



DEEP SEA ELECTRONICS PLC DSE7450 Configuration PC Suite Software Manual

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Author: Paul Gibbons

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

DSE7450 Configuration Suite PC Software Manual.

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Amendments List

Issue	Comments
1	Initial release
2	Adding AVR
3	Charging efficiency & plant battery charge percentage settings added

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.

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1 BIBLIOGRAPHY

This document refers to and is referred to by the following DSE publications which is obtained from the DSE website www.deepseapl.com:

DSE PART	DESCRIPTION
057-004	Electronic Engines and DSE wiring
057-170	DSE7450 Operators Manual
057-082	DSE2130 Input Expansion Manual
057-139	DSE2131 Input Expansion Manual
057-140	DSE2133 Input Expansion Manual
057-141	DSE2152 Input Expansion Manual
057-083	DSE2157 Input Expansion Manual
057-084	DSE2548 Input Expansion Manual

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

This manual covers the operation of the **DSE Configuration Suite** for the DSE7450 module. Separate manuals cover the remaining DSE modules supported by the software.

The **DSE Configuration Suite** allows the DSE7450 module to be connected to a PC via USB 'A – USB B' cable. Once connected the various operating parameters within the module is viewed or edited as required by the engineer. This software allows easy controlled access to these values and also has diagnostic monitoring facilities.

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 is found on our website: www.deepseapl.com

4 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.

4.1 SCREEN LAYOUT

Previous ↑ Next ↓

7450 Configuration v2.0

- 7450 Configuration
- Module
- Application
- Inputs
- Outputs
- Timers
- Generator
- Mains
- Engine
- DC Settings
- Communications
- Scheduler
- Maintenance Alarm
- Expansion
- Advanced

Move to the Previous or Next configuration

The coloured shading shows the currently selected page.

The type of configuration file being edited

Click + or - to show or hide the sub settings within each sections.

Close this configuration file

Click to return to this page at any time

Step forward or backward through previously viewed pages

← Back Home Forward →

7450 Configuration

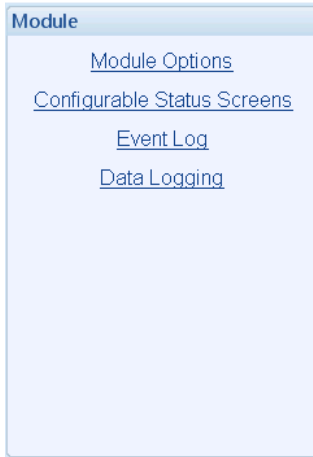
- Module
- Application
- Inputs
- Outputs
- Timers
- Generator
- Mains
- Engine
- DC Settings
- Communications
- Scheduler
- Maintenance Alarm
- Expansion
- Advanced

Click to select the subsection to view / edit

4.2 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.



4.2.1 MODULE OPTIONS

The screenshot shows the 'Module Options' configuration page, divided into three main sections:

- Description:** Four free entry boxes for providing a description of the configuration file. A callout explains: "Free entry boxes to allow the user to give the configuration file a description. Typically this is used to enter the job number, customer name, engineers name etc."
- LED Indicators:** Four rows of dropdown menus for selecting LED indicator functions. Each row also has a 'Lit' dropdown and an 'Insert Card Text' field. Callouts explain: "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* in this document." and "Allows the user to create logo and text insert cards".
- Miscellaneous Options:** A list of checkboxes for various features:
 - Enable fast loading feature
 - Audible alarm prior to starting
 - All warnings are latched
 - Enable sleep mode
 - Enable manual fuel pump control
 - Support right-to-left languages in module strings
 - Enable alternative breaker button control
 - Inhibit retransfer to mains

Parameter	Description
Enable fast loading feature	<p><input type="checkbox"/> = Normal Operation, the safety on timer is 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 leads to overspeed alarms on start up.</p> <p><input checked="" type="checkbox"/> = The module terminates 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>▲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.)</p> </div>
Audible alarm prior to starting	<p><input type="checkbox"/> = The module starts with no audible indication</p> <p><input checked="" type="checkbox"/> = The module gives an audible warning during the pre-heat timer as an indicator that the set is about to run. This is often a site's specification requirement of AUTO mode operation.</p>

Parameter	Description
All Warnings Are Latched	<input type="checkbox"/> = Normal Operation, the warnings and pre-alarms automatically reset once the triggering condition is 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).
Enable Alternative Breaker Button Control	Default breaker button control is transfer to Generator/ Transfer to mains: Alternative breaker button control is:- Open Mains breaker / Close mains breaker Open Generator breaker / Close breaker.
Enable sleep mode	<input type="checkbox"/> =Normal operation <input checked="" type="checkbox"/> =The module goes into "sleep mode" if left in manual mode for a prolonged time with no button presses.
Enable manual fuel pump control	<input type="checkbox"/> =Normal operation <input checked="" type="checkbox"/> =Allows manual fuel pump control when the "fuel level" instrument page is being viewed.
Support right-left languages in module strings	Determines the direction of text input where supported (i.e. configurable input text) <input type="checkbox"/> =left to right language support <input checked="" type="checkbox"/> =right to left language support
Inhibit Retransfer to Mains	<input type="checkbox"/> =Normal operation <input checked="" type="checkbox"/> =The module inhibits a transfer back to the mains.

4.2.2 CONFIGURABLE STATUS SCREENS

Configurable Status Screens allow the operator to design the status screen to match the requirements of the end user or application more closely. For instance it is possible to configure the module to show the factory set 'summary screen' and then cycle the display to show instruments specified by the end user. This display cycling occurs with no user intervention.

Configurable Status Screens

Home Page: Home Page Instrumentation

Displayed Pages:

Page 1	Summary screen	Page 6	Not Used
Page 2	Engine Fuel Level	Page 7	Not Used
Page 3	Summary screen	Page 8	Not Used
Page 4	Not Used	Page 9	Not Used
Page 5	Not Used	Page 10	Not Used

This is the page that appears automatically when the engine is running (either instrumentation or status)

These instruments are displayed one after the other when the set runs. If an entry is set to 'Not Used', or is not applicable, the entry is skipped over and not displayed.

4.2.3 EVENT LOG

4.2.3.1 DISPLAY OPTIONS

The module display option allows the operator to choose between `Date and Time` or `Engine Hours` displayed on the bottom of the screen.

4.2.3.2 LOGGING OPTIONS

The event log is configured to allow users to select which events are stored.

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"/>	Log Fuel Level <input checked="" type="checkbox"/>
Mains fail <input checked="" type="checkbox"/>	Log When At Rest <input checked="" type="checkbox"/>
Mains return <input checked="" type="checkbox"/>	Engine starts <input checked="" type="checkbox"/>
ECU Shutdown alarms <input checked="" type="checkbox"/>	Engine stops <input checked="" type="checkbox"/>
	Starts <input checked="" type="checkbox"/>
	Stops <input checked="" type="checkbox"/>

'Repeat SMS' requires a GSM modem to be configured on the Communications/Basic page

Shutdown alarms <input checked="" type="checkbox"/>	
Repeat SMS <input type="checkbox"/>	
Repeat delay 12h	<input type="range" value="50"/>
Repeats 2	<input type="range" value="10"/>
Electrical trip alarms <input checked="" type="checkbox"/>	
Repeat SMS <input type="checkbox"/>	
Repeat delay 12h	<input type="range" value="50"/>
Repeats 2	<input type="range" value="10"/>
Latched warnings <input checked="" type="checkbox"/>	
Unlatched warnings <input checked="" type="checkbox"/>	
Repeat SMS <input type="checkbox"/>	
Repeat delay 12h	<input type="range" value="50"/>
Repeats 2	<input type="range" value="10"/>
Maintenance alarms <input checked="" type="checkbox"/>	
Repeat SMS <input type="checkbox"/>	
Repeat delay 12h	<input type="range" value="50"/>
Repeats 2	<input type="range" value="10"/>

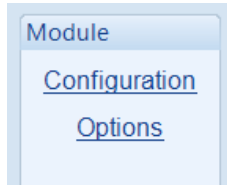
4.2.3.3 SMS MESSAGING

When using the controller, logged events also cause modem 'dial outs' and SMS messages to be sent if the module is configured to do so and connected to a suitable external GSM modem with functioning SIM card.

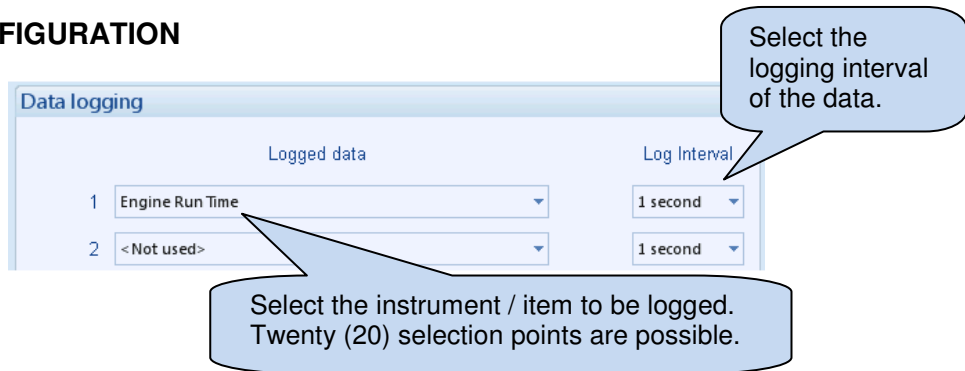
4.2.4 DATA LOGGING

NOTE: Data logging to internal and external memory is available.

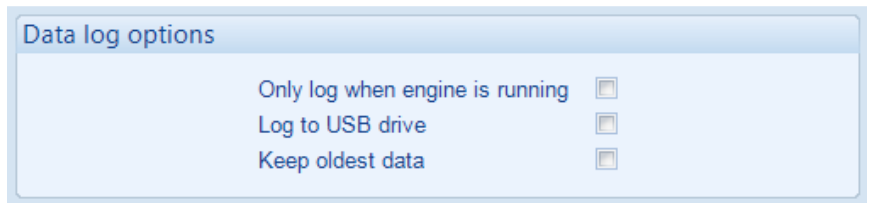
The Data Logging page is subdivided into smaller sections. Select the required section with the mouse.



4.2.4.1 CONFIGURATION



4.2.4.2 OPTIONS



Setting	Description
Only log when engine is running	<input type="checkbox"/> = The module logs data regardless of engine running state. <input checked="" type="checkbox"/> = The module only logs data when the engine is running.
Log to USB drive	<input type="checkbox"/> = The module logs data to the modules internal memory. <input checked="" type="checkbox"/> = The module logs data to an external USB device connect to the USB host socket on the module.
Keep oldest data	<input type="checkbox"/> = When the logging memory is full, the module overwrites the oldest data first with the new data. <input checked="" type="checkbox"/> = When the logging memory is full, the module stops recording new data.

4.3 APPLICATION

4.3.1 APPLICATION

The screenshot shows a configuration window titled "Application". It is divided into two main sections: "ECU (ECM) Options" and "CAN Data Fail Alarm".

ECU (ECM) Options:

- Engine Type:** A dropdown menu currently set to "Conventional Engine". A callout bubble points to this dropdown with the text: "Allows selection of the Engine type being used (ie Conventional Diesel Engine, Gas Engine or Electronic Engine)".
- Enhanced J1939:** A checkbox that is currently unchecked.
- Alternative Engine Speed:** A checkbox that is currently unchecked.
- Modbus Engine Comms Port:** A dropdown menu currently set to "RS485 Port".

CAN Data Fail Alarm:

- Action:** A dropdown menu currently set to "Shutdown". A callout bubble points to this dropdown with the text: "Action to be taken on loss of can data from the ECU."
- Arming:** A dropdown menu currently set to "From Safety On".
- Activation Delay:** A slider control set to "0s".

See overleaf for description of the parameters....

4.3.2 ECU (ECM) OPTIONS

Parameter	Description
Engine type	<p>Select the engine type appropriate to your system</p> <p><i>Conventional Engine:</i> Select this if you have a traditional (non ECU) engine, either Energise to Run or Energise to Stop.</p> <p><i>Conventional Gas Engine:</i> Select this if you have a traditional (non ECU) engine and require GAS engine functionality. This enables control of configurable outputs for <i>Gas Choke and Gas Ignition</i> and instructs the module to follow the gas engine timers.</p> <p><i>Other Engines:</i> The list of supported CAN (or Modbus) engines is constantly updated, check the DSE website at www.deepseapl.com for the latest version of Configuration Suite software.</p>
Enhanced J1939	<p><input type="checkbox"/> = The module reads 'Basic' instrumentation from the engine ECU and display (where supported by the engine) :</p> <p>Engine Speed Oil Pressure Engine Coolant Temperature Hours Run</p> <p><input checked="" type="checkbox"/> = The module reads and displays an 'Enhanced' instrumentation list (where supported by the engine) :</p> <p>Engine Speed Oil Pressure Engine Coolant Temperature Hours Run Engine Oil Temperature Exhaust Temperature Fuel Pressure Total Fuel used Fuel Consumption Inlet Manifold Temperature Coolant Pressure Turbo Pressure</p> <p>Where an instrument is not supported by the engine ECU, the instrument is not displayed.</p> <p>DSE Reserve the right to change these lists in keeping with our policy of continual development.</p>
Alternative Engine Speed	<p><input type="checkbox"/> = The engine is instructed to run at its <i>Nominal Speed</i> as configured by the Engine Manufacturer.</p> <p><input checked="" type="checkbox"/> = The engine is instructed to run at its <i>Alternative Speed</i> as configured by the Engine Manufacturer.</p>
Modbus Engine Comms Port	<p><i>RS485 Port:</i> The modules RS485 port is used to communicate to the engine (when a Modbus engine type is selected).</p> <p><i>DSENet Port:</i> The modules DSENet port is used to communicate to the engine (when a Modbus engine type is selected. This 'frees' the RS485 port in case connection to BMS or other RS485 compatible equipment is required.</p>

4.3.3 DISABLE PROTECTIONS

This feature is provided to assist the system designer in meeting specifications for “Warning only”, “Protections Disabled”, “Run to Destruction”, “War mode” or other similar wording.

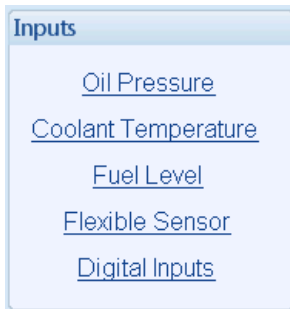
Options	Description
Enable	<p><input type="checkbox"/> = The module operates as normal and provides engine shutdown if required. <input checked="" type="checkbox"/> = <i>Protections disabled</i> function is activated. Operation depends upon the following configuration.</p> <div style="border: 1px solid black; padding: 5px;"> <p>NOTE: Writing a configuration to the controller that has “Protections Disabled” configured, results in a warning message appearing on the PC screen for the user to acknowledge before the controller’s configuration is changed. This prevents inadvertent activation of the feature.</p> </div>
Disable All Protections	<p><i>Never</i> : The protections are not disabled <i>Always</i> : Protections are always overridden by the DSE controller. <i>On Input</i> : Protections are disabled whenever a configurable input set to <i>Protections Disabled</i> is activated</p>
Protections Disabled Alarm Action	<p>If <i>Disable All Protections</i> is set to <i>On Input</i>, this selection allows configuration of an alarm to highlight that the protections have been disabled on the engine.</p> <p><i>Indication</i> : Any output or LCD display indicator configured to <i>Protections Disabled</i> is made active, however the internal alarm sound don't operate. <i>Warning</i> : Any output or LCD display indicator configured to <i>Protections Disabled</i> is made active, and the internal alarm sound operates.</p> <p>When protections are disabled, <i>Protections Disabled</i> appear on the module display to inform the operator of this status.</p>

4.3.4 CAN DATA FAIL ALARM

Parameter	Description
CAN Data Fail	<p>Provides protection against failure of the ECU (ECM) CANbus data link.</p> <p>The alarm action list is as follows, see section entitled <i>Alarm Types</i> for more information: None Electrical Trip Shutdown Warning</p>
Arming	<p>Select when the <i>CAN ECU (ECM) Data Fail</i> alarm is active.</p> <p>Options are as follows: Active from Breaker Closed: Active only after the breaker is closed Always: The alarm is active at anytime the CANbus Link is lost From Safety On: Active only after the <i>Safety On</i> delay timer From Starting: Active only after the <i>Crank Relay</i> is energised Never: Alarm is disabled When Stationary: Active only when the engine is not running</p>
Activation Delay	<p>The amount of time before the module activates the <i>CAN ECU (ECM) Data Fail</i> after a failure.</p>

4.4 INPUTS

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



4.4.1 OIL PRESSURE

Oil Pressure

Input Type

Use Module to Measure Oil Pressure

Not used Oil pressure is read from the ECU (ECM)

Sensor Open Circuit Alarm

Enable Open Circuit Alarm

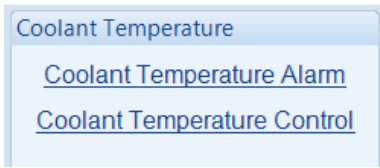
Low Oil Pressure Alarms

Alarm	Enabled	Trip	Unit	Value	Unit
Alarm	<input checked="" type="checkbox"/>	1.03	Bar	14.94	PSI, 103 kPa
Pre-alarm	<input checked="" type="checkbox"/>	1.24	Bar	17.98	PSI, 124 kPa
Return	<input checked="" type="checkbox"/>	1.38	Bar	20.01	PSI, 138 kPa

Callouts:

- Select the sensor type
- Click to read Oil Pressure from module. When using ECU
- Click to edit the 'sensor curve'. See section entitled *Editing the sensor curve*.
- Enable or disable the alarms. The relevant values below is appeared *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

4.4.2 COOLANT TEMPERATURE



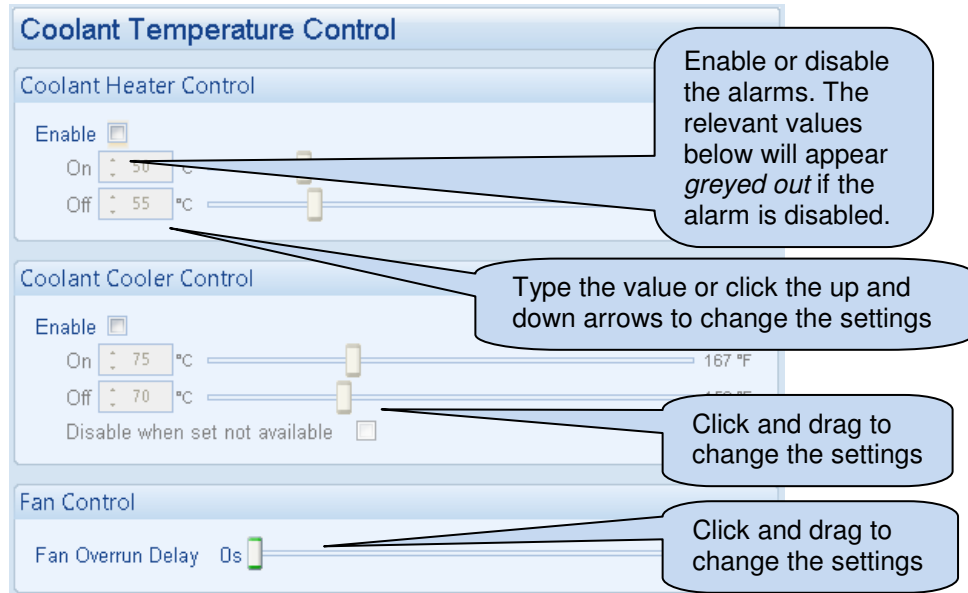
4.4.2.1 COOLANT TEMPERATURE ALARMS

The screenshot shows the 'Engine Temperature' configuration interface. It includes sections for 'Sender Usage', 'Input Type', 'Open Circuit Alarm', 'High Coolant Temperature Alarms', and 'Low Coolant Temperature Alarms'. Callouts provide instructions: 'Select the sensor type' points to the 'VDO 120 °C' dropdown; 'Click to edit the 'sensor curve'. See section entitled *Editing the sensor curve*.' points to the 'Edit...' button; 'Enable or disable the alarms. The relevant values below will appear *greyed out* if the alarm is disabled.' points to the 'Alarm' and 'Electrical Trip' checkboxes; 'Click and drag to change the settings' points to a slider; and 'Type the value or click the up and down arrows to change the settings' points to a numeric input field.

Options	Description
Pre alarm	<input type="checkbox"/> = Pre-alarm is disabled <input checked="" type="checkbox"/> = If the temperature exceeds the <i>Trip</i> setting, an alarm is generated. The temperature must fall below the <i>Return</i> setting to cease the alarm.
Electrical Trip	<input type="checkbox"/> = Electrical trip is disabled <input checked="" type="checkbox"/> = If the temperature exceeds the <i>Trip</i> setting, an alarm is generated, the load switch is opened and the module enters the cooling timer after which the set is stopped.
Shutdown	If the temperature exceeds the <i>Trip</i> setting, an alarm is generated, the load switch is opened and the set is immediately stopped.

4.4.2.2 COOLANT TEMPERATURE CONTROL

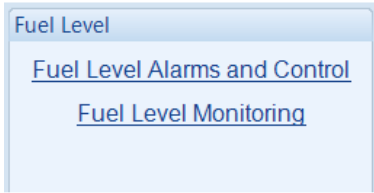
The Coolant temperature control settings provide for control of coolant heaters / coolers using the Coolant Temperature Sensor as the control input. Outputs should be configured to *Coolant Cooler Control* and/or *Coolant Heater Control* to achieve this.



Option	Description
Coolant heater control	<input type="checkbox"/> = Coolant Heater Control function is disabled <input checked="" type="checkbox"/> = Coolant Heater Control function is enabled. If the engine coolant temperature falls below the <i>On</i> setting, any output configured to <i>Coolant Heater Control</i> is energised. This is designed to control an external engine heater. If the coolant temperature rises above the <i>Off</i> setting, the output is de-energised.
Coolant Cooler control	<input type="checkbox"/> = Coolant Cooler Control function is disabled <input checked="" type="checkbox"/> = Coolant Cooler Control function is enabled. If the engine coolant temperature rises above the <i>On</i> setting, any output configured to <i>Coolant Cooler Control</i> is energised. This is designed to control an external engine cooling system, for instance an additional cooling fan. If the coolant temperature falls below the <i>On</i> setting, the output is de-energised.
Fan Control	An output configured to <i>Fan Control</i> is energised when the engine becomes available (up to speed and volts). This output is designed to control an external cooling fan. When the engine stops, the cooling fan remains running for the duration of the <i>Fan Overrun Delay</i> .

4.4.3 FUEL LEVEL

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



4.4.3.1 FUEL LEVEL ALARMS AND CONTROL

Select the sensor type

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

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

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

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.

4.4.3.2 FUEL LEVEL MONITORING

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

SMS logging of Fuel monitoring

Click and drag to change the settings

Parameter	Description
Fuel Pump Control	If enabled, allows the module to control an external fuel pump to transfer fuel from a bulk tank to the generator set's day tank.
Fuel Usage Alarm	Provides an alarm to monitor the usage of the generator set's fuel. There are two settings, one to monitor fuel usage when the set is running and another to monitor the fuel usage when the set is stopped. These alarms are provided to check for fuel leakage problems or potential fuel theft.

4.4.4 BATTERY TEMPERATURE

The following screen shot shows the configuration when set for *Temperature Sensor*. When set to other Sensor Type, consult the relevant manual section for details (Digital inputs, Oil Pressure input etc)

The screenshot displays the 'Battery Temperature' configuration page. It includes sections for 'Sender Usage', 'Input Type', 'Open Circuit Alarm', 'High Battery Temperature Alarms', and 'Low Battery Temperature Alarms'. Callouts provide instructions on how to interact with these settings:

- Select the sensor type:** Points to the 'Use sensor as' dropdown menu set to 'Temperature sensor'.
- Edit...:** Points to the 'Edit...' button next to the 'Input Type' dropdown, which is currently set to 'VDO 120 °C'.
- Click to edit the 'sensor curve':** Points to the 'Edit...' button.
- Click to enable or disable the alarms:** Points to the checkboxes for 'Pre-alarm' and 'Alarm' in the 'High Battery Temperature Alarms' section.
- Click and drag to change the settings:** Points to the sliders for 'Return' and 'Trip' values in the 'High Battery Temperature Alarms' section.
- Type the value or click the up and down arrows to change the settings:** Points to the numeric input fields for 'Return' and 'Trip' values in the 'Low Battery Temperature Alarms' section.

4.4.5 EDITING THE SENSOR CURVES

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

Deleting custom sensor curves that have been added is performed in the main menu, select *Tools / Curve Manager*.

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

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

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 OK to accept the changes and return to the configuration editor

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.

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

4.4.6 DIGITAL INPUTS

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

Digital Inputs

- [Digital Inputs A - C](#)
- [Digital Inputs D - F](#)
- [Digital Inputs G - I](#)
- [Digital Input J](#)

Digital Input A

Function: Remote Start on Load
Polarity: Close to Activate
Action: [greyed out]
Arming: [greyed out]
LCD Display: [greyed out]
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

Digital Input B

Function: User Configured
Polarity: Close to Activate
Action: Shutdown
Arming: Always
LCD Display: Sample Text
Activation Delay: 2s

Example of a user configured input

Close or open to activate

This is the text that will be displayed on the module screen when the alarm is triggered.

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.

4.4.7 DIGITAL INPUT FUNCTIONS

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

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

 **NOTE: Input selection is dependant on controller.**

Function	Description
Air flap closed auxiliary IEEE 37.2 - 3 Checking or interlocking relay	This input is used to connect to the Air flap switch contacts. This gives an immediate shutdown in the event of the air-flap being closed. It also prevents the generator from being restarted if the air flap has not been reset following an overspeed shutdown.
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.
Alt Config 1-3 Select	These inputs are used to instruct the module to follow one of the <i>alternative</i> configuration settings instead of the <i>main</i> configuration settings.
Alternative Language Select	This input is used to select the alternative uploaded language file.
Auto Restore Inhibit IEEE 37.2 - 3 checking or interlocking relay	In the event of a remote start/mains failure, the generator is instructed to start and take load. On removal of the remote start signal/mains return the module continues 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 doesn't give a start command to the generator. If this input signal is then removed, the controller operates as if a remote start/mains failure has occurred, starting and loading the generator. This function is used to give an 'AND' function so that a generator is only 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 ignores 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 monitors 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 is operated as if the incoming mains supply has fallen outside of limits, the generator is instructed to start and take the load. Removal of the input signal causes 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.

Function	Description
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 using the switch and the analogue input is used to give protection or configured to be used for indication only.
Crank Disconnect	This input is used to give an external crank disconnect input.
Disable Protections	The system designer provides this switch (not DSE) so its location varies depending upon manufacturer, however it normally takes the form of a key operated switch to prevent inadvertent activation. Depending upon configuration, a warning alarm may be generated when the switch is operated. When active, and the module is suitably configured (see section entitled 'Application') this prevents the engine being stopped upon critical alarm (Sometimes called War Mode or Run to Destruction)
Droop enable	This input is used to switch the engine into droop mode on CAN engines that support this function.
EJP1	For the French EJP (Effacement Jours de Pointe) tariff system. This input is functionally identical to <i>Remote Start Off Load</i> . If this input is active, operation is similar to the 'Remote Start on load' function except that the generator is not instructed to take the load. This function is used where an engine only run is required e.g. for exercise.
EJP2	For the French EJP (Effacement Jours de Pointe) tariff system. This input is functionally identical to <i>Remote Start On Load</i> . When in auto mode, the module performs the start sequence and transfer load to the generator. In Manual mode, the load is transferred to the generator if the engine is already running, however in manual mode, this input doesn't generate start/stop requests of the engine. In both cases, synchronising takes place if required.
External Panel Lock	This input is used to provide security to the installation. If the External Panel lock input is active, the module doesn't respond to operation of the Mode select or start buttons. This allows the module to be placed into a specific mode (such as Auto) and then secured. The operation of the module is not affected and the operator is still able to view the various instrumentation pages etc. (<i>Front panel configuration access is still possible while the system lock is active</i>). ▲NOTE: External control sources (i.e. Simulate Start Button) are not affected by the external panel lock input and continue to operate normally.
Fuel Pump Control	This input is used to activate the fuel Pump output control. When active the Fuel control output is active When inactive Fuel control output is not active.
Fuel Usage Alarm	This Input is used to give an input from an external fuel usage alarm.

Function	Description
Generator Closed Auxiliary IEEE 37.2 - 3 Checking or interlocking relay	This input is used to provide feedback to allow the DSE7450 to give true indication of the contactor or circuit breaker switching status. It should be connected to the generator load switching device auxiliary contact. Action: Warning (Alarm only, No shutdown)
Generator Load Inhibit IEEE 37.2 - 52 AC circuit breaker	This input is used to prevent the controller from loading the generator. If the generator is already on load, activating this input causes the controller to unload the generator. Removing the input allows the generator to be loaded again. ⚠️NOTE: This input only operates to control the generator-switching device if the DSE7450 load switching logic is attempting to load the generator. It doesn't control the generator-switching device when the mains supply is on load.
Generator Loading Frequency OK	This input is used when the loading Frequency is within acceptable limits before allowing the generator to go on load when active
Generator loading Voltage OK	This input is used when the loading Voltage is within acceptable limits before allowing the generator to go on load when active
High Coolant Temperature Electrical Trip	This Input is used to Electrically trip the Generator breaker upon an external high coolant temperature sensor becoming active.
Inhibit Retransfer To Mains IEEE 37.2 - 3 checking or interlocking relay	When active, this input prevents the load being transferred back to the mains supply, even in the event of the generators failing.
Inhibit Scheduled Run IEEE 37.2 - 3 checking or interlocking relay	This input is used to provide a means of disabling a scheduled run.
Inhibit SMS Remote Start	This input is used to provide a means of disabling SMS Remote Start.
Lamp Test	This input is used to provide a test facility for the front panel indicators fitted to the DSE module. When the input is activated all LED's should illuminate.
Low Fuel Level Switch	A digital normally open or closed fuel level switch gives this input. It allows fuel level detection using the switch and the analogue input to be used in parallel to give protection or to be used for fuel level indication only.
Main Config Select	This input is used to select the <i>Main</i> configuration when <i>Alternative</i> configurations are enabled.
Mains closed Auxiliary IEEE 37.2 - 3 Checking or interlocking relay	This input is used to provide feedback to allow the module to give true indication of the contactor or circuit breaker switching status. It should be connected to the mains load switching device auxiliary contact. Incorrect application of this signal does not trigger an alarm condition, it is used solely for indication of the breaker status.
Mains Fail	This input is used to give indication to the module of a mains failure while the input is active.

