

Series IV

Diagnostic Scan Tool (DST)

Instruction Manual





June, 2013

DST Software Installation Instructions

DST INSTALLATION INSTRUCTIONS

Before installing the DST software, please be sure your computer meets the minimum system requirements.

Minimum Operating Windows Version Spectrum II Spectrum III Spectrum IV System PC RAM Windows 8 32- & 64-bit • Windows 7 32- & 64-bit 1 GB • • • 512 MB Windows Vista 32- & 64-bit • • Windows XP 256 MB 32- & 64-bit ٠ ٠ Windows 2000 32-bit 128 MB • •

Supported Laptop Operating Systems:

Additional:

• Display capable of at least 1024 x 768 screen resolution and one available USB port.

NOTE: Examples and snapshots used in this manual are based off of the initial DST tool release as of August, 2011 using the Windows 7 operating system. This tool is used for multiple fuel systems and is frequently updated. Snapshot illustrations may vary depending on the installed operating system and changes included in any updated DST display Interface. This software has the ability to automatically detect functions that may or may not be used in any one particular fuel system. In this instance unused or irrelevant values and graphic displays will be shaded in gray on the DST display screens. Terms, names and descriptions of systems and other servicing procedures may be updated periodically with new DST installation software.

Ifak Driver and Utility Installation:

(skip if using a Kvaser)

NOTE: Close any open applications prior to installing the DST.



Insert the Ifak CD included with your USB to CAN adapter and open the file folder.



For users with restricted rights using Windows 7 or Windows Vista, select **Run as administrator** as shown above. For all others, select the **Setup file**. You may receive a Windows message asking you to confirm the installation request by an unknown publisher. You must select **Yes** to continue the installation.



Select the **Next** box to continue with the installation.

Documents	is CAN Multidriver - InstallShield Wizard
	Customer Information Control Please enter your information.
ontrol Panel	User Name: Spec Tech Company Name:
teoyele Bin	I Install this application for:
	InstallShield

Enter your company name or organization and click the **Next** box. Follow the next steps using the recommended defaults.



Click the **Finish** box to complete the installation. It is now recommended you re-boot your computer.



Connect the Ifak adapter to an available USB port. You may see a message confirming you wish to make changes to the computer from an unknown publisher. If so, you must select the **Yes** box to continue the installation. Windows will now install the Ifak driver to your computer. You should see a message confirming the driver was successfully installed as shown above.



Open the **Start** menu. You should see the isCAN Configuration utility confirming the utility installation. Select the **isCAN Configurator**.



Click the Add box.

Computer Documents		
Control Panel	SisCAN Driver Configuration Devices Add Device C PCI C PCI C PCI C USB C NetCube C Empty-Slot	EX to add a device d make your OK Cancel
		DK Cancel

Select the **USB** button, then click the **OK** box.

Computer		
Documents		
Control Panel	 isCAN Driver Configuration Devices isCAN Driver Configuration a Device 0 (USB-Device) 	Device: USB-Device
Recycle Bin		Serial No. 5949 Search attached device
	AddRemove	
		OK Cancel

Click on the Search attached device box.

Computer Documents		
Control Panel	SisCAN Driver Configuration EX Devices Device: USB-Device Image: Select Image: Select Image: Select Cancel	
	DK Cancel	

When the Ifak device serial number is shown, click the **Select** box, then click the **OK** box. The Ifak driver and utility installation is now complete. If you had problems during this installation please see the additional information and test instructions for your Ifak adapter included with your service test kit.

Spectrum Series IV DST Software Installation:

The installation files may have been provided to you by internet download*, CD or other media storage. Regardless of the delivery system, please follow the instructions to install the DST software below. If the files were supplied to you in a .zip file format it is strongly recommended that the files are first unzipped before proceeding with the DST software installation.



Insert the CD, USB flash drive, other storage media or find the location where the DST software has been saved on your computer.

