DEEP SEA ELECTRONICS

DSEL401 MKII Configuration Suite
PC Software Manual

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DSEL401 MKII Configuration Suite PC Software Manual

Amendments Since Last Publication

Issue	Comments
1	Initial release
1.1	Checked text and corrected minor typos
2	Amended to include new module features: - Limit Audible Alarm Duration - Mains Supply - Light Output Override - Power Save Mode digital input - Auto Retry on Loss of Crank Disconnect
3	Amended to include new module features: - Sunrise / Sunset scheduling options - Block Heater output - Fuel Pull In Coil output - Generator Within Standards output - Engine Interface 7 support - Increased mast control functionality
4	- Generator Options changed to suit new DC Topology's - Manual Mode Description added
5	- Added Crank Disconnect on Oil Pressure Delay - Updated Style of document

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 DSEL401 MKII module, which is 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 DSEL401 MKII module to be connected to a PC via USB A to USB B cable (USB printer cable). Once connected, the software allows easy, controlled access to various operating parameters within the module which can then be viewed and edited as required.

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

The information contained in this manual must be read in conjunction with the information contained in the appropriate module documentation. This manual only details which settings are available and how they may be used. Separate manuals deal with the operation of the individual module and its ancillaries, refer to section entitled *Bibliography* elsewhere in this document 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
DSEL4xx	All modules in the DSEl4xx range.
DSEL401 MKII	DSEL401 MKII module/controller
CAN	Controller Area Network Vehicle standard to allow digital devices to communicate to one another.
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.
FMI	Failure Mode Indicator A part of DTC that indicates the type of failure, e.g. high, low, open circuit etc.

Continued over page…

Term	Description
Fuel Tank Bund	An external tank used to collect fuel that may leak or overflow from the fuel tank. This tank may also be integral to the main fuel tank. A level switch is usually located within the Bund to indicate the presence of the leak or overflow condition. May be called Retention Tank in some locales.
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.
IEEE	Institute of Electrical and Electronics Engineers
LED	Light Emitting Diode
OC	Occurrence Count A part of DTC that indicates the number of times that failure has occurred.
PGN	Parameter Group Number A CANbus address for a set of parameters that relate to the same topic and share the same transmission rate.
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
053-172	DSEL401 MKII Installation Instructions

1.3.2 MANUALS

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

DSE Part	Description
057-151	DSE Configuration Suite PC Software Installation & Operation Manual
057-004	Electronic Engines and DSE Wiring
057-221	DSEL401 MKII 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
056-006	Introduction to Comms
056-010	Over Current Protection
056-022	Switchgear Control
056-023	Adding New CAN Files
056-026	kVA, kW, kvar and Power Factor
056-029	Smoke Limiting
056-030	Module PIN Codes
056-051	Sending DSEGencomm Control Keys
056-055	Alternate Configurations
056-069	Firmware Update
056-076	Reading DSEGencomm Alarms
056-079	Reading DSEGencomm Status
056-080	MODBUS
056-081	Screen Heaters
056-082	Override Gencomm PLC Example
056-091	Equipotential Earth Bonding
056-092	Best Practices for Wiring Restive Sensors
056-095	Remote Start Input Functions
056-097	USB Earth Loops and Isolation
056-099	Digital Output to Digital Input Connection

1.3.4 THIRD PARTY DOCUMENTS

The following third party documents are also referred to:

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.

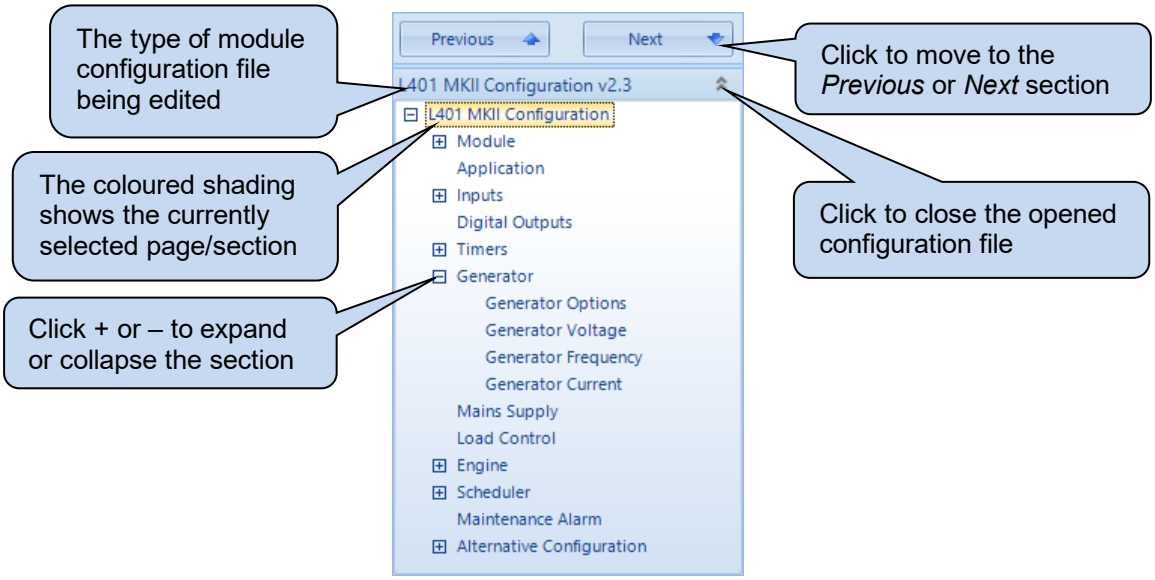
1.4 INSTALLATION AND USING THE DSE CONFIGURATION SUITE SOFTWARE

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*** found on the DSE's website: www.deepseaelectronics.com

2 EDITING THE CONFIGURATION

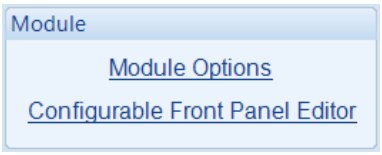
The software is broken down into separate sections to provide simple navigation whilst editing the module's configuration to suit a particular application.

2.1 SCREEN LAYOUT



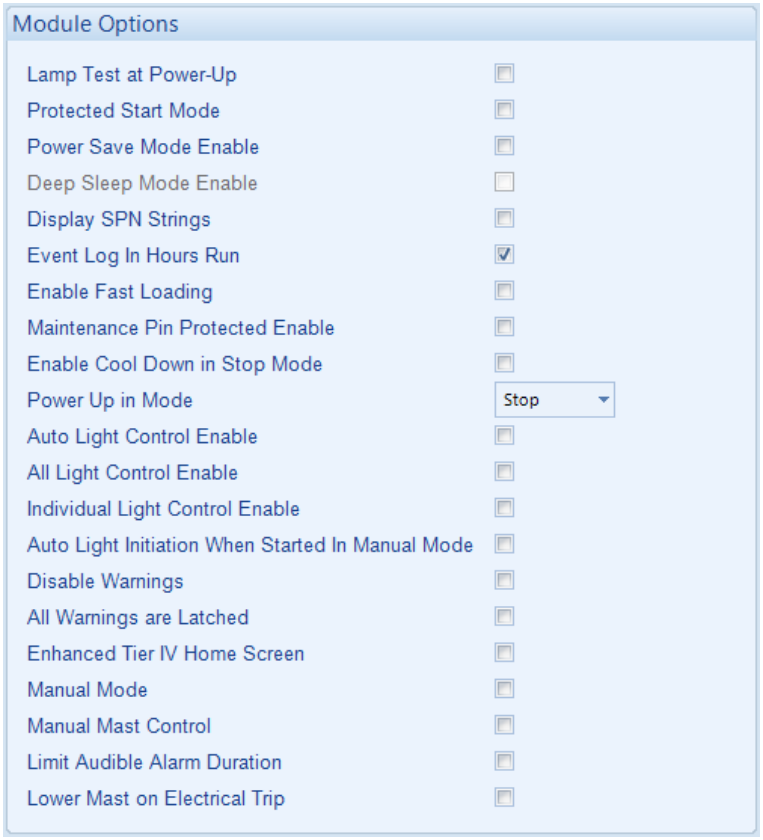
2.2 MODULE

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



2.2.1 MODULE OPTIONS

Module Options



Parameter	Description
Lamp Test At Power Up	☐ = Feature disabled ☑ = All the LEDs on the module's fascia illuminate when the DC power is applied as a 'lamp test' feature.
Protected Start Mode	☐ = Pressing the Start button on the module initiates the starting sequence ☑ = The Start button needs to be pressed twice to confirm a manual start request. When the Start button is pressed once the module waits for 30 seconds for the next press to start the generator in Manual mode, if the Start button is not pressed a second time within the next 30 seconds, the mode changes to Stop mode for safety.
Power Save Mode Enable	☐ = Normal operation ☑ = Module goes into power save (low current) mode after 1m of inactivity in STOP mode. Press any button to 'wake' the module.

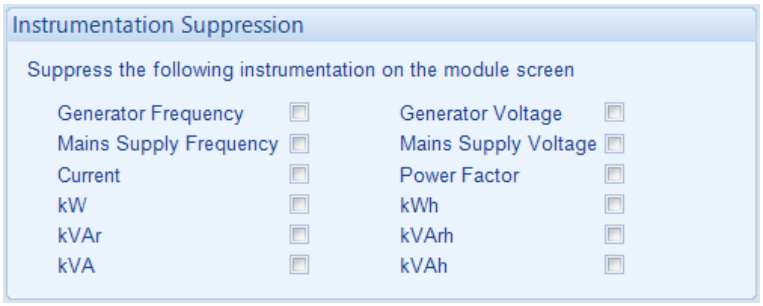
Parameters are continued overleaf…

Parameter	Description
Deep Sleep Mode Enable	**NOTE: Available only if Power Save Mode is Enabled** ☐ = Normal operation ☑ = When enabled, the module goes into a deeper sleep state with maximum power saving
Display SPN Strings	☐ =The module displays CAN messages in manufacturer numerical code. ☑ = The module displays CAN messages in ENGLISH text alongside the manufacturer numerical code.
Event Log in Hours Run	☐ = Recorded events in the module's event log include the date/time stamp ☑ = The engine run hours is added to the recorded event in the event log
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.)** ☐ = Normal Operation, the safety on timer is observed in full. This feature is useful if the module is to be used with some small engines where pre-mature termination of the delay timer leads to overspeed alarms on start up. ☑ = The module terminates the safety on timer once all monitored parameters have reached their normal settings. This feature is useful if the module is to be used as a standby controller as it allows the generator to start and go on load in the shortest possible time.
Maintenance PIN Protected Enable	☐ = PIN is not required to reset maintenance alarms through the front panel. ☑ = Maintenance alarm reset through the front panel is PIN protected.
Enable Cooldown in Stop Mode	☐ =Normal operation. Pressing the Stop button instantly opens the load switch and stops the generator. ☑ =Alternative operation. Pressing the Stop button instantly opens the load switch and puts the generator into a cooling run. Pressing the Stop button again instantly stops the generator.
Power Up in Mode	Select the mode that the module enters when DC power is applied. Available modes to select from: ***Auto*** ***Manual*** ***Stop***
Auto Light Control Enable	☐ = Feature is disabled. ☑ = An additional control screen is shown under the module's Manual Control display section. When the set is started in Manual mode, the light outputs are controlled via the module's *Manual* Control display section. The light outputs follow the *Start Up Timers* and *Shutdown Timers* automatically.
All Light Control Enable	☐ = Feature is disabled. ☑ = An additional control screen is shown under the module's *Manual Control* display section for controlling all light outputs together in Manual mode.
Individual Light Control Enable	☐ = Feature is disabled. ☑ = Additional control screens are shown under the module's *Manual Control* display section for controlling light outputs individually in Manual mode.

Parameters are continued overleaf…

Parameter	Description
Auto Light Initiation When Started in Manual Mode	☐ = When the set is started in Manual mode, the light outputs are controlled via digital inputs or via the light control screens on the module display. ☑ = When the set is started in Manual mode, the light outputs follow the *Start Up Timers* and *Shutdown Timers* automatically.
Disable Warnings	☐ = All Warnings are displayed on the front screen, in SCADA, logged in the event log and activate configured output sources. ☑ = Warnings are supressed from the front screen, SCADA and the event log. Configured output sources continue to follow warning state.
All Warnings Are Latched	☐ = Normal Operation, the warnings and pre-alarms automatically reset once the triggering condition has cleared. ☑ = Warnings and pre-alarms latch when triggered. Resetting the alarm is performed by either an external reset applied to one of the inputs or, the 'Stop/Reset' pushbutton must be operated (once the triggering condition has been cleared).
Enhanced Tier IV Home Screen	☐ = Normal operation, the module shows the default home screen ☑ = The module's home screen is changed to show the Tier IV Lamps
Manual Mode	**NOTE: Should manual mast and light control be required in Manual Mode ensure *Manual Mast Control* and *All Light Control Enabled* are enabled.** The mode allows the controller to be used in a generator only application. ☐ = Automatic control of the lights and mast is enabled when in manual mode. ☑ = Automatic control of Mast and lights is disabled when in manual mode. Should the mast be deployed and the lights active they will automatically stow and turn off upon manual mode selection.
Manual Mast Control	☐ = The mast control in Manual mode is disabled. ☑ = Normal operation, the mast control is enabled in both Manual and Auto modes.
Limit Audible Alarm Duration	☐ = Normal operation, the configured *Audible Alarm* digital output is active when any alarm is active on the controller. The *Audible Alarm* digital output is inactive when the alarm is muted or reset. ☑ = The configured *Audible Alarm* digital output is active when any alarm is active on the controller for the duration of the *Audible Alarm Duration* timer. The *Audible Alarm* digital output is inactive when the alarm is muted or reset or when the *Audible Alarm Duration* timer expires.
Lower Mast on Electrical Trip	☐ = The mast is lowered upon activation of an Electrical Trip alarm. ☑ = The mast is lowered upon activation of an Electrical Trip alarm.

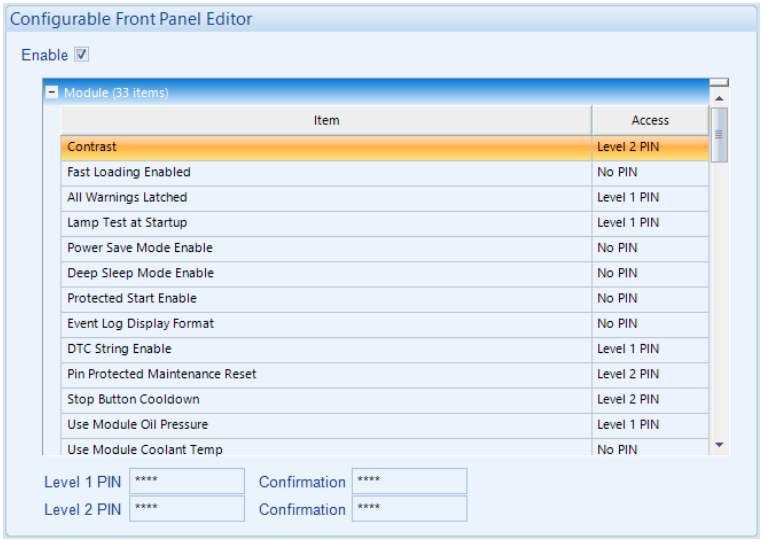
Instrumentation Suppression



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 Supply Frequency	☐ = The *Mains Frequency Instrumentation* is displayed. ☑ = The *Mains Frequency Instrumentation* is suppressed.
Mains Supply 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.

2.2.2 CONFIGURABLE FRONT PANEL EDITOR

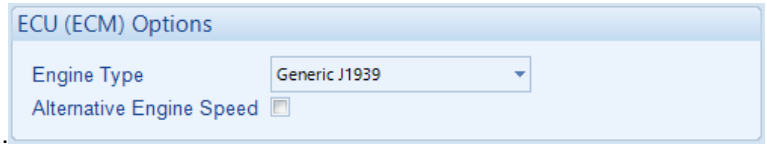
The *Configurable Front Panel Editor* allows generator OEMs to create a PIN protected, customised *Front Panel Editor* with up to two security access levels. Items may be added or removed as required by the generator supplier.



Parameter	Description
Enable	☐ = Configuration parameters are all accessible from Front Panel Editor. ☑ = The Configuration parameters depend on their *Access* level.
Access	Permits the relevant item to be edited through the Front Panel Editor of the module. ***Not in FPE:*** The item cannot be edited through the Front Panel Editor ***No PIN:*** Allowing access to edit the item with no PIN ***Level 1 PIN:*** The Front Panel Editor asks for the configured *Level 1 PIN* to allow access to the relevant item. ***Level 2 PIN:*** The Front Panel Editor asks for the configured *Level 2 PIN* to allow access to the relevant item.
Level 1 PIN	Set four digit PIN number, then repeat the PIN in the *Confirmation* to configure *Level 1 PIN* for this access level.
Level 2 PIN	Set four digit PIN number, then repeat the PIN in the *Confirmation* to configure *Level 2 PIN* for this access level.

2.3 APPLICATION

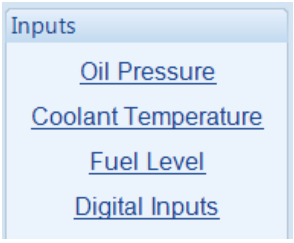
NOTE: For further details and instructions on ECU options and connections, refer to DSE Publication: *057-004 Electronic Engines and DSE Controllers* which are found on our website: *www.deepseaelectronics.com*



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.
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.

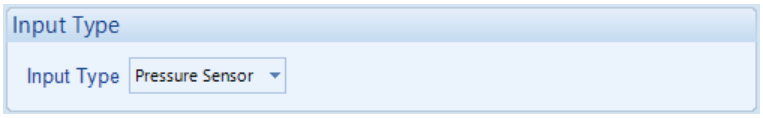
2.4 INPUTS

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



2.4.1 OIL PRESSURE

Input Type



Parameter	Description
Input Type	Select what the analogue input is to be used for: ***Digital Input:*** Configured as an additional digital input. ***Pressure Sensor:*** Configured to measure engine oil pressure. *Low Oil Pressure* protection configured under the *Engine* section of the configuration.

