Curriculum Training

Integrated Diagnostic System (IDS)

IDS - Introduction for new Users

E82209

JAGUAR

Technical Training

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The Integrated Diagnostic System (IDS) is being introduced to improve the diagnostic capability of dealers.

IDS represents a leap forward in diagnostic technology for current vehicles, combining the ease of use and familiarity of the previous Worldwide Diagnostic System (WDS) software with an up to date specification laptop computer.

IDS will replace the current WDS Dell based laptop diagnostic system, although it may still be used to perform diagnostic routines on earlier vehicles.

This course provides an introduction to IDS and is intended for technicians who are new to the Jaguar brand or who have no experience with using WDS software.

NOTE: The IDS software is subject to continuous development. Therefore, deviations may occur between the test procedures / scope of testing described in this brochure and the IDS.

The information contained in this Student Guide was correct at the time of printing.

During the course you will be spending time with people from other dealerships that you may not know. Your Program Manager will ask you to introduce yourself to the rest of the delegates to enable you and them to get to know each other. You may like to make a note of their names and details for your reference.

Please remember that our training literature has been prepared for TRAINING PURPOSES only. Repairs and adjustments MUST always be carried out according to the instructions and specifications in the workshop literature. Please make full use of the training offered by Technical Training to gain extensive knowledge of both theory and practice.

Lesson 4 – System and User Settings

Lesson 5 – Working with IDS

Lesson 6 – Diagnostic and Test Routines

Lesson 7 – Datalogger

Workshop safety

This page highlights the general observations expected whilst attending this training programme, and its continuation upon returning to your place of work.

General

Whilst working on all vehicles, the following items where available should always be used:

- Wing covers
- Seat covers
- Floor protection

Optional items:

- Steering wheel cover
- Park brake lever cover
- Door grab handle protection

Safety

All precautions must be taken and observed at all times, to prevent injury or damage to the following:

- Yourself
- Customer's property
- Workshop equipment
- Work place colleagues

Operating guidelines

Whilst using any piece of workshop equipment:

The manufacturer's guidelines and warning labels must be followed.

This will ensure correct use and application at all times.

Seek the necessary advice or training where equipment usage is unclear.

Chemicals, Oils and Solvents

Follow all manufacturer's warnings and labels, also take into account local disposal regulations when working with chemicals, oils or solvents.

Ensure that all risks are completely minimised.

Make sure that all protective items of clothing are worn where required e.g.

- Eye protection
- Gloves
- Overalls
- Footwear

System capping

Upon disconnecting components from a system, take all precautions necessary to prevent system contamination or environmental leakage.

Fit relevant plugs or caps i.e. to pipes, unions and component orifices etc.

Updates

Keep abreast of all relevant changes that effect your role within the dealership, by monitoring all factory issued documentation.

Driving

Operating vehicle features, such as ICE, mobile phones and CD player equipment etc., can cause a momentary distraction whilst driving.

Follow all road traffic regulations as written in the Highway Code, when operating vehicle systems or using diagnostic equipment whilst on the move.

Mobile diagnostic equipment operation, may require the use of an assistant.

Overall Objectives

At the end of this training course the delegates will be able to:

- Recognize IDS hardware
- State the specification of the IDS laptop computer
- Describe the features of IDS
- Recognize the Diagnostic software installation procedure
- Describe the features of the IDS work station
- Switch on IDS and navigate through the menus
- Set Dealer Information
- Add and delete users
- Change user preferences
- Dock and undock IDS from the work station
- Use IDS in 'Laptop' and 'Tablet' mode
- Recognise the VCM driver download procedure
- Read and clear Diagnostic Trouble Codes (DTCs)
- Use IDS to carry out Diagnostic procedures
- Use Datalogger to monitor system signals
- Use the Output State Control (OSC) function of datalogger
- Upload and view Car Configuration Files (CCF)
- Use a USB mass storage device to store and transfer data
- Recognize the procedure for obtaining technical support for IDS
- Recognize the battery recalibration procedure

Notes

On completing this lesson, you will be able to:

- State the specifications of the IDS Toughbook Laptop computer
- Recognize the various IDS kit options

Acronyms and Abbreviations

The following acronyms and abbreviation have been used in the workbook

- CCF - Car Configuration File
- CD - Compact Disc
- CDROM - Compact Disc Read Only Memory
- CDRW - Compact Disc ReWritable
- CPU - Central Processing Unit
- DDR - Double Data Rate
- DLC - Data Link Connector / Diagnostic Link Connector
- DMM - Digital Multimeter
- DTC - Diagnostic Trouble Code
- DVD - Digital Versatile Disc
- EOBD - European On Board Diagnostics
- Gb - Gigabyte
- GTR - Global Technical Reference
- IDS - Integrated Diagnostic System
- LAN - Local Area Network
- LCD - Liquid Crystal Display
- Mb - Megabyte
- MY - Model Year
- OBD - On Board Diagnostics
- OSC - Output State Control
- PCMCIA - Personal Computer Memory Card International Association
- PTU - Portable Test Unit
- RAM - Random Access Memory
- ROM - Read Only Memory
- SD - Secure Digital
- SDRAM - Synchronous Dynamic Random Access Memory
- TSD - Touch Screen Display
- USB - Universal Serial Bus
- VVA - Vehicle Vibration Analyser
- VCM - Vehicle communication Module
- VIN - Vehicle Identification Number
- VMM - Vehicle Measurement Module
- WDS - Worldwide Diagnostic System

IDS Specification

IDS

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Specification

IDS Component Specification

Component	Specification
Processor	Intel® Centrino® Processor 1.2GHz
RAM	512Mb (Megabytes)
Screen	10.4" (visible) anti reflective Touch Screen Display (TSD) LCD colour screen (1024x768 resolution)
Hard Drive	60Gb (Gigabytes) - minimum

Component	Specification
DVD /CDRW	External DVD reader /CD writer
Operating system	Microsoft® Windows® XP Professional service pack 2
Other	Supports Bluetooth® Wireless connectivity Internal 10/100 Ethernet LAN and 56Mb internal Modem 2 x USB ports - Expand to 5 when connected to the work station Secure Digital (SD) card slot Tough construction which will withstand a fall from 1.3m at any angle

Comparing IDS to the WDS PTU, the IDS computer has a much higher specification with significantly improved performance. IDS will also be used by other vehicle manufacturing brands, although software applications will be specific to the respective vehicle brand.

The vehicle Communications Module (VCM) is used to allow IDS to communicate with the vehicles.

IDS will provide diagnostic support for all Jaguar vehicles from 1995 model year. This ensures that all models from 1995 to future models is assured.

IDS is supported by a portable work station which provides the facility to store IDS and associated hardware.

Diagnostic Capabilities

IDS diagnostic capabilities include:

- EOBD compliant
- OBDII compliant
- Full automotive diagnostics
- Full automotive configuration
- Full automotive tune update capabilities
- IDS diagnostic self test (applicable with VMM -not currently applicable to Land Rover)

IDS uses WDS style diagnostic routines, the look and operation of which are very familiar to experienced technicians.

IDS laptops will have the relevant operating system software loaded, prior to being dispatched to the dealerships. This will make sure that all IDS laptop computers will all have the correct operating software and be configured correctly.

The diagnostic systems application software will be loaded at the dealership.

NOTE: The diagnostic software is loaded onto the hard drive of the IDS laptop computer and therefore it is not necessary to leave any of the discs in the DVD drive. The software discs should be removed from the DVD drive once the software has been loaded since the auto run command may cause the application software to be reloaded each time the IDS is switched on.

Future application software releases will be distributed to dealers when they become available.

If any software enhancements are required prior to the next software release being distributed, they will continue to be released as Patch files, which may be downloaded from GTR.

NOTE: Patch files are only made available to correct a known concern and are Vehicle Identification Number (VIN) related.

IDS Kits

There are several versions of the IDS system kits available.

Details of available IDS kits are listed in policy letters:

- JHSC579 (UK)
- JHSC569 (UK)
- JOSC426 (Export)
- JOSC440 (Export)

Upgrade kits are also available to allow joint Jaguar and Land Rover dealers to support diagnostics for both brands. Refer to policy letters for further information.

IDS Kit Summary

Part Number	Description	Kit Description	Kit Contents
JAG-IDS-1	IDS - Full system	New full kit	Includes all IDS diagnostic system components
JAG-IDS-Mob	IDS mobile kit	New full mobile kit	Includes the IDS diagnostic system components but without the work station or VMM
JAG-IDS-2	IDS mobile - work station upgrade kit	work station	work station
JAG-IDS-3	IDS PDI kit	IDS mobile kit with work station	IDS mobile kit with work station (VMM not included)

Notes

On completing this lesson, you will be able to:

- Recognize IDS hardware
- Describe the features of IDS
- Switch IDS on and off
- Recognize the VCM driver download procedure
- Dock and undock IDS from the work station
- Use IDS in 'Laptop' and 'Tablet' mode

IDS Laptop Computer

IDS Laptop Computer

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IDS represents a leap forward in diagnostic technology for our vehicles, combining the ease of use and familiarity of the previous PTU/WDS software with a high specification laptop computer.

IDS is being introduced to improve the diagnostic capability of Jaguar dealers and it will supersede the current Dell laptop based diagnostic equipment.

The IDS uses a standard Panasonic Toughbook laptop computer which has been specifically designed to operate in workshop conditions.

Using a standard laptop computer provides a much higher level of processing power coupled with a substantial reduction in capital costs.

The unit itself has an Intel® Centrino® 1.2GHz processor with 512MB DDR SDRAM (Double Data Rate Synchronous Dynamic Random Access Memory) and a 60 Gb hard drive.

DDR effectively doubles the processor's data transfer capacity. SDRAM allows the processor to synchronize itself with the operating system Central Processing Unit (CPU) bus. The result is a much faster performance compared to previous systems which do not have this ability.

An external DVD / CDRW drive is provided to allow software updates and storage of data onto disc. The DVD / CDRW drive is connected through a USB port.

DVD Drive

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IDS is supported by a new portable work station together with additional hardware in order to provide a complete diagnostic system.

Work station

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The VCM allows IDS to communicate with the vehicle.

VCM

E68232

The Vehicle Measurement Module (VMM) provides the enables the multimeter and oscilloscope function of IDS to be used.

VMM

E71399

VMM Test Adaptor

E68243

An accessory socket power supply is available to allow IDS to be powered from a vehicle's accessory socket.

Accessory Socket Power Supply (Optional)

E79290

A Universal Serial Bus (USB) drive supplied to allow the transfer and storage of files from IDS

USB Drive

E78955

The following items will also be included with the IDS kit:

1 Supplementary test leads
2 Current probe (50 Amp)
3 Adaptor probes
4 Black measurement probe
5 Red measurement probe
6 Battery adaptor lead
7 Mains power supply lead
8 Vehicle diagnostic cable
9 Mains power supply transformer
10 Ether net connection (x 2). One to VCM and one to VMM
11 TSD cleaning cloth
12 LAN connection cable
13 IDS carrying strap

IDS Power Supplies

IDS may be powered from its internal battery or from an external power supply.

There are two types of external power supply:

- Mains power supply
  - The IDS work station has its own built in DC transformer to convert mains power to the required voltage for IDS. When the IDS is docked to the work station it is automatically connected to the mains power supply transformer
- Accessory socket power supply (optional) - For use when 'going mobile' with IDS and using the vehicle battery as a power source

When 'going mobile' with IDS, the mains power supply transformer may also be used by connecting it to IDS using the power supply socket located at the left hand side of the laptop computer.

When IDS is switched on, the green power Light Emitting Diode (LED) is illuminated on the front panel of the laptop computer.

Internal Battery


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The IDS internal lithium battery is located at the right hand side of the laptop computer.

Battery Location

E68234

1 Battery

When IDS is powered from the internal battery, a battery symbol is shown on the task bar. If the curser is positioned on the battery, the condition of the battery is displayed together with the estimated operating time remaining.

An LED located on the front of the laptop computer also provides a visual indication of the battery status. The battery LED will be illuminated amber when the battery condition falls below 95% charged, providing the unit is connected to an external power supply.

The LED will be green when IDS is powered from an external power supply, providing the internal battery is greater than approximately 95% fully charged. When IDS is powered from an external power supply, charging of the internal battery will automatically take place once the battery condition falls below 95% fully charged. When charging of the internal battery is taking place, the LED will be amber.

Charging of the battery will automatically be carried out when connected to an external power supply, regardless of whether the IDS is switched on or off. The battery will be charged more quickly when IDS is switched off.

The battery LED will be red when the battery condition is approximately 9% or less that of a fully charged condition.

The IDS laptop will operate for approximately four hours from a fully charged battery in good condition.

Battery charging

The battery life may deteriorate each time it is charged. Charging the battery only when it has become completely discharged will reduce the number of charge cycles and thus extend battery life.

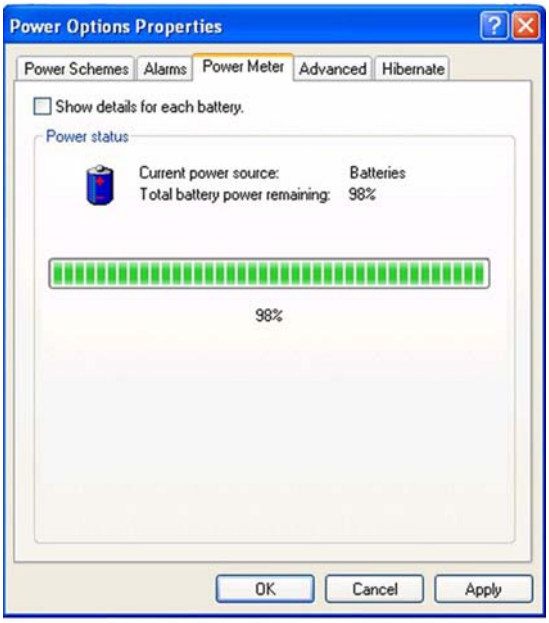
Do not repeatedly charge the battery before it is discharged.

To help reduce the number of charge cycles, the battery can only be recharged when the remaining power is less than 95% of its capacity.

The battery will not charge when it is outside its temperature range of 10°C to 30°C, (50° to 86°F). If the battery is outside of this temperature range, the battery indicator lamp will flash orange and charging will not begin.

The condition of the internal battery may be viewed in the power management properties by selecting the power metre tab. The current power source and the percentage of battery power remaining will be displayed.

Battery Power Display



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The battery condition may also be displayed by selecting **Fn + F9**.

Battery Power Display

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To assist in prolonging the operating time of the IDS when running from the internal battery, the power management function of the IDS has been set by the factory.

IDS has been configured to warn the operator if the battery is low by displaying a message and an audible alarm.

NOTE: The power options properties have been set at the factory for optimum performance and should not be changed.

For additional information on the power management settings, refer to the Appendix section of this workbook.

Battery Calibration

As the battery deteriorates the remaining battery capacity may not be displayed accurately. In this situation, it may be necessary to carry out the battery recalibration procedure. For additional information on the battery calibration procedure, refer to the Maintenance section of this workbook.

IDS Work Station

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The IDS work station provides a secure and safe storage facility for the IDS laptop and associated hardware. It also allows IDS to be charged from a mains power supply.

The IDS docking station is located beneath the lid of the work station and contains a security lock to prevent the release latch from being operated when it is locked.

The front drawers and lower compartments of the work station allow for storage of cables and test lead adaptors. The inside of the front door of the work station allows release notes and diagnostic application software discs to be stored.

The top drawer on the side of the work station provides the facility to hold two standard sized drinking cups and a compartment for storing documents. When the drawer is open and the document compartment lid is closed, it provides a surface which may be used to display or write on documents, such as job cards or circuit diagrams etc.

The first drawer on the right hand side of the work station contains the VMM. The second drawer on the right hand side on the work station is not used for Jaguar applications.

All of the drawers are prevented from opening when the work station lid is locked in the closed position.

The work station is easily moved on the four castors. The two front castors have a brake facility to prevent the work station from moving when desired.

The base of the work station has a hole formed in it which may be used to tether the work station to a suitable anchor point in the workshop if desired.

Vehicle Communication Module (VCM)

VCM

E68232

The Vehicle Communication Module (VCM) is a high performance, rugged, vehicle serial communications gateway. This device provides multiple vehicle serial communication interfaces between the vehicle and IDS to meet future diagnostic requirements of Jaguar vehicles.

The VCM unit is housed in a magnesium casing which also has a tough protective plastic cover. The VCM is located behind the docking station of the IDS work station. It is attached to the bracket of the IDS work station by locating lugs sliding into 'key holes' of the bracket. The VCM is easily removed from the bracket when required.

VCM Location

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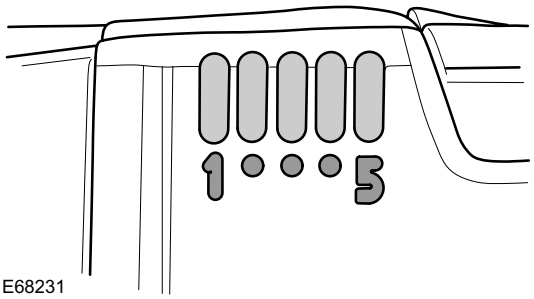
Care should be taken when removing the VCM from the work station in order to prevent damage to the cables and connections.

The VCM features five LED's which are used to indicate the status of the VCM. Three sockets are provided for external connections. Two of the sockets allow connection to IDS and to the vehicle. The third socket is to allow for an input from a 12V DC power supply, but this is not currently used in our application.

VCM LED Indicators

The five LED indicators are visible through the plastic cover of the VCM and allows the user to visually observe the operation of the VCM.



E68231

VCM LED's

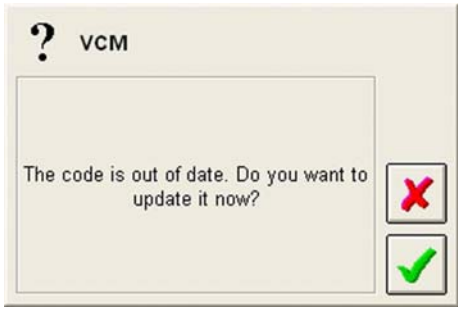
LED	Colour	Purpose
1	Amber	Vehicle link
2	Green	VCM operating
3	Red	Power supply
4	Green	Flash memory access
5	Amber	Host Link (To IDS)

VCM Driver Software

In order to make sure that the VCM is able to communicate with IDS, it is necessary to download the latest driver software to the VCM. Each time that the VCM is connected to IDS and the VCM is powered up, IDS will check the software version of the VCM. If the software of the VCM is an earlier version to that which

is available from IDS, a message will be displayed stating that a later version is available and asking the operator if the user wishes to update the VCM now.

VCM Code Out Of Date



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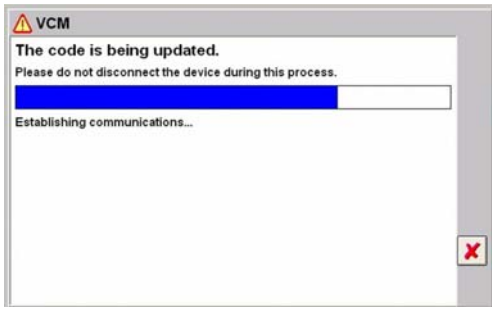
This action will be carried out whenever a later driver software is available, following an IDS software update. Always answer **yes** by selecting the acknowledgment tick, whenever the VCM code is out of date.

Downloading the latest VCM driver software will only take a short time, approximately 90 seconds, to complete.

VCM Driver Update



E78949

Once the software has been downloaded to the VCM, diagnostics with the vehicle may be carried out as normal.

⚠ **CAUTION: Do not switch off IDS or disconnect the VCM during a software download. Failure to follow this instruction may cause damage to the VCM or may cause communication errors when attempting to diagnose vehicle faults.**

NOTE: A VCM software download is only carried out when a later software version is available following an IDS software update.

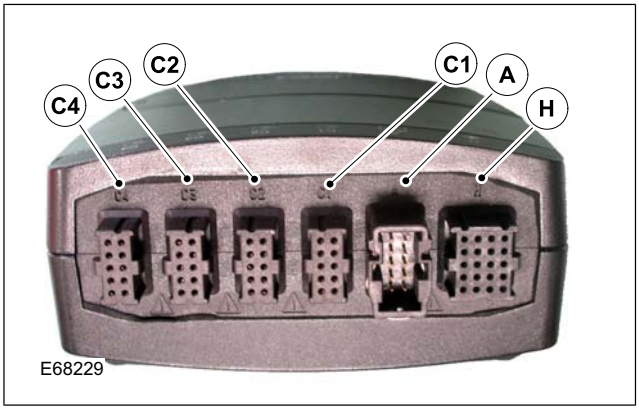
Vehicle Measurement Module (VMM)

VMM

The Vehicle Measurement Module (VMM) is located in the first drawer on the side of the IDS work station. One end of the VMM cable is connected to the IDS expansion port using a USB connection, while the other end of the cable is connected to the **H** (Host) connection of the VMM.

The remainder of the connections at the top of the VMM allow connection to the measurement probes etc and are very similar to those already seen on the WDS PTU.

VMM connections



H Host - Connection to IDS

A Connection to battery reference lead

C1 Connection to red measurement probe

C2 Connection to black measurement probe

C3 Connection to VVA sensor (black lead)

C4 Connection to propshaft (driveshaft) balancer sensor (blue lead)

New measurement probes are provided to fit the connections of the VMM. The red and black probes will operate in the same way as those already used on WDS PTU. However the new red probe features an LED to illuminate the area which is being probed.

CONFIRM WHEN THIS WILL BE IMPLIMENTED AND WHEN AVAILABLE

The battery reference lead must be connected to the vehicle battery when the VMM is in use, since the VMM is not powered from the IDS laptop computer.

Red measurement probe

The VMM is required in order to allow IDS to carry out electrical measurements on the vehicle. The VMM carries out the electrical measurements and then encodes it into a format which the IDS laptop can understand.

The Vehicle Vibration Analyser (VVA) connections on the VMM have also changed when compared to those on the PTU. Two adaptor leads are provided to allow connection to the VVA tester leads.

VVA and Propshaft Balancer Adaptor Leads

E71398

The drawer must be open to allow connection of the leads to the VMM. A bracket is provided to prevent strain on the leads at the connection with the VMM. When the VMM is in use it will become warm, which is quite normal. Connection of the measurement probes etc, prevent the drawer from being closed. This has been specifically designed in this way to assist with cooling of the VMM, reducing the possibility of it from overheating.

A hinged bracket is installed to the VMM drawer to prevent the VMM cables connections from being subject to undue strain. The bracket should be positioned to allow the cables to be routed over the top of it when the VMM is in use. This will prevent the cables from 'pulling' on the connections and reduce the risk of the cables or connections from becoming damaged during use.

The VMM unit has four LED status indicators that are visible through the LED identity label. The LED status indicators allow the user to visually observe the operation of the VMM.

VMM Status LED's

E68230

VMM LED's

LED	Colour	Purpose
1	Green	Heart beat and under / over temperature
2	Red	Power /Power on self test
3	Green	Critical access
4	Amber	Host Link activity

VMM LED Operation

VMM LED Description

LED	Colour	Status	Description
1	Green	Flashes once per second	VMM running normally
1	Green	Flashes regularly every two seconds with all other LED's unlit	VMM is in warm up mode, following storage at temperatures below 0°C (32°F)
1	Green	Flashes rapidly at approxim-ately five times per second	VMM is shut down due to over temperature

LED	Colour	Status	Description
2	Red	Flashing	Indicates a boot failure code following a Power On Self Test (POST) The POST is carried out each time the VMM is powered up
2	Red	On permanently	No faults are present following the POST
3	Green	Flashing	Critical VMM activity such as when carrying out a flash memory access. This is when new software is being down-loaded into the VMM
4	Amber	Flashing	Indicates activity between the IDS laptop and the VMM

VMM Driver Software

In order to make sure that the VMM is able to communicate with IDS, it is necessary to download the latest driver software to the VMM. Each time that the VMM is connected to IDS and the VMM is powered up, IDS will check the software version of the VMM, in a similar way to which the VCM driver software is checked.

A message will be displayed if the VMM driver software is out of date.

The driver software download procedure is carried out in a similar way to that of the VCM driver software download procedure.

This action will be carried out whenever a later driver software is available, following an IDS software update. Always answer **yes** by selecting the acknowledgment tick, whenever the VMM code is out of date.

Downloading the latest VMM driver software will only take a short time, approximately 90 seconds, to complete.

Once the software has been downloaded to the VMM is ready for use.

CAUTIONS:

⚠ **Do not switch off IDS or disconnect the VMM during a software download. Failure to follow this instruction may cause damage to the VMM.**

⚠ **The VMM power lead must not be removed when LED 3 is flashing. Failure to follow this instruction may cause irreversible damage to the VMM.**

During normal use LED 3 will be off. It is unlikely that LED 3 will be observed operating.

CHECK WITH STEVE IF THIS HAS CHANGED??

NOTE: A VMM software download is only carried out when a later software version is available following an IDS software update.

IDS Laptop features:

IDS features Bluetooth® connectivity and also wireless LAN. (This will vary between markets). The Bluetooth® and wireless LAN antennas are located in the casing of the lid around the TSD.

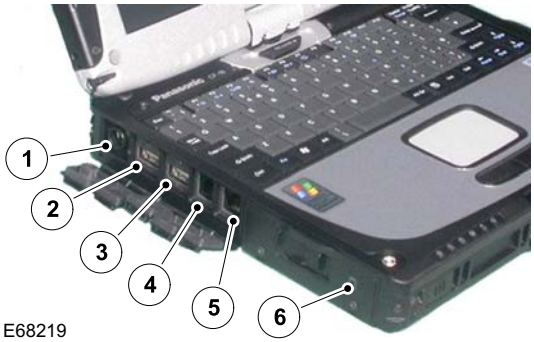
There are two wireless LAN antennas, one at each side of the lid of the TSD.

There is one Bluetooth® antenna located at the top of the lid of the TSD.

NOTE: Bluetooth® is not licensed in all markets.

A number of connections are provided to allow connection to other devices.

LHS of IDS Laptop Computer



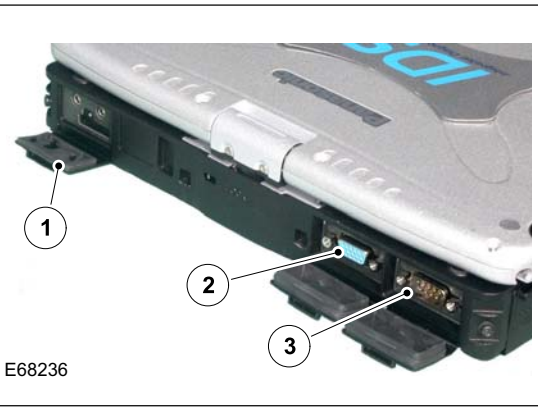
1 DC power supply socket
2 USB port
3 USB port
4 Modem connection socket
5 Local Area Network (LAN) connection socket
6 Secure Digital (SD) and Personal Computer Memory Card International Association (PCMCIA) card slot

SD and PCMCIA card Slot

RHS of IDS Laptop Computer

1 Battery
2 Hard Drive

Rear of IDS Laptop Computer



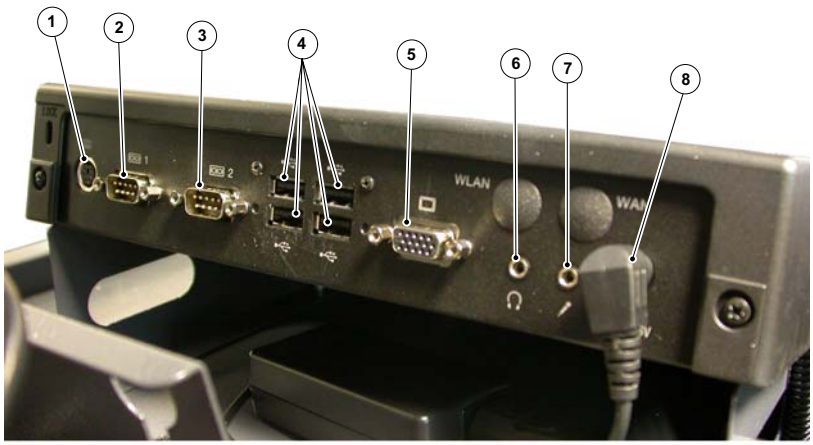
1 Microphone and headphone socket connections
2 External display port
3 Serial port

The identification serial numbers, replicator port connection and speaker are located on the underside of IDS.

Underside of IDS Laptop Computer

1 Replicator port and cover
2 Speaker
3 Operating system serial number
4 IDS laptop computer serial number

Connections at Rear of IDS Docking Station



1 Keyboard connection
2 External display port 1
3 External display port 2
4 USB connections
5 Serial port
6 Headphone connection
7 Microphone connection
8 12V DC in Connection

The USB connections of the docking station are used to connect the following components:

- DVD drive (External)
- VCM
- VMM

The third and fourth USB ports may be used in the future.

NOTE: It does not matter which USB connection ports are used since the connection will automatically be recognized by IDS.

The following features are located on the front of the IDS laptop computer:

- Power switch
- LED indicators
- Lid latch
- Tablet buttons

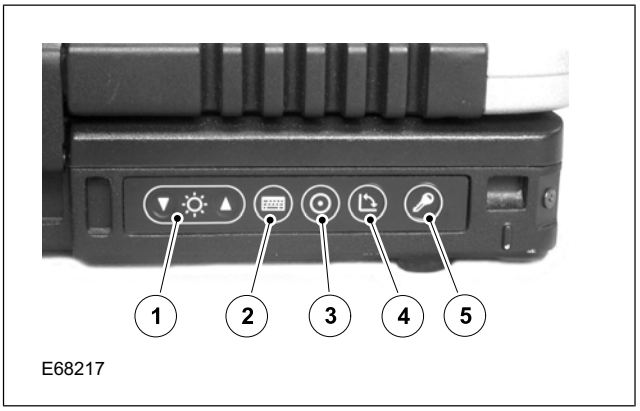
Power Switch

The power switch is located at the front of IDS.

Power switch

Tablet Buttons

The tablet buttons located at the front of IDS are for use when IDS is being used in Tablet Mode.



1 TSD brightness control

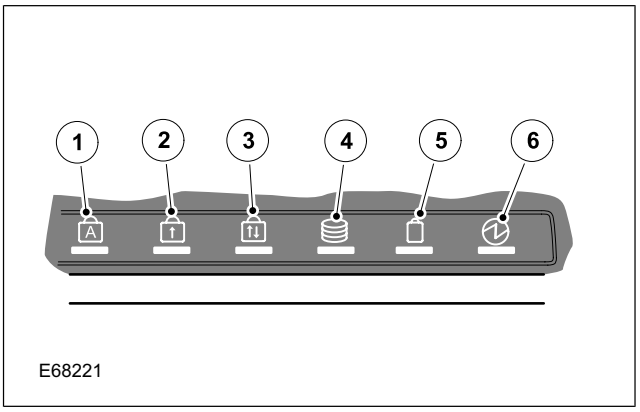
2 Software keyboard

3 Enter

4 Display rotation

5 Security

LED Indicators



1 Caps lock

2 NumLk

3 ScrLk

4 Hard disc drive status

5 Battery status

6 Power status

The LED indicators are located at the front of IDS.

LED indicator definitions

LED	Function	Definition
1	Caps lock	Green - Indicates when caps lock is active. Non shifted input is capitalized
2	NumLk (Numeric key)	Green - Indicates when numeric key lock is active. Causes some of the keyboard to perform as numeric keys
3	ScrLk (Scroll lock)	Green - Indicates when **Fn + ScrLk** are pressed. Scroll lock functions differently depending upon the application
4	Hard disc drive status	This illuminates to indicate when the hard drive is being accessed
5	Battery status	Not lit - Battery not connected or charging not being carried out Green - Connected to external power supply with battery over 95% of its full capacity (fully charged) Green (Flashing) - IDS in high temperature mode and battery is discharging to 80% of capacity Amber - Battery charging Amber (Flashing) - Battery cannot be recharged temporarily due to high internal temperature of battery Red - Battery level very low, 9% or less Red (flashing) - Fault with battery or charging not operating correctly Green and Amber (Flashing alternately) Warming up the system to prevent hard disc drive damage
6	Power status	Not lit - Power off or Hibernation mode Flashing once every 3 seconds - Standby mode

DVD Drive

The DVD ROM drive is located behind the front upper door of the IDS work station. It is an external drive and is connected to IDS using a USB connection.

The DVD drive lid is opened by spring pressure after operating the release catch located on the lid, providing IDS is switched on with the DVD drive connected. The DVD drive is powered up from IDS. An LED on the DVD drive is illuminated, when it is powered up.

The DVD drive lid may be opened when it is not powered up by operating the manual release catch located on the underside the DVD drive.

DVD Drive

E68247

Software is loaded from the software disc onto the hard drive of IDS. This allows IDS to operate when the DVD drive is not connected.

Once the software has been loaded onto IDS, the disc should be removed from the DVD drive and stored for future reference.

Touch Screen Display (TSD)

The IDS computer features a TSD. This allows the user to touch the screen in order to make a selection and initiate a command. Using the TSD is a more convenient method of operating IDS when compared to using the touch pad or a computer mouse.

A protective membrane is fitted to the screen to reduce the risk of damage which may occur during use. The TSD should be operated by touching it in the desired position using a finger or the stylus provided. Sharp or hard implements must not be used to operate the TSD.

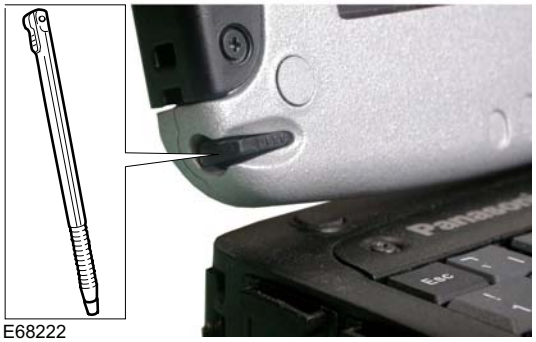
A calibration procedure is available to make sure that IDS recognizes the exact position that the TSD is contacted. It may be necessary to carry out the TSD calibration procedure after loading new software. Details of the calibration procedure are shown in the 'Working with IDS' section of the workbook.

⚠ **CAUTION: Do not use sharp implements or excessive pressure to operate the TSD. Failure to follow this instruction may cause damage to the TSD.**

Stylus

A stylus for operating the TSD is neatly stowed in the lid of IDS and may be tethered to IDS using the tether cord provided.

Stylus Location



E68222

Operating IDS

The IDS unit is based around a standard laptop computer which makes user interface very simple and is familiar to anyone who has used a personal computer. The IDS software has a similar appearance to that of the PTU/WDS software which will already be familiar to experienced Jaguar technicians.

The TSD has a protective membrane covering the screen to reduce the risk of surface damage during use.

The screen only requires light pressure from the stylus or finger tip in order to operate IDS.

Stylus

⚠ **CAUTION: Do not use excess pressure or sharp implements to operate the screen. Failure to follow this instruction may cause damage to the screen.**

IDS may be operated while it is either docked to the work station or removed from it.

When IDS is used with the TSD open, like a conventional laptop computer, it is referred to as 'Laptop' mode.

Laptop mode

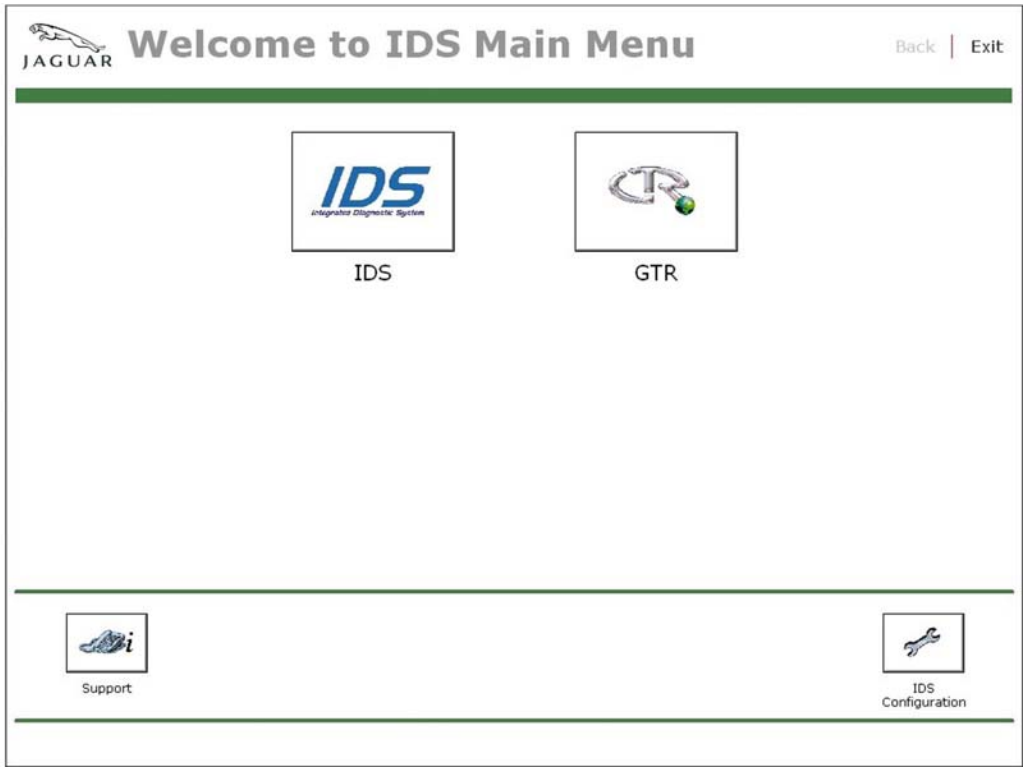
Tablet mode

IDS has the facility to reverse the lid so that the TSD is accessible with the lid in the closed position. When IDS is used in this manner, it is referred to as **Tablet mode**.

Starting Up and Shutting Down

Open the lid of the IDS, unless it is being used in tablet mode. To switch on IDS, slide the power switch to the right and hold it for approximately one second, until the indicator is illuminated, before releasing it. The laptop will power up and will automatically open the 'Welcome to IDS main menu' screen.

IDS Main Menu



E70882

IDS Power Switch

E68220

NOTE: In cold conditions, IDS may display **'Warming up system'** when starting up, or the battery indicator may flash alternately amber and green. This indicates that IDS is warming up and will not start up until a suitable temperature has been reached. This may take up to 25 minutes and is normal and does not indicate a fault.

To shut down IDS, exit the IDS diagnostic software application by selecting the white cross in the red box at the top RH corner of the screen. The 'welcome to IDS main menu' screen will be displayed. Select 'Exit' and IDS will shut down after a short time.

Tablet Mode

To use IDS in tablet mode, release the latch and open the lid. Slide the latch to the right and rotate the TSD in a clockwise direction, as shown in the following illustration.

TSD rotation release latch

E68240

Rotate the screen 180° before closing it and then securing it in the closed position. The IDS is now in tablet mode.

Tablet Mode

E68225

When changing to tablet mode, the TSD image will automatically be orientated to display in the same dimension as it was previously. This will prevent the image from now appearing upside down to the user. The orientation of the image may also be changed using the tablet rotation button. Each press of the tablet rotation button will rotate the image 180°.

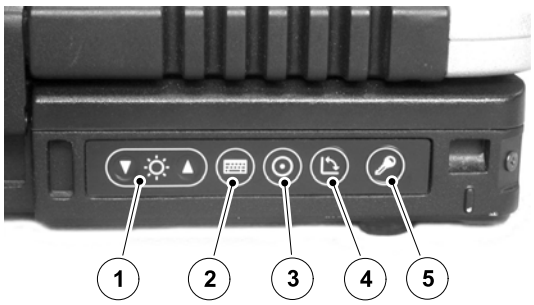
If preferred, a software keyboard can be used if keyboard operation is required when using IDS in tablet mode.

Software keyboard

E68244

To access the keyboard, press the keyboard tablet button.

Tablet Buttons



E68217

2 Software keyboard button

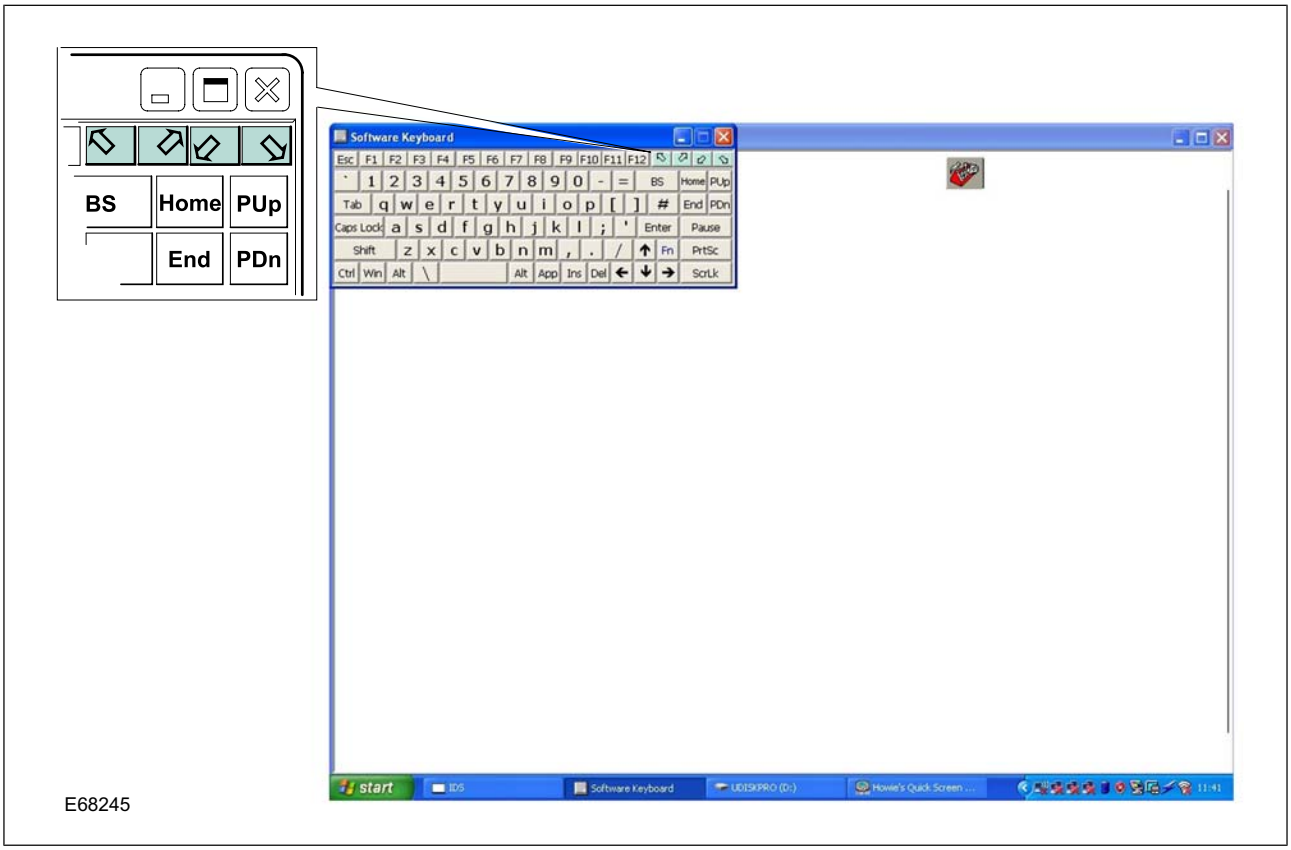
When using the software keyboard it is recommended that the stylus is used to operate the keys.

Stylus

E68223

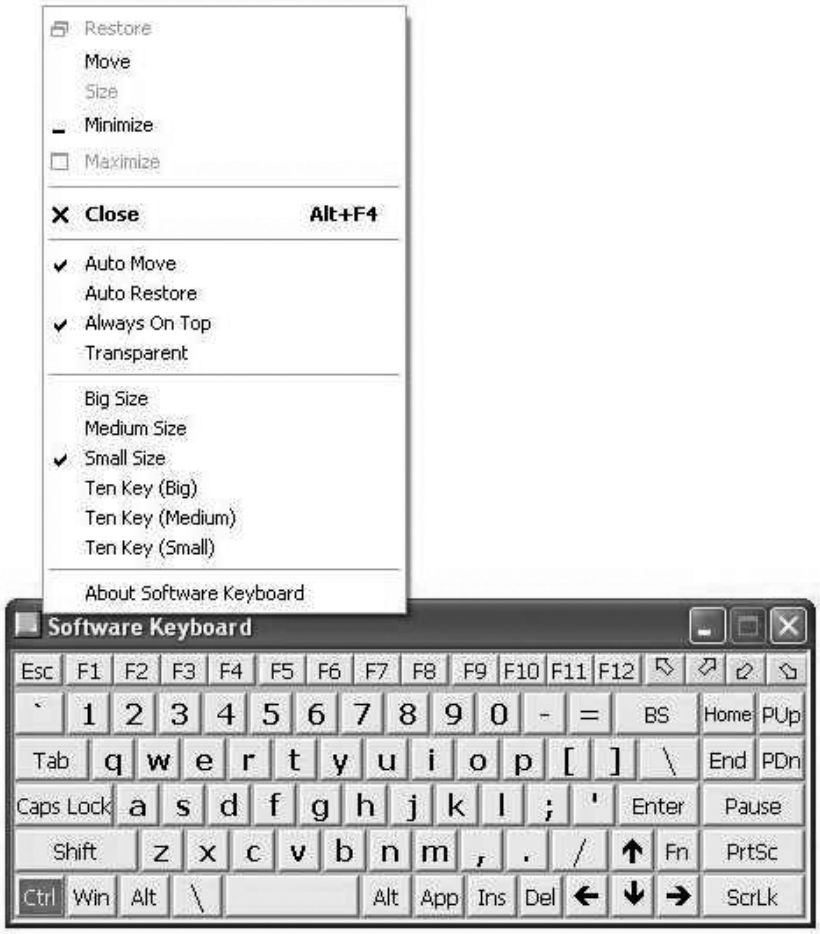
The location of the software keyboard may be displayed in any of the four corners of the screen area using the appropriate arrow keys as shown in the following illustration.

TSD software keyboard location



The size of the software keyboard may also be changed by using the square key at the top left hand corner of the software keyboard. This will provide access to a drop down menu where the desired size of the software keyboard may be selected.

Changing TSD Keyboard Properties



E76683

The orientation of the display may be changed manually using the rotation tablet button at the front of the IDS.

Navigation

Navigating around the screen is normally achieved using the TSD, although a touch pad is located in the centre of the IDS laptop. This is a pressure sensitive pad which may be used to navigate around IDS and open program files in the same way as a conventional computer mouse is used. Navigating around IDS may be carried out using the touch pad although when diagnosing faults the TSD is the most convenient method.

Keyboard components

Item	Description
1	Left mouse button
2	Right mouse button
3	Touch pad
4	TSD swivel release latch

Directly beneath the touch pad are two buttons. These are directly equivalent to the left and right buttons on a conventional computer mouse.

It is also possible to connect a standard computer mouse although this is not necessary with a TSD.

