



# **DEEP SEA ELECTRONICS**

## **DSE7110 / DSE7120**

### **Configuration Suite PC Software Manual**

**Document Number 057-185**

Author: Fady Atallah

## 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

### DSE7110 MKII / DSE7120 MKII Configuration Suite PC Software Manual

© 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 is a 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	Minimum Module version required	Minimum Configuration Suite Version required
1	Initial release	V1.0.0	2013.5 v1.77.2

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>5</b>
1.1	INSTALLATION INSTRUCTIONS.....	5
1.2	MANUALS .....	5
1.3	OTHER .....	5
<b>2</b>	<b>DESCRIPTION .....</b>	<b>5</b>
<b>3</b>	<b>INSTALLATION AND USING THE DSE CONFIGURATION SUITE .....</b>	<b>5</b>
<b>4</b>	<b>MODULE CONFIGURATION TYPE.....</b>	<b>6</b>
<b>5</b>	<b>EDIT CONFIG.....</b>	<b>7</b>
5.1	SCREEN LAYOUT .....	7
5.2	MODULE .....	8
5.2.1	MODULE OPTIONS.....	8
5.2.2	EVENT LOG .....	10
5.3	APPLICATION .....	10
5.4	DIGITAL INPUTS.....	11
5.4.1	OIL PRESSURE .....	11
5.4.2	COOLANT TEMPERATURE .....	11
5.4.3	FUEL LEVEL .....	12
5.4.4	FLEXIBLE SENSOR .....	13
5.4.5	EDITING THE SENSOR CURVE.....	14
5.4.6	DIGITAL INPUTS.....	15
5.4.7	INPUT FUNCTIONS.....	16
5.5	DIGITAL OUTPUTS .....	18
5.5.1	OUTPUT SOURCES.....	19
5.6	TIMERS .....	23
5.6.1	START TIMERS.....	23
5.6.2	LOAD / STOPPING TIMERS .....	24
5.6.3	MODULE TIMERS .....	25
5.7	GENERATOR .....	26
5.7.1	GENERATOR OPTIONS.....	26
5.7.2	GENERATOR VOLTAGE .....	27
5.7.3	GENERATOR FREQUENCY.....	28
5.7.4	GENERATOR CURRENT .....	29
5.7.4.1	OVERCURRENT ALARM.....	29
5.7.4.2	OVERLOAD PROTECTION .....	29
5.8	MAINS .....	30
5.8.1	MAINS OPTIONS.....	30
5.8.2	MAINS ALARMS.....	31
5.9	ENGINE .....	32
5.9.1	ENGINE PROTECTION .....	32
5.9.2	CAN OPTIONS .....	33
5.9.3	ENGINE OPTIONS .....	34
5.9.4	CRANK DISCONNECT .....	36
5.9.5	SPEED SETTINGS.....	36
5.9.6	PLANT BATTERY.....	37
5.10	SCHEDULER.....	38
5.11	MAINTENANCE ALARM.....	39
5.12	ALTERNATIVE CONFIGURATION.....	40
5.12.1	CONFIGURATION OPTIONS.....	40
5.12.2	ALTERNATIVE CONFIGURATIONS EDITOR.....	41
<b>6</b>	<b>SCADA.....</b>	<b>42</b>
6.1	MIMIC .....	43
6.2	DIGITAL INPUTS .....	44
6.3	DIGITAL OUTPUTS .....	44
6.4	MAINS .....	45
6.5	GENERATOR .....	46
6.6	POWER .....	47
6.7	ENGINE .....	48
6.8	FLEXIBLE SENSOR .....	48
6.9	ALARMS.....	49
6.10	STATUS.....	50
6.11	EVENT LOG .....	51
6.12	MAINTENANCE.....	52
6.12.1	MAINTENANCE ALARM RESET .....	52

6.12.2	HOURS RUN AND NUMBER OF STARTS.....	53
6.12.3	DAY AND TIME.....	53
6.12.4	ACCUMULATED INSTRUMENTATION .....	54
6.12.5	MODULE PIN.....	54
<b>7</b>	<b>ALARM TYPES.....</b>	<b>55</b>

# 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
053-151	7110 MKII / 7120 MKII installation instructions sheet

## 1.2 MANUALS

DSE PART	DESCRIPTION
057-151	DSE Configuration Suite PC Software Installation & Operation Manual
057-004	Electronic Engines and DSE wiring
057-182	DSE 7110 MKII / 7120 MKII 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 **DSE 7110 MKII / 7120 MKII Series configuration suite** allows the 7100 MKII 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 DSE 7110 MKII / 7120 MKII series 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).

# 3 INSTALLATION AND USING THE DSE CONFIGURATION SUITE SOFTWARE

For information in regards to instating and using the DSE Configuration Suite Software please refer to DSE publication: **057-151 DSE Configuration Suite PC Software Installation & Operation Manual** which can be found on our website: [www.deepseapl.com](http://www.deepseapl.com)

## 4 MODULE CONFIGURATION TYPE

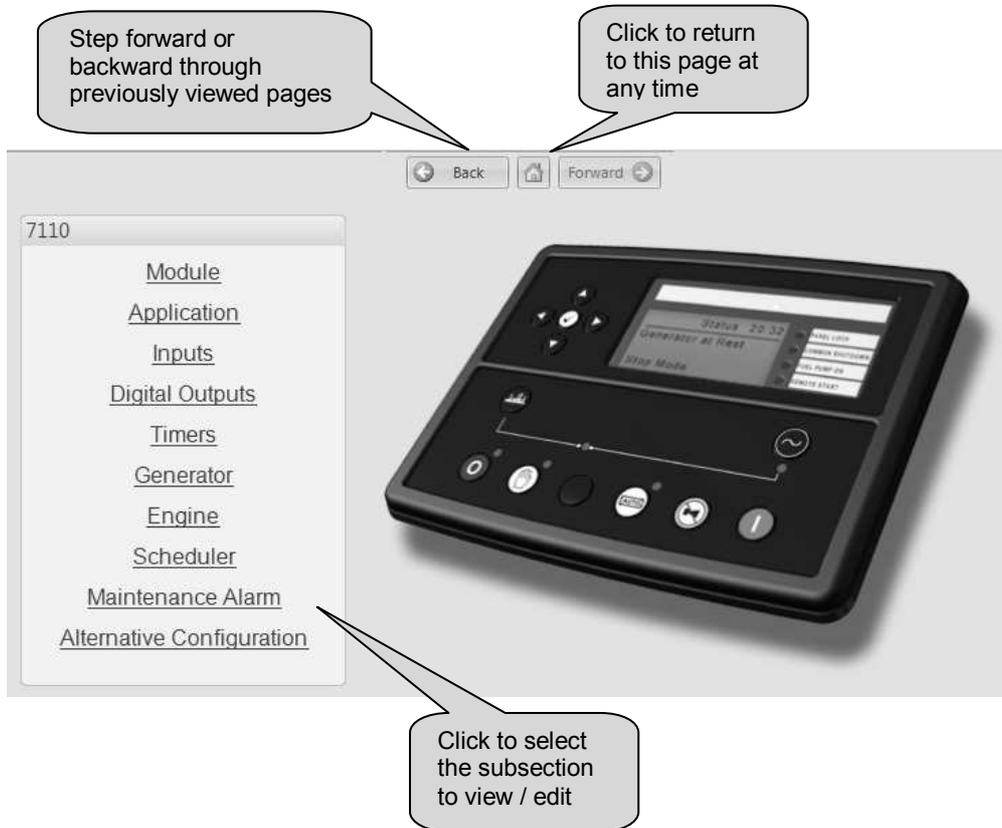
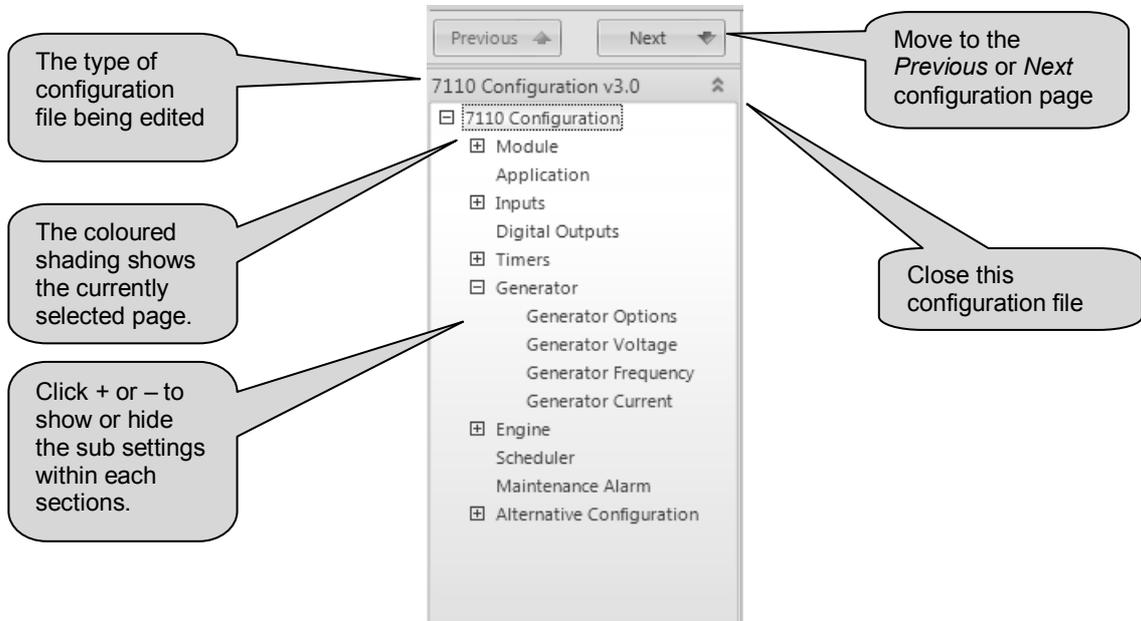
The following table shows the configuration type to select based on the module part number and description.

