DEEP SEA ELECTRONICS

DSEE800 Configuration Suite
PC Software Manual

Document Number: 057-203

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DSEE800 Configuration Suite PC Software Manual

Amendments Since Last Publication

Issue No.	Comments
1	Initial release
2	Updated for V1.2.12, and Tier IV engine DPF Regeneration
3	Updated for V2.0.1.0
4	Rebranded to DSE Control
5	Updated for V3.0 added Tier VII engine control new parameters.
6	Updated for v3.1 PID added
7	Updated for v3.2. Manual layout updated to latest version
8	Updated to v3.5 Manual layout updated to latest version

Typeface: The typeface used in this document is *Arial*. Care should be taken not to mistake the upper-case letter I with the numeral 1. The numeral 1 has a top serif to avoid this confusion.

TABLE OF CONTENTS

SECTION PAGE

1 INTRODUCTION

This document details the use of the *DSE Configuration Suite PC Software* with the DSEE800 module, which is part of the DSEControl® range of products.

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

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

The *DSE Configuration Suite PC Software* allows the DSEE800 module to be connected to a PC via USB A to USB B cable (USB printer cable). Once connected, the software allows easy, controlled access to various operating parameters within the module which can then be viewed and edited as required.

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

The information contained in this manual must be read in conjunction with the information contained in the appropriate module documentation. This manual only details which settings are available and how they may be used. Separate manuals deal with the operation of the individual module and its ancillaries, refer to section entitled *Bibliography* elsewhere in this document for further information.

1.1 CLARIFICATION OF NOTATION

Clarification of notation used within this publication.

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

1.2 GLOSSARY OF TERMS

Term	Description
DSEE800	All modules in the DSEE800
CAN	Controller Area Network Vehicle standard to allow digital devices to communicate to one another.
CDMA	Code Division Multiple Access. Cell phone access used in small number of areas including parts of the USA and Australia.
BMS	Building Management System A digital/computer based control system for a building's infrastructure.
DEF	Diesel Exhaust Fluid (AdBlue) A liquid used as a consumable in the SCR process to lower nitric oxide and nitrogen dioxide concentration in engine exhaust emissions.
DM1	Diagnostic Message 1 A DTC that is currently active on the engine ECU.
DM2	Diagnostic Message 2 A DTC that was previously active on the engine ECU and has been stored in the ECU's internal memory.
DPF	Diesel Particulate Filter A filter fitted to the exhaust of an engine to remove diesel particulate matter or soot from the exhaust gas.
DPTC	Diesel Particulate Temperature Controlled Filter A filter fitted to the exhaust of an engine to remove diesel particulate matter or soot from the exhaust gas which is temperature controlled.
DTC	Diagnostic Trouble Code The name for the entire fault code sent by an engine ECU.
ECU/ECM	Engine Control Unit/Management An electronic device that monitors engine parameters and regulates the fuelling.
FMI	Failure Mode Indicator A part of DTC that indicates the type of failure, e.g. high, low, open circuit etc.
Fuel Tank Bund	An external tank used to collect fuel that may leak or overflow from the fuel tank. This tank may also be integral to the main fuel tank. A level switch is usually located within the Bund to indicate the presence of the leak or overflow condition. May be called Retention Tank in some locales.
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.

Term	Description
HMI	Human Machine Interface A device that provides a control and visualisation interface between a human and a process or machine.
IEEE	Institute of Electrical and Electronics Engineers
LED	Light Emitting Diode
OC	Occurrence Count A part of DTC that indicates the number of times that failure has occurred.
PGN	Parameter Group Number A CANbus address for a set of parameters that relate to the same topic and share the same transmission rate.
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.
SIM	Subscriber Identity Module. The small card supplied by the GSM/CDMA provider that is inserted into the cell phone, GSM modem or DSEGateway device to give GSM/GPRS connection.
SMS	Short Message Service The text messaging service of mobile/cell phones.
SPN	Suspect Parameter Number A part of DTC that indicates what the failure is, e.g. oil pressure, coolant temperature, turbo pressure etc.

1.3 BIBLIOGRAPHY

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

1.3.1 INSTALLATION INSTRUCTIONS

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

DSE Part	Description
053-090	DSEE800 Installation Instructions Sheet
053-033	DSE2130 Input Expansion Installation Instructions
053-125	DSE2131 Ratio-metric Input Expansion Installation Instructions
053-126	DSE2133 RTD/Thermocouple Input Expansion Installation Instructions
053-134	DSE2152 Ratio-metric Output Expansion Installation Instructions
053-034	DSE2157 Output Expansion Installation Instructions
053-032	DSE2548 LED Expansion Annunciator Installation Instructions

1.3.2 MANUALS

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

DSE Part	Description
057-151	DSE Configuration Suite PC Software Installation & Operation Manual
057-202	DSEE800 Operator Manual
N/A	DSEGencomm (MODBUS protocol for DSE controllers)
057-004	Electronic Engines and DSE Wiring Guide
057-082	DSE2130 Input Expansion Operator Manual
057-083	DSE2157 Output Expansion Operator Manual
057-084	DSE2548 Annunciator Expansion Operator Manual
057-139	DSE2131 Ratio-metric Input Expansion Manual
057-140	DSE2133 RTD/Thermocouple Expansion Manual
057-141	DSE2152 Ratio-metric Output Expansion Manual
057-175	PLC Programming Guide For DSE Controllers

1.3.3 TRAINING GUIDES

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

DSE Part	Description
056-006	Introduction to Comms
056-023	Adding New CAN Files
056-024	GSM Modem
056-029	Smoke Limiting
056-030	Module PIN Codes
056-036	DSE Module Expansion
056-051	Sending DSEGencomm Control Keys
056-053	Recommended Modems
056-069	Firmware Update
056-075	Adding Language Files
056-076	Reading DSEGencomm Alarms
056-079	Reading DSEGencomm Status
056-080	MODBUS
056-092	Best Practices for Wiring Restive Sensors
056-095	Remote Start Input Functions
056-097	USB Earth Loops and Isolation

1.3.4 THIRD PARTY DOCUMENTS

The following third party documents are also referred to:

Reference	Description
ISBN 1-55937-879-4	IEEE Std C37.2-1996 IEEE Standard Electrical Power System Device Function Numbers and Contact Designations. Institute of Electrical and Electronics Engineers Inc
ISBN 0-7506-1147-2	Diesel engine handbook. L.L.J. Mahon

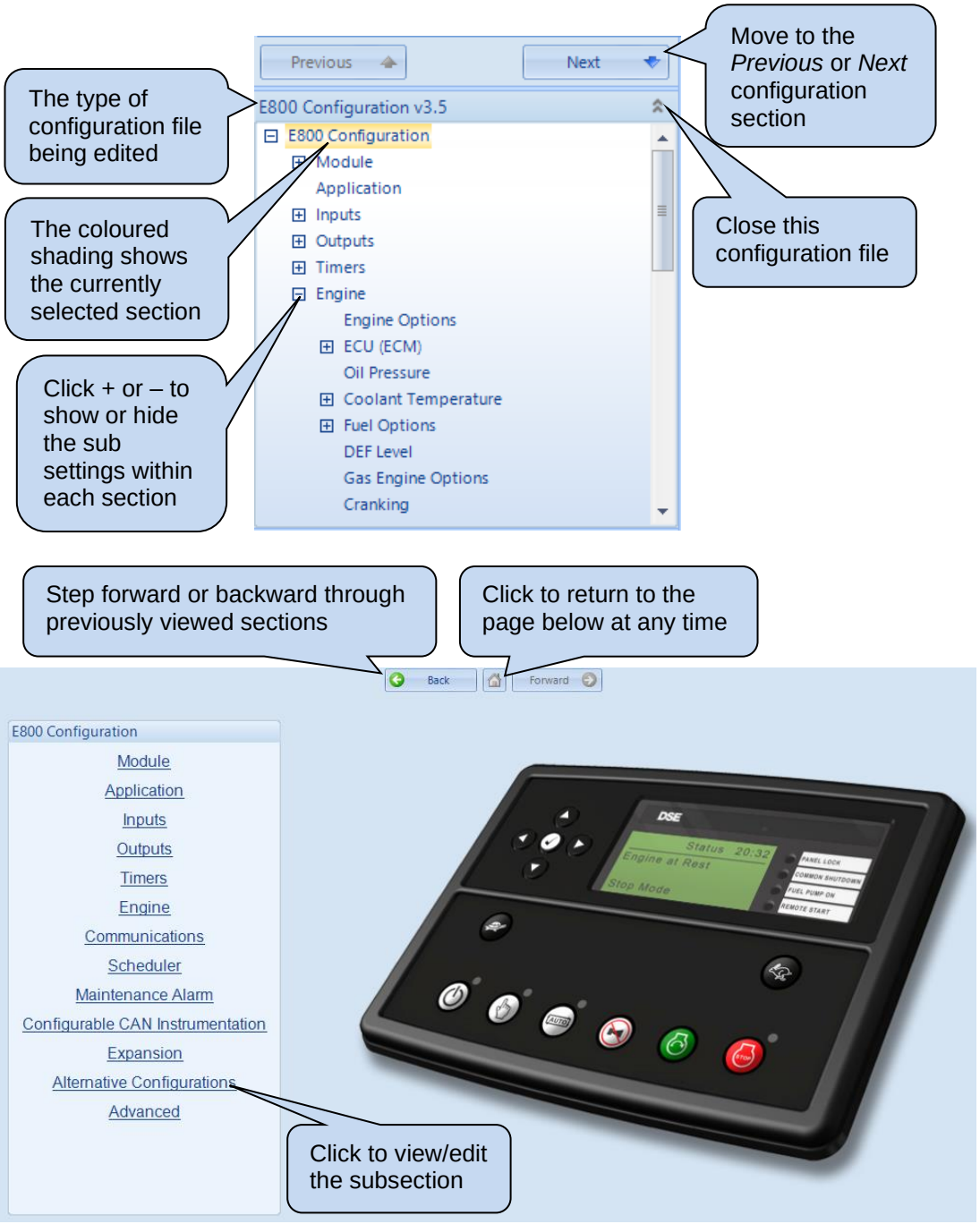
1.4 INSTALLATION AND USING THE DSE CONFIGURATION SUITE SOFTWARE

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

2 EDIT CONFIGURATION

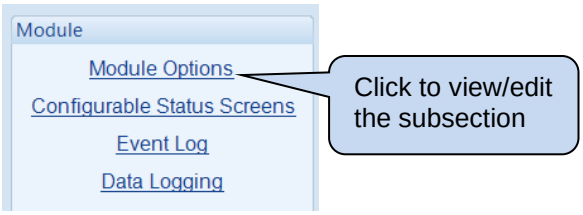
This menu allows module configuration to change the function of Inputs, Outputs, LED's, system timers and protection settings to suit a particular application.

2.1 SCREEN LAYOUT



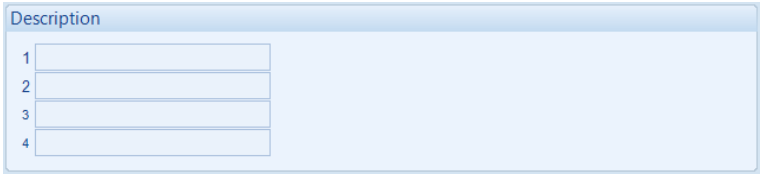
2.2 MODULE

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



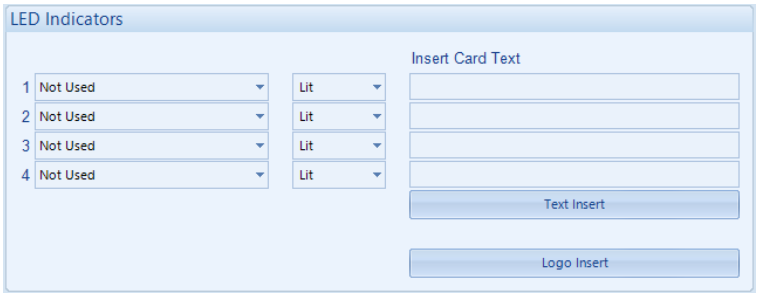
2.2.1 MODULE OPTIONS

Description



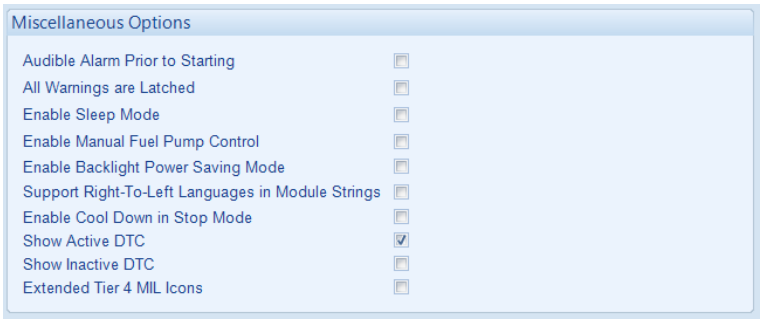
Parameter	Description
Description	Four free entry boxes to allow the user to give the configuration file a description. Typically used to enter the job number, customer name, engine information etc. This text is not shown on the module's display and is only seen in the configuration file.

LED Indicators



Parameter	Description
Function	Allows the user to assign an output source to an LED indicator which are to the right of the module's LCD. For details of possible selections, see section entitled *Output Sources* elsewhere in this document.
Polarity	***Lit:*** When the output source is true, the LCD indicator activates. ***Unlit:*** When the output source is true, the LCD indicator de-activates.
Insert Card Text	Enter custom text to print on the text insert for the LEDs.
Text Insert	Allows the user to print the custom text insert cards for the LEDs.
Logo Insert	Allow the user to choose and print an image for the logo insert above the LCD.

Miscellaneous Options



Parameter	Description
Audible Alarm Prior to Starting	☐ = The *Audible Alarm Prior to Starting* is disabled. ☑ = The *Audible Alarm Prior to Starting* is enabled. The module gives an audible warning during the *Pre-Heat Timer* to indicate the engine is about to start.
All Warnings Are Latched	☐ = The *All Warnings Are Latched* is disabled. The module automatically resets the warning and pre-alarms once the triggering condition has been cleared. ☑ = The *All Warnings Are Latched* is enabled. The module does not automatically reset the warning and pre-alarms. Resetting the alarm is performed by either activating a digital input configured for *Alarm Reset* or, pressing the ***Stop/Reset Mode*** button once the triggering condition has been cleared.
Enable Sleep Mode	☐ = The *Sleep Mode* is disabled. ☑ = The *Sleep Mode* is enabled. The module goes into a low current mode when it is left in the ***Stop/Reset Mode*** for the duration of the *Sleep Timer if* the communication ports or data logging facility are not active. During the *Sleep Mode* the module effectively powers down and its display turns off. Press any button on the module's facia to take it out of *Sleep Mode.*
Enable Manual Fuel Pump Control	**CAUTION! It is possible to overfill the fuel tank when using the Manual Fuel Pump Control feature. Care must be taken to ensure the correct volume of fuel is transferred.** **NOTE: Manual Fuel Pump Control is only available when a fuel level sensor is configured.** ☐ = The *Manual Fuel Pump Control* is disabled. ☑ = The *Manual Fuel Pump Control* is enabled. To manually control the fuel pump, press the ***Tick*** button when viewing the *Fuel Level* instrument on the module's display.
Enable Backlight Power Saving Mode	☐ = Disables DC power saving ☑ = Enables DC power saving by turning off the LCD Backlight when the module is not operated for the duration of the Backlight Timer.

Continued overleaf…

Setting	Description
Support Right-To-Left Languages in Module Strings	☐ = The *Support Right-To-Left Languages in Module Strings* is disabled. The module displays user configured strings in the order left to right. ☑ = The *Support Right-To-Left Languages in Module Strings* is enabled. The module displays user configured strings in the order right to left.
Enable Cool Down in Stop Mode	☐ = Pressing the stop button instantly disengages the clutch and stop the engine. ☑ = Pressing the stop button instantly disengages the clutch and put the engine into a cooling run. Pressing the stop button again instantly stops the engine.
Show Active DTC	⚠ **NOTE: Show Active DTC is only available when the module is configured to communicate to an engine's ECU/ECM over CANbus.** ☐ = The *Show Active DTC* is disabled. The module does not display DM1 fault codes that are active on the engine ECU/ECM. ☑ = The *Show Active DTC* is enabled. The module displays DM1 fault codes that are active on the engine ECU/ECM.
Show Inactive DTC	☐ = The module does not show inactive ECU / ECM fault codes. ☑ = The module shows the in-active ECU (ECM) DTC on its 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).
Extended Tier 4 Mil Icons	☐ = The module does not show EPA icons ☑ = The module displays EPA icons for the Amber and Red ECU lamps when active.

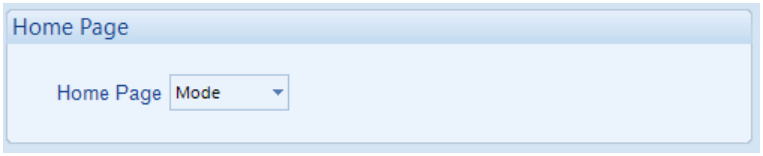
Start Up Image

Parameter	Description
Show at Start Up	☐ = Start Up screen is disabled ☑ = Enable a *Start Up Text* or *Image* to be displayed on the module's LCD at power up.
Use for Screensaver	☐ = Screensaver is disabled ☑ = Module activates the Screensaver to show the selected image after inactivity in any mode for the configured *Delay* time. Press any button to 'end' the Screensaver.
Select Image	Browse and select the image file to display at power up. The file required must be a monochrome bitmap image of size 132 pixels in width by 64 pixels in height.
Clear	Clears the image file selection
Duration	Set the duration for which the *Start Up Image* is displayed at power up

2.2.2 CONFIGURABLE STATUS SCREENS

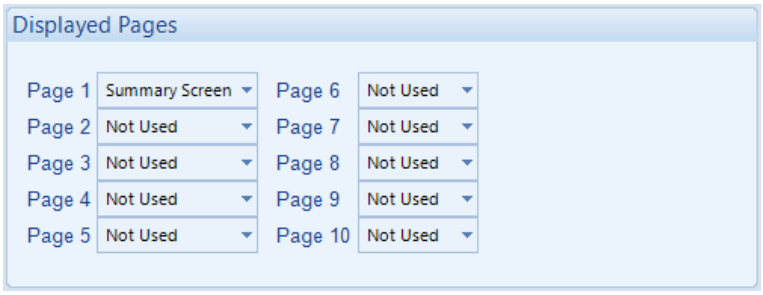
Configurable Status Screens allow the operator to design the default screen to match the requirements of the application.

Home Page



Parameter	Description
Home Page	***Mode:*** When no navigation buttons are pressed for the duration of the *Page* Timer, the module's display reverts to show the control mode state. ***Instrumentation:*** When no navigation buttons are pressed for the duration of the *Page* Timer, the module's display scrolls through the *Displayed Pages,* the mode page is not displayed automatically but can still be accessed by manually pressing the navigation buttons.

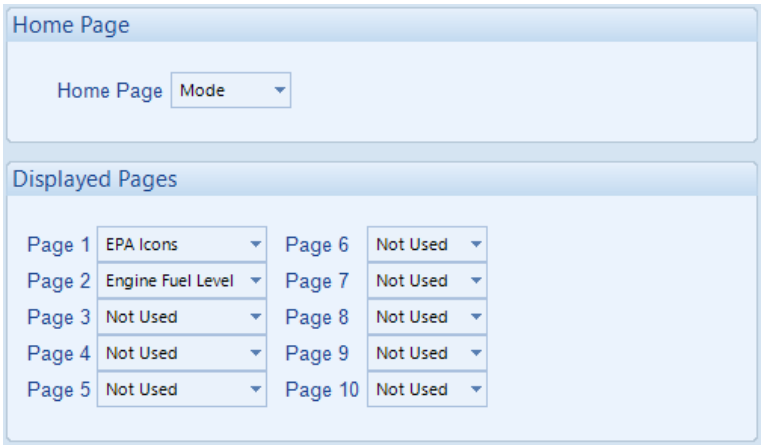
Displayed Pages



Parameter	Description
Page 1 to 10	Select the instrumentation parameter that is to be displayed for the specific *Configurable Status Screen.*

Example

In the example below, the *Home Page* is configured to *Instrumentation* so will scroll through the *Configurable Status Screens*. Depending on the application, the system designer selects the instrumentation parameters that are most important to constantly show on the module.



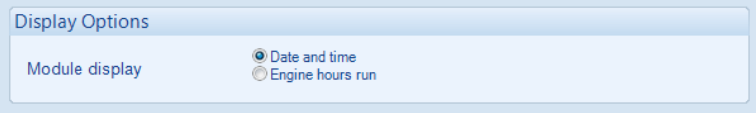
Multi Instrument

Parameter	Description
Multi Instrument 1 & 2	When these pages are selected in the Displayed Pages option, they allow the configuration of four parameters to occupy the four corners of each page.
Multi Instrument 1 & 2	When these pages are selected in the Displayed Pages option, they allow the configuration of four parameters to occupy the four corners of each page.

2.2.3 EVENT LOG

Display Options

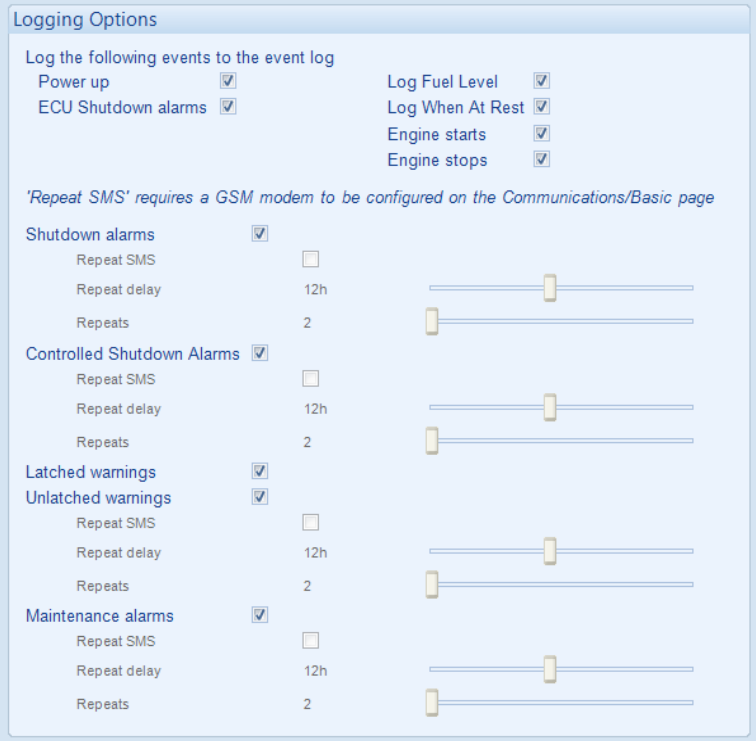
The module display option allows the operator to choose whether *Date and Time* or *Engine Hours* are displayed at the bottom of the *Event Log* pages.



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

Logging Options

The event log can be configured to allow users to select which events are recorded.



Parameter	Description
Power-Up	☐ **=** *Power-Up* events are not logged. ☑ **=** *Power-Up* events are logged when the DC Supply is applied to the module.

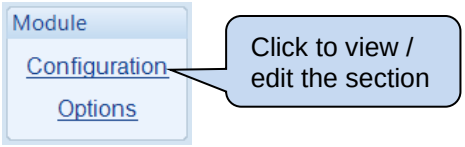
Parameter descriptions are continued overleaf…

NOTE: Sending events by SMS is only available when the module is configured to communicate to a supported modem by RS232. Refer to section entitled *RS232 Port* elsewhere in this document for further details.

Parameter	Description
ECU Shutdown Alarms	**NOTE: ECU Alarms are only available when the module is configured to communicate to an engine's ECU/ECM over CANbus.** ☐ = *ECU/ECM Shutdown Alarms* are not logged. ☑ = *ECU/ECM Shutdown Alarms* are logged when generated by the engine ECU/ECM.
Fuel Level	☐ = *Fuel Monitoring* events are not logged when the engine running. Fuel level alarms are still logged if the appropriate alarm category is logged. ☑ = *Fuel Monitoring* events are logged when the engine is running.
Fuel Level When at Rest	☐ = *Fuel Monitoring* events are not logged when the engine is at rest. Fuel level alarms are still logged if the appropriate alarm category is logged. ☑ = *Fuel Monitoring* events are logged when the engine is at rest.
Engine Starts	☐ = *Engine Start* events are not logged. ☑ = *Engine Start* events are logged when the engine successfully crank disconnects.
Engine Stops	☐ = *Engine Stop* events are not logged. ☑ = *Engine Stop* events are when the *Stopping Timer* ceases.
Shutdown Alarms	☐ = *Shutdown Alarms* are not logged. ☑ = *Shutdown Alarms* are logged when the moment they activate.
Shutdown Alarms Repeat SMS	☐ = *Shutdown Alarms* are only sent once via an SMS message. ☑ = *Shutdown Alarms* are sent via SMS repeatedly until the *Repeats* value has been met. The delay between the repeated SMS is set by the *Repeats Delay* value.
Controlled Shutdown Alarms	☐ = The *Controlled Shutdown Alarms* are not logged in the module's event log ☑ = Logs the Controlled Shutdown alarms
Controlled Shutdown Alarms Repeat SMS	☐ = *Controlled Shutdown Alarms* are only sent once via an SMS message. ☑ = *Controlled Shutdown Alarms* are sent via SMS repeatedly until the *Repeats* value has been met. The delay between the repeated SMS is set by the *Repeats Delay* value.
Latched Warnings	☐ = *Latched Warnings Alarms* are not logged. ☑ = *Latched Warnings Alarms* are logged when the moment they activate.
Unlatched Warnings	☐ = *Unlatched Warnings Alarms* are not logged. ☑ = *Unlatched Warnings Alarms* are logged when the moment they activate.
Unlatched Warnings Alarms Repeat SMS	☐ = *Unlatched Warnings Alarms* are only sent once via an SMS message. ☑ = *Unlatched Warnings Alarms* are sent via SMS repeatedly until the *Repeats* value has been met. The delay between the repeated SMS is set by the *Repeats Delay* value.
Maintenance Alarms	☐ = *Maintenance Alarms* are not logged. ☑ = *Maintenance Alarms* are logged when the moment they activate.
Maintenance Alarms Repeat SMS	☐ = *Maintenance Alarms* are only sent once via an SMS message. ☑ = *Maintenance Alarms* are sent via SMS repeatedly until the *Repeats* value has been met. The delay between the repeated SMS is set by the *Repeats Delay* value.

2.2.4 DATA LOGGING

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



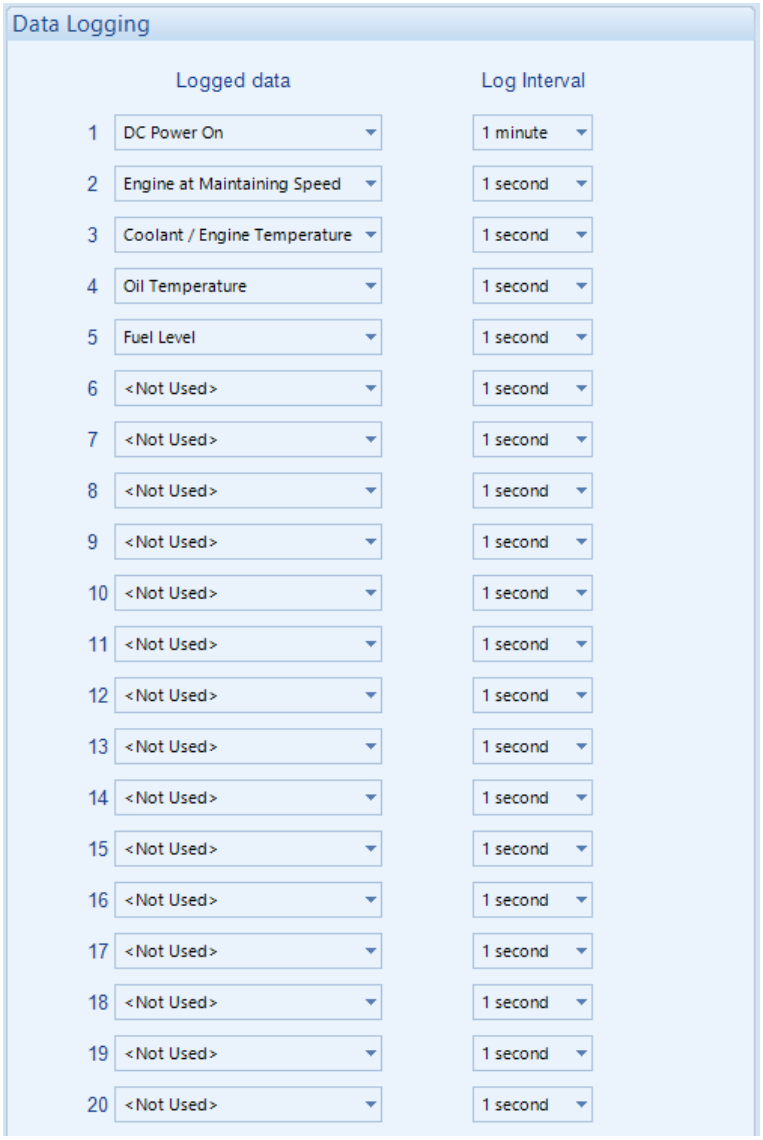
The module has the ability to record up to twenty parameters and is saved as a *Data Log File* to the module's internal memory or an external USB storage device. If 20 parameters were configured to be logged, each with a *Log Interval* of 1 second, the length of each *Data Log File* would be 11 hours and 19 minutes. This time is extendable as the length of each *Data Log File* varies upon the number of selected parameters and their configured *Log Interval*.

The module has the ability to store only one *Data Log File* to its internal memory. The number of *Data Log Files* increases when an external USB storage device is connected to the module's USB Host port. The increased number of *Data Log Files* is dependent upon the size of the USB storage device connected. When using the maximum size USB storage device of 16 GB, the number of *Data Log Files* is increased to 500. This results in a total *Data Log* length of 33 weeks, 4 days, and 20 minutes (assuming 20 parameters were configured to be logged, each with a *Log Interval* of 1 second).

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

2.2.4.1 CONFIGURATION

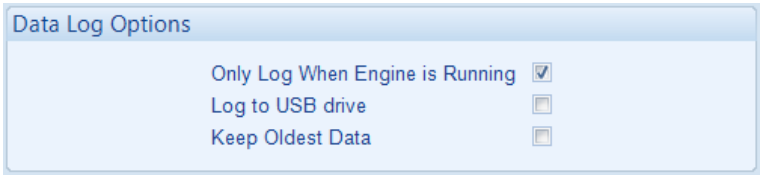
Data Logging



Parameter	Description
Logged Data	Select the instrument required to be logged
Log Interval	Select the logging interval of the data

2.2.4.2 OPTIONS

Data Log Options

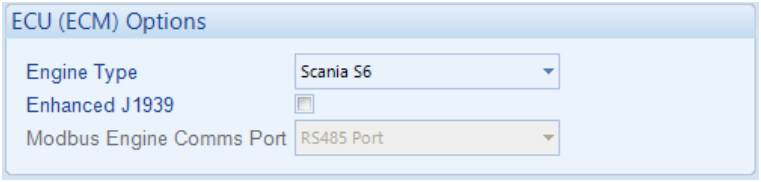


Parameter	Description
Only Log When Engine is Running	☐ = The module logs data regardless of engine running state. ☑ = The module only logs data when the engine is running.
Log to USB Drive	☐ = The module logs data to the module's internal memory. ☑ = The module logs data to an external USB memory device connect to the USB host socket on the module.
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.

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 can be found on our website: *www.deepseaelectronics.com*

ECU (ECM Options)



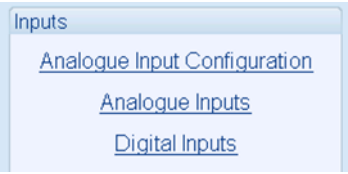
Parameter	Description
Engine Type	Select the appropriate engine type ***Conventional Diesel:*** Select this for a traditional (non-electronic) engine, either Energise to Run or Energise to Stop. ***Conventional Gas:*** Select this for a traditional (non-electronic) engine and require Gas engine functionality. This enables control of configurable outputs for *Gas Choke and Gas Ignition* and instructs the module to follow the gas engine timers. ***Other Engines:*** The list of supported CAN (or MODBUS) engines is constantly updated, check the DSE website at www.deepseaelectronics.com for the latest version of Configuration Suite software.
Enhanced J1939	☐ = The module reads and displays 'Basic' instrumentation from the ECU: • 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 reserves the right to change these lists in keeping with our policy of continual development.

Continued over leaf…

Parameter	Description
Modbus Engine Comms Port	***RS485 Port:*** The modules RS485 port is used to communicate to the engine when a Modbus engine type is selected. ***DSENet Port****:* The modules DSENet port is used to communicate to the ECU when a Modbus engine type is selected. This 'frees' the RS485 port in case connection to BMS or other RS485 compatible equipment is required.

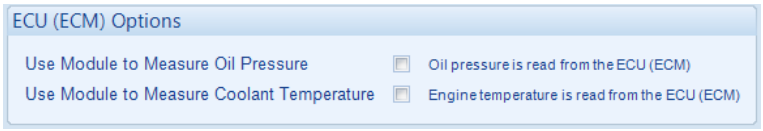
2.4 INPUTS

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



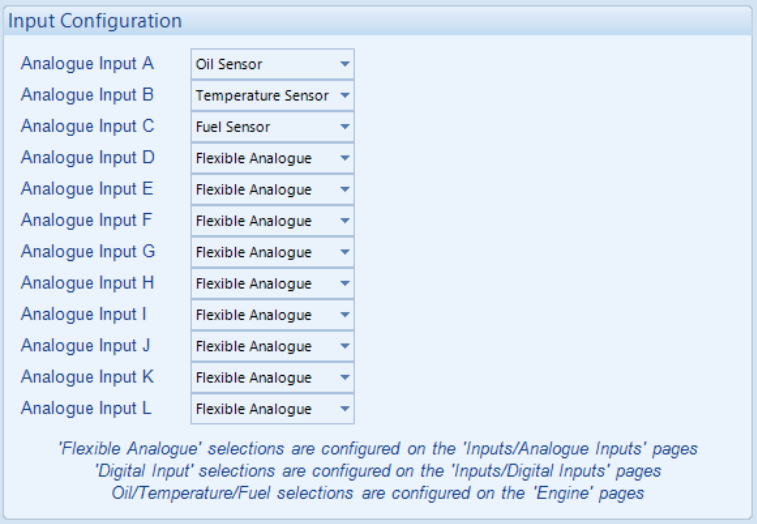
2.4.1 ANALOGUE INPUT CONFIGURATION

ECU (ECM Options)



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

Input Configuration



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

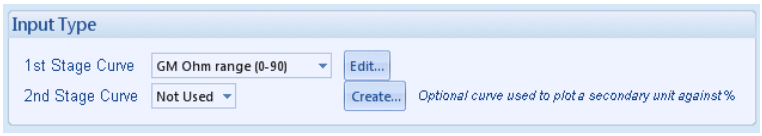
2.4.2 ANALOGUE INPUTS

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

Sensor Description

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

Input Type

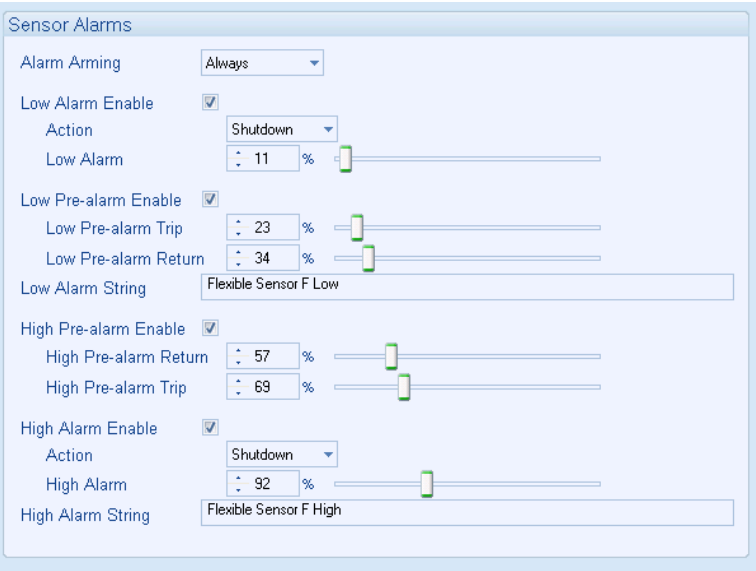


Parameter	Description
Sensor Name	Enter the *Sensor Name*, this text is shown on the module display when a sensor alarm activates
1st Stage Curve	Select the sensor type and curve from a pre-defined list or create a user-defined curve ***Current:*** for sensors with maximum range of 0 mA to 20 mA ***Resistive:*** for sensors with maximum range of 0 Ω to 480 Ω ***Voltage:*** for sensors with maximum range of 0 V to 10 V ***Pressure:*** The input is configured as a pressure sensor ***Percentage:*** The input is configured as a percentage sensor ***Temperature:*** The input is configured as a temperature sensor
2nd Stage Curve	Allows the creation of a second curve driven by the output of the *1st Stage Curve*. Choose a custom curve from the list or create a new curve. Useful when the required quantity for measurement is different from that of the installed sensor, such as using a pressure sensor on non-standard shape fuel tanks to measure the fuel level.

Sensor Fault Alarm

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

Sensor Alarms



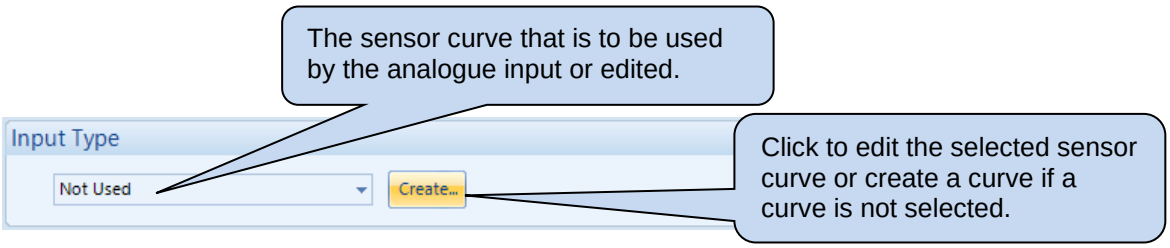
Parameter	Description
Alarm Arming	**NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the alarm generated by the analogue input becomes active: ***Always*** ***From Loading*** ***From Safety On*** ***From Starting*** ***Never*** ***Wait for ECU***
Low Alarm Enable	☐ = The Alarm is disabled. ☑ = The *Low Alarm* activates when the measured quantity drops below the *Low Alarm* setting.
Low Alarm Action	**NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required from the list: ***Controlled Shutdown*** ***Shutdown***
Low Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *Low Pre-Alarm* is active when the measured quantity drops below the *Low Pre-Alarm Trip* setting. The *Low Pre-Alarm* is automatically reset when the measured quantity rises above the configured *Low Pre-Alarm Return* level.
Low Alarm String	The text that is displayed on the module's LCD when the *Low Alarm* or *Low Pre-Alarm* activates.

Parameter descriptions are continued overleaf…

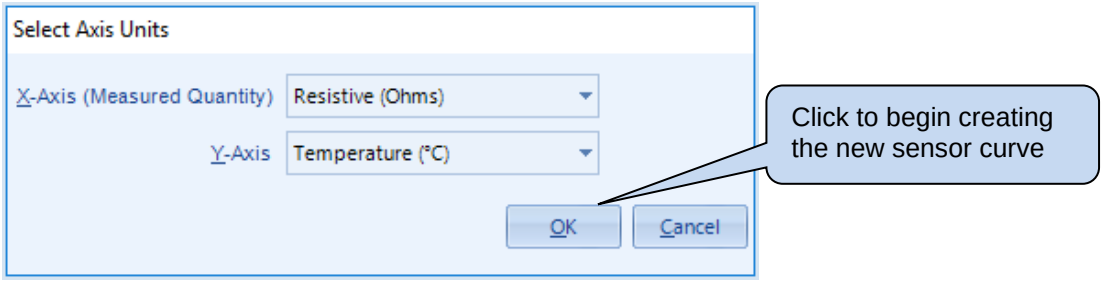
Parameter	Description
High Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *High Pre-Alarm* is active when the measured quantity rises above the *High Pre-Alarm Trip* setting. The *High Pre-Alarm* is automatically reset when the measured quantity falls below the configured *High Pre-Alarm Return* level.
High Alarm Enable	☐ = The Alarm is disabled. ☑ = The *High Alarm* is active when the measured quantity rises above the *High Alarm* setting.
High Alarm Action	**NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required from the list: ***Controlled Shutdown*** ***Shutdown***
High Alarm String	The text that is displayed on the module's LCD when the *High Alarm* or *High Pre-Alarm* activates.

2.4.2.1 CREATING / EDITING THE SENSOR CURVE

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

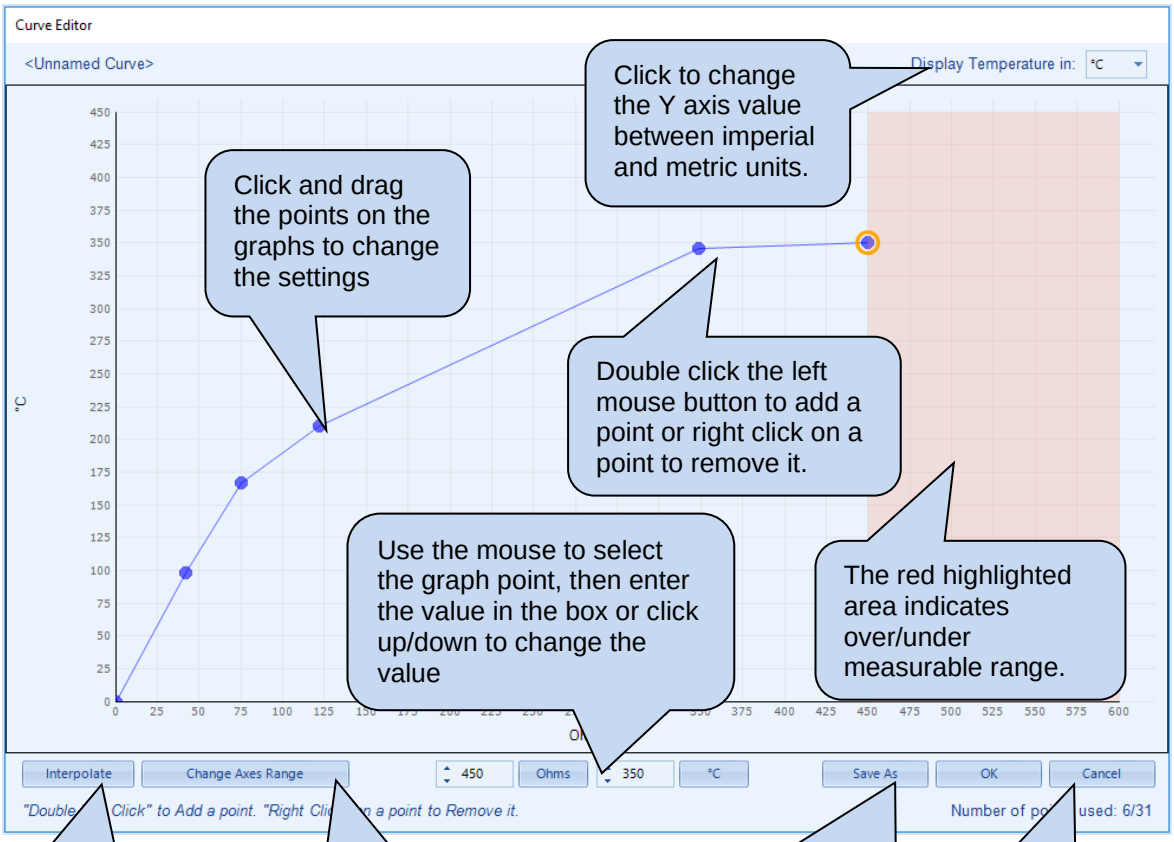


When creating a new sensor curve the measurement quantity and measured parameter are required.



