

**COMPLEX SOLUTIONS  
MADE SIMPLE**

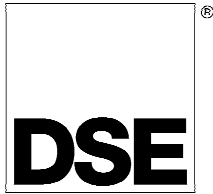


# **DEEP SEA ELECTRONICS**

## **DSE4400 Series PC configuration suite**

**Document Number 057-093**

Author : Anthony Manton



Deep Sea Electronics Plc  
Highfield House  
Hunmanby  
North Yorkshire  
YO14 0PH  
ENGLAND

Sales Tel: +44 (0) 1723 890099  
Sales Fax: +44 (0) 1723 893303

E-mail : sales@Deepseapl.com  
Website : www.deepseapl.com

#### DSE4400 Series configuration suite

© Deep Sea Electronics Plc

All rights reserved. No part of this publication may be reproduced in any material form (including photocopying or storing in any medium by electronic means or other) without the written permission of the copyright holder except in accordance with the provisions of the Copyright, Designs and Patents Act 1988.

Applications for the copyright holder's written permission to reproduce any part of this publication should be addressed to Deep Sea Electronics Plc at the address above.

The DSE logo and the names DSEUltra, DSEControl, DSEPower, DSEExtra, DSEMarine and DSENet are UK registered trademarks of Deep Sea Electronics PLC.

Any reference to trademarked product names used within this publication is owned by their respective companies.

Deep Sea Electronics Plc reserves the right to change the contents of this document without prior notice.

#### Amendments List

Issue	Comments
1	Initial release
2	Added phase to phase voltages, AC system. Module version V1.1
3	Added changes to Mk2 module including true three phase sensing of the generator, start upon low battery volts and addition of analogue inputs.
4	Added changes to flexible sensor alarms and fast loading.

Typeface : The typeface used in this document is *Arial*. Care should be taken not to mistake the upper case letter I with the numeral 1. The numeral 1 has a top serif to avoid this confusion.

# TABLE OF CONTENTS

<b>1</b>	<b>BIBLIOGRAPHY .....</b>	<b>4</b>
1.1	INSTALLATION INSTRUCTIONS .....	4
1.2	MANUALS .....	4
1.3	OTHER .....	4
<b>2</b>	<b>DESCRIPTION .....</b>	<b>4</b>
2.1	SOFTWARE INSTALLATION INSTRUCTIONS .....	5
2.1.1	TROUBLESHOOTING SOFTWARE INSTALLATION .....	8
<b>3</b>	<b>HARDWARE INSTALLATION .....</b>	<b>9</b>
3.1	TROUBLESHOOTING HARDWARE INSTALLATION .....	9
<b>4</b>	<b>USING THE CONFIGURATION SUITE .....</b>	<b>10</b>
<b>5</b>	<b>MENUS AND TOOLBAR .....</b>	<b>11</b>
5.1	FILE MENU.....	11
5.2	TOOLS MENU .....	12
5.2.1	OPTIONS.....	12
5.2.2	ACCESS PERMISSIONS .....	12
5.2.3	UPDATE FIRMWARE .....	14
5.3	HELP MENU.....	16
5.4	TOOLBAR .....	16
<b>6</b>	<b>EDIT CONFIG .....</b>	<b>17</b>
6.1	SCREEN LAYOUT .....	17
6.2	MODULE .....	18
6.2.1	MODULE.....	19
6.3	APPLICATION.....	20
6.3.1	CAN OPTION MODULE .....	20
6.3.2	MAGNETIC PICKUP OPTION MODULE .....	20
6.4	INPUTS.....	21
6.4.1	ANALOGUE INPUTS .....	21
6.4.2	INPUT A – OIL PRESSURE SENSOR .....	22
6.4.3	INPUT B – ENGINE TEMPERATURE SENSOR .....	23
6.4.4	FLEXIBLE SENSOR .....	24
6.4.5	EDITING THE SENSOR CURVE.....	25
6.4.7	DIGITAL INPUTS.....	26
6.4.8	INPUT FUNCTIONS .....	27
6.5	OUTPUTS.....	29
6.5.1	DIGITAL OUTPUTS .....	29
6.5.2	OUTPUT SOURCES.....	30
6.6	TIMERS .....	32
6.6.1	START TIMERS.....	32
6.6.2	LOAD / STOPPING TIMERS .....	33
6.6.3	MODULE TIMERS .....	33
6.7	GENERATOR .....	34
6.7.1	GENERATOR OPTIONS .....	34
6.7.2	GENERATOR VOLTAGE ALARMS.....	35
6.7.3	GENERATOR FREQUENCY ALARMS .....	36
6.8	MAINS .....	37
6.8.1	MAINS OPTIONS.....	37
6.8.2	MAINS ALARMS.....	38
6.9	ENGINE .....	39
6.9.1	ENGINE OPTIONS .....	39
6.9.2	CRANK DISCONNECT .....	41
6.9.3	SPEED ALARMS .....	42
6.9.4	PLANT BATTERY .....	43
6.10	SCHEDULER.....	44
6.11	ALTERNATIVE CONFIGURATIONS .....	45
6.11.1	ALTERNATIVE CONFIGURATION OPTIONS .....	45
6.11.2	ALTERNATIVE CONFIGURATIONS EDITOR.....	46
<b>7</b>	<b>SCADA.....</b>	<b>47</b>
7.2	MIMIC .....	48
7.3	DIGITAL INPUTS .....	49
7.4	DIGITAL OUTPUTS.....	50
7.5	MAINS .....	51
7.6	GENERATOR .....	51
7.6.1	FREQUENCY, VOLTAGES AND CURRENT .....	51
7.7	ENGINE .....	52

7.8	FLEXIBLE SENSOR .....	52
7.9	ALARMS .....	52
7.10	STATUS .....	53
7.11	EVENT LOG .....	53
7.12	ENHANCED CANBUS .....	54
7.13	MAINTENANCE .....	55
7.13.1	HOURS RUN AND NUMBER OF STARTS .....	55
7.13.2	DAY AND TIME .....	55

## 1 BIBLIOGRAPHY

This document refers to and is referred to by the following DSE publications which can be obtained from the DSE website [www.deepseapl.com](http://www.deepseapl.com):

### 1.1 INSTALLATION INSTRUCTIONS

DSE PART	DESCRIPTION
053-056	4410 installation instructions sheet for Mark 1 controller
053-057	4420 installation instructions sheet for Mark 1 controller
053-078	4410 installation instructions sheet for Mark 2 controller
053-079	4420 installation instructions sheet for Mark 2 controller

### 1.2 MANUALS

DSE PART	DESCRIPTION
057-004	Electronic Engines and DSE wiring
057-092	DSE4410 / DSE4420 operator manual

### 1.3 OTHER

The following third party documents are also referred to:

ISBN	DESCRIPTION
1-55937-879-4	IEEE Std C37.2-1996 IEEE Standard Electrical Power System Device Function Numbers and Contact Designations. Published by Institute of Electrical and Electronics Engineers Inc

## 2 DESCRIPTION

The **DSE4400 Series configuration suite** allows the 4400 family of modules to be connected to a PC via USB 'A –USB B' cable. Once connected the various operating parameters within the module can be viewed or edited as required by the engineer. This software allows easy controlled access to these values.

**This manual details the configuration of the DSE4400 series Mk1 AND DSE4400 series Mk2 controllers.**

The configuration suite should only be used by competent, qualified personnel, as changes to the operation of the module may have safety implications on the panel / generating set to which it is fitted. Access to critical operational sequences and settings for use by qualified engineers, may be barred by a security code set by the generator provider.


The information contained in this manual should be read in conjunction with the information contained in the appropriate module documentation. This manual only details which settings are available and how they may be used.


A separate manual deals with the operation of the individual module (See section entitled *Bibliography* elsewhere in this document).


## 2.1 SOFTWARE INSTALLATION INSTRUCTIONS

### Minimum system requirements

Operating System	Windows Vista, Windows XP or Windows 2000 with Microsoft™ .Net® 2.0 framework
Monitor	17 inch recommended (1024 x 768 resolution)
Communications	USB required to configure the module.

**NOTE:** - As 4400 Series configuration software for Windows™ is a 32-Bit application requiring Microsoft .net 2 framework, it will not operate on Windows 2.0, 3.0, 3.1, 3.11, 95, 98 or Me.

**NOTE:** - Exit all other programs before installing the software. It is recommended that any earlier releases of the software be uninstalled prior to installing this version.

**NOTE:** - Please register online at [www.deepseapl.com](http://www.deepseapl.com) – Once registered you will be able to download updates to the software to ensure that you always have access to the latest features.

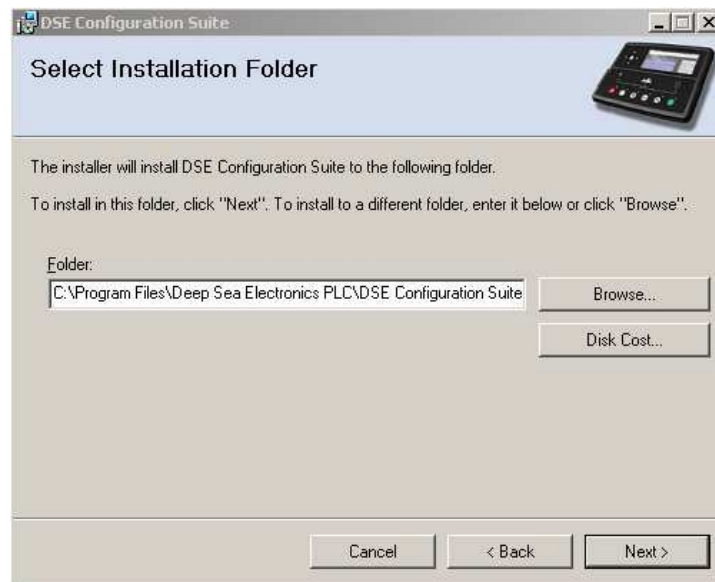
Insert the Software CD into the CD-ROM drive on the PC. The CD will then Auto-run if this feature is enabled on your PC.

Alternatively:

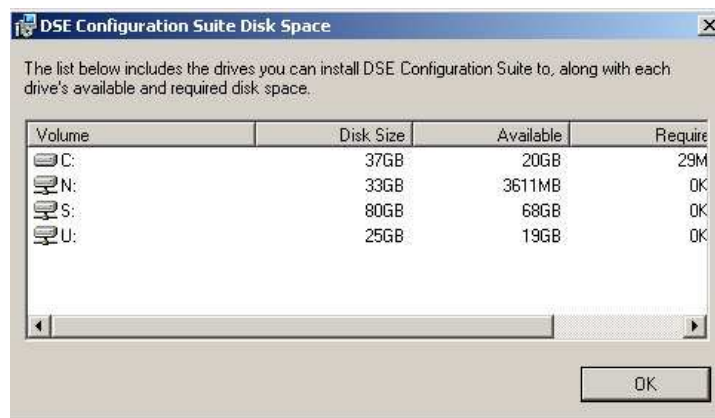
- Double click on **Computer**
- Double click on **CD-ROM Drive**
- Double click CDSetup



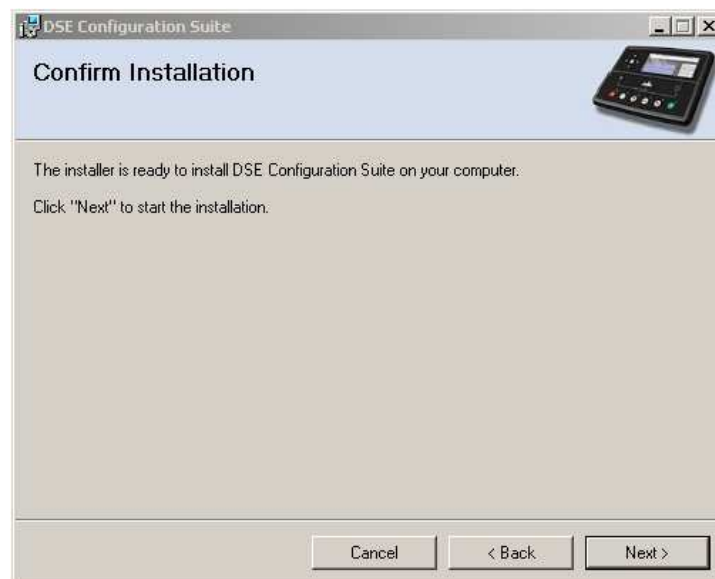
Click **Next** to continue

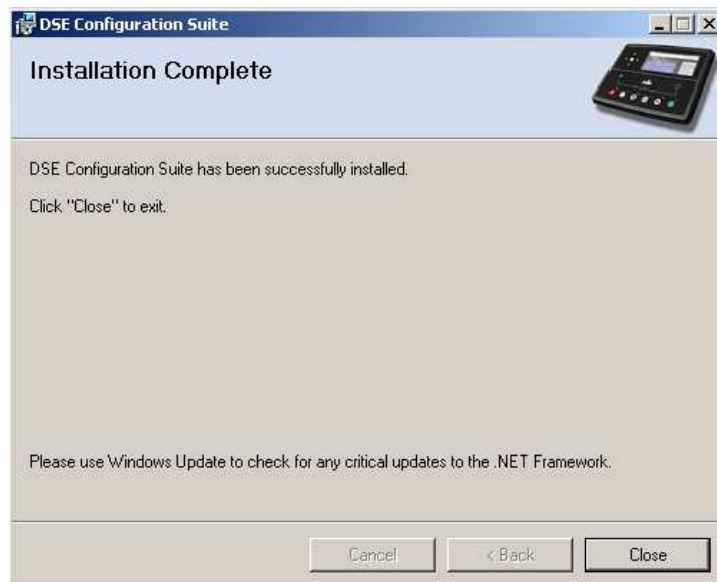


Select *Disk Cost* to view remaining disk space, Click **Next** to continue.