Computer	▶ Removable Disk (E:) ▶		Search Removal	ole Disk (E:)	Q
Organize 👻 👸 Open	Share with 🔻 Burn New folder				0
🔆 Favorites	Name	Date modified	Туре	Size	
💻 Desktop	📕 Spectrum_Series_IV_DST	3/15/2010 1:41 PM	File folder		
Downloads					
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🧊 Libraries					
Documents					
Music					
Videos					
🖳 Computer					
Local Disk (C:) DVD RW Drive (D-) is					
Removable Disk (E:)					
🍶 Spectrum_Series_P					
A					
Network					

Open the **Spectrum_Series_IV_DST** file folder.

*The DST software for all Spectrum Systems is available for download at: <u>http://www.impcotechnologies.com/spectrum-test-tools.asp</u>

Computer	Removable Disk (E:) Spectrum Series IV [DST - 4	Search Spectrum Sei	ries IV DST	\$
		1.4.10			
Organize 🔻 👸 Install	Burn New folder				(?)
🚖 Favorites	Name	Date modified	Туре	Size	
🧮 Desktop	B Spectrum Engine Monitor 2.3 Beta 031510	3/15/2010 11:58 AM	Windows Installer	2,091 K	B
🚺 Downloads					
📃 Recent Places					
🕞 Libraries					
Documents					
J Music					
Pictures					
Videos					
Computer					
I computer					
Computer Local Disk (C:) DVD RW Drive (D:) is					
P Computer Local Disk (C:) DVD RW Drive (D:) is Removable Disk (E:)					
F Computer Local Disk (C:) DVD RW Drive (D:) is Removable Disk (E:) Spectrum_Series_I					
Computer Coal Disk (C:) DVD RW Drive (D:) is Removable Disk (E:) Spectrum_Series_P					
Computer Computer Coll Disk (C:) DVD RW Drive (D:) is Removable Disk (E:) Spectrum_Series_P Network					
Computer Local Disk (C:) DVD RW Drive (D:) is Removable Disk (E:) Spectrum_Series_P					

For users with restricted rights using Windows 7 or Windows Vista, it may be necessary to select the **Run as administrator** box similar to the Ifak USB driver installation. For all others, click the **Spectrum Engine Monitor.msi** file. You may receive a Windows message asking you to confirm the installation request by an unknown publisher. If so, you must select the **Yes** box to continue the installation.



Click the **Next** box.

0	🕽 🗢 🚺 🕨 Computer	Removable Disk (E:) Spectrum Series IV DST V 4+ Search Spectrum Series IV DST
Org	anize 👻 🐻 Install	- Burn Newfolder 🔤 - 🗔 🔞
ents 🍝	Envoritor	🙀 Spectrum Engine Monitor 2.3 Beta 031510 💿 🗉 🕰 pize
	Desktop	Confirm Installation
	🖡 Downloads	
9 g	Recent Places	
	Libraries	The installer is ready to install Spectrum Engine Monitor 2.3 Beta 031010 on your computer.
	Documents	Llick Next to start the installation.
	Music	
	Pictures	
eem -	Videos	
r.	Computer	
4	🔓 Local Disk (C:)	
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	Removable Disk (E:)	
	- spectrum_sentes_r	
Q	Network	Cancel < Back Next >
- 2		
	Spectrum Engin	e Monitor 2 3 Reta 031510 Date modified: 3/15/2010 11:58 AM Date created: 3/15/2010 1:41 PM

Follow the on screen prompts that will guide you through the installation.



The Spectrum 4 logo shortcut is placed on the desktop confirming the installation is complete. It is now recommended that you re-boot your computer.

Connecting the DST:



Connect the Diagnostic Link Connector or DLC to the Ifak adapter's connector. Connect the other end of the DLC connector to the engine harness (3 pin connector).



Click on the Spectrum 4 shortcut to open the DST software program. Turn the engine ignition power ON.

