DEEP SEA ELECTRONICS

DSE6110 MKII / DSE6120 MKII
Configuration Suite PC Software Manual

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DSE6110 MKII / DSE6120 MKII Configuration Suite PC Software Manual

Amendments List

Amd. No.	Comments
1	Initial release
2	Updated to add the version 2 firmware features of the DSE61xx MKII module.

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

The **DSE Configuration Suite PC Software** allows the DSE6100 MKII modules to be connected to a PC via USB A –USB B cable. Once connected the various operating parameters within the module are viewed or edited as required by the engineer. This software allows easy controlled access to these values.

This manual details the configuration of the DSE6110 MKII / DSE6120 MKII series controllers.
A separate document covers the older DSE6110 and DSE6120 modules configuration.
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. A separate manual deals with the operation of the individual module (See section entitled *Bibliography* elsewhere in this document).

1.1 BIBLIOGRAPHY

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

1.1.1 INSTALLATION INSTRUCTIONS

DSE PART	DESCRIPTION
053-173	6110 MKII / 6120 MKII installation instructions sheet

1.1.2 MANUALS

DSE PART	DESCRIPTION
057-151	DSE Configuration Suite PC Software Installation & Operation Manual
057-004	Electronic Engines and DSE wiring
057-226	DSE6110 MKII / DSE6120 MKII Operator Manual
057-096	DSE6100 Software Manual

1.1.3 OTHER

The following third party documents are also referred to:

ISBN	DESCRIPTION
1-55937-879-4	IEEE Std C37.2-1996 IEEE Standard Electrical Power System Device Function Numbers and Contact Designations. Published by Institute of Electrical and Electronics Engineers Inc

1.1.4 GLOSSARY OF TERMS

Term	Description
DSE6100 MKII, DSE61xx MKII	All modules in the DSE61xx MKII range.
DSE6110 MKII	DSE6110 MKII module/controller
DSE6120 MKII	DSE6120 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 scale.

Continued over page…

Term	Description
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 (ECM).
DM2	Diagnostic Message 2 A DTC that was previously active on the engine ECU (ECM) and has been stored in the ECU's (ECM) 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 (ECM).
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.
GSM	Global System for Mobile communications. Cell phone technology used in most of the World.
HEST	High Exhaust System Temperature Initiates when DPF filter is full in conjunction with an extra fuel injector in the exhaust system to burn off accumulated diesel particulate matter or soot.
HMI	Human Machine Interface A device that provides a control and visualisation interface between a human and a process or machine.
IDMT	Inverse Definite Minimum Time
OC	Occurrence Count A part of DTC that indicates the number of times that failure has occurred.
PGN	Parameter Group Number A CAN address for a set of parameters that relate to the same topic and share the same transmission rate.
PLC	Programmable Logic Controller A programmable digital device used to create logic for a specific purpose.
SCADA	Supervisory Control And Data Acquisition A system that operates with coded signals over communication channels to provide control and monitoring of remote equipment
SCR	Selective Catalytic Reduction A process that uses DEF with the aid of a catalyst to convert nitric oxide and nitrogen dioxide into nitrogen and water to reduce engine exhaust emission.
SPN	Suspect Parameter Number A part of DTC that indicates what the failure is, e.g. oil pressure, coolant temperature, turbo pressure etc.

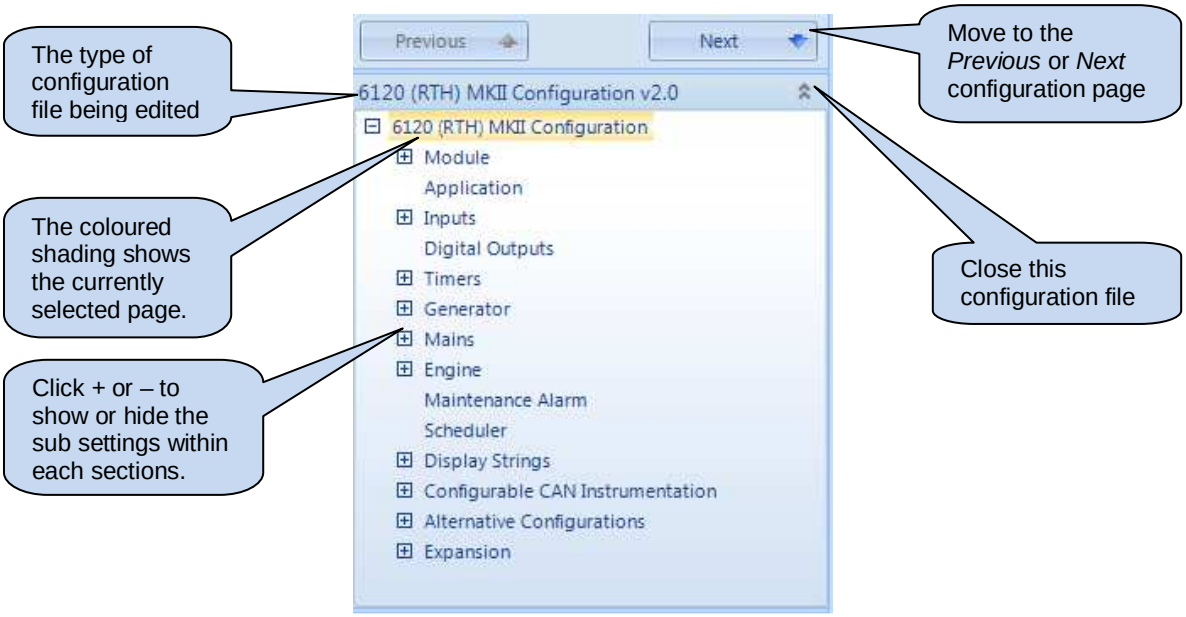
1.2 INSTALLATION AND USING THE DSE CONFIGURATION SUITE SOFTWARE

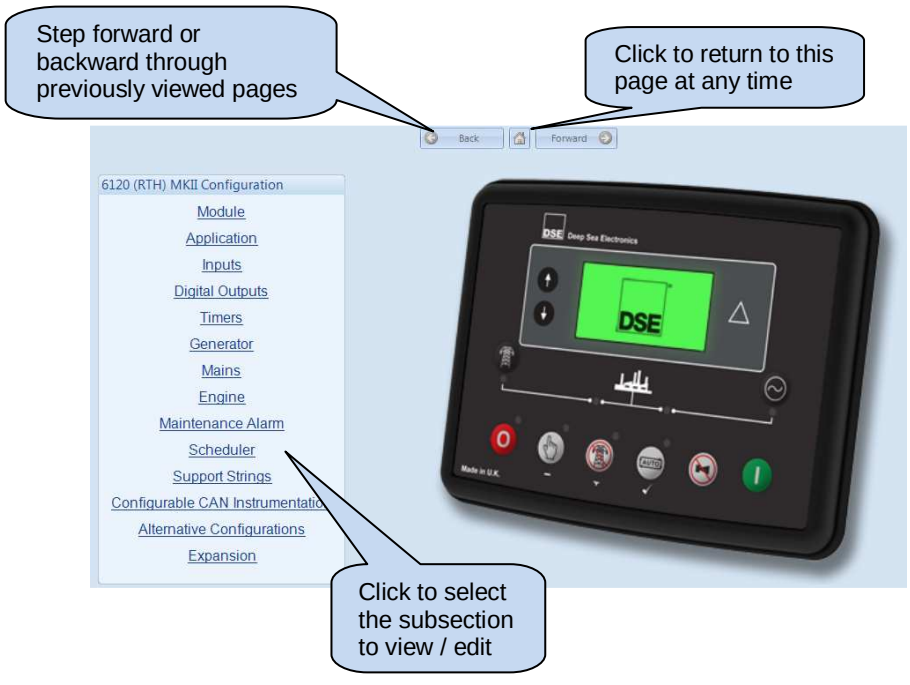
For information in regards to instating and using the DSE Configuration Suite Software please refer to DSE publication: ***057-151 DSE Configuration Suite PC Software Installation & Operation Manual*** which is found on our website: www.deepseaplc.com

2 EDITING THE CONFIGURATION

This menu allows module configuration, to change the function of Inputs, Outputs and LED's, system timers and level settings to suit a particular application.

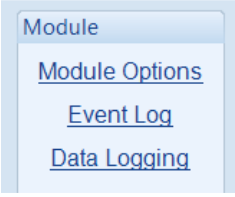
2.1 SCREEN LAYOUT



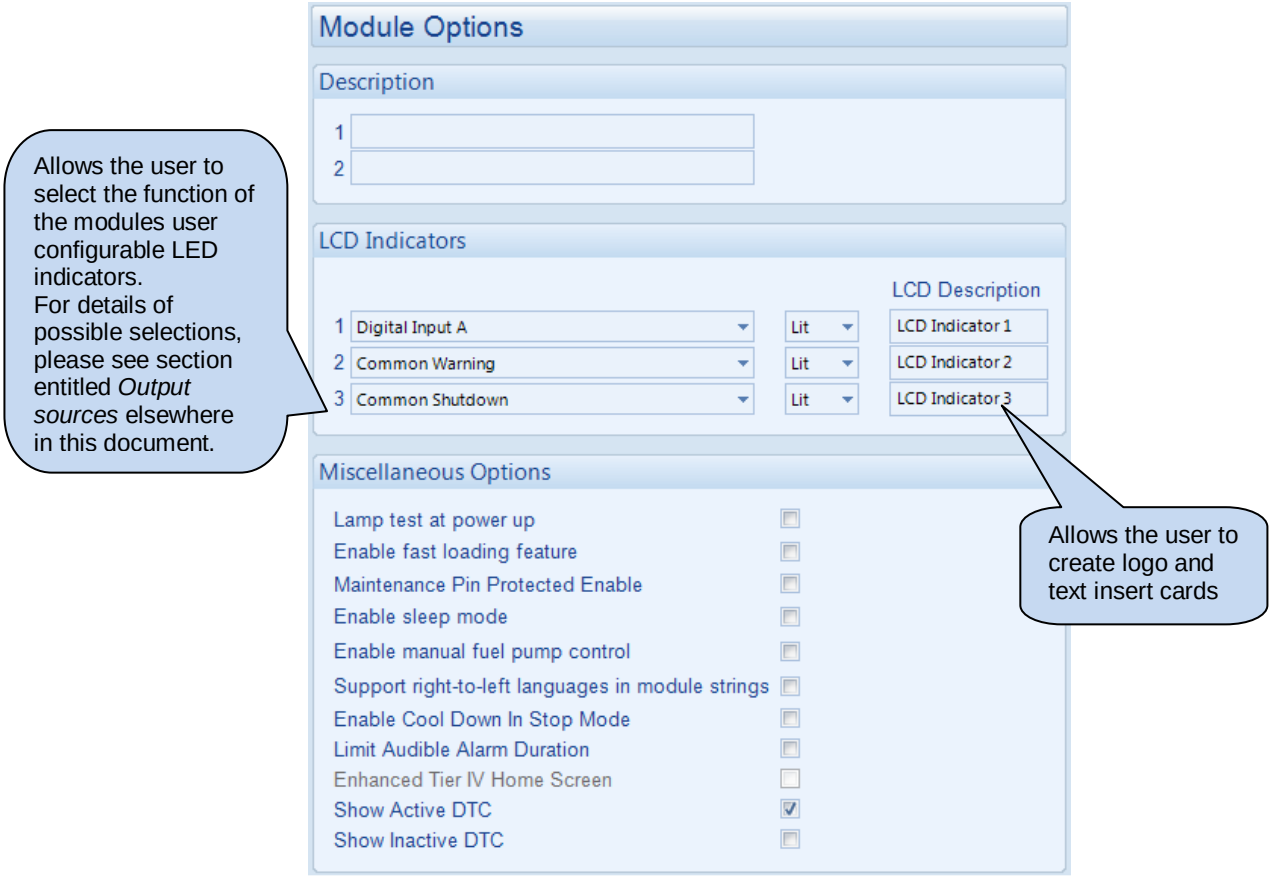


2.2 MODULE

The module section is subdivided into smaller sections.
Select the required section with the mouse.
This section allows the user to change the options related to the module itself.



2.2.1 MODULE OPTIONS



Parameter	Description
Lamp Test At Power Up	☐ = Feature disabled ☑ = The LEDs on the module's fascia all illuminate when the DC power is applied as a 'lamp test' feature.
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.

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Parameter	Description
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 Sleep Mode	☐ =Normal operation ☑ = Module goes into sleep (low current) mode after 1m of inactivity in STOP mode. Press any button to 'wake' the module.
Enable Manual Fuel Pump Control	☐ =Normal operation ☑ =Allows manual fuel pump control when the "fuel level" instrument is being viewed.
Support Right-To-Left Languages in Module Strings	Determines the direction of text input where supported (i.e. configurable input text) ☐ =left to right language support ☑ =right to left language support
Enable Cool Down 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.
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.
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
Show Active DTC **ECU / ECM Only**	Enable this option to show the active ECU / ECM fault codes on the module display. (Active DTC are also called DM1 in J1939 ECU)
Show Inactive DTC **ECU / ECM Only**	Enable this option to show the in-active ECU (ECM) DTC on the module display. Inactive DTCs are the historical log of the ECU, where previous alarms have been cleared from the active DTC list. (Inactive DTC are called DM2 in J1939).

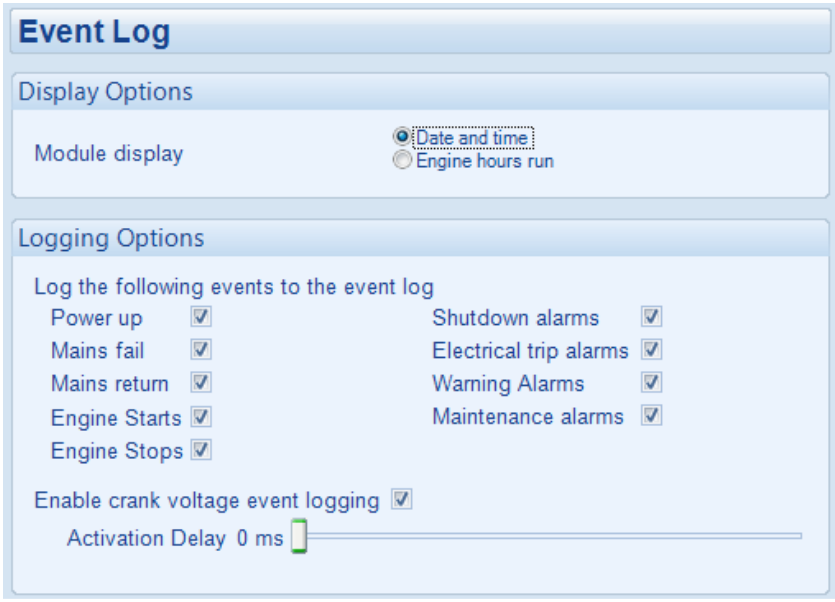
2.2.2 EVENT LOG

2.2.2.1 DISPLAY OPTIONS

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

2.2.2.2 LOGGING OPTIONS

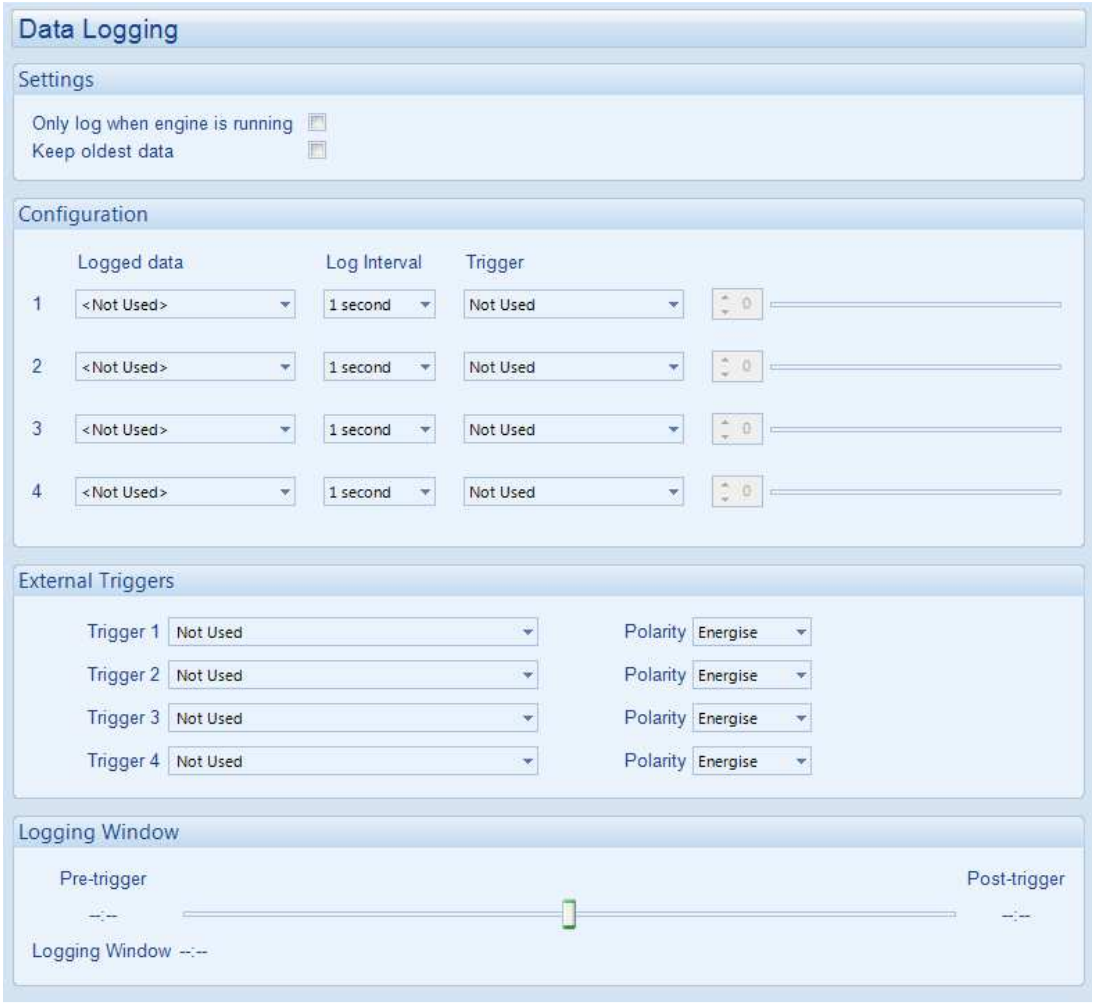
The event log is configured to allow users to select which events are stored.



Parameter	Description
Power Up	☐ = Power up events are not logged in the module's event log ☑ = Power up events are logged when the DC Supply is applied to the module or whenever the module is rebooted
Mains Fail	☐ = The Mains Fail events are not logged in the module's event log ☑ = Logs the Mains Failure events
Mains Return	☐ = The Mains Return events are not logged in the module's event log ☑ = Logs the Mains Return events
Engine Starts	☐ = The Engine Start events are not logged in the module's event log ☑ = Logs the Engine Start events
Engine Stops	☐ = The Engine Stop events are not logged in the module's event log ☑ = Logs the Engine Stop events
Shutdown Alarms	☐ = The Shutdown Alarms are not logged in the module's event log ☑ = Logs the Shutdown alarms
Electrical Trip Alarms	☐ = The Electrical Trip Alarms are not logged in the module's event log ☑ = Logs the Electrical Trip alarms
Warning Alarms	☐ = The Warning Alarms are not logged in the module's event log ☑ = Logs the Warning Alarms
Maintenance Alarms	☐ = The Maintenance Alarms are not logged in the module's event log ☑ = Logs the Maintenance alarms
Enable Crank Voltage Event Logging	☐ = *Pre-crank* and *Average* crank voltages are not logged in the module's event log ☑ = Logs the *Pre-crank* and the *Average* voltages. The *Pre-crank* is the voltage before cranking, the *Average* is the average voltage of the Pre-crank and the voltage level after the *Activation Delay* time from cranking.
Activation Delay	The timer starts when the *Start Relay* is energised, the DC Voltage during Cranking is logged after this time, to calculate the *Average Crank Voltage*.

2.2.3 DATA LOGGING

The module holds a rolling log of up to four parameters in a memory buffer. The buffered log is saved to the *Data Logging* when any of the paramters exceed its configurable *Trigger* or on an *External Trigger* such as an alarm. The logged data contains the *Logging Window* for each of the four parameters, holding a *Pre-Trigger* and *Post-Trigger* log.
The module's *Data Logging* memory holds up to 35 blocks of memory, each block containing the *Logging Window* for the selected parameters.
The *Data Logging* is viewed using the *Data Log Viewer* application, which can accessed from the DSE Configuration Suite software under the Tools menu.



2.2.3.1 SETTINGS

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

Parameters are continued overleaf…

2.2.3.2 CONFIGURATION

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

2.2.3.3 EXTERNAL TRIGGERS

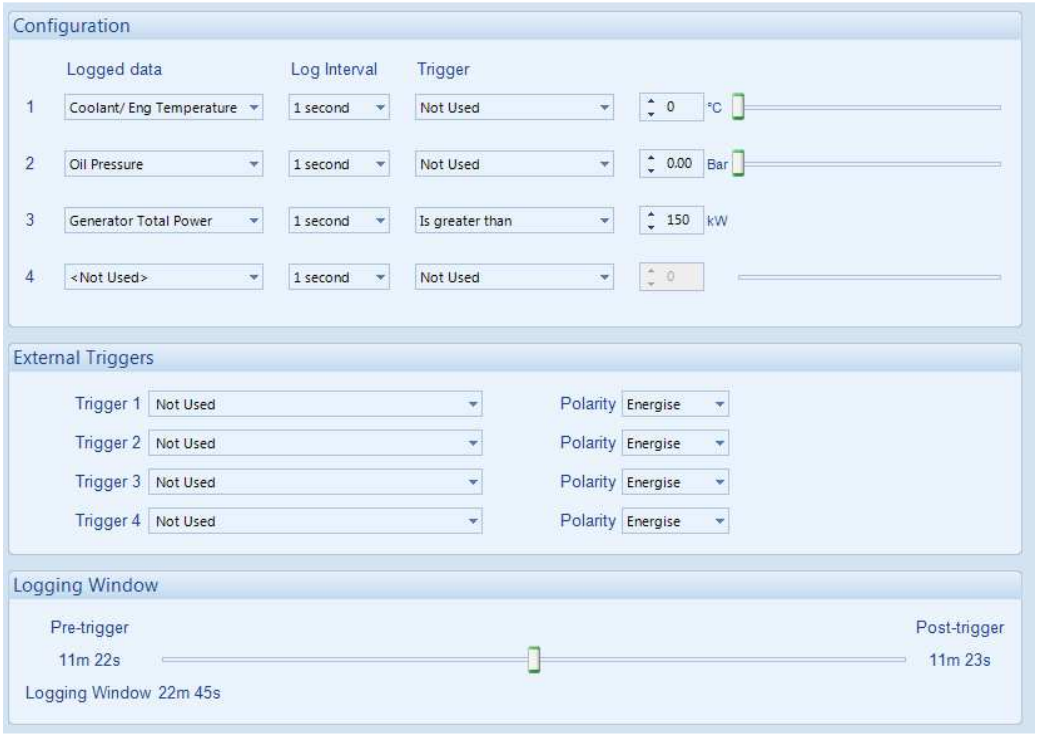
Parameter	Description
Trigger	Select an external trigger to initiate a data log
Polarity	Select the polarity of the trigger. ***Energise**:* the data log is triggered when the configured trigger goes active. ***De-Energise**:* the data log is triggered when the configured trigger goes inactive

2.2.3.4 LOGGING WINDOW

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

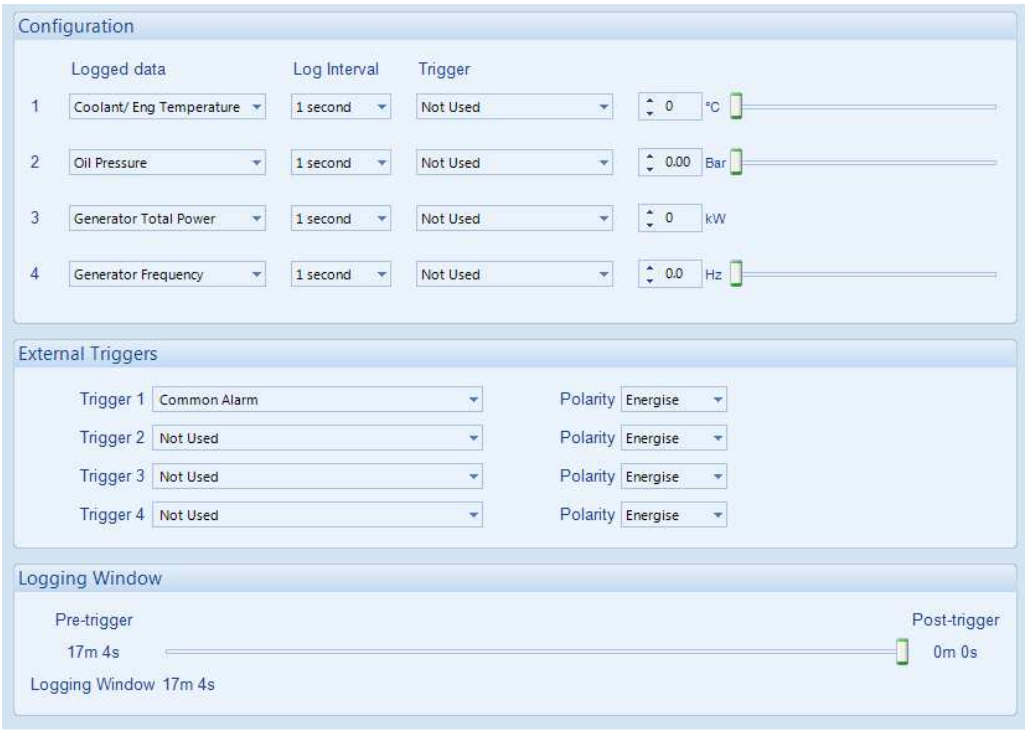
Example 1

In the example below, the selected three parameters are logged when the *Generator Total Power* exceeds the set trip level of 150 kW.
The *Data Log* in the module contains the values of these three parameters for the duration of the *Logging Window*, that is 11 m 22 s before the *Generator Total Power* exceeded 150 kW and 11 m 23 s after that.



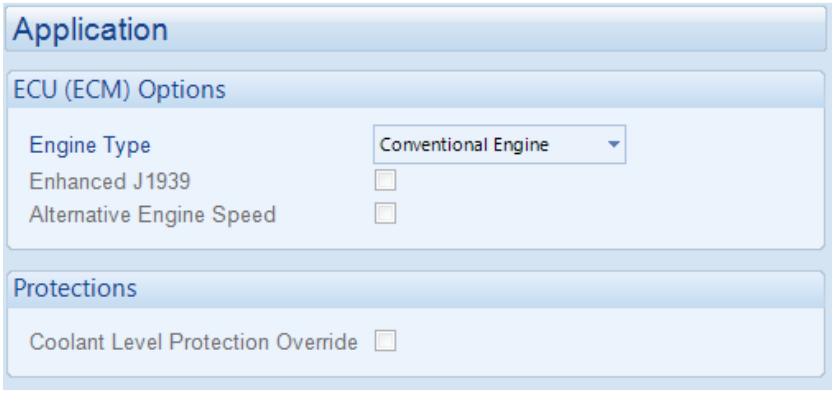
Example 2

In the example below, the selected four parameters are logged when a *Common Alarm* occurs on the controller. The *Data Log* in the module contains the values of these four parameters for the duration of the *Logging Window*, that is 17 m 4 s before the *Alarm* ocurred.



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.deepseaplc.com*



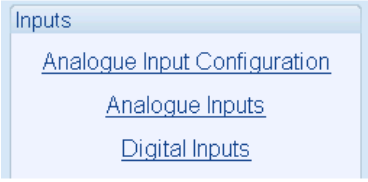
Parameter	Description
Engine Type	Select the appropriate engine type ***Conventional Engine:*** Select this for a traditional (non ECU) engine, either Energise to Run or Energise to Stop. ***Conventional Gas Engine:*** Select this for a traditional (non ECU) engine and require Gas engine functionality. 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.deepseaplc.com for the latest version of Configuration Suite software.
Enhanced J1939	☐ = The module reads 'Basic' instrumentation from the engine ECU and display (where supported by the engine) : • Engine Speed • Oil Pressure • Engine Coolant Temperature • Hours Run ☑ = The module reads and display an 'Enhanced' instrumentation list (where supported by the engine) : • Engine Speed • Oil Pressure • Engine Coolant Temperature • Hours Run • Engine Oil Temperature • Exhaust Temperature • Fuel Pressure • Total Fuel used • Fuel Consumption • Inlet Manifold Temperature • Coolant Pressure • Turbo Pressure Where an instrument is not supported by the engine ECU, the instrument is not displayed. DSE Reserve the right to change these lists in keeping with our policy of continual development.

Parameters are continued overleaf…

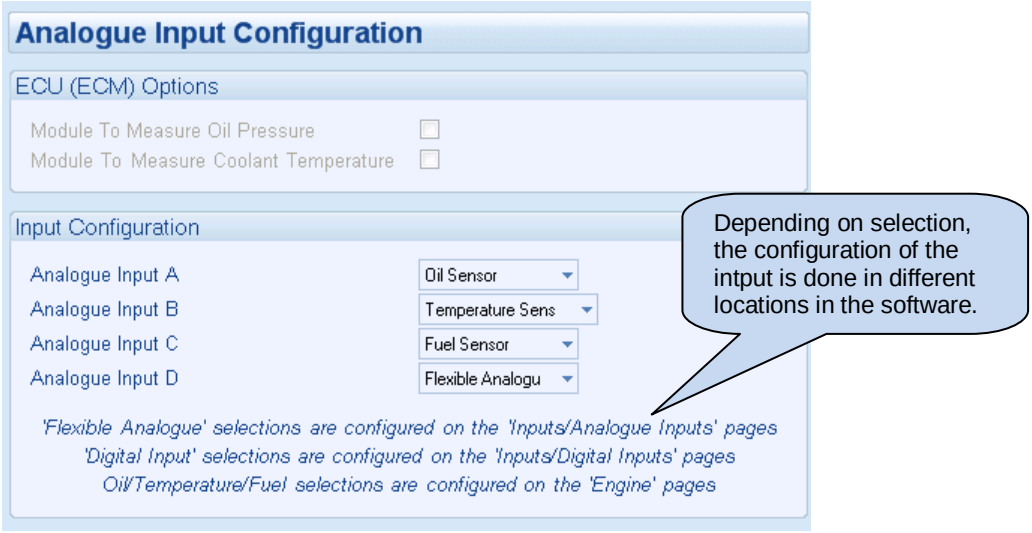
Parameter	Description
Alternative Engine Speed	☐ = The engine is instructed to run at its *Nominal Speed* as configured by the Engine Manufacturer. ☑ = The engine is instructed to run at its *Alternative Speed* as configured by the Engine Manufacturer.
Coolant Level Protection Override	☐ = The Coolant Level Protection is read from the ECU and a Shutdown alarm triggers when the ECU activates this alarm ☑ = The Coolant Level Protection is ignored when the ECU activates this alarm.

