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Introduction

This guide contains instructions for the installation of the Portable Diagnostic Unit hardware in Aston Martin Dealer workshops. To achieve maximum benefit from the system, please follow the instructions carefully. The following System Diagram shows the principal system components and panel details.

This introduction briefly describes the system and its capabilities. This is followed by the Installation and Power-Up procedures which give detailed instructions on how to start the system and access the self-contained Interactive Training Programme.

The subsequent sections detail the fault diagnosis and maintenance procedures.

WARNING: *The equipment must only be used by trained personnel. Care should be taken to use the equipment in accordance with the operating procedures. Observe all safety warnings in this guide. If any part of the system is damaged do not use it. Call your local GenRad Service Centre immediately for a substitute part. Refer to 'Parts Ordering'.*

WARNING: *If the system is used to measure high voltages, these voltages can appear on the pins of other connectors in the system. Ensure that socket covers are fitted on unused sockets. Ensure that all connections are made prior to applying the high voltage to the probes. Do not leave the equipment unattended in this state. The maximum voltage that may be applied between the test probes is 150 volts AC or DC.*

Radio Interference Statements

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

This equipment has been tested and found to comply with the limits for Class A digital device pursuant to part 15 of the Federal Communications Commission (FCC) rules. However, operation in close proximity to domestic communication equipment may cause interference. It is the responsibility of the user to avoid or correct this condition.

The Aston Martin Diagnostic System

The Aston Martin Diagnostic System is a new generation diagnostic tool which fulfils a number of functions in aiding the technician to quickly and accurately locate faults. The heart of the system is the Portable Diagnostic Unit, a lightweight powerful computer/measurement system providing a step-by-step user friendly interface for the technician.

PDU functions include:

Data Logger - The ability to monitor and record control module signals even whilst the vehicle is being driven.

On-Line Help - Containing detailed descriptions in the operation of the vehicles electronic components.

Vehicle Setup - The ability to setup various adjustable parameters to their optimum settings.

Diagnostic Trouble Codes - The ability to extract recorded fault information from the DB7's control modules.

Each of these functions is described in detail in the PDU Users Guide.

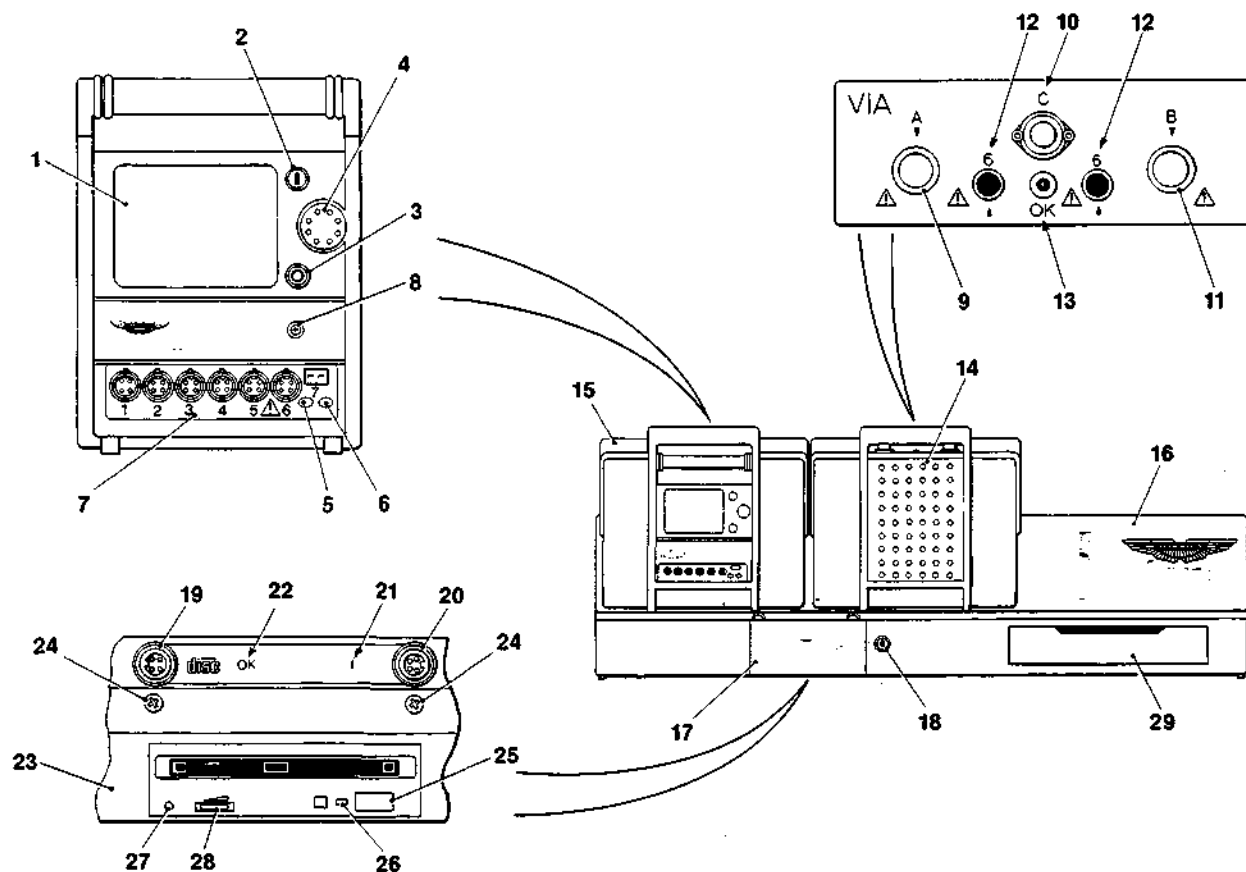


Figure 1. The Aston Martin Diagnostic System

Key to Figure 1

- | | |
|--|---|
| 1. LCD touch screen | 12. Connector for PDU cable |
| 2. Power on switch | 13. VIA status indicator |
| 3. Power off switch | 14. Vehicle Interface Adaptor (VIA) |
| 4. Screen contrast control | 15. Portable Diagnostic Unit (PDU) |
| 5. Battery charge indicator (Orange/Yellow) | 16. Base Station |
| 6. Power on indicator (Green) | 17. Base station door |
| 7. PDU interface connectors | 18. Base station door lock |
| 7.1. Black probe | 19. Charging and loading data connector |
| 7.2. Red probe | 20. Secondary charging connector |
| 7.3. Current clamp | 21. Power on indicator (Green) |
| 7.4. Pressure transducer | 22. Status Indicator (Red) |
| 7.5. Vehicle battery adaptor (VBA) | 23. CD-ROM drive |
| 7.6. VIA, base station, serial interface and system test | 24. Electronic module securing screws |
| 7.7. Temperature probe | 25. CD-ROM eject button |
| 8. Battery cover | 26. CD-ROM drive active light |
| 9. Connector A for vehicle cable | 27. Audio output (not used) |
| 10. VIA power input cable | 28. Audio level (not used) |
| 11. Connector B for vehicle cable | 29. Base station drawer. |

Component Identification

Base Station (Fig 1-16)

The Base Station is a wall or bench mounted steel unit on which up to two Portable Diagnostic Units and a Vehicle Interface Adaptor can be stored.

Portable Diagnostic Unit (PDU) (Fig 1-15)

The PDU is a hand held diagnostic tool utilising a touch sensitive screen and serial communications capability

Electronics Module

The Electronics Module is located behind the base station door (Fig 1-17) and facilitates the charging of the PDU battery. Also contained in the module is the CD-ROM drive (Fig 1-23) for the storage of all system software. The PDU must be connected to the electronic module whenever it is located on the base station.

Vehicle Interface Adaptor (VIA) (Fig 1-14)

The VIA enables the PDU to interface with vehicle systems not equipped with serial communications.

Vehicle Battery Adaptor (VBA)

The VBA provides the correct voltage to power the PDU from the vehicle battery and also protects the PDU from any interference from the vehicles electrical systems.

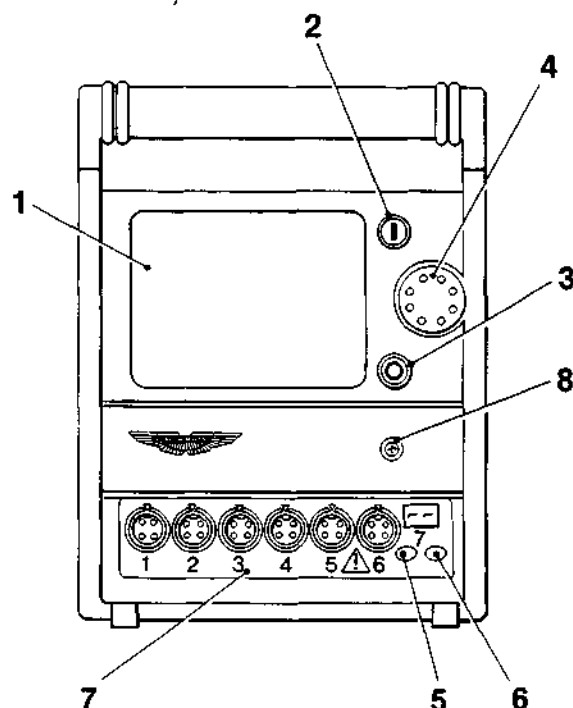


Figure 2. The Portable Diagnostic Unit

Controls

The Touching the Power On button (Fig 2-2) will switch on the unit and bring on the screen backlight. Also note that the Power On Indicator (Fig 2-6) will illuminate.

Touching the Power Off button (Fig 2-3) will turn off the unit, screen backlight and power on indicator.

The Touch Sensitive Screen (Fig 2-1) is used to display information in digital or in graphic forms. Program options are also displayed and may be selected by touching the appropriate area of the screen.

CAUTION: The use of sharp pointed implements will damage the touch sensitive screen. Use only light finger pressure to operate the PDU.

To adjust the screen contrast, rotate the contrast control (Fig 2-4) to the required position.

In order to preserve the battery charge, the power to the screen backlight is automatically switched off after 5 minutes of inactivity. In this state, the Power On indicator (Fig 2-6) remains illuminated to indicate that the PDU is in stand-by mode. Touching the screen will return the PDU to normal operating mode.

Diagnostic System Cables

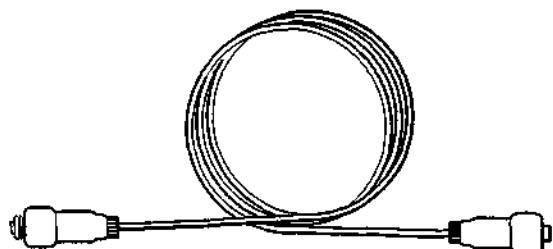
Cables

The cables connecting the diagnostic system elements together and to the electronic units of the vehicle are identified in the following illustrations.

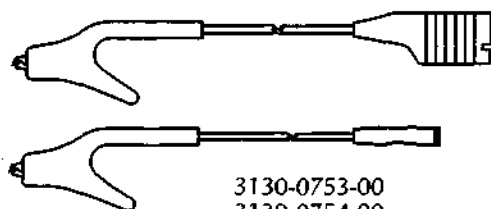
The cables should be stowed in the base station drawer or in the pockets of the PDU and VIA carrying cases.

CAUTION: Care must be taken when using the vehicle cables since they are capable of passing high currents. Short Circuits are a fire risk.

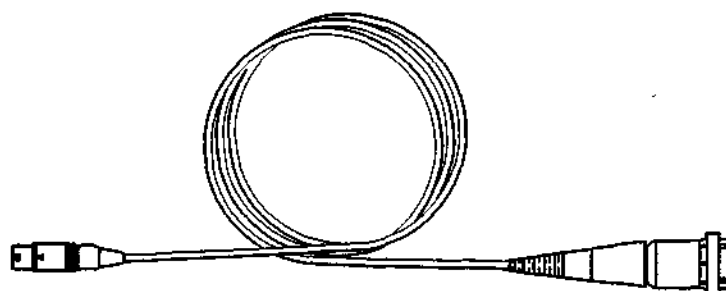
Diagnostic System Cables



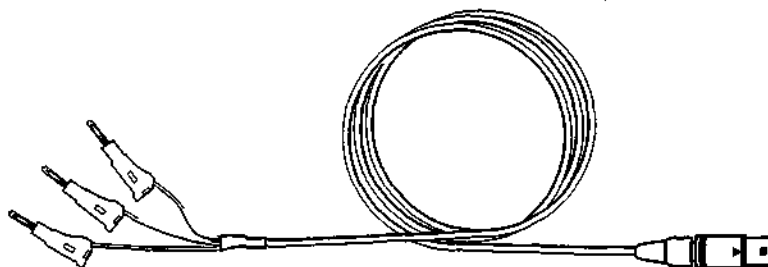
3130-0028-01 VIA-VBA Cable



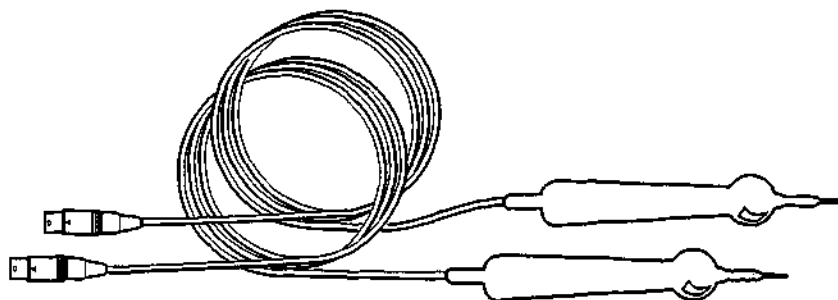
3130-0753-00
3130-0754-00
Red and Black Croc Clips



3130-0756-00 Transmission Test Cable



3130-0026-01 Scope and Self Test Adaptor Cable

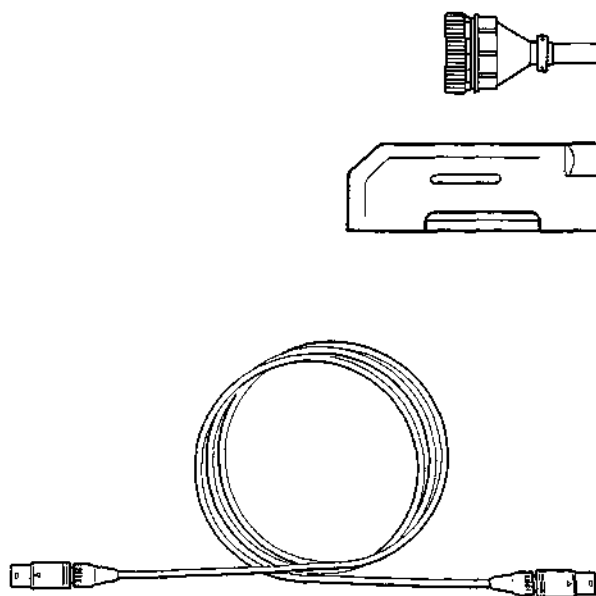


3130-022-01 Red Probe
3130-023-01 Black Probe

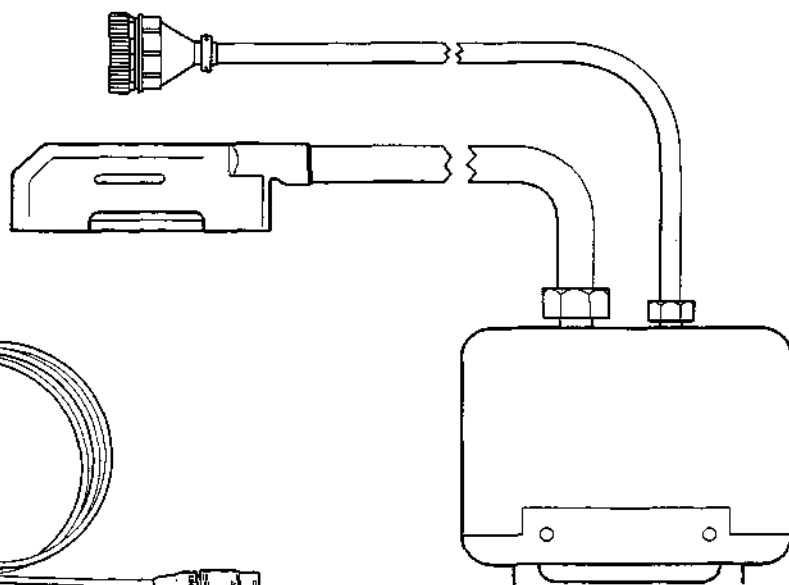


3130-1242-00 Aston Martin Protocol Adaptor

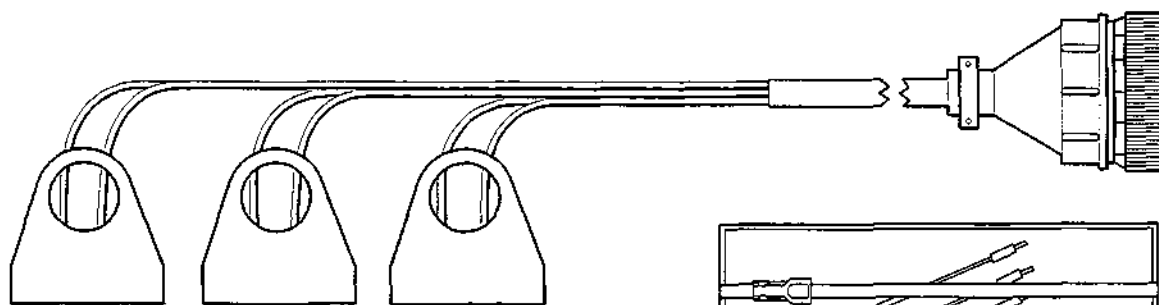
Diagnostic System Cables



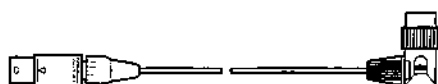
3130-0030-01 VIA-PDU Cable



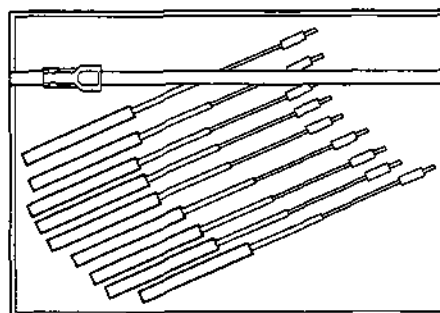
3130-0778-00-B Anti-Lock Brakes



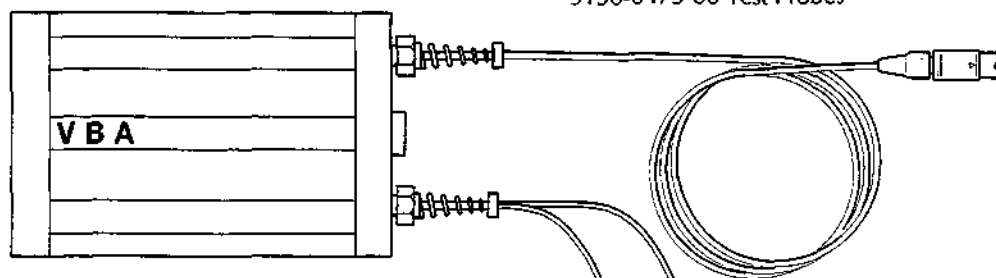
3130-0780-00-B Air Conditioning Test Cable Cable



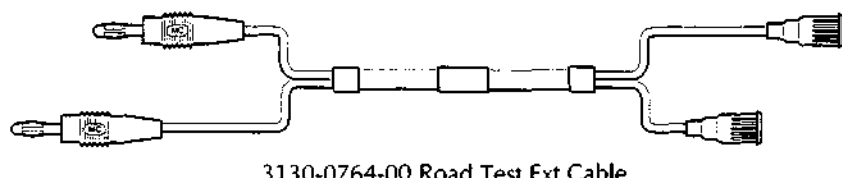
3130-0064-01 Base Station-PDU Cable



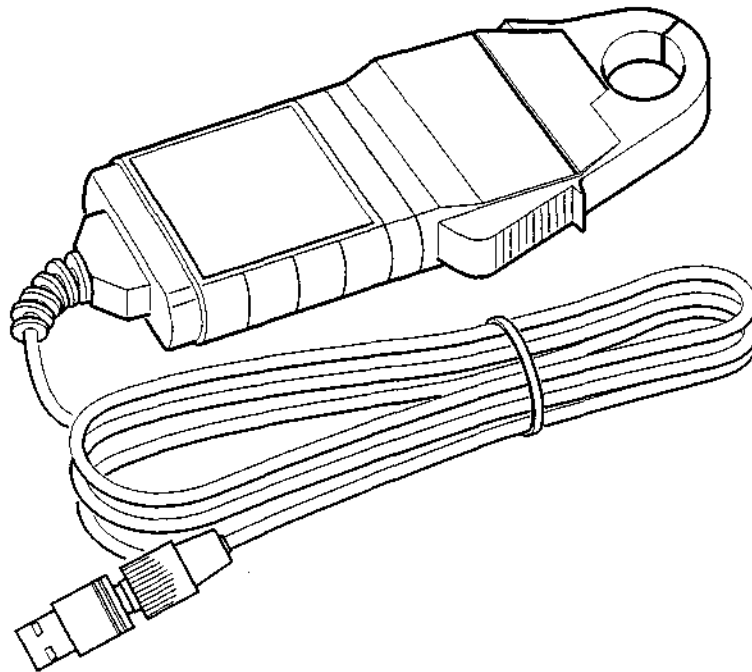
3130-0475-00 Test Probes



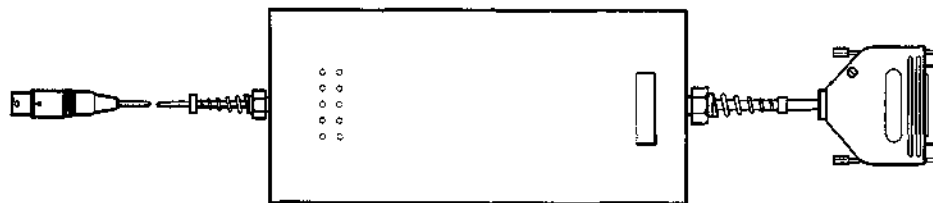
3130-0024-01 Vehicle Battery Adaptor



3130-0764-00 Road Test Ext Cable

Diagnostic System Cables

3130-1213-01 Aston Martin Current Probe



3539-1169-02 Aston Martin Printer Lead



3538-0100-01 Aston Martin Multi Protocol Adaptor

Base Station Installation

It is recommended that the base station is wall mounted (Fig 3). Alternatively it may be mounted on a bench. The base station houses the CD-ROM drive and power supplies.

Note: The electronic module should only be fitted after the base station has been installed.

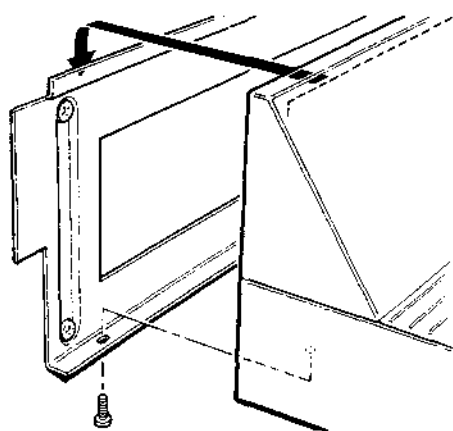
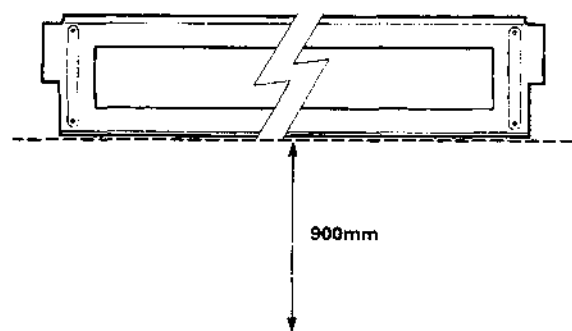
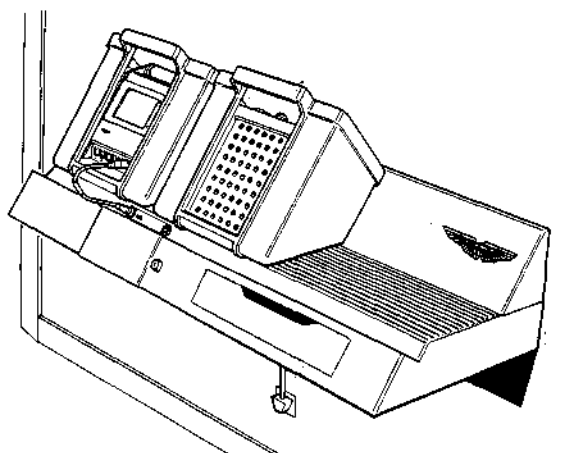


Figure 3. Wall Mounted installation

Wall Mounting

It is important that the following points be considered before carrying out the mounting procedure.

