DEEP SEA ELECTRONICS

DSEE100

Operator Manual

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Amendments Since Last Publication

Amd. No.	Comments
1	Initial Release
2	Amendment to scheduler example Addition of MPU input specifications
3	Addition of missing input sources Add description of MPU

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Section **Page**

1 INTRODUCTION

This document details the installation and operation requirements of the DSEE100 module and is part of the DSEControl® range of products.

The manual forms part of the product and should be kept for the entire life of the product. If the product is passed or supplied to another party, ensure that this document is passed to them for reference purposes.
This is not a *controlled document.* DSE do not automatically inform on updates. Any future updates of this document are included on the DSE website at www.deepseaelectronics.com

The DSEExxx series is designed to provide differing levels of functionality across a common platform. This allows the engine OEM greater flexibility in the choice of controller to use for a specific application.

The DSEE100 module has been designed to allow the operator to start and stop the engine, manually or automatically.

The user also has the facility to view the system operating parameters via the text LCD display.

The DSEE100 module monitors the engine, indicating the operational status and fault conditions, automatically shutting down the engine and giving a true first up fault condition of an engine failure by the LCD display.

The powerful ARM microprocessor contained within the module allows for incorporation of a range of complex features:

- *Text based LCD display*
- *USB Communications*
- *Engine parameter monitoring.*
- *Fully configurable inputs for use as alarms or a range of different functions.*

The DSE Configuration Suite PC Software allows alteration of selected operational sequences, timers, alarms and operational sequences. Additionally, the module's integral front panel configuration editor allows adjustment of this information.

Access to critical operational sequences and timers for use by qualified engineers, can be protected by a security code. Module access can also be protected by PIN code. Selected parameters can be changed from the module's front panel.

The module is housed in a robust plastic case suitable for panel mounting. Connections to the module are via locking plug and sockets.

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
DSEE000, DSEExxx	All modules in the DSEExxx range.
DSEE100	DSEE100 module/controller
SCADA	Supervisory Control And Data Acquisition A system that operates with coded signals over communication channels to provide control and monitoring of remote equipment

1.3 BIBLIOGRAPHY

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

1.3.1 INSTALLATION INSTRUCTIONS

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

DSE Part	Description
053-225	DSEE100 Installation Instructions

1.3.2 MANUALS

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

DSE Part	Description
N/A	Gencomm (MODBUS protocol for DSE controllers)
057-151	DSE Configuration Suite PC Software Installation & Operation Manual
057-267	DSEE100 DSE Configuration Suite PC Software Manual

1.3.3 TRAINING GUIDES

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

DSE Part	Description
056-006	Introduction to Comms
056-029	Smoke Limiting
056-030	Module PIN Codes
056-069	Firmware Update
056-075	Adding Language Files
056-081	Screen Heaters

2 SPECIFICATION

2.1 OPERATING TEMPERATURE

Module	Specification
DSEE100	-30 ºC +70 ºC (-22 ºF +158 ºF)

2.2 REQUIREMENTS FOR UL

Description	Specification
Screw Terminal Tightening Torque	4.5 lb-in (0.5 Nm)
Conductors	Terminals suitable for connection of conductor size 12 AWG to 26 AWG (0.5 mm² to 2.0 mm²). Conductor protection must be provided in accordance with NFPA 70, Article 240 Low voltage circuits (35 V or less) must be supplied from the engine starting battery or an isolated secondary circuit. The communication, sensor, and/or battery derived circuit conductors shall be separated and secured to maintain at least ¼" (6 mm) separation from the generator and mains connected circuit conductors unless all conductors are rated 600 V or greater.
Communication Circuits	Must be connected to communication circuits of UL Listed equipment
Output Pilot Duty	0.5 A
Mounting	Suitable for use in type 1 Enclosure Type rating with surrounding air temperature -22 ºF to +158 ºF (-30 ºC to +70 ºC)
Operating Temperature	-22 ºF to +158 ºF (-30 ºC to +70 ºC)
Storage Temperature	-40 ºF to +176 ºF (-40 ºC to +80 ºC)

2.3 TERMINAL SPECIFICATION

Description	Specification	
Connection Type	Two part connector. Male part fitted to module Female part supplied in module packing case - Screw terminal, rising clamp, no internal spring.	 Example showing cable entry and screw terminals of a 10 way connector
Minimum Cable Size	0.5 mm² (AWG 24)	
Maximum Cable Size	2.5 mm² (AWG 12)	
Tightening Torque	0.5 Nm (4.5 lb-in)	
Wire Strip Length	7 mm (9/32”)	

2.4 POWER SUPPLY REQUIREMENTS

Description	Specification
Minimum Supply Voltage	8 V continuous, 5 V for up to 1 minute.
Cranking Dropouts	Able to survive 0 V for 100 ms providing the supply was greater than 5 V for 2 seconds before the dropout and recovers to 5 V afterwards.
Maximum Supply Voltage	35 V continuous (60 V protection)
Reverse Polarity Protection	-35 V continuous
Maximum Operating Current	96 mA at 12 V 85 mA at 24 V
Maximum Standby Current	51 mA at 12 V 47 mA at 24 V
Maximum Current When In Sleep Mode	35 mA at 12 V 32 mA at 24 V
Maximum Current When In Deep Sleep Mode	Less than 10 µA at 12 V Less than 10 µA at 24 V
Typical Power	3.8 W to 4.1 W

2.4.1 MODULE SUPPLY INSTRUMENTATION DISPLAY

Description	Specification
Range	0 V to 70 V DC (Maximum continuous operating voltage of 35 V DC)
Resolution	0.1 V
Accuracy	1 % full scale (±0.35 V)

2.5 INPUTS

2.5.1 DIGITAL INPUTS

Description	Specification
Number	4 configurable digital inputs (7 when *Analogue Inputs* are configured as digital inputs)
Arrangement	Contact between terminal and ground
Low Level Threshold	3.2 V minimum
High Level Threshold	8.1 V maximum
Maximum Input Voltage	+60 V DC with respect to module DC supply negative
Minimum Input Voltage	-24 V DC with respect to module DC supply negative
Contact Wetting Current	6 mA typical
Open Circuit Voltage	12 V typical