2.4 INPUTS

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



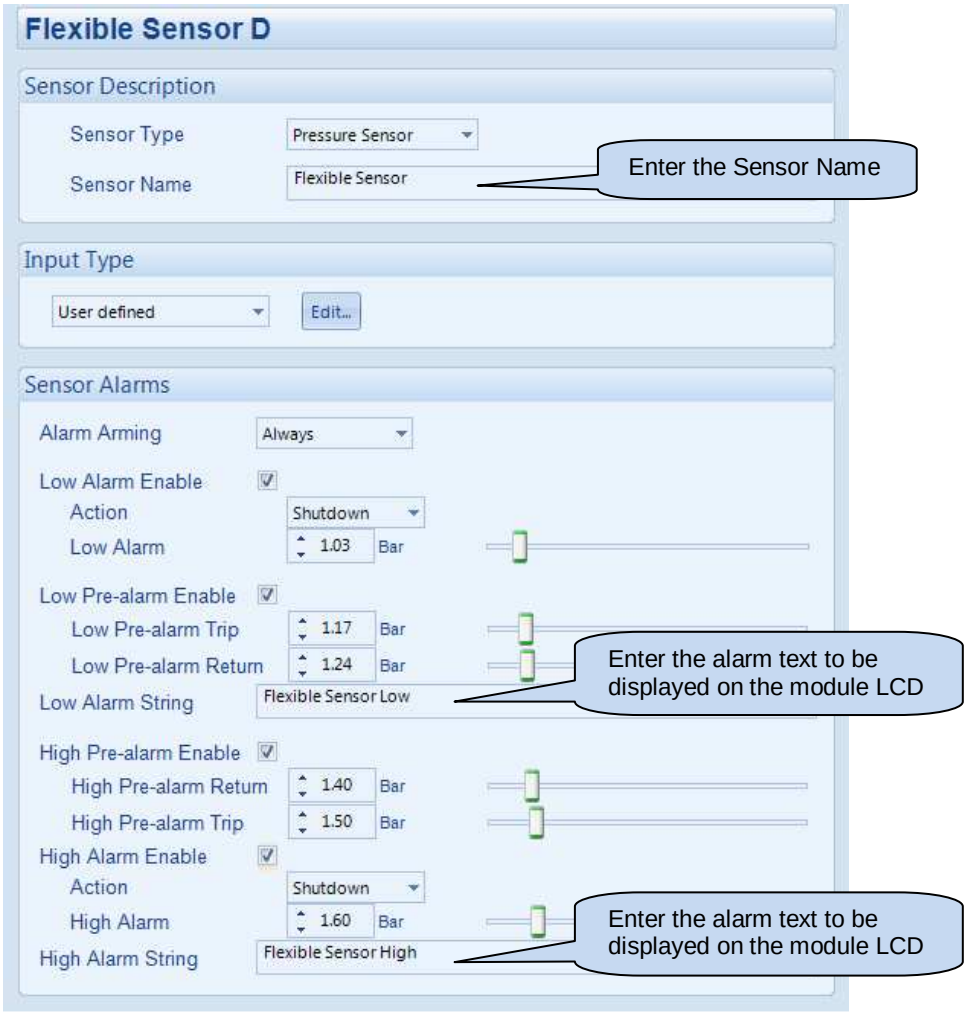
2.4.1 ANALOGUE INPUT CONFIGURATION



Parameter	Description
Module To Measure Oil Pressure	(Available only when the module is configured for connection to a CAN engine.) ☐ = The measurements are taken from the ECU. ☑ = The module ignores the CAN measurement and uses the analogue sensor input.
Module To Measure Coolant Temperature	(Available only when the module is cionfigured for connection to a CAN engine.) ☐ = The measurements are taken from the ECU. ☑ = The module ignores the CAN measurement and uses the analogue sensor input.
Analogue Input A	Select what the analogue input is to be used for: ***Digital Input:*** Configured on the *Inputs/Digital Inputs* pages ***Flexible Analogue:*** Configured on the *Inputs/Analogue Inputs* pages ***Not Used:*** The input is disabled ***Oil Sensor:*** Configured on the *Engine* pages
Analogue Input B	Select what the analogue input is to be used for: ***Digital Input:*** Configured on the *Inputs/Digital Inputs* pages ***Temperature Sensor:*** Configured on the *Engine* pages ***Not Used:*** The input is disabled
Analogue Input C	Select what the analogue input is to be used for: ***Digital Input:*** Configured on the *Inputs/Digital Inputs* pages ***Flexible Analogue :*** Configured on the *Inputs/Analogue Inputs* pages ***Fuel Sensor:*** Configured on the *Engine* pages ***Not Used:*** The input is disabled
Analogue Input D	Select what the analogue input is to be used for: ***Digital Input:*** Configured on the *Inputs/Digital Inputs* pages ***Flexible Analogue:*** Configured on the *Inputs/Analogue Inputs* pages ***Not Used:*** The input is disabled ***Oil Sensor:*** Configured on the *Engine* pages

2.4.2 FLEXIBLE SENSOR D

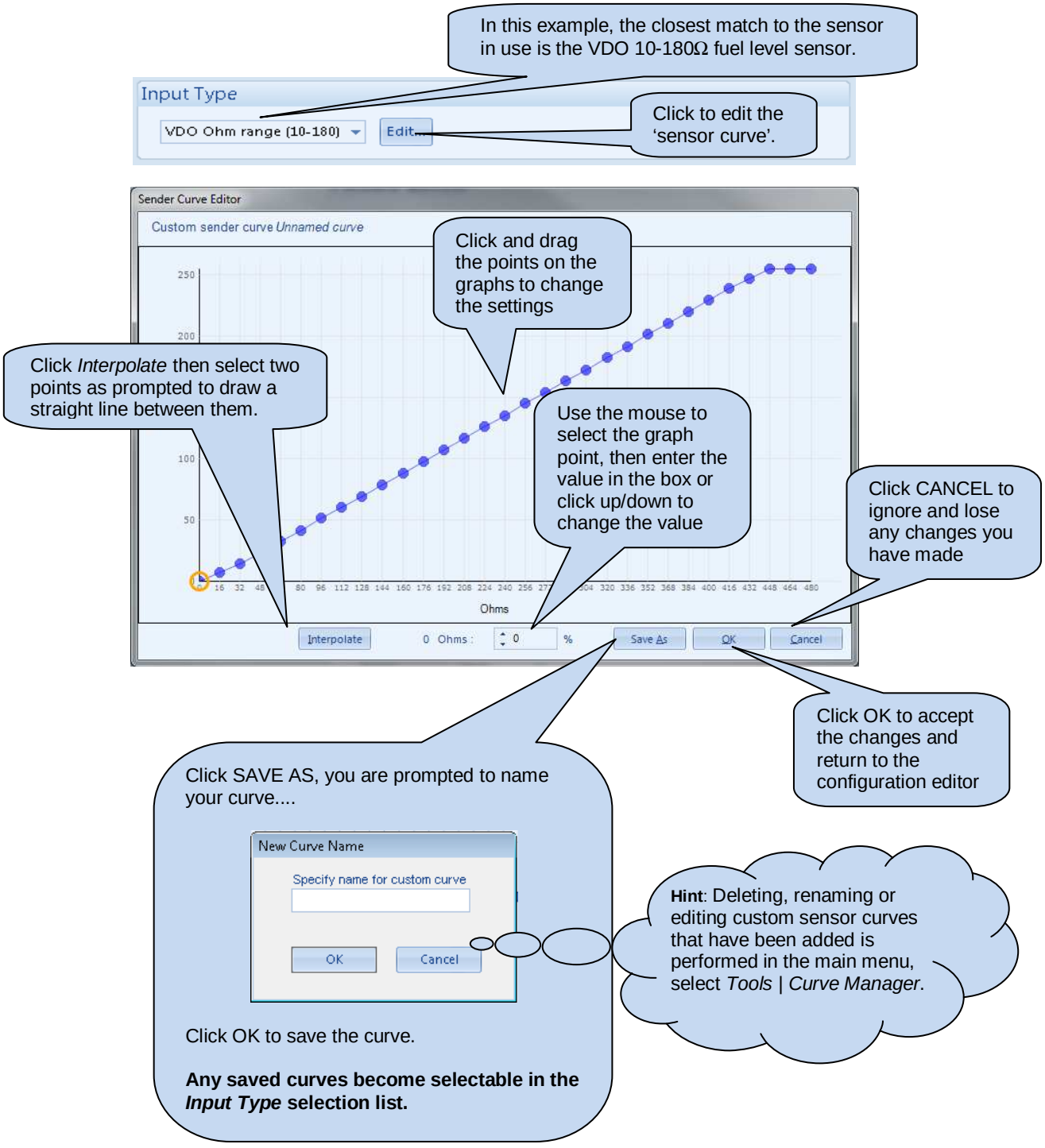
Analogue input D is configured for *Flexible Sensor.*



Parameter	Description
Sensor Type	Select the sensor type: ***Pressure:*** The input is configured as a pressure sensor ***Percentage:*** The input is configured as a percentage sensor ***Termperature:*** The input is configured as a temperature sensor
Input Type	Select the sensor curve from a pre-defined list or create a user-defined curve
Alarm Arming	Select when the input becomes active: ***Always:*** The input state is always monitored ***From Safety On:*** The state of the input is monitored from the end of the *Safety On Delay* timer ***From Starting:*** The state of the input is only monitored from engaging the crank
Low Alarm Enable	☐ = The Alarm is disabled. ☑ = The *Low Alarm* is active when the measured quantity drops below the *Low Alarm* setting.
Low Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *Low Pre-Alarm* is active when the measured quantity drops below the *Low Pre-Alarm* setting. The *Low Pre-Alarm* is automatically reset when the measured quantity rises above the configured *Low Pre-Alarm Return* level.
High Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *High Pre-Alarm* is active when the measured quantity rises above the *High Pre-Alarm* setting. The *High Pre-Alarm* is automatically reset when the measured quantity falls below the configured *High Pre-Alarm Return* level.
High Alarm Enable	☐ = The Alarm is disabled. ☑ = The *High Alarm* is active when the measured quantity rises above the *High Alarm* setting.

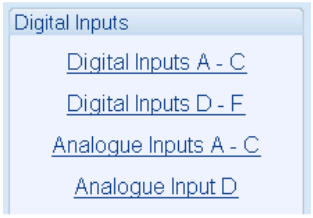
2.4.3 EDITING THE SENSOR CURVE

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

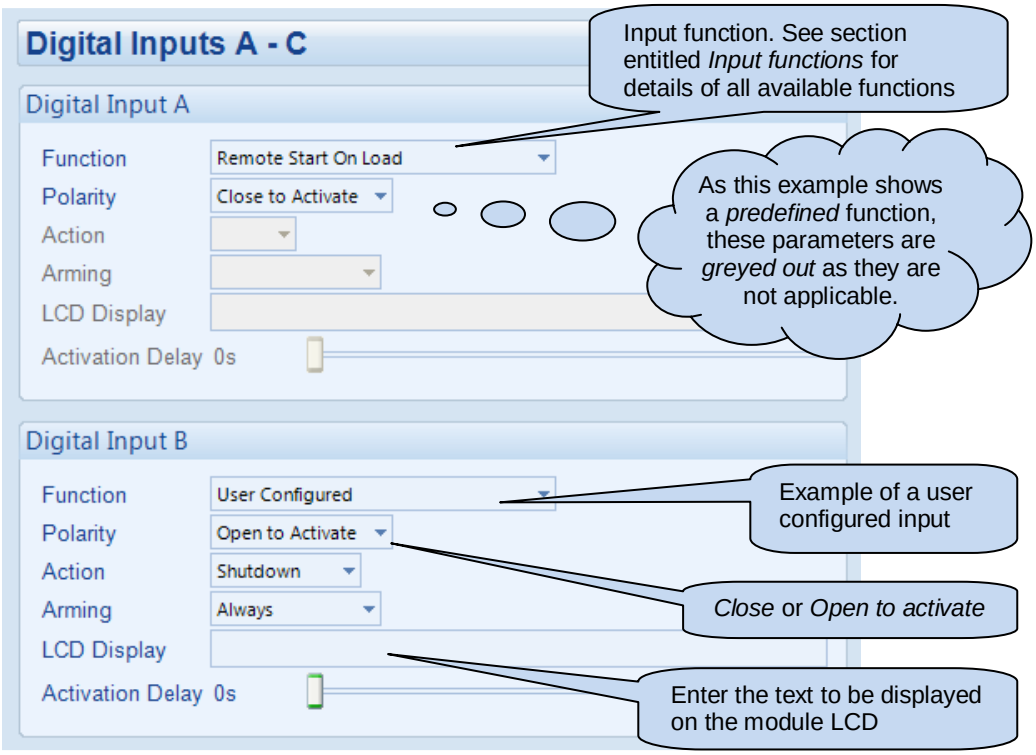


2.4.4 DIGITAL INPUTS

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

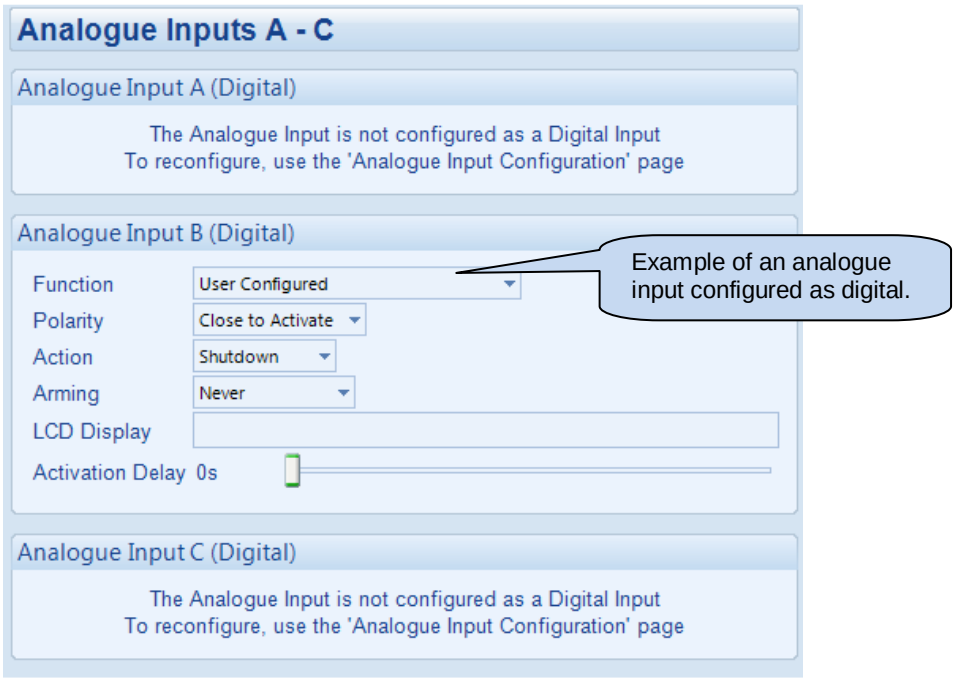


2.4.4.1 DIGITAL INPUTS



Parameter	Description
Funtion	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	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	Select when the input becomes active: ***Always:*** The input state is always monitored ***Active From Safety On:*** The state of the input is monitored from the end of the *Safety On Delay* timer ***Active From Starting:*** The state of the input is only monitored from engaging the crank ***Never:*** The input is disabled
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 ANALOGUE INPUTS



2.4.6 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.

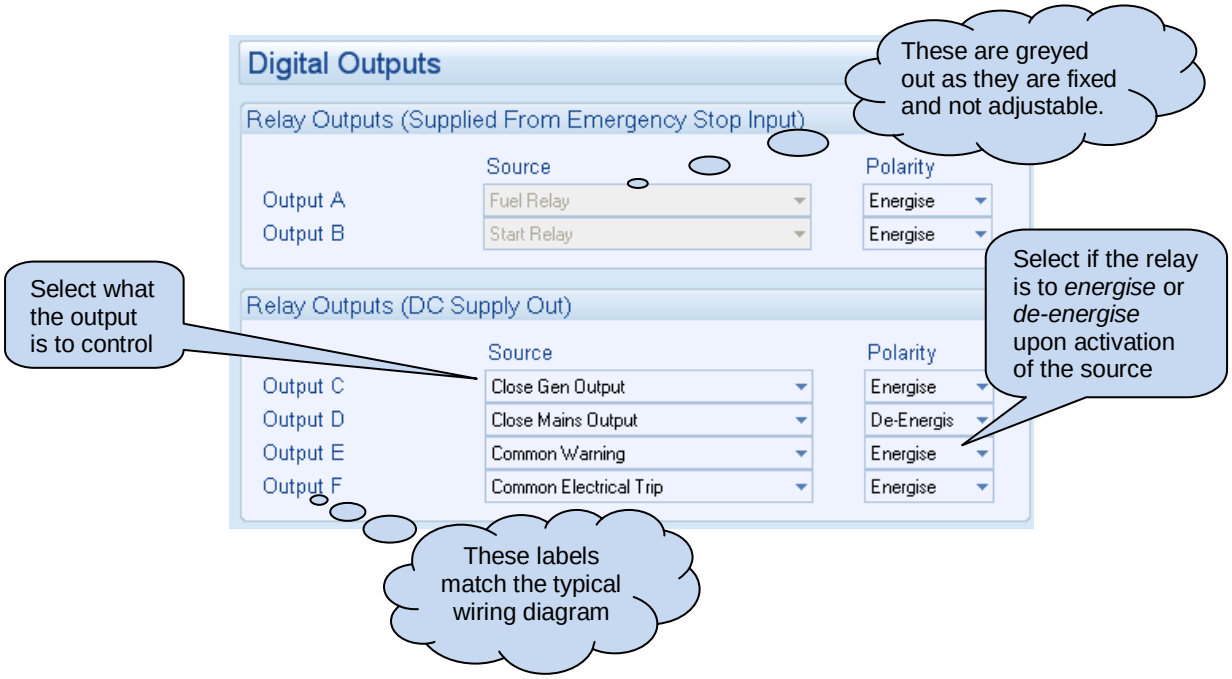
 **= Only applicable to DSE6120 MKII AMF Modules**

Function	Description
Alarm Mute	This input is used to silence the audible alarm from an external source, such as a remote mute switch.
Alarm Reset	This input is used to reset any latched alarms from a remote location. It is also used to clear any latched warnings which may have occurred (if configured) without having to stop the generator.
Alternative Configuration	These inputs are used to instruct the module to follow the *alternative* configuration settings instead of the *main* configuration settings.
Auto Restore Inhibit  IEEE 37.2 - 3 checking or interlocking relay	In the event of a remote start/mains failure, the generator is instructed to start and take load. On removal of the remote start signal/mains return the module continues to run the generator on load until the *Auto Restore Inhibit* input is removed. This input allows the controller to be fitted as part of a system where the restoration to mains is controlled remotely or by an automated system.
Auto Start Inhibit IEEE 37.2 - 3 checking or interlocking relay	This input is used to provide an over-ride function to prevent the controller from starting the generator in the event of a remote start/mains out of limits condition occurring. If this input is active and a remote start signal/mains failure occurs the module does not give a start command to the generator. If this input signal is then removed, the controller operates as if a remote start/mains failure has occurred, starting and loading the generator. This function is used to give an **‘AND’** function so that a generator is only called to start if the mains fails and another condition exists which requires the generator to run. If the ‘Auto start Inhibit’ signal becomes active once more it is ignored until the module has returned the mains supply on load and shutdown. This input does not prevent starting of the engine in MANUAL mode.
Auxiliary Mains Fail 	The module monitors the incoming single or three phase supply for Over voltage, Under Voltage, Over Frequency or Under frequency. It may be required to monitor a different mains supply or some aspect of the incoming mains not monitored by the controller. If the devices providing this additional monitoring are connected to operate this input, the controller operates as if the incoming mains supply has fallen outside of limits, the generator is instructed to start and take the load. Removal of the input signal causes the module to act if the mains has returned to within limits providing that the mains sensing also indicates that the mains is within limits.
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.
DPF Auto Regen Inhibit	This input is used to override the ECU function and prevent the automatic regeneration of the diesel particulate filter
DPF Force Regeneration	This input is used to override the ECU function and activate the regeneration of the diesel particulate filter
DPF Regeneration Interlock	This input is used to stop a manual regeneration from occurring
External Panel Lock	Locks the mode buttons on the module front fascia.
Generator Closed Auxiliary IEEE 37.2 - 3 Checking or Interlocking Relay	This input is used to provide feedback to allow the **7xxx** to give true indication of the contactor or circuit breaker switching status. It must be connected to the generator load switching device auxiliary contact.

Function	Description
Generator Load Inhibit IEEE 37.2 - 52 AC Circuit Breaker	**NOTE: This input only operates to control the generator-switching device if the module load switching logic is attempting to load the generator. It does not control the generator switching device when the mains supply is on load.** This input is used to prevent the module from loading the generator. If the generator is already on load, activating this input causes the module to unload the generator. Removing the input allows the generator to be loaded again.
Inhibit Scheduled Run IEEE 37.2 - 3 Checking Or Interlocking Relay	This input is used to provide a mean of disabling a scheduled run.
Lamp Test	This input is used to provide a test facility for the front panel indicators fitted to the module. When the input is activated all LEDs illuminate.
Low Battery Run	This input is used to run the generator off load when the DSE module is in Auto mode, once the input is removed the engine keeps running for the *Engine Run Duration* time configured in the *Start On Low Battery* in the *Plant Battery* section, then it stops after the *Return Delay*.
Low Fuel Level Switch	Used to give a digital input function to provide a low fuel level alarm
Mains closed Auxiliary IEEE 37.2 - 3 Checking or interlocking relay	This input is used to provide feedback to allow the module to give true indication of the contactor or circuit breaker switching status. It must be connected to the mains load switching device auxiliary contact. Incorrect application of this signal does not trigger an alarm condition, it is used solely for indication of the breaker status.
Mains Load Inhibit IEEE 37.2 - 3 Checking or Interlocking Relay	**NOTE: This input only operates to control the mains switching device if the module load switching logic is attempting to load the mains. It does not control the mains switching device when the generator is on load.** This input is used to prevent the module from loading the mains supply. If the mains supply is already on load activating this input causes the module to unload the mains supply. Removing the input allows the mains to be loaded again.
Manual Restore contact IEEE 37.2 - 3 Checking or Interlocking Relay	Used to 'hold off' transfer back to the mains after a mains failure and keep the generator on load. Transfer back to the mains supply is held off in *Auto mode* while the input is present. Typically, a key switch provides this input with *spring return to closed* functionality.
Oil Pressure Switch	A digital normally open or closed oil pressure switch gives this input. It allows low oil pressure protection.
Remote Start Off Load	If this input is active, operation is similar to the 'Remote Start on load' function except that the generator is not instructed to take the load. This function is used where an engine only run is required e.g. for exercise.
Remote Start On Load	When in auto mode, the module performs the start sequence and transfer load to the generator. In Manual mode, the load is transferred to the generator if the engine is already running, however in manual mode, this input does not generate start/stop requests of the engine.
Reset Maintenance Alarm 1	Provides an external digital input to reset the maintenance alarm 1
Reset Maintenance Alarm 2	Provides an external digital input to reset the maintenance alarm 2
Reset Maintenance Alarm 3	Provides an external digital input to reset the maintenance alarm 3
Simulate Auto Button	**NOTE: If a call to start is present when AUTO MODE is entered, the starting sequence begins. Call to Start comes from a number of sources depending upon module type and configuration and includes (but is not limited to) : Remote start input present, Mains failure, Scheduled run, Auxiliary mains failure input present, Telemetry start signal from remote locations.** This input mimic's the operation of the 'Auto' button and is used to provide a remotely located Auto mode push button.

Function	Description
Simulate Lamp Test	This input is used to provide a test facility for the front panel indicators fitted to the module. When the input is activated all LED's illuminate. The input also serves a second function, in that it also provides a mute signal to silence the audible alarm. The input is recognised by the module as though it was the Push button on the module itself being operated.
Simulate Mains Available 	This function is provided to override the module's internal monitoring function. If this input is active, the module does not respond to the state of the incoming AC mains supply.
Simulate Manual Button	This input mimic's the operation of the 'Manual' button and is used to provide a remotely located Manual mode push button.
Simulate Start Button	This input mimic's the operation of the 'Start' button and is used to provide a remotely located start push button.
Simulate Stop Button	This input mimic's the operation of the 'Stop' button and is used to provide a remotely located stop/reset push button.
Simulate Test on load button	This input mimics the operation of the 'Test' button and is used to provide a remotely located Test on load mode push button.
Smoke Limiting IEEE 37.2 – 18 Accelerating or Decelerating Device	This input instructs the module to give a *run at idle speed* command to the engine either via an output configured to *smoke limit* or by data commands when used with supported electronic engines.
Stop and Panel Lock	Combined function input that instructs the module to enter *STOP* **mode** and also perform the *Panel Lock* function. Once the input is active, the module does not respond to operation of the mode select or start buttons. The operator is still able to view the various instrumentation pages etc. (*Front panel configuration access is still possible while the system lock is active*).
Transfer To Generator/Open Mains IEEE 37.2 - 52 AC Circuit Breaker 	This input is used to transfer the load to the generator when running in MANUAL MODE
Transfer To Mains/ Open Generator IEEE 37.2-52 AC Circuit Breaker 	This input is used to transfer the load to the mains supply when running in MANUAL MODE

2.5 DIGITAL OUTPUTS



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

The outputs are in alphabetical order with the *parameter* first. For instance for over frequency output, it's listed as *Generator Overfrequency*.