1. The location should be close to the vehicle repair bays. The base station will require a power outlet close by, such that the 2m mains lead will comfortably reach the outlet.
2. The wall plate should be attached with four fasteners, each of which has a minimum pull-out strength of 300 kg (662 lb). The four fasteners are not supplied, as the type of fastening will depend on the wall material. The mounting holes in the wall plate are 8mm diameter with a maximum clearance for a socket spanner of 30mm. It is recommended that 6mm diameter bolts are used to secure the wall plate.

WARNING: The mains power outlet must be close to the equipment and be clearly recognisable as the power source for safety reasons.

French Market Only: Do not connect the PDU equipment to IT (Impedante Terre) power systems.

WARNING: This equipment must be earthed via the mains lead through the outlet socket. In markets where three pin main power outlets are not available, a separate earth point must be used

Procedure

1. Select a suitable location.
2. Mark a horizontal line on the wall 900mm above the floor (Fig 3)
3. Remove the two screws securing the wall mounting plate to the base station and remove the wall mounting plate.
4. Hold the wall mounting plate up to the marked line and mark four hole positions for the wall mounting plate bolts.
5. Drill the wall to the correct diameter and depth required for the four bolts.
6. Securely fasten the wall mounting plate to the wall. Lift the base station onto the wall mounting plate, fit and tighten the two screws/washers to secure the base station to the mounting plate.

CAUTION: The gap beneath the base station should be maintained free from obstructions to allow a flow of air under the unit for cooling.

Bench Mounting

The base station may also be mounted on a bench, which must be in a safe position, stable and protected from hazards and impacts. The base station must be mounted at the back of the bench. 'Z' clips are provided for permanent mounting. The bench surface must be kept free from dust at all times.

CAUTION: A gap under the base station must be maintained free from obstructions to allow a flow of air under the unit for cooling.

Electronic Module Installation

WARNING: The base station electronic module must be disconnected from the mains supply prior to installation/removal from the base station assembly. **DO NOT** reconnect to the mains supply until the module is safely fitted into the base station. This unit must be earthed.

Note: Users in North America are advised to replace the ceramic mains fuse in the electronic module with the glass fuse supplied.

Procedure

1. Unlock the base station door
2. Pull the right spring-loaded hinge (Fig 4-1) and remove the door.
3. Remove the electronics module from the packaging and place it on a firm surface.
4. Remove the two screws and washers from the front of the module (Fig 4-3).
5. Insert the mains power lead into the socket at the rear of the module (Fig 4-4), **DO NOT CONNECT TO THE MAINS SUPPLY.**
6. Insert the two guide pins on the sides of the module (Fig 4-5) into the base station slots.
7. Slide the module into the base station until fully home, raise the front so that it is level and draw it slightly forward.
8. The two connectors on the front of the module will appear through the matching holes in the base station. Support the module whilst refitting the two retaining screws and washers (Fig 4-6).
9. Secure the mains lead to the underside of the base station using the two cable ties provided (Fig 4-7).
10. If bench mounting, the base station will need to be turned on its back to install and secure the mains lead.
11. Refit the base station door.

CAUTION: Take care to avoid the sharp edges of the module whilst installing. Take care to support the module from the underside until the mounting screws are secured.

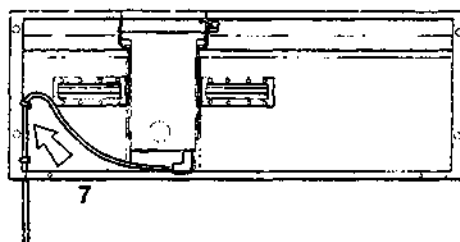
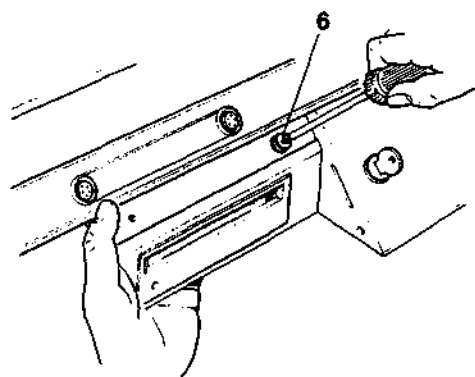
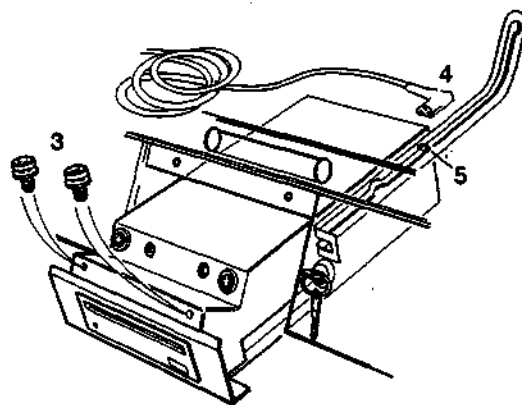
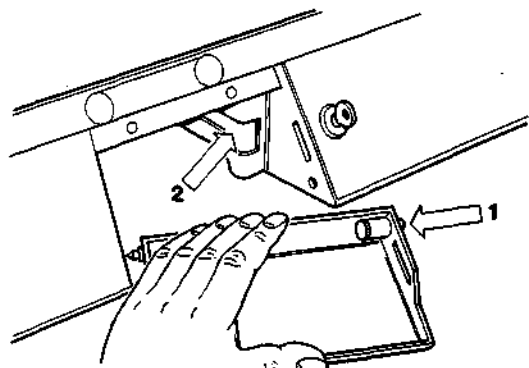


Figure 4. Electronic Module Installation

Powering-Up the Base Station

When first operating the System or when first using a PDU fitted with substitute batteries, it will take up to 36 hours to achieve full charge. In the meantime, the PDU can be used whilst connected to the base station or to the vehicle battery.

WARNINGS:

When using the system equipment, basic safety precautions should always be followed, including:

Carefully read and follow all instructions.

Care should be taken as burns can occur from touching hot parts.

Do not operate the appliance with a damaged mains lead or if the appliance has been dropped or damaged. Call your local GenRad Service Centre immediately for a substitute part.

Do not let the mains lead hang over the edge of the table, bench or counter or come into contact with hot manifolds or moving fan blades.

The Aston Martin Portable Diagnostic Unit is fitted with an auto switching power supply suitable for voltage supplies of 100 - 240 VAC 50 - 60 Hz. You need only check that the power cord connector is of the correct type for your power outlets.

1. Connect the mains lead to the mains outlet.
2. Check that the green indicator lamp above the base station door is illuminated. If the green lamp does not come on, see the problem solving section for advice.
3. After a few seconds, during which the electronics module completes its self-test, the red OK indicator lamp should illuminate. If the red lamp does not come on, see the problem solving section for advice.
4. Allow the base station electronics module to reach working temperature. This will take approximately 30 minutes, after which time the base station will be ready to accept the software on CD-ROM.
5. Slide the PDU into its carrying case and place the associated cables and probes in the carrying case compartments.

6. Place the carrying case onto the base station at the far left side (Fig 5). This is the normal place for charging the battery, loading software and storing the PDU. Note that it is retained by raised retaining blocks which fit inside the recesses under the carrying cases (Fig 5).
7. Remove the protective cover from the PDU interface panel socket (Fig 1-7.6)
8. Using the PDU to base station cable (0064) connect panel socket 6 to the base station left socket (Fig 1-19). The indicator lamp will glow orange during fast charge and yellow during trickle charging.
9. A second PDU can be fitted on the central position on the base station and may be connected to the right charging socket using a second cable (0064). Note that both units may be charged simultaneously but software may only be loaded from CD-ROM using the left base station socket.

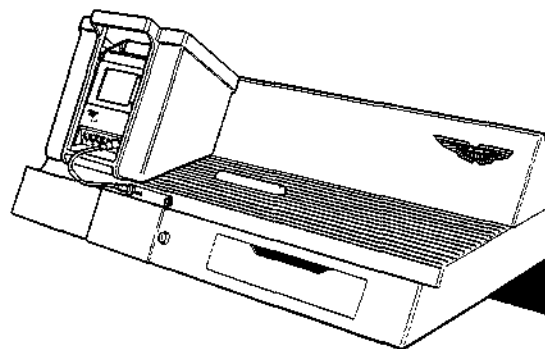


Figure 5. Normal PDU position

Installing the CD-ROM (Early Systems)

1. Ensure that your hands are clean before touching the CD-ROM disc, disc caddy, or the CD-ROM drive.
2. Open the base station door to gain access to the CD-ROM drive.
3. Open the CD caddy by squeezing the sides whilst lifting the hinged door upwards (Fig 6).
4. Handling the CD by the edges only, remove it from the protective sleeve and insert it into the caddy with the image side uppermost. Close the caddy door.
5. Insert the CD caddy into the CD drive in the base station. Close and lock the CD-ROM drive door. The base station is now ready for use.

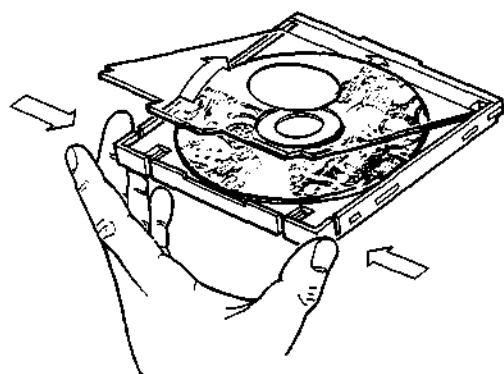


Figure 6. CD-ROM Installation (Early Systems)

Installing the CD-ROM (Later Systems)

Later PDU systems have an improved CD-ROM drive incorporating a tray loading mechanism for the CD-ROM disc.

1. Ensure that your hands are clean before touching the CD-ROM disc, or the CD-ROM drive.
2. Open the base station door to gain access to the CD-ROM drive.
3. Press the tray eject button on the CD-ROM drive (Fig 7). The tray will open automatically.
4. Remove the CD from its protective sleeve and place it on the tray with the image side uppermost.
5. Gently push on the tray and the motorised mechanism will start to retract the tray automatically.

Alternatively, pressing the eject button will cause the tray to close.

6. Close and lock the CD-ROM drive door. The base station is now ready for use.

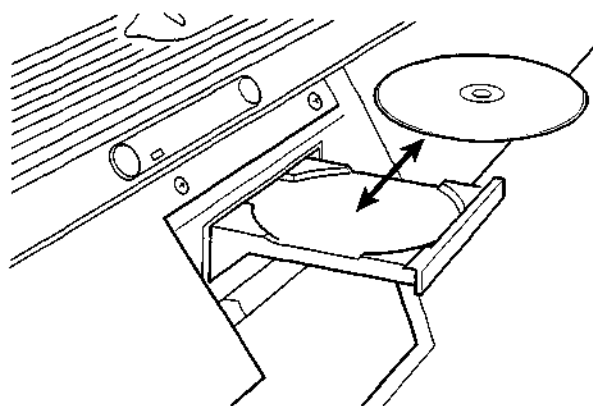


Figure 7. CD-ROM Installation (Later Systems)

Removing the CD-ROM (Early Systems)

1. Ensure that your hands are clean before touching the CD-ROM disc, disc caddy, or the CD-ROM drive.
2. Unlock and open the CD-ROM drive door.
3. Press the eject button on the CD-ROM drive (Fig 1-25).
4. After a short delay, the CD caddy will be ejected. Remove the caddy from the CD drive.
5. Open the caddy and remove the CD. Place the CD into its storage sleeve and store in the base station drawer (Fig 8).

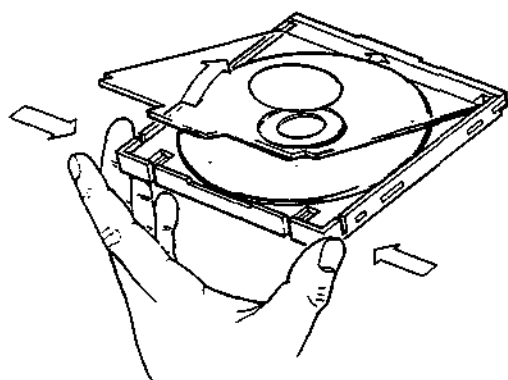


Figure 8. CD-ROM Removal (Early Systems)

Removing the CD-ROM (Later Systems)

1. Ensure that your hands are clean before touching the CD-ROM disc, or the CD-ROM drive.
2. Unlock and open the CD-ROM drive door.
3. Press the eject button on the CD-ROM drive (Fig 1-25).
4. The CD tray will open fully. Remove the CD from the tray.
5. Gently push on the tray or press the eject button again to close the motorised tray (Fig 9).

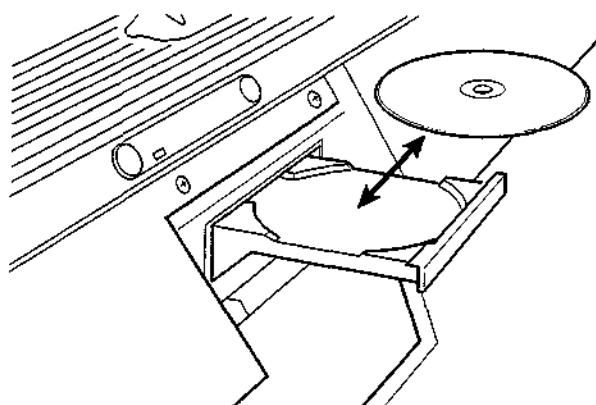


Figure 9. CD-ROM Removal (Later Systems)

Powering-Up the PDU

1. Install the CD-ROM.
2. Press the PDU power on switch (Fig 1-2). An audible tone will be heard and the green PDU power on indicator (Fig 1-6) will illuminate. The touch sensitive screen will also be activated. If this does not happen, see the problem solving section.
3. Adjust the contrast control (Fig 1-4).
4. When the PDU is switched on, it will perform an automatic self-check to test the internal components. On successful completion of the self-check, a PDU symbol will appear with a 'tick' next to it (Fig 10). The PDU will then display the language selection screen (Fig 11).
5. Select the required language and confirm the selection (Fig 11).
Note: PDU text is available in English, French, Italian, German and Japanese.
6. The PDU will then load its software from the CD-ROM and display the 'main menu' (Fig 12).
7. New users may select 'Training' and press the 'tick' icon to enter the on-screen PDU training programme.

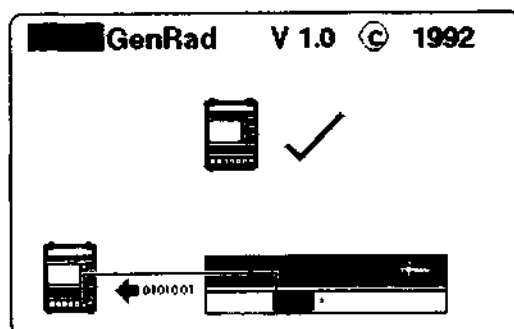


Figure 10. Self-check completed screen

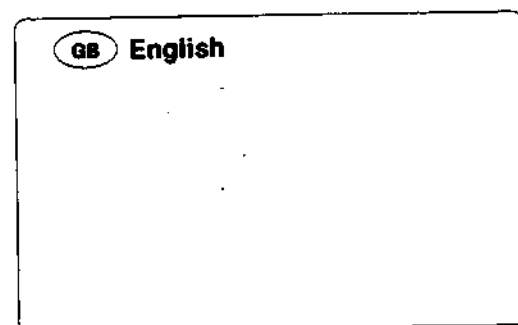


Figure 11. Language selection screen

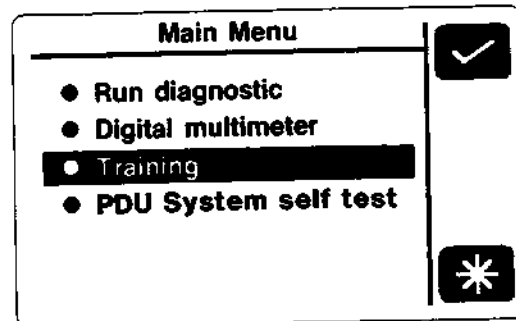


Figure 12. The main menu

Battery Charging

The PDU is fitted with internal NICAD batteries which allow the PDU to be transported whilst retaining programs. The batteries are not designed to be used as a general power source. A special circuit monitors the amount of charge in the batteries so that they cannot be overcharged.

From the time when first operating the system or a PDU fitted with substitute batteries, it will take up to 36 hours to achieve full charge. In the meantime, the PDU can be used whilst connected to the base station or to the vehicle battery. Keep transit times to and from the vehicle as short as reasonably possible to preserve battery charge.

Subsequent battery charges should take six to seven hours from fully discharged. The PDU must always be left connected to the base station when not in use in order to keep the batteries fully charged.

CAUTION: The rechargeable NICAD batteries fitted to the PDU are of a special type and must only be replaced with GenRad approved parts. Do not substitute the batteries with any other type. Always dispose of old batteries in compliance with local recycling regulations. The procedure for changing the battery pack is described later in this installation guide.

Operating Procedures

Refer to the Aston Martin Diagnostic System Users Guide for detail on each of the PDU software options

Selecting Diagnostics

1. Switch on the PDU, the main menu will be displayed.
2. Select 'Run Diagnostic' from the main menu and confirm the selection by pressing the 'tick' icon. A sequence of menus will be displayed requesting identification of the vehicle under test.
3. The system will load the appropriate software.
4. On completion of software loading, disconnect the PDU from the base station and transfer it in its carrying case to the vehicle. The additional pockets in the carrying case may be used for carrying any interface cables required.
5. If the VIA is required, also transfer it in its carrying case to the vehicle together with any vehicle interface cable required.

Using the PDU on the Vehicle

At the vehicle, the PDU may be removed from its carrying case if required. The PDU should always be connected to the vehicle using the Vehicle Battery Adaptor (VBA) (0024). The PDU will continue to charge from the vehicle battery.

Vehicle Battery Adaptor

This unit transforms battery voltage to the correct level for the PDU. The VBA (Fig 13) also contains electrical filters to protect the PDU from any voltage spikes or other interference from the vehicle which could affect PDU operation.

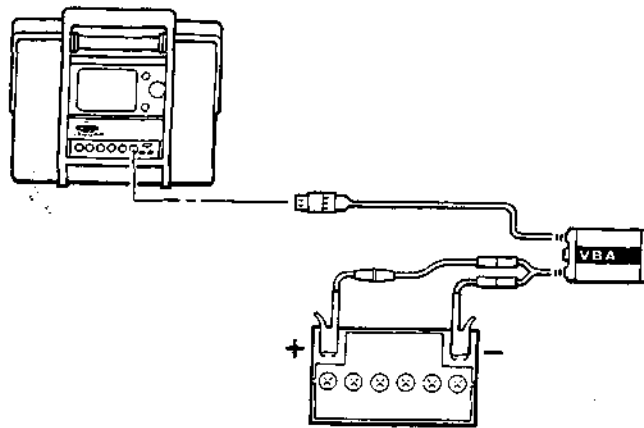


Figure 13. The vehicle battery adaptor

Vehicle Interface Adaptor

When the software requires the Vehicle Interface Adaptor to be used, it is powered from the vehicle battery (Fig 14). The Vehicle Battery Adaptor incorporates a socket into which the VIA to VBA cable (0028) is inserted. The opposite end of this cable is inserted into the connector on the VIA panel.

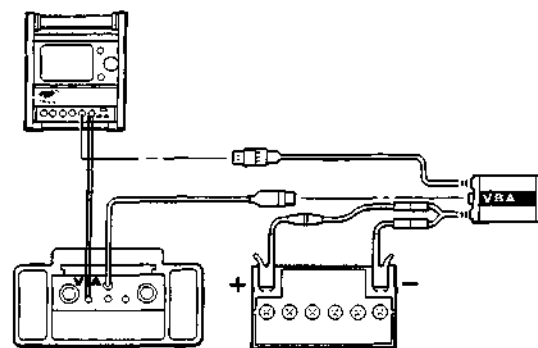


Figure 14. The vehicle interface adaptor

Finishing the Test

When data analysis is finished, switch off the PDU and disconnect it from the vehicle. Store the PDU and cables in the carrying case and refit the case to the base station.

Connect the PDU to the base station using cable 0064. The base station will keep the PDU batteries fully charged at all times (Fig 15).

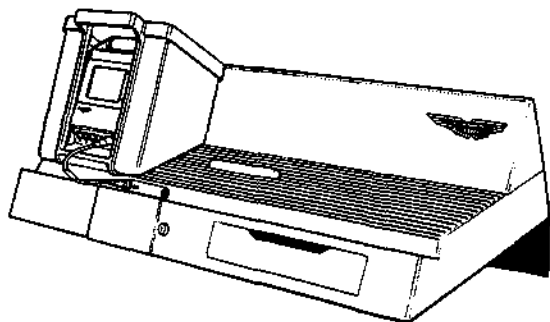


Figure 15. PDU connected for recharging

Care of the Equipment

CAUTION: *With the exception of those parts referred to in the Servicing and Maintenance section, there are no user serviceable parts. All servicing must be carried out by GenRad Service Centres.*

Switch off the power before cleaning the equipment. The Aston Martin Diagnostic System should only be cleaned using a non-abrasive, mild cleaning agent. Dust and other particles should be lightly brushed from the surface before cleaning. Cleaning agent should be applied to a soft lint-free cleaning cloth and never directly to the unit. Do not soak the cleaning cloth and take care not to allow cleaning fluid to enter connectors.

CAUTION: *If any liquid is spilt on the equipment, switch off immediately. Ensure that the equipment has dried out completely before operating it again, especially in connectors where fluid can lodge.*

Problem Solving

CAUTION: If any part of the system is damaged, do not use it. Call your local GenRad Service Centre immediately for a substitute part. Refer to 'Parts Ordering'.

CAUTION: With the exception of those parts referred to in the Servicing and Maintenance section, there are no user serviceable parts. All servicing must be carried out by GenRad Service Centres.

PDU Self-Test

The system self test routine should be run periodically even if there are no apparent problems with the system. Running the system self-test will identify any problems before they impact on productivity.

If it is suspected that the system is operating incorrectly, run the PDU system self test option on the main menu).

If the system self test will not run, or the PDU will not switch on, the instructions in this section must be followed carefully.

If one of the following test steps advises you to order or fit a new part, make a note of the test step, part number and description. Then follow the parts ordering procedure later in this section.

Step 1

Connect the mains power to the base station. Is the green base station indicator illuminated?

YES - Go to step 4

NO - Go to step 2

Step 2

Check the mains supply, then check the mains lead. Is the mains lead faulty?

YES - Renew the mains lead.

NO - Go to step 3

Step 3

Remove the electronic module from the base station.

Using a small screwdriver, open the fuse drawer below the power socket on the rear of the module (Fig 16). Remove the fuse and fit the spare fuse. The fuse must be IEC 127 approved ceramic type 250V 2A (T). Re-install the module into the base station, power up the system. Is the base station green indicator illuminated?

YES - The fuse was faulty

NO - Renew the electronic module (0019)

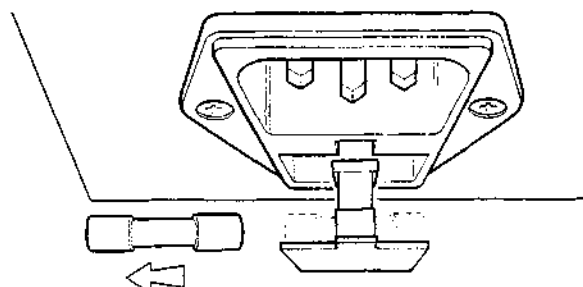


Figure 16. Electronic Module Fuse Replacement

Step 4

Connect the mains power to the base station. Is the base station red indicator illuminated?

YES - Go to step 5

NO - Renew the electronic module (0019)

Step 5

Switch off the PDU and disconnect all cables. Set up the PDU to charge from the left charge socket on the base station using one of the PDU to base station cables. Is the PDU charge indicator (Fig 1-5) illuminated.

YES - Go to step 9

NO - Go to step 6

Step 6

Set up the PDU to charge from the right socket on the base station using the same PDU to base station cable. Is the PDU charge indicator (Fig 1-5) illuminated.

YES - Go to step 8

NO - Go to step 7

Step 7

Using the VBA, connect the PDU to a charged vehicle battery. Is the PDU charge indicator illuminated?

YES - Go to step 8

NO - Renew the PDU (0017)

Step 8

Switch off the PDU and disconnect all cables. Connect the PDU to the base station left connector using the second PDU to base station cable (0064). Is the PDU charge indicator illuminated?

YES - The first PDU to base station cable (0064) is faulty, renew the cable.

NO - Renew the electronic module (0019).

Step 9

Switch on the PDU. Is the PDU power indicator (Fig 1-6) illuminated?

YES - Go to step 10.

NO - Renew the PDU (0017).

Step 10

Is the PDU touch screen illuminated?

YES - Go to step 12.

NO - Go to step 11.

