DEEP SEA ELECTRONICS

DSEE400

Configuration Suite PC Software Manual

Document Number: 057-251

Author: Ian Roberts

Deep Sea Electronics Ltd.
Highfield House
Hunmanby
North Yorkshire
YO14 0PH
England

Sales Tel: +44 (0) 1723 890099

E-mail: sales@deepseaelectronics.com
Website: www.deepseaelectronics.com

DSEE400 Configuration Suite PC Software Manual

© Deep Sea Electronics Ltd.
All rights reserved. No part of this publication may be reproduced in any material form (including photocopying or storing in any medium by electronic means or other) without the written permission of the copyright holder except in accordance with the provisions of the Copyright, Designs and Patents Act 1988.
Applications for the copyright holder's written permission to reproduce any part of this publication must be addressed to Deep Sea Electronics Ltd. at the address above.

The DSE logo and the names DSEGenset®, DSEATS®, DSEPower® and DSEControl® are UK registered trademarks of Deep Sea Electronics Ltd.

Any reference to trademarked product names used within this publication is owned by their respective companies.

Deep Sea Electronics Ltd. reserves the right to change the contents of this document without prior notice.

Issue	Comments
1	Initial release
2	Rebranded to DSEControl
3	Added DEF Level, preheat & post heat parameters, speed change step size, and Alternative Configurations
3.1	Added Clutch Control for V3.1 controller.
4	Updated screenshot for alternative configurations to include flexible outputs and email/website address.
5	Added maintain value for engine control, increase amount of maintenance alarms, and ECU override.
6	Update for Version 6 including new PLC and Module PIN Read/Write feature
7	Added Configurable CAN Instrumentation and increase amount of maintenance alarms.
8	Added "Disable ECM Speed Control" input, *Enable Run Time,* and Modbus intelligent battery charger compatibility.

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

TABLE OF CONTENTS

Section Page

1 INTRODUCTION

The **DSE Configuration Suite PC Software** allows the DSEE400 module to be connected to a PC via USB Type A to USB Type B cable. Once connected the various operating parameters within the module are viewed or edited as required by the engineer. This software allows easy controlled access to these values.

This manual details the configuration of the DSEE400 controller.
The configuration suite must only be used by competent, qualified personnel, as changes to the operation of the module may have safety implications on the panel and/or engine to which it is fitted. Access to critical operational sequences and settings for use by qualified engineers, may be barred by a PIN 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. A separate manual deals with the operation of the individual module .See the section entitled *Bibliography* elsewhere in this document.

1.1 CLARIFICATION OF NOTATION

Clarification of notation used within this publication.

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

1.2 GLOSSARY OF TERMS

Term	Description
DSEExxx	All modules in the DSEExxx range.
DSEE400	DSEE400 module/controller
CAN	Controller Area Network Vehicle standard to allow digital devices to communicate to one another.
DEF	Diesel Exhaust Fluid (AdBlue®) A liquid used as a consumable in the SCR process to lower nitric oxide and nitrogen dioxide concentration in engine exhaust emissions.
DM1	Diagnostic Message 1 A DTC that is currently active on the engine ECU (ECM).
DM2	Diagnostic Message 2 A DTC that was previously active on the engine ECU (ECM) and has been stored in the ECU's (ECM) internal memory.
DPF	Diesel Particulate Filter A filter fitted to the exhaust of an engine to remove diesel particulate matter or soot from the exhaust gas.
DPTC	Diesel Particulate Temperature Controlled Filter A filter fitted to the exhaust of an engine to remove diesel particulate matter or soot from the exhaust gas which is temperature controlled.
DTC	Diagnostic Trouble Code The name for the entire fault code sent by an engine ECU (ECM).
ECU/ECM	Engine Control Unit/Management An electronic device that monitors engine parameters and regulates the fuelling.
FMI	Failure Mode Indicator A part of DTC that indicates the type of failure, e.g. high, low, open circuit etc.
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.
IEEE	Institute of Electrical and Electronics Engineers
LED	Light Emitting Diode
PGN	Parameter Group Number A CANbus address for a set of parameters that relate to the same topic and share the same transmission rate.
PWM	Pulse Width Modulation
PWMi	Current Pulse Width Modulation
SCADA	Supervisory Control And Data Acquisition A system that operates with coded signals over communication channels to provide control and monitoring of remote equipment
SCR	Selective Catalytic Reduction A process that uses DEF with the aid of a catalyst to convert nitric oxide and nitrogen dioxide into nitrogen and water to reduce engine exhaust emission.
SPN	Suspect Parameter Number A part of DTC that indicates what the failure is, e.g. oil pressure, coolant temperature, turbo pressure etc.

1.3 BIBLIOGRAPHY

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

1.3.1 INSTALLATION INSTRUCTIONS

DSE PART	DESCRIPTION
053-175	DSE9474/9484 Installation Instructions
053-180	DSEE400 Installation Instructions
053-235	DSE 9476 Installation Instructions
053-251	DSE BC2410Ei Installation Instructions
053-277	DSE 9470 MKII Installation Instructions

1.3.2 MANUALS

DSE PART	DESCRIPTION
N/A	DSEGencomm (MODBUS protocol for DSE controllers)
057-004	Electronic Engines and DSE wiring
057-151	DSE Configuration Suite PC Software Installation & Operation Manual
057-220	Options for Communications with DSE Controllers
057-231	DSE9474/9484 Operator Manual
057-252	DSEE400 Operator Manual
057-282	DSE 9476 Operator Manual
057-291	DSE9470 MKII Operator Manual
057-314	Advanced PLC Programming Guide for DSE Modules
057-315	DSE BC2410Ei Configuration Suite PC Software Manual
057-316	DSE BC2410Ei Operator Manual

1.3.3 OTHER

The following third party documents are also referred to:

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

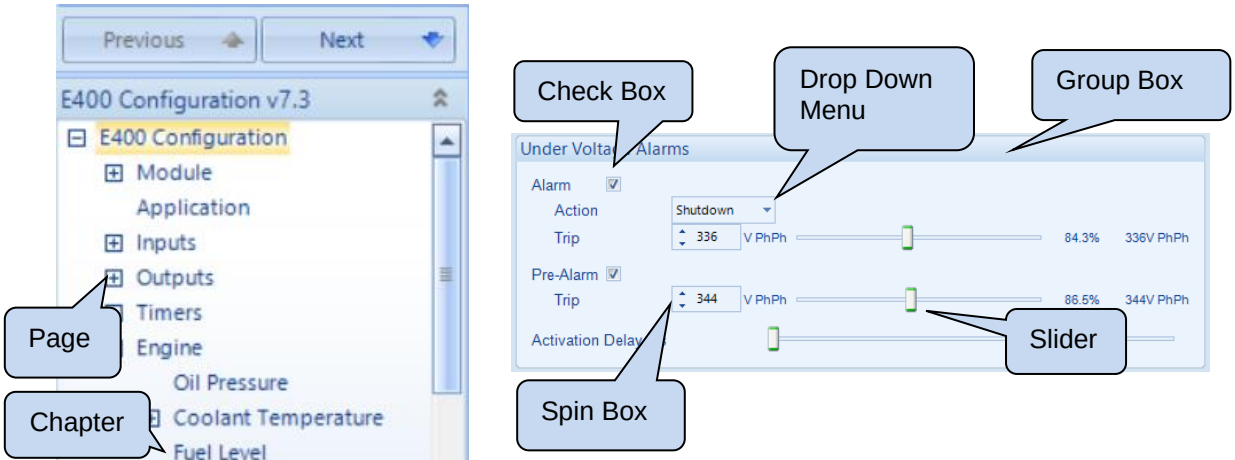
1.4 INSTALLATION AND USING THE DSE CONFIGURATION SUITE SOFTWARE

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

2 GENERAL CONTROLS

Overview

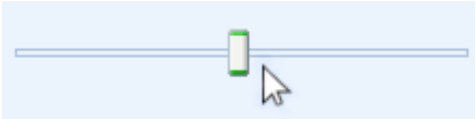
The *DSE Configuration Suite PC Software* dialog boxes provide the user with a way to type text, choose options, and initiate actions. Controls in other windows provide a variety of services, such as letting the user choose commands and view and edit text. This section describes the controls provided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



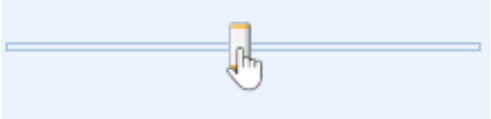
2.1 USER CONTROLS

Slider

The Slider Control allows the user to change a value using a mouse or arrows found on a standard keyboard.
The slider is highlighted in green in its inactive state and will change to orange (active state) once selected by a mouse pointer.



Inactive state

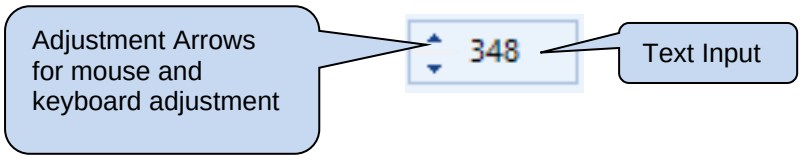


Active state

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

Spin Box

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



Clicking the mouse over the Spin box will change its colour to orange putting it in an active state.

Inactive state

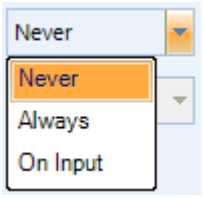
Active state

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

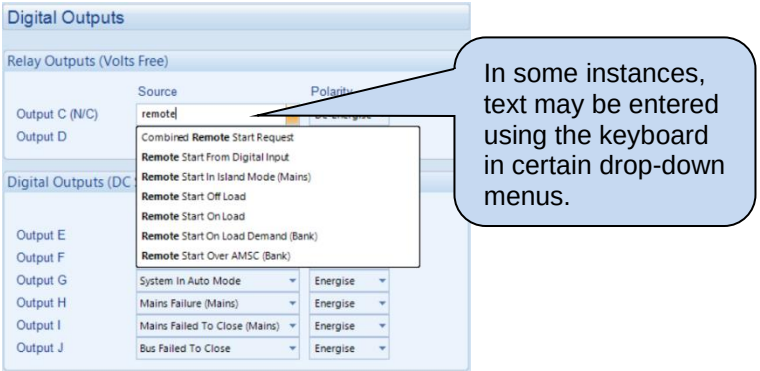
Check box

Used to select a parameter

Drop down menu



Used to select an action

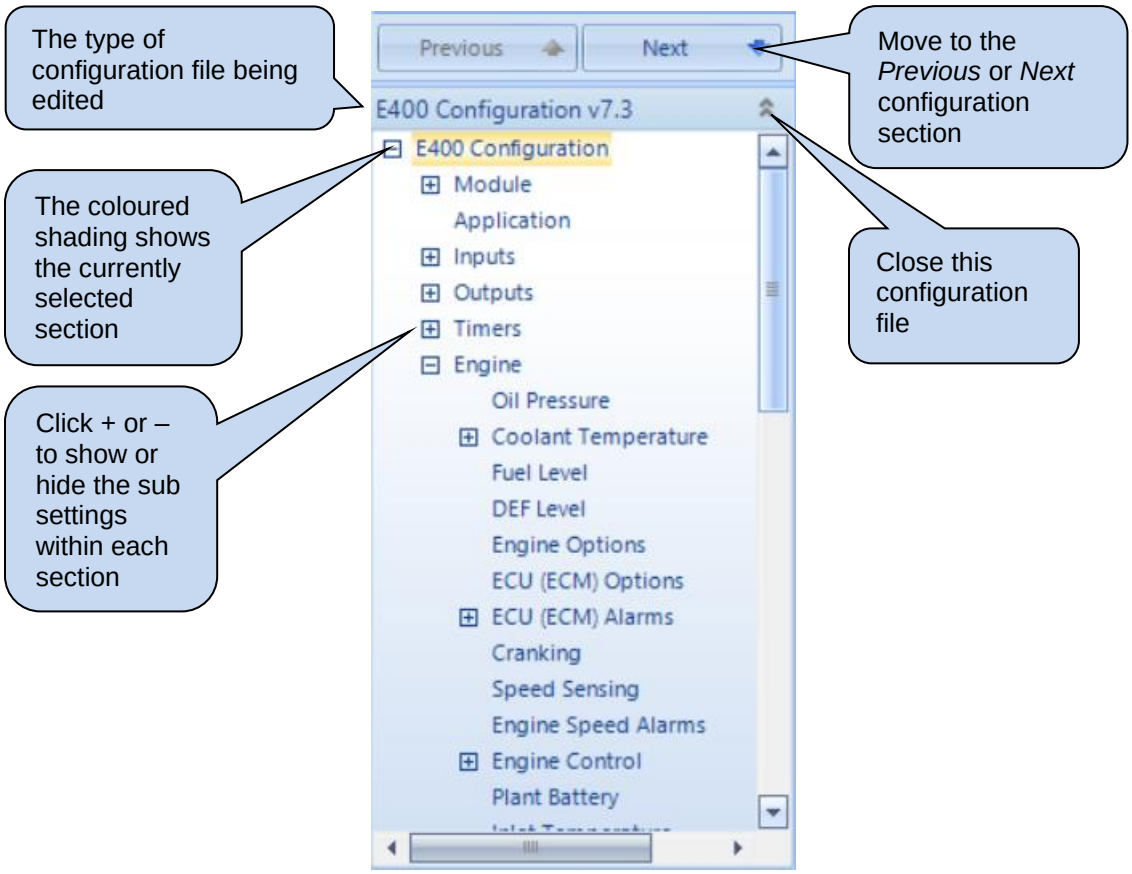


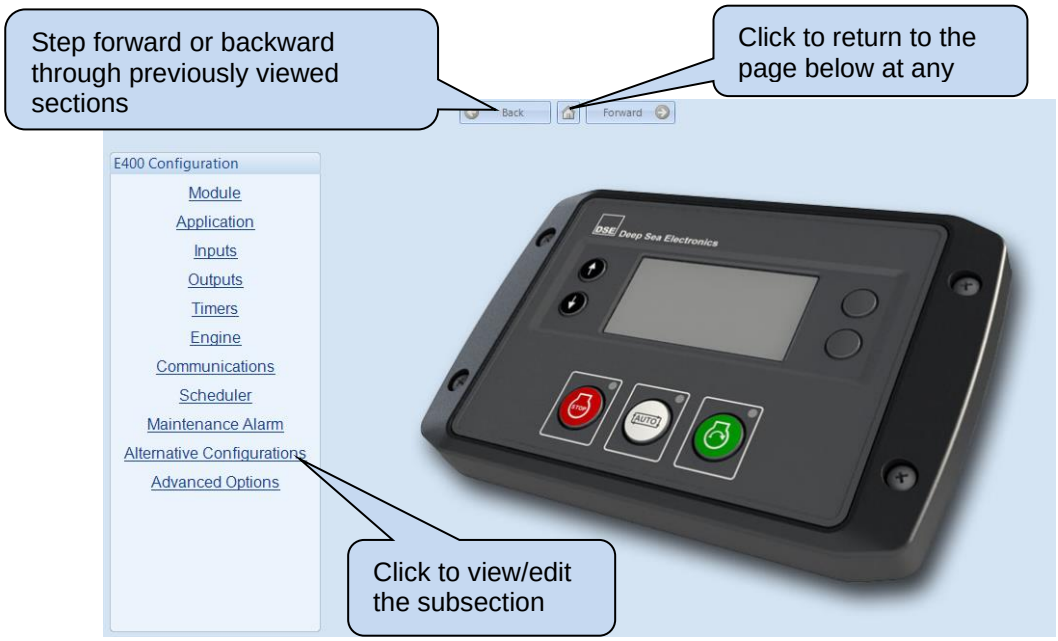
Used to select a source

3 EDITING THE 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.

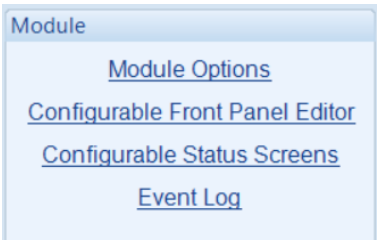
3.1 SCREEN LAYOUT





3.2 MODULE

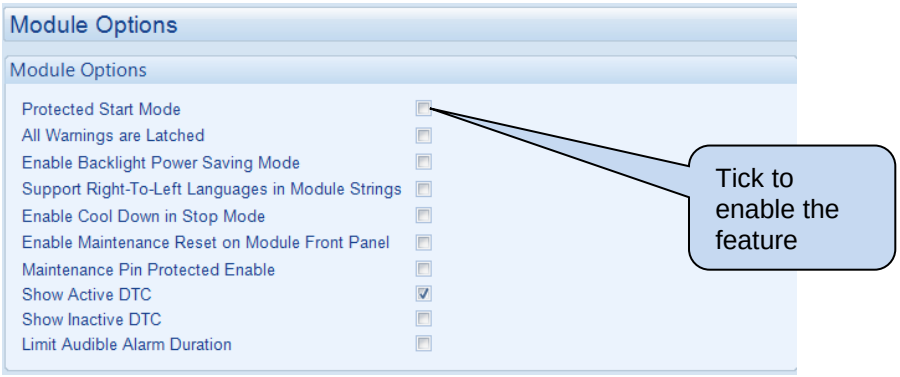
The *Module* section is subdivided into smaller sections.
Select the required section with the mouse.



3.2.1 MODULE OPTIONS

This section allows the user to configure options related to the module.

Module Options



Setting	Description
Protected Start Mode	If enabled, the start button must be pressed twice to confirm manual start request
All Warnings Are Latched	☐ = The warnings and pre-alarms automatically reset once the triggering condition has cleared. ☑ = Warnings and pre-alarms latch when triggered. Resetting the alarm is performed by either an external reset applied to one of the configured *Alarm Reset* digital inputs or the 'Stop/Reset' pushbutton must be operated (once the triggering condition has been cleared).
Enable Backlight Power Saving Mode	☐ = Normal Operation. ☑ = The DSE module's backlight turns off after the *Backlight* timer expires. This is used to save power.
Support Right-Left Languages in Module Strings	Determines the direction of text input where supported (i.e. configurable input text) ☐ = Left to right language support ☑ = Right to left language support
Enable Cool Down in Stop Mode	☐ = 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.

Parameter descriptions are continued overleaf…

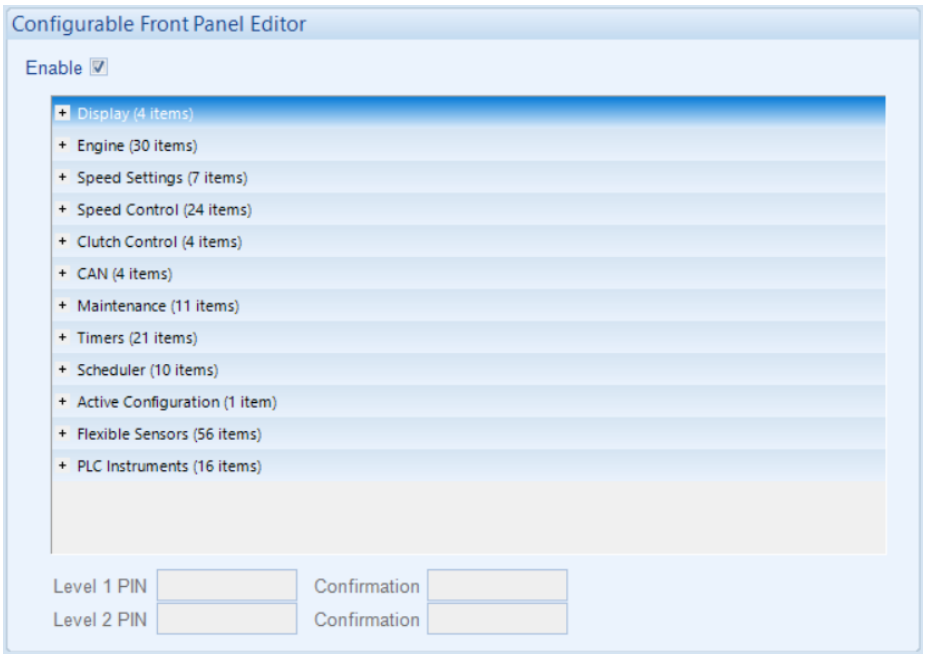
Setting	Description
Enable Maintenance Reset on Module Front Panel	☐ = Maintenance reset available only via digital input or by Configuration Suite PC Software SCADA | Maintenance. ☑ = Additionally provides the user the ability to reset the Maintenance Alarms using the Front Panel Editor of the controller. Refer to DSE part 057-252 DSEE400 Operator Manual for details.
Maintenance PIN Protected Enable	☐ = Maintenance Alarm reset not protected by PIN code. ☑ = Maintenance Alarm Reset is protected by PIN code.
Show Active DTC **ECU / ECM Only**	☐ = The DSE module does not show the active ECU / ECM fault codes on its display. ☑ = The DSE module shows the active ECU / ECM fault codes on the module display. (Active DTC are also called DM1 in J1939 ECU)
Show Inactive DTC **ECU / ECM Only**	☐ = The DSE module does not show the inactive ECU / ECM fault codes on its display. ☑ = The DSE module shows the in-active ECU (ECM) DTC on the module display. Inactive DTCs are the historical log of the ECU, where previous alarms have been cleared from the active DTC list. (Inactive DTC are called DM2 in J1939).
Limit Audible Alarm Duration	☐ = Audible Alarm Output continues until the alarm is muted. ☑ = Audible Alarm Output automatically ceases after the duration of the Audible Alarm Timer.

3.2.1.1 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.
Duration	Set the duration for which the *Start Up Image* is displayed at power up.
Select Image	Browse and select the image file to display at power up. The file required has to be a monochrome bitmap image of size 132 pixels in width by 64 pixels in height.
Clear	Clears the image file selection.

3.2.2 CONFIGURABLE FRONT PANEL EDITOR

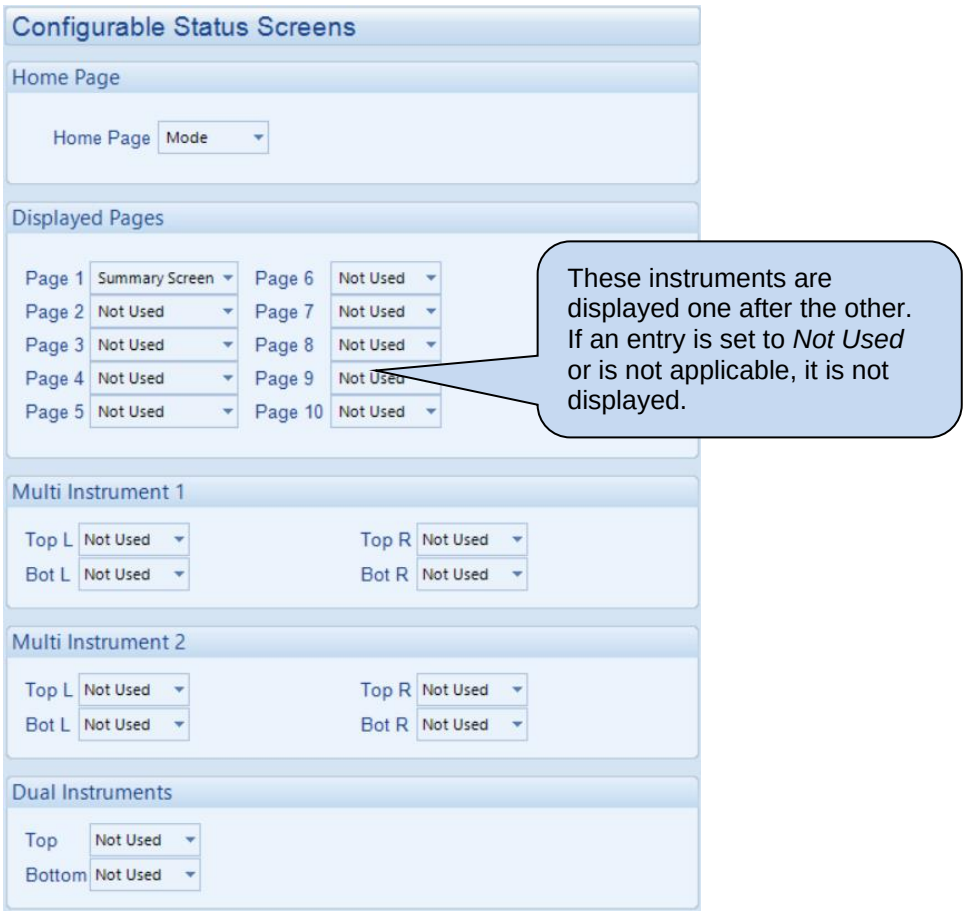
The Configurable Front Panel Editor allows generator OEMs to create a PIN protected, customised Front Panel Editor with up to two security access levels. Items may be added or removed as required by the engine supplier.



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

3.2.3 CONFIGURABLE STATUS SCREENS

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

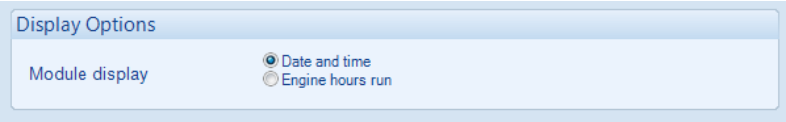


Setting	Description
Home Page	*Mode:* When no navigation buttons are pressed for the duration of the *Page* Timer, the module's display reverts back to show the control mode state. *Instrumentation*: When no navigation buttons are pressed for the duration of the *Page* Timer, the module's display scrolls through the *Displayed Pages,* the mode page is not displayed automatically but can still be accessed by manually pressing the navigation buttons.
Displayed Pages	When no navigation buttons are pressed for the duration of the *Page Timer*, the module's display scrolls through the configured *Displayed Pages*. Each of the configured *Displayed Pages* remains on the display for the duration of the *Scroll Timer*. Choose from the module's instrumentation parameters or the *Multi-Instrument* pages.
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.
Dual Instruments	When these pages are selected in the *Displayed Pages* option, they allow the configuration of two parameters to occupy the top and bottom of each page.

3.2.4 EVENT LOG

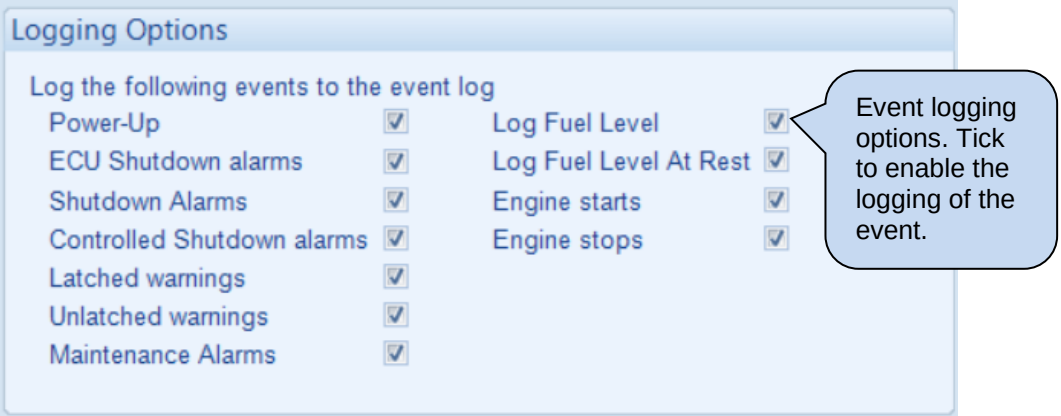
Display options

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.



3.2.4.1 LOGGING OPTIONS

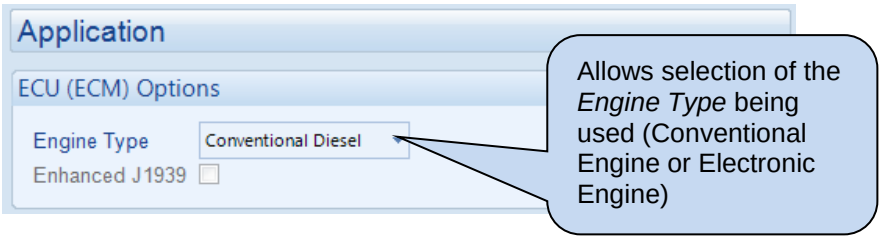
The event log can be configured to allow users to select which events are recorded.



Parameter	description
Power Up	☐ = Power up events are not logged in the module's event log ☑ = Power up events are logged when the DC Supply is applied to the module or whenever the module is rebooted
ECU Shutdown Alarms	☐ = The ECU Shutdown Alarms are not logged in the module's event log ☑ = Logs the shutdown alarms generated by the ECU (ECM)
Shutdown Alarms	☐ = The Shutdown Alarms are not logged in the module's event log ☑ = Logs the Shutdown alarms
Controlled Shutdown Alarms	☐ = The Controlled Shutdown Alarms are not logged in the module's event log ☑ = Logs the Controlled Shutdown alarms
Latched Warnings	☐ = The Latched Warning Alarms are not logged in the module's event log ☑ = Logs the Latched Warning Alarms
Unlatched Warnings	☐ = The Unlatched Warning Alarms are not logged in the module's event log ☑ = Logs the Warning Alarms
Maintenance Alarms	☐ = The Maintenance Alarms are not logged in the module's event log ☑ = Logs the Maintenance alarms
Log Fuel Level	☐ = The fuel level percentage is not logged in the module's event log ☑ = Logs the fuel level percentage
Log Fuel Level At Rest	☐ = The fuel level percentage is not logged when the engine is at rest ☑ = Logs the fuel level even while the engine is at rest
Engine Starts	☐ = Engine start events are not logged in the module's event log ☑ = Logs an event when the engine starts
Engine Stops	☐ = Engine stop events are not logged in the module's event log ☑ = Logs an event when the engine is stopped

3.3 APPLICATION

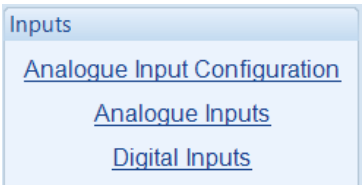
NOTE: For further details and instructions on ECU (ECM) options and connections, refer to DSE Publication: *057-004 Electronic Engines and DSE Controllers* which can be found on our website: www.deepseaelectronics.com



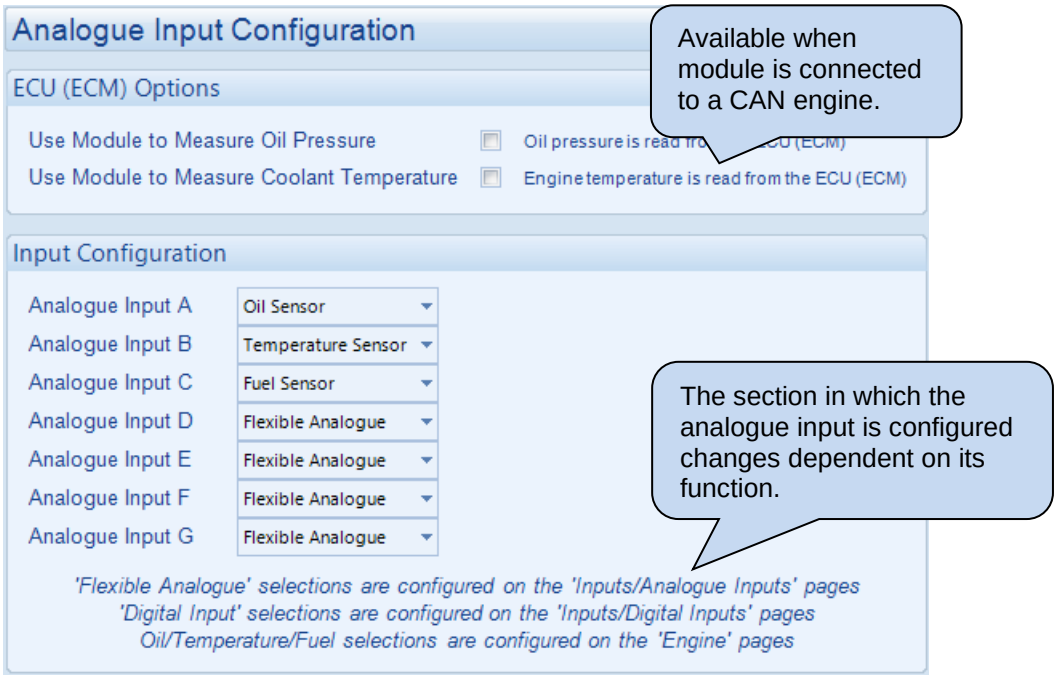
Parameter	Description
Engine Type	Select the engine type appropriate to your system *Conventional Diesel Engine:* Select this for a traditional (non ECU) engine, either Energise to Run or Energise to Stop. *Other Engines:* The list of supported CANbus (or Modbus) engines is constantly updated, check 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 (ECM): • 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 The above list is not exhaustive. Where an instrument is not supported by the engine ECU (ECM), the instrument is not displayed. DSE reserves the right to change these lists in keeping with our policy of continual development.

