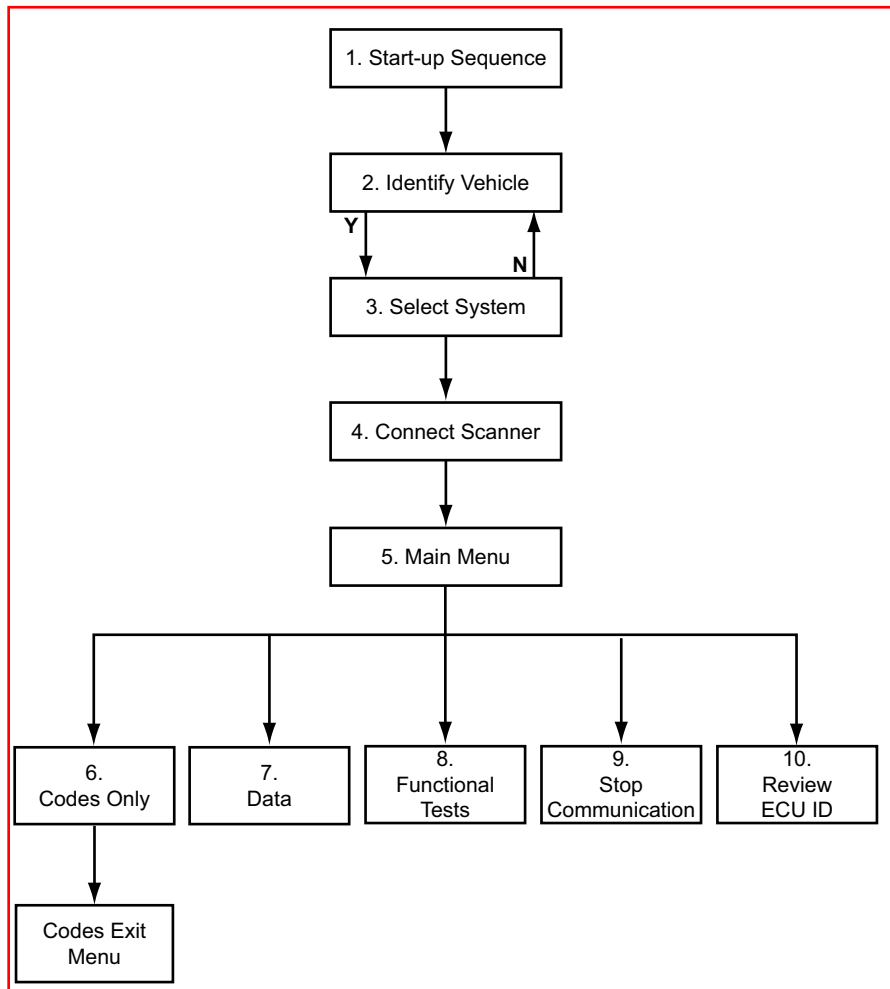
Caution:

The ABS System or the ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the Main Menu and select "Stop Communication" before disconnecting the Scanner.

4

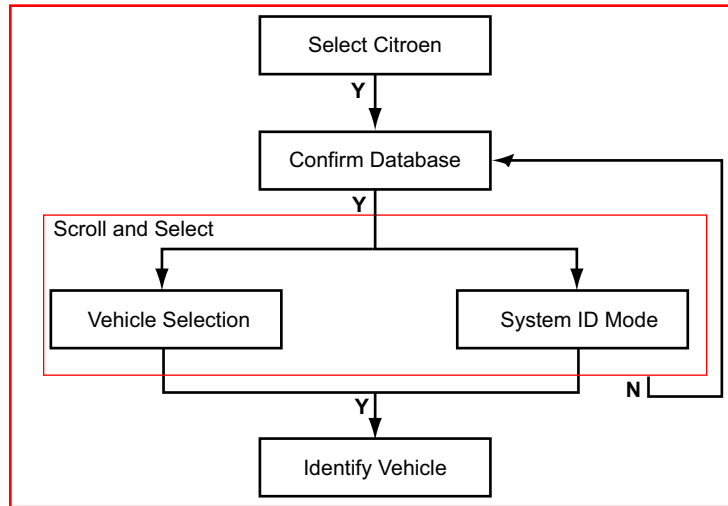
Citroën

Overview



This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

4.1 Start-up Sequence



4.1.1 Vehicle Selection

Allows you to identify the test vehicle by answering a series of questions:

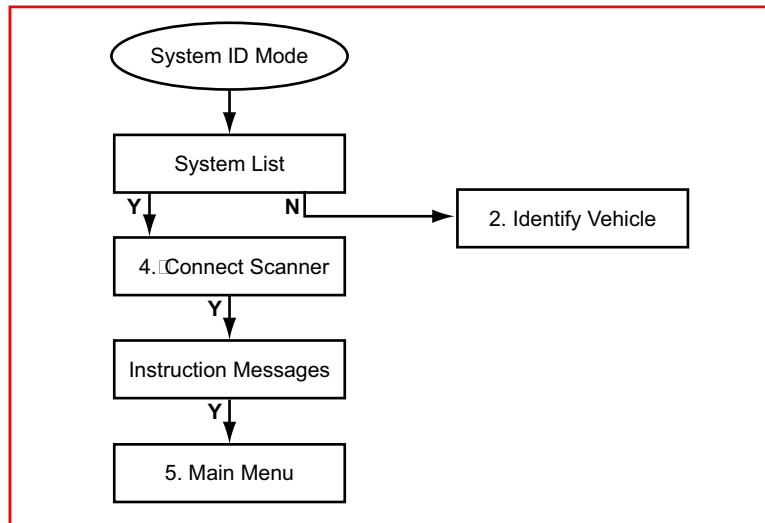
- Model Year
- Model
- Engine
- Optional equipment

4.1.2 System ID Mode

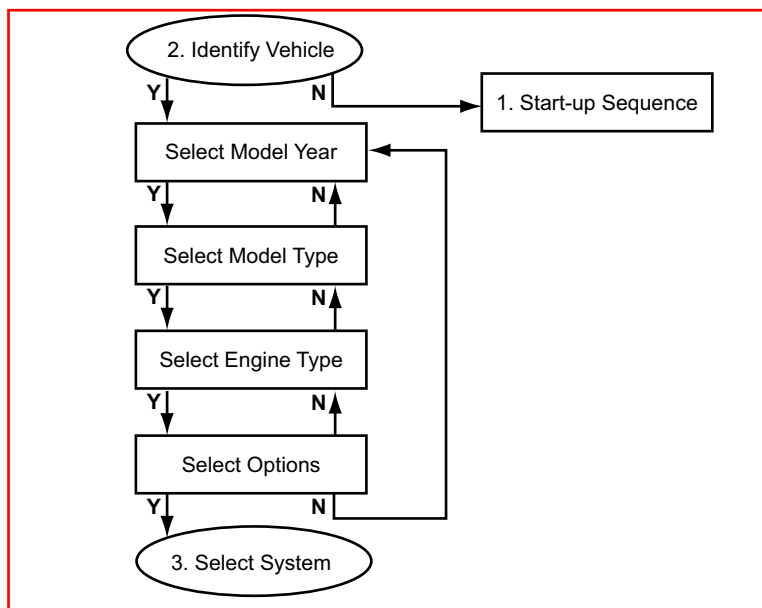
Allows you to begin the vehicle identification by first selecting the system to be tested. Use this mode if communication problems arise or if the vehicle has an unknown ECU type.

To use System ID Mode:

1. Select a system group from the list. Only fitted systems groups (engines, lights, seat, etc.) are displayed.
2. After selecting the system group, select the system to be tested.
3. Connect the scanner and proceed with testing.



4.2 Identify Vehicle



4.2.1 Vehicle Selection Tips

The following additional information is available to help ensure a correct vehicle identification.

4.2.1.1 ORG/RP/DAM and Chassis Numbers Locations

To help identify the model year during the Vehicle ID process, an ORG/RP/DAM or Chassis Number is available. The ORG/RP/DAM numbers should have 6 characters, (only the first 4 are required) use the look-up table supplied by the manufacturer to find the correct model year. The possible location of these numbers are as follows:

- Under the bonnet in yellow painted characters
- On a sticker located on the drivers-side door near hinge
- On a sticker located on the drivers-side door near the lock
- On a sticker located on the Fuse-box Cover

4.2.1.2 DHX 1.9L Turbo-Diesel Engine

This engine, which is used on Evasion, Jumpy, Sinage, and Xantia models, can be equipped with a Lucas Pump or a Bosch VP20 Pump.

- If it has a Bosch VP20 Pump select engine type: "1.9L T-DSL BOSCH VP20 = DHX"
- If it has any other pump select engine type: "1.9L T-DSL OTHER = DHX"

4.2.1.3 VJY and VJZ 1.5L Diesel Engine

This engine, which is used on Saxo models, can be equipped with a Lucas Pump or a Bosch VP20 Pump.

- For a VJY engine with a Bosch VP20 Pump select engine type: "1.5L DIESEL BOSCH VP20 = VJY"
- For a VJY engine with any other pump select engine type: "1.5L DIESEL OTHER = VJY"

When it is a VJZ type engine use the same entries for the VJZ engine.

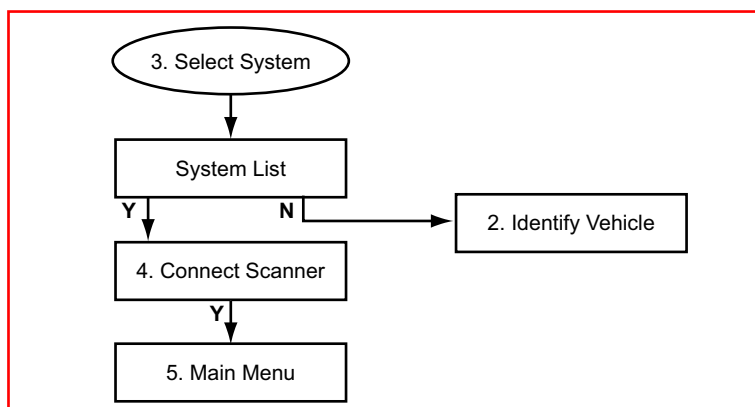
4.2.1.4 XM Models

The XM up to model year 1994 has a 2-pin connector located on the front of the ECU in the engine compartment. XMs from model year 1995 and later have a 30-pin connector located behind a panel on the lower dashboard. So, when a vehicle has a 2-pin connector it is a 1994 or older and if it has a 30-pin connector it is a 1995 or later.

4.2.1.5 Airbags

The Scanner can only communicate with an Airbag if it has a connection to the diagnostic connector. Some Airbags do not have this connection. These Airbags can be identified by the presence of a LED on the right side of the steering wheel.

4.3 Select System to be Tested



4.3.1 System List

The System List displayed is dependent on the selected vehicle. Listed below are some of the possible systems that can be found in Citroën vehicles:

- Engine
- Anti-lock Brakes
- Airbag
- Side Airbag Left, (Separated)
- Side Airbag Right, (Separated)
- Suspension
- Transmission
- Xenon
- Service Interval Reset

4.3.2 System Test Tips

Keep the following points in mind when performing system tests:

- When testing certain vehicles, communication problems may occur when engine speed is above 2000 rpm. In this case communication cannot be built up. Once communication has been re-established, the engine may be revved above 2000 rpm.
- Some Side Airbag systems do not have a separate ECU but are controlled by the normal Airbag ECU. However, some Side Airbag systems do have a separate ECU, if this is the case, then select “Side-airbag Left / Right (Separated)” from the System List.

- When testing Automatic Transmission Systems, if there is a communicating transmission system fitted on the vehicle then confirm when asked if the vehicle is fitted with an Automatic Transmission at the vehicle identification stage.
- When testing Automatic Transmission systems the engine must be off and the gearbox must be in Park or Neutral in order to establish communications. Once communication is built up, the engine may be started and the gearbox can be set into Drive.
- When testing Bosch ABS 5.3 ESP, Bosh ABS 8, Siemens Airbag Through Central, and Temic MK70 systems the Trouble Code list may be incomplete.

4.3.2.1 No Communication

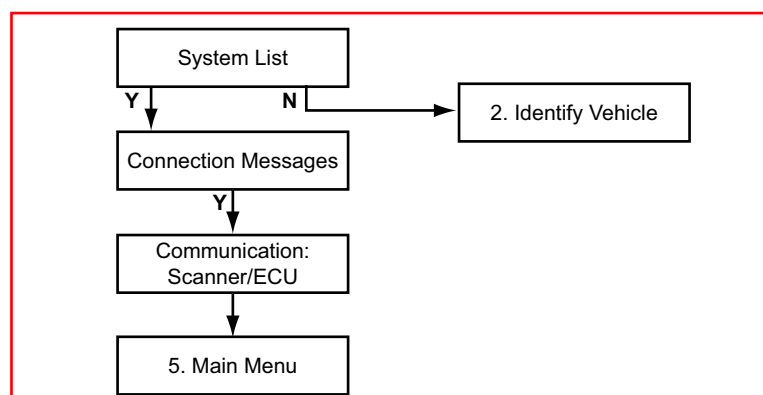
If there is No Communication to the selected System it is advisable to select the ECU type, if known, from the Test entry to determine if the ECU is communicating or not.

This can be found in the Vehicle ID selection by choosing 1987 /TEST / the ECU name. All available ECU types are located here.

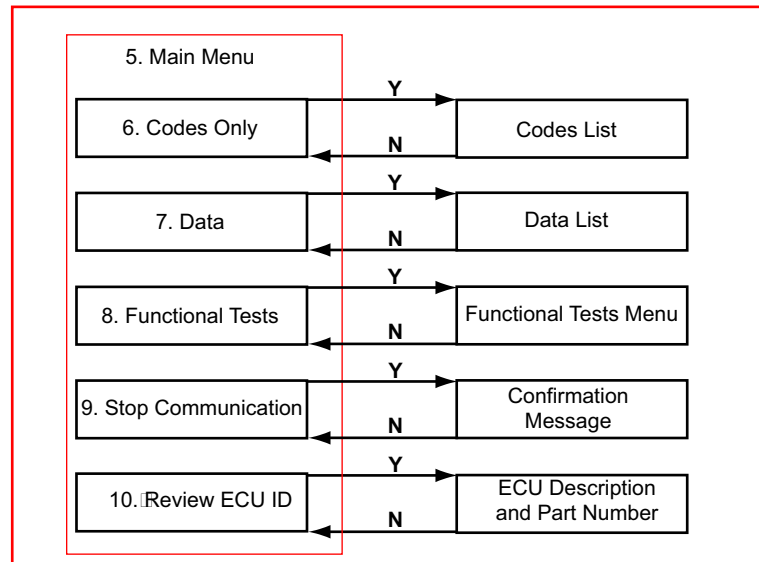
4.3.2.2 Unavailable Data Parameters

If there is a Data Parameter in the Screen Data List that is not mounted on the engine, ignore it. For example the EDC15 System(the High Diesel Injection, HDI) Turbo Diesel system mounted on the RHS, RHV, RHX, RHY and RHZ engines. The Data List consists of Data Parameters including MAP sensor and Airflow sensor. Most if not all of these engines are fitted with both sensors. But if there is an engine that is not fitted with one of these sensors disregard the Data Parameter in question.

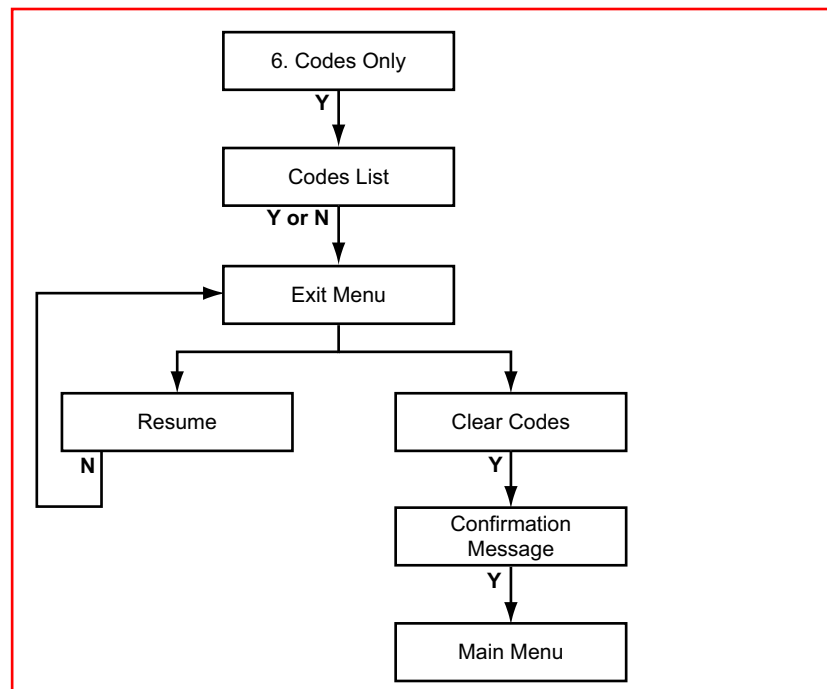
4.4 Connect Scanner



4.5 Main Menu



4.6 Codes Only



4.6.1 Undocumented Codes

If undocumented codes are received, especially with 2000 and later models, it is advisable to check the manuals for the relevant Trouble Code numbers, especially if they are OBD codes on the newer ECUs.

4.6.2 Clear Codes Tips

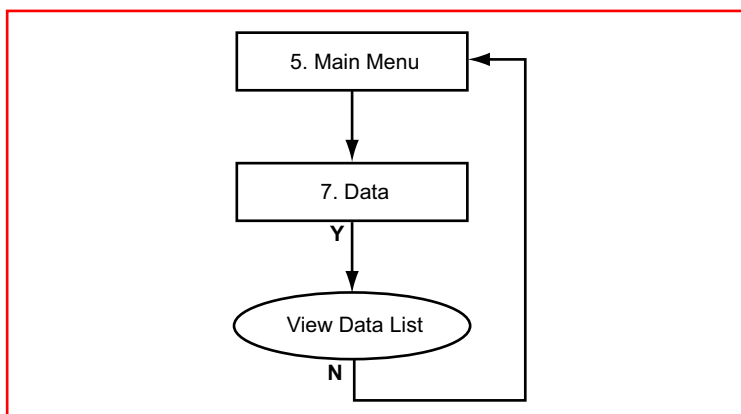
Keep the following in mind when erasing codes from the ECU:

- Be aware, some codes can only be set again under certain circumstances. Note or print the codes before repair and before clearing codes.
- When the code setting error condition still exists, the code can be set again by the ECU.
- When codes are cleared, the fuel pump relay can be activated for some time and the “No Communication” message is displayed.
- Some codes may be sent several times per data frame. These codes will be displayed a number of times in the Code List.

4.6.3 Transmission System Tips

For Citroën SAXO there is a Calibration Pedal Test to be performed after the Clearing Codes is completed.

4.7 Data



4.8 Functional Tests

Functional Tests allow you to switch certain system components on and off to check their operation. From the system main menu, select **Functional Tests > Actuator Tests** to open a list of actuators available for testing. The number of actuators that can be activated is dependent on the ECU under test and the vehicle itself.

The Scanner energizes the selected actuator for 30 seconds, then automatically switches it off to prevent overheating or other damage to the component or system. For most actuators, the test can be cancelled at any time by the operator.



Note:

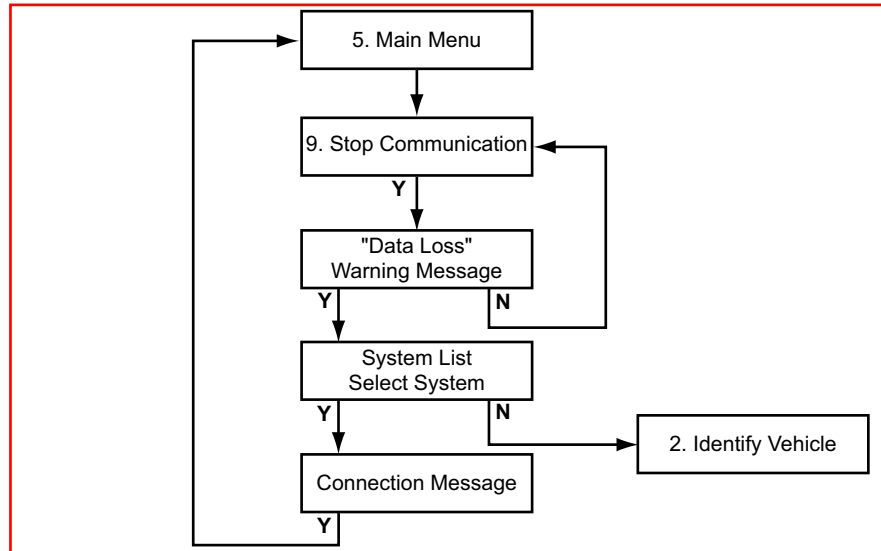
Carefully follow all on-screen messages and instructions that display while performing functional tests.

4.8.1 Actuator Test Tips

Keep the following points in mind while performing actuator tests:

- After performing an actuator test, some trouble codes may be set. Some of these trouble codes can not be cleared immediately. Wait for a couple of minutes (sometimes even up to 15 minutes) and the codes can be cleared.
- Actuator tests for EDC15C7 system may be activated longer than expected.
- Often a certain actuator may not be present on a vehicle, although according to the manuals it should be. Therefore, please check this first after failing to hear a reaction from the actuator under test. Have the engine running only when instructed to do so by the Scanner.
- When available, Ignition Adjust increases or decreases the ignition correction. The ignition can be increased from -8 to 0° and can be decreased from 0 to -8° .
- When available, Fuel Adjust increases or decreases the CO correction. The engine must be running to perform this test. The CO correction can be increased from -24 to 54 and can be decreased from 54 to -24 . Values displayed are dependant on the MAP sensor and the ECU.
- When available, Pedal Calibration Test calibrates the throttle pedal for the automatic transmission system. The gear lever must be in Park position during this test. The maximum and minimum pedal position need to be determined by fully depressing and releasing the pedal. When the test is complete it exits to the Functional Tests Menu.

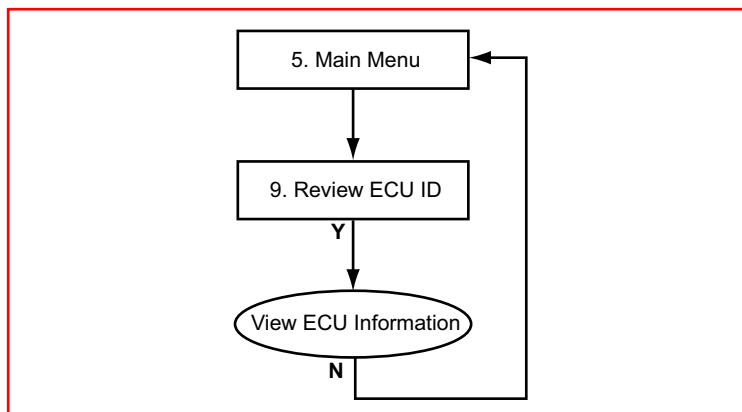
4.9 Stop Communication



Caution:

The ABS System or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the Main Menu and select "Stop Communication" before disconnecting the Scanner.

4.10 Review ECU ID

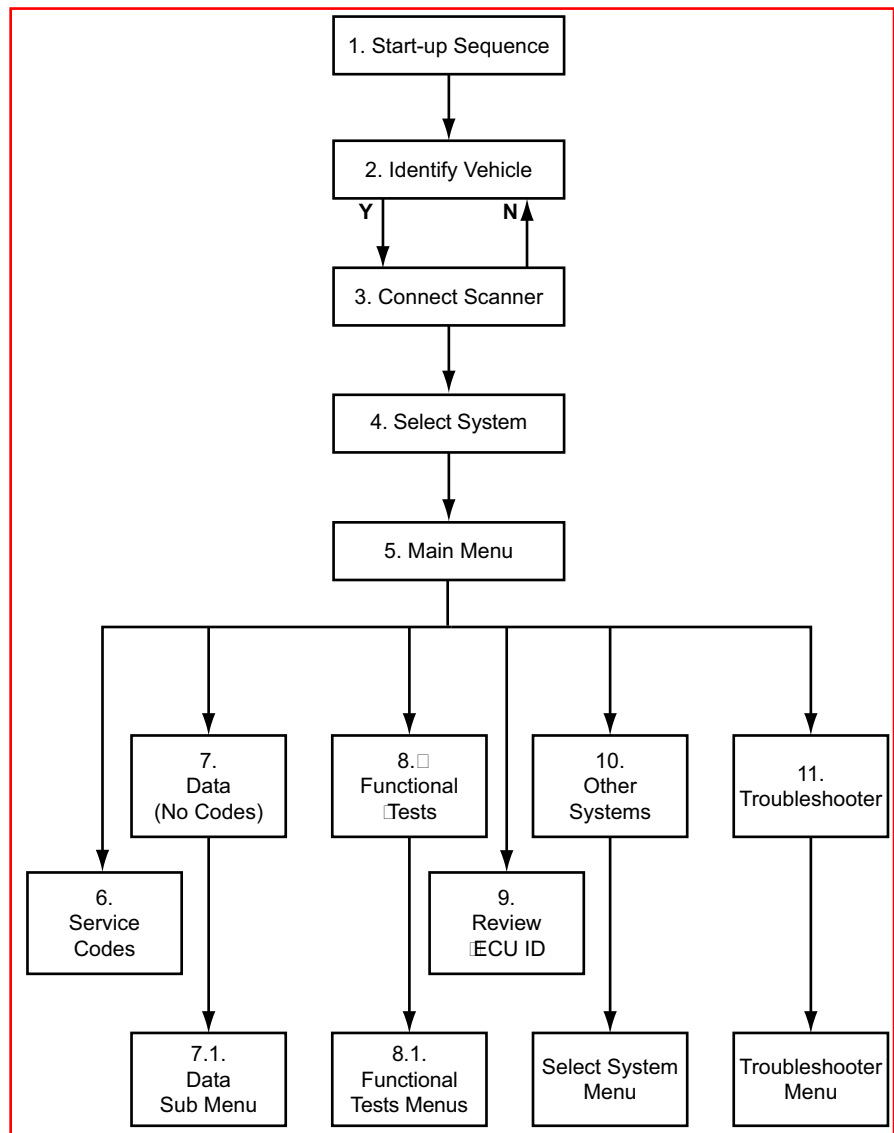


This selection displays pertinent information, such as the part and model numbers and the manufacturer, about the ECU under test.

5

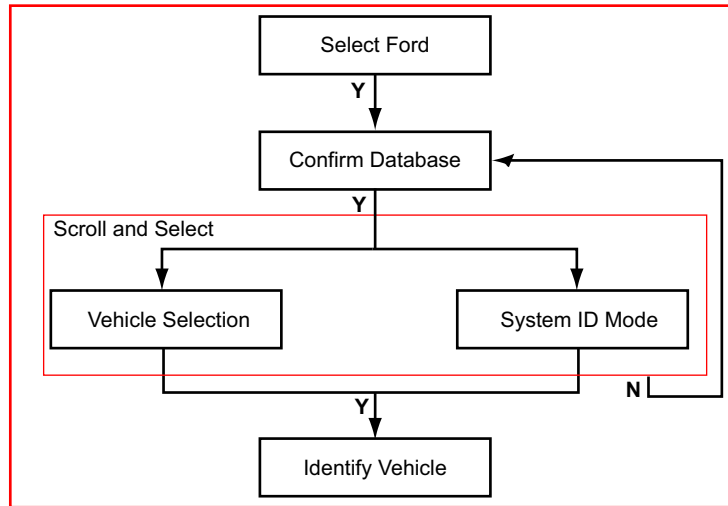
Ford

Overview



This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

5.1 Start-up Sequence



5.1.1 Vehicle Selection

Allows you to identify the test vehicle by answering a series of questions:

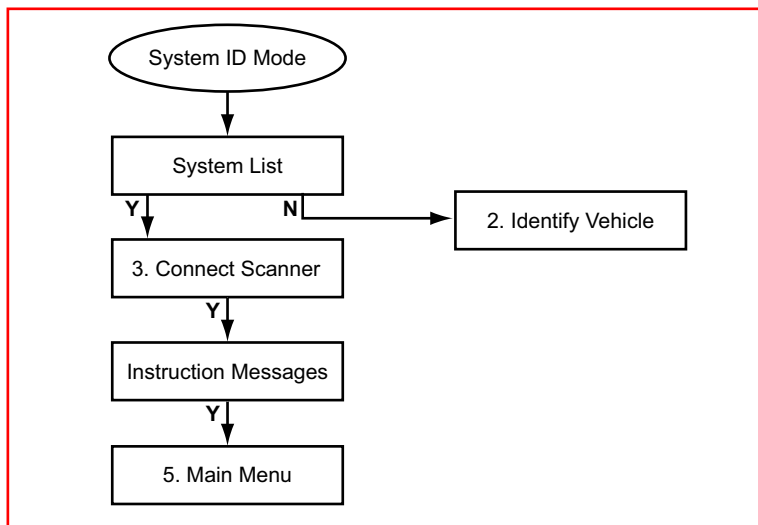
- Model Year
- Model
- Engine
- Optional equipment

5.1.2 System ID Mode

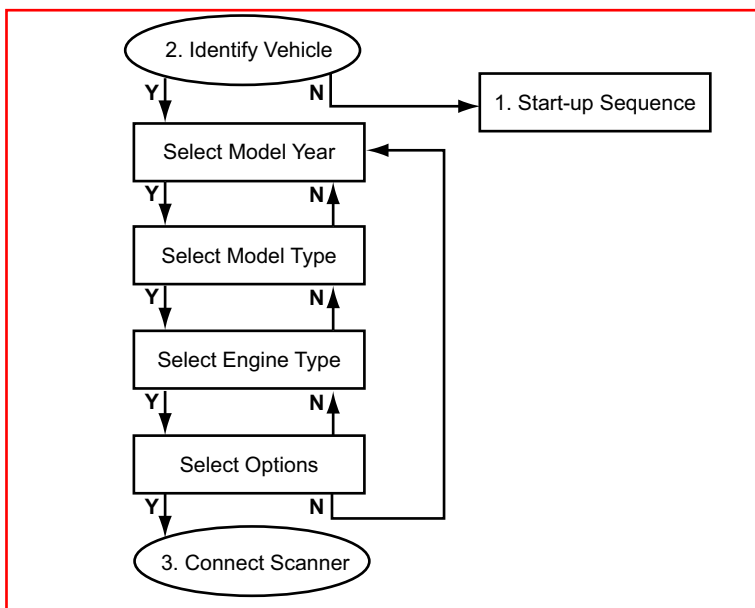
Allows you to begin the vehicle identification by first selecting the system to be tested. Use this option if communication problems arise or the ECU type is unknown.

To use System ID Mode:

1. Select a system group from the list. Only fitted systems groups (engines, lights, seat, etc.) are displayed.
2. After selecting the system group, select the system to be tested.
3. Connect the scanner and proceed with testing.



5.2 Identify Vehicle



In order to help with the Vehicle ID process, in some cases the engine letter code can be found on the VIN plate. See example below:

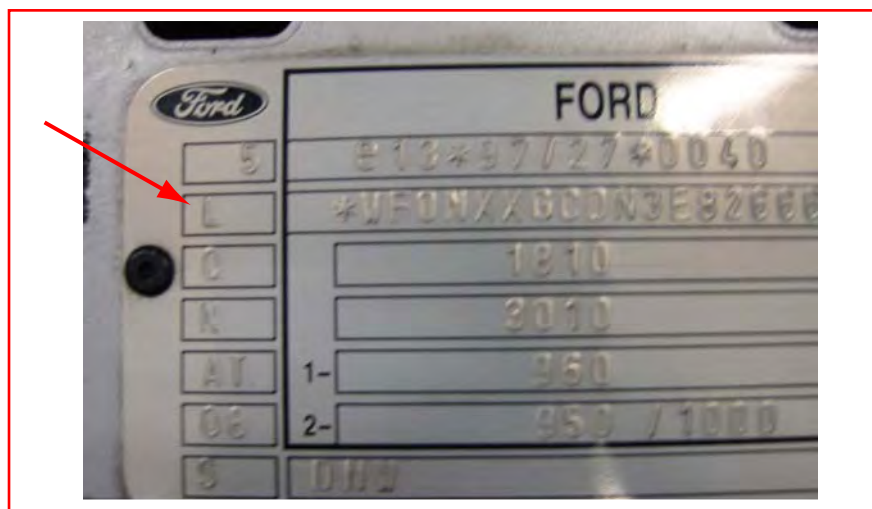


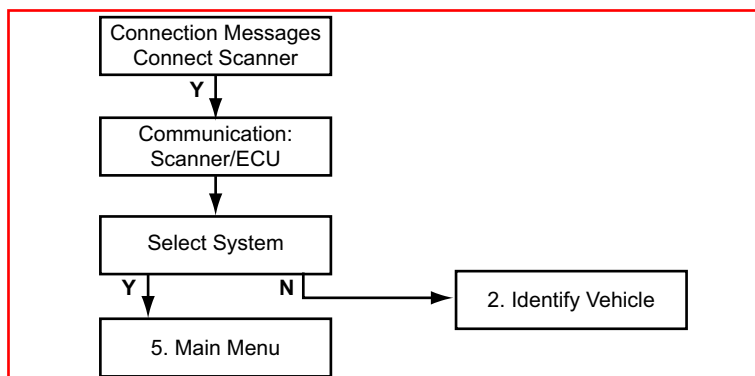
Figure 5-1 2003, Ford Focus, 1.8L DURATORQ TDCI=L



Note:

Be aware that this is not true for all vehicles, such as older models.

5.3 Connect Scanner



Note:

Refer to the “Adaptors Overview & Data Parameters” manual for details.

Additional Information, Mazda Electronic Control Systems (MECS)

The MULTI-1 Adaptor (MT2500-90), (Optional) or the GA-1 Adaptor (recommended) is used on Mazda Electronic Control Systems (MECS) self-test connectors.