Parameter	Description
X-Axis (Measured Quantity)	Select the electrical quantity that the sensor outputs. ***Current (mA):*** For sensors that output current within a range 0 mA to 20 mA ***Voltage (Volt):*** For sensors that output voltage within a range of 0 V to 10 V ***Resistive (Ohms):*** For sensors that output a resistance within a range 0 Ω to 480 Ω
Y-Axis	Select the parameter that is being monitored by the sensor. ***Temperature (ºC):*** For sensors that measure temperature. ***Pressure (Bar):*** For sensors that measure pressure. ***Percentage (%):*** For sensors that measure percentage.

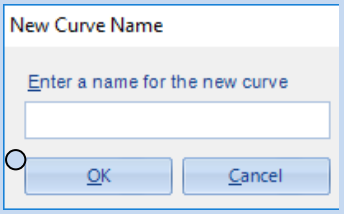
Sensor curve creation / editor descriptions are continued overleaf…



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

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

Click SAVE AS, a prompt to name the curve…



Click OK to save the curve.

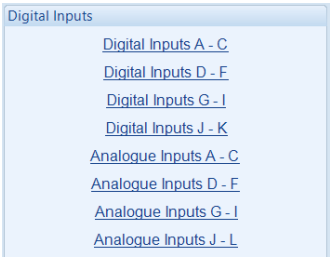
Any saved curves become selectable in the *Input Type* selection list.

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

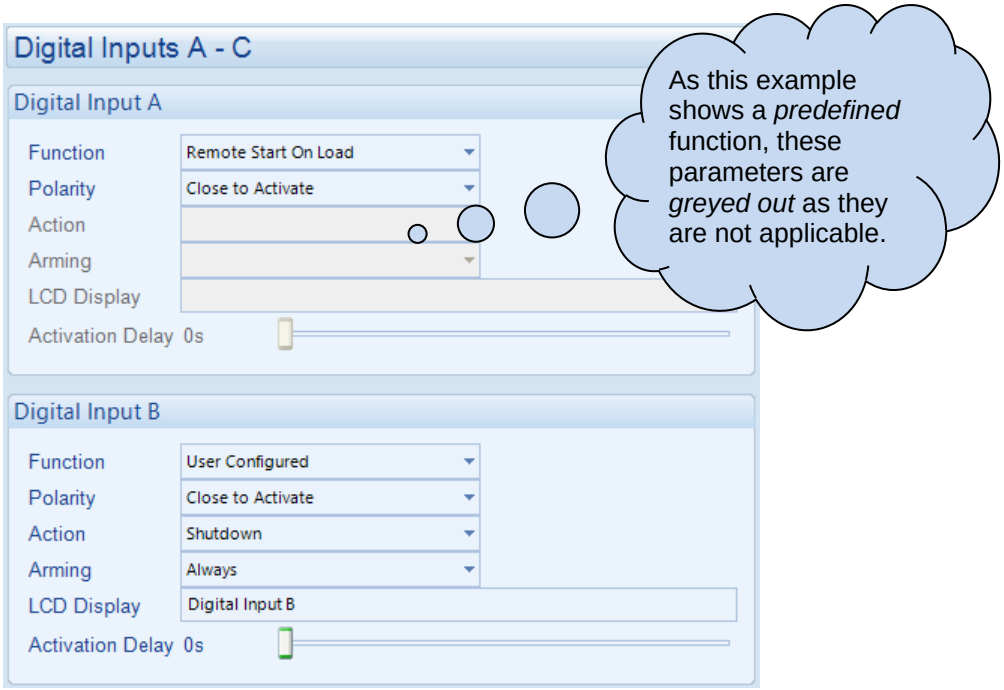
Hint: Deleting, renaming, or editing custom sensor curves that have been added is performed in the main menu, select *Tools* | *Curve Manager*.

2.4.3 DIGITAL INPUTS

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



2.4.3.1 DIGITAL INPUTS



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

Parameter descriptions are continued overleaf…

Parameter	Description
Arming	**NOTE: For details of these, see the section entitled Alarm *Arming* elsewhere in this document.** Select when the alarm generated by the input becomes active: ***Always*** ***From Loading*** ***From Safety On*** ***From Starting*** ***Never*** ***Wait For ECU***
LCD Display	The text that is displayed on the module's LCD when the input activates and generates an alarm.
Activation Delay	This is used to give a delay on acceptance of the input. Useful for liquid level switches or to mask short term operations of the external switch device.

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

Input Function	Description
Abort Priming	Activation of this input causes the module to end the priming phase. During the priming phase, the module runs at the configured priming speed until the priming mode timer expires. Upon activation of the *Abort Priming* digital input, the module begins to control the engine speed using the selected speed control mode.
Air Flap Closed Auxiliary IEEE 37.2 - 3 Checking or Interlocking Relay	This input is used to connect to the air flap switch contacts. This gives an immediate shutdown in the event of the air flap being closed. It prevents the engine from being restarted if the air flap has not been reset following an overspeed shutdown.
Alarm Mute	This input is used to silence the audible alarm from an external source such as a remote mute switch.
Alarm Reset	This input is used to reset any latched alarms from a remote location. It is also used to clear any latched warnings which may have occurred (if configured) without having to stop the engine.
Alternative Language Select	This input is used to instruct the module to switch to the alternative language instead of the default English language.
Auto Start Inhibit IEEE 37.2 - 3 Checking or Interlocking Relay	**NOTE: This input does not prevent starting of the engine in Manual mode.** This input is used to provide an over-ride function to prevent the controller from starting the engine in the event of a start request in auto mode. If this input is active and a start signal occurs, the module does not give a start command to the engine. If this input signal is then removed, the controller operates as if a start request has occurred, starting, and loading the engine.
Auto Run Inhibit	**NOTE: This input does not prevent the engine starting and running in Manual mode.** This input is used to provide an over-ride function to prevent the controller from starting and/or running the engine in the event of a remote start and /or scheduled run condition occurring. If the ‘Auto Run Inhibit’ signal becomes active while the engine is running, a controlled shutdown sequence begins.
Coolant Temperature Switch	This input is used to give a *Coolant Temperature High* shutdown from a digital normally open or normally closed switch.
Disable Protections	The system designer provides this switch (not DSE), so its location varies depending upon manufacturer; however, it normally takes the form of a key operated switch to prevent inadvertent activation. Depending upon configuration, a warning alarm may be generated when the switch is operated. When active, and the module is suitably configured (see section entitled *Advanced*) this prevents the engine being stopped upon critical alarm (Also called War Mode, Run to Destruction or Battle Short Mode)

Continued overleaf…

Input Function	Description
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 enable Manual regeneration via the DPF Force regeneration or Running editor or SCADA option.
External Panel Lock	**NOTE: External control sources (i.e. Simulate Start Button) are not affected by the external panel lock input and continues to operate normally** This input is used to provide security to the installation. If the External Panel lock input is active, the module does not respond to operation of the Mode select or start buttons. This allows the module to be placed into a specific mode (such as Auto) and then secured. The operation of the module is not affected, and the operator is still able to view the various instrumentation pages etc. (*Front panel configuration access is still possible while the system lock is active*).
Fuel Tank Bund Level High	This input is used to provide protection against fuel leakage, where a level switch is fitted to the fuel tank bund. The action for this alarm is configurable under the Engine Protections page in the module
Inhibit Scheduled Run IEEE 37.2 - 3 Checking or Interlocking Relay	This input is used to provide a means of disabling a scheduled run.
Inhibit SMS Remote Start	This input is used to provide a means of disabling a start request sent by SMS when a GSM is connected, and SMS control is configured.
Lamp Test	This input is used to provide a test facility for the front panel indicators fitted to the module. When the input is activated all LEDs illuminate.
Low Fuel Level Switch	This input is used to give a *Low Fuel Level Switch* shutdown from a digital normally open or normally closed switch.
Oil Pressure Switch	This input is used to give *Oil Pressure Switch* shutdown from a digital normally open or normally closed switch.
Remote Start Off Load	When in Auto mode, this input is used to perform the start sequence without transferring the load to the engine. This function can be used where an engine only run is required e.g. for exercise.
Remote Start On Load	When in auto mode, this input is used to perform the start sequence and transfer the load to the engine. In Manual mode, this input does not generate start/stop requests of the engine; however, the load is transferred to the engine if the engine is already running.
Remote Stop	This input is used to perform the stop sequence when the engine is running via a start request in Auto mode.
Reset Maintenance Alarm 1	This input is used to provide an external source to reset maintenance alarm 1
Reset Maintenance Alarm 2	This input is used to provide an external source to reset maintenance alarm 2
Reset Maintenance Alarm 3	This input is used to provide an external source to reset maintenance alarm 3

Continue Overleaf

<table>
<tr><th>Input Function</th><th>Description</th></tr>
<tr><td>Simulate Auto Button</td><td>NOTE: If a start request is present when Auto mode is entered, the starting sequence begins. Start requests can be generated from a number of sources depending upon module type and configuration and includes (but is not limited to): Remote Start Input present, Scheduled Run and Telemetry Start signal from remote locations.

This input mimics the operation of the ‘Auto’ button and is used to provide a remotely located Auto mode push button.</td></tr>
<tr><td>Simulate Lamp Test / Alarm Mute Button</td><td>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.
This input mimics the operation of the ‘Lamp Test / Alarm Mute’ button and is used to provide a remotely located Lamp Test / Alarm mute push button.</td></tr>
<tr><td>Simulate Manual Button</td><td>This input mimics the operation of the ‘Manual’ button and is used to provide a remotely located Manual mode push button.</td></tr>
<tr><td>Simulate Off Button</td><td>This input mimics the operation of the ‘Stop’ button and is used to provide a remotely located Stop mode push button.</td></tr>
<tr><td>Simulate Start Button</td><td>This input mimics the operation of the ‘Start’ button and is used to provide a remotely located start push button.</td></tr>
<tr><td>Simulate Stop Button</td><td>This input mimics the operation of the ‘Stop’ button and is used to provide a remotely located stop/reset push button.</td></tr>
<tr><td>Simulate Throttle Down Button</td><td>This input mimics the operation of the ‘Throttle Down’ button and is used to provide a remotely located Throttle Down push button.</td></tr>
<tr><td>Simulate Throttle Up Button</td><td>This input mimics the operation of the ‘Throttle Up’ button and is used to provide a remotely located Throttle Up push button.</td></tr>
<tr><td>Smoke Limiting
IEEE 37.2 – 18 Accelerating Or Decelerating Device</td><td>This input instructs the module to issue 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 CAN engines.</td></tr>
<tr><td>Speed Lower</td><td>This input is used to decrease the engine speed when a digital output is configured for Speed Lower Relay.
Available only when the Analogue Output is set to Flexible Analogue.</td></tr>
<tr><td>Speed Priority 1, 2, 3 & 4</td><td>These inputs are used to select the engine Speed Priority when the Speed Control scheme is configured as Selectable.</td></tr>
<tr><td>Speed Raise</td><td>This input is used to increase the engine speed when a digital output is configured for Speed Raise Relay.
Available only when the Analogue Output is set to Flexible Analogue.</td></tr>
<tr><td>Speed Selection High & Speed Selection Low</td><td>These two inputs are used to select the engine speed priority when the Speed Control scheme is configured as Selectable.
Activating none, one or both of these inputs instructs the module to switch to the relevant speed priority setpoint.

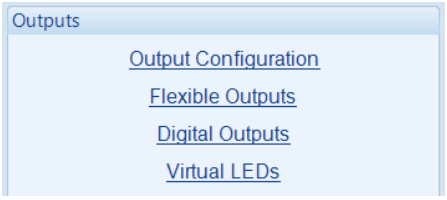
Example:
<table>
<tr><th>Speed Selection High</th><th>Speed Selection Low</th><th>Selected Speed</th></tr>
<tr><td>Inactive</td><td>Inactive</td><td>Speed Priority 1</td></tr>
<tr><td>Inactive</td><td>Active</td><td>Speed Priority 2</td></tr>
<tr><td>Active</td><td>Inactive</td><td>Speed Priority 3</td></tr>
<tr><td>Active</td><td>Active</td><td>Speed Priority 4</td></tr>
</table></td></tr>
</table>

Continued overleaf…

Input Function	Description
Start Pause	This input is used to pause the start sequence with the Fuel Output active (for up to the user-specified crank duration) before the Crank output becomes active. If the input is not removed before the crank duration timer expires, the controller reports a fail to start. If the input is removed before the timer expires, the first engage attempt begins.
Stop And Panel Lock	This input is used to instruct the module to enter **STOP MODE** and 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*).
Water In Fuel	Some engines are fitted with water separators, which have a switch indicator for water detection. This input is used to provide protection against high water content in the fuel, where a switch is fitted to the fuel filter. The action for this alarm is configurable under the Engine Protections page in the module configuration.

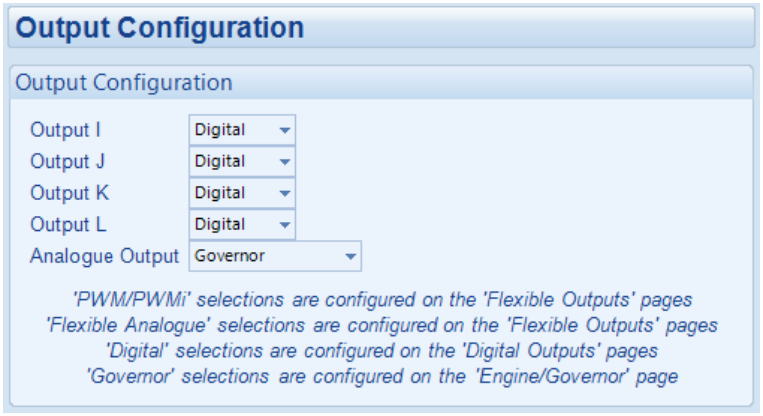
2.5 OUTPUTS

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



2.5.1 OUTPUT CONFIGURATION

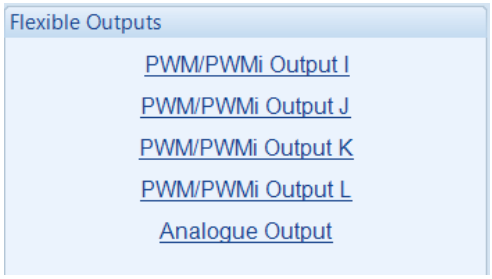
Output Configuration



Parameter	Description
Output I, J, K & L	Allows the configuration of the output signal type: ***Not Used*** ***Digital*** ***PWM*** ***PWMi***
Analogue Output	Allows the configuration of the analogue output usage: ***Flexible Analogue*** ***Governor***

2.5.2 FLEXIBLE OUTPUTS

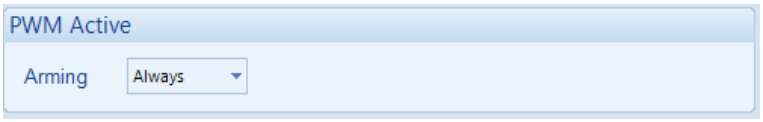
The *Outputs* section is subdivided into smaller sections.
Select the required section with the mouse.



2.5.2.1 PWM

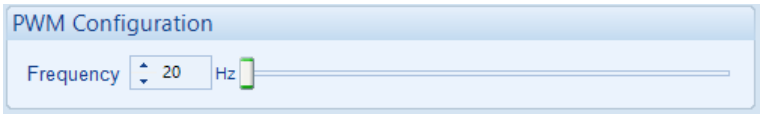
The *PWI* is a voltage-controlled PWM signal, where the average output voltage is maintained during the period of the signal.

PWN Active



Parameter	Description
Arming	Select when the output is active, the available options are: ***Always*** ***From Loading*** ***From Safety On*** ***From Starting*** ***Never*** ***Wait For ECU***

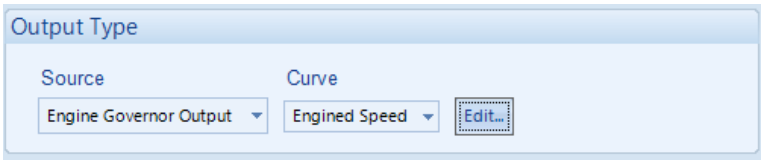
PWM Configuration



Parameter	Description
Frequency	Define the frequency of the PWM output signal.

Output Type

NOTE: For details on configuring the output *Curve* refer to section entitled *Creating/Editing the Output Curve* elsewhere in this manual.

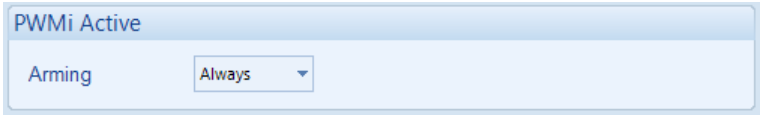


Parameter	Description
Source	Select the output source for the PWM signal from the engine parameters or from expansion inputs modules.
Curve	Click to edit the 'output curve.' See section entitled *Editing the sensor curve*.

2.5.2.2 PWMI

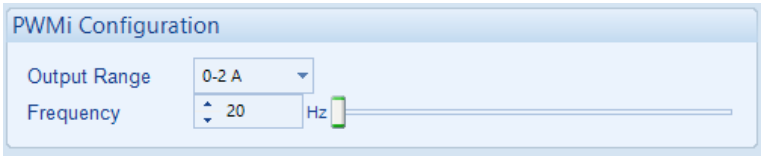
The *PWMI* is a current-controlled PWM signal, where the average output current is maintained during the period of the signal.

PWMi Active



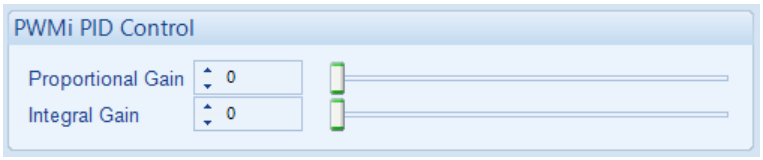
Parameter	Description
Arming	Select when the output is active, the available options are: ***Always*** ***From Loading*** ***From Safety On*** ***From Starting*** ***Never*** ***Wait For ECU***

PWMi Configuration



Parameter	Description
Output Range	Select the full current range of the *PWMI* output: ***0-2 A*** ***0-4 A***
Frequency	Define the frequency of the *PWMI* output signal. The period of the signal is the inverse of the frequency, therefore at 25 Hz, the PWM signal period is 0.04 s.

PWMi PID Control



Parameter	Description
Proportional Gain	When a change in *PWMI* output current is required, the *Proportional Gain* defines the amount of adjustment to achieve it. The amplitude of the adjustment during the signal period is governed by this setting. Too high a proportional gain setting results in an unstable output signal, typically characterised by a fast change, or fast oscillation. Too low a proportional gain setting may result in the target average current not being reached or being reached a long time after.
Integral Gain	When a change in *PWMI* output current is required, the *Integral Gain* defines the time summation to achieve it. The propagation of the adjustment during the signal period is governed by this setting. Too high an integral gain setting results in an unstable output signal, typically characterised by a slow change, or slow oscillation. Too low an integral setting may result in the target average current not being reached or being reached a long time after.

Output Type

NOTE: For details on configuring the output *Curve* refer to section entitled *Creating/Editing the Output Curve* elsewhere in this manual.

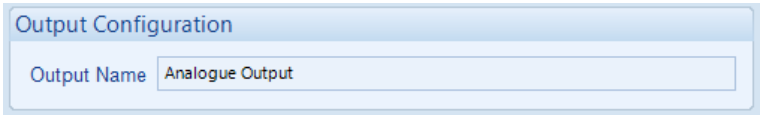
Parameter	Description
Source	Select the output source for the PWM signal from the engine parameters or from expansion inputs modules.
Curve	Click to edit the 'output curve.' See section entitled *Editing the sensor curve*.

2.5.2.3 ANALOGUE OUTPUT

NOTE: This is available when the Output Configuration is set to Flexible Analogue. When the output is configured for Governor, the configuration is done elsewhere in the software.

While the *DSE Configuration Suite* holds specifications for the most used output ranges, occasionally it is required that the module's output be connected to a nonstandard device. To aid this process, a curve editor is provided.

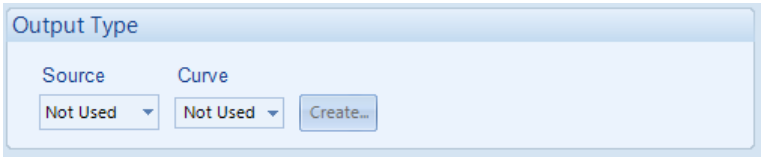
Output Configuration



Parameter	Description
Output Name	Name the Output

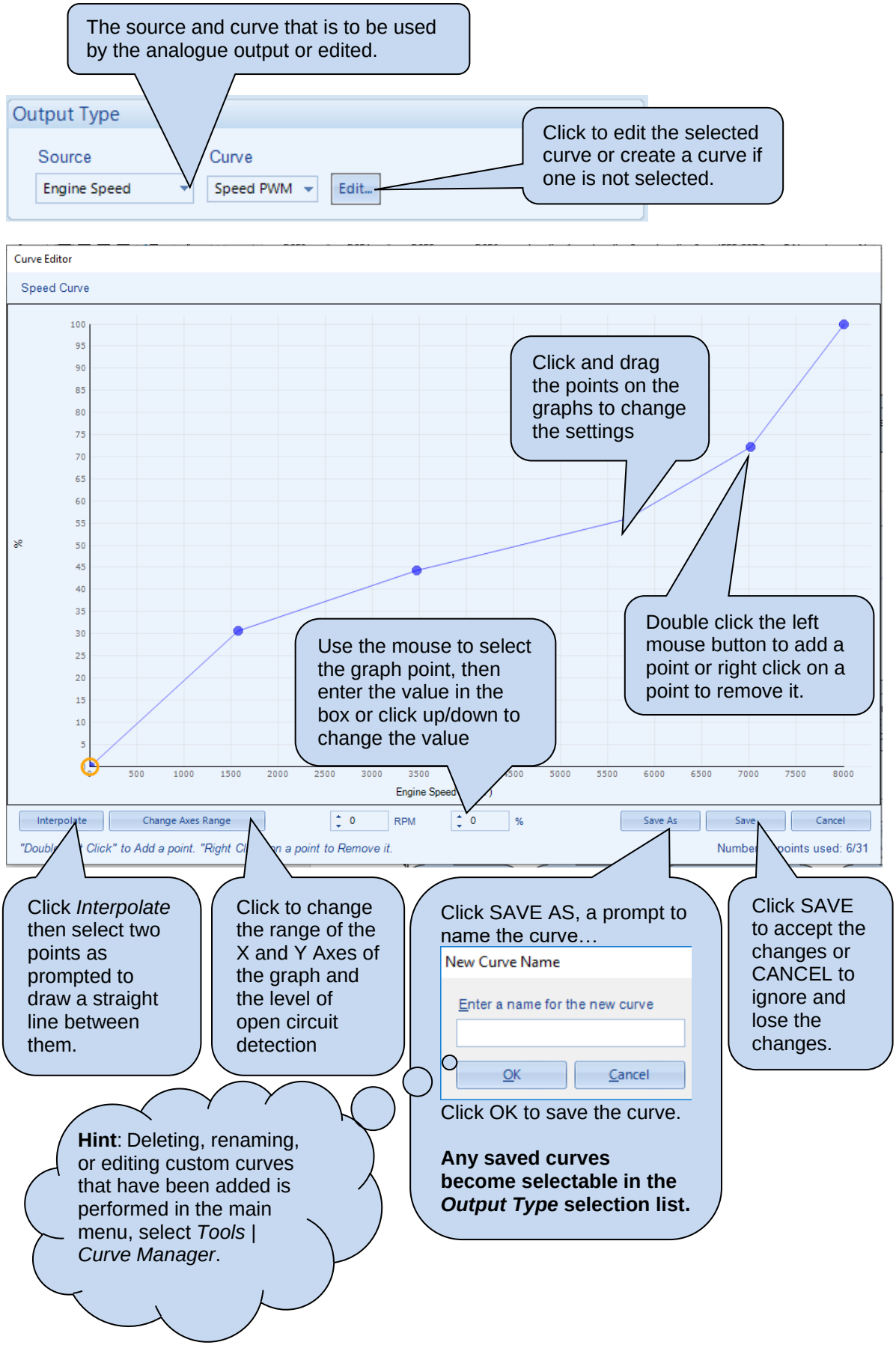
Output Type

NOTE: For details on configuring the output *Curve* refer to section entitled *Creating/Editing the Output Curve* elsewhere in this manual.



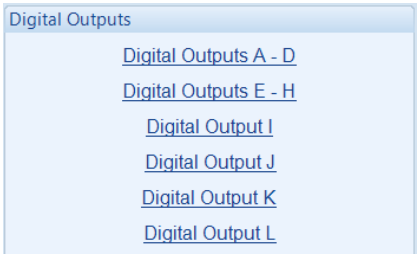
Parameter	Description
Source	Select the output source
Curve	Click to edit the 'output curve.' See section entitled *Editing the sensor curve*.

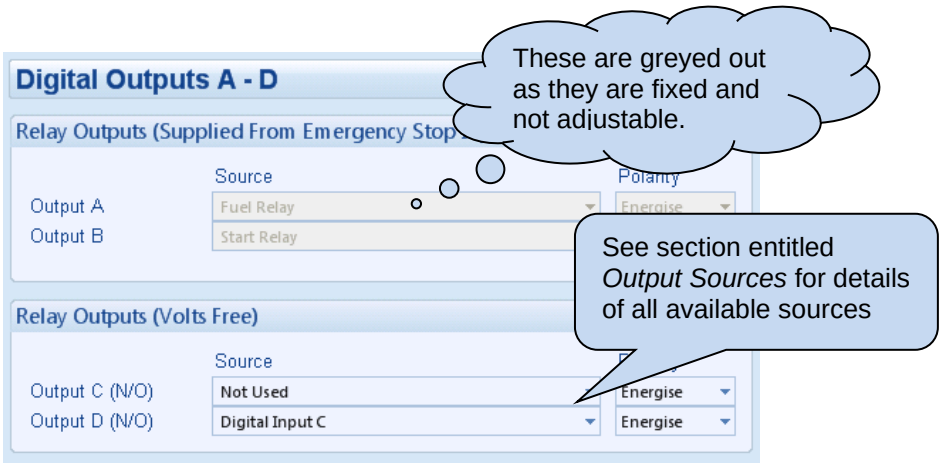
2.5.2.4 CREATING / EDITING THE OUTPUT CURVE



2.5.3 DIGITAL OUTPUTS

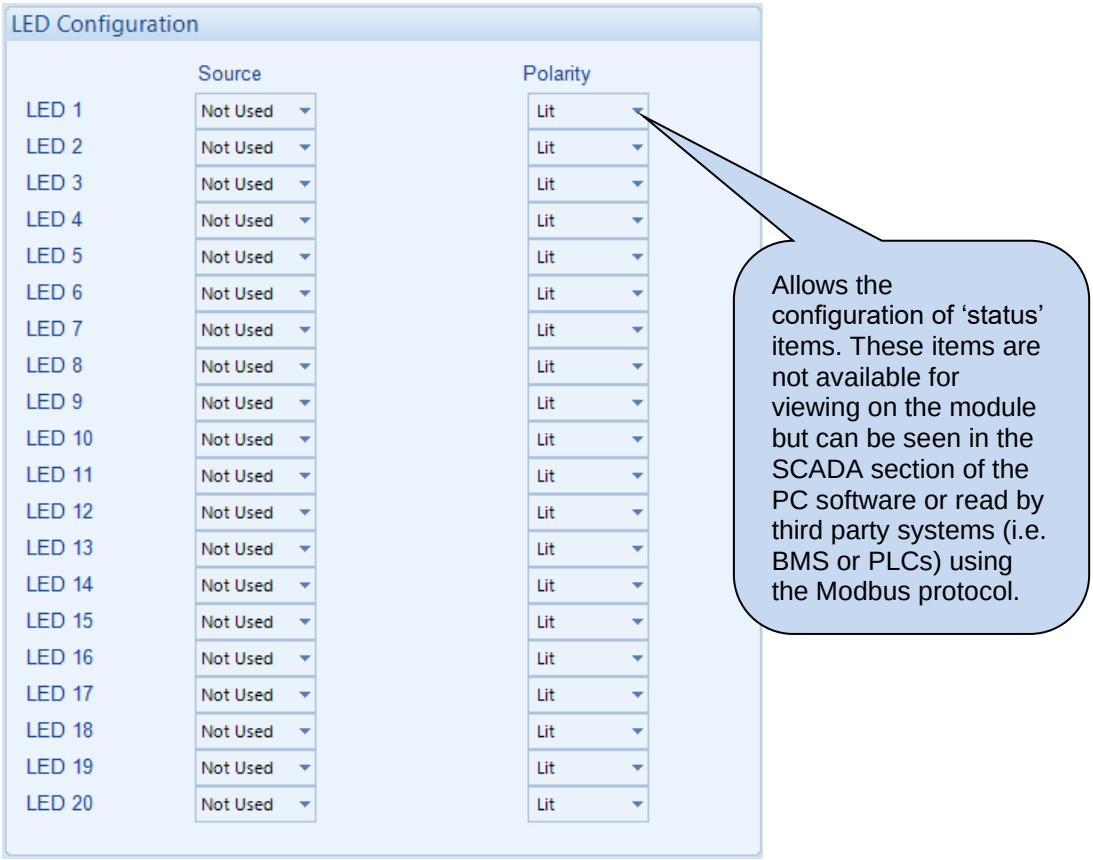
The *Digital Outputs* section is subdivided into smaller sections.
Select the required section with the mouse.





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

2.5.4 VIRTUAL LEDS



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

2.5.5 OUTPUT SOURCES

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

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

Output Source	Active	Inactive
Not Used	The output does not change state (Unused)	
Abort Priming	Active when the *Abort Priming* digital input is active	
Air Flap Alarm	Active when the *Air-Flap Closed Auxiliary* digital input is active	
Air Flap Relay	Used to control an air flap, this output becomes active upon an Emergency Stop or Overspeed shutdown alarm.	Inactive when the set has come to rest
Alarm Mute	Active when the *Alarm Mute* digital input is active	
Alarm Reset	Active when the *Alarm Reset* digital input is active	
Alternative Language Selected	Active when the configured *Alternative Language Select* digital input is active	
Arm Safety On Alarms	Active when the safety on alarms are enabled. This is active from the end of the *Safety On Delay* timer to the end of the *Cooling Time*	
Auto Run Inhibited	Active when the *Auto Run Inhibit* function is active	Inactive if no alarm condition is active or if the Mute pushbutton was pressed.
Auto Button Pressed	Active when the Auto pushbutton is pressed	
Auto Start Inhibit IEEE 37.2 – 3 Checking Or Interlocking Relay	Active when a digital input configured for *Auto Start Inhibit* is active	
Battery High Voltage IEEE 37.2 – 59DC Overvoltage Relay	Active when the *Battery High Voltage Alarm* becomes active	Inactive when the *Battery High Voltage Alarm* is not active
Battery Low Voltage IEEE 37.2 – 27DC Undervoltage Relay	Active when the *Battery Low Voltage Alarm* becomes active	Inactive when the *Battery Low Voltage* Alarm is not active
Calling For Scheduled Run	Active during a *Scheduled Run* request from the inbuilt scheduler.	
CAN ECU Data Fail	Active when no CAN data is received from the ECU after the safety delay timer has expired	Inactive when: • CAN data is being received • The set is at rest • During the starting sequence before the safety delay timer has expired
CAN ECU Power	Active when a start request is received. This is 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 Shutdown	Active when the engine ECU indicates that a Shutdown alarm is present.	Inactive when no Shutdown alarm is active from the ECU.
CAN ECU Stop	Active when the DSE controller is requesting that the CAN ECU stops the engine.	
CAN ECU Warning	Active when the engine ECU indicates that a Warning alarm is present.	Inactive when no Warning alarm is active from the ECU.
Charge Alternator Failure Warning/Shutdown	Active when the charge alternator warning/shutdown alarm is active	

Continued overleaf…

Output Source	Active	Inactive
Clutch Control	Active when the configured *Clutch Engage Speed* is reached, and the *Warming Up Time* has expired.	Inactive when: • The engine is running by *Remote Start Off Load* digital input • The engine speed falls below the *Clutch Disengage Speed* • In Cooldown • A Shutdown alarm occurs • A Controlled Shutdown alarm occurs • Smoke Limiting is active
Combined Maintenance Alarm	Active when any of the maintenance alarms are active	
Combined Remote Start Output	Active when a *Remote Start On/Off Load* digital input is active	
Common Alarm IEEE 37.2 – 74 Alarm Relay	Active when one or more alarms (of any type) are active	The output is inactive when no alarms are active
Common Controlled Shutdown IEEE 37.2 – 74 Alarm Relay	Active when one or more *Controlled Shutdown* alarms are active	The output is inactive when no controlled shutdown alarms are active
Common Shutdown IEEE 37.2 – 74 Alarm Relay	Active when one or more *Shutdown* alarms are active	The output is inactive when no shutdown alarms are active
Common Warning IEEE 37.2 – 74 Alarm Relay	Active when one or more *Warning* alarms are active	The output is inactive when no warning alarms are active
Configurable CAN x Instrument Active	Active when the relevant Configurable CAN Instrumentation alarm of the Received Instrumentation (1-30) is active.	
Coolant Cooler Control IEEE 37.2 – 23 Temperature Control Device	Activated by the *Coolant Cooler Control* in conjunction with the *Coolant Temperature Sensor*.	
Coolant Heater Control IEEE 37.2 – 23 Temperature Control Device	Activated by the *Coolant Heater Control* in conjunction with the *Coolant Temperature Sensor*.	
Cooling Down	Active when the *Cooling Timer* is in progress	The output is inactive at all other times
Data Logging Active	Active when data is being logged	Inactive when: Data logging is disabled The engine is at rest and the option *Only Log When Engine Is Running* is enabled The USB drive becomes full and the option *Log To USB Drive* is enabled The internal memory of the module becomes full, and the option *Keep Oldest Data* is enabled
DC Power On	Active when DC power is supplied to the module	
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 to K	Active when the relevant digital input is active	
Display Heater Fitted and On	Active when the internal LCD heater is switched on	
Down Button Pressed	Active when the down pushbutton is pressed	

Continued overleaf

Output Source	Active	Inactive
DPF Auto Regen Inhibited	Active when the *DPF Auto-Regen Inhibit* is active	
DPF Forced Regeneration Inhibited	Active when the *DPF Force Regeneration Inhibit* is 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	
Droop Enable	Active when an input configured to *Droop Enable* is active or if *Droop Enable* has been activated in the module configuration (CAN engine only)	
ECU Pre-Heat	Active when the ECU is performing engine pre-heat.	
Emergency Stop	Active when the Emergency Stop alarm is active.	
Droop Enable	Active when an input configured to *Droop Enable* is active or if *Droop Enable* has been activated in the module configuration (CAN engine only)	
ECU Pre-Heat	Active when the ECU is performing engine pre-heat.	
Emergency Stop	Active when the Emergency Stop alarm is active.	
Energise To Stop	Active when the controller wants the set to stop running. Normally used to control an *Energise to Stop* solenoid.	Inactive for the duration of the *ETS Solenoid Hold* timer after the engine stops.
Engine At Rest	Active when the engine is stopped	Inactive when the engine is running
Engine Available	Active when the engine becomes available to take the load	Inactive when *Clutch Engage Speed* has not been reached After a *Shutdown* or *Controlled Shutdown* alarm During the starting sequence before the end of the *Warming Timer*.
Engine Running	Active when the fuel relay is active, and the engine is running	
Engine Stop Active	Active when the *Remote Stop* digital input is active.	
Engine Stopping	Active when the fuel relay becomes inactive and stays active until the engine is fully stopped	
Fail To Start IEEE 37.2 - 48 Incomplete Sequence Relay	Active when 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	Active when the set is still running after the *Fail to Stop Timer* has expired.	
Fan Control	Active when the engine becomes available (up to speed). This output is designed to control an external cooling fan. When the engine stops, the cooling fan remains running for the duration of the Fan Overrun Delay.	

Continued overleaf

Output Source	Active	Inactive
Flexible Sensor (A to L) Active	Active when the relevant flexible sensor, configured as digital input, becomes active	
Flexible Sensor (A to L) High Alarm	Active when the relevant flexible sensor high alarm is active	
Flexible Sensor (A to L) High Pre-Alarm	Active when the relevant flexible sensor high pre-alarm is active	
Flexible Sensor (A to L) Low Alarm	Active when the relevant flexible sensor low alarm is active	
Flexible Sensor (A to L) Low Pre-Alarm	Active when the relevant flexible sensor low pre-alarm is active	
Fuel Fill End	Active when there is no change in the fuel level following a fuel fill operation	
Fuel Fill Start	Active at the start of the fuel fill operation	
Fuel Level High Alarm	Active when the level detected by the fuel level sensor has risen above the high fuel level alarm setting.	
Fuel Level High Pre-Alarm	Active when the level detected by the fuel level sensor has risen above the high fuel level pre-alarm setting.	
Fuel Level Low Alarm	Active when the level detected by the fuel level sensor has fallen below the low fuel level alarm setting.	
Fuel Level Low Pre-Alarm	Active when the level detected by the fuel level sensor has fallen below the low fuel level pre-alarm setting.	
Fuel Pump Control IEEE 37.2 – 71 Level Switch	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* rises above the *Fuel Pump Control Off* setting.
Fuel Relay	Active when the controller requires the governor/fuel system to be active.	Inactive whenever the set should be stopped, including between crank attempts, upon *Controlled Shutdown* and *Shutdown* alarms.
Fuel Tank Bund Level High	Active when the Fuel Bund Level High Alarm input is active	
Fuel Usage Alarm	Active when the fuel level decreases at a higher rate than the configured *Running Rate* when the engine is running or the *Stopped Rate* when the engine is stopped.	
Fuel Usage Alarm	Active when the fuel level decreases at a higher rate than the configured *Running Rate* when the engine is running or the *Stopped Rate* when the engine is stopped.	
HEST Active	Active when the High Exhaust Temperature alarm is active	
High Coolant Temperature Controlled Shutdown	Active when the *Coolant Temperature* exceeds the configured *High Coolant Temperature Controlled Shutdown* level	
High Coolant Temperature Shutdown	Active when the *Coolant Temperature* exceeds the configured *High Coolant Temperature Shutdown* level	
High Coolant Temperature Warning	Active when the *Coolant Temperature* exceeds the configured *High Coolant Temperature Warning* level	
High Inlet Temperature Shutdown	*Active when the Inlet Temperature exceeds the High Inlet Temperature Shutdown setting*	
High Inlet Temperature Warning	*Active when the Inlet Temperature exceeds the High Inlet Temperature Warning setting*	
Incorrect Speed	Active when the engine speed falls below the *Incorrect Speed* alarm level	
Inhibit Scheduled Run	Active when the configured *Inhibit Scheduled Run* digital input is active	
Inhibit SMS Start	Active when the configured *Inhibit SMS Start* digital input is active	

Continued overleaf…

Output Source	Active	Inactive
Lamp Test	Active when the configured *Lamp Test* digital input is active, or the Mute/Lamp Test push button is pressed.	
Lamp Test/Mute + Tick Buttons Pressed	Active when the Lamp Test/Mute and the Tick pushbuttons are pressed	
Left Button Pressed	Active when the left navigation pushbutton is pressed	
Loss of Mag Pickup Signal	Active when the controller senses the loss of signal from the magnetic pickup probe	
Louvre Control	Active when the fuel relay becomes active. Used to drive ventilation louvres for the engine.	Inactive when the fuel relay becomes inactive.
Low Coolant Temperature	Active when the *Coolant Temperature* falls below the *Low Coolant Temperature alarm* setting	
Low Fuel Level IEEE 37.2 – 71 Level Switch	Active when the Fuel Level falls below the *Fuel Level Low* setting	
Low Oil Pressure Shutdown IEEE 37.2 - 63 Pressure Switch	Active when the *Oil Pressure* falls below the *Low Oil Pressure Shutdown* setting	Inactive when • The set is stopped • During starting sequence and safety delay time.
Low Oil Pressure Warning IEEE 37.2 - 63 Pressure Switch	Active when the *Oil Pressure* falls below the *Low Oil Pressure Warning* setting	Inactive when • The set is stopped • During starting sequence and safety delay time.
Maintain Control Value is Active	Active when the Maintain Control Value is active when in *Auto* mode.	
Maintenance Alarm 1,2,3 Due	Active when the relevant maintenance alarm is due	
Manual Button Pressed	Active when the Manual pushbutton is pressed	
MPU Open Circuit	Active when an open circuit failure is detected in the Magnetic Pickup circuit.	
Mute/Lamp Test Button Pressed	Active when the Mute/Lamp Test pushbutton is pressed	
Off Button Pressed	Active when the Off pushbutton is pressed	
Oil Pressure Sender Open Circuit	Active when the Oil Pressure Sensor is detected as being open circuit.	
Over Speed Shutdown IEEE 37.2 – 12 Over Speed Device	Active when the engine speed exceeds the configured *Over Speed Shutdown* setting	
Over Speed Warning	Active when the engine speed exceeds the configured *Over Speed Warning* setting	
Over Speed Overshoot Alarm	Active when the engine speed exceeds the *Over Speed Overshoot Alarm* setting	
Overspeed Overshoot Warning	Active when the engine speed exceeds the *Over Speed Overshoot Warning* setting	
Panel Locked	Active when the module's panel lock is active.	
Panel Locked By Digital Input	Active when a digital input configured as '*Panel Lock*' is active.	
Panel Locked By Telemetry	Active when panel lock via telemetry is active.	
PLC Output Flag 1-40	A series of user configured flags that can be used by the PLC to control or drive internal and external functions	

Continued overleaf….