Example showing the *Disk Cost* window.





## 2.1.1 TROUBLESHOOTING SOFTWARE INSTALLATION

It is very rare that problems are encountered when installing the system, however if problems arise, use the following checklist to troubleshoot your software installation

### 2.1.1.1 WINDOWS VISTA 32BIT VERSIONS

- Ensure the operating system is logged onto using an *Administrator Account*. Failure to do this results in installation failure due to incorrect user permissions disallowing registration of some parts of the Configuration Suite Software.
- When installing the software, instead of clicking the icon with the left mouse button, click on the installation icon with the right mouse button, then select *Run as Administrator*.
- Ensure the operating system is fully up to date using the *Microsoft Windows Update* facility.
- Ensure that *Windows Installer* is fully up to date using the *Microsoft Windows Update* facility.
- Ensure the operating system has *Microsoft .net 2 Framework redistributable (for x86)* installed and is fully up to date. This is available from Microsoft's website.

### 2.1.1.2 WINDOWS VISTA 64 BIT VERSIONS

- Ensure you have installed the 64bit version of the DSE Configuration Suite.
- Ensure the operating system is logged onto using an *Administrator Account*. Failure to do this results in installation failure due to incorrect user permissions disallowing registration of some parts of the Configuration Suite Software.
- When installing the software, instead of clicking the icon with the left mouse button, click on the installation icon with the right mouse button, then select *Run as Administrator*.
- Ensure the operating system is fully up to date using the *Microsoft Windows Update* facility.
- Ensure that *Windows Installer* is fully up to date using the *Microsoft Windows Update* facility.
- Ensure the operating system has *Microsoft .net 2 Framework redistributable (for x86)* installed and is fully up to date. This is available from Microsoft's website.

### 2.1.1.3 WINDOWS XP

- Ensure the operating system is logged onto using an *Administrator Account*. Failure to do this results in installation failure due to incorrect user permissions disallowing registration of some parts of the Configuration Suite Software.
- Ensure the operating system is fully up to date using the *Microsoft Windows Update* facility.
- Ensure that *Windows Installer* is fully up to date using the *Microsoft Windows Update* facility.
- Ensure the operating system has *Microsoft .net 2 Framework redistributable (for x86)* installed and is fully up to date. This is available from Microsoft's website.

### 2.1.1.4 WINDOWSNT, WINDOWS MILLENIUM, WINDOWS98, WINDOWS95, WINDOWS 3.1

- DSE Configuration Suite does not support these operating systems. It is recommended that the system is operated under Windows XP or Windows Vista operating systems.



### 3 HARDWARE INSTALLATION

Ensure the Configuration Suite Software is installed on the PC as described above. The installation of the PC software also installs the DSE Controller USB Driver automatically. Connect the USB cable to the module and to the PC as shown below.



Windows detects the module when power is applied to it.

You are now ready to configure or monitor the module using the Configuration Suite Software.

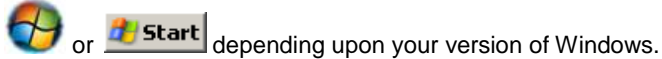
#### 3.1 TROUBLESHOOTING HARDWARE INSTALLATION

Occasionally USB devices are disabled by the Windows operating system, the following procedure will re-enable the device in these instances.

- Disconnect the *Deep Sea Electronics Controller* from the USB port. Wait a moment, then reconnect and try again. If you still encounter problems then :
- Power cycle the DSE controller
- Try another USB cable. If you don't have one, it's the same type of cable as usually used between a PC and a USB printer. If you still encounter problems then :
- Disconnect the *Deep Sea Electronics Controller*. Shutdown, then restart the PC. Reconnect the interface, and then try again. If you continue to experience problems then :
- Check the USB port with another device (for instance a mouse, printer or digital camera).

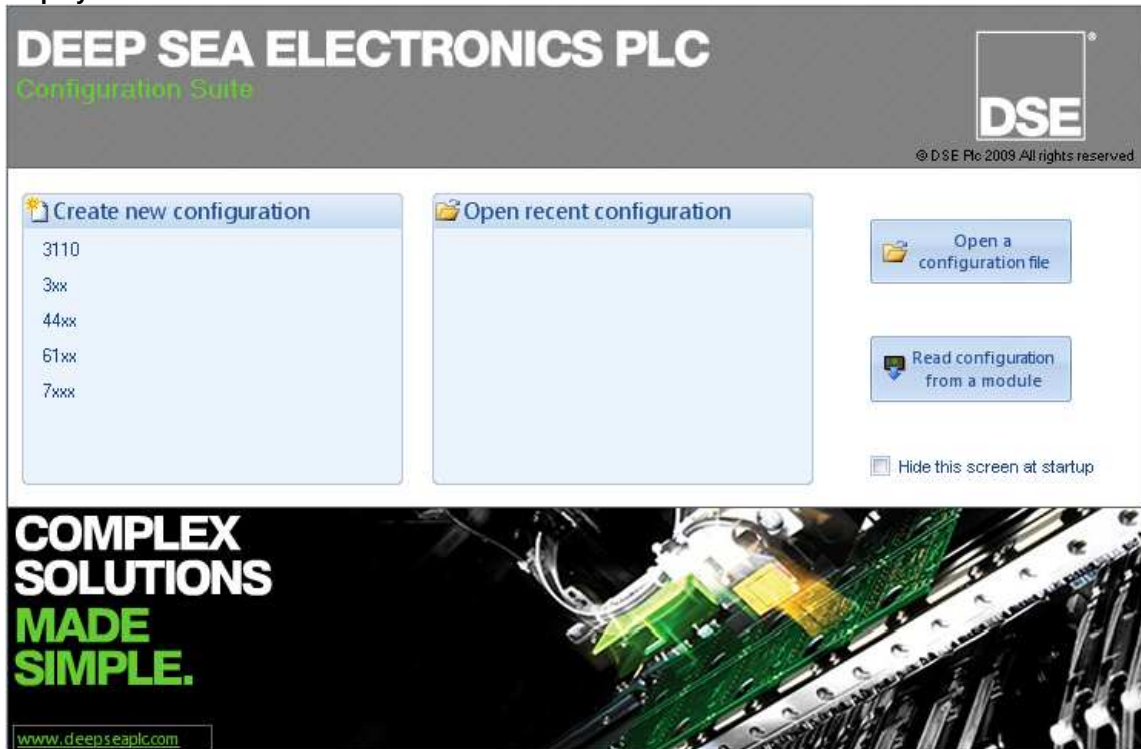
## 4 USING THE CONFIGURATION SUITE

To run the Configuration Suite Software for Windows program click the Windows start button



Then select 'All Programs' - 'Deep Sea Electronics PLC' – "DSE Configuration Suite" – "DSE Configuration Suite"

After a short delay to load the application, the splash screen is shown, after which the screen will display:-



This is the initial start-up screen and can be disabled by checking the box *Hide this screen at start-up*. The screen prompts the user to select between the three main uses for the software:

- Creating a new configuration. Select the module type under *Create new configuration*. This allows you to create a configuration for the 'latest' module version. Use *File | Convert to...* to convert the configuration to suit an earlier module version or use *Tools | Update firmware* to update an 'earlier' module to the latest firmware version.
- Editing a configuration previously saved to disk or flash memory device. Select the configuration file either from the *Open recent configuration* area or by clicking *Open a configuration file* and browsing to the file.
- Reading and changing the configuration of a connected module. Click *Read configuration from a module*. The file is read from a currently connected 4400 Series controller and is available for editing in the Configuration Suite.

Alternatively you can ignore this screen and continue to use the program in the background. Once you make a connection or load/create a configuration, the start-up screen will disappear.

## 5 MENUS AND TOOLBAR

The menu and toolbar are located at the top of the screen:



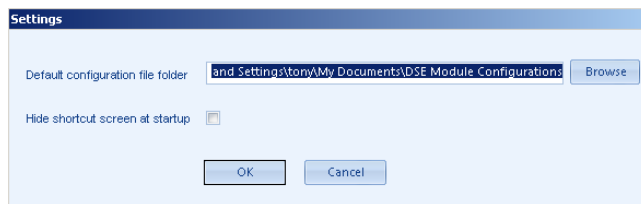
### 5.1 FILE MENU

New	Create a new configuration file. You are prompted to select what kind of module you want to create the configuration for. The settings of the new configuration file match the factory settings for the chosen module type. You can only select to create a configuration file for the 'latest' version of controller. If you want to create a configuration for an earlier version of controller, you can use <i>Convert to...</i> to make your configuration suitable for the earlier controller or use <i>Tools   Update firmware</i> to update the earlier module to the latest version.
Open	Open an existing file from disk or flash memory device.
Close	Close the currently open file.
Save	Save the currently open file to the location it was loaded from previously. If this is a new file, you are prompted to enter a filename.
Save As..	Save the currently open file, under a new name. You will be prompted to enter a filename.
Write to module	Send the currently open configuration settings to the controller.
Read from module	Read the settings out of the connected controller for viewing / editing.
Import from module	Read the settings from the connected 4400 Series controller and convert to the currently selected configuration type.
Import from file	Read the settings from a 4400 Series configuration file on disk or flash memory device and convert to the currently selected configuration type.
Convert to... ▶	Convert the currently loaded configuration file to suit another module type or another module version.
Print	Print the currently open configuration file.
Print Preview	Preview what the configuration file will look like on the page after printing.
Page Setup	Select printer type and printer settings.
Exit	Exit the software. If the currently open file has changed since it was last saved, you will be prompted to save it.

## 5.2 TOOLS MENU

### 5.2.1 OPTIONS

Opens the *Settings* screen containing customisation options for the Configuration Suite.

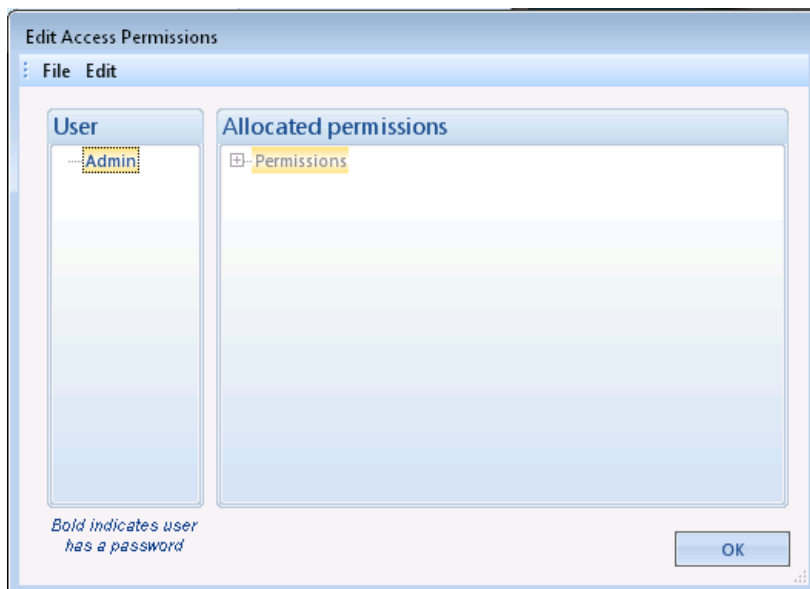


Click the **exit** button if you don't want to update your module.