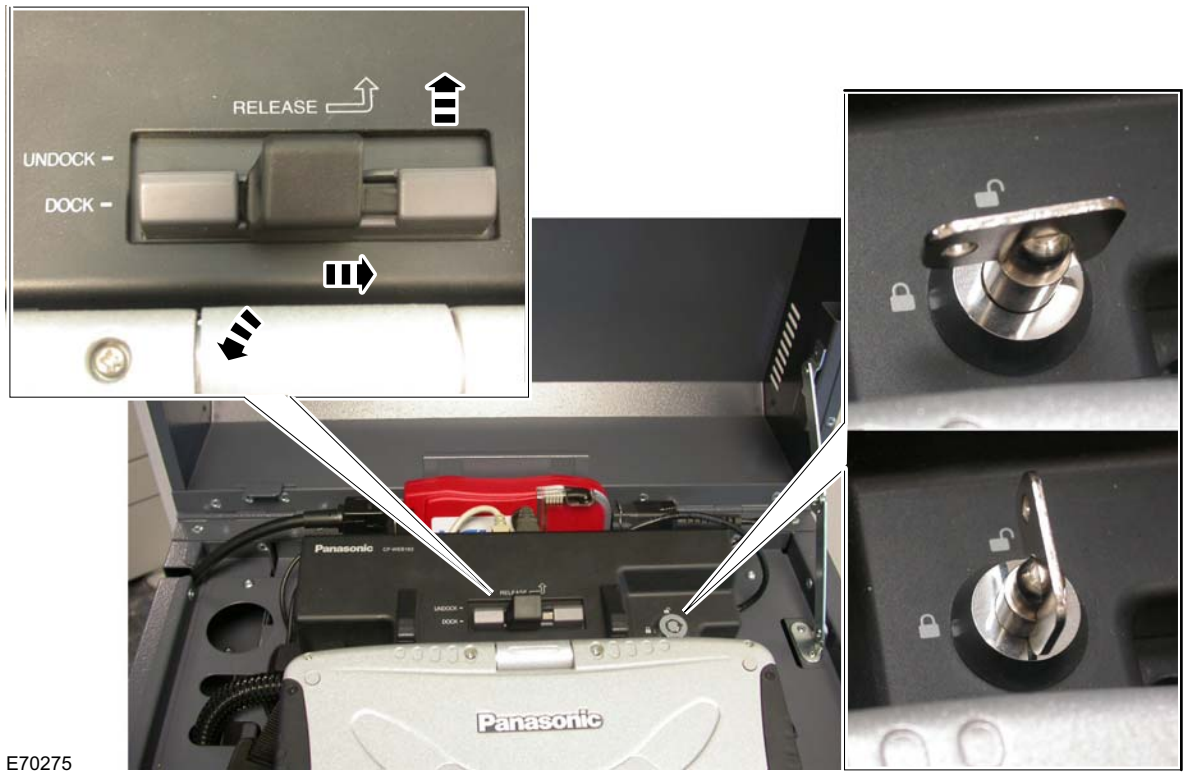
Docking and Undocking IDS

IDS may be docked and undocked from the work station with IDS either switched on or off, providing it is not connected to a vehicle.

To undock IDS from the work station:

- Unlock the release latch using the key provided
- Operate the release latch and lift IDS clear of the docking station
- Fasten carrying strap if necessary

Undocking Procedure



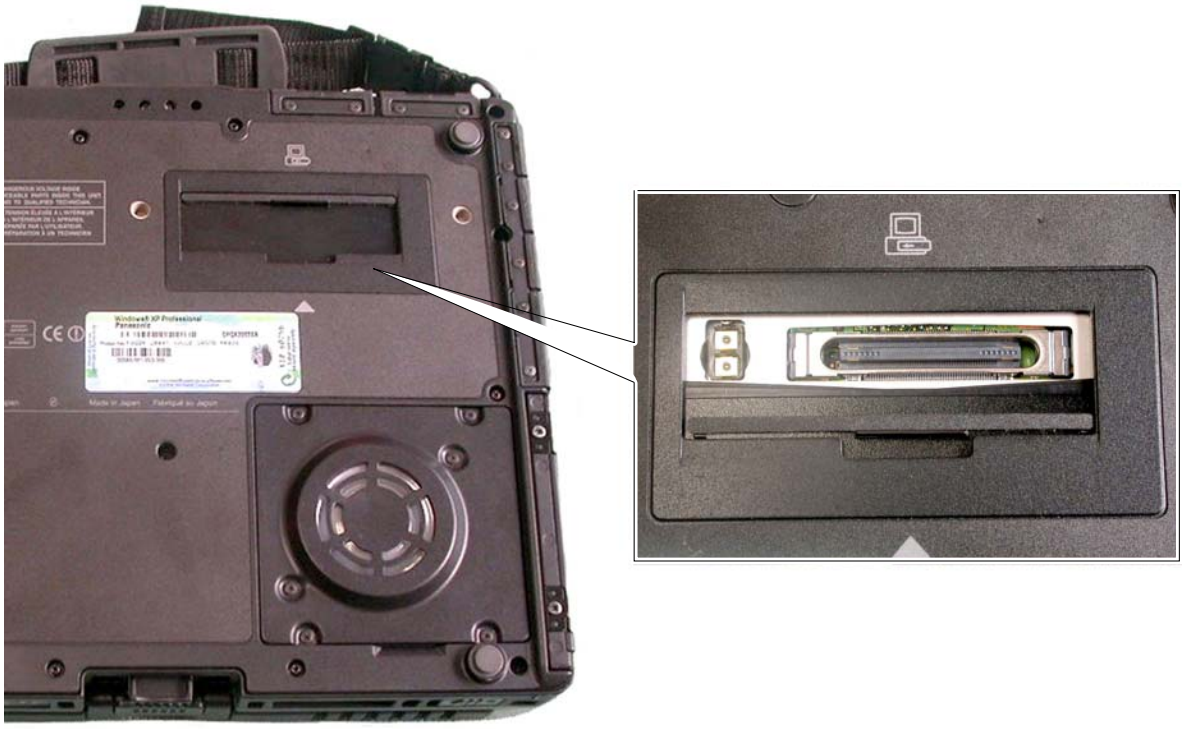
Docking Station

E70273

All connections to IDS will automatically be removed since connection to the work station is done using the single replicator connection located underneath IDS.

NOTE: Before carrying out the undocking procedure, make sure that IDS is either switched off or is not connected to a vehicle.

Replicator Port



E68228

Once IDS has been removed from the work station, close the access cover of the replicator port to prevent the ingress of dust and moisture.

To dock IDS to the work station simply reverse the undocking procedure.

⚠ **CAUTION: Make sure that the replicator port access cover is open before attempting to dock IDS to the work station.**

It may be necessary to release the IDS carrying strap, where fitted, before docking IDS.

Notes

On completing this lesson, you will be able to:

- Identify the Diagnostic software
- Recognize the Diagnostic software installation procedure

System Software

IDS will be distributed with Microsoft® Windows® XP service pack 2 operating system already installed and IDS correctly configured. This makes sure that all IDS units will be configured correctly and consistently throughout the dealer network. Dealers will be required to install diagnostic system software before IDS is ready for use.

⚠ **CAUTION: Do not attempt to update Microsoft® Windows® XP by downloading Microsoft® Windows® updates from the Microsoft® web site. Failure to follow this instruction may prevent IDS from operating correctly.**

Details of the software installation procedure are shown in the user guide, which is distributed with IDS.

A brief summary of the installation procedure is shown below:

- Make sure that only the DVD Drive is connected to the USB port of the docking station
- Install IDS Diagnostic software

System Software (Land Rover applications)

Dealers which support Jaguar and Land Rover vehicles will need to install additional software.

A brief summary of the installation procedure is shown below:

- Make sure that only the DVD Drive is connected to the USB port of the docking station
- Switch on IDS and assign the DVD Drive letter to **Z**. (Details of this procedure is included in the software installation instructions)
- Install RDS 7.0
- Install T4 Diagnostic software (latest T4 version only) onto the hard drive of IDS
- Install IDS Diagnostic software

RDS and T4 Diagnostic Software

To allow T4 diagnostic software to be installed, it is necessary to install RDS 7.0. Installation of RDS 7.0 will require the renaming of the DVD drive letter to **Z**. Once this has been done, RDS 7.0 may be installed. After installation of RDS 7.0, the T4 diagnostic software discs may be loaded onto the hard drive of IDS.

Loading the T4 diagnostic software onto the hard drive will allow T4 diagnostic routines to be carried out without the disc in the DVD drive or when IDS is not docked to the work station.

NOTE: The T4 diagnostic software discs which were for use on the Dell based diagnostic equipment with RDS 6.0, cannot be loaded onto the hard drive. However, they may be used in the DVD drive to run the T4 diagnostic application.

Only the T4 diagnostic software discs which are designed to be used with RDS 7.0 can be loaded onto the hard drive.

IDS Diagnostic Software

Once RDS 7.0 has been successfully installed, the IDS diagnostic software may be installed. The IDS diagnostic software has a very similar appearance to the currently used WDS software which current T4/WDS users will already be familiar with. The IDS software will be released in DVD format. A DVD has a much larger data storage capacity than a CD.

Updated IDS diagnostic software will be released at regular intervals as updates become available.

Installing IDS Software Updates

The first Jaguar and Land Rover IDS disc will be DVD 100.

NOTE: Jaguar IDS was first launched with IDS 41. IDS 43 will need to be uninstalled prior to loading DVD 100/101

To carry out a software update simply insert the latest IDS disc into the DVD drive and follow the on screen instructions. An auto run file will cause the software installation wizard to automatically open.

NOTE: The Update Software option from the system utilities screen is used to install patch files and is not used to load later versions of IDS diagnostic software.

For information on installing Patch Files, refer to the 'General Notes on Operation' section of this workbook.

Notes

On completing this lesson, you will be able to:

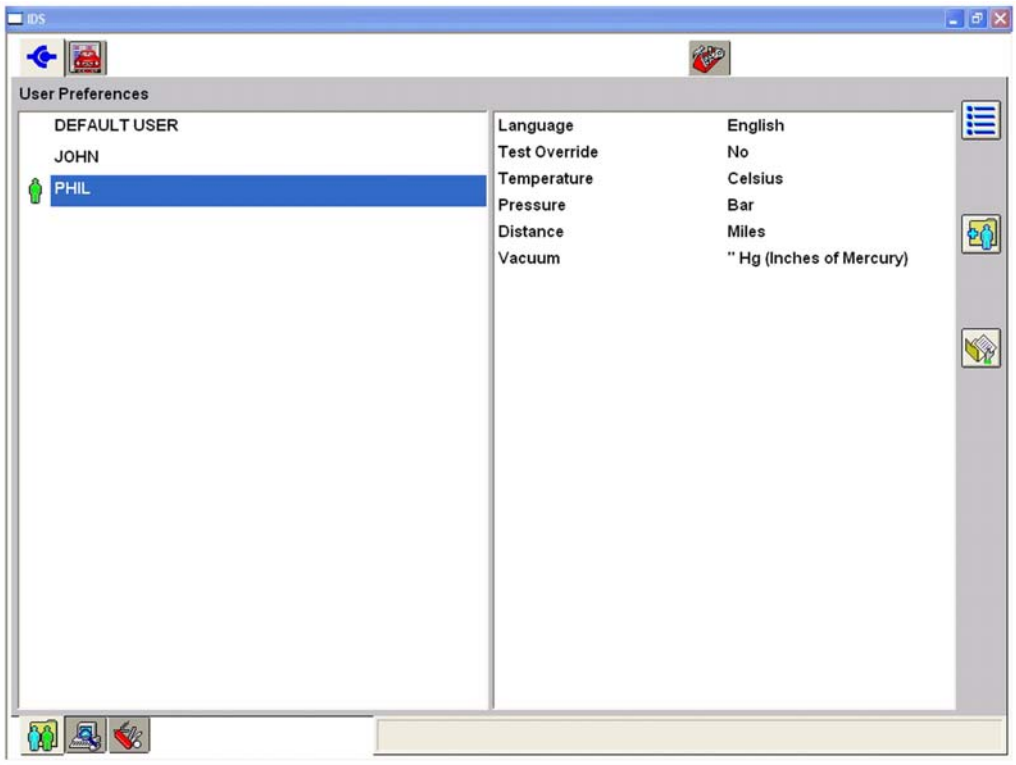
- Recognize the System Utilities menu
- Set Dealer Information
- Set User Preferences
- Add and delete users
- Recognize the procedure for disabling Windows® XP network warning messages
- Display details of the installed IDS software

User Preferences

The user preferences menu allows the user's to set their personal user specific preferences. This will allow the user to display certain parameters in their preferred unit of measurement.

The user preferences menu is accessed by selecting the user preferences sub-tab, which will be available following selection of the system page tab (Top left hand Tab).

User Preferences - Selected User

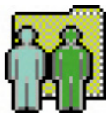


E77434

Example: Preference for user **'A'** may be to display pressure in Bar, where as user **'B'** may prefer pressure to be displayed in PSI.

Each user can save their personal preferences which will then be used when the user is set as active.

User Preferences Sub-tab



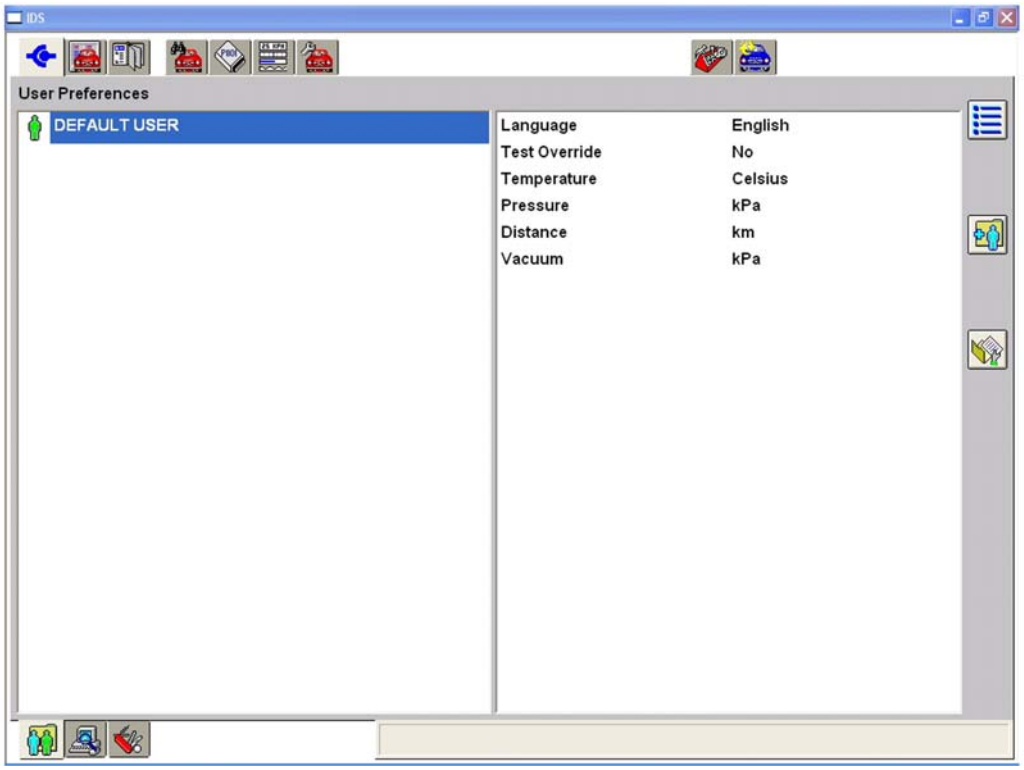
Various users can be entered under this sub-tab. This allows each user to select their own settings. A number of buttons will be available from the button bar.

Using the buttons in the button bar (right-hand side of screen), allows users to be either:

- Added
- Deleted
- Activated
- Individual settings changed

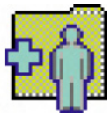
Parameters are already preset under 'Default user'. These can generally be adopted by most users.

User Preferences - Default User



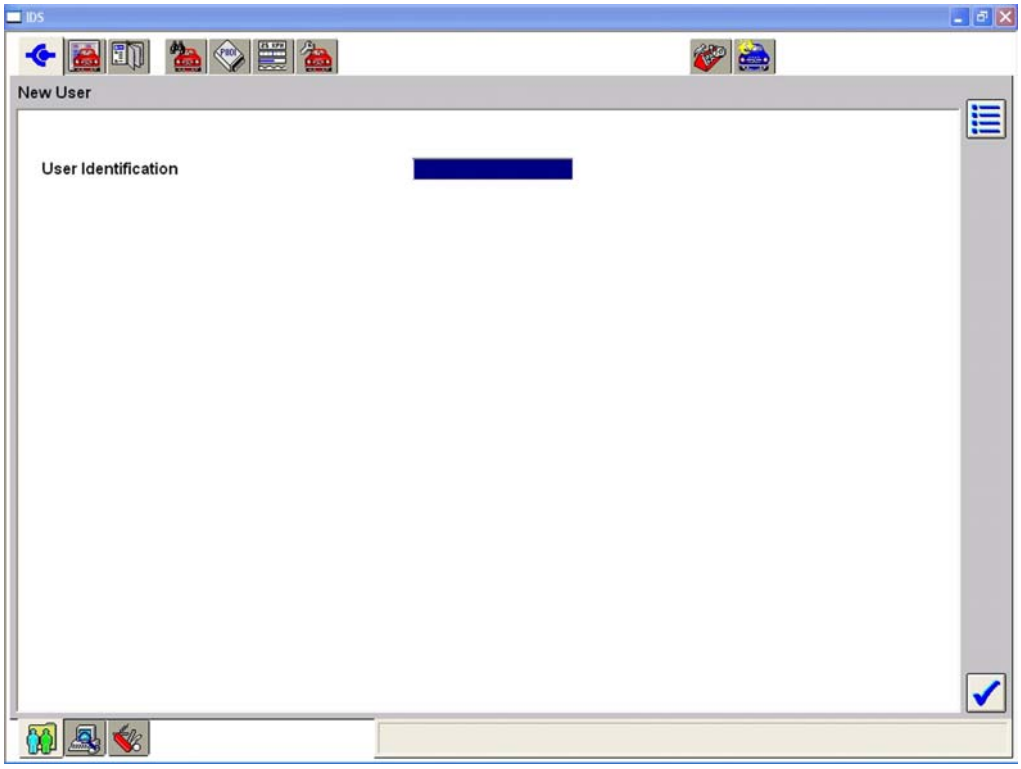
A new user may be added after selecting the **Add New User** button.

Add New User



The system will ask for the users identification (name) to be entered.

New User



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Once the entry has been confirmed, the new user name will be displayed.

Highlighting the desired user, followed by selecting the **change preferences** button, will allow certain parameters to be changed.

Change Preferences

The parameters may be edited for the selected user. You should select the setting that you wish to change from the left hand pane and choose the new setting from the right hand pane. Confirm the changes by selected the **Tick** button.

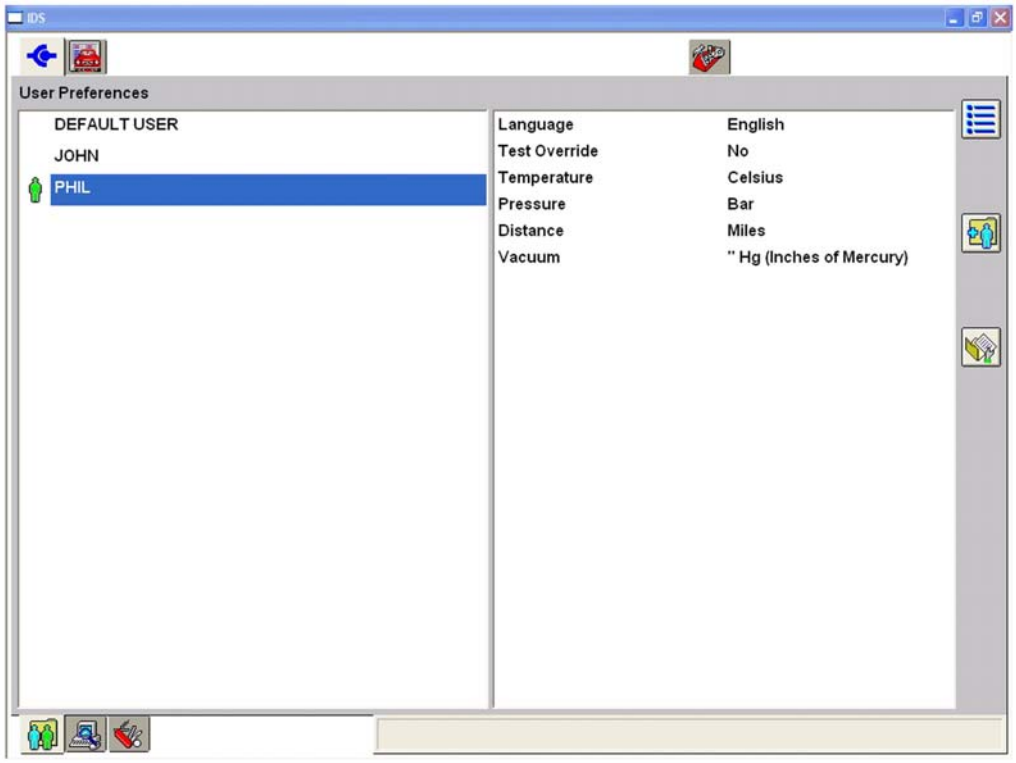
After activating the **Change preferences** button, the following parameters may be changed:

- Language
  - Selecting the menu language
- Test Override
  - This function is not active on our application and defaults to OFF. Changing the setting will have no effect
- Temperature
  - This allows the user to choose degrees Celsius or Fahrenheit as the unit of measurement for temperature
- Pressure
  - This allows the user to choose kPa, bar or psi H2O (inches of water) as the unit of measurement for pressure

- Distance
  - This allows the user to choose either km or miles as the units of measurement for distance
- Vacuum
  - This allows the user to choose kPa, Hg (inches of mercury), Bar or 'H2O' as the unit of measurement for vacuum

The user must be set as **active** for the desired preferences to be used. This will be shown by the green man symbol being displayed adjacent to the user name.

Active User



E77434

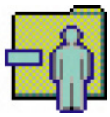
To set the user as active, highlight the user name and select the **Set Current User** button.

Set Current User

NOTE: User preferences cannot be changed while a diagnostic session is open. ie After a VIN has been entered at the VIN entry screen.

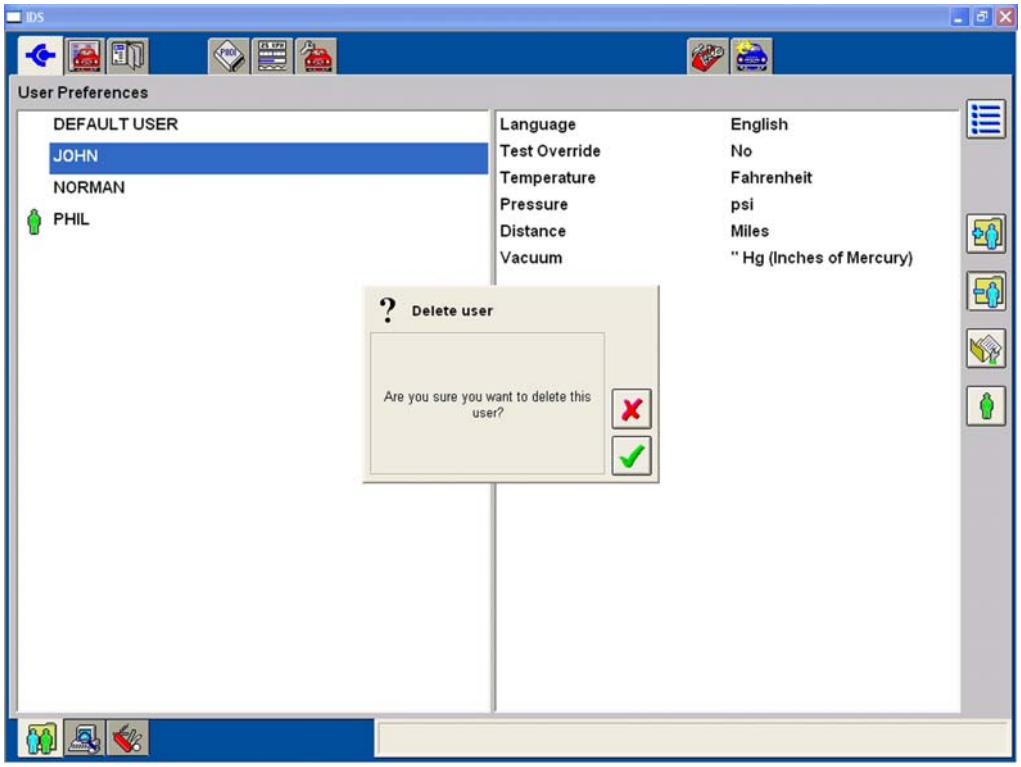
A user may be deleted by first selecting the desired user, followed by operating the **delete user** button.

Delete User



A message will be displayed, allowing the user to confirm or decline the request.

Delete User



E81063

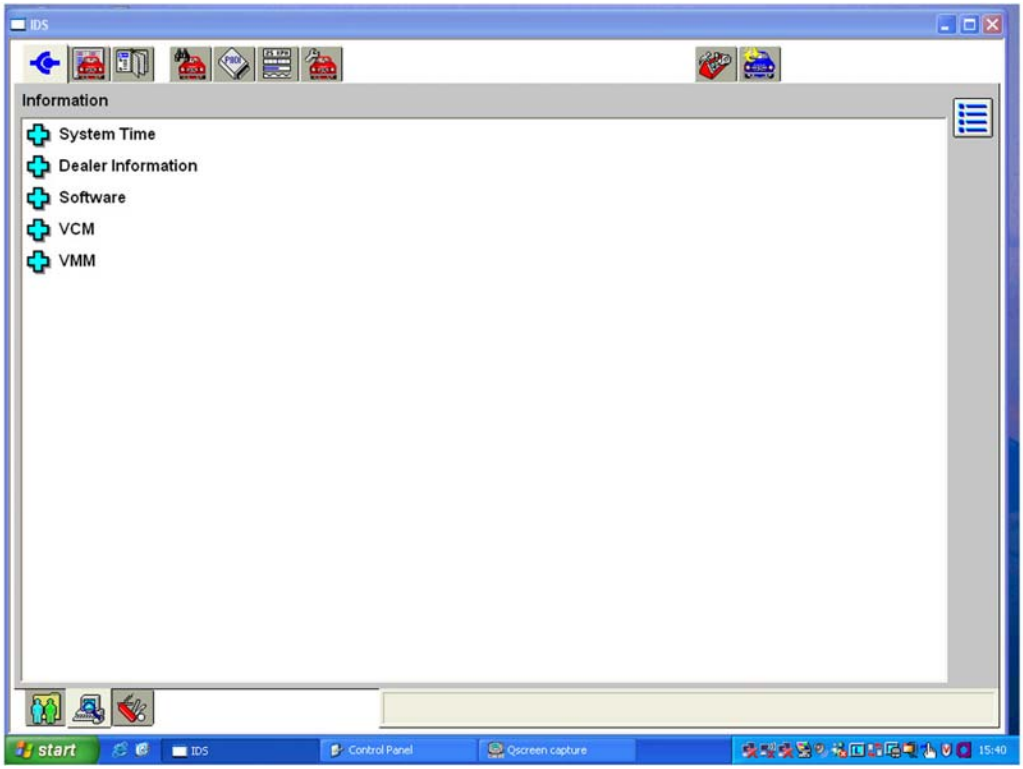
Selecting the confirmation 'tick' will delete the selected user.

System Information

Selecting system information following selection of the IDS tab reveals the following information

- System time
- Dealer Information
- Software
- VCM
- VMM

Information Screen



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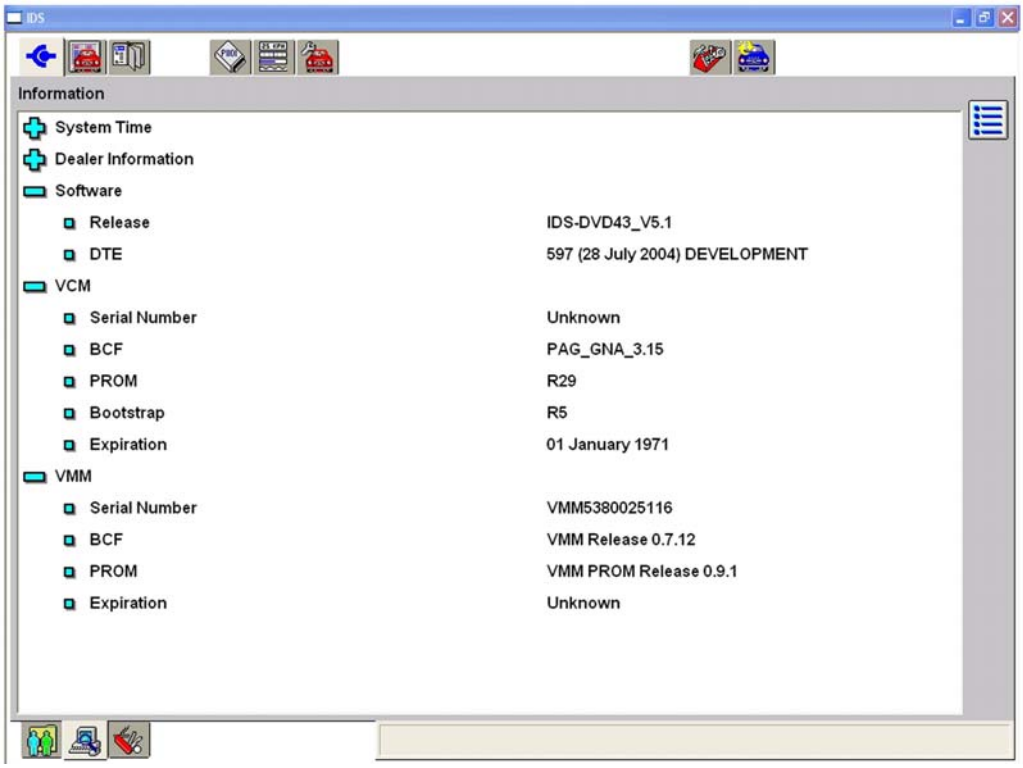
Information details may be accessed by selecting the relevant menu.

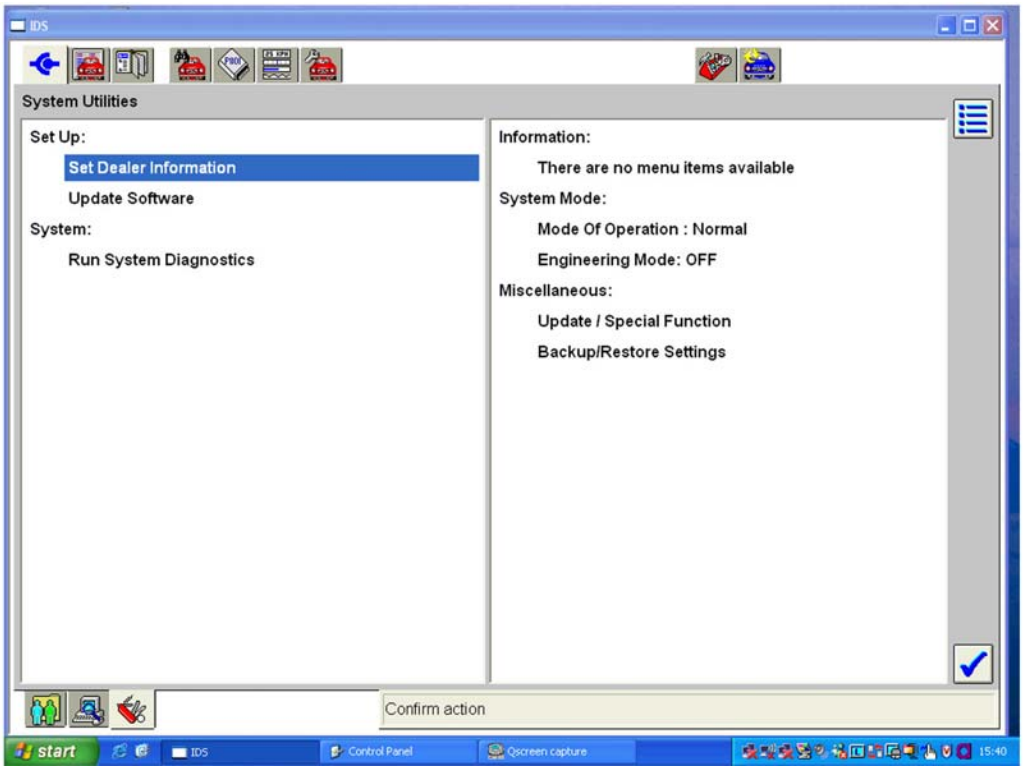
Information Screen



E69058

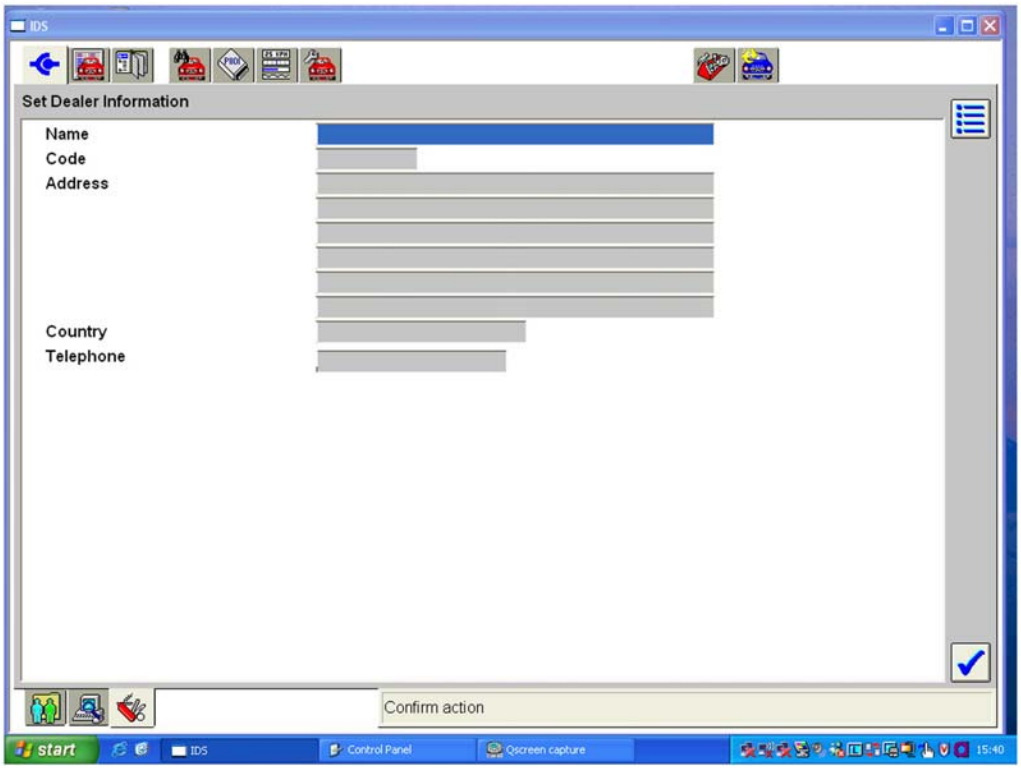
Selecting the system utilities tab will allow access to the system utilities screen. Dealers may access the dealer information screen from here.

System Utilities Set up



E69033

Set Dealer Information



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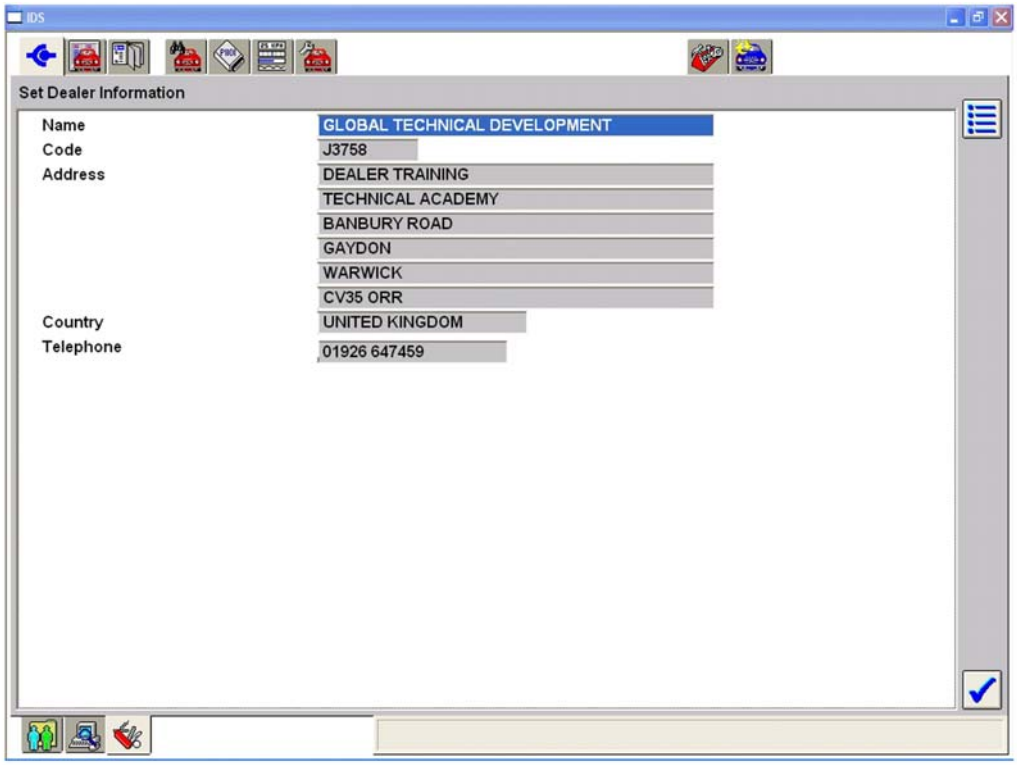
Enter the information as required.

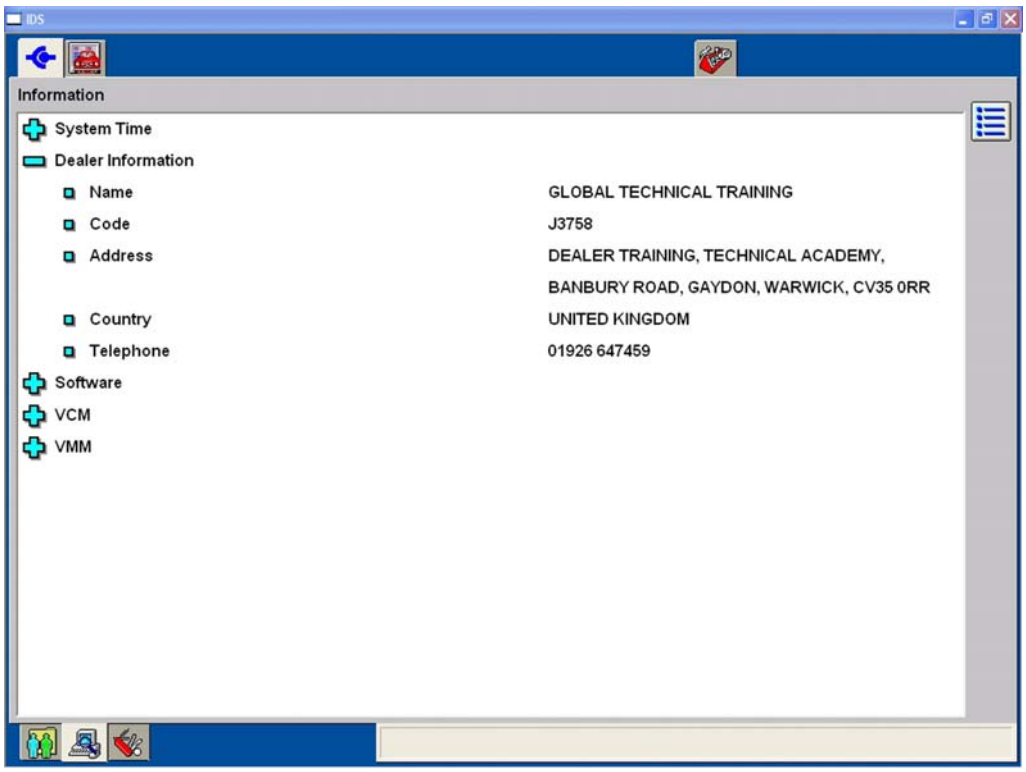
Dealer Information Details



E69053

Once the information has been entered it will be displayed in the system information screen.

Dealer Information Displayed



E69054

Disabling Windows® XP Network Warnings

The network connection established between the VCM and the IDS laptop are considered to be 'limited' networks by the Windows® environment. This limited nature of the network causes Windows® to display a warning message whenever one of the connections is established or terminated. These warnings can be a nuisance to the user and may be disabled if required.

The procedure to disable the warnings is shown below:

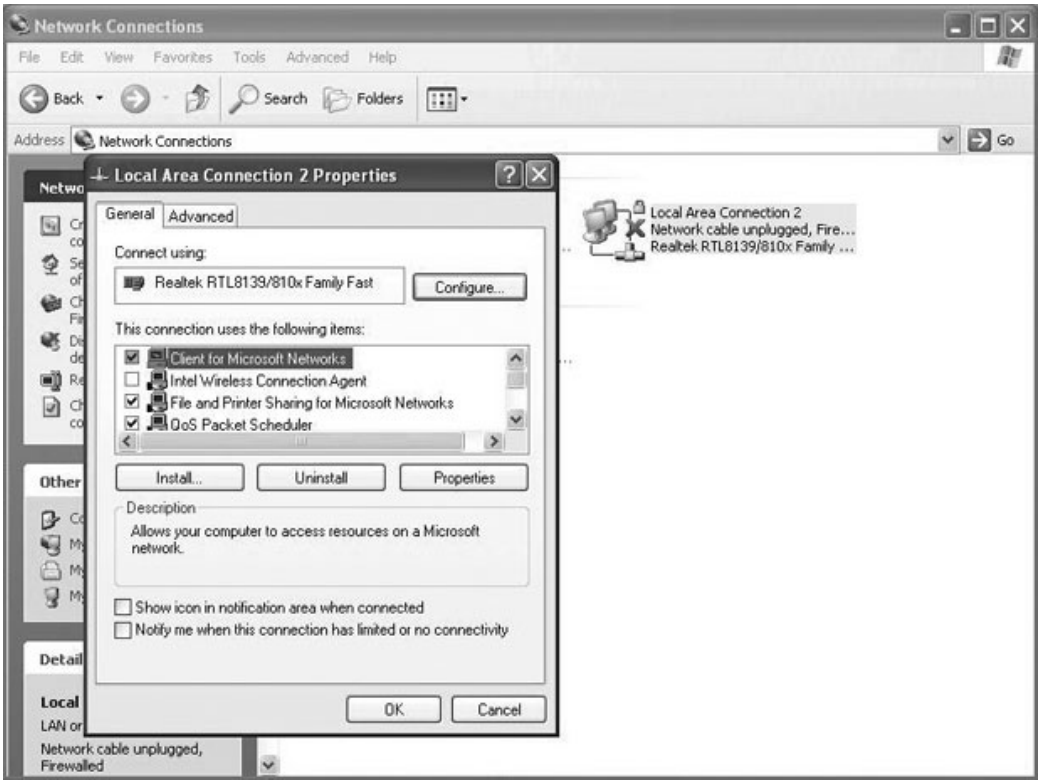
- Open the Windows Control Panel from the Start menu and select **network connections**

Select Network Connections from the Control Panel

E76580

- **Right** click on the desired **Local Area Connection** and select **Properties**
- **Deselect** the bottom box, labelled **Notify me when this connection has limited or no connectivity** and click **OK**

Network Connections Properties



This process will need to be repeated for each of the IDS network connections.

NOTE: The number assigned to the Local Area Connection may vary depending upon which USB connection is used. This may be determined by making a note of the connection number when the warning message is displayed prior to beginning this process.

Do not turn off notification for the wireless network.

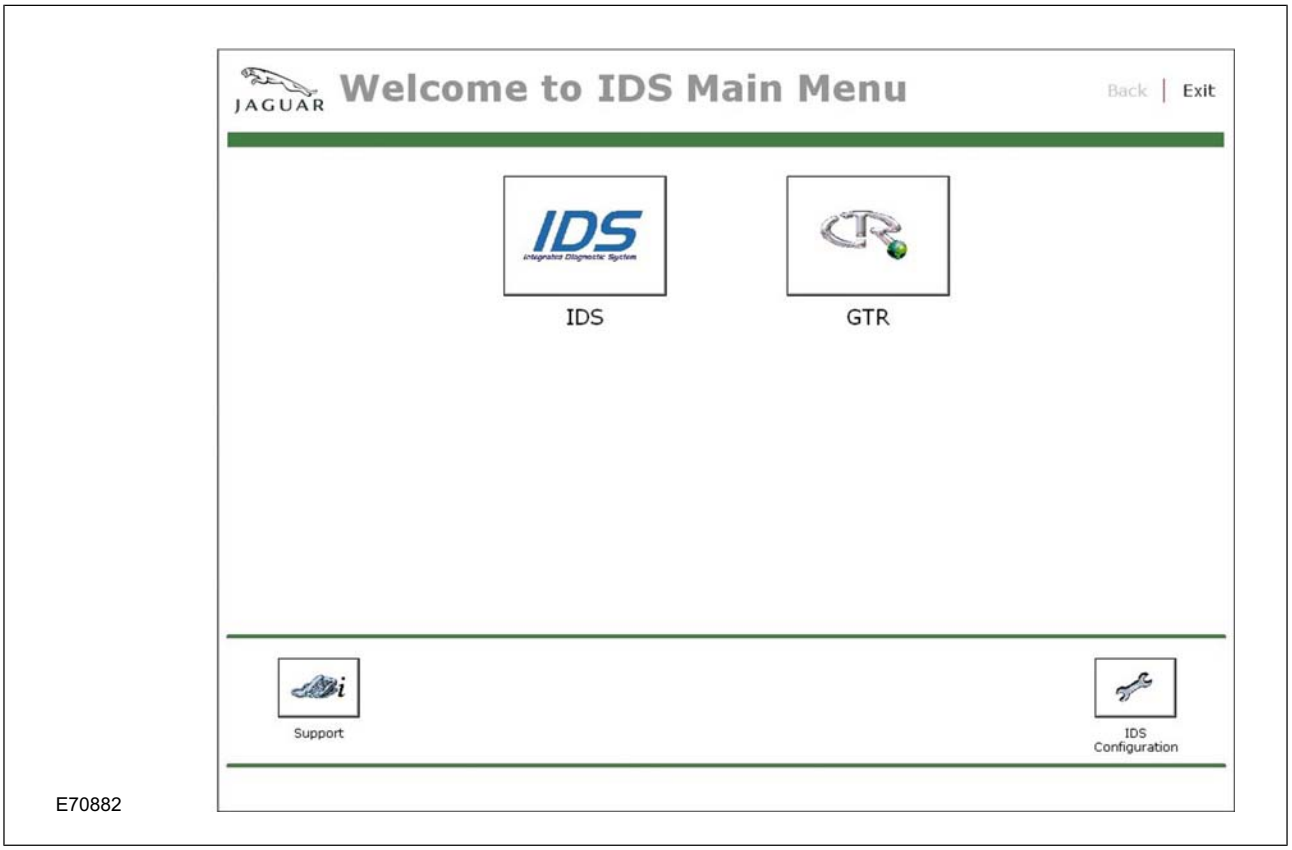
On completing this lesson, you will be able to:

- Switch on IDS and Open the IDS Diagnostic Software
- Navigate around the content model in order to select a desired vehicle system

Main Menu

The 'Welcome to IDS main menu' screen will automatically be displayed once IDS has been switched on.