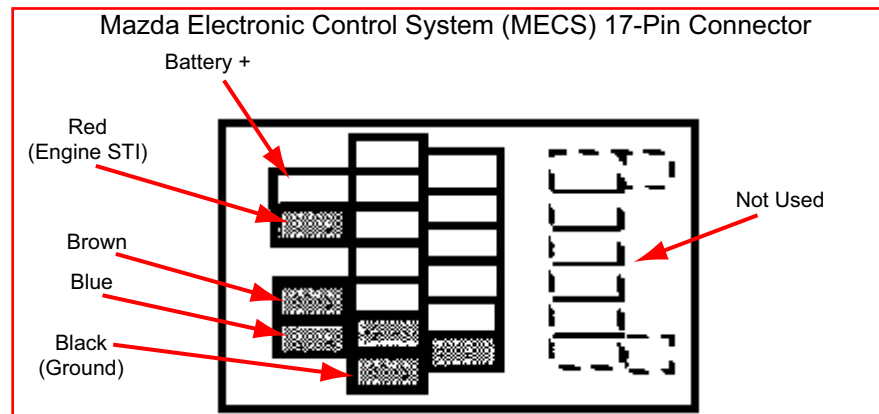


Figure 5-2 Ford connections that need the MULTI-1 Test Adaptor. Colour coding refers to the colours of the leads of the MULTI-1 adaptor, MT2500-90.



Caution:

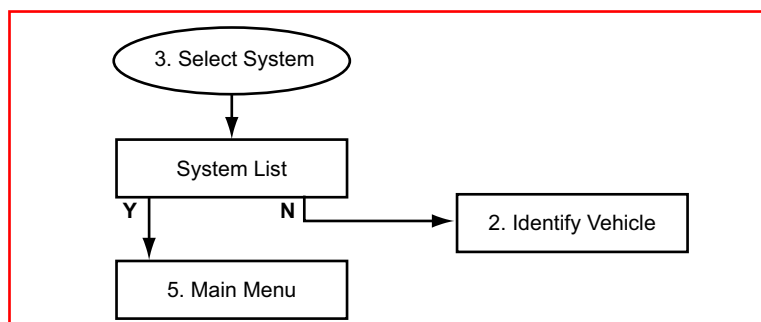
Do not connect the Scanner to the MECS TACH connector. Doing so can severely damage the Scanner.



Caution:

Connecting to the wrong Data Link Communication (DLC) pins can cause a possible malfunction. Carefully connect to the specified pins only.

5.4 Select System to be Tested



Note:

Turn the Ignition Key ON and wait at least 30 seconds before using the Auto-detect Functions.

The System List displayed is dependent on the selected vehicle. The system list remains active until a new vehicle is selected. Scroll and confirm to select the system to be tested.

Use the detect systems to list all of the systems available on the vehicle. As each system is detected, it will be added to the system list.

To automatically detect each system installed, select and confirm the detect option. Follow all instructions displayed and allow some time for the automatic detection and communication with the systems.

To automatically detect all the Sub-Systems, select Help, scroll down to the end of the help text and select "Enable All Systems". The Scanner enables all available systems and sub-systems on the selected vehicle.

It is also possible to enable a system or a sub-system that is not found with the auto-detect. For example, if the vehicle has a faulty or non-communicating accessory system installed, then manually select accessory systems.

5.4.1 System List Tips

Keep the following in mind when testing systems:

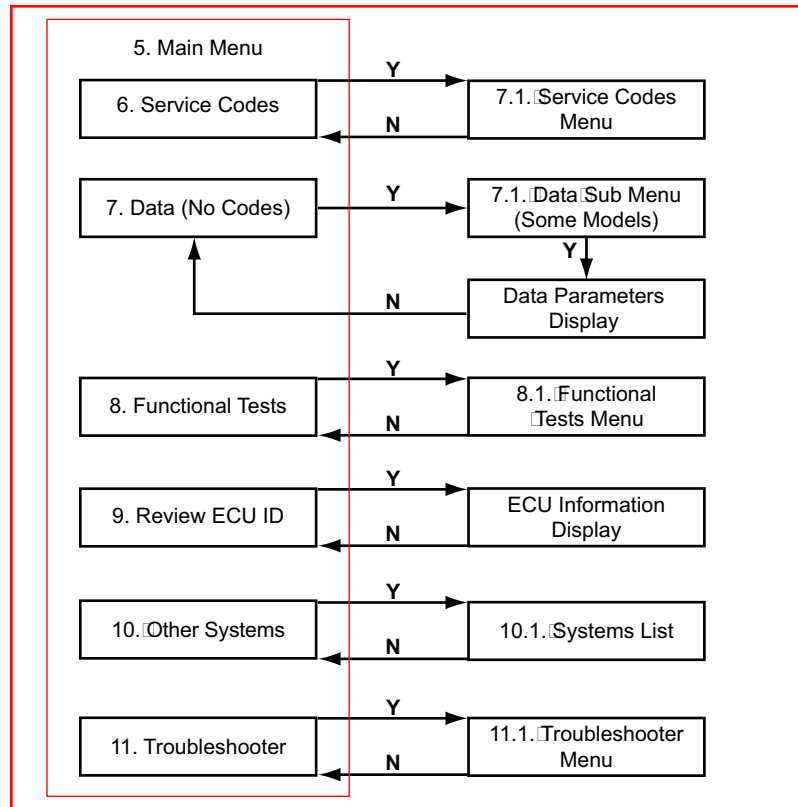
- The systems list will remain active until a new vehicle is selected.
- Refer to Section [5.10.2: 'Special Ford Galaxy Systems' on page 43](#) of this Chapter for information concerning the "Special Ford Galaxy Systems".

5.4.2 CAN Systems Tips

Keep the following in mind when testing CAN systems:

- The CAN adaptor needs to be updated for testing CAN systems. Detection of the first CAN system may take longer, up to 1 minute.
- The ECU may time out if the ignition is switched ON for too long. It is important to Cycle the ignition to OFF for 15 seconds, then ON for 15 seconds periodically. If however a "No Communication" occurs cycle the ignition as stated above before retrying test.
- When the user is asked to change to the S-43 Key, the ignition must be switched OFF and ON again after 15 seconds. Then select the required system using the Auto-detect function.

5.5 Main Menu



5.5.1 Main Menu Selections

Service Codes—allows the operator to perform Key-On, Engine-Off (KOEO) and Key-On, Engine-Running (KOER) self-tests and review codes after performing these self-tests.

Data (No Codes)—allows the monitoring of various sensors, switches and actuator inputs/outputs on vehicles with Data Communication Link (DCL) EEC-IV and EEC-V controllers.

Functional Tests—allows the Scanner to switch certain system components on and off for an operational check.

Review ECU ID—displays specification and identification information for the ECU under test.

Other Systems—ends the current diagnostic session, stops communication with the ECU, and returns to the system selection menu.

Troubleshooter—when available, opens a database of diagnostic information, tests, and procedures for the identified vehicle.

5.6 Ford Service Codes

Ford refers to service codes as on-demand codes and KAM codes. On-demand codes are “hard” codes that occur during a Key-On, Engine-Off (KOEO) self-test, or a Key-On, Engine-Running (KOER) self-test. KAM codes are “soft” memory codes from the power-train control module (PCM). These indicate intermittent problems that have occurred in the past, during normal vehicle operation. Memory codes cannot be set while running a self-test. Some codes can only be set as KAM (Keep Alive Memory) codes.

During the KOEO self-test:

- EEC-IV systems transmit hard (on-demand) codes first, followed by soft (KAM) memory codes. EEC-IV vehicles do not transmit KAM memory codes during the KOER self-test.
- EEC-V (OBD-II) systems do not generate KAM codes during the KOEO or KOER self-test. Instead, select KAM CODES from the Service Code Menu to generate KAM codes.

Wiggle Tests—The engine-off and engine-running wiggle tests are available from the Functional Test Menu on EEC-IV vehicles. Wiggle tests place the Scanner and the PCM in a stand-by mode that allows the checking for an intermittent problem caused by wiggling electrical harnesses. If a fault occurs during a wiggle test, it is recorded in PCM memory as a KAM code. The KOEO test must be repeated to read codes set during a wiggle test.

5.6.1 Service Codes Menu

Service Code Menus vary by vehicle and system, typical selection options include:

- **Key-on, Engine-off (KOEO) test**—displays on-demand hard codes present with the ignition on, but the engine not running. These are usually electrical open and short circuits and must be serviced first, before any other codes.

For EEC-IV systems, the KOEO test also displays KAM memory codes of intermittent faults from ECU memory.

For EEC-V systems, KAM memory codes are gathered by selecting KAM CODES. Memory codes should be serviced last, after any other hard codes.

- **Key-on, Engine-Running (KOER) test**—displays on-demand hard codes present with the engine running. These should be serviced second, after any KOEO hard codes and before any memory codes. Some 1988 and later Ford vehicles will not perform a KOER test if any KOEO hard codes are present and uncorrected.
- **Review Codes**—displays a list of codes generated during self-tests.

- **Continuous Codes**—when available, displays hard codes with the engine running. It is the only EEC-IV test where it is still possible to drive the vehicle whilst the ECU is in diagnostic mode.
- **KAM Codes**—when available, displays KAM memory codes of intermittent faults from PCM memory. Memory codes should be serviced last, after any other hard codes. For EEC-IV systems, KAM codes are gathered at the end of the KOEO self-test.
- **Clear Codes**—when available, allows the manual clearing of KAM memory codes of intermittent faults from PCM memory.

5.6.1.1 Troubleshooting Sequence

Ford test procedures are very specific about the order in which self-tests should be performed and codes should be diagnosed and serviced.

Diagnose Ford codes in the order in which they are listed by the Scanner. After fixing a problem, repeat the self-tests to be sure the code does not reappear. Some codes may be present as both hard and soft codes. Fixing the hard codes first may also correct problems that caused soft codes.

Ford EEC systems control a variety of engine functions, but basic fuel, ignition and electrical tests should be made before, or along with, control system testing. Make sure that these systems and parts are in good working order:

- Fuel delivery
- Battery condition, electrical connectors and wiring harnesses
- Ignition primary and secondary circuits
- Vacuum lines and connectors
- Cooling system
- General engine mechanical condition.



Note:

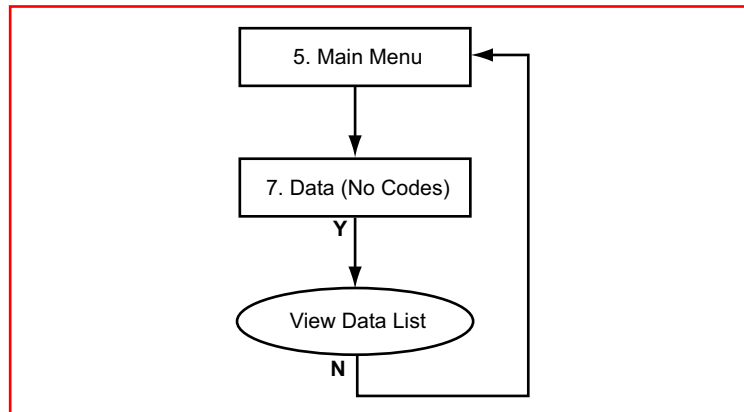
If something should go wrong when testing EEC-IV systems, turn the ignition key off and restart the test.



Note:

If something should go wrong when testing EEC-V systems, turn the ignition key off, wait at least 10 seconds before turning the key on again and restart the test.

5.7 Data (No Codes)



5.7.1 Data Sub-menu

The Data (No Codes) selection is available on many 1993 and later Ford vehicles with EEC-IV controllers and 1995 and later vehicles with EEC-V controllers. When Data (No Codes) is selected from the Main Menu on an EEC-IV vehicle, the Scanner displays the ECU data list.

When Data (No Codes) is selected on an EEC-V vehicle, the Scanner displays a sub-menu of data list selections, allowing the selection of groups of related parameters for viewing.

5.7.1.1 Displaying the EEC-IV and EEC-V Data-list

On EEC-IV vehicles, select Data (No Codes) the data list displays.

On EEC-V vehicles, select Data (No Codes) a sub-menu displays, select Driveability for example. After communication has been established the custom data list displays, select the required number of data parameters to be displayed.

The data parameters available in one data list vary from one vehicle to another. The data list can be scrolled forward and backwards.

5.7.1.2 OBD Information

These selections display information concerning the OBD (On-Board Diagnostics) related data and fault codes:

- Readiness Monitors
- OBD Data
- OBD Freeze Frame

To view OBD Information:

1. Select **Readiness Monitors** and confirm.

2. Scroll to display the data.
3. Select **OBD Freeze Frame** and confirm.
 - a. If the vehicle supports OBD Freeze Frame, the data displays.
 - b. If the vehicle does not support OBD Freeze Frame or if no Freeze Frame is stored a “no information available” message displays.
4. Scroll to display the data.

5.8 Functional Tests

Selecting Functional tests opens a menu of tests. These tests allow the Scanner to control ECU output for certain components.

5.8.1 Functional Tests Menus

Functional test menus and procedures vary by control system.

5.8.1.1 Functional Tests — EEC-IV

For EEC-IV vehicles the operator can perform all engine operating (functional) tests programmed into the powertrain control module (PCM). The ignition key should be OFF when Functional Tests is selected.

Computed Timing



Note:

Before entering this test, connect a timing light or a magnetic timing meter to the engine.

The Computed Timing test allows the checking of ignition timing with the engine running at a controlled idle speed. It also verifies the ability of the ECU to advance and retard timing. The ECU provides a fixed base timing specification in this test mode.

Wiggle Tests (Engine Off) & (Engine Running)

The Wiggle tests put the system into a program that will record intermittent service codes that occur as various engine sensors, actuators and wiring connectors are wiggled or tapped with the engine off or running or during a test drive.

Output State Test



Note:

The engine must be shut down before selecting Output State Test.

The Output State test allows the switching of the ECU signals to the engine actuators on and off so that they can be tested with a voltmeter.

Cylinder Balance (SFI Engines)

The Cylinder Balance test allows the checking of the operation of individual fuel injectors for sequential electronic fuel injection (SFI) systems. The ECU disables each injector individually and compares the engine speed drop from cylinder to cylinder. At the end of the test stages, the Scanner will display the results recorded by the ECU.

Idle Speed Adjustment

The Scanner can be used to assist in idle speed adjustment on certain engines. Before adjusting idle speed, make sure that the throttle body and the idle speed control (ISC) devices are clean and that the throttle linkage is not sticking or binding.



Caution:

If any service codes other than 11 — No Faults Present are displayed after the engine-running test, diagnose and correct those problems before proceeding with idle adjustment.

5.8.1.2 Functional Tests — EEC-V

There are 2 types of EEC-V Functional Tests: Actuator Tests and Output State Tests. Output State Tests are the same as for EEC-IV systems discussed above.

Actuator Tests

These procedures cycle certain ECU output devices on and off to verify operation. The number of actuators that can be activated is dependent on the ECU under test and the vehicle itself. Only the tests available from the ECU display in the menu. Note the following:

- Often a certain actuator may not be present on a vehicle, although according to the manuals it should be. Therefore, check this first after failing to hear a reaction from the actuator under test.
- Have the engine running only when instructed to do so by the Scanner and always follow the instructions displayed on the Scanner.
- With some engines hearing the various components click/activate is very difficult. Use a multimeter or scope to make sure or check that the components are activated properly.
- Some actuators are activated for a short time. For example, the injectors activate for only five seconds, this is for safety reasons.



Caution:

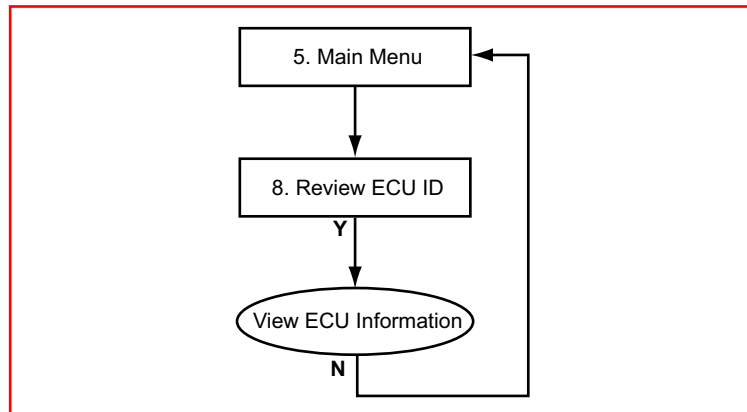
Make sure the fuel system is intact before proceeding. Selecting All Outputs On causes the electric fuel pump to briefly energise.



Caution:

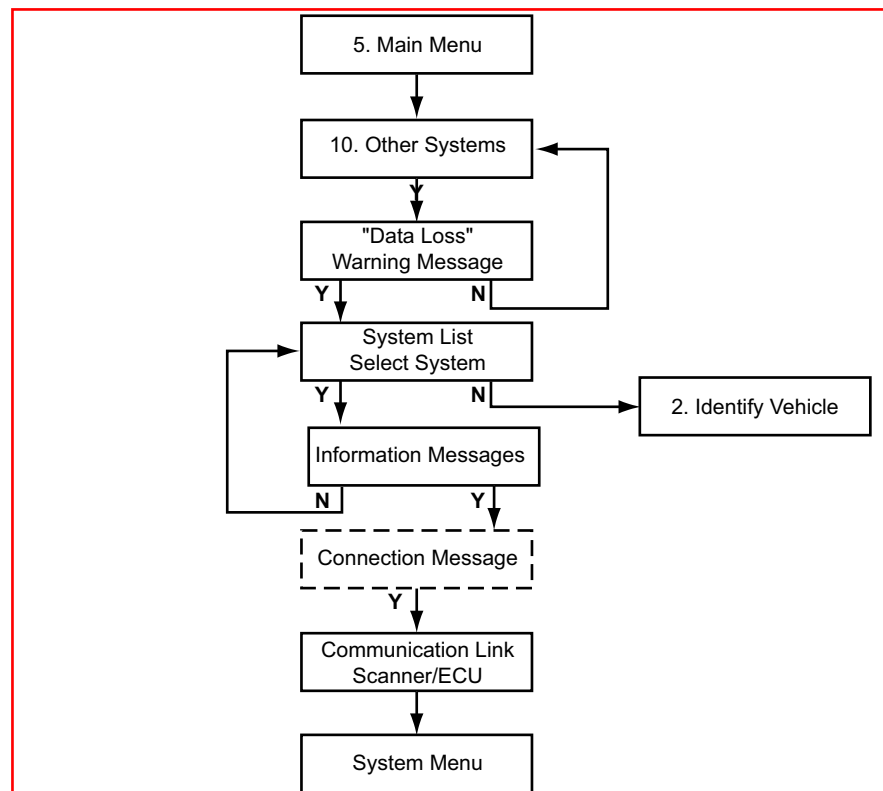
Make sure that the fan blades are clear of obstructions before selecting low or high speed fan on.

5.9 Review ECU ID



This selection displays pertinent information about the ECU under test, such as the part and model numbers and the manufacturer.

5.10 Other Systems



Use Other Systems to end the current diagnostic session and to Stop Communication with the ECU.

**Caution:**

The ABS System or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the Main Menu and select “Other Systems” before disconnecting the Scanner.

5.10.1 Super Star II Selection

Select this option and the Scanner displays the Super Star II operating screen, which emulates the Ford factory diagnostic tool.

The Scanner operates as explained below in the Super Star Mode:

Arrow Keys—use the arrow keys move the cursor and select any of the three functions on the screen.

Y Button—use the Y button to change the setting of the function indicated by the cursor.

N Button—use the N button to exit from the Super Star II mode and return to the test selection screen.

LED Indicators—the left-hand LED works as a self-test output (STO) indicator. The LED lights each time the STO voltage switches low. Fast codes cause the LED to flicker or flash briefly. Slow codes cause the LED to light in even pulses, which indicate the code digits.

5.10.2 Special Ford Galaxy Systems

The Ford Galaxy can have a number of different combinations of Engines and Electronic Control Systems. The following sections describe these various systems.

5.10.2.1 System Identification

When the vehicle has been identified and after the vehicle connection message, a “System Appears Not To Be EEC-V” message could display.

Select to continue and the Scanner attempts to communicate with the vehicle, once communication has been established the Select Systems menu displays.

Select Galaxy Engine And Sub-systems and the vehicle connection message displays. Connect the Scanner to the vehicle as instructed, select to continue, and the System Menu displays once communication is established.

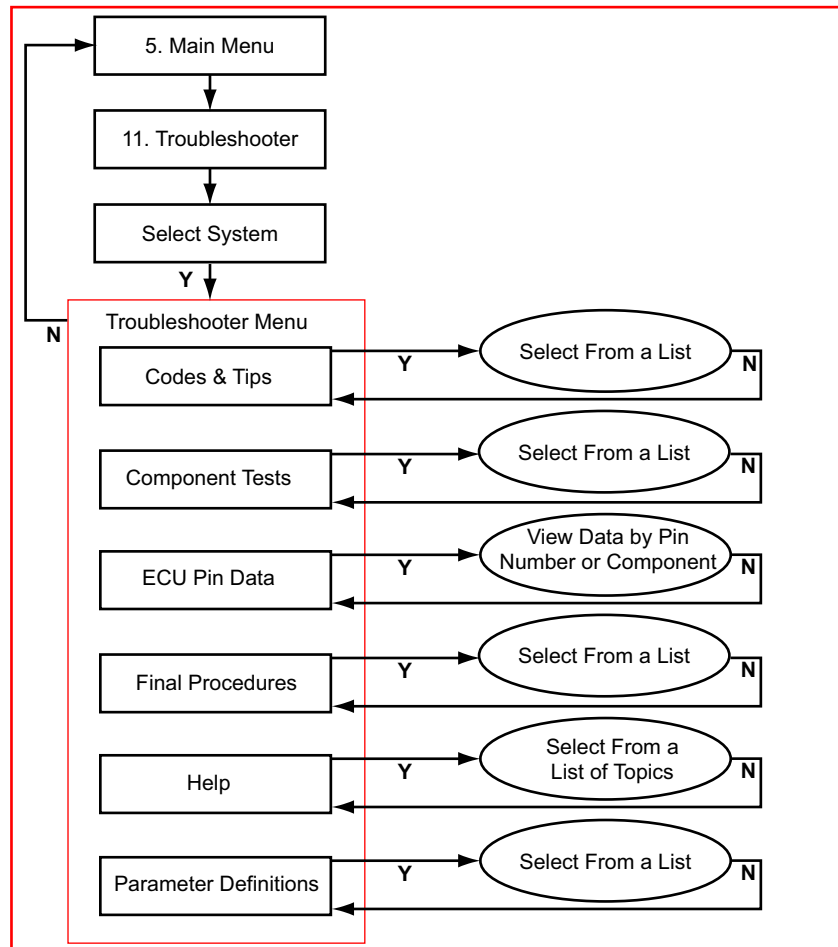
5.10.2.2 Select System to be Tested

After the vehicle has been identified and connected, the Select System menu displays. The number of systems that can be tested is dependant on the selected vehicle. However, not all of the systems will be present, some are optional and others are mutually exclusive.

**Note:**

If the selected vehicle (engine) has “Blink Codes” only, refer to SAIS for more information.

5.11 Troubleshooter

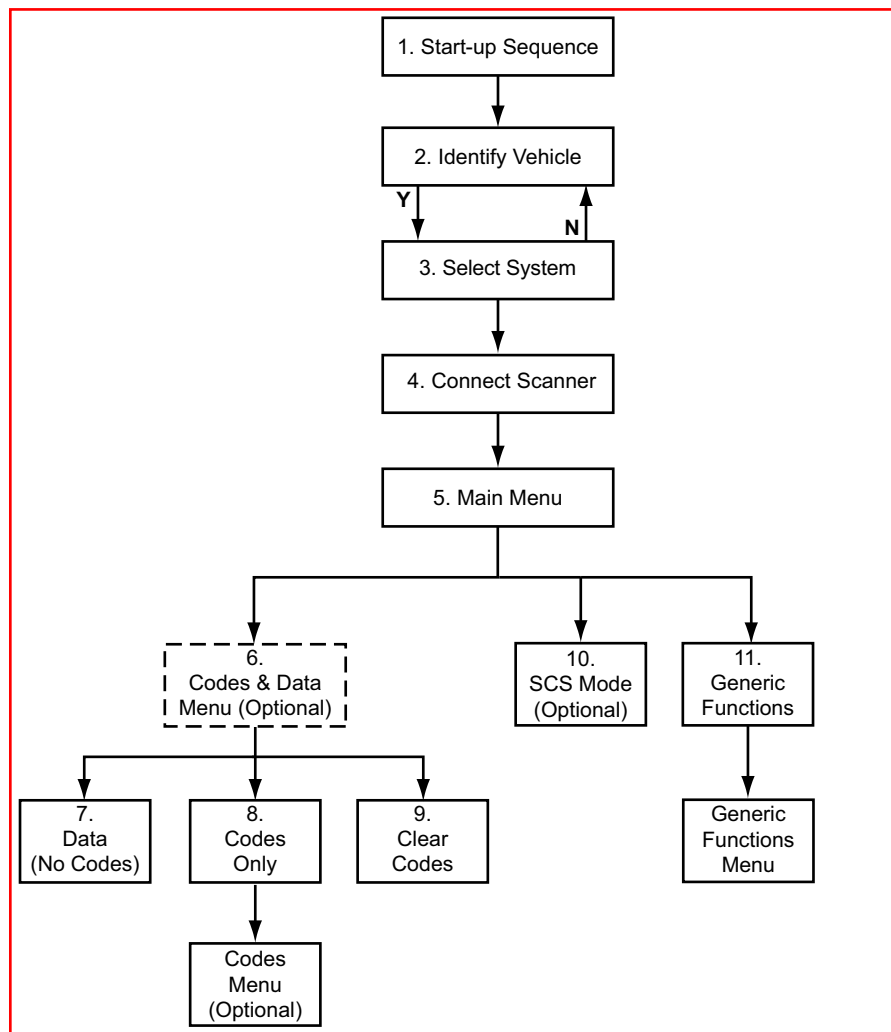


The Troubleshooter selection is on the system Main Menu only if information is available for the test vehicle. Troubleshooter is a database of information designed to assist you in diagnosing vehicle problems. Troubleshooter menus vary by make, model, and system.

6

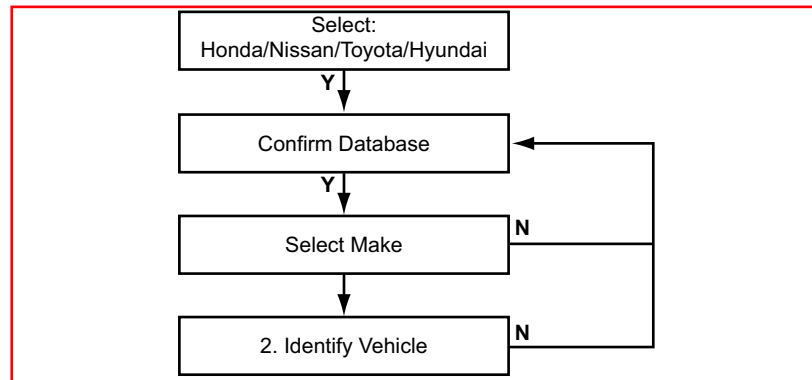
Honda

Overview

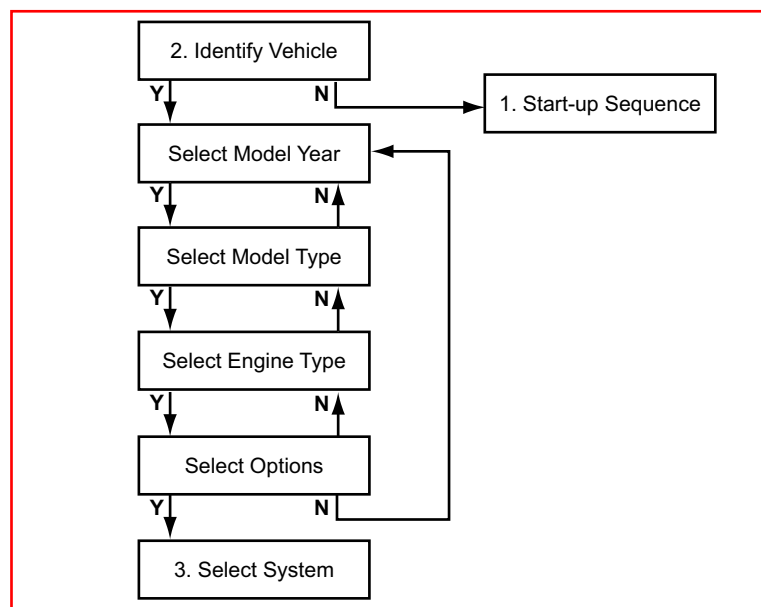


This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

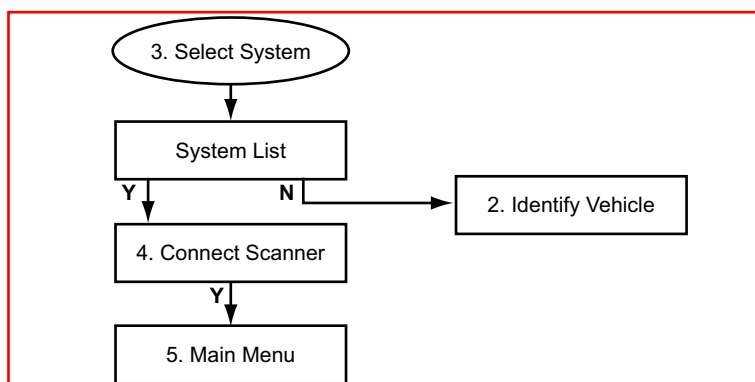
6.1 Start-up Sequence



6.2 Identify Vehicle



6.3 Select System to be Tested



6.3.1 System List

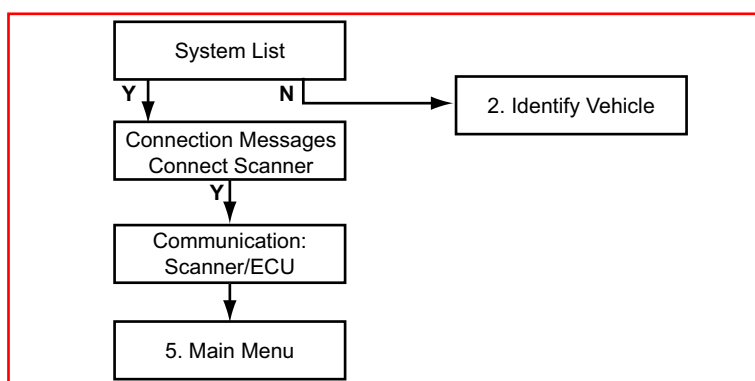
The System List displayed is dependent on the selected vehicle. The system list remains active until a new vehicle is selected. Scroll and confirm to select the system to be tested.



Caution:

The ABS System or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the “Select System” menu before disconnecting the Scanner.

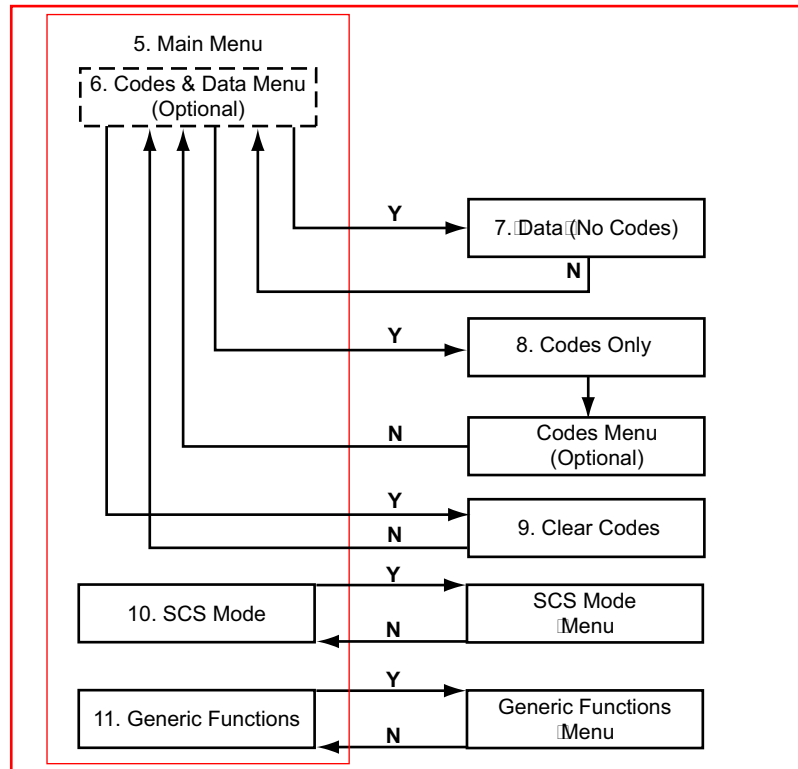
6.4 Connect Scanner



Note:

Refer to the “Adaptors Overview & Data Parameters” manual for connection information.

6.5 Main Menu



6.6 Codes & Data Menu

On some models the Data (No Codes), Codes Only, and Clear Codes options detailed on the following sections are grouped into a sub menu.

6.7 Data (No Codes)

Displays live data parameters, scroll to view the complete list.

6.8 Codes Only

Codes Only displays the EOBD Diagnostic Trouble Codes (DTCs) in a standard, 5-character alphanumeric format. Refer to the OBD-II/EOBD Vehicle Communication Software Manual for more information.

6.8.1 Codes Menu

A codes menu displays if there are more than one type of code list available. Typical choices are:

- Permanent Codes
- Temporary Codes
- Pending codes

6.8.1.1 Pending Codes

Pending Codes are set when operating conditions are out of the normal range, but not all the criteria to set a DTC occur. For example, a failure must occur on two consecutive trips or drive cycles before certain EOBD codes are set. In this case, a pending code is recorded during the first trip when the failure occurs. Pending codes can be symptomatic of a driveability concern.

6.9 Clear Codes



Note:

Some cleared codes only set again under certain circumstances. Note or print the codes before repair and before clearing codes.



Note:

When the error condition still exists, the code can be set again.

If the code clearing operation fails for any reason, the previous codes reappear. If this occurs, return to the Codes & Data menu and repeat the Clear Codes operation.

6.10 SCS Mode

When available, this test mode flashes codes on an instrument cluster warning lamp for antilock brake and airbag systems. The Scanner also uses SCS Mode to direct the ECU to run two-trip EOBD monitors on the first trip.