Output Source	Active	Inactive
Preheat During Preheat Timer	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	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	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	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
Priming Phase	Active after the *Smoke Limit* timer expires and stays active until the *Priming Delay* timer expires or until a configured *Abort Priming* digital input becomes active.	
Priming Speed	Active when the engine is running at priming speed	
Protections Disabled	Active when the protection system of the module has been disabled by configuration or by digital input configured to perform this disabling function.	
Remote Control 1-10	Active when the *Remote Control* output source controlled in the SCADA section of the software becomes active. These can be used to control external circuits or can be used in the *PLC Logic* section of the configuration suite.	
Remote Start Off Load	Active when a digital input configured as '*Remote Start off Load*' is active. This output could be used to pass the remote start signal on to elsewhere in the control system.	
Remote Start On Load	Active when a digital input configured as '*Remote Start on Load*' is active. This output could be used to pass the remote start signal on to elsewhere in the control system.	
Remote Stop	Active when a digital input configured as '*Remote Stop*' is active. This output could be used to pass the remote stop signal on to elsewhere in the control system.	
Reset Governor To Datum	Active when the module needs to reset the potentiometer to its centre position. This output is intended to be used in conjunction with an electronic or motorised potentiometer, which has a 'centre pot' type input.	
Reset Maintenance 1, 2, 3	Active when the relevant *Reset Maintenance Alarm* digital input is active	
Return Delay In Progress	Active when the *Return Delay Timer* is active	
Reverse Power	Active when the *Reverse Power Alarm* becomes active.	
Scheduled Auto Start Inhibit	Active during a *Scheduled Auto Start Inhibit* request from the inbuilt *Scheduler*.	
SCR Inducement	Active when SCR Inducement CAN alarm is active	
Shutdown Blocked	Active when the Protections Disabled Mode is active, and any shutdown or controlled shutdown alarm is triggered.	

Continued overleaf….

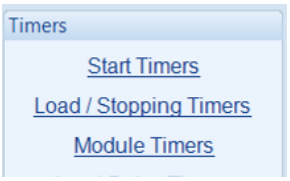
Output Source	Active	Inactive
Simulate Auto Button	Active when a configured *Simulate Auto Button* digital input is active	
Simulate Manual Button	Active when a configured *Simulate Manual Button* digital input is active	
Simulate Off Button	Active when a configured *Simulate Off Button* digital input is active	
Simulate Start Button	Active when a configured *Simulate Start Button* digital input is active	
Simulate Stop Button	Active when a configured *Simulate Stop Button* digital input is active	
Simulate Throttle Down Button	Active when a configured *Simulate Throttle Down Button* digital input is active	
Simulate Throttle Up Button	Active when a configured *Simulate Throttle Up Button* digital input is active	
Smoke Limiting	Active when the controller requests that the engine runs at idle speed. Used to give a signal to the *Idle input* of an engine speed governor (if available)	Inactive when the controller requests that the engine runs at rated speed.
SMS Remote Start Off Load	Active when a remote start off load request is received by SMS	
SMS Remote Start On Load	Active when a remote start on load request is received by SMS	
Speed 1,2,3,4 Active	Active when the relevant *Speed* is active	
Speed Lower Relay	Active when the module needs to lower the speed of an external fuel governor or electronic pot.	
Speed Priority 1,2,3,4 Selected	Active when the *Speed Control* is configured to *Selectable,* and the relevant *Speed Priority* is active	
Speed Raise Relay	Active when the module needs to raise the speed of an external fuel governor or electronic pot.	
Speed Selection High Selected	Active when the *Speed Selection High* input is active.	
Speed Selection Low Selected	Active when the *Speed Selection Low* input is active.	
Start Button Pressed	Active when the Start pushbutton is pressed.	
Start Delay In Progress	Active when the *Remote Start* timer is active.	
Start Paused	Active when the *Start Pause* digital input is active.	
Start Relay IEEE 37.2 – 54 Turning Gear Engaging Device	Active when the controller requires the cranking of the engine.	
Starting Alarm	Active AFTER the start delay time, during the pre-heat delay (if used) and continues until the set starts. This output is used to supply an external sounder with a signal that the engine is about to start.	
Starting Alarms Armed	Active when the *Starting Alarms* are active. The *Starting Alarms* are armed as soon as the module commences the starting of the engine and remain armed until the engine becomes at rest. This output can be used to control external logic circuitry.	
Stop + Tick Buttons Pressed	Active when the Stop and Tick pushbuttons are pressed	
Stop And Panel Lock	Active when the configured *Stop And Panel Lock* digital input is active	
Stop Button Pressed	Active when the stop pushbutton is pressed. Once the button is released, the output becomes inactive.	
System Healthy	Active when the module is in *Auto* mode and there are no alarms present.	
System in Auto Mode	Active when Auto mode is selected	
System in Manual Mode	Active when Manual mode is selected	
System in Off Mode	Active when the Off mode is selected	
System in Stop Mode	Active when Stop mode is selected	

Continued overleaf…

Output Source	Active Inactive
Telemetry Active	Active when the communication port is live and for a brief time after transmission stops. Can be used as a relay or LED.
Telemetry Data Active	Active when data is being transmitted. This output changes continuously state (flash) upon data transfer. Normally used as an LED source rather than a relay source as this source flashes repeatedly. For a similar source more suited to drive a relay, see *Telemetry Active*.
Telemetry Start in Auto Mode	Active when a start request sent by telemetry is being processed in Auto mode
Throttle Down Button Pressed	Active when the Throttle Down pushbutton is pressed
Throttle Up Button Pressed	Active when the Throttle Up pushbutton is pressed
Tick Button Pressed	Active when the Tick pushbutton is pressed
Under Speed Shutdown	Active when the engine speed falls below the configured under speed Shutdown setting
Under Speed Shutdown	Active when the engine speed falls below the configured under speed warning setting
Up Button Pressed	Active when the up pushbutton is pressed
Waiting For Engine	Active when the engine has been instructed to start but has not yet become available.
Water In Fuel	Active when the digital input or CAN ECU function *Water In Fuel* is active

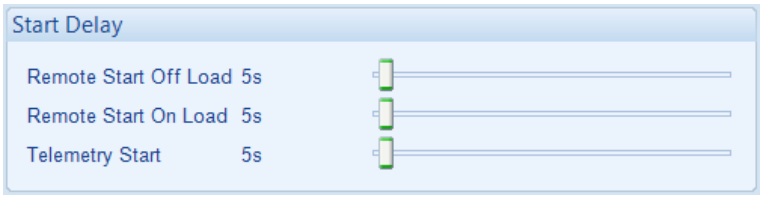
2.6 TIMERS

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



2.6.1 START TIMERS

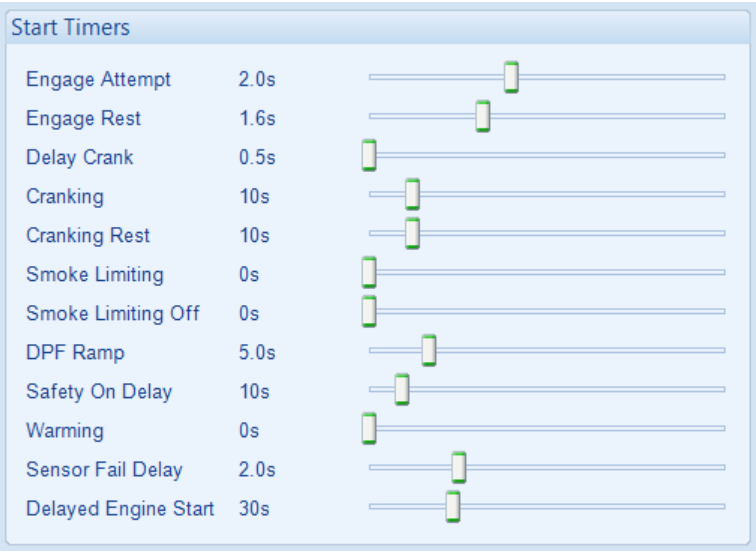
Start Delay



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

Parameters are detailed overleaf…

Start Timers



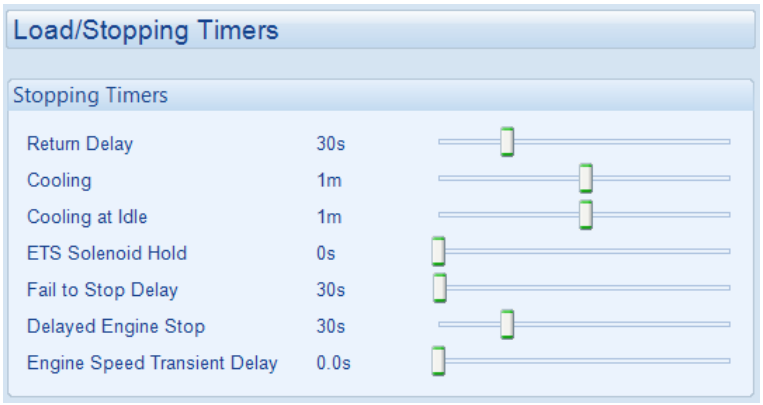
Timer	Description
Engage Attempt	**NOTE: Only available if using magnetic pick-up and multiple engage attempts** The amount of time the module attempts to engage the starter motor during each engage attempt. If the Magnetic Pick-up is not detecting movement of the flywheel when this timer expires, the engage attempt terminates. When the engage fails consecutively for the configured number of *Engage Attempts*, the *Fail to Engage* alarm is activated.
Engage Rest	**NOTE: Only available if using magnetic pick-up and multiple engage attempts** The amount of time the module waits between attempts to engage the starter.
Delay Crank	The amount of time delay between the fuel relay and the crank relay energising. This is typically used to allow fuel systems to prime.
Cranking	The amount of time for each crank attempt
Crank Rest	The amount of time between multiple crank attempts.
Smoke Limit	The amount of time that the engine is requested to run at idle speed upon starting. This is typically used to limit emissions at start-up.
Smoke Limit Off	The amount of time that the engine takes to run up to rated speed after removal of the command to run at idle speed. If this time is too short, the engine could be stopped due to an *Underspeed* alarm. If the time is too long, *Underspeed* protection is disabled until the *Smoke Limit Time Off* time has expired.
DPF Ramp	After terminating the DPF stage at idle speed, the amount of time required to disable the speed protections till the engine reaches to its nominal values.
Safety On Delay	The amount of time at start-up that the controller ignores oil pressure and engine speed and other delayed alarms. This is used to allow the engine to run up to speed before protections are activated.
Warming	The amount of time the engine runs before being allowed to take load. This is used to warm the engine to prevent excessive wear.

Continued overleaf…

Timer	Description
Sensor Fail Delay	**NOTE: Only available if using Magnetic pick-up** The amount of time during which the module must receive a speed signal once cranking has commenced. If no signal is present, the engine is shutdown and a *Loss of Speed Sensing* alarm given.
Delayed Engine Start	When the *Start Control* scheme is configured for *Start/Stop Contacts,* this is the amount of time a delay before starting in AUTO mode. After this time delay expires, the *Remote Start On Load* delay timer is initiated. Typically this timer is applied to prevent starting upon fleeting start signals.

2.6.2 LOAD / STOPPING TIMERS

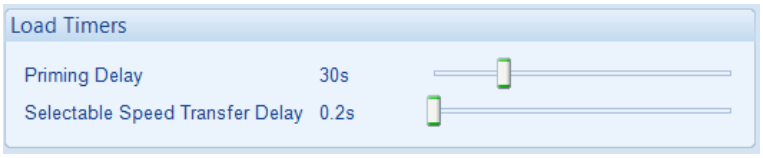
Stopping Timers



Timer	Description
Return Delay	The amount of time, in auto mode only, that allows for short term removal of the request to stop the engine before action is taken. This is used to ensure the engine remains on load before accepting that the start request has been removed.
Cooling	The amount of time that the engine is made to run off load before stopping. This is to allow the set to cooldown and is particularly important for engines with turbo chargers.
Cooling at Idle	The amount of time the module instructs the engine to run at idle speed after the *Cooling Time.*
ETS Solenoid Hold	The amount of time the *Energise to Stop* output is kept energised after the engine has come to rest. This is used to ensure the set has fully stopped before removal of the stop solenoid control signal.
Fail to Stop Delay	The amount of time when the set is called to stop and is still running after the *Fail To Stop* delay, a *Fail to Stop* alarm is generated.
Delayed Engine Stop	The amount of time before stopping in AUTO mode. This timer is activated upon the *Remote Stop* command being issued when the *Start Control* scheme is configured for *Start/Stop Contacts*. Typically, this timer is applied to prevent stopping upon fleeting remote stop signal.
Engine Speed Transient Delay	The amount of time the *Under/Over Speed* alarms are delayed. Typically, this is used to prevent spurious shutdown alarms caused by large changes in load levels.

Continued overleaf…

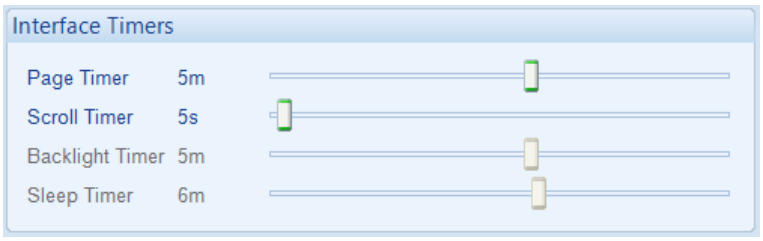
Load Timers



Timer	Description
Priming Delay	The amount of time the engine runs at priming speed. Also called the priming phase.
Speed Transfer Delay	**NOTE: Only available when the *Speed Control* scheme is configured as *Selectable.*** The amount of time the speed change is delayed upon activation of speed selection digital inputs.

2.6.3 MODULE TIMERS

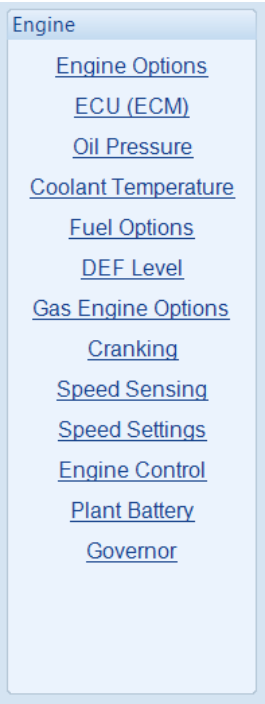
Interface Timers



Timer	Description
Page Timer	The amount of time before the module reverts to show the *Status* page when it is left unattended,
Scroll Timer	The amount of time for automatic scroll between parameters on a selected page.
Backlight Timer	If the module is left unattended for the duration of the *Backlight Timer*, the LCD backlight turns off
Sleep Timer	If the module is in STOP mode, the module will go to sleep after sleep timer has expired.

2.7 ENGINE

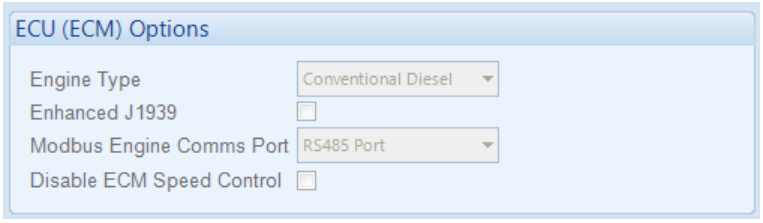
The *Engine* section is subdivided into smaller sections.
Select the required section with the mouse.



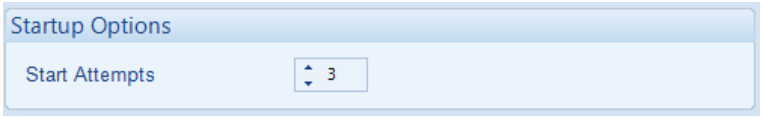
2.7.1 ENGINE OPTIONS

ECU Options

NOTE: These items are read only and not adjustable. To change these items, refer to section *Application* elsewhere in this manual.



Startup Option

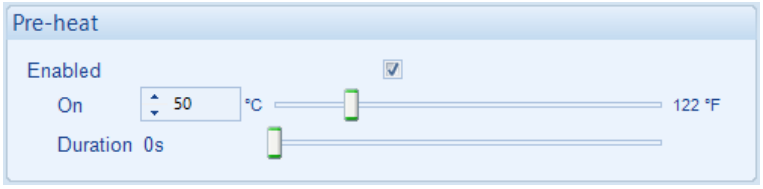


Parameter	Description
Start Attempts	The number of starting attempts the module makes. If the module does not detect that the engine has fired before the end of the *Cranking Time*, then the current start attempt is cancelled, and the *Crank Rest* time takes place before the next crank attempt begins.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

Pre-heat

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

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

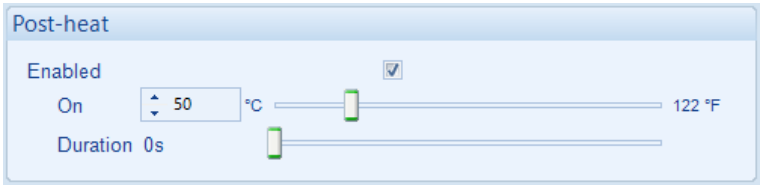


Parameter	Description
Enabled	☐ = Pre-heat is not temperature dependent. ☑ = When the *Coolant Temperature* is below the configured *On* level, the *Pre-Heat* digital output is activated for the set *Duration* of time before cranking.
On	Set the coolant temperature below which the pre-heat is activated.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

Post-heat

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

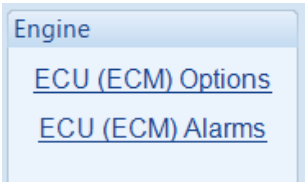
NOTE: Depending on *Engine Type* configuration, this is controlled direct by the ECU (ECM).



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

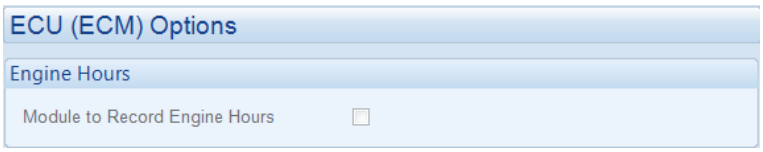
2.7.2 ECU (ECM)

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



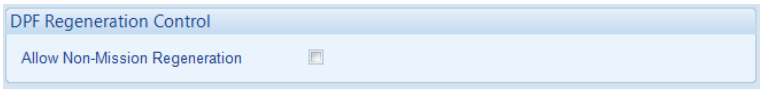
2.7.2.1 ECU (ECM OPTIONS)

Engine Hours



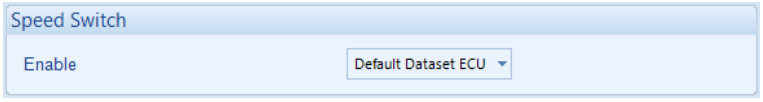
Parameter	Description
Module To Record Engine Hours	☐ = Engine hours value is obtained from the ECU. ☑ = The DSE module counts the *Engine Hours Run*, disregarding the ECU value for the parameter.

DPF Regeneration Control



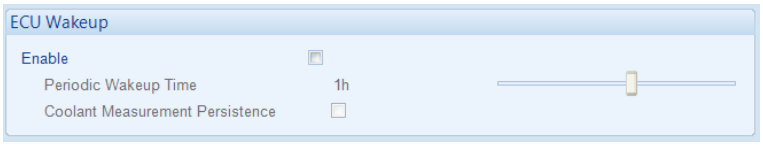
Parameter	Description
DPF Regeneration Control	Available for ECUs (ECM) which require the engine speed to drop during a manual regeneration cycle. During this time, the engine is not available to supply power and the under speed and under frequency alarms are not active.

Speed Switch



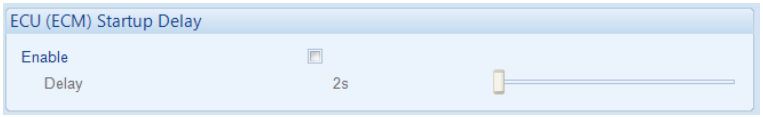
Parameter	Description
Speed Switch	Defines the method of speed control over CANbus when supported by the ECU (ECM). Selection needs to match the ECU (ECM) calibration for the speed control method. Available speed control methods to choose from: ***0: CAN Open Increase Decrease*** ***1: ECU Increase Decrease Input*** ***2: CAN Open Increase Decrease*** ***3: ECU Analogue Absolute*** ***4: ECU Analogue Relative*** ***5: ECU Frequency Input*** ***6: ECU CANopen Analogue*** ***7: CANOpen Speed Demand***

ECU Wakeup



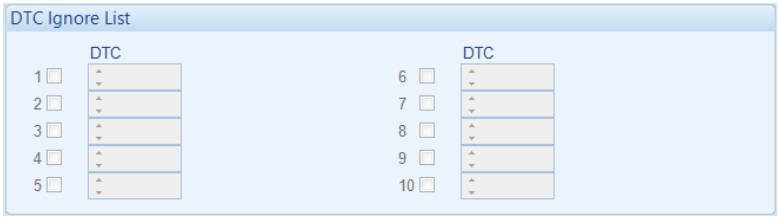
Parameter	Description
ECU Wakeup	☐ = Option is disabled. ☑ = When the engine is stopped, the DSE module sends a wakeup signal to the ECU (ECM) and keeps it powered up for 2 minutes to read the ECU (ECM) parameters. This is periodically repeated depending on the configured *Periodic Wakeup Time.*
Coolant Measurement Persistence	**NOTE: Available only when *ECU Wakeup* is enabled.** ☐ = Option is disabled. ☑ = The *Coolant Temperature* measurement is used for the *Coolant Temperature Control.*

ECU (ECM) Startup Delay



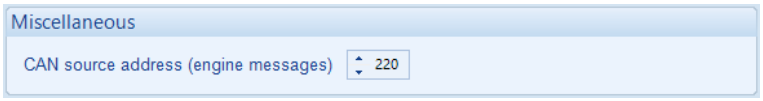
Parameter	Description
ECU StartUp Delay	☐ = Option is disabled. ☑ = When the engine receives a start signal, the DSE module sends the wakeup signal to the ECU (ECM) before activating the Fuel Relay, Start Relay outputs, or sending the start signal by CAN message, and waits for the ECU to respond before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

DTC Ignore List



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

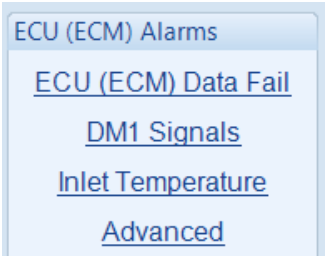
Miscellaneous



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

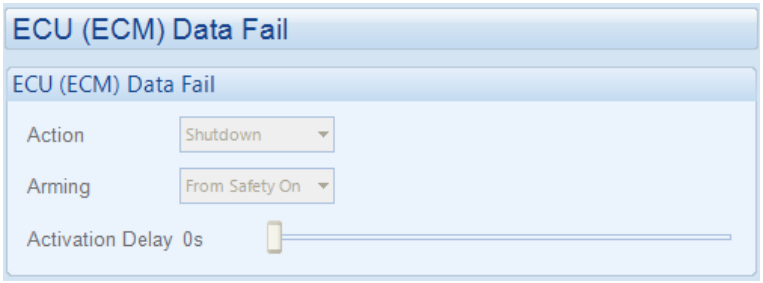
2.7.2.2 ECU (ECM) ALARMS

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



2.7.2.2.1 ECU (ECM) DATA FAIL

ECU (ECM) DATA FAIL



Parameter	Description
ECU Data Fail	Provides protection against failure of the ECU CAN data link. The alarm action list is as follows: ***None*** ***Controlled Shutdown*** ***Shutdown*** ***Warning***
Arming	Select when the *CAN ECU Data Fail* alarm is active. Options are as follows: ***Always:*** The alarm is active at any time the CAN Link is lost ***From Loading:*** Active only after the engine is on load ***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 ***When Stationary****:* Active only when the engine is not running
Activation Delay	The amount of time before the module activates the *CAN ECU Data Fail* after a failure.

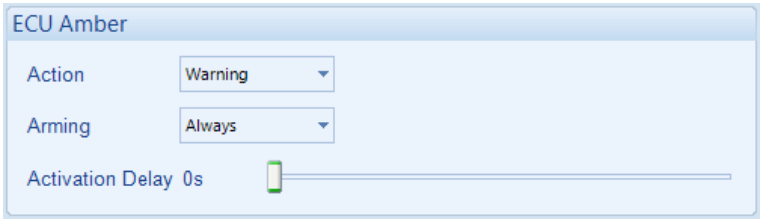
2.7.2.2.2 DM1 SIGNALS

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

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

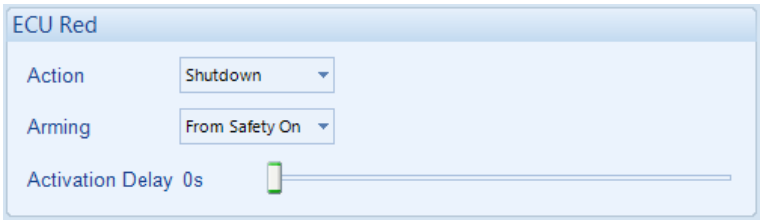
DM1 signals are messages from the CAN (ECM) ECU. The following parameters allows configuration of how the DSE module responds to these messages.

ECU Amber



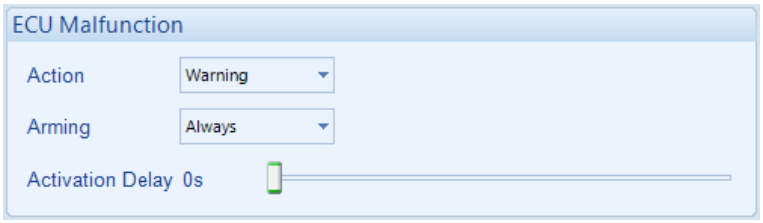
Parameter	Description
ECU Amber Action	The action the DSE module takes when receiving and ECU Amber fault condition. The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***None*** ***Controlled Shutdown*** ***Shutdown*** ***Warning***
Arming	Select when the DSE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

ECU Red



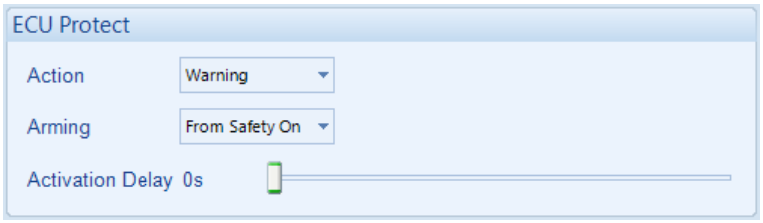
Parameter	Description
ECU Red Action	The action the DSE module takes when receiving and ECU Red fault condition. The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***None*** ***Controlled Shutdown*** ***Shutdown*** ***Warning***
Arming	Select when the DSE module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

ECU Malfunction



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

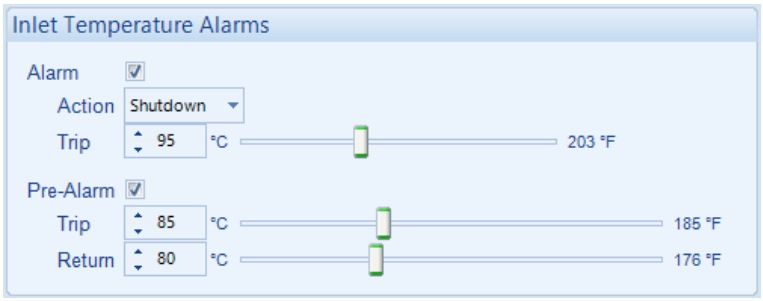
ECU Protect



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

2.7.2.2.3 INLET TEMPERATURE

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



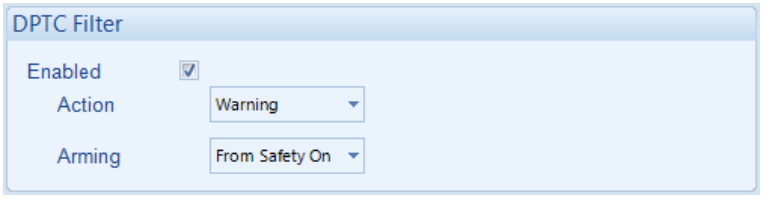
Parameter	Description
Inlet Temperature Alarm	**NOTE: The feature is only available when an electronic engine is selected.** ☐ = Disable the alarm ☑ = *Inlet Temperature Alarm is* activated when the *Inlet Temperature* sent from the ECU rise above the *Trip* level.
Action	Select the type of alarm required from the list: ***Controlled Shutdown*** ***Shutdown*** For details of these, see the section entitled *Alarm Types* elsewhere in this document.
Inlet Temperature Pre-Alarm	☐ = The alarm is disabled. ☑ = *Inlet Temperature Pre-Alarm is* activated when the *Inlet Temperature* sent from the ECU is above the configured *Trip* level The Pre-Alarm is deactivated when the *Inlet Temperature* falls below the *Return* level.

2.7.2.2.4 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.

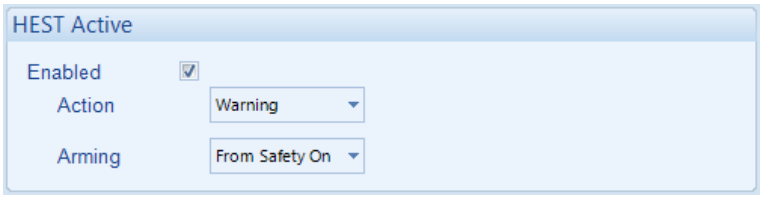
DPTC Filter



Parameter	Description
DPTC Filter Enabled	☐ = The DSE module's *DPTC Filter* alarm is disabled, it does not act upon any DPTC Filter fault conditions from the ECU. ☑ = The DSE module's *DPTC Filter* alarm is enabled. The action the DSE module takes when receiving a DPTC Filter fault condition from the ECU. The alarm action list is as follows, see section entitled *Alarm Types* The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***Controlled Shutdown*** ***Indication*** ***Shutdown*** ***Warning***
Arming	Select when the DSE module activates its *DPTC Filter* alarm. Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***From Safety On*** ***From Starting***

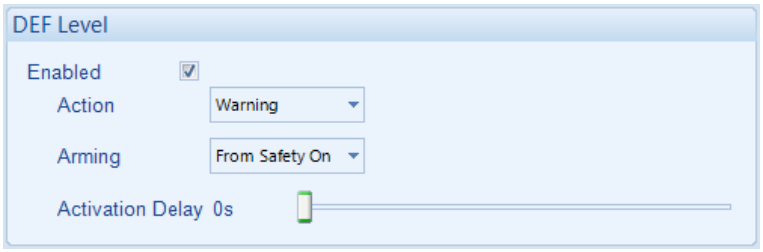
Parameter descriptions are continued overleaf…

HEST Active



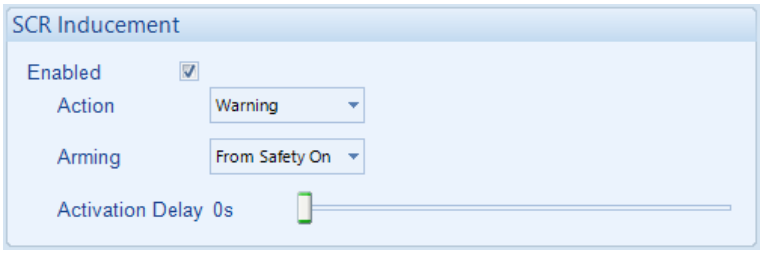
Parameter	Description
HEST Active Enabled	☐ = The DSE module's *HEST* alarm is disabled, it does not act upon any HEST fault conditions from the ECU. ☑ = The DSE module's *HEST* alarm is enabled. The action the DSE module takes when receiving a HEST fault condition from the ECU. The alarm action list is as follows, see section entitled *Alarm Types* The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***Indication*** ***Warning***
Arming	Select when the DSE module activates its *HEST* alarm. Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***From Safety On*** ***From Starting***

DEF Level



Parameter	Description
DEF Level Enabled	☐ = The DSE module's *DEF Level* alarm is disabled; it does not act upon any DEF Level fault conditions from the ECU. ☑ = The DSE module's *DEF Level* alarm is enabled. The action the DSE module takes when receiving a DEF Level fault condition from the ECU. The alarm action list is as follows, see section entitled *Alarm Types* The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***Controlled Shutdown*** ***Shutdown*** ***Warning***
Arming	Select when the DSE module activates its *DEF Level* alarm. Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***Never****:* ***When Stationary***
Activation Delay	The amount of time before the module activates the *DEF Level* alarm after a receiving a DEF Level fault condition from the ECU.

SCR Inducement



Parameter	Description
SCR Inducement Enabled	☐ = The DSE module's *SCR Inducement* alarm is disabled; it does not act upon any SCR Inducement fault conditions from the ECU. ☑ = The DSE module's *SCR Inducement* alarm is enabled. The action the DSE module takes when receiving a SCR Inducement fault condition from the ECU. The alarm action list is as follows, see section entitled *Alarm Types* The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***Controlled Shutdown*** ***Shutdown*** ***Warning***
Arming	Select when the DSE module activates its *SCR Inducement* alarm. Options are as follows, see the section entitled *Alarm Arming* elsewhere in this document: ***Always*** ***From Safety On*** ***From Starting*** ***Loading Alarms Activation*** ***Never****:* ***When Stationary***
Activation Delay	The amount of time before the module activates the *SCR Inducement* alarm after a receiving a SCR Inducement fault condition from the ECU.

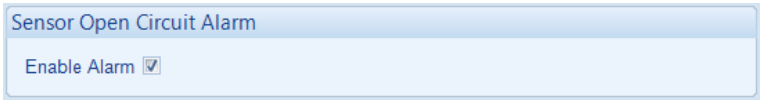
2.7.3 OIL PRESSURE

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

Input Type

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

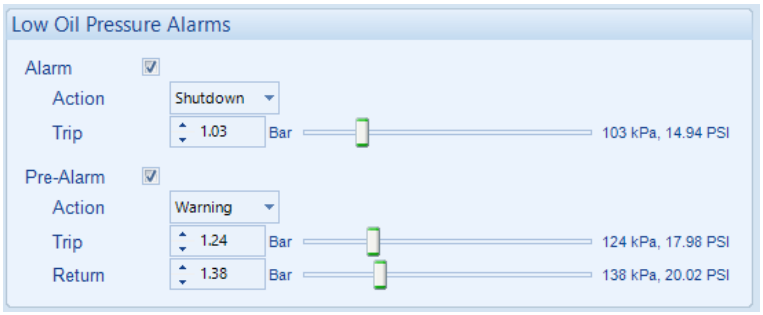
Sensor Open Circuit Alarm



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

Parameter descriptions are continued overleaf…

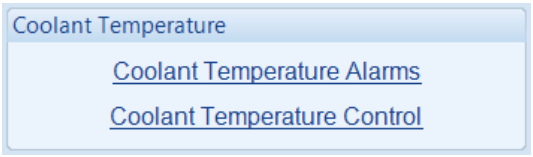
Low Oil Pressure Alarms



Parameter	Description
Low Oil Pressure Alarm	☐ = Alarm is disabled. ☑ = The *Low Oil Pressure Alarm* is active when the measured oil pressure drops below the configured *Trip* level.
Action	Select the type of alarm required from the list: ***Controlled Shutdown*** ***Shutdown*** For details of these, see the section entitled *Alarm Types* elsewhere in this document.
Low Oil Pressure Pre-Alarm	☐ = Alarm is disabled. ☑ = The *Low Oil Pressure Warning Alarm* is active when the measured oil pressure drops below the configured *Trip* level. The warning is automatically reset when the oil pressure increases above the configured *Return* level.
Action	Select the type of alarm required from the list: ***Controlled Shutdown*** ***Shutdown*** For details of these, see the section entitled *Alarm Types* elsewhere in this document.

2.7.4 COOLANT TEMPERATURE

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



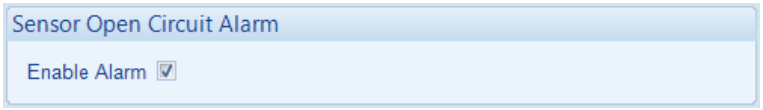
2.7.4.1 COOLANT TEMPERATURE ALARM

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

Input Type

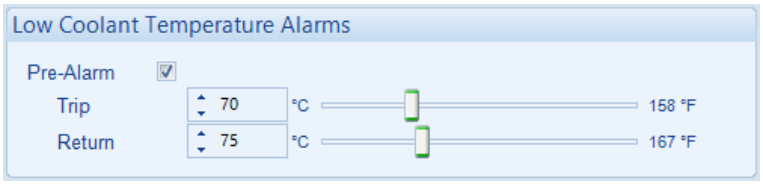
Parameter	Description
Input Type	Select the sensor type and curve from a pre-defined list or create a user-defined curve ***Resistive:*** for sensors with maximum range of 0 Ω to 480 Ω ***Current:*** for sensors with maximum range of 0 mA to 20 mA ***Voltage:*** for sensors with maximum range of 0 V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

Sensor Open Circuit Alarm



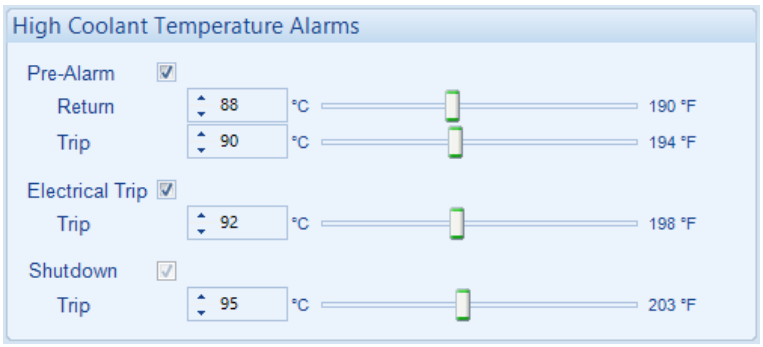
Parameter	Description
Enable Alarm	☐ = Alarm is disabled. ☑ = The *Coolant Temperature Open Circuit* Alarm is active when the module detects an open circuit when the sensor is disconnected

Low Coolant Temperature Alarms



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

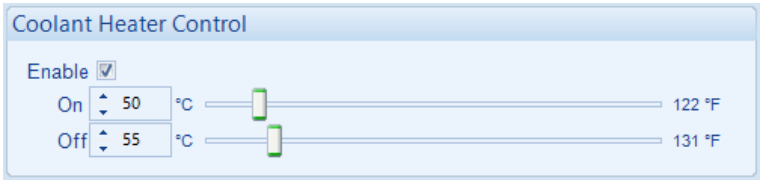
High Coolant Temperature Alarms



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

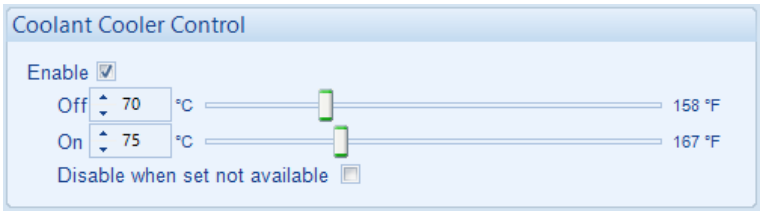
2.7.4.2 COOLANT TEMPERATURE CONTROL

Coolant Heater Control



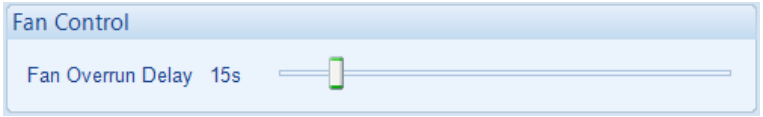
Parameter	Description
Coolant Heater Control	☐ = Coolant Heater Control function is disabled ☑ = The digital output configured to *Coolant Heater Control* is energised when the engine coolant temperature falls below the configured *On* level. This is designed to control an external engine heater. When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

Coolant Cooler Control



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

Fan Control



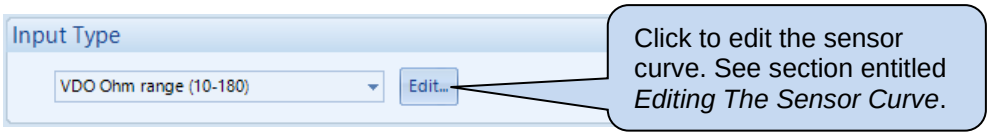
Parameter	Description
Fan Control	An output configured to *Fan Control* energises when the engine becomes available (up to speed). This output is designed to control an external cooling fan. When the engine stops, the cooling fan remains running for the duration of the *Fan Overrun Delay.*

2.7.5 FUEL OPTIONS

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

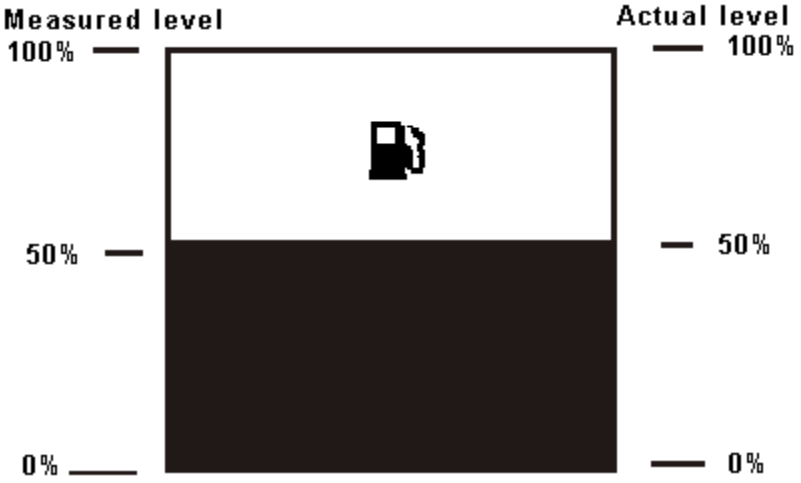
2.7.5.1 FUEL CONTROL AND MONITORING

Input Type



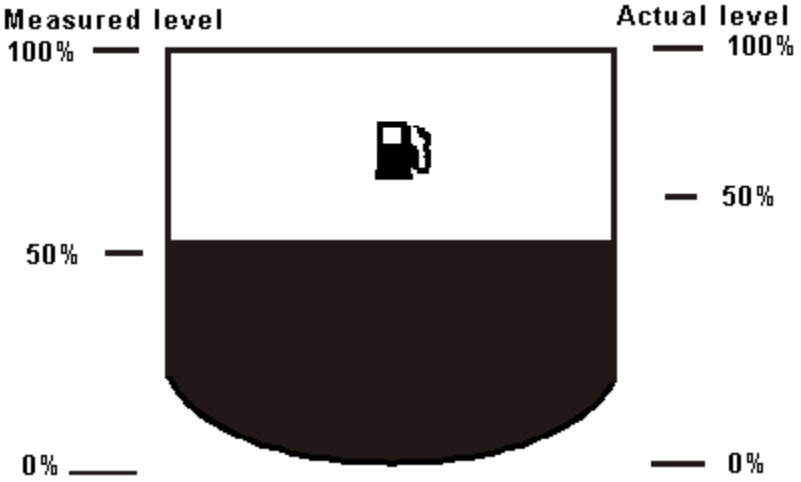
Parameter	Description
Input Type	Select the sensor type and curve from a pre-defined list or create a user-defined curve ***Resistive:*** for sensors with maximum range of 0 Ω to 480 Ω ***Current:*** for sensors with maximum range of 0 mA to 20 mA ***Voltage:*** for sensors with maximum range of 0 V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

In the case of a parallel sided fuel tank, an accurate measure of the fuel level is easily made, however this is not the case with non-parallel sided fuel tanks. Alteration to the fuel level sensor curve is required for non-parallel sided to attain more accurate level indication. This is because a fuel level sensor measures the distance between the top of the tank and the fuel level.



In this example, the distance between the top of the tank and the level of the fuel is 50% of the height of the tank. The fuel level sensor correctly reports the tank as being 50% full.