3.4 INPUTS

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



3.4.1 ANALOGUE INPUT CONFIGURATION



ECU (ECM) Options

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

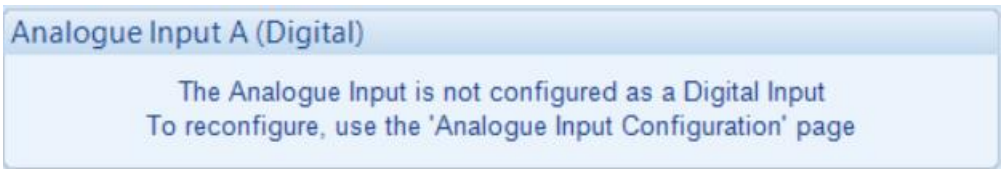
Parameter descriptions are continued overleaf…

Input Configuration

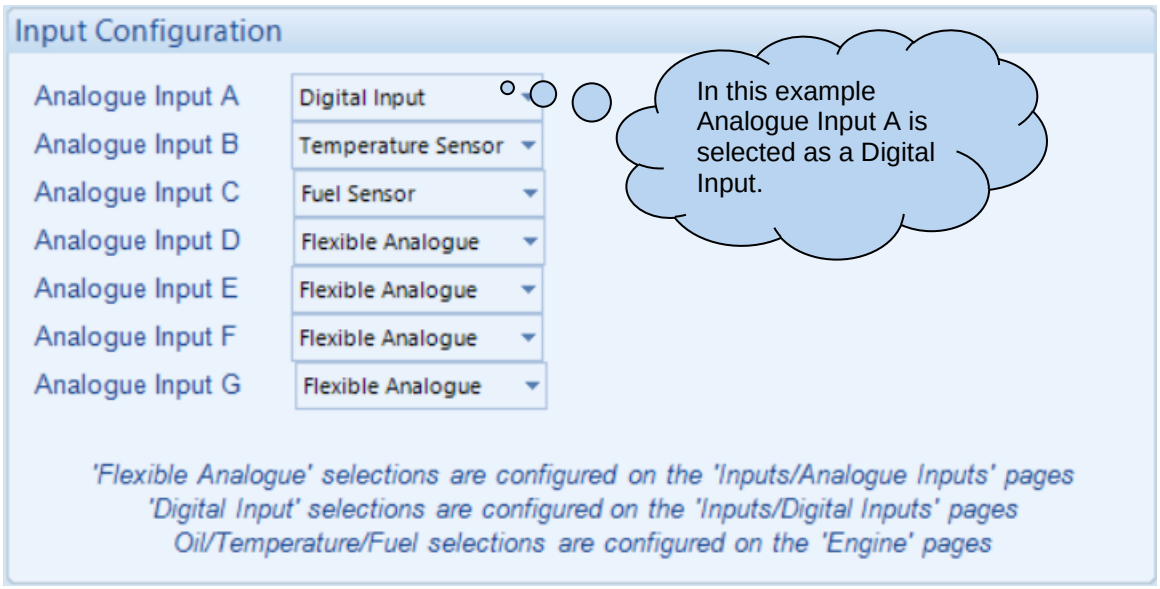
Parameter	Description
Analogue Input A	Select what the analogue input is to be used for: ***Not Used:*** The analogue input is disabled ***Digital Input:*** Configured on the *Inputs/Digital Inputs* pages ***Flexible Analogue:*** Configured on the *Inputs/Analogue Inputs* pages ***Oil Sensor:*** Configured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

Configuring an Analogue Input as a Digital Input

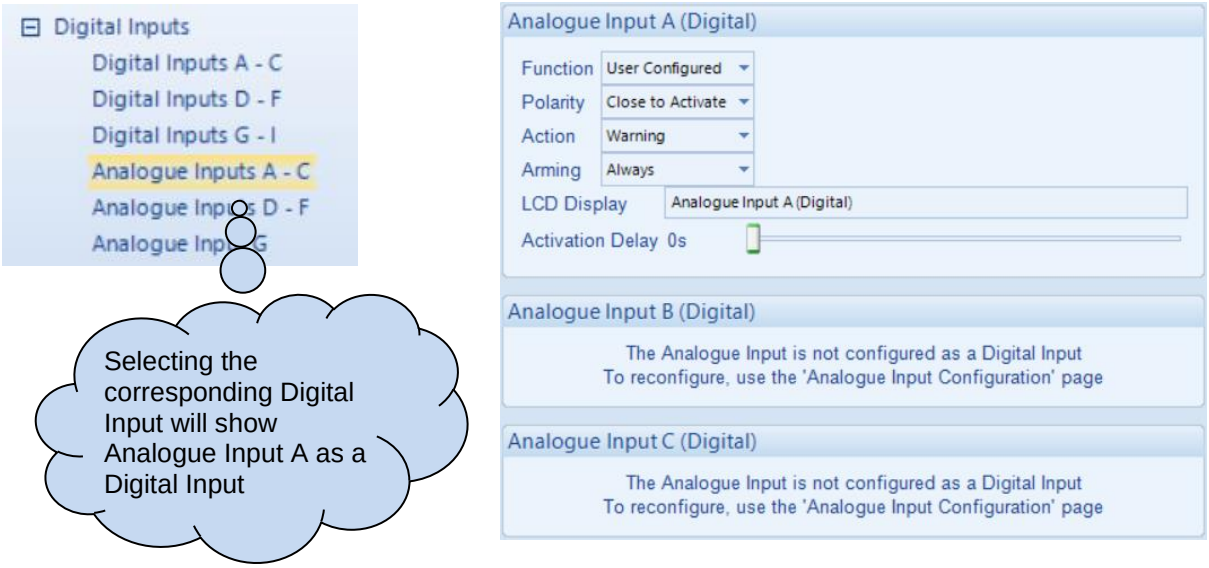
Analogue inputs can be configured as a Digital Input.



Select the required Analogue Input from A to G



Analogue Input A will now be selected as a Digital Input

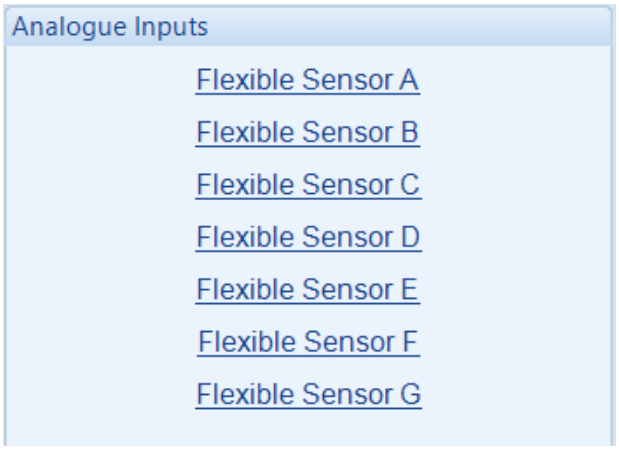


In this example Analogue Input A is configured as a Digital Input.

3.4.2 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.

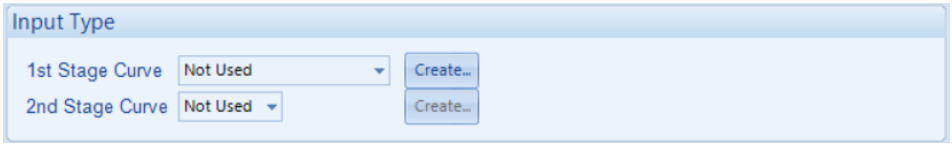
Analogue Inputs



Sensor Description

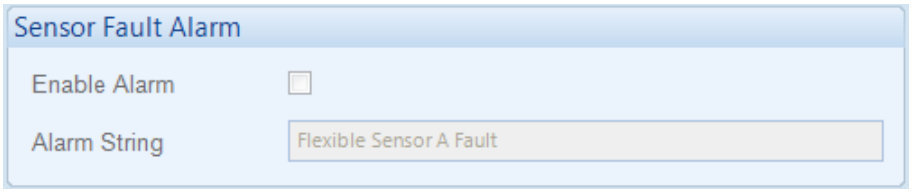
Parameter	Description
Sensor Name	Enter the *Sensor Name*, this text is shown on the module display when viewing the instrument.

Input Type



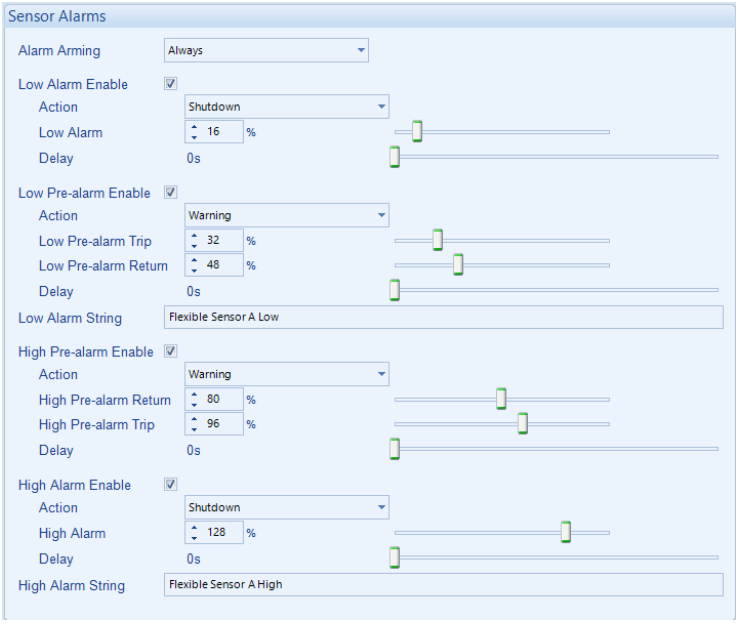
Parameter	Description
Sensor Name	Enter the *Sensor Name*, this text is shown on the module display when a sensor alarm activates
1st Stage Curve	Select the sensor type and curve from a pre-defined list or create a user-defined curve ***Current:*** for sensors with maximum range of 0 mA to 20 mA ***Resistive:*** 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 *Sensor fault alarm is enabled*
Alarm String	The text that is displayed on the module's LCD when the Sensor Fault *Alarm* activates.

Sensor Alarms

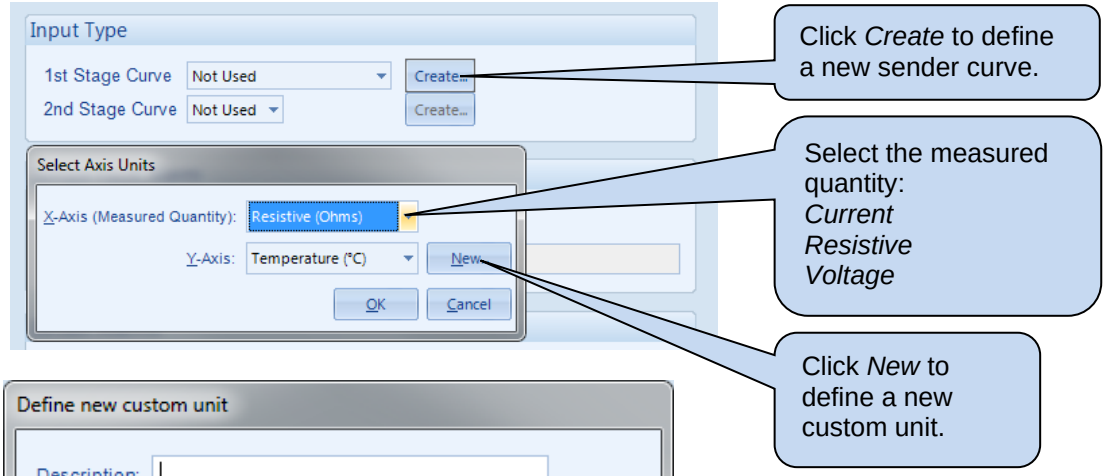


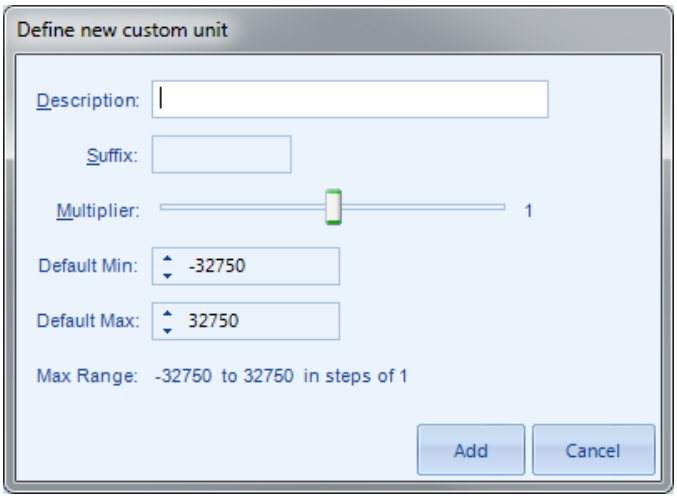
Parameter	Description
Alarm Arming	**NOTE: For details of these, see the section entitled *Alarm Arming* elsewhere in this document.** Select when the alarm generated by the analogue input becomes active: ***Always*** ***From Safety On*** ***From Starting***
Low Alarm Enable	☐ = The Alarm is disabled. ☑ = The *Low Alarm* activates when the measured quantity drops below the *Low Alarm* setting.
Low Alarm Action	**NOTE: For details of these, see the section entitled *Alarm Types* elsewhere in this document.** Select the type of alarm required from the list: ***Controlled Shutdown*** ***Shutdown***

Parameter	Description
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 Pre-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*** ***Warning***
Low Alarm String	The text that is displayed on the module's LCD when the Low *Alarm* or Low *Pre-Alarm* activates.
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 Pre-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*** ***Warning***
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.

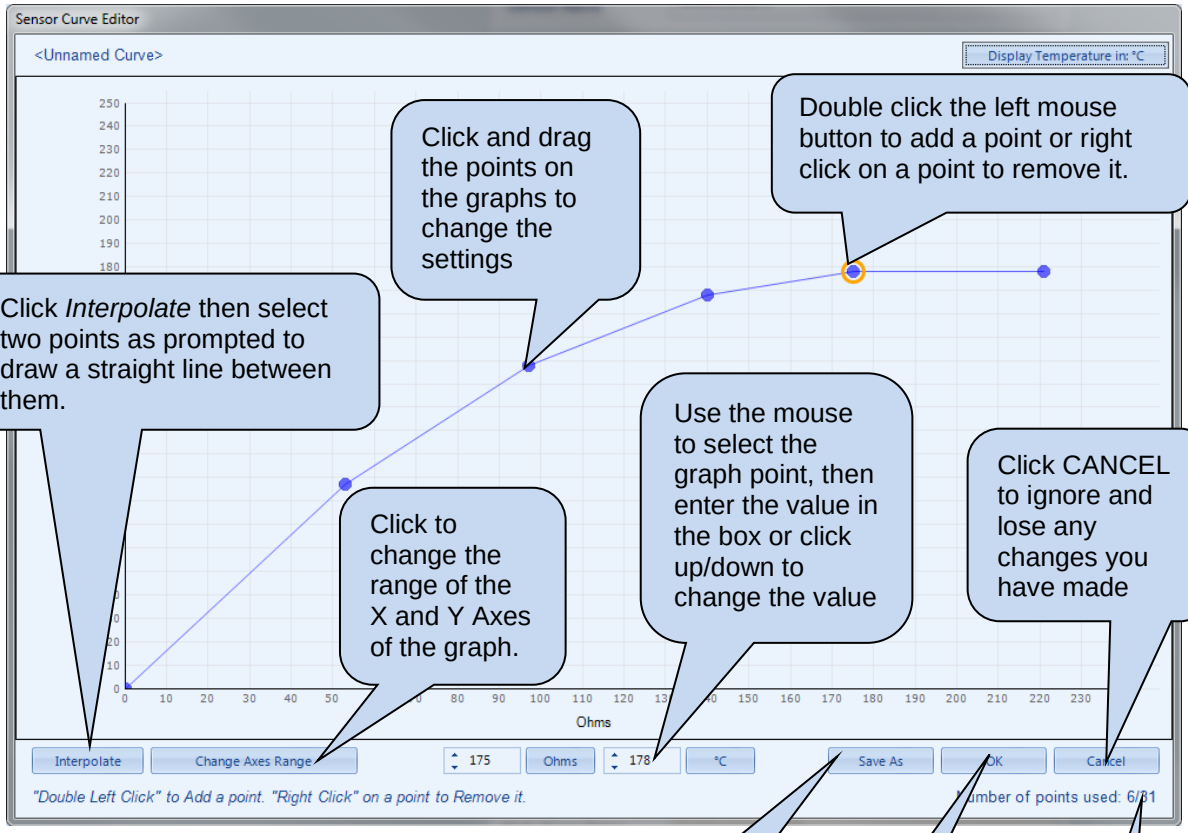
3.4.3 CREATING A SENSOR CURVE

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





Parameter	Description
Description	This is the name of the created *Curve*
Suffix	This is the name of the new unit
Multiplier	Define the scaling factor for the new unit
Default Min	Set the minimum value for the new unit's range
Default Max	Set the maximum value for the new unit's range



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

Double click the left mouse button to add a point or right click on a point to remove it.

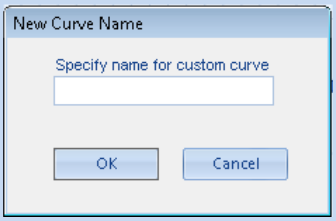
Click *Interpolate* then select two points as prompted to draw a straight line between them.

Click to change the range of the X and Y Axes of the graph.

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

Click CANCEL to ignore and lose any changes you have made

Click SAVE AS, you are prompted to name your curve....



Click OK to save the curve.

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

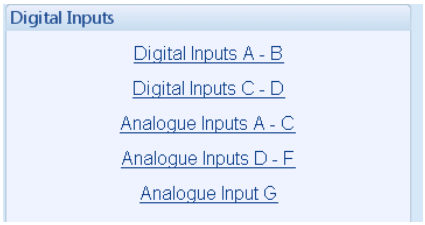
Click OK to accept the changes and return to the configuration editor

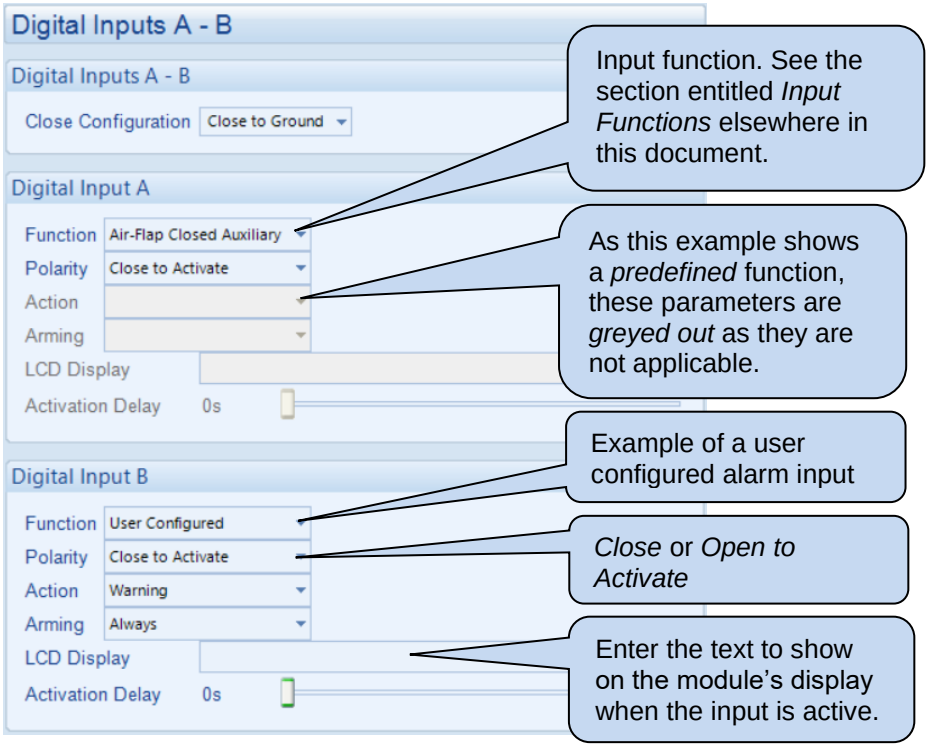
Shows the number of points used in the curve.

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

3.5 DIGITAL INPUTS

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





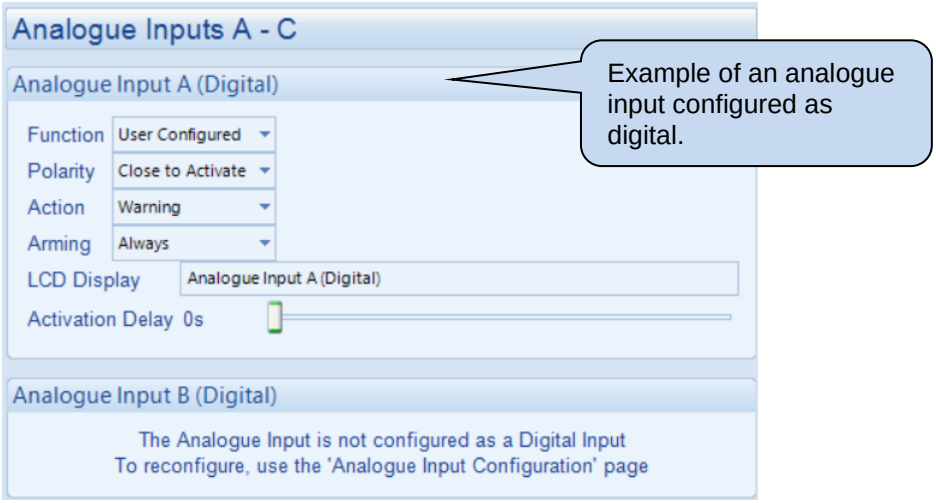
Parameter	Description
Close Configuration	The options are: **Close to Ground:** **Close to Supply:**
Function	Select the input function to activate when the relevant terminal is energised. See the section entitled *Input functions* elsewhere in this document.
Polarity	Select the digital input polarity: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

Parameter descriptions are continued overleaf…

Parameter	Description
Arming	Select when the input becomes active: ***Never*** ***Always*** ***From Loading*** ***From Starting*** ***From Safety On*** ***Wait for ECU*** For details of these, see the section entitled *Alarm Arming* elsewhere in this document.
LCD Display	This is the text that appears on the module's display when the input becomes active.
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.

3.5.1 ANALOGUE INPUTS

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



Parameter	Description
Function	Select the input function to activate when the relevant terminal is energised. See the section entitled *Input Functions* elsewhere in this document.
Polarity	Select the digital input polarity: ***Close to Activate:*** the input function is activated when the relevant terminal is connected. ***Open to Activate:*** the input function is activated when the relevant terminal is disconnected.
Action	**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 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.

3.5.2 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.
Alt Config 1,2,3,4 Select	These inputs are used to instruct the module to follow the *alternative* configuration settings instead of the *main* configuration settings.
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 the generators starting in *Manual* mode.** This input is used to provide an over-ride function to prevent the controller from starting the generator in the event of a remote start/Mains out of limits condition occurring. If this input is active and a remote start signal/Mains failure occurs the module does not give a start command to the generator. If this input signal is then removed, the controller operates as if a remote start/Mains failure has occurred, starting, and loading the generator. This function is used to give an ‘AND’ function so that a generator is only called to start if the Mains fails, and another condition exists which requires the generator to run. If the ‘Auto start Inhibit’ signal becomes active once more it is ignored until the module has returned the Mains supply on load and shutdown. This input does not prevent starting of the engine in MANUAL mode.

Parameter descriptions are continued overleaf…

Input Function	Description
Auto Run Inhibit IEEE 37.2 - 3 Checking Or Interlocking Relay	**NOTE: This input does not prevent the generators 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 generator in the event of a remote start and /or scheduled run condition occurring. If this input is active and a remote start signal/scheduled run occurs the module does not give a start command to the generator or stops the generator if it is already running. If this input signal is then removed, the controller operates as if a remote start/scheduled run has occurred, starting, and loading the generator. This function is used to give an **'AND'** function so that a generator is only called to start/run if a remote start requests, and another condition exists which requires the generator to run. If the 'Auto Run Inhibit' signal becomes active while the generator is running, a controlled shutdown sequence begins. If the generator is running in a load demand scheme, this input takes priority and begins the controlled shutdown sequence, causing another generator to start (if available).
Coolant Temperature Switch	This input is used to give a *Coolant Temperature High* shutdown from a digital normally open or normally closed switch.
Disable ECU(ECM) Speed Control	This input is used to *Disable Speed Control* via an external device.
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 the section entitled *Advanced Options* elsewhere in this document) this prevents the engine being stopped upon critical alarm (Also called War Mode, Run to Destruction or Battle Short Mode)
Disengage Clutch	Immediately disengages the clutch regardless of operating mode or other conditions.
DPF Auto Regen Inhibit	This input is used to override the ECU (ECM) function and prevent the automatic regeneration of the diesel particulate filter.
DPF Force Regeneration	This input is used to override the ECU (ECM) function and activate the regeneration of the diesel particulate filter.
DPF Regeneration Interlock	This input is used to enable Manual regeneration via the DPF Force regeneration or Running editor or SCADA option.
Engage Clutch	**NOTE: This input has no effect if *Enable Gear Clutch* is selected on the *Clutch Control* settings page.** Engages the clutch when the engine is considered to be running.
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*).

Parameter descriptions are continued overleaf…

Input Function	Description
Inhibit Scheduled Run IEEE 37.2 - 3 Checking Or Interlocking Relay	This input is used to provide a means of disabling a scheduled run.
Lamp Test	This input is used to provide a test facility for the front panel indicators fitted to the module. When the input is activated all 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.
Main Config Select	This input is used to instruct the module to follow the *main* configuration settings instead of the *alternative* configuration settings.
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 is 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 to 10	These inputs are used to provide an external source to reset a maintenance alarm.
Simulate Auto Button	**NOTE: If a start request is present when Auto mode is entered, the starting sequence begins. Start requests are 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.
Simulate Start Button	This input mimics the operation of the 'Start' button and is used to provide a remotely located start push button.
Simulate Stop Button	This input mimics the operation of the 'Stop' button and is used to provide a remotely located stop/reset push button.
Simulate Throttle Down Button	This input mimics the operation of the 'Throttle Down' button and is used to provide a remotely located Throttle Down push button.
Simulate Throttle Up Button	This input mimics the operation of the 'Throttle Up' button and is used to provide a remotely located Throttle Up push button.
Smoke Limiting IEEE 37.2 – 18 Accelerating Or Decelerating Device	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 CANbus engines.
Speed Lower	This input is used to decrease the engine speed. Available only when the *Governor Interface* is set for *Internal Relays*.
Speed Priority 1, 2, 3 & 4	These inputs are used to select the engine *Speed Priority* when the *Speed Control* scheme is configured as *Selectable*.
Speed Raise	This input is used to increase the engine speed. Available only when the *Governor Interface* is set for *Internal Relays*.

Parameter descriptions are continued overleaf…

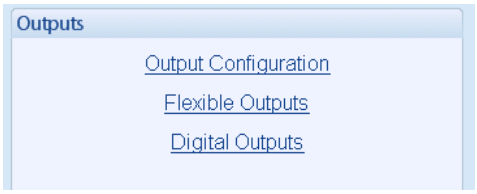
<table>
<tr><th>Input Function</th><th>Description</th></tr>
<tr><td>Speed Selection High
&
Speed Selection Low</td><td>These two inputs are used to select the engine speed priority when the Speed Control scheme is configured as Selectable.
Activating none, one or both of these inputs instructs the module 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>
<tr><td>Start Pause</td><td>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.</td></tr>
<tr><td>Stop And Panel Lock</td><td>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.