6.11 Generic Functions

The Generic Functions selection opens a menu of available EOBD functions on 1996 and newer vehicles. Menu options typically include:

- Freeze Frame—displays data stored by the ECU when a DTC is set

- Readiness Monitors—displays the status of the EOBD monitors
- Mode 6 Non Cont—displays the status of non-continuous EOBD monitors
- Mode 9 Calib. ID—displays the calibration identification numbers of the vehicle ECUs
- Mode 9 (CVN)—displays the calibration verification numbers of the vehicle ECU
- Mode 9 (VIN)—displays the vehicle identification number

6.12 Anti-lock Brakes Systems

For ABS testing the following Code Functions Menu items are available:

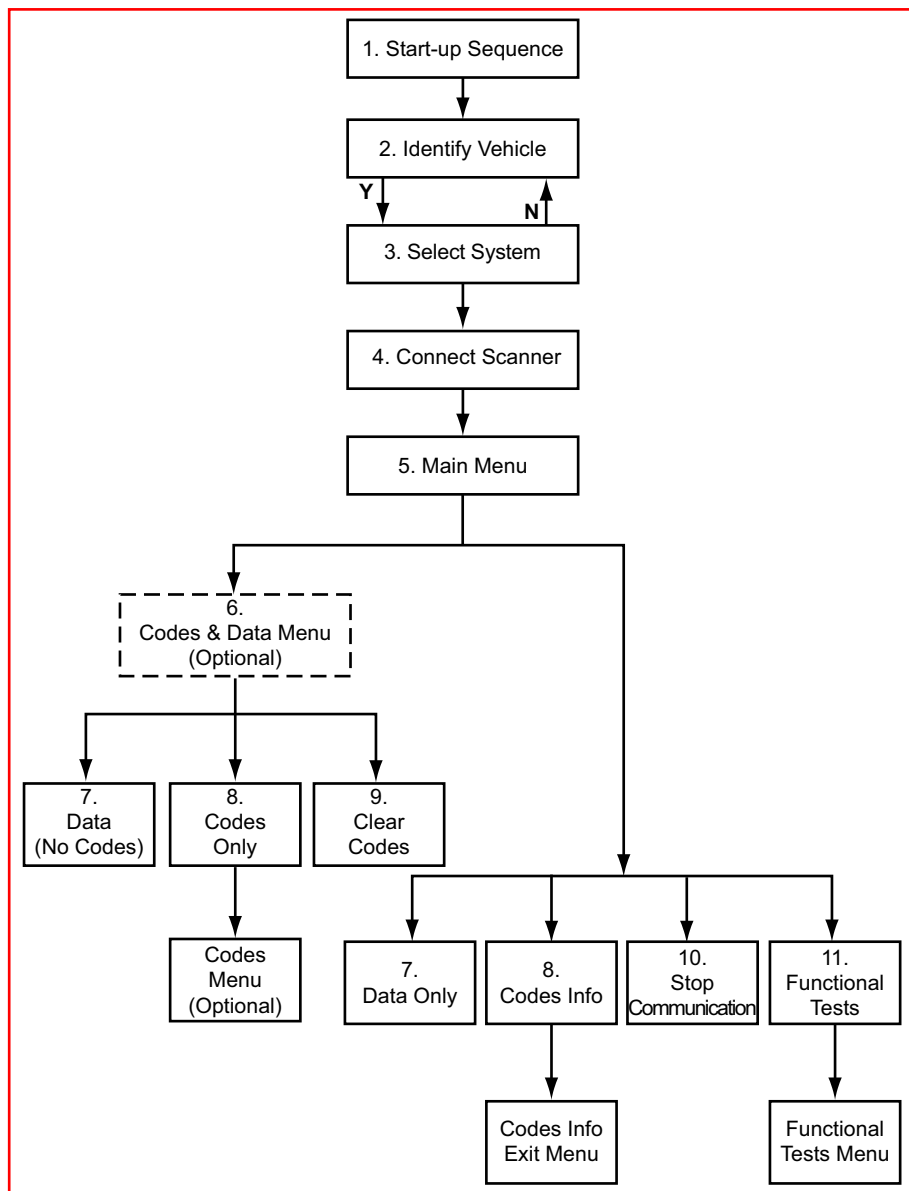
- **SCS Mode**, (Service Check Signal) used for checking the ABS/TCS flash diagnostic trouble codes. The stored codes will flash on the ABS/TCS lamp. If there are no codes present the lamp will switch off for approximately 3 seconds and then stay on continuously. Refer to manufacturers documentation for more information.
- **Clear Codes**, used to clear codes. Carefully follow all instructions displayed.
- **Code Descriptions**, displays the ABS code and a brief description.

6.13 Airbag Systems

For airbag system testing the following Code Functions Menu items are available:

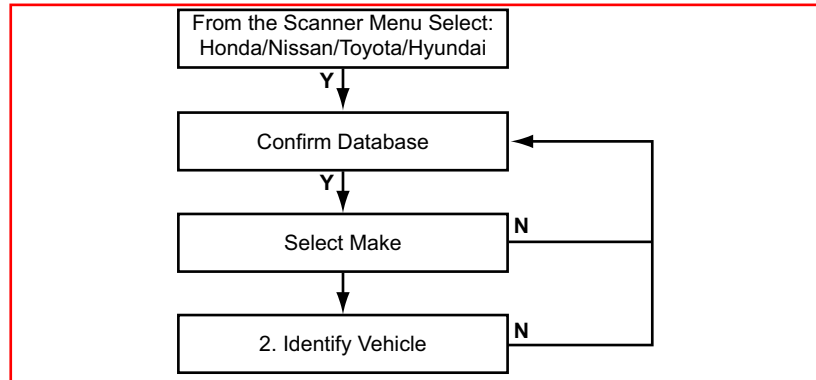
- **SCS Mode**, (Service Check Signal) used for checking the SRS flash diagnostic trouble codes. The stored codes will flash on the SRS lamp. If there are no codes present the lamp will switch off once and then stay on continuously. Refer to manufacturers documentation for more information.
- **Clear Codes**, used to clear codes. Carefully follow all instructions displayed.
- **Code Descriptions**, displays the Airbag code and a brief description.

Overview

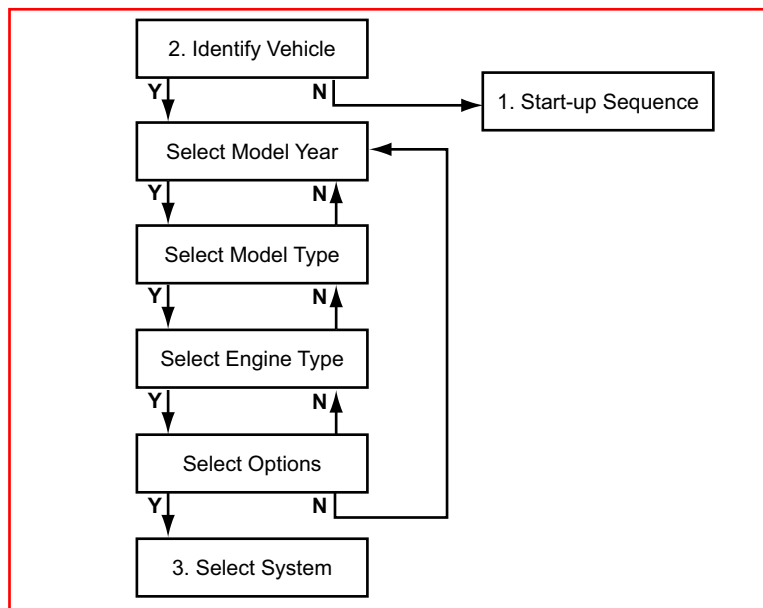


This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

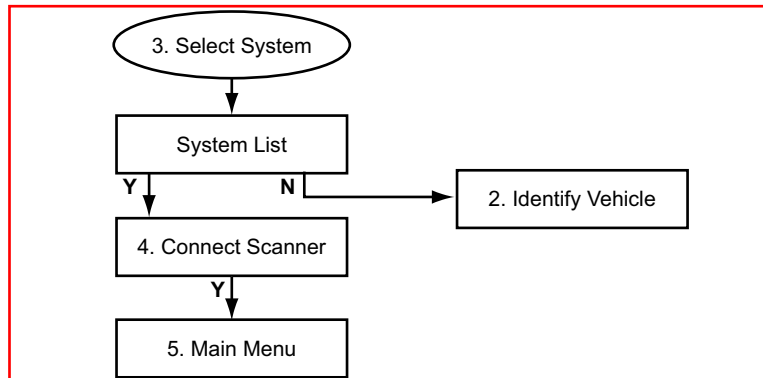
7.1 Start-up Sequence



7.2 Identify Vehicle



7.3 Select System to be Tested



7.3.1 System List

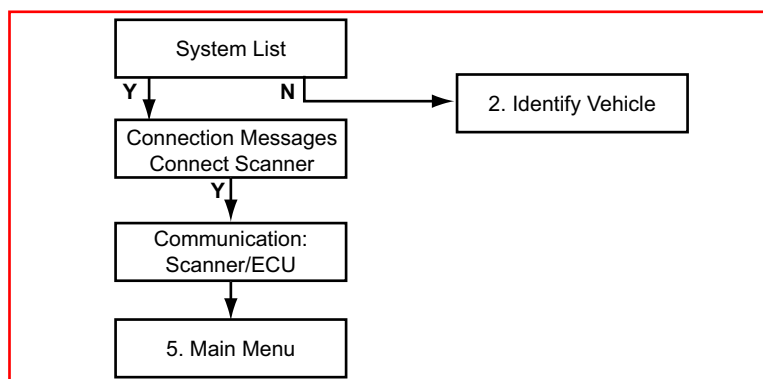
The System List displayed is dependent on the selected vehicle. The system list remains active until a new vehicle is selected. Scroll and confirm to select the system to be tested.



Caution:

The ABS System or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the “Select System” menu before disconnecting the Scanner.

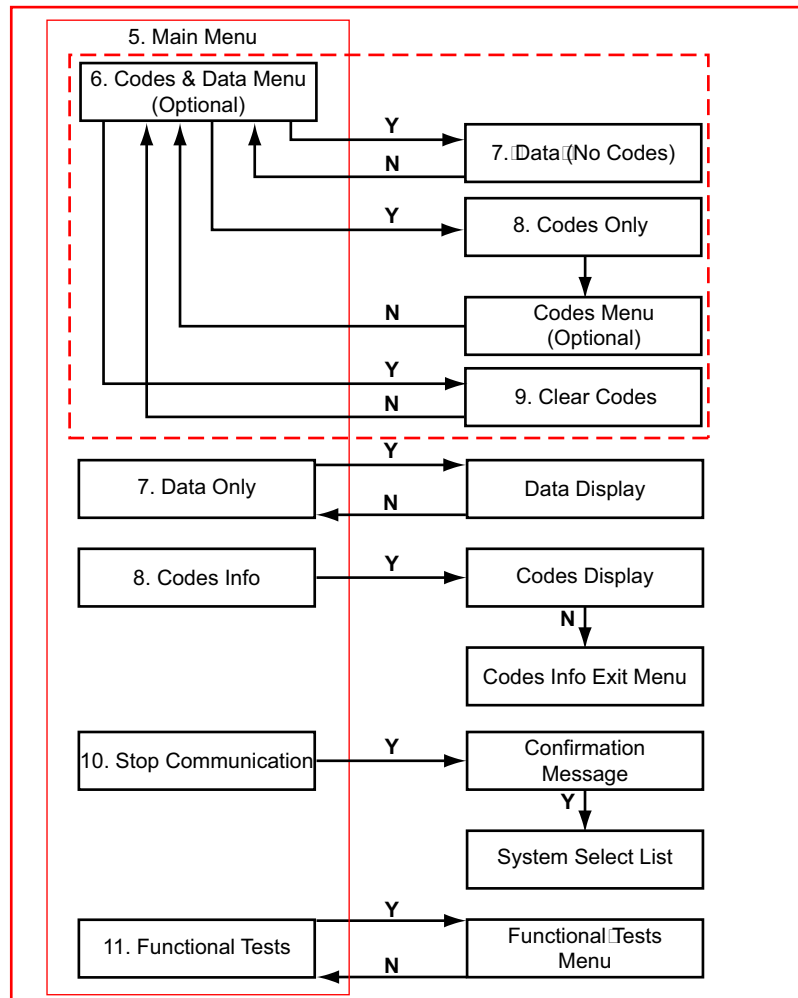
7.4 Connect Scanner



Note:

Refer to the “Adaptors Overview & Data Parameters” manual for connection information.

7.5 Main Menu



7.6 Codes and Data Menu

On some models the code features are grouped into a Codes & Data Menu selection. Select to open a list of available options. The operations available are similar to those on models without the Codes & Data Menu. However, the names are slightly different. Data (No Codes) is similar to Data Only and Codes Only is similar to Codes Info.

7.7 Data Only or Data (No Codes)

Selecting Data Only from the Main Menu, or selecting Data (No Codes) from the Codes & Data Menu, opens a display of live data parameters from the vehicle ECU. Scroll to view the complete parameter list.

7.8 Codes Info or Codes Only

Selecting Codes Info from the Main Menu, or selecting Codes Only from the Codes & Data Menu, opens a list of EOBD Diagnostic Trouble Codes (DTCs). Refer to the OBD-II/EOBD Vehicle Communication Software Manual for more information.

7.8.1 Codes Menu

A code menu displays if there are more than one type of code list available. Typical choices include Codes, which is the standard code list, and Pending Codes.

7.8.1.1 Pending Codes

Pending Codes are set when operating conditions are out of the normal range, but not all the criteria to set a DTC occur. For example, a failure must occur on two consecutive trips or drive cycles before certain EOBD codes are set. In this case, a pending code is recorded during the first trip when the failure occurs. Pending codes can be symptomatic of a driveability concern.

7.9 Clear Codes

Depending on the system under test, the Clear Codes feature may appear on the Codes & Data Menu or on the Codes Info Exit Menu. Regardless of location, the operation is the same, select and follow any on-screen instructions to delete code records from the ECU.



Note:

Some cleared codes only set again under certain circumstances. Note or print the codes before repair and before clearing codes.

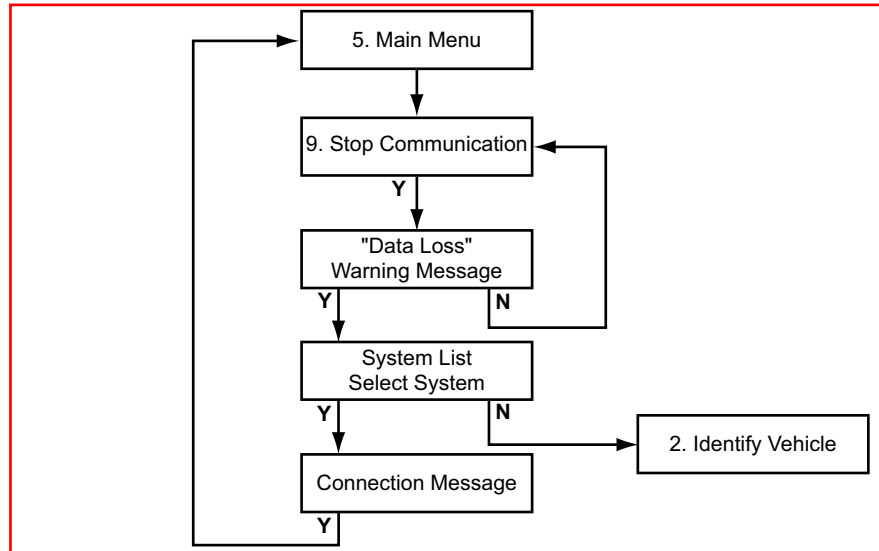


Note:

When the error condition still exists, the code can be set again.

If the code clearing operation fails for any reason, the previous codes reappear. Should this occur, return to the menu and repeat the Clear Codes operation.

7.10 Stop Communication



Use stop communication to stop communication with the ECU, or to exit and return to the Main Menu to select another system to test.

7.11 Functional Tests

Functional Tests allows the Scanner to switch certain system components on and off to check their operation. The number of components that can be activated is dependent on the ECU under test and the vehicle itself.

The Scanner energizes the selected actuator for 30 seconds, then automatically switches it off to prevent overheating or other damage to the component or system. For most actuators, the test can be cancelled at any time by the operator.



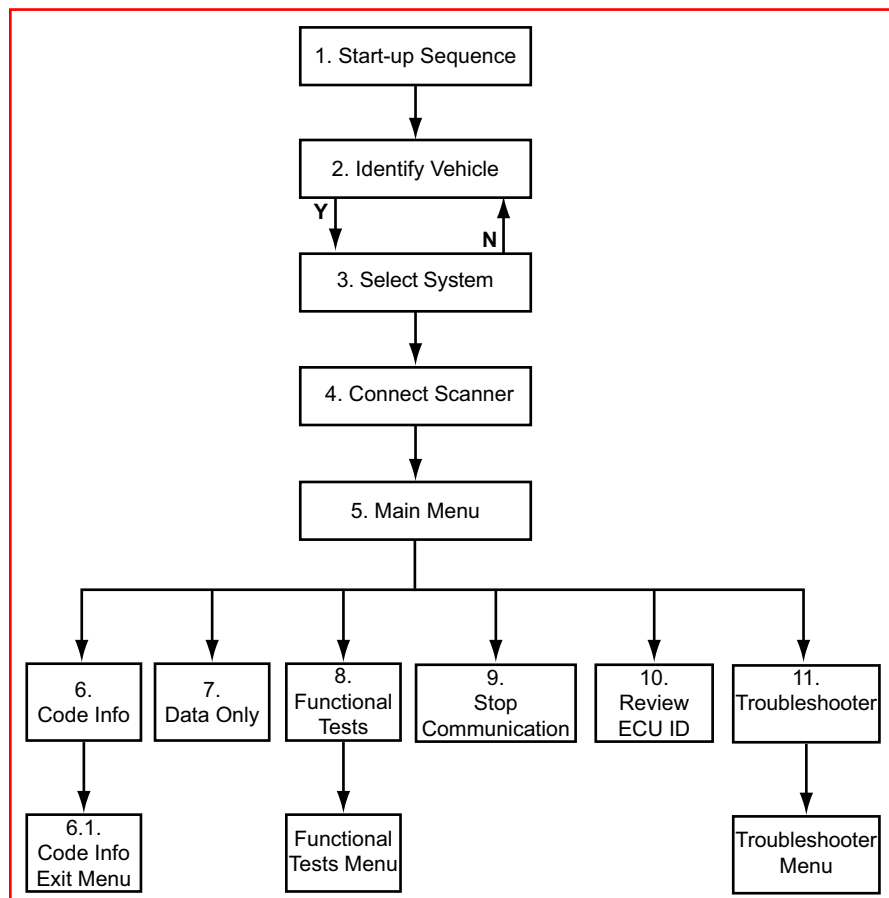
Note:

Carefully follow all on-screen messages and instructions that display while performing functional tests.

8

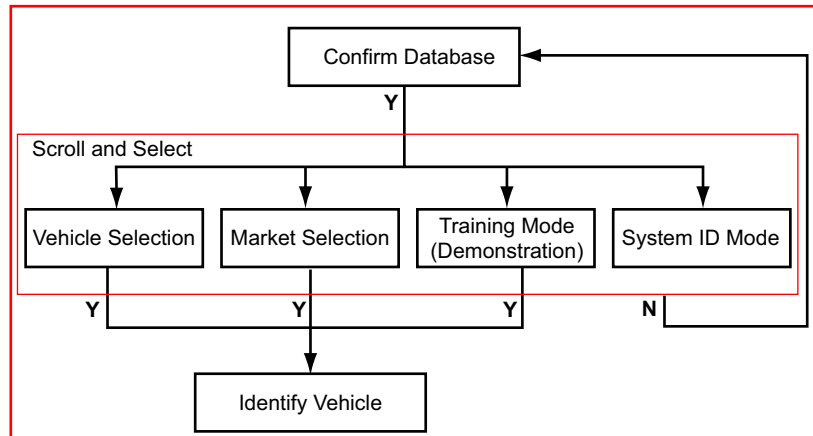
Land Rover

Overview



This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

8.1 Start-up Sequence



8.1.1 Vehicle Selection

Allows you to identify the test vehicle by answering a series of questions:

- Model Year
- Model
- Engine
- Optional equipment

8.1.2 Market Selection

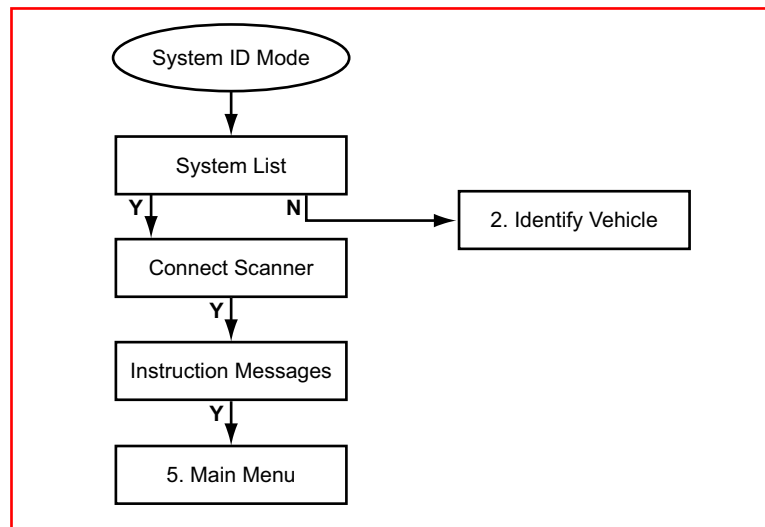
Allows you to choose between left or right hand drive. The correct connector location information displayed is dependent on this selection.

8.1.3 Training Mode (Demonstration)

Allows you to use many of the Scanner functions without actually connecting to a vehicle. Simulated data and test results are provided.

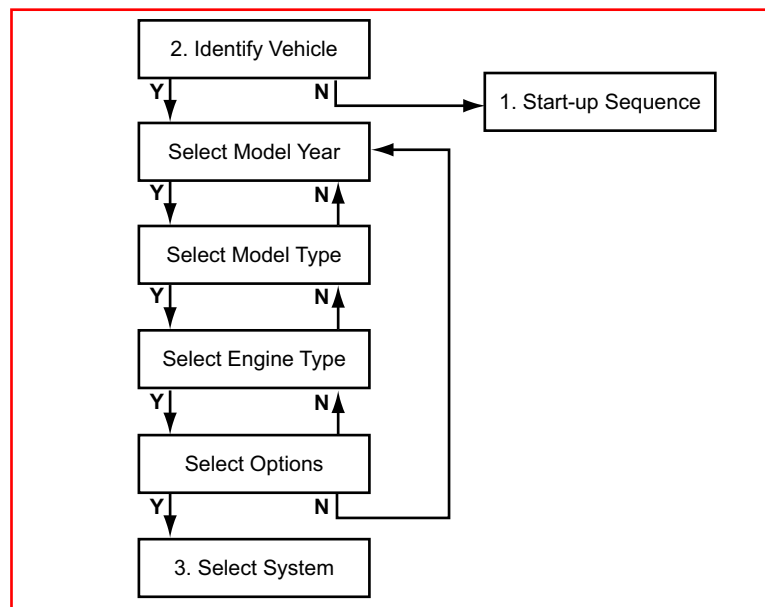
8.1.4 System ID Mode

Allows you to begin the vehicle identification by first selecting the system to be tested. Use this option if communication problems arise or the ECU type is unknown.

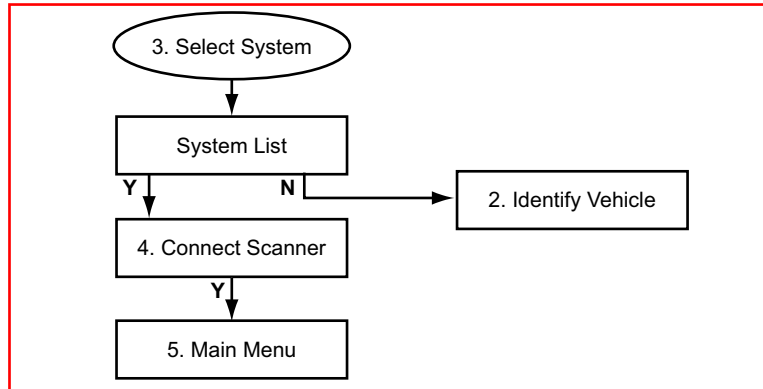


1. Select a system group from the list. Only fitted systems groups (engines, lights, seat, etc.) will be displayed.
2. After selecting the system group, select the system to be tested.
3. Connect the scanner and proceed testing.

8.2 Identify Vehicle



8.3 Select System to be Tested



8.3.1 System List

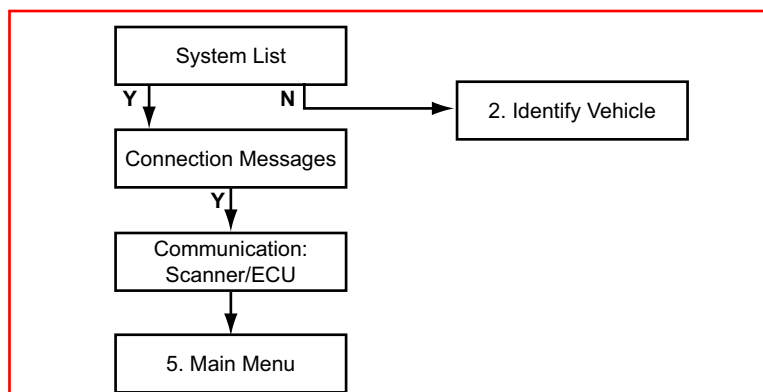
The System List displayed is dependent on the selected vehicle. The system list remains active until a new vehicle is selected. Scroll and confirm to select the system to be tested.

8.3.1.1 No Communication

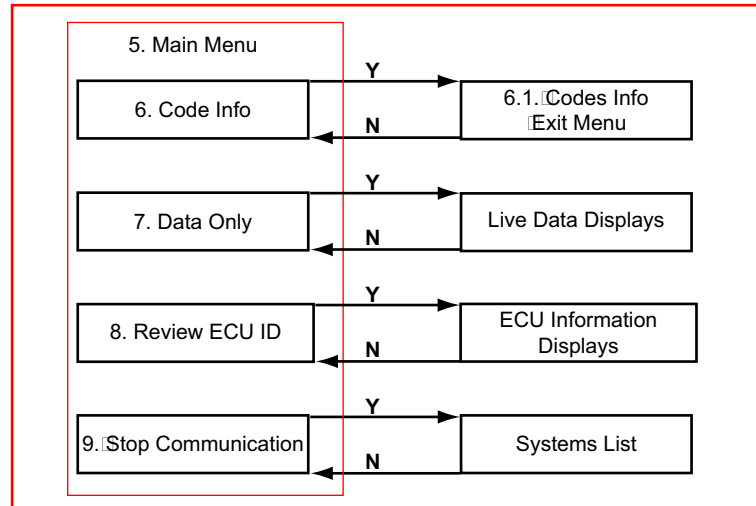
If there is no communication to the selected System it is advisable to select the ECU type, if known, from the Test entry to determine if the ECU is communicating or not.

This can be found in the Vehicle ID selection by choosing 1987 /TEST / the ECU name. All available ECU types are located here.

8.4 Connect Scanner



8.5 Main Menu



8.6 Code Info

Displays the Diagnostic Trouble Codes (DTCs) stored in ECM memory, scroll to view the complete list.

8.6.1 Code Info Exit Menu

The Code Info Exit Menu offers the following options:

- Resume—returns to the code list.
- Clear Codes—erases all code records from ECM memory.
- Return To Main Menu—returns to the System Main Menu.

8.7 Data Only

Displays live data parameters, scroll to view the complete list.

8.8 Functional Tests

Functional Tests allows the Scanner to switch certain components on and off to check their operation. The number of components that can be activated is dependent on the ECU under test and the vehicle itself.

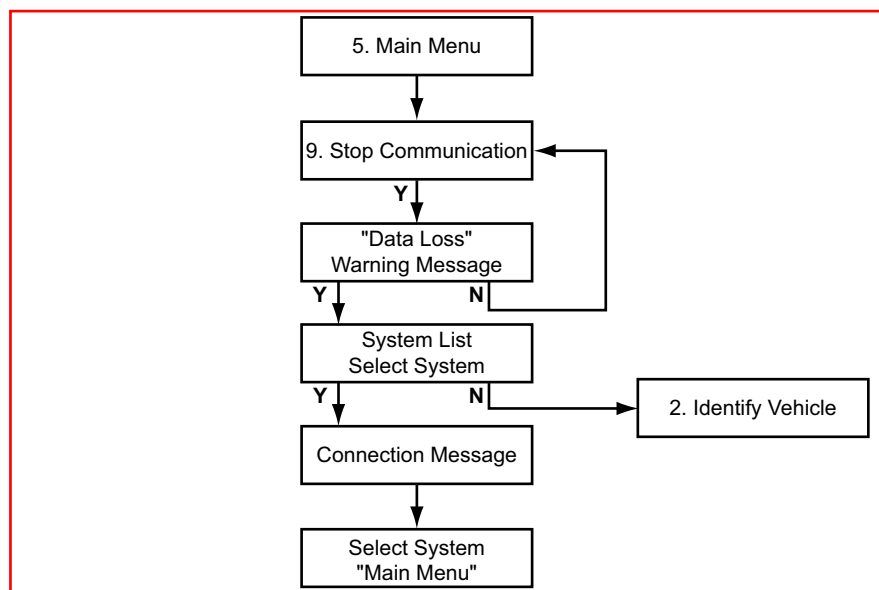
The Scanner energizes the selected actuator for 30 seconds, then automatically switches it off to prevent overheating or other damage to the component or system. For most actuators, the test can be cancelled at any time by the operator.



Note:

Carefully follow all on-screen messages and instructions that display while performing functional tests.

8.9 Stop Communication



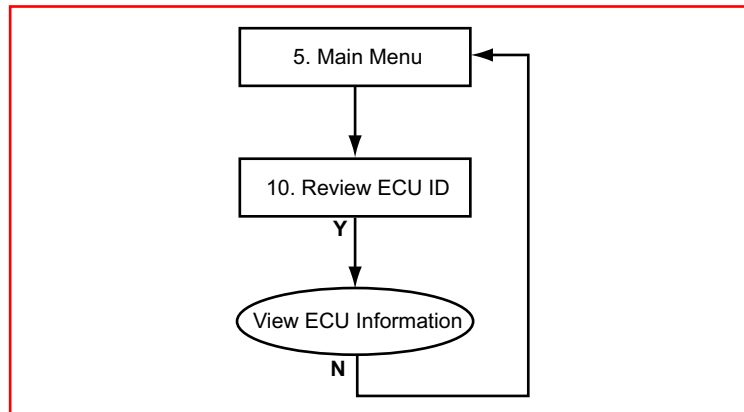
Use Stop Communication to end the current diagnostic session and to Stop Communication with the ECU.



Caution:

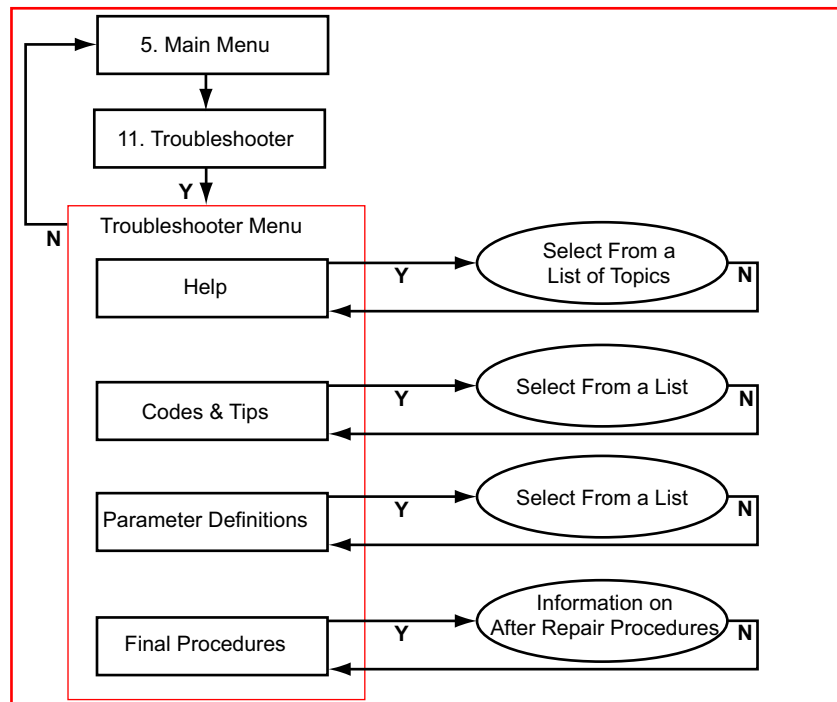
The ABS System or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the Main Menu and select "Stop Communication" before disconnecting the Scanner.

8.10 Review ECU ID



This selection displays pertinent information about the ECU under test, such as the part and model numbers and the manufacturer.

8.11 Troubleshooter

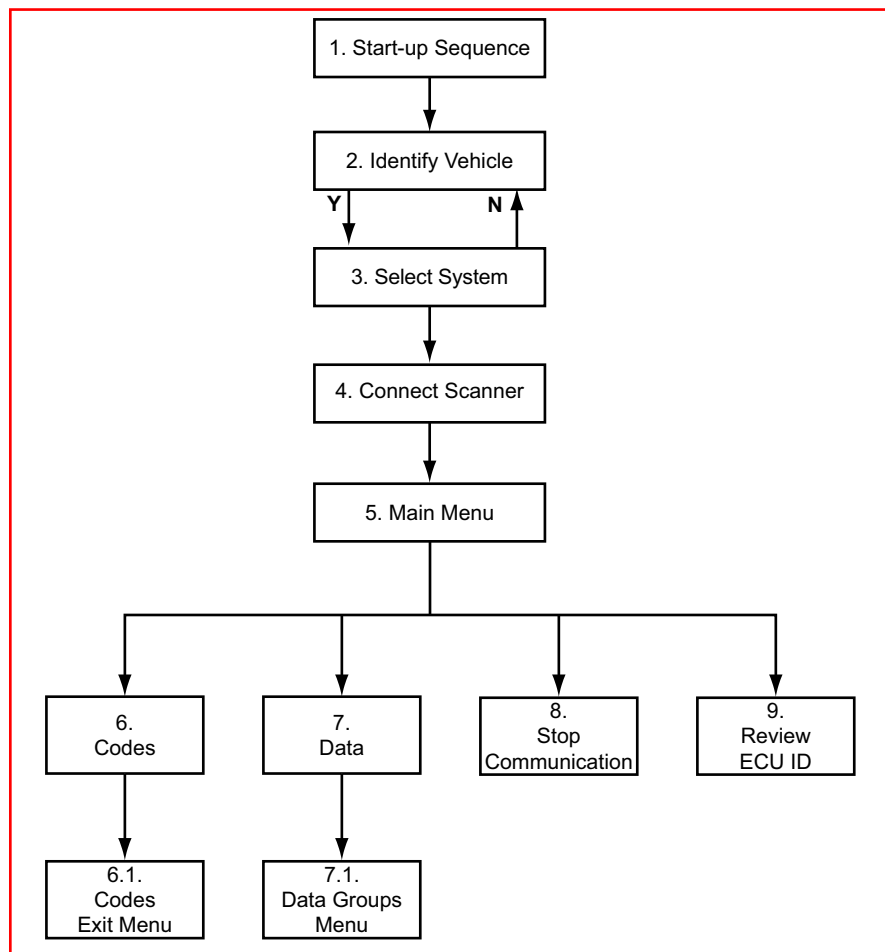


The Troubleshooter selection is on the system Main Menu only if information is available for the test vehicle. Troubleshooter is a database of information designed to assist you in diagnosing vehicle problems. Troubleshooter menus vary by make, model, and system.