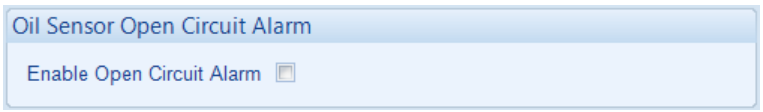
Pressure Sensor

NOTE: Only applicable when *Input Type* is configured as *Pressure Sensor.*

Parameter	Description
Input Type	Select the sensor type and curve from a pre-defined list or create a user-defined curve

Oil Sensor Open Circuit Alarm

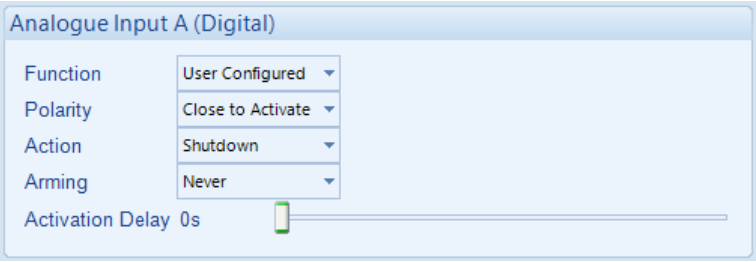
NOTE: Only applicable when *Input Type* is configured as *Pressure Sensor.*



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

Analogue Input A (Digital)

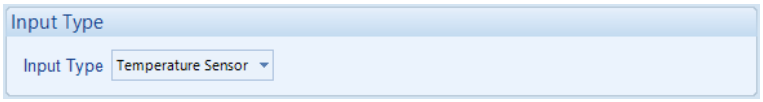
NOTE: Only applicable when *Input Type* is configured as *Digital Input.*



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*** ***Shutdown*** ***Warning***
Arming	**NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the alarm generated by the input becomes active: ***Always*** ***From Safety On*** ***From Starting*** ***Never***
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.

2.4.2 COOLANT TEMPERATURE

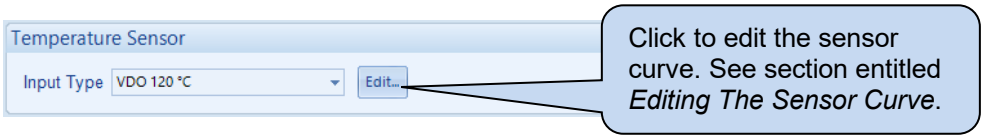
Input Type



Parameter	Description
Input Type	Select what the analogue input is to be used for: ***Digital Input:*** Configured as an additional digital input. ***Temperature Sensor:*** Configured to measure engine coolant temperature. *High Coolant Temperature* protection configured under the *Engine* section of the configuration.

Pressure Sensor

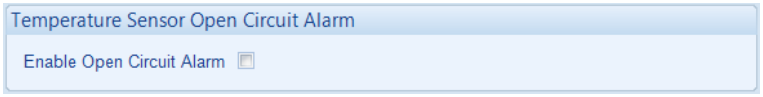
NOTE: Only applicable when *Input Type* is configured as *Temperature Sensor.*



Parameter	Description
Input Type	Select the sensor type and curve from a pre-defined list or create a user-defined curve

Oil Sensor Open Circuit Alarm

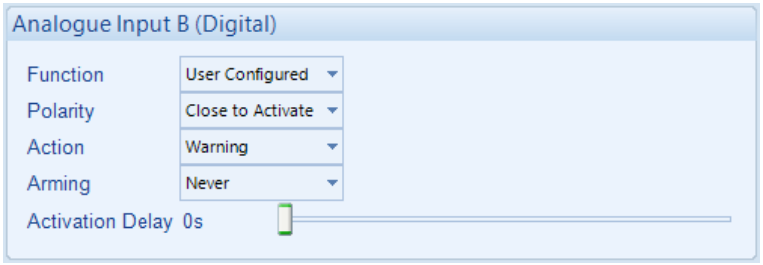
NOTE: Only applicable when *Input Type* is configured as *Temperature Sensor.*



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

Analogue Input B (Digital)

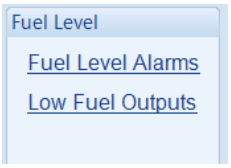
NOTE: Only applicable when *Input Type* is configured as *Digital Input.*



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*** ***Shutdown*** ***Warning***
Arming	**NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the alarm generated by the input becomes active: ***Always*** ***From Safety On*** ***From Starting*** ***Never***
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.

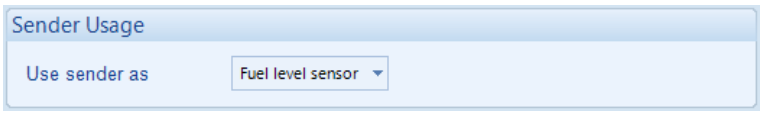
2.4.3 FUEL LEVEL

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



2.4.3.1 FUEL LEVEL ALARMS

Sender Usage



Parameter	Description
Use Sender As	Select what the analogue input is to be used for: ***Fuel Level Sensor:*** Configured to measure engine fuel level. ***Flexible Sensor:*** Input can be configured as an additional digital input or a flexible analogue input.

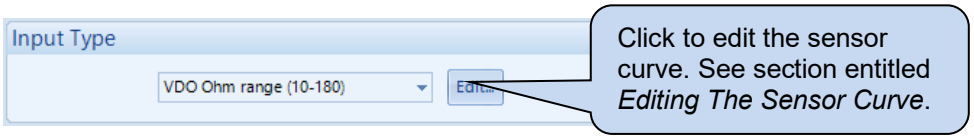
Sensor Description

NOTE: Only applicable when *Sender Usage* is configured as *Flexible Sensor.*

Parameter	Description
Sensor Type	Select what the analogue input is to be used for: ***Not Used:*** Analogue input is disabled. ***Digital Input:*** Configured as an additional digital input. ***Percentage Sensor:*** Configured as an additional level sensor. ***Pressure Sensor:*** Configured as an additional pressure sensor. ***Temperature Sensor:*** Configured as an additional temperature sensor.

Input Type

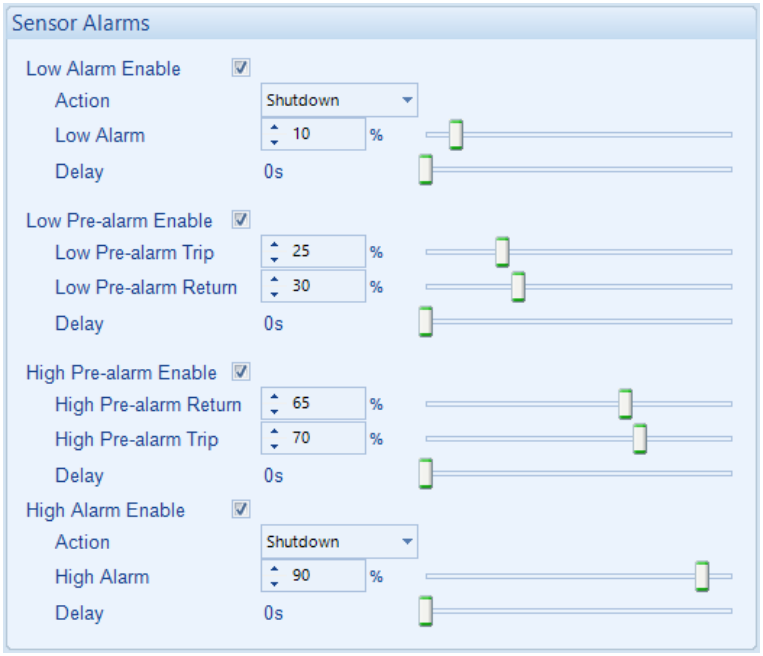
NOTE: Not applicable when *Sender Usage* is configured as *Digital Input.*



Parameter	Description
Input Type	Select the sensor type and curve from a pre-defined list or create a user-defined curve

Sensor Alarms

NOTE: Not applicable when *Sender Usage* is configured as *Digital Input.*



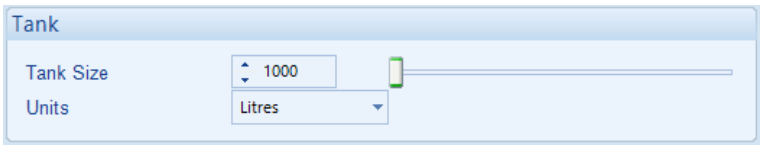
Parameter	Description
Alarm Arming	**NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the alarm generated by the analogue input becomes active: ***Always*** ***From Safety On*** ***From Starting***
Low Alarm Enable	☐ = The Alarm is disabled. ☑ = The *Low Alarm* activates when the measured quantity drops below the *Low Alarm* setting.
Low Alarm 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***
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 Trip* setting. The *Low Pre-Alarm* is automatically reset when the measured quantity rises above the configured *Low Pre-Alarm Return* level.

Parameter descriptions are continued overleaf…

Parameter	Description
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 Trip* 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.
High Alarm 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***

Tank

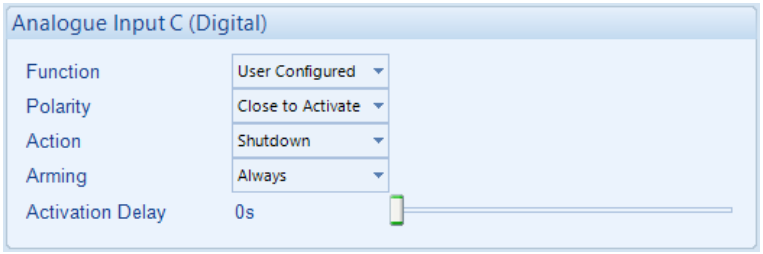
NOTE: Only applicable when *Sender Usage* is configured as *Fuel Level Sensor.*



Parameter	Description
Tank Size	Enter the size of the fuel tank where the fuel level sensor is fitted.
Units	Select the type of units to be used for the fuel level: ***Imperial Gallons*** ***Litres*** ***US Gallons***

Analogue Input C (Digital)

NOTE: Only applicable when *Input Type* is configured as *Digital Input.*

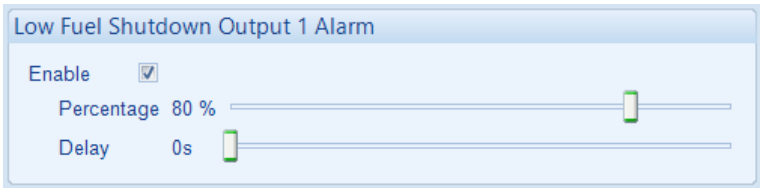


Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See section entitled *Input Functions* for details of all available functions
Polarity	Select the digital input polarity: ***Close to Activate:*** the input function is activated when the relevant 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*** ***Shutdown*** ***Warning***
Arming	**NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the alarm generated by the input becomes active: ***Always*** ***From Safety On*** ***From Starting*** ***Never***
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 LOW FUEL OUTPUTS

Low Fuel Shutdown Output 1 to 4 Alarm

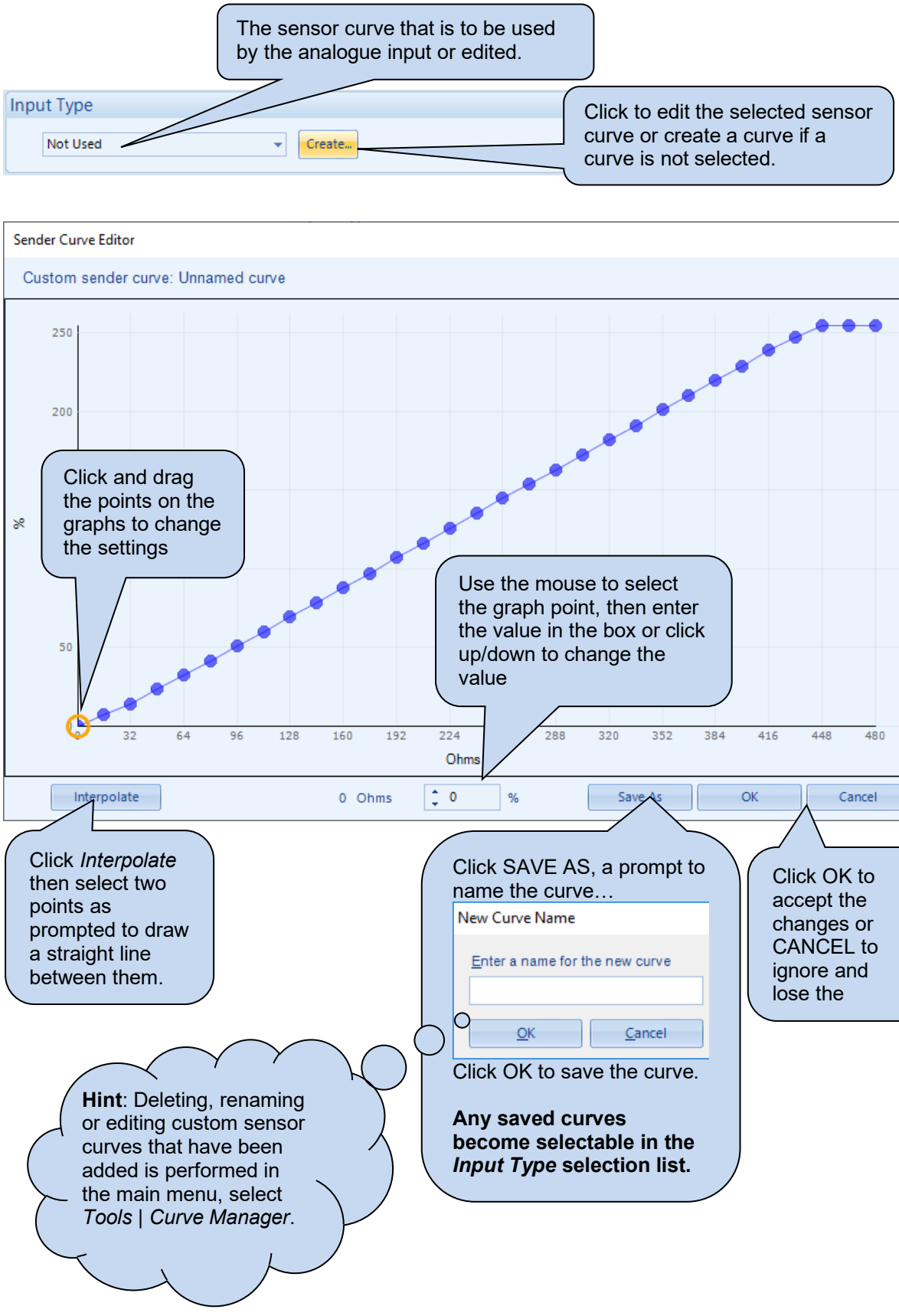
NOTE: Only applicable when *Sender Usage* is configured as *Fuel Level Sensor.*



Parameter	Description
Enable	☐ = The *Light Outputs* are not affected by the *Fuel Level*. ☑ = The *Light Outputs* are automatically deactivated when the *Fuel Level* drops below *Low Fuel Shutdown Output* alarm level for the duration of the *Delay* time.

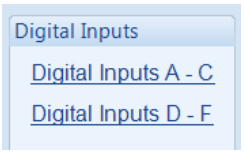
2.4.4 CREATING / EDITING THE SENSOR CURVE

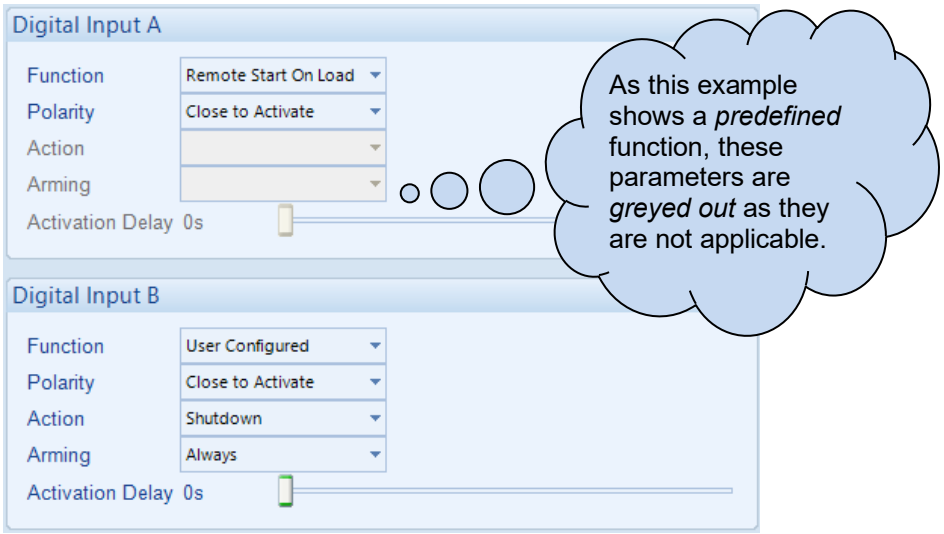
While the *DSE Configuration Suite* holds sensor specifications for the most commonly used resistive sensors, occasionally it is required that the module be connected to a sensor not listed by the *DSE Configuration Suite*. To aid this process, a sensor curve editor is provided.



2.4.5 DIGITAL INPUTS

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





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*** ***Shutdown*** ***Warning***
Arming	**NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the alarm generated by the input becomes active: ***Always*** ***From Safety On*** ***From Starting*** ***Never***
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.

2.4.5.1 INPUT FUNCTIONS

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

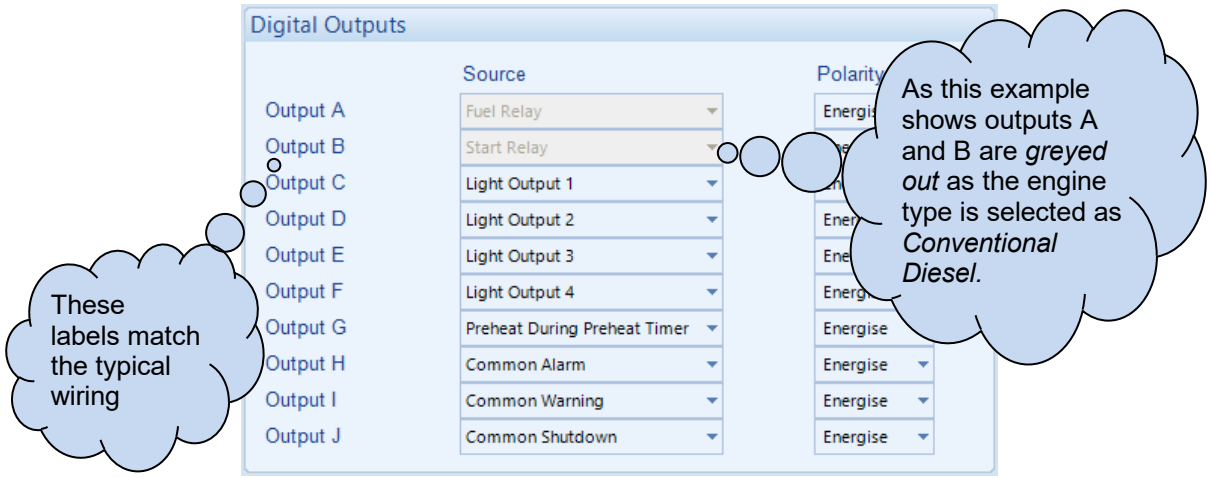
Under the scope of IEEE 37.2, *function numbers are also used to represent functions in microprocessor devices and software programs*. Where the DSE input functions are represented by IEEE 37.2, the function number is listed below.