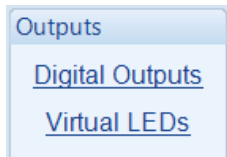
Function	Description
Mains Load Inhibit IEEE 37.2 - 3 checking or interlocking relay	<p>This input is used to prevent the from loading the mains supply. If the mains supply is already on load activating this input causes the module to unload the mains supply. Removing the input allows the mains to be loaded again.</p> <div style="border: 1px solid black; padding: 5px;"> <p>⚠NOTE: This input only operates to control the mains switching device if the DSE7450 load switching logic is attempting to load the mains. It does <u>not</u> control the mains switching device when the generator is on load.</p> </div>
Manual Restore Contact	In the event of a remote start/mains failure, the generator is instructed to start and take load.
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 is similar to the 'Remote Start on load' function except that the generator is not instructed to take the load. This function is used where an engine only run is required e.g. for exercise.
Remote Start on load	When in auto mode, the module performs the start sequence and transfer load to the generator. In Manual mode, the load is transferred to the generator if the engine is already running, however in manual mode; this input does not generate start/stop requests of the engine.
Reset DC Battery	This input is used to indicate a new plant battery has been installed, by activating this input the <i>Plant Battery Status</i> instruments reset all to zero (Battery Run Time, Battery Charge Cycles, Battery Discharge %, Battery Charge %, Battery Power %), the <i>Plant Battery Maintenance Alarms (1,2,3)</i> and <i>DOD Alarms</i> are reset as well.
Reset DC Battery Maintenance Alarm 1-3	These inputs are used to reset the DC Battery maintenance alarms. When activated it resets the maintenance counter to the pre-configured value (i.e. 250 hours). If the maintenance alarm is configured to monitor the monthly service interval this also resets to the pre-configured period (i.e. 6 Months).
Reset Maintenance Alarm 1-3	These inputs are used to reset the maintenance alarms. When activated it resets the maintenance counter to the pre-configured value (i.e. 250 hours). If the maintenance alarm is configured to monitor the monthly service interval this also resets to the pre-configured period (i.e. 6 Months).
Simulate Auto Button	<div style="border: 1px solid black; padding: 5px;"> <p>⚠NOTE: If a call to start is present when AUTO MODE is entered, the starting sequence begins. Call to Start comes 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 mimic's the operation of the 'Auto' button and is used to provide a remotely located Auto mode push button.</p>

Function	Description
Simulate Lamp test \ Alarm Mute Button	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. The input also serves a second function, in that it also provides a mute signal to silence the audible alarm. The input is recognised by the module as though it was the Push button on the module itself being operated.
Simulate Mains available	This function is provided to override the module's internal monitoring function. If this input is active, the module does 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.
Start Pause IEEE 37.2 - 3 checking or interlocking relay	This input is intended to be used to allow the generator start sequence to commence, but not to complete. This feature is used with Air start engines for example to give a controlled start sequence. The function operates such that if the 'Start pause' input is active and an engine start is commanded, the module performs its start sequence thus: The pre-heat output (if used) is activated for the duration of the pre-heat timer. The Fuel output is then energised and the module then enters a pause state - 'Awaiting clear to start'. If the 'start pause' signal becomes inactive at this time then the module continues its normal start sequence. The 'start pause' mode uses the 'manual crank limit' timer and if this expires during the 'Awaiting clear to start' state then a 'Fail to start' alarm is generated and the set shutdown.
Stop and Panel Lock	Combined function input that instructs the module to enter STOP MODE and also perform the <i>Panel Lock</i> function. Once the input is active, the module does not respond to operation of the Mode select or start buttons. The operator is still able to view the various instrumentation pages etc. (<i>Front panel configuration access is still possible while the system lock is active</i>).
Transfer to Mains/ Open Generator / Battery Button 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.)
Transfer to Generator/Open Mains / Battery Button IEEE 37.2 - 52 AC circuit breaker	This input is used to transfer the load to the generator when running in MANUAL MODE ..

Function	Description
Volts Lower	<p>▲ NOTE: This input has no effect when using the internal analogue system to control the AVR</p> <p>This is operational in Manual Mode only, when the breaker is open. On systems where internal relays are used to control the AVR, this input is used to decrease the volts.</p>
Volts Raise	<p>▲ NOTE: This input has no effect when using the internal analogue to control the governor.</p> <p>This is operational in Manual Mode only, when the breaker is open. On systems where internal relays are used to control the governor, this input is used to increase the speed.</p>

4.5 OUTPUTS

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



4.5.1 DIGITAL OUTPUTS

Digital Outputs

Relay Outputs (Supplied From Emergency)

	Source	Polarity
Output A	Fuel Relay	Energise
Output B	Start Relay	Energise

Relay Outputs (Volts Free)

	Source	Polarity
Output C (N/C)	Close Mains Output	De-Energise
Output D	Close Gen Output	Energise

Relay Outputs (DC Supply Out)

	Source	Polarity
Output E	Preheat During Preheat Timer	Energise
Output F	Not Used	Energise
Output G	Audible Alarm	Energise
Output H	System In Auto Mode	Energise
Output I	Fuel Pump Control	Energise
Output J	Low Fuel Level	Energise

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

Select what the output is to be used to control

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

These labels match the typical wiring diagram

The list of output sources available for configuration of the module outputs is listed in the section entitled *Output Sources*.

4.5.2 VIRTUAL LEDS

LED Configuration		
	Source	Polarity
LED 1	Not Used	Lit
LED 2	Not Used	Lit
LED 3	Not Used	Lit
LED 4	Not Used	Lit
LED 5	Not Used	Lit
LED 6	Not Used	Lit
LED 7	Not Used	Lit
LED 8	Not Used	Lit
LED 9	Not Used	Lit
LED 10	Not Used	Lit
LED 11	Not Used	Lit
LED 12	Not Used	Lit
LED 13	Not Used	Lit
LED 14	Not Used	Lit
LED 15	Not Used	Lit
LED 16	Not Used	Lit
LED 17	Not Used	Lit
LED 18	Not Used	Lit
LED 19	Not Used	Lit
LED 20	Not Used	Lit

Allows the configuration of 'status' items. These items are not available for viewing on the module itself but can be seen in the SCADA section of the PC software, or read by third party systems (i.e. BMS or PLCs) using the Modbus protocol.

The list of output sources available for configuration of the module Virtual LEDs is listed in the section entitled *Output Sources*.

4.5.3 OUTPUT SOURCES

The list of output sources available for configuration of the module relay outputs also applies to the LED configuration and expansion relay outputs.

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

 **NOTE: Output selection is dependant on controller and the Configuration.**

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

Output source	Activates...	Is not active...
Not Used	The output does not change state (Unused)	
Air Flap Alarm	This output indicates that the air-flap is closed; to operate it requires an input configured as 'Air-flap closed' connected to the external air-flap switch.	
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
Alternative Config 1-3 selected	Indicates which of the three alternative configurations has been selected (if any)	
Alternative Language Select	Active when a digital input configured to <i>Alternative Language Select</i> is active.	
Alarm Mute	Indicates that an alarm mute operation is in progress by digital input	
Alarm Reset	Indicates that an alarm reset operation is in progress by digital input	
Arm Safety On Alarms	Becomes active at the end of the <i>safety delay</i> timer whereupon all alarms configured to 'From Safety On' become active	Inactive when : When the set is at rest In the starting sequence before the Safety Delay timer has expired
Audible Alarm <i>IEEE 37.2 – 74 alarm relay</i>	This output indicates that the internal sounder is operating to allow it to feed an external sounder. Operation of the Mute pushbutton resets this output once activated.	Inactive if the internal sounder is not operating.
Auto Button Pressed (Auto mode)	Active when the controller is in AUTO mode	Inactive in any other mode.
Auto Restore Inhibit	Indicates that a auto restore inhibit operation is in progress	
Auto Start Inhibit <i>IEEE 37.2 – 3 Checking or Interlocking relay</i>	Indicates that an auto start inhibit operation is in progress.	
Auxilliary Mains Failure	Indicates a Auxilliary Mains Fail is Active	
AVR Maximum Trim Limit Reached	Indicates that the analogue AVR output has reached 100%. This indicates a fault with the control of the AVR (including connection error), or that the alternator has reached its maximum capacity.	
Calling For Scheduled Run	Active during a <i>scheduled run</i> request from the inbuilt scheduler.	

Edit Configuration - Outputs

Output source	Activates...	Is not active....
CAN ECU Data Fail	Becomes active when no CAN data is received from the ECU after the safety delay timer has expired	Inactive when: CAN data is being received The set is at rest During the starting sequence before the safety delay timer has expired
CAN ECU Error	The engine ECU has indicated that a Warning alarm is present.	Inactive when no Warning alarm from the ECU is present
CAN ECU Fail	The engine ECU has indicated that a Shutdown alarm is present.	Inactive when no Shutdown alarm from the ECU is present
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 Failure (Shutdown or warning)	Indicates that there is a charging fault with the auxiliary charging alternator	When the set is at rest During the starting sequence before the safety delay timer has expired
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 becomes 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 DSE7450 module selects the generator to be on load this control source becomes active for the duration of the Breaker Close Pulse timer, after which it becomes inactive again.	
Close Gen Button Pressed	Active when the close Gen button pressed on the Facia of the controller.	
Close Mains Output IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the DSE7450 module selects the mains to be on load this control source becomes 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 DSE7450 module selects the mains to be on load this control source becomes active for the duration of the Breaker Close Pulse timer, after which it becomes inactive again.	
Closed to Generator state	Used to be active when the status of the Generator breaker is closed.	
Closed to mains state	Used to be active when the status of the mains breaker is closed.	
Combined DC Battery Maintenance Alarm Active	Active when a Dc Battery maintenance Alarm active.	
Combined Engine Maintenance Alarm Active	Active when a Engine maintenance Alarm active.	
Combined Mains Failure	Active when the mains supply is out of limits OR the input for Auxiliary Mains Failure is active	
Combined Remote Start Output	Indicates that a remote start input is active.	
Combined Under and Over Frequency Alarm IEEE 37.2 - 81 frequency relay	Active when the generator is shutdown due to either under OR over frequency	
Combined Under and Over Frequency Warning IEEE 37.2 - 81 frequency relay	Active when the generator alarm for either under OR over frequency is active	

Edit Configuration - Outputs

Output source	Activates...	Is not active...
Combined Under and Over Voltage Alarm IEEE 37.2 – 27AC under voltage relay IEEE 37.2 – 59AC over voltage relay	Active when the generator is shutdown due to either under OR overvoltage	
Combined Under and Over Voltage Warning IEEE 37.2 – 27AC under voltage relay IEEE 37.2 – 59AC over voltage relay	Active when the generator alarm for either under OR overvoltage is active	
Common Alarm IEEE 37.2 – 74 alarm relay	Active when one or more alarms (of any type) are active	The output is inactive when no alarms are present
Common Electrical Trip IEEE 37.2 – 74 alarm relay	Active when one or more <i>Electrical trip</i> alarms are active	The output is inactive when no electrical alarms are present
Common Shutdown IEEE 37.2 – 74 alarm relay	Active when one or more <i>Shutdown</i> alarms are active	The output is inactive when no shutdown alarms are present
Common Warning IEEE 37.2 – 74 alarm relay	Active when one or more <i>Warning</i> alarms are active	The output is inactive when no warning alarms are present
Coolant Cooler Control IEEE 37.2 – 23 temperature control device	Activated by the Coolant Cooler Control in conjunction with the Coolant Temperature Sensor.	
Coolant Heater Control IEEE 37.2 – 23 temperature control device	Activated by the Coolant Heater Control in conjunction with the Coolant Temperature Sensor.	
Cooling Down	Active when the Cooling timer is in progress	The output is inactive at all other times
Data Logging Active	Active When Data Logging function active.	
DC Battery charge Overcurrent Alarm	Active When Dc Battery Charge over current alarm active	
DC Battery Float Delay in Progress	Active When DC Battery Float Delay timer active	
DC Battery High Voltage Alarm	Active When DC Battery High Voltage shutdown / Electrical trip alarm active	
DC Battery High Voltage Warning	Active When Dc Battery High Voltage warning alarm active	
DC Battery Load Overcurrent Alarm	Active When DC Battery Load Over Current alarm active	
DC Battery Low Charge State Alarm	Active When DC Battery Low Charge State shutdown / Electrical Trip alarm active	
DC Battery Low Charge State Warning	Active When DC Battery Charge State Warning alarm active	
DC Battery Low Voltage Alarm	Active When DC low Voltage alarm active	
DC Battery Low Voltage Warning	Active When DC low Voltage warning alarm active	
DC Battery Off Load	Active when Off load active	
DC Battery On Load	Active when On load active	
DC Battery Temperature High Alarm	Active When DC Battery High Temperature shutdown / Electrical trip alarm active	
DC Battery DC Battery Temperature High warning Alarm	Active When DC Battery High Voltage shutdown / Electrical trip alarm active	
DC Battery Temperature Low Alarm	Active When DC Battery Low Voltage shutdown / Electrical trip alarm active	
DC Battery Temperature Low Warning	Active When DC Battery Low Voltage Warning alarm active	

Output source	Activates...	Is not active...
DC KW Overload Alarm	Active When DC Battery High Voltage shutdown / Electrical trip alarm active	
DC KW Overload Pre-Alarm	Active When DC Battery High Voltage pre alarm active	
DC Overcurrent IDMT	Active when the DC IDMT alarm is active	
DC Overcurrent Pre-Alarm	Active When DC Overcurrent Pre-Alarm Active	
DC Power On	Active when DC power is supplied to the module	
Digital Input A - J	Active when the digital input is active	Inactive when : If the input is not active If the input is active but conditioned by <i>activation delay, safety timer</i> or <i>Arming</i> requirements.
Down Button Pressed	This output indicates that the Down pushbutton is being operated. Once the button is released, the output becomes inactive.	
Droop Enable	Becomes active when an input configured to <i>Droop enable</i> is active or if <i>Droop Enable</i> has been activated in the module configuration (CAN engine only)	
EJP1 / EJP2	Indicates that an input configured to EJP1 or EJP2 is active	
Emergency Stop IEEE 37.2 – 86 Lockout Relay	Active when the Emergency Stop input has been activated	
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> .
Engine Battery High Voltage IEEE 37.2 – 59DC Over Voltage Relay	This output indicates that a Battery Over voltage alarm has occurred.	Inactive when battery voltage is not High
Engine Battery Low Voltage	This output Indicates that a battery under voltage has occurred	Inactive when battery voltage in not Low
Engine Maintenance Alarm 1-3 due	Indicates that the specified maintenance alarm is due	
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 becomes active. This is the <i>Fail to stop</i> timer.	
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.	
Fan Control	Energises when the engine becomes available (up to speed and volts). This output is designed to control an external cooling fan. When the engine stops, the cooling fan remains running for the duration of the Fan Overrun Delay.	
Flexible Sensor x Active	Indicates that the respective flexible sensor alarm is active.	
Flexible Sensor x High (Pre-) Alarm	Indicates that the respective flexible sensor's relevant High Alarm or High Pre-alarm is active.	
Flexible Sensor x Low (Pre-) Alarm	Indicates that the respective flexible sensor's relevant Low Alarm or Low Pre-alarm is active.	
Fuel Fill Start	Indicates when fuel fill starts	
Fuel Fill End	Indicates when the end of the fueling event.	
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 becomes inactive when the <i>Fuel level</i> is above the <i>Fuel Pump Control OFF</i> settings.

Edit Configuration - Outputs

Output source	Activates...	Is not active....
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.
Fuel Usage Alarm	Becomes active when the amount of fuel used over a set time period exceeds the set value.	
Gen Over Frequency Overshoot Alarm	Becomes active when the <i>Over-Frequency Overshoot Shutdown</i> is active.	
Gen Over Frequency Overshoot Warning	Becomes active when the <i>Over-Frequency Overshoot Warning</i> is active.	
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</i> timer.
Generator at Rest	This output indicates that the generator is not running.	
Generator Available	Becomes active when the generator is available to take load.	Inactive when Loading voltage and loading frequency have not been reached After electrical trip alarm During the starting sequence before the end of the warming timer.
Generator Closed Aux	Active when the <i>Generator closed auxiliary</i> input is active	
Generator Excite IEEE 37.2 – 31 separate excitation device	Used to control the excitation of the main alternator (AC).	Becomes inactive when the set is stopped.
Generator Failed to Close IEEE 37.2 - 48 Incomplete Sequence Relay	This output source is intended to be used to indicate a failure of the generator contactor or breaker. It is only used if the module is configured to use 'Generator Closed Auxiliary' feedback.	
Generator Failed to Open IEEE 37.2 - 48 Incomplete Sequence Relay	This output source is intended to be used to indicate a failure of the generator contactor or breaker. It is only used if the module is configured to use 'Generator Closed Auxiliary' feedback.	
Generator Load Inhibited	This output indicates that a digital input that has been configured as ' <i>Generator Load Inhibit</i> ' is active. Refer to the ' <i>Edit Inputs</i> ' section of this manual for details.	
Generator High Voltage Alarm IEEE 37.2 – 59AC over voltage relay	Active when the generator voltage exceeds the <i>High Voltage Shutdown</i> setting	
Generator High Voltage Warning IEEE 37.2 – 59AC over voltage relay	Active when the generator voltage exceeds the <i>High Voltage Warning</i> setting	
Generator Low Voltage Shutdown IEEE 37.2 – 27AC under voltage relay	Active when the generator voltage falls below the <i>Low Voltage Shutdown</i>	Inactive when The set is stopped During starting sequence before the safety delay time has expired.
Generator Low Voltage Warning IEEE 37.2 – 27AC under voltage relay	Active when the generator voltage falls below the <i>Low Voltage Warning</i> setting	Inactive when The set is stopped During starting sequence before the safety delay time has expired.

Edit Configuration - Outputs

Output source	Activates...	Is not active....
Generator Off Load	Active when generator running and generator breaker open	
Generator On Load	Active when generator running and generator breaker closed	
Generator Overcurrent Pre-Alarm	Active When When Generator Pre-Alarm is active.	
Generator Under Frequency Warning(Alarm) / Shutdown IEEE 37.2 – 81 frequency relay	Active when the generator falls below the <i>low frequency Warning/ Shutdown</i> setting	Inactive when The set is stopped During starting sequence before the safety delay time has expired.
Generator Over Frequency Warning(Alarm) / Shutdown	Active when the generator rises above the <i>high frequency Warning/ Shutdown</i> setting	Inactive when The set is stopped During starting sequence before the safety delay time has expired.
Generator Phase Rotation Alarm	This output indicates that the module has detected a phase sequence error from the generator output.	
Generator Stopping	This output source indicates that the engine has been instructed to stop but has not yet come to rest. Once the engine comes to a standstill this output becomes in-active.	
High Coolant Temperature Electrical Trip	Active when the Coolant Temperature exceeds the High Coolant Temperature Electrical Trip setting	
High Coolant Temperature Shutdown	Active when the Coolant Temperature exceeds the High Coolant Temperature Shutdown setting	
High Coolant Temperature Warning	Active when the Coolant Temperature exceeds the High Coolant Temperature Warning setting	
High Inlet Temperature Shutdown	Active when the Inlet Temperature exceeds the High Inlet Temperature Shutdown setting	
High Inlet Temperature Warning	Active when the Inlet Temperature exceeds the High Inlet Temperature Warning setting	
Inhibit Sms Start	Indicates when the Inhibit SMS Start is active.	
Inhibit Retransfer to Mains	Indicates when mains fails,Gens fails and mains not enough capacity to take load inhibit retransfer.	
Inhibit Scheduled Run	Active when the digital input configured for <i>Inhibit Scheduled Run</i> is active	
kW Overload Shutdown / Electrical Trip / Alarm	Active when the measured kW are above the setting of the <i>kW overload shutdown / electrical trip alarm</i> . Used to give alarms on overload, control a dummy load breaker or for load shedding functionality.	
kW Overload Warning	Active when the measured kW are above the setting of the <i>kW overload warning alarm</i> . Used to give alarms on overload, control a dummy load breaker or for load shedding functionality.	
Lamp Test	This output indicates that the module is performing a lamp test. Once the lamp test is completed, the output becomes inactive again. The output is used to feed a lamp test on external modules or panel lamps.	
Lamp Test/Mute + Tick Buttons pressed	This output indicates that both Lamp Test/Mute pushbutton and Tick pushbutton are pressed simultaneously. Once one of the buttons is released, the output becomes inactive.	
Left Button Pressed	This output indicates that the Left pushbutton is being operated. Once the button is released, the output becomes inactive.	
Loading Frequency Not Reached	Indicates that the generator frequency has not reached the configured <i>loading frequency</i> during the starting process.	
Loading Voltage Not Reached	Indicates that the generator voltage has not reached the configured <i>loading voltage</i> during the starting process.	
Loss of Mag Pickup Signal	Active when the controller senses the loss of signal from the magnetic pickup probe	

Edit Configuration - Outputs

Output source	Activates...	Is not active...
Louvre Control	Normally used to drive ventilation louvres for the generator set, this output becomes active when the fuel relay becomes active	Inactive when the fuel relay becomes inactive.
Low Coolant Temperature	Active when the Coolant Temperature falls below the Low Coolant Temperature alarm setting	
Low Fuel Level IEEE 37.2 – 71 level switch	Active when the Fuel Level falls below the <i>Fuel Level Low</i> setting	
Low Oil Pressure Shutdown IEEE 37.2 - 63 pressure switch	Active when the <i>Oil Pressure</i> falls below the <i>Low Oil Pressure Shutdown</i> setting	Inactive when The set is stopped During starting sequence before the safety delay time has expired.
Low Oil Pressure Warning IEEE 37.2 - 63 pressure switch	Active when the <i>Oil Pressure</i> falls below the <i>Low Oil Pressure Warning</i> setting	Inactive when The set is stopped During starting sequence before the safety delay time has expired.
MPU open circuit	This output indicates that the module has detected an open circuit failure in the Magnetic Pickup transducer circuit.	
Main Config Selected	Indicates that the main configuration fail has been selected	
Mains Closed Aux	Active when the <i>Mains closed auxiliary</i> input is active	
Mains failed to close	This output indicates the mains breaker failed to close	
Mains failed to open	This output indicates the mains breaker failed to open	
Mains Failure IEEE 37.2 - 81 frequency relay IEEE 37.2 – 27AC under voltage relay IEEE 37.2 – 59AC over voltage relay	The output indicates that one or more of the module's sources of determining mains failure is active. The output is inactive when the mains supply is healthy	
Mains Load Inhibited	Active when the mains is inhibited to take load.	
Mains Off Load	Active when the mains breaker is not closed	
Mains On Load	Active when the mains breaker closed	
Mains Phase Rotation Alarm	Active when the Mains Phase rotation alarm is active.	
Mains High Frequency IEEE 37.2 - 81 frequency relay	Active when the mains frequency exceeds the <i>High Frequency</i> setting	
Mains High Voltage IEEE 37.2 – 59AC overvoltage relay	Active when the mains voltage exceeds the <i>High Voltage</i> setting	
Mains Low Frequency IEEE 37.2 - 81 frequency relay	Active when the mains frequency falls below the <i>Low Frequency</i> setting	
Mains Low Voltage IEEE 37.2 – 27AC under voltage relay	Active when the mains voltage falls below the <i>Low Voltage</i> setting	
Maintenance Alarm 1,2,3 Due	Indicates that the specified maintenance alarm is due	
Manual Button Pressed	This output indicates that the Manual pushbutton is being operated. Once the button is released, the output becomes inactive.	
Manual Mode	Active when the controller is in MANUAL mode	Inactive in any other mode.
Manual Restore Contact	Active when manual restore contact is active	
MPU Open Circuit	Active when the <i>MPU Open Circuit</i> alarm is enabled and active.	
Mute/Lamp Test Button Pressed	This output indicates that the alarm mute / Lamp test pushbutton is being operated. Once the button is released, the output becomes inactive.	
No loading Command	Active when no Loading command Active	
Oil Pressure Sender Open Circuit	Active when the <i>Oil Pressure Sensor</i> is detected as being <i>open circuit</i> .	
Open Generator Button Pressed	Active when the Open gen Button is active.	

Edit Configuration - Outputs

Output source	Activates...	Is not active....
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 becomes 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 becomes active for the duration of the Breaker Open Pulse timer, after which it returns 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 becomes 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 becomes active for the duration of the Breaker Open Pulse timer, after which it becomes inactive again.	
Over Current IDMT Alarm IEEE 37.2 – 51 ac time overcurrent relay	Active when an overcurrent condition has caused the <i>Overcurrent IDMT</i> alarm to trigger	
Over Current Immediate Warning IEEE 37.2 – 50 instantaneous overcurrent relay	Active when an overcurrent condition exceeds the <i>Overcurrent alarm Trip</i> setting. At the same time, the controller begins following the <i>IDMT curve</i> . If the overload condition exists for an excess time, the <i>Overcurrent IDMT</i> alarm becomes activate.	
Over Frequency Warning IEEE 37.2 - 81 frequency relay	Active when the generator frequency exceeds the <i>High Frequency Warning</i> setting	
Over Frequency Shutdown IEEE 37.2 - 81 frequency relay	Active when the generator frequency exceeds the <i>High Frequency Shutdown</i> setting	
Over Speed Shutdown IEEE 37.2 – 12 over speed device	Active if the engine speed exceeds the <i>Over Speed Shutdown</i> setting	
Over Speed Warning IEEE 37.2 – 12 over speed device	Active if the engine speed exceeds the <i>Over Speed Warning</i> setting	
Overspeed Overshoot Alarm / Warning	Active if the overspeed / overshoot parameters during the safety on timer.	
Panel Locked	This output indicates that the module ' <i>Panel Lock</i> ' is active. If the Panel lock input is active, the module does not respond to operation of the Mode select or start buttons. This allows the module to be placed into a specific mode (such as Auto) and then secured. The operation of the module is not affected and the operator is still able to view the various instrumentation pages etc. (<i>Front panel configuration access is barred while system lock is active</i>).	
Panel Locked By Digital Input	This output indicates that a digital input that has been configured as ' <i>Panel Lock</i> ' is active. If the Panel lock input is active, the module does not respond to operation of the Mode select or start buttons. This allows the module to be placed into a specific mode (such as Auto) and then secured. The operation of the module is not affected and the operator is still able to view the various instrumentation pages etc. (<i>Front panel configuration access is barred while system lock is active</i>). Refer to the ' <i>Edit Inputs</i> ' section of this manual for details.	
Panel Locked By Telemetry	This output indicates that remote ' <i>Panel Lock</i> ' via telemetry is active. If the Panel lock is active, the module does not respond to operation of the Mode select or start buttons. This allows the module to be controller remotely without local interference. The operation of the module is not affected and the local operator is still able to view the various instrumentation pages etc. (<i>Front panel configuration access is barred while system lock is active</i>).	
Plant Battery Available	Active when the Plant battery has been charged to full charge level and the float charge timer has expired.	Inactive when the battery charge has fallen below the depth of discharge level.

Edit Configuration - Outputs

Output source	Activates...	Is not active....
Plant Battery Maintenance Alarm 1-3 Active	Active when the Plant Battery Maintenance Alarm is active.	
Plant battery On Charge	Active When the Plant Battery on charge timer is active.	
PLC Output Flag 1-40	A Series of user configured flags that is used by the PLC to control / drive internal and external functions	
Preheat During Preheat Timer	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : The set is stopped The preheat timer has expired
Preheat Until End Of Cranking	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : The set is stopped The set has reached <i>crank disconnect</i> conditions
Preheat Until End Of Safety Timer	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : The set is stopped The set has reached the end of the <i>safety delay</i> timer
Preheat Until End Of Warming Timer	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : The set is stopped The set has reached the end of the <i>warming</i> timer
Protections Disabled	Indicates the protection system of the module has been disabled by configuration or by digital input configured to perform this disabling function.	
Remote Control 1-10	A series of output sources that are controlled by remote control in the SCADA section of the software. They are used to control external circuits or used in the <i>control logic</i> section of the configuration suite.	
Remote Start Off Load	This output indicates that a digital input that has been configured as ' <i>Remote Start off load</i> ' is active. This output could be used to pass the remote start signal on to elsewhere in the control system.	
Remote Start On Load	This output indicates that a digital input that has been configured as ' <i>Remote Start on load</i> ' is active. This output could be used to pass the remote start signal on to elsewhere in the control system.	
Reset DC Battery Maintenance Alarm 1-3	This input is active when Reset DC Battery Maintenance Alarm 1-3 is active	
Reset Maintenance 1-3	This input is active when Reset Maintenance Alarm 1-3 is active	
Reset Plant Battery	This input is active when Reset Plant Battery Alarm is active	
Return delay in progress	This output source is active to indicate that the return timer is running.	
Right Button Pressed	This output indicates that the Right pushbutton is being operated. Once the button is released, the output becomes inactive.	
Short Circuit		
Short Circuit Generator	This output indicates that the module has detected a short circuit on the generator output.	
Shutdown Blocked	Indicates that a <i>Shutdown</i> type alarm is active but that the shutdown function has been blocked because the <i>Protections Disabled</i> function is active.	
Simulate Auto Button	This output is active whilst the Simulate Auto button is active	
Simulate Mains Available	This output is active whilst the Simulate Mains is within limits (available)	
Simulate Manual Button	This output is active whilst the Simulate Manual button is active	
Simulate Start Button	This output is active whilst the Simulate Start button is active	
Simulate Stop Button	This output is active whilst the Simulate Stop button is active	
Simulate Test On Load Button	This output is active whilst the Simulate Test On Load button is active	

Edit Configuration - Outputs

Output source	Activates...	Is not active....
Simulate Transfer to Generator Button	This output is active whilst the Simulate Transfer to Gen button is active	
Simulate Transfer to Mains Button	This output is active whilst the Simulate Transfer to mains button is active	
Smoke Limiting	Becomes active when the controller requests that the engine runs at idle speed. As an output, this is 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.
SMS Remote Start Off Load	This output indicates that the SMS Remote Start off load is now enabled	
SMS Remote Start On Load	This output indicates that the SMS Remote Start on load is now enabled	
Start Button Pressed	This output indicates that the stop pushbutton is being operated. Once the button is released, the output becomes inactive	
Start Paused	This output is active when the Start Pause input is active	
Start Delay in Progress	This output source becomes active to indicate that the module's internal start delay timer is running. Once this timer expires the module with initiate its start sequence.	
Start Relay IEEE 37.2 – 54 turning gear engaging device	Active when the controller requires the cranking of the engine.	
Starting Alarm	This output is used to supply an external sounder with a signal that the engine is about to start. The output becomes active AFTER the start delay time, during the pre heat delay (if used) and continues until the set starts.	
Starting Alarms Armed	This output indicates that the starting alarms are now enabled. It is used to control external logic circuitry. Starting alarms are armed as soon as the module commences starting of the engine and remain armed until the engine is at rest.	
Stop + Tick Buttons Pressed	This output indicates that both Stop pushbutton and Tick pushbutton are pressed simultaneously. Once one of the buttons is released, the output becomes inactive.	
Stop And Panel Lock	Active when the <i>Stop And Panel Lock</i> digital input is active.	
Stop Button Pressed	This output indicates that the stop pushbutton is being operated. Once the button is released, the output becomes inactive.	
System in Stop Mode	Active when the controller is in STOP mode	Inactive in any other mode.
System healthy	This output indicates that the module is in <i>Auto</i> mode and there are no alarms present.	
Stop Mode	Active when the controller is in STOP mode	Inactive in any other mode.
System healthy	This output indicates that the module is in <i>Auto</i> mode and there are no alarms present.	
System in Auto mode	This output indicates that the module is in <i>Auto</i> mode.	
System in Manual mode	This output indicates that the module is in <i>Manual</i> mode.	
System in Test mode	Active when the controller is in TEST mode	Inactive in any other mode.
Telemetry Active (Relay)	Active when the communication port is live and for a short time after transmission stops. Used as a relay or LED source.	
Telemetry Data Active (LED)	Active when data is being transmitted. This output changes continuously state (flash) upon data transfer. Normally used as an LED source rather than a relay source as this source flashes repeatedly. For a similar source more suited to drive a relay, see <i>Telemetry Active</i> .	
Test Mode Button Pressed	Active when the Test mode Button pressed	
Tick Button Pressed	Active when the Tick Button pressed	

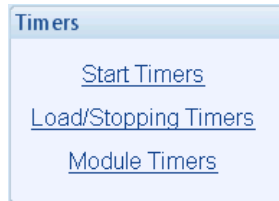
Edit Configuration - Outputs

Output source	Activates...	Is not active....
Transfer To Generator Button Pressed	Active when the Transfer To Generator Button pressed.	
Transfer To Mains Button Pressed	Active when the Transfer To Mains Button pressed.	
Under Frequency Warning <i>IEEE 37.2 - 81 frequency relay</i>	Active when the generator frequency falls below the <i>Low Frequency Warning</i>	Inactive when The set is stopped During starting sequence before the safety delay time has expired.
Under Frequency Shutdown <i>IEEE 37.2 - 81 frequency relay</i>	Active when the generator frequency falls below the <i>Low Frequency Shutdown</i>	Inactive when The set is stopped During starting sequence before the safety delay time has expired.
Under Speed Shutdown <i>IEEE 37.2 - 14 under speed relay</i>	Active when the engine speed falls below the <i>Under speed Shutdown</i> setting	
Under Speed Warning <i>IEEE 37.2 - 14 under speed relay</i>	Active when the engine speed falls below the <i>Under speed Warning</i> setting	
Up Button Pressed	This output indicates that the Up pushbutton is being operated. Once the button is released, the output becomes inactive.	
User Defined Control 1-3 active	Indicates that the specified User Defined Control (Control Logic) is active	
Voltage Lower Relay	On systems where internal relays are used to control the AVR, this input is used to increase the volts.	
Voltage Raise Relay	On systems where internal relays are used to control the AVR, this input is used to decrease the volts.	
Waiting for generator	This output indicates that the engine has been instructed to start but has not yet become available. Once the generator becomes available this output becomes in-active. (Available = Generator Frequency and Voltage levels are above the ' <i>Loading</i> ' levels set in the configuration)	
Waiting for Manual Restore <i>IEEE 37.2 – 3 Checking or Interlocking relay</i>	Becomes active when the generator is on load and the mains supply is healthy but an input configured to Manual Restore is active. This is used to signal to an operator that action is required before the set transfers back to the mains supply.	