9

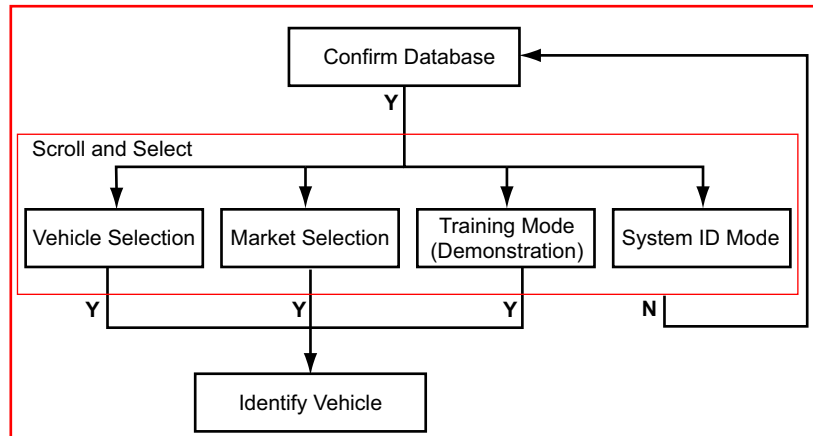
Mercedes-Benz

Overview



This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

9.1 Start-up Sequence



9.1.1 Vehicle Selection

Allows you to identify the test vehicle by answering a series of questions:

- Model Year
- Model
- Engine
- Optional equipment

9.1.2 Market Selection

The correct connector location information displayed is dependent on this selection. Choices are:

- European Right Hand Drive
- European Left Hand Drive
- USA

The European Left and Right Hand Drive selection differs in connector locations because the steering wheel is on different sides. The USA selection differs because it uses another vehicle selection procedure. In the USA the Vehicle Identification Number (VIN) is used to make the vehicle selection.

In the European market selection only a model year is displayed, in the USA selection the tenth VIN character is displayed. This character corresponds to a certain model year. When this VIN character is selected the correct model year is automatically selected. This makes model year selection easier.

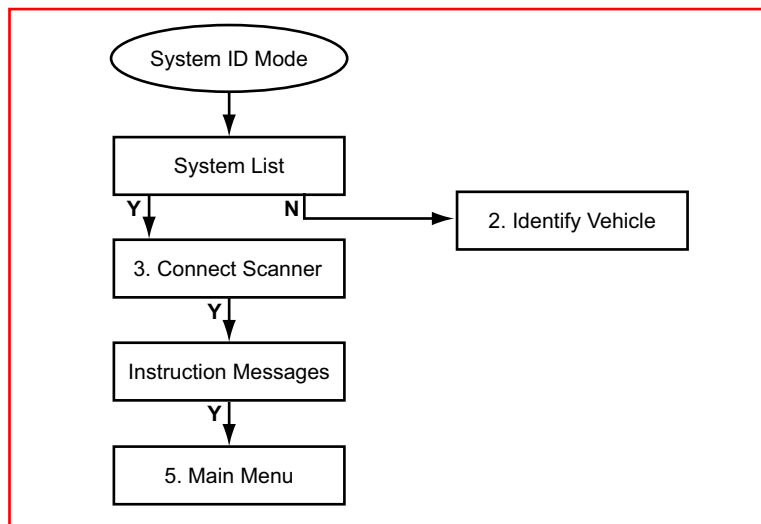
With the European market selection a model and engine can be selected by scrolling through the models and engines and selecting the correct one. The USA market selection uses certain characters of the VIN. When these characters are selected the model and engine are automatically selected.

9.1.3 Training Mode (Demonstration)

Allows you to use many of the Scanner functions without actually connecting to a vehicle. Simulated data and test results are provided.

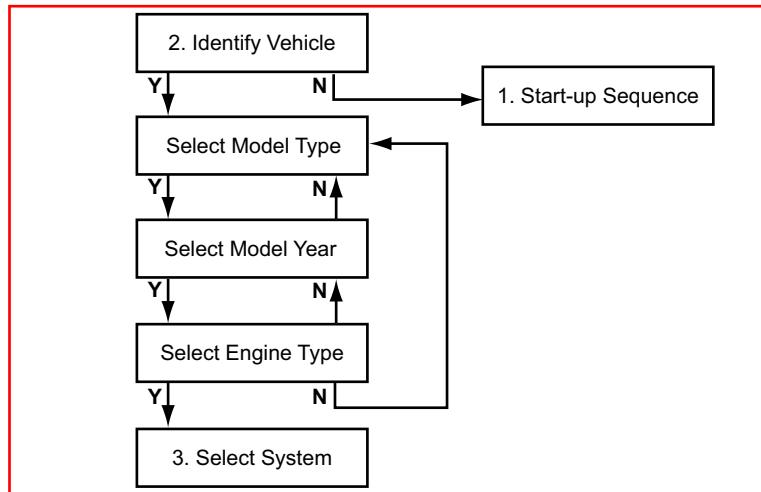
9.1.4 System ID Mode

Allows you to begin the vehicle identification by first selecting the system to be tested. Use this option if communication problems arise or the ECU type is unknown.



1. Select a system group from the list. Only fitted systems groups (engines, lights, seat, etc.) will be displayed.
2. After selecting the system group, select the system to be tested.
3. Connect the scanner and proceed testing.

9.2 Identify Vehicle



9.2.1 Model Type Selection

The model is selected first. Mercedes uses a 6-digit model number: XXX.YYY.

The first three digits (XXX) indicate the Mercedes series and the second three digits (YYY) are the model number for the selected series.

When selecting the model, the characters on the US VIN and International VIN also change. However, not all models are available in the US, in these cases the US VIN indicates Not Available.

9.2.2 Model Year Selection

Only the years that the selected model exists display. The tenth character of the VIN displays after the model year.



Note:

The tenth character of the VIN does not represent the model year in all countries.

9.2.3 Engine Selection

Engine selection is limited to the engines available for the selected model and year. Only one engine will be available in most cases.

In cases where more than one engine is available it is important to choose the correct engine, otherwise the Scanner attempts to communicate with a non-existent ECU.

As with the Model selection, Mercedes uses a 6-digit engine code. The Scanner displays this number along with the engine displacement.

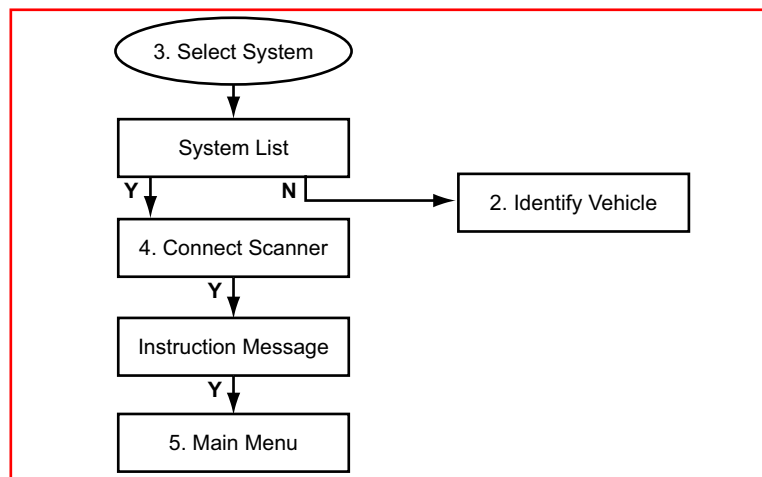
A code is displayed after the engine displacement indicating how the engine is mounted, the type of engine and the number of cylinders.

For example:

- L-V8: Engine mounted in line, V-type, 8 cylinders
- T-L4: Engine mounted transversely, Line-engine, 4 cylinders

When the vehicle has been completely selected, an overview of the selection displays. The operator can accept this selection or return to the vehicle selection and select a different vehicle.

9.3 Select the System to be Tested



9.3.1 System List

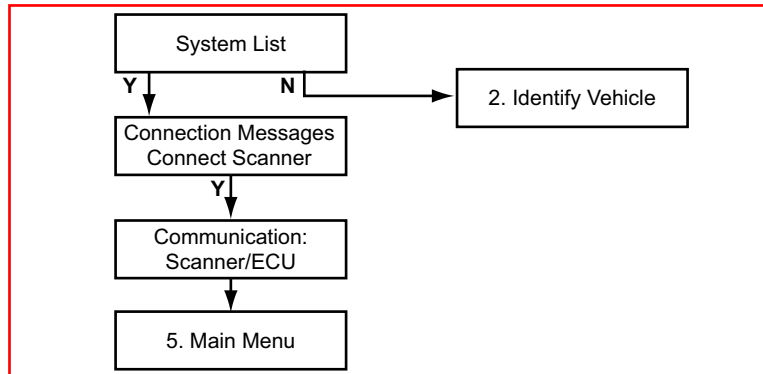
Because Mercedes can use more than one ECU to control the engine, a menu selection is available that displays a list of all of the ECUs in the vehicle along with a brief description.



Note:

The System List displayed on the Scanner shows all of the available systems for the selected vehicle. However, all of the systems listed may not be actually present on the currently selected vehicle. If the Scanner fails to communicate with a system that is not present, check that the ECU is physically installed.

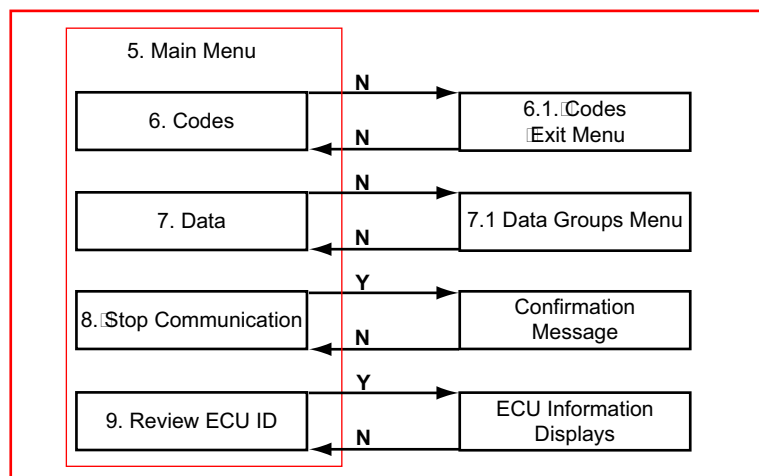
9.4 Connect Scanner



Note:

Refer to the “Adaptors Overview & Data Parameters” Manual for connection information.

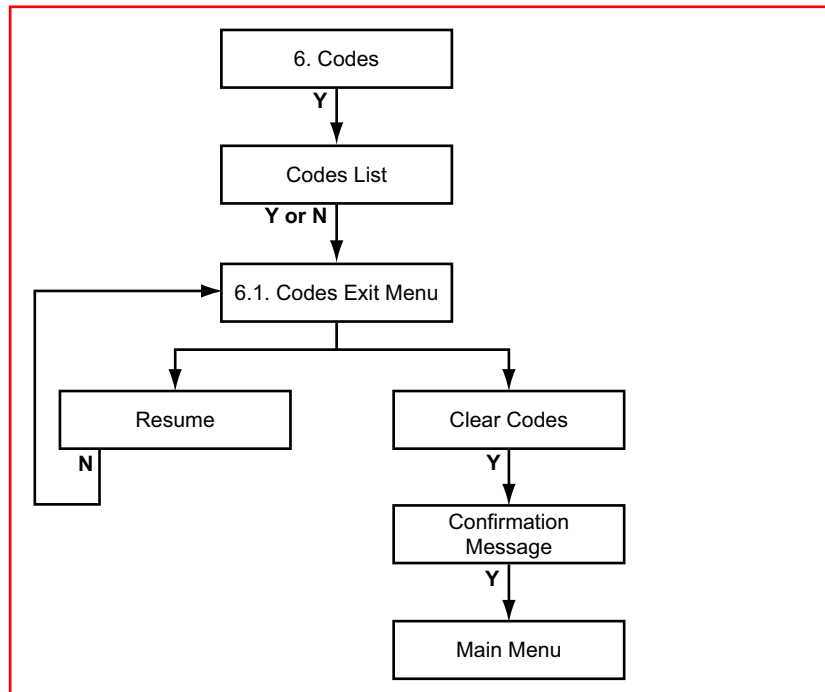
9.5 Main Menu



The selections are only for the specific vehicle being tested. The name of the ECU under test will be displayed in the upper left hand corner of the display.

9.6 Codes

Displays the Diagnostic Trouble Codes (DTCs) stored in ECM memory, scroll to view the complete list.



On some older systems like CIS-E, the Scanner can read the blink codes from the car. The procedure to do this is the same as for ECUs with serial communication. The Scanner shows the CODES option on the Main Menu.

9.6.1 Codes Exit Menu

The Code Info Exit Menu offers the following options:

- Resume—returns to the code list.
- Clear Codes—erases all code records from ECM memory.

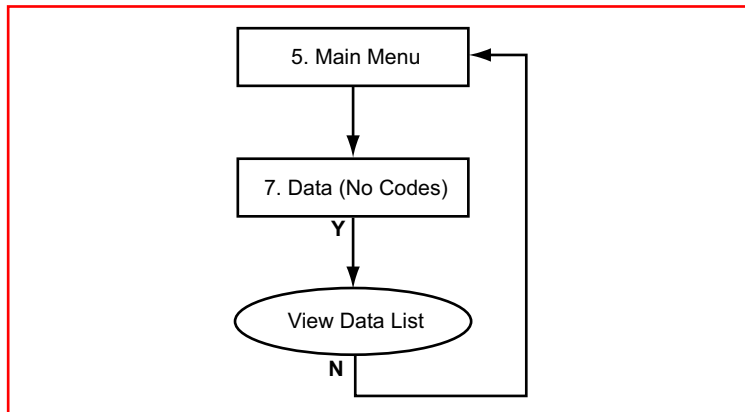
Be aware, some cleared codes can only be set again under certain circumstances. Note or print the codes before repair and clearing codes.



Note:

Sometimes a fault code is displayed for a component which is not installed in the test vehicle. These codes cannot be cleared. Always make sure the component the code refers to is present, when a code cannot be cleared.

9.7 Data



Displays live data parameters, scroll to view the complete list.

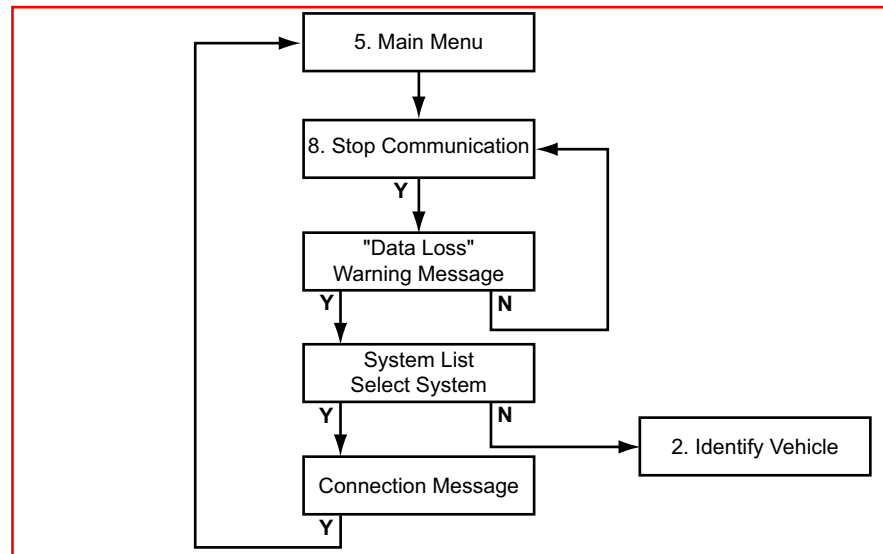
9.7.1 Data Groups Menu

Because Mercedes has a very large number of data parameters available, some grouping of parameters is required. This means that data parameters are grouped in logical sequences. Therefore, the number of data parameters that are displayed is reduced which in turn speeds-up the screen update rate.

For some models there is a group called Complete Engine Data. This group, which may include over 100 parameters, displays all of the available parameters. Updating this group can take up to 30 seconds.

9.8 Stop Communication

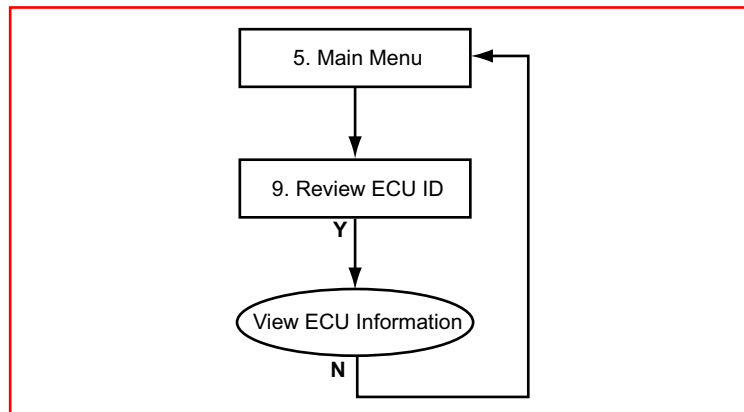
This selection ends the current diagnostic session and terminates communication with the ECU. Once communication has been stopped, the Scanner display returns to the system selection list. From here, you can select another system to test on the same vehicle, or exit and change the vehicle identification.



Caution:

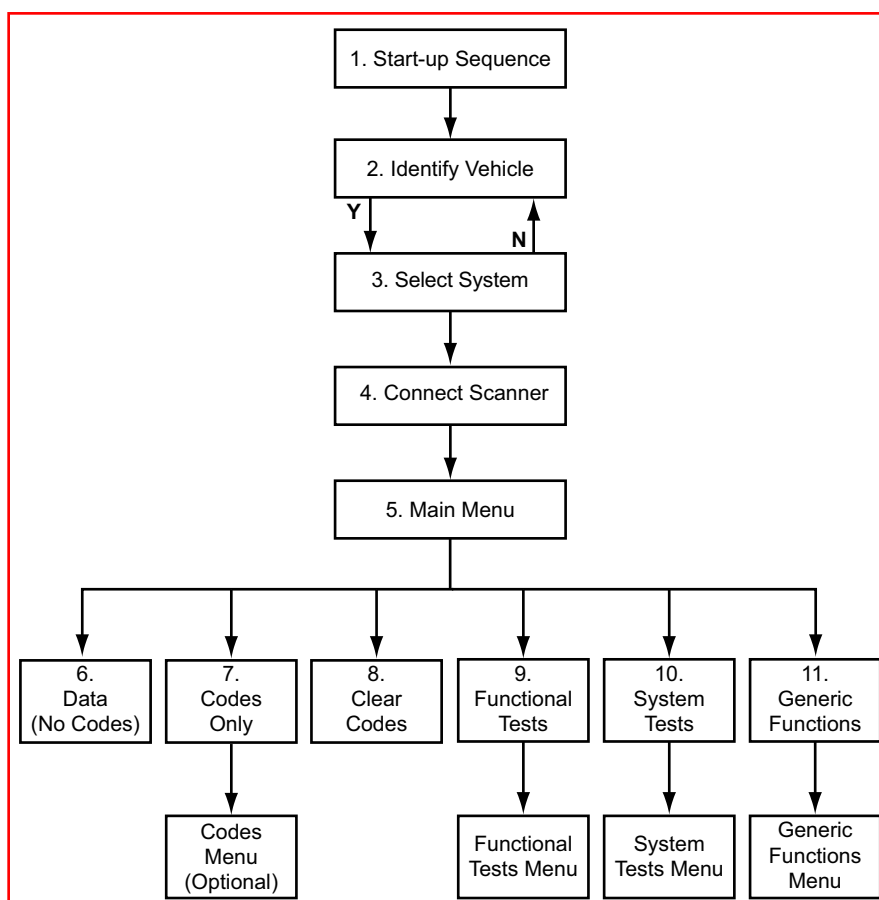
The ABS System or other ECUs can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the Main Menu and select “Stop Communication” before disconnecting the Scanner.

9.9 Review ECU ID



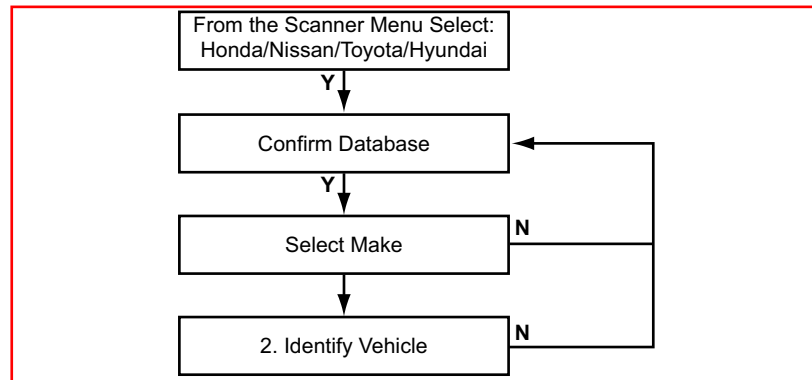
This selection displays pertinent information about the ECU under test, such as the part and model numbers and the manufacturer.

Overview

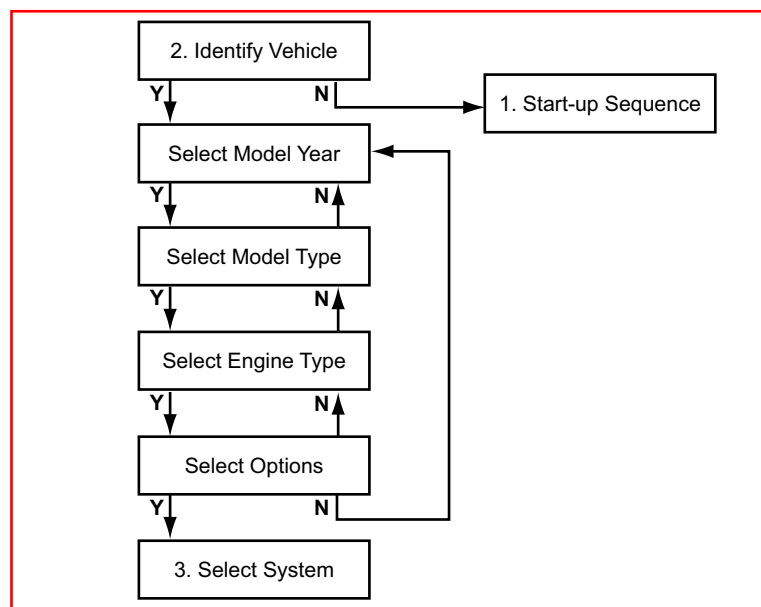


This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

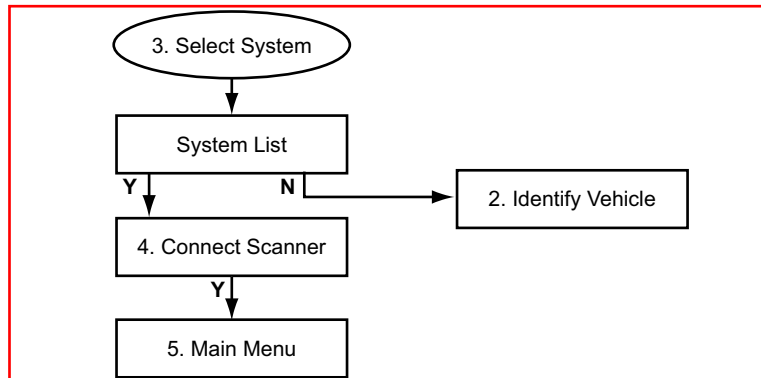
10.1 Start-up Sequence



10.2 Identify Vehicle



10.3 Select System to be Tested



10.3.1 System List

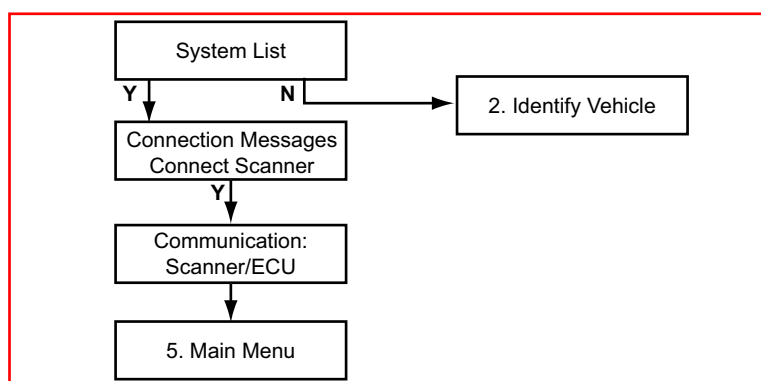
The System List displayed is dependent on the selected vehicle. The system list remains active until a new vehicle is selected. Scroll and confirm to select the system to be tested.



Caution:

The ABS System or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the “Select System” menu before disconnecting the Scanner.

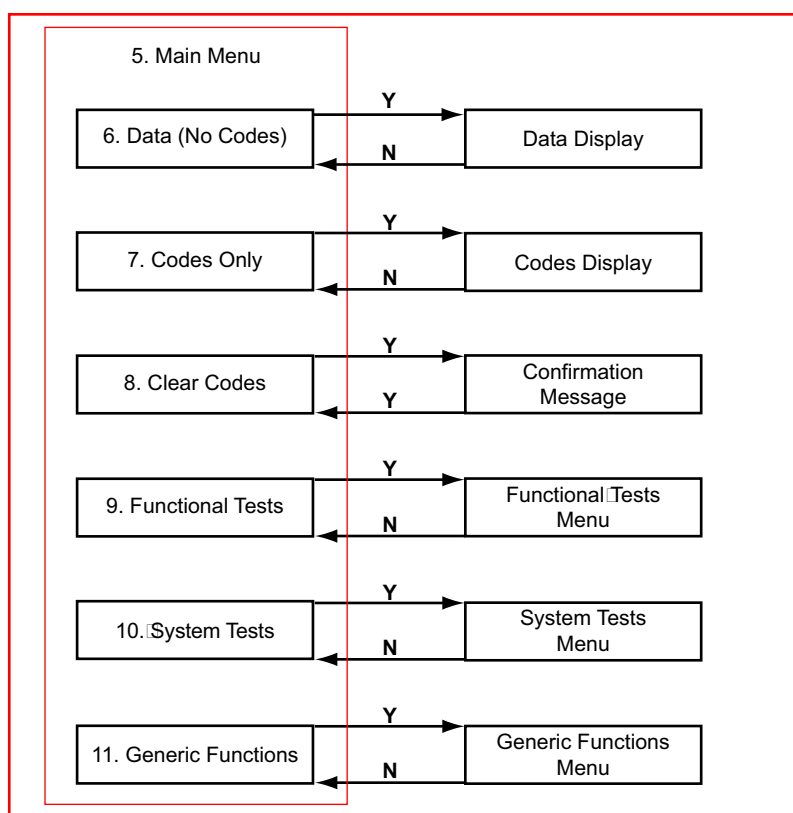
10.4 Connect Scanner



Note:

Refer to the “Adaptors Overview & Data Parameters” manual for connection information.

10.5 Main Menu



10.6 Data (No Codes)

Displays live data parameters, scroll to view the complete list.

10.7 Codes Only

Codes Only displays the EOBBD Diagnostic Trouble Codes (DTCs) in a standard, 5-character alphanumeric format. Refer to the OBD-II/EOBD Vehicle Communication Software Manual for more information.

10.7.1 Codes Menu

A codes menu displays if there are more than one type of code list available. Typical choices include Codes, which is the standard code list, and Pending Codes.

10.7.1.1 Pending Codes

Pending Codes are set when operating conditions are out of the normal range, but not all the criteria to set a DTC occur. For example, a failure must occur on two consecutive trips or drive cycles before certain EOBD codes are set. In this case, a pending code is recorded during the first trip when the failure occurs. Pending codes can be symptomatic of a driveability concern.

10.8 Clear Codes



Note:

Some cleared codes only set again under certain circumstances. Note or print the codes before repair and before clearing codes.



Note:

When the error condition still exists, the code can be set again.

If the code clearing operation fails for any reason, the previous codes reappear. Should this occur, return to the menu and repeat the Clear Codes operation.

10.9 Functional Tests

Functional Tests allow the Scanner to switch certain system components on and off to check their operation. The number of components that can be activated is dependent on the ECU under test and the vehicle itself.

The Scanner energizes the selected actuator for 30 seconds, then automatically switches it off to prevent overheating or other damage to the component or system. For most actuators, the test can be cancelled at any time by the operator.



Note:

Carefully follow all on-screen messages and instructions that display while performing functional tests.

10.10 System Tests

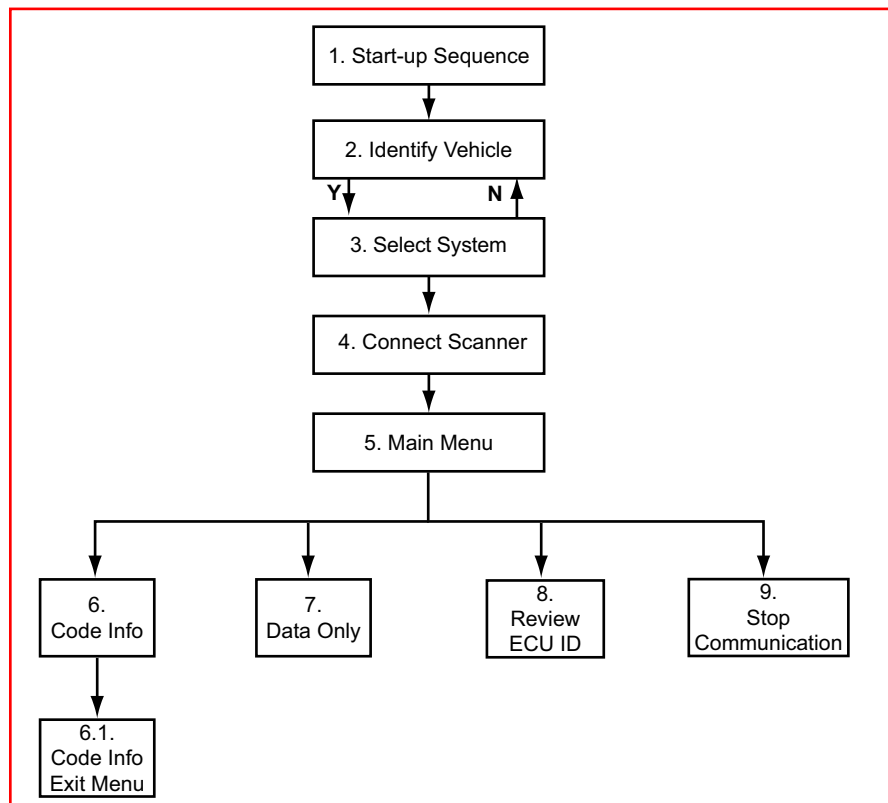
On some models a System Tests option is available on the main menu. Selecting opens a list of test options. Select from the list and follow the on-screen instructions.

10.11 Generic Functions

The Generic Functions selection opens a menu of available EOBD functions on 1996 and newer vehicles. Menu options typically include:

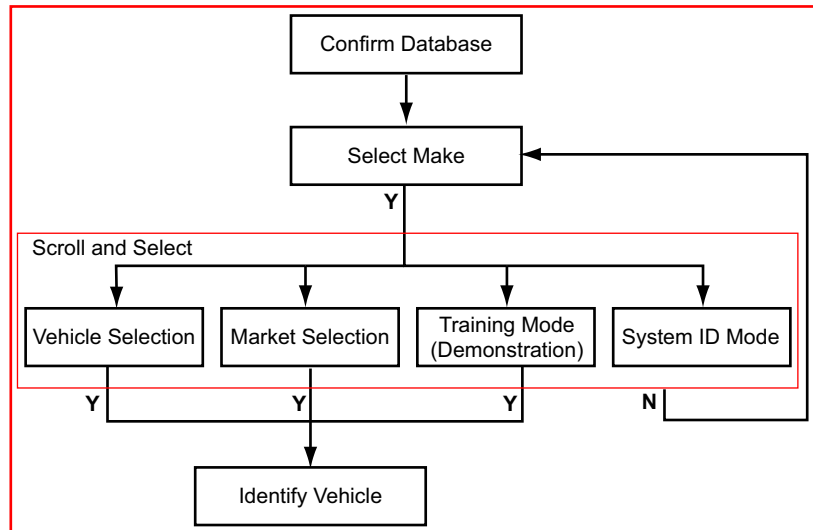
- Freeze Frame—displays data stored by the ECM when a DTC is set
- Readiness Monitors—displays the status of the EOBD monitors
- Mode 6 Non Cont—displays the status of non-continuous EOBD monitors
- Mode 9 Calib. ID—displays the calibration identification numbers of the vehicle ECMs
- Mode 9 (CVN)—displays the calibration verification numbers of the vehicle ECM
- Mode 9 (VIN)—displays the vehicle identification number

Overview



This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

11.1 Start-up Sequence



11.1.1 Vehicle Selection

Allows you to identify the test vehicle by answering a series of questions:

- Model Year
- Model
- Engine
- Optional equipment

11.1.2 Market Selection

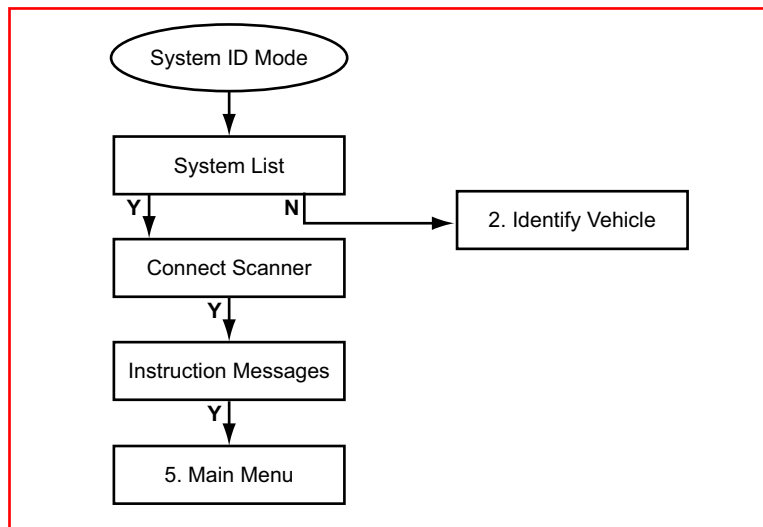
Allows you to choose between left or right hand drive. The correct connector location information displayed is dependent on this selection.