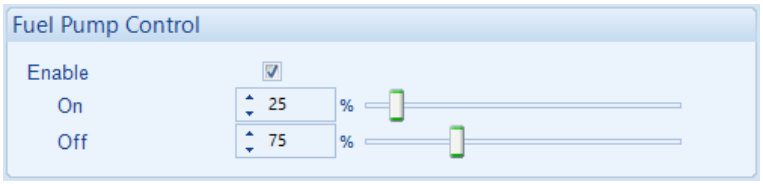
For a parallel-sided tank like this one, 50% distance between the top of the tank and the level of the fuel occurs when the tank is 50% full of fuel.



In this example, the distance between the top of the tank and the level of the fuel is again 50% of the height of the tank.

For this non-parallel sided tank, the actual amount of fuel in the tank is roughly 40%. However, the fuel level sensor incorrectly reports the tank as being 50% full.

Fuel Pump Control



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

Fuel Monitoring

NOTE: Sending events by SMS is only available when the module is configured to communicate to a supported modem by RS232. Refer to section entitled *RS232 Port* elsewhere in this document for further details.

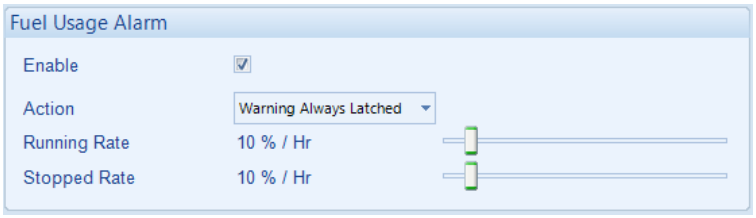
Parameter	Description
Fuel Tank Size	Select the tank size and the units for the module's display: ***Imperial Gallons*** ***Litres*** ***US Gallons***
Logging Interval	The interval at which the fuel level is stored in the event log.
Dial Out on Logging	☐ = Dial Out on Logging is disabled. ☑ = Dial Out on Logging is enabled. When the *Fuel Level* is recorded in the module's event log, the module dials the pre-configured number of a PC.
SMS Enabled	☐ = *Fuel Level Values* are not sent by SMS message. ☑ = The value of the *Fuel Level is sent by SMS message at the configured SMS Interval based on the Logging Interval.*

Continued overleaf…

Parameter	Description
Stable Timer	The controller maintains a rolling record of the fuel level percentage for the duration of the *Stable Timer*. When the rolling record of the fuel level percentage indicates that the fuel level has increased more than the *Change Indicating Filling* during the *Stable Timer*, the controller records a *Fuel Filling Start* event in its event log. When the rolling record of the fuel level indicates that the fuel level has not changed more than the *Change Indicating Stable* during the *Stable Timer*, the controller records a *Fuel Filling Stop* event in its event log.
Change Indicating Filling	When the fuel level increases at a rate higher than **Change Indicating Filling** *Stable Timer* Then a fuel fill start event is recorded into the event log. Depending on configuration this generates a dial out or SMS message. **Example** *Stable Timer* = 1 minute *Change Indicating Filling* = 3 % When the fuel level increases by more than 3% in 1 minute, a fuel fill event is recorded.
Change Indicating Stable	During filling, if the fuel level increases at a rate less than **Change Indicating Stable** *Stable Timer* then a fuel fill end event is recorded into the event log. Depending on configuration this generates a dial out or SMS message. **Example:** *Stable Timer* = 1 minute *Change Indicating Stable* = 2 % When the fuel level increases by less than 2% in 1 minute, a fuel fill end event is recorded.

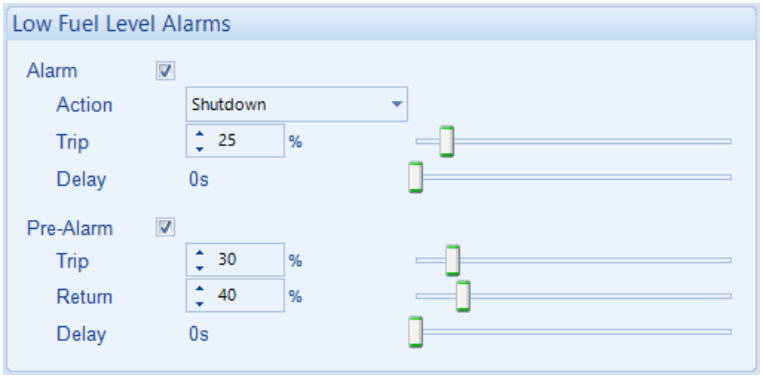
Parameter descriptions are continued overleaf…

Fuel Usage Alarm



Parameter	Description
Enable	☐ = Alarm is disabled. ☑ = Provides an alarm to monitor the usage of the fuel. The alarm activates when the fuel level drops at a higher rate than the configured *Running Rate* while the engine is running. Or if the fuel level drops at a higher rate than the configured *Stopped Rate* while the engine is stopped. This alarm is provided to check for fuel leakage problems or potential fuel theft.
Action	The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***Controlled Shutdown*** ***Latched Indication*** ***Shutdown*** ***Warning Always Latched***

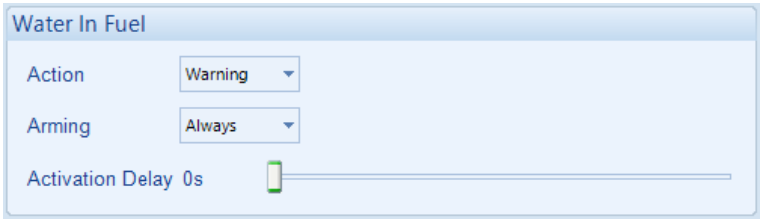
2.7.5.2 FUEL LEVEL ALARMS



Parameter	Description
Low Fuel Level Alarm	☐ = Alarm is disabled. ☑ = The *Low Fuel Level Alarm* activates with the configured *Action* when the measured fuel level drops below the *Trip* setting for the configured *Delay* time.
Action	**NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required from the list: ***Controlled Shutdown*** ***Shutdown***
Low Fuel Level Pre-Alarm	☐ = Alarm is disabled. ☑ = The *Low Fuel Level Pre-Alarm* activates with the configured *Action* when the measured fuel level drops below the *Low Pre-Alarm Trip* setting for the configured *Delay* time. The pre-alarm is automatically reset when the fuel level exceeds the configured *Low Pre-Alarm Return* setting.

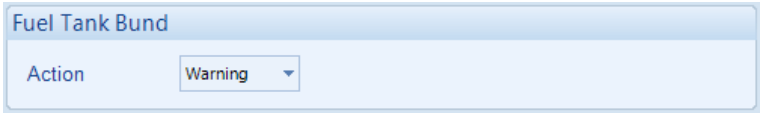
2.7.5.3 ADVANCED ALARMS

Water in Fuel



Parameter	Description
Action	The alarm activates when a *Water in Fuel* alarm is received from the engine ECU, or if a digital input configured for *Water in Fuel* actives for longer than the configured *Activation Delay* timer. The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***None*** ***Controlled Shutdown*** ***Shutdown*** ***Warning***
Arming	Select when the alarm is active, see section entitled *Alarm Arming* for more information: ***Active from Breaker Closed*** ***Active from Parallel*** ***Always*** ***From Safety On*** ***From Starting*** ***Never*** ***When Stationary***

Fuel Tank Bund



Parameter	Description
Action	The alarm goes active when a digital input configured for *Fuel Tank Bund Level High* activates The input is designed to connect to a level switch within the tank bund (sometimes known as the Fuel Retention Tank). This is used to detect fuel leaks and/or overflows. The alarm action list is as follows, see section entitled *Alarm Types* for more information: ***Controlled Shutdown*** ***Shutdown*** ***Warning***

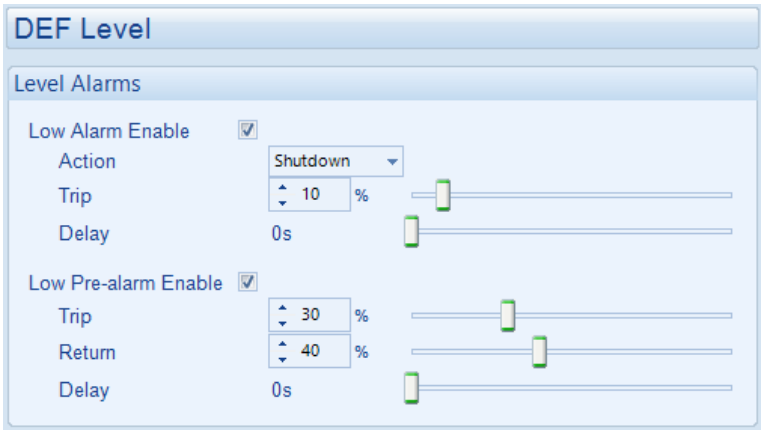
2.7.6 DEF LEVEL

Level Alarms

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

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

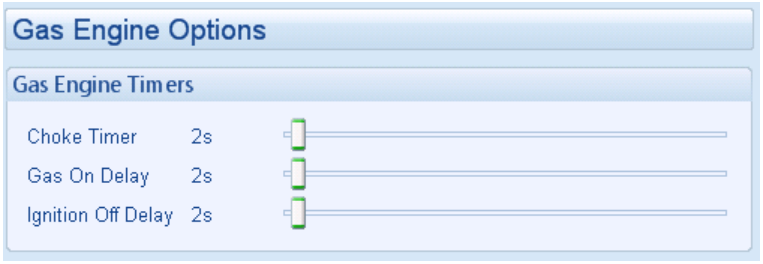
DEF Level is a CANbus message from the ECU (ECM). The following parameters allow configuration of how the DSE module responds to the DEF Level.



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

2.7.7 GAS ENGINE OPTIONS

Gas Engine Timers



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.

2.7.8 CRANKING

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

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

When *Check Oil Pressure Prior to Starting* is enabled, the cranking is not allowed if the oil pressure is not seen as being low. This is used as a *double check* that the engine is stopped before the starter is

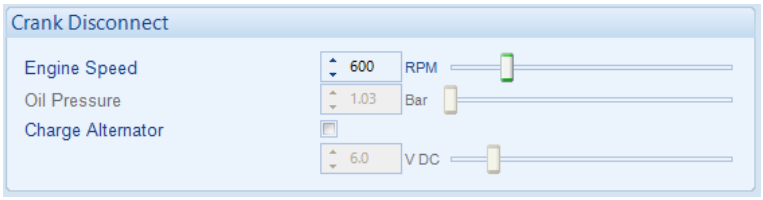
Options

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

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

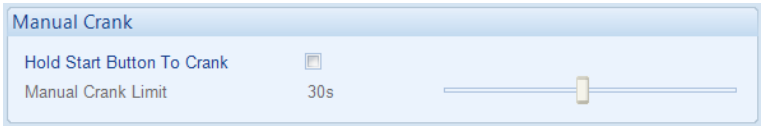
Having more than one *Crank Disconnect* source allows for a much faster crank disconnect response leading to less wear on the engine and starter components. It also provides added safety in case one source is lost, by a blown or tripped fuse for example.

Crank Disconnect



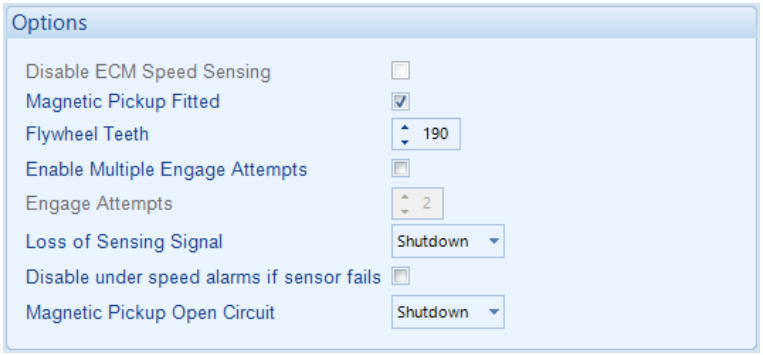
Parameter	Description
Engine Speed	The DSE module disengages the starter motor when the engine speed rises above the configured level.
Oil Pressure	The DSE module disengages the starter motor when the engine oil pressure rises above the configured level for longer than the configured *Delay.*
Charge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

Manual Crank



Parameter	Description
Hold Start Button to Crank	☐ = When in manual mode, pressing the start button momentarily instructs the engine to go through its cranking procedure. ☑ = Releasing the start button during a manual start also disconnects the crank. Manual Crank Limit is provided to protect the engine from being cranked too long in case of a start failure.

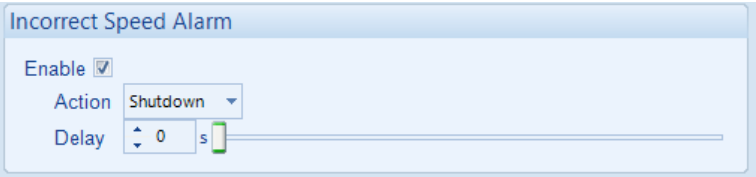
2.7.9 SPEED SENSING



Parameter	Description
Disable ECM Speed Sensing	☐ = An ECM is connected to the DSE module and being used for speed sensing. ☑ = An ECM is connected to the DSE module, but another form of speed sensing fitted to the DSE module is being used.
Magnetic Pickup Fitted	**NOTE: For more detailed information on the Magnetic Pickup Specification, refer to DSE Publication: 057-254 DSEE800 Operator Manual.** ☐ = Magnetic pickup device is not connected to the DSE module. ☑ = A low impedance magnetic pickup device is connected to the DSE module to measure engine speed.
Flywheel Teeth	Define the number of pulses which are counted by the speed sensing device in each engine revolution.
Enable Multiple Engage Attempts	☐ = No engage attempt is given. If no speed sensing is detected during cranking, the *Fail To Start* alarm is active. ☑ = If no magnetic pickup pulses are detected during cranking, it is assumed that the starter has not engaged to turn the engine. The starter is withdrawn and re-energised for the configured number of *Engage Attempts.*
Loss of Sensing Signal	If the speed sensing signal is lost during engine running (or not present during cranking when *Multiple Engage Attempts* is enabled), an alarm is generated: ***Shutdown*** ***Warning***
Disable Under Speed Alarms If Sensor Fails	☐ = Under speed alarms activate even if speed sensor has failed. ☑ = Under speed alarms are disabled when the speed sensor fails.
Magnetic Pickup Open Circuit	If the magnetic pickup device is not detected, an alarm is generated: ***Shutdown*** ***Warning Always Latched***

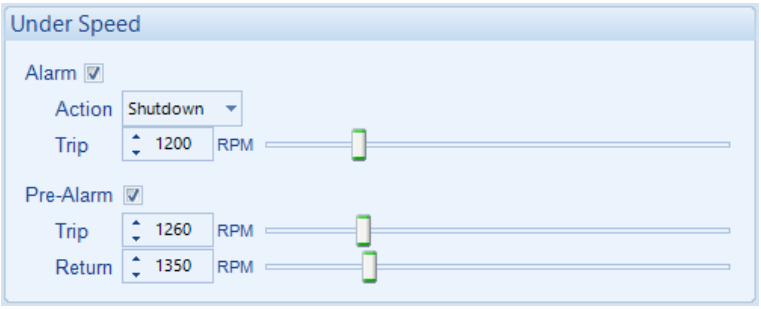
2.7.10 SPEED SETTINGS

Incorrect Speed Alarm



Parameter	Description
Enable	☐ = Alarm is disabled. ☑ = *Incorrect Speed* gives an alarm in the event of the engine speed falling below the required speed for longer than the configured *Delay*. The *Incorrect Speed Alarm Trip* value is adjustable to suit user requirements.
Action	Select the type of alarm required from the list: ***Indication*** ***Shutdown*** ***Warning*** For details of these, see the section entitled *Alarm Types* elsewhere in this document.
Delay	Set the time delay before the *Incorrect Speed Alarm* is activated.

Under Speed

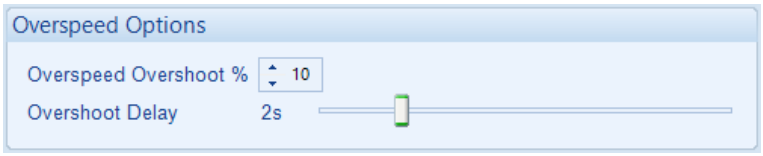


Parameter	Description
Under Speed Alarm	☐ = *Under Speed* alarm is disabled ☑ = Under Speed gives an alarm in the event of the engine speed falling below the configured *Under Speed Alarm Trip* value for longer than the *Engine Transient Delay*. The *Underspeed Alarm Trip* value is adjustable to suit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

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

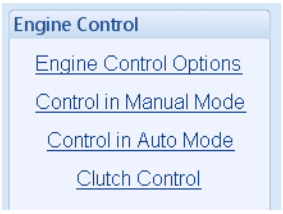
Overspeed Options



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

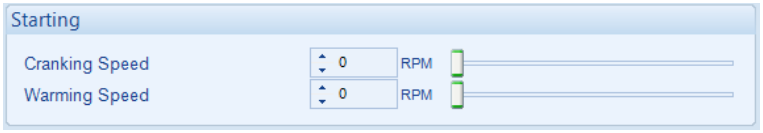
2.7.11 ENGINE CONTROL

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



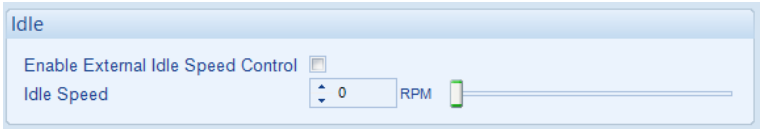
2.7.11.1 ENGINE CONTROL OPTIONS

Starting



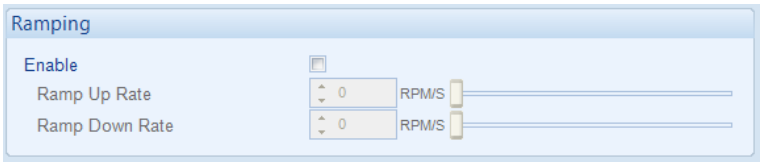
Parameter	Description
Cranking Speed	The voltage produced by the governor output during cranking.
Warming Speed	The voltage produced by the governor output during the *Warming Up* timer

Idle



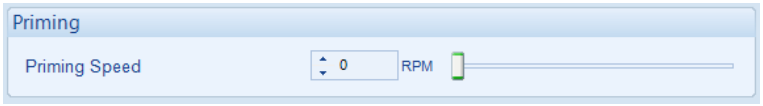
Parameter	Description
Enable	☐ = Idle speed is disabled ☑ = Idle speed is enabled, and the engine speed is switched to idle after the cranking has ended
Idle Speed	The voltage produced by the governor output during the *Safety On Delay* timer and the *Smoke Limit* timer to make the engine run at idle speed.

Ramping



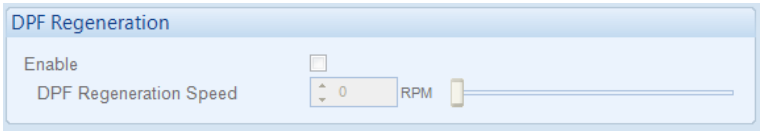
Parameter	Description
Ramping Enabled	☐ = Ramping is disabled when changing from one configured speed to another. ☑ = Ramping is enabled when changing between one configured speed to another. This allows a softer ramp up or ramp down for the engine.
Ramp Up Rate	The rate of the governor output voltage change per second when the speed is requested to switch to higher configured setting.
Ramp Down Rate	The rate of the governor output voltage change per second when the speed is requested to switch to a lower configured setting.

Priming



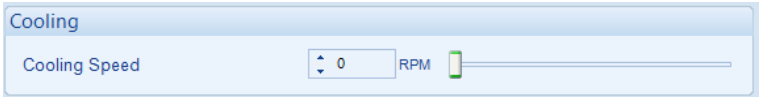
Parameter	Description
Priming Speed	The voltage produced by the governor output during the priming phase.

DPF Regeneration



Parameter	Description
Enable DPF Regeneration Speed RPM	☐ = DPF Regeneration is disabled ☑ = Available when *Non-mission DPF Regeneration* is enabled where supported by the ECU (ECM), the DPF Regeneration is enabled at the configured speed.

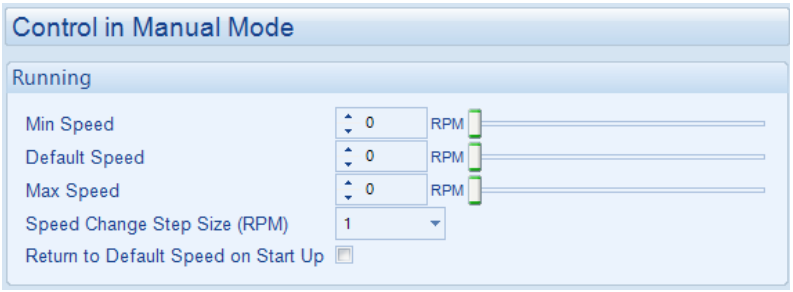
Cooling



Parameter	Description
Cooling Speed	The RPM produced by the governor output during *Cooling Time.*

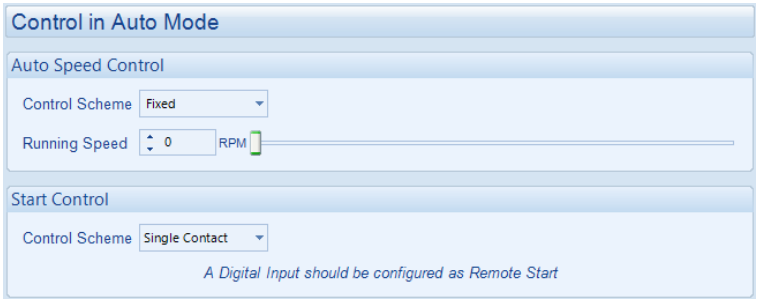
2.7.11.2 CONTROL IN MANUAL MODE

Running



Parameter	Description
Min Speed	The minimum engine speed (RPM) when changing it through the *Throttle Up/Throttle Down* front fascia buttons.
Default Speed	The RPM speed setting to define the default engine running speed. This parameter is changed while the engine is running through the *Throttle Up/Throttle Down* front fascia buttons.
Max Speed	The maximum RPM speed setting when changing the speed through the *Throttle Up/Throttle Down* front fascia buttons.
Speed Change Step Size (RPM)	**NOTE: If ramping is enabled, pressing, and holding the Increase Engine Speed or Decrease Engine Speed buttons cause the target speed to raise or lower according to the ramp rate instead of the step size. For further information, refer to DSE Publication: 057-202 DSEE800 Operator Manual.** The step speed to increase or decrease the engine speed by using a single short press on the ***Increase Engine Speed*** and ***Decrease Engine Speed buttons.***
Return to Default Speed on Start Up	☐ = After stopping the engine, a new start request runs the engine at the previous set speed. ☑ = After stopping the engine, a new start request runs the engine at the configured *Default Speed*.

2.7.11.3 CONTROL IN AUTO MODE



The speed control in *Auto* mode is configurable to different schemes; these are described in the following sections. The configuration in this section defines the speed control scheme when the engine is running in *Auto* mode.

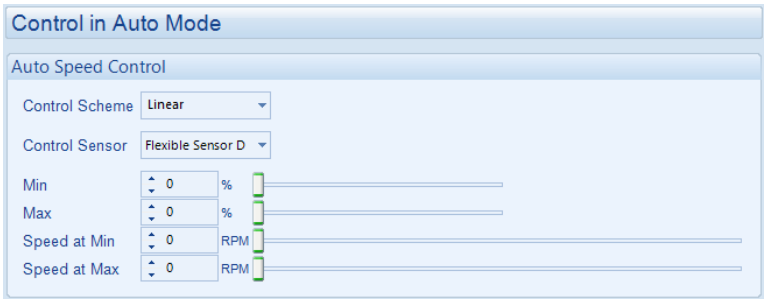
Auto Speed Control (Fixed)

This is used for fixed speed engine application, where the engine runs at constant RPM whenever it starts.

Parameter	Description
Fixed Control Scheme	The *Governor Output* voltage is fixed when the engine is running.
Running Speed	The voltage produced by the governor output to define the default engine running speed.

Auto Speed Control (Linear)

This is used for variable speed engine application, where the engine speed is dependent of an analogue input reading.



Parameter	Description
Linear Control Scheme	The *Governor Output* voltage is linear and is driven by the *Control Sensor* value when the engine is running.
Control Sensor	Select the *Flexible Sensor* to adjust the engine speed when in *Auto* mode. The flexible sensor must be configured to be used.
Min	The minimum limit of the *Flexible Sensor* input. When the flexible sensor is adjusted to this value, the governor output is reduced to the configured *Min Speed* value.
Max	Set the minimum limit of the *Flexible Sensor* input. When the flexible sensor is adjusted to this value, the governor output is increased to the configured *Max Speed* value.
Speed at Min	The minimum voltage produced by the governor output when changing the speed through the *Flexible Sensor* or in manual mode when changing the speed through the *Throttle Up/Throttle Down* front fascia buttons.
Speed at Max	The maximum voltage produced by the governor output when changing the speed through the *Flexible Sensor* or in manual mode when changing the speed through the *Throttle Up/Throttle Down* front fascia buttons.

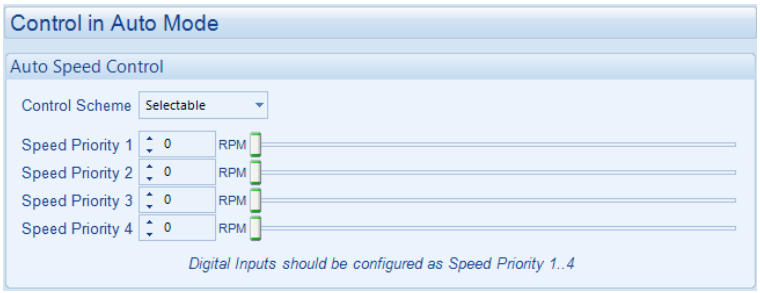
Auto Speed Control (Manual Control)

This is used for variable speed engine application, where the engine speed is defined by the operation of the *Throttle Up/Throttle Down* front fascia buttons.

Parameter	Description
Manual Control Scheme	The *Governor Output* voltage is manual and is defined by the configuration of the *Control in Manual Mode.*

Auto Speed Control (Selectable)

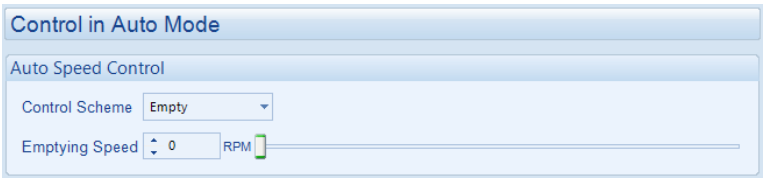
This is used for variable speed engine application where the speed is defined by activation of digital inputs configured for *Speed Priority.*



Parameter	Description
Selectable Control Scheme	The *Governor Output* voltage is defined by the activation of digital inputs configured for *Speed Priority.*
Speed Priority 1	Set the governor output voltage when activating the *Speed Priority 1* digital input.
Speed Priority 2	Set the governor output voltage when activating the *Speed Priority 2* digital input.
Speed Priority 3	Set the governor output voltage when activating the *Speed Priority 3* digital input.
Speed Priority 4	Set the governor output voltage when activating the *Speed Priority 4* digital input.

Auto Speed Control (Empty)

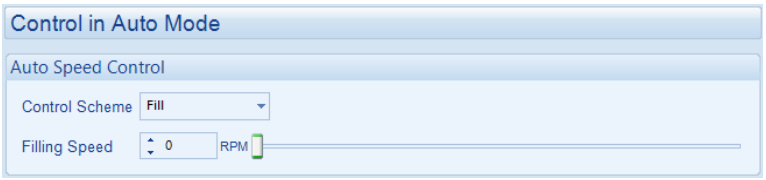
This is used for fixed speed engine application, where the engine runs at constant RPM whenever it starts.



Parameter	Description
Empty Control Scheme	The *Governor Output* voltage is fixed when the engine is running.
Emptying Speed	The voltage produced by the governor output to define the default engine running speed.

Auto Speed Control (Fill)

This is used for fixed speed engine application, where the engine runs at constant RPM whenever it starts.

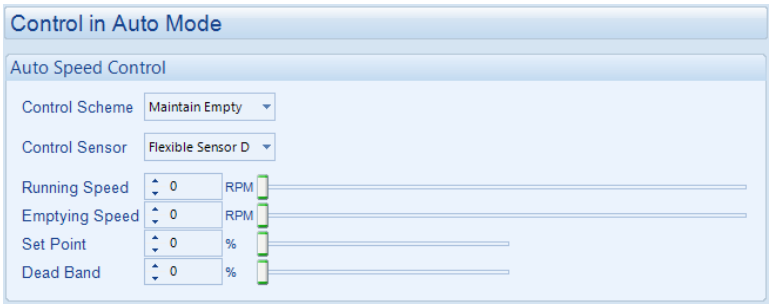


Parameter	Description
Fill Control Scheme	The *Governor Output* voltage is fixed when the engine is running.
Emptying Speed	The voltage produced by the governor output to define the default engine running speed.

Auto Speed Control (Maintain Empty)

NOTE: A *Flexible Sensor* must be configured and selected as a *Control Sensor*; otherwise, the DSE Configuration Suite software does not allow the file to be written to the controller.

This is used for pump control application, where the engine drives a fluid pump to maintain an empty level of a tank.

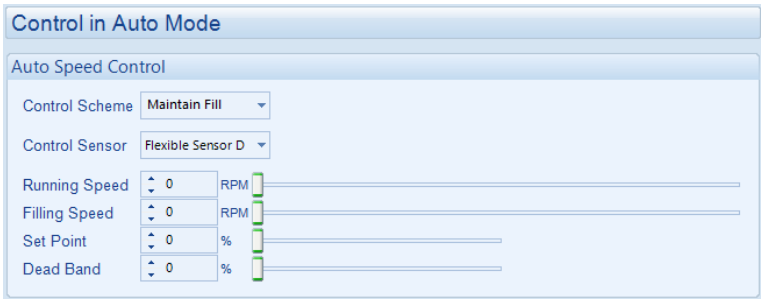


Parameter	Description
Maintain Empty Control Scheme	The *Governor Output* voltage is dependent on the *Control Sensor* level. When the *Control Sensor* value is below the configured *Set Point* by the *Dead Band*, the engine runs at the *Running Speed.* When the *Control Sensor* measured value goes above the configured *Set Point* by the *Dead Band*, then the engine runs at the *Emptying Speed.*
Control Sensor	Select the *Flexible Sensor* to adjust the engine speed when in *Auto* mode. The flexible sensor must be configured to be used.
Running Speed	The voltage produced by the governor output when the *Control Sensor* value is below the configured *Set Point* by the *Dead Band* amount.
Emptying Speed	The voltage produced by the governor output when the *Control Sensor* value is above the configured *Set Point* by the *Dead Band* amount.
Set Point	The value at which the empty level is maintained.
Dead Band	The range around the *Set Point* to start or stop the emptying process.

Auto Speed Control (Maintain Fill)

NOTE: A Flexible Sensor must be configured and selected as a Control Sensor; otherwise, the DSE Configuration Suite software does not allow the file to be written to the controller.

This is used for pump control application, where the engine drives a fluid pump to maintain a full level of a tank.



Parameter	Description
Maintain Fill Control Scheme	The *Governor Output* voltage is dependent on the *Control Sensor* level. When the *Control Sensor* value is above the configured *Set Point* by the *Dead Band*, the engine runs at the *Running Speed.* When the *Control Sensor* measured value goes below the configured *Set Point* by the *Dead Band*, then the engine runs at the *Filling Speed.*
Control Sensor	Select the *Flexible Sensor* to adjust the engine speed when in *Auto* mode. The flexible sensor must be configured to be used.
Running Speed	The voltage produced by the governor output when the *Control Sensor* value is above the configured *Set Point* by the *Dead Band* amount.
Filling Speed	The voltage produced by the governor output when the *Control Sensor* value is below the configured *Set Point* by the *Dead Band* amount.
Set Point	The value at which the full level is maintained.
Dead Band	The range around the *Set Point* to start or stop the filling process.

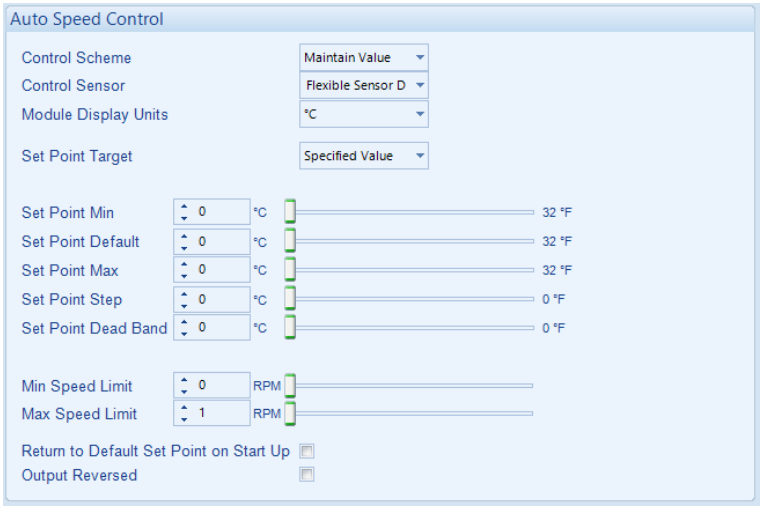
Auto Speed Control (Maintain Value with *Control Sensor* Configured as *Flexible Sensor*)

NOTE: A *Flexible Sensor* or PLC *Register* or *Store* must be configured and selected as the *Control Sensor* for the *Maintain Value* function to be enabled.

NOTE: The *Set Point Min / Max* provides an operational range within which the *Set Point Default* value is configured. The *Set Point Default* value is also adjustable via the module facia buttons. For further details refer to DSE Publication: *057-202 DSEE800 Operator Manual*

NOTE: The *Maintain Value* scheme is a closed loop control function using PID. For tuning of the PID parameters, refer to section entitled *Engine Control* detailed elsewhere within this document.

Maintain value allows the engine to automatically increase or decrease the engine fuel and air supply in order maintain a specific value. The *Set Point* parameters define the value that is to be maintained and allowed movement around that value.

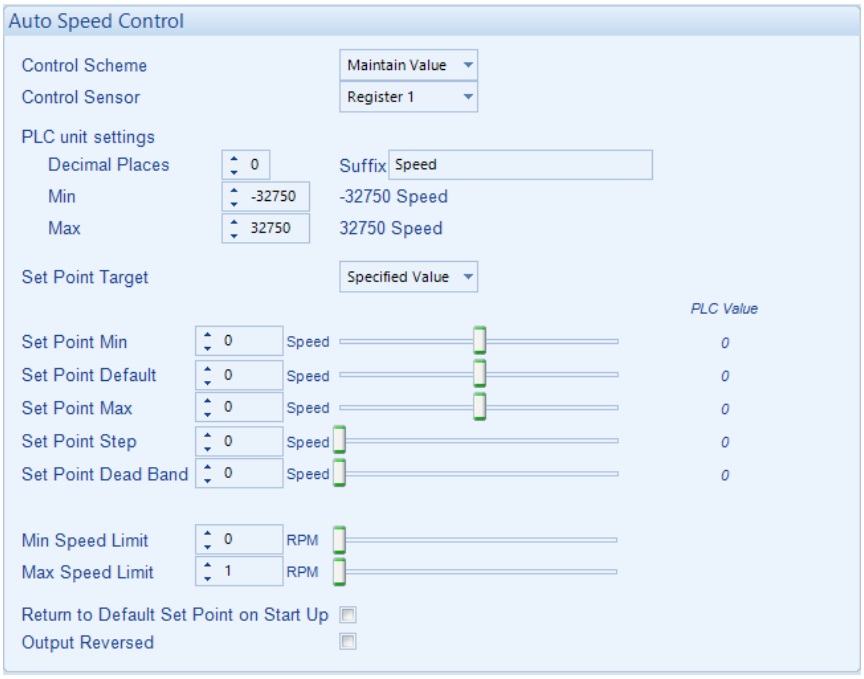


Parameter	Description
Control Scheme	***Maintain Value:*** The *Governor Output* voltage is dependent on the *Control Sensor* level. When the *Control Sensor* value is within the *Set Point Dead Band*, the speed is not changed. When the measured *Control Sensor* value goes above or below the *Set Point Dead Band*, the engine increases / decreases its RPM until the measured value matches the *Set Point Default* Value
Control Sensor	Select the *Flexible Sensor* or *PLC Register/Store* that is used to measure the value that is to be maintained.
Module Display Units	The unit that that Set point is displayed as on the module facia.

Parameters continued overleaf…

Parameter	Description
Set Point Target	**NOTE: The *Set Point Default* value is also adjustable via the module facia buttons and the SCADA section of configuration suite. For further details refer to DSE Publication: 057-202 DSEE800 Operator Manual and section entitled *Engine Control* located elsewhere in this manual** Configure the *Set Point Target* Value that the Engine will maintain. ***Specified Value:*** The engine specifies the *Set Point Default* as its target value. The *Set Point Default* value is also adjustable via the module facia buttons and the SCADA section of configuration suite. ***Register*:** Maintains a target value equivalent to the value located in the PLC memory Register. ***Store:*** Maintains a target value equivalent to the value located in the PLC memory Store.
Set Point Min	The minimum value that the *Set Point Default* is adjustable to. The absolute limits of this parameter are defined by the *Sensor Curve.*
Set Point Default	**NOTE: Not configurable when the *Set Point Target* parameter is configured as a PLC *Register* or *Store*** The default value that engine is expected to maintain. The *Set Point Default* value is also adjustable via the module facia buttons and the SCADA section of configuration suite.
Set Point Max	The maximum value that the *Set Point Default* is adjustable to. The absolute limits of this parameter are defined by the *Sensor Curve*
Set Point Step	**NOTE: Not configurable when the *Set Point Target* parameter is configured as a PLC *Register* or *Store*** The offset step range by which the *Set Point Default* is changed by via the facia *Speed Up* and *Speed Down* buttons.
Set Point Dead Band	The range around the *Set Point Default* whereby the engine speed is not changed. Once outside this range the engine reduces or increases its speed to maintain the *Set Point Default* value.
Min Speed Limit	The minimum speed the engine runs at in order to maintain it's *Set Point Default.* The absolute limits of this parameter are defined by the *Governor Curve*
Max Speed Limit	The maximum speed the engine runs at in order to maintain it's *Set Point Default*. The absolute limits of this parameter are defined by the *Governor Curve*
Return to Default Set Point on Start Up	**NOTE: Not configurable when the *Set Point Target* parameter is configured as a PLC *Register* or *Store*** ☐ = After stopping the engine, a new start request runs the engine at the same set point value that the engine last ran at (*Set Point Default* in addition to the *Set Point Step*). ☑ = After stopping the engine, a new start request runs the engine at the configured *Set Point Default* value.
Output Reversed	☐ **=** Lower analogue output voltage equates to lower engine speed. ☑ **=** Lower analogue output voltage equates to higher engine speed.

Auto Speed Control (Maintain Value with *Control Sensor* Configured as PLC *Register/Store)*



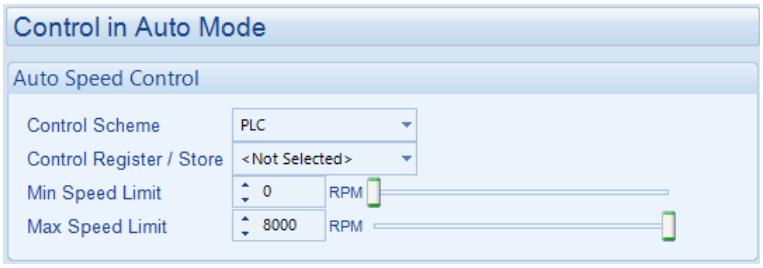
Parameter	Description
Control Scheme	***Maintain Value:*** The *Governor Output* voltage is dependent on the *Control Sensor* level. When the *Control Sensor* value is within the *Set Point Dead Band*, the speed is not changed. When the measured *Control Sensor* value goes above or below the *Set Point Dead Band*, the engine increases / decreases its RPM until the measured value matches the *Set Point Default* Value
Control Sensor	Select the *Flexible Sensor* or *PLC Register/Store* that is used to measure the value that is to be maintained.
Decimal	The PLC Decimal Place location within the PLC Register/Store.
Suffix	The Suffix used to define the PLC Register/Store value.
Min	The Minimum value range the *Set Point Min* is configured within. Outside this value the PLC Register/Store value is considered is invalid.
Max	The Maximum value range the *Set Point Max* is configured within. Outside this value the PLC Register/Store value is considered is invalid.
Set Point Target	**NOTE: The *Set Point Default* value is also adjustable via the module facia buttons and the SCADA section of configuration suite. For further details refer to DSE Publication: 057-202 DSEE800 Operator Manual and section entitled *Engine Control* located elsewhere in this manual** Configure the *Set Point Target* Value that the Engine will maintain. ***Specified Value*:** The engine specifies the *Set Point Default* as its target value. The *Set Point Default* value is also adjustable via the module facia buttons and the SCADA section of configuration suite. ***Register:*** Maintains a target value equivalent to the value located in the PLC memory Register. ***Store:*** Maintains a target value equivalent to the value located in the PLC memory Store.

Continued overleaf…

Parameter	Description
Set Point Min	The minimum value that the *Set Point Default* is adjustable to. The absolute limits of this parameter are defined by the *Sensor Curve.*
Set Point Default	⚠ **NOTE: Not configurable when the *Set Point Target* parameter is configured as a PLC *Register* or *Store*** The default value that engine is expected to maintain. The *Set Point Default* value is also adjustable via the module facia buttons and the SCADA section of configuration suite.
Set Point Max	The maximum value that the *Set Point Default* is adjustable to. The absolute limits of this parameter are defined by the *Sensor Curve*
Set Point Step	⚠ **NOTE: Not configurable when the *Set Point Target* parameter is configured as a PLC *Register* or *Store*** The offset step range by which the *Set Point Default* is changed by via the facia *Speed Up* and *Speed Down* buttons.
Set Point Dead Band	The range around the *Set Point Default* whereby the engine speed is not changed. Once outside this range the engine reduces or increases its speed to maintain the *Set Point Default* value.
Min Speed Limit	The minimum speed the engine runs at in order to maintain it's *Set Point Default.* The absolute limits of this parameter are defined by the *Governor Curve*
Max Speed Limit	The maximum speed the engine runs at in order to maintain it's *Set Point Default*. The absolute limits of this parameter are defined by the *Governor Curve*
Return to Default Set Point on Start Up	⚠ **Note: Not configurable when the *Set Point Target* parameter is configured as a PLC *Register* or *Store*** ☐ = After stopping the engine, a new start request runs the engine at the same set point value that the engine last ran at (*Set Point Default* in addition to the *Set Point Step*). ☑ = After stopping the engine, a new start request runs the engine at the configured *Set Point Default* value.
Output Reversed	☐ **=** Lower analogue output voltage equates to lower engine speed. ☑ **=** Lower analogue output voltage equates to higher engine speed.