4.6 TIMERS

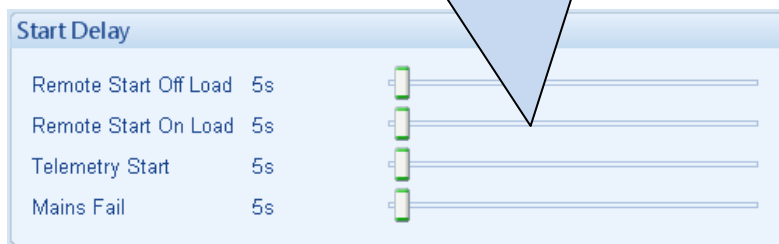
Many timers are associated with alarms. Where this occurs, the timer for the alarm is located on the same page as the alarm setting. Timers not associated with an alarm are located on the timers page.

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

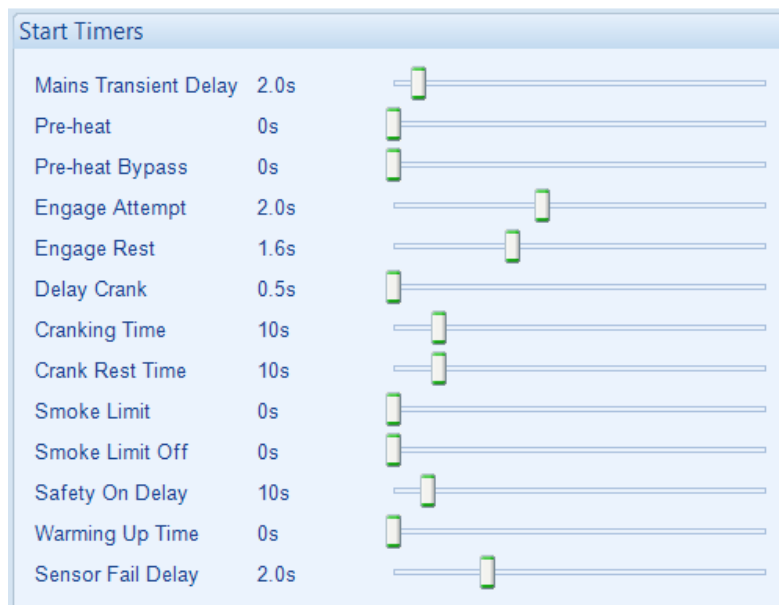


Click and drag to change the setting. Timers increment in steps of 1 second up to one minute, then in steps of 30 seconds up to 30 minutes, then in steps of 30 minutes thereafter (where allowed by the limits of the timer).

4.6.1 START TIMERS



Timer	Description
Remote Start Off Load	Used to give a delay before starting in AUTO mode. This timer is activated upon the respective start command being issued.
Remote Start On Load	
Mains fail	Typically this timer is applied to prevent starting upon fleeting remote start signals or short term mains failures.
Telemetry Start	



Parameters detailed overleaf...

Edit Configuration - Timers

Timer	Description
Pre-heat	Give a 'pre start' time during which the <i>Preheat</i> output and <i>Starting alarm</i> becomes active (if configured)
Pre-heat bypass	Should the set be stopped, the <i>Pre-heat</i> bypass timer begins. Should the set be called to start again, before the timer expires, the pre-heat sequence is bypassed as heating is not required since the set is still warm after the last run.
Cranking time	The length of each crank attempt
Crank rest time	The time between multiple crank attempts.
Engage Attempt time	(Only available if using Magnetic pick-up and multiple engage attempts) This timer dictates the duration that the module attempts to engage the starter motor during each engage attempt. If the Magnetic Pick-up is not detecting movement of the flywheel when this timer expires, the engage attempt terminates. Once all engage attempts have been made, the next start attempt begins.
Engage Rest Time	(Only available if using Magnetic pick-up and multiple engage attempts) This timer dictates the duration that the module waits between attempts to engage to starter.
Delay Crank	This is the difference in time when the fuel relay energises and the crank relay energises.
Smoke limit	The amount of time that the engine is requested to run at <i>idle</i> speed upon starting. This is typically used to limit emissions at start up.
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>under speed</i> failure. If the time is too long, <i>under speed</i> protection is disabled until the <i>Smoke limit time off</i> time has expired.
Safety on delay	The amount of time at start up that the controller ignores 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 runs BEFORE being allowed to take load. This is used to warm the engine to prevent excessive wear.
Sensor fail delay	(Only available if using Magnetic pick-up) This is only used if magnetic pick speed sensing is selected. Once cranking has commenced the module must receive a speed signal within this time. If no signal is present, the engine stops and a Loss of Speed Sensing alarm given.

4.6.2 LOAD / STOPPING TIMERS

Load/Stopping Timers

Load Timers

Transfer Time / Load Delay	0.7s
Breaker Close Pulse	0.5s
Breaker Trip Pulse	0.5s

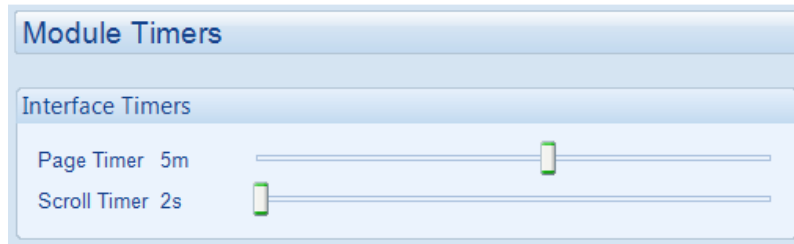
Stopping Timers

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 1 second up to one minute, then in steps of 30 seconds up to 30 minutes, then in steps of 30 minutes thereafter (where allowed by the limits of the timer).

Timer	Description
Transfer time/ Load Delay	This timer has two functions 1: The time between the mains load switch being opened and the generator load switch being closed (and vice versa). 2: The time between the Load Shed Control outputs (if configured) being energised and the generator being placed on load (at start up).
Breaker close pulse	The amount of time that <i>Breaker Close Pulse</i> signals is present when the request to close a breaker is given.
Breaker Trip pulse	The amount of time that <i>Breaker Open Pulse</i> signals is 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 is 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 is 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.

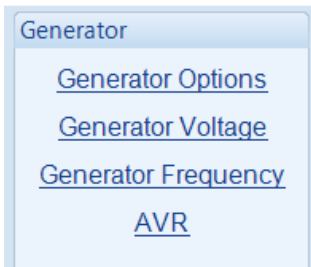
4.6.3 MODULE TIMERS



Timer	Description
LCD Page timer	If the module is left unattended for the duration of the <i>LCD Page Timer</i> it reverts to show the <i>Status</i> page.
LCD Scroll Timer	The scroll time between parameters on a selected page

4.7 GENERATOR

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



4.7.1 GENERATOR OPTIONS

The screenshot shows the 'Generator Options' configuration page with several sections and callouts:

- Generator Options Section:**
 - Alternator Fitted:** A checked checkbox. Callout: "Click to enable or disable the alarms. The relevant values below appear *greyed out* if the alarm is disabled."
 - Poles:** A dropdown menu set to '4'.
 - AC System:** A dropdown menu set to '3 Phase, 4 Wire'. Callout: "Select your AC system. A schematic is shown below with connection details from the alternator to the module."
 - Schematic:** A diagram showing a 3-phase, 4-wire system with phases L1 (R), L2 (S), and L3 (T), and a neutral line N. Terminals 43, 44, 45, and 46 are connected to the phases.
 - VT fitted:** A checked checkbox. Callout: "Click to enable or disable the feature. The relevant values below appear *greyed out* if the alarm is disabled."
 - Primary:** A numeric input field set to '111'.
 - Secondary vPhPh:** A numeric input field set to '110'.
- Generator Phase Rotation Section:**
 - Enable:** A checked checkbox.
 - Phase Rotation:** A dropdown menu set to 'L1-L2-L3'. Callout: "If there is no input configured to *Generator Closed Auxiliary* this option is *greyed out*".
- Breaker Control Section:**
 - Enable Breaker Alarms:** A checked checkbox.
 - Fail to Open Delay:** A numeric input field set to '1.0s' with a slider.
 - Fail to Close Delay:** A numeric input field set to '1.0s' with a slider.
- Run on Low Battery Section:**
 - Run Generator on Low Plant Battery:** A checked checkbox.

These parameters are described overleaf...

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.
Poles	The number of poles on the alternator
VT Fitted	<input type="checkbox"/> = The voltage sensing to the controller is direct from the alternator <input checked="" type="checkbox"/> = The voltage sensing to the controller is via Voltage Transformers (VTs or PTs) This is used to step down the generated voltage to be within the controller voltage specification. By entering the <i>Primary</i> and <i>Secondary</i> voltages of the transformer, the controller displays the <i>Primary</i> voltage rather than the actual measured voltage. This is typically used to interface the DSE module to high voltage systems (ie 11kV) also used on systems such as 600V ph-ph.

4.7.1.1 GENERATOR PHASE ROTATION

Parameter	Description
Generator Phase Rotation IEEE 37.2 – 47 phase sequence relay	<input type="checkbox"/> = Generator phase rotation is not checked. <input checked="" type="checkbox"/> = An electrical trip alarm is generated if the phase rotation is not as configured.

4.7.1.2 GENERATOR BREAKER CONTROL

Parameter	Description
Generator Breaker Alarm	<input type="checkbox"/> = Generator fail to open/fail to close alarm is disabled <input checked="" type="checkbox"/> = If the generator breaker does not open/close, within the time alarm an alarm is raised.

4.7.1.3 RUN ON LOW PLANT BATTERY

Parameter	Description
Run on Low Plant Battery	<input type="checkbox"/> = Generator does not start on low Plant battery Voltage <input checked="" type="checkbox"/> = Generator does start on low Plant battery Voltage

4.7.2 GENERATOR VOLTAGE ALARMS

The screenshot shows the 'Generator Voltage Alarms' configuration page, divided into four sections: Under Voltage Alarms, Loading Voltage, Nominal Voltage, and Over Voltage Alarms. Each section contains various settings, checkboxes, and sliders. Callouts provide instructions on how to interact with these elements:

- Under Voltage Alarms:**
 - Alarm:** A checkbox is checked. A callout states: "Click to enable or disable the alarms. The relevant values below appear *greyed out* if the alarm is disabled."
 - Action:** A dropdown menu is set to 'Shutdown'. A callout states: "Select the type of alarm required. For details of these, see the section entitled *Alarm Types* elsewhere in this document."
 - Trip:** A value of 152 V PhPh is shown. A callout points to the input field: "Type the value or click the up and down arrows to change the settings".
 - Pre-alarm:** A checkbox is checked. A callout points to the 'Enable Alarm' checkbox in the Loading Voltage section: "Click to enable alarm upon failure to reach loading voltage."
- Loading Voltage:**
 - Enable Alarm:** A checkbox is checked.
 - Action:** A dropdown menu is set to 'Electrical Trip'. A callout points to the slider: "Click and drag to change the setting."
- Nominal Voltage:** A value of 190 V PhPh is shown.
- Over Voltage Alarms:**
 - Pre-alarm:** A checkbox is checked.
 - Return:** A value of 209 V PhPh is shown.
 - Trip:** A value of 219 V PhPh is shown.
 - Alarm:** A value of 228 V PhPh is shown.

4.7.2.1 UNDER VOLTAGE ALARMS

Parameter	Description
Generator Under Voltage Alarm IEEE 37.2 - 27AC Undervoltage Relay	<input type="checkbox"/> = Generator Under Volts does NOT give an alarm <input checked="" type="checkbox"/> = Generator Under Volts gives an alarm in the event of the generator output falling below the configured <i>Under Volts Alarm Trip</i> value for longer than the <i>Activation Delay</i> . The <i>Undervolts Alarm Trip</i> value is adjustable to suit user requirements.
Action	Select the type of alarm required from the list: <i>Shutdown</i> <i>Electrical Trip</i> For details of these, see the section entitled <i>Alarm Types</i> elsewhere in this document.
Generator Under Voltage Pre-Alarm IEEE 37.2 - 27AC Undervoltage Relay	<input type="checkbox"/> = Generator Under Volts does NOT give a warning alarm <input checked="" type="checkbox"/> = Generator Under Volts gives a warning alarm in the event of the generator output falling below the configured <i>Under Volts Pre-Alarm Trip</i> value for longer than the <i>Activation Delay</i> . The <i>Undervolts Pre-Alarm Trip</i> value is adjustable to suit user requirements.

4.7.2.2 LOADING VOLTAGE

Parameter	Description
Loading Voltage	This is the minimum voltage the generator must be operating at before the module considers it available to take the load. It is also the voltage above the under voltage trip that the generator output must return to before the module considers that the supply is back within limits. (i.e. With an undervolts trip of 184.0V and a loading voltage of 207.0V, the output voltage must return to 207.0V following an under voltage event to be considered within limits.)
Enable Alarm	<input type="checkbox"/> = Alarm is disabled. <input checked="" type="checkbox"/> = Upon starting and after the <i>Safety On Delay Timer</i> expires, if the generator output voltage fails to reach the <i>Loading Voltage</i> setpoint, the <i>Loading Voltage Not Reached</i> alarm is activated.

4.7.2.3 NOMINAL VOLTAGE

Parameter	Description
Nominal Voltage	This is used to calculate the percentages of the alarm setpoints.

4.7.2.4 OVER VOLTAGE ALARMS

Parameter	Description
Generator Over Voltage Pre-Alarm IEEE 37.2 – 59 AC Overvoltage Relay	<input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = Generator Over Volts gives a warning alarm in the event of the generator output voltage rising above the configured <i>Over Volts Pre-Alarm Trip</i> value for longer than the <i>Activation Delay</i> . The <i>Warning</i> is automatically reset when the generator output voltage falls below the configured <i>Return</i> level. The <i>Over Volts Pre-Alarm Trip</i> value is adjustable to suit user requirements.
Generator Over Voltage IEEE 37.2 – 59 AC Overvoltage Relay	<input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = Generator Over Volts gives a <i>Shutdown</i> alarm in the event of the generator output rising above the configured <i>Over Volts Alarm Trip</i> value for longer than the <i>Activation Delay</i> . The <i>Overvolts Alarm Trip</i> value is adjustable to suit user requirements.

4.7.3 GENERATOR FREQUENCY ALARMS

The screenshot shows the 'Generator Frequency Alarms' configuration window, divided into four sections: Under Frequency Alarms, Loading Frequency, Nominal Frequency, and Over Frequency Alarms. Callouts provide the following instructions:

- Under Frequency Alarms:**
 - Alarm:** A checkbox is checked. Callout: "Click to enable or disable the alarms. The relevant values below appear *greyed out* if the alarm is disabled."
 - Action:** A dropdown menu is set to 'Shutdown'.
 - Trip:** A slider is set to 40.0 Hz. Callout: "Click and drag to change the setting."
 - Pre-alarm:** A checkbox is checked.
 - Trip:** A slider is set to 42.0 Hz.
- Loading Frequency:**
 - Loading Frequency:** A slider is set to 45.0 Hz.
 - Enable Alarm:** A checkbox is checked. Callout: "Click to enable alarm upon failure to reach loading frequency"
 - Action:** A dropdown menu is set to 'Electrical Trip'.
- Nominal Frequency:** A slider is set to 50.0 Hz.
- Over Frequency Alarms:**
 - Pre-alarm:** A checkbox is checked.
 - Return:** A slider is set to 54.0 Hz.
 - Trip:** A slider is set to 55.0 Hz.
 - Alarm:** A checkbox is checked.
 - Trip:** A slider is set to 57.0 Hz.

Additional callouts include: "Type the value or click the up and down arrows to change the settings" pointing to the trip value input fields, and a cloud-shaped callout: "Over frequency Shutdown can only be disabled if another method of speed protection is available (i.e. CAN or Magnetic Pickup). Hence the checkbox is *greyed out*".

4.7.3.1 UNDER FREQUENCY ALARMS

Parameter	Description
Generator Under Frequency Alarm IEEE 37.2 -81 Frequency Relay	<input type="checkbox"/> = Generator Under Frequency does NOT give an alarm <input checked="" type="checkbox"/> = Generator Under Frequency gives an alarm in the event of the generator output frequency falling below the configured <i>Under Frequency Alarm Trip</i> value for longer than the <i>Activation Delay</i> . The <i>Underfrequency Alarm Trip</i> value is adjustable to suit user requirements.
Action	Select the type of alarm required from the list: <i>Shutdown</i> <i>Electrical Trip</i> For details of these, see the section entitled <i>Alarm Types</i> elsewhere in this document.
Generator Under Frequency Pre-Alarm IEEE 37.2 -81 Frequency Relay	<input type="checkbox"/> = Generator Under Frequency does NOT give a warning alarm <input checked="" type="checkbox"/> = Generator Under Frequency gives a warning alarm in the event of the generator output frequency falling below the configured <i>Under Frequency Pre-Alarm Trip</i> value for longer than the <i>Activation Delay</i> . The <i>Under Frequency Pre-Alarm Trip</i> value is adjustable to suit user requirements.

4.7.3.2 LOADING FREQUENCY

Parameter	Description
Loading Frequency	This is the minimum frequency the generator must be operating at, before the module considers it available to take the load. It is also the frequency above the under frequency trip that the generator output must return to before the module considers that the supply is back within limits. (i.e. With an underfrequency trip of 42.0 Hz and a loading frequency of 45.0 Hz, the output frequency must return to 45.0 Hz following an under frequency event to be considered within limits.)
Enable Alarm	<input type="checkbox"/> = Alarm is disabled. <input checked="" type="checkbox"/> = Upon starting and after the <i>Safety On Delay Timer</i> expires, if the generator output frequency fails to reach the <i>Loading Frequency</i> setpoint, the <i>Loading frequency Not Reached</i> alarm is activated.

4.7.3.3 NOMINAL FREQUENCY

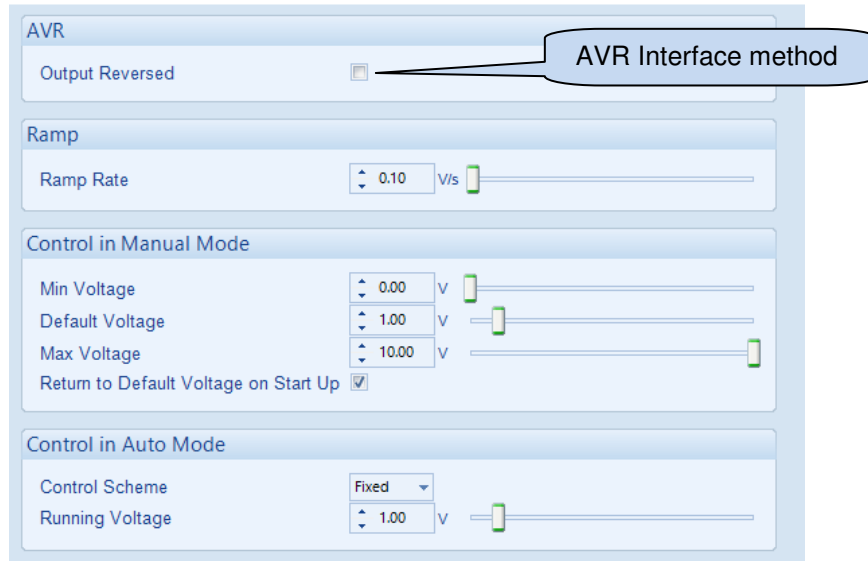
Parameter	Description
Nominal Frequency	This is used to calculate the percentages of the alarm setpoints.

4.7.3.4 OVER FREQUENCY ALARMS

Parameter	Description
Generator Over Frequency Pre-Alarm IEEE 37.2 -81 Frequency Relay	<input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = Generator Over Frequency gives a warning alarm in the event of the generator output frequency rising above the configured <i>Over frequency Pre-Alarm Trip</i> value for longer than the <i>Activation Delay</i> . The <i>Warning</i> is automatically reset when the generator output frequency falls below the configured <i>Return</i> level. The <i>Over Frequency Pre-Alarm Trip</i> value is adjustable to suit user requirements.
Generator Over Frequency IEEE 37.2 -81 Frequency Relay	<input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = Generator Over Frequency gives a <i>Shutdown</i> alarm in the event of the generator output rising above the configured <i>Over Frequency Alarm Trip</i> value for longer than the <i>Activation Delay</i> . The <i>Over Frequency Alarm Trip</i> value is adjustable to suit user requirements.

4.7.4 AVR

These settings configure the method of interface between the DSE7450 controller and the Automatic Voltage Regulator (AVR)



Parameter	Description
AVR Output Reversed	Defines the voltage range of the <i>AVR Analogue Output</i> : <input type="checkbox"/> = 0 V to 10 V <input checked="" type="checkbox"/> = -10 V to 0V
Ramp Rate	The rate at which the DSE AVR analogue output changes to drive the AVR.

Control in Manual Mode

The default voltage control range is 0 – 10 volts, *Control in Manual Mode* configuration allows the user to limit the SW1 range if required by setting the minimum voltage and maximum voltage levels of the AVR analogue output voltage.

Parameter	Description
Min Voltage	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>NOTE: This limits the AVR analogue output voltage in both <i>Manual</i> control scheme, <i>Fixed</i> control scheme.</p> </div> <p>The lowest voltage level SW1 provides, decreasing SW1 below this level does not allow the SW1 or AVR analogue output to drop any further.</p>
Default Voltage	This defines the AVR analogue voltage output at startup in Manual mode and in Auto mode when <i>Manual</i> control scheme is selected.
Max Voltage	The highest voltage level SW1 reaches, increasing SW1 above this level does not allow the SW1 or AVR analogue output to increase any further.
Return to Default Voltage on Start Up	<input type="checkbox"/> = At startup, the AVR analogue voltage output is defined by the SW1 setting. <input checked="" type="checkbox"/> = At startup, SW1 and the AVR analogue voltage output reverts to the <i>Default Voltage</i> setting.

Control in Auto Mode

Parameter	Description
Control Scheme	This defines the voltage control scheme when running in Auto mode: Fixed – The AVR analogue voltage output is constantly held at the <i>Running Voltage</i> level. Manual – The module behaves the same as in Manual Mode
Running Voltage	The AVR analogue output voltage that is provided when the <i>Control Scheme</i> is configured to <i>Fixed</i> .

4.8 MAINS

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

Mains

- [Mains Options](#)
- [Mains Voltage Alarms](#)
- [Mains Frequency Alarms](#)

4.8.1 MAINS OPTIONS

Mains Options

Mains Options

Mains Failure Detection

Immediate Mains Dropout

AC System 3 Phase, 4 Wire

VT fitted

Primary 111 110 Secondary vPhPh

Mains Phase Rotation

Enable

Phase Rotation L1-L2-L3

Breaker Control

Enable Breaker Alarms

Fail to Open Delay 1.0s

Fail to Close Delay 1.0s

Phase Offset

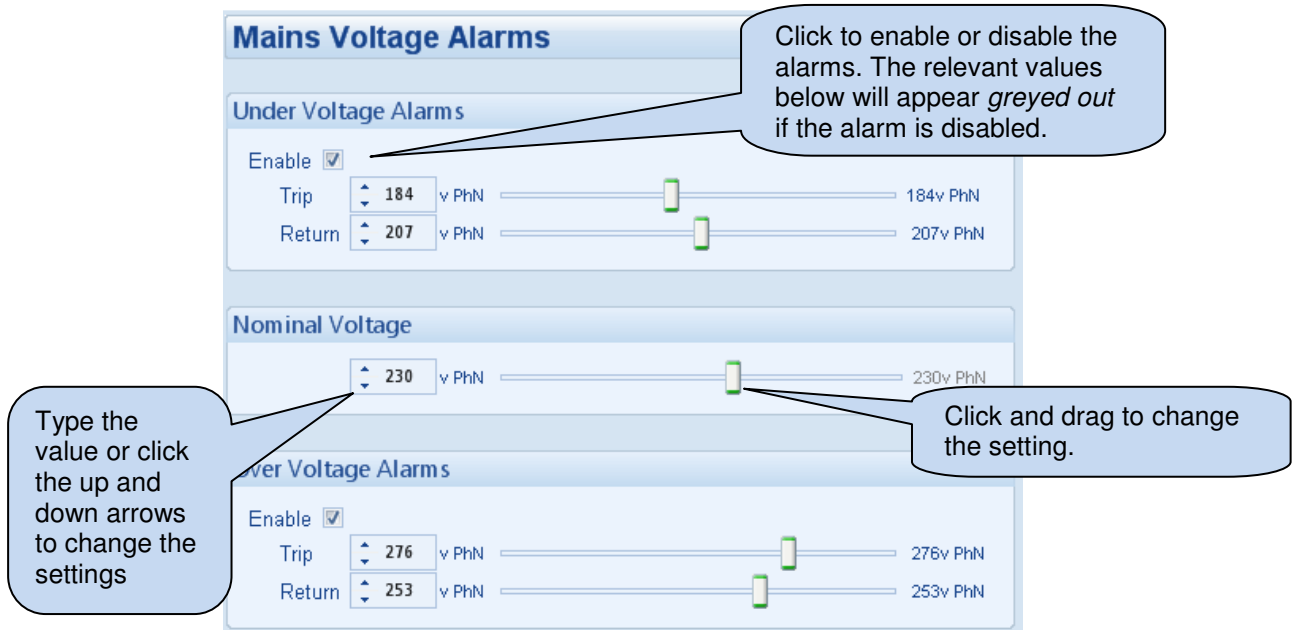
Allow Editing

Phase Offset 0

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

Parameter	Description
AC System	<p>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</p> <p>This list is not exhaustive. DSE reserve the right to add to this list as part of our policy of continual development</p>
Mains Phase Rotation IEEE 37.2 – 47 phase sequence relay	<p><input type="checkbox"/> = Mains phase rotation is not checked. <input checked="" type="checkbox"/> = A 'mains failure' situation is generated if the phase rotation is not as configured.</p>
Breaker Control	Timer before the fail to close alarm is activated
VT Fitted	<p><input type="checkbox"/> = The voltage sensing to the controller is direct from the mains <input checked="" type="checkbox"/> = The voltage sensing to the controller is via Voltage Transformers (VTs or PTs)</p> <p>This is used to step down the supplied voltage to be within the modules controller voltage specification. By entering the Primary and Secondary voltages of the transformer, the controller displays the Primary voltage rather than the actual measured voltage.</p> <p>This is typically used to interface the DSE module to high voltage systems (ie 11kV) also used on systems such as 600V ph-ph.</p>
Phase Offset	When using VTs this allows to set a phase offset to the mains.

4.8.2 MAINS VOLTAGE ALARMS



Mains Voltage Alarms

Under Voltage Alarms

Enable

Trip v PhN

Return v PhN

Nominal Voltage



v PhN

Over Voltage Alarms

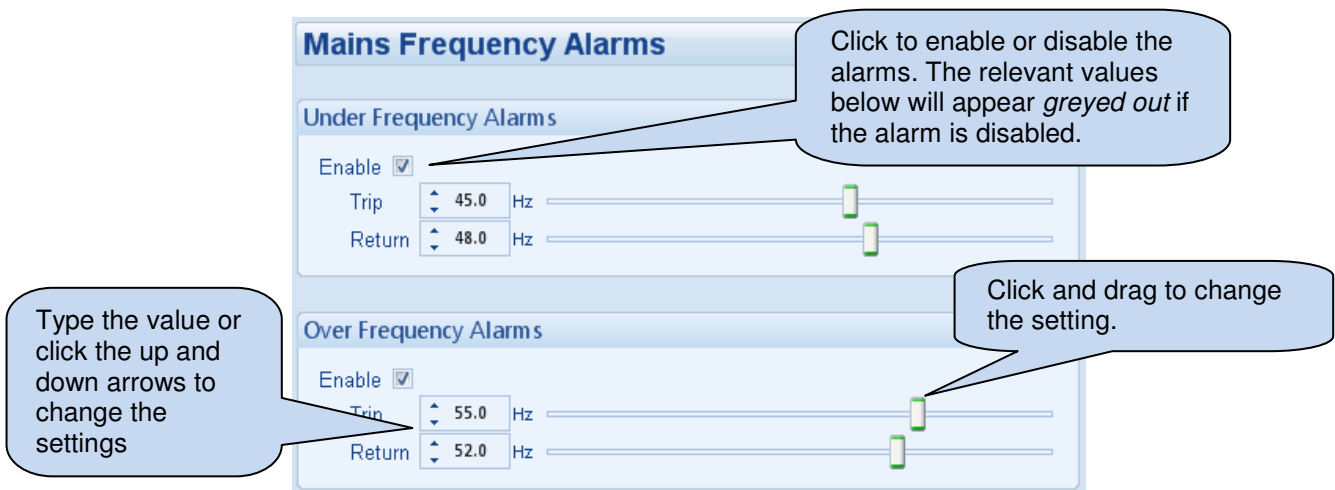
Enable

Trip v PhN

Return v PhN

Alarm	IEEE designation
Mains Under Voltage IEEE 37.2 – 27 AC Undervoltage Relay 	<input type="checkbox"/> = Mains Under Voltage detection is disabled <input checked="" type="checkbox"/> = Mains Under Voltage gives an alarm in the event of the mains voltage falling below the configured <i>Under Voltage Trip</i> value. The <i>Under Voltage Trip</i> value is adjustable to suit the application. The alarm is reset and the mains is considered within limits when the mains voltage rises above the configured <i>Under Voltage Return</i> level.
Mains Over Voltage IEEE 37.2 – 59 AC Overvoltage Relay 	<input type="checkbox"/> = Mains Over Voltage detection is disabled <input checked="" type="checkbox"/> = Mains Over Voltage gives an alarm in the event of the mains voltage rising above the configured <i>Over Voltage Trip</i> value. The <i>Over Voltage Trip</i> value is adjustable to suit the application. The alarm is reset and the mains is considered within limits when the mains voltage falls below the configured <i>Over Voltage Return</i> level.