11.1.3 Training Mode (Demonstration)

Allows you to use many of the Scanner functions without actually connecting to a vehicle. Simulated data and test results are provided.

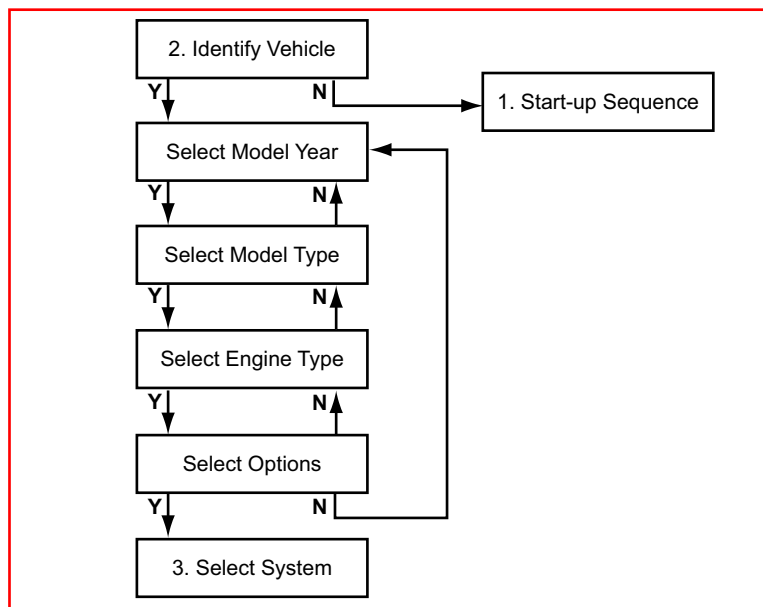
11.1.4 System ID Mode

Allows you to begin the vehicle identification by first selecting the system to be tested. Use this option if communication problems arise or the ECU type is unknown.

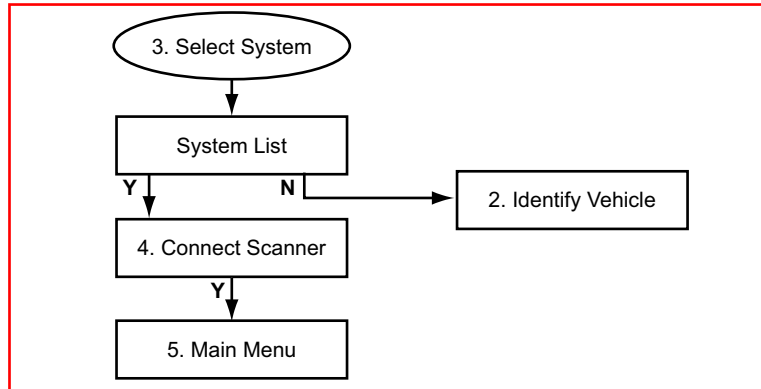


1. Select a system group from the list. Only fitted systems groups (engines, lights, seat, etc.) will be displayed.
2. After selecting the system group, select the system to be tested.
3. Connect the scanner and proceed testing.

11.2 Identify Vehicle



11.3 Select System to be Tested



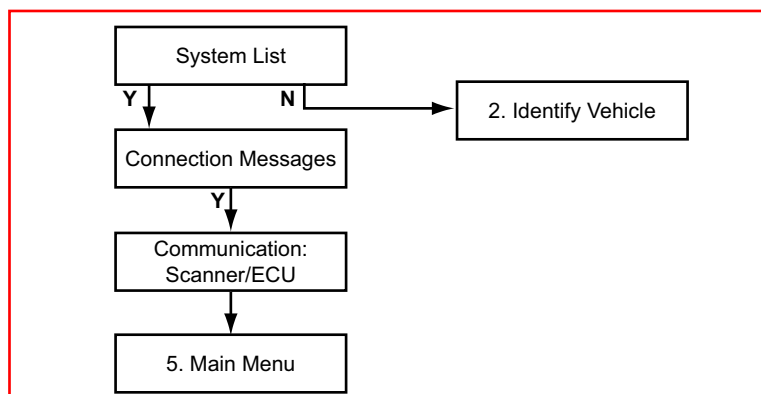
The System List displayed is dependent on the selected vehicle. The system list remains active until a new vehicle is selected. Scroll and confirm to select the system to be tested.

11.3.1 No Communication

If there is no communication it is advisable to select the ECU type, if known, from the Test entry to determine if the ECU is communicating.

This can be found in the Vehicle ID selection by choosing 1987 /Test / the ECU name. All available ECU types are located here.

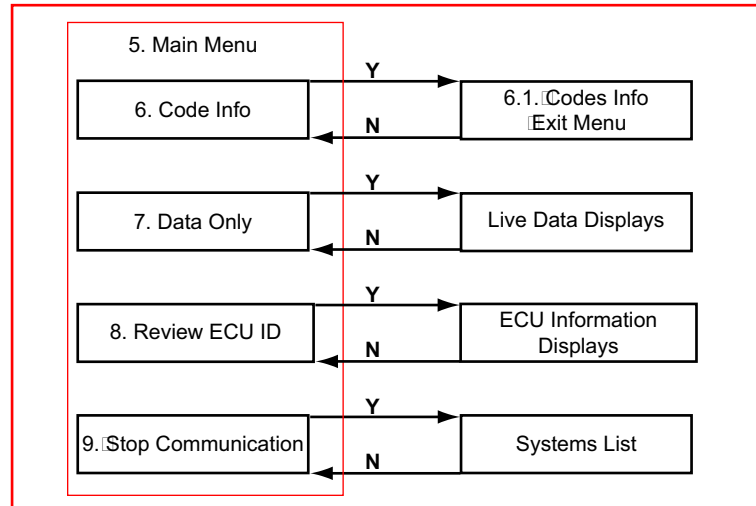
11.4 Connect Scanner



Note:

Refer to the “Adaptors Overview & Data Parameters” manual for additional connector and connection information.

11.5 Main Menu



11.6 Code Info

Displays the Diagnostic Trouble Codes (DTCs) stored in ECM memory, scroll to view the complete list.

11.6.1 Code Info Exit Menu

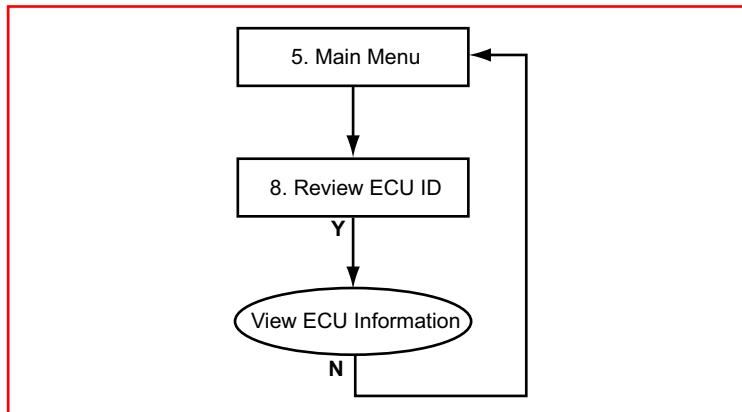
The Code Info Exit Menu offers the following options:

- Resume—returns to the code list.
- Clear Codes—erases all code records from ECM memory.
- Return To Main Menu—returns to the System Main Menu.

11.7 Data Only

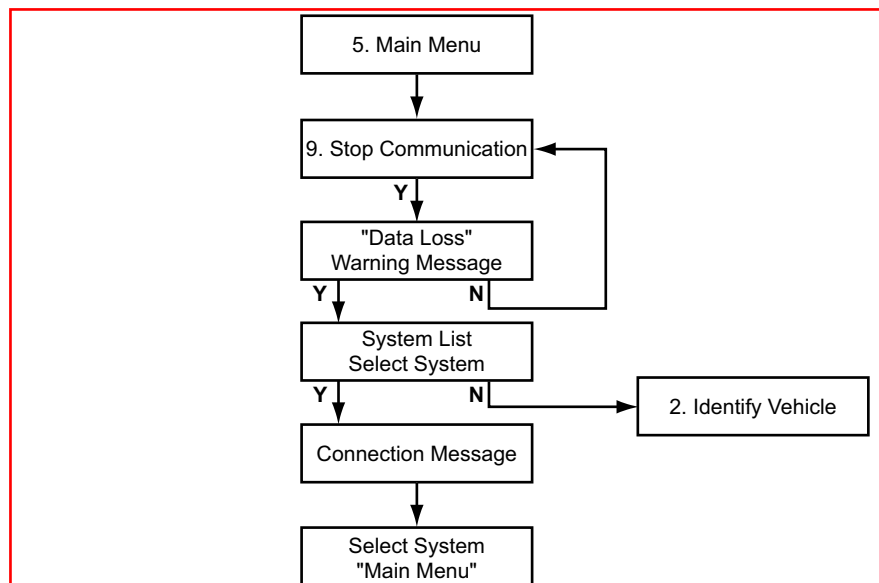
Displays live data parameters, scroll to view the complete list.

11.8 Review ECU ID



This selection displays pertinent information about the ECU under test, such as the part and model numbers and the manufacturer.

11.9 Stop Communication



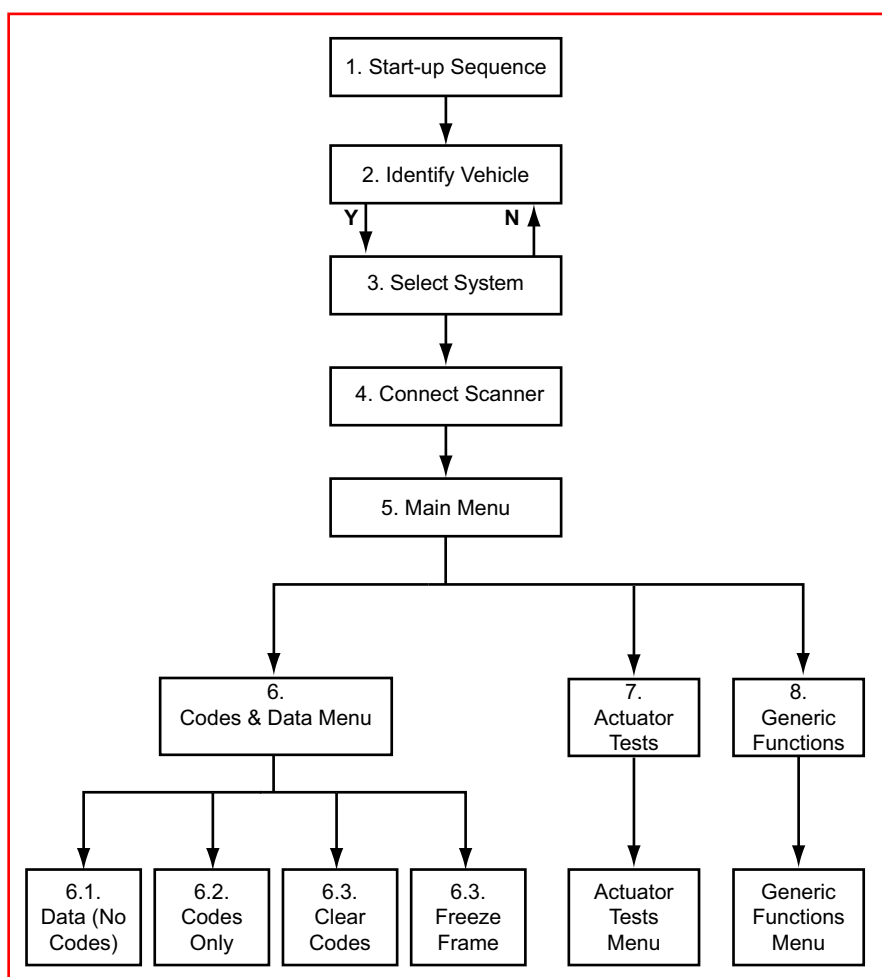
Use Stop Communication to end the current diagnostic session and to Stop Communication with the ECU.



Caution:

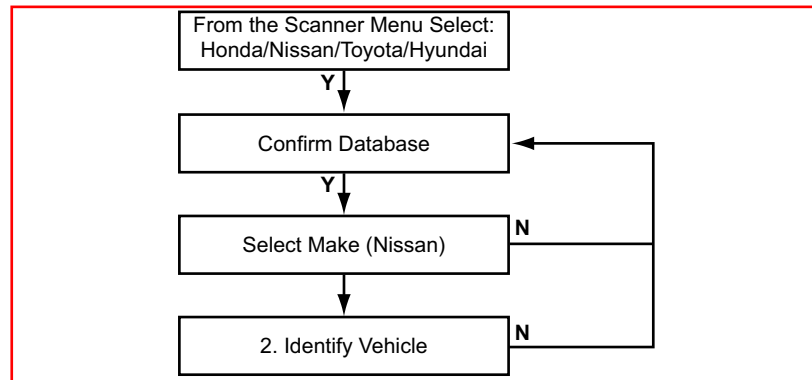
The ABS System or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the Main Menu and select "Stop Communication" before disconnecting the Scanner.

Overview

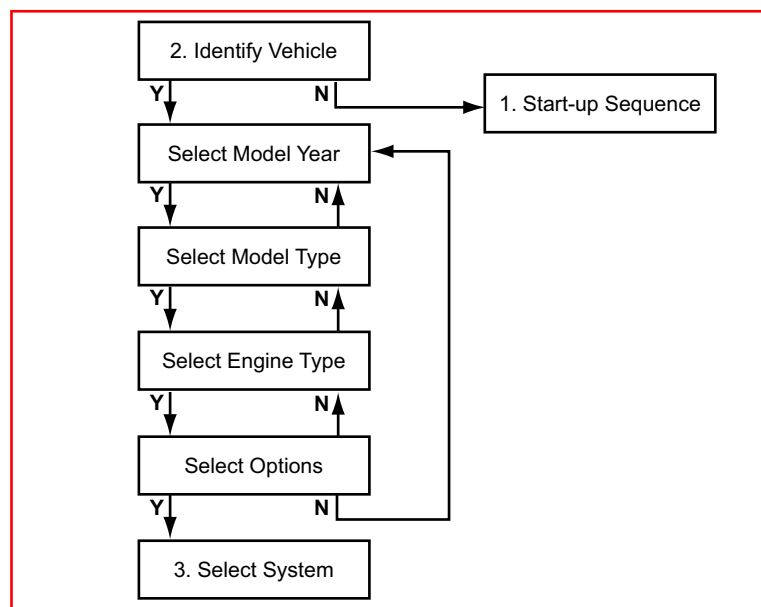


This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

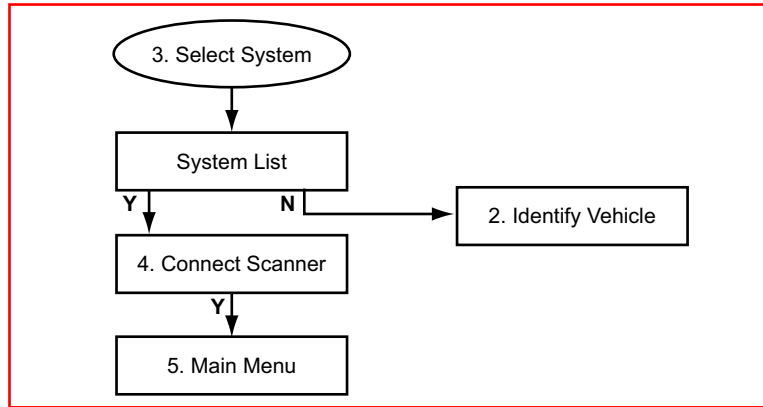
12.1 Start-up Sequence



12.2 Identify Vehicle



12.3 Select System to be Tested



12.3.1 System List

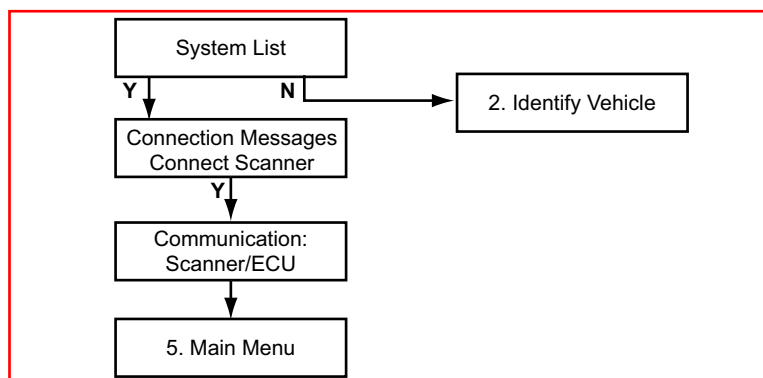
The System List displayed is dependent on the selected vehicle. The system list remains active until a new vehicle is selected. Scroll and confirm to select the system to be tested.



Caution:

The ABS System or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the “Select System” menu before disconnecting the Scanner.

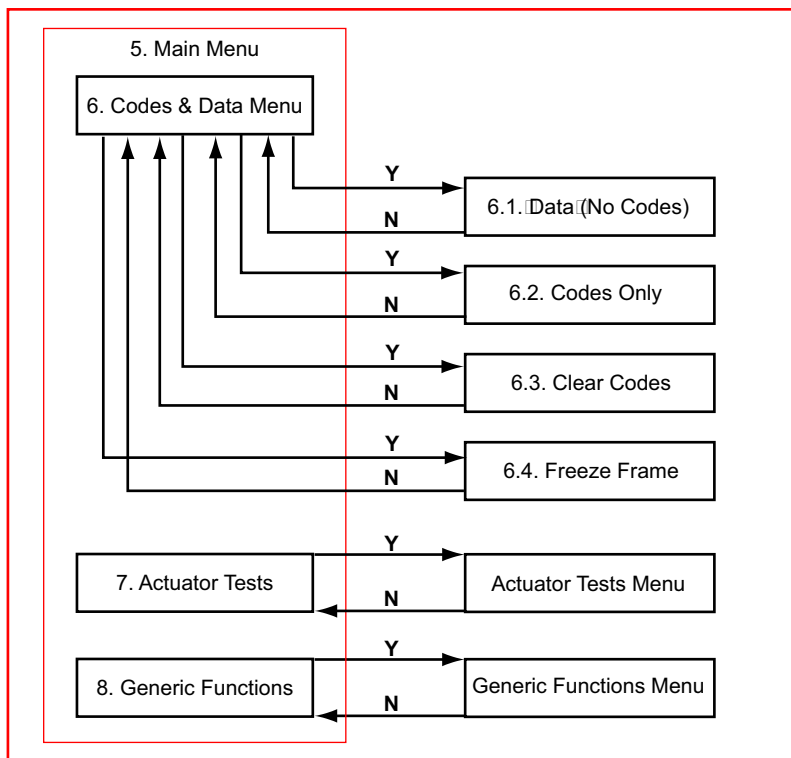
12.4 Connect Scanner



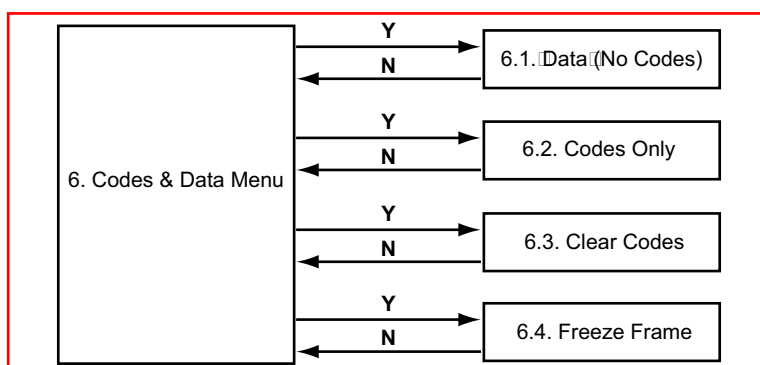
Note:

See the “Adaptors Overview & Data Parameters” manual for information.

12.5 Main Menu



12.6 Codes & Data Menu



12.6.1 Data (No Codes)

Displays live data parameters from the vehicle ECU, scroll to view the complete list. Some models have more than one data list available and a Data Menu displays. Select from options on the data groups list.

12.6.1.1 Data Groups Menu

Due to a very large number of data parameters available on some models, parameters are divided into several smaller groups of related data. Reducing the number of data parameters that display increases the screen update rate, so values displayed on the Scanner refresh much faster.

12.6.2 Codes Only

Codes Only displays the EOBD Diagnostic Trouble Codes (DTCs) in a standard, 5-character alphanumeric format. Refer to the *Global OBD User's Manual* for additional information.

12.6.3 Clear Codes

Selecting erases all stored code and freeze frame records from the vehicle ECM.



Note:

Be aware, some cleared codes can only be set again under certain circumstances. Note or print the codes before repair and clearing codes.



Note:

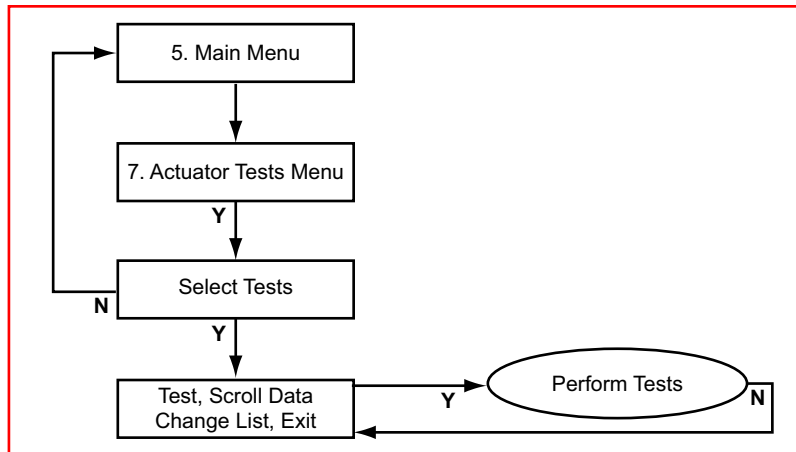
When the error condition still exists, the ECU can set the code again.

If the code clearing operation fails for any reason, the previous codes reappear. Should this occur, return to the Codes & Data menu and repeat the Clear Codes operation.

12.6.4 Freeze Frame

Displays select data parameter values that the ECM recorded at the time an EOBD DTC set. Refer to the *Global OBD User's Manual* for additional information.

12.7 Actuator Tests



Caution:

Do not enter any actuator test while driving a vehicle unless the specific test requires it. ECU changes to ignition timing, fuel delivery and other engine functions may affect engine operation and vehicle control.

The number of actuators that can be activated is dependent on the ECM under test and the vehicle itself. A sub-menu displays showing the various options available.



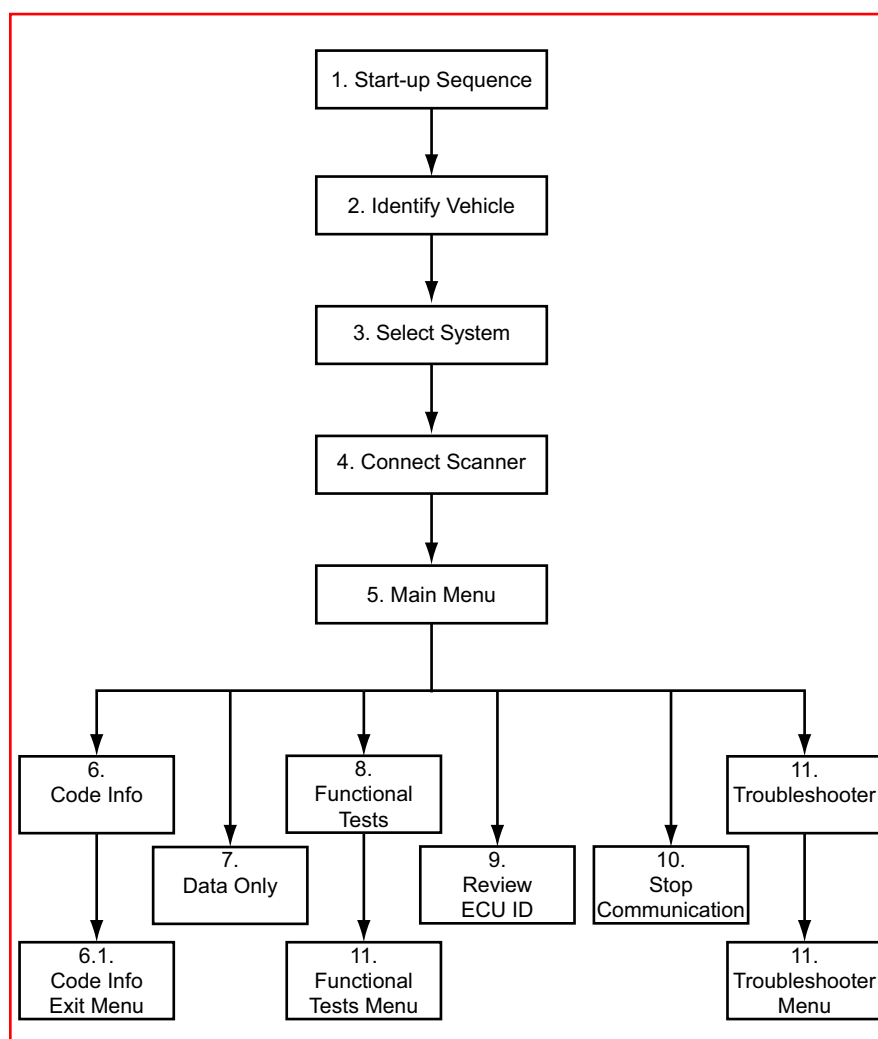
Note:

Often a certain actuator may not be present on a vehicle, although according to the manuals it should be. Therefore, check this first after failing to hear a reaction from the actuator under test. Have the engine running only when instructed to do so by the Scanner and always follow the instructions displayed on the Scanner.

12.8 Generic Functions

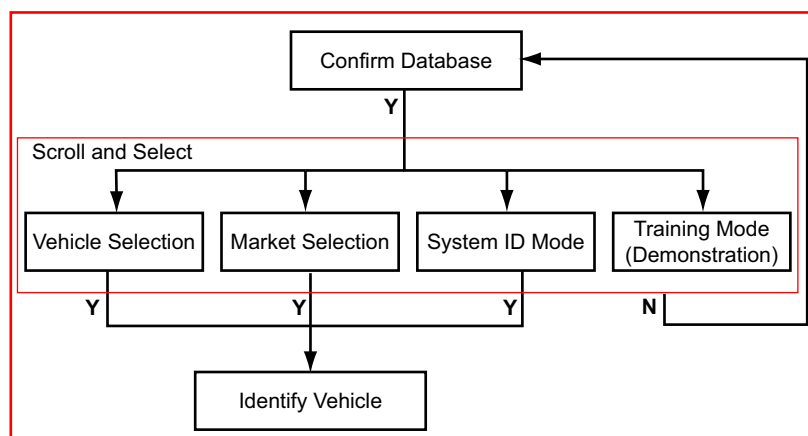
Display a list of readiness monitors and other tests available on EOBD systems. Refer to the *Global OBD User's Manual* for additional information.

Overview



This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

13.1 Start-up Sequence



13.1.1 Vehicle Selection

Allows you to identify the test vehicle by answering a series of questions:

- Model Year
- Model
- Engine
- Optional equipment

13.1.2 Market Selection

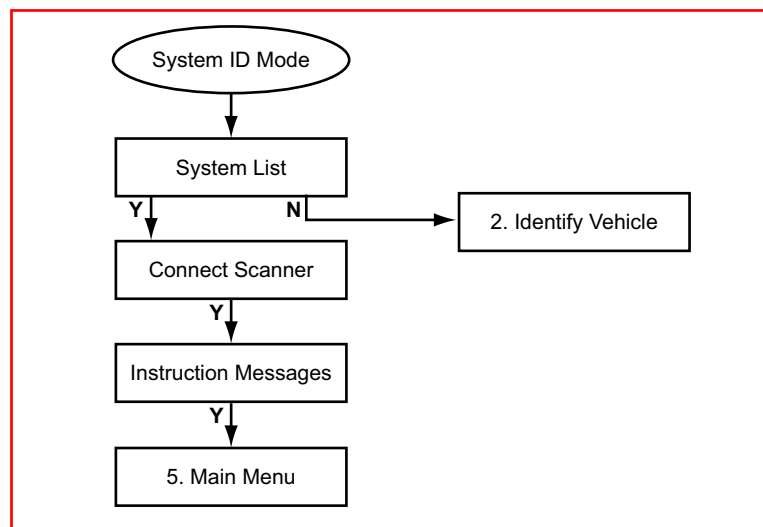
Allows you to choose between left or right hand drive. The correct connector location information displayed is dependent on this selection.

13.1.3 System ID Mode

Allows you to begin the vehicle identification by first selecting the system to be tested. Use this option if communication problems arise or the ECU type is unknown.

To use System ID Mode:

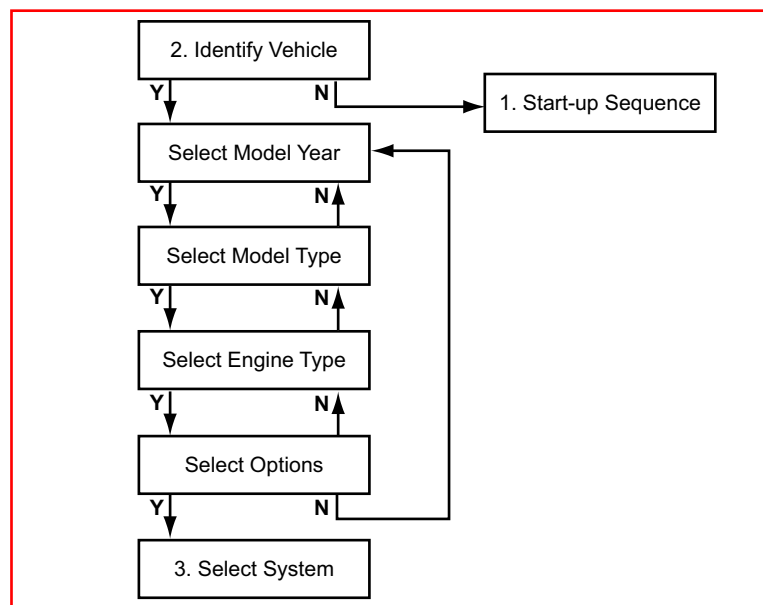
1. Select a system group from the list. Only fitted systems groups (engines, lights, seat, etc.) will be displayed.
2. After selecting the system group, select the system to be tested.
3. Connect the scanner and proceed testing.



13.1.4 Training Mode (Demonstration)

Allows you to use many of the Scanner functions without actually connecting to a vehicle. Simulated data and test results are provided.

13.2 Identify Vehicle



13.2.1 Vehicle Selection Tips

Because midyear manufacturing changes in engine computer systems may affect test operation, when a different vehicle is to be tested a new identification should always be entered. This is true even when two different vehicles are the same year and model and have the same engine and accessory installations.

13.2.1.1 Selecting the Correct Model Year

The figure below shows how the Tenth VIN Character (vehicle identification number) can be used to select the correct build year.

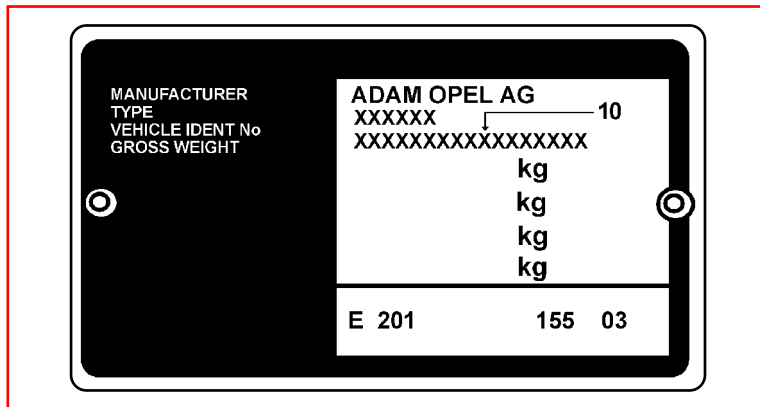


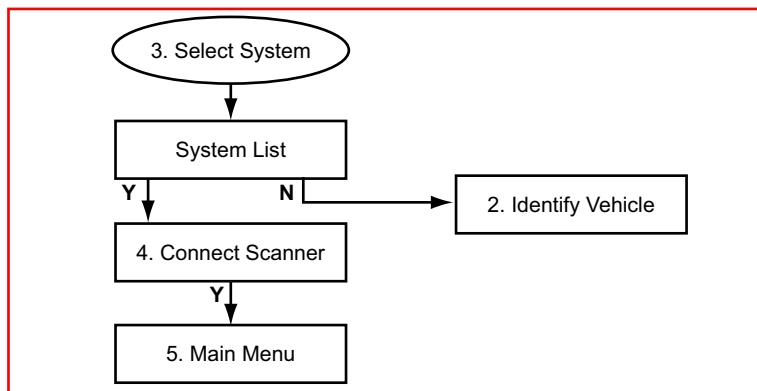
Figure 13-1 Sample VIN tag



Note:

The Vehicle Identification Number (VIN) plate is located on the front panel of the engine compartment.

13.3 Select System to be Tested



13.3.1 System List

The System List displayed is dependent on the selected vehicle. Listed below are some of the possible systems available:

- Engine Management
- Airbag
- Anti-lock Brakes
- Transmission

13.3.1.1 No Communication

If there is no communication it is advisable to select the ECU type, if known, from the TEST entry to determine if the ECU is communicating.

This can be found in the Vehicle ID selection by choosing 1987 /TEST / the ECU name. All available ECU types are located here.