<b>DESCRIPTION</b>	<b>MODEL PART NUMBER</b>	<b>CONFIGURATION</b>
DSE7110 MkII with Real Time Clock	7110-005-01	7110 RTH
DSE7110 MkII with Real Time Clock and Display Heater	7110-005-02	7110 RTH
DSE7120 MkII with Real Time Clock	7120-005-01	7120 RTH
DSE7120 MkII with Real Time Clock and Display Heater	7120-005-02	7120 RTH

## 5 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.

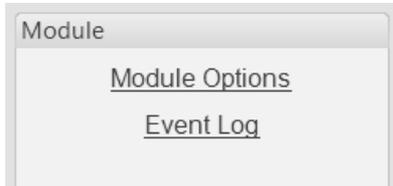
### 5.1 SCREEN LAYOUT



## 5.2 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.



### 5.2.1 MODULE OPTIONS

The screenshot shows the 'Module Options' configuration page, divided into three sections: 'LED Indicators', 'Module Options', and 'Instrumentation Suppression'. Callouts provide additional context for various controls.

**LED Indicators**

Indicator	Function	State	Text
1	Digital Input A	Lit	
2	Common Warning	Lit	
3	Common Electrical Trip	Lit	
4	Common Shutdown	Lit	

**Module Options**

- Lamp test at power up
- Power Save Mode Enable
- Display SPN Strings
- Enable Fast Loading
- Maintenance Pin Protected Enable
- Enable Cool Down In Stop Mode
- Power Up In Mode
- All warnings are latched

**Instrumentation Suppression**

Suppress the following instrumentation on the module screen

Generator Frequency	<input type="checkbox"/>	Generator Voltage	<input type="checkbox"/>
Current	<input type="checkbox"/>	Power Factor	<input type="checkbox"/>
kW	<input type="checkbox"/>	kWh	<input type="checkbox"/>
kVA <sub>r</sub>	<input type="checkbox"/>	kVA <sub>rh</sub>	<input type="checkbox"/>
kVA	<input type="checkbox"/>	kVA <sub>h</sub>	<input type="checkbox"/>

**Callouts:**

- LED Indicators:** Allows the user to select the function of the modules user configurable LED indicators. For details of possible selections, please see section entitled *Output sources* elsewhere in this document.
- Text/Logo Insert:** Allows the user to create logo and text insert cards.
- Instrumentation Suppression:** Tick to hide the parameter on the module display.

Parameters detailed overleaf...

Module 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 test' 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.
Display SPN Strings	<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	<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. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  <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> </div>
Maintenance PIN Protected Enable	Maintenance alarm reset through the front panel editor, will be PIN protected
Enable Cool Down In Stop Mode	Changes the way the module reacts to the Stop button. <input type="checkbox"/> = if the engine is running on load and the stop button is pressed, the module will open the breaker and directly shutdown the engine. <input checked="" type="checkbox"/> = if the engine is running and the breaker is closed, the module will open the breaker, wait for the cool down timer to expire, then shutdown the engine. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  <b>NOTE: - If the engine is running with the breaker open, the module will always shutdown the engine directly even if this option is enabled.</b> </div>
Power Up in Mode	Select the mode that the module enters when DC power is applied. Available modes to select from: Auto, Manual, Stop mode
All Warnings Are Latched	<input type="checkbox"/> = Normal Operation, the warnings and pre-alarms will automatically reset once the triggering condition has cleared. <input checked="" type="checkbox"/> = Warnings and pre-alarms latch when triggered. Resetting the alarm is performed by either an external reset applied to one of the inputs or, the 'Stop/Reset' pushbutton must be operated (once the triggering condition has been cleared).

### 5.2.2 EVENT LOG

**Event Log**

Display Options

Module display  Date and time  Engine hours run

Logging Options

Log the following events to the event log

Power up	<input checked="" type="checkbox"/>	Shutdown alarms	<input checked="" type="checkbox"/>
Mains return	<input checked="" type="checkbox"/>	Electrical trip alarms	<input checked="" type="checkbox"/>
Mains fail	<input checked="" type="checkbox"/>	Latched warnings	<input checked="" type="checkbox"/>
ECU Shutdown alarms	<input checked="" type="checkbox"/>	Unlatched warnings	<input checked="" type="checkbox"/>
		Maintenance alarms	<input checked="" type="checkbox"/>

Event logging options, Tick to enable the type of event to be logged.

### 5.3 APPLICATION

**Application**

ECU (ECM) Options

Engine Type

Alternative Engine Speed

CAN Data Fail Alarm

Action

Arming

Activation Delay

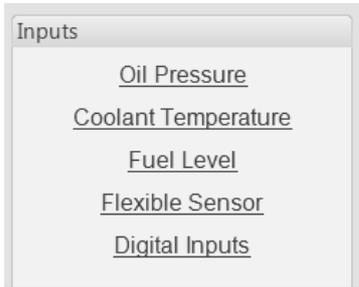
Allows selection of the Engine type being used (ie Conventional Diesel Engine, Conventional Gas Engine or Electronic Engine)

Instructs electronic engines to run at their 'alternative speed' (supported CAN engines only)

Configuration of the CAN data fail alarm, providing protection against the failure of the engine ECU data link.