= Only available on DSE6120 MKII AMF Modules

Output Source	Activates…	Is Not Active….
Not Used	The output does not change state (Unused)	
Air Flap Relay	Normally used to control an air flap, this output becomes active upon an Emergency Stop or Over-speed situation.	Inactive when the set has come to rest
Alarm Mute	This input is used to silence the audible alarm from an external source such as a remote mute switch.	
Alarm Reset	This input is used to reset any latched alarms from a remote location. It is also used to clear any latched warnings which may have occurred (if configured) without having to stop the engine.	
Alternative Config Selected	Active when the alternative configuration is selected.	
Analogue Input A, B, C & D (Digital)	Active when the relevant analogue input, configured as digital input, is active	
Arm Safety On Alarms	Becomes active at the end of the *safety delay* timer whereupon all alarms configured to 'From Safety On' become active	Inactive when : • When the set is at rest • In the starting sequence before the Safety Delay timer has expired

Output Source	Activates…	Is Not 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.
Auto Start Inhibit	Active when the *Auto-Start Inhibit* function is active.	
Battery High Voltage IEEE 37.2 – 59 DC Overvoltage Relay	This output indicates that a Battery Over voltage alarm has occurred.	Inactive when battery voltage is not High
Battery Low Voltage IEEE 37.2 – 27 DC Undervoltage Relay	This output indicates that a Battery Under Voltage alarm has occurred.	Inactive when battery voltage is not Low
CAN ECU Power	Used to switch an external relay to power the CAN ECU. Exact timing of this output is dependent upon the type of the engine ECU	
CAN ECU Stop	Active when the DSE controller is requesting that the CAN ECU stops the engine.	
Charge Alternator Shutdown	Active when the charge alternator shutdown alarm is active	
Close Gen Output IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the module selects the generator to be on load this control source is activated.	Inactive whenever the generator is not required to be on load
Close Gen Output Pulse IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the module selects the generator to be on load this control source is activated for the duration of the Breaker Close Pulse timer, after which it becomes inactive again.	
Close Mains Output IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the module selects the mains to be on load this control source is activated.	The output is inactive whenever the mains is not required to be on load
Close Mains Output Pulse IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the module selects the mains to be on load this control source is activated for the duration of the Breaker Close Pulse timer, after which it becomes inactive again.	
Combined Mains Failure 	Active when the mains supply is out of limits OR the input for Auxiliary Mains Failure is active	
Combined Maintenance Alarm	Active when any of the maintenance alarm is active.	
Combined Under and Over Frequency Alarm	Active when an *Under-Frequency* or *Over-Frequency Shutdown* alarm is active	
Combined Under and Over Frequency Warning	Active when an *Under-Frequency* or *Over-Frequency Warning* alarm is active	
Combined Under and Over Voltage Alarm	Active when an *Under-Voltage* or *Over-Voltage Shutdown* alarm is active	
Combined Under and Over Voltage Warning	Active when an *Under-Voltage* or *Over-Voltage Warning* alarm is active	
Common Alarm	Active when one or more alarms (of any type) are active	The output is inactive when no alarms are present
Common Electrical Trip	Active when one or more *Electrical Trip* alarms are active	The output is inactive when no shutdown alarms are present
Common Shutdown	Active when one or more *Shutdown* alarms are active	The output is inactive when no shutdown alarms are present
Common Warning	Active when one or more *Warning* alarms are active	The output is inactive when no warning alarms are present
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.	
DEF Level Low Alarm	Active when *DEF Level Low Alarm* is active.	
Digital Input A, B, C, D, E & F	Active when the relevant digital input is active	
Display Heater Fitted and On	Active when the display heater is on	

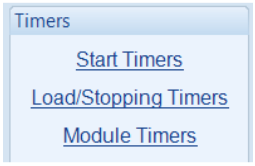
Output Source	Activates…	Is Not Active….
DPF Forced Regeneration Interlock Active	Active when the *DPF Force Regeneration Interlock* is active	
DPF Forced Regeneration Requested	Active when the *DPF Force Regeneration* is active	
DPF Non Mission State	Active when the *DPF Non-Mission State* is active	
DPF Regeneration In Progress	Active when the *DPF Regeneration* is in progress	
DPTC Filter	Active when the diesel particulate filter CAN alarm is active	
ECU (ECM) Data Fail	Active when the ECU (ECM) Data Fail is actve.	Inactive when the ECU (ECM) Data Fail is inactve.
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 not present
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 not present
Emergency Stop IEEE 37.2 – 5 Stopping Device	Active when the *Emergency Stop* input has been activated	
Energise To Stop	Normally used to control an *Energise to Stop* solenoid, this output becomes active when the controller wants the set to stop running.	Becomes inactive a configurable amount of time after the set has stopped. This is the *ETS hold time*.
Fail to Close Generator	Active when the *Generator Closed Auxiliary* input fails to become active after the *Close Generator Output* or *Close Generator Output Pulse* becomes active	
Fail to Close Mains	Active when the *Mains Closed Auxiliary* input fails to become active after the *Close Mains Output* or *Close Mains Output Pulse* becomes active	
Fail To Start IEEE 37.2 - 48 Incomplete Sequence Relay	Becomes active if the set is not seen to be running after the configurable number of start attempts	
Fail To Stop IEEE 37.2 - 48 Incomplete Sequence Relay	If the set is still running a configurable amount of time after it has been given the stop command, the output becomes active. This configurable amount of time is the *Fail to Stop Timer*.	
Fan Control	Energises when the engine becomes available (up to speed and volts). This output is designed to control an external cooling fan. When the engine stops, the cooling fan remains running for the duration of the Fan Overrun Delay.	
Flexible Sensor A, B, C or D Low/High – Alarm/Pre- Alarm	Active when the relevant flexible sensor alarm is active	
Fuel Level High/Low – Alarm/Pre-Alarm	Active when the relevant *Fuel Level High/Low* Alarm/Pre-Alarm is active.	
Fuel Pump Control IEEE 37.2 – 71 Level Switch	Becomes active when the *Fuel level* falls below the *Fuel Pump Control ON* setting and is normally used to transfer fuel from the bulk tank to the day tank.	If the output is already active it becomes inactive when the *Fuel level* is above the *Fuel Pump Control OFF* settings.
Fuel Relay	Becomes active when the controller requires the governor/fuel system to be active.	Becomes inactive whenever the set is to be stopped, including between crank attempts, upon controlled stops and upon fault shutdowns.
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.
Generator Loading Frequency Not Reached	Indicates that the generator frequency has not reached the configured *Loading Frequency* during the starting process.	
Generator Loading Voltage Not Reached	Indicates that the generator voltage has not reached the configured *Loading Voltage* during the starting process.	
Gen Over Frequency Overshoot Alarm	Becomes active when the over frequency overshoot alarm is active	

Output Source	Activates…	Is Not Active….
Generator Available	Becomes active when the generator is available to take load.	Inactive when • *Loading voltage* and *loading frequency* have not been reached • After *electrical trip* alarm • During the starting sequence before the end of the warming timer.
Generator High Volts Shutdown	Active when the generator voltage exceeds the shutdown level.	
Generator Over Frequency Shutdown	Becomes active when the over frequency shutdown alarm is active	
HEST	Active when the High Exhaust System Temperature CAN alarm is active	
KW Overload Alarm	Active when the measured kW are above the setting of the *kW overload alarm*. Used to give alarms on overload, control a dummy load switch or for load shedding functionality.	
Lamp Test	Active when the lamp test is activated by a digital input or by pressing the *Mute/Lamp Test* control button	
Loading Frequency Not Reached	Active when the generator frequency has not reached the configured *Loading Frequency* during the starting process.	
Loading Voltage Not Reached	Active when the generator voltage has not reached the configured *Loading Voltage* during the starting process.	
Louvre Control	Active when the fuel relay becomes active. Normally used to drive ventilation louvres for the generator set.	
Low Fuel Level	Active when the *Low Fuel Level* alarm becomes active.	
Low Load	Active when the measured kW are below the setting of the *Low Load alarm*. Used to give alarms on low loads, or to control a dummy load switch.	
Main Config Selected	Active when the main configuration is active.	
Mains Failure IEEE 37.2 - 81 Frequency Relay IEEE 37.2 – 27AC Undervoltage Relay IEEE 37.2 – 59AC Overvoltage Relay	The output indicates that one or more of the module's sources of determining mains failure is active.	
Mains Phase Rotation Alarm	Active when the detected mains phase sequence is different than the configured *Mains Phase Rotation*	
Maintenance Alarm 1, 2 or 3 Due	Active when the relevant maintenance alarm is due.	
Manual Restore Contact	Active when the manual restore contact input is active	
MPU open circuit	This output indicates that the module has detected an open circuit failure in the Magnetic Pickup transducer circuit.	
Open Gen Output IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the module selects the generator to be off load this control source is activated.	Inactive whenever the generator is required to be on load
Open Gen Output Pulse IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the module selects the generator to be off load this control source is activated for the duration of the Breaker Open Pulse timer, after which it becomes inactive again.	
Open Mains Output IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the module selects the mains to be off load this control source is activated.	The output is inactive whenever the mains is required to be on load
Open Mains Output Pulse IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the module selects the mains to be off load this control source is activated for the duration of the Breaker Open Pulse timer, after which it becomes inactive again.	

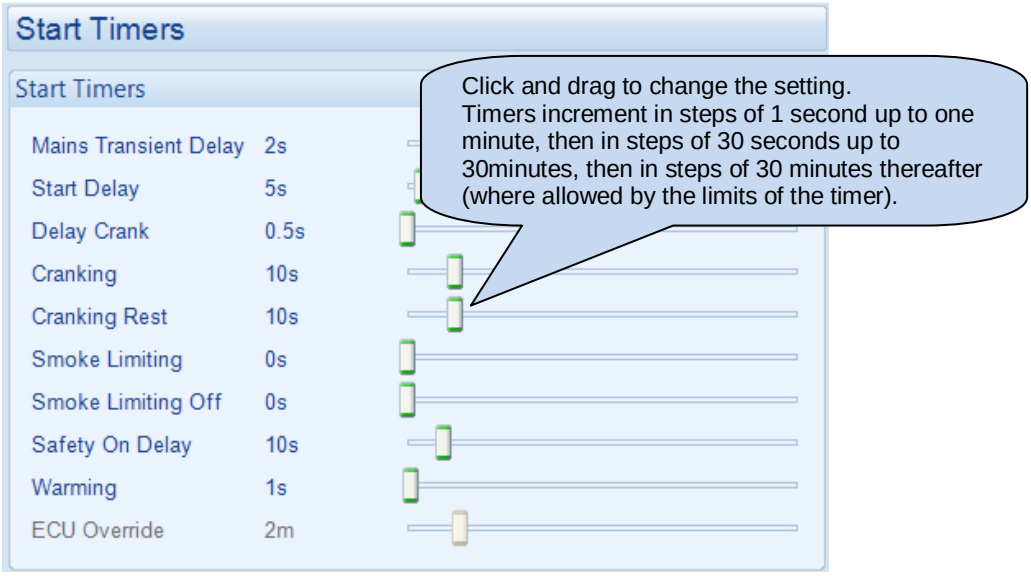
Output Source	Activates…	Is Not Active….
Overspeed Delayed Alarm IEEE 37.2 – 12 Over Speed Device	Active when the *Over Speed Delayed* alarm is active	
Over Speed Shutdown IEEE 37.2 – 12 over speed device	Active if the engine speed exceeds the Over Speed Shutdown setting	
Over Speed Overshoot Alarm	Active if the engine speed exceeds the Over Speed Overshoot alarm setting	
Preheat During Preheat Timer	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : • 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
Remote Start OnLoad	Active when the *Remote Start on Load* input is active	
Reset Maintenance 1, 2 or 3	Active when the relevant *Maintenance Alarm Reset* is active	
Scheduled Auto Start Inhibit	Active when the *Inhibit Scheduled Run* input is active	
SCR Inducement	Active when *SCR Inducement CAN Alarm* is active	
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 IEEE 37.2 – 54 Turning Gear Engaging Device	Active when the controller requires the cranking of the engine.	
System in Auto Mode	Active when Auto mode is selected	
System in Manual Mode	Active when Manual mode is selected	
System in Stop Mode	Active when Stop mode is selected	
System in Test Mode	Active when Test On Load mode is selected	
Waiting For Manual Restore	Becomes active when the generator is on load and the mains supply is healthy but an input configured to Manual Restore is active. This is used to signal to an operator that action is required before the set transfers back to the mains supply.	

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.



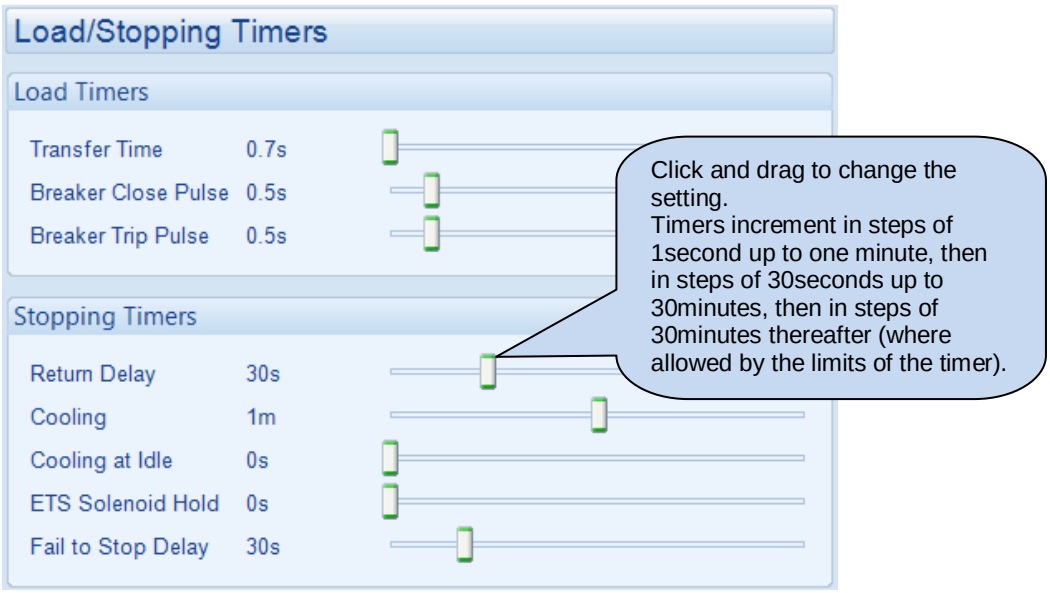
2.6.1 START TIMERS



= Only available on DSE6120 MKII AMF Modules

Timer	Description
Mains Transient Delay	Used to give a delay between sensing mains failure and acting upon it. This is used to prevent dropouts of the mains breaker and operation of the system due to mains supply transient conditions.
Start Delay	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.
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
Cranking Rest	The amount of time between multiple crank attempts.
Smoke Limit	The amount of time that the engine is requested to run at idle speed upon starting. This is typically used to limit emissions at startup.
Smoke Limit Off	The amout 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.
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 Override	The amount of time the CAN ECU Power stays energised when the Start button is pressed in Stop mode.

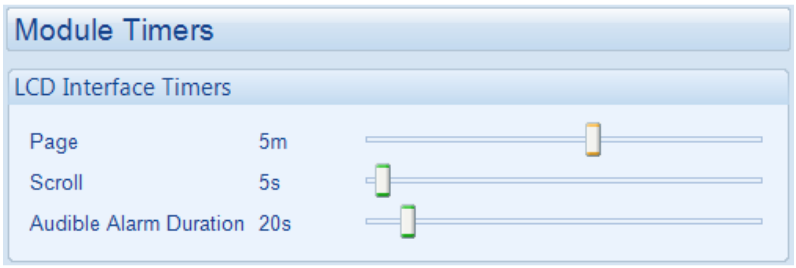
2.6.2 LOAD / STOPPING TIMERS



= Only available on DSE6120 MKII AMF Modules

Timer	Description
Transfer Time	The time between one load switch opening and the other closing. Used during transfer to and from the generator.
Breaker Close Pulse	The amount of time that *Breaker Close Pulse* signal is present when the request to close a breaker is given.
Breaker Trip Pulse	The amount of time that *Breaker Open Pulse* signal is present when the request to open a breaker is given.
Return Delay	A delay, used in auto mode only, that allows for short term removal of the request to stop the set before action is taken. This is usually used to ensure the set remains on load before accepting that the start request has been removed.
Cooling	The amount of time that the set is made to run OFF LOAD before being stopped. This is to allow the set to cool down and is particularly important for engines with turbo chargers.
Cooling At Idle	The amount of time that the set is made to run OFF LOAD at *Idle Speed* before being stopped.
ETS Solenoid Hold	The amount of time the *Energise to stop* solenoid is kept energised after the engine has come to rest. This is used to ensure the set has fully stopped before removal of the stop solenoid control signal.
Fail To Stop Delay	If the set is called to stop and is still running after the *fail to stop* delay, a *Fail to Stop* alarm is generated.

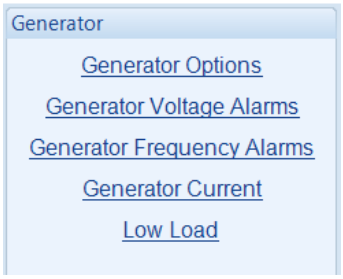
2.6.3 MODULE TIMERS



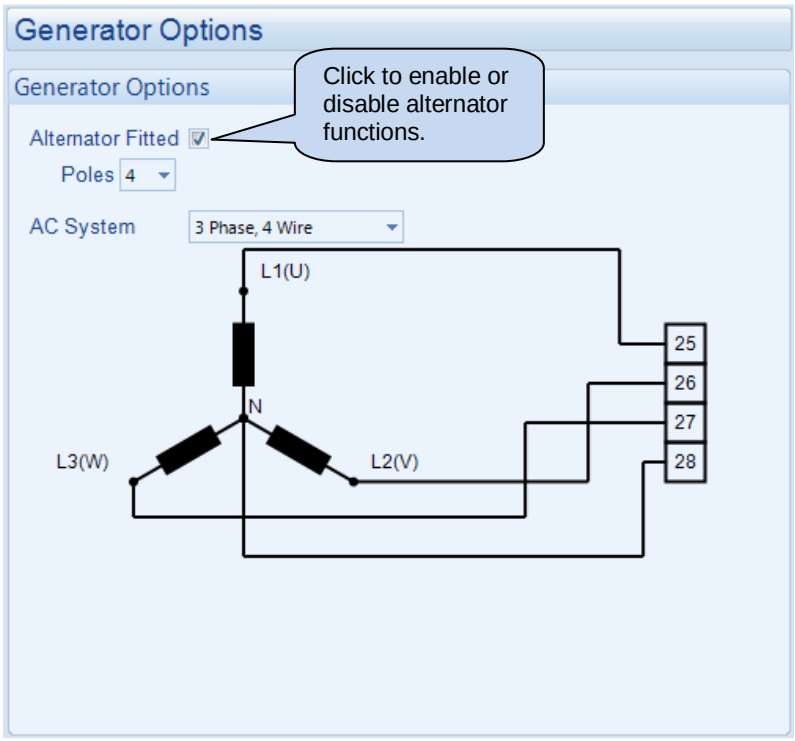
Timer	Description
Page	If the module is left unattended for the duration of the Page Timer it reverts to show the Status page.
Scroll	The scroll time between parameters on a selected page.
Audible Alarm Duration	When an alarm is active on the module, this is the time duration during which the *Audible 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.

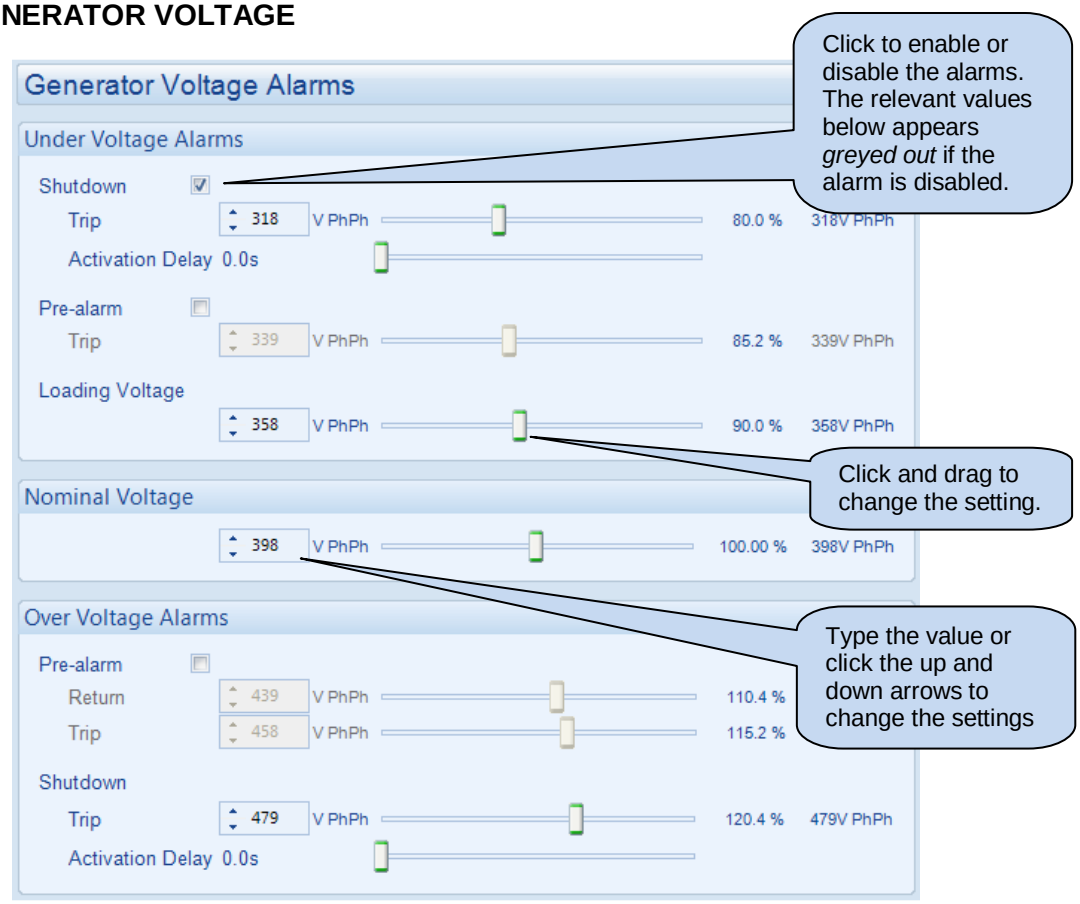


2.7.1 GENERATOR OPTIONS



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.
AC System	Allows a number of AC systems to be catered for. Selecting the AC system shows the connections required for that particular system, along with the relevant connection numbers on the controller.

2.7.2 GENERATOR VOLTAGE



2.7.2.1 UNDER VOLTAGE ALARMS

Alarm	Description
Generator Under Voltage Alarm IEEE 37.2 - 27AC Undervoltage Relay	☐ = Generator Under Volts does NOT give a Shutdown alarm ☑ = Generator Under Volts gives a shutdown alarm in the event of the generator output falling below the configured *Under Volts Alarm Trip* value for longer than the *Activation Delay*. The *Undervolts Alarm Trip* value is adjustable to suit user requirements.
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. The *Warning* is automatically reset when the generator output voltage rises above the configured *Loading Voltage* level.
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 with in limits. (i.e. With an undervolts trip of 184.0V and an undervolts return of 207.0V, the output voltage must return to 207.0V following an under voltage event to be considered within limits.)

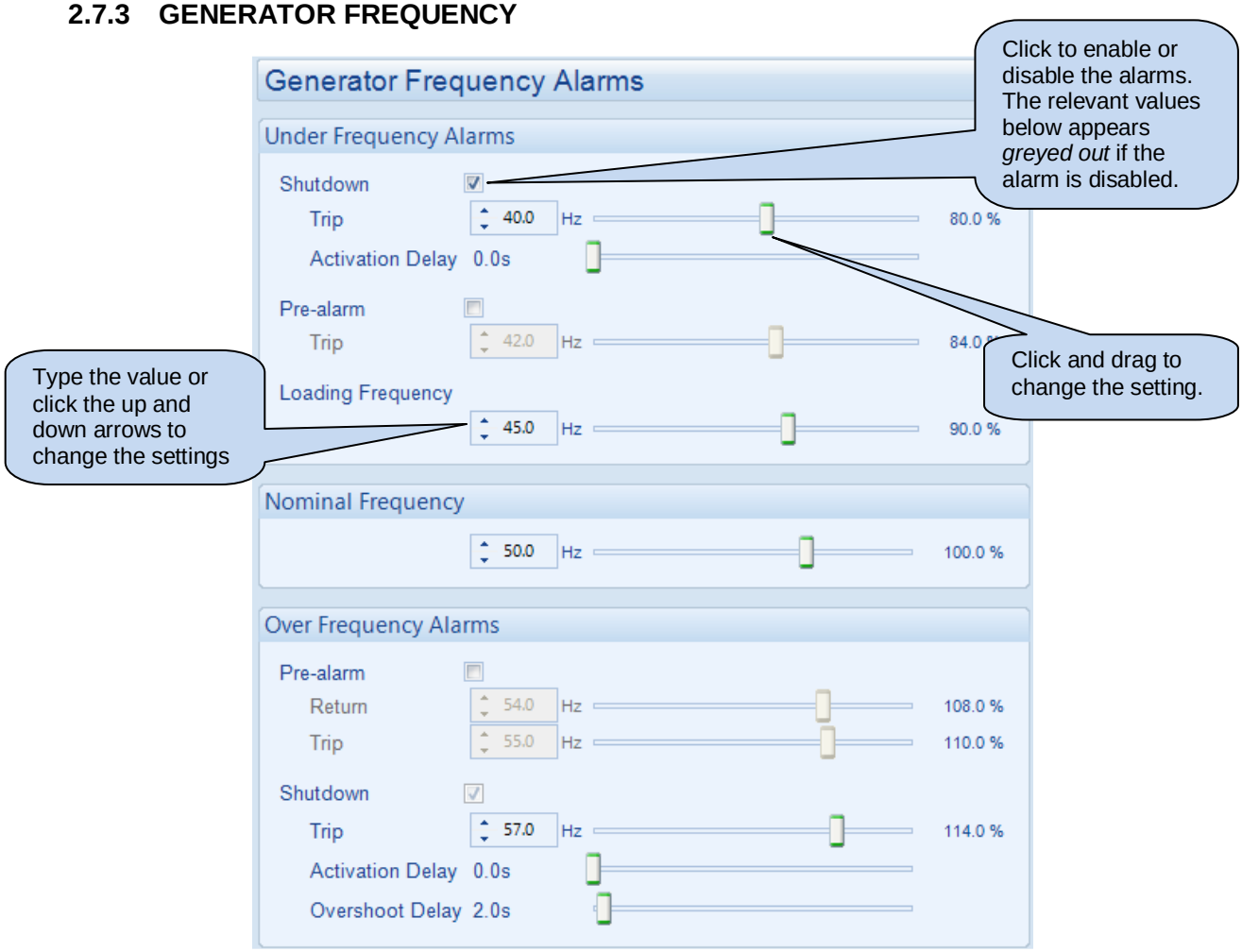
2.7.2.2 NOMINAL VOLTAGE

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

2.7.2.3 OVER VOLTAGE ALARM

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. 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 IEEE 37.2 – 59 AC Overvoltage Relay	☐ = Alarm is disabled ☑ = Generator Over Volts gives a *Shutdown* alarm in the event of the generator output rising above the configured *Over Volts Alarm Trip* value for longer than the *Activation Delay*. The *Overvolts Alarm Trip* value is adjustable to suit user requirements.

2.7.3 GENERATOR FREQUENCY



2.7.3.1 UNDER FREQUENCY ALARMS

Alarm	IEEE designation
Generator Under Frequency IEEE 37.2 -81 Frequency Relay	☐ = Generator Under Frequency does NOT give a Shutdown alarm ☑ = Generator Under Frequency gives a Shutdown alarm in the event of the generator output frequency falling below the configured *Under Frequency Shutdown Trip* value for longer than the *Activation Delay*. The *Underfrequency 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. The *Warning* is automatically reset when the generator output frequency rises above the configured *Loading Frequency* level. The *Under Frequency Pre-Alarm Trip* value is adjustable to suit user requirements.
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 with in limits. (i.e. With a under frequency trip of 45.0Hz and a under frequency return of 48.0Hz, the mains frequency must return to 48.0Hz following an under frequency event to be considered within limits.)

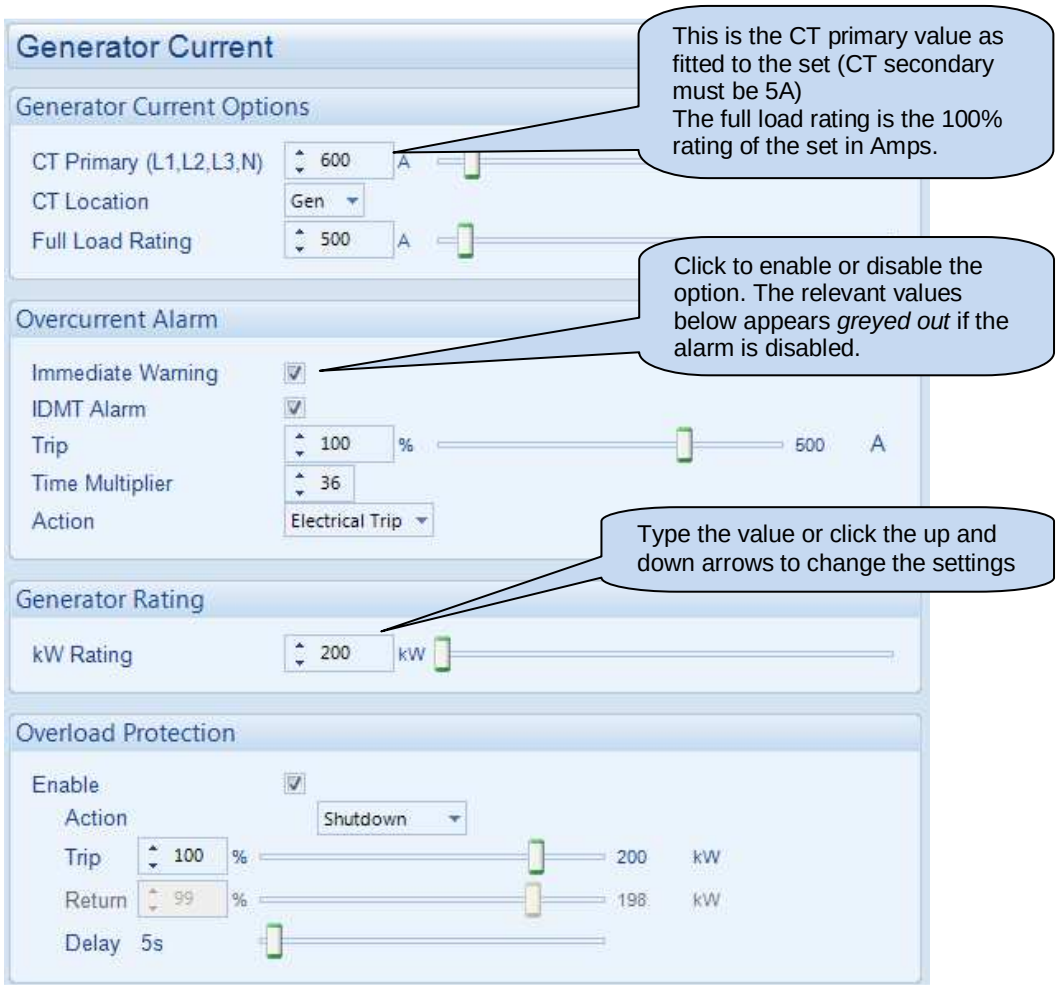
2.7.3.2 NOMINAL FREQUENCY

Nominal Frequency	This setting is used to configure the generator nominal frequency. This is also used to calculate the percentages of the alarm setpoints.

2.7.3.3 OVER FREQUENCY ALARMS

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. The *Warning* is automatically reset when the generator output frequency falls below the configured *Return* level. The *Over Frequency Pre-Alarm Trip* value is adjustable to suit user requirements.
Generator Over Frequency IEEE 37.2 -81 Frequency Relay	**NOTE: When the frequency is selected as the only source of speed sensing (i.e. no Mag-pickup fitted), then the generator over frequency alarm trip is not disabled as it provides an overspeed protection function. If a Mag-pickup is fitted ad selected as the speed sensing source it is possible to disable the over frequency trip if required.** ☐ = Generator Over Frequency does NOT give a Shutdown alarm ☑ = Generator Over Frequency gives a shutdown alarm in the event of the generator output rising above the displayed O*ver Frequency Trip* value for longer than the *Activation Delay*. The O*ver Frequency Trip* value is adjustable to suit user requirements.
Overshoot Delay	To prevent spurious over-frequency alarms at start up, the module includes configurable *Over Frequency Overshoot* protection. This allows the frequency to 'overshoot' the *Over-Frequency Shutdown* level during the starting process for a short time. Rather than 'inhibiting' the *Over Frequency* alarms, the levels are temporarily raised by the DSE module's default *Over Frequency Overshoot %* for the duration of the *Overshoot Delay* from starting.

2.7.4 GENERATOR CURRENT



2.7.4.1 GENERATOR CURRENT OPTIONS

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

2.7.4.2 OVERCURRENT ALARM

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

Immediate warning

IEEE 37.2 -50 instantaneous overcurrent relay

If the current exceeds the *Trip* level the *Immediate Warning* activates.

