



DEEP SEA ELECTRONICS
DSE335 MKII Configuration Suite
PC Software Manual

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DSE335 MKII Configuration Suite PC Software Manual

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Amendments List

Amd. No.	Comments
1	Initial release.
2	Update to correct check sync description.
3	Master/Slave terminology updated to Client/Server
4	Added Ethernet and Modbus over TCP/IP

Typeface: The typeface used in this document is *Arial*. Care must 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 INTRODUCTION

This document details the use of the *DSE Configuration Suite PC Software* with the 335 MKII module, which is part of the DSEATS® range of products.

The manual forms part of the product and should be kept for the entire life of the product. If the product is passed or supplied to another party, ensure that this document is passed to them for reference purposes.

This is not a *controlled document*. DSE do not automatically inform on updates. Any future updates of this document are included on the DSE website at www.deepseaelectronics.com




The *DSE Configuration Suite PC Software* allows the 335 MKII module to be connected to a PC via USB A to USB B cable (USB printer cable). Once connected, the software allows easy, controlled access to various operating parameters within the module which can then be viewed and edited as required.

The *DSE Configuration Suite PC Software* must 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 must 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. Separate manuals deal with the operation of the individual module and its ancillaries, refer to section entitled *Bibliography* elsewhere in this document.

1.1 CLARIFICATION OF NOTATION

Clarification of notation used within this publication.

	NOTE:	Highlights an essential element of a procedure to ensure correctness.
	CAUTION!	Indicates a procedure or practice, which, if not strictly observed, could result in damage or destruction of equipment.
	WARNING!	Indicates a procedure or practice, which could result in injury to personnel or loss of life if not followed correctly.

1.2 GLOSSARY OF TERMS

Term	Description
DSE355 MKII	DSE355 MKII module/controller
ATS	Automatic Transfer Switch. An Automatic Transfer Switch is a type of transfer panel used with a diesel generator to automatically switch between the mains and generator in the event of a power failure.
BMS	Building Management System. A digital/computer based control system for a building's infrastructure.
CT	Current Transformer. An electrical device that takes a large AC current and scales it down by a fixed ratio to a smaller current.
GSM	Global System for Mobile communications. Cell phone technology used in most of the World.
LCD	Liquid Crystal Display. A flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers.
LED	Light Emitting Diode. A semiconductor device that emits light when an electric current passes through it.
LSB	Least Significant Bit The least significant bit is the bit which is farthest to the right and holds the least value in a multi-bit binary number.
MSB	Most Significant Bit The most significant bit is the bit which is farthest to the left and holds the largest value in a multi-bit binary number.
PIN	PIN number. A four digit number used to access the modules Main Front Panel Configuration Editor.
PLC	Programmable Logic Controller. A programmable digital device used to create logic for a specific purpose.
RTU	Remote Terminal Unit. A Remote Terminal Unit (RTU) is a microprocessor-controlled electronic device that interfaces objects in the physical world to a distributed control system or SCADA (Supervisory Control and Data Acquisition) system.
SCADA	Supervisory Control And Data Acquisition. A system that operates with coded signals over communication channels to provide control and monitoring of remote equipment
USB	Universal Serial Bus. An industry standard that allows data exchange and delivery of power between many various types of electronics.

1.3 BIBLIOGRAPHY

This document refers to, and is referred by the following DSE publications which are obtained from the DSE website: www.deepseaelectronics.com or by contacting DSE technical support: support@deepseaelectronics.com.

1.3.1 INSTALLATION INSTRUCTIONS

Installation instructions are supplied with the product in the box and are intended as a 'quick start' guide only.

DSE Part	Description
053-032	DSE2548 LED Expansion Annunciator Installation Instructions
053-033	DSE2130 Input Expansion Installation Instructions
053-034	DSE2157 Output Expansion Installation Instructions
053-272	DSE335 MKII Installation Instructions

1.3.2 MANUALS

Product manuals are obtained from the DSE website: www.deepseaelectronics.com or by contacting DSE technical support: support@deepseaelectronics.com.

DSE Part	Description
057-082	DSE2130 Input Expansion Operator Manual
057-083	DSE2157 Output Expansion Operator Manual
057-084	DSE2548 Annunciator Expansion Operator Manual
057-151	DSE Configuration Suite PC Software Installation & Operation Manual
057-175	PLC Programming Guide For DSE Controllers
057-368	DSE335 MKII Operator Manual
N/A	DSEGencomm (MODBUS protocol for DSE controllers)

1.3.3 TRAINING GUIDES

Training guides are provided as 'hand-out' sheets on specific subjects during training sessions and contain specific information regarding to that subject.

DSE Part	Description
056-005	Using CTs With DSE Products
056-017	PC Configuration Interfacing
056-018	Negative Phase Sequence
056-019	Earth Fault Protection
056-021	Mains Decoupling
056-022	Switchgear Control
056-026	kVA, kW, kvar and Power Factor
056-030	Module PIN Codes
056-036	DSE Module Expansion
056-051	Sending DSEGencomm Control Keys
056-069	Firmware Update
056-075	Adding Language Files
056-076	Reading DSEGencomm Alarms
056-079	Reading DSEGencomm Status
056-080	MODBUS
056-091	Equipotential Earth Bonding
056-097	USB Earth Loops and Isolation
056-099	Digital Output to Digital Input Connection

1.3.4 THIRD PARTY DOCUMENTS

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
ISBN 0-7506-1147-2	Diesel Generator Handbook. L.L.J. Mahon
ISBN 0-9625949-3-8	On-Site Power Generation. EGSA Education Committee.

1.4 INSTALLATION AND USING THE DSE CONFIGURATION SUITE SOFTWARE

For information in regard to installing and using the *DSE Configuration Suite PC Software*, refer to DSE publication: **057-151 DSE Configuration Suite PC Software Installation & Operation Manual** which is found on the DSE website: www.deepseaelectronics.com

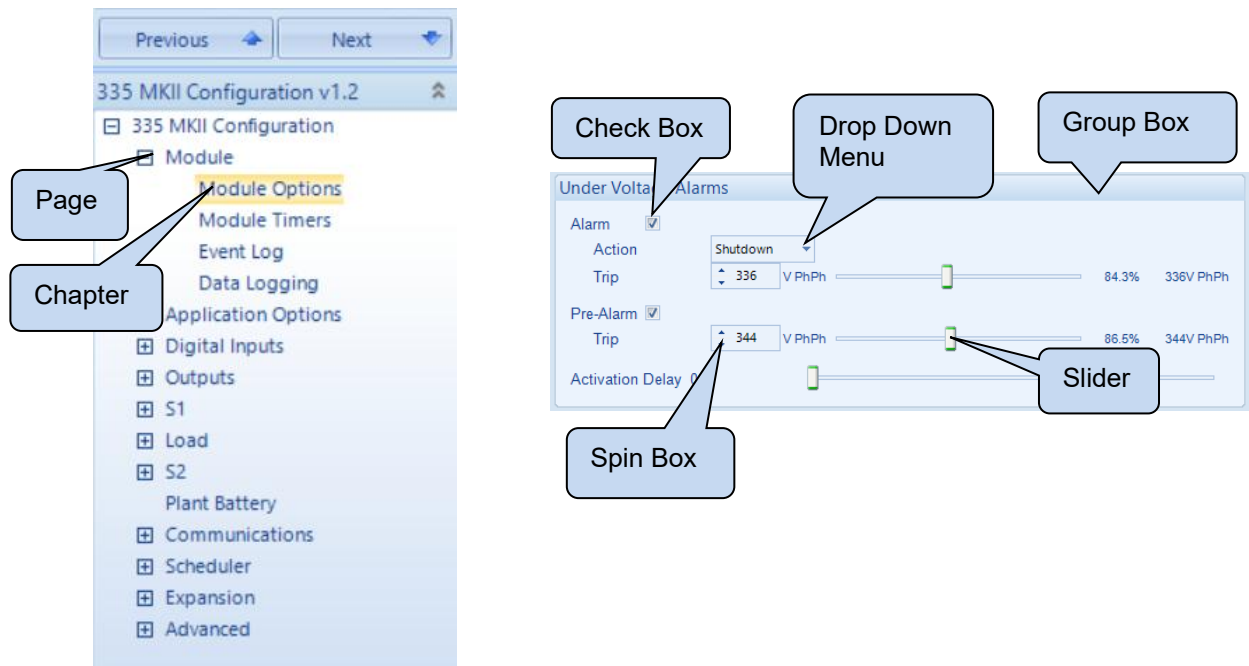
1.5 GENERAL CONTROLS

NOTE: For information on Menu & Toolbars please refer to DSE Publication: 057-151 *DSE Configuration Suite PC Software Installation & Operation Manual*

1.5.1 OVERVIEW

The *DSE Configuration Suite PC Software* dialog boxes provide the user with a way to type text, choose options, and initiate actions. Controls in other windows provide a variety of services, such as letting the user choose commands and view and edit text. This section describes the controls provided by the *DSE Configuration Suite* and how to manipulate them.

The diagram below shows the general controls of the main configuration screen.

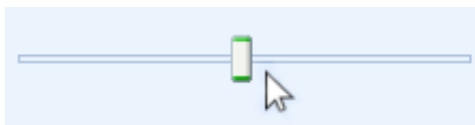


1.5.2 USER CONTROLS

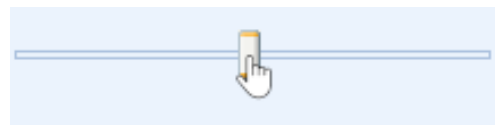
Slider

The Slider Control allows the user to change a value using a mouse or arrows found on a standard keyboard.

The slider is highlighted in green in its inactive state and is highlighted orange (active state) after selection by the mouse pointer.



Inactive state

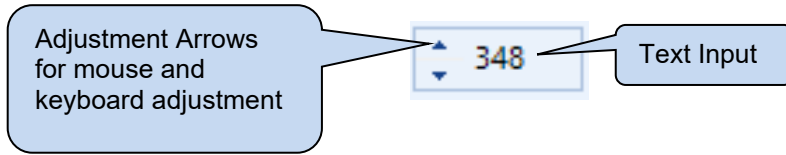


Active state

During the active state, the slider is moved with the mouse pointer and the left and right keyboard arrows.

Spin Box

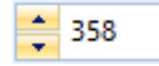
The Spin box displays the current value of the setting in the group box.



The Spin box is in its active state (orange) after a left mouse click.



Inactive state



Active state

During the active state text is entered using the keyboard, changed using the mouse pointer or the up and down arrows on the keyboard.

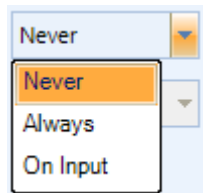
Check Box

Commonly used to enable or disable specific features or settings within an application.

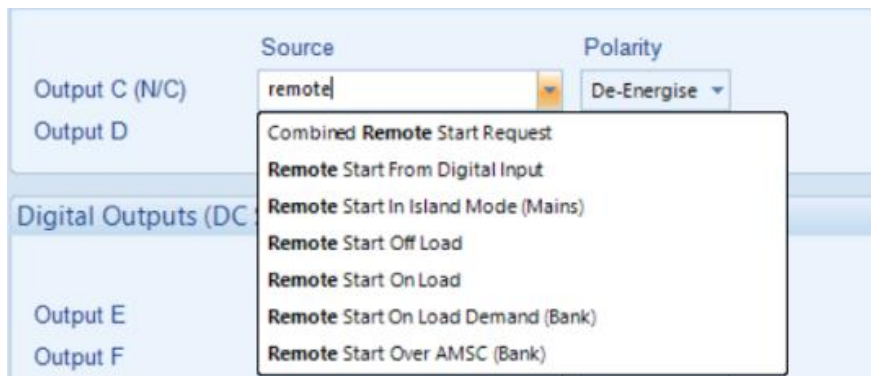


Drop-down Menu

Drop-down menus are used to organise and display a hierarchical list of options, allowing users to easily navigate between subcategories and select the desired choice.



The *Source* parameter in the *Digital Outputs* section, allows users to input text from the keyboard as a simple means to locate the desired setting.



2 EDITING THE CONFIGURATION

The software is broken down into separate sections to provide simple navigation whilst editing the module's configuration to suit a particular application.

2.1 SCREEN LAYOUT

The screenshot shows a software interface for editing the configuration of a 335 MKII module. At the top, there are 'Previous' and 'Next' buttons. Below them is a breadcrumb trail: '335 MKII Configuration v1.2' > '335 MKII Configuration' > 'Module' > 'Module Options' (highlighted in yellow). A list of sub-sections follows: 'Module Timers', 'Event Log', 'Data Logging', 'Application Options', 'Digital Inputs', 'Outputs', 'S1', 'Load', 'S2', 'Plant Battery', 'Communications', 'Scheduler', 'Expansion', and 'Advanced'. At the bottom of the interface are 'Back' and 'Forward' buttons. A callout points to the 'Previous' button: 'Move to the Previous or Next configuration page.' Another callout points to the top right corner: 'Close this configuration file.' A callout points to the yellow highlight: 'The coloured shading shows the currently selected page.' A callout points to the expand/collapse icons: 'Click + or - to show or hide the sub settings within each sections.' A callout points to the 'Back' button: 'Step forward or backward through previously viewed pages.' A callout points to the 'Forward' button: 'Click to return to this page at any time.' A callout points to the 'S1' link in the left sidebar: 'Click to select the subsection to view / edit.'

335 MKII Configuration v1.2

- 335 MKII Configuration
 - Module
 - Module Options
 - Module Timers
 - Event Log
 - Data Logging
 - Application Options
 - Digital Inputs
 - Outputs
 - S1
 - Load
 - S2
 - Plant Battery
 - Communications
 - Scheduler
 - Expansion
 - Advanced

Back Forward

335 MKII Configuration

- Module
- Application Options
- Digital Inputs
- Outputs
- S1
- Load
- S2
- Plant Battery
- Communications
- Scheduler
- Expansion
- Advanced

S2 Voltage

L1-N	0v
L2-N	0v
L3-N	0v

S1 S2

0 Mode i

2.2 MODULE

The *Module* section allows the user to edit options related to the module itself and is subdivided into smaller sections.



2.2.1 MODULE OPTIONS

Description

A screenshot of the 'Module Options' configuration page. At the top, there is a header bar labeled 'Module Options'. Below it is a section titled 'Description' which contains four numbered text input fields (1, 2, 3, 4) for entering configuration details.

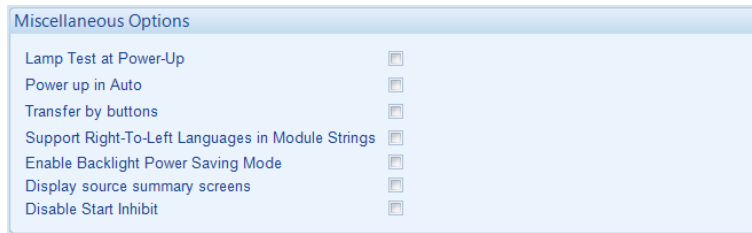
Parameter	Description
Description	Four free entry boxes to allow the user to give the configuration file a description. Typically used to enter the job number, customer name, engine information etc. This text is not shown on the module's display and is only seen in the configuration file.








LED Indicators

A screenshot of the 'LED Indicators' configuration page. It features four rows of configuration options for LEDs 1 through 4. Each row includes a dropdown menu for 'Function' (all set to 'Not Used'), a dropdown for 'Polarity' (all set to 'Lit'), and a dropdown for 'Colour' (all set to 'Red'). To the right of these is an 'Insert Card Text' section with four text input fields and two buttons: 'Text Insert' and 'Logo Insert'.

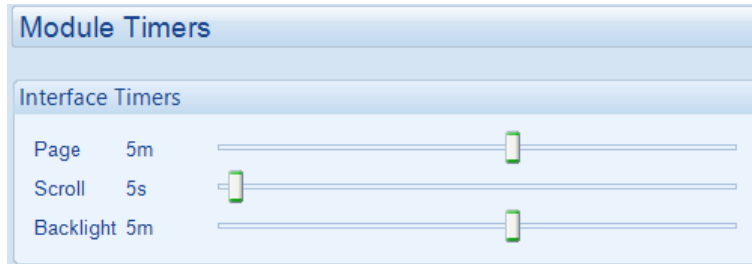
Parameter	Description
Function	Allows the user to assign an output source to an LED indicator which are to the right of the module's LCD. For details on potential choices, see section entitled <i>Output Sources</i> elsewhere in this document.
Polarity	Lit: When the output source is true, the LCD indicator activates. Unlit: When the output source is true, the LCD indicator de-activates.
Colour	Select the colour of the LED when active: Red Green
Insert Card Text	Enter custom text to print on the text insert for the LEDs.
Text Insert	Allows the user to print the custom text insert cards for the LEDs.
Logo Insert	Allows the user to choose and print an image for the logo insert above the LCD.


