Technical Training
Diagnostic Systems

IDS-SDD-JLR:
IDS Symptom Driven Diagnostics

JAGUAR | LAND ROVER

IDS-SDD-JLR 02/2012
Printed in USA

https://www.jlridssddmongoose.com/sdd-symptom-driven-diagnostics/

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General Information

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Objectives

At the end of this course, technicians will be able to:

- Recognize IDS hardware
- Navigate through SDD menus
- Perform diagnostics in a logical sequence
- Diagnose the root cause of stored DTCs
- Utilize Pinpoint Tests
- Monitor/control systems using Datalogger

Online Course Evaluation

Class participants are encouraged to fill out an online evaluation for this course.

The Jaguar evaluation is available at:

- **http://www.hostedsurvey.com/takesurvey.asp?c=JLRUSJAG1**

The Land Rover evaluation is available at:

- **http://www.hostedsurvey.com/takesurvey.asp?c=JLRUSLR2**

The information provided in the evaluations is kept confidential and will only be used to improve training activities. Your prompt response will be appreciated.

Your feedback is extremely important to us!

ACRONYMS AND ABBREVIATIONS

The following acronyms, abbreviations and symbols are used in this course book. The majority of them conform to J1930 standards.

Abbreviation	Definition
CCF	Car Configuration File
CD	Compact Disc
CDROM	Compact Disc Read Only Memory
CD-RW	Compact Disc Read/Write
CM	Control Module
CPU	Central Processing Unit
DDR	Double Data Rate
DDW	Dealer Direct Warranty
DLC	Data Link Connector
DMM	Digital Multimeter
DSG	Digital Signal Grouping
DTC	Diagnostic Trouble Code
DTS	Designated Technical Specialist
DVD	Digital Versatile Disc
FRFT	Fixed Right First Time
GB	GigaByte
GHz	GigaHertz
GMRDB	Global Master Reference Database
HHT	Hand-Held Tester
IDS	Integrated Diagnostic System
IT	Information Technology
LAN	Local Area Network
LCD	Liquid Crystal Display
LCS	Land Rover Coding System
LED	Light-Emitting Diode
LTFT	Long Term Fuel Trim
MB	MegaByte

Abbreviation	Definition
MRDB	Master Reference Database
MY	Model Year
OBD	On-Board Diagnostics
OSC	Output State Control
PCMCIA	Personal Computer Memory Card International Association
PDI	Pre-Delivery Inspection
PWM	Pulse-Width Modulated
RAM	Random Access Memory
RDS	Land Rover Diagnostic System
ROM	Read Only Memory
SAE	Society of Automotive Engineers
SD	Secure Digital
SDD	Symptom-Driven Diagnostics
SDRAM	Synchronous Dynamic Random Access Memory
SMS	Support Management System
SSM	Special Service Message
TOPIx	Technical Online Product Information Exchange
TSB	Technical Service Bulletin
TSD	Touch Screen Display
T4	T4 Diagnostic System
UPS	Update Prior to Sale Notice
USB	Universal Serial Bus
VCI	Vehicle Communication Interface
VCM	Vehicle Communication Module
VMM	Vehicle Measurement Module
VIN	Vehicle Identification Number
VVA	Vehicle Vibration Analyzer

Acronym Cross-Reference

The following table cross-references Master Reference Data Base (MRDB) terms with some more familiar alternate terms. The MRDB terms are used by SDD to comply with the ISO 14229 standard for Unified Diagnostic Services.

MRDB Acronym	MRDB Description	Alternate Name(s)
AAM	Audio Amplifier Module	Audio Amplifier (AUD)
AAMB	Audio Amplifier Module B	Subwoofer Module
ABCM	Auxiliary Body Control Module	
ABS	Anti-Lock Brake System (ABS) Control Module	Anti-Lock Brake Module
ACCM	Air Conditioning Control Module	
ACM	Audio Front Control Module	Audio Module, Integrated Audio Module, IAM 2.1
ANT	Antenna Control Module	Antenna Module
APIM	Accessory Protocol Interface Module	Accessory/Auxiliary USB Unit
ARCM	Active Roll Control Module	
ATCM	All Terrain Control Module	Terrain Optimization Switch, Terrain Response Control Module
AVCM	Active Vibration Control Module	
AWD	All Wheel Drive Module	
BCBM	Body Control Module B	Rear Smart Junction Box, RJB
BCM	Body Control Module	Central Electronic Smart Junction Box, CJB
BECM	Battery Energy Control Module	Battery Management System Module
CCM	Cruise Control Module	Adaptive Cruise Control, Forward Sensing Module
CDP	Compact Disc Player / Changer Module	
CHCM	Chassis Control Module	
CHCMB	Chassis Control Module B	
CM	Compass Module	
CMR	Camera Module – Rear	Park Assist Camera
CTCM	Coolant Temperature Control Module	
DACMC	Digital Audio Control Module C	High Definition Radio
DDM	Driver Front Door Module	Driver Door Module
DPM	DVD Player / Changer Module	DVD Player
DRDM	Driver Rear Door Module	Rear Driver Door Module, LH Rear Door Module
DSM	Driver Front Seat Module	Seat Control Module A, Power Seat Module
DSP	Audio Digital Signal Processing Module	
EMM	Energy Management Module	
FACM	Fuel Additive Control Module	
FCDIM	Front Control/Display Interface Module	Combined HLDF and ICM, Touch-Screen Display (TSD)
FCIM	Front Controls Interface Module	
FCM	Fuel Cell Control Module	
FDM	Front Display Interface Module	

MRDB Acronym	MRDB Description	Alternate Name(s)
FDSM	Front Distance Sensing Module	Closing Velocity Module
FEM	Front Entertainment Control Module	
FLM	Front Lighting Control Module	
FPAM	Front Parking Assist Control Module	
GPSM	Global Positioning System Module	
GSM	Gear Shift Module	Electronic Transmission Selector (ETS)
GSMB	Gear Shift Module B	
GWM	Gateway Module	
HCM	Headlamp Control Module A	AFS Headlamp Control Module, Dynamic Headlamp Leveling
HCMB	Headlamp Control Module B	Auto Headlamp Dipping (AHD)
HUD	Head Up Display	
HVAC	HVAC Control Module	Climate Control Module
ICM	Information Center Module	Infotainment Control Module
ICS	Impact Classification System	
ILCM	Interior Lighting Control Module	
IPC	Instrument Panel Cluster (IPC) Control Module	Driver Information Module, Instrument Cluster
IPMA	Image Processing Module A	Night Vision System
IPMB	Image Processing Module B	Parking Multi Camera System
IRVM	Inside Rearview Mirror Module	
NCM	Navigation Control Module	MMM Multimedia Module
OCS	Restraints Occupant Classification System Module	Occupant Weight Sensor
PBM	Park Brake Control Module	
PCM	Powertrain Control Module	Engine Control Module (ECM)
PDM	Passenger Front Door Module	Passenger Door Module
PMM	Powertrain Control Monitor Module	
PRDM	Passenger Rear Door Module	Rear Passenger Door Module, RH Rear Door Module
PSCM	Power Steering Control Module	Electric Power Assisted Steering Module
PSM	Passenger Front Seat Module	Seat Control Module B
RACM	Rear Audio Control Module	Rear Seat Entertainment (RSE) Module
RBM	Running Board Control Module	
RCM	Restraints Control Module	Supplementary Restraint System Module
RDCM	Rear Differential Control Module	DEM Differential Electronic Module, E-Coupling
RDUM	Remote Driver Utility Module	Remote Accessory Module
REM	Rear Entertainment Control Module	Rear Seat Entertainment (RSE)
RFA	Remote Function Actuator	Keyless Vehicle Module (KVM)
RGTM	Rear Gate / Trunk Module	Power Operated Tailgate
RHVAC	Rear HVAC Control Module	Rear Climate Control Module

MRDB Acronym	MRDB Description	Alternate Name(s)
RLM	Ride Level Control Module	
RSM	Remote Start Module	
SARM	Satellite Radio Module	Satellite Digital Audio Receiver (SDARS) Module, Remote Digital Audio Receiver (RDAR)
SASM	Steering Angle Sensor Module	Steering Angle Sensor
SCCM	Steering Column Control Module	Steering Wheel Module
SCMC	Seat Control Module C	Driver Rear Seat Module
SCMD	Seat Control Module D	Passenger Rear Seat Module (or power fold)
SCME	Seat Control Module E	Drivers Climate Seat, Seat Heating Module
SCMF	Seat Control Module F	Passenger Climate Seat, Rear Climate Seat
SCMG	Seat Control Module G	Drivers Seat Contour Control
SCMH	Seat Control Module H	Passenger Seat Contour Control
SECM	Steering Effort Control Module	
SODL	Side Object Detection Control Module – Left	Blind Spot Monitoring System Left
SODR	Side Object Detection Control Module – Right	Blind Spot Monitoring System Right
SPCM	Secondary Powertrain Control Module	
SPMA	Seatbelt Pretensioner Control Module A	
SPMB	Seatbelt Pretensioner Control Module B	
SPRM	Speech Recognition Module	Speech Recog. Module
SUMB	Suspension Control Module B	Adaptive Damping Control Module
TACM	Throttle Actuator Control Module	
TBM	Tow Bar Control Module	
TCCM	Transfer Case Control Module	
TCM	Transmission Control Module	
TCU	Telematic Control Unit Module	Phone Module, Telematics module
TEL	Telephone Control Module	Bluetooth Phone Module
TPM	Tire Pressure Monitor Module	Tire Pressure Monitoring System (TPMS) Module
TRM	Trailer Module	Trailer Module
TSTR	Diagnostic Tester	
VDM	Vehicle Dynamics Control Module	Suspension Module
VSM	Vehicle Security Control Module	
YRM	Yaw Rate Sensor Module	Body Sensor Cluster

OVERVIEW

The Integrated Diagnostic System (IDS) is based on a Panasonic Toughbook® laptop computer which has been specifically designed to operate in a harsh environment. Combined with the Vehicle Communication Module (VCM) or a J2534 Vehicle Communication Interface (VCI), and either the Jaguar-specific Vehicle Measurement Module (VMM) or the Land Rover-specific T4 docking station, the system offers diagnostics for current and future Jaguar and Land Rover vehicles.

IDS includes a mobile workstation for docking and storing the laptop and associated hardware.

NOTE: Refer to the section 'Using T4 with IDS' for T4-specific information.

Current IDS Mobile Workstation

SDDJLR253

IDS SPECIFICATIONS

In the time since IDS was first introduced, PC specifications have advanced, so the software has been enhanced to take advantage of the hardware capabilities. At the time of printing, the current minimum specification is as follows:

- 1.06 GHz Dual Core Processor
- 1GB Ram
- 160GB Hard Drive

These specifications are equivalent to the Panasonic TOUGHBOOK® CF-19 Mk5.

Currently two models of approved Panasonic Toughbook® laptop computers are available: the CF-19 Mk5 and the CF-53 Mk1. Panasonic designed the Toughbook® with a magnesium case and spill-resistant keyboard to permit its use in workshop conditions.

PANASONIC CF-19 Mk5

PANASONIC CF-53 Mk1

IDS SOFTWARE

The IDS software provides the following diagnostic capabilities:

- OBD II diagnostics
- Full DTC read and Datalogger diagnostics
- Full vehicle configuration
- Module calibration update
- IDS diagnostic self-test

IDS software supports Jaguar and Land Rover vehicles as follows:

Jaguar

- 1995 model year onwards: All vehicles
  - All systems

Land Rover

- 2005 model year Range Rover
  - Infotainment systems
- 2005 model year LR3
  - All systems
- 2006 model year onwards: All vehicles
  - All systems

To ensure that all IDS units are configured correctly and consistently throughout the dealer network, IDS will be distributed with Microsoft® Windows® XP Service Pack 2 operating system already installed and IDS correctly configured.

NOTE: The IDS diagnostic application software must be loaded at the dealership.

CAUTION: Do not attempt to update Microsoft® Windows® XP by downloading Microsoft® Windows® updates from the Microsoft® web site since these updates have not been validated with IDS. Failure to follow this instruction may prevent IDS from operating correctly.

Installing IDS Software

Dealers are required to install the IDS diagnostic software before IDS is ready for use. The latest SDD software is obtained at the IDS Central website at:

www.DiagnosticDelivery.com/IDSCentral

The diagnostic software is loaded from a flash drive onto the hard drive of the IDS laptop.

The installation procedure varies depending on the model of Toughbook® being used. Refer to the IDS/SDD Maintenance Guide and any Read Me files on the IDS Central website, if necessary (details are provided in the Appendix).

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

Installing IDS Software Updates

Updated software releases are distributed to dealers over the internet. If software enhancements are required prior to the next software release, they are provided as automatic updates.

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Component Description

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OVERVIEW

The Integrated Diagnostic System (IDS) is a laptop PC-based diagnostic system using vehicle communication interfaces. An IDS workstation provides a docking station for the laptop, allowing for power supply, battery charging, and secure locking. It also provides storage for the remaining components that make up the system.

Currently two models of approved Panasonic Toughbook® laptop computers are available: the CF-19 Mk5 and the CF-53 Mk1. Panasonic designed the Toughbook® with a magnesium case and spill-resistant keyboard to permit its use in workshop conditions.

In the time since IDS was first introduced, PC specifications have advanced, so the software has been enhanced to take advantage of the hardware capabilities. At the time of printing, the current minimum specification is as follows:

- 1.06 GHz Dual Core Processor
- 1GB Ram
- 160GB Hard Drive

These specifications are equivalent to the Panasonic TOUGHBOOK® CF-19 Mk2.

Additional Hardware

Additional IDS hardware at your dealership may include the following:

- Vehicle Communication Module (VCM) or J2534 Vehicle Communication Interface (VCI)
- Vehicle Measurement Module (VMM) (Jaguar only)
- RDS T4 docking station (Land Rover only)
- Appropriate test leads and accessories
- External DVD/CD-RW drive (no longer used for diagnostics s/w, but may be used for Navigation map updates)
- Accessory socket power supply (optional)
- Removable USB flash drive

IDS WORKSTATION

The IDS workstation cart provides a docking station and storage for the IDS laptop and associated hardware.

The workstation includes an AC power connection with a built-in transformer to provide the required DC voltage for the laptop when docked, and allows the laptop to be charged from an electrical outlet. The later style cart provides the option of adding a separate flat-screen monitor.

Early Style Cart

Later Style Cart

IDS LAPTOP

The Panasonic Toughbook® IDS laptop is the primary component of the IDS system, and can be used docked to the workstation or undocked as a portable unit.

NOTE: The laptop uses Local Area Network (LAN) wireless to receive diagnostic software downloads and updates. The wireless antennas are located in the casing of the lid around the display.

Both the CF-19 and CF-53 have Touch-Screen Displays (TSD) for easy operation of the diagnostic software. The CF-19 Toughbook is designed so that it can be used in standard Laptop Mode or with the screen rotated and flattened to the unit in Tablet Mode.

PANASONIC CF-19 Mk5

PANASONIC CF-53 Mk1

SDD0254

Toughbook Specifications

Panasonic CF-19 Mk5	Panasonic CF-53 Mk1
• Fully-Rugged TOUGHBOOK® • Windows 7 • Intel Core I5-2520M 2.50 GHz processor • 10.4” HD Touchscreen LCD • 320GB Shock Mounted HD (7200 RPM) • 4GB Memory • Wi Fi • Bluetooth®	• Semi-Rugged TOUGHBOOK® • Windows 7 • Intel Core I5-2520M 2.50 GHz processor • 14.0” HD Touchscreen LCD • 320GB Shock Mounted HD (7200 RPM) • 4GB Memory • Wi Fi • Bluetooth® • DVD Super Multi Drive

IDS Laptop Features

CF-19 Mk5

Power Switch
The power switch is located at the right front of the CF-19 laptop.

Battery and Power Status LEDs
The battery and power status LEDs are located along the right front edge of the laptop.

Power Status

- Off: Power Off / Hibernating
- Green: Power On

LED Indicators
The LED status indicators are located along the left front edge of the laptop.

CF-53 Mk1

Power Switch
The power switch is located at the rear of the keyboard below the display.

Battery and Power Status LEDs
The battery and power status LEDs are located at the right front of the laptop.

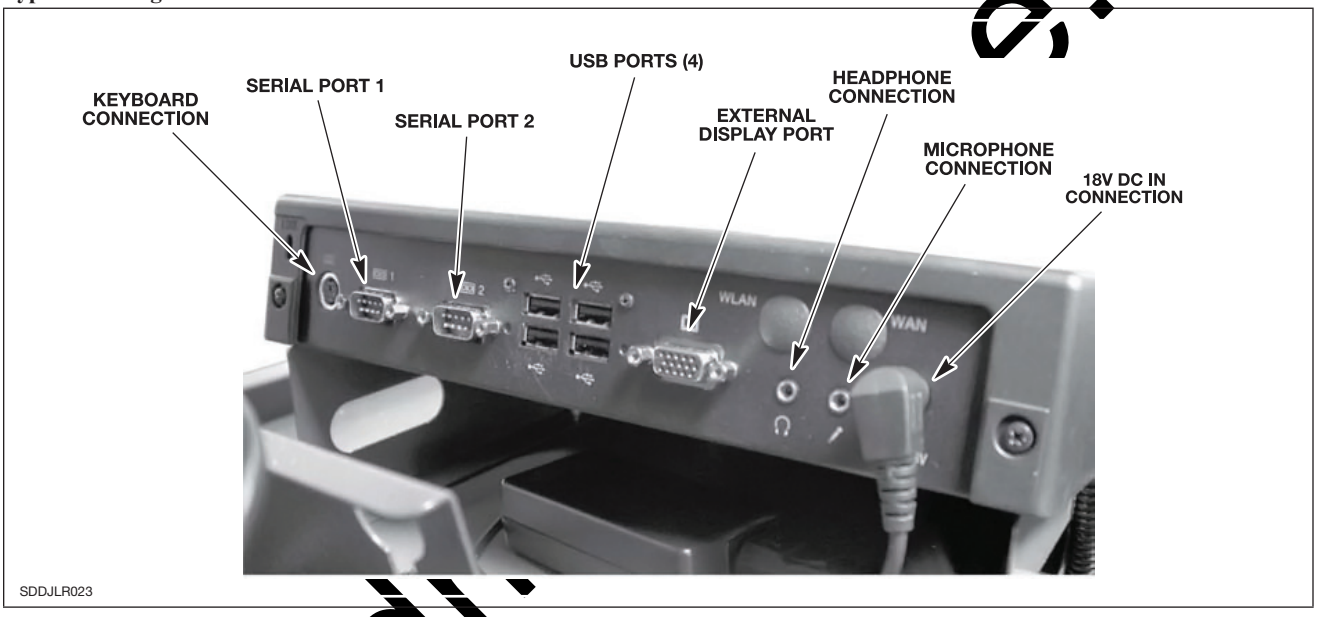
- **Power Status**
  - Off: Power Off / Hibernating
  - Green: Power On
  - Blinking Green: Sleep / Standby
  - Rapid Blinking Green: Cannot power up due to low temperature

LED Indicators
The LED status indicators are located along the right front edge of the laptop.

Docking Station Connections

When the laptop is docked to the workstation, most of the laptop ports are replicated on the rear of the docking station.

Typical Docking Station Connections



The USB ports are used to connect the following components:

- VCM
- VMM
- DVD / CD-RW drive

The fourth USB port may be used in the future.

Laptop Power Supply

IDS can be powered from an AC electrical supply through a DC transformer.

The IDS workstation has its own built-in transformer to convert AC power to the required DC voltage for IDS. When the IDS is docked to the workstation it is automatically connected to the AC power supply transformer.

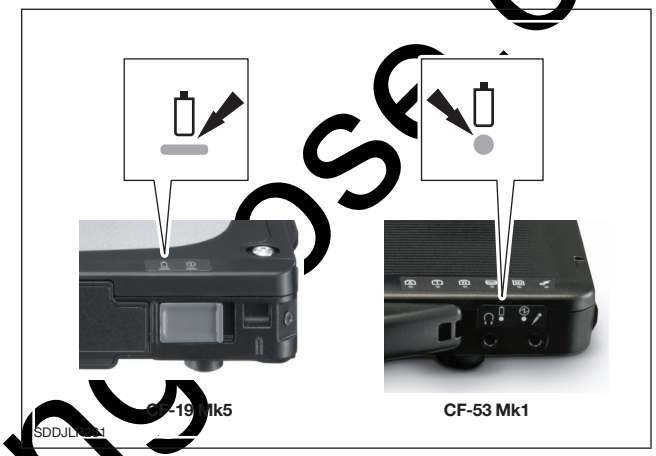
If the laptop is removed from the workstation, a separate AC power supply transformer (supplied with the workstation) can be connected to it using the power supply socket located at the left hand side of the laptop computer.

Separate AC Power Supply Transformer

Toughbook Internal Battery

The IDS laptop also can be powered by its internal Lithium battery, which is located at the right hand side of the laptop.

Battery Status LEDs



LED Indicator	Battery Status
Not Lit	The battery pack is not inserted or is not being charged.
Orange	Charging is in progress.
Green	The battery is fully charged.
Blinking Green	In High Temperature Mode; the battery pack discharges the power to 80% of the normal temperature mode. Do not remove the battery pack in this status.
Red	The remaining battery charge is approximately 9% or less.
Blinking Red	The battery pack or the charging circuit is not operating properly.
Blinking Orange	The battery cannot be charged (temporarily) for one of the following reasons: • Its internal temperature is out of the acceptable range. • The power supply is insufficient because software applications or peripheral devices are consuming a large amount of power.

Battery Charging Best Practices

The battery life deteriorates 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.

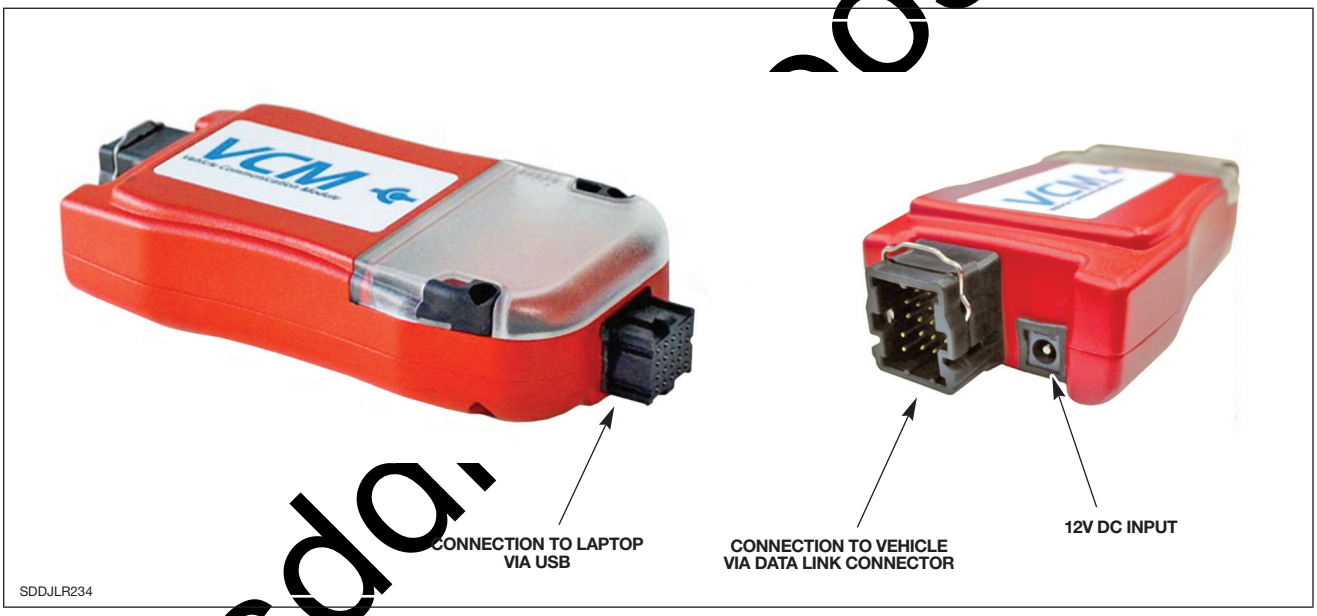
- Do not repeatedly charge the battery before it is discharged.
- To help reduce the number of charge cycles, the battery can only be recharged when the remaining power is less than 95% of its capacity.
- The battery will not charge when it is outside its temperature range of 10°C to 30°C, (50° to 86°F). If the battery is outside of this temperature range, the battery indicator lamp will flash orange and charging will not begin.

Battery Calibration

Over time, the remaining battery capacity may not be displayed accurately. In this situation, it may be necessary to carry out the battery recalibration procedure. Additional information on the battery calibration procedure is provided in the 'Appendix' section of this course.

VEHICLE COMMUNICATION MODULE (VCM)

The Vehicle Communication Module (VCM) is a high-performance vehicle serial communications gateway which facilitates communication between IDS and the various vehicle networks (such as CAN, SCP and ISO9141) of most current and future of Jaguar/Land Rover vehicles. The VCM also allows communication with most legacy vehicles (those prior to the introduction of ISO14229 diagnostic protocol). The VCM is a rugged unit, housed in a magnesium casing with a tough protective plastic cover.



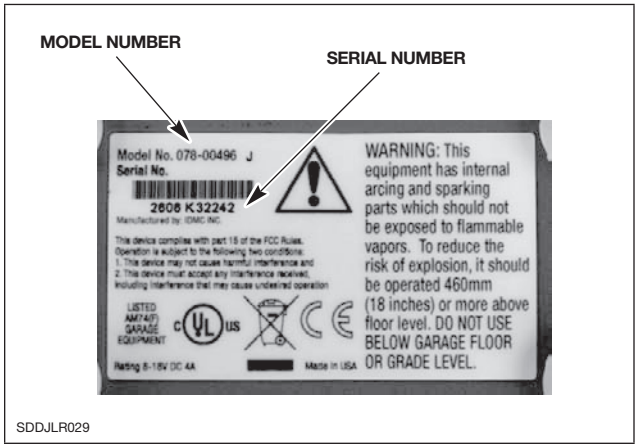
Genuine VCMs are currently only manufactured in the USA.

The VCM provides three sockets for external connections. Two of the sockets allow connection to IDS and to the vehicle. The third socket is to allow for a stand-alone 12V DC power supply, which is not currently provided with Jaguar applications. The VCM gets its power from the vehicle via the data link connector, NOT from the laptop.

NOTE: The VCM power supply, which is available from SPX, will not charge the IDS laptop battery when connected.

⚠ CAUTION: Excessive stress on the rear USB connector can damage the USB cable, disrupting VCM communication. Care must be taken when installing or removing the VCM to route the USB cables with minimal stress. The cables are long to facilitate remote use; be sure to route excess length such that the cable will not be pinched by the workstation enclosure.

The VCM serial and model number can be found on a label on the underside of the unit. These numbers may be required when requesting IDS support.

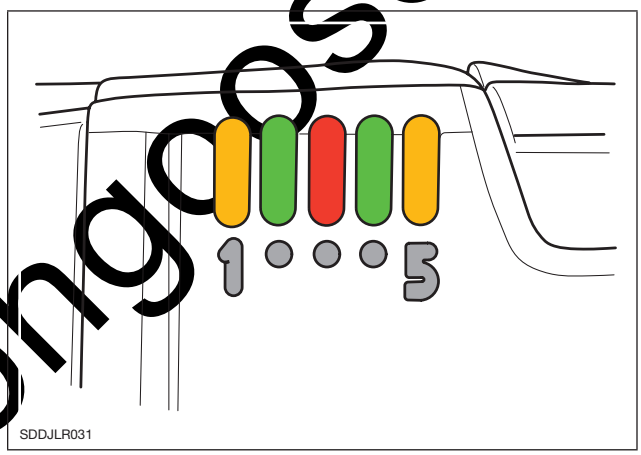


The VCM is located behind the laptop docking area of the IDS workstation, attached to the bracket of the workstation by locating lugs sliding into 'key holes' on the bracket. The VCM is easily removed from the bracket when required.

VCM Location

VCM LED Indicators

The VCM features five status indicator LEDs, visible through the plastic cover of the VCM to allow the user to visually observe the operation of the VCM. LEDs are numbered 1 – 5 from left to right.

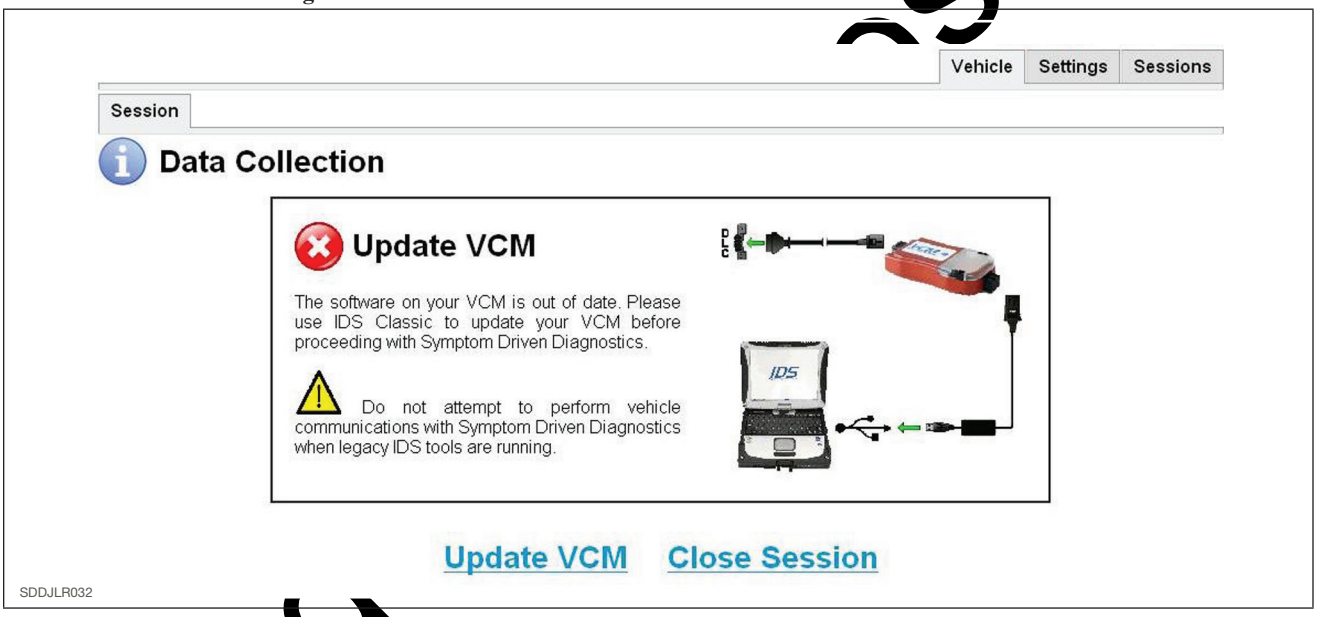


LED	Color	Indicates	Operating Behavior
1	Amber	Vehicle link established	Flashes when communication link to vehicle is established
2	Green	VCM operating	Flashes @ regular interval when functioning
3	Red	Power supply	Lit when functioning
4	Green	Flash memory access	Should be OFF except during VCM software update
5	Amber	Host Link	Flashes when communication link to Toughbook is established

VCM Driver Software

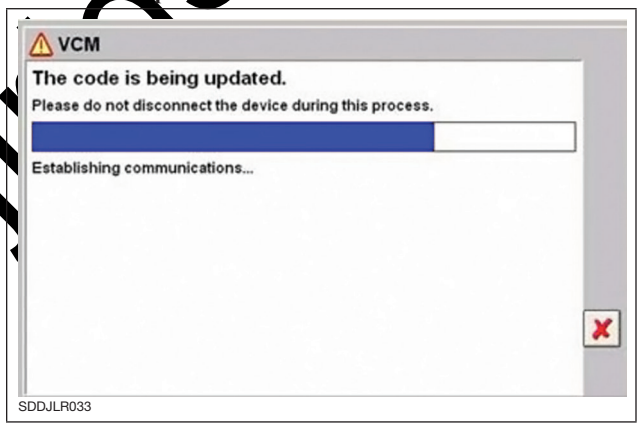
Before the VCM can be used, it is necessary to download the latest driver software. Each time the VCM is connected to IDS and the VCM is powered up, the VCM driver software version will be checked. If the current software of the VCM is out of date and a later version is available, a message will be displayed stating that the code is out of date and asking if the user wants to update the VCM now.

VCM Code Out of Date Message



NOTE: Always select the affirmative tick (check mark) in this case. A status bar screen will be displayed while the driver is updated.

VCM Driver Update Status



Downloading the latest VCM driver software will only take a short time (approximately 90 seconds to complete). Once the software has been downloaded, 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 initiated when a later software version is available following an IDS software update. Later VCM software cannot be overwritten by an earlier software version.

NOTE: The VCM recovery procedure is described in the IDS/SDD Maintenance Guide.

J2534 VEHICLE COMMUNICATION INTERFACE DEVICES

Starting with IDS DVD 125 (March 2011), the IDS/SDD diagnostic platform supports a number of Jaguar Land Rover-approved J2534 Vehicle Communication Interface (VCI) devices in addition to the VCM.

J2534 is an international standard for vehicle communication devices known as 'pass-thru' devices. Pass-thru devices allow a PC-based system to communicate with and/or program modules on supported vehicles. This capability allows the user to read DTCs, monitor PIDs, and reprogram Control Modules. Previously, the only approved communication device for use with IDS/SDD has been the Teradyne Vehicle Communications Module (VCM).

Support for these devices is specified by the EU5 standard. For Jaguar and Land Rover vehicles, this represents 2011MY NAS vehicles and later.

Model Part	Number
Diagnostic Associates DA-VINA	JLR-DAP-N0021
Diagnostic Associates DA-Dongle	JLR-DAP-N0021
Drewtech Mongoose	JLR-MONGOOSE-VCI
Teradyne iView	JLR-iVIEW-VCI

NOTE: As required under EU5 vehicle compliance legislation, the IDS/SDD Diagnostic System is capable of supporting additional VCI devices. However, these units will not be supported by Jaguar Land Rover Technical Support or SPX Customer Service Help Line, and will not be listed on the Jaguar Land Rover approved list.

Diagnostic Associates DA-VINA

SDDJLR257

Drewtech Mongoose

SDDJLR259

Diagnostic Associates DA-Dongle

SDDJLR258

Teradyne iView

SDDJLR260

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Introduction to Symptom Driven Diagnostics

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OVERVIEW

Why Change IDS?

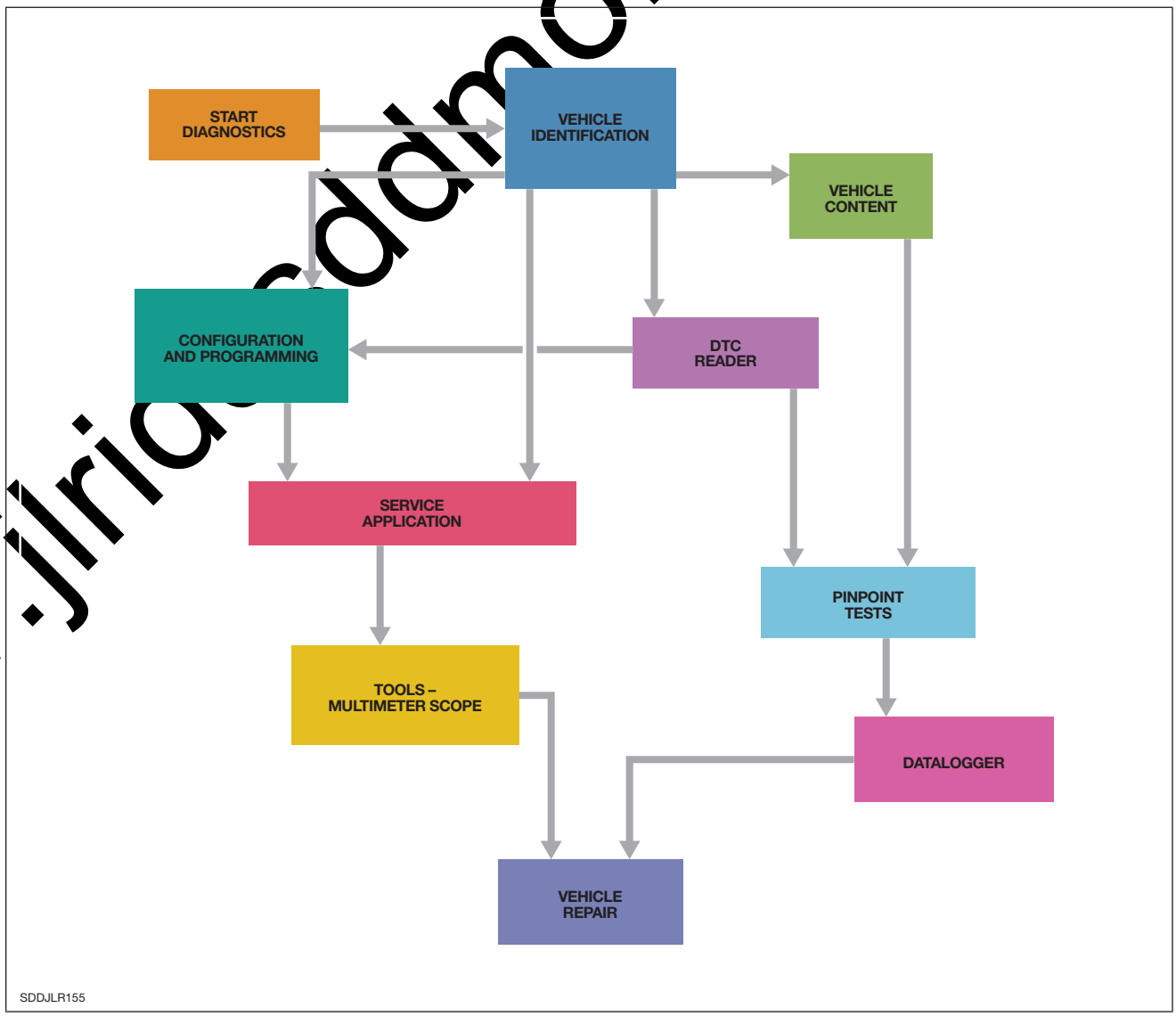
The Integrated Diagnostic System (IDS) core architecture dates from 1999 and incorporates elements going back as far as 1995. In the meantime, vehicle technology has become more complex and the number of vehicle variants has increased. Current vehicle systems support up to 4,000 different Diagnostic Trouble Codes (DTCs), which increases the complexity of diagnostics. The technician now needs to diagnose systems, not merely individual components.

Without a clear strategy for a repair process, a technician faced with up to 40 DTCs at the start of an IDS session can easily lose confidence in the diagnostic tool. Feedback data from dealerships shows inconsistent methods of fault diagnosis with under-utilization of the IDS capabilities.

This has resulted in high 'No Fault Found' repair rates, difficulty in achieving Fixed Right First Time (FRFT) repairs, and an increase in the time that a customer's vehicle is off the road.

Unstructured Diagnosis

The diagram shows a typical flow chart of a diagnostic procedure with little or no clear direction of a systematic process.



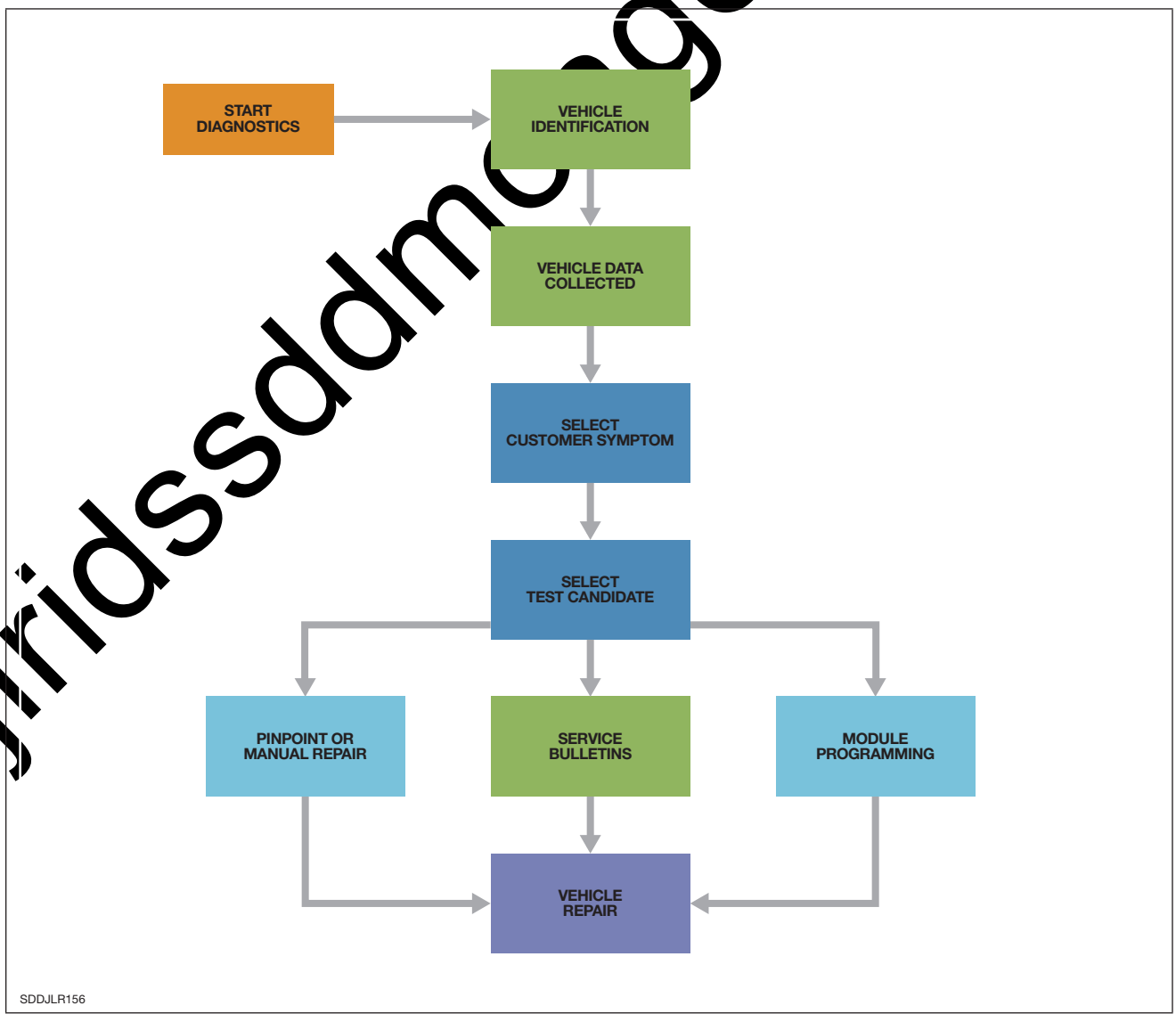
New Diagnostic Process

IDS has been updated with the goal of providing a clear diagnostic strategy and tool navigation path to the technician. With Symptom Driven Diagnostics (SDD), the technician is able to begin the diagnostic process by identifying the specific symptoms of a customer concern using Symptom Maps incorporated into the SDD software. A diagnostic strategy can then be structured around only the DTCs that are relevant to those symptoms.

SDD can also provide links to other service information to support the diagnostic process.

Structured Diagnosis

The diagram shows a schematic of the systematic application of a structured diagnostic route using symptom-based information and diagnostic Symptom Maps.



Symptom Maps

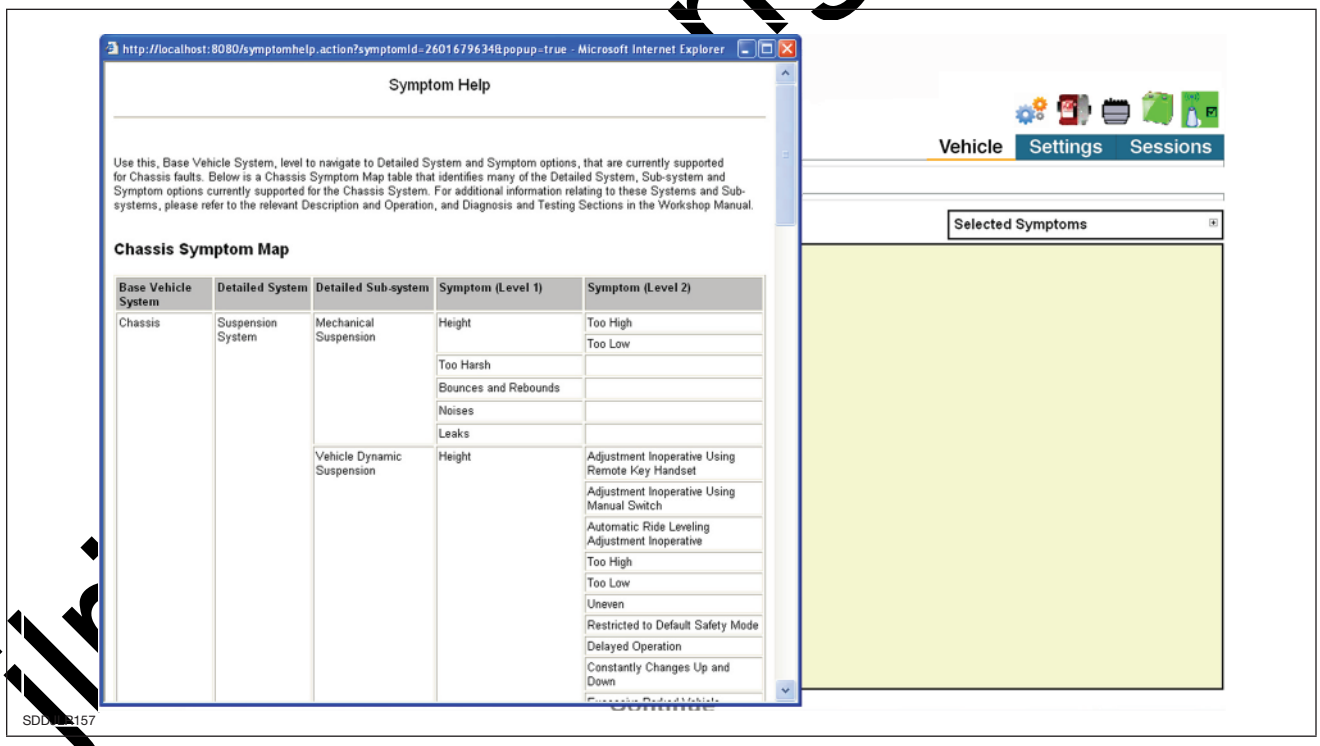
Symptom Maps are incorporated into the SDD software, and allow the technician to target DTCs and diagnostic routines based on a specific set of symptoms. Symptom Maps are organized by major vehicle system as follows:

- Module Communications Network
- Chassis
- Powertrain
- Electrical
- Body

Maps are then further structured by System and Sub-System details to provide lists of possible symptoms at 2 levels.

Symptom Maps are used by SDD in conjunction with DTCs. In order to ensure the best possible recommendations to achieve FRFT repairs, the technician must input ALL vehicle symptoms that match the customer concern.

NOTE: Symptom Maps are viewed from the Symptom Selection Screen as described later in this section. Symptom Maps can also be searched using the browser's 'Find' feature (Ctrl F).



IMPORTANT NOTE: Because SDD relies on logged DTCs in conjunction with vehicle symptoms to perform diagnostics, it is very important that you **DO NOT CLEAR DTCs** unless instructed to do so by SDD. Clearing DTCs will clear the vehicle fault history and erase important data required for correct diagnosis of a concern.

Sample Symptom Map

The table below approximates the Symptom Map for the Powertrain System as currently included in IDS. Symptom Maps will continue to evolve, and will be updated with subsequent software releases.

Basic Vehicle System (Level 1)	Detailed System (Level 2)	Detailed Sub-system (Level 3)	Symptom (Level 4)	Symptom (Level 5)
Powertrain	Engine System	Engine Cooling	Engine Overheats	
			Engine Will Not Reach Operating Temperature	
			Coolant Loss	
			Cooling Fan Inoperative	
			Cooling Fan Inoperative	
		Starting System	Will Not Start	Will Not Crank
				Cranks Too Slow
				Cranking Speed Normal
			Starts With Incorrect Starting Conditions	Engine Cranks Without Switch Input
				Engine Cranks With Incorrect Switch Input
				Starts Without Operating Brake Pedal
				Starts Without Operating Clutch Pedal
			Starts With Difficulty	Smart Cranking Will Not Operate
				Delay Before Cranking
		Fuel Vapor and Odor	Inside Vehicle	
			Outside of Vehicle	
		Fuel Tank	Slow Fill and Splashback	Leaks
			Leaks	
		Emissions	Excessive Smoke From Exhaust	
			Odor From Exhaust	
			Exhaust Noises	Rattle
				Harmonics Audible at Low Speed
				Harmonics Missing Under Acceleration
			Secondary Air Injection	Air Pump Runs Continuously
		Glow Plug System	Inoperative	
			On Constantly When Ignition On	
			Warning Lamp Will Not Illuminate	

Basic Vehicle System (Level 1)	Detailed System (Level 2)	Detailed Sub-system (Level 3)	Symptom (Level 4)	Symptom (Level 5)
Powertrain	Engine System	Engine Performance	Vehicle In Limp Home Mode	
			Fuel Consumption High	
			Poor Idle	
			High Idle	
			Poor Acceleration and Lack of Power	
			Engine Hesitates	
			Engine Vibrates	
			Engine Surges	
			Engine Judders and Shakes	
			Engine Misfire	
			Engine Stalls	
			Noises	
		Speed Control System	Adaptive Speed Control	Adaptive Speed Control Inoperative
			Speed Control	Speed Control Does Not Release
				Speed Control Inoperative
			Automatic Speed Limiter	Inoperative
	Automatic Transmission and Transaxle	Automatic Transmission and Transaxle Symptoms	Transmission In Limp Home	
			Holds Gear for Too Long	
			Harsh Gear Engagement From Park or Neutral	
			Harsh Gear Change	
			Will Not Change Up Gear	
			Will Not Change Down Gear	
			Winter Mode Inoperative	
			Sport Mode Permanently Selected	
			Torque Converter Clutch Inoperative	
			Slips in Gear	
			Fluid Leaks	
			Kickdown Inoperative	
			Judder	
			Noises	
			Bump From Transmission On Shutdown	
			Transfer Case Inoperative	
			High or Low Range Selection Switch Inoperative	
			Dynamic Optimization Switch Inoperative	

Basic Vehicle System (Level 1)	Detailed System (Level 2)	Detailed Sub-system (Level 3)	Symptom (Level 4)	Symptom (Level 5)
Powertrain	Automatic Transmission and Transaxle	Automatic Transmission and Transaxle Symptoms	Gear Selection Malfunction	Selector Locked in Park
				Selector Inhibit Inoperative
				Selector Position Locked
				Selector Reduced Operation
				Selector Does Not Raise or Lower
				Selector Will Not Lock at Ignition Off
				Gear Position Display Flashing
				Reverse Gear Inoperative
				No Drive In Any Selected Position
				Step Shift Inoperative
				Inconsistent Operation
				Noisy
				Coarse Operation
				Display Position Illumination Fault
				Does Not Upshift
				Inoperative
				Does Not Downshift

NOTE: Additional information on Systems and Sub-systems can be found in the Workshop Manual 'Description and Operation' and 'Diagnosis and Testing' Sections.

Recommendations

Based on the symptoms selected and the DTCs present in the vehicle modules, SDD will provide the technician with a list of recommendations for diagnosis and repair, which may include the following:

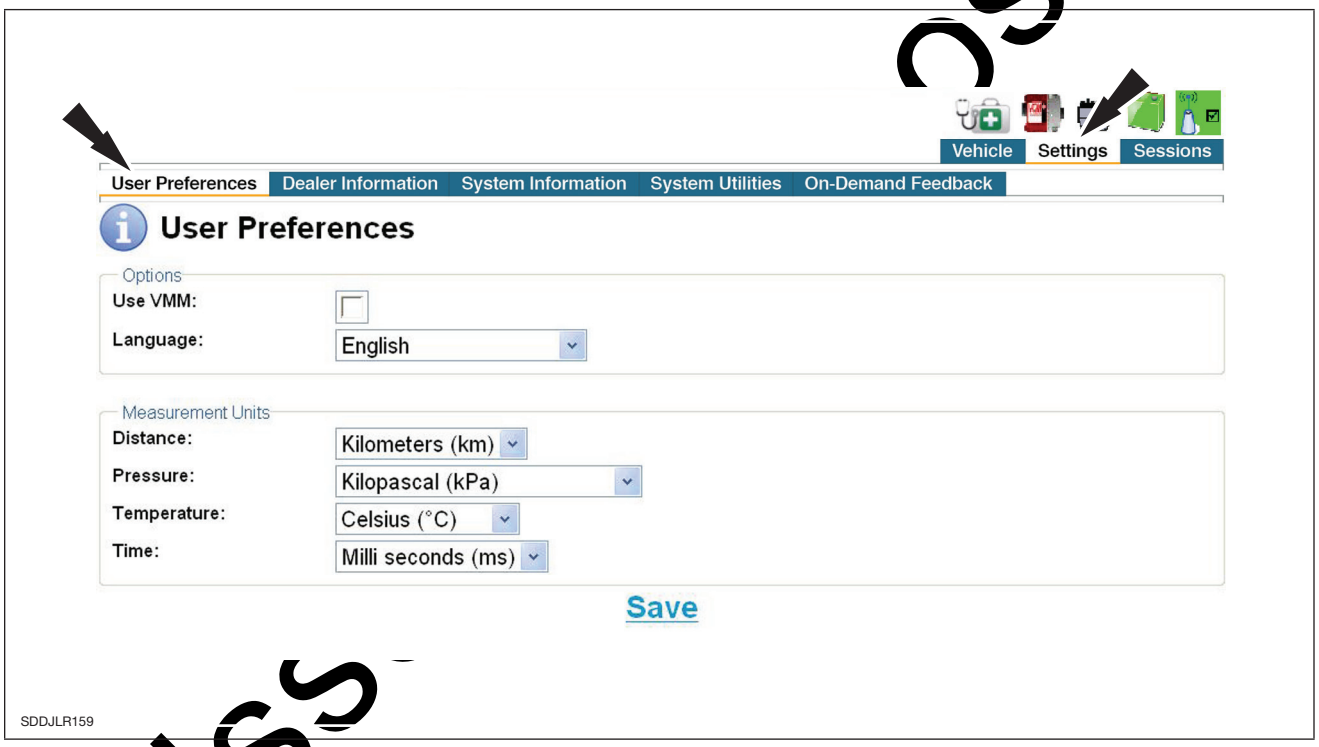
- Pinpoint Test
- Technical Service Bulletin
- Functional Test
- Service Function
- Diagnostic Tools

Recommendations are identified by icons as shown in the graphic.

SYSTEM SETTINGS

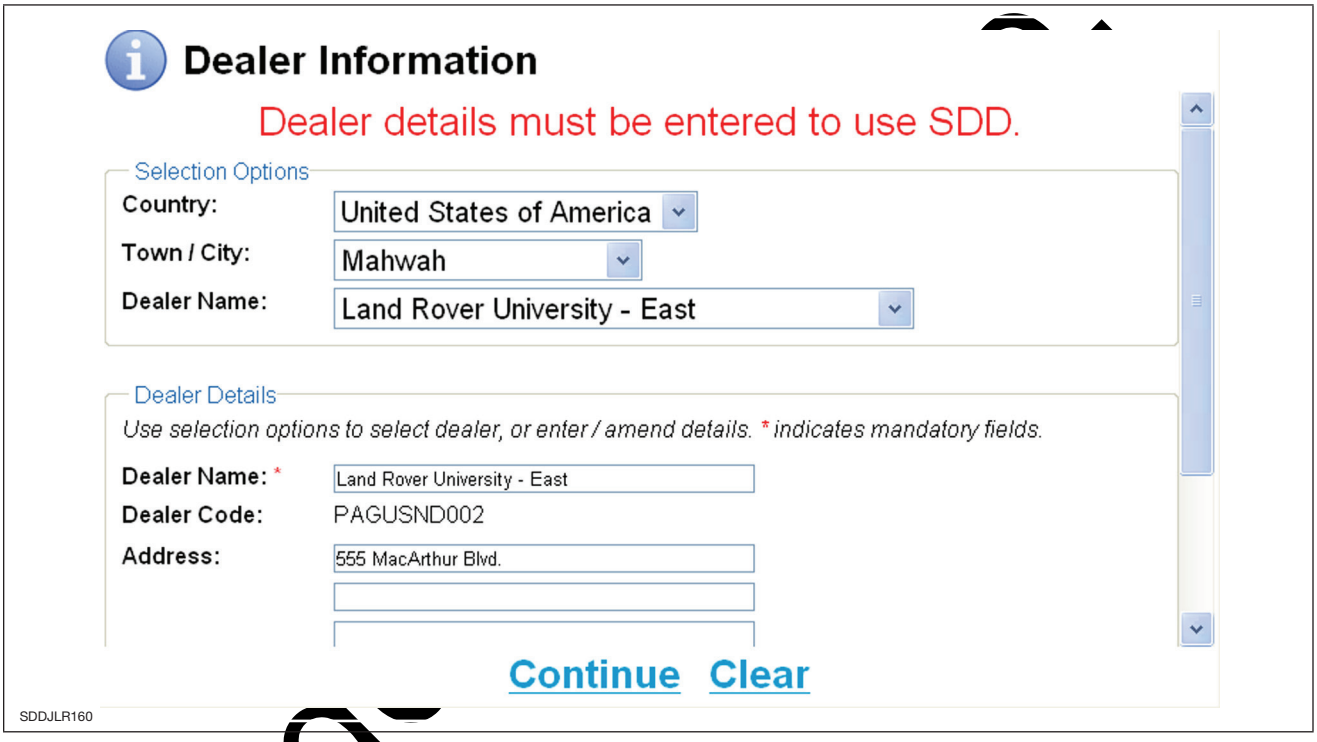
System Settings can be accessed by clicking the 'Settings' tab at any time during a session. System Settings include User Preferences, Dealer Information, System Information, and System Utilities.