IDMT Alarm

IEEE 37.2 -51 AC time overcurrent relay (shutdown / electrical trip)

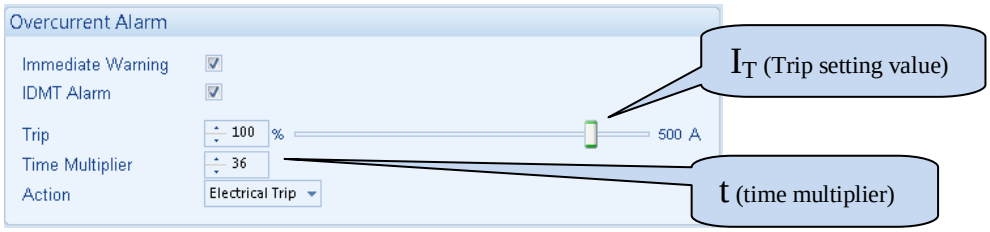
If the *IDMT Alarm* is enabled, the 72/7300 Series controller begins following the IDMT 'curve'. If the *Trip* is surpassed for an excess amount of time the *IDMT Alarm* triggers (*Shutdown* or *Electric trip* as selected in *Action*).

The higher the overload, the faster the trip. The speed of the trip is dependent upon the fixed formula :

$$T = t / ((I_A / I_T) - 1)^2$$

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

Typical settings for the *IDMT Alarm* when used on a brushless alternator are :



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

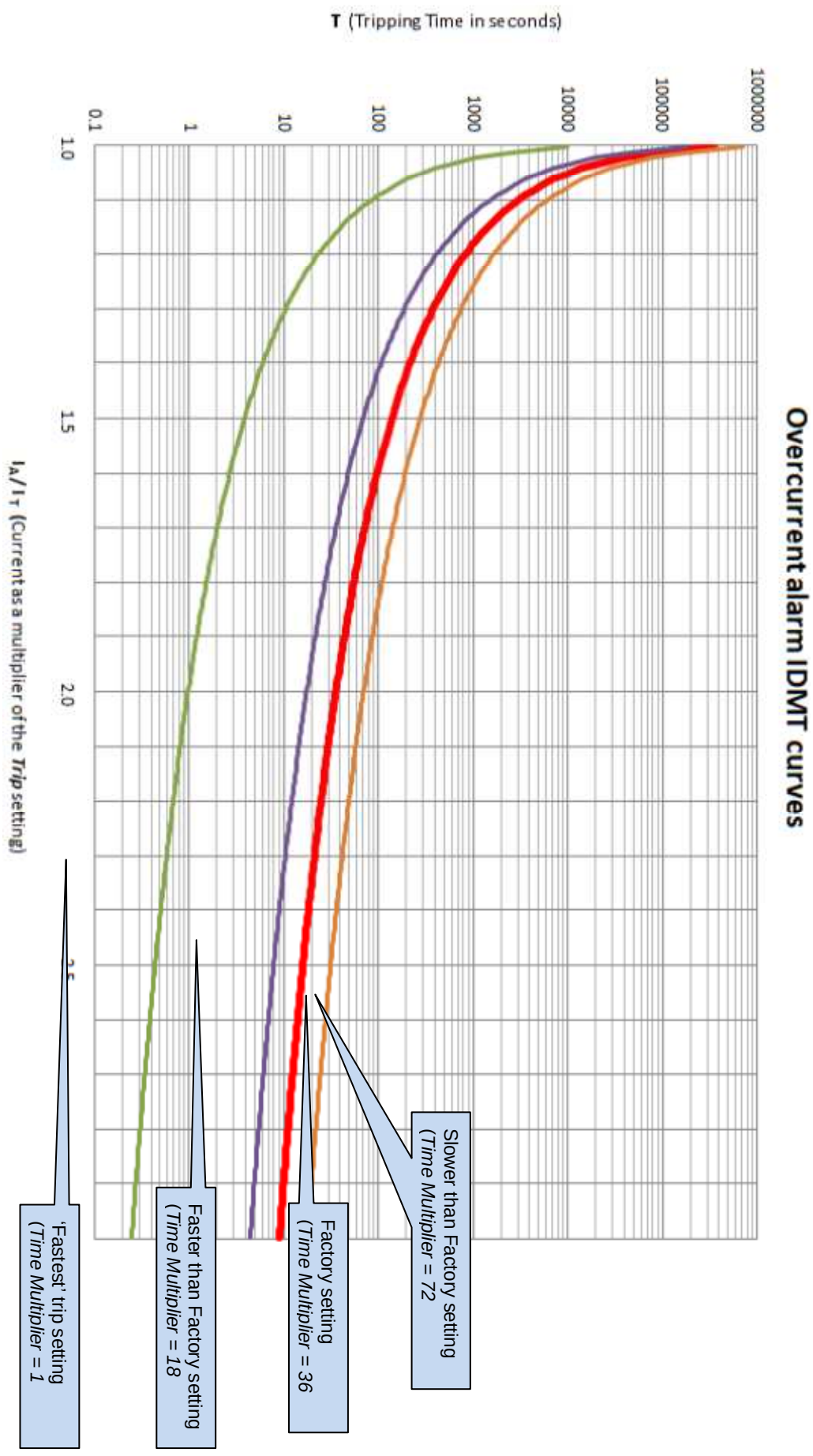
The effect of an overload on the generator is that the alternator windings begin to overheat, the aim of the *IDMT alarm* is to prevent the windings being overload (heated) too much. The amount of time that the set is safely overloaded is governed by how high the overload condition is.

See overleaf for details of the IDMT alarm factory settings and examples of different settings for the *Time Multiplier (t)*.

The IDMT alarm factory settings, allows for overload of the set to the limits of the *Typical Brushless Alternator* whereby 110% overload is permitted for 1 hour.

If the set load is reduced, the controller then *follows* a cooling curve. This means that a second overload condition may trip much sooner than the first as the controller *knows* if the windings have not cooled sufficiently.

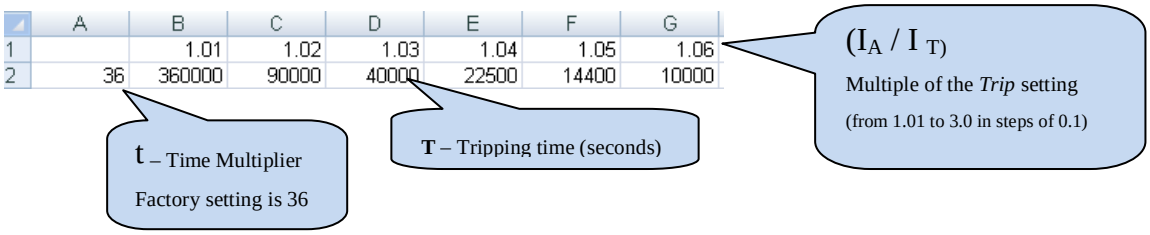
For further details on the *Thermal damage curve* of your alternator, you are referred to your alternator manufacturer.

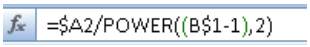

Overcurrent alarm IDMT curves
T (Tripping Time in seconds)
1000000
100000
10000
1000
100
10
1
0.1
1.0
1.5
2.0
IA/IT (Current as a multiplier of the Trip setting)
Slower than Factory setting
(Time Multiplier = 72
Factory setting
(Time Multiplier = 36
Faster than Factory setting
(Time Multiplier = 18
'Fastest' trip setting
(Time Multiplier = 1

Creating an Excel spreadsheet of the IDMT curve.

The formula used: $T = t / ((I_A / I_T) - 1)^2$

Is simplified for addition into a spreadsheet. This is useful for 'trying out' differering values of *t* (*Time Multiplier)* and viewing the results, without actually testing this on the engine.



The formula for the *Tripping Time* cells is : 

2.7.4.3 GENERATOR RATING

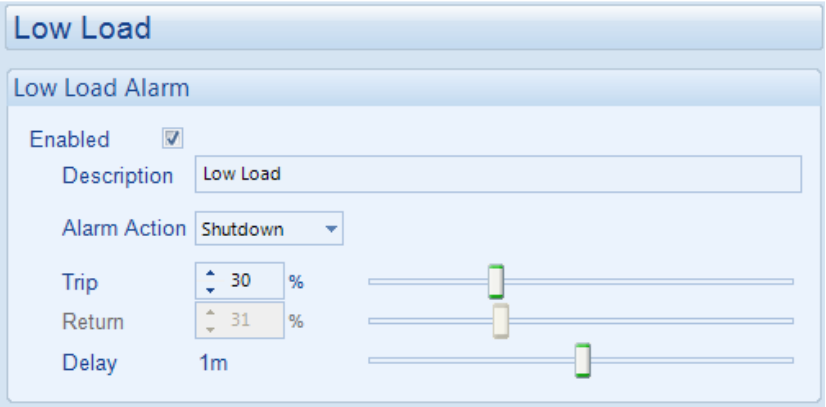
Parameter	Description
Generator KW Rating	The generator kW rating must be set in order for the *Generator Power* functions to be correctly utilised.

2.7.4.4 OVERLOAD PROTECTION

Parameter	Description
Overload Protection	☐ = Overload Protection function is disabled. ☑ = *kW Overload Alarm* activated when the kW level exceeds the *Trip* level for the configured *Delay* time.
Action	Select the type of alarm required from the list: ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning***
Trip	Set the percentage of total kW load at which the *Overload Alarm* is activated
Return	When the *Action* configured to *Warning*, the *Warning* is automatically reset when the generator kW level falls below the configured *Return* level.
Delay	The amount of time before the module activates the *Overload Alarm.*

2.7.5 LOW LOAD

NOTE: Often alternators are specified to run not less than a certain kW level. The *Low Load Alarm* provides protection for the alternators running at low loads below their specified levels.

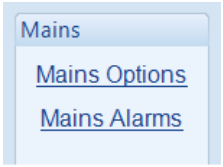


Parameter	Description
Low Load Alarm	☐ = Low Load Protection function is disabled. ☑ = *Low Load Alarm* activated when the kW level falls the *Trip* level for the configured *Delay* time.
Description	Provide a text to display when alarm is active.
Action	Select the type of alarm required from the list: ***Electrical Trip*** ***Indication*** ***Shutdown*** ***Warning***
Trip	Set the percentage of kW load level at which the *Low Load Alarm* is activated
Return	When the *Action* configured to *Warning*, the *Warning* is automatically reset when the generator kW level rises above the configured *Return* level.
Delay	The amount of time before the module activates the *Low Load Alarm.*

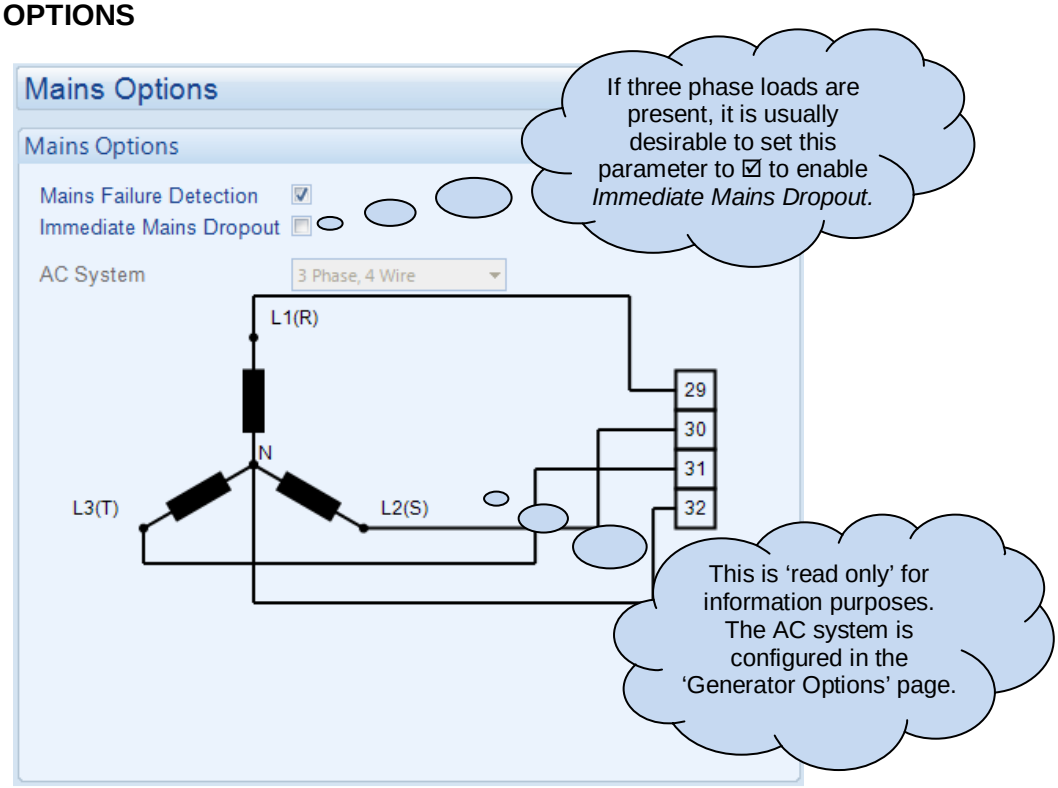
2.7.6 MAINS

= Only available on DSE6120 MKII AMF Modules

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

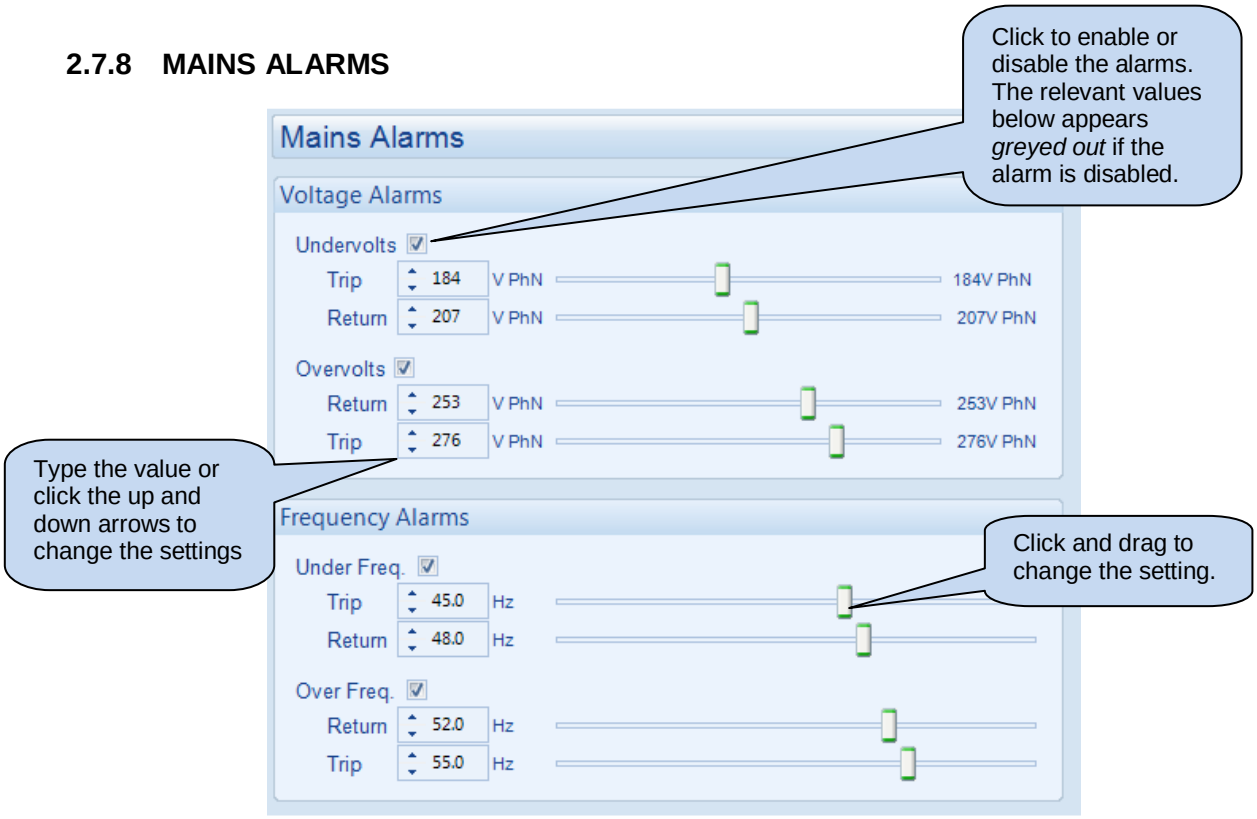


2.7.7 MAINS OPTIONS



Timer	Description
Mains Failure Detection	☐ = The module ignores the status of the mains supply. ☑ = The module monitors the mains supply and use this status for automatically starting and stopping the set in auto mode.
Immediate Mains Dropout	☐ = Upon mains failure, the mains load switch is kept closed until the generator is up to speed and volts. ☑ = Upon mains failure, the mains load switch is opened immediately, subject to the setting of the *mains transient* timer.
AC System	These settings are used to detail the type of AC system to which the module is connected: 3 phase 4 wire, 1 phase 2 wire, 2 phase 3 wire – L1-L2, 2 phase 3 wire – L1-L3, 3 phase 3 wire, 3 phase 4 wire delta This list is not exhaustive. DSE reserve the right to add to this list as part of our policy of continual development

2.7.8 MAINS ALARMS



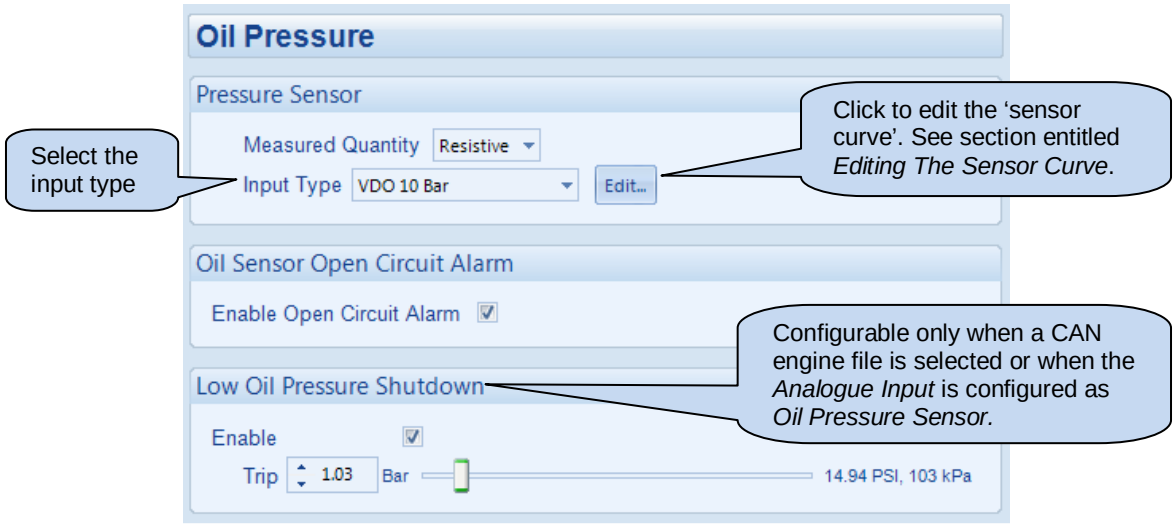
Alarm	IEEE designation
Mains Under Voltage IEEE 37.2 – 27 AC Undervoltage Relay	☐ = Mains Under Voltage detection is disabled ☑ = Mains Under Voltage gives an alarm in the event of the mains voltage falling below the configured *Under Voltage Trip* value. The *Under Voltage Trip* value is adjustable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

2.8 ENGINE

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

2.8.1 OIL PRESSURE

If a CAN Engine File is selected – Most engines give oil pressure from CAN link. In these cases, Analogue Input A is configured as Flexible Analogue or Digital Input. Configuration of Flexible Analogue Inputs and Digital Inputs is detailed elsewhere in this document.
Where the CAN engine does not support oil pressure over CAN link, Analogue input A is selectable as either digital input, analogue flexible input, or as analogue oil pressure sensor.

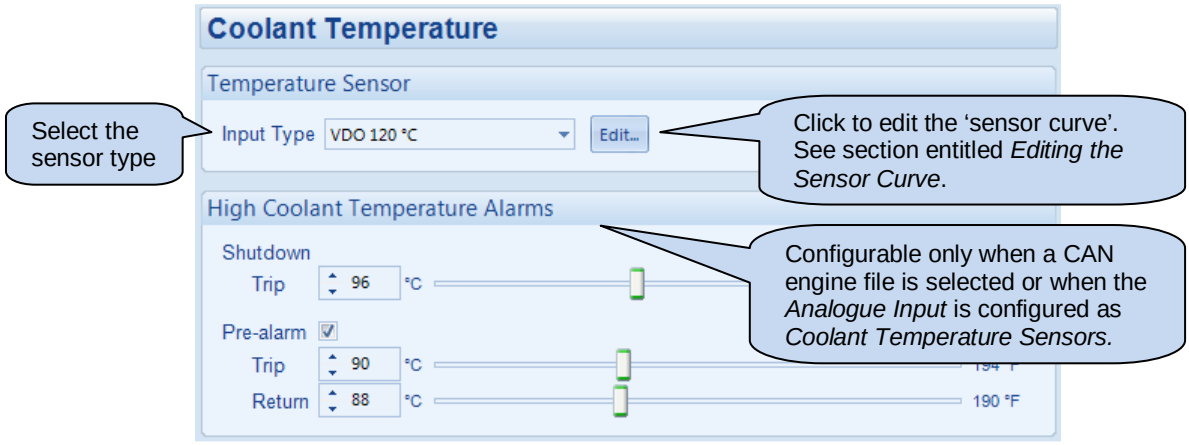


Parameters described overleaf…

Parameter	Description
Measured Quantity	Select the sensor signal: ***Current:*** for sensors with maximum range of 0 mA to 20 mA ***Resistive:*** for sensors with maximum range of 0 Ω to 480 Ω ***Voltage:*** for sensors with maximum range of 0 V to 10 V
Input Type	Select the sensor curve from a pre-defined list or create a user-defined curve.
Enable Open Circuit Alarm	☐ = Alarm is disabled. ☑ = The *Low Oil Pressure Open Circuit Alarm* is active when the module detects an open circuit when the sensor is disconnected
Low Oil Pressure Shutdown	☐ = Alarm is disabled. ☑ = The *Low Oil Pressure Shutdown Alarm* is active when the measured oil pressure drops below the configured *Trip* level.

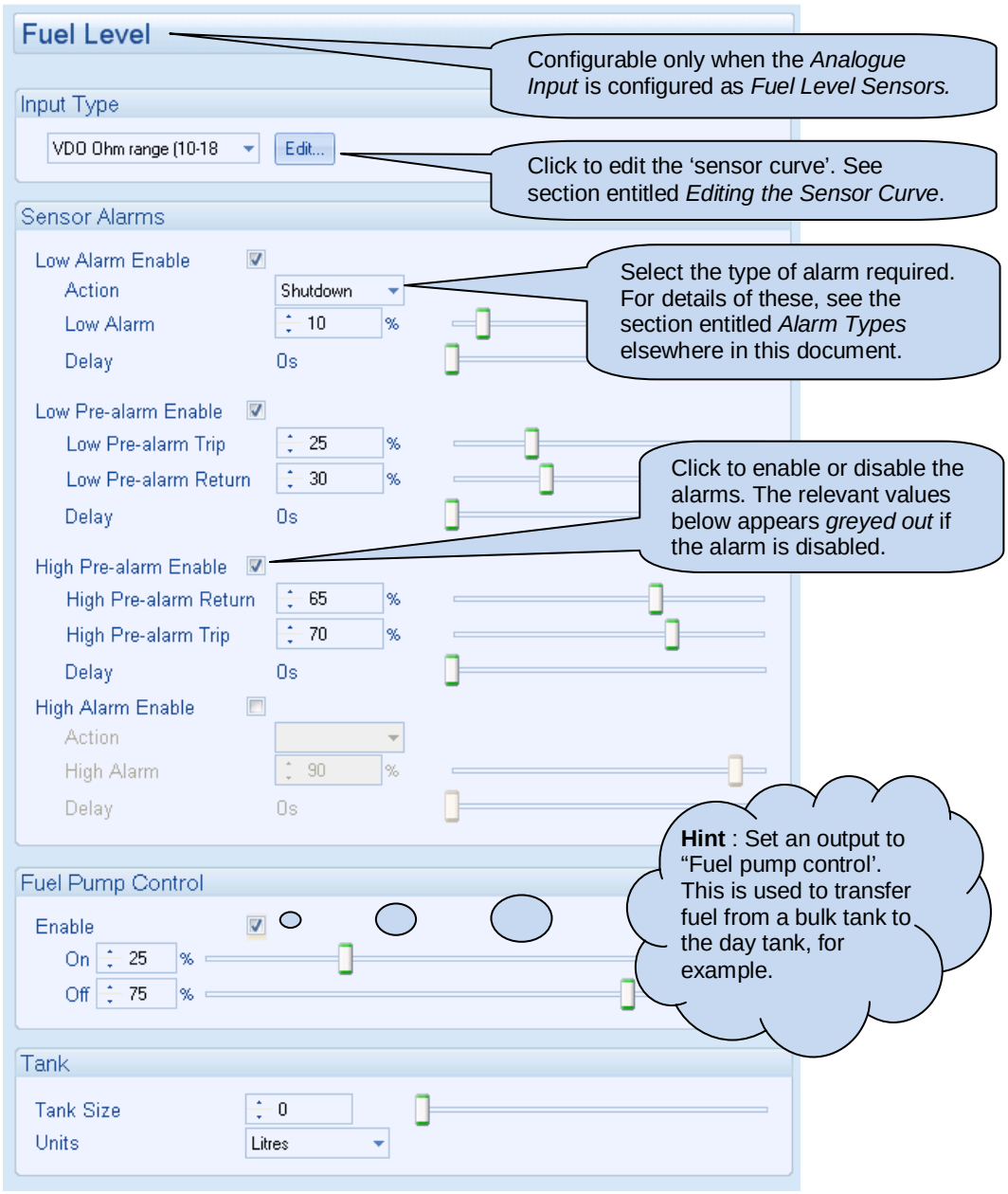
2.8.2 COOLANT TEMPERATURE

If a CAN Engine File is selected – Engines give temperature measurements from CAN link. Analogue Input B is configured as Digital Input. Configuration is the same as for Digital Inputs, detailed elsewhere in this document.



Parameter	Description
Input Type	Select the sensor curve from a pre-defined list or create a user-defined curve.
High Coolant Temperature Shutdown	The *High Coolant Temperature Shutdown Alarm* is active when the measured coolant temperature rises above the configured *Trip* level.
High Coolant Temperature Pre-Alarm	☐ = Alarm is disabled. ☑ = The *High Coolant Temperature Warning Alarm* is active when the measured coolant temperature rises above the configured *Trip* level. The *Warning* is automatically reset when the coolant temperature falls below the configured *Return* level.

2.8.3 FUEL LEVEL



Parameters are detailed overleaf…

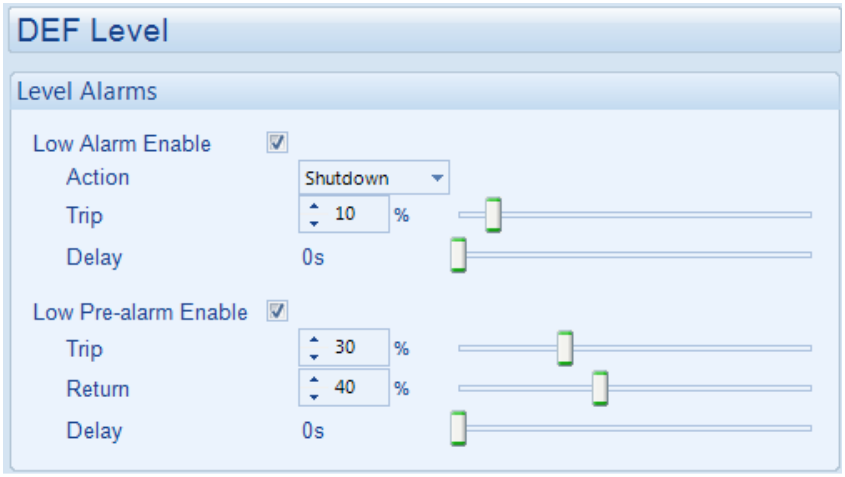
Parameter	Description
Input Type	Select the sensor curve from a pre-defined list or create a user-defined curve.
Low Alarm Enable	☐ = Alarm is disabled. ☑ = The *Low Fuel Level Alarm* is active when the measured fuel level drops below the *Low Alarm* setting for the configured *Delay* time.
Low Pre-Alarm Enable	☐ = Alarm is disabled. ☑ = The *Low Fuel Level Pre-Alarm* is active when the measured fuel level drops below the *Low Pre-Alarm Trip* setting for the configured *Delay* time. The pre-alarm is automatically reset when the fuel level exceeds the configured *Low Pre-Alarm Return* setting.
High Pre-Alarm Enable	☐ = Alarm is disabled. ☑ = The *High Fuel Level Pre-Alarm* is active when the measured fuel level rises above the *High Pre-Alarm Trip* setting for the configured *Delay* time. The pre-alarm is automatically reset when the fuel level drops below the configured *High Pre-Alarm Return* setting.
High Alarm Enable	☐ = Alarm is disabled. ☑ = The *High Fuel Level Alarm* is active when the measured fuel level rises above the *High Alarm* setting for the configured *Delay* time.
Fuel Pump Control	☐ = Fuel Pump Control is disabled. ☑ = Allows the module to control an external fuel pump to transfer fuel from a bulk tank to the day tank. A digital output configured for *Fuel Pump Control* energises when the fuel level falls below the configured *On* setting and de-energises when the fuel level exceeds the configured *Off* setting.
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***

2.8.4 DEF LEVEL

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

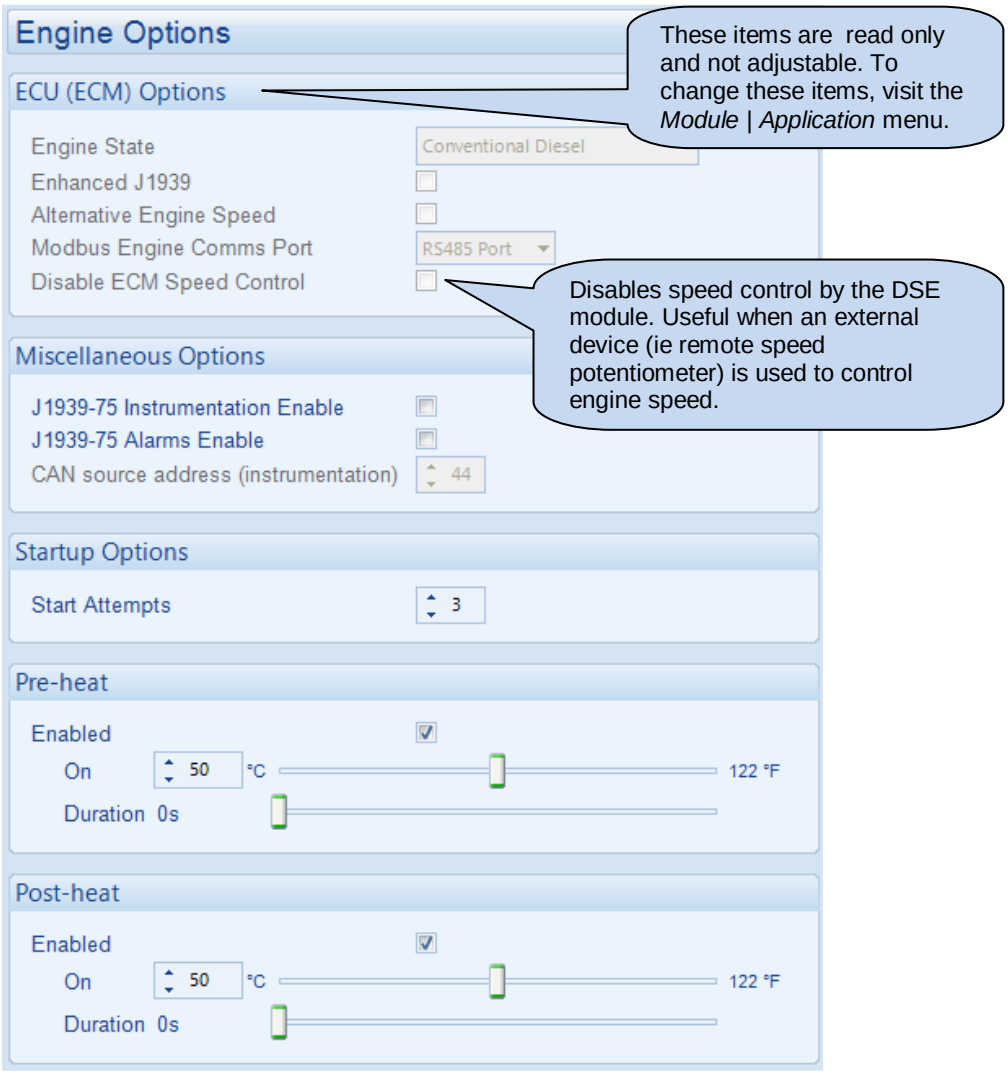
NOTE: Configuration of the *Alarm Action* in this section defines the DSE module response to the CANbus message; however, the ECU (ECM) still shuts down the engine depending on the alarm severity.