				SPECTR
2000 0 100 0 100 0 100 0 100 0 100 0 100 0 100 100	ES 20 -100 -100 0 IP resure 200 -00 -00 -00 -00 -00 -00 -00	Oxygen Sensor(s) 1.0 0.9 0.8 0.7 0.6 0.4 0.4 0.3 0.4 0.4 0.4 0.3 0.4 0.3 0.4 0.3 0.4 0.3 0.4 0.4 0.3 0.4 0.1 0.1 0.0 0.00	Bank 1 Fuel Control Feedback 0.0 % BLM 0.0 % BLM 0.0 % Control Mode Injection Time Injection Time 0.0 ms Fuel 0. Spark 0.0 Mp Fuel Plosure 0.0 Mp Fuel Pressure 0.0 Mp Air Flow 0.0 kg/h Ignition Timing 0.0 %DDC Optimize Timing 0.0 %DDC Battery Voltage 0.0 V Engine Mode Fuel Mode	Bank 2 Fuel Control Feedback 0.0 % BLM 0.0 % Control Mode Injecton Time 0.0 ms Diagnostics MIL Clear Details
-40 0 °C	0 kPa Manifold Pressure	RO2 correction C Pedal Position Sensor Pedal Position 0,0 %	0 mV Throttle Pr Throttle Pr	ustion Sensor
40 20 0	40 50 60 70 80 90 30 40 50 60 70 80 90 20 50 50 50 10 10 10 10 10	0 10 20 30 40 5 Sensor 1 Sensor Voltage 0.0	0 60 70 80 90 100 Sensor 2 V 0.0 V Sensor	20 30 40 50 60 70 80 90 2 Sensor 1 Sensor 2 Voltage 0.0 V 0.0 V
-20 -40 0 °C				

Click on the **S3000** tab at the lower left of the Spectrum Engine Monitor page.

rile Connection	n View Settings Tools	SPECTRUM
b u n n 14	🗙 🛫 🗗 🗊 Connection Settings	SPECIALDA MINO
Category	Name a Recorder Settings	
Diagnostics	Actives 😰 Configure Plot	
Diagnostics	ActiveTroubleCodes	
Diagnostics	AmberWarningLampStatus	
Diagnostics	HistoricCodeCount	
Diagnostics	HistoricTroubleCodes	
Diagnostics	MalfunctionIndicatorLampStatus	
Diagnostics	ProtectLampStatus	
Diagnostics	RedStopLampStatus	
ECU	CalbrationChecksum	
ECU	CalibrationVersion	
ECU	CertVersion	
ECU	ComponentID	
ECU	ECUVersion	
ECU	EngineSize	
ECU	FuelType	
ECU	HardwareVersion	
ECU	SoftwareID	
ECU	SoftwareIDStrings	
ECU	SoftwareVersion	
Fluids	EngineCoolantTemp	
Fluids	EngineOlPressure	
Fluids	FuePressure	
Fuel Control	ArFlow	
Fuel Control	BLM	
Fuel Control	EngneLoad	
Fuel Control	FuelControlMode1	
Fuel Control	FuelControMode2	
Fuel Control	FuelFlow	
Fuel Control	FuePumpStatus	
Fuel Control	InjectionPulseWidth1	
Fuel Control	InjectionPulseWidth2	
Fuel Control	LambdaFeedback1	
Fuel Control	LambdaFeedback2	
Fuel Control	O2Heater1DutyCycle	
Fuel Control	O2Heater2DutyCycle	
Fuel Control	02Sensor1	
Fuel Control	O2Sensor2	
Fuel Control	RearO2Sensor	
Friel Control	RO2ControlCorrection	

On the S3000 data stream page, pull down the Settings menu and click on Connection Settings