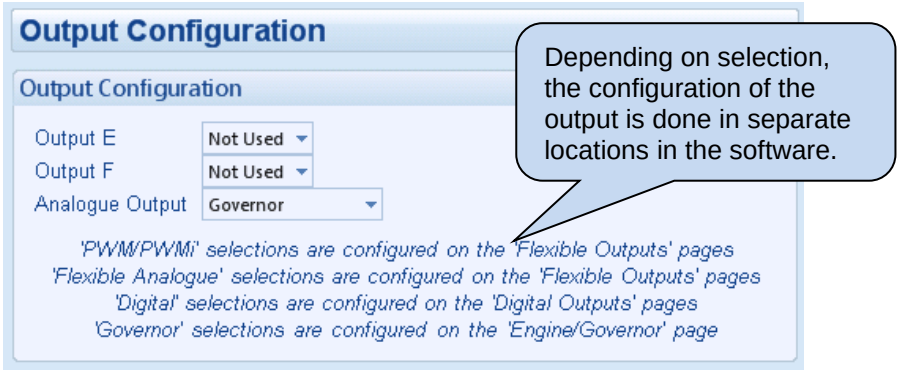
The operator is still able to view the various instrumentation pages etc. (Front panel configuration access is still possible while the system lock is active).</td></tr>
<tr><td>Wait for Cleared Start</td><td>If the input is active the module will wait until the digital input becomes inactive before any attempt to crank is made.</td></tr>
</table>

3.6 OUTPUTS

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



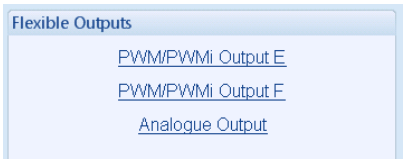
3.6.1 OUTPUT CONFIGURATION



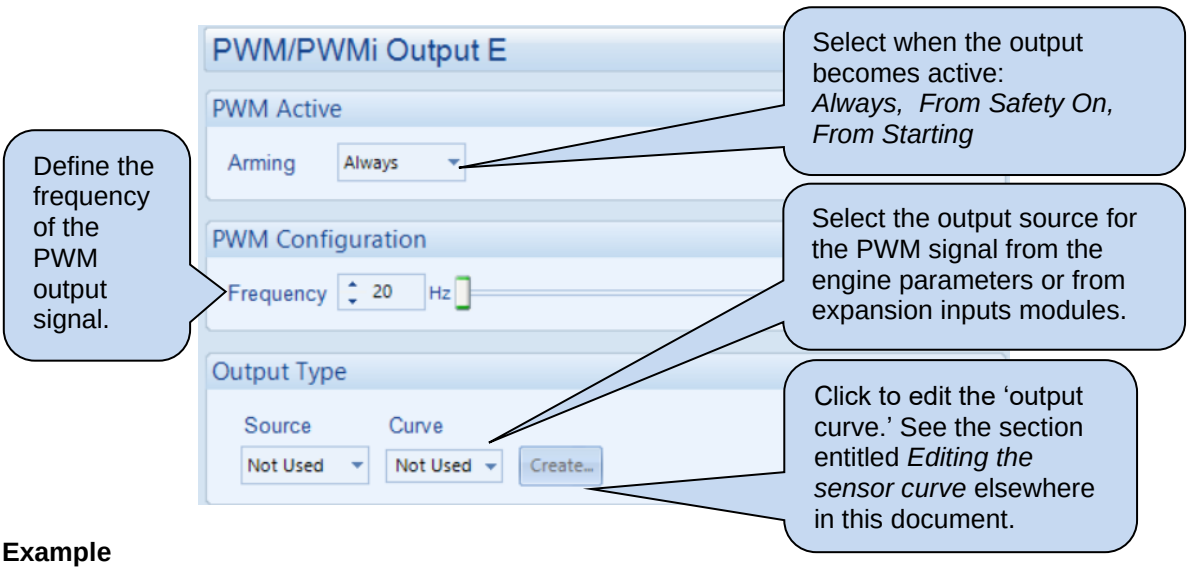
Parameter	Description
Output E & F	Allows the configuration of the output signal type: ***Not Used*** ***Digital*** ***PWM*** ***PWMi***
Analogue Output	Allows the configuration of the analogue output usage: ***Flexible Analogue*** ***Governor***

3.6.2 FLEXIBLE OUTPUTS

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

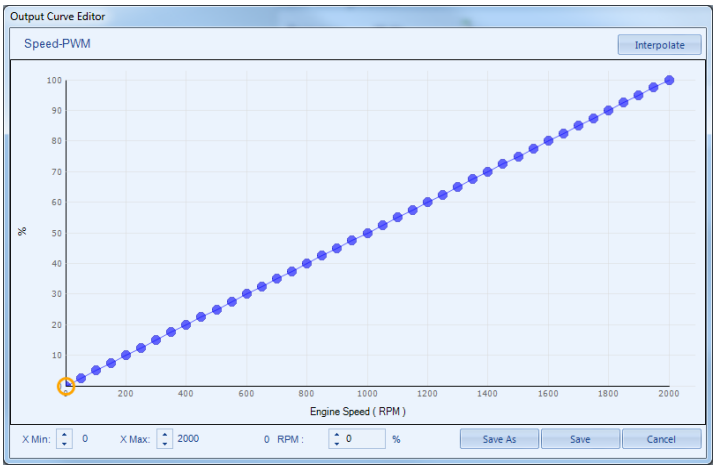


3.6.2.1 PWM



Example

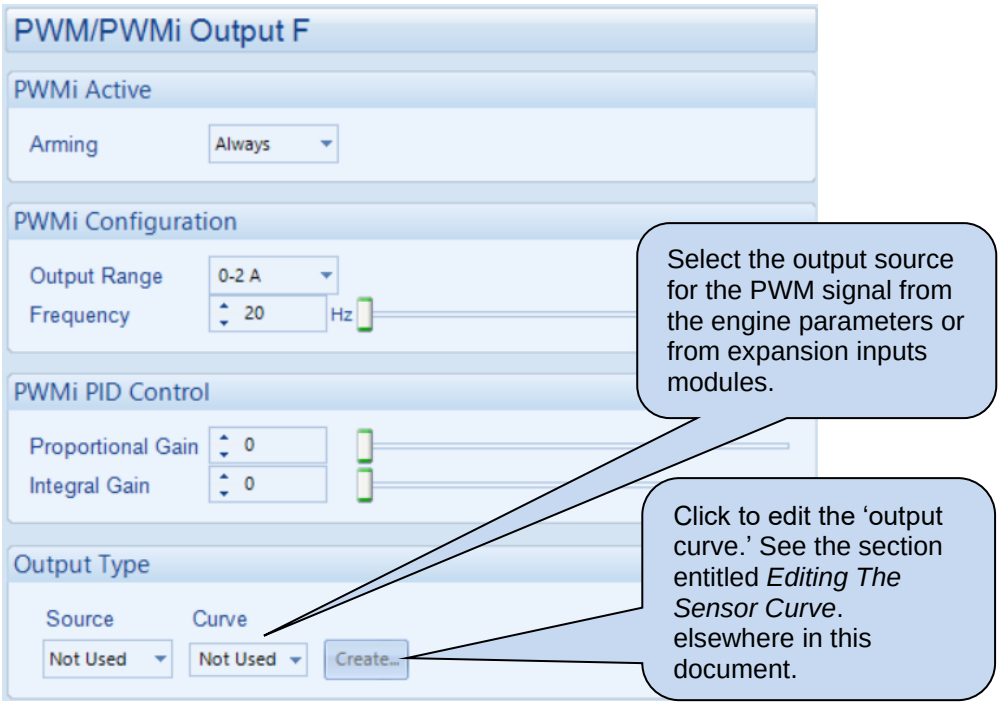
The *Engine Speed* parameter is used as the PWM output source. The user defined curve for the *Engine Speed PWM Output* is configured as shown in the picture below with a *PWM Frequency* of 20Hz



Based on the user-defined curve used in this example, the full range for the engine speed is configured as 2000 rpm. The pulse width in the PWM output signal is defined by the proportion of the engine speed value out of the full range. The period of the signal is the inverse of the frequency, therefore at 20 Hz, the PWM signal period is 0.05 s.

3.6.2.2 PWMI

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



Parameter	Description
Arming	Select when the output is active, the available options are: ***Always*** ***From Safety On*** ***From Starting***
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.
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.

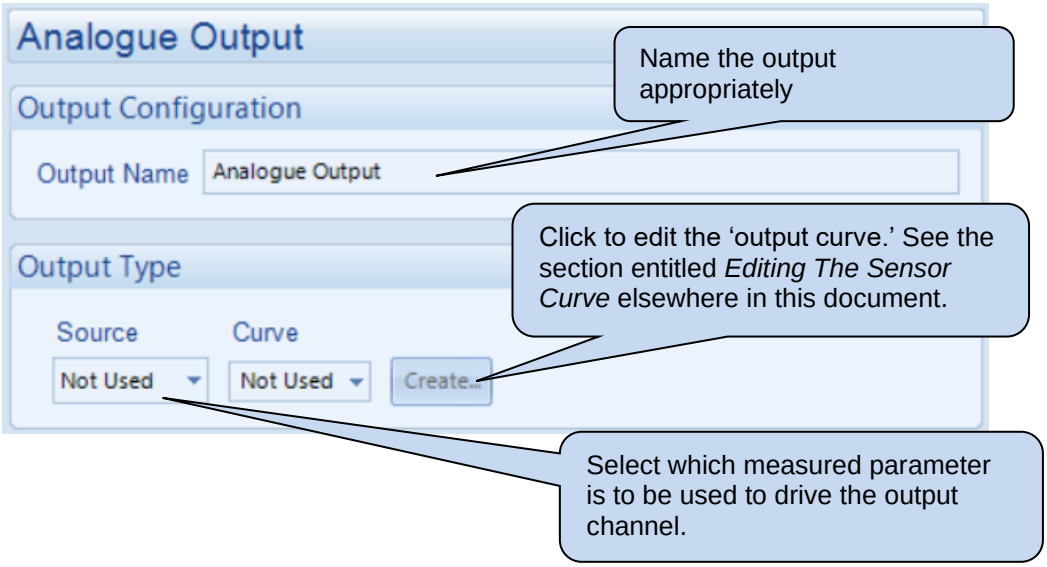
Example

The *Desired Speed* parameter is used as the PWM output source. The user defined curve for the *Desired Speed PWMI Output* is configured as shown in the picture below with a *PWMI Frequency* of 25Hz

Based on the user-defined curve used in this example, the full range for the engine speed is configured as 3000 rpm. The PWMI average current output signal is defined by the *Desired Speed* value. The PID loop controls the duty cycle of the signal to maintain the required average current output. The period of the signal is the inverse of the frequency, therefore at 25 Hz, the PWM signal period is 0.04 s.

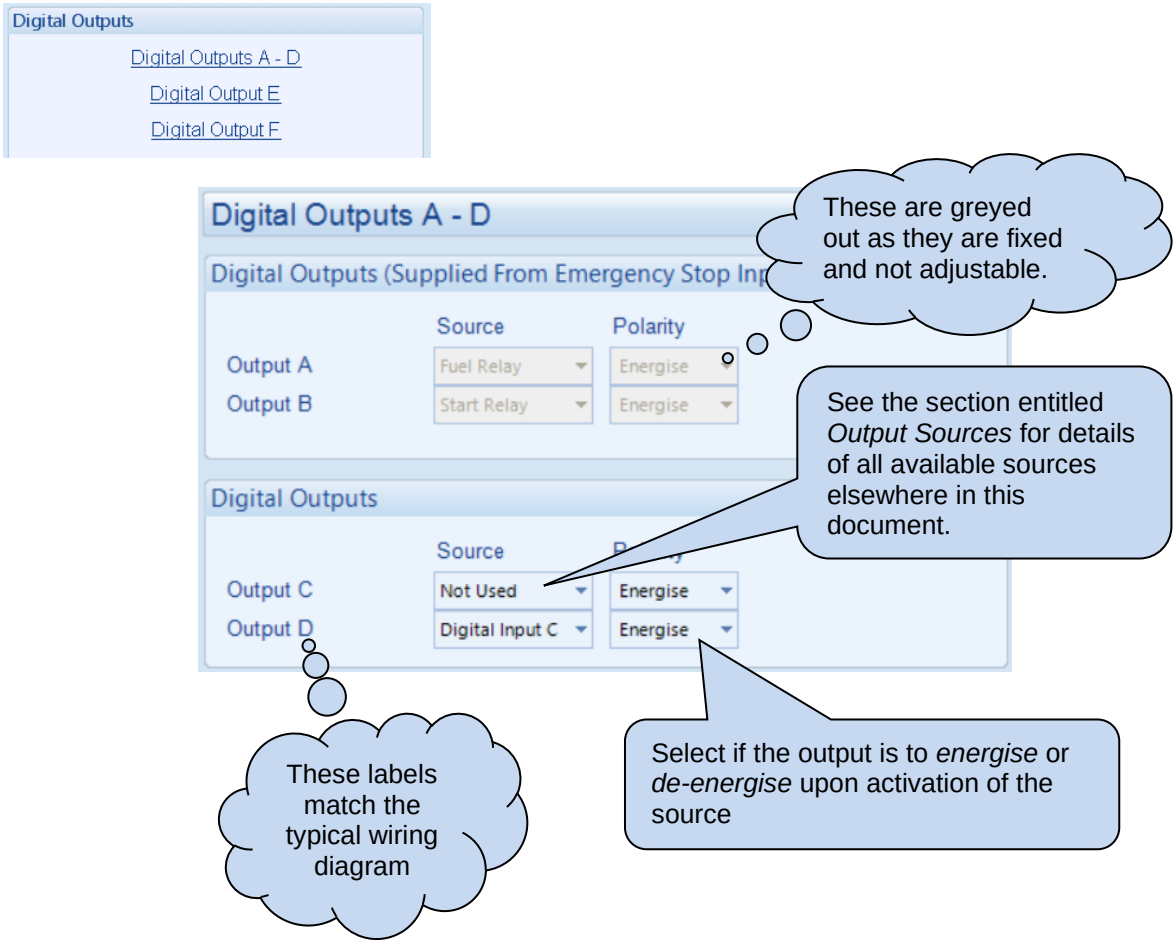
3.6.2.3 ANALOGUE OUTPUT

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.



3.6.3 DIGITAL OUTPUTS

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



3.6.4 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 Config 1,2,3,4 Selected	Active when the alternative configuration is selected.	
Alternative Language Selected	Active when the configured *Alternative Language Select* digital input is active	
Analogue Input A,B,C,D,E,F,G (Digital)	Active when the analogue input A,B,C,D,E,F,G configured to digital 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*	
Audible Alarm IEEE 37.2 – 74 Alarm Relay	Active when an alarm condition becomes active. Use this output to activate an external sounder or external alarm indicator.	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 Run Inhibited	Active when the Auto Run Inhibit function is active.	
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.	
Charge Alternator Failure Warning/Shutdown	Active when the charge alternator warning/shutdown alarm is active	
Clutch Control	Active when the clutch is required to be engaged by either manual or automatic control. Deactivates immediately upon activation of the Disengage Clutch. For additional information of the clutch control function, see the section entitled *Clutch Control* elsewhere in this document.	
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	

Parameter descriptions are continued overleaf…

Output Source	Active	Inactive
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 1 to 10 Instrument Active	Active when the relevant CAN Function triggers an alarm.	
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
DC Power On	Active when DC power is supplied to the module	
DEF Level Low	Active when DEF Level Low CANbus alarm is active.	
DEF Level Low Alarm	Active when the DEF Level sent from the ECU is below the configured Trip level for longer than the configured Delay time.	
Default Running Speed	Active when a Control In Auto Mode *Control Scheme* is configured to be used (i.e. Maintain Empty, Maintain Fill etc) but is not currently active.	
Digital Input A to D	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	
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 CANbus alarm is active	
ECU (ECM) Data Fail	Active when no CANbus data is received from the ECU (ECM) after the safety delay timer has expired	Inactive when: • CANbus data is being received • The set is at rest • During the starting sequence before the safety delay timer has expired
ECU (ECM) Power	Active when a start request is received. This is used to switch an external relay to power the CANbus ECU. Exact timing of this output is dependent upon the type of the engine ECU (ECM)	
ECU (ECM) Shutdown	Active when the ECU (ECM) indicates that a Shutdown alarm is present.	Inactive when no Shutdown alarm is active from the ECU (ECM).

Parameter descriptions are continued overleaf…

Output Source	Active	Inactive
ECU (ECM) Stop	Active when the DSE controller is requesting that the CANbus ECU (ECM) stops the engine.	
ECU (ECM) Warning	Active when the ECU (ECM) indicates that a Warning alarm is present.	Inactive when no Warning alarm is active from the ECU (ECM).
ECU Pre-Heat	Active when the ECU is performing engine preheat.	
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 Emptying Speed	Active when the engine is running at the *Emptying Speed*	
Engine at Filling Speed	Active when the engine is running at the *Filling Speed*	
Engine at Maintaining Speed	Active when the engine is running at the *Maintaining Speed*	
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 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.	
Flexible Sensor (A to G) Fault	Active when the relevant flexible sensor fault alarm is active. This function only works when the sensor is configured as resistive.	
Flexible Sensor (A to G) High Alarm	Active when the relevant flexible sensor high alarm is active	
Flexible Sensor (A to G) High Pre-Alarm	Active when the relevant flexible sensor high pre-alarm is active	
Flexible Sensor (A to G) Low Alarm	Active when the relevant flexible sensor low alarm is active	
Flexible Sensor (A to G) 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 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.	

Parameter descriptions are continued overleaf…

Output Source	Active	Inactive
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 is to be stopped, including between crank attempts, upon *Controlled Shutdown* and *Shutdown* alarms.
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	
Lamp Test	Active when the configured *Lamp Test* digital input is active, or the Mute/Lamp Test push button is pressed.	
Linear Speed	Active when the Control In Auto Mode *Control Scheme* is set to Linear and the engine speed is between *Min* and *Max* settings.	
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 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.
Main Config Selected	Active when the *Main Configuration* file is selected.	
Maintain Value Control is Active	Active when the *Maintain Value Control Scheme* is active.	

Parameter descriptions are continued overleaf…

Output Source	Active	Inactive
Maintenance Alarm 1 to 10 Due	Active when the relevant maintenance alarm is due	
MPU Open Circuit	Active when an open circuit failure is detected in the Magnetic Pickup circuit.	
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.	
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.	
PWM(i) E,F Active	Active when the relevant PWM(i) output is active. This output is useful to show its arming state.	
Remote Start Off Load	Active when a digital input configured as '*Remote Start off Load*' is active. This output is 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 is 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 is used to pass the remote stop signal on to elsewhere in the control system.	
Reset Maintenance 1 to 10	Active when the relevant *Reset Maintenance Alarm* digital input is active	
Return Delay In Progress	Active when the *Return Delay Timer* is active	

Parameter descriptions are continued overleaf…

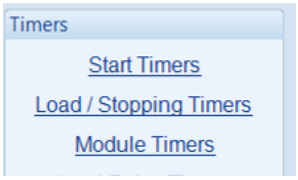
Output Source	Active	Inactive
Scheduled Auto Start Inhibit	Active when the *Auto Start Inhibit* input is active.	
SCR Inducement	Active when SCR Inducement CANbus alarm is active	
Shutdown Blocked	Active when the Protections Disabled Mode is active, and any shutdown or controlled shutdown alarm is triggered.	
Simulate Auto Button	Active when a configured *Simulate Auto 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.
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 is used to control external logic circuitry.	
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 Stop Mode	Active when Stop mode is selected	

Parameter descriptions are continued overleaf…

Output Source	Active	Inactive
Throttle Down Button Pressed	Active when the Throttle Down pushbutton is pressed	
Throttle Up Button Pressed	Active when the Throttle Up pushbutton is pressed	
Under Speed Shutdown	Active when the engine speed falls below the configured under speed Shutdown setting	
Under Speed Warning	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.	
Waiting For Cleared Start	Active while the module is waiting for the cleared start input to be inactive.	

3.7 TIMERS

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

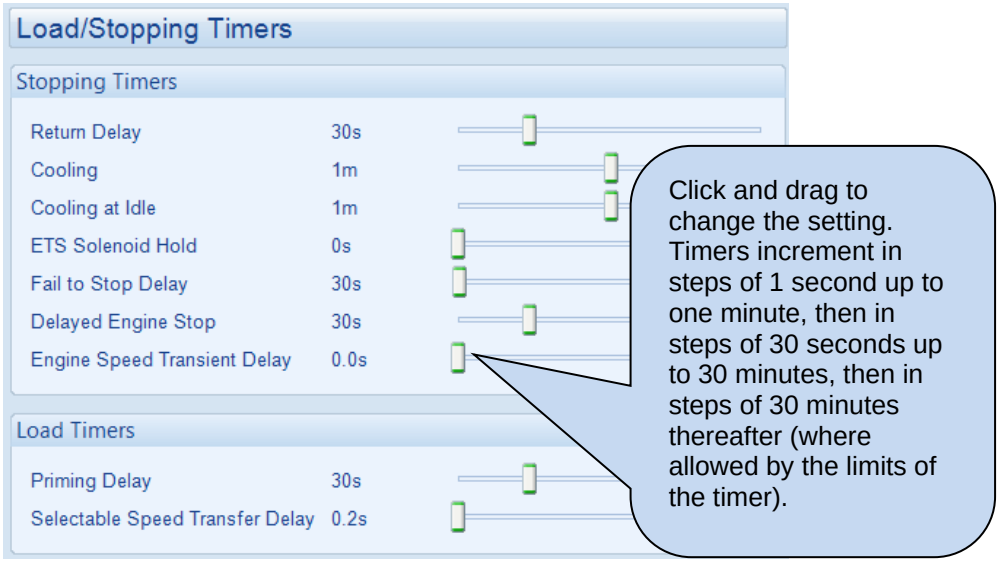


3.7.1 START TIMERS

Parameters are detailed overleaf…

Timer	Description
Remote Start Off Load Remote Start On Load Telemetry Start	The amount of time delay before starting in AUTO mode. This timer is activated upon the respective start command being issued. Typically, this timer is applied to prevent starting upon fleeting start signals.
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
Cranking Rest	The amount of time between multiple crank attempts.
Smoke Limit	The amount of time that the engine is requested to run at idle speed upon starting. This is typically used to limit emissions at start-up.
Smoke Limit Off	The amount of time that the engine takes to run up to rated speed after removal of the command to run at idle speed. If this time is too short, the engine is stopped due to an *Under speed* alarm. If the time is too long, *Under speed* 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.
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 shut down and a *Loss of Speed Sensing* alarm given.
Delayed Engine Start	When the *Start Control* scheme is configured for *Float 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.

3.7.2 LOAD / 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.
Priming Delay	The amount of time the engine runs at priming speed. Also called the priming phase.
Selectable 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.

3.7.3 MODULE TIMERS

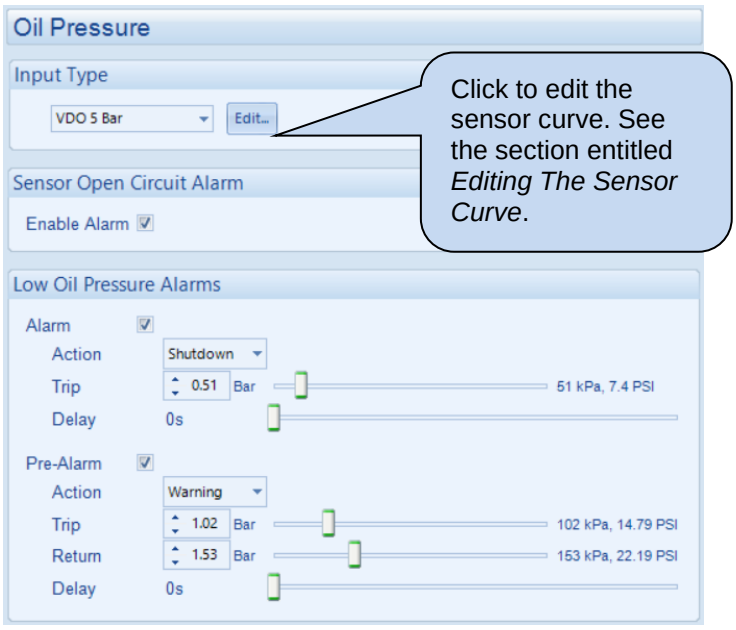
Timer	Description
Page Timer	The amount of time before the module reverts to show the *Status* page when it is left unattended,
Scroll Timer	The amount of time for automatic scroll between parameters on a selected page.
Backlight Timer	If the module is left unattended for the duration of the *Backlight Timer*, the LCD backlight turns off
Audible Alarm	**NOTE: Only available when the Digital Output Audible Alarm and Limit Alarm Duration is configured. Refer to the section entitled Digital Outputs, and the section entitled Module Options elsewhere in this document.** The amount of time the audible alarm (sounder) remains active.

3.8 ENGINE

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

3.8.1 OIL PRESSURE

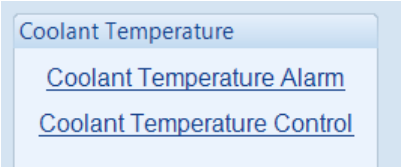
If a CANbus Engine File is selected – Most engines give oil pressure over CANbus link. In these cases, Analogue Input A is configured as Flexible Analogue or Digital Input. Configuration of Flexible Analogue Inputs and Digital Inputs is detailed in the section entitled *Analogue Input configuration*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



Parameter	Description
Input Type	Select the sensor signal and the sender curve from a pre-defined list or create a user-defined curve.
Sensor Open Circuit Alarm	☐ = Alarm is disabled. ☑ = The *Low Oil Pressure Open Circuit Alarm* is active when the module detects an open circuit when the sender is disconnected
Low Oil Pressure Alarm	☐ = Alarm is disabled. ☑ = The *Low Oil Pressure Shutdown Alarm* is active when the measured oil pressure drops below the configured *Trip* level.
Low Oil Pressure Pre-Alarm	☐ = Alarm is disabled. ☑ = The *Low Oil Pressure Warning Alarm* is active when the measured oil pressure drops below the configured *Trip* level. The warning is automatically reset when the oil pressure increases above the configured *Return* level.

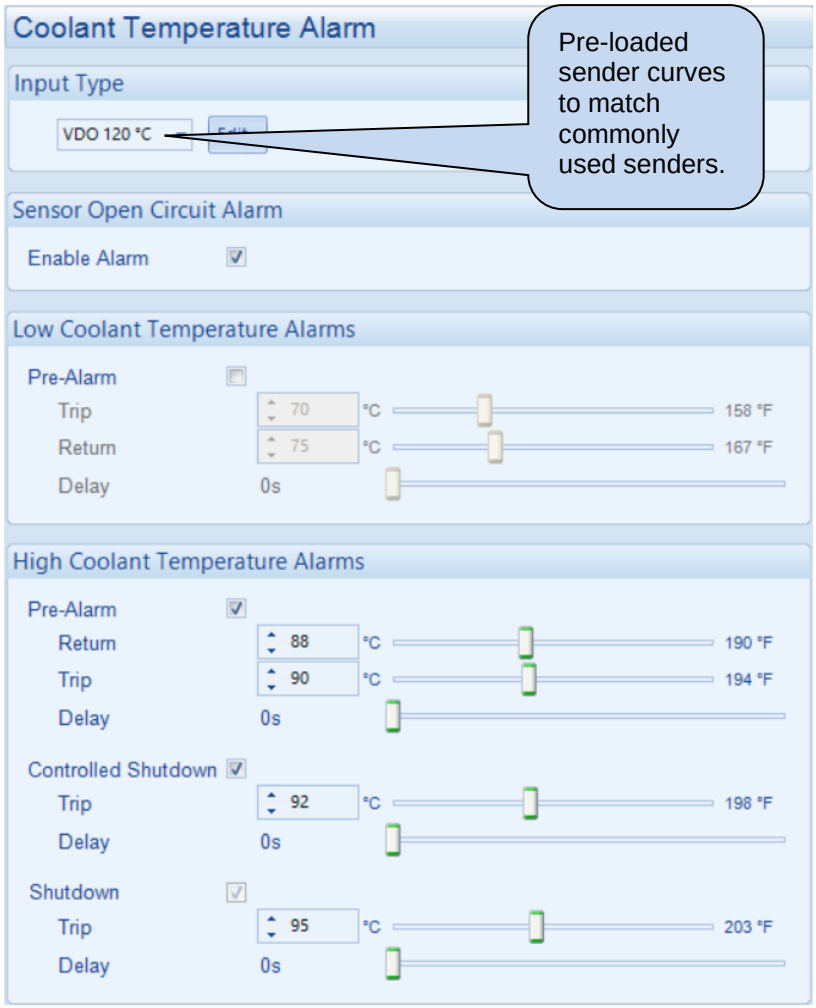
3.8.2 COOLANT TEMPERATURE

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



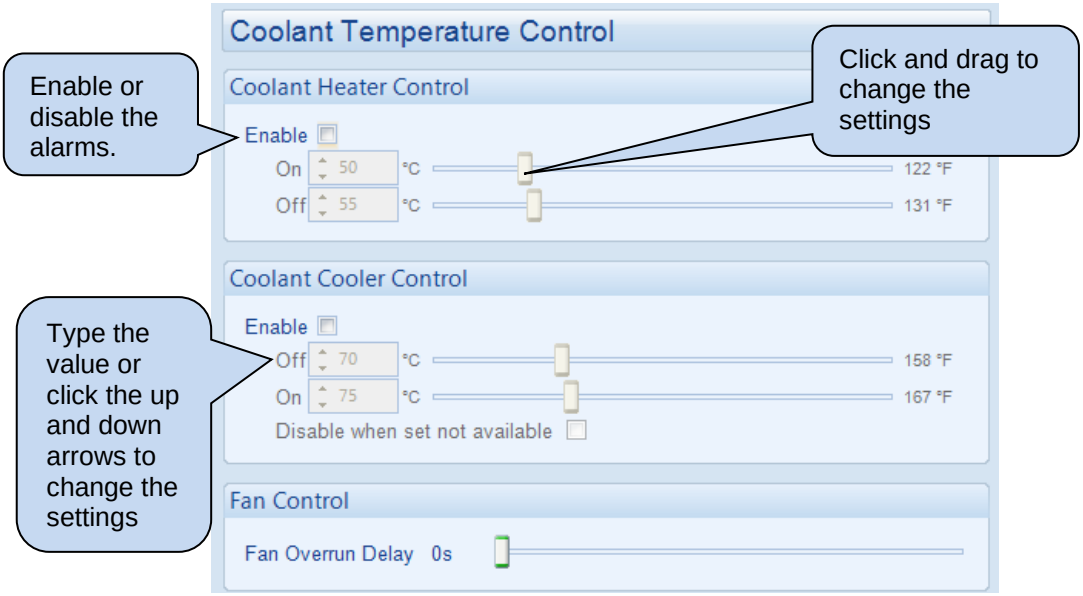
3.8.3 COOLANT TEMPERATURE ALARM

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



Parameter	Description
Input Type	Select the sensor signal and the sender curve from a pre-defined list or create a user-defined curve.
Sensor Open Circuit 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 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 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.
Controlled Shutdown Alarm	☐ = 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 Alarm	The *High Coolant Temperature Shutdown Alarm* is active when the measured coolant temperature rises above the configured *Trip* level.

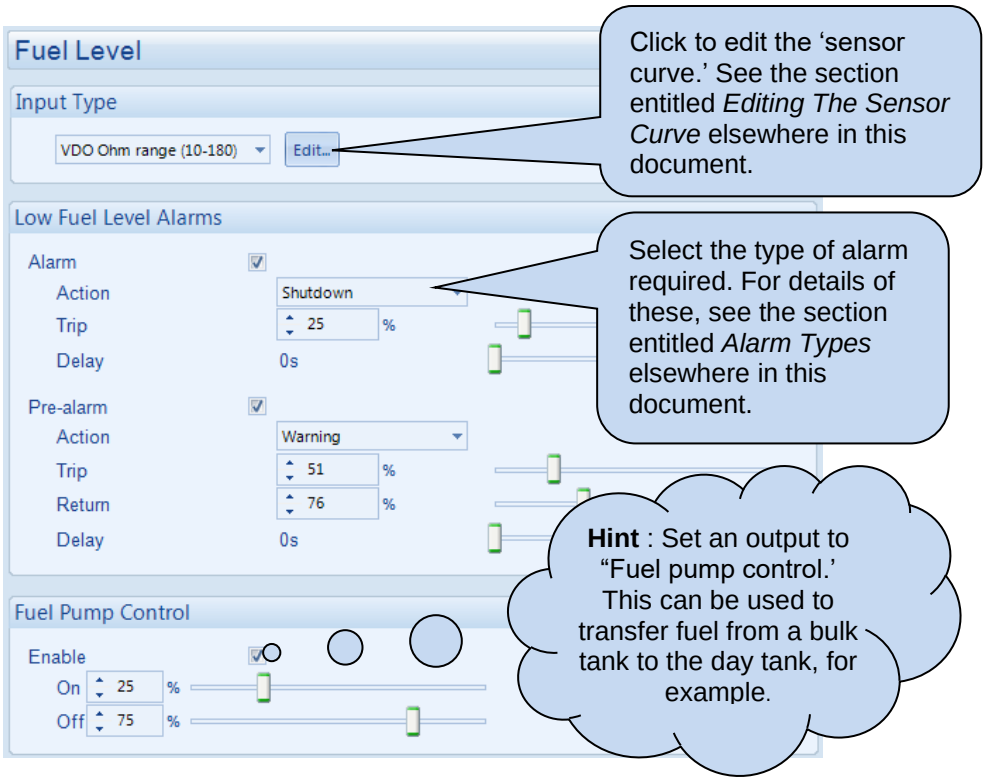
3.8.4 COOLANT TEMPERATURE CONTROL



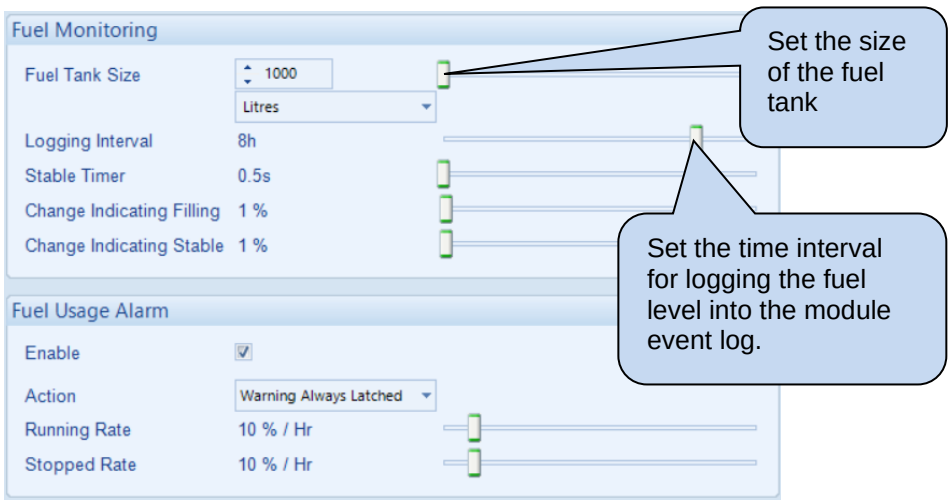
Parameter	Description
Coolant Heater Control	☐ = Coolant Heater Control function is disabled ☑ = The digital output configured to *Coolant Heater Control* is energised when the engine coolant temperature falls below the configured *On* level. This is designed to control an external engine heater. When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

3.8.5 FUEL LEVEL

This section allows the configuration of the fuel level input.