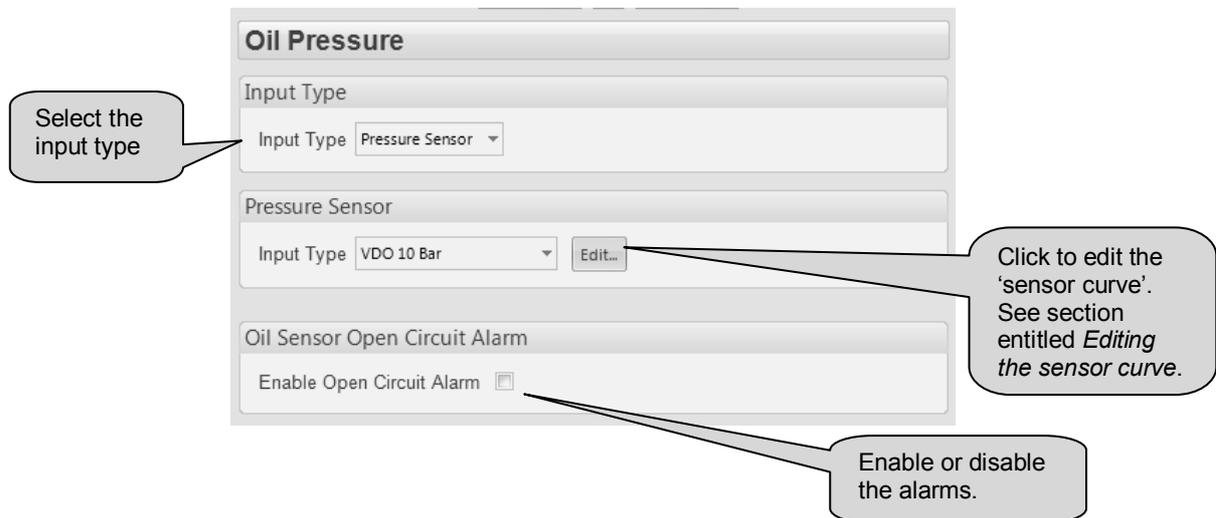
## 5.4 DIGITAL INPUTS

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



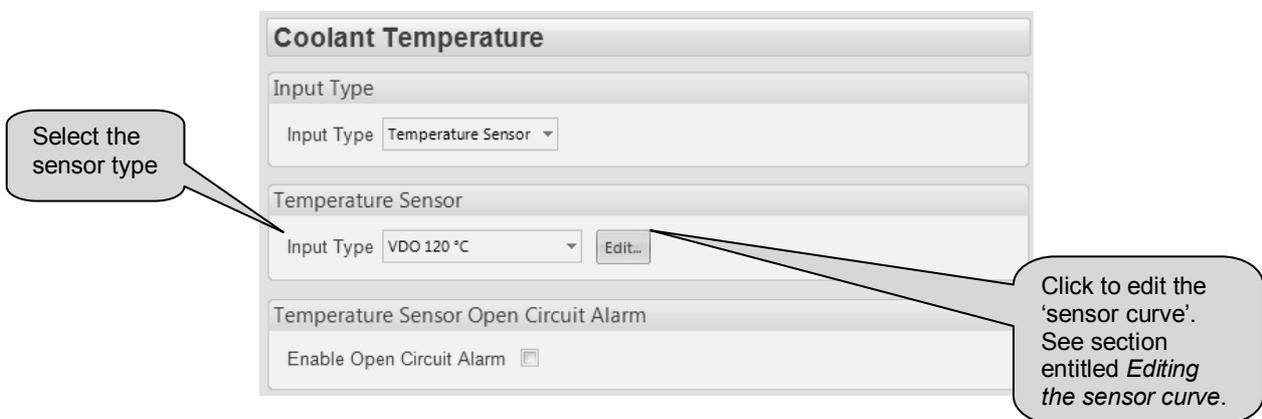
### 5.4.1 OIL PRESSURE

**If a CAN Engine File is selected** – 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.



### 5.4.2 COOLANT TEMPERATURE

**If a CAN Engine File is selected** – 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.



### 5.4.3 FUEL LEVEL

The screenshot shows the 'Fuel Level' configuration page. It is divided into several sections: 'Sender Usage', 'Input Type', 'Sensor Alarms', 'Fuel Pump Control', and 'Tank'. The 'Sender Usage' section has a dropdown for 'Use sender as' set to 'Fuel level sensor'. The 'Input Type' section has a dropdown for 'VDO Ohm range (10-180)' and an 'Edit...' button. The 'Sensor Alarms' section is the largest and contains settings for 'Alarm Enable', 'Action', 'Low Alarm', 'Delay', 'Low Pre-alarm Enable', 'Low Pre-alarm Trip', 'Low Pre-alarm Return', 'Delay', 'High Pre-alarm Enable', 'High Pre-alarm Return', 'High Pre-alarm Trip', 'Delay', 'High Alarm Enable', 'Action', 'High Alarm', and 'Delay'. Each alarm type has a checkbox to enable it, a dropdown for the action (currently 'Shutdown'), a percentage value for the trip/return, and a delay time (currently '0s'). To the right of these values are sliders for adjusting the settings. The 'Fuel Pump Control' section has an 'Enable' checkbox and two sliders for 'On' (25%) and 'Off' (75%) points. The 'Tank' section has a 'Tank Size' input (0) and a 'Units' dropdown (Litres).

Select the sensor type

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

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

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

Click and drag to alter the time delay

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

**Hint** : Set an output to "Fuel pump control". This can be used to transfer fuel from a bulk tank to the day tank, for example.

### 5.4.4 FLEXIBLE SENSOR

The screenshot shows the 'Flexible Sensor' configuration page. It is divided into three main sections: 'Sensor Description', 'Input Type', and 'Sensor Alarms'.  
- **Sensor Description:** 'Sensor Type' is set to 'Temperature Sensor'.  
- **Input Type:** 'VDO 120 °C' is selected, with an 'Edit...' button.  
- **Sensor Alarms:** This section contains settings for 'Alarm Arming' (set to 'Always'), 'Low Alarm Enable' (checked), 'Low Alarm' (65 °C), 'Low Pre-alarm Enable' (checked), 'Low Pre-alarm Trip' (70 °C), 'Low Pre-alarm Return' (75 °C), 'High Pre-alarm Enable' (checked), 'High Pre-alarm Return' (88 °C), 'High Pre-alarm Trip' (90 °C), 'High Alarm Enable' (checked), 'High Alarm Action' (Shutdown), and 'High Alarm' (95 °C). Each temperature value has a slider and up/down arrows for adjustment.

Callout boxes provide the following instructions:

- Top center:** Select the sensor type
- Top right:** Click to edit the 'sensor curve'. See section entitled *Editing the sensor curve*.
- Left side:** Click to enable or disable the alarms. The relevant values below will appear *greyed out* if the alarm is disabled.
- Bottom center:** Type the value or click the up and down arrows to change the settings
- Bottom right:** Select the type of alarm required. For details of these, see the section entitled *Alarm Types* elsewhere in this document.

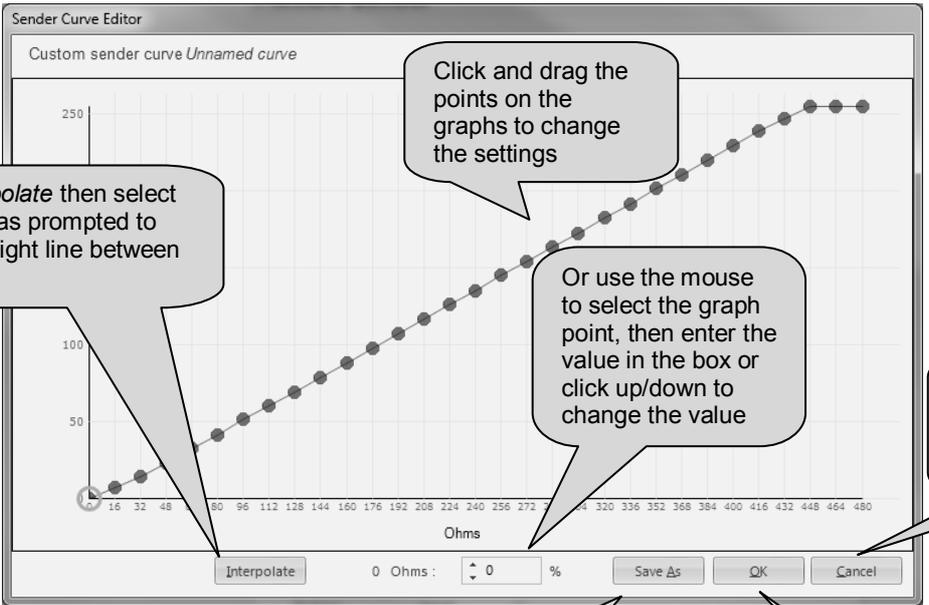
### 5.4.5 EDITING THE SENSOR CURVE

While the *configuration suite* holds sensor specification for the most commonly used resistive sensors, occasionally it is required that the 7100 MKII 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'.



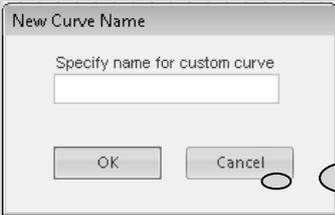
Click *Interpolate* then select two points as prompted to draw a straight line between them.

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 CANCEL to ignore and lose any changes you have made

Click SAVE AS, you are prompted to name your curve....



Click OK to save the curve.

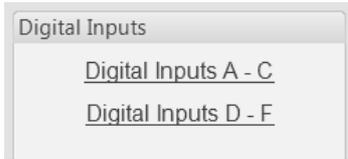
**Any saved curves become selectable in the *Input Type* selection list.**

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

**Hint:** Deleting, renaming or editing custom sensor curves that have been added is performed in the main menu, select *Tools | Curve Manager*.

### 5.4.6 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

Input function. See section entitled *Input functions* for details of all available functions

As this example shows a *predefined* function, these parameters are *greyed out* as they are not applicable

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

Example of a user configured input

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.

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.

### 5.4.7 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 DSE7120 MKII 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 module to follow 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 mode.
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.
Close Generator	This input is used to close the generator breaker when running in Manual mode.
Coolant Temperature 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.
External Panel Lock	Locks the mode buttons on the module front fascia.
Generator Load Inhibit IEEE 37.2 - 52 AC circuit breaker	This input is used to prevent the module from loading the generator. If the generator is already on load, activating this input will cause the module to unload the generator. Removing the input will allow the generator to be loaded again.
<p> <b>NOTE:</b> -This input only operates to control the generator-switching device if the module 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>	

Function	Description
Lamp Test	This input is used to provide a test facility for the front panel indicators fitted to the 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 module from loading the mains supply. If the mains supply is already on load activating this input will cause the module to unload the mains supply. Removing the input will allow the mains to be loaded again.</p> <div style="border: 1px solid black; padding: 5px;"> <p><b>NOTE:</b> -This input only operates to control the mains switching device if the module 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> </div>
Maintenance Reset Alarm Air	Provides an external digital input to reset the maintenance alarm
Maintenance Reset Alarm Fuel	Provides an external digital input to reset the maintenance alarm
Maintenance Reset Alarm Oil	Provides an external digital input to reset the maintenance alarm
Oil Pressure Switch	A digital normally open or closed oil pressure switch gives this input. It allows low oil pressure protection.
Open Generator	This input is used to open the generator breaker when running in Manual mode.
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	<p><b>(Only applicable to Digital Input A)</b> 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.</p>
Simulate Auto Button	<div style="border: 1px solid black; padding: 5px;"> <p><b>NOTE:</b> - If a call to start is present when AUTO MODE is entered, the starting sequence will begin. Call to Start can come from a number of sources depending upon module type and configuration and includes (but is not limited to) : Remote start input present, Mains failure, Scheduled run, Auxiliary mains failure input present, Telemetry start signal from remote locations.</p> </div> <p>This input mimics the operation of the 'Auto' button and is used to provide a remotely located Auto mode push button.</p>
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.
Simulate Manual Button	This input mimics the operation of the 'Manual' button and is used to provide a remotely located Manual mode push button.
Simulate Start Button	This input mimics the operation of the 'Start' button and is used to provide a remotely located start push button.
Simulate Stop Button	This input mimics the operation of the 'Stop' button and is used to provide a remotely located stop/reset push button.
Simulate Test on load button	This input mimics the operation of the 'Test' button and is used to provide a remotely located Test on load mode push button.
Smoke Limiting 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 MANUAL MODE
Transfer To Mains/ Open Generator IEEE 37.2-52 AC circuit breaker 	This input is used to transfer the load to the mains supply when running in MANUAL MODE

## 5.5 DIGITAL OUTPUTS

The screenshot shows a configuration window titled "Digital Outputs" with three sections: "Relay Outputs (Supplied from Emergency Stop Input)", "Relay Outputs (Volts Free)", and "Relay Outputs (DC Supply Out)". Each section contains a table of outputs with "Source" and "Polarity" dropdown menus. Callouts provide instructions: "Select what the output is to be used to control" points to the Source dropdown; "These are greyed out as they are fixed and not adjustable." points to the Polarity dropdowns in the first section; "Select if the relay is to energise or de-energise upon activation of the source" points to the Polarity dropdown in the third section; and "These labels match the typical wiring diagram" points to the Source labels in the third section.