Step 11

Adjust the contrast control. Is the PDU touch screen illuminated?

YES - Go to step 12

NO - Renew the PDU (0017)

Step 12

Observe the display screen. Is the screen displaying a PDU hard error symbol similar to that shown in Fig 17

YES - Note the number and refer to 'Parts Ordering'.

NO - Go to step 13

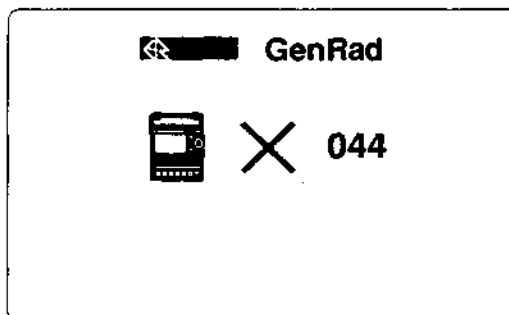


Figure 17. PDU hard error code

Step 13

Observe the screen display. Is the screen displaying the main menu (Fig 9)?

YES - Go to step 14

NO - Go to step 15

Step 14

Select the PDU system self test option and press the 'tick' icon. Does the screen respond?

YES - Go to step 15

NO - Renew the PDU (0017)

Step 15

Observe the display screen. Is the screen displaying the symbol shown in Fig 18?

YES - Connection problem, go to step 17

NO - Go to step 16

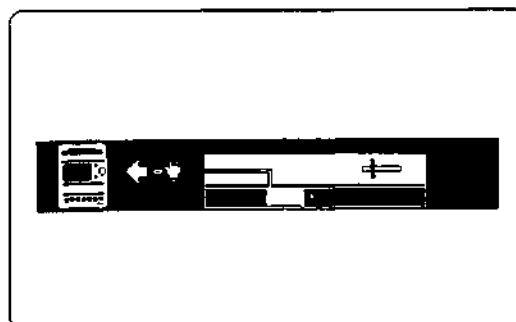


Figure 18. Communications blocked

Step 16

Observe the display screen. Is the screen displaying either of the symbols shown in Fig 19?

YES - Remove the CD caddy and check the CD-ROM. Re-install the CD-ROM. Go to step 13.

NO - Go to step 19

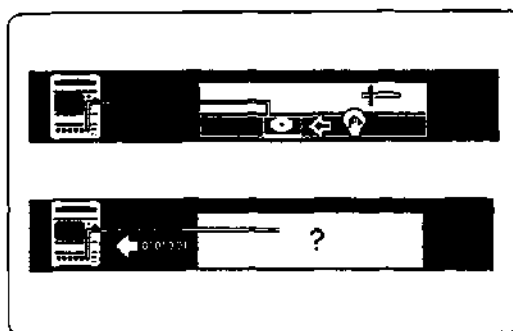


Figure 19. Reload the CD and retry

Step 17

Connect the PDU to the base station top left connector using the second PDU to base station cable (0064) (Fig 34). Is the screen displaying the symbol shown in Fig 15?

YES - Go to step 18

NO - The first PDU to base station cable is faulty, renew the cable (0064)

Step 18

Connect the PDU to the VIA using cable (0030) and connect the VIA to the VBA using cable (0028). Connect the VBA to a charged battery. Does the VIA panel indicator flash for more than 5 seconds after pressing the 'tick' icon.

YES - Renew the electronic module (0019)

NO - Renew the PDU (0017)

Step 19

Observe the screen display. Is the screen displaying the symbol shown in Fig 20?

YES - During the data transfer, the connection was lost. Check to see if the cable connections are intact, if not, reconnect and go back to step 13.

NO - Go to step 20

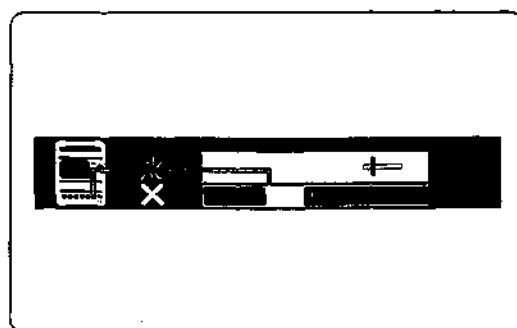


Figure 20. Data transfer connection lost

Step 20

Observe the screen display. Is the language selection screen displayed (Fig 21)?

YES - Try to select a language, go to step 21

NO - Call your local GenRad Service Centre for advice.

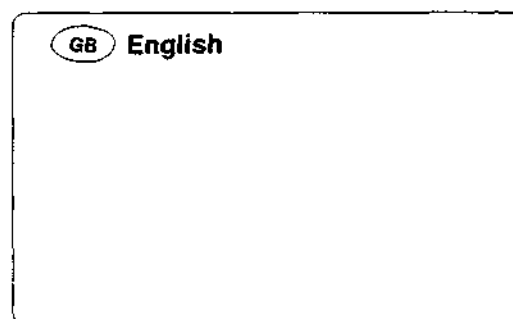


Figure 21. Language selection screen

Step 21

Observe the screen display. Is the system loading from the CD-ROM?

YES - Go to step 13.

NO - Renew the PDU (0017).

Parts Ordering

Before calling GenRad, it is essential that the system self test is run from the main menu. If the system self test will not run or the PDU does not switch on, follow the Problem Solving procedures.

The system self test option will identify any fault and display a fault code on the PDU screen. This fault code number must be recorded. When in contact with your local GenRad Service Centre, they will require this number in order to send the correct substitute parts.

Before calling the GenRad Service Centre, please have the following information available.

- Dealer Name and Address
- Name of the contact at that address
- PDU Serial Number (base station LHS - Fig 22)
- Fault Code, Component Name and Serial Number as given on the PDU screen during self test.

If the system self test will not run, GenRad will require the name and part number of the component identified during the Problem Solving Procedures.

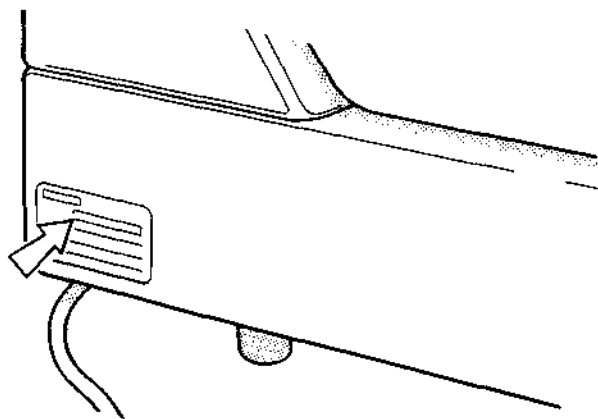


Figure 22. Diagnostic System Serial Number

Service Centres**UK and EIRE**

GenRad Limited, Horsefield Way, Bredbury Industrial Park, Bredbury, Stockport, Cheshire SK6 2SU, England

Telephone: 061-406-8209 Fax: 061-406-8480

Germany

GenRad GmbH, Neumarkter Strasse 83, 81673 München, Germany

Telephone: 01049-89-431990 Fax: 01049-89-43199101

Switzerland and Austria

GenRad AG, Drahzug Strasse 18, Postfach 8032, Zürich, Switzerland

Telephone: 010411-422-2420 Fax: 010411-422-2065

Italy

GenRad SPA, Via Fantoli 21/13, 20138 Milano, Italy

Telephone: 01039-2-502951 Fax: 01039-2-5063331

France, Spain and Portugal

GenRad Europe Paris, Succursale de GenRad Europe Limited, 6 Rue Vincent Van Gogh, 93364, Neuilly Plaisance Cedex, France.

Telephone: 01033-1-49442200 Fax: 01033-1-49442298

Sweden, Norway, Denmark and Finland

Lagercrantz Kontest AB, Kung Hans väg 3, Box 986, 191 29 Sollentuna, Sweden

Telephone: 01046-8-626-06-20 Fax: 01046-8-754-88-67

Netherlands, Belgium and Luxembourg

Multidata BV, Postbus 137, Bedrijvencentrum "De Baanderije", Parallelweg Zuid 33/1, 5280 AC Boxtel, Netherlands

Telephone: 01031-4116-83775 Fax: 01031-4116-85359

USA and Canada

GenRad Inc, 300 Baker Avenue, Concord, Massachusetts, 1742, USA.

Telephone: 0101-508-369-4400 Fax: 0101-508-287-2011

Singapore, Taiwan, Hong Kong and Thailand

GenRad Inc, 73 Science Park Drive, Cintech Building #03-04, Singapore, Singapore 0511.

Telephone: 01065-2784400 Fax: 01065-7766422

Australia and New Zealand

Nilsen Instruments, 25-27 Paul Street North, North Ryde, New South Wales 2113, Australia.

Telephone: 01061-2-7362888 Fax: 01061-2-7363005

Japan

Tokyo Electron Limited, 2-30-7 Sumiyoshi-Cho, Fuchu City, Tokyo, Japan 183

Telephone: 01081-423-33-8377 Fax: 01081-423-33-8489

Warranty

The Aston Martin Diagnostic System is covered by a one year warranty. Should any of the electrical components fail during the warranty period, contact your local GenRad Service Centre for a replacement part. Note that the warranty does not include physical damage.

Spare Parts

Refer to the Aston Martin Diagnostic System Users Guide for a full parts list. All spare parts should be obtained from your local GenRad Service Centre who can advise you on current prices.

Servicing and Maintenance

CAUTION: *With the exception of those parts listed in this section, there are no user serviceable parts within the system. All servicing must be carried out by GenRad Service Centres.*

Battery Testing.

The NICAD batteries fitted in the PDU are designed to be rechargeable and should normally last through many recharge cycles. Battery life of three to five years can be expected. The capacity of new batteries improves after several charging cycles. After extended use, they may require renewing. The following procedure will assist you to determine when renewal is required. Do not use this procedure with new batteries or with a new PDU.

Testing Procedure

1. Remove all cables from the PDU.
2. Switch the PDU on and leave it until it switches off (the power on indicator will extinguish)
3. Connect the PDU to the base station for at least 12 hours charging.
4. Remove all cables from the PDU, switch on the PDU and start timing.
5. If the PDU switches off in less than 30 minutes, the batteries should be renewed.

Changing the Battery Pack

CAUTION: *Always read and follow safety warnings and instructions printed on the equipment. The rechargeable NICAD batteries fitted to the PDU are of a special type. They must only be substituted by GenRad approved parts. Do not substitute the batteries with any other type. Always dispose of old batteries in compliance with local recycling regulations.*

Battery Changing Procedure

A spare battery pack kit (0975) is available from your local GenRad Service Centre.

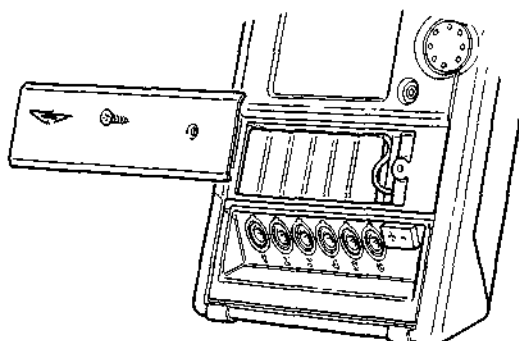


Figure 23. Battery cover screw

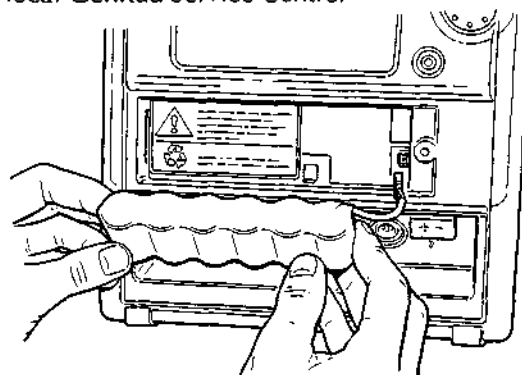


Figure 24. Battery pack

1. Switch off the PDU and remove all cables.
2. Remove the cover screw (Fig 23) and remove the cover.
3. If damaged, remove the old foam gasket from the cover and replace with the new one supplied.
4. Note the orientation of the connector. Disconnect the connector and remove the old battery pack.
5. Fit and connect the new battery pack (Fig 24) with the black cable towards the touch screen.
6. Refit the cover and cover screw.
7. Refer to the Battery Charging instructions for recharging times.

Changing the Dust Filter

The electronic module has a dust filter fitted to the underside of the module. Every three months a new filter will be supplied. To change the filter, proceed as follows:

1. Switch off the mains supply and pull out the old filter (Fig 25).
2. Feed in the new filter with the blue side facing in, pushing it well into the corners of the holder.
3. Switch on the mains supply.

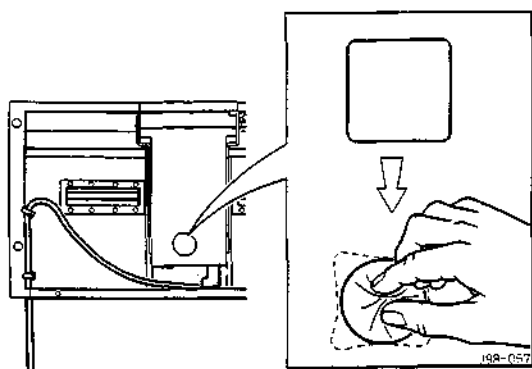


Figure 25. Dust filter replacement

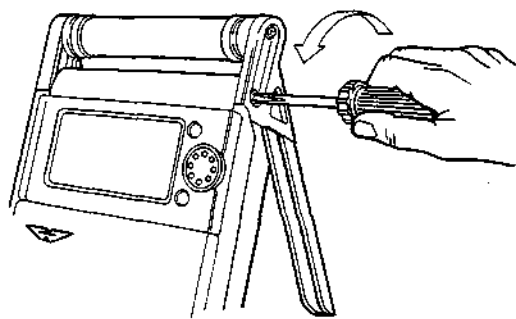


Figure 26. Support arm adjustment

Support Arm Adjustment

Periodically the support arm mechanism may require adjustment.

1. Remove the cross head arm fixing screw.
2. Using a suitable screwdriver, turn the tensioning screw (Fig 26) anti-clockwise half a turn.
3. Refit the leg fixing screw and repeat the operation on the opposite side.
4. Check that the arm tension is enough to support the weight of the PDU without movement.

VIA Carrying Case

The VIA unit (0018) is secured into its carrying case with two fixing screws from the underside of the case. If a new VIA is required, remove the two fixing screws and lift the VIA from the carrying case. Return only the VIA for replacement, do not return the carrying case.

New CD-ROM Releases

The latest version of the Aston Martin Diagnostic System software will be supplied with the system. When necessary, new releases of software will be issued by mail to each user of the system. Immediately fit the new CD-ROM to the disc caddy, retaining the old CD in its protective case as a backup. The new software should be loaded at the next use of the PDU.

In order to identify the revision level of the software, the version number is included on the disc.

e.g. DB7 PDU 001 is version 001 of the DB7 PDU software.

Technical Specifications

Electronics Module

Voltage Supply	100-240 VAC
Frequency	50-60 Hz
Current Consumption	1.0-0.5 Amp
Operating Temperature	0 - 45°C
Operating Humidity	15 - 85% non-condensing

PDU and VIA

Voltage Supply	12 VDC
PDU Current Consumption	2.5 Amp
VIA Current Consumption	6.5 Amp
Operating Temperature	0 - 50°C
Operating Humidity	95% max non-condensing 12 hours
Storage Humidity	60% RH max non-condensing 1000 hours
Storage Temperature	-20°C to 70°C

Weights

Base Station	20.5 kg (45.2 lb)
Electronic Module	3.7 kg (8.16 lb)
PDU	3.7 kg (8.16 lb)
Carrying Case	2.0 kg (4.4 lb)
VIA	4.3 kg (9.48 lb)

Statement of Calibration

Product Range Aston Martin Diagnostic System

Product Type Portable Diagnostic Unit

Product Number 3130-0017

We certify that the above product has been tested and found to conform to the product specification, prior to dispatch from GenRad. The measurements performed by this equipment are traceable to international measurement standards. Calibration records, including the date of calibration and the serial numbers of the measurement instruments are maintained by GenRad and are traceable through the PDU System serial number.

NOTE: The PDU will not require any periodic adjustment in order to maintain specified measurement accuracy.

Calibration Measurements

Ambient temperature during calibration $20 \pm 1^\circ\text{C}$.

The test resistances in the table below are applied between the red and black probes. The PDU is set to measure resistance between these probes using the DMM function. The PDU reading must be between the limits shown.

Test Resistance	PDU Reading Limits
10 Ω	9.84 Ω - 10.16 Ω
10M Ω	8.22M Ω - 11.78M Ω

The test voltages in the table below are applied between the red and black probes. The PDU is set to measure voltage between these probes using the DMM function. The PDU reading must be between the limits shown.

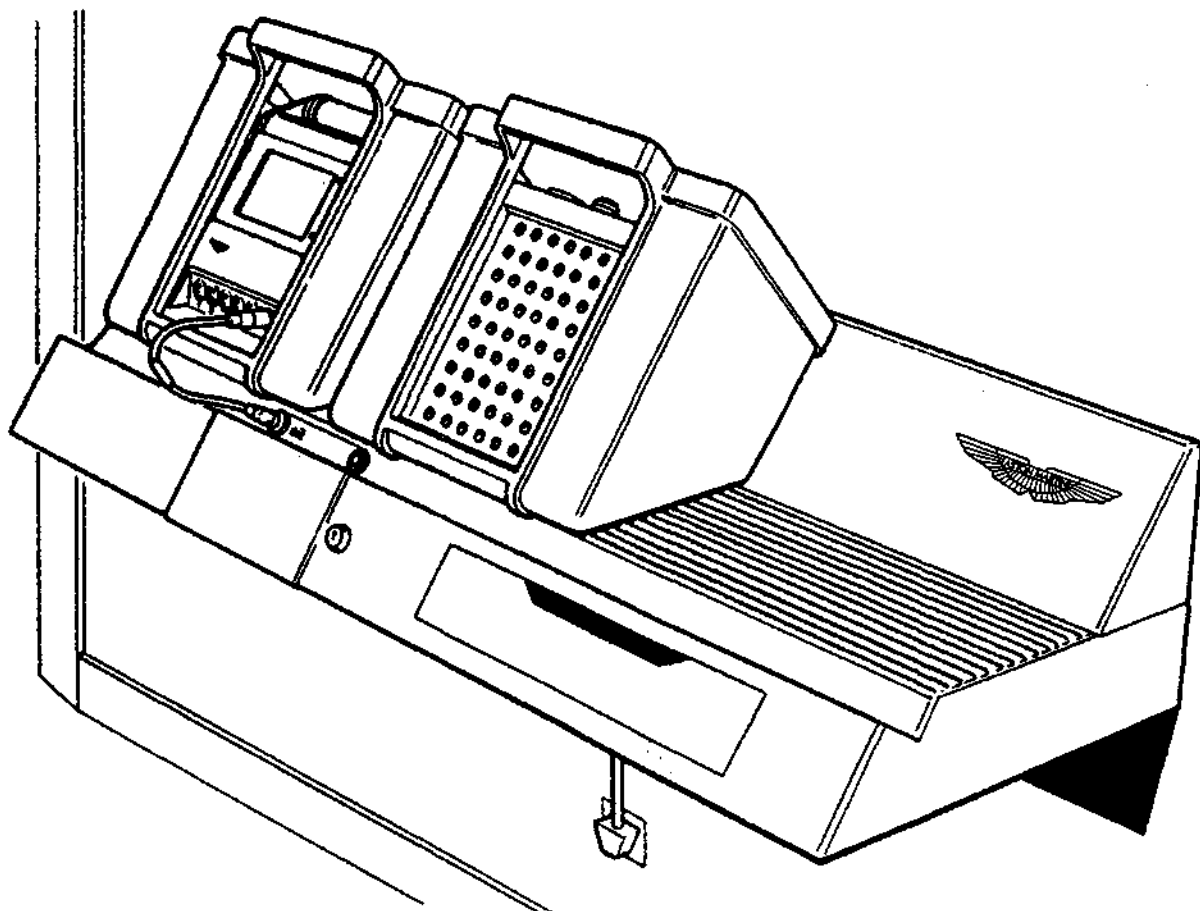
Test Voltage	PDU Reading Limits
50mV	48mV - 52mV
100mV	98mV - 102mV
160mV	157mV - 163mV
350mV	345mV - 355mV
720mV	712mV - 728mV
1.45V	1.43V - 1.47V
2.90V	2.86V - 2.94V
7.25V	7.17V - 7.33V
14.5V	14.35V - 14.65V
29V	28.7V - 29.3V
49V	48.5V - 49.5V
98V	97.0V - 99.0V
175V	173.7V - 176.3V



cardiagn.com

The Aston Martin Lagonda Diagnostic System

The Aston Martin Lagonda Diagnostic System fulfils a number of functions in aiding the technician to quickly and accurately locate faults. The heart of the system is the Portable Diagnostic Unit (PDU), a lightweight powerful computer/measurement system providing a step-by-step user friendly interface for the technician.



PDU Functions

The PDU main menu provides access into the following functions:

- Diagnostics
- Training
- Digital Multimeter
- User Self Test

Diagnostics

On selecting 'Diagnostics' from the main menu, the user will be prompted to enter the features and market specification of the vehicle to be tested. Use of the diagnostics in each of the above areas is described later in this guide.

Diagnostics Menu - 95 Model Year

- Engine
- Anti-Lock Braking System
- Transmission
- Climate Control

Diagnostics Menu - 97 Model Year

- Engine Diagnostics
- OBD II Scan Tool
- Airbag
- Seat Belt Pretensioner
- Engine Datalogger
- Climate Control
- PATS System
- Transmission
- Anti-Lock Braking System
- Security

Digital Multimeter

The Digital Multimeter function provides the capability to measure voltage, current, resistance, frequency, pulse width, pulse period, and duty cycle. These measurements are usually made using the PDU measurement probes. Measurements may also be made using the module pin selection function on the Teves Mk II braking system and on the Air Conditioning system.

Training

An on-screen programme is provided to train new users in the use of screen icons and in the use of the digital multimeter and datalogger functions.

User Self Test

In order to prove that the equipment is functioning correctly, a complete user self test is incorporated. The user is directed to test the PDU and then to progressively connect each part of the PDU system which will be tested by the software. Any fault identified during the test is notified to the user. If no faults are identified, the user is advised on the correct functioning of the system.

PDU Power

Power for the PDU is supplied via an internal rechargeable battery pack which can keep the PDU operational for approximately one hour when disconnected from the base station and the vehicle. In order to preserve PDU battery charge, power to the screen backlight is automatically cut after five minutes of inactivity. The power ON indicator remains lit, indicating that the PDU is in 'stand-by' mode. One touch of the screen will restore backlight power.

When connected to the base station, power is supplied to the PDU from the Electronic Module to recharge the PDU battery pack as necessary.

On 95 MY vehicles, the Vehicle Battery Adaptor (VBA) is used to maintain PDU power.

On 97 MY vehicles, when connected via the MPA to either diagnostic socket on the vehicle, power is supplied via pin 4 (chassis ground) and pin 16 (battery power) to maintain PDU power at all times even when the vehicle ignition is switched off.

On all model years, when connected to the air conditioning system using the VIA, the vehicle battery adaptor (VBA) must also be used to maintain PDU power.

Software

Software for the PDU system is supplied on CD ROM discs and supports diagnosis on the following control units:

- Zytex Engine Management System (95 MY)
- EEC-V Engine Management System (97 MY)
- GM 4L80-E Transmission Controller
- PATS - Passive Anti Theft System
- Teves Mk II ABS System (95 MY)
- Teves Mk IV ABS System (97 MY)
- Valeo Air Conditioning System
- FMC Airbag System
- Megamos Security System
- Autoliv Drivers Seat Belt Pretensioner (where fitted)

All of these systems are supported in English, French, Italian, German and Japanese.

In addition to the specific system software listed above, the PDU is also equipped with general purpose software to provides multimeter, printing and PDU training options.

Software for 95 and 97 Model Year Vehicles

Software for both the 95 and 97 model year vehicles is provided.

The PDU system requires a Vehicle Interface Adaptor (VIA) to communicate with the control units of 95 model year vehicles.

Communication with 97 model year control units is principally via an Aston Martin multi-protocol adaptor to 2 inbuilt diagnostic sockets in the vehicle. Only the air conditioning unit requires the VIA on 97 model year vehicles.

If the multimeter function is used, the Vehicle Battery Adaptor (VBA) will be required to provide the basic supply and ground levels for the multimeter.

Software Loading and Selection

Ensure that the system is powered up and that the PDU is correctly connected to the base station. Check and if necessary load the DB7 software CD Revision 002. (see the installation guide)

Switch 'on' the PDU which will run through two front screens and then load the following initial PDU software.