Parameter	Description
Input Type	Select the sensor signal and the sender curve from a pre-defined list or create a user-defined curve. The sender signal type is configured as: ***Current*** ***Resistive*** ***Voltage***
Low Fuel Level Alarm	☐ = Alarm is disabled. ☑ = The *Low Fuel Level Alarm* is active when the measured fuel level drops below the *Trip* setting for the configured *Delay* time.
Action	Select the type of alarm required from the list: ***Shutdown*** ***Controlled Shutdown*** For details of these, see the section entitled *Alarm Types* elsewhere in this document.
Low Fuel Level Pre-Alarm	☐ = Pre-Alarm is disabled. ☑ = The *Low Fuel Level Pre-Alarm* is active when the measured fuel level drops below the *Trip* setting for the configured *Delay* time. The *Low Fuel Level Pre-Alarm* is inactive when the measured fuel level increases above the *Return* setting.
Action	Select the type of alarm required from the list: ***Warning*** ***Controlled Shutdown*** For details of these, see the section entitled *Alarm Types* elsewhere in this document.
Fuel Pump Control	☐ = Fuel Pump Control is disabled. ☑ = Allows the module to control an external fuel pump to transfer fuel from a bulk tank to the day tank. A digital output configured for *Fuel Pump Control* energises when the fuel level falls below the configured *On* setting and de-energises when the fuel level exceeds the configured *Off* setting.



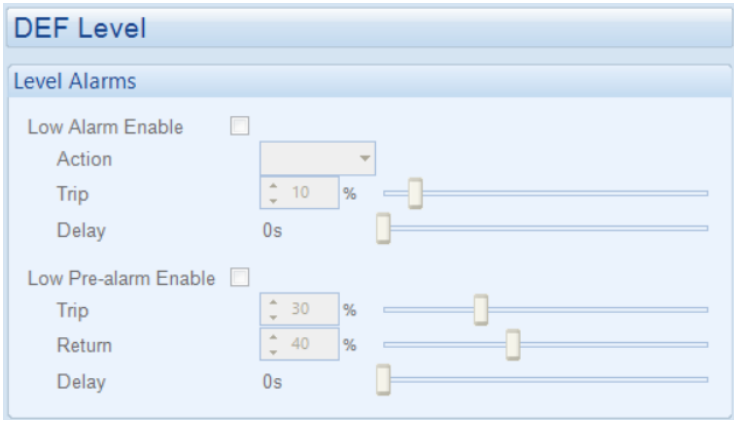
Parameter	Description
Fuel Tank Size	Set the size of the Fuel Tank
Logging Interval	Set the time interval for logging the fuel level into the module event log.
Stable Timer	The controller maintains a rolling record of the fuel level percentage for the duration of the *Stable Timer*. When the rolling record of the fuel level percentage indicates that the fuel level has increased more than the *Change Indicating Filling* during the *Stable Timer*, the controller records a *Fuel Filling Start* event in its event log. When the rolling record of the fuel level indicates that the fuel level has not changed more than the *Change Indicating Stable* during the *Stable Timer*, the controller records a *Fuel Filling Stop* event in its event log.
Change Indicating Filling	When the fuel level increases at a rate higher than $\frac{\textit{Change Indicating Filling}}{\textit{Stable Timer}}$ then a fuel fill start event is recorded into the event log. **Example:** *Stable Timer* = 1 minute *Change Indicating Filling* = 3 % When the fuel level increases by more than 3% in 1 minute, a fuel fill event is recorded.
Change Indicating Stable	During filling, if the fuel level increases at a rate less than $\frac{\textit{Change Indicating Stable}}{\textit{Stable Timer}}$ then a fuel fill end event is recorded into the event log. **Example:** *Stable Timer* = 1 minute *Change Indicating Stable* = 2 % When the fuel level increases by less than 2% in 1 minute, a fuel fill end event is recorded.
Fuel Usage Alarm	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.

3.8.6 DEF LEVEL

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

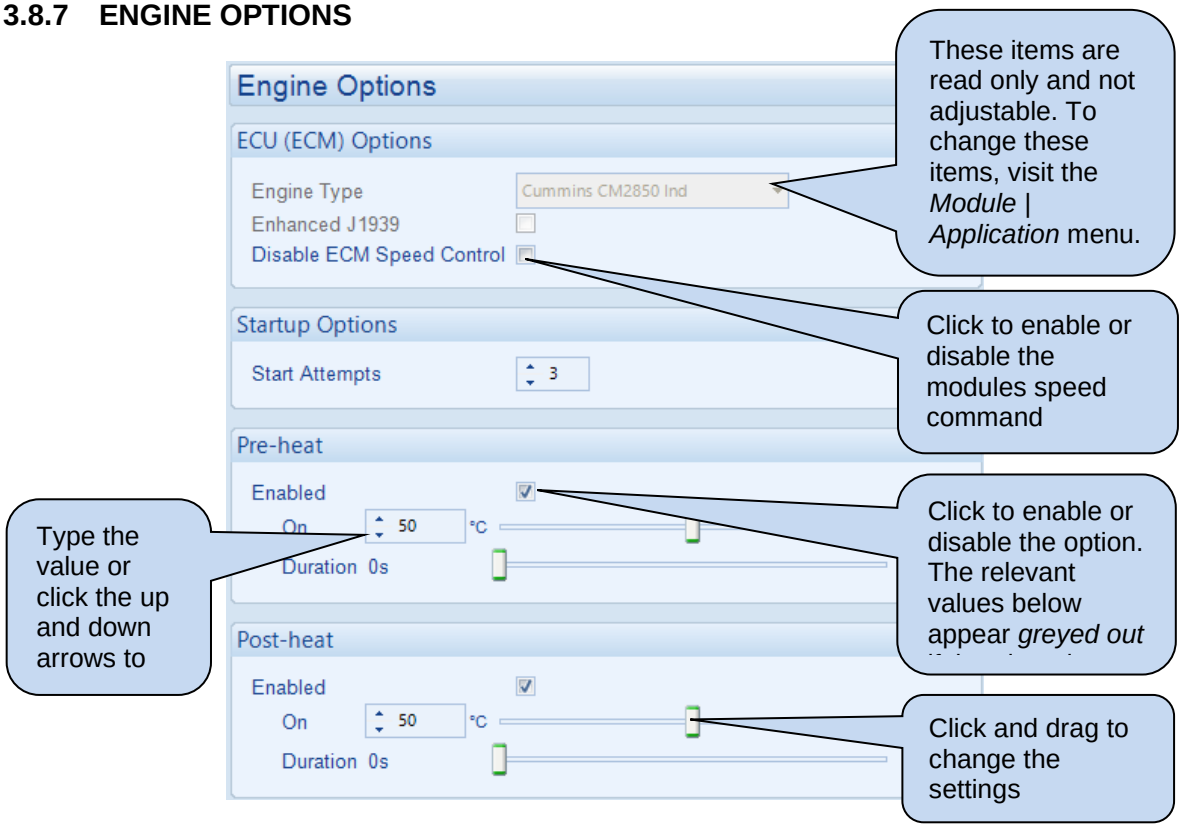
NOTE: Configuration of the *Alarm Action* in this section defines the DSE module response to the CANbus message; however, the ECU (ECM) still shuts down the engine depending on the alarm severity.

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

3.8.7 ENGINE OPTIONS



3.8.7.1 STARTUP OPTIONS

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

3.8.7.2 PRE-HEAT

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

NOTE: Depending on *Engine Type* configuration, this is directly controlled 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

3.8.7.3 POST-HEAT

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

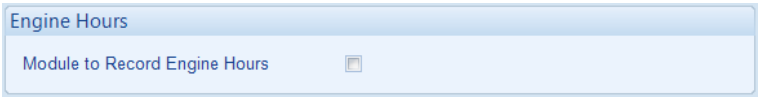
NOTE: Depending on *Engine Type* configuration, this is directly controlled by the ECU (ECM).

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.

3.8.8 ECU (ECM) OPTIONS

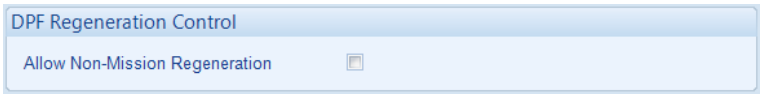
NOTE: This section is only available when the module is connected to an ECU (ECM).

Engine Hours



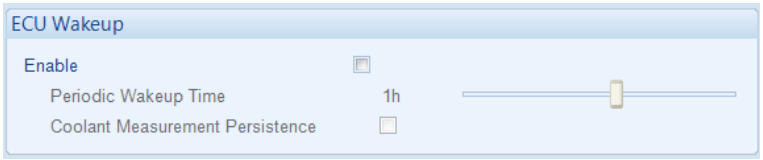
Parameter	Description
Module to Record Engine Hours	☐ = Option is disabled. ☑ = When enabled, DSE module counts Engine Run Hours. When disabled, Engine ECU (ECM) provides Run Hours.

DPF Regeneration Control



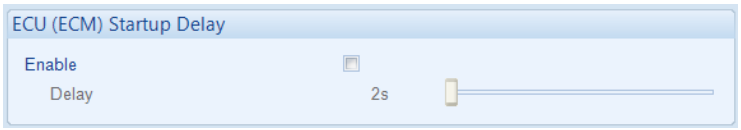
Parameter	Description
Allow Non-Mission Regeneration	☐ = Option is disabled. ☑ = Available for ECUs which require the engine speed to drop during a manual regeneration cycle. During this period, the engine runs off load and the under speed alarms are not active.

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.*
Periodic Wakeup Timer	Move slider to adjust time elapsed between one periodic wakeup to another.
Coolant Measurement Persistence	☐ = With option unchecked the module does not store the last known coolant temperature preventing control of a configured coolant heater/cooler ☑ = Before the ECU powers down the module stores the last measured coolant temperature to correctly control a configured coolant heater/cooler

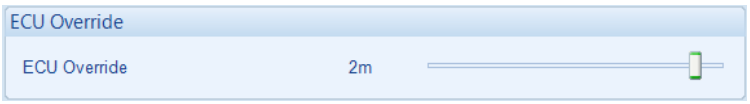
ECU (ECM) Start-up Delay



Parameter	Description
ECU (ECM) Start-up 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.

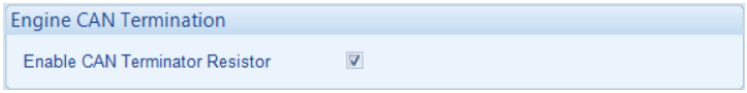
ECU Override

NOTE: *Protected Start Mode* must be enabled to activate this feature, refer to *Module Options.*



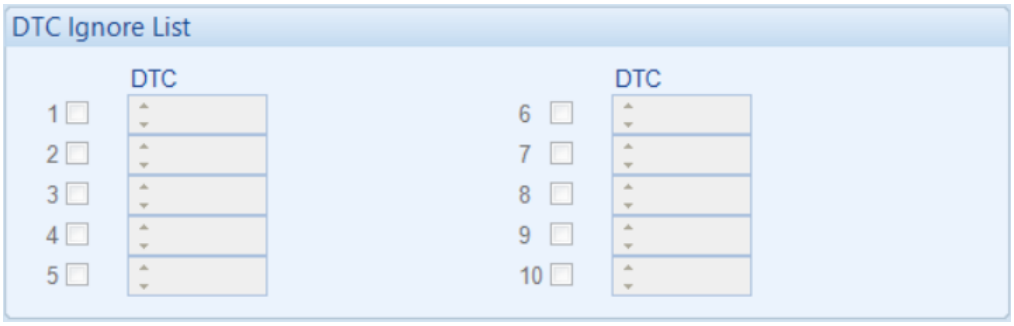
Parameter	Description
ECU Override	Move the slider to adjust the length of time that *ECU Override* remains active once triggered.

Engine CAN Termination



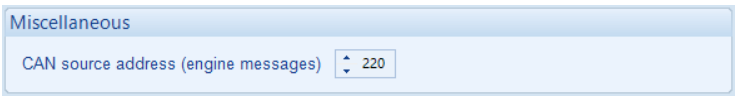
Parameter	Description
Engine CAN Termination Resistor	☐ = A 120 Ω termination resistor is fitted across the H and L terminals of the ECU port when the unit is powered. ☑ = The internal 120 Ω termination resistor is disabled, one must be fitted across the H and L terminals if the module is the first or last on the link.

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.

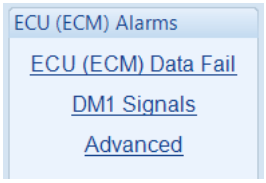
Miscellaneous



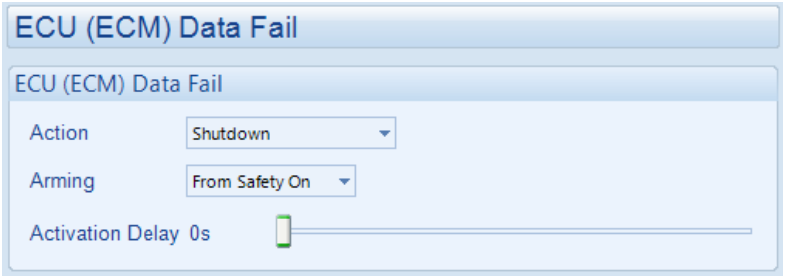
Parameter	Description
CAN Source Address (engine messages)	**NOTE: For a full list of the J1939-75 engine message and instrumentation, refer to DSE Publication: *057-253 DSE7300MKII Operator Manual* which is found on our website: www.deepseaelectronics.com** Set the *CAN Source Address* for the DSE module over which other CANbus devices read the alarms.

3.8.9 ECU (ECM) ALARMS

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



3.8.9.1 ECU (ECM) DATA FAIL



Parameter	Description
ECU (ECM) Data Fail	Provides protection against failure of the ECU (ECM) CANbus 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 CANbus 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 *ECU (ECM) Data Fail* after a failure.

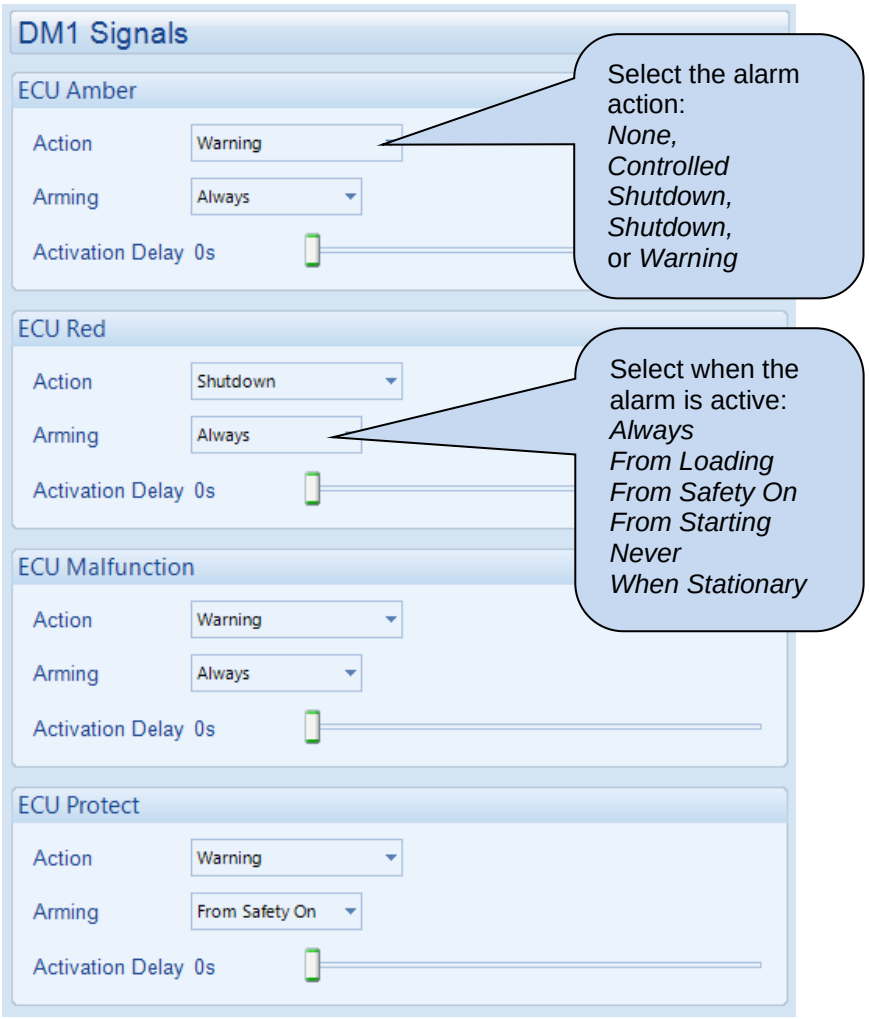
3.8.9.2 DM1 SIGNALS

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

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

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.

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

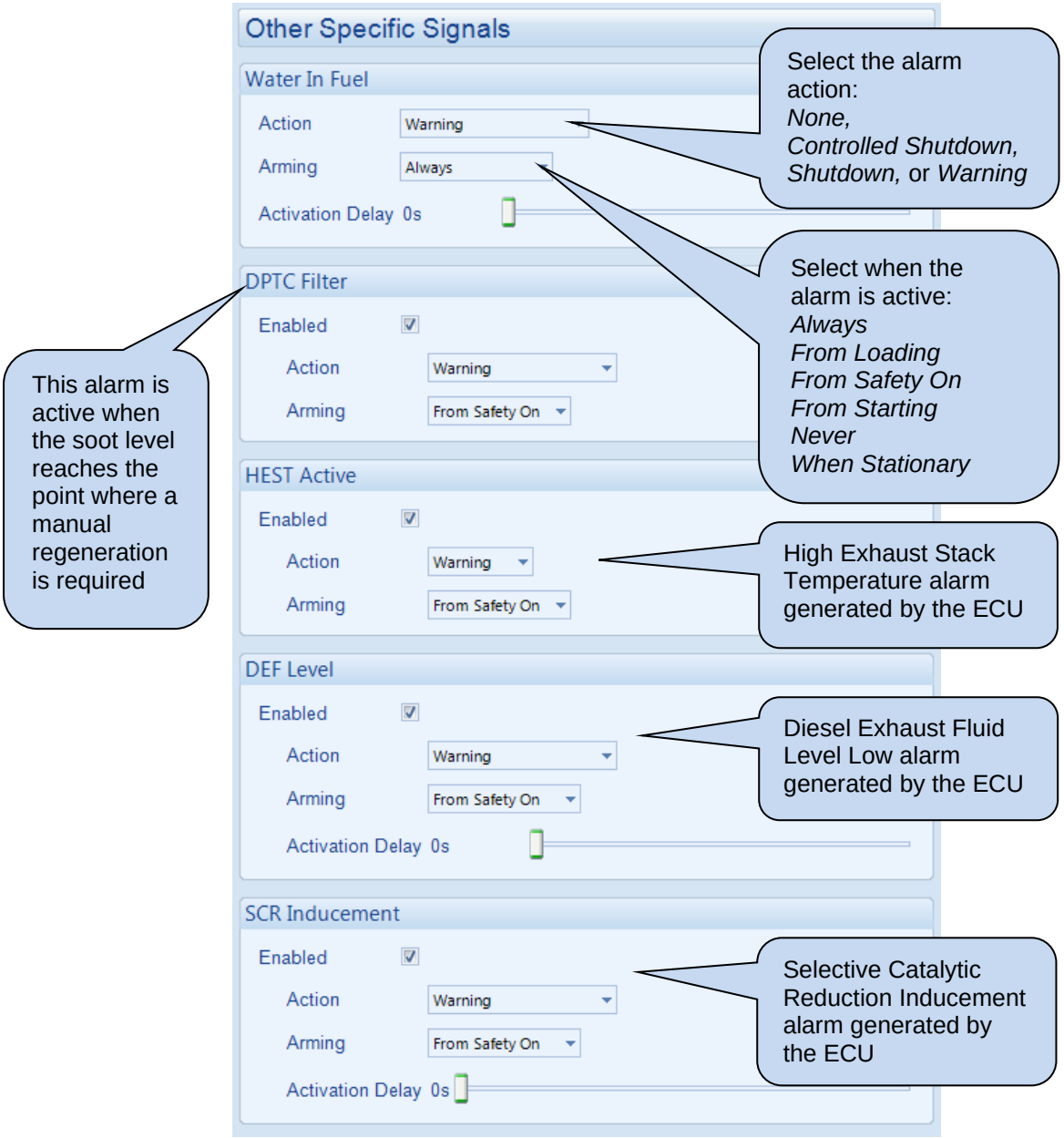


3.8.9.3 ADVANCED

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

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

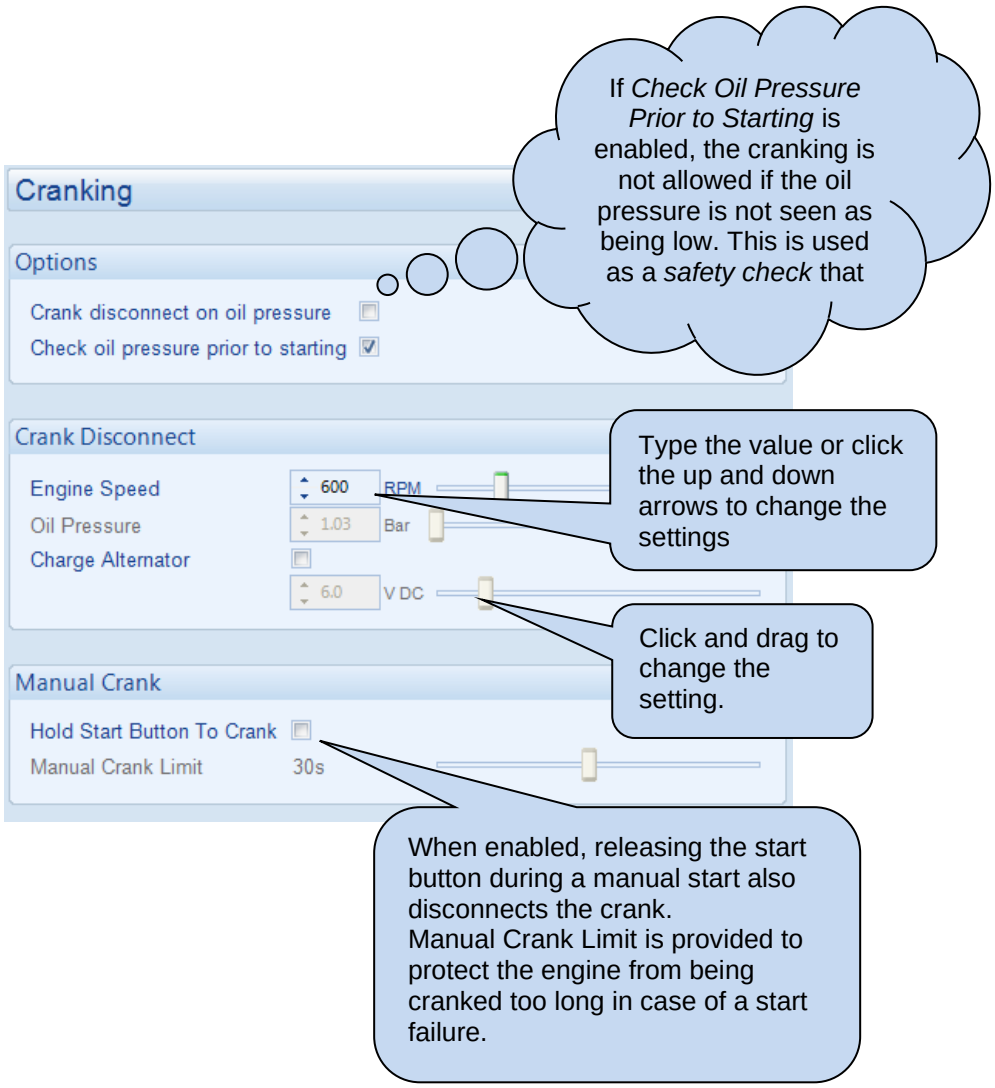
Allows configuration of selected additional CANbus messages from the engine ECU (ECM).



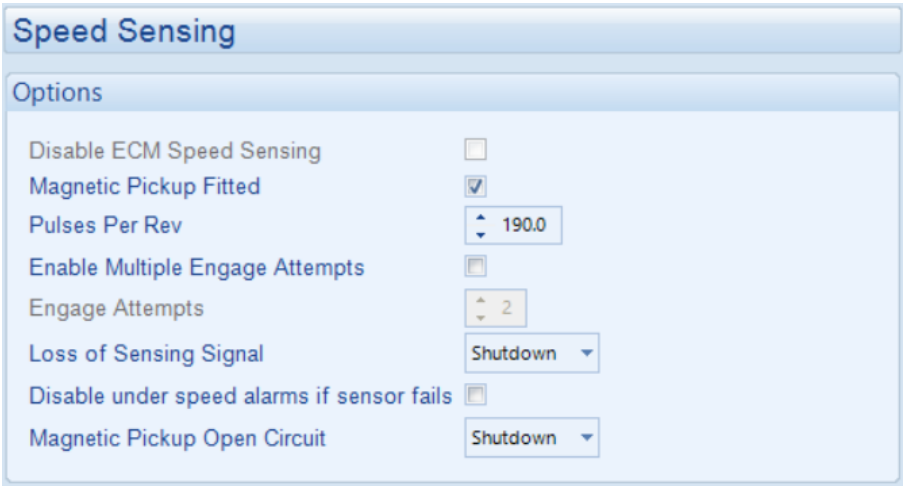
3.8.10 CRANKING

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.

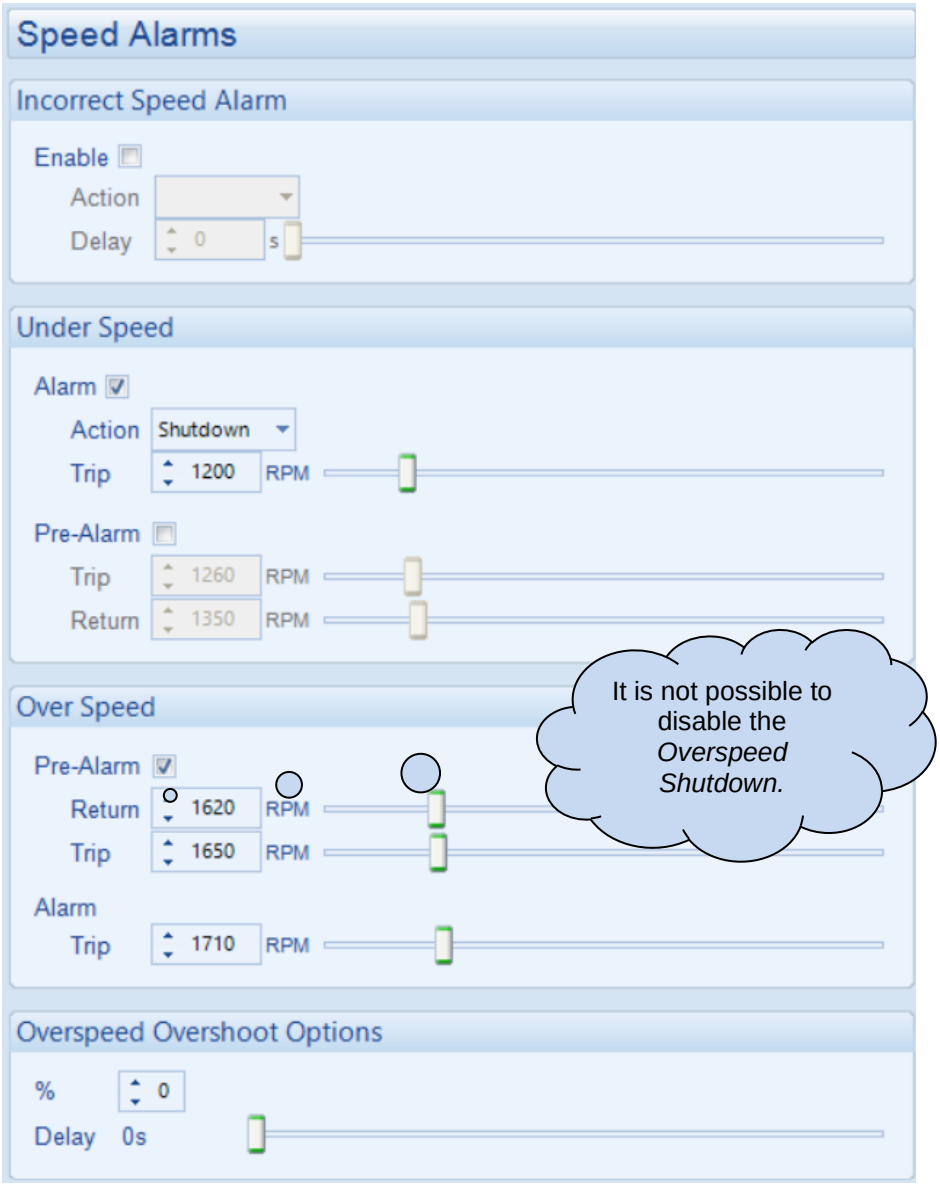


3.8.11 SPEED SENSING



Parameter	Description
Disable ECM Speed Sensing	☐ = An ECU (ECM) is connected to the DSE module and being used for speed sensing. ☑ = An ECU (ECM) is connected to the DSE module, but another form of speed sensing fitted to the DSE module is being used.
Magnetic Pickup Fitted	**NOTE: For specifications of the pulse pickup input, refer to DSE Publication: *057-252 DSEE400 Operator Manual* which is found on our website: www.deepseaelectronics.com** ☐ = Magnetic pickup device is not connected to the DSE module. ☑ = A low impedance magnetic pickup device is connected to the DSE module to measure engine speed.
Pulses Per Rev	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 magnetic pickup pulses are detected during cranking, the *Loss of Mag Pickup Signal* 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.*
Engage 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 *Cranking* elsewhere in this document.
Loss of Sensing Signal	If the speed sensing signal is lost during engine running (or not present during cranking when *Multiple Engage Attempts* is enabled), an alarm is generated: *Shutdown:* The engine is removed from load and is immediately stopped. *Warning:* The engine continues to run; however a warning alarm is raised.
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:* The engine is removed from load and is immediately stopped. *Warning Always Latched:* The engine continues to run; however a latched warning alarm is raised even if the magnetic pickup signal returns to normal.

3.8.12 ENGINE SPEED ALARMS



3.8.12.1 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.

3.8.12.2 UNDER SPEED

Parameter	Description
Under Speed Alarm	☐ = Under Speed does NOT give an alarm ☑ = Under Speed gives an alarm in the event of the engine speed falling below the configured *Under Speed Alarm Trip* value. The *Under speed 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 does NOT give a warning alarm ☑ = Under Speed gives a warning alarm in the event of the engine speed falling below the configured *Under Speed Pre-Alarm Trip* value. The *Under Speed Pre-Alarm Trip* value is adjustable to suit user requirements.

3.8.12.3 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. 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. The *Over Speed Alarm Trip* value is adjustable to suit user requirements.

3.8.12.4 OVERSPEED OVERSHOOT OPTIONS

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

3.8.13 ENGINE CONTROL

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

3.8.13.1 ENGINE CONTROL OPTIONS

Starting

Parameter	Description
Cranking Speed	The engine speed (RPM) during cranking.
Warming Speed	The engine speed (RPM) 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 engine speed (RPM) 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 speed (RPM) change per second when the speed is requested to switch to higher configured setting.
Ramp Down Rate	The rate of the speed (RPM) change per second when the speed is requested to switch to a lower configured setting.

Priming

Parameter	Description
Priming Speed	The engine speed (RPM) during the priming phase.