Main Menu

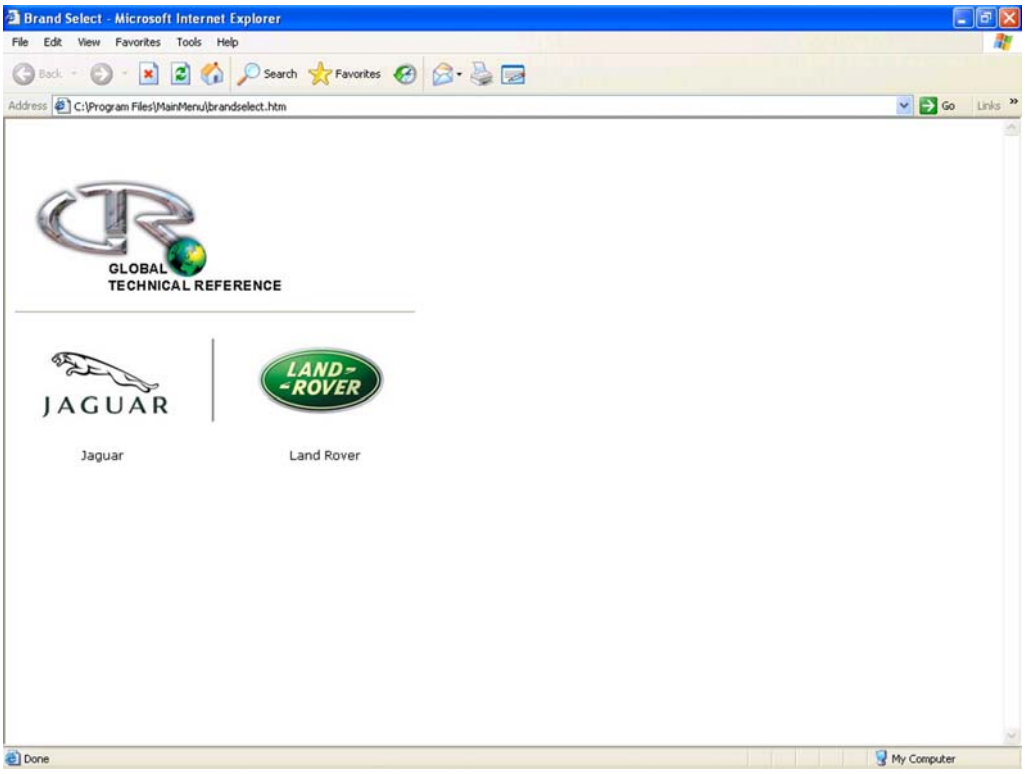


The following options may be selected from the IDS main menu

- IDS - Launches the IDS diagnostic application software
- GTR - Provides access to GTR
- Support - Displays the IDS support contact numbers
- IDS configuration - Opens the IDS Configuration screen

GTR

GTR Selection Screen



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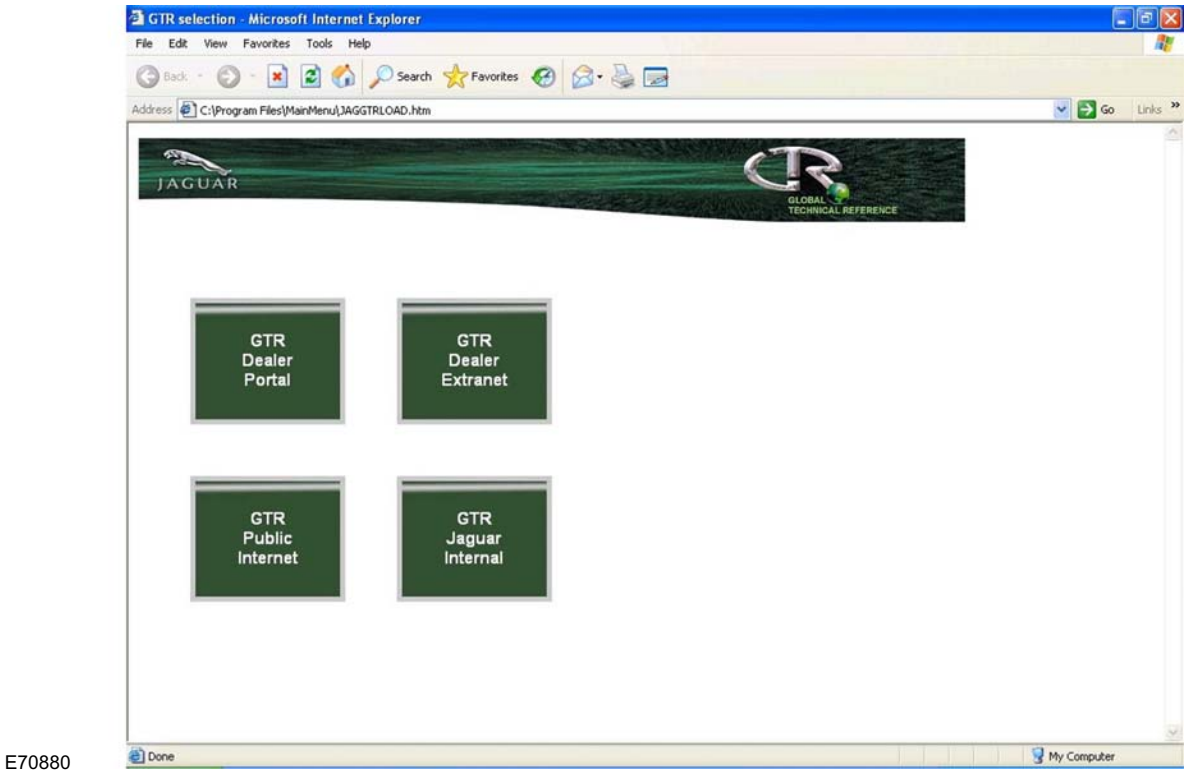
Select the desired vehicle brand. (Jaguar)

Access to GTR



1 GTR Dealer Portal
2 GTR Dealer Extranet
3 GTR Public Internet
4 GTR Jaguar Internal

Selecting GTR will open the GTR screen.

The button used to access GTR will depend upon your account details.

GTR Buttons

- GTR Dealer Portal - This may be used by authorised dealers to connect to GTR. Links to a web page to allow users to login once and access several business applications from a single source.
- GTR Dealer Extranet - This may be used by authorised dealers to connect to GTR. Links to a web page to allow users to login once and access several business applications from a single source. This is being progressively replaced by Dealer Portal.
- GTR Public Internet - Used by independent repairers to access GTR
- GTR Jaguar Internal - This is for internal Jaguar employees to access GTR through the Intranet.

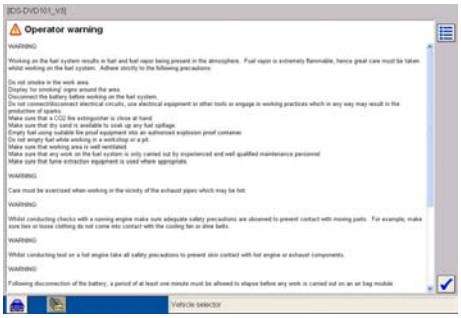
Touch Screen Display (TSD) Calibration

If the accuracy of the TSD has depreciated, then it may need to be recalibrated. Refer to the 'IDS Maintenance section' of this workbook for further details on the calibration procedure.

Using the IDS Software

Selecting IDS from the menu will open the IDS diagnostic software, where the user may navigate to the VIN entry screen. The first IDS operator warning screen will be displayed.

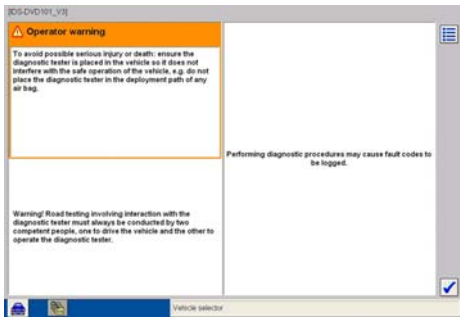
Operator Warning Screen 1



E81510

Once the technician has acknowledged that this screen has been read, the second IDS operator warning screen will displayed.

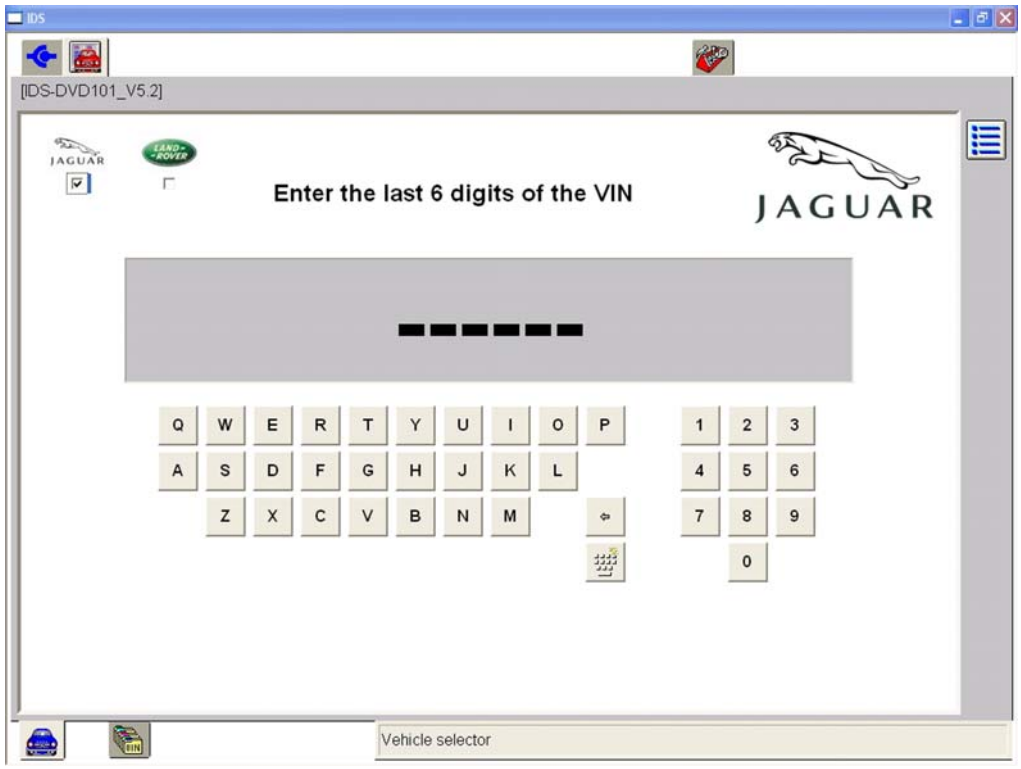
Operator Warning Screen 2



E81607

Once the technician has acknowledged the contents of this screen the VIN entry screen will be displayed.

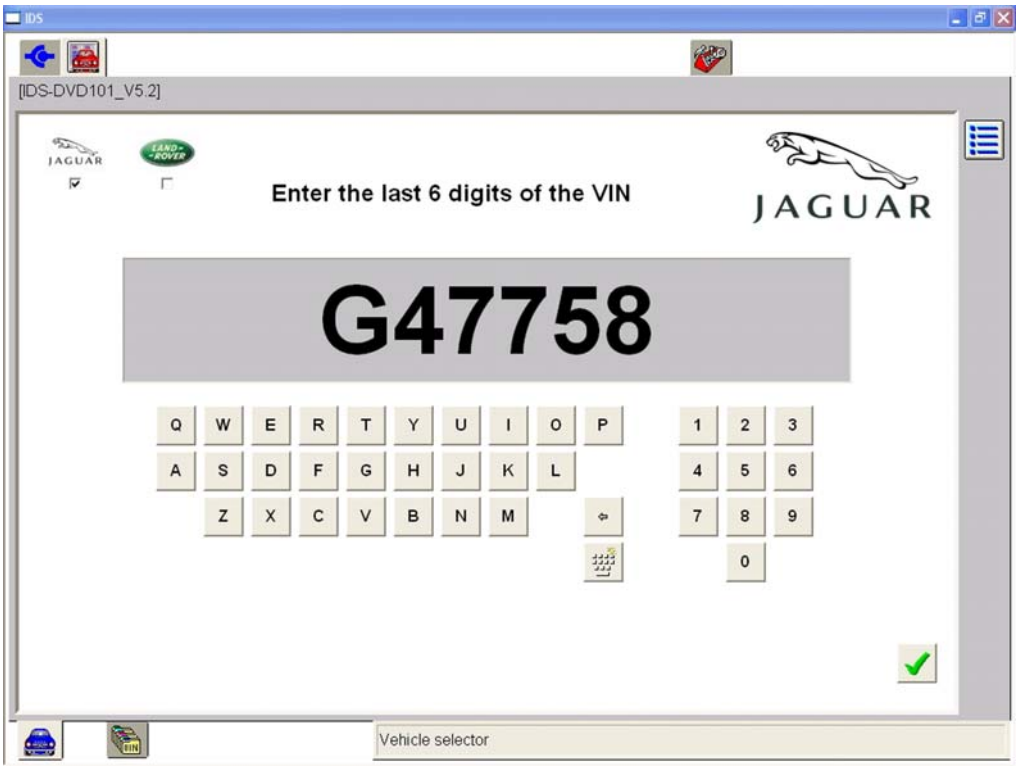
VIN Entry Screen



E77370

Make sure the appropriate vehicle brand is selected. Enter the last six digits of VIN number and confirm selection by operating the 'tick' button.

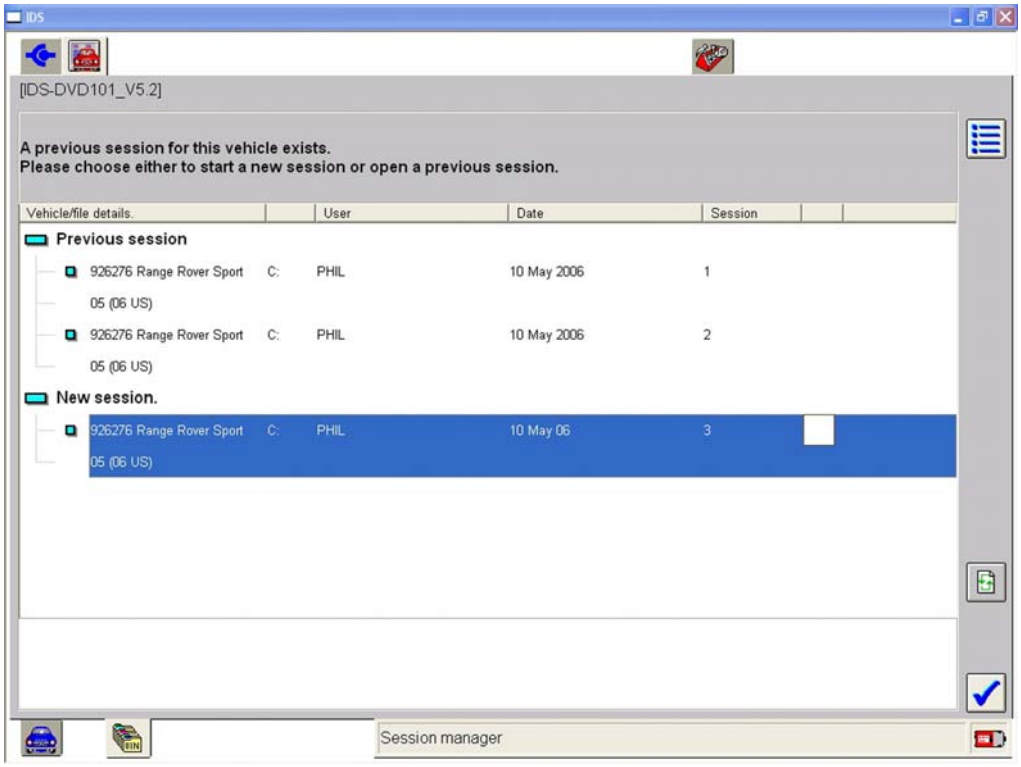
VIN Entry



E77371

If a previous session exists for the entered VIN number, a screen will be displayed showing details of the previous sessions.

Previous Session Exists for This Vehicle



E81507

If a new session is to be started, select 'New session' and press the 'tick' button. Selecting 'New Session' will require the vehicle details to be entered / confirmed. Example: Engine size, Speed control fitted, etc.

Selecting a previous session will not require these details to be entered. For further information on sessions, refer to 'Sessions' in the IDS maintenance section of this workbook.

The vehicle details will be displayed with a message asking if the details are correct. The details should be checked before proceeding. Select **No** if the vehicle details are incorrect. The vehicle details may then be amended.

Once the vehicle details have been confirmed as correct, the option to read DTCs will be displayed. See the 'Diagnostic and Test routines' section of this workbook for further information.

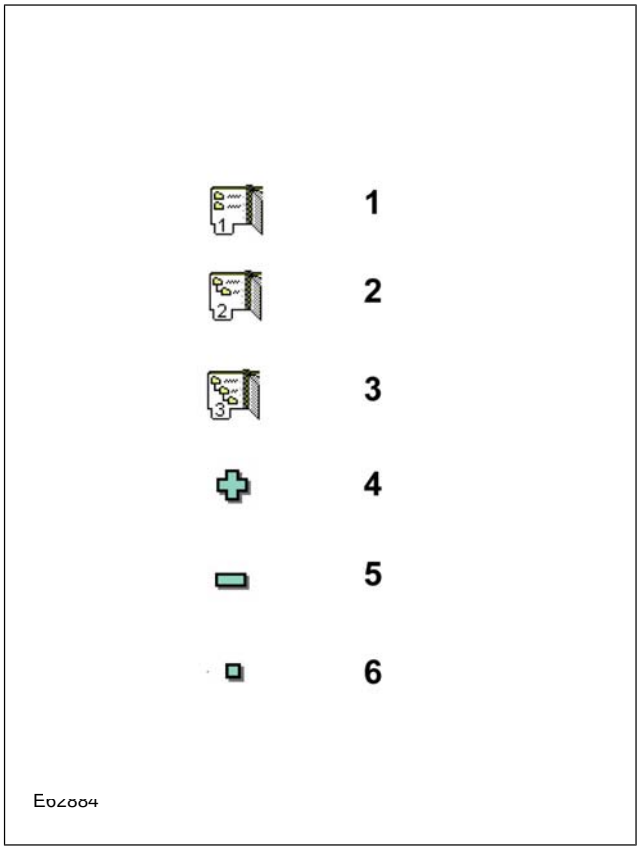
Content Model

The Content Model application allows the user to select a particular area of the vehicle for testing. Selecting a system from the content model, will configure other IDS tools with the same system information. Example: If 303-00 Engine System is selected, from the content model, Datalogger and DTC monitor will also be configured to this system.

Content Model Tab

The Content Model is similar to the workshop manual navigator. The left side of the screen presents the main vehicle systems in the form of an expanding hierarchical tree. The name of the selected system is displayed on the title bar at the top of the screen. As the hierarchical tree expands, sub-system and component names are added to the system name.

To use the content model, first select the content model tab. The vehicle systems will be displayed in a similar manner to which they are displayed in GTR.

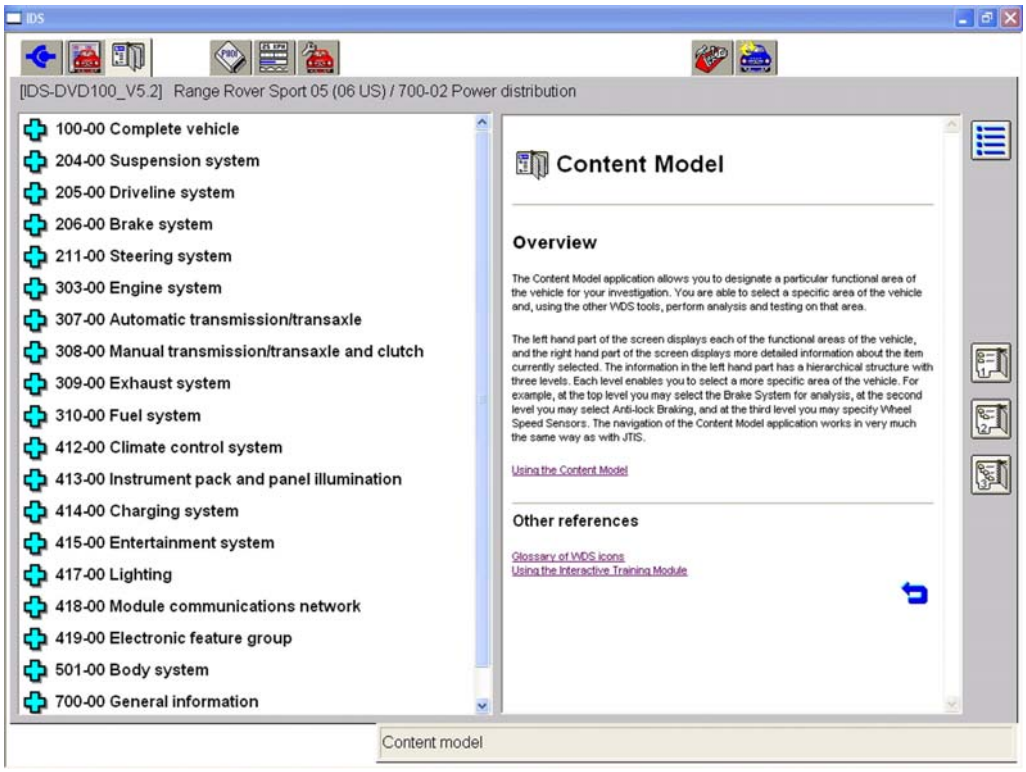


1	Level 1 button: Level 1 only	2	Level 2 button: Expand content Level 2
3	Level 3 button: Expand all content	4	The item may have lower levels
5	It has been expanded	6	It is the lowest level

When a content position is selected, this is passed to all of the tools. The current content position is displayed on the title bar. The 'level' buttons are displayed in the button bar.

Level 1 Button

Content Model Screen - Level 1



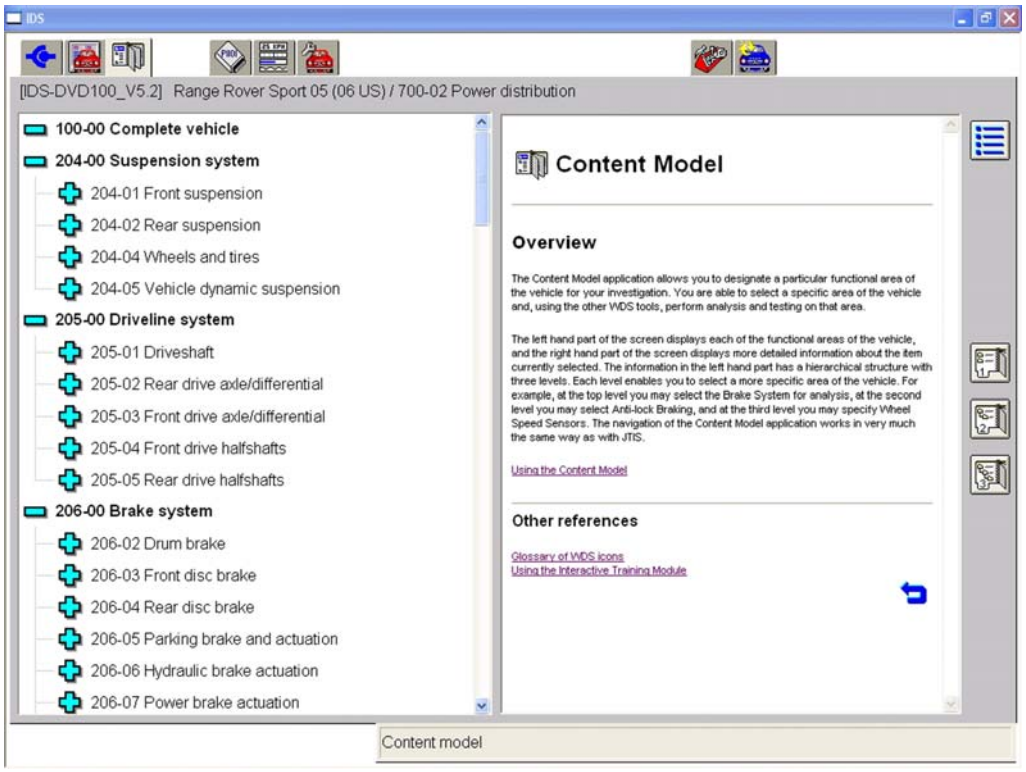
E79387

Level 1 button Select the Level 1 button to display main vehicle systems. At this level, DTC monitor and Datalogger will be configured to the system you have selected.

NOTE: The diagnostic software version and vehicle information is now displayed at the top of the diagnostic screen.

Level 2 Button

Content Model Screen - Level 2

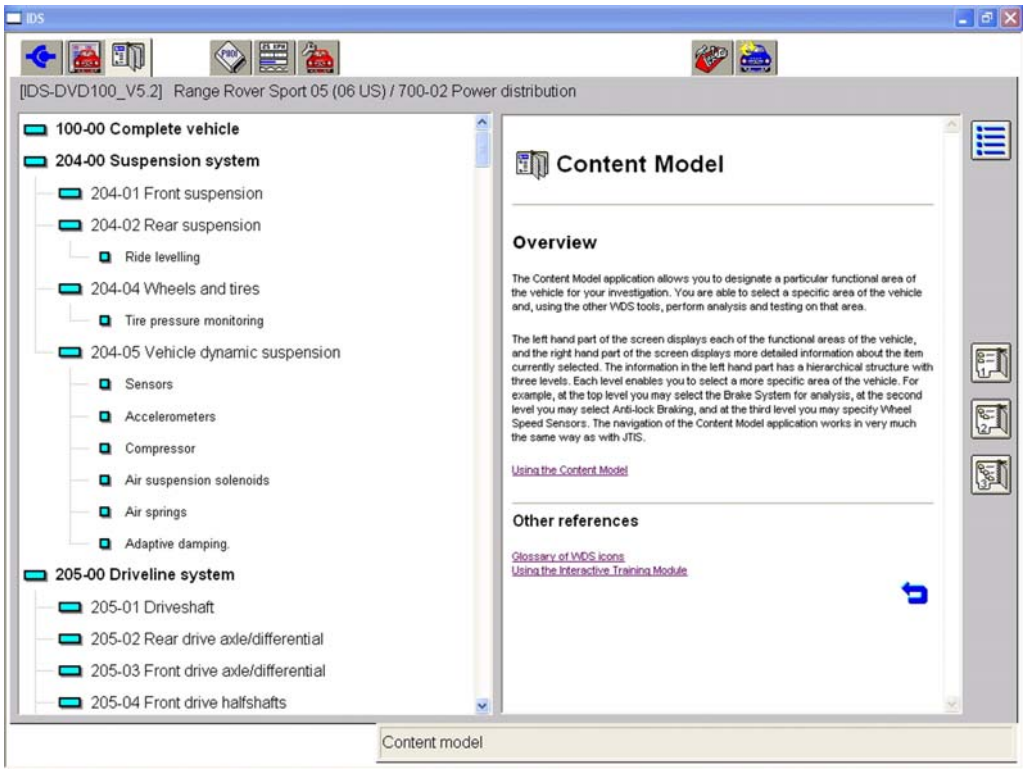


E79388

Level 2 button Select the Level 2 button to reveal the constituent sub-systems. At this level, DTC monitor and Datalogger will be configured to the sub-system selected.

Level 3 Button

Content Model Screen - Level 3



E79389

Level 3 button Select the Level 3 button to expand the tree further. At this level, DTC monitor and Datalogger will be configured to the components selected.

Sub-system or component information for a particular system may be expanded individually by selecting the + symbol, adjacent to the desired system. Selecting the - symbol will contract the expanded individual signal.

Task Bar

Technicians already experienced with using PTU/WDS, will have noticed that when using the IDS diagnostic software, the task bar is displayed at the bottom of the screen. The right hand corner of the task bar displays information which may be useful to the operator and which may be used to access further menus or features of the computer. The number of symbols displayed will vary depending upon the status of the computer.

Task Bar Symbols

E71397

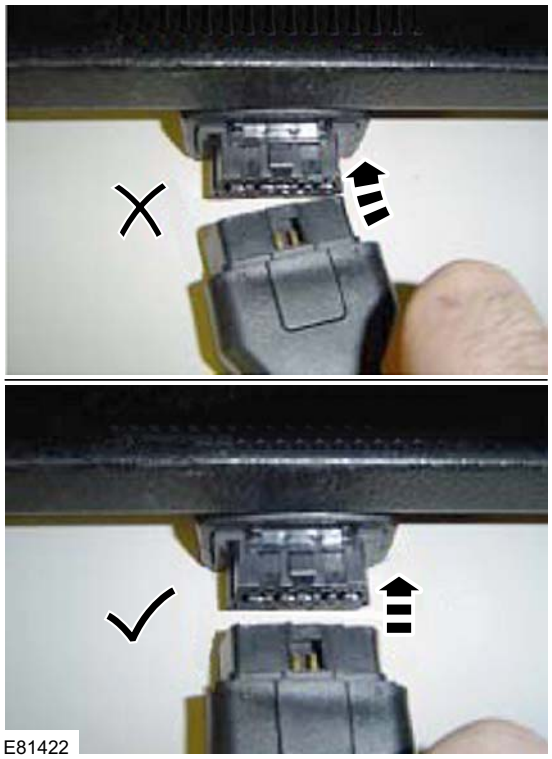
VCM Display

When the VCM is connected to IDS and is powered up, a symbol will be displayed in the information bar confirming the connection.

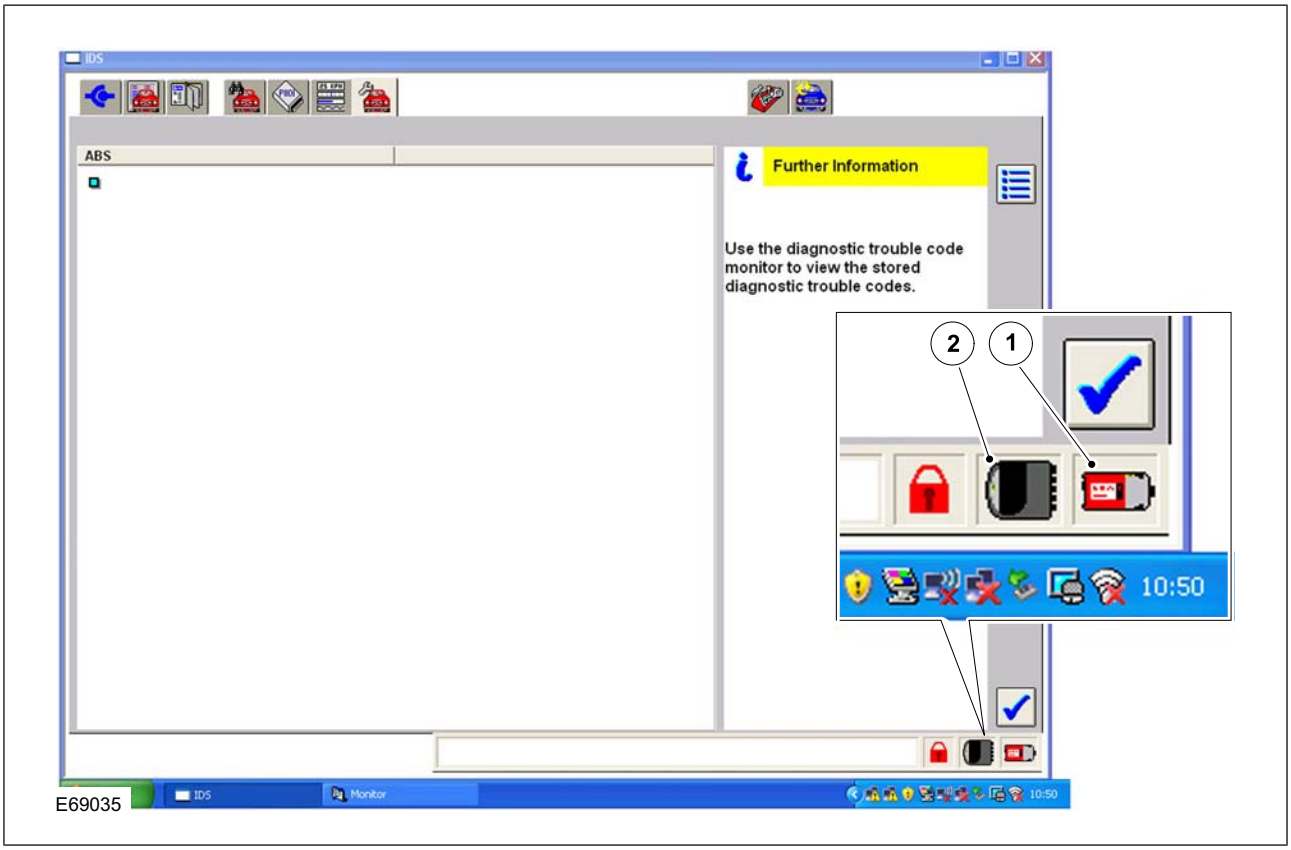
CAUTIONS:

⚠ **Before connecting the diagnostic cable to the vehicle, make sure that the vehicle ignition is switched off.**

⚠ **When connecting the diagnostic cable to the vehicle, make sure that the connector is correctly aligned to the vehicle diagnostic socket in order for a 'clean' connection to be made.**



NOTE: It may take several minutes before the VCM connected symbol is displayed. Diagnostic procedures requiring the VCM cannot be carried out until the symbol is displayed.



1 VCM connected

Notes

On completing this lesson, you will be able to:

- Use IDS to read and clear DTCs
- Identify DTC status symbols
- Recognize 'Enhanced DTC Summary' information
- Use Trace Monitor
- Carry out a Pin point test to diagnose a fault
- Use IDS to carry out Diagnostic procedures
- Upload and view Car Configuration Files (CCF)
- State the cause of the 'error symbol' being displayed when viewing CCF data
- Download 'As Built' CCF data to a vehicle
- Recognize the process for programming control modules

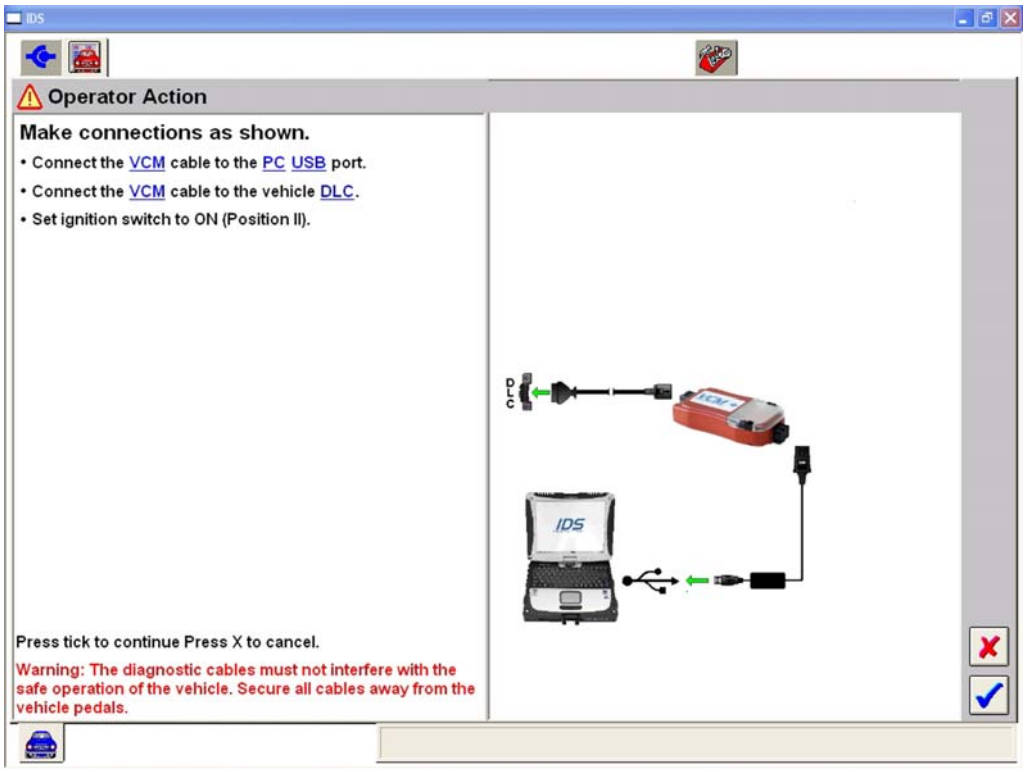
Overview

To carry out diagnostic routines, IDS will require the VCM to be connected.

When carrying out diagnostic routines on vehicles requiring the VCM, it is recommended that the VCM is connected to the vehicle at the earliest opportunity. Connecting the VCM before it is requested will reduce operator waiting time, as it may take up to several minutes following connection to the vehicle, before the VCM is recognised by IDS. Diagnostic routines cannot begin until the VCM has been recognised by IDS.

IDS will display a VCM connection instruction screen when the VCM is not connected and communication with the vehicle is required.

Connect VCM

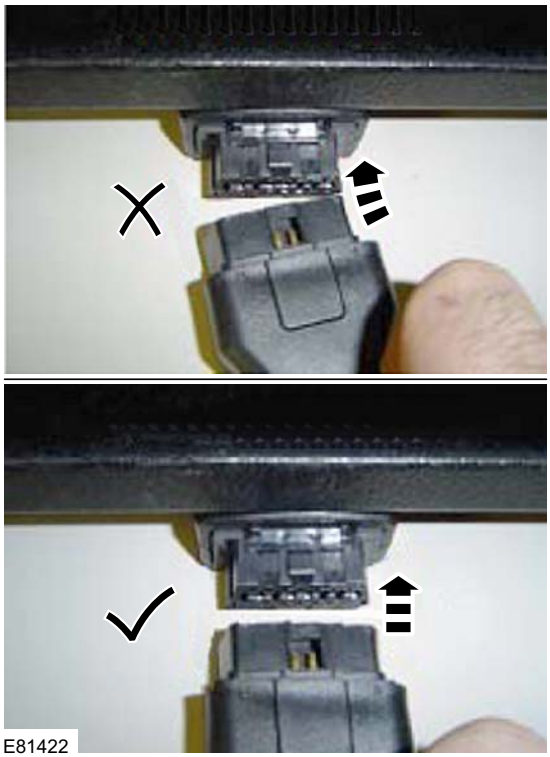


E78950

⚠ **CAUTION: When connecting the diagnostic cable to the vehicle, make sure that the connector is correctly aligned to the vehicle diagnostic socket in order for a 'clean' connection to be made.**

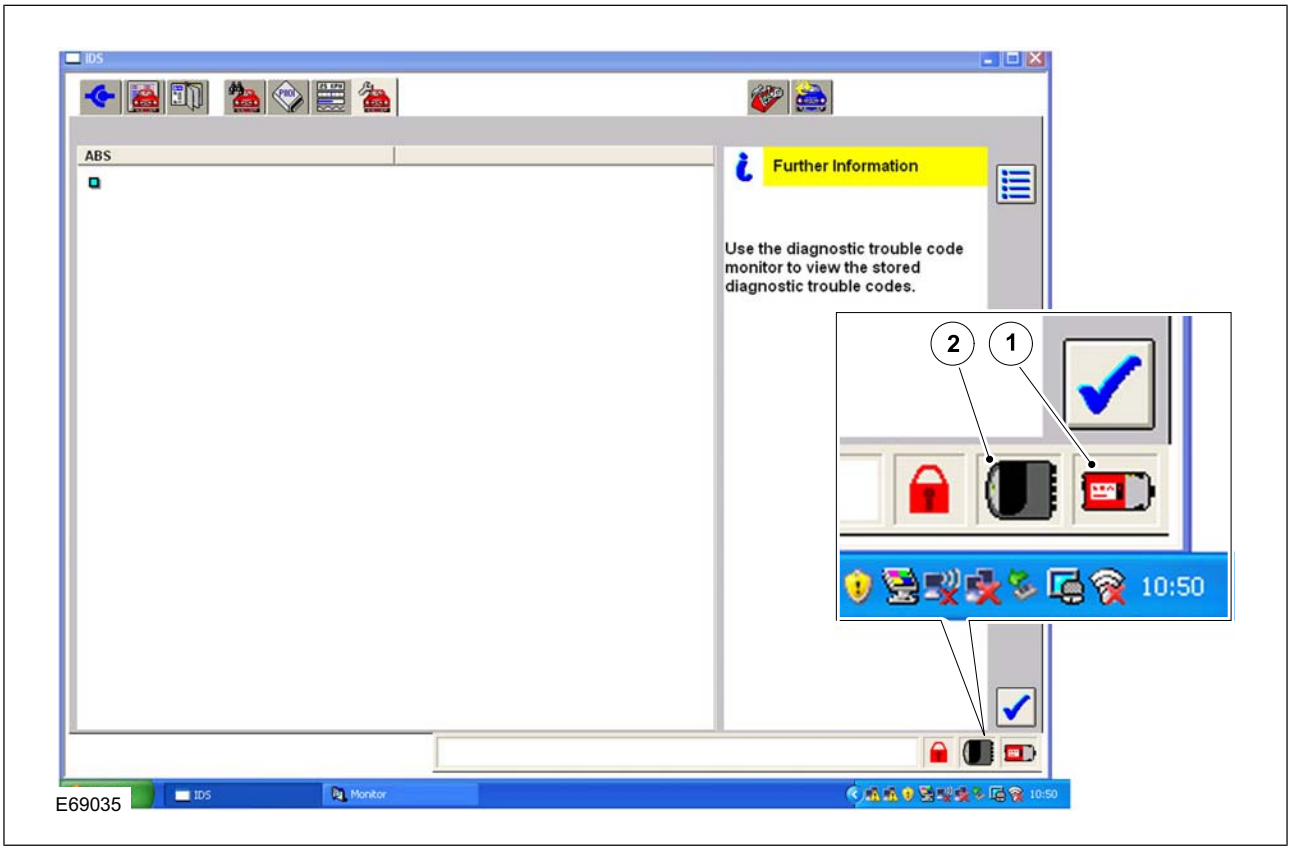
NOTE: Do not confirm connection of the VCM until the VCM has been recognised by IDS. This may take several minutes.

DLC Connection



When the VCM has been connected and is ready for use, the VCM symbol will be displayed in the lower right hand corner of the screen.

VCM Connected



1 VCM connected

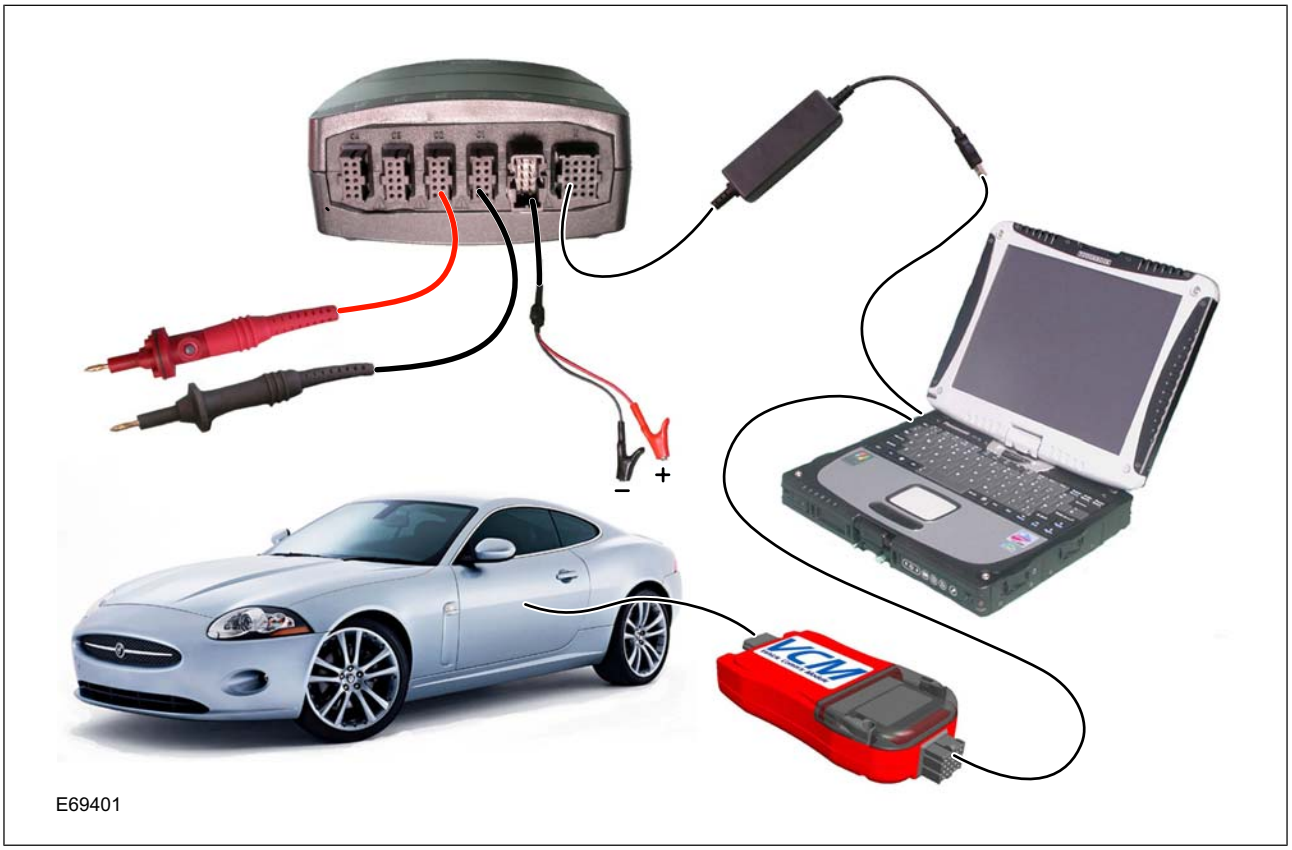
It is acceptable to connect the VCM to the vehicle before switching on IDS.

It is recommended that IDS is used when it is docked to the work station. This will make sure that IDS is always running from an external power supply.

NOTE: The VMM and the VCM are powered from the vehicle battery. This may cause the vehicle battery voltage to fall to a low level much sooner than expected when carrying out diagnostics.

Connecting IDS From the Work Station

IDS Connected to a Vehicle (Mobile)



However, IDS may be used when it is not docked to the work station.

NOTE: It is recommended that IDS is connected to an external power supply and the vehicle battery is connected to a battery charger when programming modules.

NOTE: IDS is not powered from the vehicle battery through the DLC.

NOTE: It must be remembered that when using the IDS accessory socket power supply (available separately) to power IDS, current draw from the vehicle battery will be increased.

Accessory Socket Power Supply (Optional)

Overview

IDS is able to read the Diagnostic Trouble Codes (DTCs) that are flagged by the vehicle's control modules. The menu is accessed by selecting the DTC Monitor Tab, once a session is in progress.

DTC Monitor Tab

The DTC monitor application enables the user to read, analyse and use these codes to determine the most appropriate course of action.

The user is able to:

- Retrieve stored DTCs
- Display retrieved DTCs, their status, descriptions and possible causes
- Clear stored DTCs
- Initiate On-Demand Self-Test (for modules which support this feature)
- Launch a pinpoint diagnostic routine for a selected DTC
- Retrieve Freeze Frame data
- Generate an S93 (OBDII) report

There are four sub-tabs within DTC monitor.

- Code display (default)
- code detail
- S93 report
- Sort DTCs

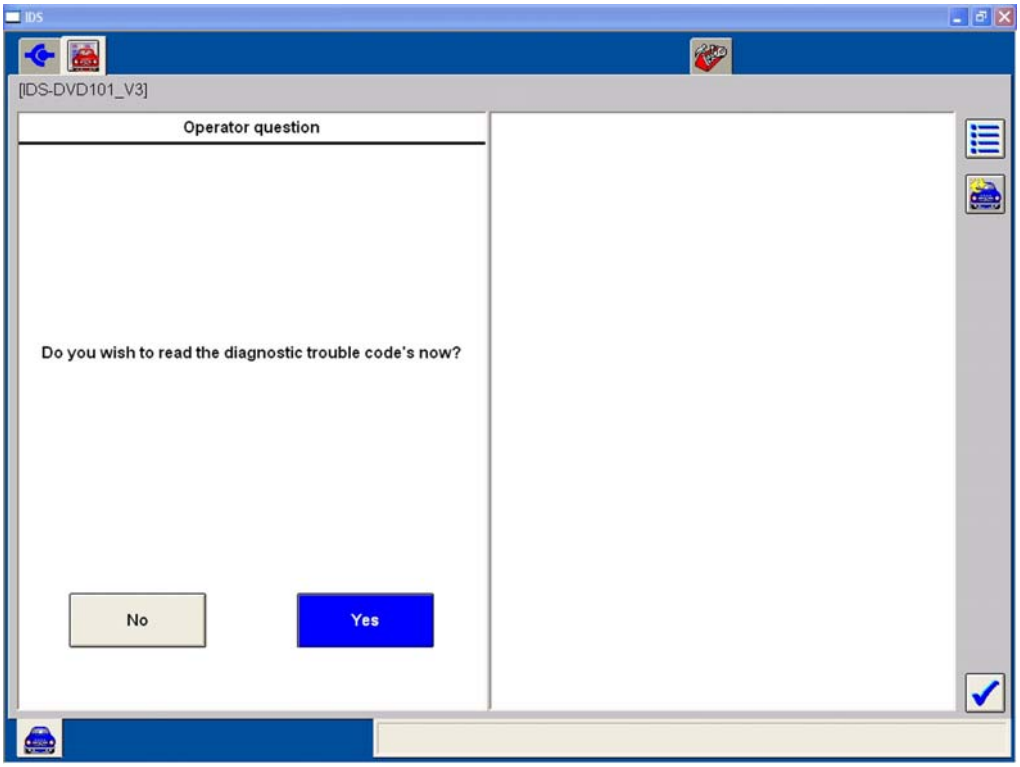
Using DTC Monitor

Before using the DTC monitor, a specific area of the vehicle may be selected from the content model.

The option to read DTCs may be selected after the VIN entry screen, when a session is first started, by answering **Yes** when IDS asks the user: 'Do you wish to read DTCs now?'

DTC monitor will automatically be opened.