Miscellaneous Options



Parameter	Description
Lamp Test at Power Up	<input type="checkbox"/> = Lamp test at power up is disabled. <input checked="" type="checkbox"/> = All module lamps illuminate when power is first applied.
Power Up in Auto	<input type="checkbox"/> = The module enters Start Inhibit Mode  when DC power is applied. <input checked="" type="checkbox"/> = The module enters Auto Mode  when DC power is applied.
Transfer by Buttons	<input type="checkbox"/> = Fascia load control buttons S1 & S2 are disabled. <input checked="" type="checkbox"/> = Fascia load control buttons S1 & S2 are enabled when the module is in Manual Mode  .
Support Right-Left Languages in Module Strings	<input type="checkbox"/> = The <i>Support Right-To-Left Languages in Module Strings</i> is disabled. The module displays user configured strings in the order left to right. <input checked="" type="checkbox"/> = The <i>Support Right-To-Left Languages in Module Strings</i> is enabled. The module displays user configured strings in the order right to left.
Enable Backlight Power Saving Mode	<input type="checkbox"/> = The LCD Backlight stays On at all times. <input checked="" type="checkbox"/> = The module conserves DC power by deactivating the LCD Backlight when it is not in use after the <i>Backlight Timer</i> has expired.
Display Source Summary Screens	<input type="checkbox"/> = Source Summary Screens are not shown on the module display <input checked="" type="checkbox"/> = Additional screens for the two sources are shown the module display.
Disable Start Inhibit	<input type="checkbox"/> = Pressing the Start Inhibit Mode  button changes the operating mode to <i>Start Inhibit Mode</i> (therefore removing the <i>S2 Start and Run</i> output). <input checked="" type="checkbox"/> = Pressing the Start Inhibit Mode  button does not change the operating mode to Start Inhibit Mode  (the <i>S2 Start and Run</i> output remains active). This allows the user to select the Start Inhibit Mode  button to enter the FPE and clear alarms without changing the Modules Operating Mode

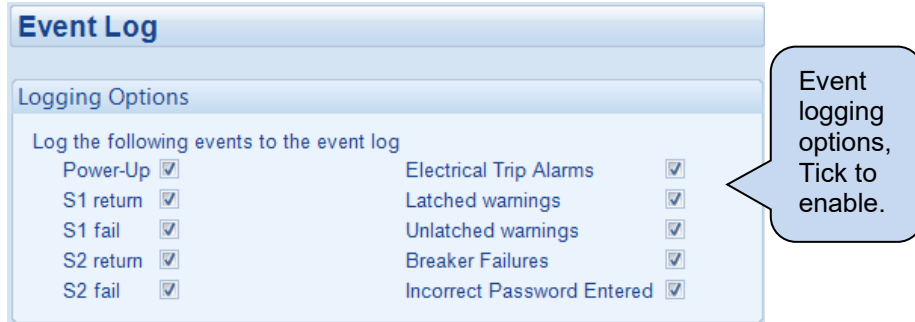
2.2.2 MODULE TIMERS



Parameter	Description
Page	If the module buttons are not pressed for the duration of the <i>LCD Page Timer</i> it reverts to show the <i>Status</i> page.
Sleep Timer	If the module is left in Start Inhibit Mode  and is at rest with no communication for the duration of the <i>Sleep Timer</i> , it goes into sleep mode to save power.
Backlight	<div style="border: 1px solid black; padding: 5px;"> <p>NOTE: To activate the Backlight, select the <i>Backlight Power Saving Mode</i> under the <i>Miscellaneous Options</i>. See section entitled <i>Module Options</i> elsewhere in this document.</p> </div> <p>Power Save Mode is enabled if the module is left unattended after the set duration has expired.</p>

2.2.3 EVENT LOG

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



Parameter	Description
Power Up	<input type="checkbox"/> = <i>Power-Up</i> events are not logged. <input checked="" type="checkbox"/> = <i>Power-Up</i> events are logged when the DC Supply is applied to the module.
S1 return	<input type="checkbox"/> = <i>S1 return</i> events are not logged. <input checked="" type="checkbox"/> = <i>S1 return</i> events are logged when the S1 source has returned.
S1 fail	<input type="checkbox"/> = <i>S1 fail</i> events are not logged. <input checked="" type="checkbox"/> = <i>S1 fail</i> events are logged when the S1 source has failed.
S2 return	<input type="checkbox"/> = <i>S2 return</i> events are not logged. <input checked="" type="checkbox"/> = <i>S2 return</i> events are logged when the S2 source has returned.
S2 fail	<input type="checkbox"/> = <i>S2 fail</i> events are not logged. <input checked="" type="checkbox"/> = <i>S2 fail</i> events are logged when the S2 source has failed.
Electrical Trip Alarms	<input type="checkbox"/> = <i>Electrical Trip Alarms</i> are not logged. <input checked="" type="checkbox"/> = <i>Electrical Trip Alarms</i> are logged when the moment they activate.
Latched warnings	<input type="checkbox"/> = <i>Latched Warnings Alarms</i> are not logged. <input checked="" type="checkbox"/> = <i>Latched Warnings Alarms</i> are logged when the moment they activate.
Unlatched warnings	<input type="checkbox"/> = <i>Unlatched Warnings Alarms</i> are not logged. <input checked="" type="checkbox"/> = <i>Unlatched Warnings Alarms</i> are logged when the moment they activate.
Breaker auxiliary failures	<input type="checkbox"/> = <i>The Breaker Auxiliary Failures</i> are not logged in the module's event log. <input checked="" type="checkbox"/> = <i>Breaker Auxiliary Failures</i> are not logged.
Incorrect Password Entered	<input type="checkbox"/> = <i>Incorrect passwords</i> are not logged. <input checked="" type="checkbox"/> = <i>Incorrect passwords</i> are logged.

2.2.4 DATA LOGGING

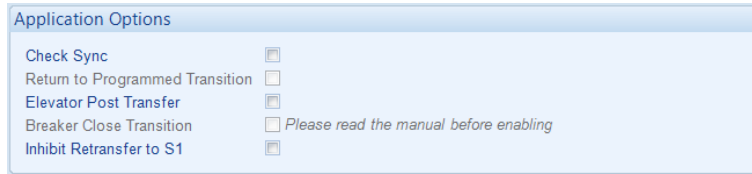
NOTE: At present, log data storage is not possible; however, it is possible to configure values and monitor them via SCADA.

The screenshot shows a configuration window titled "Data Logging". Inside, there is a section labeled "Logged data" containing a vertical list of 20 numbered dropdown menus. Each menu is currently set to "<Not Used>". A callout bubble with a pointer to the first dropdown menu contains the text "Click to select data to be logged".

Parameter	Description
Logged Data	Select the item required to be logged. Data is logged from a Specific Register, Alarms, Control, Instrumentation, or a Status item.

2.3 APPLICATION OPTIONS

Application Options



Parameter	Description
Check Sync	<p>NOTE: The module does not consider the voltage difference between the S1 and S2 supplies when <i>Check Sync</i> is enabled, only the frequency and phase difference is considered.</p> <p><input type="checkbox"/> = When <i>Check Sync</i> is disabled only open transition (break) transfers are possible.</p> <p><input checked="" type="checkbox"/> = When <i>Check Sync</i> is enabled, the module ensures that the S1 and S2 supplies are in sync before performing a changeover. For the module to detect that S1 and S2 are in sync, their frequencies and phase difference must be within ± 1 Hz and $\pm 25^\circ$.</p>
Return to programmed transition	<p>NOTE: This option is only available when <i>Check Sync</i> is enabled.</p> <p><input type="checkbox"/> = The module performs the <i>Check Sync</i> function.</p> <p><input checked="" type="checkbox"/> = If the two electrical supplies do not achieve synchronism prior to a transfer of the load within 2 minutes, an open transition (break) transfer occurs.</p>
Elevator Post Transfer	<p><input type="checkbox"/> = The configurable output set to <i>Elevator Control</i> remains active for the duration of the <i>Elevator Delay Timer</i> and then turns off after the transfer.</p> <p><input checked="" type="checkbox"/> = The configurable output set to <i>Elevator Control</i> remains active for the duration of the <i>Elevator Delay Timer</i> and for an equal duration after a load transfer has occurred.</p>
Breaker Close Transition	<p>NOTE: This option is only available when <i>Check Sync</i> is enabled.</p> <p><input type="checkbox"/> = The module performs an open transition (break) transfer.</p> <p><input checked="" type="checkbox"/> = When the option is enabled, the module performs a closed transition transfer from one source to another and performs a check sync before executing the transition.</p>
Inhibit Retransfer to S1	<p><input type="checkbox"/> = When the S1 supply is reinstated after a failure, the re-transfer back to S1 takes place.</p> <p><input checked="" type="checkbox"/> = When Inhibit Retransfer S1 is selected the load is NOT transferred back to S1 if the backup power fails and there is a request to transfer to backup. This is to prevent using very high-priced mains electricity and it is preferred to have a black out.</p>

NOTE: The *Transfer Timers* options are only available when the *Breaker Close Transition* is enabled.

Transfer Timers

Transfer Timers	
Fail to Close	250ms
Paralleling	100ms
Fail To Open	250ms

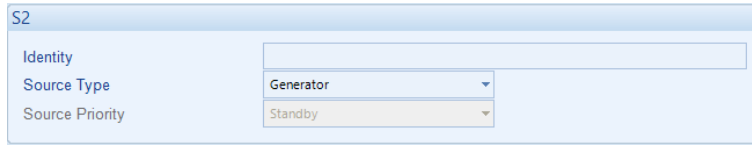
Parameter	Description
Fail to Close	When the <i>Close S1</i> or <i>Close S2</i> output is activated, if the configured <i>S1 Closed Auxiliary</i> or <i>S2 Closed Auxiliary</i> digital input respectively do not become active within the <i>Fail To Close</i> timer, the alarm is activated
Paralleling	This timer dictates how long the two supplies are closed in parallel for during the <i>Close Transition</i> .
Fail to Open	When the <i>Close S1</i> or <i>Close S2</i> output is de-activated, if the configured <i>S1 Closed Auxiliary</i> or <i>S2 Closed Auxiliary</i> digital input respectively do not deactivate within the <i>Fail To Open</i> timer, the alarm is activated

S1


S1	
Identity	<input type="text"/>
Source Type	Mains
Source Priority	Priority

Parameter	Description
Identity	Enter a text string to identify the module's S1 source.
Source Type	<p>NOTE: When S1 functions as a generator, the DSE335 MKII does not start or stop this generator. Instead, it is identified as the priority supply.</p> <p>Select the function of the module's S1 sensing terminals: Mains Generator</p>
Source Priority	<p>NOTE: This is only selectable when the source type is mains.</p> <p>Available options to choose from: Priority Standby</p>

S2

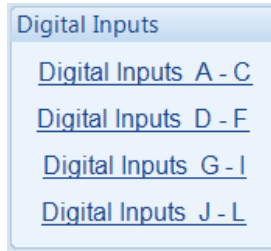


The screenshot shows a configuration window titled 'S2'. It contains three fields: 'Identity' is a text input field; 'Source Type' is a dropdown menu with 'Generator' selected; 'Source Priority' is a dropdown menu with 'Standby' selected.

Parameter	Description
Identity	Enter a text string to identify the module's S2 source.
Source Type	Select the function of the module's S2 sensing terminals: Mains Generator
Source Priority	<div style="border: 1px solid black; padding: 5px;"> <p> NOTE: This option is not available for selection, but it is the opposite of the choice selected for S1.</p> </div> <p>Available options to choose from: Priority Standby</p>

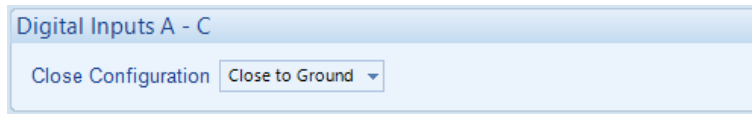
2.4 DIGITAL INPUTS

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



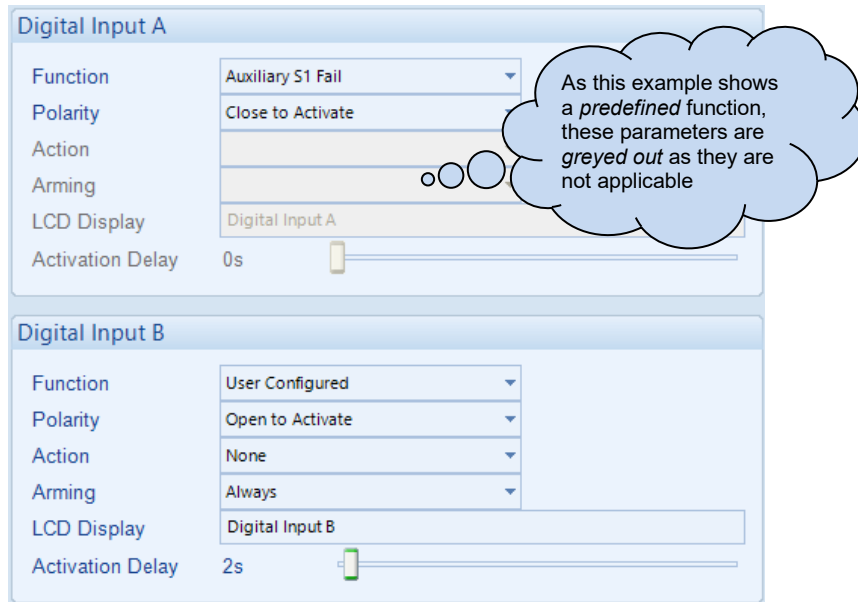
 **NOTE:** The module's digital inputs are configured as either negative or positive switching in groups of three, this is determined in the modules configuration.

Digital Inputs Configuration



Parameter	Description
Close Configuration	Select the Close Configuration. Close to Ground Close to Supply

Digital Inputs





Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See section entitled <i>Input Functions</i> elsewhere in this document.
Polarity	Select the digital input polarity: Close to Activate: the input function is activated when the relevant terminal is connected. Open to Activate: the input function is activated when the relevant terminal is disconnected.
Action	<div style="border: 1px solid black; padding: 5px;"> <p>NOTE: For details of these, see the section entitled <i>Alarm Types</i> elsewhere in this document.</p> </div> <p>Select the type of alarm required from the list: Electrical Trip Indication None Warning</p>
Arming	<div style="border: 1px solid black; padding: 5px;"> <p>NOTE: For details of these, see the section entitled <i>Alarm Arming</i> elsewhere in this document.</p> </div> <p>Select when the alarm generated by the input becomes active: Always Never</p>
LCD Display	The text that is displayed on the module's LCD when the input activates and generates an alarm.
Activation Delay	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.




2.4.1 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.

Function	Description
Alarm Mute	This input is used to silence the audible alarm from an external source, such as a remote mute switch.
Alarm Reset	This input is used to reset any latched alarms from a remote location. It is also used to clear any latched warnings which may have occurred (if configured) without having to stop/unload S2.
Auto Restore Inhibit IEEE 37.2 - 3 Checking Or Interlocking Relay	In the event of a remote start/priority source failure, the standby source is instructed to start and take load. On removal of the remote start signal/priority source return the module continues to run the standby source on load until the Auto Restore Inhibit input is removed. This input allows the controller to be fitted as part of a system where the restoration to priority source is controlled remotely or by an automated system.
Auto Start Inhibit IEEE 37.2 - 3 Checking Or Interlocking Relay	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>NOTE: This input does not prevent the generators starting in <i>Manual Mode</i> </p> </div> <p>This input is used to provide an over-ride function to prevent the controller from starting the standby source in the event of a remote start/priority source out of limits condition occurring. If this input is active and a remote start signal/priority source failure occurs the module does not give a start command to the standby source. If this input signal is then removed, the controller operates as if a remote start/priority source failure has occurred, starting, and loading the standby source. This function is used to give an ‘AND’ function so that the standby source is called to start if the priority source fails, and another condition exists which requires the standby source to run. If the ‘Auto start Inhibit’ signal becomes active once more it is ignored until the module has returned the priority source supply on load and shutdown. This input does not prevent starting of the engine in <i>Manual Mode</i> , or test modes.</p>
Auxiliary S1 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 S1 supply or some aspect of the incoming S1 not monitored by the controller. If the devices providing this additional monitoring are connected to operate this input, the controller operates as if the incoming S1 supply has fallen outside of limits, S2 is instructed to start and take the load. Removal of the input signal causes the module to act if S1 has returned to within limits providing that the S1 sensing also indicates that the S1 is within limits.
Auxiliary S1 Ready	Allows an external device (such as the engine control module) to instruct the controller that S2 is healthy and available to take load. The controller then monitors the voltage and frequency to check they are within acceptable limits before performing the load transfer function.

Parameter descriptions are continued overleaf...

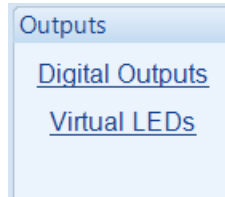
Function	Description
Auxiliary S2 Fail	The module monitors the incoming single or three phase supply for Over voltage, Under Voltage, Over Frequency or Under frequency. It may be required to monitor a different S2 supply or some aspect of the incoming S2 not monitored by the controller. If the devices providing this additional monitoring are connected to operate this input, the controller operates as if the incoming S2 supply has fallen outside of limits, S1 is instructed to start and take the load. Removal of the input signal causes the module to act if S2 has returned to within limits providing that the S2 sensing also indicates that the S2 is within limits.
Auxiliary S2 Ready	Allows an external device (such as the engine control module) to instruct the controller that S1 is healthy and available to take load. The controller then monitors the voltage and frequency to check they are within acceptable limits before performing the load transfer function.
External Panel Lock	This input is used to provide security to the installation. If the External 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 able to view the various instrumentation pages etc. (<i>Front panel configuration access is still possible while the system lock is active</i>).
Force Transfer To S1	Activating this input causes the module to open S2 and transfer the load to S1 disregarding the status of S1. When S1 is not available, the load remains off until the supply is back within limits.
Force Transfer To S2	Activating this input causes the module to open S1 and transfer the load to S2 disregarding the status of S2. When S2 is not available, the load remains off until the supply is back within limits.
Inhibit Scheduled Run IEEE 37.2 - 3 Checking Or Interlocking Relay	This input is used to provide a means of disabling a scheduled run.
Lamp Test	This input is used to provide a test facility for the front panel indicators fitted to the module. When the input is activated all LED's are illuminated.
Open / Close S1 IEEE 37.2 - 52 AC Circuit Breaker	Allows connection of an external signal to control open and closing of the S1 load switch device.
Open / Close S2 IEEE 37.2 - 52 AC Circuit Breaker	Allows connection of an external signal to control open and closing of the S2 load switch device.
Remote Start Off Load	If this input is active, operation is similar to the 'Remote Start on load' function except that the standby source 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 standby source. In Manual Mode  , the load is transferred to the standby source if the supply is already healthy, however in Manual Mode  , this input does not generate standby source start/stop requests.
S1 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 S1 load switching device auxiliary contact.