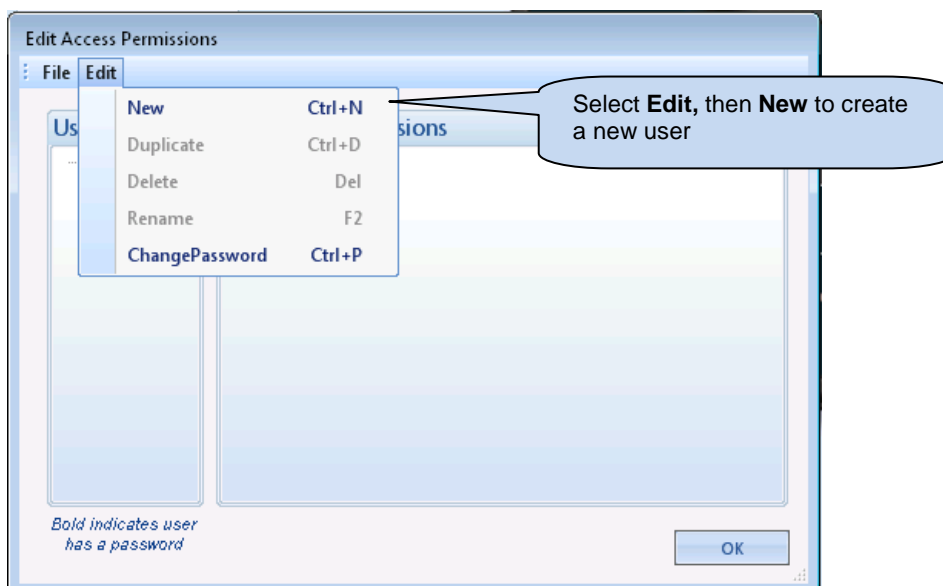
### 5.2.2 ACCESS PERMISSIONS

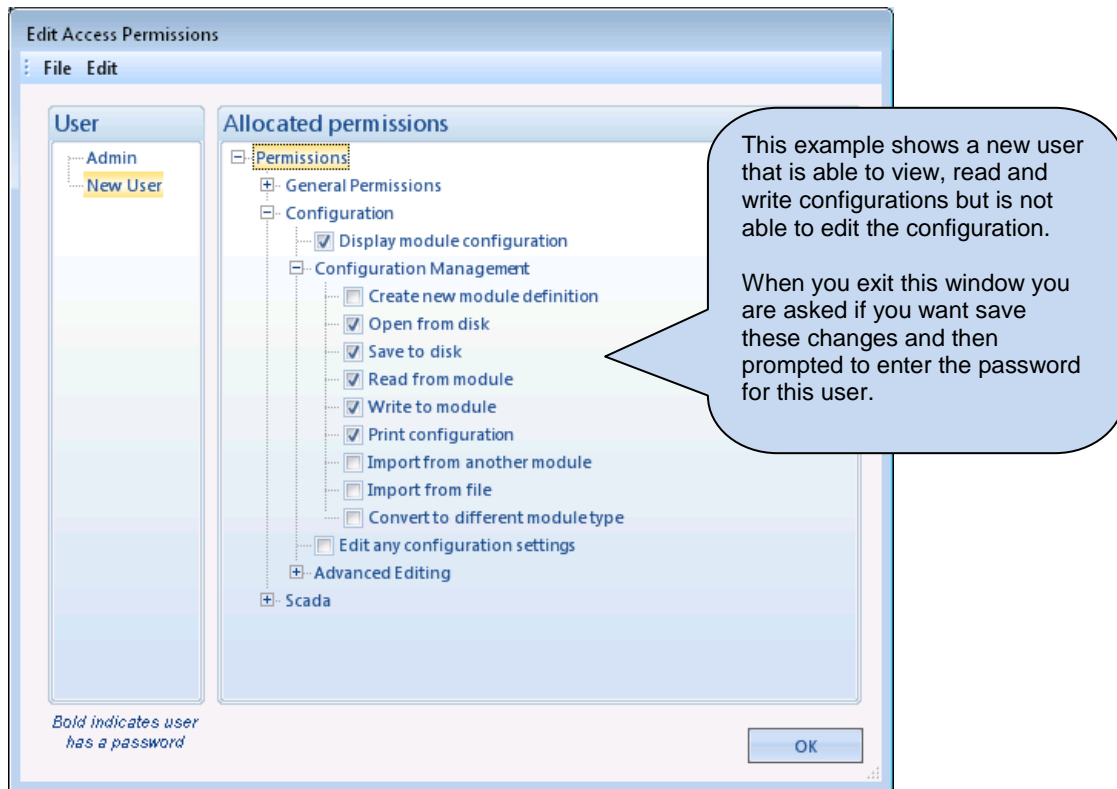
Access permissions is an advanced Administration option to allow OEMS to setup the Configuration Suite software to limit access for certain users.

For instance, the generator OEM can install the software on the End User's PC and then setup multiple usernames to limit the customer's access to only those functions that the OEM requires for the end user. An example of this is to give only SCADA access to a user requiring monitoring, or to give access to read and write configuration files, but not to edit a configuration file.



#### Create a new user type



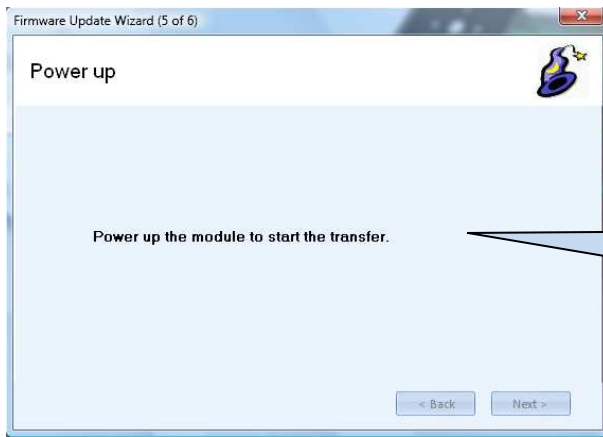


### 5.2.3 UPDATE FIRMWARE

Selecting *Update Firmware* initiates the update wizard:

The Firmware Update Wizard consists of four steps:

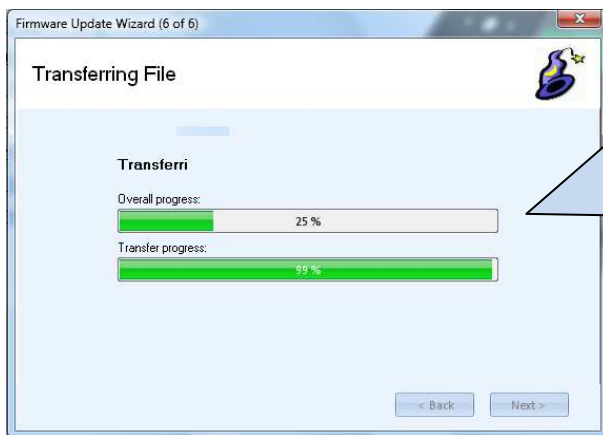
- Welcome**: The wizard will guide you through the firmware update process. A warning states: "Warning: Interrupting this process at any point may render the module inoperable." Callouts indicate: "Click the **exit** button if you don't want to update your module." and "Click **next** to continue."
- Power down**: Disconnect the module from power supply. Callout: "Ensure the module's supply is removed, and then Click **next** to continue."
- Connect USB**: Connect the USB cable between the module and PC. Callout: "Connect the USB cable to the module and into your PC, then Click **next** to continue."
- Select file**: Select firmware update file. The screen shows a "File name:" field and a "Browse" button. Callouts indicate: "Click to select the firmware update file." and "Then click **next** to continue."



Power up the module. It will be automatically detected and the update process will begin.



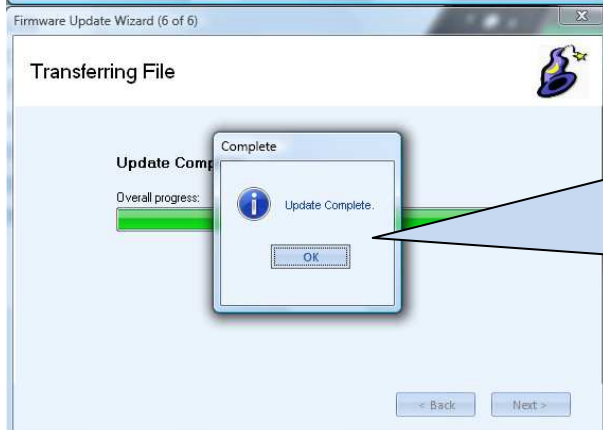
If the file you attempt to send to the module is not compatible with the currently connected module, the update cannot continue. In this example an attempt was made to send a 4410 firmware file to a 4420 module!



The update is now in progress and will take under one minute.

During this phase:

- DO NOT DISCONNECT THE USB CONNECTION
- DO NOT TURN OFF YOUR PC
- DO NOT REMOVE POWER FROM THE DSE4400 Series CONTROLLER




The update is now complete.

The module will automatically restart with the updated firmware (internal software program).

It is now safe to disconnect the USB lead and power down the module or your PC.











Click **OK** to continue.

## 5.3 HELP MENU

 About	Shows the version number of the configuration suite
---	---

## 5.4 TOOLBAR

The toolbar contains the most used commands from the menus and is often a quicker way of accessing these commands.

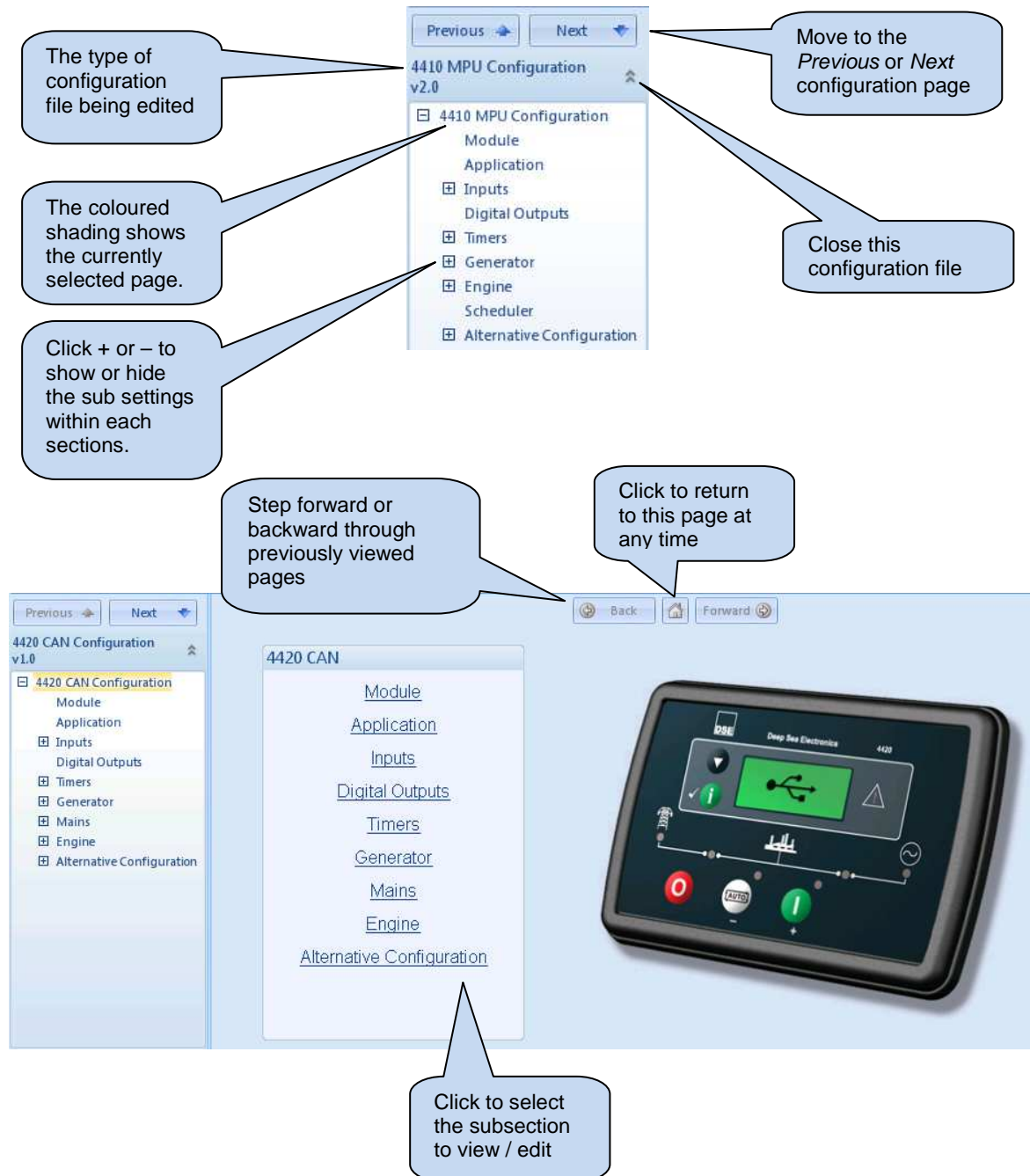
	Create a new configuration file
	Open an existing file from disk or flash memory device
	Save the currently open file to the location it was loaded from previously. If this is a new file, you are prompted to enter a filename.
	Print the currently open configuration file
	Preview what the configuration file will look like on the page after printing.
	Send the currently open configuration settings to the controller
	Read the settings out of the connected controller for viewing / editing
	Shows the version number of the configuration suite
<input type="checkbox"/> Display volts as PhPh	<input checked="" type="checkbox"/> Voltages are shown as phase to phase voltages in the configuration editor <input type="checkbox"/> Voltages are shown as phase to neutral voltages in the configuration editor
Connect via   <b>USB</b>	Select the communication method. The choices present are dependent upon your PC's configuration.  To connect via <b>USB</b> directly to the controller, select <i>USB</i> : 



## 6 EDIT CONFIG

This menu allows module configuration, to change the function of Inputs, Outputs and LED's, system timers and level settings to suit a particular application.