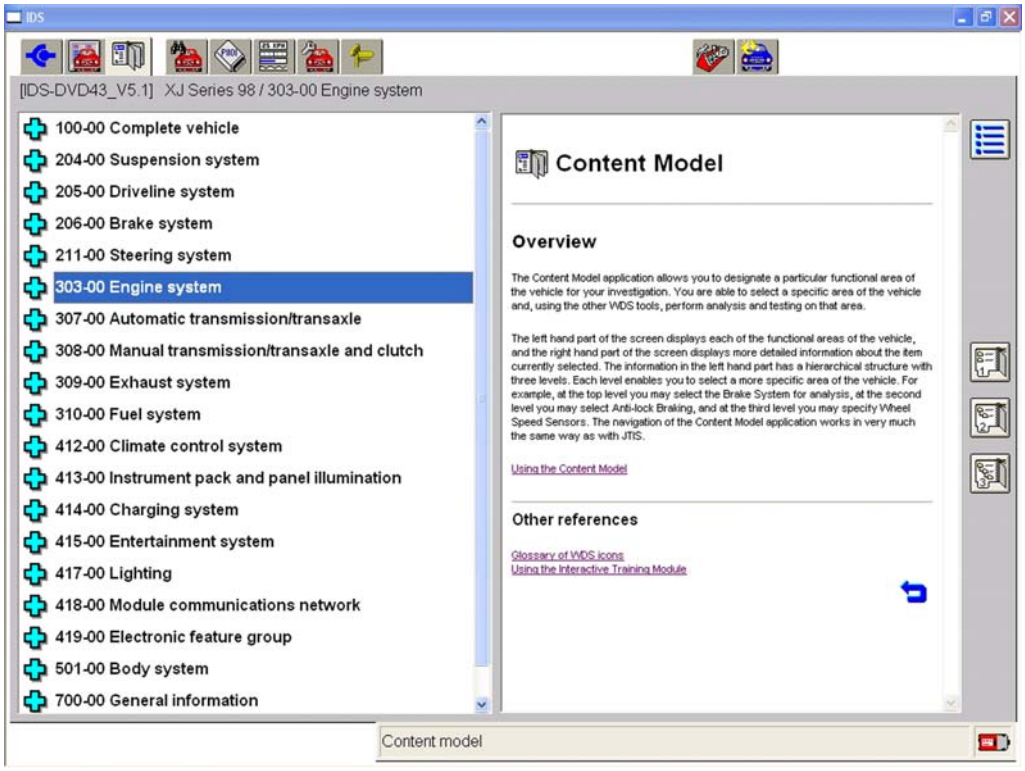
Operator Question



E81511

IDS is able to scan all modules on the vehicle for DTCs or a specific system may be selected from the content model. It will be noticeably quicker if only the desired system is scanned for DTCs compared with scanning all of the modules.

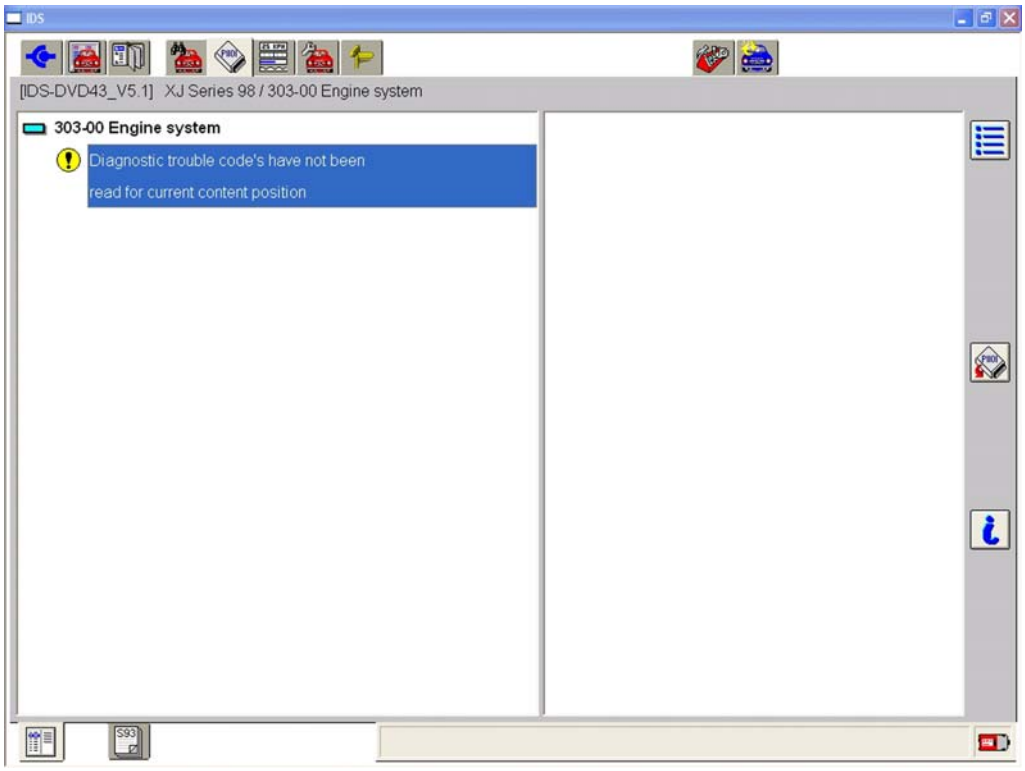
Example: Selecting 303-00 Engine, Powertrain Control Module (PCM), rather than the full vehicle.



E77968

After selecting the required system, select the DTC monitor tab.

The chosen system will be displayed in the DTC signal selection screen.



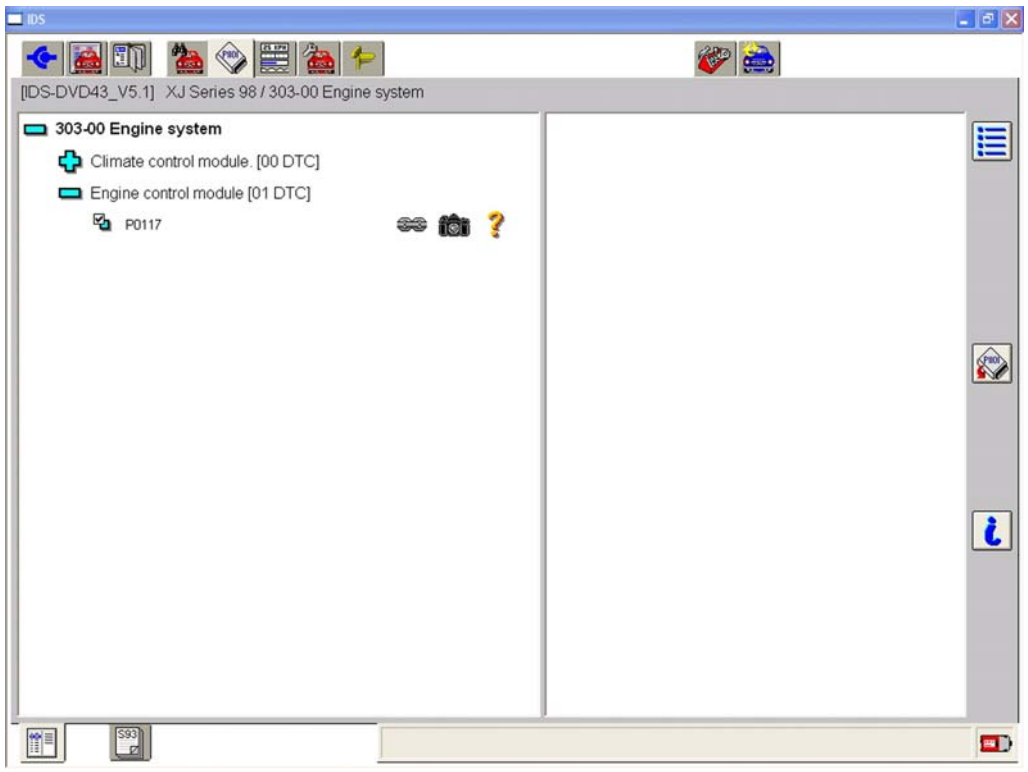
E77969

Highlight the desired system from the signal selected screen and select the 'read DTCs button'.

Read DTCs

The DTCs will be displayed once they have been read from the selected vehicle system. The status of the DTC is also shown.

Displayed DTCs



The presence of a question mark, indicates that a test is available for the displayed DTC.

Test Available

If the **Guided Diagnosis** tab is displayed, then a guided diagnostic routine is available.

Test Available

Guided diagnostic routine will lead the technician through a series of checks in order to establish the fault.

If the **Pin Point Test** button is displayed, a pin point diagnostic routine is available.

Pin Point Test Button

A **Pin Point Test** will allow the technician to carry out a system pin point test in order to diagnose the fault. The technician is able to select which of the available pin point tests are applicable to the logged DTC.

Example: If the DTC has been logged due to a short circuit to ground. It is pointless carrying out the pin point test which checks for open circuit on the power supply.

Once either a **Pin Point Test** or a **guided Diagnostic** routine has been carried out. Either a **Tick** or a **Cross** will be displayed in place of the **Question Mark**, depending on the result of the test. A **Tick** confirms that the system passed the test, while a **Cross** indicates that the system failed the test.

Diagnostic Trouble Code (DTC) Information

DTCs are now be three bytes long on vehicles using diagnostic protocol ISO 14229. This was introduced form 2004 MY. The first two bytes will identify the fault area/component and the third byte will be the fault type (For example open circuit). The third byte fault type definitions are defined by SAE and are standard across all manufacturers. The following example shows the make up of a typical DTC.

P0720-14 Transmission Output Speed Sensor General Electrical Failure short circuit to ground or open circuit.

The IDS will decode the DTC fully.

DTC Status - Fourth Byte

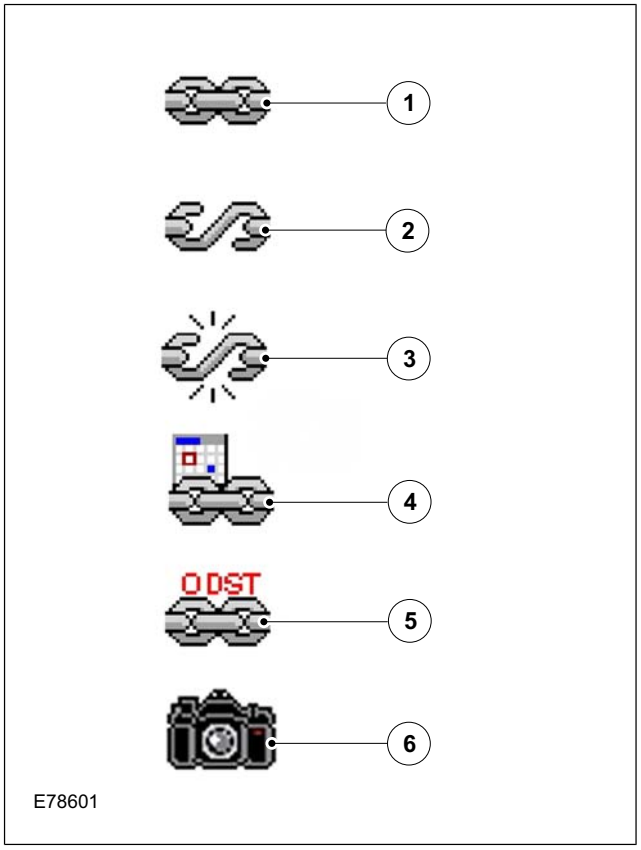
When IDS reads a DTC, a fourth byte of information is returned, which contains information relating to the status of the DTC.

This fourth byte of information may be displayed in two ways.

- Method 1 - DTC status symbol displayed adjacent to the DTC
- Method 2 - The sorted order of the DTCs

The DTC status symbol is always displayed adjacent to the DTC, following a DTC read.

DTC Status Symbols



1 DTC Permanent

2 DTC Pending

3 DTC Intermittent

4 DTC Historic

5 On Demand Self Test

6 Freeze Frame data available

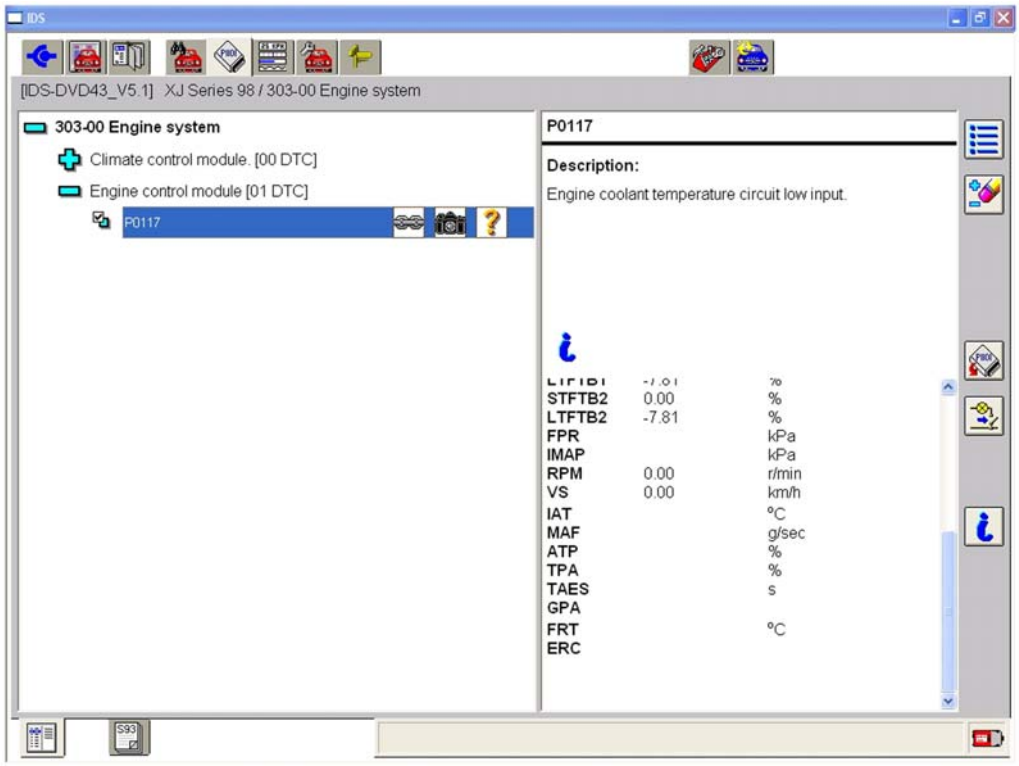
DTC Symbol Summary

- **Permanent** - Applied to a continuously monitored DTC which is logged and where a corresponding fault is currently present
- **Pending** - Applied to a continuously monitored DTC where a corresponding fault has been detected in either the current or previous drive cycle, but has not yet been present for the complete drive cycle to enable it to be transferred to the logged state

- **Intermittent** - Applied to a continuously monitored DTC which is logged but where the fault is not currently present
- **Historic** - Applied to a continuously monitored DTC where a fault was previously detected but has not been detected for a set period
- **ODST** - Applied to a DTC which is logged as a result of running an ODST
- **Freeze Frame data available** - Indicates that a sample of freeze frame data is available. (Conditions when DTC was logged)

Select a DTC from the left part of the screen. Its description and additional information are displayed on the right, if available.

DTC Information



E77971

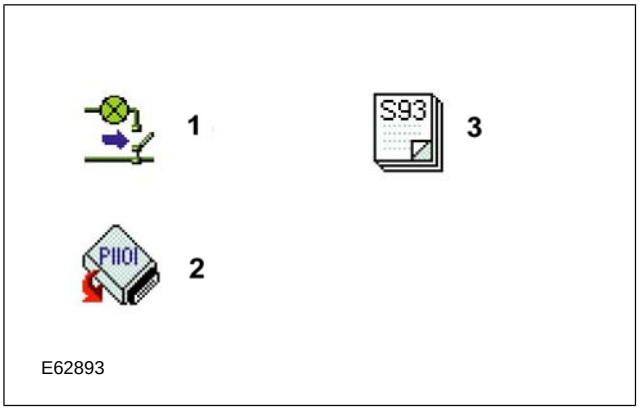
The 'Freeze Frame Data' symbol is displayed, when freeze frame data is available.

The freeze frame data is a 'snap shot' record of the data values when the DTC was logged. Freeze frame data is only supported by emission related DTCs (OBDII).

Freeze Frame Data

The status of the DTC and the availability of pinpoint tests are indicated next to the DTC

- To pinpoint the cause of the DTC, start a pinpoint routine by selecting (1)
- When you have diagnosed and repaired the fault, re-test by selecting (2)
- You can generate an S93 report by selecting (3)



1 Pinpoint Test

2 Re-run read DTCs

3 S93 report

NOTE: If a DTC scan performed on a specific subsystem results with a response of; **'No content available for this component'**, the subsystem selected may be too specific. Return to a more general level of the content model and repeat the scan.

Enhanced DTC Summary

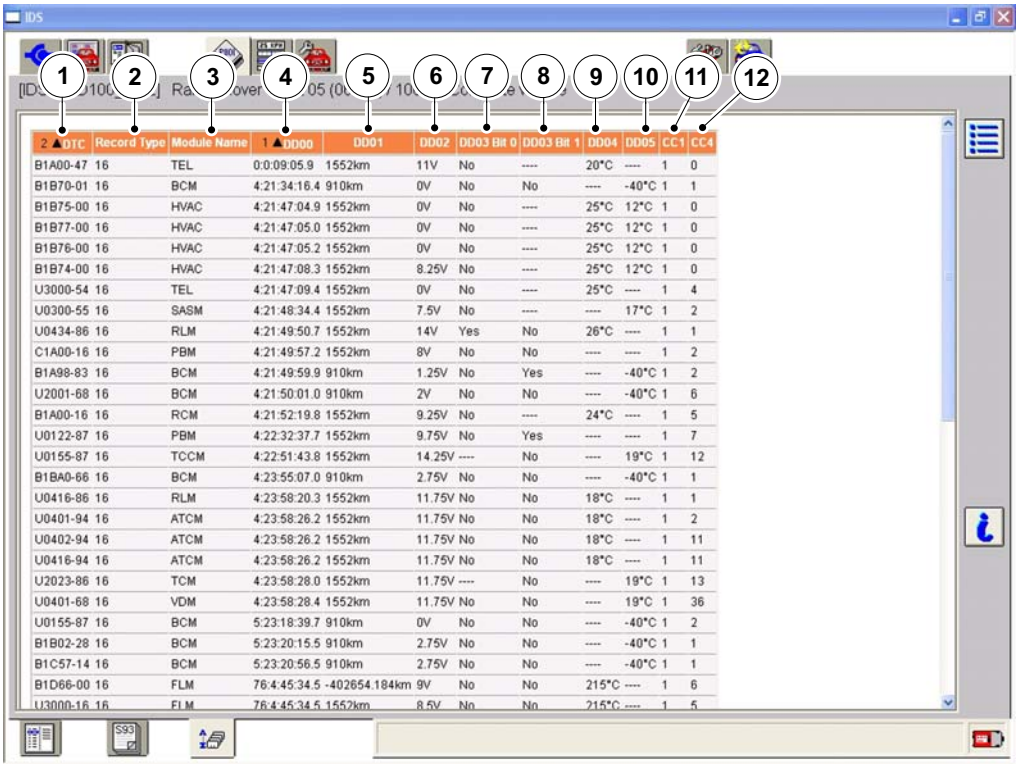
It is now possible to sort the DTCs in a specified order.

To display the sorted order of the DTC, select the sort DTC sub-tab.

Sort DTCs

The DTC information will be displayed in the following format.

Enhanced DTC Summary



E81513

The following information is displayed

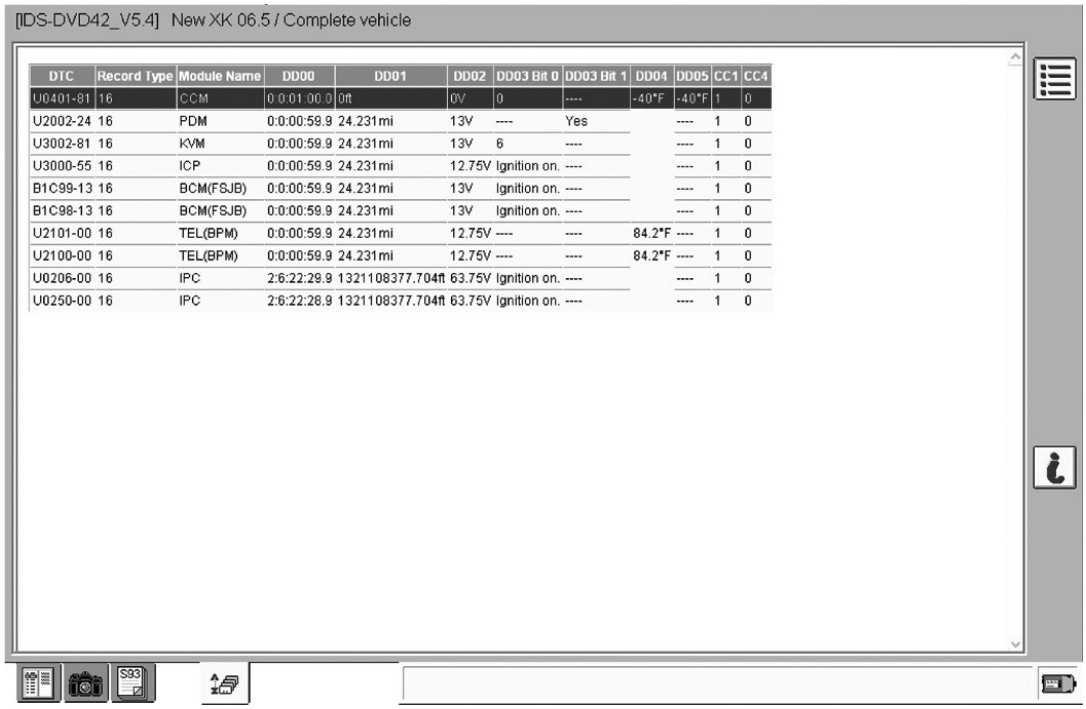
1. **DTC** - List of logged DTCs
2. **Record type** - The number of the snapshot data the DTC was sorted by. 16 - first occurrence of DTC. 17 - last occurrence of DTC
3. **Module name** - The control module from which the DTC was read
4. **DD00** - The elapsed time since the DTC was logged, displayed in days, hours, minutes, seconds and tenths of a second
5. **DD01** - Odometer reading when DTC logged
6. **DD02** - Battery voltage measured at module when DTC was logged
7. **DD03 Bit 0** - Engine running status
8. **DD03 Bit 1** - Engine cranking status
9. **DD04** - In vehicle temperature (°C)
10. **DD05** - Ambient temperature (°C)
11. **CC1** - DTC cycle counter 1; the number of ignition monitoring cycles since the fail was last detected
12. **DD4** - DTC cycle counter 4; the number of monitoring cycles during which a fail has been detected

Selecting a column heading, groups all of the DTCs per that heading.

Example, selecting 'Module Name' will group all DTCs logged on a single module together as a group in module name in alphabetical order. Similarly, selecting 'DTC', will group all DTCs in alpha numeric order.

If snapshot data is available for the selected module, the snapshot sub-tab will be available.

Enhanced DTC Summary - snapshot data available



NOTE: Not all DTCs or modules report all items of snapshot data.

On initial inspection this feature may appear to be worthless, but if numerous DTCs are present, they can be sorted by the time which has elapsed since the DTCs occurred. This is particularly useful if a customer is complaining of a fault which occurred 3 days ago. The technician may easily rule out DTCs which are more than 3 days old, or have only just occurred. Also, if modules are reporting message errors on the network, the information can be analysed to see in which order the modules reported the error. This information can then be used to find out which module was the first to report the network problem and hence narrow down the area of search where the fault lies.

Erasing DTCs

To erase a DTC, highlight the system, from the selected signal screen, and select the **Select DTC for clearing** button.

Select DTC For Clearing Button

The symbol will be displayed adjacent to the displayed DTCs.

To deselect the DTCs, operate the **De-select DTC** button.

De-select DTC

Once the select DTC for erasure symbol is displayed adjacent to the DTC, select the **Erase DTC** button.

Erase DTC

The DTCs will be erased, providing the fault is not present.

The **Select / De-select Button** may also be used to select or de-select DTCs for clearing.

Select / De-select Button

S93 Report

S93 Report Sub-Tab

The S93 sub-tab provides a method to generate an S93 report, a specific extract of freeze frame data is taken from the Powertrain Control Module (PCM) together with software and calibration data from other modules to produce a document required by CARB/EPA. In US markets it is a legislative requirement that an OBDII report is completed and returned to the manufacturer whenever an emission related failure occurs (i.e. MIL on). The IDS version of this document is called the S93 report.

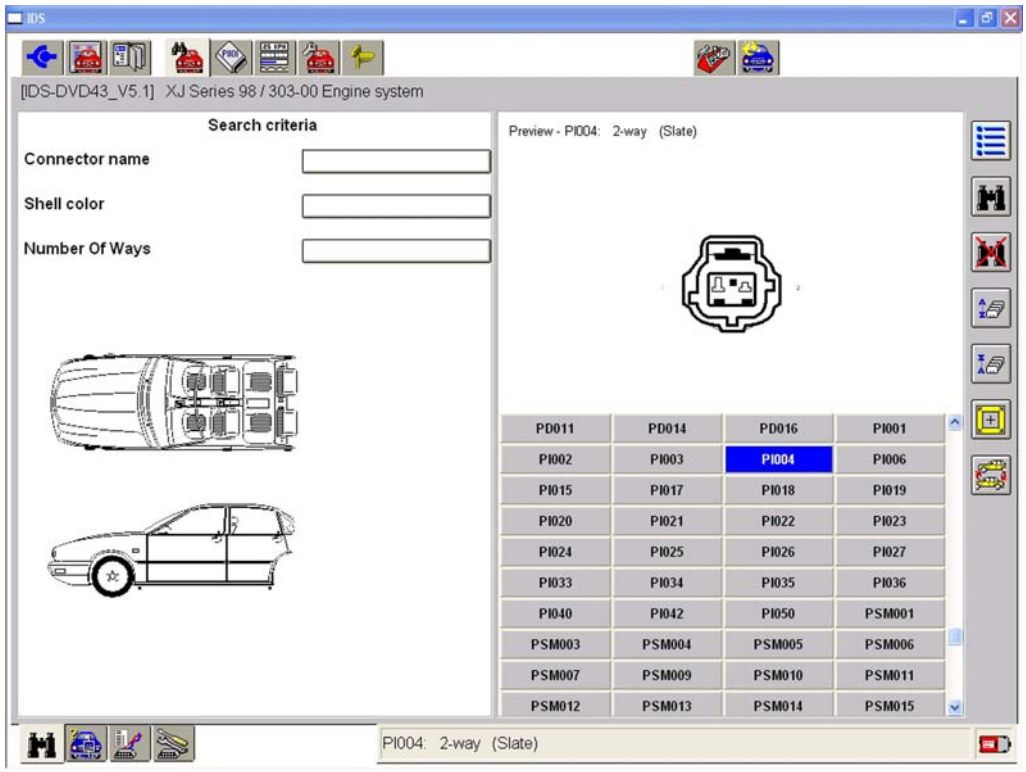
From the S93 sub-tab, you can:

- Generate the S93 report for the current vehicle
- Display the report for your viewing
- Save the report locally on IDS
- Open an existing report from any session which is stored locally on the IDS
- Print the report
- Send it over the Internet to Jaguar Cars LTD

Using Connector Information Viewer

The Connector Information Viewer (CIV) enables you to locate details about any electrical connector fitted to a vehicle by specifying the search criteria.

CIV Search Screen



E77961

NOTE: All vehicles are not supported by CIV. When CIV is not available, refer to GTR.

Selecting the Connector Search sub tab opens the CIV search screen.

Enter your search criteria in the fields in the left hand pane of the screen.

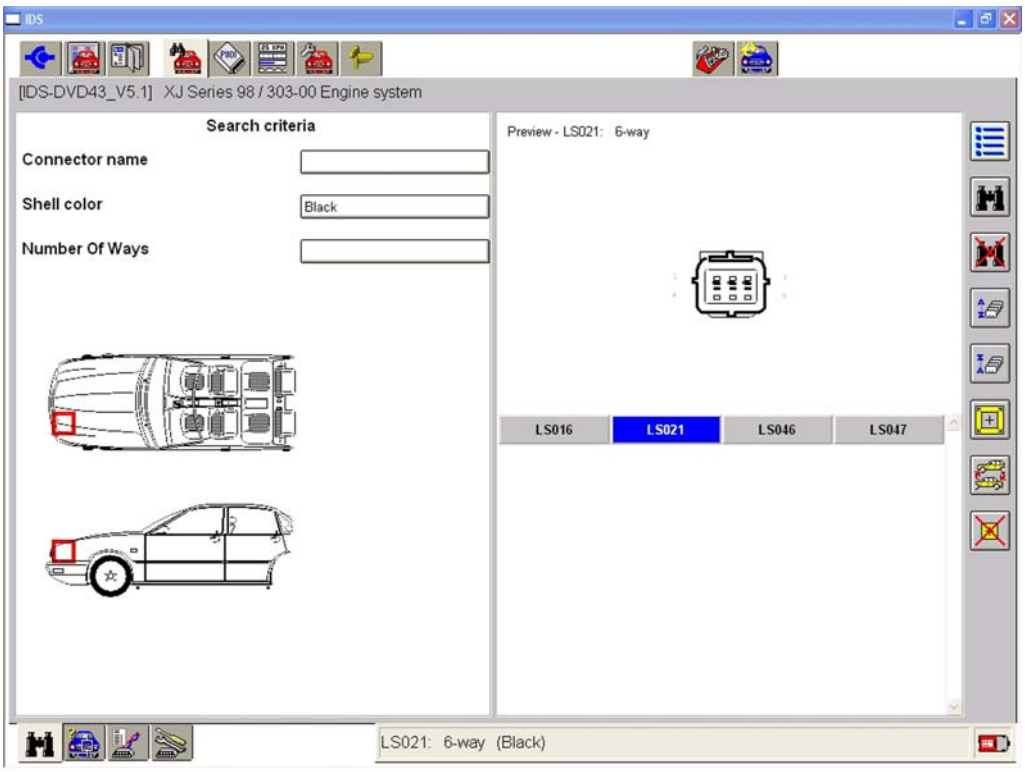
Do this by touching one of the search criteria fields and selecting the appropriate item from the list of options as follows:

- Connector - name or reference number
- Shell colour - connector colour
- Number of Ways - number of pins

The right hand pane lists all the connectors that satisfy the search criteria you have entered. When you select a connector by its name or reference number, a picture and brief description are also displayed. Once you have selected a connector other sub tabs become available that provide access to additional information.

The area of the vehicle where the connector is found may also be touched and used as a search criteria.

CIV Search Screen



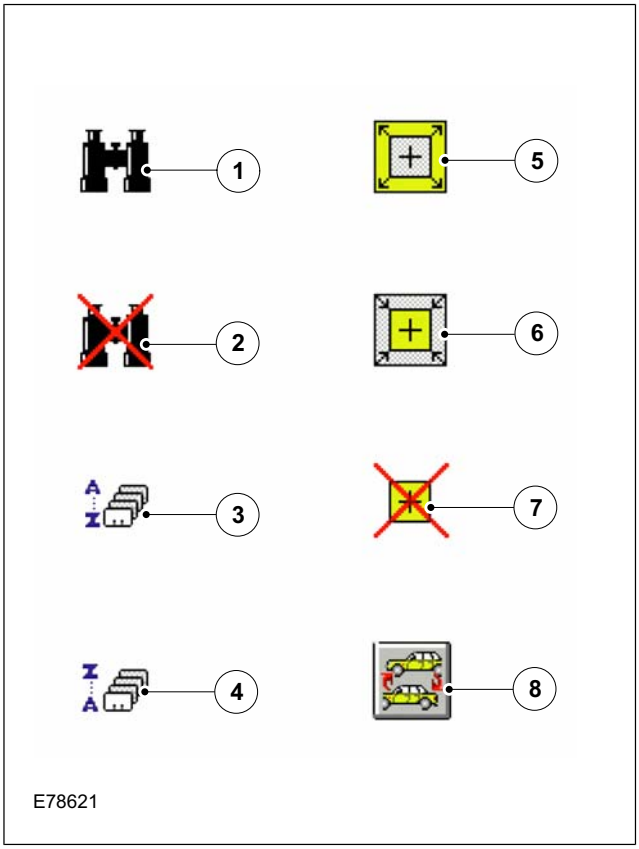
E77962

The name of the connector is displayed on the status bar at the bottom of the screen. The red square on the side and plan views of the vehicle, indicate the location of the connector.

NOTE: If you open the CIV screen when you are running a guided diagnostic routine, the appropriate connector will already be selected for you and the connector location sub-tab is pre-selected.

Several buttons will be available in the button bar.

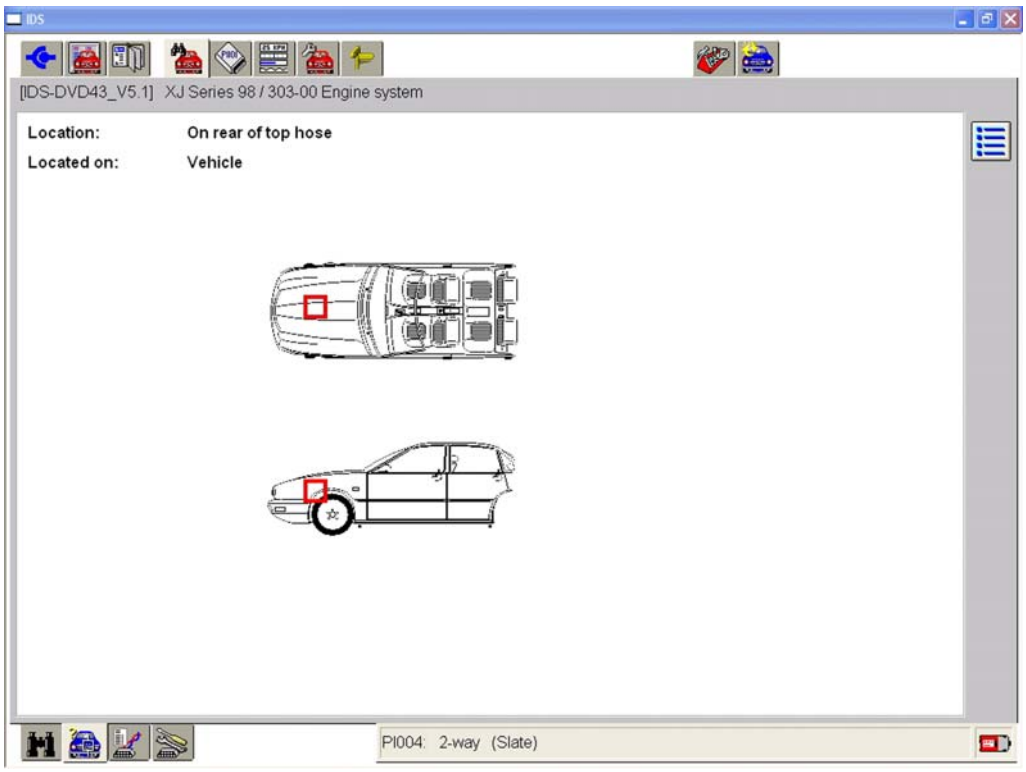
CIV Buttons



1 Search
2 Ignore search
3 Sort - Ascending order
4 Sort - Descending order
5 Increase size of location area
6 Decrease size of location area
7 Remove location highlight
8 Next available view

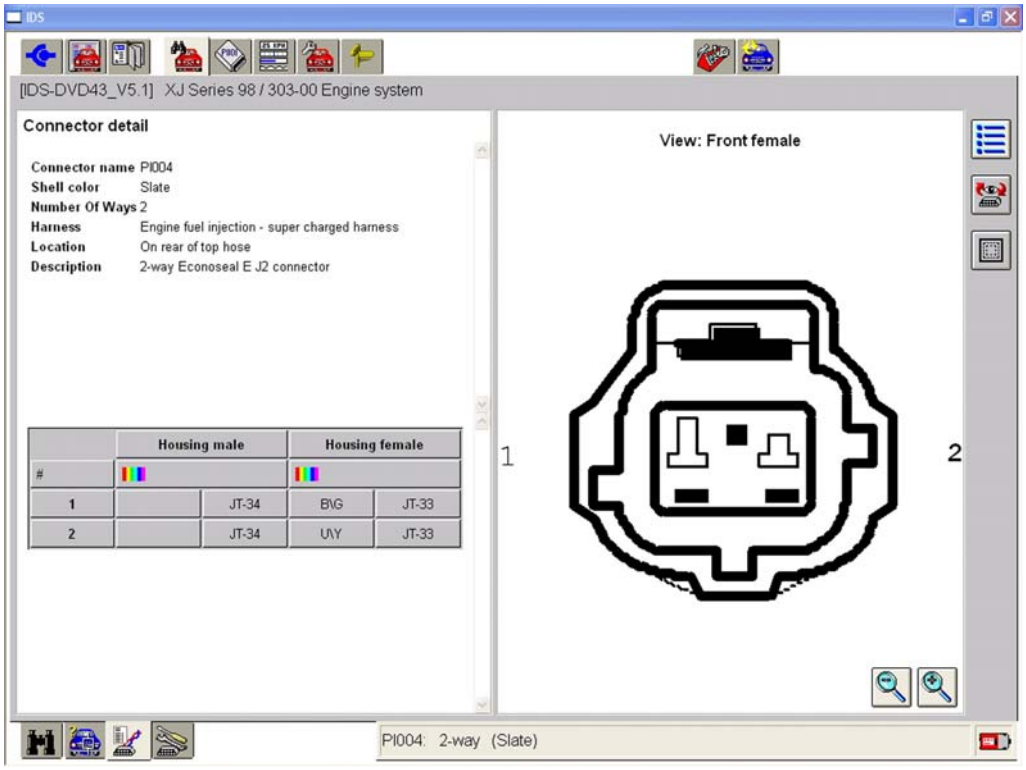
More detailed information may be found using the CIV sub tabs.

Locate Connector



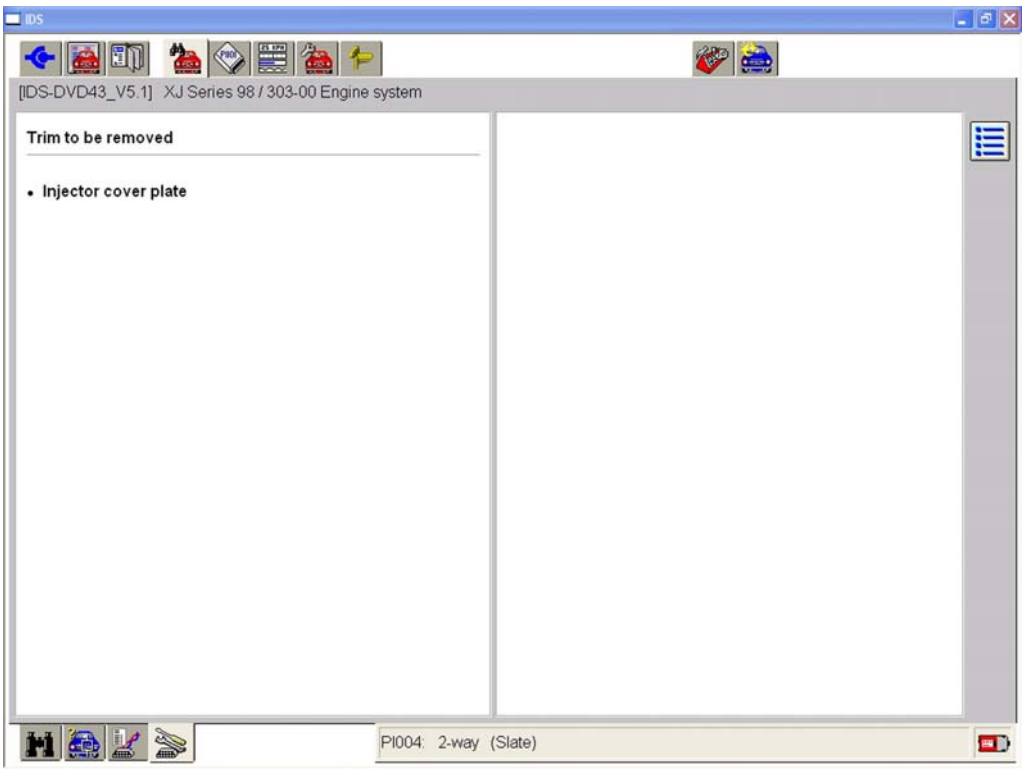
E77965

Detailed Information



E77964

Trim to be Removed



E77963

CCF

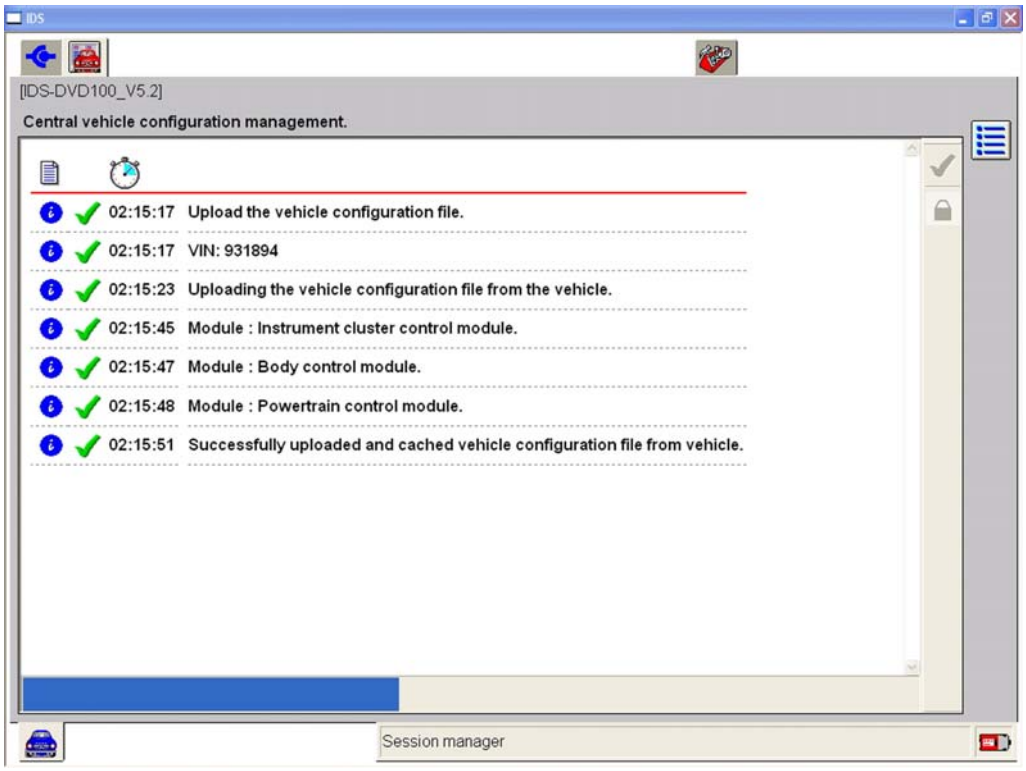
CCF files are used on the new XK. The CCF on the vehicle replaces what was previously known as the Vehicle Identification Data (VID) block. Although VID block data has been replaced by CCF data, the principles of the two are similar.

The CCF files are stored in several modules, one of which will be the master module. The other modules store copies of the CCF data which may be used when programming new modules.

When IDS is connected to a vehicle which uses CCF data, the CCF data will automatically upload from the vehicle to the IDS diagnostic system.

The modules from which the CCF data have been uploaded, together with the current VIN, will be displayed.

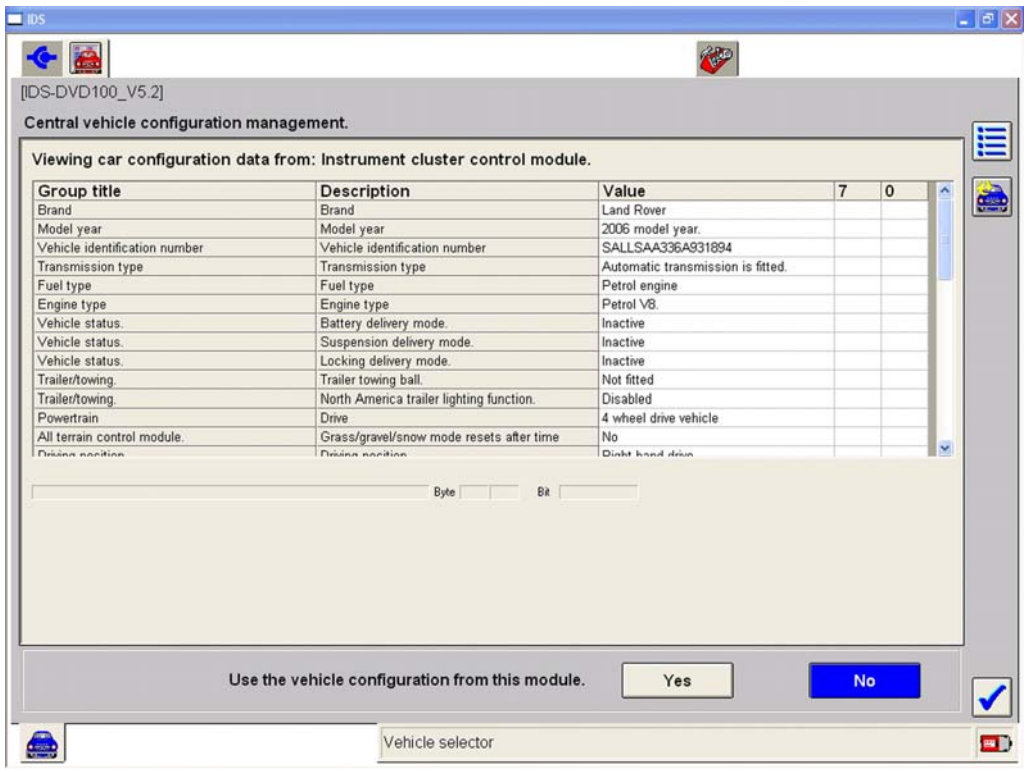
Uploaded CCF



E79291

Selecting the confirmation 'tick' will proceed to the next screen which will display the CCF detail. This will be from the master CCF module.

CCF Data



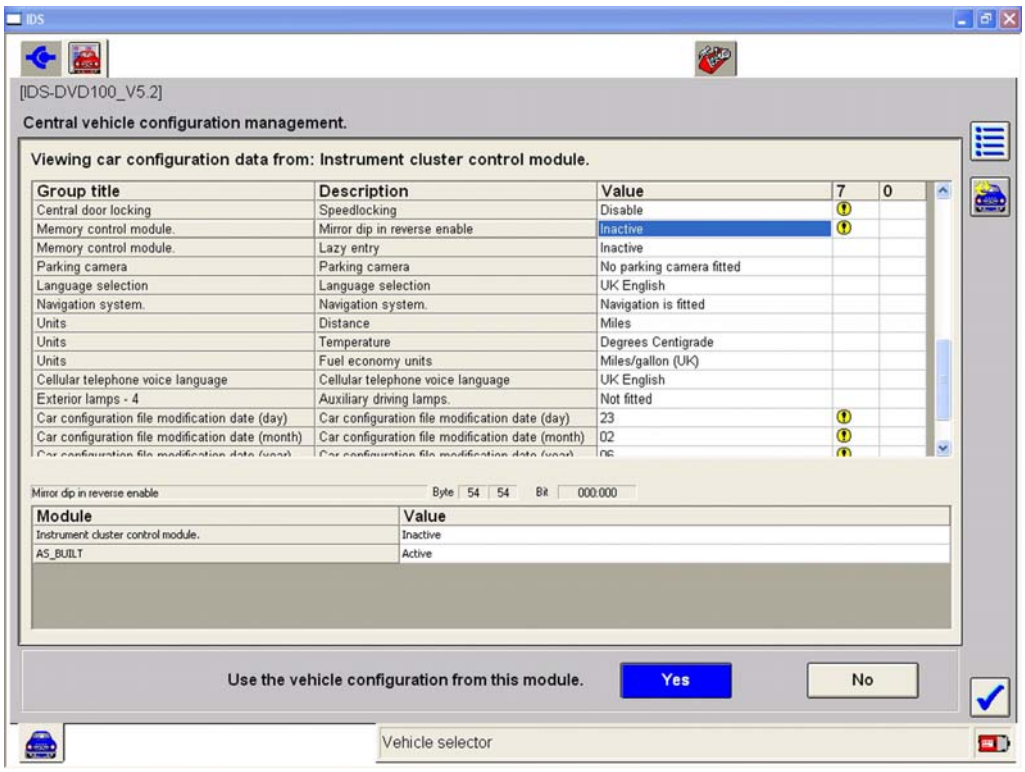
E79292

A question is displayed at the bottom of the screen, asking the user to confirm whether the data should be used from the currently displayed module or whether to use the CCF data from another source.

The number at the top of the fourth column displays how many conflicts are present when comparing the displayed CCF data to the As Built CCF Data.

Scrolling down the displayed page will reveal more of the CCF data.

CCF Data with Errors



E79293

The exclamation error symbol

Error Symbol

denotes in which parameter a CCF data conflict exists.

Highlighting the error value, will display additional information at the bottom area of the screen.