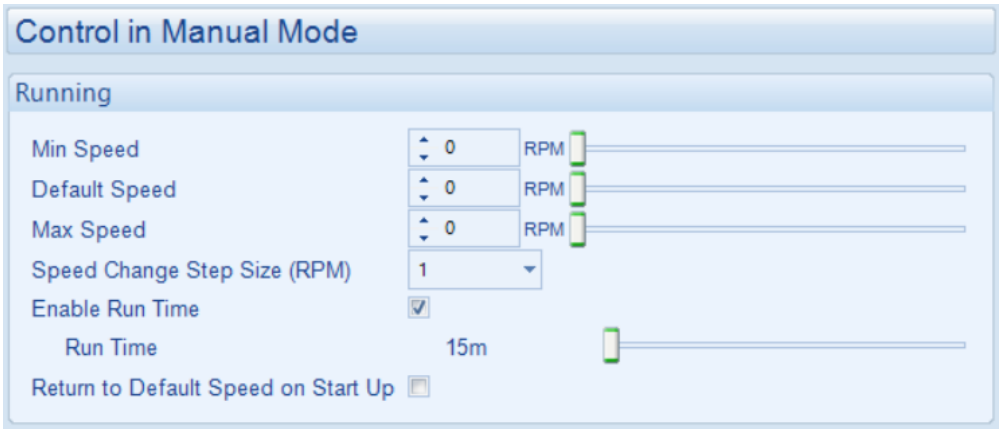
DPF Regeneration

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 engine speed (RPM) during *Cooling Time.*

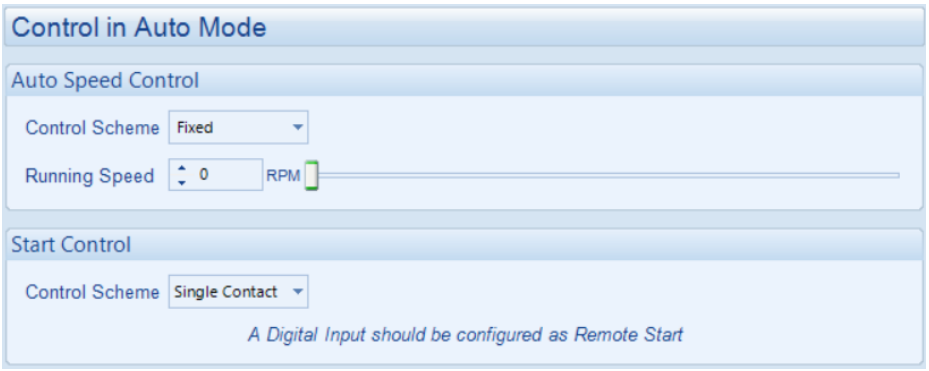
3.8.13.2 CONTROL IN MANUAL MODE



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: *057-252 DSEE400 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.***
Enable Run Time	**NOTE: When the Enable Run Time feature is disabled, any subsequent presses of the Manual button will not activate it.** ☐ = *Run Time* is disabled ☑ = *Run Time* is enabled.
Run Time	**NOTE: Press the Manual button twice to activate the Run Time, subsequent presses of the Manual button causes the module to toggle the Run Time activation . For further information, refer to DSE Publication: *057-252 DSEE400 Operator Manual*.** When the module starts the engine in Manual Mode, clicking the Manual button for a second time activates the *Run Time* where the module stops the engine after the *Run Time* timer expires.
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*.

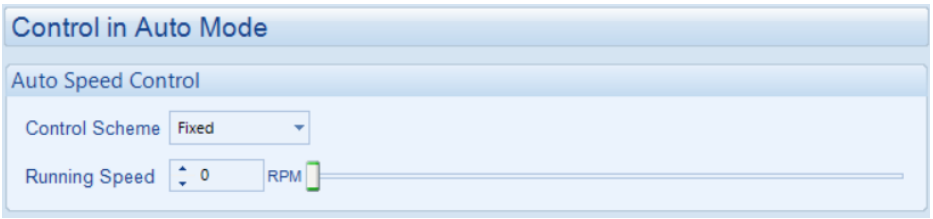
3.8.13.3 CONTROL IN AUTO MODE

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.



Fixed

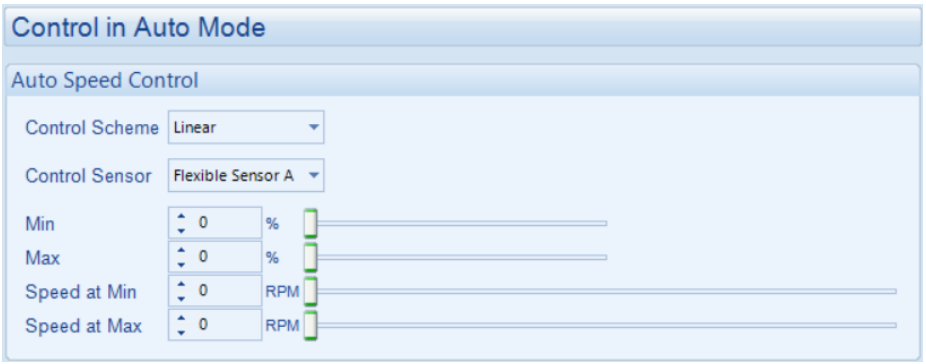
This is used for fixed speed engine application, where the engine runs at constant RPM whenever it starts.



Parameter	Description
Fixed Control Scheme	The *Governor Output* voltage is fixed when the engine is running.
Running Speed	The RPM speed setting for the default engine running speed.

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 RPM speed setting 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 RPM speed setting 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.

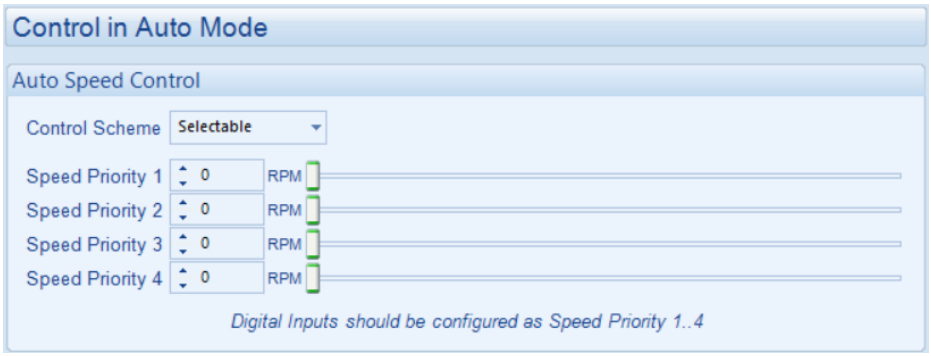
Manual Control

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.*

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 engine speed (RPM) when activating the *Speed Priority 1* digital input.
Speed Priority 2	Set the engine speed (RPM) when activating the *Speed Priority 2* digital input.
Speed Priority 3	Set the engine speed (RPM) when activating the *Speed Priority 3* digital input.
Speed Priority 4	Set the engine speed (RPM) when activating the *Speed Priority 4* digital input.

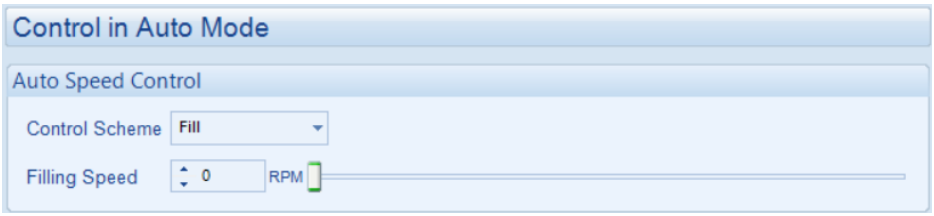
Empty

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 RPM speed setting to define the default engine running speed.

Fill

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

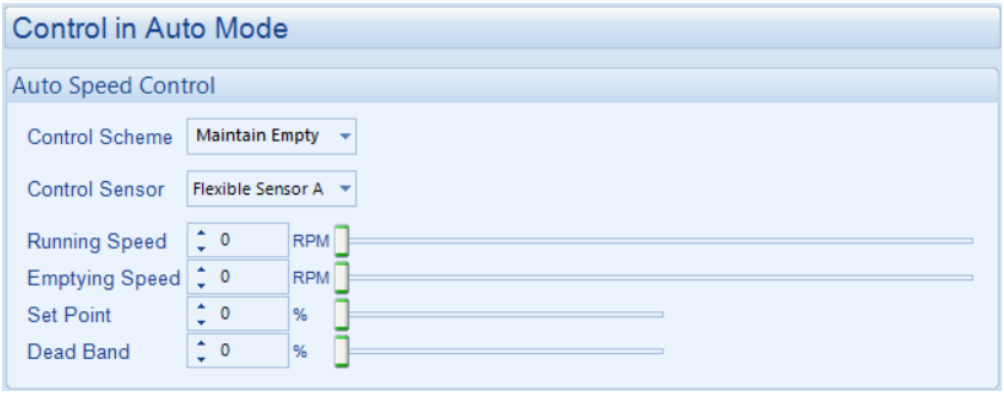


Parameter	Description
Fill Control Scheme	The *Governor Output* voltage is fixed when the engine is running.
Filling Speed	The RPM speed setting to define the default engine running speed.

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.

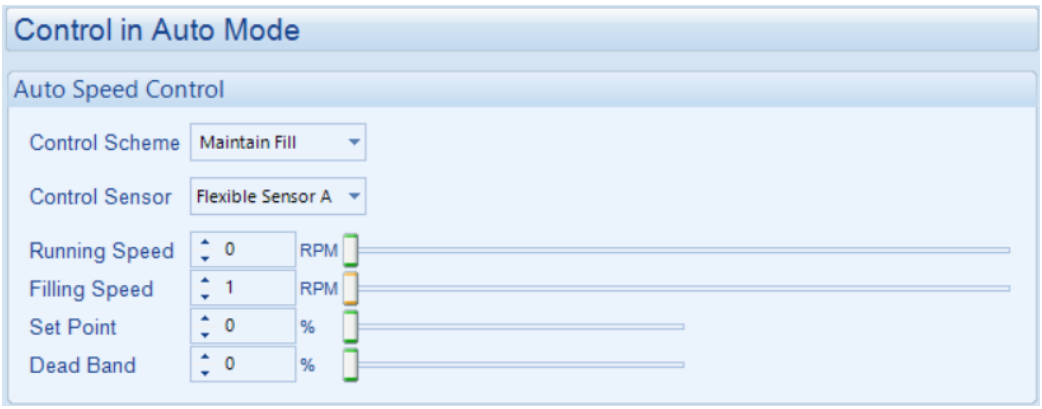


Parameter	Description
Maintain Empty Control Scheme	The *Governor Output* voltage is dependent on the *Control Sensor* level. When the *Control Sensor* value is below the configured *Set Point* by the *Dead Band*, the engine runs at the *Running Speed.* When the *Control Sensor* measured value goes above 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 RPM speed setting when the *Control Sensor* value is below the configured *Set Point* by the *Dead Band* amount.
Emptying Speed	The RPM speed setting 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.

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.



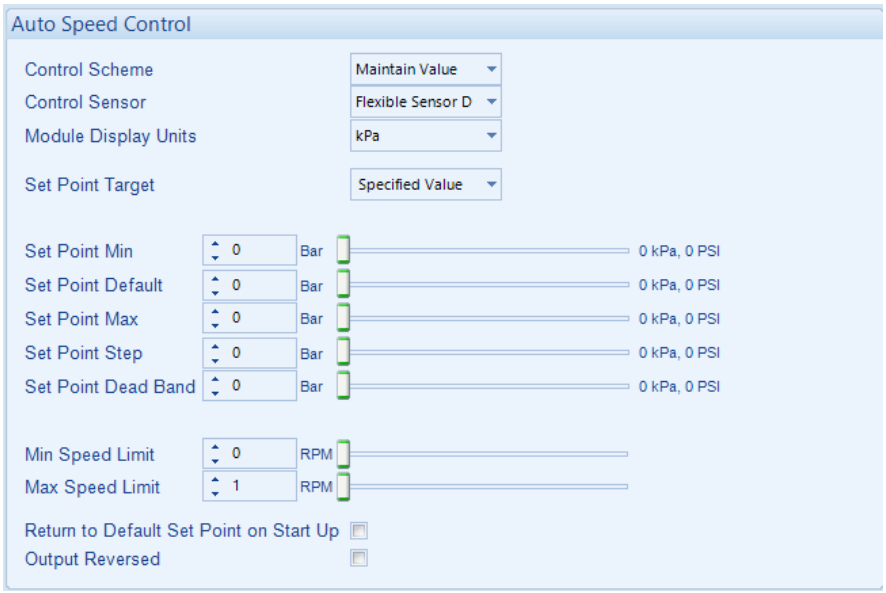
Parameter	Description
Maintain Fill Control Scheme	The *Governor Output* voltage is dependent on the *Control Sensor* level. When the *Control Sensor* value is above the configured *Set Point* by the *Dead Band*, the engine runs at the *Running Speed.* When the *Control Sensor* measured value goes below 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 RPM speed setting when the *Control Sensor* value is above the configured *Set Point* by the *Dead Band* amount.
Filling Speed	The RPM speed setting 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.

Maintain Value

NOTE: A *Flexible Sensor* 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: *057-252 DSEE400 Operator Manual.*

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



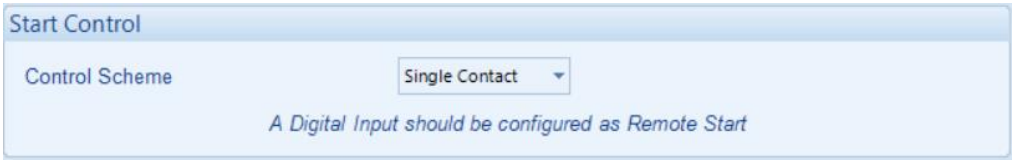
Parameter	Description
Maintain Value Control Scheme	The *Governor Output* voltage is dependent on the *Control Sensor* level. When the *Control Sensor* value is within the *Set Point Dead Band*, the speed is not changed. When the measured *Control Sensor* value goes above or below the *Set Point Dead Band*, the engine increases / decreases its RPM until the measured value matches the *Set Point Default* Value
Control Sensor	Select the *Flexible Sensor* that is used to measure the value that is to be maintained.
Module Display Units	Select the units to be displayed on the module from the list: ***Bar*** ***kPa*** ***PSI*** ***ºC*** ***ºF***
Set Point Min	The minimum value that the *Set Point Default* is adjustable to. The absolute limits of this parameter is defined by the *Sensor Curve*
Set Point Default	The default value that engine is expected to maintain.
Set Point Max	The maximum value that the *Set Point Default* is adjustable to. The absolute limits of this parameter is defined by the *Sensor Curve*

Parameter	Description
Set Point Step	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 is defined by the *Governor Curve*

Parameter descriptions are continued overleaf…

Parameter	Description
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 is defined by the *Governor Curve*
Return to Default Set Point on Start Up	☐ = 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	Reverses the direction of engine speed when attempting to maintain the *Set Point Default* value.

Start Control

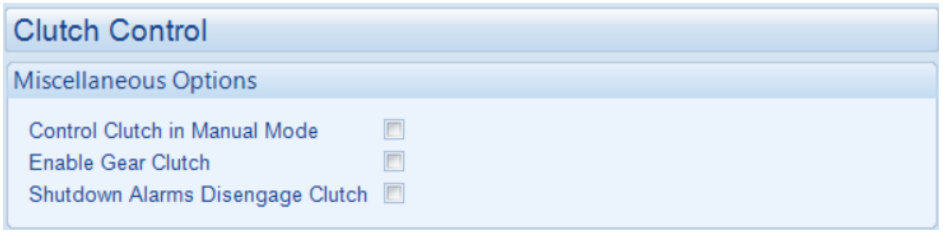


Parameter	Description
Type	The *Start Control* is selected from different types. This determines the module's response to the start/stop input functions in Auto mode. *Flexible Sensor Value:* The engine is started and stopped depending on configurable flexible sensor values *Float Contacts:* when a *Remote 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 sender to control the starting and stopping of the engine, This is only available when the *Start Control* is configured as *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.

3.8.14 CLUTCH CONTROL

This provides DSEE400 with a number of options for automatic Clutch Control for a wide range of applications.
Primarily designed for AUTO mode, a MANUAL mode option is also available along with a digital input function (Disengage Clutch) to allow for external override.
Options are available to allow the use of gear clutches, friction clutches and electric clutches.

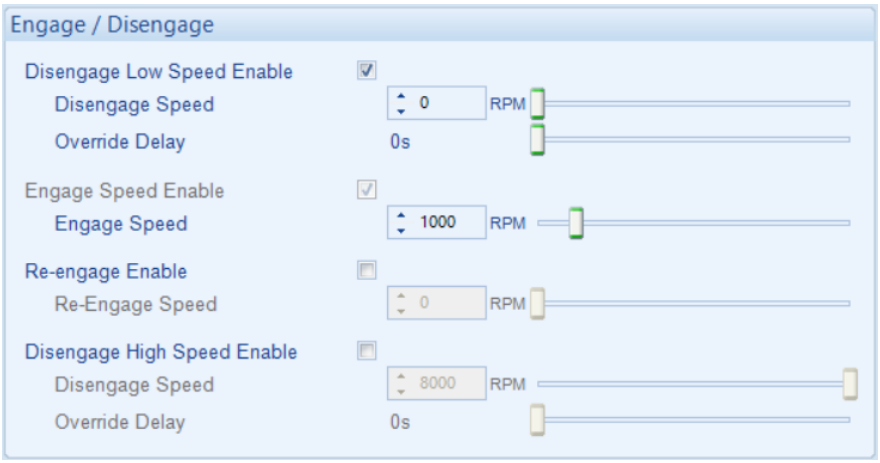
3.8.14.1 MISCELLANEOUS OPTIONS



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.*
Enable Gear Clutch	☐ = *Gear Clutch Control* is disabled. ☑ = *Gear Clutch Control* is enabled. *Clutch Control* activates during the start sequence, at Fuel On and prior to cranking, The output de-activates when the engine comes to rest. The Digital Input function *Engage Clutch* has no action when this option is enabled.
Shutdown Alarms Disengage Clutch	**NOTE: This feature is not available when *Enable Gear Clutch* is selected.** ☐ = Upon a shutdown alarm, the engine is requested to stop. The clutch remains engaged until the engine comes to rest or when engine speed falls below the Disengage Low Speed (if enabled). ☑ = Upon a shutdown alarm the engine is requested to stop and the clutch is immediately disengaged.

3.8.14.2 ENGAGE / DISENGAGE

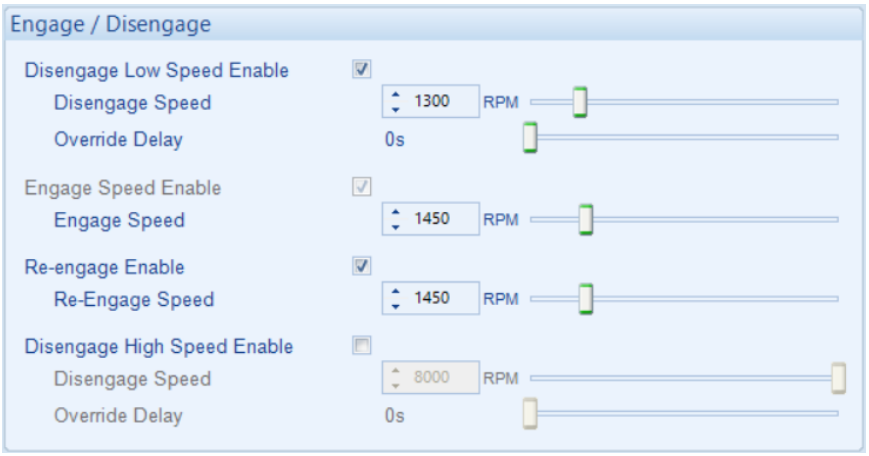
NOTE: These features are not available when *Enable Gear Clutch* is selected.

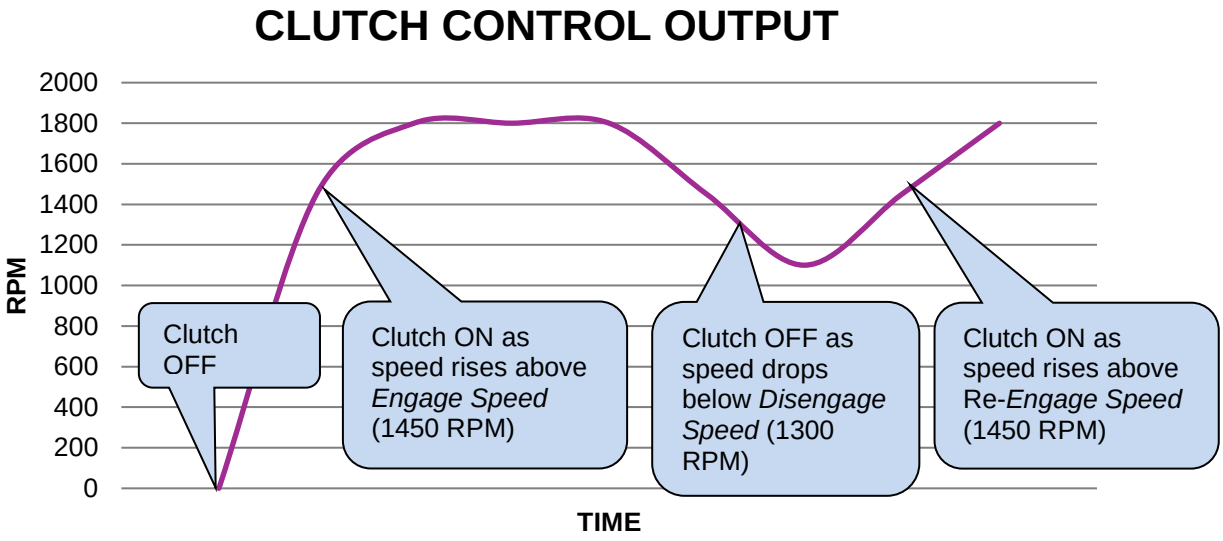


Parameter	Description
Disengage Low Speed Enable Disengage Speed Override Delay	☐ = Normal clutch operation. ☑ = When engine speed falls below the *Disengage Speed* for longer than the period of the *Override Delay* (including during a stopping operation), the clutch is disengaged.
Engage Speed Enable Engage Speed	During the engine start sequence, the clutch engages when engine speed rises above the Engage Speed.
Re-engage Enable Re-engage Speed	☐ = The clutch does not re-engage when engine speed returns to normal. ☑ = Following a Clutch Disengage upon high speed, the clutch re-engages when engine speed falls below the Re-engage speed. Following a Clutch Disengage upon low speed, the clutch re-engages when engine speed rises above the Re-engage speed.
Disengage High Speed Enable Disengage Speed Override Delay	☐ = Normal clutch operation. ☑ = When engine speed rises above the *Disengage Speed* for longer than the period of the *Override Delay*, the clutch is disengaged.

3.8.14.3 EXAMPLE 1

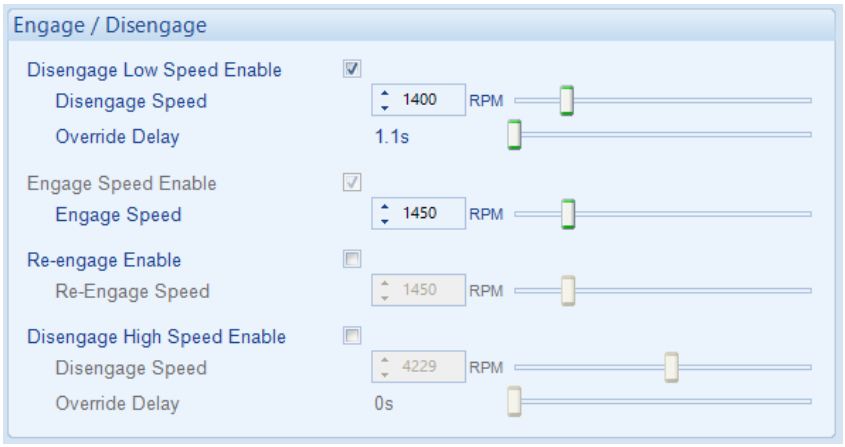
The engine is used to drive a stone crusher machine. At engine start up, the clutch is engaged as the engine speed increases above 1450 RPM, starting the crushing process. Occasionally large stones enter the crusher increasing the load on the engine, slowing it down. As the engine speed falls below 1300 RPM for over one second, DSEE400 disengages the clutch, stopping the crusher from rotating and removing the load from the engine. The engine speed rises again.
As the engine speed rises above 1450 RPM the clutch is re-engaged. The intention is that the 'jolt' as the crusher restarts adds extra pressure, and the crushing process continues.
The operator is on hand to stop the stone crusher should this occur more than desired.
The same principle is applied to a log choppers, garbage crushers etc.

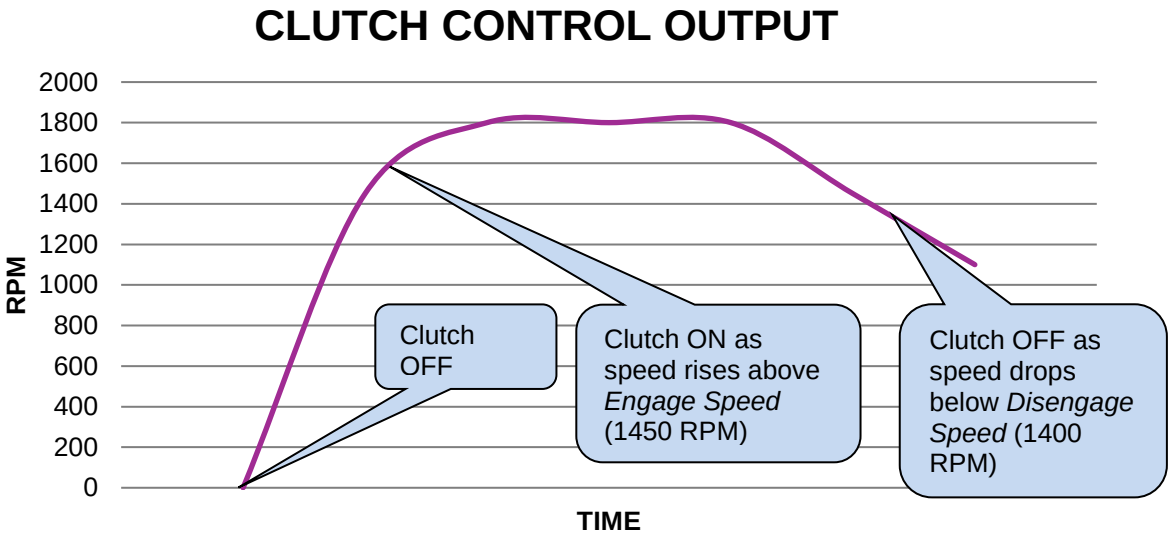




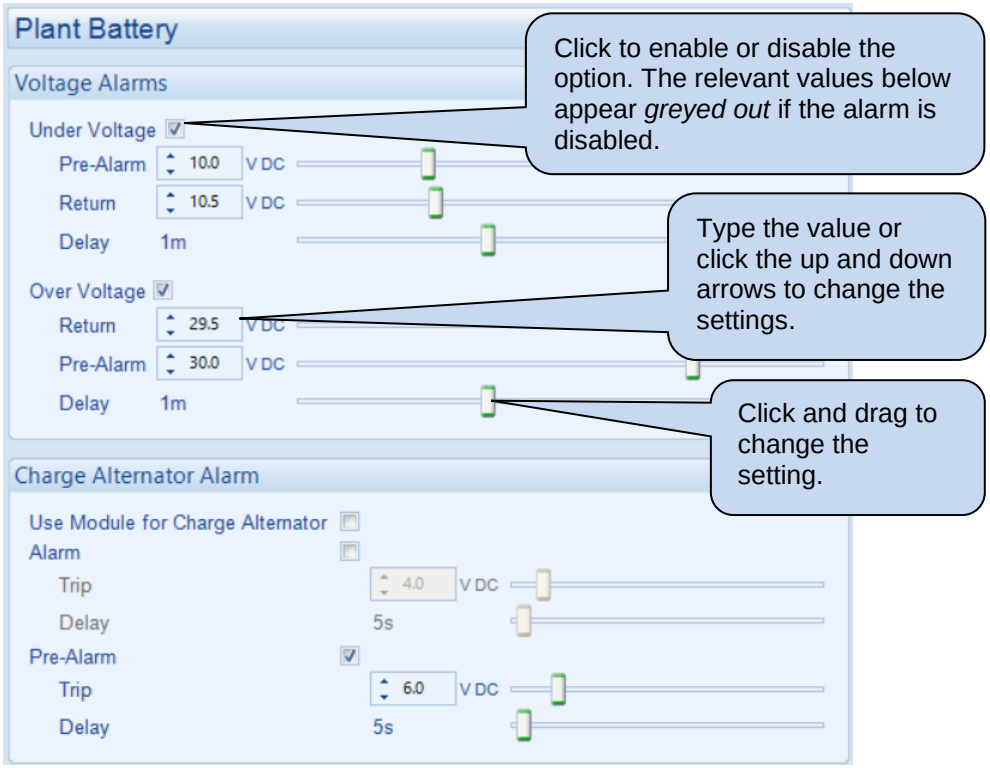
3.8.14.4 EXAMPLE 2

The engine is used to drive a water pump. Occasionally debris enters the pump, slowing the engine. At engine start, the clutch engages as the speed rises above 1450 RPM and the pump starts operation. Should debris enter, the engine speed falls. As the engine speed falls below 1400 RPM the clutch is disengaged to prevent damage to the pump.
The operator is on hand to stop the system, clear the fault and restart it again.





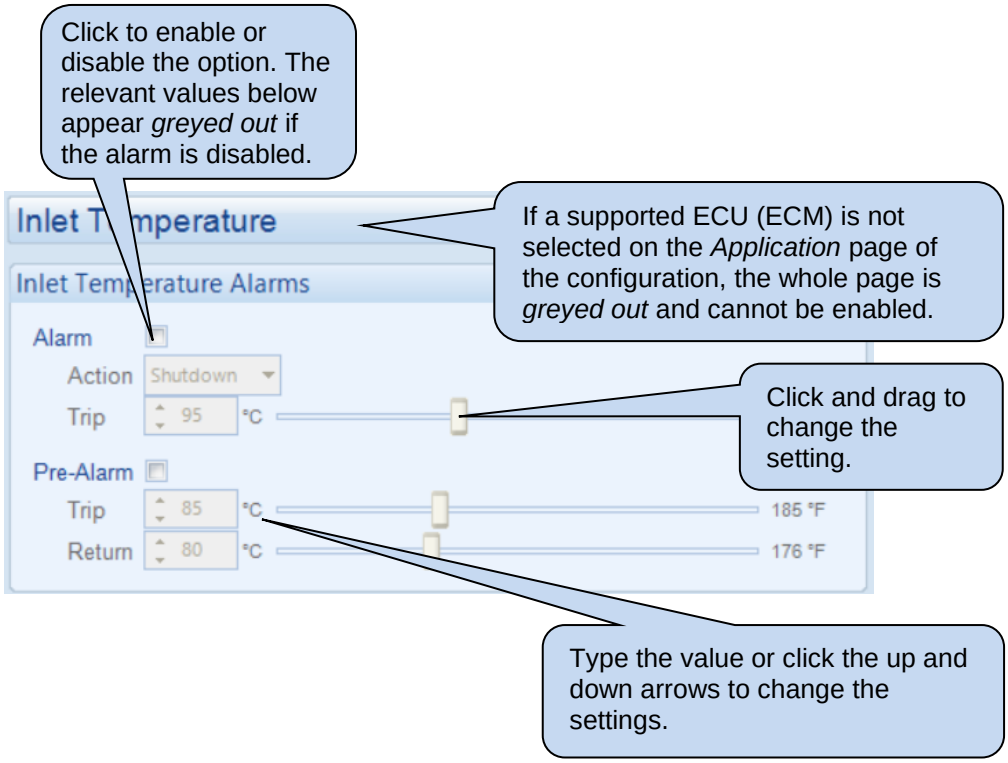
3.8.15 PLANT BATTERY



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

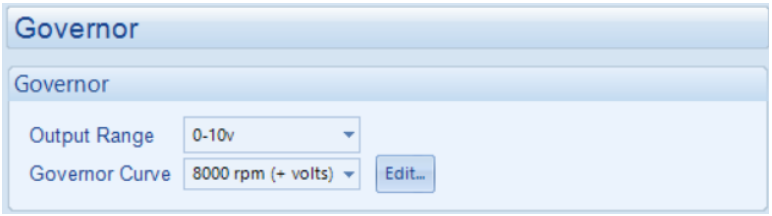
3.8.16 INLET TEMPERATURE

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



3.8.17 GOVERNOR

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

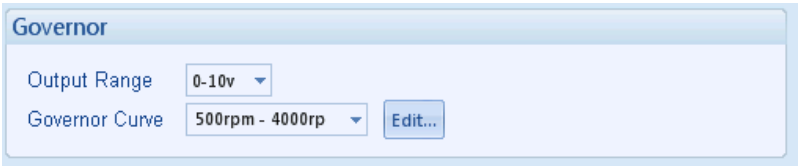


Parameter	Description
Output Range	Define the voltage range of the *Governor Output*: ***0 V to 10 V*** ***-10 V to 0V***
Governor Curve	Allows the creation and selection between different output curves. The curve defines the *Governor Output* voltage required to maintain the engine RPM.