2.5.2 ANALOGUE INPUTS

2.5.2.1 ANALOGUE INPUT A

Description	Specification
Input Type	Oil Pressure Sensor
Measurement Type	Resistance measurement by measuring voltage across sensor with a fixed current applied
Arrangement	Differential resistance measurement input
Measurement Current	11 mA ±10%
Full Scale	240 Ω
Over Range / Fail	270 Ω
Resolution	0.1 bar (1-2 PSI)
Accuracy	±2 % of full scale resistance (±4.8 Ω) excluding transducer error
Max Common Mode Voltage	±2 V
Display Range	0 bar to 17.2 bar (0 PSI to 250 PSI) subject to limits of the sensor and sensor configuration

2.5.2.2 ANALOGUE INPUT B

Description	Specification
Input Type	Coolant Temperature Sensor
Measurement Type	Resistance measurement by measuring voltage across sensor with a fixed current applied
Arrangement	Differential resistance measurement input
Measurement Current	11 mA ±10%
Full Scale	480 Ω
Over Range / Fail	540 Ω
Resolution	1°C (2°F)
Accuracy	±2% of full scale resistance (±9.6 Ω) excluding transducer error
Max Common Mode Voltage	±2 V
Display Range	0 °C to 250 °C (32 °F to 482 °F) subject to limits of the sensor and sensor configuration

2.5.2.3 ANALOGUE INPUT C

Description	Specification
Input Type	Fuel Level Sensor or Flexible Sensor
Flexible Input Selection	Pressure Sensor, Percentage Sensor or Temperature Sensor
Measurement Type	Resistance measurement by measuring voltage across sensor with a fixed current applied
Arrangement	Differential resistance measurement input
Measurement Current	15 mA ±10 %
Full Scale	480 Ω
Over Range / Fail	600 Ω
Resolution	±1 % of full scale
Accuracy	±2 % of full scale resistance (±9.6 Ω) excluding sensor error
Max Common Mode Voltage	±2 V
Display Range	0 % to 250 %, 0 °C to 250 °C (32 °F to 482 °F) or 0 bar to 17.2 bar (0 PSI to 250 PSI) subject to limits of the sensor and sensor configuration

2.5.3 CHARGE FAIL INPUT

The charge fail input is actually a combined input and output. Whenever the engine is required to run, the terminal provides excitation current to the charge alternator field winding.

When the charge alternator is correctly charging the battery, the voltage of the terminal is close to the plant battery supply voltage. In a failed charge situation, the voltage of this terminal is pulled down to a low voltage. It is this drop in voltage that triggers the *Charge Failure* alarm. The level at which this operates and whether this triggers a warning or shutdown alarm is configurable using the DSE Configuration Suite Software.

Description	Specification
Minimum Voltage	0 V
Maximum Voltage	35 V
Resolution	0.2 V
Accuracy	±1 % of full scale
Excitation	Active circuit constant power output
Output Power	2.5 W nominal at 12 V and 24 V
Current At 12V	210 mA
Current At 24V	105 mA

2.5.4 MAGNETIC PICK-UP

NOTE: DSE supply a suitable magnetic pickup device, available in two body thread lengths:
DSE Part number 020-012 - Magnetic Pickup probe 5/8 UNF 2 ½" thread length
DSE Part number 020-013 - Magnetic Pickup probe 5/8 UNF 4" thread length

Magnetic Pickup devices can often be 'shared' between two or more devices. For example, one device can often supply the signal to both the DSE module and the engine governor. The possibility of this depends upon the amount of current that the magnetic pickup can supply.

Description	Specification
Type	Differential input
Minimum Voltage	0.5 V RMS
Maximum Voltage	70 V RMS
Max Common Mode Voltage	±2 V peak
Minimum Frequency	5 Hz
Maximum Frequency	10,000 Hz
Resolution	6.25 rpm
Accuracy	±25 rpm
Minimum Flywheel Teeth	10
Maximum Flywheel Teeth	500

2.6 OUTPUTS

2.6.1 DC OUTPUTS A & B (FUEL & START)

Description	Specification
Type	Normally used as Fuel & Start outputs. Fully configurable for other purposes if the module is configured to control an electronic engine, supplied from DC supply terminal 2.
Rating	10 A resistive for 10 seconds, 5 A resistance continuous at module supply.

2.6.2 DC OUTPUTS C, D, E & F

Description	Specification
Type	Fully configurable, supplied from DC supply terminal 2.
Rating	2 A resistive at module supply.

2.7 COMMUNICATION PORTS

Description	Specification
USB Slave Port	Type B USB 2.0 For connection to PC running DSE Configuration Suite Max distance 6 m (20 feet)

2.8 COMMUNICATION PORT USAGE

2.8.1 USB SLAVE PORT (PC CONFIGURATION)

NOTE: DSE stock 2 m (6.5 feet) USB type A to type B cable, DSE Part Number: 016-125. Alternatively they are purchased from any PC or IT store.

NOTE: The DC supply must be connected to the module for configuration by PC.

NOTE: For further details of module configuration, refer to DSE Publication: *057-267 DSEE100 Configuration Suite PC Software Manual.*

The USB port is provided to give a simple means of connection between a PC and the controller. Using the DSE Configuration Suite Software, the operator is then able to control the module, starting or stopping the engine, selecting operating modes, etc.

Additionally, the various operating parameters (such as coolant temperature, oil pressure, etc.) of the engine are available to be viewed or changed.

To connect a module to a PC by USB, the following items are required:

DSEE100 Controller

DSE Configuration Suite PC Software
(Supplied on configuration suite software CD or available from www.deepseapelectronics.com).