Section	Output	Source	Polarity
Relay Outputs (Supplied from Emergency Stop Input)	Output A	Fuel Relay	Energise
	Output B	Start Relay	Energise
Relay Outputs (Volts Free)	Output C (N/C)	Open Mains Output	De-Energise
	Output D	Close Gen Output	Energise
Relay Outputs (DC Supply Out)	Output E	Common Alarm	Energise
	Output F	Common Shutdown	Energise
	Output G	Common Electrical Trip	Energise
	Output H	Not Used	Energise

### 5.5.1 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 DSE7120 MKII AMF Modules**

Output source	Activates...	Is not active...
Not Used	The output will not change state (Unused)	
Air Filter Maintenance	Indicates that the air filter maintenance alarm is due	
Air Flap Relay	Normally used to control an air flap, this output becomes active upon an Emergency Stop or Over-speed situation.	Inactive when the set has come to rest
Analogue Input A, B, C & D (Digital)	Active when the relevant analogue input, configured as digital input, is active	
Audible Alarm IEEE 37.2 – 74 alarm relay	Use this output to activate an external sounder or external alarm indicator. Operation of the Mute pushbutton will reset this output once activated.	Inactive if no alarm condition is active or if the Mute pushbutton was pressed.
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 ECU 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 Error	Becomes active when a 'Yellow lamp' – Warning alarm is signalled by the CAN ECU	
CAN ECU Fail	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 Gen Output IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the 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 Gen Output Pulse IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the 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.	

Output source	Activates...	Is not active...
Close Mains Output IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the 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 Output Pulse IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the 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 Electrical Trip	Active when one or more <i>Electrical Trip</i> alarms are active	The output is inactive when no shutdown 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
Cooling Down	Active when the Cooling timer is in progress	The output is inactive at all other times
Delayed Load Output 1, 2, 3 & 4	Provide delayed outputs for controlling load switching devices	
Digital Input A, B, C, D, E & F	Active when the relevant digital input is active	
Display Heater On	Active when the display heater is on	
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> .
Fail To Start IEEE 37.2 - 48 Incomplete Sequence Relay	Becomes active if the set is not seen to be running after the configurable number of start attempts	
Fail To Stop IEEE 37.2 - 48 Incomplete Sequence Relay	If the set is still running a configurable amount of time after it has been given the stop command, the output will become active. This configurable amount of time is the <i>Fail to Stop Timer</i> .	
Flexible Sensor C & D Low/High – Alarm/Pre- Alarm	Active when the relevant flexible sensor alarm is active	
Fuel Filter Maintenance	Indicates that the fuel filter maintenance alarm is due	
Fuel Level Low/High – Alarm/Pre-Alarm	Active when the relevant fuel level alarm is active	
Fuel Pump Control IEEE 37.2 – 71 level switch	Becomes active when the <i>Fuel level</i> falls below the <i>Fuel Pump Control ON</i> setting and is normally used to transfer fuel from the bulk tank to the day tank.	If the output is already active it will become inactive when the <i>Fuel level</i> is above the <i>Fuel Pump Control OFF</i> settings.
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.
Gen Over Frequency Overshoot Alarm	Becomes active when the over frequency overshoot alarm is active	
Generator Available	Becomes active when the generator is available to take load.	Inactive when <ul style="list-style-type: none"> <li>• <i>Loading voltage and loading frequency</i> 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>
Generator High Voltage Alarm	Active when the generator voltage exceeds the shutdown level.	
Generator Low Voltage Alarm	Active when the generator voltage falls below the shutdown level during normal running.	

Output source	Activates...	Is not active...
Generator Over Frequency Shutdown	Becomes active when the over frequency shutdown alarm is active	
Generator Under Frequency Shutdown	Becomes active when the under frequency shutdown alarm is active	
High Coolant Temperature Shutdown	Active when the high coolant temperature shutdown alarm is active	
kW Overload Alarm	Active when the measured kW are above the setting of the kW overload alarm. Can be used to give alarms on overload, control a dummy load breaker or for load shedding functionality.	
Loss of Mag Pickup Signal	Active when the controller senses the loss of signal from the magnetic pickup probe	
Low Oil Pressure Shutdown	Active when the Low Oil Pressure Shutdown alarm is activate	
Mains Low/High Frequency	Active when the relevant Mains Frequency trip level has been pased	
Mains Low/High Voltage	Active when the relevant Mains Voltage trip level has been pased	
MPU open circuit	This output indicates that the module has detected an open circuit failure in the Magnetic Pickup transducer circuit.	
Oil Filter Maintenance	Indicates that the oil filter maintenance alarm is due	
Oil Pressure Sender Open Circuit	Active when the Oil Pressure Sensor is detected as being open circuit.	
Open Gen Output IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the 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 Gen Output Pulse IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the 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 Output IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the 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 Output Pulse IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the 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.	
Over Current Delayed Alarm	Active when an overcurrent condition has caused the Overcurrent Delayed alarm to trigger	
Over Current Immediate Warning IEEE 37.2 – 50 instantaneous overcurrent relay	Active when an overcurrent condition exceeds the Overcurrent alarm Trip setting. At the same time, the controller begins following the IDMT curve. If the overload condition exists for an excess time, the Overcurrent IDMT alarm will activate.	
Over Speed Shutdown IEEE 37.2 – 12 over speed device	Active if the engine speed exceeds the Over Speed Shutdown setting	
Over Speed Overshoot Alarm	Active if the engine speed exceeds the Over Speed Overshoot alarm setting	
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 Cranking	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 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 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>

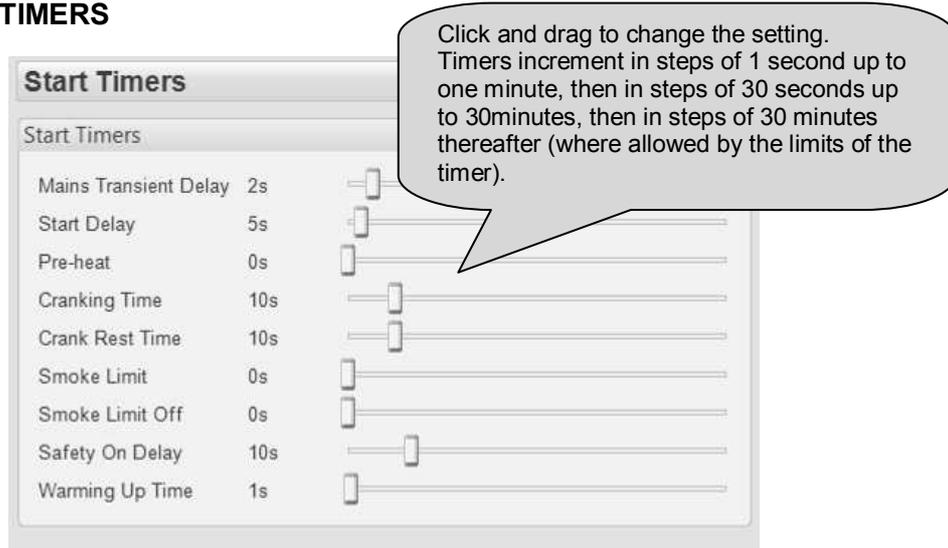
Output source	Activates...	Is not active...
Smoke Limiting	Becomes active when the controller requests that the engine runs at idle speed. As an output, this can be used to give a signal to the <i>Idle input</i> of an engine speed governor (if available)	Becomes inactive when the controller requests 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.	
System in Auto Mode	Active when Auto mode is selected	
System in Manual Mode	Active when Manual mode is selected	
System in Stop Mode	Active when Stop mode is selected	
System in Test Mode	Active when Test On Load mode is selected	
Temperature Sensor Open Circuit	Active when the Temperature Sensor is detected as being open circuit.	
Under Frequency Shutdown	Active when the generator frequency falls below the low frequency Shutdown setting	
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.	

## 5.6 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.



### 5.6.1 START TIMERS



= Only available on DSE7120 MKII AMF Modules

Timer	Description
 Mains Transient Delay	Used to give a delay between sensing mains failure and acting upon it. This is used to prevent dropouts of the mains breaker and operation of the system due to mains supply transient conditions.
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.

### 5.6.2 LOAD / STOPPING TIMERS

**Load/Stopping Timers**

**Load Control Timers**

Transfer Time	0.7s	<input type="range"/>
Breaker Trip Pulse	0.5s	<input type="range"/>
Breaker Close Pulse	0.5s	<input type="range"/>

**Load Delay Timers**

Delay Load Output 1	0s	<input type="range"/>
Delay Load Output 2	0s	<input type="range"/>
Delay Load Output 3	0s	<input type="range"/>
Delay Load Output 4	0s	<input type="range"/>

**Stopping Timers**

Return Delay	30s	<input type="range"/>
Cooling Time	1m	<input type="range"/>
Cooling Time At Idle	0s	<input type="range"/>
ETS Solenoid Hold	0s	<input type="range"/>
Fail to Stop Delay	30s	<input type="range"/>
Generator Transient Delay	0.0s	<input type="range"/>

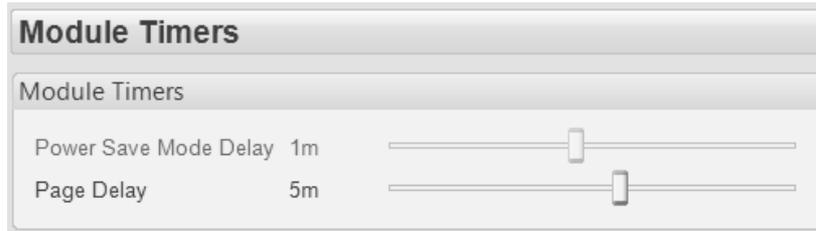
Click and drag to change the setting. Timers increment in steps of 1second up to one minute, then in steps of 30seconds up to 30minutes, then in steps of 30minutes thereafter (where allowed by the limits of the timer).