User Preferences

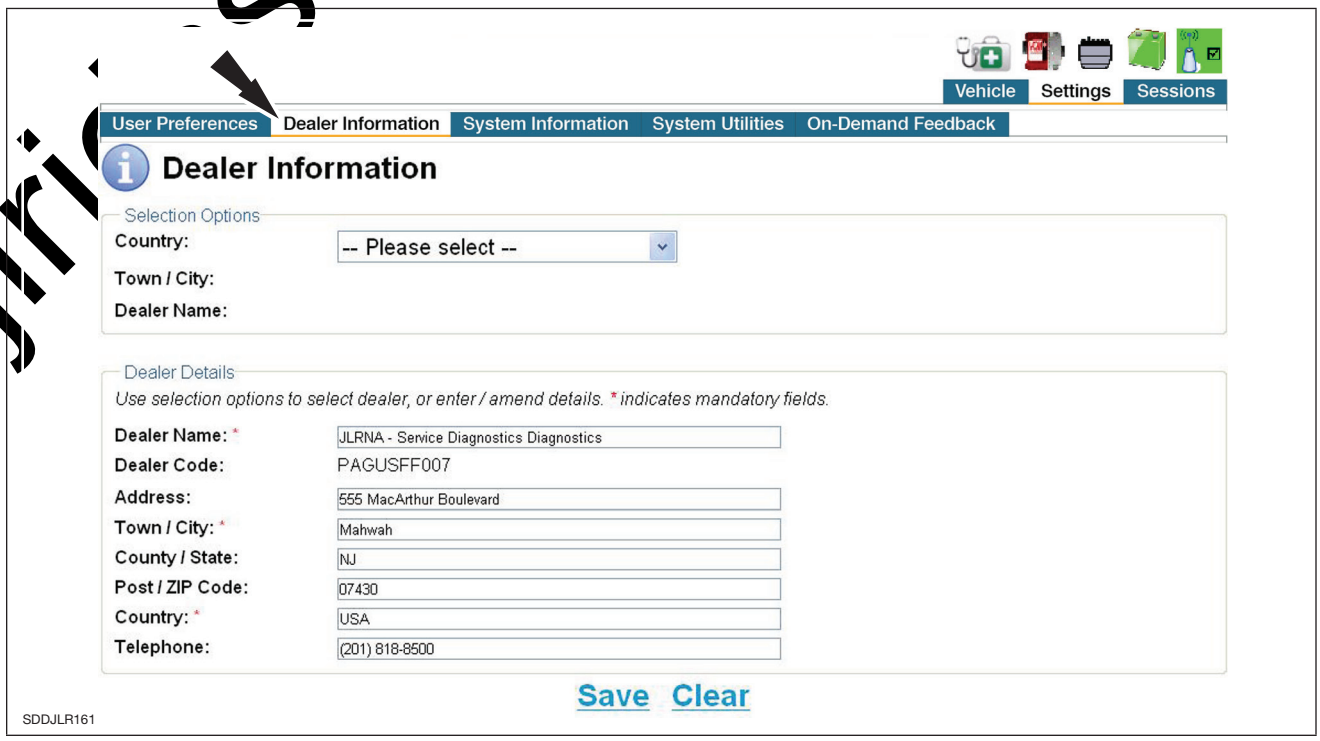


Dealer Information

The user is prompted to enter the correct dealer information when SDD is first started after installation.

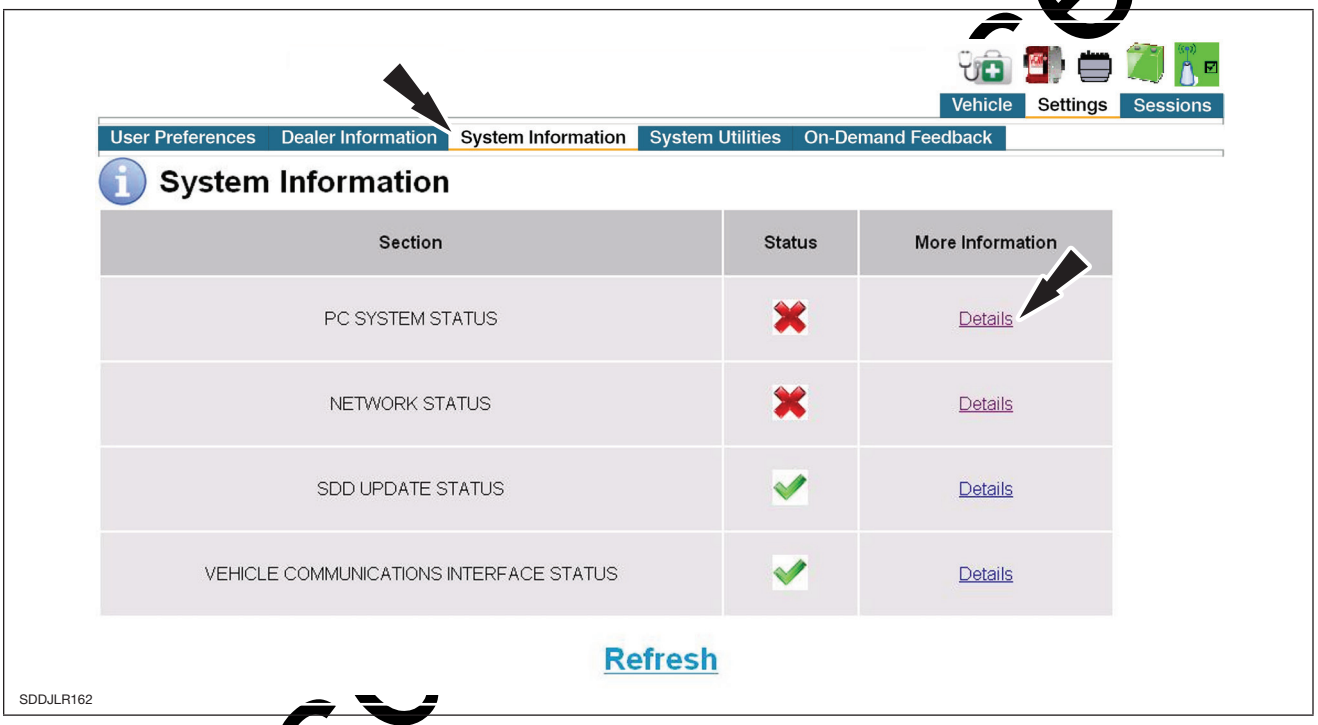


Dealer information can be viewed at any time during a session.



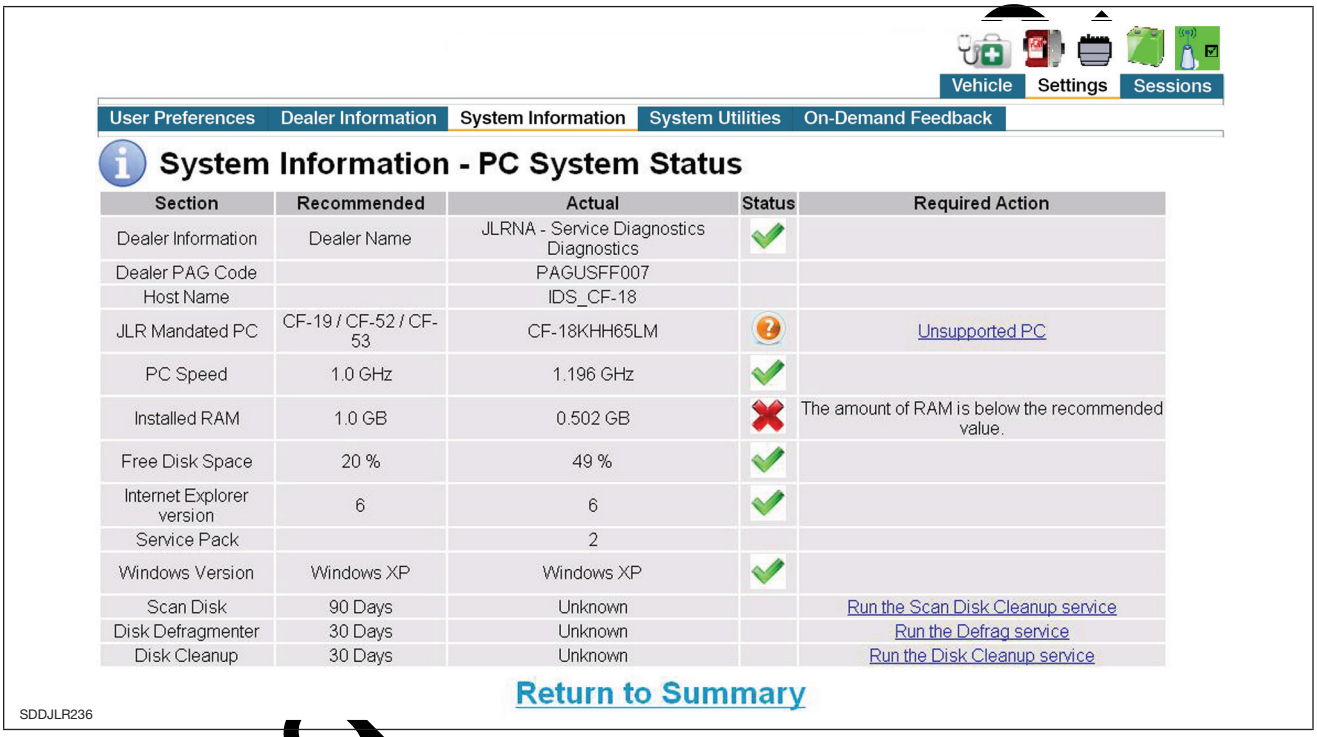
System Information

The System Information screen offers the user assistance with system maintenance by providing more detail about the status of important system elements. Click on 'Details' in the right-hand column for more information on each of these elements.



PC System Status Details

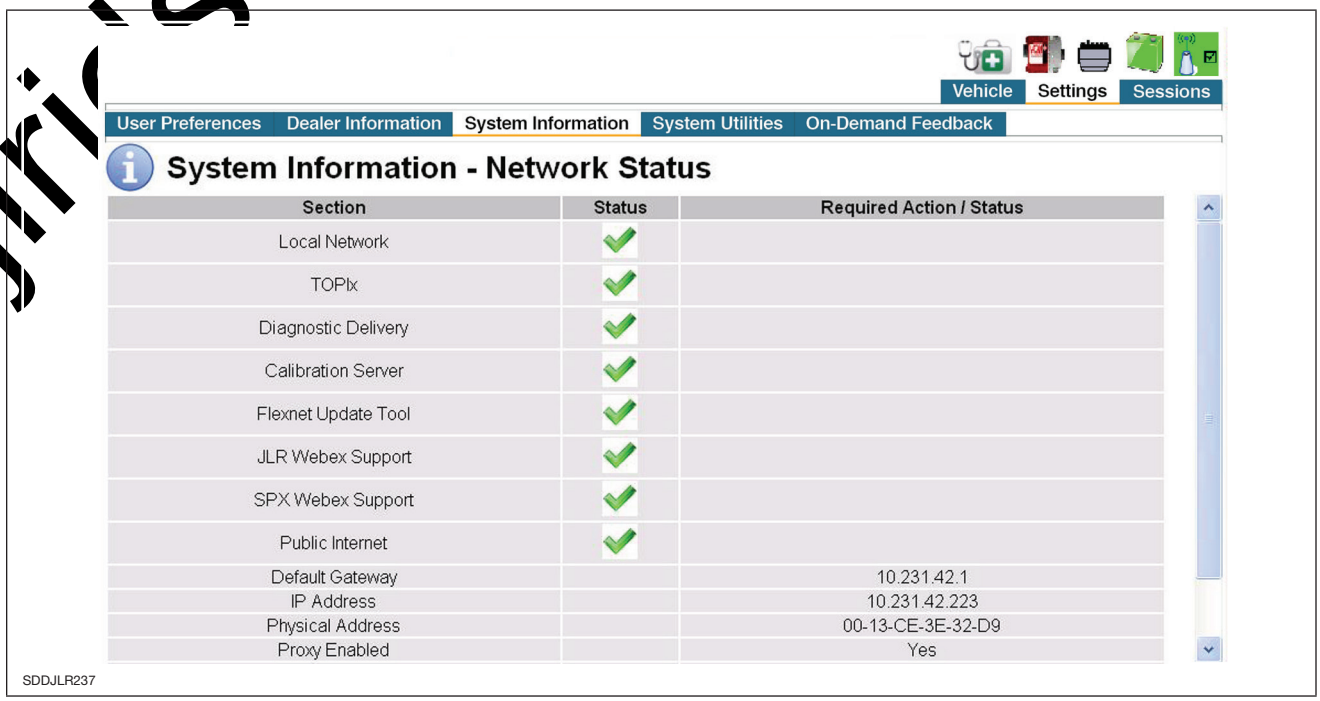
The example shows that an early (now unsupported) CF-18 is in use, and that the RAM is not up to specification.



Section	Recommended	Actual	Status	Required Action
Dealer Information	Dealer Name	JLRNA - Service Diagnostics Diagnostics	✓	
Dealer PAG Code		PAGUSFF007		
Host Name		IDS_CF-18		
JLR Mandated PC	CF-19 / CF-52 / CF-53	CF-18KHH65LM	?	Unsupported PC
PC Speed	1.0 GHz	1.196 GHz	✓	
Installed RAM	1.0 GB	0.502 GB	✗	The amount of RAM is below the recommended value.
Free Disk Space	20 %	49 %	✓	
Internet Explorer version	6	6	✓	
Service Pack		2		
Windows Version	Windows XP	Windows XP	✓	
Scan Disk	90 Days	Unknown		Run the Scan Disk Cleanup service
Disk Defragmenter	30 Days	Unknown		Run the Defrag service
Disk Cleanup	30 Days	Unknown		Run the Disk Cleanup service

Network Status Details

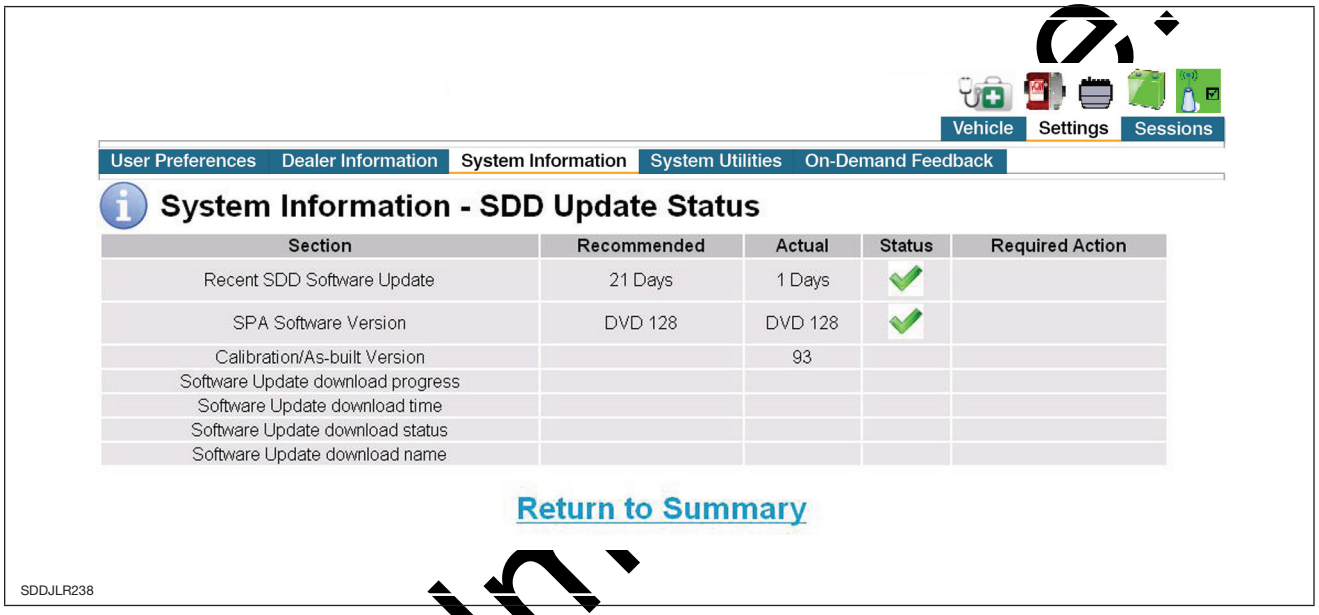
The system uses a diagnostic to verify that these resources are available.



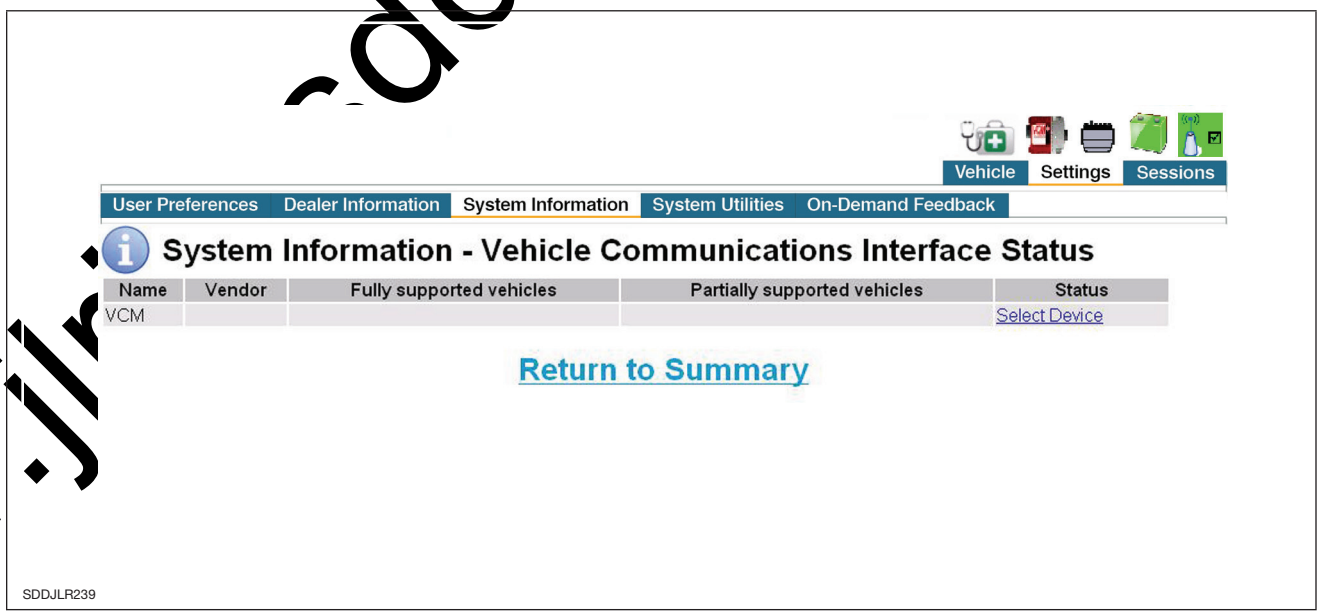
Section	Status	Required Action / Status
Local Network	✓	
TOPIx	✓	
Diagnostic Delivery	✓	
Calibration Server	✓	
Flexnet Update Tool	✓	
JLR Webex Support	✓	
SPX Webex Support	✓	
Public Internet	✓	
Default Gateway		10.231.42.1
IP Address		10.231.42.223
Physical Address		00-13-CE-3E-32-D9
Proxy Enabled		Yes

SDD Update Status Details

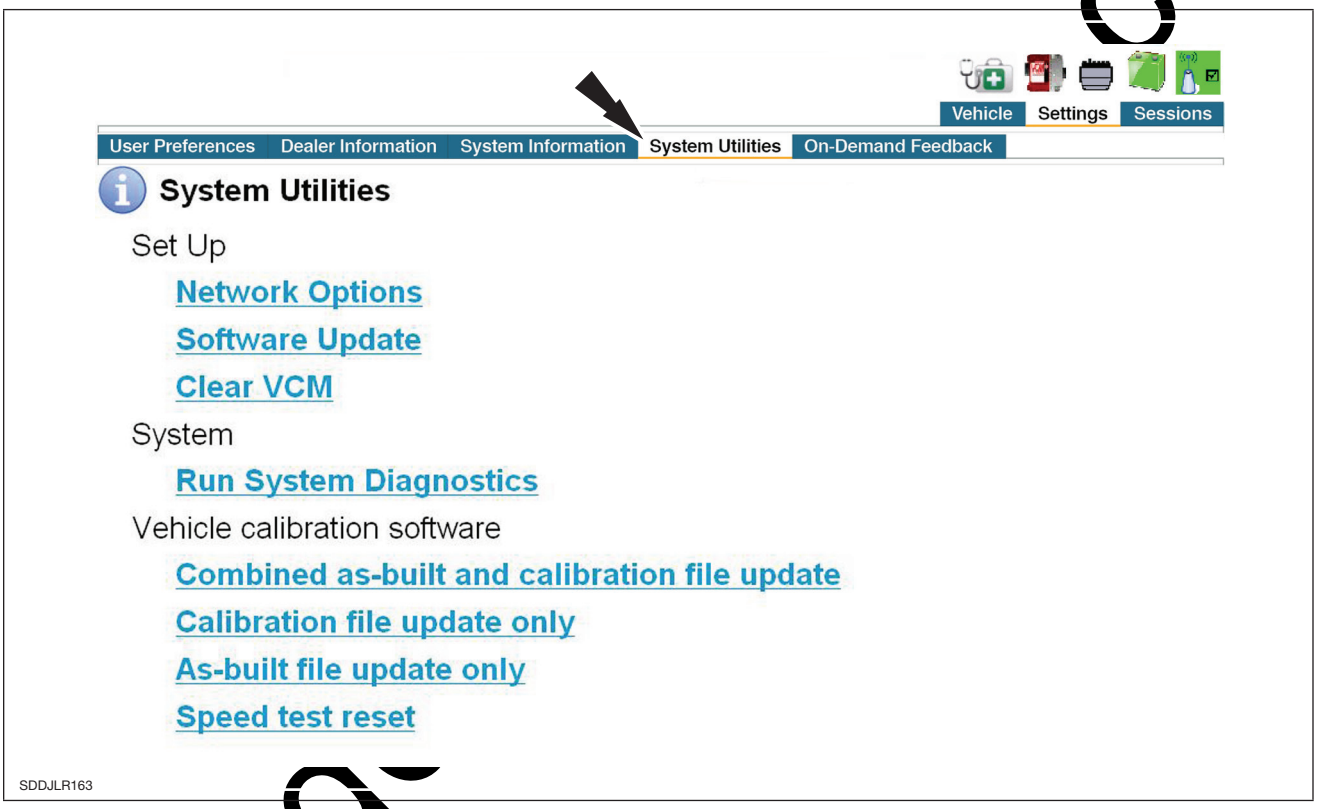
This screen summarizes the status of software and calibration files.



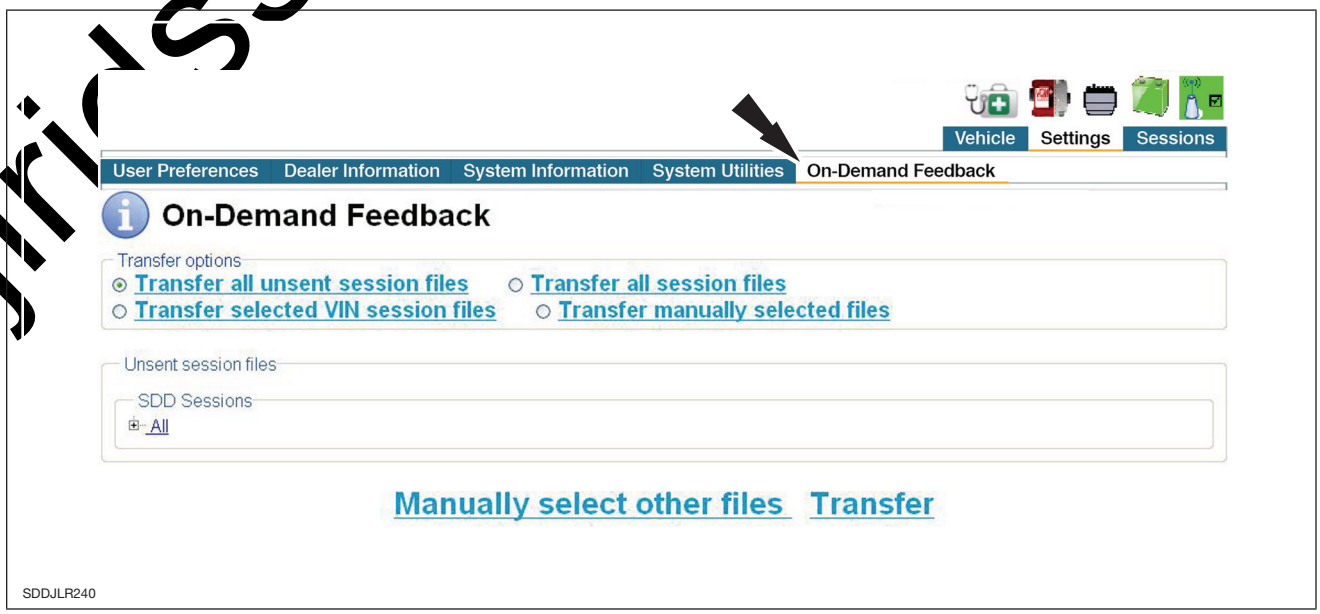
Vehicle Communication Interface Status Details



System Utilities



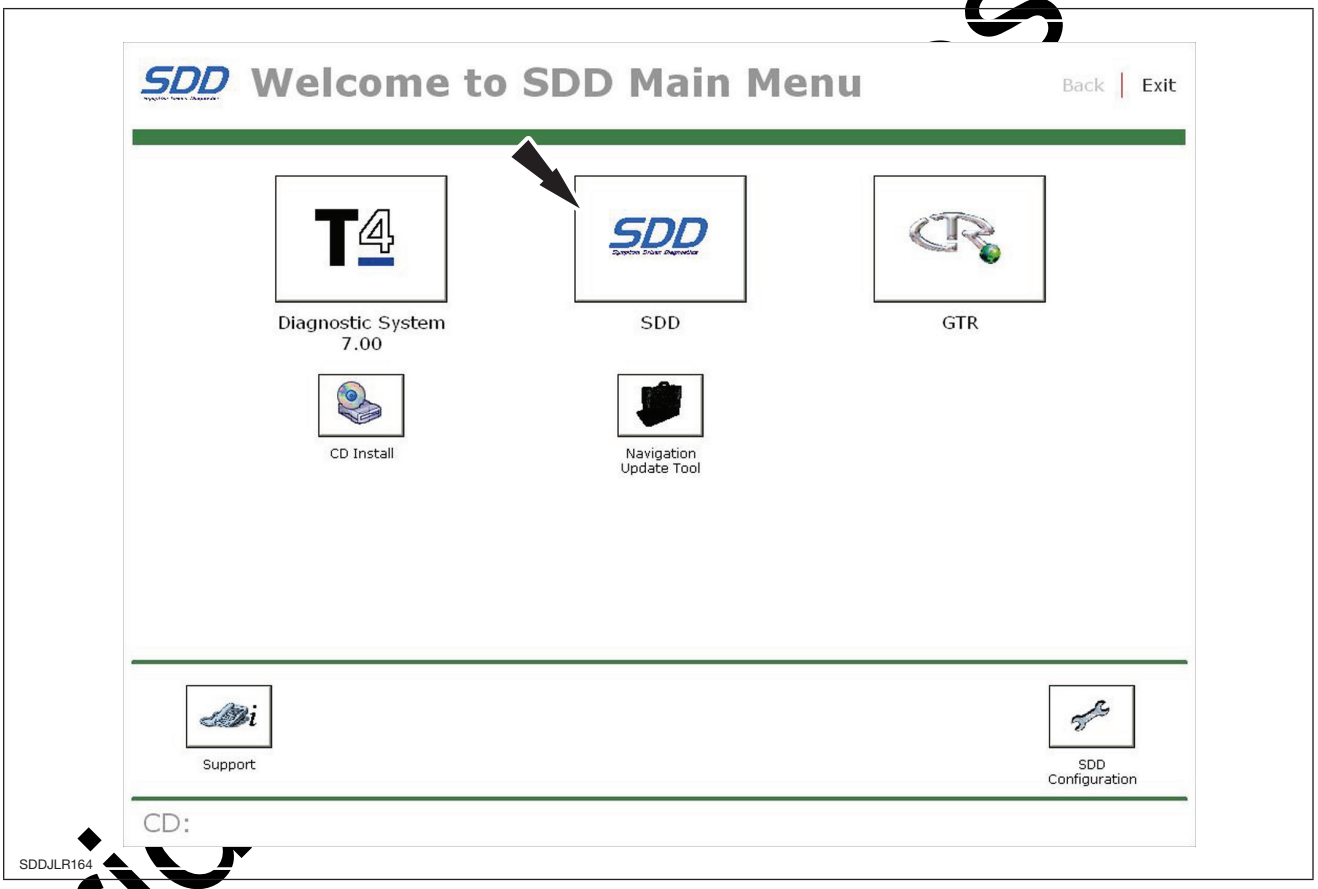
On-Demand Feedback



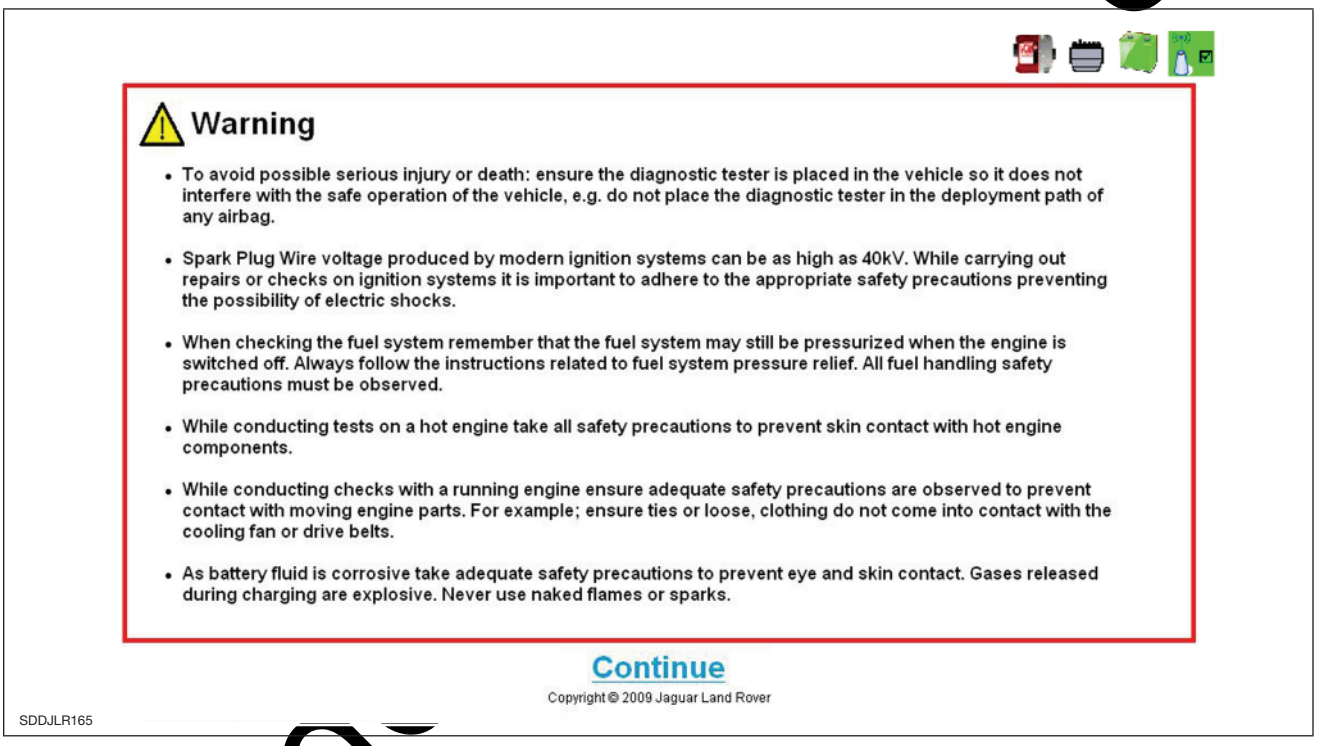
WORKING WITH SDD

NOTE: Communication with the vehicle is via the 16-pin Data Link Connector (DLC), with ignition switched to the 'ON' position.

Click the SDD icon on the main menu:

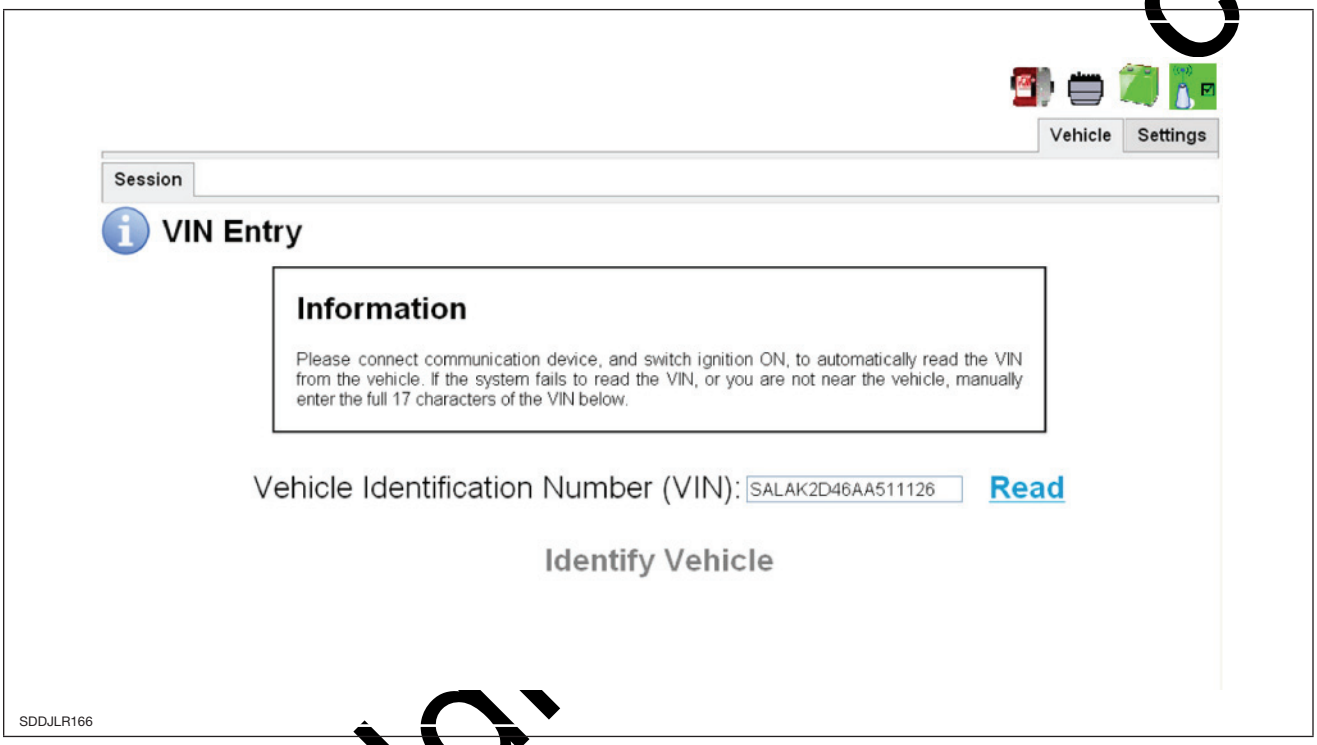


The initial display is a general 'Warning' screen with important safety precautions that must be observed when performing any procedure.



When the warnings have been read and understood, click 'Continue'.

VIN Entry



The VIN entry screen allows for identification of the vehicle using the 17-digit Vehicle Identification Number (VIN). With the communication device connected to the vehicle and the ignition switched ON, the operator can automatically retrieve the VIN from the vehicle by selecting the 'Read' option. The operator should then select 'Identify Vehicle' to continue.

If, during the automatic retrieval of the VIN, it is not possible to establish communications with the vehicle, the VIN field will be fully populated with 'X', or if invalid data is read from the vehicle, the VIN field will be fully populated with '?????'.

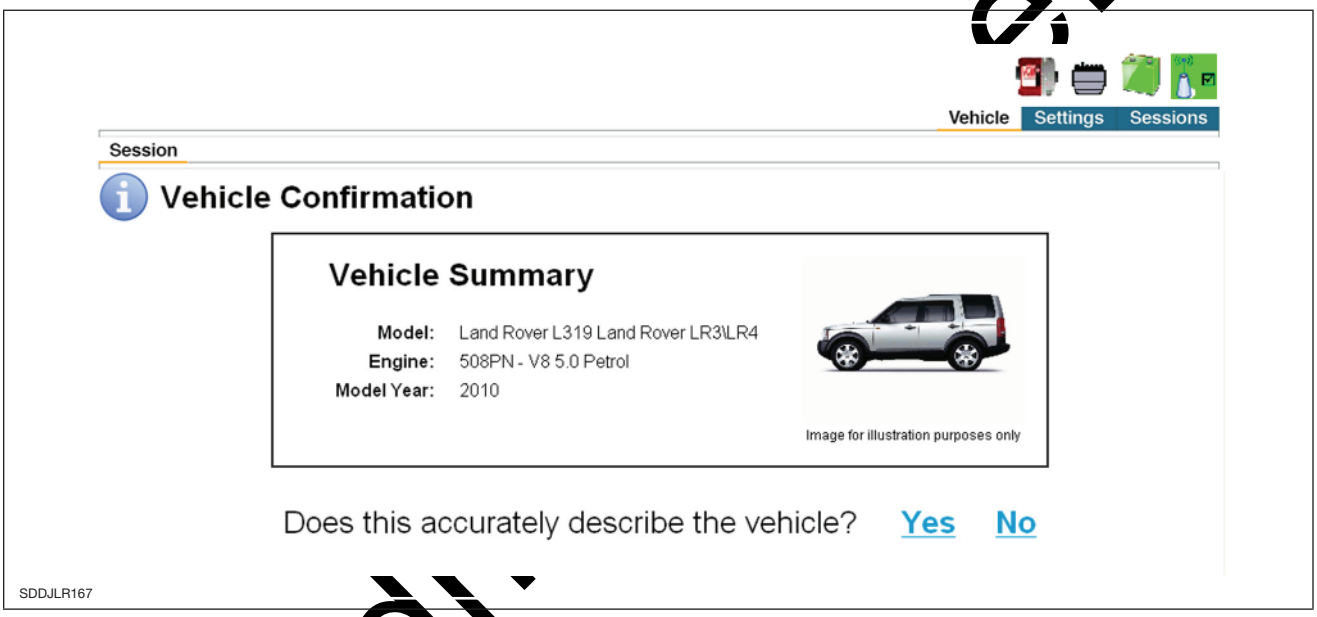
If it is not possible to establish communications with the vehicle, or the system fails to automatically retrieve the VIN, the VIN can be entered manually. After manually entering the full 17-digit VIN, as displayed on the vehicle's VIN plate, the operator should then select 'Identify Vehicle' to continue.

If, after entering the VIN manually and selecting 'Identify Vehicle', a screen is displayed stating 'Invalid VIN Entered', it is likely that the VIN has been entered incorrectly. If this window is displayed, ensure that the correct VIN has been entered as displayed on the vehicle VIN plate.

If this screen is NOT displayed, it is likely that the VIN manually entered at the VIN Entry screen is of an incorrect format that cannot be decoded.

Vehicle Confirmation

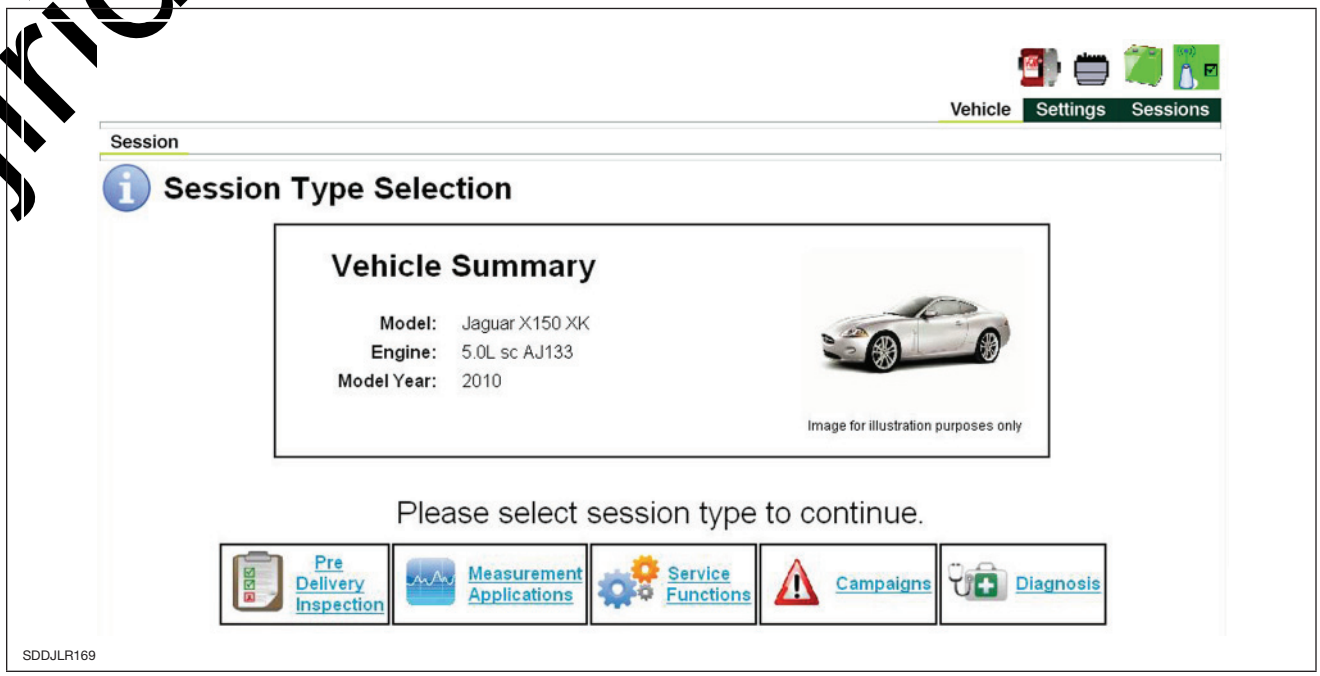
The information displayed in the Vehicle Summary field describes the basic specification of the vehicle identified by decoding of the 17-digit alphanumeric VIN entered at the VIN Entry screen.



The operator should verify the details and proceed if correct by selecting 'Yes', or return to the VIN Entry screen to input the correct VIN by selecting 'No'.Once the correct vehicle has been identified, the 'Session Type Selection' screen will be displayed.

Session Type Selection

The various SDD functions are accessed based on Session Type. From the Session Type Selection screen, the operator is able to select from the functions supported for the current vehicle.



Session Types

Pre Delivery Inspection (PDI)
Select this to access the Pre Delivery Inspection application and other PDI-related items for the selected vehicle. These functions are utilized in conjunction with the Pre-Delivery Inspection sheet.

Measurement Applications
Select this to access the Measurement Applications for the selected vehicle.

NOTE: Some Measurement Application functions can only be utilized in conjunction with the Vehicle Measurement Module (VMM).

Service Functions
Select this to access any Service Function applications relevant to the selected vehicle and system/area.

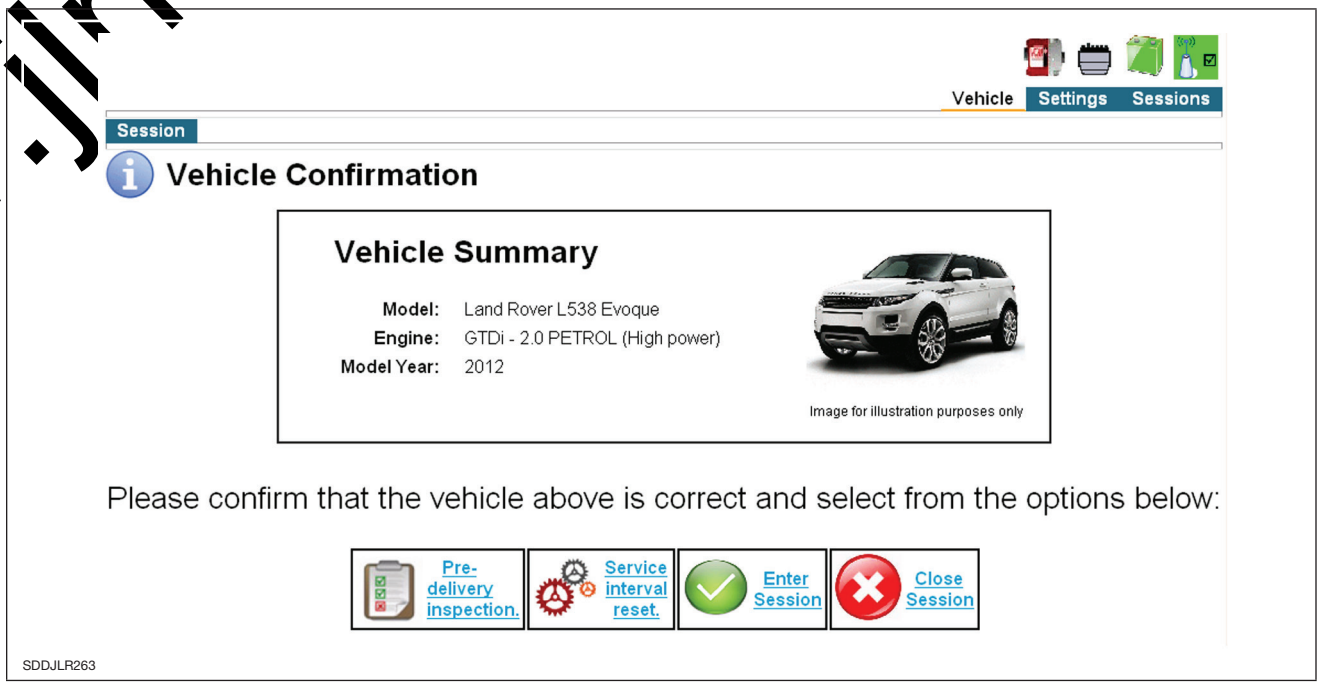
Campaigns
Select this to access all mandated Service Actions or Service Recalls associated with the selected vehicle.

Diagnosis
Select this to access the SDD Diagnosis application. This application enables the operator to diagnose an identified concern via the Symptom Maps.

Session Type Icons

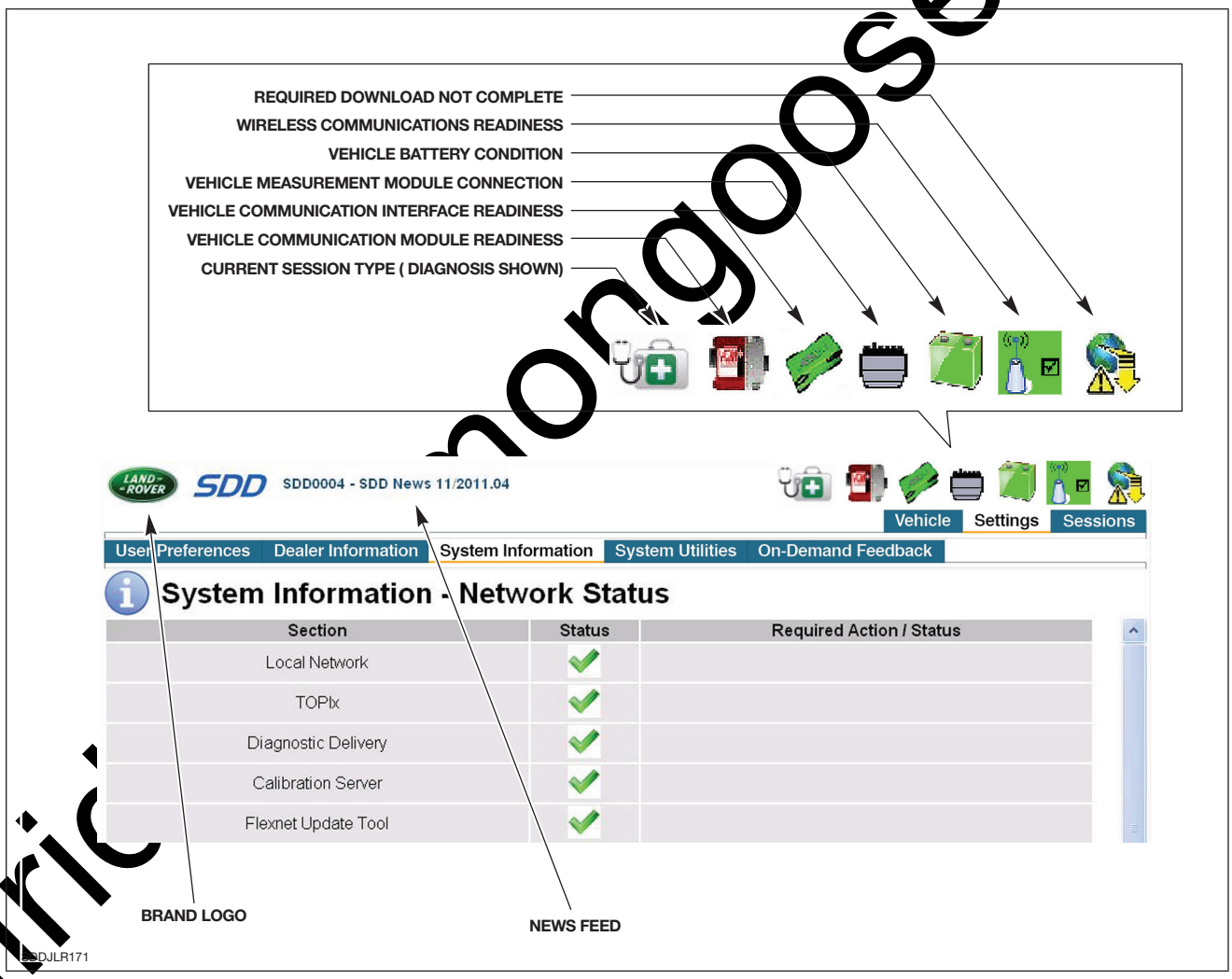
Session Selection Shortcuts

Beginning with L538, direct short cuts are being phased in which allow the user to select the PDI or Service Interval Reset functions directly from the Vehicle Confirmation screen.



Status Indicators

Several onscreen features are employed to keep the user informed about system status. Status icons indicate session type, communications readiness, vehicle battery condition, and download completion. The range of icons is shown here, although not all of them will be present at all times.



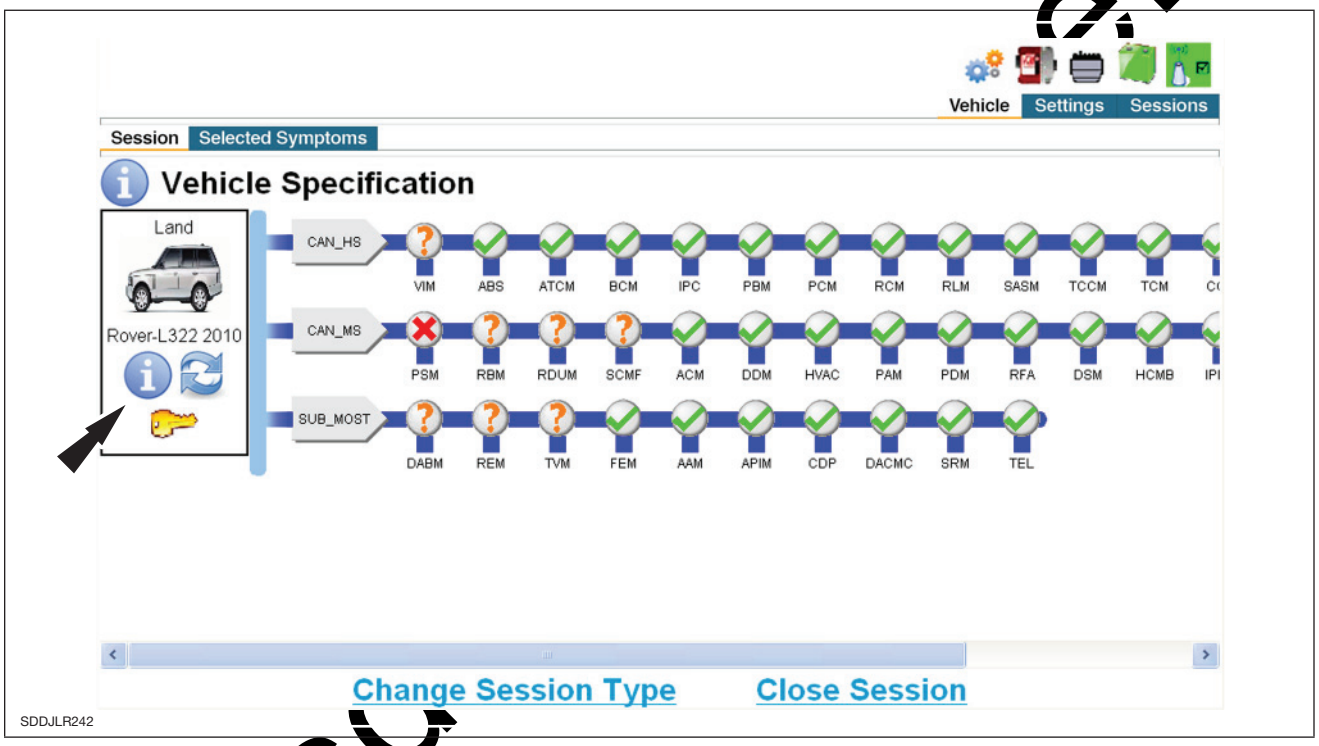
News Feed

A scrolling banner lists headlines from the latest SDD news document on TOPIx. Clicking on the banner will lead the user to the document in TOPIx.

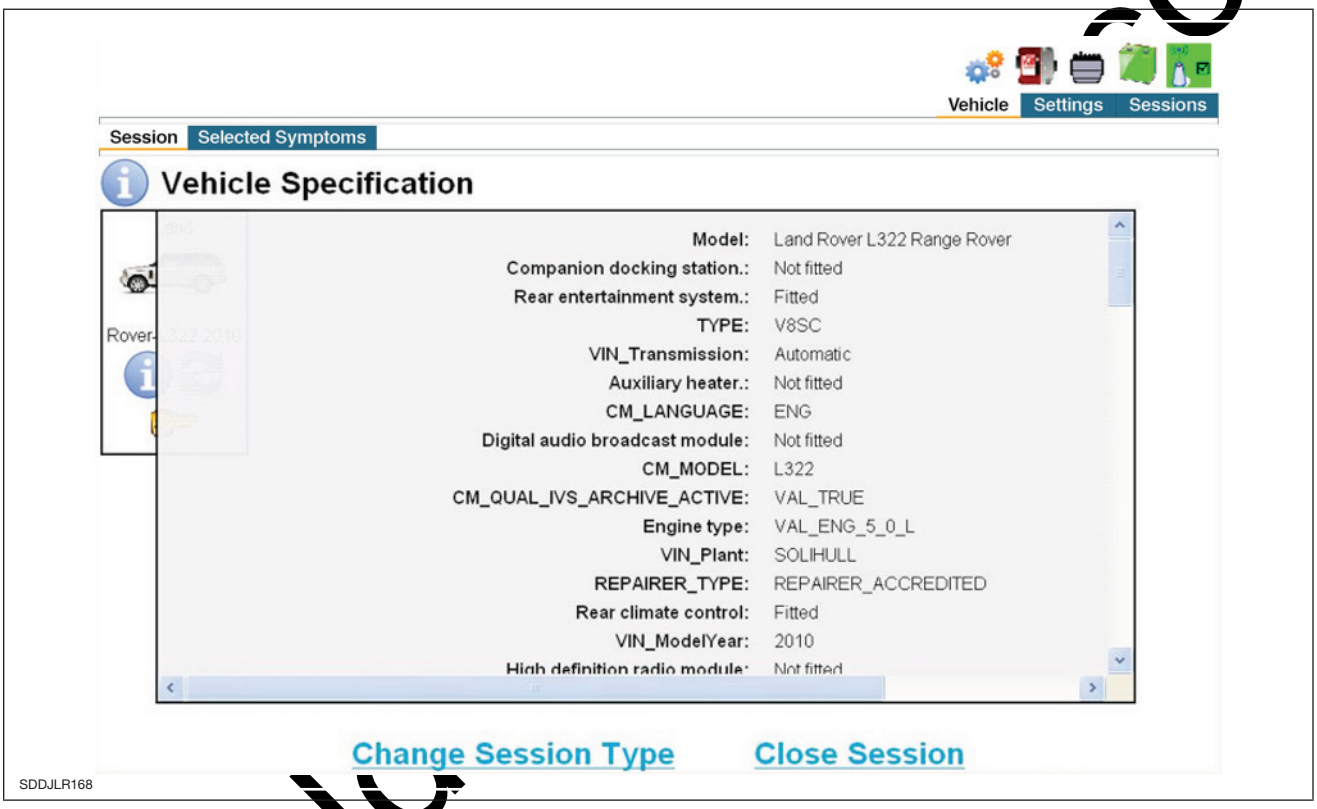
NOTE: The brand logo and news feed are omitted from screen shots throughout this section.