USB cable Type A to Type B.
(This is the same cable as often used between a PC and a USB printer)

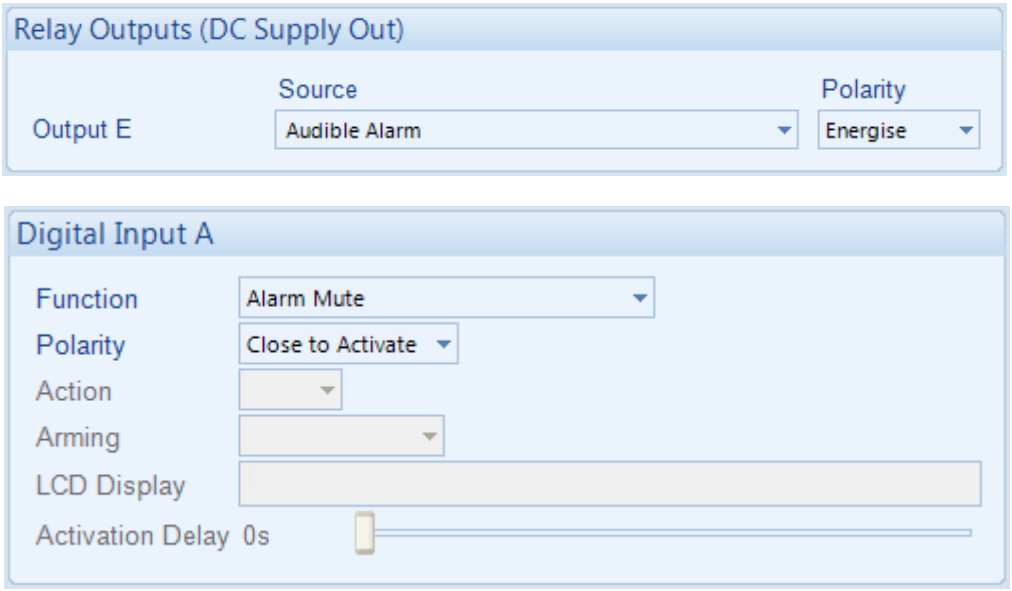
DSE can supply this cable if required:
PC Configuration interface lead (USB type A – type B)
DSE Part No 016-125

2.9 ADDING AN EXTERNAL SOUNDER

Should an external alarm or indicator be required, this can be achieved by using the DSE Configuration Suite PC software to configure an auxiliary output for *Audible Alarm,* and by configuring an auxiliary input for *Alarm Mute*.

The audible alarm output activates and de-activates at the same time as the module's internal sounder. The *Alarm Mute* input de-activates audible alarm output.

Example of configuration to achieve external sounder with external alarm mute button:



2.10 ACCUMULATED INSTRUMENTATION

NOTE: When an accumulated instrumentation value exceeds the maximum number as listed below, the value is reset and begins counting from zero again.

The number of logged *Engine Hours* and *Number of Starts* can be set/reset using the DSE Configuration Suite PC software. Depending upon module configuration, this may have been PIN number locked by the set supplier.

Description	Specification
Engine Hours Run	Maximum 99999 hrs 59 minutes (Approximately 11yrs 4 months)
Number of Starts	1,000,000 (1 Million)

2.11 DIMENSIONS AND MOUNTING

2.11.1 DIMENSIONS

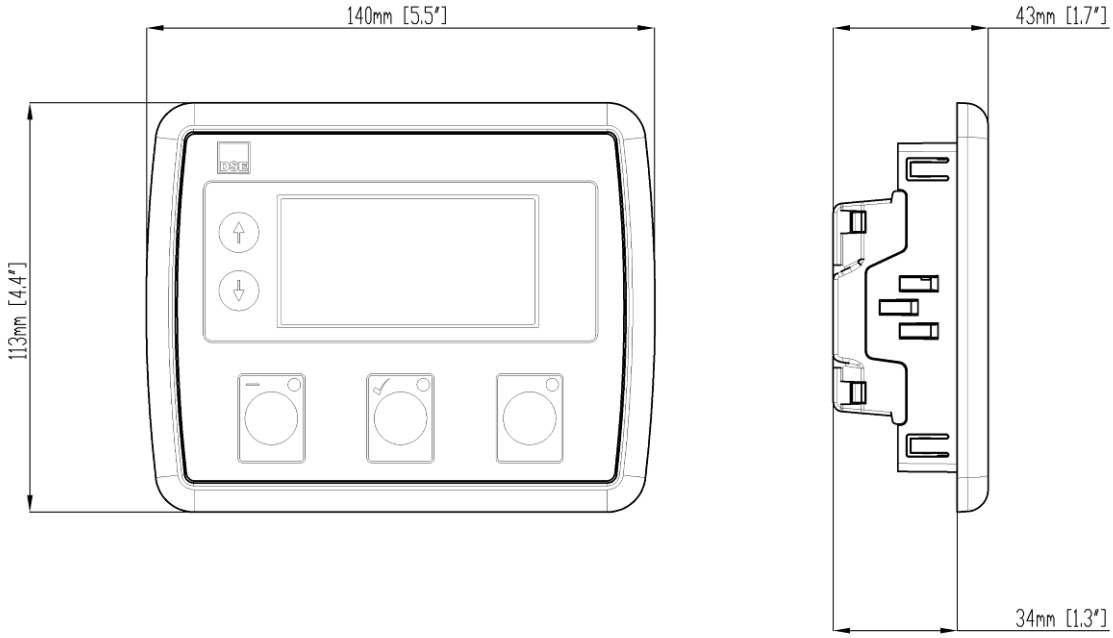
140 mm x 113 mm x 43 mm
(5.5 ” x 4.4 ” x 1.7 ”)

2.11.2 PANEL CUTOUT

118 mm x 92 mm
(4.6 ” x 3.6 ”)

2.11.3 WEIGHT

0.16 kg
(0.35 lb)