Note:

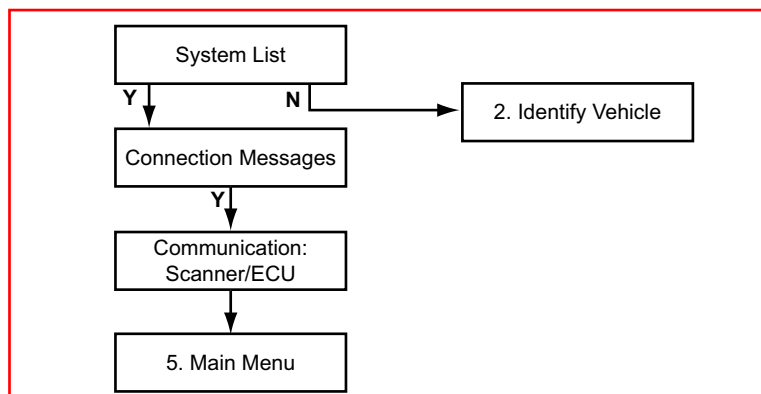
When testing certain vehicles, communication problems may occur when the engine revs are above 2000 rpm. Once communication has been re-established, the engine may be revved above 2000 rpm.



Note:

When testing automatic transmission systems the engine must be OFF and the Transmission must be in Park or Neutral in order to establish communication. Once communication has been established, the engine may be started and the transmission can be set to Drive.

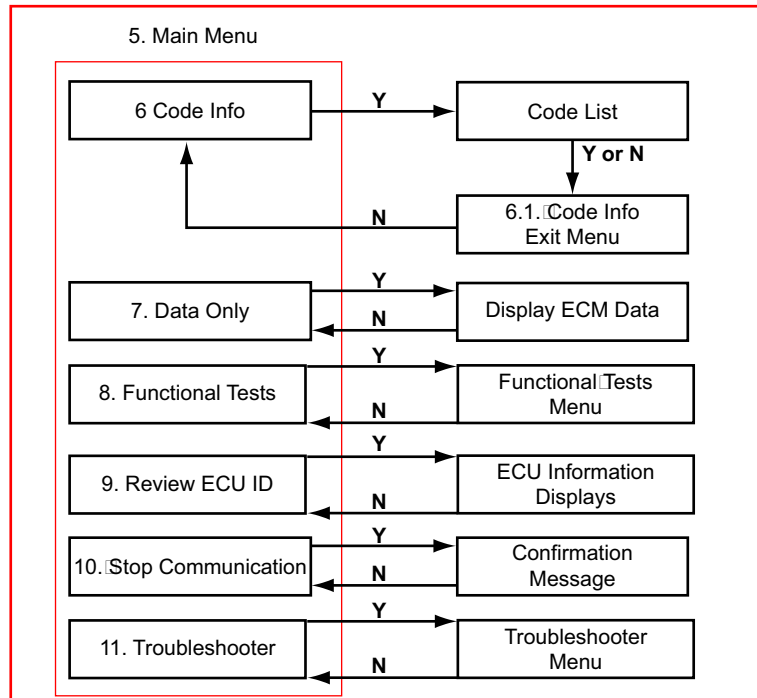
13.4 Connect Scanner



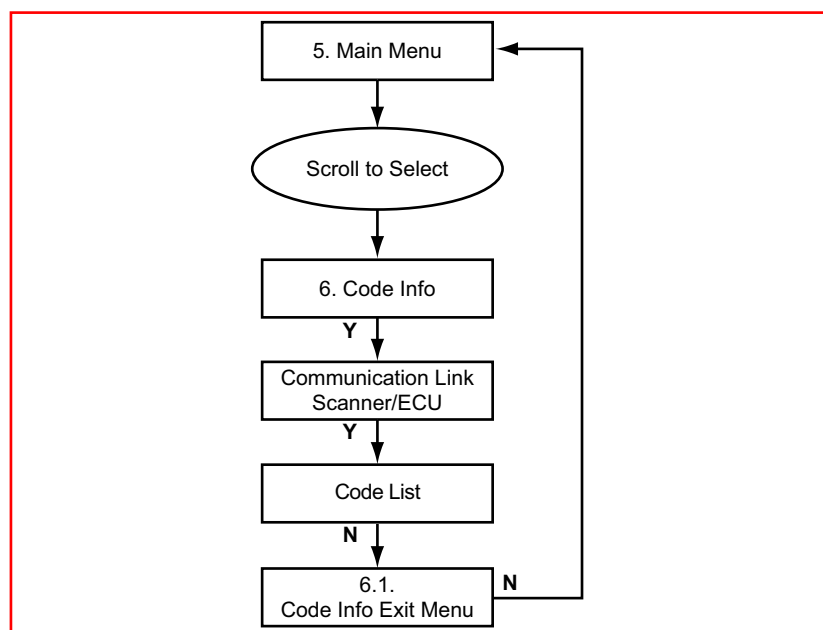
Note:

See the “Adaptors Overview & Data Parameters” manual for information.

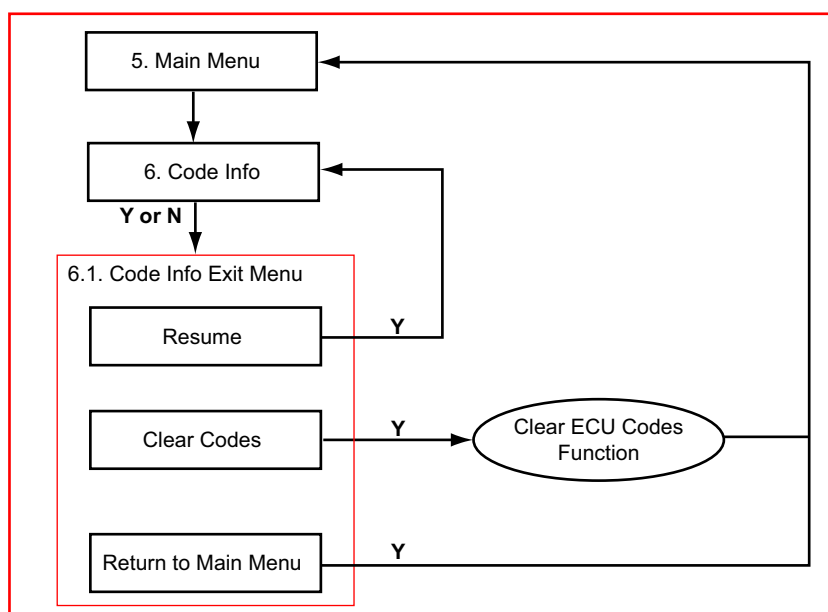
13.5 Main Menu



13.6 Code Info



13.6.1 Code Info Exit Menu



Note:

Sometimes a fault code is displayed of a component that is not installed in the vehicle under test, e.g. Cruise Control. This code can't be cleared. Always make sure the component, the code refers to, is present, when a code can't be cleared.



Note:

Some cleared codes only set again under certain circumstances. Note or print the codes before repair and before clearing codes.



Note:

When the error condition still exists, the ECM can set the code again.

13.7 Data Only

Displays live data parameters without codes, scroll to view the complete list of parameters.

13.8 Functional Tests

Functional Tests allow the Scanner to switch certain system components on and off to check their operation. The number of components that can be activated is dependent on the ECU under test and the vehicle itself.

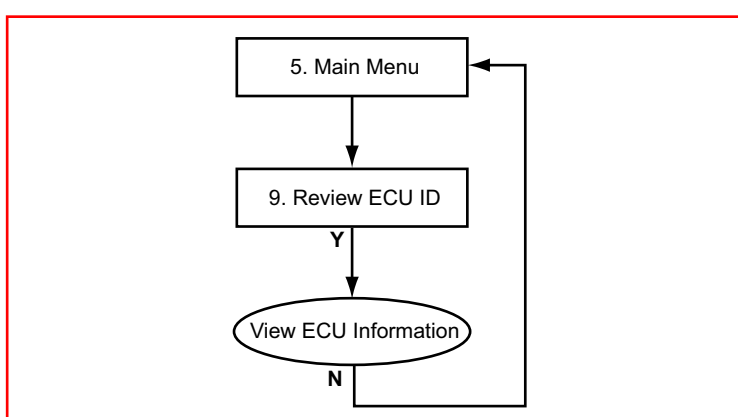
The Scanner energizes the selected actuator for 30 seconds, then automatically switches it off to prevent overheating or other damage to the component or system. For most actuators, the test can be cancelled at any time.



Note:

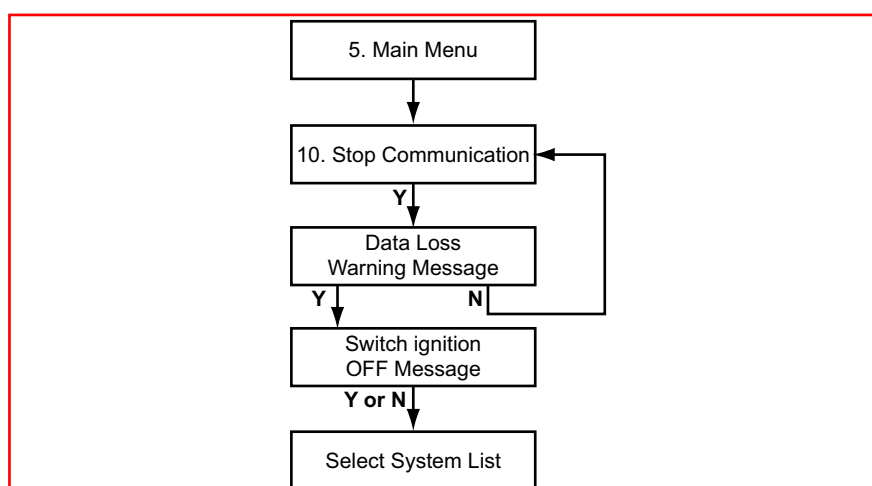
Carefully follow all on-screen messages and instructions that display while performing functional tests.

13.9 Review ECU ID



This selection displays pertinent information about the ECU under test, such as the part and model numbers and the manufacturer.

13.10 Stop Communication



**Caution:**

The ABS System or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the Main Menu and select “Stop Communication” before disconnecting the Scanner.

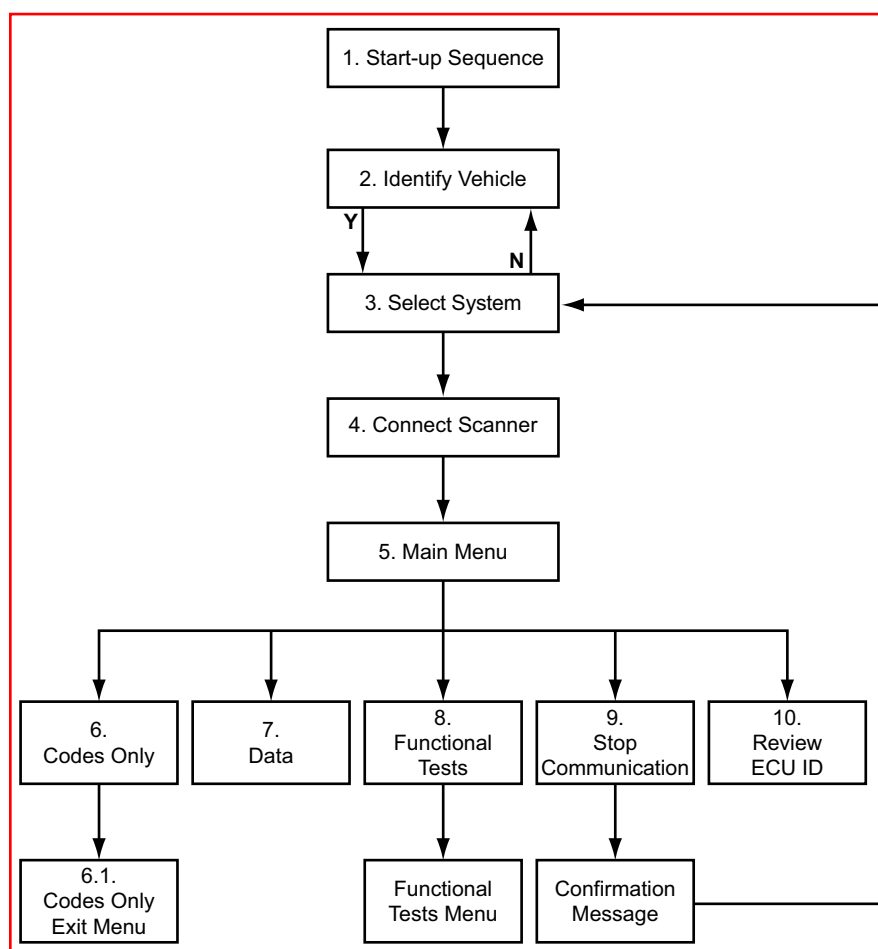
**Note:**

When performing the “Service Interval Reset” in the “Instrument Panel Systems”, the values entered for the Service Interval Reset will vary depending on the selected vehicle.

13.11 Troubleshooter

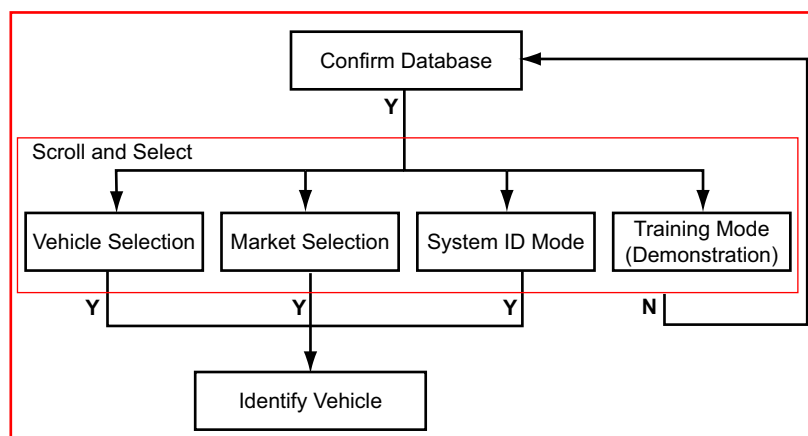
The Troubleshooter selection is on the system Main Menu only if information is available for the test vehicle. Troubleshooter is a database of information designed to assist you in diagnosing vehicle problems. Troubleshooter menus vary by make, model, and system.

Overview



This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

14.1 Start-up Sequence



14.1.1 Vehicle Selection

Allows you to identify the test vehicle by answering a series of questions:

- Model Year
- Model
- Engine
- Optional equipment

14.1.2 Market Selection

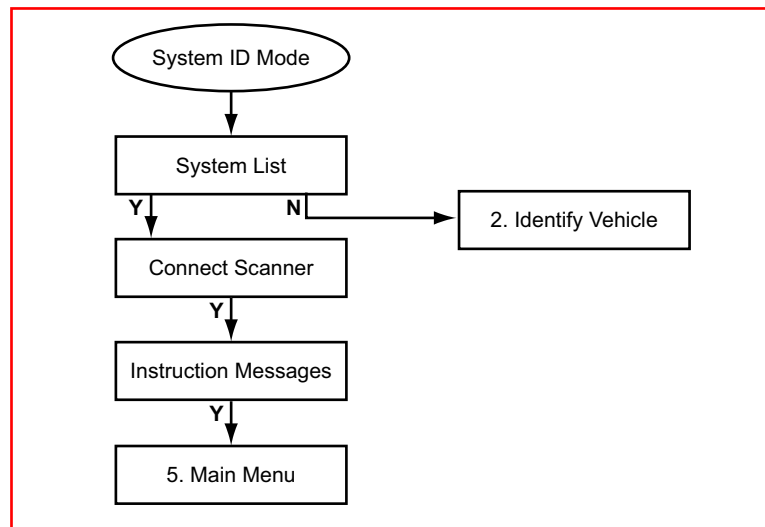
Allows you to choose between left or right hand drive. The correct connector location information displayed is dependent on this selection.

14.1.3 System ID Mode

Allows you to begin the vehicle identification by first selecting the system to be tested. Use this option if communication problems arise or the ECU type is unknown.

To use System ID Mode:

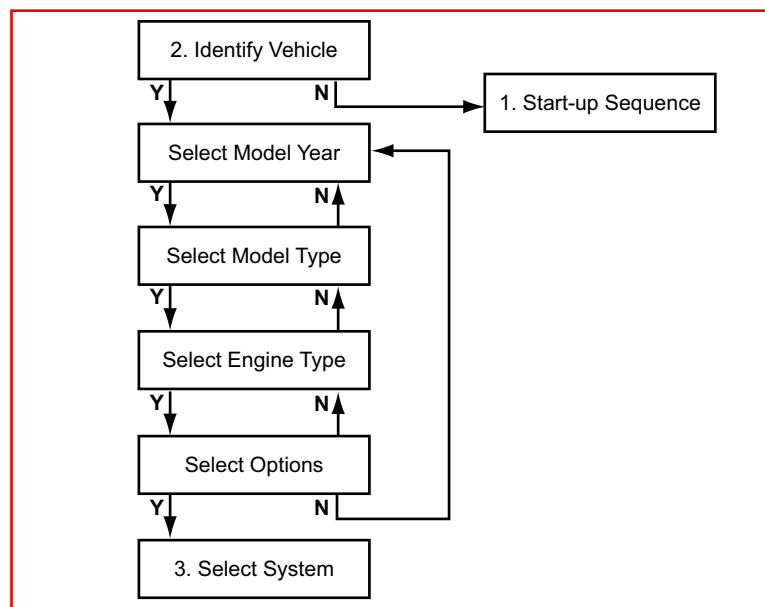
1. Select a system group from the list. Only fitted systems groups (engines, lights, seat, etc.) will be displayed.
2. After selecting the system group, select the system to be tested.
3. Connect the scanner and proceed testing.



14.1.4 Training Mode (Demonstration)

Allows you to use many of the Scanner functions without actually connecting to a vehicle. Simulated data and test results are provided.

14.2 Identify Vehicle



14.2.1 Vehicle Selection Tips

To help identify the model year during the Vehicle ID process, an ORG/RP/DAM or Chassis Number is available. The ORG/RP/DAM numbers should have 6 characters, (only the first 4 are required) use the look-up table supplied by the manufacturer to find the correct model year. The possible location of these numbers are as follows:

- Under the bonnet in yellow painted characters
- On a sticker located on the drivers-side door near the hinge
- On a sticker located on the drivers-side door near the lock
- On a sticker located on the fuse-box cover

14.2.1.1 106 Models

During model year 1996 the 106 was restyled. The Scanner uses "106" for the old type and "106 Restyle" for the new type.

The earlier 106 has a 2-pin connector. The restyled 106 has a 30-pin connector in model years 1996 and 1997 and a 16-pin connector in model years 1998 and 1999.

14.2.1.2 306 Models

During model year 1997 the 306 was restyled. The Scanner uses "306" for the old type and "306 Restyle" for the new type.

The earlier 306 has a 2-pin connector. The restyled 106 has a 16-pin connector.

14.2.1.3 406, 806, and Expert Models

The DHX 1.9L Turbo Diesel engine used in these models can have either a Lucas pump or a Bosch VP20 pump.

If it has a Bosch VP20 pump select engine type: "1.9L T-DSL BOSCH VP20 = DHX".

For any other pump select engine type: "1.9L T-DSL OTHER = DHX".

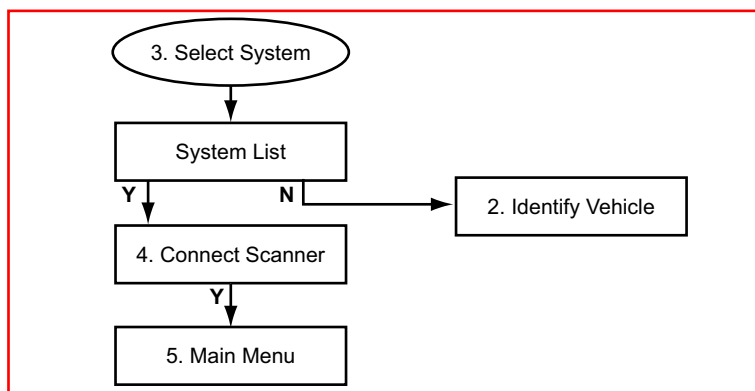
14.2.1.4 605 Model

Through model year 1994 The 605 has a 2-pin connector located on the front of the ECU in the engine compartment.

Beginning with model year 1995 the 605 uses a 30-pin connector located on the passenger side behind a panel on the lower dashboard.

If the vehicle has a 2-pin connector it is a 1994 or older model and if it has a 30-pin connector it is a 1995 or later model.

14.3 Select System to be Tested



14.3.1 System List

The System List displayed is dependent on the selected vehicle. The system list remains active until a new vehicle is selected. Scroll and confirm to select the system to be tested.

14.3.1.1 System Testing Tips

Keep the following points in mind while performing system tests:

- **Airbag systems:**

- The Scanner can only communicate with an Airbag if it has a connection to the diagnostic connector. Some Airbags do not have this connection. These Airbags can be identified by the presence of a LED on the right side of the steering wheel.
- Some Side Airbag systems do not have a separate ECU but are controlled by the normal Airbag ECU. However, some Side Airbag systems do have a separate ECU, if this is the case, then select "SIDE-AIRBAG LEFT / RIGHT (SEPARATED)" from the System List.

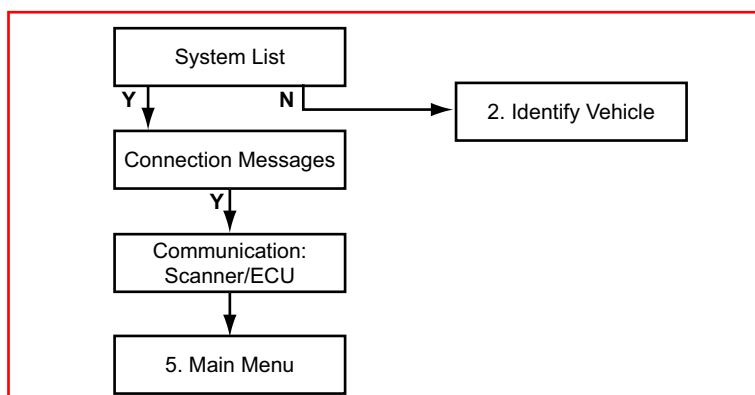
- **Automatic transmission systems:**

- If there is a communicating transmission system fitted on the vehicle, select to confirm the automatic transmission during the vehicle identification process.
- When testing Automatic Transmission systems the engine **MUST** be off and the gearbox must be in Park or Neutral in order to establish communications. Once communication is built up, the engine may be started and the gearbox can be set into Drive

- **Antilock brake systems (ABS):**

- The trouble code list may be incomplete when testing Bosch 5.3 ESP, Bosch 8, and Temic MK70 systems.

14.4 Connect Scanner



Note:

Refer to the “Adaptors Overview & Data Parameters” manual for connection information.

14.4.1 No Communication

If there is no communication to the selected System it is advisable to select the ECU type, if known, from the Test entry to determine if the ECU is communicating or not.

This can be found in the Vehicle ID selection by choosing 1987 /Test / the ECU name. All available ECU types are located here.



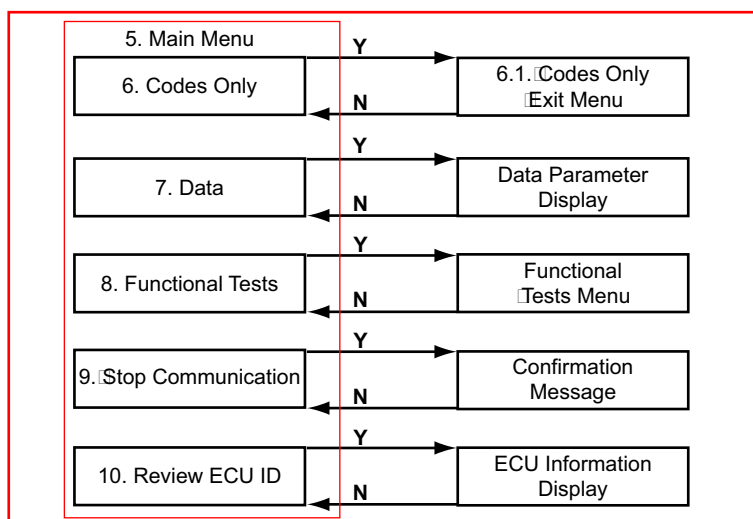
Note:

When testing certain vehicles, communication problems may occur when the engine revs are above 2000 rpm. In this case communication cannot be built up. Once communication has been re-established, the engine may be revved above 2000 rpm.

14.4.2 Unavailable Data Parameters

If there is a data parameter in the data list that does not apply to the engine, ignore it. For example the EDC15 System, this is the HDI (High Diesel Injection) Turbo Diesel system mounted on the RHS, RHV, RHX, RHY and RHZ engines. The Screen Data List consists of Data Parameters including MAP sensor and Airflow sensor. Most of these engines are fitted with both sensors. But if there is an engine that is not fitted with one of these sensors disregard the parameter in question.

14.5 Main Menu



14.6 Codes Only

Displays the Diagnostic Trouble Codes (DTCs) stored in ECU memory, scroll to view the complete list.



Note:

If undocumented Codes are received, check the manuals for the relevant Code numbers, especially if they are OBD codes on the newer ECUs.

14.6.1 Codes Only Exit Menu

The Codes Only Exit Menu offers two options:

- Resume—returns to the code list.
- Clear Codes—erases all code records from ECU memory.

14.6.1.1 Clear Codes Tips

Keep the following points in mind when clearing codes:

- Some codes can only reset under certain conditions. Note or print the codes before repair and before clearing codes.
- When the error condition still exists, the ECU can set the code again.
- When codes are cleared, the Fuel Pump Relay can be activated for some time and a “No Communication” message displays for a while.
- Some codes may display multiple times in the Code List.

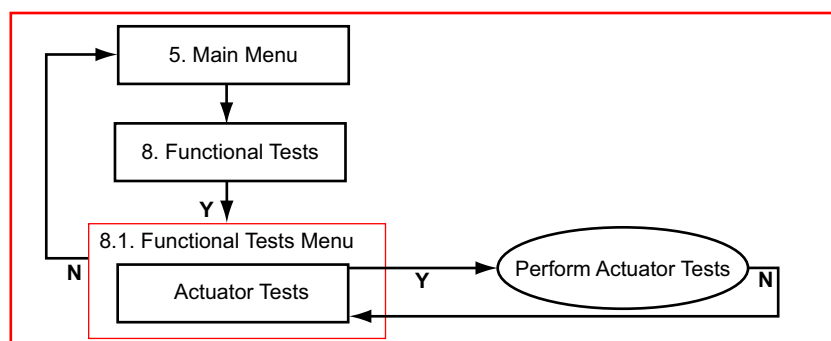
14.7 Data Only

Displays live data parameters without codes, scroll to view the complete list of parameters.

14.8 Functional Tests

Functional Tests allow the Scanner to switch certain system components on and off to check their operation. The number of components that can be activated is dependent on the ECU under test and the vehicle itself.

Select Actuator Tests from the Functional Tests Menu to bring up a list of available tests. The number of actuators tests available is dependent on the ECU under test and the vehicle itself.



The Scanner energizes the selected actuator for 30 seconds, then switches it off to prevent overheating or other damage to the component or system. For most actuators, the test can be cancelled at any time.



Note:

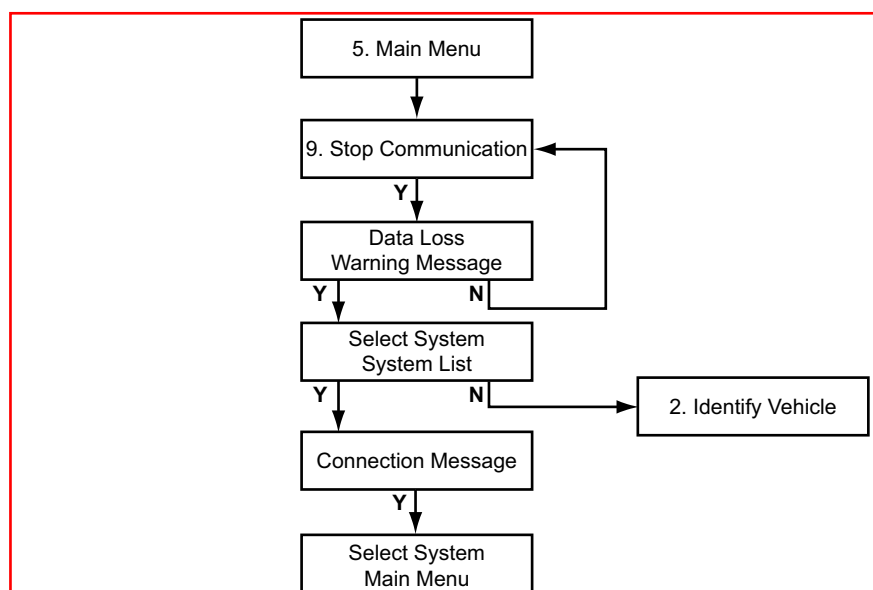
Carefully follow all on-screen messages and instructions that display while performing functional tests.

14.8.1 Functional Tests Tips

Keep the following points in mind when performing functional tests:

- After performing an actuator test, codes may be set. Some of these codes can not be cleared immediately. Wait for a couple of minutes (sometimes up to 15 minutes) and the codes can be cleared.
- EDC15C7 actuator tests may be activated longer than expected.
- Often a certain actuator may not be present on a vehicle, although according to the manuals it should be. Therefore, please check this first after failing to hear a reaction from the actuator under test.
- Run the engine only when instructed to do so by the Scanner.

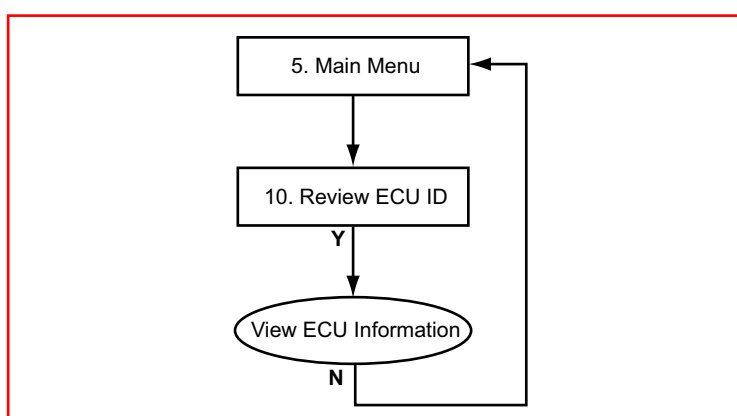
14.9 Stop Communication



Caution:

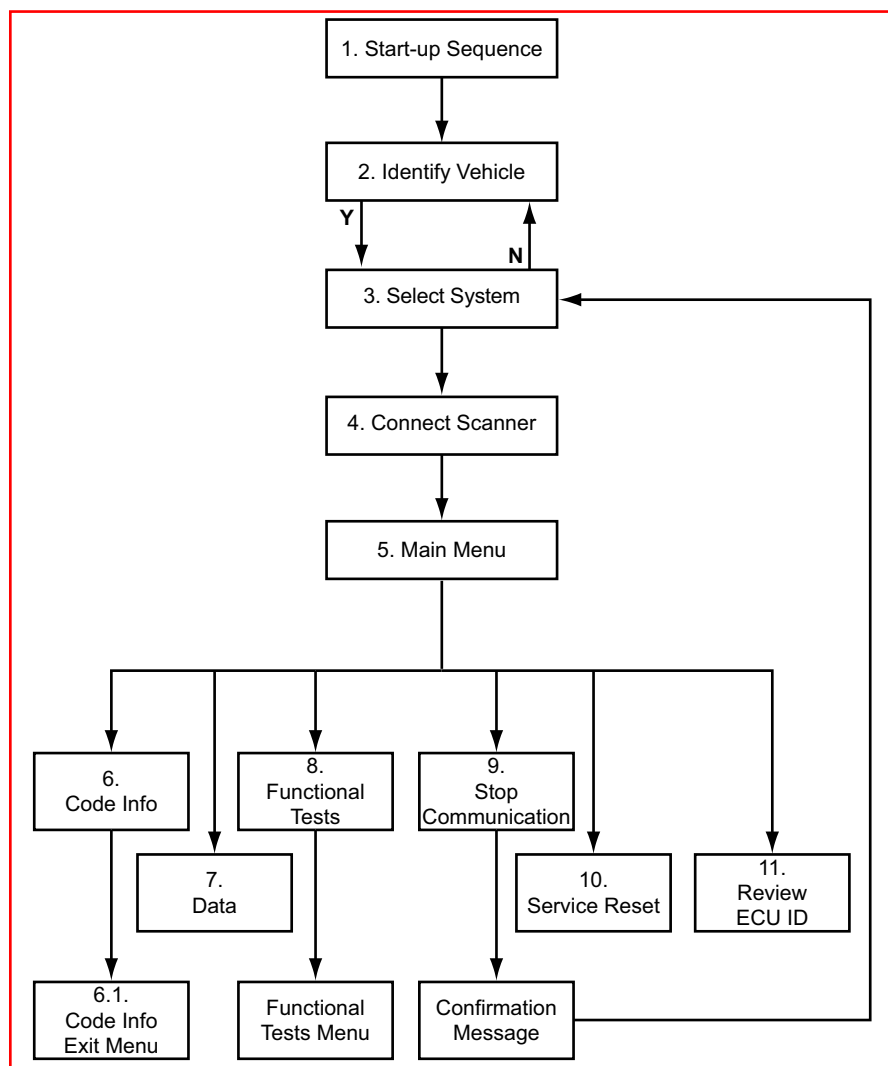
The ABS System or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the Main Menu and select “Stop Communication” before disconnecting the Scanner.

14.10 Review ECU ID



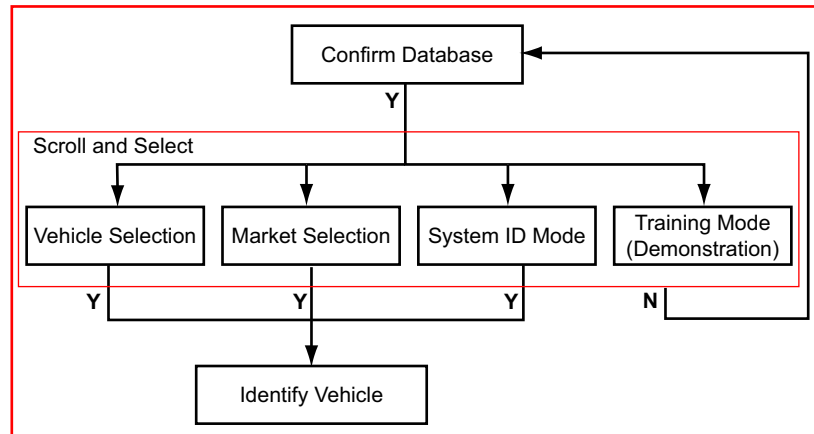
This selection displays pertinent information about the ECU under test, such as the part and model numbers and the manufacturer.