Auto Speed Control (PLC)

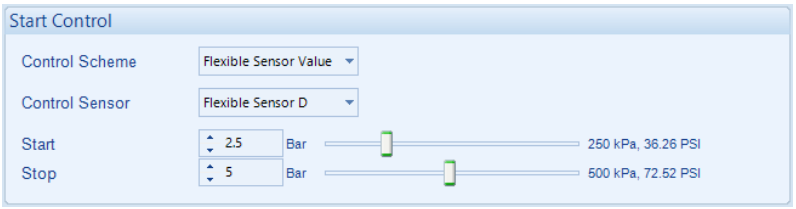
NOTE: A *PLC Register* or *Store* must be configured and selected as a *Control Register/Store* for the *PLC Control Scheme* function to be enabled.



Parameter	Description
Control Scheme	***PLC:*** The *Governor Output* voltage is dependent on the PLC control scheme being selected.
Control Register / Store	Select the PLC Register or store value which the engine should maintain.
Min Speed Limit	The minimum speed the engine runs at in order to maintain its PLC *Register / Store value.*
Max Speed Limit	The maximum speed the engine runs at in order to maintain its PLC *Register / Store value.*

Start Control

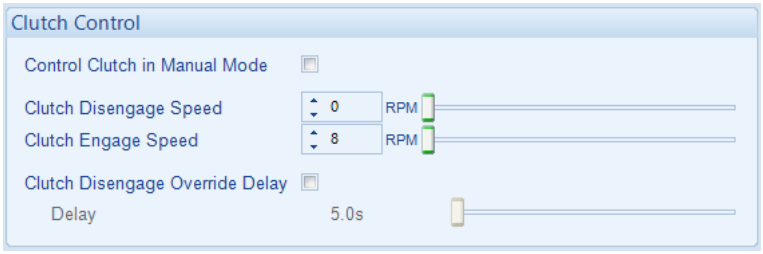
The *Start Control* is selected from different types. This determines the module's response to the start/stop input functions when in Auto mode.



Parameter	Description
Control Scheme	***Flexible Sensor Value****:* The engine is started and stopped depending on configurable flexible sensor values ***Float Contacts:*** When a *Remote Start Off Load/On Load* input function becomes deactivated for longer than the *Remote Start Off Load/On Load Delay* timer and the *Delayed Engine Start*, the engine is then started. The engine keeps running even if the *Remote Start Off Load/On Load* input function changes its state. The engine is stopped when the *Remote Stop* is active for longer than the *Delayed Engine Stop* time. ***Single Contact:*** The engine is started when a *Remote Start On Load/Off Load* input function is active longer than the respective start delay timer. Upon removal of the start request, the stopping sequence is initiated. ***Start/Stop Contacts:*** The engine is started when a *Remote Start On Load/Off Load* input function is active longer than the *Remote Start Off Load/On Load Delay* timer. The engine keeps running even if the *Remote Start Off Load/On Load* input function changes its state. When the *Remote Stop* input is active, the stopping sequence is then initiated.
Control Sensor	Select the flexible sensor to control the starting and stopping of the engine, This is only available when the *Start Control* is configured as a *Flexible Sensor Value*.
Start	When the *Start Control* scheme is configured as *Flexible Sensor*, the engine is started when the sender value reaches the configurable *Start* level.
Stop	When the *Start Control* scheme is configured as *Flexible Sensor*, the engine is stopped when the sender value reaches the configurable *Stop* level.

2.7.11.4 CLUTCH CONTROL

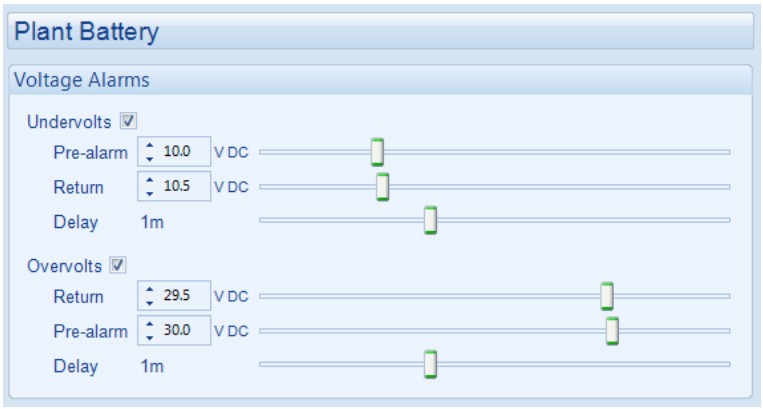
Clutch Control



Parameter	Description
Control Clutch in Manual Mode	☐ = *Clutch Control* is disabled in *Manual* mode. ☑ = *Clutch Control* is enabled in *Manual* mode as well as in *Auto Mode.*
Clutch Disengage Speed	The digital output configured for *Clutch Control* is de-activated when the engine speed falls below the *Clutch Disengage Speed.*
Clutch Engage Speed	The digital output configured for *Clutch Control* is activated when the engine speed rises above the *Clutch Engage Speed.*
Clutch Disengage Override Delay	☐ = *Clutch Disengage Override Delay* is disabled. ☑ = *Clutch Disengage Override Delay* is *enabled.* This feature allows for a time *Delay* upon the clutch disengage being triggered. This allows engine RPM to fall further below the *Clutch Disengage Speed.* This helps limit overspeed and prevents unnecessary clutch Disengage/Engage commands.

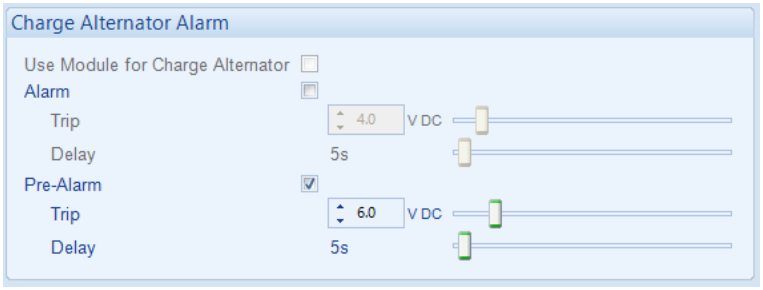
2.7.12 PLANT BATTERY

Voltage Alarms



Parameter	Description
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.
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.

Charge Alternator Alarm



Parameter	Description
Charge Alternator Alarm	The alarm activates when the charge alternator voltage falls below the configured *Trip* level for the configured *Delay* time.
Charge Alternator Pre-Alarm	The alarm activates when the charge alternator voltage falls below the configured *Trip* level for the configured *Delay* time.

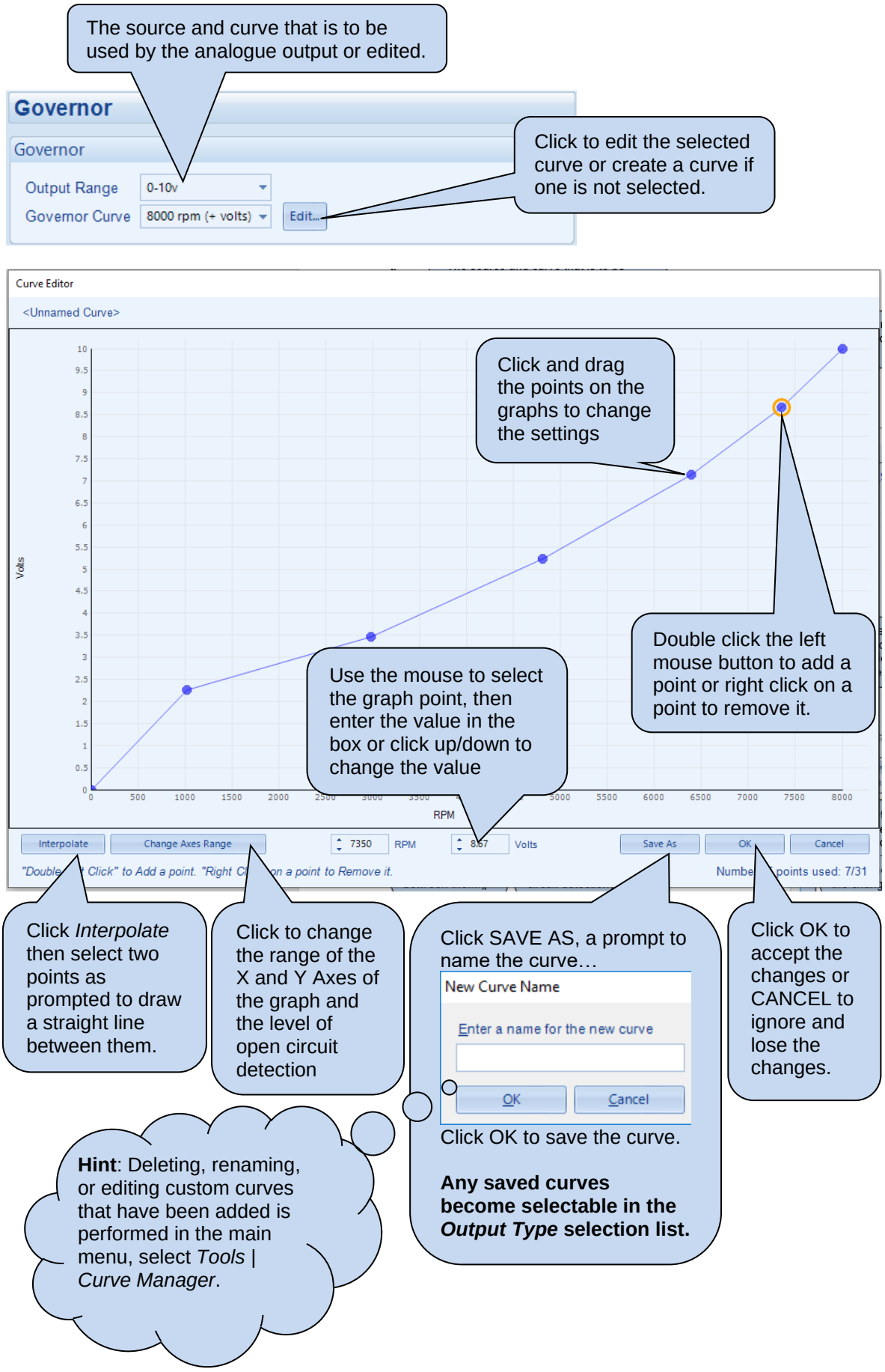
2.7.13 GOVERNOR

Governor

This is used to provide a DC voltage output to interface with many engine speed governors remote speed adjusts inputs.

Parameter	Description
Output Range	Define the voltage range of the *Governor Output*: ***0 V to 10 V*** ***-10 V to 0V***
Governor Curve	Allows the creation and selection between different output curves. The curve defines the *Governor Output* voltage required to maintain the engine RPM.

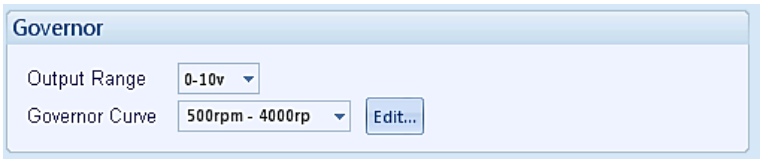
2.7.13.1 CREATING / EDITING THE GOVERNOR CURVE



Example

For a governor with a speed range of 500 rpm to 4000 rpm controlled by a speed control input range of 0 V to 10 V, the required curve is defined as follows:

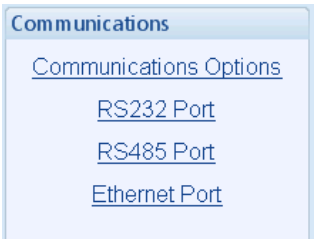
First the *Output Range* is defined as 0-10v, and a custom curve is created using the *Edit Curve* button.



The curve is shaped to represent the voltage output required to control the governor among the full range of speed.

2.8 COMMUNICATIONS

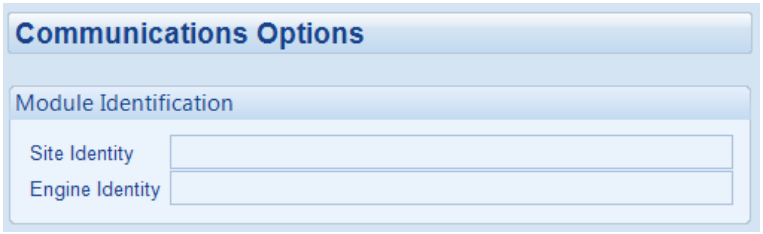
The *Communications* page is subdivided into smaller sections.
Select the required section with the mouse.



2.8.1 COMMUNICATION OPTIONS

Module Information

Provides a means of giving the controller an identity. This is used in the SCADA section to allow the operator to see the site name and engine identity that it is currently connected to. This feature could be used when a remote module is connected over modem or Ethernet.



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

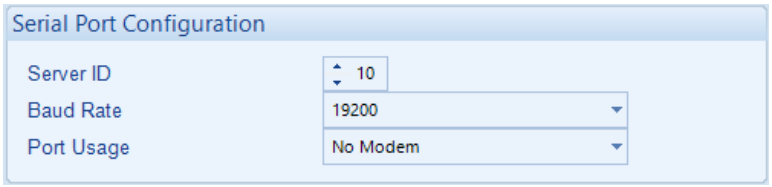
2.8.2 RS232 PORT

The *RS232 Port* page is subdivided into smaller sections.
Select the required section with the mouse.

2.8.2.1 BASIC

Serial Port Configuration

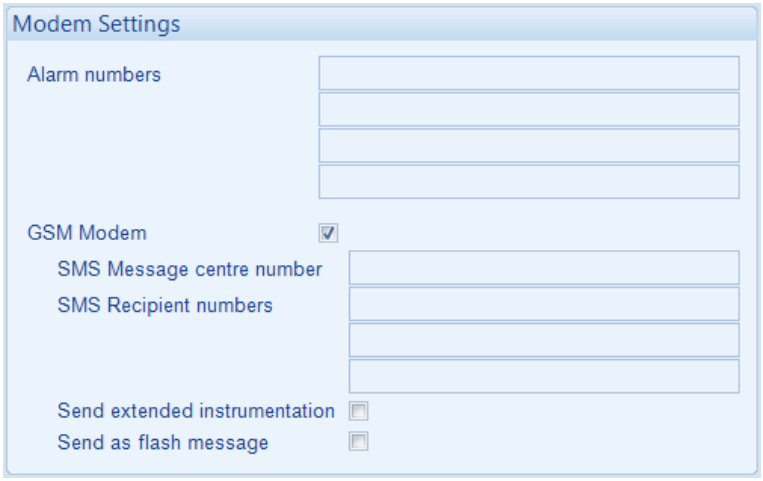
NOTE: Connecting a modem directly to the module's RS232 for is legacy support only. When a new installation requires remote communication using the cellular network is required, refer to DSE products DSE890 MKII, DSE891 and DSEWebNet on the DSE website: www.deepseaelectronics.com.



Parameter	Description
Server ID	Select the Server ID of the DSE module's RS232 port.
Baud Rate	Select the Baud Rate (speed of communication) of the DSE module's RS232 port. Every device on the RS232 link must have the same Baud Rate. ***1200*** ***2400*** ***4800*** ***9600*** ***14400*** ***19200*** ***28800*** ***38400*** ***57600*** ***115200***
Port Usage	***No Modem:*** RS232 ports is used for direct RS232 connection to PLC, BMS etc ***Incoming Modem Calls:*** RS232 port connected to modem, used to accept incoming calls from a PC only. ***Incoming And Outgoing Modem (Sequence):*** RS232 port connected to modem used to accept incoming calls from a PC and also make calls upon events. When multiple *Alarm Numbers* are configured, the module attempts to dial each number. When the dial out call fails to one of the configured numbers, the module attempts to call that number for the configured number of *Retries*, before it carries on to the next number. ***Incoming And Outgoing Modem (Cyclic):*** RS232 port connected to modem used to accept incoming calls from a PC and also make calls upon events. When multiple *Alarm Numbers* are configured, the module attempts to dial each number. When the dial out call fails to one of the configured numbers, the module completes the cycle and re-attempts to call those numbers for the configured number of *Retries*. ***Outgoing Modem Alarms (Sequence):*** RS232 port connected to modem, used to make calls upon events. When multiple *Alarm Numbers* are configured, the module attempts to dial each number. When the dial out call fails to one of the configured numbers, the module attempts to call that number for the configured number of *Retries*, before it carries on to the next number. ***Outgoing Modem Alarms (Cyclic):*** RS232 port connected to modem, used to make calls upon events. When multiple *Alarm Numbers* are configured, the module attempts to dial each number. When the dial out call fails to one of the configured numbers, the module completes the cycle and re-attempts to call those numbers for the configured number of *Retries*.

Modem Settings

NOTE: Connecting a modem directly to the module's RS232 for is legacy support only. When a new installation requires remote communication using the cellular network is required, refer to DSE products DSE890 MKII, DSE891 and DSEWebNet on the DSE website: www.deepseaelectronics.com.

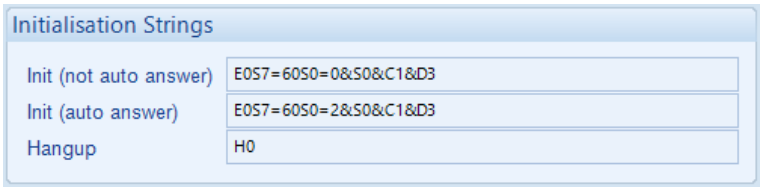


Parameter	Description
Alarm Numbers	The phone number that the module dials upon an event. This number must be connected to a PC modem on a PC running the DSE Configuration Suite Software. Leave this field empty when dial-out to a PC is not required.
GSM Modem	☐ = The connected modem is a fixed line telephone modem ☑ = The connected modem is a GSM (cellular) modem. The GSM signal strength meter and GSM operator are shown on the module display.
SMS Message Centre Number	The Message centre used to send SMS messages. This number is obtained from the GSM operator.
SMS Recipient Numbers	Numbers of the cell phones to send SMS messages to. Leave blank if SMS function is not required.
Send Extended Instrumentation	☐ = The SMS message that is sent only contains information about the event. ☑ = When the module sends an SMS message for an event, it also contains information about the engine (such as oil pressure) at the time the event occurred.
Send as Flash Message	☐ = The type of SMS message that is sent is standard. ☑ = The type of SMS message that is sent is a flash message. A flash SMS is a type of message that without user action appears directly and full screen on the phone.

2.8.2.2 ADVANCED

NOTE: Connecting a modem directly to the module's RS232 for is legacy support only. When a new installation requires remote communication using the cellular network is required, refer to DSE products DSE890 MKII, DSE891 and DSEWebNet on the DSE website: www.deepseaelectronics.com.

Initialisation Strings



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

Factory Set Initialisation Strings

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

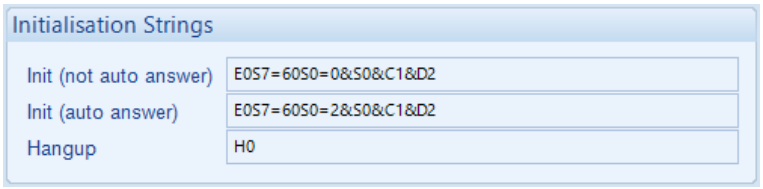
Silent Operation

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

Parameter	Description
M0	Silent operation
M1	Sounds during the initial stages of making a data call
M2	Sounds always when connected (not recommended for troubleshooting)

Sierra/Wavecom Fastrak Supreme GSM Modem Initialisation Strings

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

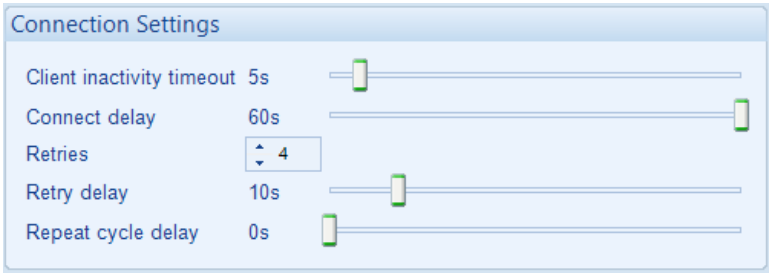


Parameter	Description
&D2 (required for Sierra / Wavecom Fastrak Supreme)	Hang up on DTR-drop
&D3 (DSE module factory settings)	Reset on DTR-drop

Other Modems

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

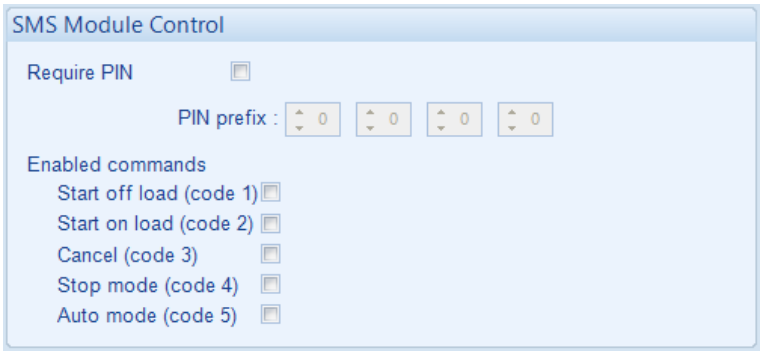
Connection Settings



Parameter	Description
Client Inactivity Timeout	The module monitors by default the USB port for communications. When activity is detected on the RS232 port, the module monitors the port for further data. If no data activity is detected on the port for the duration of the *Client Inactivity Timer*, it reverts to looking at the USB port. This needs to be set longer than the time between Modbus polls from the client.
Connect Delay	The amount of time that is allowed to elapse between the alarm being registered and the controller dialling out with the fault.
Retries	The number of times the module attempts to contact the remote PC by modem.
Retry Delay	The amount of time between retries
Repeat Cycle Delay	The amount of time between the cycle repeats when dialling out calls to multiple *Alarm Numbers* fails.

2.8.2.3 SMS CONTROL

NOTE: Connecting a modem directly to the module's RS232 for is legacy support only. When a new installation requires remote communication using the cellular network is required, refer to DSE products DSE890 MKII, DSE891 and DSEWebNet on the DSE website: www.deepseaelectronics.com.



Parameter	Description
Require PIN	☐ = A control code sent by SMS does not require a PIN code entered before the code. ☑ = For security, the configured *PIN Prefix* must be entered in the SMS prior to the control code.
Start Off Load (Code 1)	☐ = Sending code 1 to the module via SMS does not issue a *Start Off Load* command. ☑ = When in Auto mode, the module performs the start sequence, but the engine is not instructed to take the load when code 1 is sent via SMS. This function is used where an engine only run is required e.g. for exercise.
Start On Load (Code 2)	☐ = Sending code 2 to the module via SMS does not issue a *Start On Load* command. ☑ = When in auto mode, the module performs the start sequence and transfer load to the engine when code 2 is sent via SMS.
Cancel (Code 3)	☐ = Sending code 3 to the module via SMS does not issue a cancel the start command issued by code 1 or 2. ☑ = Sending code 3 to the module via SMS cancels the start command issued by code 1 or 2.
Stop Mode (Code 4)	☐ = Sending code 4 to the module via SMS does not issue place the unit into its *Stop Mode*. ☑ = Sending code 4 to the module via SMS mimics the operation of the 'Stop' button and is used to provide a remote SMS stop command.
Auto Mode (Code 5)	☐ = Sending code 5 to the module via SMS does not issue place the unit into its *Auto Mode*. ☑ = Sending code 5 to the module via SMS mimics the operation of the Auto button.

2.8.2.4 TROUBLESHOOTING MODEM COMMUNICATIONS

NOTE: Connecting a modem directly to the module's RS232 for is legacy support only. When a new installation requires remote communication using the cellular network is required, refer to DSE products DSE890 MKII, DSE891 and DSEWebNet on the DSE website: www.deepseaelectronics.com.

2.8.2.4.1 MODEM COMMUNICATION SPEED SETTING

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

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

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

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

When connected, enter the following command:

AT+IPR=9600 and press <ENTER>
This sets the modem to 9600 baud.

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

Enter the following command:

AT&W and press <ENTER>

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

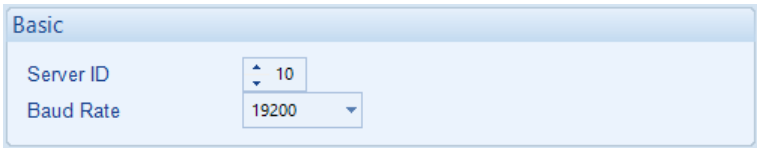
2.8.2.4.2 GSM MODEM CONNECTION

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

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

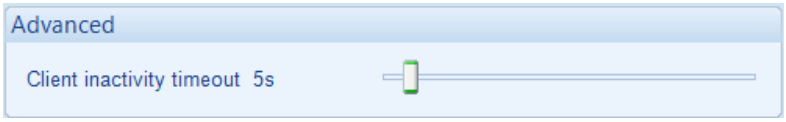
2.8.3 RS485 PORT

Basic



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

Advanced

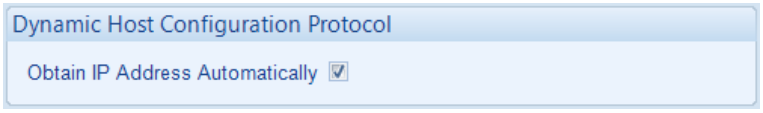


Parameter	Description
Client Inactivity Timeout	Set the time delay between a MODBUS RTU request and the receipt of a response. The module monitors by default the USB port for communications. When activity is detected on the RS485 port, the module monitors the port for further data. If no data activity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

2.8.4 ETHERNET PORT

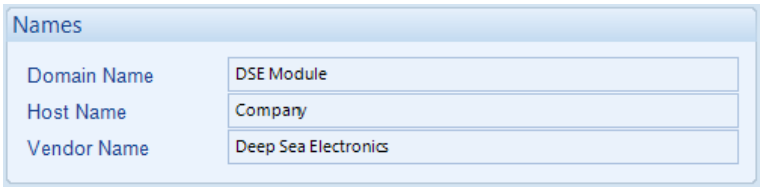
NOTE: Consult the network administrator of the host network before changing these settings. Incorrect settings cause network errors in the existing local area network. These settings must only be changed by qualified network administrators.

Dynamic Host Configuration Protocol



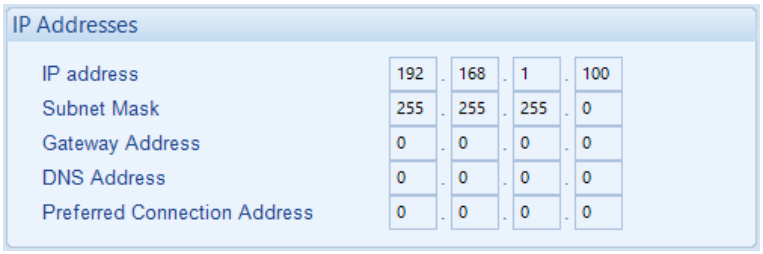
Parameter	Description
Obtain IP Address Automatically	☐ = The Dynamic Host Configuration Protocol (DHCP) is disabled, and the unit has a fixed IP address as configured in the *IP Address* section. ☑ = The Dynamic Host Configuration Protocol (DHCP) is enabled, and the unit automatically attains an IP address from the network it is connected to if it has DHCP enabled.

Names



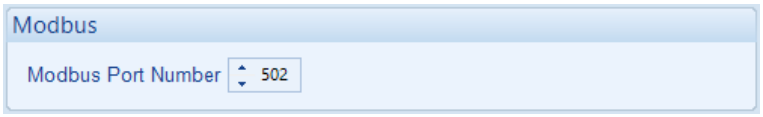
Parameter	Description
Domain Name	The hostname of the device which is used for DHCP requests and acknowledgements. Consult the network IT manager for suitable naming
Host Name	Additional description string for DHCP
Vendor Name	Additional description string for DHCP

IP Address



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

MODBUS



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

2.8.4.1 FIREWALL CONFIGURATION FOR INTERNET ACCESS

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

The DSE module makes its data available to a configurable TCP port number.
You must configure your modem/router to allow inbound traffic on this port. For more information you are referred to your WAN interface device (modem/router) manufacturer.

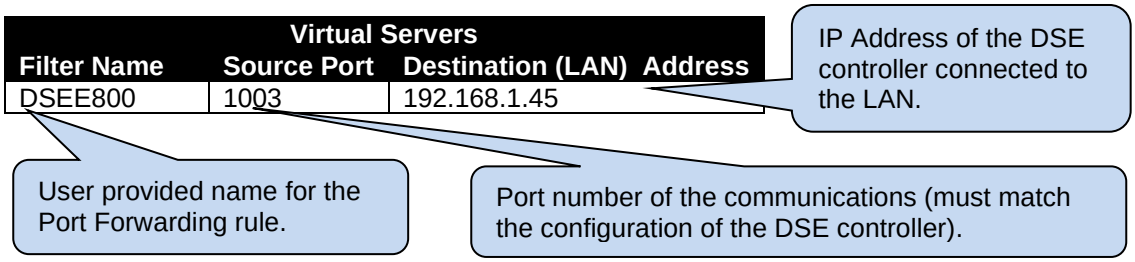
2.8.4.2 INCOMING TRAFFIC (VIRTUAL SERVER)

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

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

When requests reach the modem/router, we want this passed to a ‘virtual server’ for handling, in our case this is the DSE module.

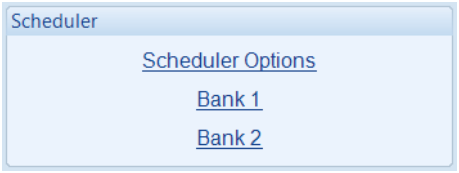
Example:



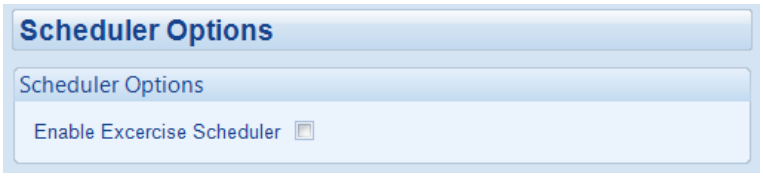
Result : Traffic arriving from the WAN (internet) on port 1003 is automatically sent to IP address 192.168.1.45 on the LAN (DSE module) for handling.

2.9 SCHEDULER

The section is subdivided into smaller sections.



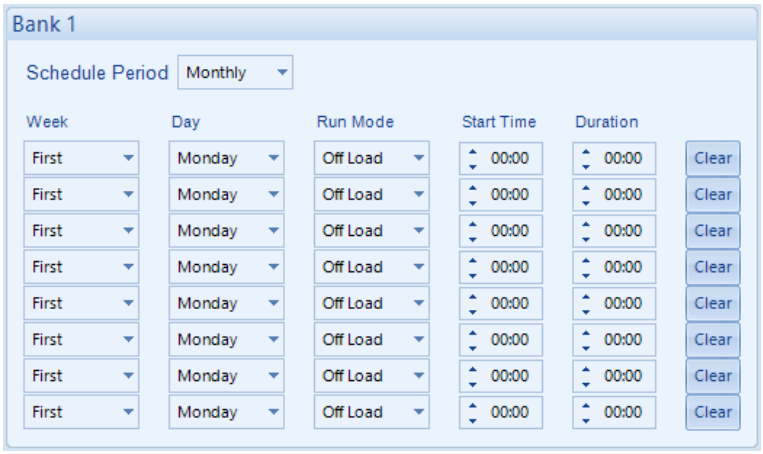
2.9.1 SCHEDULER OPTIONS



Function	Description
Enable Exercise Scheduler	☐ = The scheduler is disabled. ☑ = The scheduler is enabled, Bank 1 and Bank 2 become editable.

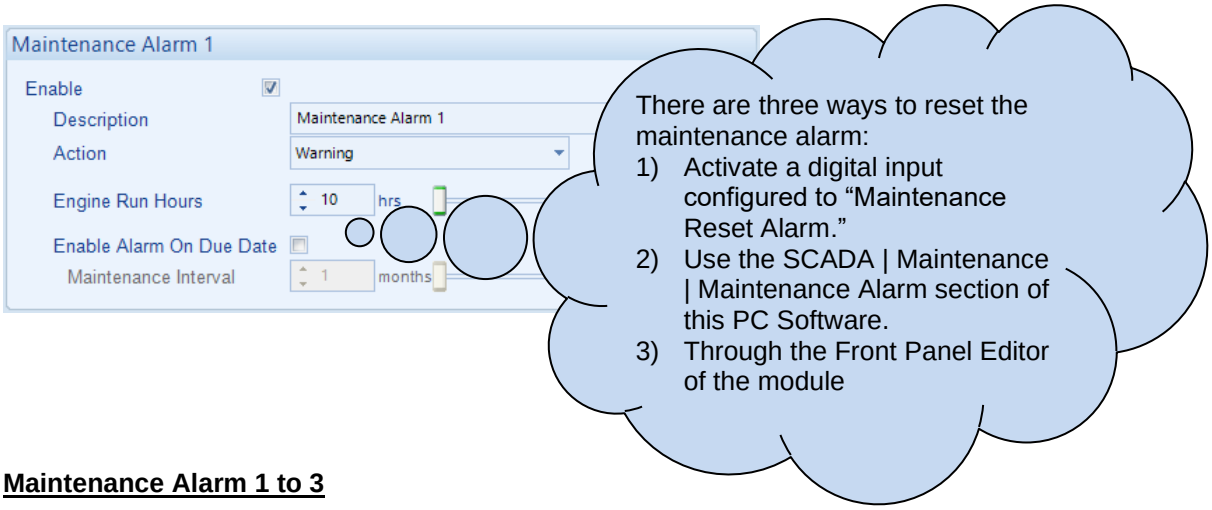
2.9.2 BANK 1 / BANK 2

Each Bank of the Exercise Scheduler is used to give up to 8 scheduled runs per bank, 16 in total. This run schedule is configurable to repeat every 7 days (weekly) or every 28 days (monthly). The run is *On Load*, *Off Load* or *Auto Start Inhibit.*
Each scheduler bank configured differently either to weekly or monthly based exercises.



Function	Description
Schedule Period	Determines the repeat interval for the scheduled run. Options available are: ***Weekly:*** The schedule events occur every week. ***Monthly:*** The schedule events occur every month on the week selected.
Week	Specifies the week of the month, on which the scheduled run takes place
Day	Specifies the day of week, on which the scheduled run takes place
Run Mode	Determines the loading state mode of the engine when running on schedule ***Auto Start Inhibit:*** The engine is prevented from running in *Auto* mode. ***Off Load:*** The module runs the engine on schedule *off load* ***On Load:*** The module runs the engine on schedule *on load*
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

2.10 MAINTENANCE ALARM



Maintenance Alarm 1 to 3

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

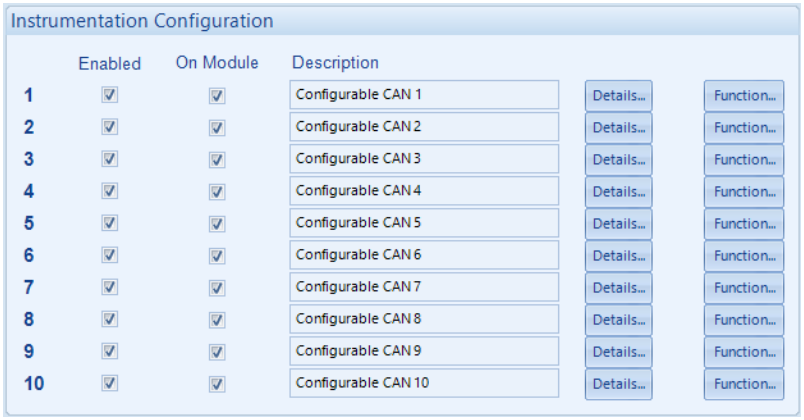
2.11 CONFIGURABLE CAN INSTRUMENTATION

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

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

2.11.1 RECEIVED INTRUMENTATION (1 TO 30)

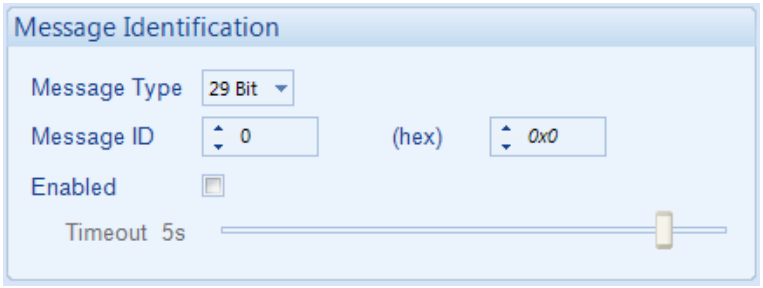
This feature allows for up to ten custom engine CAN instrumentation items to be decoded from CAN messages on the connected ECU port.



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 if at least one CAN instrumentation is enabled. The CAN instrumentation is shown on the DSE module's display when the On Module is enabled.** ☐ = The CAN instrumentation is not displayed on the DSE module. ☑ = The CAN instrumentation is displayed on the DSE module.
Description	Provide a description for the CAN instrumentation. This description is only shown in the SCADA.
Details	Click on Details to set the *Message Decoding* CAN options.
Function	Click on Function to configure a User Configured alarm.

2.11.1.1 DETAILS

Message Identification



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

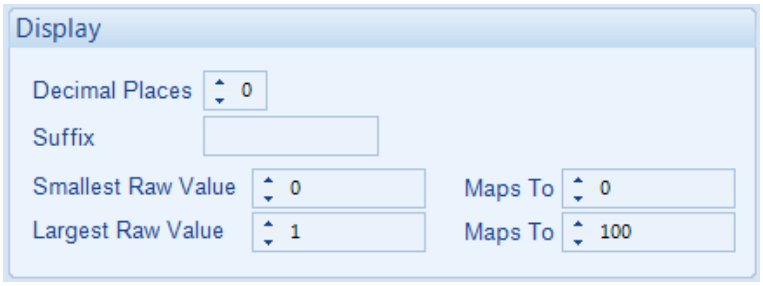
Data Structure

Parameter	Description
Offset Byte	Set the start position Byte
Offset Bit	Set the start position Bit
Length (Bits)	Data length 1-32 bits
Signed Value	☐ = Unsigned value ☑ = Signed value

Parameter descriptions are continued overleaf…

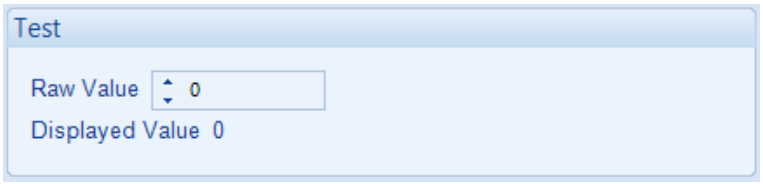
Display

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



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

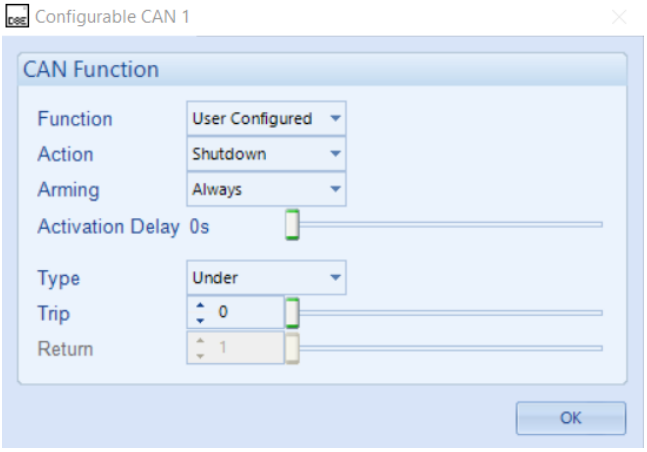
Test



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

2.11.1.2 FUNCTION

The Function is only available for the Received Instrumentation (1-30), it allows to configure a User Configured alarm by monitoring the relevant *Configurable CAN Instrumentation*.

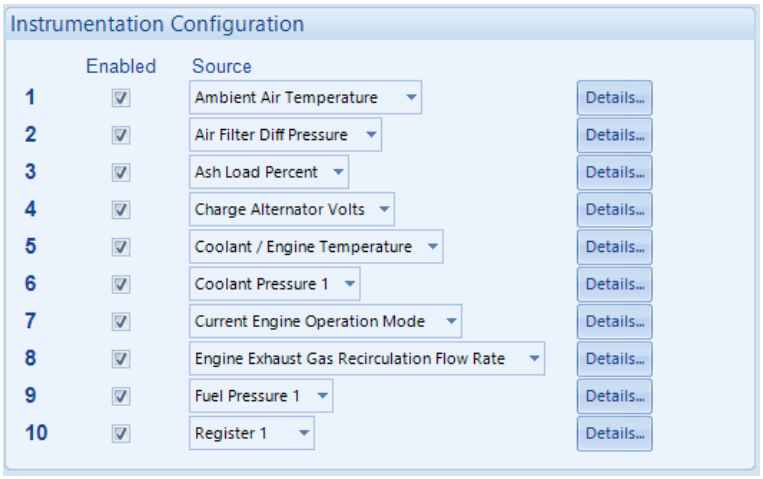


Parameter	Description
Function	Select a digital input function to activate according to the CAN value received. **NOTE: Refer to the *Digital Inputs* section elsewhere in this document for the list of descriptions of the functions list.**
Action	**NOTE: Action is only adjustable when Function is set to User Configured.** Select the type of alarm to activate the *Function* after the *Activation Delay* time. **Electrical Trip** **Indication** **Shutdown** **Warning**
Arming	**NOTE: *Arming* is only adjustable when *Function* is set to *User Configured.*** Select when the *Trip* level is monitored. Options are as follows: ***Always:*** The protection is always active on the controller. This is used to constantly monitor status of the *CAN Instrumentation.* ***From Safety On:*** Active only after the *Safety On* delay timer. ***When Stationary:*** Active only when the engine is not running.
Activation Delay	The amount of time before the module activates the selected *Function* upon the *Configurable CAN Instrumentation* reaching the *Trip* level.
Type	Select the required option to monitor the *Configurable CAN Instrumentation* when to trip. **Over:** The *Function* is active when the *Configurable CAN Instrumentation* raises above the Trip level for longer than the *Activation Delay* timer. **Under:** The *Function* is active when the *Configurable CAN Instrumentation* lowers below the Trip level for longer than the *Activation Delay* timer.
Return	The Function is removed when the *Configurable CAN Instrumentation* value rises above the *Return* level if *Type* is *Under*. The Function is removed when the *Configurable CAN Instrumentation* value is reduced below the *Return* level if *Type* is *Over*.

2.11.2 TRANSMITTED INSTRUMENTATION

Instrumentation Configuration

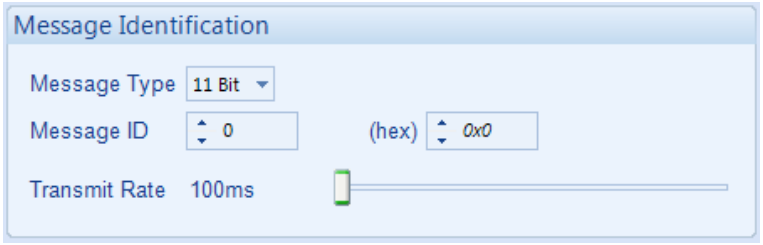
The module allows transmitting up to ten instruments over the CANbus on the ECU port by specifying the source address (message ID) of the selected Instrument.