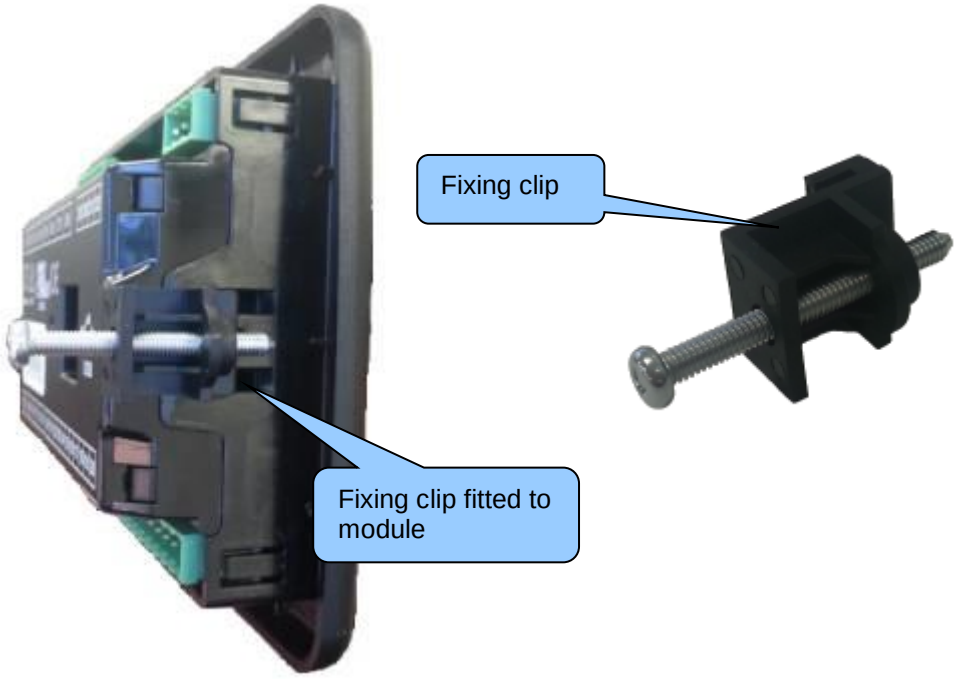


2.11.4 FIXING CLIPS

NOTE: In conditions of excessive vibration, mount the module on suitable anti-vibration mountings.

The module is held into the panel fascia using the supplied fixing clips.

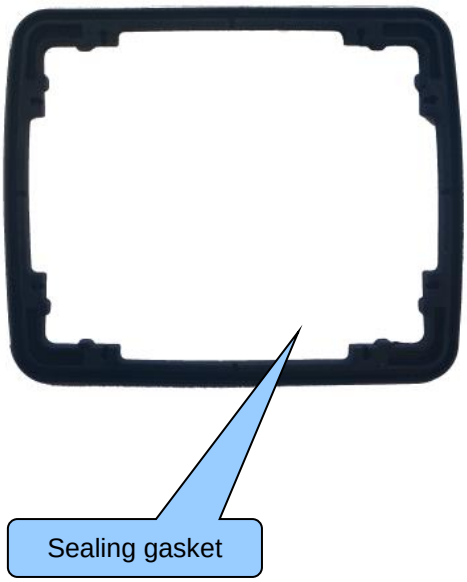
Withdraw the fixing clip screw (turn anticlockwise) until only the pointed end is protruding from the clip.
Insert the three ‘prongs’ of the fixing clip into the slots in the side of the module case.
Pull the fixing clip backwards (towards the back of the module) ensuring all three prongs of the clip are inside their allotted slots.
Turn the fixing clip screws clockwise until they make contact with the panel fascia.
Turn the screw a quarter of a turn to secure the module into the panel fascia. Care must be taken not to over tighten the fixing clip screws.



2.11.5 OPTIONAL SILICON SEALING GASKET

NOTE: For purchasing a silicon gasket from DSE, see the section entitled Maintenance, Spares, Repair and Servicing elsewhere in this document.

The silicon gasket provides improved sealing between module and the panel fascia. The gasket is fitted to the module before installation into the panel fascia. Take care to ensure the gasket is correctly fitted to the module to maintain the integrity of the seal.



2.12 APPLICABLE STANDARDS

Standard	Description
BS 4884-1	This document conforms to BS4884-1 1992 Specification for presentation of essential information.
BS 4884-2	This document conforms to BS4884-2 1993 Guide to content
BS 4884-3	This document conforms to BS4884-3 1993 Guide to presentation
BS EN 60068-2-1 (Minimum temperature)	-30 °C (-22 °F)
BS EN 60068-2-2 (Maximum temperature)	+70 °C (158 °F)
BS EN 60950	Safety of information technology equipment, including electrical business equipment
BS EN 61000-6-2	EMC Generic Immunity Standard (Industrial)
BS EN 61000-6-4	EMC Generic Emission Standard (Industrial)
BS EN 60529 (Degrees of protection provided by enclosures)	IP65 (front of module when installed into the control panel with the optional sealing gasket) IP42 (front of module when installed into the control panel WITHOUT being sealed to the panel)
UL508 NEMA rating (Approximate)	12 (Front of module when installed into the control panel with the optional sealing gasket). 2 (Front of module when installed into the control panel WITHOUT being sealed to the panel)
IEEE C37.2 (Standard Electrical Power System Device Function Numbers and Contact Designations)	Under the scope of IEEE 37.2, function numbers can also be used to represent functions in microprocessor devices and software programs. The controller is device number 11L-8000 (Multifunction device protecting Line (generator) –module). As the module is configurable by the set OEM, the functions covered by the module vary. Depending on module configuration, the device numbers included within the module could be: 2 – Time Delay Starting Or Closing Relay 5 – Stopping Device 6 – Starting Circuit Breaker 11 – Multifunction Device 12 – Overspeed Device 14 – Underspeed Device 27DC – DC Undervoltage Relay 29 – Isolating Contactor Or Switch 30 – Annunciator Relay 31 – Separate Excitation Device
IEEE C37.2 (Standard Electrical Power System Device Function Numbers and Contact Designations)	Continued… 54 – Turning Gear Engaging Device 59DC – DC Overvoltage Relay 62 – Time Delay Stopping Or Opening Relay 63 – Pressure Switch 71 – Level Switch 74 – Alarm Relay 83 – Automatic Selective Control Or Transfer Relay 86 – Lockout Relay

In line with our policy of continual development, Deep Sea Electronics, reserve the right to change specification without notice.