4.8.3 MAINS FREQUENCY ALARMS



Mains Frequency Alarms

Under Frequency Alarms

Enable

Trip Hz

Return Hz



Over Frequency Alarms

Enable

Trip Hz

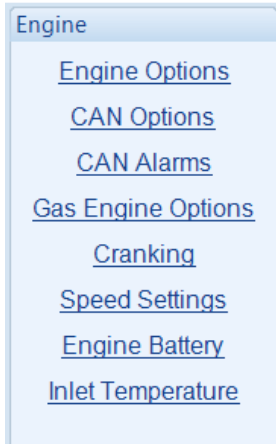
Return Hz

Parameters described overleaf...

Alarm	IEEE designation
Mains Under Frequency IEEE 37.2 – 81 Frequency Relay 	<input type="checkbox"/> = Mains Under Frequency detection is disabled <input checked="" type="checkbox"/> = Mains Under Frequency gives an alarm in the event of the mains frequency falling below the configured <i>Under Frequency Trip</i> value. The <i>Under Frequency Trip</i> value is adjustable to suit the application. The alarm is reset and the mains is considered within limits when the mains frequency rises above the configured <i>Under Frequency Return</i> level.
Mains Over Frequency IEEE 37.2 – 81 Frequency Relay 	<input type="checkbox"/> = Mains Over Frequency detection is disabled <input checked="" type="checkbox"/> = Mains Over Frequency gives an alarm in the event of the mains frequency rising above the configured <i>Over Frequency Trip</i> value. The <i>Over Frequency Trip</i> value is adjustable to suit the application. The alarm is reset and the mains is considered within limits when the mains frequency falls below the configured <i>Over Frequency Return</i> level.

4.9 ENGINE

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



4.9.1 ENGINE OPTIONS

Engine Options

ECU (ECM) Options

- Engine Type: Conventional Engine
- Enhanced J1939:
- Alternative Engine Speed:
- Modbus Engine Comms Port: RS485 Port
- Disable ECM Speed Control:

Sensing Options

- Disable ECM Speed Sensing:
- Magnetic Pickup Fitted:
- Flywheel Teeth: 190

Startup Options

- Enable Multiple Engage Attempts:
- Engage Attempts: 2
- Start Attempts: 3
- Loss of Sensing Signal: Shutdown
- Disable under speed alarms if sensor fails:
- Magnetic pickup open circuit: Shutdown

Overspeed Options

- Overspeed Overshoot %: 0
- Overshoot Delay: 0s

Droop

- Enable:
- Value: 4.0 %

Callout Boxes:

- ECU (ECM) Options:** This item is not adjustable here, it's read only. To change this item, visit the *Module | Application* menu.
- Sensing Options:** Click to enable or disable the option. The relevant values below will appear *greyed out* if the sensor is disabled.
- Overspeed Options:** Overspeed setting is temporarily raised by the *Overspeed Overshoot* amount during the *Overshoot timer* at start up
- Droop:** Enables Engine Droop on supported electronic (ECU) engines

Parameters detailed overleaf...

4.9.1.1 SENSING OPTIONS

Parameter	Description
Disable ECM Speed Sensing	<input type="checkbox"/> = An ECM is fitted to the DSE module and being used for speed sensing. <input checked="" type="checkbox"/> = An ECM is fitted to the DSE module but another form of speed sensing fitted to the DSE module is being used.
Magnetic pickup fitted	<input type="checkbox"/> = Magnetic pickup device is not fitted to the DSE module. <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 the Operators manual
Flywheel teeth	The number of teeth on the engine flywheel. This is read by the magnetic pickup device.

4.9.1.2 STARTUP OPTIONS

Parameter	Description
Enable Multiple Engage Attempts	<input type="checkbox"/> = Only one engage attempt per start attempt is given. If no magnetic pickup pulses are detected during cranking, the <i>Loss of Sensing</i> alarm is given. <input checked="" type="checkbox"/> = If no magnetic pickup pulses are detected during cranking, it is assumed that the starter has not engaged to turn the engine. The starter is withdrawn and re-energised for the configured number of <i>Engage Attempts</i>
Start Attempts	<p>The number of starting attempts the module makes.</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>
Disable under speed alarms if sensor fails	<input type="checkbox"/> = Under speed alarms activate even if speed sensor has failed. <input checked="" type="checkbox"/> = Under speed alarms are disabled when the speed sensor fails.
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>

4.9.1.3 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	This allows the engine speed to 'overshoot' the Overspeed / Over frequency setting during the starting process for a short time. 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.

4.9.1.4 DROOP

▲ NOTE: Droop options are available only where supported by the Engine ECU over the CAN or Modbus datalink. Contact engine manufacturer for further details.

Parameter	Description
Enable	<input type="checkbox"/> = Engine droop is not enabled.
Droop %	<input checked="" type="checkbox"/> = Where supported by the electronic engine ECU, the module enables droop in the engine ECU governor at the %age configured.

4.9.1.5 CAN OPTIONS

The screenshot shows the 'CAN Options' configuration page. It is divided into four sections: 'Engine Hours', 'DPF Regeneration Control', 'Speed Switch', and 'ECU Wakeup'.
- **Engine Hours:** 'Module to Record Engine Hours' checkbox is checked.
- **DPF Regeneration Control:** 'Enable' dropdown is set to 'Automatic'.
- **Speed Switch:** 'Enable' dropdown is set to 'Default Dataset ECU'.
- **ECU Wakeup:** 'Enable' checkbox is checked, 'Periodic Wakeup Time' is set to '1h', and 'Coolant Measurement Persistence' checkbox is unchecked.
Two callout boxes provide additional information:
1. A callout pointing to the 'Module to Record Engine Hours' checkbox: "When enabled, DSE module counts Engine Run Hours. When disabled, Engine ECU provides Run Hours."
2. A callout pointing to the 'Enable' checkbox in the 'ECU Wakeup' section: "When enabled, DSE module periodically 'powers up' the engine ECU when the engine is stopped. This can be utilised to provide coolant temperature measurement when the engine is stopped."

4.9.2 CAN ALARMS

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

The screenshot shows the 'CAN Alarms' menu with three sub-sections: [CAN Data Fail](#), [DM1 Signals](#), and [Advanced](#).

4.9.2.1 CAN DATA FAIL

The screenshot shows the 'CAN Data Fail' configuration page. It is divided into two sections: 'CAN Data Fail' and 'CAN ECU Data Fail'.
- **CAN ECU Data Fail:** 'Action' dropdown is set to 'Shutdown', 'Arming' dropdown is set to 'From Safety On', and 'Activation Delay' is set to '0s'.
A callout box provides additional information: "Configuration of the CAN data fail alarm, providing protection against the failure of the engine ECU data link."

4.9.2.2 DM1 SIGNALS

DM1 signals are messages from the CAN ECU. The following parameters allows configuration of how the DSE module responds to these messages.

The screenshot displays the 'DM1 Signals' configuration window, which is organized into four distinct sections, each with a light blue header. Each section contains three configuration items: 'Action' (a dropdown menu), 'Arming' (a dropdown menu), and 'Activation Delay 0s' (a horizontal slider control with a green indicator).
- **ECU Amber:** Action is set to 'Warning', Arming is set to 'Always', and the Activation Delay slider is at 0s.
- **ECU Red:** Action is set to 'Shutdown', Arming is set to 'Always', and the Activation Delay slider is at 0s.
- **ECU Malfunction:** Action is set to 'Warning', Arming is set to 'Always', and the Activation Delay slider is at 0s.
- **ECU Protect:** Action is set to 'Warning', Arming is set to 'From Safety On', and the Activation Delay slider is at 0s.

4.9.2.3 ADVANCED

Allows configuration of selected additional CAN messages from the engine ECU.

The screenshot displays the 'Other Specific Signals' configuration window, which is organized into two distinct sections, each with a light blue header. Each section contains three configuration items: 'Action' (a dropdown menu), 'Arming' (a dropdown menu), and 'Activation Delay 0s' (a horizontal slider control with a green indicator).
- **Water In Fuel:** Action is set to 'Warning', Arming is set to 'Always', and the Activation Delay slider is at 0s.
- **After Treatment:** Action is set to 'Warning', Arming is set to 'Always', and the Activation Delay slider is at 0s.

4.9.4 GAS ENGINE OPTIONS

Gas Engine Options		
Gas Engine Timers		
Choke Timer	2s	
Gas On Delay	2s	
Ignition Off Delay	2s	

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.

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.

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

4.9.5 CRANKING

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 results 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.

The screenshot shows the 'Cranking' configuration window, divided into three sections: 'Options', 'Crank Disconnect', and 'Manual Crank'. The 'Options' section includes 'Crank disconnect on oil pressure' (unchecked) and 'Check oil pressure prior to starting' (checked). The 'Crank Disconnect' section lists several parameters: Generator Frequency (21.0 Hz), Engine Speed (600 RPM), Oil Pressure (1.03 Bar), Charge Alternator (unchecked), Generator Voltage (6.0 V DC), and another parameter (186 v PhN). The 'Manual Crank' section includes 'Hold Start Button To Crank' (unchecked) and 'Manual Crank Limit' (30s). Callouts provide additional context: a cloud callout explains the 'Check oil pressure prior to starting' option; a callout points to the numerical input fields, stating 'Type the value or click the up and down arrows to change the settings'; another callout points to a slider, stating 'Click and drag to change the setting.'; and a large callout at the bottom explains the 'Hold Start Button To Crank' and 'Manual Crank Limit' options.

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

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

Click and drag to change the setting.

When enabled, releasing the start button during a manual start will also disconnect the crank. Manual Crank Limit is provided to protect the engine from being cranked too long in case of a start failure.

4.9.6 SPEED SETTINGS

The screenshot shows the 'Speed Settings' configuration window, divided into 'Under Speed' and 'Over Speed' sections. Callouts provide the following instructions:

- Under Speed Alarm:** A callout points to the 'Alarm' checkbox, stating: 'Click to enable or disable the option. The relevant values below will appear *greyed out* if the alarm is disabled.'
- Under Speed Action:** A callout points to the 'Action' dropdown menu, stating: 'Select the type of alarm required. For details of these, see the section entitled *Alarm Types* elsewhere in this document.'
- Under Speed Trip:** A callout points to the 'Trip' slider, stating: 'Click and drag to change the setting.'
- Under Speed Pre-alarm:** A callout points to the 'Pre-alarm' checkbox, stating: 'Click to enable or disable the option. The relevant values below will appear *greyed out* if the alarm is disabled.'
- Over Speed Pre-alarm:** A callout points to the 'Pre-alarm' checkbox, stating: 'Click to enable or disable the option. The relevant values below will appear *greyed out* if the alarm is disabled.'
- Over Speed Trip:** A callout points to the 'Trip' slider, stating: 'Click and drag to change the setting.'
- Over Speed Alarm:** A callout points to the 'Alarm' checkbox, stating: 'Click to enable or disable the option. The relevant values below will appear *greyed out* if the alarm is disabled.'
- General:** A callout points to the numerical input fields, stating: 'Type the value or click the up and down arrows to change the settings.'
- Note:** A thought bubble indicates: 'Overspeed shutdown cannot be disabled.'

4.9.6.1 UNDER SPEED

Parameter	Description
Under Speed Alarm	<input type="checkbox"/> = Under Speed does NOT give an alarm <input checked="" type="checkbox"/> = Under Speed gives an alarm in the event of the engine speed falling below the configured <i>Under Speed Alarm Trip</i> value for longer than the <i>Activation Delay</i> . The <i>Underspeed Alarm Trip</i> value is adjustable to suit user requirements.
Action	Select the type of alarm required from the list: <i>Shutdown</i> <i>Electrical Trip</i> For details of these, see the section entitled <i>Alarm Types</i> elsewhere in this document.
Under Speed Pre-Alarm	<input type="checkbox"/> = Under Speed does NOT give a warning alarm <input checked="" type="checkbox"/> = Under Speed gives a warning alarm in the event of the engine speed falling below the configured <i>Under Speed Pre-Alarm Trip</i> value for longer than the <i>Activation Delay</i> . The <i>Under Speed Pre-Alarm Trip</i> value is adjustable to suit user requirements.

4.9.6.2 OVER SPEED

Parameter	Description
Over Speed Pre-Alarm	<input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = Over Speed gives a warning alarm in the event of the engine speed rising above the configured <i>Over Speed Pre-Alarm Trip</i> value for longer than the <i>Activation Delay</i> . The <i>Warning</i> is automatically reset when the engine speed falls below the configured <i>Return</i> level. The <i>Over Speed Pre-Alarm Trip</i> value is adjustable to suit user requirements.
Over Speed Alarm	<input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = Over Speed gives a <i>Shutdown</i> alarm in the event of the engine speed rising above the configured <i>Over Speed Alarm Trip</i> value for longer than the <i>Activation Delay</i> . The <i>Over Speed Alarm Trip</i> value is adjustable to suit user requirements.

4.9.7 ENGINE BATTERY

The screenshot shows the 'Engine Battery' configuration window. It is divided into three main sections: 'Voltage Alarms', 'Charge Alternator Alarm', and 'Pre-Alarm'.
 - **Voltage Alarms:** Contains 'Undervolts' and 'Overvolts' sections. Each has 'Pre-alarm', 'Return', and 'Delay' settings. The 'Pre-alarm' and 'Return' values are shown in input boxes and also on sliders. A callout bubble points to a slider with the text 'Click and drag to change the setting.'
 - **Charge Alternator Alarm:** Includes a checkbox for 'Use Module for Charge Alternator', an 'Alarm' checkbox, and 'Trip' and 'Delay' settings for both 'Alarm' and 'Pre-Alarm'. A callout bubble points to the 'Pre-Alarm' Trip value with the text 'Type the value or click the up and down arrows to change the settings'.

Alarm	IEEE designation
Engine Battery Undervolts IEEE 37.2 -27 DC Undervoltage Relay	The alarm activates when the battery voltage drops below the configured <i>Pre-Alarm</i> level for the configured <i>Delay</i> time. When the battery voltage rises above the configured <i>Return</i> level, the alarm is de-activated.
Engine Battery Overvolts IEEE 37.2 -59 DC Overvoltage Relay	The alarm activates when the battery voltage rises above the configured <i>Pre-Alarm</i> level for the configured <i>Delay</i> time. When the battery voltage drops below the configured <i>Return</i> level, the alarm is de-activated.
Charge Alternator Alarm	The alarm activates when the charge alternator voltage falls below the configured <i>Trip</i> level for the configured <i>Delay</i> time.
Charge Alternator Pre-Alarm	The alarm activates when the charge alternator voltage falls below the configured <i>Trip</i> level for the configured <i>Delay</i> time.

4.9.8 INLET TEMPERATURE

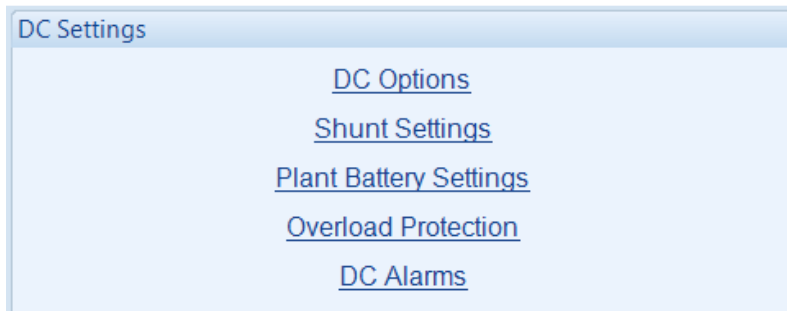
Provides inlet temperature alarms when the module is used in conjunction with electronic (ECU) engines that support the reading of inlet temperature.

If a supported ECU engine is not selected on the *Application* page of the configuration, the whole page is *greyed out* and cannot be enabled.

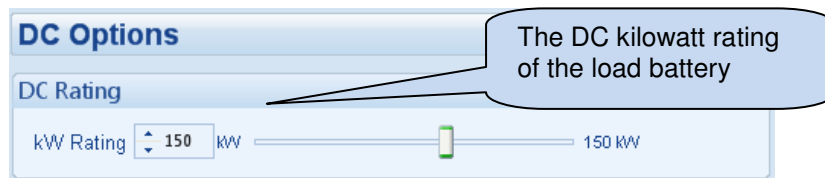
The screenshot displays the 'Inlet Temperature' configuration interface. It features a title bar 'Inlet Temperature' and a sub-section 'Inlet Temperature Alarms'. The 'Alarm' checkbox is unchecked. The 'Action' dropdown menu is set to 'Shutdown'. The 'Trip' temperature is set to 95 °C, with a corresponding slider and a maximum value of 203 °F. The 'Pre-alarm' checkbox is also unchecked. The 'Pre-alarm' section includes a 'Trip' temperature of 85 °C (with a slider and a maximum of 185 °F) and a 'Return' temperature of 80 °C (with a slider and a maximum of 176 °F).

4.10 DC SETTINGS

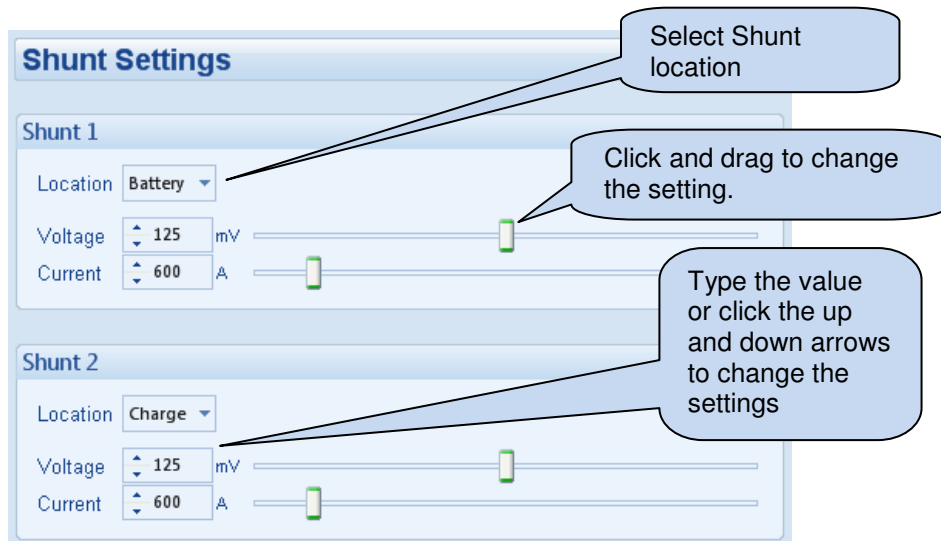
The *DC Settings* page is subdivided into smaller sections. Select the required section with the mouse.



4.10.1 DC OPTIONS



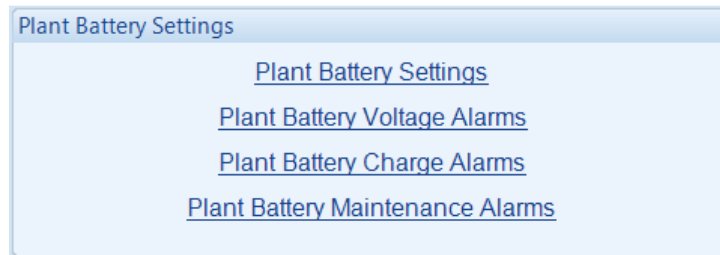
4.10.2 SHUNT SETTINGS



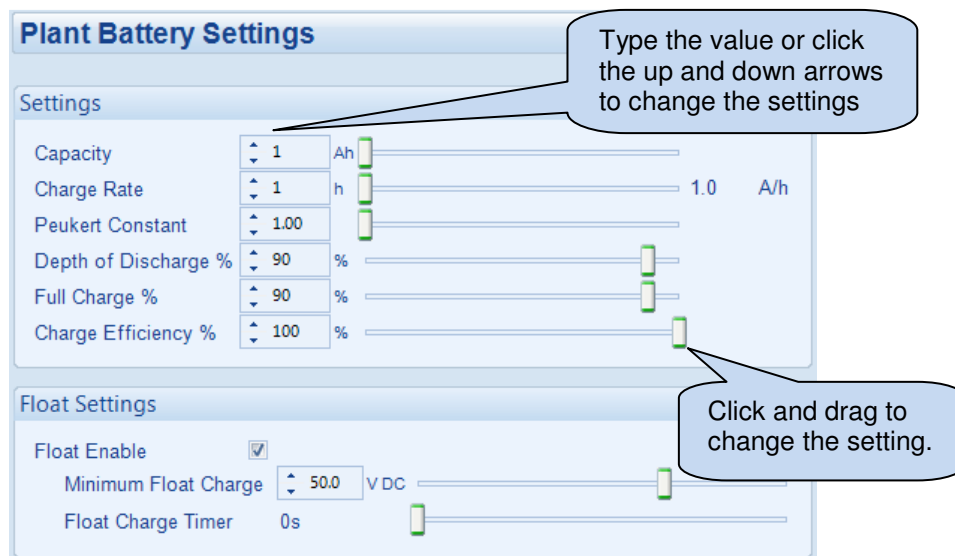
Parameter	Description
Location	Battery: The Shunt is located between the DC bus and the battery. Charge: The Shunt is located on the incoming DC bus. Load: The Shunt is located between the DC bus and the load.
Voltage	The shunt voltage rating in millivolts.
Current	The shunt current rating.

4.11 PLANT BATTERY SETTINGS

The *Plant Battery Settings* page is subdivided into smaller sections. Select the required section with the mouse.



4.11.1.1 PLANT BATTERY SETTINGS



Settings	Description
Capacity	Ampere hour rating of the battery.
Charge Rate	The rate setting for charging the Plant battery,
Peukert Constant	See Charging Scheme Information elsewhere in this manual
Depth Of Discharge%	This is the percentage the battery discharges before the battery starts to start to charge.
Full Charge %	The percentage the Plant battery charges to before float charge.
Charge Efficiency %	Charge efficiency percentage of the <i>Plant Battery</i> . This parameter is useful for some <i>Plant Battery</i> types which do not support float charging. It is used to accommodate inefficiencies during charging. The charging current applied to the Plant Battery recorded in the DSE7450, is reduced by the <i>Charge Efficiency %</i> . This applies only when charging the Plant Battery. During Plant Battery discharge, the Charge Efficiency % is NOT used, therefore the Battery Discharge % recorded by the DSE7450 is the true discharge level.
Float Enable	<input type="checkbox"/> = Float charge is disabled <input checked="" type="checkbox"/> = Float charge is enabled
Minimum Float Charge	Setting of the float Voltage charge level
Float Charge Timer	Time the float charge continues after reaching the full charge percentage of the plant battery.

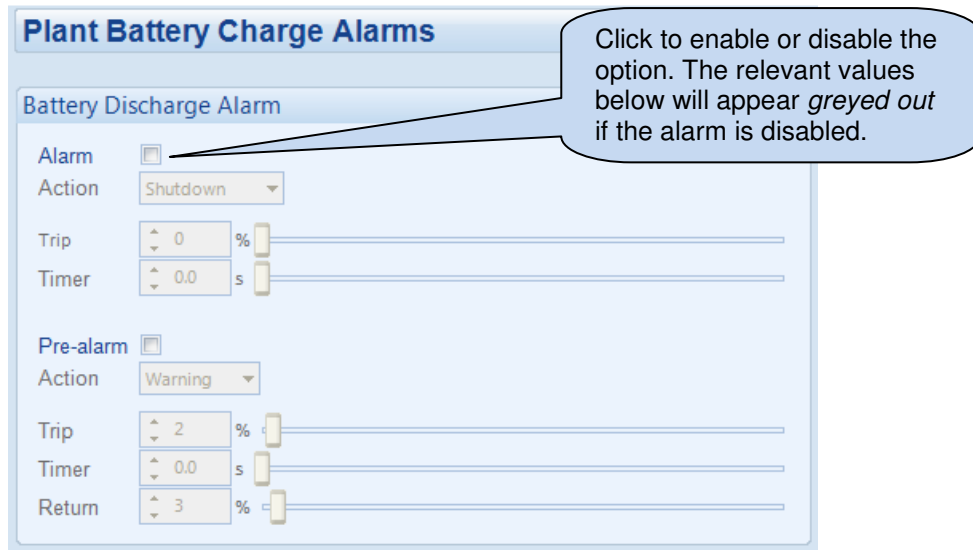
4.11.1.2 PLANT BATTERY VOLTAGE

Parameter	Description
Plant Battery Under Voltage Alarm	<input type="checkbox"/> = Plant Battery Under Volts does NOT give an alarm <input checked="" type="checkbox"/> = Plant Battery Under Volts gives an alarm in the event of the Plant Battery voltage falls below the configured <i>Under Volts Alarm Trip</i> value for longer than the configured <i>Timer</i> . The <i>DC Undervolts Alarm Trip</i> value is adjustable to suit user requirements.
Action	Select the type of alarm required from the list: Shutdown Electrical Trip For details of these, see the section entitled <i>Alarm Types</i> elsewhere in this document.
Plant Battery Under Voltage Pre-Alarm	<input type="checkbox"/> = Plant Battery Under Volts does NOT give a warning alarm <input checked="" type="checkbox"/> = Plant Battery Under Volts gives a warning alarm in the event of the Plant Battery voltage falls below the configured <i>Under Volts Pre-Alarm Trip</i> value for longer than the configured <i>Timer</i> . The <i>DC Undervolts Pre-Alarm Trip</i> value is adjustable to suit user requirements. The <i>Warning</i> is automatically reset when the Plant Battery voltage rises above the configured <i>Return</i> level.

Parameters are continued overleaf...

Parameter	Description
Plant Battery Over Voltage Pre-Alarm	<p><input type="checkbox"/> = Plant Battery Over Volts does NOT give a warning alarm</p> <p><input checked="" type="checkbox"/> = Plant Battery Over Volts gives a warning alarm in the event of the Plant Battery voltage falls below the configured <i>Over Volts Pre-Alarm Trip</i> value for longer than the configured <i>Timer</i>. The <i>DC Overvolts Pre-Alarm Trip</i> value is adjustable to suit user requirements.</p> <p>The <i>Warning</i> is automatically reset when the Plant Battery voltage falls below the configured <i>Return</i> level.</p>
Plant Battery Over Voltage Alarm	<p><input type="checkbox"/> = Plant Battery Over Volts does NOT give an alarm</p> <p><input checked="" type="checkbox"/> = Plant Battery Over Volts gives an alarm in the event of the Plant Battery voltage falls below the configured <i>Over Volts Alarm Trip</i> value for longer than the configured <i>Timer</i>. The <i>DC Overvolts Alarm Trip</i> value is adjustable to suit user requirements.</p>

4.11.1.3 PLANT BATTERY CHARGE



Options	Description
Pre alarm	<input type="checkbox"/> = Pre-alarm is disabled <input checked="" type="checkbox"/> = If the temperature exceeds the <i>trip</i> setting, an alarm is generated. The temperature must fall below the <i>return</i> setting to cease the alarm.
Electrical Trip	<input type="checkbox"/> = Electrical trip is disabled <input checked="" type="checkbox"/> = If the temperature exceeds the <i>trip</i> setting, an alarm is generated, the load switch is opened and the module enters the cooling timer after which the set is stopped.
Shutdown	If the temperature exceeds the <i>trip</i> setting, an alarm is generated, the load switch is opened and the set is immediately stopped.

4.11.1.4 PLANT BATTERY MAINTENANCE

Plant Battery Maintenance Alarms

Plant Battery Maintenance Alarm 1

Enable

Description

Action Warning

Run Time: 10 hrs

Maintenance Interval: 1 months

Cycles: 0 Cycles

Plant Battery Maintenance Alarm 2

Enable

Description

Action Warning

Run Time: 10 hrs

Maintenance Interval: 1 months

Cycles: 0 Cycles

Plant Battery Maintenance Alarm 3

Enable

Description

Action Warning

Run Time: 10 hrs

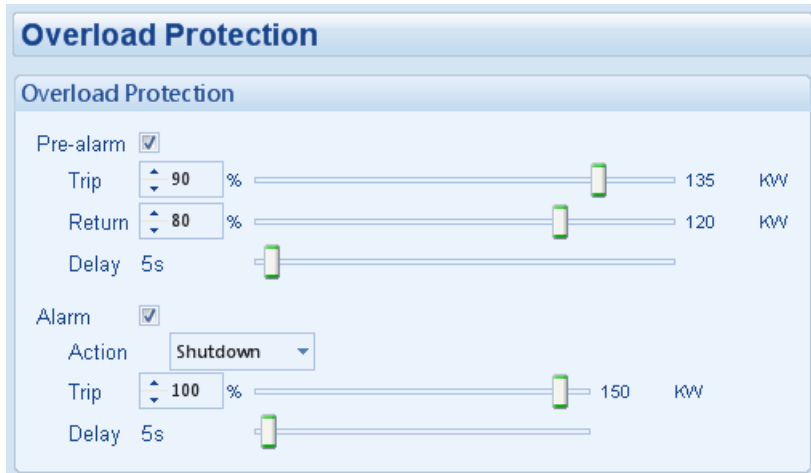
Maintenance Interval: 1 months

Cycles: 0 Cycles

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

Options	Description
Pre alarm	<input type="checkbox"/> = Pre-alarm is disabled <input checked="" type="checkbox"/> = If the temperature exceeds the <i>trip</i> setting, an alarm is generated. The temperature must fall below the <i>return</i> setting to cease the alarm.
Electrical Trip	<input type="checkbox"/> = Electrical trip is disabled <input checked="" type="checkbox"/> = If the temperature exceeds the <i>trip</i> setting, an alarm is generated, the load switch is opened and the module enters the cooling timer after which the set is stopped.
Shutdown	If the temperature exceeds the <i>trip</i> setting, an alarm is generated, the load switch is opened and the set is immediately stopped.