Function	Description
Alarm Mute	This input is used to silence the audible alarm from an external source, such as a remote mute switch.
Alarm Reset	This input is used to reset any latched alarms from a remote location. It is also used to clear any latched warnings which may have occurred (if configured) without having to stop the generator.
Alternative Configuration	These inputs are used to instruct the module to follow the *alternative* configuration settings instead of the *main* configuration settings.
Auto Start Inhibit IEEE 37.2 - 3 Checking Or Interlocking Relay	This input is used to provide an override function to prevent the controller from starting the generator in the event of a remote start condition occurring. If this input is active and a remote start signal occurs the module does not give a start command to the generator. When this input signal is removed, the controller operates as if a remote start 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 a remote start occurs 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 next remote start request. This input does not prevent starting of the engine in MANUAL mode.
Controlled Shutdown	This input allows an external source to tell the controller to lower the mast, i.e. a wind gauge at the top of the mast closes a relay switch. The light outputs deactivate and the normal stopping sequence is initiated.
Coolant Temperature Switch	This input is used to give a *Coolant Temperature High* shutdown from a digital normally open or closed switch. It allows coolant temperature protection.
Disable Mast Control	This input is used to ensure the light mast is kept in the current position. When active, the *Light Mast Up* and *Light Mast Down* outputs are constantly deactivated.
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
Emergency Stop	Provides an immediate engine hot shutdown, used in emergency situations
External Panel Lock	Locks the mode buttons on the module front fascia.
Fuel Tank Bund Level High	This input is connected to the fuel tank bund level switch. It provides feedback to the module that the level of fuel in the bund is too high, indicative of a leaking fuel tank.
Holding Supports Open	This input is used to provide a feedback to the module that the supports are open and is safe to activate the *Light Mast Up* digital output.

Function	Description
Inhibit Light Output 1, 2, 3 & 4 IEEE 37.2 - 52 Ac Circuit Breaker	This input is used to prevent the module from activating the corresponding light output. If the light output was already activated, activating this input causes the light output de-activation. Removing the input allows the light output to become active 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.
Light Mast Fully Closed	This input is used to provide a feedback to the module that the light mast is fully closed. This input overrides the module's control for closing the mast both in Automatic and Manual modes.
Light Mast Fully Open	This input is used to provide a feedback to the module that the light mast is fully open. This input overrides the module's control for opening the mast both in Automatic and Manual modes.
Light Output Activate 1, 2, 3, & 4	If the module is running the genset off load, this input activates the corresponding light output.
Light Output Override	This is used to activate the digital outputs *Light Output 1, 2, 3 & 4*; irrespective of the status of the generator supply and the *Mains Supply Active* digital input. This is useful for powering up the light outputs from an external supply. The light mast control is not affected by this input function.
Low Fuel Level Switch IEEE 37.2 - 71 Liquid Level Switch	Used to give a digital input function to provide a low fuel level alarm
Mains Supply Active	When this input is active the module's display changes the generator icon to mains. AC parameters such as Voltage, Frequency and Current are shown as Mains parameters. the generator starting is inhibited when this input is active. For further details, see the section entitled *Mains Supply* elsewhere in this document.
Maintenance Reset Alarm Air	Provides an external digital input to reset the maintenance alarm
Maintenance Reset Alarm Fuel	Provides an external digital input to reset the maintenance alarm
Maintenance Reset Alarm Oil	Provides an external digital input to reset the maintenance alarm
Oil Pressure Switch	A digital normally open or closed oil pressure switch gives this input. It allows low oil pressure protection.
Override Fuel Shutdown	This input provides a mean to prevent all Low Fuel Shutdown Output Alarms
Photocell Start	When in auto mode, the module performs the start sequence and activate all configured Light Outputs.
Power Save Mode	This is used to force the module into *Power Save Mode.*
Raise/Lower Mast	When this input becomes active, the *Light Mast Up* output is activated for the duration of the *Mast Up Time* timer. Upon removal of the input, the *Light Mast Down* output is activated for the duration of the *Mast Down Time* timer. This allows complete mast control via a single input function.
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 are 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 activate all configured Light Outputs.

Function	Description
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, Scheduled run.** This input mimic's the operation of the 'Auto' button and is used to provide a remotely located Auto 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.
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.
Water in Fuel	This input provides feedback from the water indicator switch on the fuel water separators and indicates water ingress in the fuel supply.

2.5 DIGITAL OUTPUTS

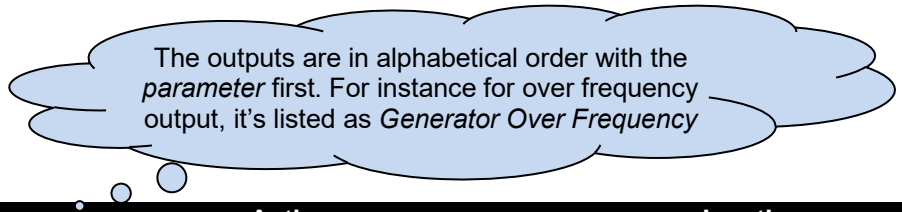


Parameter	Description
Source	Select the output source to control the state of the output See section entitled *Output Sources* for details of all available functions
Polarity	Select the digital output polarity: ***De-Energise:*** When the output source is true, the output deactivates. ***Energise:***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

2.5.1 OUTPUT SOURCES

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

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



Output Source	Active…	Inactive….
Not Used	The output does not change state (Unused)	
Air Filter Maintenance	Indicates that the air filter maintenance alarm is due	
Air Flap Relay	Used to control an air flap, this output becomes active upon an Emergency Stop or Over-speed situation.	Inactive when the set has come to rest
Analogue Input A, B & C (Digital)	Active when the relevant analogue input, configured as digital input, is active	
Audible Alarm IEEE 37.2 – 74 Alarm Relay	Use this output to activate an external sounder or external alarm indicator. Operation of the Mute pushbutton resets this output once activated.	Inactive if no alarm condition is active or if the Mute pushbutton was pressed.
Battery Over Voltage IEEE 37.2 – 59DC Overvoltage Relay	This output indicates that a Battery Over voltage alarm has occurred.	Inactive when battery voltage is not High
Battery Under Voltage IEEE 37.2 – 27DC Undervoltage Relay	This output indicates that a Battery Under Voltage alarm has occurred.	Inactive when battery voltage is not Low
Block Heater	Activated by the *Block Heater* function, in conjunction with the Coolant Temperature Sensor	
Charge Alternator Warning/Shutdown	Active when the charge alternator alarm is active	
Combined Gen/Mains Failure	Active when either the Generator or Mains supplies has failed	
Combined Mains Supply Failure	Active when a *Mains Failure* is detected	
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
Controlled Shutdown	Active when the Controlled Shutdown input is active	
Coolant Temperature Switch IEEE 37.2 – Apparatus Thermal Device	Active when the Coolant Temperature Switch input is active	

Output Source	Active…	Inactive….
Cooling Down	Active when the Cooling timer is in progress	The output is inactive at all other times
DEF Level Low	Active when *DEF Level Low* CAN alarm is active.	
Digital Input A to F	Active when the relevant digital input is active	
Display Heater Fitted and ON	**NOTE: For further information on the display heater, refer to DSE Publication: *056-081 Screen Heaters* which are found on our website: *www.deepseaelectronics.com*** Active when the LCD screen heater is active	
DPF Auto Regeneration Inhibit Request	Active when the *DPF Auto Regeneration Inhibit* is active	
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	
ECU (ECM) Data Fail	Becomes active when no CANbus data is received from the ECU after the safety delay timer has expired	Inactive when: • CANbus 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 CANbus 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 CANbus 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
Emergency Stop	Active when the Emergency Stop alarm is active.	
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*.
Fuel Filter Maintenance	Indicates that the fuel filter maintenance alarm is due	
Fuel Level High Alarm	Active when the level detected by the fuel level sensor has risen above the high fuel level alarm setting.	
Fuel Level High Pre-Alarm	Active when the level detected by the fuel level sensor has risen above the high fuel level pre-alarm setting.	
Fuel Level Low Alarm	Active when the level detected by the fuel level sensor has fallen below the low fuel level alarm setting.	
Fuel Level Low Pre-Alarm	Active when the level detected by the fuel level sensor has fallen below the low fuel level pre-alarm setting.	
Fuel Pull in Coil	Becomes active for the *Fuel Pull Coil Duration* amount of time when the *Fuel Relay* output is energised.	Becomes inactive when the *Fuel Pull Coil Duration* timer expires, or when the Fuel Relay output is de-energised.

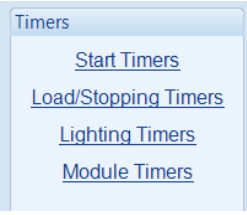
Output Source	Active…	Inactive….
Fuel Relay	Becomes active when the controller requires the governor/fuel system to be active.	Becomes inactive whenever the set must be stopped, including between crank attempts, upon controlled stops and upon fault shutdowns.
Fuel Sender Trip 1, 2, 3 & 4	Active when the corresponding Low Fuel Shutdown Output Alarm is active	
Fuel 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/Mains Over Frequency	Active when an *Over Frequency* alarm is detected on either the Gen or Mains	
Gen/Mains Over Voltage	Active when an *Over Voltage* alarm is detected on either the Gen or Mains	
Gen/Mains Under Frequency	Active when an *Under Frequency* alarm is detected on either the Gen or Mains	
Gen/Mains Under Voltage	Active when an *Under Voltage* alarm is detected on either the Gen or Mains	
Generator Available	Becomes active when the generator is available to take load.	Inactive when • *Loading voltage* and *loading frequency* have not been reached • After *electrical trip* alarm • During the starting sequence before the end of the warming timer.
Generator Over Frequency Delayed Pre-alarm	Active when the *Generator Over Frequency Delayed Pre-alarm* is active.	
Generator Over Frequency Delayed Alarm	Active when the *Generator Over Frequency Delayed Alarm* is active.	
Generator Over Frequency Overshoot Pre-alarm	Active when the *Generator Over Frequency Overshoot Pre-alarm* is active.	
Generator Over Frequency Overshoot Alarm	Active when the *Generator Over Frequency Overshoot Alarm* is active.	
Generator Over Frequency Pre-Alarm	Active when the generator frequency exceeds the *Over Frequency* pre-alarm trip level during normal running.	
Generator Over Frequency Alarm	Active when the generator frequency exceeds the *Over Frequency* alarm trip level during normal running.	
Generator Over Voltage Pre-Alarm	Active when the generator voltage exceeds the *Over Voltage* pre-alarm trip level during normal running.	
Generator Over Voltage Alarm	Active when the generator voltage exceeds the *Over Voltage* alarm trip level.	
Generator Under Frequency Pre-Alarm	Active when the generator frequency falls below the *Under Frequency* pre-alarm trip level during normal running.	
Generator Under Frequency Alarm	Active when the generator frequency falls below the *Under Frequency* alarm trip level during normal running.	
Generator Under Voltage Pre-Alarm	Active when the generator voltage falls below the *Under Voltage* pre-alarm level during normal running.	

Output Source	Active… Inactive….
Generator Under Voltage Alarm	Active when the generator voltage falls below the *Under Voltage* alarm trip level during normal running.
Generator Within Standards	When configured, the *Generator Within Standards* output is active when both the voltage and frequency are within the pre-alarm limits. Once the voltage or frequency deviate out of the configured pre-alarm limits, the output deactivates but no pre-alarm is indicated by the module. The voltage and frequency shutdown alarms continue to function as normal.
HEST Active	Active when the High Exhaust System Temperature CAN alarm is active
High Coolant Temperature Shutdown	Active when the high coolant temperature shutdown alarm is active
Light Mast Down	**NOTE: Activating the *Emergency Stop* immediately de-activates this output.** Active when the light mast is needed to be lowered. In Auto mode, the module activates this output after the *Return Delay* timer expires. The output remains active until the *Light Mast Fully Closed* digital input is activated or the *Mast Down Time* delay expires. In Manual mode, holding the down button on the mast control screen activates this output. The output remains active until the down button is released or if the *Light Mast Fully Closed* digital input is active.
Light Mast Up	**NOTE: Activating the *Emergency Stop* immediately de-activates this output.** Active when the light mast is needed to be raised. In Auto mode, the module activates this output after the *Warming Up* timer expires. The output remains active until the *Light Mast Fully Open* digital input is activated or the *Mast Up Time* delay expires. In Manual mode, holding the up button on the mast control screen activates this output. The output remains active until the up button is released or if the *Light Mast Fully Open* digital input is active.
Light Output 1, 2, 3 & 4	Provide delayed outputs for controlling the lights.
Low Battery Start	Active when the *Start On Low Battery* function is active.
Low Current Alarm	Becomes active when the low current alarm is active.
Low Fuel Switch	Active when the *Low Fuel Level Switch* input is active.
Low Oil Pressure Shutdown	Active when the Low Oil Pressure Shutdown alarm is activated.
Mains Supply Active	Active when the *Mains Supply Active* digital input is activated.
Mains Supply Over Frequency Pre-Alarm	Active when the Mains Supply frequency exceeds the pre-alarm trip level.
Mains Supply Over Frequency Alarm	Active when the *Mains Over Frequency Alarm* is active.
Mains Supply Over Voltage Pre-Alarm	Active when the Mains Supply voltage exceeds the pre-alarm trip level.
Mains Supply Over Voltage Alarm	Active when the *Mains Over Voltage Alarm* is active.
Mains Supply Under Frequency Pre-Alarm	Active when the Mains Supply frequency falls below the pre-alarm trip level.
Mains Supply Under Frequency Alarm	Active when the *Mains Under Frequency Alarm* is active.

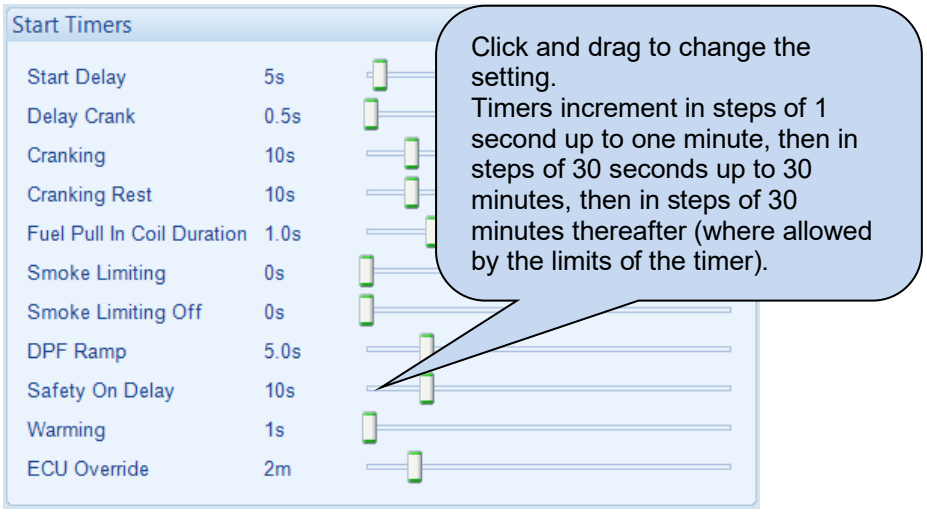
Output Source	Active…	Inactive….
Mains Supply Under Voltage Pre-Alarm	Active when the Mains Supply voltage falls below the pre-alarm trip level.	
Mains Supply Under Voltage Alarm	Active when the *Mains Under Voltage Alarm* is active.	
Oil Filter Maintenance	Indicates that the oil filter maintenance alarm is due	
Oil Pressure Sender Open Circuit	Active when the Oil Pressure Sensor is detected as being open circuit.	
Oil Pressure Switch	Active when the *Oil Pressure Switch* input is active.	
Over Current Delayed Alarm	Active when an overcurrent condition has caused the Overcurrent Delayed alarm to trigger	
Over Current Immediate Warning IEEE 37.2 – 50 Instantaneous Overcurrent Relay	Active when an overcurrent condition exceeds the Overcurrent alarm Trip setting. At the same time, the controller begins following the IDMT curve. If the overload condition exists for an excess time, the Overcurrent IDMT alarm activates.	
Over Speed Shutdown IEEE 37.2 – 12 Over Speed Device	Active if the engine speed exceeds the *Over Speed Shutdown* setting during normal operation.	
Overspeed Delayed Shutdown	Active when the *Overspeed Delayed Shutdown* alarm is active.	
Overspeed Overshoot Alarm	Active when the *Overspeed Overshoot Alarm* 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
SCR Inducement	Active when *SCR Inducement CAN Alarm* is active	
Smoke Limiting	Becomes active when the controller requests that the engine runs at idle speed. As an output, this is used to give a signal to the *Idle input* of an engine speed governor (if available)	Becomes inactive when the controller requests that the engine runs at rated speed.
Start Relay	Active when the controller requires the cranking of the engine.	
System in Auto Mode	Active when Auto mode is selected	
System in Manual Mode	Active when Manual mode is selected	
System in Stop Mode	Active when Stop mode is selected	
Temperature Sensor Open Circuit	Active when the Temperature Sensor is detected as being open circuit.	
Under Speed Shutdown	Active when the engine speed falls below the under speed Shutdown setting	
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.