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* activates 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* activates 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.

2.8.5 ENGINE OPTIONS



2.8.5.1 MISCELLANEOUS OPTIONS

NOTE: For a full list of the J1939-75 alarms and instrumentation, refer to DSE Publication: *057-253 DSE7300MKII Operator Manual* which is found on our website: *www.deepseaplc.com*

Parameter	Description
J1939-75 Instrumentation Enable	Allows the DSE module to be interrogated by another CAN device and transfer the generator set instrumentation over J1939 link.
J1939-75 Alarms Enable	Allows the DSE module to be interrogated by another CAN device and transfer the alarms over J1939 link.
CAN Source Address (Instrumentation)	**NOTE: For a full list of the J1939-75 engine message and instrumentation, refer to DSE Publication: *057-253 DSE7300MKII Operator Manual* which is found on our website: *www.deepseaplc.com*** Set the *CAN Source Address* for the DSE module over which other CANbus devices read the generator set instrumentation.

2.8.5.2 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.

2.8.5.3 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	☐ = The *Pre-Heat* digital output is always active. ☑ = 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

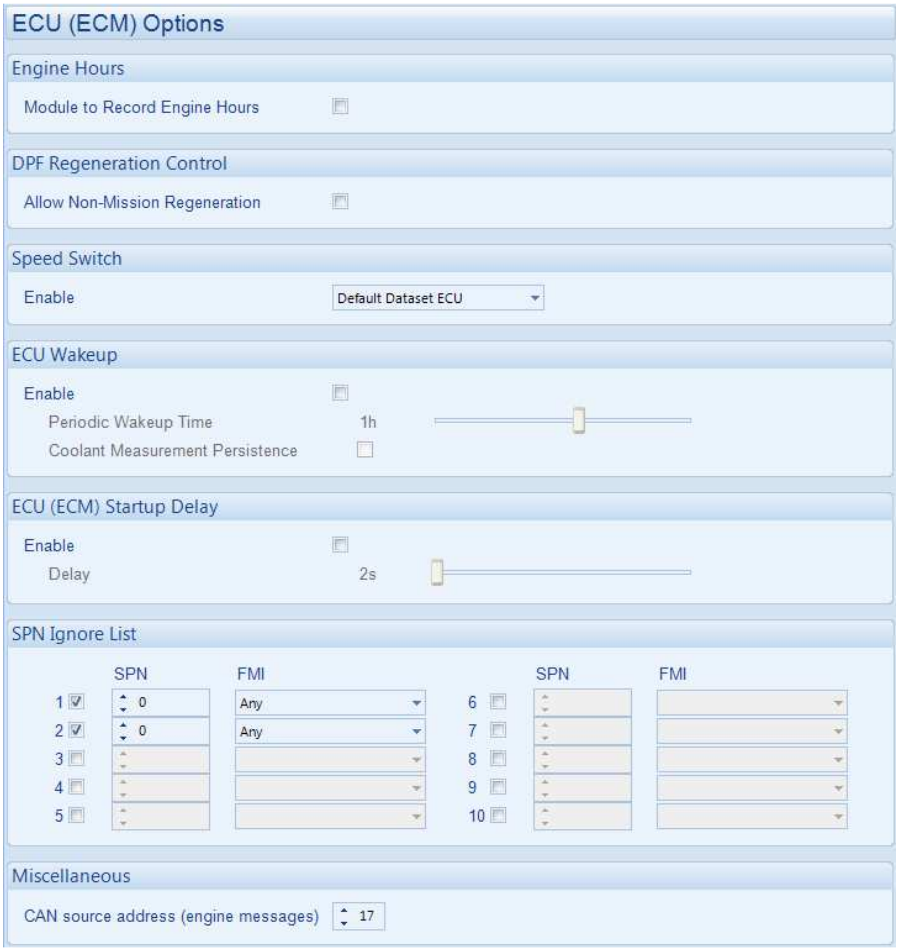
2.8.5.4 POST-HEAT

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 disabled. ☑ = 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.

2.8.5.5 ECU (ECM) OPTIONS



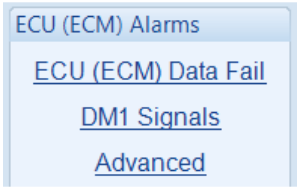
Parameter	Description
Module to Record Engine Hours	When enabled, DSE module counts Engine Run Hours. When disabled, Engine ECU (ECM) provides Run Hours.
DPF Regeneration Control	Available for ECUs (ECM) which require the engine speed to drop during a manual regeneration cycle. During this time, the generator is not available to supply power and the under speed and under frequency alarms are not active.
Speed Switch	Defines the method of speed control over CANbus when supported by the ECU (ECM). Selection needs to match the ECU (ECM) calibration for the speed control method. Available speed control methods to choose from: ***CAN Open Increase Decrease*** ***CAN Open Speed Demand*** ***Default Dataset ECU*** ***ECU Analogue Absolute*** ***ECU Analogue Relative*** ***ECU CAN Open Analogue*** ***ECU Frequency Input*** ***ECU Increase Decrease Input***
ECU Wakeup	☐ = 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 2 minutes to read the ECU (ECM) parameters. This is periodically repeated depending on the configured *Periodic Wakeup Time.*

Paramters continued overleaf…

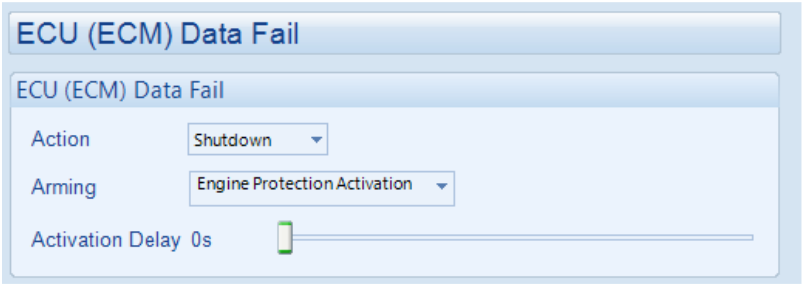
Parameter	Description
Coolant Measurement Persistance	**NOTE: Available only when *ECU Wakeup* is enabled.** ☐ = Option is disabled. ☑ = The *Coolant Temperature* measurement is used for the *Coolant Temperature Control.*
SPN Ignore List	Choose the specific SPN for the module to ignore. The module allows 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.
CAN Source Address (Engine Messages)	**NOTE: This is useful when the *Electronic Engine ECU's CAN Source Address* is different than its default address.** Set the *CAN Source Address* for the DSE module over which other CANbus devices read the alarms.

2.8.6 ECU (ECM) ALARMS

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



2.8.6.1 ECU DATA FAIL



Parameter	Description
CAN Data Fail	Provides protection against failure of the ECU CAN data link. The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***None*** ***Electrical Trip*** ***Shutdown*** ***Warning***
Arming	Select when the *CAN ECU Data Fail* alarm is active. Options are as follows: ***Always:*** The alarm is active at anytime the CAN Link is lost ***From Safety On:*** Active only after the *Safety On* delay timer ***From Starting:*** Active only after the *Crank Relay* is energised ***Never****:* Alarm is disabled ***Engine Protection Activation:*** Active when the engine protections are activated
Activation Delay	The amount of time before the module activates the *CAN ECU Data Fail* after a failure.

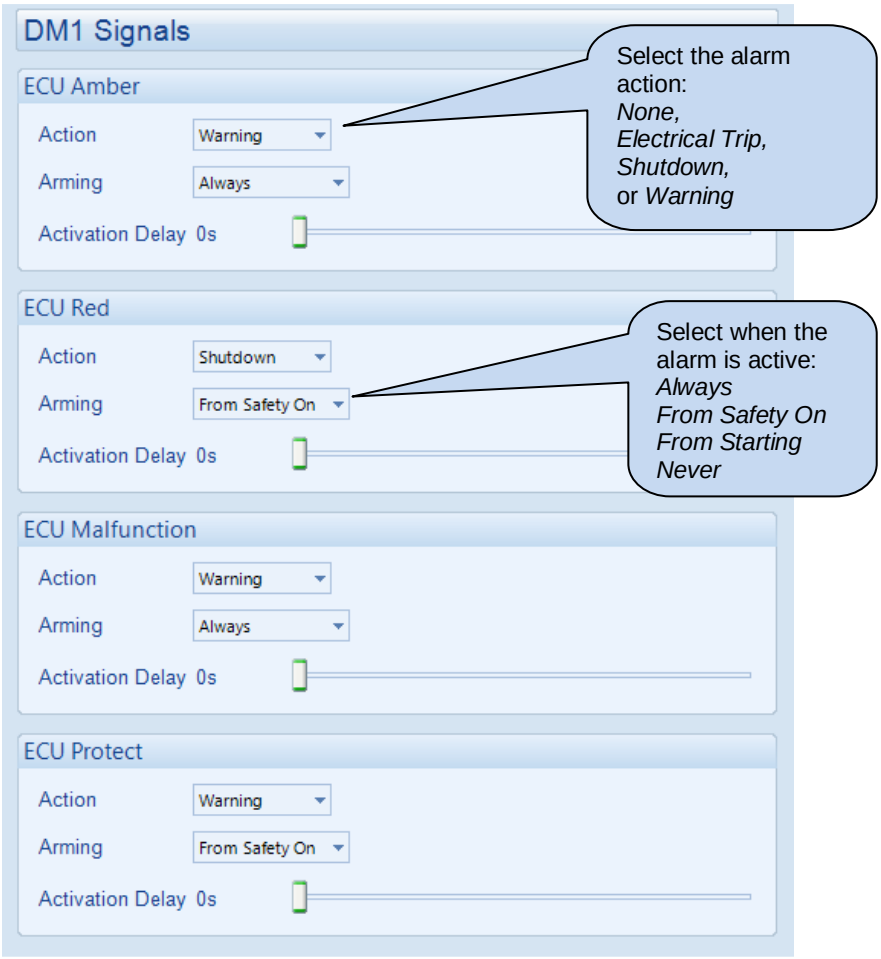
2.8.6.2 DM1 SIGNALS

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

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

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

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

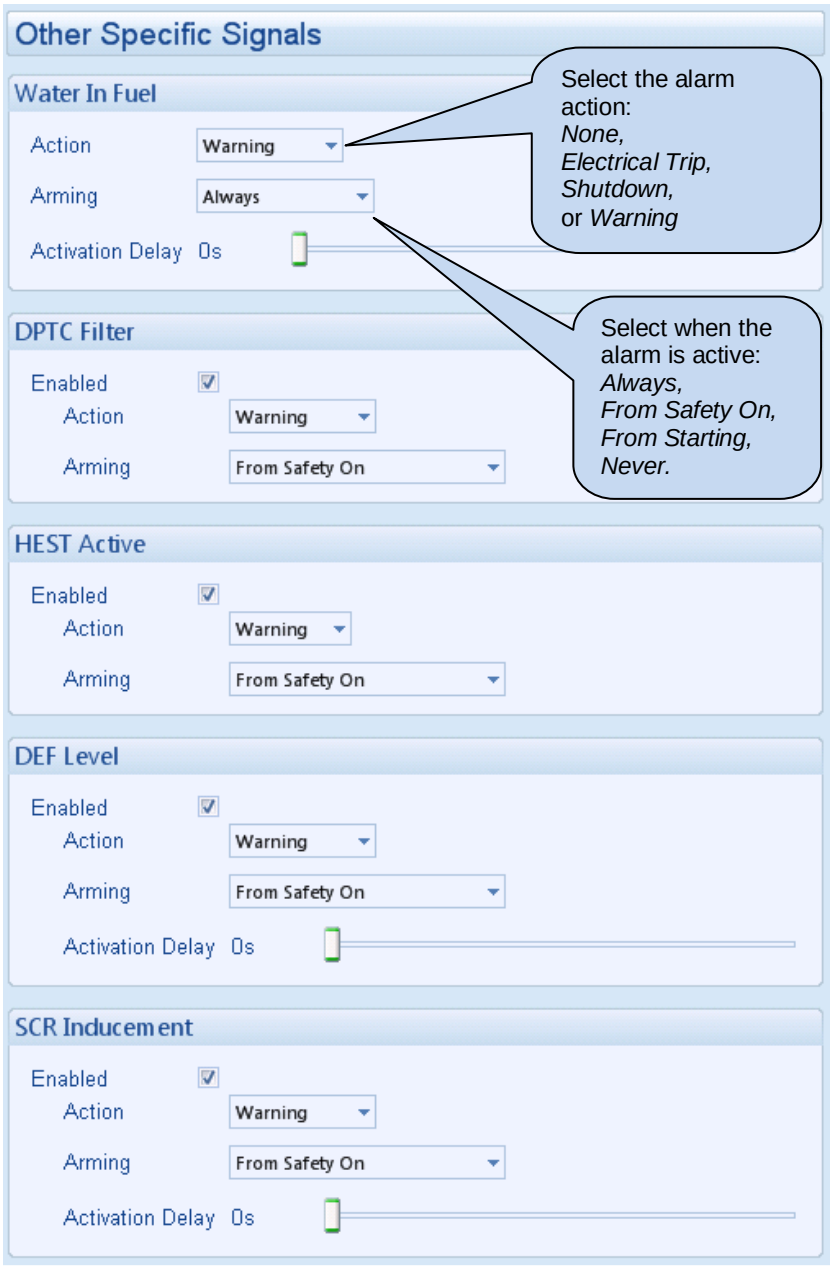


2.8.6.3 ADVANCED

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

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

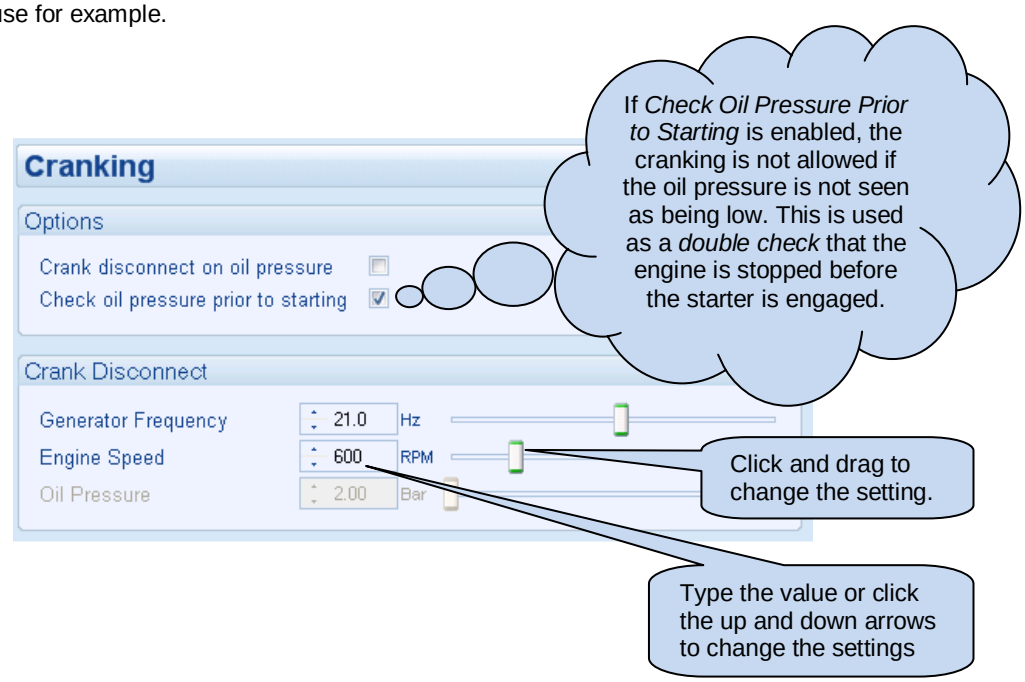
Allows configuration of selected additional CAN messages from the engine ECU.



2.8.7 CRANK DISCONNECT

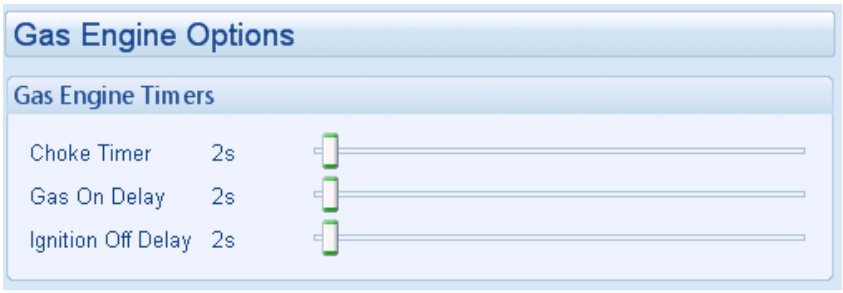
Crank disconnect settings are used to detect when the set fires during the starting sequence.
As the set is cranked, the first parameter that passes it's *crank disconnect* setting results in the cessation of the cranking signal.

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



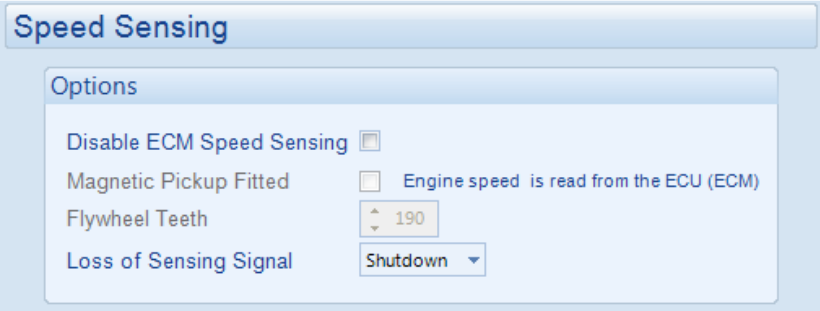
2.8.8 GAS ENGINE OPTIONS

NOTE: Only applicable when *Conventional Gas Engine Type* is selected.



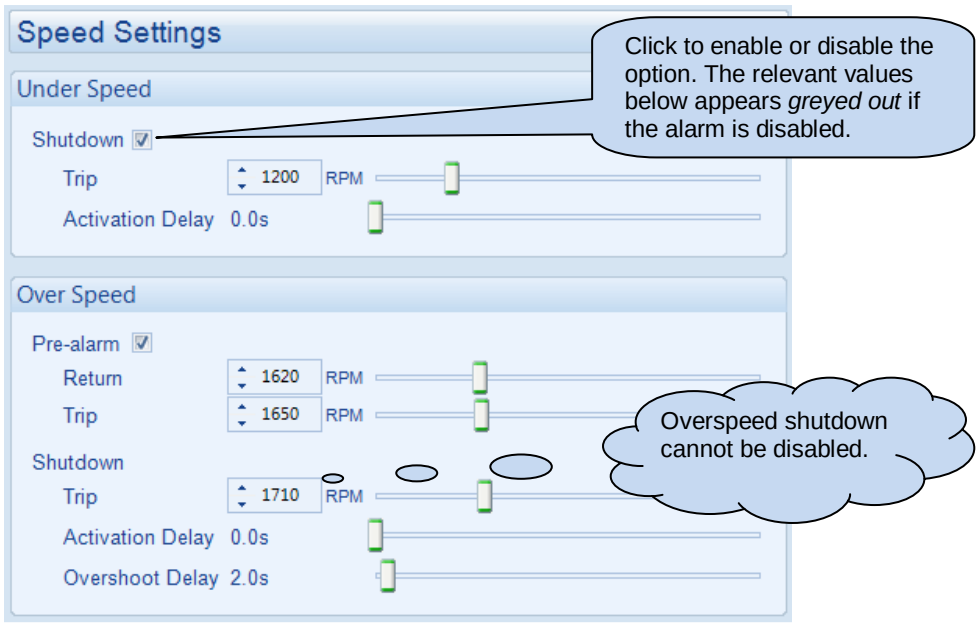
Parameter	Description
Choke Timer	Controls the amount of time that the Gas Choke output is active during the starting sequence.
Gas On Delay	Controls the amount of time between energising the Gas Ignition and energising the Fuel output. Used in the starting sequence to purge old gas from the engine.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

2.8.9 SPEED SENSING



Parameter	Description
Disable ECM Speed Sensing	☐ = An ECM is connected to the DSE module and being used for speed sensing. ☑ = An ECM is connected to the DSE module but another form of speed sensing fitted to the DSE module is being used.
Magnetic Pickup Fitted	**NOTE: For specifications of the magnetic pickup input, refer to DSE Publication: *057-236 DSE6100MKII Operator Manual* which is found on our website: *www.deepseaplc.com*** ☐ = Magnetic pickup device is not connected to the DSE module. ☑ = A low impedance magnetic pickup device is connected to the DSE module to measure engine speed.
Flywheel Teeth	Define the number of pulses which are counted by the speed sensing device in each engine revolution.
Loss of Sensing Signal	If the speed sensing signal is lost during engine running (or not present during cranking when *Multiple Engage Attempts* is enabled), an alarm is generated: *Shutdown:* The engine is removed from load and is immediately stopped. *Warning:* The engine continues to run, however a warning alarm is raised.

2.8.10 SPEED SETTINGS



Parameters detailed overleaf…

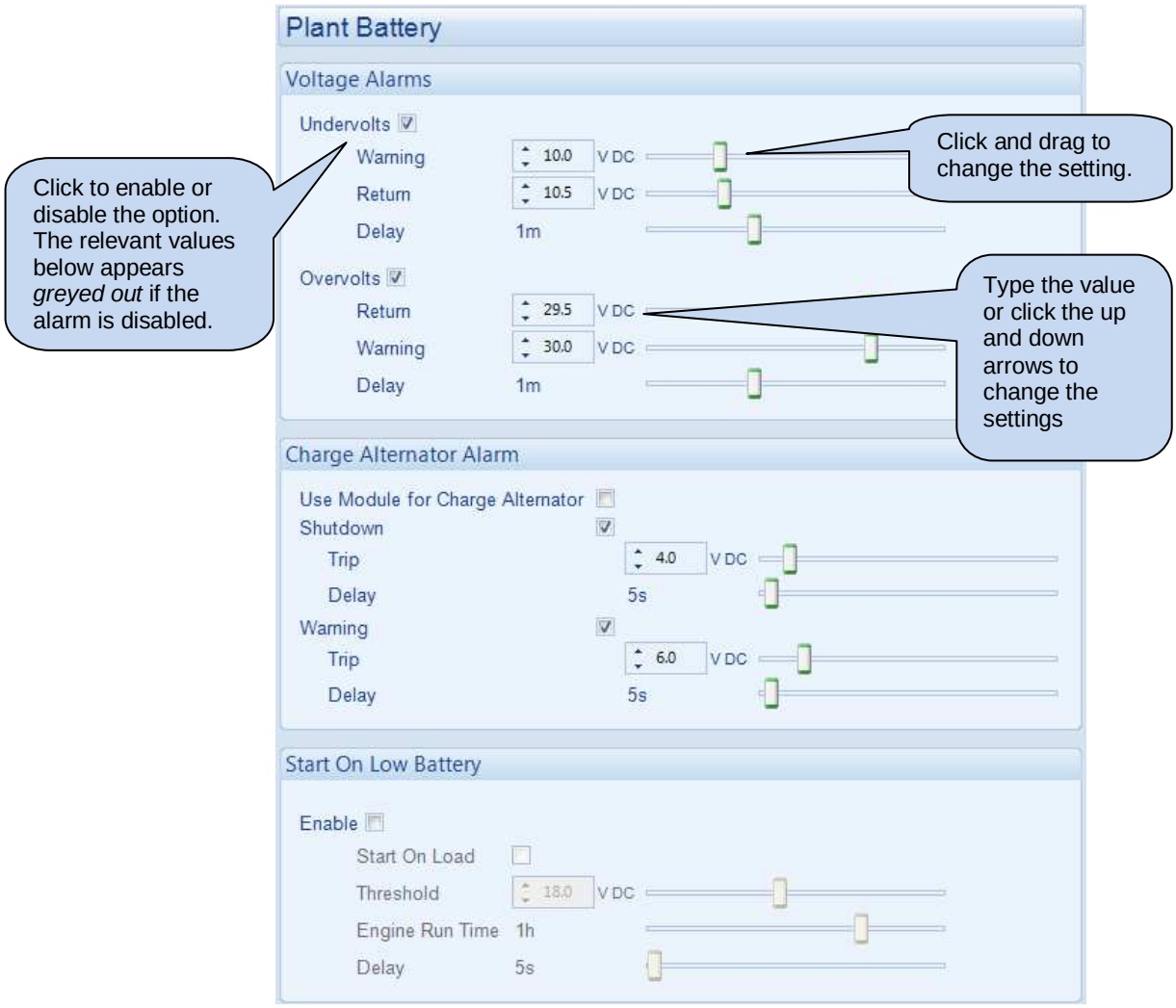
2.8.10.1 UNDER SPEED

Parameter	Description
Under Speed Alarm	☐ = *Under Speed* alarm is disabled ☑ = Under Speed gives a *Shutdown* alarm in the event of the engine speed falling below the configured *Under Speed Alarm Trip* value for longer than the *Activation Delay*. The *Underspeed Alarm Trip* value is adjustable to suit user requirements.

2.8.10.2 OVER SPEED

Parameter	Description
Over Speed Pre-Alarm	☐ = Alarm is disabled ☑ = Over Speed gives a warning alarm in the event of the engine speed rising above the configured *Over Speed Pre-Alarm Trip* value for longer than the *Activation Delay*. The *Warning* is automatically reset when the engine speed falls below the configured *Return* level. The *Over Speed Pre-Alarm Trip* value is adjustable to suit user requirements.
Over Speed Alarm	☐ = Alarm is disabled ☑ = Over Speed gives a *Shutdown* alarm in the event of the engine speed rising above the configured *Over Speed Alarm Trip* value for longer than the *Activation Delay*. The *Over Speed Alarm Trip* value is adjustable to suit user requirements.
Overshoot Delay	To prevent spurious overspeed alarms at engine start up, the module includes configurable *Overspeed Overshoot* protection. This allows the engine speed to 'overshoot' the Overspeed setting during the starting process for a short time. Rather than 'inhibiting' the Overspeed alarms, the levels are temporarily raised by the DSE module's default *Overspeed Overshoot %* for the duration of the *Overspeed Overshoot* delay from starting.

2.8.11 PLANT BATTERY



Parameters described overleaf…

2.8.11.1 PLANT BATTERY VOLTAGE ALARMS

Parameter	Description
Plant Battery Undervolts IEEE 37.2 -27 DC Undervoltage Relay	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 Overvolts IEEE 37.2 -59 DC Overvoltage Relay	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.