Vehicle Specification

When Vehicle Specification is displayed during a Session, the small window at the left of the screen shows basic details of the currently selected vehicle (model, model year).



Clicking on the Information icon (i) displayed in this field will launch a pop-up window showing more detailed vehicle specification information that has been retrieved from the vehicle, decoded from the VIN, and from operator input during the currently selected session.



NOTE: Options for changing Session Type or closing the Session are available at the bottom of the screen.

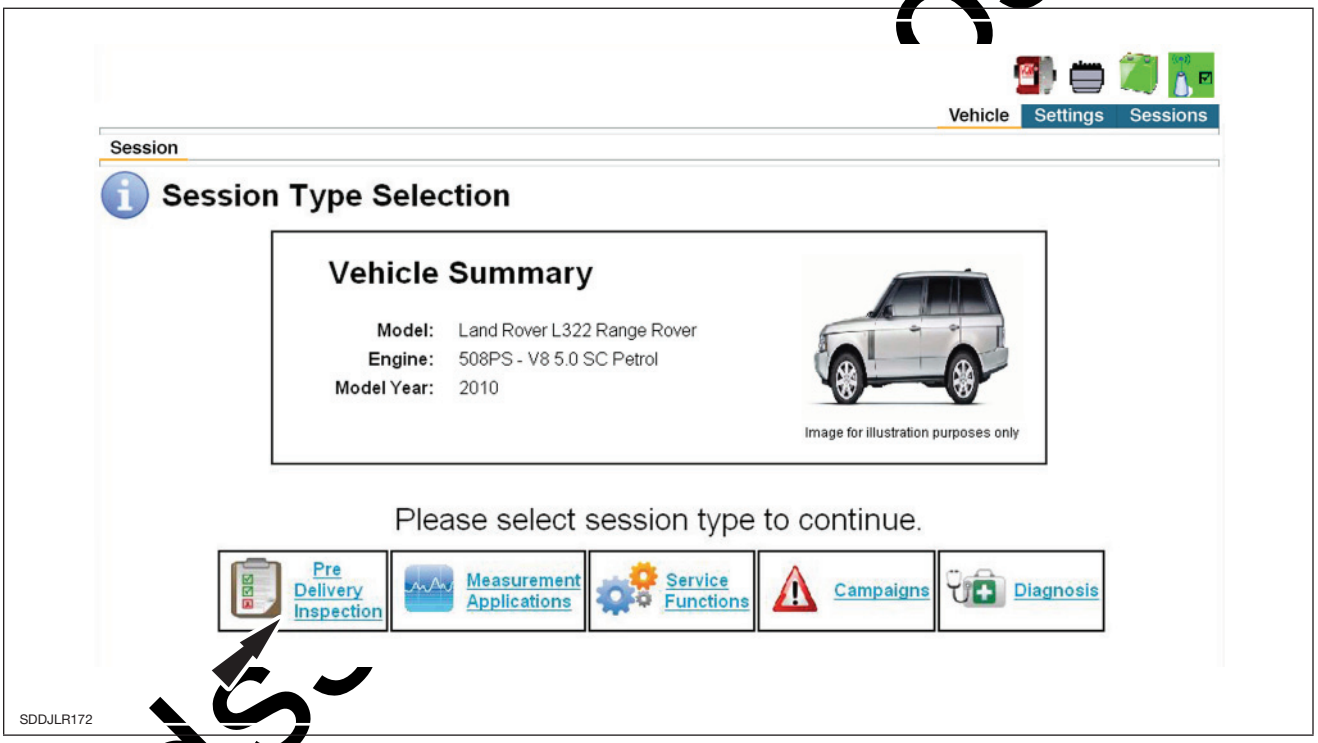
The Importance of DTCs to the SDD Process

SDD relies on logged DTCs in conjunction with vehicle symptoms to perform diagnostics. Clearing DTCs will clear the vehicle fault history and erase important data required for correct diagnosis of a concern.

- If DTCs are cleared then diagnostics CANNOT be carried out.
- ⚠ **DO NOT CLEAR DTCs unless instructed to do so by SDD.**
- Before clearing DTCs, save the session for possible later use.

PRE DELIVERY INSPECTION (PDI) SESSION TYPE

Select this Session Type to access the Pre Delivery Inspection application and other PDI related items for the selected vehicle. Click on the icon on the Session Type Selection screen to launch the Session.



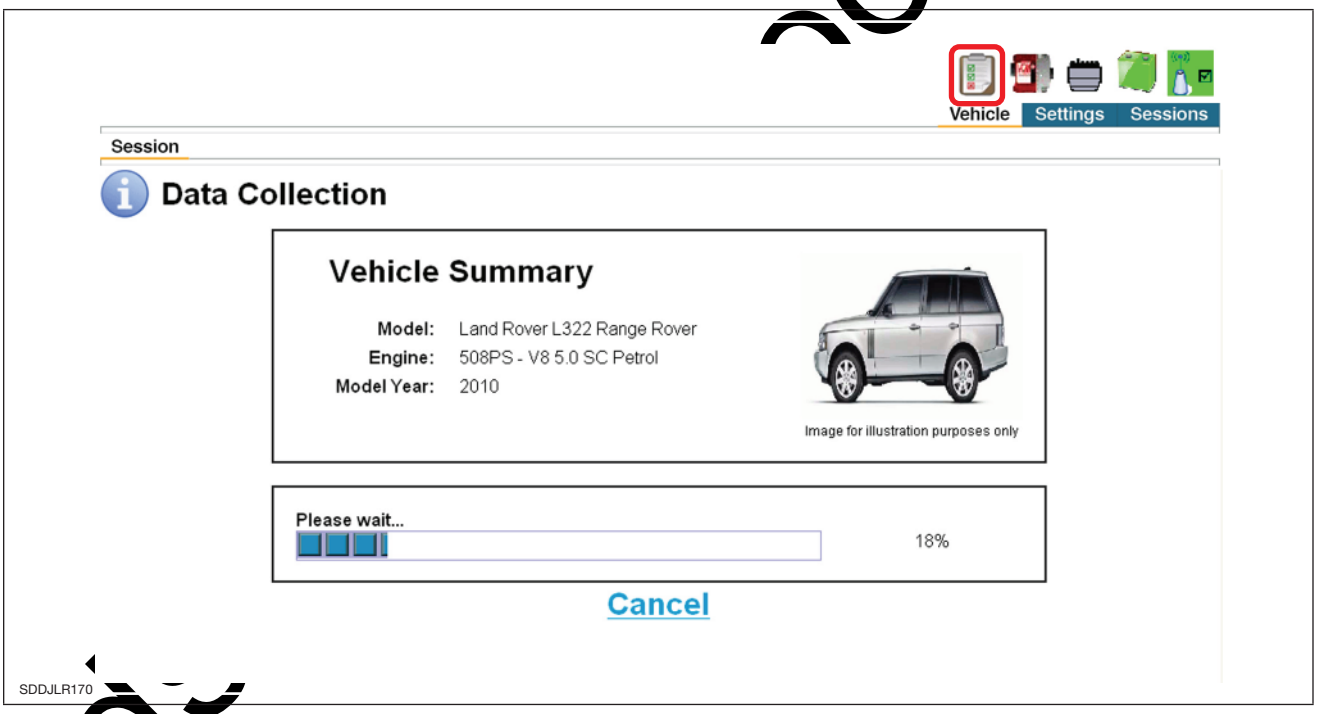
Data Collection

As SDD launches a Session Type, it performs a process of collecting data to be used throughout the session to maximize the efficiency of the system and support various tool functions.

Data collection includes:

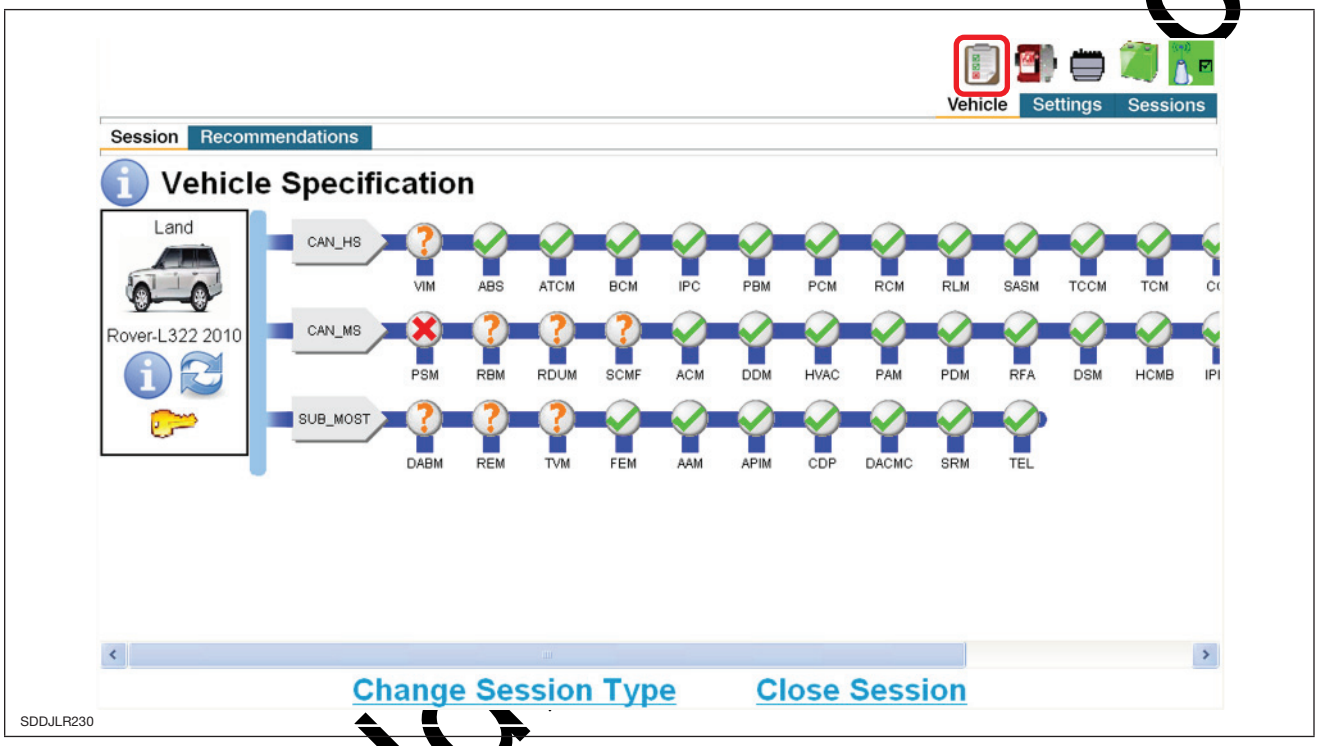
- Establishing communication with the vehicle's control modules
- Performing a 'silent' read of logged DTCs
- Qualifying details of the vehicle specification

The progress bar indicates that the Data Collection process is underway.

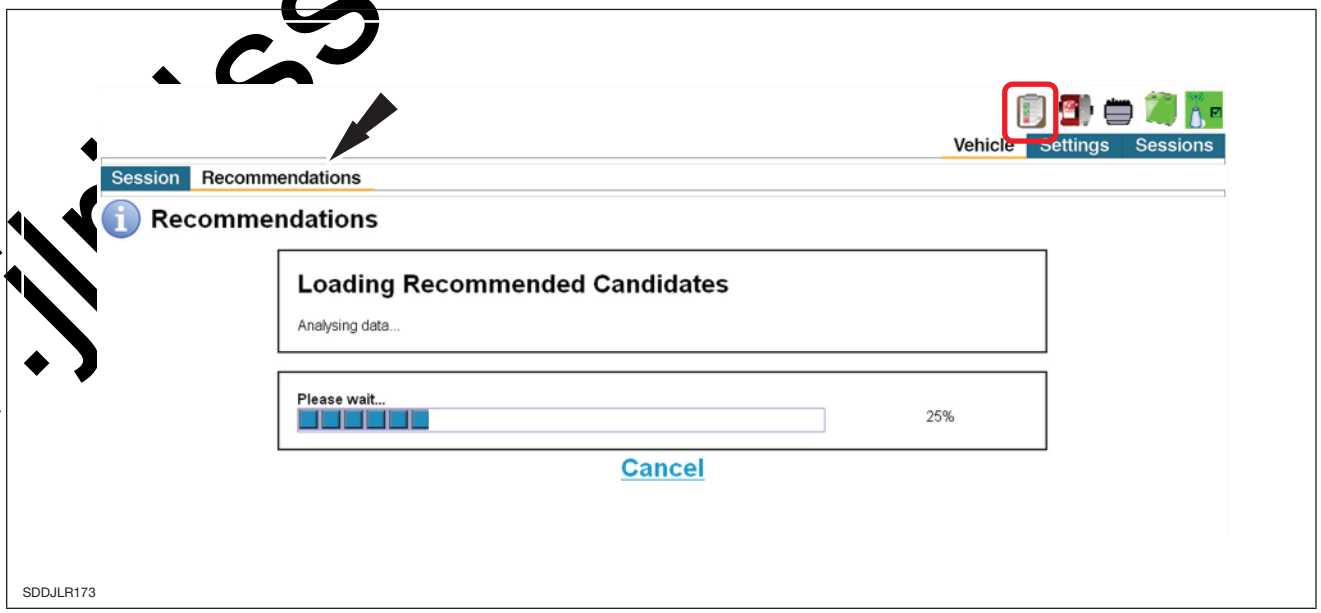


Once Data Collection is complete, SDD will display the Vehicle Specification screen.

The Vehicle Specification screen includes a summary of vehicle control module communication.



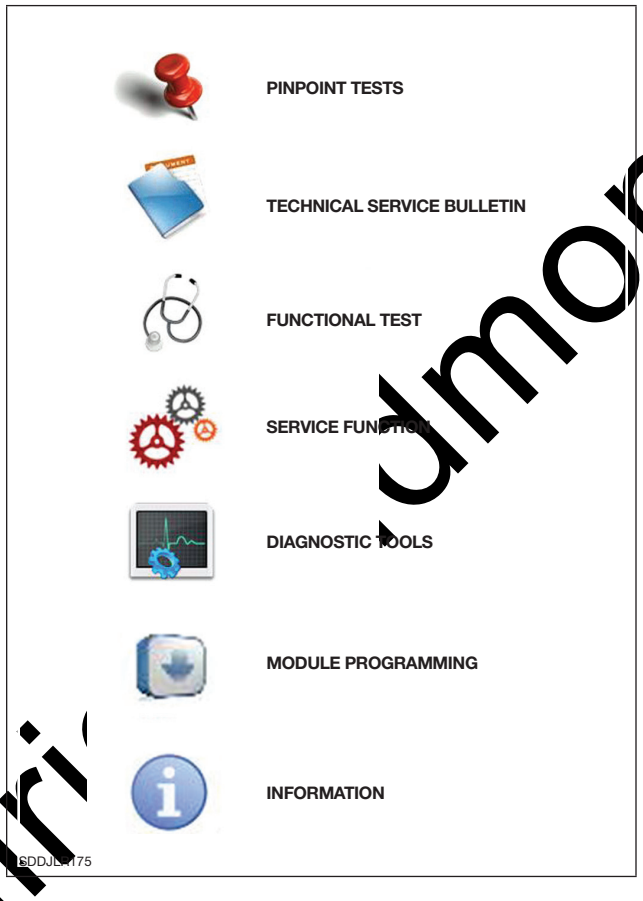
Clicking on the 'Recommendations' tab will prompt SDD to load 'Recommended Candidates' related to the session type.



Recommended Candidates

A Candidate is a recommendation made by SDD for targeted diagnosis of a concern based on selected symptoms and DTCs read from the vehicle. A Candidate may be a Pinpoint Test, Pre-Configured Tool, Technical Service Bulletin, or other Document supported by SDD.

Recommendations may fall into a number of categories, represented by a series of icons for identification.

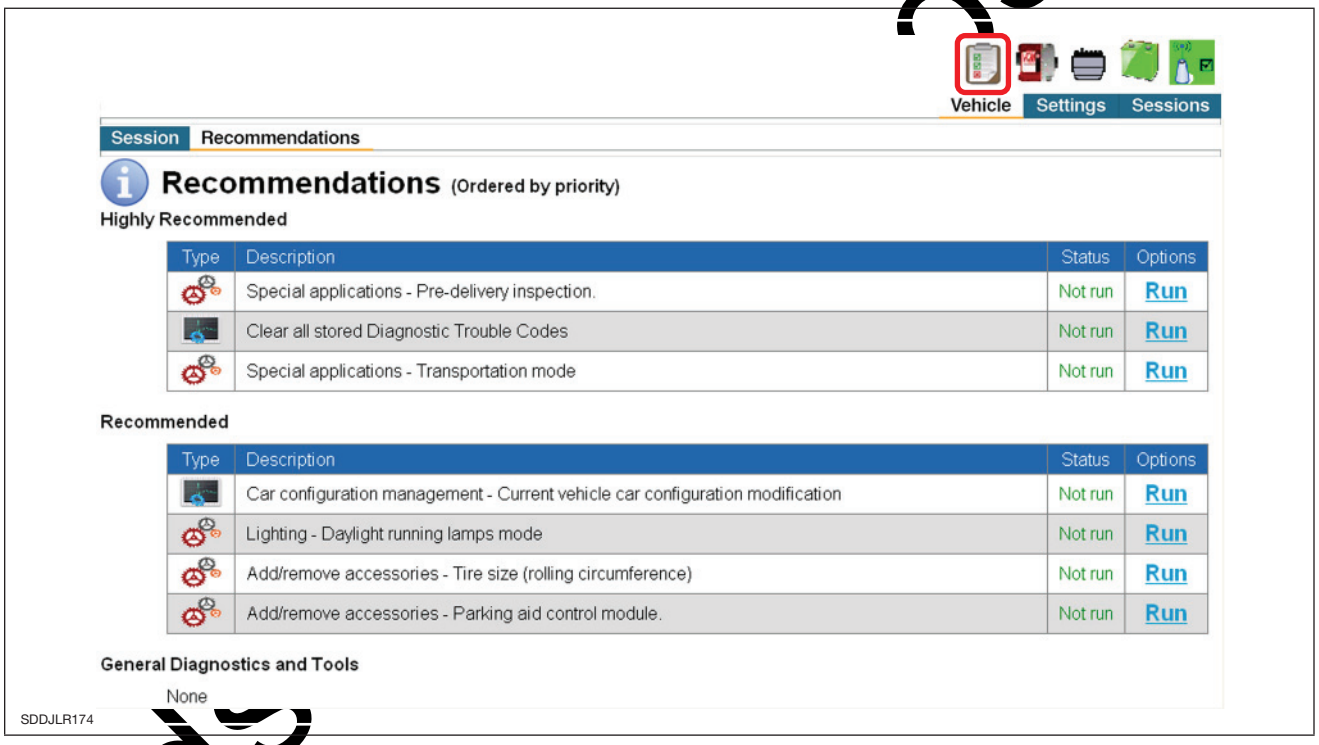


Recommended Candidates are displayed in 3 categories:

- Highly Recommended
- Recommended
- General Diagnostics and Tools

Candidates are displayed in order of priority relevant to the current session.

The right-hand 'Options' column gives the user the option to 'Run' or 'Read' the Recommended Candidate. The 'Status' column will indicate whether or not the candidate has been Run or Read.



In this case, the highest priority Candidate is the Pre-Delivery Inspection (PDI), which is performed using the latest PDI sheet. To launch the application, click on 'Run' in the right-hand 'Options' column.

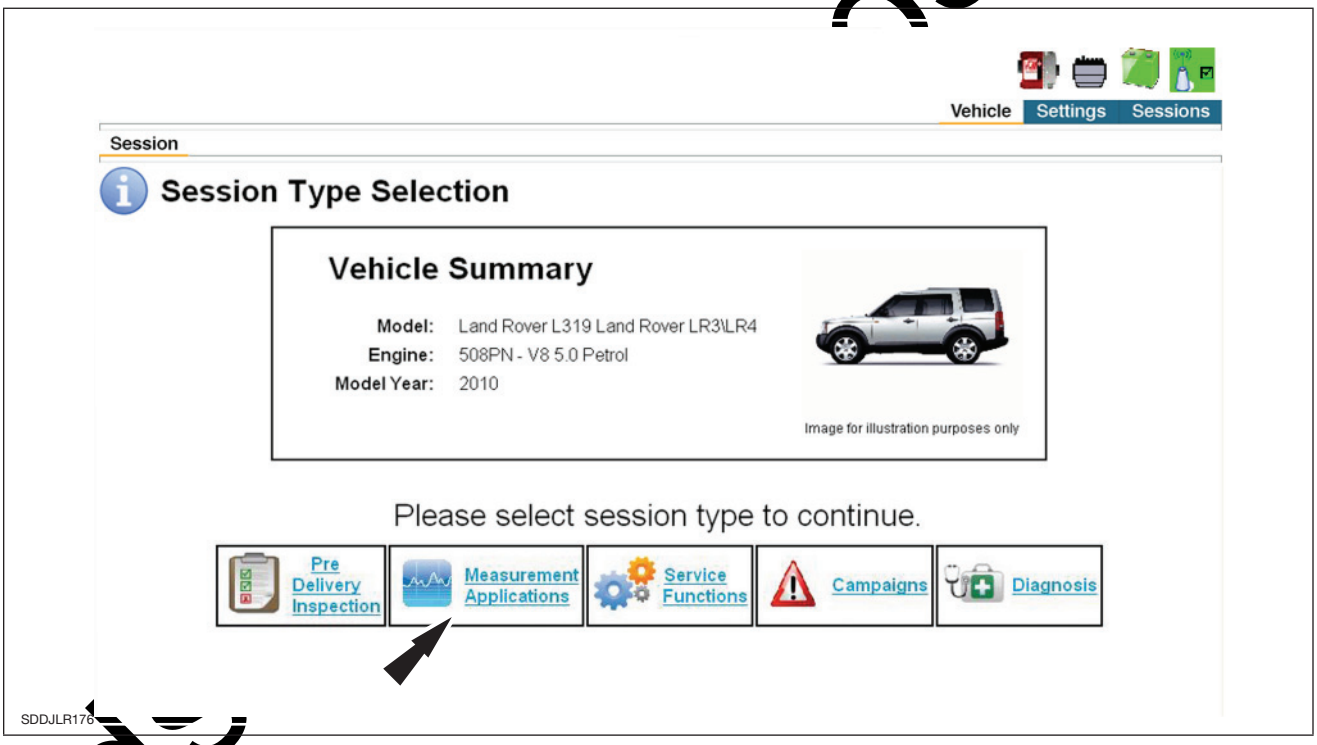
When the application is launched, SDD will display any outstanding updates – Update Prior to Sale Notice (UPS) or Technical Service Bulletins (TSBs), for example.

NOTE: It is important that all outstanding updates be carried out before continuing with the session.

NOTE: Always check TOPIx for the latest publications.

MEASUREMENT APPLICATIONS SESSION TYPE

Select this Session Type to access the Measurement Applications for the selected vehicle. Click on the icon on the Session Type Selection screen to launch the Session.



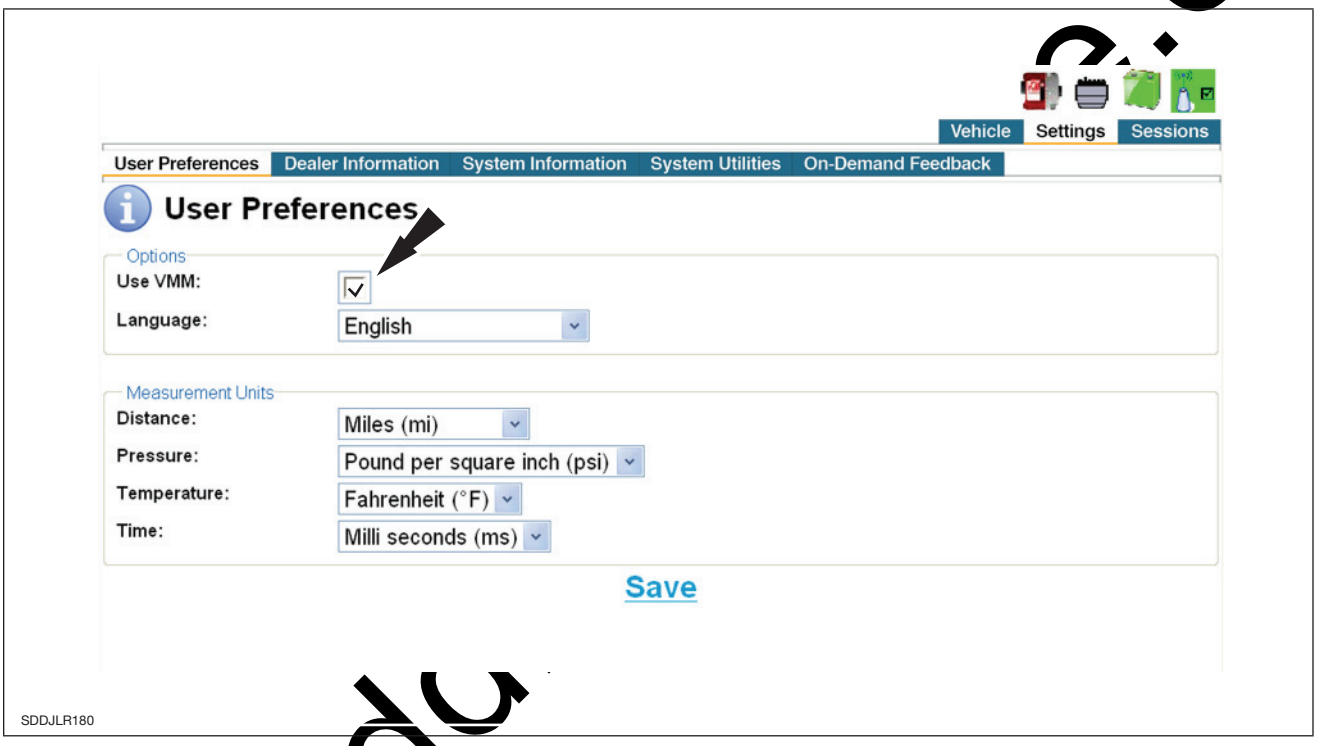
Measurement Applications may include:

- Datalogger
- Digital multimeter *
- Oscilloscope *
- Vehicle Vibration Analyzer *
- Driveshaft balancing tool *

* These tools must be used in conjunction with the Vehicle Measurement Module (VMM), currently supported only for Jaguar vehicles. The appearance and function of these tools is unchanged.

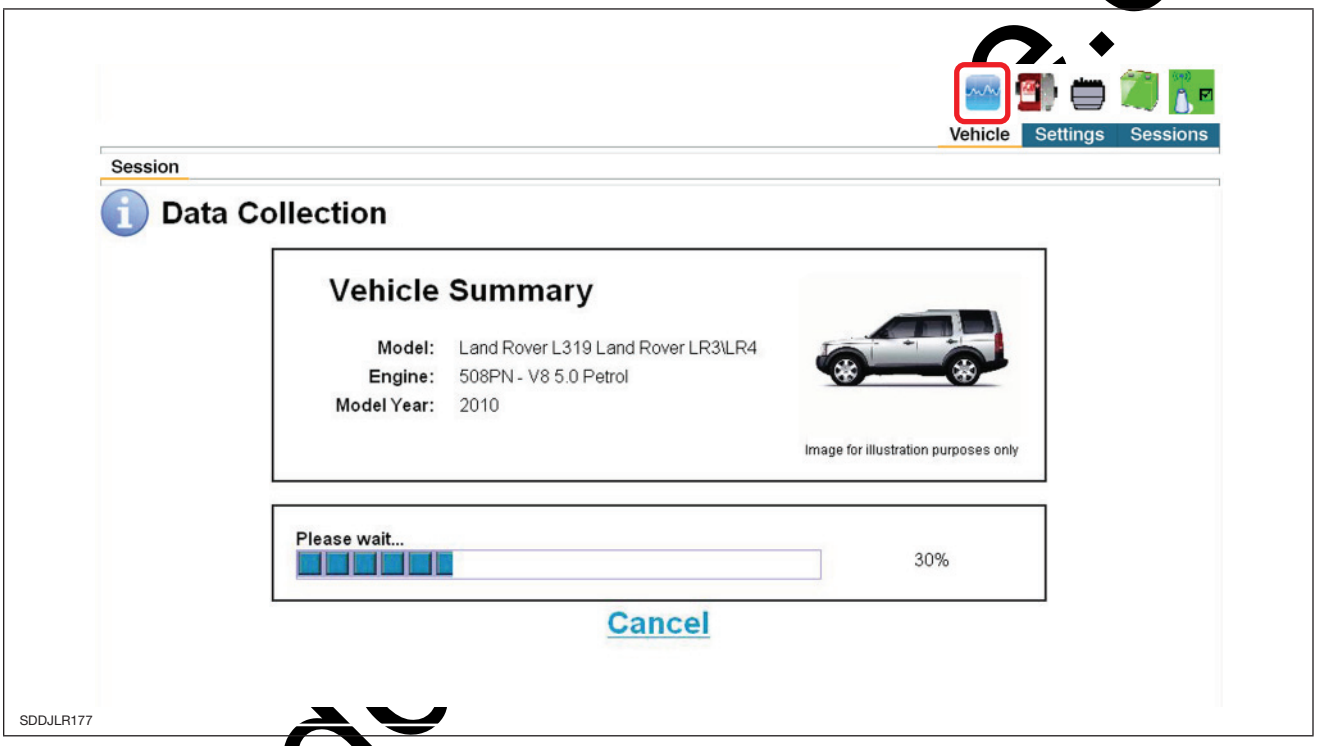
Vehicle Measurement Module (VMM)

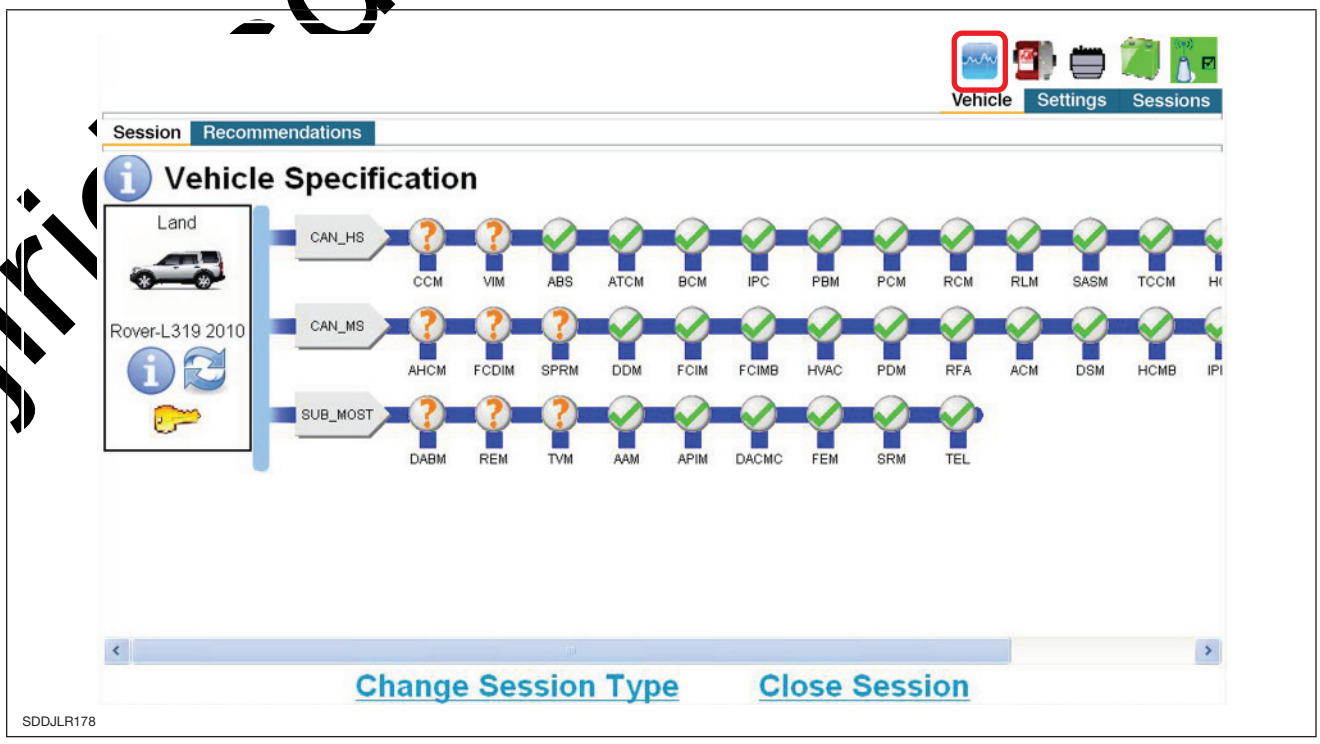
When using the VMM with Measurement Applications, the option must be selected in User Preferences in order for SDD to make accurate recommendations.



NOTE: This is an option for Land Rover vehicles.

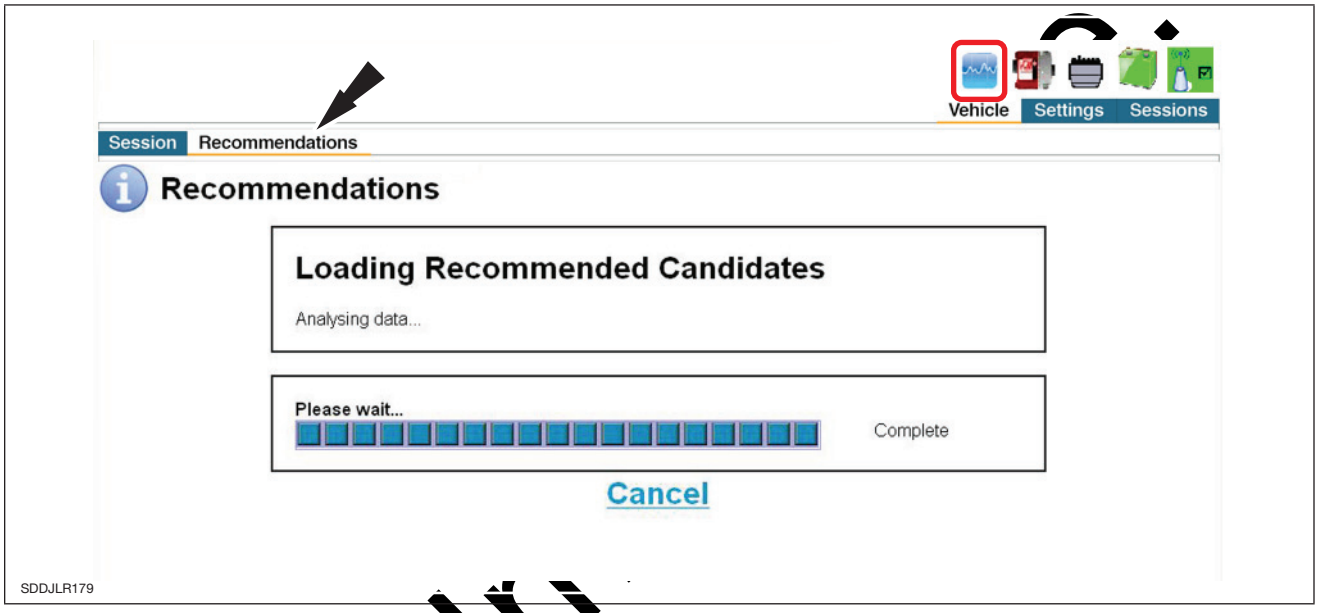
As the Measurement Applications session is launched, SDD will perform the Data Collection process and then display the Vehicle Specification screen.





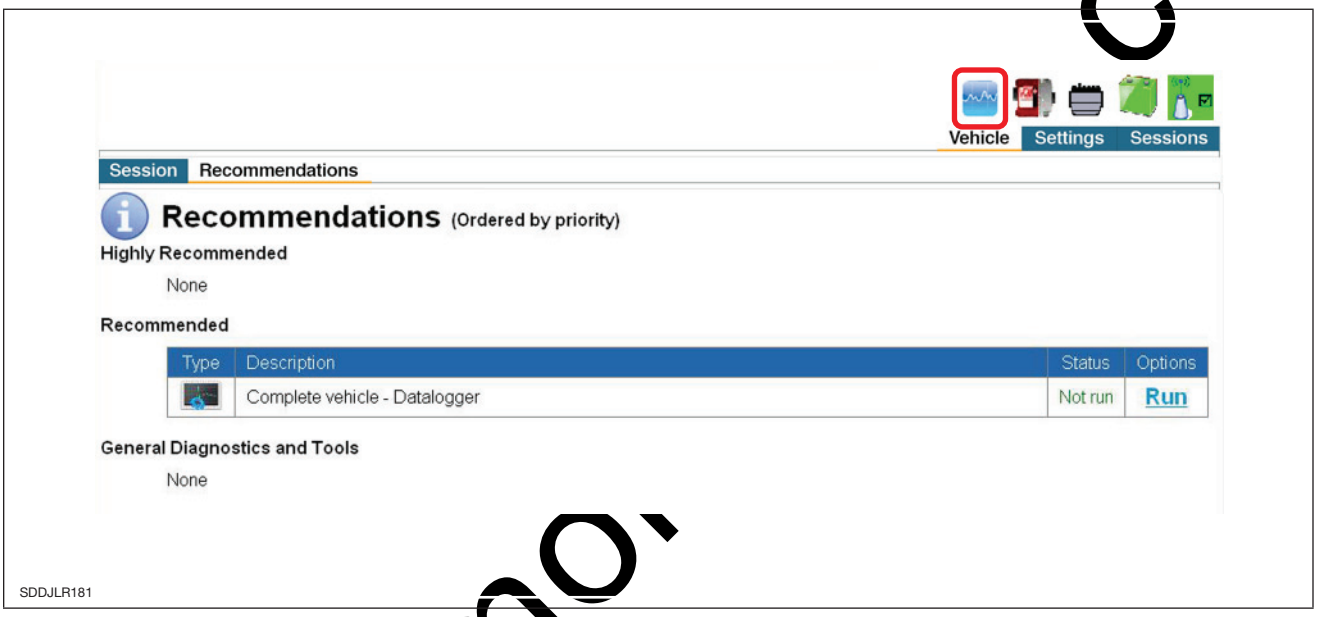
Recommendations

Click on the 'Recommendations' tab to load Recommended Candidates.



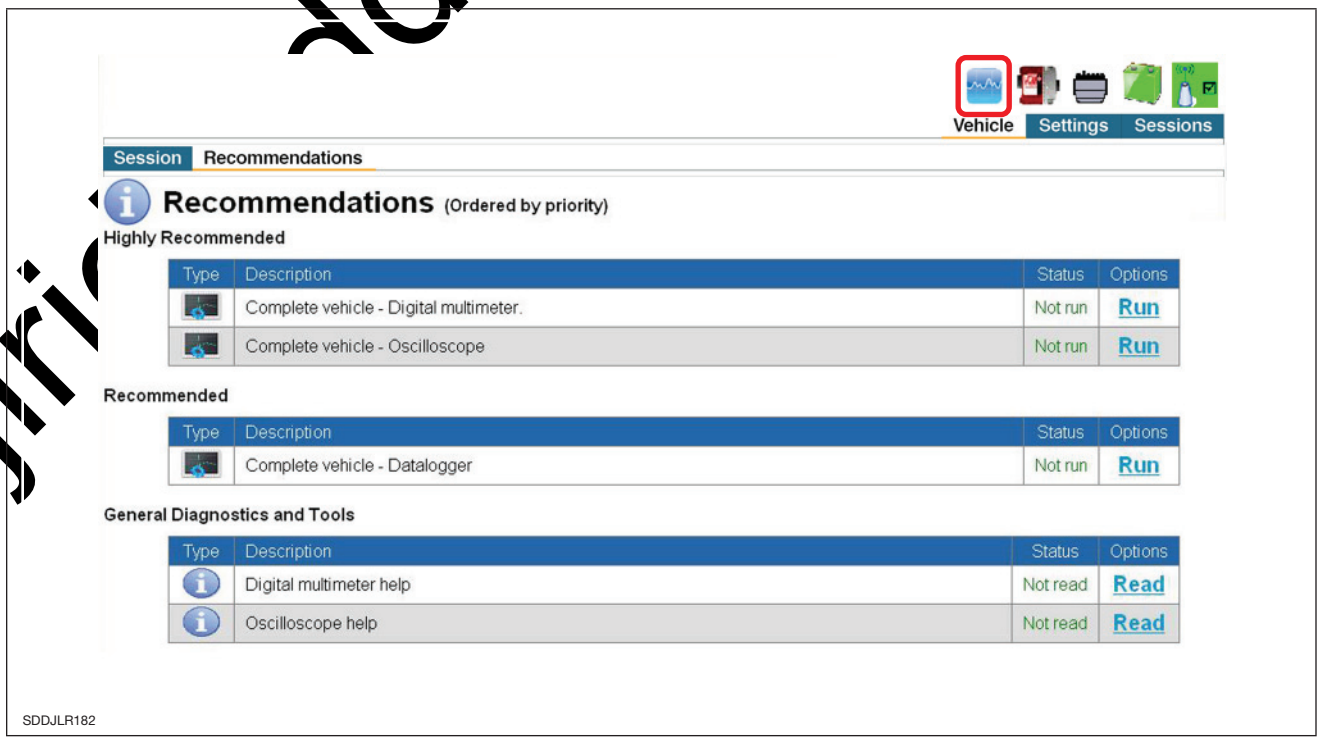
The recommendations displayed will depend on whether or not VMM is being used.

Recommendations without VMM



NOTE: Datalogger is also available in the 'Diagnosis' session type.

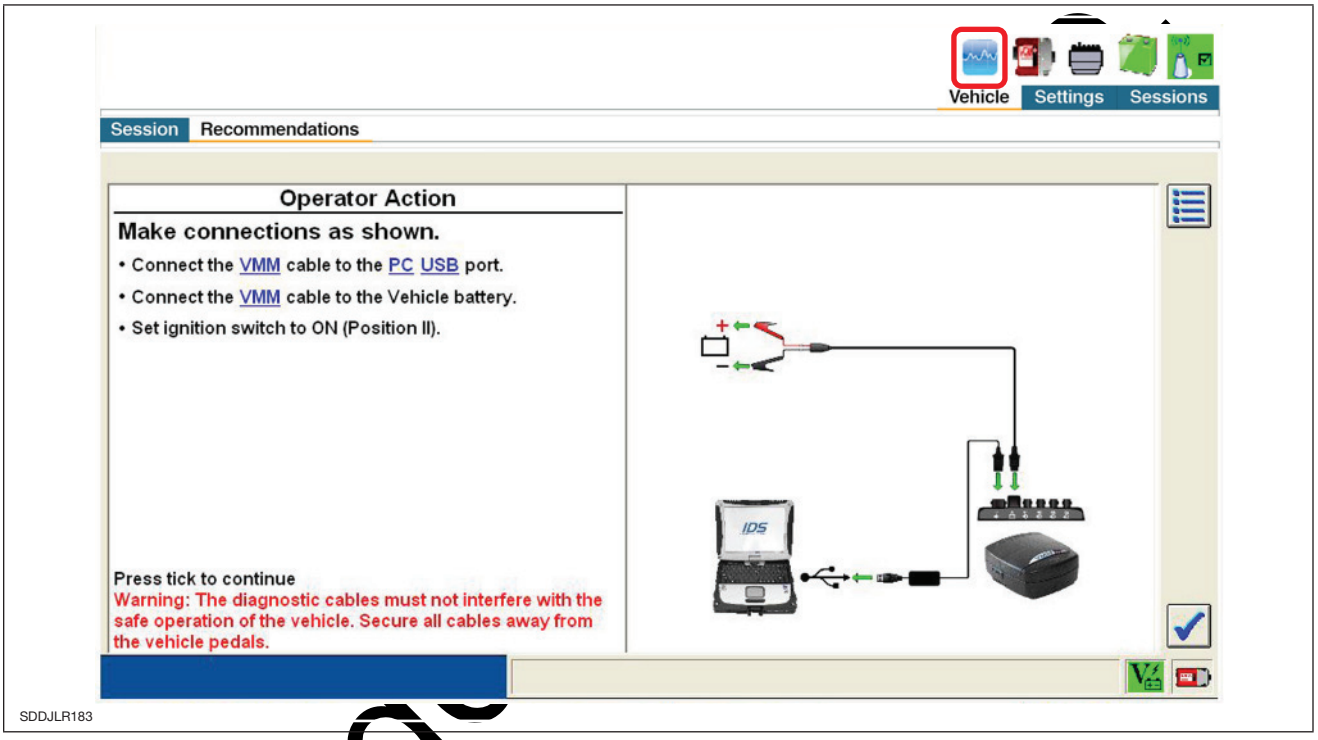
Recommendations with VMM



NOTE: These applications only function with the Vehicle Measurement Module, currently supplied with Jaguar systems.

System Tools

Selecting 'Run' for any of the 'Highly Recommended' candidates will launch the System Tools.

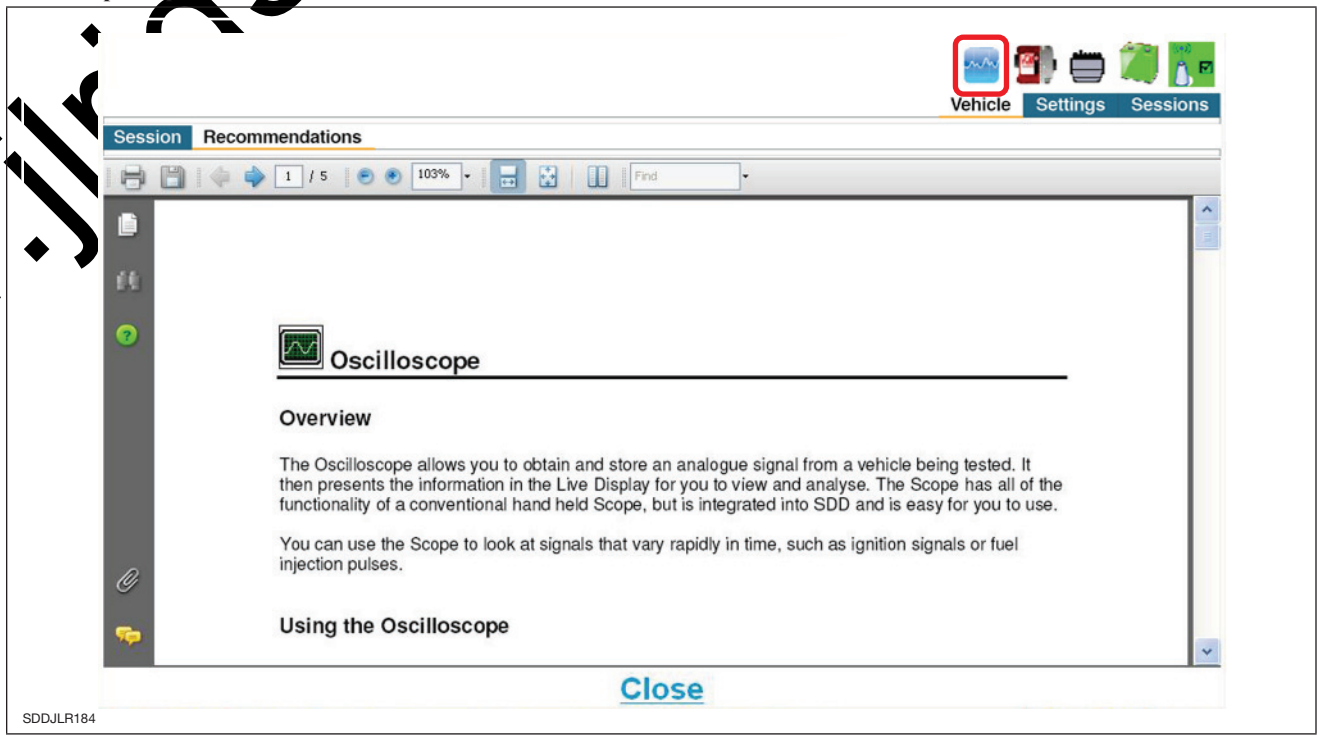


SDDJLR183

Help Screens

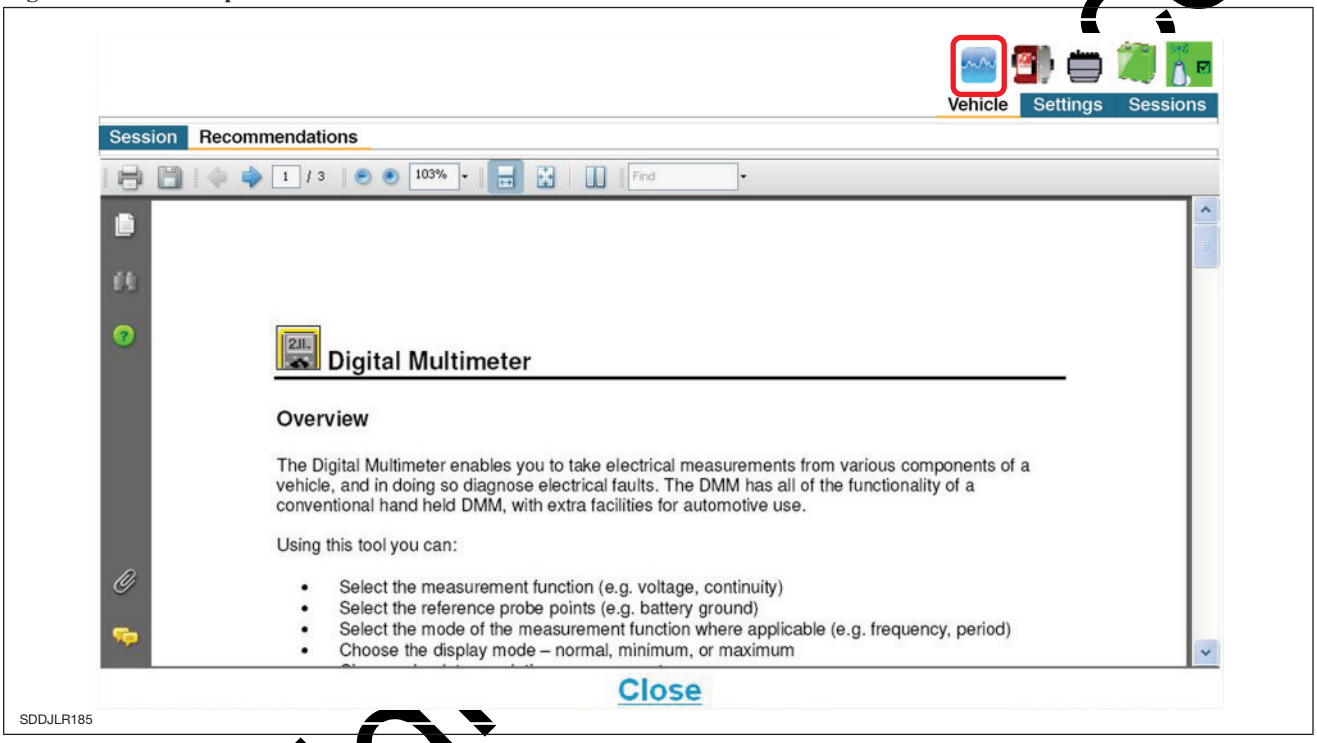
Selecting 'Read' for any of the Help options will display a Help screen for that tool.

Oscilloscope Help Screen



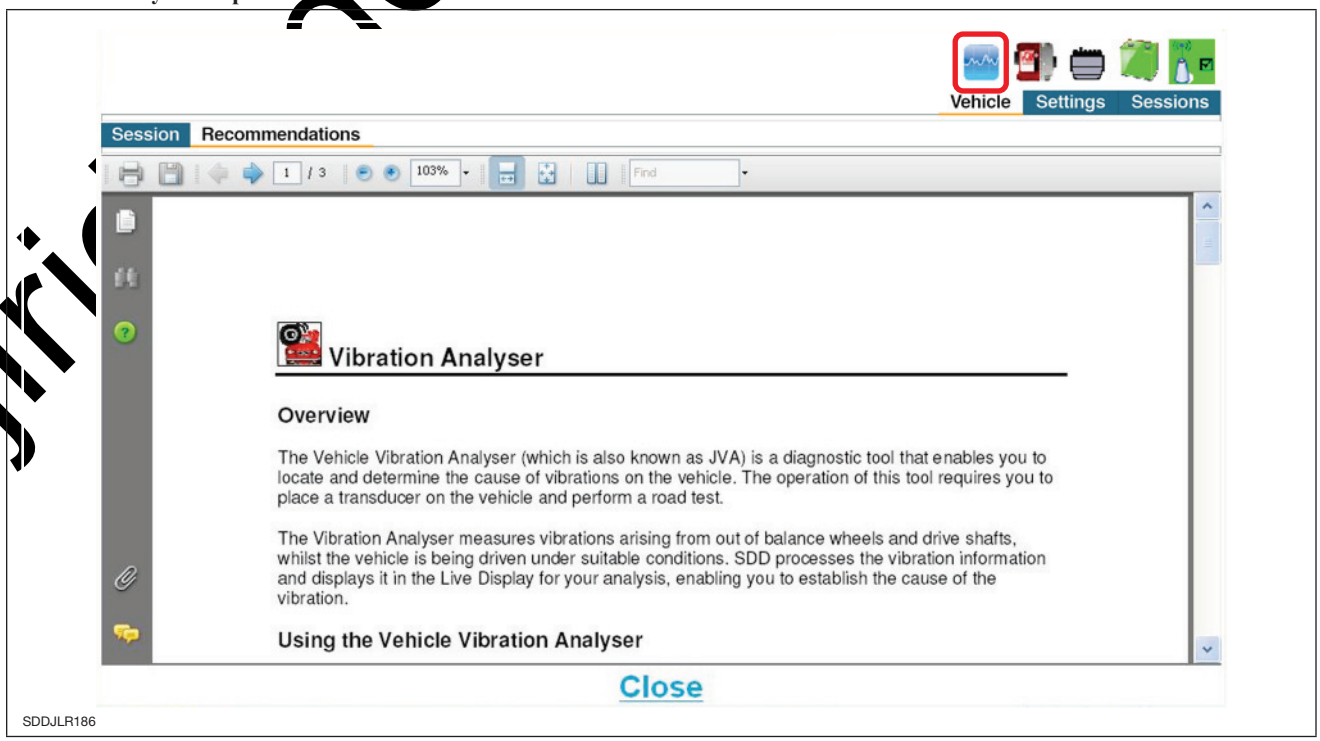
SDDJLR184

Digital Multimeter Help Screen



SDDJLR185

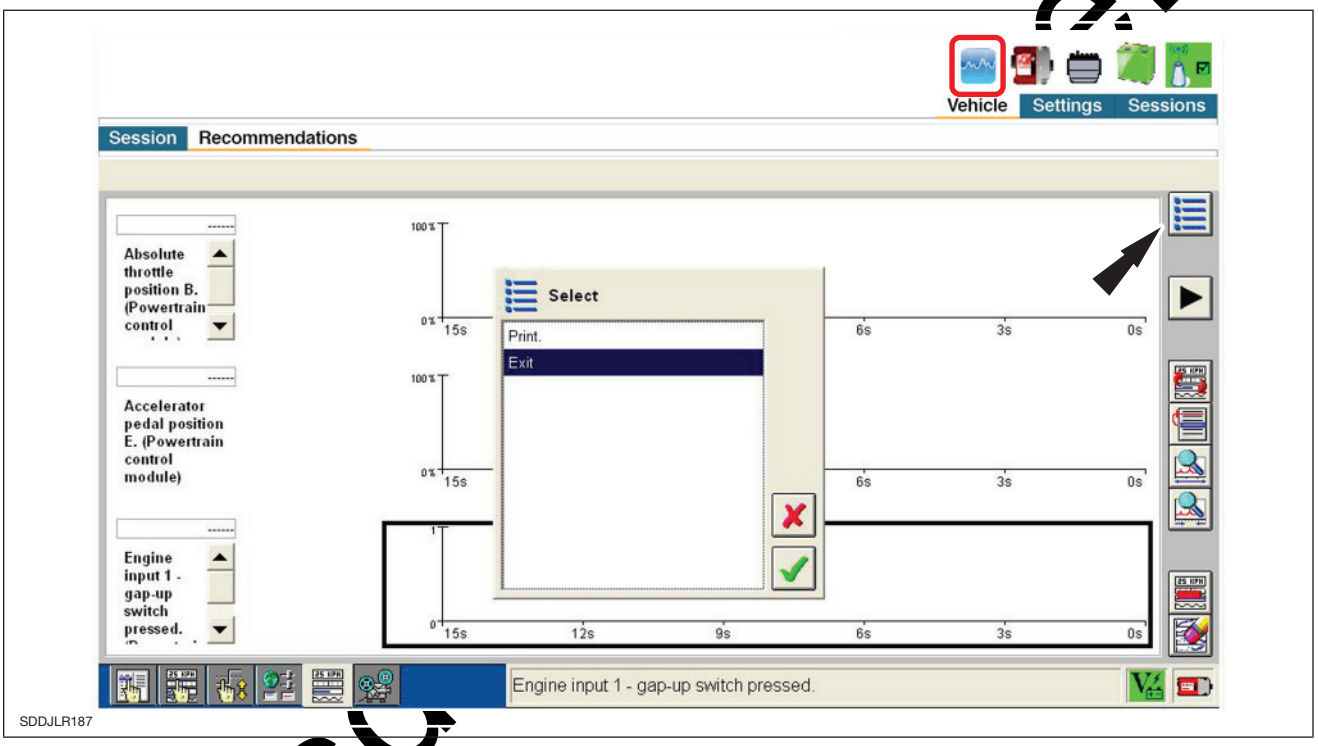
Vibration Analyzer Help Screen



SDDJLR186

Exiting Measurement Tools

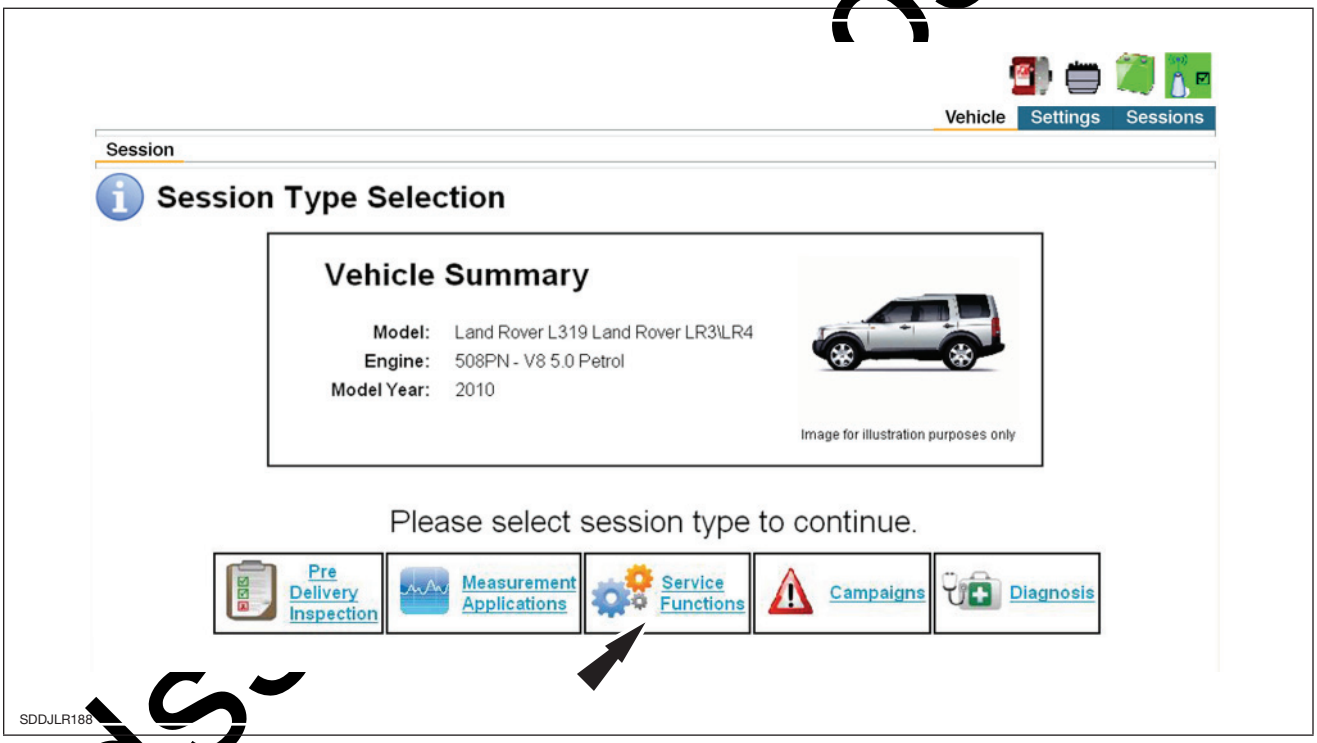
To exit the measurement tools, click on the System Options icon at the top of the Function Button bar, select 'Exit' from the pop-up window, and select the conformation 'tick'.