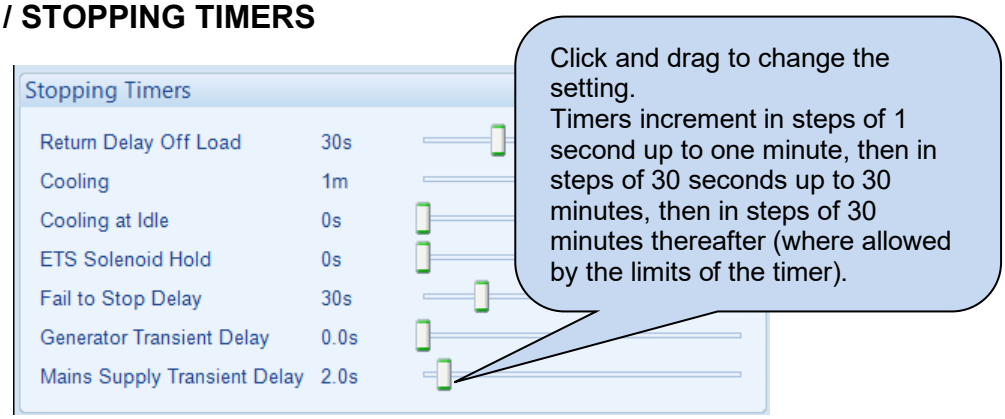


2.6.1 START TIMERS



Parameter	Description
Start Delay	The amount of time delay before starting in AUTO mode. This timer is activated upon the respective start command being issued. Typically, this timer is applied to prevent starting upon fleeting start signals.
Pre-heat	The amount of 'pre start' time during which the *Preheat* output becomes active (if configured)
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.
Fuel Pull in Coil Duration	**NOTE: A digital output must be configured for *Fuel Pull in Coil* to configure this timer.** The amount of time for the *Fuel Pull in Coil* output stay energised when the *Fuel Relay* output is energised.
Smoke Limiting	The amount of time that the engine is requested to run at idle speed upon starting. This is typically used to limit emissions at startup.
Smoke Limiting 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, an *Underspeed* alarm is detected. 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 a DPF session.
Safety On Delay	The amount of time at startup 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	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

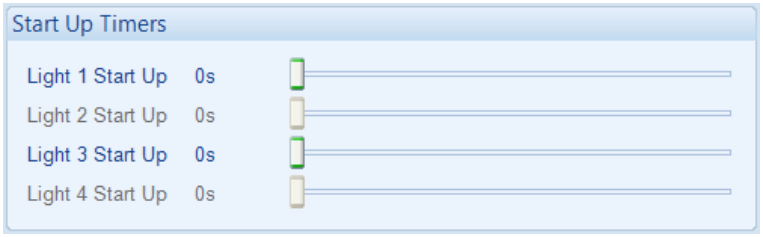


Parameter	Description
Return Delay Off Load	The amount of time, in Auto mode only, that allows for short term removal of the request to stop the set before action is taken. This is used to ensure the set remains on load before accepting that the start request has been removed.
Cooling	The amount of time that the set is made to run off load before stopping. This allows the set to cooldown and is particularly important for engines with turbo chargers.
Cooling At Idle	The amount of time the module instructs the engine to run at idle speed after the *Cooling Time*.
ETS Solenoid Hold	The amount of time the *Energise to Stop* output 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	The amount of time when the set is called to stop and is still running after the *Fail To Stop* delay, a *Fail to Stop* alarm is generated.
Generator Transient Delay	Used to delay the generator under/over volts/frequency alarms. Typically this is used to prevent spurious shutdown alarms caused by large changes in load levels.
Mains Supply Transient Delay	Used to delay the mains under/over volts/frequency alarms. Typically this is used to prevent spurious alarms caused by mains brownouts.

2.6.3 LIGHTING TIMERS

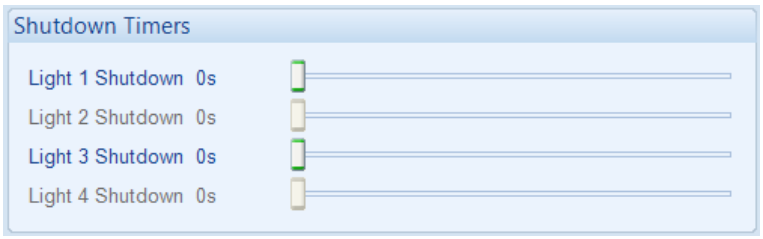
NOTE: Timers are greyed out when the respective *Light Output* is not configured.

Start Up Timers



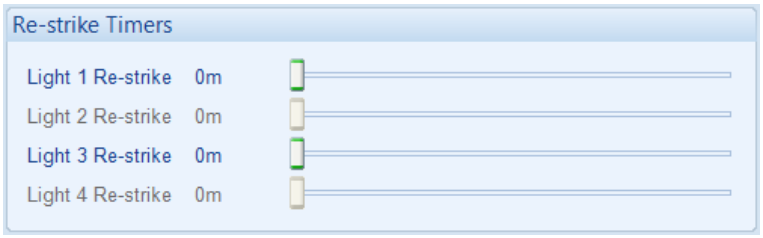
Parameter	Description
Light 1 to 4 Start Up	When the generator becomes available and after the activation of the *Light Mast Fully Open* digital input or the expiry of the *Mast Up Time* delay, the corresponding light output is delayed for this amount of time before activating

Shutdown Timers



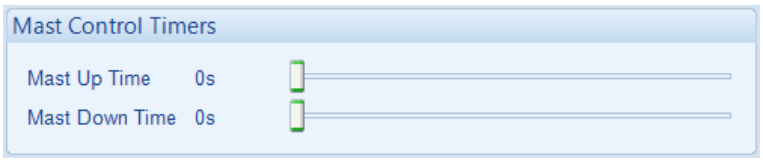
Parameter	Description
Light 1 to 4 Shutdown	**NOTE: The Light Mast Down digital output activates after the longest Light Shutdown timer has expired.** After the Return Delay time expires, the corresponding light output remains active for this amount of time.

Re-strike Timers



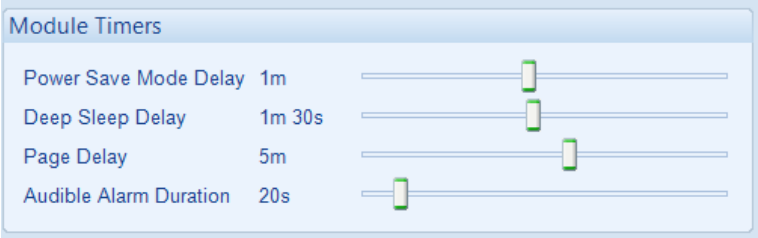
Parameter	Description
Light 1 to 4 Re-strike	When a light output has been de-energised, this is the amount of time for the light to cool down before the light output is energised again.

Mast Control Timers



Parameter	Description
Mast Up Time	The amount of time required for the light mast to fully open. If this timer expires before the *Light Mast Fully Open* digital input is activated, the *Light Mast Up* digital output becomes inactive.
Mast Down Time	The amount of time required for the light mast to fully close. If this timer expires before the *Light Mast Fully Closed* digital input is activated, the *Light Mast down* digital output becomes inactive.

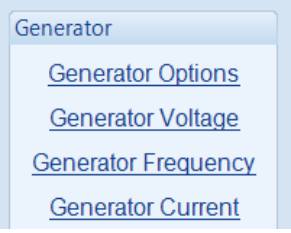
2.6.4 MODULE TIMERS



Timer	Description
Power Save Mode Delay	If the module is left unattended in Stop mode for the duration of the *Power Save Mode Delay,* it enters low power consumption mode (Power Save Mode).
Deep Sleep Delay	When the module is in Power Save Mode, if left unattended for the duration of the *Deep Sleep Mode Delay* timer, it enters a lower power consumption mode (Deep Sleep Mode)
Page Delay	If the module is left unattended for the duration of the *Page Delay Timer,* it reverts to show the Status page.
Audible Alarm Duration	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.*

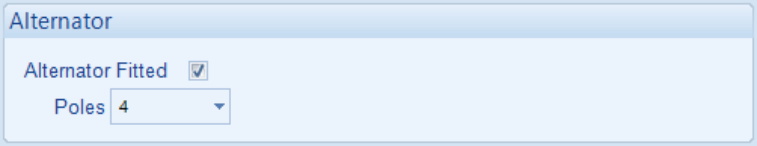
2.7 GENERATOR

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



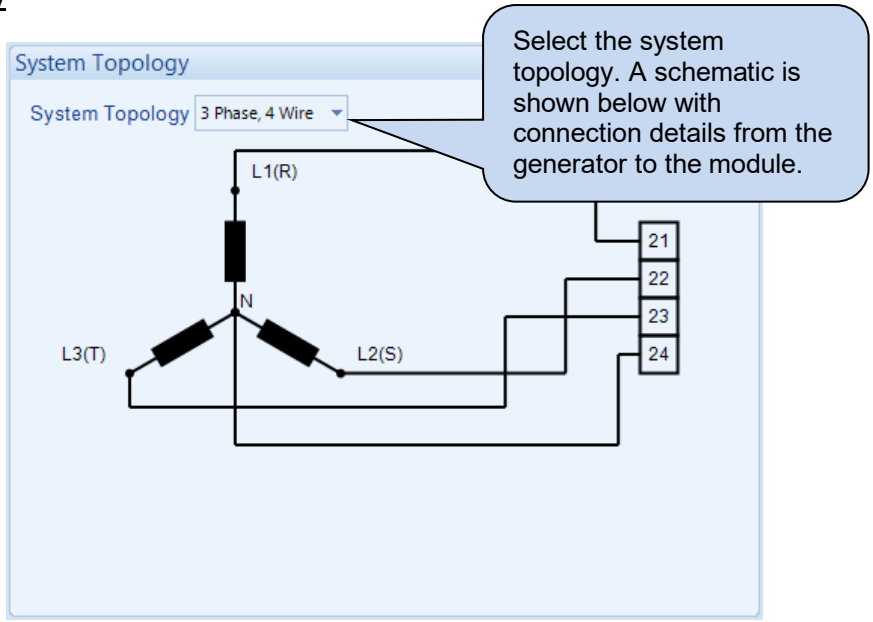
2.7.1 GENERATOR OPTIONS

Alternator



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

System Topology



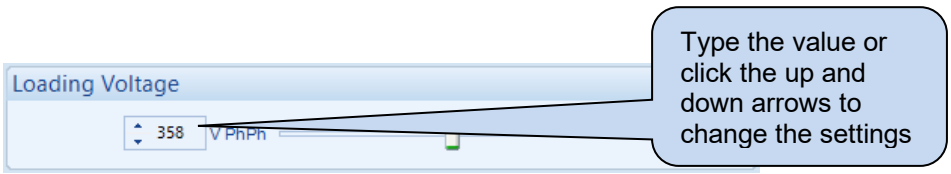
Parameter	Description
System Topology	Select the AC topology of the generator from the following list: ***2 Phase, 3 Wire L1 - L2*** ***2 Phase, 3 Wire L1 - L3*** ***2 Wire Unearthed DC*** ***3 Phase, 3 Wire*** ***3 Phase, 4 Wire*** ***3 Phase, 4 Wire Delta L1 - N - L2*** ***3 Phase, 4 Wire Delta L1 - 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***

2.7.2 GENERATOR VOLTAGE

Under Voltage Alarms

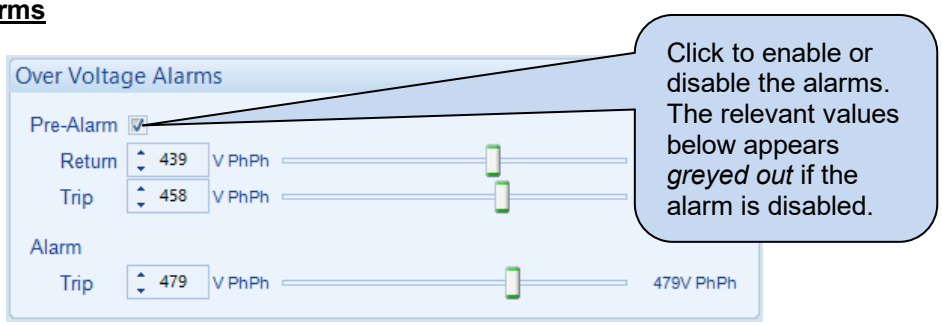
Parameter	Description
Generator Under Voltage Alarm IEEE 37.2 - 27AC Undervoltage Relay	☐ = Generator Under Volts does NOT give an alarm ☑ = Generator Under Volts gives an alarm in the event of the generator output falling below the configured *Under Volts Alarm Trip* value for longer than the *Generator Transient Delay*. The *Under-volts Alarm Trip* value is adjustable to suit user requirements.
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 *Generator Transient Delay*. The *Under-volts Pre-Alarm Trip* value is adjustable to suit user requirements.

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 under voltage trip of 184 V and a loading voltage of 207 V, the output voltage must return to 207 V following an under voltage event to be considered within limits.)

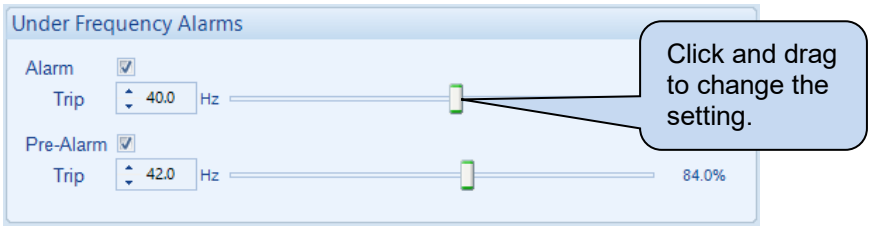
Over Voltage Alarms



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 *Generator Transient 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 Alarm 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 *Generator Transient Delay*. The *Over-volts Alarm Trip* value is adjustable to suit user requirements.

2.7.3 GENERATOR FREQUENCY

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 *Generator Transient Delay*. The *Under-frequency Alarm Trip* value is adjustable to suit user requirements.
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 *Generator Transient Delay*. The *Under Frequency Pre-Alarm Trip* value is adjustable to suit user requirements.

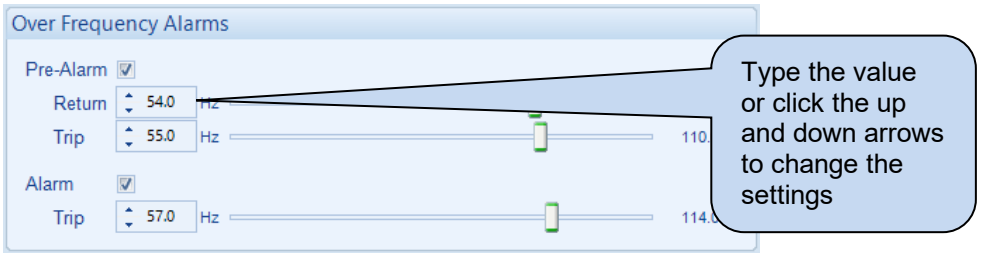
Loading Frequency

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 under-frequency 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.)

Nominal Frequency

Parameter	Description
Nominal Frequency	This is used to calculate the percentages of the alarm and to instruct the ECU what speed to run the engine at.

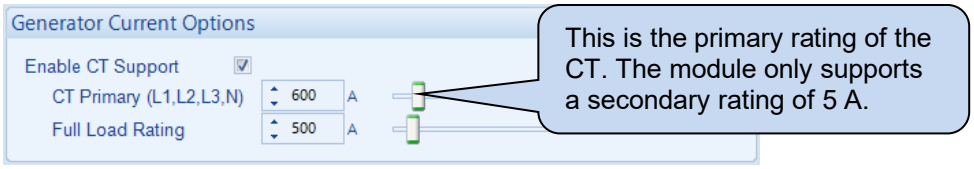
Over Frequency Alarms



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 *Generator Transient 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 Alarm 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 *Generator Transient Delay*. The *Over Frequency Alarm Trip* value is adjustable to suit user requirements.

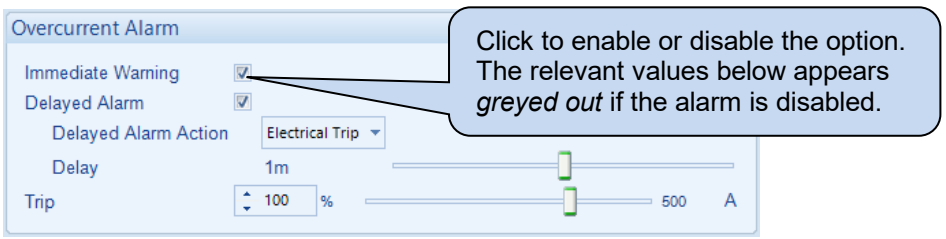
2.7.4 GENERATOR CURRENT

Generator Current Options



Parameter	Description
CT Primary (L1, L2, L3, N)	Primary rating of the three phase current transformers.
Full Load Rating	This is the full load current rating of the alternator.

Overcurrent Alarm



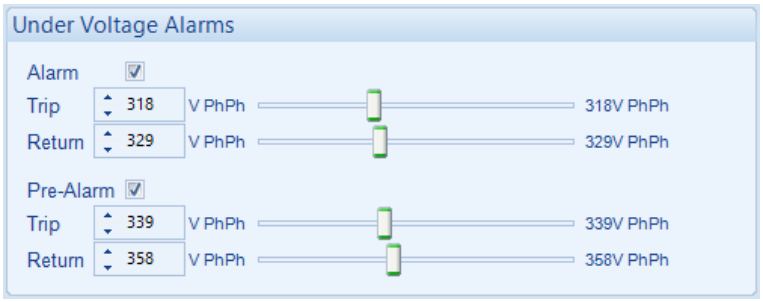
Parameter	Description
Immediate Warning IEEE 37.2 -50 Instantaneous Overcurrent Relay	☐ = *Immediate Overcurrent Warning* is disabled. ☑ = The *Immediate Overcurrent Warning* activates as soon as the *Trip* level is reached. The alarm automatically resets once the generator loading current falls below the *Trip* level (unless *All Warnings are latched* is enabled). For further advice, consult the generator supplier.
Delayed Alarm IEEE 37.2 -51 AC Time Overcurrent Relay	☐ = *Delayed Overcurrent Alarm* is disabled. ☑ = The *Delayed Overcurrent Alarm* activates when the current exceeds the *Trip* setting for longer than the configured *Delay* time.
Delayed Alarm 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.

2.8 MAINS SUPPLY

NOTE: To enable these parameters, a *Digital Input* must be configured for the function *Mains Supply Active*.

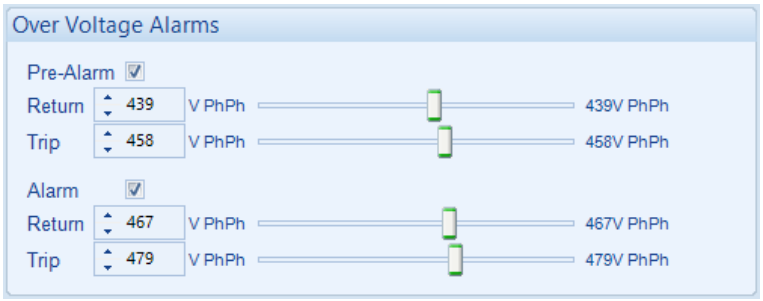
A configured *Mains Supply Active* digital input allows the controller to monitor the AC sensing terminals being fed from an external supply without the generator running. When this input is active, the module expects the supply on the AC sensing terminals to be within the *Mains Supply* voltage and frequency limits in order to operate the light outputs. This requires a manual changeover panel to transfer the supply between the mains and the generator.

Under Voltage Alarms



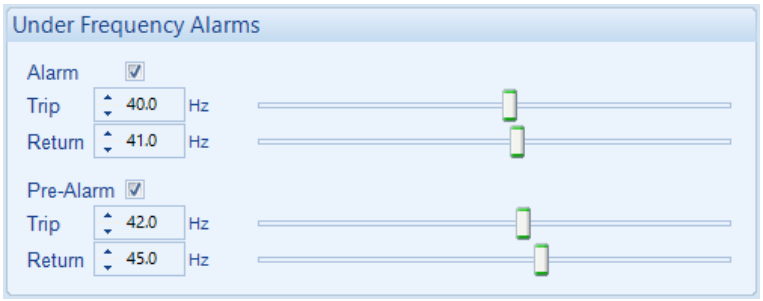
Parameter	Description
Mains Under Voltage Alarm IEEE 37.2 - 27AC Undervoltage Relay	☐ = *Mains Under Voltage Alarm* does NOT give an alarm ☑ = *Mains Under Voltage Alarm* gives an alarm in the event of the mains voltage falling below the configured *Under Voltage Alarm Trip* value for longer than the *Mains Transient Delay*. The *Under Voltage Alarm Trip* value is adjustable to suit user requirements. The alarm is reset when the mains voltage rises above the configured *Under Voltage Alarm Return* level. When the alarm actives all *Light Outputs* are turned off.
Mains Under Voltage Pre-Alarm IEEE 37.2 - 27AC Undervoltage Relay	☐ = *Mains Under Voltage Pre-Alarm* does NOT give an alarm ☑ = *Mains Under Voltage Pre-Alarm* gives a warning alarm in the event of the mains voltage falling below the configured *Under Voltage Pre-Alarm Trip* value for longer than the *Mains Transient Delay*. The *Under Voltage Pre-Alarm Trip* value is adjustable to suit user requirements. The alarm is reset when the mains voltage rises above the configured *Under Voltage Pre-Alarm Return* level.