### 6.1 SCREEN LAYOUT



## 6.2 MODULE

The module page is subdivided into smaller sections.  
Select the required section with the mouse.

This section allows the user to change the options related to the module itself.



## 6.2.1 MODULE

**Module**

Module Options

Lamp Test at Power Up ☐



Power Save Mode Enable ☐

Protected Start Enable ☐

Power Up In Auto ☐

Event Log in Hours Run ☒

Enable Fast Loading ☐

Miscellaneous Options	
Lamp Test At Power Up	<input type="checkbox"/> = Feature disabled <input checked="" type="checkbox"/> = The LEDs on the module's fascia will all illuminate when the DC power is applied as a 'lamp tst' feature.
Power Save Mode Enable	<input type="checkbox"/> =Normal operation <input checked="" type="checkbox"/> =Module goes into power save (low current) mode after 1m of inactivity in STOP mode. Press any button to 'wake' the module.
Protected Start Enable	<input type="checkbox"/> =Normal operation <input checked="" type="checkbox"/> =Requires TWO presses of the start button to begin the engine start sequence. This may be required to meet local legislation in some countries. Check with your local authority if in doubt.
Display Oil pressure in PSI (CAN variant only) V1.1 only	<input type="checkbox"/> =The module displays the oil pressure in bar <input checked="" type="checkbox"/> = The module displays the oil pressure in PSI (pounds per square inch)
Display voltages phase to phase V1.1 only	<input type="checkbox"/> =The module displays the voltage as measured at its terminals. <input checked="" type="checkbox"/> = The module displays the measured voltage multiplied by 2 or by 'root 3' as required by the AC System selected.
Power Up in Auto	<input type="checkbox"/> =The module enters STOP mode when DC power is applied. <input checked="" type="checkbox"/> = The module enters AUTO mode when DC power is applied.
Event log in Hours Run	<input checked="" type="checkbox"/> = The engine run hours is added to the recorded event in the event log
Display SPN Strings (CAN variant only)	<input type="checkbox"/> =The module displays CAN messages in manufacturer numerical code. <input checked="" type="checkbox"/> = The module displays CAN messages in ENGLISH text alongside the manufacturer numerical code.
Enable Fast Loading	<p> <input type="checkbox"/> = Normal Operation, the safety on timer will be observed in full. This feature is useful if the module is to be used with some small engines where pre-mature termination of the delay timer can lead to overspeed alarms on start up.  <input checked="" type="checkbox"/> = The module will terminate the safety on timer once all monitored parameters have reached their normal settings. This feature is useful if the module is to be used as a standby controller as it allows the generator to start and go on load in the shortest possible time.           </p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p> <b>NOTE: - Enabling Fast Loading is only recommended where steps have been taken to ensure rapid start up of the engine is possible. (For example when fitted with engine heaters, electronic governors etc.)</b></p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p> <b>NOTE: - Enabling Fast Loading is available in V2.3.x onwards.</b></p> </div>

## 6.3 APPLICATION

### 6.3.1 CAN OPTION MODULE

**NOTE:** - CAN options only available with the CAN version of the 4400 controller.

The screenshot shows the 'Application' configuration window for the CAN Option Module. It is divided into three sections: 'ECU (ECM) Options', 'CAN Data Fail Alarm', and 'Activation Delay'. Callouts provide the following explanations:

- Engine Type:** Allows selection of the Engine type being used (ie Conventional Diesel Engine, Gas Engine or Electronic Engine). The dropdown is currently set to 'Generic J1939'.
- Alternative Engine Speed:** Instructs electronic engines to run at their 'alternative speed' (supported CAN engines only). This is represented by a checkbox.
- CAN Data Fail Alarm:** Configuration of the CAN data fail alarm, providing protection against the failure of the engine ECU data link. This section includes:
  - Action:** Dropdown set to 'Shutdown'.
  - Arming:** Dropdown set to 'From Safety On'.
  - Activation Delay:** Set to '0s' with a timer icon.

### 6.3.2 MAGNETIC PICKUP OPTION MODULE

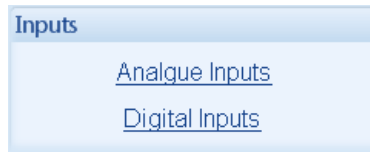
**NOTE:** - Magnetic Pickup options only available with the MPU version of the 4400 controller.

The screenshot shows the 'Application' configuration window for the Magnetic Pickup Option Module. It contains an 'Engine Options' section with the following field:

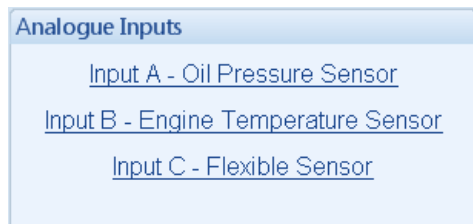
- Engine Type:** Allows selection of engine type (Conventional engine or GAS engine functionality). The dropdown is currently set to 'Conventional Engine'.

## 6.4 INPUTS

The inputs page is subdivided into smaller sections, depending upon the variant in use. Select the required section with the mouse.



### 6.4.1 ANALOGUE INPUTS



## 6.4.2 INPUT A – OIL PRESSURE SENSOR

**CAN Version module** – Most engines give oil pressure from CAN link. In these cases, Input A is fixed as Digital Input. Configuration is the same as for Digital Inputs, detailed elsewhere in this document. Where the CAN engine does not support oil pressure over CAN link, Analogue input A is selectable as either digital input, or as analogue oil pressure sensor.

**Input A - Oil Pressure Sensor**

**Input Type**

Input Type: Digital Input

**Digital Input**

Function: User Configured

Polarity: Close to Activate

Action: Shutdown

Arming: Never

Activation Delay: 0s

Close or open to activate

Select the type of alarm required. For details of these, see the section entitled *Alarm Types* elsewhere in this document.

Configures when the input is active: Never, always, active from starting, active from the end of the safety timer

Click and drag to change the setting. This is used to give a delay on acceptance of the input. Useful for liquid level switches or to mask short term operations of the external switch device.

**MPU Version module** - Analogue input A is selectable as either digital input, or as analogue oil pressure sensor.

**Input A - Oil Pressure Sensor**

**Input Type**

Input Type: Pressure Sensor

**Sensor Selection**

VDO 10 Bar

Edit...

**Low Oil Pressure Shutdown**

Enable: ☒

Trip: 1.03 Bar

14.94 PSI, 103 kPa

**Sensor Open Circuit Alarm**

Enable: ☐

Select the sensor type

Click to edit the 'sensor curve'. See section entitled *Editing the sensor curve*.

Enable or disable the alarms. The relevant values below will appear *greyed out* if the alarm is disabled.

Click and drag to change the settings

Type the value or click the up and down arrows to change the settings

### 6.4.3 INPUT B – ENGINE TEMPERATURE SENSOR

**CAN Version module** –Engines give temperature measurements from CAN link. Input A is fixed as Digital Input. Configuration is the same as for Digital Inputs, detailed elsewhere in this document.

**Input B - Engine Temperature Sensor**

**Input Type**  
Input Type: Digital Input

**Digital Input**

Function: User Configured  
Polarity: Close to Activate  
Action: Warning  
Arming: Never  
Activation Delay: 0s

Close or open to activate

Select the type of alarm required. For details of these, see the section entitled *Alarm Types* elsewhere in this document.

Configures when the input is active: Never, always, active from starting, active from the end of the safety timer

Click and drag to change the setting. This is used to give a delay on acceptance of the input. Useful for liquid level switches or to mask short term operations of the external switch device.

**MPU Version module** - Analogue input B is selectable as either digital input, or as analogue engine temperature sensor.

**Input B - Engine Temperature Sensor**

**Input Type**  
Input Type: Temperature Sensor

**Input type**  
Input type: VDO 120 °C Edit...

**High Coolant Temperature Shutdown**  
Trip: 96 °C 205 °F

**Sensor Open Circuit Alarm**  
Enable: ☒

Select the sensor type

Click to edit the 'sensor curve'. See section entitled *Editing the sensor curve*.

Type the value or click the up and down arrows to change the settings

Click and drag to change the settings

## 6.4.4 FLEXIBLE SENSOR

### Flexible Sensor Alarms

**Input C - Flexible Sensor**

**Sensor Description**

Sensor Type: Temperature Sensor (Select the sensor type)

Sensor Name: Flexible Sensor (Click to edit the 'sensor curve'. See section entitled *Editing the sensor curve*.)

**Input Type**

Murphy (Click and drag to change the settings)

**Sensor Alarms**

**Low Alarm**

Action: Shutdown

Trip: 65 °C

**Low Pre-alarm** ☒ (Version 2.3.x or later Click to enable or disable the alarms. The relevant values below will appear *greyed out* if the alarm is disabled.)

Trip: 70 °C

Return: 75 °C

**High Pre-alarm** ☒ (Version 2.3.x or later Select the type of alarm required. For details of these, see the section entitled *Alarm Types* elsewhere in this document.)

Return: 88 °C

Trip: 90 °C

**High Alarm**

Action: Electrical Trip

Trip: 95 °C

Alarm Arming: Always (Type the value or click the up and down arrows to change the settings)



## 6.4.5 EDITING THE SENSOR CURVE

While the *configuration suite* holds sensor specification for the most commonly used resistive sensors, occasionally it is required that the 4400 Series module be connected to a sensor not listed by the *configuration suite*. To aid this process, a sensor editor has been provided.

In this example, the closest match to the sensor in use is the VDO 10-180Ω fuel level sensor.

Click to edit the 'sensor curve'.

Click and drag the points on the graphs to change the settings

Or use the mouse to select the graph point, then enter the value in the box or click up/down to change the value

Click OK to save the changes and return to the configuration editor

Click CANCEL to ignore and lose any changes you have made

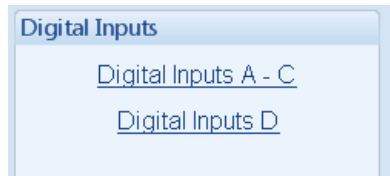
The **Sensor Curve Editor** window displays a graph with the following data points (approximate values):

Ohms	%
0	0
32	10
64	20
96	30
128	40
160	50
192	60
224	70
256	80
288	90
320	100
352	110
384	120
416	130
448	140
480	150

The interface includes a dropdown menu for 'Sensor Type' (currently showing 'VDO Ohm range (10-180)'), an 'Edit...' button, and a '0 Ohms' input field with a percentage sign. The graph has 'Ohms' on the x-axis (0 to 480) and '%' on the y-axis (0 to 250). 'OK' and 'Cancel' buttons are at the bottom right.

## 6.4.7 DIGITAL INPUTS

The *digital inputs* page is subdivided into smaller sections. Select the required section with the mouse.



**Digital Inputs A - C**

**Digital Input A**

Function: Emergency Stop  
 Polarity: Open to Activate  
 Action: [Greyed out]  
 Arming: [Greyed out]  
 Activation Delay: 0s

**Digital Input B**

Function: User Configured  
 Polarity: Close to Activate  
 Action: Shutdown  
 Arming: Always  
 Activation Delay: 0s

**Callouts:**

- Input function.** See section entitled *Input functions* for details of all available functions (points to 'Emergency Stop' dropdown).
- As this example shows a predefined function, these parameters are greyed out as they are not applicable** (points to 'Action' and 'Arming' dropdowns).
- Configures when the input is active: Never, always, active from starting, active from the end of the safety timer** (points to 'Arming' dropdown).
- Example of a user configured input** (points to 'User Configured' dropdown).
- Close or open to activate** (points to 'Close to Activate' dropdown).
- Select the type of alarm required. For details of these, see the section entitled *Alarm Types* elsewhere in this document.** (points to 'Shutdown' dropdown).
- Click and drag to change the setting. This is used to give a delay on acceptance of the input. Useful for liquid level switches or to mask short term operations of the external switch device.** (points to 'Activation Delay' slider).


## 6.4.8 INPUT FUNCTIONS



Where a digital input is NOT configured as “user configured”, a selection can be made from a list of predefined functions. The selections are as follows:

Under the scope of IEEE 37.2, *function numbers can also be used to represent functions in microprocessor devices and software programs*. Where the DSE input functions can be represented by IEEE 37.2, the function number is listed below.