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

2.11.2.1 DETAILS

Message Identification



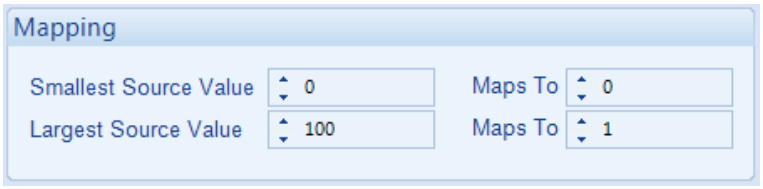
Parameter	Description
Message Type	Select the required message type to transmit: ***11 Bit:*** message identifier for standard CAN ***29 Bit:*** message identifier for extended CAN
Message ID	CAN message ID
Transmit Rate	The rate at which the *CAN Instrument* is transmitted over the CANbus.

Parameter descriptions are continued overleaf…

Data Structure

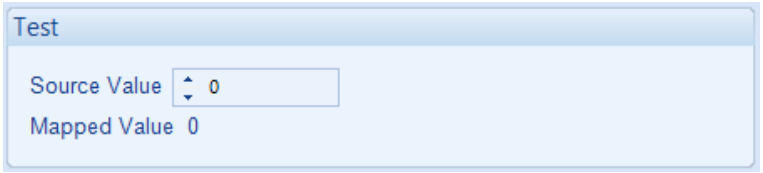
Parameter	Description
Offset Byte	Set the start position Byte
Offset Bit	Set the start position Bit
Length (Bits)	Data length 1-32 bits
Signed Value	☐ = Transmit unsigned value ☑ = Transmit signed value

Mapping



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

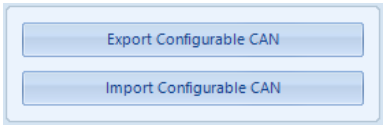
Test



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

2.11.3 EXPORT / IMPORT CONFIGURABLE CAN

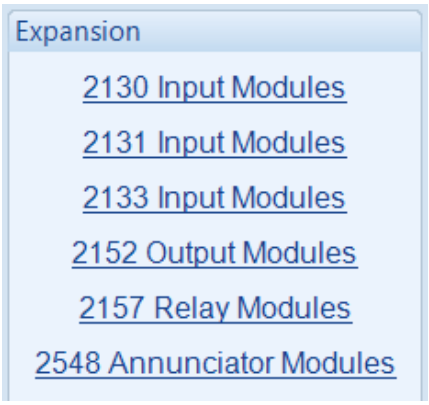
This feature is used to import the *Configurable CAN Instrumentation* settings into another DSE module.



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

2.12 EXPANSION

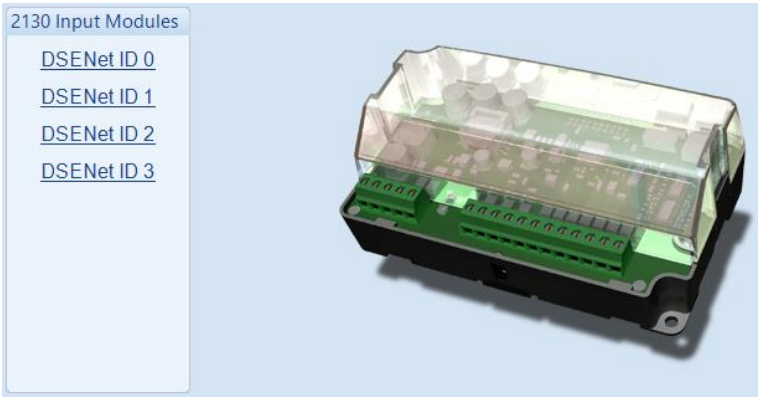
The *Expansion* page is subdivided into smaller sections.
Select the required section with the mouse.



See overleaf for description of the different expansion modules.

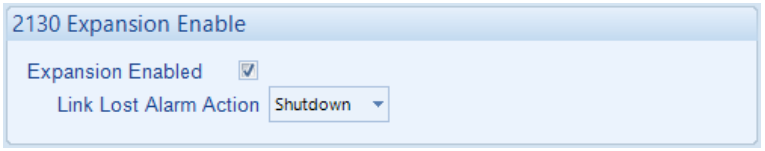
2.12.1 DSE2130 INPUT MODULES

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



The following options are then shown:

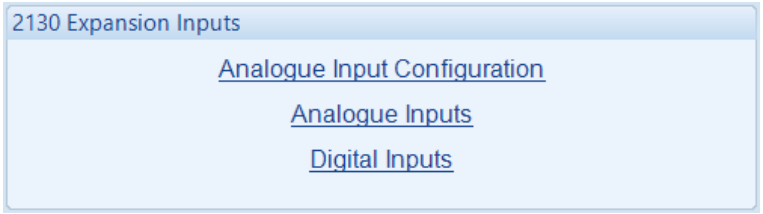
2130 Expansion Enable



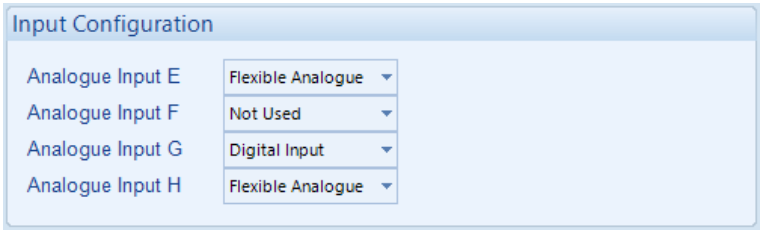
Parameter	Description
Expansion Enabled	☐ = The expansion module with the selected ID is not enabled. ☑ = The expansion module with the selected ID is enabled. If the expansion module is not connected / detected by the module, the module generates an *Exp. Unit Failure* alarm with the configured *Link Lost Alarm Action* severity.

2130 Expansion Inputs

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



2.12.1.1 ANALOGUE INPUT CONFIGURATION



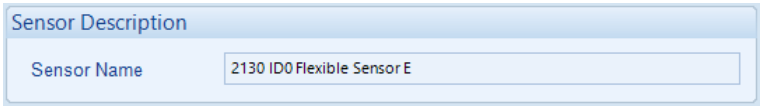
Input Configuration

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

2.12.1.1.1 ANALOGUE INPUTS

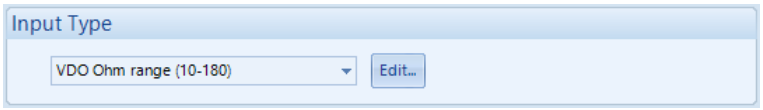
NOTE: An analogue input is only configurable as a flexible sensor if it has been configured as Flexible Analogue, refer to section entitled *Analogue Input Configuration* elsewhere in this document for further details.

Sensor Description



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

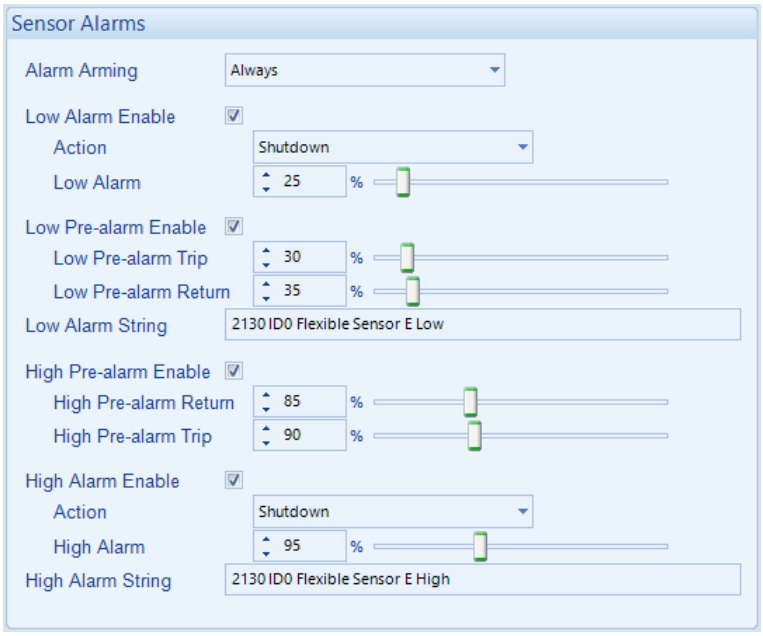
Input Type



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

Parameter descriptions are continued overleaf…

Sensor Alarms



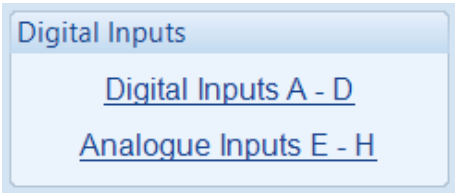
Parameter	Description
Alarm Arming	**NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the alarm generated by the analogue input becomes active: ***Controlled Shutdown*** ***Shutdown***
Low Alarm Enable	☐ = The Alarm is disabled. ☑ = The *Low Alarm* activates when the measured quantity drops below the *Low Alarm* setting.
Low Alarm Action	**NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required from the list: ***Controlled Shutdown*** ***Shutdown***
Low Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *Low Pre-Alarm* is active when the measured quantity drops below the *Low Pre-Alarm Trip* setting. The *Low Pre-Alarm* is automatically reset when the measured quantity rises above the configured *Low Pre-Alarm Return* level.
Low Alarm String	The text that is displayed on the module's LCD when the *Low Alarm* or *Low Pre-Alarm* activates.

Parameter descriptions are continued overleaf…

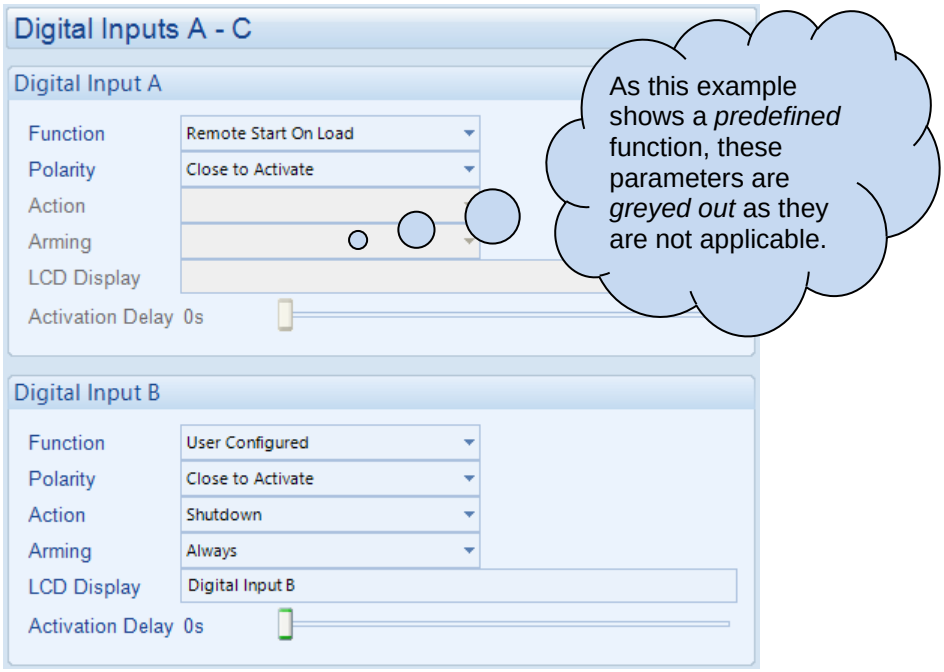
Parameter	Description
High Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *High Pre-Alarm* is active when the measured quantity rises above the *High Pre-Alarm Trip* setting. The *High Pre-Alarm* is automatically reset when the measured quantity falls below the configured *High Pre-Alarm Return* level.
High Alarm Enable	☐ = The Alarm is disabled. ☑ = The *High Alarm* is active when the measured quantity rises above the *High Alarm* setting.
High Alarm Action	**NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required from the list: ***Controlled Shutdown*** ***Shutdown***
High Alarm String	The text that is displayed on the module's LCD when the *High Alarm* or *High Pre-Alarm* activates.

2.12.1.2 DIGITAL INPUTS

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



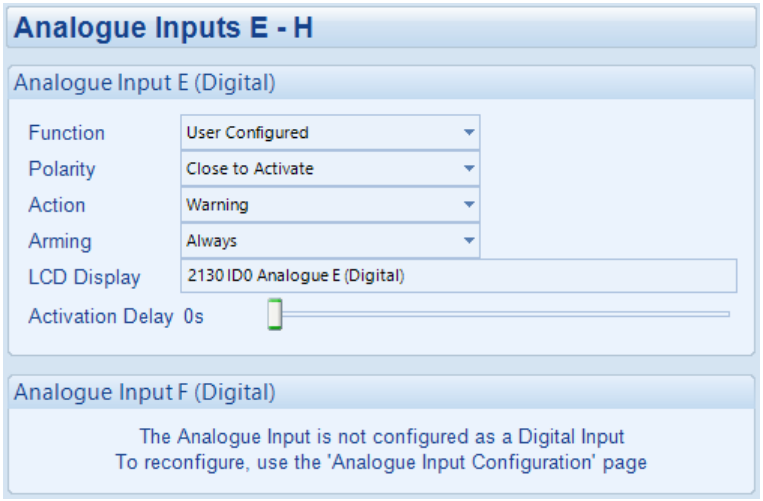
2.12.1.2.1 DIGITAL INPUTS



Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See section entitled *Input Functions* for details of all available functions
Polarity	Select the digital input polarity: ***Close to Activate:*** the input function is activated when the relevant terminal is connected. ***Open to Activate:*** the input function is activated when the relevant terminal is disconnected.
Action	**NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required from the list: ***Controlled Shutdown*** ***Indication*** ***Shutdown*** ***Warning***
Arming	**NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the input becomes active: ***Controlled Shutdown*** ***Indication*** ***Shutdown*** ***Warning***
LCD Display	The text that is displayed on the module's LCD when the input activates and generates an alarm.
Activation Delay	This is used to give a delay on acceptance of the input. Useful for liquid level switches or to mask short term operations of the external switch device.

2.12.1.2.2 ANALOGUE INPUTS

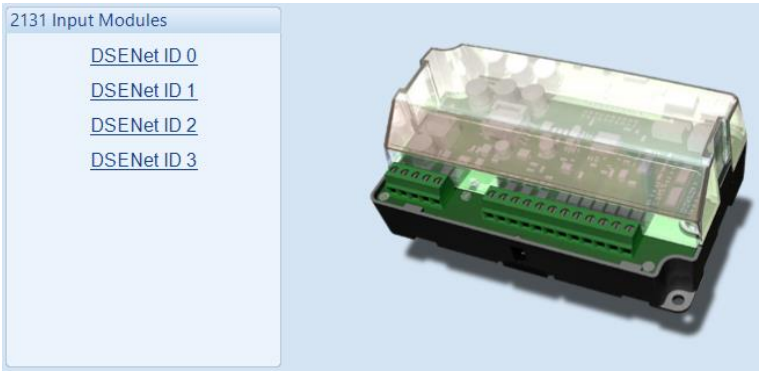
NOTE: An analogue input is only configurable as a digital input if it has been configured as Digital Input, refer to section entitled *Analogue Input Configuration* elsewhere in this document for further details.



Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See section entitled *Input Functions* for details of all available functions
Polarity	Select the digital input polarity: ***Close to Activate:*** the input function is activated when the relevant terminal is connected. ***Open to Activate:*** the input function is activated when the relevant terminal is disconnected.
Action	**NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required from the list: ***Controlled Shutdown*** ***Indication*** ***Shutdown*** ***Warning***
Arming	**NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the input becomes active: ***Controlled Shutdown*** ***Indication*** ***Shutdown*** ***Warning***
LCD Display	The text that is displayed on the module's LCD when the input activates and generates an alarm.
Activation Delay	This is used to give a delay on acceptance of the input. Useful for liquid level switches or to mask short term operations of the external switch device.

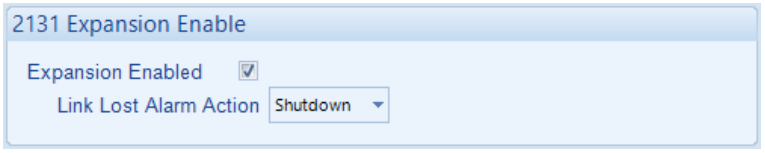
2.12.2 DSE2131 INPUT MODULES

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



The following options are then shown:

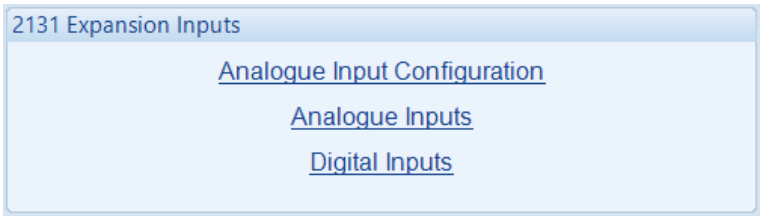
2131 Expansion Enable



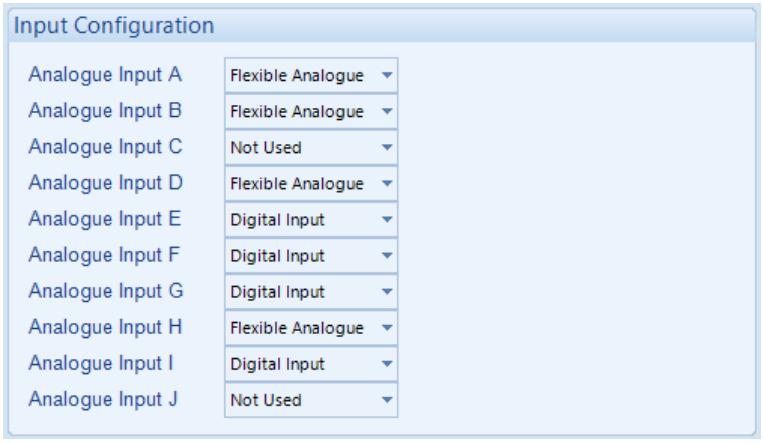
Parameter	Description
Expansion Enabled	☐ = The expansion module with the selected ID is not enabled. ☑ = The expansion module with the selected ID is enabled. If the expansion module is not connected / detected by the module, the module generates an *Exp. Unit Failure* alarm with the configured *Link Lost Alarm Action* severity.

2131 Expansion Inputs

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



2.12.2.1 ANALOGUE INPUT CONFIGURATION



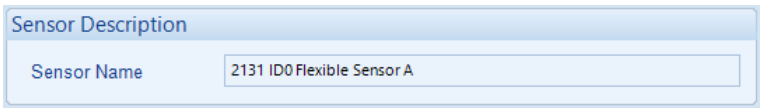
Input Configuration

Parameter	Description
Analogue Input A to J	Select what the analogue input is to be used for: ***Not Used:*** The analogue input is disabled ***Digital Input:*** Configured on the *2131/Digital Inputs* pages ***Flexible Analogue:*** Configured on the *2131/Analogue Inputs* pages

2.12.2.2 ANALOGUE INPUTS

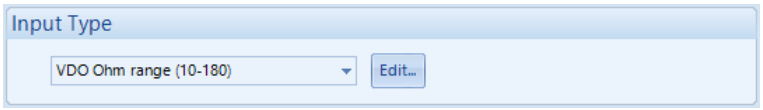
NOTE: An analogue input is only configurable as a flexible sensor if it has been configured as Flexible Analogue, refer to section entitled *Analogue Input Configuration* elsewhere in this document for further details.

Sensor Description



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

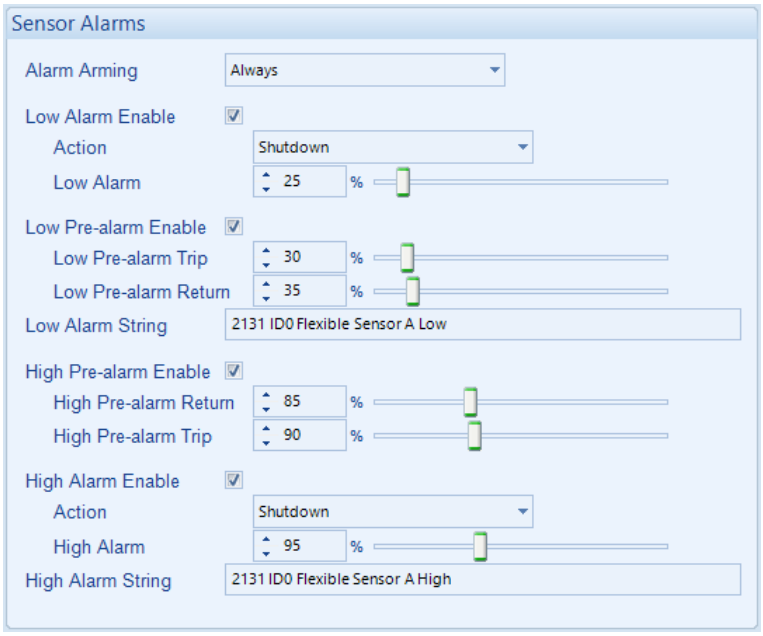
Input Type



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

Parameter descriptions are continued overleaf…

Sensor Alarms



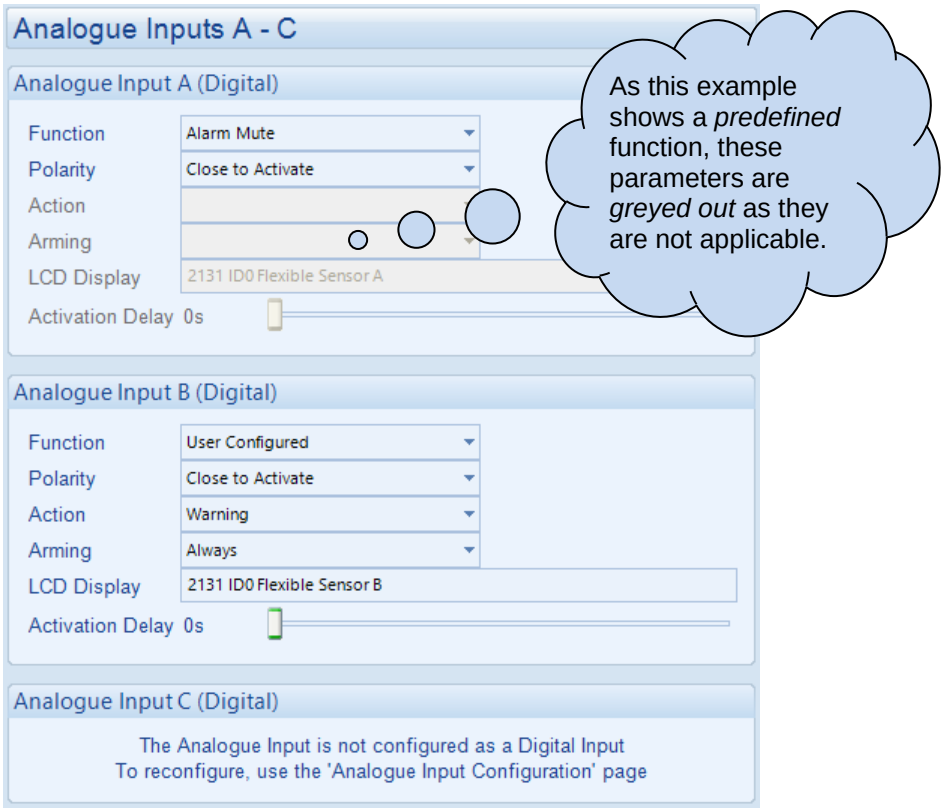
Parameter	Description
Alarm Arming	⚠ **NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the alarm generated by the analogue input becomes active: ***Controlled Shutdown*** ***Shutdown***
Low Alarm Enable	☐ = The Alarm is disabled. ☑ = The *Low Alarm* activates when the measured quantity drops below the *Low Alarm* setting.
Low Alarm Action	⚠ **NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required from the list: ***Controlled Shutdown*** ***Shutdown***
Low Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *Low Pre-Alarm* is active when the measured quantity drops below the *Low Pre-Alarm Trip* setting. The *Low Pre-Alarm* is automatically reset when the measured quantity rises above the configured *Low Pre-Alarm Return* level.
Low Alarm String	The text that is displayed on the module's LCD when the *Low Alarm* or *Low Pre-Alarm* activates.

Parameter descriptions are continued overleaf…

Parameter	Description
High Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *High Pre-Alarm* is active when the measured quantity rises above the *High Pre-Alarm Trip* setting. The *High Pre-Alarm* is automatically reset when the measured quantity falls below the configured *High Pre-Alarm Return* level.
High Alarm Enable	☐ = The Alarm is disabled. ☑ = The *High Alarm* is active when the measured quantity rises above the *High Alarm* setting.
High Alarm Action	**NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required from the list: ***Controlled Shutdown*** ***Shutdown***
High Alarm String	The text that is displayed on the module's LCD when the *High Alarm* or *High Pre-Alarm* activates.

2.12.2.3 DIGITAL INPUTS

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

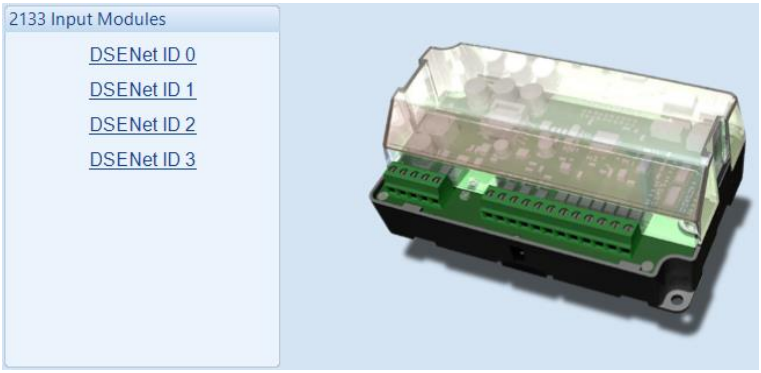


Parameter descriptions are overleaf…

Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See section entitled *Input Functions* for details of all available functions
Polarity	Select the digital input polarity: ***Close to Activate:*** The input function is activated when the relevant terminal is connected. ***Open to Activate:*** The input function is activated when the relevant terminal is disconnected.
Action	**NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required from the list: ***Controlled Shutdown*** ***Indication*** ***Shutdown*** ***Warning***
Arming	**NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the input becomes active: ***Always*** ***From Loading*** ***From Safety On*** ***From Starting*** ***Never*** ***Wait for ECU***
LCD Display	The text that is displayed on the module's LCD when the input activates and generates an alarm.
Activation Delay	This is used to give a delay on acceptance of the input. Useful for liquid level switches or to mask short term operations of the external switch device.

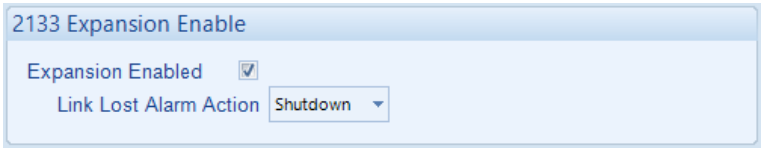
2.12.3 DSE2133 INPUT MODULES

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



The following options are then shown:

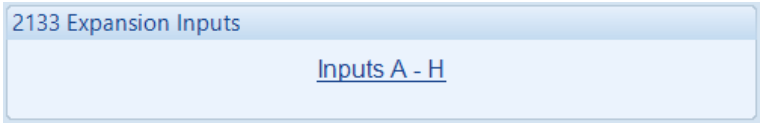
2133 Expansion Enable



Parameter	Description
Expansion Enabled	☐ = The expansion module with the selected ID is not enabled. ☑ = The expansion module with the selected ID is enabled. If the expansion module is not connected / detected by the module, the module generates an *Exp. Unit Failure* alarm with the configured *Link Lost Alarm Action* severity.

2133 Expansion Inputs

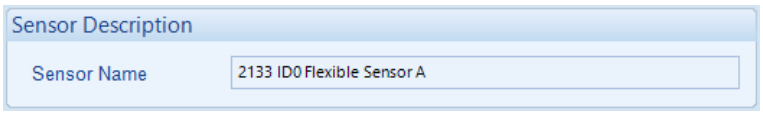
The *Expansion Unit* page is then subdivided into smaller sections.
Select the required section with the mouse.



2.12.3.1 ANALOGUE INPUTS

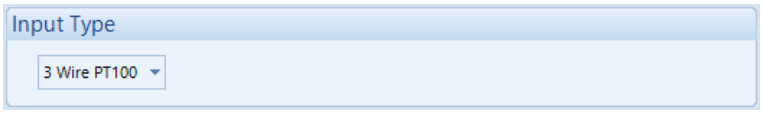
NOTE: An analogue input is only configurable as a flexible sensor if it has been configured as Flexible Analogue, refer to section entitled *Analogue Input Configuration* elsewhere in this document for further details.

Sensor Description



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

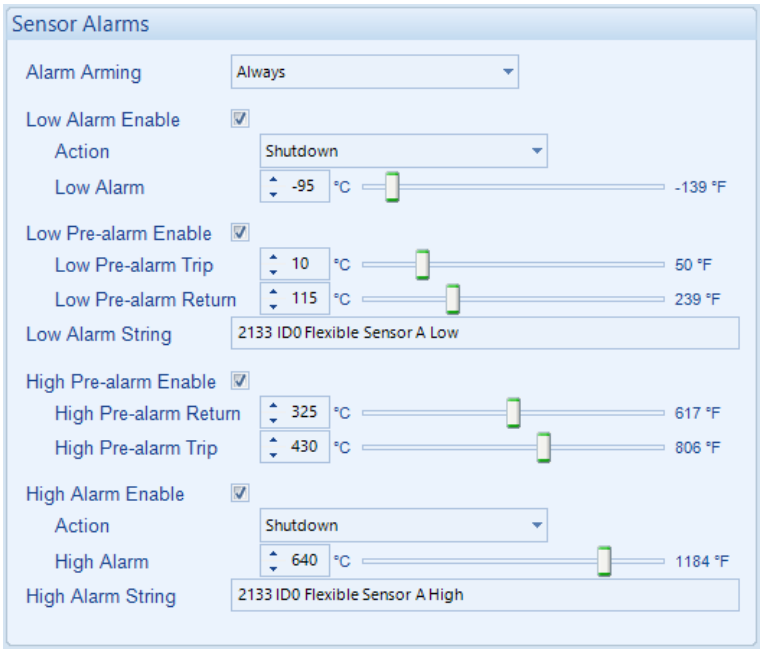
Input Type



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

Parameter descriptions are continued overleaf…

Sensor Alarms



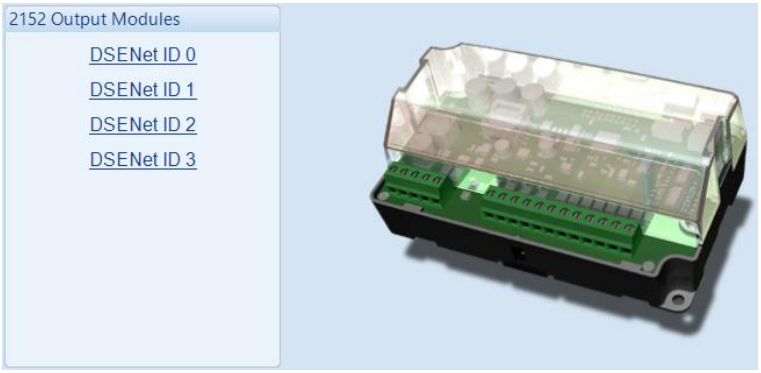
Parameter	Description
Alarm Arming	**NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the alarm generated by the analogue input becomes active: ***Always*** ***From Loading*** ***From Safety On*** ***From Starting*** ***Never*** ***Wait for ECU***
Low Alarm Enable	☐ = The Alarm is disabled. ☑ = The *Low Alarm* activates when the measured quantity drops below the *Low Alarm* setting.
Low Alarm Action	**NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required from the list: ***Controlled Shutdown*** ***Shutdown***
Low Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *Low Pre-Alarm* is active when the measured quantity drops below the *Low Pre-Alarm Trip* setting. The *Low Pre-Alarm* is automatically reset when the measured quantity rises above the configured *Low Pre-Alarm Return* level.
Low Alarm String	The text that is displayed on the module's LCD when the *Low Alarm* or *Low Pre-Alarm* activates.

Parameter descriptions are continued overleaf…

Parameter	Description
High Pre-Alarm Enable	☐ = The Pre-Alarm is disabled. ☑ = The *High Pre-Alarm* is active when the measured quantity rises above the *High Pre-Alarm Trip* setting. The *High Pre-Alarm* is automatically reset when the measured quantity falls below the configured *High Pre-Alarm Return* level.
High Alarm Enable	☐ = The Alarm is disabled. ☑ = The *High Alarm* is active when the measured quantity rises above the *High Alarm* setting.
High Alarm Action	**NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required from the list: ***Controlled Shutdown*** ***Shutdown***
High Alarm String	The text that is displayed on the module's LCD when the *High Alarm* or *High Pre-Alarm* activates.

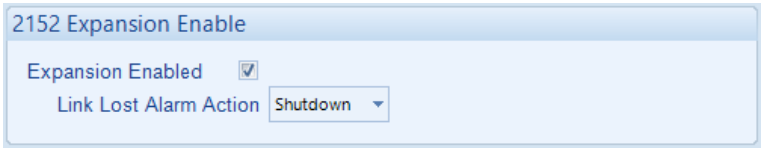
2.12.4 DSE2152 OUTPUT MODULES

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



The following options are then shown:

2152 Expansion Enable



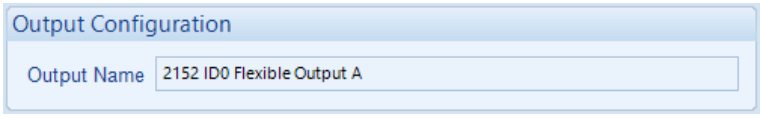
Parameter	Description
Expansion Enabled	☐ = The expansion module with the selected ID is not enabled. ☑ = The expansion module with the selected ID is enabled. If the expansion module is not connected / detected by the module, the module generates an *Exp. Unit Failure* alarm with the configured *Link Lost Alarm Action* severity.

2152 Expansion Outputs

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

2.12.4.1 ANALOGUE OUTPUTS

Output Configuration



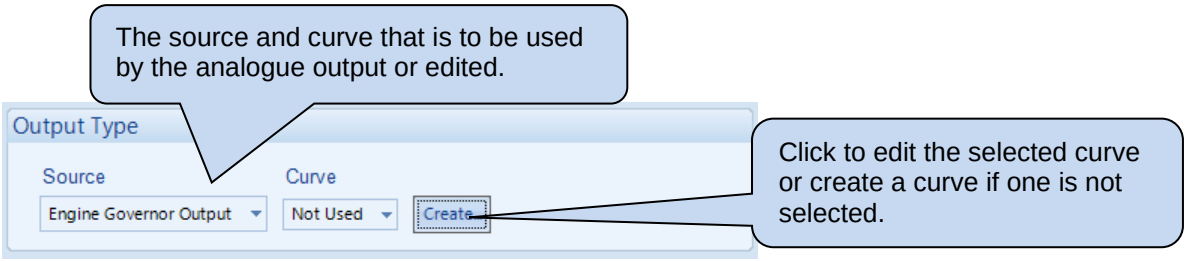
Parameter	Description
Output Name	Enter the *Output Name*, this text is shown on in the SCADA section when viewing the output.

Output Type

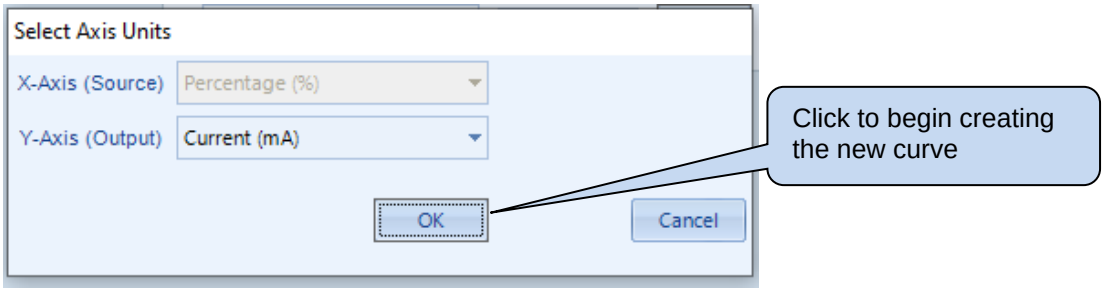
Parameter	Description
Source	Select the parameter that is to be mapped to the analogue output.
Curve	Select the output type and curve from a pre-defined list or create a user-defined curve ***Current:*** for sensors with maximum range of 0 mA to 20 mA ***Voltage:*** for sensors with maximum range of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

2.12.4.2 CREATING / EDITING THE OUTPUT CURVE

While the *DSE Configuration Suite* holds specifications for the most used output ranges, occasionally it is required that the expansion module's output be connected to a nonstandard device. To aid this process, a curve editor is provided.

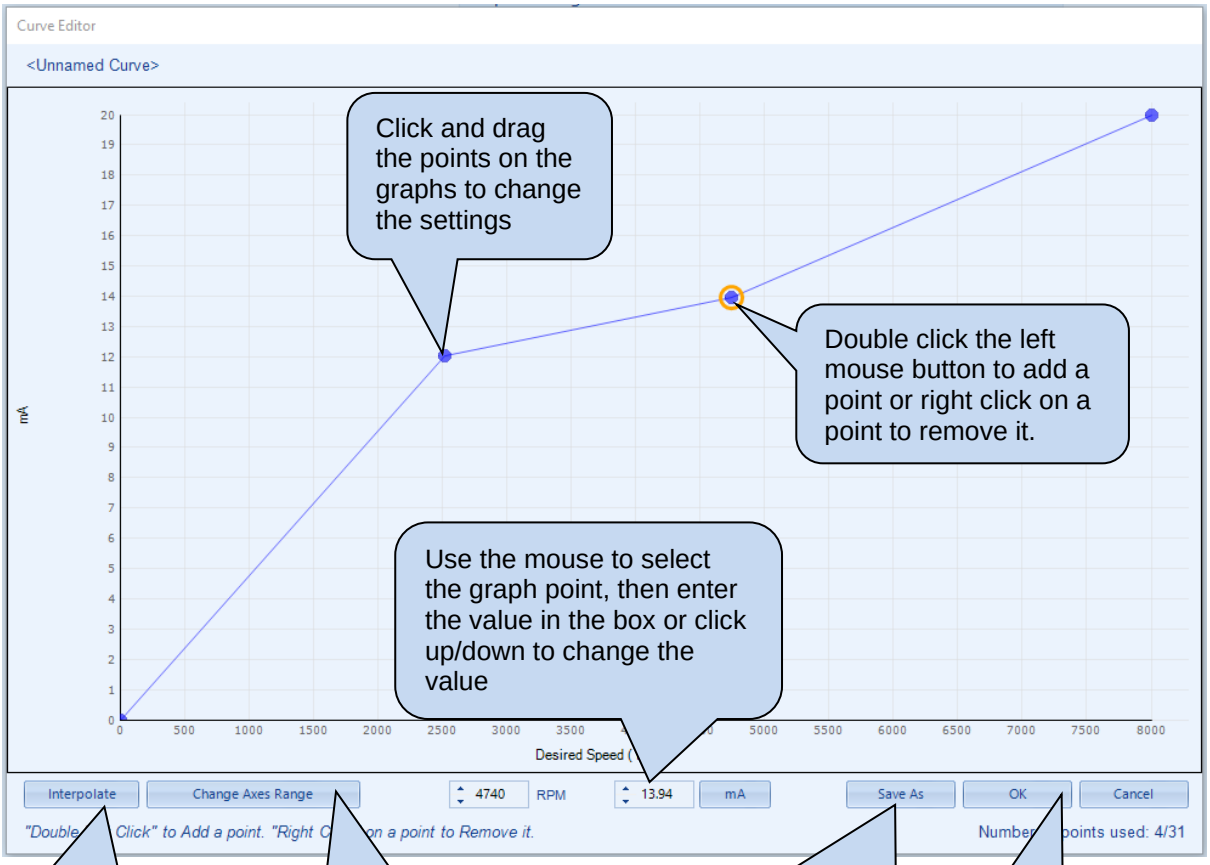


When creating a new sensor curve the measurement quantity and measured parameter are required.



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

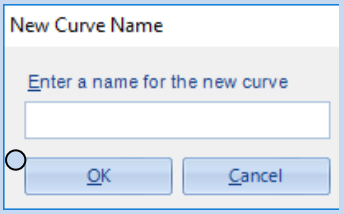
Curve creation / editor descriptions are continued overleaf…



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

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

Click SAVE AS, a prompt to name the curve…



Click OK to save the curve.

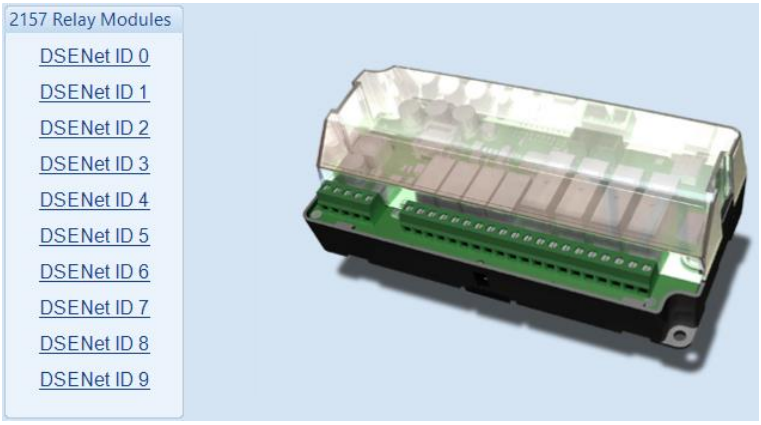
Any saved curves become selectable in the *Output Type* selection list.

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

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

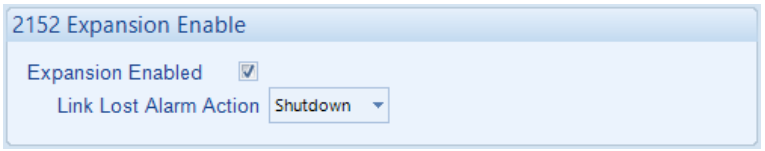
2.12.5 DSE2157 RELAY MODULES

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



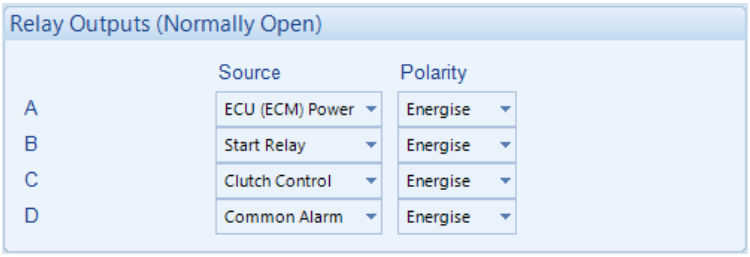
The following options are then shown:

2152 Expansion Enable



Parameter	Description
Expansion Enabled	☐ = The expansion module with the selected ID is not enabled. ☑ = The expansion module with the selected ID is enabled. If the expansion module is not connected / detected by the module, the module generates an *Exp. Unit Failure* alarm with the configured *Link Lost Alarm Action* severity.