- Operating System
- Main Menu
- Selector
- Digital Multimeter
- Interactive Training

Vehicle Features

The vehicle features screen illustrated below is used to identify the vehicle particulars and the model year.

If Airbag - NO is selected, the vehicle is assumed to be 95 model year.

If Airbag - YES is selected, 97 model year is assumed. On completing entries in the vehicle features screen, the appropriate vehicle area screen will be displayed.

Vehicle Features	
Transmission	MANUAL AUTO
Airbag	YES NO

Vehicle Area

This screen allows selection of the vehicle system to be accessed. Only 4 systems may be accessed on 95 model year vehicles, on 97 model year cars, 8 systems may be accessed as follows:

Vehicle Areas	
• Engine Diagnostic	✓ ↓ i ★
• Engine DataLogger	
• Transmission	
• OBDII Scan Tool	
• Climate Control	
• Anti-Lock Braking System	
• Airbag	
• DATA	

95 model year software

- Zytec Engine Management
- GM 4L80-E Transmission Controller
- Teves Mk II Anti-Lock Braking System
- Valeo Air Conditioning

97 model year software

- EEC-V Engine Management
- GM 4L80-E Transmission Controller with OBDII
- Teves Mk IV Anti-Lock Braking System
- Valeo Air Conditioning
- PATS Engine Immobiliser
- Megamoss security system
- FMC Airbag system
- Autoliv seatbelt pretensioner

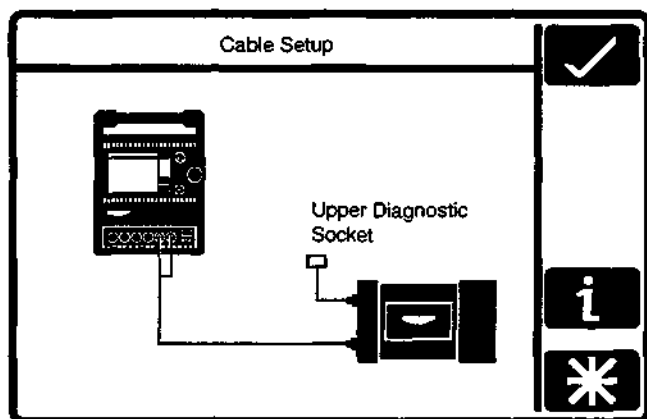
Cable Setup - 95 MY

On selecting the required vehicle area, the selected software will be loaded and then the Cable Setup screen will appear.

Connections will be shown directly to the selected control unit on 95 model year vehicles using the vehicle interface adaptor (VIA) and appropriate cables from the PDU kit. Select the specified interface devices and cables from the PDU kit and connect as shown in the diagram.

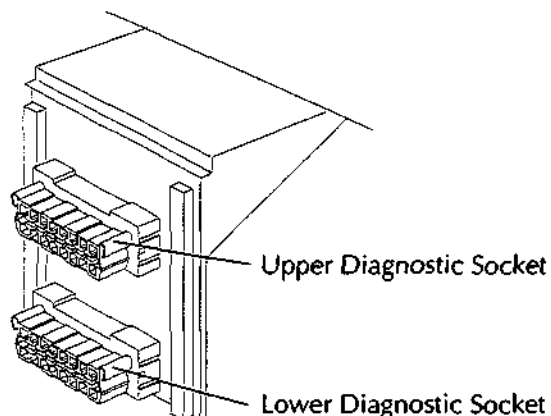
Cable Setup - 97 MY

On 97 model year vehicles, connections to the vehicle are made via the Aston Martin Multi-Protocol Adaptor and two diagnostic sockets for most vehicle systems.



Diagnostic Sockets - 97 MY

The diagnostic sockets are located behind the passenger side underscuffle panel.



The sockets are mounted on a bracket and labelled Upper and Lower. The following lists describe the systems accessed from each socket.

Upper Diagnostic Socket

- Transmission Control Module (TCM)
- Megamoss Security System
- FMC Airbag System
- Teves Mk IV Anti-Lock Braking System

Lower Diagnostic Socket

- EEC V Powertrain Control Module (PCM)
- PATS Passive Anti-Theft System
- Autoliv Seatbelt Pretensioner System

Air Conditioning Diagnostics

The Valeo air-conditioning system uses a unique communications protocol and therefore the vehicle interface adaptor (VIA) is required and is connected directly to the air-con CPU in order to carry out diagnostics work on the system.

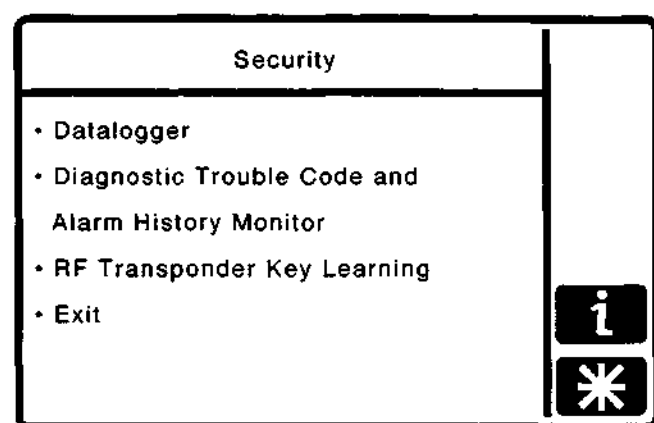
Establishing Communications

When cable connections are completed, switch on the vehicle ignition. The electronic control units will 'wake up' and communication between the selected control unit and the PDU will be established.

As communication is established with the selected system, a system menu similar to that below will be displayed.

System Menu Selections

The options for each vehicle system are described in detail on the following pages but menu entries fall into the following general areas:



Datalogger

The Datalogger function is described in detail using a worked example at the end of this PDU Users Guide.

Diagnostic Trouble Codes

This application enables the PDU to monitor selected control module trouble codes and provides the following functions:

- Decode and display any trouble codes logged by the control module being monitored.
- When supported by the module, decode and display enhanced trouble codes, together with any count of the number of occurrences
- Clear all of the trouble codes and freeze frame data logged in the control module.
- Monitor other data such as the alarm history in this example.

Note: The 95 model year ZyteK engine management system permits clearing of individual trouble codes selected by the technician on the PDU.

System Specific Tests

These menu entries cover special tests required to program or test system specific features. The following are examples of tests provided:

Engine	KOEO and KOER tests OBDII Readiness test Output State Control test Throttle Potentiometer track test
PATS	Ignition Key Learn Menu
Security	Remote Transmitter Key Learn Tests Special Functions Programming

Exit

Selecting and then confirming the exit option will return the PDU to the Main Menu.

PDU Use

In the following pages, the use of the PDU on each vehicle system is described.

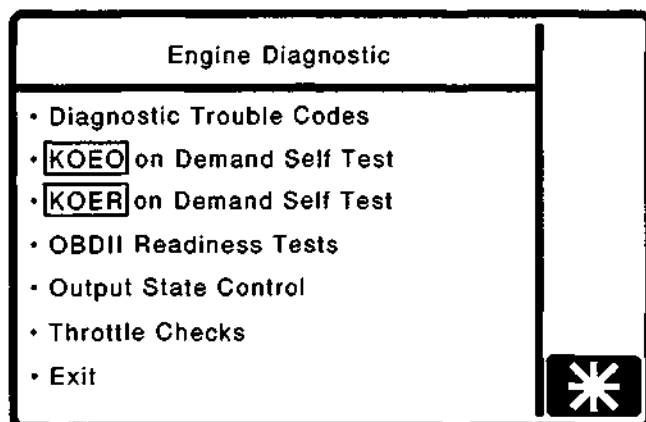
- Engine Diagnostics
- Transmission Diagnostics
- Climate Control Diagnostics
- Anti-Lock Brakes Diagnostics
- Passive Anti-Theft (PATS) Diagnostics
- Security System Diagnostics
- Airbag Diagnostics
- Seat Belt Pretensioner Diagnostics

After these system specific descriptions, the following general purpose functions are described:

- Datalogger
- Digital Multi-Meter
- Diagnostic Trouble Codes
- Printing
- Training
- OBD II Scan Tool
- User Self-Test

Engine Diagnostics - 97 MY

Selecting Engine Diagnostics from the Vehicle Area screen brings up the following Engine Diagnostics Screen.



Diagnostic Trouble Codes (DTCs)

On selecting Diagnostic Trouble Codes, the PCM memory will be scanned and any recorded DTCs will be decoded and displayed.

The engine and transmission DTCs are integral to the On Board Diagnostics (OBD II) system and are fully described in the DB7 OBD II Diagnostics Manual.

Before attempting to clear the logged DTCs, record all logged DTCs for use in subsequent fault analysis.

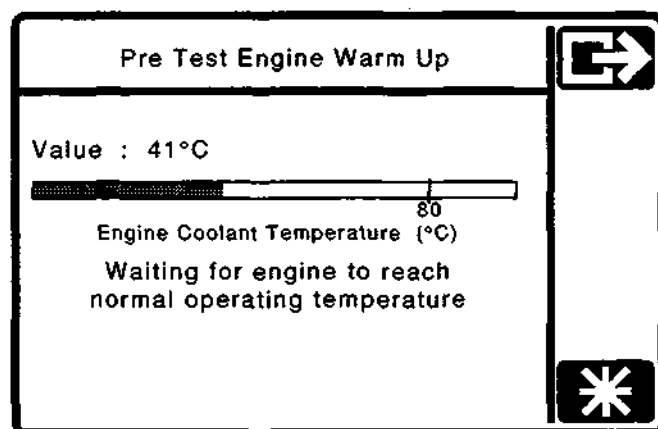
All logged DTCs may be cleared by selecting the EEC-V EMS DTCs title. This will bring up the Clear (C) icon which may be selected and confirmed to clear all logged DTCs.

Note that on clearing all logged DTCs you will also clear the associated timers, counters and fault history files (and extinguish the engine management warning light for North American vehicles). The OBD II readiness test status will also clear down and a P1000 (OBD II readiness test incomplete) trouble code will be set. A full drive cycle (see DB7 OBD II Diagnostics Manual) must be completed to clear the P1000 code if required. The P1000 code will clear automatically after some miles of driving when all required tests have satisfactorily completed.

Caution: If a transmission code is logged in the PCM, the TCM DTCs must be cleared first and then clear the PCM DTCs. If the PCM DTCs are cleared without clearing the TCM, the TCM code will immediately reset in the PCM when power is restored.

Key On Engine Off (KOEO) and Key On Engine Running (KOER) On Demand Self Tests

Before either the KOEO or KOER test will run, the engine coolant temperature must be in excess of 80°C. Select and confirm either the KOEO or KOER test. If the coolant temperature is too low, the Pre Test Engine Warm Up screen will appear. Start the engine and run until coolant temperature is at 80+°C.



KOEO Test

As coolant temperature rises through the 80°C level, the technician will be requested to turn the ignition off and then on again. The KOEO test will then commence. Static inputs to the PCM will be checked and any faults detected will be recorded and displayed as DTCs. If any DTCs other than P1000 are logged, go to the OBD II Diagnostics Manual and resolve the concern(s) using the OBD II diagnostic procedures.

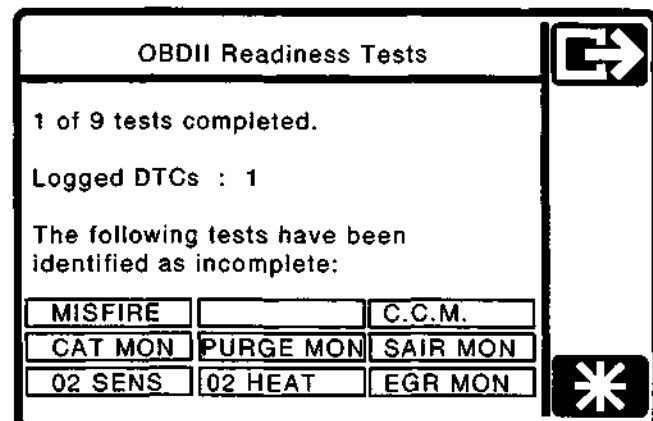
KOER Test

If coolant temperature level is below 80°C, the technician will be prompted to start and run the engine until coolant temperature rises above 80°C. As the temperature passes the 80°C level, the KOER test will commence automatically.

If coolant temperature is above the 80°C level, the technician will be requested to start the engine. The KOER test will commence as the engine is started. Dynamic inputs to the PCM will be checked and any faults detected will be recorded and displayed as DTCs. If any DTCs other than P1000 are logged, go to the OBD II Diagnostics Manual and resolve the problem(s) using the OBD II diagnostic procedures.

OBD II Readiness Test Monitor - 97 MY

Selecting OBD II Readiness Tests will bring up the following screen.



This software monitors the status of all significant components and parameters required to control vehicle emissions. When the tests are satisfactorily completed, the test boxes will be empty and the P1000 status code will be removed from the DTC list.

If any problem is detected, the tests will be terminated and the status will be shown as on the screen above e.g.: 1 of 9 tests completed, Logged DTCs : 1

Incomplete test titles will remain in the screen boxes. Completed test titles are deleted from the screen boxes.

Details of any trouble codes may be accessed using the Diagnostic Trouble Code function.

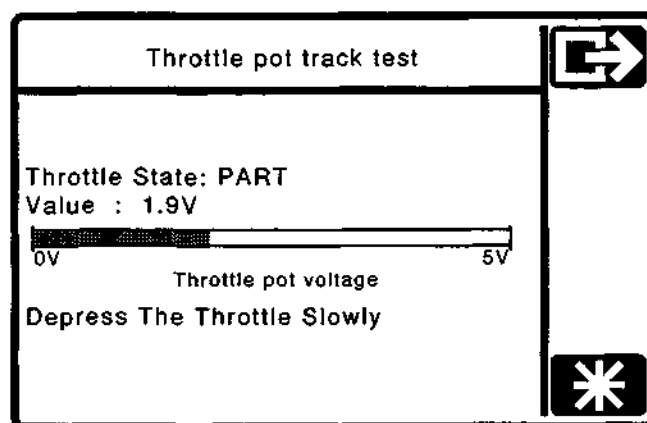
The tests incorporated into this routine are as follows:

- Misfire Monitoring
- Fuel System Monitoring
- Comprehensive Component Monitoring
- Catalyst Monitoring
- Purge System Monitor
- Secondary Air Injection Monitor
- Oxygen Sensor Monitor
- Oxygen Sensor Heater Monitor
- Exhaust Gas Recirculation Monitor

Throttle Position Sensor Track Test - 97 MY

This test is used to detect any problems with the throttle potentiometer track which could cause faulty throttle position signals to enter the PCM. Such signals would result in incorrect calculation of engine power demand and possibly create excessive fuelling and high emissions.

Selecting Throttle Checks from the Engine Diagnostics screen will bring up the Throttle Position Sensor Track Test screen:



Follow the screen instructions to test the throttle position sensor track. The throttle must be moved slowly from fully closed to fully open without hesitation. Any pause in throttle movement will be interpreted as a track fault.

If a fault is detected, repeat the test several times to eliminate hesitant throttle movement errors from actual potentiometer faults. If a repeatable fault is detected, the potentiometer must be replaced.

Output State Control - 97 MY

This menu item provides a quick test of the basic electro-mechanical components controlled by the PCM. These tests should be performed in a key on engine off state.

The selections available are:

- Low Speed Cooling Fans
- High Speed Cooling Fans
- Set Electromechanical Outputs

Low and High Speed Fans

Selecting and confirming either the low or high speed cooling fans will run the fans at the selected speed for 5 seconds to verify their operation.

Electromechanical Outputs

This selection will cause the following electromechanical devices to operate for five seconds

Air Pump
Fuel Pumps
Canister Purge Valve
Idle Air Control Valve

Observing each device in turn as the PCM outputs are turned 'On' will enable the technician to verify correct operation.

Engine Datalogger

The datalogger software is designed to aid the technician in identifying permanent or intermittent faults in the DB7's electrical and electronic systems. It can provide a recorded view of selected signals over a chosen time period. This recording may be captured in a static, rolling road or road test situation. Data recorded during such tests may then be analysed on completion of the test or printed out for later analysis.

Datalogger operation is described using a fully worked example at the end of this PDU Users Guide.

The full list of datalogger signal names and descriptions is provided in the DB7 OBD II Diagnostic Manual and on the PDU screen. The following list is a summary of the PCM signals which may be monitored.

Signal	Description
ACCS	Air-Con Control Switch - 1 = A/C On
ACP	Air-Con Pressure Sensor - 1 = A/C pressure high
ACT MAX	Maximum Intake Air Temperature signal during normal running
Adap Fuel 1	Current Adaptive Fuel Correction - (% of range)
Adap Fuel 2	Current Adaptive Fuel Correction - (% of range)
ADPT1F	Adaptive Fuel - Table 1 failure mode
ADPT2F	Adaptive Fuel - Table 2 failure mode
AIR	Air Pump On/Off - 1 = Pump On
AIRM	Air Pump Monitor - 1 = high, pump on
B+	Battery Positive - Volts
BARO	Barometric Pressure
CID	Cylinder Identification - Cam sensor status
CMP STAT	Cam Position Sensor - 1 = CID mis, not currently reliable
DRVCNT	Number of OBDII Drive Cycles Completed
DSDRPM	Desired engine speed (RPM)
DTCCNT	Diagnostic Trouble Codes Count (Fault codes + pending codes. MIL and non-MIL)
ECT MAX	Maximum Engine Coolant Temperature signal during normal running
ECT STAT	Engine Coolant Temperature - In or out of range
ECT-C	Engine Coolant Temperature - °C or raw counts
ECT-V	Engine Coolant Temperature - Volts or raw counts
EGR STAT	EVP EGR sensor failure
ENGLOAD	Engine Load (Ratio of air charge over standard)
ENGRPM	Engine Speed - RPM
EPT	DPFE Sensor feedback
EVAP DC	Cannister Purge Duty Cycle (% on)
EVAPCVA	Vapour Management Valve (VMV) fault detected
Evts HI	Cumulative cylinder events total carried over from previous background logic executions
Evts LO	Cumulative cylinder events total carried over from previous background logic executions
FPM	Fuel Pump Monitor - 0 = pump off, 1 = pump on
FPUMP DC	Desired Fuel Pump Duty Cycle - 0% or 100%
H02S12	Sensor Output - Volts
H02S21	Sensor Output - Volts
H02S22	Sensor Output - Volts
H02SII	Sensor Output - Volts
HFC	High Speed Fan Status
Htr11 ret	Highest number of retries seen on the HO2S 11 heater
Htr12 ret	Highest number of retries seen on the HO2S 12 heater
Htr21 ret	Highest number of retries seen on the HO2S 21 heater
Htr22 ret	Highest number of retries seen on the HO2S 22 heater
HTRCM11	HO2S 11 heater current
HTRCM12	HO2S 12 heater current
HTRCM21	HO2S 21 heater current
HTRCM22	HO2S 22 heater current

Signal	Description
IACDTCY	Idle Air Control Duty Cycle (% open)
IAT	Intake Air Temperature - °C or raw input counts
IAT STAT	Air Temperature - Temperature sensor failure
IAT-V	Intake Air Temperature - Volts or raw counts
IGN	Desired Ignition Timing - ° BTDC
INDS	Input from manual lever position sensor (counts)
IPWA	Injector Pulse Width in mS- Bank A (Cylinders 1-3)
IPWB	Injector Pulse Width in mS- Bank B (Cylinders 4-6)
LAMSE1	Current Short Term Fuel Trim 1, adjustment from stoich - (% of range)
LAMSE2	Current Short Term Fuel Trim 2, adjustment from stoich - (% of range)
LFC	Low Speed Fan Status
LOOP	Fuel Control - 1 = Open Loop, 0 = Closed Loop
MAF MAX	Maximum Mass Air Flow signal during normal running
MAF	Raw MAF sensor output (A/D counts)
MAF STAT	Mass Air Flow Meter - MAF sensor failure
MIL	Malf. Indicator Lamp Status - 1 = Lamp On
Mis HI	Cumulative misfires detected by misfire test (Hi bit).
Mis LO	Cumulative misfires detected by misfire test (Lo bit).
Mis nc HI	Cumulative misfires detected by a misfire test (Hi bit).
Mis nc LO	Cumulative misfires detected by a misfire test.
Mis1 HI	Cumulative misfires detected by cylinder 1 misfire test (Hi bit).
Mis1 LO	Cumulative misfires detected by cylinder 1 misfire test (Lo bit).
Mis2 HI	Cumulative misfires detected by cylinder 2 misfire test (Hi bit).
Mis2 LO	Cumulative misfires detected by cylinder 2 misfire test (Lo bit).
Mis3 HI	Cumulative misfires detected by cylinder 3 misfire test (Hi bit).
Mis3 LO	Cumulative misfires detected by cylinder 3 misfire test (Lo bit).
Mis4 HI	Cumulative misfires detected by cylinder 4 misfire test (Hi bit).
Mis4 LO	Cumulative misfires detected by cylinder 4 misfire test (Lo bit).
Mis5 HI	Cumulative misfires detected by cylinder 5 misfire test (Hi bit).
Mis5 LO	Cumulative misfires detected by cylinder 5 misfire test (Lo bit).
Mis6 HI	Cumulative misfires detected by cylinder 6 misfire test (Hi bit).
Mis6 LO	Cumulative misfires detected by cylinder 6 misfire test (Lo bit).
MISF	Misfire Monitor - 1 = Currently misfiring
ODCODES	Total number of on-demand codes currently stored.
PGM CVS DC	Purge Management Duty Cycle (% on)
PIP	Profile Ignition Pick-Up - PIP input level
PNP	Park Neutral Position Switch
R-BIAS1	Rear bias trim (Bank 1, cylinders 1-3)
R-BIAS2	Rear bias trim (Bank 2, cylinders 4-6)
RATCH	Lowest TP reading during driving
TP MAX	Maximum Throttle Potentiometer signal during normal running
TP STAT	Throttle Position Sensor - TP sensor failure
TP	Throttle Potentiometer - Volts or counts
TPR-V	Raw counts from sensor
TQ-NET	Net torque into the torque converter
TRIP	OBDII Drive Cycle Complete (except cat monitor) - 1 = Trip completed
TRIPCNT	Number of Completed OBDII Trips
VS MAX	Maximum Vehicle Speed signal during normal running
VS STAT	Vehicle Speed Sensor mode flag
VS	Vehicle Speed - MPH
WAC	Wide Open Throttle A/C Cut-Off - 1 = High (WOT Relay)

Engine Setup - 95 MY

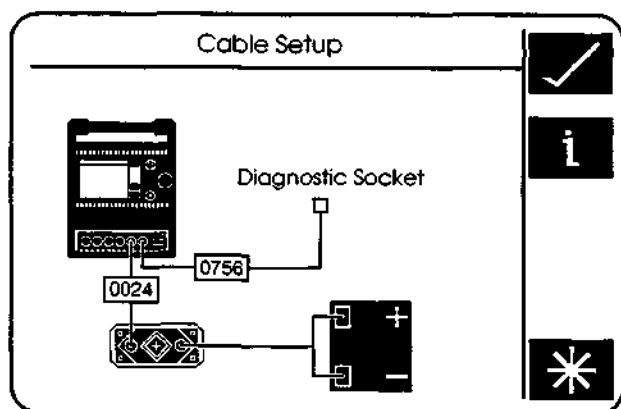
Two adjustments may be set with the aid of the PDU on 95 MY vehicles.

- Throttle Potentiometer
- Idle Fuelling Trim

From the 95 MY Main Menu, make and confirm the following sequence of selections:

Diagnostics	✓
Manual or Auto Transmission	✓
Engine	✓
Engine Setup	✓

The following connection diagram will then be displayed.



Engine Setup Connections

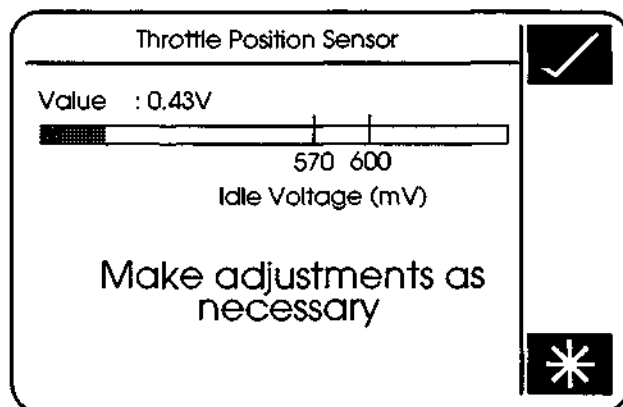
Throttle Sensor Adjustment - 95 MY

Note: The throttle stop and throttle cable adjustments must be correct before setting the throttle potentiometer.

On completion of the engine setup connections the test selection screen will be displayed.