2.12.1 ENCLOSURE CLASSIFICATIONS

2.12.1.1 IP CLASSIFICATIONS

The modules specification under BS EN 60529 Degrees of protection provided by enclosures

IP65 (Front of module when module is installed into the control panel with the optional sealing gasket).
IP42 (front of module when module is installed into the control panel WITHOUT being sealed to the panel)

First Digit Protection against contact and ingress of solid objects	Second Digit Protection against ingress of water
0 No protection	0 No protection
1 Protected against ingress solid objects with a diameter of more than 50 mm. No protection against deliberate access, e.g. with a hand, but large surfaces of the body are prevented from approach.	1 Protection against dripping water falling vertically. No harmful effect must be produced (vertically falling drops).
2 Protected against penetration by solid objects with a diameter of more than 12 mm. Fingers or similar objects prevented from approach.	2 Protection against dripping water falling vertically. There must be no harmful effect when the equipment (enclosure) is tilted at an angle up to 15° from its normal position (drops falling at an angle).
3 Protected against ingress of solid objects with a diameter of more than 2.5 mm. Tools, wires etc. with a thickness of more than 2.5 mm are prevented from approach.	3 Protection against water falling at any angle up to 60° from the vertical. There must be no harmful effect (spray water).
4 Protected against ingress of solid objects with a diameter of more than 1 mm. Tools, wires etc. with a thickness of more than 1 mm are prevented from approach.	4 Protection against water splashed against the equipment (enclosure) from any direction. There must be no harmful effect (splashing water).
5 Protected against harmful dust deposits. Ingress of dust is not totally prevented but the dust must not enter in sufficient quantity to interface with satisfactory operation of the equipment. Complete protection against contact.	5 Protection against water projected from a nozzle against the equipment (enclosure) from any direction. There must be no harmful effect (water jet).
6 Protection against ingress of dust (dust tight). Complete protection against contact.	6 Protection against heavy seas or powerful water jets. Water must not enter the equipment (enclosure) in harmful quantities (splashing over).

2.12.1.2 NEMA CLASSIFICATIONS

NOTE: There is no direct equivalence between IP / NEMA ratings. IP figures shown are approximate only.

12 (Front of module when module is installed into the control panel with the optional sealing gasket).
2 (Front of module when module is installed into the control panel WITHOUT being sealed to the panel)

1 **IP30**	Provides a degree of protection against contact with the enclosure equipment and against a limited amount of falling dirt.
2 **IP31**	Provides a degree of protection against limited amounts of falling water and dirt.
3 **IP64**	Provides a degree of protection against windblown dust, rain and sleet; undamaged by the formation of ice on the enclosure.
3R **IP32**	Provides a degree of protection against rain and sleet:; undamaged by the formation of ice on the enclosure.
4 (X) **IP66**	Provides a degree of protection against splashing water, windblown dust and rain, hose directed water; undamaged by the formation of ice on the enclosure. (Resist corrosion).
12/12K **IP65**	Provides a degree of protection against dust, falling dirt and dripping non corrosive liquids.
13 **IP65**	Provides a degree of protection against dust and spraying of water, oil and non corrosive coolants.

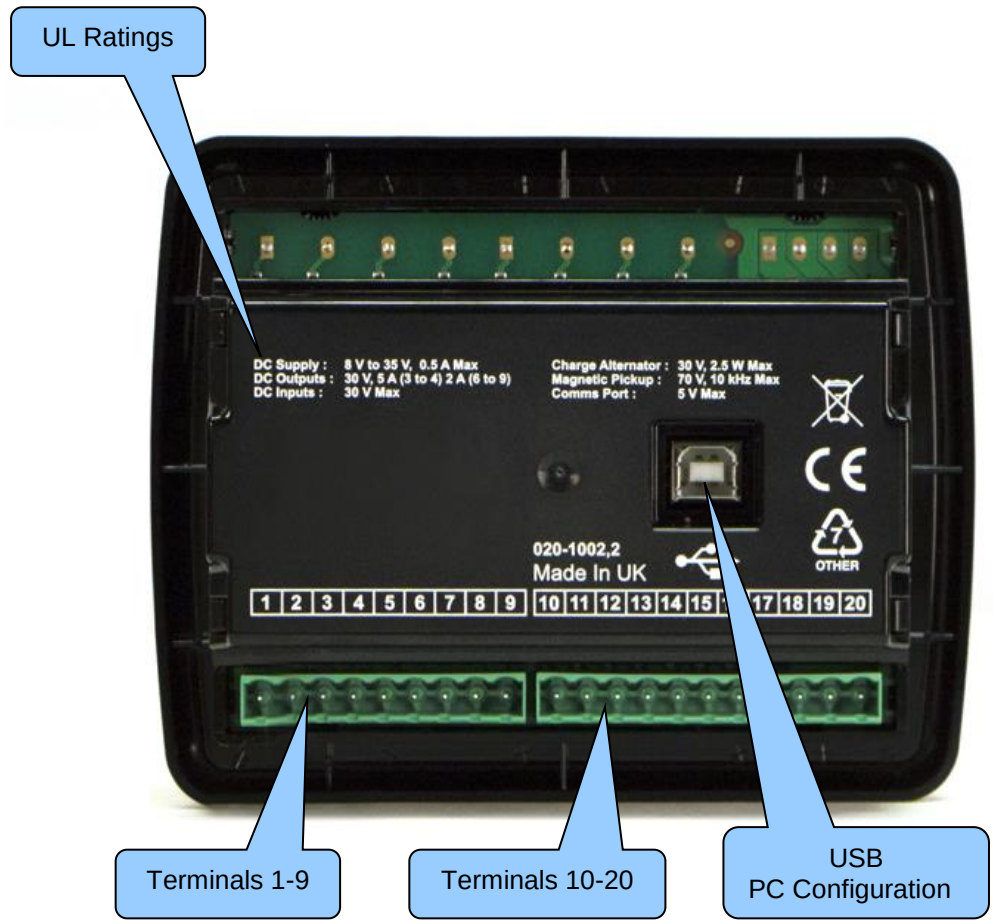
3 INSTALLATION

The module is designed to be mounted on the panel fascia. For dimension and mounting details, see the section entitled *Dimension and Mounting* elsewhere in this document.

3.1 USER CONNECTIONS

NOTE: Availability of some terminals depends upon module version. Full details are given in the section entitled *Terminal Description* elsewhere in this manual.

To aid user connection, icons are used on the rear of the module to help identify terminal functions. An example of this is shown below.