Parameter descriptions are continued overleaf...

Function	Description
S1 and S2 Load Inhibit IEEE 37.2 - 3 Checking Or Interlocking Relay	This input is used to prevent the module from loading the S1 and S2 supply. If the S1 or S2 supply is already on load activating this input causes the module to unload the S1 or S2 supply.
S1 Load Inhibit IEEE 37.2 - 3 Checking Or Interlocking Relay	<div style="border: 1px solid black; padding: 5px;"> <p>⚠ NOTE: This input only operates to control the S1 switching device if the module's load switching logic is attempting to load to S1. It does <u>not</u> control the S1 switching device when S2 is on load.</p> </div> <p>This input is used to prevent the module from loading the S1 supply. If the S1 supply is already on load activating this input causes the module to unload the S1 supply. Removing the input allows S1 to be loaded again.</p>
S2 Closed Auxiliary IEEE 37.2 - 3 Checking Or Interlocking Relay	This input is used to provide feedback to allow the controller to give true indication of the contactor or circuit breaker switching status. It should be connected to the S2 load switching device auxiliary contact.
S2 Load Inhibit IEEE 37.2 - 3 Checking Or Interlocking Relay	<div style="border: 1px solid black; padding: 5px;"> <p>⚠ NOTE: This input only operates to control the S2 switching device if the module's load switching logic is attempting to load to S2. It does <u>not</u> control the S2 switching device when S1 is on load.</p> </div> <p>This input is used to prevent the module from loading the S2 supply. If the S2 supply is already on load activating this input causes the module to unload the S1 supply. Removing the input allows S2 to be loaded again.</p>
Simulate S1 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 S1 supply.
Simulate S2 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 S2 supply.
Simulate Auto Button	This input mimics the operation of the 'Auto' button and is used to provide a remotely located Manual Mode  push button.
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 Stop Button	This input mimics the operation of the 'Stop' button and is used to provide a remotely located Manual Mode  push button.
Transfer To S1	Activating this input causes the module to open S2 and transfer the load to S1, only when S1 is available. When S1 is not available, S2 remains on load until S1 is back within limits.
Transfer To S2	Activating this input causes the module to open S1 and transfer the load to S2, only when S2 is available. When S2 is not available, S1 remains on load until S2 is back within limits.

2.5 OUTPUTS

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



2.5.1 DIGITAL OUTPUTS

Relay Outputs (Volt Free)		
	Source	Polarity
Output A (N/C)	Close S1 Output	De-Energise
Output B (N/O)	Close S2 Output	Energise
Output C (C/O)	Not Used	Energise
Output D (C/O)	Not Used	Energise
Output E (N/C)	S2 Start And Run	De-Energise
Output F (N/O)	Not Used	Energise

FET Outputs		
Output G	Not Used	Energise
Output H	Not Used	Energise
Output I	Not Used	Energise
Output J	Not Used	Energise
Output K	Not Used	Energise
Output L	Not Used	Energise

Parameter	Description
Source	Select the output source to control the state of the output See section entitled <i>Output Sources</i> for details of all available functions
Polarity	Select the digital output polarity: De-Energise: When the output source is true, the output deactivates. Energise: When the output source is true, the output activates.

2.5.2 VIRTUAL LEDS

The virtual LEDs provide a configuration of 'status' items. These items are not available for viewing on the module but are seen in the SCADA section of the PC software or read by third party systems (i.e. BMS or PLCs) using the Modbus protocol.

Virtual LEDs

LED Configuration


	Source	Polarity
LED 1	S2 Start And Run	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

Parameter	Description
Source	Select the output source to control the state of the output See section entitled <i>Output Sources</i> for details of all available functions
Polarity	Select the digital input polarity: Lit: When the output source is true, the virtual LED activates Unlit: When the output source is true, the virtual LED deactivates.

2.5.3 OUTPUT SOURCES


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

Output Source	Activates...	Is Not Active....
Not Used	Not Used	
Alarm Mute	Indicates that an alarm mute operation is in progress by digital input	
Alarm Reset	Active when the alarm reset digital input is active.	
Audible Alarm IEEE 37.2 – 74 Alarm Relay	This output indicates that the internal sounder is operating to allow it to feed an external sounder. Operation of the Mute/Lamp Test  pushbutton resets this output once activated.	Inactive if the internal sounder is not operating.
Auto Restore Inhibit	Active when the Auto Restore Inhibit function is active.	
Auto Start Inhibit	Active when the Auto-Start Inhibit function is active.	
Auxiliary S1 Fail	Active when the Auxiliary S1 Fail input function is active.	
Auxiliary S1 Ready	Active when a configured Auxiliary S1 Ready digital input is active	
Auxiliary S2 Fail	Active when the Auxiliary S2 Fail input function is active.	
Auxiliary S2 Ready	Active when a configured Auxiliary S2 Ready digital input is active	
Battery Over 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
Battery Under Voltage IEEE 37.2 – 27DC Under Voltage Relay	This output indicates that a Battery Under Voltage alarm has occurred.	Inactive when battery voltage is not Low
Breaker Alarms Reset	Active when a configured Breaker Alarm Reset digital input is active	
Close S1 Output IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects S1 to be on load this control source is active.	The output is inactive whenever S1 is not required to be on load
Close S1 Output Pulse IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects S1 to be on load this control source is active for the duration of the Breaker Close Pulse timer, after which it becomes inactive again.	
Close S2 Output IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects S2 to be on load this control source is active.	The output is inactive whenever S2 is not required to be on load
Close S2 Output Pulse IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects to be on load this control source is active for the duration of the Breaker Close Pulse timer, after which it becomes inactive again.	
Close to N Output IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects S1 and S2 to not supply the load this control source is active.	The output is inactive when S1 or S2 are required to be on load

Parameter descriptions are continued overleaf...

Editing the Configuration

Output Source	Activates...	Is Not Active....
Close to N Output Pulse IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects ATS to be in the neutral position, this control source is active for the duration of the Breaker Close Pulse timer, after which it becomes inactive again.	
Close Transition in Progress	Active only when a closed transition is in progress. The output goes inactive after the transfer is complete.	
Common Alarm	Active when one or more alarms (of any type) are active.	
Common Electrical Trip	Active when one or more Electrical Trip alarms are active.	
Common Warning IEEE 37.2 – 74 Alarm Relay	Active for the duration of the Breaker Trip Timer.	The output is inactive when no warning alarms are present
Cooling Down	Active when the Cooling timer is in progress	The output is inactive at all other times
Digital Input A To L	Active when the digital input is active	Inactive when : <ul style="list-style-type: none"> • If the input is not active • If the input is active but conditioned by activation delay or arming requirements.
Elevator Control	Active during the <i>elevator delay</i> time before a load transfer takes place and remains active for the duration of the <i>elevator delay</i> after a transfer takes place (when <i>elevator post transfer</i> is enabled.	Inactive at all other times
External Panel Lock	Active when the module's panel lock function is active.	
Fail to Start IEEE 37.2 - 48 Incomplete Sequence Relay	Becomes active if S2 is not seen to be running after the configurable number of start attempts.	
Fail to Stop IEEE 37.2 - 48 Incomplete Sequence Relay	If S2 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.	
Force Transfer to S1	Active when the Force Transfer To S1 digital input is active.	
Force Transfer to S2	Active when the Force Transfer To S2 digital input is active.	
Inhibit Scheduled Run	Active when the Inhibit Scheduled run input is active.	
Lamp Test	Active when the lamp test is activated by a digital input or by pressing the Mute/Lamp Test  button.	
Load Shedding Control (1 To 5)	Becomes active when the engine kW exceeds Load Shedding Control Trip Setting.	Inactive when the engine kW returns to below the Load Shedding Control Return setting.
Loading Frequency Not Reached	Active when S2 has failed to reach the loading frequency after the 'Safety on Delay' timer.	
Loading Voltage Not Reached	Active when S2 has failed to reach the loading voltage after the 'Safety on Delay' timer.	
Open S1 Output IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects S1 to be off load this control source becomes active.	The output is inactive whenever S1 is required to be on load
Open S1 Output Pulse IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects S1 to be off load this control source becomes active for the duration of the Breaker Open Pulse timer, after which it becomes inactive again.	



Parameter descriptions are continued overleaf...

Editing the Configuration

Output Source	Activates...	Is Not Active....
Open S2 Output IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects S2 to be off load this control source is active.	Inactive whenever S2 is required to be on load
Open S2 Output Pulse IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects S2 to be off load this control source is active for the duration of the Breaker Open Pulse timer, after which it becomes inactive again.	
Open/Close S1	Active when a configured Open/Close S1 digital input is active	
Open/Close S2	Active when a configured Open/Close S2 digital input is active	
PLC Output Flag 1 To 20	Activates when the PLC Output Flag (1-20) becomes active.	
Remote Start Off Load	Active when the Remote Start Off Load input is active.	
Remote Start On Load	Active when the Remote Start On Load input is active.	
Return Delay in Progress	This output source is active to indicate that the return timer is running.	
S1 and S2 Closed	Active when the S1 and S2 Closed Auxiliary inputs are active at the same time, indicating the two supplies are closed in parallel.	
S1 and S2 Load Inhibit	Active when a configured S1 and S2 Load Inhibit digital input is active	
S1 and S2 Open	Active when the S1 and S2 Closed Auxiliary inputs are not active at the same time.	
S1 Available	Active when the S1 supply is available and within limits	
S1 Closed	Active when the Close S1 output function is active	
S1 Closed Auxiliary	Active when a configured S1 Closed Auxiliary digital input is active	
S1 Failed to Close	Active when the Close S1 output has activated but the S1 Closed Auxiliary input has not activated within the Fail to Close time.	
S1 Failed to Open	This output source is intended to be used to indicate that the S1 contactor or breaker failed to open..	
S1 Failure Latched	Activates when the S1 failure alarm is active. Reset by digital input configured to <i>Alarm Reset</i>	
S1 Failure Unlatched	Activates when the S1 failure alarm is active. Reset automatically when S1 becomes available	
S1 High Frequency	Becomes active if S1's frequency goes higher than the configured trip setting.	
S1 High Voltage	Becomes active if S1's voltage goes higher than the configured trip setting.	
S1 In Limits	Activates when S1 becomes available and is within configured limits.	
S1 Load Inhibit	Active when the S1 Load inhibit is active.	
S1 Load Inhibited	Indicates that an input configured to <i>S1 Load Inhibit</i> is active, preventing the supply from taking load.	
S1 Low Frequency	Becomes active if S1's frequency goes lower than the configured trip setting.	
S1 Low Voltage	Becomes active if S1's voltage goes lower than the configured trip setting.	
S1 Phase Rotation Alarm	This output indicates that the module has detected a phase sequence error on S1 source.	
S1 Ready	Active when a configured S1 Ready digital input is active	
S1 Transient Delay	Active during the Transient Delay time when S1 is not within limits	
S2 Available	Activates when S2 becomes available. Ignores alarm conditions and the <i>S2 transient delay</i>	

Parameter descriptions are continued overleaf...

Editing the Configuration

Output Source	Activates...	Is Not Active....
S2 Closed	Active when the Close S2 output function is active	
S2 Closed Auxiliary	Active when a configured S2 Closed Auxiliary digital input is active	
S2 Failed to Close	This output indicates the S2 breaker failed to close.	
S2 Failed to Open	This output indicates the S2 breaker failed to open.	
S2 Failure Latched	Activates when the S2 failure alarm is active. Reset by digital input configured to <i>Alarm Reset</i>	
S2 Failure Unlatched	Activates when the S2 failure alarm is active. Reset automatically when S1 becomes available	
S2 Gen High Frequency	When S2 is configured to Gen, this output becomes active if S2's frequency goes above the configured trip setting.	
S2 Gen High Voltage	When S2 is configured to Gen, this output becomes active if S2's voltage goes above the configured trip setting.	
S2 Gen Low Frequency	When S2 is configured to Gen, this output becomes active if S2's frequency falls below the configured trip setting.	
S2 Gen Low Voltage	When S2 is configured to Gen, this output becomes active if S2's voltage falls below the configured trip setting.	
S2 In Limits	Activates when the S2 becomes available, is within configured limits and the <i>Auxiliary S2 Ready</i> input is active.	
S2 Load Inhibit	Active when the S2 Load inhibit is active.	
S2 Load Inhibited	Indicates that an input configured to <i>S2 Load Inhibit</i> is active, preventing the supply from taking load.	
S2 Mains High Frequency	When S2 is configured to Mains, this output becomes active if S2's frequency goes above the configured trip setting.	
S2 Mains High Voltage	When S2 is configured to Mains, this output becomes active if S2's voltage goes above the configured trip setting.	
S2 Mains Low Frequency	When S2 is configured to Mains, this output becomes active if S2's frequency falls below the configured trip setting.	
S2 Mains Low Voltage	When S2 is configured to Mains, this output becomes active if S2's voltage falls below the configured trip setting.	
S2 Phase Rotation Alarm	Active when the S2 Phase Rotation Alarm is active.	
S2 Ready	Activates when S2 becomes available, and both the warming and cooldown time are not active. Ignores alarm conditions and the <i>S2 transient delay</i>	
S2 Start and Run	Active when the controller has requested for S2 to start and run.	
S2 Transient Delay	Active during the Transient Delay time when S1 is not within limits	
Scheduled Do Not Transfer	Active when a configured Do Not Transfer scheduler event is active.	
Scheduled Event in Progress	Active when any configured scheduler event is active.	
Scheduled Start S2 Off—load	Active when a configured S2 Start Off Load scheduler event is active.	
Scheduled Transfer to S1	Active when a configured Transfer To S1 scheduler event is active.	
Scheduled Transfer to S2	Active when a configured Transfer To S2 scheduler event is active.	
Simulated S1 Available	Active when the Simulated S1 Available digital input is active.	
Simulated S2 Available	Active when the Simulated S2 Available digital input is active.	
Start Delay in Progress	Active when the controller is in the <i>start delay</i> timer, after which the set is called to start.	
System in Auto Mode	Active when unit is in Auto Mode 	
System in Manual Mode	Active when unit is in Manual Mode 	

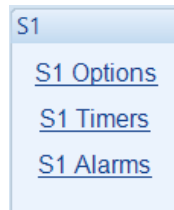
Parameter descriptions are continued overleaf...

Editing the Configuration

Output Source	Activates...	Is Not Active....
System in Prohibit Return Mode	Active when unit is in Prohibit Return Mode	
System in Stop Mode	Active when unit is in Stop Mode	
System in Test Off-Load Mode	Active when unit is in Test Off-Load Mode	
System in Test On-Load Mode	Active when unit is in Test On-Load Mode	
Transfer to S1	Active when the Transfer to S1 digital input is active	
Transfer to S2	Active when the Transfer to S2 digital input is active	
Waiting For Manual Restore	This becomes active when S2 is on load and the S1 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 is transferred back to the S1 supply.	
Waiting For S1	Active when the controller has requested for S1 to start and is waiting for it to become available.	
Waiting For S2	Active when the controller has requested for S2 to start and is waiting for it to become available.	
Warming Up	Active when S2 is running off load, during the warming timer, before taking load.	

2.6 S1

The S1 section is subdivided into smaller sections. Select the required section with the mouse.



2.6.1 S1 OPTIONS

When three phase loads are present, it is usually desirable to enable the *Immediate S1 Dropout* feature.

Select your AC system. A schematic is shown below with connection details from the alternator to the module.

Click to enable or disable the feature. The relevant values below appear *greyed out* when the alarm is disabled.

Parameter	Description
Open When S2 Available	<p>NOTE: Active when S1 source is set to <i>Standby</i>. For further details see section entitled <i>Application Options elsewhere in this document</i>.</p> <p>NOTE: S1/S2 Closed Auxiliary must be configured to enable this Parameter. For further details, see section entitled <i>Digital Inputs elsewhere in this document</i>.</p> <p><input type="checkbox"/> = The S1 breaker is requested to open irrespective of the availability of S2. This is useful when using DC controlled opening signals.</p> <p><input checked="" type="checkbox"/> = The S1 breaker is only requested to open when S2 is available. This is required when S1's breaker's opening signals are supplied by S2's supply.</p>
Immediate S1 Dropout	<p>NOTE: This feature cannot be enabled when <i>Open When S2 Available</i> is enabled.</p> <p><input type="checkbox"/> = Upon S1 failure, the S1 Breaker remains closed until a transfer to S2 is initiated.</p> <p><input checked="" type="checkbox"/> = Upon S1 failure, the S1 Breaker opens immediately.</p>

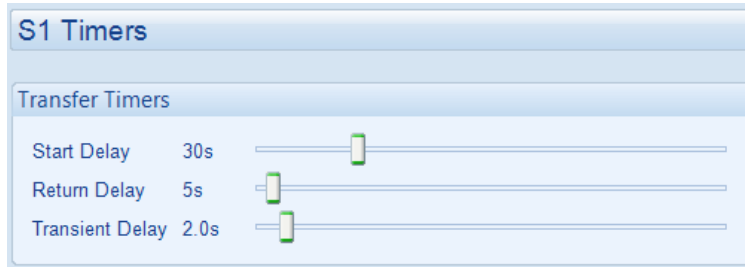
Parameter descriptions are continued overleaf...