4.11.2 OVERLOAD PROTECTION



Parameter	Description
Overload Protection Pre-Alarm	<input type="checkbox"/> = Overload Protection warning is disabled. <input checked="" type="checkbox"/> = The <i>kW Overload Warning</i> activates when the kW level exceeds the <i>Trip</i> setting for longer than the configured <i>Delay</i> time. The <i>Warning</i> is automatically reset when the kW level falls below the configured <i>Return</i> percentage level.
Overload Protection Alarm	<input type="checkbox"/> = Overload Protection alarm is disabled. <input checked="" type="checkbox"/> = The <i>kW Overload Alarm</i> activates when the kW level exceeds the <i>Trip</i> setting for longer than the configured <i>Delay</i> time.
Action	Select the action for the <i>kW Overload Alarm</i> : Electrical Trip Shutdown

4.11.3 DC ALARMS

DC Alarms

Overcurrent Alarm

Immediate Warning

IDMT Alarm

Trip A

Time Multiplier

Action

Short Circuit

Enabled

Action

Trip A

Time Multiplier

Load Over Current

Enable

Action

Trip A

Timer s

Charge Current Limit

Enable

Current Limit A

Charge Over Current

Enable

Action

Trip A

Timer s

4.12 PLANT BATTERY CHARGING SCHEME

4.12.1 START REQUEST

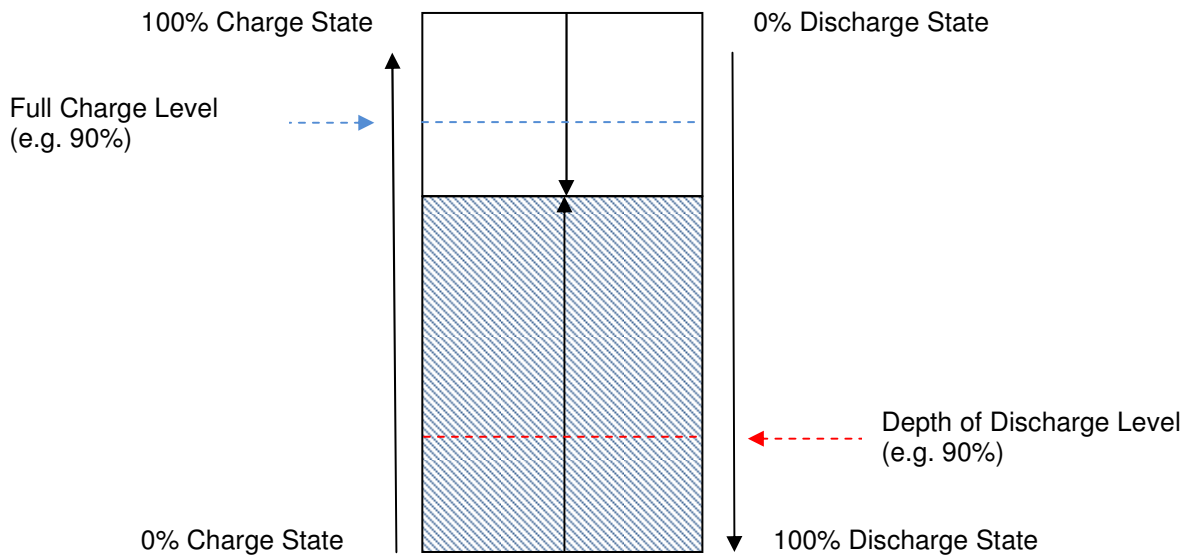
Starting requests are from the following sources:

The Plant Battery discharges below the level of the Depth of Discharge (DOD) setting
 The DC voltage falls beneath the low Plant Battery Voltage alarm level

Starting requests are removed when:

The Plant Battery has been charged to the *Full Charge Level* and has been in the *Floating* charge state for the duration of the configured *Float Charge Timer*.

4.12.2 PLANT BATTERY CHARGE STATE



Charge Status	Description	
Discharged	When the Plant Batteries have fallen below the <i>Depth of Discharge Level</i>	
Discharging	When the Plant Batteries' charge current is negative (discharging)	
Charging	When the generator is running and the <i>Charge Current</i> is positive.	
	Bulk Stage	When the Charge Current is greater then the Battery Charge Rate and when the Battery Voltage is less then the Minimum Float Voltage Level
	Absorption Stage	When the Plant Battery Voltage is above the Minimum Float Voltage Level
Floating	When the Plant Batteries' voltage has fallen below the <i>Minimum Float Charge Voltage</i> and the <i>Charge Current</i> has fallen bellow the <i>Charge Rate Current</i> .	
OK	When the Plant Batteries have been charged to the <i>Full Charge Level</i> and has been in the <i>Floating</i> charge state for the duration of the configured <i>Float Charge Timer</i> .	

4.12.3 CALCULATING EFFECTIVE BATTERY CAPACITY

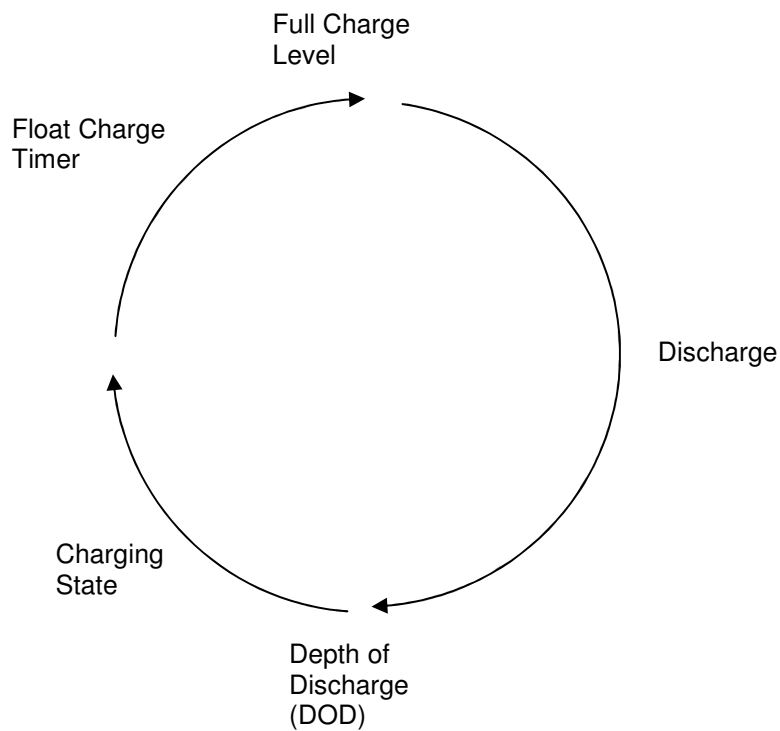
The effective battery capacity is calculated whilst the battery is charging upon a fixed formula:
 $It = C (C / IH)^{K-1}$

Where: C is the rated capacity (amp hours) of the Plant Batteries combined
IH is the charge rate (amps per hour)
It is the effective battery capacity
K is Peukert's Constant (obtained from the battery data sheet or when the battery is calibrated) or by the calculated Peukert's Constant

4.12.4 CHARGE CYCLE

A single charge cycle is determined by the following sequence:

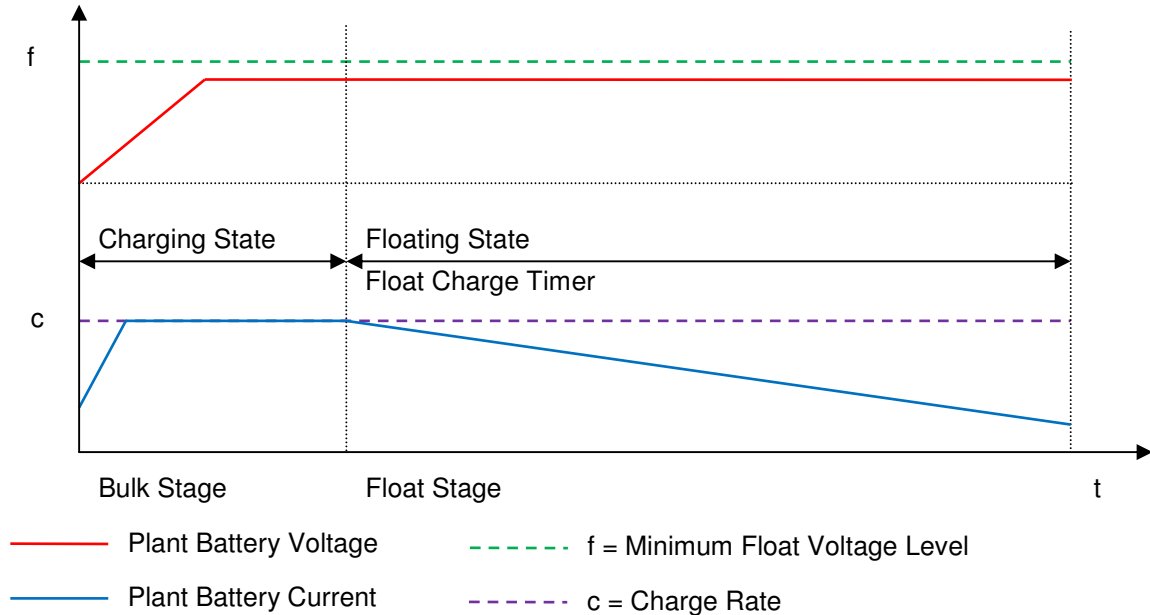
1. Plant Batteries fall below Depth of Discharge (DOD) Level
2. Plant Batteries are charged to the *Full Charge Level*
3. Plant Batteries start to discharge and reach *Depth of Discharge (DOD)*



4.12.5 DETERMINING THE CHARGE MODE

TWO STAGE CHARGER

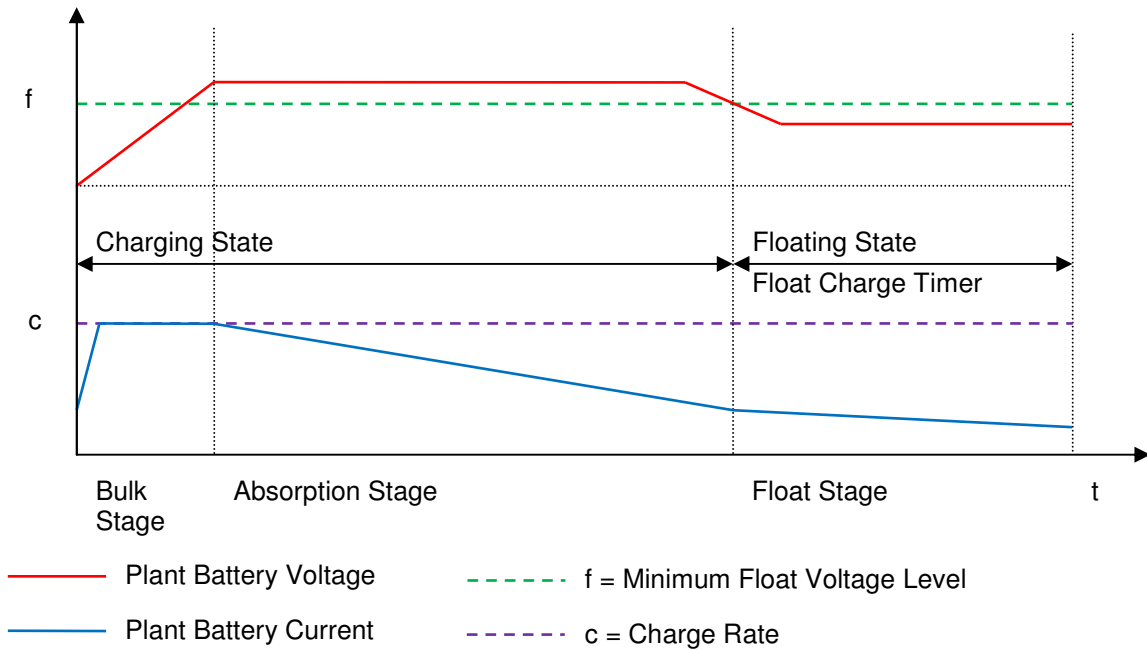
▲ NOTE: When using a two stage charger, the Minimum Float Voltage Level must be set higher than the float voltage produced by the rectifying device as shown below.



The charge modes for a two stage charger are determined as follows:

Charge Status	Description
Discharged	When the Plant Batteries have fallen below the <i>Depth of Discharge Level</i>
Discharging	When the Plant Batteries' charge current is negative (discharging)
Charging	When the generator is running and the <i>Charge Current</i> is positive.
	Bulk Stage When the Charge Current is greater than the Battery Charge Rate and when the Battery Voltage is less than the Minimum Float Voltage Level
Floating	When the Plant Batteries' voltage has fallen below the <i>Minimum Float Charge Voltage</i> and the <i>Charge Current</i> has fallen below the <i>Charge Rate Current</i> .
Ok	When the Plant Batteries have been charged to the <i>Full Charge Level</i> and has been in the <i>Floating</i> charge state for the duration of the configured <i>Float Charge Timer</i> .

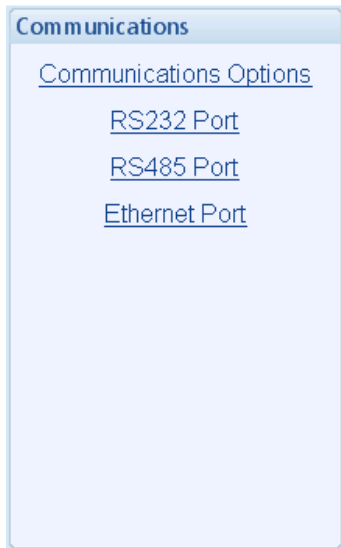
4.12.6 THREE STAGE CHARGER



The charge modes for a three stage charger are determined as follows:

Charge Status	Description			
Discharged	When the Plant Batteries have fallen below the <i>Depth of Discharge Level</i>			
Discharging	When the Plant Batteries' charge current is negative (discharging)			
Charging	When the generator is running and the <i>Charge Current</i> is positive.			
	<table border="1"> <tr> <td>Bulk Stage</td> <td>When the Charge Current is greater then the Battery Charge Rate and when the Battery Voltage is less then the Minimum Float Voltage Level</td> </tr> <tr> <td>Absorption Stage</td> <td>When the Plant Battery Voltage is above the Minimum Float Charge Voltage Level</td> </tr> </table>	Bulk Stage	When the Charge Current is greater then the Battery Charge Rate and when the Battery Voltage is less then the Minimum Float Voltage Level	Absorption Stage
Bulk Stage	When the Charge Current is greater then the Battery Charge Rate and when the Battery Voltage is less then the Minimum Float Voltage Level			
Absorption Stage	When the Plant Battery Voltage is above the Minimum Float Charge Voltage Level			
Floating	When the Plant Batteries' voltage has fallen below the <i>Minimum Float Charge Voltage</i> and the <i>Charge Current</i> has fallen bellow the <i>Charge Rate Current</i> .			
OK	When the Plant Batteries have been charged to the <i>Full Charge Level</i> and has been in the <i>Floating</i> charge state for the duration of the configured <i>Float Charge Timer</i> .			

4.13 COMMUNICATIONS



4.13.1 COMMUNICATIONS OPTIONS

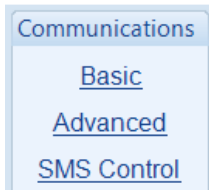
Provides a means of giving the control an identity name. This is used in the SCADA section to allow the operator to see the site name and genset identity that is currently connected to the SCADA. As this could be a remote module connected over modem or Ethernet connection this is a very useful feature.



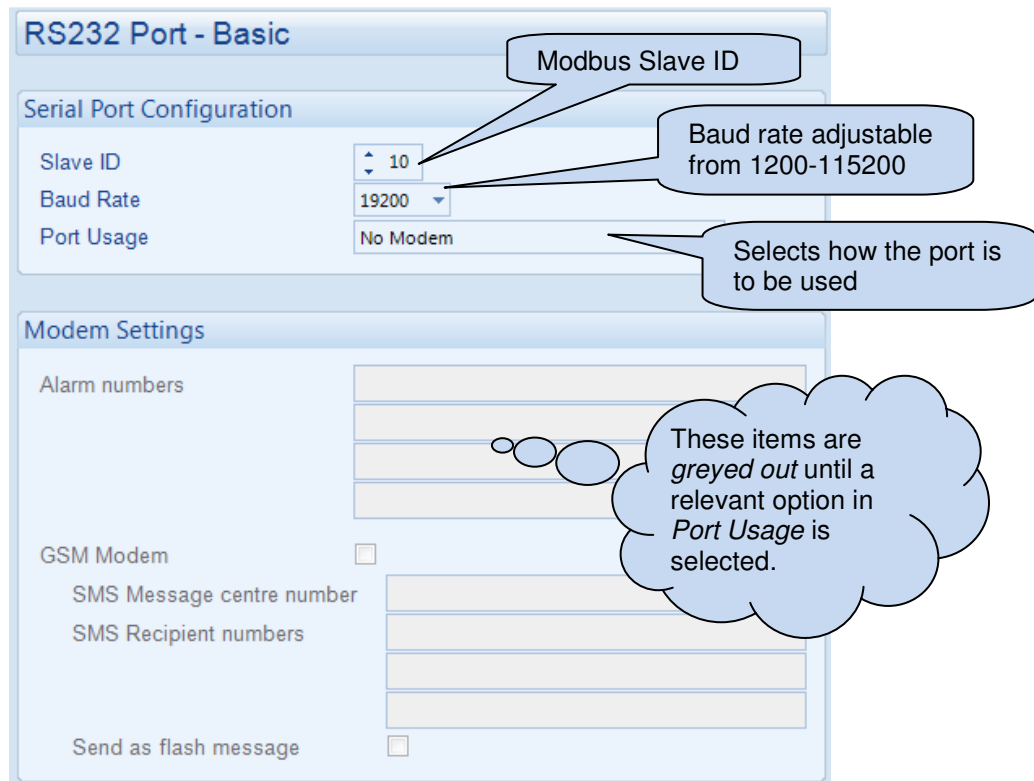
The image shows a configuration window titled "Communications Options". It has a sub-section titled "Module Identification". There are two text input fields: "Site identity" and "Genset identity".

Free text entries to identify the generator set. This text is displayed on the SCADA screen when the module is connected to the PC.

4.13.2 RS232 PORT



4.13.2.1 BASIC



SERIAL PORT CONFIGURATION


Timer	Description
Port usage	<p>Only one of the two serial ports is used at any one time (RS232 or RS485) The options are :</p> <p>No Modem – RS232 ports is used for direct RS232 connection to PLC, BMS etc</p> <p>Incoming modem calls – RS232 port connected to modem, used to accept incoming calls only.</p> <p>Incoming and outgoing modem (Sequence) – RS232 port connected to modem used to accept incoming calls and also make calls upon shutdown alarms.</p> <p>Outgoing modem alarms (Sequence) - RS232 port connected to modem, used to make calls upon shutdown alarms.</p> <p>Incoming and outgoing modem (Cyclic) – RS232 port connected to modem used to accept incoming calls and also make calls upon shutdown alarms.</p> <p>Outgoing modem alarms (Cyclic) - RS232 port connected to modem, used to make calls upon shutdown alarms.</p>

MODEM SETTINGS

Timer	Description
Alarm Number	The phone number that the module dials upon an alarm condition. This number must be connected to a PC modem on a PC running the Configuration Suite Software.
GSM Modem	<input type="checkbox"/> = The connected modem is a fixed line telephone modem <input checked="" type="checkbox"/> = The connected modem is a GSM (cellular) modem. The GSM signal strength meter and GSM operator are shown on the module display.
SMS Message Centre Modem	The Message centre used so send SMS messages. This number is usually stored on the SIM card and need not be entered here. A number is only needed here if it is not stored on the SIM card.
SMS Recipient Numbers	Numbers of the cell phones to send SMS messages to. Leave blank if SMS function is not required.
Send as flash message	This type of message sends an instant message

GSM modem

DSE do not stock or supply CSD SIM cards for the modem, these must be obtained from your local GSM provider.

Description	DSE Part Number
Wavecom Fastrak Xtend GSM Modem supplied with power supply cable, RS232 connection cable and GSM antenna. Suitable for GSM operating on 900/1800 MHz bands.	0830-001-01
<div style="border: 1px solid black; padding: 5px;"> <p> NOTE : This modem is supplied ready configured to operate with the DSE module. When purchasing from a third party, the modem is not configured to communicate with the module.</p> </div>	

4.13.2.2 ADVANCED

RS232 Port - Advanced

Initialisation strings

Init (not auto answer)	E0S7=60S0=0&S0&C1&D3
Init (auto answer)	E0S7=60S0=2&S0&C1&D3
Hangup	H0

Connection Settings

Master inactivity timeout	5s	<input type="range"/>
Connect delay	60s	<input type="range"/>
Retries	<input type="text" value="4"/>	
Retry delay	5s	<input type="range"/>
Repeat cycle delay	10s	<input type="range"/>

Modem initialisation strings. These set up the modem to perform the functions required.

INITIALISATION STRINGS

The initialisation strings are commands that are sent to the modem upon powering up the DSE module and additionally at regular intervals subsequently, whenever the module *initialises* (resets) the modem.

Factory set initialisation strings

Setting	Description
E0	Echo off
S7=60	Wait for carrier time 60s
S0=0 (not auto answer)	Do not answer
S0=2 (auto answer)	Answer after two rings
&S0	DSR always on
&C1	DCD is active if modem is online
&D3	Reset (ATZ) on DTR-drop
H0	Hang up (disconnect)

Silent operation

The modem connected to the controller usually makes dialling noises and 'squeal' in the initial stages of making a data call. To control this noise, add the following command to the end of the initialisation string:

Setting	Description
M0	Silent operation
M1	Sounds during the initial stages of making a data call
M2	Sounds always when connected (not recommended for normal use, also used for troubleshooting)

Wavecom Fastrak Xtreme GSM Modem initialisation strings

When connected to the Wavecom Fastrak Xtreme GSM modem, the initialisation strings must be altered by changing the factory set &D3 to &D2.

Setting	Description
&D2 (required for Wavecom Fastrak Supreme)	Hang up on DTR-drop
&D3 (DSE7300 series factory settings)	Reset on DTR-drop

Initialisation strings

Init (not auto answer)	E0S7=60S0=0&S0&C1&D2
Init (auto answer)	E0S7=60S0=2&S0&C1&D2
Hangup	H0

OTHER MODEMS

When using modems not recommended by DSE first try either of the options shown above. If problems are still encountered, you should contact your modem supplier for further advice.

CONNECTION SETTINGS

Timer	Description
Master inactivity timeout	The module <i>looks</i> by default at the USB port for communications. When activity is detected on the RS232 or RS485 port, the module <i>switches</i> to look at the relevant port for further data. If no data activity is detected on the port for the duration of the <i>master inactivity timer</i> , it reverts to looking at the USB port. This should be set longer than the time between modbus polls from the master.
Connect delay	The amount of time that is allowed to elapse between the alarm being registered and the controller dialling out with the fault.
Retries Retry delay	The number of times the module attempts to contact the remote PC by modem. The amount of time between retries

4.13.2.3 SMS MODULE CONTROL

RS232 Port - SMS Control

SMS Module Control

Require PIN

PIN prefix :

Enabled commands

Start off load (code 1)

Start in parallel (code 2)

Cancel (code 3)

Stop mode (code 4)

Auto mode (code 5)

Tick to enable a pin code .This code would be required at the start of each SMS message for the generator controller to take any action for any commands .

Example
 Pin prefix 1234 and a Remote start on load command.
 “ 1234 1”
 1234 pin + (space) + (Code)

The SMS commands listed below.

Parameter	Code	Description
Remote Start off load	1	If this input is active, operation is similar to the 'Remote Start on load' function except that the generator does not instruct to take the load. This function is used where an engine only run is required e.g. for exercise.
Remote Start on load	2	When in auto mode, the module performs the start sequence and transfer load to the generator.
Cancel	3	By sending cancel code cancels SMS remote start off load or SMS Remote start on load, If the unit was in Auto mode the unit stops and the module with remain in Auto mode
Stop mode	4	This input mimic's the operation of the 'Stop' button and is used to provide a remote SMS stop command.
Auto Mode	5	This input mimics the operation of the "AUTO" button

4.13.3 TROUBLESHOOTING MODEM COMMUNICATIONS

4.13.3.1 MODEM COMMUNICATION SPEED SETTING

First ensure the modem is set to communication with the DSE module at 9600 baud – Modems supplied by DSE are factory adjusted to operate with the module. Only modems purchased from a third party may require adjustment.

To change the modems RS232 baud rate a command line terminal program (Hyperterminal by Microsoft is a good solution) is needed. Operation of this terminal program is not supported by DSE; you should contact your terminal program supplier.

Connect the modem RS232 port to your PC's RS232 port. You may need an additional card in your PC to provide this facility.

Use Hyperterminal (or similar) to connect to the modem at its current baud rate. You may need to contact your modem supplier to obtain this detail. If this is not possible, use 'trial and error' methods. Select a baud rate, attempt connection, press <ENTER> a few times. If the modem responds with OK> then you are connected at the correct baud rate. Any other response (including nothing) means you are not connected so select another baud rate.

When connected, enter the following command:

AT+IPR=9600 and press <ENTER>

This sets the modem to 9600 baud.

Close the Hyperterminal connection (**do not** remove power from the modem) then open a new connection to the modem at 9600 baud.

Enter the following command:

AT&W and press <ENTER>

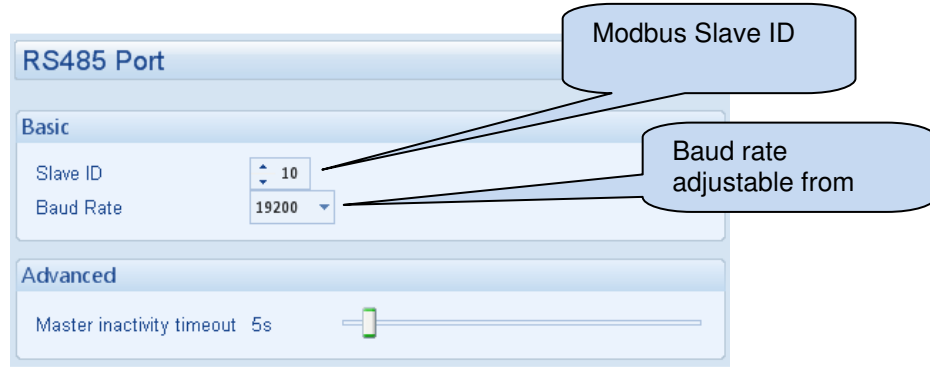
This saves the new setting in the modem. Power is now removed. The next time power is applied, the modem starts with the new settings (Baud rate = 9600), suitable to communicate with the DSE module.

4.13.3.2 GSM MODEM CONNECTION

Most GSM modems have a *Status* LED. The Wavecom Fastrack Supreme as recommended and supplied by DSE has a RED Status LED, operating as follows.

LED STATE	Description
Off	Modem is not powered
On Continuous	Not connected to GSM network
Flashing Slow (approx once every two seconds)	Connected to GSM network
Flashing Fast (approx twice per second)	Connected to GSM network data transmission in progress.

4.13.4 RS485 PORT



Timer	Description
Master inactivity timeout	The module <i>looks</i> by default at the USB port for communications. When activity is detected on the RS232 or RS485 port, the module <i>switches</i> to look at the relevant port for further data. If no data activity is detected on the port for the duration of the <i>master inactivity timer</i> , it reverts to looking at the USB port. This should be set longer than the time between modbus polls from the master.

4.13.5 ETHERNET PORT

NOTE: Consult the network administrator of the host network before changing these settings. Incorrect settings could cause network errors in the existing network. These settings must only be changed by qualified network administrators.

The screenshot shows the 'Ethernet Port' configuration page. It includes sections for 'Dynamic Host Configuration Protocol', 'Names', 'IP Addresses', and 'Modbus'. The 'IP Addresses' section contains a table with the following values:

IP Address	192	168	1	45
Subnet Mask	255	255	255	0
Gateway Address	192	168	1	1
DNS Address	192	168	1	1
Preferred Connection Address	192	168	1	2

The 'Modbus' section shows the 'Modbus Port Number' set to 1003. Two callouts provide additional information:

- One callout points to the IP address fields, stating: "After the IP address is changed by writing the configuration, the controller must be power cycled before the change takes effect."
- Another callout points to the Modbus Port Number field, stating: "Network port number that the modbus TCP communications will operate over. Ensure any firewall in the system (for instance within the router) is configured to allow traffic on this port."

Firewall configuration for internet access

As modem/routers differ enormously in their configuration, it is not possible for DSE to give a complete guide to their use with the module. However it is possible to give a description of the requirements in generic terms. For details of how to achieve the connection to your modem/router you are referred to the supplier of your modem/router equipment.

The module makes its data available to a configurable TCP port number.

You must configure your modem/router to allow inbound traffic on this port. For more information you are referred to your WAN interface device (modem/router) manufacturer.

Incoming traffic (virtual server)

Network Address and Port Translation (NAPT) allows a single device, such as the modem/router gateway, to act as an agent between the Internet (or "public external network") and a local (or "internal private") network. This means that only a single, unique IP address is required to represent an entire group of computers.

For our application, this means that the WAN IP address of the modem/router is the IP address we need to access the site from an external (internet) location.

When requests reach the modem/router, we want this passed to a 'virtual server' for handling.

Example

Virtual Servers			
Filter Name	Port	Destination (LAN)	Address
DSE7450	1003	192.168.1.45	

IP Address of the Controller

User provided name for the Port Forwarding rule

Port number of the communications (must match the configuration of the controller)

Result : Traffic arriving from the WAN (internet) on port 1003 is automatically sent to IP address 192.168.1.3 on the LAN for handling.

4.14 SCHEDULER

The Exercise Scheduler is used to give up to 16 scheduled runs. This run schedule is configurable to repeat every 7 days (weekly) or every 28 days (monthly). The run is *on load* or *off load*.

The screenshot shows the 'Scheduler' configuration page. At the top, there is a header 'Scheduler' and a sub-header 'Exercise Scheduler'. Below the sub-header, there are three controls: 'Enabled' with a checked checkbox, 'Run Mode' set to 'Off Load', and 'Schedule Period' set to 'Weekly'. Below these are two identical tables for scheduling runs. Each table has columns for 'Week', 'Day', 'Start Time', and 'Duration'. The 'Week' column contains a dropdown menu. The 'Day' column contains a dropdown menu with 'Monday' selected. The 'Start Time' and 'Duration' columns contain time pickers. To the right of each row in both tables is a 'Clear' button. Two callout boxes provide instructions: one points to the 'Enabled' checkbox, stating 'Click to enable or disable the option. The relevant values below will appear greyed out if the option is disabled.' The other points to the 'Start Time' and 'Duration' pickers, stating 'Configure the required start time and run duration.'

Week	Day	Start Time	Duration	Clear	Week	Day	Start Time	Duration	Clear
	Monday	00:00	00:00	Clear		Monday	00:00	00:00	Clear
	Monday	00:00	00:00	Clear		Monday	00:00	00:00	Clear
	Monday	00:00	00:00	Clear		Monday	00:00	00:00	Clear
	Monday	00:00	00:00	Clear		Monday	00:00	00:00	Clear
	Monday	00:00	00:00	Clear		Monday	00:00	00:00	Clear
	Monday	00:00	00:00	Clear		Monday	00:00	00:00	Clear
	Monday	00:00	00:00	Clear		Monday	00:00	00:00	Clear
	Monday	00:00	00:00	Clear		Monday	00:00	00:00	Clear

4.15 MAINTENANCE ALARM

Three maintenance alarms are available to provide maintenance schedules to the end user. For instance Maintenance Alarm 1 is used for an oil change schedule, Maintenance Alarm 2 for a battery change schedule etc.

The screenshot shows the configuration interface for 'Maintenance alarm 1'. It includes the following fields:

- Enable:** A checkbox that is currently unchecked.
- Description:** A text field containing 'Maintenance alarm 1'.
- Action:** A dropdown menu set to 'Warning'.
- Engine run hours:** A numeric input field set to '10' with 'hrs' as the unit, accompanied by a slider control.
- Enable alarm on due date:** An unchecked checkbox.
- Maintenance interval:** A numeric input field set to '1' with 'months' as the unit, accompanied by a slider control.