Over Voltage Alarms



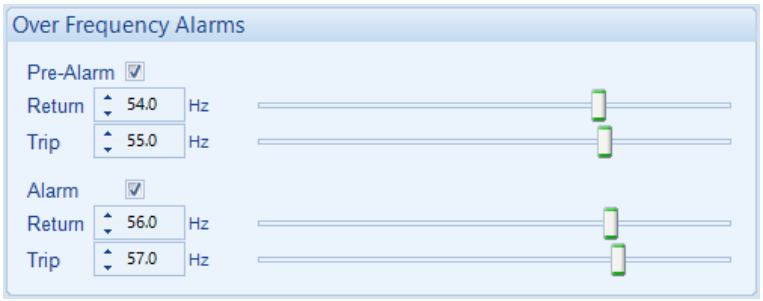
Parameter	Description
Mains Over Voltage Pre-Alarm IEEE 37.2 – 59 AC Overvoltage Relay	☐ = *Mains Over Voltage Pre-Alarm* does NOT give an alarm ☑ = *Mains Over Voltage Pre-Alarm* gives a warning alarm in the event of the mains voltage rising above the configured *Over Voltage Pre-Alarm Trip* value for longer than the *Mains Transient Delay*. The *Over Voltage Pre-Alarm Trip* value is adjustable to suit user requirements. The alarm is reset when the mains voltage falls below the configured *Over Voltage Pre-Alarm Return* level.
Mains Over Voltage Alarm IIEEE 37.2 – 59 AC Overvoltage Relay	☐ = *Mains Over Voltage Alarm* does NOT give an alarm ☑ = *Mains Over Voltage Alarm* gives an alarm in the event of the mains voltage rising above the configured *Over Voltage Alarm Trip* value for longer than the *Mains Transient Delay*. The *Over Voltage Alarm Trip* value is adjustable to suit user requirements. The alarm is reset when the mains voltage falls below the configured *Over Voltage Alarm Return* level. When the alarm actives all *Light Outputs* are turned off.

Under Frequency Alarms



Parameter	Description
Mains Under Frequency Alarm IEEE 37.2 – 81 Frequency Relay	☐ = *Mains Under Frequency Alarm* does NOT give an alarm ☑ = *Mains Under Frequency Alarm* gives an alarm in the event of the mains frequency falling below the configured *Under Frequency Alarm Trip* value for longer than the *Mains Transient Delay*. The *Under Frequency Alarm Trip* value is adjustable to suit user requirements. The alarm is reset when the mains frequency rises above the configured *Under Frequency Alarm Return* level. When the alarm actives all *Light Outputs* are turned off.
Mains Under Frequency Pre-Alarm IEEE 37.2 – 81 Frequency Relay	☐ = *Mains Under Frequency Pre-Alarm* does NOT give an alarm ☑ = *Mains Under Frequency Pre-Alarm* gives a warning alarm in the event of the mains frequency falling below the configured *Under Frequency Pre-Alarm Trip* value for longer than the *Mains Transient Delay*. The *Under Frequency Pre-Alarm Trip* value is adjustable to suit user requirements. The alarm is reset when the mains frequency rises above the configured *Under Frequency Pre-Alarm Return* level.

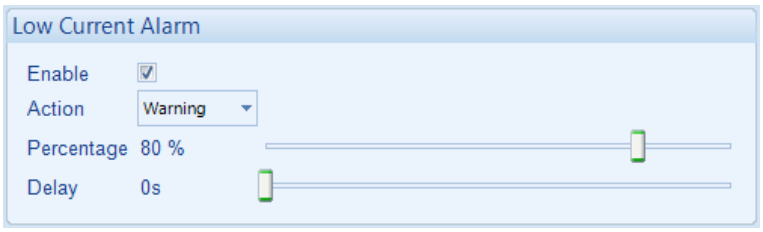
Over Frequency Alarms



Parameter	Description
Mains Over Frequency Pre-Alarm IEEE 37.2 – 81 Frequency Relay	☐ = *Mains Over Frequency Pre-Alarm* does NOT give an alarm ☑ = *Mains Over Frequency Pre-Alarm* gives a warning alarm in the event of the mains frequency rising above the configured *Over Frequency Pre-Alarm Trip* value for longer than the *Mains Transient Delay*. The *Over Frequency Pre-Alarm Trip* value is adjustable to suit user requirements. The alarm is reset when the mains frequency falls below the configured *Over Frequency Pre-Alarm Return* level.
Mains Over Frequency Alarm IEEE 37.2 – 81 Frequency Relay	☐ = *Mains Over Frequency Alarm* does NOT give an alarm ☑ = *Mains Over Frequency Alarm* gives an alarm in the event of the mains frequency rising above the configured *Over Frequency Alarm Trip* value for longer than the *Mains Transient Delay*. The *Over Frequency Alarm Trip* value is adjustable to suit user requirements. The alarm is reset when the mains frequency falls below the configured *Over Frequency Alarm Return* level. When the alarm actives all *Light Outputs* are turned off.

2.9 LOAD CONTROL

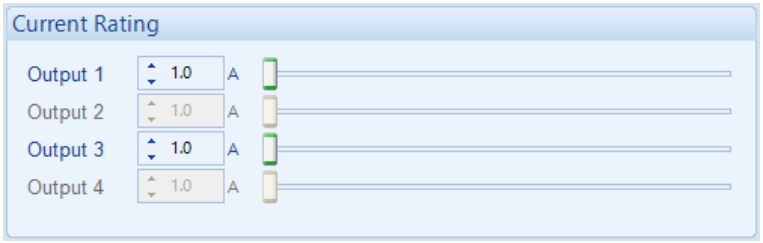
Low Current Alarm



Parameter	Description
Low Current Alarm	☐ = *Low Current Alarm* is disabled. ☑ = *Low Current Alarm* activates when the total current is less than the configured *Percentage* of expected current of the active light outputs as set by the *Current Ratings,* for longer than the configured *Delay* time.
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.

Current Rating

NOTE: Outputs are greyed out when the respective *Light Output* is not configured.



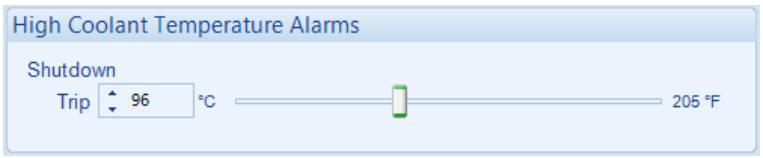
Parameter	Description
Output 1 to 4	Define the maximum current consumption of each *Light Output.* These ratings are used to calculated the expected current the generator produces based on active *Light Outputs.*

2.10 ENGINE

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

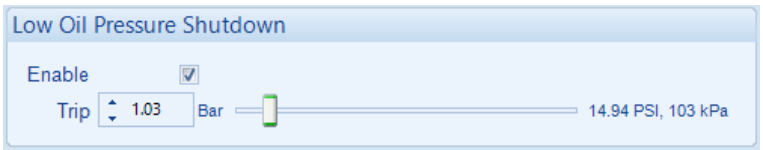
2.10.1 ENGINE PROTECTION

High Coolant Temperature Alarm



Parameter	Description
High Coolant Temperature Alarm	☐ = Alarm is disabled. ☑ = The *High Coolant Temperature Shutdown Alarm* is active when the measured coolant temperature rises above the configured *Trip* level.

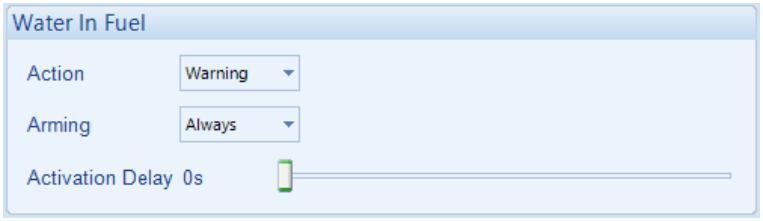
Low Oil Pressure Shutdown



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.

Water In Fuel

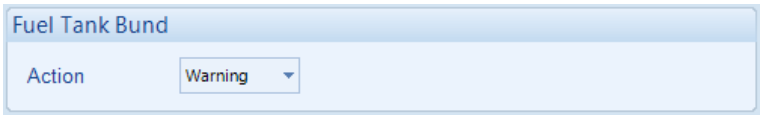
NOTE: *Water in Fuel* settings are greyed out unless a ECU (ECM) or *Digital Input* for *Water in Fuel* is configured.



Parameter	Description
Water in Fuel	Select the type of action when the *Water In Fuel* alarm occurs after the *Activation Delay time*. 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.
Arming	**NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the alarm generated by the input becomes active: ***Always*** ***From Safety On*** ***From Starting*** ***Never*** ***When Stationary***

Fuel Tank Bund

NOTE: *Fuel Tank Bund* alarm is greyed out unless a *Digital Input* for *Fuel Tank Bund* is configured.



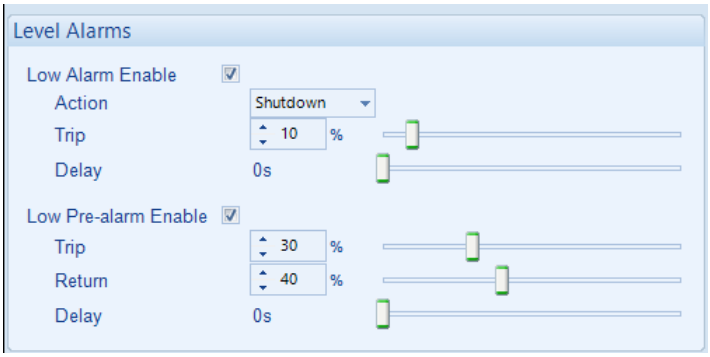
Parameter	Description
Fuel Tank Bund	**NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required when the digital input configured for *Fuel Tank Bund* activates from the list: ***Electrical Trip*** ***Shutdown*** ***Warning***

2.10.2 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.

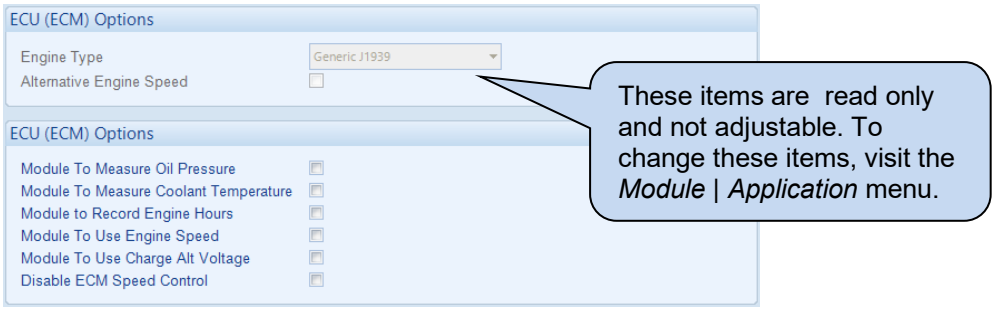
DEF Level is a CANbus message from the ECU (ECM). The following parameters allow configuration of how the DSE module responds to the DEF Level.



Parameter	Description
DEF Level Low Alarm	☐ = Disable the alarm ☑ = *DEF Low Alarm* is 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* is 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.

2.10.3 ENGINE OPTIONS

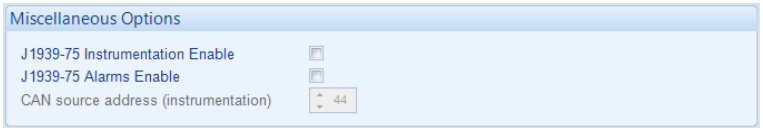
ECU (ECM) Options



Parameter	Description
Module to Measure Oil Pressure	☐ = Oil pressure is read from the ECU. ☑ = Oil pressure is read from the *Oil Pressure Sensor*.
Module to Measure Coolant Temperature	☐ = Coolant Temperature is read from the ECU. ☑ = Coolant Temperature is read from the *Coolant Temperature Sensor*.
Module to Record Engine Hours	☐ = Engine hours are read from the ECU. ☑ = Engine hours counted by the DSE module.
Module To Use Engine Speed	☐ = Engine speed is read from the ECU. ☑ = Engine speed is determined from measured generator frequency.
Module to Use Charge Alt Voltage	☐ = Charge alternator voltage is read from the ECU. ☑ = Charge alternator voltage is read from the module.
Disable ECM Speed Control	☐ = The module sends the speed control message to the ECU over CAN. ☑ = The module is inhibited from sending the speed control message to the ECU over CAN. This is useful if an external device is used to control engine speed, for example a remote speed potentiometer.

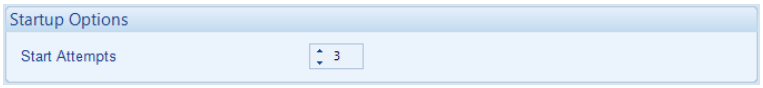
Miscellaneous Options

NOTE: For a full list of the J1939-75 alarms and instrumentation, refer to DSE Publication: *057-221 DSEL401 MKII Operator Manual* found on DSE's website: *www.deepseaelectronics.com*



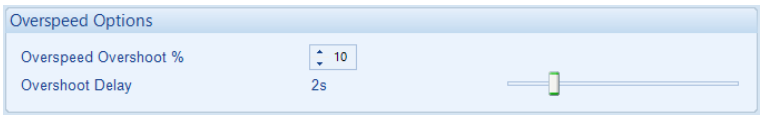
Parameter	Description
J1939-75 Instrumentation Enable	☐ = J1939-75 Instrumentation is not broadcast by the DSE module. ☑ = J1939-75 Instrumentation is broadcast by the DSE module.
J1939-75 Alarms Enable	☐ = J1939-75 Alarms are not broadcast by the DSE module. ☑ = J1939-75 Alarms are broadcast by the DSE module.
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.

Overspeed Options

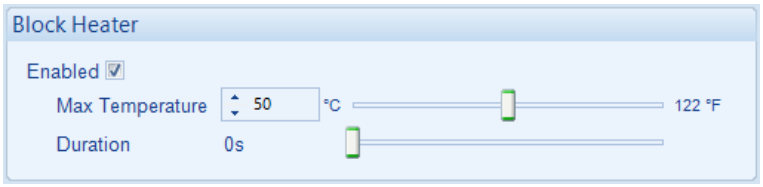


Parameter	Description
Overspeed Overshoot %	To prevent spurious overspeed alarms at engine start up, the module includes configurable *Overspeed Overshoot* protection. This allows the engine speed to 'overshoot' the Overspeed setting during the starting process for a short time.
Overshoot Delay	Rather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

2.10.4 ENGINE HEATING OPTIONS

Block Heater

NOTE: For this feature to have effect, configure a digital output for *Block Heater.*

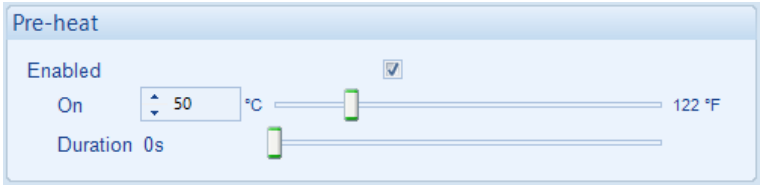


Parameter	Description
Enabled	☐ = Block Heater is disabled. ☑ = When the *Coolant Temperature* is below the configured *Max Temperature*, the *Block Heater* digital output is activated for the set *Duration* of time before cranking, or the *Pre-Heat* function if configured.
On	Set the coolant temperature below which the *Block Heater* output is activated.
Duration	Set the time delay during which the *Block Heater* digital output remains active before cranking, or the *Pre-Heat* function if configured.

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).

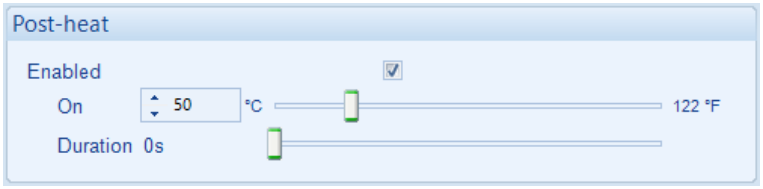


Parameter	Description
Enabled	☐ = Pre-heat is not temperature dependent. ☑ = When the *Coolant Temperature* is below the configured *On* level, the *Pre-Heat* digital output is activated for the set *Duration* of time before cranking.
On	Set the coolant temperature below which the pre-heat is activated.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

Post-heat

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

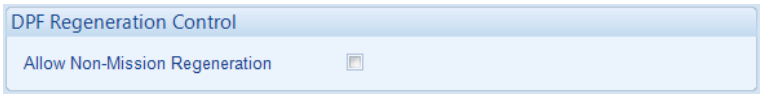
NOTE: Depending on *Engine Type* configuration, this is controlled direct by the ECU (ECM).



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.

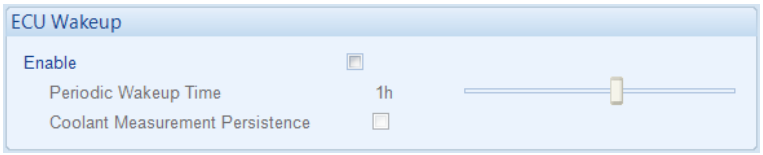
2.10.5 ECU (ECM) OPTIONS

DPF Regeneration Control



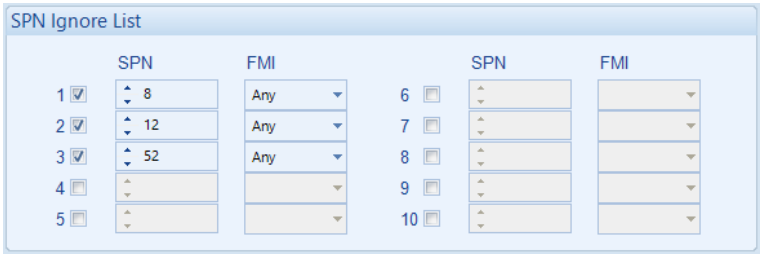
Parameter	Description
DPF Regeneration Control	Available for ECUs (ECM) which require the engine speed to drop during a manual regeneration cycle. During this time, the generator is not available to supply power and the under speed and under frequency alarms are not active.