			SPECTR
Category	Name	Value	
kachostics	ActiveCodeCount		
Nacinostics	ActiveTroubleCodes		
Nacrostics	AmberWarningi ampStat	his	
Nacrostics	HistoricCodeCount		
lacrostics	HistoricTroubleCodes		
Nachostics	MalfunctionIndicatorLam	oStatus	
Nagnostics	ProtectLampStatus		
Nagnostics	RedStopLampStatus		
a	CalibrationChecksum	Select CAN Device & Chann	
CU	CalibrationVersion	Select Device	Select Channel
CU	CertVersion		
CU	ComponentID	Itok	USB: 11595 (not present)
CU	ECUVersion	Vector	USB: 3000 (not present)
CU	EngineSize	Kvaser	USB 5152 (not present)
CU	FuelType		USB 12629 (reddy)
CU	HardwareVersion		050.12029 (Heady)
CU	SoftwareID		
CU	SoftwareIDStrings		
CU	SoftwareVersion		
luids	EngineCoolantTemp		
luids	EngineOlPressure		
luids	FuelPressure		
uel Control	AirFlow		
uel Control	BLM		
uel Control	EngineLoad		
uel Control	FuelControlMode1		
uel Control	FuelControlMode2		
uel Control	FuelFlow	OK	Refresh Cancel
uel Control	FuelPumpStatus		
uel Control	InjectionPulseWidth1		
uel Control	InjectionPulseWidth2		
uel Control	LambdaFeedback1		
uel Control	LambdaFeedback2		
uel Control	O2Heater1DutyCycle		
uel Control	O2Heater2DutyCycle		
uel Control	O2Sensor1		
uel Control	O2Sensor2		
uel Control	RearO2Sensor		
uel Control	RO2ControlCorrection		
Monitor	niectors 1 53000 MEEL	🟮 Diagnostics 🖭 TSC1 🔛 Plot	😧 About

The **Select CAN Device & Channel** dialog box will appear. Select the **Ifak** device, and then click the **OK** box.

Els Company Many Company Train			
File Connecto	on View Settings Tools		SPECTRUI
Conn	ect y		Y syneric
Categ	met	Value	
Diagno Reco	rd eCount		
Diagno II Paus	 bleCodes 		
Diagnostics	AmberWarningLampStati	5	
Diagnostics	HistoricCodeCount		
Diagnostics	HistoricTroubleCodes		
Diagnostics	MalfunctionIndicatorLamp	Status	
Diagnostics	ProtectLampStatus		
Diagnostics	RedStopLampStatus		
ECU	CalibrationChecksum		
ECU	CalibrationVersion		
ECU	CertVersion		
ECU	ComponentID		
ECU	ECUVersion		
ECU	EngineSize		
ECU	FuelType		
ECU	HardwareVersion		
ECU	SoftwareID		
ECU	SoftwareIDStrings		
ECU	SoftwareVersion		
Fluids	EngineCoolantTemp		
Fluids	EngineOiPressure		
Fluids	FuePressure		
Fuel Control	AirFlow		
Fuel Control	BLM		
Fuel Control	EngineLoad		
Fuel Control	FuelControlMode1		
Fuel Control	FuelControlMode2		
Fuel Control	FueHow		
Fuel Control	FuelPumpStatus		
Fuel Control	InjectionPulseWidth1		
Fuel Control	InjectionPulseWidth2		
Fuel Control	LambdaFeedback1		
Fuel Control	LambdaFeedback2		
Fuel Control	O2Heater 1DutyCycle		
Fuel Control	O2Heater2DutyCycle		
Fuel Control	O2Sensor 1		
Fuel Control	O2Sensor2		
Fuel Control	RearO2Sensor		
Fuel Control	RO2ControlCorrection		
Fred Canadial	0.000.000.000.00		