Two callout boxes provide additional information:

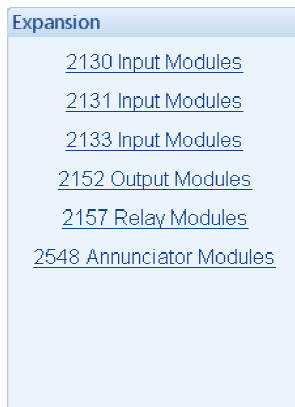
- The first callout points to the 'Enable' checkbox and states: 'Click to enable or disable the option. The relevant values below will appear *greyed out* if the alarm is disabled.'
- The second callout points to the 'Engine run hours' and 'Maintenance interval' fields and states: 'Maintenance Alarm will occur when the engine has run for the specified number of hours OR the specified date interval has passed (whichever occurs soonest)'

There are two ways to reset the maintenance alarm:

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

4.16 EXPANSION

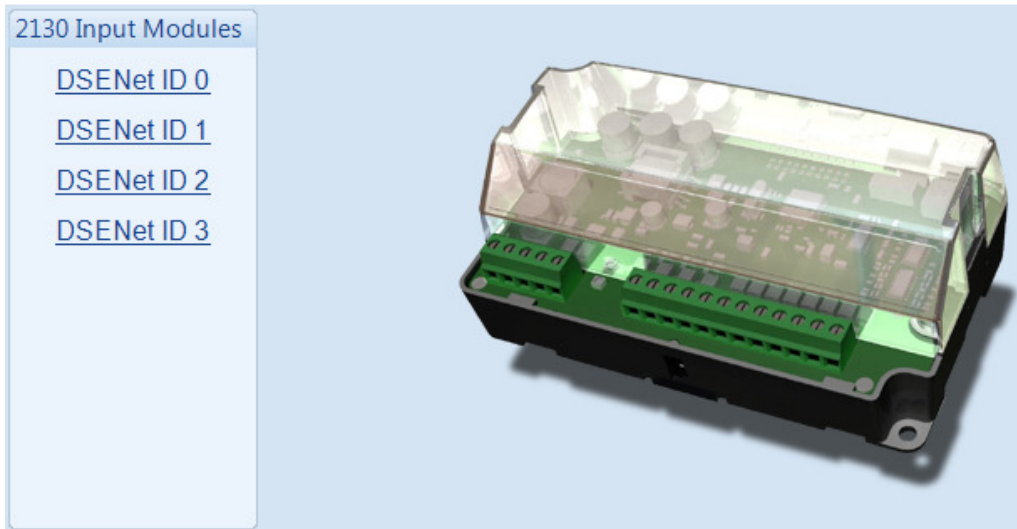
The *Expansion* page is subdivided into smaller sections. Select the required section with the mouse.



See overleaf for description of the different expansion modules.

4.16.1 DSE2130 INPUT MODULES

Select the DSENet ID of the input expansion you wish to configure. The ID of the expansion input module is set by rotary decimal switch accessible under the removable cover of the device.



The following is then shown:

DSENet ID 0

2130 Expansion Enable

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

Link Lost Alarm Action Warning Select the alarm type of the *link lost alarm*. This alarm will take action if the expansion module is not detected by the host module.

2130 Expansion Inputs

[Inputs A - D](#)

[Inputs E - H](#) Select which of the expansion inputs you wish to configure.

4.16.1.1 DIGITAL INPUTS (A-D)

Inputs A - D

Digital Input A

Function User Configured Select the required function of the input and whether it is *open* or *close to activate*.

Polarity Close to Activate

Action Warning Select the required alarm type of the input and when it is

Arming Always

LCD Display Low water level Type the text that is to appear on the module's display when the alarm is active.

Activation Delay 5s Gives a delay upon activation of the input to allow the input to be used as a level switch for example.

4.16.1.2 ANALOGUE INPUTS (E-H)

Analogue Input E

Sensor Description

Sensor Type

Configure the sensor type. Select *Digital Input* to use the analogue input as a digital

Depending upon your selection above, either the *Analogue Input* or *Digital Input* configuration screen is shown

Used as an Analogue Input

Analogue Input E

Sensor Description

Sensor Type

Sensor Name

Input Type

Sensor Alarms

Alarm Arming

Low Alarm Enable

Low Alarm Action

Low Alarm Bar

Low Pre-alarm Enable

Low Pre-alarm Trip Bar

Low Pre-alarm Return Bar

Low Alarm String

High Pre-alarm Enable

High Pre-alarm Return Bar

High Pre-alarm Trip Bar

High Alarm Enable

High Alarm Action

High Alarm Bar

High Alarm String

Edit the sensor curve if required.

Click and drag to change the setting.

Click to enable or disable the option. 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

Used as a Digital Input

Digital Input

Function

Polarity

Action

Arming

LCD Display

Activation Delay

Select the required function of the input and whether it is *open* or *close to activate*.

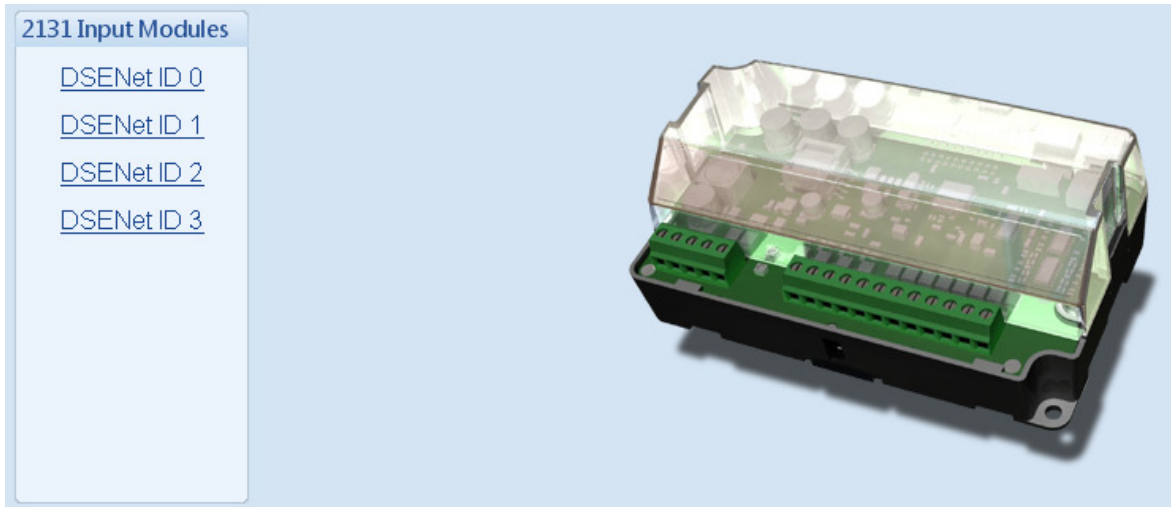
Select the required alarm type of the input and when it is active.

Type the text that is to appear on the module's display when the alarm is active.

Gives a delay upon activation of the input to allow the input to be used as a liquid level switch for example.

4.16.2 DSE2131 RATIOMETRIC EXPANSION INPUT MODULE

Select the DSENet ID of the input expansion you wish to configure. The ID of the expansion input module is set by rotary decimal switch accessible under the removable cover of the device.



The following is then shown:

DSENet ID 0

2131 Expansion Enable

Expansion Enabled

Link Lost Alarm Action **Warning**

2131 Expansion Inputs

[Inputs A - J](#)

Analogue Inputs

- [Analogue Input A](#)
- [Analogue Input B](#)
- [Analogue Input C](#)
- [Analogue Input D](#)
- [Analogue Input E](#)
- [Analogue Input F](#)
- [Analogue Input G](#)
- [Analogue Input H](#)
- [Analogue Input I](#)
- [Analogue Input J](#)

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

Select the alarm type of the *link lost alarm*. This alarm will take action if the expansion module is not detected by the host module.

Click to configure the inputs

Then select which input you want to configure

Depending upon your selection of *Sensor Type*, one of the following configuration screens are shown :

Used as a Digital Input

The screenshot shows the configuration interface for a digital input sensor. It is divided into two main sections: 'Sensor Description' and 'Digital Input'.

- Sensor Description:**
 - Sensor Type:** A dropdown menu set to 'Digital Input'.
- Digital Input:**
 - Function:** A dropdown menu set to 'User Configured'. Callout: "Select the required function of the input and whether it is *open* or *close* to activate."
 - Polarity:** A dropdown menu set to 'Close to Activate'.
 - Action:** A dropdown menu set to 'Warning'. Callout: "Select the required alarm type of the input and when it is active."
 - Arming:** A dropdown menu set to 'Always'.
 - LCD Display:** A text field containing '2131 ID0 Digital Input A'. Callout: "Type the text that is to appear on the module's display when the alarm is active."
 - Activation Delay:** A text field containing '0s'. Callout: "Gives a delay upon activation of the input to allow the input to be used as a liquid level switch for example."

Used as an Analogue Input

The screenshot shows the configuration interface for an analogue input sensor. It is divided into two main sections: 'Sensor Description' and 'Input Type'.

- Sensor Description:**
 - Sensor Type:** A dropdown menu set to 'Percentage Sensor'. Callout: "Select the required function of the input. Percentage, Pressure, Temperature or Digital input."
 - Measured Quantity:** A dropdown menu set to 'Voltage'. Callout: "Select the required type of the input. Voltage (0-10V), Current (4-20mA), Resistive"
 - Sensor Name:** A text field containing '2131 ID0 Flexible Sensor A'. Callout: "Name the sensor appropriately to describe the measurements on the module's display"
- Input Type:**
 - A dropdown menu set to '100%' and an 'Edit...' button. Callout: "Edit the sensor curve if required."

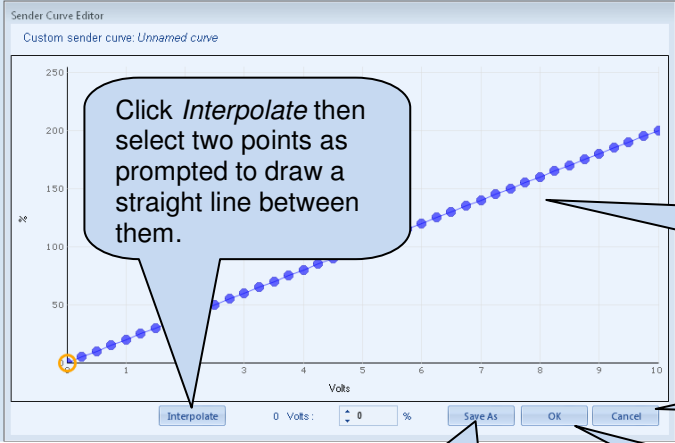
4.16.2.1 EXPANSION FLEXIBLE SENSOR

The following screen shot shows the configuration when set for *Temperature Sensor*. When set to other Sensor Type, consult the relevant manual section for details (Digital inputs, Oil Pressure input etc)

The screenshot shows the configuration for 'Analogue Input A'. It is divided into three main sections: 'Sensor Description', 'Input Type', and 'Sensor Alarms'. Callouts provide instructions for various elements:

- Sensor Description:**
 - Sensor Type:** Set to 'Temperature Sensor'. Callout: "Select the sensor type".
 - Measured Quantity:** Set to 'Resistive'. Callout: "Select the required type of the input. Voltage (0-10V), Current (4-20mA), Resistive".
 - Sensor Name:** '2131 ID0 Flexible Sensor A'.
 - Wide Range:** A checkbox. Callout: "Increases temperature alarms to 1300 deg C".
- Input Type:**
 - Set to 'VDO 120 °C'. Callout: "Click to edit the 'sensor curve'. See section entitled *Editing the sensor curve*".
- Sensor Alarms:**
 - Alarm Arming:** Set to 'Always'.
 - Low Alarm:** Enabled. Action: 'Shutdown'. Value: 103 °C. Callout: "Click and drag to change the settings".
 - Low Pre-alarm:** Enabled. Trip: 117 °C, Return: 124 °C. Callout: "Click to enable or disable the alarms. The relevant values below will appear *greyed out* if the alarm is disabled."
 - High Pre-alarm:** Enabled. Trip: 150 °C, Return: 140 °C. Callout: "Type the value or click the up and down arrows to change the settings".
 - High Alarm:** Enabled. Action: 'Shutdown'. Value: 160 °C. Callout: "Select the type of alarm required. For details of these, see the section entitled *Alarm Types* elsewhere in this document."
 - Low Alarm String:** 'Flexible Sensor Low'. Callout: "Type the text you want to appear on the screen when the alarm is triggered."
 - High Alarm String:** 'Flexible Sensor High'.

4.16.2.2 EDITING THE SENSOR CURVES



Sender Curve Editor
Custom sender curve: *Unnamed 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

Click CANCEL to ignore and lose any changes you have made

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

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

New Curve Name

Specify name for custom curve

OK Cancel

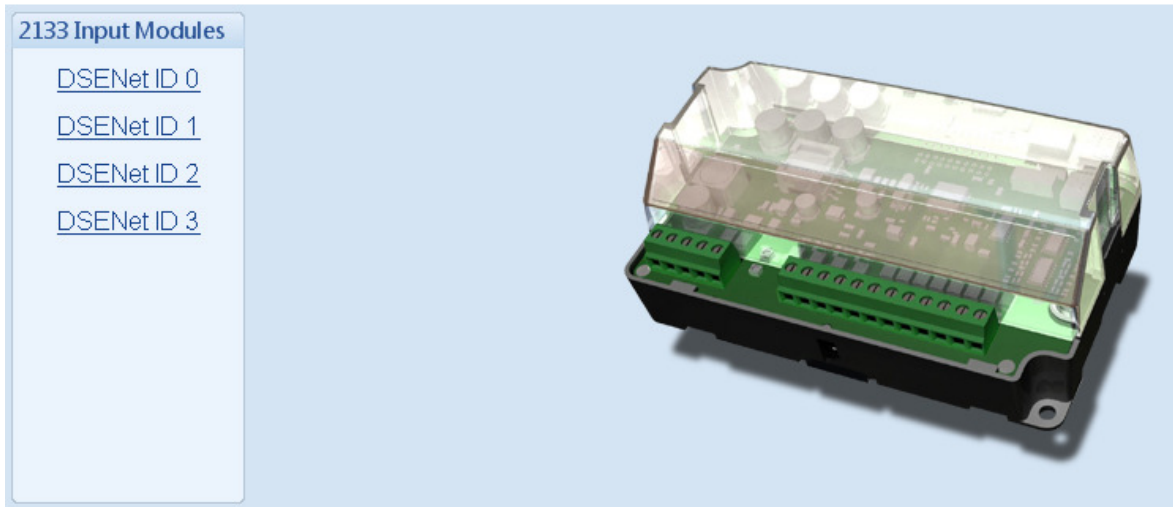
Click OK to save the curve.

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

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

4.16.3 DSE2133 RTD / THERMOCOUPLE INPUT MODULE

Select the DSENet ID of the input expansion you wish to configure. The ID of the expansion input module is set by rotary decimal switch accessible under the removable cover of the device.



The following is then shown:

DSENet ID 0

2133 Expansion Enable

Expansion Enabled

Link Lost Alarm Action Warning

2133 Expansion Inputs

[Inputs A - H](#)

Analogue Inputs

- [Analogue Input A](#)
- [Analogue Input B](#)
- [Analogue Input C](#)
- [Analogue Input D](#)
- [Analogue Input E](#)
- [Analogue Input F](#)
- [Analogue Input G](#)
- [Analogue Input H](#)

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

Select the alarm type of the *link lost alarm*. This alarm will take action if the expansion module is not detected by the host module.

Click to configure the inputs

Then select which input you want to configure

Analogue Input A

Sensor Description

Sensor Type: Temperature Sensor
Sensor Name: 2133 ID0 Flexible Sensor A
Wide Range:

Input Type

Type J

Sensor Alarms

Alarm Arming: Always

Low Alarm Enable:
Action: [Dropdown]
Low Alarm: 103 °C

Low Pre-alarm Enable:
Low Pre-alarm Trip: 117 °C
Low Pre-alarm Return: 124 °C

Low Alarm String: Flexible Sensor Low

High Pre-alarm Enable:
High Pre-alarm Return: 140 °C
High Pre-alarm Trip: 150 °C

High Alarm Enable:
Action: [Dropdown]
High Alarm: 160 °C

High Alarm String: Flexible Sensor High

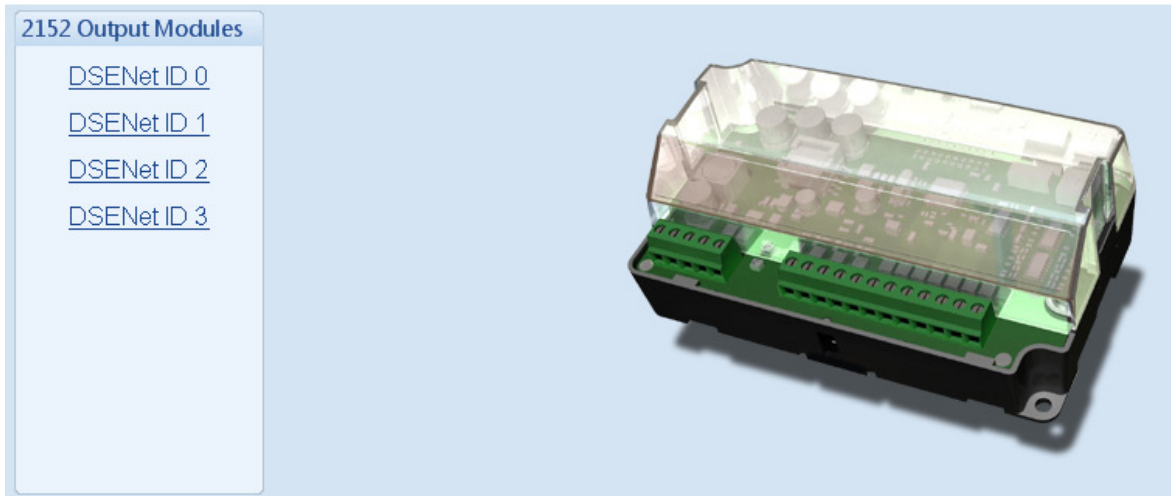
Callout 1: Increases temperature alarms to 1300 deg C (points to Wide Range checkbox)

Callout 2: Choose between Type J or Type K thermocouples or RTD (PT100) (points to Input Type dropdown)

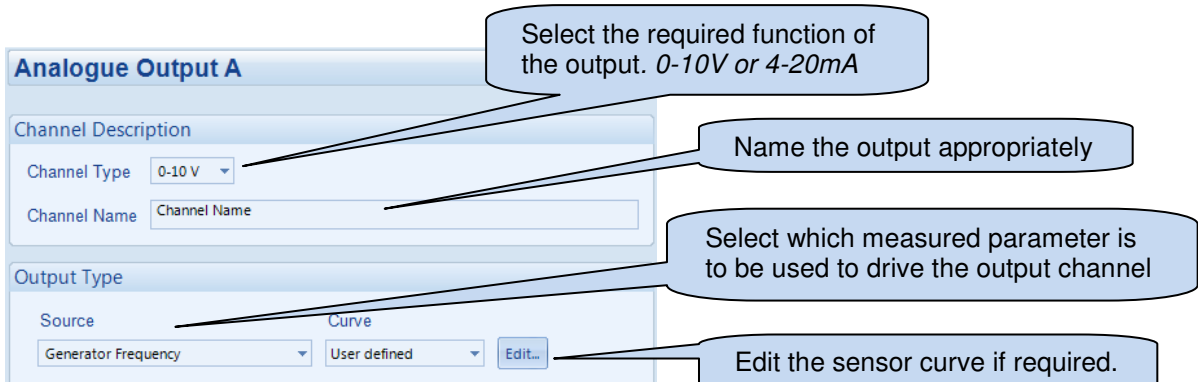
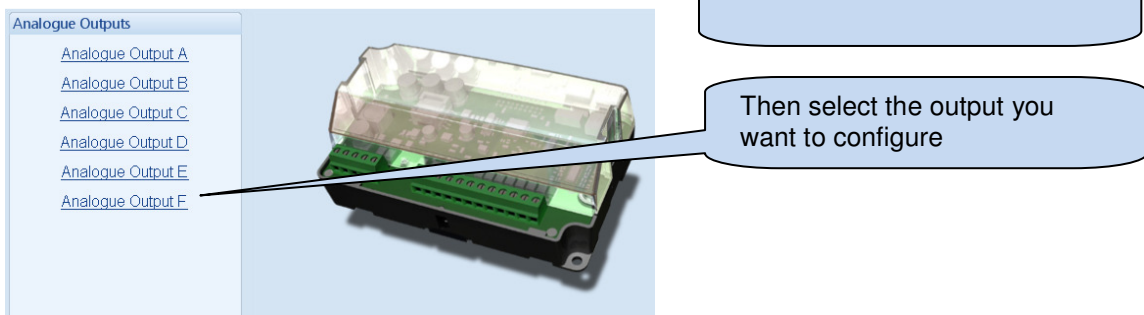
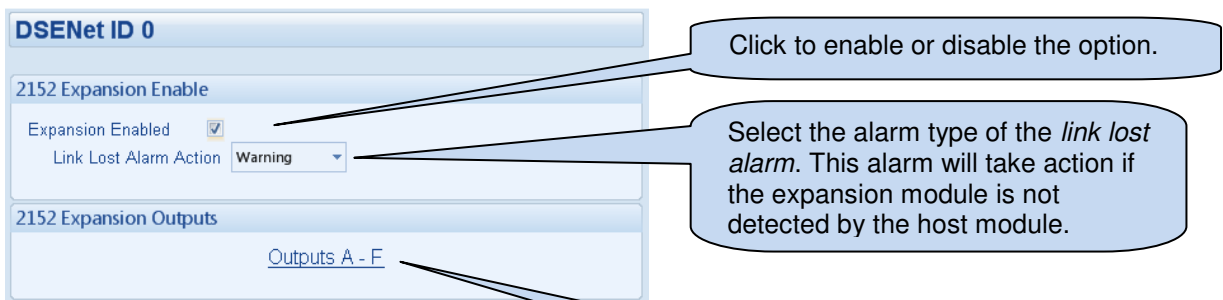
Callout 3: Set the alarm trip points if required. (points to Low Alarm slider)

4.16.4 DSE2152 ANALOGUE OUTPUT MODULE

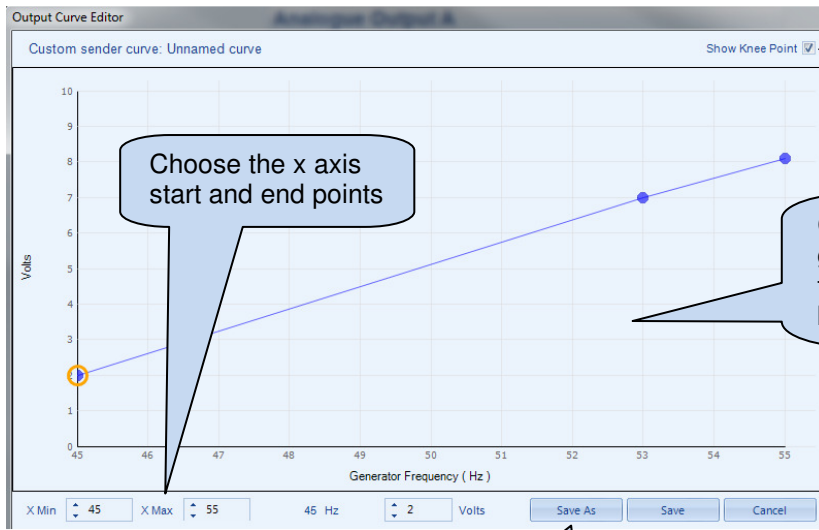
Select the DSENet ID of the output expansion you wish to configure. The ID of the expansion output module is set by rotary decimal switch accessible under the removable cover of the device.



The following is then shown:



4.16.4.1 EDITING THE OUTPUT CURVE



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

The dialog box is titled 'New Curve Name'. It contains a text input field with the placeholder text 'Specify name for custom curve'. Below the input field are two buttons: 'OK' and 'Cancel'.

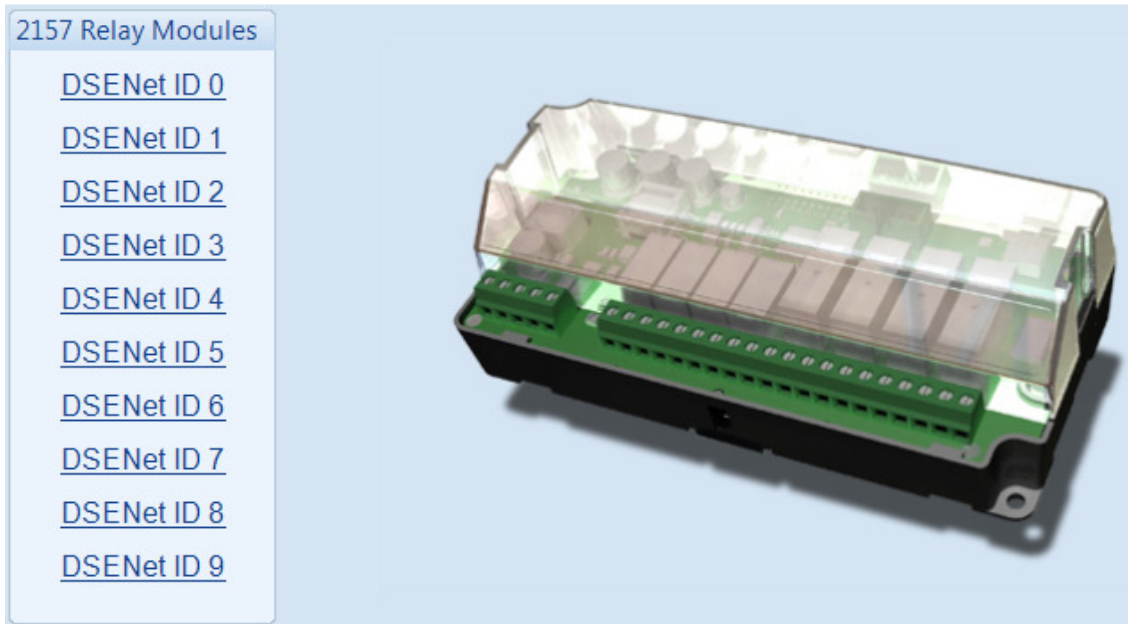
Click OK to save the curve.

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

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

4.16.5 DSE2157 RELAY MODULES

Select the DSENet ID of the relay expansion you wish to configure. The ID of the relay board is set by rotary decimal switch accessible under the removable cover of the device.



The following is then shown:

DSENet ID 0

2157 Enable

Expansion Enabled

Link Lost Alarm Action Warning

Relay Outputs (Normally Open)

	Source	Polarity
A	System In Auto Mode	Energise
B	Not Used	Energise
C	Not Used	Energise
D	Not Used	Energise

Relay Outputs (Changeover)

	Source	Polarity
E	Not Used	Energise
F	Not Used	Energise
G	Not Used	Energise
H	Not Used	Energise

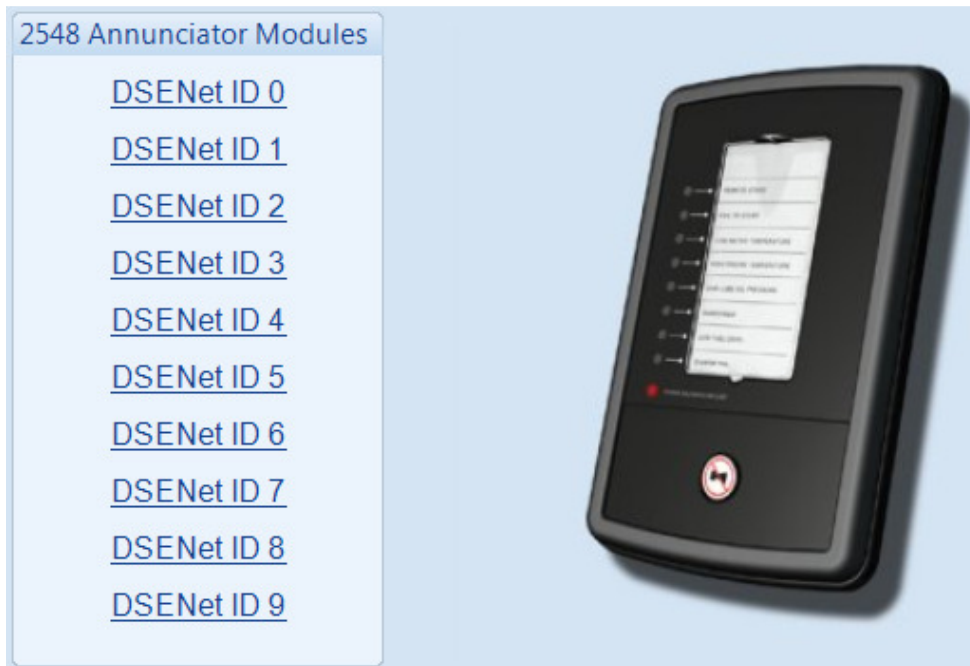
Click to enable or disable the option.

Select the alarm type of the *link lost alarm*. This alarm will take action if the expansion module is not detected by the host module.

Select the output source and the polarity required. For example this output will *energise* when the module is in the *Auto* mode.

4.16.7 DSE2548 LED EXPANSION

Select the DSENet ID of the LED expansion you wish to configure. The ID of the Annunciator is set by rotary decimal switch accessible on the back of the device.



The following is then shown:

DSENet ID 0

2548 Expansion Enable

Expansion Enabled

Link Lost Alarm Action Warning

Sounder Configuration

Follow main unit

Sounder enabled

LED Indicators

A	System In Auto Mode	Unlit
B	Not Used	Lit
C	Not Used	Lit
D	Not Used	Lit
E	Not Used	Lit
F	Not Used	Lit
G	Not Used	Lit
H	Not Used	Lit

Annunciator Insert Card

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

Select the alarm type of the *link lost alarm*. This alarm will take action if the expansion module is not detected by the host module.

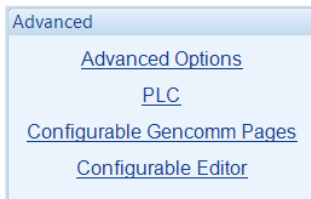
Enable or disable the expansion module's internal sounder.

- If the *mute / lamp test* button is pressed, other DSE2548 modules configured to *Follow main unit* and the host module will also lamp test / mute their alarm and vice-versa.
 - If the *mute / lamp test* button is pressed, other DSE2548 modules and the host module will not respond to this.

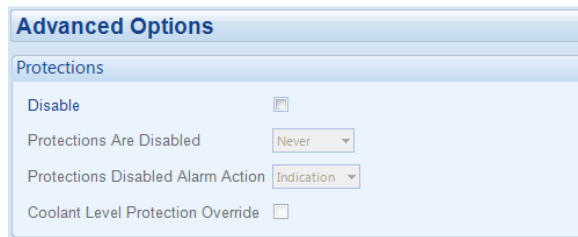
Select the configuration for the LED. For instance this LED is configured to be *unlit* when in *auto mode*. Hence this is a *not in auto* LED.

4.17 ADVANCED

These settings are provided for *advanced* users only. Take care when changing these options and ensure you fully understand the consequences of any change made.




4.17.1 ADVANCED OPTIONS



4.17.1.1 PROTECTIONS

This feature is provided to assist the system designer in meeting specifications for “Warning only”, “Protections Disabled”, “Run to Destruction”, “War mode” or other similar wording.