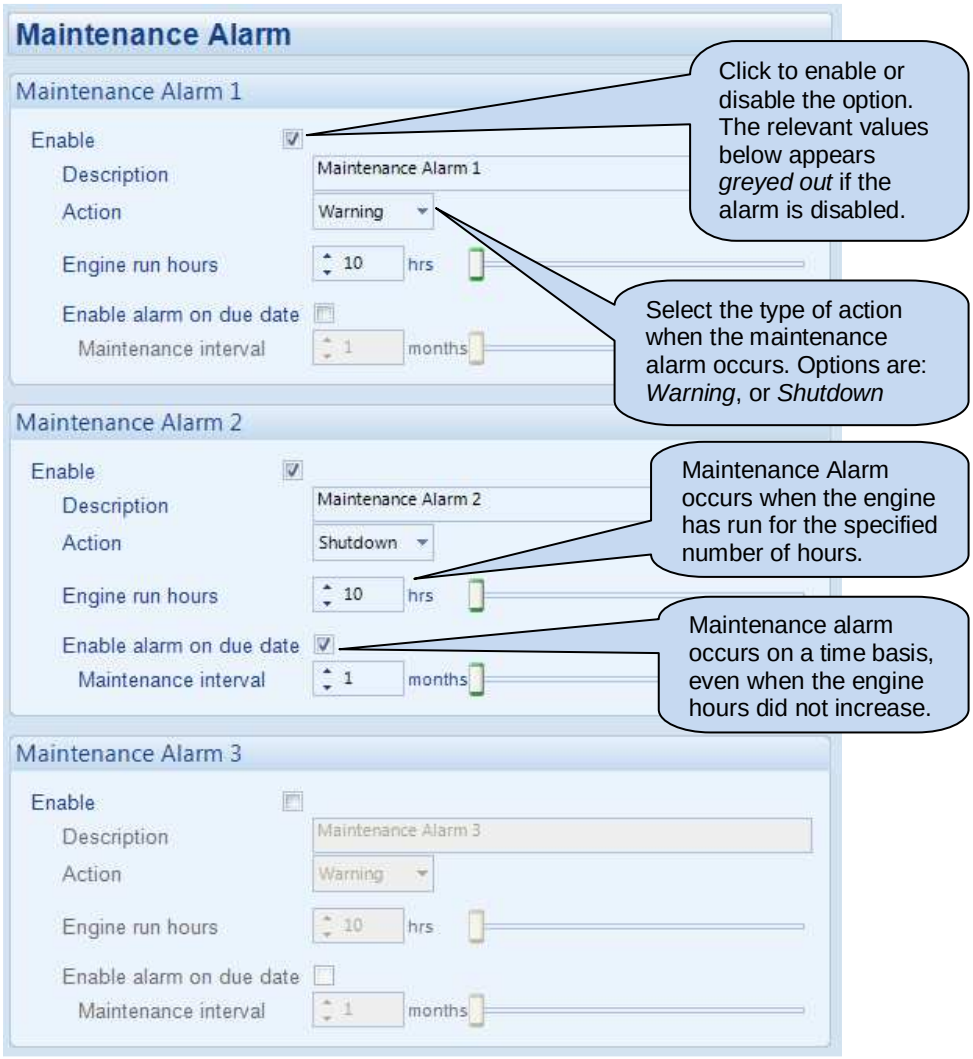
2.8.11.2 CHARGE ALTERNATOR ALARM

Parameter	Description
Use Module For Charge Alternator	☐ = .When CAN engine selected, the charge alternator is controlled by the engine ECU (ECM). ☑ =When CAN engine selected, the charge alternator is controlled by the DSE module.
Charge Alternator Shutdown	☐ = The *Shutdown* alarm is disabled. ☑ = The *shutdown* alarm activates when the charge alternator voltage falls below the configured *Trip* level for the configured *Delay* time.
Charge Alternator Pre-Alarm	☐ = The *Warning* alarm is disabled.. ☑ = The *Warning* alarm activates when the charge alternator voltage falls below the configured *Trip* level for the configured *Delay* time.

2.8.11.3 START ON LOW BATTERY

Parameter	Description
Start on Low Battery	☐ = Start on Low Battery is disabled. ☑ = Select to enable autostart upon the battery voltage falling below the T*hreshold* level for longer than the *Start Delay* time. The engine starts and run for the specified *Engine Run Time*. This occurs only if the module is in AUTO mode.
Start On Load	☐ = Run the generator *Off Load*. ☑ = Run the generator *On Load*.

2.9 MAINTENANCE ALARM

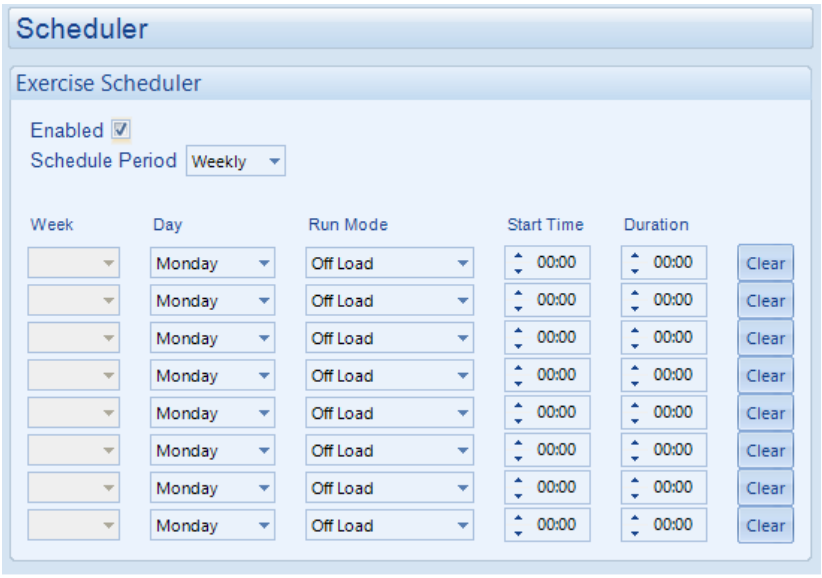


There are two ways to reset the maintenance alarm:

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

2.10 SCHEDULER

The scheduler is used to automatically start the set at a configured day and time and run it for the configured duration of hours.
The generator is made to run *on load* or *off load* depending upon the configuration :



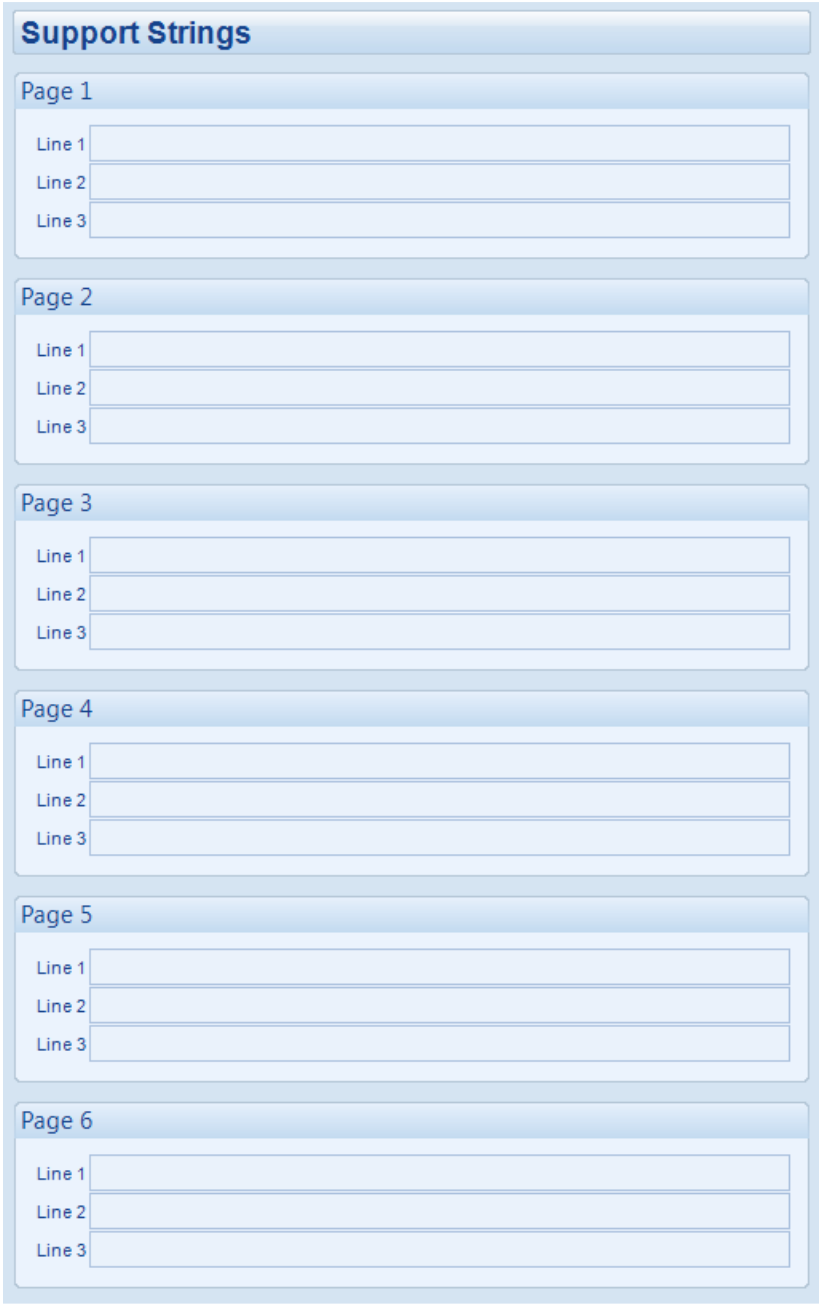
Function	Description
Enabled	☐ = Scheduled runs are disabled ☑ = Enables the Scheduler
Schedule Period	Determines the repeat interval for the scheduled run. Options available are: Weekly, Monthly
Run Mode	Determines the loading state mode of the generator when running on schedule *Auto Start Inhibit:* the generator is prevented from running in *Auto* mode. *Off Load:* The module runs the generator on schedule with the breaker open *On Load:* The module runs the generator on schedule and closes the breaker
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
Start Time	Determines at what time of day the scheduled run starts
Duration	Determines the time duration in hours for the scheduled run
Clear	Resets the values for the Day, Start Time and Duration to defaults

2.11 DISPLAY STRINGS

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

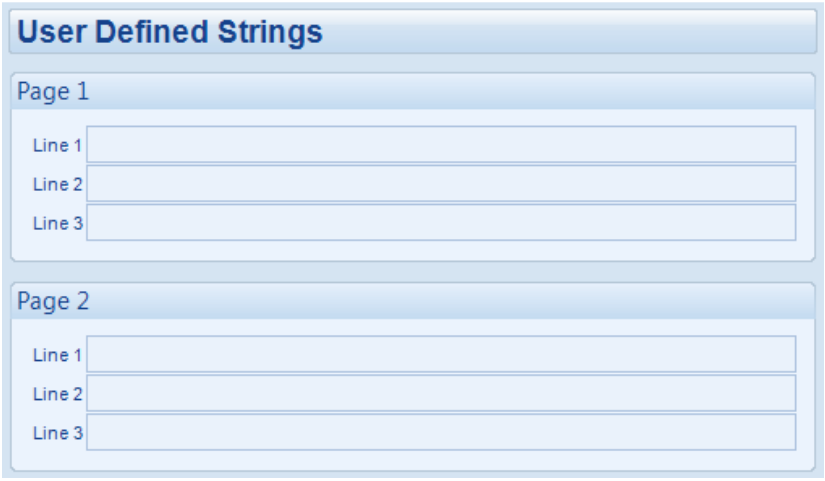
2.11.1 SUPPORT STRINGS

The module display is able to accommodate for up to six support pages. Information entered in the below page appear on the module LCD for the end-user.



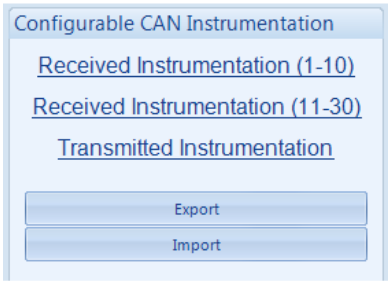
2.11.2 USER DEFINED STRINGS

The module display is able to accommodate for up to two *User Defined Strings* pages. Information entered in the below page appear on the module LCD for the end-user.



2.12 CONFIGURABLE CAN INTRUMENTATION

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



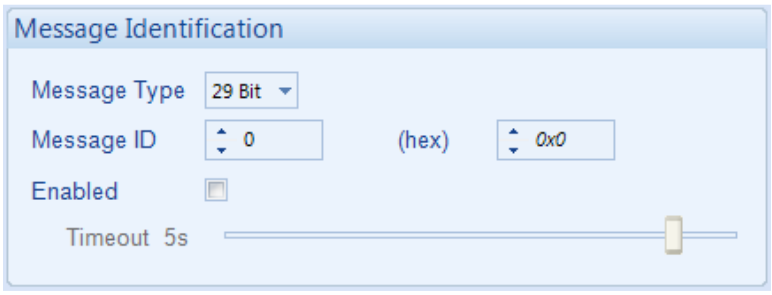
2.12.1 RECEIVED INTRUMENTATION (1-10)

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

Parameter	Description
Enabled	**NOTE: The CAN instrumentation must already be available on the CAN bus. There is no request for a non-standard instrumentation.** ☐ = The CAN instrumentation is disabled. ☑ = The CAN instrumentation is enabled. Reading depends upon the message availability on the bus.
On Module	**NOTE: The CAN instrumentation is always available on the Scada, Data Logging, PLC as long as at least one CAN instrumentation is enabled. The CAN instrumentation is shown on the DSE61xx MKII module's display when the *On Module* is enabled.** ☐ = The CAN instrumentation is not displayed on the DSE614xx MKII module. ☑ = The CAN instrumentation is displayed on the DSE61xx MKII module.
Description	Provide a description for the CAN instrumentation. This description is only shown in the Scada.
Details	Click on Details to set the *Message Decoding* CAN options.

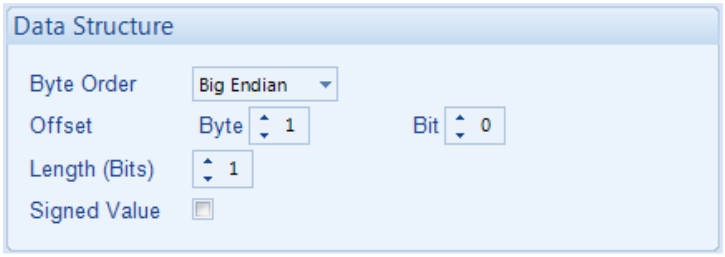
Click on *Details…* to set the *Message Decoding* parameters.

2.12.1.1 MESSAGE IDENTIFICATION



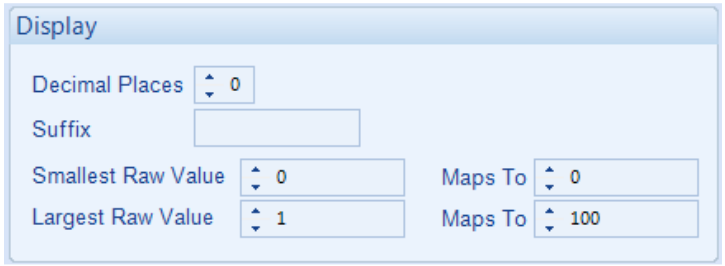
Parameter	Description
Message Type	Select the required message type: ***11 Bit*** message identifier for standard CAN ***29 Bit*** message identifier for externded CAN
Message ID	CAN message ID
Enabled	☐ = Timeout is disabled ☑ = Timeout is enabled
Timeout	It indicates how often the messages are expected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

2.12.1.2 DATA STRUCTURE



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

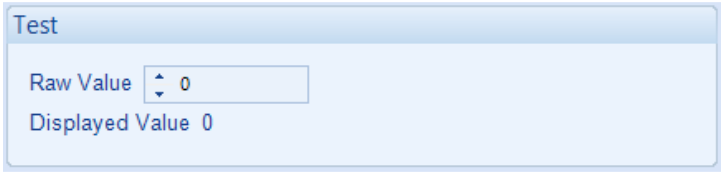
2.12.1.3 DISPLAY



Parameters detailed overleaf…

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

2.12.1.4 TEST



Parameter	Description
Test Raw Value	**NOTE: The Test Raw Value is not saved in the configuration, this is only to check the displayed value.** This is a test case to check the representation of the *Raw Value* when they are complicated. *Test Raw Value* is the value read from the CAN bus before the transformation
Displayed Value	The *Test Raw Values's* represented value as to be shown on the DSE61xx MKII's screen, or in the Scada.

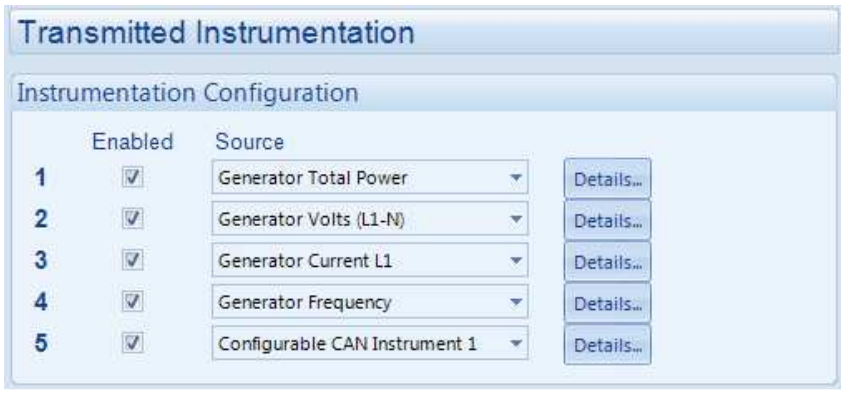
2.12.2 RECEIVED INTRUMENTATION (11-30)

NOTE: The *Received Instrumentation (11-30)* only have the default Description string. Description cannot be configured to the *Received Instrumentation (11-30).*

NOTE: The *Message Decoding Details* parameters of the *Received Instrumentation(11-30)* are exactly the same as the Received *Intrumentation (1-10).* Please refer to the previous subsection for the *Message Decoding Details*.

2.12.3 TRANSMITTED INSTRUMENTATION

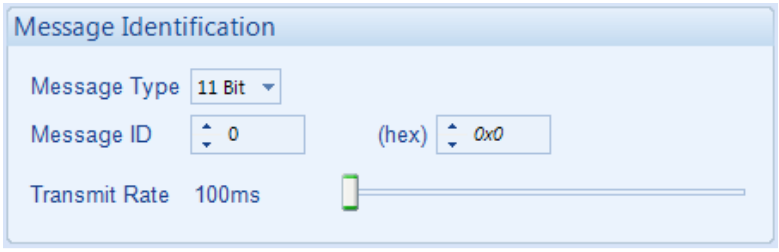
The DSE61xx MKII module allows transmitting up to five instruments over the CANbus on the ECU port by specifying the source address (message ID) of the selected Instrument.



Parameters detailed overleaf…

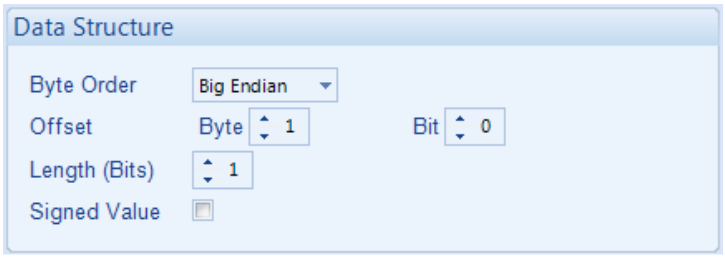
Parameter	Description
Enabled	☐ = The Transmit CAN instrumentation is disabled. ☑ = The Transmit CAN instrumentation is enabled.
Source	Select the instrument to be created over the CAN.
Details	Click on Details to set the *Message Encoding* CAN options.

2.12.3.1 MESSAGE IDENTIFICATION



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

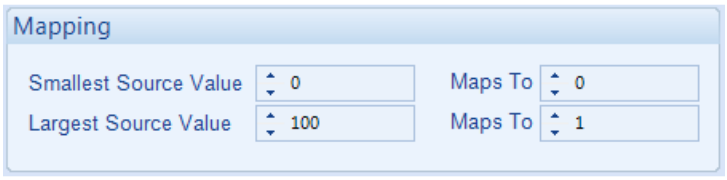
2.12.3.2 DATA STRUCTURE



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

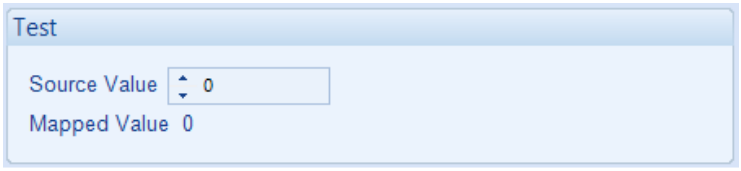
Continued Overleaf..

2.12.3.3 MAPPING



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

2.12.3.4 TEST



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

2.12.4 CONFIGURABLE CAN INSTRUMENTATION EXPORT/IMPORT

This feature is used to import the *Configurable CAN Instrumentation* settings in another DSE61xx MKII module.

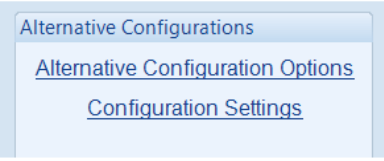
Parameter	Description
Export	This allows the configuration settings of all Configurable CAN Instrumentation (Received & Transmited) into one XML file.
Import	This allows to import an existing configuration settings of all Configurable CAN Instrumentation saved in XML format.

2.13 ALTERNATIVE CONFIGURATION

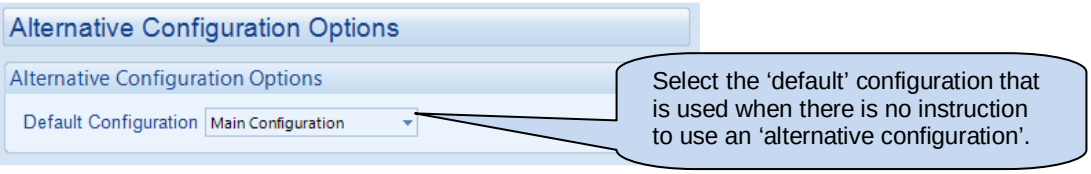
An Alternative Configuration is provided to allow the system designer to cater for different AC requirements utilising the same generator system. Typically this feature is used by Rental Set Manufacturers where the set is capable of being operated at (for instance) 120V 50Hz and 240V 50Hz using a selector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

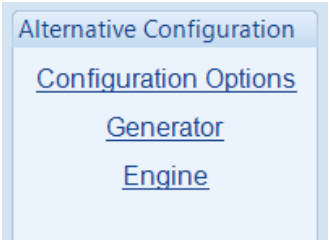


2.13.1 ALTERNATIVE CONFIGURATION OPTIONS

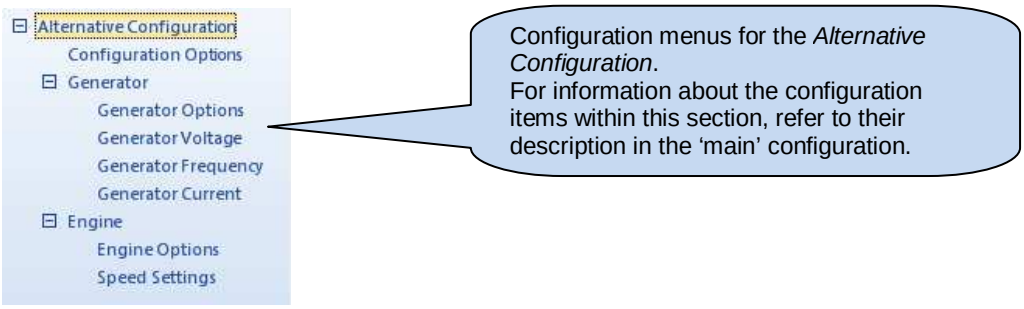


2.13.2 ALTERNATIVE CONFIGURATION OPTIONS

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



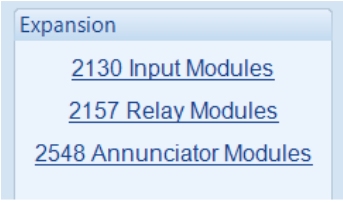
Alternative configuration options contain a subset of the main configuration. The adjustable parameters are not discussed here as they are identical to the main configuration options :



2.14 EXPANSION

NOTE: A maximum of two (2) expansion units are connected to the DSE6100 MKII series of controllers.

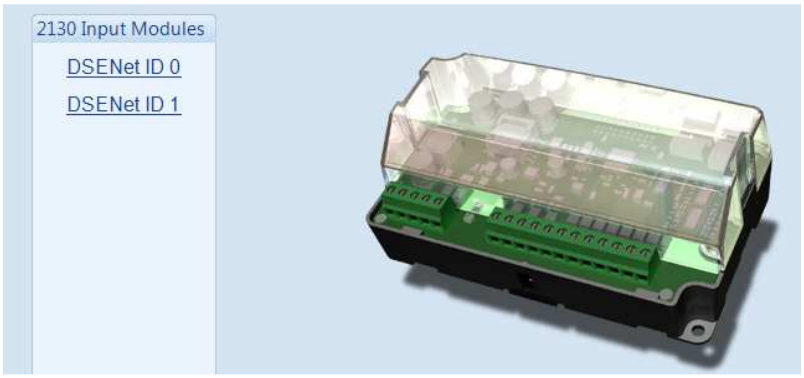
The *Expansion* page is subdivided into smaller sections.
Select the required section with the mouse.



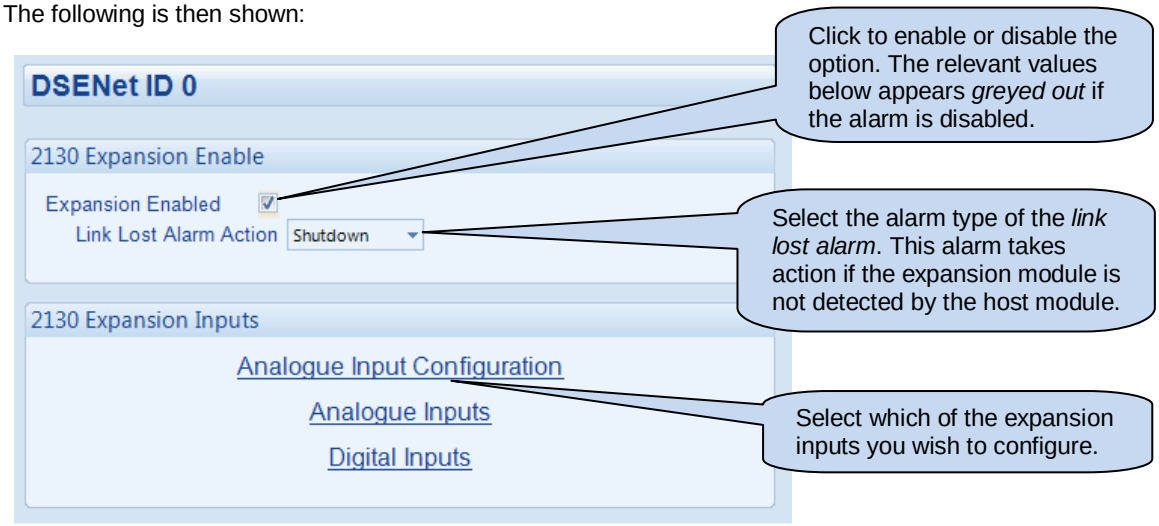
See overleaf for description of the different expansion modules.

2.14.1 DSE2130 INPUT MODULES

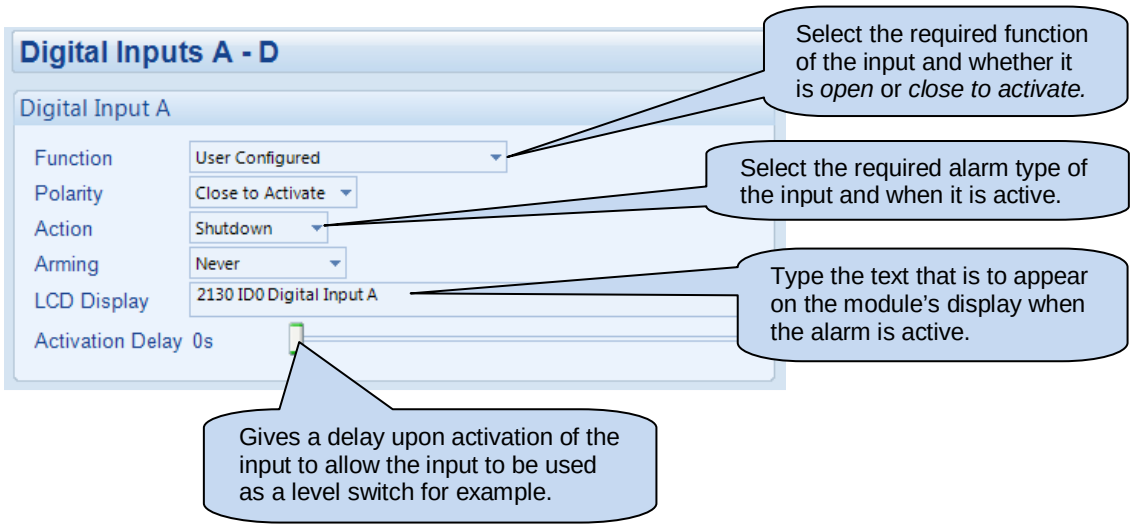
Select the DSENet ID of the input expansion you wish to configure. The ID of the expansion input module is set by rotary decimal switch accessible under the removable cover of the device.