**= Only applicable to DSE4420 / DSE4420 AMF Modules**

Function	Description
Alarm Mute	This input is used to silence the audible alarm from an external source, such as a remote mute switch.
Alarm Reset	This input is used to reset any latched alarms from a remote location. It is also used to clear any latched warnings which may have occurred (if configured) without having to stop the generator.
Alternative Configuration	These inputs are used to instruct the DSE4400 Series module to follow one of the <i>alternative</i> configuration settings instead of the <i>main</i> configuration settings.
Auto Restore Inhibit IEEE 37.2 - 3 checking or interlocking relay	In the event of a remote start/mains failure, the generator will be instructed to start and take load. On removal of the remote start signal/mains return the module will continue to run the generator on load until the <i>Auto Restore Inhibit</i> input is removed. This input allows the controller to be fitted as part of a system where the restoration to mains is controlled remotely or by an automated system.
Auto start Inhibit IEEE 37.2 - 3 checking or interlocking relay	This input is used to provide an over-ride function to prevent the controller from starting the generator in the event of a remote start/mains out of limits condition occurring. If this input is active and a remote start signal/mains failure occurs the module will not give a start command to the generator. If this input signal is then removed, the controller will operate as if a remote start/mains failure has occurred, starting and loading the generator. This function can be used to give an ‘AND’ function so that a generator will only be called to start if the mains fails and another condition exists which requires the generator to run. If the ‘Auto start Inhibit’ signal becomes active once more it will be ignored until the module has returned the mains supply on load and shutdown. This input does not prevent starting of the engine in MANUAL or TEST modes.
Auxiliary Mains Fail 	The module will monitor the incoming single or three phase supply for Over voltage, Under Voltage, Over Frequency or Under frequency. It may be required to monitor a different mains supply or some aspect of the incoming mains not monitored by the controller. If the devices providing this additional monitoring are connected to operate this input, the controller will operate as if the incoming mains supply has fallen outside of limits, the generator will be instructed to start and take the load. Removal of the input signal will cause the module to act if the mains has returned to within limits providing that the mains sensing also indicates that the mains is within limits.
Coolant Temperature High switch	This input is used to give a <i>Coolant Temperature High</i> shutdown from a digital normally open or closed switch. It allows coolant temperature protection using the switch and the analogue input can be used in parallel to give protection or configured to be used for indication only.
Emergency Stop	Used for connection to the emergency stop switch. For fail safe operation, use a normally closed stop switch and configure the input to “Open to Activate”
External Panel Lock	Locks the module into the current operating mode.

Function	Description
Generator Load Inhibit IEEE 37.2 - 52 AC circuit breaker	<p>This input is used to prevent the <b>4400</b> from loading the generator. If the generator is already on load, activating this input will cause the <b>4400</b> to unload the generator. Removing the input will allow the generator to be loaded again.</p> <p><b>NOTE:</b> -This input only operates to control the generator-switching device if the 4400 load switching logic is attempting to load the generator. It will not control the generator-switching device when the mains supply is on load.</p>
Lamp Test	This input is used to provide a test facility for the front panel indicators fitted to the <b>4400</b> module. When the input is activated all LED's should illuminate.
Low Fuel Level Switch	Used to give a digital input function to provide a low fuel level alarm
Mains Load Inhibit IEEE 37.2 - 3 checking or interlocking relay 	<p>This input is used to prevent the <b>4x20</b> from loading the mains supply. If the mains supply is already on load activating this input will cause the <b>7x20</b> to unload the mains supply. Removing the input will allow the mains to be loaded again.</p> <p><b>NOTE:</b> -This input only operates to control the mains switching device if the 7x20 load switching logic is attempting to load the mains. It will <u>not</u> control the mains switching device when the generator is on load.</p>
Oil Pressure Switch	A digital normally open or closed oil pressure switch gives this input. It allows oil pressure protection using the switch and the analogue input to be used in parallel to give protection or to be used for oil pressure indication only.
Remote Start off load	If this input is active, operation will be similar to the 'Remote Start on load' function except that the generator will not be instructed to take the load. This function can be used where an engine only run is required e.g. for exercise.
Remote Start on load	When in auto mode, the module will perform the start sequence and transfer load to the generator. In Manual mode, the load will be transferred to the generator if the engine is already running, however in manual mode, this input will not generate start/stop requests of the engine.
Simulate Mains available 	This function is provided to override the module's internal monitoring function. If this input is active, the module will not respond to the state of the incoming AC mains supply.
Smoke limit IEEE 37.2 – 18 accelerating or decelerating device	This input instructs the module to give a <i>run at idle speed</i> command to the engine either via an output configured to <i>smoke limit</i> or by data commands when used with supported electronic engines.
Transfer to generator/Open Mains IEEE 37.2 - 52 AC circuit breaker	This input is used to transfer the load to the generator when running in <b>MANUAL MODE</b>
Transfer to Mains/ Open Generator IEEE 37.2 - 52 AC circuit breaker	This input is used to transfer the load to the mains supply (AMF module) when running in MANUAL MODE or provide the 'Open Generator' signal in a non AMF Module.)

## 6.5 OUTPUTS

### 6.5.1 DIGITAL OUTPUTS

The screenshot shows the 'Digital Outputs' configuration window. It has a title bar 'Digital Outputs' and a subtitle 'Output Configuration'. On the left is a list of output labels: Output A, Output B, Output C, Output D, Output E, and Output F. To the right is a table with two columns: 'Source' and 'Polarity'. The 'Source' column contains dropdown menus with the following options: Fuel Relay, Start Relay, Close Mains Output, Close Gen Output, Digital Input A, and Common Warning. The 'Polarity' column contains dropdown menus with the following options: Energise, Energise, De-Energise, Energise, Energise, and Energise. The first two rows (Fuel Relay and Start Relay) are highlighted in yellow. Callouts provide additional context: a speech bubble points to the output labels stating 'These labels match the typical wiring diagram'; a speech bubble points to the yellow-highlighted rows stating 'These are greyed out as they are fixed, not adjustable unless a CAN engine has been selected'; and a speech bubble points to the 'De-Energise' option stating 'Select if the relay is to energise or de-energise upon activation of the source'.

Select what the output is to be used to control

These labels match the typical wiring diagram

These are greyed out as they are fixed, not adjustable unless a CAN engine has been selected

Select if the relay is to *energise* or *de-energise* upon activation of the source

	Source	Polarity
Output A	Fuel Relay	Energise
Output B	Start Relay	Energise
Output C	Close Mains Output	De-Energise
Output D	Close Gen Output	Energise
Output E	Digital Input A	Energise
Output F	Common Warning	Energise

## 6.5.2 OUTPUT SOURCES




The list of output sources available for configuration of the module relay.




Under the scope of IEEE 37.2, *function numbers can also be used to represent functions in microprocessor devices and software programs*. Where the DSE output functions can be represented by IEEE 37.2, the function number is listed below.

The outputs are in alphabetical order with the *parameter* first. For instance for overspeed output, it's listed as *Engine Overspeed*.



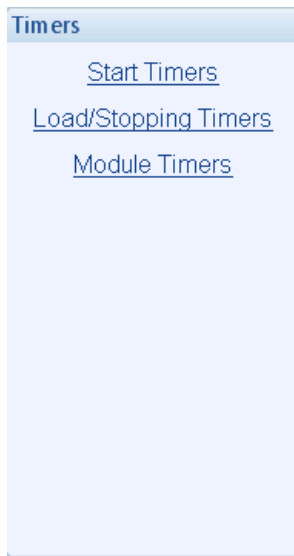
= Only available on DSE4420 / DSE4420 AMF Modules

Output source	Activates...	Is not active...
Not Used	The output will not change state (Unused)	
Audible Alarm IEEE 37.2 – 74 alarm relay	This output indicates that the internal sounder is operating to allow it to feed an external sounder. Operation of the Mute pushbutton will reset this output once activated.	Inactive if the internal sounder is not operating.
Battery High Voltage IEEE 37.2 – 59DC overvoltage relay	This output indicates that a Battery Over voltage alarm has occurred.	Inactive when battery voltage is not High
Battery Low Voltage IEEE 37.2 – 27DC undervoltage relay	This output indicates that a Battery Under Voltage alarm has occurred.	Inactive when battery voltage is not Low
CAN Data Fail	Becomes active when no CAN data is received from the ECU after the safety delay timer has expired	Inactive when: <ul style="list-style-type: none"> <li>CAN data is being received</li> <li>The set is at rest</li> <li>During the starting sequence before the safety delay timer has expired</li> </ul>
CAN ECU WARNING	Becomes active when a 'Yellow lamp' – Warning alarm is signalled by the CAN ECU	
CAN ECU SHUTDOWN	Becomes active when a 'Red lamp' – Shutdown alarm is signalled by the CAN ECU	
CAN ECU Power	Used to switch an external relay to power the CAN ECU. Exact timing of this output is dependent upon the type of the engine ECU	
CAN ECU Stop	Active when the DSE controller is requesting that the CAN ECU stops the engine.	
Charge alternator warning/shutdown	Active when the charge alternator alarm is active	
Close Generator IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the 4400 module selects the generator to be on load this control source will be active.	Inactive whenever the generator is not required to be on load
Close Generator Pulse IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the 4400 module selects the generator to be on load this control source will be active for the duration of the Breaker Close Pulse timer, after which it will become inactive again.	
Close Mains IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the 4400 module selects the mains to be on load this control source will be active.	The output is inactive whenever the mains is not required to be on load
Close Mains Pulse IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the 4400 module selects the mains to be on load this control source will be active for the duration of the Breaker Close Pulse timer, after which it will become inactive again.	
Combined Mains Failure 	Active when the mains supply is out of limits OR the input for Auxiliary Mains Failure is active	
Common Alarm	Active when one or more alarms (of any type) are active	The output is inactive when no alarms are present
Common Shutdown	Active when one or more <i>Shutdown</i> alarms are active	The output is inactive when no shutdown alarms are present
Common Warning	Active when one or more <i>Warning</i> alarms are active	The output is inactive when no warning alarms are present

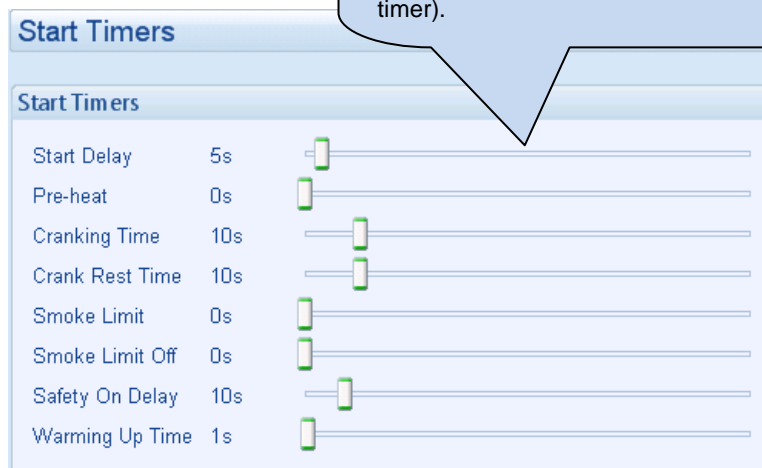
Emergency Stop	Active when the Emergency Stop alarm is active.	
Energise to Stop	Normally used to control an <i>Energise to Stop</i> solenoid, this output becomes active when the controller wants the set to stop running.	Becomes inactive a configurable amount of time after the set has stopped. This is the <i>ETS hold time</i> .
Fuel Relay	Becomes active when the controller requires the governor/fuel system to be active.	Becomes inactive whenever the set should be stopped, including between crank attempts, upon controlled stops and upon fault shutdowns.
Gas Choke On	Becomes active during starting for the duration of the Gas Choke timer. Normally used to choke a gas engine.	Inactive at all other times
Gas Ignition	Becomes active during starting.	Becomes inactive a configurable amount of time after the <i>fuel relay</i> becomes inactive. This is the <i>Gas ignition off timer</i> .
Generator Available	Becomes active when the generator is available to take load.	Inactive when <ul style="list-style-type: none"> <li>Loading voltage and loading frequency have not been reached</li> <li>After <i>electrical trip</i> alarm</li> <li>During the starting sequence before the end of the warming timer.</li> </ul>
Open Generator IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the 4400 module selects the generator to be off load this control source will be active.	Inactive whenever the generator is required to be on load
Open Generator Pulse IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the 4400 module selects the generator to be off load this control source will be active for the duration of the Breaker Open Pulse timer, after which it will become inactive again.	
Open Mains IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the 4400 module selects the mains to be off load this control source will be active.	The output is inactive whenever the mains is required to be on load
Open Mains Pulse IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the 4400 module selects the mains to be off load this control source will be active for the duration of the Breaker Open Pulse timer, after which it will become inactive again.	
Preheat during preheat timer	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : <ul style="list-style-type: none"> <li>The set is stopped</li> <li>The preheat timer has expired</li> </ul>
Preheat until end of crank	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : <ul style="list-style-type: none"> <li>The set is stopped</li> <li>The set has reached <i>crank disconnect</i> conditions</li> </ul>
Preheat Mode until end of safety timer	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : <ul style="list-style-type: none"> <li>The set is stopped</li> <li>The set has reached the end of the <i>safety delay</i> timer</li> </ul>
Preheat Mode until end of warming timer	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : <ul style="list-style-type: none"> <li>The set is stopped</li> <li>The set has reached the end of the <i>warming</i> timer</li> </ul>
Smoke Limiting	Becomes active when the controller requests that the engine runs at idle speed. As an output, this can be used to give a signal to the <i>Idle input</i> of an engine speed governor (if available)	Becomes inactive when the controller requests that the engine runs at rated speed.
Start Relay IEEE 37.2 – 54 turning gear engaging device	Active when the controller requires the cranking of the engine.	
Waiting for Manual Restore 	Becomes active when the generator is on load and the mains supply is healthy but an input configured to Manual Restore is active. This can be used to signal to an operator that action is required before the set can transfer back to the mains supply.	