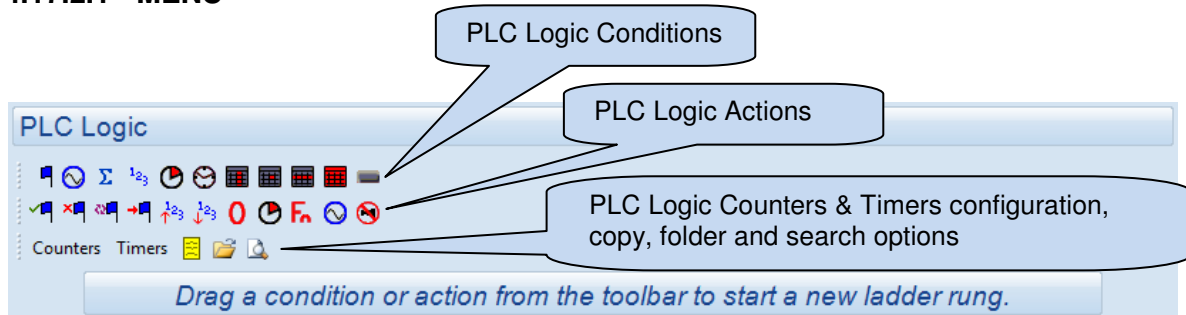
WARNING! - Enabling this feature prevents the set being stopped upon critical alarm conditions. All shutdown alarms are disabled with the exception of **EMERGENCY STOP** which continues to operate.

Options	Description
Disable	<input type="checkbox"/> = The module operates as normal and provide engine shutdown if required. <input checked="" type="checkbox"/> = <i>Protections disabled</i> function is activated. Operation depends upon the following configuration. <div style="border: 1px solid black; padding: 5px;"> <p>NOTE: Writing a configuration to the controller that has “Protections Disabled” configured, results in a warning message appearing on the PC screen for the user to acknowledge before the controller’s configuration is changed. This prevents inadvertent activation of the feature.</p> </div>
Protections are disabled	<i>Never</i> : The protections are not disabled <i>Always</i> : Protections are always overridden by the DSE controller. <i>On Input</i> : Protections are disabled whenever a configurable input set to <i>Protections Disabled</i> is activated
Protections Disabled Alarm Action	If <i>Disable All Protections</i> is set to <i>On Input</i> , this selection allows configuration of an alarm to highlight that the protections have been disabled on the engine. <i>Indication</i> : Any output or LCD display indicator configured to <i>Protections Disabled</i> is made active; however the internal alarm sound does not operate. <i>Warning</i> : Any output or LCD display indicator configured to <i>Protections Disabled</i> is made active, and the internal alarm sound operates. When protections are disabled, <i>Protections Disabled</i> appear on the module display to inform the operator of this status.

4.17.2 PLC LOGIC

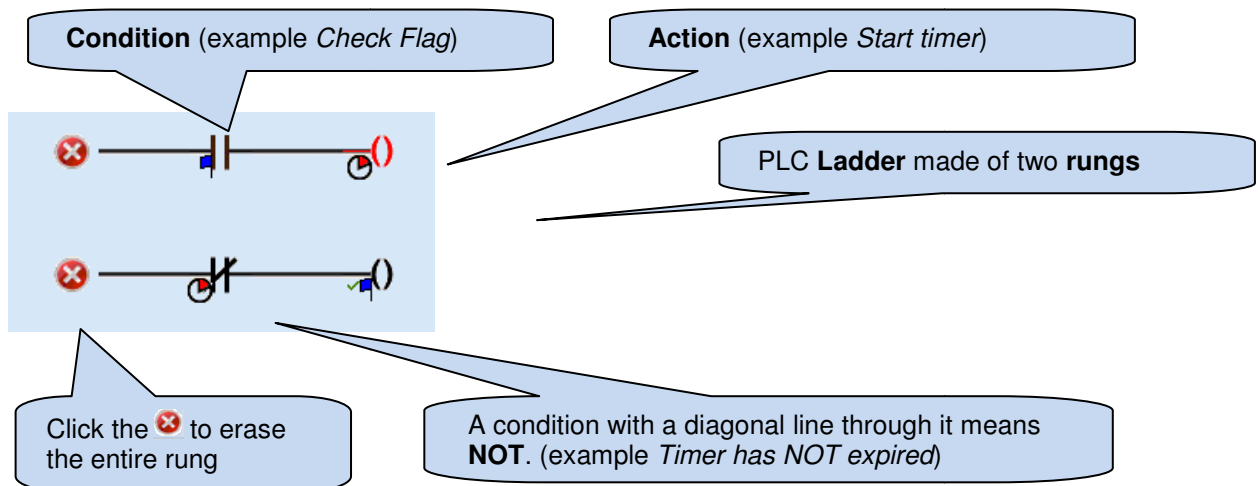
PLC Logic adds comprehensive PLC functionality to the DSE controller. This is an advanced section, used entirely at your own risk.

4.17.2.1 MENU



In PLC logic, the *ladder* of logic is made up of a series of *rungs*. The ladder is the complete PLC *program*. This program may perform a single task, or multiple tasks. Each rung contains a number of *conditions* and *actions*.

For instance if the conditions in the rung are met, the action takes place.



4.17.2.2 FLAGS

A *flag* is set when a condition within the DSE controller is met. For instance, if the module is in *Auto Mode* an internal flag is set. This flag is exposed as an *output source* when configuring module outputs and LEDs.

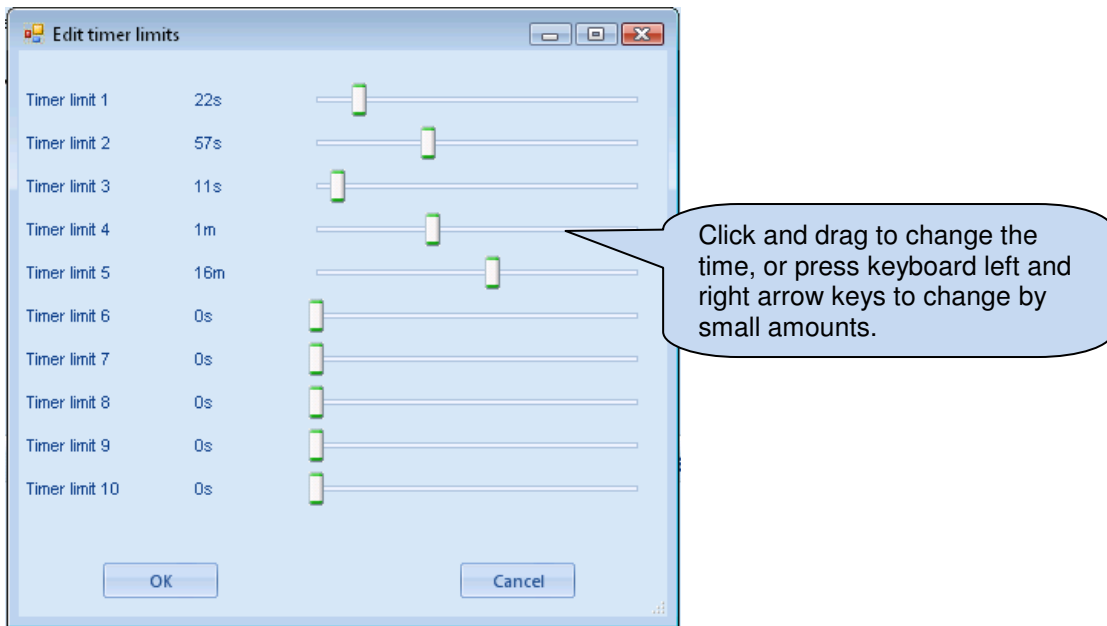
In addition to internal flags, a further twenty (40) custom flags are available (named PLC Output Flag 1-40). These are used to ‘memorise’ that a condition has been met, and/or used to drive module outputs and LEDs’.

For example if a timer expires, a flag is set to make a note of the timer expiring for later use in the ladder.

4.17.2.3 TIMERS

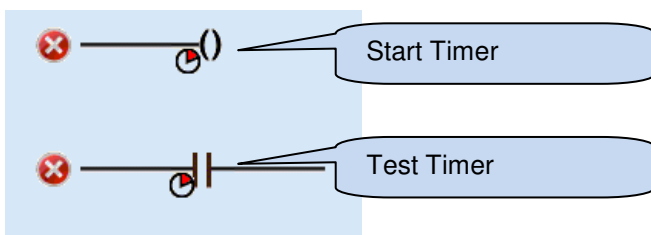
The PLC logic section contains twenty (20) user timers for use in the ladder.

A timer is configured by clicking **Timers** in the menu bar. The ‘Edit time limits’ window appears.



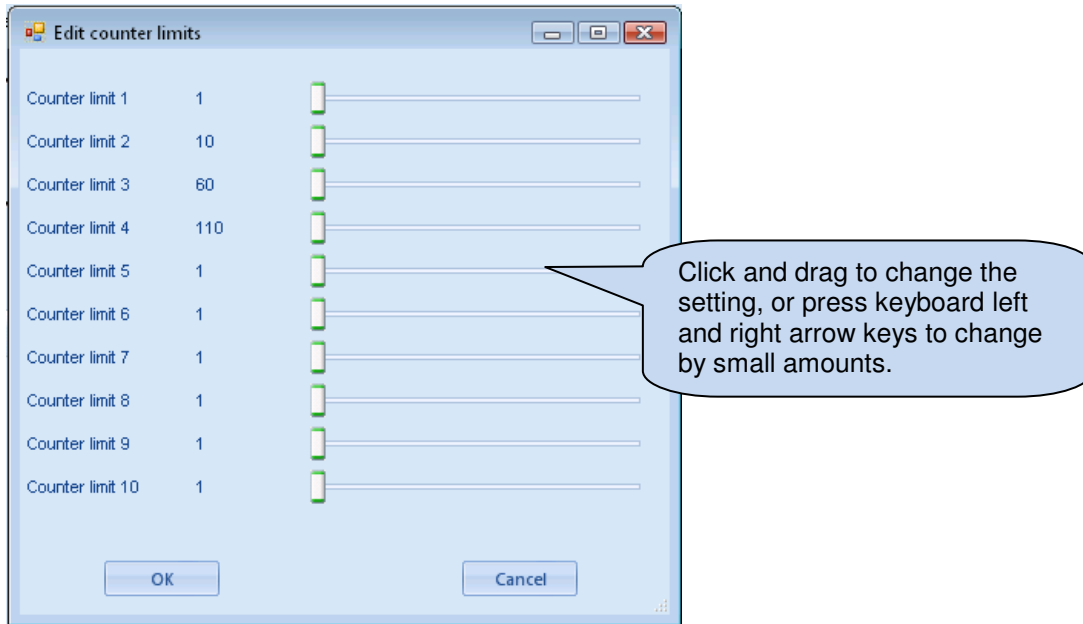
A timer is used by adding the timer action to the ladder. When this action takes place, the timer begins.

Upon the timer reaching the configured ‘Timer limit’, a test for the timer is successful:

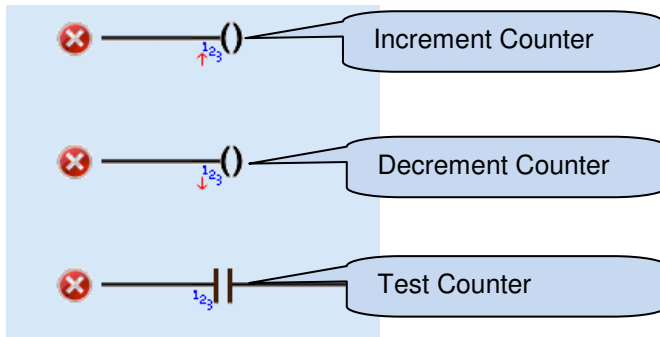


4.17.2.4 COUNTERS

The PLC logic section contains twenty (20) user counters for use in the ladder. A counter is configured by clicking **Counters** in the menu bar. The 'Edit counter limits' window appears.



A counter is used by incrementing (adding to) or decrementing (subtracting from) to the counter on the ladder. Upon the counter reaching the configured 'Counter limit', a test for the counter is successful:



4.17.2.5 PLC FUNCTIONS

PLC Functions allow the PLC logic to create alarm conditions or drive ‘virtual inputs’ on the controller.

A PLC function is configured in the same way as a module digital input:

Predefined Functions

The screenshot shows the 'Function 1' configuration window with the following settings:

- Function: Alarm Mute
- Polarity: Close to Activate
- Action: (dropdown menu)
- Arming: (dropdown menu)
- LCD Display: (text field)
- Activation Delay: 0s

Callout 1: Function. See section entitled *Input functions* for details of all available functions

Callout 2: As this example shows a *predefined* function, these parameters are

Predefined functions are only used once in the DSE Configuration Suite. For example if digital input A is configured to ‘remote start on load’, another input cannot be configured to the same function. Similarly, a PLC function cannot be configured to this function either.

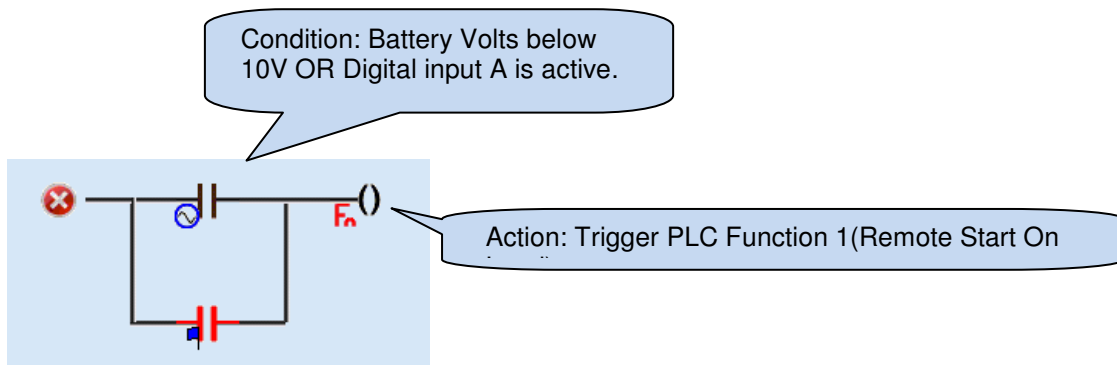
Where this is a required function, it is achieved by setting the digital input to “User Configured”, “always active”, “indication”, and OR’ing this into the PLC condition as follows:

The screenshot shows the 'Digital Input A' configuration window with the following settings:

- Function: User Configured
- Polarity: Close to Activate
- Action: Indication
- Arming: Always
- LCD Display: Used for PLC logic remote start
- Activation Delay: 0s

The screenshot shows the 'PLC Functions 1-4' configuration window with 'Function 1' settings:

- Function: Remote Start On Load
- Polarity: Close to Activate
- Action: (dropdown menu)
- Arming: (dropdown menu)
- LCD Display: (text field)
- Activation Delay: 0s



User Defined alarms


The screenshot shows a configuration window titled "Functions 1-4" with a list of settings on the left and their values on the right. The settings and their values are:

- Function: User Configured
- Polarity: Close to Activate
- Action: Warning
- Arming: Always
- LCD Display: (empty)
- Activation Delay: 0s

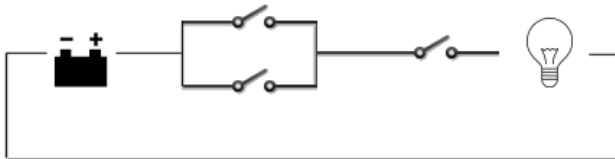
Callouts provide the following explanations:

- Configures when the input is active:** Never, always, active from starting, active from the end of the safety timer (points to the "User Configured" dropdown).
- Example of a user configured input** (points to the "User Configured" dropdown).
- Close or open to activate** (points to the "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 the "Warning" 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 the "Activation Delay" slider).
- This is the text that will be displayed on the module screen when the alarm is triggered.** (points to the "LCD Display" field).

4.17.2.6 CREATING AND EDITING RUNGS

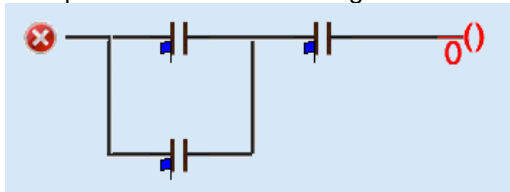
- Click a symbol in the tool bar and drag it to the bar (Drag a condition or action from the toolbar to start a new ladder rung.) to create the first rung in your ladder.
- Click a symbol in the tool bar and drag it to a blank space below existing rungs to create a new rung.
- Click a symbol in the tool bar and drag it to the ladder diagram to place the symbol.
- To move a placed symbol, click and drag it to its new location.
- To copy a placed symbol, press the keyboard **CTRL** button, then click and drag the symbol to the location you want to copy it to.
- To delete a placed symbol, click on it, it changes colour to red, now press the keyboard **DELETE** button.
- Click  next to a rung to erase the entire rung.

Imagine the schematic like a simple circuit with a battery and a bulb.



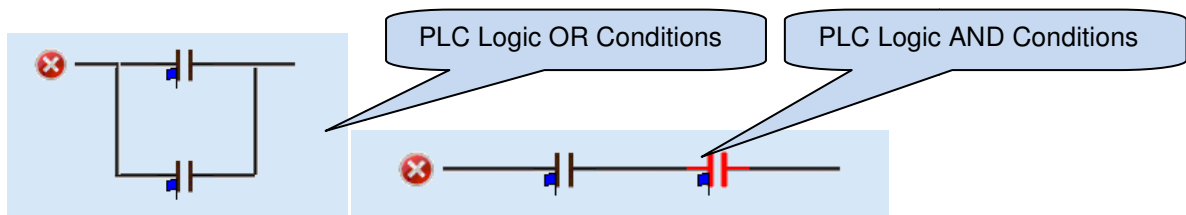
There are two switches (*Output sources*) in parallel to provide an **OR** function and one switch (*Output source*) in series to provide an **AND** function. When the conditions are satisfied, the bulb illuminates (The action occurs).

An equivalent PLC ladder rung looks like this :

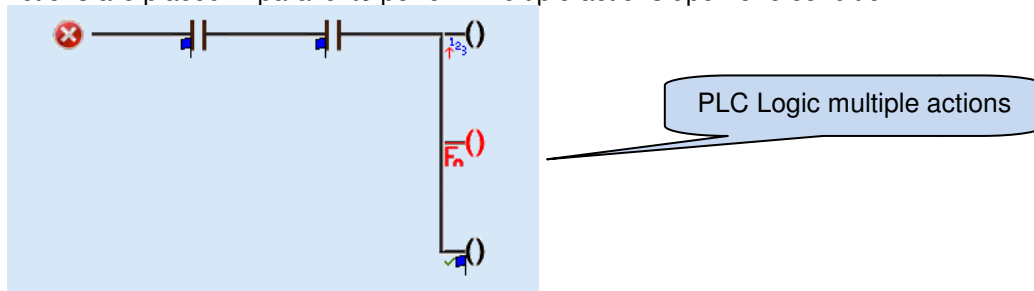


Rungs are processed in order (rung 1, rung 2, rung 3 etc). This sequence repeats every 100mS. Careless setting of the PLC logic causes toggling of an output at a rate of 100mS on/off. This may shorten the life and/or cause damage to externally connected slave relays or other connected equipment.






Conditions are placed in series to form an AND operation, or in parallel for form an OR operation:







Actions are placed in parallel to perform multiple actions upon one condition:

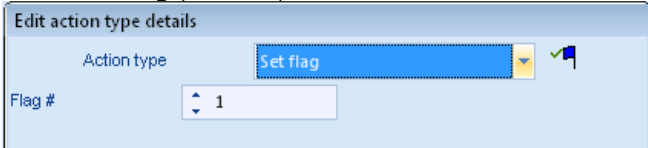
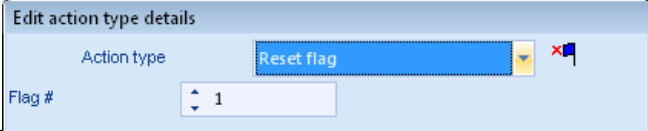
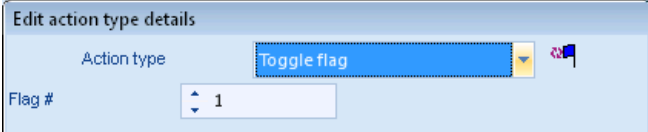
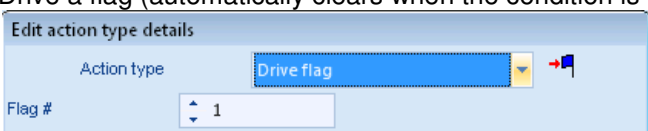
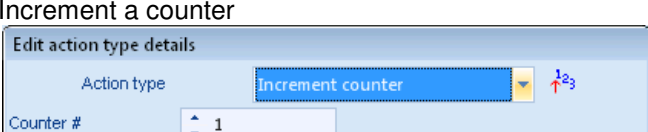
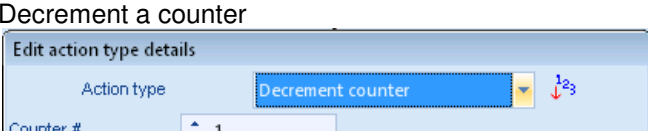
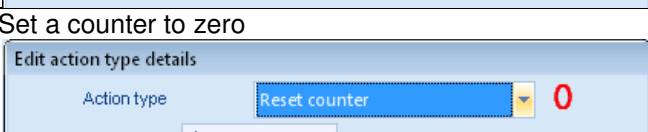
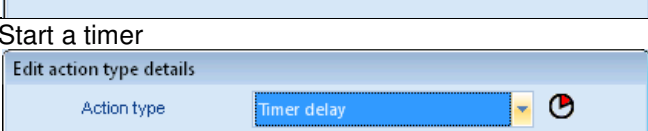









4.17.2.7 CONDITIONS

Conditions	
	<p>Test flag (for instance : test module inputs, test for certain condition)</p> <div data-bbox="368 297 1018 495"> <p>Edit condition type details</p> <p>Condition type: Flag test</p> <p>Polarity: Normally open</p> <p>Source: Auto Mode</p> </div>
	<p>Test an instrumentation value</p> <div data-bbox="368 528 1018 797"> <p>Edit condition type details</p> <p>Condition type: Instrumentation value</p> <p>Polarity: Normally open</p> <p>Instrumentation: Battery Voltage</p> <p>Test: Less than</p> <p>Value: 8.0V DC</p> </div>
	<p>Test a counter</p> <div data-bbox="368 831 1018 1014"> <p>Edit condition type details</p> <p>Condition type: Counter test</p> <p>Polarity: Normally open</p> <p>Counter #: 1</p> </div>
	<p>Test a timer</p> <div data-bbox="368 1048 1018 1240"> <p>Edit condition type details</p> <p>Condition type: Timer test</p> <p>Polarity: Normally open</p> <p>Timer #: 1</p> </div>
	<p>Test for a specific time period in the day</p> <div data-bbox="368 1274 1018 1485"> <p>Edit condition type details</p> <p>Condition type: Time of day</p> <p>Polarity: Normally open</p> <p>Start: 09:00 Duration: 00:10</p> </div>

Conditions	
	<h3>Test for a certain day</h3> <p>Edit condition type details</p> <p>Condition type: Day of week</p> <p>Polarity: Normally open</p> <p>Day(s): Tuesday</p> <ul style="list-style-type: none"> <input type="checkbox"/> Monday <input checked="" type="checkbox"/> Tuesday <input type="checkbox"/> Wednesday <input type="checkbox"/> Thursday <input type="checkbox"/> Friday <input type="checkbox"/> Saturday <input type="checkbox"/> Sunday <p>OK Cancel</p>
	<h3>Test for a certain week</h3> <p>Edit condition type details</p> <p>Condition type: Week in the month</p> <p>Polarity: Normally open</p> <p>Week(s): Week 1</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Week 1 <input type="checkbox"/> Week 2 <input type="checkbox"/> Week 3 <input type="checkbox"/> Week 4 <p>OK Cancel</p>
	<h3>Test for a certain month</h3> <p>Edit condition type details</p> <p>Condition type: Month</p> <p>Polarity: Normally open</p> <p>Month(s): <None selected></p> <ul style="list-style-type: none"> <input type="checkbox"/> January <input type="checkbox"/> February <input type="checkbox"/> March <input type="checkbox"/> April <input type="checkbox"/> May <input type="checkbox"/> June <input type="checkbox"/> July <input type="checkbox"/> August <p>OK Cancel</p>
	<h3>Test for a module button press</h3> <p>Edit condition type details</p> <p>Condition type: Button press</p> <p>Polarity: Normally open</p> <p>Button(s): <None selected></p> <ul style="list-style-type: none"> <input type="checkbox"/> Stop <input type="checkbox"/> Manual <input type="checkbox"/> Test <input type="checkbox"/> Auto <input type="checkbox"/> Start <input type="checkbox"/> Mains <input type="checkbox"/> Gen <input type="checkbox"/> Mute <p>OK Cancel</p>

4.17.2.8 ACTIONS

Actions	
✓	<p>Set a PLC flag (Set to 1)</p> 
✗	<p>Reset a PLC flag (Set to 0)</p> 
↕	<p>Toggle a flag (swap 0/1 or 1/0)</p> 
➔	<p>Drive a flag (automatically clears when the condition is false)</p> 
↑	<p>Increment a counter</p> 
↓	<p>Decrement a counter</p> 
0	<p>Set a counter to zero</p> 
⌚	<p>Start a timer</p> 

Actions	
	<p>Drive a PLC function</p> <p>Edit action type details</p> <p>Action type: Trigger alarm function </p> <p>Function #: 1</p>
	<p>Write a value to a Gencomm register</p> <p>Edit action type details</p> <p>Action type: Override gencomm value </p> <p>Gencomm: Load demand priority</p> <p>Value: 1 </p>
	<p>Reset an alarm</p> <p>Edit action type details</p> <p>Action type: Reset alarm </p> <p>Alarm: Battery voltage high</p>

4.17.2.9 EXAMPLES

AUTO MUTE after 30 seconds and provide a manual mute function using Digital Input C.

Function 1

Function: Alarm Mute

Polarity: Close to Activate

Action: [Dropdown]

Arming: [Dropdown]

LCD Display: [Text Box]

Activation Delay: 0s [Slider]

PLC Function 1 configured to Alarm Mute.

Digital Input C

Function: User Configured

Polarity: Close to Activate

Action: Indication

Arming: Always

LCD Display: Used by PLC for Alarm Mute

Activation Delay: 0s [Slider]

Digital Input C configured to Indication. This input will be checked for by the PLC logic. Descriptive text placed in the “LCD Display” box for future reference. (LCD Display text does not appear on the screen for “indication” inputs).

PLC Logic

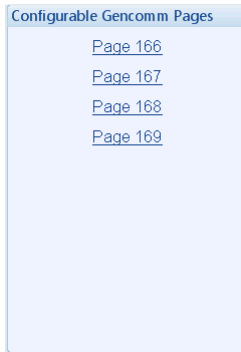
Counters Timers

Condition	Action
Flag Test (Audible Alarm)	Start Timer 1 (30 seconds)
If the audible alarm is active	Begin a 30 second delay

Condition	Action
Timer 1 expired OR Flag Test (Digital Input C)	Trigger Function (Alarm Mute)
When the timer expires OR Digital Input C is activated	Trigger the alarm mute function

Drag a condition or action from the toolbar to start a new ladder rung.

4.17.3 CONFIGURABLE GENCOMM PAGES

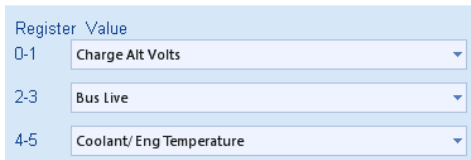


For advanced Modbus users of the controller, configurable Gencomm pages are available. The intention is to allow the user to create personal collections of data in subsequent registers to minimise the number of modbus reads required by the master, and hence speed up data collection.

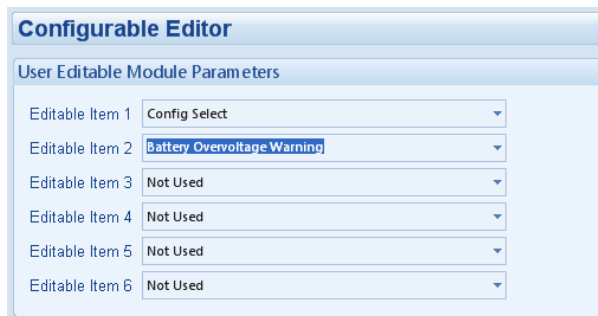
The configurable modbus pages are :

Page	Hex address	Decimal address
166	A600	42496
167	A700	42752
168	A800	43008
169	A900	43264

Example of page configuration



4.17.4 CONFIGURABLE EDITOR

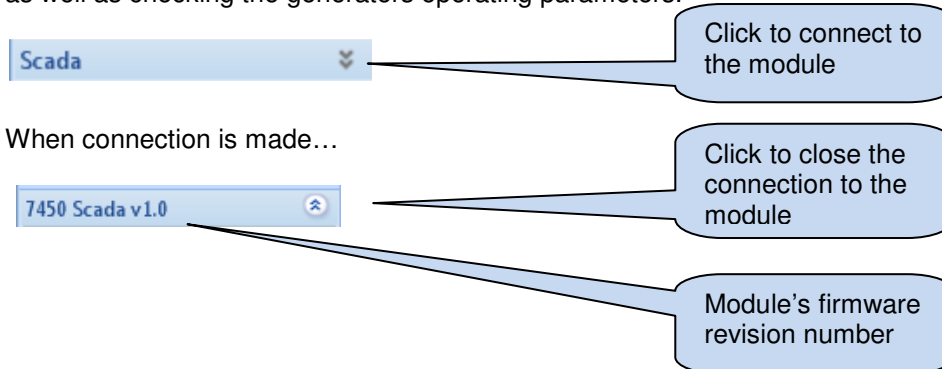


Configurable Editor Screen is available, This is to enable user preferred editable pages.

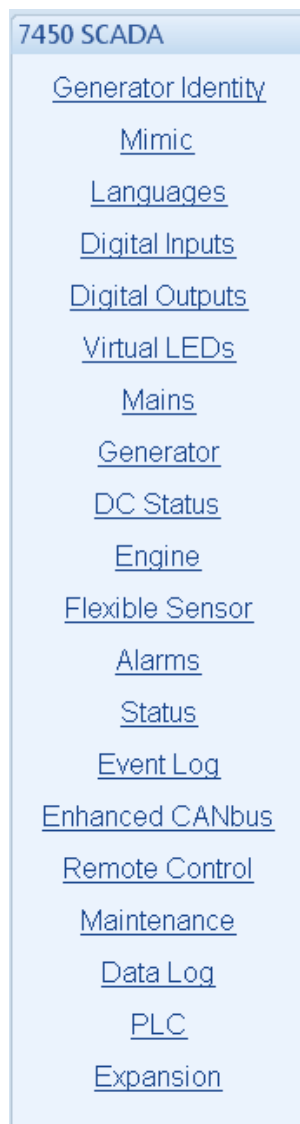
5 SCADA

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 is to check the operation of the controller's inputs and outputs as well as checking the generators operating parameters.