1. Select Throttle Potentiometer.
2. Turn the ignition switch to position II but do not start the engine.
3. Monitor the throttle potentiometer bargraph voltage at fully closed and then at fully open throttle.
4. The throttle potentiometer voltage specifications are:

Throttle Closed	0.57 - 0.59V
Throttle Full Open	4.00 +V



Throttle Potentiometer Voltage

5. If both voltages are either high or low, loosen the two throttle pot screws and adjust the potentiometer until the specified voltages are achieved. Carefully tighten both screws ensuring that the potentiometer does not move during tightening.
6. If either voltage is unstable or if the specified voltages cannot be achieved, investigate the cause. If the potentiometer is replaced, set the new pot using steps 3 - 5 above.

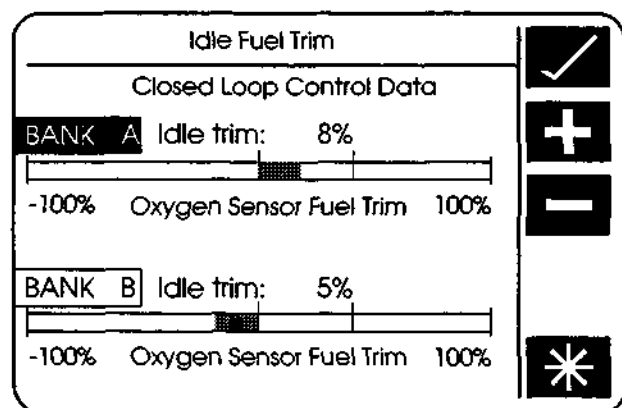
Note: On automatic vehicles, the kickdown switch adjustment check follows the throttle pot adjustment.

Idle Fuelling Trim - 95 MY

This program is used to check and if necessary reset the fuelling level at idle to ensure that the specified idle speed and emission levels are attainable. The throttle potentiometer adjustment sequence must be completed before the fuel trim sequence can be run.

Note: The throttle setup must be completed before attempting to set the Idle Fuelling Trim. An error in throttle stop, throttle cable or throttle pot adjustments can cause serious difficulties in setting the Idle Fuelling.

1. Select Idle Fuelling Trim from the Engine Setup Menu. (The PDU connections are as for the Throttle Potentiometer Adjustment.)
2. Start the DB7 engine and allow it to warm to normal operating temperature.
3. Follow the screen instructions to run the idle fuelling trim procedure.
4. Observe the bargraphs for oxygen sensors A and B. The bargraph indications should oscillate evenly about the 0% position on the bargraph.



Idle Fuelling Trim Display

5. If the bargraph indications are not oscillating evenly about the 0% position, select the A (cylinders 1, 2 and 3) or the B (cylinders 4, 5 and 6) sensor. The Increase/Decrease buttons will appear.
6. Adjust the fuel trim as required to achieve even oscillation about the 0% mark for both sensors. When the adjustment is correct, select the 4 icon and confirm that the idle fuelling trim is correct. On confirmation of the adjustment, the PDU will exit from the idle fuelling program.
7. On completion of the procedure, select Exit from the Engine Diagnostics Software.

Transmission Diagnostics

Automatic transmission DB7s are fitted with a GM4L80-E gearbox electronically controlled by a Transmission Control Unit (TCM)

The TCM is mounted on the rear left wheel arch. It may be electronically accessed from the upper diagnostic socket.

The TCM continuously monitors requests made by the driver via the gear selector, throttle pedal, mode switch, etc. This data is used in conjunction with speed input from the transmission unit to calculate the optimum shift points under current conditions. Shift pressure and ignition retard are also controlled from this data to enhance shift quality and reduce transmission wear.

The TCM also detects faults within the transmission system and stores the relevant fault codes for later analysis.

Gearshifts are controlled by two solenoid valves and a pressure regulator within the transmission valve block assembly.

If a serious fault occurs, the TCM removes all electrical power from these valves and the transmission defaults to a 'limp home' condition. In this state, only mechanical selection of either reverse or second gear is available.

Gearshift Timing

Inputs from the performance mode switch (Sport, Normal or 1st Gear Inhibit) and the throttle position sensor are used to modify transmission gearshift operation as required by the driver.

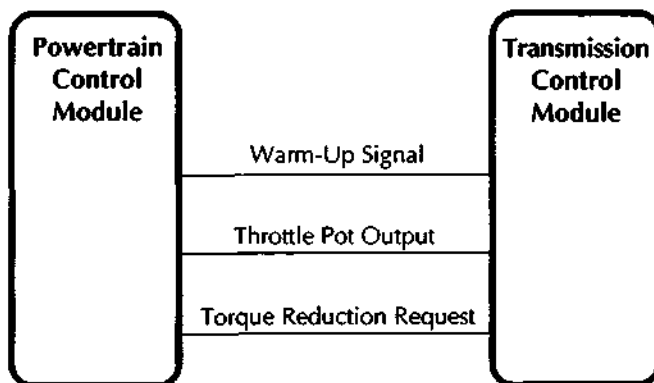
Sport mode raises the road speed at which gearshifts occur enabling higher acceleration rates for the vehicle.

1st gear inhibit prevents engagement of first gear to reduce the risk of wheel slip in icy conditions.

The throttle position sensor signal is continuously monitored by the TCM to detect a rapid throttle opening. If the throttle position sensor signal rises rapidly to above 4.5 volts, a 'Kickdown' condition is initiated. In this condition, upshifts are delayed to higher road speeds to provide the higher acceleration required for overtaking etc.

TCM - PCM Communication

The interface between TCM and PCM allows continuous exchange of the primary data required to appropriately control the gearshifts required during driving under a wide range of conditions.



Warm-Up

The Warm-Up signal is sent from the TCM to the PCM and is used to detect when the transmission reaches normal operating temperature of approximately 100°C (212°F). As this temperature is reached, the modified gearshift timing required with a cold gearbox may be abandoned in favour of the standard timing for a warm gearbox.

Throttle Pot Output

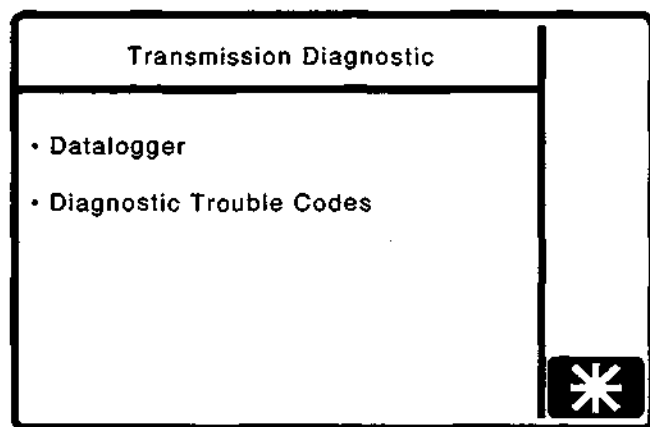
The ThrottlePot Output signal is sent from the PCM to the TCM. The TCM can then use this information to control shift timing in relation to the power demanded by the driver.

Torque Reduction Request

The Torque Reduction Request signal is sent from the TCM to the PCM. It is used to temporarily retard the ignition timing during gear shifts to improve shift quality. When the gearshift is completed, ignition timing will be returned to normal.

Transmission Diagnostics

Selecting 'Transmission' from the vehicle area menu will present the technician with the following transmission diagnostic tools menu:



The Datalogger function is fully described in the worked example at the rear of this PDU Users Guide.

Transmission Datalogger

The PDU datalogger function may be used to monitor the following transmission controller signals

DTCS Number of DTCs Logged

The Diagnostics status manager (DSM) receives and processes fault information and decides when a DTC should be logged and the MIL turned on (if enabled). The actual total stored is indicated by the parameter DTCS.

FBRAKE Brake Switch

The footbrake switch signal is input to the TCM. The input is normally at ground potential and goes open circuit when the brakes are applied. If the torque converter clutch is applied it will disengage when this signal is detected.

FMA Actual Force Motor Current

The force motor regulates the transmission fluid pressure. It is a variable force solenoid whose coil current is determined by the TCM. Range 0 - 1.245 amps. A driver circuit limits excessive current flow and performs a ratiometric comparison of Desired (commanded) Force Motor Current and Actual Force Motor current. The parameter monitors the Actual Force Motor current 1 Bit = 1/204.8amps.

HOT Hot Mode

The signal from the transmission temperature sensor is used to control TCC and line pressure. It is also used in many diagnostic signals and is a critical component for OBD II. Above 120°C the TCC is on in 2nd, 3rd and 4th gears. This reduces transmission temperature by decreasing the heat generated by the torque converter. It also provides maximum cooling by routing transmission fluid directly to the transmission cooler in the radiator. When the Hot Mode is ON the bit is set to 1.

IGN+ Ignition Feed Positive

The TCM receives ignition voltage through TCM pin 53.

MD Desired Force Motor Current

The force motor regulates the transmission fluid pressure. It is a variable force solenoid whose coil current is determined by the TCM. Range 0 - 1.245 amps. A driver circuit limits excessive current flow and performs a ratiometric comparison of Desired (commanded) Force Motor Current. The parameter monitors the Desired Force Motor current 1 Bit = 1/204.8amps.

RATIO Actual Gear Ratio

The diagnostic detects malfunction in the transmission output components by monitoring the actual gear ratio. The actual gear ratio is calculated using input (Ni) and output speed (No): $\text{Ratio} = N_i / N_o$. This is compared with the standard gear ratio for each gear. Malfunction can be defined as: actual gear ratio is not equal to any of the standard gear ratios.

RPM Engine Speed

The engine speed signal is input from the instrument pack. The signal originates at the crankshaft sensor. The crankshaft sensor signal is modified by the PCM and the instrument pack before being input to the TCM.

SSA Shift Solenoid A

Shift solenoid A is attached to the valve body and its outlet is open to exhaust when it is switched off. A OFF - outlet open - 2nd and 3rd gears selected. The solenoid is energised by the TCM providing an internal ground to close the outlet. A ON - outlet closed - 1st and 4th gears selected.

SSB Shift Solenoid B

Shift solenoid B is attached to the valve body and its outlet is open to exhaust when it is switched off. B OFF - outlet open - 1st and 2nd gears selected. The solenoid is energised by the TCM providing an internal ground to close the outlet. B ON - outlet closed - 3rd and 4th gears selected.

TCCS Torque Converter Clutch Solenoid

The torque converter clutch solenoid is mounted on the valve body. The signal is Pulse Width Modulated at 32Hz to provide closed loop control of the pressure across the converter clutch plates. 1 bit = 0.39% Range 0 to 100%

TCS Torque Converter Slip

Torque converter slip is defined as the difference between the Input/turbine (ni) speed and the Engine speed (Ne): Slip = Ne-Ni. The PWM duty cycle may increase from 0 to 100% when TCC is fully applied. In practice a 100% duty cycle will be achieved only if a large slip is detected. Normally only a 60 to 95% duty cycle will be required for full application of the TCC. Slip is expressed in rpm. 1 Bit = 1/8 rpm. Range -4096 to +4096 rpm.

TCSW Transmission Control Switch

A three position switch allows the driver to select Sport, Normal or 1st Gear Inhibit mode. When 'Sport' is selected gearshifts take place at higher engine revs. When '1st Gear Inhibit' is selected, the transmission only operates in the higher forward ratios to prevent wheel slip in icy conditions.

TISSA Turbine Input Shaft Speed

Turbine speed is the speed of the input shaft of the transmission measured by the input speed sensor mounted on the transmission. An alternating waveform is induced in the sensor by 31 serrations on the forward clutch housing as it rotates. The waveform frequency and amplitude is low at low speeds and high at high speeds. The TCM changes this signal into a digital signal. 1 bit = 1/8 RPM. Range: 0 - 8192 RPM.

TOS+ Transmission Output Speed

The output speed sensor is mounted on the transmission case and measures the speed of the output shaft. As the shaft rotates an alternating waveform is induced in the sensor which varies in frequency and voltage. The waveform is converted into a digital signal by the TCM and used to control TCC, line pressure, shift timing and torque management. 1 bit = 1/8 RPM. Range 0 - 8192 RPM

TOT Transmission Oil Temperature

The transmission temperature sensor signal is used to control TCC and line pressure. It has a negative temperature coefficient so when the temperature is cold its resistance is high and the TCM sees a high voltage. As the temperature warms the volts drop across the sensor decreases and the signal voltage becomes lower. The TCM converts this analogue input into a digital signal.

1 bit = 1°C Range -55°C to +200°C.

TP Throttle Position

This is provided by the EECV Engine Management System as a Pulse Width Modulated signal derived from the throttle position signal read by that module from the throttle position sensor.

TRX Transmission Control Switch X

TRY Transmission Control Switch Y

TRZ Transmission Control Switch Z

The transmission range is detected by the pressure switch manifold (PSM) and input to the TCM. The signal consists of three discrete lines X, Y, Z which transmit a 3 bit binary code as shown in the table below.

0 = open circuit

1 = short circuit to ground

	X	Y	Z
P	0	0	0
R	1	0	1
N	0	0	0
D	1	0	0
3	0	1	1
2	0	1	0
Error	1	1	1

VS Vehicle Speed

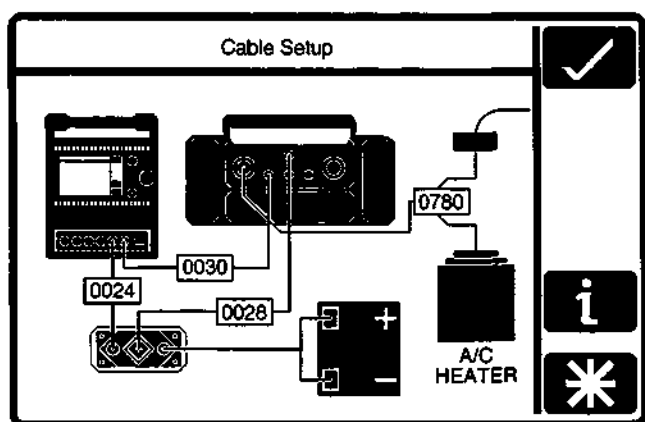
Vehicle speed is derived from a pulsed wave form generated by the speed sensor in the hypoid unit. There are 40 pulses per shaft rotation and the TCM converts this to vehicle speed and applies correction for axle ratio and road wheel diameter. 1 bit = 1kph. Range 0 - 255kph

Transmission Diagnostic Trouble Codes

The diagnostic trouble codes supported by the GM 4L80-E Transmission Control Module are covered in detail in the DB7 OBD II Diagnostics Manual.

Climate Control Diagnostics

The air conditioning control module is located at the right end of the air conditioning unit. Since this controller uses a unique communications protocol, the PDU must be connected directly to the unit via the Vehicle Interface Adaptor as shown in the following cable setup screen.



A digital microprocessor within the control module receives data signals from the operator controlled switches. Comparison of these signals with those returned from system temperature sensors and feedback devices results in the appropriate output voltage changes needed to vary: Blower motor speed, flap position and the solenoids which respond to operator selected temperature demand.

The air from two blower motors is passed through the evaporator matrix which, depending on the positions of the humidity buttons, removes heat from the incoming air. Depending on the position of the two blend flaps, the cold air either passes directly to the vehicle outlet vents, or is passed through the heater matrix to be reheated and then to the vehicle outlet vents.

The amount of air passing through the heater matrix is infinitely variable depending on ambient temperature and the temperature selected within the vehicle.

Selecting 'Climate Control' from the vehicle area menu, will present the technician with the datalogger tool selection screen.

Details of the signals which may be monitored in the system may be found in the DB7 Workshop Manual - Section 8 - Air Conditioning'

Anti-Lock Braking Diagnostics

The Teves Mk IV Braking System consists of two sub-systems, power braking and anti-lock braking.

The PDU software (DataLogger) only allows the monitoring of the anti-lock braking system.

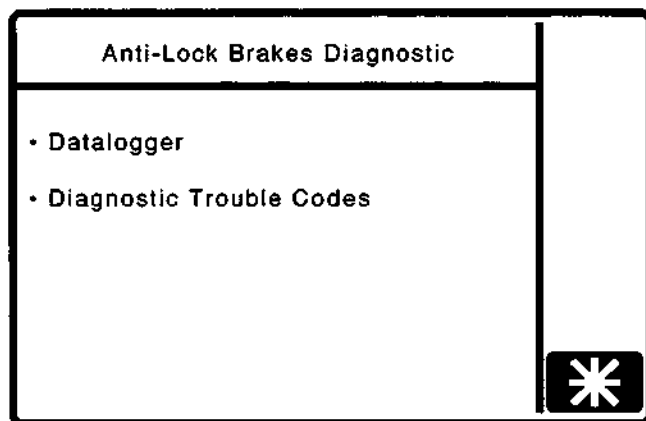
The ABS System consists of:

- Four wheel speed sensors.
- One control module.
- Seven solenoid valves.
- One pressure switch.
- One fluid level switch.

The ABS System is controlled and continuously monitored by the ABS control module, which automatically switches off the system if a failure is identified, illuminating a warning lamp and leaving full, boosted braking to all wheels. A wheel speed sensor is installed at each wheel. Their wheel speed related signals are processed by the control module, which triggers the solenoid valves to modulate hydraulic pressure, preventing the wheels from locking. The control module also monitors the fluid level and will inhibit ABS operation should low fluid level be detected.

The DataLogger function will permit monitoring of the complete system apart from the solenoid valves. The control module transmits short duration test pulses of 25 to 100 microseconds to the solenoid valves. These pulses are too fast for the PDU to monitor and as a result would cause confusing waveforms.

Selecting 'Anti-Lock Braking' from the vehicle area menu, will present the technician with the following menu of diagnostic tools screen:



ABS Diagnostic Trouble Codes

The DTCs which are supported in the Teves Mk IV ABS system are listed in the workshop manual - Section 5 Brakes Wheels and Tyres.

ABS Datalogger

The following signals in the Teves Mk IV ABS system may be monitored using the datalogger function.

DTCs Number of DTCs Logged

The Diagnostic status manager (DSM) receives and processes fault information and decides when a DTC should be logged and the MIL turned on. The actual total stored is indicated by the parameter.

FBRAKE Brake Switch

The signal from the brake switch is used by the CM to ensure that traction control is inhibited when the brakes are applied. The input circuitry within the CM is a 10K pull-up to ignition voltage. When the switch is closed the parameter is set to 1.

FLWS Front Left Wheel Speed Sensor

An indication sensor outputs a sinusoidal wave form 48 pulses per revolution. The output is processed by the CM to control braking and traction. The sensor is continually monitored for open and short failure and operating range. If its output exceeds 330km/h it is deemed to be faulty and the CM is disabled. The parameter tracks the sensor waveform through 255 steps.

FRWS Front Right Wheel Speed Sensor

An indication sensor outputs a sinusoidal wave form 48 pulses per revolution. The output is processed by the CM to control braking and traction. The sensor is continually monitored for open and short failure and operating range. If its output exceeds 330km/h it is deemed to be faulty and the CM is disabled. The parameter tracks the sensor waveform through 255 steps.

RLWS Rear Left Wheel Speed Sensor

An indication sensor outputs a sinusoidal wave form 48 pulses per revolution. The output is processed by the CM to control braking and traction. The sensor is continually monitored for open and short failure and operating range. If its output exceeds 330km/h it is deemed to be faulty and the CM is disabled. The parameter tracks the sensor waveform through 255 steps.

RRWS Rear Right Wheel Speed Sensor

An indication sensor outputs a sinusoidal wave form 48 pulses per revolution. The output is processed by the CM to control braking and traction. The sensor is continually monitored for open and short failure and operating range. If its output exceeds 330km/h it is deemed to be faulty and the CM is disabled. The parameter tracks the sensor waveform through 255 steps.

Passive Anti Theft (PATs) Diagnostics

Security System Diagnostics

Because of the requirement to maintain vehicle security, the PATs and Security System operating instructions and diagnostics are covered in the Vehicle Security supplement to section 6 of the workshop manual. This supplement has restricted circulation and is only available to Aston Martin Dealers.

Airbag System Diagnostics

WARNING: Whilst it is completely safe to access and read the airbag diagnostic module memory at the diagnostic socket, significant personal risks exist in the performance of any other tasks on the airbag system or components. Therefore all workshop manual warnings must be read and all safety procedures must be followed before, during and on completion of any other practical work on the airbag system.

System Description

The airbag system installation comprises:

- Airbag Diagnostic Module
- Driver and passenger airbag modules
- Two front impact (crash) sensors
- One 'safing' sensor
- Dedicated wiring harness
- SRS indicator/warning lamp

The system is designed to provide protection for both driver and front seat passenger by automatically deploying airbags in the event of a collision during forward travel.

In the event of a collision, the crash and safing sensors will operate, completing the firing circuit and causing the airbags to inflate within 32 milliseconds. At least one crash sensor and the safing sensor must operate to fire the airbags.

Any faults in system components, installation or wiring will be indicated by a flashing code on the SRS/AIRBAG warning lamp. Fault code information may also be monitored using the PDU or scan tool.

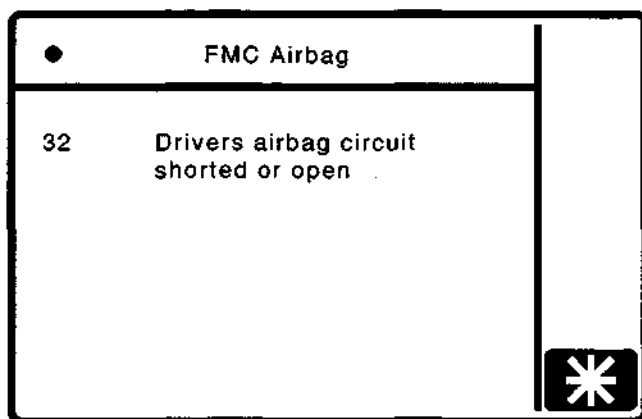
A full description of the airbag system components is included in the workshop manual.

Airbag Diagnostics

The Airbag Control Module indicates a fault by transmitting a pulsed signal down the Airbag System Failure line to flash the SRS/AIRBAG warning lamp. The fault code is repeated continuously. If there are two or more faults, the fault code with the highest priority is transmitted first. The second fault code is only transmitted when the first fault has been rectified.

The SRS/AIRBAG warning lamp is also used to indicate any problem in the seat belt pretensioner system (if fitted). Flashing of the lamp indicates an airbag fault, constant illumination of the lamp indicates a seat belt pretensioner fault.

At the top left of the PDU screen there is a bullet mark which indicates the current state of the Airbag System Failure line. As a code is transmitted the bullet mark can be seen to flash. The PDU reads the fault code, and writes the code number and fault description to the screen. The PDU continues to monitor the transmitted code. If the transmitted code changes, the new code number and description will appear below the first.



When remedial action has been taken to correct a fault, press the Clear Button to clear down the PDU display. Then use the PDU to ensure that no faults are reported.

A series of audible beeps, continuously transmitted by the Airbag Diagnostic Module, indicates that there is an Airbag System fault to report and that the Airbag System Failure line is open circuit. The PDU is not able to monitor the fault line in this situation as there is no pull-up resistor, normally provided by a warning lamp in the instrument pack.

Rapid continuous flashing of the Instrument Pack Airbag Failure Lamp indicates that both front impact sensors are disconnected. No fault code is reported on the PDU, however on close inspection the bullet mark can be seen to flicker.

Airbag Diagnostic Trouble Code Monitor

The following diagnostic trouble codes are supported by the Airbag Control Module:

- 12 Low battery voltage
- 13 Air bag circuit shorted to ground
- 14 Front impact sensor circuit shorted to ground
- 21 Safing impact sensor incorrectly mounted to vehicle
- 22 Safing impact sensor output shorted to battery voltage
- 23 Safing impact sensor input feed / return open circuit
- 24 Safing impact sensor output feed / return open circuit
- 32 Driver side airbag circuit high resistance or open
- 33 Passenger side airbag circuit high resistance or open
- 34 Driver side airbag circuit low resistance or short circuit
- 41 Front right impact sensor feed / return open circuit
- 42 Front left impact sensor feed / return open circuit
- 44 Front right impact sensor incorrectly mounted to vehicle
- 45 Front left impact sensor incorrectly mounted to vehicle
- 51 Airbag CM internal thermal fuse - intermittent short to ground
- 52 Back up power supply - voltage boost fault
- 53 Front impact sensor circuits resistance to ground or internal Airbag CM failure

Seat Belt Pretensioner Diagnostics (where fitted)

Description

The DB7 seat belt pretensioner system operates the drivers seat belt pretensioner in conjunction with the Airbag system. The seat belt pretensioner control module is located under the right hand seat, beside the seat control module.

The pretensioner control module calculates changes in vehicle speed using an input signal from an accelerometer. When a collision is detected (Rapid reduction in vehicle speed) the pretensioner charge is fired using electrical energy stored in a capacitor within the pretensioner control module. Firing of the pretensioner charge applies additional tension to the drivers seat belt.

The airbag and seat belt pretensioner systems share the SRS (Airbag) warning lamp. Any fault detected by the pretensioner control module is indicated by constant illumination of the SRS (Airbag) warning lamp. Flashing of the SRS warning lamp indicates a fault in the airbag system.