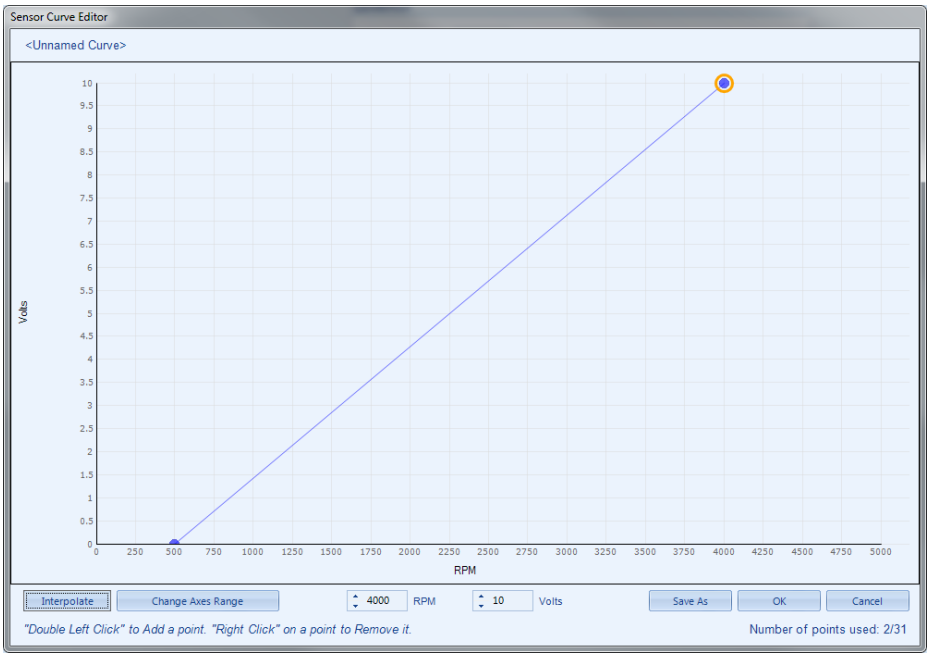
Example

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.

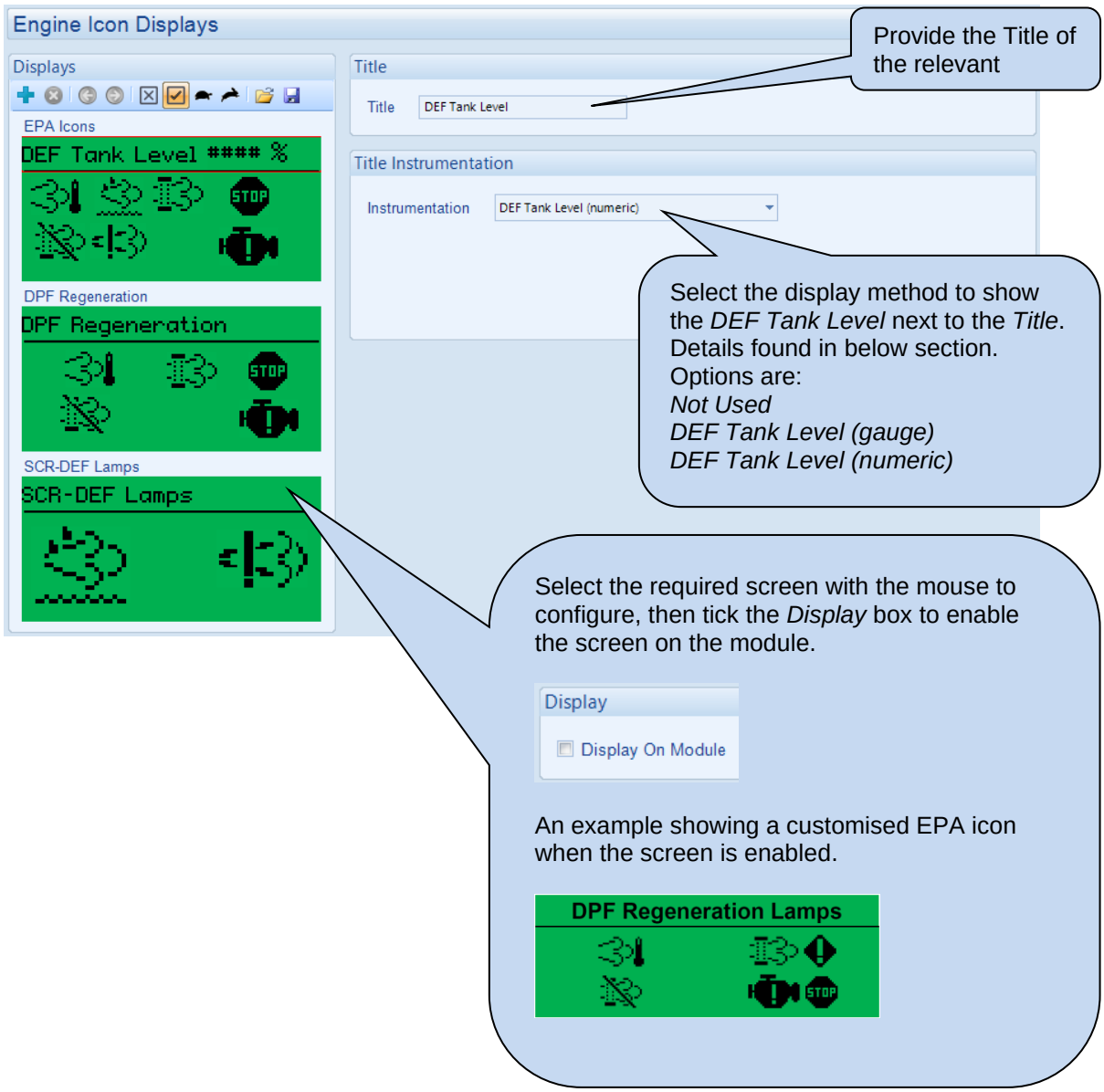


The curve is shaped to represent the voltage output required to control the governor among the full range of speed.



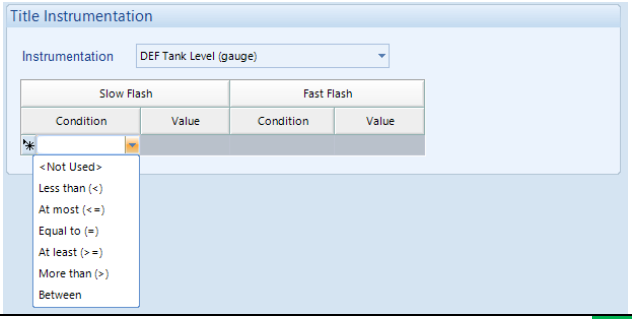
3.8.18 ENGINE ICON DISPLAYS

This section is used with Electronic Engines, it allows to create or define a CAN Lamp icon and how to be displayed when the configured alarm or message is active, such as flashing the CAN icon rapidly or slowly. The first screen is enabled by default, and it cannot be disabled, the second and third screens are configurable to be enabled or disabled through this section to allow the user to create more CAN Icon Displays. The CAN icon instrument is activated based on a DTC message sent from the ECU or according to GenComm instrumentation conditions.



3.8.18.1 TITLE INSTRUMENTATION

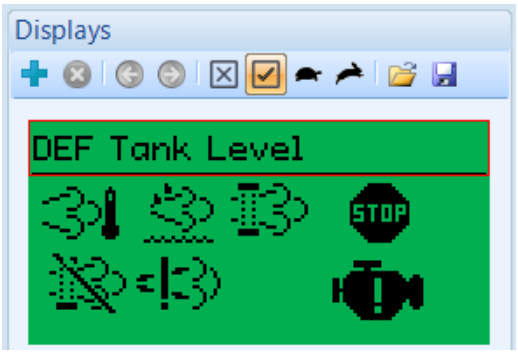
Select the display form of the DEF Tank Level instrument in the relevant screen.

Title Instrumentation	Display
Not Used	The *DEF Tank Level* is not displayed in the title of the screen.
DEF Tank Level (Gauge)	The *DEF Tank Level* is displayed in form of bar gauge meter  The DEF Tank Level (gauge) display is flashed slowly or rapidly on the screen if the conditions and values are configured, and the instrument readings are satisfied. 
DEF Tank Level (numeric)	The *DEF Tank Level* is displayed in numeric form 

3.8.18.2 ICON INSTRUMENTATION

Displays

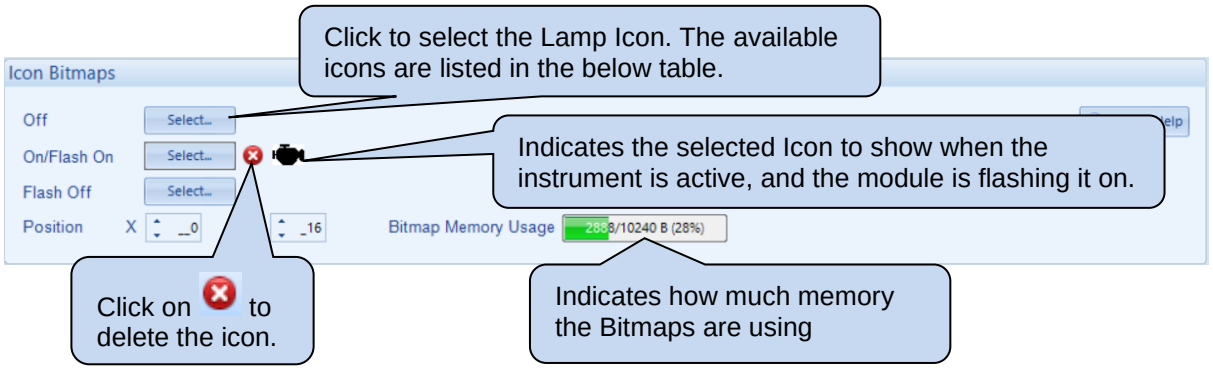
Select the required Lamp Icon from the screen to configure or click on the tab to create a new Lamp Icon.



Display tab tools	Description
	Click on the Plus tab to create a new Lamp Icon within the selected screen.
	Click on the delete tab to delete the selected Lamp Icon from the screen.
	Click on the right or left tab to select the next Lamp Icon in the screen.
	Click to hide the instruments from the screens.
	Click to show all the instruments in the screens.
	This tool is for flashing demonstration. Click to flash all the instruments slowly.
	This tool is for flashing demonstration. Click to flash all the instruments rapidly.
	Click to import a saved *Engine Icon Displays*.
	Click to export the configured *Engine Icon Displays*.

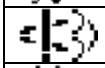
Icon Bitmaps

Configure the Icon Bitmaps of the selected instrument from the screen, to show the Lamp Icon when active or inactive.



Icon Bitmaps	Description
Flash On (On)	Select the icon to show when the instrument is active, and the module has flashed on the *Engine Icons* on the screen.
Flash Off	Select the icon to show when the instrument is active, and the module has flashed off the *Engine Icons* on the screen.
Off	Select the icon to show when the instrument is not active on the screen.
Position X, Y	Configure the instrument positions for X & Y coordinates on the screen.

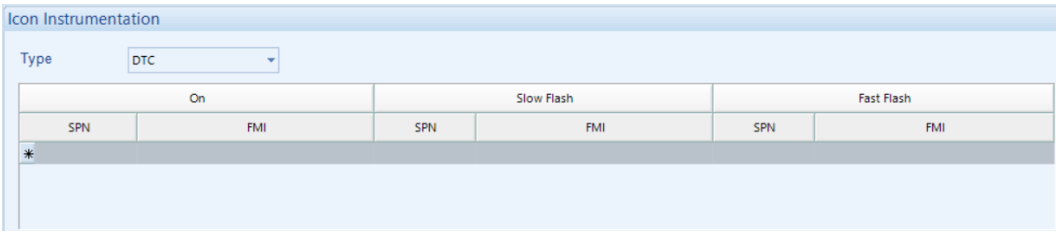
Parameter descriptions are continued overleaf…

Lamp Icons	Display
	DEF On Large
	DEF On
	DPF Active
	DPF Inhibit
	DPF Stop
	DPF Warning
	ECU Red Alarm
	ECU Yellow Alarm
	HEST On
	SCR Active Large
	SCR Active

Icon Instrumentation (Conventional Diesel)

Configure the Type of the Instrumentation to read from the DTC or from a GenComm register, and on what condition(s) the selected instrument to be On or flashing.

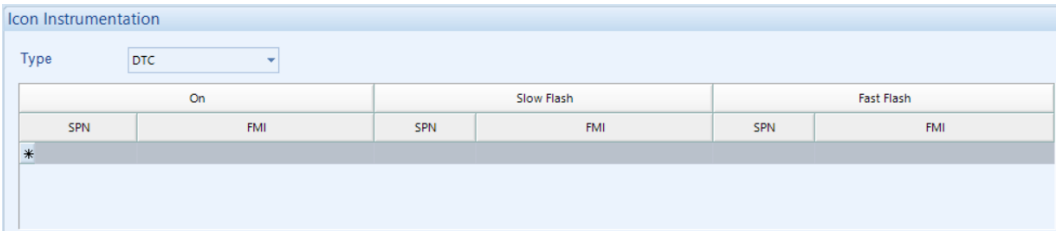
Icon Instrumentation DTC Type



Icon Instrumentation	Description
On	Configure the SPN code to activate the instrument when *On DTC* satisfied.
Slow Flash	Configure the SPN code to flash the instrument slowly when *Slow DTC* satisfied.
Fast Flash	Configure the SPN code to flash the instrument rapidly when *Fast DTC* satisfied.

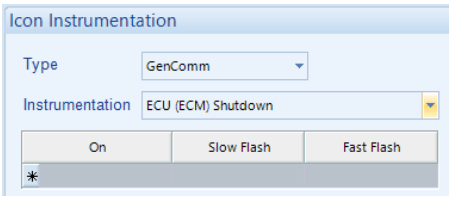
Icon Instrumentation (Other Engine Types)

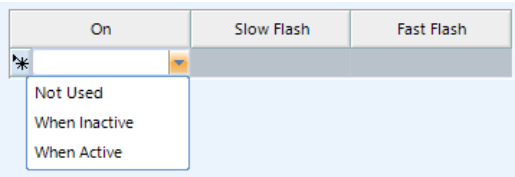
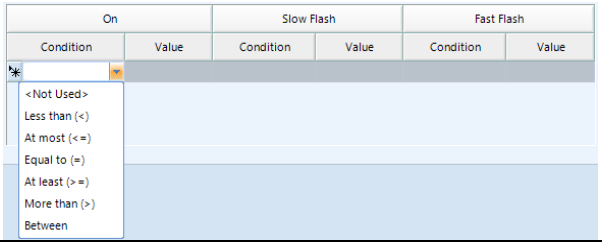
Icon Instrumentation DTC Type



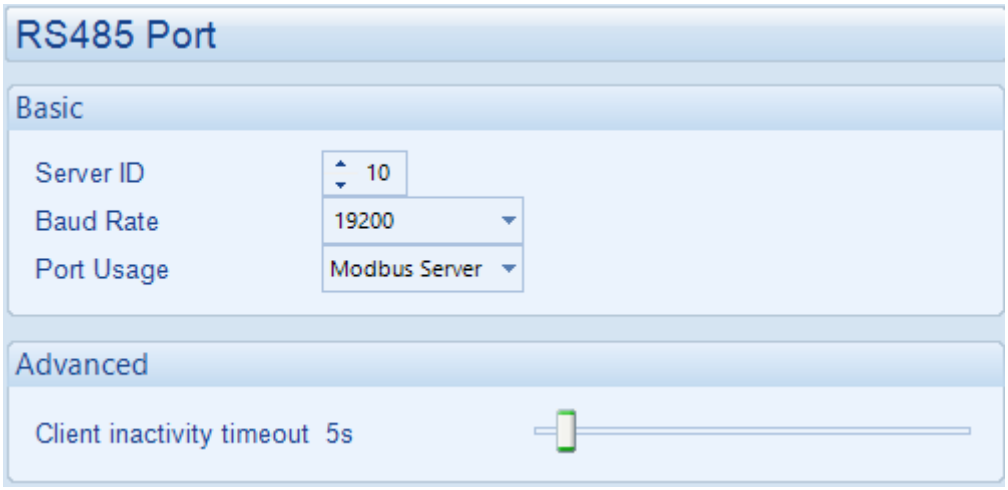
Icon Instrumentation	Description
On	Configure the SPN code to activate the instrument when *On DTC* satisfied.
Slow Flash	Configure the SPN code to flash the instrument slowly when *Slow DTC* satisfied.
Fast Flash	Configure the SPN code to flash the instrument rapidly when *Fast DTC* satisfied.

Icon Instrumentation GenComm Type



Icon Instrumentation	Description
Instrumentation	Select the instrument to monitor. This could be a flag condition or an instrumentation value.
Flag type of GenComm Icon Instrument	Select the required Condition to activate the Instrumentation Icon, or to Slow Flash, or to Fast Flash based on the options below: *Not Used* *When Inactive* *When Active* 
Instrumentation type of GenComm Icon Instrument	Configure the required Condition to activate the Instrumentation Icon, or to Slow Flash, or to Fast Flash. 

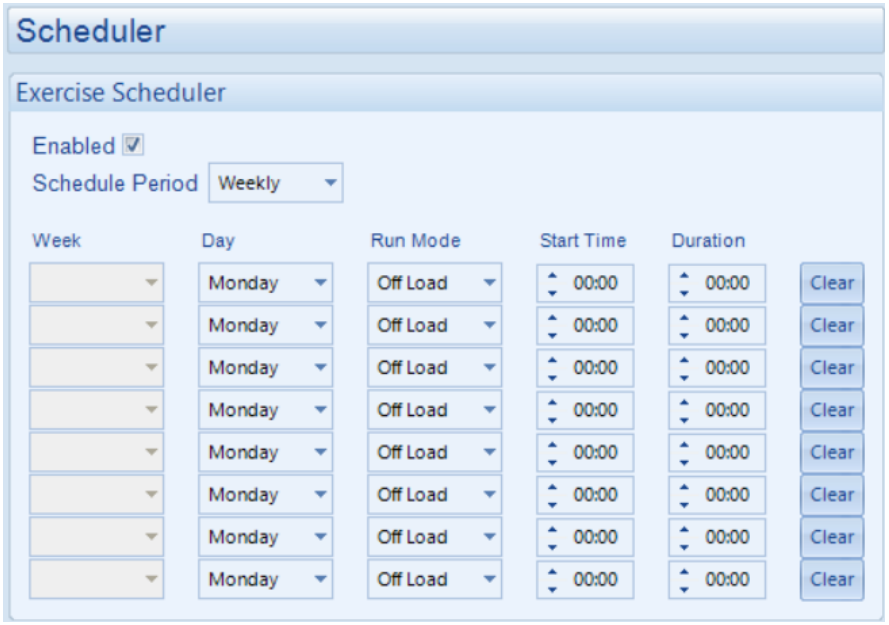
3.9 COMMUNICATIONS



Parameter	Description
Server ID	Select the Server ID of the DSE module's RS485 port. Every device on the RS485 link must have a unique ID.
Baud Rate	Select the Baud Rate (speed of communication) of the DSE module's RS485 port. Every device on the RS485 link must have the same Baud Rate. **1200** **2400** **4800** **9600** **14400** **19200** **28800** **38400** **57600** **115200**
Client Inactivity Timeout	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 has to be set longer than the time between Modbus polls from the client.
Port Usage	**NOTE: When RS485 *Modbus Client* is selected the *Client Inactivity Timeout* and *Server ID* options are greyed out.** Select the RS485 Port1 usage. **Modbus Server:** MODBUS RTU RS485 communication. **RS485 Modbus Client:** The RS485 Port is used to communicate with an intelligent battery charger over the RS485 link.

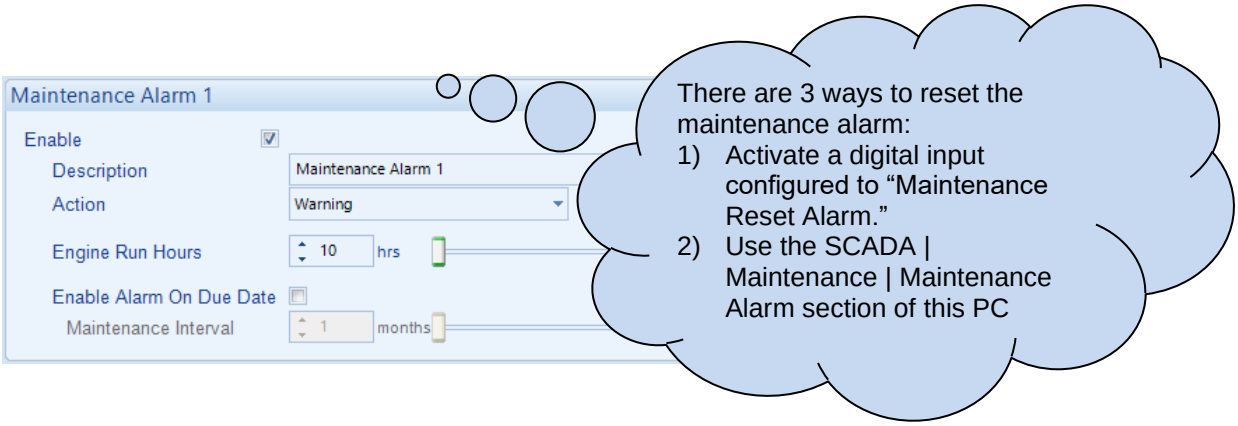
3.10 SCHEDULER

The scheduler is used to automatically start the engine at a configured day and time and run for the configured duration of hours.
The engine is made to run *On Load* or *Off Load* depending upon the configuration:



Function	Description
Enabled	☐ = Scheduled runs are disabled ☑ = Scheduled runs are enabled
Schedule Period	Determines the repeat interval for the scheduled run. *Weekly*: Provides the ability to select certain days of the week when the scheduler is needed *Monthly*: Provides the ability to select the weeks of the month when the scheduler is needed
Week	**The option is available when the *Schedule Period* is configured as *Monthly.*** Select the number of the week the schedule is required in each month.
Day	Specify the day of week 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 without engaging the clutch ***On Load***: The module starts the engine and engages the clutch when the engine becomes available.
Start Time	Determines at what time of day the scheduled run starts
Duration	Determines the duration of time for the scheduled run
Clear	Resets the values for the *Week*, *Day*, *Start Time,* and *Duration* to defaults

3.11 MAINTENANCE ALARMS

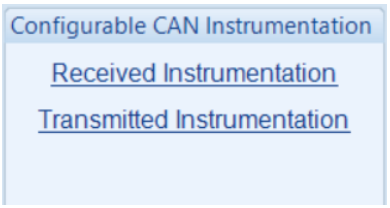


Maintenance Alarms 1 to 10

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: ***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.

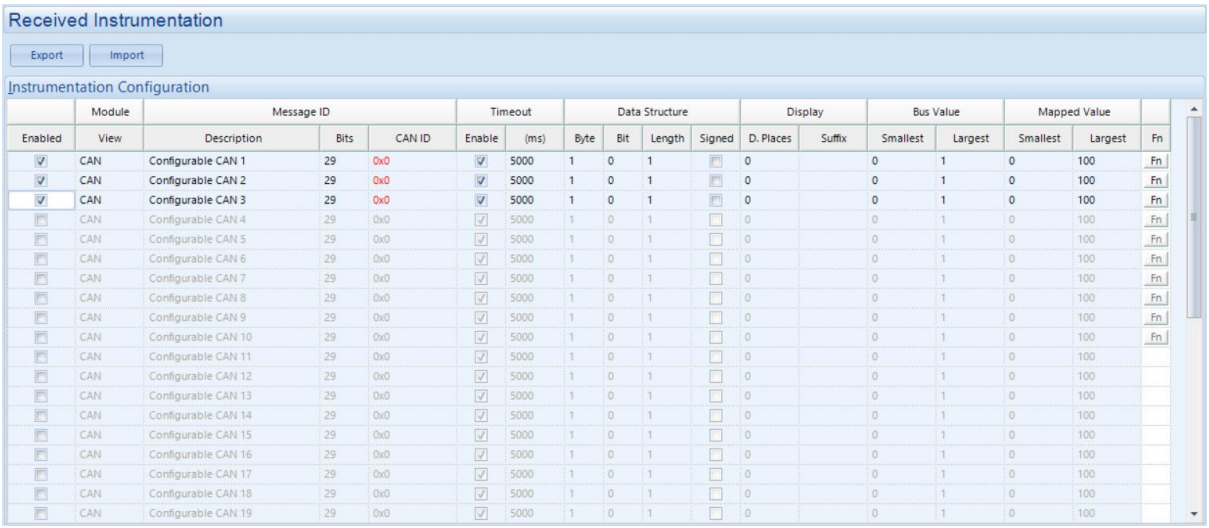
3.12 CONFIGURABLE CAN INSTRUMENTATION

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



3.12.1 RECEIVED INTRUMENTATION (1-30)

This feature allows for up to 30 custom engine CAN instrumentation items to be decoded from CAN messages on the connected ECU port.



	Module	Message ID			Timeout		Data Structure				Display		Bus Value		Mapped Value		
Enabled	View	Description	Bits	CAN ID	Enable	(ms)	Byte	Bit	Length	Signed	D. Places	Suffix	Smallest	Largest	Smallest	Largest	Fn
☑	CAN	Configurable CAN 1	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	Fn
☑	CAN	Configurable CAN 2	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	Fn
☑	CAN	Configurable CAN 3	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	Fn
☐	CAN	Configurable CAN 4	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	Fn
☐	CAN	Configurable CAN 5	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	Fn
☐	CAN	Configurable CAN 6	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	Fn
☐	CAN	Configurable CAN 7	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	Fn
☐	CAN	Configurable CAN 8	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	Fn
☐	CAN	Configurable CAN 9	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	Fn
☐	CAN	Configurable CAN 10	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	Fn
☐	CAN	Configurable CAN 11	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	
☐	CAN	Configurable CAN 12	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	
☐	CAN	Configurable CAN 13	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	
☐	CAN	Configurable CAN 14	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	
☐	CAN	Configurable CAN 15	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	
☐	CAN	Configurable CAN 16	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	
☐	CAN	Configurable CAN 17	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	
☐	CAN	Configurable CAN 18	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	
☐	CAN	Configurable CAN 19	29	0x0	☑	5000	1	0	1	☐	0		0	1	0	100	

Export/Import

This feature is used to import/export the *Configurable CAN Instrumentation* settings.

Parameter	Description
Export	This allows to export the configuration settings of the CAN Received Instrumentation into a *.canrx file.
Import	This allows to import existing configuration settings of the Legacy CAN Export File (*.xml) or Received (*.canrx) file.

3.12.1.1 INSTRUMENT CONFIGURATION

Module

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.
View	The options are as follows: ***CAN:*** The value is shown under CAN page on the module display screen. ***Disabled:*** The value is not shown on the module display screen. ***Engine:*** The value is shown under Engine page on the module display screen.

Message ID

Parameter	Description
Description	Provide a description for the CAN instrumentation. This description is shown in the Scada and module display screen.
Bits	The options are: ***29:*** A 29 bit identifier (extended format) allows a total of 229 (= 536+ million) messages. ***11:*** An 11 bit identifier (standard format) allows a total of 211 (= 2048) different messages.
CAN ID	29-bit CAN Message Identifier to receive. *CAN ID* must match exactly the full ID of the message to be received in the standard J1939 29-bit (Extended) format.

Timeout

Parameter	Description
Enable	☐ = Timeout is disabled ☑ = Timeout is enabled
(ms)	It indicates how often the messages are expected to be seen on the CAN bus in milliseconds. If no new instrumentation is seen beyond the timeout period, the calculated instrumentation value changes to a 'bad data' sentinel value.

Data Structure

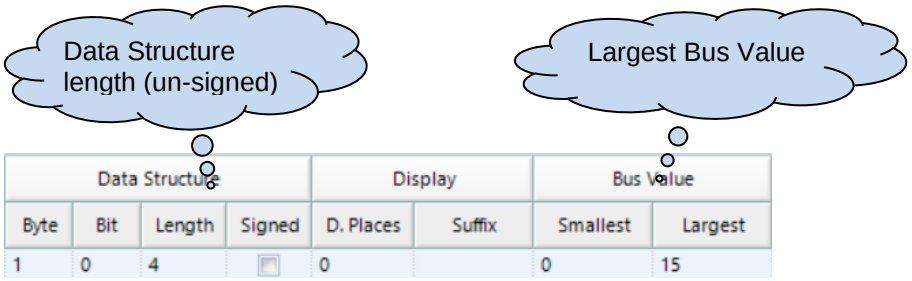
Parameter	Description
Byte	Set the start position Byte
Bit	Set the start position Bit
Length (Bits)	Data length 1-32 bits
Signed	☐ = Unsigned value ☑ = Signed value

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)

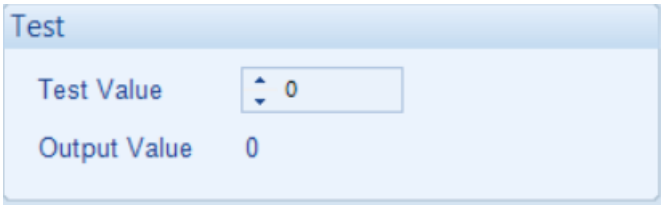
Bus Value

Parameter	Description
Smallest	This is the smallest value (up to the Largest Bus Value setting) which can be sent over the CAN bus.
Largest	This is the largest value (up to the maximum *Data Structure-Length* setting) which can be sent over the CAN bus. For Example: If the un-signed *Data Structure- Length* value is 4 then the *Largest Bus Value* will be 15. 

Mapped Value

Parameter	Description
Mapped Value Smallest Mapped Value Largest	Details how the Displayed Values relate to the received *Bus Values.* For example: *Bus Value* 10 to 100 *Mapped Value* 20 to 200. This configures the device to display *20* when the value 1*0* is received and to display *200* when the value *100* is received. Values in between are linearly interpolated.

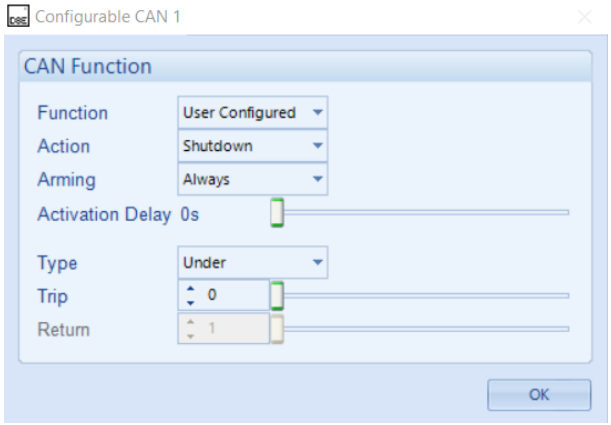
Test



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 module's screen, or in the Scada.

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*.