## 6.6 TIMERS

Many timers are associated with alarms. Where this occurs, the timer for the alarm is located on the same page as the alarm setting. Timers not associated with an alarm are located on the timers page. The *timers* page is subdivided into smaller sections. Select the required section with the mouse.



### 6.6.1 START TIMERS



= Only available on DSE4420 / DSE4420 AMF Modules

Timer	Description
Start delay	Used to give a delay before starting in AUTO mode. This timer is activated upon a remote start signal being applied, or upon a start due to mains failure, scheduled run or any other <i>automatic</i> start. Typically this timer is applied to prevent starting upon fleeting remote start signals or short term mains failures.
Pre-heat	Give a 'pre start' time during which the <i>Preheat</i> output will become active (if configured)
Cranking time	The length of each crank attempt
Crank rest time	The time between multiple crank attempts.
Smoke limit	The amount of time that the engine will be requested to run at <i>idle</i> speed upon starting. This is typically used to limit emissions at startup.
Smoke limit off	This should be set to a little longer than the amount of time that the set takes to run up to rated speed after removal of the command to run at <i>idle</i> speed. If this time is too short, the set could be stopped due to <i>underspeed</i> failure. If the time is too long, <i>underspeed</i> protection is disabled until the <i>Smoke limit time off</i> time has expired.
Safety on delay	The amount of time at startup that the controller will ignore oil pressure, engine speed, alternator voltage and other <i>delayed</i> alarms. This is used to allow the engine to run up to speed before protections are activated.
Warming up time	The amount of time that the set will run BEFORE being allowed to take load. This is used to warm the engine to prevent excessive wear.



## 6.6.2 LOAD / STOPPING TIMERS

**Load/Stopping Timers**

**Load Timers**

Breaker Close Pulse	0.5s	
Breaker Trip Pulse	0.5s	

**Stopping Timers**

Return Delay	30s	
Cooling Time	1m	
ETS Solenoid Hold	0s	
Fail to Stop Delay	30s	
Generator Transient Delay	0.0s	

Click and drag to change the setting.  
Timers increment in steps of 1second up to one minute, then in steps of 30seconds up to 30minutes, then in steps of 30minutes thereafter (where allowed by the limits of the timer).



= Only available on DSE4420 / DSE4420 AMF Modules

Timer	Description
Breaker close pulse	The amount of time that <i>Breaker Close Pulse</i> signals will be present when the request to close a breaker is given.
Breaker Trip pulse	The amount of time that <i>Breaker Open Pulse</i> signals will be present when the request to open a breaker is given.
Return delay	A delay, used in auto mode only, that allows for short term removal of the request to stop the set before action is taken. This is usually used to ensure the set remains on load before accepting that the start request has been removed.
Cooling time	The amount of time that the set will be made to run OFF LOAD before being stopped. This is to allow the set to cool down and is particularly important for engines with turbo chargers.
ETS Solenoid hold	The amount of time the <i>Energise to stop</i> solenoid will be kept energised after the engine has come to rest. This is used to ensure the set has fully stopped before removal of the stop solenoid control signal.
Fail to stop delay	If the set is called to stop and is still running after the <i>fail to stop</i> delay, a <i>Fail to Stop</i> alarm is generated.
Generator transient delay	Used to delay the generator under/over volts/frequency alarms. Typically this is used to prevent spurious shutdown alarms caused by large changes in load levels.

## 6.6.3 MODULE TIMERS

**Module Timers**

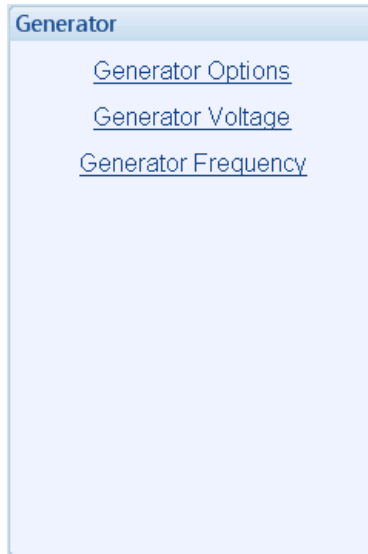
**Module Timers**

Power Save Mode Delay	1m	
-----------------------	----	--

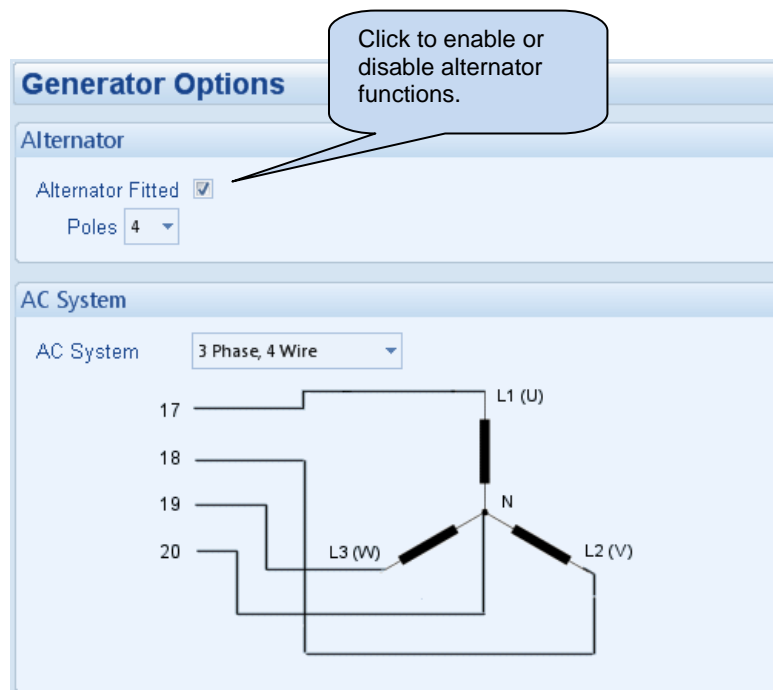
Timer	Description
Power Save Mode Delay (fixed timer)	If the module is left unattended in STOP mode for the duration of the <i>Power Save Mode Delay</i> it will enter low power consumption mode (Power Save Mode).

## 6.7 GENERATOR

The *generator* page is subdivided into smaller sections. Select the required section with the mouse.



### 6.7.1 GENERATOR OPTIONS



Parameter	Description
Alternator fitted	<input type="checkbox"/> = There is no alternator in the system, it is an <i>engine only</i> application <input checked="" type="checkbox"/> = An alternator is fitted to the engine, it is a <i>generator</i> application.
AC System V1.1+	Allows a number of AC systems to be catered for.  Selecting the AC system shows the connections required for that particular system, along with the relevant connection numbers on the controller.

## 6.7.2 GENERATOR VOLTAGE ALARMS

The screenshot shows the 'Generator Voltage Alarms' configuration window. It contains three main sections: 'Under Voltage Shutdown', 'Loading Voltage', and 'Over Voltage Shutdown'. Each section has a value input field, a unit, and a slider. Callouts provide instructions: 'Click to enable or disable the alarms. The relevant values below will appear *greyed out* if the alarm is disabled.' points to the 'Enable' checkbox in the 'Under Voltage Shutdown' section. 'Type the value or click the up and down arrows to change the settings' points to the '184' input field in the 'Under Voltage Shutdown' section. 'Click and drag to change the setting.' points to the slider in the 'Loading Voltage' section.

**Generator Voltage Alarms**

**Under Voltage Shutdown**

Enable ☒ 184 v PhN 184v PhN

**Loading Voltage**

207 v PhN 207v

**Over Voltage Shutdown**

Shutdown 277 v PhN 277v PhN

Alarm	IEEE designation
Generator Under voltage	IEEE 37.2 - 27AC Undervoltage relay
Generator Over voltage	IEEE 37.2 - 59AC Overvoltage relay

### 6.7.3 GENERATOR FREQUENCY ALARMS

The screenshot shows the 'Generator Frequency Alarms' configuration window. It contains four sections: 'Under Frequency Shutdown', 'Loading Frequency', 'Nominal Frequency', and 'Over Frequency Shutdown'. Each section has an 'Enable' checkbox and a frequency slider with numerical input fields and percentage indicators.

- Under Frequency Shutdown:** Enable checkbox is checked. The frequency is set to 40.0 Hz (80.0 %).
- Loading Frequency:** The frequency is set to 45.0 Hz (90.0 %).
- Nominal Frequency:** The frequency is set to 50.0 Hz.
- Over Frequency Shutdown:** Enable checkbox is checked. The frequency is set to 57.0 Hz (114.0 %).

Callouts provide additional information:

- Top right callout:** Click to enable or disable the alarms. The relevant values below will appear *greyed out* if the alarm is disabled.
- Left callout:** Type the value or click the up and down arrows to change the settings.
- Right callout:** Click and drag to change the setting.
- Bottom right callout:** Overfrequency Shutdown can only be disabled if another method of speed protection is available (ie CAN or Magnetic Pickup). Hence the checkbox is *greyed out*.

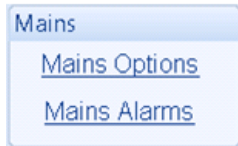
Alarm	IEEE designation
Generator Under Frequency	IEEE 37.2 -81 Frequency relay
Generator Over Frequency	IEEE 37.2 -81 Frequency relay

## 6.8 MAINS

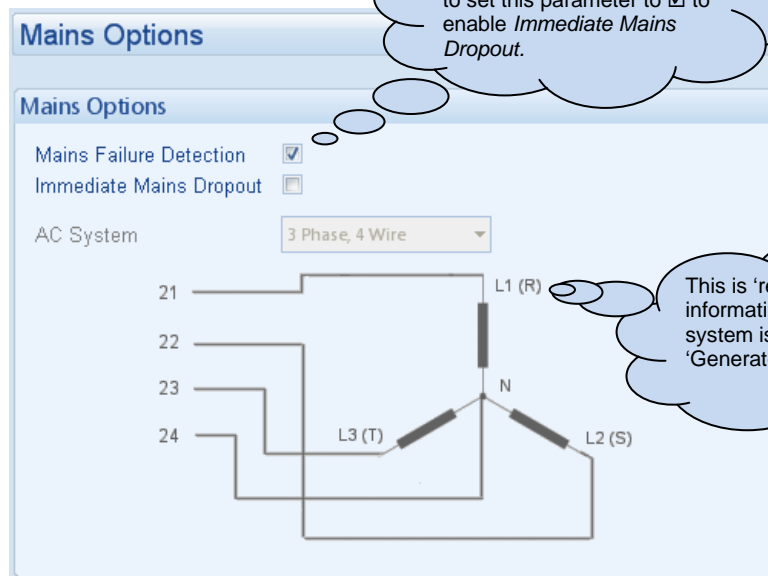


= Only available on DSE4420 AMF Modules

The *mains* page is subdivided into smaller sections.  
Select the required section with the mouse.



### 6.8.1 MAINS OPTIONS



Timer	Description
Mains failure detection 	<input type="checkbox"/> = The module will ignore the status of the mains supply. <input checked="" type="checkbox"/> = The module will monitor the mains supply and use this status for automatically starting and stopping the set in auto mode.
Immediate Mains Dropout 	<input type="checkbox"/> = Upon mains failure, the mains load switch will be kept closed until the generator is up to speed and volts. <input checked="" type="checkbox"/> = Upon mains failure, the mains load switch will be opened immediately, subject to the setting of the <i>mains transient</i> timer.
AC System 	These settings are used to detail the type of AC system to which the module is connected: 3 phase 4 wire, 1 phase 2 wire, 2 phase 3 wire – L1-L2, 2 phase 3 wire – L1-L3, 3 phase 3 wire, 3 phase 4 wire delta  This list is not exhaustive. DSE reserve the right to add to this list as part of our policy of continual development

## 6.8.2 MAINS ALARMS

The screenshot shows the 'Mains Alarms' configuration window, divided into 'Voltage Alarms' and 'Frequency Alarms' sections.