Relay Outputs (Normally Open / Changeover)



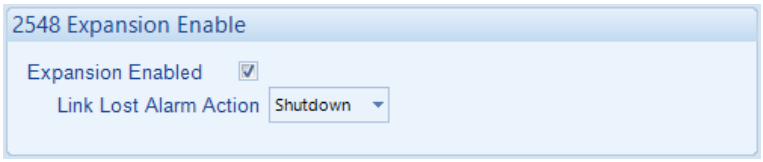
Parameter	Description
Source	Select the output source to control the state of the output See section entitled *Output Sources* for details of all available functions
Polarity	Select the digital input polarity: ***Energise:*** When the output source is true, the output activates. ***De-Energise:*** When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

2.12.6 DSE2548 ANNUCIATOR MODULES

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

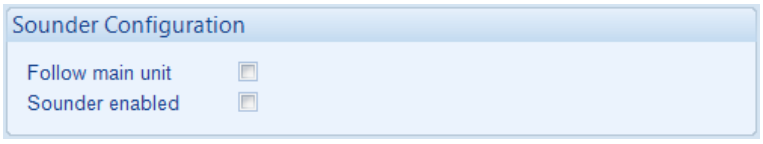
The following options are then shown:

2548 Expansion Enable



Parameter	Description
Expansion Enabled	☐ = The expansion module with the selected ID is not enabled. ☑ = The expansion module with the selected ID is enabled. If the expansion module is not connected / detected by the module, the module generates an *Exp. Unit Failure* alarm with the configured *Link Lost Alarm Action* severity.

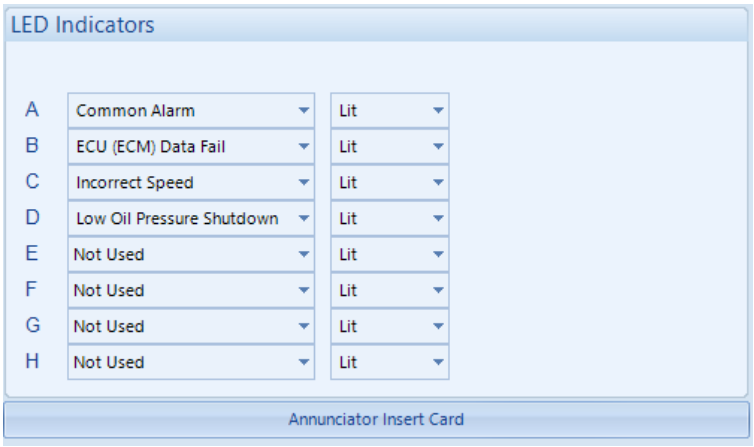
Sounder Configuration



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

Parameter descriptions are continued overleaf…

LED Indicators



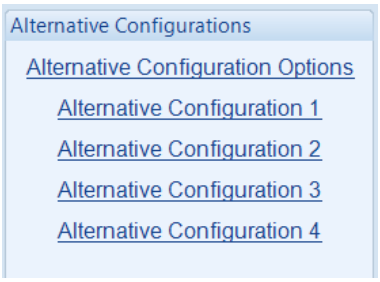
Parameter	Description
Source	Select the output source to control the state of the output See section entitled *Output Sources* for details of all available functions
Polarity	Select the digital input polarity: ***Energise:*** When the output source is true, the output activates. ***De-Energise:*** When the output source is true, the output deactivates.
Annunciator Insert Card	Allows the user to create and print the custom text insert cards for the LEDs.

2.13 ALTERNATIVE CONFIGURATIONS

Alternative Configurations are provided to allow the system designer to cater for different speed setting requirements or applications utilising the same engine system.

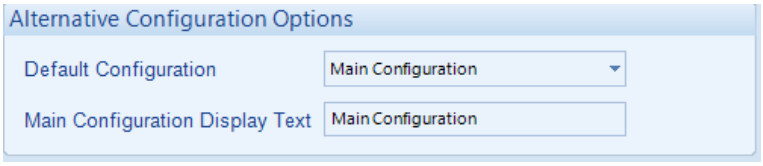
The Alternative Configurations are selected using either:

- Configuration Suite Software (Selection for 'Default Configuration')
- Module Front Panel Editor
- Via external signal to the module input configured to "Alternative Configuration 1,2,3,4 Select".



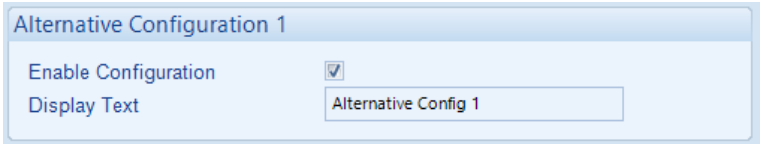
2.13.1 ALTERNATIVE CONFIGURATION OPTIONS

Alternative Configuration Options



Parameter	Description
Default Configuration	Select the 'default' configuration that is used when there is no instruction to use an 'alternative configuration.'
Main Configuration Display Text	Provide a name to the Main Configuration. This is shown on the DSE Module's display.

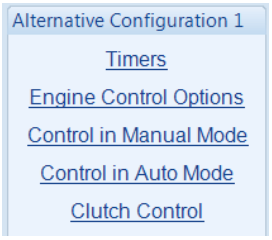
Alternative Configuration (1)



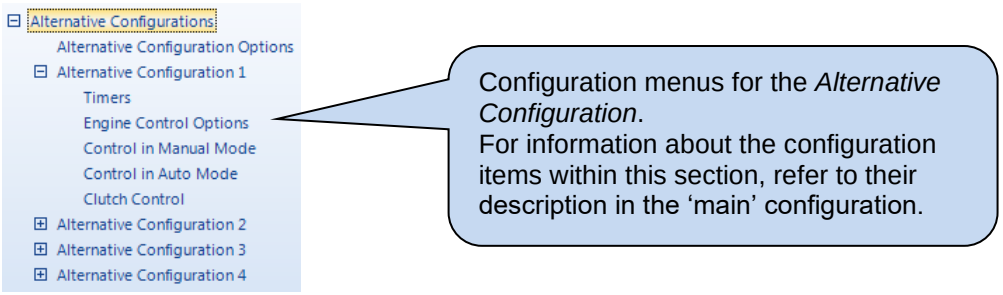
Parameter	Description
Enable Configuration	☐ = *Alternative Configuration* is disabled. ☑ = Alternative Configuration is enabled. The configuration is enabled by changing the *Default Configuration,* activating a digital input or through the module's *Front Panel Editor*.
Display Text	Provide a name to the Alternative Configuration. This is shown on the DSE Module's display.

2.13.2 ALTERNATIVE CONFIGURATION

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

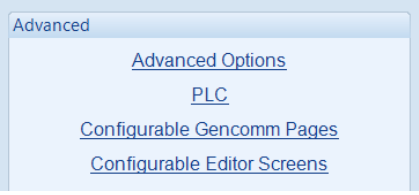


Alternative configuration options contain a subset of the main configuration. The adjustable parameters are not discussed here as they are identical to the main configuration options :



2.14 ADVANCED

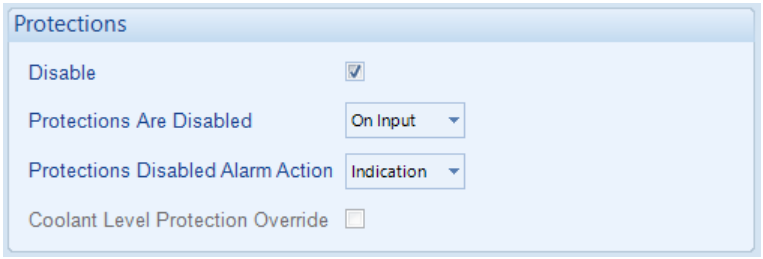
The *Advanced* page is subdivided into smaller sections.
Select the required section with the mouse.



2.14.1 ADVANCED OPTIONS

Protections

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

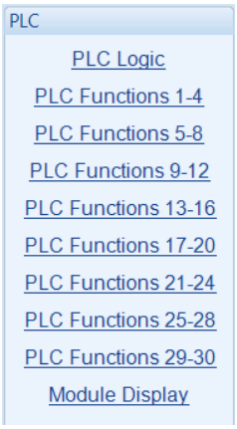


This feature is provided to assist the system designer in meeting specifications for “Warning only,” “Protections Disabled,” “Run to Destruction,” “Battleshort Mode” or other similar wording.

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

2.14.2 PLC

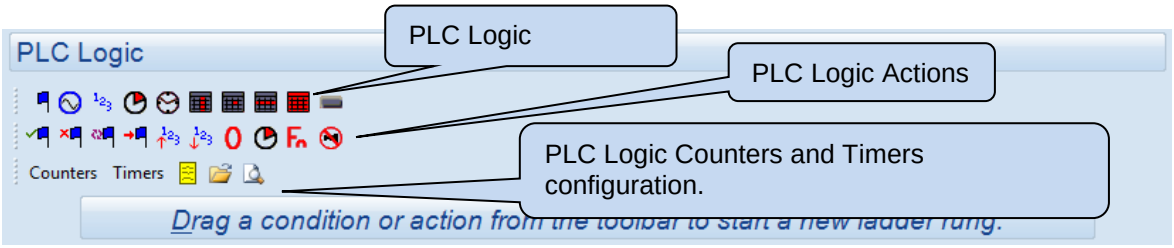
The *PLC* section is subdivided into smaller sub-sections.



2.14.2.1 PLC LOGIC

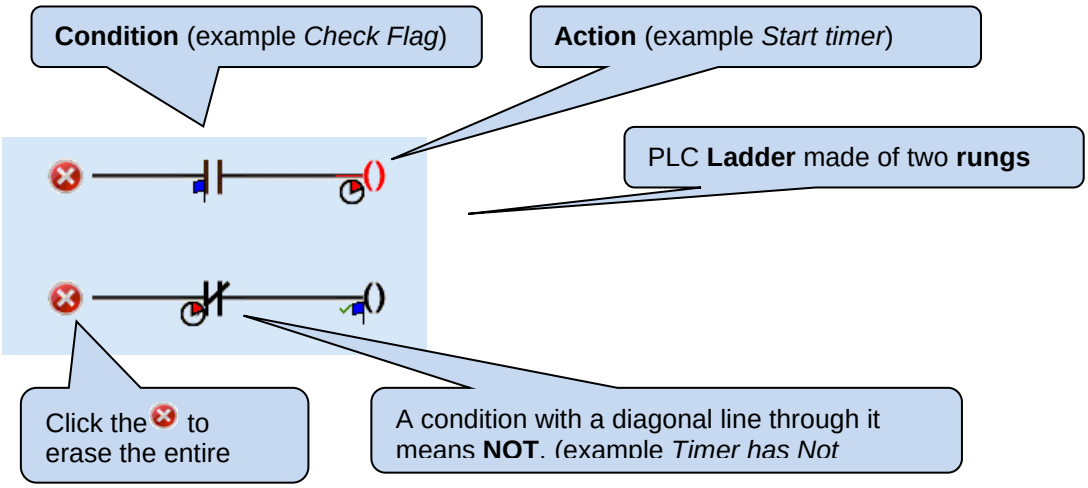
NOTE: For further details and instructions on PLC Logic and PLC Functions, refer to DSE Publication: *057-175 PLC Programming Guide* which can be found on our website: *www.deepseaelectronics.com*

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



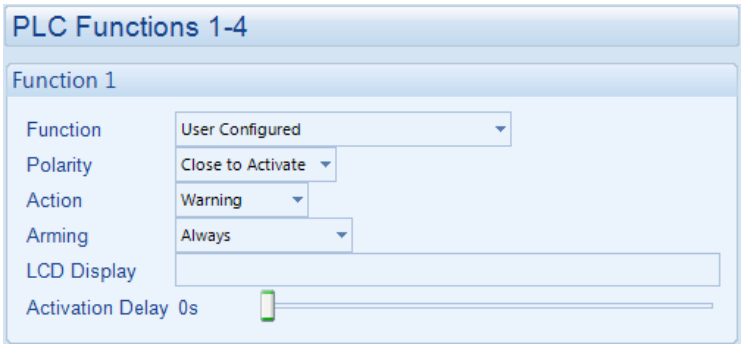
In PLC logic, the *ladder* of logic is made up of a series of *rungs*.
The ladder is the complete PLC *program*. This program may perform a single task, or multiple tasks.
Each rung contains a number of *conditions* and *actions*.

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



2.14.2.2 PLC FUNCTIONS

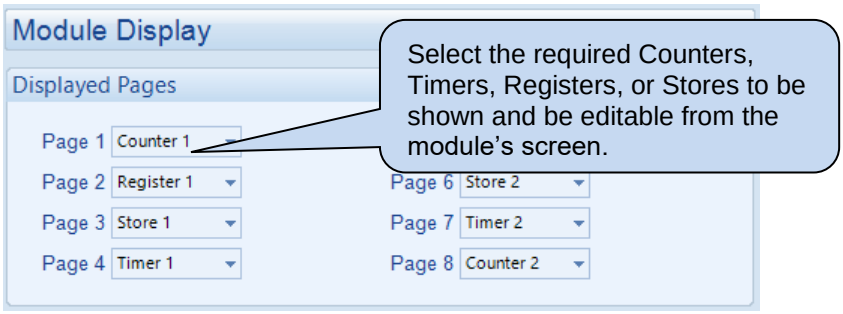
NOTE: For further details and instructions on PLC Logic and PLC Functions, refer to DSE Publication: *057-175 PLC Programming Guide* which can be found on our website: *www.deepseaelectronics.com*



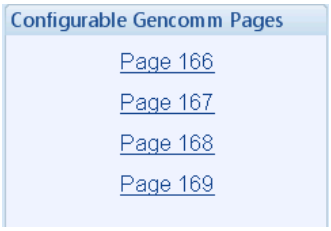
PLC Functions allow the PLC logic to create alarm conditions or drive 'virtual inputs' on the controller. A PLC function is configured in the same way as a module digital input.

2.14.2.3 MODULE DISPLAY

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

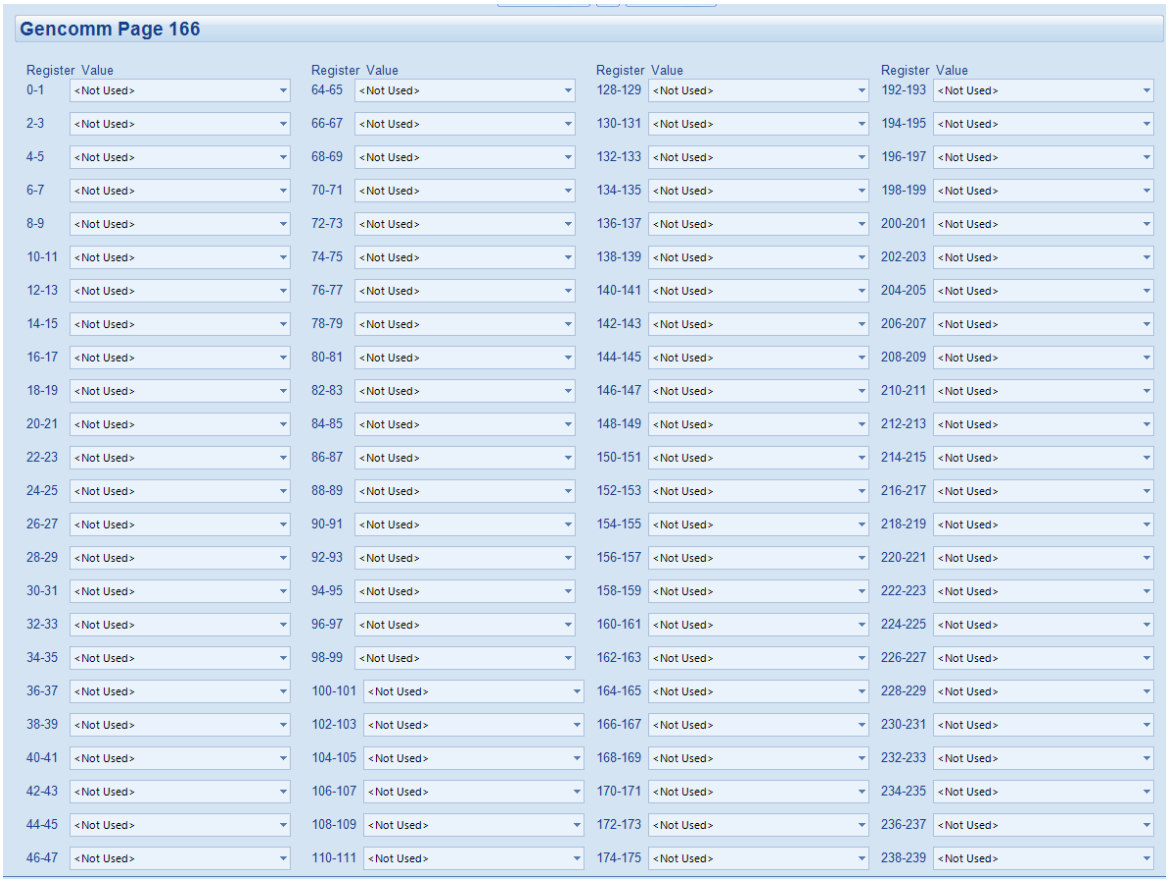


2.14.3 CONFIGURABLE GENCOMM PAGES



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

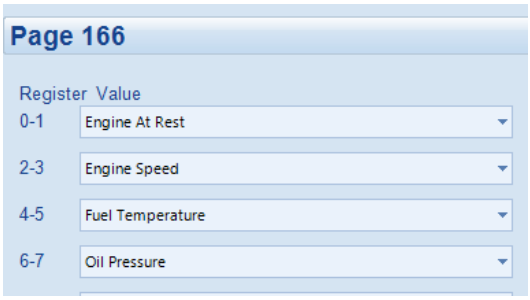
All configurable Gencomm registers are 32-bit unsigned format.



The configurable Modbus pages are:

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

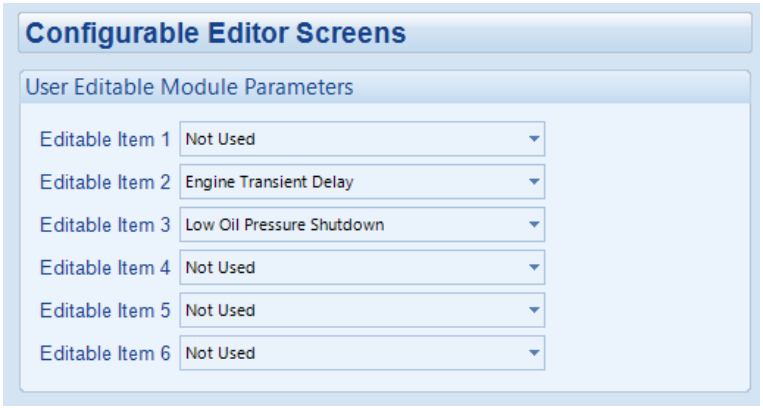
Example of Gencomm Page Configuration:



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

2.14.4 CONFIGURABLE EDITOR SCREENS

User Editable Module Parameters

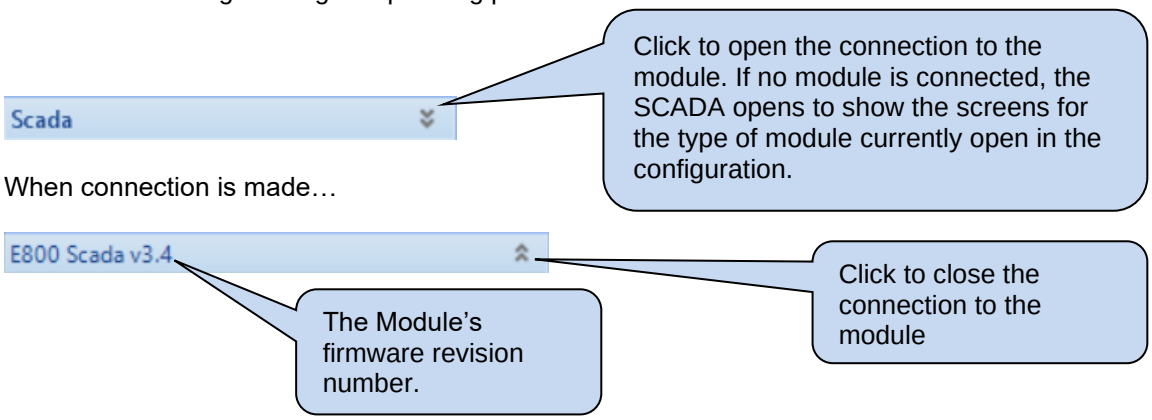


The module's display includes new screens for editing these parameters.

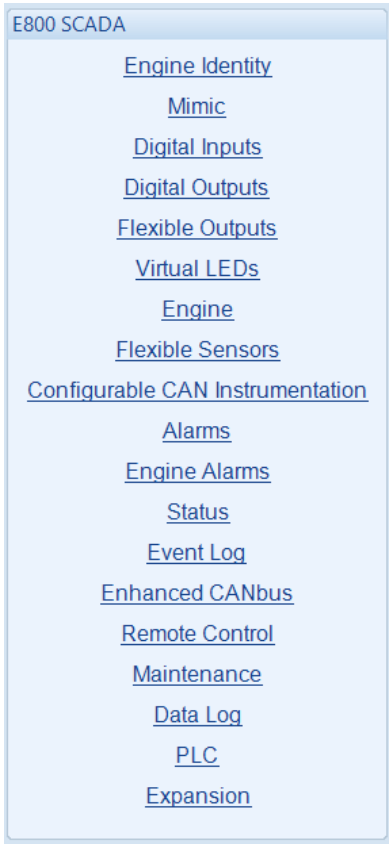
Parameter	Description
Editable Item	**NOTE: The editing of these parameters is not protected by the PIN (if enabled).** Select parameters to be editable through the module display.

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

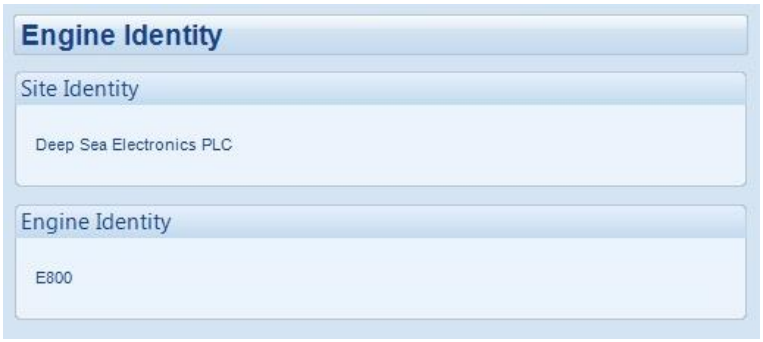


The *SCADA* page is subdivided into smaller sections.
Select the required section with the mouse.



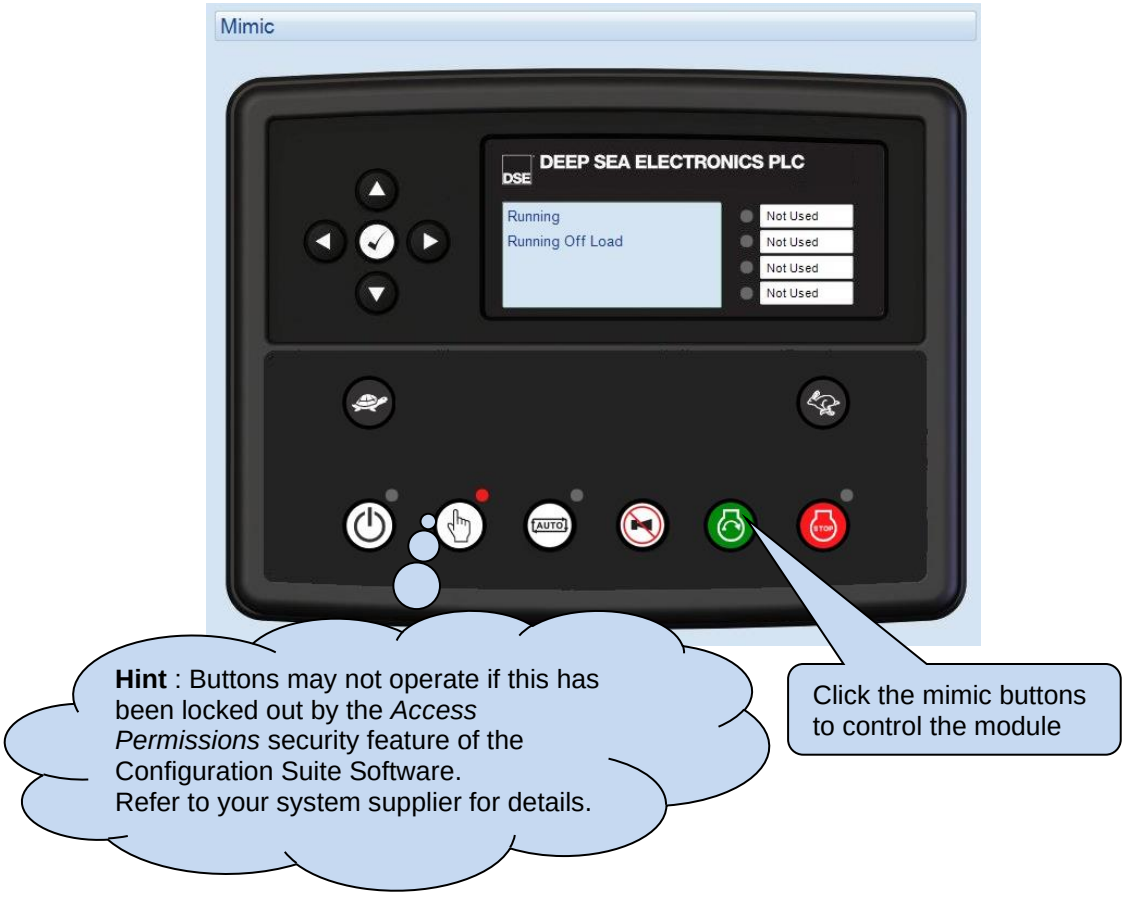
3.1 ENGINE IDENTITY

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

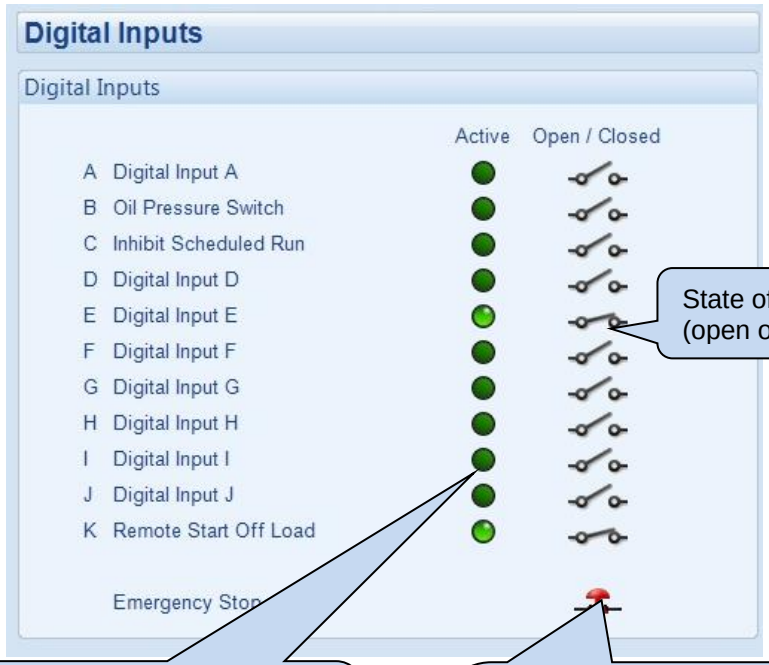


3.2 MIMIC

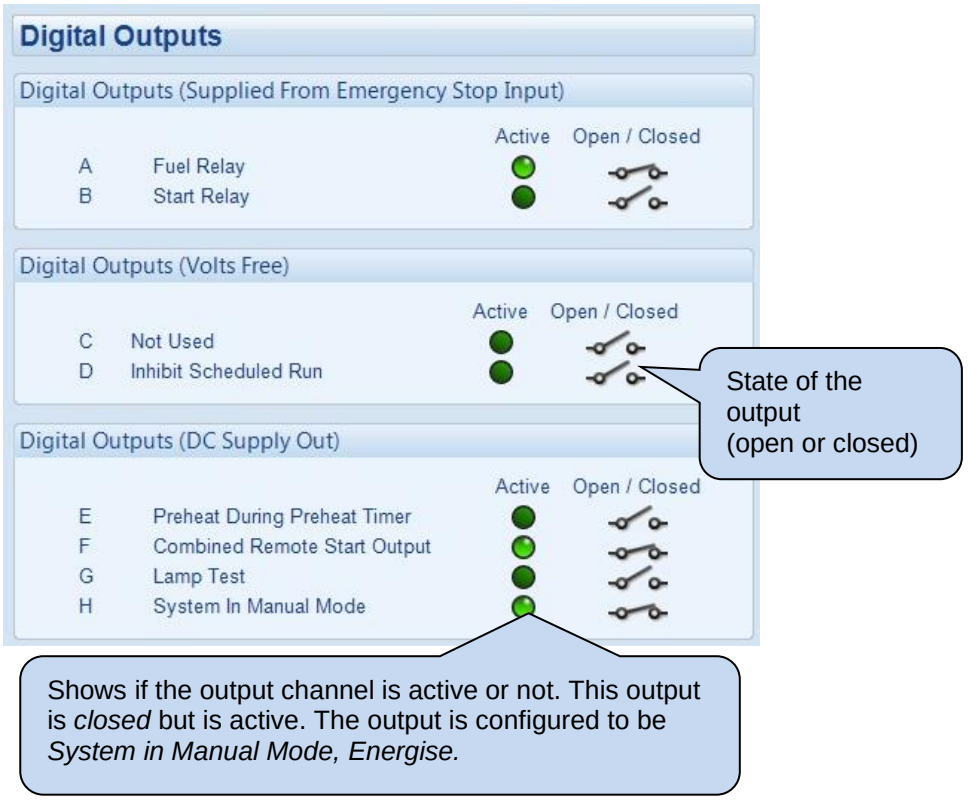
This screen provides a mimic of the control module and allows the operator to change the control mode of the module.
Only the mode control and load switch buttons are operational in the mimic display. The menu navigation buttons are inoperable.



3.3 DIGITAL INPUTS

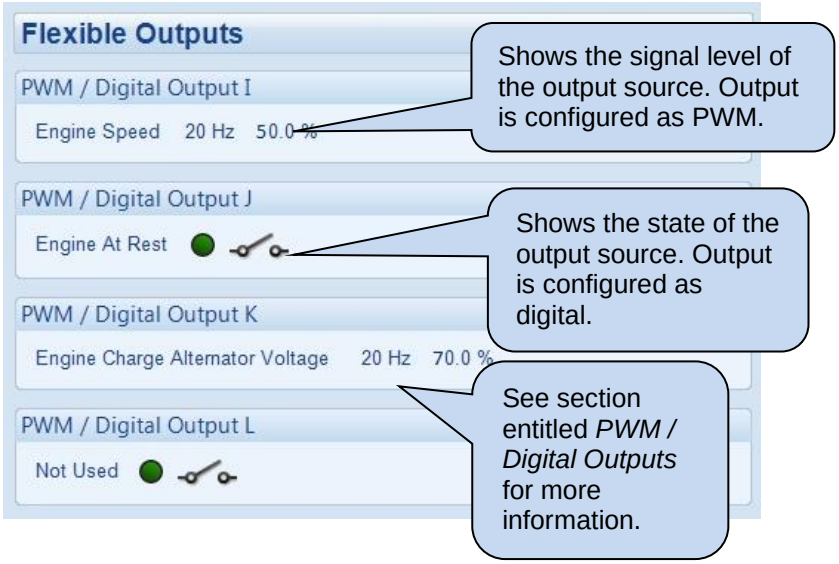


3.4 DIGITAL OUTPUTS



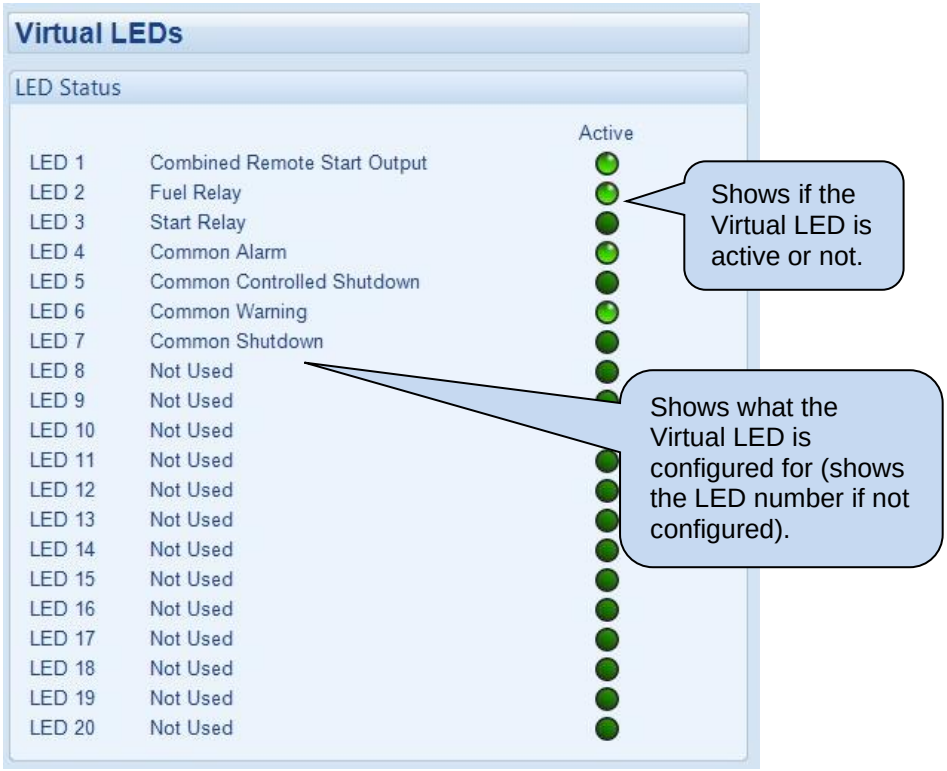
3.5 FLEXIBLE OUTPUTS

Shows the module's flexible outputs.



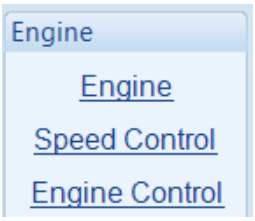
3.6 VIRTUAL LEDS

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



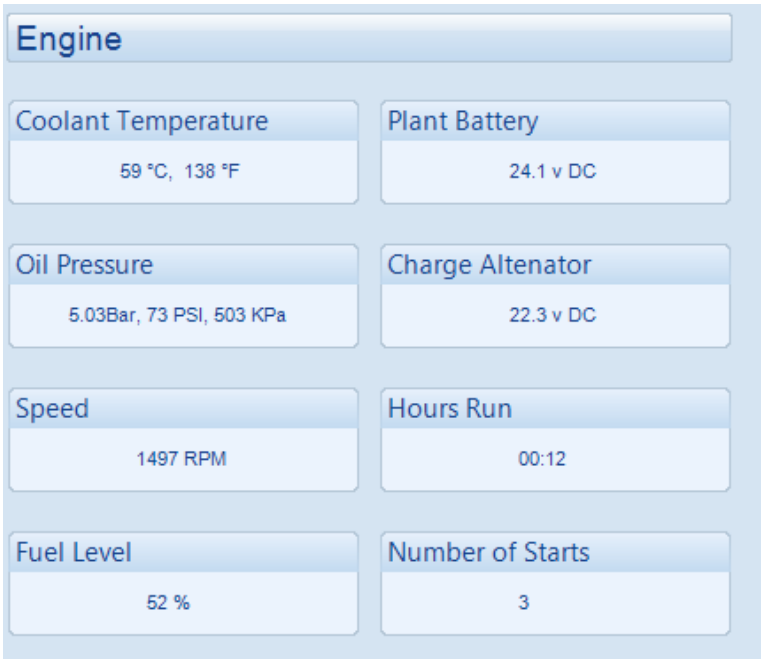
3.7 ENGINE

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



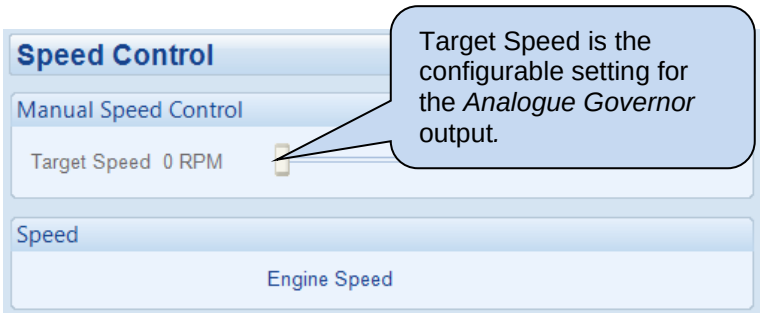
3.7.1 ENGINE

Shows the modules measurements of the engine parameters.



3.7.2 SPEED CONTROL

Allows the adjustment of the speed control.

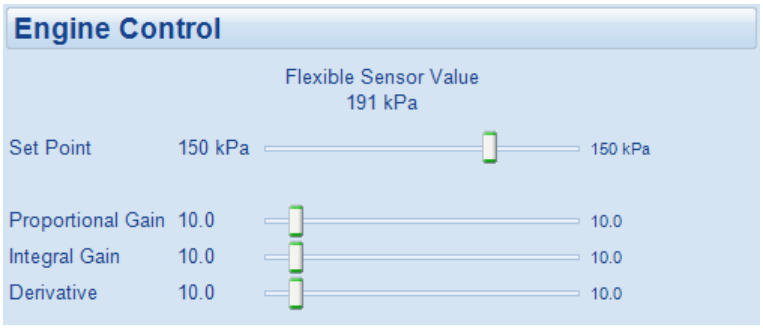


Item	Function
Target Speed	Sets the voltage produced by the DSE module's governor output. For example, Target Speed = 5.00 for the governor output, means that the analogue governor output voltage is 5 V DC.

3.7.3 ENGINE CONTROL

NOTE: The PID Control loop is only active when the module is in *Auto* mode with *Maintain Level or PLC* is configured, and the clutch is engaged. If the clutch is not engaged the control loop holds the Engine at the *Maintain Level* > *Set Point Default* value detailed elsewhere in this manual.

It may be necessary to adjust the PID levels if the engine RPM is unstable or slow to respond. It may also require adjustment to account for load acceptance. Typically, when PID tuning is required it is good practice to start with all levels close to zero before slowly adjusting the gains starting with the Proportional followed by Integral and Derivative Gains.



Parameter	Description
Flexible Sensor Value	The live reading from the *Flexible Sensor* configured for the *Maintain Level* curve.
Set Point	The *Set Point* value that the Engine attempts to maintain. Changing this value overrides the *Set Point Default* value configured within *Maintain Level* section detailed elsewhere in this manual.
Governor (kW) Gain (P) Stability (I) Derivative (D)	The setting for the Gain (P), Stability (I) and Derivative (D) of the control loop used for engine speed when *Maintain level* or *PLC* is configured

3.7.3.1.1 ADJUSTING GAIN (P), STABILITY (I) AND DERIVATIVE (D)

Initial Setup

In most cases the DSE factory settings of 10% for *Gain (P), Stability (I)* and 0 % for *Derivative (D)* are suitable for most systems. This is because the DSE module's control is limited by the *Gain (P), Stability (I)* and *Derivative (D)* settings of the engine's governor. Before adjusting the DSE module's settings, adjust the *Gain (P), Stability (I)* and *Derivative (D)* settings of the engine's governor in accordance with the manufacturer's recommendations.

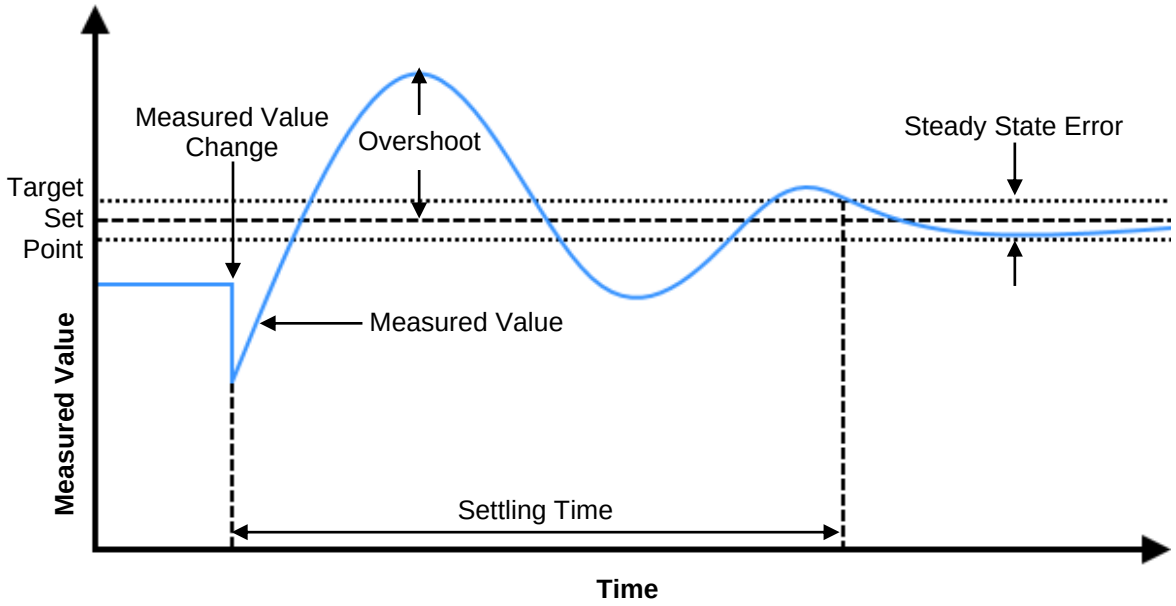
The PID settings are tuned to ensure the DSE matches the measured value to the *Set Point* value by varying the engine's speed, as much as is possible given the system characteristics. The measured value and *Set Point* value are dependent on the engine application. For example, the measured value for an engine used to drive a pump typically relates to maintaining a flow rate (LPM or GPM) or a pressure (PSI or Bar).

Calibration

If the response and stability of the system is not satisfactory after adjusting the *Gain (P), Stability (I)* and *Derivative (D)* settings of the engine's governor, then adjust the DSE's settings by following the steps below:

1. Starting with the *Gain (P), Stability (I)* at 5 % and *Derivative (D)* at 0%, configure the *Set Point* and run the engine on load.
2. Gradually increase the *Gain (P)* setting until the measured value becomes unstable. Very slowly decrease the *Gain (P)* setting until the measured value stabilises around the *Set Point*. Reduce the setting further by approximately 10 %.
3. Gradually increase the *Stability (I)* setting until the measured value becomes unstable. Very slowly decrease the *Stability (I)* setting until the measured value stabilises around the *Set Point*.
4. Apply and remove load to the engine to test response and ensure the measured value remains stable around the *Set Point*. If it's not possible to make load changes, attempt to 'knock' the governor actuator to simulate load changes. This induces a change to the measured value and forces the DSE module into reacting.
5. To further improve the load change response, increase the *Derivative (D)* setting to decrease the overshoot and settling time.