Editing the Configuration

Parameter	Description
AC System	Select the AC topology of the generator from the following list: 2 Phase, 3 Wire L1 - L2 2 Phase, 3 Wire L1 - L3 3 Phase, 3 Wire 3 Phase, 4 Wire 3 Phase, 4 Wire Delta Single Phase, 2 Wire
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 specifications. 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 (i.e. 11kV)

2.6.2 S1 TIMERS

NOTE: Timers increase in intervals of 1 second up to one minute, then in intervals of 30 seconds up to 30 minutes, and subsequently in intervals of 30 minutes, as per the timer's limitations.



Parameter	Description
Start Delay	Used to give a delay before starting in Auto Mode  . This timer is activated upon the respective start command being issued. Typically this timer is applied to prevent starting upon fleeting remote start signals or short term S2 failures.
Return Delay	A delay, used in Auto Mode  only, that allows for short term removal of the request to unload the supply before action is taken. This is usually used to ensure the supply remains on load before accepting that the start request has been removed.
Transient Delay	Used to delay the detection of S1 failure. This is normally used to prevent short term transients or brownout conditions from being classified as a S1 Failure and opening the breaker.

2.6.3 S1 ALARMS

Voltage Alarms



Parameter	Description
Under Voltage IEEE 37.2 – 27 AC Undervoltage Relay	<input type="checkbox"/> = S1 Under Voltage detection is disabled <input checked="" type="checkbox"/> = S1 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 S1 is considered within limits when the S1 voltage rises above the configured <i>Under Voltage Return</i> level.
Over Voltage IEEE 37.2 – 59 AC Overvoltage Relay	<input type="checkbox"/> = S1 Over Voltage detection is disabled <input checked="" type="checkbox"/> = S1 Over Voltage gives an alarm in the event of the S1 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 S1 is considered within limits when the S1 voltage falls below the configured <i>Over Voltage Return</i> level.

Frequency Alarms



Parameter	Description
Under Frequency IEEE 37.2 – 81 Frequency Relay	<input type="checkbox"/> = S1 Under Frequency detection is disabled <input checked="" type="checkbox"/> = S1 Under Frequency gives an alarm in the event of the S1 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 S1 is considered within limits when the S1 frequency rises above the configured <i>Under Frequency Return</i> level.
Over Frequency IEEE 37.2 – 81 Frequency Relay	<input type="checkbox"/> = S1 Over Frequency detection is disabled <input checked="" type="checkbox"/> = S1 Over Frequency gives an alarm in the event of the S1 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 S1 is considered within limits when the S1 frequency falls below the configured <i>Over Frequency Return</i> level.

Phase Rotation Detection

Phase Rotation Detection

Enable

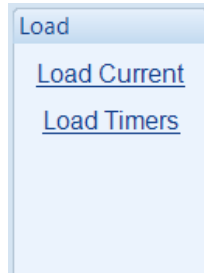
Phase Rotation L1-L2-L3

Action Electrical Trip

Parameter	Description
Phase Rotation Detection IEEE 37.2 – 47 Phase Sequence Relay	<input type="checkbox"/> = The phase rotation is not checked <input checked="" type="checkbox"/> = An Electrical Trip alarm is generated when the phase rotation of S1 supply is not matching the configured <i>Phase Rotation</i> setting.
Phase Rotation	Select the type of phase rotation required from the list: L1-L2-L3 L3-L2-L1

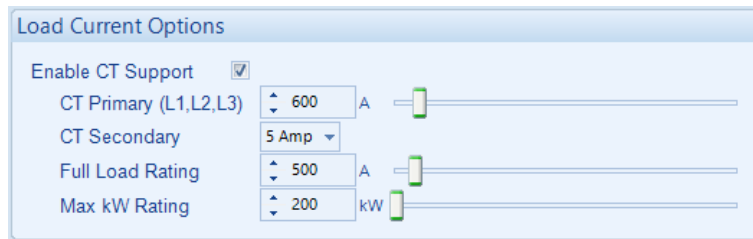
2.7 LOAD

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




2.7.1 LOAD CURRENT

Load Current Options



Parameter	Description
Enable CT Support	Provides control of configurable CT settings. <input type="checkbox"/> = CT Support is disabled. <input checked="" type="checkbox"/> = Allows adjustment of CT settings.
CT Primary (L1, L2, L3)	Primary rating of the three phase current transformers.
CT Secondary	Secondary rating of all the current transformers, options are: 1 Amp 5 Amp
Full Load Rating	This is the full load current rating of the CT.
Max kW Rating	Full load rating of the load in kW.

Load Shedding Control

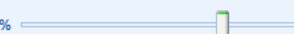
 **NOTE: Load Shedding Control is active when S2 is on load.**

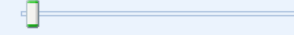
Load Shedding Control


Enable

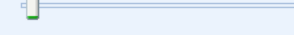
Outputs in Scheme

Outputs at Start

Trip %  160 kW

Trip Delay 5s 

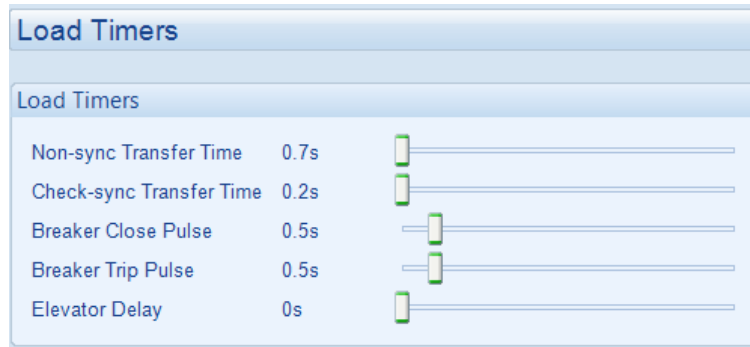
Return %  140 kW

Return Delay 5s 

Transfer Time / Load Delay 0.7s

Parameter	Description
Load Shedding Control Enable	Provides control of configurable outputs set to <i>Load Shedding Control</i> . <input type="checkbox"/> = Load Shedding Control is disabled. <input checked="" type="checkbox"/> = The module monitors the load and controls any outputs configured to <i>Load Shedding Control (1 to 5)</i>
Outputs in Scheme	The number of outputs (max 5) that is included in the function.
Outputs at Start	The number of outputs configured to <i>Load Shedding Control 1 to 5</i> that are energised when the set is required to take load. The <i>Transfer Delay / Load Delay</i> timer begins. At the end of this timer, the generator load switch is closed – The generator is placed on load.
Trip / Trip Delay	When the load level is above the <i>Trip</i> setting for the duration of the <i>Trip Delay</i> , then the 'next' output configured to <i>Load Shedding Control</i> is activated (max 5)
Return / Return Delay	When the load level is below the <i>Return</i> setting for the duration of the <i>Return Delay</i> , then the 'highest numbered' output configured to <i>Load Shedding Control</i> is de-activated, and the timer is reset.
Transfer Time / Load Delay	The time between closing the <i>Load Shedding Control</i> outputs (<i>Outputs at Start</i>) and closing the generator load switching device.

2.7.2 LOAD TIMERS



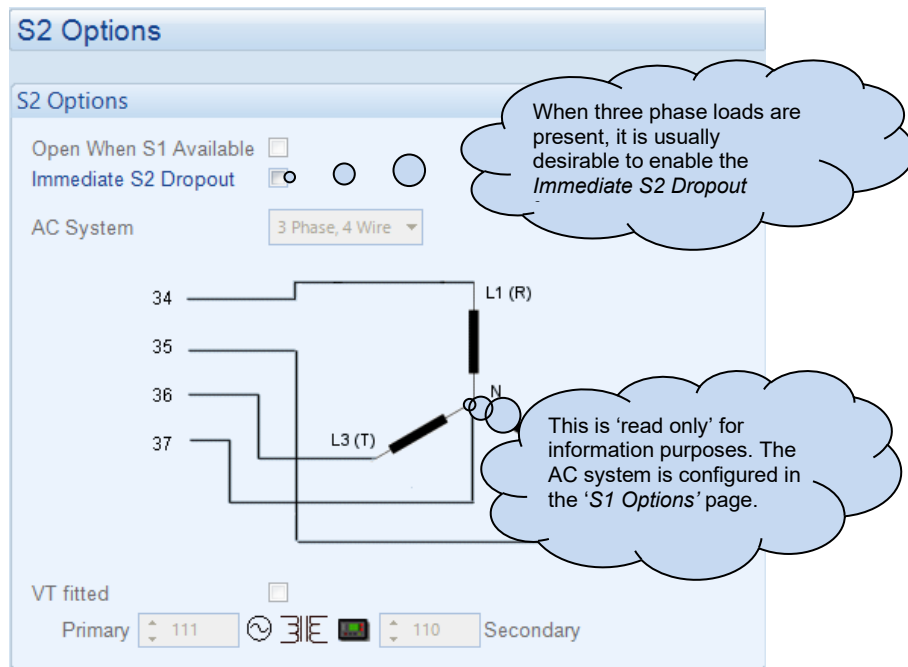
Parameter	Description
Non-sync Transfer Time	The time between one supply's load switch being opened and the other supply's load switch being closed. Used to give time for the load switches to move to their correct positions and to prevent the mechanical interlock from "jamming." This timer is also used to give a 'dead time' to ensure that any machinery stops fully after removal of the supply, before applying the new supply to the equipment (for instance directly driven AC motors).
Check-Sync Transfer Time	The time between one load switch opening and the other closing during a synchronous transfer.
Breaker close pulse	The amount of time that <i>Breaker Close Pulse</i> signals are present when the request to close a breaker is given.
Breaker Trip pulse	The amount of time that <i>Breaker Open Pulse</i> signals are present when the request to open a breaker is given.
Elevator Delay	Use to delay the <i>Elevator Control</i> output before and after load transfer takes place. See section entitled <i>Application Options</i> for details of <i>Elevator Control</i> elsewhere in this document.

2.8 S2

The S2 section is subdivided into smaller sections. Select the required section with the mouse.



2.8.1 S2 OPTIONS



Parameter	Description
Open When S1 Available	<p>NOTE: Tick box shown for read only purpose. To configure the tick box see section entitled <i>S1 Options</i> elsewhere in this document.</p> <p>NOTE: Active when S2 source is set to <i>Standby</i>. For further details see section entitled <i>Application Options</i> elsewhere in this document.</p> <p><input type="checkbox"/> = The S2 breaker is requested to open irrespective of the availability of S2. This is useful when using DC controlled opening signals.</p> <p><input checked="" type="checkbox"/> = The S2 breaker is only requested to open when S1 is available. This is required when S2's breaker's opening signals are supplied by S1's supply.</p>
Immediate S2 Dropout	<p>NOTE: This feature cannot be enabled when <i>Open When S2 Available</i> is enabled.</p> <p><input type="checkbox"/> = Upon S2 failure, the S2 Breaker remains closed until a transfer to S1 is initiated.</p> <p><input checked="" type="checkbox"/> = Upon S2 failure, the S2 Breaker opens immediately.</p>

Parameter descriptions are continued overleaf...



Parameter	Description
AC System	<p>▲ NOTE: This feature is enabled S1 options. To configure see section entitled <i>S1 Options</i> elsewhere in this document.</p> <p>Select the AC topology of the generator from the following list:</p> <p>2 Phase, 3 Wire L1 - L2 2 Phase, 3 Wire L1 - L3 3 Phase, 3 Wire 3 Phase, 4 Wire 3 Phase, 4 Wire Delta Single Phase, 2 Wire</p>
VT Fitted	<p>▲ NOTE: This feature is enabled S1 options. To configure see section entitled <i>S1 Options</i> elsewhere in this document.</p> <p><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)</p> <p>This is used to step down the generated voltage to be within the controller voltage specifications. 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.</p> <p>This is typically used to interface the DSE module to high voltage systems (i.e. 11kV)</p>

2.8.2 S2 TIMERS

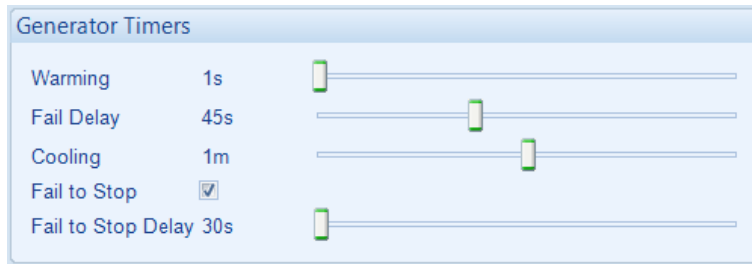
NOTE: Timers increase in intervals of 1 second up to one minute, then in intervals of 30 seconds up to 30 minutes, and subsequently in intervals of 30 minutes, as per the timer's limitations.

Transfer Timers



Parameter	Description
Start Delay	Used to give a delay before starting in Auto Mode  . This timer is activated upon the respective start command being issued. Typically this timer is applied to prevent starting upon fleeting remote start signals or short term S1 failures.
Return Delay	A delay, used in Auto Mode  only, that allows for short term removal of the request to unload the supply before action is taken. This is usually used to ensure the supply remains on load before accepting that the start request has been removed.
Transient Delay	Used to delay the detection of S2 failure. This is normally used to prevent short term transients or brownout conditions from being classified as a S1 Failure and opening the breaker.

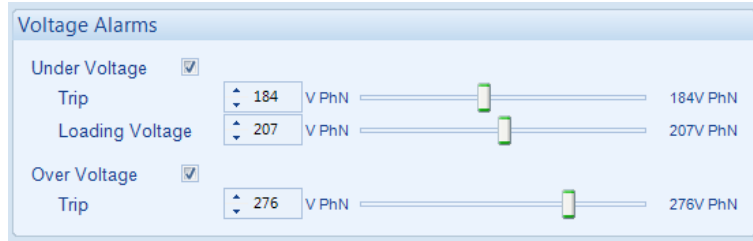
Generator Timers



Parameter	Description
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.
Fail Delay	The module instructs that S2 is to start and waits for the period of this timer for S2 to become available. If it is not available when the timer expires, the <i>S2 failure</i> alarm is triggered.
Cooling time	The amount of time that the set runs OFF LOAD before being stopped. This is to allow the set to cool down and is particularly important for engines with turbo chargers.
Fail to Stop Delay	<input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = If the supply is called to stop and is still running after the configurable <i>Fail to Stop</i> delay time expires, a <i>Fail to Stop</i> alarm is generated.

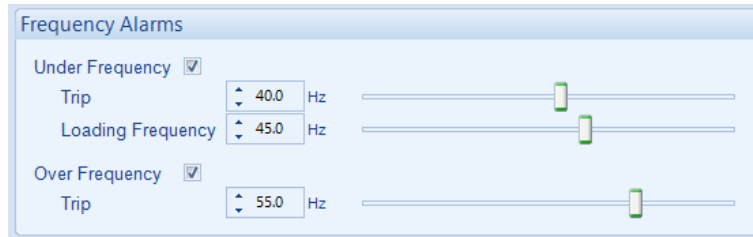
2.8.3 S2 ALARMS

Voltage Alarms



Parameter	Description
Under Voltage IEEE 37.2 – 27 AC Undervoltage Relay	<input type="checkbox"/> = S2 Under Voltage detection is disabled <input checked="" type="checkbox"/> = S2 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 S2 is considered within limits when the S2 voltage rises above the configured <i>Under Voltage Return</i> level.
Over Voltage IEEE 37.2 – 59 AC Overvoltage Relay	<input type="checkbox"/> = S2 Over Voltage detection is disabled <input checked="" type="checkbox"/> = S2 Over Voltage gives an alarm in the event of the S2 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 S2 is considered within limits when the S2 voltage falls below the configured <i>Over Voltage Return</i> level.

Frequency Alarms



Parameter	Description
Under Frequency IEEE 37.2 – 81 Frequency Relay	<input type="checkbox"/> = S2 Under Frequency detection is disabled <input checked="" type="checkbox"/> = S2 Under Frequency gives an alarm in the event of the S2 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 S2 is considered within limits when the S2 frequency rises above the configured <i>Under Frequency Return</i> level.
Over Frequency IEEE 37.2 – 81 Frequency Relay	<input type="checkbox"/> = S2 Over Frequency detection is disabled <input checked="" type="checkbox"/> = S2 Over Frequency gives an alarm in the event of the S2 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 S2 is considered within limits when the S2 frequency falls below the configured <i>Over Frequency Return</i> level.


Phase Rotation Alarm

Phase Rotation Alarm

Enable

Phase Rotation L1-L2-L3

Action Electrical Trip

Parameter	Description
Phase Rotation Detection <i>IEEE 37.2 – 47 Phase Sequence Relay</i>	<input type="checkbox"/> = The phase rotation is not checked <input checked="" type="checkbox"/> = An Electrical Trip alarm is generated when the phase rotation of S2 supply is not matching the configured <i>Phase Rotation</i> setting.
Phase Rotation	<div style="border: 2px solid black; padding: 5px; margin-bottom: 5px;"> <p> NOTE: This feature is enabled S1 options. To configure see section entitled S1 Options elsewhere in this document.</p> </div> <p>Select the type of phase rotation required from the list: L1-L2-L3 L3-L2-L1</p>

2.8.4 PLANT BATTERY

Voltage Alarms

Under Voltage

Pre-Alarm V DC

Return V DC

Delay

Over Voltage

Return V DC

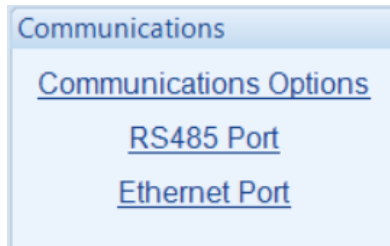
Pre-Alarm V DC

Delay

Parameter	Description
Plant Battery Under Voltage IEEE C37.2 -27 DC Undervoltage Relay	<input type="checkbox"/> = The alarm is disabled. <input checked="" type="checkbox"/> = 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 deactivated.
Plant Battery Over Voltage IEEE C37.2 -59 DC Overvoltage Relay	<input type="checkbox"/> = The alarm is disabled. <input checked="" type="checkbox"/> = 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 deactivated.