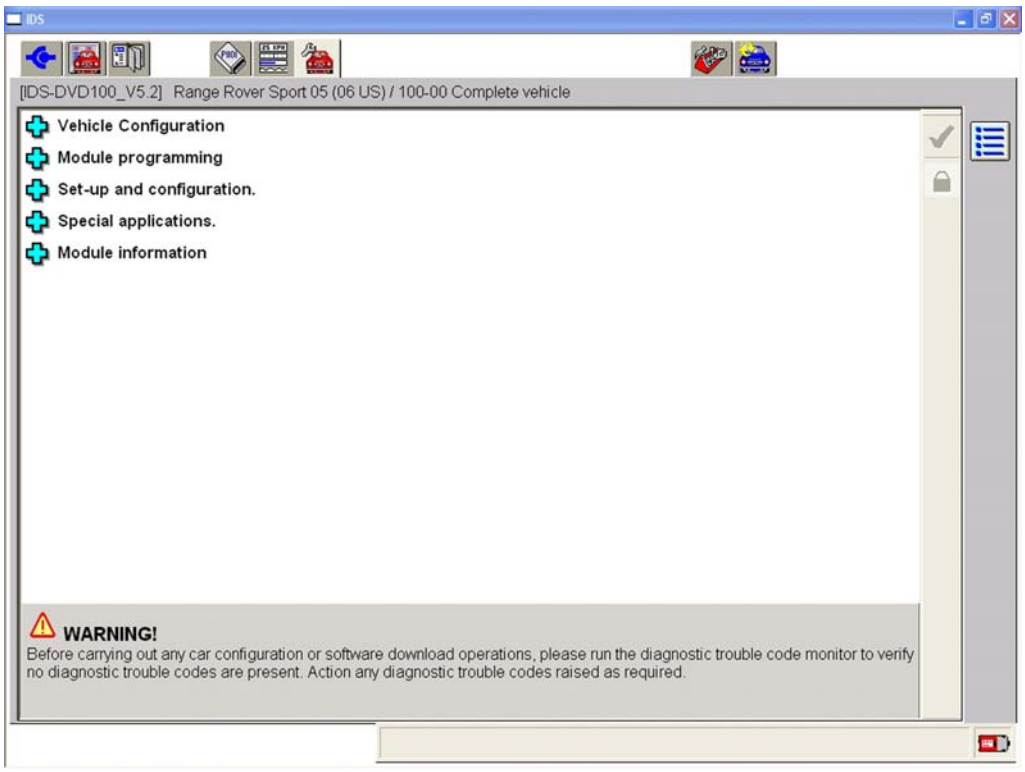
From the illustration it may be seen that the data relating to the **mirror dip in reverse enable** value is **Inactive** in the instrument cluster. However, the **mirror dip in reverse enable** value is set to **Active** in the as built data.

This shows why the error symbol is displayed.

In this example, the **mirror dip in reverse enable** value has been changed using the customer personalisation settings.

A CCF editing tool is available which allows certain parameters of the CCF data to be changed using IDS. This is available from the vehicle configuration tab.

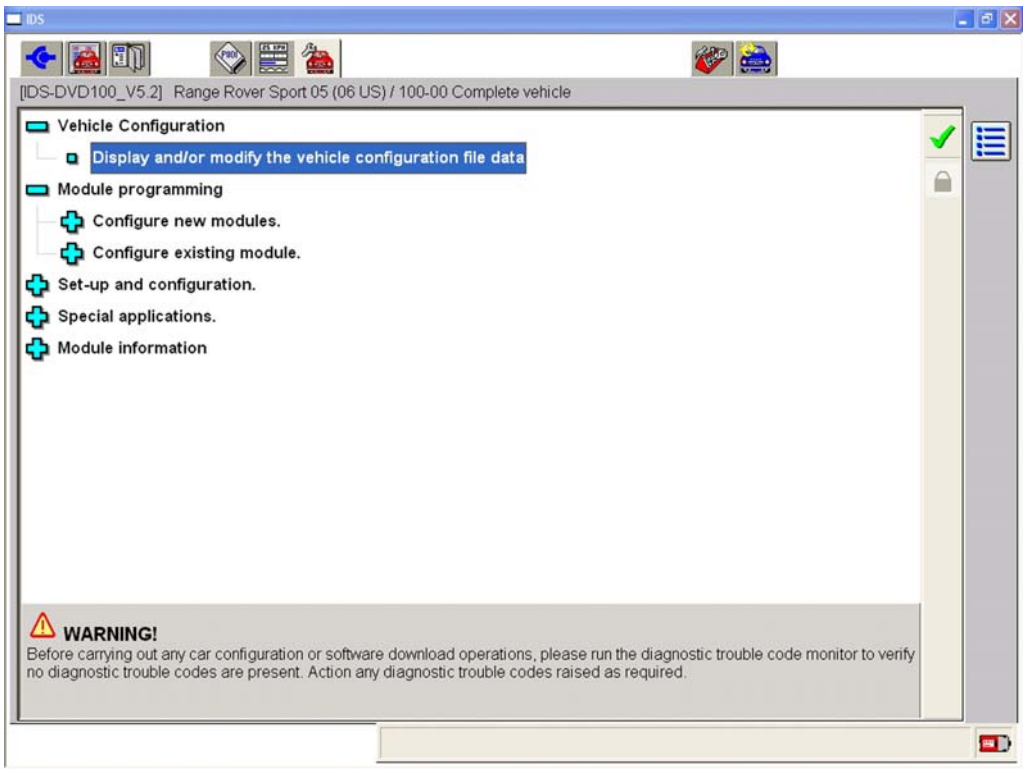
Configuration Menu



E79297

Expanding the vehicle configuration menu will reveal the options available.

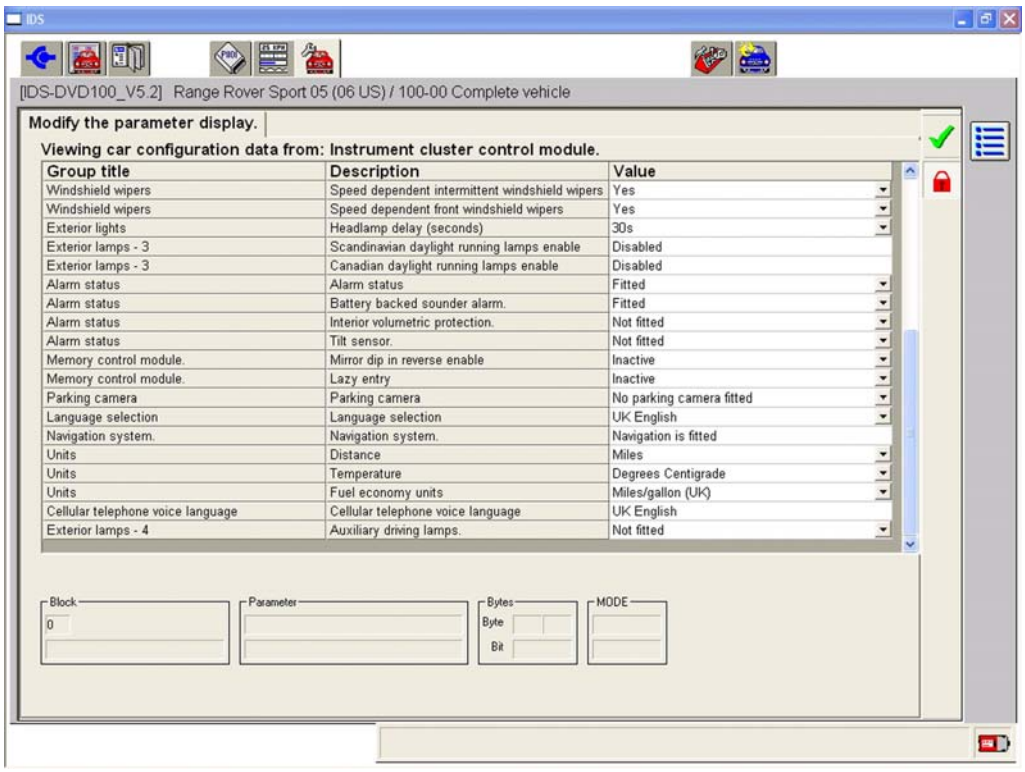
Vehicle Configuration Menu



E79298

Confirming the selected option will display the CCF data editing screen.

CCF Data Editing Screen



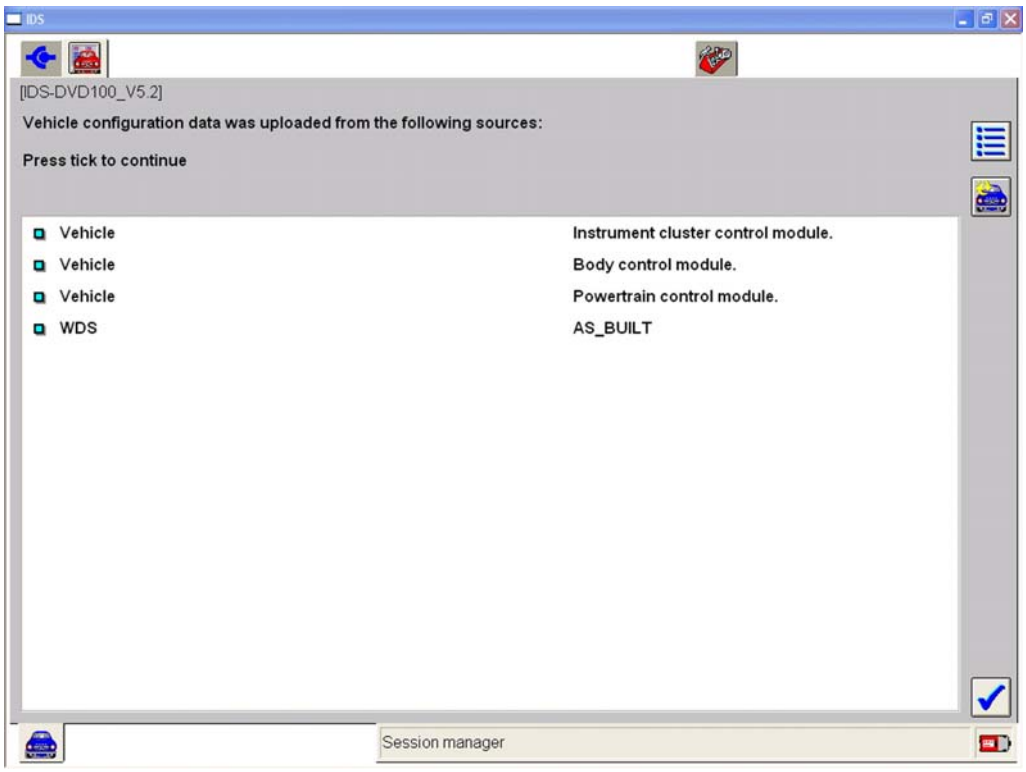
E79295

Selecting the drop down arrow will reveal which changes may be made.

Editing Option Menu

Modules may be programmed using the CCF data from any of the available sources.

CCF Data Sources



E79299

This screen will also be displayed after answering **No** when IDS requests the user to confirm that the CCF data should be used from the currently displayed module.

NOTE: If using the as built data to program modules, all customer personalisation settings will be lost and will need to be reset.

NOTE: The As Built Data is copied onto the IDS software discs when it becomes available. Therefore, a situation may occur when the As Built Data is not available for a particular VIN number until the next IDS software release.

As built CCF data will only normally have to be used to program modules if the vehicle CCF data has become corrupt due to poor programming procedures carried out by the technician.

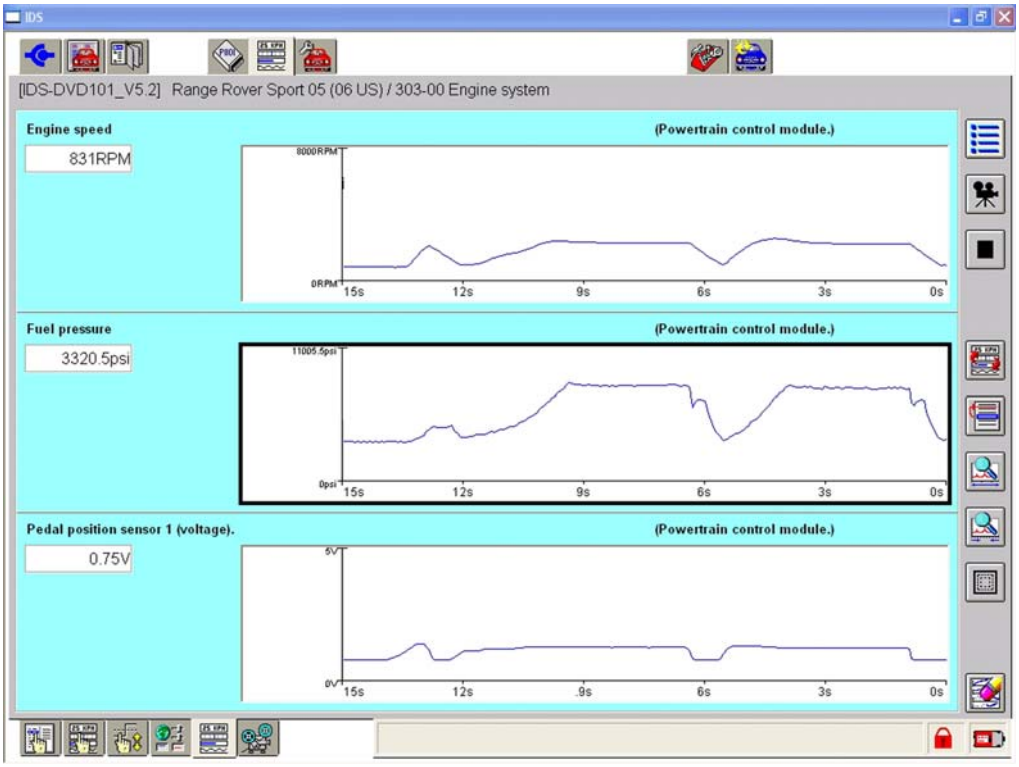
On completing this lesson, you will be able to:

- Identify the Datalogger Tab and Sub-tabs
- Monitor vehicle system signals using datalogger
- Manually capture a datalogger signal
- Use datalogger trigger's to capture a dalalogger signal
- Playback and review a captured datalogger signal
- Use Output State Control (OSC) to operate a system component

Overview

Datalogger acquires, displays and records vehicle signals. It also permits the value of output signals from a control module to be controlled. The user may decide which signals are to be monitored, how they are buffered, sampled and scaled for display. Limits and trigger settings may also be set.

Datalogger Live Display Screen



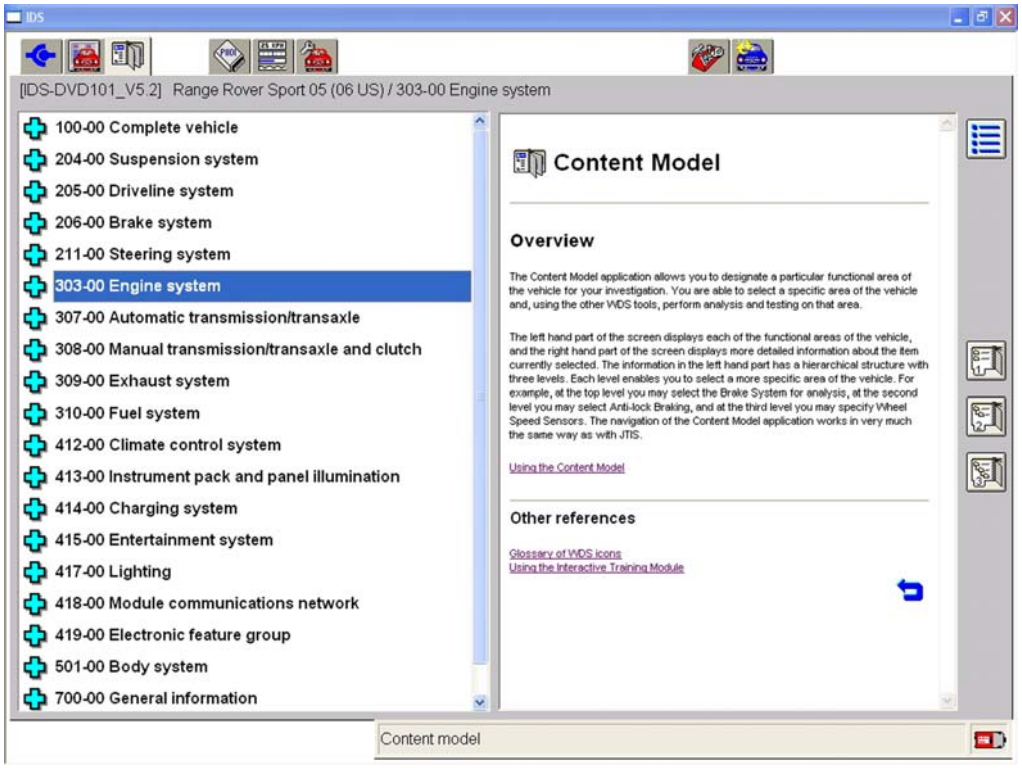
E81504

Signal Selection

The Signal Selection screen is the screen displayed when datalogger is first opened. This provides an opportunity to immediately select or de-select any signals.

Selecting Vehicle System from Content Model

The user may select the desired system to be monitored from the content model prior to selecting datalogger.



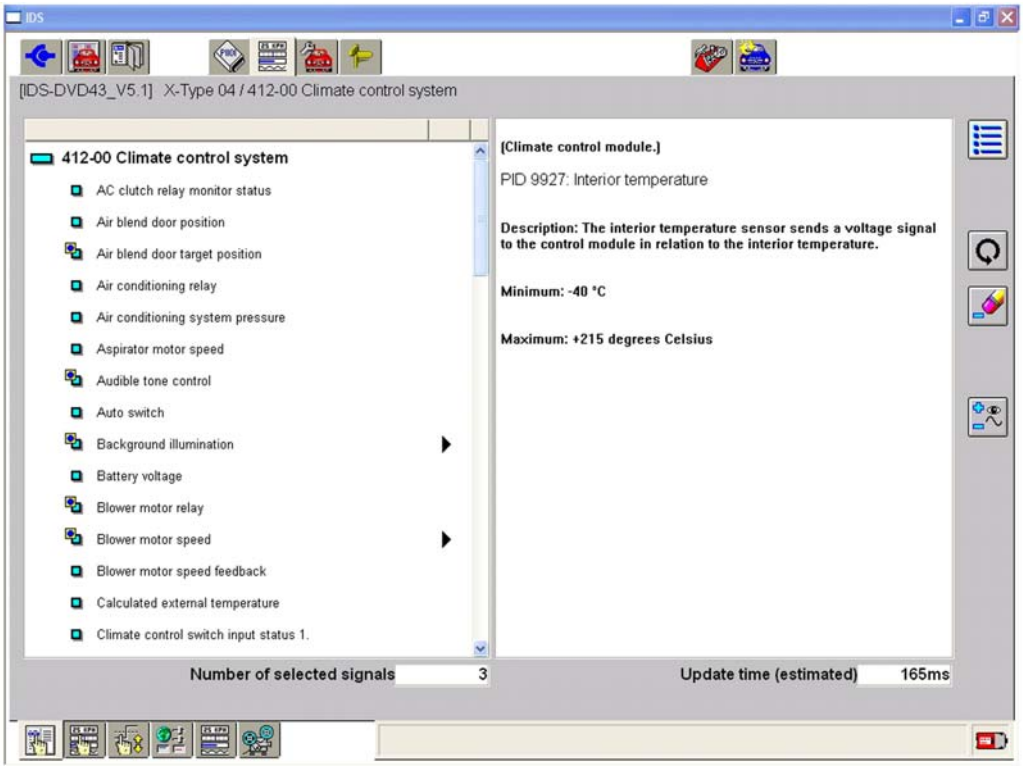
E81508

Select the datalogger tab at the top of the screen. The signal selection screen will be displayed, by default, when datalogger is first selected.

The signal selection screen may be selected using the datalogger 'Signal Selection' sub-tab, when a different datalogger screen is displayed.

The screen is laid out so that the signals are displayed in the left hand pane with help text, if available, in the right hand pane.

Datalogger-System Selection Screen



If the vehicle system has first been selected from the content model tab prior to selecting datalogger, the Output State Control (OSC) function (where applicable) will be configured. The components which are supported by OSC is indicated by the circle inside the small box adjacent to the signal title as seen in the illustration above.

Screen Layout

Left-hand panel - Available Signals: The left-hand panel displays all available signals.

Right-hand panel - Signal Help Text: The right-hand panel is used to display information about selected signals, such as description, standard units, operating range etc.

Signals are displayed as a menu structured as an hierarchical tree, similar to the menu structure of the vehicle content model. By selecting the + or - symbols adjacent to a system, the menu will be either expanded or contracted accordingly. Signals may be selected from anywhere within the menu structure.

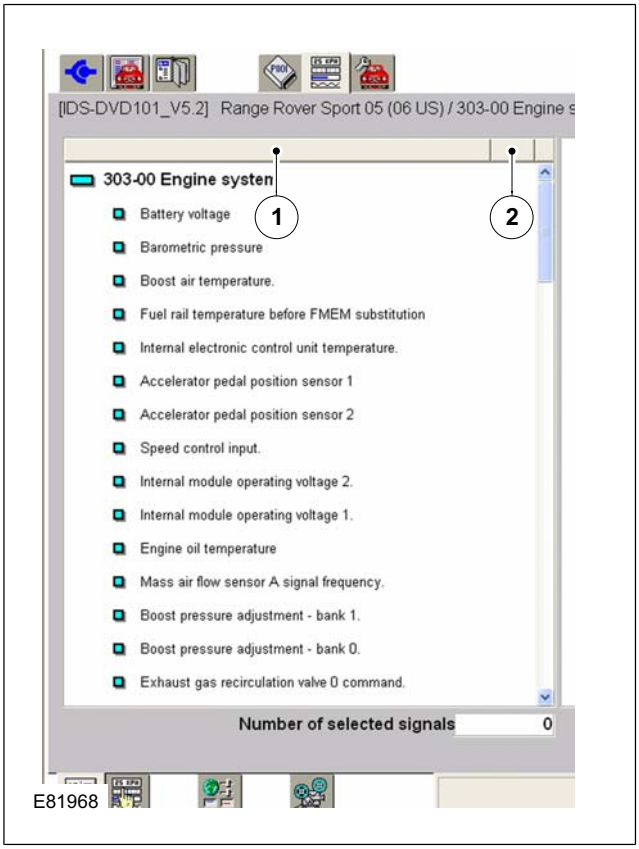
To select a signal for display or capture, highlight it and select the signal selection button.

Signal Select / De-select Button

Repeat this operation to de-select a signal.

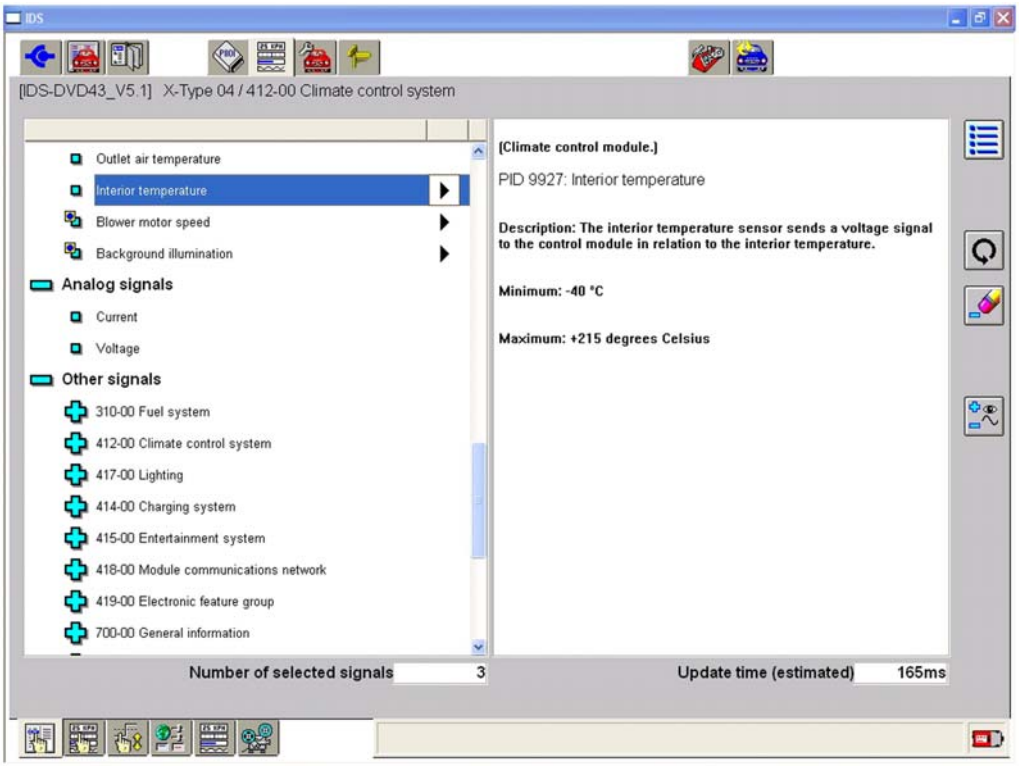
The signals may be displayed in alphabetical order in either ascending or descending order by selecting item 1 in the following illustration.

Signal Sort Buttons



The selected signals may be grouped together by selecting the bar at the top of the pane above the selected signals arrow (item 2).

Signals Grouped



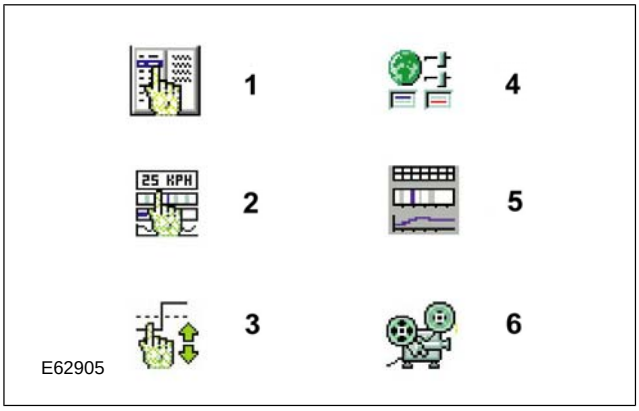
E77377

The number of signals selected is always displayed at the bottom of the screen.

Using Datalogger

Once the desired vehicle signals have been selected, use the datalogger sub-tabs to switch between Datalogger's various functions.

Sub-Tabs



1 Signal Selection: Select the signals for capture

2 Signal Configuration: Set signal attributes including Display, OSC. and Analogue

3 Trigger Configuration: Set the triggering limits of a selected signal

4 Global Configuration: Set the parameters of all selected signals and display a summary of information about them

5 Live Display: Capture selected signals and display them in real time

6 Playback Display: Recall and display previously captured signal data

Display Units

The units of measurement displayed on the traces may be changed to suit the users preference.

Example: Celsius to Fahrenheit, kph to mph and so on.

The changes must be made before data is displayed on the live display screen.

Global settings

The Global Settings screen contains the configuration items common to all signals and provides a summary of the current configuration.

Pre and Post trigger settings may be changed, as well as; captured recording time and capture rate.

In order to use the Output State Control (OSC) function, it must be enabled to **ON** using this screen.

Specifically, global settings allow you to set the duration of all captures within a session. The duration of Pre and Post triggers can be set so that additional data is recorded following a trigger event. This means that a session file can contain captures of varying duration. The road test function for datalogger is also set using this screen.

Capture duration

The capture duration is the recorded time of the signal data which is saved following either a trigger event, or following selection of the record button. The recorded data may then be viewed by the user.

The capture duration, or record time can be pre set in increments using the fast medium and slow buttons as follows:

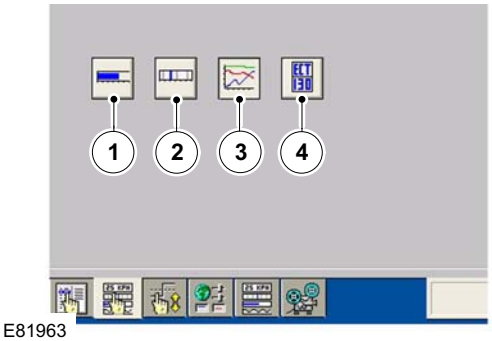
- Capture duration Fast- 30 seconds
- Capture duration Medium- 10 Minutes
- Capture duration Slow- 12 Hours

For trigger information, refer to the trigger section of this lesson.

Signal Display

The display format of the signals may be changed using the signal 'Display Type' buttons from the signal configuration sub tab.

Signal Display Type Buttons



1 Bar graph display

2 Histogram display

3 Waveform display

4 Digital display

Alternatively, once the datalogger signals are displayed in the 'Live Display' screen, the format of the displayed signal may be changed using the 'Change Signal Display Type' button

Change Signal Display Type Button

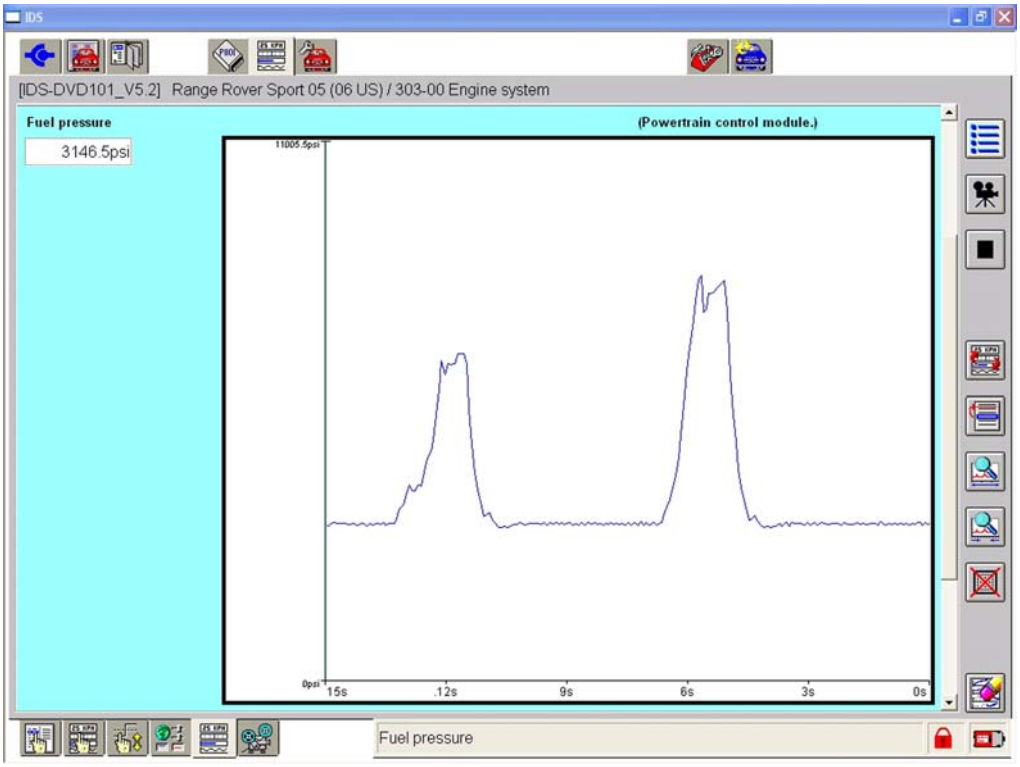
Up to three signals can be displayed on each screen, or one signal can be displayed full screen.

Select the **play** button to start datalogger. A message will be displayed if communication with the vehicle has been terminated.

To expand a signal, select the signal and operate the expand to full screen button

Full Screen Button

Expanding Signal Display



To contract the expanded signal, select the close full screen button.

Close Full Screen

Changing Signal Order

The initial order in which the signals are displayed is dependant on which order the signals were initially selected. However, the order in which the signals are displayed may be changed.

To swap the display order of the signals:

1. Select the signal you wish to move
2. Selecting the Move Signal Position button
3. Select the signal that occupies the point where you wish the selected signal to be moved to

Move Signal Position Button

Capture Playback

A datalogger signal may be captured and viewed later for analysis. The signal may be captured manually by selecting the ' Trigger Datalogger Recording' button, or

a trigger may be set so that when the selected trigger conditions are met, the datalogger trace will automatically be recorded.

To view a captured signal, select the 'playback viewer' sub-tab.

Playback Viewer Sub-Tab

Select the sub-tab to open the Playback screen. The format mirrors the Live Display screen: the range and display formats can be modified, and the X-axis can be expanded and contracted using the appropriate buttons (See Live Display Button Bar). When the Playback screen first appears, the last captured signal is displayed by default.

Selecting Captures for Playback

Select Event Button: When you select the button the Playback screen is overlaid with a dialogue box listing all the captured events stored in the buffer. Select the ones you wish to view and select the confirm button.

Restrictions During Playback

The following restrictions apply when using the Playback screen:

Because Playback is literally the replaying of previously recorded signals, it is only possible to make changes to the way in which the signals are displayed. It is not possible to alter anything that would affect the signals themselves. The following functions are therefore not available from the playback screen:

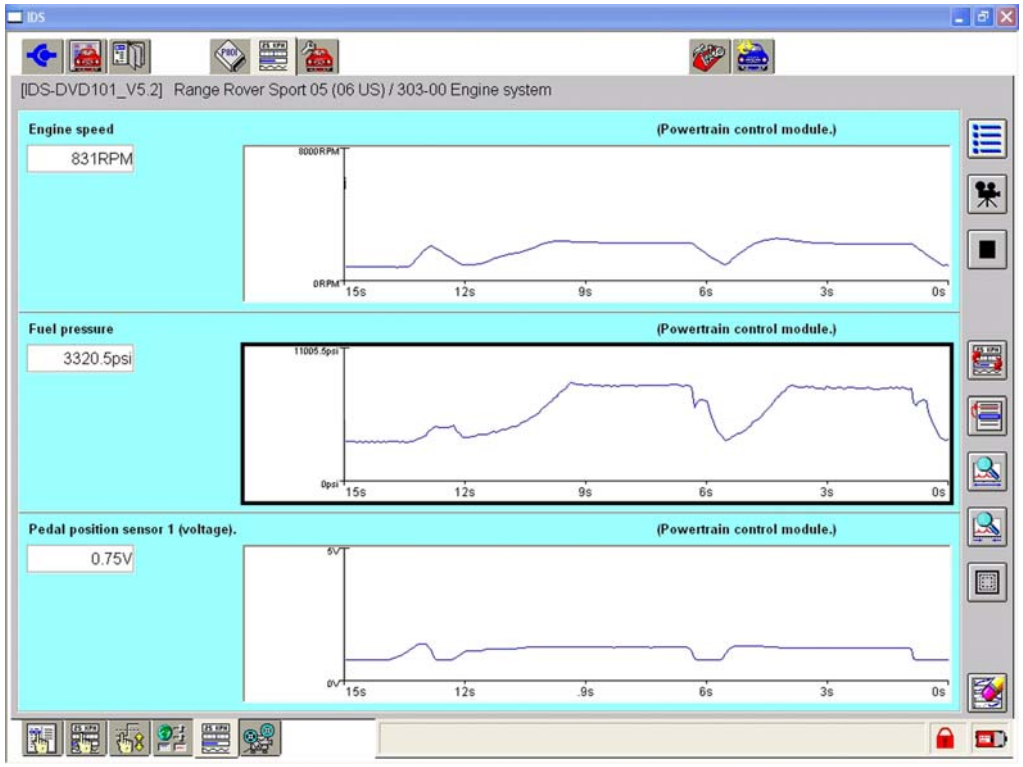
- Trigger configuration
- Output state control functions
- New capture button
- Clear graph

Live Display screen

When you select the Live Display sub-tab, datalogger verifies that the IDS is connected to the vehicle.

The Live Display screen and the Playback screen share certain features. The most obvious of these is the way in which signals are displayed.

Live Display Screen



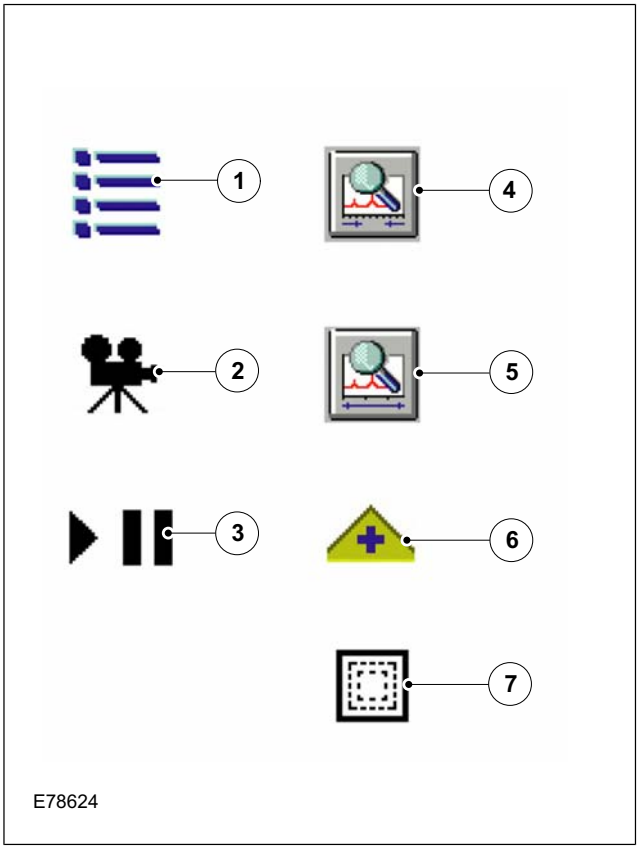
E81504

You can select a signal simply by selecting the waveform (or bar graph/histogram) or signal name. Up to three signals may be displayed together on the screen. This arrangement is made in the interests of clarity. If there are more than three signals, a vertical scroll bar will appear on the right of the screen to allow you to navigate between them.

Live Display and Playback Button Bar

The button bar permits you to capture and work on signals.

Live Display and Playback Button Bar



1 **System Menu:** This ever present button allows you to print, road test and exit datalogger

2 **Capture:** This button only appears on the Live Display screen

3 **Play/ pause:** This button only appears on the Live Display screen. It allows the Live Display to be stopped and re-started

4 **Zoom in:** When this button is pressed, the horizontal (X-axis) divisions are enlarged by increments of 10%, 20%, 50%, 75%, 100%, 150% 200%, 300% and 600%

5 **Zoom out:** When this button is pressed, the horizontal (X-axis) divisions are reduced by increments of 10%, 20%, 50%, 75%, 100%, 150% 200%, 300% and 600%.

6 **Increment OSC level:** This button only appears on the Live Display screen. Further, it only appears when OSC overwrite state on the Global Settings screen is On and at least one signal on the Signal Configuration screen has been assigned an OSC value

7 **Full screen:** Press this button to display the selected signal full screen. Press the button a second time to restore the normal screen display

Signal Capture

Datalogger signals may be captured for review.

Signals may be captured:

- Manually
- or by a Trigger event

Capture Store

Each session may store up to nine datalogger capture events (recordings). When a new capture is made, all of the currently selected signals are stored for a duration defined by the values set in the capture buffer section of the Global Settings screen. Captures may be triggered automatically using the trigger settings, or manually by selecting the capture button. In either case, while capture is in progress a bar graph is displayed in the status panel.

Capture by Trigger

When a trigger event occurs, signals are automatically captured, provided trigger action is set to record, in Trigger Configuration. Refer to the Trigger section of this lesson for further information.

Capture Completion

A capture event is completed either when its pre-set duration is reached, or when you select the Stop button. In either case, you will be prompted to confirm whether the capture is to be saved, and if so to give it a name using the keypad. You can store up to nine captures. When this number is exceeded, further captures over-write the oldest capture in the store.

Capture Restrictions

The following restrictions apply to capturing:

- No distinction is made between captured signals and signals selected for display
- An OSC signal can trigger a capture if you adjust its value to exceed its limit. This does not apply if a capture is already under way
- Auto-trigger is disabled when all nine event buffers are filled
- Captures can only be triggered by signals that are part of the selected signal set. This means, you cannot trigger on signal A and only capture signals B and C

Global settings

The Global Settings screen contains the configuration items common to all signals and provides a summary of the current configuration.

Pre and Post trigger settings may be changed as well as captured recorded time and capture rate.

Specifically, global settings allow you to set the duration of all captures within a session. The duration of Pre and Post triggers can be set so that additional data is recorded following a trigger event. This means that a session file can contain captures of varying duration.

Capture duration

The capture duration is the recorded time of the signal data which is saved following either a trigger event, or following selection of the record button. The recorded data may then be viewed by the user.

The capture duration, or record time can be pre set in increments using the fast medium and slow buttons as follows:

- Capture duration Fast- 30 seconds
- Capture duration Medium- 10 Minutes
- Capture duration Slow- 12 Hours

For trigger information, refer to the trigger section of this lesson.

Trigger Overview

A trigger may be set so that a datalogger action is automatically carried out when a trigger event has been reached or exceeded. This action may be to record datalogger signals or to display an audible warning.

Triggers Events

A trigger event is a point in time when a defined limit is reached or exceeded. A trigger also defines the action taken when the triggering condition is reached.

Trigger Action

This action may be to:

- **Record:** All selected signals captured according to the current global settings (See Signal Capture). If you do not select a trigger action then the trigger becomes a set of limits on the display
- **Acoustic Warning:** An audible warning sounds when the signal triggers. If you wish, you may select Record on its own, Acoustic on its own or Record and Acoustic together; or even nothing at all. The choice is yours

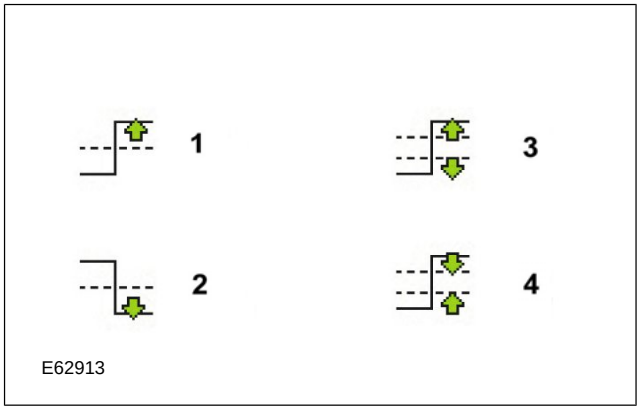
If the trigger is set to 'Audible', then no recording occurs.

The progress indicator is activated while capture is in progress and navigation to other parts of the system is inhibited, although, scrolling and Stop Capture are enabled.

Trigger limits

A cluster of four buttons allow you to select the type of trigger. When either of these buttons is pressed, its background colour changes to show it is live. At the same time, a thumbnail sketch indicating the chosen format appears in the pane above the cluster.

Trigger Types



1 Trigger High Limit: Select this to set a limit on a signal exceeding a pre-selected value

2 Trigger Low Limit: Select this to set a limit on a signal dropping below a pre-selected value

3 Trigger Outside Range: Select this to set a limit on a signal exceeding pre-selected upper and lower values

4 Trigger Inside Range: Select this to set a limit on a signal dropping below pre-selected upper and lower values

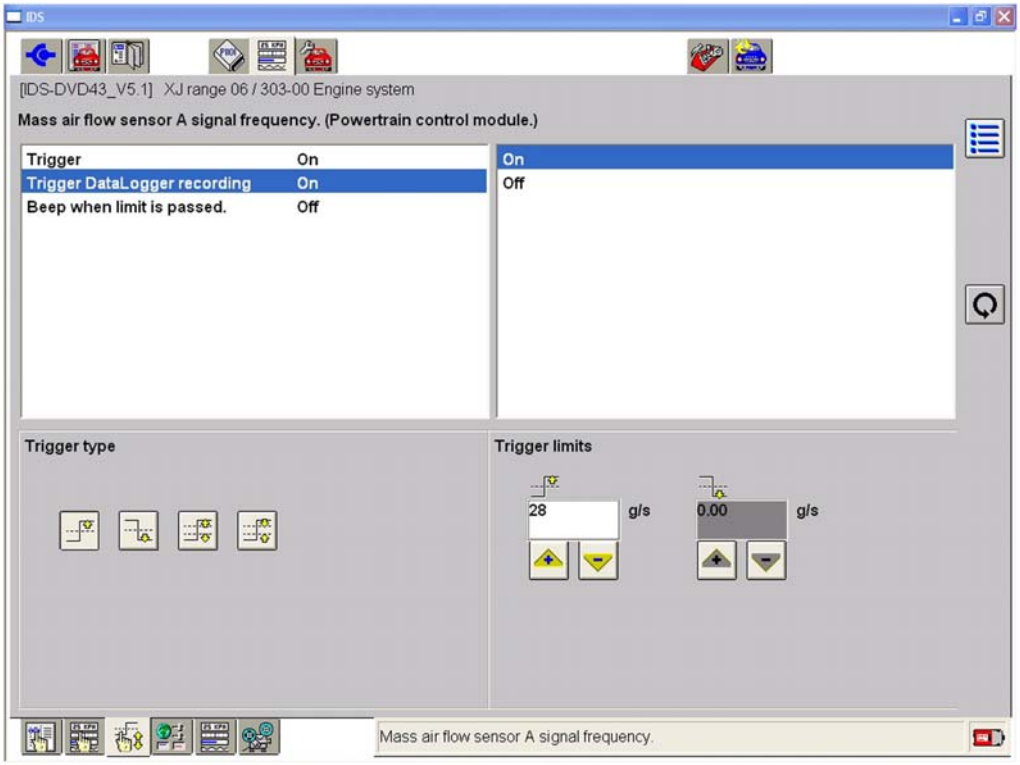
Setting A Trigger

The signal which is required to be used as the trigger must first be selected. Following this, the trigger parameters must be set by then selecting the trigger selection sub-tab.

Trigger sub-tab: Select the trigger screen by pressing the trigger sub-tab. The layout of the trigger screen is similar to the 'Signal Configuration' screen. The name of the signal selected as the trigger appears on the title bar at the top of the screen. The two panes immediately below the title bar indicate trigger action and trigger status. These will be On or Off.

Set the trigger setting to **on** and select which action is to be taken when the trigger conditions are met.

Trigger Selection

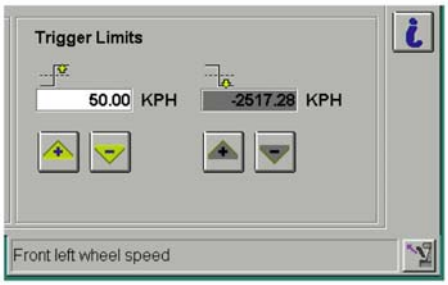


E77718

Trigger Limit Values

You may specify Trigger limit values by selecting the appropriate display pane and using the increment / decrement buttons. More accurate values can be set using the keypad. In the example shown here, the symbols for upper and lower trigger limits appear over their display panes. However, when only one trigger limit has been selected, the right-hand display pane is greyed out.

Trigger Limit Values

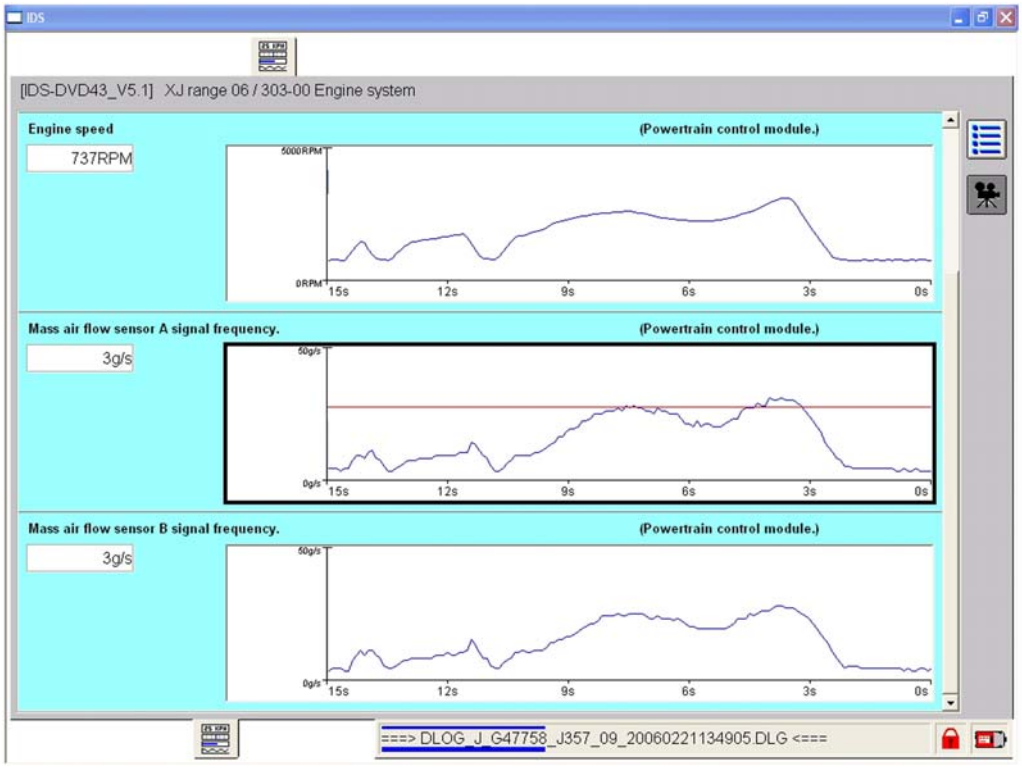


E62914

Once the trigger settings have been selected, navigate to the 'live display' screen and set datalogger running.