3.2 CONNECTION DESCRIPTIONS

3.2.1 DC SUPPLY, DC OUTPUTS & CHARGE FAIL INPUT

NOTE: For further details of module configuration, refer to DSE Publication: *057-267 DSEE100 Configuration Suite PC Software Manual.*

Pin No	Description	Cable Size	Notes
1	DC Plant Supply Input (Negative)	2.5mm² AWG 13	
2	DC Plant Supply Input (Positive)	2.5 mm² AWG 13	Supplies the module and DC Outputs A, B, C, D, E & F
3	DC Output A (FUEL)	2.5mm² AWG 13	Plant Supply Positive from terminal 2. 10 A for 10 seconds, 5 A resistive continuous Fixed as FUEL relay if electronic engine is not configured.
4	DC Output B (START)	2.5mm² AWG 13	Plant Supply Positive from terminal 2. 10 A for 10 seconds, 5 A resistive continuous Fixed as START relay if electronic engine is not configured.
5	Charge Fail / Excite	2.5mm² AWG 13	Do not connect to ground (battery negative). If charge alternator is not fitted, leave this terminal disconnected.
6	DC Output C	1.0mm² AWG 18	2 Amp rated from module supply.
7	DC Output D	1.0mm² AWG 18	2 Amp rated from module supply.
8	DC Output E	1.0mm² AWG 18	2 Amp rated from module supply.
9	DC Output F	1.0mm² AWG 18	2 Amp rated from module supply.

3.2.2 ANALOGUE SENSOR INPUTS

NOTE: For further details of module configuration, refer to DSE Publication: *057-267 DSEE100 Configuration Suite PC Software Manual.*

NOTE: It is VERY important that terminal 10 (sensor common) is connected to an earth point on the ENGINE BLOCK, not within the control panel, and must be a sound electrical connection to the sensor bodies. This connection MUST NOT be used to provide an earth connection for other terminals or devices. The simplest way to achieve this is to run a SEPARATE earth connection from the system earth star point, to terminal 10 directly, and not use this earth for other connections.

NOTE: If PTFE insulating tape is used on the sensor thread when using earth return sensors, ensure not to insulate the entire thread, as this prevents the sensor body from being earthed via the engine block.

Pin No	Description	Cable Size	Notes
10	Sensor Common Return	0.5 mm² AWG 20	Ground Return Feed For Sensors
11	Analogue Sensor Input A	0.5 mm² AWG 20	Connect To Oil Pressure Sensor
12	Analogue Sensor Input B	0.5mm² AWG 20	Connect To Coolant Temperature Sensor
13	Analogue Sensor Input C	0.5 mm² AWG 20	Connect To Fuel Level Sensor or a Flexible Sensor

3.2.3 CONFIGURABLE DIGITAL INPUTS

NOTE: For further details of module configuration, refer to DSE Publication: *057-267 DSEE100 Configuration Suite PC Software Manual.*

Pin No	Description	Cable Size	Notes
14	Configurable Digital Input A	0.5mm² AWG 20	Switch to negative
15	Configurable Digital Input B	0.5mm² AWG 20	Switch to negative
16	Configurable Digital Input C	0.5mm² AWG 20	Switch to negative
17	Configurable Digital Input D	0.5mm² AWG 20	Switch to negative
18	Magnetic Pickup Positive	0.5mm² AWG 20	Connect to Magnetic Pickup device
19	Magnetic Pickup Negative	0.5mm² AWG 20	Connect to Magnetic Pickup device
20	Magnetic Pickup Screen	N/A	Do not connect the other end to earth!

3.2.4 USB SLAVE (PC CONFIGURATION) CONNECTOR

NOTE: The USB connection cable between the PC and the module must not be extended beyond 5 m (yards). For distances over 5 m, it is possible to use a third party USB extender. Typically, they extend USB up to 50 m. The supply and support of this type of equipment is outside the scope of Deep Sea Electronics LTD.

CAUTION!: Care must be taken not to overload the PCs USB system by connecting more than the recommended number of USB devices to the PC. For further information, consult your PC supplier.

NOTE: For further details of module configuration, refer to DSE Publication: *057-267 DSEE100 Configuration Suite PC Software Manual.*

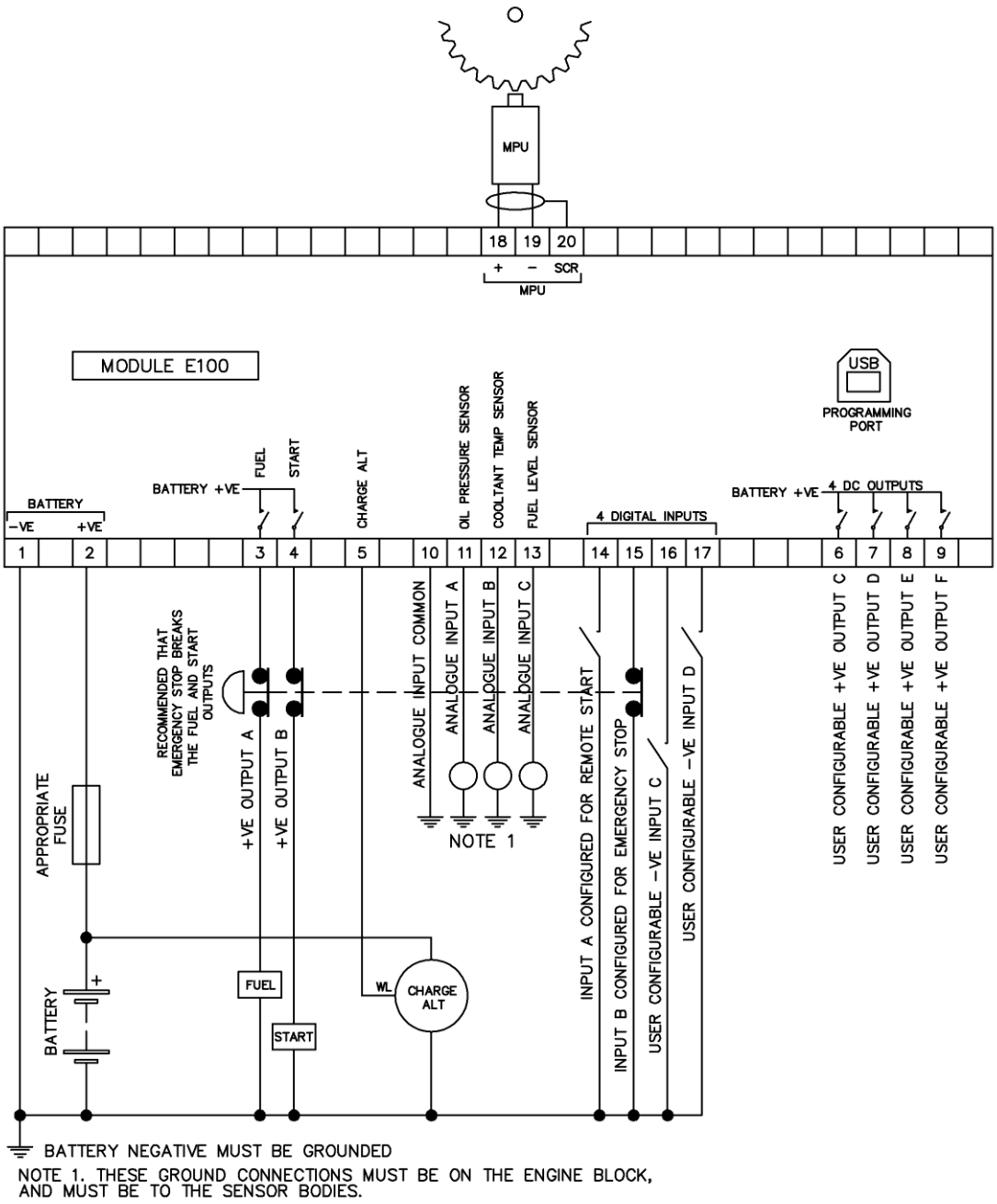
	Description	Cable Size	Notes	
	Socket for connection to PC with DSE Configuration Suite Software	0.5 mm² AWG 20	This is a standard USB type A to type B connector.	

