DEEP SEA ELECTRONICS

DSE6110 MKIII & DSE6120 MKIII
Configuration Suite PC Software Manual

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DSE6110 MKIII & DSE6120 MKIII Configuration Suite PC Software Manual

Amendments Since Last Publication

Amd. No.	Comments
1	Initial Release
2	Updated to v2.0
3	Amendment to Fuel Control and Monitoring

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 DSE6110 MKIII and DSE6120 MKIII modules, which are part of the DSEGenset® 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 DSE61xx MKIII modules 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 for further information.

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
DSE6000, DSE6xxx	All modules in the DSE6xxx range.
DSE6100 MKIII, DSE61xx MKIII	All modules in the DSE61xx MKIII range.
DSE6110 MKIII	DSE6110 MKIII module/controller
DSE6120 MKIII	DSE6120 MKIII module/controller
CT	Current Transformer An electrical device that takes a large AC current and scales it down by a fixed ratio to a smaller current.
DEF	Diesel Exhaust Fluid (AdBlue) A liquid used as a consumable in the SCR process to lower nitric oxide and nitrogen dioxide concentration in engine exhaust emissions.
DM1	Diagnostic Message 1 A DTC that is currently active on the engine ECU.
DM2	Diagnostic Message 2 A DTC that was previously active on the engine ECU and has been stored in the ECU's internal memory.
DPF	Diesel Particulate Filter A filter fitted to the exhaust of an engine to remove diesel particulate matter or soot from the exhaust gas.
DPTC	Diesel Particulate Temperature Controlled Filter A filter fitted to the exhaust of an engine to remove diesel particulate matter or soot from the exhaust gas which is temperature controlled.
DTC	Diagnostic Trouble Code The name for the entire fault code sent by an engine ECU.
ECU/ECM	Engine Control Unit/Management An electronic device that monitors engine parameters and regulates the fuelling.

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Term	Description
FMI	Failure Mode Indicator A part of DTC that indicates the type of failure, e.g. high, low, open circuit etc.
GSM	Global System for Mobile communications. Cell phone technology used in most of the World.
HEST	High Exhaust System Temperature Initiates when DPF filter is full in conjunction with an extra fuel injector in the exhaust system to burn off accumulated diesel particulate matter or soot.
HMI	Human Machine Interface A device that provides a control and visualisation interface between a human and a process or machine.
IDMT	Inverse Definite Minimum Time
LCD	Liquid Crystal Display The green flat-panel display on the fascia of the module.
OC	Occurrence Count A part of DTC that indicates the number of times that failure has occurred.
PGN	Parameter Group Number A CAN address for a set of parameters that relate to the same topic and share the same transmission rate.
PLC	Programmable Logic Controller A programmable digital device used to create logic for a specific purpose.
SCADA	Supervisory Control And Data Acquisition A system that operates with coded signals over communication channels to provide control and monitoring of remote equipment
SCR	Selective Catalytic Reduction A process that uses DEF with the aid of a catalyst to convert nitric oxide and nitrogen dioxide into nitrogen and water to reduce engine exhaust emission.
SPN	Suspect Parameter Number A part of DTC that indicates what the failure is, e.g. oil pressure, coolant temperature, turbo pressure etc.

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
053-049	DSE9xxx Battery Charger Installation Instructions
053-125	DSE2131 Ratio-metric Input Expansion Installation Instructions
053-126	DSE2133 RTD/Thermocouple Input Expansion Installation Instructions
053-134	DSE2152 Ratio-metric Output Expansion Installation Instructions
053-147	DSE9460 & DSE9461 Battery Charger Installation Instructions
053-185	DSE9473 & DSE9483 Battery Charger Installation Instructions
053-240	DSE6110 MKIII & DSE6120 MKIII 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
057-004	Electronic Engines and DSE Wiring Guide
057-082	DSE2130 Input Expansion Operator Manual
057-083	DSE2157 Output Expansion Operator Manual
057-084	DSE2548 Annunciator Expansion Operator Manual
057-085	DSE9xxx Battery Charger Operator Manual
057-139	DSE2131 Ratio-metric Input Expansion Manual
057-140	DSE2133 RTD/Thermocouple Expansion Manual
057-141	DSE2152 Ratio-metric Output Expansion Manual
057-151	DSE Configuration Suite PC Software Installation & Operation Manual
057-175	PLC Programming Guide For DSE Controllers
057-176	DSE9460 & DSE9461 Battery Charger Operator Manual
057-289	DSE6110 MKIII & DSE6120 MKIII Operator Manual

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
056-010	Over Current Protection
056-018	Negative Phase Sequence
056-022	Switchgear Control
056-023	Adding New CAN Files
056-026	kW, kvar, kVA and pf.
056-029	Smoke Limiting
056-030	Module PIN Codes
056-036	Expansion Modules
056-055	Alternate Configurations
056-069	Firmware Update
056-075	Adding Language Files
056-081	Screen Heaters
056-091	Equipotential Earth Bonding
056-092	Best Practices for Wiring Restive Sensors
056-095	Remote Start Input Functions
056-097	USB Earth Loop and Isolation
056-099	Digital Output to Digital Input Connection
056-118	Configurable CAN

1.3.4 THIRD PARTY DOCUMENTS

The following third party documents are also referred to:

Reference	Description
ISBN 1-55937-879-4	IEEE Std C37.2-1996 IEEE Standard Electrical Power System Device Function Numbers and Contact Designations. 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.

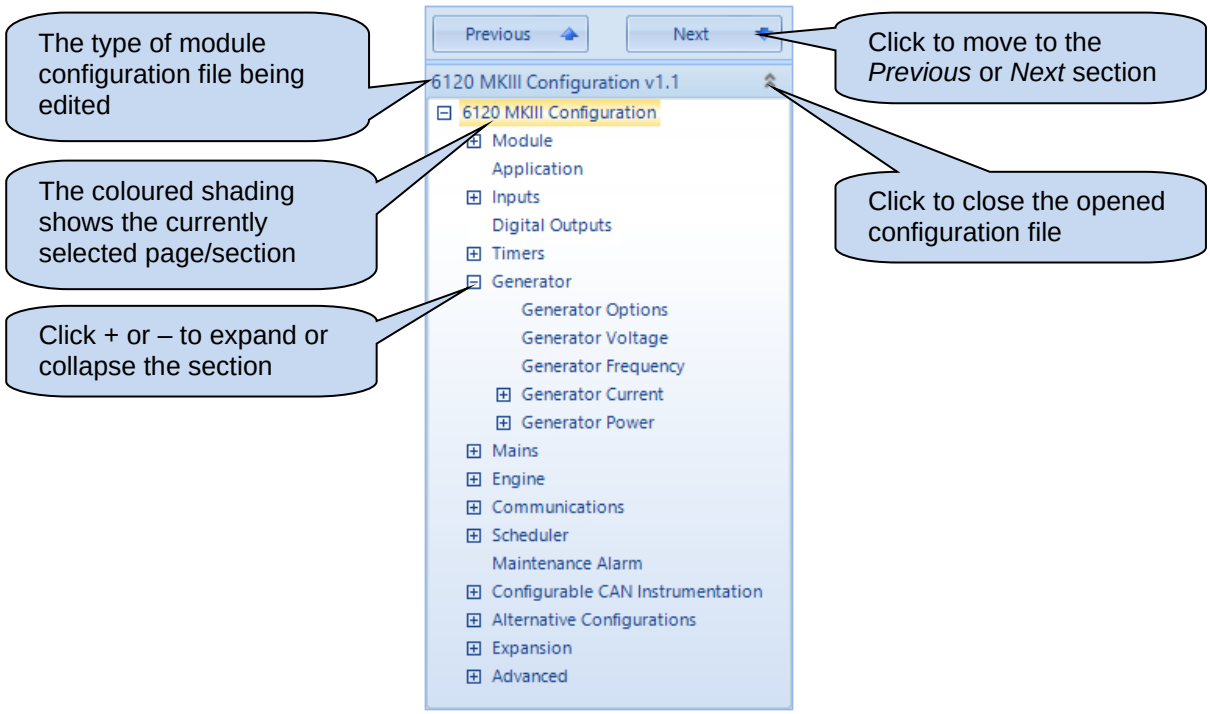
1.4 INSTALLATION AND USING THE DSE CONFIGURATION SUITE SOFTWARE

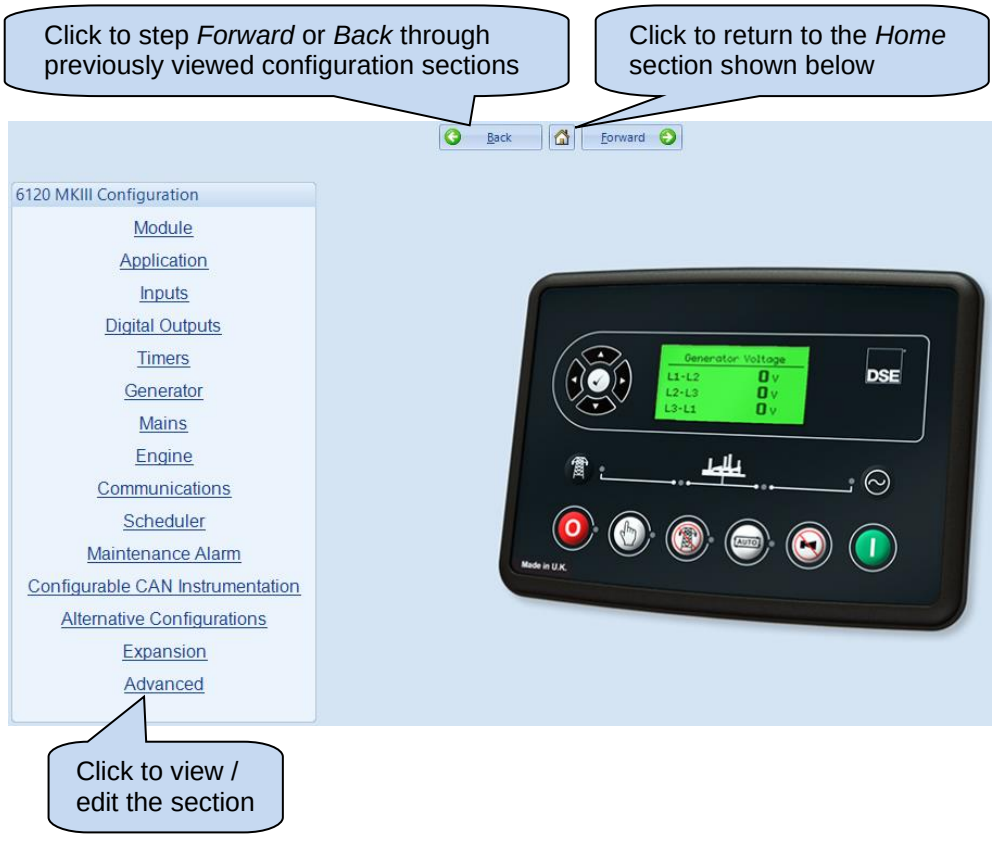
For information in regards to installing and using the *DSE Configuration Suite PC Software,* refer to DSE publication: ***057-151 DSE Configuration Suite PC Software Installation & Operation Manual*** which is found on the DSE website: www.deepseaelectronics.com

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.

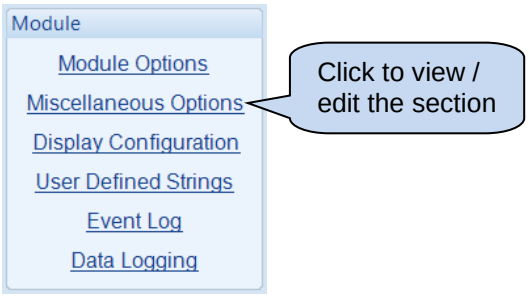
2.1 SCREEN LAYOUT



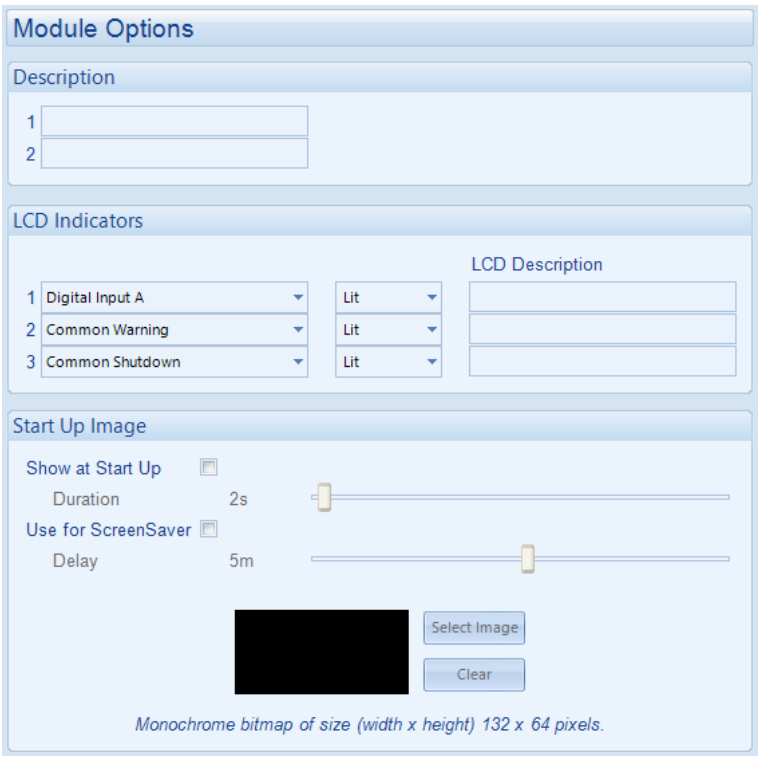


2.2 MODULE

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

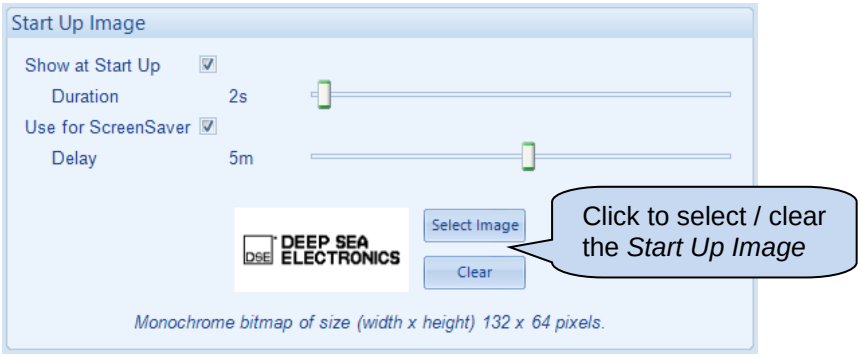
Parameter	Description
Description	Two free entry boxes to allow the user to give the configuration file a description. Typically used to enter the job number, customer name, engine information etc. This text is not shown on the module's display and is only seen in the configuration file.

Parameter descriptions are continued overleaf…

LCD Indicators

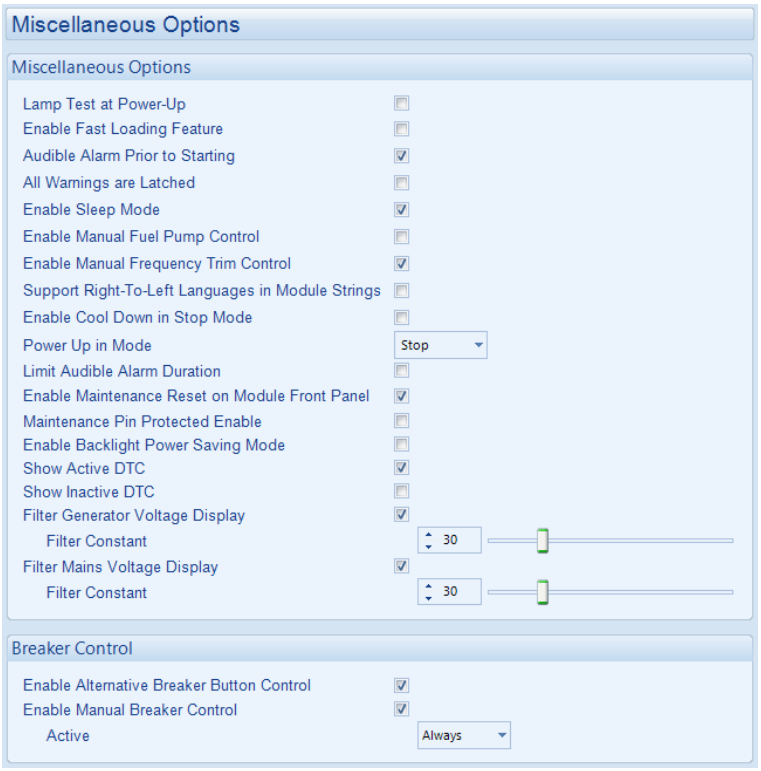
Parameter	Description
Function	Allows the user to assign an output source to an indicator shown on the LCD. For details of possible selections, see section entitled *Output Sources* elsewhere in this document.
Polarity	Lit: When the output source is true, the LCD indicator activates. Unlit: When the output source is true, the LCD indicator de-activates.
LCD Description	Enter the text to be displayed on the module's LCD next to the indicator.

Start Up Image



Parameter	Description
Show at Start Up	☐ = The *Start Up Image* is disabled ☑ = The *Start Up Image* is enabled. The *Start Up Image* is displayed on the module's LCD for the configured *Duration* during power up.
Use for ScreenSaver	☐ = The *ScreenSaver* is disabled ☑ = The *ScreenSaver* is enabled. The *ScreenSaver* displays the *Start Up Image* if the unit is inactive for the configured *Delay* time. Press any button to stop the *ScreenSaver*.
Select Image	Browse and select the image file to be used for the *Start Up Image*. The file is required to be a monochrome bitmap image of size 132 pixels in width by 64 pixels in height.
Clear	Clears the image file selection

2.2.2 MISCELLANEOUS OPTIONS



Miscellaneous Options

Parameter	Description
Lamp Test at Power-Up	☐ = The *Lamp Test at Power Up* is disabled. ☑ = The *Lamp Test at Power Up* is enabled. During power up, the LEDs on the module's fascia all illuminate.
Enable Fast Loading	⚠ **NOTE: Enabling Fast Loading is only recommended where steps have been taken to ensure rapid start up of the engine is possible. (For example when fitted with engine heaters, electronic governors etc.)** ☐ = The *Fast Loading* is disabled. The module observes the *Safety on Delay* timer in full to allow the generator plenty of time to reach operating *Oil Pressure, Coolant Temperature, Engine Speed, Loading Voltage and Loading Frequency.* ☑ = The *Fast Loading* is enabled. The module terminates the *Safety on Delay* timer once the generator has attained the *Loading Voltage* and *Loading Frequency*. This feature is useful if the generator is to be used in critical application as it allows it to start and go on load in the shortest possible time.
Audible Alarm Prior to Starting	☐ = The *Audible Alarm Prior to Starting* is disabled. ☑ = The *Audible Alarm Prior to Starting* is enabled. The module gives an audible warning during the *Pre-Heat Timer* to indicate the generator is about to start.

Parameter descriptions are continued overleaf…

Parameter	Description
All Warnings Are Latched	☐ = The *All Warnings Are Latched* is disabled. The module automatically resets the warning and pre-alarms once the triggering condition has been cleared. ☑ = The *All Warnings Are Latched* is enabled. The module does not automatically reset the warning and pre-alarms. Resetting the alarm is performed by either activating a digital input configured for *Alarm Reset* or, pressing the ***Stop/Reset Mode*** button once the triggering condition has been cleared.
Enable Sleep Mode	**NOTE: Sleep Mode is disabled when the DSE25xx MKII remote display module is connected.** ☐ = The *Sleep Mode* is disabled. ☑ = The *Sleep Mode* is enabled. The module goes into a low current mode when it is left in the ***Stop/Reset Mode*** for the duration of the *Sleep Timer* if the communication ports or data logging facility are not active. Press any button on the module's facia to take it out of *Sleep Mode*.
Enable Manual Fuel Pump Control	**CAUTION! It is possible to overfill the fuel tank when using the Manual Fuel Pump Control feature. Care must be taken to ensure the correct volume of fuel is transferred.** ☐ = The *Manual Fuel Pump Control* is disabled. ☑ = The *Manual Fuel Pump Control* is enabled. To manually control the fuel pump, press the ***Tick*** button when viewing the *Fuel Level* instrument on the module's display.
Enable Manual Frequency Trim Control	**NOTE: Manual Frequency Trim Control is only available when the module is configured to communicate to an engine's ECU/ECM over CANbus.** ☐ = The *Manual Frequency Trim Control* is disabled. ☑ = The *Manual Frequency Trim Control* is enabled. The module allows the user to increase/decrease the speed of the engine via the *Running Editor* or the *SCADA* section of the *DSE Configuration Suite,* whilst the generator switchgear is open.
Support Right-To-Left Languages in Module Strings	☐ = The *Support Right-To-Left Languages in Module Strings* is disabled. The module displays user configured strings in the order left to right. ☑ = The *Support Right-To-Left Languages in Module Strings* is enabled. The module displays user configured strings in the order right to left.
Enable Cool Down in Stop Mode	☐ = The *Cool Down in Stop Mode* is disabled. Pressing the ***Stop/Reset Mode*** button instructs the module to immediately open the generator's switchgear and stop the generator. ☑ = The *Cool Down in Stop Mode* is disabled. Pressing the ***Stop/Reset Mode*** button instructs the module to immediately open the generator's switchgear and instructs the generator to run for the duration of the *Cooling* time. Pressing the ***Stop/Reset Mode*** button again results in the generator stopping immediately.
Power Up in Mode	Select the mode which the module enters once DC power is applied. ***Auto:*** The module powers up in the ***Auto Mode***. ***Manual:*** The module powers up in the ***Manual Mode***. ***Stop:*** The module powers up in the ***Stop/Reset Mode***.

Parameter descriptions are continued overleaf…

Parameter	Description
Limit Audible Alarm Duration	☐ = The *Limit Audible Alarm Duration* is disabled. The *Audible Alarm* output source activates upon a new alarm activating. The *Audible Alarm* output source de-activates when the alarm is muted or reset. ☑ = The *Limit Audible Alarm Duration* is enabled. The *Audible Alarm* output source activates upon a new alarm activating. The *Audible Alarm* output source de-activates when the alarm is muted or reset, or when the *Audible Alarm Duration* timer expires.
Enable Maintenance Reset on Module Front Panel	☐ = The *Maintenance Reset on Module Front Panel* is disabled. The maintenance alarms are only reset using a digital input configured for *Maintenance Alarm Reset* or the *SCADA* section of the *DSE Configuration Suite*. ☑ = The *Maintenance Reset on Module Front Panel* is enabled. The maintenance alarms are resettable by pressing and holding the ***Stop/Reset Mode*** button when viewing the specific *Maintenance* instrument on the module's display.
Maintenance Pin Protected Enable	**NOTE: Maintenance Pin Protected is only available when the Maintenance Reset on Module Front Panel is enabled.** ☐ = The *Maintenance Pin Protected* is disabled. If the 4 digit security PIN is configured, it is not required to reset maintenance alarms using the *Maintenance Reset on Module Front Panel* feature. ☑ = The *Maintenance Pin Protected* is enabled. If the 4 digit security PIN is configured, it is required to reset maintenance alarms using the *Maintenance Reset on Module Front Panel* feature.
Enable Backlight Power Saving Mode	☐ = The *Backlight Power Saving Mode* is disabled ☑ = The *Backlight Power Saving Mode* is enabled. The module turns off the LCD's green backlight, if it is not operated for the duration of the *Backlight Timer*.
Show Active DTC	**NOTE: Show Active DTC is only available when the module is configured to communicate to an engine's ECU/ECM over CANbus.** ☐ = The *Show Active DTC* is disabled. The module does not display DM1 fault codes that are active on the engine ECU/ECM. ☑ = The *Show Active DTC* is enabled. The module displays DM1 fault codes that are active on the engine ECU/ECM.
Show Inactive DTC	**NOTE: Show Inactive DTC is only available when the module is configured to communicate to an engine's ECU/ECM over CANbus.** ☐ = The *Show Inactive DTC* is disabled. The module does not display the historical log of DM2 fault codes from the engine ECU/ECM. ☑ = The *Show Inactive DTC* is enabled. The module displays the historical log of DM2 fault codes from the engine ECU/ECM.

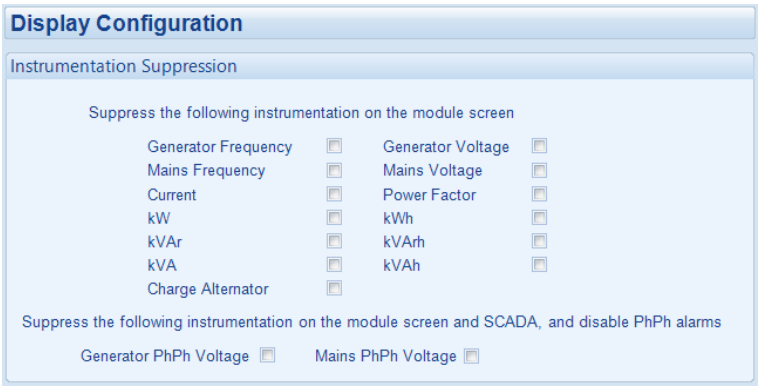
Parameter descriptions are continued overleaf…

Parameter	Description
Filter Generator Voltage Display	**NOTE: The generator voltage is only filtered on the module's display and not on the SCADA or any other remote monitoring device.** ☐ **=** The *Filter Generator Voltage Display* is disabled. The rate at which the generator voltage instruments are refreshed is fast in order to display all voltage fluctuations. ☑ **=** The *Filter Generator Voltage Display* is enabled. The rate at which the generator voltage instruments are refreshed is configurable based on the *Filter Constant. A* larger *Filter Constant* leads to a slower refresh rate, filtering out the fluctuations on the generator voltage instruments.
Filter Mains Voltage Display	**NOTE: The mains voltage is only filtered on the module's display and not on the SCADA or any other remote monitoring device.** ☐ **=** The *Filter Mains Voltage Display* is disabled. The rate at which the mains voltage instruments are refreshed is fast in order to display all voltage fluctuations. ☑ **=** The *Filter Mains Voltage Display* is enabled. The rate at which the mains voltage instruments are refreshed is configurable based on the *Filter Constant. A* larger *Filter Constant* leads to a slower refresh rate, filtering out the fluctuations on the mains voltage instruments.

Breaker Control

Parameter	Description
Enable Alternative Breaker Control Button	**NOTE: For more detailed information on the *Alternative Breaker Control Button* operation, refer to DSE Publication: *057-289 DSE6110 MKIII & DSE6120 MKIII Operator Manual.*** ☐ **=** The *Alternative Breaker Control Button* is disabled. Pressing the ***Transfer to Mains*** or ***Transfer to Generator*** buttons requests a transfer of load to the respective supply, if it is available. ☑ **=** The *Alternative Breaker Control Button* is enabled. Pressing the ***Transfer to Mains*** or ***Transfer to Generator*** buttons requests the respective switchgear to open or close, causing a transfer of load to occur if required, if the supply is available.
Enable Manual Breaker Control	☐ **=** The *Manual Breaker Control* is disabled. When the module is in the ***Manual Mode***, activation of any automatic on load request (such as *Remote Start on Load* or *Mains Failure*) causes the generator switchgear to close. ☑ **=** The *Manual Breaker Control* is enabled. When the module is in the ***Manual Mode***, only the following load requests cause the generator switchgear to close: • Pressing the ***Transfer to Generator*** button. • Activating a digital input configured for *Close Generator* The *Manual Breaker Control* is activated: ***Always:*** *Manual Breaker Control* is always active. ***On Input:*** *Manual Breaker Control* is only active when a digital input configured for *Manual Breaker Mode* is active.

2.2.3 DISPLAY CONFIGURATION



Instrumentation Suppressions

Parameter	Description
Generator Frequency	☐ = The *Generator Frequency Instrumentation* is displayed. ☑ = The *Generator Frequency Instrumentation* is suppressed.
Generator Voltage	☐ = The *Generator Voltage Instrumentation* is displayed. ☑ = The *Generator Voltage Instrumentation* is suppressed.
Mains Frequency	☐ = The *Mains Frequency Instrumentation* is displayed. ☑ = The *Mains Frequency Instrumentation* is suppressed.
Mains Voltage	☐ = The *Mains Voltage Instrumentation* is displayed. ☑ = The *Mains Voltage Instrumentation* is suppressed.
Current	☐ = The *Current Instrumentation* is displayed. ☑ = The *Current Instrumentation* is suppressed.
Power Factor	☐ = The *Power Factor Instrumentation* is displayed. ☑ = The *Power Factor Instrumentation* is suppressed.
kW	☐ = The *kW Instrumentation* is displayed. ☑ = The *kW Instrumentation* is suppressed.
kWh	☐ = The *kWh Instrumentation* is displayed. ☑ = The *kWh Instrumentation* is suppressed.
kvar	☐ = The *kvar Instrumentation* is displayed. ☑ = The *kvar Instrumentation* is suppressed.
kvarh	☐ = The *kvarh Instrumentation* is displayed. ☑ = The *kvarh Instrumentation* is suppressed.
kVA	☐ = The *kVA Instrumentation* is displayed. ☑ = The *kVA Instrumentation* is suppressed.
kVAh	☐ = The *kVAh Instrumentation* is displayed. ☑ = The *kVAh Instrumentation* is suppressed.
Charge Alternator	☐ = The *Charge Alternator Instrumentation* is displayed. ☑ = The *Charge Alternator Instrumentation* is suppressed.
Generator PhPh Voltage	☐ = The *Generator Phase to Phase Voltage Instrumentation* is displayed and alarms are active. ☑ = The *Generator Phase to Phase Voltage Instrumentation* is suppressed and alarms are disabled.
Mains PhPh Voltage	☐ = The *Mains Phase to Phase Voltage Instrumentation* is displayed and fault detection are active. ☑ = The *Mains Phase to Phase Voltage Instrumentation* is suppressed and fault detection are disabled.

2.2.4 USER DEFINED STRINGS

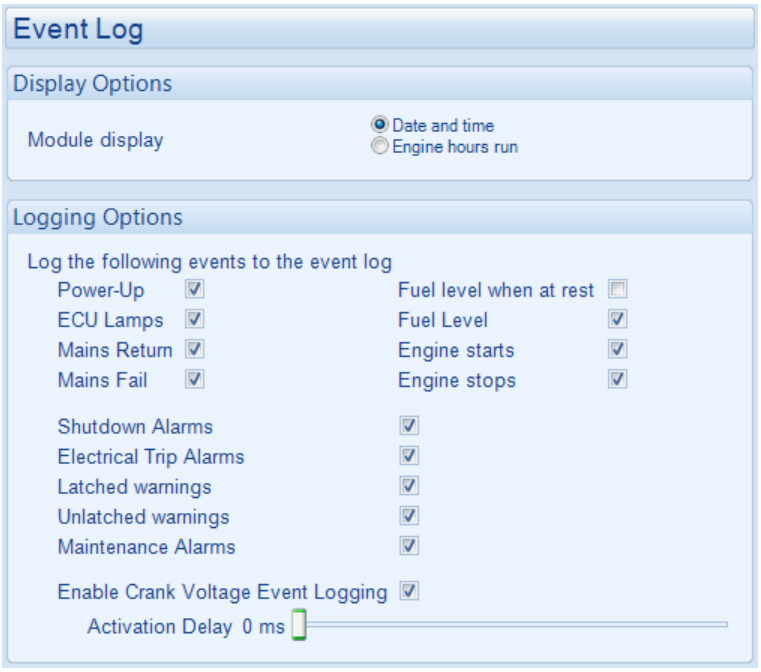
Page 1 and 2

Parameter	Description
Page Title	A free entry box to allow the user to give the custom display screen a title relating to the information contained on *Line 1 to 3*.
Line 1 to 3	Three free entry boxes, one for each line of the module's display. Typically used to show contact details or other information on the module's that is helpful to the end user of the generator.

About Page / Start Up Text

Parameter	Description
Text	A free entry box to allow the user to enter the text to be used for the *About Page* and *Start Up Text*.
Show at Start Up	☐ = The *Start Up Text* is disabled. ☑ = The *Start Up Text* is enabled. The *Start Up Text* is displayed on the module's LCD for the configured *Duration* during power up.

2.2.5 EVENT LOG



Display Options

Parameter	Description
Module Display	⊙ ***Date and Time*** **=** The module displays what the *Date and Time* was when the *Event* was logged. ⊙ ***Engine Hours Run*** **=** The module displays what the *Engine Hours* was when the *Event* was logged.

Logging Options

Parameter	Description
Power-Up	☐ = *Power-Up* events are not logged. ☑ = *Power-Up* events are logged when the DC Supply is applied to the module.
ECU Lamps	⚠ **NOTE: ECU Lamps is only available when the module is configured to communicate to an engine's ECU/ECM over CANbus.**
	☐ = *ECU/ECM Alarm Lamps* are not logged. ☑ = *ECU/ECM Alarm Lamps* are logged when generated by the engine ECU/ECM.
Mains Fail 	☐ = *Mains Fail* events are not logged. ☑ = *Mains Fail* events are logged when the mains voltage/frequency rise above/falls below the configured trip levels for the duration of the *Mains Transient Delay* timer.
Mains Return 	☐ = *Mains Return* events are not logged. ☑ = *Mains Return* events are logged when the mains voltage/frequency falls below/rise above the configured return levels for the duration of the *Mains Transient Delay* timer.

Parameter descriptions are continued overleaf…

Parameter	Description
Fuel Level When at Rest	☐ = *Fuel Monitoring* events are not logged when the generator is at rest. Fuel level alarms are still logged if the appropriate alarm category is logged. ☑ = *Fuel Monitoring* events are logged when the generator is at rest.
Fuel Level	☐ = *Fuel Monitoring* events are not logged when the generator running. Fuel level alarms are still logged if the appropriate alarm category is logged. ☑ = *Fuel Monitoring* events are logged when the generator is running.
Engine Starts	☐ = *Engine Start* events are not logged. ☑ = *Engine Start* events are logged when the generator successfully crank disconnects.
Engine Stops	☐ = *Engine Stop* events are not logged. ☑ = *Engine Stop* events are when the *Stopping Timer* ceases.
Shutdown Alarms	☐ = *Shutdown Alarms* are not logged. ☑ = *Shutdown Alarms* are logged when the moment they activate.
Electrical Trip Alarms	☐ = *Electrical Trip Alarms* are not logged. ☑ = *Electrical Trip Alarms* are logged when the moment they activate.
Latched Warnings	☐ = *Latched Warnings Alarms* are not logged. ☑ = *Latched Warnings Alarms* are logged when the moment they activate.
Unlatched Warnings	☐ = *Unlatched Warnings Alarms* are not logged. ☑ = *Unlatched Warnings Alarms* are logged when the moment they activate.
Maintenance Alarms	☐ = *Maintenance Alarms* are not logged. ☑ = *Maintenance Alarms* are logged when the moment they activate.
Enable Crank Voltage Event Logging	☐ = *Pre-Crank* and *Average Crank* voltages are not logged. ☑ = *Pre-Crank* and *Average Crank* voltages are logged. The *Pre-Crank* is the voltage before cranking, the *Average Crank* is the average voltage of the Pre-Crank and the voltage level after the *Activation Delay* from cranking.

2.2.6 DATA LOGGING

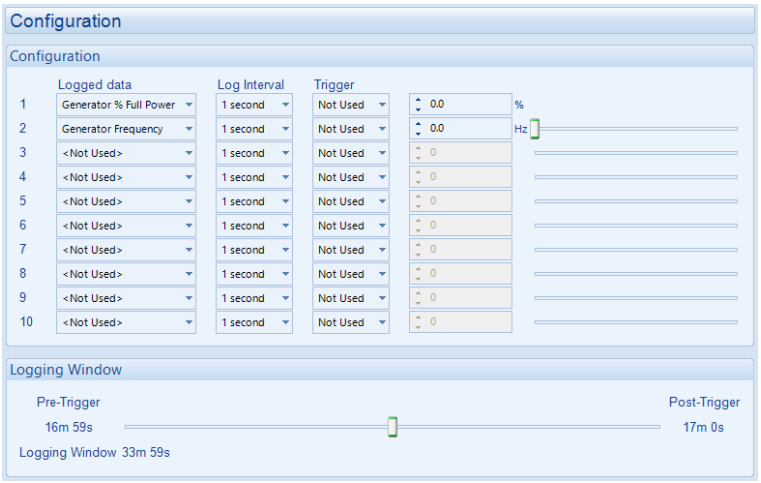
The *Data Logging* section is subdivided into smaller sections.

The module holds a rolling temporary store of up to ten parameters. This is saved to the *Data Log* as a *Logging Window* when any of the parameters exceed its configured *Trigger* or on an *External Trigger* (such as an alarm) activates. The configurable *Logging Window* allows the logged data to be recorded both *Pre-Trigger* and *Post-Trigger*.

The module has the ability to store up to 32 *Logging Windows.* If 10 parameters were configured to be logged, each with a *Log Interval* of 1 second, the length of each *Logging Window* would be 6 minutes and 47 seconds. As the module has the ability to store up to 32 *Logging Windows* on a rolling update, this results in a minimum total of 3 hours 37 minutes and 41 seconds of logged data. This time is extendable as the size of each *Logging Window* varies upon the number of selected parameters and their *Log Interval*.

The *Data Logging* is viewed using the *Data Log Viewer* application, which is accessed from the DSE Configuration Suite PC Software under the *Tools* menu.

2.2.6.1 CONFIGURATION



Configuration 1 to 10

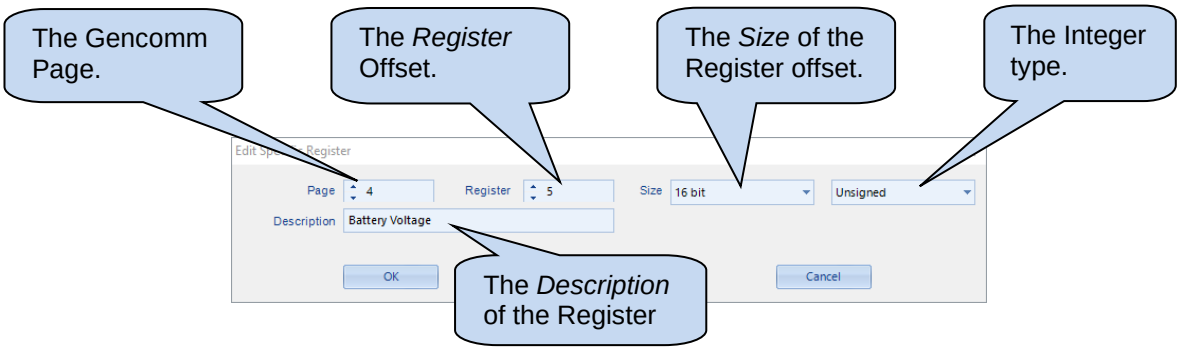
Parameter	Description
Logged Data	Select the instrument required to be logged: ***Specific Register*** ***Instrumentation*** ***Status***
Log Interval	Select the logging interval of the data
Trigger	Select when the instrument is logged compared to the configurable value of the slider

Specific Register

NOTE: The Gencomm (MODBUS) address table for the module is available upon request by contacting DSE technical support: support@deepseaelectronics.com.

Specific Register enables the user to configure a Gencomm (MODBUS) address for the *Data Logger* to obtain information from.

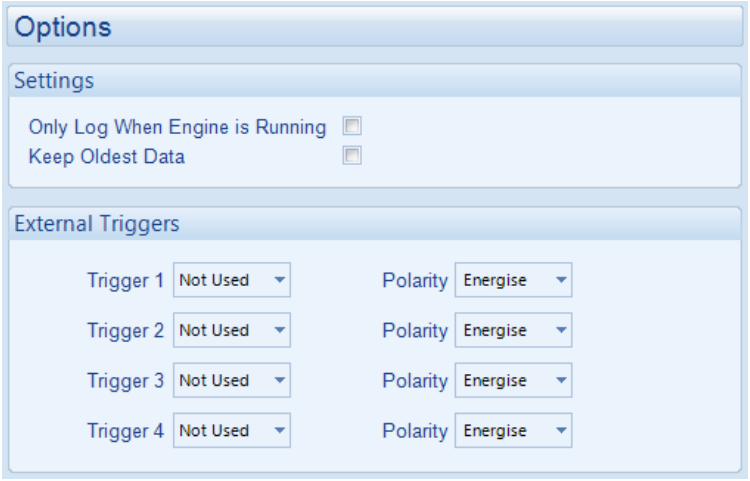
The image below shows a typical example when reading battery voltage:



Logging Window

Parameter	Description
Pre-Trigger	Shows the duration of time before the trigger, during which the data is logged.
Post-Trigger	Shows the duration of time after the trigger, during which the data is logged.
Logging Window	Shows the total duration of data logging time, combing the duration before and after the trigger.

2.2.6.2 OPTIONS



Settings

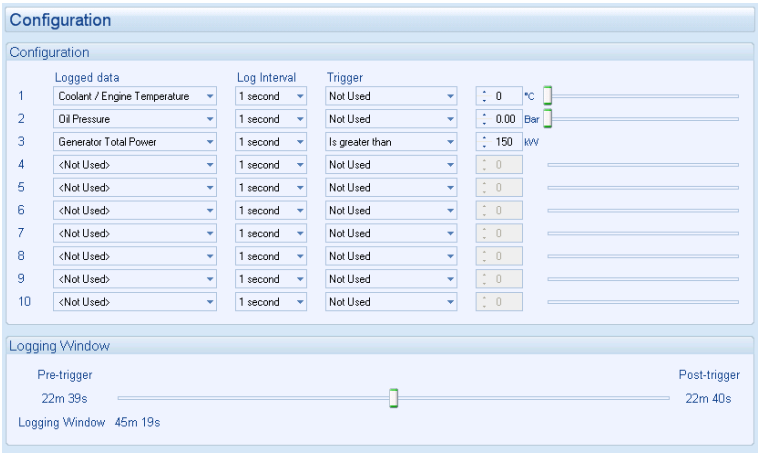
Parameter	Description
Only Log When Engine is Running	☐ = The module logs data regardless of engine running state. ☑ = The module only logs data when the engine is running.
Keep Oldest Data	☐ = When the logging memory is full, the module overwrites the oldest data first with the new data. ☑ = When the logging memory is full, the module stops recording new data.

External Triggers

Parameter	Description
Trigger	Select an external trigger to initiate a data log
Polarity	Select the polarity of the trigger. ***Energise:*** the data log is triggered when the configured trigger goes active. ***De-Energise:*** the data log is triggered when the configured trigger goes inactive

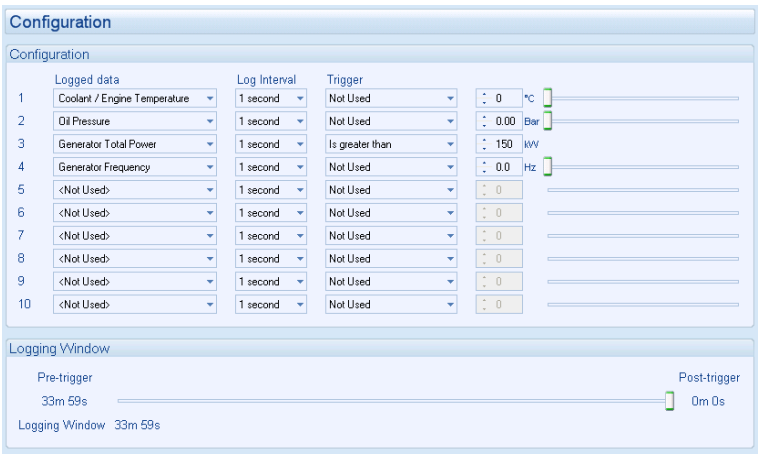
Example 1

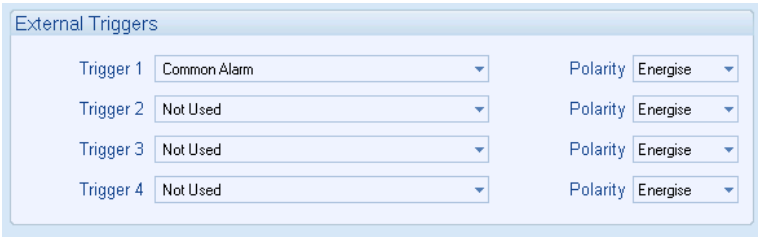
In the example below, the selected three parameters are logged when the *Generator Total Power* exceeds the set trip level of 150 kW.
The *Data Log* in the module contains the values of these three parameters for the duration of the *Logging Window*, that is 22 m 39 s before the *Generator Total Power* exceeded 150 kW and 22 m 40 s after that.



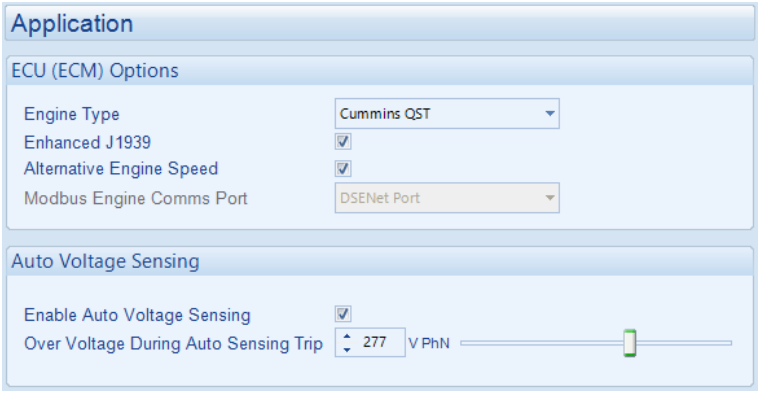
Example 2

In the example below, the selected four parameters are logged when a *Common Alarm* occurs on the controller.
The *Data Log* in the module contains the values of these four parameters for the duration of the *Logging Window*, that is 33 m 59 s before the *Alarm* occurred.