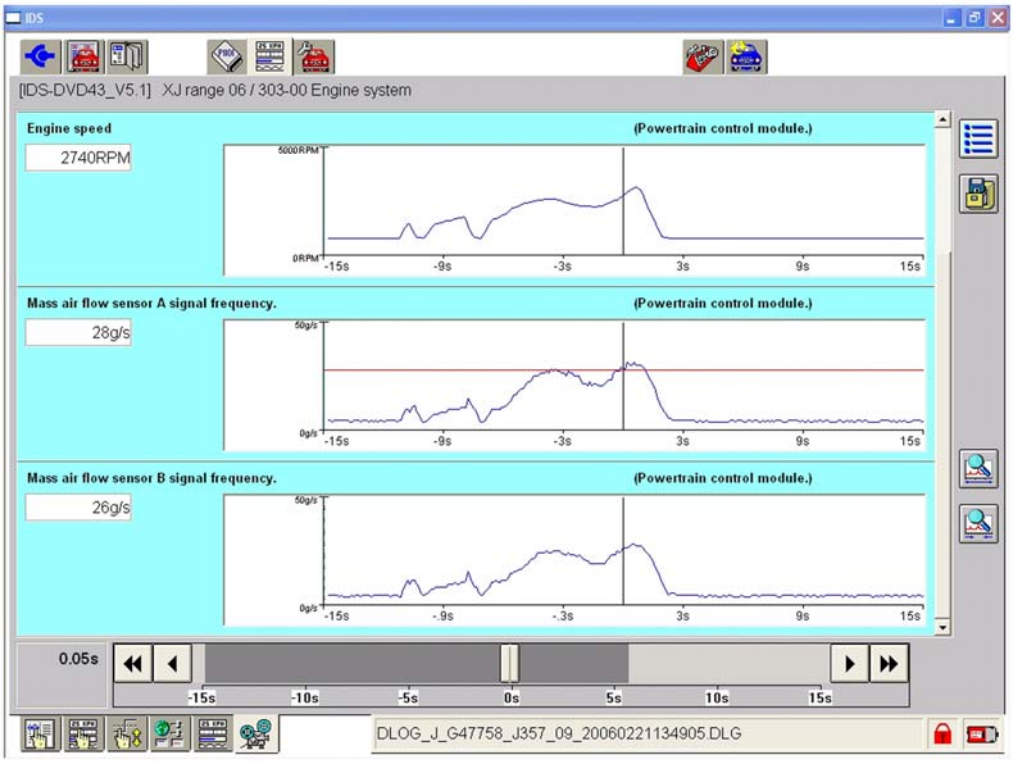
From the illustration below, we can see that the trigger has been set. It is shown here as a horizontal line. Once the trigger conditions have been met (the signal being displayed crosses this line) the capture will start. It can then be viewed when the capture period has completed.

Trigger Set



E77723

Capture Signal by Trigger Event



E77719

The trigger line is shown as a horizontal line, while the vertical line indicates the point at which the trigger event occurred.

The position of the vertical line may be moved to any point in time within the captured window, using the horizontal scroll buttons. The captured signal value is displayed in the window adjacent to the signal. The time, in seconds, when the trigger occurred, is shown on the horizontal axis. Zero represents the point at which the trigger event occurred.

Pre and Post Trigger Increments

NOTE: When a pop-up window appears in the screen display, the system only carries on working when one of the buttons offered in the window is selected. Any change to these settings after an event has been captured, affects the size of succeeding buffers.

The pre and post trigger setting enables the proportion of the signal captured before and after a trigger event to be varied. For example:

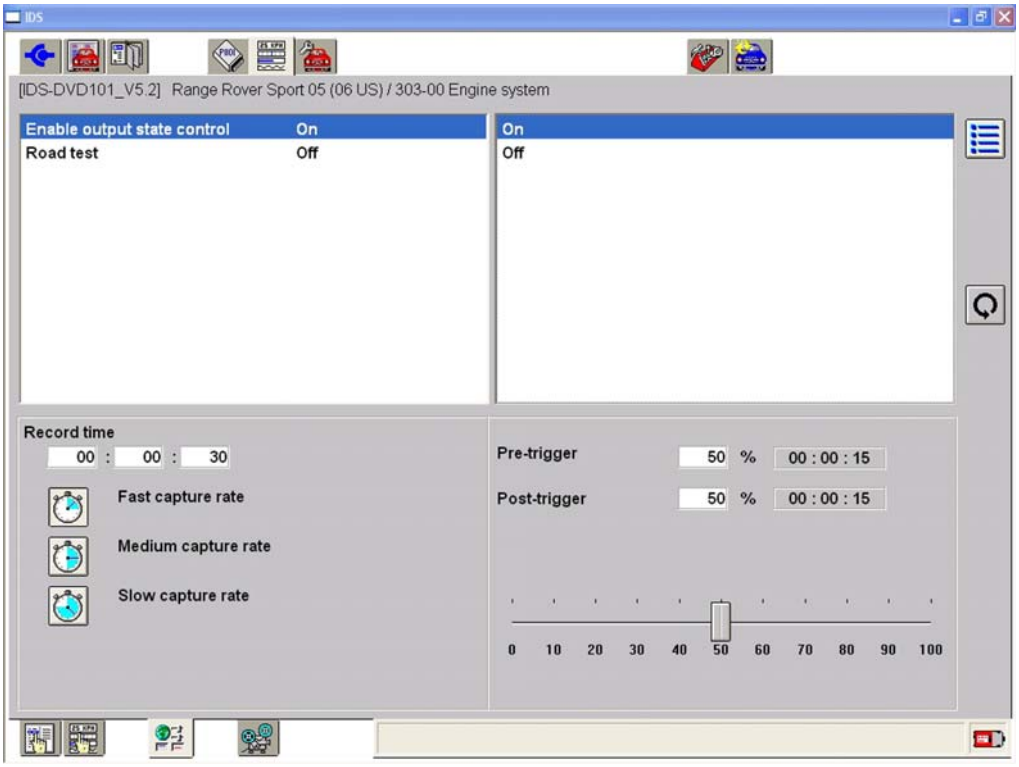
- If the capture duration is set to 20 seconds and the pre and post trigger setting is 20% and 80% respectively, then 4 seconds would be captured before the trigger event and 16 seconds would be captured after the event

Output State Control

OSC allows the user to control the voltage signal level output, from a Control Module (CM), by directly assigning a value to it. This is only allowed for certain specific digital signals. Analogue signals cannot be subjected to OSC.

The user must have enabled OSC from the Global Configuration sub-tab for the function to be enabled.

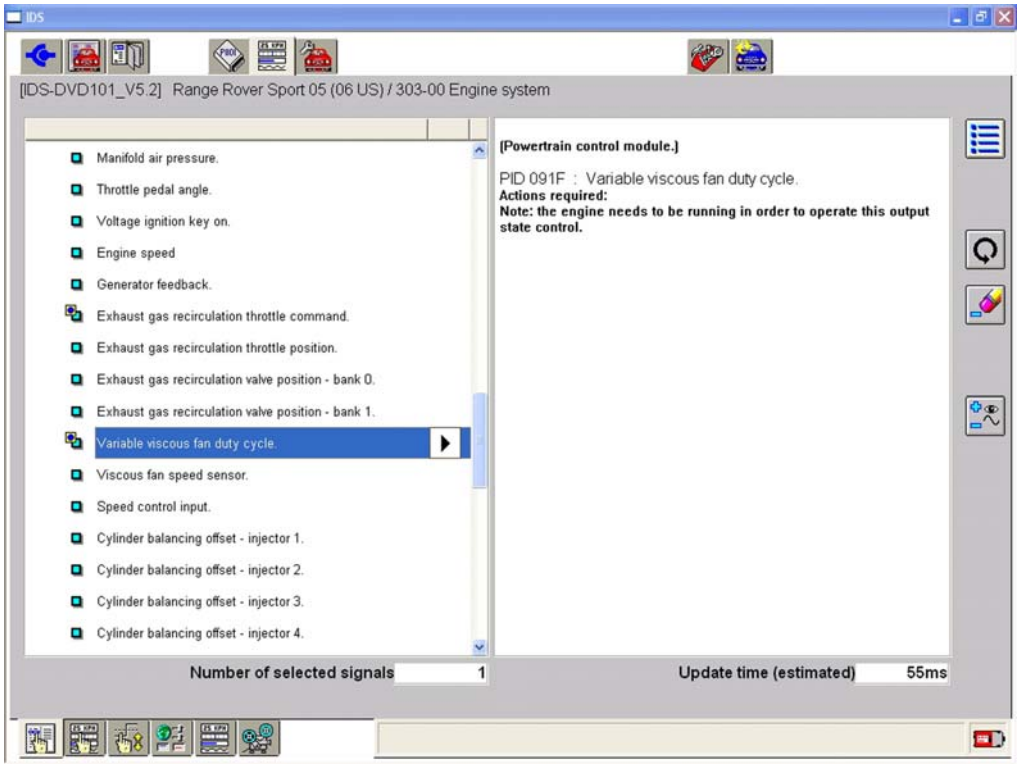
Global Settings Screen



E81503

From the datalogger signals list, signals that can have OSC applied to them are identified by the dot inside the small box adjacent to the signal, which may be seen in the following illustration:

Output State Control Signals



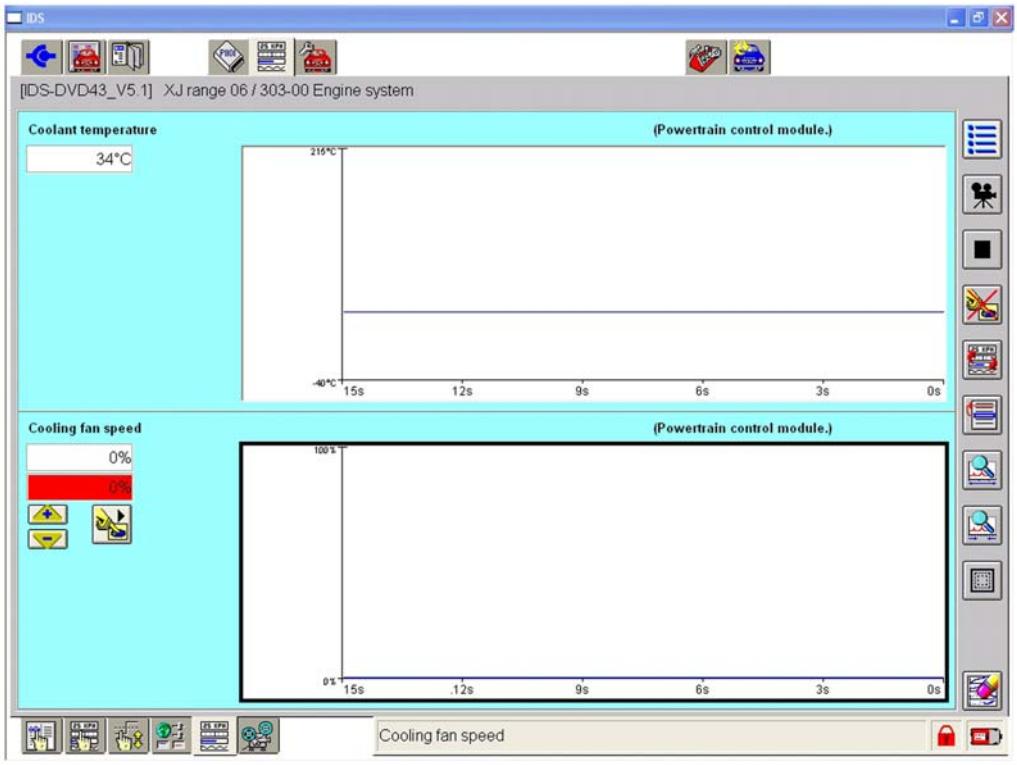
E81505

NOTE: The OSC symbol is only available, if the desired system is first selected from the content model, prior to selecting datalogger.

Additional information regarding the conditions for operating the OSC signal, where applicable, is displayed in the right hand pane of the screen once the signal has been highlighted.

Example: The engine needs to be running when applying the variable viscous fan duty cycle OSC signal.

Output State Control



Controlling OSC

Once the signals have been selected, select the datalogger **Live Display** sub-tab to display the signal.

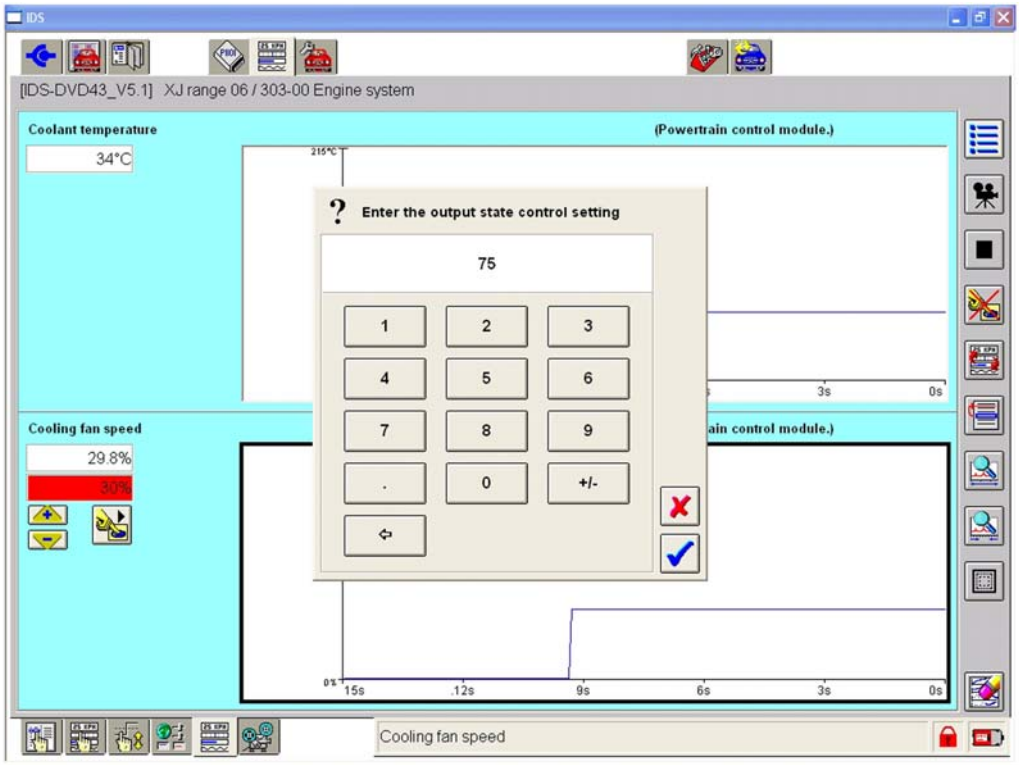
If more than one signal has been selected from the datalogger menu, highlighting the displayed signal will cause the OSC button to be displayed in the button bar. Selecting the OSC button will cause a display window and control buttons to appear on the screen adjacent to the displayed signal.

Selecting the appropriate increment buttons will change the OSC value. The current value is displayed in the upper window while the desired value is displayed in the lower window. Once the desired value has been achieved, selecting the 'activate OSC' button will cause the control module to drive the selected component to the selected OSC value.

If OSC is enabled for the selected signal, the OSC increment/decrement buttons appear on the System Button bar at the right hand of the screen. The digital value of OSC is shown on the left of the signal display area. Unless you wish to alter a discrete OSC value (e.g. ON/OFF), use the buttons to change the value.

If the OSC value is to be changed by a large amount or changed quickly, operate the TSD over the lower display window. A numerical key pad will be displayed where the user may enter a desired value.

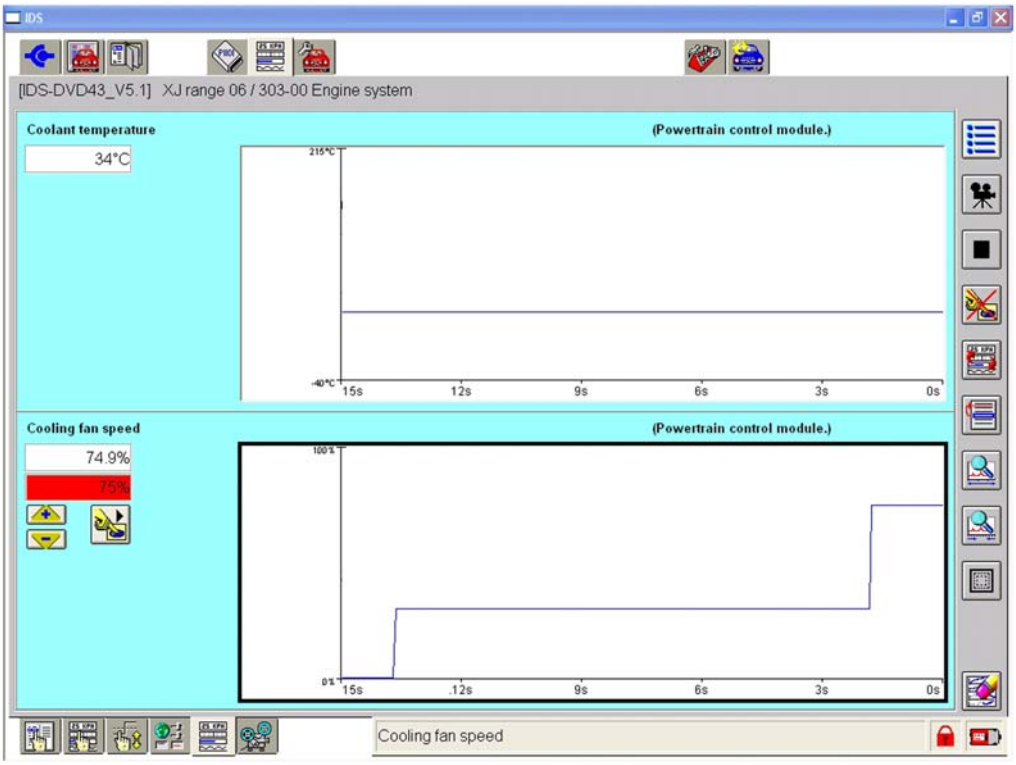
OSC Numerical Key Pad



Confirm the selected value using the confirmation tick

Selecting the OSC activation button will apply the selected value to the component.

Output State Control



E77722

On completing this lesson, you will be able to:

- Use the Digital Multimeter
- Use the Oscilloscope

Menu

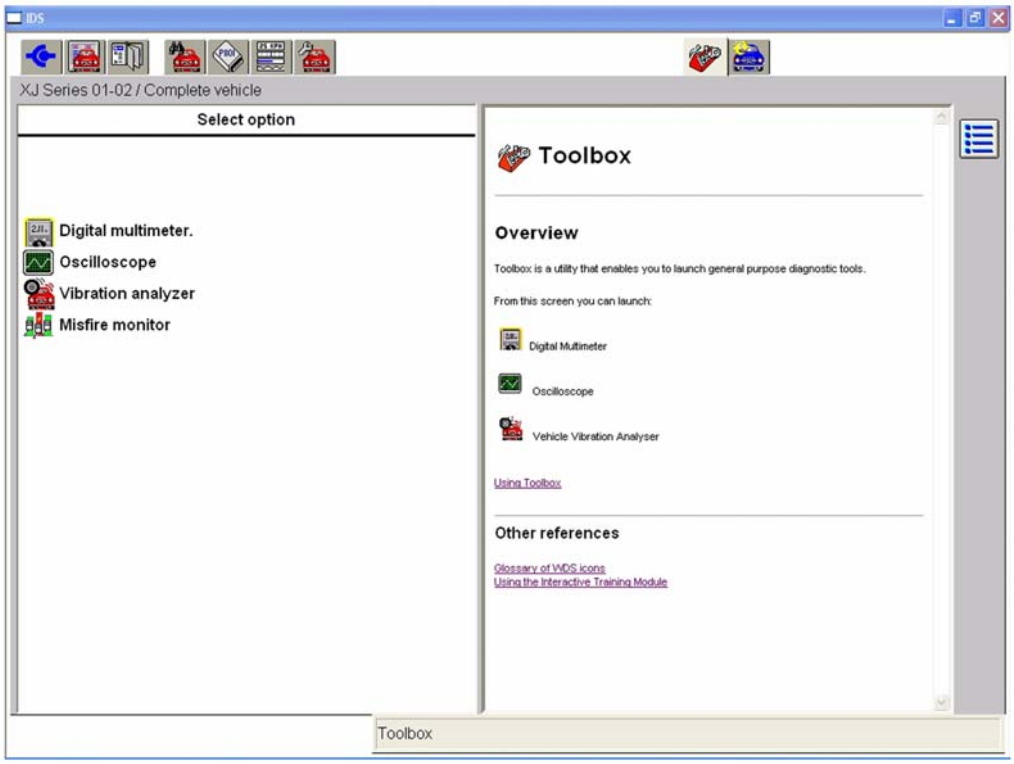
The toolbox offers a number of tools which the experienced operator may use to diagnose faults.

The tool box is accessed from the toolbox tab.

Toolbox Tab

A list of tools available from within the toolbox will be displayed on the Left Hand (LH) pane of the screen.

Toolbox Options



E77432

The list of tools displayed will vary depending upon whether a vehicle has been specified, and the model of the specified vehicle.

The following tools may be available:

- Digital Multimeter
- Oscilloscope
- Vehicle Vibration Analyser
- Misfire monitor (NAS only)

A vehicle is specified when the last six digits of the VIN number are entered in the VIN entry screen.

If no vehicle has been specified, then only the following tools will be available from the toolbox menu:

- Digital Multimeter (DMM)
- Oscilloscope

It must be remembered that the use of any of the tools is not guided.

This means that:

- No indication is given as to whether a test result is correct or incorrect
- The user must understand how to use the tool
- The user must understand the operating principles of the system being tested, together with the expected values
- They do not operate in a predetermined order

Once a tool is selected, it can run in the background when other applications are running. The relevant tools tab will be shown above the tab bar.

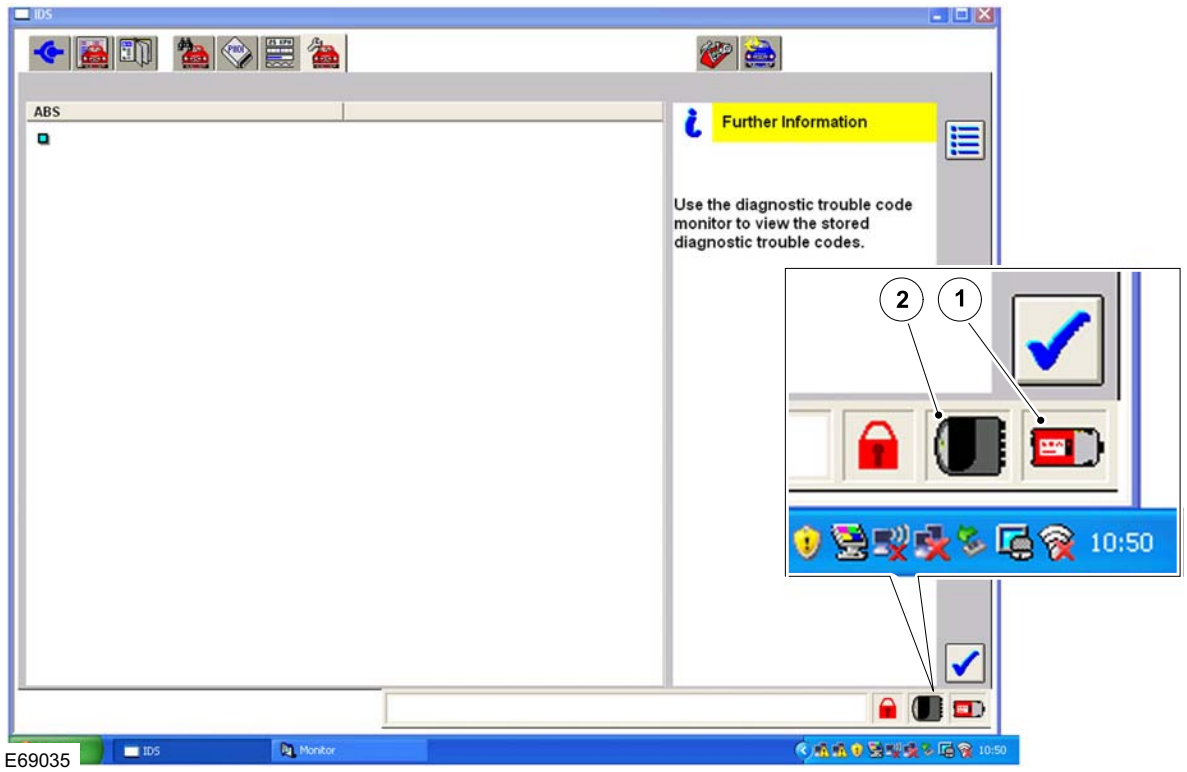
An interactive training mode is available which guides the user through the use of the DMM and the Oscilloscope. When the interactive training mode is open, a symbol is displayed in the lower right hand corner of the screen.

Interactive Training Mode Symbol

Digital Multimeter (DMM)

To access the DMM, select the DMM symbol from the toolbox menu and press the tick symbol to confirm its selection. IDS will request that the VMM is connected to IDS and to the vehicle battery.

VMM Connected

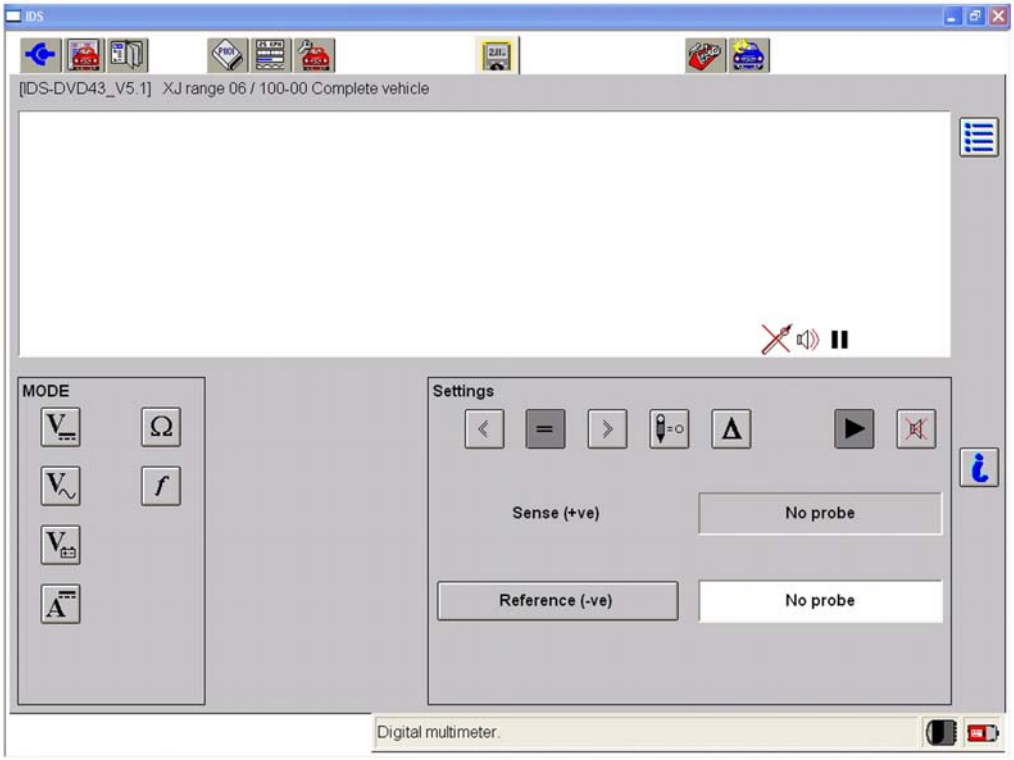


2 VMM Connected

Once the connection of the VMM has been confirmed the DMM screen will be displayed.

Once the VMM has been recognised, the VMM symbol will be displayed.

DMM Opening screen

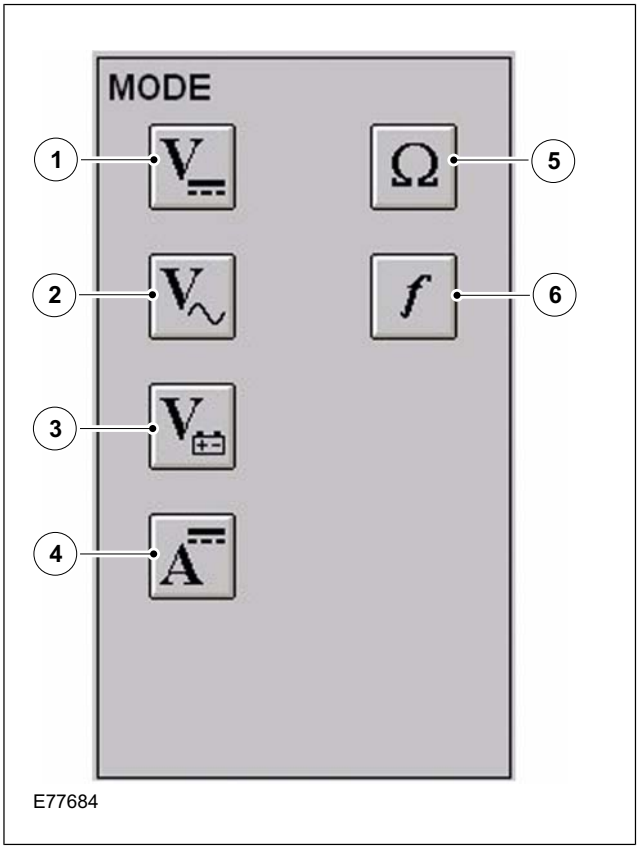


E77714

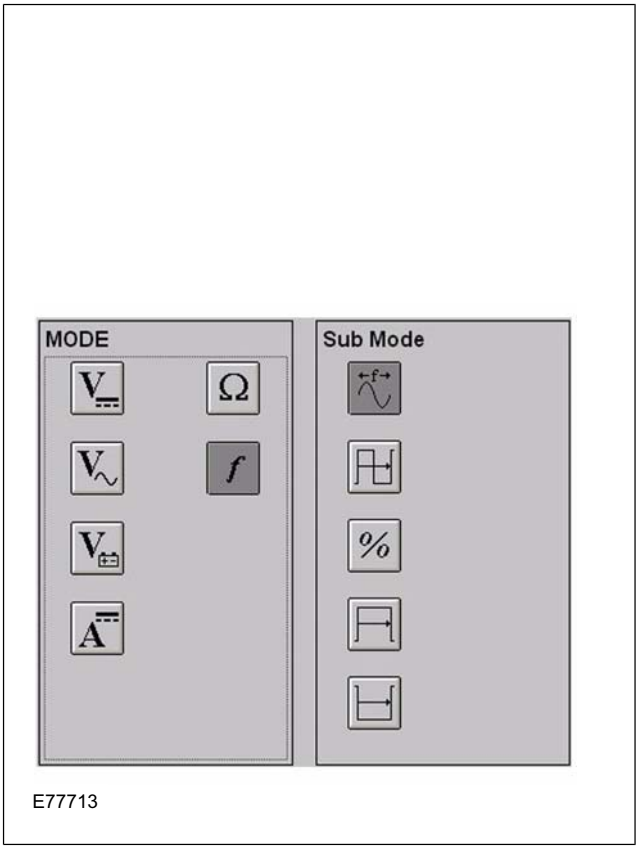
The DMM may be used to read the following types of electrical signal

- Direct Current (DC) Voltage
- Alternating Current (AC) Voltage
- Vehicle battery voltage
- Current (Amperes)
- Resistance
- Time based measurements (Frequency)

DMM -Mode Menu



DMM Sub-mode menu



1 Direct Current (DC) Voltage

2 Alternating Current (AC) Voltage

3 Vehicle battery voltage

4 Current (Amperes)

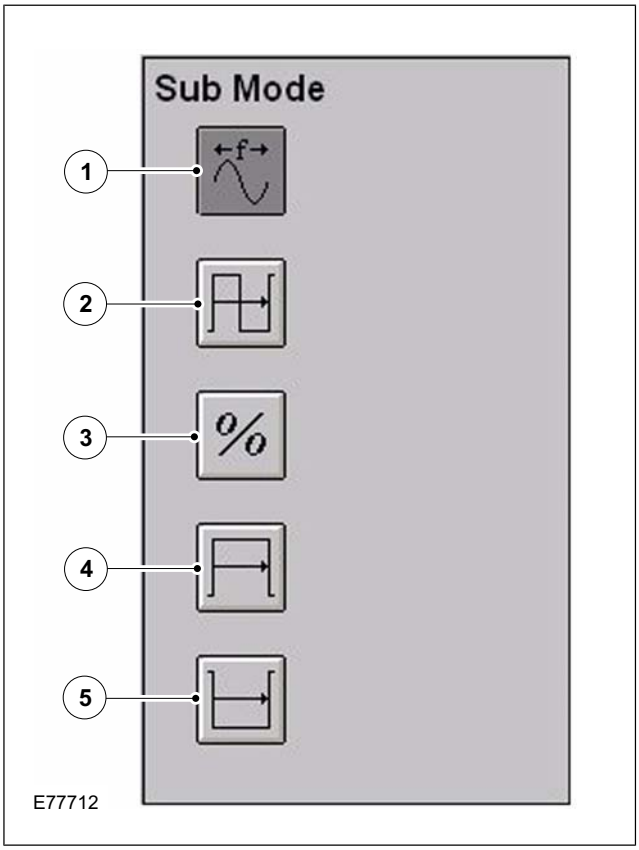
5 Resistance

1 Frequency

When the time base voltage measurement button has been selected, a number of additional sub mode buttons will be displayed.

DMM - Sub Mode Buttons

DMM Sub-Mode Menu Buttons

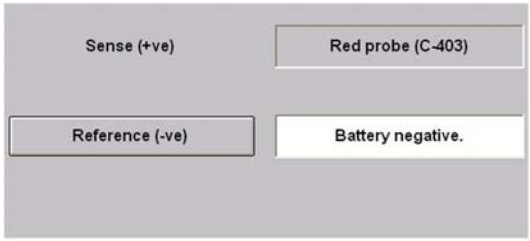


1 Measure signal frequency
2 Measure signal period
3 Measure duty cycle
4 Measure pulse width modulation high
5 Measure pulse width modulation low

Reference Button

The Reference button allows you to assign the reference point for the measurement. This may be either the black probe or battery negative lead of the VMM battery cable.

Reference button



Setting Panel

When a measurement mode button is selected, its symbol will appear in the measurement display panel. The appropriate button in the '**Settings**' panel must then be selected in order to take the measurements.

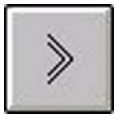
Only buttons relevant to the selected measurement mode will be visible. **Example**, the diode test button only appears when the resistance mode button is selected.

Setting Buttons

Display Minimum Hold Button

Display minimum hold

Display Maximum Hold Button

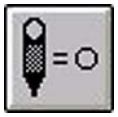


Display maximum hold

Equal Button

Display actual measurement

Calibration Button

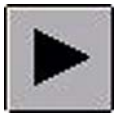


Calibrates current clamp

Offset Button

Set offset to current reading

Play Button



Continuous display

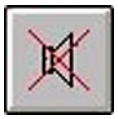
Pause Button

Displays instantaneous value when the button is pressed

Single Shot Measurement Button

Single shot measurement available when display is paused; displays instantaneous value when button is pressed

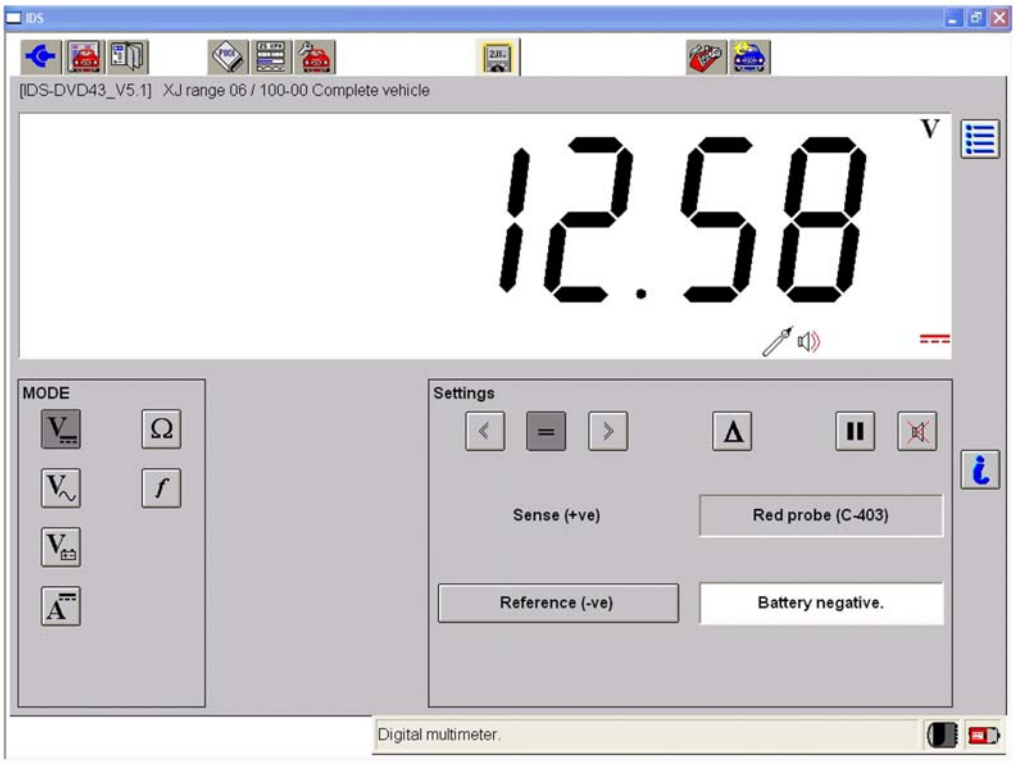
Sound Off Button



Sound off (changes to sound on button when sound is off)

Once the DMM has been configured correctly to display the desired Measurement, the value will be displayed.

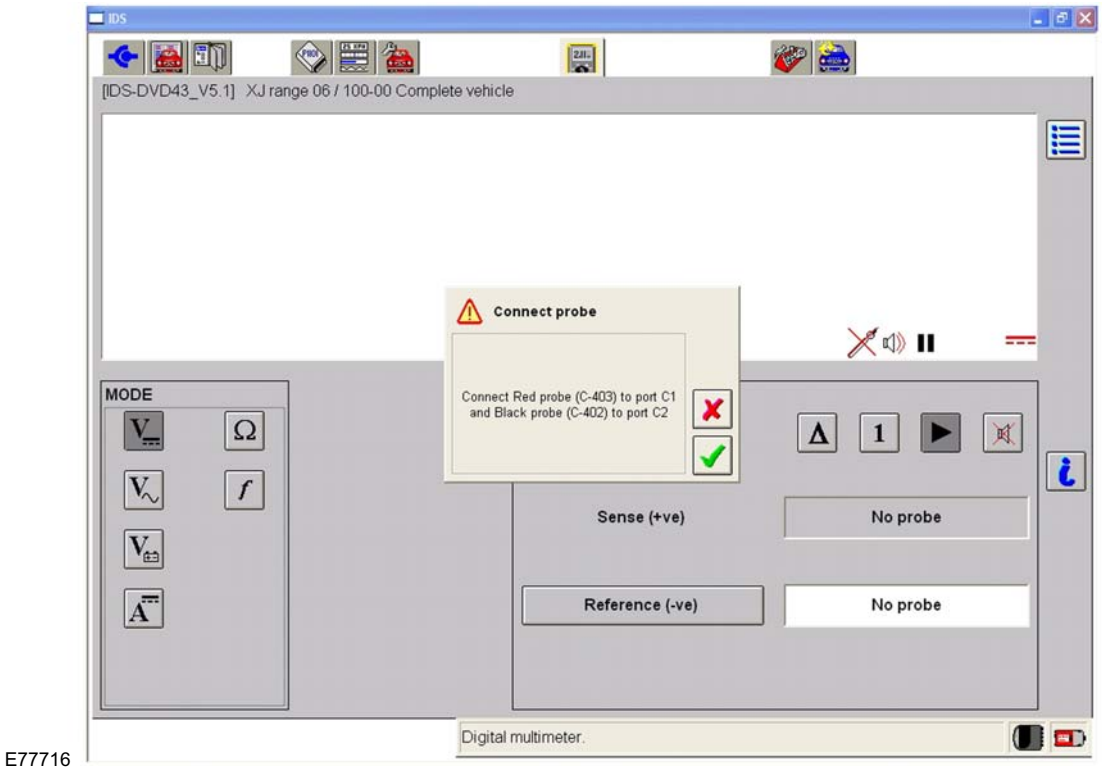
DMM display



E77711

If the Measurement probes are not connected to the VMM, the user will be prompted to connect the red and black probe to the VMM.

Connect measurement probes



Menu Options

The **Menu** button is always available when using the DMM

Two options are available

- Print Screen
- Exit

If the **Print Screen** option is selected, Pdf 995 will be opened. The image may then be saved as a pdf file and printed from a suitable printer.

Selecting the Exit button will close the DMM application. If the DMM is required again, it must be re-launched by selecting the Toolbox tab.

Oscilloscope - Introduction

An oscilloscope is a very fast responding visual voltmeter. The voltages are displayed on a voltage/time based graphical display. Using an oscilloscope allows the user to visually observe the voltages of a desired system as they actually occur. The signals appear as waveforms or traces on a grid composed of small divisions of time and voltage. An upward movement of the trace represents an increase in voltage, and downward movement represents a decrease in voltage. As the voltage trace moves from left to right across the screen, the space it occupies represents a specific length of time. A constant voltage will be displayed as a straight line, where as a changing voltage will be displayed as a waveform.

The oscilloscope is a generic tool which may be used with or without a vehicle session. No prior vehicle information is required to run this tool.

The IDS oscilloscope is a 4-channel scope. However, ports 3 and 4 have limited functionality in our application.

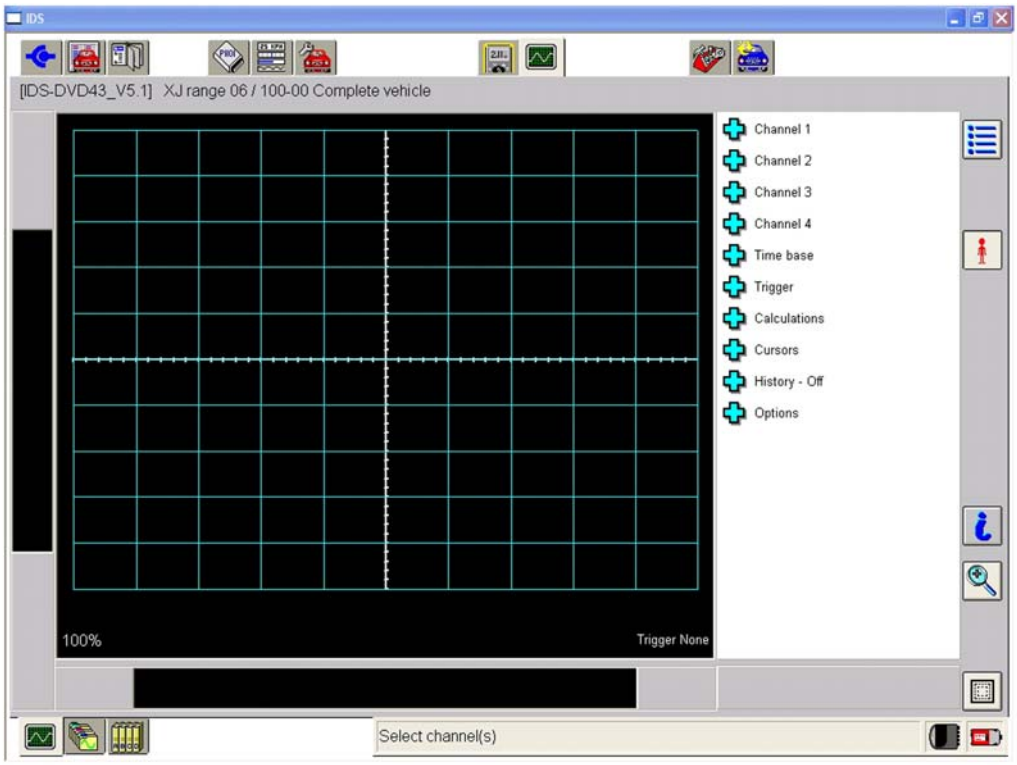
Ports 1 and 2 sample at 500K hertz (2 micro second sampling rate) with 12-bit resolution. Maximum voltage is approximately 150V before signal clipping occurs.

Ports 3 and 4 sample at 10 Megahertz (0.1 micro second sampling rate) with 8-bit resolution. Maximum voltage is approximately 40V before clipping occurs.

The oscilloscope must be configured in order to display the system signals.

Once the basic configuration of the oscilloscope has been understood, regular use of it will enable the user to become experienced and familiar with it. The oscilloscope user will then appreciate how valuable the oscilloscope is as an aid to diagnostics.

Oscilloscope Opening Screen



E77717

On the left side of the screen will be the signal display area. Just to the right of the display area will be the menu display options area for the tool. No other scope features will be available until channel(s) selections have been made. The status bar will also display the text Select Channels. When any of the first level option items are selected the available items under the first option will cascade. If the same option is selected again the cascade will collapse and leave the first level again.

The following menus are available:

- Channel 1
- Channel 2
- Channel 3
- Channel 4
- Time Base
- Trigger
- Calculations
- Cursors
- History
- Options

The first step in using the scope is to select the desired channels. Each of the four available channels will have various options. The first level options will have a larger font, bold, and have a coloured plus sign indicating that there are more options behind that selection. A minus sign would indicate no more features are available behind the selection. The first of these options is whether to Auto assign a signal or to Manually assign the selected channel.

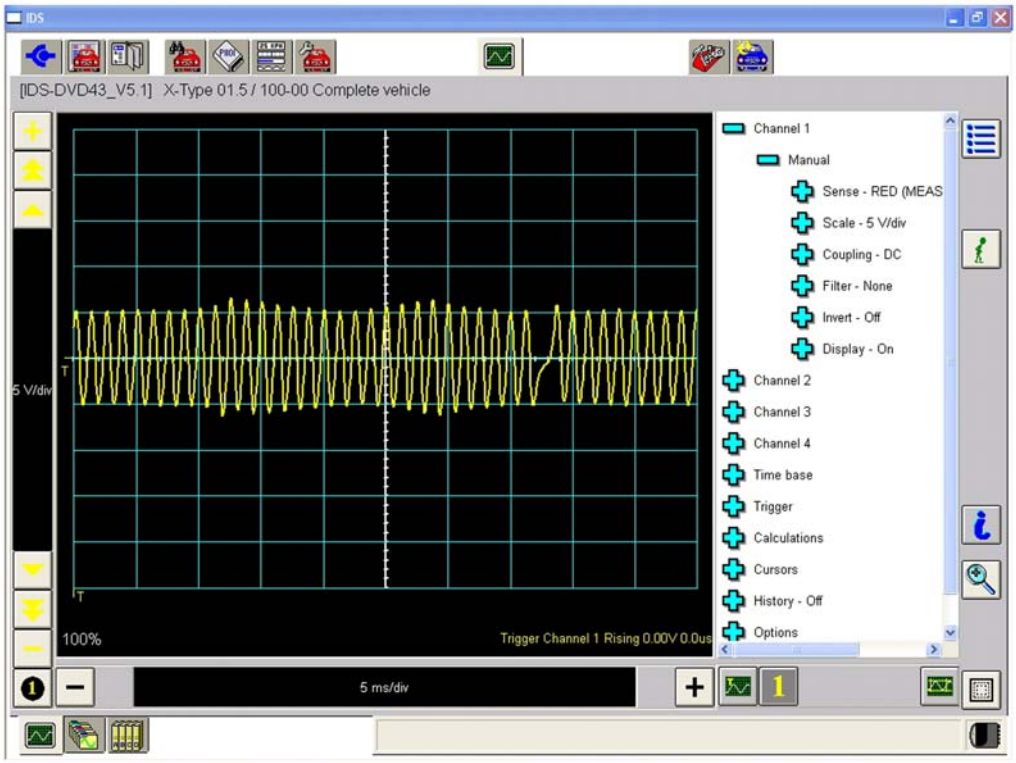
If Auto assignment is desired the user needs to select the desired signal and start the tool. All necessary configurations are predetermined (volts/time/coupling/triggering/filtering). This feature allows the experienced user a quick setup and also helps the less experienced user become easily familiar with this tool. The user can change any of the predetermined selections after the signal is displayed.