Overview



This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

15.1 Start-up Sequence



15.1.1 Vehicle Selection

Allows you to identify the test vehicle by answering a series of questions:

- Model Year
- Model
- Engine
- Optional equipment

15.1.2 Market Selection

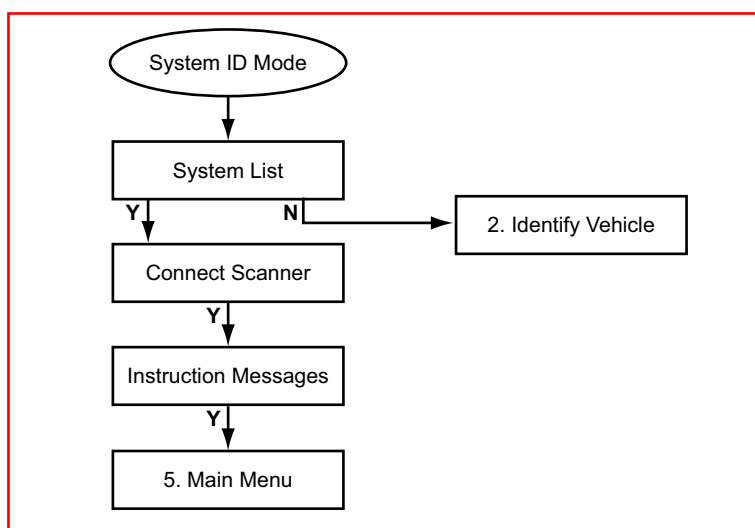
Allows you to choose between left or right hand drive. The correct connector location information displayed is dependent on this selection.

15.1.3 System ID Mode

Allows you to begin the vehicle identification by first selecting the system to be tested. Use this option if communication problems arise or the ECU type is unknown.

To use System ID Mode:

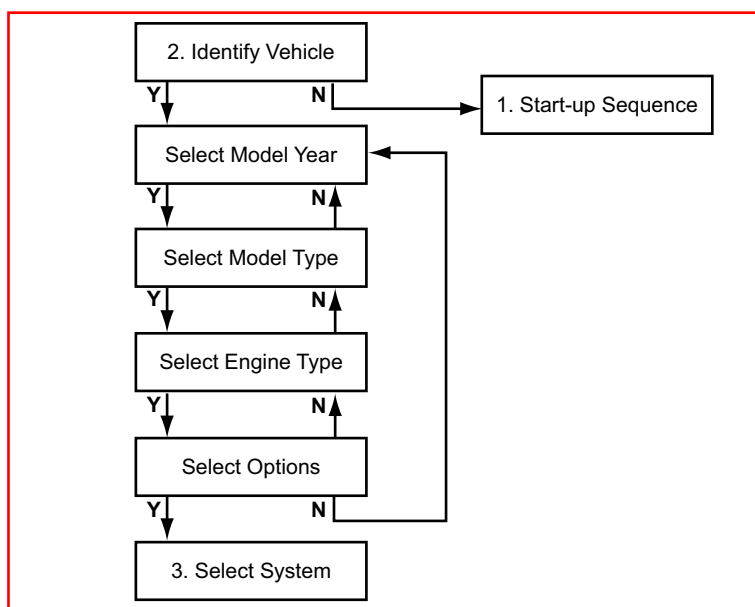
1. Select a system group from the list. Only fitted systems groups (engines, lights, seat, etc.) will be displayed.
2. After selecting the system group, select the system to be tested.
3. Connect the scanner and proceed testing.



15.1.4 Training Mode (Demonstration)

Allows you to use many of the Scanner functions without actually connecting to a vehicle. Simulated data and test results are provided.

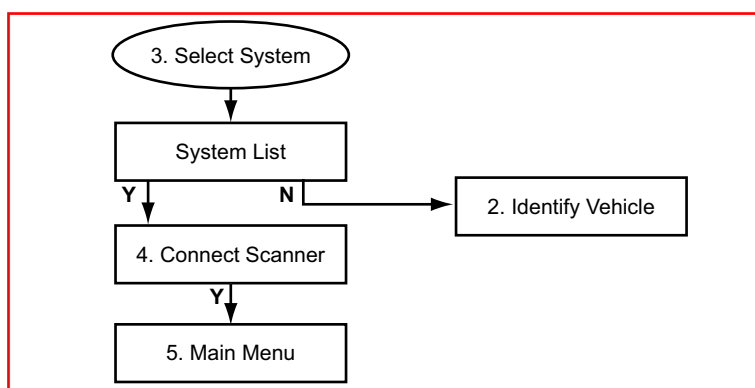
15.2 Identify Vehicle



Note:

For most vehicles, the model code (Vehicle Type) can be more easily identified by using the fourth to the seventh characters of the VIN.

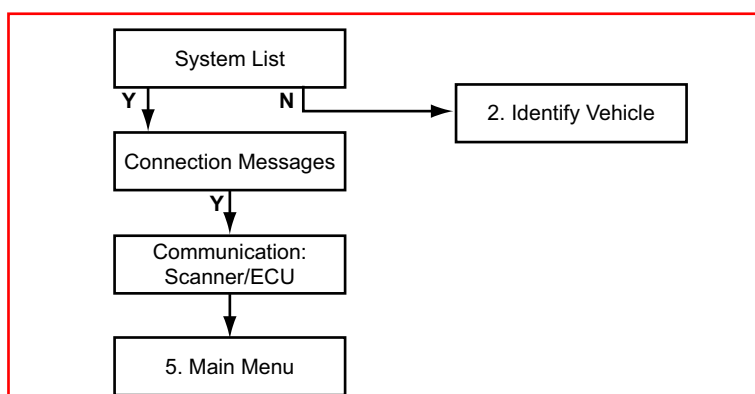
15.3 Select System to be Tested



15.3.1 System List

The System List displayed is dependent on the selected vehicle. The system list remains active until a new vehicle is selected. Scroll and confirm to select the system to be tested.

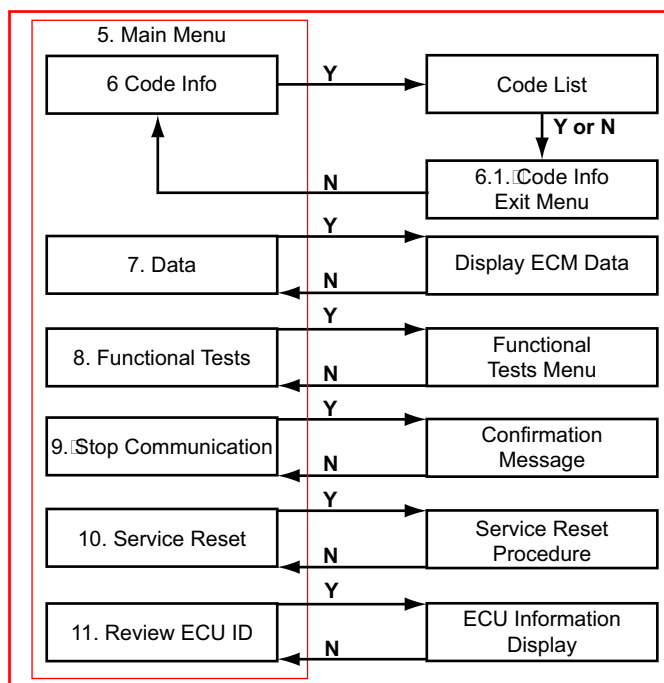
15.4 Connect Scanner



Note:

Refer to the "Adaptors Overview & Data Parameters" manual for connection information.

15.5 Main Menu



15.6 Code Info

Displays the Diagnostic Trouble Codes (DTCs) stored in ECM memory, scroll to view the complete list.

15.6.1 Code Info Exit Menu

The Codes Only Exit Menu offers three options:

- Resume—returns to the code list.
- Clear Codes—erases all code records from ECM memory.
- Return To Main Menu—returns to the system main menu

15.6.1.1 Clear Codes Tips

Keep the following points in mind when clearing codes:

- Sometimes a fault code displays for a component that is not installed on the vehicle under test. These codes cannot be cleared. Make sure the component the code refers to is present on the test vehicle when a code cannot be cleared.

- Some codes can only reset under certain conditions. Note or print the codes before repair and before clearing codes.
- When the error condition still exists, the ECM can set the code again.
- A trouble code may display more than once with the same additional information. This is because the ECU is sending the same code more than once within a single trouble codes request.
- If for some reason the automatic transmission goes into Limp Home Mode after clearing codes, the ECU needs to be reset. To reset:
 - a. Switch the ignition ON (with the engine OFF).
 - b. Depress and hold down the throttle pedal for 5 seconds.
 - c. Release the throttle pedal.
 - d. Switch the ignition OFF, then start the engine.

15.7 Data Only

Displays live data parameters without codes, scroll to view the complete list of parameters.

15.8 Functional Tests

Functional Tests allow the Scanner to switch certain system components on and off to check their operation. The number of components that can be activated is dependent on the ECU under test and the vehicle itself.

Select Actuator Tests from the Functional Tests Menu to bring up a list of available tests. The number of actuator tests available is dependent on the ECU under test and the vehicle itself.

The Scanner energizes the selected actuator for 30 seconds, then automatically switches it off to prevent overheating or other damage to the component or system. For most actuators, the test can be cancelled at any time.

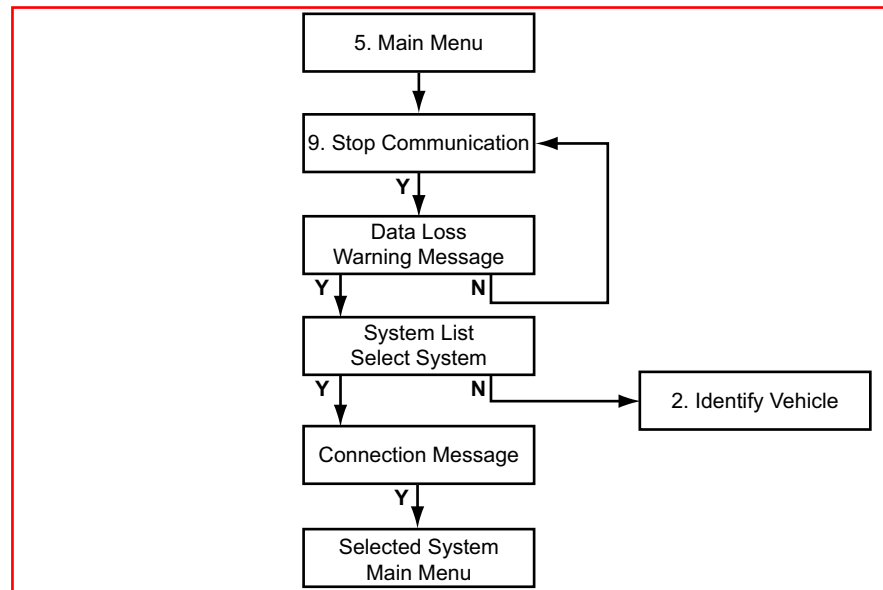


Note:

Carefully follow all on-screen messages and instructions that display while performing functional tests.

15.9 Stop Communication

This selection terminates communication between the Scanner and the ECU. Always stop communication before accessing a different system.

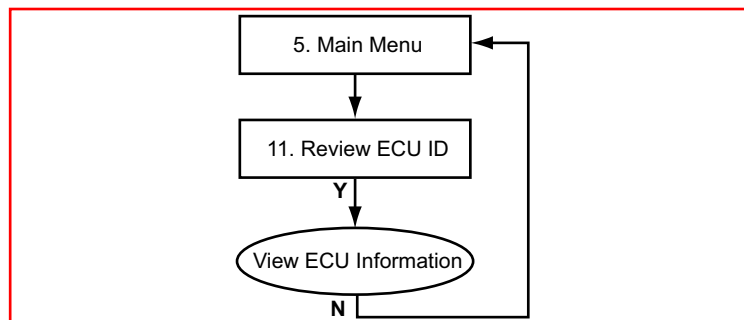
**Caution:**

The ABS System or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the Main Menu and select “End Diagnosis” before disconnecting the Scanner.

15.10 Service Reset

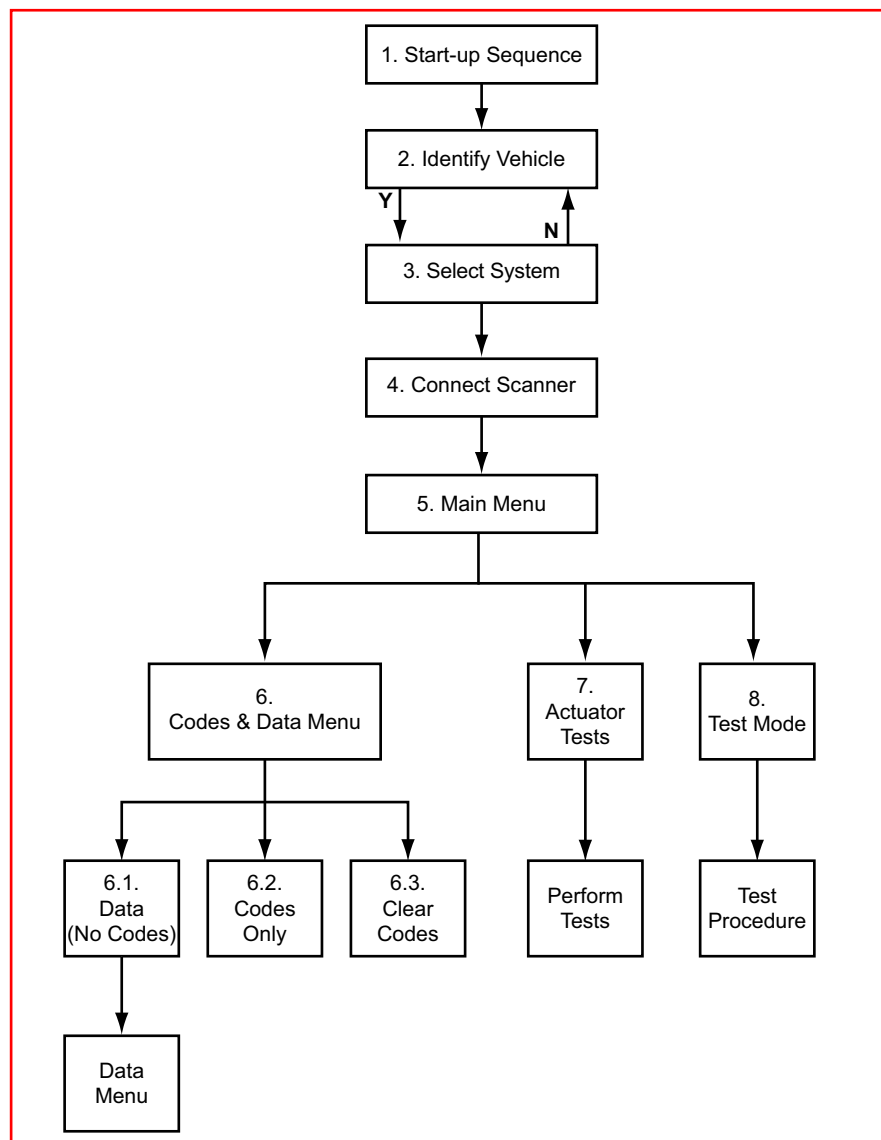
This function is used to reset or check the status of the service indicator lamps on the instrument cluster and the internal service monitors. Select a test and follow the on-screen instructions.

15.11 Review ECU ID



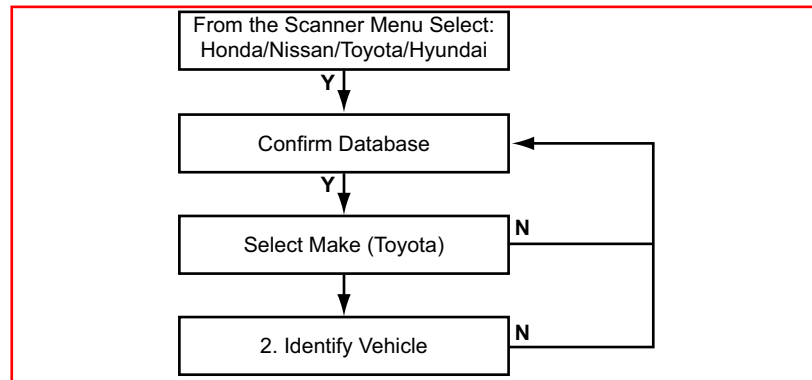
This selection displays pertinent information about the ECU under test, such as the part and model numbers and the manufacturer.

Overview

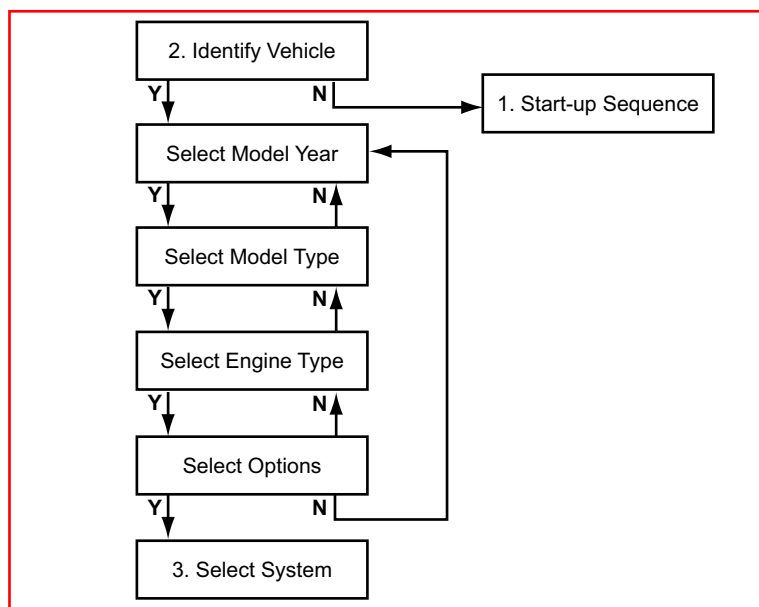


This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

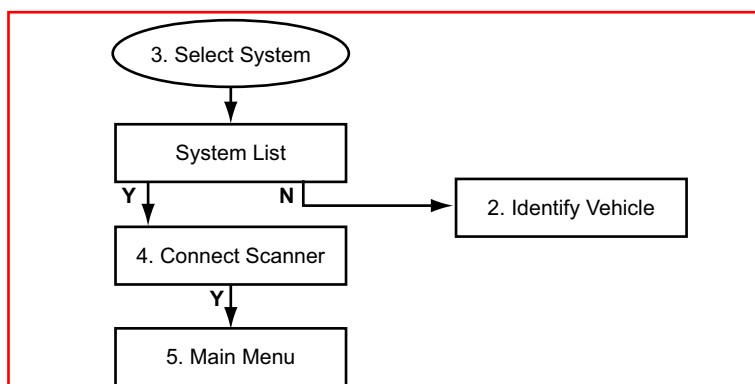
16.1 Start-up Sequence



16.2 Identify Vehicle



16.3 Select System to be Tested



16.3.1 System List

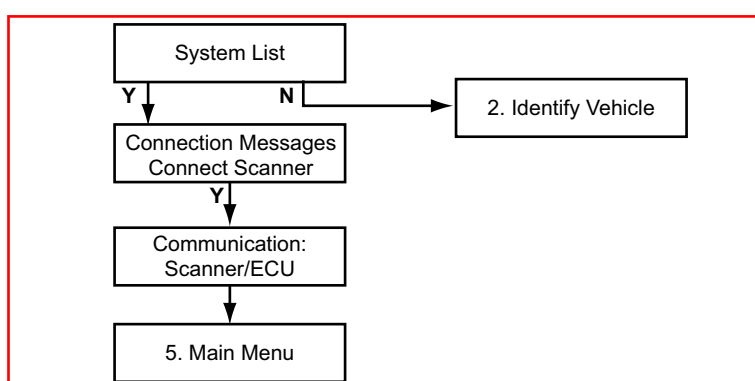
The System List displayed is dependent on the selected vehicle. The system list remains active until a new vehicle is selected. Scroll and confirm to select the system to be tested.



Caution:

The ABS System or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the “Select System” menu before disconnecting the Scanner.

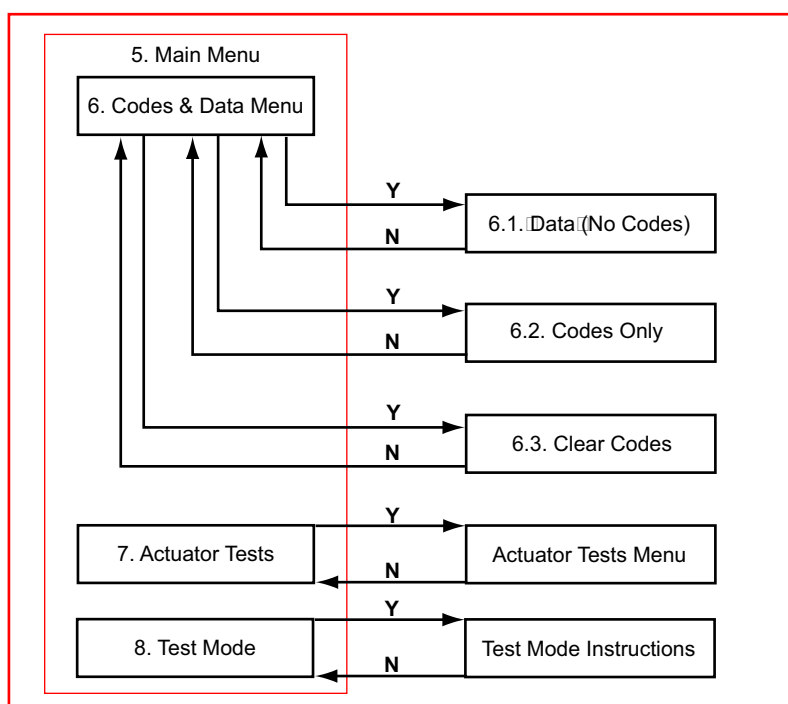
16.4 Connect Scanner



Note:

Refer to the “Adaptors Overview & Data Parameters” manual for connection information.

16.5 Main Menu



16.6 Codes and Data Menu

Select the Codes & Data Menu to open a list of available options for viewing ECU information. Highlight and confirm to select an option.

16.6.1 Data (No Codes)

This feature displays live data parameters from the vehicle ECU, scroll to view the complete list. Some models have more than one data list available and a Data Menu displays. Select from options on the list.

16.6.1.1 Data Menu

Due to the large number of data parameters available on some models, parameters are divided into several smaller groups of related data. Reducing the number of data parameters displayed increases the screen update rate, so values displayed on the Scanner refresh much faster.

16.6.2 Codes Only

Codes Only displays the EOBD Diagnostic Trouble Codes (DTCs) in a standard, 5-character alphanumeric format. Refer to the *Global OBD User's Manual* for additional information.

16.6.3 Clear Codes

Selecting erases all stored code and freeze frame records from the vehicle ECU.



Note:

Be aware, some cleared codes can only be set again under certain circumstances. Note or print the codes before repair and clearing codes.

If the code clearing operation fails for any reason, the previous codes reappear. If this occurs, return to the Codes & Data menu and repeat the Clear Codes operation.

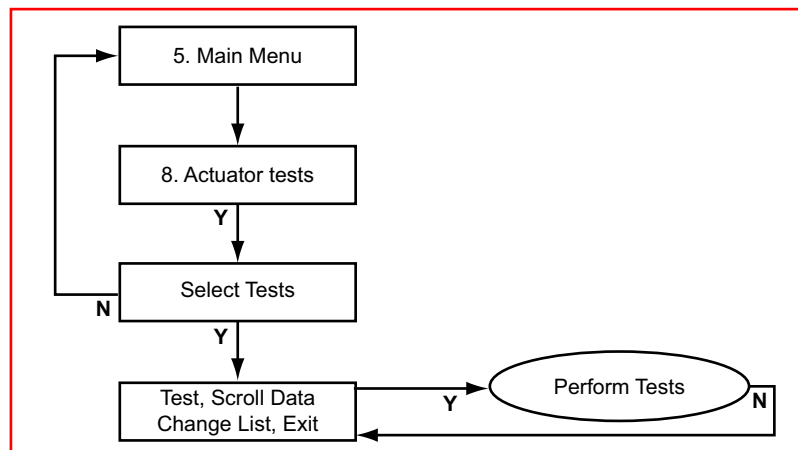


Note:

When the error condition still exists, the ECU can set the code again.

16.7 Actuator Tests

Actuator Tests allow the Scanner to switch certain system components on and off to check their operation. The number of components that can be activated is dependent on the ECU under test and the vehicle itself.



Caution:

Do not enter any actuator test while driving a vehicle unless the specific test requires it. ECU changes to ignition timing, fuel delivery and other engine functions may affect engine operation and vehicle control.

16.7.1 Actuator Test Tips

Keep the following in mind when performing actuator tests:

- Carefully follow all on-screen messages and instructions that display while performing functional tests.
- Often a certain actuator may not be present on a vehicle, although according to the manuals it should be. Therefore, please check this first after failing to hear a reaction from the actuator under test.
- Have the engine running only when instructed to do so by the Scanner and always follow the instructions displayed on the Scanner.
- The number of actuators that can be activated is dependent on the ECU under test and the vehicle itself, not the Scanner.

16.8 Test Mode

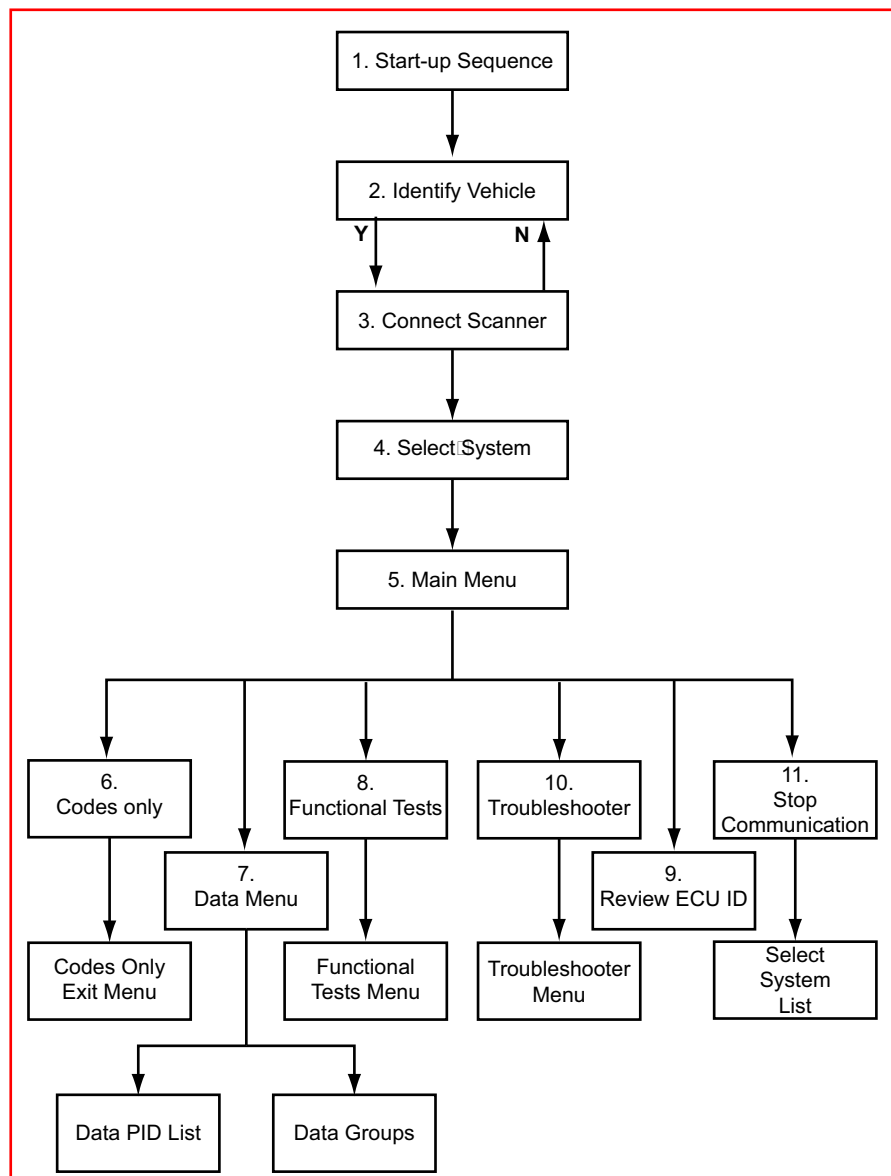
The Test Mode selection appears only on the antilock brake systems (ABS) main menu. This feature calculates the zero-point calibration for the yaw rate sensor and the G sensor. The Scanner gives step-by-step instructions for performing this operation.



Note:

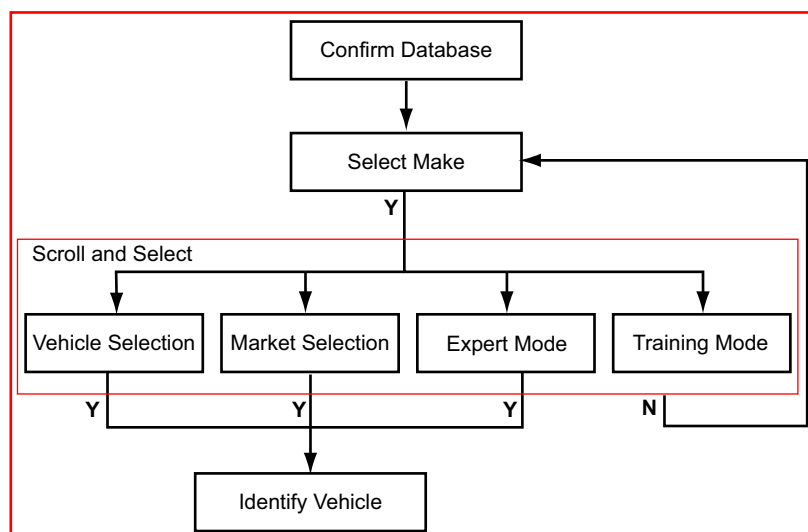
Carefully follow all instructions displayed. Refer to manufacturers documentation for more information.

Overview



This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

17.1 Start-up Sequence



17.1.1 Vehicle Selection

Allows you to identify the test vehicle by answering a series of questions:

- Model Year
- Model
- Engine
- Optional equipment

17.1.2 Market Selection

Allows you to choose between:

- European Left Hand Drive
- European Right Hand Drive
- USA

The correct connector location information displayed is dependent on the left or right hand drive selection. The USA option uses specific VIN characters to identify the vehicle and can be disregarded unless testing a vehicle built to US specifications.

17.1.3 Expert Mode

The Expert Mode is a special mode that allows the Scanner to simulate the Volkswagen factory test tool. Expert Mode gives the user the possibility to perform special functions, such as adaptation and coding of the ECU. The Expert Mode gives no information about the specific

procedures and how to perform these special functions. Information concerning performing these functions can be found in vehicle specific factory workshop manuals.



Warning:

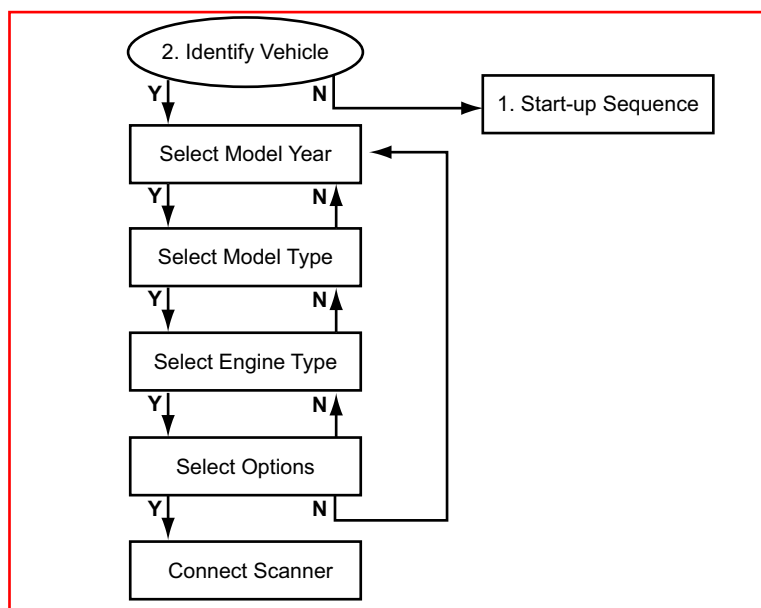
The EXPERT MODE should only be entered if the user is an Expert in VAG diagnostics. It is possible to change and clear system settings with this function. Some functions can disable and/or corrupt the ECU by incorrect use!

See 'Expert Mode' on page 130 for additional information.

17.1.4 Training Mode (Demonstration)

Allows you to use many of the Scanner functions without actually connecting to a vehicle. Simulated data and test results are provided.

17.2 Identify Vehicle

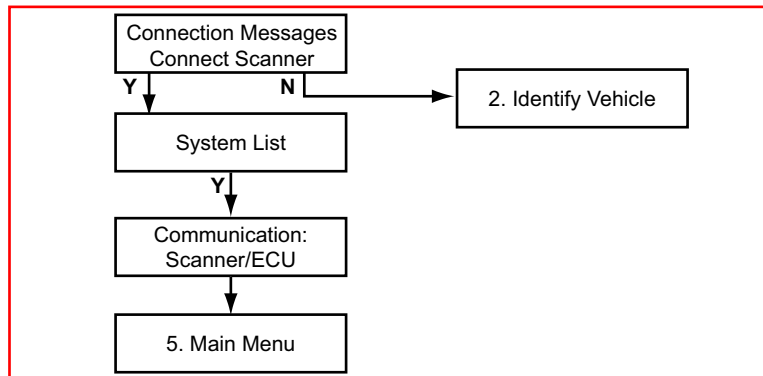


17.3 Connect Scanner

The Scanner displays instructions on where to locate the vehicle diagnostic connector and which adapter to use for testing. Follow the on-screen instructions to connect to the vehicle.

**Note:**

See the “Adaptors Overview & Data Parameters” manual for information.