The following is then shown:

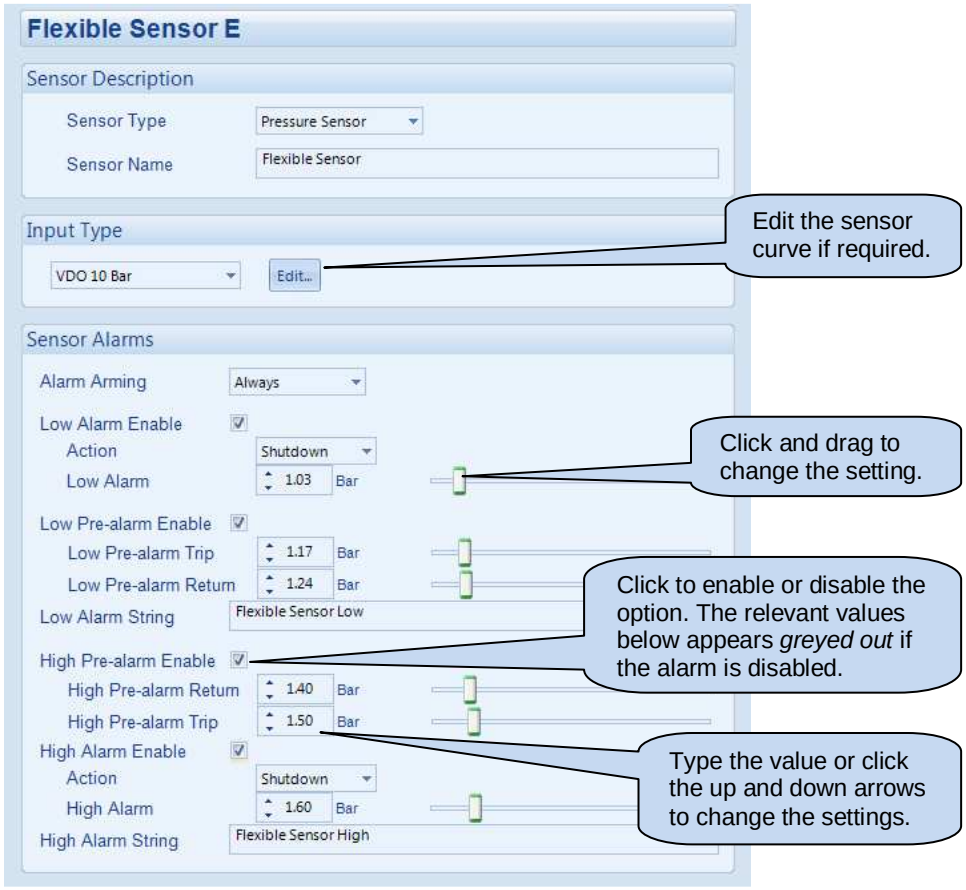


2.14.1.1 DIGITAL INPUTS (A-D)

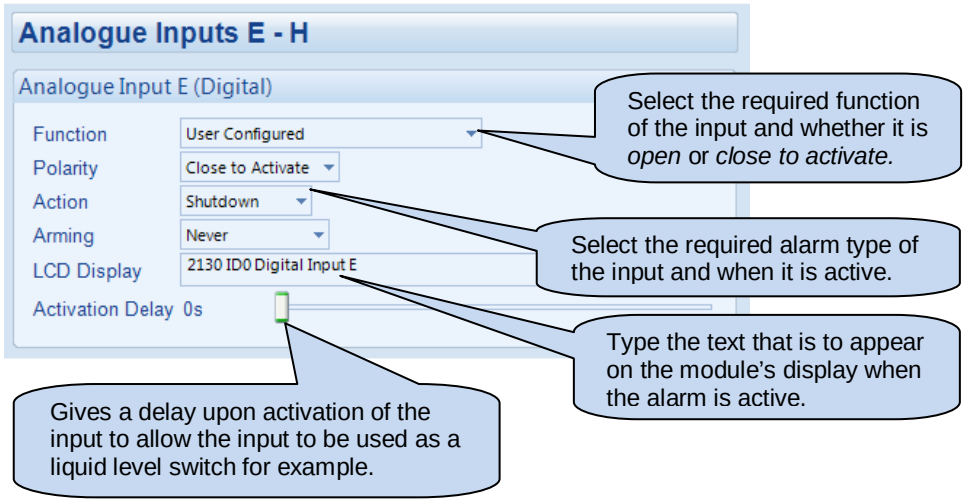


2.14.1.2 ANALOGUE INPUTS (E-H)

Configured as an Analogue Input

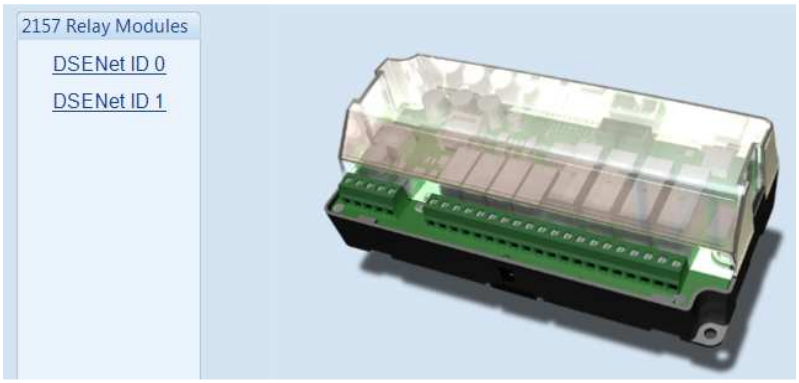


Configured as a Digital Input

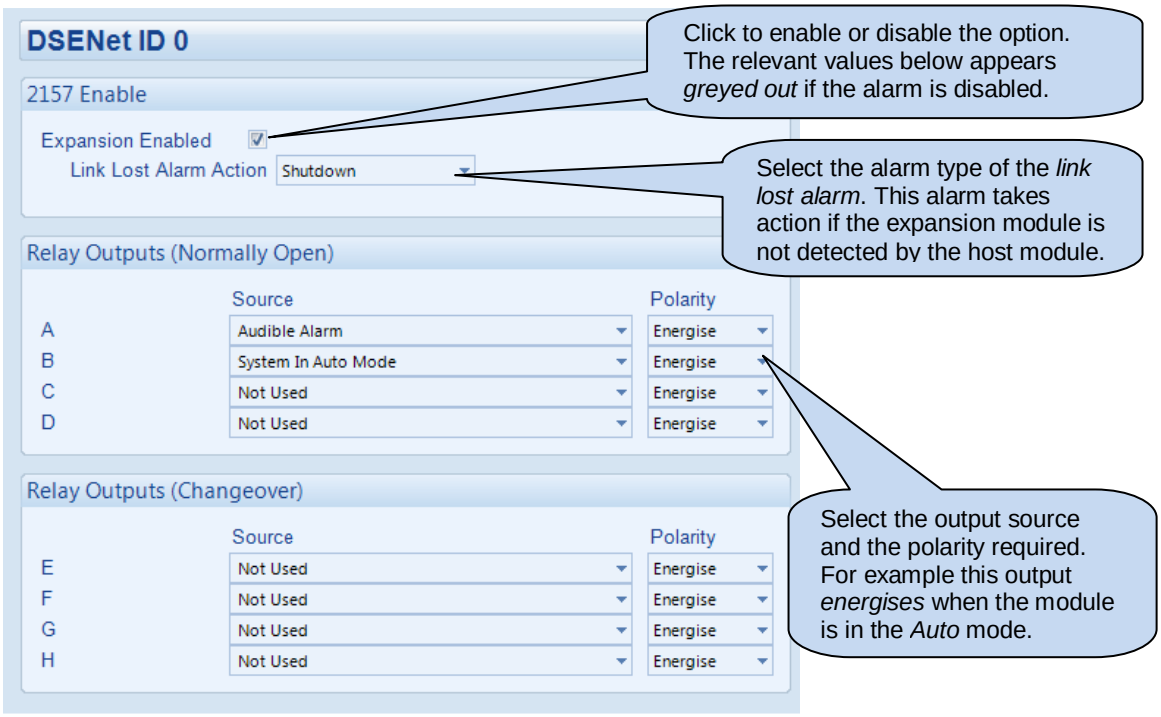


2.14.2 DSE2157 RELAY MODULES

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



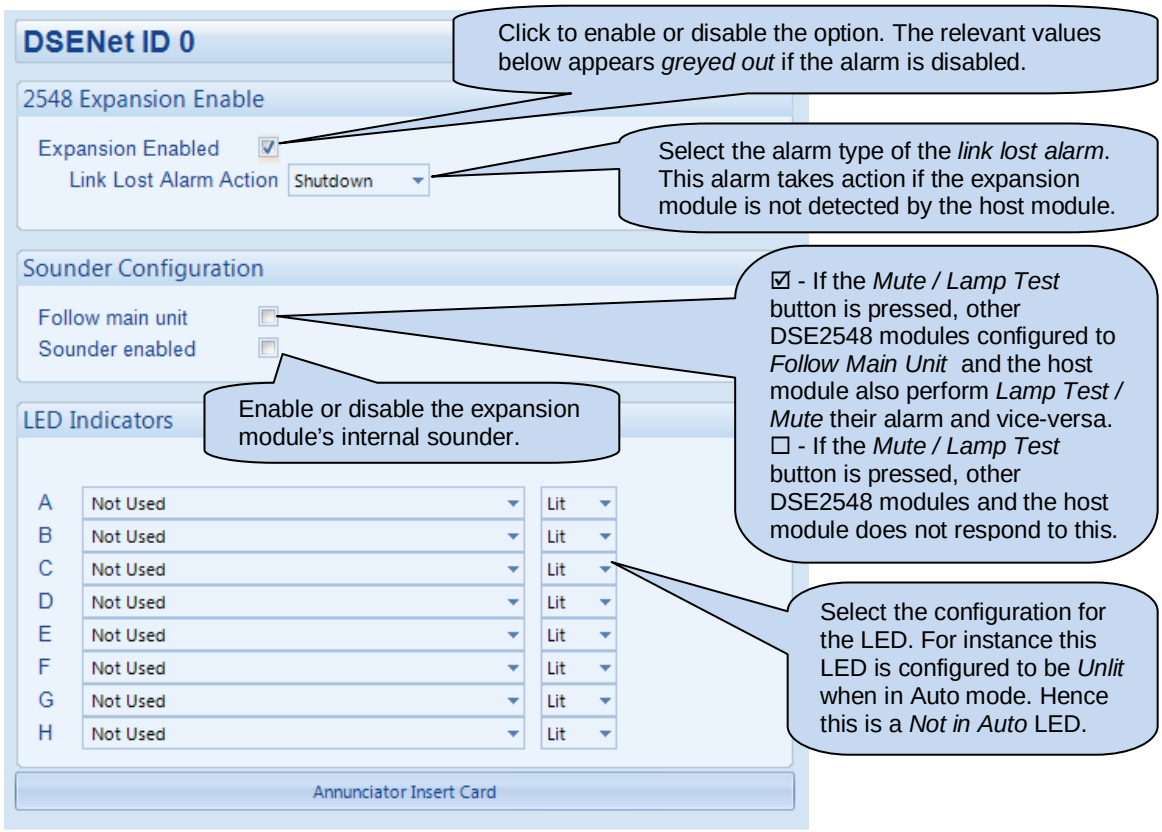
The following is then shown:



2.14.3 DSE2548 LED EXPANSION

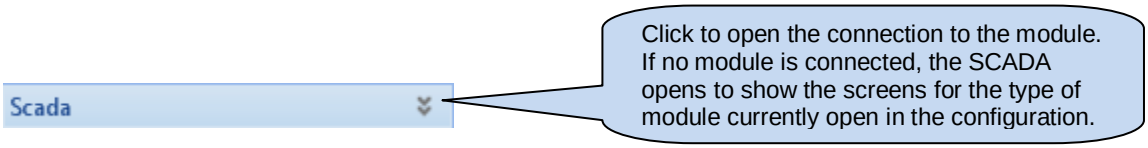
Select the DSENet ID of the LED expansion you wish to configure. The ID of the Annunciator is set by rotary decimal switch accessible on the back of the device.

The following is then shown:

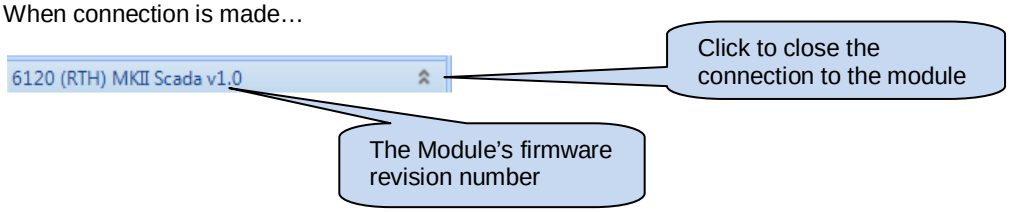


3 SCADA

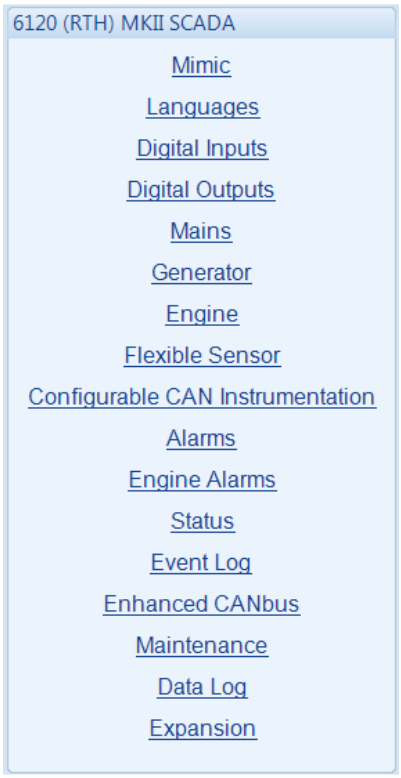
SCADA stands for **S**upervisory **C**ontrol **A**nd **D**ata **A**cquisition and is provided both as a service tool and also as a means of monitoring / controlling the generator set.
As a service tool, the SCADA pages are to check the operation of the controller's inputs and outputs as well as checking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



When connection is made…



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

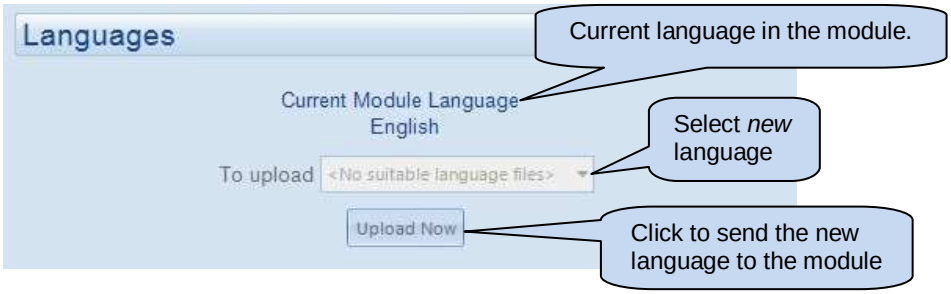


3.1 MIMIC

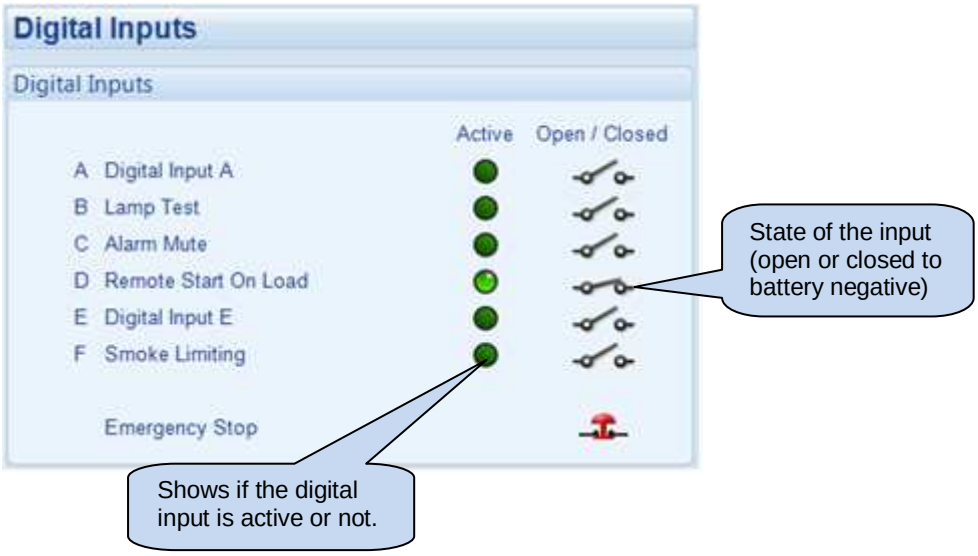
This screen provides a mimic of the control module and allows the operator to change the control mode of the module.

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

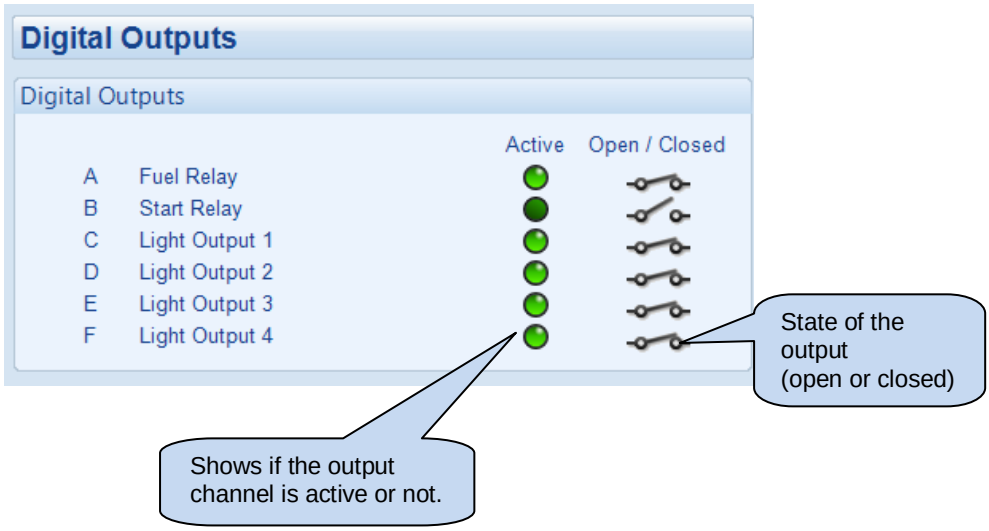
3.2 LANGUAGES



3.3 DIGITAL INPUTS



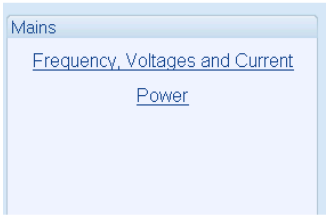
3.4 DIGITAL OUTPUTS



3.5 MAINS

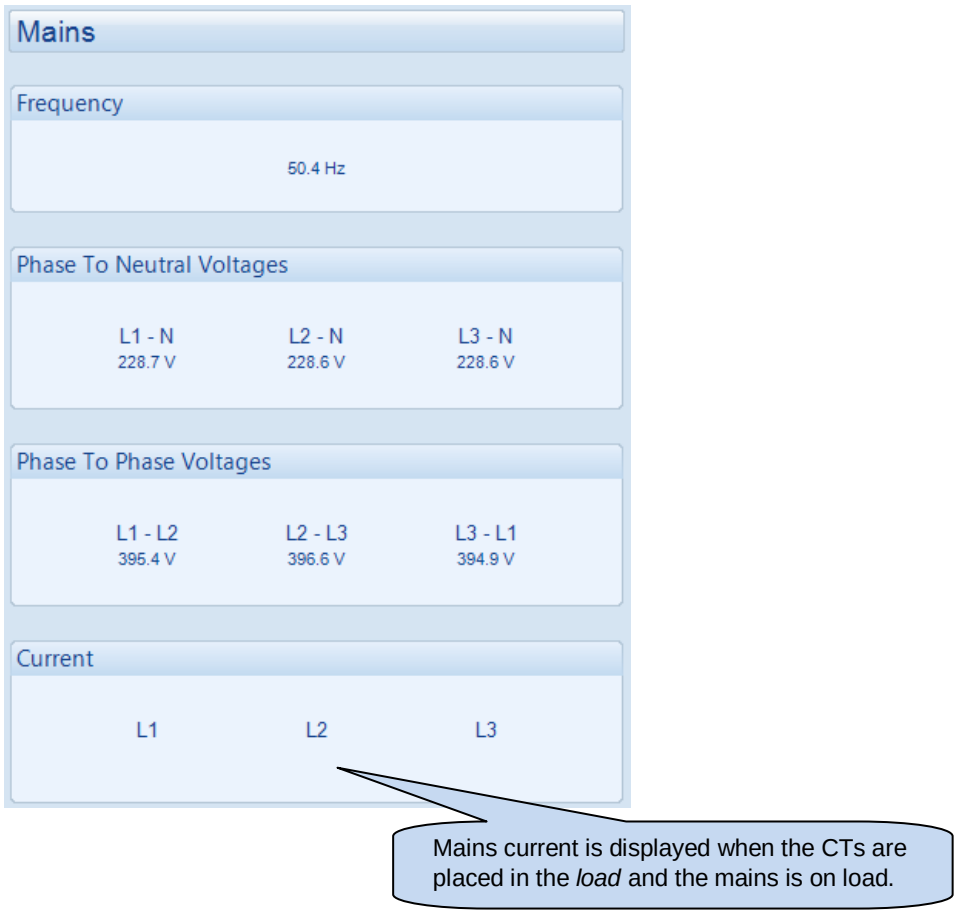
= Only available on DSE6120 MKII AMF Modules

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



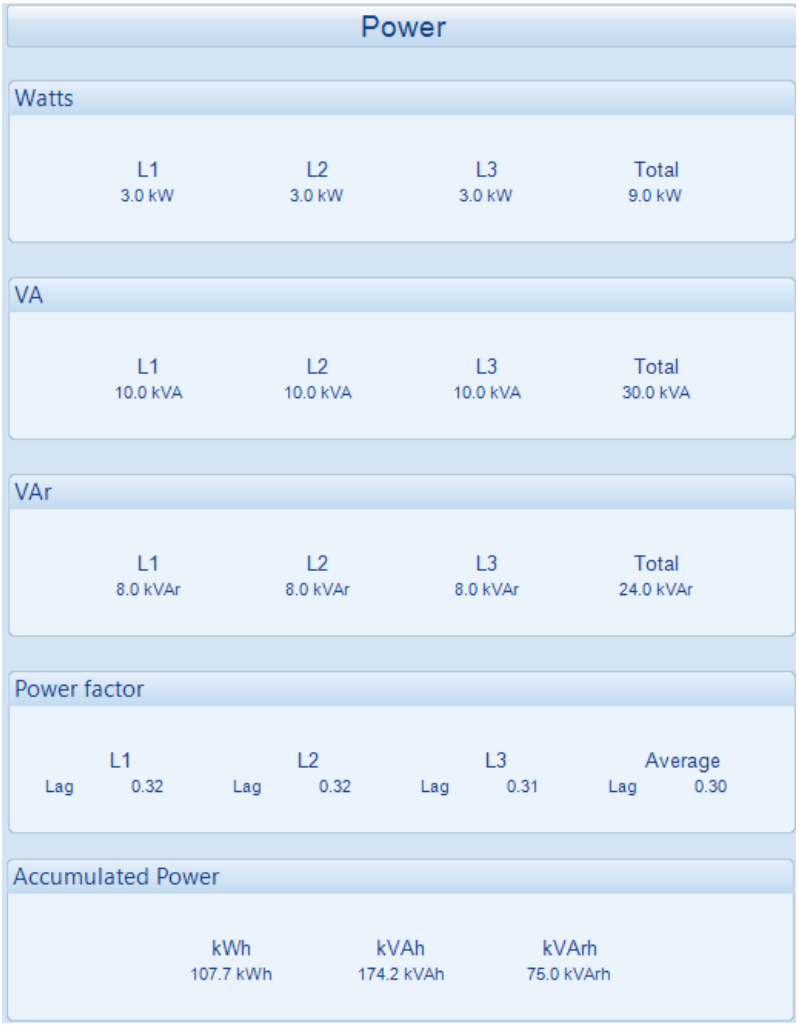
3.5.1 FREQUENCY, VOLTAGES AND CURRENT

Shows the modules measurements of the mains supply (6120 MKII only).



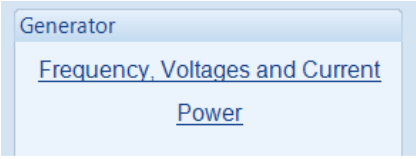
3.5.2 POWER

Shows the modules measurements of the mains supply power (6020 MKII only).



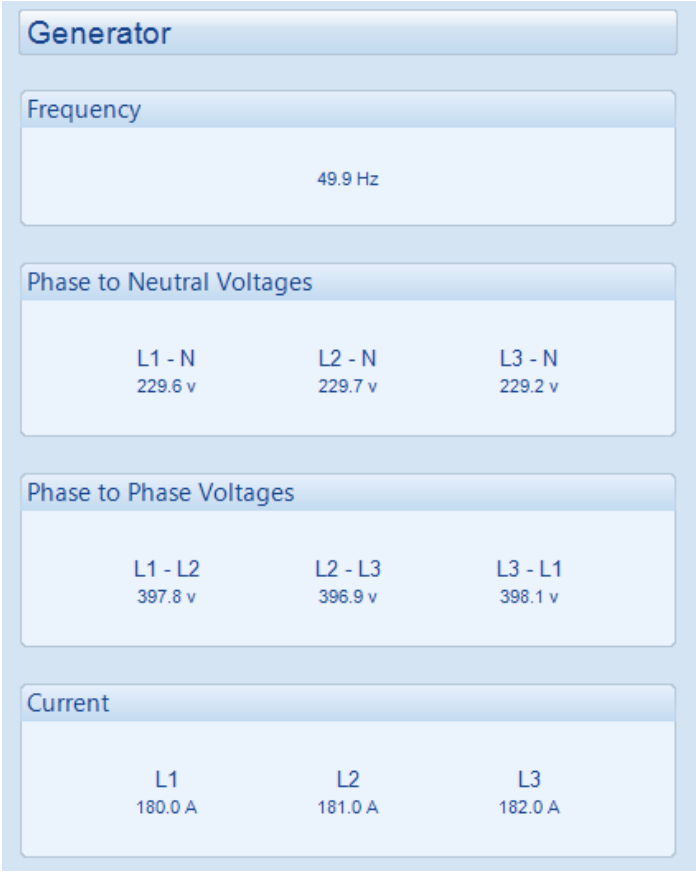
3.6 GENERATOR

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

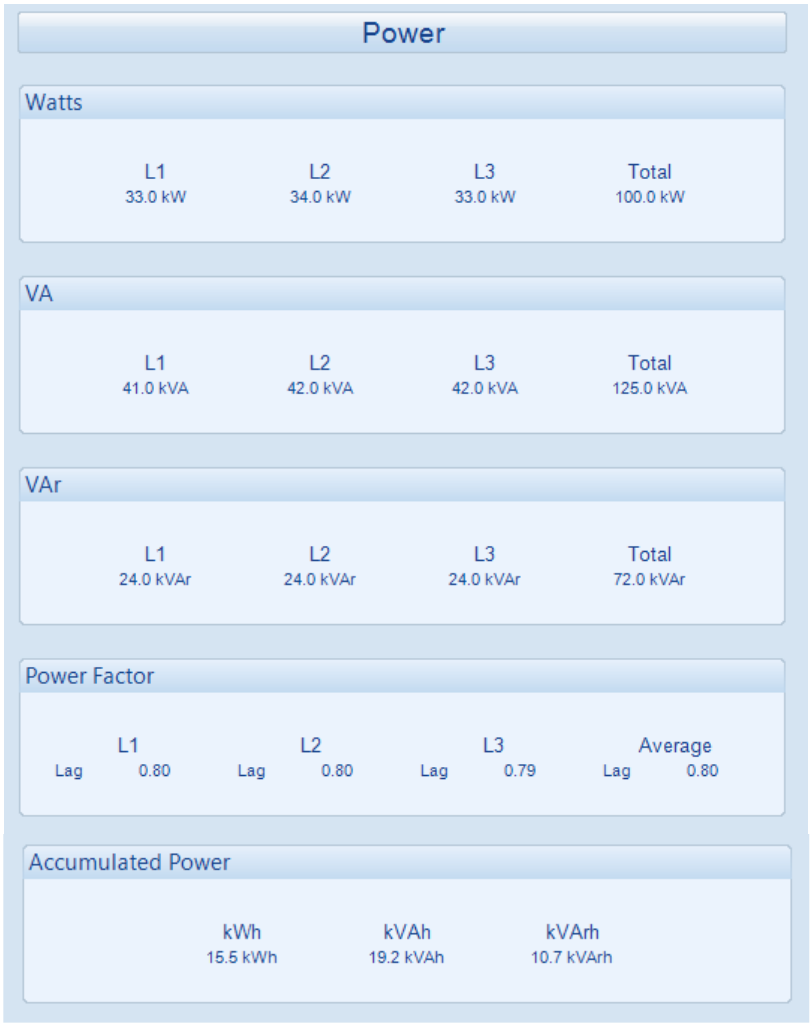


3.6.1 FREQUENCY, VOLTAGES AND CURRENT

Shows the modules measurements of the generator supply.