2.3 APPLICATION



ECU (ECM Options)

NOTE: For further details and instructions on ECU (ECM) options and connections, refer to DSE Publication: *057-004 Electronic Engines and DSE Controllers* which are found on our website: *www.deepseaelectronics.com*

Parameter	Description
Engine Type	Select the appropriate engine type ***Conventional Engine:*** Select this for a traditional (non-electronic) engine, either Energise to Run or Energise to Stop. ***Conventional Gas Engine:*** Select this for a traditional (non-electronic) engine and require Gas engine functionality. This enables control of configurable outputs for *Gas Choke and Gas Ignition* and instructs the module to follow the gas engine timers. ***Other Engines:*** The list of supported CAN (or MODBUS) engines is constantly updated, check the DSE website at www.deepseaelectronics.com for the latest version of Configuration Suite software.

Parameter descriptions are continued overleaf…

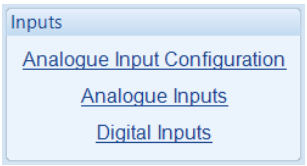
Parameter	Description
Enhanced J1939	☐ = The module reads 'Basic' instrumentation from the engine ECU (ECM) and display (where supported by the engine) : • Engine Speed • Oil Pressure • Engine Coolant Temperature • Hours Run ☑ = The module reads and display an 'Enhanced' instrumentation list (where supported by the engine) : • Engine Speed • Engine Speed Biasing (Subject to *ECM Speed Control* setting) • Oil Pressure • Engine Coolant Temperature • Hours Run • Engine Oil Temperature • Exhaust Temperature • Fuel Pressure • Total Fuel used • Fuel Consumption • Inlet Manifold Temperature • Coolant Pressure • Turbo Pressure • And more… Where an instrument is not supported by the engine ECU (ECM), the instrument is not displayed. DSE Reserve the right to change these lists in keeping with our policy of continual development.
Alternative Engine Speed	☐ = The engine is instructed to run at its *Nominal Speed* as configured by the Engine Manufacturer. ☑ = The engine is instructed to run at its *Alternative Speed* as configured by the Engine Manufacturer.
MODBUS Engine Comms Port	***DSENet Port:*** The modules DSENet port is used to communicate to the engine when a MODBUS engine type is selected.

Auto Voltage Sensing

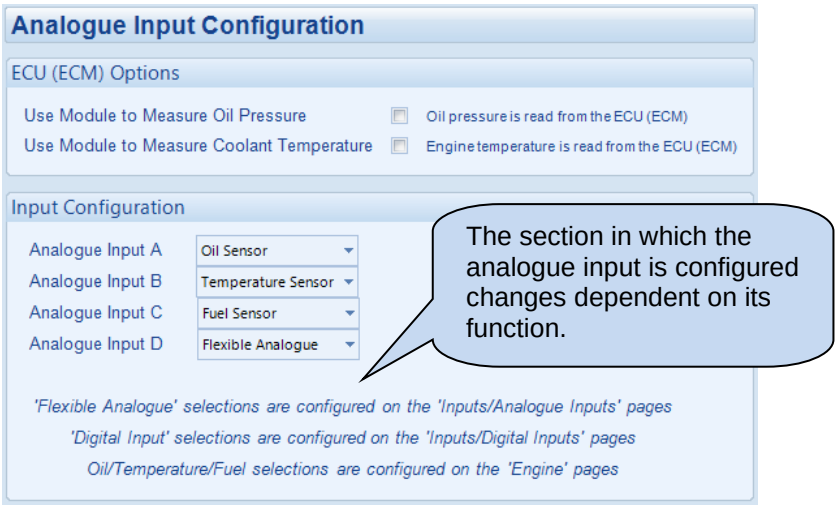
Option	Description
Enable Auto Voltage Sensing ~	☐ = The module uses the selected *Main Configuration* or *Alternative Configuration*. ☑ = *Auto Voltage Sensing* is enabled. When the generator is started, the module monitors the generator voltage. Depending on the voltage level and *AC System* detected, the module automatically selects between the *Mains Configuration* and *Alternative Configuration.* This is useful for hire generators where the *AC System* is selectable as no digital input signals are required to be given to the DSE module.

2.4 INPUTS

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



2.4.1 ANALOGUE INPUT CONFIGURATION



ECU (ECM) Options

Parameter	Description
Module To Measure Oil Pressure	(Available only when the module is configured for connection to a CAN engine.) ☐ = The measurements are taken from the ECU (ECM). ☑ = The module ignores the CAN measurement and uses the analogue sensor input.
Module To Measure Coolant Temperature	(Available only when the module is configured for connection to a CAN engine.) ☐ = The measurements are taken from the ECU. ☑ = The module ignores the CAN measurement and uses the analogue sensor input.

Parameter descriptions are continued overleaf…

Input Configuration

Parameter	Description
Analogue Input A	Select what the analogue input is to be used for: ***Not Used:*** The analogue input is disabled ***Digital Input:*** Configured on the *Inputs/Digital Inputs* pages ***Flexible Analogue:*** Configured on the *Inputs/Analogue Inputs* pages ***Fuel Sensor:*** Configured on the Engine pages ***Oil Sensor:*** Configured on the Engine pages ***Temperature Sensor:*** Configured on the *Engine* pages
Analogue Input B, C and D	Select what the analogue input is to be used for: ***Not Used:*** The analogue input is disabled ***Digital Input:*** Configured on the Inputs/Digital Inputs pages ***Flexible Analogue:*** Configured on the *Inputs/Analogue Inputs* pages ***Fuel Sensor:*** Configured on the Engine pages ***Temperature Sensor:*** Configured on the Engine pages

2.4.2 ANALOGUE INPUTS

NOTE: An analogue input is only configurable as a flexible sensor if it has been configured as Flexible Analogue, refer to section entitled Analogue Input Configuration elsewhere in this document for further details.

Sensor Description

Parameter	Description
Sensor Name	Enter the *Sensor Name*, this text is shown on the module display when viewing the instrument.

Parameter descriptions are continued overleaf…

Input Type

NOTE: The selectable measurement quantity (Current, Resistive or Voltage) is dependent on the hardware specification of the analogue input. For more detailed information on the analogue input specification, refer to DSE Publication: 057-289 DSE6110 MKIII & DSE6120 MKIII Operator Manual.

Parameter	Description
Input Type	Select the sensor type and curve from a pre-defined list or create a user-defined curve ***Current:*** for sensors with maximum range of 0 mA to 20 mA ***Resistive:*** for sensors with maximum range of 0 Ω to 480 Ω ***Voltage:*** for sensors with maximum range of 0 V to 10 V ***Pressure:*** The input is configured as a pressure sensor ***Percentage:*** The input is configured as a percentage sensor ***Temperature:*** The input is configured as a temperature sensor
Enable Volume Calculation	**NOTE: Only available when configured to measure percentage.** ☐ **=** The *Volume Calculation* is disabled. The sensor reading is displayed alone. ☑ **=** The *Volume Calculation* is enabled to display the tank's liquid volume on the controller.
Volume	**NOTE: Only available when configured to measure percentage.** Select the tank size and the unit for the display (Imperial Gallons, Litres, or US Gallons).

Sensor Fault Alarm

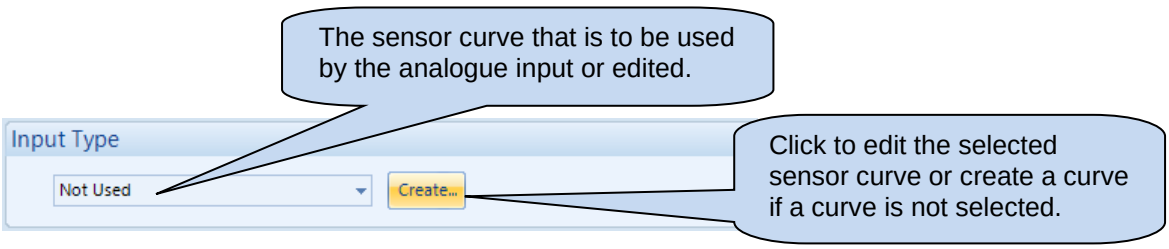
Parameter	Description
Enable Alarm	☐ **=** The Alarm is disabled. ☑ **=** The module detects an open circuit when the sensor is disconnected
Alarm String	Enter the text that is shown on the display when the alarm occurs

Sensor Alarms

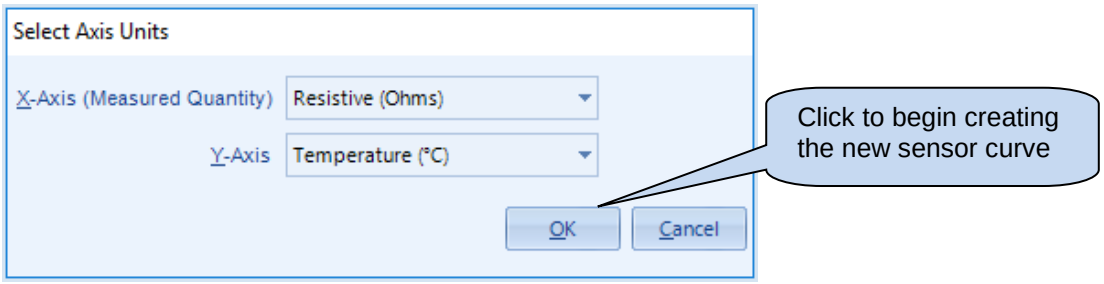
Parameter	Description
Alarm Arming	Select when the input becomes active: ***Always:*** The input state is always monitored ***From Safety On:*** The state of the input is monitored from the end of the *Safety On Delay* timer ***From Starting:*** The state of the input is only monitored from engaging the crank
Low Alarm Enable	☐ **=** The Alarm is disabled. ☑ **=** The *Low Alarm* is active when the measured quantity drops below the *Low Alarm* setting.
Low Pre-Alarm Enable	☐ **=** The Pre-Alarm is disabled. ☑ **=** The *Low Pre-Alarm* is active when the measured quantity drops below the *Low Pre-Alarm* setting. The *Low Pre-Alarm* is automatically reset when the measured quantity rises above the configured *Low Pre-Alarm Return* level.
High Pre-Alarm Enable	☐ **=** The Pre-Alarm is disabled. ☑ **=** The *High Pre-Alarm* is active when the measured quantity rises above the *High Pre-Alarm* setting. The *High Pre-Alarm* is automatically reset when the measured quantity falls below the configured *High Pre-Alarm Return* level.
High Alarm Enable	☐ **=** The Alarm is disabled. ☑ **=** The *High Alarm* is active when the measured quantity rises above the *High Alarm* setting.

2.4.2.1 CREATING / EDITING THE SENSOR CURVE

While the *DSE Configuration Suite* holds sensor specifications for the most commonly 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.

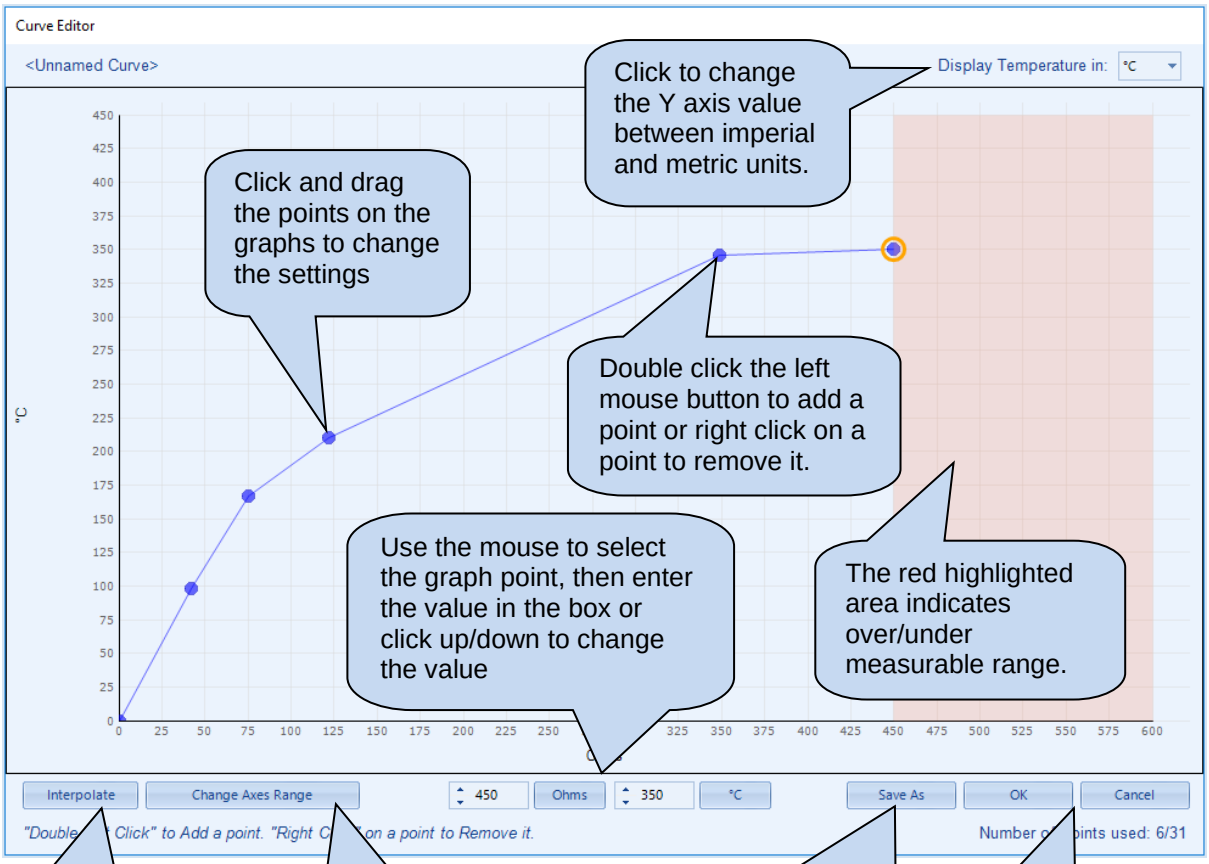


When creating a new sensor curve the measurement quantity and measured parameter are required.



Parameter	Description
X-Axis (Measured Quantity)	**NOTE: The selectable measurement quantity (Current, Resistive or Voltage) is dependent on the hardware specification of the analogue input. For more detailed information on the analogue input specification, refer to DSE Publication: 057-289 DSE6110 MKIII & DSE6120 MKIII Operator Manual.** Select the electrical quantity that the sensor outputs. ***Resistive (Ohms):*** For sensors that output resistance within the analogue inputs specification. ***Current (mA):*** For sensors that output current within a range 0 mA to 20 mA ***Voltage (Volt):*** For sensors that output voltage within a range of 0 V to 10 V
Y-Axis	Select the parameter that is being monitored by the sensor ***Temperature:*** For sensors that measure temperature. ***Pressure:*** For sensors that measure pressure. ***Percentage:*** For sensors that measure percentage.

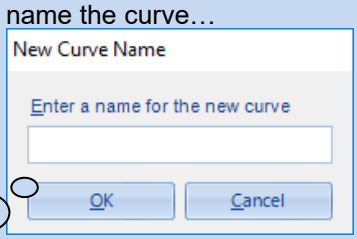
Sensor curve creation / editor descriptions are continued overleaf…



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

Click to change the range of the X and Y Axes of the graph and the level of open circuit detection

Click SAVE AS, a prompt to name the curve…



Click OK to save the curve.

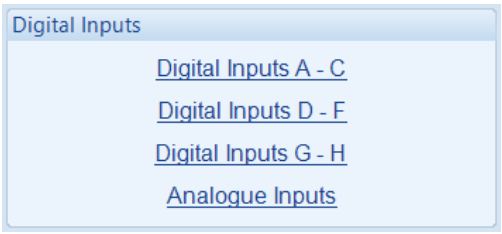
Any saved curves become selectable in the *Input Type* selection list.

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

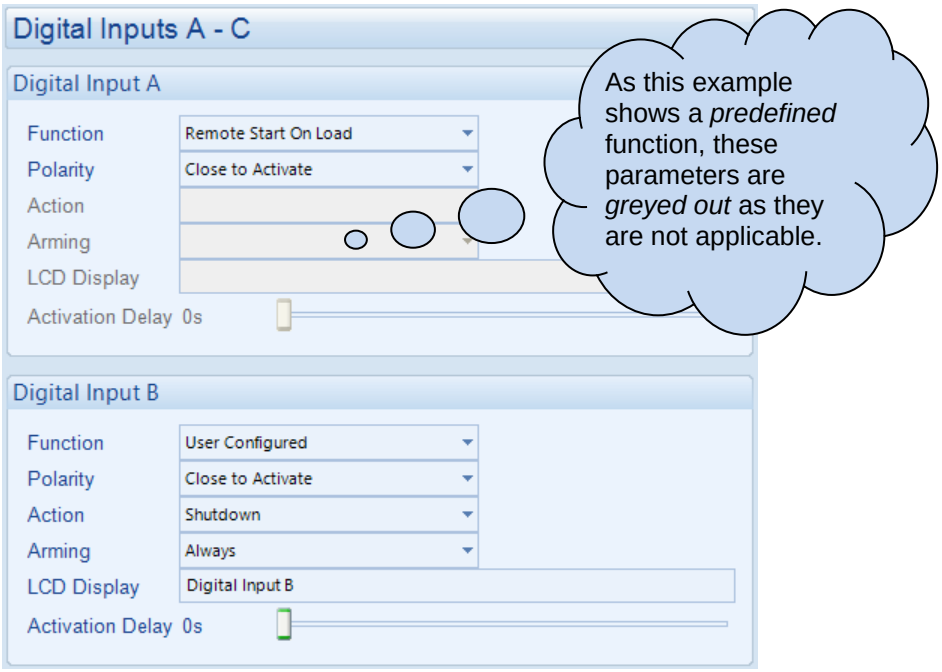
Hint: Deleting, renaming or editing custom sensor curves that have been added is performed in the main menu, select *Tools* | *Curve Manager*.

2.4.3 DIGITAL INPUTS

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



2.4.3.1 DIGITAL INPUTS



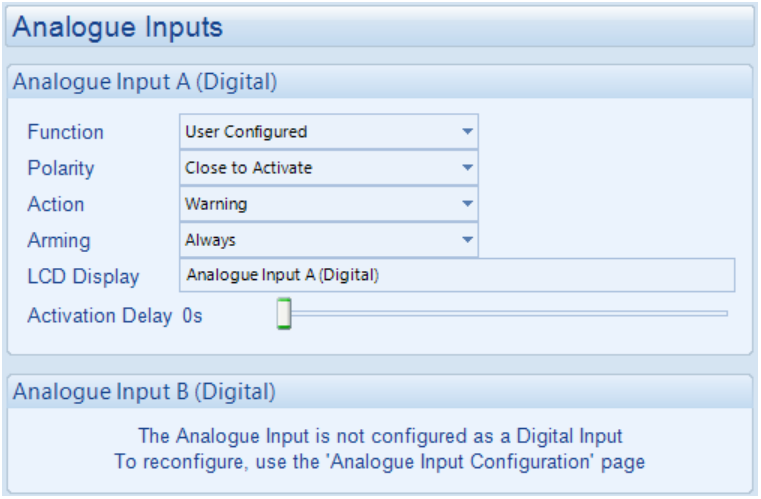
Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See section entitled *Input functions* for details of all available functions
Polarity	Select the digital input polarity: ***Close to Activate:*** the input function is activated when the relevant terminal is connected. ***Open to Activate:*** the input function is activated when the relevant terminal is disconnected.
Action	**NOTE: For details of these, see the section entitled Alarm Types elsewhere in this document.** Select the type of alarm required from the list: ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning***

Parameter descriptions are continued overleaf…

Parameter	Description
Arming	**NOTE: For details of these, see the section entitled Alarm Arming elsewhere in this document.** Select when the input becomes active: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Never*** ***Wait for ECU*** ***When Stationary***
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.

2.4.3.2 ANALOGUE INPUTS

NOTE: An analogue input is only configurable as a digital input if it has been configured as Digital Input, refer to section entitled Analogue Input Configuration elsewhere in this document for further details.



Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See section entitled *Input functions* 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	**NOTE: For details of these, see the section entitled Alarm Types elsewhere in this document.** Select the type of alarm required from the list: ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning***
Arming	**NOTE: For details of these, see the section entitled Alarm Arming elsewhere in this document.** Select when the input becomes active: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Never*** ***Wait for ECU*** ***When Stationary***
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.

2.4.3.3 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 the generator.
Alt Config 1 Select	These inputs are used to instruct the module to follow the relevant *alternative* configuration settings instead of the *main* configuration settings.
Auto Restore Inhibit IEEE 37.2 - 3 Checking Or Interlocking Relay 	In the event of a remote start/mains failure, the generator is instructed to start and take load. On removal of the remote start signal/mains return the module continues to run the generator on load until the *Auto Restore Inhibit* input is removed. This input allows the controller to be fitted as part of a system where the restoration to mains is controlled remotely or by an automated system.
Auto Start Inhibit IEEE 37.2 - 3 Checking Or Interlocking Relay	This input is used to provide an over-ride function to prevent the controller from starting the generator in the event of a remote start/mains out of limits condition occurring. If this input is active and a remote start signal/mains failure occurs the module does not give a start command to the generator. If this input signal is then removed, the controller operates as if a remote start/mains failure has occurred, starting and loading the generator. This function is used to give an ‘AND’ function so that a generator is only called to start if the mains fails and another condition exists which requires the generator to run. If the ‘Auto start Inhibit’ signal becomes active once more it is ignored until the module has returned the mains supply on load and shutdown. This input does not prevent starting of the engine in MANUAL mode.
Auxiliary Mains Fail 	The module monitors the incoming single or three phase supply for Over voltage, Under Voltage, Over Frequency or Under frequency. It may be required to monitor a different mains supply or some aspect of the incoming mains not monitored by the controller. If the devices providing this additional monitoring are connected to operate this input, the controller operates as if the incoming mains supply has fallen outside of limits, the generator is instructed to start and take the load. Removal of the input signal causes the module to act if the mains has returned to within limits providing that the mains sensing also indicates that the mains is within limits.
Close Generator IEEE 37.2 - 52 AC Circuit Breaker 	Closes the Generator load switch when the generator is available. Used to simulate the *Close Generator Breaker* button externally.
Coolant Temperature Switch IEEE 37.2 – 26 Apparatus Thermal Device	This input is used to give a *Coolant Temperature High* shutdown from a digital normally open or closed switch. It allows coolant temperature protection.

Parameter descriptions are continued overleaf…

Function	Description
Disable Protections	The system designer provides this switch (not DSE) so its location varies depending upon manufacturer, however it normally takes the form of a key operated switch to prevent inadvertent activation. Depending upon configuration, a warning alarm is generated when the switch is operated. When active, and the module is suitably configured (see section entitled 'Advanced') this prevents the engine being stopped upon critical alarm (Sometimes called Battle-Short Mode, War Mode or Run to Destruction)
DPF Auto Regen Inhibit	This input is used to override the ECU (ECM) function and prevent the automatic regeneration of the diesel particulate filter
DPF Force Regeneration	This input is used to override the ECU (ECM) function and activate the regeneration of the diesel particulate filter
DPF Regeneration Interlock	This input is used to stop a manual regeneration from occurring
Droop Enable	This input is used to switch the engine into droop mode on CAN engines that support this function.
EJP1	For the French EJP (Effacement Jours de Pointe) tariff system. This input is functionally identical to *Remote Start Off Load.* When this input is active, operation is similar to the 'Remote Start on load' function except that the generator is not instructed to take the load. This function is also used where an engine only run is required e.g. for exercise.
EJP2	For the French EJP (Effacement Jours de Pointe) tariff system. This input is functionally identical to *Remote Start On Load.* In auto mode, the module performs the start sequence and transfers load to the generator. In Manual mode, the load is transferred to the generator if the engine is already running, however in manual mode, this input does not generate start/stop requests of the engine.
External Panel Lock	**NOTE: External control sources (i.e. Simulate Start Button) are not affected by the external panel lock input and continue to operate normally.** This input is used to provide security to the installation. When 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 still able to view the various instrumentation pages etc. (*Front panel configuration access is still possible while the system lock is active*).
Fuel Tank Bund Level High	This input is used to provide protection against fuel leakage, where a level switch is fitted to the fuel tank bund. The action for this alarm is configurable under the *Engine Protections* page in the module configuration.
Generator 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 must be connected to the generator load switching device auxiliary contact.

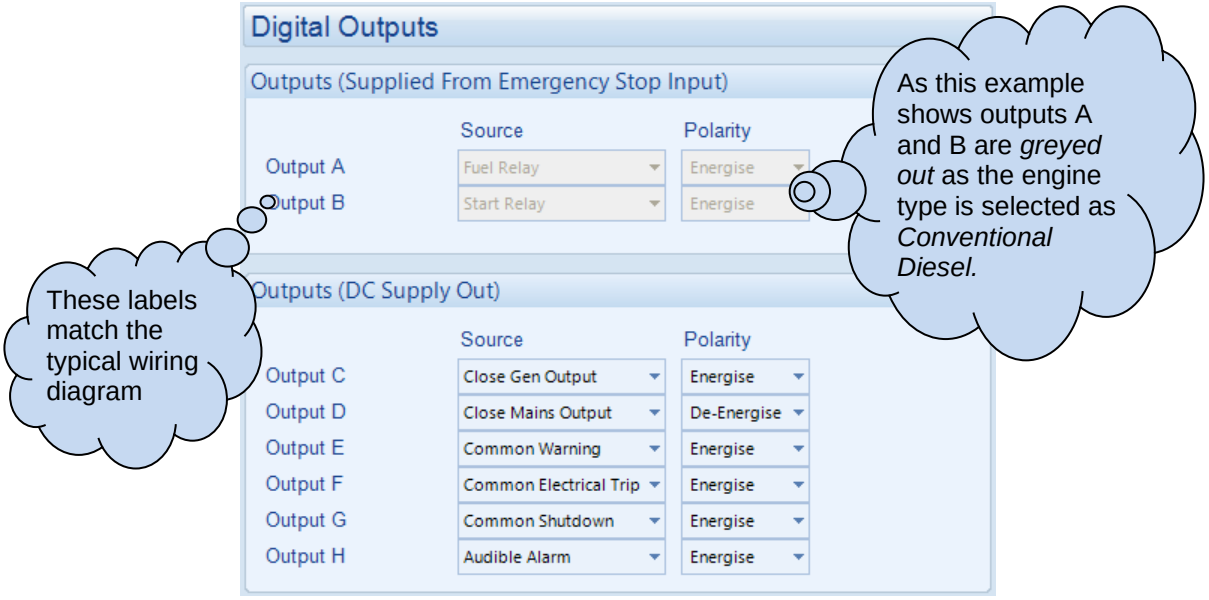
Parameter descriptions are continued overleaf…

Function	Description
Generator Load Inhibit IEEE 37.2 - 52 AC Circuit Breaker	**NOTE: This input only operates to control the generator-switching device if the module load switching logic is attempting to load the generator. It does not control the generator switching device when the mains supply is on load.** This input is used to prevent the module from loading the generator. If the generator is already on load, activating this input causes the module to unload the generator. Removing the input allows the generator to be loaded again.
Inhibit Scheduled Run IEEE 37.2 – 3 Checking Or Interlocking Relay	This input is used to provide a mean 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 LEDs illuminate.
Low Fuel Level Switch IEEE 37.2 - 71 Liquid Level Switch	This input is used to allow feedback for low fuel level.
Mains Closed Auxiliary IEEE 37.2 - 3 Checking or Interlocking Relay 	This input is used to provide feedback to allow the module to give true indication of the contactor or circuit breaker switching status. It is connected to the mains load switching device auxiliary contact. Incorrect application of this signal does not trigger an alarm condition, it is used solely for indication of the load switch status.
Mains Load Inhibit IEEE 37.2 - 3 Checking or Interlocking Relay 	**NOTE: This input only operates to control the mains switching device if the module load switching logic is attempting to load the mains. It does not control the mains switching device when the generator is on load.** This input is used to prevent the module from loading the mains supply. If the mains supply is already on load activating this input causes the module to unload the mains supply. Removing the input allows the mains to be loaded again.
Manual Breaker Mode	When breaker control is set to *Active On Input,* this input is used to activate the *Manual Breaker Control.*
Manual Restore Contact IEEE 37.2 - 3 Checking or Interlocking Relay 	Used to 'hold off' transfer back to the mains after a mains failure and keep the generator on load. Transfer back to the mains supply is held off in *Auto mode* while the input is present. Typically, a key switch provides this input with *spring return to closed* functionality.
Oil Pressure Switch IEEE 37.2 – 63 Pressure Switch	A digital normally open or closed oil pressure switch gives this input. It allows low oil pressure protection.
Open Generator IEEE 37.2 - 52 AC circuit breaker 	Opens the generator breaker. Used to simulate the *Open Generator Breaker* button externally.
Remote Start Off Load	If this input is active, operation is similar to the 'Remote Start on load' function except that the generator is not instructed to take the load. This function is used where an engine only run is required e.g. for exercise.
Remote Start On Load	When in auto mode, the module performs the start sequence and transfer load to the generator. In Manual mode, the load is transferred to the generator if the engine is already running, however in manual mode, this input does not generate start/stop requests of the engine.
Reset Maintenance Alarm 1	Provides an external digital input to reset the maintenance alarm 1
Reset Maintenance Alarm 2	Provides an external digital input to reset the maintenance alarm 2

Parameter descriptions are continued overleaf…

Function	Description
Reset Maintenance Alarm 3	Provides an external digital input to reset the maintenance alarm 3
Simulate Auto Button	**NOTE: If a call to start is present when AUTO MODE is entered, the starting sequence begins. Call to Start comes from a number of sources depending upon module type and configuration and includes (but is not limited to) : Remote start input present, Mains failure, Scheduled run, Auxiliary mains failure input present, Telemetry start signal from remote locations.** This input mimic's the operation of the 'Auto' button and is used to provide a remotely located Auto mode push button.
Simulate Lamp Test Button	This input is used to provide a test facility for the front panel indicators fitted to the module. When the input is activated all LED's illuminate. The input also serves a second function, in that it also provides a mute signal to silence the audible alarm. The input is recognised by the module as though it was the Push button on the module itself being operated.
Simulate Mains Available	This function is provided to override the module's internal monitoring function. If this input is active, the module does not respond to the state of the incoming AC mains supply.
Simulate Manual Button	This input mimic's the operation of the 'Manual' button and is used to provide a remotely located Manual mode push button.
Simulate Start Button	This input mimic's the operation of the 'Start' button and is used to provide a remotely located start push button.
Simulate Stop Button	This input mimic's the operation of the 'Stop' button and is used to provide a remotely located stop/reset push button.
Simulate Test on Load Button	This input mimics the operation of the 'Test' button and is used to provide a remotely located Test on load mode push button.
Smoke Limiting IEEE 37.2 – 18 Accelerating or Decelerating Device	This input instructs the module to give a *run at idle speed* command to the engine either via an output configured to *smoke limit* or by data commands when used with supported electronic engines.
Start in Manual Mode	Combined function input that instructs the module to enter MANUAL MODE and also perform the *START* function. Once the input is active, the module is placed into manual mode and the generator starts.
Stop and Panel Lock	Combined function input that instructs the module to enter *STOP* mode and also perform the *Panel Lock* function. Once the input is active, the module does not respond to operation of the mode select or start buttons. The operator is still able to view the various instrumentation pages etc. (*Front panel configuration access is still possible while the system lock is active*).
Transfer To Generator/Open Mains IEEE 37.2 - 52 AC Circuit Breaker	This input is used to transfer the load to the generator when running in MANUAL MODE
Transfer To Mains/ Open Generator IEEE 37.2-52 AC Circuit Breaker	This input is used to transfer the load to the mains supply when running in MANUAL MODE
Water in Fuel	Some engines are fitted with water separators, that have a switch indicator for water detection. This input is used to provide protection against high water content in the fuel, where a switch is fitted to the fuel filter. The action for this alarm is configurable under the *Engine Protections* page in the module configuration.

2.5 DIGITAL OUTPUTS



Parameter	Description
Source	Select the output source to control the state of the output See section entitled *Output Sources* for details of all available functions
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.

2.5.1 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	The output does not change state (Unused)	
Air Flap Relay	Normally used to control an air flap, this output becomes active upon an Emergency Stop or Over-speed situation.	Inactive when the set has come to rest
Alarm Mute	This input is used to silence the audible alarm from an external source such as a remote mute switch.	
Alarm Reset	This input is used to reset any latched alarms from a remote location. It is also used to clear any latched warnings which may have occurred (if configured) without having to stop the engine.	
Alternative Config 1Selected	Active when the alternative configuration is selected.	
Analogue Input A, B, C and D (Digital)	Active when the analogue input A, B, C and D are configured to digital is active.	
Arm Safety On Alarms	Becomes active at the end of the *safety delay* timer whereupon all alarms configured to 'From Safety On' become active	Inactive when : • When the set is at rest • In the starting sequence before the Safety Delay timer has expired
Audible Alarm IEEE 37.2 – 74 Alarm Relay	Use this output to activate an external sounder or external alarm indicator. Operation of the Mute pushbutton resets this output once activated	Inactive if no alarm condition is active or if the Mute pushbutton was pressed
Auto Restore Inhibit 	Active when the *Auto Restore Inhibit* digital input is active	
Auto Start Inhibit	Active when the *Auto-Start Inhibit* function is active	
Auxiliary Mains Fail 	Active when the *Auxiliary Mains Fail* input function is active	
Battery High Voltage IEEE 37.2 – 59 DC Overvoltage Relay	This output indicates that a Battery Over voltage alarm has occurred	Inactive when battery voltage is not High
Battery Low Voltage IEEE 37.2 – 27 DC Undervoltage Relay	This output indicates that a Battery Under Voltage alarm has occurred.	Inactive when battery voltage is not Low
Calling For Scheduled Run	Active during a *Scheduled Run* request from the inbuilt *Scheduler*.	
Charge Alternator Failure Shutdown	Active when the charge alternator shutdown alarm is active	
Charge Alternator Failure Warning	Active when the charge alternator warning alarm is active	
Clock Pulse	Also called 'heartbeat', it activates and deactivates every few milliseconds to indicate that the module is powered up. It stops energising during write configuration to the module.	

Parameter descriptions are continued overleaf…

Output Source	Activates…	Is Not Active….
Close Gen Output IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects the generator to be on load this control source is activated.	Inactive whenever the generator is not required to be on load
Close Gen Output Pulse IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects the generator to be on load this control source is activated for the duration of the Breaker Close Pulse timer, after which it becomes inactive again.	
Close Mains Output IEEE 37.2 – 52 AC Circuit Breaker 	Used to control the load switching device. Whenever the module selects the mains to be on load this control source is activated.	The output is inactive whenever the mains is not required to be on load
Close Mains Output Pulse IEEE 37.2 – 52 AC Circuit Breaker 	Used to control the load switching device. Whenever the module selects the mains to be on load this control source is activated for the duration of the Breaker Close Pulse timer, after which it becomes inactive again.	
Combined Mains Failure 	Active when the mains supply is out of limits OR the input for Auxiliary Mains Failure is active	
Combined Maintenance Alarm	Active when any of the maintenance alarm is active.	
Combined Under and Over Frequency Alarm	Active when an *Under-Frequency* or *Over-Frequency Shutdown* alarm is active	
Combined Under and Over Frequency Warning	Active when an *Under-Frequency* or *Over-Frequency Warning* alarm is active	
Combined Under and Over Voltage Alarm	Active when an *Under-Voltage* or *Over-Voltage Shutdown* alarm is active	
Combined Under and Over Voltage Warning	Active when an *Under-Voltage* or *Over-Voltage Warning* alarm is active	
Common Alarm	Active when one or more alarms (of any type) are active	The output is inactive when no alarms are present
Common Electrical Trip	Active when one or more *Electrical Trip* alarms are active	The output is inactive when no shutdown alarms are present
Common Shutdown	Active when one or more *Shutdown* alarms are active	The output is inactive when no shutdown alarms are present
Common Warning	Active when one or more *Warning* alarms are active	The output is inactive when no warning alarms are present
Configurable CAN x Instrument Active	Active when the relevant *Configurable CAN Instrumentation* alarm of the *Received Instrumentation (1-10)* is active.	
Coolant Cooler Control	Active by the *Coolant Cooler Control* in conjunction with the Coolant Temperature Sensor	
Coolant Heater Control	Active by the *Coolant Heater Control* in conjunction with the Coolant Temperature Sensor	
Coolant Temperature Switch IEEE 37.2 – 26 Apparatus Thermal Device	Active when the *Coolant Temperature Switch* input is active	
Cooling Down	Active when the Cooling timer is in progress	
Data Logging Active	Active when data is being logged	Inactive when: Data logging is disabled The engine is at rest and the option *Only Log When Engine Is Running* is enabled The internal memory of the module becomes full and the option *Keep Oldest Data* is enabled

Parameter descriptions are continued overleaf…

Output Source	Activates…	Is Not Active….
DEF Level Low	Active when *DEF Level Low* CAN alarm is active.	
DEF Level Low Alarm	Active when *DEF Level Low Alarm* is active.	
Digital Input A, B, C, D, E, F, G & H	Active when the relevant digital input is active	
Display Heater Fitted and On	Active when the display heater is on	
DPF Forced Regeneration Requested	Active when the *DPF Force Regeneration* is active	
DPF Non Mission State	Active when the *DPF Non-Mission State* is active	
DPF Regeneration In Progress	Active when the *DPF Regeneration* is in progress	
DPF Regeneration Interlock Active	Active when the *DPF Regeneration Interlock* is active	
DPTC Filter	Active when the diesel particulate filter CAN alarm is active	
Droop Enable	Active when an input configured to *Droop Enable* is active or if *Droop Enable* has been activated in the module configuration (CAN engine only)	
ECU (ECM) Data Fail	Becomes active when no CAN data is received from the ECU after the safety delay timer has expired	Inactive when: • CAN data is being received • The set is at rest During the starting sequence before the safety delay timer has expired
ECU (ECM) Power	Used to switch an external relay to power the CAN ECU (ECM). Exact timing of this output is dependent upon the type of the engine ECU (ECM)	
ECU (ECM) Shutdown	The engine ECU (ECM) has indicated that a Shutdown alarm is present.	Inactive when no Shutdown alarm from the ECU (ECM) is present
ECU (ECM) Stop	Active when the DSE controller is requesting that the CAN ECU (ECM) stops the engine.	
ECU (ECM) Warning	The engine ECU (ECM) has indicated that a Warning alarm is present.	Inactive when no Warning alarm from the ECU (ECM) is present
ECU Pre-Heat	Active when the *ECU Pre-Heat* is active.	
EJP1 / EJP2	Active when an input configured for *EJP1* or *EJP2* is active	
Emergency Stop IEEE 37.2 – 5 Stopping Device	Active when the *Emergency Stop* input has been activated	
Energise To Stop	Normally used to control an *Energise to Stop* solenoid, this output becomes active when the controller wants the set to stop running.	Becomes inactive a configurable amount of time after the set has stopped. This is the *ETS hold time*.
External Panel Lock	Active when the *External Panel Lock* digital input is active	
Fail To Start IEEE 37.2 - 48 Incomplete Sequence Relay	Becomes active if the set is not seen to be running after the configurable number of start attempts	
Fail To Stop IEEE 37.2 - 48 Incomplete Sequence Relay	If the set is still running a configurable amount of time after it has been given the stop command, the output becomes active. This configurable amount of time is the Fail to Stop Timer.	
Fan Control	Energises when the engine becomes available (up to speed and volts). This output is designed to control an external cooling fan. When the engine stops, the cooling fan remains running for the duration of the Fan Overrun Delay.	
Flexible Sensor A, B, C or D High Alarm	Active when the analogue input value rises above the Flexible Sensor High Alarm set point.	

Parameter descriptions are continued overleaf…

Output Source	Activates…	Is Not Active….
Flexible Sensor A, B, C or D High Pre-Alarm	Active when the analogue input value rises above the *Flexible Sensor High Pre-Alarm* set point.	
Flexible Sensor A, B, C or D Low Alarm	Active when the analogue input value falls below the *Flexible Sensor Low Alarm* set point.	
Flexible Sensor A, B, C or D Low Pre-Alarm	Active when the analogue input value falls below the *Flexible Sensor Low Pre-Alarm* set point.	
Flexible Sensor A, B, C or D Open Circuit	Active when the *Flexible Sensor Open Circuit* alarm becomes active.	
Fuel Level High Alarm	Active when the High Fuel Level Alarm is active.	
Fuel Level High Pre-Alarm	Active when the High Fuel Level Pre-Alarm is active.	
Fuel Level Low Alarm	Active when the Low Fuel Level Alarm is active.	
Fuel Level Low Pre-Alarm	Active when the Low Fuel Level Pre-Alarm is active.	
Fuel Pump Control IEEE 37.2 – 71 Level Switch	Becomes active when the *Fuel Level* falls below the *Fuel Pump Control ON* setting and is normally used to transfer fuel from the bulk tank to the day tank.	If the output is already active it becomes inactive when the *Fuel level* is above the *Fuel Pump Control OFF* settings.
Fuel Relay	Becomes active when the controller requires the governor/fuel system to be active.	Becomes inactive whenever the set is to be stopped, including between crank attempts, upon controlled stops and upon fault shutdowns.
Fuel Sensor Open Circuit	Active when the *Fuel Sensor Open Circuit* alarm becomes active	
Fuel Tank Bund Level High	Active when the *Fuel Bund Level High Alarm* input is active.	
Gas Choke On	Becomes active during starting for the duration of the Gas Choke timer. Normally used to choke a gas engine.	Inactive at all other times
Gas Ignition	Becomes active during starting.	Becomes inactive a configurable amount of time after the *Fuel Relay* becomes inactive. This is the *Gas Ignition Off* timer.
Gen Loading Frequency Not Reached	Indicates that the generator frequency has not reached the configured *Loading Frequency* during the starting process.	
Gen Loading Voltage Not Reached	Indicates that the generator voltage has not reached the configured *Loading Voltage* during the starting process.	
Gen Over Frequency Overshoot Alarm IEEE 37.2 – 81 Frequency Relay	Becomes active when the *Over Frequency Overshoot* alarm is active	
Gen Over Frequency Overshoot Warning IEEE 37.2 – 81 Frequency Relay	Becomes active when the *Over Frequency Overshoot Warning* alarm is active	
Generator Available	Becomes active when the generator is available to take load.	Inactive when • *Loading voltage* and *loading frequency* have not been reached • After *electrical trip* alarm • During the starting sequence before the end of the warming timer.