Respective digital outputs, if configured, will become energised after a load delay timer expires.

 = Only available on DSE7120 MKKII AMF Modules

Timer	Description
 Transfer Time	The time between one load switch opening and the other closing. Used during transfer to and from the generator.
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.
Load Delay Timers	Delay Load Output 1, 2, 3 & 4 Determine the time delay before energising the configured “Delayed Load” outputs. These outputs are used to control additional load breakers to provide five stage loading. After the generator load switch is closed, the remaining four outputs are closed after the configurable time delay. This allows for additional loads to be energised in sequence, minimising the size of step loading of the generator
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.
Cooling Time At Idle	After the Cooling Time, the module will instruct the set to run at idle speed for this amount of time before stop.
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.

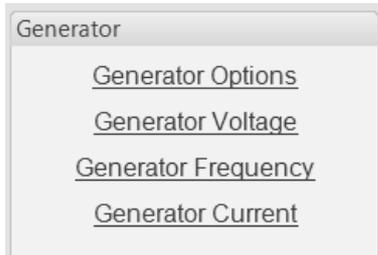
### 5.6.3 MODULE TIMERS



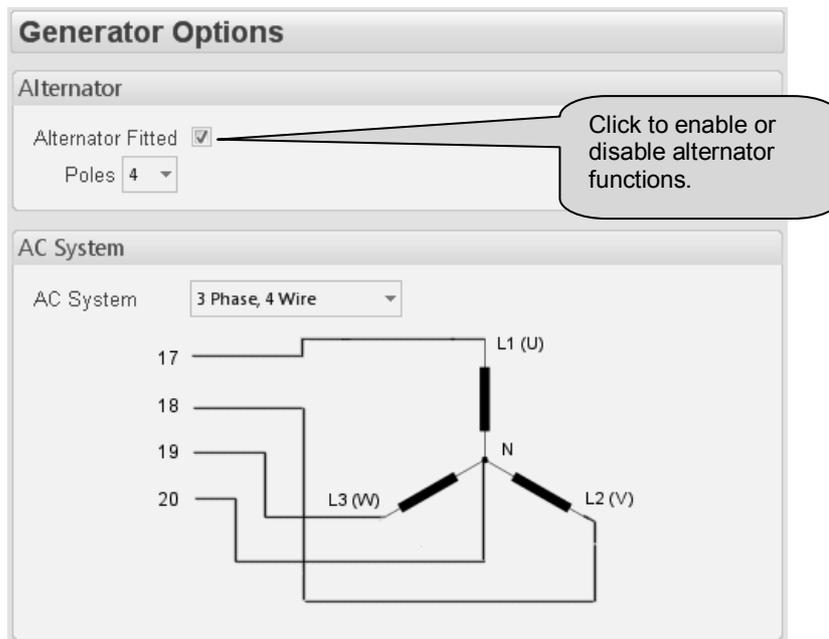
Timer	Description
Power Save Mode Delay	If the module is left unattended in STOP mode for the duration of the <i>Power Save Mode Delay</i> it will enter low power consumption mode (Power Save Mode).
Page Delay	If the module is left unattended for the duration of the Page Delay Timer it will revert to show the Status page.

## 5.7 GENERATOR

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



### 5.7.1 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 generator application.
AC System	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.

### 5.7.2 GENERATOR VOLTAGE

The screenshot shows the 'Generator Voltage Alarms' configuration window. It is divided into three sections: 'Under Voltage Alarms', 'Loading Voltage', and 'Over Voltage Alarms'. Each section contains checkboxes for enabling/disabling alarms and numerical input fields with sliders for setting trip values in 'v PhPh'. Callouts provide instructions: 'Click to enable or disable the alarms. The relevant values below will appear greyed out if the alarm is disabled.' (pointing to the 'Alarm' checkbox), 'Click and drag to change the setting.' (pointing to a slider), and 'Type the value or click the up and down arrows to change the settings' (pointing to a numerical input field).

Alarm	IEEE designation
Generator Under voltage	IEEE 37.2 - 27AC Undervoltage relay
Loading Voltage	Determines the alternator voltage at which the generator becomes available and ready to take load
Generator Over voltage	IEEE 37.2 - 59AC Overvoltage relay

### 5.7.3 GENERATOR FREQUENCY

#### Generator Frequency Alarms

##### Under Frequency Alarms

Alarm

Trip  Hz 80.0 %

Pre-alarm

Trip  Hz 84.0 %

##### Loading Frequency

Hz 90.0 %

##### Nominal Frequency

Hz 100 %

##### Over Frequency Alarms

Pre-alarm

Return  Hz 108.0 %

Trip  Hz 110.0 %

Shutdown

Trip  Hz 114.0 %

Click to enable or disable the alarms. 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

Alarm	IEEE designation
Generator Under Frequency	IEEE 37.2 -81 Frequency relay
Loading Voltage	Determines the alternator frequency at which the generator becomes available and ready to take load
Generator Over Frequency	IEEE 37.2 -81 Frequency relay

### 5.7.4 GENERATOR CURRENT

The screenshot shows the 'Generator Current' configuration window. It is divided into several sections: 'Generator Current Options', 'Overcurrent Alarm', 'Generator Rating', and 'Overload Protection'. Callouts provide additional context: one points to the 'CT Primary' and 'Full Load Rating' fields, stating they are in Amps and that the CT secondary must be 5A; another points to the 'Immediate Warning' and 'Delayed Alarm' checkboxes, noting that other values become greyed out if disabled; a third points to the 'kW Rating' field, explaining that values are changed by typing or using up/down arrows.

#### 5.7.4.1 OVERCURRENT ALARM

Setting	Description
Immediate Warning	When enabled, if the current exceeds the <i>Trip</i> level the <i>Immediate Warning</i> activates. Any output or LCD display set to <i>Over Current Immediate Warning</i> is energised. The current load must fall below the <i>Trip</i> level in order to cancel the output source.
Delayed Alarm	When enabled, if the current exceeds the <i>Trip</i> level the <i>Delayed Alarm</i> activates.
Delayed Alarm Action	<i>Electrical Trip</i> : The generator is taken off load and the set stopped after the <i>Cooling timer</i> . Any output or LCD display set to <i>Over Current Delayed Alarm</i> is energised. <i>Shutdown</i> : The generator is taken off load and the set stopped immediately. <i>Warning</i> : An alarm is generated but the set continues to run. Any output or LCD display set to <i>Over Current Delayed Alarm</i> is energised. The current load must fall below the <i>Trip</i> level in order to cancel the output source.
Delay	A time delay will start before the alarm action is executed
Trip	The current value at which the warning or alarm will be activated

#### 5.7.4.2 OVERLOAD PROTECTION

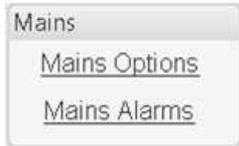
Setting	Description
Enable	<input type="checkbox"/> = Overload Protection function is disabled. <input checked="" type="checkbox"/> = The module will monitor the kW load level and provide an alarm function if the level exceeds the <i>Trip</i> setting for the configured amount of time in the <i>Delay</i> setting.
Action	<i>Electrical Trip</i> : The generator is taken off load and the set stopped after the <i>Cooling timer</i> . Any output or LCD display set to <i>kW Overload Protection</i> is energised. <i>Shutdown</i> : The generator is taken off load and the set stopped immediately.
Trip	The kW value at which the alarm will be activated
Delay	A time delay will start before the alarm action is executed

## 5.8 MAINS

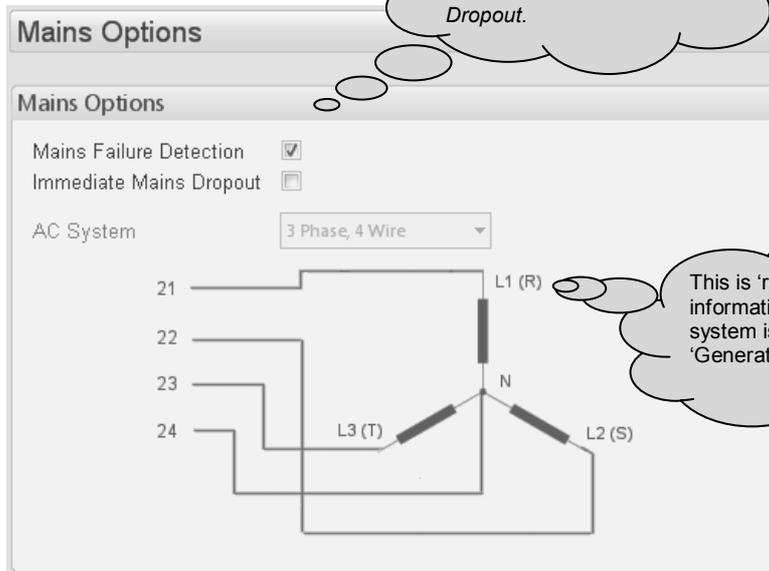


= Only available on DSE7120 MKII AMF Modules

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



### 5.8.1 MAINS OPTIONS



If three phase loads are present, it is usually desirable to set this parameter to  to enable *Immediate Mains Dropout*.