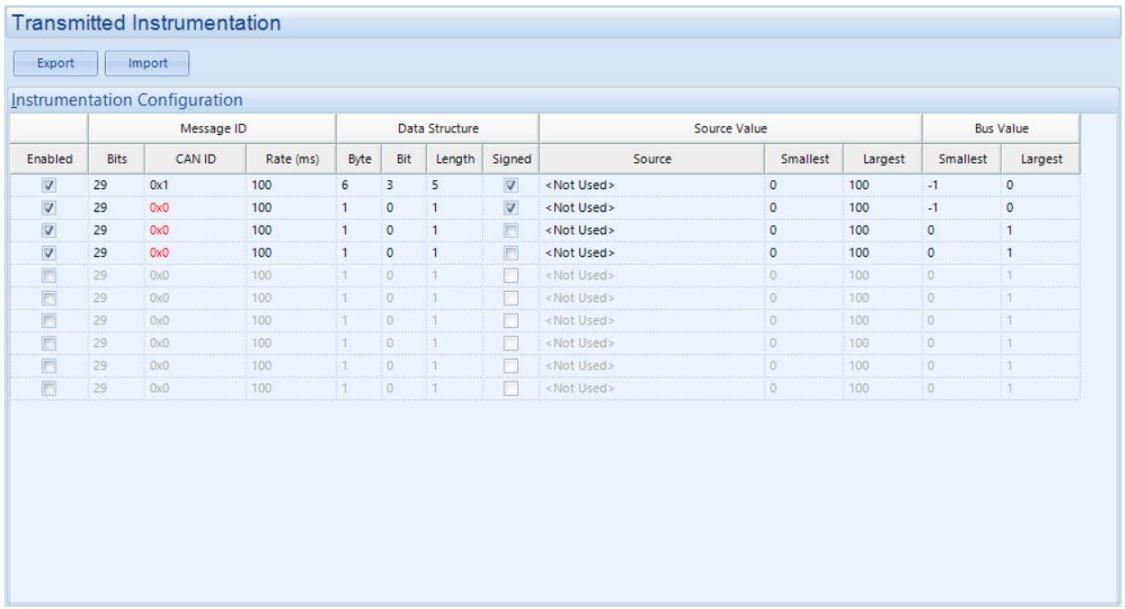
Parameter	Description
Function	Select a digital input function to activate according to the CAN value received. **NOTE: Refer to the section entitled Digital Inputs for the list of descriptions of the functions list elsewhere in this document.** **NOTE: *Crank Disconnect* function has been added in this list to instruct the module to crank disconnect when the value sent over the CAN line is under or over the configured Trip level.**

Parameter descriptions are continued overleaf…

Parameter	Description
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*.

3.12.2 TRANSMITTED INSTRUMENTATION

The module allows transmitting up to 10 instruments over the CANbus on the ECU port by specifying the source address (message ID) of the selected Instrument.



Export/Import

This feature is used to import/export the *Configurable CAN Instrumentation* settings.

Parameter	Description
Export	This allows to export the configuration settings of the CAN Transmitted Instrumentation to a *.cantx file.
Import	This allows to import existing configuration settings of the Legacy CAN Export File (*.xml) or Transmitted (*.cantx) file.

3.12.2.1 INSTRUMENT CONFIGURATION

Message ID

Parameter	Description
Enabled	☐ = The Transmit CAN instrumentation is disabled. ☑ = The Transmit CAN instrumentation is enabled.
Bits	The options are: ***29:*** A 29 bit identifier (extended format) allows a total of 229 (= 536+ million) messages. ***11:*** An 11 bit identifier (standard format) allows a total of 211 (= 2048) different messages.
CAN ID	29-bit CAN Message Identifier to transmit. *CAN ID* must match exactly the full ID of the message to be received in the standard J1939 29-bit (Extended) format.
Rate (ms)	The rate at which the *CAN Instrument* is transmitted over the CANbus.

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

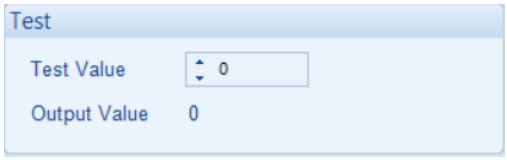
Source Value

Parameter	Description
Source	Select the source of the data to be transmitted over the CANbus. **Alarms** **Control** **Instrumentation** **Status** See the section entitled *Output Sources* for details of all available functions elsewhere in this document.
Smallest Source Value	The smallest instrument value before being sent over the CAN bus.
Largest Source Value	The largest instrument value before being sent over the CAN bus.

Bus Value

Parameter	Description
Smallest	The smallest data sent over the CAN bus before the transformations (decimal places).
Largest	The largest data sent over the CAN bus before the transformations (decimal places).

Test



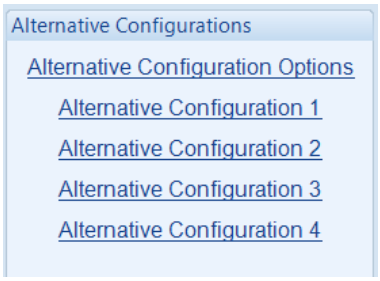
Parameter	Description
Test Raw Value	**NOTE: The Test Raw Value is not saved in the configuration, this is only to check the displayed value.** This is a test case to check the representation of the *Raw Value* when they are complicated. *Test Raw Value* is the value read from the CAN bus before the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

3.13 ALTERNATIVE CONFIGURATIONS

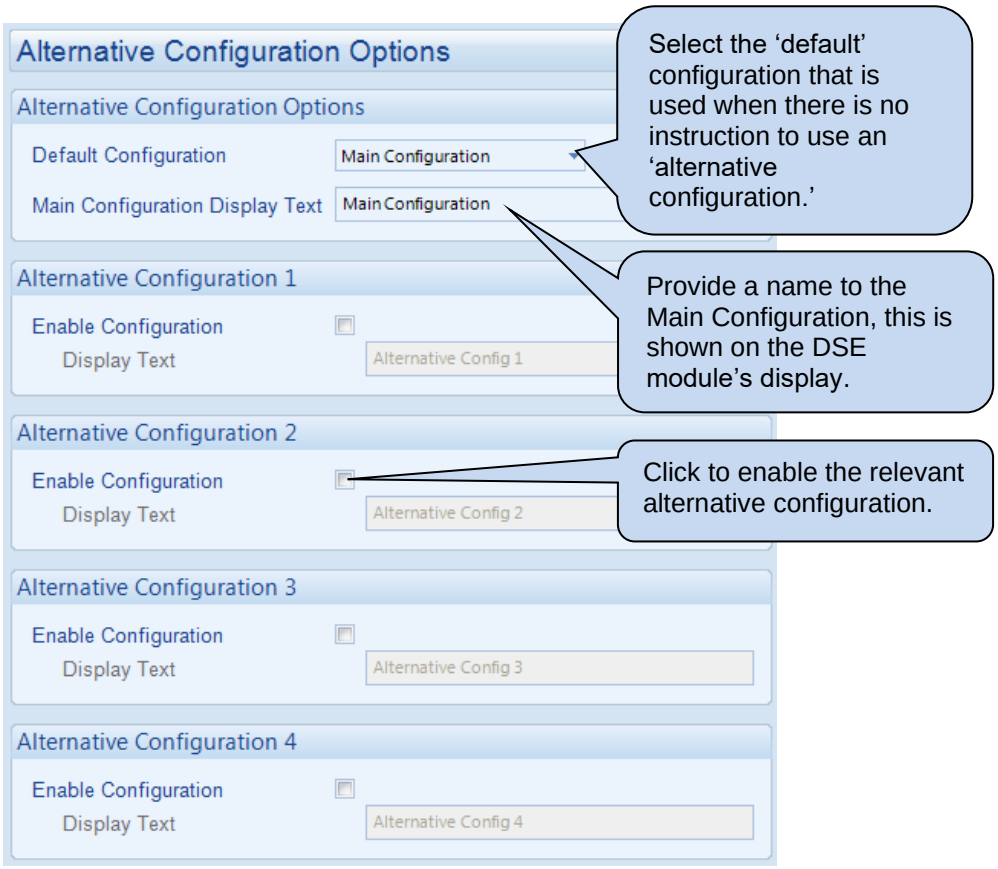
Alternative Configurations are provided to allow the system designer to cater for different speed setting requirements or applications utilising the same engine system.

The Alternative Configurations are selected using either:

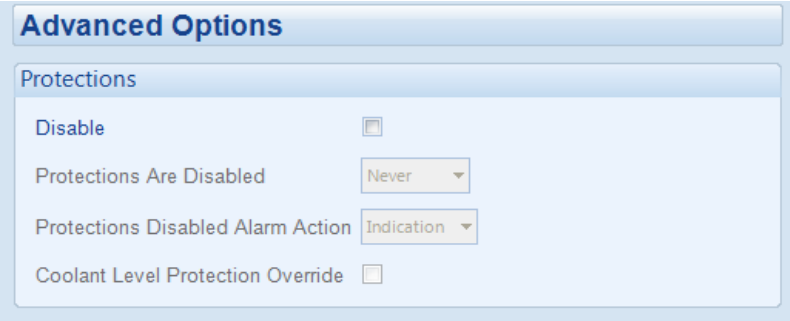
- Configuration Suite Software (Selection for 'Default Configuration')
- Module Front Panel Editor
- Via external signal to the module input configured to "Alternative Configuration 1,2,3,4 Select".



3.14 ALTERNATIVE CONFIGURATION OPTIONS



3.15 ADVANCED OPTIONS



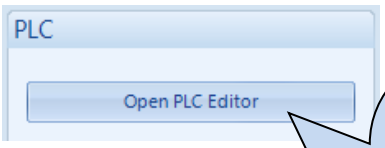
This feature is provided to assist the system designer in meeting specifications for “Warning only,” “Protections Disabled,” “Run to Destruction,” “Battleshort Mode” or other similar wording.

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.

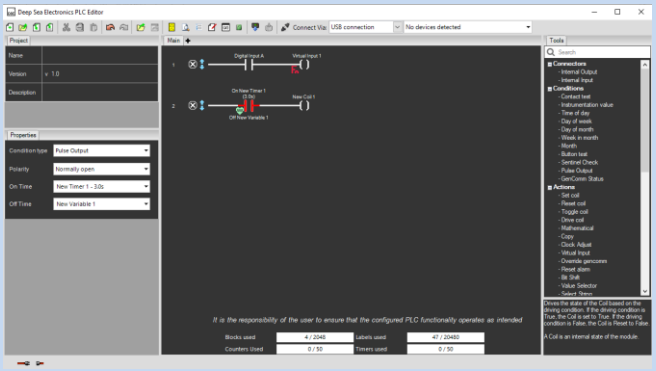
Options	Description
Disable	**NOTE: Writing a configuration to the controller that has “Protections Disabled” configured, results in a warning message appearing on the PC screen for the user to acknowledge before the controller’s configuration is changed. This prevents inadvertent activation of the feature.** ☐ = 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.
Coolant Level Protection Override	☐ = When a CANbus engine is selected, the *Coolant Level Protection* is provided when supported by the ECU (ECM). ☑ = The *Coolant Level Protection* is overridden and does not activate an alarm on the module

3.15.1 PLC

NOTE: For further details and instructions on the *PLC Editor*, refer to DSE Publication: *057-314 Advanced PLC Software Manual* which is found on our website: www.deepseaelectronics.com

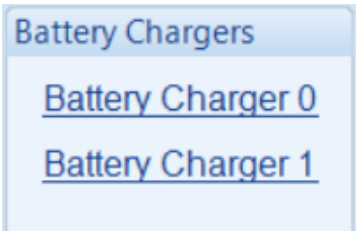


Click to open the *PLC Editor*, then the *PLC Editor* opens as shown below.



3.16 BATTERY CHARGERS

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



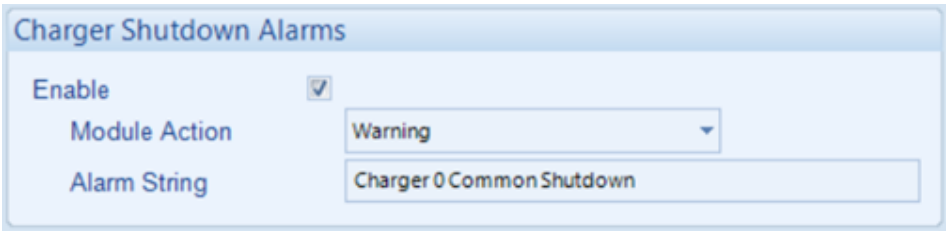
3.16.1 BATTERY CHARGER

The following options are then shown:

Battery Charger

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

Charger Shutdown Alarms



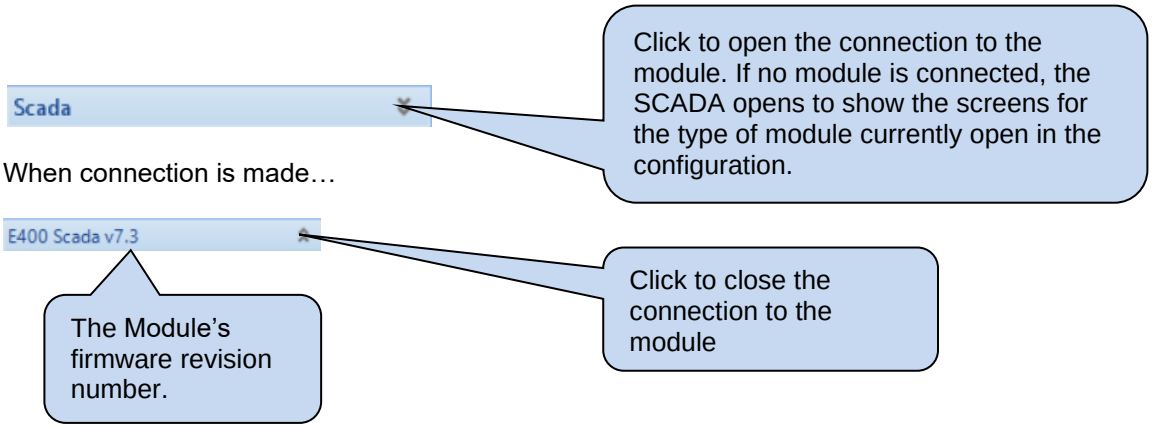
Parameter	Description
Enable	☐ = The DSE module does not display any shutdown alarms from the battery charger. ☑ = The DSE module displays shutdown alarms from the battery charger with the configured action.
Alarm String	The text that is displayed on the module's LCD when the DSE module detects a shutdown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

Charger Warning Alarms

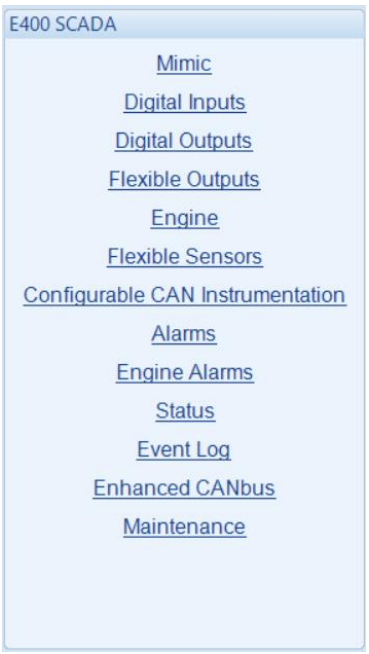
Parameter	Description
Enable	☐ = The DSE module does not display any warning alarms from the battery charger. ☑ = The DSE module displays warnings alarms from the battery charger with the configured action.
Alarm String	The text that is displayed on the module's LCD when the DSE module detects a warning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

4 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.



4.1 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.

Click the mimic buttons to control the module

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

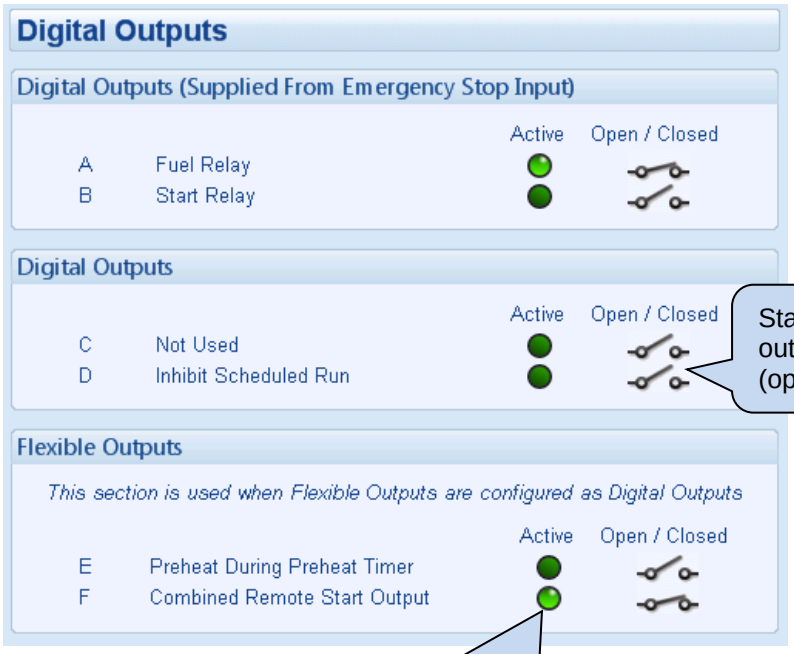
4.2 DIGITAL INPUTS

State of the input (open or closed state)

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

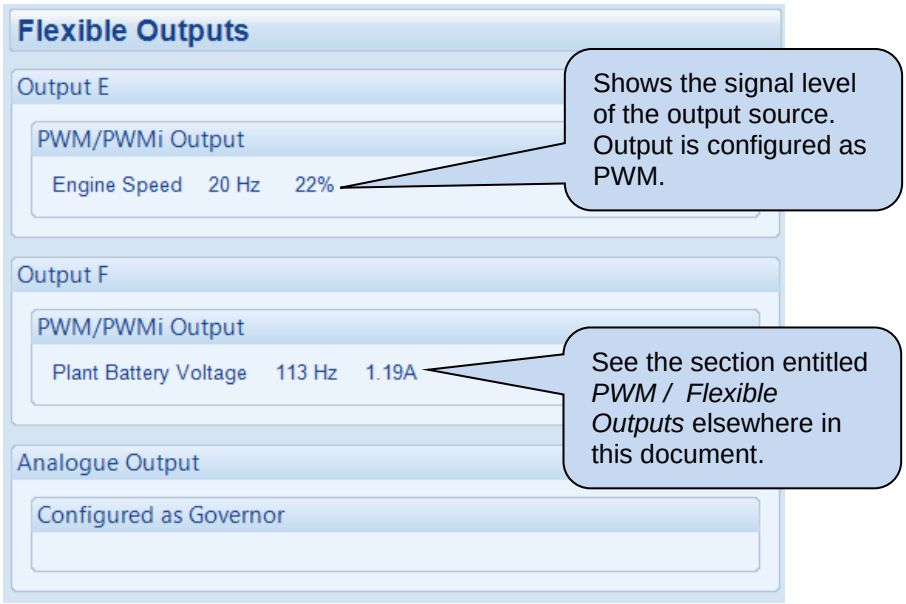
State of the Emergency stop input (open or closed to battery positive). This input MUST be closed to battery positive for *normal* operation.
If the input is open, the set is stopped if it's already running and is not allowed to start.

4.3 DIGITAL OUTPUTS



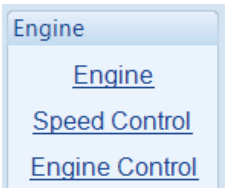
4.4 FLEXIBLE OUTPUTS

Shows the module's flexible outputs.



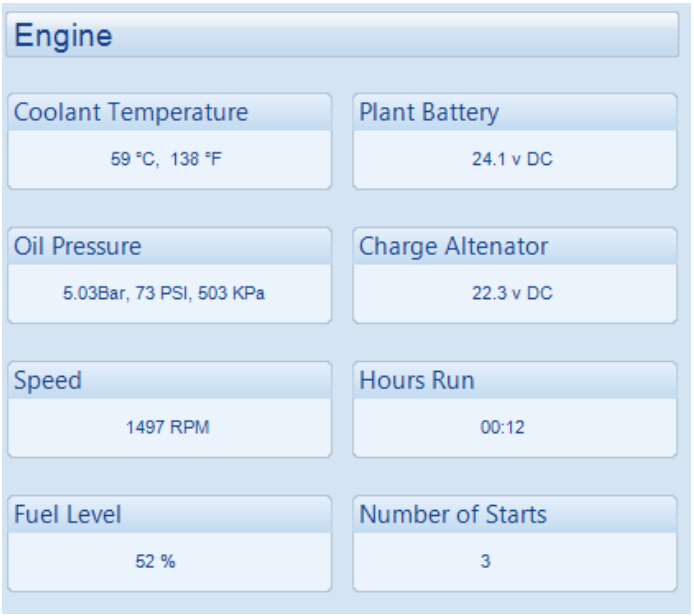
4.5 ENGINE

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



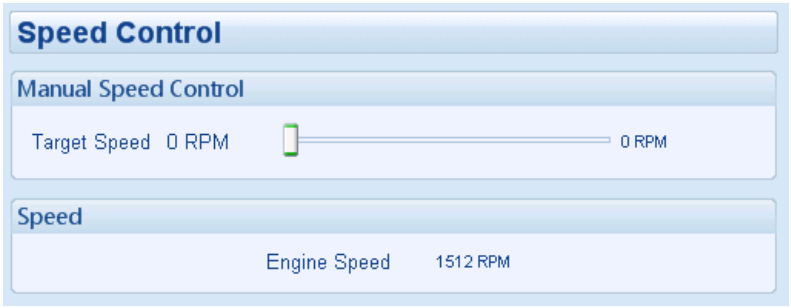
4.5.1 ENGINE

Shows the modules measurements of the engine parameters.



4.5.2 SPEED CONTROL

Allows for manual speed control when the engine is running in *Manual* mode, or the *Auto Speed Control* is set to *Manual Control.*

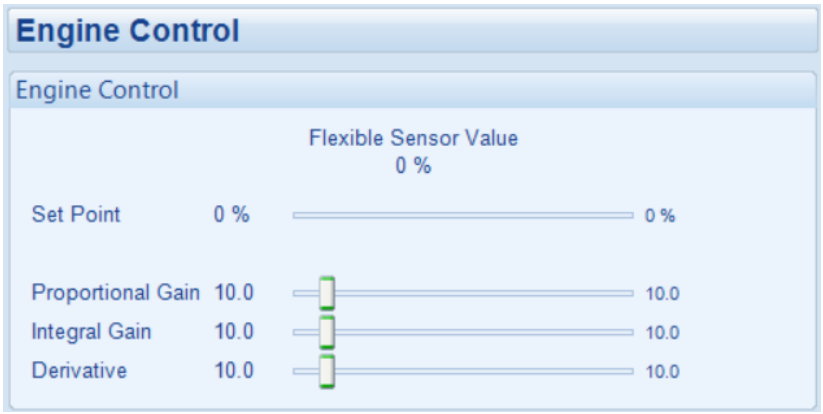


Item	Function
Target Speed	Sets the voltage produced by the DSE module's governor output. This allows for manual speed control, by changing the governor voltage output.
Engine Speed	Shows the actual speed of the engine.

4.5.3 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 in the section entitled *Control in Auto Mode* elsewhere in this document.

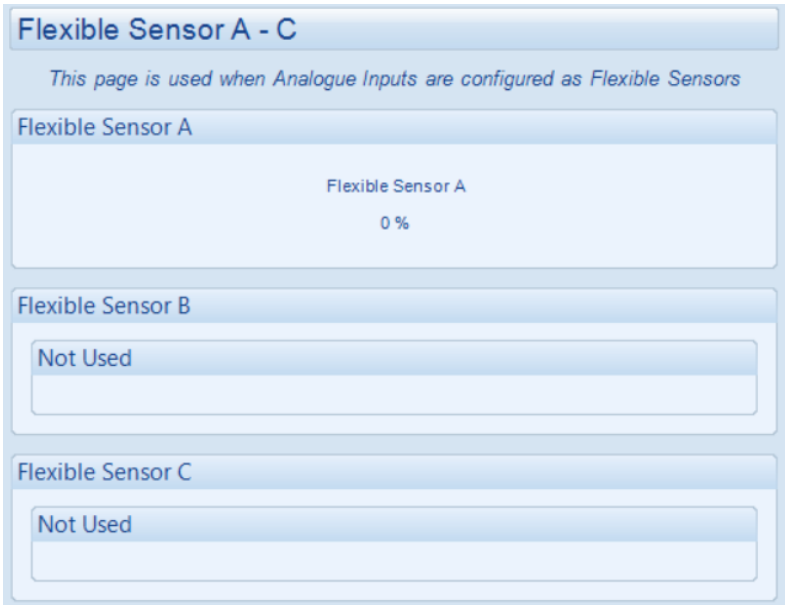
It may be necessary to adjust the PID levels if the engine RPM is unstable or slow to respond. It may also require adjustment to account for load acceptance. Typically, when PID tuning is required it is good practice to start with all levels close to zero before slowly adjusting the gains starting with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

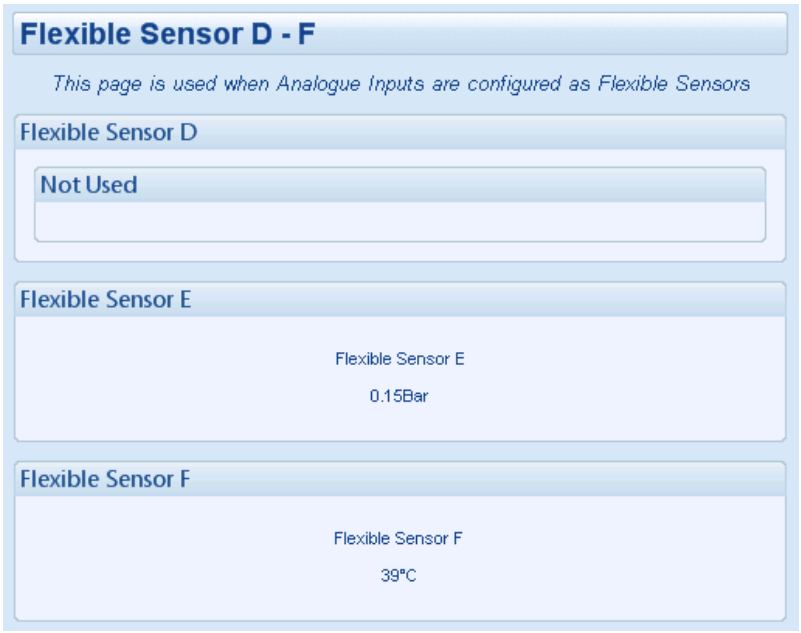


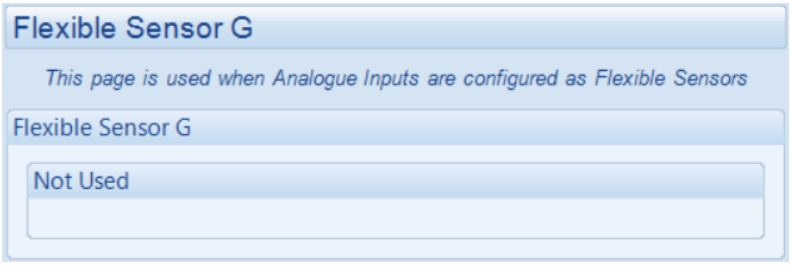
Parameter	Description
Flexible Sensor Value	The live reading from the *Flexible Sensor* configured for the *Maintain Level* curve.
Set Point	The *Set Point* value that the Engine attempts to maintain. Changing this value overrides the *Set Point Default* value configured within the *Maintain Level* section detailed in section entitled *Control in Auto Mode* elsewhere in this document.
Proportional Gain	Allows for adjustment of the *Proportional Gain* should the engine be slow to respond or unstable. Start the set and wait for the engine to reach the *Set Point*. Allow a little time for the RPM to stabilise Gradually increase the *Proportional Gain* slider until the Engine RPM becomes unstable. Very slowly decrease the *Proportional Gain slider*, until the engine RPM stabilises.
Integral Gain	**NOTE: Proceed below only after setting *Proportional Gain* slider.** Allows for adjustment of the *Integral Gain* should the engine become or unstable. Gradually increase the *Integral Gain* slider until the Engine RPM becomes unstable. Very slowly decrease the *Integral slider*, until the engine RPM stabilises.
Derivative Gain	**NOTE: Proceed below only after setting both *Proportional Gain* and *Integral Gain* slider.** Allows for adjustment of the *Derivative Gain* should the engine need fine tuning for stability. Gradually increase the *Derivative* slider until the Engine RPM becomes unstable. Very slowly decrease the *Derivative slider*, until the engine RPM stabilises.

4.6 FLEXIBLE SENSORS

Shows the measurement of the configured Flexible Sensor.





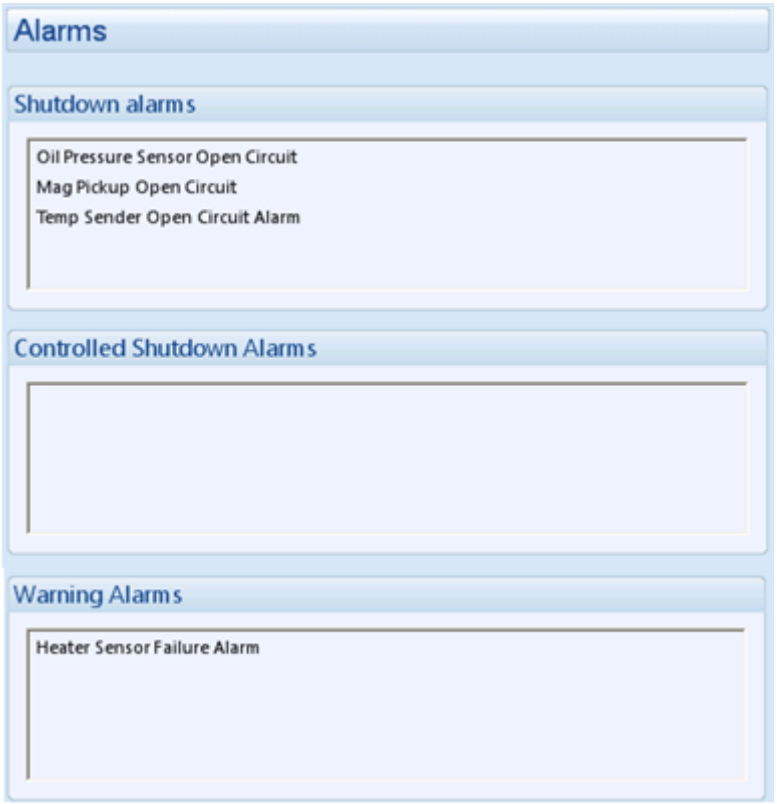


4.7 CONFIGURABLE CAN INSTRUMENTATION

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

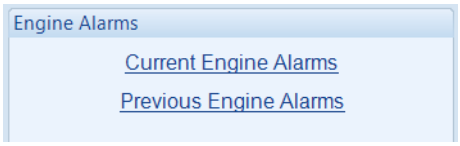
4.8 ALARMS

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



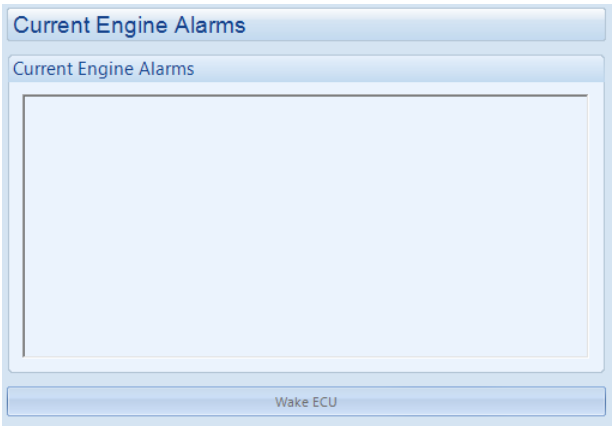
4.9 ENGINE ALARMS

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



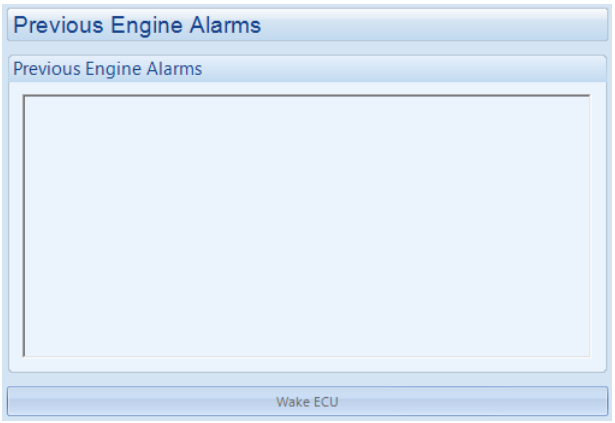
4.9.1 CURRENT ENGINE ALARMS

Shows the current engine alarms.