2.9 COMMUNICATIONS

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



2.9.1 COMMUNICATIONS OPTIONS

Provides a means of giving the controller an identity. This is used in the SCADA section to allow the operator to see the site name and genset identity that it is currently connected to.

The image shows a form titled 'Module Identification'. It contains two input fields: 'Site Identity' and 'ATS Identity', each with a corresponding text box for user input.

Parameter	Description
Site Identity	A free entry box to allow the user to give the DSE module a description of where the site is located. This text is not shown on the module's display and is only seen when performing remote communication. This aids the user in knowing where the generator is located.
ATS Identity	A free entry box to allow the user to give the DSE module a description of which generator it is connected to. This text is not shown on the module's display and is only seen when performing remote communication. This aids the user in knowing which generator on a specific site is being monitored.

2.9.2 RS485 PORT

Basic

The screenshot shows a configuration window titled 'Basic'. It contains two fields: 'Slave ID' with a value of 10 and 'Baud Rate' with a value of 19200.

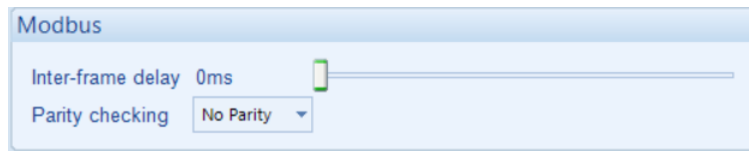
Parameter	Description
Server ID	Select the Server ID of the DSE module's RS485 port. Every device on the RS485 link must have a unique ID.
Baud Rate	Select the Baud Rate (speed of communication) of the DSE module's RS485 port. Every device on the RS485 link must have the same Baud Rate. 1200 2400 4800 9600 14400 19200 28800 38400 57600 115200

Advanced

The screenshot shows an 'Advanced' configuration window. It features a slider control for 'Client inactivity timeout' which is currently set to 5s.

Parameter	Description
Client Inactivity Timeout	Set the time delay between a Modbus RTU request and the receipt of a response. The module monitors by default the USB port for communications. When activity is detected on the RS485 port, the module monitors the port for further data. If no data activity is detected on the port for the duration of the <i>Client Inactivity Timer</i> , it reverts to looking at the USB port. This needs to be set longer than the time between Modbus polls from the client.

Modbus



Parameter	Description
Inter-frame Delay	Set the time delay between the DSE module receiving a Modbus RTU request and the DSE module's response.
Parity Checking	Set the Modbus string Parity Even Parity No Parity Odd Parity

2.9.3 ETHERNET

NOTE: Consult the network administrator of the host network before changing these settings. Incorrect settings cause network errors in the existing local area network. Qualified network administrators must only change these settings. When the Ethernet settings have been changed the module must be re booted to apply the new settings.

Dynamic Host Configuration Protocol

Dynamic Host Configuration Protocol

Obtain IP Address Automatically

Parameter	Description
Obtain IP Address Automatically	<input type="checkbox"/> = The Dynamic Host Configuration Protocol (DHCP) is disabled, and the unit has a fixed IP address as configured in the <i>IP Address</i> section. <input checked="" type="checkbox"/> = The Dynamic Host Configuration Protocol (DHCP) is enabled, and the unit automatically attains an IP address from the network it is connected to if it has DHCP enabled.

Names

Names

Domain Name	DSE Module
Host Name	Company
Vendor Name	Deep Sea Electronics

Parameter	Description
Domain Name	The hostname of the device which is used for DHCP requests and acknowledgements. Consult the network IT manager for suitable naming
Host Name	Additional description string for DHCP
Vendor Name	Additional description string for DHCP

IP Address

IP Addresses				
IP address	192	168	1	100
Subnet Mask	255	255	255	0
Gateway Address	0	0	0	0
DNS Address	0	0	0	0
Preferred Connection Address	0	0	0	0

Parameter	Description
IP Address	The static IP address of the module.
Subnet Mask	The subnet mask is to determine whether the module is on the local subnet or on a remote network.
Gateway Address	IP address of the internet router that module is connected to.
DNS Address	IP address of the Domain Name Service (DNS). Usually this is the same as the module's IP address.
Preferred Connection Address	The module allows up to five Modbus clients to connect to it. The <i>Preferred Connection Address</i> enables the unit to reserve one of the five connections for a specific IP address, such as for a remote display module to ensure it always connects.

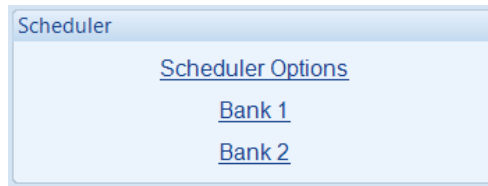
Modbus

Modbus	
Modbus Port Number	502

Parameter	Description
Modbus Port Number	The port number which the module serves Modbus traffic on.

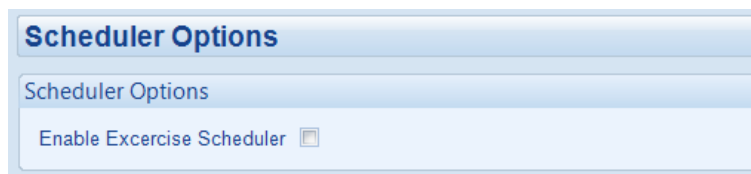
2.10 SCHEDULER

The DSE335 MKII Series is equipped with a built-in exercise run scheduler that has the capability to start and stop the set automatically.



2.10.1 SCHEDULER OPTIONS

Enabling the Scheduler Options setting enables the utilization of both scheduler banks.



Function	Description
Enable Exercise Scheduler	<input type="checkbox"/> = The scheduler is disabled. <input checked="" type="checkbox"/> = The scheduler is enabled, Bank 1 and Bank 2 become editable.

2.10.2 BANK 1 / BANK 2

Each Bank of the Exercise Scheduler is used to give up to 8 scheduled runs per bank, 16 in total. This run schedule is configurable to repeat every 7 days (weekly) or every 28 days (monthly). The run is *Do Not Transfer*, *Off Load* or *Transfer*.

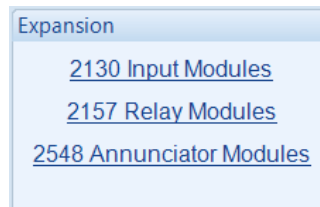
Each scheduler bank configured differently either to weekly or monthly based exercises.

Function	Description
Schedule Period	Determines the repeat interval for the scheduled run. Options available are: Weekly: The schedule events occur every week. Monthly: The schedule events occur every month on the week selected.
Week	Specifies the week of the month, on which the scheduled run takes place
Day	Specifies the day of week, on which the scheduled run takes place
Transfer Mode	Determines the loading state mode of the generator when running on schedule Do Not Transfer: The standby source does not start, and the load remains on the priority source even in the event of a failure Off Load: Only available if the standby source is a generator The generator starts and runs but there is no load transfer. Transfer: The load is transferred to the standby source for the duration of the scheduled time.
Start Time	Determines at what time of day the scheduled run starts
Duration	Determines the time duration in hours for the scheduled run
Clear	Resets the values for the Day, Start Time, and Duration to defaults

2.11 EXPANSION

▲ NOTE: If the controller does not respond to the expansion module then it is likely that there is a communication failure. If a digital input is critical then the alarm on the expansion module should be set to *Electrical Trip* or *Warning*. If the link is lost to an expansion unit then it behaves as if it is powered down.

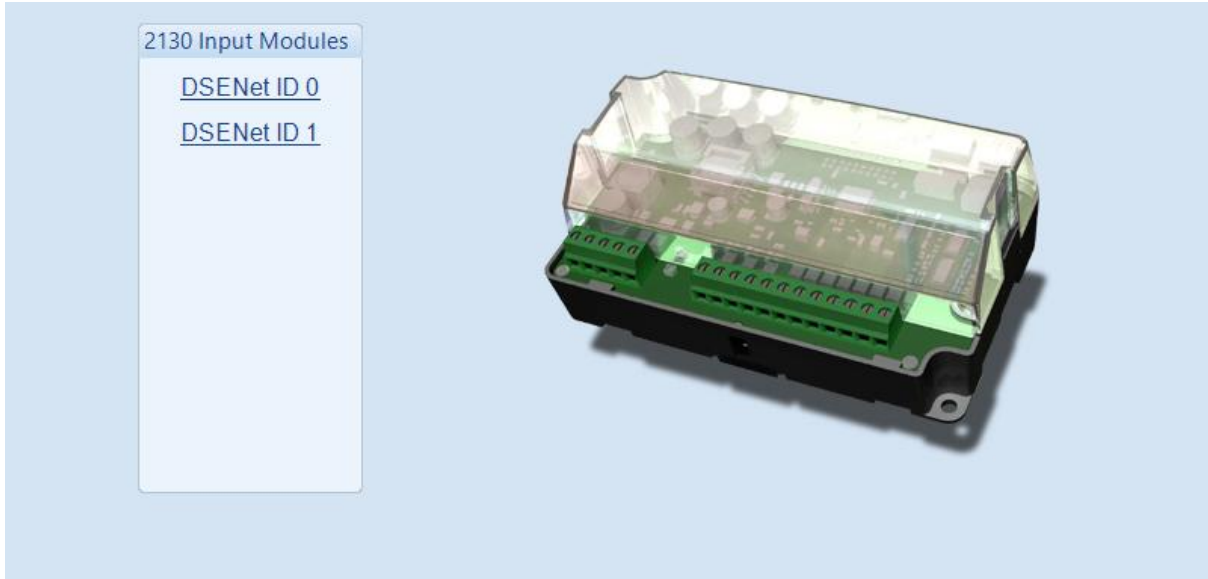
The *Expansion* page is subdivided into smaller sections.
Select the required section with the mouse.



See overleaf for description of the different expansion modules.

2.11.1 DSE2130 INPUT MODULES

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



The following options are then shown:

2130 Expansion Enable

2130 Expansion Enable

Expansion Enabled

Link Lost Alarm Action Electrical Trip

Parameter	Description
Expansion Enabled	<input type="checkbox"/> = The expansion module with the selected ID is not enabled. <input checked="" type="checkbox"/> = The expansion module with the selected ID is enabled. If the expansion module is not connected / detected by the module, the module generates an <i>Exp. Unit Failure</i> alarm with the configured <i>Link Lost Alarm Action</i> severity.
Link Lost Alarm Action	Select the type of alarm action required from the list: Electrical Trip Warning

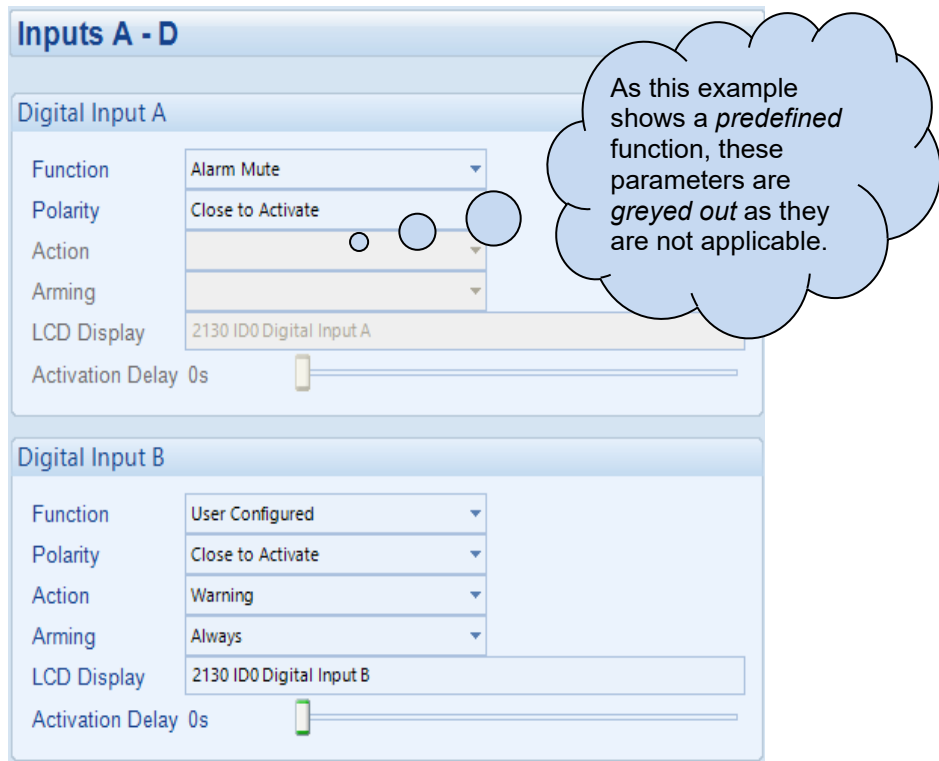
2130 Expansion Inputs

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

2130 Expansion Inputs

[Inputs A - D](#)
[Inputs E - H](#)

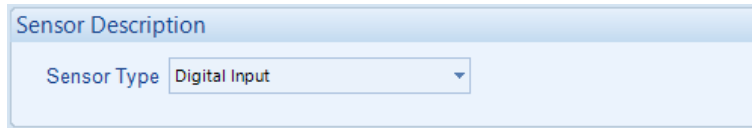
2.11.1.1 DIGITAL INPUTS A TO D



Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See section entitled <i>Input Functions</i> for details of all available functions
Polarity	Select the digital input polarity: Close to Activate: the input function is activated when the relevant terminal is connected. Open to Activate: the input function is activated when the relevant terminal is disconnected.
Action	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>NOTE: For details of these, see the section entitled <i>Alarm Types</i> elsewhere in this document.</p> </div> <p>Select the type of alarm required from the list: Electrical Trip Indication None Warning</p>
Arming	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>NOTE: For details of these, see the section entitled <i>Alarm Arming</i> elsewhere in this document.</p> </div> <p>Select when the input becomes active: Always Never</p>
LCD Display	The text that is displayed on the module's LCD when the input activates and generates an alarm.
Activation Delay	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.

2.11.1.2 ANALOGUE INPUTS E TO H

Sensor Description

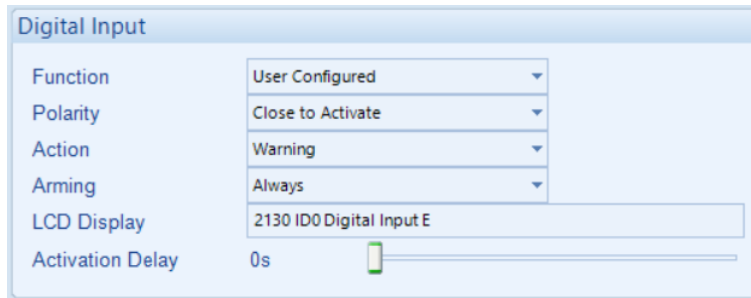


Sensor Description

Sensor Type

Parameter	Description
Sensor Type	<p>Select the sensor type and curve from a pre-defined list or create a user-defined curve.</p> <p>Available sensor types:</p> <p>Digital Input: Configured on the 2130/Digital Inputs pages</p> <p>None: The analogue input is disabled</p> <p>Pressure: The input is configured as a pressure sensor</p> <p>Percentage: The input is configured as a percentage sensor</p> <p>Temperature: The input is configured as a temperature sensor</p>

Configured as a Digital Input



Digital Input

Function: User Configured



Polarity: Close to Activate

Action: Warning

Arming: Always

LCD Display: 2130 ID0 Digital Input E

Activation Delay: 0s

Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See section entitled <i>Input Functions</i> for details of all available functions
Polarity	Select the digital input polarity: Close to Activate: the input function is activated when the relevant terminal is connected. Open to Activate: the input function is activated when the relevant terminal is disconnected.
Action	<div style="border: 2px solid black; padding: 5px;"> <p> NOTE: For details of these, see the section entitled <i>Alarm Types</i> elsewhere in this document.</p> </div> <p>Select the type of alarm required from the list: Electrical Trip Indication Warning None</p>
Arming	<div style="border: 2px solid black; padding: 5px;"> <p> NOTE: For details of these, see the section entitled <i>Alarm Arming</i> elsewhere in this document.</p> </div> <p>Select when the input becomes active: Always Never</p>
LCD Display	The text that is displayed on the module's LCD when the input activates and generates an alarm.
Activation Delay	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.

Configured as an Analogue Input

Input Type

Not used

Parameter	Description
Input Type	Select the sensor type and curve from a pre-defined list or create a user-defined curve. Available input types: Digital closed for alarm Digital open for alarm VDO Ohm range (10-180) VDO Tube type (90-0) US Ohm range (240-33) GM Ohm range (0-90) GM Ohm range (0-30) Ford (73-10) User defined

Sensor Alarms

Parameter	Description
Alarm Arming	<p> NOTE: For details of these, see the section entitled <i>Alarm Arming</i> elsewhere in this document.</p> <p>Select when the alarm generated by the analogue input becomes active: Always From Safety On From Starting</p>
Low Alarm Enable	<p><input type="checkbox"/> = The Alarm is disabled. <input checked="" type="checkbox"/> = The <i>Low Alarm</i> activates when the measured quantity drops below the <i>Low Alarm</i> setting.</p>
Low Pre-Alarm Enable	<p><input type="checkbox"/> = The Pre-Alarm is disabled. <input checked="" type="checkbox"/> = The <i>Low Pre-Alarm</i> is active when the measured quantity drops below the <i>Low Pre-Alarm Trip</i> setting. The <i>Low Pre-Alarm</i> is automatically reset when the measured quantity rises above the configured <i>Low Pre-Alarm Return</i> level.</p>
Low Alarm String	The text that is displayed on the module's LCD when the <i>Low Alarm</i> or <i>Low Pre-Alarm</i> activates.
High Pre-Alarm Enable	<p><input type="checkbox"/> = The Pre-Alarm is disabled. <input checked="" type="checkbox"/> = The <i>High Pre-Alarm</i> is active when the measured quantity rises above the <i>High Pre-Alarm Trip</i> setting. The <i>High Pre-Alarm</i> is automatically reset when the measured quantity falls below the configured <i>High Pre-Alarm Return</i> level.</p>
High Alarm Enable	<p><input type="checkbox"/> = The Alarm is disabled. <input checked="" type="checkbox"/> = The <i>High Alarm</i> is active when the measured quantity rises above the <i>High Alarm</i> setting.</p>
High Alarm String	The text that is displayed on the module's LCD when the <i>High Alarm</i> or <i>High Pre-Alarm</i> activates.