3.3 TYPICAL WIRING DIAGRAM

As every system has different requirements, these diagrams show only a typical system and do not intend to show a complete system.

Set manufacturers and panel builders may use these diagrams as a starting point; however always refer to the completed system diagram provided by the system manufacturer for complete wiring detail.

Further wiring suggestions are available in the following DSE publications, available at www.deepseaelectronics.com to website members.



3.3.1 EARTH SYSTEMS

3.3.1.1 NEGATIVE EARTH

The typical wiring diagrams located within this document show connections for a negative earth system (the battery negative connects to Earth).

3.3.1.2 POSITIVE EARTH

When using a DSE module with a Positive Earth System (the battery positive connects to Earth), the following points must be followed:

Follow the typical wiring diagram as normal for all sections ***except*** the earth points.
All points shown as Earth on the typical wiring diagram should connect to ***battery negative*** (not earth).

3.3.1.3 FLOATING EARTH

Where neither the battery positive nor battery negative terminals are connected to earth the following points must to be followed:

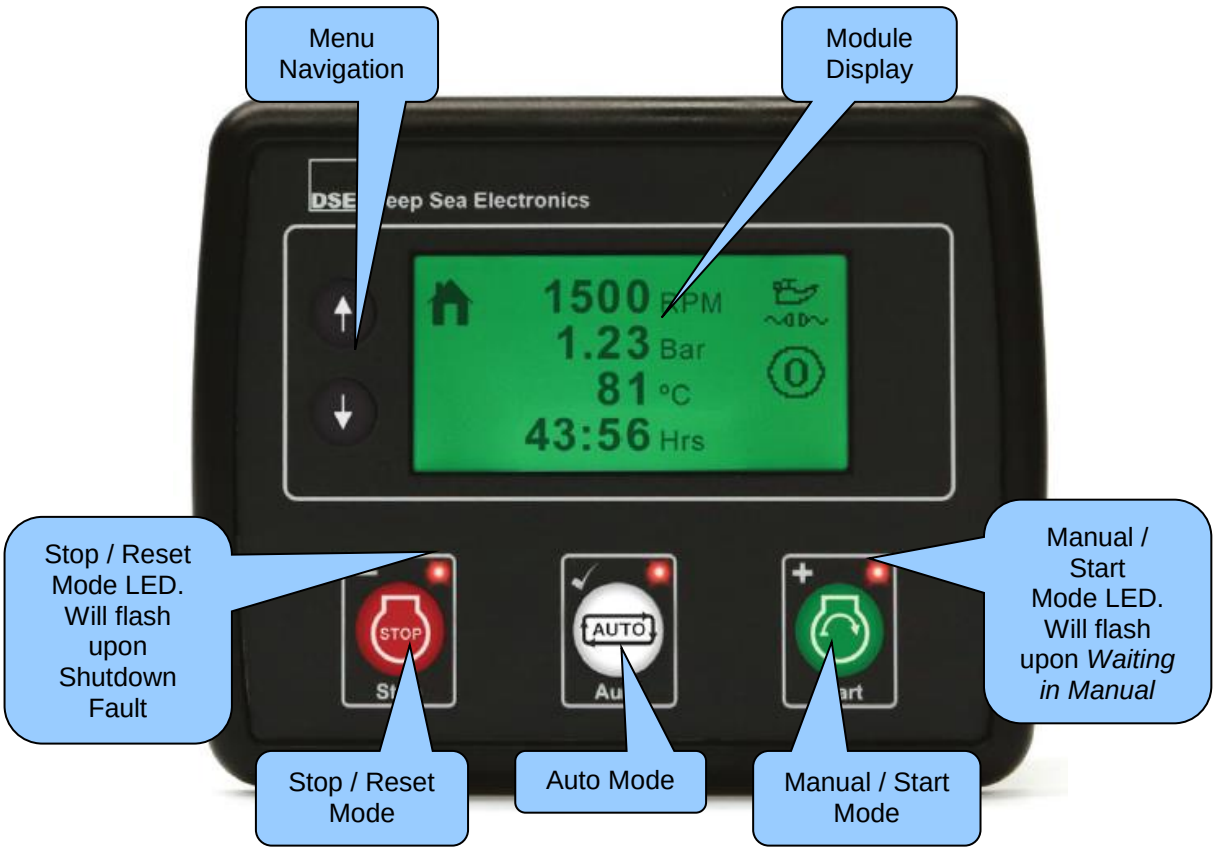
Follow the typical wiring diagram as normal for all sections ***except*** the earth points.
All points shown as Earth on the typical wiring diagram should connect to ***battery negative*** (not earth).