Parameter descriptions are continued overleaf…

Output Source	Activates…	Is Not Active….
Generator Closed Aux	Active when the *Generator Closed Auxiliary* input is active	
Generator Excite IEEE 37.2 – 31 Separate Excitation Device	Used to control the excitation of the main alternator (AC).	Becomes inactive when the set is stopped.
Generator High Voltage Alarm IEEE 37.2 – 59 AC Overvoltage Relay	Active when the *High Voltage Electrical Trip* alarm is active	
Generator High Voltage Warning IEEE 37.2 – 59 AC Overvoltage Relay	Active when the *High Voltage Warning* alarm is active	
Generator High Volts Shutdown IEEE 37.2 – 59 AC Overvoltage Relay	Active when the *High Voltage Shutdown* alarm is active	
Generator Load Inhibit	Active when the *Generator Load Inhibit* input is active	
Generator Low Voltage Shutdown/Electrical Trip IEEE 37.2 – 27 AC Undervoltage Relay	Active when the generator voltage falls below the *Low Voltage Alarm Trip* level	Inactive when • The set is stopped • During starting sequence before the safety delay time has expired.
Generator Low Voltage Warning IEEE 37.2 – 27 AC Undervoltage Relay	Active when the generator voltage falls below the *Low Voltage Pre-Alarm Trip* level	Inactive when • The set is stopped • During starting sequence before the safety delay time has expired.
Generator Over Frequency Alarm IEEE 37.2 – 81 Frequency Relay	Active when the generator frequency exceeds the *Over Frequency Shutdown Trip* level.	
Generator Over Frequency Delayed Alarm IEEE 37.2 – 81 Frequency Relay	Active when the generator frequency exceeds the configured *Over Frequency Shutdown Trip* level for a duration longer than the set *Overshoot Delay* timer.	
Generator Over Frequency Delayed Warning IEEE 37.2 – 81 Frequency Relay	Active when the generator frequency exceeds the configured *Over Frequency Warning Trip* level for a duration longer than the set *Overshoot Delay* timer.	
HEST Active	Active when the High Exhaust System Temperature CAN alarm is active	
High Coolant Temperature Electrical Trip IEEE 37.2 – 26 Apparatus Thermal Device	Active when the *Coolant Temperature* exceeds the configured *High Coolant Temperature Electrical Trip* level	
High Coolant Temperature Shutdown IEEE 37.2 – 26 Apparatus Thermal Device	Active when the *Coolant Temperature* exceeds the configured *High Coolant Temperature Shutdown* level	
High Coolant Temperature Warning IEEE 37.2 – 26 Apparatus Thermal Device	Active when the *Coolant Temperature* exceeds the configured *High Coolant Temperature Warning* level	

Parameter descriptions are continued overleaf…

Output Source	Activates…	Is Not Active….
High Inlet Temperature Alarm	Active when the High Inlet Temperature Alarm is active on the module.	
High Inlet Temperature Warning	Active when the High Inlet Temperature Warning is active on the module.	
Inhibit Scheduled run	Active when the Inhibit Scheduled run input is active	
kW Overload Alarm	Active when the measured kW are above the setting of the *kW overload alarm*. Used to give alarms on overload, control a dummy load switch or for load shedding functionality.	
Lamp Test	Active when the lamp test is activated by a digital input or by pressing the *Mute/Lamp Test* control button	
Loading Frequency Not Reached	Active when the generator frequency has not reached the configured *Loading Frequency* during the starting process.	
Loading Voltage Not Reached	Active when the generator voltage has not reached the configured *Loading Voltage* during the starting process.	
Loss of Magnetic Pickup Signal	Active when the controller senses the loss of signal from the magnetic pickup probe	
Louvre Control	Active when the fuel relay becomes active. Normally used to drive ventilation louvres for the generator set	
Low Coolant Temperature IEEE 37.2 – 26 Apparatus Thermal Device	Active when the *Coolant Temperature* falls below the *Low Coolant Temperature alarm* setting	
Low Load	Active when the Low Load alarm is active.	
Low Oil Pressure Shutdown IEEE 37.2 - 63 Pressure Switch	Active when the *Oil Pressure* falls below the *Low Oil Pressure Shutdown* setting	Inactive when • The set is stopped • During starting sequence before the safety delay time has expired.
Low Oil Pressure Warning IEEE 37.2 - 63 Pressure Switch	Active when the *Oil Pressure* falls below the *Low Oil Pressure Warning* setting	Inactive when • The set is stopped • During starting sequence before the safety delay time has expired.
Main Config Selected	Active when the main configuration is active	
Mains Closed Aux 	Active when the *Mains Closed Auxiliary* input is active	
Mains Failure IEEE 37.2 - 81 Frequency Relay IEEE 37.2 – 27 AC Undervoltage Relay IEEE 37.2 – 59 AC Overvoltage Relay 	The output indicates that one or more of the module's sources of determining mains failure is active.	
Mains High Frequency IEEE 37.2 -81 Frequency Relay 	Active when the mains frequency exceeds the *High Frequency* setting	
Mains High Voltage IEEE 37.2 – 59 AC Overvoltage Relay 	Active when the mains voltage exceeds the *High Voltage* setting	

Parameter descriptions are continued overleaf…

Output Source	Activates…	Is Not Active….
Mains Load Inhibit 	Active when the *Mains Load Inhibit* input is active	
Mains Low Frequency IEEE 37.2 -81 Frequency Relay 	Active when the mains frequency falls below the *Low Frequency* setting	
Mains Low Voltage IEEE 37.2 – 27 AC Undervoltage Relay 	Active when the mains voltage falls below the *Low Voltage* setting	
Maintenance Alarm 1, 2 or 3 Due	Active when the relevant maintenance alarm is due.	
Manual Restore Contact 	Active when the manual restore contact input is active	
MPU Open Circuit	This output indicates that the module has detected an open circuit failure in the Magnetic Pickup transducer circuit.	
Oil Pressure Sensor Open Circuit	Active when the *Oil Pressure Sensor* is detected as being open circuit.	
Oil Pressure Switch	Active when the oil pressure switch input is active	
Open Gen Output IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects the generator to be off load this control source is activated.	Inactive whenever the generator is required to be on load
Open Gen Output Pulse IEEE 37.2 – 52 AC Circuit Breaker	Used to control the load switching device. Whenever the module selects the generator to be off load this control source is activated for the duration of the Breaker Open Pulse timer, after which it becomes inactive again.	
Open Mains Output IEEE 37.2 – 52 AC Circuit Breaker 	Used to control the load switching device. Whenever the module selects the mains to be off load this control source is activated.	The output is inactive whenever the mains is required to be on load
Open Mains Output Pulse IEEE 37.2 – 52 AC Circuit Breaker 	Used to control the load switching device. Whenever the module selects the mains to be off load this control source is activated for the duration of the Breaker Open Pulse timer, after which it becomes inactive again.	
Over Current IDMT Alarm	Active when the *Over Current IDMT* alarm is active	
Over Current Immediate Warning	Active when the *Over Current Immediate Warning* alarm is active	
Over Frequency Runaway IEEE 37.2 -81 Frequency Relay	Active when the *Over Frequency Runaway* alarm is active	
Over Frequency Warning IEEE 37.2 -81 Frequency Relay	Active when the *Over Frequency Warning* alarm is active	
Over Speed Runaway IEEE 37.2 – 12 Over Speed Device	Active when the *Over Speed Runaway* alarm is active	
Over Speed Shutdown IEEE 37.2 – 12 Over Speed Device	Active when the *Over Speed Shutdown* alarm is active	
Over Speed Warning IEEE 37.2 – 12 Over Speed Device	Active when the *Over Speed Warning* alarm is active	

Parameter descriptions are continued overleaf…

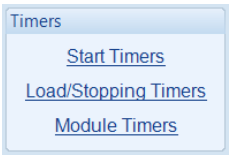
Output Source	Activates…	Is Not Active….
Overspeed Delayed Alarm IEEE 37.2 – 12 Over Speed Device	Active when the *Over Speed Delayed* alarm is active	
Overspeed Delayed Warning IEEE 37.2 – 12 Over Speed Device	Active when the *Over Speed Delayed Warning* alarm is active	
Over Speed Overshoot Alarm IEEE 37.2 – 12 Over Speed Device	Active when the *Over Speed Overshoot* alarm is active	
Overspeed Overshoot Warning IEEE 37.2 – 12 Over Speed Device	Active when the *Over Speed Overshoot Warning* alarm is active	
PLC Output Flag 1 to 20	Active when the *PLC Flag* is active	
Preheat During Preheat Timer	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : • The set is stopped • The preheat timer has expired
Preheat Until End Of Cranking	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : • The set is stopped • The set has reached *crank disconnect* conditions
Preheat Until End Of Safety Timer	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : • The set is stopped • The set has reached the end of the *safety delay* timer
Preheat Until End of Warming Timer	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : • The set is stopped • The set has reached the end of the *warming* timer
Protections Disabled	Active when protections are turned off (Unticked) in the configuration.	
Remote Control 1 to 10	A series of output sources that are controlled by remote control in the SCADA section of the software, used to control external circuits.	
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	
Reset Maintenance 1 to 3	Active when the relevant *Maintenance Alarm Reset* is active	
Scheduled Auto Start Inhibit	Active when the *Inhibit Scheduled Run* input is active	
SCR Inducement	Active when SCR Inducement CAN Alarm is active	
Screensaver Active	Active when the ScreenSaver is active on the module.	
Shutdown Blocked	Becomes active when protections are disabled and one of the parameters goes out of limits	
Simulate Auto Button	Active when the *Simulate Auto Button* digital input is active	
Simulate Close Gen Breaker	Active when the *Simulate Close Gen Breaker* digital input is active	
Simulate Lamp Test	Active when the *Simulate Lamp Test* input digital is active	
Simulate Mains Available 	Active when the *Simulate Mains Available* digital input is active	
Simulate Manual Button	Active when the *Simulate Manual* digital input is active	
Simulate Open Gen Breaker	Active when the *Simulate Open Gen Breaker* digital input is active	
Simulate Start Button	Active when the *Simulate Start Button* digital input is active	
Simulate Stop Button	Active when the *Simulate Stop Button* digital input is active	
Simulate Test On Load Button 	Active when the *Simulate Test On Load Button* digital input is active	

Parameter descriptions are continued overleaf…

Output Source	Activates…	Is Not Active….
Smoke Limiting	Becomes active when the controller requests that the engine runs at idle speed. As an output, this is used to give a signal to the *Idle Speed Input* on the engine speed governor (if available)	Becomes inactive when the controller requests that the engine runs at rated speed.
Start Relay IEEE 37.2 – 54 Turning Gear Engaging Device	Active when the controller requires the cranking of the engine.	
Stop and Panel lock	Active when the *Stop And Panel Lock* digital input is active	
System in Auto Mode	Active when Auto mode is selected	
System in Manual Mode	Active when Manual mode is selected	
System in Stop Mode	Active when Stop mode is selected	
System in Test Mode 	Active when Test On Load mode is selected	
Temperature Sensor Open Circuit	Active when the *Temperature Sensor* is detected as being open circuit.	
Under Frequency Shutdown / Electrical Trip	Active when the *Under Frequency Shutdown / Electrical Trip* alarm is active.	
Under Frequency Warning	Active when the *Under Frequency Warning* alarm is active.	
Under Speed Shutdown / Electrical Trip	Active when the *Underspeed Shutdown / Electrical Trip* alarm is active.	
Under Speed Warning	Active when the *Underspeed Warning* alarm is active.	
Waiting For Manual Restore 	Becomes active when the generator is on load and the mains supply is healthy but an input configured to Manual Restore is active. This is used to signal to an operator that action is required before the set transfers back to the mains supply.	
Water in Fuel	Active when the *Water in Fuel* input is active, or when the module is informed of the *Water in Fuel* CAN message from the ECU.	

2.6 TIMERS

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



2.6.1 START TIMERS

Start Delay

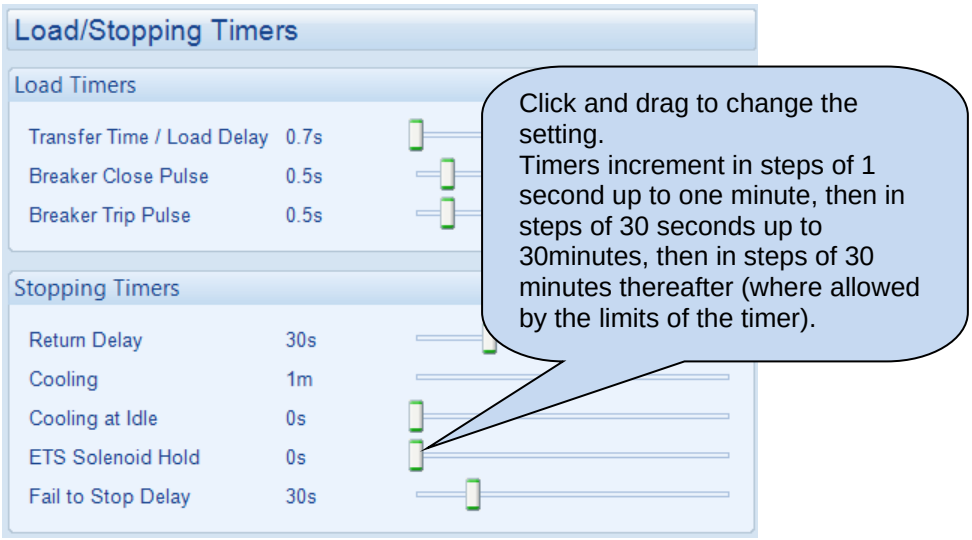
Timer	Description
Remote Start Off Load	The amount of time delay before starting in AUTO mode. This timer is activated upon the *Remote Start Off Load* command being issued. Typically this timer is applied to prevent starting upon fleeting start signals.
Remote Start On Load	The amount of time delay before starting in AUTO mode. This timer is activated upon the *Remote Start On Load* command being issued. Typically this timer is applied to prevent starting upon fleeting start signals.
Mains Fail	The amount of time delay before starting in AUTO mode. This timer is activated upon a mains failure detection.
Telemetry Start	The amount of time delay before starting in AUTO mode. This timer is activated upon a *Remote Start* command being received from a MODBUS master. Typically this timer is applied to prevent starting upon fleeting start signals.

Parameter descriptions are continued overleaf…

Start Timers

Timer	Description
Mains Transient Delay 	Used to give a delay between sensing mains failure and acting upon it. This is used to prevent dropouts of the mains load switch and operation of the system due to mains supply transient conditions.
Engage Attempt	**NOTE: Only available if using magnetic pick-up and multiple engage attempts.**
	The amount of time the module attempts to engage the starter motor during each engage attempt. If the Magnetic Pick-up is not detecting movement of the flywheel when this timer expires, the engage attempt terminates. When the engage fails consecutively for the configured number of *Engage Attempts*, the *Fail to Engage* alarm is activated.
Engage Rest	**NOTE: Only available if using magnetic pick-up and multiple engage attempts.**
	The amount of time the module waits between attempts to engage the starter.
Delay Crank	The amount of time delay between the fuel relay and the crank relay energising. This is typically used to allow fuel systems to prime.
Cranking	The amount of time for each crank attempt
Crank Rest	The amount of time between multiple crank attempts.
Smoke Limit	The amount of time that the engine is requested to run at idle speed upon starting. This is typically used to limit emissions at start up.
Smoke Limit Off	The amount of time that the engine takes to run up to rated speed after removal of the command to run at idle speed. If this time is too short, the engine is stopped due to an *Underspeed* alarm. If the time is too long, *Underspeed* protection is disabled until the *Smoke Limit Time Off* time has expired.
DPF Ramp	The amount of time that the engine takes to run up to rated speed after running at its DPF speed.
Safety On Delay	The amount of time at start up that the controller ignores oil pressure and engine speed and other delayed alarms. This is used to allow the engine to run up to speed before protections are activated.
Warming	The amount of time the engine runs before being allowed to take load. This is used to warm the engine to prevent excessive wear.
ECU (ECM) Override	**NOTE: Only available if an ECU (ECM) has been configured.**
	The amount of time the CAN ECU Power stays energised when the Start button is pressed in Stop mode.

2.6.2 LOAD / STOPPING TIMERS



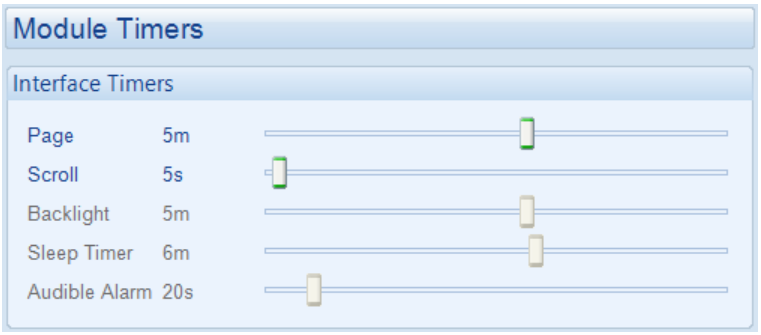
Load Timers

Timer	Description
Transfer Time	The time between one load switch opening and the other closing. Used during transfer to and from the generator.
Breaker Close Pulse	The amount of time that *Breaker Close Pulse* signal is present when the request to close the load switch is given.
Breaker Trip Pulse	The amount of time that *Breaker Open Pulse* signal is present when the request to open the load switch is given.

Stopping Timers

Timer	Description
Return Delay	A delay, used in auto mode only, that allows for short term removal of the request to stop the set before action is taken. This is usually used to ensure the set remains on load before accepting that the start request has been removed.
Cooling	The amount of time that the set is made to run OFF LOAD before being stopped. This is to allow the set to cool down and is particularly important for engines with turbo chargers.
Cooling At Idle	The amount of time that the set is made to run OFF LOAD and at Idle Speed before being stopped.
ETS Solenoid Hold	The amount of time the *Energise to stop* solenoid is kept energised after the engine has come to rest. This is used to ensure the set has fully stopped before removal of the stop solenoid control signal.
Fail To Stop Delay	If the set is called to stop and is still running after the *fail to stop* delay, a *Fail to Stop* alarm is generated.

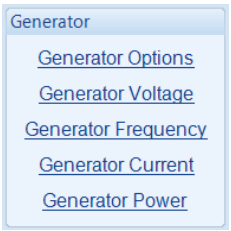
2.6.3 MODULE TIMERS



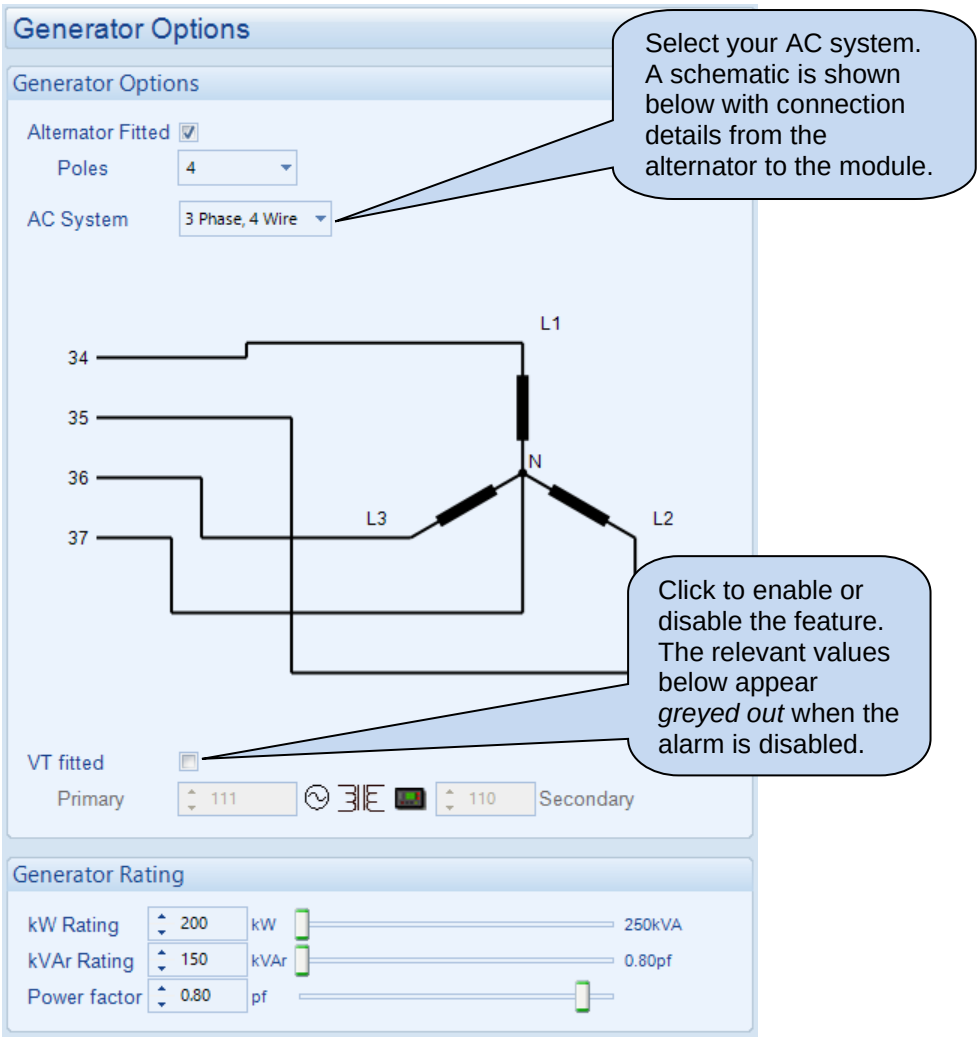
Timer	Description
Page	If the module is left unattended for the duration of the *LCD Page Timer* it reverts to show the *Status* page.
Scroll	The scroll time between parameters on a selected page
Backlight	If the module is left unattended for the duration of the *Backlight Timer*, the LCD backlight turns off
Sleep Timer	**NOTE: The Sleep Mode is disabled when the DSE25xx MKII remote display module is connected to the DSE61xx MKIII.** If the module is left unattended for the duration of the *Sleep Timer,* it goes into sleep mode to save power.
Audible Alarm	When an alarm is active on the module, this is the time duration during which the *Audible Alarm* digital output is active. This is configurable when the *Limit Audible Alarm Duration* option is enabled under *Module Options.*

2.7 GENERATOR

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



2.7.1 GENERATOR OPTIONS



These parameters are described overleaf...

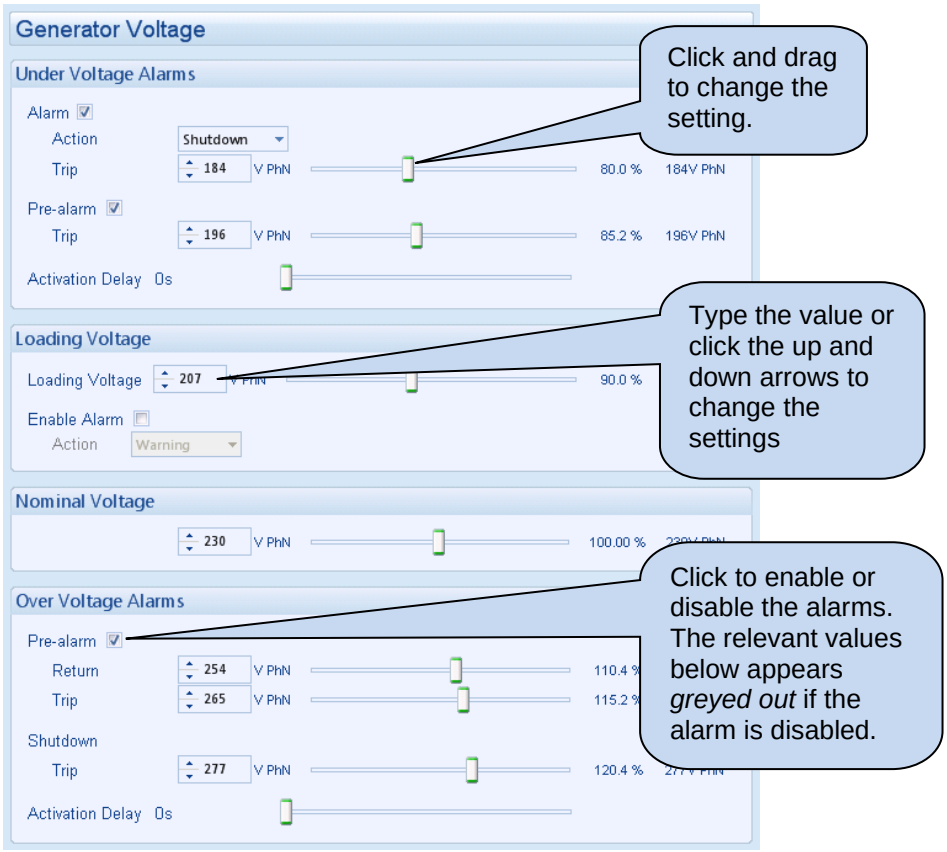
Generator Options

Parameter	Description
Alternator Fitted	☐ = There is no alternator in the system, it is an *engine only* application ☑ = An alternator is fitted to the engine, it is a generator application.
Poles	The number of poles on the alternator
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 L1 - N - L2*** ***3 Phase, 4 Wire Delta L1 - N - L3*** ***3 Phase, 4 Wire Delta L2 - N - L3*** ***Single Phase, 2 Wire*** ***Single Phase, 3 Wire L1 - L2*** ***Single Phase, 3 Wire L1 - L3***
VT Fitted	☐ = The voltage sensing to the controller is direct from the alternator ☑ = 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 *Primary* and *Secondary* voltages of the transformer, the controller displays the *Primary* voltage rather than the actual measured voltage. This is typically used to interface the DSE module to high voltage systems (i.e. 11kV)

Generator Rating

Parameter	Description
kW Rating	The kW rating of the generator. This is used for the *Generator Power* functions to be correctly utilised.
kvar Rating	The kvar rating of the generator. To calculate the kvar rating of a genset: • Most generators are rated for a power factor (kW / kVA) of 0.8 • From Pythagoras : $\cos\Phi = \frac{\text{kW}}{\text{kVA}}$ $\cos\Phi = 0.8$ $\Phi = \cos^{-1} 0.8 = 36.87°$ • From this, the kvar rating of the typical 0.8 pf rated generator is: $\tan\Phi = \frac{\text{kvar}}{\text{kW}}$ $\text{kvar} = \tan 36.87° \times \text{kW}$ $\text{kvar} = 0.75 \times \text{kW}$ • Or to simplify this, the kvar rating of a 0.8 pf rated generator is ¾ of the kW rating (kvar rating = 75% of kW rating)
Power Factor	The PF rating of the generator. Setting this value automatically calculates the kvar rating.

2.7.2 GENERATOR VOLTAGE



Under Voltage Alarms

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

Parameter descriptions are continued overleaf…

Loading Voltage

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

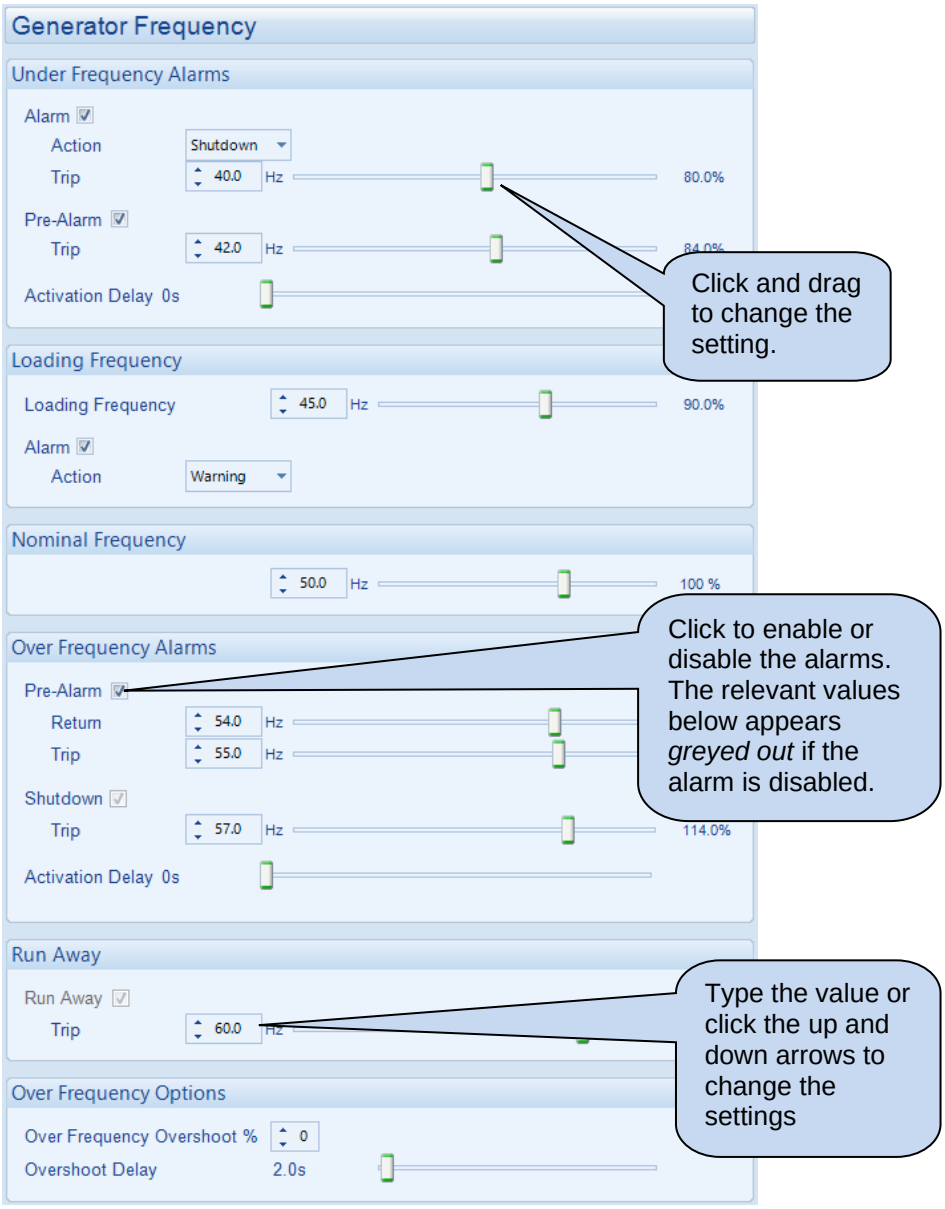
Nominal Voltage

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

Over Voltage Alarms

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

2.7.3 GENERATOR FREQUENCY



These parameters are described overleaf...

Under Frequency Alarms

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

Loading Frequency

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

Nominal Frequency

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

Parameter descriptions are continued overleaf…

Over Frequency Alarms

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

Run Away

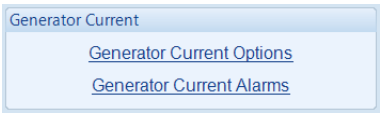
Parameter	Description
Run Away IEEE 37.2 -81 Frequency Relay	**NOTE: Only available if using magnetic pick-up or an electronic engine is connected.** ☐ = Alarm is disabled ☑ = In the event of the generator output frequency rising above the configured *Trip* value, the *Run Away Shutdown* alarm is immediately triggered. This is used to protect against engine damage due to uncontrolled speed increase, where the engine speed runs away.
Trip	Set the frequency level for the *Run Away* alarm.

Over Frequency Options

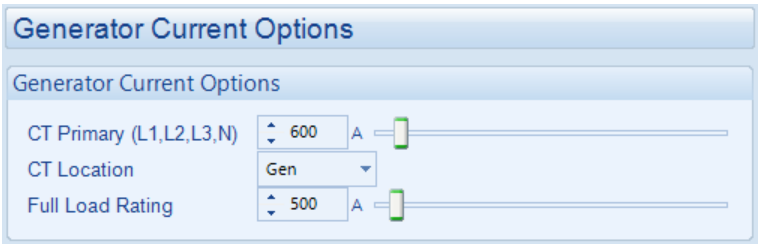
Parameter	Description
Over Frequency Overshoot % IEEE 37.2 -81 Frequency Relay	To prevent spurious over-frequency alarms at start up, the module includes configurable *Over Frequency Overshoot* protection. This allows the frequency to 'overshoot' the *Over-Frequency Shutdown* level during the starting process for a short time.
Overshoot Delay	Rather than 'inhibiting' the *Over Frequency* alarms, the levels are temporarily raised by the *Over Frequency Overshoot %* for the duration of the *Overshoot Delay* from starting.

2.7.4 GENERATOR CURRENT

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

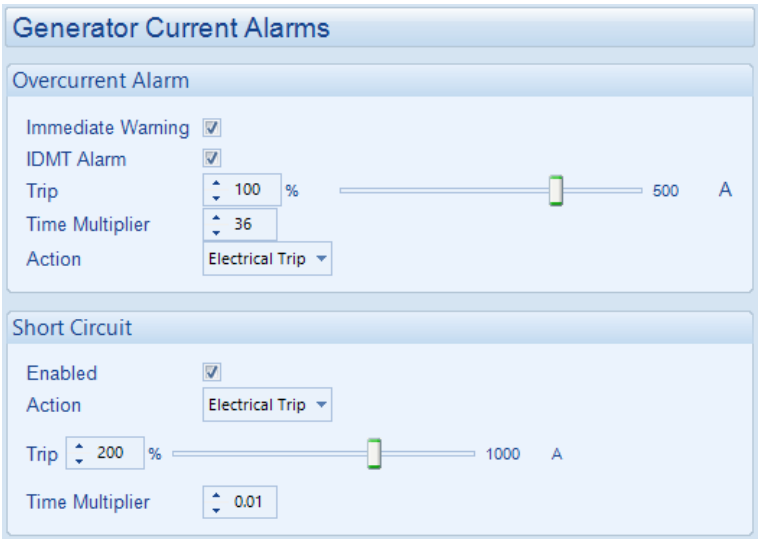


2.7.4.1 GENERATOR CURRENT OPTIONS



Parameter	Description
CT Primary	Primary rating of the three phase Current Transformers.
CT Location	***Gen:*** The CTs are in the feed from the generator, the module shows only generator load ***Load:*** The CTs are in the feed to the load, the module then displays load current, provided by the mains supply or the generator.
Full Load Rating	This is the full load current rating of the alternator

2.7.4.2 GENERATOR CURRENT ALARMS



These parameters are described overleaf...

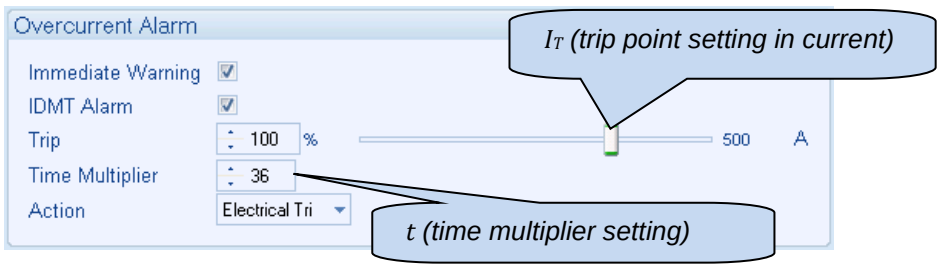
Overcurrent Alarm

The overcurrent alarm combines a simple warning trip level combined with a fully functioning IDMT curve for thermal protection.

Parameter	Description
Immediate Warning IEEE 37.2 -50 instantaneous overcurrent relay	If the *Immediate Warning* is enabled, the controller generates a *warning alarm* as soon as the *Trip* level is reached. The alarm automatically resets once the generator loading current falls below the *Trip* level (unless *All Warnings are latched* is enabled). For further advice, consult the generator supplier.
IDMT Alarm IEEE 37.2 -51 AC time overcurrent relay (shutdown / electrical trip)	If the *Over Current IDMT Alarm* is enabled, the controller begins following the IDMT 'curve' when the current on any phase passes the *Trip* setting. If the *Trip* is surpassed for an excess amount of time, the *IDMT Alarm* triggers (*Shutdown* or *Electrical Trip* as selected in *Action*). The larger the over circuit fault, the faster the trip. The speed of the trip is dependent upon the fixed formula: $$T = \frac{t}{\left(\frac{I_A}{I_T} - 1\right)^2}$$ **Where:** T is the tripping time in seconds I_A is the actual measured current of the most highly loaded line (L1, L2 or L3) I_T is the delayed trip point setting in current t is the time multiplier setting and also represents the tripping time in seconds at twice full load (when $^{I_A}/_{I_T} = 2$).
Trip	The percentage of alternator full load current at which the IDMT Alarm curve starts to operate from.
Time Multiplier	The time multiplier constant throughout the IDMT curve. It also represents the tripping time in seconds at 200% alternator full load current.
Action	Select the type of alarm required from the list: ***Electrical Trip*** ***Shutdown*** ***Warning*** For details of these, see the section entitled *Alarm Types* elsewhere in this document.

Overcurrent Protection Explanation

The settings shown in the example below are a screen capture of the DSE factory settings, taken from the DSE Configuration Suite PC Software for a brushless alternator.



These settings provide for normal running of the generator up to 100% full load. If full load is surpassed, the *Immediate Warning* alarm is triggered and the set continues to run.

The effect of an overload on the generator is that the alternator windings begin to overheat; the aim of the *IDMT Alarm* is to prevent the windings being overload (heated) too much. The amount of time that the alternator is safely overloaded is governed by how high the overload condition is.

The default settings as shown above allow for an overload of the alternator to the limits of the *Typical Brushless Alternator* whereby 110% overload is permitted for 1 hour or 200% overload is permitted for 36 seconds.

If the alternator load reduces, the controller then *follows* a cooling curve. This means that a second overload condition may trip soon after the first as the controller *knows* if the windings have not cooled sufficiently.

For further details on the *Thermal Damage Curve* of your alternator, refer to the alternator manufacturer and generator supplier.

Creating A Spreadsheet For the Over Current IDMT Curve

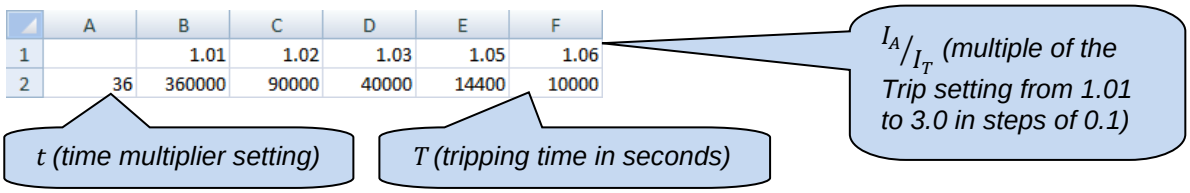
The formula used:

$$T = \frac{t}{\left(\frac{I_A}{I_T} - 1\right)^2}$$

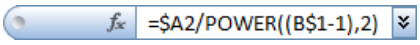
Where:

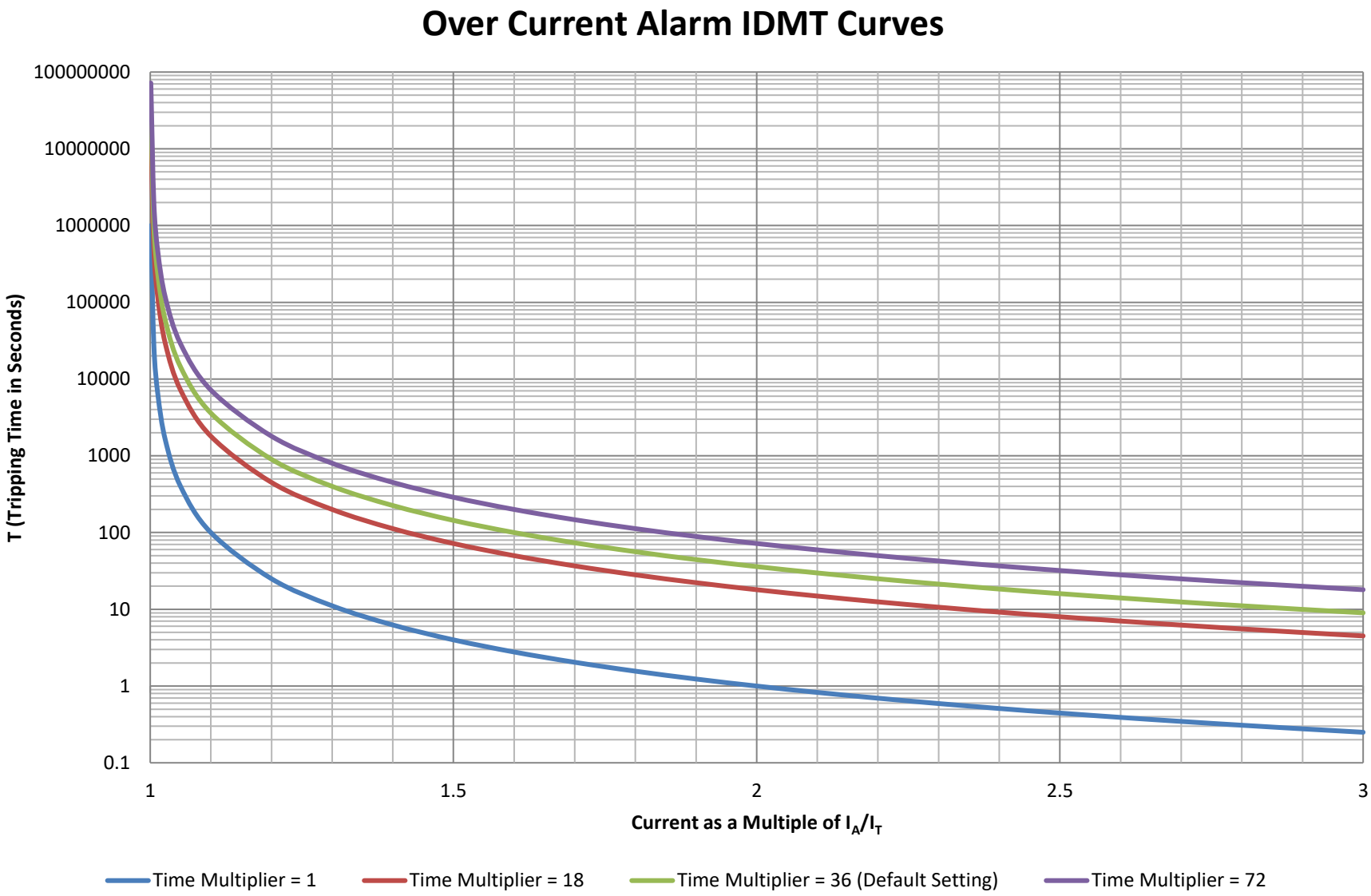
T is the tripping time in seconds
I_A is the actual measured current of the most highly loaded line (L1, L2 or L3)
I_T is the delayed trip point setting in current
t is the time multiplier setting and also represents the tripping time in seconds at twice full load (when $^{I_A}/_{I_T} = 2$).

The equation is simplified for addition into a spreadsheet. This is useful for 'trying out' different values of t *(time multiplier setting)* and viewing the results, without actually testing this on the generator.



The formula for the *Tripping Time* cells is:




Over Current Alarm IDMT Curves
T (Tripping Time in Seconds)
100000000
10000000
1000000
100000
10000
1000
100
10
1
0.1
1
1.5
2
2.5
3
Current as a Multiple of I_A/I_T
Time Multiplier = 1
Time Multiplier = 18
Time Multiplier = 36 (Default Setting)
Time Multiplier = 72

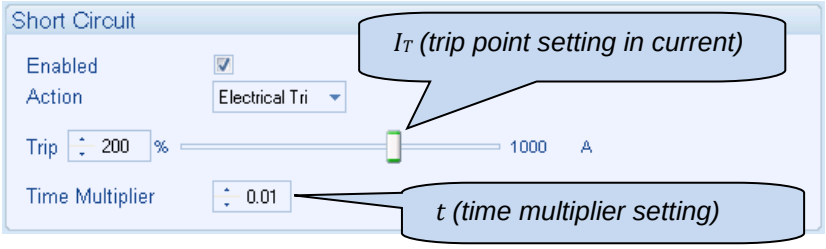
Short Circuit Alarm

Parameter	Description
Short Circuit IDMT Enable IEEE C37.2 – 51 IDMT Short Circuit Relay	If the *Short Circuit Alarm* is enabled, the controller begins following the IDMT 'curve' when the current on any phase passes the *Trip* setting. If the *Trip* is surpassed for an excess amount of time, the *IDMT Alarm* triggers (*Shutdown* or *Electrical trip* as selected in *Action*). The larger the short circuit fault, the faster the trip. The speed of the trip is dependent upon the fixed formula: $$T = \frac{t \times 0.14}{\left(\left(\frac{I_A}{I_T}\right)^{0.02} - 1\right)}$$ Where: T is the tripping time in seconds (accurate to +/- 5% or +/- 50 ms (whichever is the greater)) I_A is the actual measured current I_T is the trip point setting in current t is the time multiplier setting
Action	Select the type of alarm required from the list: ***Electrical Trip*** ***Shutdown*** ***Warning*** For details of these, see the section entitled *Alarm Types* elsewhere in this document.
Trip	The percentage of alternator full load current at which the IDMT Alarm curve starts to operate from.
Time Multiplier	The time multiplier constant throughout the IDMT curve.

Short Circuit Protection Explanation

The settings shown in the example below are a screen capture of the DSE factory settings, taken from the DSE Configuration Suite software.

NOTE: Due to large inrush currents from certain loads, such as motors or transformers, the default settings for the Short Circuit alarm may need adjusting to compensate.



The effect of a short circuit on the generator is that the alternator stator and rotor begin to overheat; the aim of the *IDMT alarm* is to prevent the stator and rotor being overload (heated) too much. The amount of time that the alternator is safely overloaded is governed by how high the short circuit condition is.

For further details on the *Thermal & Magnetic Damage Curve* of your alternator, refer to the alternator manufacturer and generator supplier.

Creating a Spreadsheet For the Short Circuit IDMT Curve

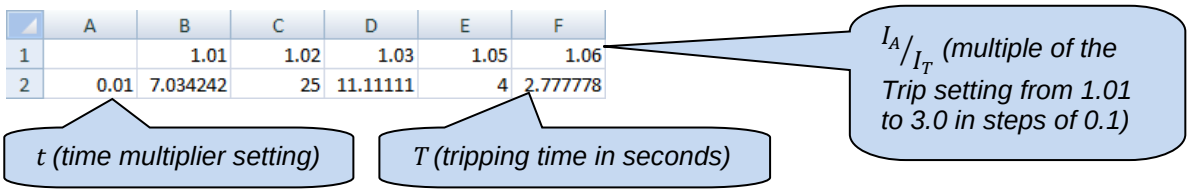
The formula used:

$$T = \frac{t \times 0.14}{\left(\left(\frac{I_A}{I_T}\right)^{0.02} - 1\right)}$$

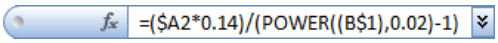
Where:

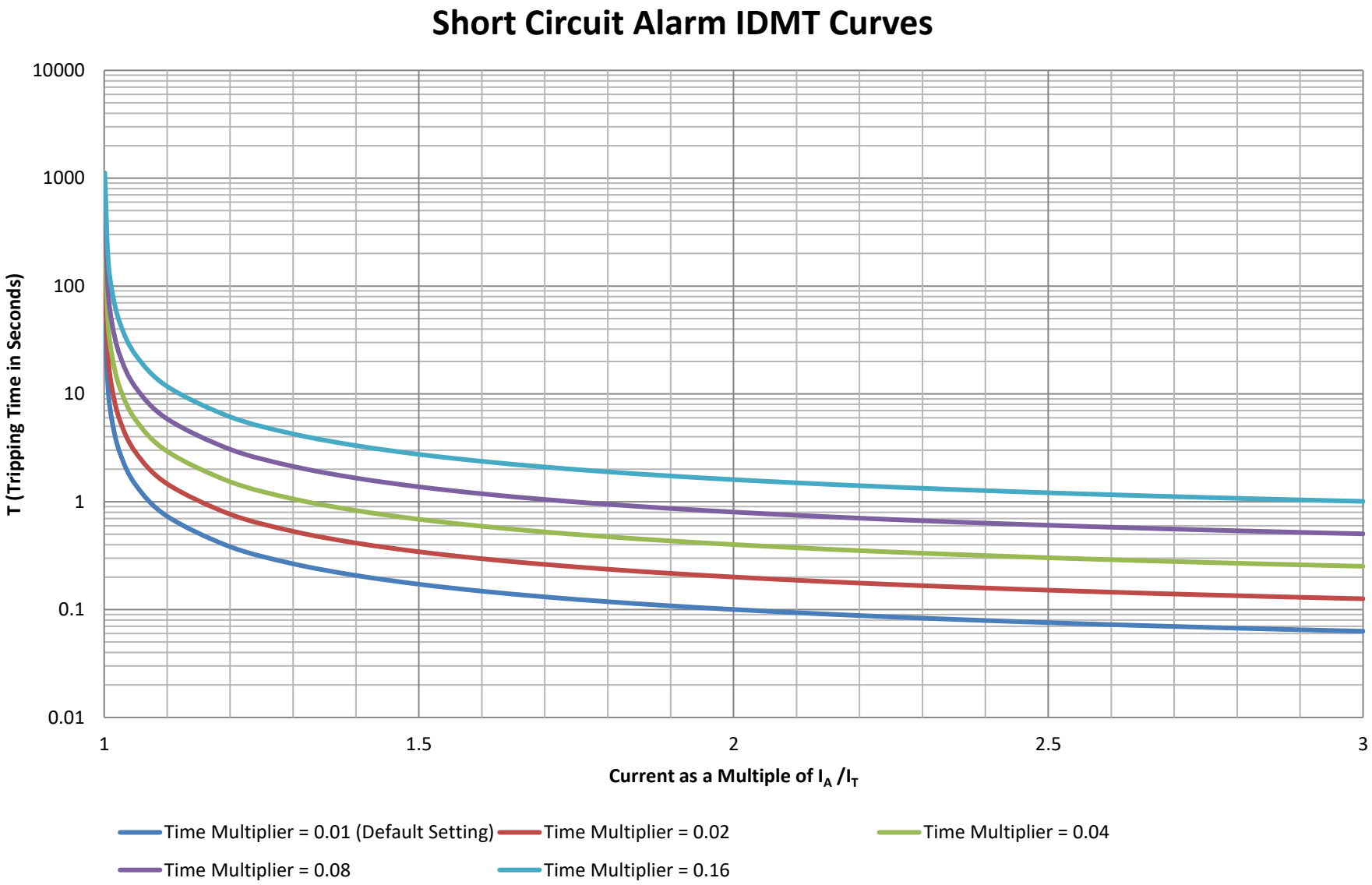
T is the tripping time in seconds (accurate to +/- 5% or +/- 50 ms (whichever is the greater))
I_A is the actual measured current
I_T is the trip point setting in current
t is the time multiplier setting

The equation is simplified for addition into a spreadsheet. This is useful for 'trying out' different values of t *(time multiplier setting)* and viewing the results, without actually testing this on the generator.