ECU Wakeup



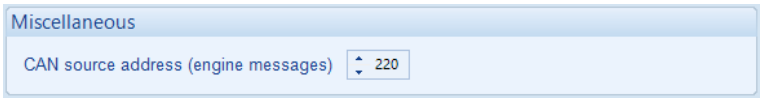
Parameter	Description
ECU Wakeup Enable	☐ = Option is disabled. ☑ = When the engine is stopped, the DSE module sends a wakeup signal to the ECU (ECM) and keeps it powered up for the *ECU Override* time (configured in *Start Timers*) to read the ECU (ECM) parameters. This is periodically repeated depending 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.*

SPN 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

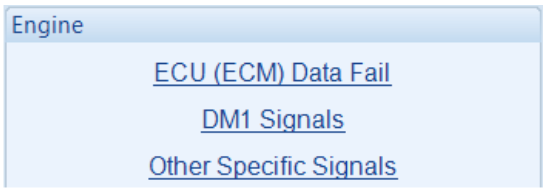


Parameter	Description
CAN Source Address (Engine Messages)	**NOTE: Although automatically pre-set upon selection of the Engine Type, this parameter is available for change if required.** Set the *CAN Source Address* that the module is to read instrumentation from. This is typically the Source Address of the engine ECU.

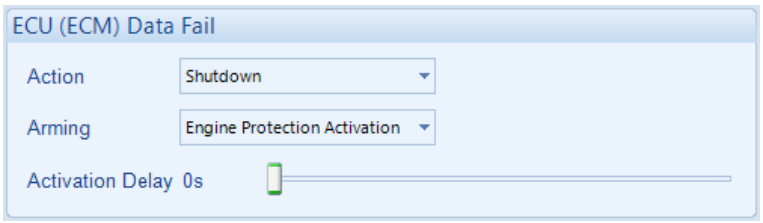
2.10.6 ECU (ECM) ALARMS

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.



2.10.6.1 ECU (ECM) DATA FAIL



Parameter	Description
ECU (ECM) Data Fail Action	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*** ***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: ***Engine Protection Activation*** ***From Safety On*** ***From Starting***
Activation Delay	The amount of time before the module activates the *CAN ECU (ECM) Data Fail* after a failure.

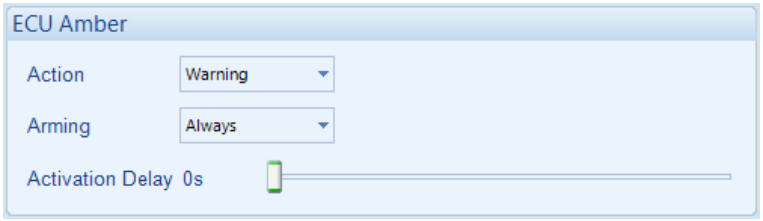
2.10.6.2 DM1 SIGNALS

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.

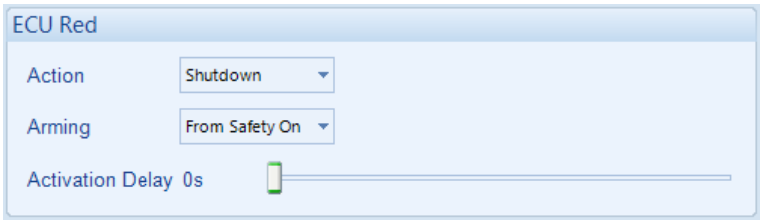
DM1 signals are messages from the CAN (ECM) ECU. The following parameters allows configuration of how the DSE module responds to these messages.

ECU Amber



Parameter	Description
ECU Amber Action	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*** ***From Safety On*** ***From Starting*** ***Never***
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.

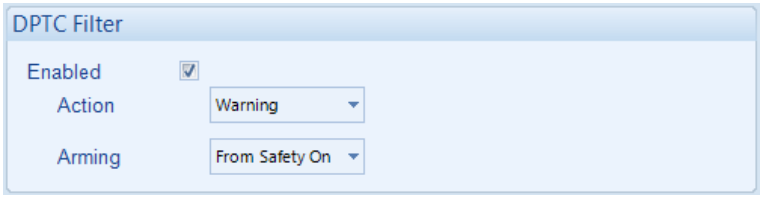
ECU Red



Parameter	Description
ECU Red Action	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*** ***From Safety On*** ***From Starting*** ***Never***
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.

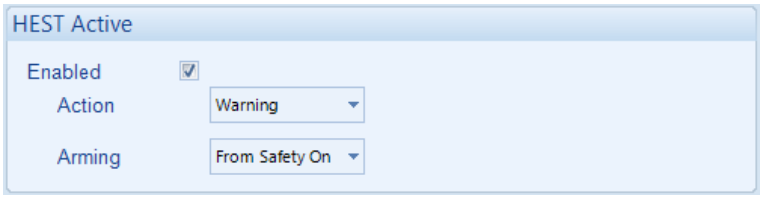
2.10.6.3 OTHER SPECIFIC SIGNALS

DPTC Filter



Parameter	Description
DPTC Filter Enabled	☐ = 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*** ***From Safety On*** ***From Starting***

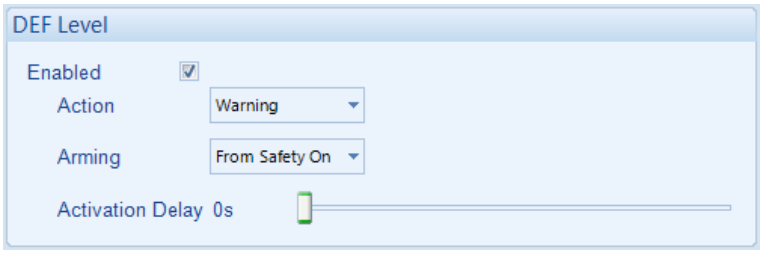
HEST Active



Parameter	Description
HEST Active Enabled	☐ = 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: ***Indication*** ***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*** ***From Safety On*** ***From Starting***

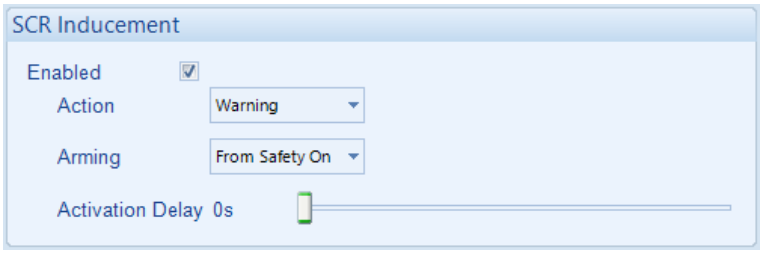
Parameter descriptions are continued overleaf…

DEF Level



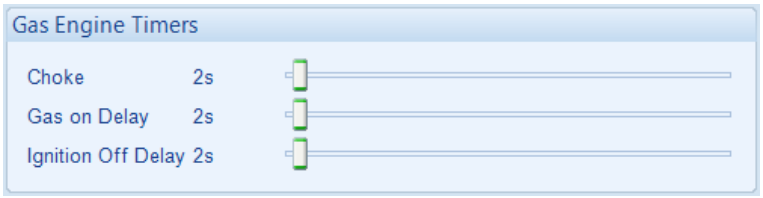
Parameter	Description
DEF Level Enabled	☐ = The DSE module's *DEF Level* alarm is disabled, it does not act upon any DEF Level fault conditions from the ECU. ☑ = The DSE module's *DEF Level* alarm is enabled. The action the DSE module takes when receiving a DEF Level fault condition from the ECU. The 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*** ***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*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***Never****:* ***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 Enabled	☐ = 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*** ***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*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***Never****:* ***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.

2.10.7 GAS ENGINE OPTIONS



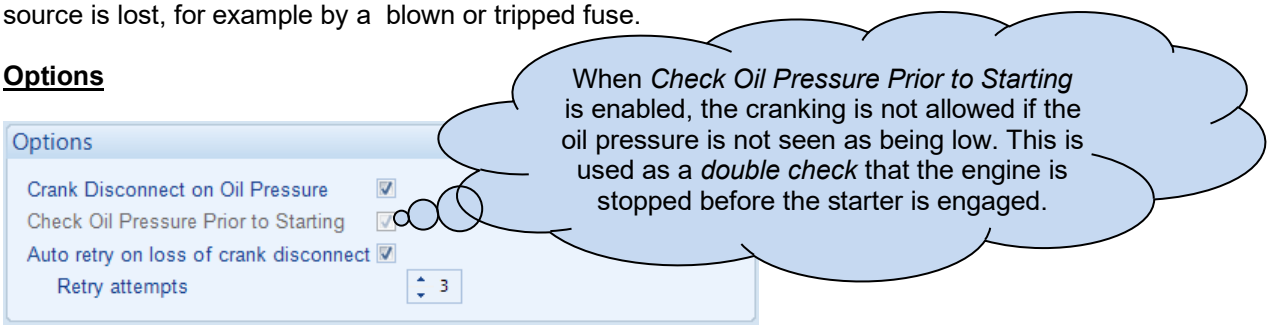
Parameter	Description
Choke Timer	Controls the amount of time that the Gas Choke output is active during the starting sequence.
Gas On Delay	Controls the amount of time between energising the Gas Ignition and energising the Fuel output. Used in the starting sequence to purge old gas from the engine.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

2.10.8 CRANK DISCONNECT

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

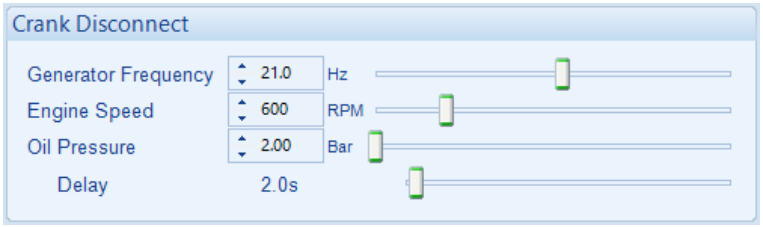
Having more than one *crank disconnect* source allows for a faster crank disconnect response. This result in less wear on the engine flywheel and starter motor. It also provides added safety in case one source is lost, for example by a blown or tripped fuse.

Options



Parameter	Description
Crank Disconnect on Oil Pressure	☐ = Oil pressure is not used to disconnect the crank motor. ☑ = When starting, the crank is disconnected when the measured oil pressure value rises above the configured *Oil Pressure Crank Disconnect* level.
Check Oil Pressure Prior to Starting	☐ = Oil pressure is not checked prior to engaging the crank motor. ☑ = The cranking is not allowed if the oil pressure is not seen as being low. This used as a double check that the engine is stopped before the starter is engaged.
Auto Retry on Loss of Crank Disconnect	☐ = Normal operation. ☑ = After a crank disconnect, if the engine fails to start and the set is seen to be at rest, the module activates an unlatched shutdown alarm and repeats the starting sequence. The number of retries is defined by the *Retry Attempts.*

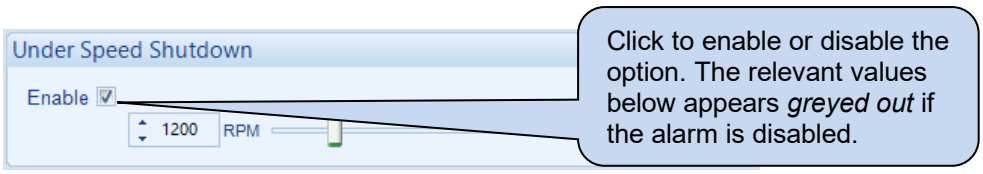
Crank Disconnect



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 for longer than the configured *Delay.*

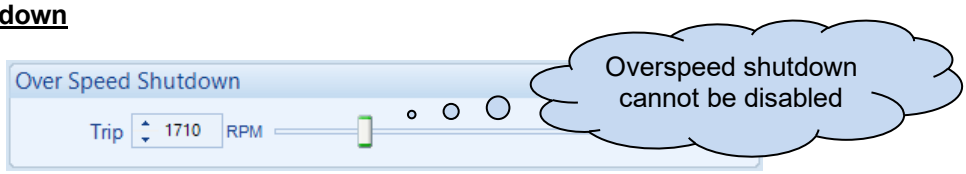
2.10.9 SPEED SETTINGS

Under Speed Shutdown



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 *Generator Transient Delay*. The *Underspeed Alarm Trip* value is adjustable to suit user requirements.

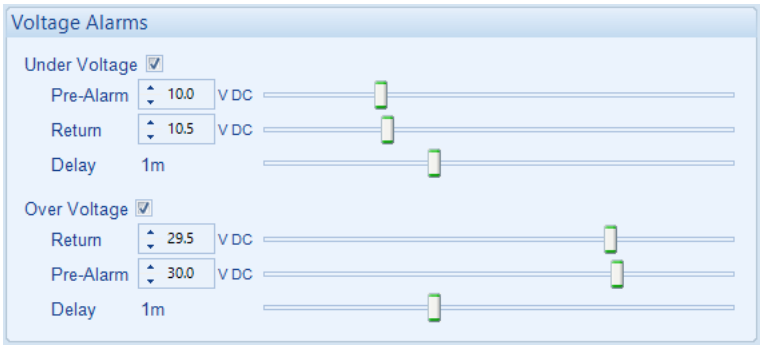
Over Speed Shutdown



Parameter	Description
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 *Generator Transient Delay*. The *Over Speed Alarm Trip* value is adjustable to suit user requirements.

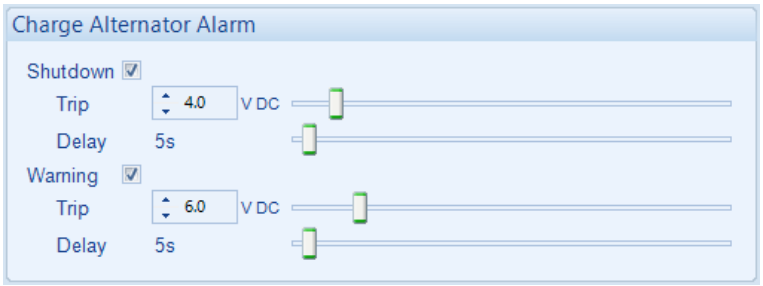
2.10.10 PLANT BATTERY

Voltage Alarms



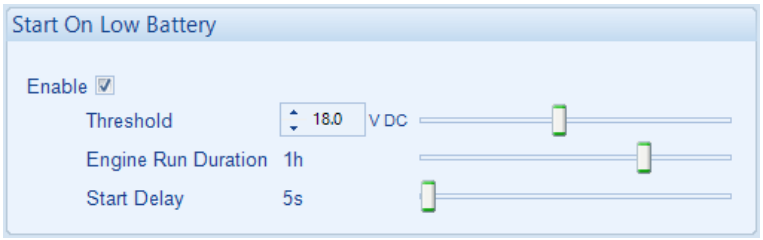
Parameter	Description
Plant Battery Under Voltage IEEE 37.2 -27 DC Undervoltage Relay	☐ = The alarm is disabled. ☑ = The alarm activates when the battery voltage drops below the configured *Pre-Alarm* level for the configured *Delay* time. When the battery voltage rises above the configured *Return* 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
Charge Alternator 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 Pre-Alarm	☐ = The alarm is disabled. ☑ = The alarm activates when the charge alternator voltage falls below the configured *Trip* level for the configured *Delay* time.

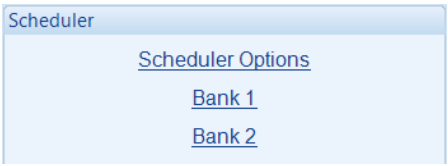
Start on Low Battery



Alarm	Description
Start on Low Battery	☐ = *Start on Low Battery* is disabled. ☑ = Select to enable autostart upon the battery voltage falling below the *Threshold* level for the duration of the *Start Delay* timer. The engine starts and run for the specified *Engine Run Duration*. This occurs only if the module is in AUTO mode

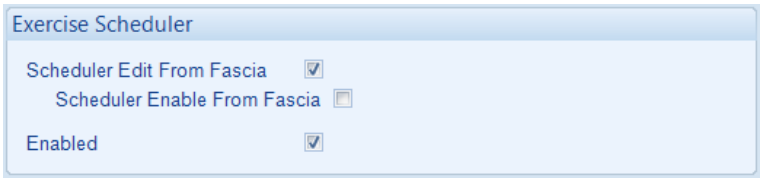
2.11 SCHEDULER

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



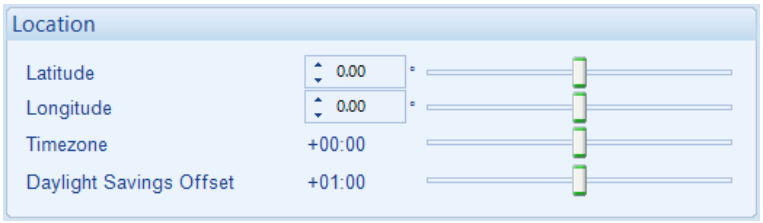
2.11.1 SCHEDULER OPTIONS

Exercise Scheduler



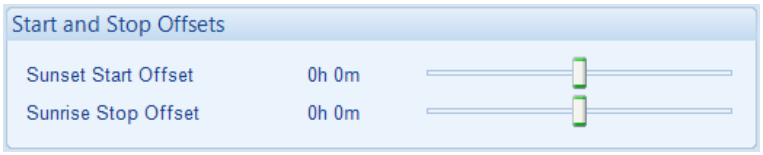
Parameter	Description
Scheduler Edit From Fascia	☐ = Scheduled is configurable only using the DSE Configuration Suite software ☑ = Scheduled is configurable through the module front panel
Scheduler Enable From Fascia	☐ = Scheduled is enabled or disabled only using the DSE Configuration Suite software ☑ = Scheduler is possible to enable and disable through the module front panel
Enabled	☐ = Scheduled runs are disabled ☑ = Enables the Scheduler

Location



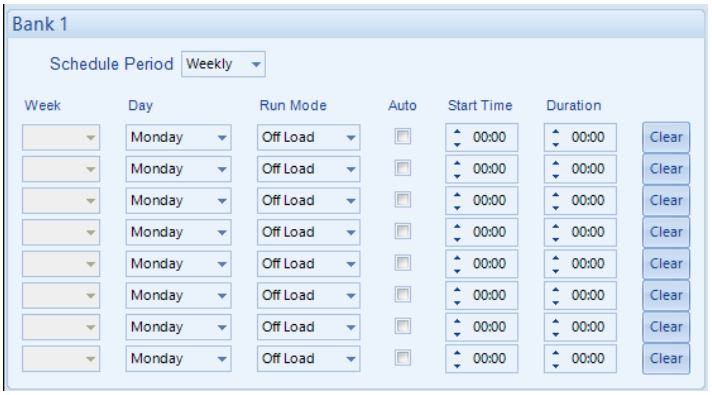
Parameter	Description
Latitude	Set the latitude at the site location to enable correct calculation of sunrise and sunset times.
Longitude	Set the longitude at the site location to enable correct calculation of sunrise and sunset times.
Timezone	Set the timezone at the site location to enable correct calculation of sunrise and sunset times.
Daylight Savings Offset	Set the daylight savings time offset at the site location to enable correct calculation of sunrise and sunset times.