NOTE: Datalogger shown; others similar.

SERVICE FUNCTIONS SESSION TYPE

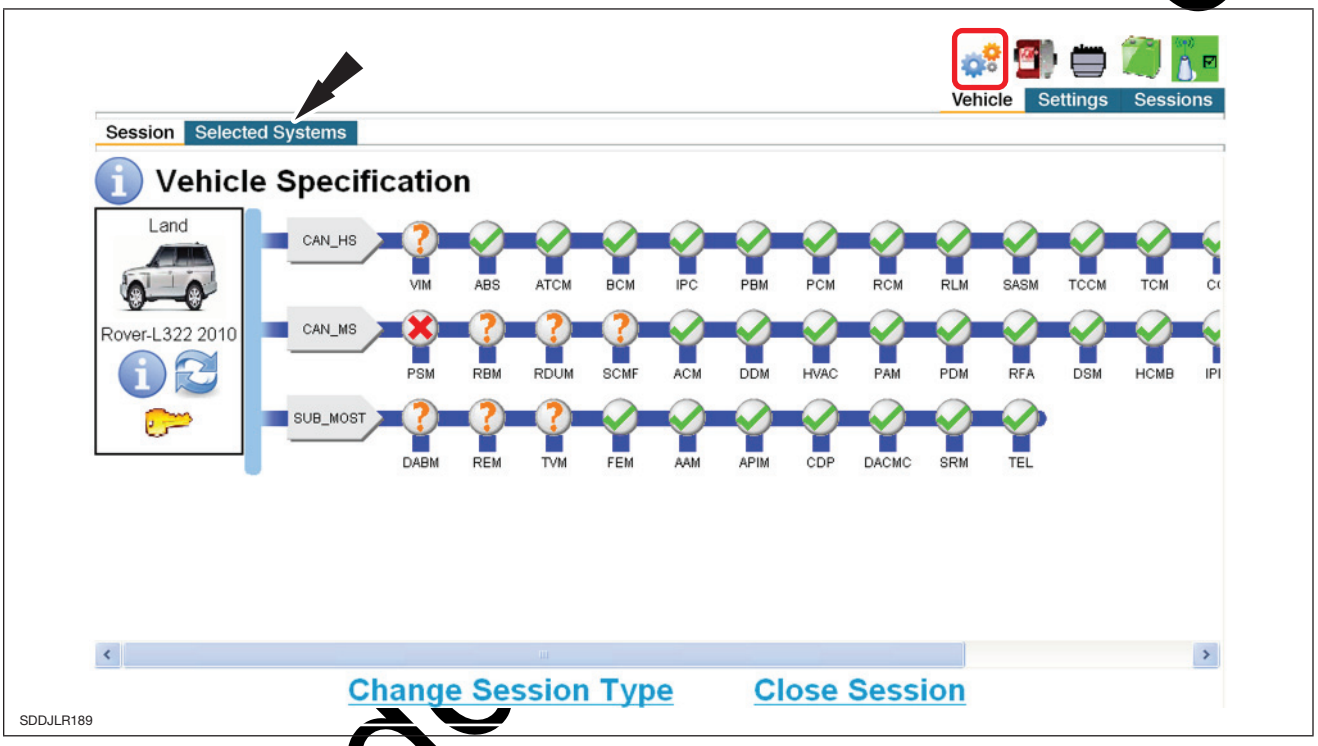
Select this Session Type to access the Service Functions for the selected vehicle. Click on the icon on the Session Type Selection screen to launch the Session.

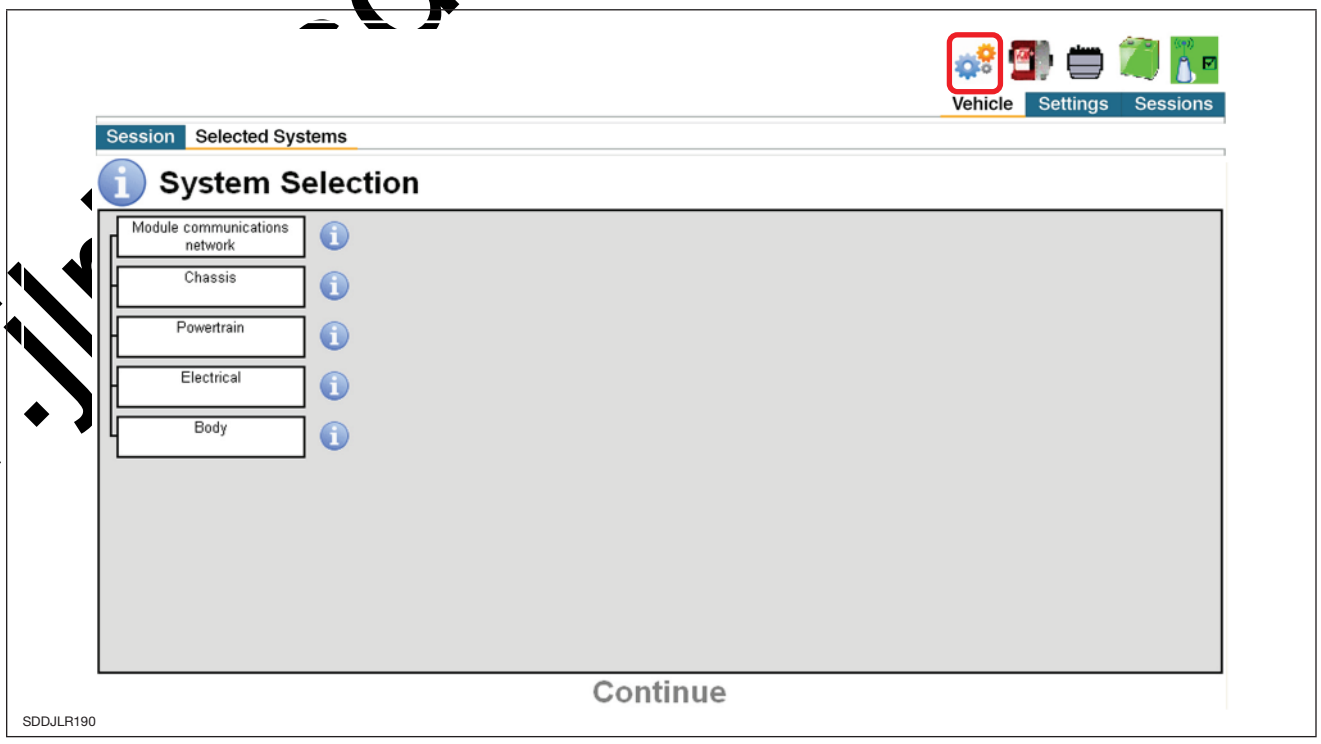


Service Functions include:

- Recalibrations
- Network Tests
- Set Ups
- Clear Adaptations
- Service Resets

Once the Data Collection process is complete and the Vehicle Specification screen is displayed, click on the 'Selected Systems' tab to display the System Selection screen.

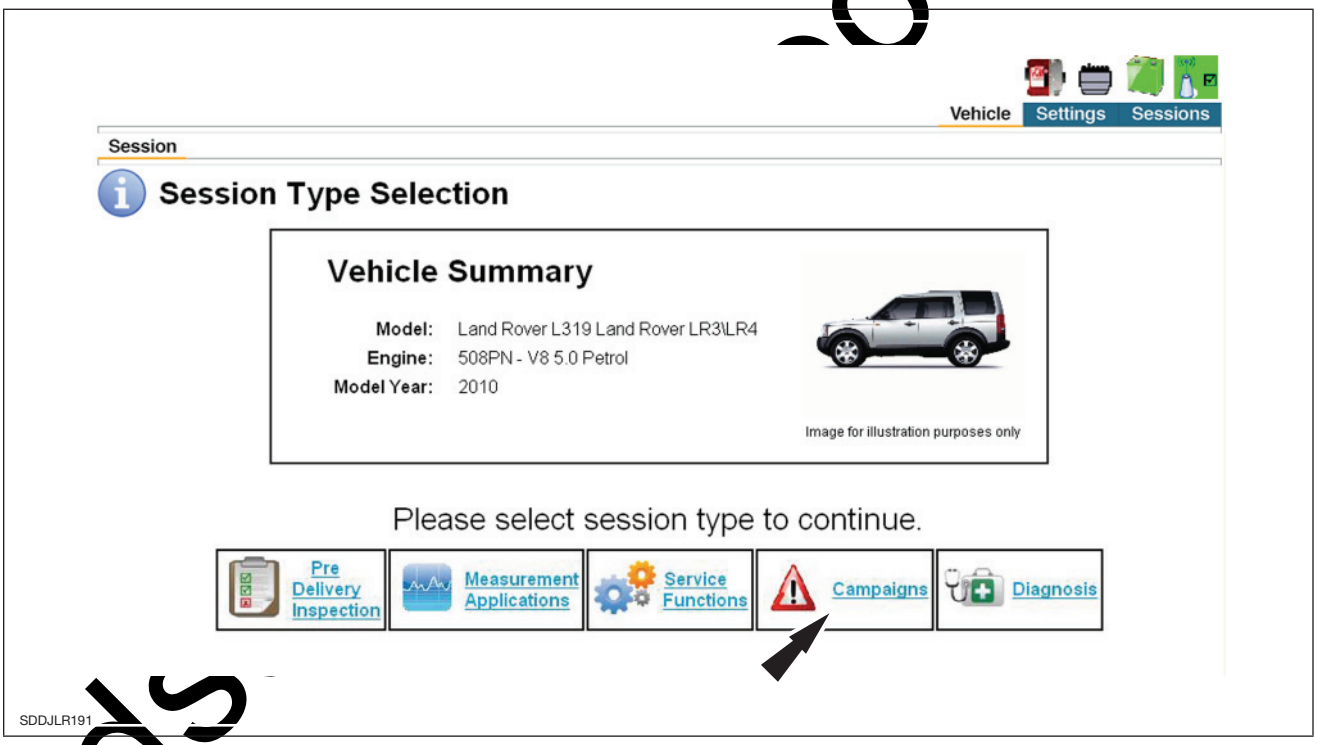




The map displayed in a Service Functions sessions offers a choice of systems, but no symptoms, since no diagnostics are performed in this Session Type.

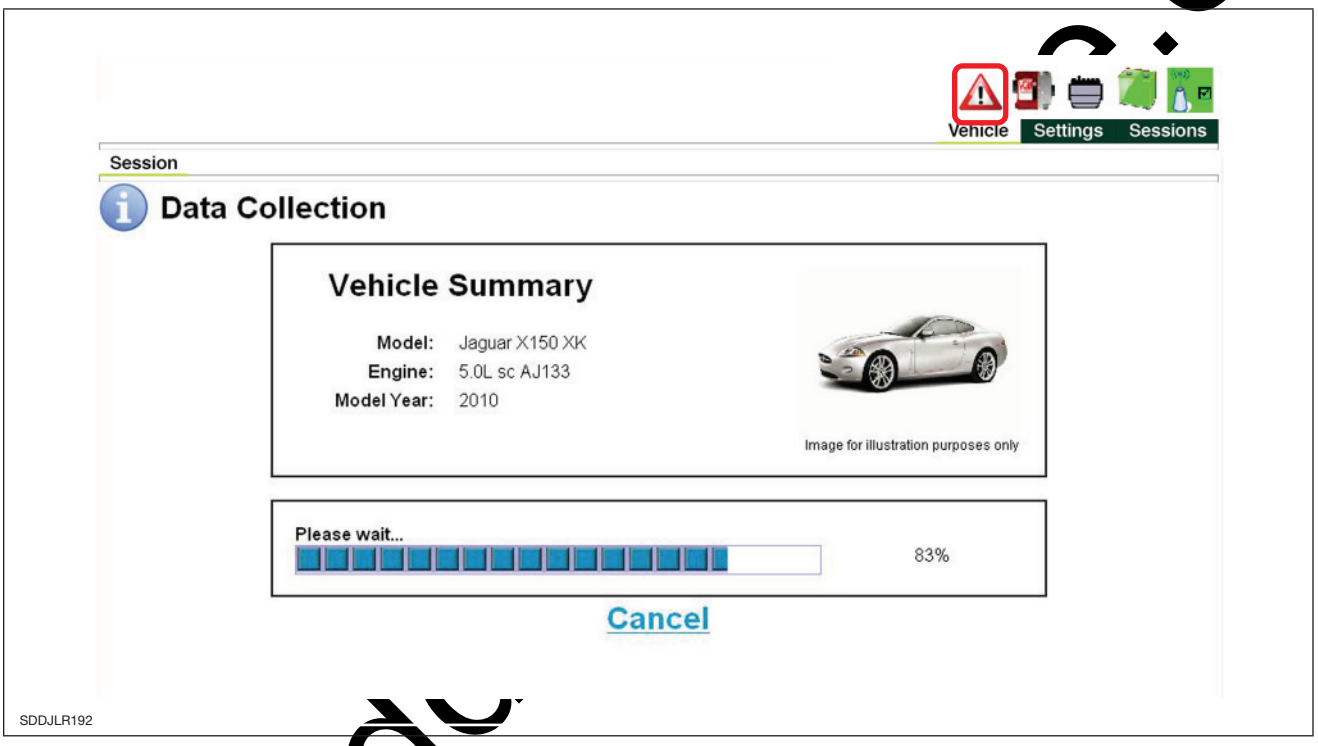
CAMPAIGNS SESSION TYPE

Select this Session Type to access all mandated Service Actions or Service Recalls associated with the selected vehicle. Only recommendations for the selected vehicle will be displayed. Click on the icon on the Session Type Selection screen to launch the Session.

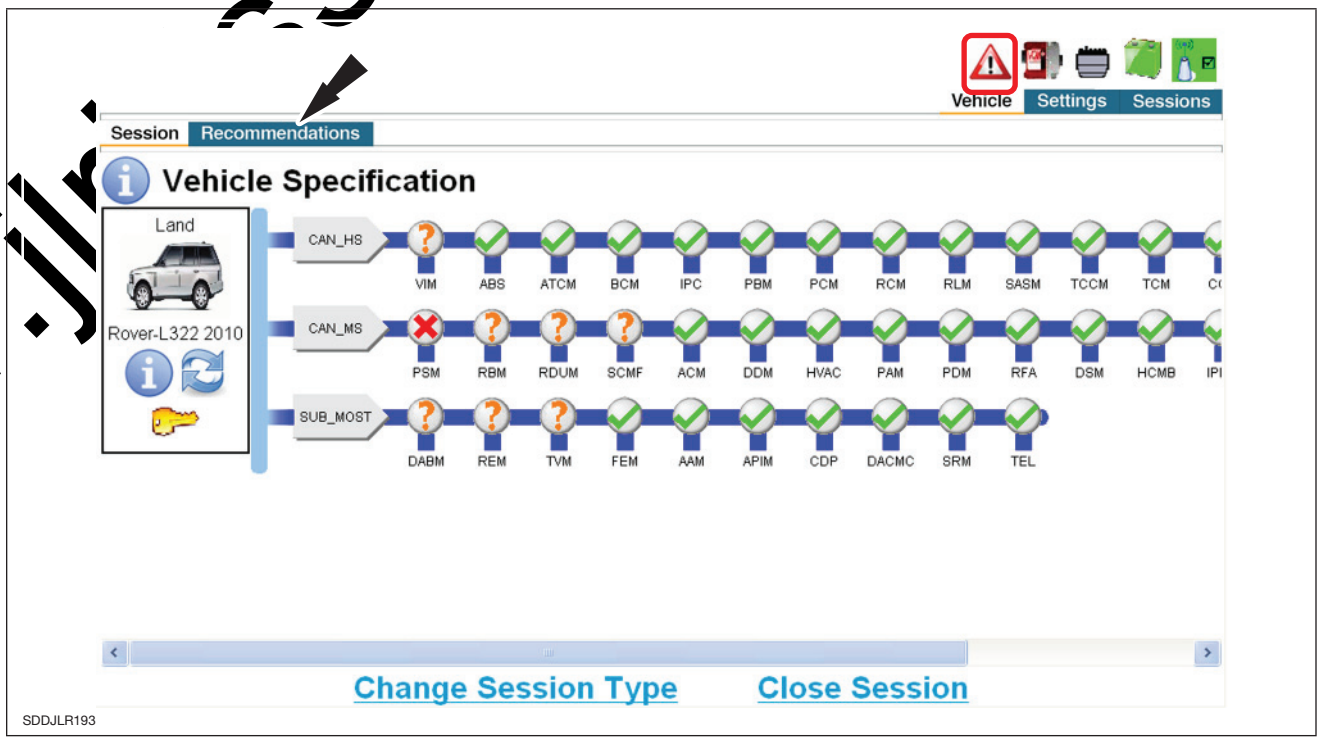


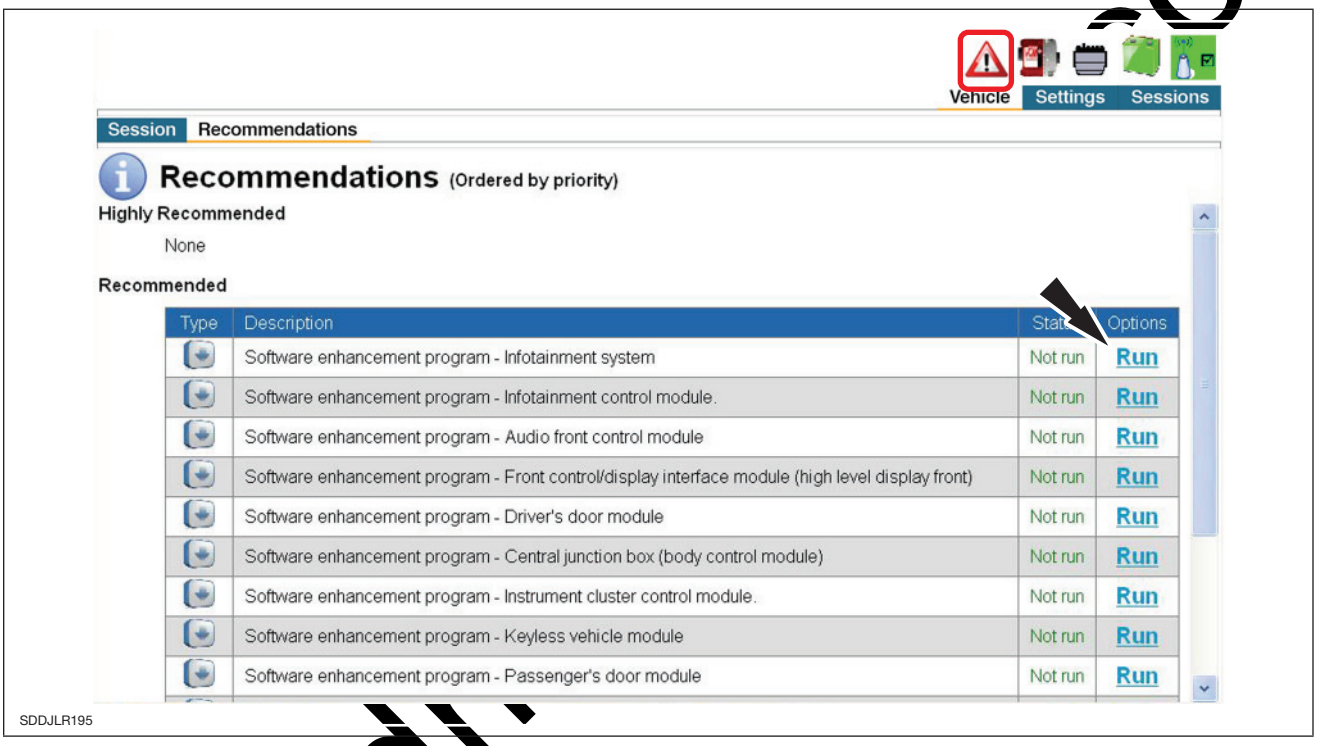
NOTE: It is possible that there will be no Campaigns currently required for the selected vehicle.

As the Campaigns session is launched, SDD will perform the Data Collection process and then display the Vehicle Specification screen.



Clicking on the 'Recommendations' tab will prompt SDD to load 'Recommended Candidates' related to the session type.





Campaign Recommendations may include:

- Recalls
- Recalibrations
- Software updates and enhancements

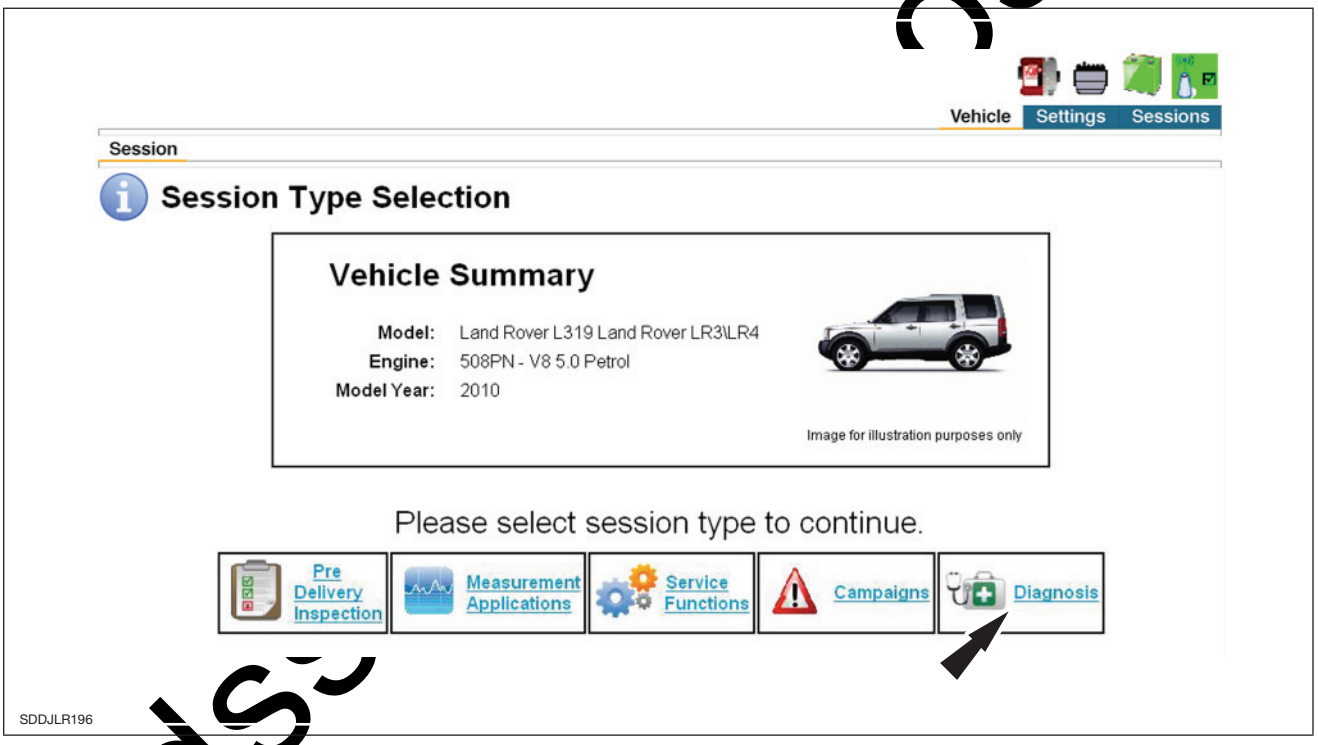
It is possible that there will be no Campaigns currently required for the selected vehicle.

To perform a recommended Campaign, click on 'Run' in the right-hand 'Options' column.

NOTE: Always check DDW to confirm which campaigns are open for a specific VIN. Do not perform a campaign if it is closed for that vehicle.

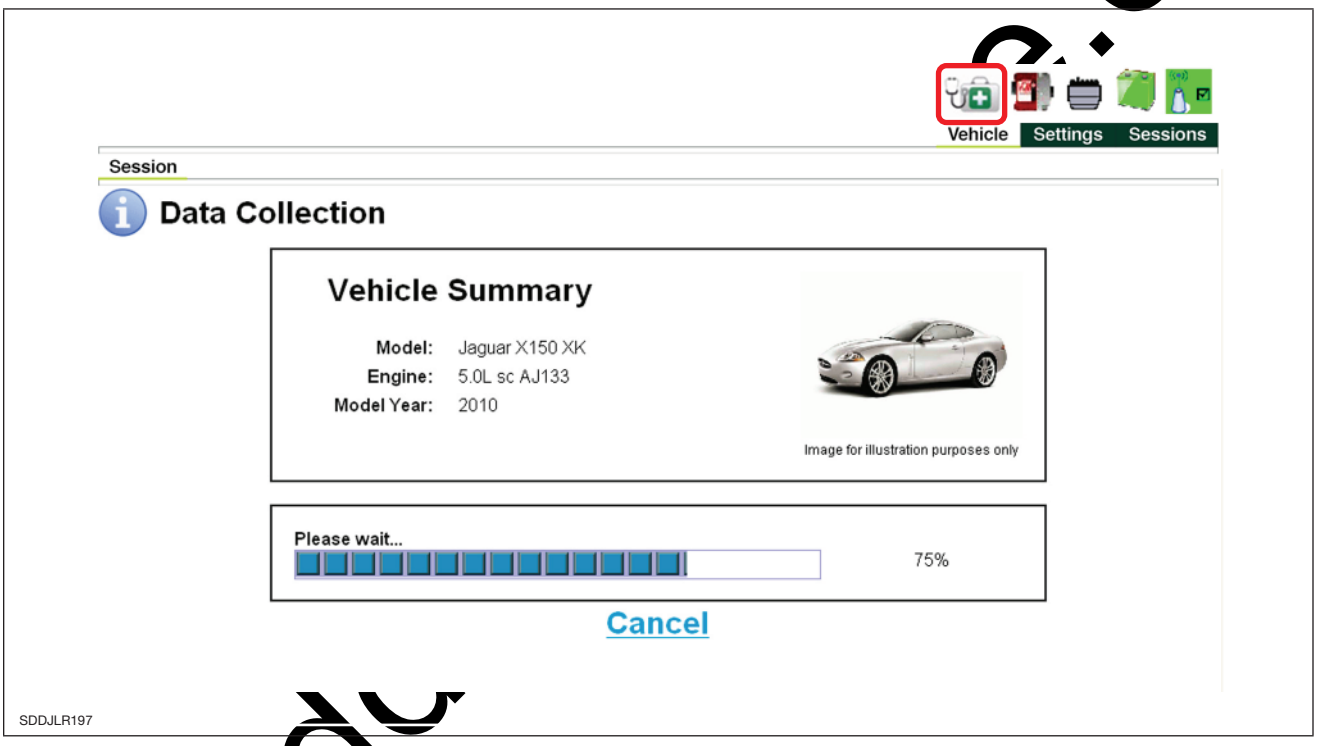
DIAGNOSIS SESSION TYPE

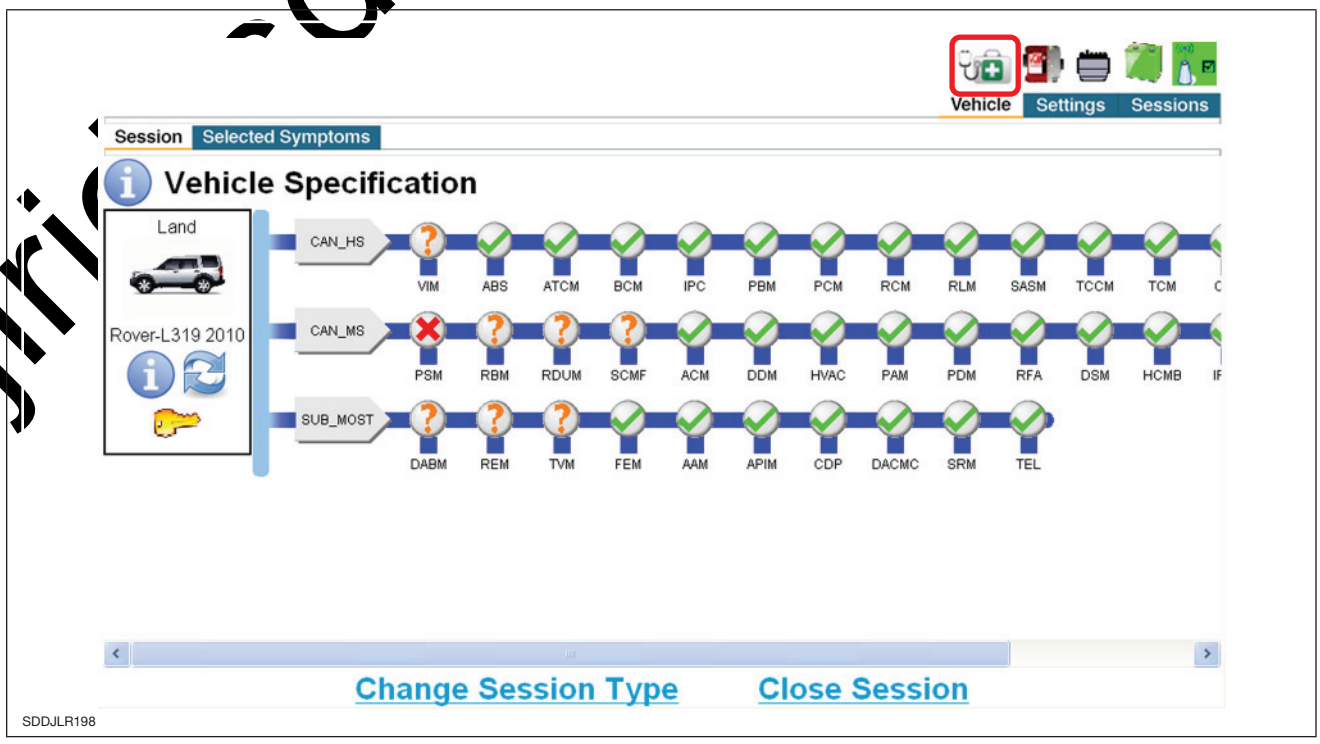
Select this Session Type to perform diagnostics on the selected vehicle. Click on the icon on the Session Type Selection screen to launch the Session.



⚠ **IMPORTANT NOTE:** Because SDD relies on logged DTCs in conjunction with vehicle symptoms to perform diagnostics, it is very important that you **DO NOT CLEAR DTCs** unless instructed to do so by SDD. Clearing DTCs will clear the vehicle fault history and erase important data required for correct diagnosis of a concern.

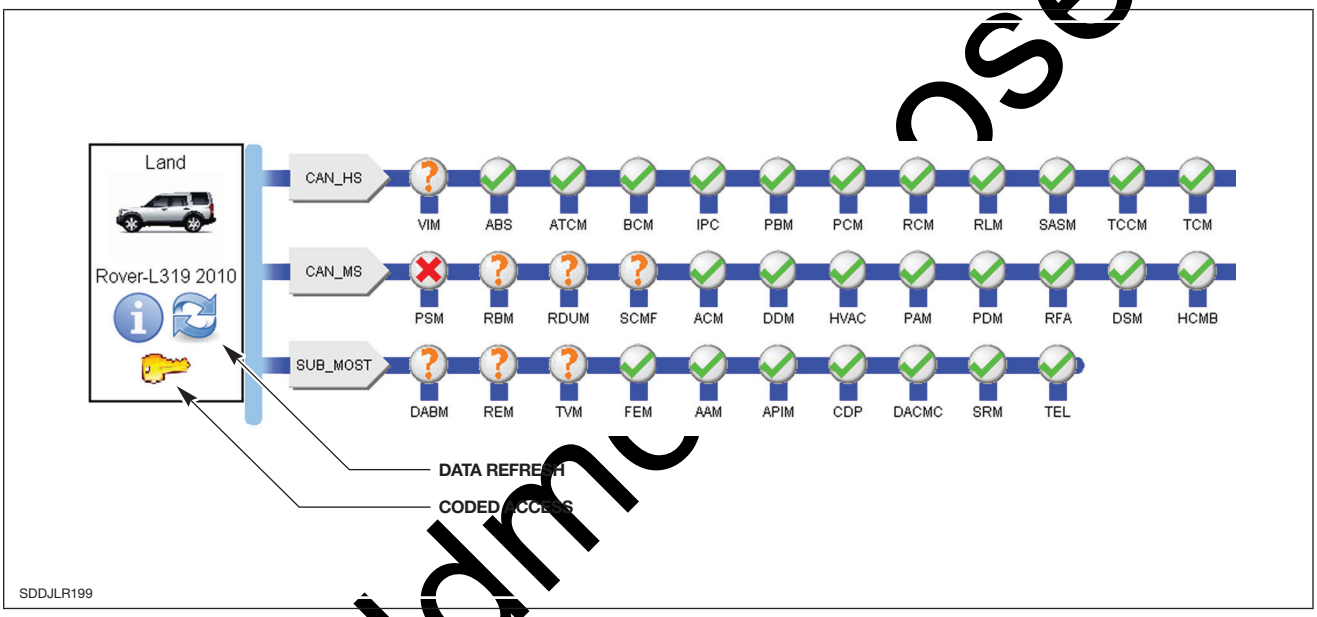
As the Diagnosis session is launched, SDD will perform the Data Collection process and then display the Vehicle Specification screen.





Network Summary

The Vehicle Specification screen includes the Network Summary, which shows the results of IDS's attempt to establish communication with each of the vehicle control modules. Possible communication faults can be identified from the Network Summary.



The graphic depicts each of the major networks and the modules associated with them. Within each network, the modules are grouped alphabetically by response status. The response status depends on whether the module is required or optional on the selected vehicle. Status is represented by one of the following icons:

- Red 'X' – indicates that a required module did not respond
- Amber '?' – indicates that an optional module did not respond, this may indicate a communication failure, or it may simply mean that, as an optional module, the module is not installed on the selected vehicle
- Green 'Tick' – indicates that the module is installed on the vehicle and has responded to SDD

If installed modules have failed to respond, attempt to establish communication by cycling the ignition, disconnecting and reconnecting IDS cables, then clicking the 'Refresh' icon.

NOTE: The Network Summary does not represent actual vehicle network architecture and does not offer a direct evaluation of vehicle network failures.

The summary is an indication of communication between IDS and the control modules. Once communication is established with all functioning modules, the user may proceed with the session.

Network Summary Communication Failures

If the Network Summary indicates communications failures, the user must investigate the causes before performing diagnostic work using SDD, and in particular before clearing any DTCs. It is important that users understand the potential problems that can be created when IDS fails to capture all possible DTC information at the start of a diagnostic session.

In most cases, if the IDS equipment is properly maintained, and the vehicle's DLC is not damaged, a negative result seen in the Network Summary will simply indicate a problem within the vehicle network or specific control module.

However, IF the communication failures seen in the Network Summary are actually the result of a problem with the IDS equipment or vehicle DLC, valuable DTC information from those control modules will not be available. This can compromise the ability of SDD to offer or effectively prioritize recommended tools.

If a session is started under such conditions, and a successful DTC clear procedure is performed before all available DTC data was captured from the vehicle, diagnostic data can be lost with no ability to recover it.

If symptoms of a customer concern are intermittent, and the stored DTC information is inadvertently cleared, the effectiveness of SDD will be greatly reduced, and FRFT will be difficult to achieve.

⚠ **IMPORTANT NOTE:** Because SDD relies on logged DTCs in conjunction with vehicle symptoms to perform diagnostics, it is very important that you **DO NOT CLEAR DTCs** unless instructed to do so by SDD.

Best Practices

When the Network Summary indicates communication problems for one or more control modules, first perform some basic visual checks of the IDS hardware and vehicle DLC. It may be effective to cycle the ignition as well.

Reconnect the cables, and then click the 'Refresh' icon on the Network Summary screen

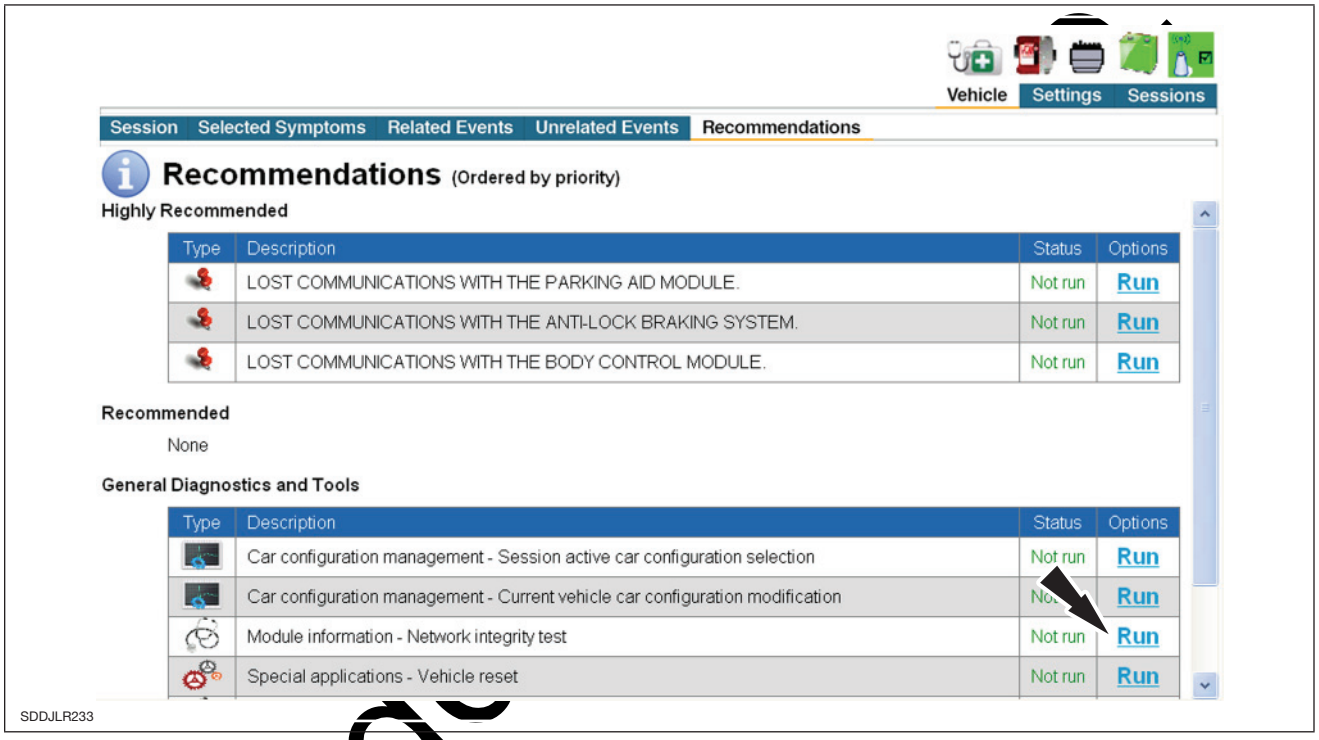
If the Network Summary now indicates complete success, it will be 'safe' to proceed with whatever diagnostic/service work is required for this session, as all the vehicle DTC information will have been collected and saved for use.

If the Network Summary still indicates negative results, consider which modules are being reported as 'off line', and compare that to the vehicle behavior.

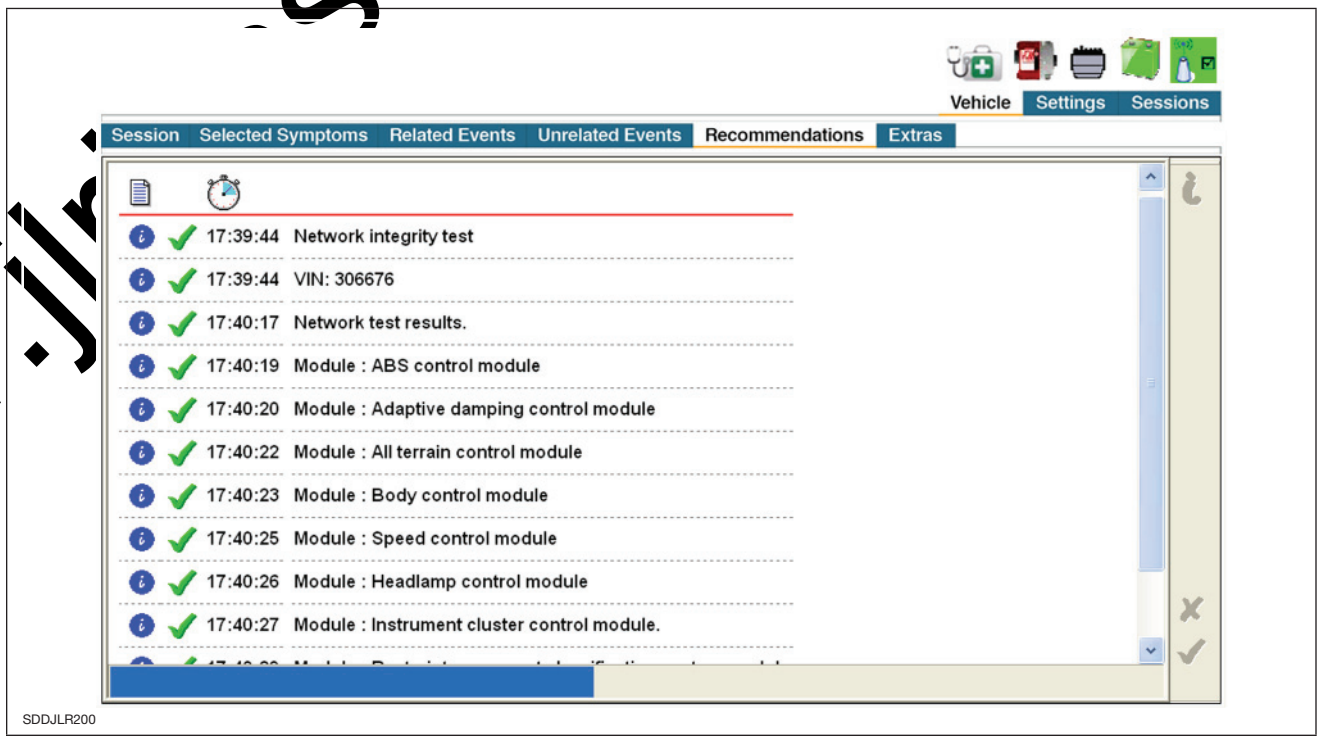
For example, if the ABS module displays a red 'X' on the Network Summary, and the ABS module itself is not communicating on the vehicle networks, there should be numerous warning lamps and error messages displayed on the vehicle's instrument panel.

Network Integrity Test

The option to run a Network Integrity Test is found in the Recommendations under 'General Diagnostics and Tools'.



The results from the Network Test are displayed in a similar format to IDS 'classic'.

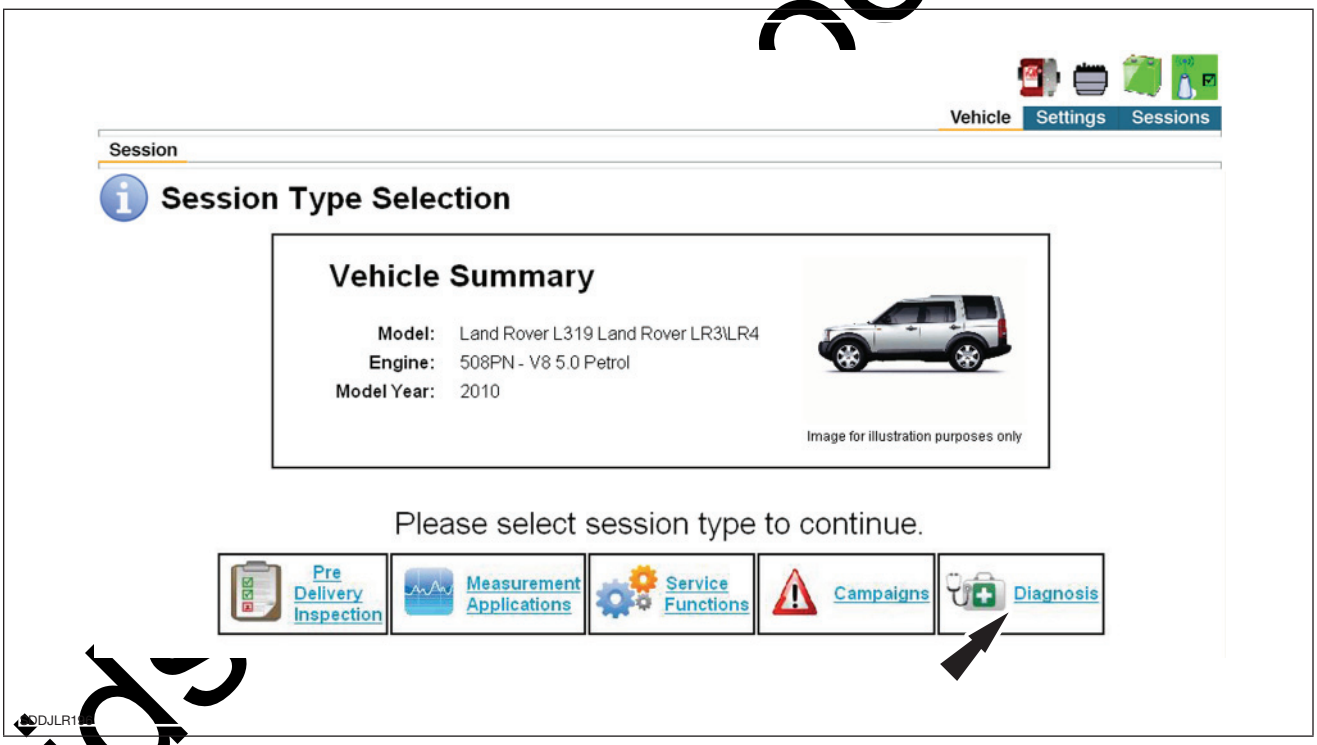


SAMPLE DIAGNOSTIC ROUTINE

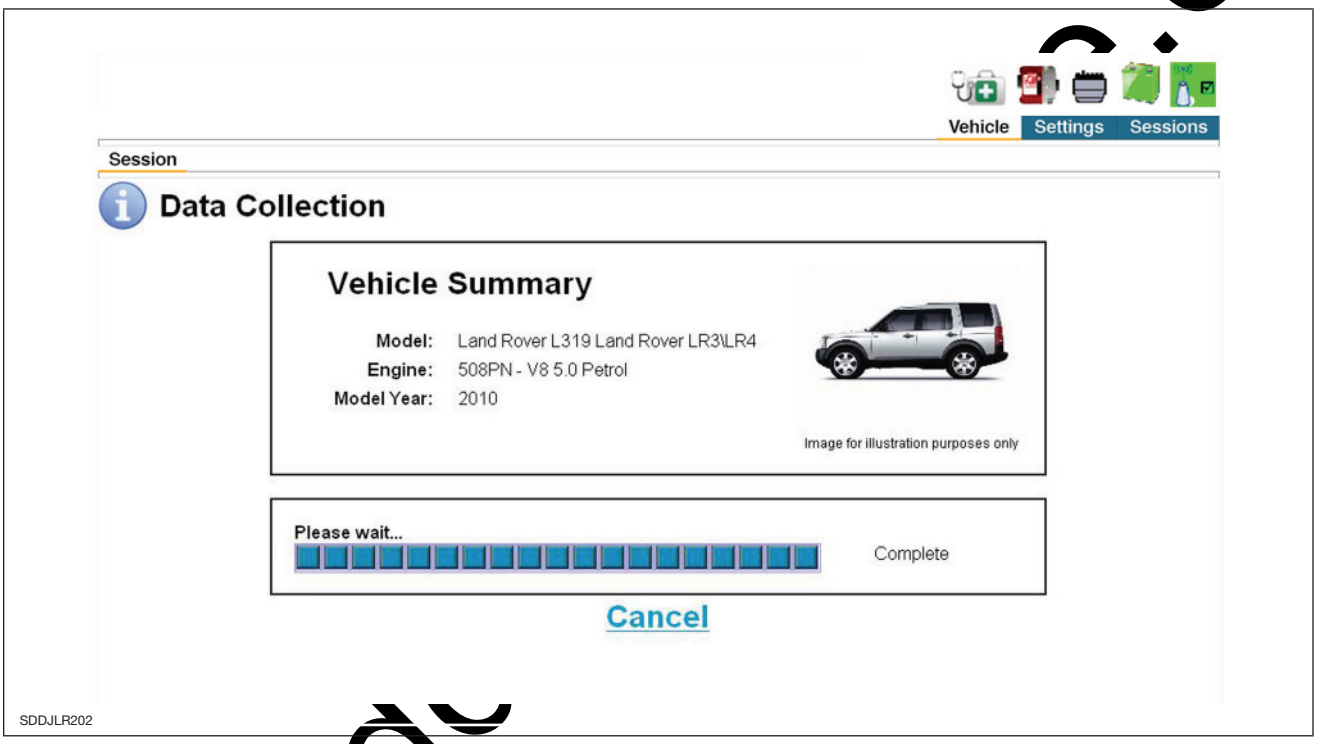
ABS Warning Light Illuminated

⚠ **IMPORTANT NOTE:** Because SDD relies on logged DTCs in conjunction with vehicle symptoms to perform diagnostics, it is very important that you **DO NOT CLEAR DTCs** unless instructed to do so by SDD. Clearing DTCs will clear the vehicle fault history and erase important data required for correct diagnosis of a concern.

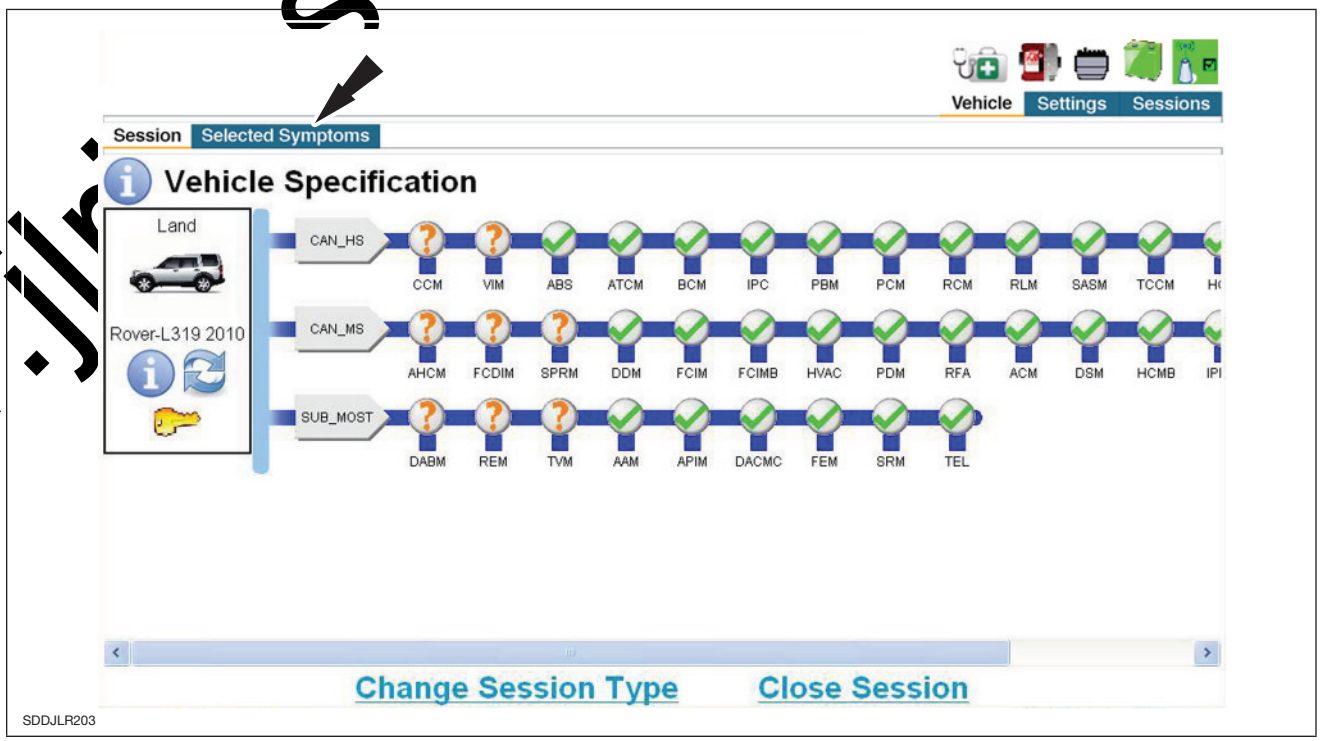
Click on 'Diagnosis' on the Session Type Selection screen to launch the Session.



As the Diagnosis session is launched, SDD will perform the Data Collection process and then display the Vehicle Specification screen.