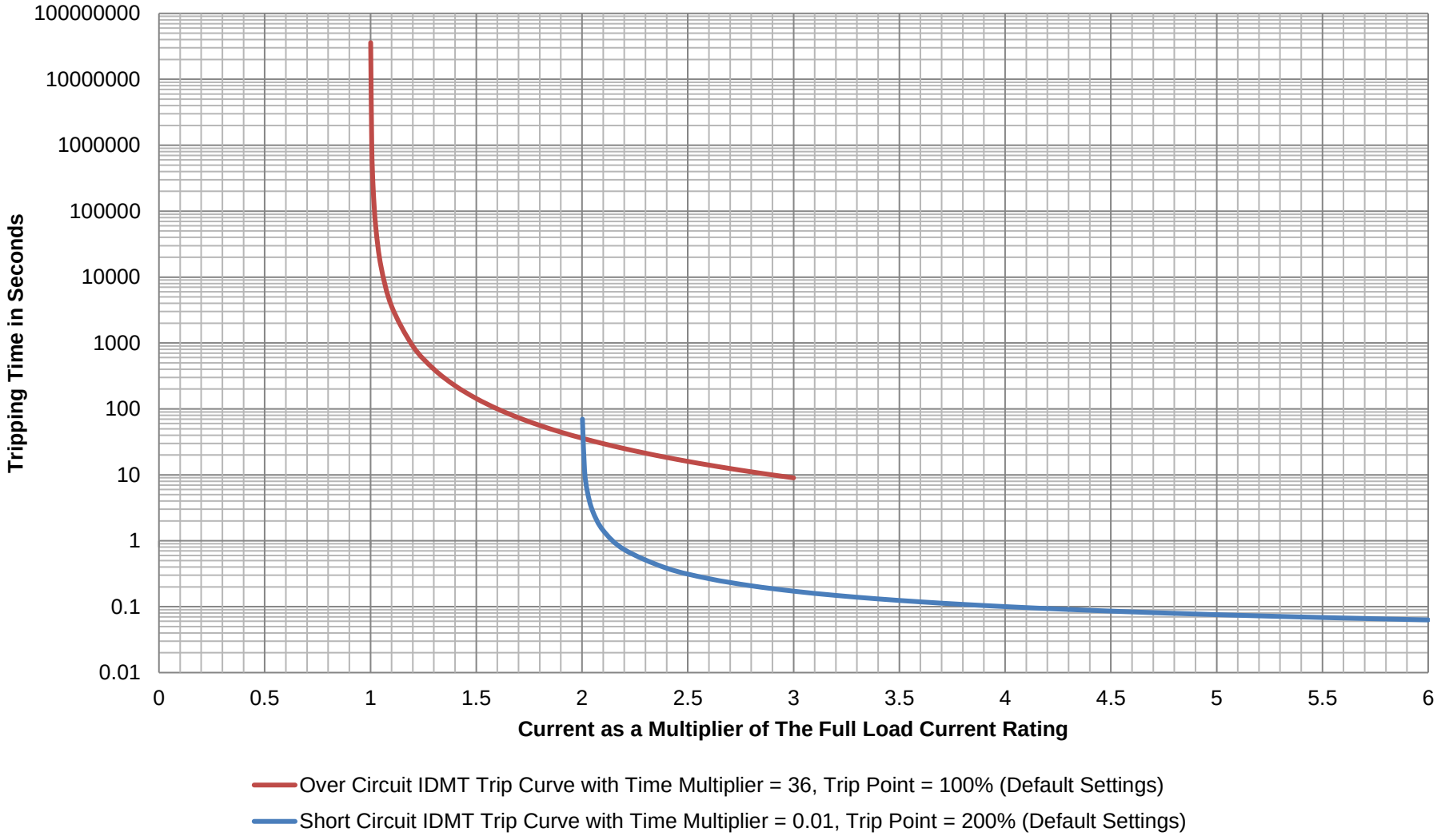


The formula for the *Tripping Time* cells is:




Short Circuit Alarm IDMT Curves
10000
1000
100
10
1
0.1
0.01
T (Tripping Time in Seconds)
1
1.5
2
2.5
3
Current as a Multiple of I_A / I_T
Time Multiplier = 0.01 (Default Setting)
Time Multiplier = 0.02
Time Multiplier = 0.04
Time Multiplier = 0.08
Time Multiplier = 0.16

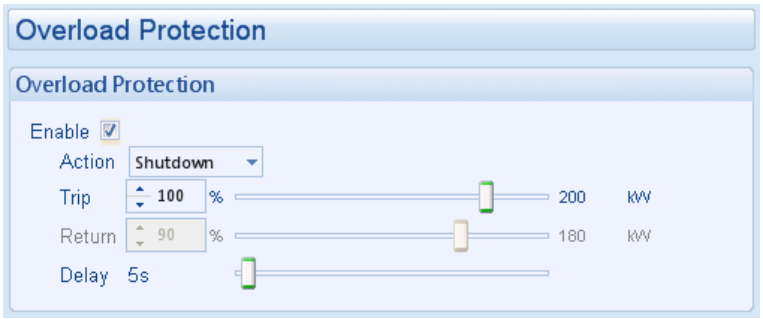
DSE Default Configratuion of Over Current, Short Circuit & Earth Fault IDMT Alarm Curves



2.7.5 GENERATOR POWER

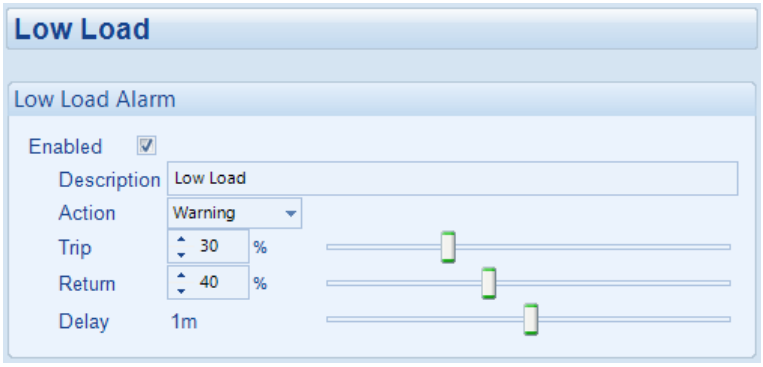
The *Generator Power* section is subdivided into smaller sections.
Select the required section with the mouse.

2.7.5.1 OVERLOAD PROTECTION



Parameter	Description
Overload Protection	☐ = Overload Protection alarm is disabled. ☑ = The *kW Overload Alarm* activates when the kW level exceeds the *Trip* setting for longer than the configured *Delay* time.
Action	Select the action for the *kW Overload Alarm:* ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning*** For details of these, see the section entitled *Alarm Types* elsewhere in this document.

2.7.5.2 LOW LOAD



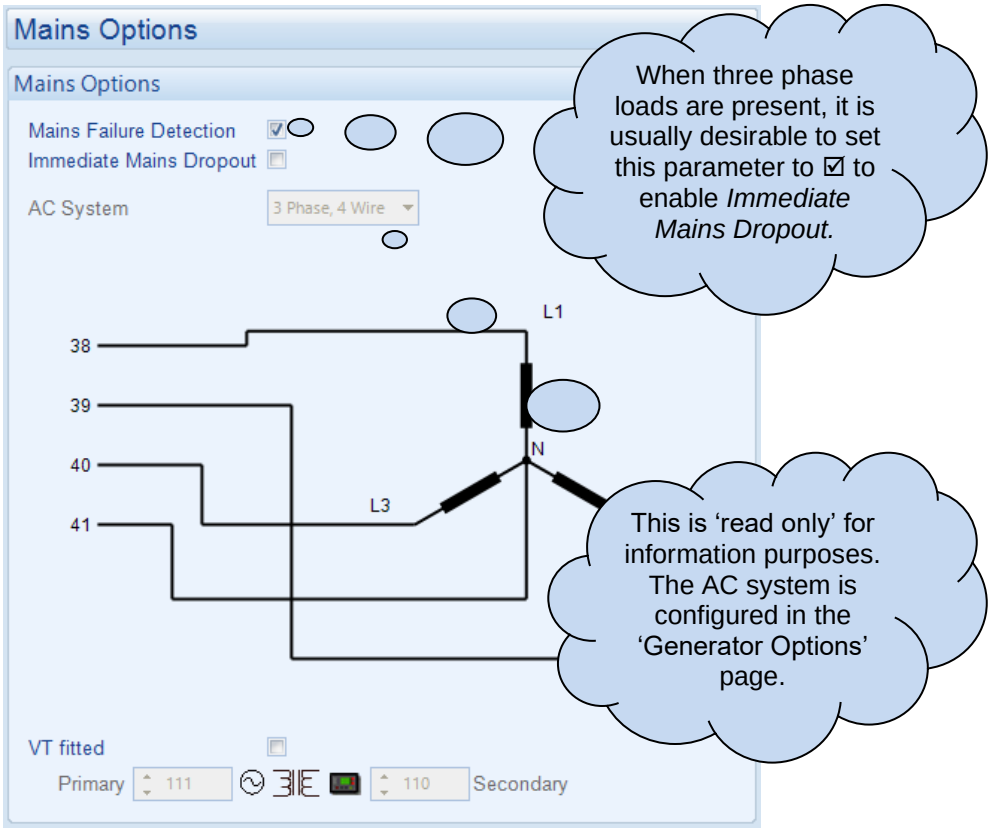
Parameter	Description
Enabled	☐ = *Low Load Alarm* is disabled. ☑ = The *Low Load Alarm* activates when the generator power drops below the configured *Trip* setting longer than the configured *Delay* time. This is used to prevent the engine from running at very low load levels.
Description	Enter the LCD text that shows up on the display when this alarm activates
Action	Select the action for the *Low Load Alarm:* ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning*** For details of these, see the section entitled *Alarm Types* elsewhere in this document.
Trip	Set the percentage of total power at which the *Low Load Alarm* is activated
Return	The Return level is only used for the *Warning Action.* When the load returns to above this percentage level of the total power, the *Warning* alarm is reset.
Delay	Set the amount of time before the *Low Load Alarm* activates.

2.8 MAINS

= Only available on DSE6120 MKIII AMF modules

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

2.8.1 MAINS OPTIONS

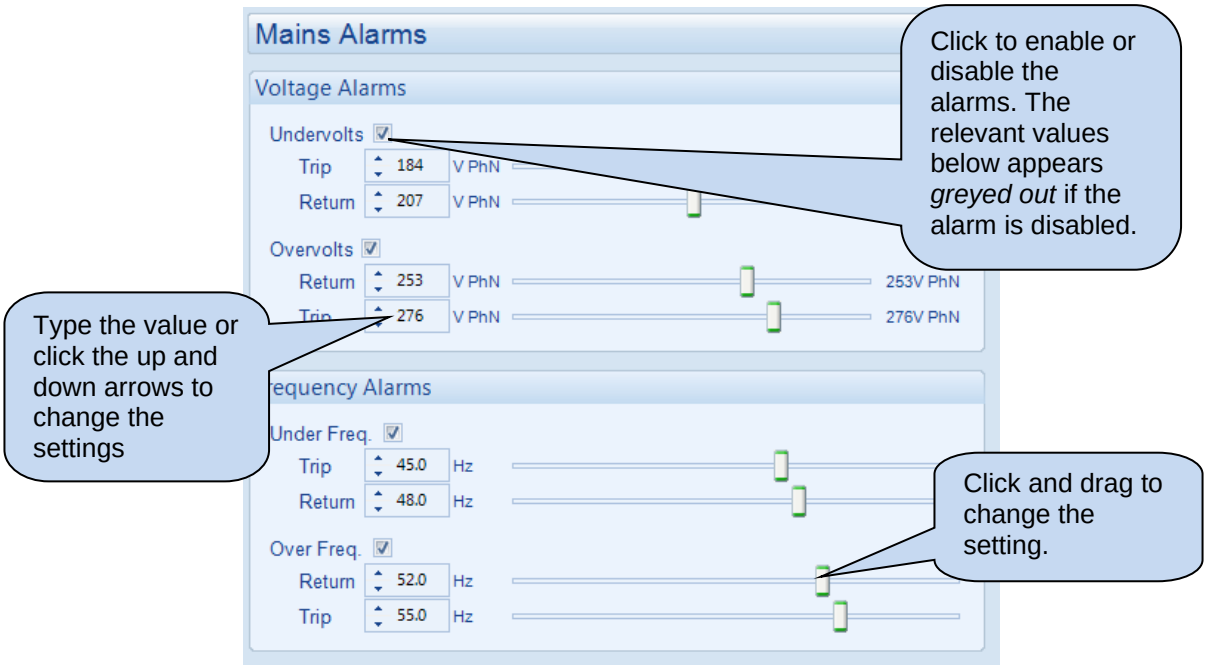


Parameters are detailed overleaf…

Mains Options

Parameter	Description
Mains Failure Detection	☐ = The module ignores the status of the mains supply. ☑ = The module monitors the mains supply and use this status for automatically starting and stopping the set in auto mode.
Immediate Mains Dropout	☐ = Upon mains failure, the mains load switch is kept closed until the generator is up to speed and volts. ☑ = Upon mains failure, the mains load switch is opened immediately, subject to the setting of the *mains transient* timer.
AC System	The AC System of the mains is fixed to the same setting as the generator. These settings are used to detail the type of AC system to which the module is connected: ***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 L1 - N - L2*** ***3 Phase, 4 Wire Delta L1 - N - L3*** ***3 Phase, 4 Wire Delta L2 - N - L3*** ***Single Phase, 2 Wire*** ***Single Phase, 3 Wire L1 - L2*** ***Single Phase, 3 Wire L1 - L3***
VTs	☐ = The voltage sensing to the controller is direct from the Mains ☑ = 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 *Primary* and *Secondary* voltages of the transformer, the controller displays the *Primary* voltage rather than the actual measured voltage. This is typically used to interface the DSE module to high voltage systems (i.e. 11 kV)

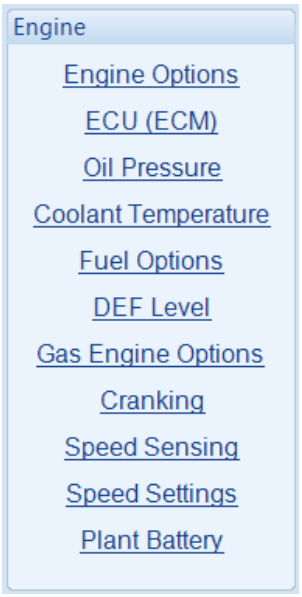
2.8.2 MAINS ALARMS



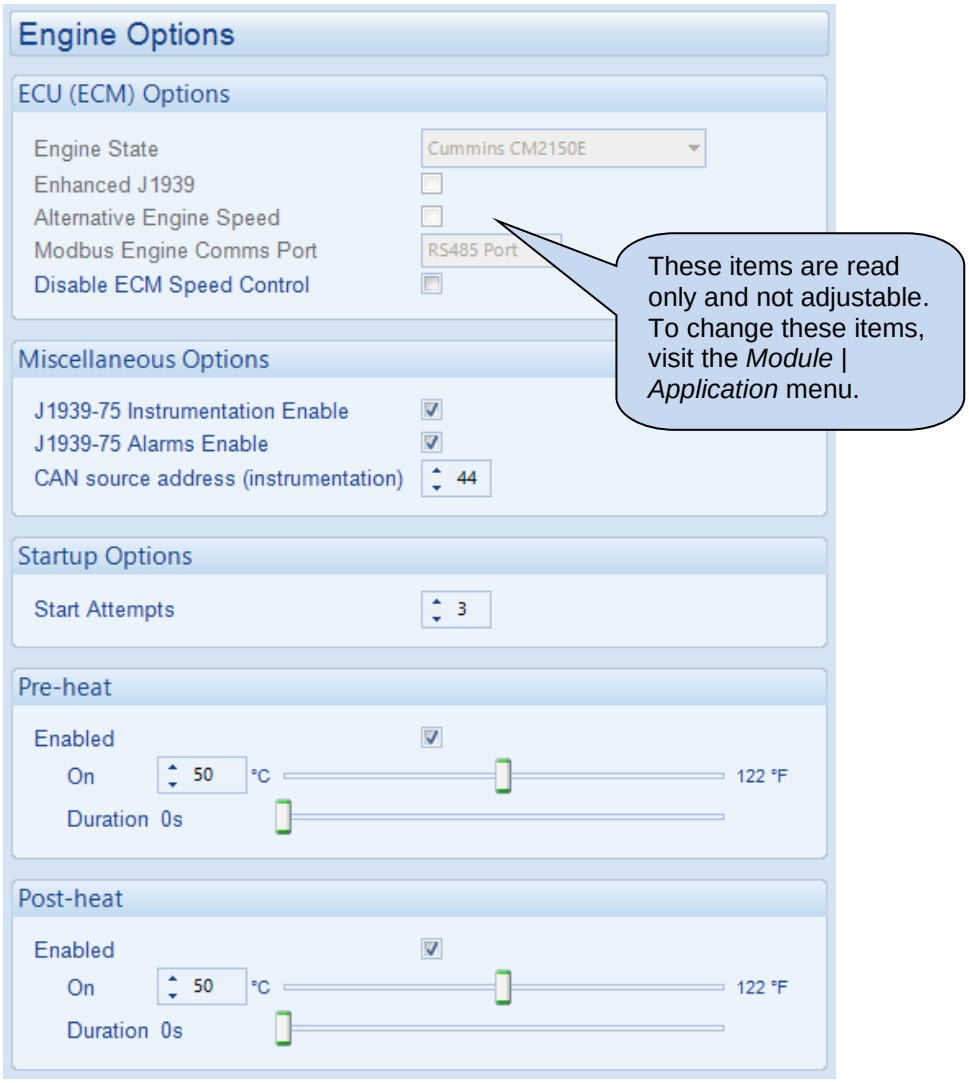
Alarm	Description
Mains Under Voltage IEEE 37.2 – 27 AC Undervoltage Relay	☐ = Mains Under Voltage detection is disabled ☑ = Mains Under Voltage gives an alarm in the event of the mains voltage falling below the configured *Under Voltage Trip* value. The *Under Voltage Trip* value is adjustable to suit the application. The alarm is reset and the mains is considered within limits when the mains voltage rises above the configured *Under Voltage Return* level.
Mains Over Voltage IEEE 37.2 – 59 AC Overvoltage Relay	☐ = Mains Over Voltage detection is disabled ☑ = Mains Over Voltage gives an alarm in the event of the mains voltage rising above the configured *Over Voltage Trip* value. The *Over Voltage Trip* value is adjustable to suit the application. The alarm is reset and the mains is considered within limits when the mains voltage falls below the configured *Over Voltage Return* level.
Mains Under Frequency IEEE 37.2 – 81 Frequency Relay	☐ = Mains Under Frequency detection is disabled ☑ = Mains Under Frequency gives an alarm in the event of the mains frequency falling below the configured *Under Frequency Trip* value. The *Under Frequency Trip* value is adjustable to suit the application. The alarm is reset and the mains is considered within limits when the mains frequency rises above the configured *Under Frequency Return* level.
Mains Over Frequency IEEE 37.2 – 81 Frequency Relay	☐ = Mains Over Frequency detection is disabled ☑ = Mains Over Frequency gives an alarm in the event of the mains frequency rising above the configured *Over Frequency Trip* value. The *Over Frequency Trip* value is adjustable to suit the application. The alarm is reset and the mains is considered within limits when the mains frequency falls below the configured *Over Frequency Return* level.

2.9 ENGINE

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



2.9.1 ENGINE OPTIONS



ECU (ECM) Options

Parameter	Description
Disable ECM Speed Control	Disables speed control by the DSE module. Useful when an external device (i.e. remote speed potentiometer) is used to control engine speed.

Parameter descriptions are continued overleaf…

Miscellaneous Options

NOTE: For a full list of the J1939-75 alarms and instrumentation, refer to DSE Publication: *057-289 DSE6110 MKIII & DSE6120 MKIII Operator Manual* which is found on our website: *www.deepseaelectronics.com*

Parameter	Description
J1939-75 Instrumentation Enable	Allows the DSE module to be interrogated by another CAN device and transfer the generator set instrumentation over J1939 link.
J1939-75 Alarms Enable	Allows the DSE module to be interrogated by another CAN device and transfer the alarms over J1939 link.
CAN Source Address (Instrumentation)	Set the *CAN Source Address* for the DSE module over which other CANbus devices read the generator set instrumentation.

Startup Options

Parameter	Description
Start Attempts	The number of starting attempts the module makes. If the module does not detect that the engine has fired before the end of the *Cranking Time*, then the current start attempt is cancelled and the *Crank Rest* time takes place before the next crank attempt begins. If, after all configured *start attempts,* the engine is not detected as running, the *Fail to Start* shutdown alarm is generated. The engine is detected as running by checking all methods of *Crank Disconnect.* For further details, see the section entitled *Crank Disconnect* elsewhere in this document.

Pre-heat

NOTE: For this feature to have effect, configure a digital output for *Pre-Heat.*

NOTE: Depending on *Engine Type* configuration, this is controlled direct by the ECU (ECM).

Parameter	Description
Enabled	☐ = Pre-heat is not temperature dependent. ☑ = When the *Coolant Temperature* is below the configured *On* level, the *Pre-Heat* digital output is activated for the set *Duration* of time before cranking.
On	Set the coolant temperature below which the pre-heat is activated.
Duration	Set the time delay during which the *Pre-Heat* digital output remains active before cranking

Parameter descriptions are continued overleaf…

Post-heat

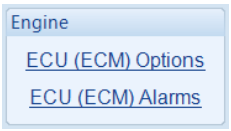
NOTE: For this feature to have effect, configure a digital output for *Pre-Heat.*

NOTE: Depending on *Engine Type* configuration, this is controlled direct by the ECU (ECM).

Parameter	Description
Enabled	☐ = Post-heat is not temperature dependent. ☑ = When the *Coolant Temperature* is below the configured *On* level, the *Pre-Heat* digital output is activated for the set *Duration* of time after cranking and before the set is considered available.
On	Set the coolant temperature below which the pre-heat is activated.
Duration	Set the time delay during which the *Pre-Heat* digital output remains active after cranking and before the engine is considered available.

2.9.2 ECU (ECM)

The *ECU (ECM)* section is subdivided into smaller sections.
Select the required section with the mouse.



2.9.2.1 ECU (ECM) OPTIONS

Engine Hours

Parameter	Description
Module to Record Engine Hours	When enabled, DSE module counts Engine Run Hours. When disabled, Engine ECU (ECM) provides Run Hours.

Parameter descriptions are continued overleaf…

DPS Regeneration Control

Parameter	Description
DPF Regeneration Control	Available for ECUs (ECM) which require the engine speed to drop during a manual regeneration cycle. During this time, the generator is not available to supply power and the under speed and under frequency alarms are not active.

Speed Switch

Parameter	Description
Speed Switch	Defines the method of speed control over CANbus when supported by the ECU (ECM). Selection needs to match the ECU (ECM) calibration for the speed control method. Available speed control methods to choose from: ***CAN Open Increase Decrease*** ***CAN Open Speed Demand*** ***Default Dataset ECU*** ***ECU Analogue Absolute*** ***ECU Analogue Relative*** ***ECU CAN Open Analogue*** ***ECU Frequency Input*** ***ECU Increase Decrease Input***

ECU Wakeup

Parameter	Description
ECU Wakeup	☐ **=** Option is disabled. ☑ **=** When the engine is stopped, the DSE module sends a wakeup signal to the ECU (ECM) and keeps it powered up for the *ECU Override* time (configured in *Start Timers*) to read the ECU (ECM) parameters. This is periodically repeated depending on the configured *Periodic Wakeup Time.*
Coolant Measurement Persistence	**NOTE: Available only when *ECU Wakeup* is enabled.** ☐ **=** Option is disabled. ☑ **=** The *Coolant Temperature* measurement is used for the *Coolant Temperature Control.*

ECU (ECM) Startup Delay

Parameter	Description
ECU StartUp Delay	☐ **=** Option is disabled. ☑ **=** When the engine has to start, the DSE module sends the wakeup signal to the ECU (ECM) before activating the *Fuel Relay, Start Relay* outputs, or sending the start signal by CAN message, and waits for the ECU to respond before sending the start request. If the ECU (ECM) doesn't respond within the *Delay* time, the module activates the *ECU Start Fail* alarm.

Parameter descriptions are continued overleaf…

Droop

Parameter	Description
Droop	**NOTE: Droop options are only available where supported by the Engine ECU (ECM) over the CAN or MODBUS datalink. Contact the engine manufacturer for further details.** ☐ **=** Engine droop is not enabled. ☑ **=** Where supported by the electronic engine ECU (ECM), the module enables droop in the engine ECU (ECM) governor at the configured percentage.

DTC Ignore List

Parameter	Description
SPN Ignore List	Choose the specific SPN for the module to ignore. The module allows the engine to keep running when the ignored SPN occurs; however, depending on the severity, the engine shuts down based on the ECU (ECM) calibration. This is used to mask certain indications or warnings on the ECU (ECM) and not display them on the DSE module.

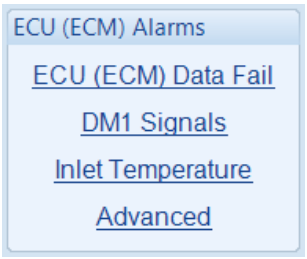
Miscellaneous

Parameter	Description
CAN Source Address (Engine Messages)	Set the *CAN Source Address* for the DSE module over which other CANbus devices read the alarms.

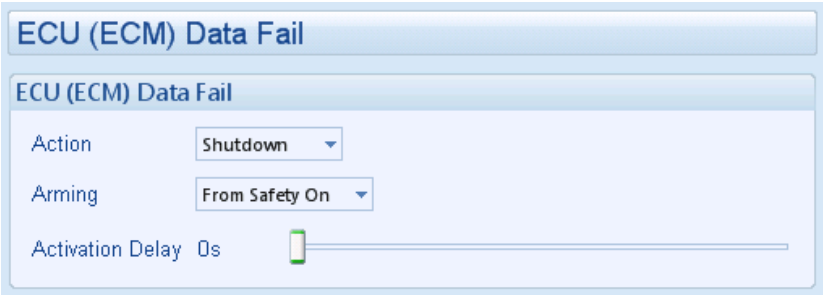
2.9.2.2 ECU (ECM) ALARMS

NOTE: This section is only available when the module is connected to an ECU.

The *ECU (ECM) Alarms* section is subdivided into smaller sections.
Select the required section with the mouse.



2.9.2.2.1 ECU (ECM) DATA FAIL



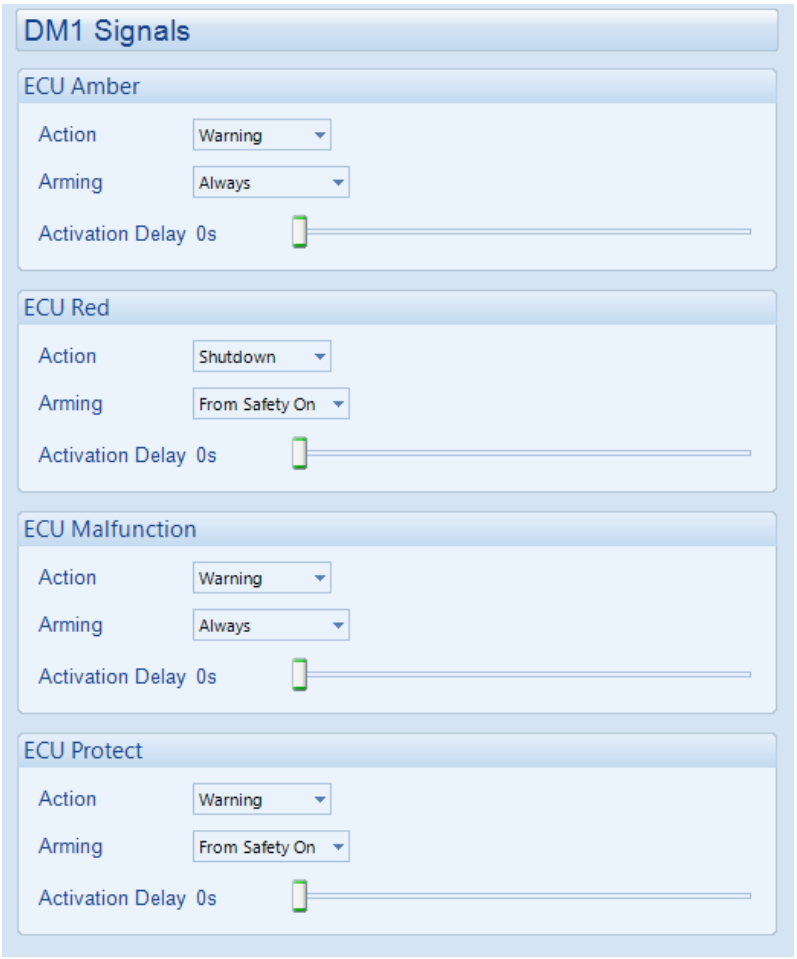
Parameter	Description
ECU (ECM) Data Fail	Provides protection against failure of the ECU (ECM) CAN data link. The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***None*** ***Electrical Trip*** ***Shutdown*** ***Warning***
Arming	Select when the *CAN ECU (ECM) Data Fail* alarm is active. Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***Never*** ***When Stationary***
Activation Delay	The amount of time before the module activates the *CAN ECU (ECM) Data Fail* after a failure.

2.9.2.2.2 DM1 SIGNALS

NOTE: Configuration of parameters in this section only has effect when the ECU (ECM) supports these features.

NOTE: Configuration of the *Alarm Action* in this section defines the DSE module response to the CAN message; however, the ECU (ECM) still shuts down the engine depending on the alarm severity.

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



Parameter descriptions are overleaf…

ECU Amber

Parameter	Description
ECU Amber	The action the DSE module takes when receiving and ECU Amber fault condition. The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***None*** ***Electrical Trip*** ***Shutdown*** ***Warning***
Arming	Select when the DSE module activates it *ECU Amber* alarm. Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***Never****:* ***When Stationary***
Activation Delay	The amount of time before the module activates the *ECU Amber* alarm after a receiving an ECU Amber fault condition from the ECU.

ECU Red

Parameter	Description
ECU Red	The action the DSE module takes when receiving and ECU Red fault condition. The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***None*** ***Electrical Trip*** ***Shutdown*** ***Warning***
Arming	Select when the DSE module activates it *ECU Red* alarm. Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***Never*** ***When Stationary***
Activation Delay	The amount of time before the module activates the *ECU Red* alarm after a receiving an ECU Red fault condition from the ECU.

Parameter descriptions are continued overleaf…

ECU Malfunction

Parameter	Description
ECU Malfunction	The action the DSE module takes when receiving and ECU Malfunction fault condition. The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***None*** ***Electrical Trip*** ***Shutdown*** ***Warning***
Arming	Select when the DSE module activates it *ECU Malfunction* alarm. Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***Never*** ***When Stationary***
Activation Delay	The amount of time before the module activates the *ECU Malfunction* alarm after a receiving an ECU Malfunction fault condition from the ECU.

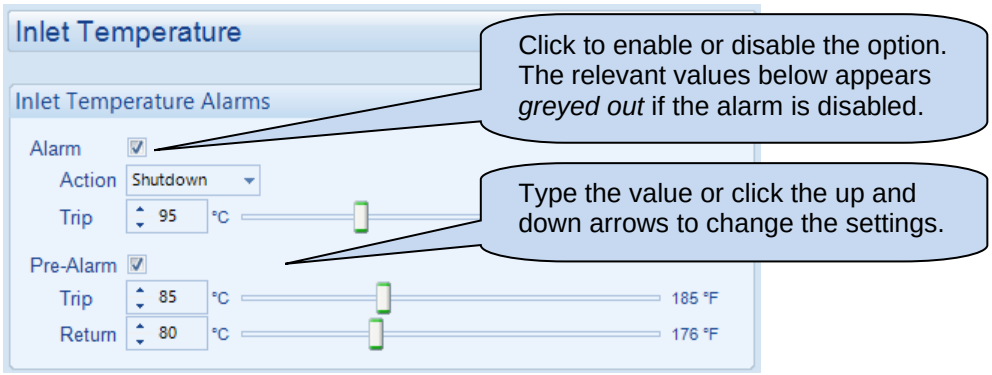
ECU Protect

Parameter	Description
ECU Protect	The action the DSE module takes when receiving and ECU Protect fault condition. The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***None*** ***Electrical Trip*** ***Shutdown*** ***Warning***
Arming	Select when the DSE module activates it *ECU Protect* alarm. Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***Never*** ***When Stationary***
Activation Delay	The amount of time before the module activates the *ECU Protect* alarm after a receiving an ECU Protect fault condition from the ECU.

2.9.2.2.3 INLET TEMPERATURE

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

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

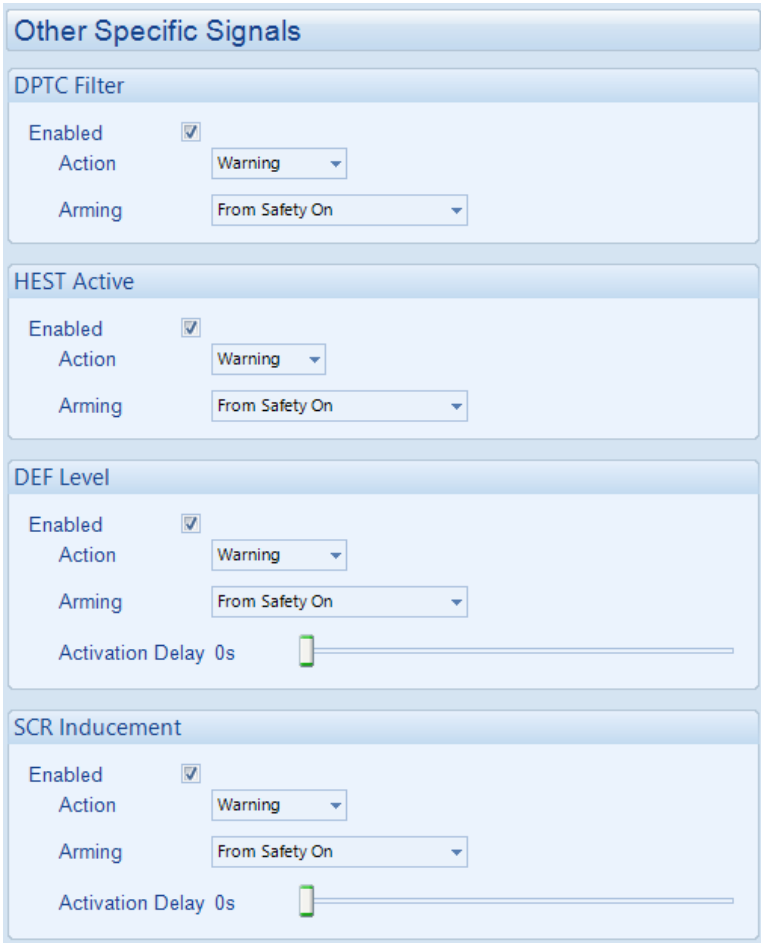


Parameter	Description
Alarm Enable	☐ = The Inlet Temperature Alarm is disabled. ☑ = The Inlet Temperature Alarm is activates with the severity of the *Action* when the measured quantity rises above the *Alarm Trip* setting. The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***Electrical Trip*** ***Shutdown***
Pre-Alarm Enable	☐ = The Inlet Temperature Pre-Alarm is disabled. ☑ = The Inlet Temperature *Pre-Alarm* is active when the measured quantity rises above the *Inlet Temperature Pre-Alarm Trip* setting. The *Inlet Temperature Pre-Alarm* is automatically reset when the measured quantity falls below the configured *Inlet Temperature Pre-Alarm Return* level.

2.9.2.2.4 ADVANCED

NOTE: Configuration of parameters in this section only has effect when the ECU (ECM) supports the features.

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



Parameter descriptions are overleaf…

DPTC Filter

Parameter	Description
DPTC Filter	☐ = The DSE module's *DPTC Filter* alarm is disabled, it does not act upon any DPTC Filter fault conditions from the ECU. ☑ = The DSE module's *DPTC Filter* alarm is enabled. The action the DSE module takes when receiving a DPTC Filter fault condition from the ECU. The alarm action list is as follows, see section entitled *Alarm Types* The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning***
Arming	Select when the DSE module activates its *DPTC Filter* alarm. Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***When Stationary***
Activation Delay	The amount of time before the module activates the *DPTC Filter* alarm after a receiving a DPTC Filter condition from the ECU.

HEST Active

Parameter	Description
HEST Active	☐ = The DSE module's *HEST* alarm is disabled, it does not act upon any HEST fault conditions from the ECU. ☑ = The DSE module's *HEST* alarm is enabled. The action the DSE module takes when receiving a HEST fault condition from the ECU. The alarm action list is as follows, see section entitled *Alarm Types* The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning***
Arming	Select when the DSE module activates its *HEST* alarm. Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***When Stationary***
Activation Delay	The amount of time before the module activates the *HEST* alarm after a receiving a HEST fault condition from the ECU.

Parameter descriptions are continued overleaf…

DEF Level

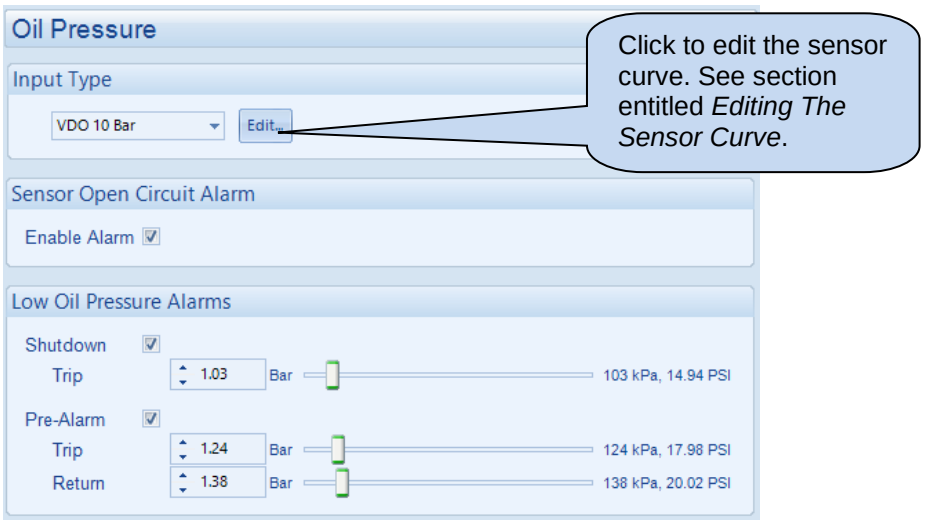
Parameter	Description
DEF Level	☐ = The DSE module's *DEF Level* alarm is disabled, it does not act upon any DEF Level fault conditions from the ECU. ☑ = The DSE module's *DEF Level* alarm is enabled. The action the DSE module takes when receiving a DEF Level fault condition from the ECU. The alarm action list is as follows, see section entitled *Alarm Types* The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning***
Arming	Select when the DSE module activates its *DEF Level* alarm. Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***When Stationary***
Activation Delay	The amount of time before the module activates the *DEF Level* alarm after a receiving a DEF Level fault condition from the ECU.

SCR Inducement

Parameter	Description
SCR Inducement	☐ = The DSE module's *SCR Inducement* alarm is disabled, it does not act upon any SCR Inducement fault conditions from the ECU. ☑ = The DSE module's *SCR Inducement* alarm is enabled. The action the DSE module takes when receiving a SCR Inducement fault condition from the ECU. The alarm action list is as follows, see section entitled *Alarm Types* The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning***
Arming	Select when the DSE module activates its *SCR Inducement* alarm. Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***When Stationary***
Activation Delay	The amount of time before the module activates the *SCR Inducement* alarm after a receiving a SCR Inducement fault condition from the ECU.

2.9.3 OIL PRESSURE

NOTE: The DSE module reads oil pressure from the ECU (ECM) if the selected Engine Application supports it. In these cases, Analogue Input A is configured as Flexible Analogue or Digital Input. Configuration of Flexible Analogue Inputs and Digital Inputs is detailed elsewhere in this document.



Input Type

NOTE: The selectable measurement quantity (Current, Resistive or Voltage) is dependent on the hardware specification of the analogue input. For more detailed information on the analogue input specification, refer to DSE Publication: 057-289 DSE6110 MKIII & DSE6120 MKIII Operator Manual.

Parameter	Description
Input Type	Select the sensor type and curve from a pre-defined list or create a user-defined curve ***Current:*** for sensors with maximum range of 0 mA to 20 mA ***Resistive:*** for sensors with maximum range of 0 Ω to 480 Ω ***Voltage:*** for sensors with maximum range of 0 V to 10 V

Sensor Open Circuit Alarm

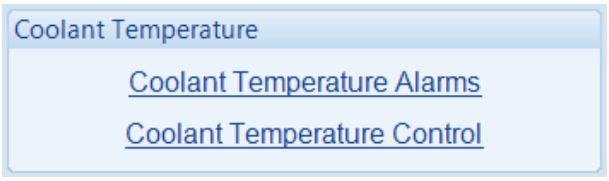
Parameter	Description
Enable Alarm	☐ = Alarm is disabled. ☑ = The *Low Oil Pressure Open Circuit Alarm* is active when the module detects an open circuit when the sensor is disconnected

Low Oil Pressure Alarms

Parameter	Description
Low Oil Pressure Alarm	☐ = Alarm is disabled. ☑ = The *Low Oil Pressure Shutdown Alarm* is active when the measured oil pressure drops below the configured *Trip* level.
Low Oil Pressure Pre-Alarm	☐ = Alarm is disabled. ☑ = The *Low Oil Pressure Warning Alarm* is active when the measured oil pressure drops below the configured *Trip* level. The warning is automatically reset when the oil pressure increases above the configured *Return* level.

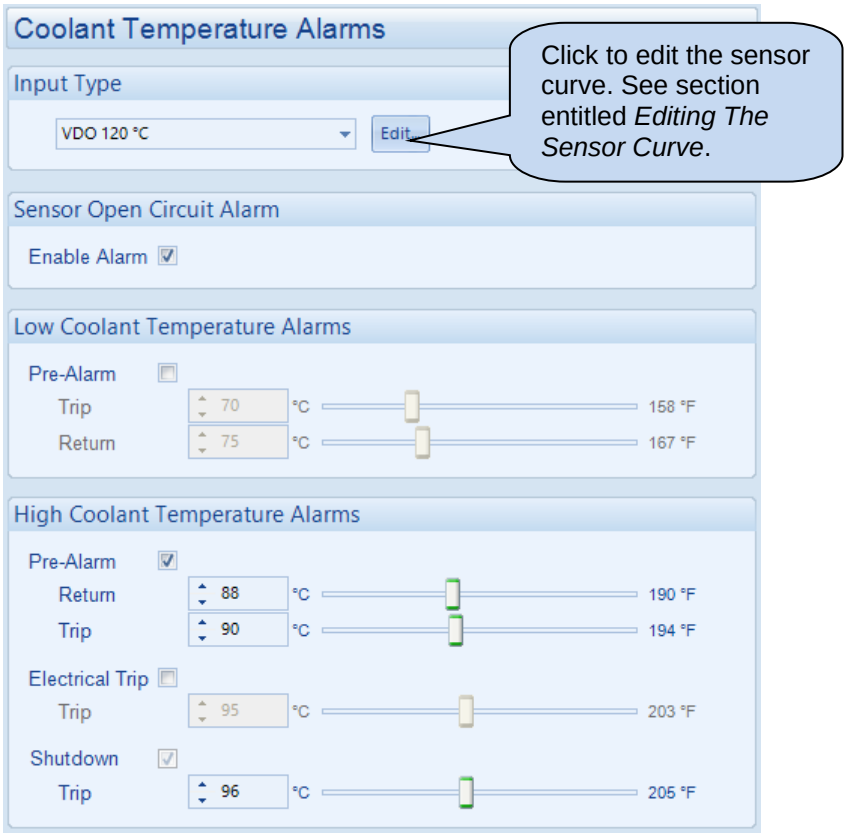
2.9.4 COOLANT TEMPERATURE

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



2.9.4.1 COOLANT TEMPERATURE ALARM

NOTE: The DSE module reads oil pressure from the ECU (ECM) if the selected Engine Application supports it. In these cases, Analogue Input B is configured as Flexible Analogue or Digital Input. Configuration of Flexible Analogue Inputs and Digital Inputs is detailed elsewhere in this document.



Parameter descriptions are overleaf…

Input Type

NOTE: The selectable measurement quantity (Current, Resistive or Voltage) is dependent on the hardware specification of the analogue input. For more detailed information on the analogue input specification, refer to DSE Publication: 057-289 DSE6110 MKIII & DSE6120 MKIII Operator Manual.