Start and Stop Offsets



Parameter	Description
Sunset Start Offset	Add an offset, of up to two hours difference from the calculated sunset time, for commencing the scheduled run.
Sunrise Stop Offset	Add an offset, of up to two hours difference from the calculated sunrise time, for stopping the scheduled run.

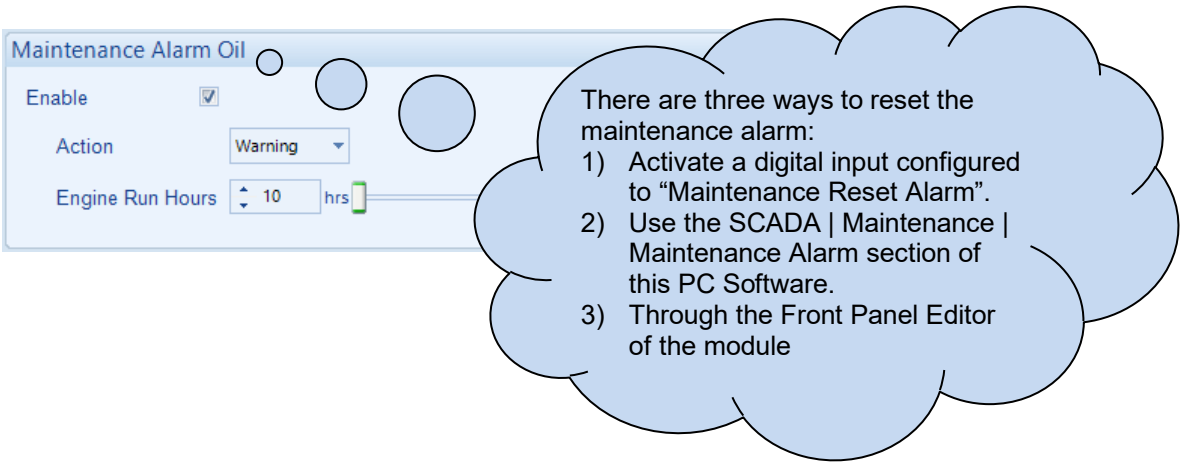
2.11.2 BANK 1 / BANK 2



Parameter	Description
Schedule Period	Determines the repeat interval for the scheduled run. Options available are: Weekly, Monthly, Daily
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 ***Lights Only:*** The module powers the lights but does not start the generator. ***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
Auto	☐ = The module follows the Start Time and Duration for the scheduled run. ☑ = The module follows the sunrise / sunset times for the scheduled run.
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 Oil, Air and Fuel



Function	Description
Enable	☐ = The maintenance alarm is disabled. ☑ = The maintenance alarm is activated with the configured *Action* when the engine hours increase more than the *Engine Run Hours*
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: ***Shutdown*** ***Warning***
Engine Run Hours	The value the engine hours must increase by to trigger the maintenance alarm.

2.13 ALTERNATIVE CONFIGURATION

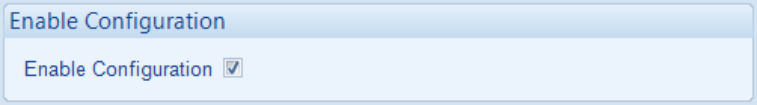
An Alternative Configuration is provided to allow the system designer to cater for different AC requirements utilising the same generator system. Typically this feature is used by Rental Set Manufacturers where the set is capable of being operated at (for instance) 120 V 50 Hz and 240V 50 Hz using a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

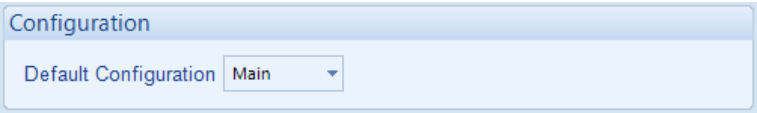
2.13.1 CONFIGURATION OPTIONS

Enable Configuration



Parameter	Description
Enable Configuration	☐ = *Alternative Configuration* is disabled. ☑ = Alternative Configuration is enabled. The configuration is enabled by changing the *Default Configuration,* activating a digital input or through the module's *Front Panel Editor*.

Configuration

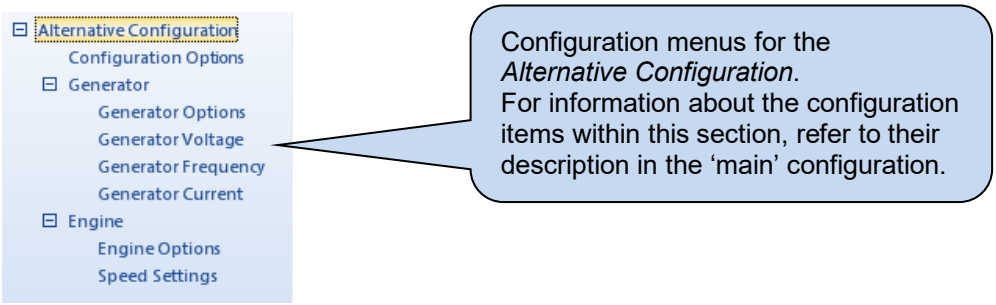


Parameter	Description
Default Configuration	Select the 'default' configuration that is used when there is no instruction to use an 'alternative configuration'.

2.13.2 ALTERNATIVE CONFIGURATIONS EDITOR

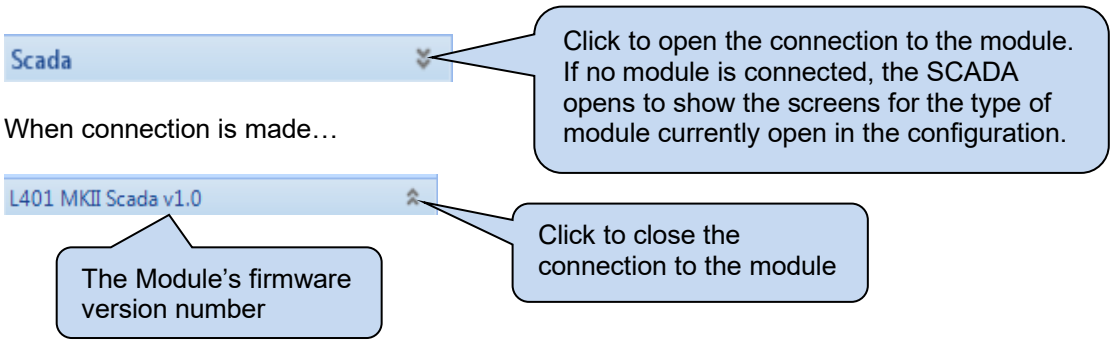
The Alternative Configurations Editor allows for editing of the parameters that are to be changed when an Alternative Configuration is selected.

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 :

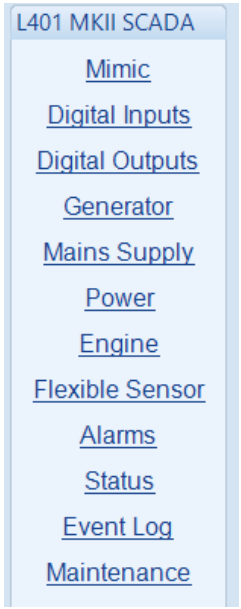


3 SCADA

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

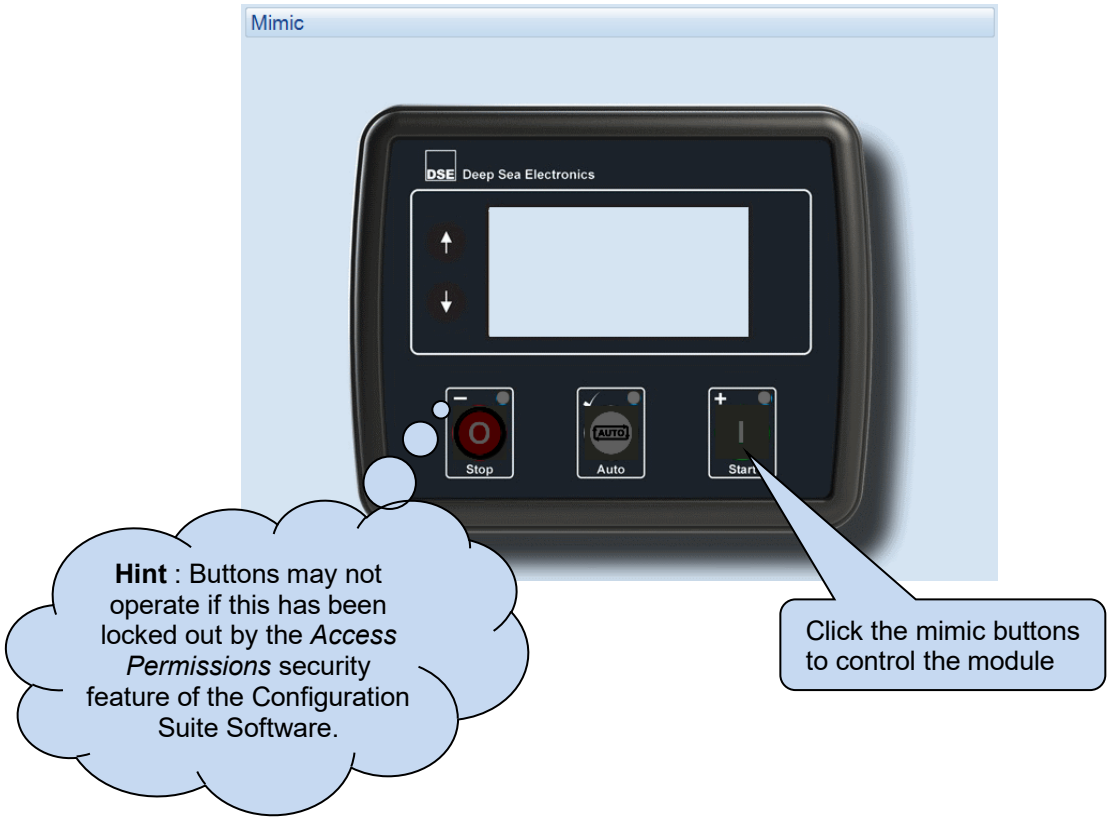


The *SCADA* page is subdivided into smaller sections.
Select the required section with the mouse.



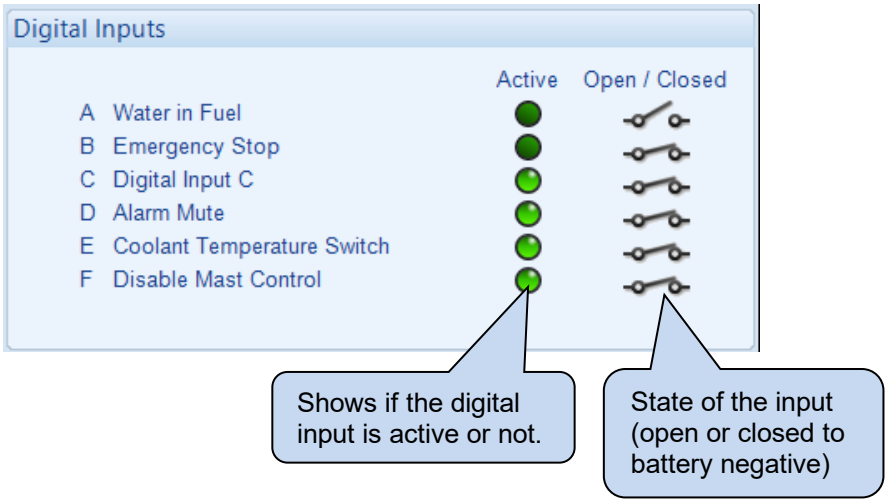
3.1 MIMIC

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



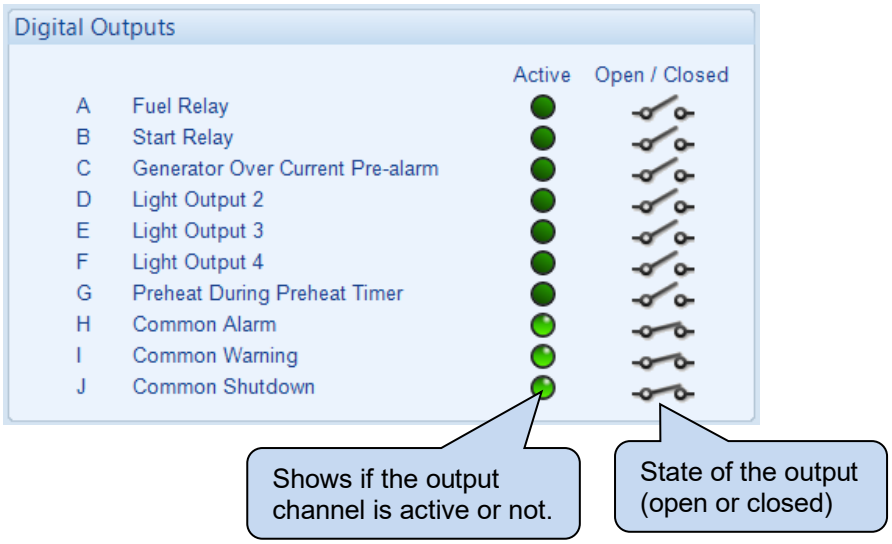
3.2 DIGITAL INPUTS

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



3.3 DIGITAL OUTPUTS

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



3.4 GENERATOR

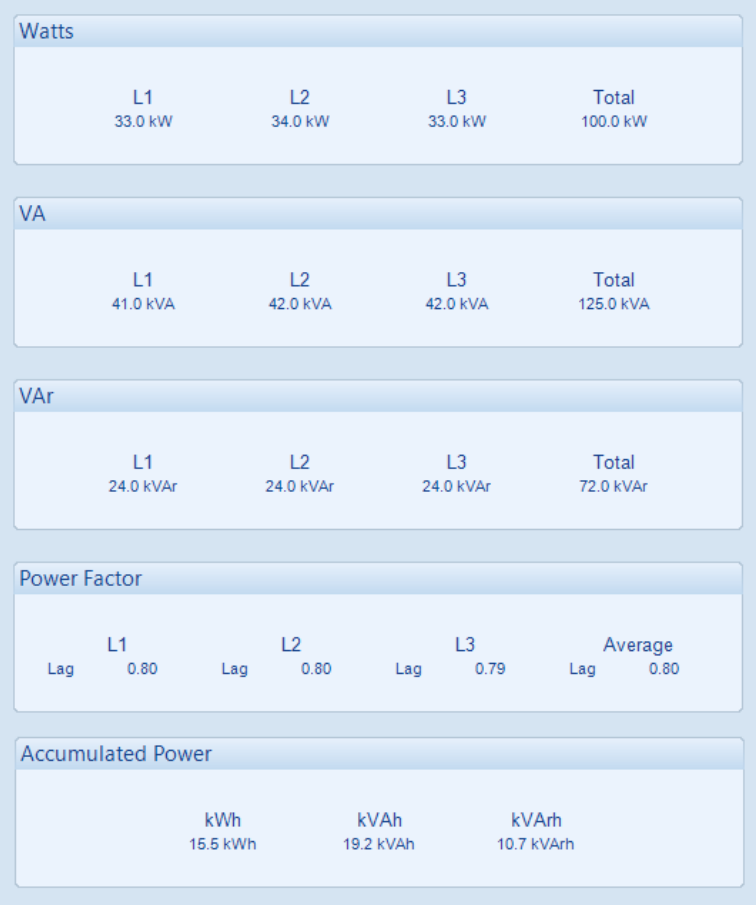
This section displays the module's measurement of the *Generator* frequency, voltage and current supply.

3.5 MAINS SUPPLY

This section displays the module's measurement of the *Mains* frequency, voltage and current supply.

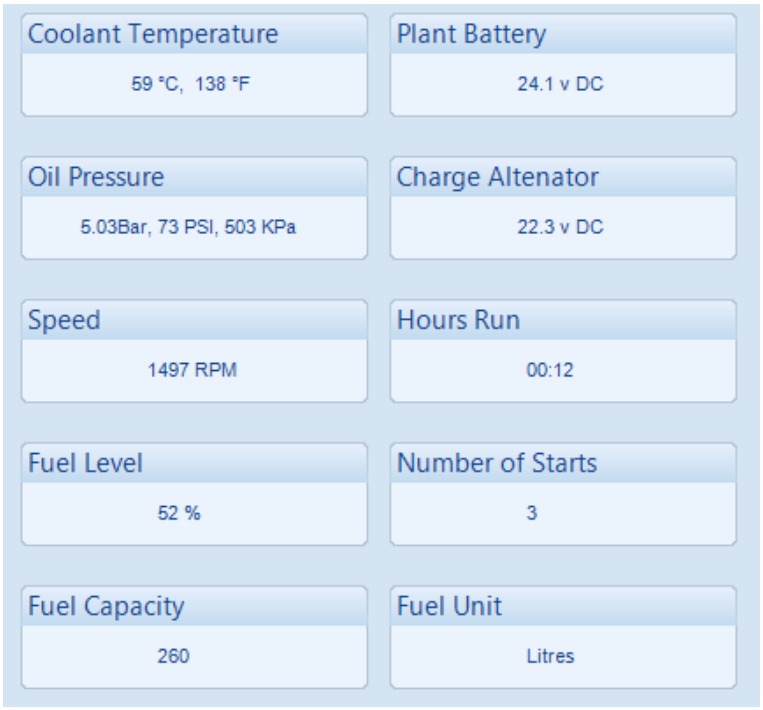
3.6 POWER

This section displays the module's measurement of the *Generator* or *Mains* power output.



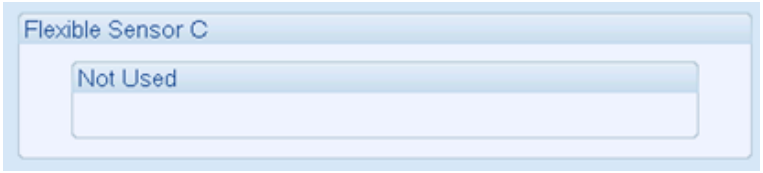
3.7 ENGINE

This section displays the measurement of the *Engine* parameters. These measurements come from either the module's inputs or from the engine ECU/ECM. For further details on how to configure these items, refer to section entitled *Application* elsewhere within this document.