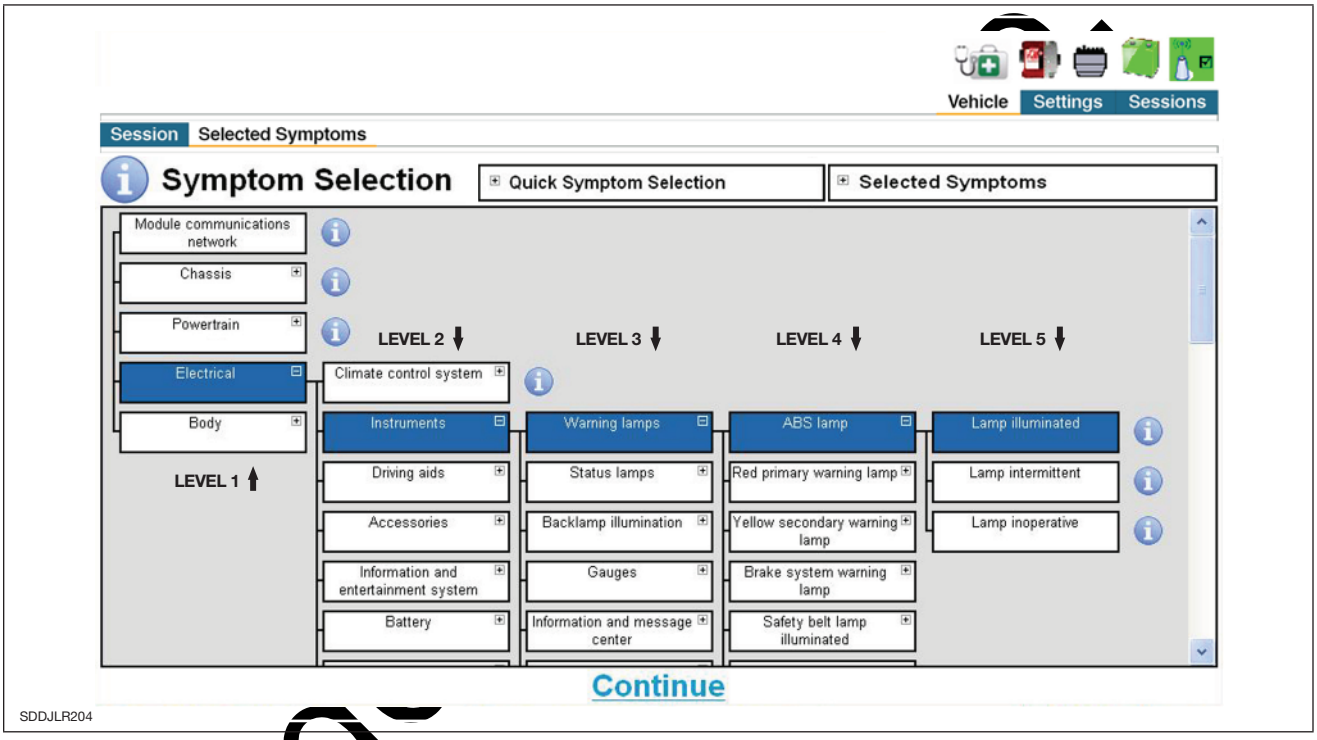


Click on the 'Selected Symptoms' tab to access the Symptom Selection screen.



Symptom Selection

This screen displays the currently released Symptom Maps for the selected vehicle.

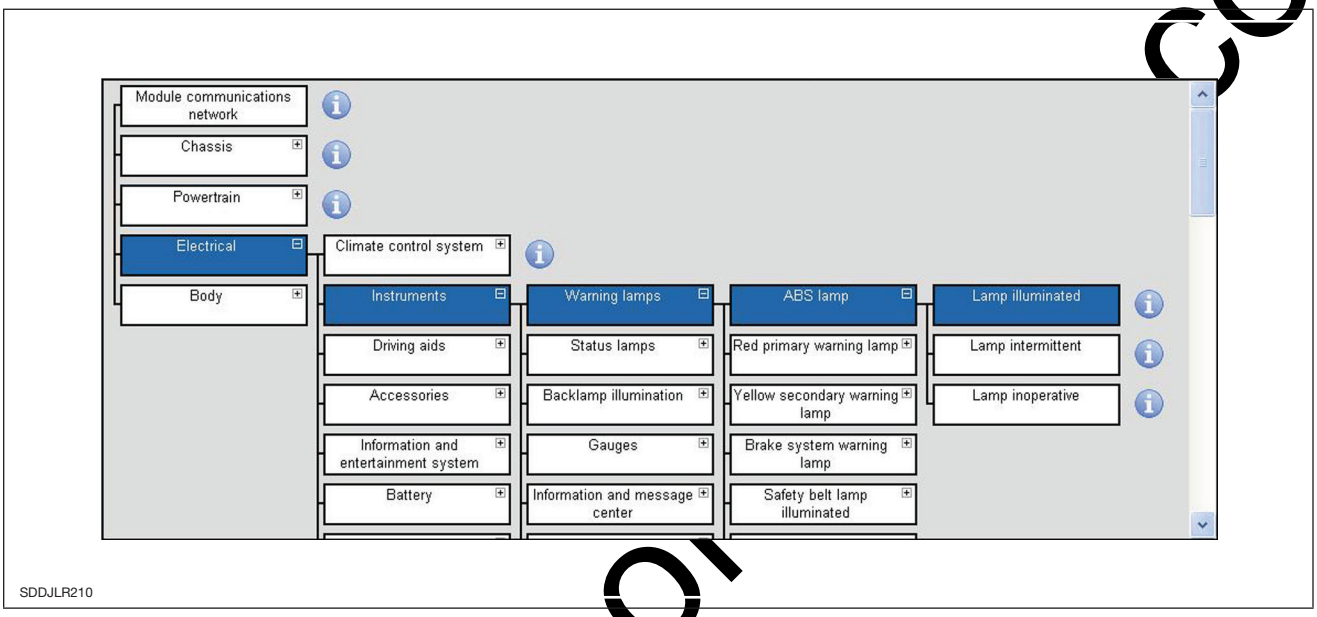


NOTE: The user must make selections down to at least Level 3 before being able to continue with diagnosis. Additional levels may be available, to allow the operator to further isolate the area of concern. It is advisable the operator isolates a symptom as far as possible, as the remedial recommendations will be more specific.

The first three Levels identify the Systems/Areas of the vehicle. A route should be selected through these first three Levels, according to the information that is available and relevant to the concern under investigational. If only limited information or no specific symptom is available, then diagnostics should be started at this point.

Levels 4 and 5 identify specific symptoms for the selected Systems/Areas of the vehicle. These should be used only when relevant to the identified concern, to allow the SDD to determine the most appropriate diagnostic strategy and offer the most appropriate remedial actions.

This screen also contains 'Quick Symptom Selection' and 'Selected Symptoms' drop-down menus.



In the example shown:

If the information available to the operator is that various warning lamps have been illuminated on the Instrument Cluster, the appropriate selection will be:

ELECTRICAL > INSTRUMENTS > WARNING LAMPS.

If diagnostics are then started from this point, data will be displayed for all warning lamps.

If the information available to the operator is more specific and identifies that only the ABS warning lamp is illuminated, the appropriate selection will be:

ELECTRICAL > INSTRUMENTS > WARNING LAMPS > ABS LAMP > ABS LAMP ILLUMINATED.

When diagnostics are started from this point, data will be displayed for the ABS warning lamp only.

When navigating through the Symptom Maps, a single click will select the required option and display any further options available; a double click will deselect and close the further options.

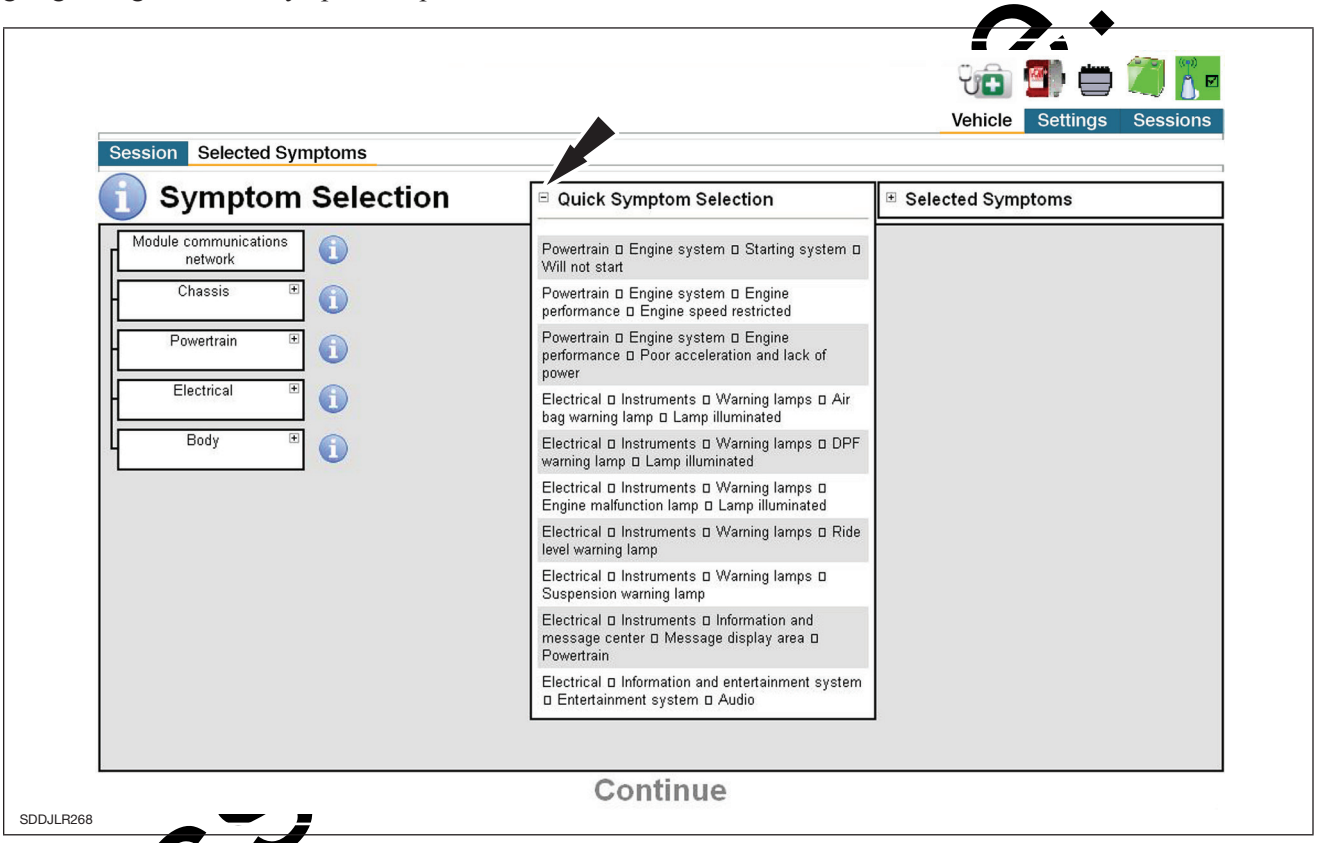
Multiple Symptoms can be selected for one session, and therefore SDD will carry out data analysis based on all symptoms selected.

Once all relevant symptoms have been selected, click 'Continue' to display the Related Events screen.

NOTE: This example is used to illustrate the fact that, if the MIL is illuminated, the user must list this as a symptom. Failure to select symptoms accurately will reduce the effectiveness of SDD.

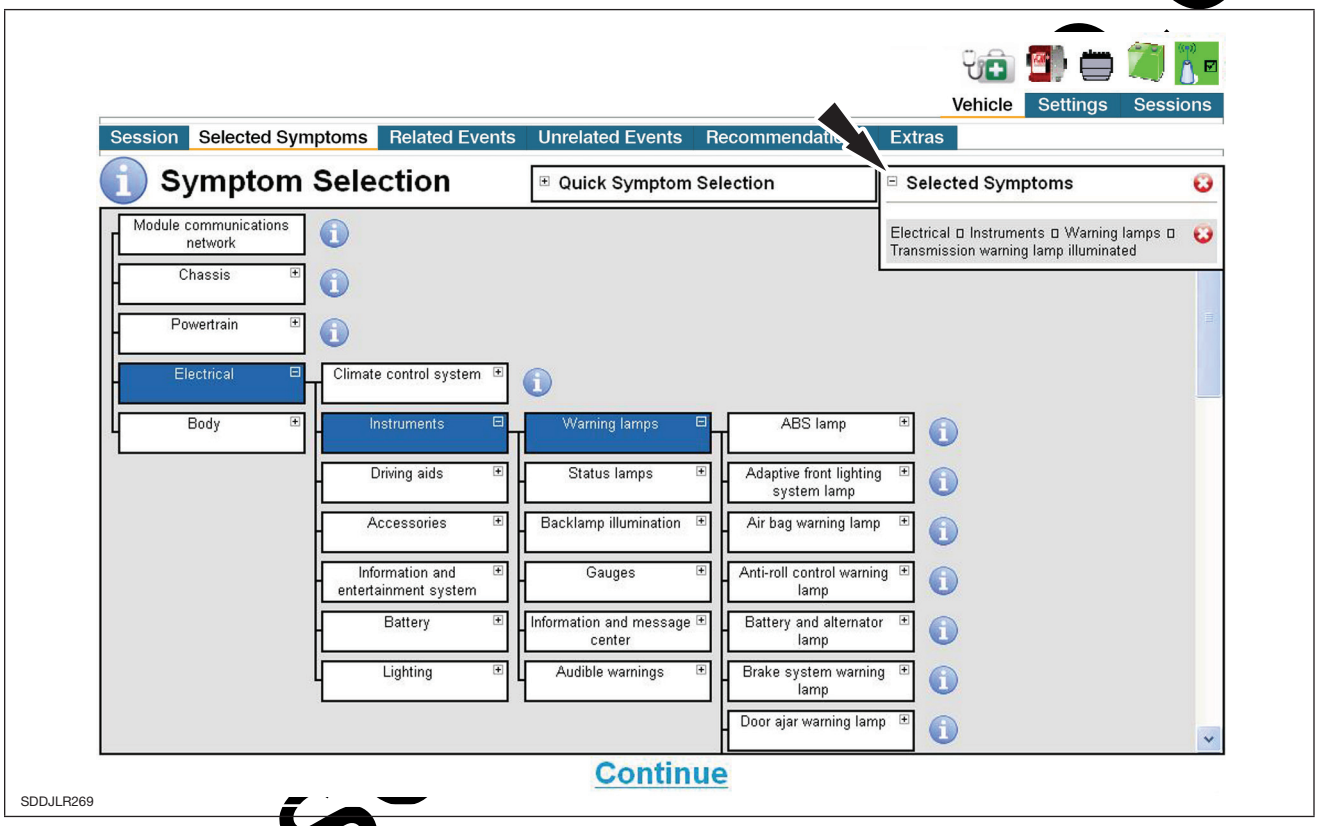
Quick Symptom Selection

The 'Quick Symptom Selection' drop-down menu provides an alternate way to select a specific symptom without going through the entire symptom map.



Selected Symptoms

The 'Selected Symptoms' drop-down menu displays the symptoms that have been selected as described previously.



Improving SDD Effectiveness when Selecting Vehicle Symptoms

SDD is designed to link DTCs and provide recommendations based on *Customer Facing* and/or the *most significant* symptoms. Do not try to short-cut or refine the customer's reported symptoms based on expected failures. If the primary or most obvious Customer Facing symptom is an MIL or message center warning, those symptoms MUST be included in your symptom selection inputs using SDD.

While it might seem logical when selecting 'Air Suspension is inoperative' that there is really no need to select the symptom 'Message center warning', it is important to do so. Otherwise SDD may exclude DTCs or recommendations that relate to failures known to trigger a warning message or MIL.

Be sure to select any additional symptoms observed during a road test in addition to the most obvious symptoms and customer reported info.

Altering the selected symptoms adjusts the filtering of the DTCs. Selecting fewer symptoms makes the filter 'coarser' while selecting more symptoms makes the filter 'finer'.

- If very few or no DTCs and recommendations are listed, try restricting your symptom selections to Level 3 in the symptom tree.
- If too many DTCs or recommendations are listed, try selecting symptoms to Level 4 or 5, using care not to select an inaccurate symptom.
- To be sure that you are only working with your intended symptom list: open the 'Selected Symptoms' drop down box at the upper right portion of the Symptom Selection tab to review all currently selected symptoms.

Avoiding Common SDD Symptom Selection Errors

Powertrain > Engine system > Starting system > Start-stop system:
Note that the Start-Stop System is a fuel conserving technology used on diesel vehicles sold in other markets. This is not associated with the 'Start Button' used to actuate the ignition on Smart Key equipped vehicles.

Warning Lamps, Status Lamps, and Message Center
Use care when entering symptoms related to customer complaints of MIL lights and warnings. When a light and a message are reported or observed, both of these symptoms must be included.

When viewing the symptom categories within the Electrical > Instrument Cluster section, there are 3 classes of 'driver information' symptoms:

- Warning Lamps (red)
- Warning Messages (in Message Center)
- Status Lamps (yellow)

While it is easy to distinguish between a Warning Message and a Warning Lamp that is currently active, if the problem is intermittent, the service writer must determine through careful questioning of the customer if a warning lamp, warning message, or both were displayed.

Also, not every MIL is considered a Warning Lamp since some indicators on the instrument cluster are used to indicate the status of a system. Examples of Status Lamps include the Passenger Seat Occupancy Status Lamp and the TPMS Status Lamp.

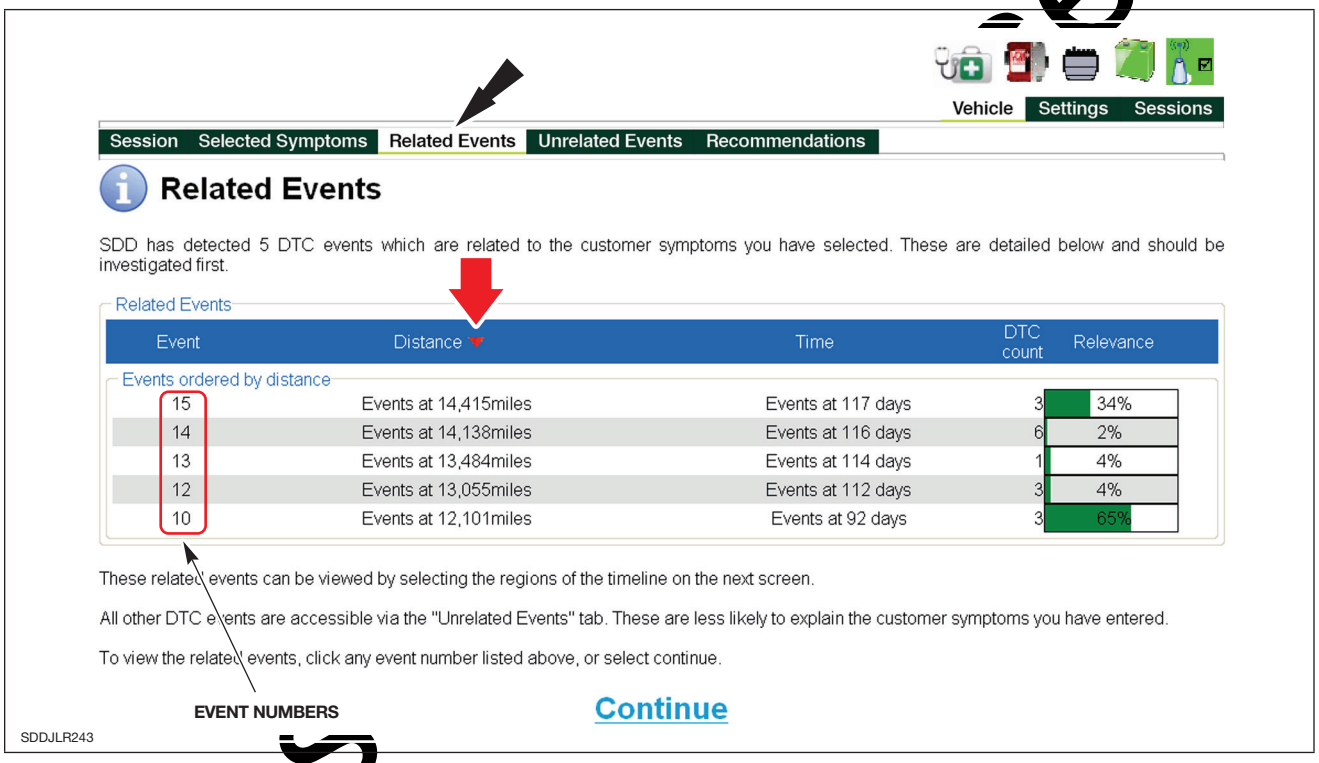
Using the Passenger Seat Occupancy Status Lamp as an example: this light is only used to indicate the status of the passenger seat. When lit, it simply indicates that the SRS system has determined that based on the current inputs, the passenger restraints will not be deployed. It does not mean the system has detected a failure that requires a driver warning. For this reason, the lamp is classified as a Status Lamp.

Similarly, the amber TPMS indicator is used to inform the driver that the tire pressure requires attention. While this light may remain lit when a system malfunction exists, it is considered a Status Lamp since its primary function is to inform the driver of the tire pressure status.

Recommendation:
When selecting SDD symptoms for lamps that are primarily considered a Status Lamp, but are also known to have a secondary function as a Warning Lamp, be sure to select the symptoms under both categories in the symptom selection map.

Related Events

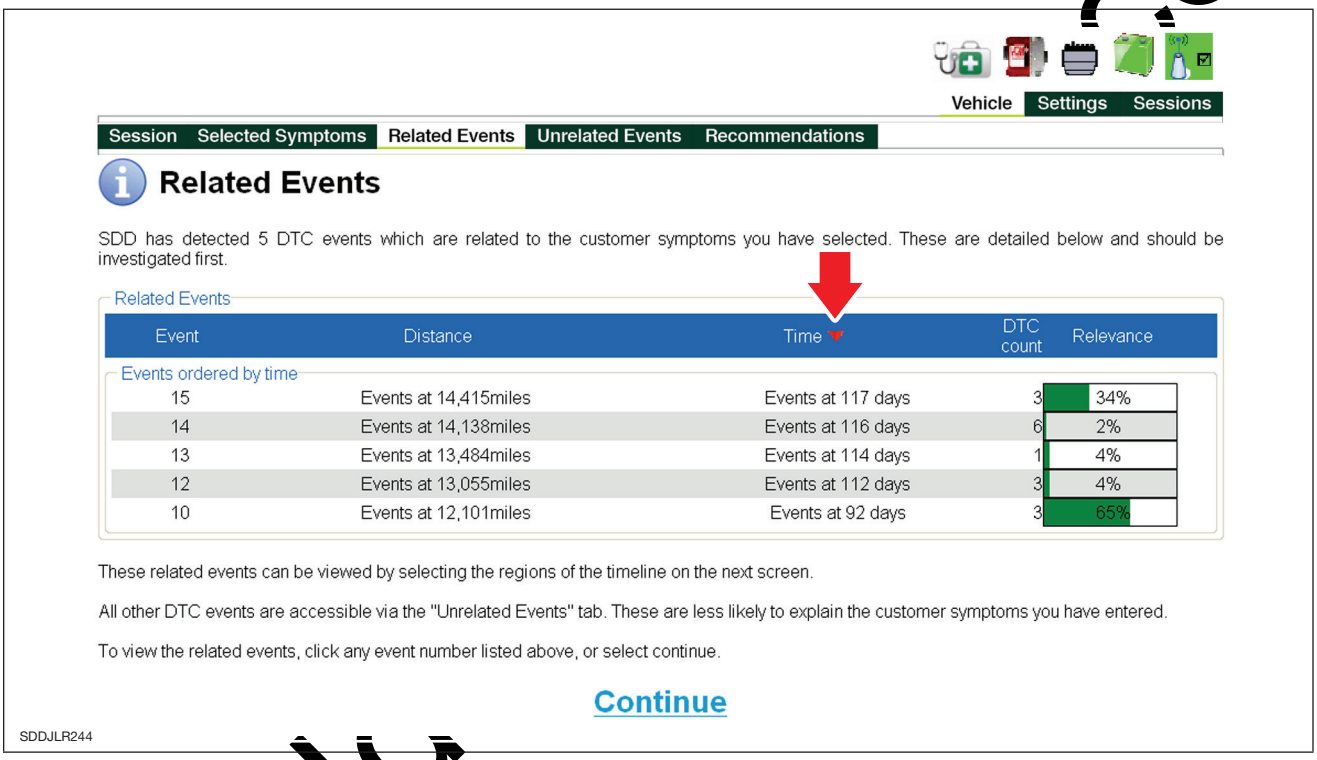
Clicking on the 'Related Events' tab will launch the Summary Event View, which displays all the events relevant to the symptoms the user has entered. The default screen is sorted by distance, but results can be sorted by any of the parameters by clicking on the column heading. A small red triangle indicates which parameter the results are sorted by.



Clicking on an event number will load the Related Events Timeline view.

NOTE: DTC count refers to the number of DTC events at that mileage event.

Results Sorted by Time



The time value in days is intended to be the life of the vehicle (although it tends to get reset unintentionally on some vehicles such as the LM Range Rovers).

The benefit of the time value is in comparing DTCs that were set at the same mileage, but on different days. Consider the following example:

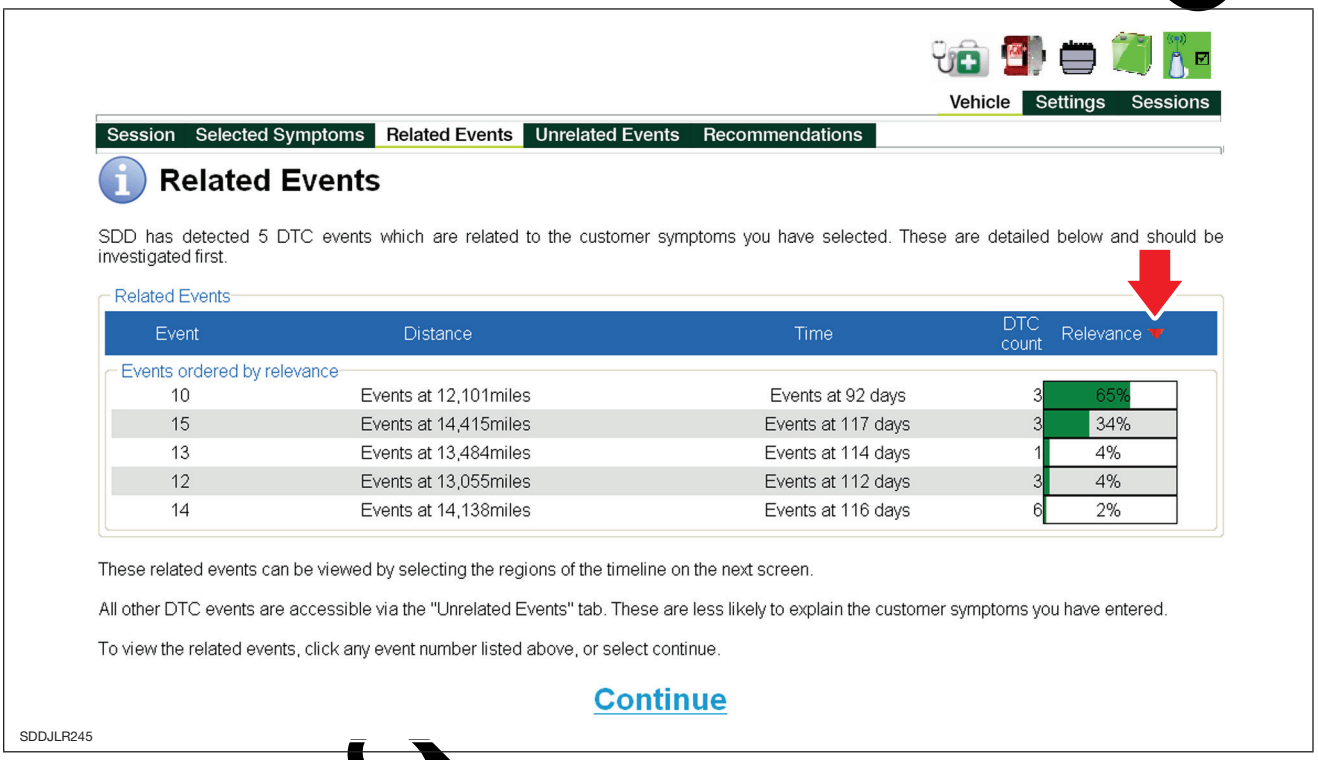
The vehicle breaks down on the road, sets DTCs, gets towed in on a Friday evening, and sits over the weekend. The technician gets to the vehicle on the following Tuesday, finding that the battery was discharged because flashers were left on.

The technician finds that numerous DTCs have been set, but 2 are from Friday (Day 10), the rest are from 4 days later on Tuesday (Day 14) and have probably been cause by the dead battery.

To find out what is actually wrong with the vehicle, the technician would focus on the 2 DTCs from Day 10.

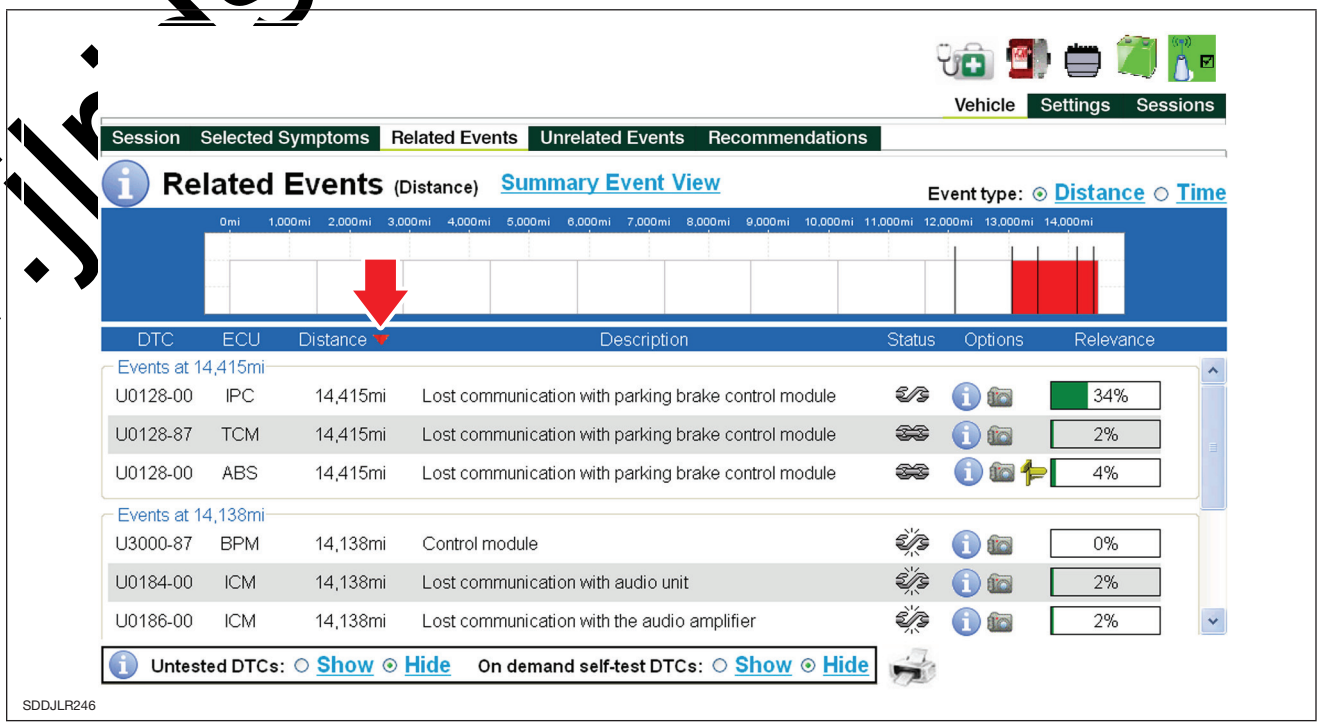
Results Sorted by Relevance

This view sorts results by their relevance to the symptoms entered.

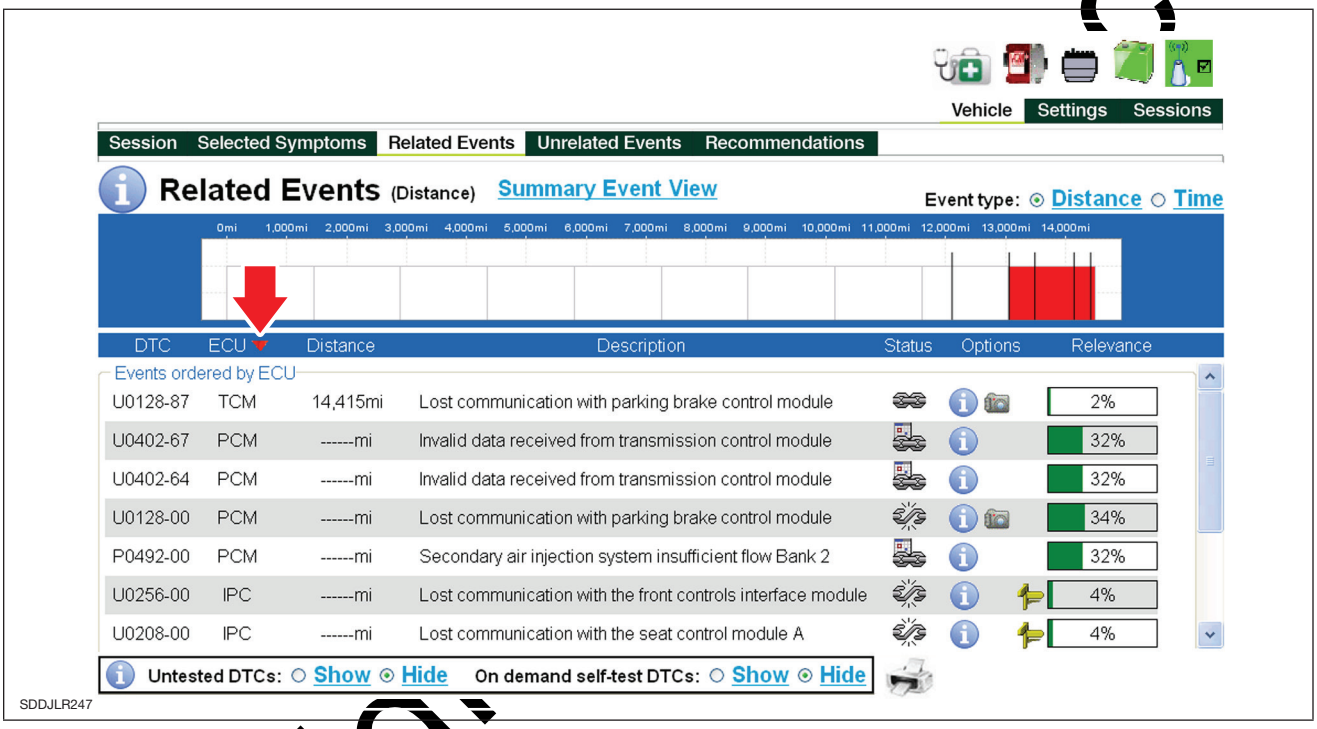


Clicking on an event number will load the Related Events Timeline view, which allows the results to be viewed on a timeline with several options for sorting (indicated by the small red triangle).

Results Sorted by Distance

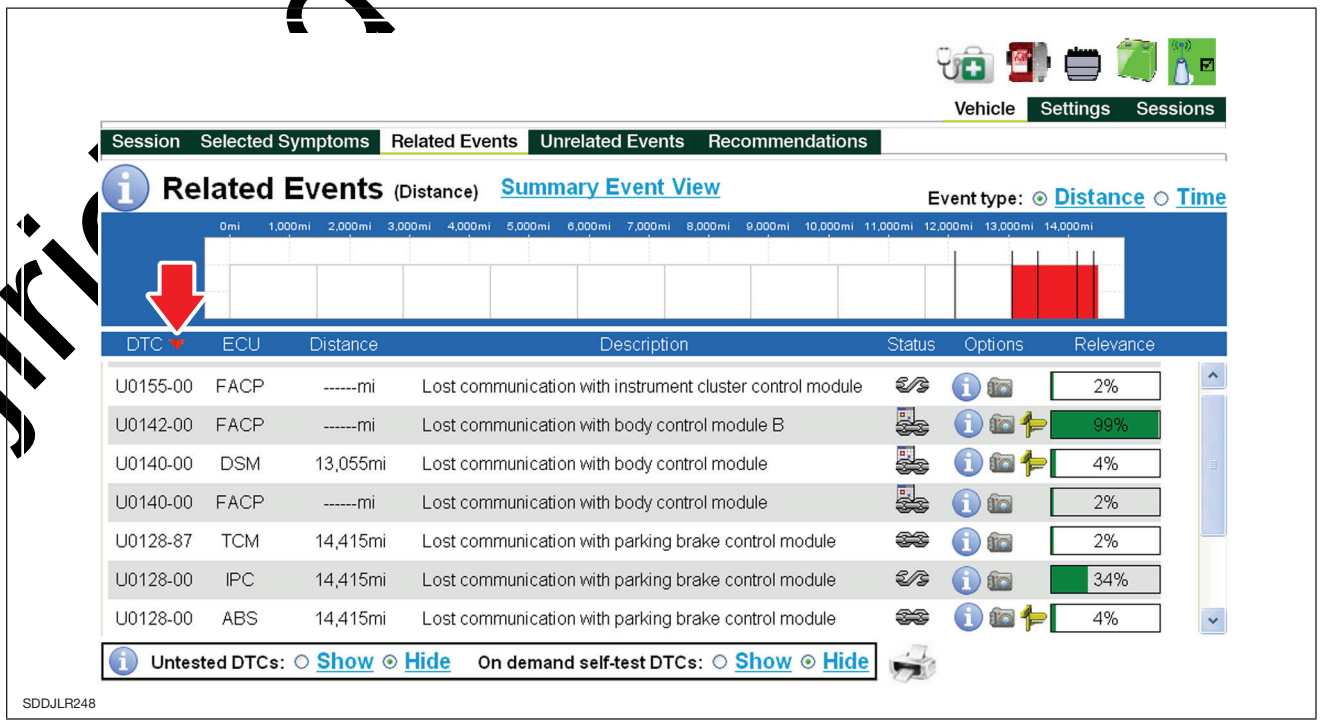


Results Sorted by Control Module (ECU)



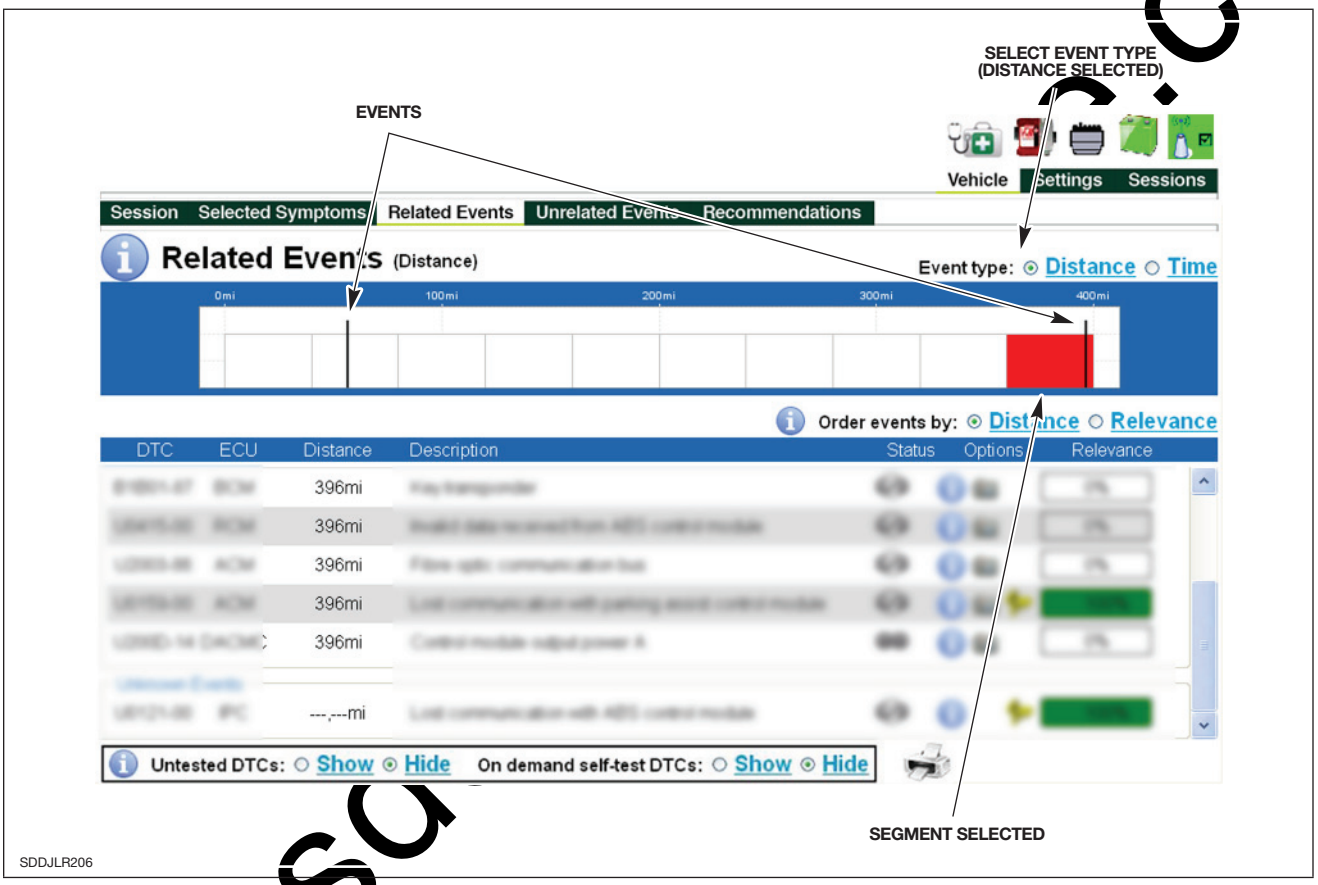
SDDJLR247

Results Sorted by DTC



SDDJLR248

Related Events Timeline



The Related Events timeline displays 'Events' as a heavy black vertical line. An event is a point in time at which a group of DTCs were triggered simultaneously. Events can be viewed by Distance and Time by selecting either the 'Distance' or 'Time' button above the timeline.

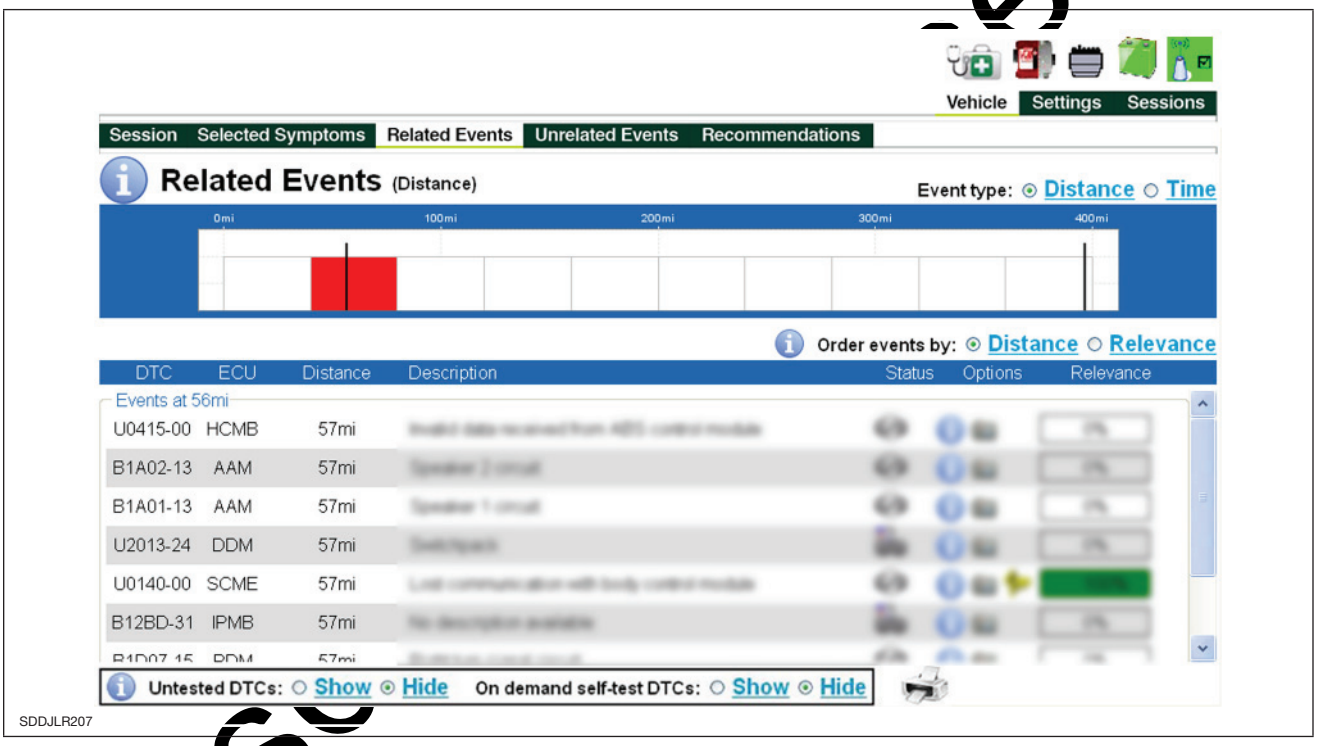
Clicking on segments of the timeline will display the DTCs triggered by the events that occurred during that segment (Distance or Time, depending on which Event type is specified).When a segment is selected, it will be highlighted in red.

Only the events that contain one or more DTCs related to the currently selected symptom(s) will be displayed in the Related Events timeline.

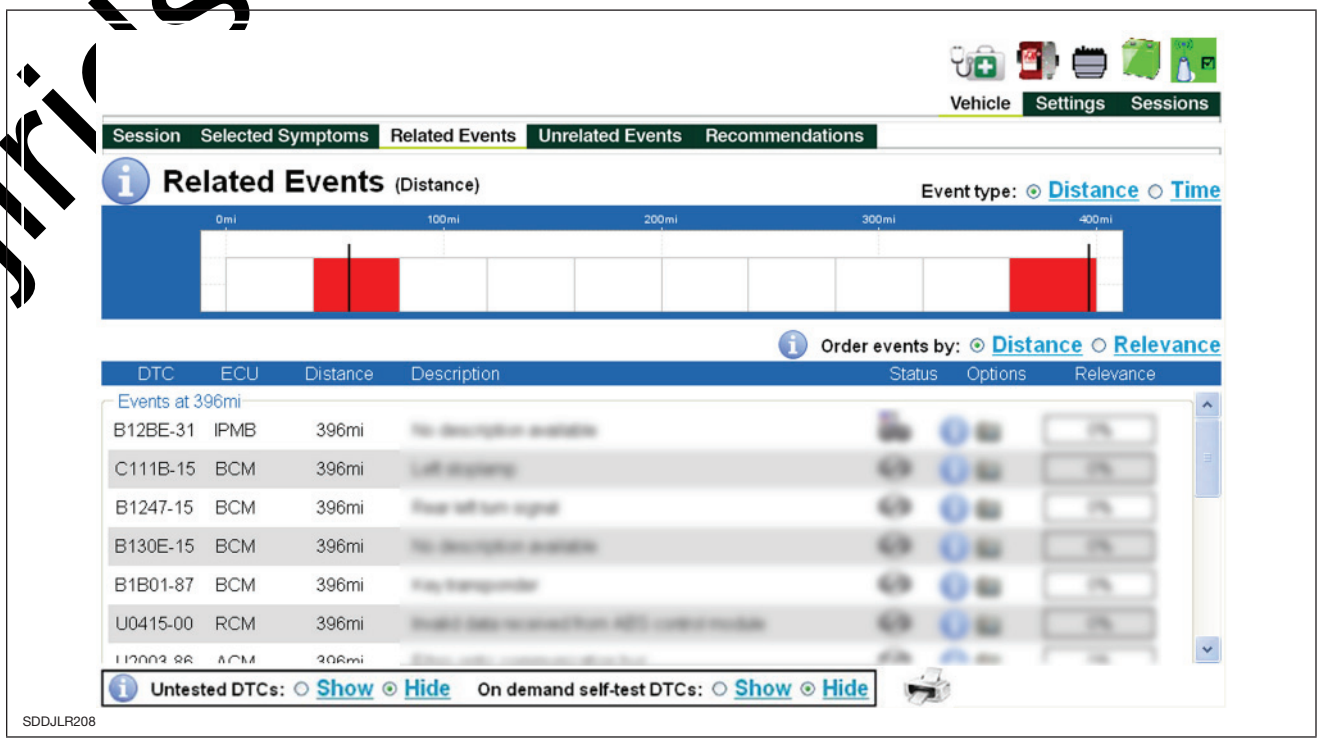
The DTC listing in the Related Events screen includes the following for each DTC:

- Module that flagged the DTC
- Distance or Time at which it was set
- Brief description
- Status
- Options, which may include:
  - DTC Help information
  - Snapshot data
  - Guided Diagnostics (Recommendations)
- Relevance

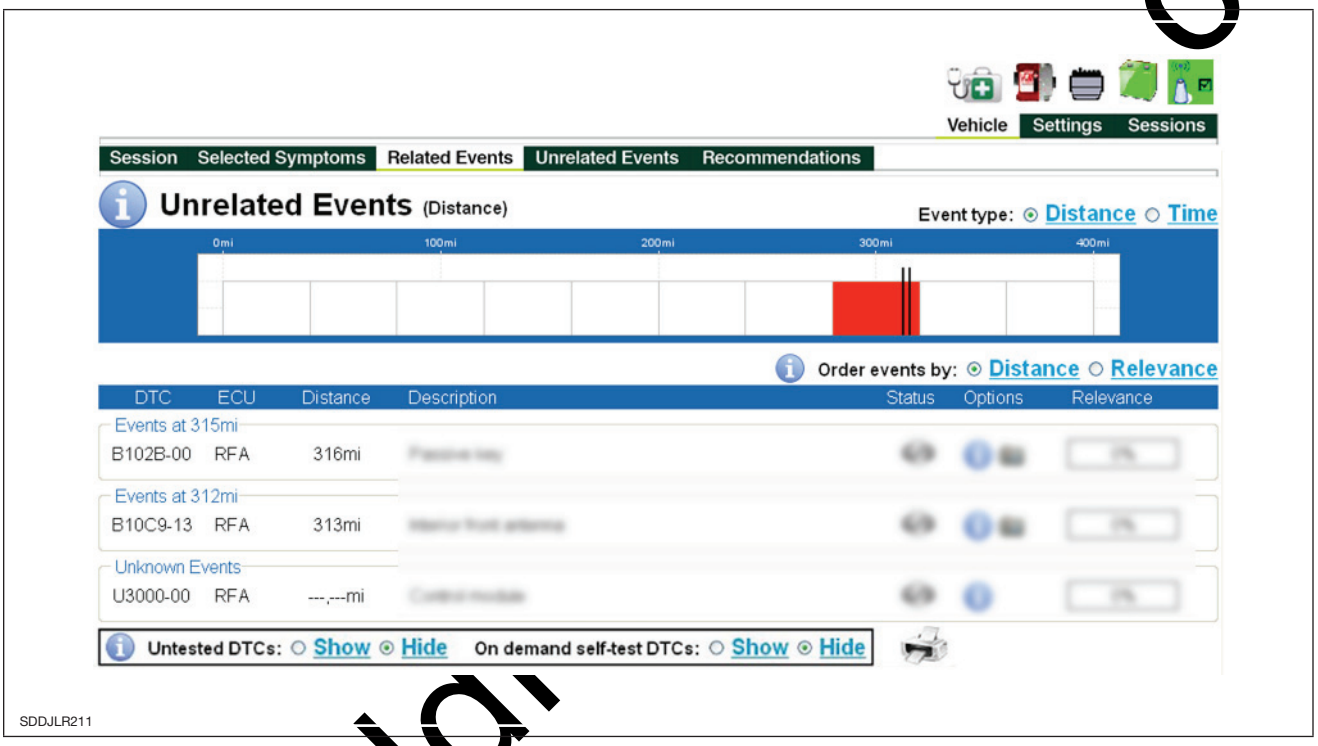
By default, SDD displays only the most recent event segment in the timeline, as indicated by the red block. Each segment may contain more than one event. Users must select and deselect portions of the timeline to view each event individually or in small groups when clustered within a single segment. This allows technicians to quickly determine which DTCs are linked to a common event in the vehicle's history. The following example shows an earlier event selected.



The user can select two segments at one time.



The user should also view Unrelated Events to learn about other DTCs in the vehicle's history.



Advantages of Viewing DTCs on a Timeline

DTCs are associated with Distance or Time-based 'Events', as displayed in the timeline when viewing the Related or Unrelated Events screens.

While SDD has the ability to link DTCs to symptoms, the technician must evaluate how the timing of the events relates to the customer complaint. This feature will be most effective when service advisors accurately document the detail of the customer complaint on the Repair Order, especially in association with warning lamps and electrical failures.

For example, if the Repair Order states 'MIL illuminated at about 35,000 miles', or 'Audio began cutting out intermittently shortly after the 15K service', the technician can use the Event timeline sorted by 'Distance' to effectively associate one group of DTCs with a specific customer complaint.

Because Events can also be sorted by Time, the following examples would be equally useful to the technician:

- MIL illuminated 2 weeks ago
- Audio has been cutting out intermittently for about a month now.

The option to sort Events by time provides a significant advantage for technicians when multiple DTCs have been stored at the same mileage. Since the time sorting is possible down to one-tenth of a second, it is most effective for identifying the root cause of multiple failures. This becomes most significant when it involves network failures within the vehicle where a few 'hard faults' cascade out to multiple modules as network info U04XX DTCs.

The technician can sort the Events by time and look at the first 3 – 5 DTCs in the list as the most significant issues and likely root cause.

'Two-Trip' DTCs

When a DTC is set in a vehicle system that supports the ISO14229 diagnostic standard, information about time/mileage is processed from CAN data and recorded with the 'global snapshot' record for that DTC. When SDD processes DTCs from the vehicle, the information in the global snapshot is read and used to plot each DTC on the timeline.

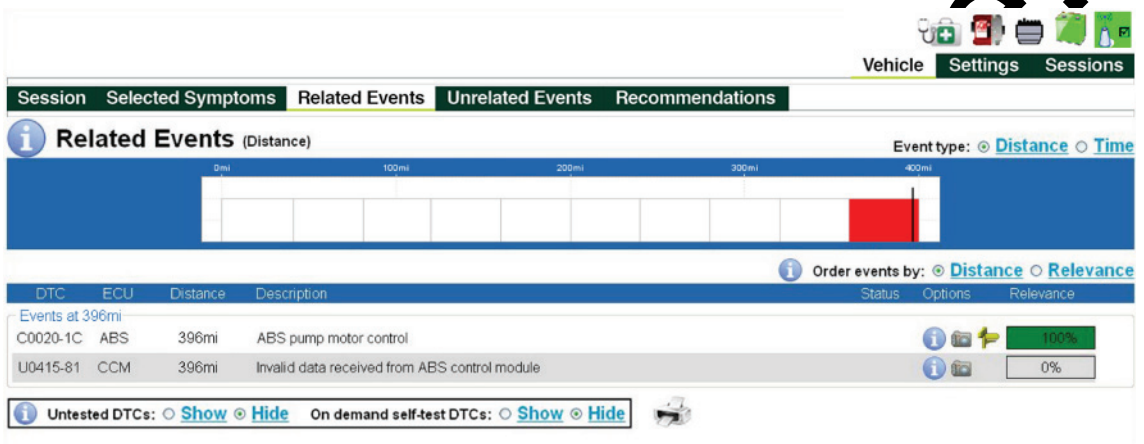
Note the following details regarding this global snapshot data for mileage/time.

1. Since the global snapshot data is only recorded when the DTC is first set, any single DTC can only be listed once on the timeline regardless of how many more times the DTC has occurred.
2. Since the global snapshot data is derived from information broadcast on the CAN bus, there can be times when conditions prevent the recording of mileage/time when a DTC is set.

   If a DTC is being recorded while the vehicle CAN bus is being initialized, or is not communicating, the DTCs global snapshot record may not contain time and mileage data to allow SDD to project it on a timeline. Such DTCs will be listed as an 'Unknown Event'.
3. When investigating customer concerns about Check Engine MILs, consider the impact of PCM/OBDII 'Two-Trip' DTCs, such as those for Evaporative Emissions Leaks.
   - Since each DTC will only record global snapshot data from the first time it was detected, Two-Trip DTCs that do not trigger a Check Engine MIL on the first occurrence may not appear on the timeline at the point where the customer has reported that the Check Engine MIL first illuminated.
   - For example, if the PCM first detects a P0456 at 5500 miles, this code will be set with 5500 miles as the global snapshot data. If the problem is intermittent and/or the diagnostic monitoring conditions prevents this code from being detected, or set a second time in close proximity to the original failure at 5500 miles, the Check Engine MIL may not be illuminated for several hundred or even thousands of miles, depending on the customer's driving habits.
   - When the vehicle condition finally degrades to the point where the 'Two-Trip' requirements are met to trigger the Check Engine MIL, the customer may report that the failure occurred at 7500 miles (for example), but the strategy in the vehicle to record the global snapshot record at the time of the first occurrence will place this DTC further back in the timeline at the 5500 mile mark.
   - Refer to the OBDII systems documentation on TOPIx to determine which PCM DTCs are regarded as 'Two-Trip' failures to trigger a MIL.