This is 'read only' for information purposes. The AC system is configured in the 'Generator Options' page.

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

### 5.8.2 MAINS ALARMS

#### Mains Alarms

---

#### Voltage Alarms

Undervolts

Trip  v PhPh 319v PhPh

Return  v PhPh 359v PhPh

Overvolts

Return  v PhPh 438v PhPh

Trip  v PhPh 478v PhPh

---

#### Frequency Alarms

Under Freq.

Trip  Hz 45.0 Hz

Return  Hz 48.0 Hz

Over Freq.

Return  Hz 52.0 Hz

Trip  Hz 55.0 Hz

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

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

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

## 5.9 ENGINE

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



### 5.9.1 ENGINE PROTECTION

**Engine Protection**

High Coolant Temperature Alarms

Shutdown

Trip  °C  205 °F

Low Oil Pressure Shutdown

Enable

Trip  Bar  14.94 PSI, 103 KPa

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

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

Click and drag to change the settings

## 5.9.2 CAN OPTIONS

**CAN Options**

CAN Options

Module To Measure Oil Pressure

Module To Measure Coolant Temperature

Module To Record Engine Hours

Module To Use Engine Speed

Module To Use Charge Alt Voltage

Disable ECM Speed Control

Option	Description
Module to Measure Oil Pressure	When enabled the oil pressure analogue input is used for the measurement instead of using the value measured by the ECU
Module to Measure Coolant Temperature	When enabled the coolant temperature analogue input is used for the measurement instead of using the value measured by the ECU
Module to Record Engine Hours	When enabled, DSE module counts Engine Run Hours. When disabled, Engine ECU provides Run Hours.
Module To Use Engine Speed	When enabled the module frequency measurement will determines the engine speed instead of using the speed value measured by the ECU.
Module to Use Charge Alt Voltage	When enabled the charge alternator voltage measured by the module will be used instead of the value measured by the ECU
Disable ECM Speed Control	Disables speed control by the DSE module. Useful if an external device (ie remote speed potentiometer) is used to control engine speed.

### 5.9.3 ENGINE OPTIONS

**Engine Options**

ECU (ECM) Options

Engine Type: Conventional Engine

Alternative Engine Speed:

Startup Options

Start Attempts: 3

Loss of Sensing Signal: Shutdown

Magnetic pickup open circuit: Shutdown

Gas Engine Timers

Choke Timer	2s	<input type="range"/>
Gas On Delay	2s	<input type="range"/>
Ignition Off Delay	2s	<input type="range"/>

Sensing Options

Magnetic Pickup Fitted:

Flywheel Teeth: 190

Overspeed Options

Overspeed Overshoot %: 10

Overshoot Delay: 2s

This item is not adjustable here, it's read only. To change this item, visit the *module* menu.

Controls the amount of time that the Gas Choke output will be active during the starting sequence.

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.

For these timers to have any meaning, outputs are required for Gas Choke, Gas Ignition and Fuel.

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.

Parameters detailed overleaf...

### 5.9.3.1 STARTUP OPTIONS

Parameter	Description
Start Attempts	<p>The number of starting attempts the module will make.</p> <p>If the module does not detect that the engine has fired before the end of the <i>Cranking time</i>, then the current start attempt is cancelled and the <i>Crank Rest</i> time takes place before the next crank attempt begins.</p> <p>If, after all configured <i>start attempts</i>, the engine is not detected as running, the <i>Fail to Start</i> shutdown alarm is generated.</p> <p>The engine is detected as running by checking all methods of <i>Crank Disconnect</i>. For further details, see the section entitled <i>Crank Disconnect</i> elsewhere in this document.</p>
Loss of sensing signal	<p>If the speed sensing signal is lost during engine running (or not present during cranking when <i>Multiple Engage Attempts</i> is enabled), an alarm is generated :</p> <p><i>Shutdown</i>: The generator is removed from load and the set is immediately stopped.</p> <p><i>Warning</i>: The generator continues to run, however a warning alarm is raised.</p>
Magnetic Pickup Open Circuit	<p>If the magnetic pickup device is not detected, an alarm is generated :</p> <p><i>Shutdown</i>: The generator is removed from load and the set is immediately stopped.</p> <p><i>Warning</i>: The generator continues to run, however a warning alarm is raised.</p>

### 5.9.3.2 SENSING OPTIONS

Parameter	Description
Magnetic pickup fitted	<p><input type="checkbox"/> = Magnetic pickup device is not fitted to the DSE module.</p> <p><input checked="" type="checkbox"/> = A low impedance magnetic pickup device is fitted to the DSE module to measure engine speed. Specifications of the DSE module Magnetic Pickup Input are contained within DSE publication 057-074 8600 Series Operator Manual.</p>
Flywheel teeth	The number of teeth on the engine flywheel. This is read by the magnetic pickup device.

### 5.9.3.3 OVERSPEED OPTIONS

Parameter	Description
Overspeed overshoot %	To prevent spurious overspeed alarms at engine start up, the module includes configurable <i>overspeed overshoot</i> protection.
Overspeed overshoot delay	<p>This allows the engine speed to 'overshoot' the Overspeed / Over frequency setting during the starting process for a short time.</p> <p>Rather than 'inhibiting' the Overspeed / Over frequency alarms, the levels are temporarily raised by the <i>Overspeed Overshoot %</i> for the duration of the <i>Overspeed Overshoot</i> delay.</p>

### 5.9.4 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.

**Crank Disconnect**

**Options**

- Crank disconnect on oil pressure
- Check oil pressure prior to starting

**Crank Disconnect**

- Generator Frequency  Hz
- Engine Speed  RPM
- Oil Pressure  Bar

If *check oil pressure prior to starting* is enabled, the cranking will not be allowed if the oil pressure is not seen as being low. This used as a *double check* that the engine is stopped before the starter is engaged

Click and drag to change the setting.

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

### 5.9.5 SPEED SETTINGS

**Speed Settings**

**Under Speed Shutdown**

- Enable
- RPM

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

**Over Speed Shutdown**

- Trip  RPM

Click and drag to change the setting.

Overspeed shutdown cannot be disabled.

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

### 5.9.6 PLANT BATTERY

The screenshot shows the 'Plant Battery' configuration window, divided into three sections: 'Voltage Alarms', 'Charge Alternator Alarm', and 'Start On Low Battery'. Each section contains various settings with callouts explaining their function.

- Voltage Alarms:**
  - Undervolts:** Checked. Settings include Warning (10.0 V DC), Return (10.5 V DC), and Delay (1m). A callout states: 'Click to enable or disable the option. The relevant values below will appear greyed out if the alarm is disabled.'
  - Overvolts:** Checked. Settings include Return (29.5 V DC), Warning (30.0 V DC), and Delay (1m). A callout states: 'Type the value or click the up and down arrows to change the settings.'
- Charge Alternator Alarm:**
  - Shutdown:** Unchecked. Settings include Trip (4.0 V DC) and Delay (5s).
  - Warning:** Checked. Settings include Trip (6.0 V DC) and Delay (5s). A callout states: '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.'
- Start On Low Battery:**
  - Enable:** Unchecked. Settings include Threshold (18.0 V DC), Engine Run Time (1h), and Start Delay (5s).

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
Charge Alternator Alarm	If the voltage measured at the charge alternator output drops below the configured value the respective alarm will be triggered.
Start Delay	Start delay timer for the Start on Low Battery function.

## 5.10 SCHEDULER

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

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

Function	Description
Enabled	<input type="checkbox"/> = Scheduled runs are disabled <input checked="" type="checkbox"/> = Enables the Scheduler
Schedule Period	Determines the repeat interval for the scheduled run. Options available are: repeat every 1 week, 2 weeks, 3 weeks or 4 weeks
Scheduled Runs are On Load	<input type="checkbox"/> = The module will run the generator on schedule with the breaker open <input checked="" type="checkbox"/> = The module will run the generator on schedule and will close the breaker
Week	Specifies the week of the month, on which the scheduled run should take place
Day	Specifies the day of week, on which the scheduled run should take place
Start Time	Determines at what time of day the scheduled run should start
Duration	Determines the time duration in hours for the scheduled run
Clear	Resets the values for the Day, Start Time and Duration to defaults

## 5.11 MAINTENANCE ALARM

**Maintenance Alarm**

**Maintenance alarm Air**

Enable

Action Warning

Engine run hours  hrs

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

**Maintenance Alarm Oil**

Enable

Action Shutdown

Engine run hours  hrs

Maintenance Alarm will occur when the engine has run for the specified number of hours.

**Maintenance Alarm Fuel**

Enable

Action Shutdown

Engine run hours  hrs

There are three ways to reset the maintenance alarm:

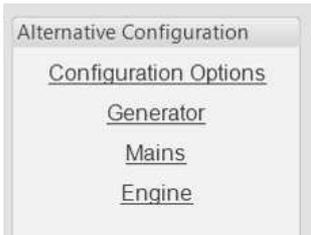
- 1) Activate a digital input configured to "Maintenance Reset Alarm".
- 2) Use the SCADA | Maintenance | Maintenance Alarm section of this PC Software.
- 3) Through the Front Panel Editor of the module

## 5.12 ALTERNATIVE CONFIGURATION

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.