Should both systems develop faults, the pretensioner system will permanently illuminate the warning lamp. This would mask the airbag system warning indication. Therefore, rectify the pretensioner fault and then retest for faults in the airbag system.

The pretensioner control module can log up to 10 diagnostic trouble codes together with a time since each fault was alerted to the driver. Each fault will be identified as 'Permanent' or 'Intermittent' on the PDU diagnostic trouble codes screen.

System Connections

The Autoliv RC5 Pretensioner Control Module has an 18 pin connector featuring six shorting bridges. The mating halves of the connector may be securely locked using a double mechanical locking system.

The following pins on the control module connector are used in the Aston Martin seat belt pretensioner system:

Pin 1	Ground
Pin 2	SRS/Airbag Warning Lamp
Pin 11	Drivers airbag positive
Pin 12	Drivers airbag negative
Pin 14	Serial communications
Pin 15	12 volt positive feed
Case	Ground

System Fault Strategy

No single fault may cause an unexpected deployment. The controller will supervise the airbag/pretensioner electrical system in order to warn the driver should a fault occur. Any fault detected by the self diagnostics shall cause the airbag warning lamp to be activated, and in some cases the pretensioner control module to enter shutdown mode. In shutdown mode, the energy of the reserve capacitors shall be discharged to avoid unintended deployment.

As the ignition is switched on, the pretensioner controller will directly discharge the energy capacitors. When the start up procedure is completed without detecting any faults, the convertor will be activated allowing the capacitors to be charged. The system shall be fully active within 11 seconds after switching the ignition on providing that no faults are detected.

All system faults monitored by the controller are filtered in software to avoid fault warnings due to transient electrical disturbances.

If a fault which could lead to inadvertent deployment be detected by the microprocessor, a software shutdown will be generated. However, a leakage to an earth or positive potential in the pretensioner output circuit shall not cause the controller to enter shutdown mode.

If a permanent short of the ignition transistor occurs, a shutdown shall be generated by the hardware circuit. If a shutdown occurs, the system shall be unable to deploy the pretensioner after a period of 3 seconds (i.e. capacitors discharged to under minimum deployment voltage).

WARNING: To avoid the possibility of personal injury caused by accidental deployment of the pretensioner, disconnect the vehicle battery and wait at least 10 minutes for all voltages to fully discharge before working on the pretensioner system. This covers the possibility of the normal capacitor discharge circuits being inoperative and failing to discharge the capacitor when instructed to do so.

If the module enters shutdown mode, all diagnostic functions are stopped, but the communications link remains active. A fault code corresponding to the cause of the problem may be read by the PDU.

Seatbelt Pretensioner Diagnostic Trouble Codes

050A Pretensioner squib leak to battery positive
050B Pretensioner squib leak to ground
050C Pretensioner squib high resistance
050D Pretensioner squib low resistance
0D13 Capacitor voltage error
0D14 Capacitor capacitance
0D09 Energy reserve switch
0D1E Energy shutdown switch
050E Seatbelt pretensioner switch error
0109 Accelerometer function
010A Acceleration out of range
010B Accelerometer offset
0209 Safing sensor error
030A Temperature sensor error
060C Warning lamp short circuit
060D Warning lamp open circuit
060E Warning lamp driver error
0A0C Analogue voltage error
0A09 Communications error
090A EEPROM not programmed
0909 EEPROM checksum
0A0A External watchdog error
0A0B External watchdog time out
020A Safing sensor not closed
090C RAM check error

Print Facility

The print trace and print screen facilities provided on DB7 CD2 will enable the Dealer to print directly to a serial printer via an isolated RS 232 cable.

General Information

This cable is designed to provide full electrical isolation between the Portable Diagnostic Unit (PDU) and a device using the RS232 serial communication port. The cable is constructed with an in-line module that contains the optical isolation circuitry, powered from the PDU.

Printer type

The cable is supplied configured to suite an Epson LX300 printer. This is the only installation verified and approved by Aston Martin Lagonda Ltd.

Unexpected results may occur if used with an unapproved printer.

Part Number Equipment type

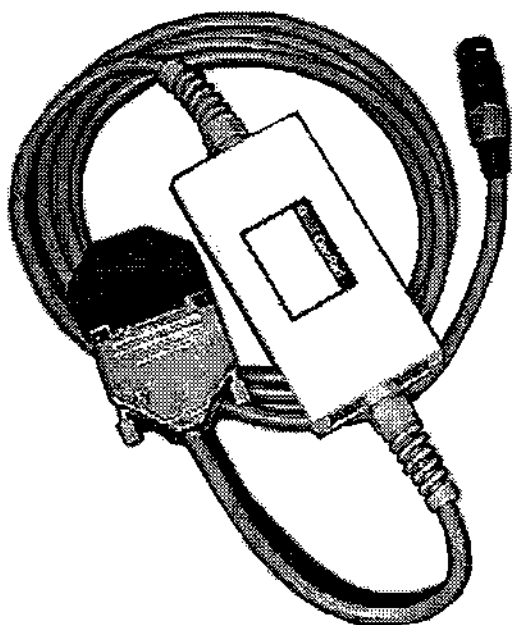
3539-1114-03 Epson LX300 printer cable kit

comprising
3539-1169-03 Printer Cable

3539-1175-02 User Self Test Adaptor

Connecting to the PDU

Connection to the PDU RS232 port is made by plugging the circular connector with the BLUE ident ring into socket (1) on the PDU interface panel.



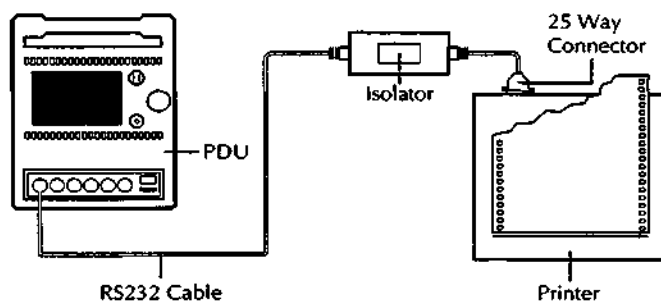
RS232 Printer Cable

RS232 Protocol

The RS232 protocol operated by the PDU is 9600 baud, 8 bit, no parity, 1 stop bit, RTS / CTS hardware handshake.

Printer Configuration

When connected to the printer a hardcopy of the PDU data can be produced.



Printer Connection

When connecting to the printer please record original printer settings prior to making any changes. Neither GenRad nor Aston Martin Lagonda can accept responsibility for re-configuration of the printer for other applications.

Self Test Adaptor

Each cable type is supplied with a User Self Test (UST) adaptor. This allows the function of the cable to be verified independently of a printer. Future releases of UST software will include testing procedures for this cable.

Printer Use

Print Trace

The Trace Buffer is used to record technician use of the PDU. As the diagnostics are executed, the following information is written to trace:

- Screen Title
- Menu options selected
- Operator questions selected
- Operator actions
- Control module information
- Test limits and results
- P codes detected by the DTC monitor
- Snapshot data from the datalogger
- OBD II freeze frame data

Set up the printer and load with paper. Select Print Trace and confirm the selection. All recorded information in the above list will be printed.

Print trace is supported in English, French, German and Italian.

Print Screen

The Print Screen function dumps a bitmap image of the current screen display to the printer. This function is particularly useful for recording data such as waveforms captured by the datalogger application.

The print screen function is supported in English, French, German, Italian and Japanese.

Digital Multimeter

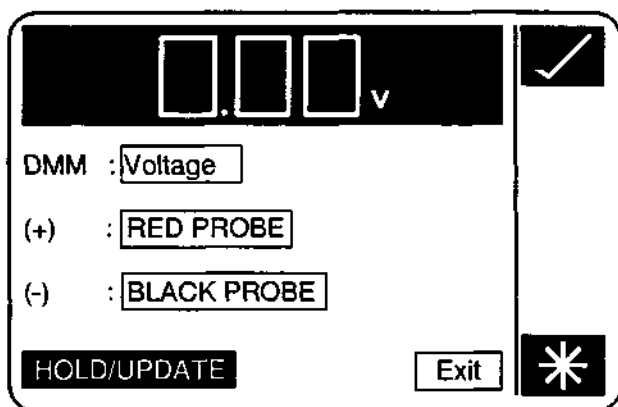
Introduction

The Digital Multi-Meter provides the capability to measure voltage, current, resistance, frequency, pulse width, pulse period and duty cycle using measurement probes or vehicle interface adaptor channels.

WARNING: DMM measurements must not be taken while the PDU is connected to the base station. The PDU measurement system becomes referenced to earth when connected to the base station. Serious measurement errors may be present because of any voltage difference between vehicle ground and base station earth. Operation of the PDU in this mode has both functional and safety implications and therefore must be avoided.

A digital multimeter (DMM) is resident within the PDU software toolbox.

The DMM application can be accessed from the main menu. On selection of "Digital Multimeter" from the main menu, the PDU will always display the same screen, known as the DMM general screen.



The DMM General Screen

The DMM is used to display measured values, to three significant figures, in the correct units.

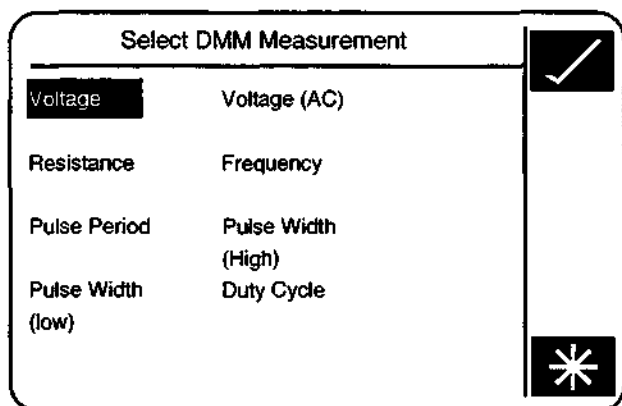
Modes of measurement are Voltage, Voltage (AC), Resistance, Frequency, Pulse Period, Pulse Width (High/Low) and Duty Cycle. Current measurements up to 50A may be made using the current probe. Measurements are usually made directly using the PDU measurement probes. On the air conditioning system only, when using the VIA, measurements may be made between specific module pins. If required, this mode must be specified when specifying the measurement to be made.

Operation

On selection of DMM the general screen, as shown in Fig. 1, will be displayed.

Voltage is the default selection for measurement, with red and black probes selected as sources. To choose alternatives to these options, press the relevant description for change followed by the 'tick' icon in the top, right-hand, corner.

If the measurement mode (Voltage) is selected for change, followed by a confirming 'tick', a screen as shown will be displayed.



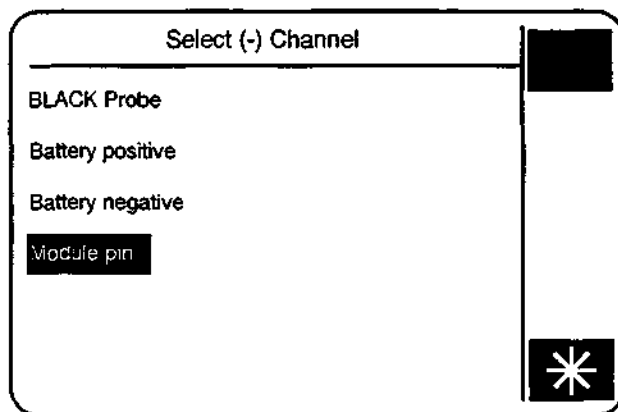
DMM Measurement Selection

Selection of any option from this screen, followed by a confirming 'tick', will return the operator to the general screen but with the new mode displayed against DMM.

If 'Resistance' is selected an additional icon, showing an audio symbol, will appear above the "EXIT" display. This icon allows the enabling / disabling of an audible signal which sounds when measured value falls below 0.5 ohms. Touch the icon to toggle the warning ON / OFF directly, no confirming 'tick' is necessary. A 'cross' is displayed over the icon when warning is turned OFF.

Measurement Source Selection

If a measurement source (either RED or BLACK PROBE) is selected, a screen as shown will be displayed. This screen may vary depending upon the various probes which can be connected to the PDU. A full list of possible sources will be displayed on the 'Source Select' screen.



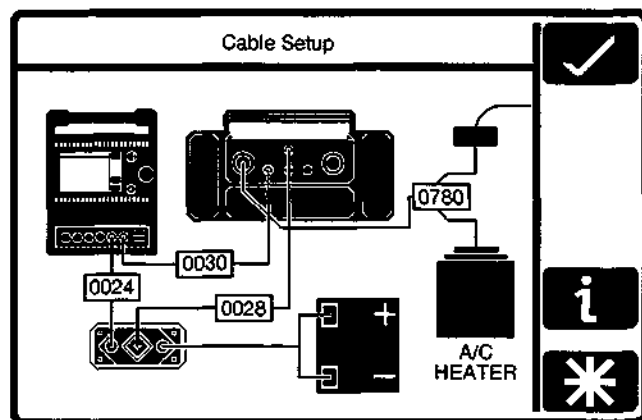
Selection of (+) and (-) measurement channels

Selection of any source option, except "Module Pin", will return the user to the general screen, which will display the revised source.

Module Pin Selection (Air-Con only)

Selection of "Module Pin" will display a screen as shown.

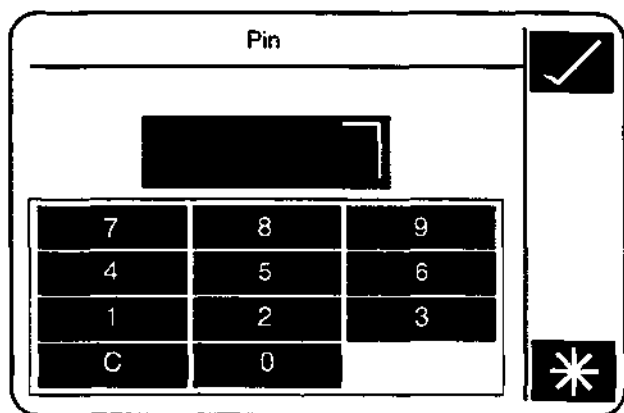
Selection of one of the options displayed on this screen allows the operator to make measurements on designated pins of the air conditioning control module. When the air conditioning module is selected PDU will display a wiring connection diagram, as shown.



Module Connection

The PDU will then check the cable connections. Until all connections are correct, the PDU will not allow progression beyond this screen. Pressing the 'asterisk' icon and selecting abort returns the operator to the general screen if an incorrect system has been chosen.

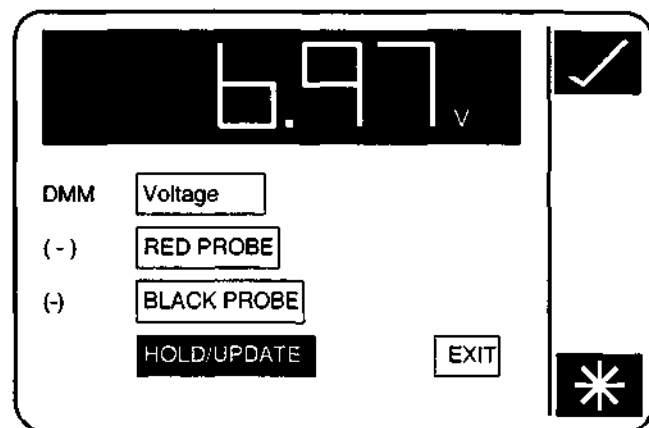
If selection and wiring are correct a numeric keypad will be displayed. The operator can now enter a pin number to be tested, using this keypad.



Numeric Keypad

Display Freezing

To assist the operator a "HOLD/UPDATE" option is displayed on the general screen. This option is selected as default on the general screen and allows a reading to be 'frozen' on screen when the 'tick' icon is pressed. A 'tick' button is also incorporated into the red probe so that a remote 'freeze' command can be sent to PDU, holding the reading until the operator can view the screen. A frozen value is displayed on a 'grey' background indicating that the value is on HOLD. Re-pressing the 'tick' icon (either local or remote) unfreezes the display and restores the normal display background.



The Hold/Update option

The "HOLD/UPDATE" option operates on one touch of the 'tick' icon (or 'tick' button) irrespective of the state of the screen backlight. Therefore it is not necessary to reinstate the screen backlight if there has been no operator contact with the PDU for five minutes (or longer). Pressing "HOLD/UPDATE" reinstates the backlight and initiates/releases display 'freeze' automatically.

System Exit

At any point during DMM operation it is possible to exit the system by either pressing the 'asterisk' icon and selecting abort, or pressing "EXIT" (where available) followed by a confirming 'tick'.

Diagnostic Trouble Codes

Introduction

The 'Diagnostic trouble codes' application enables the PDU to monitor the trouble codes logged in selected control module's and provides the following functions:

- Decode and display any trouble codes logged by the control module(s) being monitored.
- Decode and display enhanced diagnostic information, together with any count of the number of occurrences, when supported by the control module(s).
- Clear some or all of all these trouble codes selected by the user on the PDU screen, when supported by the control module(s).

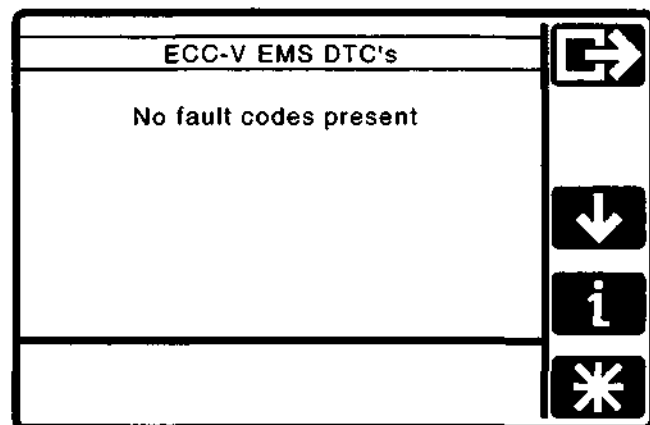
Diagnostic Trouble Codes are logged by the Engine Management and by the Automatic Transmission control units and can be accessed using the PDU. Logged codes in the 95 MY Teves Mk II ABS controller can only be accessed using the brake warning light. The Air Conditioning control unit does not log trouble codes.

Operation

From the Main Menu make the following selections:

- Select Diagnostics
- Select Engine or Transmission
- The system will then load the appropriate software
- Select Diagnostic Trouble Codes
- Connect the PDU to the car as shown on the screen diagram
- Select the ✓ icon to confirm connection
- The PDU will then interrogate the chosen control unit and will display any logged trouble codes.

If no trouble codes have been flagged by the control module, the PDU will display a screen similar to Fig. 15



The No Fault Codes screen

The trouble code screen will be headed by a module title block followed by a list showing all logged trouble codes for the selected module.

Note: There may be more logged diagnostic trouble codes than displayed on the first screen. Use the 'up arrow' and 'down arrow' icons if necessary to scroll through the total display.

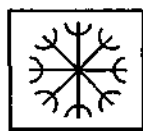
On the Zyteck engine management system only, each trouble code definition will be individually selectable to invoke the clear trouble codes screen. If one or more trouble codes are selected, the clear all and clear selected trouble code icons will be displayed.

On all other systems, only the 'Clear All' function is available.



'Clear All' and 'Clear Selected Codes' Icons

Freeze Frame Data



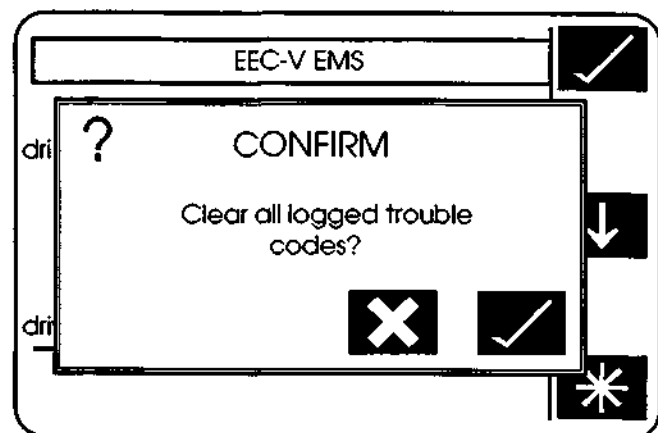
As any engine management trouble code is logged, the system takes a snapshot (freeze frame) and records the state of all signals at that time.

On the Zyteck engine management system (95 MY), freeze frame data can be displayed by selecting a logged trouble code and touching the 'snowflake' icon.

On the 97 MY EEC V engine management system, freeze frame data is accessed using the OBD II scan tool.

Clear all Trouble Codes

Selecting the clear all trouble codes icon will invoke a confirmation window.



'Clear All Codes' confirmation screen

Selecting the 'tick' will instruct the PDU to clear all logged trouble codes in the selected module and return to the no logged codes screen.

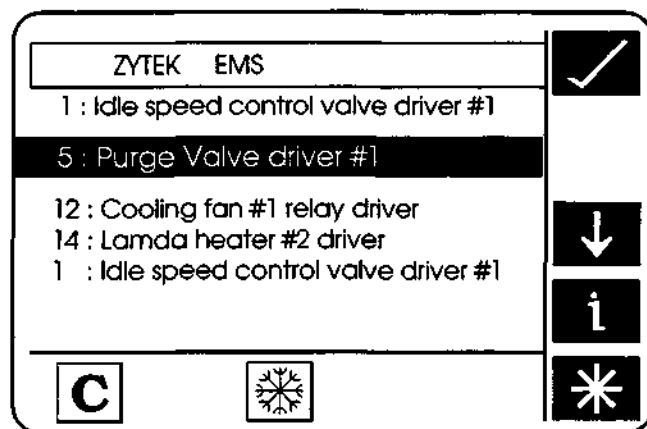
Select the 'tick' icon to exit Diagnostic Trouble Codes.

Clear Selected Trouble Codes

(95 MY Zytex Engine Management Only)

If you wish only to clear selected codes on the Zytex ECU and leave others for later investigation, proceed as follows:

Highlight only the trouble code(s) to be cleared.



Highlighting Selected Trouble Codes

Select the 'clear selected trouble codes' icon; this will invoke a confirmation window.

Selecting the 'tick' icon will instruct the PDU to clear only the selected trouble codes from the control module fault table, and if successful, the system will return to the 'Diagnostic trouble codes' screen.

If any attempt to clear trouble codes is unsuccessful, a warning window will be displayed.

This will indicate that some selected trouble codes remain logged, selecting the 'tick' icon will return to the 'Diagnostic trouble codes' screen.

Select the 'tick' icon again to exit Diagnostic Trouble Codes.

Datalogger

Introduction

DataLogger is software produced to identify permanent or intermittent faults on vehicle electronics. The objective of DataLogger is to provide a view of the vehicle's electrical behaviour, such that intermittent activity can be recorded and interpreted quickly and accurately. Running on the Portable Diagnostic Unit (PDU), the DataLogger application can capture vehicle information in three ways.

- Serial communications direct from the control unit.
- Parallel communications using the Interface Adaptor.
- Direct signal monitoring using the measurement probes.

Serial Communication

Serial Communication is a two-wire communication link between the PDU and most vehicle control modules providing digital measurements for connected components. The serial communication link allows the tester to determine the current condition of components connected to the control module, and to identify any history of faults.

On later vehicles, the PDU is connected to the vehicle diagnostic sockets via the multi Protocol Adaptor (MPA) to gather serial data from the control modules.

Parallel Communication

The Vehicle Interface Adapter (VIA) provides an interface between the PDU and the vehicle harnesses for the acquisition of multiple analogue measurements. The VIA is connected between the relevant vehicle control module and its harness connector. This allows the PDU to capture information from a multitude of channels entering the control module. This vehicle interface is used with control modules not equipped with a serial communication link (Teves Mk II braking system and the air conditioning system).

Measurement Probes

The measurement probes permit readings to be taken directly from any connector on the vehicle.

DataLogger Applications

Datalogger may be used to interrogate the following DB7 systems:

- ABS braking system controller
- Engine Management Controller
- Air Conditioning Controller
- Automatic Transmission Controller
- Passive Anti Theft (97 MY)
- Security System (97 MY)

Using the Datalogger

Configure the vehicle to the normal operating conditions for the system under test.

From the PDU main menu screen:

Highlight 'Diagnostics'.

Press the 'tick' icon to confirm the selection.

Enter the Transmission Type and confirm the selection.

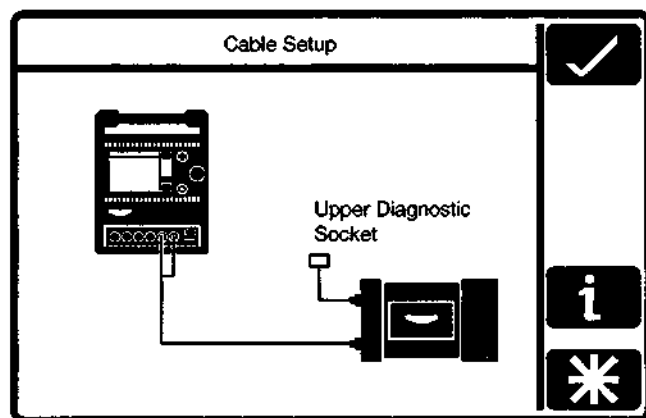
Select the Vehicle Area to be tested and confirm the selection.