3.8 FLEXIBLE SENSOR

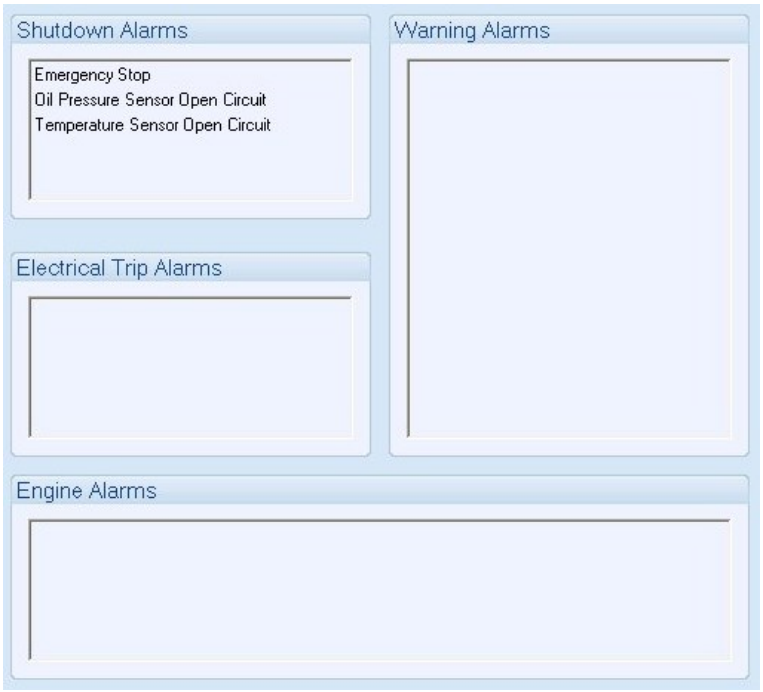
This section displays the status and instrumentation measured by the module's analogue inputs and the functions they are configured for. For further details on how to configure these items, refer to section entitled *Fuel Level* elsewhere within this document.



3.9 ALARMS

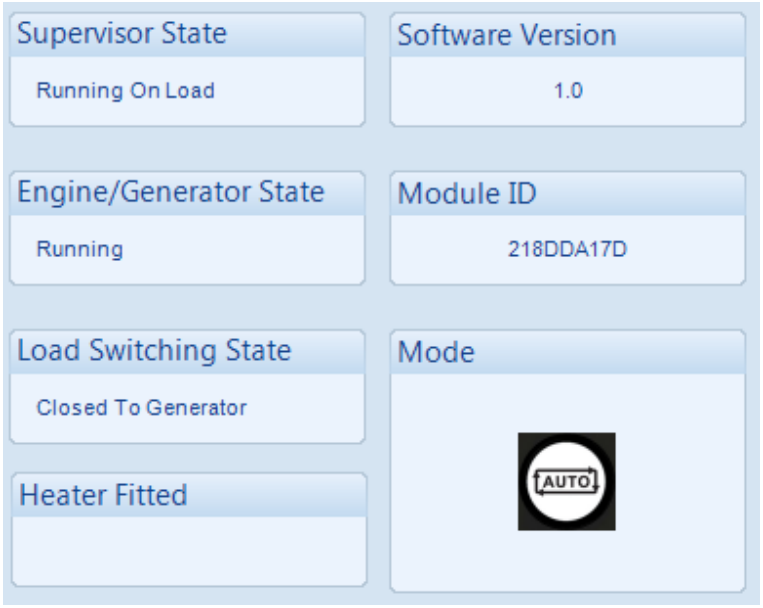
This section displays the alarms that are currently active on the module. For information in regards to alarm descriptions, refer to DSE publication: ***057-221 DSEL401 MKII Operator Manual*** found DSE's the DSE website: www.deepseaelectronics.com.

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



3.10 STATUS

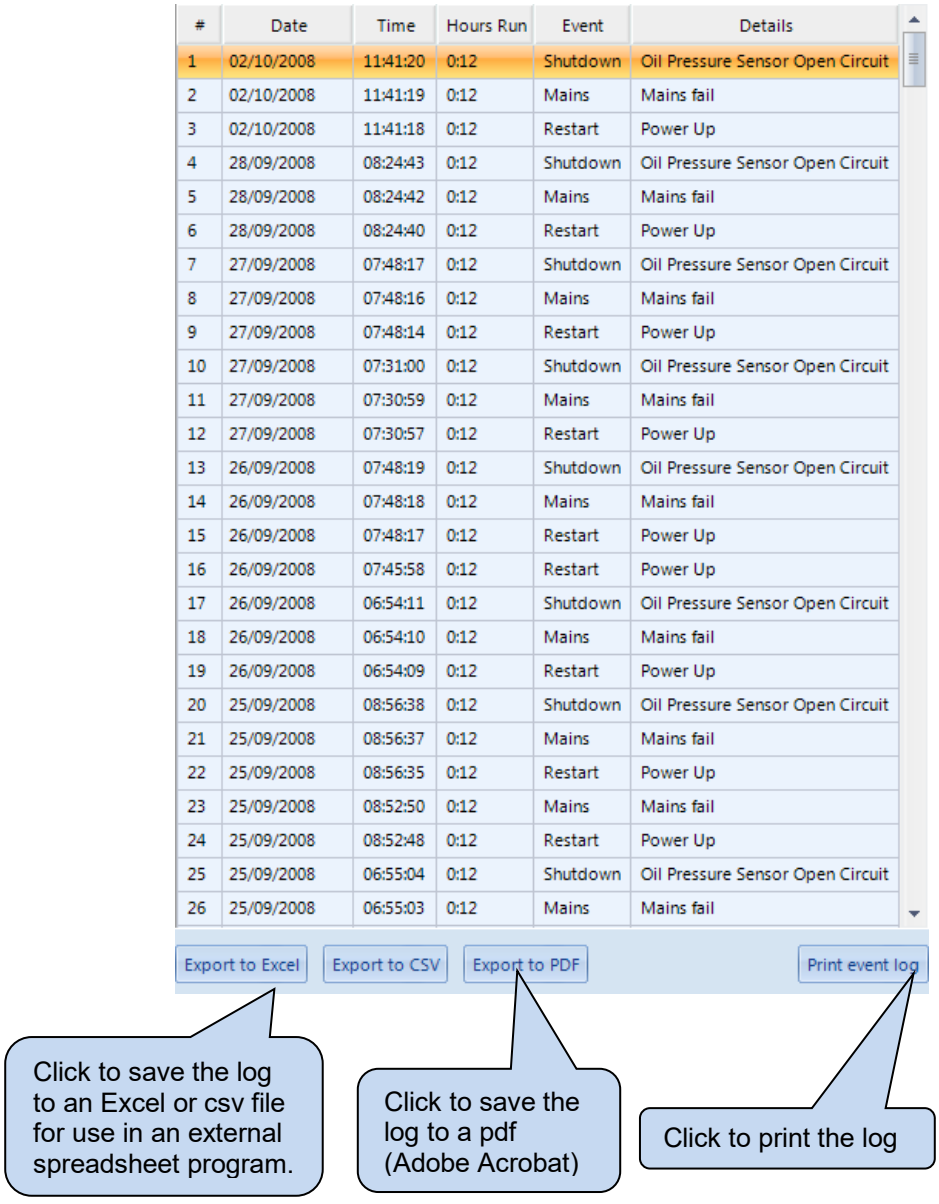
This section displays the status information about the module.



3.11 EVENT LOG

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

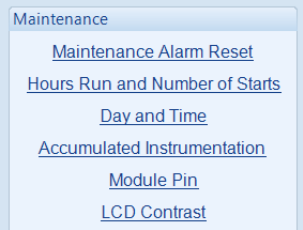
For information in regards to alarm descriptions, refer to DSE publication: ***057-221 DSEL401 MKII Operator Manual*** found on DSE's website: www.deepseaelectronics.com.



#	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

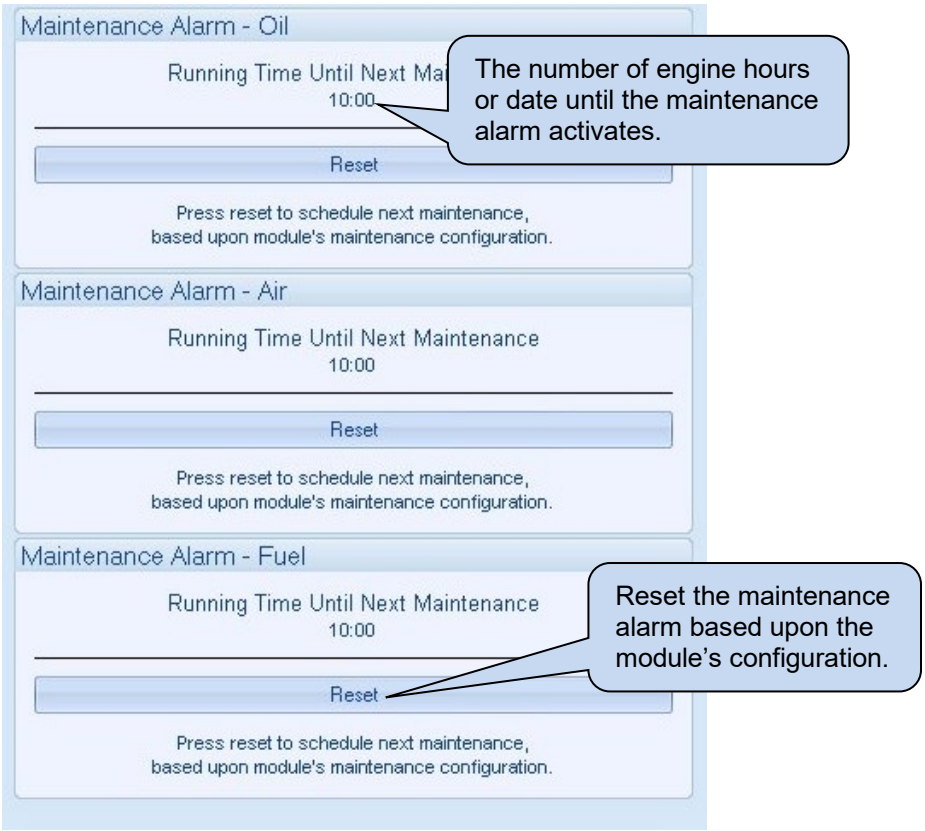
3.12 MAINTENANCE

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



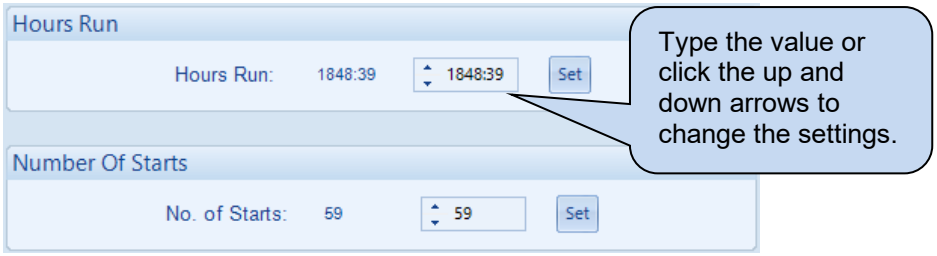
3.12.1 MAINTENANCE ALARM RESET

This section allows the module's three maintenance alarms to be reset and when the alarm is due to activate.



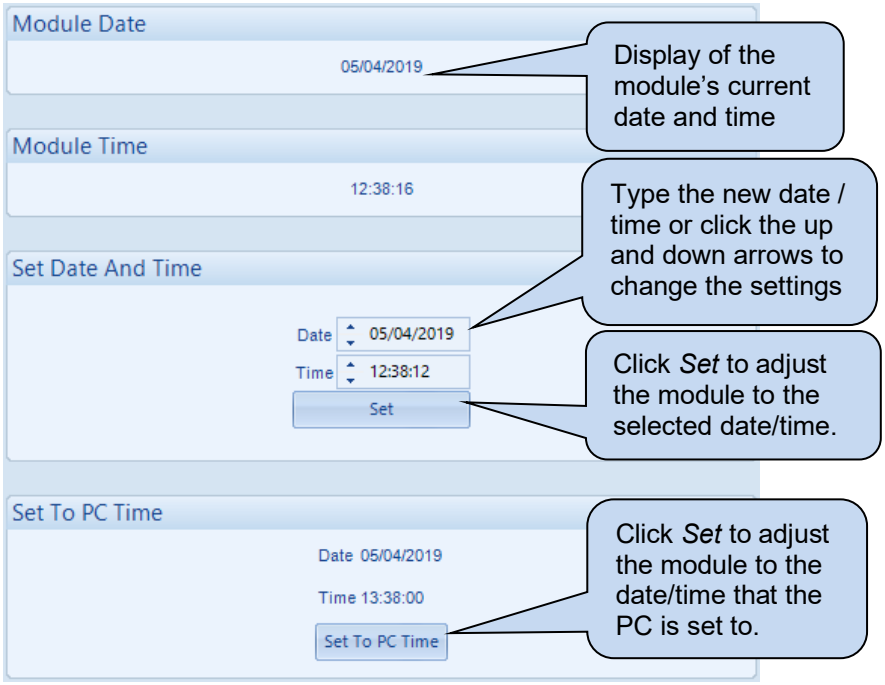
3.12.2 HOURS RUN AND NUMBER OF STARTS

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



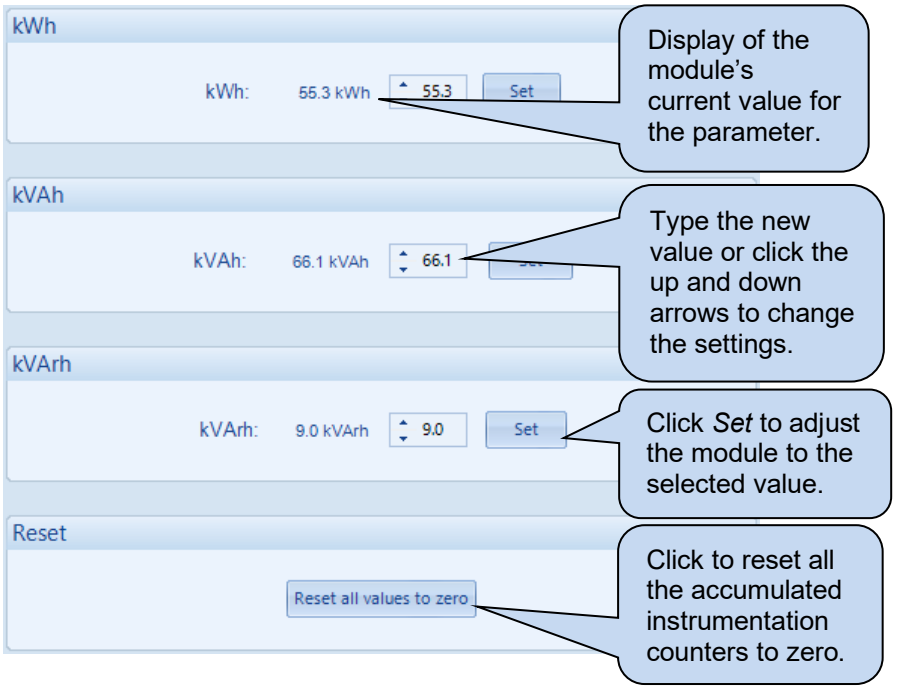
3.12.3 DATE AND TIME

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



3.12.4 ACCUMULATED INSTRUMENTATION

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



3.12.5 DPF REGENERATION

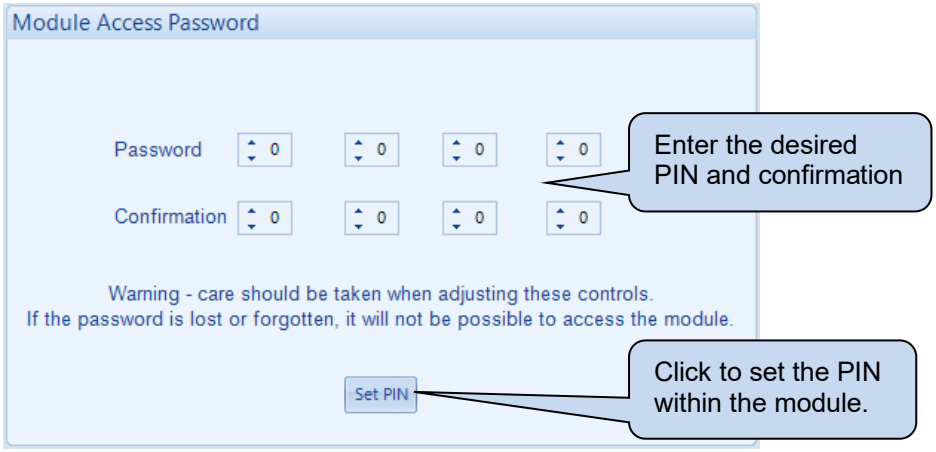
This section allows settings within the engine's ECU to be altered when supported.

Parameter	Description
DPF Auto Regen Inhibit	☐ = The ECU's DPF Auto Regeneration happens automatically. ☑ = The ECU's DPF Auto Regeneration is inhibited from activating.

3.12.6 MODULE PIN

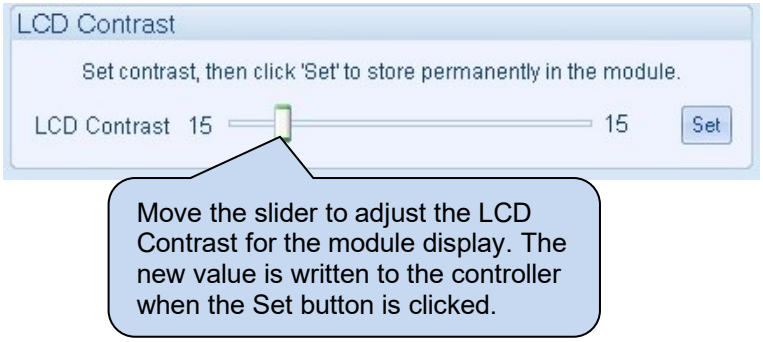
CAUTION!: If the module PIN is lost or forgotten, it is no longer possible to access or make changes to the module!

This section allows the user to configure a PIN (Personal Identification Number) within the module. This PIN must be entered to access the modules *Main Front Panel Configuration Editor* or, when writing a configuration / changing a value in SCADA using the DSE Configuration Suite PC Software.



3.12.7 LCD CONTRAST

This section allows the user to adjust the module's display contrast. This is useful when the contrast is set to a level where the display is no longer visible and therefore cannot be configured through the Front Panel Editor.



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
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 breaker. The set is allowed to cool before stopping.
Shutdown	Audible alarm and common alarm signal is generated. The set is taken off load and immediately stopped. *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 on Delay	Smoke Limiting	Smoke Limiting Off	Warming Up	Gen Available	Gen On Load	Cooling	Cooling in Idle
Never													
Always													
When Stationary													
From Starting													
Overfrequency / Overspeed Overshoot													
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 FROM STARTING

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

5.5 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

5.6 FROM SAFETY ON

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

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