The Alternative Configuration can be selected using either:

- Configuration Suite Software (Selection for 'Default Configuration')
- DSE7100 MKII Series Front Panel Editor
- Via external signal to DSE7100 MKII Series module input configured to "Alternative Configuration" select.



### 5.12.1 CONFIGURATION OPTIONS

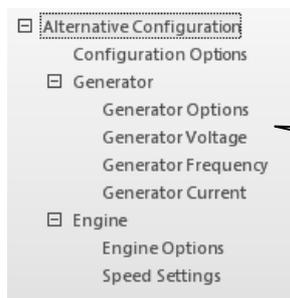
A screenshot of the "Configuration Options" dialog box. The dialog has a title bar "Configuration Options". Below the title bar, there are two sections. The first section is "Enable Configuration" and contains a checkbox labeled "Enable Configuration" which is checked. The second section is "Configuration" and contains a dropdown menu labeled "Default Configuration" with "Main" selected. Two callout boxes are present. The first callout box points to the "Enable Configuration" checkbox and contains the text: "Click to enable or disable the option. The relevant values below will appear greyed out if the alarm is disabled." The second callout box points to the "Default Configuration" dropdown menu and contains the text: "Select the 'default' configuration that will be used when there is no instruction to use an 'alternative configuration'."

### 5.12.2 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 :

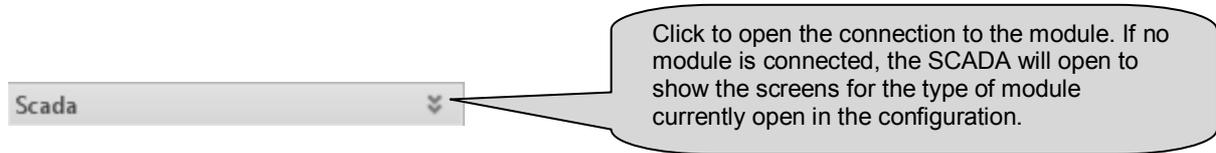


Configuration menus for the *Alternative Configuration*. For information about the configuration items within this section, you are referred to their description in the 'main' configuration.

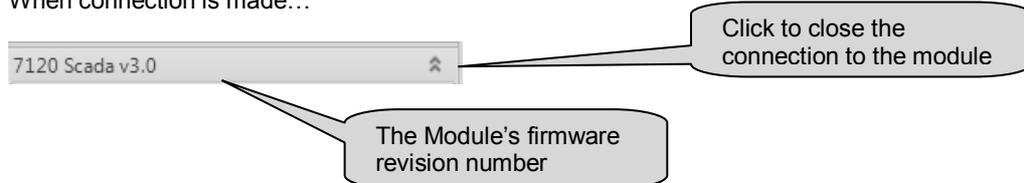
## 6 SCADA

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.

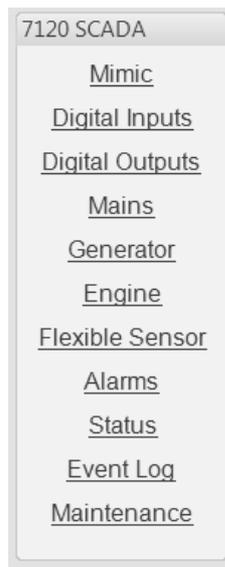
As a service tool, the SCADA pages are to check the operation of the controller's inputs and outputs as well as checking the generators operating parameters.



When connection is made...

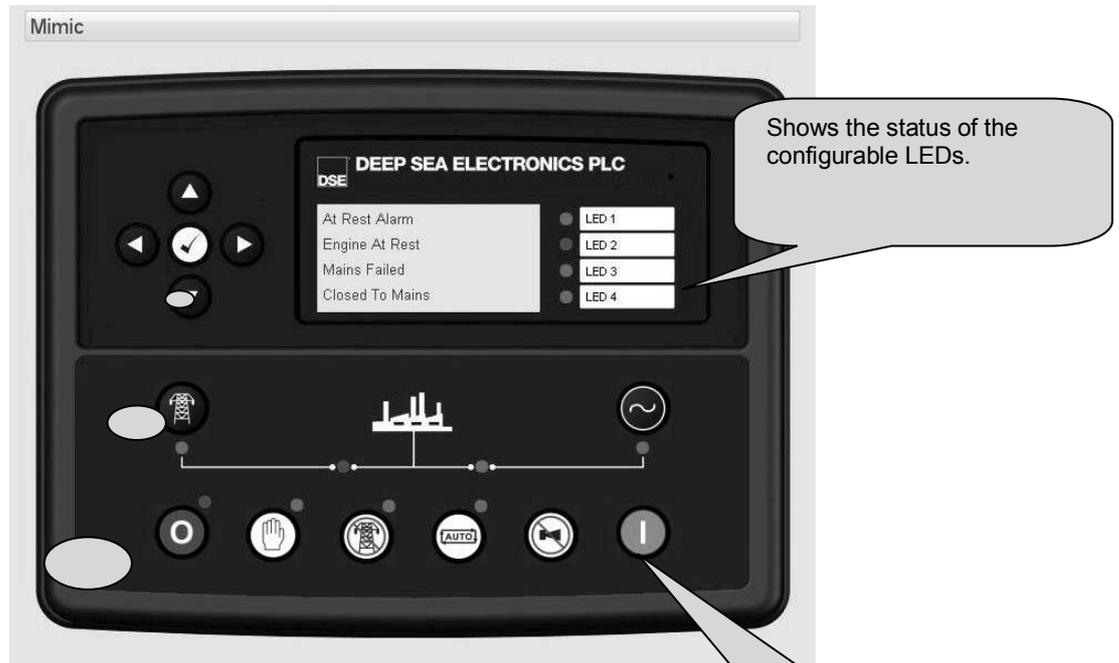


The SCADA page is subdivided into smaller sections. Select the required section with the mouse.



## 6.1 MIMIC

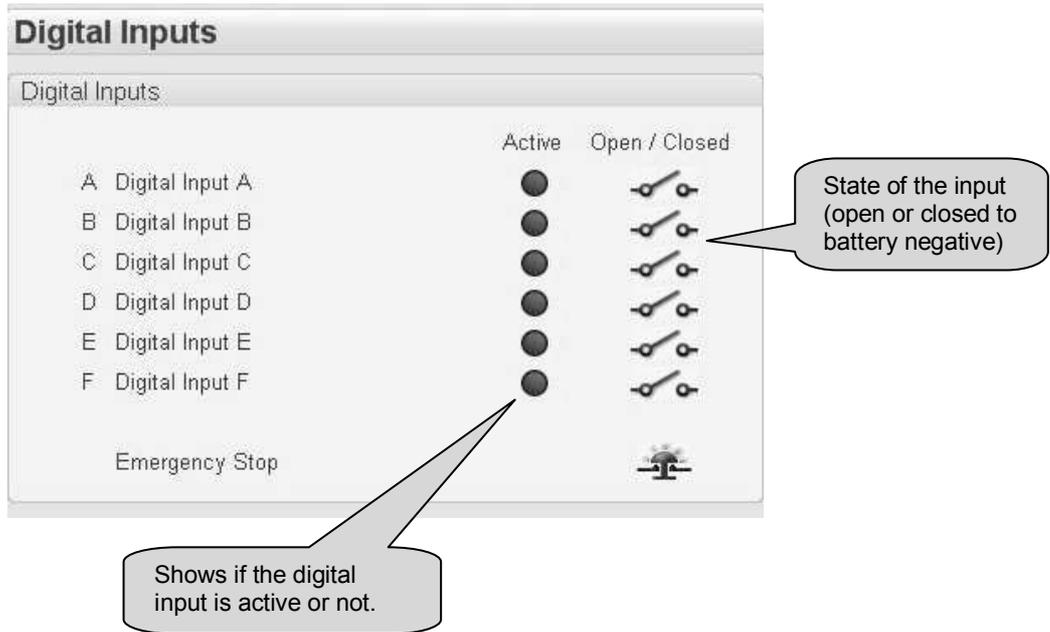
This screen provides a mimic of the control module and allows the operator to change the control mode of the module.