The PDU tools screen should now be displayed.

Highlight 'DataLogger'.

Confirm the selection with the 'tick' icon.

The PDU connection screen should now be displayed.



PDU Connections for Datalogger

Connect the PDU to the vehicle as described in the screen image.

Switch On the ignition and press the 'tick' icon.

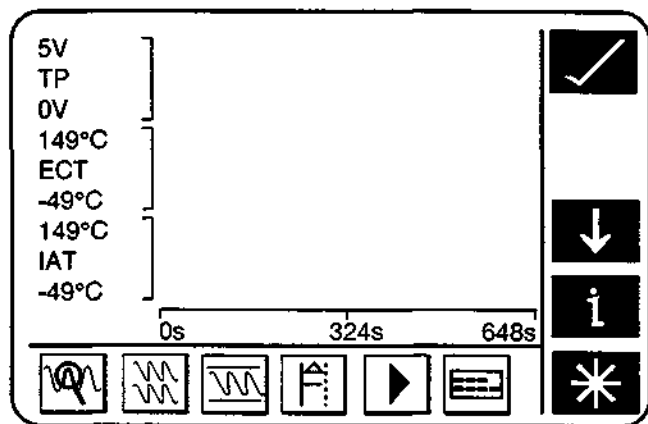
'Establishing connection to control module' should now be displayed on the screen.

If for any reason the PDU cannot communicate with the relevant vehicle control module a 'communications failure screen' will be displayed with a retry option.

Check all connections before retrying.

Once communications are successful 'Starting DataLogger' will appear on the screen momentarily.

DataLogger will automatically default to the waveform screen.



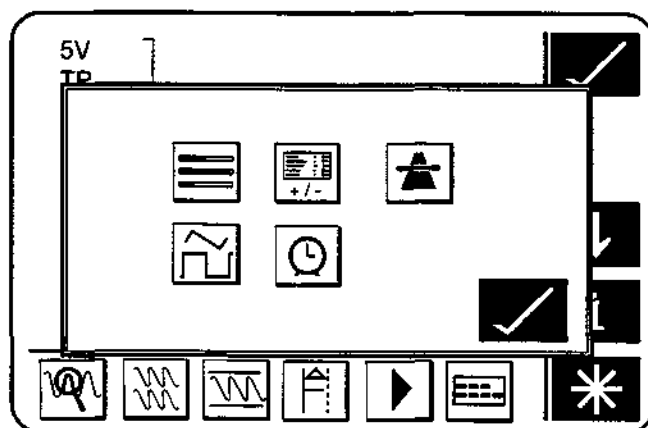
DataLogger Waveform Screen



The default waveform screen will display previous selected parameters. If these parameters are ideal for the test procedure then DataLogger can be started immediately, simply by pressing the record icon.



Select the main menu icon to go to the main menu screen.



DataLogger Main Menu

Main Menu

The datalogger main menu) is the main control screen, and can be selected from any of DataLogger's screens.

The main menu provides a single touch entry to each of DataLogger's features.

These features include (left to right, top to bottom):

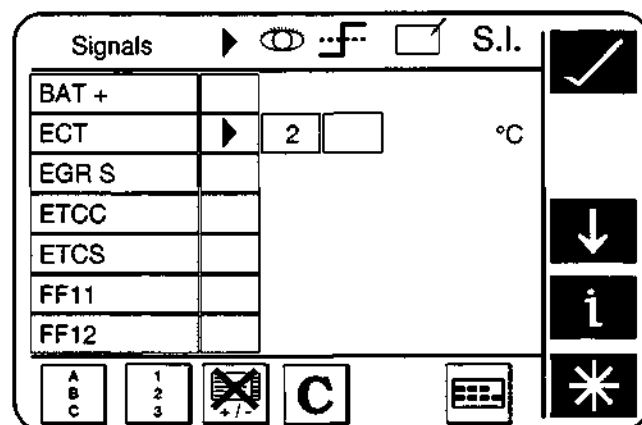
- Bargraph Display
- Parameter Customisation
- On-Road Manual Trigger
- Waveform Display
- DataLogger timing

Parameter Customisation

Parameter customisation enables the selection of signals to be recorded by DataLogger. It also enables the signal units to be selected, the order in which the signals are displayed, and whether the displayed signals are to be used as a trigger.

The Parameter Customisation screen presents selections in a five column table. Each column from left to right represents:

- Parameter name or acronym.
- Record enabled.
- Display order.
- Trigger action.
- Display S.I. Units.



Parameter Customisation

Parameter Name

Parameters can be fault codes, inputs to, or specific outputs from, a vehicle control module.

The number of parameters selectable is limited to 32.

If the number of parameters available for customization exceeds the display area, the arrow buttons will be present, allowing display area scrolling.

The parameters declared to DataLogger are initially presented in alphabetical order.

Record Enabled

Record enabled is used to select which signals are to be recorded.

To select a signal for recording, touch the rectangle next to the signal name.

The record button will then be displayed.

Note: Additional rectangles may appear in other columns beside a selected signal name, indicating that the signal units may be changed or that the signal may be used as a trigger.

It should be noted that the more parameters you select to record the slower the PDU's sample rate will be for each parameter e.g. The PDU may be able to monitor six parameters sampling each parameter twice a second. If the number of parameters is increased to twelve then the PDU would only be able to sample each parameter once per second, thus reducing its ability to capture fast faults; therefore it is recommended that the number of parameters is kept to a minimum.

Display Order

Parameters may be displayed on the waveform / bargraph screen in any order.

To set the parameter display order, press the required rectangle to create a numbered list.

Note: It is not necessary to display all of the parameters required to be recorded.

This has particular benefits if a parameter is to be used as a trigger but is not required to be displayed.

Trigger Action

For a detailed description of trigger action, refer to the Trigger Customisation description on the following page.

S.I. Units

Certain parameters can be measured / displayed in a number of different units eg temperature in °C or °F. If a rectangle appears around the displayed units in the 'S.I.' column then the units are selectable. Each time the rectangle is pressed, the selectable units scroll one step through the available options.

Other Features

To make parameter customization easier two icons have been introduced on to the bottom of the screen, these are:

 This icon simply puts all of the signals selected for recording in alphabetical order irrespective of the language.

 This icon will put all of the signals selected for recording at the top of the parameter list in numerical order.

After the parameter customization process is completed, return to the DataLogger main menu.

Default Customisation

 To cancel all customisations, press the Customisation Reset icon. This will reset the customisation on all parameters to the default setting.

Trigger Customisation

DataLogger operates using a 'rolling memory'.

When the Record icon is selected on the waveform display, PDU will start to record data, it will then continue to record data until its memory is full.

At this point it will continue recording by overriding the oldest data. This process will continue indefinitely or until the trigger is activated.

When the trigger is activated it performs a number of functions.

- The first function is to place a zero time point within the stored data, this enables the trigger point to be easily accessible in later stages.
- The second function is to set a timer, ensuring that the PDU will only continue recording for the time selected in 'test-duration'.

Only the data within the selected time period will be stored. A trigger is used to define the zero time point on any waveform display. This is used to make it easier to locate the actual point at which the fault occurred on the waveform display. Triggers may take three forms.

1. Manual Trigger

A manual trigger would be used in circumstances where the technician can clearly identify the point when the fault occurs and has access to the PDU at this point.

The trigger icon should be pressed on the waveform / bargraph display (or the on-road trigger icon) at the instant the fault occurs. This will then become the zero point for the waveform/bargraph display. The waveform/bargraph display up to this point would have a negative form.

2. Fault Code Trigger

The fault code trigger is used when the first indication of a fault is normally by the appearance of a warning lamp within the instrument pack. For some vehicle systems DataLogger can trigger on specific fault codes, this type of triggering is more precise than simply triggering on the warning lamp.

This trigger is selected during the parameter customisation process. To select a fault code to trigger 'on', set the fault code (parameter) to record.

Assign the display order by touching the rectangle below the Eye icon repeatedly until the desired display order number is shown.

Press the rectangle in the trigger column.

Highlight the fault code parameter again and select the magnifying glass icon. The trigger customisation screen will be displayed.

Select the appropriate trigger style icon and select the tick icon to confirm.

Press the Tick icon again to return to the main DataLogger screen.

Select the Record icon to start data capture.

The unit will trigger when the fault code appears and will set the zero time point of the waveform / bargraph display.

3. Specific Signal Trigger

It is possible to select a specific parameter or signal to trigger DataLogger.

Triggering on specific signals is likely to be used when the vehicle system has no on-board diagnostics or when diagnostic information is not readily available at the time the fault occurs, e.g. air-conditioning.

This type of trigger should only be used when it is known that a particular signal has certain characteristics at the time the fault occurs, e.g. one signal will always go from 12 Volts to ground, bringing on a warning lamp when a particular fault occurs, as this is a known event, this signal may be used to trigger the PDU.

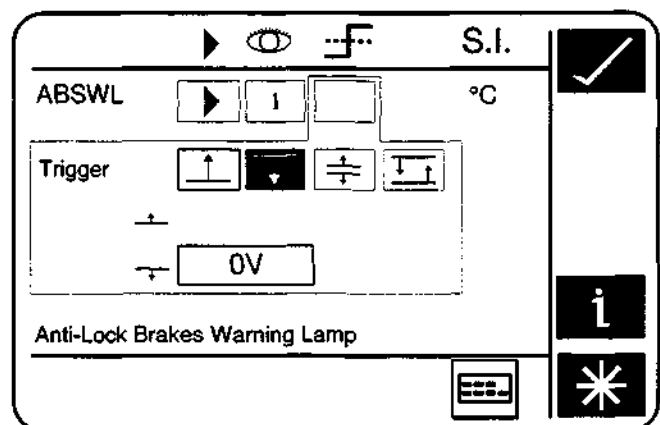
Trigger Selection

Any of the record enabled parameters may be used to trigger DataLogger.

To select a trigger highlight the parameter name, a magnifying glass type icon will appear at the bottom of the screen.

Select the magnifying glass type icon.

The trigger action screen should be displayed.



Trigger Action Screen

The following trigger options are available:-



Triggers when the signal passes above a specified value, i.e. stop lamp.



Triggers when the signal passes below a specified value, i.e. Anti-Lock brakes warning lamp.



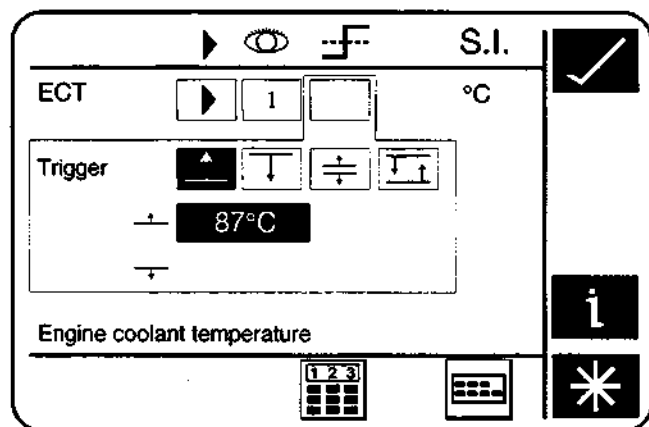
Triggers when the signal passes outside a specified band, i.e. oxygen sensor feedback.



Triggers when the signal passes into a specified band.

Once the type of trigger has been selected the trigger value(s) (i.e. the signal level at which the trigger point will occur) should be set.

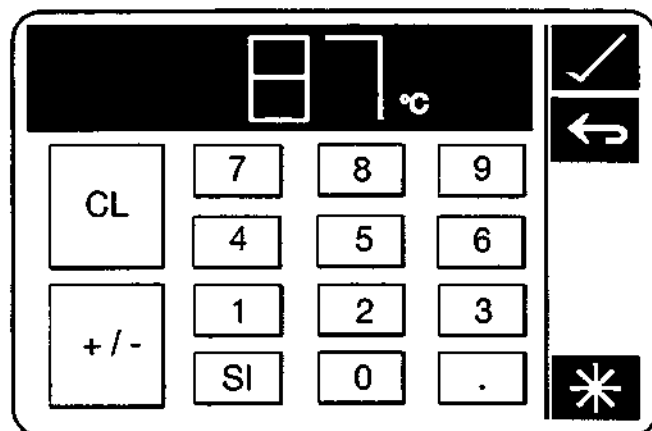
These values are set by highlighting the existing value.



Highlighted Trigger Value

Press the calculator-style icon.

A new screen should now be displayed.



Trigger Value Entry

Enter the required trigger value using the calculator-style screen buttons.

The S.I. button enables unit selection, where applicable, refer to S.I. Units.

Confirm the trigger value by pressing the 'tick' icon.

The trigger screen will now be re-displayed.

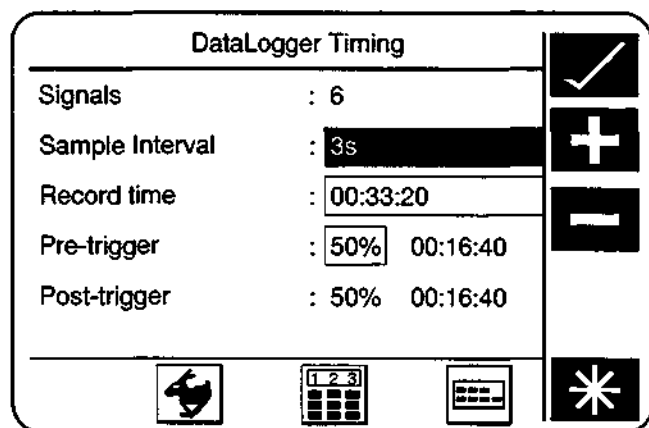
Press the 'tick' icon to go back to the Parameter Customisation screen.

Press the 'tick' icon again to return to the datalogger main menu.

Datalogger Timing

Select the 'clock' icon from the main menu screen.
Confirm the selection using the 'tick' icon.

The DataLogger timing screen should now be displayed.



Datalogger Timing

The DataLogger timing screen allows customisation of the sample interval and duration of data capture.

The display will identify the number of parameters (channels) which have been selected to be recorded by DataLogger.

Timing changes can only be made while data capture is inactive. Entering DataLogger timing while vehicle data is being captured will display the current settings, but disable selection.

Signals

The signals are the number of parameters set for sampling by DataLogger.

Sample Interval

The sample interval (frequency) defines the time interval between successive block requests for all recorded parameters.

The sample interval is selectable to enable fast response to intermittent faults.

Note: Very short sample intervals may reduce test duration because the PDU memory becomes full of data.

Select the sample interval rectangle.

A calculator-style icon should now be displayed.



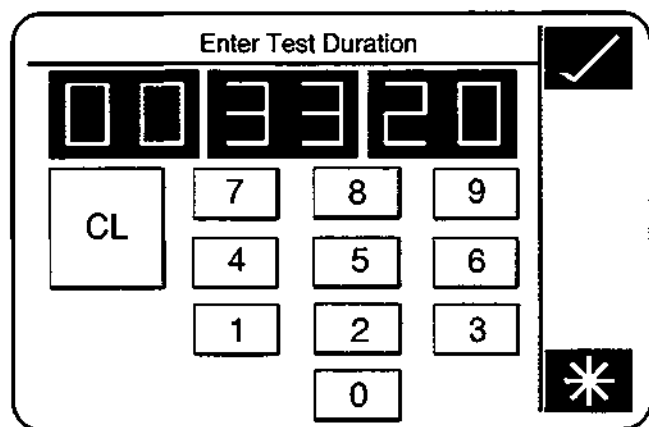
As well as a calculator-style icon being displayed there will be a hare icon, selecting this icon will automatically set the fastest sample rate for the selected parameters.



Note: The fastest sample rate set using the 'hare' icon may be too fast for some applications.

Select the calculator-style icon.

A new screen should now be displayed.



Test Duration

Enter the required value in milliseconds up to a maximum of 60,000 mS (1 min). At this stage DataLogger will not verify if the entered sample interval can be achieved.

When DataLogger is actioned to start recording vehicle data, and the sample interval is shorter than the fastest achievable capture time, a warning screen will be displayed, requesting changes to the sample interval.

Record Time

The record time (test duration) defines the length of the data slice which will be preserved for analysis after the fault occurs. The selected time will be split equally before and after the fault trigger. e.g. a 10 minutes recording will preserve data from 5 minutes before to 5 minutes after the fault.

At the end of the record time the PDU will automatically stop recording.

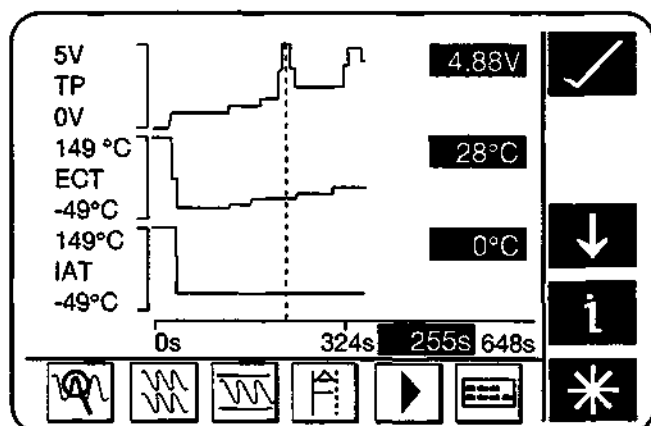
The record time is entered in the same way as the sample interval, by enabling the rectangle and selecting the calculator-style icon.

Pre-trigger and Post-trigger

The pre-trigger and post-trigger represent the duration of the tests before and after the trigger point respectively.

Waveform

Select the waveform icon from the main menu, confirm selection using the 'tick' icon; the waveform screen should now be displayed.



Waveform Display

The screen consists of three parts:

- Waveform Display
- System icons
- DataLogger Specific icons

Waveform Display

The waveform display provides a graphical indication of activity occurring within the displayed parameters. This feature provides a display of various waveforms simultaneously. Each waveform represents a vehicle parameter indicating measured activity in relation to time. The display is dynamically updated at the frequency of the sample interval.

To the right-hand side of the waveform is a digital read-out of that signal.

A vertical dotted line (cursor) on the screen represents the point in time displayed by the digital read-out.

This cursor may be moved by applying finger pressure to the screen in the position the cursor is required.

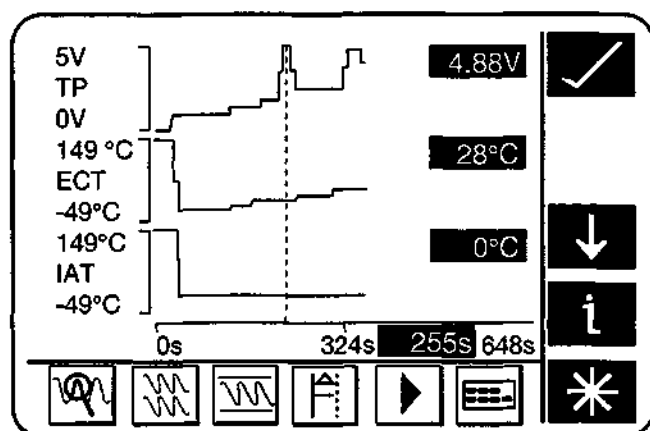
The system up or down icons can be used to scroll the waveform display up or down respectively to look at the other displayed waveforms.

System Icons

For a detailed description of each of the system icons, refer to the on-screen Dataslogger Training Programme.

DataLogger Specific Icons

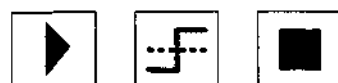
The DataLogger specific icons are those at the bottom of the screen.



DataLogger Icons

Record Icon

Press the record icon to start capturing data, a trigger icon will replace the record icon.



Press the trigger icon to instigate the manual trigger.

Once the trigger procedure has occurred, a stop icon will replace the trigger icon.

Press the stop icon to stop capturing data.

The following icons are to aid viewing / analysis.

Split Cursor Icon



The split cursor icon splits the vertical cursor into two parts.

One permanent static cursor represented by a solid vertical line in the waveform display, and one moveable cursor represented by a dotted vertical line, this is moved by applying finger pressure to the screen in the position the cursor is required.

The digital display of the waveforms will now represent the difference in levels between the two cursors and not the absolute signal level as detailed earlier.

Re-scale Vertical Icon



Normally all of the waveforms are displayed with the vertical axis representing the maximum possible variation of the signal, e.g. battery voltage 0 to 16 V.

The re-scale icon causes the waveform to scale such that the recorded variation determines the scale, this normally enlarges the vertical scale.

The scaling operation can be performed on any of the displayed waveforms by highlighting the parameter name prior to the operation.

Once auto-scaling has taken place, further manual scaling may be achieved by using the '+' and '-' system icons.

Waveform Display Number



This icon enables control of the number of waveforms displayed on the screen at any one time.

Pressing this icon causes the '+' and '-' system icons to appear. Using these system icons increase or decrease the number of displayed waveforms.

It should be noted that the more waveforms displayed the poorer the detail becomes, therefore the number of displayed waveforms should be kept to a minimum.

Horizontal Scale



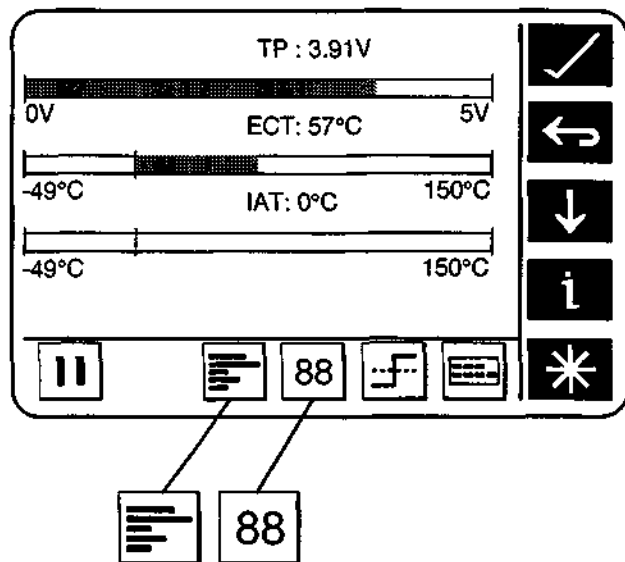
This icon performs the same function as the re-scale vertical icon only for the horizontal axis.

By expanding the scale more detail will be available, thus proving easier to analyse. However the amount of time displayed on any one screen will be reduced.

Bargraph / Digital display

Bargraph / Digital display provides another format in which to display recorded data.

The DataLogger icons operate similar to those used in the waveform display. However one new icon is provided as a toggle option from bargraph to digital display.



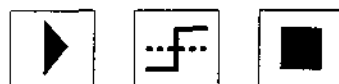
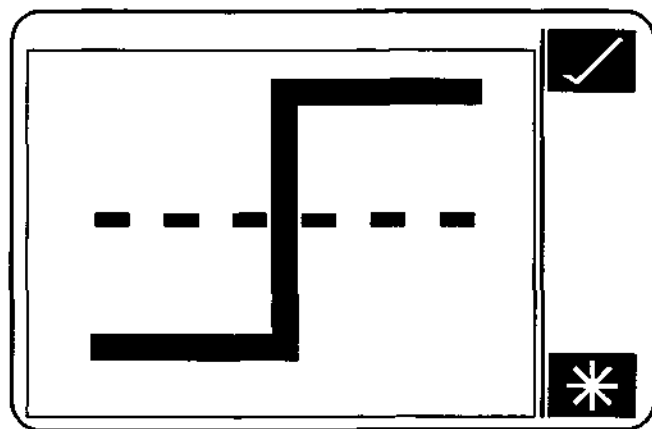
Bargraph / Digital Display

On-Road Trigger

When on-road trigger is selected using the motorway icon from the main menu a symbol is displayed over the entire screen display area.

This option is intended for use during on-road tests to ensure that the PDU screen does not distract the driver.

Press the record icon to start capturing data, a trigger icon will replace the record icon.



Datalogger Trigger Icon

Press the trigger icon to instigate the manual trigger.

Once the trigger procedure has occurred, a stop icon will replace the trigger icon. Press the stop icon to stop capturing data.