Under the Connection drop down menu, select Connect

Spectrum Engin	Spectrum Engine Monitor			
File Connection	View Settings Tools	Concernant		
i k 😐 ii 🖬 (ele el	k 📽 🕄 🕼	SPECTROM WWW.		
Category	Name	Value		
Diagnostics	ActiveCodeCount	0		
Diagnostics	ActiveTroubleCodes	0-0		
Diagnostics	AmberWarningLampStatus	OFF		
Diagnostics	HistoricCodeCount	0		
Diagnostics	HistoricTroubleCodes	0-0		
Diagnostics	MalfunctionIndicatorLampStatus	ON		
Diagnostics	ProtectLampStatus	OFF		
Diagnostics	RedStopLampStatus	OFF		
ECU	CalibrationChecksum	4294912141		
ECU	CalibrationVersion	20091108.20		
ECU	CertVersion	7		
ECU	ComponentID	GFI 53000 8170518837 1		
ECU	ECUVersion	S3000R		
ECU	EngineSize	2.40		
ECU	FuelType	LPG		
ECU	HardwareVersion	10		
ECU	SoftwareID	GF14.01.17		
ECU	SoftwareIDStrings	1		
ECU	SoftwareVersion	262423		
Fluids	EngineCoolantTemp	36 °C		
Fluids	EngineOlPressure	0 kPag		
Fluids	FuelPressure	160 kPaa		
Fuel Control	AirFlow	0.00 kg/h		
Fuel Control	BLM	N/A		
Fuel Control	EngineLoad	77 %		
Fuel Control	FuelControlMode1	OpenLoop		
Fuel Control	FuelControlMode2	OpenLoop		
Fuel Control	FuelFlow	0.00 kg/h		
Fuel Control	FuePumpStatus	OFF		
Fuel Control	InjectionPulseWidth1	0.00 ms		
Fuel Control	InjectionPulseWidth2	N/A		
Fuel Control	LambdaFeedback1	-0.08 %		
Fuel Control	LambdaFeedback2	N/A		
Fuel Control	O2Heater1DutyCycle	0%		
Fuel Control	O2Heater2DutyCycle	0%		
Fuel Control	O2Sensor1	0.47 V		
Fuel Control	O2Sensor2	N/A		
Fuel Control	RearO2Sensor	0.00 V		
Fuel Control	RO2ControlCorrection	0.00 mV		
🔿 Monitor 📉 Inject	ors 🕐 S3000 🥗 MEFI 🔒 Diagr	nostics 🔍 TSC1 🖼 Plot 🔍 About		
Connected		S3000 817051883 2.4 LPG GFI4.01.17 0091108.2(,)		

When connected, the live data stream appears in the Value column.

Using the Spectrum DST

The Spectrum IV DST is the next generation all CAN (Controller Area Network) enabled diagnostic tool. It is designed to be compatible for all Spectrum fuel systems that use both the MEFI (industrial) and S3000 (mobile) ECM applications. The DST operates on an expandable platform and its functions are planned to increase in the future. The functions are listed below:

- Updating the ECM calibration using the .s37 calibration file.
- Provide graphical display interface for engine and sensors parameters
- Display DTC (Diagnostic Trouble Codes)
- Provide data stream information from engine sensors and actuators
- Plot data.
- Record Data

Graphic Display Interface



Shown as the monitor page in the DST, the above page is the default entry page that opens with the DST program. It provides a graphical interface for important engine parameters. Graphics shown in gray are not available for the specific application the DST may be connected to as shown above. This function is controlled by the ECM calibration file and cannot be changed by the service technician.

Display DTC (Diagnostic Trouble Codes)

G Spect File	trum Engine I Connection	Monitor View Settings T	ools				
▶ •	н 🖬 🖂	. 🥆 🖉 🗑 🕼					by IMPC
MIL	Source: All	• 0 /	ctive O Historic Clear Clear EEPROM Save]			
Source	P-Code	Fault Name	Description	SPN	FMI	Count	
MEFI	N/A	66002-0	N/A	66002	0	1	
MEFI	P0223	EtcTps2	EtcTps2Range	65601	2	5	
MEFI	P0123	EtcTps1	EtcTps 1Range	65602	2	5	
MEFI	P2128	EtcPps2	EtcPps2Range	65604	2	5	
MEFI	P2137	EtcPps12 Correlation	EtcPps12CorrelationFault	65613	2	5	
MEFI	P2123	EtcPps1	EtcPps 1Range	65605	2	5	
MEFI	P0118	TEMP_EAU_CC1	Coolant Temp Short to High	110	3	5	
MEFI	N/A	66015-0	N/A	66015	0	1	
-	16	1.00					
(Mo	nitor 📉 Inje	ectors 🏶 S3000 🍩 N	IEFI 🗾 Diagnostics 🖳 TSCI 📓 Plot 🥝 About				
Conn	ected						15-36.00,3.0,00