17.3.1 Scanner Connection Tips

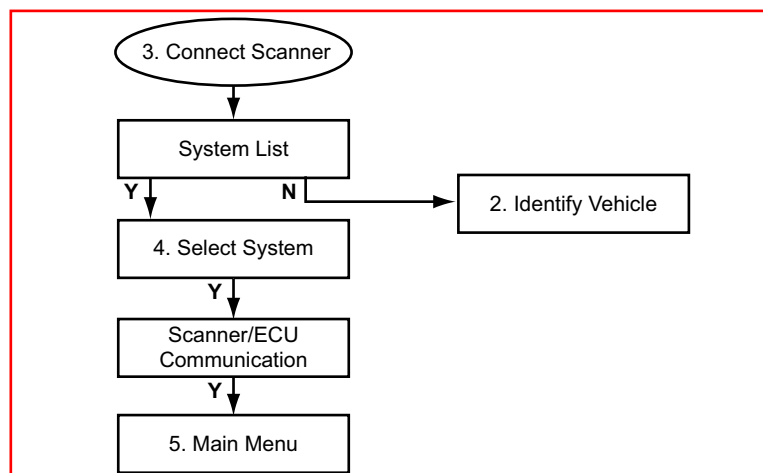
An “overvoltage on communication lines” may display after the connector location message. This is often the result of an incorrectly installed radio.

If an after market radio is incorrectly installed, there is the possibility that the battery voltage is connected to the communication line. This can damage the ECU and also damage the test equipment if it is connected to the diagnostic connector.

If this warning displays, make sure that battery voltage is not present on the communication line:

- If battery voltage is present, repair the wiring before proceeding.
- If battery voltage is not present, ignore the message and continue.

17.4 Select System to be Tested



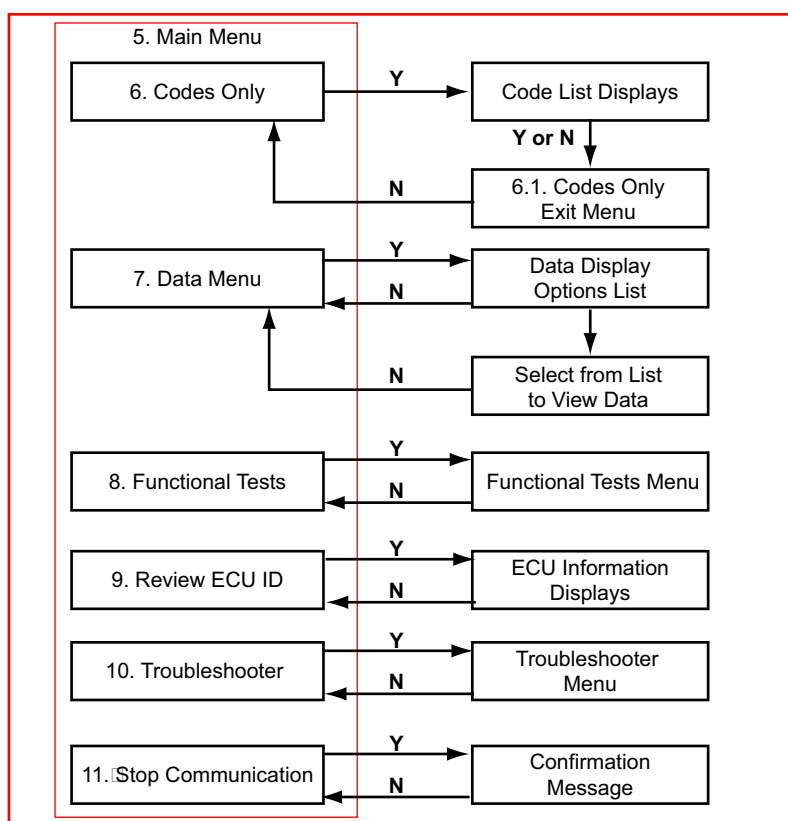
The number of systems that can be tested is dependant on the selected vehicle. However, not all of the systems will be present, some of them are optional and others are mutually exclusive. For example, when an Integrated Immobilizer is present, a Separate Immobilizer is not present.

17.4.1 Separated and Not Separated System Tips

Only select the Immobilizer (If Not Separated) and Steering Help (If Not Separated) if the Separated system is not communicating. Be aware, the codes and ECU information will be not valid for the Immobiliser or Steering Help systems.

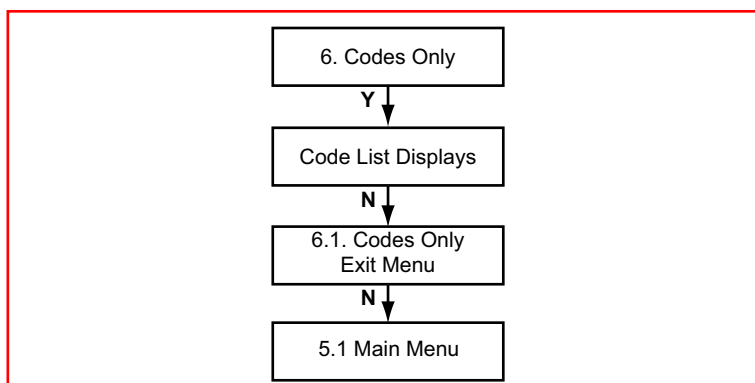
The “If Not Separated” systems communicate with the electronic instrument panel, these systems are integrated and hence do not use a separate system.

17.5 Main Menu



17.6 Codes Only

Displays the diagnostic trouble codes (DTCs) stored in ECU memory, scroll to view the complete list.



17.6.1 Codes Only Exit Menu

The Code Info Exit Menu offers the following options:

- Resume—returns to the code list.
- Clear Codes—erases all code records from ECM memory.

17.6.1.1 Clear Codes Tips

Keep the following in mind when clearing codes from the ECU:

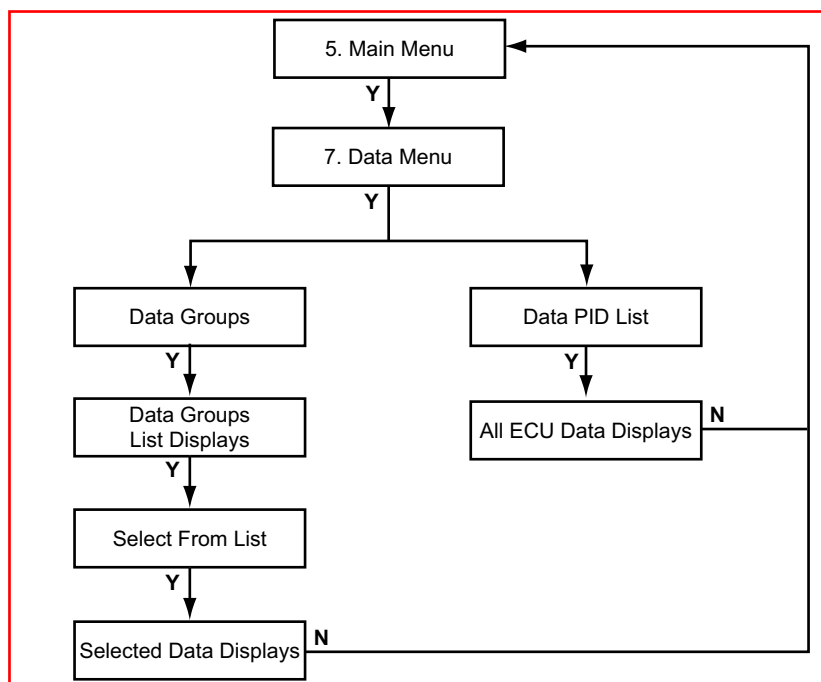
- Sometimes a fault code displays for a component that is not installed on the test vehicle. This is a function of the ECU, not the Scanner. These codes cannot be cleared. Always make sure the component, the code refers to, is present, when a code cannot be cleared.
- Some cleared codes only set again under certain circumstances. Note or print the codes before repair and before clearing codes.
- IF the error condition still exists after repairs, the ECU can set the code again.

17.7 Data Menu

The Data Menu selection is available from the Main Menu on most vehicles. When selected, a list of options displays:

- Data PID List—displays all of the parameters available from the ECU.
- Data Groups—displays only the parameters in the selected group.

With either selection, the ECU data can be used for testing in the workshop as well as road testing.



When Data Groups are selected, data displays in diagnostic groups to make problem solving easier. This method allows for a faster screen update rate.

17.8 Functional Tests

Selecting Functional Tests opens a menu of test options:

- Actuator Tests
- Special Functions
- Adaptation

17.8.1 Actuator Tests

Actuator Tests allow the Scanner to switch certain system components on and off to check their operation. The number of components that can be activated is dependent on the ECU under test and the vehicle itself.



Warning:

“Important Safety Warning”: The Fuel Pump runs continuously while the Actuator Tests are in progress.

17.8.1.1 Actuator Test Tips

Keep the following in mind when performing actuator tests:

- Often a certain actuator may not be present on a vehicle, although according to the manuals it should be. Therefore, please check this first after failing to hear a reaction from the actuator under test.
- Have the engine running only when instructed to do so by the Scanner and always follow the instructions displayed on the Scanner.
- With some engines, it is very difficult to hear the injectors click. Use a multimeter or scope to make sure the injectors are activated properly.
- The sequence in which the tests are performed and the availability of the tests is controlled by the ECU under test.
- On some models, the engine must run for at least 30 seconds prior to initiating the test.
- Some automatic transmission systems do not have actuator tests. A “Actuator Test Not Possible” message displays if selected.
- Most actuator tests automatically stop after 30 seconds.

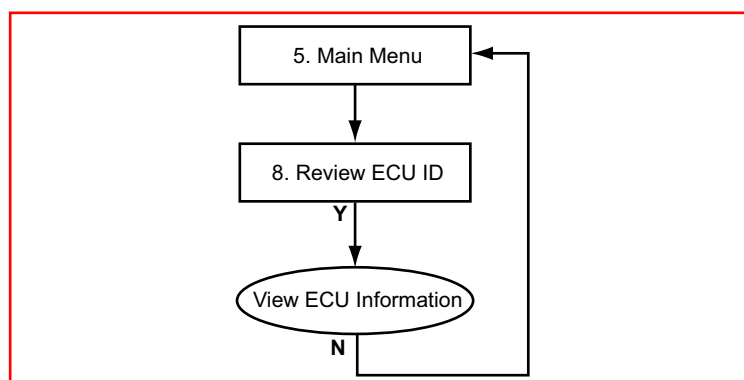
17.8.2 Special Functions

These tests are for resetting the ECU default values after select components have been repaired or replaced. Select an item from the menu and the Scanner displays step-by-step instructions.

17.8.3 Adaptation

These tests are for resetting the ECU adaptive values after select components have been repaired or replaced. Select an item and follow the on-screen instructions.

17.9 Review ECU ID

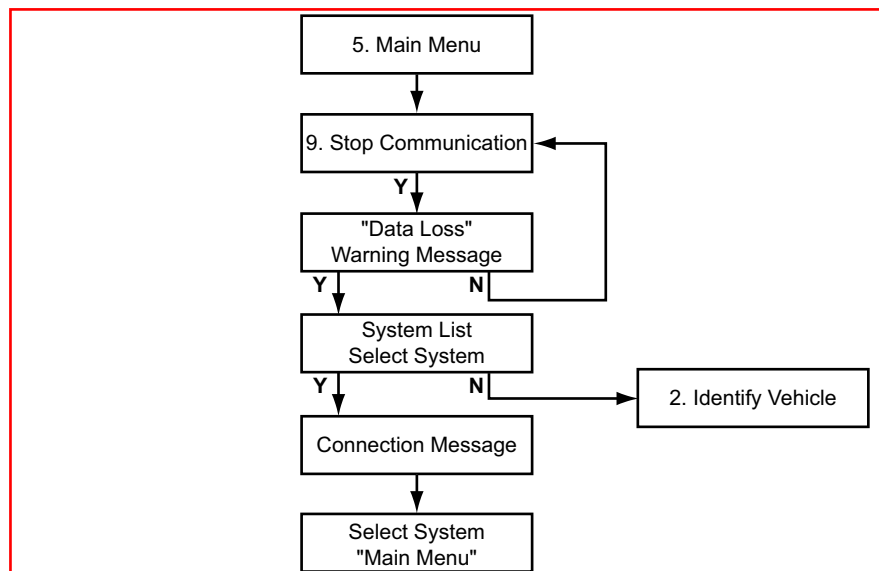


This selection displays pertinent information about the ECU under test, such as the part and model numbers and the manufacturer.

17.10 Troubleshooter

The Troubleshooter selection is on the system Main Menu only if information is available for the test vehicle. Troubleshooter is a database of information designed to assist you in diagnosing vehicle problems. Troubleshooter menus vary by make, model, and system.

17.11 Stop Communication



Use Stop Communication to end the current diagnostic session and to Stop Communication with the ECU.



Caution:

The ABS System or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the Main Menu and select "Stop Communication" before disconnecting the Scanner.

17.12 Expert Mode

This is a special mode that gives the user the possibility to perform special functions, such as adaptation and coding of the ECU. When using the expert mode the vehicle specific workshop manual should be

available with self diagnostic information. This information is necessary to give an interpretation to displayed data values and to know the procedure to perform a specific test, coding or adaptation.



Note:

The Expert Mode should only be entered if the user is an expert in Volkswagen/Audi diagnostics. It is possible to change and clear system settings with this function. Some functions can disable or corrupt the ECU by incorrect use!

Select **Expert Mode** and a system menu displays. The menu includes two special items, explained below, and a list of other systems:

17.12.1 Automatic System Test

This procedure tests all available systems and prints the ECU ID along with a list of any existing trouble codes. A printer must be connected and must be on-line. Because the Scanner scans all available systems, this procedure can take some time, ten minutes is not exceptional.

17.12.2 Blink Codes System

This system enters a blink/slow codes menu for reading blink/slow codes. Select codes to read blink codes from a system that has blink codes possibilities.

17.12.3 All Other Systems:

After selecting a system, communication starts by displaying several warnings followed by the ECU identification. Select to continue to open the function menu. Functions available depends on the communication protocol. Functions that can be executed depend on the system and entry conditions. Some functions need a log-in or security access before executing the particular function. Not all systems support all functions.



Note:

*The 25-Immobilizer (Separated) and 44-Steering Help (Separated) systems can give the following ECU identification: **Bitte Adresse 17 eingeben**. Although it is possible to continue and select the functions, the information retrieved is not valid and should be discarded. The selected system is integrated in the instrument panel. Select 17-Electronic Instrument Panel for diagnostics.*

The following functions may be available in the list:

17.12.3.1 01 – Read ECU Information

This function displays the ECU identification string and the ECU coding and WSC (WorkShop Code). Also, some systems display extra ECU identification if requested.

17.12.3.2 02 – Check DTC Memory

This function displays all current trouble codes present.

17.12.3.3 03 – Actuator Tests

This function activates different actuator tests for about 30 seconds in sequence. The user can abort or continue to the next test. Some tests display a command to the user. For example; if “Press Brake Pedal” displays, the user must press and hold the brake pedal and then confirm to continue.

The sequence, number and type of tests are dictated by the ECU. To perform the actuator tests the entry conditions must be correct. For the correct entry conditions refer to the vehicle specific workshop manual. On some systems the actuator tests cannot be restarted until the ignition key is switched off for some time.

17.12.3.4 04 – Basic Settings

This function either places a system in basic mode or performs a basic setting. The block number (000-255) that was entered determines which occurs. After entering a block number either data values or text display. There is no description of the data value, only the value and unit are shown. Refer to the factory workshop manual to interpret the values.

The system performs the basic setting now, and some data may change during the procedure. For interpretation of the data and instructions on how to perform a basic setting refer to the factory workshop manual.

17.12.3.5 05 – Clear DTC Memory

This function clears any existing trouble codes and checks if the trouble codes are really cleared. Trouble codes from problems that are still present are not cleared, and are redisplayed.

17.12.3.6 06 – Stop Communication

This function stops Scanner communication with the ECU and exits the Expert Mode.

17.12.3.7 07 – ECU Coding

This function changes the existing ECU coding by entering a new code. The range of coding can be either 0-127, 0-32767 or 0-1048575. The coding provides vehicle configuration data to the ECU. For example; whether or not cruise control is available.

After entering a new code, the Scanner reports back if the ECU has accepted the code or not. A coding is not accepted by the ECU if it is an unknown number or if the ECU cannot be coded. However, the ECU will accept an incorrect coding number.

Some special codings require an unlocked ECU. The ECU can be unlocked with a Log-in or Security Access request.

ECU Coding Tips

Keep the following in mind while performing ECU coding:

- Enter the individual code digits using the arrow buttons.
- After the new code is entered always end communication using the “06-Stop Communication” function.
- If an incorrect code is entered and detected by the software, a warning message displays. Cancel that entry, then enter the correct code and the display returns to the 07-ECU Coding function.



Note:

Always remember the original code, if the code is entered incorrectly, the “Old” code can always be used.

17.12.3.8 08 – Read Measuring Value Block

This function displays measuring value blocks. Enter a valid block number and data values or text displays. There is no description of the data value, only the value and unit is displayed. For interpretation of the values refer to the factory workshop manual. Scroll to change the block number value.



Note:

The displayed data is the actual data received from the ECU.

17.12.3.9 09 – Read ADC Channel

This function displays data from a single ADC channel. enter a valid channel number and a number from 0 to 65535 displays. Scroll to change the channel number.



Note:

This function is not available on the KW2000 communication protocol.

17.12.3.10 10 – Adaptation

This function changes the adaptation values from the ECU. Select a valid channel and the actual adaptation value is displayed. Some adaptation channels display data on the last line. By scrolling or selecting for manual input, the new adaptation value can be tested or changed. Selecting channel 000 clears all adaptation values after confirmation.

17.12.3.11 11 – Login Request

This function performs a log-in request to the ECU. Enter a valid log-in code and the ECU is configured to perform a special coding or adaptation function.

**Note:**

This function is not available on the KW2000 communication protocol.

17.12.3.12 11 – ECU Coding 2

This function changes the ECU coding by entering a new valid code.

**Note:**

This function is available on the KW2000 communication protocol only.

17.12.3.13 15 – Check Readiness Code Setting

If the system has a readiness code, this function displays the readiness code and information as to whether or not it is set. If the system has no special readiness block. The same information can sometimes be found in Function 08 by selecting group 86, and check channel 1.

**Note:**

This function is not available on the KW2000 communication protocol.

17.12.3.14 16 – Security Access

This function performs a security access request to the ECU. Enter a valid code and the ECU is ready to perform a special coding or adaptation function.

**Note:**

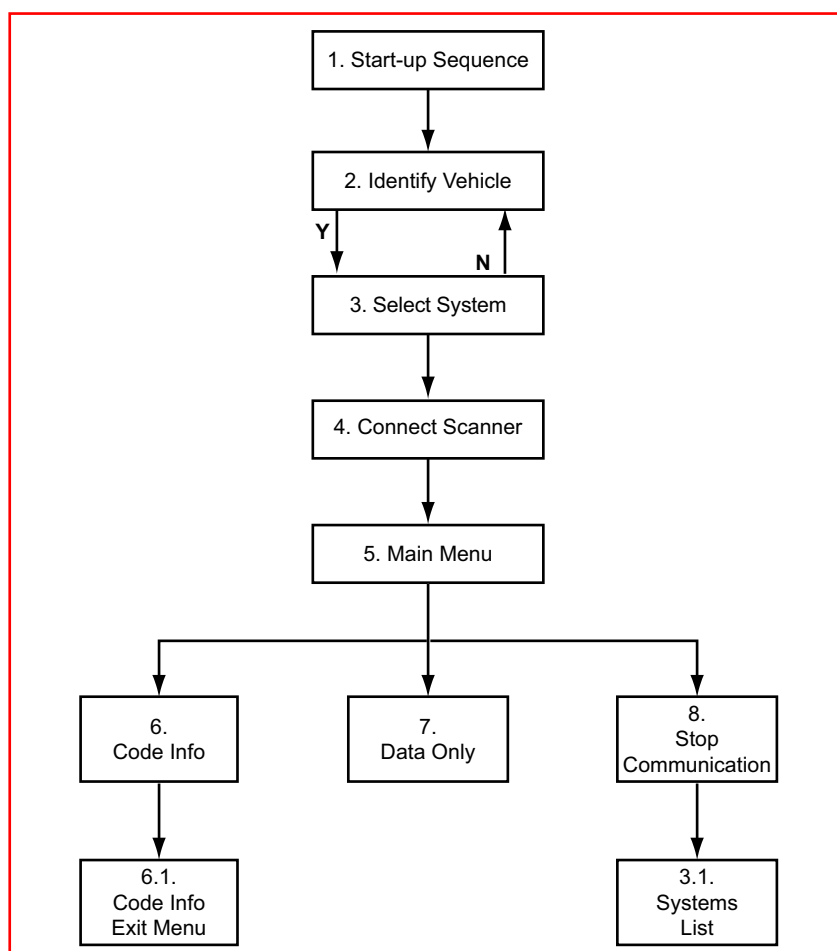
This function is not available on the KW2000 communication protocol.

17.12.4 Expert Mode Tips

Keep the following in mind when working with Expert Mode:

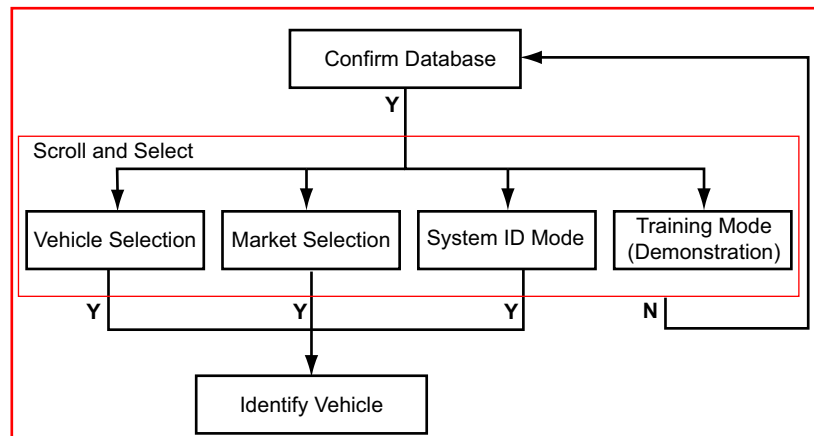
- Some systems cannot communicate if the engine is running.
- Some systems cannot communicate, or loose communication, if engine speed exceeds a certain rpm. Refer to the specific factory workshop manual.
- Some systems cannot communicate, or loose communication, if vehicle speed exceeds a certain speed. For example; some ABS modules cancel communication above 19 km/h. Refer to the specific factory workshop manual.

Overview



This flow diagram represents the basic operation of the software. The numbers beside each item refer to the various headings in this chapter.

18.1 Start-up Sequence



18.1.1 Vehicle Selection

Allows you to identify the test vehicle by answering a series of questions:

- Model Year
- Model
- Engine
- Optional equipment

18.1.2 Market Selection

The correct connector location information displayed is dependent on this selection. Choices are:

- European Right Hand Drive
- European Left Hand Drive
- USA

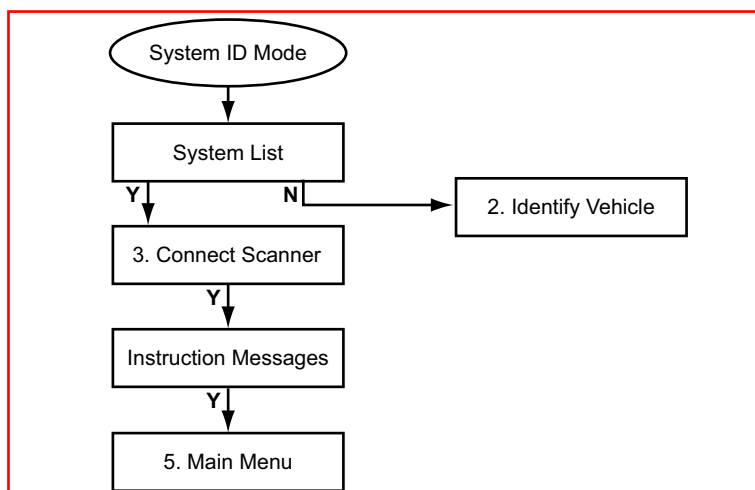
The correct connector location information displayed is dependent on the left or right hand drive selection. The USA option uses specific VIN characters to identify the vehicle and can be disregarded unless testing a vehicle built to US specifications.

18.1.3 Training Mode (Demonstration)

Allows you to use many of the Scanner functions without actually connecting to a vehicle. Simulated data and test results are provided.

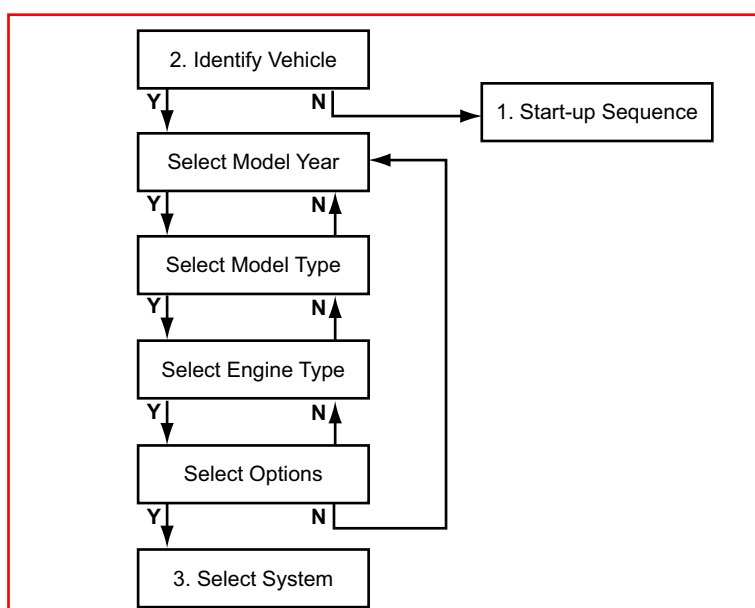
18.1.4 System ID Mode

Allows you to begin the vehicle identification by first selecting the system to be tested. Use this option if communication problems arise or the ECU type is unknown.

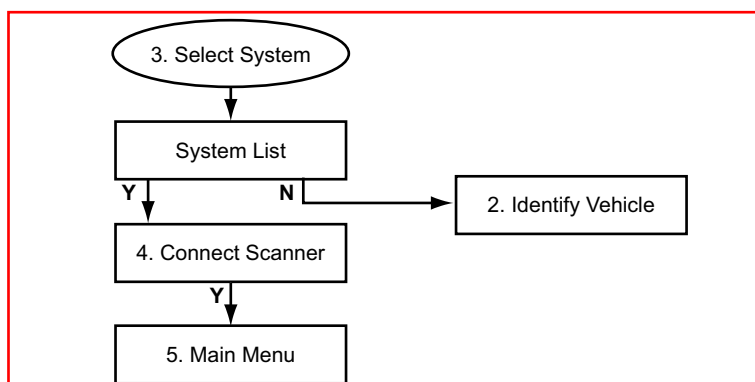


1. Select a system group from the list. Only fitted systems groups (engines, lights, seat, etc.) will be displayed.
2. After selecting the system group, select the system to be tested.
3. Connect the scanner and proceed testing.

18.2 Identify Vehicle



18.3 Select System to be Tested



18.3.1 System List

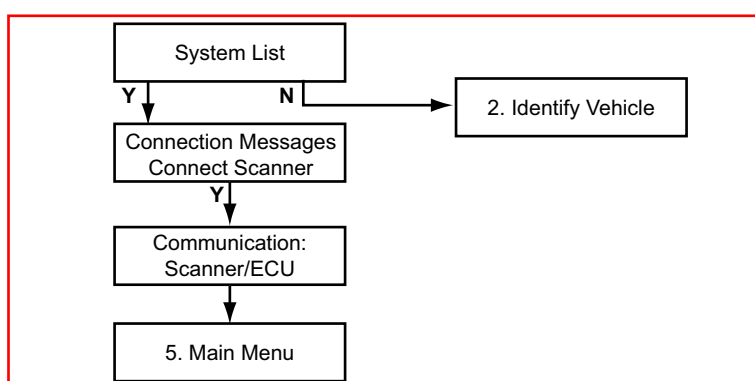
The System List displayed is dependent on the selected vehicle. The system list remains active until a new vehicle is selected. Scroll and confirm to select the system to be tested.



Caution:

The ABS or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the “Select System” menu before disconnecting the Scanner from the vehicle.

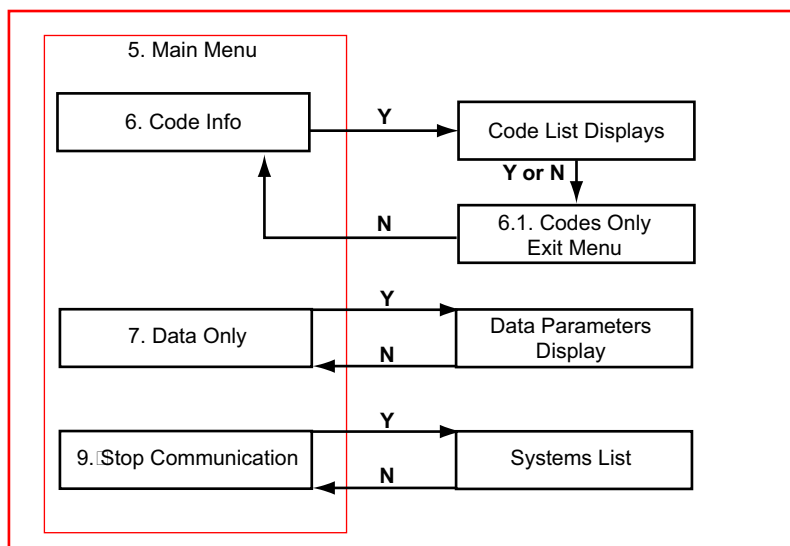
18.4 Connect Scanner



Note:

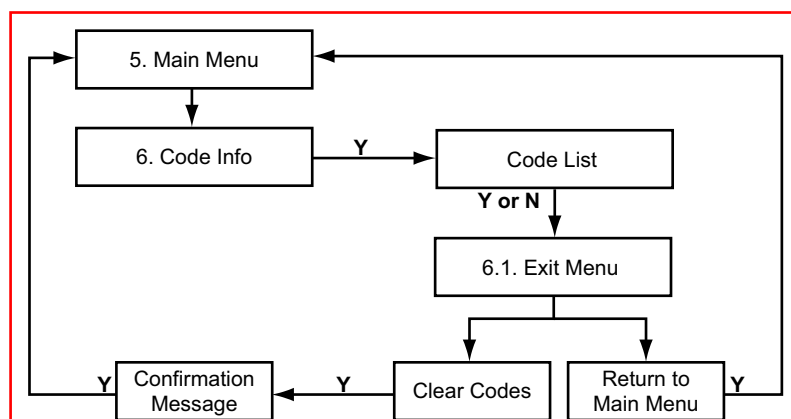
Refer to the “Adaptors Overview & Data Parameters” manual for connection information.

18.5 Main Menu



18.6 Code Info

Displays the Diagnostic Trouble Codes (DTCs) stored in ECM memory, scroll to view the complete list.



Two types of codes display:

- Diagnostic Trouble Codes (DTCs)—these standard EODB/OBD-II codes display in a 5-character alphanumeric format.
- Pending Codes—these codes set when operating conditions are out of the normal range, but not all the criteria to set a DTC occur. For example, a failure must occur on two consecutive trips or drive cycles

before certain EOBD codes are set. In this case, a pending code is recorded during the first trip when the failure occurs. Pending codes can be symptomatic of a driveability concern

Refer to the *Global OBD-II Vehicle Communication Software Manual* for additional information.

18.6.1 Code Info Exit Menu

The Codes Only Exit Menu offers two options:

- Clear Codes—erases all code records from ECM memory.
- Return to Main Menu—returns to the system main menu.

18.6.1.1 Clear Codes Tips

Keep the following points in mind when clearing codes:

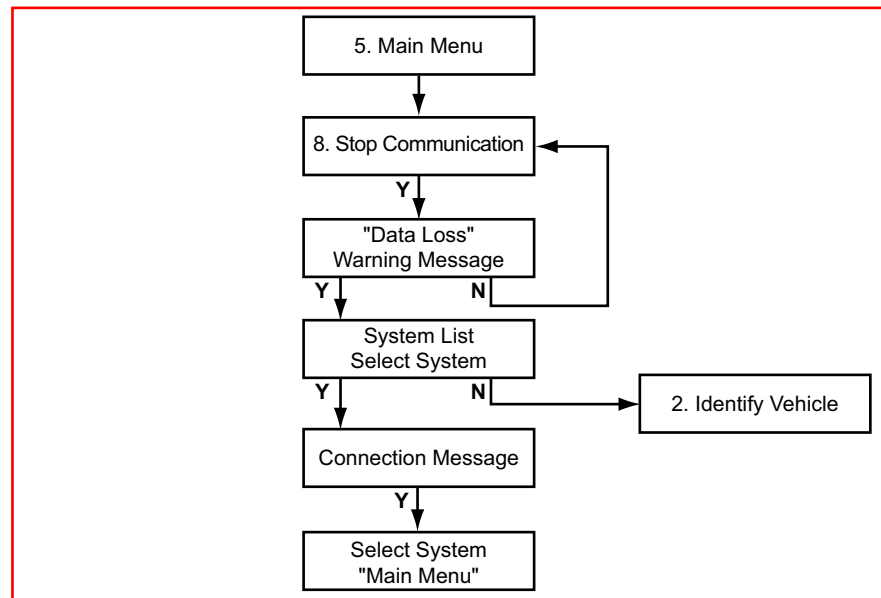
- Some codes can only reset under certain conditions. Note or print the codes before repair and before clearing codes.
- When the error condition still exists, the ECM can set the code again.
- Some codes may be sent several times per data frame. These Codes display multiple times in the Code List.
- If the code clearing operation fails for any reason, the previous codes reappear. Should this occur, return to the Codes menu and repeat the Clear Codes operation.
- Carefully follow all instructions displayed on the Scanner.

18.7 Data Only

Displays live data parameters, scroll to view the complete list.

18.8 Stop Communication

Use Stop Communication to end the current diagnostic session and to Stop Communication with the ECU.

**Caution:**

The ABS or ECU can be damaged or disabled if the Scanner is disconnected before communication has properly stopped. Always return to the Main Menu and select "Stop Communication" before disconnecting the Scanner.