The following options are available from the **Auto** set up menu:

- CKP
- CMP
- Injector
- Ignition coil
- MAF
- O2 Sensor
- VSS
- OSS
- IAC
- EPC
- SCP +/–
- TP
- Generator (alternator) ripple

If manual assignment is desired, the user must manually configure the channel for the desired signal.

Oscilloscope Set Up



The following items are available from the manual menu:

- Sense
- Scale
- Coupling
- Filter
- Invert
- Display

Sense

Channel 1 Sense

- None
- Red probe
- Black probe
- Red Probe/Black Probe Differential
- Ripple - battery cable

NOTE: [If black probe or differential has been selected through channel #1 then it will be unavailable through channel #2.]

Channel 2 Sense

- None
- Black (reference) probe

Channel 3 Sense

- Current Probe only available in our application

Channel 4 Sense

- Current Probe only available in our application

Scale

The following scale options are available:

- 50mV
- 100mV
- 200mV

- 500mV
- 1V
- 2V
- 5V
- 10V
- 15V
- 20V
- 50V

NOTE: The above scale options refer to the unit of measurement per division for channels 1, 2, 3 and 4.

Display Channel

The display channel may be switched on or off. If the waveform is turned off the settings are saved and will resume when the signal is turned back on. If the tool is exited then the setting will be lost.

Invert

If invert is selected, the displayed trace will be inverted.

Coupling

The following coupling options are available:

- AC- Displays only the AC portion of the waveform
- DC- Displays both the AC and DC portion of the waveform
- GND- Checks the ground level. Used for ground reference

Filter

All filters are low pass, meaning that they will pass any frequency below the selected value.

Example: If 180 kHz is selected, all signal frequencies below 180 kHz will be displayed, while any frequencies above 180 kHz will be stripped from the displayed signal.

The following scale options are available:

- Hertz (Displays all parts of the signal below 8 cycles per second)
- 10 Hertz (Displays all parts of the signal below 10 cycles per second)
- 16 Hertz (Displays all parts of the signal below 16 cycles per second)
- 800 Hertz (Displays all parts of the signal below 800 cycles per second)
- 1,000 Hertz (Displays all parts of the signal below 1,000 cycles per second)
- 1,500 Hertz (Displays all parts of the signal below 1,500 cycles per second)
- 7,500 Hertz (Displays all parts of the signal below 7,500 cycles per second)
- 10,000 Hertz (Displays all parts of the signal below 10,000 cycles per second)
- 15,000 Hertz (Displays all parts of the signal below 15,000 cycles per second)
- 20,000 Hertz (Displays all parts of the signal below 20,000 cycles per second)
- 30,000 Hertz (Displays all parts of the signal below 30,000 cycles per second)
- 180,000 Hertz (Displays all parts of the signal below 180,000 cycles per second)

Options Menu

The following options are available from the Options Menu:

- Time Base
- Trigger
- Calculations

- Cursors
- Options

Time Base

The following time base scales are available:

- 1us
- 2us
- 5us
- 10us
- 50us
- 100us
- 200us
- 500us
- 1ms
- 2ms
- 5ms
- 10ms
- 20ms
- 50ms
- 100ms
- 200ms
- 500ms
- 1s
- 2s
- 5s
- 10s

The standard unit of measurement of time is the second. Since this is a relatively large unit of measurement, often a division of a second is used.

Definitions of time base scale units

- s - second
- ms - millisecond (thousandth of a second)
- us - micro second (ten thousandth of a second)

The following display ratios are available from the zoom function

- 100%
- 125%
- 250%
- 500%

Trigger

- None
- Channel 1
- Channel 2
- Channel 3
- Channel 4
- Edge rising or falling
- Mode - Auto or Normal
- History - None or 1 to 100 shot

Calculations

Each channel can have any one of the following calculation selections assigned to it.

- None
- Vp-p - Maximum voltage difference detected between the min and max
- Vmin - Minimum voltage detected
- Vmax - Maximum voltage detected
- Vrms - Maximum peak detected multiplied by 0.707
- Frequency - frequency detected and displayed in hertz
- Period - Full cycle displayed in time
- Pulse Width High - High pulse displayed in time
- Pulse Width Low - Low pulse displayed in time
- Duty Cycle - High time of the signal displayed as %

Cursors

- Off
- Channel 1
- Channel 2
- Channel 3
- Channel 4

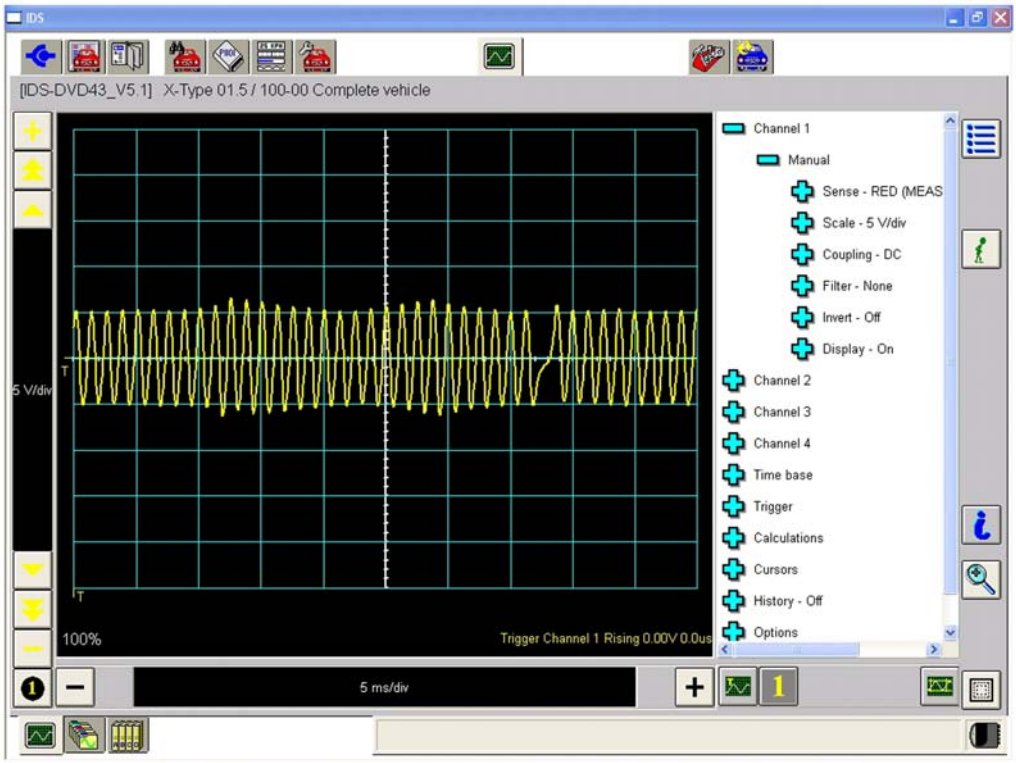
Options

- Display > Colour
- Default
- Black
- Green
- Blue

Once a channel has been selected, other screen features now become visible on the screen.

Live Display

Live Display



Crankshaft signal shown

On the vertical left of the signal display area are the volts/div +/- buttons, allowing the user to select another volts/div setting.

The arrow buttons allow the user to move the waveform up or down on the display area. The double arrow button will auto scroll and then stop when it is touched again. The single arrow will move once per touch for fine

tuning. The trigger will follow any vertical movement made with the arrow buttons provided that the primary and triggered signal are the same. The current voltage setting is displayed in the bar between the arrows.

A black reset button is available just below the volts/div minus button. The reset button will also have the coloured number of the signal it applies to in the centre.

Just under the display area are the time/div +/- buttons allowing the user to select another time/div setting. The current time setting is displayed in the bar between the +/- buttons. Just to the right of the time/div area is a button area showing which channel(s) has been selected.

Channel Selection

Now that the basic feature of getting into the tool has been covered, the following will outline in detail the function of each button individually.

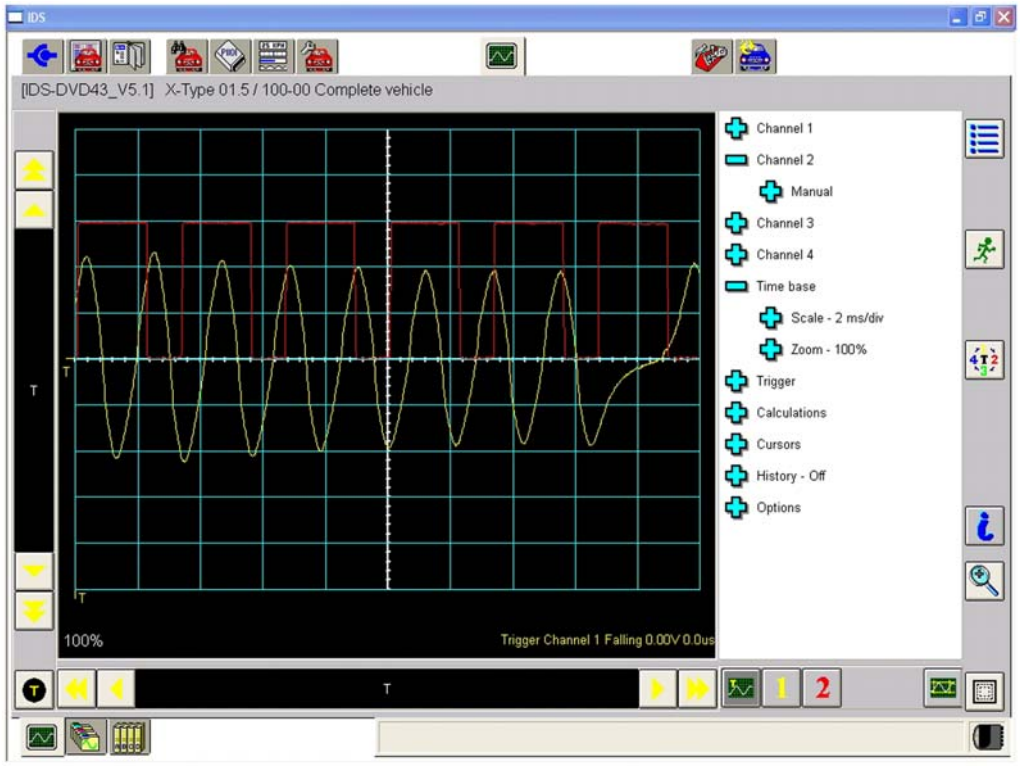
Assign channels 1 and / or 2 on the Selection Screen.

Connect the red and black probes to the VMM. Red probe to C1 and black probe to C2. IDS will prompt this action if the probes are not connected when they are required.

The Coupling - AC, displays only the AC portion of the waveform. DC, displays both the AC and the DC portion of the waveform. GND checks the ground level. Used for ground reference.

The plus and minus buttons will increase or decrease either voltage or time scale. The voltage buttons will change colour, based on the primary signal selected. The time buttons will remain black since time for any given signal cannot be changed independently.

Two Channels Selected



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Channel 1 Reset Button

The reset button will always remain black with the coloured number of the primary signal inside it and always function as a reset button for the designated signal. The reset button in the channel display mode will reset the signal about the x-axis.

The number will be always be displayed in the same colour as the signal it represents.

Curser A Reset Button

Curser B Reset Button

The cursor reset button(s) will only reset the cursor(s) back to their respective default settings. The active cursor set will have a black letter designation in the middle of the white reset button.

The trigger button will allow specific control of the vertical and horizontal triggers.

Trigger Button

The Trigger button will be displayed once a trigger has been set.

Arrow buttons will appear above and below the control bars with a '**T**' displayed inside. The single arrow will move the '**T**' incrementally with each touch, while the double arrow will auto-scroll the '**T**' and stop when it is touched again.

The '**T**' and arrow buttons will be the colour of the triggered channel. If the vertical '**T**' is moved out of range of the signal being triggered, the waveform will scroll across the screen as if no triggering had been selected.

Trigger out of Range will be displayed if the vertical (voltage) trigger is moved outside the displayed signal voltage range.

Note: This range may not be visible, based on the time/div setting selected. To change the trigger channel from the trigger screen, select the desired channel from the Trigger heading in the options menu.

Other options available from the Trigger selection in the Options menu are, Edge (rising or falling), Mode (Auto or Normal). The Edge selection allows the user the choice of triggering off the rising or falling edge of the signal.

The Mode selection allows the user to select Auto or Normal mode.

In Auto mode the signal being triggered will always be displayed whether the trigger conditions are being met or not. If the trigger conditions are not being met the signal may scroll across the screen as if no trigger has been selected. This is the default trigger mode.

In Normal mode the signal will be displayed as long as the trigger conditions are being met. If the trigger conditions are not being met, the display signal will freeze and remain frozen until the trigger conditions are being met or, the trigger is re-adjusted to be met.

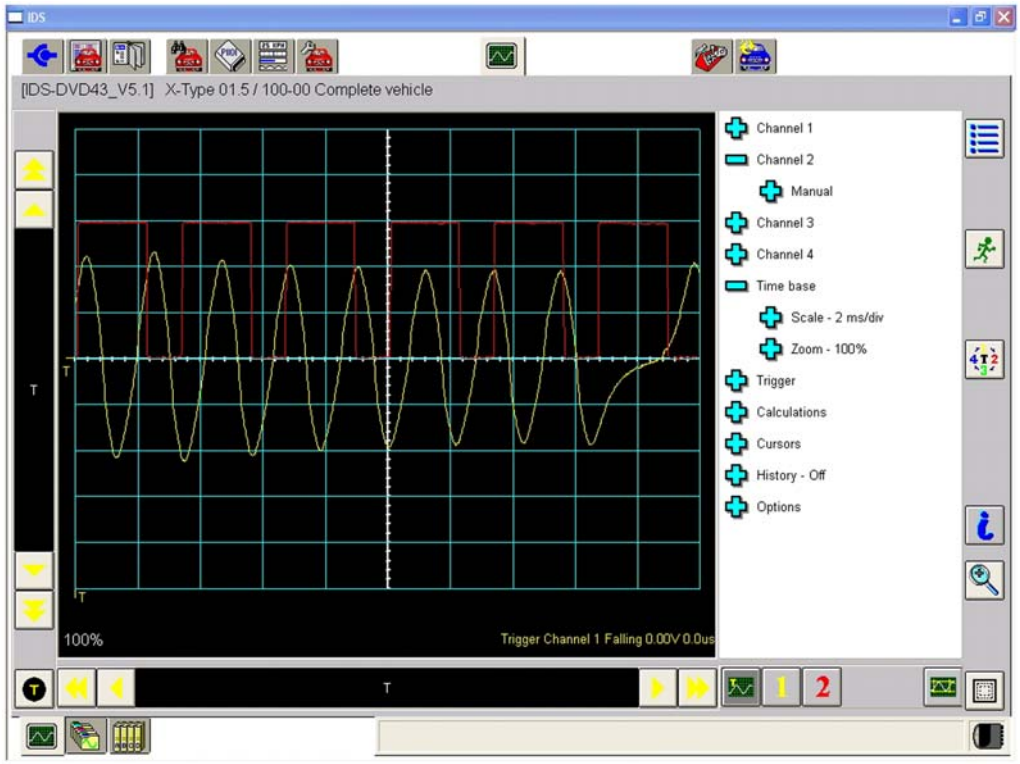
The Trigger reset button will be displayed when a trigger has been set. The trigger reset button will allow the user to reset the trigger back to its default condition

Trigger Reset Button

The '**T**' of the trigger reset button will be displayed in the same colour as the signal to which it is assigned to.

Notice the small **T**'s at the edge of the display grid. These **T**'s will also match the colour of the triggered channel and move when the arrows are selected.

Two Channels Selected



E77949

When more than one channel is used, the change trigger channel button will appear.

Change Trigger Channel Button

This button allows the user to change the triggered channel without reselecting it from the menu.

History

History can only be selected from the options menu. When History is on, this feature will continue to paint all data gathered and leave the data on the screen instead of replacing it. The user can select whether or not to display history. This can be very useful for signal integrity checking or intermittent faults.

Auto Configuration Button

The auto configuration button will auto configure the signal being viewed. The intent of this button is to allow the user to just let the scope get the signal to a viewable format that the user can fine tune.

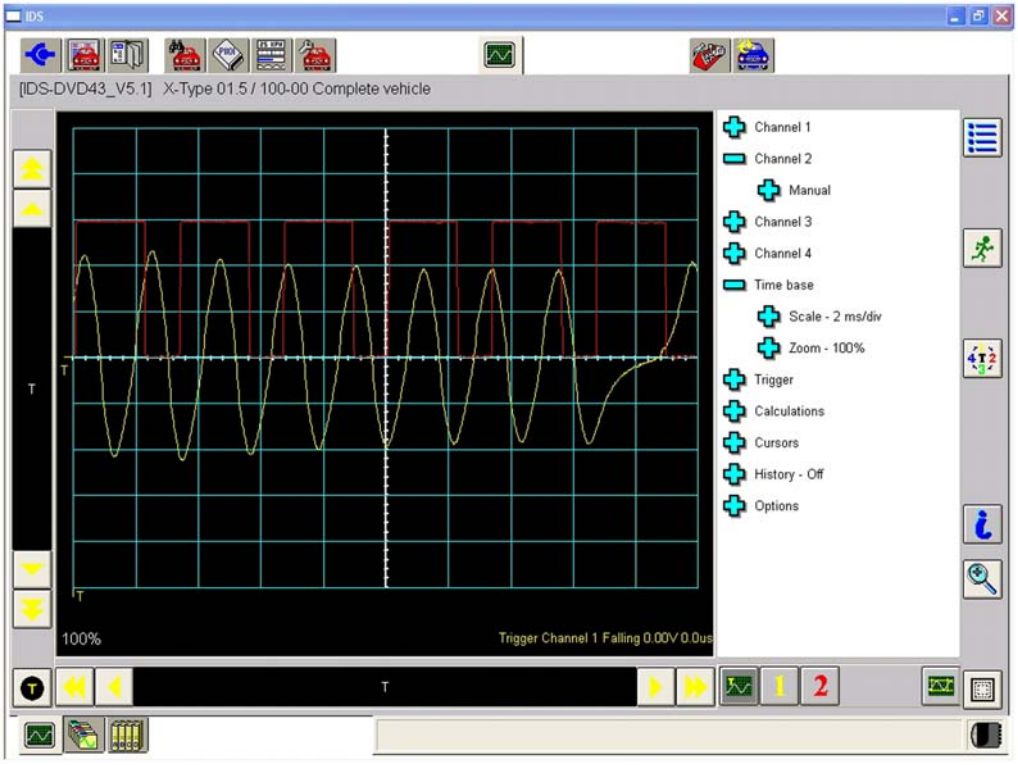
Channel 1 Button

The channel buttons will have the same features regardless of which screen you are on. Each channel has a predetermined colour assignment. Channel 1 (yellow), Channel 2 (red).

Channel 3 (green), and Channel 4 (blue), have limited functionality in our applications. They may only be used with the current clamp. Other options are available from the menu of channels 3 and 4 currently only supported by other vehicle brands.

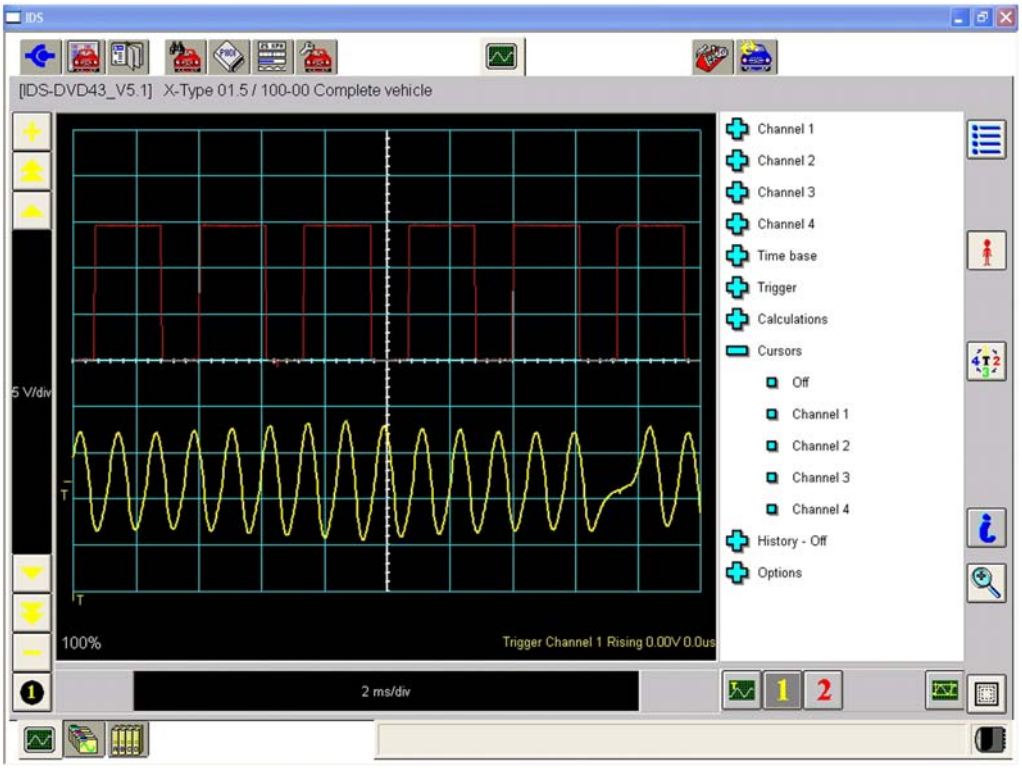
The channel buttons will allow the user to select any one of the signals as the primary signal indicated by a thicker signal display line. This will also be apparent from the vertical control bar colours. The primary signal and the trigger are independent assignments but can still be the same signal.

2 Signals Superimposed



Two signals may be displayed but without superimposing them, if desired.

2 Signals Not Superimposed



To seperate the two channel signals, move the trigger line of the selected channels to another position on the screen.

This is the full screen button.

Full Screen Button

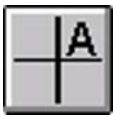
When this button is selected the Options menu will collapse and the options area now has full screen signal viewing. A red **X** will appear over this button when in the full screen mode.

Cancel Full Screen Button

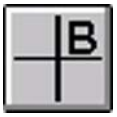
Touch this button and the options menu reappears and full screen goes back to the way it was displayed before the full screen button was selected.

When cursors are selected from the Options menu these two buttons will appear on the vertical right of the screen allowing the user to control either the A cursors or B cursors.

Curser A Button



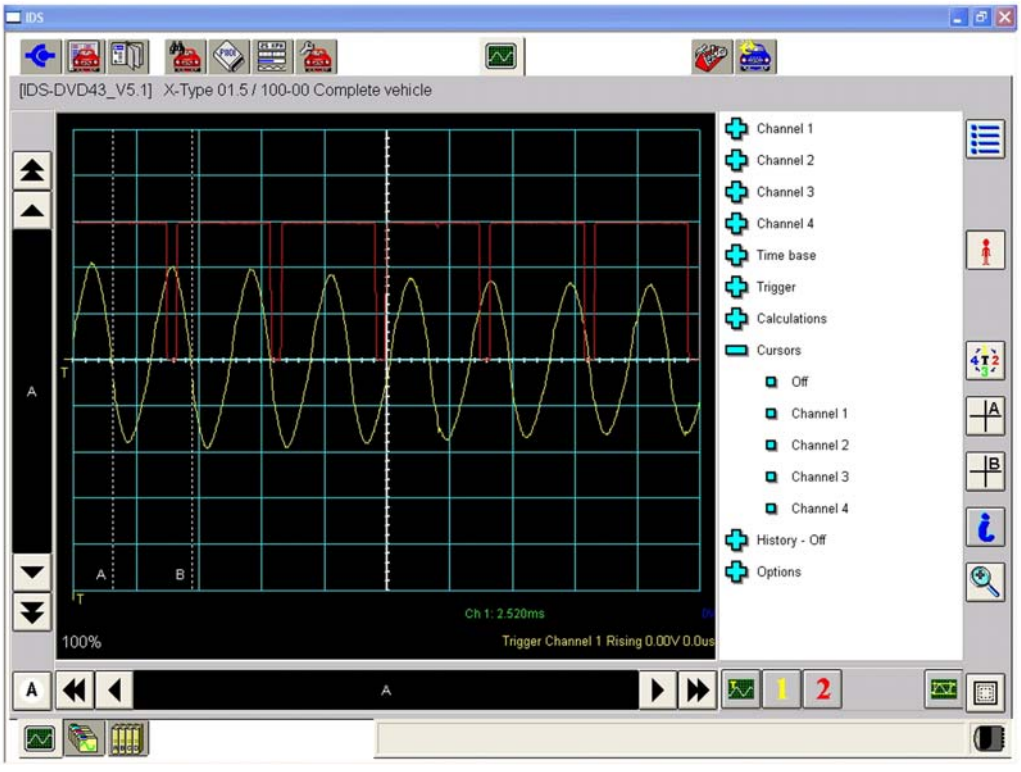
Curser B Button



The A cursor will have a horizontal and vertical dashed line associated with it as will the B cursor. The difference between the horizontal A and B cursors will display the delta voltage between the two dashed lines just below the graph area.

The vertical A and B cursors will display the delta time with the delta time displayed just below the graph area. The single and double arrows at either end of the bar area will control the selected cursor. The bar area between the arrows will display whether the user is controlling the A or the B set of cursors.

Curser Displayed



E77951

The single arrow increments every time it is touched while the double arrow auto scrolls and stops when it is touched again. The arrows will remain black since their function is independent of the signal(s) being displayed.

Select any channel button to get back to the regular signal display. This feature can be invoked with the screen running or stopped. The only requirement is that it has to be initially selected from the options menu. Screen saves will also support cursors in the saved file.

Auto Scroll Left Button

Scroll Left Button

Scroll Right Button

Auto Scroll Right Button

These buttons are used to scroll the trigger T and will match the colour of the triggered signal. The same buttons are also available on the cursor screen to move either the A or B cursors.

Zoom in Button

Zoom out Button

The zoom button is always available on the right vertical. Zoom starts at 100% and goes to 500%. Once the user is between 100 and 500% another zoom button will appear with a minus sign in the magnifying glass. The zoom level will always be displayed just below the graph area. Default zoom is 100%. The reset button will put any zoom selection above 100% back to the default of 100%.

The single arrow increments every time it is touched while the double arrow auto scrolls and stops when it is touched again. These buttons are also displayed in a vertical format and perform in the same manner. These buttons are also displayed in channel mode (vertical only) and match the colour of the primary signal.

Running Figure Button

Standing Figure Button

This button has two functions. When the running figure is selected the red button will appear and stop the screen. When the standing figure is selected the green running figure will appear and signal acquisition starts. The running figure is animated to let the user know that the tool is running. The red stationary figure is red to let the user know the tool is stopped.

Encyclopaedia Sub-tab

The Encyclopaedia sub tab button will display detailed help for the oscilloscope tool supported by text and graphics.

Waveform Library Sub-tab

The waveform library sub tab will display the waveform library screen.

The user has the choice of selecting files, load a file from a disk button, and the delete file button on the vertical right of the screen. Once a saved waveform has been selected it the waveform will be displayed.

When a waveform is displayed, the option to save the file to disc will be provided. Once the tool is exited then this process starts over again. This menu will display any Factory Saved and User Saved files.

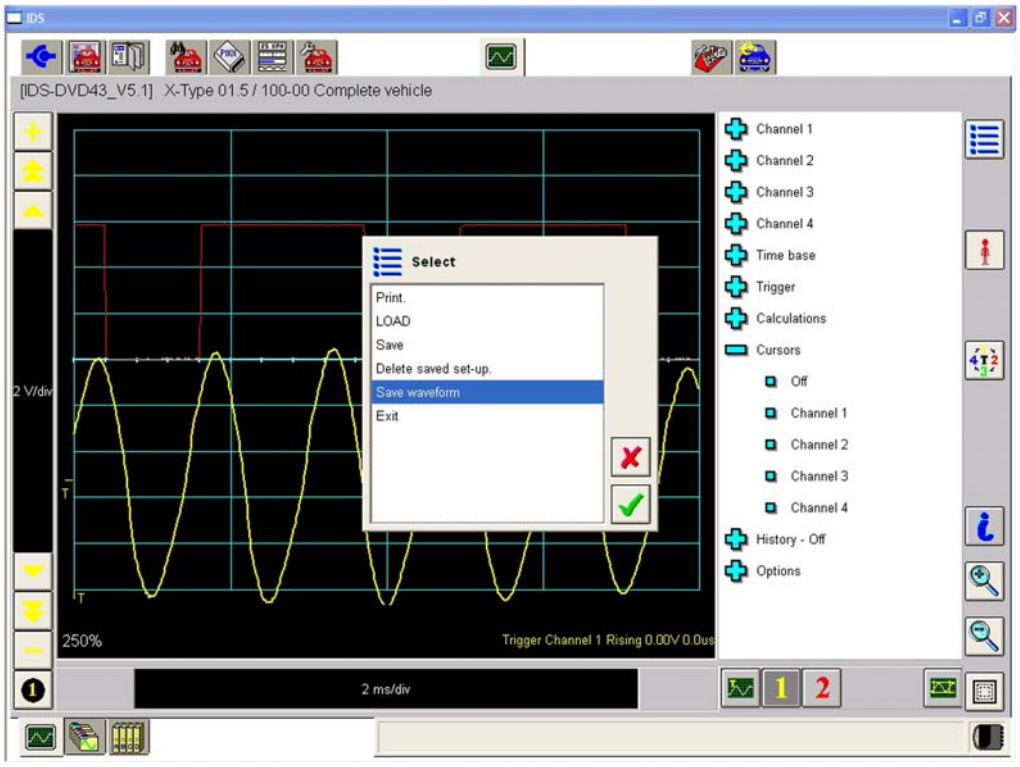
The load files button needs to be selected to show a list of the available files.

Oscilloscope traces may be saved. To save an oscilloscope trace, select the menu button from the oscilloscope button bar.

Menu Button

Select save waveform

Save Waveform



E77952

A **Enter File Name** window will be displayed together with a keyboard. Give the signal trace a file name and select the **Tick** button

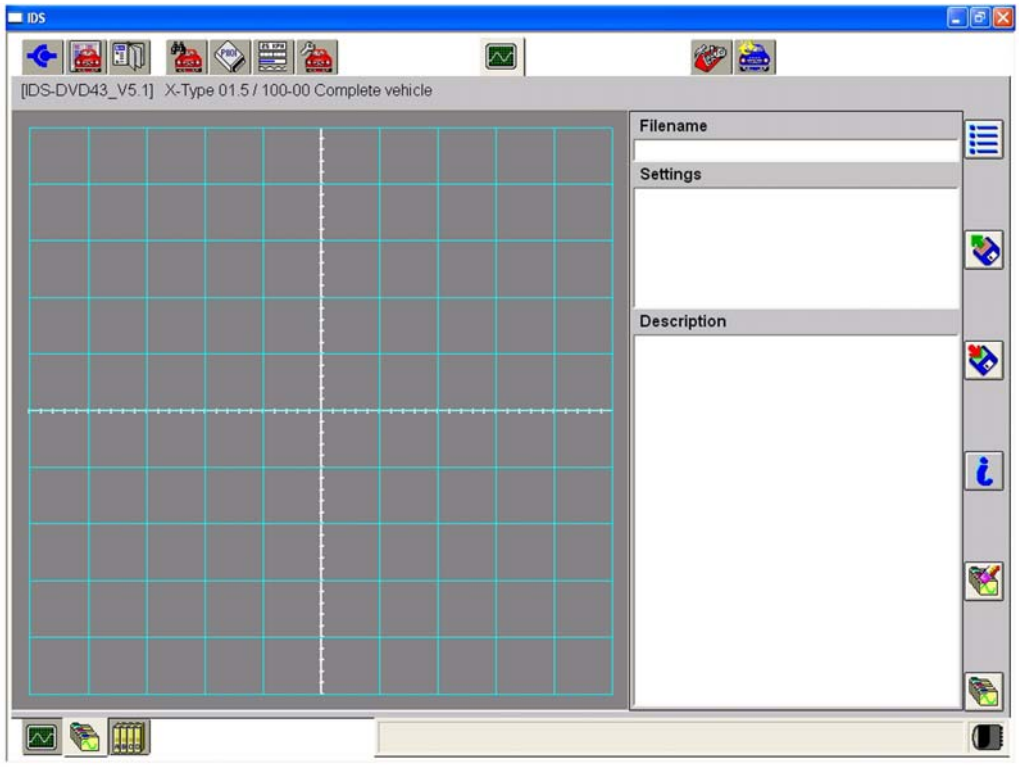
File Name

E77954

A similar window will appear where you may enter a description of the signal. Enter a description and confirm selection using the tick button. The file will be saved.

to display a saved file, select the waveform library sub tab.

Saved Waveform Screen (no files display)



E77953

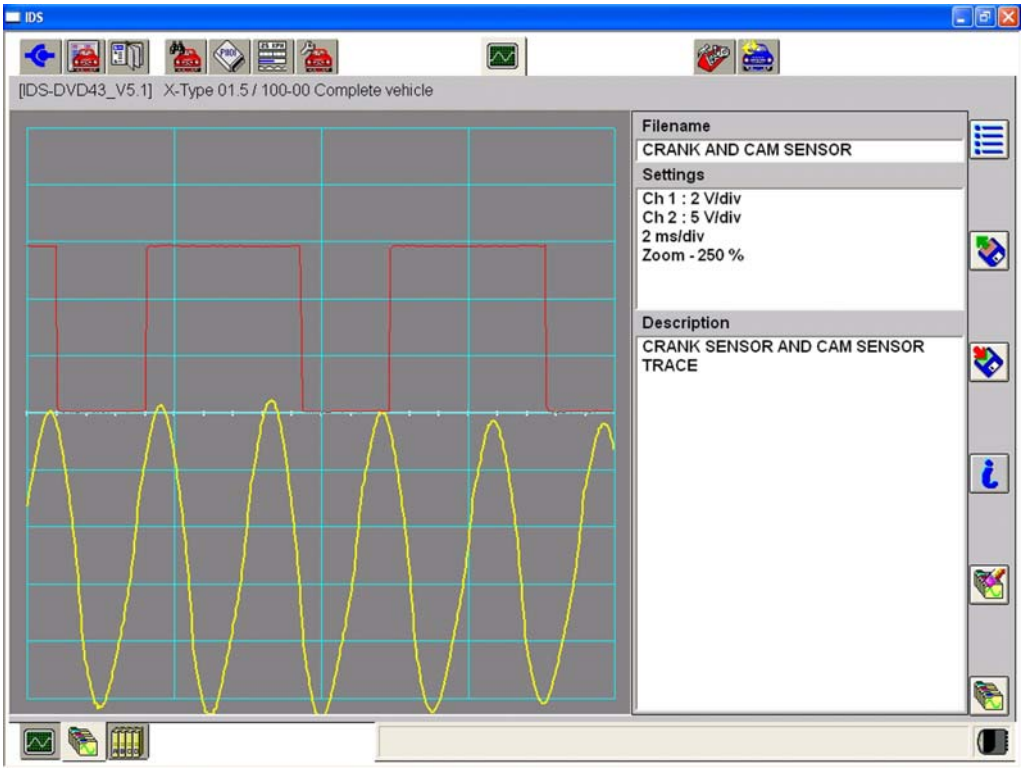
Select the **Load waveform** button from the lower right hand corner of the button bar.

Load Waveform Button

All signals within the library will be listed. Reference signals will be listed in the left hand pane, while saved files will be listed in the right hand pane.

Select a signal of your choice and confirm selection.

Displayed Saved File



E77956

When a file is selected for display, the waveform, waveform name, settings, and description is also displayed.

Waveforms can be deleted in a similar manner. Select the files to be deleted and select the erase button.

Erase File

A confirmation popup will be displayed so the user does not delete by accident.

Information Button

When the information button is pressed, information on the current topic will be displayed.

Menu Button

The menu button is a standard button on all tools. Items available behind this button will allow standard features such as Print, Load Saved Setup, Delete Saved Setup, Save Setup, Save Waveform, and Exit.

The save setup selection will allow the user to save just the setup information and once a setup has been saved it can be recalled making a specific setup automatic.

The deleted saved setup will provide a confirmation popup so the user has one last chance to change their decision.

Notes

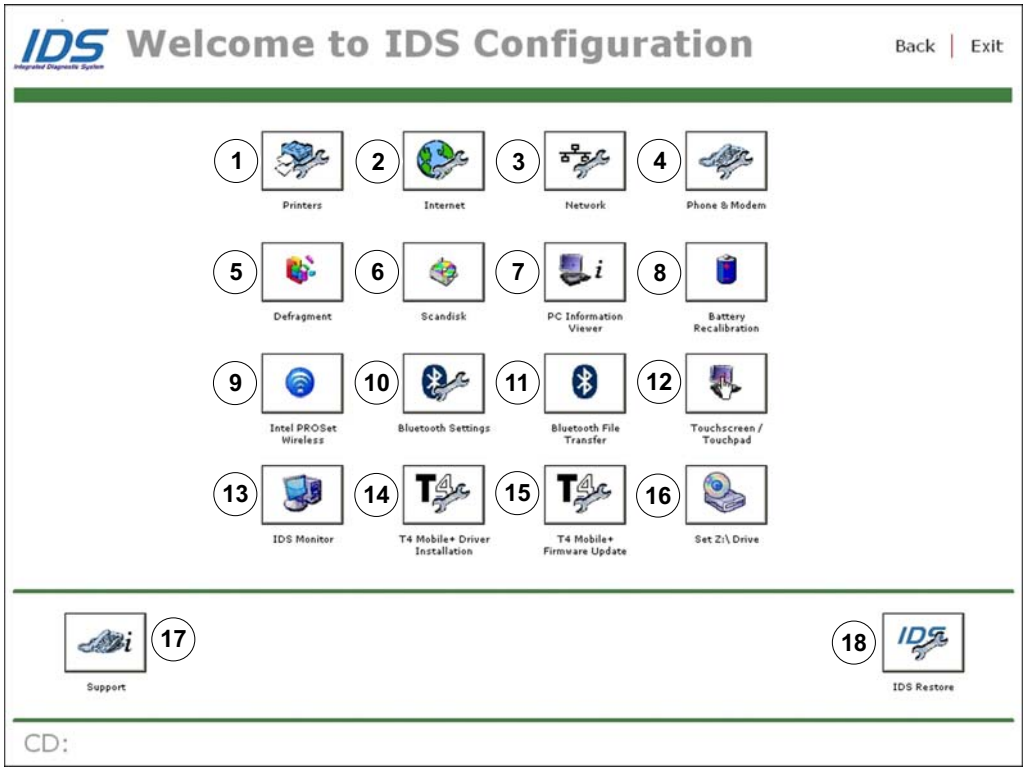
On completing this lesson, you will be able to:

- Describe the function of the buttons in the IDS Configuration Menu
- Use the USB drive to transfer and save files
- Recognize the procedure for installing 'Patch Files' onto IDS

IDS Configuration Menu

The IDS configuration menu contains 18 buttons in order to access various IDS menus.

IDS Configuration Menu



E79264

IDS Configuration Menu

1 Printers - Enables printers to be added and configured

2 Internet - Configure internet connections

3 Network – Configure network connections

4 Phone and Modem – Configures the Modem

5 Disk Defragmenter – Runs disk defragmenter to improve file access. Use following installation of updated software

6 Scandisk – Inspects hard disc drive for unused files and removes them

7 PC information viewer – Displays current PC configuration

8 Battery recalibration – Recalibrates the battery

9 Intel PROSet wireless – Configures wireless network connection

10 Bluetooth® settings – Configures Bluetooth connections

11 Bluetooth® file transfer – Transfer files using Bluetooth network

12 Touchscreen / Touchpad – Reconfigures / calibrates the touch screen

13 IDS Monitor – this launches the IDS Monitor application

14 T4 Mobile+ Driver Installation – Installs software updates to the Laptop. Not used for Jaguar only applications

Jaguar dealers only will only see 16 buttons.

15 T4 Mobile+ Firmware Updates – Installs updates for the T4 Mobile+ communications box. Not used for Jaguar only applications

16 Set Z:\ Drive – Changes the DVD drive letter to Z (When DVD drive is connected to another USB port) Not used for Jaguar only applications

NOTE: Items 2, 3, 4, and 10 are used to configure the appropriate connections and will normally only be used by the dealer Information Technology (IT) department.

17 Support - Provides access to the IDS support contact details

18 IDS Restore – Runs the IDS restore software

Testman

If for some reason an error occurs while using IDS, a Testman executable message window may be displayed.

Testman Executable Message

E69039

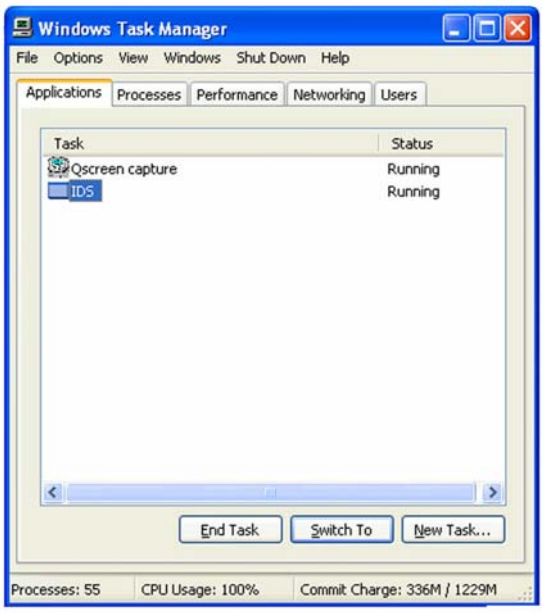
Select the 'Click here' option to display details of the error report. Make a note of the details and select the 'Don't Send' option.

Task Manager

If for some reason IDS 'locks up' and fails to respond to TSD or keyboard commands. It may be necessary to close down the IDS application. To do this when IDS has 'locked up' simultaneously press the Ctrl + Alt + Del keys on the key board.

The task manager will be displayed.

Task Manager



E69050

Select **Shut Down** from the list above the tabs. Then select **Restart**. IDS will then shut down and restart.

If the computer has locked up completely and will not respond to the Ctrl + Alt + Del keys, it may be necessary to shut down the computer by holding the power switch in the 'on' position to force it to shut down.

NOTE: This process should not normally be required and should not be used as a substitute for closing down the computer by exiting from IDS.

If the above problems persist the IDS support desk should be contacted.

Using the USB Drive

USB Drive

A USB drive (sometimes referred to as USB mass storage device) is supplied to allow files to be stored or transferred to another computer. If a printer is required to print files, which is not connected to IDS, it may be used to transfer the required files to the printer.

The large capacity of the USB drive will provide the facility to transfer a large amount of data from the IDS laptop computer to another computer.

Insert the USB drive into one of the USB ports on IDS. After a short time, IDS will recognize the device and will display a screen pop-up message. The USB drive may be opened from this pop up message providing IDS has been configured to do so. If it has not it may be opened by selecting '**My Computer**' from the **Start** menu and selecting the appropriate drive letter. Right click the cursor on the drive letter and select open to display the contents of the USB drive.

A symbol will appear on the task bar to indicate that a USB device is connected.

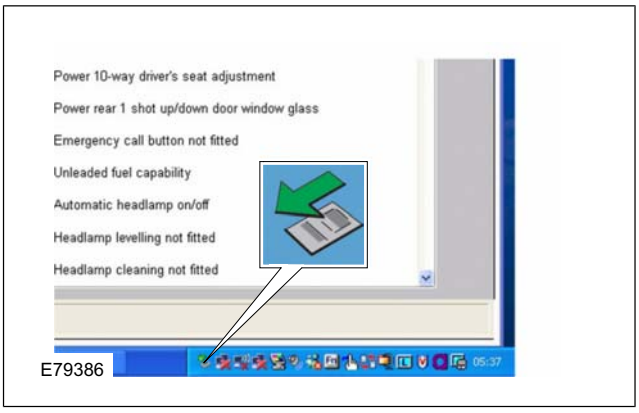
Save the required files to the USB drive and close the drive.

⚠ **CAUTION: Do not remove the USB drive from IDS without first closing the drive and carrying out the disconnection procedure.**

To remove the USB drive, close down the drive contents by selecting **X** at the top right hand corner of the screen.

Close down the USB drive by selecting the USB symbol on the task bar.

USB Symbol



The following message will be displayed: '**Safely remove USB mass storage device**'. Select the message. A confirmation message will be displayed stating that it is safe to remove the USB drive and the symbol will disappear from the task bar.

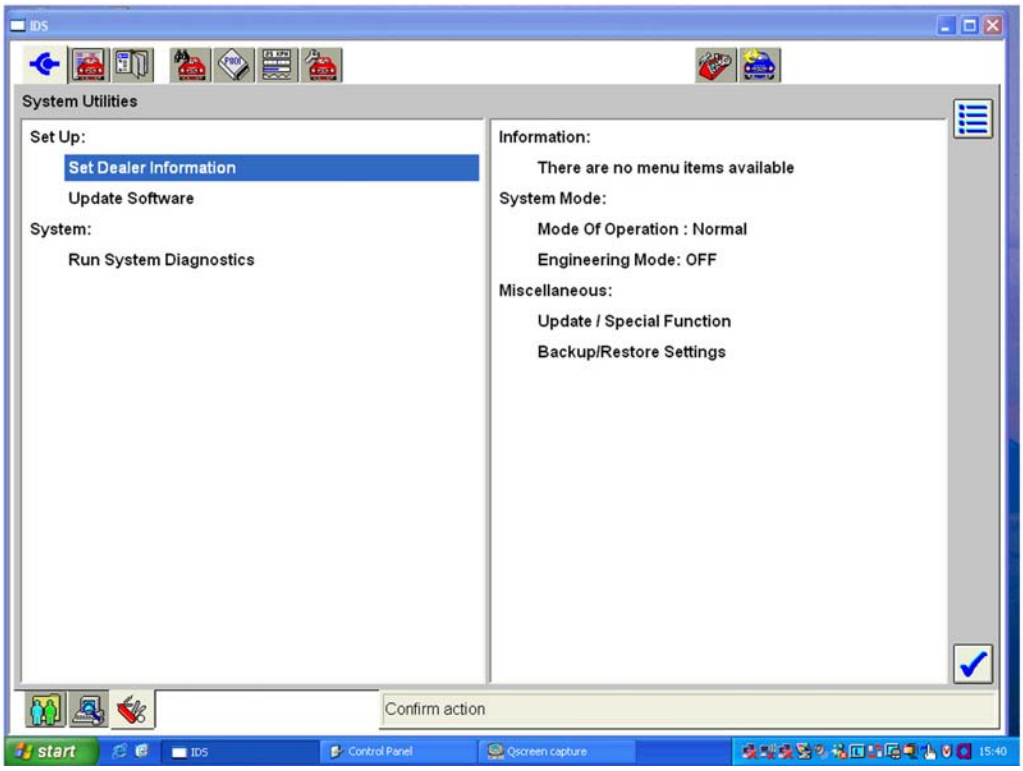
Installing Patch Files

Periodically, patch files will be released to enhance a diagnostic procedure. The patch files may be downloaded from GTR onto the USB mass storage device (and then transferred to IDS if downloaded from another computer).

To install a patch file carry out the following procedure:

- Connect the USB drive to one of the USB ports on the side of IDS
- Access GTR and navigate to the desired patch file
- Download the patch file from GTR to the USB drive
- Close down GTR and launch the IDS diagnostic software if not already running
- Navigate to the System Utilities menu

System Utilities



E69033

- Select **Update Software**
- Select **Removable Disc** from the **select drive menu** displayed
- IDS will then install the patch file

NOTE: Only the correct patch file will be installed. If the correct patch file is not present a warning message will be displayed.

Patch files may only be installed in numerical order. Example. Patch file 2 cannot be installed unless patch file 1 has already been installed.

Following the installation of the patch file, it is recommended that the patch file is deleted from the USB drive. It is also recommended that only one patch file is downloaded to the USB drive at a time.