With the exception of these Two-Trip DTCs in the PCM, in most cases it is reliable to associate the customer's story with the events in the timeline for all other areas of vehicle operation, since most other systems and DTCs will instantly trigger an MIL or message in the instrument cluster.

ABS DTC C0020-1C Example



SDDJLR205

In the example shown:

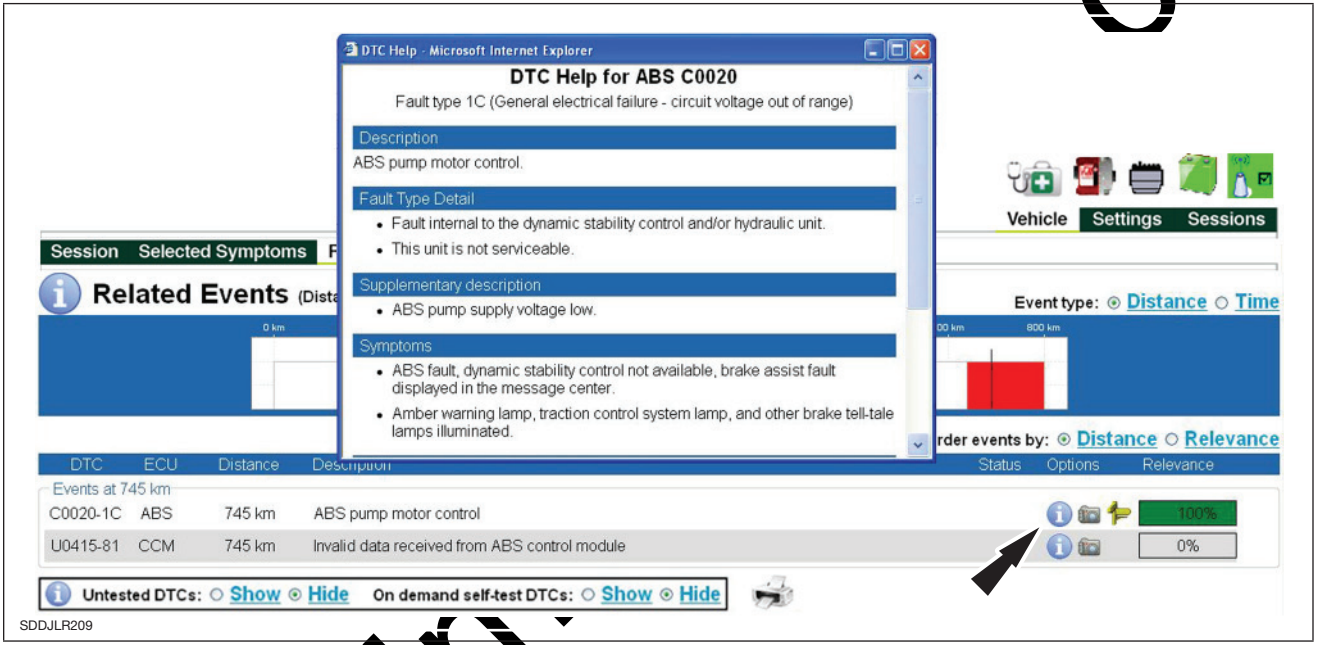
- DTC C0020-1C 'ABS pump motor control' was flagged by the ABS module at 396 miles.
  - DTC Help information ('?' icon), Snapshot data (camera icon) and Guided Diagnostics (signpost icon) are available.
  - This DTC is 100% Relevant to the Selected Symptoms

This DTC's 'Relevance' rating indicates that there is a 100% probability that it is the fault that caused the Selected Symptoms. 'Guided Diagnostics' indicates that there is a Pinpoint Test available, which is highly recommended. Clicking on the Guided Diagnostics icon will also display a page with a filtered list of recommended tools related to this DTC specifically.

NOTE: With SDD, Pinpoint Tests are no longer launched from the DTC displays but instead will appear as Recommended Candidates once the 'recommendations' tab is selected.

NOTE: The Pinpoint Tests are specific to the Selected Symptoms rather than an individual DTC.

Clicking on the Information icon (i) will display the DTC Help pop-up.

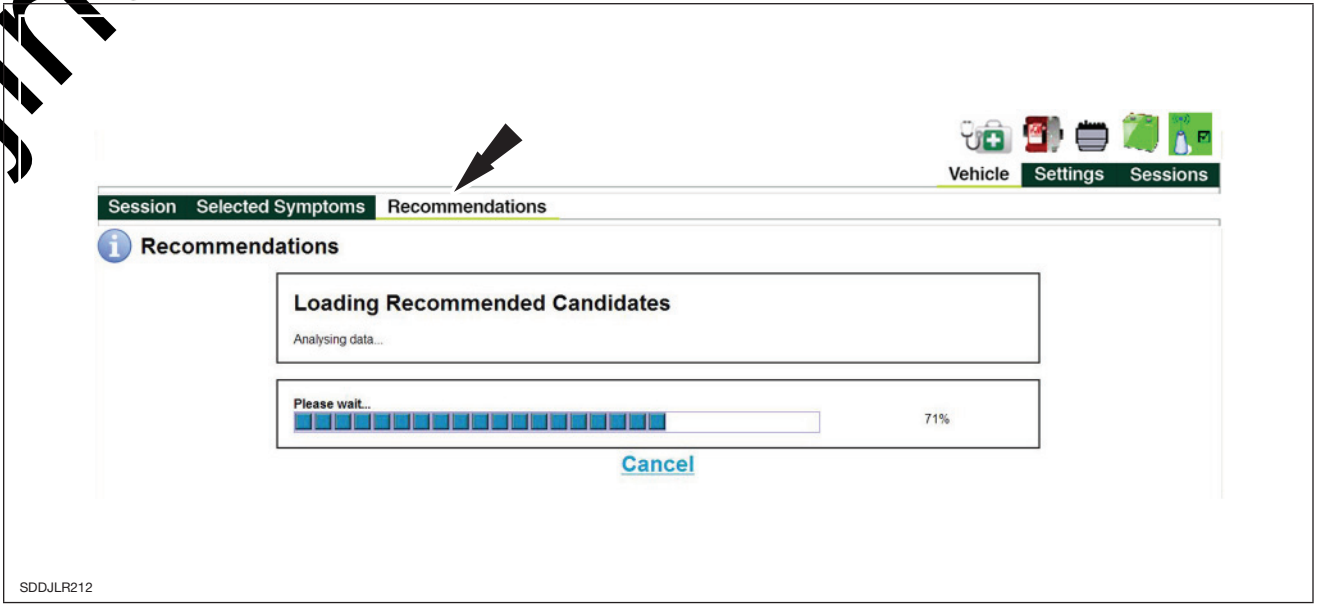


SDDJLR209

The pop-up will show the following information:

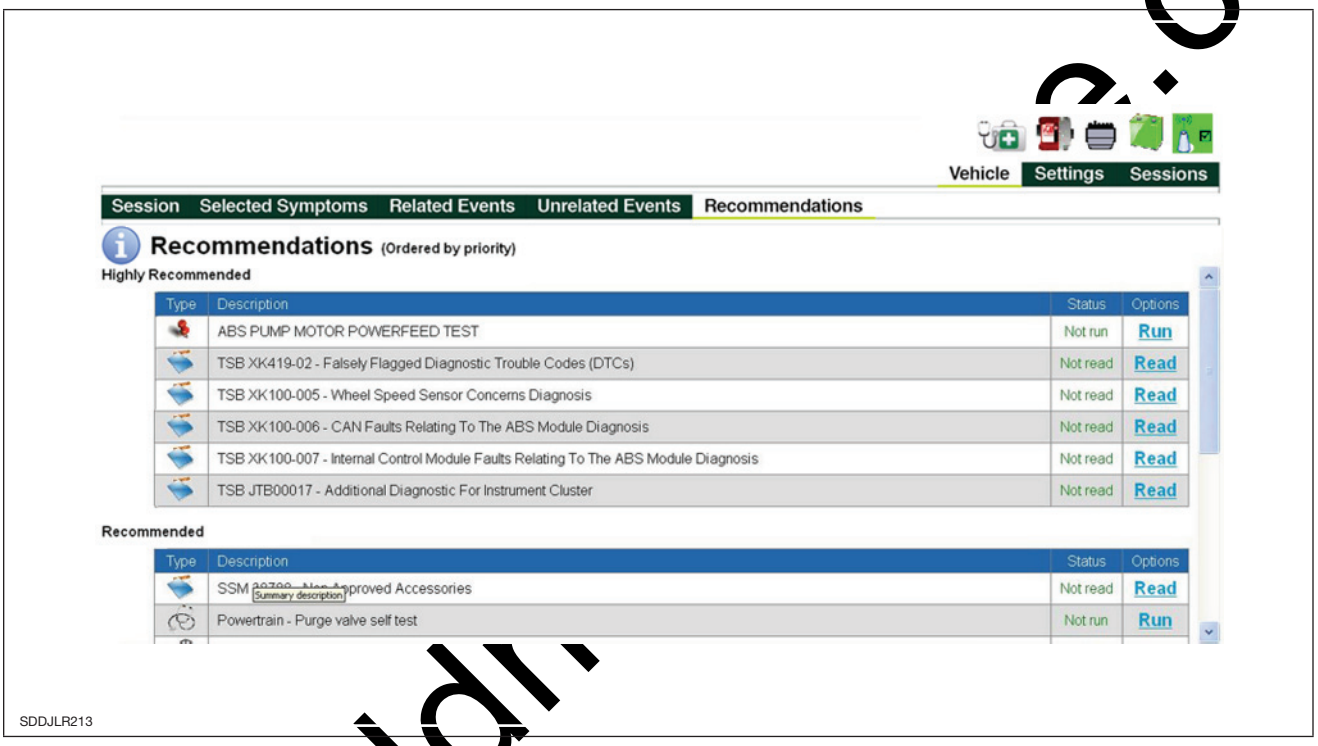
- DTC number
- Fault type
- Description
- Fault Type detail
- Supplementary description
- Symptoms

Click on the 'Recommendations' tab to load Recommended Candidates.



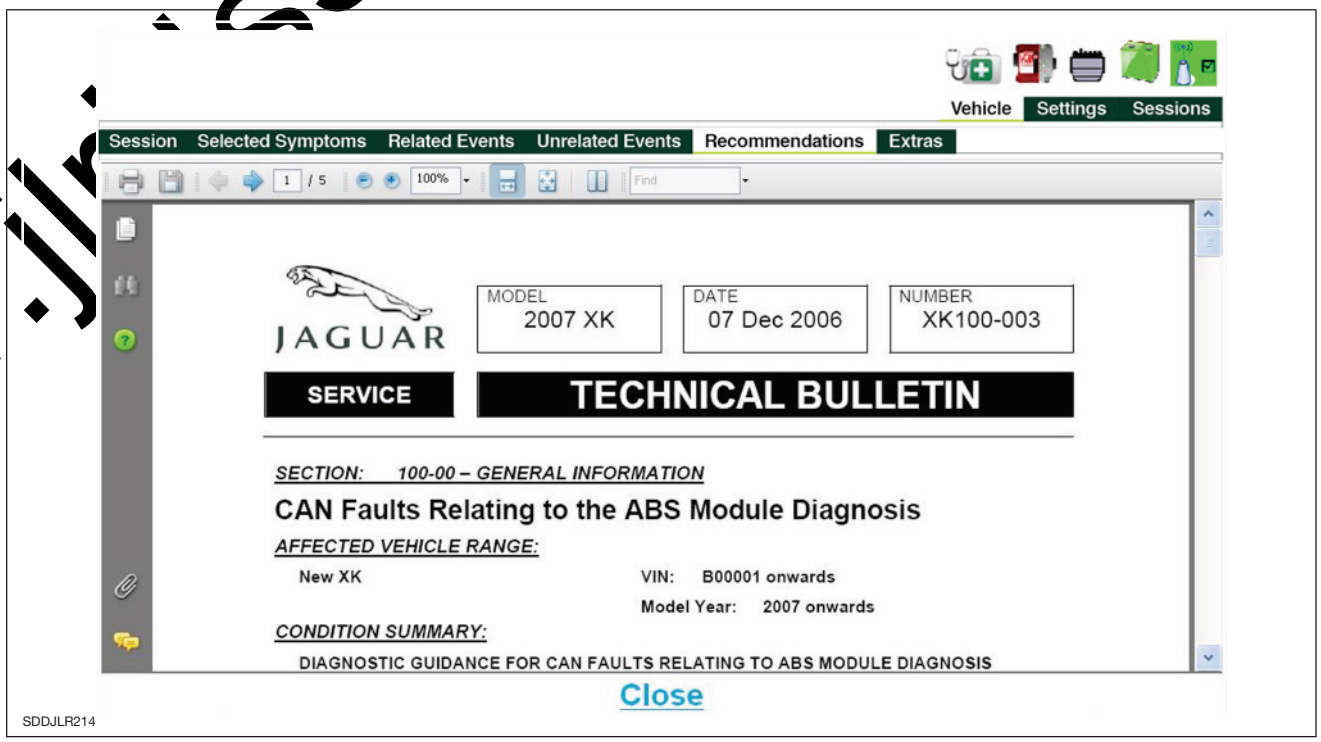
SDDJLR212

Candidates are listed in order of priority.



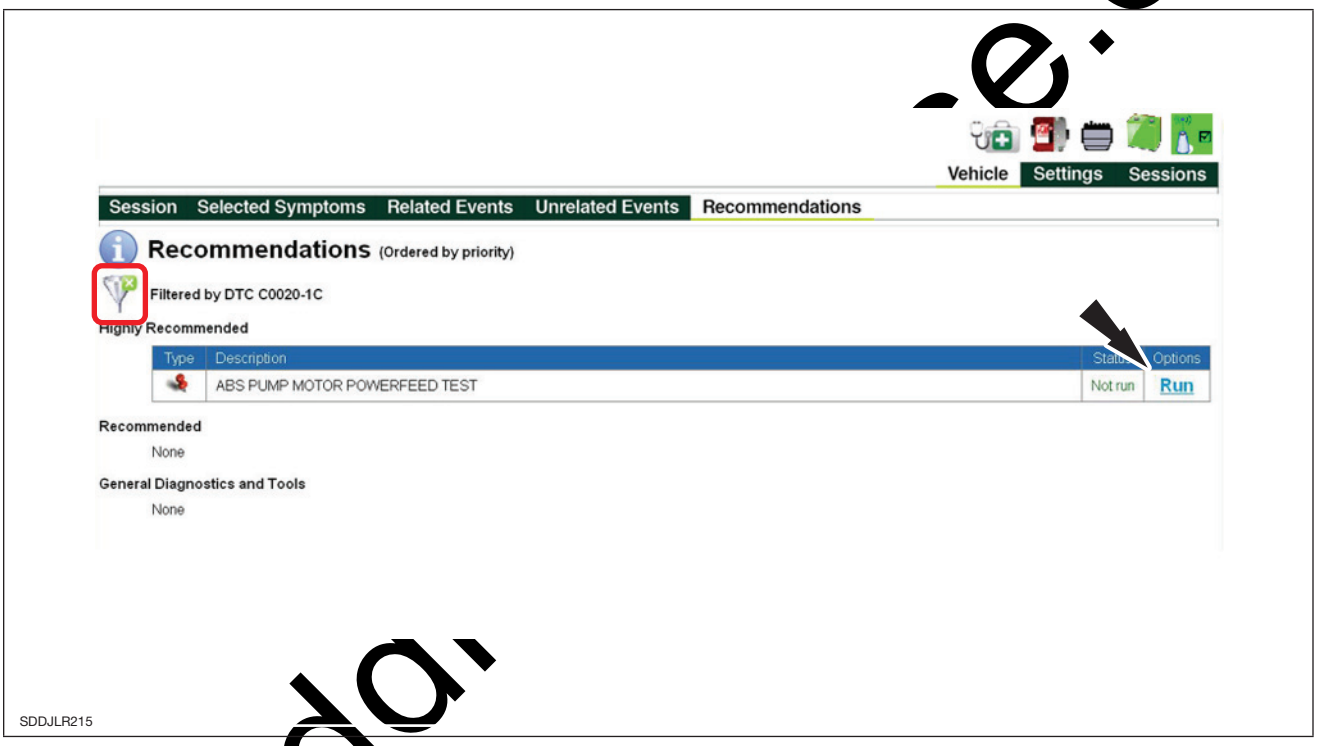
The highest priority candidate for the Selected Symptom is the ABS PUMP MOTOR POWERFEED TEST. There are also several Highly Recommended Technical Service Bulletins.

Technical Service Bulletins may include a relevant diagnostic process.



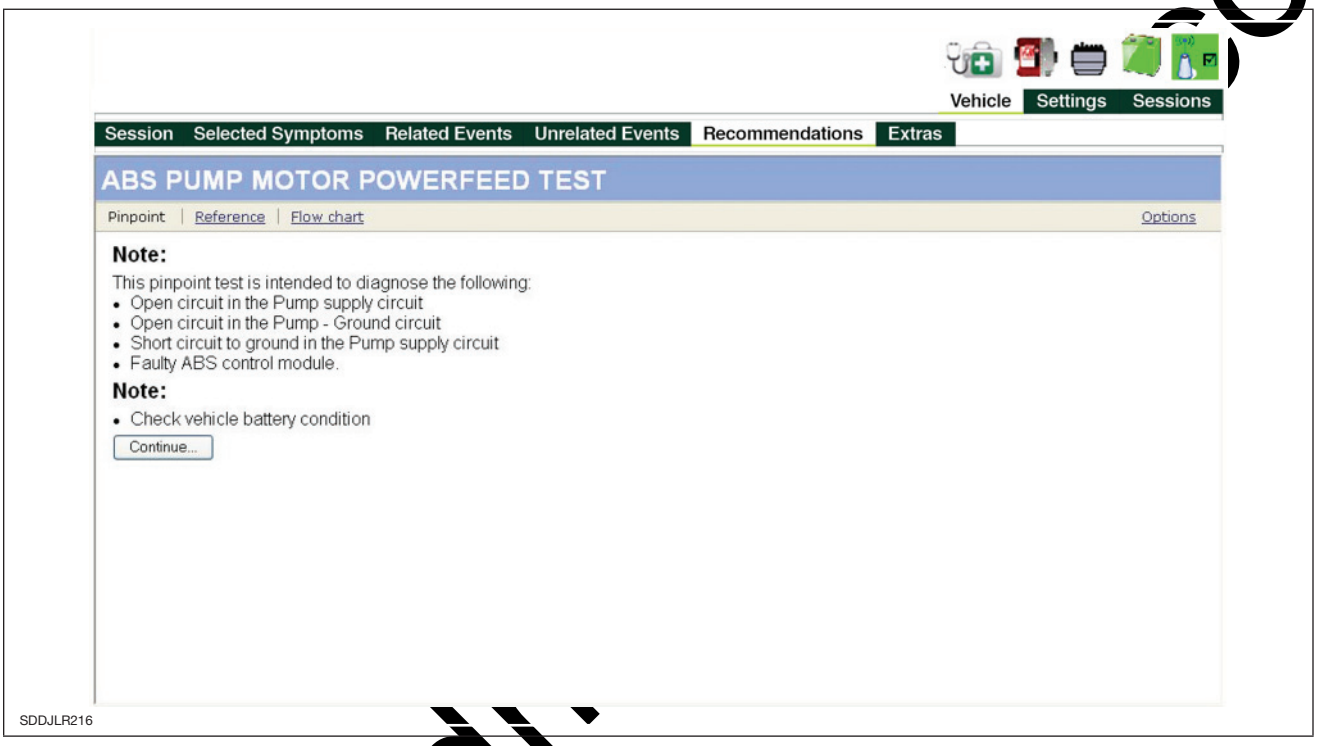
Running the Pinpoint Test

To run the ABS PUMP MOTOR POWERFEED TEST, click on 'Run' in the right-hand 'Options' column.

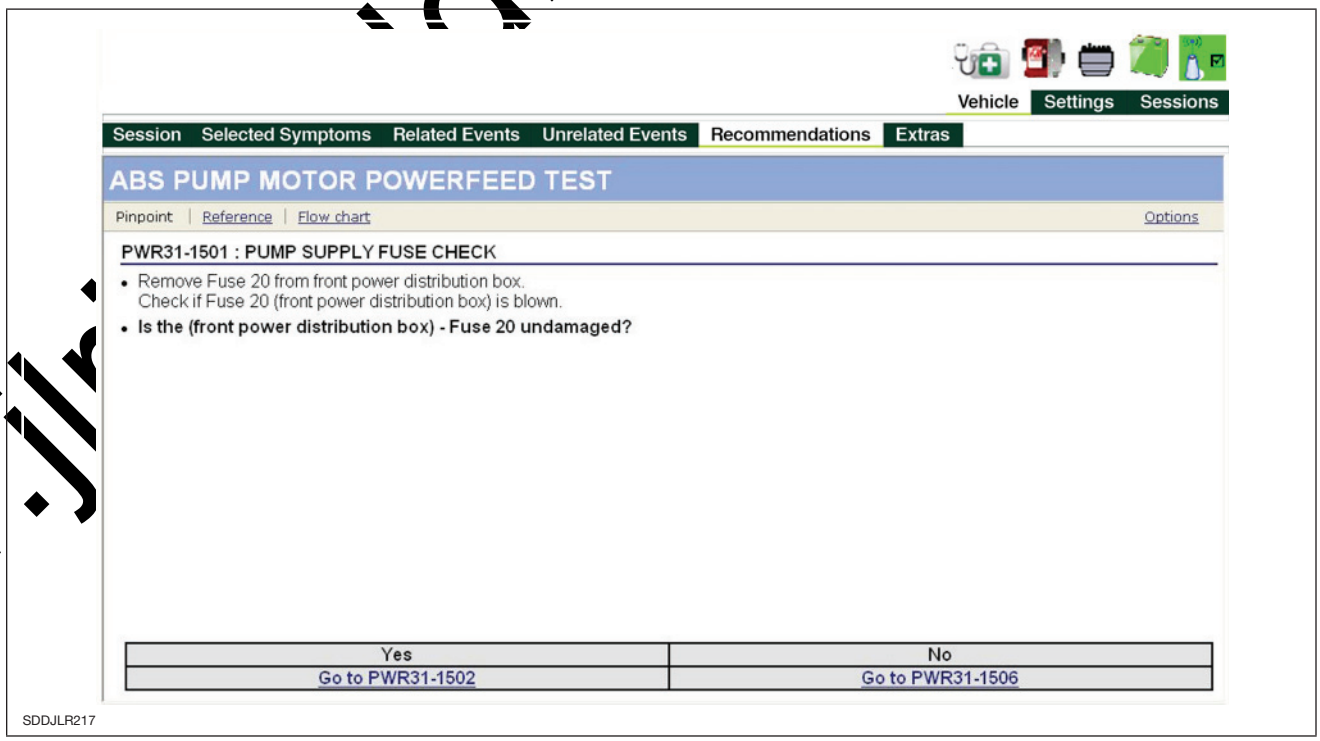


Follow the on-screen instructions in the successive windows to complete the test.

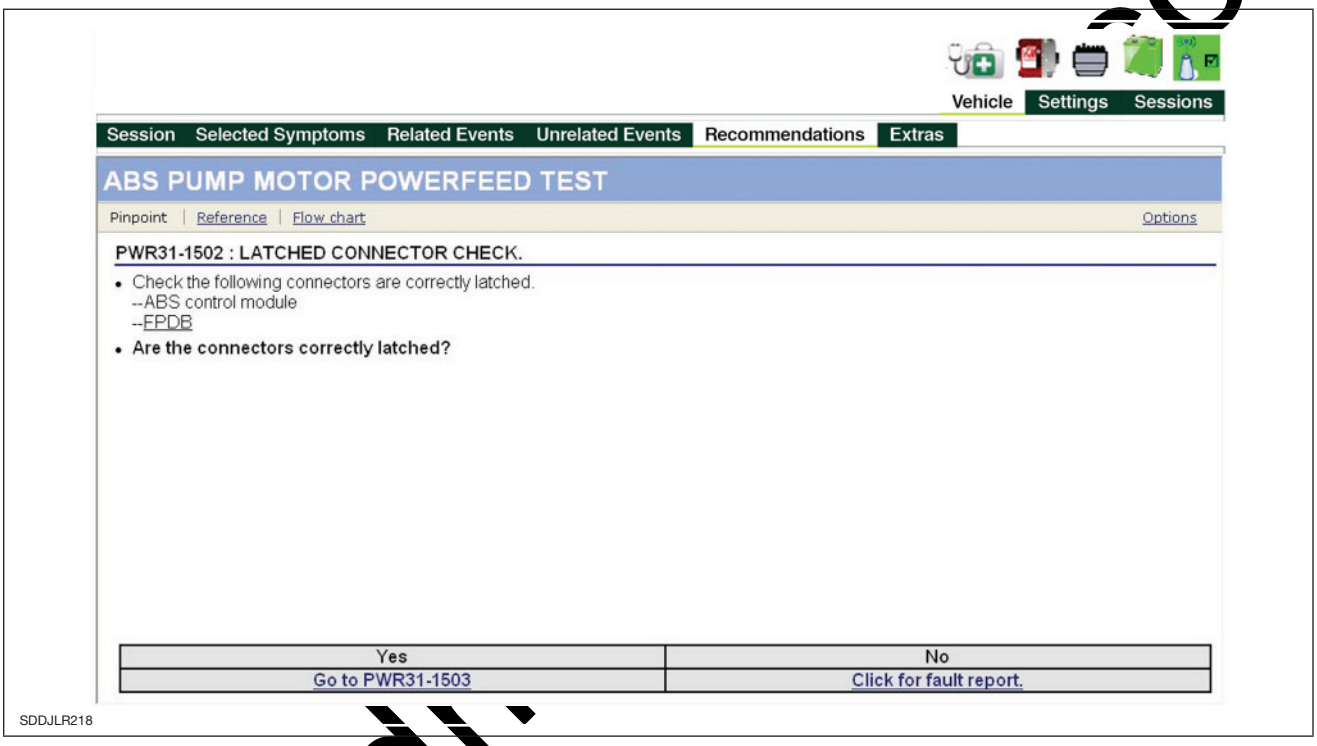
NOTE: Clicking on the 'Funnel' icon will remove filtering and display all recommendations.



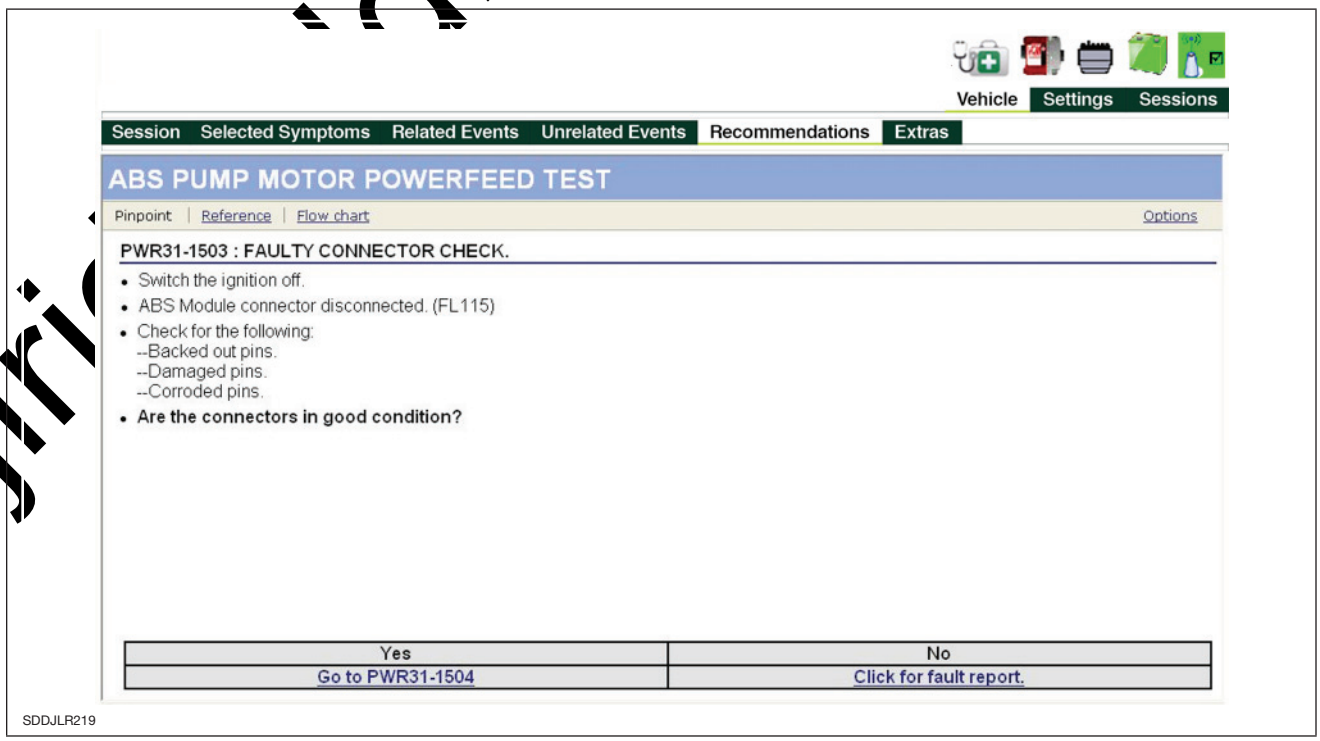
SDDJLR216



SDDJLR217



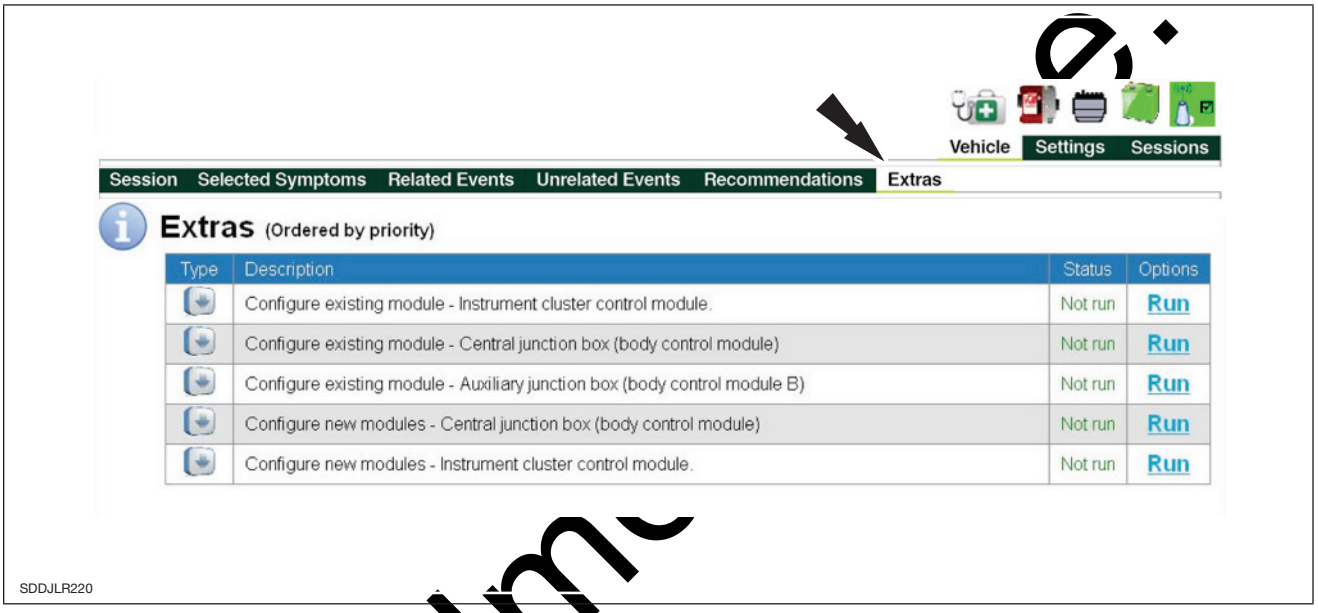
SDDJLR218



SDDJLR219

Extras

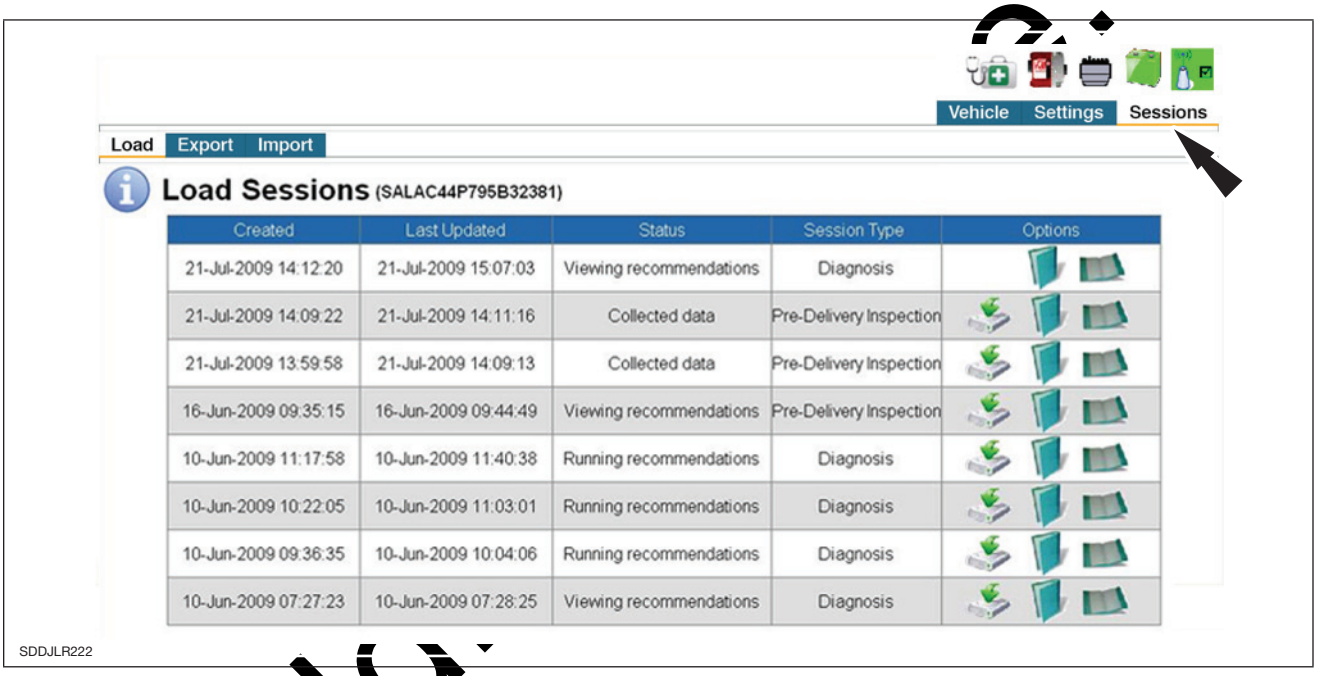
Click on the 'Extras' tab for further recommendations.



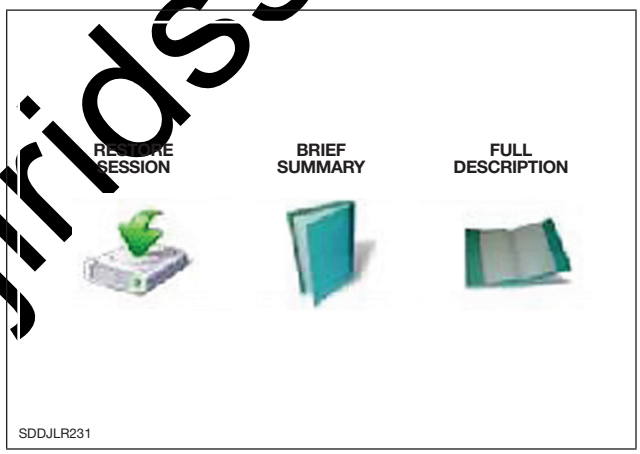
⚠ **CAUTION: Module programming and configuration must only be performed once all suggested routines and repairs have been completed.**

VEHICLE SESSIONS

All Session files for the current vehicle can be viewed by clicking on the 'Sessions' tab.

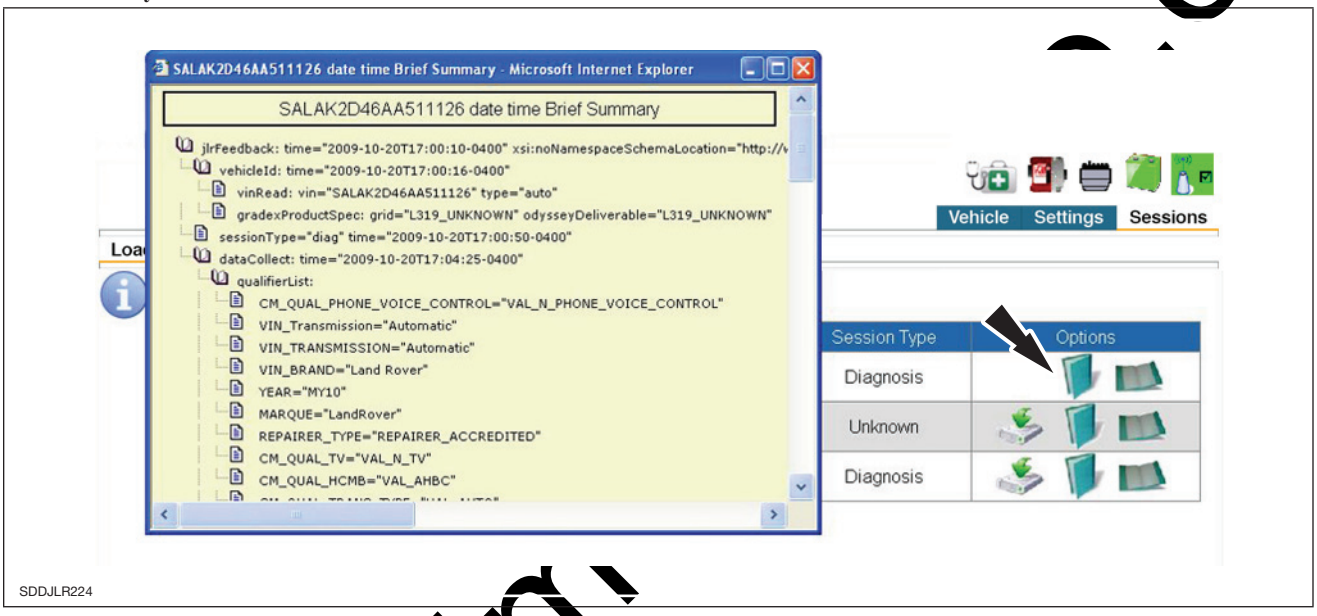


For each Session, the user has the option to Restore the session or to view a Brief Summary or Full Description. Click on the appropriate icon for the desired option.

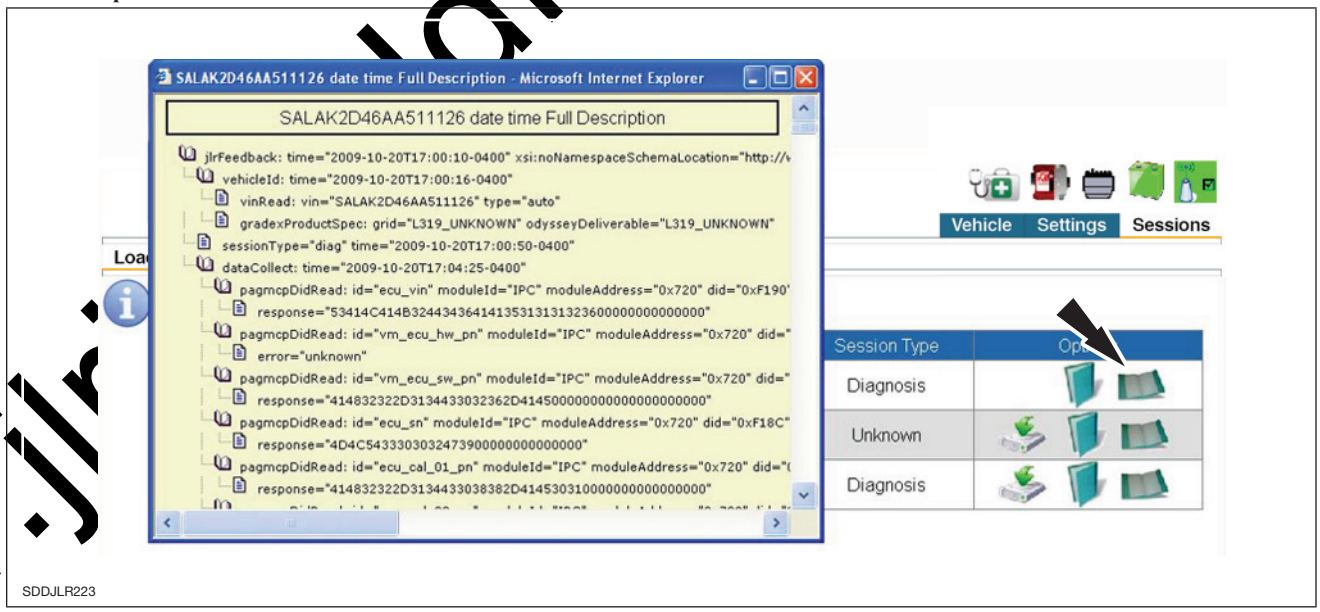


For each Session, a Brief Summary and a Full Description are available. These may be viewed onscreen or printed.

Brief Summary

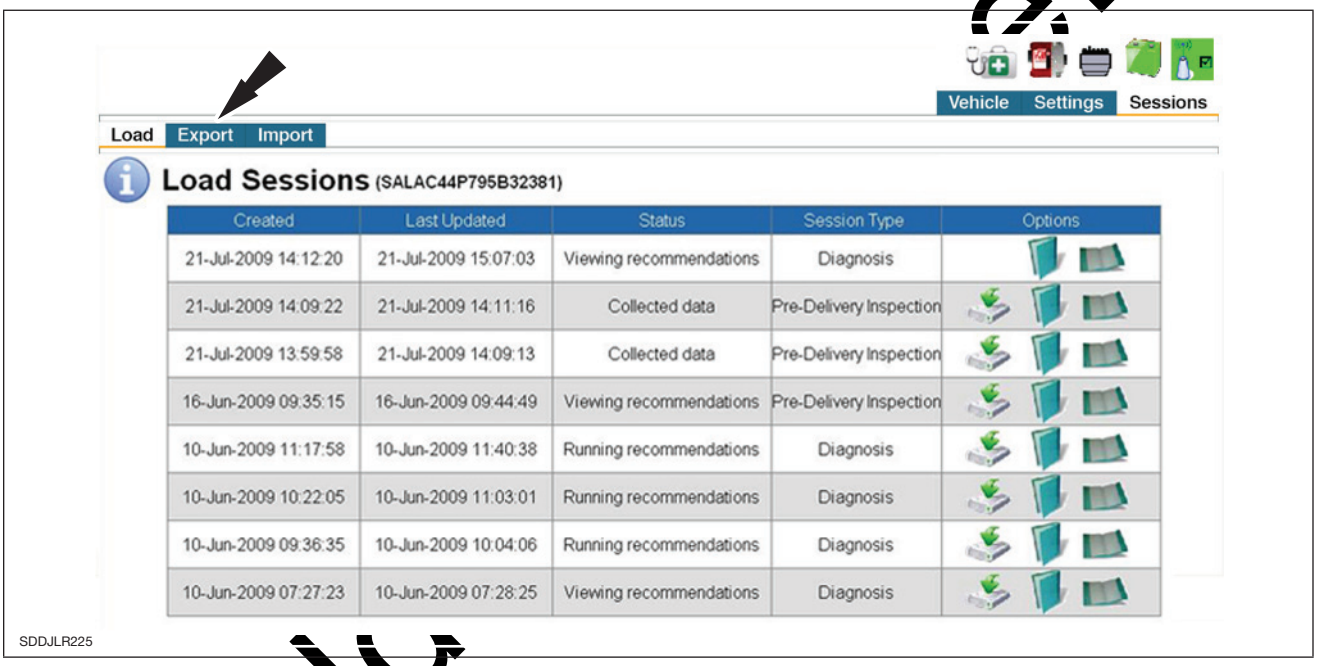


Full Description

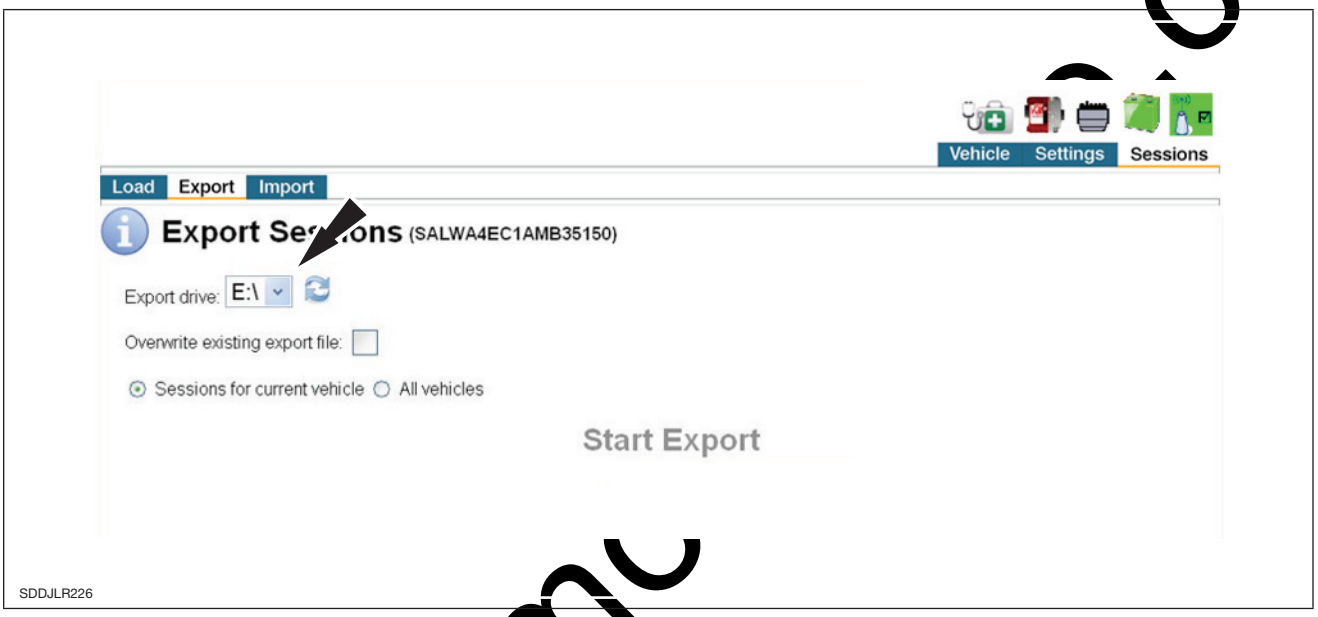


Export Sessions

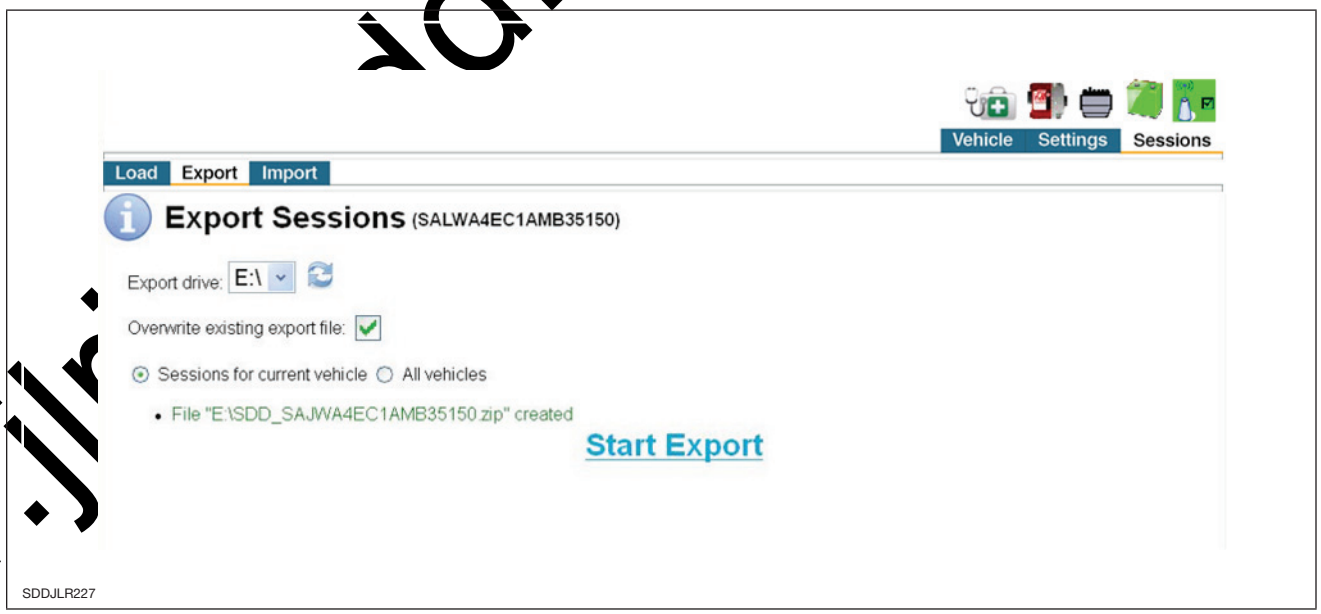
Sessions can also be imported and exported from the 'Sessions' tab. To export a Session, select the desired session from the left-hand column and click on the 'Export' tab.



From the 'Export drive' drop-down, select the drive to which the session is to be saved, then click on 'Start Export'.

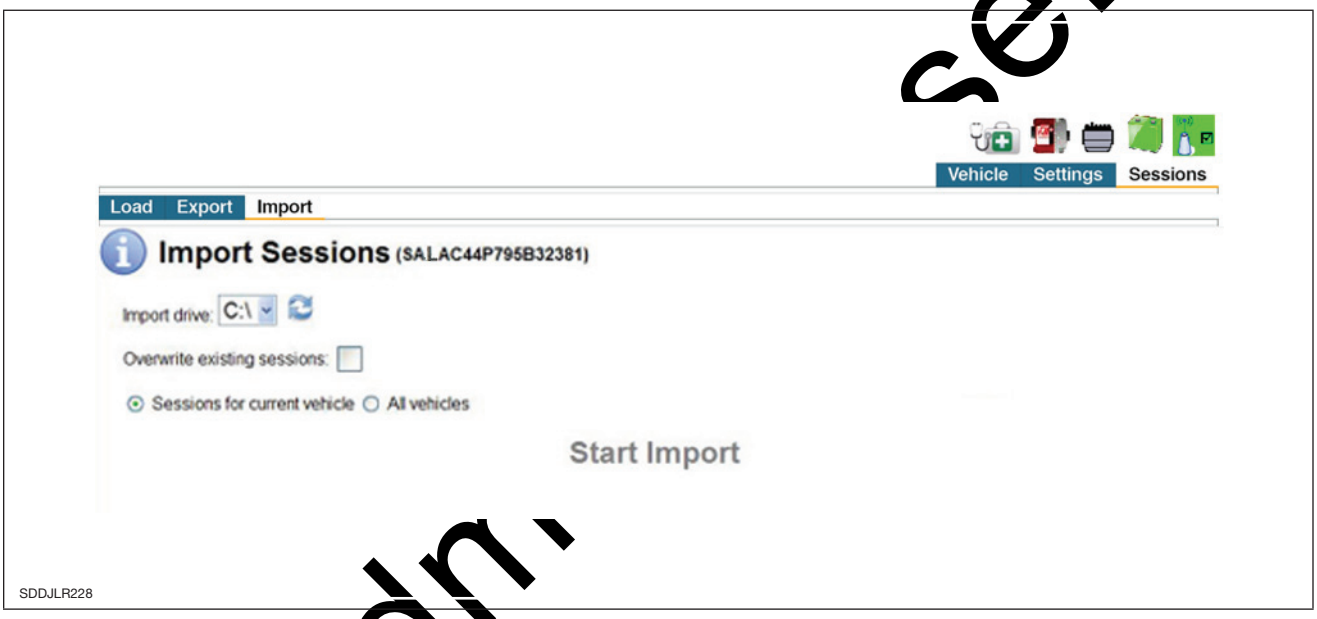


Once the Export is complete, the screen will display a 'File.....created' confirmation, as shown in the screen below.

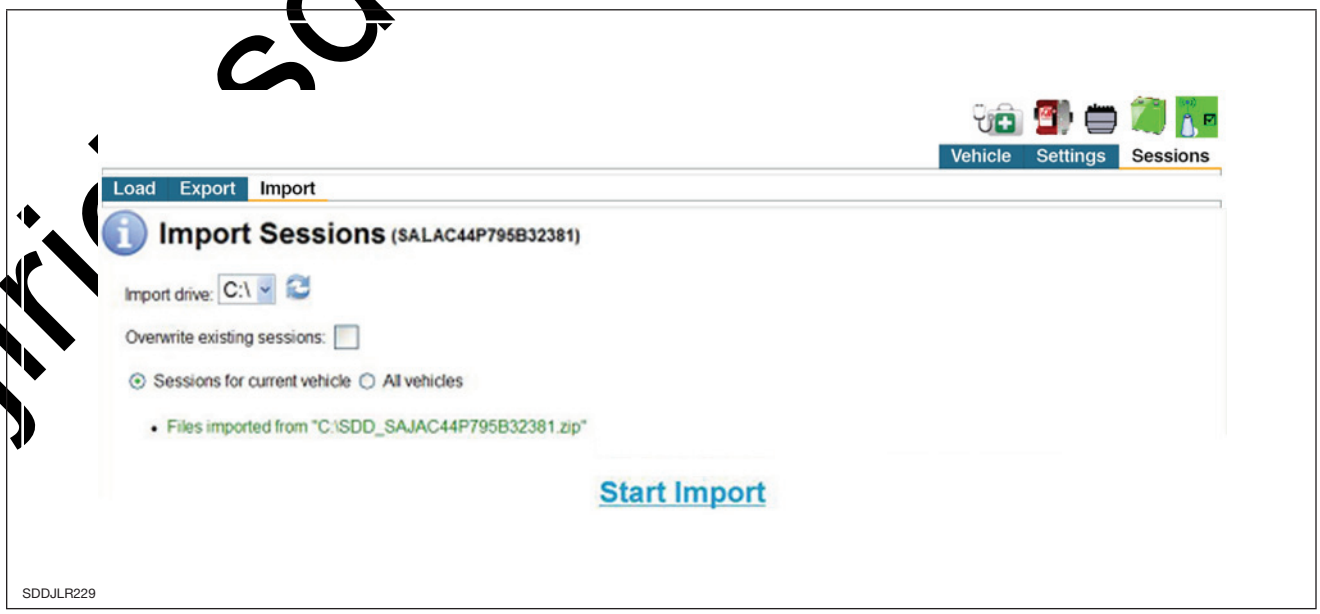


Import Sessions

From the following screen select 'Import'. The screen will display file details and vehicle chassis VIN. Click on 'Start Import' to load session.



Once the Import is complete the screen will display a 'Files imported from...' confirmation, as shown in the screen below.