The below example details the affect the *Gain (P), Stability (I)* and *Derivative (D)* settings have on the response to a change in the measured value.



PID Adjustment	Overshoot	Settling Time	Steady State Error
Increase Gain (P)	Increases	Minimal Effect	Decreases
Increase Stability (I)	Increases	Increases	Eliminates
Increase Derivative (D)	Decrease	Decreases	No Effect

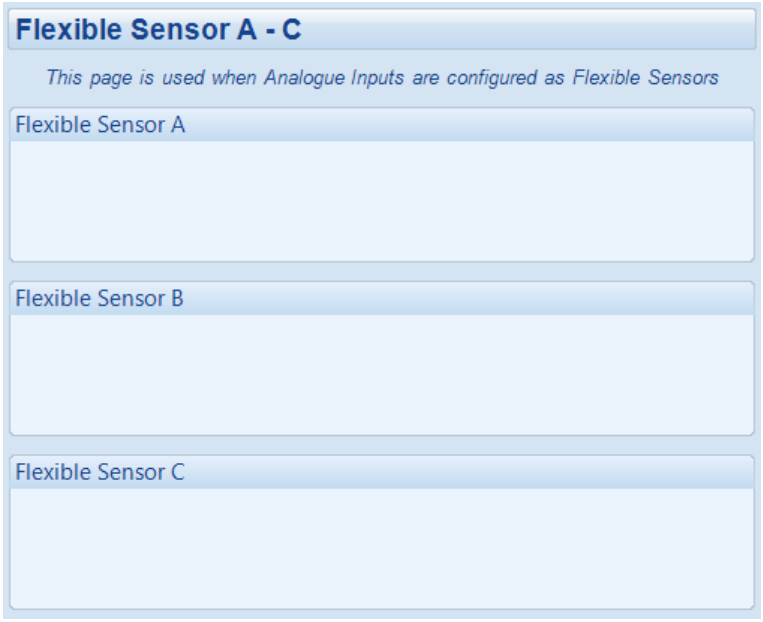
Troubleshooting

NOTE: An over damped response results in a slower control process. An under damped response (overshooting the target) leads to an unstable control process.
Either case leads to undesirable consequences such as overcurrent or reverse power, resulting in engine shutdown, and loss of supply to the load.

If the load is oscillating quickly it suggests that the setting for the *Gain (P)* on the engine(s) is too high or too low. A slow rolling oscillation usually indicates that the *Stability (I)* is too high or too low.

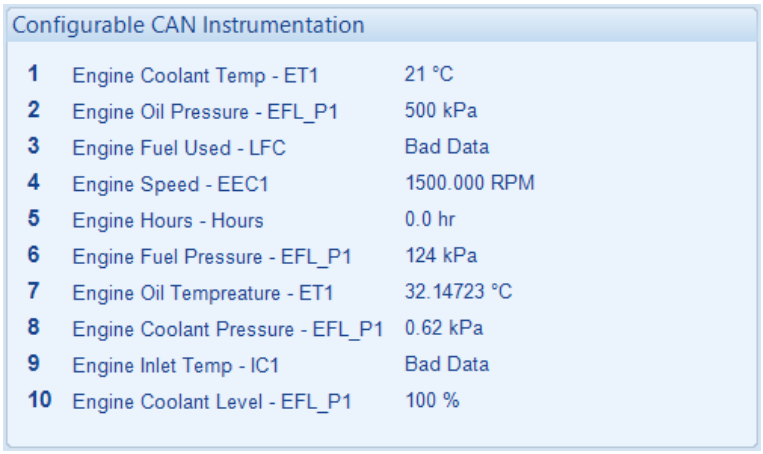
3.8 FLEXIBLE SENSORS

Shows the measurement of the Flexible Sensor (If configured)



3.9 CONFIGURABLE CAN INSTRUMENTATION

This section displays 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. For further details on how to configure these items, refer to section entitled *Configurable CAN Instrumentation* in the *Edit Config* section elsewhere within this document.

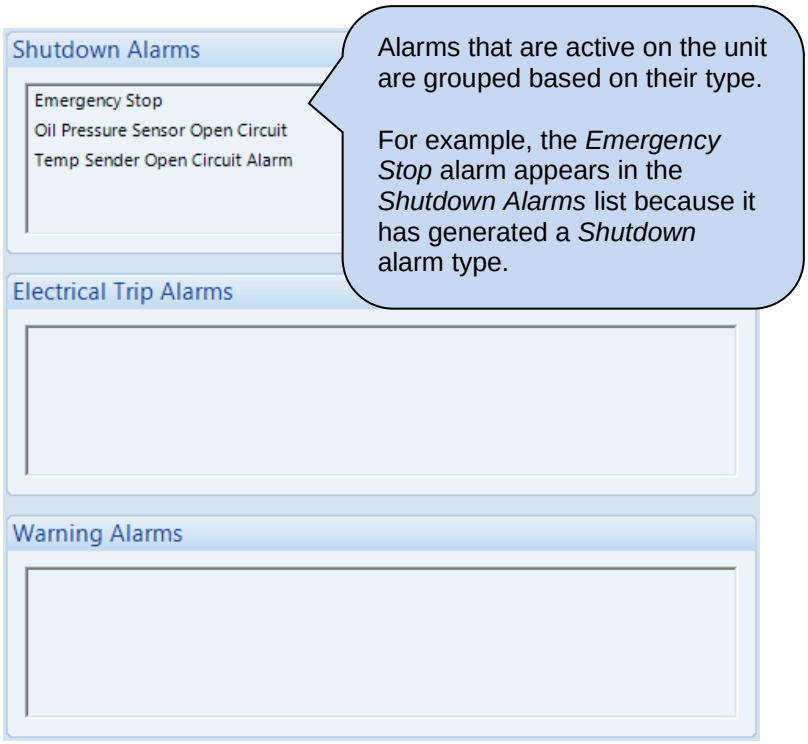


3.10 ALARMS

This section displays the alarms that are currently active on the module. For information in regard to alarm descriptions, refer to DSE publication: ***057-202 DSEE800 Operation Manual*** which is found on the DSE website: www.deepseaelectronics.com

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

Alarms



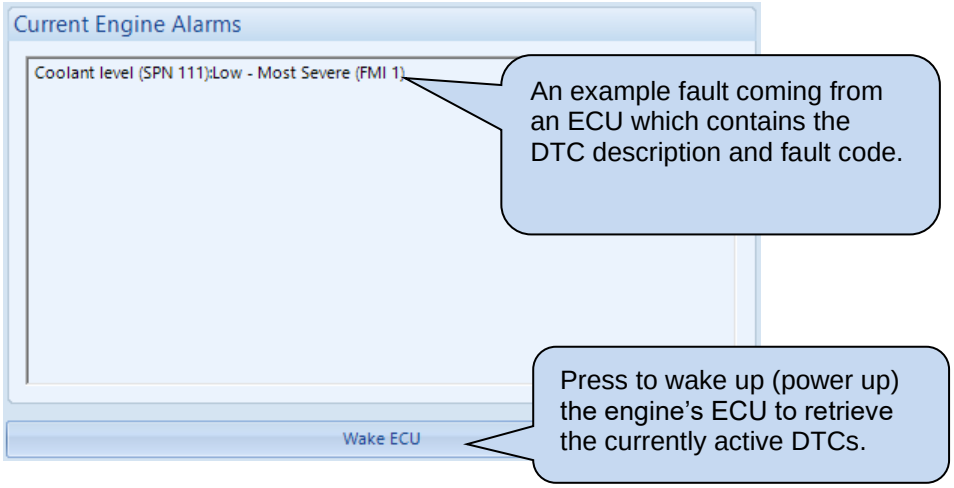
Shows any present alarm conditions.
For a description of the different alarm types, see the section entitled *Alarm Types* elsewhere in this manual.

3.11 ENGINE ALARMS

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

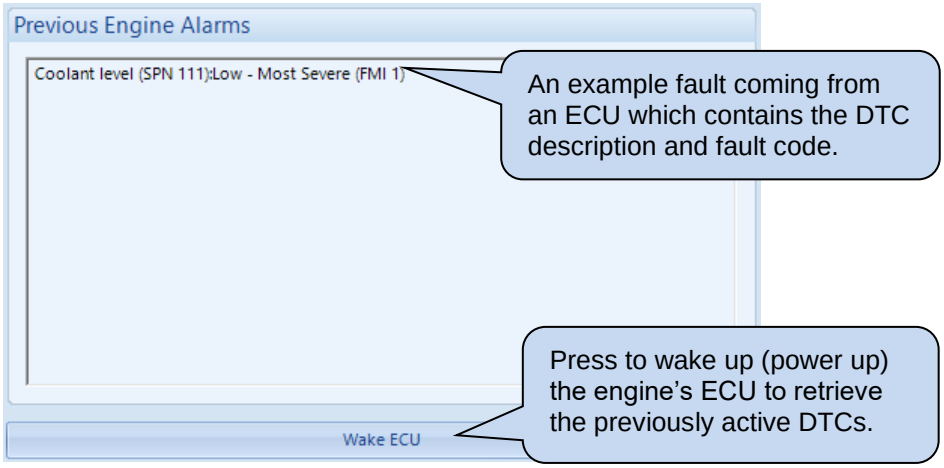
3.11.1 CURRENT ENGINE ALARMS

This section displays the list of active *ECU Current DTCs* (Diagnostic Trouble Codes) which are being read from the engine's ECU. *ECU Current DTCs* are DM1 messages and are only read when the engine's ECU is awake (powered up). For information, refer to DSE publication: ***057-004 Electronic Engines And DSE Wiring*** which is found on the DSE website: www.deepseaelectronics.com



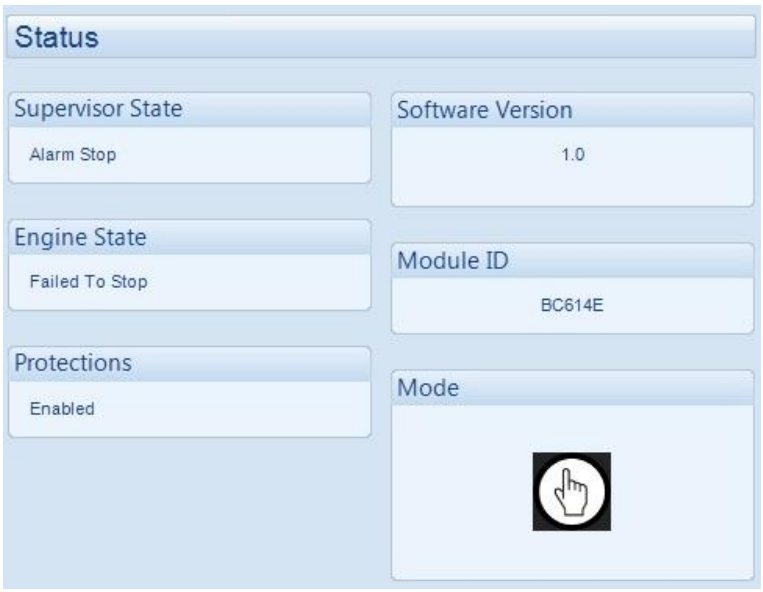
3.11.2 PREVIOUS ENGINE ALARMS

This section displays the list of active *ECU Previous DTCs* (Diagnostic Trouble Codes) which are being read from the engine's ECU. *ECU Previous DTCs* are DM2 messages and are only read when the engine's ECU is awake (powered up). For information, refer to DSE publication: ***057-004 Electronic Engines And DSE Wiring*** which is found on the DSE website: www.deepseaelectronics.com



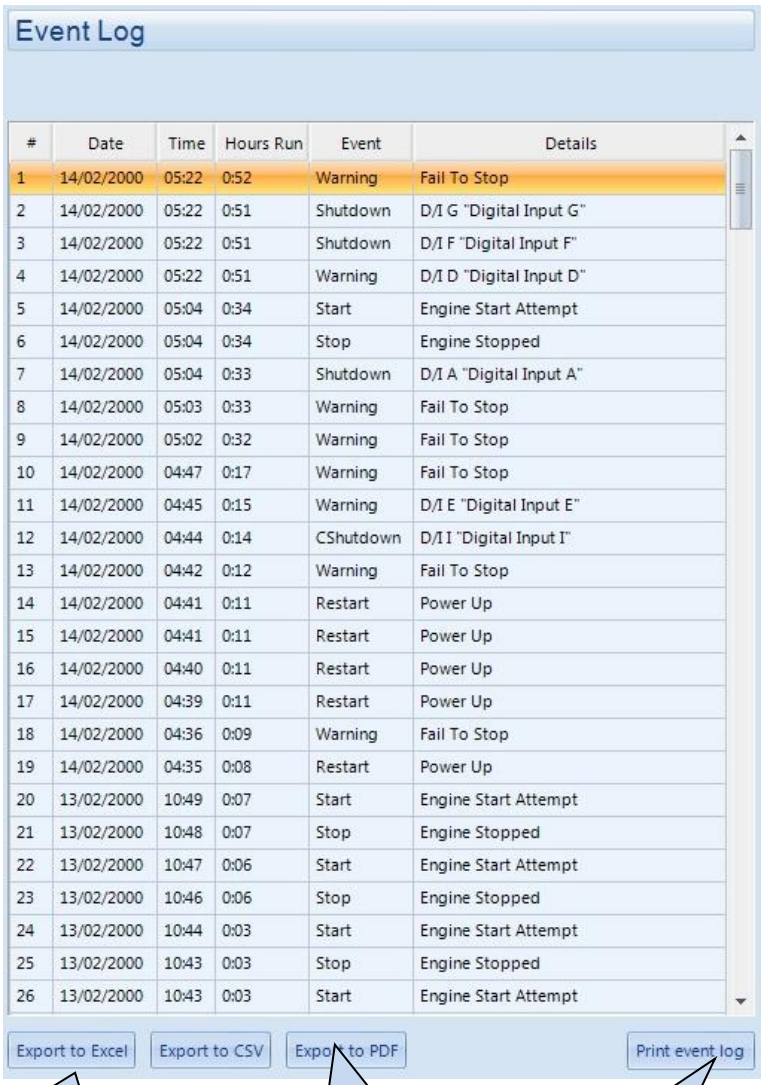
3.12 STATUS

Shows the module's current status.



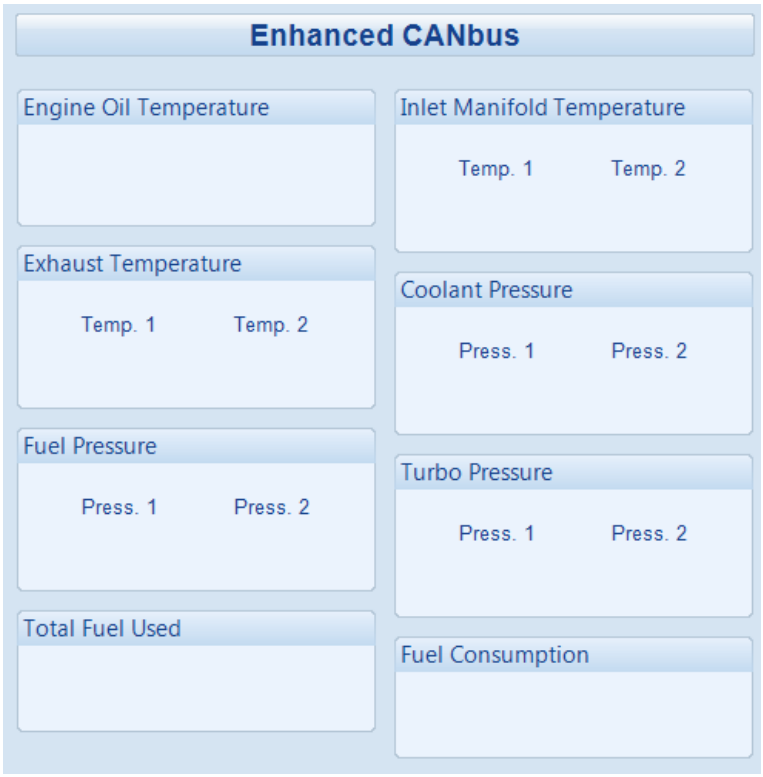
3.13 EVENT LOG

Shows the contents of the module's event log.



3.14 ENHANCED CANBUS

When the module is connected to a compatible electronic engine, the following information is read from the ECU (if supported by the ECU).

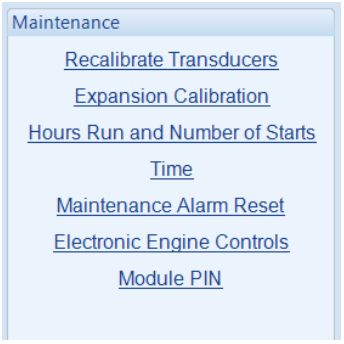


3.15 REMOTE CONTROL

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

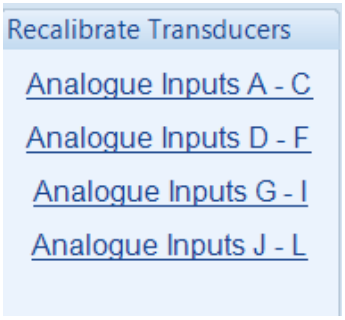
3.16 MAINTENANCE

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



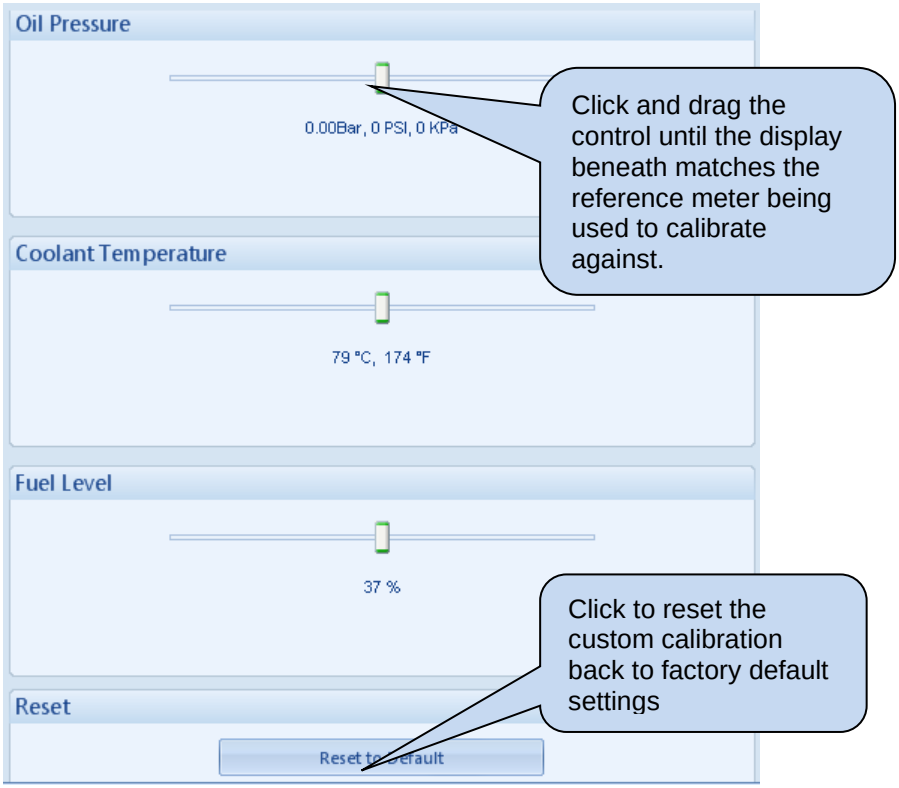
3.16.1 RECALIBRATE TRANSDUCERS

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



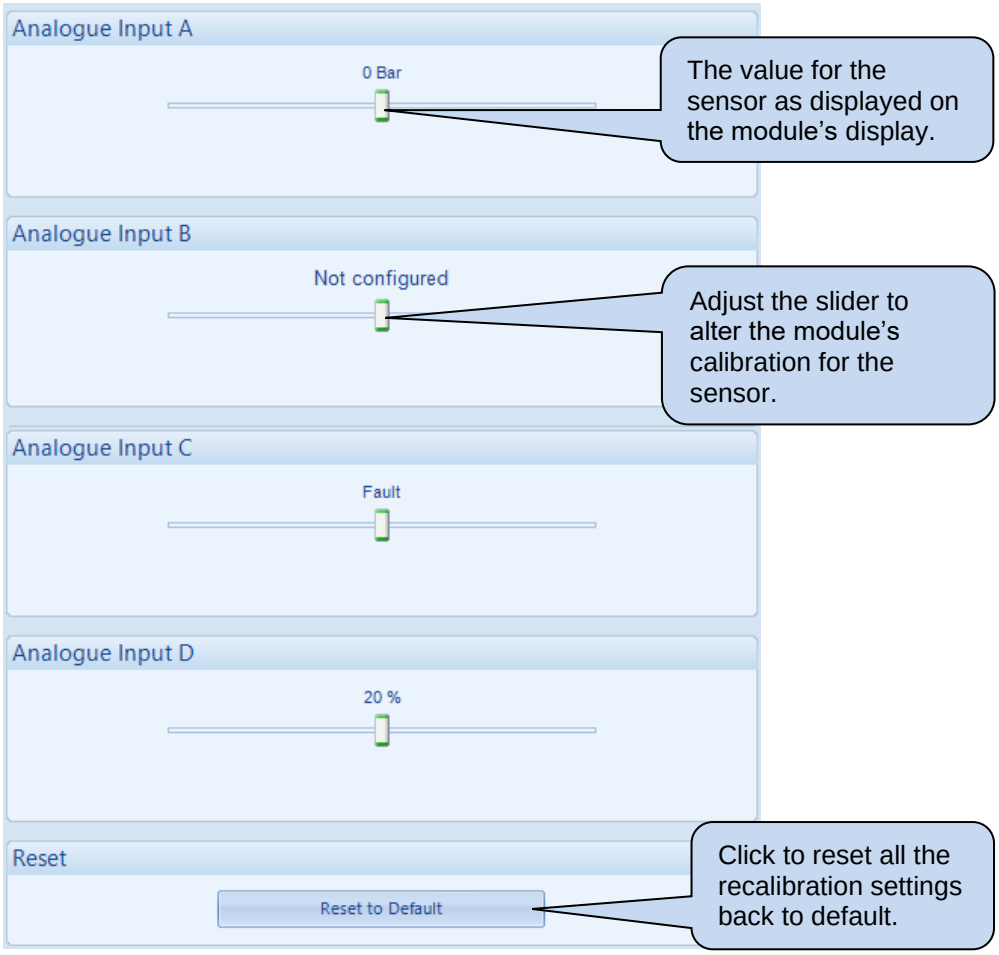
3.16.1.1 OIL / TEMPERATURE / FUEL

Allows the re-calibration of the module oil pressure, coolant temperature and fuel level senders readings.



3.16.1.2 ANALOGUE INPUT

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



3.16.2 SPEED CONTROL CALIBRATION

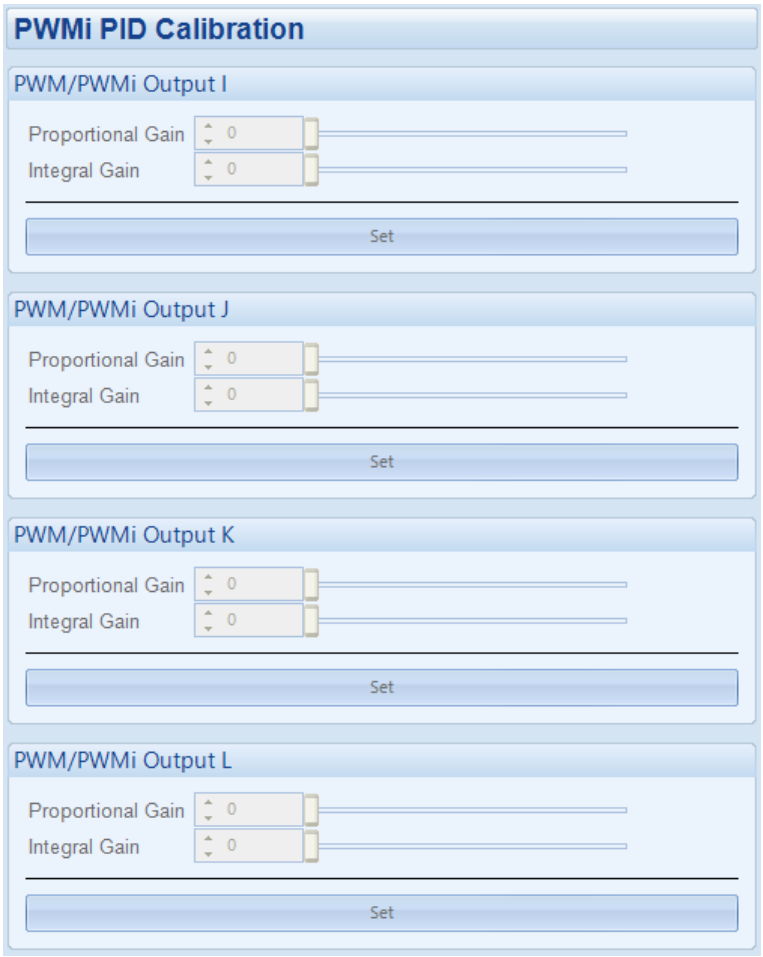
Allows the adjustment of the speed control.

Item	Function
Pulse Rate	The number of raise/lower changes per second of the raise / lower relay outputs.
Pulse Length	The lengths of raise/lower pulses of the raise / lower relay outputs.

3.16.3 PWMI PID CALIBRATION

NOTE: For details on tuning PWMi PID loops refer to section entitled *Adjusting Gain (P), Stability (I) and Derivative (D)*

Allows the calibration of the *PWMI PID Control* while the engine is running. This is useful for fine-tuning the PWMi control loop.

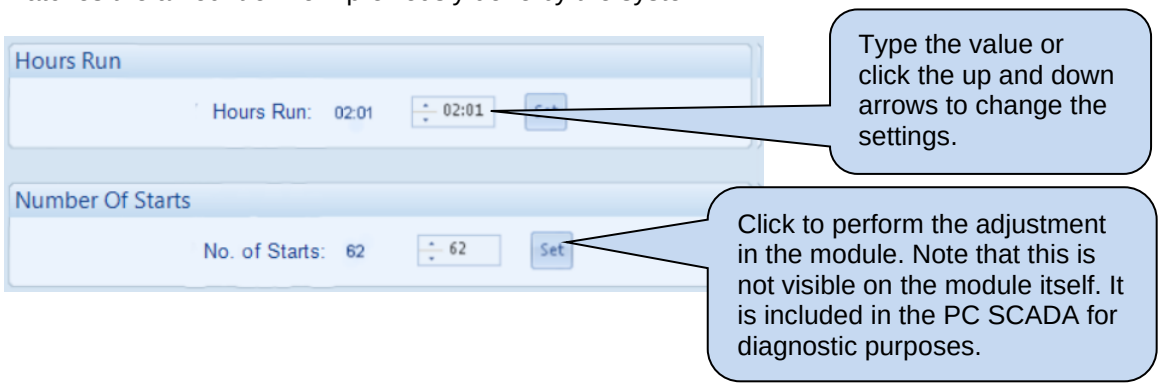


3.16.4 EXPANSION CALIBRATION

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

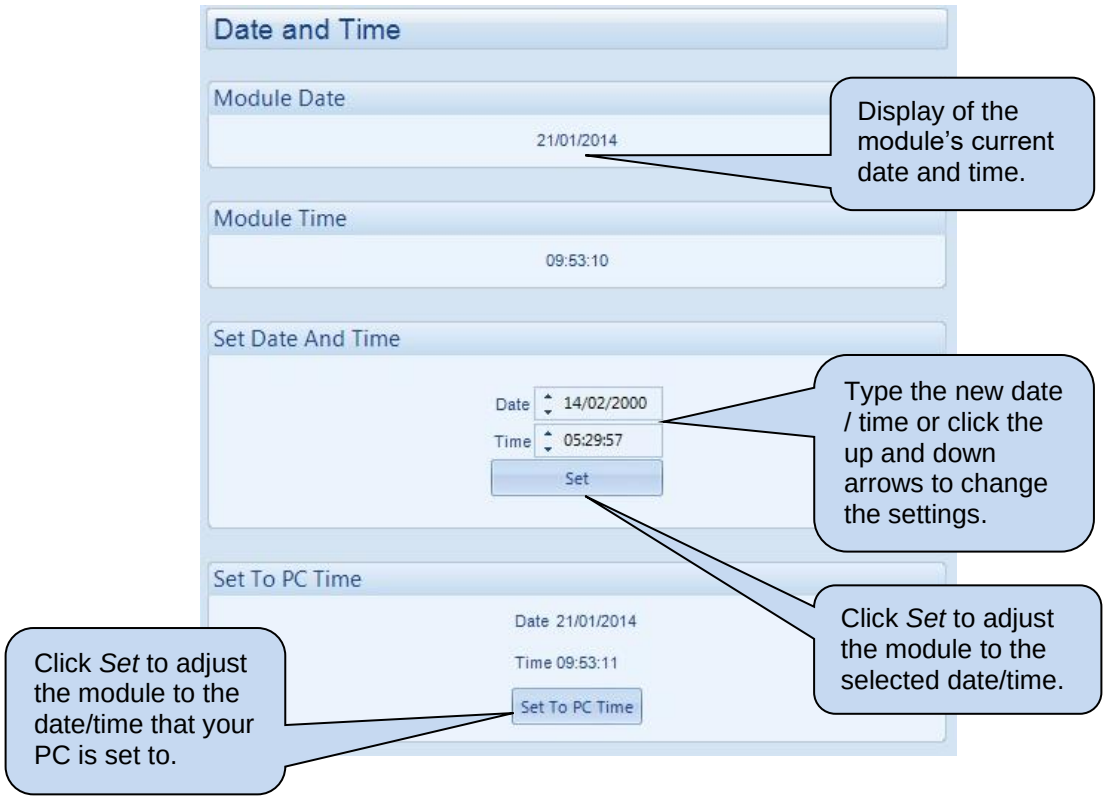
3.16.5 HOURS RUN AND NUMBER OF STARTS

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



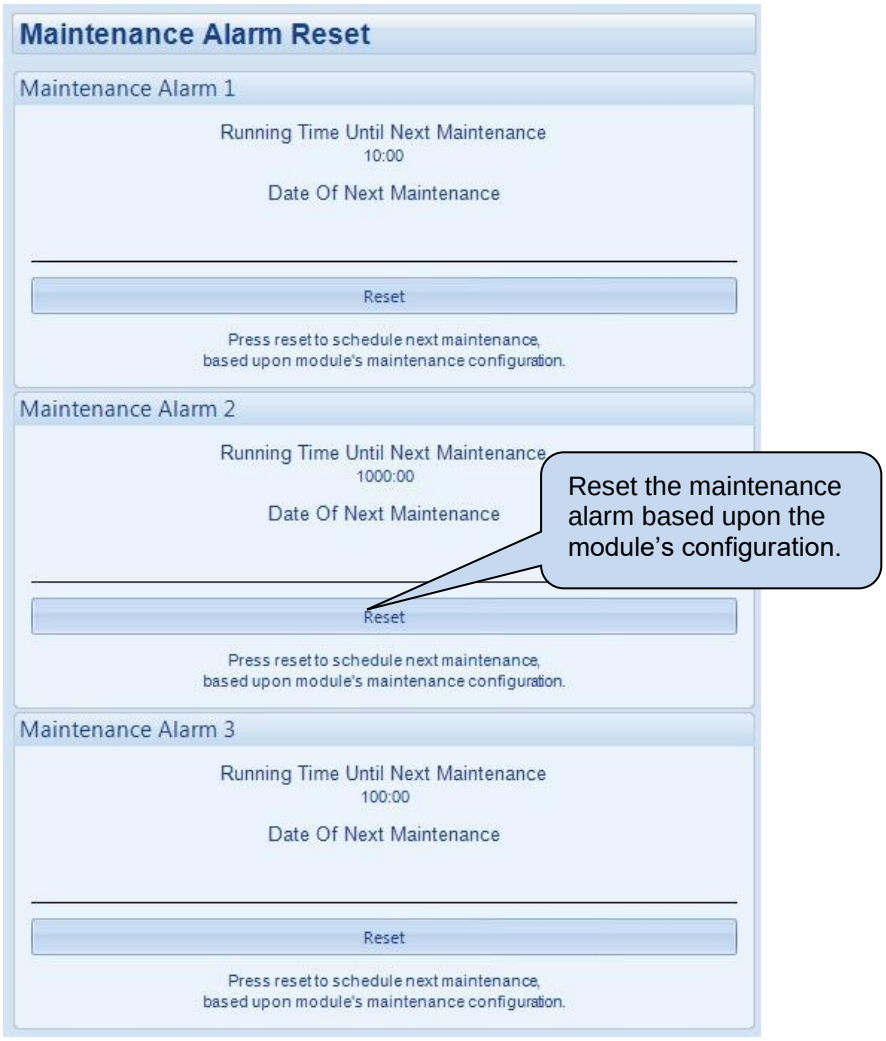
3.16.6 TIME

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



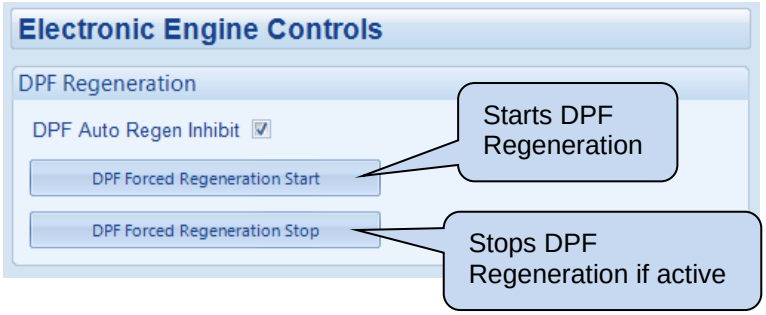
3.16.7 MAINTENANCE ALARM RESET

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



3.16.8 ELECTRONIC ENGINE CONTROLS

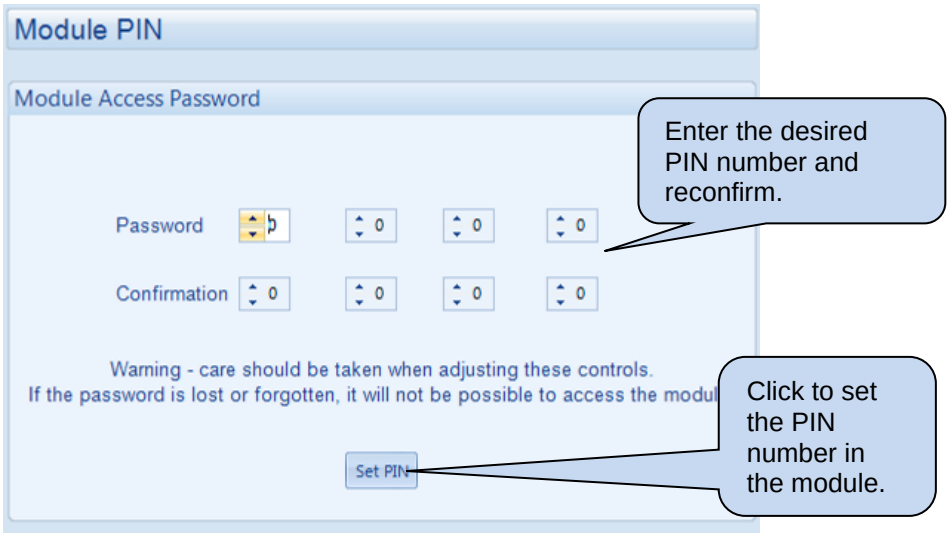
The DPF Forced Regeneration is controlled when the Electronic Engine supports the Non-mission DPF Regeneration.



3.16.9 MODULE PIN

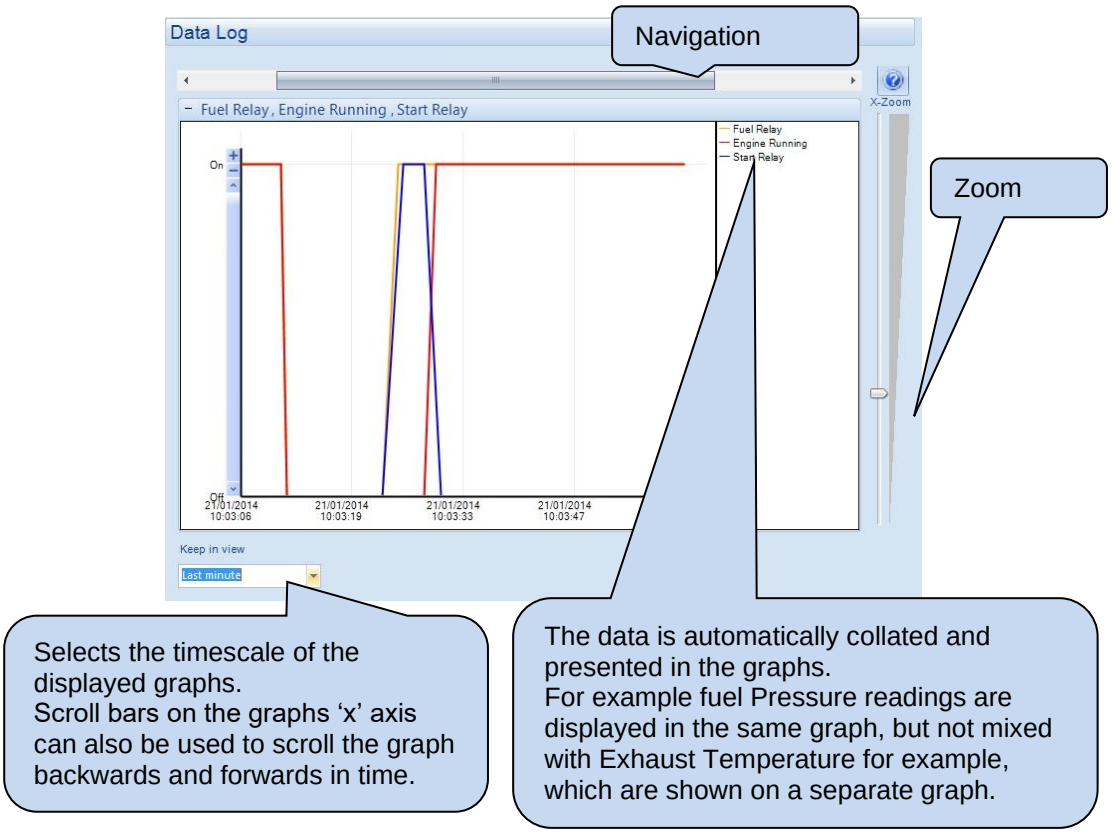
NOTE : If the PIN is lost or forgotten, it is no more possible to access the module!

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 can be sent to the controller from the PC software.



3.17 DATA LOG

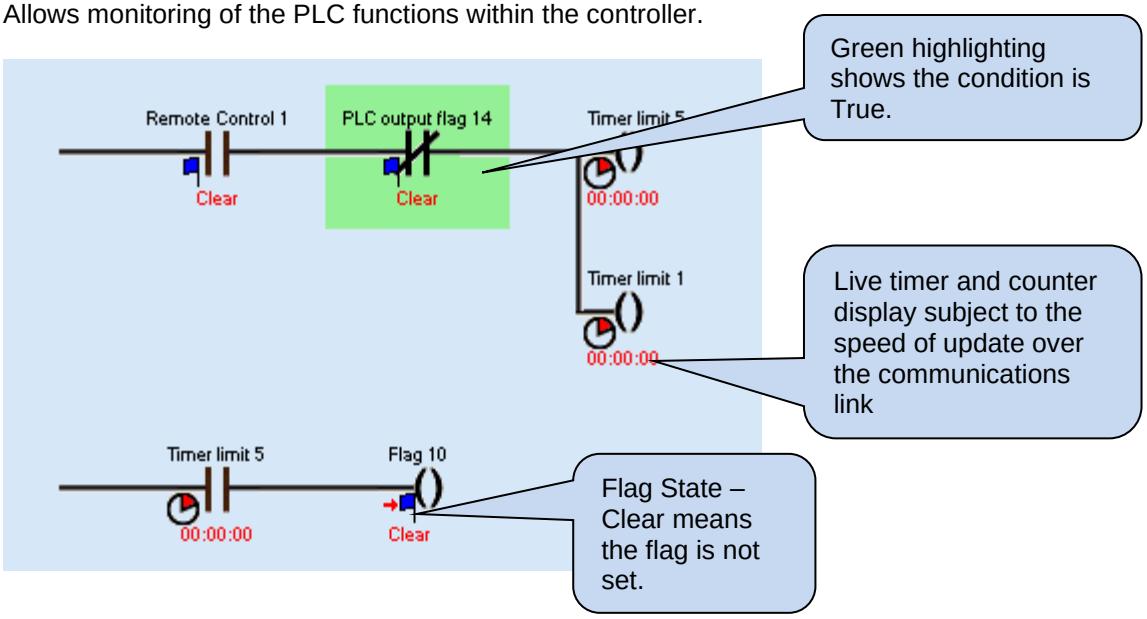
Allows viewing of the module data log (if configured).



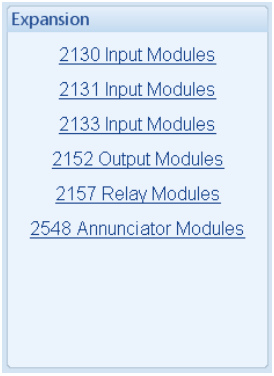
3.18 PLC

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

Allows monitoring of the PLC functions within the controller.



3.19 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 Action	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 are 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 a *Controlled Shutdown* or *Shutdown Alarm* if left untreated.
Controlled Shutdown	Audible alarm and common alarm signal are generated. The engine is taken off load and the cooling timer begins, after which the engine is stopped. *Controlled Shutdown alarms* are serious issues that require the engine to be taken off load. As the name implies, this is often a load-related fault that occurs 'after' the clutch has been engaged. The engine is allowed to cooldown before stopping.
Shutdown	Audible alarm and common alarm signal are generated. The engine is taken off load and immediately stopped. *Shutdown alarms* are serious issues that demand immediate stopping of the engine. For instance, Emergency Stop or Overspeed alarms require immediate shutdown.

5 ALARM ARMING

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

Timing Segment	Stopped	Start Delay	Preheat	Cranking	Safety Delay	Smoke Limiting	Smoke Limiting Off	Warming Up	On Load	Cooling	Cooling in Idle
Always											
From Starting											
Overspeed Overshoot											
Engine Protection											
From Safety On											

5.1 ALWAYS

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

5.2 FROM STARTING

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

5.3 FROM SAFETY ON

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

5.4 ENGINE PROTECTION

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

5.5 OVERSHOOT

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

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

Example

1700 rpm *Over Speed* setting, 10% *Overspeed Overshoot*
During *Safety Delay* an engine speed above (1700 rpm x 1.1) = 1870 rpm results in an immediate shutdown without delay.
After *Safety delay*, an engine speed above 1700 rpm for the period of the *Speed Transient Delay* results in a shutdown

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