Parameter	Description
Input Type	Select the sensor type and curve from a pre-defined list or create a user-defined curve ***Current:*** for sensors with maximum range of 0 mA to 20 mA ***Resistive:*** for sensors with maximum range of 0 Ω to 480 Ω ***Voltage:*** for sensors with maximum range of 0 V to 10 V

Sensor Open Circuit Alarm

Parameter	Description
Enable Alarm	☐ = Alarm is disabled. ☑ = The *Coolant Temperature Open Circuit* Alarm is active when the module detects an open circuit when the sensor is disconnected

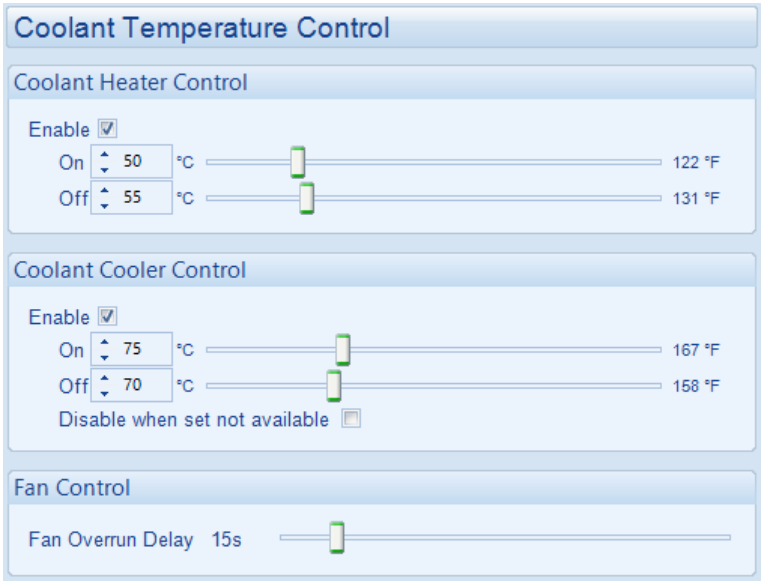
Low Coolant Temperature Alarms

Parameter	Description
Low Coolant Temperature Pre-Alarm	☐ = Alarm is disabled. ☑ = The *Low Coolant Temperature Warning Alarm* is active when the measured coolant temperature falls below the configured *Trip* level. The *Warning* is automatically reset when the coolant temperature rises above the configured *Return* level.

High Coolant Temperature Alarms

Parameter	Description
High Coolant Temperature Pre-Alarm	☐ = Alarm is disabled. ☑ = The High Coolant Temperature Warning Alarm is active when the measured coolant temperature rises above the configured Trip level. The Warning is automatically reset when the coolant temperature falls below the configured Return level.
High Coolant Temperature Electrical Trip	☐ = Alarm is disabled. ☑ = The High Coolant Temperature Controlled Shutdown Alarm is active when the measured coolant temperature rises above the configured Trip level.
High Coolant Temperature Shutdown	The High Coolant Temperature Shutdown Alarm is active when the measured coolant temperature rises above the configured Trip level.

2.9.4.2 COOLANT TEMPERATURE CONTROL



Coolant Heater Control

Parameter	Description
Coolant Heater Control	☐ = Coolant Heater Control function is disabled ☑ = The digital output configured to *Coolant Heater Control* is energised when the engine coolant temperature falls below the configured *On* level. This is designed to control an external engine heater. When the coolant temperature rises above the configured *Off* level, the digital output is de-energised.

Coolant Cooler Control

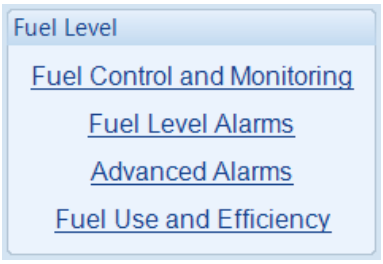
Parameter	Description
Coolant Cooler Control	☐ = Coolant Cooler Control function is disabled ☑ = The digital output configured to *Coolant Cooler Control* is energised when the engine coolant temperature exceeds the configured *On* level. This is designed to control an external engine cooling system, for instance an additional cooling fan. When the coolant temperature falls below the configured *Off* level, the digital output is then de-energised.

Fan Control

Parameter	Description
Fan Control	An output configured to *Fan Control* energises when the engine becomes available (up to speed). This output is designed to control an external cooling fan. When the engine stops, the cooling fan remains running for the duration of the *Fan Overrun Delay.*

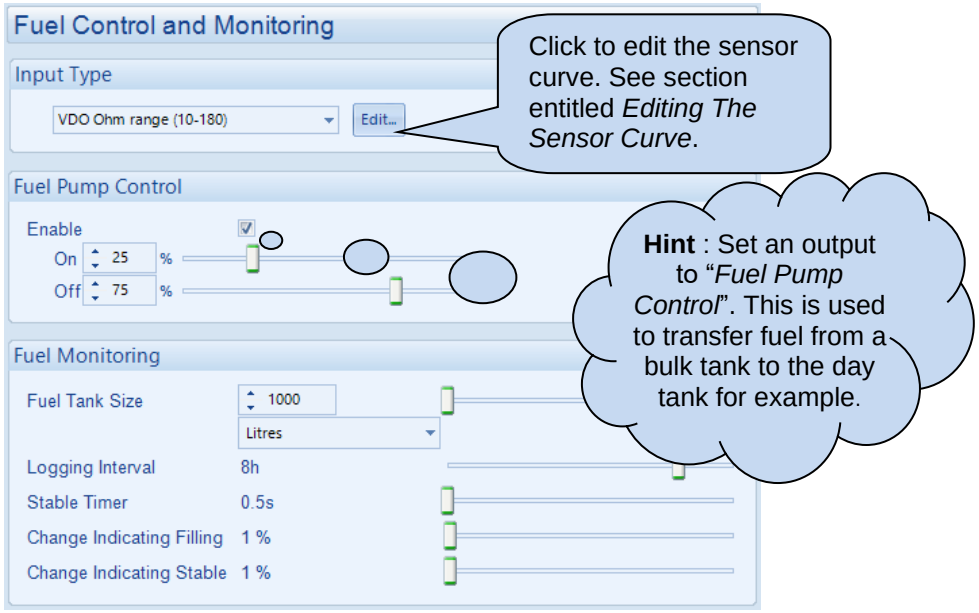
2.9.5 FUEL OPTIONS

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



2.9.5.1 FUEL CONTROL AND MONITORING

This section allows the configuration of the fuel level input.



Parameter descriptions are overleaf…

Input Type

NOTE: The selectable measurement quantity (Current, Resistive or Voltage) is dependent on the hardware specification of the analogue input. For more detailed information on the analogue input specification, refer to DSE Publication: 057-289 DSE6110 MKIII & DSE6120 MKIII Operator Manual.

Parameter	Description
Input Type	Select the sensor type and curve from a pre-defined list or create a user-defined curve ***Current:*** for sensors with maximum range of 0 mA to 20 mA ***Resistive:*** for sensors with maximum range of 0 Ω to 480 Ω ***Voltage:*** for sensors with maximum range of 0 V to 10 V

Fuel Pump Control

Parameter	Description
Fuel Pump Control	☐ = Fuel Pump Control is disabled. ☑ = Allows the module to control an external fuel pump to transfer fuel from a bulk tank to the day tank. A digital output configured for *Fuel Pump Control* energises when the fuel level falls below the configured *On* setting and de-energises when the fuel level exceeds the configured *Off* setting.

Fuel Monitoring

Parameter	Description
Fuel Tank Size	Select the tank size and the unit for the display (Imperial Gallons, Litres, or US Gallons).
Logging Interval	The interval at which the fuel level is stored in the event log.
Stable Timer	The controller maintains a rolling record of the fuel level percentage for the duration of the *Stable Timer*. When the rolling record of the fuel level percentage indicates that the fuel level has increased more than the *Change Indicating Filling* during the *Stable Timer*, the controller records a *Fuel Filling Start* event in its event log. When the rolling record of the fuel level indicates that the fuel level has not changed more than the *Change Indicating Stable* during the *Stable Timer*, the controller records a *Fuel Filling Stop* event in its event log.
Change Indicating Filling	When the fuel level increases at a rate higher than ***Change Indicating Filling*** *Stable Timer* Then a fuel fill start event is recorded into the event log. **Example** *Stable Timer* = 1 minute *Change Indicating Filling* = 3 % When the fuel level increases by more than 3% in 1 minute, a fuel fill event is recorded.

Parameter descriptions are continued overleaf…

Parameter	Description
Change Indicating Stable	During filling, if the fuel level increases at a rate less than ***Change Indicating Stable*** *Stable Timer* then a fuel fill end event is recorded into the event log. **Example:** *Stable Timer* = 1 minute *Change Indicating Stable* = 2 % When the fuel level increases by less than 2% in 1 minute, a fuel fill end event is recorded.

2.9.5.2 FUEL LEVEL ALARMS

Sensor Open Circuit Alarm

Parameter	Description
Sensor Open Circuit Alarm	☐ = Alarm is disabled. ☑ = The *Fuel Level Open Circuit Alarm* is active when the module detects an open circuit when the sensor is disconnected

Low Fuel Level Alarms

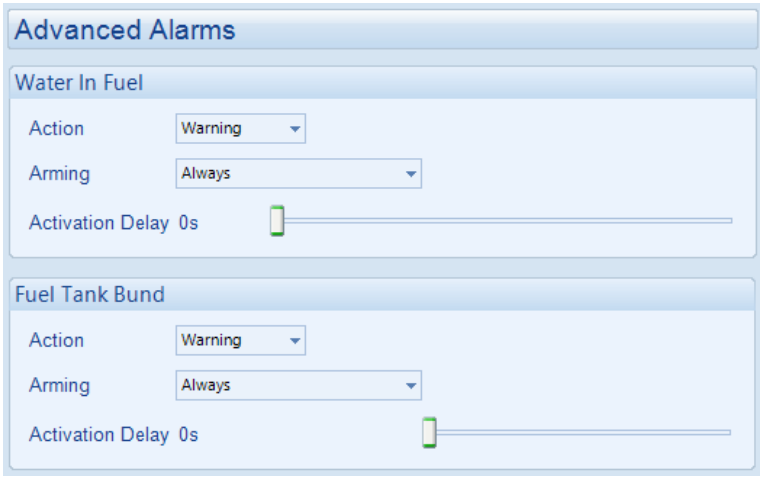
Parameter	Description
Low Fuel Level Alarms	☐ = Alarm is disabled. ☑ = The *Low Fuel Level Alarm* activates with the configured *Action* when the measured fuel level drops below the *Trip* setting for the configured *Delay* time.
Low Fuel Level Pre-Alarm	☐ = Alarm is disabled. ☑ = The *Low Fuel Level Pre-Alarm* activates with the configured *Action* when the measured fuel level drops below the *Low Pre-Alarm Trip* setting for the configured *Delay* time. The pre-alarm is automatically reset when the fuel level exceeds the configured *Low Pre-Alarm Return* setting.

Parameter descriptions are continued overleaf…

High Fuel Level Alarms

Parameter	Description
High Fuel Level Pre-Alarm	☐ = Alarm is disabled. ☑ = The *High Fuel Level Pre-Alarm* activates with the configured *Action* when the measured fuel level rises above the *High Pre-Alarm Trip* setting for the configured *Delay* time. The pre-alarm is automatically reset when the fuel level drops below the configured *High Pre-Alarm Return* setting.
High Fuel Level Alarm	☐ = Alarm is disabled. ☑ = The *High Fuel Level Alarm* activates with the configured *Action* when the measured fuel level raises above the *Trip* setting for the configured *Delay* time.

2.9.5.3 ADVANCED ALARMS



Water In Fuel

Parameter	Description
Water in Fuel	Select the type of action when the *Water In Fuel* alarm occurs, after the *Activation Delay time*. The alarm action list is as follows, see section entitled *Alarm Types* The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***None*** ***Electrical Trip*** ***Shutdown*** ***Warning***
Arming	Select when the *Water In Fuel* alarm becomes active: Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***Never*** ***When Stationary***

Fuel Tank Bund

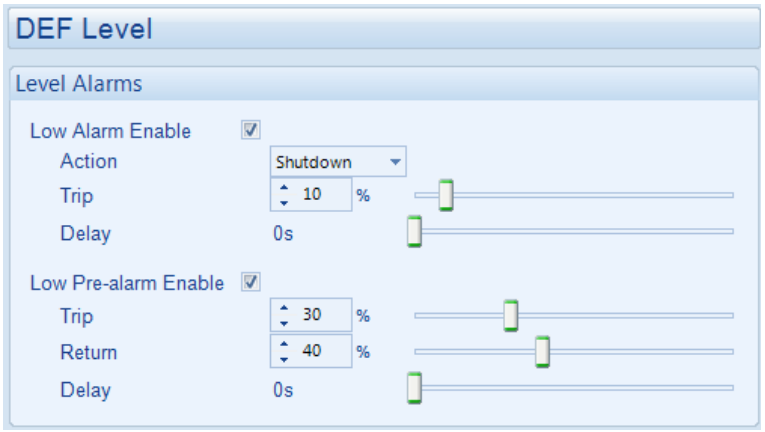
Parameter	Description
Fuel Tank Bund	Select the type of action when the *Fuel Tank Bund Level High* alarm occurs. The alarm action list is as follows, see section entitled *Alarm Types* The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***None*** ***Electrical Trip*** ***Shutdown*** ***Warning***
Arming	Select when the *Fuel Tank Bund Level High* alarm becomes active: Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***Never*** ***When Stationary***

2.9.6 DEF LEVEL

NOTE: Configuration of alarms in this section only has effect when the ECU (ECM) supports DEF Level.

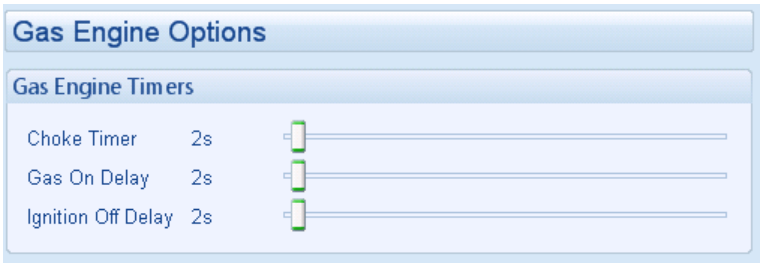
NOTE: Configuration of the *Alarm Action* in this section defines the DSE module response to the CANbus message; however, the ECU (ECM) still shuts down the engine depending on the alarm severity.

DEF Level is a CANbus message from the ECU (ECM). The following parameters allow configuration of how the DSE module responds to the DEF Level.



Parameter	Description
DEF Level Low Alarm	☐ = Disable the alarm ☑ = *DEF Low Alarm* will be activated when the *DEF Level* sent from the ECU is below the configured *Trip* level for longer than the configured *Delay* time.
Action	Select the type of alarm required from the list: ***Shutdown*** ***Electrical Trip*** For details of these, see the section entitled *Alarm Types* elsewhere in this document.
DEF Level Low Pre-Alarm	☐ = The Pre-alarm is disabled. ☑ = *DEF Low Pre-Alarm* will be activated when the *DEF Level* sent from the ECU is below the configured *Trip* level for longer than the configured *Delay* time. The Pre-Alarm is deactivated when the *DEF Level* rises above the *Return* level.

2.9.7 GAS ENGINE OPTIONS

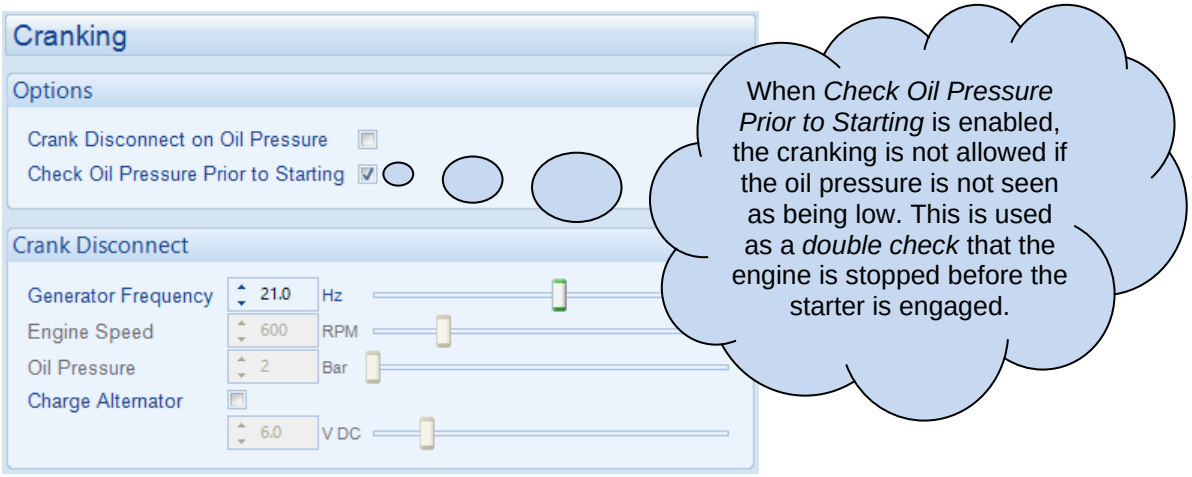


Parameter	Description
Choke Timer	Controls the amount of time that the Gas Choke output is active during the starting sequence.
Gas On Delay	Controls the amount of time between energising the Gas Ignition and energising the Fuel output. Used in the starting sequence to purge old gas from the engine.
Ignition Off Delay	Controls the amount of time between de-energising the Fuel output and de-energising the Gas Ignition output. Used in the stopping sequence to purge unburnt gas from the engine before it is stopped.

2.9.8 CRANKING

Cranking settings are used to detect when the set fires during the starting sequence.
As the set is cranked, the first parameter that passes it's *crank disconnect* setting results in the cessation of the cranking signal.

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



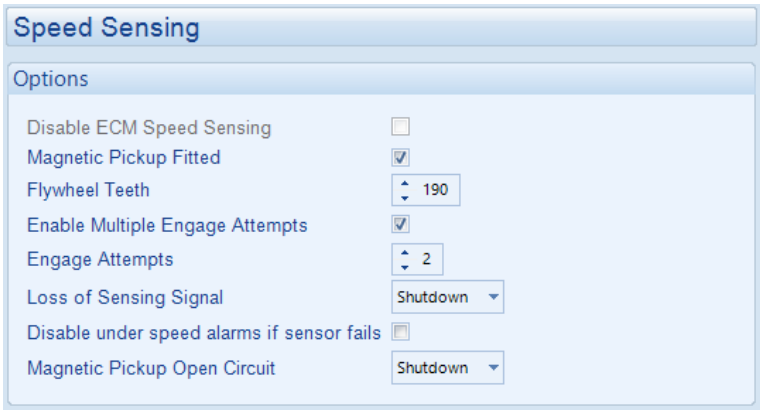
Options

Parameter	Description
Crank Disconnect on Oil Pressure	☐ = The DSE module does not use oil pressure to decide when to disengage the starter motor. ☑ = The DSE module does uses oil pressure to decide when to disengage the starter motor in addition to the enabled methods
Check Oil Pressure Prior to Starting	☐ = The DSE module does not use oil pressure as an indication if the engine is running. This is disabled for large engines that have an electrical oil pump which is used to maintain oil pressure even when the engine is stationary. ☑ = The DSE module uses oil pressure as an indication if the engine is running.

Crank Disconnect

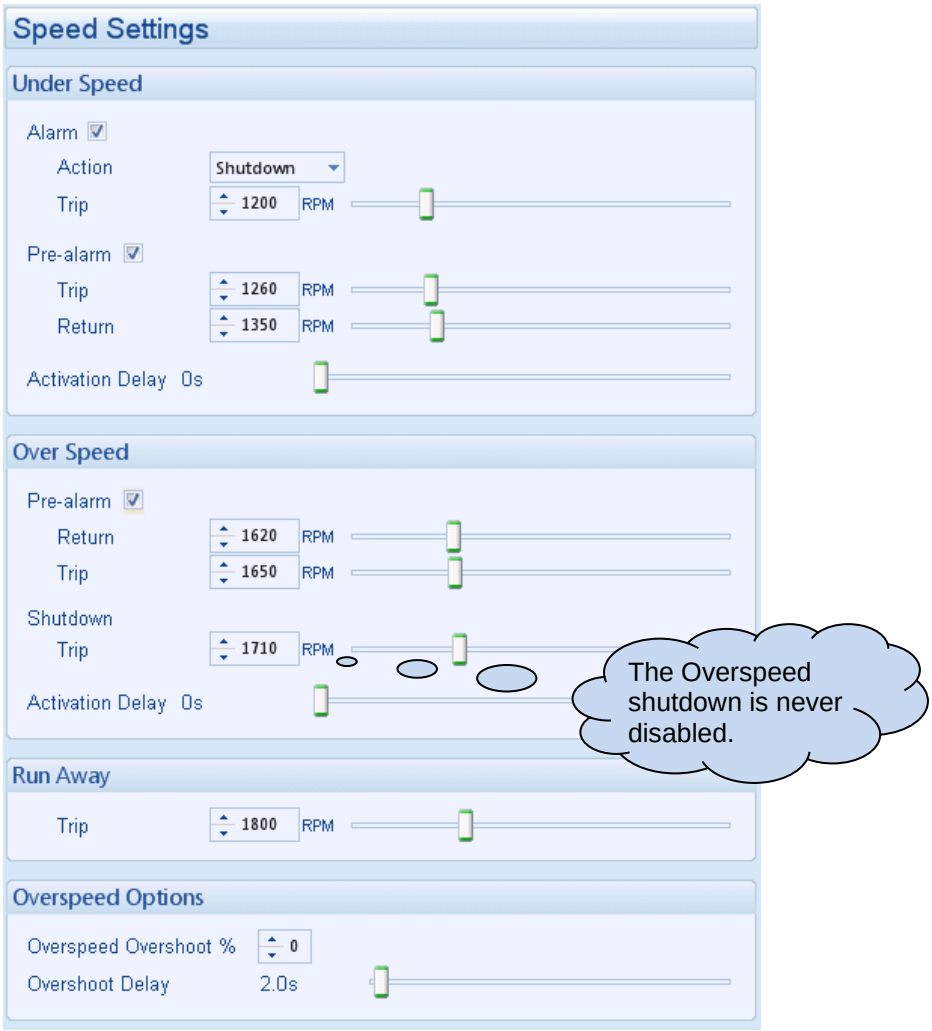
Parameter	Description
Generator Frequency	The DSE module disengages the starter motor when the generator frequency rises above the configured level.
Engine Speed	The DSE module disengages the starter motor when the engine speed rises above the configured level.
Oil Pressure	The DSE module disengages the starter motor when the engine oil pressure rises above the configured level.
Charge Alternator	☐ = The DSE module does not use charge alternator voltage to decide when to disengage the starter motor. ☑ = The DSE module disengages the starter motor when the charge alternator voltage rises above the configured level.

2.9.9 SPEED SENSING



Parameter	Description
Disable ECM Speed Sensing	☐ = An ECM is connected to the DSE module and being used for speed sensing. ☑ = An ECM is connected to the DSE module but another form of speed sensing fitted to the DSE module is being used.
Magnetic Pickup Fitted	**NOTE: For more detailed information on the Magnetic Pickup Specification, refer to DSE Publication: 057-289 DSE6110 MKIII & DSE6120 MKIII Operator Manual.** ☐ = Magnetic pickup device is not connected to the DSE module. ☑ = A low impedance magnetic pickup device is connected to the DSE module to measure engine speed.
Flywheel Teeth	Define the number of pulses which are counted by the speed sensing device in each engine revolution.
Enable Multiple Engage Attempts	☐ = No engage attempt is given. If no speed sensing is detected during cranking, the *Fail To Start* alarm is active. ☑ = If no magnetic pickup pulses are detected during cranking, it is assumed that the starter has not engaged to turn the engine. The starter is withdrawn and re-energised for the configured number of *Engage Attempts.*
Loss of Sensing Signal	If the speed sensing signal is lost during engine running (or not present during cranking when *Multiple Engage Attempts* is enabled), an alarm is generated: ***Shutdown:*** ***Warning:***
Disable Under Speed Alarms If Sensor Fails	☐ = Under speed alarms activate even if speed sensor has failed. ☑ = Under speed alarms are disabled when the speed sensor fails.
Magnetic Pickup Open Circuit	If the magnetic pickup device is not detected, an alarm is generated: ***Shutdown*** ***Warning Always Latched***

2.9.10 SPEED SETTINGS



Under Speed

Parameter	Description
Under Speed Alarm	☐ = *Under Speed* alarm is disabled ☑ = Under Speed gives an alarm in the event of the engine speed falling below the configured *Under Speed Alarm Trip* value for longer than the *Activation Delay*. The *Underspeed Alarm Trip* value is adjustable to suit user requirements.
Action	Select the type of alarm required from the list: ***Shutdown*** ***Electrical Trip*** For details of these, see the section entitled *Alarm Types* elsewhere in this document.
Under Speed Pre-Alarm	☐ = *Under Speed Warning* alarm is disabled ☑ = Under Speed gives a warning alarm in the event of the engine speed falling below the configured *Under Speed Pre-Alarm Trip* value for longer than the *Activation Delay*. The *Under Speed Pre-Alarm Trip* value is adjustable to suit user requirements.

Parameter descriptions are continued overleaf…

Over Speed

Parameter	Description
Over Speed Pre-Alarm	☐ = Alarm is disabled ☑ = Over Speed gives a warning alarm in the event of the engine speed rising above the configured *Over Speed Pre-Alarm Trip* value for longer than the *Activation Delay*. The *Warning* is automatically reset when the engine speed falls below the configured *Return* level. The *Over Speed Pre-Alarm Trip* value is adjustable to suit user requirements.
Over Speed Alarm	Over Speed gives a *Shutdown* alarm in the event of the engine speed rising above the configured *Over Speed Alarm Trip* value for longer than the *Activation Delay*. The *Over Speed Alarm Trip* value is adjustable to suit user requirements.

Run Away

Parameter	Description
Run Away	In the event of the engine speed rising above the configured *Trip* value the *Run Away Shutdown* alarm is immediately triggered. This is used to protect against engine damage due to uncontrolled speed increase, where the engine speed runs away.
Trip	Set the speed level for the *Run Away* alarm.

Overspeed Options

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

2.9.11 PLANT BATTERY

Voltage Alarms

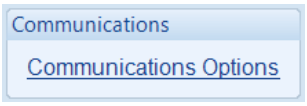
Parameter	Description
Plant Battery Under Voltage IEEE 37.2 -27 DC Undervoltage Relay	☐ = The alarm is disabled. ☑ = The alarm activates when the battery voltage drops below the configured *Pre-Alarm* level for the configured *Delay* time. When the battery voltage rises above the configured *Return* level, the alarm is de-activated.
Plant Battery Over Voltage IEEE 37.2 -59 DC Overvoltage Relay	☐ = The alarm is disabled. ☑ = The alarm activates when the battery voltage rises above the configured *Pre-Alarm* level for the configured *Delay* time. When the battery voltage drops below the configured *Return* level, the alarm is de-activated.

Charge Alternator Alarms

Parameter	Description
Use Module For Charge Alternator	**NOTE: The feature is only available when an electronic engine is selected.** ☐ = DSE module measures the charge alternator voltage. ☑ = Engine ECU (ECM) provides charge alternator voltage.
Charge Alternator Shutdown Alarm	☐ = The alarm is disabled. ☑ = The alarm activates when the charge alternator voltage falls below the configured *Trip* level for the configured *Delay* time.
Charge Alternator Warning Alarm	☐ = The alarm is disabled. ☑ = The alarm activates when the charge alternator voltage falls below the configured *Trip* level for the configured *Delay* time.

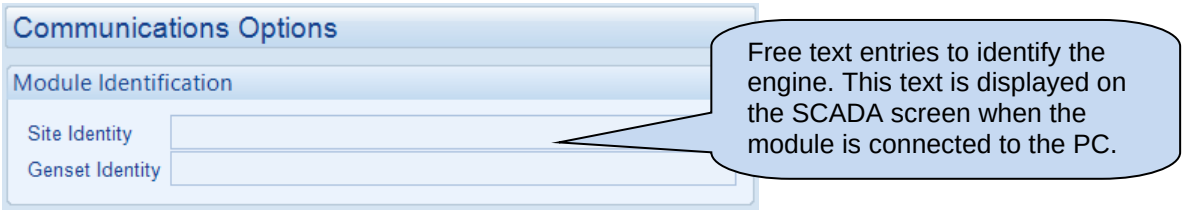
2.10 COMMUNICATIONS

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



2.10.1 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 engine identity that it is currently connected to.

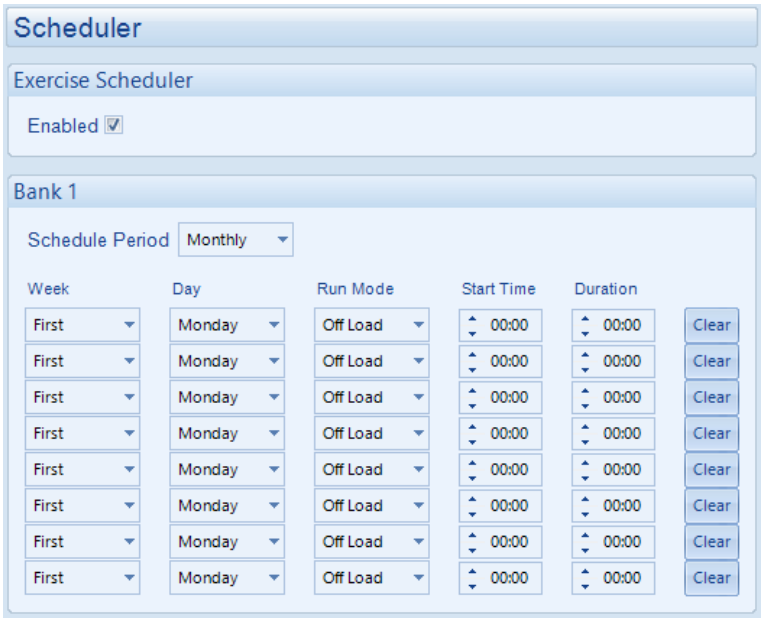


Parameter	Description
Site Identity	A free entry boxes to allow the user to give the DSE module a description of where the site is located. This text is not shown on the module's display and is only seen when performing remote communication. This aids the user in knowing where the generator is located.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

2.11 SCHEDULER

The section is subdivided into smaller sections.

The *Exercise Scheduler* is used to give up to 8 scheduled runs. This run schedule is configurable to repeat every 7 days (weekly) or every 28 days (monthly). The run is *On Load*, *Off Load* or *Auto Start Inhibit.*



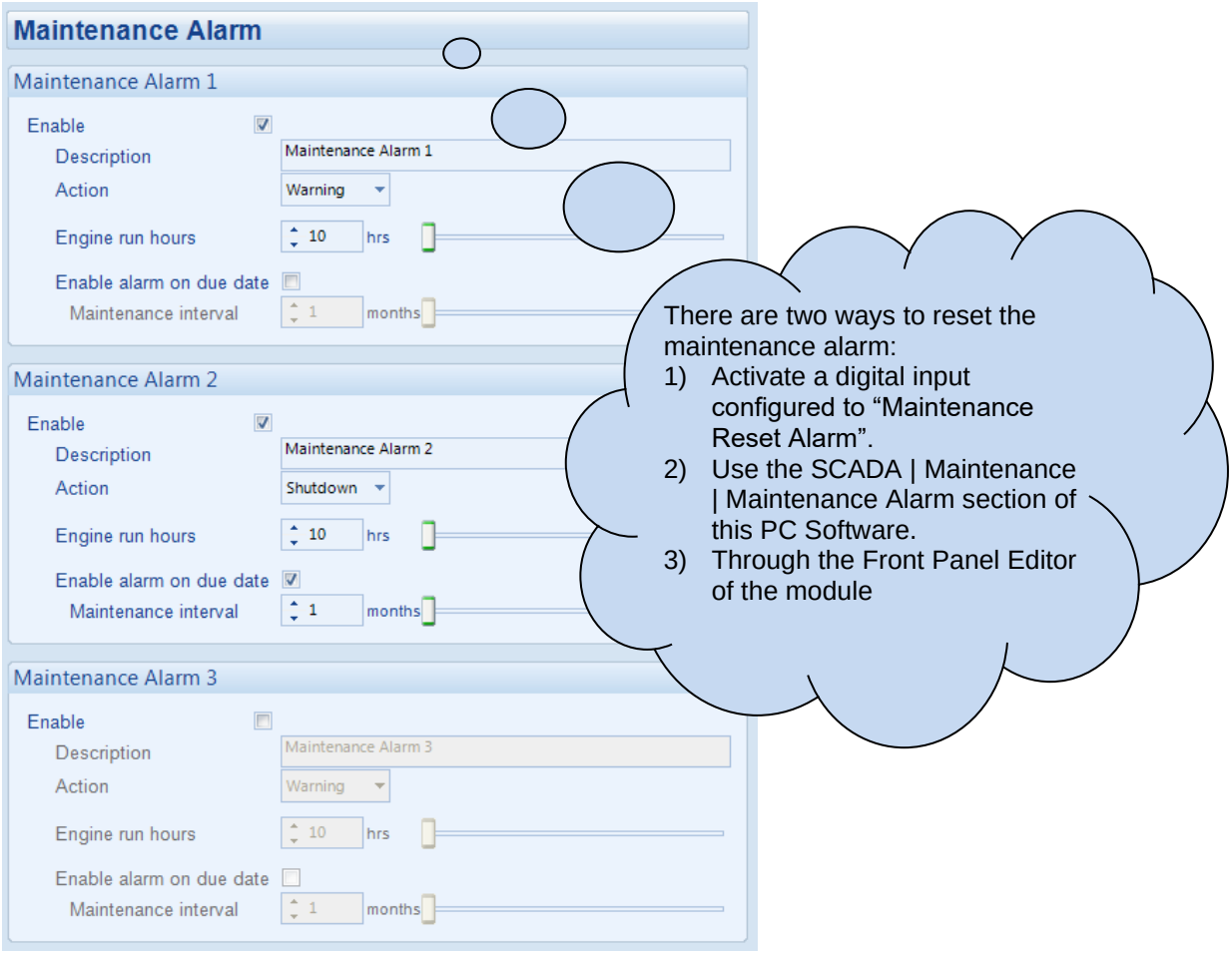
Exercise Scheduler

Function	Description
Enable Exercise Scheduler	☐ = The scheduler is disabled. ☑ = The scheduler is enabled, Bank 1 become editable.

Bank 1

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
Run Mode	Determines the loading state mode of the generator when running on schedule ***Auto Start Inhibit:*** The generator is prevented from running in *Auto* mode. ***Off Load:*** The module runs the generator on schedule with the load switch open ***On Load:*** The module runs the generator on schedule and closes the load switch
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

2.12 MAINTENANCE ALARM



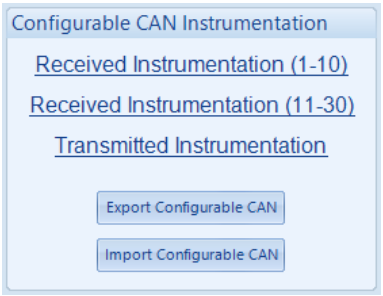
Maintenance Alarm 1 to 3

Function	Description
Enable	☐ = The maintenance alarm is disabled. ☑ = The maintenance alarm is activated with the configured *Action* when the engine hours increases more than the *Engine Run Hours* or when the date increase more than the *Maintenance Interval* settings.
Description	The text that is displayed on the module’s LCD when the maintenance alarm activates.
Action	**NOTE: For details of these, see the section entitled Alarm Types elsewhere in this document.** Select the type of alarm required from the list: ***Electrical Trip*** ***Shutdown*** ***Warning***
Engine Run Hours	The value the engine hours must increase by to trigger the maintenance alarm.
Enable Alarm on Due Date	☐ = The maintenance alarm only activates on the engine hours increasing ☑ = The maintenance alarm activates on the engine hours increasing or the date increasing, whichever occurs first.
Maintenance Interval	The value the date must increase by to trigger the maintenance alarm.

2.13 CONFIGURABLE CAN INSTRUMENTATION

NOTE: For further details and instructions on using *Configurable CAN*, refer to DSE Publication: *056-118 PLC Configurable CAN* which is found on our website: *www.deepseaelectronics.com*

The *Configurable CAN Instrumentation* section is subdivided into smaller sections. Select the required section with the mouse.



2.13.1 RECEIVED INTRUMENTATION (1-10)

This feature allows for up to ten custom engine CAN instrumentation items to be decoded from CAN messages on the connected ECU port.

Parameter	Description
Enabled	**NOTE: The CAN instrumentation must already be available on the CAN bus. There is no request for a non-standard instrumentation.** ☐ = The CAN instrumentation is disabled. ☑ = The CAN instrumentation is enabled. Reading depends upon the message availability on the bus.
On Module	**NOTE: The CAN instrumentation is always available on the SCADA, Data Logging, PLC as long as at least one CAN instrumentation is enabled. The CAN instrumentation is shown on the DSE module's display when the On Module is enabled.** ☐ = The CAN instrumentation is not displayed on the DSE module. ☑ = The CAN instrumentation is displayed on the DSE module.
Description	Provide a description for the CAN instrumentation. This description is only shown in the SCADA.
Details	Click on Details to set the *Message Decoding* CAN options.
Function	Click on Function to set the *Function Triggering* options.

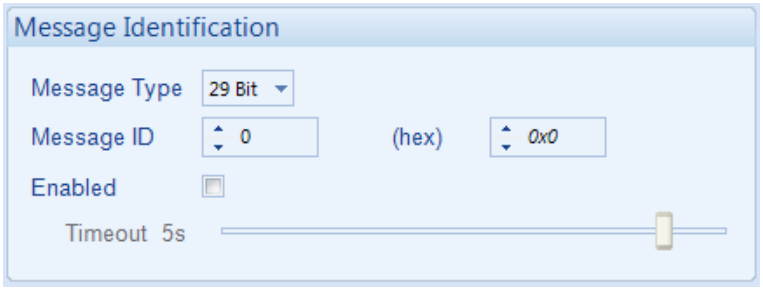
2.13.2 RECEIVED INTRUMENTATION (11-30)

NOTE: The Received Instrumentation (11-30) does not have the Function option.

Parameter	Description
Enabled	**NOTE: The CAN instrumentation must already be available on the CAN bus. There is no request for a non-standard instrumentation.** ☐ = The CAN instrumentation is disabled. ☑ = The CAN instrumentation is enabled. Reading depends upon the message availability on the bus.
On Module	**NOTE: The CAN instrumentation is always available on the SCADA Data Logging, PLC as long as at least one CAN instrumentation is enabled. The CAN instrumentation is shown on the DSE module's display when the On Module is enabled.** ☐ = The CAN instrumentation is not displayed on the DSE module. ☑ = The CAN instrumentation is displayed on the DSE module.
Description	Provide a description for the CAN instrumentation. This description is only shown in the SCADA.
Details	Click on Details to set the *Message Decoding* CAN options.

2.13.2.1 DETAILS

Message Identification



Parameter	Description
Message Type	Select the required message type: ***11 Bit:*** message identifier for standard CAN ***29 Bit:*** message identifier for extended CAN
Message ID	CAN message ID
Enabled	☐ = Timeout is disabled ☑ = Timeout is enabled
Timeout	It indicates how often the messages are expected to be seen on the CAN bus. If no new instrumentation is seen beyond the timeout period, the calculated instrumentation value changes to a 'bad data' sentinel value.

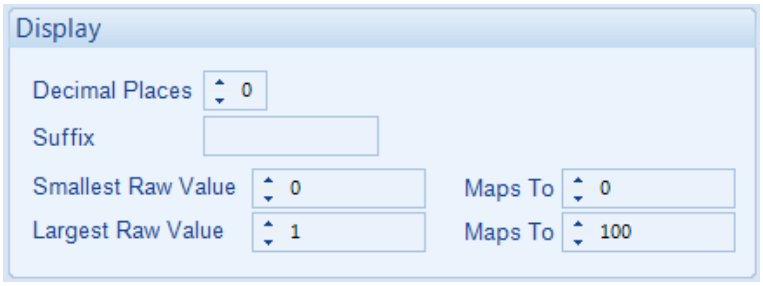
Data Structure

Parameter	Description
Byte Order	Select the *Byte Order* ***Big Endian:*** the bytes on the bus are sent from the Most Significant Byte to the Least Significant Byte. ***Little Endian:*** the bytes on the bus are sent from the Least Significant Byte to the Most Significant Byte.
Offset Byte	Set the start position Byte
Offset Bit	Set the start position Bit
Length (Bits)	Data length 1-32 bits
Signed Value	☐ = Unsigned value ☑ = Signed value

Parameter descriptions are continued overleaf…

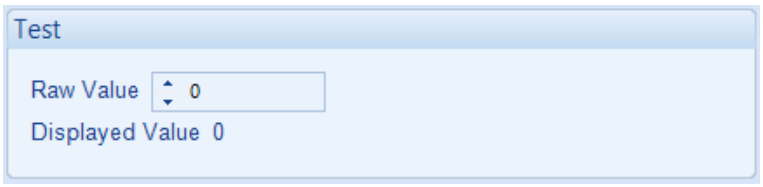
Display

NOTE: If the received CAN instrument is outside the configured raw values, the module displays sentinel value.



Parameter	Description
Decimal Places	Display the decimal point. 0 represents 0 scaling factor, 1 represents 0.1 scaling factor, -1 represents 10 multiplier.
Suffix	Unit display (example: m³/hr)
Smallest Raw Value	The smallest data sent over the CAN bus before the transformations (decimal places).
Maps To	The output format after all transformations including decimal point shift) as to be shown on the module screen, or SCADA, in data log file, etc.
Largest Raw Value	The largest data sent over the CAN bus before the transformations (decimal places).
Maps To	The output format after all transformations including decimal point shift) as to be shown on the module screen, or SCADA, in data log file, etc.

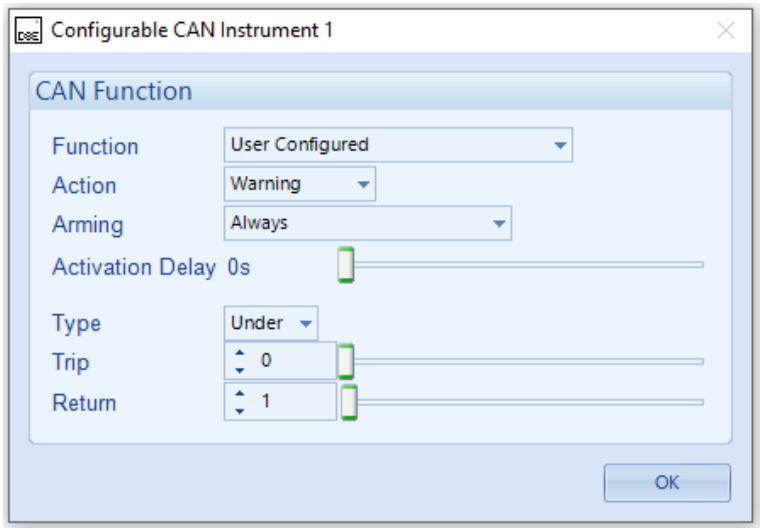
Test



Parameter	Description
Test Raw Value	**NOTE: The Test Raw Value is not saved in the configuration, this is only to check the displayed value.** This is a test case to check the representation of the *Raw Value* when they are complicated. *Test Raw Value* is the value read from the CAN bus before the transformation
Displayed Value	The *Test Raw Values'* represented value as to be shown on the DSE module's screen, or in the Scada.

2.13.2.2 FUNCTION

The Function is only available for the Received Instrumentation (1-10), it allows to configure a User Configured alarm by monitoring the relevant *Configurable CAN Instrumentation*.



Parameter	Description
Function	Select a digital input function to activate according to the CAN value received. **NOTE: Refer to the Digital Inputs section elsewhere in this document for the list of descriptions of the functions list.** **NOTE: Crank Disconnect function has been added in this list to instruct the DSE module to crank disconnect when the value sent over the CAN line is under or over the configured Trip level.**
Action	Select the type of alarm to activate the *Function* after the *Activation Delay* time. ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning***
Arming	Select when the *Trip* level is monitored. Options are as follows: ***Always:*** The alarm is active at anytime the CAN Link is lost ***Engine Protection Activation:*** The alarm is monitored after the engine is running and the oil pressure engine protection is in a 'healthy' state, until the engine stops. ***From Safety On:*** Active only after the *Safety On* delay timer ***From Starting:*** Active only after the *Crank Relay* is energised ***Never****:* Alarm is disabled ***Wait For ECU:*** Active when the ECU Link is ok. ***When Stationary:*** Active only when the engine is not running
Activation Delay	The amount of time before the module activates the selected *Function* upon the *Configurable CAN Instrumentation* reaching the *Trip* level.
Type	Select the required option to monitor the *Configurable CAN Instrumentation* when to trip. ***Over:*** The *Function* is active when the *Configurable CAN Instrumentation* raises above the Trip level for longer than the *Activation Delay* timer. ***Under:*** The *Function* is active when the *Configurable CAN Instrumentation* lowers below the Trip level for longer than the *Activation Delay* timer.

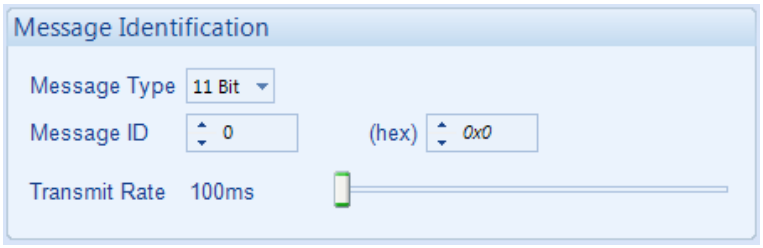
2.13.3 TRANSMITTED INSTRUMENTATION

The module allows transmitting up to ten instruments over the CANbus on the ECU port by specifying the source address (message ID) of the selected Instrument.

Parameter	Description
Enabled	☐ = The Transmit CAN instrumentation is disabled. ☑ = The Transmit CAN instrumentation is enabled.
Source	Select the instrument to be created over the CAN.
Details	Click on Details to set the *Message Encoding* CAN options.

2.13.3.1 DETAILS

Message Identification



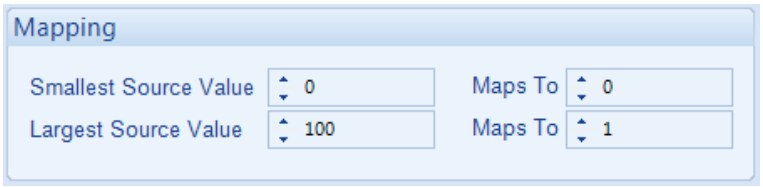
Parameter	Description
Message Type	Select the required message type to transmit: ***11 Bit:*** message identifier for standard CAN ***29 Bit:*** message identifier for extended CAN
Message ID	CAN message ID
Transmit Rate	The rate at which the *CAN Instrument* is transmitted over the CANbus.