REPAIR VALIDATION

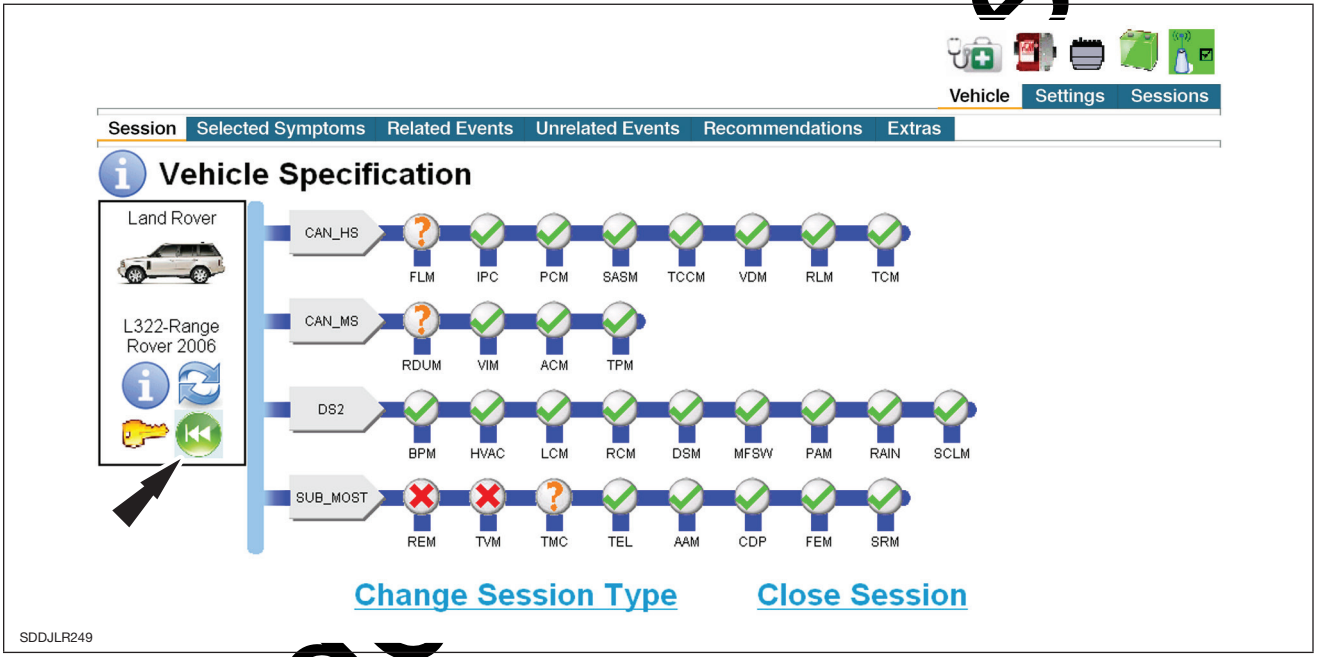
Since SDD is designed to retain DTC information first read from the vehicle during the current session, some specific actions must be taken to ensure technicians are correctly interpreting the DTCs displayed when performing a repair validation process.

After ALL diagnostic procedures have been run, ALL repairs have been performed, take the following steps to execute a 'basic' repair validation before executing a road test (when required):

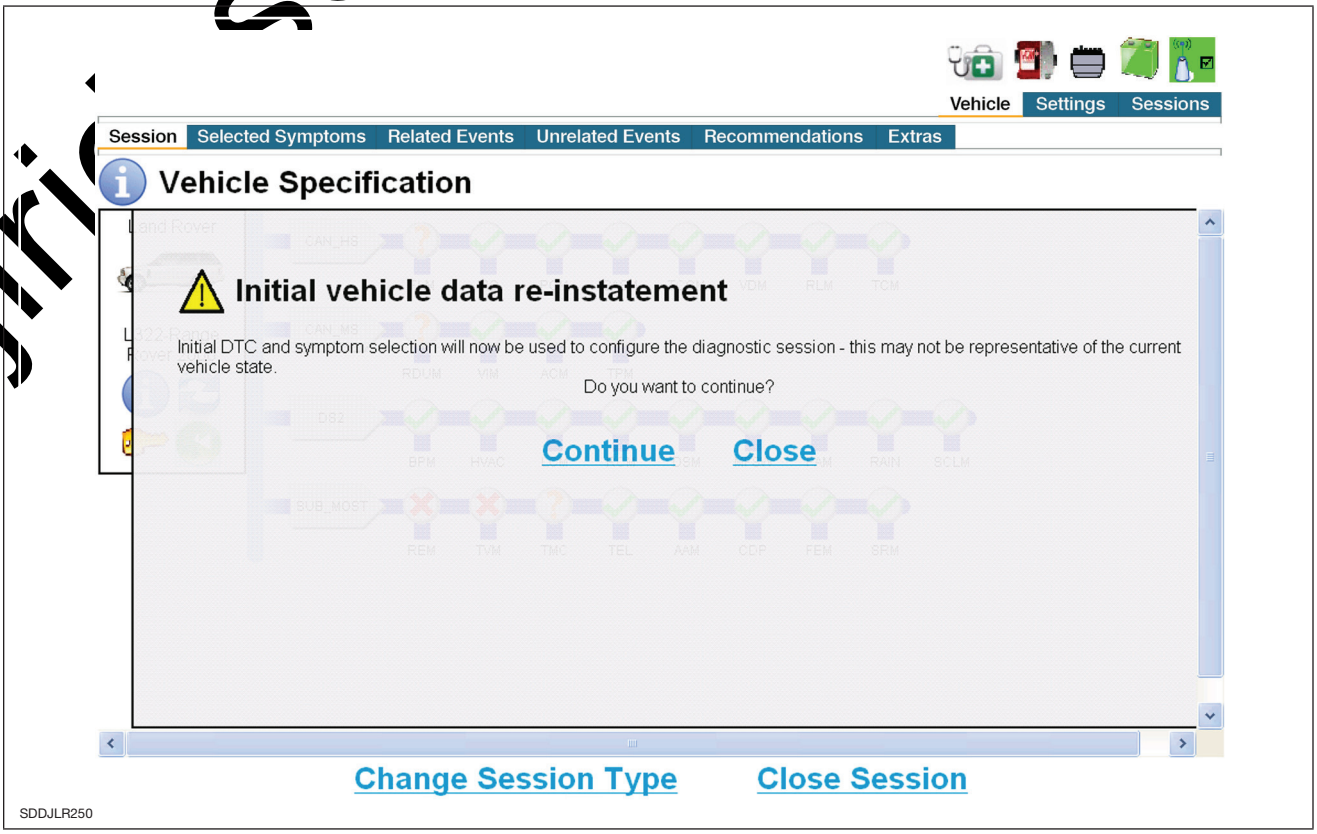
1. From the recommendations list, locate and run the 'Re-Read DTCs' function.
2. Return to the 'Symptom Selection Screen' and ensure all of the applicable symptoms are currently selected.
3. Select 'Continue' and allow SDD to process the current vehicle information.
4. Review the 'Related Events' for any remaining DTCs.
5. Additional DTC info can be seen if the 'Show' option is selected to display 'Not Tested' DTCs to confirm that the vehicle has met the requirements to self-diagnose a specific DTC.

INITIAL DATA REINSTATEMENT

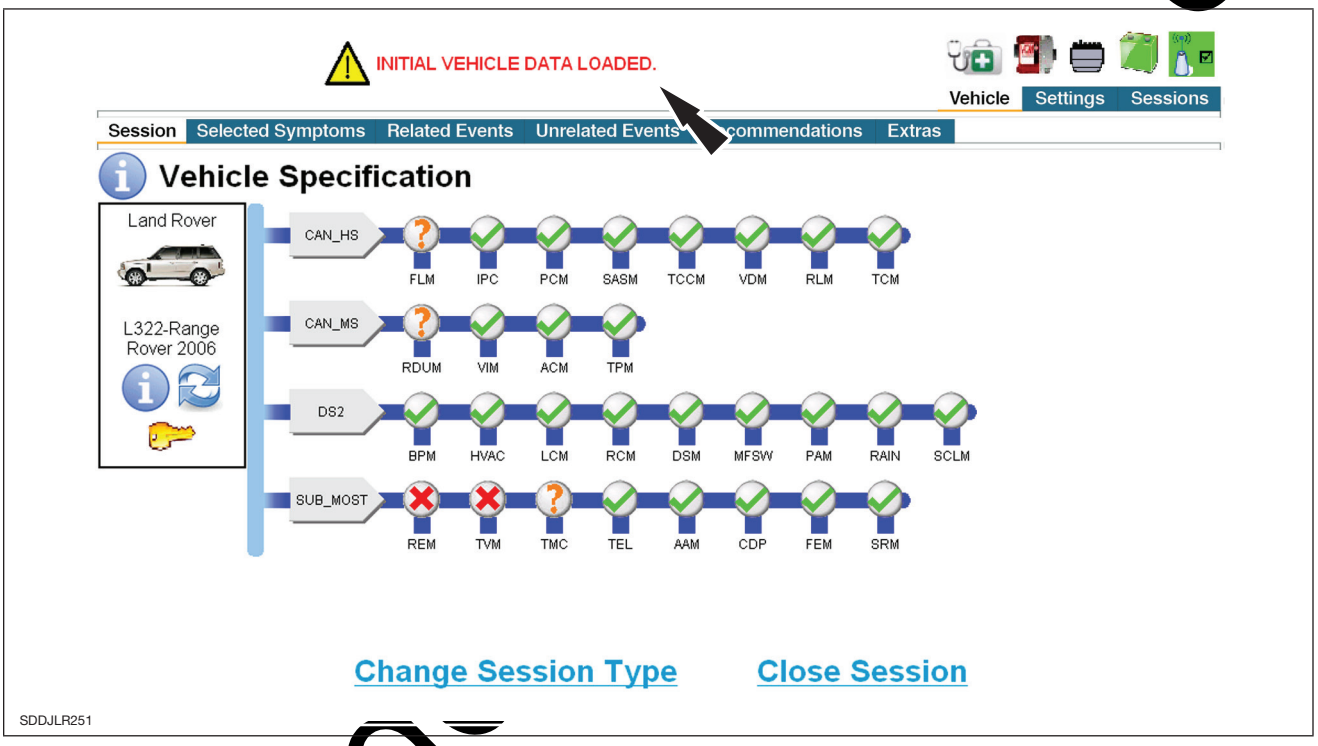
Once repairs have been carried out and DTCs have been cleared and re-read, the initial vehicle data can be restored for comparison purposes by clicking the icon highlighted below.



The acknowledgement screen warns that the display does not represent the current state of the vehicle.



The screen will indicate that initial vehicle data is being used as a reminder that this display does not represent the current state of the vehicle.



EVENTS DEFINITIONS

Related Events / Unrelated Events

NOTE: The Related Events screen displays information based on an event. An event is a group of DTCs that were all triggered at the same point in time. Only the events that contain one or more DTCs related to the currently selected symptom(s) will be displayed in the Related Events timeline. The remainder of the events present in the vehicle will be displayed in the Unrelated Events tab.

Grouping the DTCs in this way allows a visual representation of the vehicle event history to be displayed to the operator.

The Event type can be switched between Distance and Time events, as required, by selecting either the 'Distance' or 'Time' button above the timeline.

Distance Event
If Distance is selected, the events will be identified by the recorded mileage at the point the event occurred.

Time Event
If Time is selected, the events will be identified by the number of days since the event occurred.

This selection will also determine whether DISTANCE or ELAPSED TIME information is displayed within the event detail section.

The timeline is split into segments based upon mileage or days. A maximum of two segments may be selected at any one time. All of the events that occurred within the selected segments will be displayed in the event detail section, and this data may be ordered by Distance/Time or Relevance.

When an event is selected, the event detail section will display the DTCs that are related to the currently selected event. The information displayed includes.

DTC

This field displays the logged DTC.

ECU

This field displays the control module acronym that the DTC was logged in.

DISTANCE or ELAPSED TIME

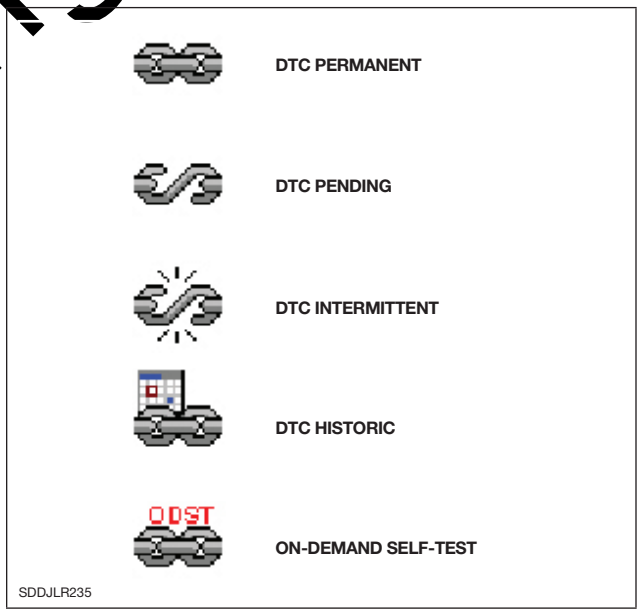
This field displays the mileage or time stamp that relates to when the DTC was logged.

DESCRIPTION

This field displays the DTC description.

STATUS

This field shows the status of the DTC. Status options are identified by the following icons:



DTC status options are:

Permanent
Applied to a continuously monitored DTC that is logged (for example, the results from the associated on-board diagnostic test indicates that a fault exists) and where a corresponding fault is currently present (for example, was detected the last time the associated diagnostic test completed its run).

Pending
Applied to a continuously monitored DTC that is explicitly reported as Pending (for example, a fault has been detected in either the current or previous drive cycle, but has not yet been present for the necessary complete drive cycle to enable it to be transferred to the logged state).

Intermittent
Applied to a continuously monitored DTC that is logged, but where a corresponding fault is not currently present (for example, was not detected the last time the associated diagnostic test completed its run).

Historic
Applied to a continuously monitored DTC, that is explicitly reported as Historic (for example, a previously detected fault that has not been detected for a set period).

Unknown
Applied to a continuously monitored DTC that is logged, but does not fall into any of the previous categories (for example, the request for logged DTCs was completed successfully, but the request for additional information was unsuccessful so that categorization as either Permanent or Intermittent was not possible).

On Demand Self-Test (ODST)
Applied to an On-Demand DTC that is logged (for example, as a result of running an On-Demand Self-Test).

OPTIONS

This field displays the options available to the operator, to enable correct diagnosis and repair of the failure that logged the DTC. These options include the following:

DTC Help Information
When selected, DTC help meet that will enable the operator to diagnose and rectify the failure for the relevant DTC will be displayed in a pop-up window.

DTC Snapshot Data
When selected, Snapshot Data relevant to the selected DTC will be displayed.

Recommended Candidates
When selected, a priority ordered list of Recommended Candidates relevant to the selected DTC will be displayed.

RELEVANCE

This field displays a bar graph and percentage figure that is related to the number of associated and currently selected symptom(s). For example, if four symptoms have been selected, and the DTC shown is related to all four symptoms, the relevance field will show 100%. If the DTC is only related to three of the symptoms, the relevance field will show 75%.

DTCs that are logged and related to the currently selected symptom(s), but cannot be associated to an event due to missing time stamp information, will be displayed below the event data for the selected events. The detail information is displayed in the same format as the event detail information.

Also available to the operator on this screen is the option to either omit or display Untested or On-Demand Self Test DTCs.

When all information has been obtained from the Related and Unrelated Events screens, click ‘Recommendations’.

Technical Training
Diagnostic Systems

IDS-SDD-JLR:
IDS Symptom Driven Diagnostics

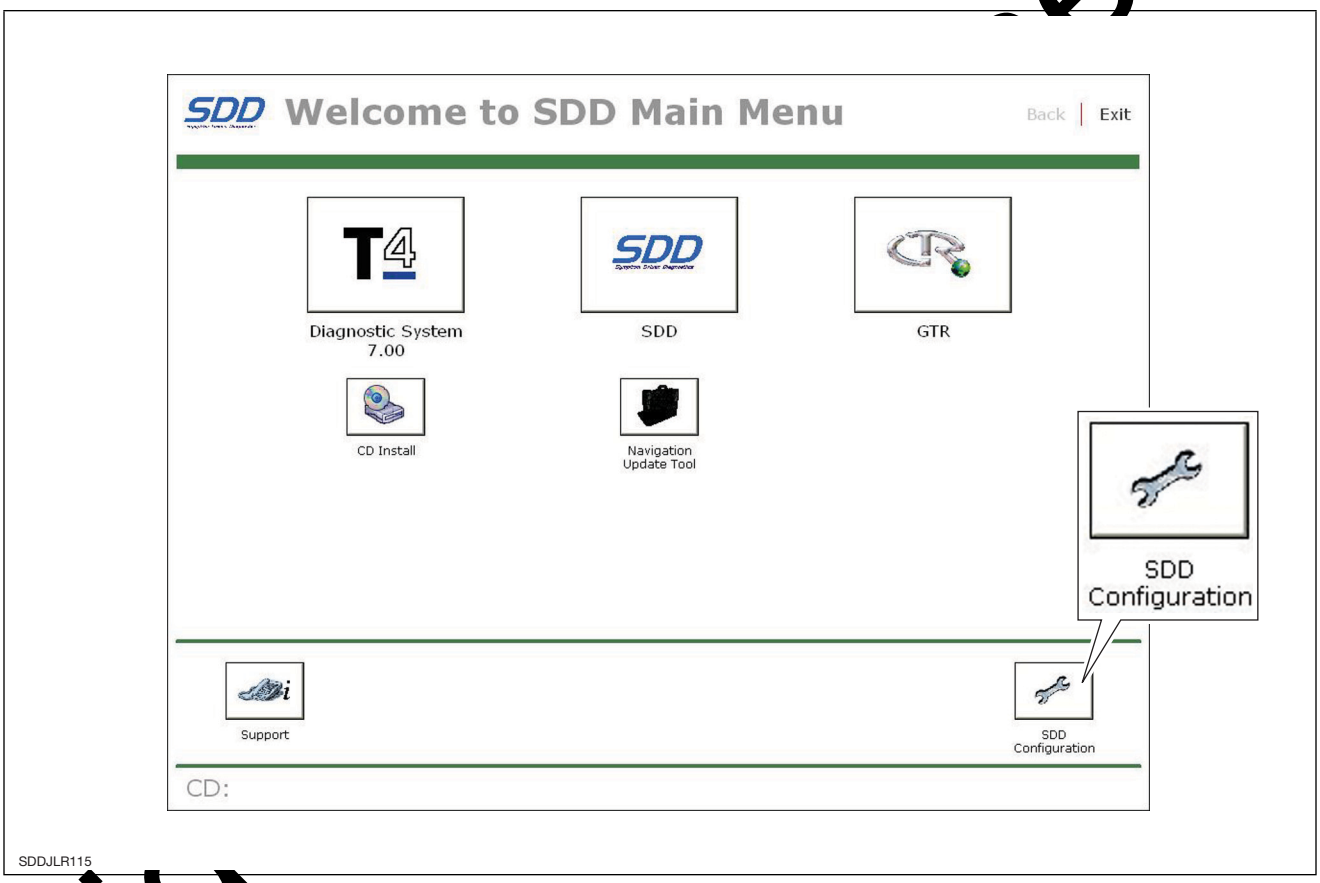
General Notes on Operation

IDS-SDD-JLR 02/2012
Printed in USA

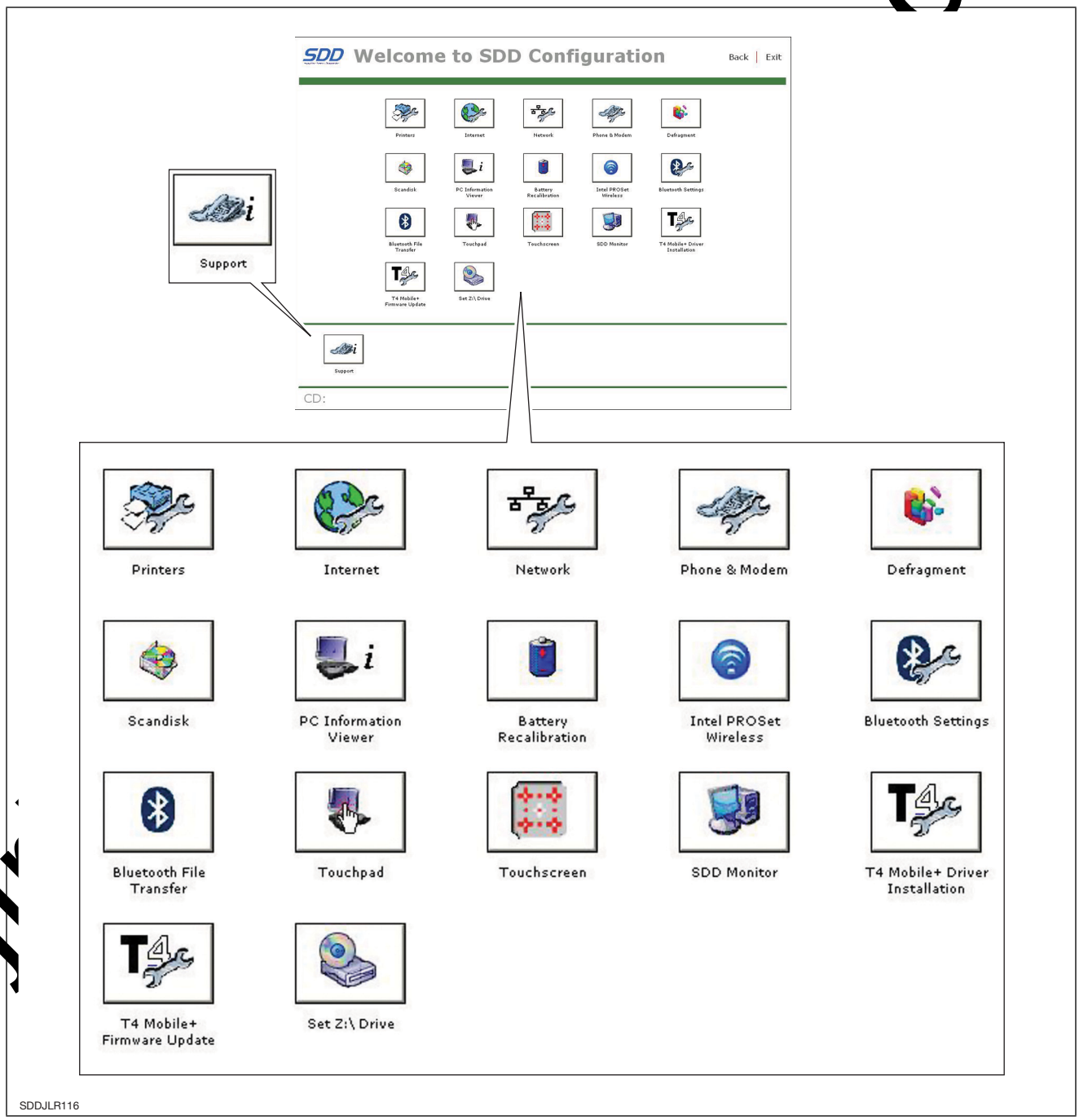
https://www.jlridssddmongoose.com/sdd-symptom-driven-diagnostics/

SDD CONFIGURATION MENU

SDD system configuration tasks are carried out from the SDD Configuration Menu, accessed by selecting the 'SDD Configuration' button from the IDS main menu Welcome screen.



The SDD Configuration Menu contains 18 buttons for access to the various configuration options.



SDD configuration options are as follows:

Printers
Enables printers to be added and configured.

Internet
Configure internet connections.

Network
Configure network connections.

Phone & Modem
Configures the modem.

Defragment
Runs disk defragmenter to improve file access; use following installation of updated software.

Scandisk
Used to check the hard drive for faults and broken programs that may affect the operation of IDS.

PC Information Viewer
Displays current PC configuration.

Battery Recalibration
Recalibrates the battery.

Intel PROSet Wireless
Configures wireless network connection.

Bluetooth Settings
Configures Bluetooth® connections.

Bluetooth File Transfer
Transfer files using Bluetooth® network.

Touchscreen / Touchpad
Reconfigures / calibrates the touch screen.

SDD Monitor
Launches the SDD Monitor application.

T4 Mobile+ Driver Installation
Installs software updates to the laptop.

T4 Mobile+ Firmware Updates
Installs updates for the T4 Mobile+ communications box.

Set Z:\ Drive
Changes the DVD drive ID letter to Z (when DVD drive is connected to another USB port).

Support
Provides access to the SDD support contact details.

NOTE: The options 'Internet', 'Network', 'Phone & Modem', and 'Bluetooth Settings' are used to configure the appropriate connections and will normally only be used by the dealer Information Technology (IT) department.

TESTMAN AND TASK MANAGER

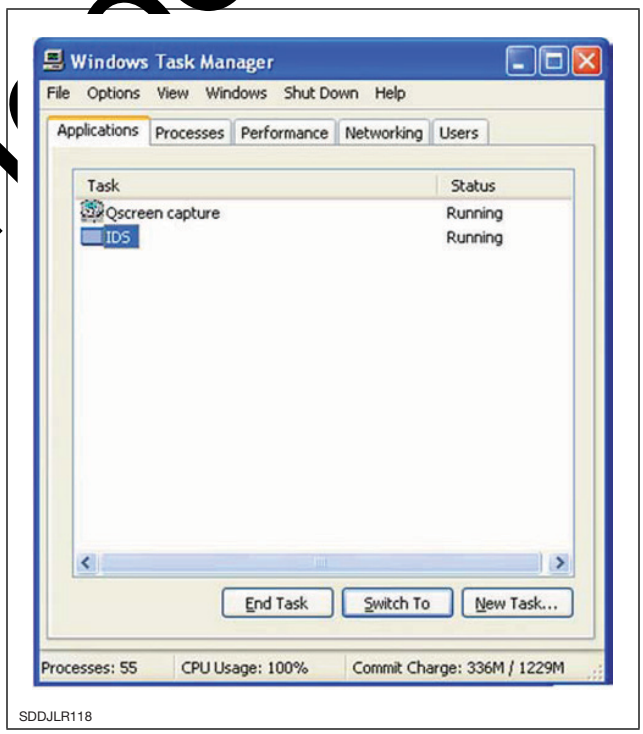
Testman

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

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 shut down the IDS application. To shut down IDS, simultaneously press the 'Ctrl' + 'Alt' + 'Del' keys on the keyboard. The Task Manager will be displayed.



Select 'Shut Down' from the menu headings above the tabs, then select 'Restart'. IDS will shut down then restart.

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

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

If the problems described persist, the IDS support desk should be contacted.

USING THE 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 it is necessary to print files, the USB drive can be used to transfer the required files to the printer.

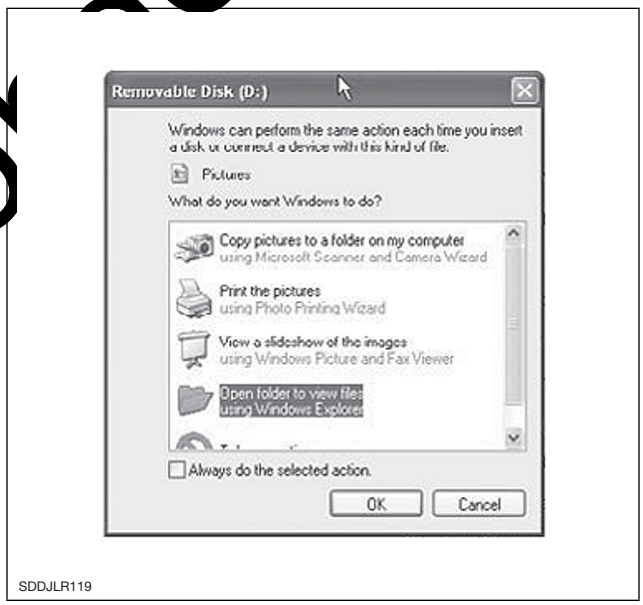
The large capacity of the USB drive allows the transfer of a large amount of data from the IDS laptop computer to another computer.

SDDJLR003

Connecting the USB Drive

Remove the cap covering the connector on the USB drive, then insert the drive into one of the USB ports on IDS. After a short time, IDS will recognize the device and will display a pop-up screen message. The USB drive can be opened from this pop-up screen, provided IDS has been configured to do so.

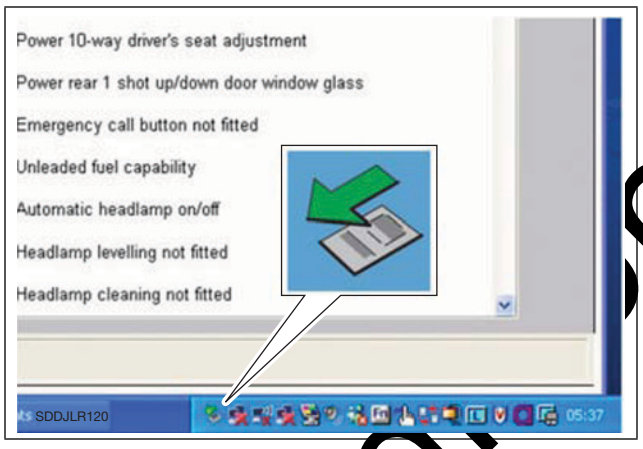
USB Connection Pop-Up Screen



SDDJLR119

If IDS is not configured for this method, the USB drive can be opened by selecting 'My Computer' from the Windows 'Start' menu. Right-click on 'Removable Disk (D:)' 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.

Closing and Removing the USB 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 the 'X' at the top RH corner of the screen.

To disconnect the drive, select the USB symbol on the task bar. The message 'Safely remove USB mass storage device' will be displayed. Select the message. A confirmation message will be displayed stating that it is safe to remove the USB drive; the USB symbol will disappear from the task bar. The USB drive can now be removed from IDS.

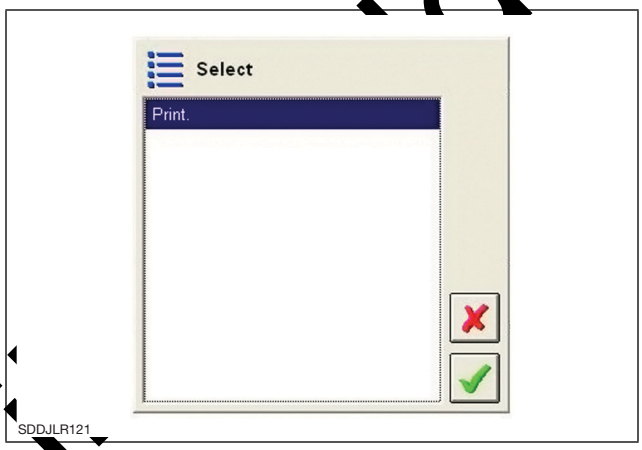
PRINTING IDS SCREENS

IDS includes a program called PDF995, which allows the user to 'print' screen images and save them as a Portable Document Format (PDF) file. These files can then be saved to a preferred file destination on the computer, or saved to the USB drive and transferred to another computer for printing, e-mailing, etc. When a problem occurs on IDS, it is most helpful if the screen images are printed and sent to the Support Desk.

To print a screen image, select the desired screen, then select the Select System Options function button.

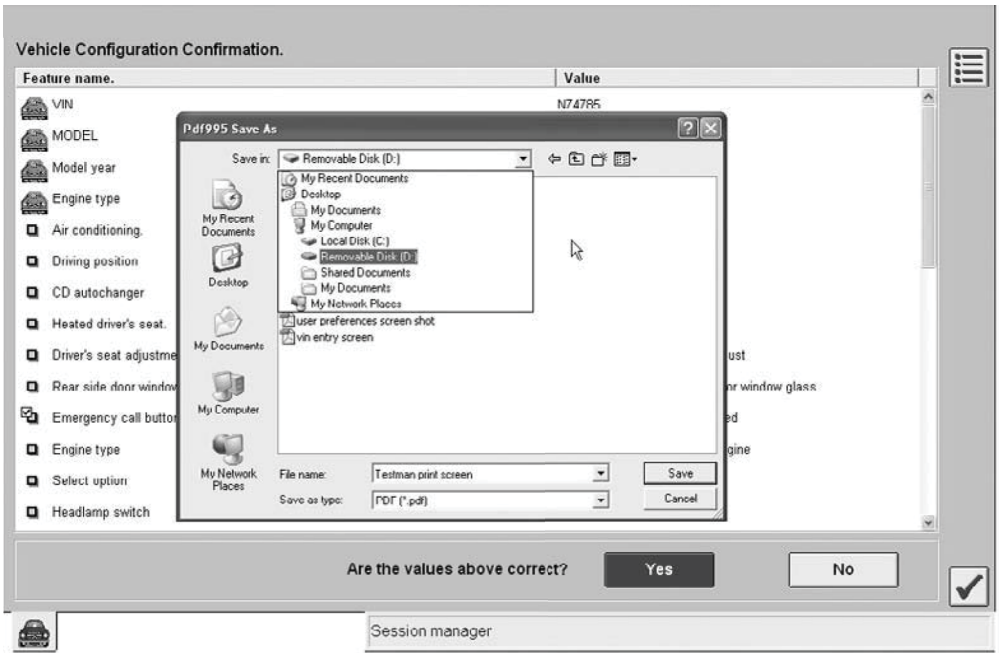
Select System Options Function Button

A dialog box will appear, with option 'Print' or 'Print screen' highlighted.



Select the confirmation 'tick' to print/save the selected screen. A 'Pdf995 Save As' window will be displayed.

'Pdf995 Save As' Pop-Up Screen



SDDJLR122

Select a location where the file is to be saved and give the file a name.

NOTE: IDS will assign a default file name, but it is recommended that you assign a specific name that will help you identify and locate the file later (for example 'VIN_012345_DTC1').

Save to USB Drive

To save the file to the USB drive (make sure the drive is connected), select 'Removable Drive' from the list, then select 'Save.' The file is now saved to the USB drive.

Adobe Reader will open, displaying an image of the screen you have printed. Close the document.

Save to Computer Hard Drive

To save the file to the IDS laptop's hard drive, select an appropriate location (for example 'Desktop' --> 'My Documents'), then select 'Save.' The file is now saved to the hard drive.

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

To locate the file, open the desktop and go to the location where the document was saved. The file can be copied to the USB drive and transferred to another computer or printer if required.

SDD MONITOR TRACE

The SDD Monitor is a powerful data collection tool that enables users to capture details of a failed SDD process. When Jaguar / Land Rover engineers must diagnose a failed procedure, the SDD Monitor information is the only way to effectively identify the root cause.

Example: Monitor trace provides additional details to troubleshoot a failed procedure, like module replacement or key programming. Information from the Monitor will allow JLR to determine if the failed procedure is within the vehicle or SDD itself.

Before exiting from the diagnostic routine, select the 'Alt' + 'Tab' keys to display the Main Menu. Select 'SDD Monitor' from the 'SDD Configuration' menu.

SDD Monitor will open and create a trace of all data relating to the diagnostic routine performed. Name and save the file to a preferred destination, where it can be retrieved later. It is recommended that the file name contains the VIN, since this will assist in referring to it easily. The file can be transferred to another computer using the USB drive and, if required, can be sent to engineering for analysis.

The trace file will show all details of the diagnostic routine performed, including the VIN, test performed, which answers had been selected from the pop-up messages, etc.

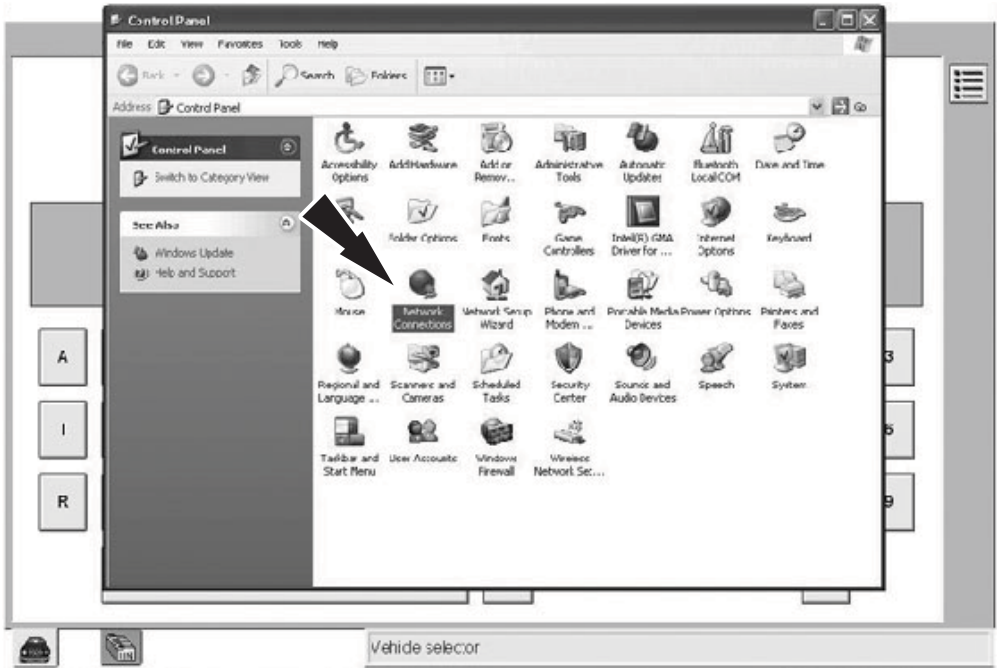
NOTE: Due to frequent updates to SDD Monitor operation, please review the latest Special Service Messages (SSMs) to set up and run a Monitor Trace effectively.

DISABLING WINDOWS XP NETWORK WARNINGS

The network established between the VCM and the IDS laptop is considered a 'limited' network by the Windows environment. Because of this, Windows will issue a warning whenever the VCM connection is established or terminated. The warnings are displayed in balloon format on the bottom right of the screen, and may cover some function buttons.

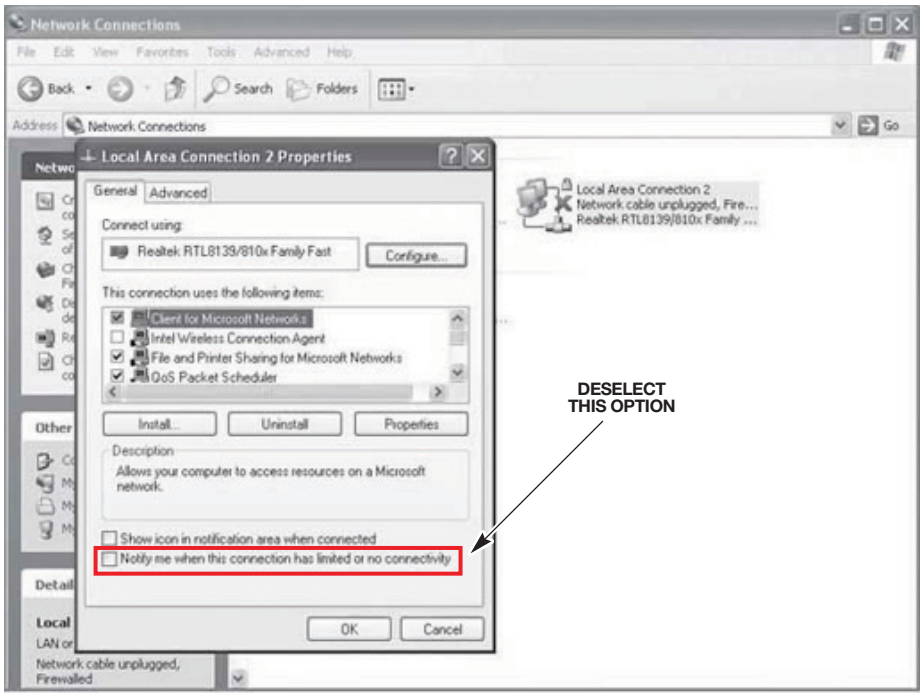
These warnings, and warnings which occur whenever power to the VCM is interrupted, can be disabled within the Windows Control Panel as follows:

– Select 'Network Connections' from the Control Panel.



SDDJLR123

– Right-click on 'Local Area Connection 2' and select 'Properties'
– Deselect the bottom box, labeled 'Notify me when this connection has limited or no connectivity' and click 'OK'



SDDJLR124

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

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

Technical Training
Diagnostic Systems

IDS-SDD-JLR:
IDS Symptom Driven Diagnostics

Maintenance and Support

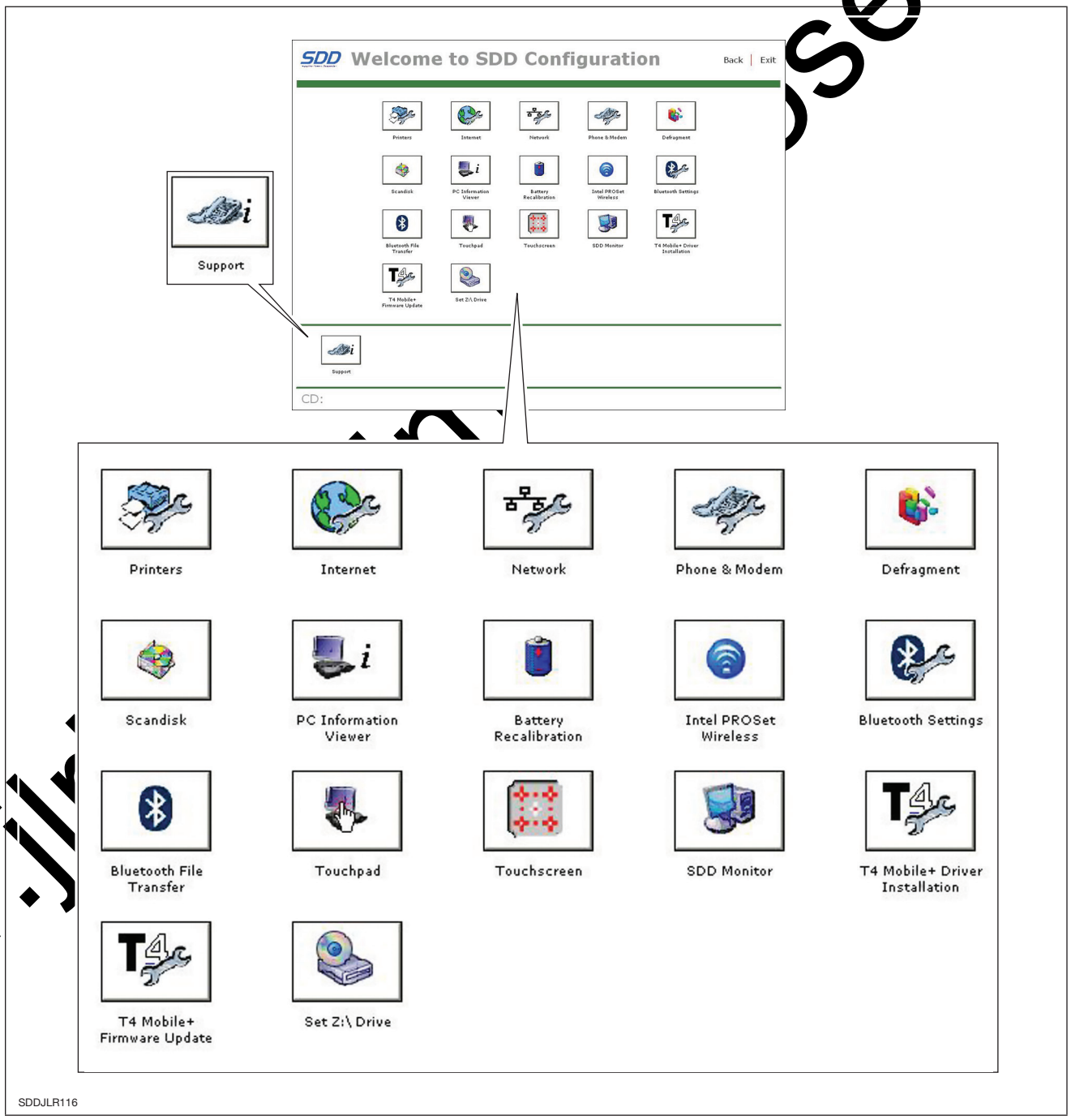
JAGUAR | LAND ROVER

IDS-SDD-JLR 02/2012
Printed in USA

https://www.jlridssddmongoose.com/sdd-symptom-driven-diagnostics/

IDS MAINTENANCE

Several Maintenance features are available to keep IDS running in optimal condition. Maintenance features are accessed from the SDD Configuration menu.



Scandisk

A scandisk should be performed once a month. This action checks the drive for corrupt files or bad segments and repairs them as required.

Disk Defragmenter

Because of the way a computer stores data on its hard disk, the storage space can become 'fragmented' over time, with bits of data for a single operation stored in pieces around the hard drive. Once this happens, the computer has to search simultaneously in several areas of the hard drive to locate necessary data, which can slow down the operation of the computer. Disk Defragmenter reassembles fragmented data (the operation is called 'defragging') so that the hard drive can work more efficiently. The Disk Defragmenter is accessed by selecting 'Defragment' from the SDD Configuration menu.

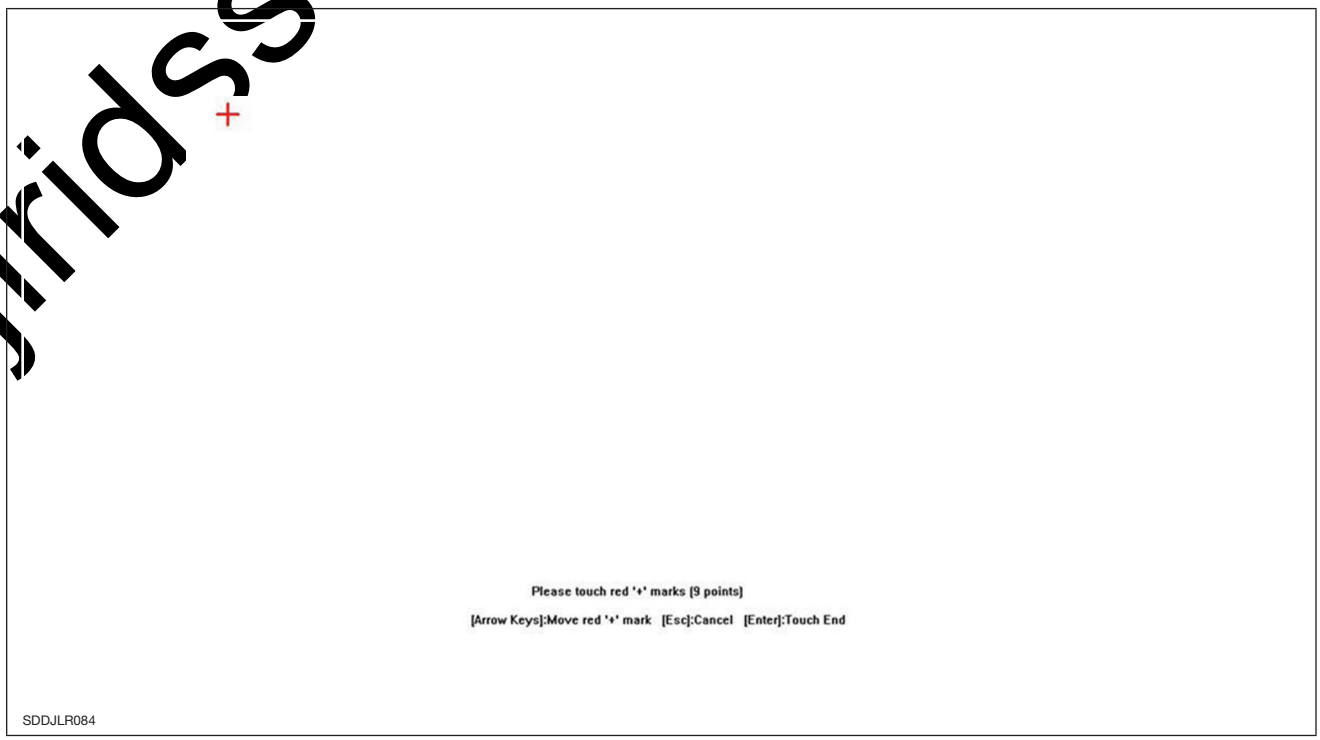
It is recommended that the defragmenter is used at a convenient time following the installation of new diagnostic software. Defragging the hard drive may take some time to complete, so only carry out this procedure at the end of a working day when IDS will not be required. Monthly defragging is recommended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

Touch Screen Display Calibration

If the accuracy of the TSD has depreciated it can be recalibrated by selecting 'Touchscreen/Touchpad' from the SDD Configuration menu. The mouse properties will be displayed. Select the 'Touch screen' tab and then 'calibration'. The calibration screen will be displayed.

Using the stylus, touch and hold the '+' symbol for approximately one second. The symbol will then move to another position where the procedure will be repeated. Repeat the process for each position of the symbol. Once all nine '+' positions have been verified, complete the calibration by selecting 'Enter'.

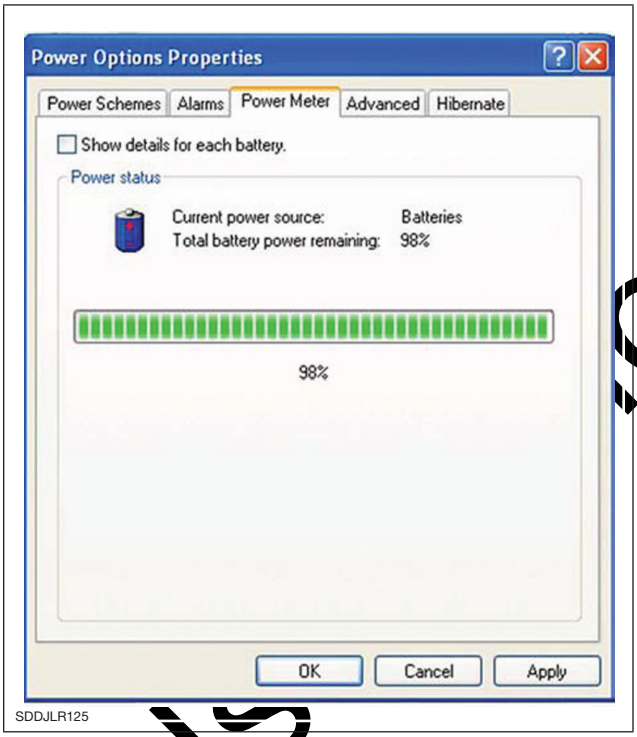
Calibration Screen



Laptop Battery

Battery Power Status

The condition of the internal battery can be viewed in the 'Power Options Properties' window by selecting the 'Power Meter' tab. The current power source and the percentage of battery power remaining will be displayed.



SDDJLR125

The battery condition can also be displayed by selecting 'Fn' + 'F9' on the keyboard.

Battery Power Display

SDDJLR126

Battery Calibration

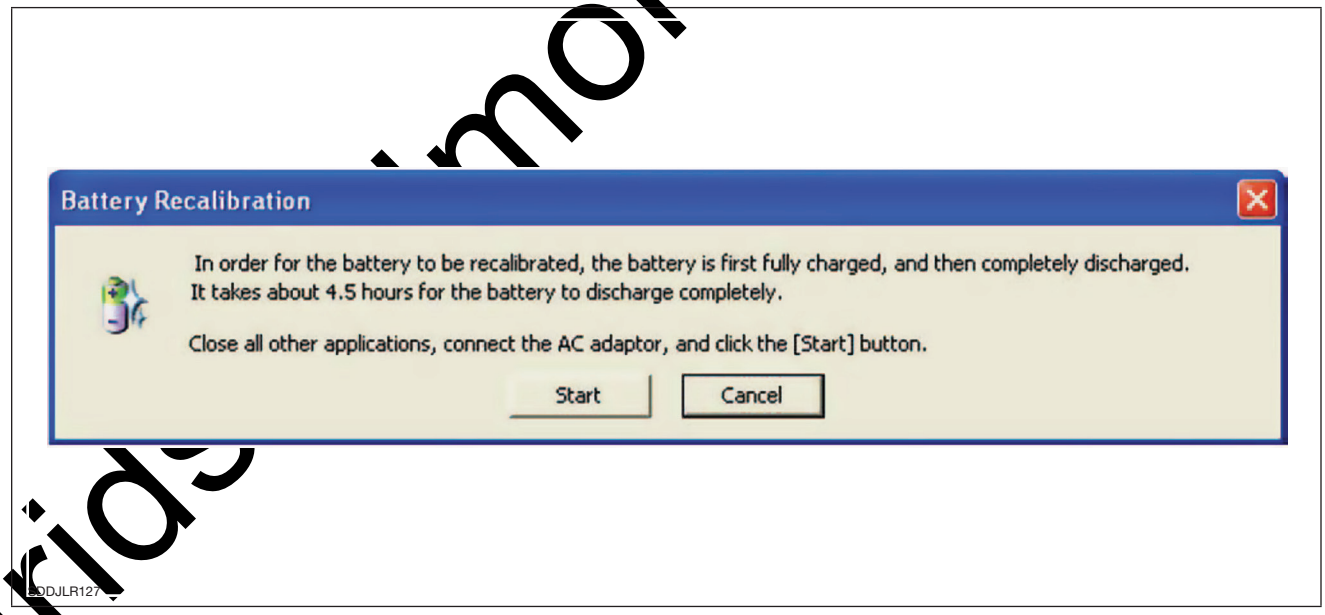
As the battery deteriorates the remaining battery capacity may not be displayed accurately. In this situation, select 'Battery Recalibration' from the SDD Configuration menu to recalibrate the battery. The battery will be charged (if not already fully charged), then fully discharged.

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

NOTE: The calibration procedure also recalibrates the battery power meter to ensure its accuracy.

It is recommended that battery recalibration is carried out monthly. Battery recalibration can take up to 14 hours to complete and so should be carried out overnight when IDS is not required. Battery recalibration can only be carried out when IDS is connected to an AC power supply.



IDS SUPPORT

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.

To contact IDS Support:

- In the U.S. and Canada, call **(866) 628-5508**
- In Mexico, call **(800) 504-5330**
- From TOPIx, go to **www.spxtools.com**

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 provided by SPX (the IDS supplier), not by the Dealer Technical Support Hotline. The Dealer Technical Support Hotline only provides support for vehicle 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

Details of IDS Test Function Being Used

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

In addition to the Monitor2k2 data, vehicle information also should be included with 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.

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.

IDS Example:

- Select Configuration tab
- Select Configure new modules
- Select Datalogger tab
- Select Global options

T4 Example:

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

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

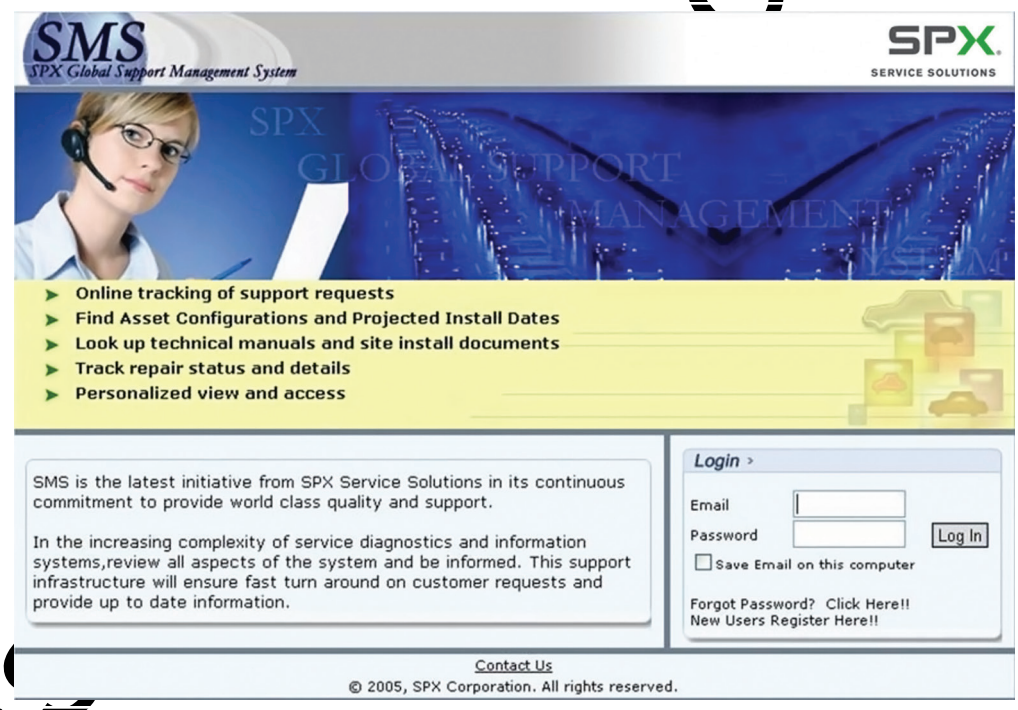
In addition, it is helpful to IDS engineers if they are informed of difficulties experienced when using IDS even though you may have resolved the problem yourself. This information can then be used to prevent problems occurring in the future.

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 can 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 access the SMS site online, go to: **http://sms.spx.com**

SMS Login



SDDJLR133

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 or closed

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Technical Training
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IDS Symptom Driven Diagnostics

Datalogger

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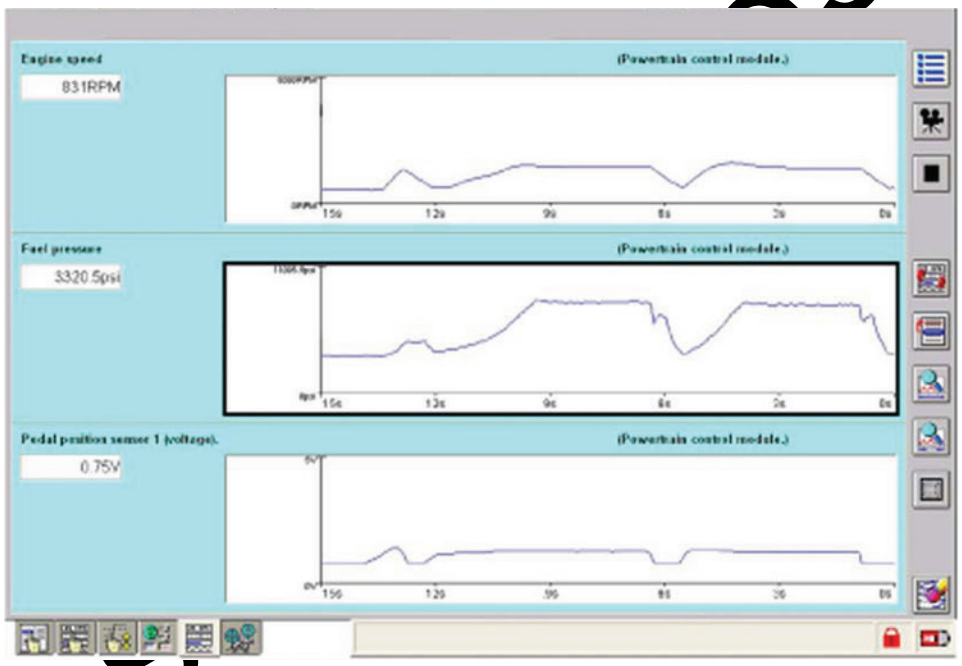
Printed in USA

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 can decide which signals are to be monitored, how they are buffered, sampled and scaled for display. Limits and trigger settings can also be set.