Datalogger Example

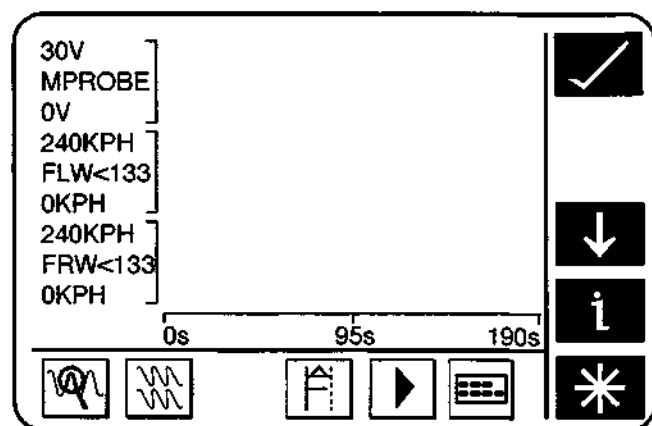
A customer reported intermittent illumination of the anti-Lock Brakes (ABS) warning lamp.

The ABS control module was interrogated, producing fault code 33 (95 MY), right-rear wheel speed sensor.

The PDU was used to check the wheel speed sensor output using the ABS warning lamp as a trigger.

The PDU was setup to the vehicle's configurations and DataLogger was accessed.

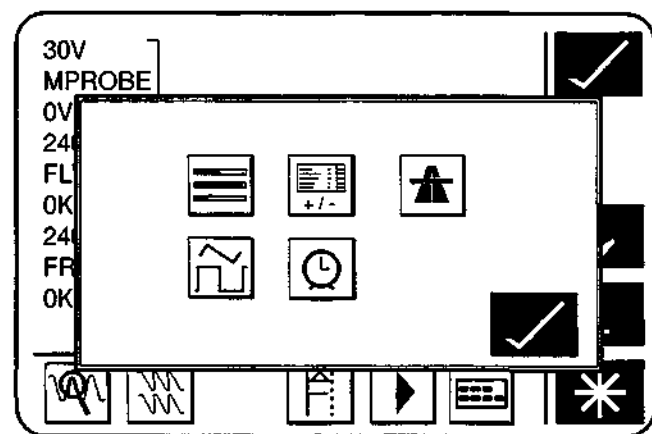
DataLogger automatically defaulted to the waveform screen.



Datalogger Waveform Screen

The main menu icon was selected to access the main menu screen.

The main menu screen is the main control screen for access to DataLogger's subsystems.

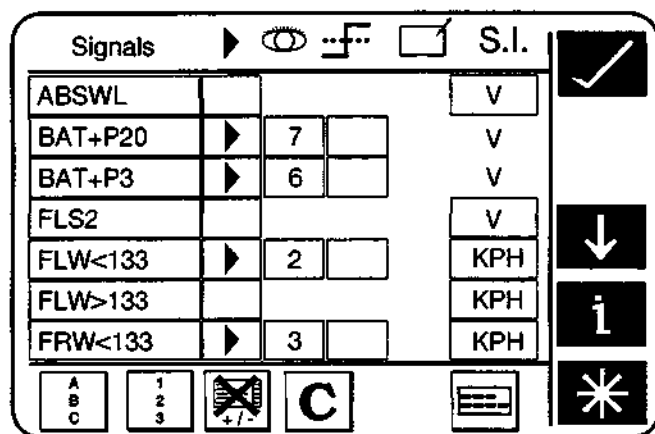


Datalogger Main Menu



The customisation icon was selected, and the selection was confirmed using the 'tick' icon.

The parameter customisation screen was then displayed.



Parameter Customisation Screen

All pre-defined parameters were cancelled using the 'C' icon, the screen was now similar to that below.

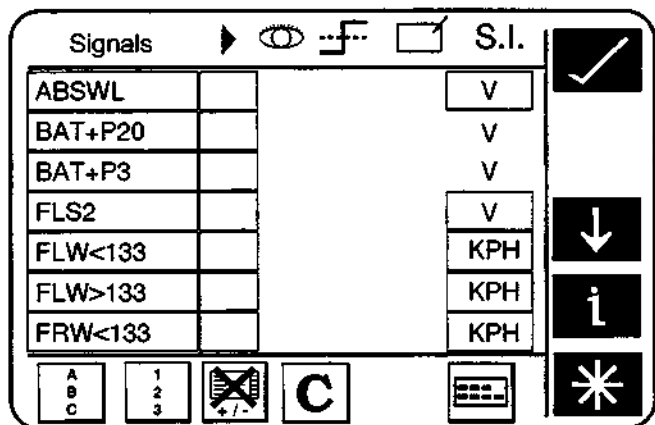


Fig. 35 Parameter Setup

The rectangle below the play icon next to 'ABSWL' (Anti-Lock Brakes System Warning Lamp) was selected to be recorded.

The rectangle below the 'eye' icon in the 'ABSWL' row was selected to be recorded.

The screen was scrolled down until 'RLW<133' was displayed.

The rectangle below the play icon in row 'RLW<133' was selected.

The rectangle below the eye icon in row 'RLW<133' was selected.

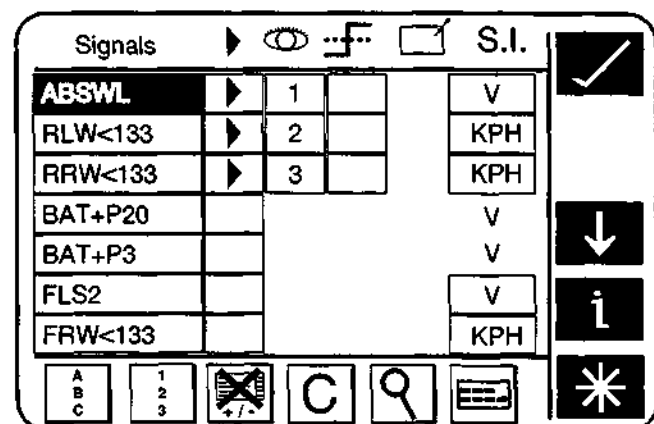
The screen was scrolled down until 'RRW<133' was displayed.

The rectangle below the play icon on row 'RRW<133' was selected.

The rectangle below the eye icon in row 'RRW<133' was selected.

1 The 're-order' icon was then selected; this places
2 the record enabled parameters at the top of the
3 parameter list in numerical order.

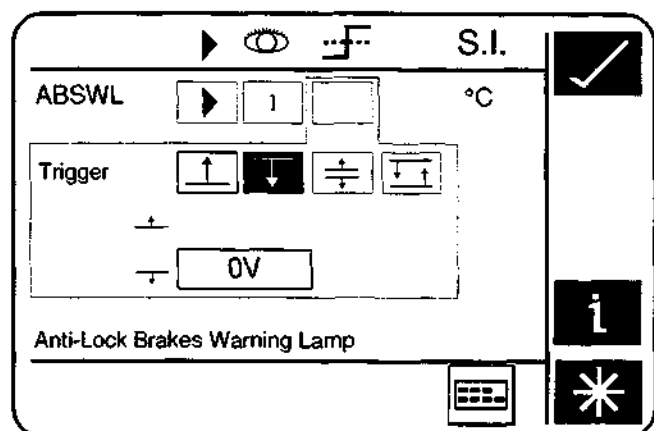
The 'ABSWL' parameter was then selected and the trigger switched on by touching the rectangle in the ABSWL line below the trigger symbol.



ABS Warning Light selection

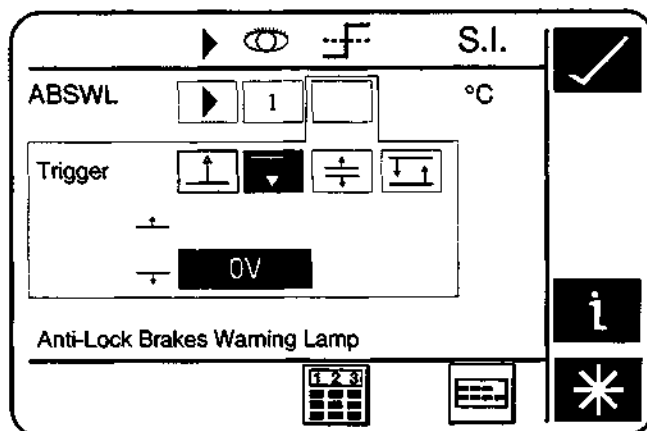
The magnifying-glass type icon was then selected to lead to the trigger customization screen.

The 'falling-edge' trigger icon was then selected. DataLogger will then trigger from the ABSWL when the signal passes below a specified value.



Falling Edge Trigger Icon

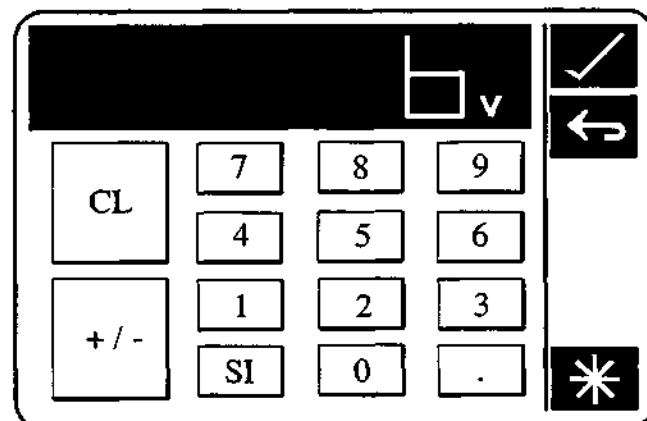
The 'OV' rectangle was then selected.



Selection of the 0V trigger point

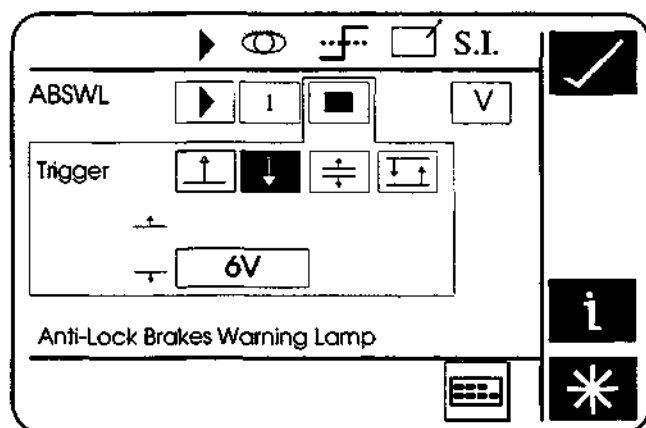
1 2 3 The calculator-style icon was then selected to alter the trigger value.

Using the calculator-style screen buttons, a threshold value of 6 Volts was entered.



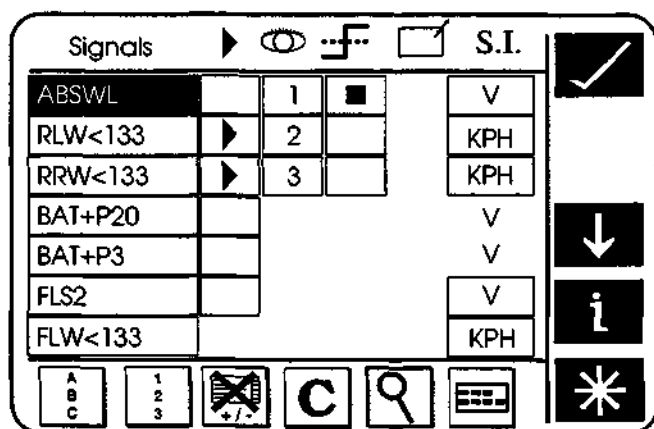
Trigger Point setting to 6V

The 'tick' icon was selected to return to the trigger screen which will then be as shown below.



The Trigger Set-Up Screen

The 'tick' icon was then selected to return to the parameter customisation screen. The screen should now look similar to that below.



Parameter Customisation - Final Setup

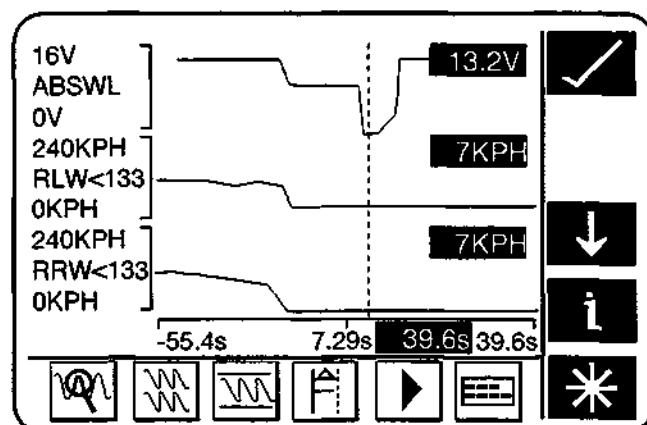
The 'tick' icon was pressed to access the waveform display.

The PDU was now ready to start recording data.

The 'record' icon was selected to start recording data.

When the fault occurred, the ABS warning lamp automatically triggered the PDU. This will place a fixed cursor on the screen and set the time base to zero. The PDU will stop recording after the preset record time. If no record time has been entered, the PDU will use its default record time of 16 minutes and 40 seconds. 8m20s pre-trigger and 8m20s post trigger.

The following figure indicates the typical waveform display for the wheel speed sensor fault. The dotted vertical line represents the trigger point.



Wheel Speed Sensor Display

Training

The training programme incorporated into the PDU software is designed to cover the needs of new users and those who have basic PDU skills but require further training on the DMM and Datalogger functions.

Select 'Training' from the PDU main menu to bring up the training menu.

New User Training

The new user training program takes the student through a structured sequence of activities to learn the meaning and use of the basic screen icons. The trainee may then work through programmed exercises to learn the digital multi-meter and then the datalogger functions.

Existing User Training Menu

In this program the existing user may select training from the following list:

- User Screen Controls
- Digital Multi-Meter
- Datalogger

OBD II Scan Tool (Not 95 MY)

The OBD II Scan Tool is designed to access the memories of the engine and transmission control units to monitor and extract data relative to emissions control.

The following types of data may be accessed:

- Current Powertrain Data
- Monitor Freeze Frame Data
- Request Trouble Codes
- Clear Trouble Codes
- Request Oxygen Sensor Test Results
- Monitor Oxygen Sensors
- Display Pending Trouble Codes
- Request On-Board Monitoring Test Results
- Examine Readiness Tests
- Malfunction Lamp Status

The data to be monitored is selected from the OBD II main menu.

For example if Monitor Freeze Frame Data is selected, the system will display up to 11 parameters which are always recorded when a fault code is logged. The parameters are as follows:

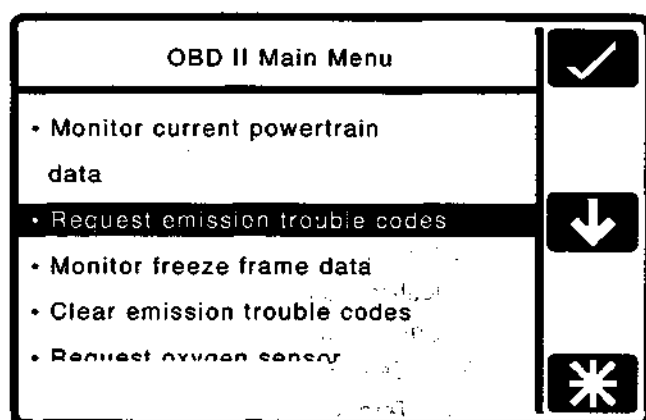
0 : SUPP	Supported
2 : FCFF	Fault Causing Freeze Frame
3 : FSS	Fuel System Status
4 : CLV	Calculated Load Value
5 : ECT	Engine Coolant Temperature
6 : STFT-B1	Short Term Fuel Trim - bank 1 (Cyl 1-3)
7 : LTFT-B1	Long Term Fuel Trim - bank 1 (Cyl 1-3)
8 : STFT-B2	Short Term Fuel Trim - bank 2 (Cyl 4-6)
9 : LTFT-B2	Long Term Fuel Trim - bank 2 (Cyl 4-6)
12 : RPM	Engine Speed
13 : VS	Vehicle Speed

Accessing Freeze Frame Data

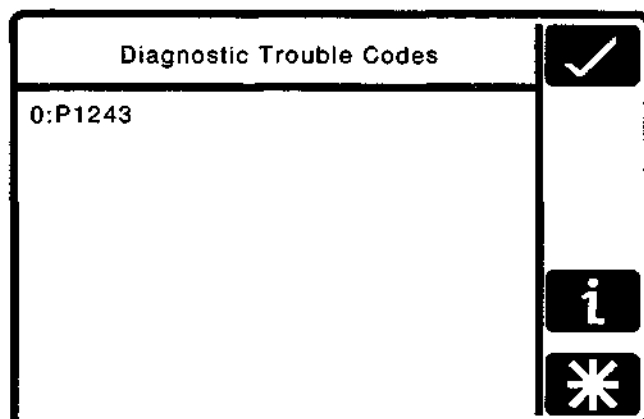
The freeze frame data is vital in analysing unresolved trouble codes. If an emissions related trouble code occurs, complete a diagnostic trouble code report form including the vehicle data, logged trouble codes and the freeze frame data. Fax a copy of the form to Aston Martin Service Operations Department who will assist in resolving the concern.

To access freeze frame data, proceed as follows:

1. Switch on the PDU and select 'Engine Diagnostics'.
2. Select 'OBD II Scan Tool'. The scan tool software will load and the 'Cable Setup' screen will appear.
3. Connect the PDU to the lower diagnostic socket using the multi protocol adaptor (MPA). Switch on the ignition. After communications are established, the OBD II Main Menu will appear.

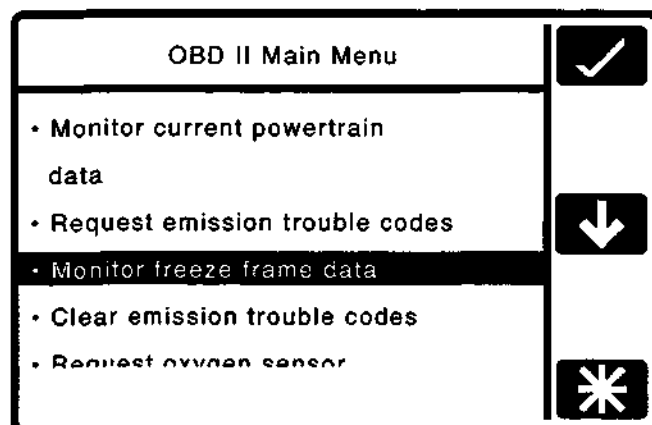


4. Select 'Request Emission Trouble Codes' and press the 'tick' icon.

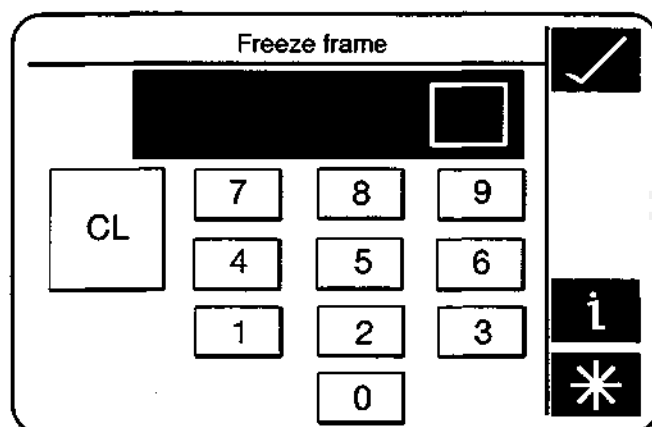


5. Any logged diagnostic trouble codes will be displayed on the screen (e.g. 0:P1243). Record both the list number (e.g. 0, 1, 2, etc) and the logged 'P' codes (e.g. P1243, etc).

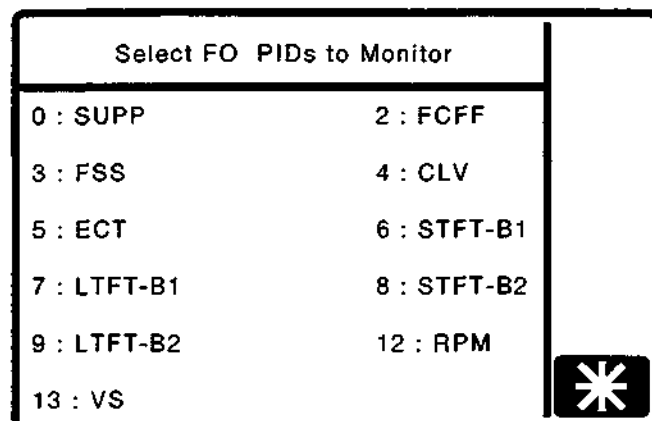
6. Press the 'tick' icon and return to the OBD II main menu.



7. Select 'Monitor Freeze Frame Data' and press the 'tick' icon.
8. The numeric keypad screen will appear. Enter the list number noted in step 5 for the fault code to be investigated and press the 'tick' icon.



9. The 'Select PIDs to Monitor' screen will appear.



10. Select all PIDS (Parameter Identifications) and press the 'tick' icon.

Select FO PIDs to Monitor	
0 : SUPP	2 : FCFF
3 : FSS	4 : CLV
5 : ECT	6 : STFT-B1
7 : LTFT-B1	8 : STFT-B2
9 : LTFT-B2	12 : RPM
13 : VS	

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11. The freeze frame data for the selected parameters will appear (Press the down arrow to scroll to the lower part of the display).

FO	SUPP	\$10 : \$7f980000
FO	FCFF	\$10 : \$1243
FO	FSS	\$10 : (#1) \$2
FO	CLV	\$10 : 28.6%
FO	ECT	\$10 : 79°C
FO	STFT-R1	\$10 : -1.5%

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FO	STFT-R1	\$10 : -1.5%
FO	LTFT-B1	\$10 : 0.0%
FO	STFT-B2	\$10 : 5.4%
FO	LTFT-B2	\$10 : 0.0%
FO	RPM	\$10 : 795r/min
FO	VS	\$10 : 0km/h

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12. Enter the freeze frame data onto the DTC Report Form together with the vehicle details and 'P' codes.

13. Select the 'asterisk' icon and return to the main PDU menu.

User Self Test

The self-test function built into the PDU software enables users to completely test the system for faulty modules and cables. By following the screen instructions, faulty system components can be identified.

Procedure

Select User Self-Test from the PDU main menu. The self-test software will load from the CD.

The first screen shows the cable setup with the PDU connected to the base station. After confirming that the connections are correct, the self-test sequence begins.

The initial test is of the PDU and base station electronics and takes slightly less than 2 minutes.

The user is then directed to connect the various external elements of the system in turn and confirm the cable setup at each stage. As each element is connected and tested, the sequence will either direct that the next element is connected or will report a fault in the last element tested.

Using this procedure, any faulty element in the system will be identified. If the self-test concludes with no fault reported, any problem encountered must be in the vehicle or as a result of incorrect use.

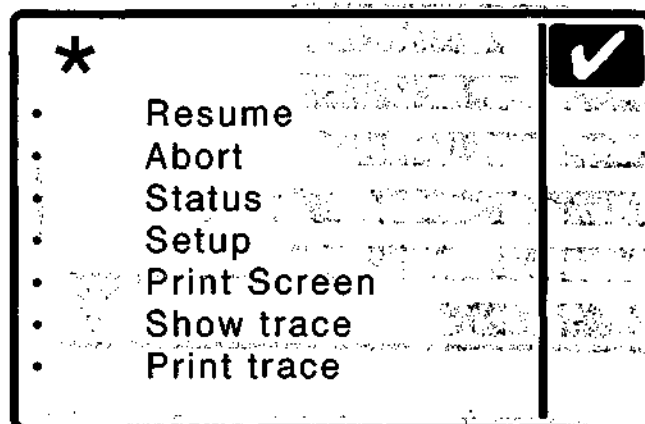
Self-Test Problems

If the self test software will not load or if unidentified problems are encountered during the self-test, go to the problem solving procedure in the PDU installation guide.

Be prepared to record any problem codes which are reported during problem solving. The Genrad Service Centre will require the problem code number to identify the correct remedial action and replacement parts.

The Asterisk (*) Icon

When available, selecting the asterisk icon will bring up the following menu of general facilities:



Resume

Return to the screen from which you selected the asterisk icon.

Abort

Return to the PDU Main Menu.

Status

Show the current software level and the application currently loaded.

Print Screen

Send the current screen display to the printer.

Show Trace

Display the current contents of the trace memory on the screen (Use the Down and Up arrows to scroll through the display if more than one screenful).

Print Trace

Send the current contents of the trace memory to the printer.

System Setup

The System Setup Menu may be accessed at any time from the asterisk (*) menu. The menu provides system configuration options for the following parameters:

Display Mode

Sets the screen to either Black on White or White on Black display

Trace Mode

Sets the trace information gathering to All the Time or Only After a Fault.

Trace Type

Sets the trace system to gather Everything or Only Test Information.

Fault Override

If fault override is OFF, the trace recording will stop when a fault occurs. With fault override set to ON, trace recording will continue after fault occurrence and show vehicle performance after the fault.

Language

Permits selection of one of the following languages:

- English
- German
- French
- Italian
- Japanese

Caution: Check that the correct language is selected. If you accidentally select and confirm the wrong language, it may be difficult to configure the system back to a familiar language.