Parameter descriptions are continued overleaf…

Data Structure

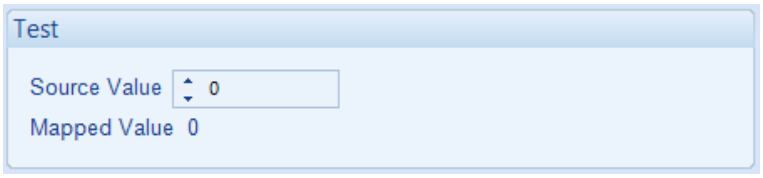
Parameter	Description
Byte Order	Select the *Byte Order* ***Big Endian:*** the bytes on the bus are sent from the Most Significant Byte to the Least Significant Byte. ***Little Endian:*** the bytes on the bus are sent from the Least Significant Byte to the Most Significant Byte.
Offset Byte	Set the start position Byte
Offset Bit	Set the start position Bit
Length (Bits)	Data length 1-32 bits
Signed Value	☐ = Transmit unsigned value ☑ = Transmit signed value

Mapping



Parameter	Description
Smallest Source Value	The smallest instrument value before being sent over the CAN bus.
Maps To	The transmitted format for the *Smallest Source Value*.
Largest Source Value	The largest instrument value before being sent over the CAN bus.
Maps To	The transmitted format for the *Largest Source Value*.

Test



Parameter	Description
Source Value	**NOTE: The Source Value is not transmitted over the CANbus, this is only to check the encoded value.** This is a test case to check the representation of the *Source Value* when they are complicated. *Source Value* is the instrument value before being encoded.
Mapped Value	The *Mapped Value* represents the transmitted *Source value*.

2.13.4 EXPORT / IMPORT CONFIGURABLE CAN

This feature is used to import the *Configurable CAN Instrumentation* settings into another DSE module.

Parameter	Description
Export	This allows the configuration settings of all Configurable CAN Instrumentation (Received & Transmitted) into one XML file.
Import	This allows to import an existing configuration settings of all Configurable CAN Instrumentation saved in XML format.

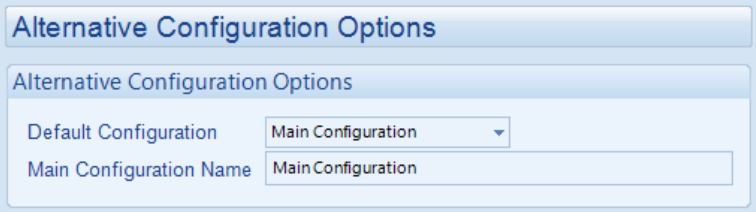
2.14 ALTERNATIVE CONFIGURATIONS

An Alternative Configurations are provided to allow the system designer to cater for different AC requirements utilising the same generator system. Typically this feature is used by Rental Set Manufacturers where the set is capable of being operated at (for instance) 120 V 50 Hz and 240V 50 Hz using a selector switch.

The Alternative Configuration is selected using either:

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

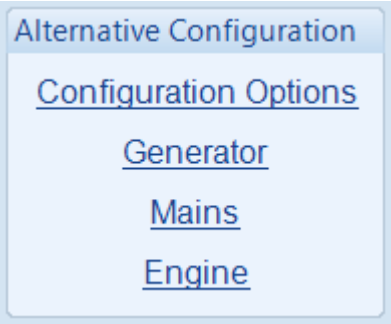
2.14.1 ALTERNATIVE CONFIGURATION OPTIONS



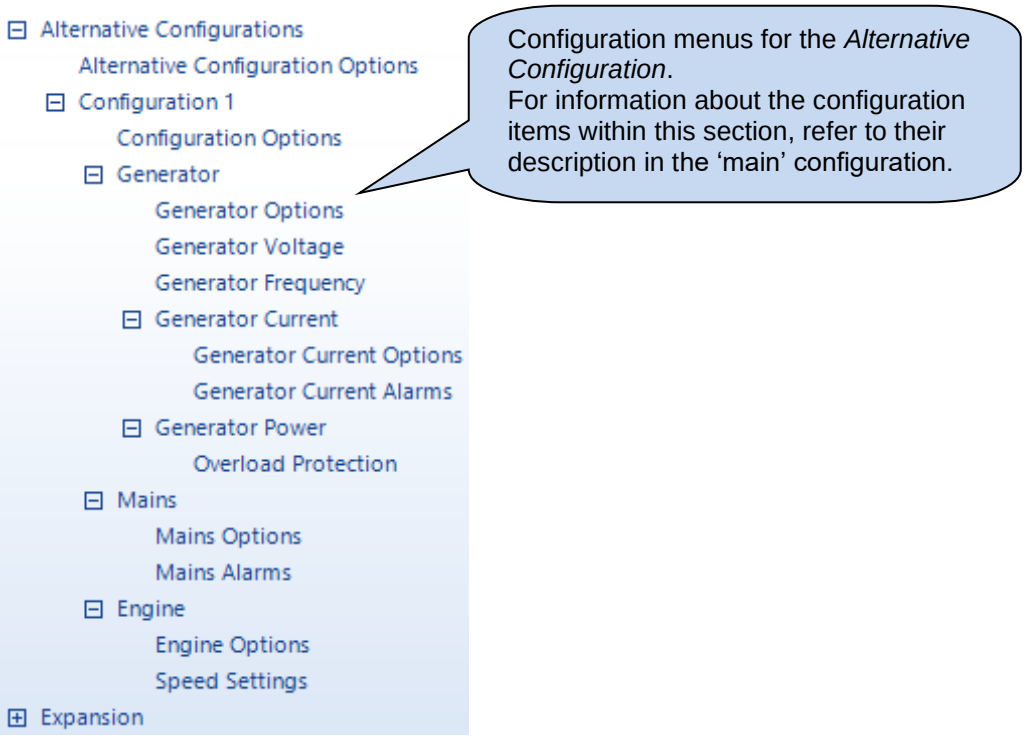
Parameter	Description
Default Configuration	Select the 'default' configuration that is used when there is no instruction to use an 'alternative configuration'.
Main Configuration Name	Free entry boxes to allow the user to give the Main Configuration name. This is shown on the module's display when the configuration is selected.

2.14.2 ALTERNATIVE CONFIGURATION 1 TO 5

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

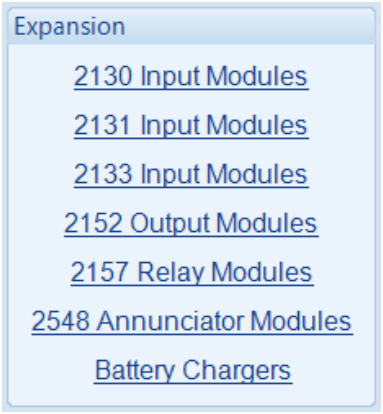


Alternative configuration options contain a subset of the main configuration. The adjustable parameters are not discussed here as they are identical to the main configuration options :



2.15 EXPANSION

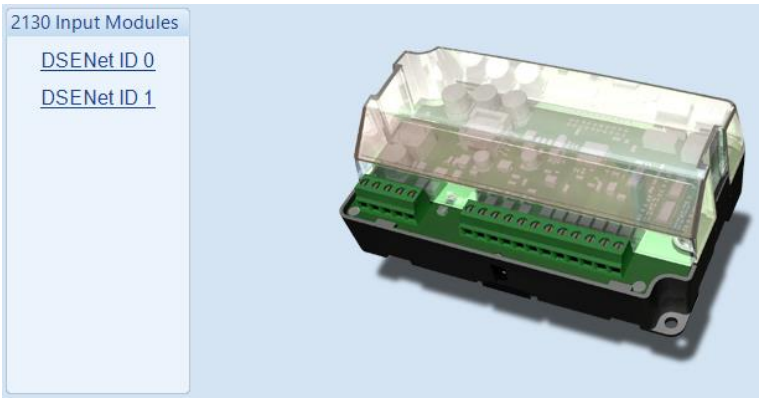
The *Expansion* page is subdivided into smaller sections.
Select the required section with the mouse.



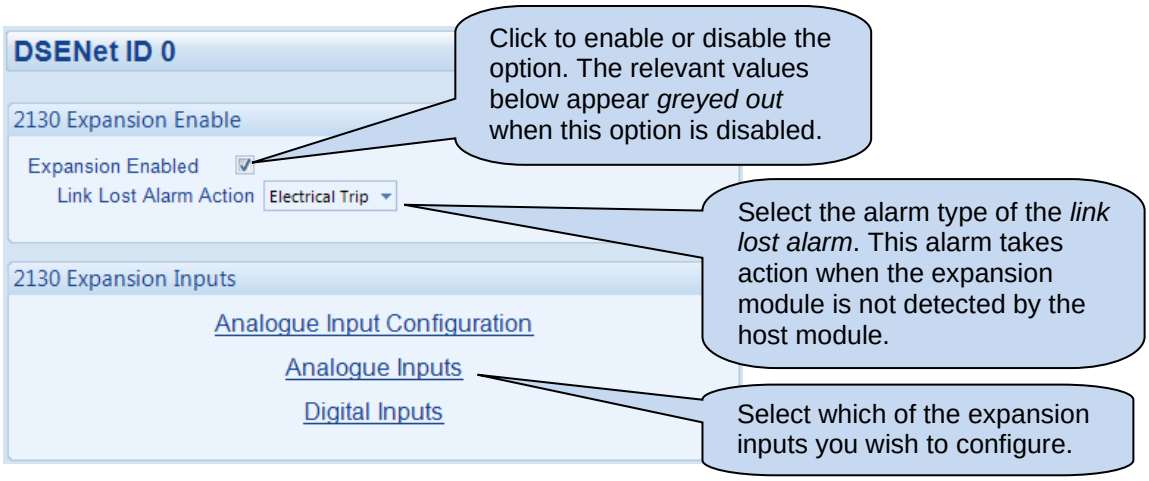
See overleaf for description of the different expansion modules.

2.15.1 DSE2130 INPUT MODULES

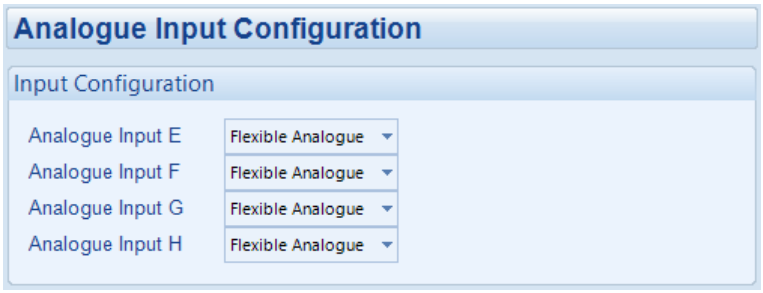
Select the DSENet ID of the input expansion you wish to configure.



The following is then shown:



2.15.1.1 ANALOGUE INPUT CONFIGURATION



Input Configuration

Parameter	Description
Analogue Input E to H	Select what the analogue input is to be used for: ***Not Used:*** The analogue input is disabled ***Digital Input:*** Configured on the 2130/Digital Inputs pages ***Flexible Analogue:*** Configured on the *2130/Analogue Inputs* pages

2.15.1.2 ANALOGUE INPUTS

NOTE: An analogue input is only configurable as a flexible sensor if it has been configured as Flexible Analogue, refer to section entitled Analogue Input Configuration elsewhere in this document for further details.

Sensor Description

Parameter	Description
Sensor Name	Enter the *Sensor Name*, this text is shown on the module display when viewing the instrument.

Input Type

NOTE: The selectable measurement quantity (Current, Resistive or Voltage) is dependent on the hardware specification of the analogue input. For more detailed information on the analogue input specification, refer to DSE Publication: 057-289 DSE6110 MKIII & DSE6120 MKIII Operator Manual.

Parameter	Description
Input Type	Select the sensor type and curve from a pre-defined list or create a user-defined curve ***Resistive:*** for sensors with maximum range of 0 Ω to 480 Ω ***Pressure:*** The input is configured as a pressure sensor ***Percentage:*** The input is configured as a percentage sensor ***Temperature:*** The input is configured as a temperature sensor

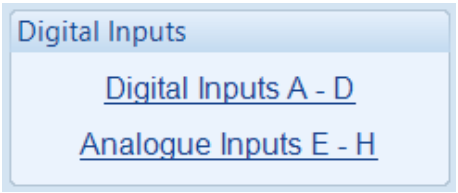
Parameter descriptions are continued overleaf…

Sensor Alarms

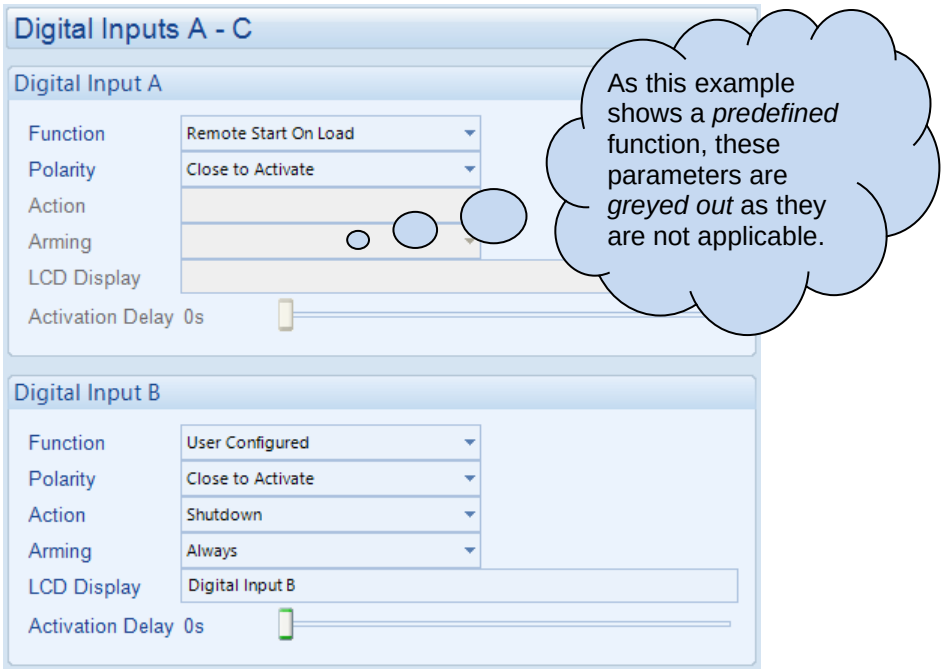
Parameter	Description
Alarm Arming	Select when the input becomes active: ***Always:*** The input state is always monitored ***From Safety On:*** The state of the input is monitored from the end of the Safety On Delay timer ***From Starting:*** The state of the input is only monitored from engaging the crank
Low Alarm Enable	☐ = The Alarm is disabled. ☑ = The *Low Alarm* is active when the measured quantity drops below the *Low Alarm* setting.
Low Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *Low Pre-Alarm* is active when the measured quantity drops below the *Low Pre-Alarm* setting. The *Low Pre-Alarm* is automatically reset when the measured quantity rises above the configured *Low Pre-Alarm Return* level.
High Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *High Pre-Alarm* is active when the measured quantity rises above the *High Pre-Alarm* setting. The *High Pre-Alarm* is automatically reset when the measured quantity falls below the configured *High Pre-Alarm Return* level.
High Alarm Enable	☐ = The Alarm is disabled. ☑ = The *High Alarm* is active when the measured quantity rises above the *High Alarm* setting.

2.15.1.3 DIGITAL INPUTS

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



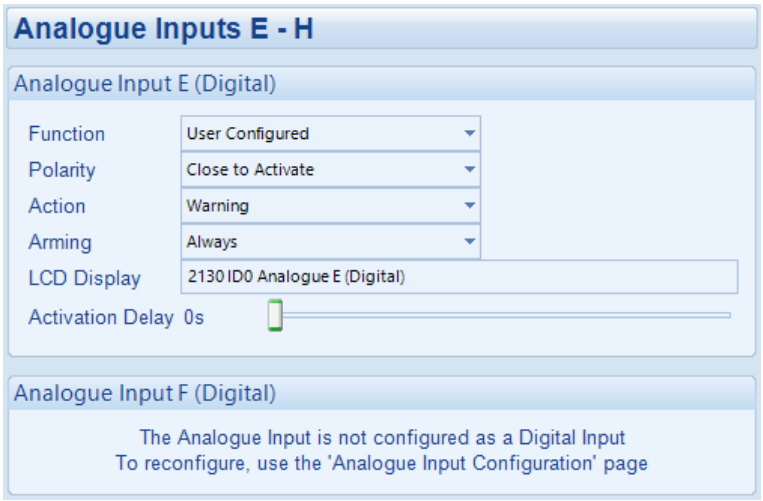
2.15.1.3.1 DIGITAL INPUTS



Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See section entitled *Input functions* 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	**NOTE: For details of these, see the section entitled Alarm Types elsewhere in this document.** Select the type of alarm required from the list: ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning***
Arming	**NOTE: For details of these, see the section entitled Alarm Arming elsewhere in this document.** Select when the input becomes active: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Never*** ***Wait for ECU*** ***When Stationary***
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.

2.15.1.3.2 ANALOGUE INPUTS

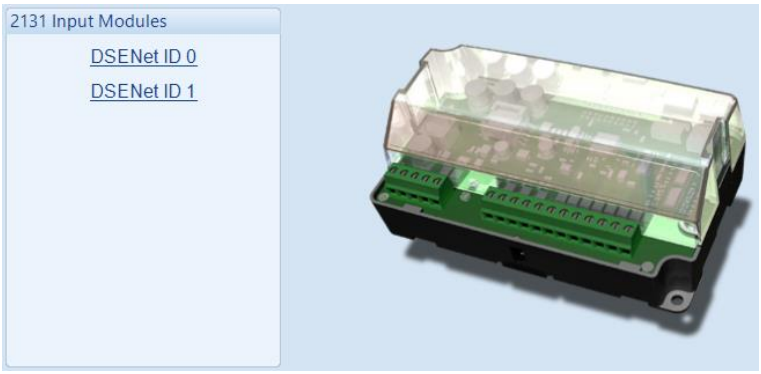
NOTE: An analogue input is only configurable as a digital input if it has been configured as Digital Input, refer to section entitled Analogue Input Configuration elsewhere in this document for further details.



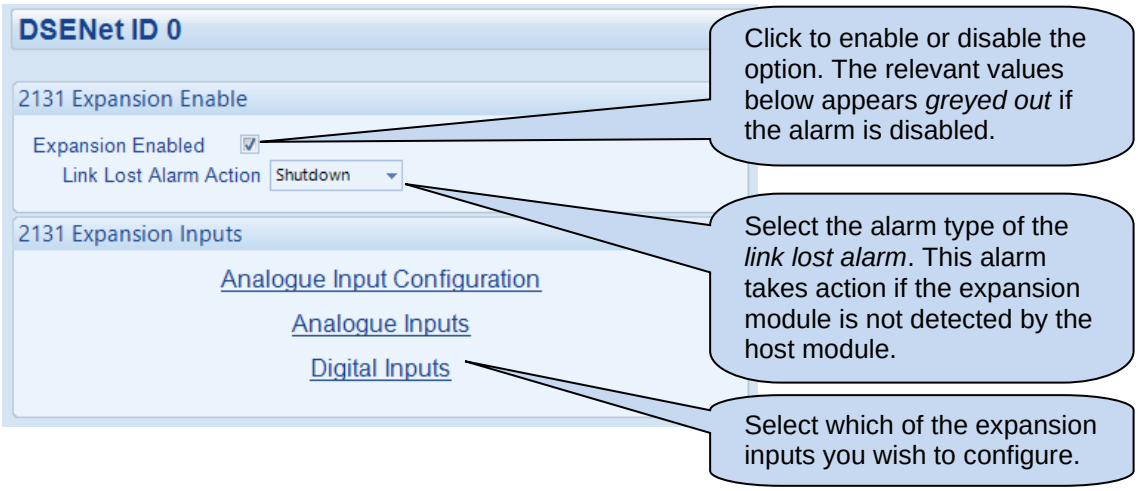
Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See section entitled *Input functions* for details of all available functions
Polarity	Select the digital input polarity: ***Close to Activate:*** the input function is activated when the relevant terminal is connected. ***Open to Activate:*** the input function is activated when the relevant terminal is disconnected.
Action	**NOTE: For details of these, see the section entitled Alarm Types elsewhere in this document.** Select the type of alarm required from the list: ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning***
Arming	**NOTE: For details of these, see the section entitled Alarm Arming elsewhere in this document.** Select when the input becomes active: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Never*** ***Wait for ECU*** ***When Stationary***
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.

2.15.2 DSE2131 INPUT MODULES

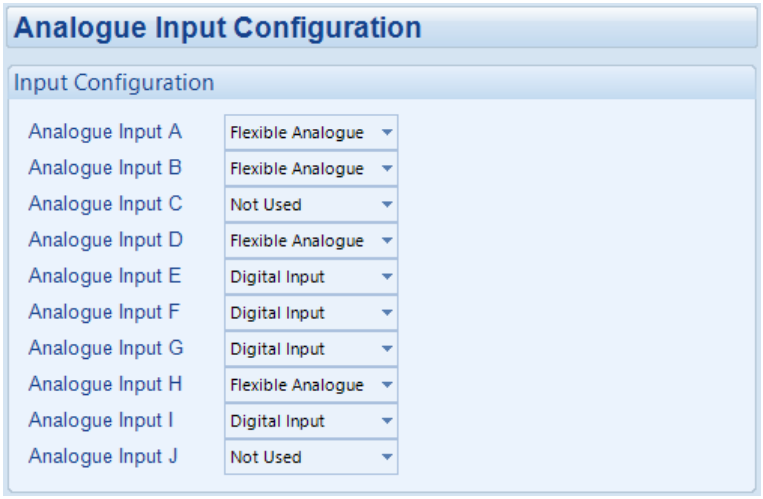
Select the DSENet ID of the input expansion you wish to configure. The ID of the expansion input module is set by rotary decimal switch accessible under the removable cover of the device.



The following is then shown:



2.15.2.1 ANALOGUE INPUT CONFIGURATION



Input Configuration

Parameter	Description
Analogue Input E to H	Select what the analogue input is to be used for: ***Not Used:*** The analogue input is disabled ***Digital Input:*** Configured on the 2130/Digital Inputs pages ***Flexible Analogue:*** Configured on the *2130/Analogue Inputs* pages

2.15.2.2 ANALOGUE INPUTS

NOTE: An analogue input is only configurable as a flexible sensor if it has been configured as Flexible Analogue, refer to section entitled Analogue Input Configuration elsewhere in this document for further details.

Sensor Description

Parameter	Description
Sensor Name	Enter the *Sensor Name*, this text is shown on the module display when viewing the instrument.

Input Type

Parameter	Description
Input Type	Select the sensor type and curve from a pre-defined list or create a user-defined curve ***Current:*** for sensors with maximum range of 0 mA to 20 mA ***Resistive:*** for sensors with maximum range of 0 Ω to 1920 Ω ***Voltage:*** for sensors with maximum range of 0 V to 10 V ***Pressure:*** The input is configured as a pressure sensor ***Percentage:*** The input is configured as a percentage sensor ***Temperature:*** The input is configured as a temperature sensor

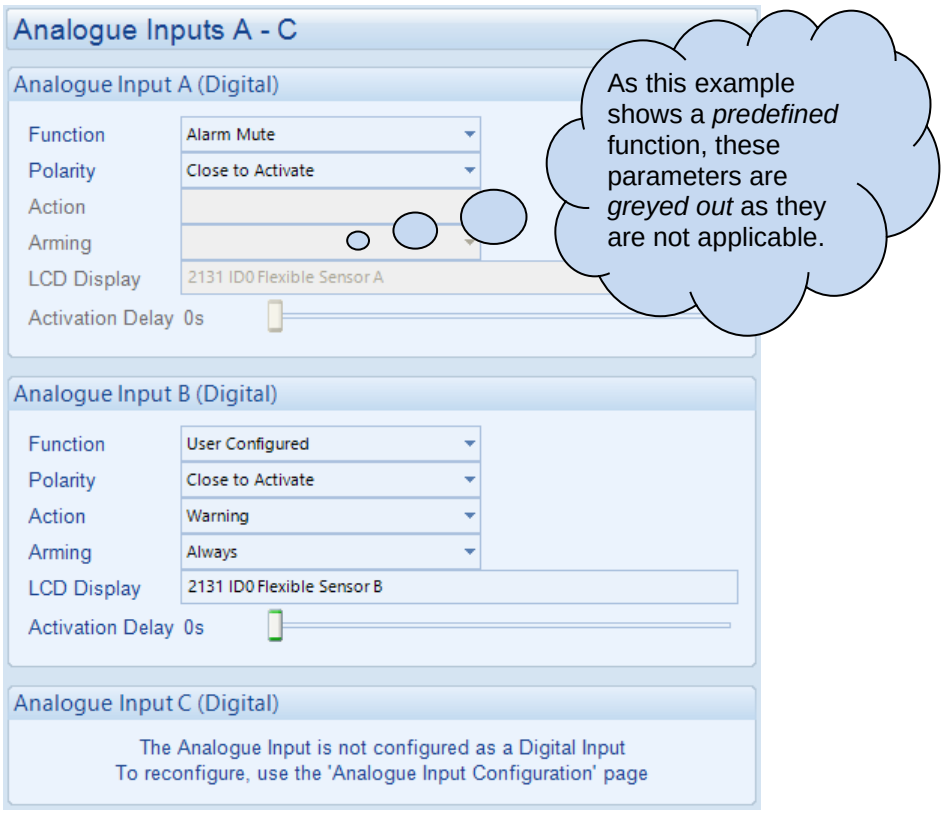
Parameter descriptions are continued overleaf…

Sensor Alarms

Parameter	Description
Alarm Arming	Select when the input becomes active: ***Always:*** The input state is always monitored ***From Safety On:*** The state of the input is monitored from the end of the Safety On Delay timer ***From Starting:*** The state of the input is only monitored from engaging the crank
Low Alarm Enable	☐ = The Alarm is disabled. ☑ = The *Low Alarm* is active when the measured quantity drops below the *Low Alarm* setting.
Low Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *Low Pre-Alarm* is active when the measured quantity drops below the *Low Pre-Alarm* setting. The *Low Pre-Alarm* is automatically reset when the measured quantity rises above the configured *Low Pre-Alarm Return* level.
High Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *High Pre-Alarm* is active when the measured quantity rises above the *High Pre-Alarm* setting. The *High Pre-Alarm* is automatically reset when the measured quantity falls below the configured *High Pre-Alarm Return* level.
High Alarm Enable	☐ = The Alarm is disabled. ☑ = The *High Alarm* is active when the measured quantity rises above the *High Alarm* setting.

2.15.2.3 DIGITAL INPUTS

NOTE: An analogue input is only configurable as a digital input if it has been configured as Digital Input, refer to section entitled Analogue Input Configuration elsewhere in this document for further details.

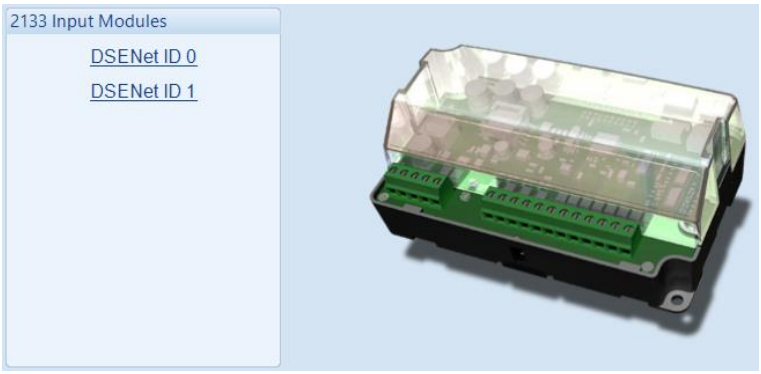


Parameter descriptions are overleaf…

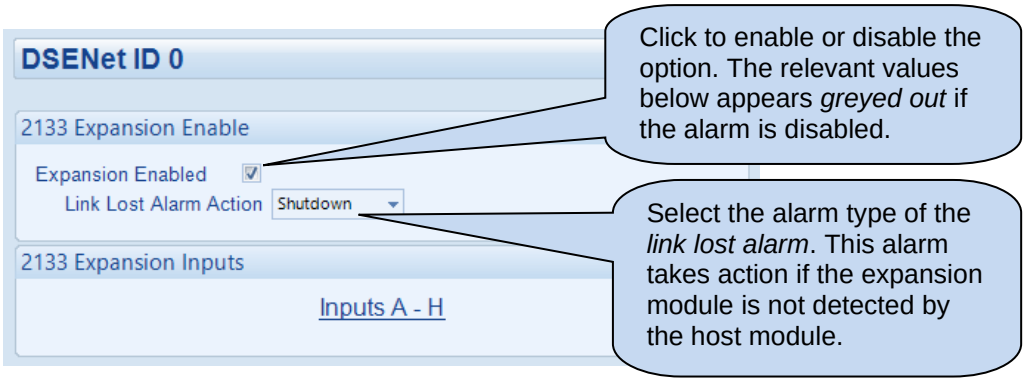
Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See section entitled *Input functions* for details of all available functions
Polarity	Select the digital input polarity: ***Close to Activate:*** the input function is activated when the relevant terminal is connected. ***Open to Activate:*** the input function is activated when the relevant terminal is disconnected.
Action	**NOTE: For details of these, see the section entitled Alarm Types elsewhere in this document.** Select the type of alarm required from the list: ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning***
Arming	**NOTE: For details of these, see the section entitled Alarm Arming elsewhere in this document.** Select when the input becomes active: ***Always*** ***Engine Protection Activation*** ***From Safety On*** ***From Starting*** ***Never*** ***Wait for ECU*** ***When Stationary***
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.

2.15.3 DSE2133 INPUT MODULES

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



The following is then shown:



2.15.3.1 ANALOGUE INPUTS

NOTE: An analogue input is only configurable as a flexible sensor if it has been configured as Flexible Analogue, refer to section entitled Analogue Input Configuration elsewhere in this document for further details.

Sensor Description

Parameter	Description
Sensor Name	Enter the *Sensor Name*, this text is shown on the module display when viewing the instrument.

Input Type

Parameter	Description
Input Type	Select the sensor type from the pre-defined list: ***2 Wire PT100*** ***3 Wire PT100*** ***Type J (Thermocouple)*** ***Type K (Thermocouple)***

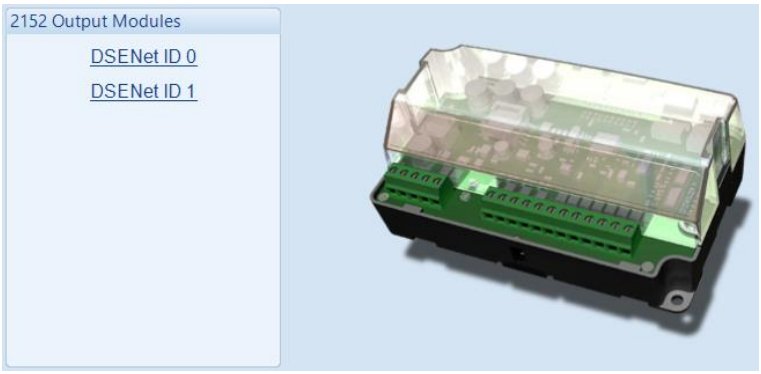
Parameter descriptions are continued overleaf…

Sensor Alarms

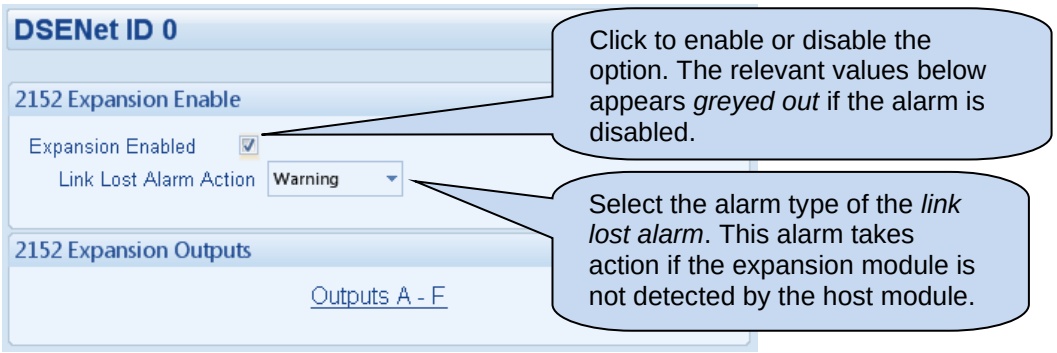
Parameter	Description
Alarm Arming	Select when the input becomes active: ***Always:*** The input state is always monitored ***From Safety On:*** The state of the input is monitored from the end of the Safety On Delay timer ***From Starting:*** The state of the input is only monitored from engaging the crank
Low Alarm Enable	☐ = The Alarm is disabled. ☑ = The *Low Alarm* is active when the measured quantity drops below the *Low Alarm* setting.
Low Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *Low Pre-Alarm* is active when the measured quantity drops below the *Low Pre-Alarm* setting. The *Low Pre-Alarm* is automatically reset when the measured quantity rises above the configured *Low Pre-Alarm Return* level.
High Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *High Pre-Alarm* is active when the measured quantity rises above the *High Pre-Alarm* setting. The *High Pre-Alarm* is automatically reset when the measured quantity falls below the configured *High Pre-Alarm Return* level.
High Alarm Enable	☐ = The Alarm is disabled. ☑ = The *High Alarm* is active when the measured quantity rises above the *High Alarm* setting.

2.15.4 DSE2152 OUTPUT MODULES

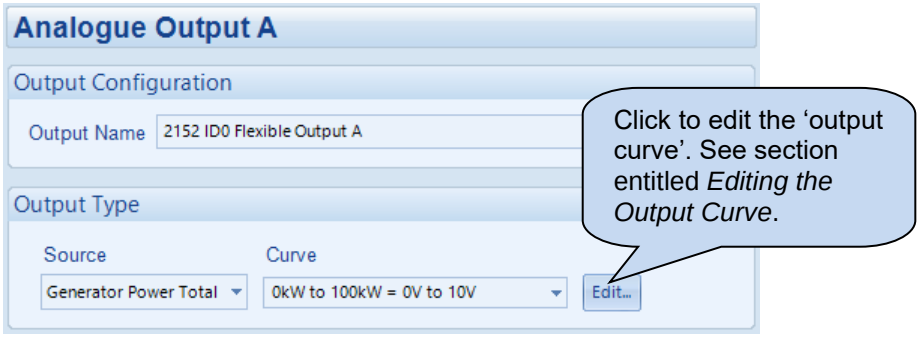
Select the DSENet ID of the output expansion you wish to configure. The ID of the expansion output module is set by rotary decimal switch accessible under the removable cover of the device.



The following is then shown:



2.15.4.1 ANALOGUE OUTPUTS



Output Configuration

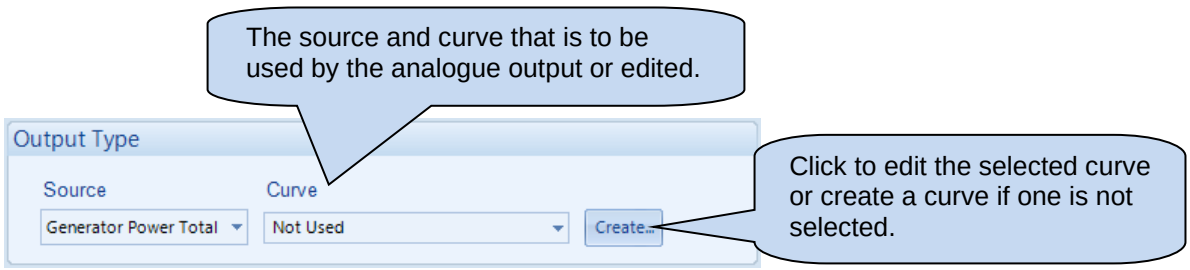
Parameter	Description
Output Name	Enter the *Output Name*, this text is shown on in the SCADA section when viewing the output.

Output Type

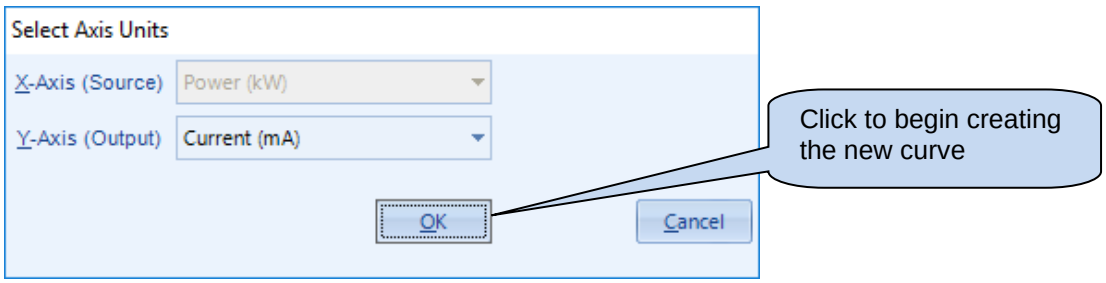
Parameter	Description
Source	Select the parameter that is to be mapped to the analogue output.
Curve	Select the output type and curve from a pre-defined list or create a user-defined curve ***Current:*** for sensors with maximum range of 0 mA to 20 mA ***Voltage:*** for sensors with maximum range of 0 V to 10 V

2.15.4.2 CREATING / EDITING THE OUTPUT CURVE

While the *DSE Configuration Suite* holds specifications for the most used output ranges, occasionally it is required that the expansion module's output be connected to a none standard device. To aid this process, a curve editor is provided.

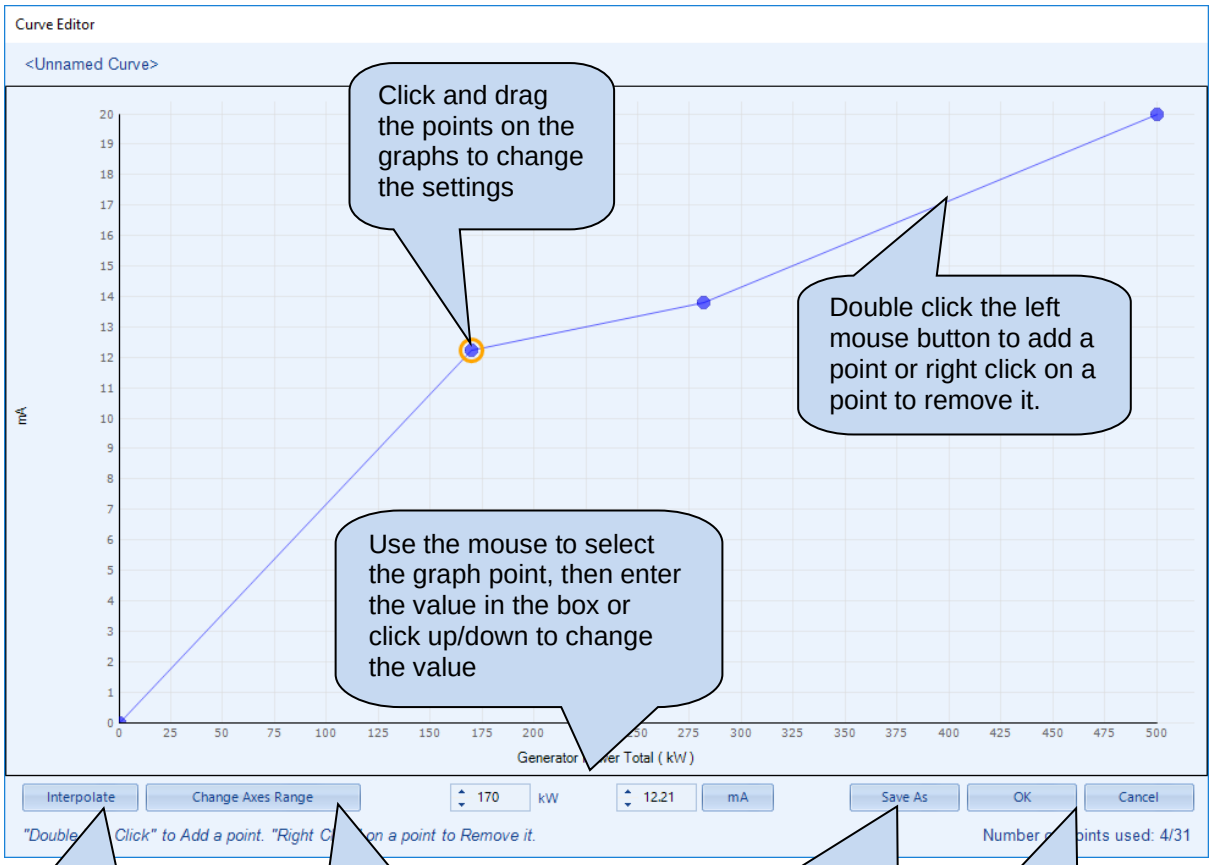


When creating a new sensor curve the measurement quantity and measured parameter are required.



Parameter	Description
Y-Axis (Source)	The parameter measured by the DSE module that is to be mapped to the output.
X-Axis (Output)	Select the electrical quantity that the sensor outputs. ***Current (mA):*** For an output current within a range 0 mA to 20 mA ***Voltage (Volt):*** For an output voltage within a range of 0 V to 10 V

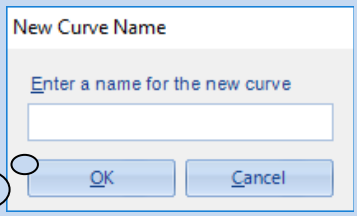
Curve creation / editor descriptions are continued overleaf…



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

Click to change the range of the X and Y Axes of the graph and the level of open circuit detection

Click SAVE AS, a prompt to name the curve…



Click OK to save the curve.

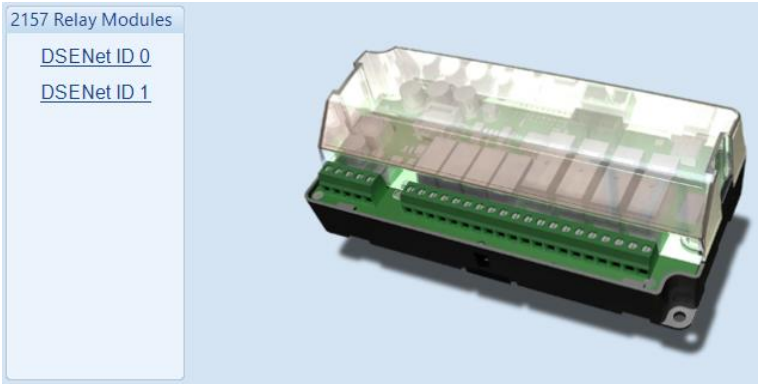
Any saved curves become selectable in the *Output Type* selection list.

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

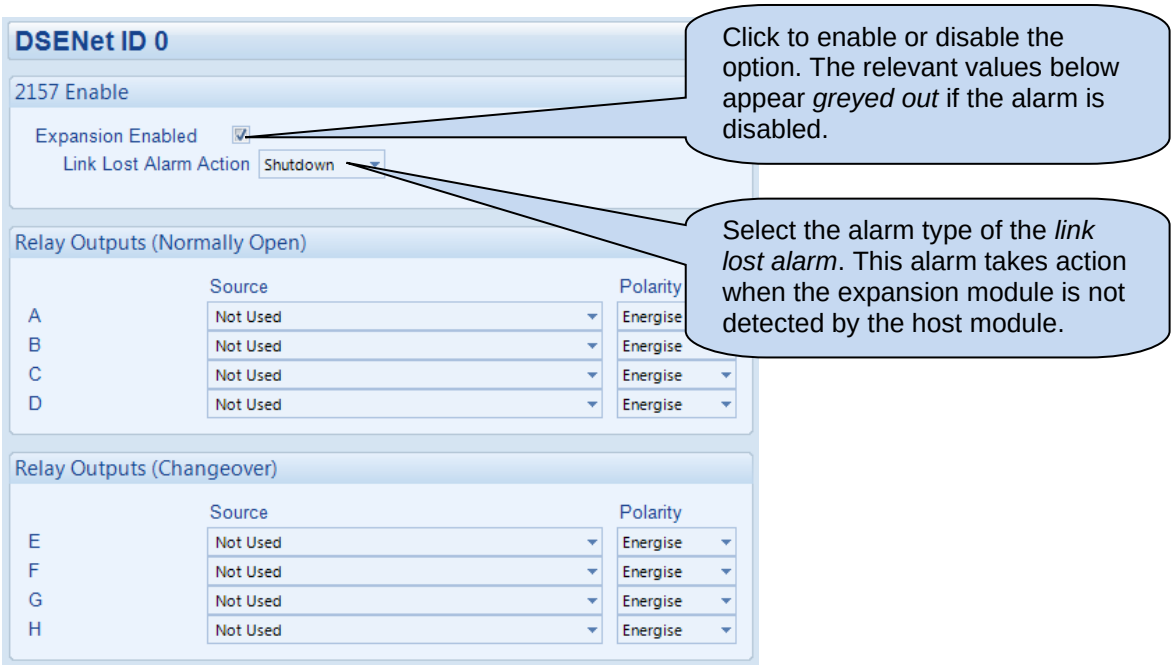
Hint: Deleting, renaming or editing custom curves that have been added is performed in the main menu, select *Tools* | *Curve Manager*.

2.15.5 DSE2157 RELAY MODULES

Select the DSENet ID of the relay expansion you wish to configure.