Datalogger Live Display Screen



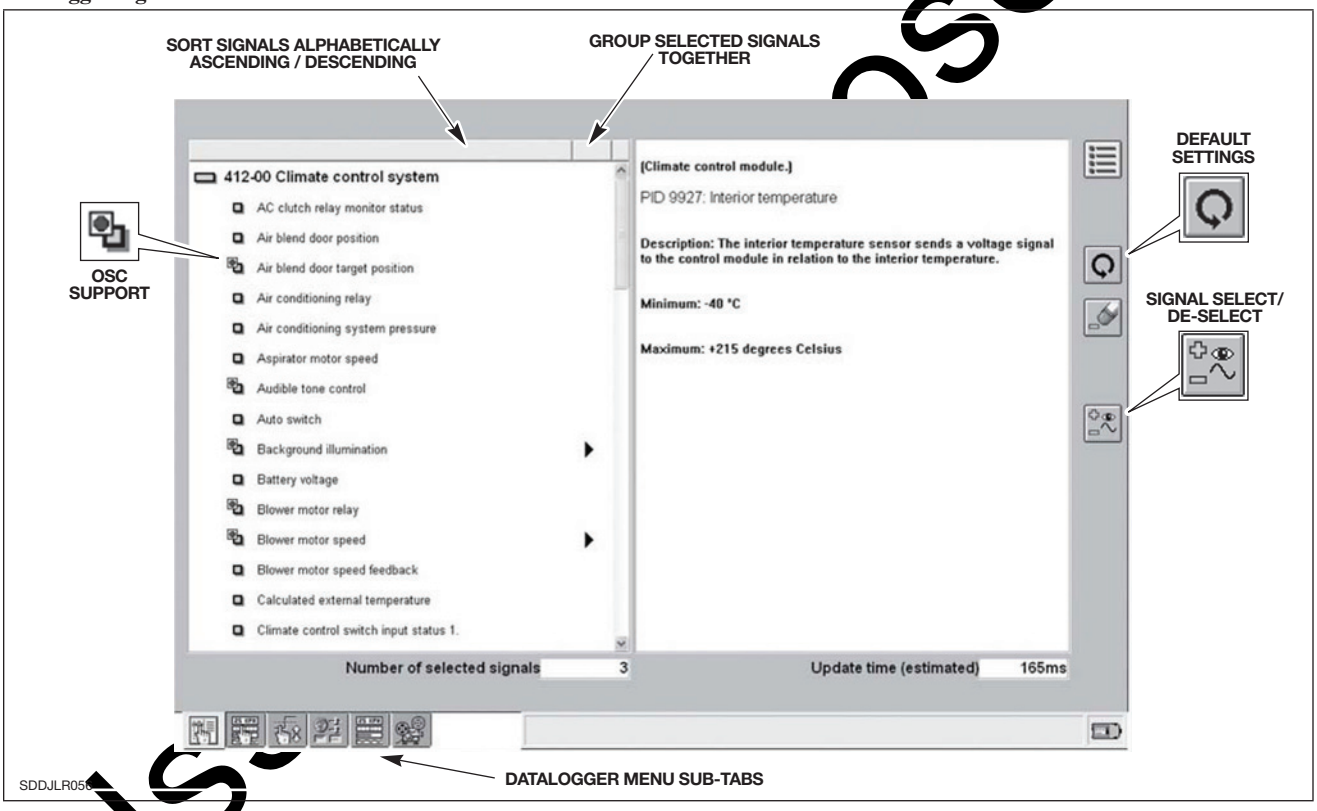
SDDJLR055

Prior to selecting Datalogger, the user should select the desired system for Datalogger monitoring using the Content Model, the first level of the Content Model is recommended for optimal results.

Datalogger Signal Selection

The Signal Selection sub-tab menu is displayed when Datalogger is first opened; this is the default. This provides an opportunity to immediately select or de-select any signals. To select a different signal while working in other Datalogger menus, the user will return to the Signal Selection menu by selecting the sub-tab.

Datalogger Signal Selection Menu Screen



Signal Selection Screen Layout

The left-hand panel displays a list of all available signals. The right-hand panel is used to display information about selected signals, such as description, standard units, operating range, etc.

The signal menu uses a hierarchical structure, similar to the menu structure of the Content Model. By selecting the '+' or '-' icon adjacent to a system, the menu will be either expanded or collapsed. Signals can be selected from anywhere within the menu structure.

If the vehicle system was selected from the Content Model prior to launching Datalogger, the Output State Control (OSC) function (where applicable) will be configured. Components that are supported by OSC are indicated by an enhanced icon adjacent to the signal.

Highlighting a signal in the menu will display additional information about the signal in the right-hand pane; it does not select the signal for logging. To select a signal for display or capture, highlight it and select the Signal Select / De-Select Function Button. The number of signals selected is always displayed at the bottom of the screen.

Sorting and Grouping Signals

The signals can be displayed in ascending or descending alphabetical order; sort the signals be clicking on the wide bar above the list.

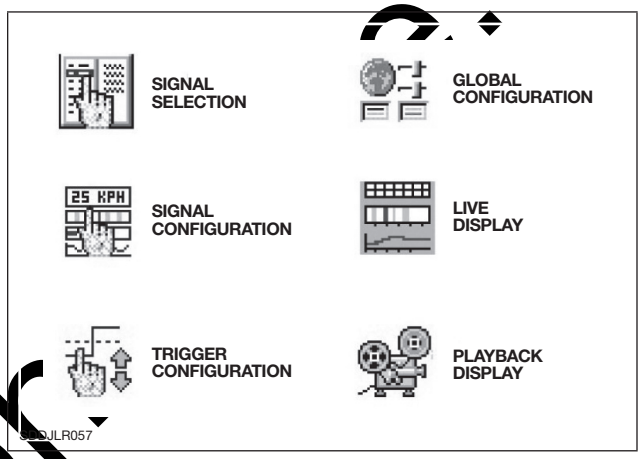
The selected signals can be grouped together by clicking on the narrow bar to the right of the alphabetical sort bar. Grouping the signals serves two purposes:

- It allows the user to easily view the signals that have been selected
- It allows all selected signals to be de-selected at the same time, rather than individually.

USING DATALOGGER

Datalogger Sub-Tabs

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



Signal Selection
Select the signals for capture.

Signal Configuration
Set signal attributes including Display, OSC, and Analog.

Trigger Configuration
Set the triggering limits of a selected signal.

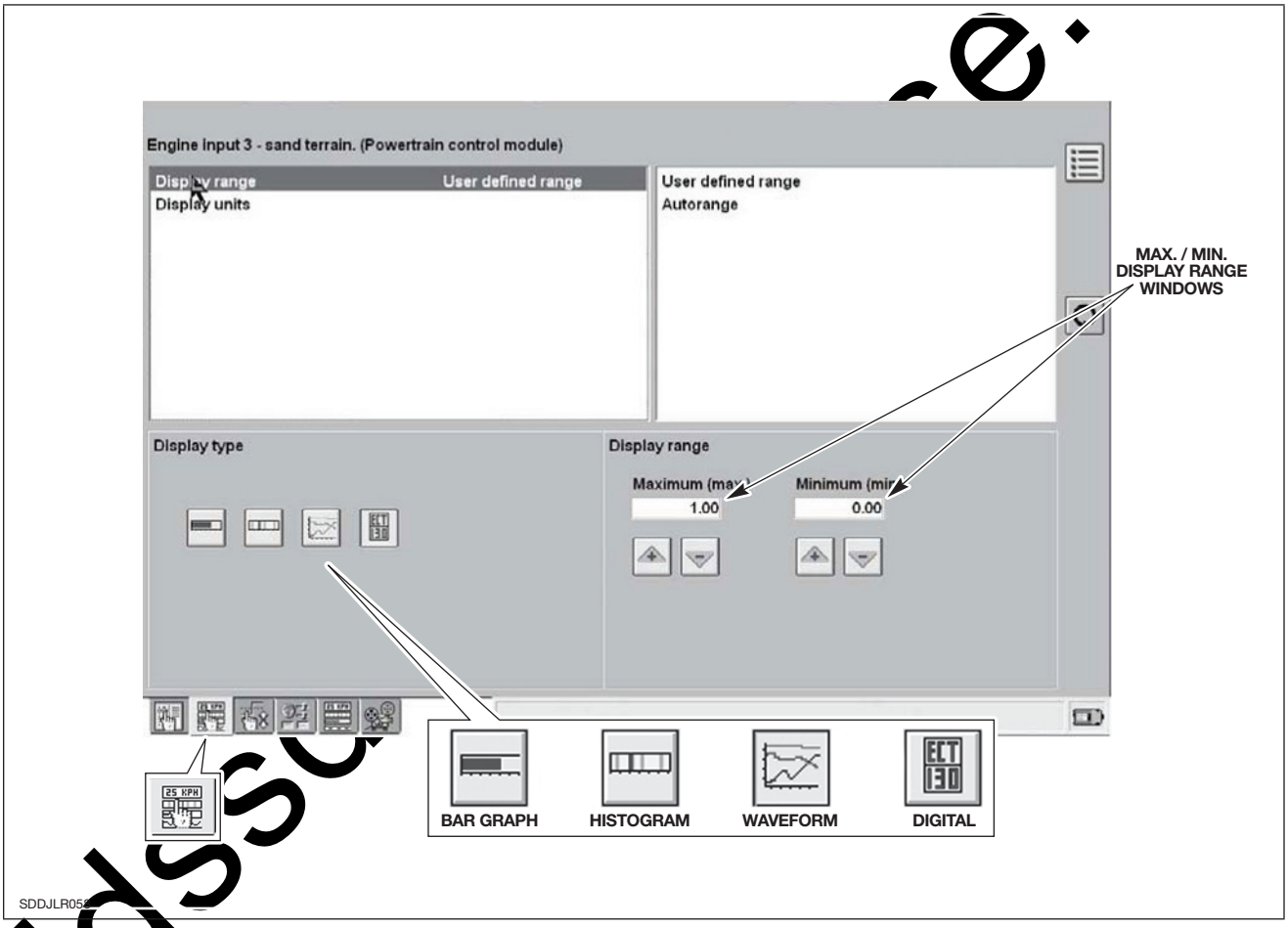
Global Configuration
Set the parameters of all selected signals and display a summary of information about them.

Live Display
Capture selected signals and display them in real time.

Playback Display
Recall and display previously captured signal data.

Datalogger Signal Display

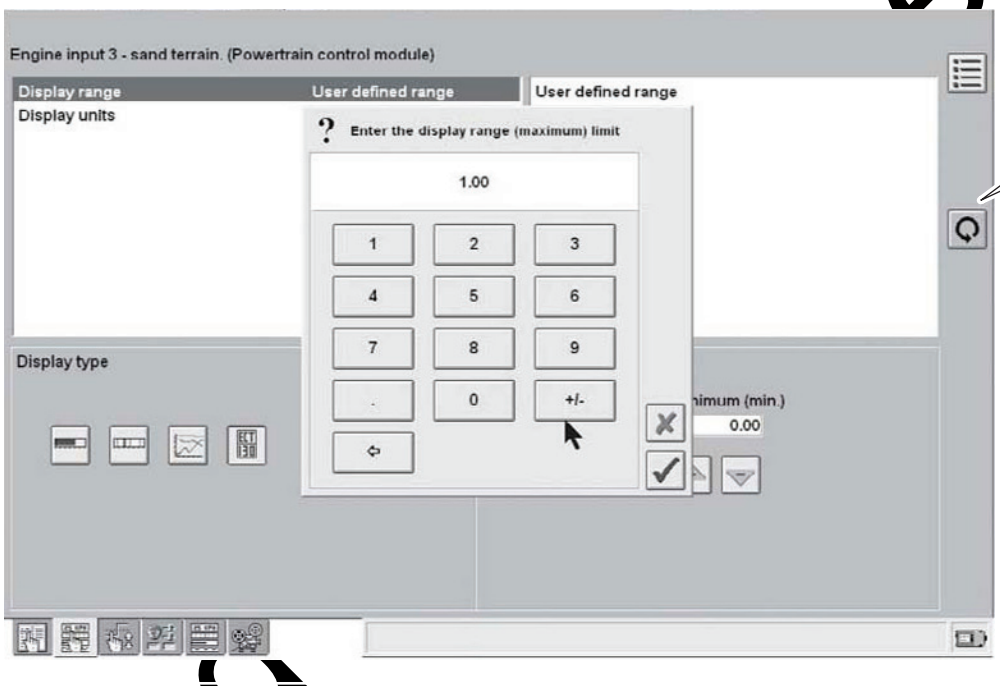
The Signal Configuration sub-tab allows the user to select the display type and to adjust the display range.



The 'Display type' buttons allow the user to change the form in which Datalogger signals are displayed, while 'Display Range' allows the user to modify the scale of the signal displayed.

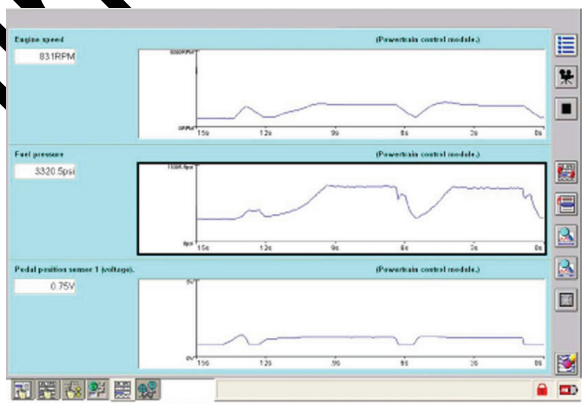
For example, the fuel pressure Autorange may display the pressure on a scale of 1 to 100 psi; by highlighting 'User Defined Range' the user can set the minimum/ maximum range of the display using the increment buttons from 1 to 50 psi, which allows the user to read the signal more precisely.

A numerical keypad is available to quickly change the value by a large amount. 'Tick' the TSD in the Min. or Max. display range window to display the keypad. The values can be returned to the default setting quickly by selecting the Default Settings function button.

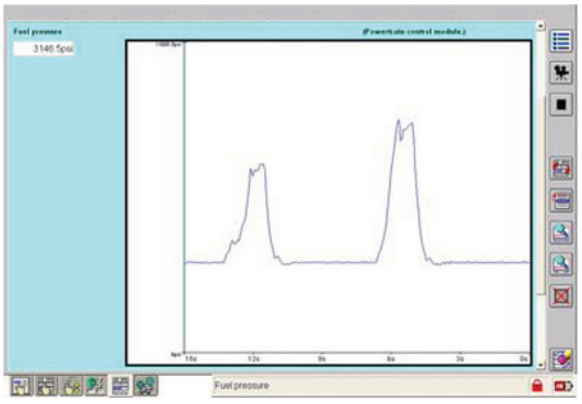


SDDJLR059

The order in which the signals are displayed initially depends on the order in which they were selected. However, the order in which they are displayed can be changed. Up to three signals can be displayed on each screen, or one signal can be expanded to the full screen.



THREE SIGNALS PER SCREEN



ONE SIGNAL, FULL SCREEN

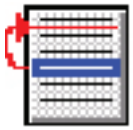
SDDJLR060

Changing Signal Display Order

To change the display order of the signals:

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

Move Signal Position Function Button



Expand Signal Display to Full Screen

To expand a signal, select the signal and operate the Full Screen function button. To return the signal display to normal view, operate the Full Screen button again.

Full Screen Function Button

Capture Playback

A Datalogger signal can be captured and viewed later for analysis. The signal can be captured manually by selecting the 'Trigger Datalogger Recording' button, or a trigger can 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 Function Buttons). 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

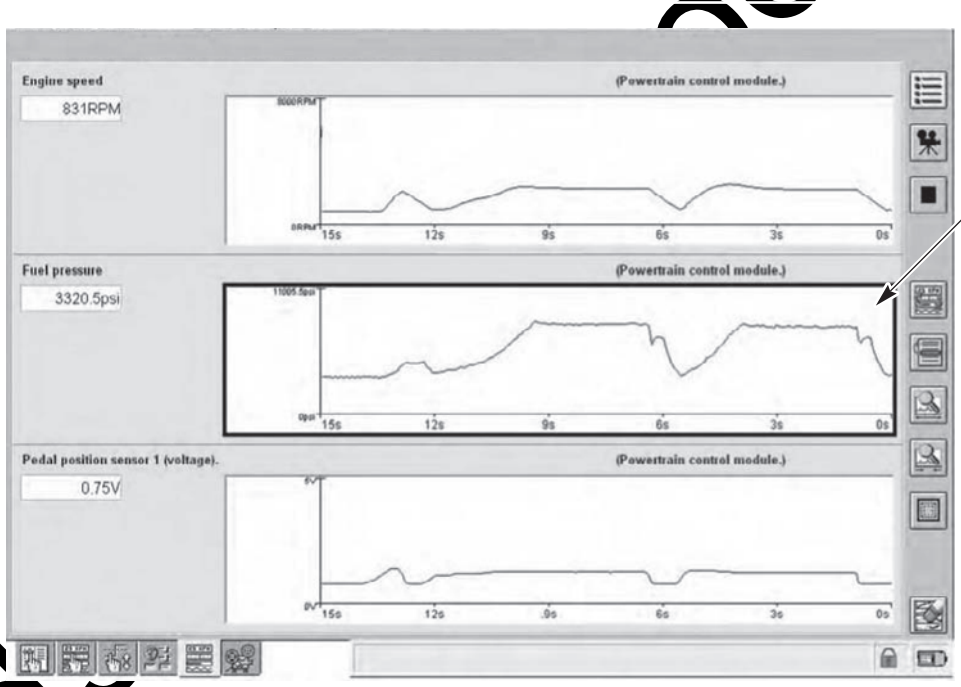
Live Display Sub-Tab

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 Sub-Tab

Live Display Screen



SDDJLR066

You can select a signal simply by selecting the waveform (or bar graph/histogram) or signal name. If there are more signals, a vertical scroll bar will appear on the right of the screen to allow you to navigate between them.

Live Display Function Buttons

The Function Buttons associated with Live Display allow the user to capture and work on specific signals.

Select System Options
This button (which is always displayed regardless of sub-tab selection) allows you to print, road test and exit Datalogger.

Capture
This button only appears on the Live Display screen.

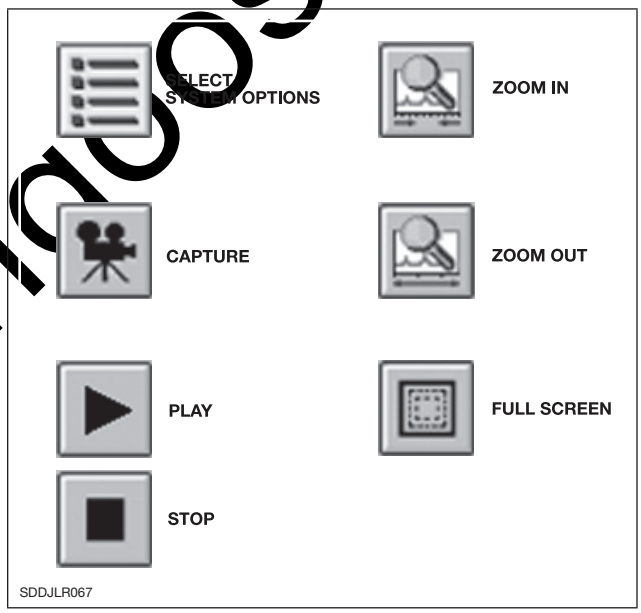
Play / Stop
This button only appears on the Live Display screen; it allows the Live Display to be stopped and re-started.

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%.

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%.

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

NOTE: These are only some of the Function Buttons. To view the description of any Function Button, hold the stylus over the button for a few seconds; the description will be displayed in the secondary information bar at the bottom of the screen.



SIGNAL CAPTURE

Datalogger signals can be captured for review, either manually or by a Trigger Event.

Each session can 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 can 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.

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 overwrite the oldest capture in the store.

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 can be changed as well as captured recorded time and capture rate.

Specifically, Global Settings allows 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 can then be viewed by the user.

The capture duration can be pre set in increments using the Fast, Medium, and Slow buttons as follows:

Fast – 30 seconds

Medium – 10 Minutes

- Slow – 12 Hours

Using Triggers

A trigger event is a point in time when a defined limit is reached or exceeded. A trigger can be set so that a Datalogger action is automatically carried out when the trigger event occurs. This action may be to record Datalogger signals or to sound an audible warning:

- **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. You can select Record on its own, Acoustic on its own or Record and Acoustic together, or select nothing.

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.

Setting a Trigger

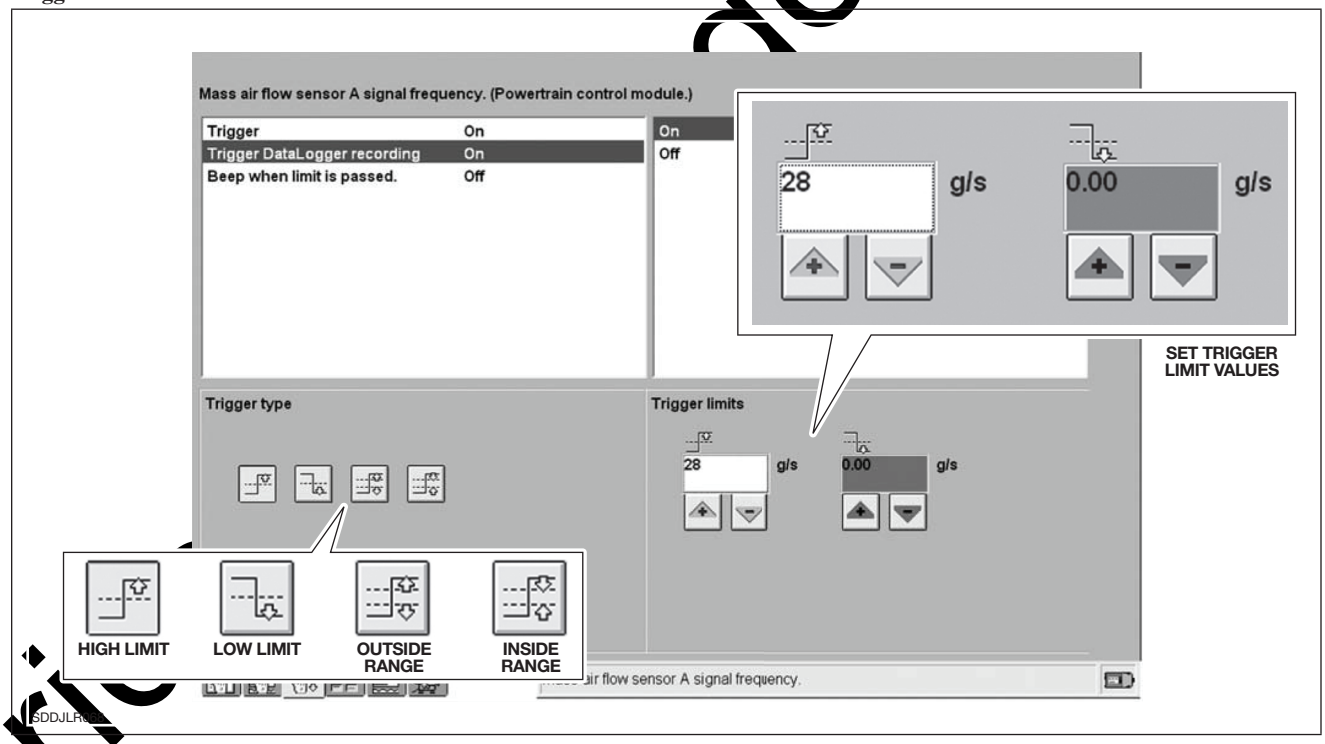
The signal which is required to be used as the trigger must first be selected. Following this, the trigger parameters must be set by selecting the trigger selection sub-tab.

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



Trigger Limits

A cluster of four buttons allow you to select the type of trigger. When either of these buttons is pressed, its background color 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 High Limit Select this to set a limit on a signal exceeding a pre-selected value

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

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

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

Trigger Limit Values

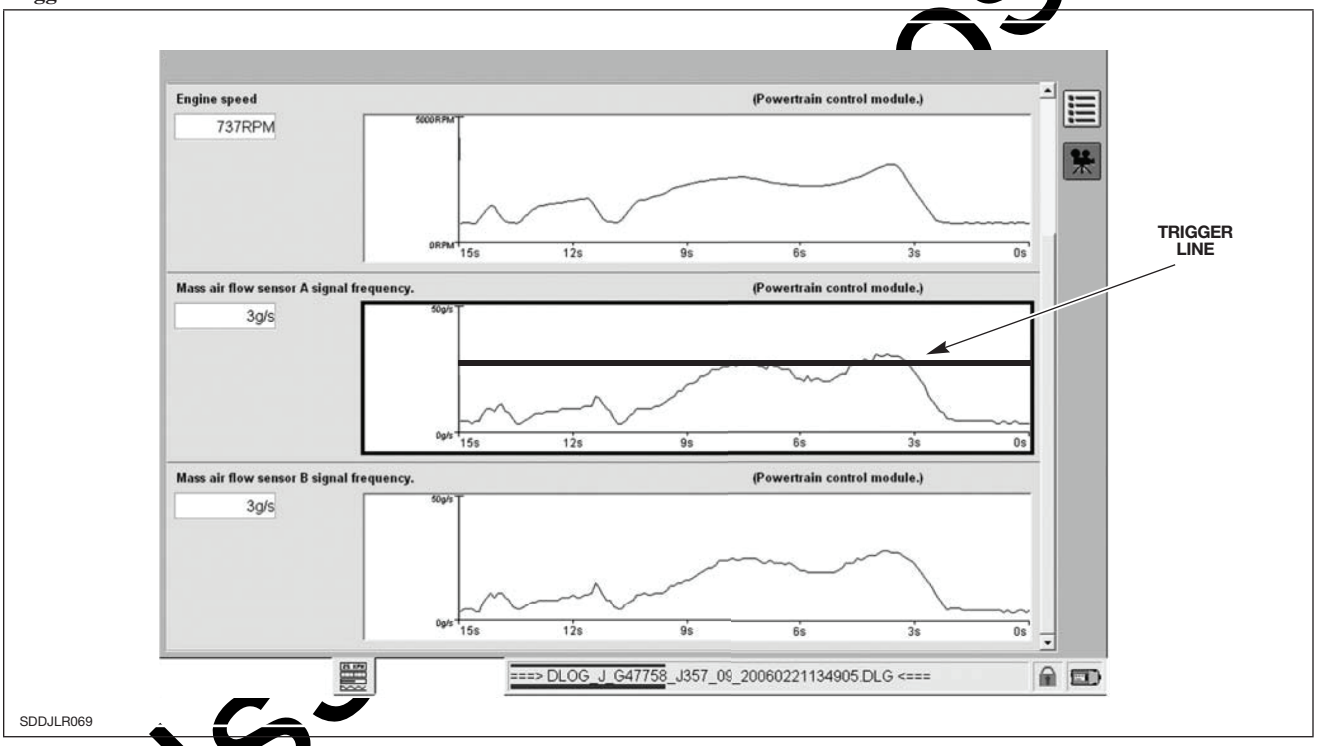
You can specify Trigger limit values by selecting the appropriate display pane and using the increment / decrement buttons. More accurate values can be set using the keypad. In the example shown here, the symbols for upper and lower trigger limits appear over their display panes. However, when only one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

Run Datalogger

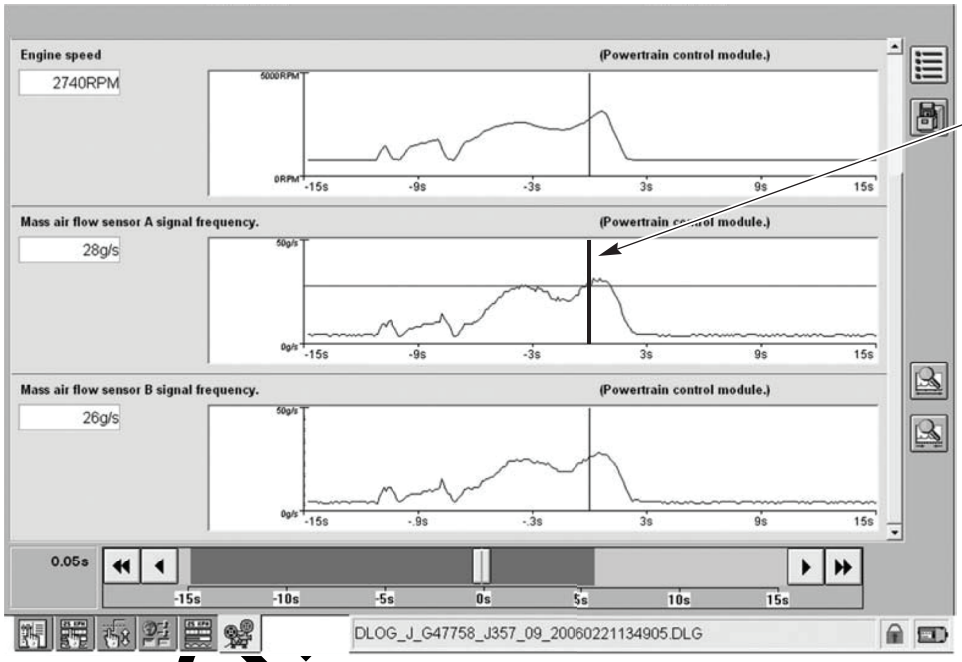
Once the trigger settings have been selected, navigate to the 'live display' screen and set Datalogger running.

The illustration below shows that the trigger has been set, 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



Capture Signal by Trigger Event



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 can 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.

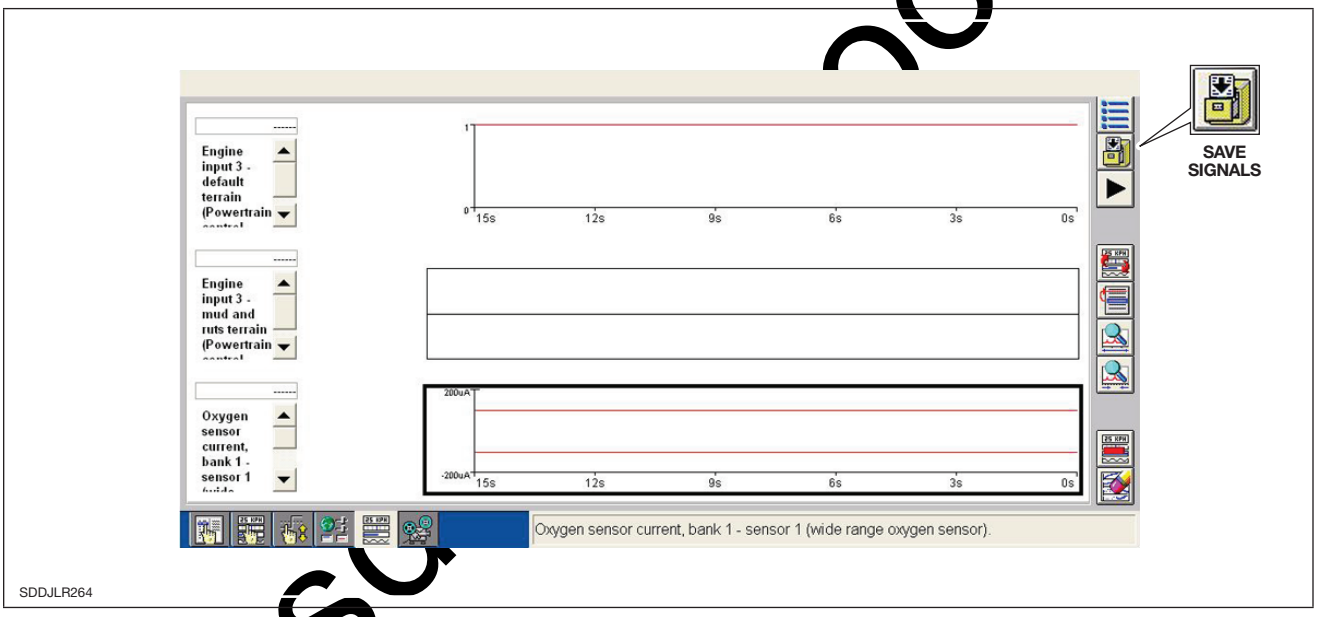
For example, if the capture duration is set to 20 seconds and the pre- and post-trigger setting is 20% and 80% respectively, then 4 seconds would be captured before the trigger event and 16 seconds would be captured after the event.

Datalogger Signal Grouping Feature

Datalogger Signal Grouping (DSG) allows users to create unique signal groups conforming to their individual needs. These signal groups can be saved and then recalled when needed.

Use the existing Datalogger interface to select and configure up to 16 Datalogger signals for viewing live.

You may also change the signal order, scaling, display type, triggers, etc., and create the arrangement of signals desired for a given purpose. Once the live display is set up to meet your needs, click on the 'Save Signals' button (file cabinet with arrow down icon) in the button bar at the right side of the screen.



When the 'Save File' dialog window appears, give the file a name that will allow you to recognize the purpose of that signal group. Files will be saved in the required default location (the 'My Documents' folder in Windows®). DSG files can be identified by the '**DSG_**' preceding the user-assigned name, as in this example:

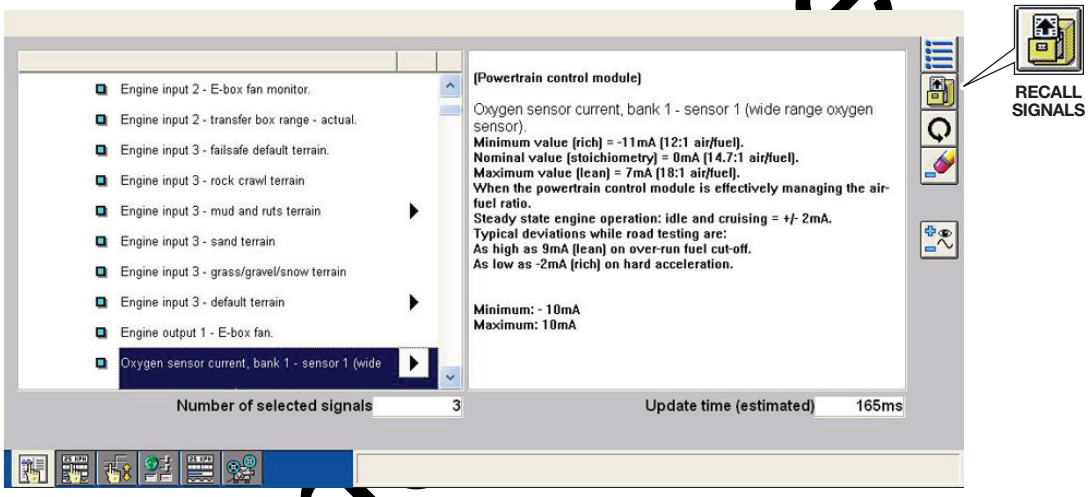
DSG_<user-assigned name>.XML

New DSG files are automatically assigned the model and model year range of the vehicle specifications for the current session.

Users that wish to share DSG files across multiple IDS laptops can manually export/import DSG files from/to the My Documents folder. Note that if an IDS laptop requires a static restore and full system recovery, the DSG files must be manually backed-up and exported to a flash drive BEFORE executing a Phoenix Recovery/Static Restore process.

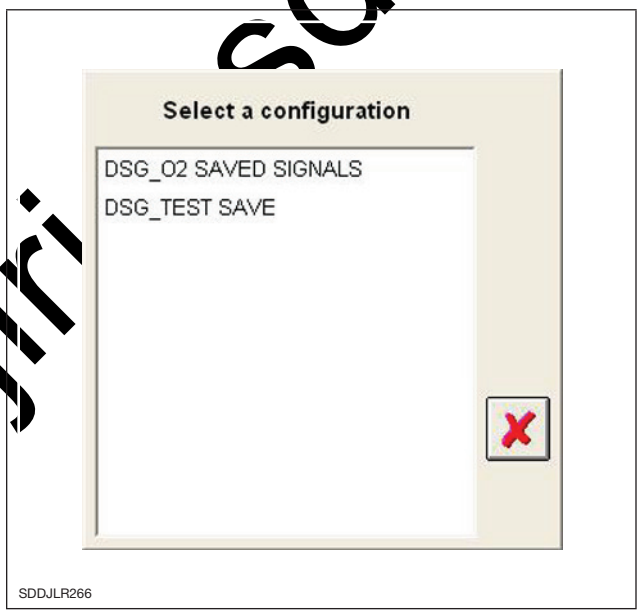
Recalling Existing Signal Groups

From the Signal Selection screen, click the new 'Recall Signals' button (file cabinet with arrow up icon) in the button bar.



SDDJLR265

This will pop-up a list of available DSG files for the current vehicle specification, as found by Datalogger in the default location.



SDDJLR266

Select the desired DSG file and the signal group will load into the live display viewer within Datalogger, with all the saved signal order, scaling, display type, triggers, etc. Click the Play button to begin viewing live data.

DSG File Associations and Vehicle Models

When new DSG files are created, Datalogger will automatically assign the currently specified vehicle model line. When DSG files are recalled, Datalogger will only present files compatible with the current vehicle specification.

Users must create unique DSG files for each vehicle variant for any given list of Datalogger signals. For example, to create a DSG file for oxygen sensors and fuel trim values to cover all Range Rover Sport vehicles, a total of 3 files would need to be created: one to cover 2006 – 2009 MY vehicles, another to cover 2010 – 2011 MY, and a third to cover 2012 MY.

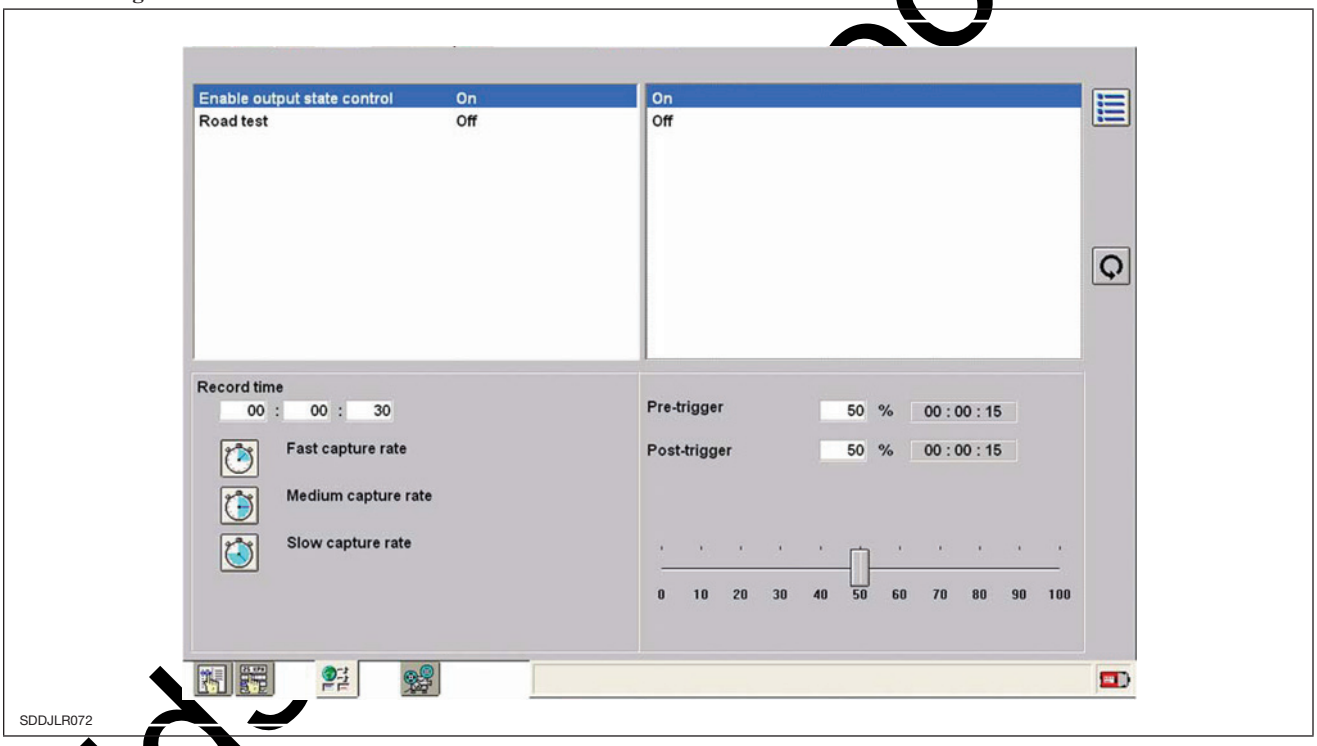
If a DSG file is loaded that includes signals that are not applicable to the current vehicle because of optional equipment that is not present, those signals will not be added to the live display. Under these circumstances, SDD should alert the user to the conflict with a pop-up message window. The remaining applicable signals will be added to the live display.

Road Test Mode

Road Test Mode allows the user to manually record a preselected Datalogger event while operating the vehicle safely. To access Road Test Mode, select the Global Configuration sub-tab.

Global Configuration Sub-Tab

Global Settings Screen



Highlight 'Road test' in the left-hand pane of the display, then select On / Off in the right-hand pane.

Once Road Test is selected 'On', the following screen will appear.

IDS is now in Road Test Mode. Everything is blocked out on the screen and the user can easily touch anywhere on the screen to manually capture an event live while operating the vehicle safely. To stop the recording, the user will need to touch the screen again.

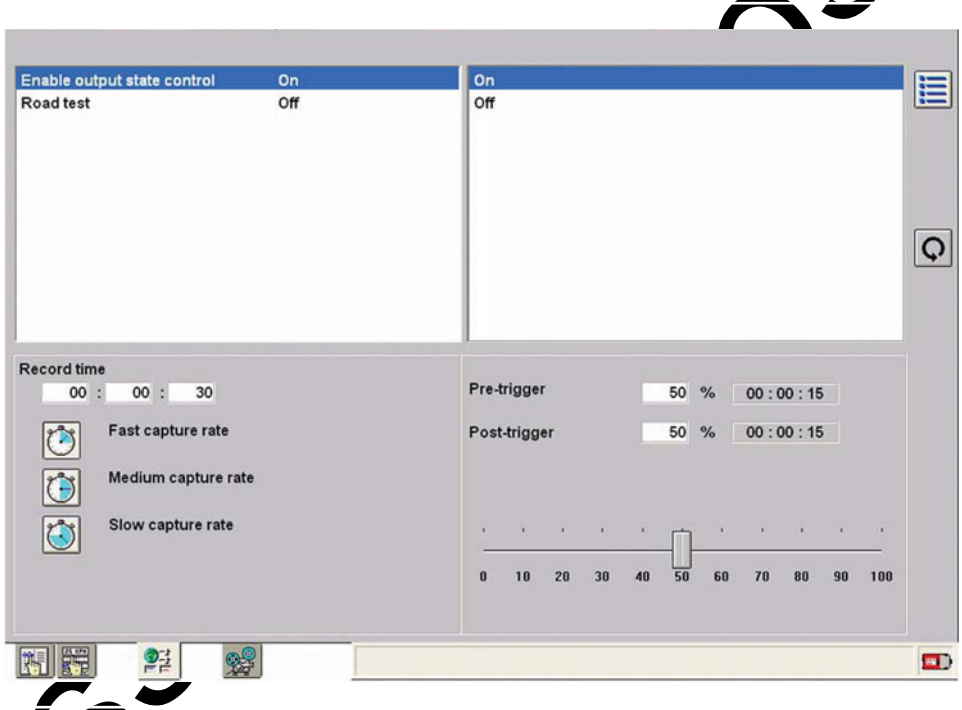
Up to nine recordings can be saved.

OUTPUT STATE CONTROL (OSC)

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. Analog signals cannot be subjected to OSC.

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

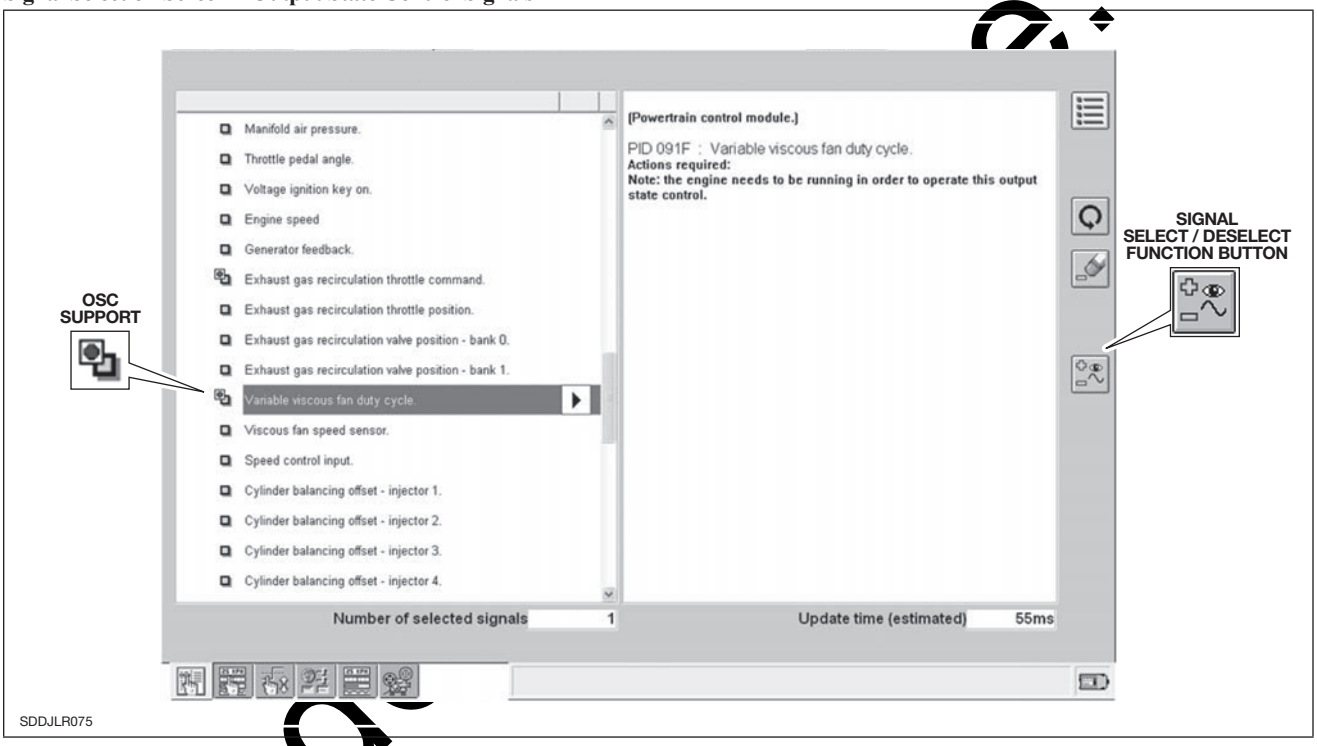
Global Settings Screen



SDDJLR072

In the Datalogger signals list, signals that can have OSC applied to them are identified by an enhanced icon, as shown in the following illustration.

Signal Selection Screen – Output State Control Signals



NOTE: The OSC icon is only displayed if the desired system has been selected from the Content Model prior to selecting Datalogger.

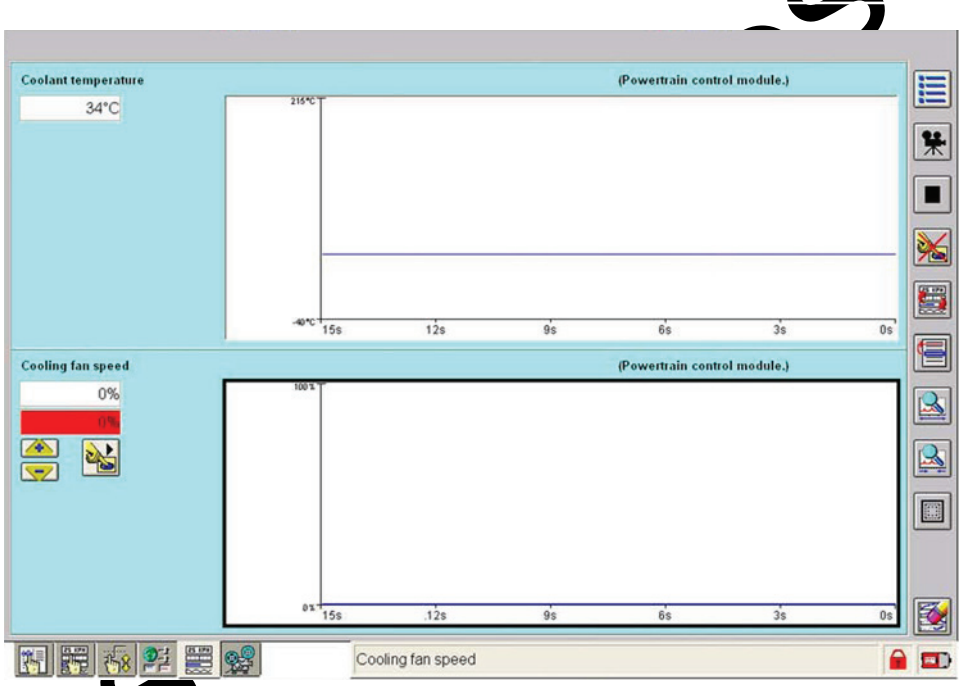
Additional information regarding the conditions for operating the OSC signal, where applicable, is displayed in the right-hand pane of the screen once the signal has been highlighted.

In the illustration, 'Variable viscous fan duty cycle' is highlighted; in the right-hand pane, a note indicates that the engine needs to be running when applying the variable viscous fan duty cycle OSC signal.

NOTE: Highlighting a signal does not select it for Live Display. To select a signal, highlight it in the list, then operate the Select / De-select Signal function button. To select additional signals, repeat this sequence for each signal.

Controlling OSC

Once the signals have been selected, select the Datalogger Live Display sub-tab to display the signal(s). If more than one signal has been selected from the Datalogger menu, highlighting the displayed signal will cause the OSC function button to be displayed in the function button bar. Selecting the OSC function button will cause a display window and control buttons to appear on the screen to the left of the displayed signal.



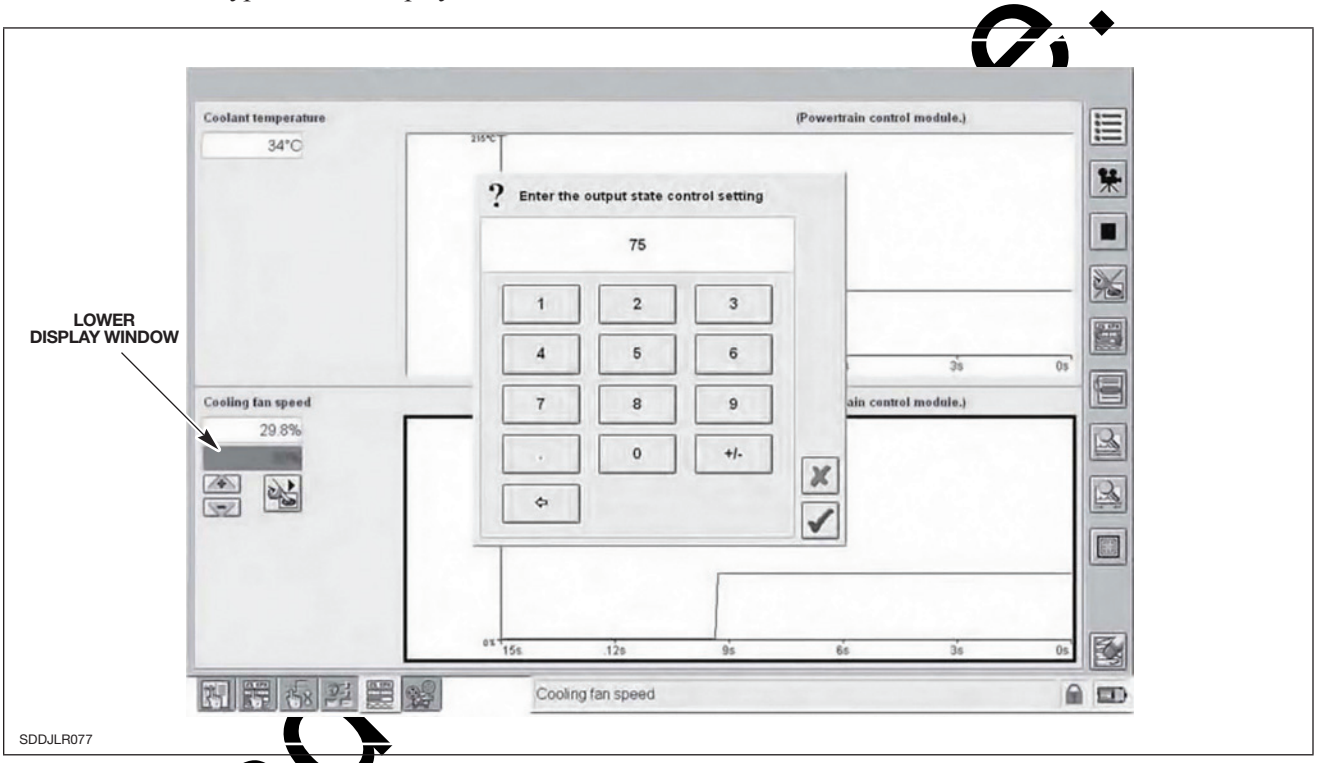
SDDJLR076

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 function 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.

OSC Numerical Keypad

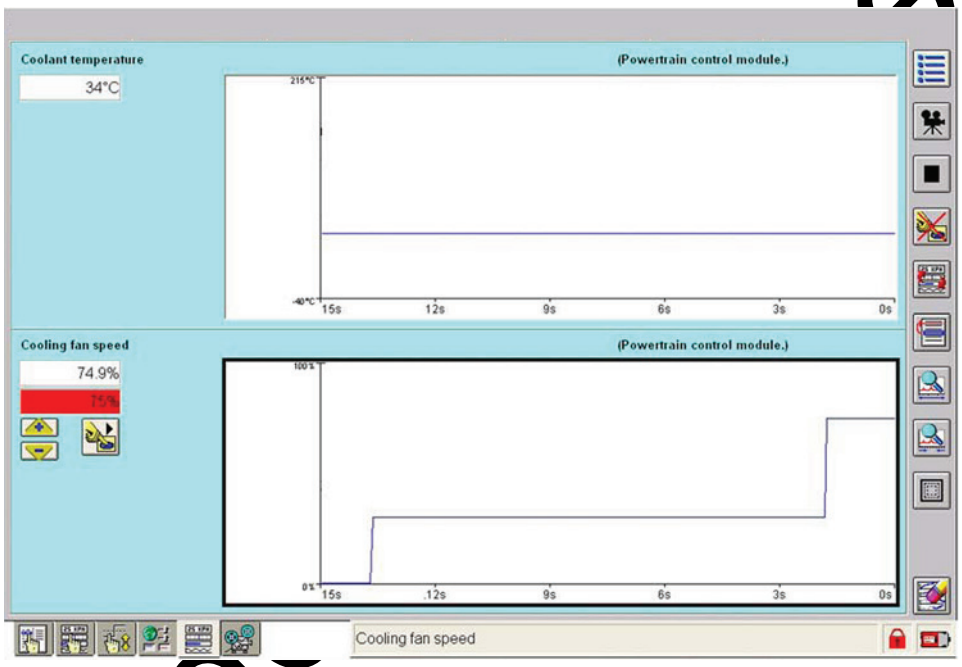
If the OSC value is to be changed by a large amount or changed quickly, operate the TSD over the lower display window. A numerical keypad will be displayed where the user can enter a desired value.



Confirm the selected value using the confirmation 'tick'.

Selecting the OSC activation button will apply the selected value to the component. Cooling Fan is now enabled at the desired speed. To stop OSC, select the Stop function button.

Output State Control – Cooling Fan Enabled



SDDJLR078

Output State Control Instruction Summary

1. Highlight subsystem from Content Model tab
2. Select Datalogger tab
3. Select desired signals to be monitored/controlled
4. Select Global Settings sub-tab
5. Select 'On' for 'Enable output state control'
6. Select Live Display sub-tab
7. Press the Play function button to begin the signal monitoring
8. Highlight the signal to be controlled by touching the signal display (a bold outline will surround the selected signal)
9. Press the Output State Control function button (Output State Control buttons will appear below the digital value box to the left of the highlighted signal)
10. Desired value can be selected two ways:
    - Incremental Up/Down buttons
    - Selecting the lower value display window will display a keypad that will allow numeric value entry
11. Press the Output State Control Play button to cause the entered value to be initiated.