DTC codes can be read by clicking on the **Diagnostics** tab at the bottom of the monitor page. The source of the DTC stream can be set manually for the MEFI ECM or the S3000 ECM, or left in the default **All** position for auto detection of the DTC codes from either MEFI or the S3000 ECM. Codes that can be viewed are set in two categories, active and historic. Active codes are codes that are set and the fault that is causing the code to set is constant. Historic codes are codes that have set in the past, but the fault that caused them has been corrected such as with an intermittent problem. This function is selectable by choosing the **Active** or **Historic**, as shown in the above image. Codes can be cleared by clicking the **Clear** box. The DTC set code list may also be saved by clicking the **Save** box shown above. The file will be saved in a convenient HTML file compatible with Windows Internet Explorer and will provide a browse function to save the file to a location of choice for the service technician.

Data Stream:

🗐 Spectrum En	gine Monitor		
File Connectio	n View Settings Tools		C CDECTDUM
🕨 🖬 🖬 🗐	k 🕆 🖬 🗑 🖗		SPECTRONA ty merco
Category	Name	Value	^
Diagnostics	ActiveCodeCount	1	
Diagnostics	ActiveTroubleCodes	135-18	
Diagnostics	AmberWarningLampStatus	OFF	
Diagnostics	HistoricCodeCount	1	
Diagnostics	HistoricTroubleCodes	0-0	
Diagnostics	MalfunctionIndicatorLampStatus	OFF	
Diagnostics	ProtectLampStatus	OFF	
Diagnostics	RedStopLampStatus	OFF	
ECU	CalbrationChecksum	4294966218	
ECU	CalbrationVersion	20091108.20	
ECU	CertVersion	7	
ECU	ComponentID	GFI \$3000 8170518837 1	
ECU	ECUVersion	\$3000R	
ECU	EngineSize	2.40	
ECU	FuelType	LPG	
FOU	HardwareVersion	10	
FOU	SoftwareID	GFI4.01.23	
FOU	SoftwareIDStripps	1	
ECU	Softwarel/ension	262435	
E) ide	EngineCoolantTemp	£8.9°	
E) ide	EngineCiDrace ra	312kDag	
Eliste	Engli Forri Coscilie	East	
Fuel Control	AirElow	24.94 kalo	
Fuel Centrol	DLM	54.54 NUT	
Fuel Centrel	Enginet and	22.0	
Fuel Control	Englisheda I	S2 %	
Fuel Centrel	FuelControlMode1	OpenLoop	
Fuel Control	FuelControlmode2	2 22 kate	
Fuel Control	FUEROW	2.22 Kg/m	
Fuel Control	Puer-umpstatus	10.00 m	
Fuel Control	InjectorPulsewidth1	10.63 ms	
Fuel Control	InjectionPulseWidth2	N/A	
rue control	Lambdareedback1	10.06 %	
Fuel Control	Lambdar-eedback2	N/A	
Fuel Control	O2Heater 1DutyCycle	92%	
Fuel Control	O2Heater2DutyCycle	92%	
Fuel Control	025ensor1	0.87 v	
Fuel Control	O2Sensor2	N/A	
Fuel Control	RearOZSensor	0.01 V	
Fuel Control	R02ControlCorrection	0.00 mV	×
😷 Monitor 🖎 In	jectors 🖄 \$3000 🐡 MEFI 🔒 Diag	nostics 🖻 TSC 1 🐯 Plot i 🥹 About i	
Connected			\$3000 817051883 2.4 LPG GF14.01.23 0091108.2();;

The fuel and emissions service manual will refer to the DST and asked that it be connected in the data stream mode. This simply means it is first connected and that data is shown on the S3000 data stream page as shown above. The data stream page can be accessed by selecting the S3000 tab shown at the lower left above.



Plot Data:

Data stream information may also be selected for a trace plot. This page is available by clicking the **Plot** tab at the lower page center as shown above.