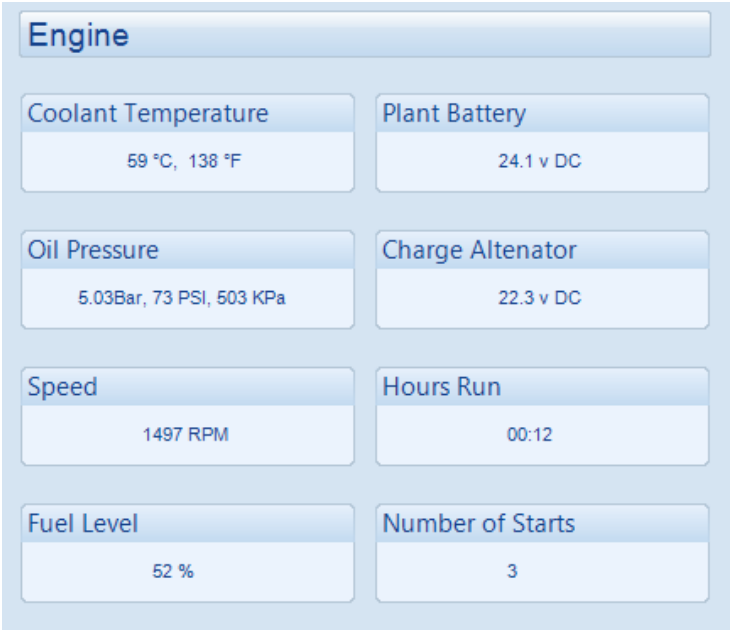


3.6.2 POWER


Power
Watts
L1
33.0 kW
L2
34.0 kW
L3
33.0 kW
Total
100.0 kW
VA
L1
41.0 kVA
L2
42.0 kVA
L3
42.0 kVA
Total
125.0 kVA
VAr
L1
24.0 kVAr
L2
24.0 kVAr
L3
24.0 kVAr
Total
72.0 kVAr
Power Factor
L1
Lag 0.80
L2
Lag 0.80
L3
Lag 0.79
Average
Lag 0.80
Accumulated Power
kWh
15.5 kWh
kVAh
19.2 kVAh
kVArh
10.7 kVArh

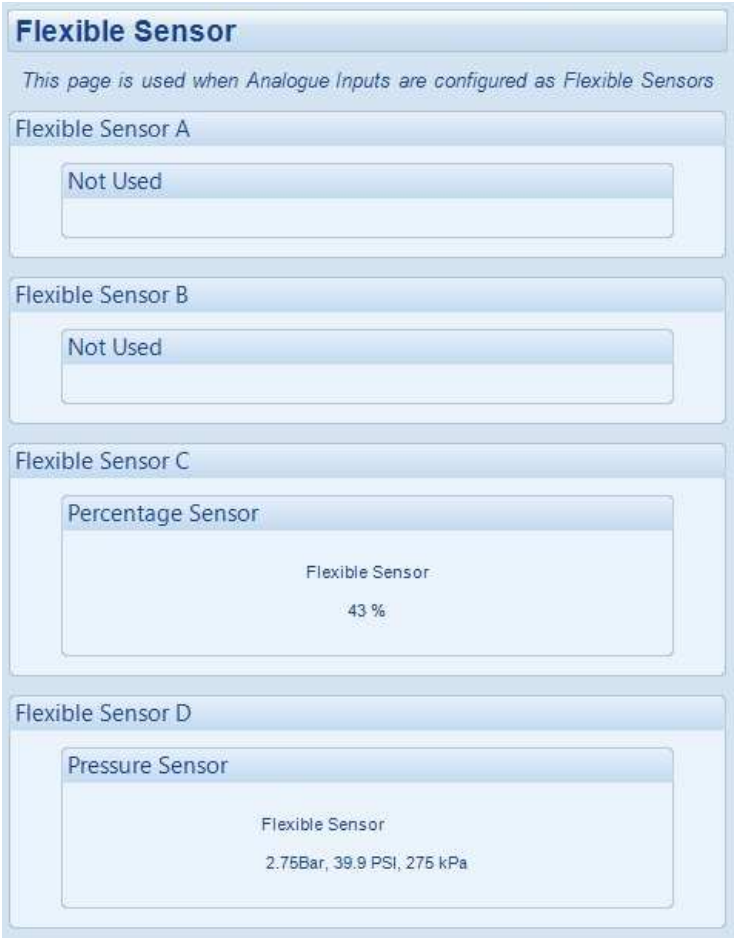
3.7 ENGINE

Shows the modules measurements of the engine parameters.



3.8 FLEXIBLE SENSOR

Shows the modules measurements of the flexible sensors parameters.

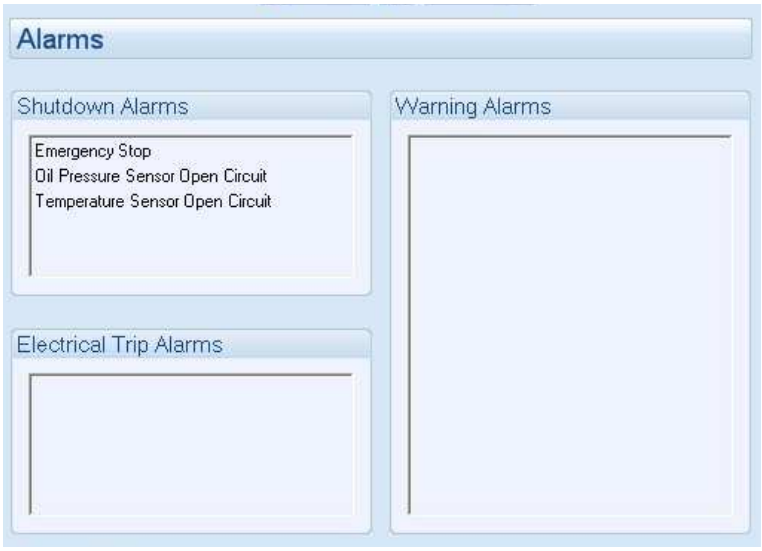


3.9 CONFIGURABLE CAN INSTRUMENTATION

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

3.10 ALARMS

Shows any present alarm conditions.

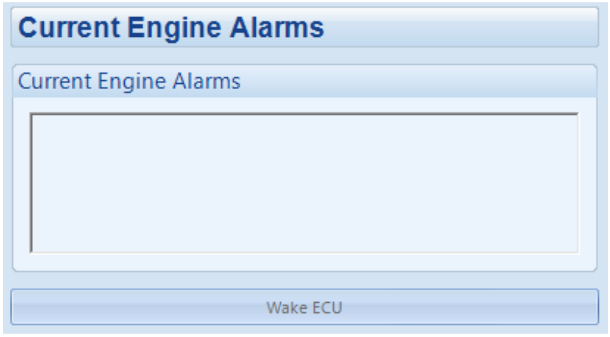


3.11 ENGINE ALARMS

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

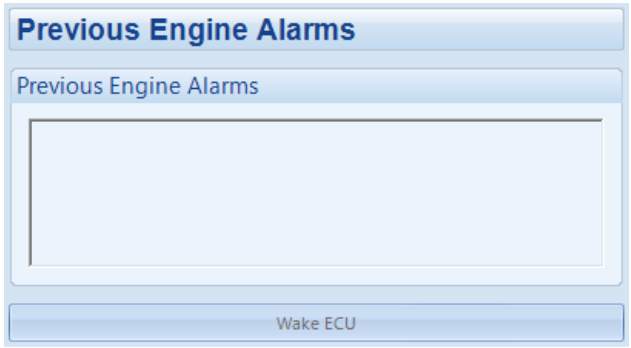
3.11.1 CURRENT ENGINE ALARMS

Shows the current engine alarms.



3.11.2 PREVIOUS ENGINE ALARMS

Shows the previous engine alarms.

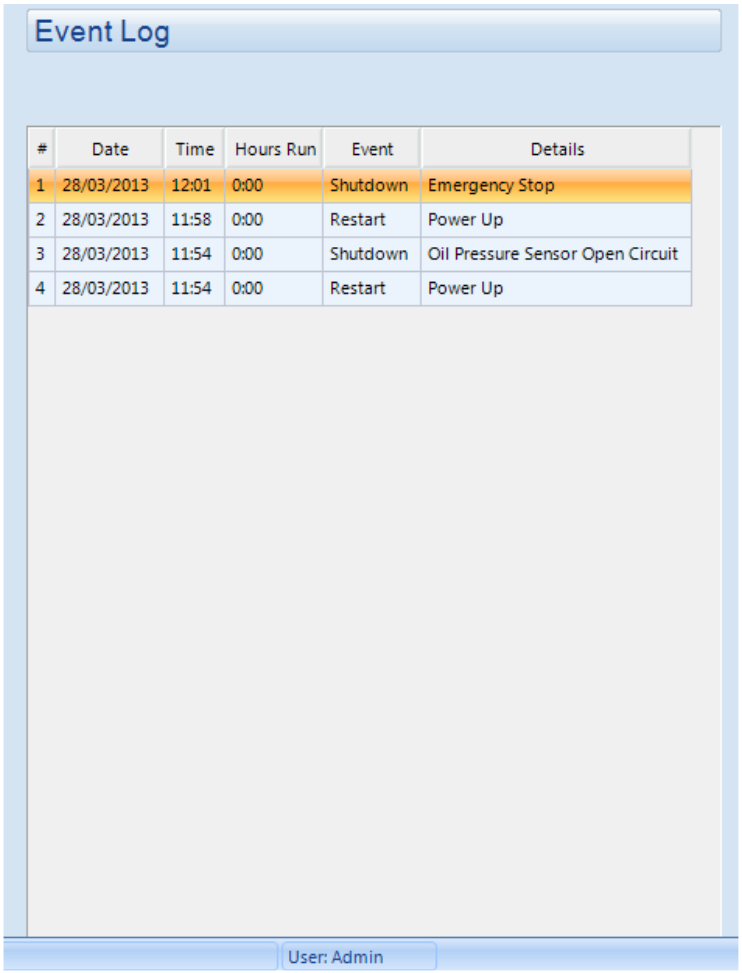


3.12 STATUS

Shows the module's current status.

3.13 EVENT LOG

Shows the contents of the module's event log.

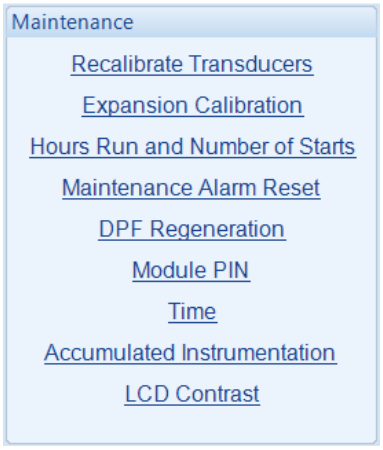


3.14 ENHANCED CANBUS

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

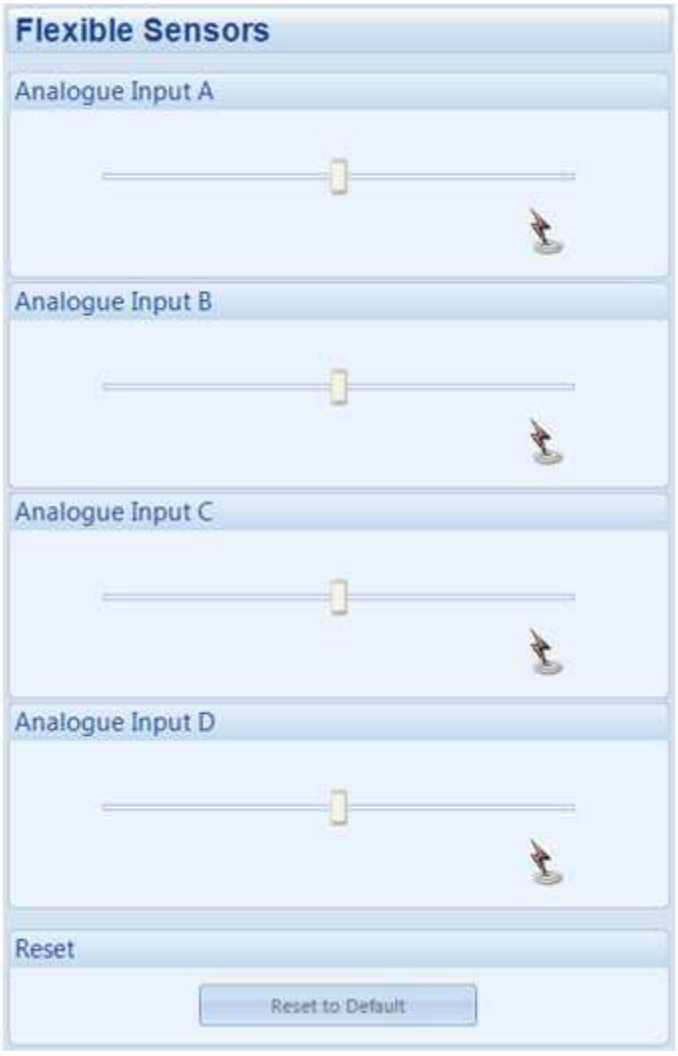
3.15 MAINTENANCE

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



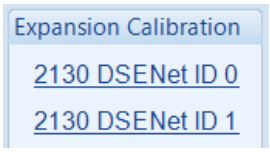
3.15.1 RECALIBRATE TRANSDUCERS

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



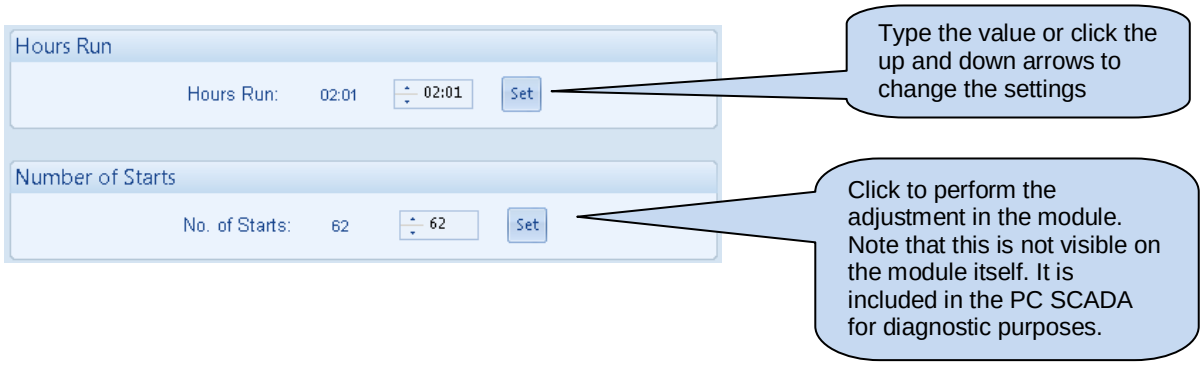
3.15.2 EXPANSION CALIBRATION

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



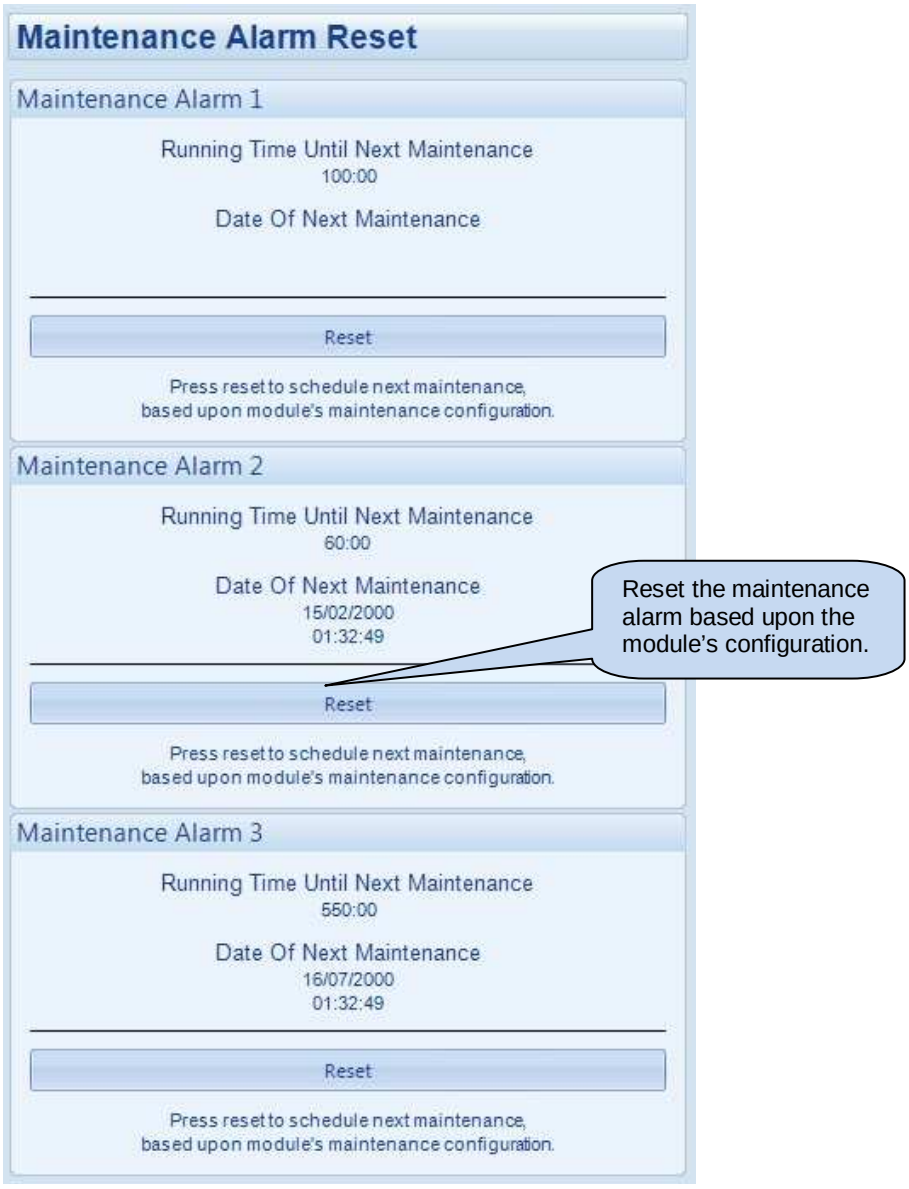
3.15.3 HOURS RUN AND NUMBER OF STARTS

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



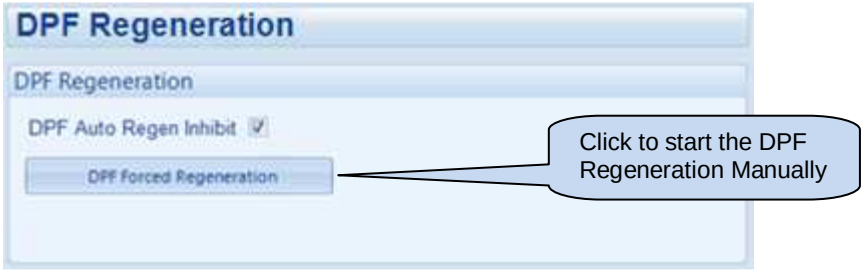
3.15.4 MAINTENANCE ALARM RESET

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



3.15.5 DPF REGENERATION

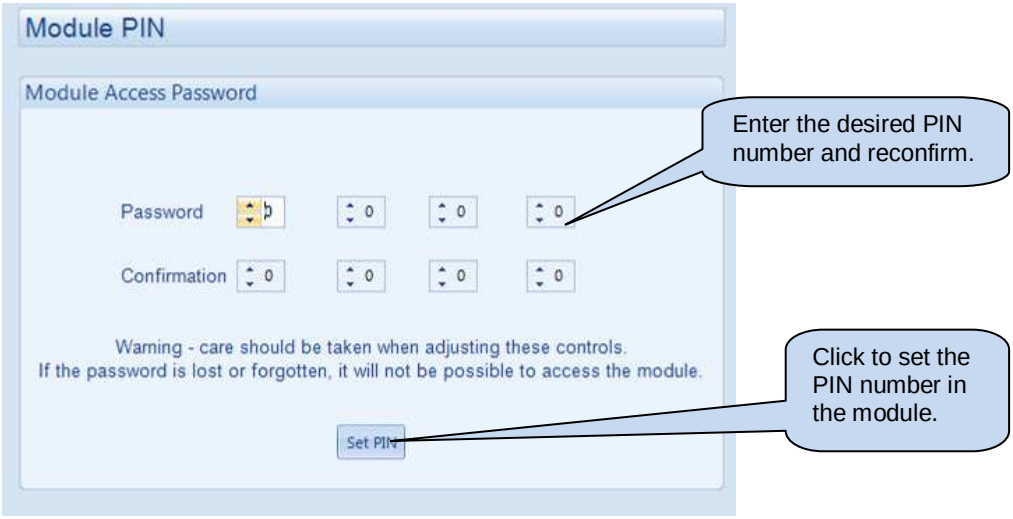
The DPF Forced Regeneration is controlled when the Electronic Engine supports the Non-mission DPF Regeneration.



3.15.6 MODULE PIN

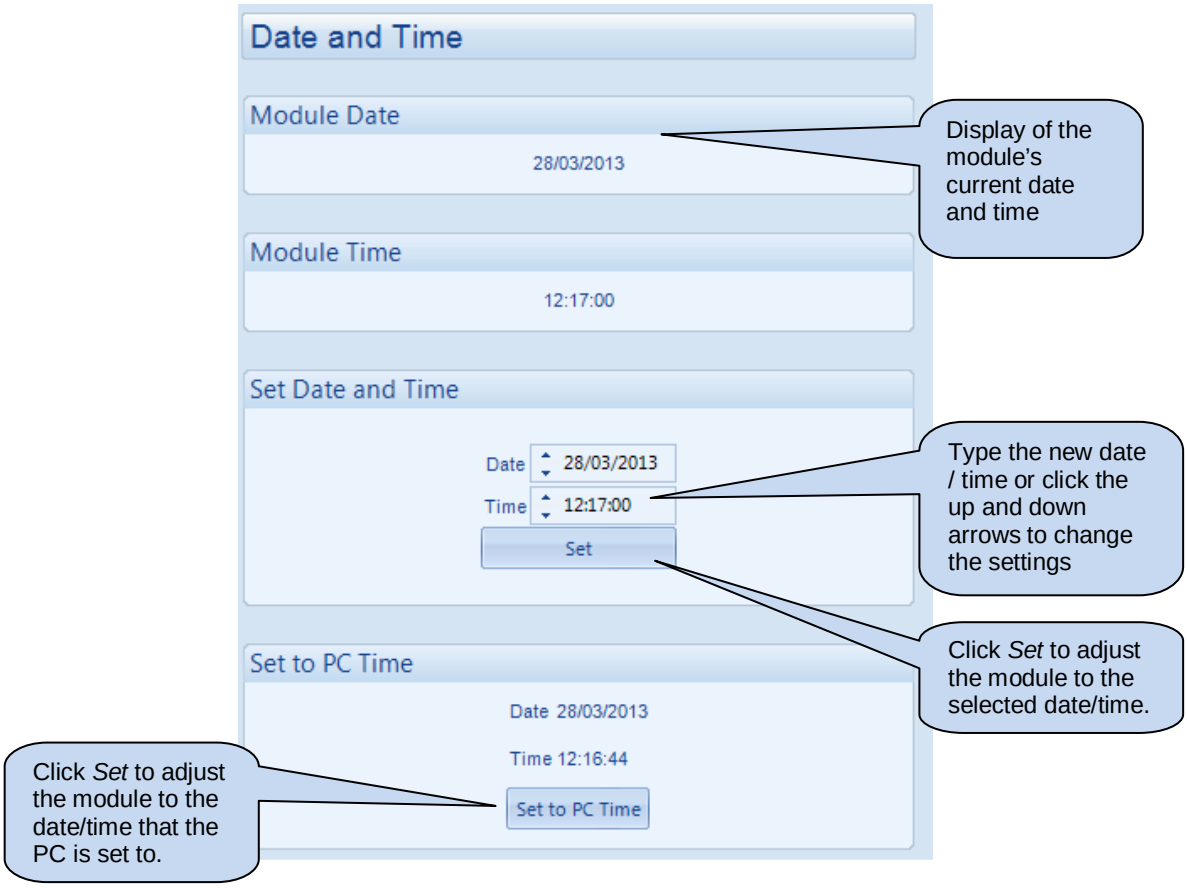
NOTE : If the PIN is lost or forgotten, it is no more possible to access the module!

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



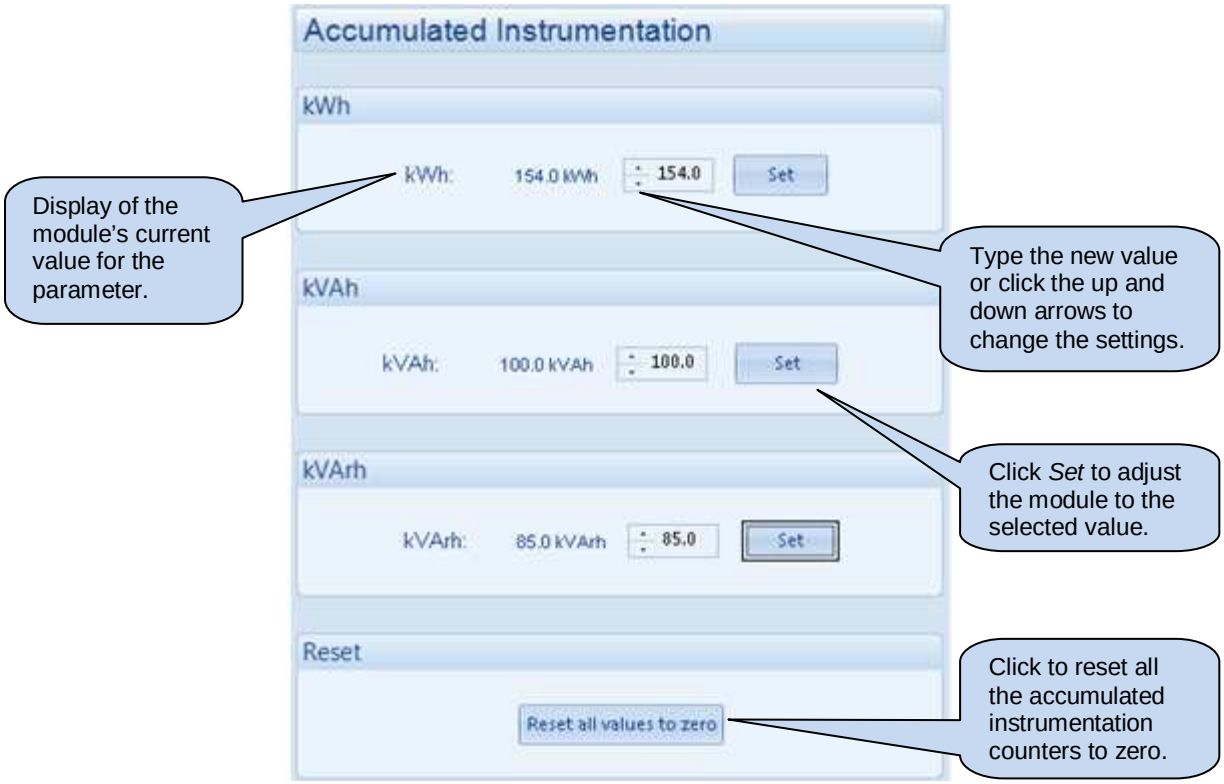
3.15.7 DATE AND TIME

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



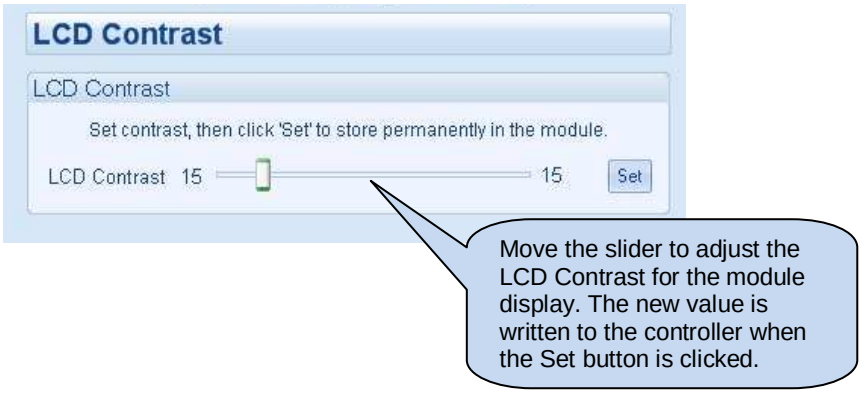
3.15.8 ACCUMULATED INSRUMENTATION

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



3.15.9 LCD CONTRAST

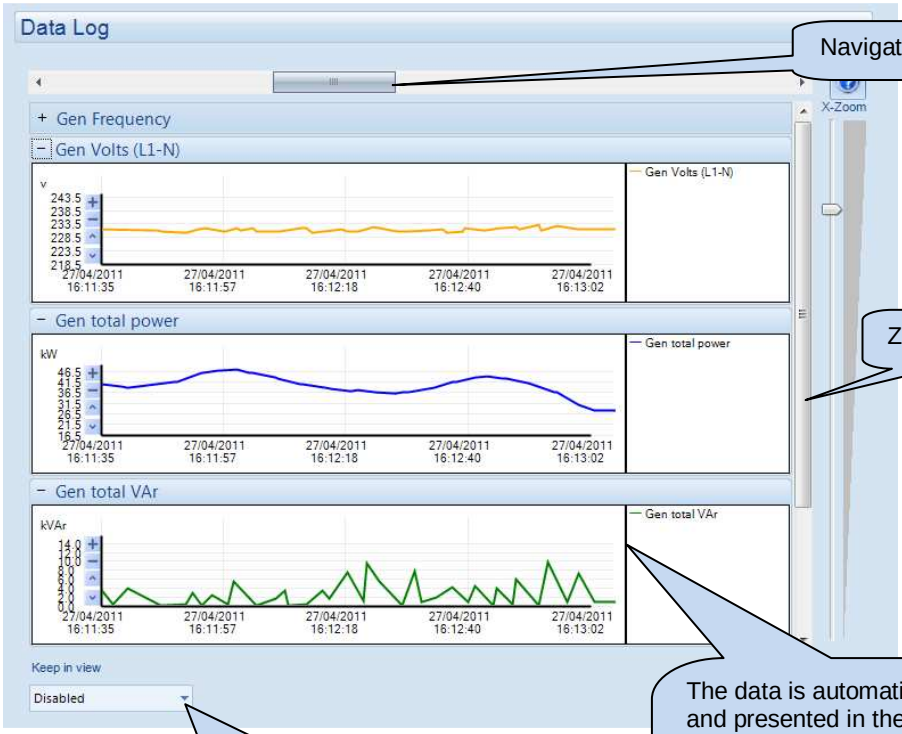
The LCD Contrast section allows the adjustment of the module's display contrast level. This is useful when the contrast is configured through the Front Panel Editor and set to a level where the display is no longer visible.



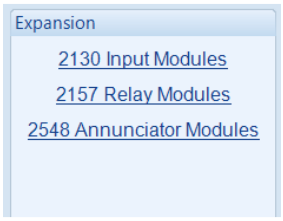
3.16 DATA LOG

Allows viewing of the module datalog (if configured).

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



3.17 EXPANSION



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

For example:

4 ALARM TYPES

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

Alarm type	Description
Indication	No audible alarm or common warning signal occurs. *Indication* alarms are only used to illuminate indicators or to activate outputs.
Warning	Audible alarm and common alarm signal is generated. The set continues to run. *Warning alarms* are used to draw the operator's attention to a minor issue or to a problem that may escalate to an Electrical Trip or Shutdown Alarm if left untreated.
Electrical Trip	Audible alarm and common alarm signal is generated. The set is taken off load and the cooling timer begins, after which the set is stopped. *Electrical Trip alarms* are series issues that require the set to be taken off load. As the name implies, this is often electrical faults that occur 'after' the load 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.

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