PDF995

PDF995 is a program which allows the user to capture screen images and save them as a portable document format (pdf) file. These files may then be saved to a preferred file destination of the computer, or the USB drive and transferred to another computer for printing or e-mailing etc. When a problem exists it may be most helpful if the screen images are captured and sent to the support desk.

To capture the screen image, select the **Select System Options** button.

When the **print screen** confirmation message is displayed, select the tick symbol. A **Pdf995 Save As** window will be displayed. Select file address where the file is to be saved and give the file a name.

Example: Save in: My Documents, IDS screen images. File name: VIN_012345_ DTC1

Select save.

Adobe Reader will be opened displaying an image of the screen you have captured. Close the document.

To locate the document, open the desktop and go to the file where the document has been saved.

The file may be copied to the USB drive and transferred to another computer or printer if required.

IDS Monitor

It is possible to create a file containing all details of a diagnostic routine carried out. This is especially useful for engineers to locate the cause of a failed diagnostic routine.

Before exiting from the diagnostic routine, select the **Alt + Tab** keys to display the main menu. Select **IDS monitor** from the IDS configuration menu.

IDS monitor will be opened and a trace of all data relating to the diagnostic routine carried out will be created. Name and save the file to a preferred destination, where it may be retrieved later. It is recommended that the file name contains the VIN, since this will assist in referring to it easily. The file may be transferred to another computer using the USB drive and if required may be sent to engineering for analysis.

The trace file will show all details of the diagnostic routine carried out. This will include the VIN, test being carried out, which answers had been selected from the pop up messages etc.

Notes

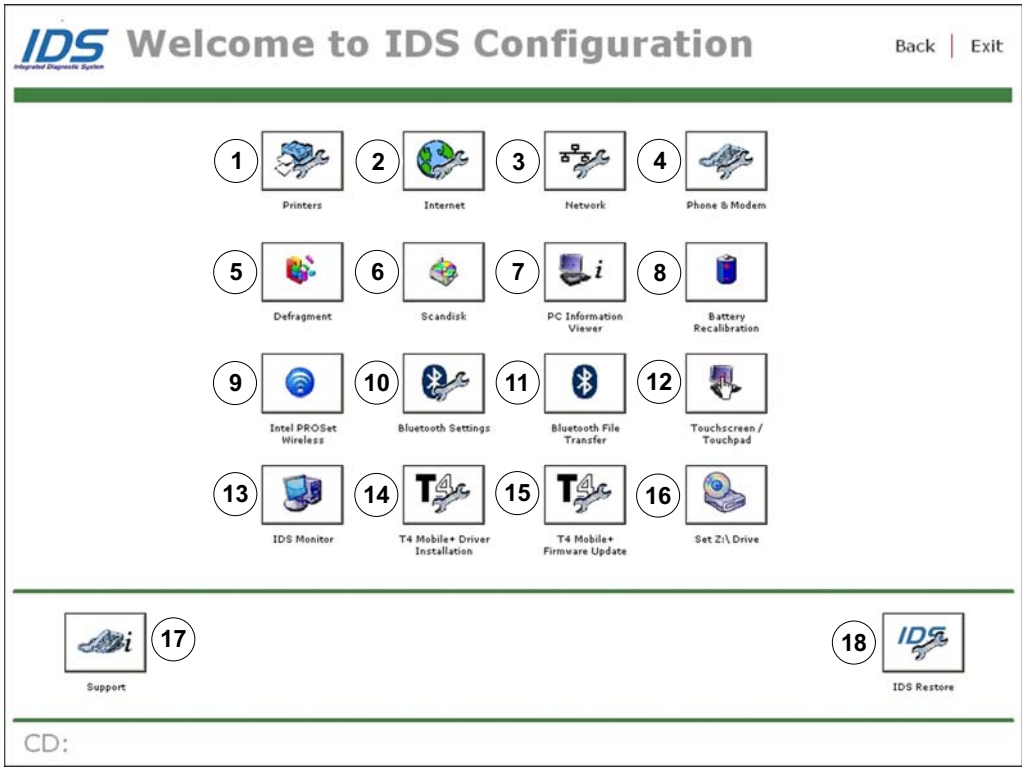
On completing this lesson, you will be able to:

- Describe the function of the buttons in the IDS Configuration Menu
- Use the USB drive to transfer and save files
- Recognize the procedure for installing 'Patch Files' onto IDS

Overview

There are several maintenance tools available from the IDS configuration menu in order to assist in maintaining IDS at its optimum operating performance.

IDS Configuration Menu



E79264

5 Disc Defragmenter

6 Scandisk

8 Battery Recalibration

Scandisk

Scandisk is a tool used to check the hard drive for faults and unused programs. It is not recommended that scandisk is used unless instructed to do so by the technical support line or a technical bulletin or release note.

Scandisk may remove unused programs which may affect the operation of IDS.

⚠ **CAUTION: Do not use Scandisk unless instructed to do so by the IDS technical support desk or a release note.**

Defragmenter

Defragmenter will also assist in maintaining IDS operating at its optimum performance. Defragging of the hard disc is achieved by selecting 'Disc Defragmenter' from the IDS configuration menu.

A computer stores data on the hard disc. When a file is created and saved, hard disc space is used up. When the operating system and programs are installed onto the computer, they are written to the disk, for the most part, in one block without any gaps. The exceptions are certain system files that must be stored in specific locations. Over time, as files are created and deleted, once filled locations are left empty and the hard disc becomes filled with files storage areas, dotted all over the disk. When Windows is writing a file to the disk, it looks for a suitable piece of free space in which to store it. When a file is larger than the available size of single storage area, the file is 'chopped up' into smaller size pieces. Windows writes the first part of the file in one section of the disk and then searches the disc for other places to store the rest of the file. The end result is that a single file may be stored in several areas scattered about the disk. The disc becomes fragmented. When these files are accessed, the computer has to search in several areas for all of the data. Fragmentation makes the hard disk do extra work that can slow down the operation of the computer.

Disk Defragmenter rearranges fragmented data so that the hard disk can work more efficiently.

Defragmenter works by moving slabs of data to unused parts of the disk, in order to open up a large free section of space. It then assembles the fragmented parts of a file and writes them in one complete piece to the cleared space. It then does the same with the next file, and so on until the entire disk is defragmented.

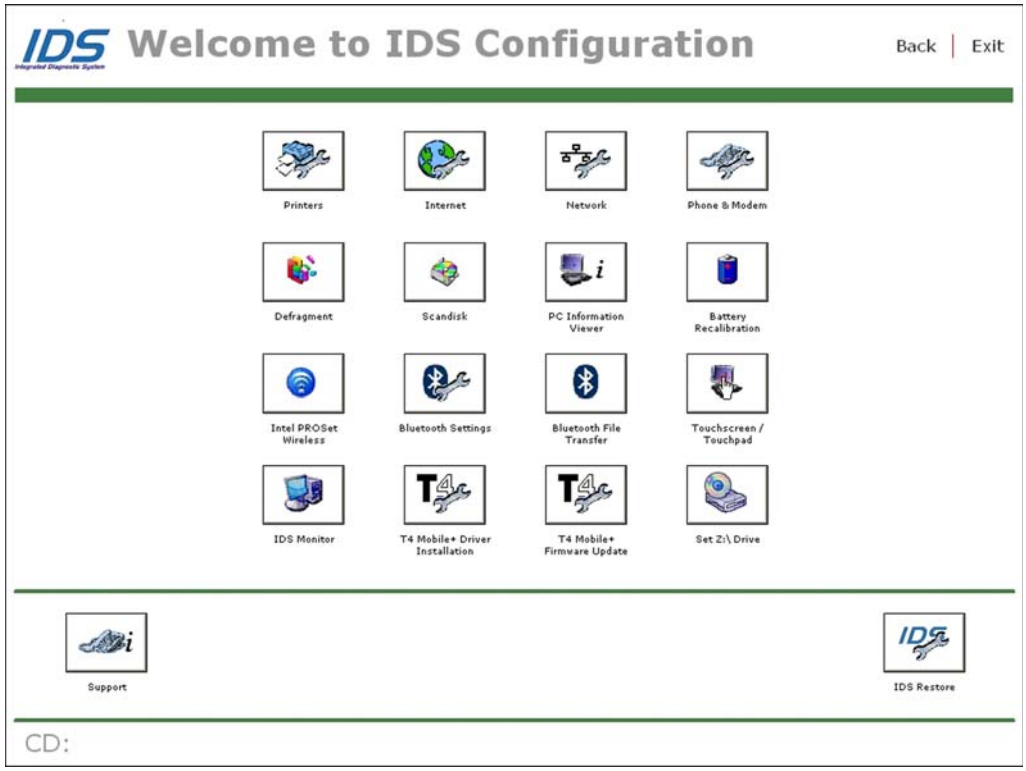
Due to the size of the IDS hard drive and the operation of IDS, it is not necessary to use defragmenter at a regular interval.

It is recommended that defragmenter is used at a convenient time, following the installation of new diagnostic software. Defragging the hard drive may take some time to complete, so only carry out this procedure at the end of a working day when IDS will not be required.

Calibrating the TSD

If the accuracy of the TSD has depreciated then it may be recalibrated by selecting the **Touchscreen/Touchpad** button from the IDS configuration menu.

TSD Configuration Button

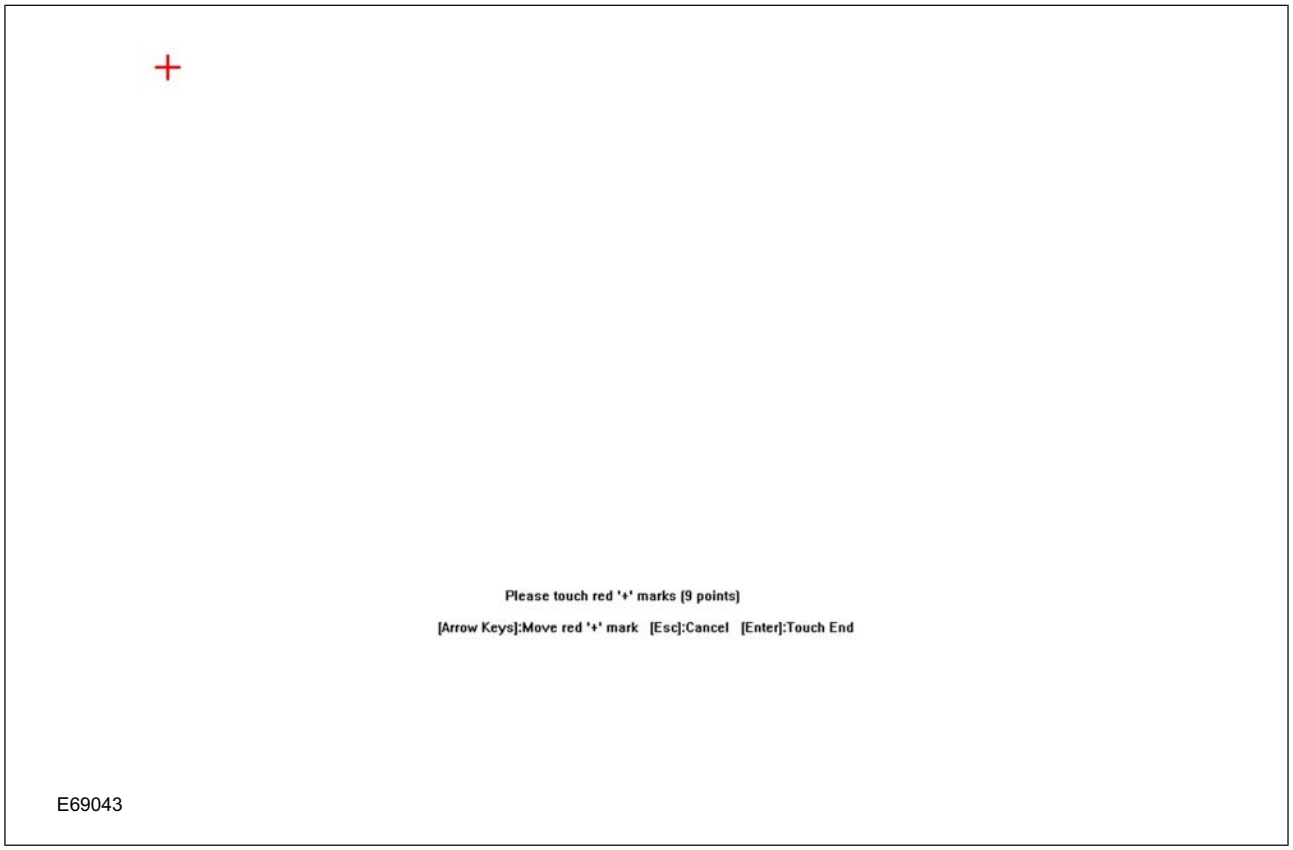


E79263

The mouse properties will be displayed. Select the **Touch screen** tab and then **calibration**.

The calibration screen will be displayed.

Calibration screen



Using the stylus, touch and hold the + symbol for approximately one second. The + symbol will then move to another position after it is released, where the procedure will be repeated.

NOTE: It is easier to position the stylus in the centre of the + symbol by first contacting the TSD adjacent to the + symbol and then sliding the stylus to align it exactly over the centre of the + symbol. The datum point is made on releasing the TSD.

Repeat the process for each position of the + symbol. The calibration process is complete once all nine + symbols have been touched followed by the enter key.

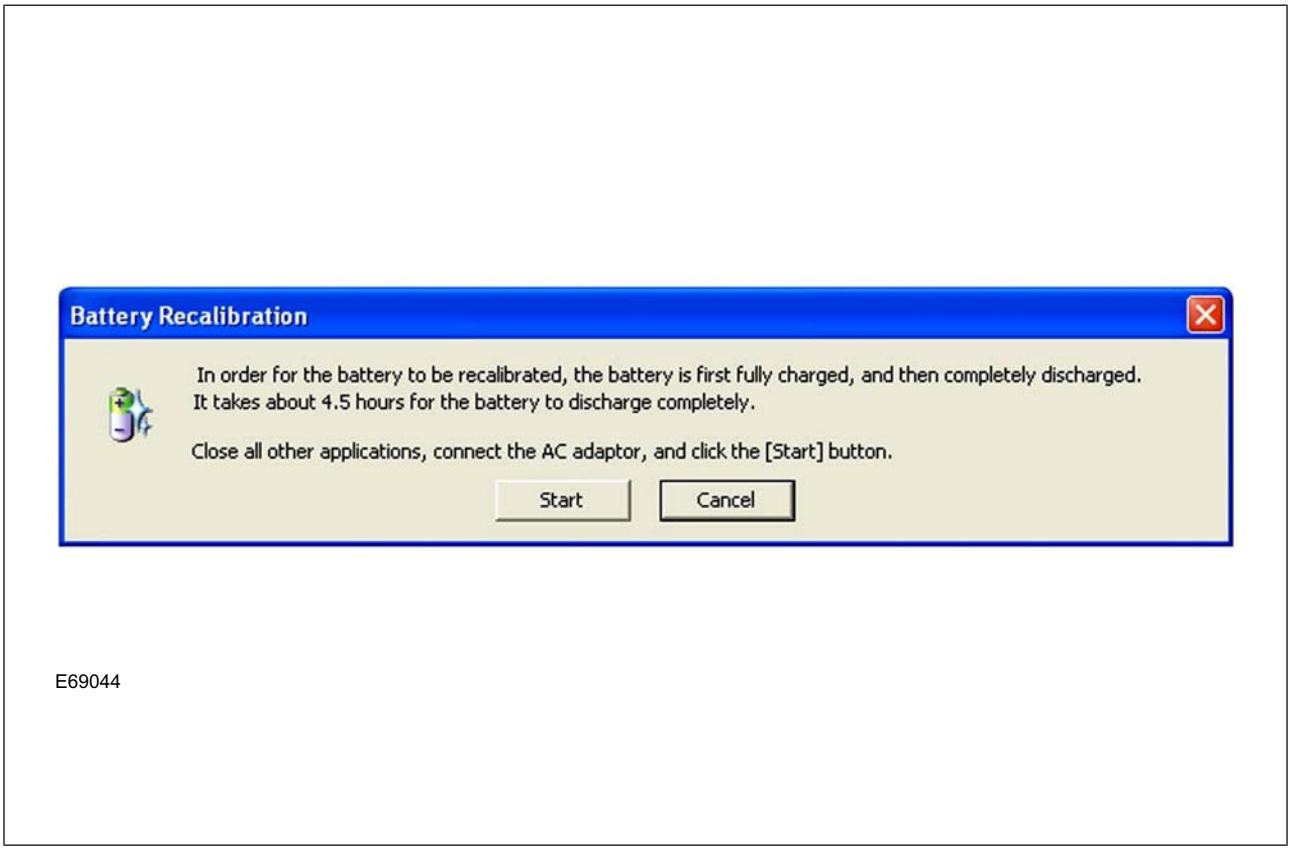
Battery Calibration

As the battery deteriorates the remaining battery capacity may not be displayed accurately. Selecting the battery recalibration function from the IDS configuration menu will recalibrate the battery.

During battery recalibration, the following actions are carried out:

- Battery will be charged (providing it is not already fully charged)
- Battery will be discharged
- Computer will shut down
- Battery will be charged

Battery Recalibration



It is recommended that the battery recalibration procedure is carried out weekly. Battery recalibration may take up to 14 hours to complete and so should be carried out overnight when IDS is not required. Battery recalibration may only be carried out when IDS is connected to a mains power supply and the lid is open.

If battery calibration is inadvertently selected, the process may be terminated by switching off IDS, although it is recommended that once the battery calibration process has started, it should be left to complete the process.

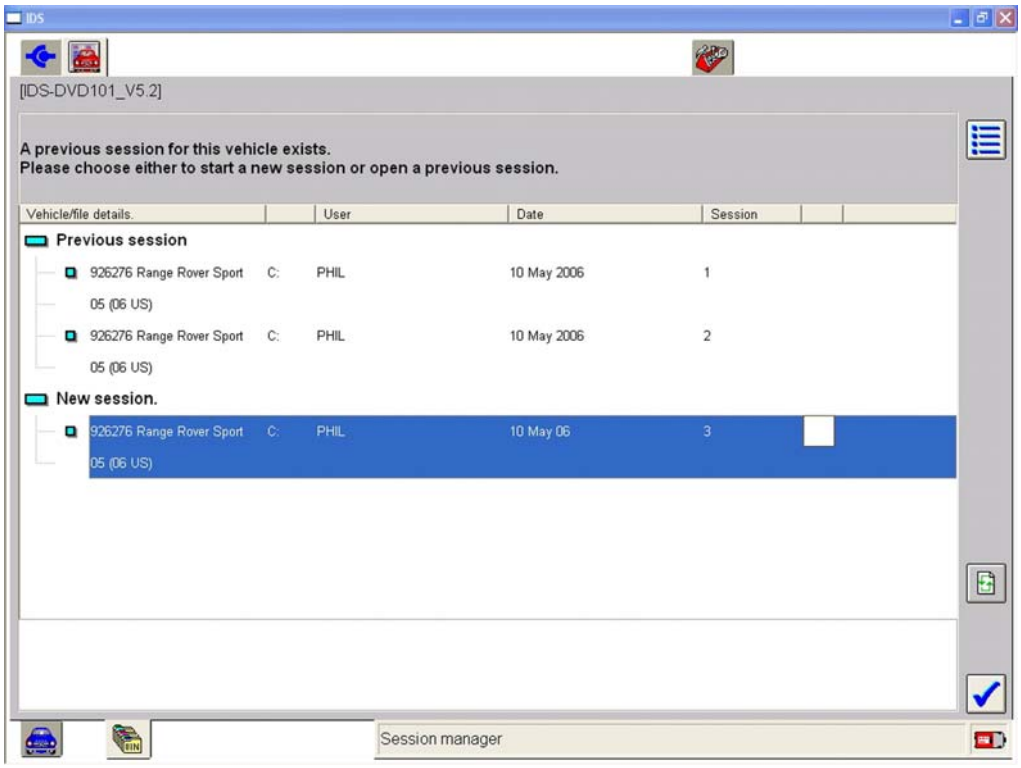
Session Management

Each time a VIN number is entered into IDS, a session file is created. Ending the session will save the session file. Up to a maximum of 99 session files may be saved for per VIN. Over a period of time the amount of free space on the hard drive will be reduced which may reduce the operating performance of IDS.

Resume a previous session either by :

- Entering a VIN number for which previous stored session information is available. The user will be notified and presented with a list of the sessions that were previously created for that VIN. The user may then select one of the previous sessions or start a new session. The new session details shall be marked as selected
- When selecting the Session Manager sub-tab, a list of all previous sessions for all VIN's is presented. The user may then select one of the previous sessions or start a new session.

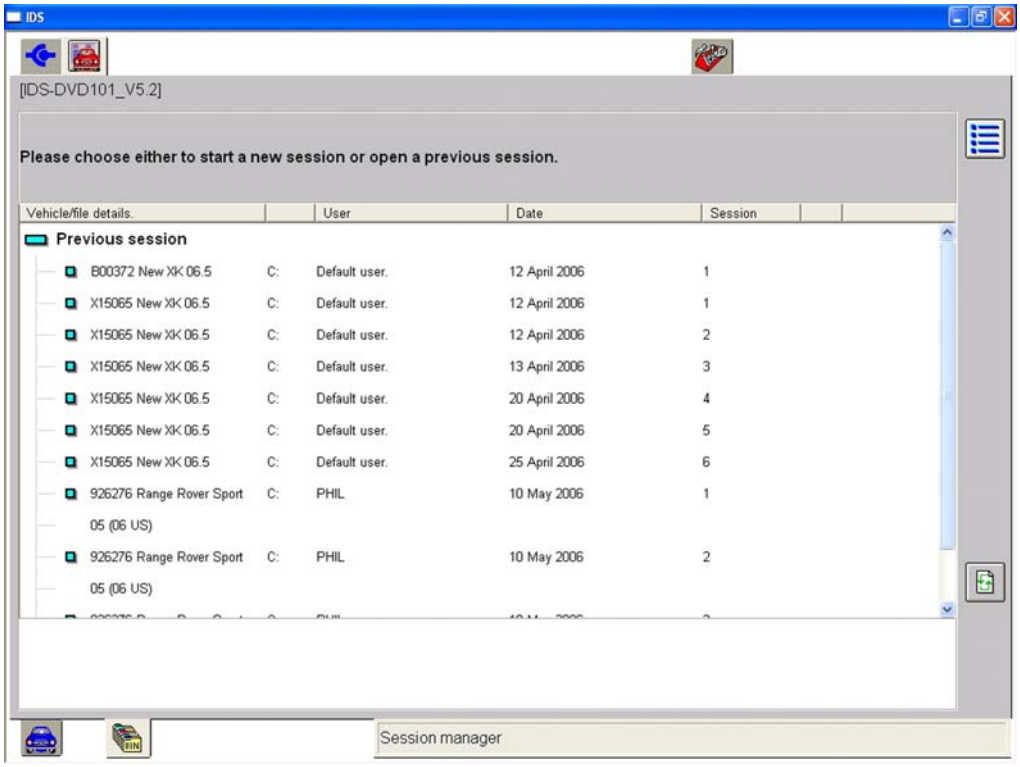
New Session



E81507

A list of all previous sessions may be accessed by selecting the 'session manager sub-tab before a session has been started.

Session File Manager



E81509

All files created during a session will be displayed under the File Manager sub-tab.

The user may either:

- Copy a file
- Save the file to another area or medium (ie, USB drive or C.D ROM)
- Print the file
- Create an annotation or comments on the file
- Delete the file

Sessions files that are no longer required may be deleted, in order to save free hard drive space.

Session files that are more than 28 days old will automatically be deleted, during installation of the next diagnostic software up date.

Phoenix Restore Program

Most computer faults are due to software and configuration issues. A fault rarely occurs due to a hardware failure.

A Phoenix restore program is installed on IDS and may be used to reset the laptop computer to the same configuration as it was on a date when it was known to be operating satisfactory, or to the same configuration as the laptop was when it was first switched on for the first time.

The two options are:

- Incremental restore point
- Static restore point

Incremental Restore Point

The Phoenix restore program will be set to make an Incremental restore point each day.

⚠ **CAUTION: The time that the restore point is created has been set during manufacture and should not be changed.**

The program takes a snap shot of the hard drive and stores it on a partitioned part of the hard drive. The size of this partition will allow the storage of many Incremental files. However, once the partitioned drive becomes full, the later Incremental restore points will still be saved by the program deleting the earlier restore points in order to make room for the new Incremental restore point file.

The Phoenix recovery program is accessed from the IDS Restore button of the IDS configuration menu screen. Selecting the Phoenix FirstWare recovery pro button, will give access to the recovery program.

CAUTIONS:

⚠ **Do not access the Phoenix restore program unless instructed to do so by the IDS support desk.**

⚠ **If instructed by the support desk to use the Phoenix restore program, make sure that their instructions are followed carefully.**

NOTE: Once a restore point action has been carried out, all restore points and data saved since the selected date will have been deleted. This is because the computer is being set to the condition which it was at on a previous date.

Static Restore Point

There is only one static restore point. This is also allocated a space on the partitioned part of the hard drive. The static restore point will have been created the very first time that the computer is operated. Restoring the computer to the static restore point condition will erase all data and changes made after the static restore point was created. You should also be aware that it is possible to create a new static restore point, but this is not recommended since this action will erase the original static restore point data. This will prevent the computer from being reset to its original condition.

⚠ **CAUTION: Never create a new static restore point. Doing so will erase all original data and may prevent the laptop from being restored to a known good restored condition.**

If 'Windows' fails to operate after switching on IDS, and the computer appears to be working but cannot be used; on the sixth attempt of switching on IDS, the Phoenix restore program will automatically open.

Contacting the Support Desk

In the event that you experience any problems with using IDS and you are unable to resolve them by repeating the procedure or by consulting IDS literature, contact the IDS support desk for assistance.

Details of the relevant contact telephone number may be found by selecting the 'support' button from the IDS main menu screen.

NOTE: Access to international free phone telephone line is required. Often, workshop telephones are prevented from dialling international telephone numbers.

The support desk will carry out a call qualification check, making sure that your dealer code is valid and that your support contract is up to date.

NOTE: IDS support is carried out by SPX and not the Dealer Technical Support Hotline.

NOTE: The Dealer Technical Support Hotline will deal with vehicle and diagnostic software concerns.

Before contacting either of the support teams, make sure you have the following details available:

- Dealer Name
- Dealer code
- Telephone Number
- Fax Number
- Contact name
- IDS Serial/Model Number
- VIN number of the vehicle being tested
- Details of the test being carried out
- The details and description of the fault
- Details of any error messages displayed
- The IDS software application details. Example: IDS software release number 2

A support desk information form must be completed before contacting the support desk.

The following items are covered by a five year manufacturers warranty:

- IDS Laptop computer
- VMM (Not currently applicable for Land Rover)
- VCM

The battery and leads are covered by a six month manufacturers warranty.

Replacement components will usually be received by the dealers within 24 hours of contacting the support desk, depending upon the market and the time of day that the support desk was contacted.

An item covered under the manufacturers warranty will be temporarily exchanged with a replacement component being loaned to the dealer. The original component will then be tested and repaired. The component will then be delivered to the dealer. The support desk will then arrange collection of the loaned component from the dealer. If the dealer does not allow the loaned component to be collected within the time period, then the dealer will incur a penalty cost.

It should be noted that computer faults are usually caused by software problems and are rarely due to faulty hardware components.

A replacement component not covered under the manufacturers warranty will incur a cost to the dealer. Example, replacement of a damaged measurement probe.

Vehicle Details And Reported Fault

This should include the exact vehicle model, derivative, model year and VIN, plus any component numbers or codes relevant to the area of the vehicle being worked on. When combined with details of the reported fault that you are trying to diagnose, this may give IDS engineers a short cut to a solution based on previous experience.

An IDS report form should always be completed before contacting Technical support

Details Of Test Being Carried Out

This information is vital to an IDS engineer who is trying to reproduce and solve the problem.

Some diagnostics may be reached using several different routes. It is vital that the IDS engineers follow exactly the same diagnostic route as the technician experiencing the problem. It would help if you made a note of each screen where you made a decision, so the engineer can follow exactly the same route.

Example:

- Select Diagnostic System
- Select Security
- Select Locking/Unlocking
- Select guided diagnostics

Continue the route until you reach the screen where the fault occurred.

Full Details Of Any Difficulties Using IDS

It may be useful to IDS engineers if they are informed of difficulties experienced when using IDS even though you may have resolved the problem yourself. This information may then be used to prevent problems occurring in the future.

Hardware and Connection Details

NOTE: If the IDS screen on which your problem occurred is one of those that can be printed, please print it off and fax it through to the Help Desk with your Information Sheet. The more information you can provide to the Help Desk, the faster they can resolve the problem.

It is essential to use the correct cables for a given test procedure. By providing the details of the cables/connections used will enable the IDS engineers to check that these are correct before looking for other problems.

IDS Support Desk Contact Details

IDS Support Desk Contact Details

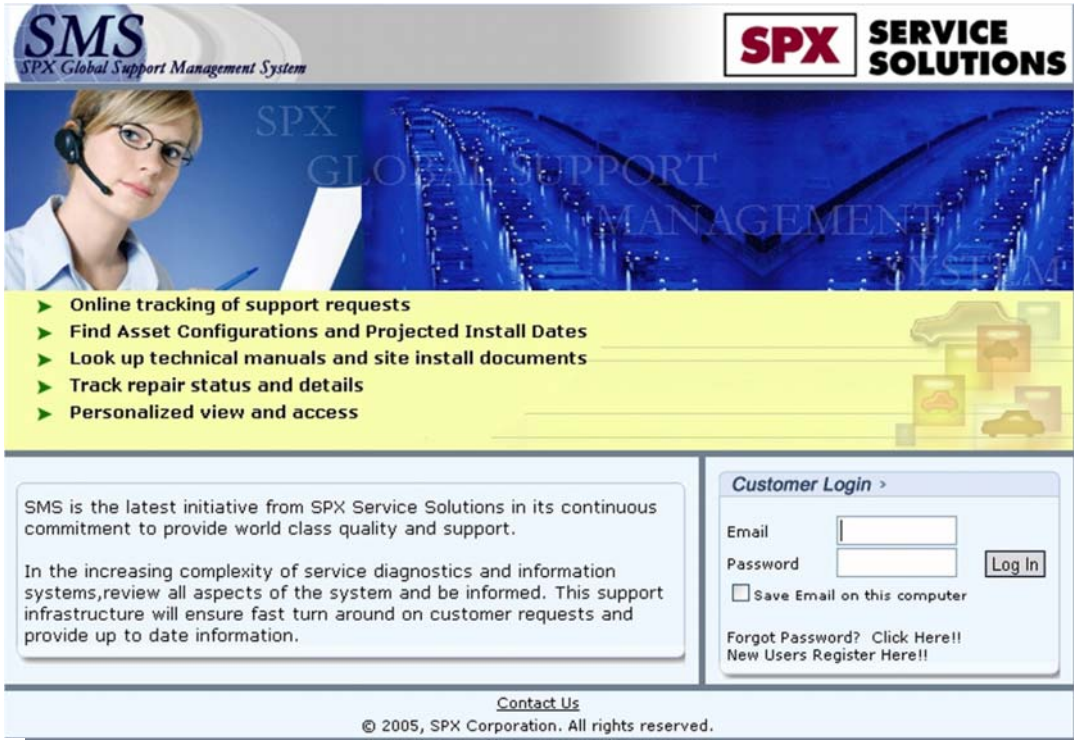
Country	Phone	Web address
Europe/ROW	080077977910	www.spxtools.com
ROW	+49 (0) 6182959400	www.spxtools.com
USA	+1 (1) 8005335338	www.spxtools.com
Japan	+81 (0) 455624483	www.spxtools.com
Mexico	+52 (01) 5525951630	www.spxtools.com

SMS (SPX Global Support Management System)

Once a call has been made to the IDS support desk, details will be logged by the desk on the SMS global reporting system. The dealer may log onto the site and track the progress of the complaint/fault. All registered dealers will be able to log onto the site and check the progress of the help desk regarding their complaint/fault. Dealers will not be able to view details of calls made by other dealers.

To enter the SMS site go to the following internet address: **http://sms.spx.com**

SMS Login



E81512

The dealer must first register on the site to gain access. Once access has been given, dealers will be able to view details of a current complaint, and also historic problems incurred by the dealer. Comments and corrective action details will be entered on the site by the help desk

Dealers will be able to view the following information

- Date and time help desk was contacted
- Contact details of dealership
- Nature of the complaint
- Action taken by help desk
- If the complaint is current of closed

On completing this lesson, you will be able to:

- Disable Windows® XP Network Warnings
- Recognise the Power management options
- Identify Tabs, Sub-Tabs and Buttons used on IDS

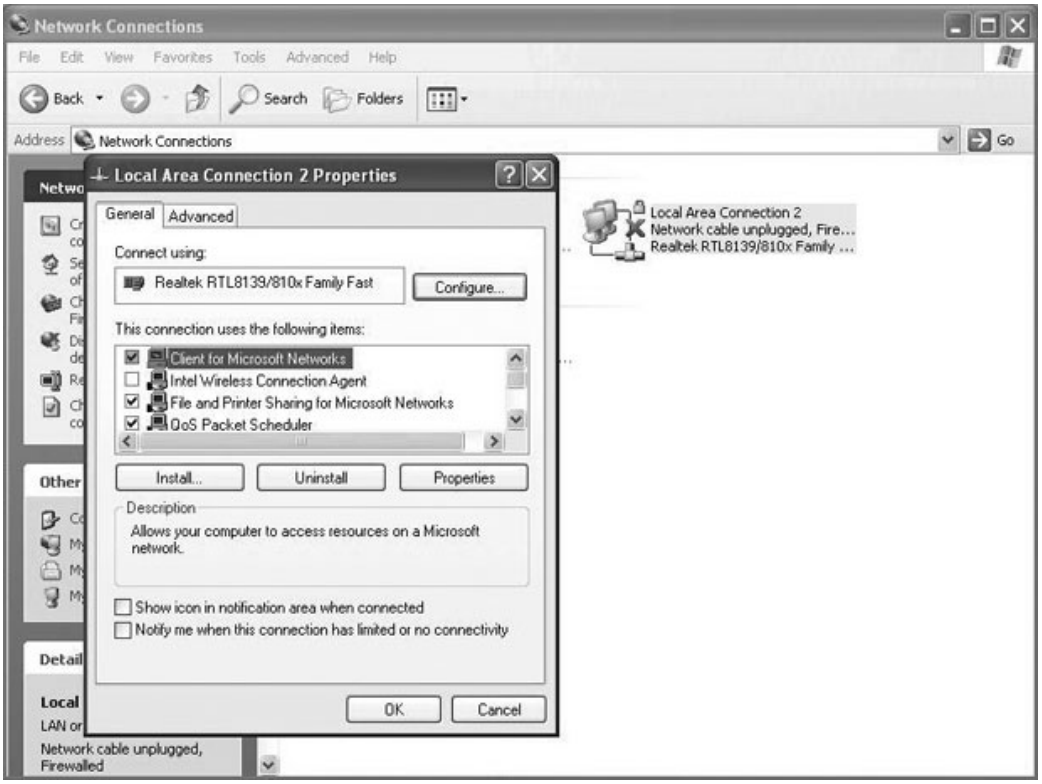
Disabling Windows XP Network Warnings

The network established between the VCM and the IDS laptop, are considered 'limited' networks by the Windows environment. This limited nature of the network causes Windows to issue a warning whenever the connection is established or terminated. These warning's which occur whenever power to the VCM is interrupted can be disabled within the Windows Control Panel as follows:

Select Network Connections from the Control Panel

- Select **Network Connections** from the Control Panel

Network Connections Properties



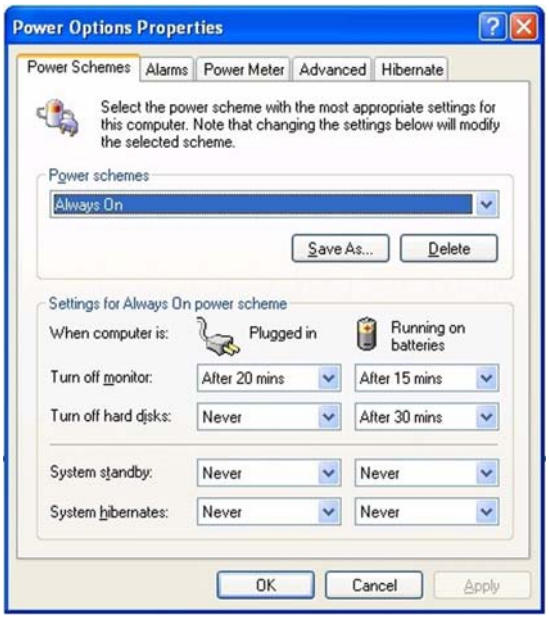
- **RIGHT** click on **Local Area Connection 2** and select **Properties**
- **Deselect** the bottom box, labelled **Notify me when this connection has limited or no connectivity** and click **OK**

This process will need to be repeated for each of the IDS network connections.

NOTE: Do not turn off notification for the wireless network.

Power Management

Power Management Options



E69040

The IDS power management is adjusted by selecting the Power Schemes tab, from the power options menu of the control panel. The power saving mode options become active when IDS is running from either its internal battery or the mains power supply after IDS remains inactive for a pre determined time.

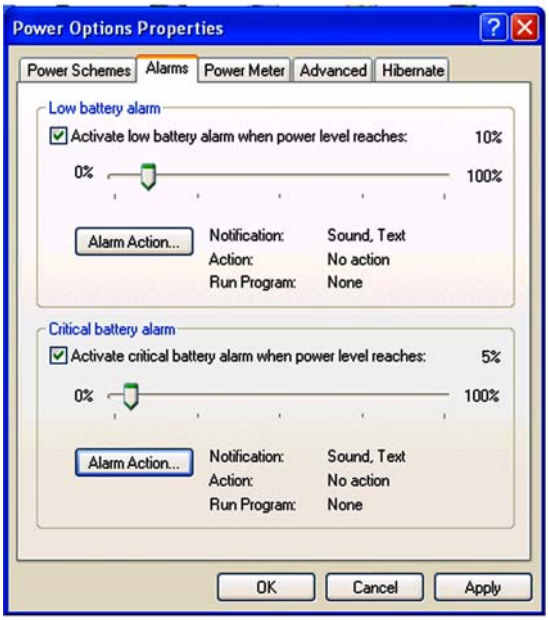
Providing the appropriate options have been selected, the following actions may be carried out by the IDS power management function:

- Turn off monitor
- Turn off hard disc
- System standby
- System hibernates

The time period for which IDS must remain inactive before the system carries out the power management action are selectable.

NOTE: The power options properties have been set at the factory for optimum performance and should not be changed.

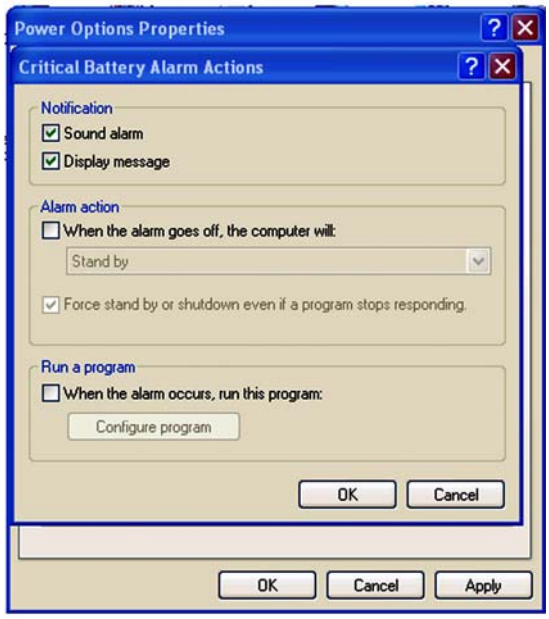
Power Option Properties



E69046

IDS has been configured to warn the operator if the battery is low by displaying a message and an audible alarm.

Critical Alarms Actions



E69042

NOTE: The power options and critical alarm actions have been set at the factory for optimum performance and should not be changed.

Power management default settings

Action	Running from mains power supply	Running from internal battery
Turn off monitor	Never	After 20 minutes
Turn off hard disc	After 1 hour	After 30 minutes
System standby	Never	Never
System hibernates	Never	Never

When the power management function has carried out the appropriate action, due to IDS remaining inactive for a pre-determined time, the following action must be carried out in order to activate IDS once more.

Activating IDS following power management actions

Power management action	How to re-activate IDS
Turn off monitor	Touch the TSD or operate the enter key
Hard disc off	Touch the TSD or operate the enter key
System standby	Operate the power switch
System hibernation	Operate the power switch

System Standby and Hibernation

System standby and hibernation will shut down the computer without closing down programs or documents. Restarting the computer from either standby or hibernation mode will return the user to the same programs and documents that were open at the time before the computer entered either standby or hibernation.

When the computer enters standby mode, data is stored in the computer's memory (RAM) and the recovery time is short. Power must be maintained, from either a mains power supply or the internal battery, in order for the computer to retain this data in the memory. If power is lost, then the data will be lost.

When the computer enters hibernation mode, data is stored on the computer's hard drive. The recovery time is a little longer than when in standby mode. However, power is not required in order to maintain the data.

NOTE: It is not recommended that Standby or Hibernation mode is used as an alternative to switching IDS off, when IDS is not required.

Tabs, Sub-Tabs and Buttons

The following symbols glossary is provided for reference only.

Tabs

Tabs

System Page

This tab gives you access to the System Page. From here you can set up user preferences, get system information and run system utilities.

Vehicle ID

You can access the Vehicle ID screen, and identify a vehicle to the system by selecting this tab.

Content Model

This tab allows you to access the content model and select a specific functional area of the vehicle.

DTC Monitor

This tab allows you to access the DTC Monitor, view and analyse Diagnostic Trouble Codes.

Datalogger

This tab allows you to access the Datalogger.

Vehicle Configuration

This tab allows access to the configuration menu.

Close Session

You are able to close the current session by selecting this Tab. You will be prompted to either Hold, Complete or Delete the session.

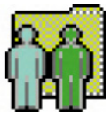
Toolbox

This provides access to IDS Toolbox. (Only used if VMM is available)

Sub-Tabs

Sub-Tabs

User Preferences



From the User preferences screen you can create, delete and edit user preferences. By selecting this sub-tab you can also change the current user.

System Information

Using this sub-tab you can view a summary of information about the system including system time, dealer information and software version.

System Utilities

When you select this sub-tab you will be given access to a menu of system functions which will allow you to enable training mode, add printers, change printer settings and view release notes.

Code Display

This allows DTCs to be viewed

S93 Report

You can generate or print an S93 report from within the DTC Monitor by using this sub-tab.

Sorted Snapshot Data

By selecting this button you can sort snapshot data into a logical order.

Signal Selection

Datalogger signals are selected from this sub-tab.

Configure Signals

This sub-tab enables you to configure limits range and signal display settings in Datalogger.

Configure Trigger Settings

This sub-tab enables you to configure trigger limits and actions.

Global Configuration

This sub-tab enables you select settings which configure the whole Datalogger operation

Datalogger Live Display

This sub-tab allows you to access the Datalogger Live Display.

Playback Viewer

By selecting this sub-tab you can access the Playback Viewer and view any captured data.

Configure Log Viewer

You are able to select which items from the log file you wish to view by selecting this sub-tab.

Log Viewer

By selecting this sub-tab you can access the Log Viewer.

Encyclopaedia Sub-tab

The Encyclopaedia sub tab button will display detailed help for the oscilloscope tool supported by text and graphics.

Waveform Library Sub-tab

Provides access to saved and reference oscilloscope signals

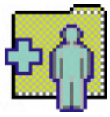
Buttons

Buttons

Menu

This button gives you access to operations specific to the current page. From here you can save or print the screen.

Add User

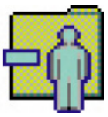


You are able to add a new user by selecting this button. The system will ask for the users identification (name) and will allow you to alter the default preferences.

Change Preferences

You can edit the preferences for the selected use. You should select the setting that you wish to change from the left, and choose the new setting from the right. You will then be prompted to confirm that you are changing the settings for the selected user.

Delete User



By selecting this button you can delete the selected user. You will be prompted to confirm this action.

Change Current User

By selecting this button you can change the current user.

Restore Session

You can restore a previously saved session from a floppy disk by selecting this button.

Upload Session

By selecting this button you can upload a previously saved session from a network.

Continue

Confirm selection / continue process

Abort

This button allows you decline your selection.

Select/De-Select

Selecting this button selects or de-selects the DTC for clearing.

Clear Codes

This button will clear and re-test the selected Continuous Memory.

Re-Test

This button will re-run the current test.

Re-run DTC Monitor

This button will re-test the current DTCs.

Move

You can reposition a signal in the Datalogger by selecting a signal. Select this button and then select the position you want to move the signal to.

Default Settings

This button returns the signal configuration settings to their default value.

Step Back

This button allows you to return to the previous step in the operation you are performing.

Scroll Down

By selecting this button you can scroll down the log file until you reach the desired information.

Information

You can view on-line help relating to the tool that you are using by selecting this button.

Content Level 1

You can choose to display only the top level areas of the vehicle, such as the Engine System, by selecting this button.

Content Level 2

You can expand the top level and display the second level by selecting this button

Content Level 3

You can expand the second level and display the third level areas by selecting this button.

Increase Signal Value

With OSC turned on, you can increase the signal value by selecting this button.

Decrease Signal Value

With OSC turned on, you can decrease the signal value by selecting this button.

Select For Clearing

You can select a DTC for clearing by selecting this button.

De-Select For Clearing

You can de-select a DTC for clearing by selecting this button.

Start ODST

This button runs an On Demand Self Test in DTC Monitor.

Pinpoint

This button enables you to start a pinpoint routine from the DTC Monitor.

Zoom in

Zoom out

Next Recording

You can skip forward to the next recorded capture event when in the Playback Viewer by selecting this symbol.

Previous Recording

You can skip backward to the last recorded capture event when in the Playback Viewer by selecting this symbol.

Play Backward

This symbol allows you to play the recording backwards in the Playback Viewer.

Backward One

This symbol allows you to move backward one recording in the Playback Viewer.

Play Forward

This symbol allows you to start the recording in the Playback Viewer.

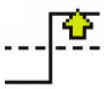
Forward One

This symbol allows you to move forward one recording in the Playback Viewer.

Trigger Low Limit

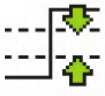
By selecting this symbol you can set a low limit for the trigger.

Trigger High Limit



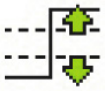
By selecting this symbol you can set a high limit for the trigger.

Trigger Inside Range



By selecting this symbol you can activate a trigger event when the signal falls within a certain range.

Trigger Outside Range



By selecting this symbol you can activate a trigger event when the signal moves outside a certain range.

Play

This allows you start datalogger running.

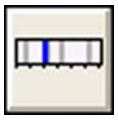
Capture

This allows you to stop datalogger running.

Capture

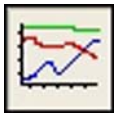
This allows you to capture datalogger signals.

Histogram Display



Displays signal as a histogram.

Waveform Display

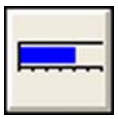


Displays signal as a waveform.

Digital Display

Displays signal in a Digital format.

Bar graph Display



Displays signal as a bar graph.

Clear Graph

This button allows you to clear the graph currently displayed on the screen.

Load Waveform Button

Displays all signals within the oscilloscope library.

Erase File

Delete saved oscilloscope file.

Information Button

Provides access to information

Trigger Button

The Trigger button will be displayed once a trigger has been set.

Trigger Reset Button

Resets trigger to default value.

Change Trigger Channel Button

This button allows the user to change the triggered channel without reselecting it from the menu.

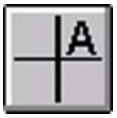
Auto Configuration Button

Configures the oscilloscope to allow the selected signal to be viewed.

Channel (1) Button

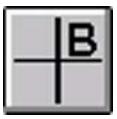
Displays the respective channel as the primary channel.

Curser A Button



Allows positioning of curser (A)

Curser B Button



Allows positioning of curser (B)

Auto Scroll Left Button

Allows the selected reference point to be moved.

Scroll Left Button

Allows the selected reference point to be moved.

Scroll Right Button

Allows the selected reference point to be moved.

Auto Scroll Right Button

Allows the selected reference point to be moved.

Zoom in Button

Increases display size.

Zoom out Button

Decreases display size.

Running Figure Button

Press to stop oscilloscope running.

Standing Figure Button

Press to start oscilloscope running.