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



5.1 GENERATOR IDENTITY

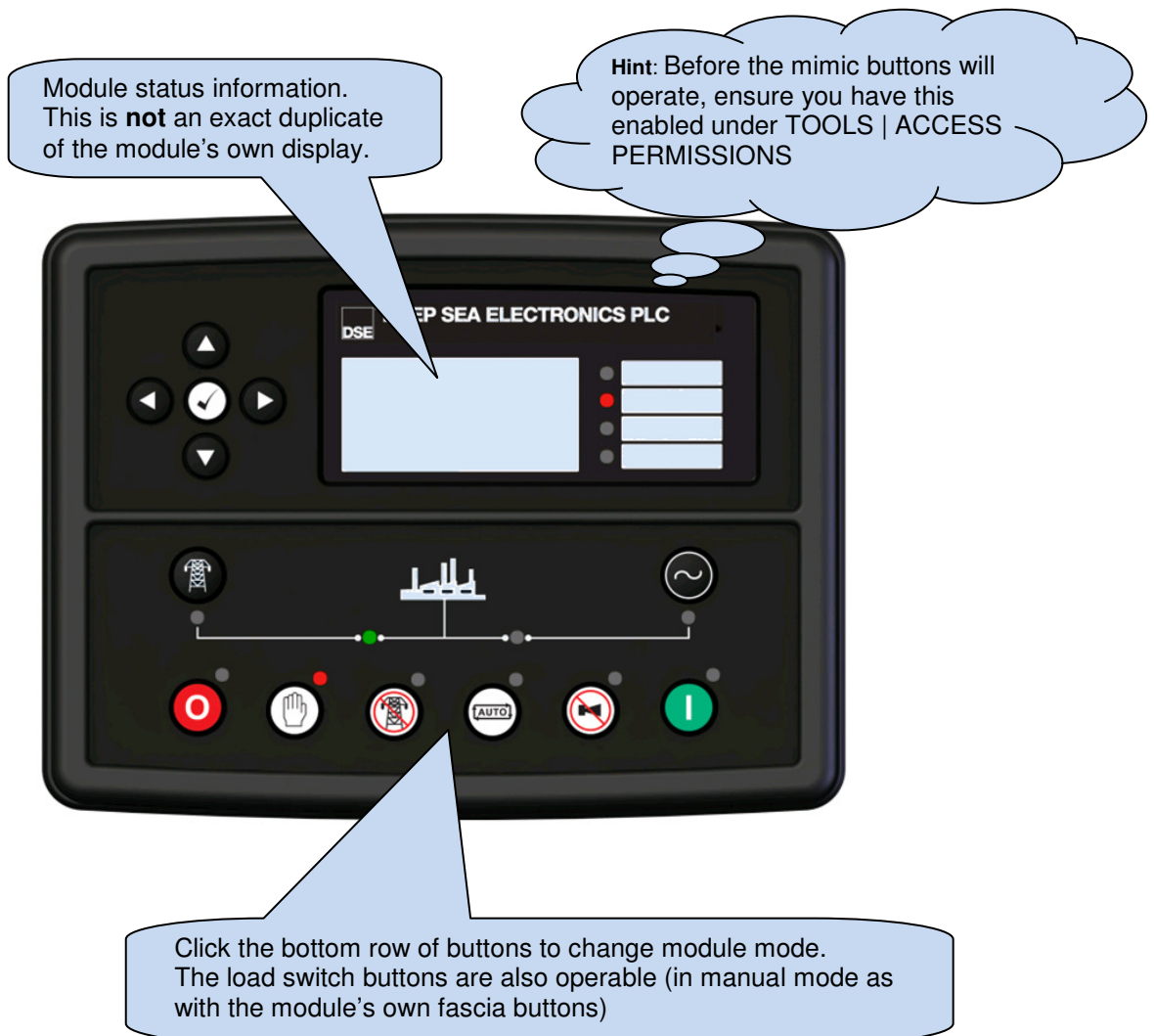
Shows the module's current settings for *Site ID* and *genset ID*. This information is particularly helpful when the current connection is made remotely by modem or internet for example or when the connected set is one of a number of sets on an RS485 data link.

Generator Identity	
Site Identity	Deep Sea Electronics Head Office
Genset Identity	Volvo TAD941 GE

5.2 MIMIC

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

Only the mode control and load switch buttons are operational in the mimic display. The menu navigation buttons are inoperable.



5.3 LANGUAGES

Current Module Language
English

To upload: Portuguese (Brazil)

Upload Now

Select *new* language

Click to send the new language to the module

5.4 DIGITAL INPUTS

Digital Inputs

	Active	Open / Closed
A Digital Input A	●	⏏
B Digital Input B	●	⏏
C Digital Input C	●	⏏
D Digital Input D	●	⏏
E Digital Input E	●	⏏
F Digital Input F	●	⏏
G Digital Input G	●	⏏
H Digital Input H	●	⏏
I Digital Input I	●	⏏
J Digital Input J	●	⏏
Emergency Stop		⏏

Shows if the input channel is active or not.

State of the input (open or closed to battery negative)

Shows if the input channel is active or not. This input is *open* but is active. The input is configured to be *open to activate*

State of the Emergency stop input (open or closed to battery positive). This input **MUST** be closed to battery positive for *normal* operation. If the input is open, the set will be stopped if it's already running and will not be allowed to start.

5.5 DIGITAL OUTPUTS

Digital Outputs (Supplied from Emergency Stop Input)			
		Active	Open / Closed
A	Fuel Relay		
B	Start Relay		

Digital Outputs (Volts Free)			
		Active	Open / Closed
C (N/C)	Close Mains Output		
D	Close Gen Output		

Digital Outputs (DC Supply Out)			
		Active	Open / Closed
E	Not Used		
F	Not Used		
G	Not Used		
H	Not Used		

Shows if the output channel is active or not. This output is *opened* but is active. The output is configured to be *Close Mains de-energise*. As the relay is normally closed (N/C) and the *Close Mains* source is not present, the relay is *activated* to *open* the N/C relay.

State of the output (open or closed)

5.6 VIRTUAL LEDs

Shows the state of the *virtual LEDs*. These LEDs are not fitted to the module or expansion modules, they are not physical LEDs. They are provided to show status and appear only in the SCADA section of the configuration suite, or are read by third party PLC or Building Management Systems (for example) using the modbus RTU protocol.

Virtual LEDs		
LED Status		
		Active
LED 1	Auto Mode	
LED 2	Common Alarm	
LED 3	Battery High Voltage	
LED 4	Alarm Mute	
LED 5	Panel Locked	
LED 6	Air Flap Relay	
LED 7	Start Relay	
LED 8	Generator At Rest	
LED 9	Alarm Reset	
LED 10	Oil Pressure Sender Open Circuit	
LED 11	Not Used	
LED 12	Not Used	
LED 13	Not Used	
LED 14	Not Used	
LED 15	Not Used	
LED 16	Not Used	
LED 17	Not Used	
LED 18	Not Used	
LED 19	Not Used	
LED 20	Not Used	

Shows if the Virtual LED is active or not

Shows what the Virtual LED is configured for (shows the LED number if not configured)

5.7 MAINS

Shows the modules measurements of the mains supply

Mains		
Frequency		
0.0 Hz		
Phase to Neutral Voltages		
L1 - N 0.0 v	L2 - N 0.0 v	L3 - N 0.0 v
Phase to Phase Voltages		
L1 - L2 0.0 v	L2 - L3 0.0 v	L3 - L1 0.0 v
Phase Rotation		
Indeterminate		

5.8 GENERATOR

5.8.1 FREQUENCY AND VOLTAGES

Shows the modules measurements of the supply.

Generator		
Frequency		
0.0 Hz		
Phase to Neutral Voltages		
L1 - N 0.0 v	L2 - N 0.0 v	L3 - N 0.0 v
Phase to Phase Voltages		
L1 - L2 0.0 v	L2 - L3 0.0 v	L3 - L1 0.0 v
Phase Rotation		
Indeterminate		

5.8.2 AVR INTERFACE

NOTE: These settings are not stored in the module configuration. They are stored in a different memory area and not transferred with the configuration. The *Backup Module* feature transfers both the configuration AND the settings of the Multiset, Governor/AVR interface and the Sync page.

The screenshot shows the AVR Interface control panel with the following sections and callouts:

- Speed And Frequency:** Displays Engine Speed and Generator Frequency. Callout: "Displays the engine speed and the generator frequency".
- AVR:** Includes a slider for Centre (SW1) at 0.00 V and a Reset button.
- Voltages and Current:** Displays Plant Battery Voltage and Total Current. Callout: "Displays plant battery voltage and current".
- Charge Current Limit:** Includes a slider for Limit at 0 A.
- Phase To Neutral Voltages:** Displays L1 - N, L2 - N, and L3 - N. Callout: "Displays generator voltages".
- Phase To Phase Voltages:** Displays L1 - L2, L2 - L3, and L3 - L1.

Parameter	Description
Centre (SW1)	Allows the adjustment of the AVR analogue output voltage when running in Manual mode and in Auto mode when <i>Manual Control Scheme</i> is selected. The SW1 setting is equal to the voltage of the AVR analogue output.
Charge Current Limit	When <i>Manual Control Scheme</i> is selected and the battery charge current exceeds the configurable <i>Charge Current Limit</i> , the AVR analogue output voltage is reduced based on the configurable <i>Ramp Rate</i> . The AVR analogue output voltage stays at this level when the battery charge current drops below the <i>Charge Current Limit</i> . When <i>Fixed Control Scheme</i> is selected and the battery charge current exceeds the configurable <i>Charge Current Limit</i> , the AVR analogue output voltage is reduced based on the configurable <i>Ramp Rate</i> . Once the battery charge current drops below the <i>Charge Current Limit</i> , the AVR analogue output is set back to the <i>Running Voltage</i> level.

5.8.3 DC SETTINGS STATUS

Shows the modules measurements of the DC Status

DC Settings
Plant Battery Status
Current and Power
Plant Battery Maintenance

5.8.3.1 PLANT BATTERY STATUS

Shows the Battery status

Plant Battery Status	
Battery Run Time 0s	Battery Charge Cycles 0
Battery Voltage 0.0 V	Battery Charge Mode Discharging
Battery Discharge % 100.0 %	Battery Charge % 0.0 %
Battery Temperature ---	Battery Power % 0.0 %

5.8.3.2 CURRENT AND POWER

Shows the Battery Maintenance Status

Current and Power			
Current		Power	
Plant Battery:	0.0 A	Charger:	0.0 kW
Load:	0.0 A	Load:	0.0 kW
Total:	0.0 A	Plant Battery:	0.0 kW
		Total:	0.0 kW

5.8.3.3 PLANT BATTERY MAINTENANCE

Shows the Battery Maintenance Status

The screenshot displays a web-based interface for 'Plant Battery Maintenance'. It features three vertically stacked panels, each representing a different battery maintenance alarm. Each panel has a title bar, three data fields, a 'Reset' button, and a descriptive instruction.

Plant Battery Maintenance

Battery Maintenance Alarm 1

Running Time Until Next Maintenance

Date Of Next Maintenance

Battery Cycles to Next Maintenance

Reset

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

Battery Maintenance Alarm 2

Running Time Until Next Maintenance

Date Of Next Maintenance

Battery Cycles to Next Maintenance

Reset

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

Battery Maintenance Alarm 3

Running Time Until Next Maintenance

Date Of Next Maintenance

Battery Cycles to Next Maintenance

Reset

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

5.9 ENGINE

Shows the modules measurements of the engine parameters.

Coolant Temperature 51 °C, 124 °F	Plant Battery 11.4 v DC
Oil Pressure 3.65Bar, 52.94 PSI, 365 KPa	Charge Alternator 0.8 v DC
Speed 1500 RPM	Hours Run 01:58
Fuel Level Low	Number of Starts 62

5.10 FLEXIBLE SENSOR

Shows the measurement of the Flexible Sensor (If configured)

Flexible Senders
Not Used
Not Used
Not Used

5.11 ALARMS

Shows any present alarm conditions.

For a description of the different alarm types, see the section entitled *Alarm Types* elsewhere in this manual.

The image shows a software interface for monitoring alarms. It consists of a main container titled "Alarms" which is divided into four distinct sections, each with a header and a corresponding empty display area:

- Shutdown alarms**: The top section, currently empty.
- Engine Alarms**: The second section, currently empty.
- Electrical trip alarms**: The third section, currently empty.
- Warning Alarms**: The bottom section, currently empty.

5.12 STATUS

Shows the module's current status.

The status dashboard is organized into several sections:

- Supervisor State:** Generator At Rest
- Software Version:** 1.0
- Engine/Generator State:** Engine At Rest
- Module ID:** 217E1D726
- Mains Detection State:** Mains Failed
- Mode:** Represented by a red circle with a white center on a black background.
- Load Switching State:** Mains On Load
- Protections:** Enabled

5.13 EVENT LOG

Shows the contents of the module's event log.

#	Date	Time	Hours Run	Event	Details
1	02/10/2008	11:41:20	0:12	Shutdown	Oil Pressure Sensor Open Circuit
2	02/10/2008	11:41:19	0:12	Mains	Mains fail
3	02/10/2008	11:41:18	0:12	Restart	Power Up
4	28/09/2008	08:24:43	0:12	Shutdown	Oil Pressure Sensor Open Circuit
5	28/09/2008	08:24:42	0:12	Mains	Mains fail
6	28/09/2008	08:24:40	0:12	Restart	Power Up
7	27/09/2008	07:48:17	0:12	Shutdown	Oil Pressure Sensor Open Circuit
8	27/09/2008	07:48:16	0:12	Mains	Mains fail
9	27/09/2008	07:48:14	0:12	Restart	Power Up
10	27/09/2008	07:31:00	0:12	Shutdown	Oil Pressure Sensor Open Circuit
11	27/09/2008	07:30:59	0:12	Mains	Mains fail
12	27/09/2008	07:30:57	0:12	Restart	Power Up
13	26/09/2008	07:48:19	0:12	Shutdown	Oil Pressure Sensor Open Circuit
14	26/09/2008	07:48:18	0:12	Mains	Mains fail
15	26/09/2008	07:48:17	0:12	Restart	Power Up
16	26/09/2008	07:45:58	0:12	Restart	Power Up
17	26/09/2008	06:54:11	0:12	Shutdown	Oil Pressure Sensor Open Circuit
18	26/09/2008	06:54:10	0:12	Mains	Mains fail
19	26/09/2008	06:54:09	0:12	Restart	Power Up
20	25/09/2008	08:56:38	0:12	Shutdown	Oil Pressure Sensor Open Circuit
21	25/09/2008	08:56:37	0:12	Mains	Mains fail
22	25/09/2008	08:56:35	0:12	Restart	Power Up
23	25/09/2008	08:52:50	0:12	Mains	Mains fail
24	25/09/2008	08:52:48	0:12	Restart	Power Up
25	25/09/2008	06:55:04	0:12	Shutdown	Oil Pressure Sensor Open Circuit
26	25/09/2008	06:55:03	0:12	Mains	Mains fail

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

Click to save the log to an Excel or csv file for use in an external spreadsheet program

Click to save the log to a pdf (Adobe Acrobat) file

Click to print the log

5.14 ENHANCED CANBUS




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 Temp. 1 Temp. 2	Coolant Pressure Press. 1 Press. 2
Fuel Pressure Press. 1 Press. 2	Turbo Pressure Press. 1 Press. 2
Total Fuel Used	Fuel Consumption

5.15 REMOTE CONTROL

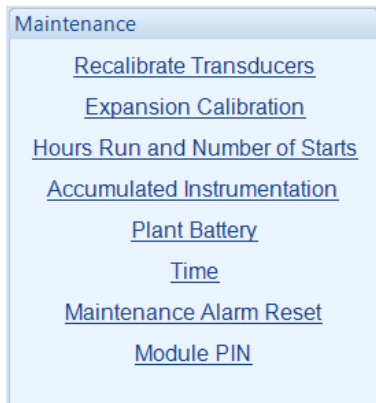
The remote control section of the SCADA section is used for monitoring and control of module 'remote control' sources.

Any of the module outputs, expansion outputs, LED indicators, or remote Annunciator LEDs are configured to *Remote Control 1-10*. This output source is energised/de-energised by click the respective check box as shown below in the *Activate* column below.

Remote Control		
Remote Control Sources		
Control	Activate	Active
1	<input checked="" type="checkbox"/>	
2	<input type="checkbox"/>	
3	<input type="checkbox"/>	
4	<input checked="" type="checkbox"/>	
5	<input type="checkbox"/>	
6	<input type="checkbox"/>	
7	<input checked="" type="checkbox"/>	
8	<input type="checkbox"/>	
9	<input type="checkbox"/>	
10	<input type="checkbox"/>	

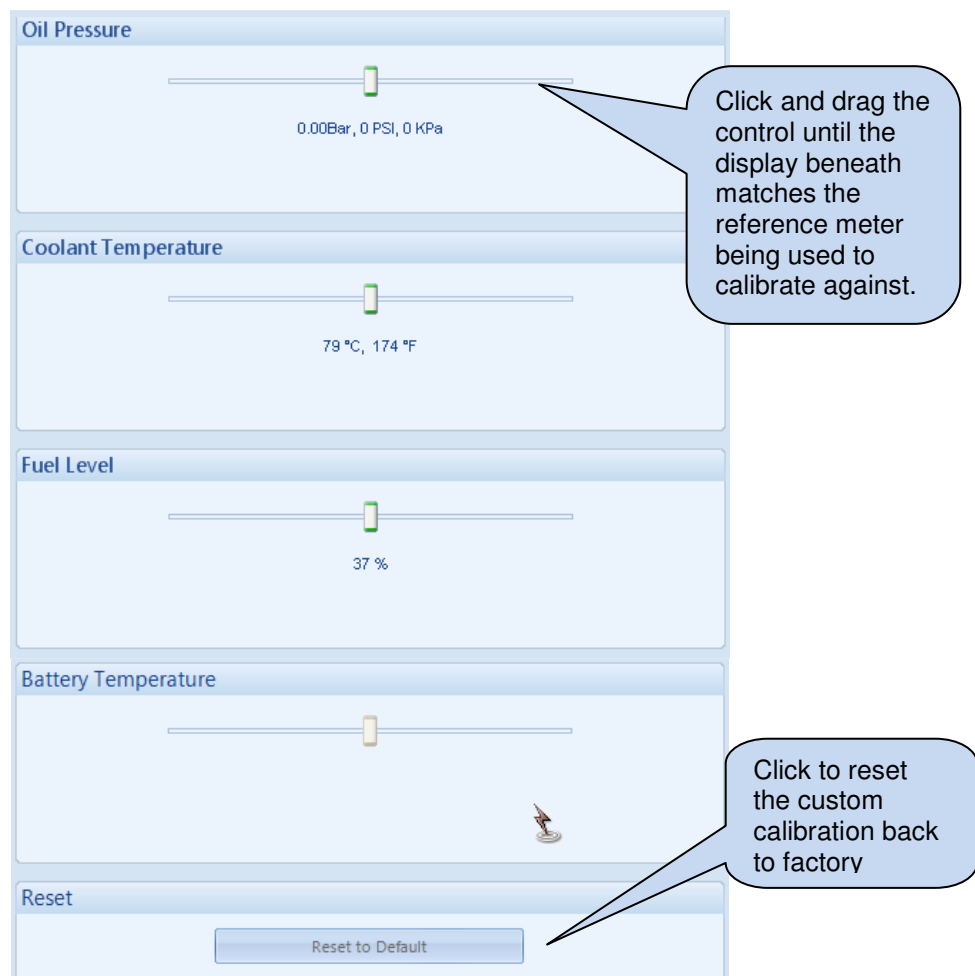
5.16 MAINTENANCE

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



5.16.1 RECALIBRATE TRANSDUCERS

This section allows the analogue sensor inputs to be calibrated to remove inaccuracies caused by the tolerance of the sensor devices. The engine runs when the instruments are calibrated and reference should be made to a third party accurate sensing device to ensure accurate recalibration.



5.16.2 EXPANSION CALIBRATION

This section allows the analogue sensor inputs of the DSE2130 input expansion modules to be calibrated to remove inaccuracies caused by the tolerance of the sensor devices. The engine runs when the instruments are calibrated and reference should be made to a third party accurate sensing device to ensure accurate recalibration.

- [Expansion Calibration](#)
- [2130 DSENet ID 0](#)
- [2130 DSENet ID 1](#)
- [2130 DSENet ID 2](#)
- [2130 DSENet ID 3](#)
- [2131 DSENet ID 0](#)
- [2131 DSENet ID 1](#)
- [2131 DSENet ID 2](#)
- [2131 DSENet ID 3](#)

5.16.3 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 configuration panels. The top panel, titled 'Hours Run', displays 'Hours Run: 02:01' with a numeric keypad and a 'Set' button. A callout box points to this panel with the text: 'Type the value or click the up and down arrows to change the settings'. The bottom panel, titled 'Number of Starts', displays 'No. of Starts: 62' with a numeric keypad and a 'Set' button. A callout box points to this panel with the text: 'Click to perform the adjustment on the module'.

5.16.4 ACCUMULATED INSTRUMENTATION

Allows the user to view or change the module's accumulated instrumentation.

The screenshot displays the 'Accumulated Instrumentation' interface, which is organized into several sections, each with a 'Reset' button:

- Load:** Shows 'kWh:' with a 'Reset' button. A callout indicates: 'Click *Reset* to reset the relevant accumulated instrument'.
- Generator:** Shows 'kWh:' with a 'Reset' button. A callout indicates: 'Display of the module's current value for the parameter'.
- Mains:** Shows 'kWh:' with a 'Reset' button.
- Battery Charging:** Shows 'kWh:' with a 'Reset' button.
- Battery Discharged:** Shows 'kWh:' with a 'Reset' button.
- Battery Charge Cycles:** Shows 'Cycles:' with a 'Reset' button.
- Reset:** Contains a 'Reset all values to zero' button. A callout indicates: 'Click to reset all the accumulated instrumentation counters to zero.'

5.16.5 PLANT BATTERY

Plant Battery

Battery Charge %

Battery Charge %

NOTE : When the float charging is disabled, the DSE7450 is not able to detect the Plant Battery's properties, therefore the user must fully charge the Plant Battery and then set the **Battery Charge %** to 100%.
 If the **Charge Efficiency %** is inaccurate, the **Battery Charge %** has loss of accuracy when charging.

5.16.6 TIME

Module Date

18/10/2007

Module Time

04:52:39

Set Date and Time

Date

Time

Set to PC Time

Date

18/10/2007

Time

10:52:41

Display of the module's current date and time


Type the new date / time or click the up and down arrows to change the settings

Click Set to adjust the module to the selected date/time.

Click Set to adjust the module to the date/time that your PC is set to.

5.16.7 MAINTENANCE ALARM RESET

Three maintenance alarms active in the control module. Each is reset individually; only one alarm is shown below for clarity.



Maintenance Alarm Reset

Maintenance Alarm 1

Running Time Until Next Maintenance
250:00

Date Of Next Maintenance
11/04/2016
20:51:16

Reset

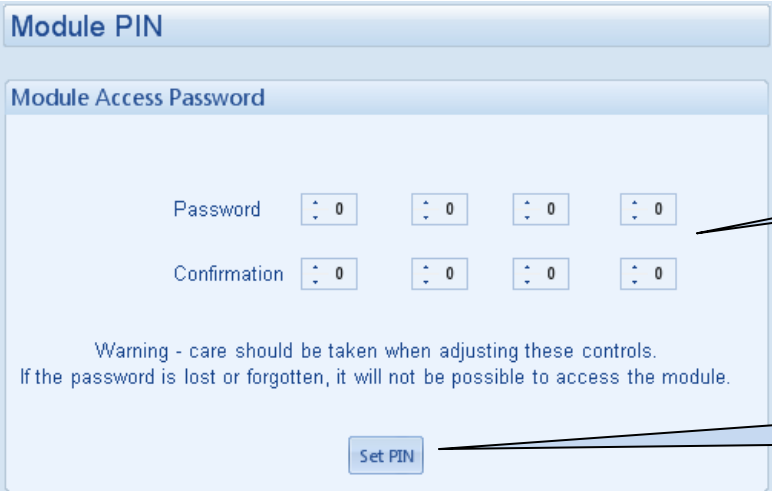
Press reset to schedule next maintenance,
based upon module's maintenance configuration.

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

5.16.8 MODULE PIN

NOTE : If the PIN is lost or forgotten, it is not 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 is sent to the controller from the PC software.



Module PIN

Module Access Password

Password : 0 : 0 : 0 : 0

Confirmation : 0 : 0 : 0 : 0

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.

Set PIN

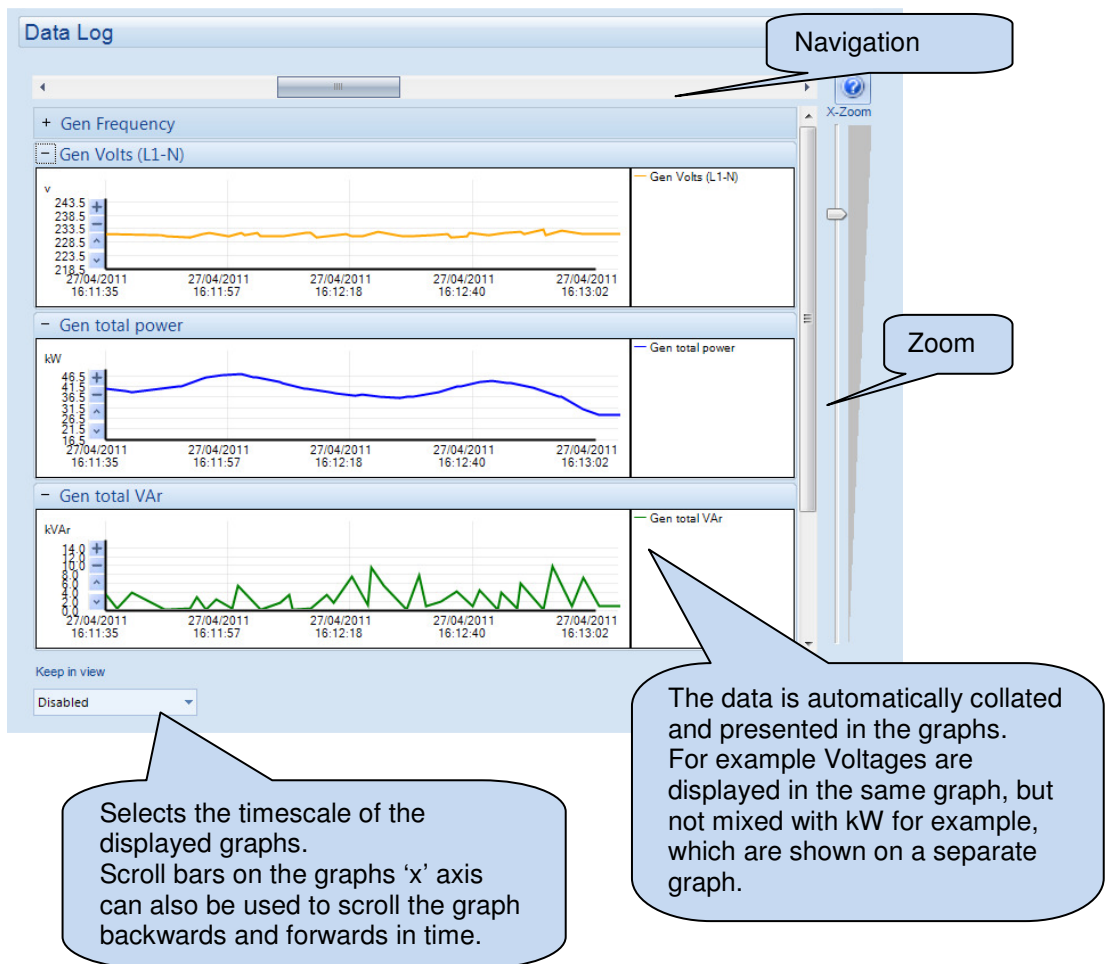
Enter the desired PIN number and reconfirm.

Click to set the PIN number in the module.

5.17 DATALOG

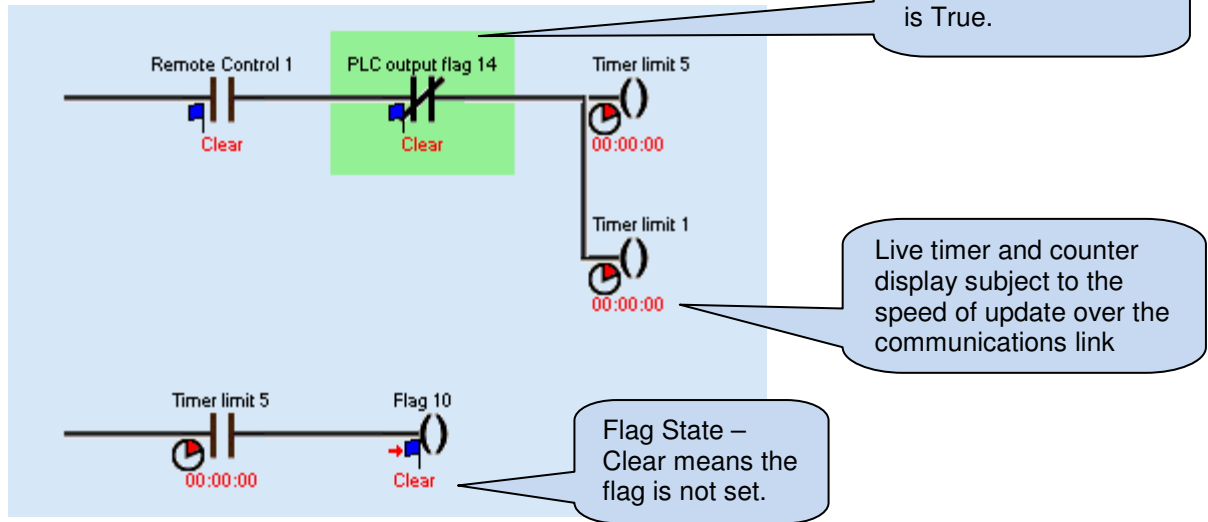
Allows viewing of the module datalog (if configured).

NOTE: Data logging is a 'live' function – Maximum 8hrs duration is shown so long as the PC is left connected to the controller.

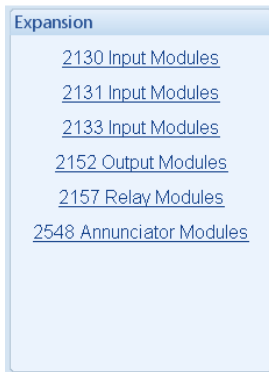


5.18 PLC

Allows monitoring of the PLC functions within the controller.



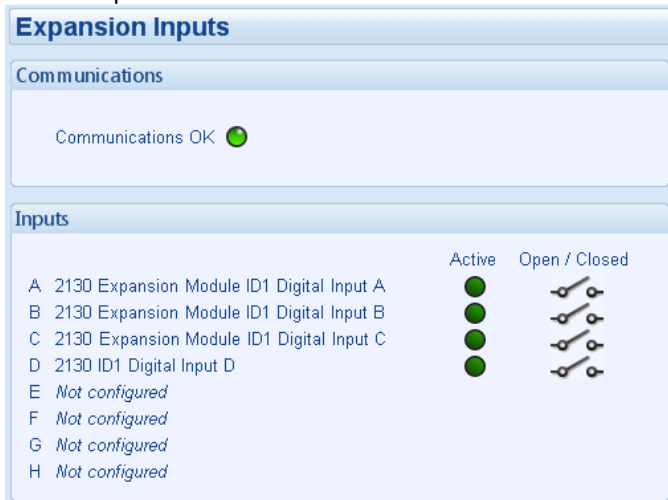
5.19 EXPANSION



5.19.1 EXPANSION INPUTS

Allows monitoring of the controller's expansion modules (if fitted)

For example:



6 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.
Generator Locked Out	This Alarm is present when an active alarm is present preventing the generator from starting. It is advisable to look in the Alarms page of the control module either using the front panel or through SCADA. The alarm needs to be investigated and the alarm reset before the "Generator Locked out" clears.

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