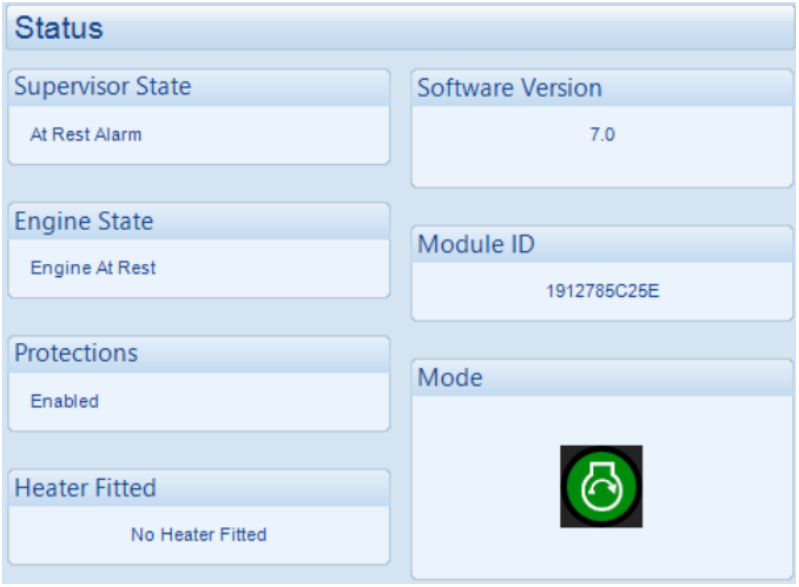
4.9.2 PREVIOUS ENGINE ALARMS

Shows the previous engine alarms.



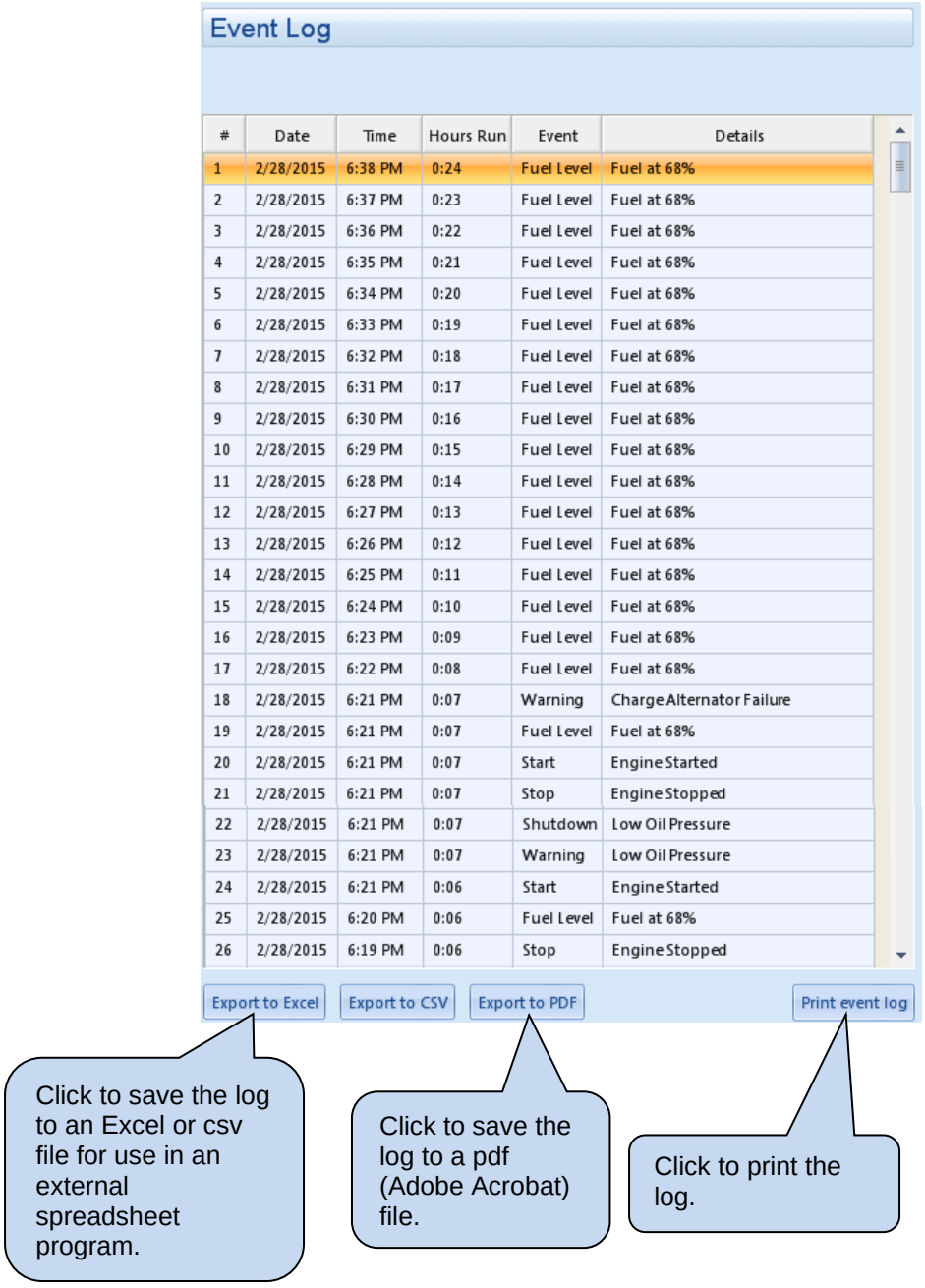
4.10 STATUS

Shows the module's current status.



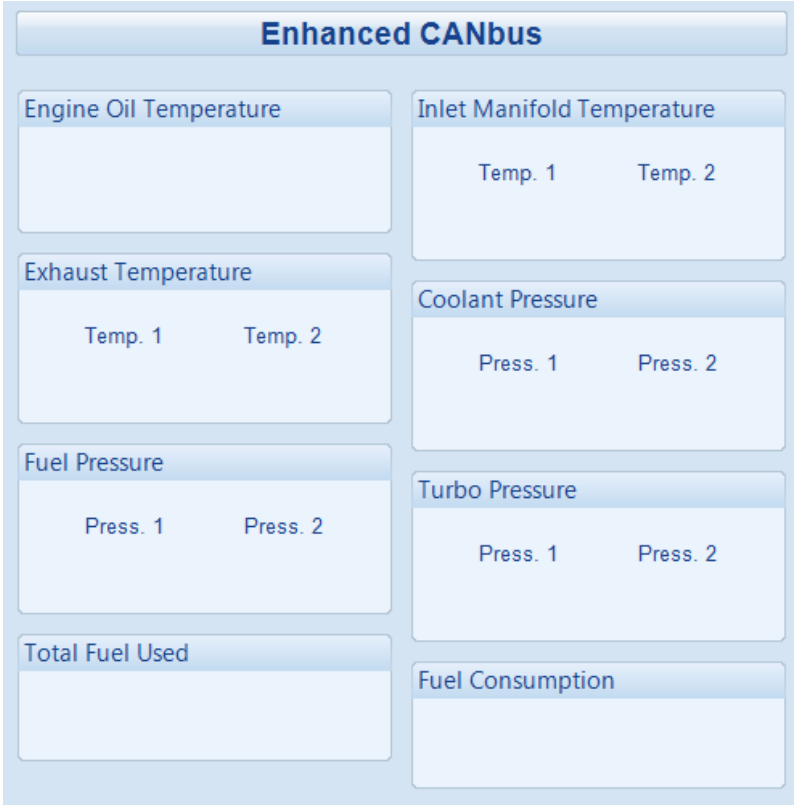
4.11 EVENT LOG

Shows the contents of the module's event log.



4.12 ENHANCED CANBUS

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

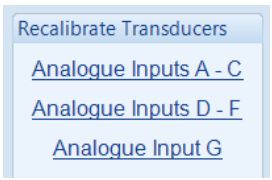


4.13 MAINTENANCE

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

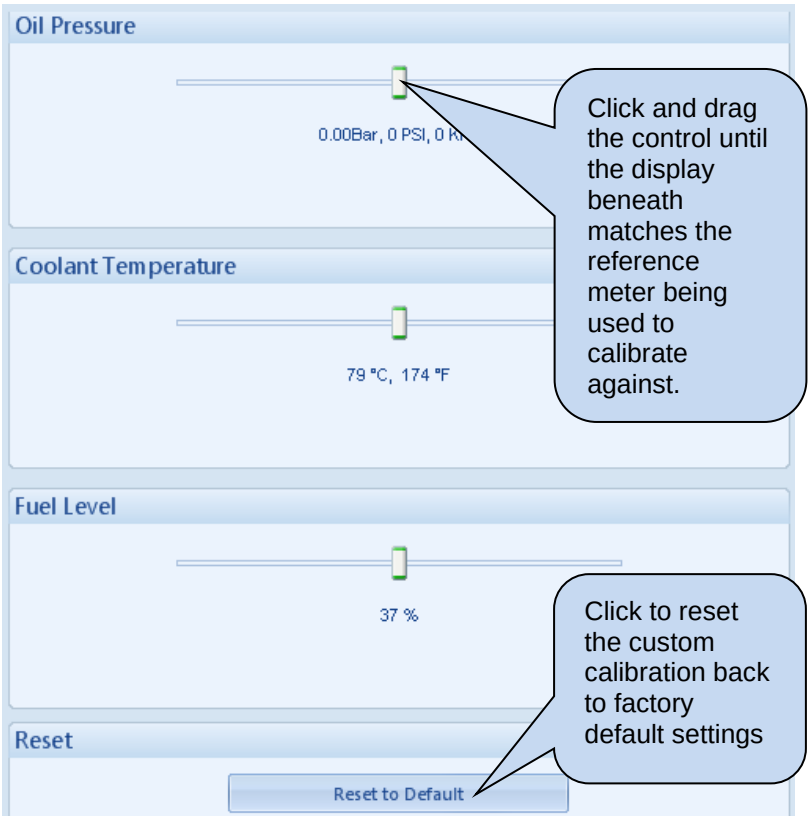
4.13.1 RECALIBRATE TRANSDUCERS

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



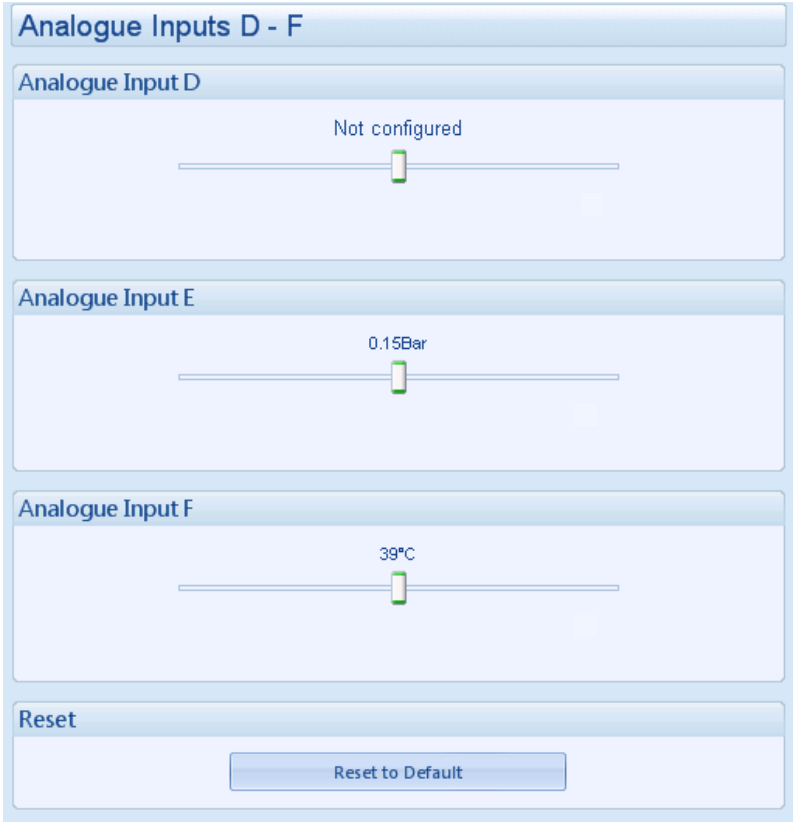
4.13.1.1 ANALOGUE INPUTS A TO C

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

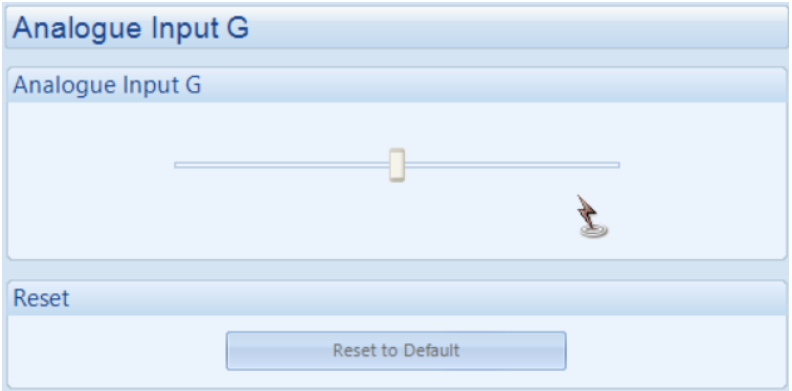


4.13.1.2 ANALOGUE INPUTS D TO F

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

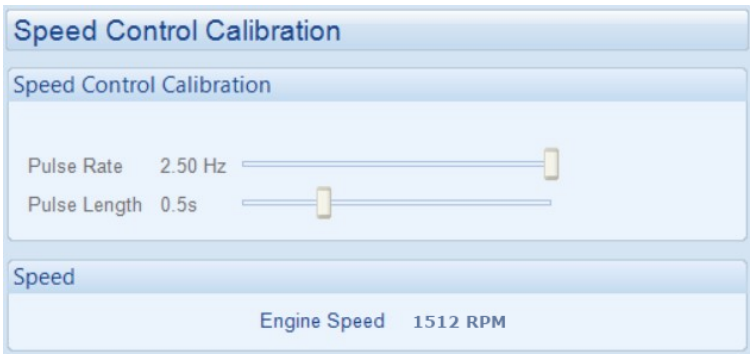


4.13.1.3 ANALOGUE INPUT G



4.13.2 SPEED CONTROL CALIBRATION

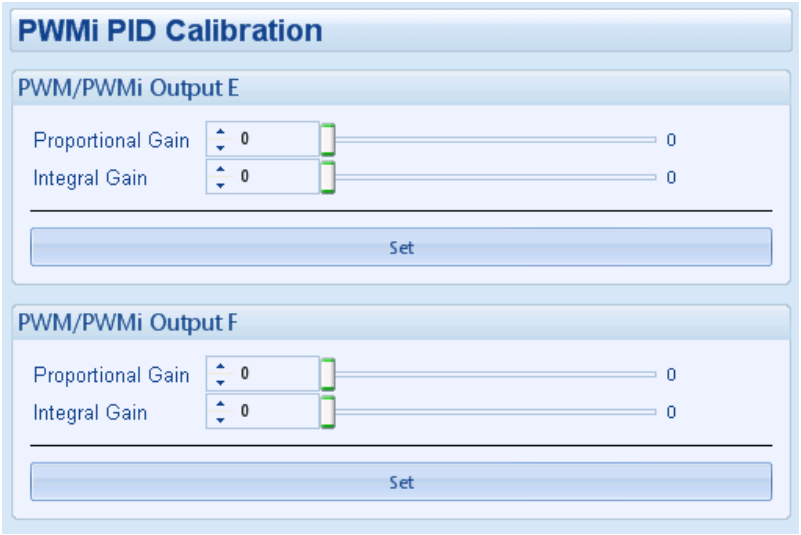
Allows the adjustment of the speed control.



Item	Function
Pulse Rate	(Not applicable when using Internal analogue control system) The number of raise/lower changes per second of the raise / lower relay outputs.
Pulse Length	(Not applicable when using Internal analogue control system) The lengths of raise/lower pulses of the raise / lower relay outputs.

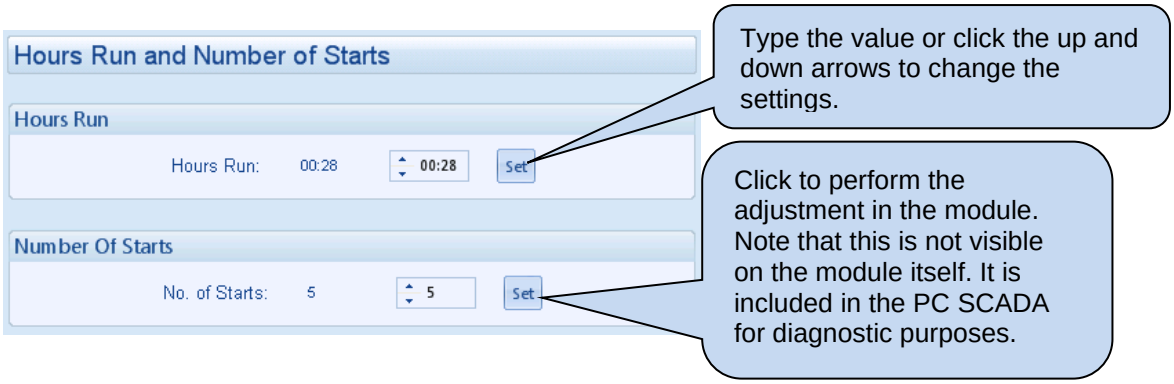
4.13.3 PWMI PID CALIBRATION

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



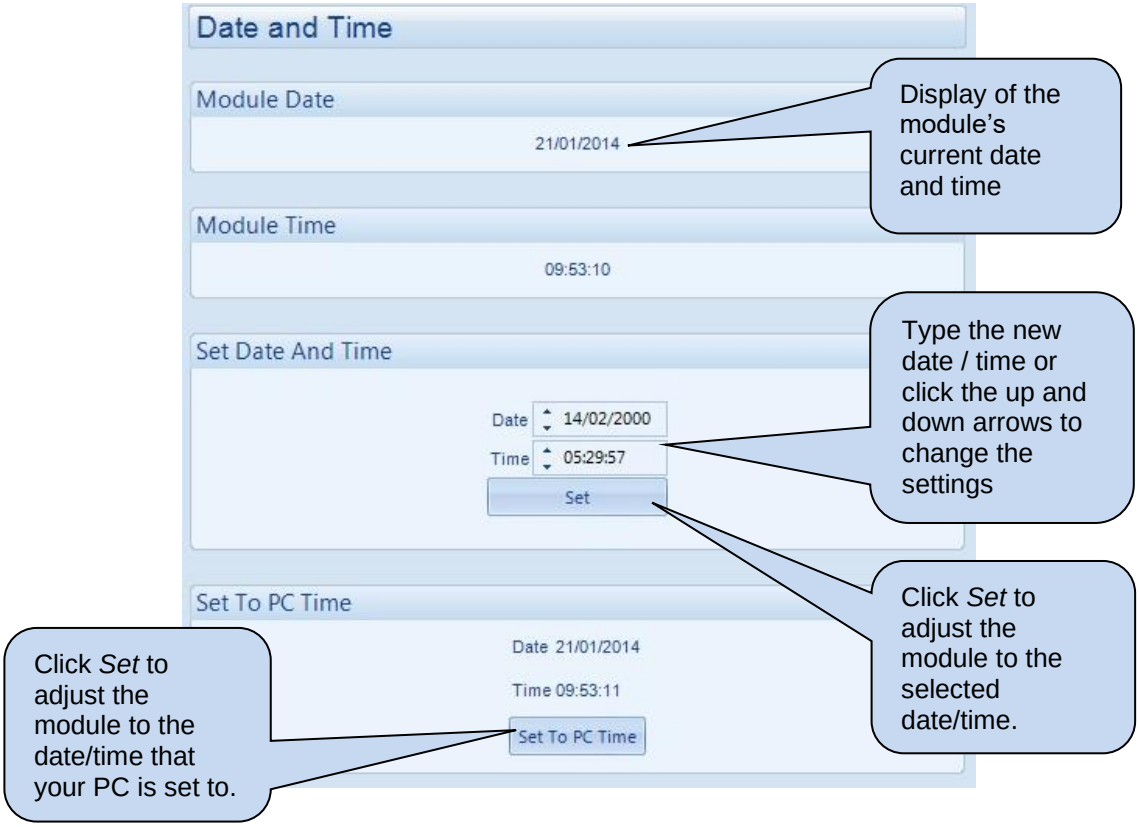
4.13.4 HOURS RUN AND NUMBER OF STARTS

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.



4.13.5 TIME

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

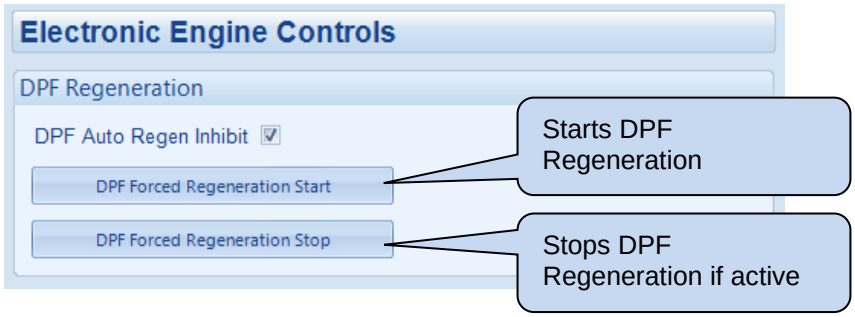


4.13.6 MAINTENANCE ALARM RESET

There are 10 maintenance alarms that can be active in the control module. Each can be reset individually.

4.13.7 ELECTRONIC ENGINE CONTROLS

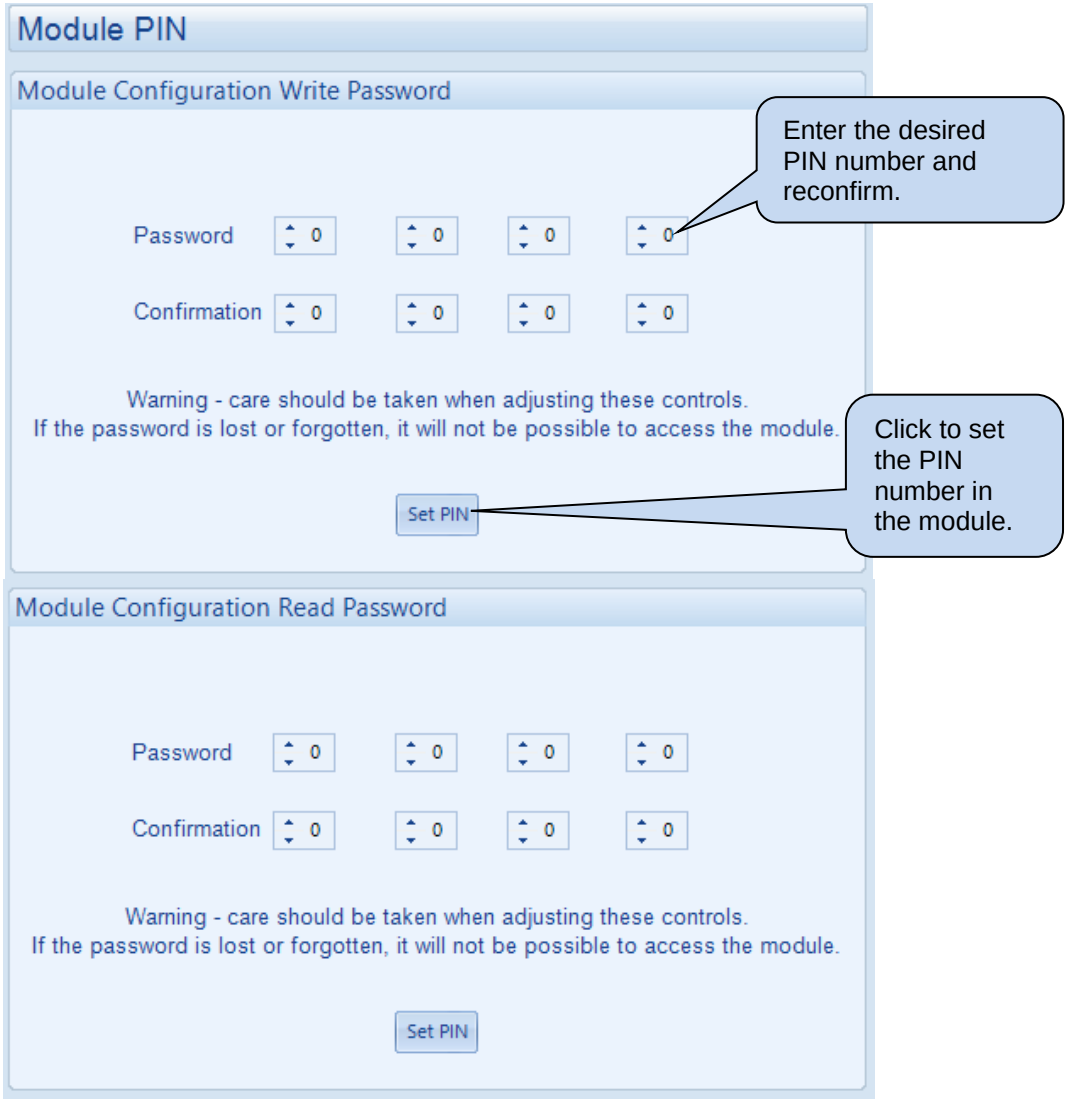
The DPF Forced Regeneration is controlled when the Electronic Engine supports the Non-mission DPF Regeneration.



4.13.8 MODULE PIN

NOTE : If the PIN is lost or forgotten, it is not possible to reset the Module PIN.

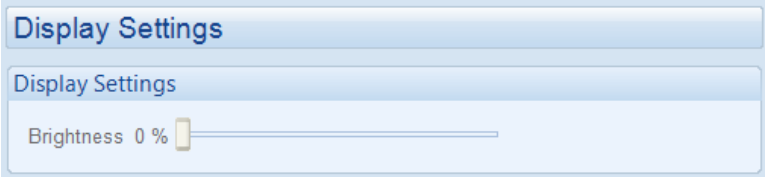
Allows a PIN (Personal Identification Number) to be set in the controller.



Parameter	Description
Module Configuration Write Password	This PIN must be entered to either access the front panel configuration editor or before a configuration file is sent to the controller from the PC software.
Module Configuration Read Password	This PIN must be entered in order to read the configuration from the DSE Module.

4.13.9 DISPLAY SETTINGS

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

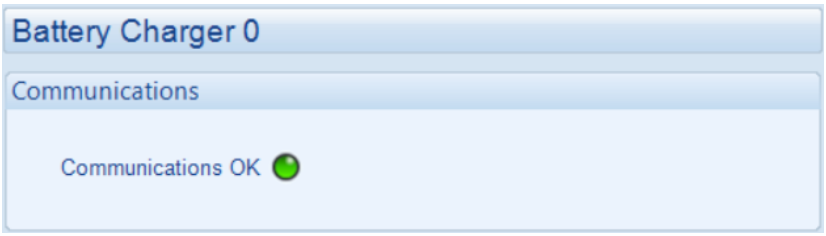


4.14 BATTERY CHARGERS

Shows the module's current battery charger settings.

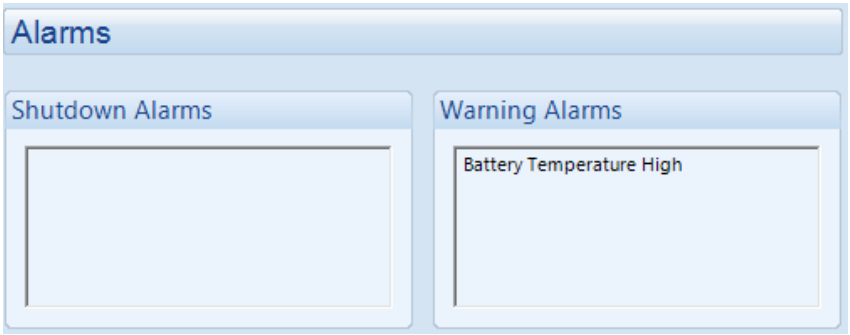
4.14.1 COMMUNICATIONS

The selected section displays the status of the battery's communication.

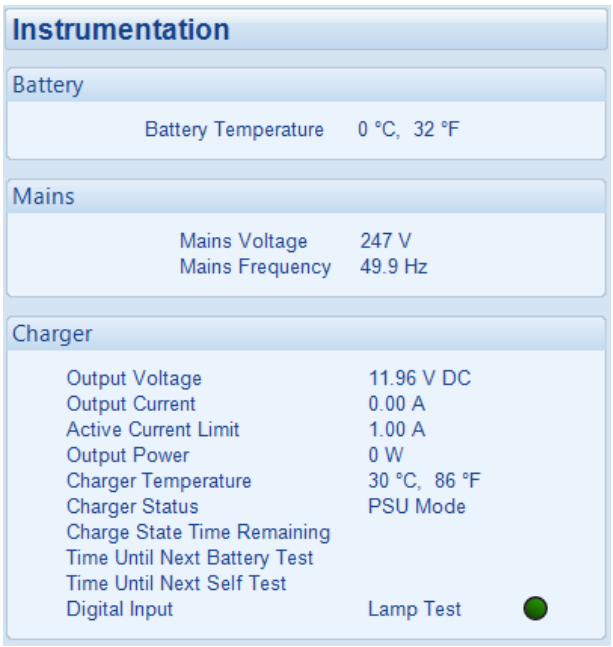


4.14.2 ALARMS

This section displays the list of active alarms.

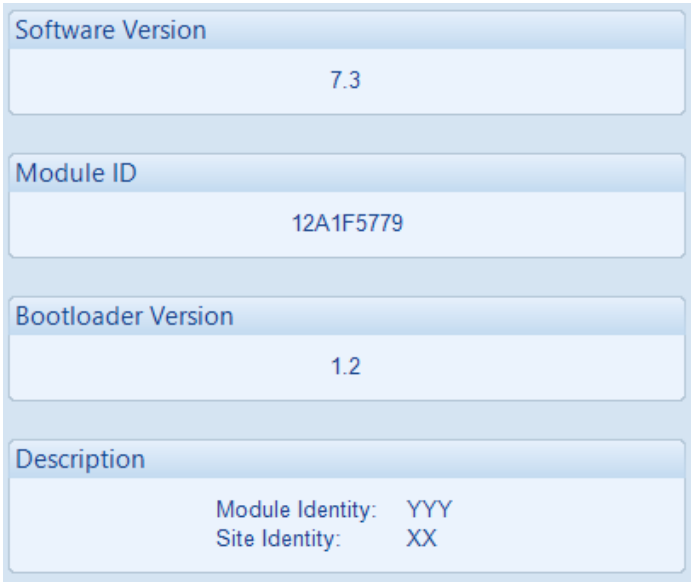


4.14.3 INSTRUMENTATION



4.14.4 MODULE

This section displays the status information about the module.



5 ALARM TYPES

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

Alarm type	Description
Indication	No audible alarm or common warning signal occurs. *Indication* alarms are only used to illuminate indicators or to activate outputs.
Warning	Audible alarm and common alarm signal 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.

6 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	ECU Wake Up Delay	Start Delay	Preheat	Cranking	Safety Delay	Smoke Limiting	Smoke Limiting Off	Warming Up	On Load	Cooling	Cooling in Idle
Always												
Wait for ECU												
From Starting												
From Safety On												
Engine Protection												
Overspeed Overshoot												
From Loading												

6.1 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.

6.2 WAIT FOR ECU

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

6.3 FROM STARTING

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

6.4 FROM SAFETY ON

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

6.5 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

6.6 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

6.7 FROM LOADING

This alarm is active after the generator runs, and the voltage and frequency are above their Loading levels, until the generator stops.

This Page Intentionally Blank

This Page Intentionally Blank