**Voltage Alarms:**





- Undervolts:** Enabled (checkbox checked). Trip is set to 319 v PhPh. Return is set to 359 v PhPh.
- Overvolts:** Enabled (checkbox checked). Return is set to 438 v PhPh. Trip is set to 478 v PhPh.

**Frequency Alarms:**

- Under Freq.:** Enabled (checkbox checked). Trip is set to 45.0 Hz. Return is set to 48.0 Hz.
- Over Freq.:** Enabled (checkbox checked). Return is set to 52.0 Hz. Trip is set to 55.0 Hz.

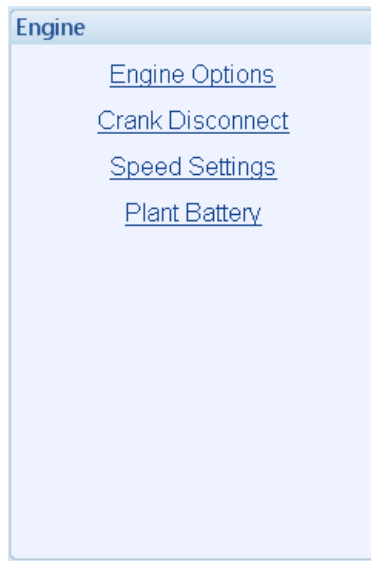
**Callouts:**

- Top right:** Click to enable or disable the alarms. The relevant values below will appear *greyed out* if the alarm is disabled.
- Left (pointing to input fields):** Type the value or click the up and down arrows to change the settings.
- Right (pointing to sliders):** Click and drag to change the setting.

Alarm	IEEE designation
Mains Under voltage 	IEEE 37.2 - 27AC Undervoltage relay
Mains Over voltage 	IEEE 37.2 - 59AC Overvoltage relay
Mains Under Frequency 	IEEE 37.2 -81 Frequency relay
Mains Over Frequency 	IEEE 37.2 -81 Frequency relay

## 6.9 ENGINE

The *engine* page is subdivided into smaller sections. Select the required section with the mouse.



### 6.9.1 ENGINE OPTIONS

#### CAN VERSION MODULE

**Engine Options**

**ECU (ECM) Options**

Engine Type: Generic J1939 (dropdown menu)

Alternative Engine Speed: ☐

**Startup Options**

Start Attempts: 3 (spinner)

**Low Oil Pressure Shutdown**

Shutdown: ☒ (checkbox)

Trip: 1.03 Bar (spinner) — 1.03Bar, 14.94 PSI, 103 KPa (slider)

**Low Oil Sensor Open Circuit Alarm**

Enable: ☐ (checkbox)

**High Coolant Temperature Shutdown**

Trip: 96 °C (spinner) — 96 °C, 205 °F (slider)

**Callouts:**

- This item is not adjustable here, it's read only. To change this item, visit the *module* menu. (points to Engine Type dropdown)
- Click to enable or disable the option. The relevant values below will appear *greyed out* if the alarm is disabled. (points to Shutdown checkbox)
- Settings for Oil Pressure and Engine Temperature are only available on selected CAN engines. (points to Low Oil Pressure Shutdown and High Coolant Temperature Shutdown sections)

**MPU VERSION MODULE**

The screenshot shows the 'Engine Options' configuration window, which is divided into four sections: 'Engine Options', 'Sensing Options', 'Startup Options', and 'Gas Engine Timers'.

- Engine Options:** Contains a dropdown menu for 'Engine Type' set to 'Conventional Engine'.
- Sensing Options:** Contains a checkbox for 'Magnetic Pickup Fitted' (checked) and a numeric input for 'Flywheel Teeth' set to 190.
- Startup Options:** Contains a numeric input for 'Start Attempts' set to 3.
- Gas Engine Timers:** Contains three sliders, each with a default value of 2s:
  - Choke Timer:** Controls the amount of time that the Gas Choke output will be active during the starting sequence.
  - Gas On Delay:** Controls the amount of time between de-energising the Fuel output and de-energising the Gas Ignition output. Used in the stopping sequence to purge unburnt gas from the engine before it is stopped.
  - Ignition Off Delay:** Controls the amount of time between energising the Gas Ignition and energising the Fuel output. Used in the starting sequence to purge old gas from the engine.

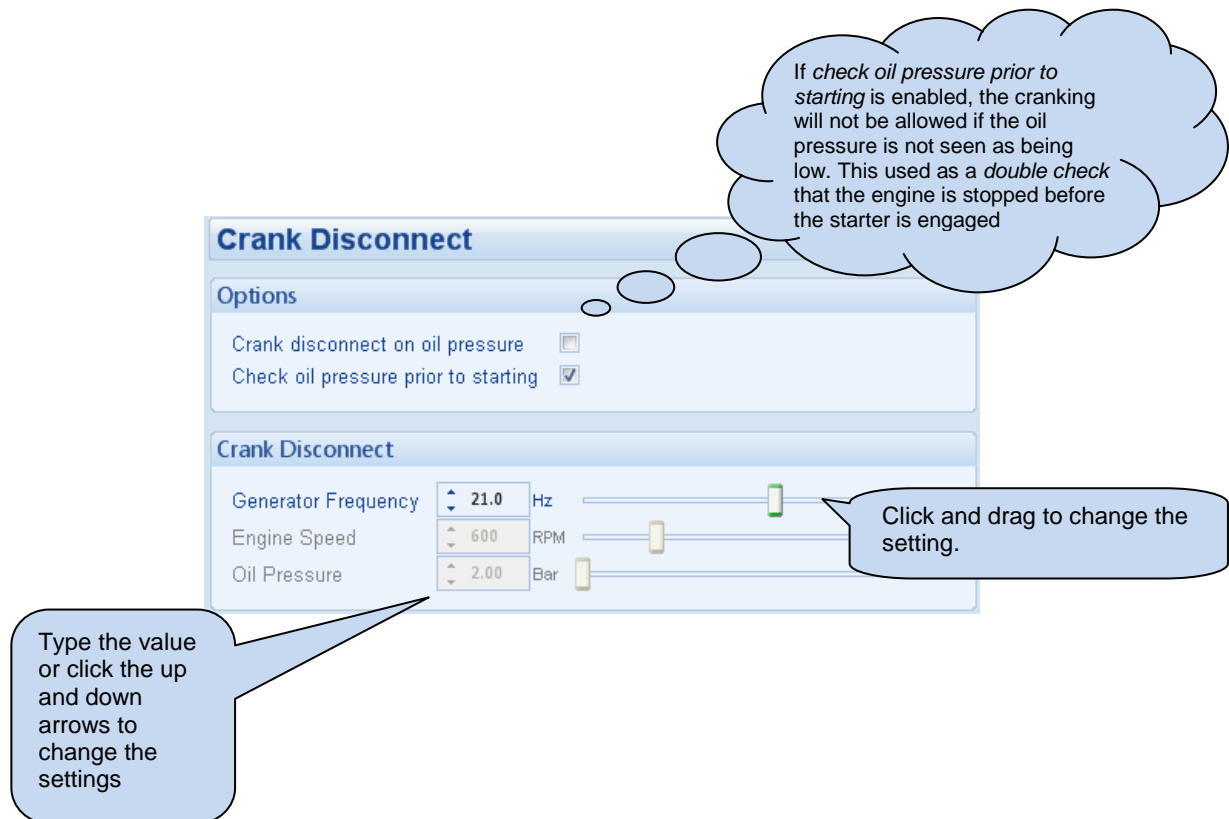
A callout bubble on the left states: 'For these timers to have any meaning, outputs are required for Gas Choke, Gas Ignition and Fuel.'



## 6.9.2 CRANK DISCONNECT

Crank disconnect settings are used to detect when the set fires during the starting sequence. As the set is cranked, the first parameter that passes its *crank disconnect* setting will result in the cessation of the cranking signal.

Having more than one *crank disconnect* source allows for a much faster crank disconnect response leading to less wear on the engine and starter components, and provides added safety in case one source is lost, by a blown or tripped fuse for example.



### 6.9.3 SPEED ALARMS

The screenshot shows the 'Speed Settings' configuration window. It is divided into two main sections: 'Under Speed' and 'Over Speed'. Each section has a 'Shutdown' checkbox and a 'Trip' value with a slider and a text input field.

- Under Speed:** The 'Shutdown' checkbox is checked. The 'Trip' value is 1200 RPM. A callout points to the checkbox with the text: "Click to enable or disable the option. The relevant values below will appear *greyed out* if the alarm is disabled."
- Over Speed:** The 'Shutdown' checkbox is checked. The 'Trip' value is 1710 RPM. A callout points to the text input field with the text: "Type the value or click the up and down arrows to change the settings". Another callout points to the slider with the text: "Click and drag to change the setting."

A thought bubble on the left side of the 'Over Speed' section contains the text: "Overspeed shutdown cannot be disabled."

## 6.9.4 PLANT BATTERY

**Plant Battery**

**Voltage Alarms**

Undervolts ☒ Warning 10.0 V DC Return 10.5 V DC Delay 1m

Overvolts ☒ Return 29.5 V DC Warning 30.0 V DC Delay 1m

**Charge Alternator Alarm**

Shutdown ☒ Trip 4.0 V DC Delay 5s

Warning ☒ Trip 6.0 V DC Delay 5s

**Start On Low Battery**

Enable ☐ Threshold 0.0 V DC Engine Run Time 0s

Click to enable or disable the option. The relevant values below will appear *greyed out* if the alarm is disabled.

Click and drag to change the setting.

Type the value or click the up and down arrows to change the settings

Select to enable autostart upon the battery voltage falling to the *threshold* level. The engine will start and run for the specified *Engine Run Time*.

Alarm	IEEE designation
Plant Battery Undervolts	IEEE 37.2 -27 DC Undervoltage relay
Plant Battery Overvolts	IEEE 37.2 -59 DC Overvoltage relay
Start on Low Battery	<input type="checkbox"/> = Start on Low Battery is disabled. <input checked="" type="checkbox"/> = Select to enable autostart upon the battery voltage falling to the <i>threshold</i> level. The engine will start and run for the specified <i>Engine Run Time</i> . This will occur only if the module is in AUTO mode

## 6.10 SCHEDULER

The scheduler is used to automatically start the set at on a configured day and time and run for the set duration.

The generator is made to run *on load* or *off load* depending upon the configuration :

**Scheduler**

**Exercise Scheduler**

Enabled ☒

Scheduled run is On Load ☐

Day  
Monday ▾

Start Time  
09:00

Duration  
05:00

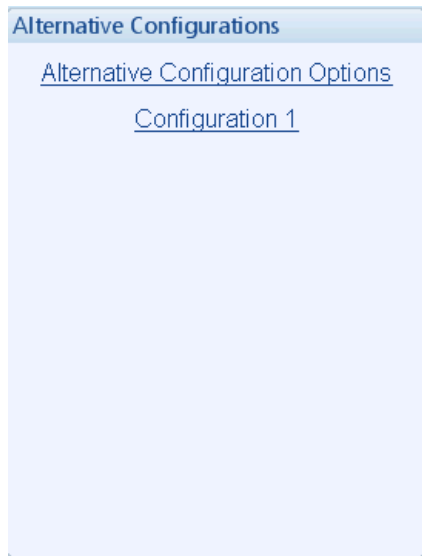
Clear

## 6.11 ALTERNATIVE CONFIGURATIONS

An Alternative Configuration is provided to allow the system designer to cater for different AC requirements utilising the same generator system. Typically this feature is used by Rental Set Manufacturers where the set is capable of being operated at (for instance) 120V 50Hz and 240V 50Hz using a selector switch, or by taking advantage of the “auto voltage sensing” option of the DSE4400 Series.

The Alternative Configuration can be selected using either :

- Configuration Suite Software (Selection for ‘Default Configuration)
- DSE4400 Series Fascia Editor
- Via external signal to DSE4400 Series module input configured to “Alternative Config 1” select.