2.11.1.3 CREATING / EDITING THE SENSOR CURVE

While the *DSE Configuration Suite* holds sensor specifications for the most used resistive sensors, occasionally it is required that the module be connected to a sensor not listed by the *DSE Configuration Suite*. To aid this process, a sensor curve editor is provided.

The sensor curve that is to be used by the analogue input or edited.

Click to edit the selected sensor curve or create a curve if a curve is not selected.

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

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

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

Click Save As prompt to name the curve...

New Curve Name

Enter a name for the new curve

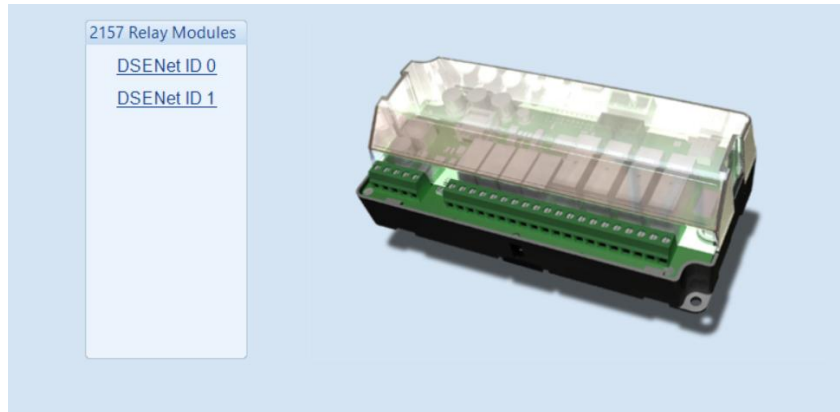
Click OK to save the curve.

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

Click OK to accept the changes or CANCEL to ignore and lose the

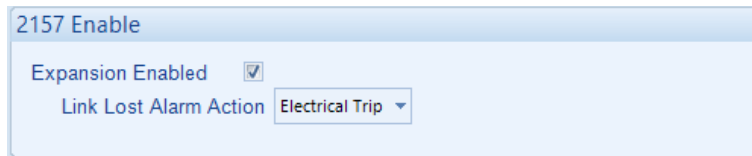
2.11.2 DSE2157 RELAY MODULES

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



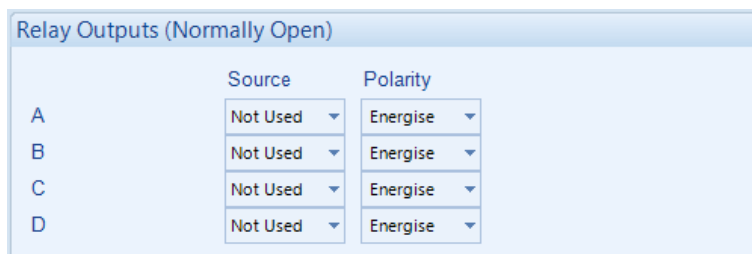
The following options are then shown:

2157 Expansion Enable



Parameter	Description
Expansion Enabled	<input type="checkbox"/> = The expansion module with the selected ID is not enabled. <input checked="" type="checkbox"/> = The expansion module with the selected ID is enabled. If the expansion module is not connected / detected by the module, the module generates an <i>Exp. Unit Failure</i> alarm with the configured <i>Link Lost Alarm Action</i> severity.
Link Lost Alarm Action	Select the type of alarm required from the list: Electrical Trip: Warning:

Relay Outputs Normally Open



Parameter	Description
Source	Select the output source to control the state of the output See section entitled <i>Output Sources</i> elsewhere in this document.
Polarity	Select the digital input polarity: Energise: When the output source is true, the output activates. De-Energise: When the output source is true, the output deactivates.

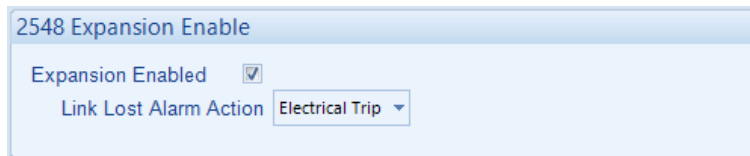
2.11.3 DSE2548 ANNUNCIATOR MODULES

Select the DSENet ID of the LED expansion to be configured. The ID of the expansion input module is set by rotary decimal switch accessible on the rear of the device.



The following options are then shown:

2548 Expansion Enable





Parameter	Description
Expansion Enabled	<input type="checkbox"/> = The expansion module with the selected ID is not enabled. <input checked="" type="checkbox"/> = The expansion module with the selected ID is enabled. If the expansion module is not connected or detected by the module, the module generates an <i>Exp. Unit Failure</i> alarm with the configured <i>Link Lost Alarm Action</i> severity.
Link Lost Alarm Action	Select the type of alarm required from the list: Electrical Trip: Warning:

Sounder Configuration

Sounder Configuration

Follow main unit

Sounder enabled

Parameter	Description
Follow Main Unit	<p><input type="checkbox"/> = If the Mute/Lamp Test  button is activated, the other DSE2548 modules and the host module do not exhibit any response.</p> <p><input checked="" type="checkbox"/> = If the Mute/Lamp Test  button is activated, other DSE2548 modules that are set up to follow the main unit also mute their alarms and vice versa.</p>
Sounder Enabled	<p><input type="checkbox"/> = The internal sounder of the DSE2548 does not emit any sound when a fault condition becomes active.</p> <p><input checked="" type="checkbox"/> = The DSE2548 internal sounder provides audible alerts when a fault condition is triggered and becomes active.</p>

LED Indicators

LED Indicators

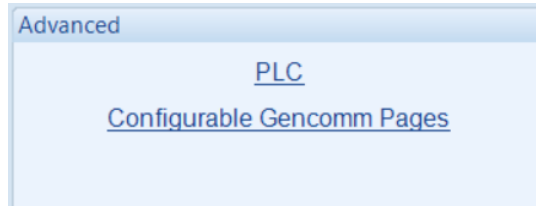
A	Not Used	Lit
B	Not Used	Lit
C	Not Used	Lit
D	Not Used	Lit
E	Not Used	Lit
F	Not Used	Lit
G	Not Used	Lit
H	Not Used	Lit

Annunciator Insert Card

Parameter	Description
Source	Select the output source to control the state of the output See section entitled <i>Output Sources</i> elsewhere in this document.
Polarity	Select the digital input polarity: Lit: When the output source is true, the output is Lit. Unlit: When the output source is true, the output is Unlit.
Annunciator Insert Card	Allows the user to create and print the custom text insert cards for the LEDs.

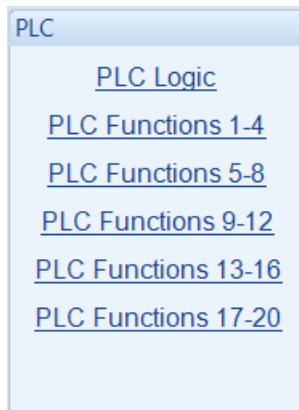
2.12 ADVANCED

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



2.12.1 PLC

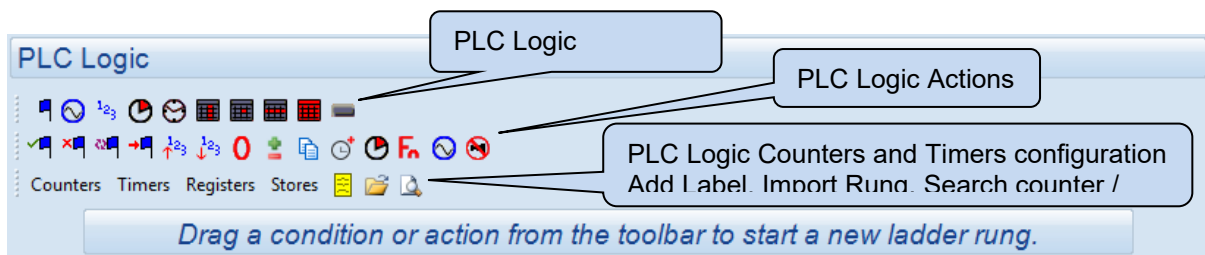
The PLC section is subdivided into smaller sub-sections. Select the required section with the mouse.



2.12.1.1 PLC LOGIC

NOTE: For further details and instructions on PLC Logic and PLC Functions, refer to DSE Publication: *057-175 PLC Programming Guide* which is found on our website: www.deepseaelectronics.com

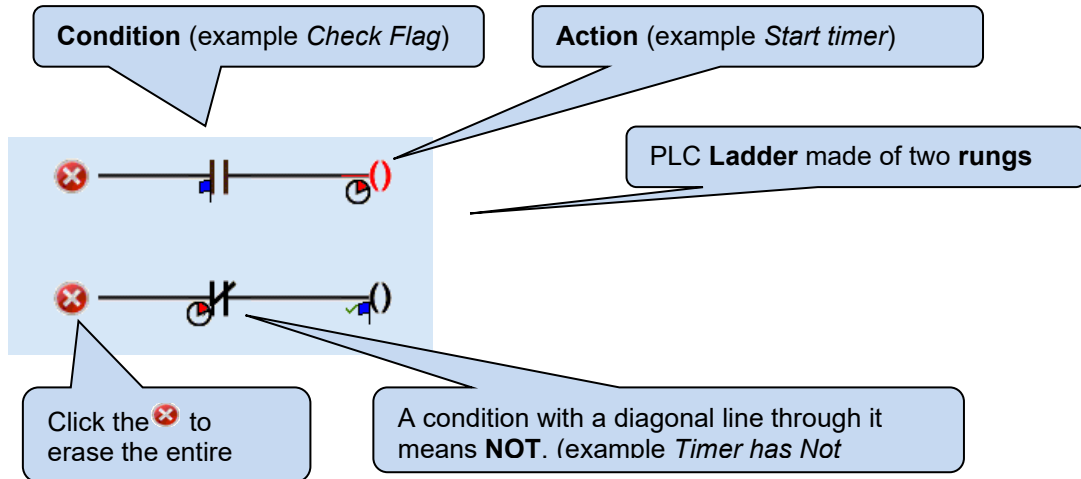
The PLC Logic adds comprehensive PLC functionality to the DSE controller. This is an advanced section, used entirely at your own risk.



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*.

Editing the Configuration

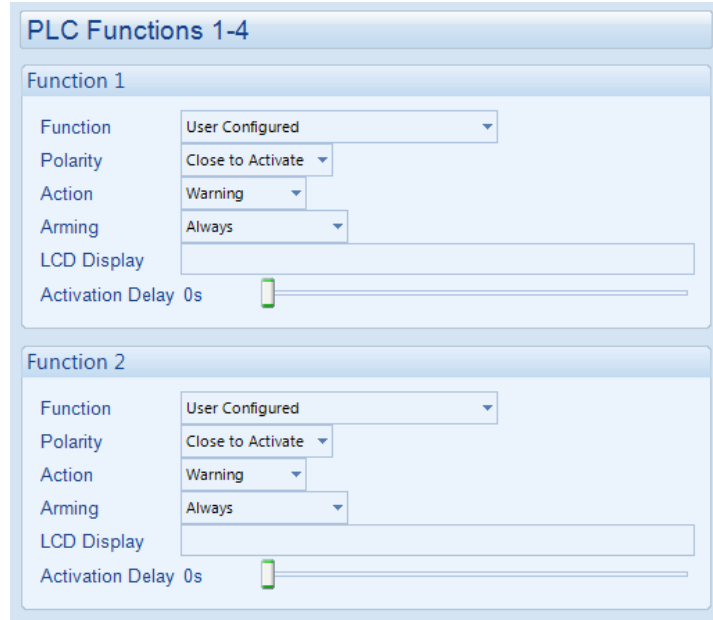
For instance if the conditions in the rung are met, the action takes place.



2.12.1.2 PLC FUNCTIONS

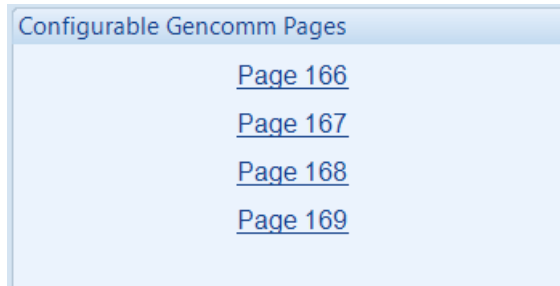
NOTE: For further details and instructions on PLC Logic and PLC Functions, refer to DSE Publication: *057-175 PLC Programming Guide* which is found on our website: www.deepseaelectronics.com

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.



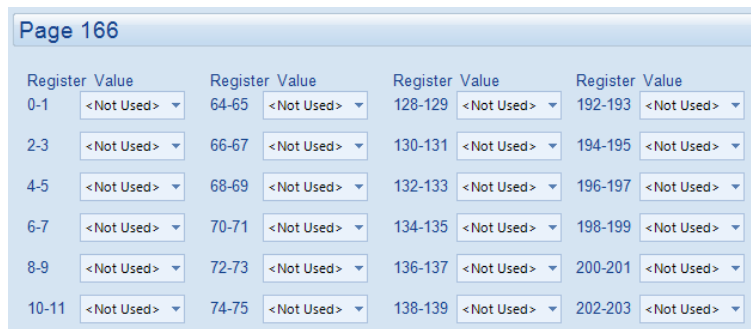
Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See section entitled <i>Input Functions</i> elsewhere in this document.
Polarity	Select the digital input polarity: Close to Activate: the input function is activated when the relevant terminal is connected. Open to Activate: the input function is activated when the relevant terminal is disconnected.
Action	<div style="border: 1px solid black; padding: 2px;"> <p>NOTE: For details of these, see the section entitled <i>Alarm Types</i> elsewhere in this document.</p> </div> <p>Select the type of alarm required from the list: Electrical Trip Indication Warning</p>
Arming	<div style="border: 1px solid black; padding: 2px;"> <p>NOTE: For details of these, see the section entitled <i>Alarm Arming</i> elsewhere in this document.</p> </div> <p>Select when the alarm generated by the input becomes active: Always Never</p>
LCD Display	The text that is displayed on the module's LCD when the input activates and generates an alarm.
Activation Delay	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.

2.12.2 CONFIGURABLE GENCOMM PAGES



Configurable Gencomm pages are available for advanced MODBUS applications on the controller. 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 client, and hence speed up data collection.

All configurable Gencomm registers are 32-bit unsigned format.



The configurable MODBUS pages are:

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

Example of Gencomm page configuration:



The register address is obtained from the formula:
 $register_address = page_number * 256 + register_offset$

To read the *Plant Battery Volts* from the above register, the MODBUS client device needs to read the data in two registers and then combine the data from the Most Significant Bit and the Least Significant Bit.

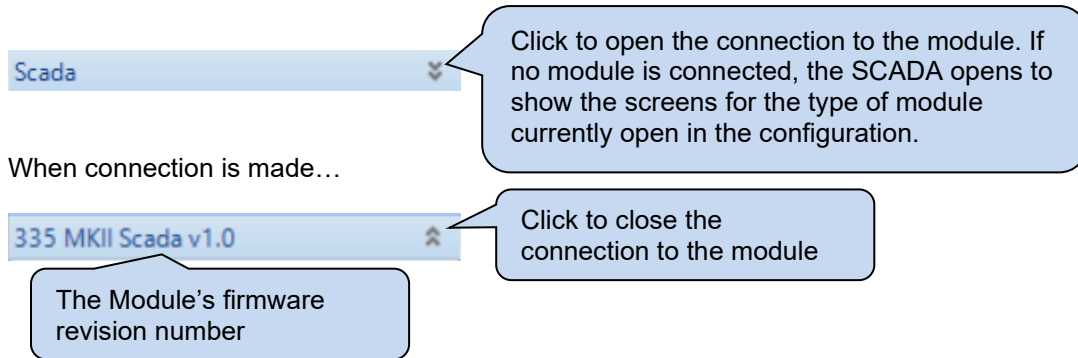
MSB address in Decimal = $(166 * 256) + 2 = 42498$

LSB address in Decimal = $(166 * 256) + 3 = 42499$

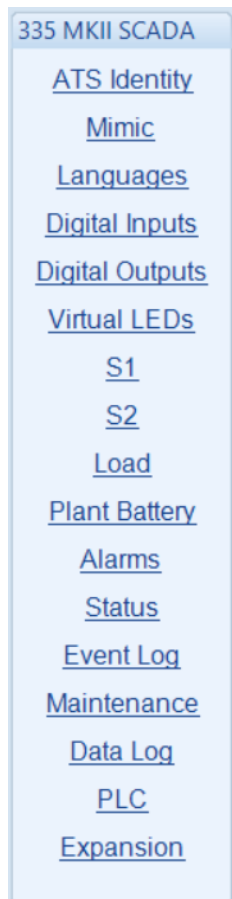
3 SCADA

SCADA stands for Supervisory Control And Data Acquisition and is provided both as a service tool and also as a means of monitoring / controlling the generator set.