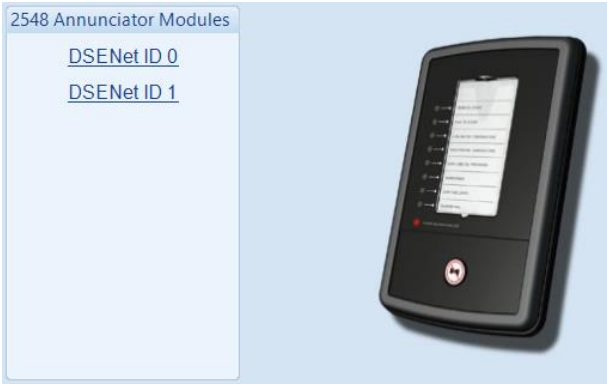
The following is then shown:



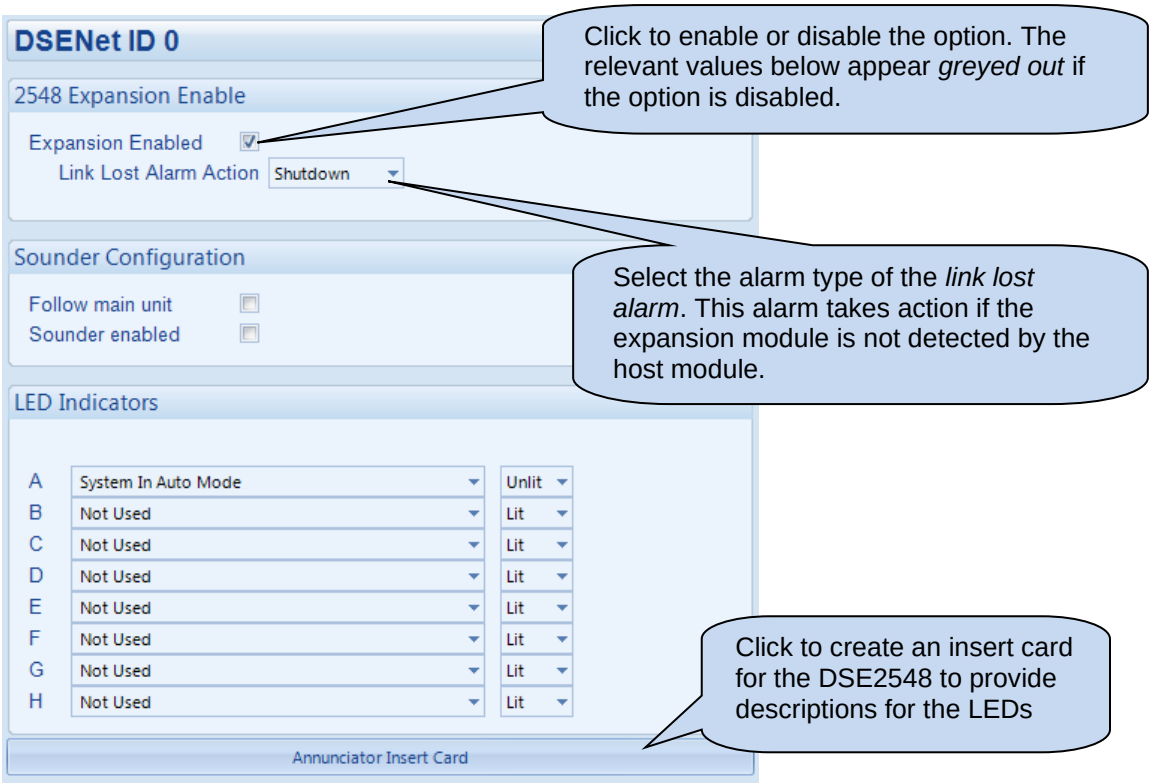
Parameter	Description
Source	Select the output source to control the state of the output See section entitled *Output Sources* for details of all available functions
Polarity	Select the digital input polarity: ***Energise:*** When the output source is true, the output activates. ***De-Energise:*** When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

2.15.6 DSE2548 ANNUCIATOR MODULES

Select the DSENet ID of the LED expansion you wish to configure.



The following is then shown:



Parameter descriptions are overleaf…

Sounder Configuration

Parameter	Description
Follow Main Unit	☐ = If the *mute / lamp test* button is pressed, other DSE2548 modules and the host module does not respond to this. ☑ = If the *mute / lamp test* button is pressed, other DSE2548 modules configured to *Follow main unit* and the host module also lamp test / mute their alarm and vice-versa.
Sounder Enabled	☐ = The DSE2548 internal sounder does not annunciate on a fault condition becoming active. ☑ = The DSE2548 internal sounder annunciates on a fault condition becoming active.

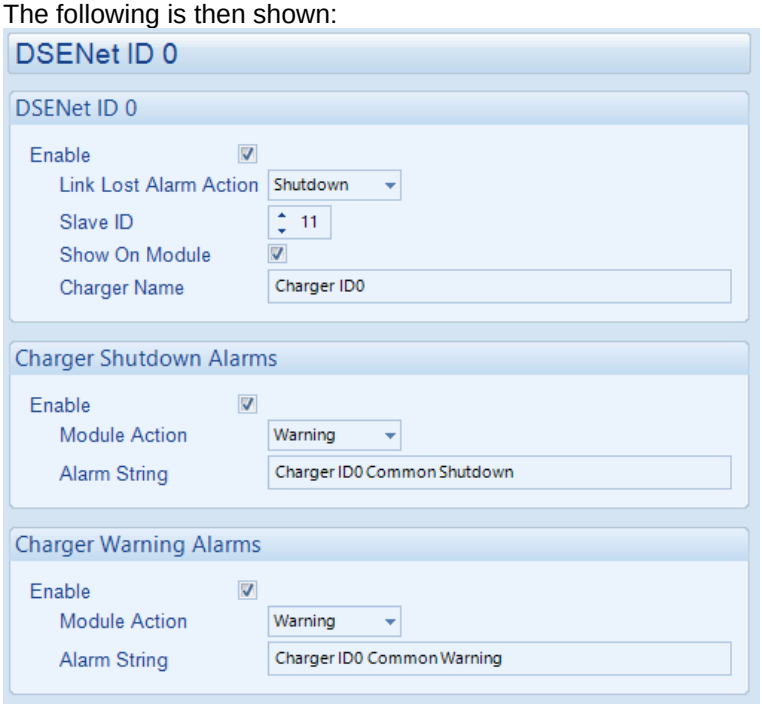
LED Indicators

Parameter	Description
Source	Select the output source to control the state of the output See section entitled *Output Sources* for details of all available functions
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.

2.15.7 BATTERY CHARGERS

Select the DSENet ID of the Battery Charger you wish the DSE host controller to communicate too. This enables the DSE host controller to display battery charger parameters and alarms.

The following is then shown:



Parameter descriptions are overleaf…

DSENet ID

Parameter	Description
Enable	☐ = The battery charger is disabled ☑ = The battery charger is enabled
Slave ID	The Slave ID used to address the battery charger via the host module's RS485 when using the host module as a MODBUS RTU pass through.
Show On Module	☐ = The battery chargers information is not shown on the host module's display. ☑ = The battery charger information is shown on the host module's display.
Charger Name	Enter the *Charger Name*, this text is shown on the module display when viewing the battery charger instrumentation

Charger Shutdown Alarms

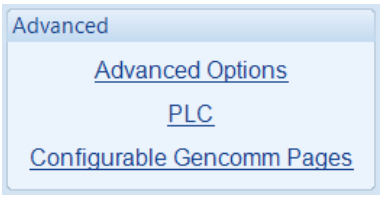
Parameter	Description
Enable	☐ = The DSE module does not display any shutdown alarms from the battery charger. ☑ = The DSE module displays shutdown alarms from the battery charger with the configured action.
Alarm String	The text that is displayed on the module's LCD when the DSE module detects a shutdown fault from the battery charger.

Charger Warning Alarms

Parameter	Description
Enable	☐ = The DSE module does not display any warning alarms from the battery charger. ☑ = The DSE module displays warnings alarms from the battery charger with the configured action.
Alarm String	The text that is displayed on the module's LCD when the DSE module detects a warning fault from the battery charger.

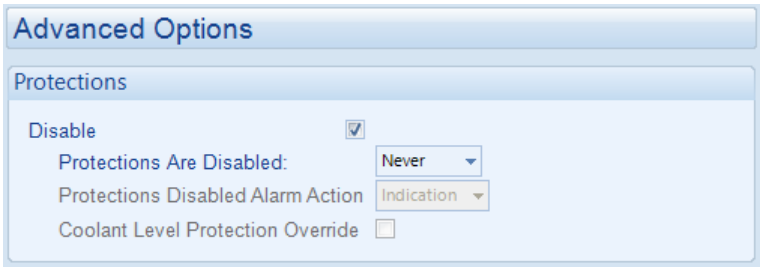
2.16 ADVANCED

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



2.16.1 ADVANCED OPTIONS

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

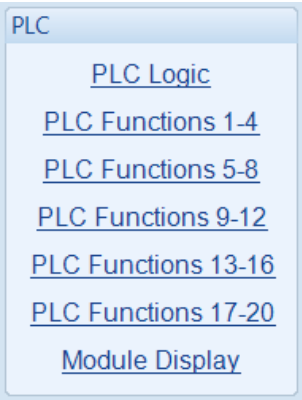


This feature is provided to assist the system designer in meeting specifications for “Warning only”, “Protections Disabled”, “Run to Destruction”, “Battleshort Mode” or other similar wording.

Parameter	Description
Disable	**NOTE: Writing a configuration to the controller that has “Protections Disabled” configured, results in a warning message appearing on the PC screen for the user to acknowledge before the controller’s configuration is changed. This prevents inadvertent activation of the feature.** ☐ **=** The module operates as normal and provide engine shutdown if required. ☑ **=** *Protections disabled* function is activated. Operation depends upon the following configuration.
Protections are disabled	***Never*** : The protections are not disabled ***Always***: Protections are always overridden by the DSE controller. ***On Input***: Protections are disabled whenever a configurable input set to *Protections Disabled* is activated
Protections Disabled Alarm Action	If *Disable All Protections* is set to *On Input*, this selection allows configuration of an alarm to highlight that the protections have been disabled on the engine. ***Indication:*** Any output or LCD display indicator configured to *Protections Disabled* is made active; however the internal alarm sound does not operate. ***Warning:*** Any output or LCD display indicator configured to *Protections Disabled* is made active, and the internal alarm sound operates. When protections are disabled, *Protections Disabled* appears on the module display to inform the operator of this status.
Coolant Level Protection Override	☐ **=** When a CANbus engine is selected, the *Coolant Level Protection* is provided when supported by the ECU (ECM). ☑ **=** The *Coolant Level Protection* is overridden and does not activate an alarm on the module

2.16.2 PLC

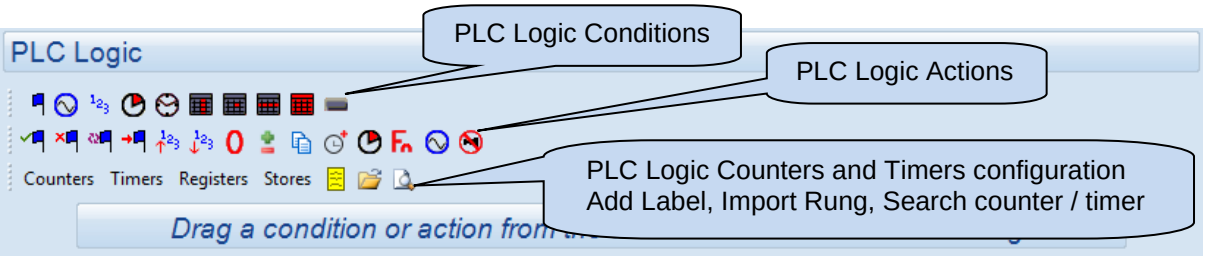
The *PLC* section is subdivided into smaller sub-sections.



2.16.2.1 PLC LOGIC

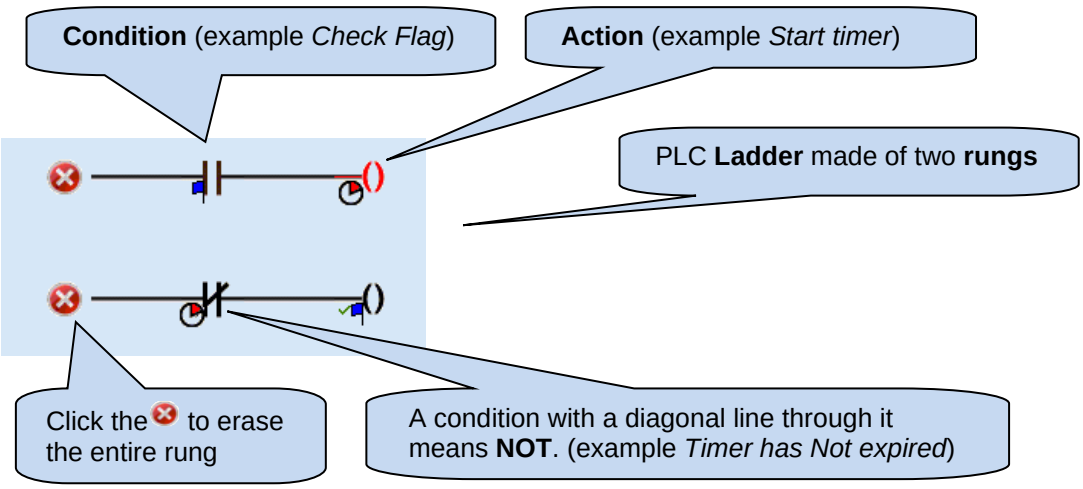
NOTE: For further details and instructions on PLC Logic and PLC Functions, refer to DSE Publication: *057-175 PLC Programming Guide* which is found on our website: *www.deepseaelectronics.com*

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*.

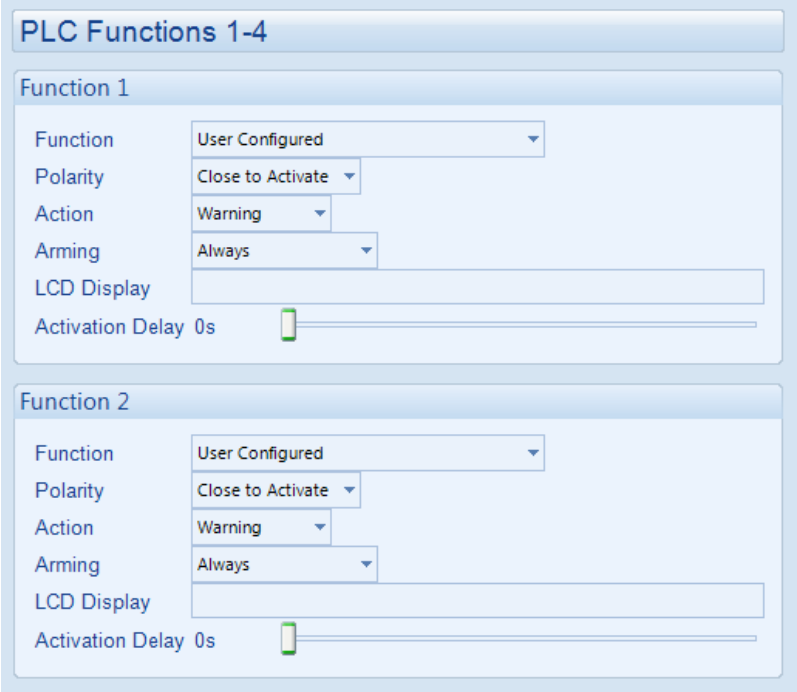
For instance if the conditions in the rung are met, the action takes place.



2.16.2.2 PLC FUNCTIONS

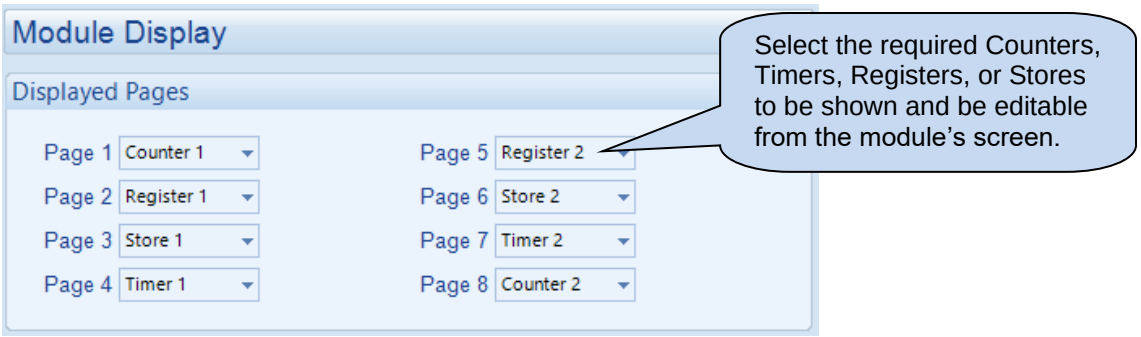
NOTE: For further details and instructions on PLC Logic and PLC Functions, refer to DSE Publication: *057-175 PLC Programming Guide* which is found on our website: *www.deepseaelectronics.com*

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.

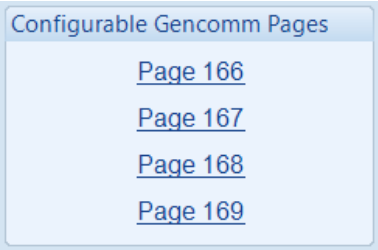


2.16.2.3 MODULE DISPLAY

The *Module Display* shows a combination of Counters, Timers, Registers and Stores on the module's PLC screen page when configured. A maximum of eight instruments can be configured in the *Module Display*.

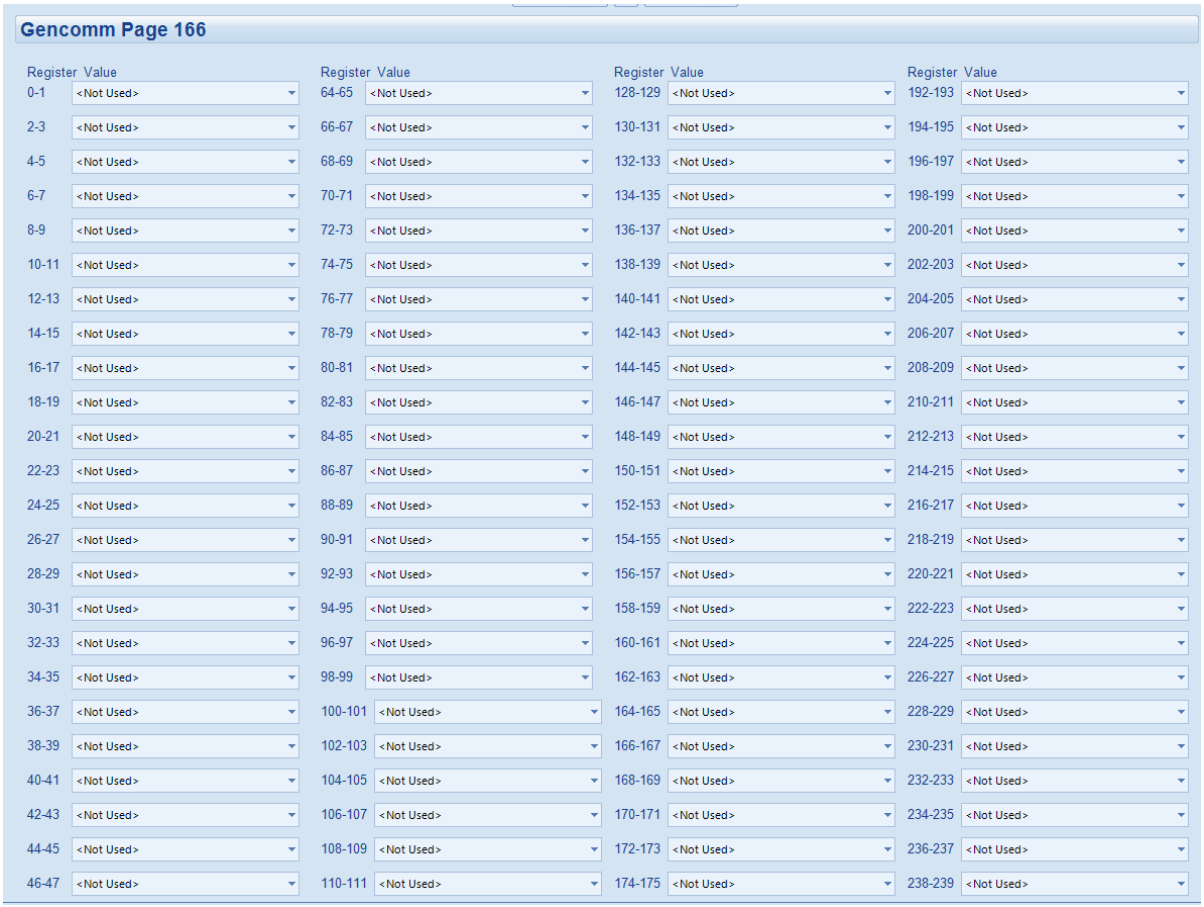


2.16.3 CONFIGURABLE GENCOMM PAGES 166 TO 169



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

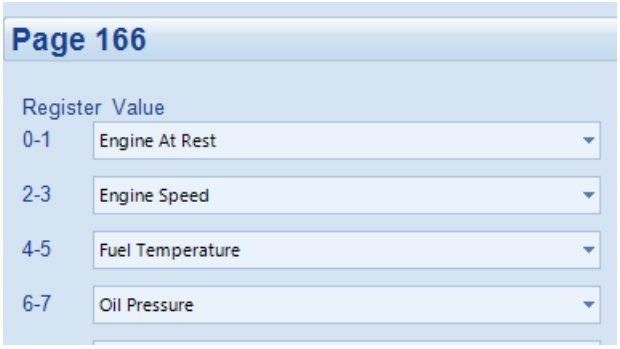
All configurable Gencomm registers are 32-bit unsigned format.



The configurable MODBUS pages are:

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

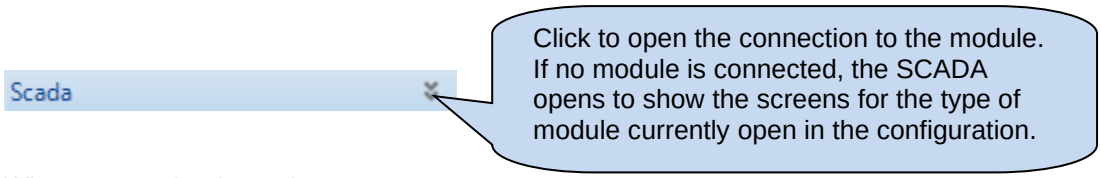
Example of Gencomm Page Configuration:



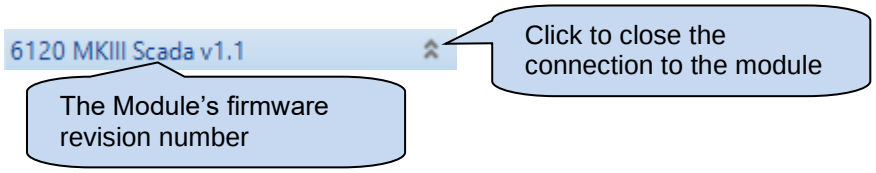
The register address is obtained from the formula:
register_address=page_number*256+register_offset.
To read the *Engine Speed* from the above register, the MODBUS master device needs to read the data in two registers and then combine the data from the Most Significant Bit and the Least Significant Bit.
MSB address in Decimal = (166 * 256) + 2 = 42498
LSB address in Decimal = (166 * 256) + 3 = 42499

3 SCADA

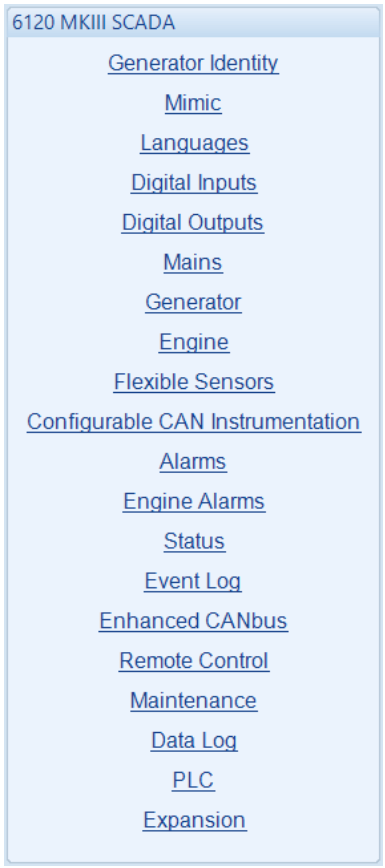
SCADA stands for Supervisory Control And Data Acquisition and is provided both as a service tool and also as a means of monitoring / controlling the generator set.
As a service tool, the SCADA pages are to check the operation of the controller's inputs and outputs as well as checking the generators operating parameters.



When connection is made…



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



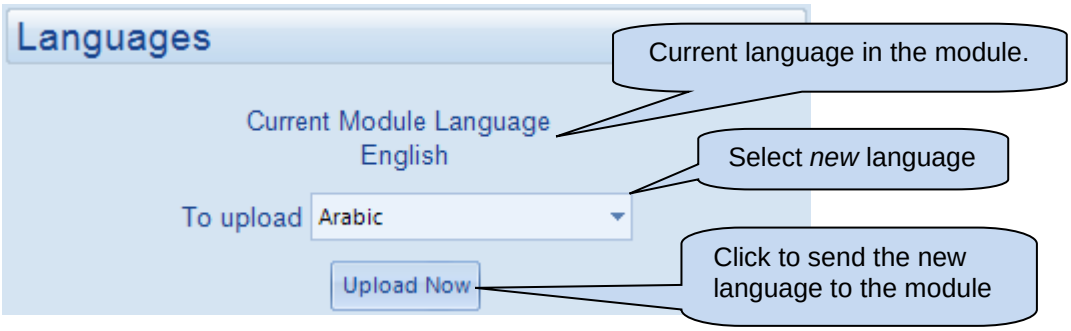
3.1 GENERATOR IDENTITY

Shows the module's current settings for *Site ID* and *Genset ID*

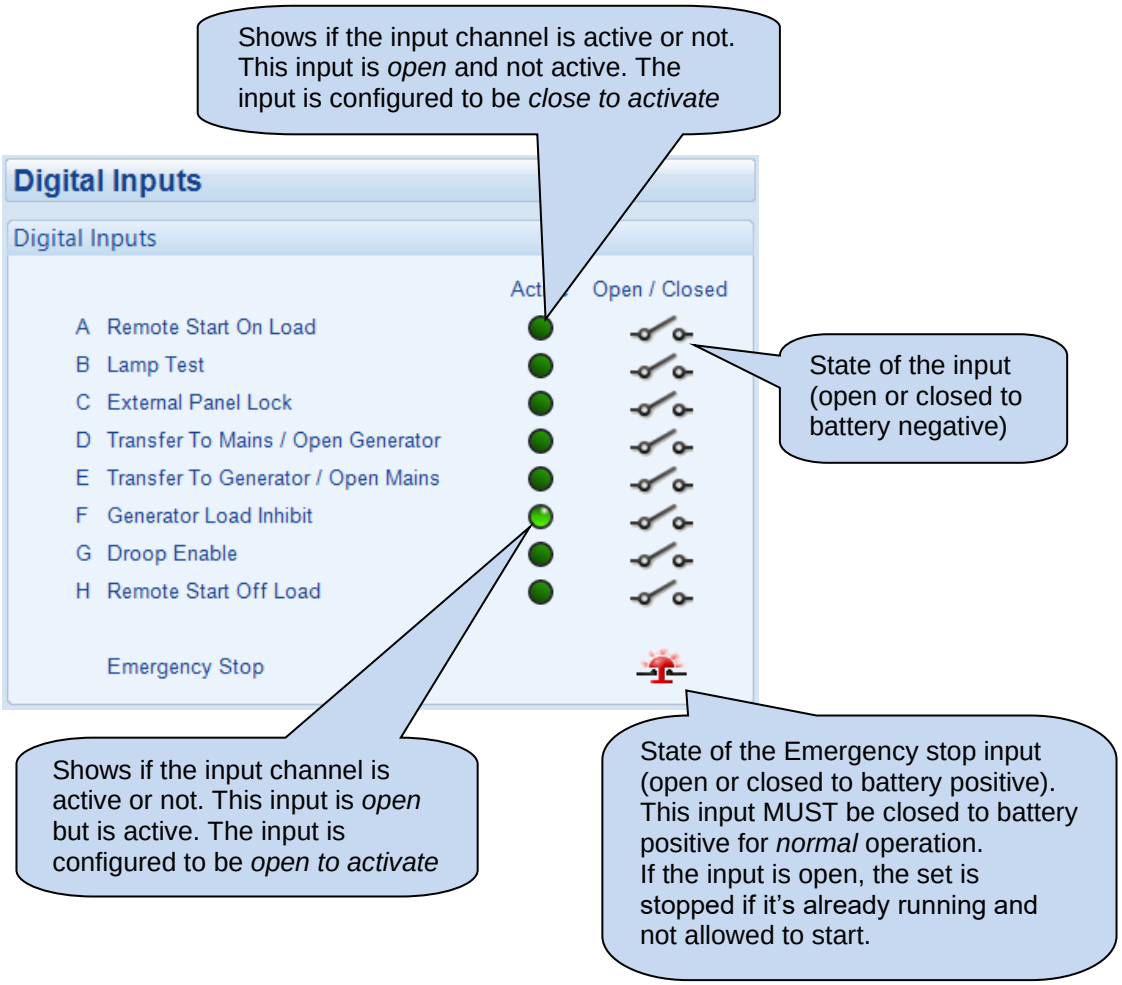
3.2 MIMIC

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

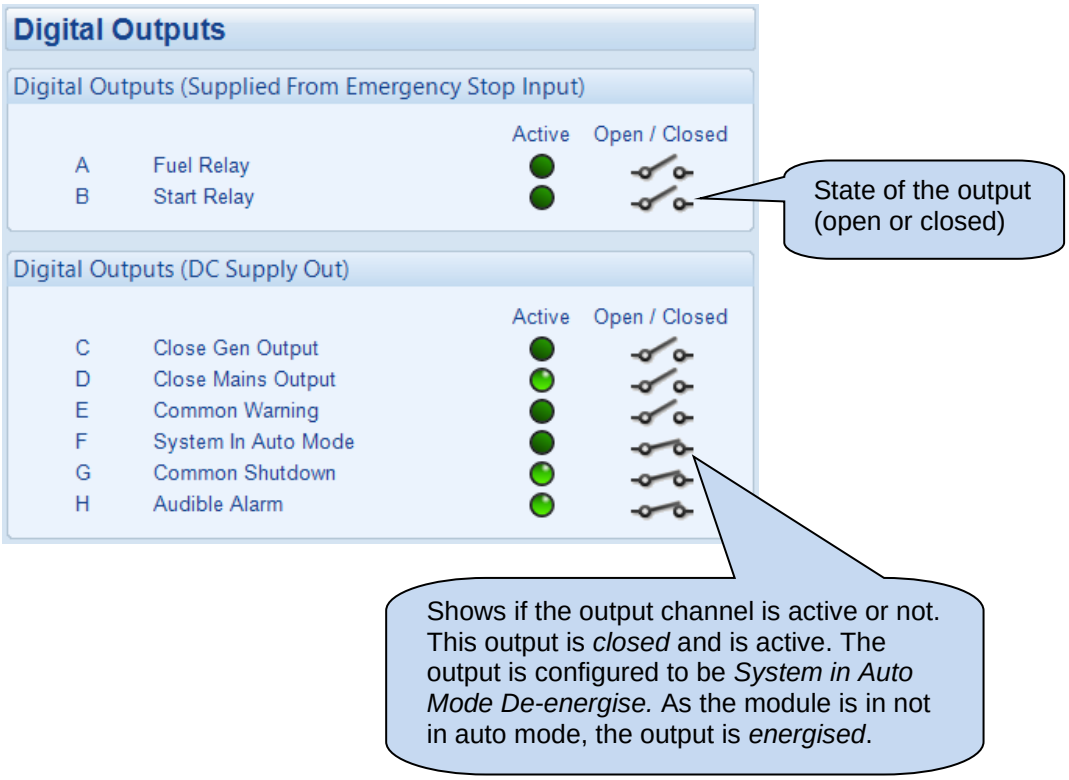
3.3 LANGUAGES



3.4 DIGITAL INPUTS



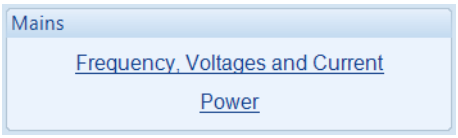
3.5 DIGITAL OUTPUTS



3.6 MAINS

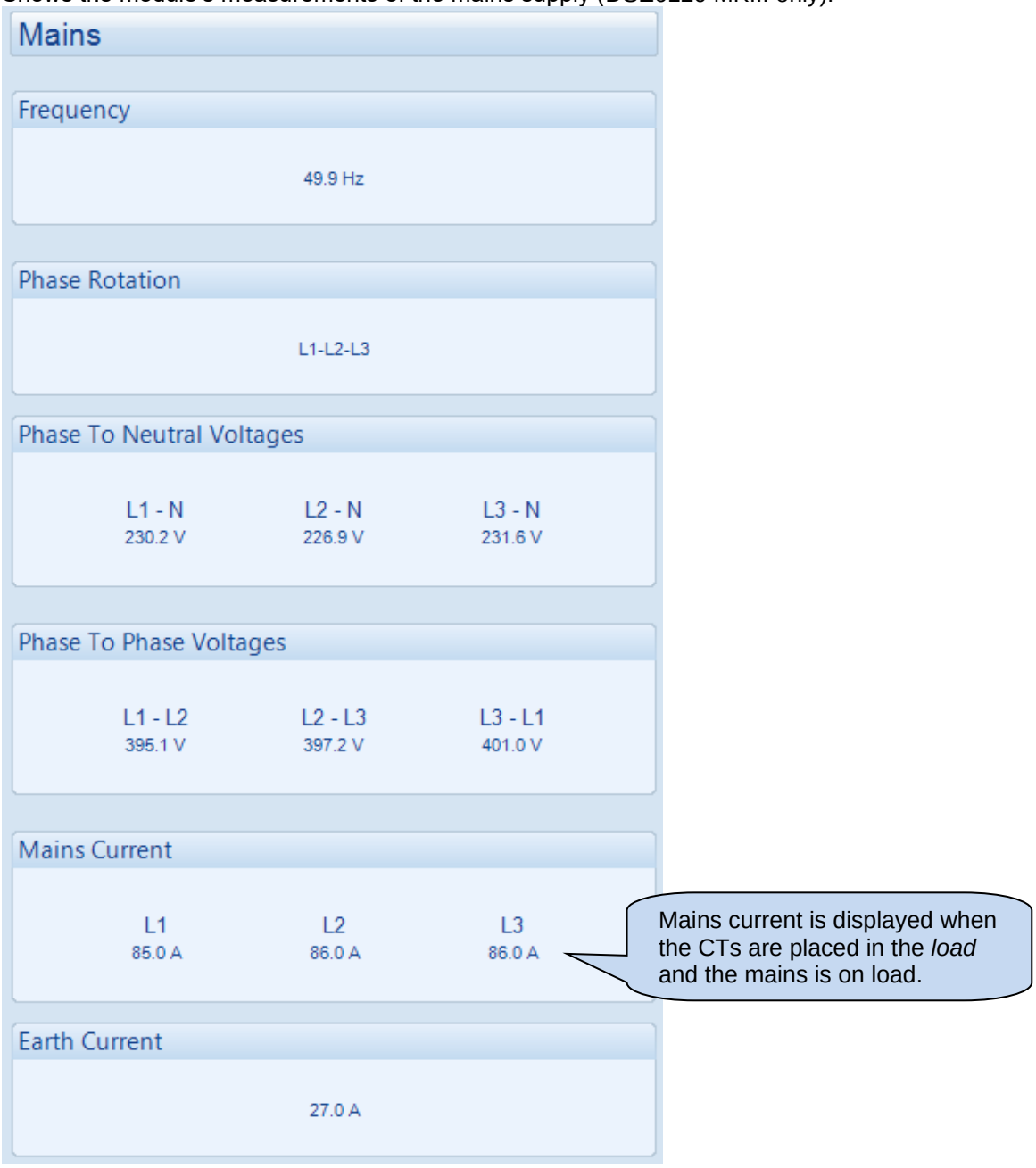
= Only available on DSE6120 MKIII Modules

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



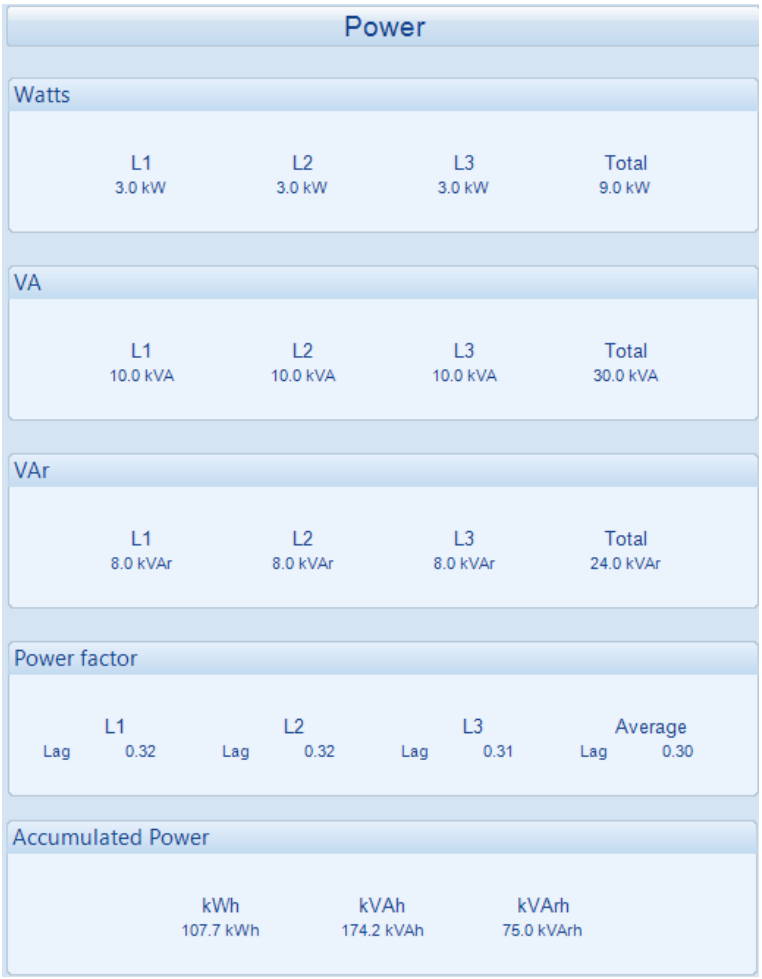
3.6.1 FREQUENCY, VOLTAGES AND CURRENT

Shows the module's measurements of the mains supply (DSE6120 MKIII only).



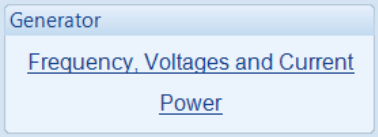
3.6.2 POWER

Shows the modules measurements of the mains supply power (DSE6120 MKIII only).



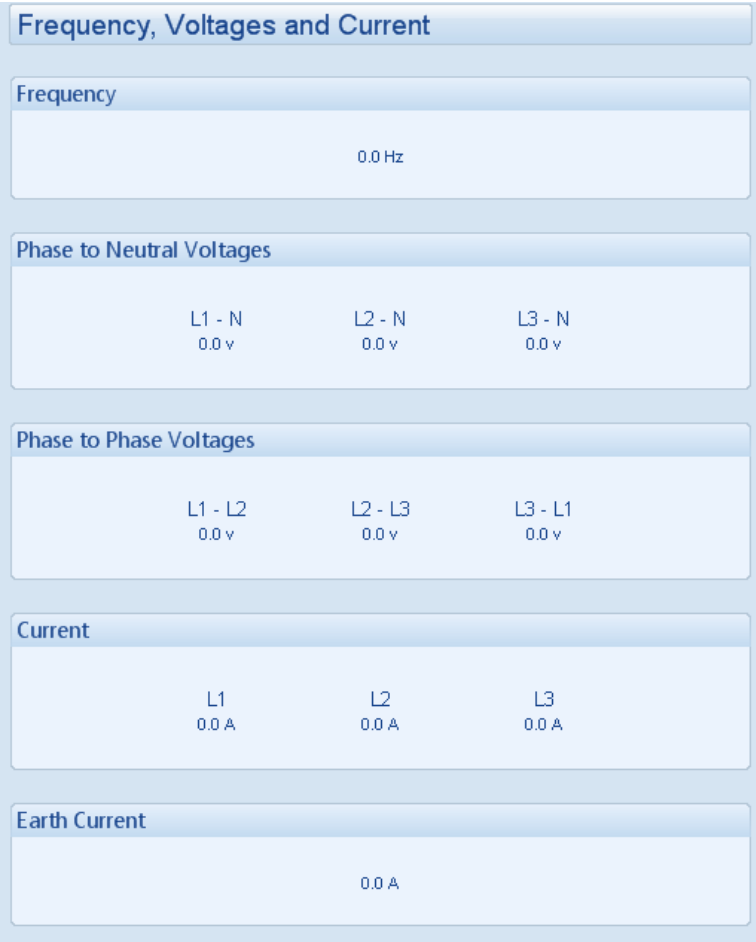
3.7 GENERATOR

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



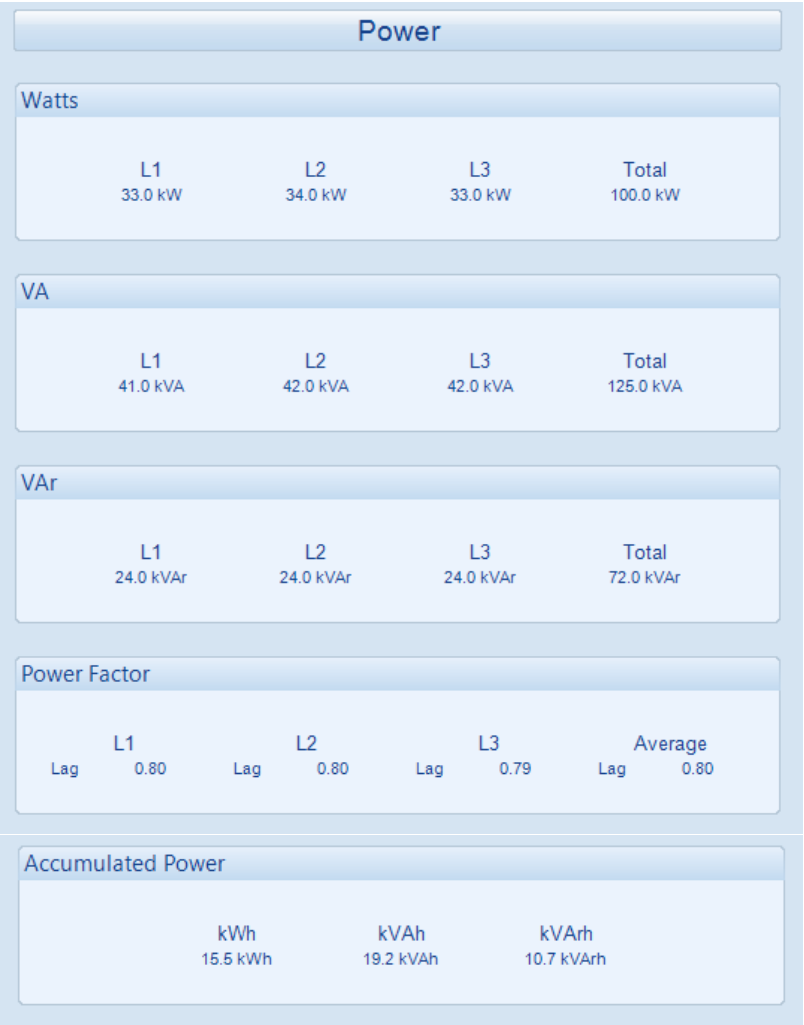
3.7.1 FREQUENCY, VOLTAGES AND CURRENT

Shows the modules measurements of the generator supply.



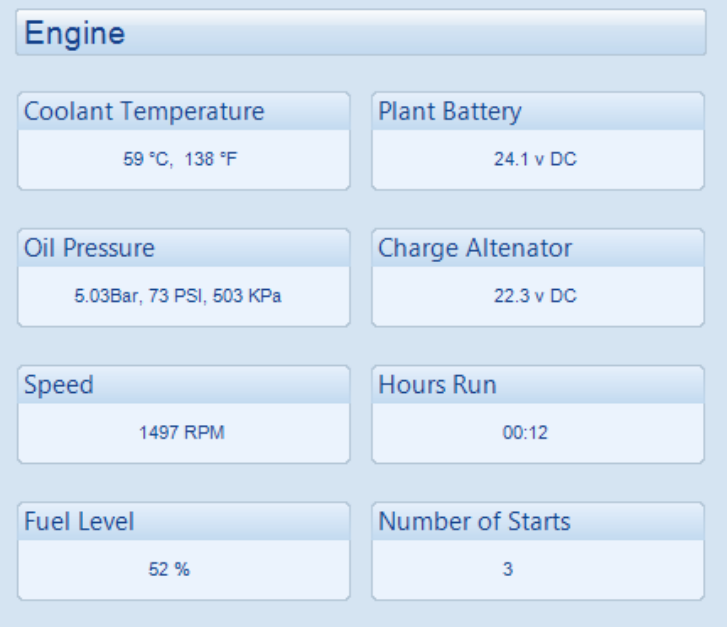
3.7.2 POWER

Shows the module's measurements of the generator supply power.