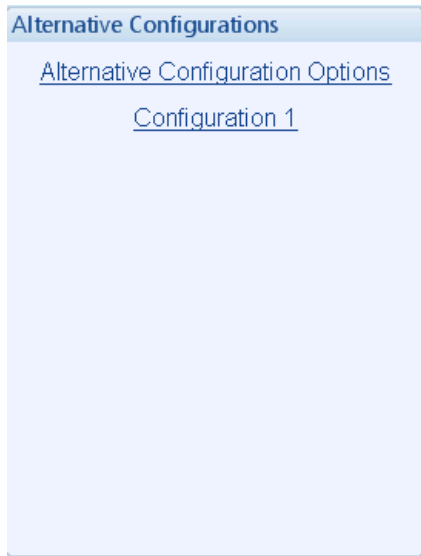
### 6.11.1 ALTERNATIVE CONFIGURATION OPTIONS



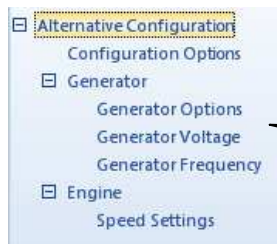
Select the 'default' configuration that will be used when there is no instruction to use an 'alternative configuration'.

## 6.11.2 ALTERNATIVE CONFIGURATIONS EDITOR

The Alternative Configurations Editor allows for editing of the parameters that will be changed when an Alternative Configuration is selected.



Alternative configuration options contain a subset of the main configuration. The adjustable parameters are not discussed here as they are identical to the main configuration options :



Configuration menus for the *Alternative Configuration*. For information about the configuration items within this section, you are referred to their description in the 'main' configuration.

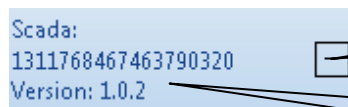
## 7 SCADA

**SCADA is only available on the DSE4400 series Mk2 controllers.**  
**There is no SCADA possibility for the 4400 Mk1 controllers.**

SCADA stands for **S**upervisory **C**ontrol **A**nd **D**ata **A**cquisition and is provided both as a service tool and also as a means of monitoring / controlling the generator set.  
 As a service tool, the SCADA pages is to check the operation of the controller's inputs and outputs as well as checking the generators operating parameters.



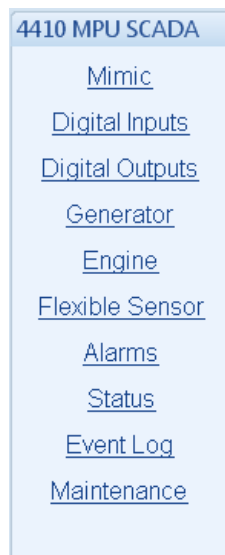
When connection is made...



Click to close the connection to the module

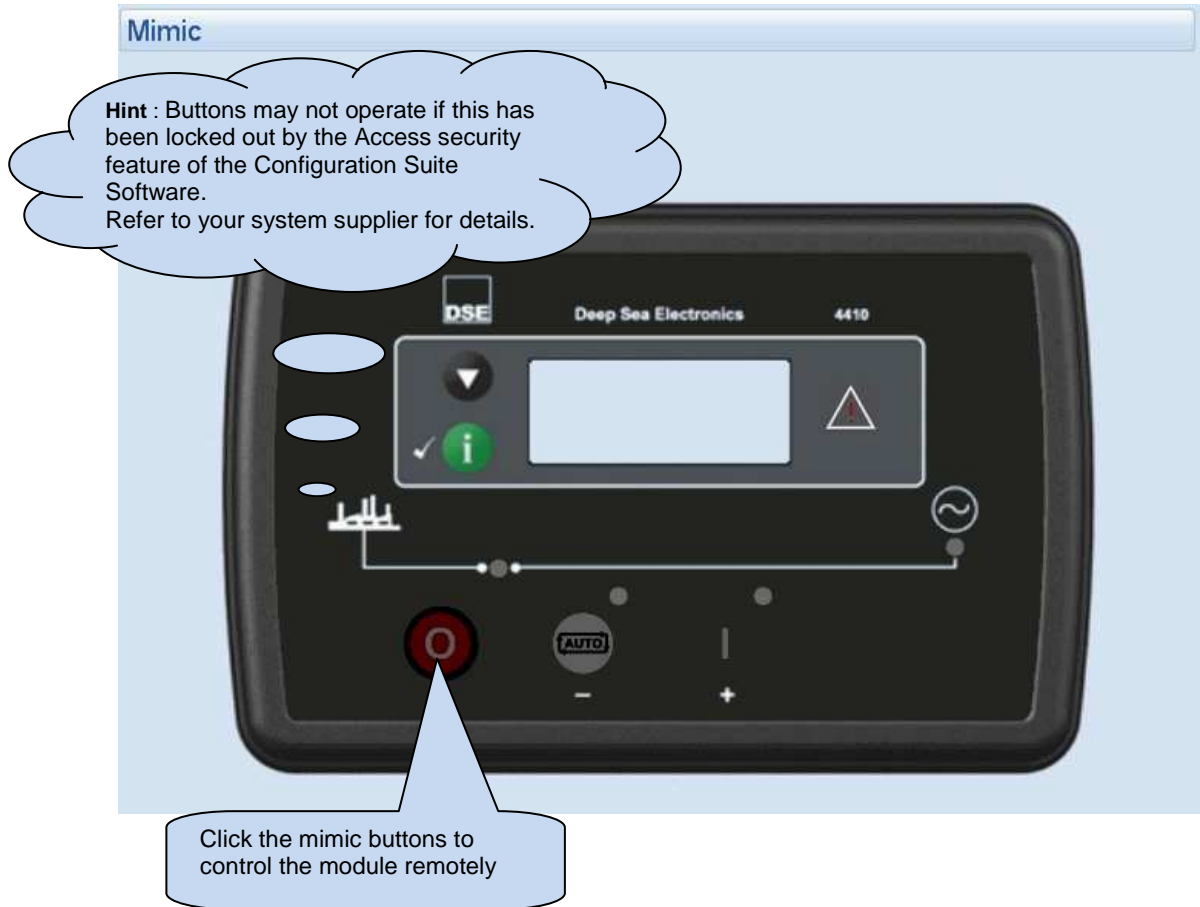
Unique serial number and the module's firmware revision number

The SCADA page is subdivided into smaller sections.  
 Select the required section with the mouse.



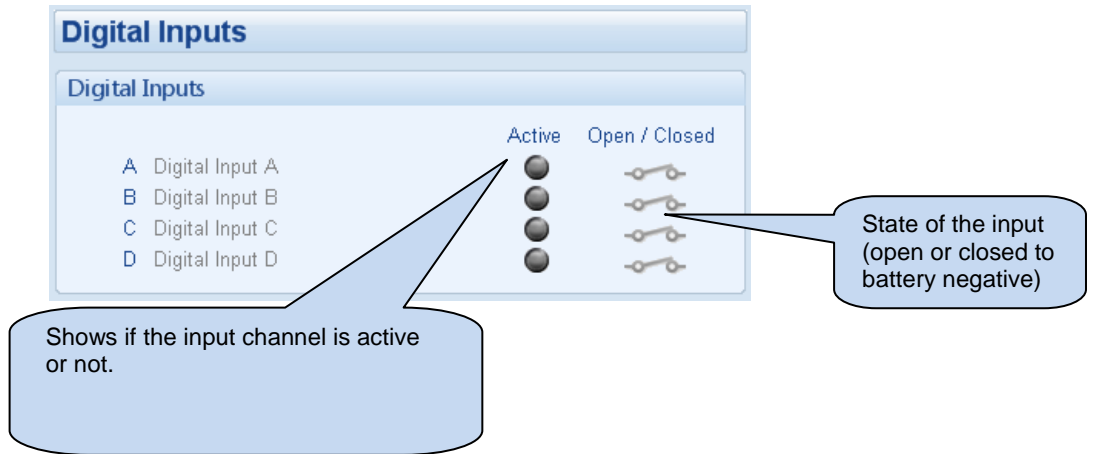
## 7.2 MIMIC

This screen provides a mimic of the control module and allows the operator to change the control mode of the module.

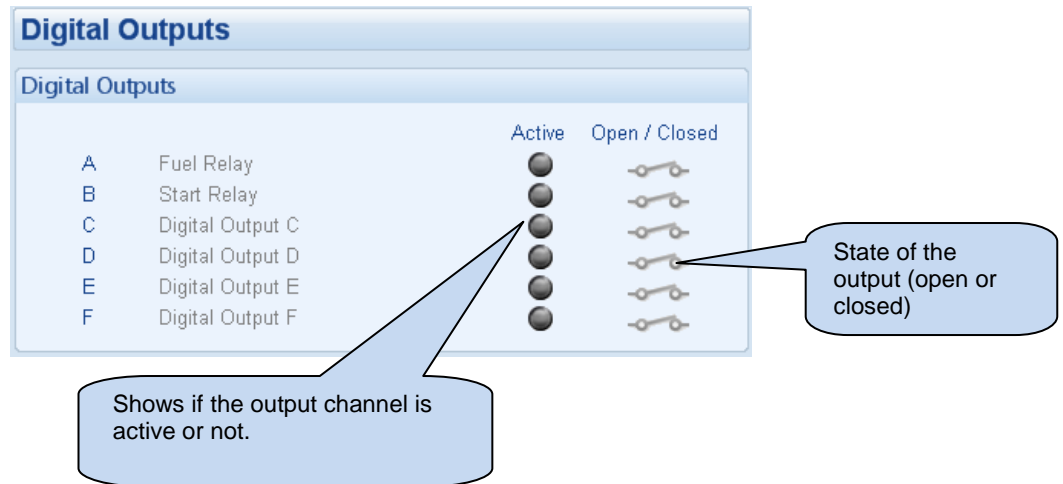




### 7.3 DIGITAL INPUTS



## 7.4 DIGITAL OUTPUTS



## 7.5 MAINS



**DSE4420 AMF MODULES ONLY.**

Shows the modules measurements of the mains supply (4420 only).

Mains		
Frequency		
0.0 Hz		
Phase to Neutral Voltages		
L1 - N 237.6 v	L2 - N 53.3 v	L3 - N 346.9 v
Phase to Phase Voltages		
L1 - L2 184.2 v	L2 - L3 293.4 v	L3 - L1 109.1 v
Mains Current		
L1	L2	L3

## 7.6 GENERATOR

### 7.6.1 FREQUENCY, VOLTAGES AND CURRENT

Shows the modules measurements of the generator supply.

Frequency and Voltages		
Frequency		
Phase to Neutral Voltages		
L1 - N	L2 - N	L3 - N
Phase to Phase Voltages		
L1 - L2	L2 - L3	L3 - L1

## 7.7 ENGINE

Shows the modules measurements of the engine parameters.

Engine	
Coolant Temperature	Plant Battery
Oil Pressure	Hours Run
Speed	Number of Starts

## 7.8 FLEXIBLE SENSOR

Shows the measurement of the Flexible Sensor (If configured)

Flexible Sender
Temperature Sender
---

## 7.9 ALARMS

Shows any present alarm conditions.

Shutdown Alarms	Warning Alarms
EM Stop	Fail to stop
Electrical Trip Alarms	

## 7.10 STATUS

Shows the module's current status.

<b>Supervisor State</b> At rest alarm	<b>Software Version</b> 2.56
<b>Engine/Generator State</b> Engine at rest	<b>Serial Number</b> 
<b>Mains Detection State</b> Mains failed	<b>Mode</b> 
<b>Load Switching State</b> Closed to mains	

## 7.11 EVENT LOG

Shows the contents of the module's event log.

<b>Engine</b>	
<b>Coolant Temperature</b> 	<b>Plant Battery</b> 
<b>Oil Pressure</b> 	<b>Hours Run</b> 
<b>Speed</b> 	<b>Number of Starts</b> 

## 7.12 ENHANCED CANBUS

Canbus Instrumentation is only available on 61x0-xxx-20 CAN version module.

If the module is connected to a compatible electronic engine, the following information is read from the ECU (if supported by the engine ECU).

Engine Oil Temperature	Inlet Manifold Temperature
	Temp. 1   Temp. 2
Exhaust Temperature	Coolant Pressure
Temp. 1   Temp. 2	Press. 1   Press. 2
Fuel Pressure	Turbo Pressure
Press. 1   Press. 2	Press. 1   Press. 2
Total Fuel Used	Fuel Consumption

## 7.13 MAINTENANCE

The *Maintenance* section is subdivided into smaller sections. Select the required section with the mouse.

Maintenance

[Hours Run and Number of Starts](#)

[Day and Time](#)

### 7.13.1 HOURS RUN AND NUMBER OF STARTS

This section allows the Hours Run and Number of Starts to be customised on the controller. Typically, this is used when fitting a new controller to an older generator so that the controller display matches the amount of work previously done by the system.

Hours Run

Hours Run: 02:01

Number of Starts

No. of Starts: 62

Type the value or click the up and down arrows to change the settings

Click to perform the adjustment in the module. Note that this is not visible on the module itself. It is included in the PC SCADA for diagnostic purposes.

### 7.13.2 DAY AND TIME

This section allows the day and time to be set and changed on the controller.

Day and Time

Module Day

Tuesday

Module Time

Set Day and Time

Day

Time

Set to PC Time

Day Monday

Time 13:51:12