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



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



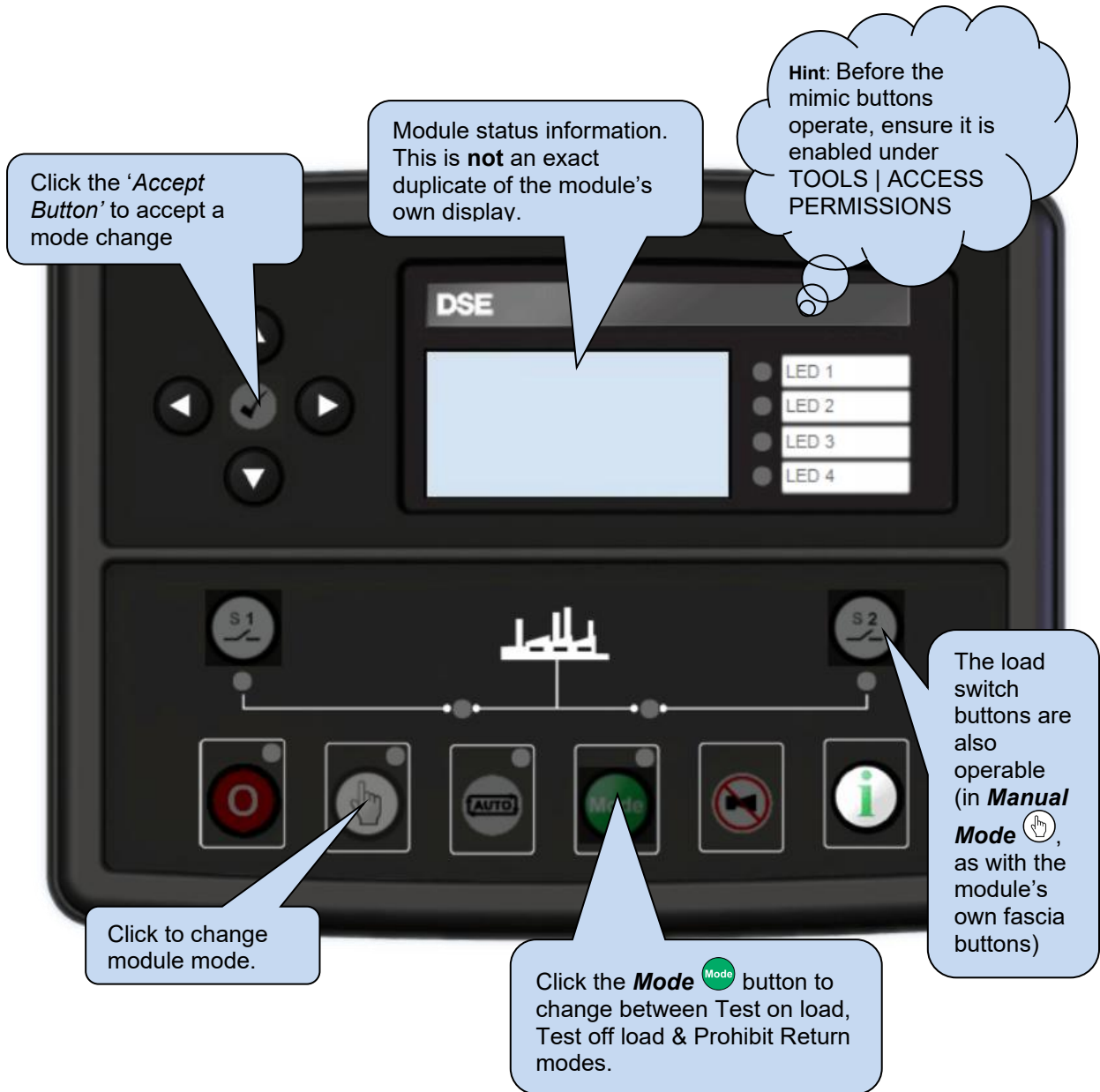
3.1 ATS IDENTITY

This section displays the module's configuration settings for *Site Identity*, *ATS Identity*, *S1 Identity* and *S2 Identity*. For further details on how to configure these items, refer to section entitled *Communications Options* elsewhere in this document.

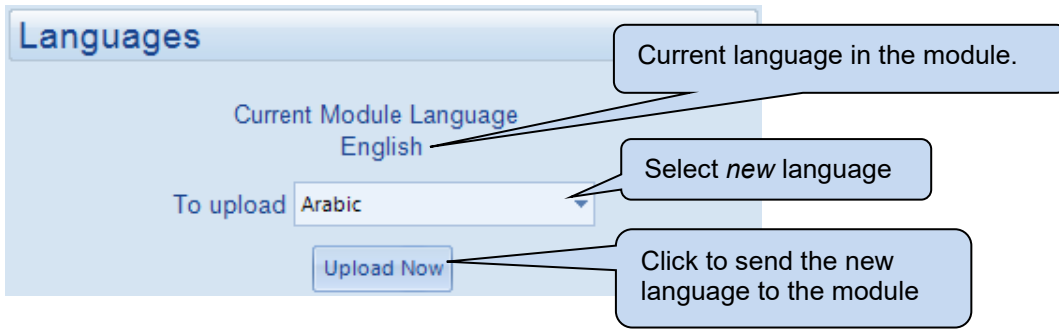
ATS Identity
Site Identity Deep Sea Electronics PLC
ATS Identity DSE335 ATS Panel
S1 Identity Source 1
S2 Identity Source 2

3.2 MIMIC

This section provides a mimic of the module's fascia and allows the operator to change the control mode of the module. For information in regard to operating the DSE module, refer to DSE publication: **057-368 DSE335 MKII Operation Manual** which is found on the DSE website: www.deepseaelectronics.com

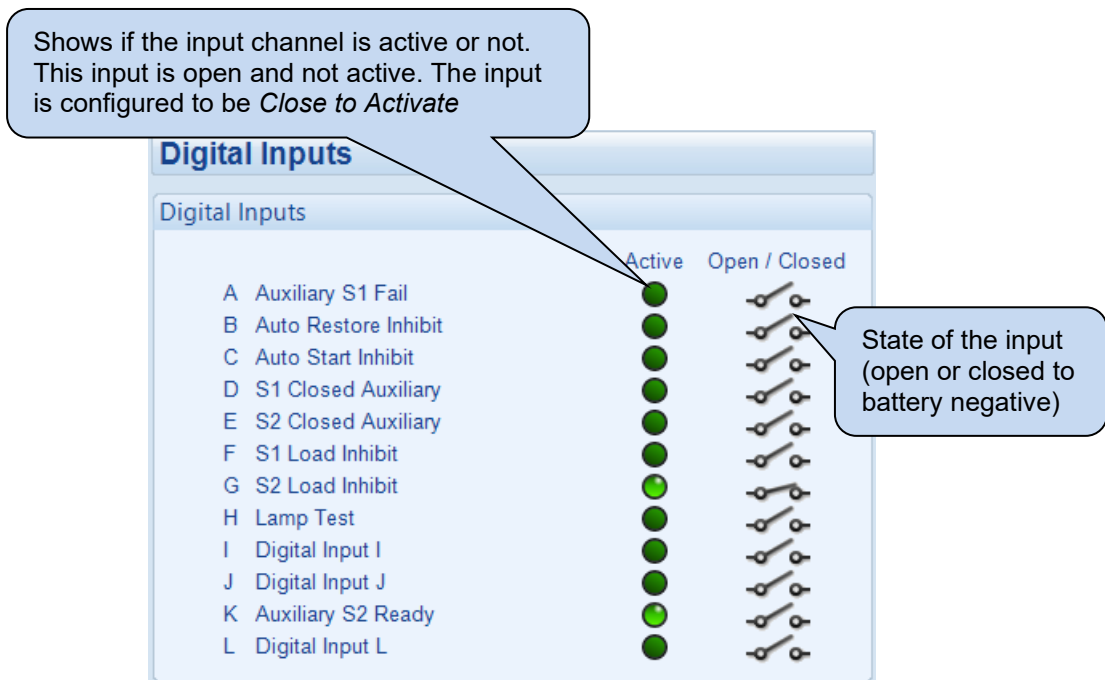


3.3 LANGUAGES



3.4 DIGITAL INPUTS

This section displays the status of the module's digital inputs and the functions they are configured for. For further details on how to configure these items, refer to section entitled *Digital Inputs* elsewhere in this document.



3.5 DIGITAL OUTPUTS

This section displays the status of the module's digital outputs and the functions they are configured for. For further details on how to configure these items, refer to section entitled *Digital Outputs* elsewhere in this document.

Shows if the output channel is active or not. This output is *Close* but is active. The output is configured to be *Close S1 Output de-energise*. As relay is normally closed (N/C) and the *Close S1* source is present, the output is *activated* to close the N/C relay.

Digital Outputs

Relay Outputs (Volt Free)

	Active	Open / Closed
A (N/C) Close S1 Output	●	⏏
B (N/O) Close S2 Output	●	⏏
C (C/O) PLC output flag 1	●	⏏
D (C/O) PLC output flag 2	●	⏏
E (N/C) Start and Run S2	●	⏏
F (N/O) Audible Alarm	●	⏏

FET Outputs

	Active	Open / Closed
G Battery High Voltage	●	⏏
H Battery Low Voltage	●	⏏
I Common Warning	●	⏏
J Flexible Sensor High	●	⏏
K S1 Failure Latched	●	⏏
L Not Used	●	⏏

State of the output (open or closed)

3.6 VIRTUAL LEDS

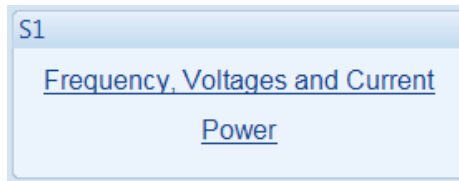
This section displays the status of the module's *Virtual LEDs* and the functions they are configured for. These LEDs are not fitted to the module or expansion modules, they are not physical LEDs. They are provided to show status and appear only in the SCADA section of the DSE Configuration Suite or read by third party PLC or Building Management Systems (for example) using the MODBUS protocol. For further details on how to configure these items, refer to section entitled *Digital Outputs* elsewhere in this document.

The screenshot shows a window titled "Virtual LEDs" with a sub-section "LED Status". It contains a table with 20 rows, each representing an LED. The first column lists the LED number (LED 1 to LED 20). The second column lists the function configured for each LED. The third column, labeled "Active", shows a vertical column of 20 green circular indicators. The top indicator (LED 1) is highlighted with a callout box stating "Shows if the Virtual LED is active or not". A second callout box points to the first row, stating "Shows what the Virtual LED is configured for (shows the LED number if not configured)".

LED	Function	Active
LED 1	Audible Alarm	Active
LED 2	LED 2	Inactive
LED 3	LED 3	Inactive
LED 4	LED 4	Inactive
LED 5	LED 5	Inactive
LED 6	LED 6	Inactive
LED 7	LED 7	Inactive
LED 8	LED 8	Inactive
LED 9	LED 9	Inactive
LED 10	LED 10	Inactive
LED 11	LED 11	Inactive
LED 12	LED 12	Inactive
LED 13	LED 13	Inactive
LED 14	LED 14	Inactive
LED 15	LED 15	Inactive
LED 16	LED 16	Inactive
LED 17	LED 17	Inactive
LED 18	LED 18	Inactive
LED 19	LED 19	Inactive
LED 20	LED 20	Inactive

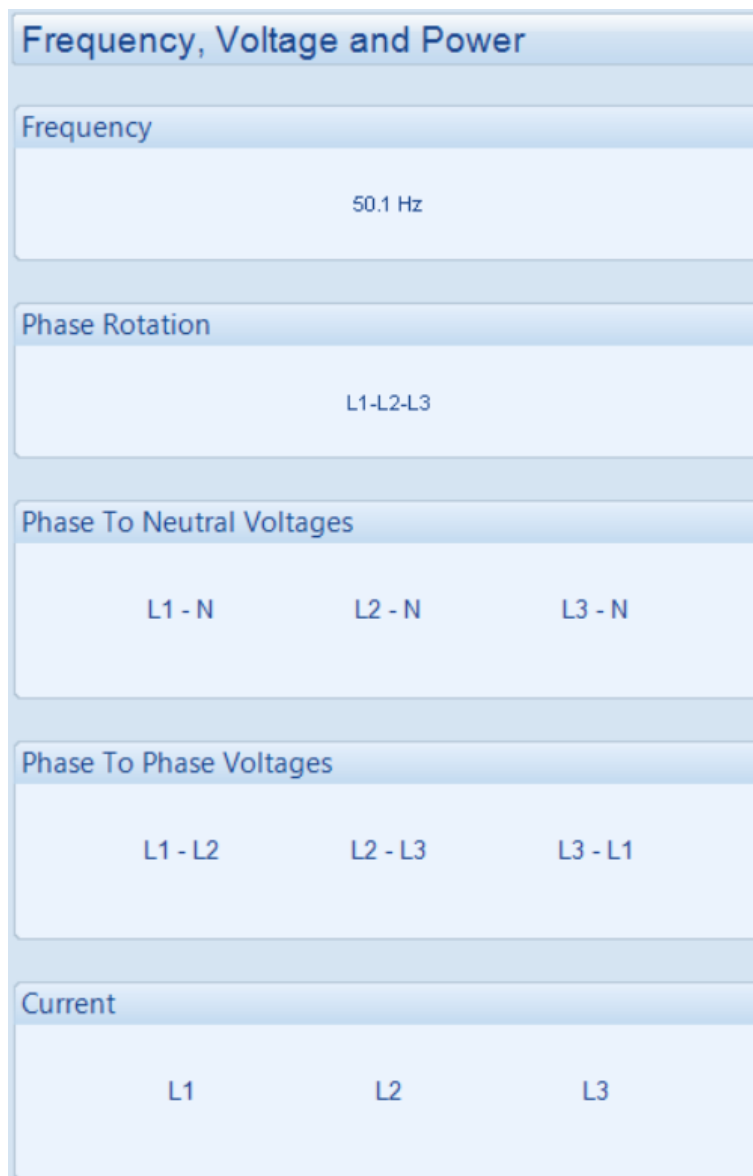
3.7 S1 & S2

The *S1* and *S2* pages are subdivided into smaller sections. Select the required section with the mouse.



3.7.1 FREQUENCY, VOLTAGE AND CURRENT

This section displays the modules measurements of the S1 or S2 supply.



3.7.2 POWER

This section displays the modules measurements of the S1 or S2 supply power.

Power			
Watts			
L1 7.6 kW	L2 7.4 kW	L3 7.7 kW	Total 22.7 kW
VA			
L1 12.6 kVA	L2 12.6 kVA	L3 12.7 kVA	Total 37.9 kVA
VAr			
L1 9.2 kVAr	L2 9.1 kVAr	L3 9.3 kVAr	Total 27.6 kVAr
Power factor			
L1 0.60	L2 0.59	L3 0.60	Average 0.59
Accumulated Power			
kWh 42.7 kWh	kVAh 71.2 kVAh	kVArh 51.8 kVArh	

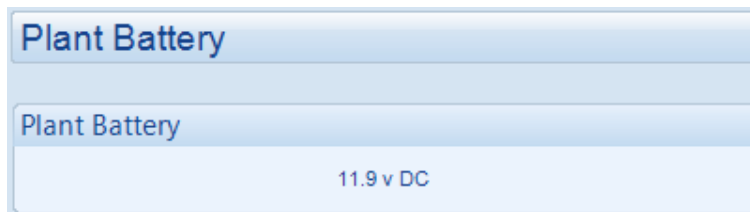
3.8 LOAD

This section displays the measurement of the load current.



3.9 PLANT BATTERY

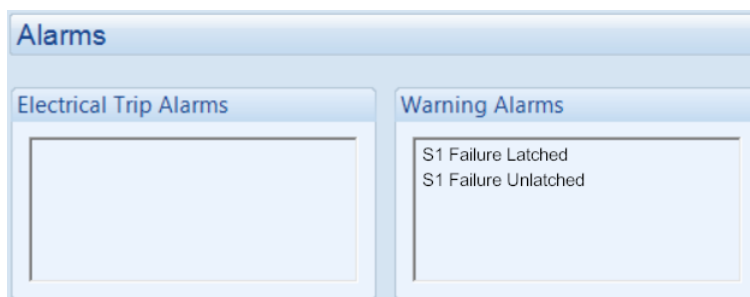
This section displays the measurement of the plant battery



3.10 ALARMS

This section displays the alarms that are currently active on the module. For information in regard to alarm descriptions, refer to DSE publication: **057-368 DSE335 MKII Operation Manual** which is found on the DSE website: www.deepseaelectronics.com.

For information in regard to alarm severity, refer to section entitled *Alarm Types* elsewhere in this document.



3.11 STATUS

This section displays the status information about the module.

Status	
S1 Supervisor State	Software Version
Failed	1.0
S1 Monitor State	Module ID
Failed	12CCE40F8
S2 Supervisor State	Mode
No Start Request	Stop
S2 Monitor State	
Offline	
Load Switching State	
S1 and S2 Open	

3.12 EVENT LOG

This section displays the events which are recorded with the module's event log along with the time, date, and hours in which they occurred. For further details on how what events are recorded, refer to section entitled *Event Log* elsewhere in this document.

For information in regard to alarm descriptions, refer to DSE publication: **057-368 DSE335 MKII Operation Manual** which is found on the DSE website: www.deepseaelectronics.com.