Spectrum Engine Monitor	is Tools			
• • • • • • • • • • • • • • • • • • •	· · · · · ·			SPECTRUN by IMPC
	Configure Plot			
100.0 % 3000.0 rpm	Selected Channels Axes			
	Variable	Axis		
1	ActualEngineTorque	torque		
	ActualEngineTorquePercent	%rel		
30.0 % - 2400.0 rpm -	ActualIngnitionAdvance	degBTDC		
	ActualVehicleTorgue	torque		
	AirFlow	kgph 1		
	AirTemp	temp		
i i	BatteryVoltage	batt		
	BLMBank1	%corr		
60.0 % - 1800.0 rpm -	BLMBank2	%corr	-	
	CoolantTemp	temp		
	DesiredEngineSpeed	rom		
	DesiredIgnitionAdvance	deaBTDC		
	EngineLoad	%abs		
	C EngineSpeed	rom		
40.0 % — 1200.0 rpm —	E FuelFlow	kaph2		
	FuelPressure	press 1		
	IniTimeBank 1	ms		
	IniTimeBank2	ms		
	LambdaFeedbackBank1	%corr		
1	LambdaEeedbackBank2	%corr		
20.0 % - 600.0 rpm -	ManifoldPressure	press3		
	OiPressure	press2		
	OxySensorBank1	021		
	OxySensorBank2	02V		
	PedaPosition	%abs		
	PedalSensor IVoltage	5V		
0.0 % - 0.0 rpm -	DadalSancor?Voltana	51/	-	
1145.9			1153.9	1155.
	OK Cancel			
EngineSpeed PedalPosition				
Monitor 📏 Injectors 🧇 S3000	MEFI 😡 Diagnostics 🖳 TSC1 👹 Plot 🔇	About		
Connected				15-36.00 3.0.00

The custom parameters of the plot can be selected by clicking on the plot icon just below the **Settings** menu item at the top left of the page shown above. To save the custom settings select **OK**.

Diagnosing Intermittent Problems

Intermittent fuel system problems can prove to be the most challenging to diagnose. It is of the upmost important when diagnosing intermittent problems to operate the engine system while monitoring with the DST and pressure gauge set. An example of this would be if the DST showed a lean fuel mixture at full load. One of the first things to look at would be the fuel pressure. The fuel pressure would need to be monitored while the engine is operating at full load, not at low or no load because the leaning effect does not occur until full load. Electrical problems should be treated in a similar same way. **One excellent tool for finding intermittent electrical problems is the DST plot function.** Set up the plot for the sensor code that sets. An example of this would be if an intermittent IAT code set, tag the IAT voltage and watch the plot. While watching the plot, agitate the electrical wire connection at the sensor and ECM connector. The resolution of the plot screen is such that you will be able to see any unstable voltages that you may not see with a standard DVOM.

Caution should be used when pressure washing the under hood of any electrical system. Avoid direct pressure spray on the system electrical connectors. The connectors are splash proof but if high pressure water or steam is sprayed directly at the connector moisture can become trapped behind the connector seal and cause serious system problems, many of them showing up as intermittent problems. Extra care must be taken when probing electrical pins and terminals. Do not bend or spread these terminals as this can also be a source of intermittent problems cause by improper handling of these low voltage connectors and terminals. When running electrical diagnostics avoid back probing the wire connectors as this may damage the wire seal. When running the continuity checks use a wire probe to only touch the wire terminal. Forcing the electrical probe into the terminal may cause the terminal to spread leading to permanent damage. More Intermittent diagnostic information can be found on the Fuel Symptom Diagnostics, Intermittent Diagnostic Charts.

Fuel System Checks

This system has OBD (Onboard Diagnostics) for many sensors, relays and monitors, but not all malfunctions have a DTC code available to alert the service technician to a problem. A good example of this would be the engine ignition system. If a spark plug, cap, rotor or wire fails a DTC code may not be set. The DST provides advanced diagnostic capabilities, but some items are still left to the basics of general engine mechanics. Following the recommended maintenance schedule is the best way to prevent this type of problem for which a DTC code does not exist. Many times the basics are overlooked and can be attributed to improper maintenance. Some general rules to follow are:

- Check to be sure the ECM is programmed with the latest calibration file
- Check general engine tune up items such as spark plugs, distributor cap and rotor, spark plug wires, air, and fuel filters if equipped with such.
- Check that the charging system is working correctly.