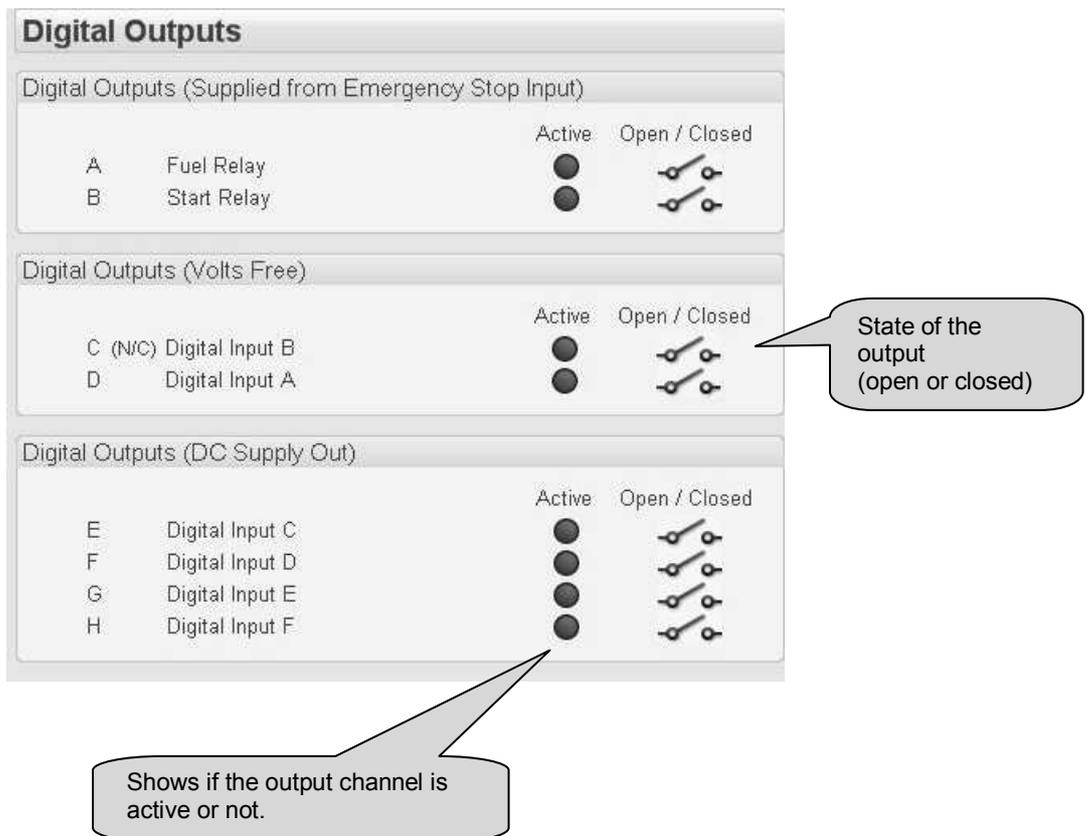
**Hint :** Buttons may not operate if this has been locked out by the *Access Permissions* security feature of the Configuration Suite Software. Refer to your system supplier for details.

Click the mimic buttons to control the module remotely

## 6.2 DIGITAL INPUTS



## 6.3 DIGITAL OUTPUTS



## 6.4 MAINS

Shows the modules measurements of the mains supply (7120 MKII only).

Mains		
Frequency		
50.4 Hz		
Phase to Neutral Voltages		
L1 - N 219.1 v	L2 - N 216.6 v	L3 - N 216.5 v
Phase to Phase Voltages		
L1 - L2 375.9 v	L2 - L3 376.2 v	L3 - L1 378.7 v

## 6.5 GENERATOR

Shows the modules measurements of the generator supply.

Frequency, Voltages and Current		
Frequency		
49.8 Hz		
Phase to Neutral Voltages		
L1 - N 236.0 v	L2 - N 235.8 v	L3 - N 235.4 v
Phase to Phase Voltages		
L1 - L2 407.9 v	L2 - L3 409.0 v	L3 - L1 409.3 v
Current		
L1 556.0 A	L2 571.0 A	L3 576.0 A

## 6.6 POWER

Shows the modules measurements of the generator supply power.

Power			
Watts			
L1	L2	L3	Total
VA			
L1	L2	L3	Total
VAr			
L1	L2	L3	Total
Power factor			
L1	L2	L3	Average
Accumulated Power			
kWh	kVAh	kVArh	

## 6.7 ENGINE

Shows the modules measurements of the engine parameters.

Engine	
Coolant Temperature 44 °C, 111 °F	Plant Battery 12.1 v DC
Oil Pressure 9.10Bar, 132 PSI, 910 KPa	Charge Alternator 10.5 v DC
Speed 1494 RPM	Hours Run 00:23
Fuel Level	Number of Starts 20
Fuel Capacity	Fuel Unit

## 6.8 FLEXIBLE SENSOR

Shows the modules measurements of the flexible sensors parameters.

Flexible Sensor
Flexible Sensor C (Fuel) Not Used
Flexible Sensor D Not Used

## 6.9 ALARMS

Shows any present alarm conditions.



## 6.10 STATUS

Shows the module's current status.

Status	
Supervisor State At Rest Alarm	Software Version 3.0
Engine/Generator State Engine At Rest	Module ID BC614E
Mains Detection State Mains Failed	Mode 
Load Switching State Closed To Mains	

## 6.11 EVENT LOG

Shows the contents of the module's event log.

Event Log					
#	Date	Time	Hours Run	Event	Details
1	3/5/2013	9:09 AM	0:10	Shutdown	Oil Pressure Sensor Open Circuit
2	3/5/2013	9:09 AM	0:10	Mains	Mains fail
3	3/5/2013	9:09 AM	0:10	Shutdown	Emergency Stop
4	3/5/2013	9:09 AM	0:10	Shutdown	Temperature Sensor Open Circuit
5	3/5/2013	9:09 AM	0:10	Restart	Restart code 0
6	3/5/2013	9:09 AM	0:10	Shutdown	Oil Pressure Sensor Open Circuit
7	3/5/2013	9:09 AM	0:10	Mains	Mains fail
8	3/5/2013	9:09 AM	0:10	Shutdown	Emergency Stop
9	3/5/2013	9:09 AM	0:10	Shutdown	Temperature Sensor Open Circuit
10	3/5/2013	9:09 AM	0:10	Restart	Restart code 0
11	2/13/2013	4:37 PM	0:10	Warning	Battery Under Volts
12	2/13/2013	4:36 PM	0:10	Shutdown	Oil Pressure Sensor Open Circuit
13	2/13/2013	4:36 PM	0:10	Mains	Mains fail
14	2/13/2013	4:36 PM	0:10	Shutdown	Emergency Stop
15	2/13/2013	4:36 PM	0:10	Shutdown	Temperature Sensor Open Circuit

Export to Excel    Export to CSV    Export to PDF    Print event log

## 6.12 MAINTENANCE

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



### 6.12.1 MAINTENANCE ALARM RESET

**Maintenance Alarm Reset**

Maintenance Alarm - Oil

Running Time Until Next Maintenance  
10:00

Reset

Press reset to schedule next maintenance, based upon module's maintenance configuration.

Maintenance Alarm - Air

Running Time Until Next Maintenance  
10:00

Reset

Press reset to schedule next maintenance, based upon module's maintenance configuration.

Maintenance Alarm - Fuel

Running Time Until Next Maintenance  
10:00

Reset

Press reset to schedule next maintenance, based upon module's maintenance configuration.

Reset the maintenance alarm based upon the module's configuration.

### 6.12.2 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.

The screenshot shows two sections: 'Hours Run' and 'Number of Starts'. Each section has a 'Set' button. Callouts provide instructions on how to use these buttons.

**Hours Run:** Shows 'Hours Run: 02:01' with a 'Set' button. A callout says: "Type the value or click the up and down arrows to change the settings".

**Number of Starts:** Shows 'No. of Starts: 62' with a 'Set' button. A callout says: "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."

### 6.12.3 DAY AND TIME

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

The screenshot shows the 'Date and Time' section with four sub-sections: 'Module Date', 'Module Time', 'Set Date and Time', and 'Set to PC Time'. Callouts explain each part.

**Module Date:** Displays '3/5/2013'. Callout: "Display of the module's current date and time".

**Module Time:** Displays '09:13:44'.

**Set Date and Time:** Contains 'Date: 3/5/2013' and 'Time: 09:13:44' with a 'Set' button. Callout: "Type the new date / time or click the up and down arrows to change the settings".

**Set to PC Time:** Contains 'Date: 3/5/2013' and 'Time: 09:13:25' with a 'Set to PC Time' button. Callout: "Click Set to adjust the module to the date/time that your PC is set to." and "Click Set to adjust the module to the selected date/time."

### 6.12.4 ACCUMULATED INSTRUMENTATION

#### Accumulated Instrumentation

##### kWh

kWh: 75.0 kWh

##### kVAh

kVAh: 100.0 kVAh

##### kVArh

kVArh: 18.0 kVArh

##### Reset

### 6.12.5 MODULE PIN

**NOTE : If the PIN is lost or forgotten, it will not be possible to access the module!**

Allows a PIN (Personal Identification Number) to be set in the controller. This PIN must be entered to either access the front panel configuration editor or before a configuration file can be sent to the controller from the PC software.

#### Module PIN

##### Module Access Password

Password

Confirmation

Warning - care should be taken when adjusting these controls.  
If the password is lost or forgotten, it will not be possible to access the module.

Enter the desired PIN number and reconfirm.

Click to set the PIN number in the module.

## 7 ALARM TYPES

The protection included with the DSE control modules provides increasing levels of notification, depending upon the severity of the situation:

Alarm type	Description
Indication	No audible alarm or common warning signal occurs. <i>Indication</i> alarms are only used to illuminate indicators or to activate outputs.
Warning	Audible alarm and common alarm signal is generated. The set continues to run. <i>Warning alarms</i> are used to draw the operator's attention to a minor issue or to a problem that may escalate to an Electrical Trip or Shutdown Alarm if left untreated.
Electrical Trip	Audible alarm and common alarm signal is generated. The set is taken off load and the cooling timer begins, after which the set is stopped. <i>Electrical Trip alarms</i> are series issues that require the set to be taken off load. As the name implies, this is often electrical faults that occur 'after' the load breaker. The set is allowed to cool before stopping.
Shutdown	Audible alarm and common alarm signal is generated. The set is taken off load and immediately stopped. <i>Shutdown alarms</i> are serious issues that demand immediate stopping of the generator. For instance Emergency Stop or Overspeed alarms require immediate shutdown.