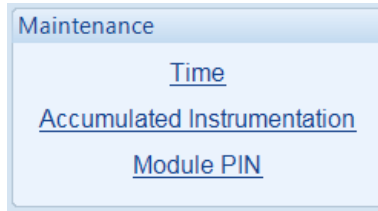
The screenshot shows the 'Event Log' interface. At the top is a title bar 'Event Log'. Below it is a table with the following columns: '#', 'Date', 'Time', 'Event', and 'Details'. The table contains 28 rows of event data. Below the table are four buttons: 'Export to Excel', 'Export to CSV', 'Export to PDF', and 'Print'. There are four callout boxes with arrows pointing to specific parts of the interface:

- A callout box on the right side of the table points to the table content and contains the text: "The recorded events in the module's Event log."
- A callout box on the left side points to the 'Export to Excel' button and contains the text: "Click to save the log to an Excel or csv file for use in an external spreadsheet program"
- A callout box on the right side points to the 'Export to PDF' button and contains the text: "Click to save the log to a pdf (Adobe Acrobat) file"
- A callout box on the right side points to the 'Print' button and contains the text: "Click to print the log"

#	Date	Time	Event	Details
1	15/03/2012	17:20	Warning	S1 Failure Unlatched
2	15/03/2012	17:16	ETrip	Expansion Unit Watchdog Alarm
3	15/03/2012	17:12	Warning	S1 Failure Unlatched
4	15/03/2012	17:12	Restart	Power Up
5	15/03/2012	10:39	Warning	S1 Failure Unlatched
6	15/03/2012	10:39	Restart	Power Up
7	31/12/1999	00:00	Initialise	User calibration data initialised
8	31/12/1999	00:00	Initialise	Accumulated instrumentation initialised
9	06/03/2012	08:37	Warning	S1 Failure Unlatched
10	06/03/2012	08:37	Restart	Power Up
11	06/03/2012	08:37	Warning	S1 Failure Unlatched
12	06/03/2012	08:37	Restart	Power Up
13	06/03/2012	08:37	Warning	S1 Failure Unlatched
14	06/03/2012	08:37	Restart	Power Up
15	06/03/2012	08:36	Warning	S1 Failure Unlatched
16	06/03/2012	08:36	Restart	Power Up
17	06/03/2012	08:36	Warning	S1 Failure Unlatched
18	06/03/2012	08:36	Restart	Power Up
19	06/03/2012	08:36	Warning	S1 Failure Unlatched
20	06/03/2012	08:36	Restart	Power Up
21	06/03/2012	08:36	Warning	S1 Failure Unlatched
22	06/03/2012	08:36	Restart	Power Up
23	06/03/2012	08:36	Warning	S1 Failure Unlatched
24	06/03/2012	08:36	Restart	Power Up
25	06/03/2012	08:36	Warning	S1 Failure Unlatched
26	06/03/2012	08:36	Restart	Power Up

3.13 MAINTENANCE

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



3.13.1 TIME

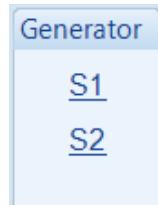
This section allows the date and time to be adjusted on the controller.

A screenshot of the 'Date and Time' configuration page. The page is divided into several sections:

- Date and Time**: A header section.
- Module Date**: A field displaying '12/10/2023'. A callout points to this field with the text: 'Display of the module's current date and'.
- Module Time**: A field displaying '15:28:23'.
- Set Date And Time**: A section containing two input fields for 'Date' (12/10/2023) and 'Time' (15:28:23), each with up and down arrows. A 'Set' button is below them. A callout points to these fields with the text: 'Type the new date / time or click the up and down arrows to change the settings'.
- Set To PC Time**: A section displaying 'Date 12/10/2023' and 'Time 15:28:23' with a 'Set To PC Time' button. A callout points to this button with the text: 'Click Set to adjust the module to the date/time that your PC is set to.' Another callout points to the 'Set' button in the previous section with the text: 'Click Set to adjust the module to the selected date/time.'

3.13.2 ACCUMULATED INSTRUMENTATION

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



3.13.2.1 S1 & S2

This section allows the generators accumulated instrumentation counters to be adjusted on the controller.

The screenshot shows the control interface for generator S1. It is divided into four sections: kWh, kVAh, kVArh, and a Reset section. Each section contains a label, a current value, a numeric input field with up/down arrows, and a "Set" button. The Reset section contains a "Reset all values to zero" button. Callouts provide instructions: "Display of the module's current value for the parameter" points to the kWh value; "Type the new value or click the up and down arrows to change the settings" points to the kWh input field; "Click Set to adjust the module to the selected value" points to the kWh Set button; and "Click to reset all the accumulated instrumentation counters to zero." points to the Reset button.

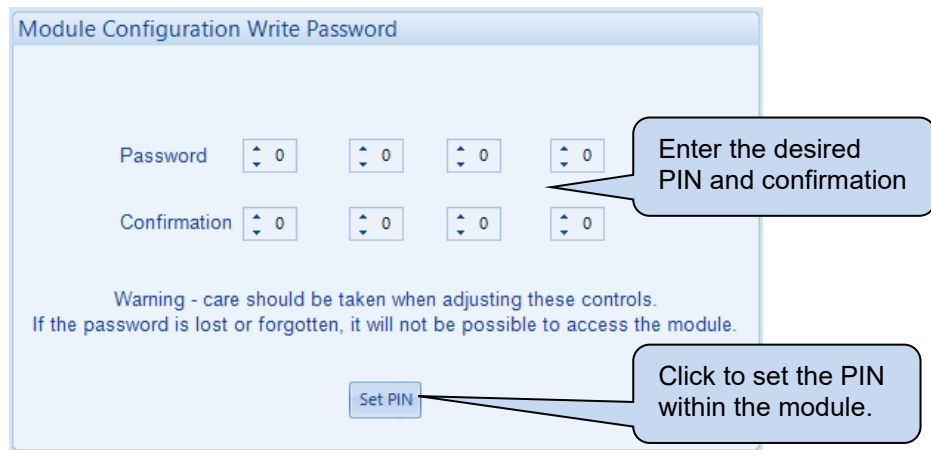
3.13.3 MODULE PIN

⚠ CAUTION!: If the module PIN is lost or forgotten, it is no longer possible to access or make changes to the module!

This section allows the user to configure a PINs (Personal Identification Number) within the module.

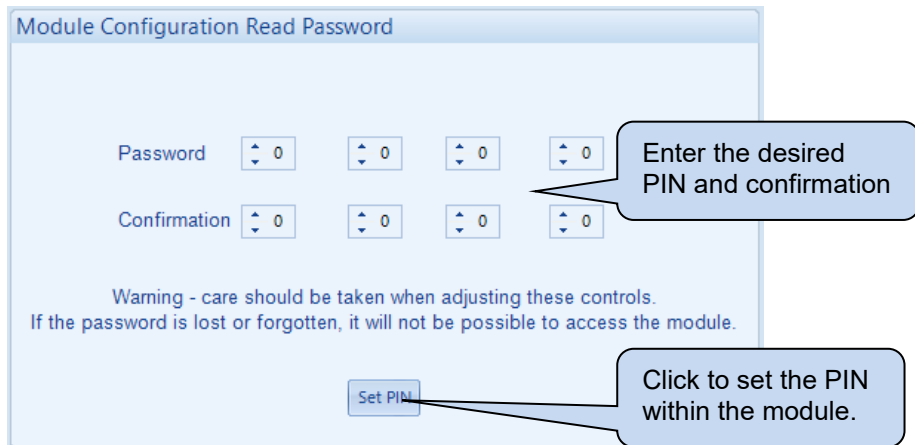
Module Configuration Write Password

This Write PIN must be entered to access the modules *Main Front Panel Configuration Editor* or, when writing a configuration / changing a value in SCADA using the DSE Configuration Suite PC Software.



Module Configuration Read Password

This Read PIN must be entered when reading a configuration / data log files or accessing the SCADA section.



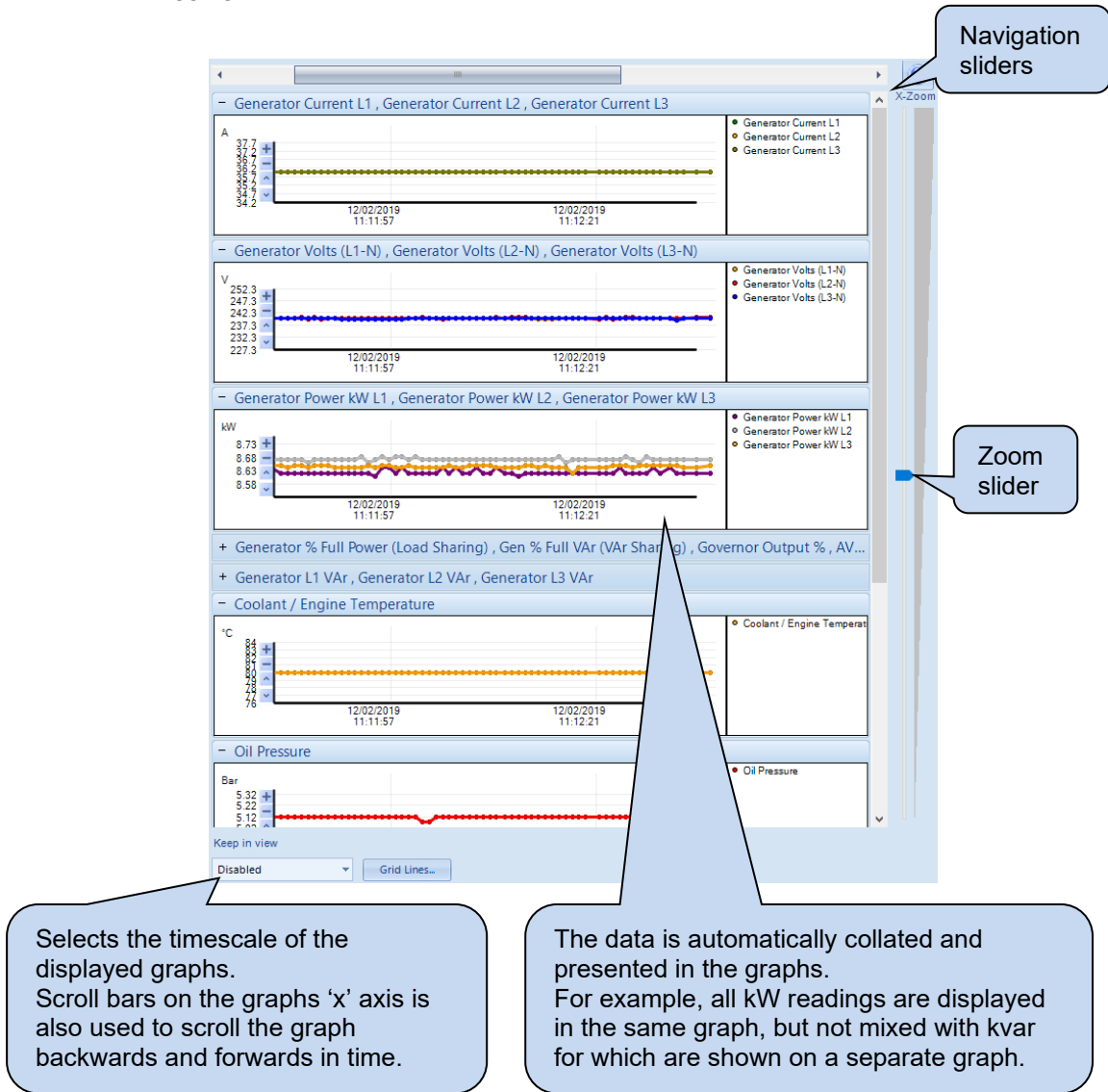
3.14 COMMUNICATIONS INFORMATION

This section displays the information about the configuration of the module's ethernet port. *For further details on how to configure the module's ethernet port, refer to the section entitled Ethernet elsewhere in this document.*

IP address 192 . 168 . 1 . 100	MAC Address E8 : A4 : C1 : 2 : 8D : 7
Subnet Mask 255 . 255 . 255 . 0	DNS 8 . 8 . 8 . 8
Host DSE Host	MODBUS Preferred IP Address 192 . 168 . 1 . 99
Domain DSE Module	MODBUS Connection Port 502
Gateway 192 . 168 . 1 . 1	DHCP Off
	TCP Vendor DSE Vender

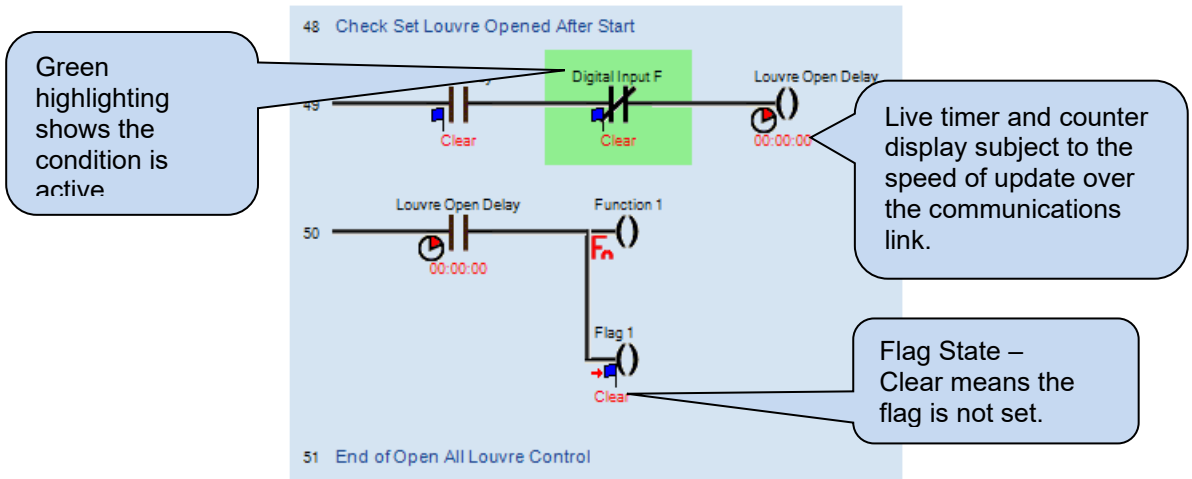
3.15 DATA LOG

This section displays and temporarily records the instruments configured within the module's *Data Logging* facility to the PC. The data which is temporarily recorded is only for the duration in which the Data Log section is viewed. For further details on how to configure these items, refer to section entitled *Data Logging* elsewhere in this document.



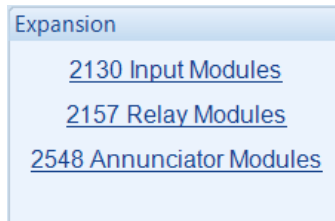
3.16 PLC

This section displays the real-time status of the PLC Logic configured within the module. This section is useful for assisting with fault finding issues relating to or caused by the PLC Logic.



3.17 EXPANSION

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



3.17.1 2130 INPUT MODULE

This section displays the status of the expansion inputs.

Expansion Inputs

Communications

Communications OK ●

Inputs

	Active	Open / Closed
A Alarm Mute	●	
B Auto Restore Inhibit	●	
C External Panel Lock	●	
D Auxiliary S1 Fail	●	
E Load Shedding	●	
F Inhibit Scheduled Run	●	
G Transformer Temperature S1	18 °C, 324 °F	
H Transformer Temperature S2	63 °C, 325 °F	

Shows if the input channel is active or not. This input is *closed* but is active. The input is configured to be *Close To Activate*

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

3.17.2 2157 OUTPUT MODULE

This section displays the status of the relay outputs.

Relay Outputs

Communications

Communications OK ● State of communication to the expansion module

Relay Outputs (Normally Open)

	Active	Open / Closed
A Elevator Control	●	⏏
B Scheduled Run	●	⏏
C Audible Alarm	●	⏏
D Common Warning	●	⏏

Relay Outputs (Changeover)

	Active	Open / Closed
E System In Auto Mode	●	⏏
F S1 In Limits	●	⏏
G Waiting For Manual Restore	●	⏏
H Not Used	●	⏏

Shows if the output channel is active or not. This output is *closed* and not active. The output is configured to be *Open To Activate*

State of the output (open or closed)

3.17.3 2548 ANNUNCIATOR MODULES

This section displays the status of the annunciator outputs.

The screenshot displays the 'LED Outputs' interface, which is divided into two main sections: 'Communications' and 'LED Indicators'.

Communications: This section shows the status of communication to the expansion module. It includes the text 'Communications OK' followed by a single green LED indicator. A callout box points to this indicator with the text: 'State of communication to the expansion module'.

LED Indicators: This section lists various annunciator outputs and their active states. The indicators are labeled A through H, plus a Sounder. A vertical column of green LEDs, labeled 'Active', shows the status of each indicator. A callout box points to this column with the text: 'Shows if the LED is active or not.'

Indicator	Description	Active
A	Common Warning	Active
B	S1 Failure Latched	Active
C	Warning Up	Active
D	Not Used	Not Active
E	Not Used	Not Active
F	Not Used	Not Active
G	Not Used	Not Active
H	Not Used	Not Active
Sounder	Not Used	Not Active

4 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
None	No audible alarm or common warning signal occurs.
Indication	No audible alarm or common warning signal occurs. <i>Indication</i> alarms are only used to illuminate indicators, activate outputs, or checked by the module's internal PLC.
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 if left untreated.
Electrical Trip	Audible alarm and common alarm signal is generated and S1 and S2 breakers are opened. <i>Electrical Trip alarms</i> are series issues that require S1 and S2 to be taken off load. As the name implies, this is often electrical faults that occur 'after' the load switch.

5 ALARM ARMING

The protections on the DSE module are active during their configured *Alarm Arming* setting. The table below shows the timing segment for the different *Alarm Arming* options with regards to the generator status.

Timing Segment	Priority On Load	Start Delay	Warming	Standby On Load	Return Delay	Cooldown
Never						
Always						

5.1 NEVER

The protection is never active on the controller. This is used to disable the protection.

5.2 ALWAYS

The protection is always active on the controller. This is used to constantly monitor statuses such as a fuel level switch irrespective of the engine running state.

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