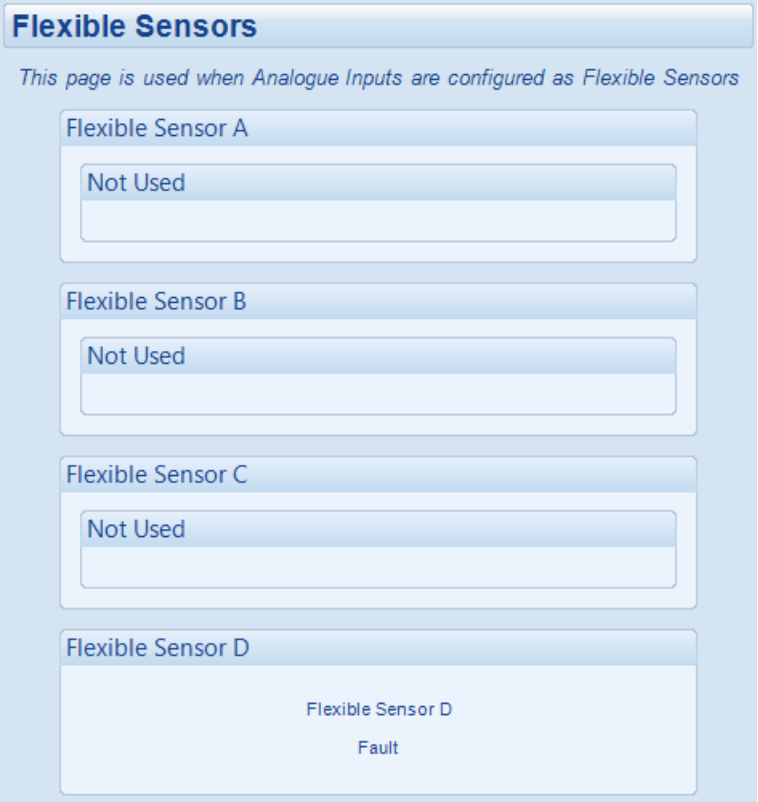
3.8 ENGINE

Shows the modules measurements of the engine parameters.



3.9 FLEXIBLE SENSORS

Shows the modules measurements of the flexible sensors parameters.

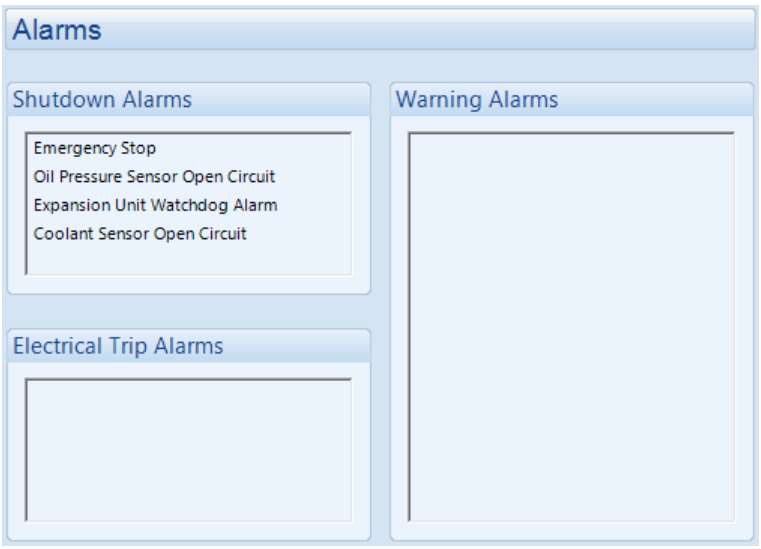


3.10 CONFIGURABLE CAN INSTRUMENTATION

Shows the module's readings of the configured *CAN Instrumentation*. This is only available if the module is configured for *Configurable CAN Instrumentation*, the *Enhanced Canbus* option is enabled, and the message is available over the relevant configured CAN bus.

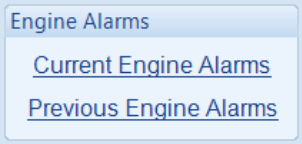
3.11 ALARMS

Shows any present alarm conditions.



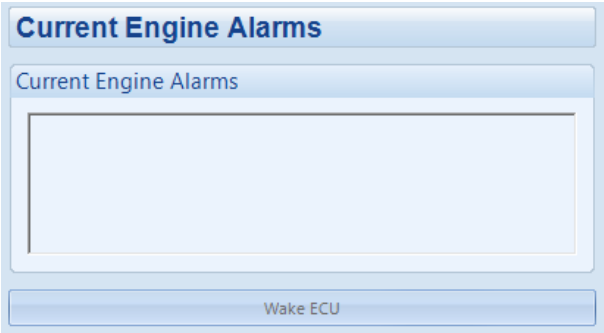
3.12 ENGINE ALARMS

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



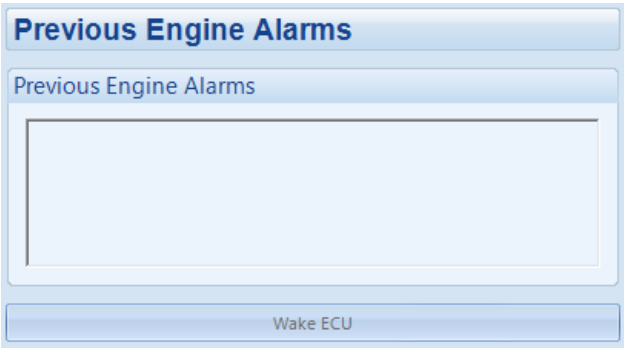
3.12.1 CURRENT ENGINE ALARMS

Shows the current engine alarms.



3.12.2 PREVIOUS ENGINE ALARMS

Shows the previous engine alarms.

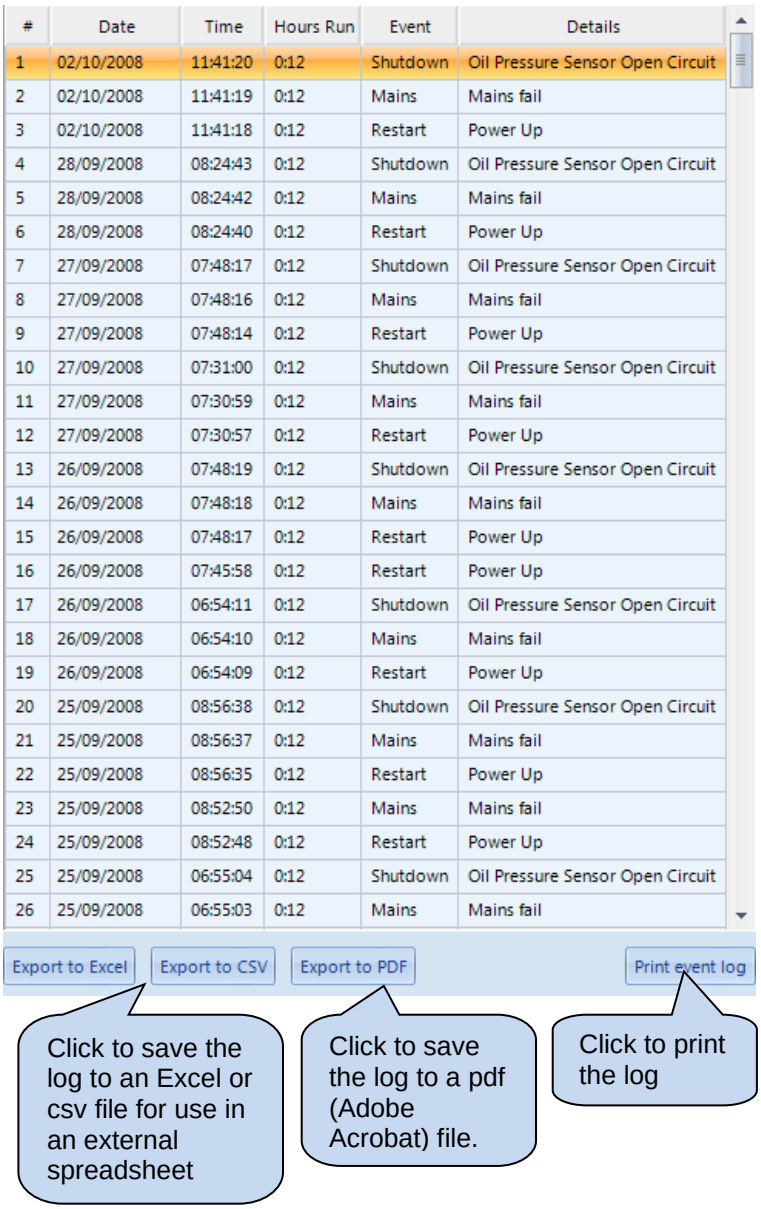


3.13 STATUS

Shows the module's current status.

3.14 EVENT LOG

Shows the contents of the module's event log.



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

3.15 ENHANCED CANBUS

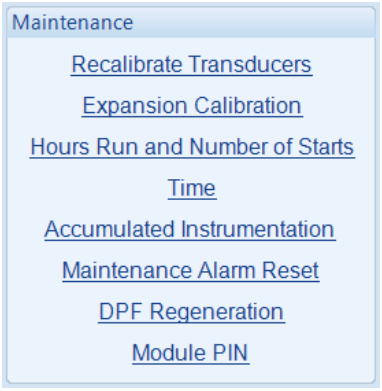
Shows the module's readings of enhanced Canbus parameters. This is only available if the module is configured for CAN communication and the *Enhanced Canbus* option is enabled.

3.16 REMOTE CONTROL

The remote control section of the SCADA section is used for monitoring and control of module ‘remote control’ sources.
Any of the module outputs, expansion outputs, LED indicators, or remote Annunciator LEDs are to be configured to *Remote Control 1-10*. This output source is energised/de-energised by click the respective check box as shown below in the *Activate* column below.

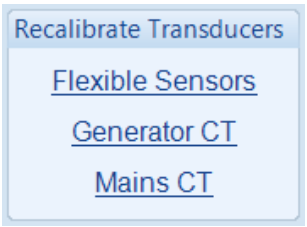
3.17 MAINTENANCE

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



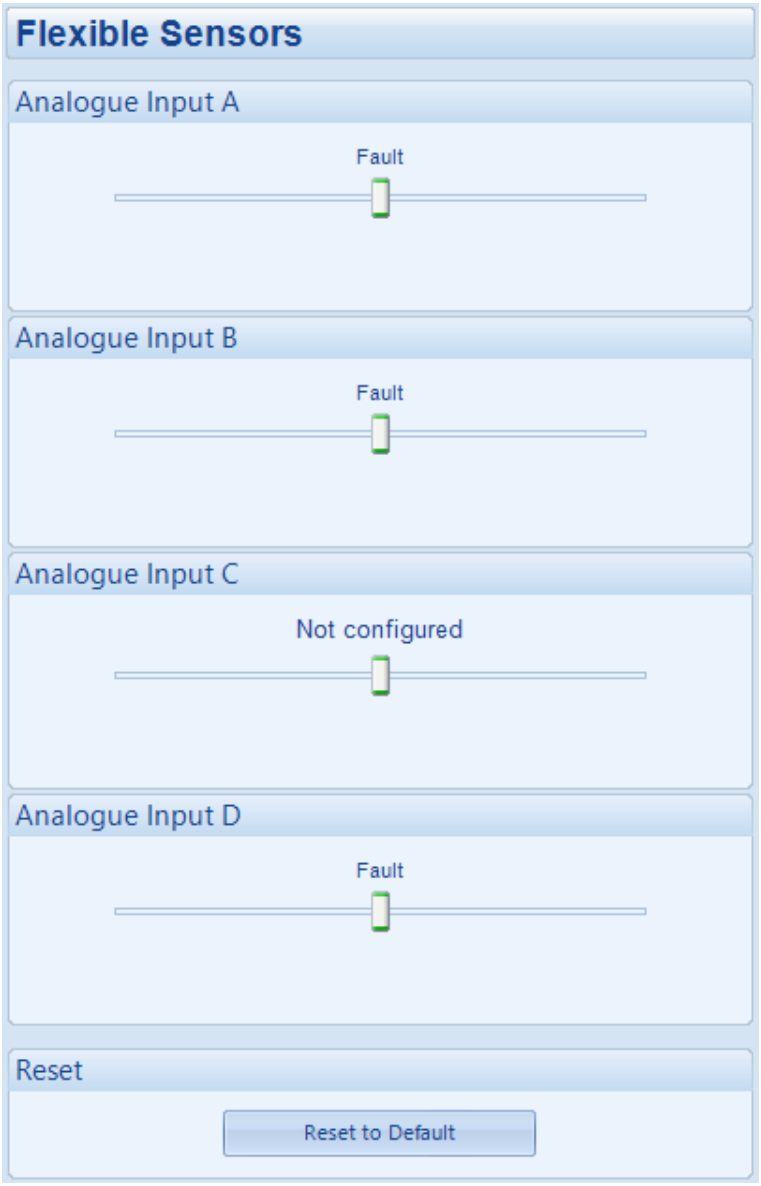
3.17.1 RECALIBRATE TRANSDUCERS

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



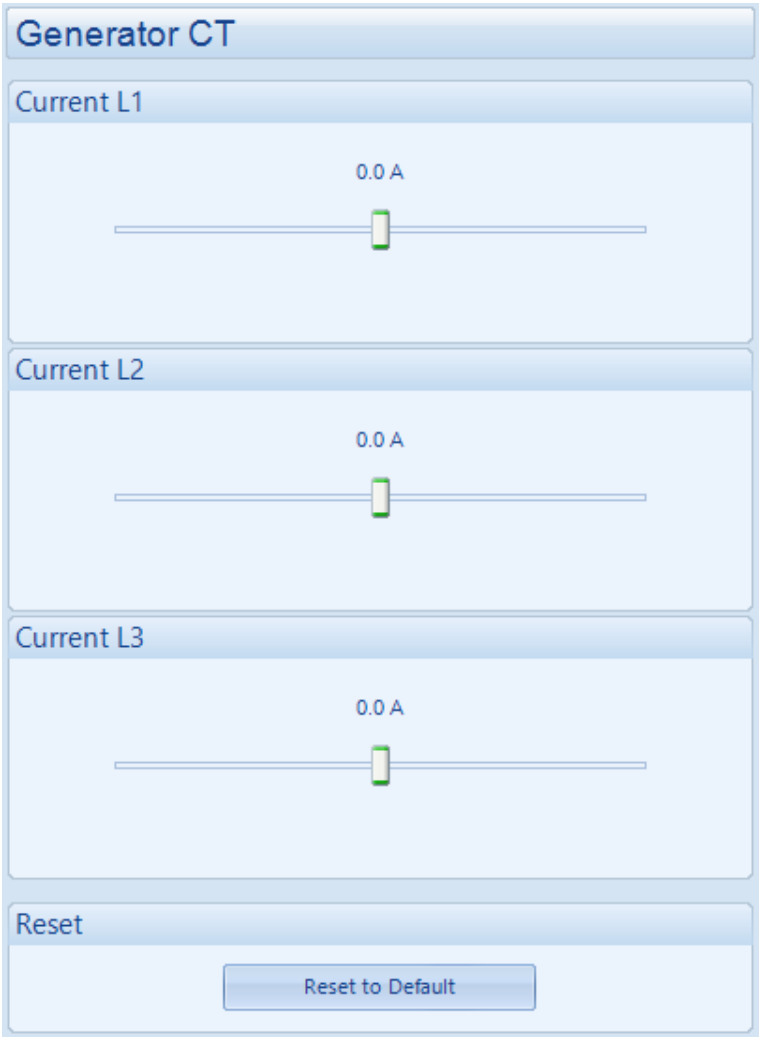
3.17.1.1 FLEXIBLE SENSORS

Allows the recalibration of the flexible sensors (when enabled in the module configuration).



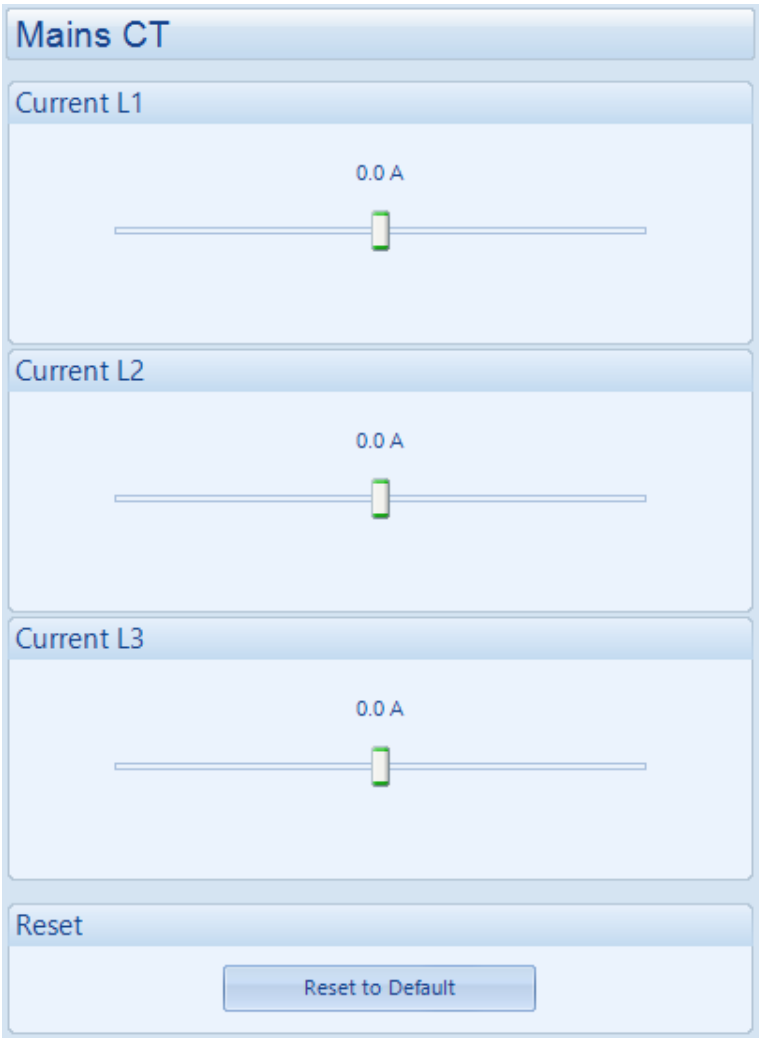
3.17.1.2 GENERATOR CT

Allows the recalibration of the generator CT readings.



3.17.1.3 MAINS CT

= Only available on DSE6120 MKIII Module and when the *CT Location* is configured to *Load.*

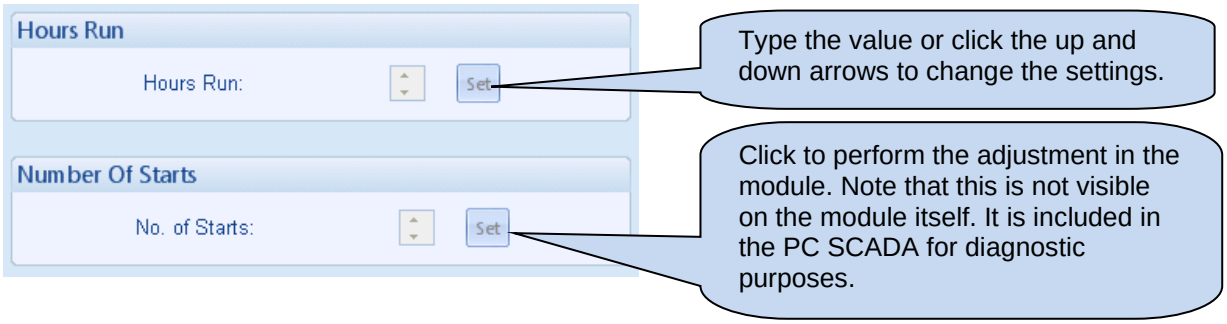


3.17.2 EXPANSION CALIBRATION

This section allows the analogue sensor inputs of the DSE2130 and DSE2131 expansion modules to be calibrated to remove inaccuracies caused by the tolerance of the sensor devices. While the engine is running, the instruments are calibrated and reference needs to be made to a third party accurate sensing device to ensure accurate recalibration.

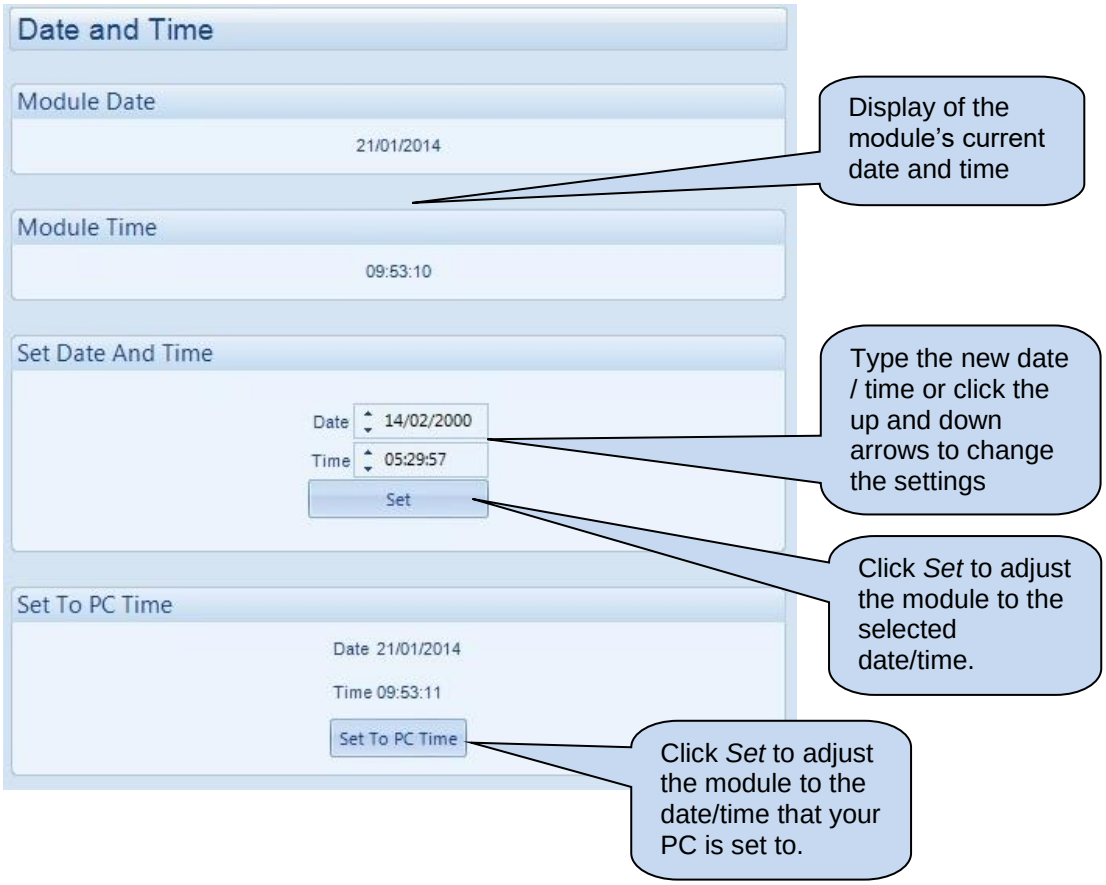
3.17.3 HOURS RUN AND NUMBER OF STARTS

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



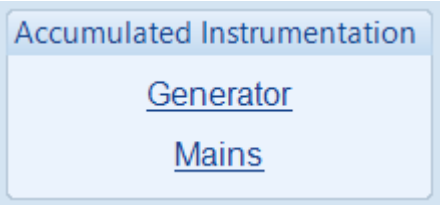
3.17.4 TIME

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



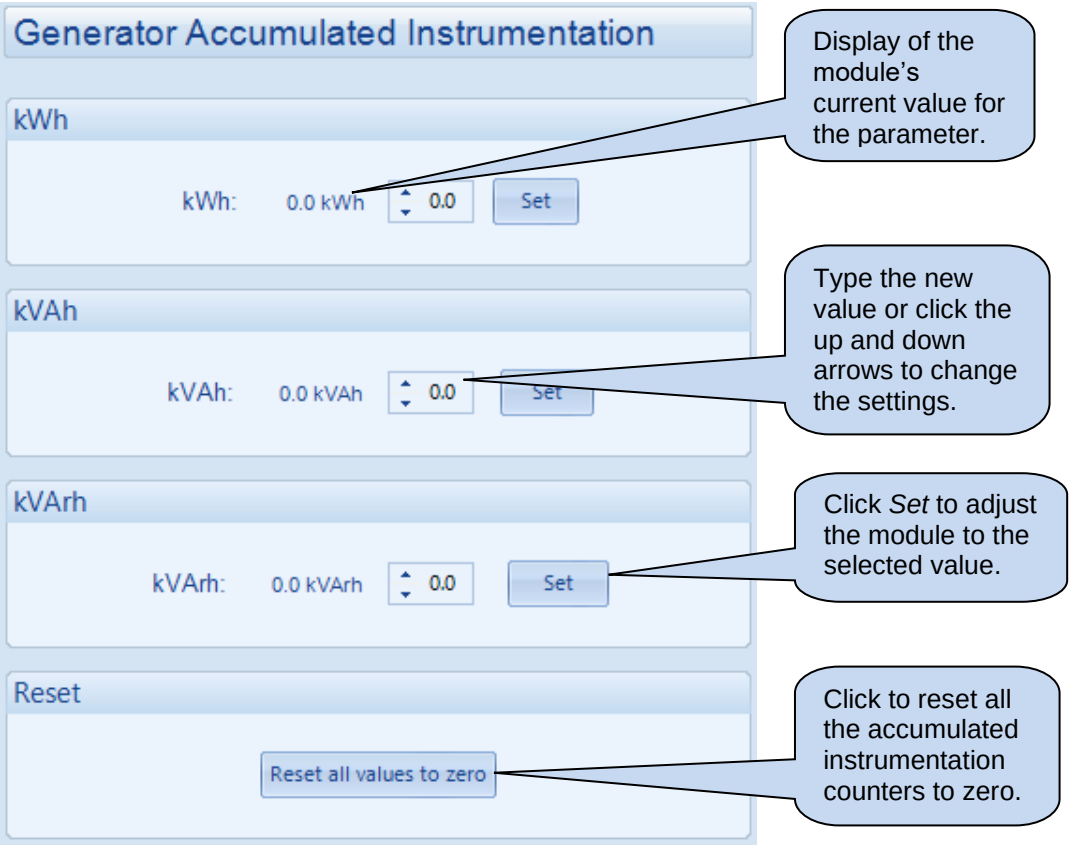
3.17.5 ACCUMULATED INSTRUMENTATION

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



3.17.5.1 GENERATOR

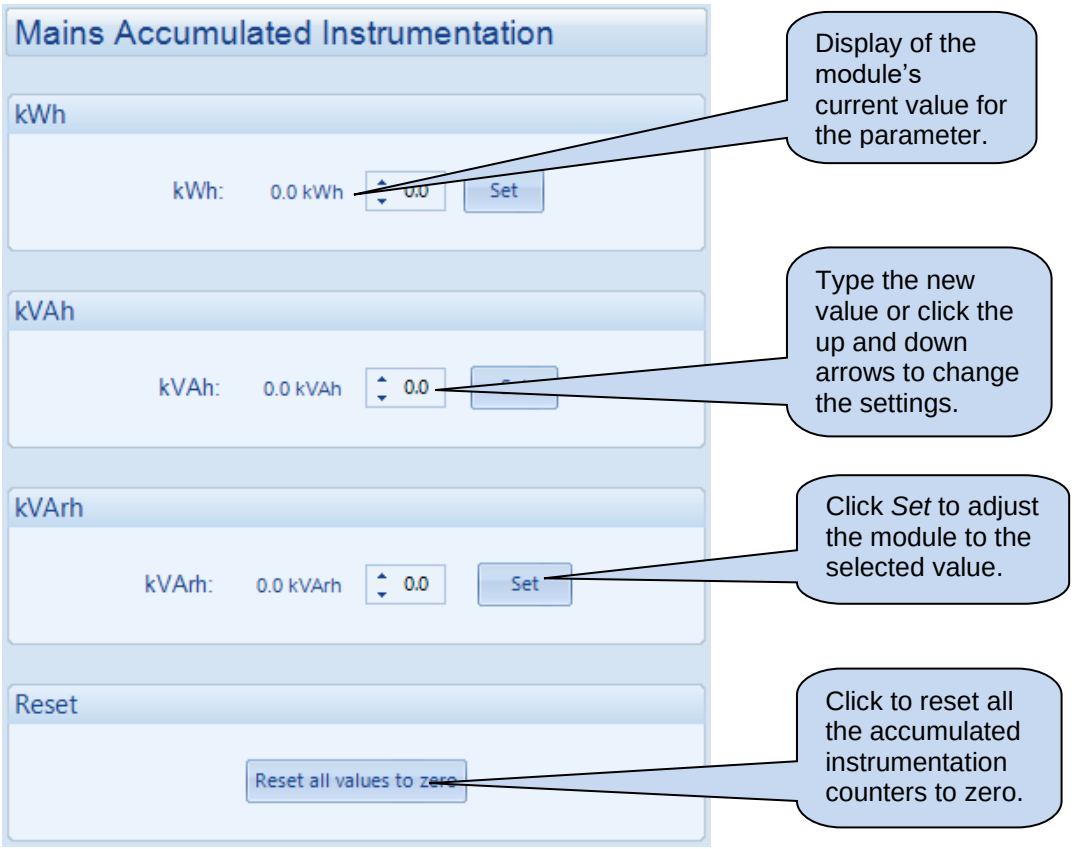
Allows the user to view or change the module's Generators accumulated instrumentation.



3.17.5.2 MAINS

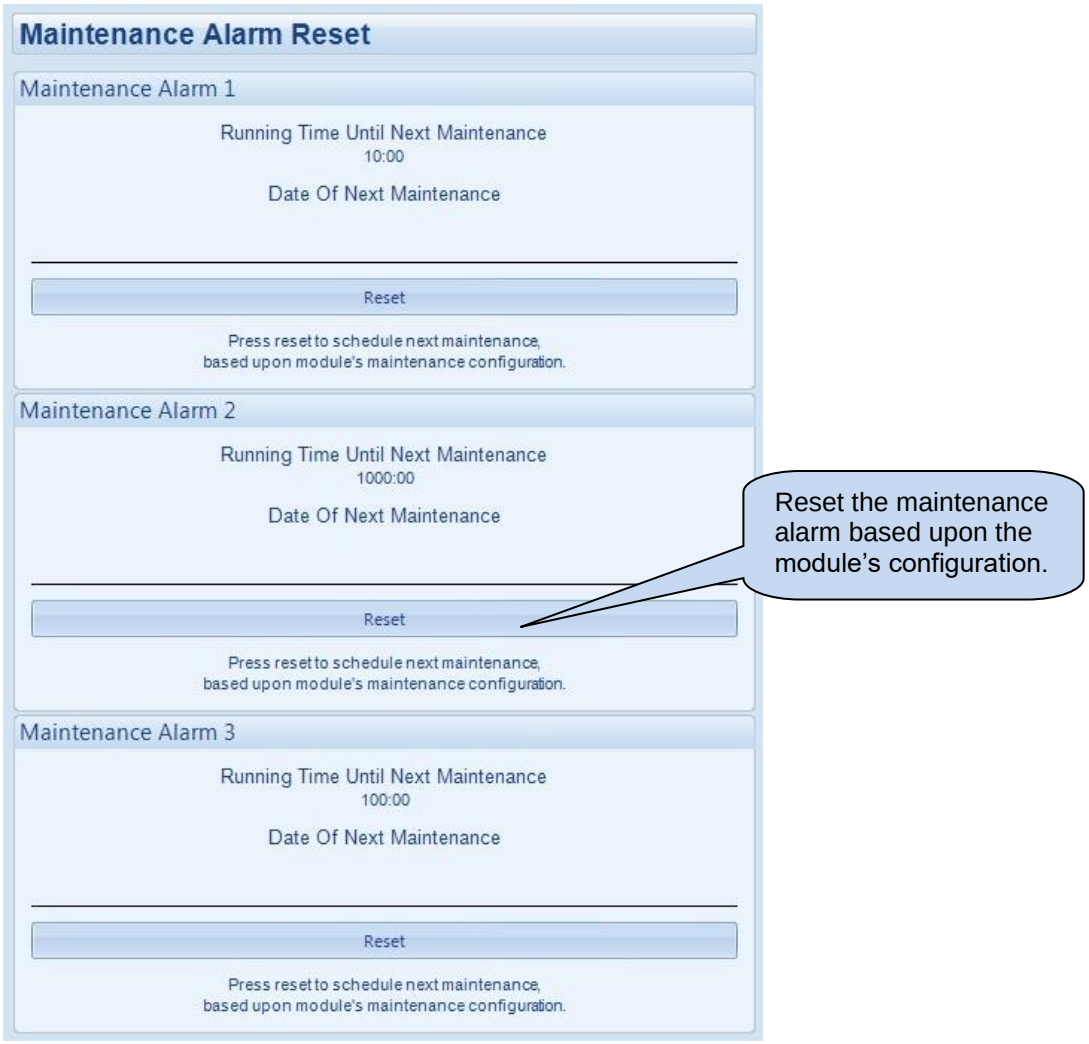
= Only available on DSE6120 MKIII Modules and when the *CT Location* is configured to *Load.*

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



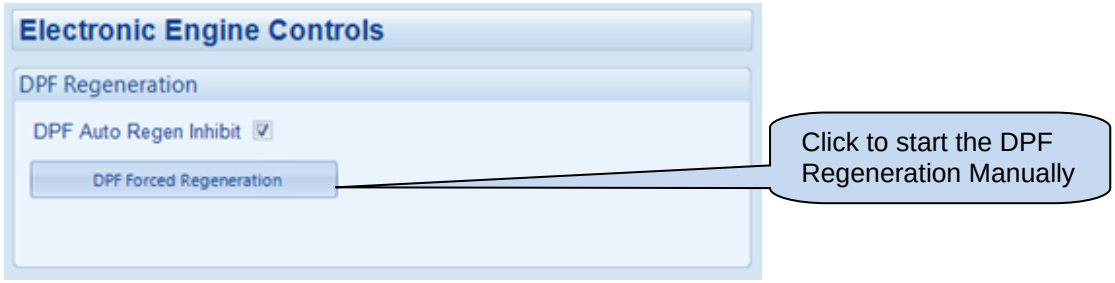
3.17.6 MAINTENANCE ALARM RESET

Three maintenance alarms active in the control module. Each is reset individually;



3.17.7 DPF REGENERATION

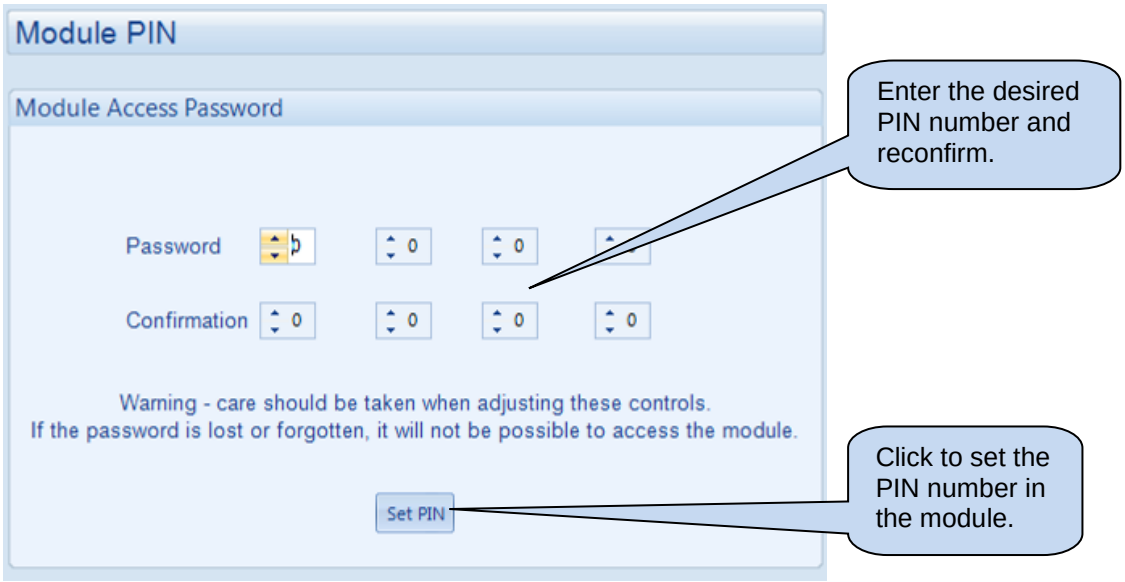
The DPF Forced Regeneration is controlled when the Electronic Engine supports the Non-mission DPF Regeneration.



3.17.8 MODULE PIN

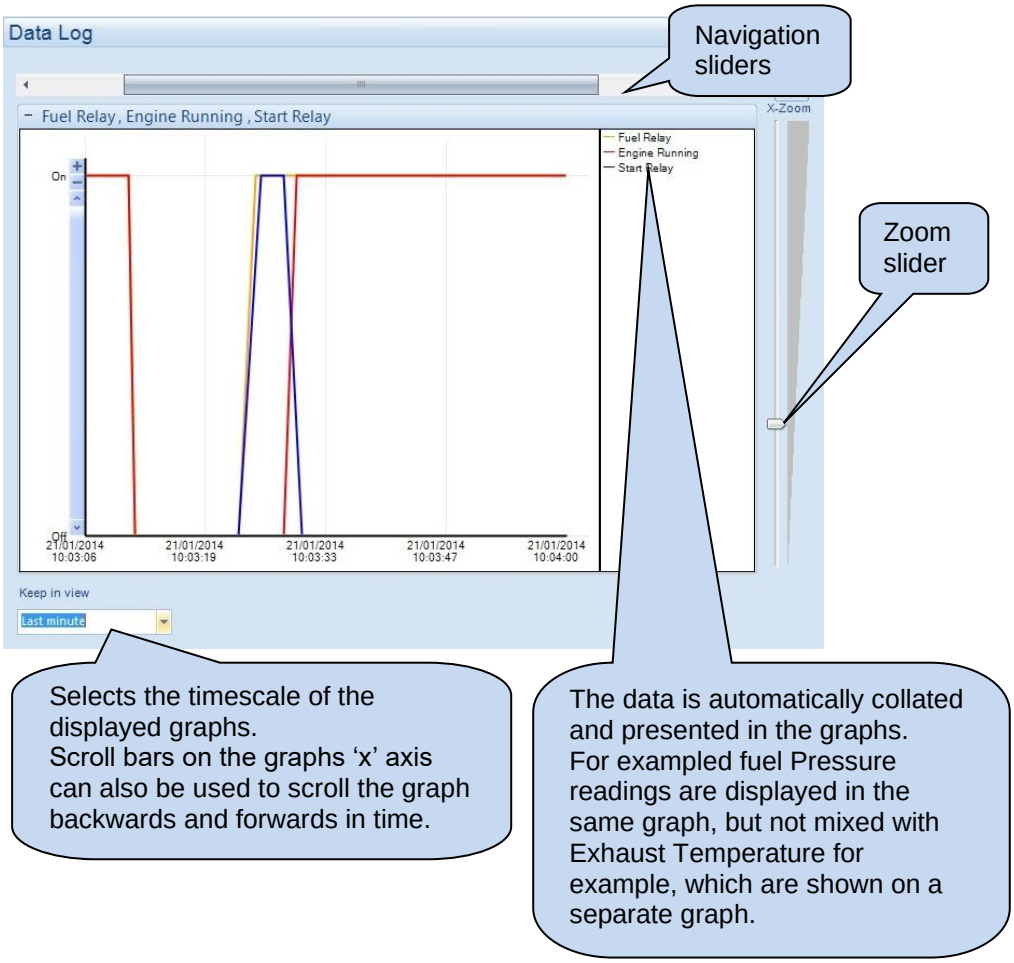
NOTE: If the PIN is lost or forgotten, it is no more possible to access the module!

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



3.18 DATA LOG

Allows viewing of the module datalog (if configured).



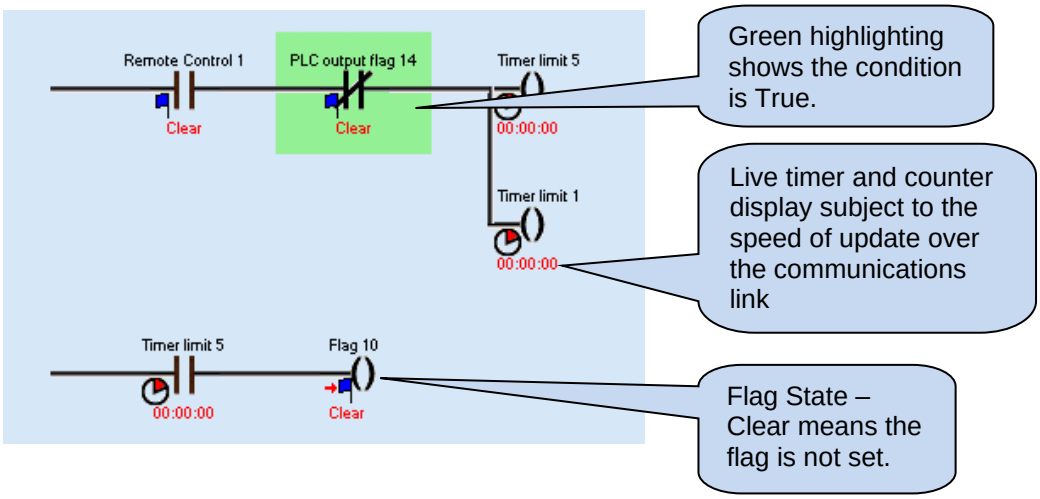
3.19 PLC

NOTE: For further details and instructions on PLC Logic and PLC Functions, refer to the DSE PLC PROGRAMMING GUIDE, document part number 057-175.

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

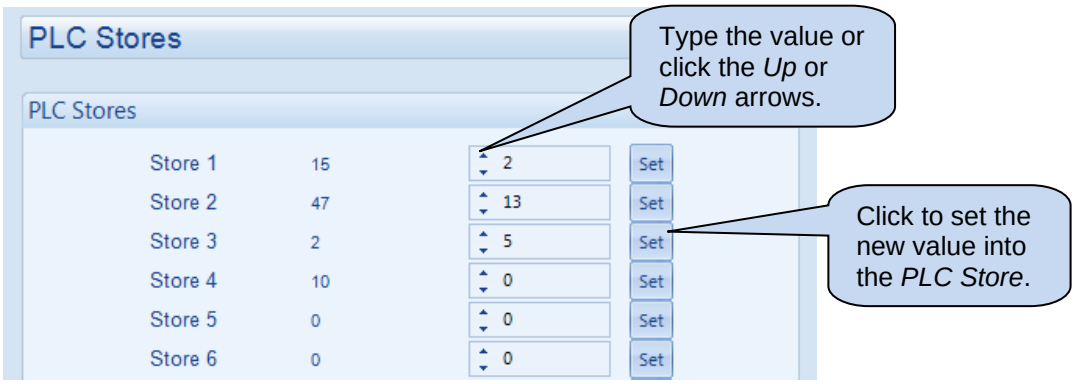
3.19.1 PLC LOGIC

Allows monitoring of the PLC functions within the controller.

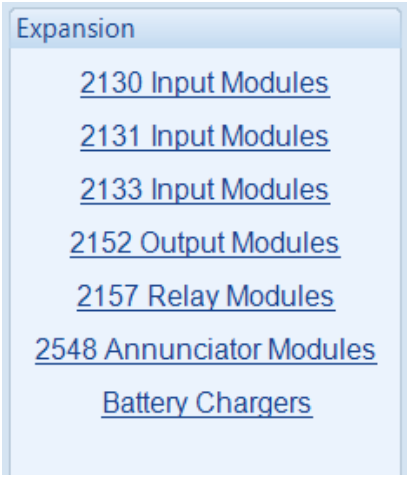


3.19.2 PLC SOTRES

Allows the editing and setting of PLC Stores values.

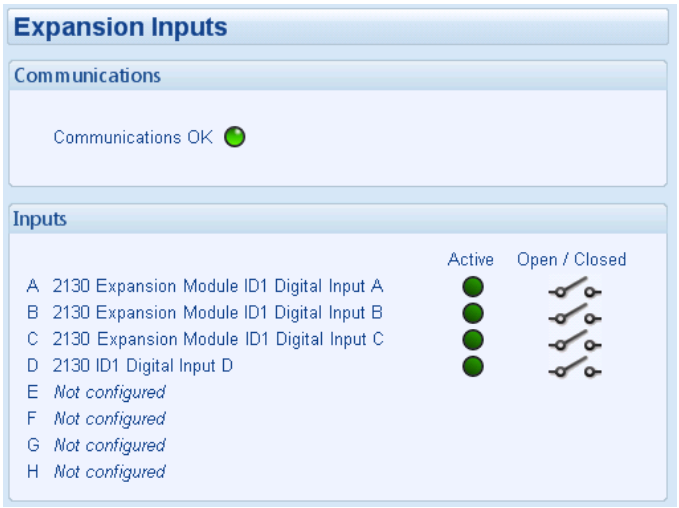


3.20 EXPANSION



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

For example:



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

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	Stopped	Start Delay	ECU Wake Up Delay	Preheat	Cranking	Safety Delay	Smoke Limiting	Smoke Limiting Off	Warming Up	Gen Available / Gen On Load	Cooling	Cooling in Idle
Never												
Always												
When Stationary												
Wait for ECU												
From Starting												
Overfrequency / Overspeed Overshoot												
Engine Protection												
From Safety On												

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.

5.3 WHEN STATIONARY

The protection is active from the moment the engine stops until the beginning of engine cranking.

5.4 WAIT FOR ECU

The protection is active if the ECU Start Up delay has been configured and the timer is currently active.

5.5 FROM STARTING

The protection is active from the beginning of engine cranking, until the engine stops.

5.6 OVERSHOOT

Active during the *Safety Delay* timer, this allows for a temporary raise of the overspeed/overfrequency trip points during start-up.

Protection Level	Over Frequency Trip Level	Over Speed Trip Level
Immediate Shutdown	Over Frequency + Overshoot %	Over Speed + Overshoot %
Delayed Shutdown (Overspeed Overshoot Delay)	Over Frequency	Over Speed

Example

57 Hz *Over Frequency* setting, 10% *Overspeed Overshoot*
During *Safety Delay* a generator frequency above (57 Hz x 1.1) = 62.7 Hz results in an immediate shutdown without delay.
After *Safety delay*, a generator frequency above 57 Hz for the period of the *Generator Transient Delay* results in a shutdown

5.7 ENGINE PROTECTION

The protection is active when the engine is running and all engine protection (for example oil pressure and coolant temperature) are in a ‘healthy’ state.
Oil Pressure Warning
Oil Pressure Shutdown
Oil Pressure Open Circuit (CANbus engine)
High Coolant Temperature Warning
High Coolant Temperature Shutdown
High Coolant Temperature Electrical Trip
High Coolant Temperature Open circuit (CANbus engine)
CAN ECU Warning
CAN ECU Shutdown

5.8 FROM SAFETY ON

The protection is active when the set is running at nominal speed, until the engine stops.

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