4 DESCRIPTION OF CONTROLS

CAUTION: The module may instruct an engine start event due to external influences. Therefore, it is possible for the engine to start at any time without warning. Prior to performing any maintenance on the system, it is recommended that steps are taken to remove the battery and isolate supplies.

NOTE: The following descriptions detail the sequences followed by a module containing the standard 'factory configuration'. Always refer to your configuration source for the exact sequences and timers observed by any particular module in the field.

Control of the module is via push buttons mounted on the front of the module with ***Stop/Reset Mode*** , ***Auto Mode*** and ***Manual/Start Mode*** functions. For normal operation, these are the only controls which need to be operated. Details of their operation are provided later in this document.



4.1 CONTROL PUSH BUTTONS

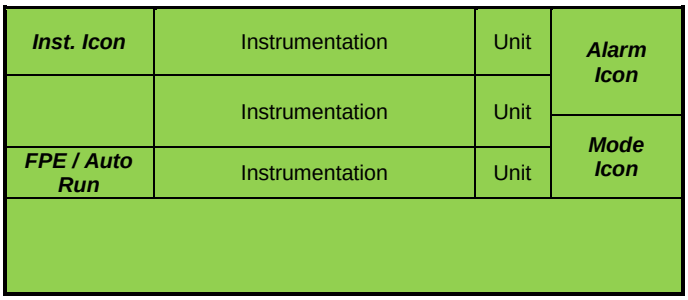
NOTE: For further details, see section entitled *Operation* elsewhere in this manual.

Icon	Description
	**Stop / Reset Mode** This button places the module into its ***Stop/Reset Mode***  . This clears any alarm conditions for which the triggering criteria have been removed. If the engine is running and the module is put into ***Stop/Reset Mode***  , the module automatically de-energises the fuel output and the engine comes to a standstill. Should any form of *start signal* be present while operating in this mode, a start does not occur. *For further details, see section entitled 'Operation' elsewhere in this manual.*
	**Auto Mode** This button places the module into its ***Auto Mode***  . This mode allows the module to control the function of the engine automatically. The module monitors the *remote start* input and once a start request is made, the set is automatically started. Upon removal of the starting signal, the module shuts the set down observing the *stop delay* timer and *cooling* timer as necessary. The module then waits for next start event. *For further details, see section entitled 'Operation' elsewhere in this manual.*
	**Manual/Start Mode** This button places the module into its ***Manual/Start Mode***  . Once in ***Manual/Start Mode***  , the module starts the engine. The module monitors the engine speed and once the configured value has been met, the engine is considered to be available. The engine remains running until ***Stop/Reset Mode***  or ***Auto Mode***  are selected or the engine speed decreases below the configured value. *For further details, see section entitled 'Operation' elsewhere in this manual.*
 	**Menu Navigation** Used for navigating the instrumentation, event log and configuration screens.

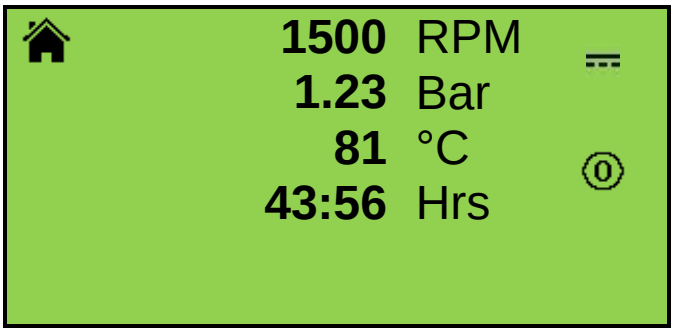
4.2 MODULE DISPLAY

The module's display contains the following sections. Description of each section can be viewed in the sub sections.

NOTE: Depending upon the module's configuration, some display screens may be disabled. For further details of module configuration, refer to DSE Publication: *057-267 DSEE100 Configuration Suite PC Software Manual.*



Example of DSEE100 Home Page Display



4.2.1 INSTRUMENTATION ICONS

When viewing instrumentation pages, an icon is displayed in the ***Inst. Icon*** section to indicate what section is currently being displayed.

Icon	Details
	The default home page
	Engine speed instrumentation screen
	Hours run instrumentation screen
	Battery voltage instrumentation screen
	Oil pressure instrumentation screen
	Coolant temperature instrumentation screen
	Flexible sensor instrumentation screen
	Appears when the event log is being displayed
	Current time held in the unit
	The current value of the scheduler run time and duration
	Oil filter maintenance timers
	Air filter maintenance timers
	Fuel filter maintenance timers

4.2.2 FRONT PANEL EDITOR (FPE) / AUTO RUN ICON

NOTE: For further details about the Front Panel Editor, see the section entitled 'Front Panel Editor' elsewhere in this manual.

When running in Auto Mode and on the Home () page, an icon is displayed in the ***FPE / Auto Run*** section to indicate the source of the auto start signal.

Icon	Auto Run Reason
	Appears when a remote start input is active
	Appears when a low battery run is active
	Appears when a scheduled run is active

4.2.3 MODE ICON

An icon is displayed in the ***Mode Icon*** section to indicate the mode the controller is currently in.

Icon	Details
	Appears when the engine is at rest and the unit is in stop mode.
	Appears when the engine is at rest and the unit is in auto mode.
	Appears when the engine is at rest and the unit is waiting for a manual start.
	Appears when a timer is active, for example cranking time, crank rest etc.
	Appears when the engine is running, and all timers have expired. The animation speed is reduced when running in idle mode.
	Appears when the unit is in the front panel editor.

4.2.4 SPLASH SCREEN

An icon is displayed across the entire screen to indicate the when the configuration of the module is changed.

Icon	Details
	Appears when a USB connection is made to the controller.
	Appears if either the configuration file or engine file becomes corrupted.

4.2.5 BACKLIGHT

The LCD backlight is on if the unit has sufficient voltage while the unit is turned on, unless the unit is cranking for which the backlight is turned off.

4.2.6 ALARM ICONS (PROTECTIONS)

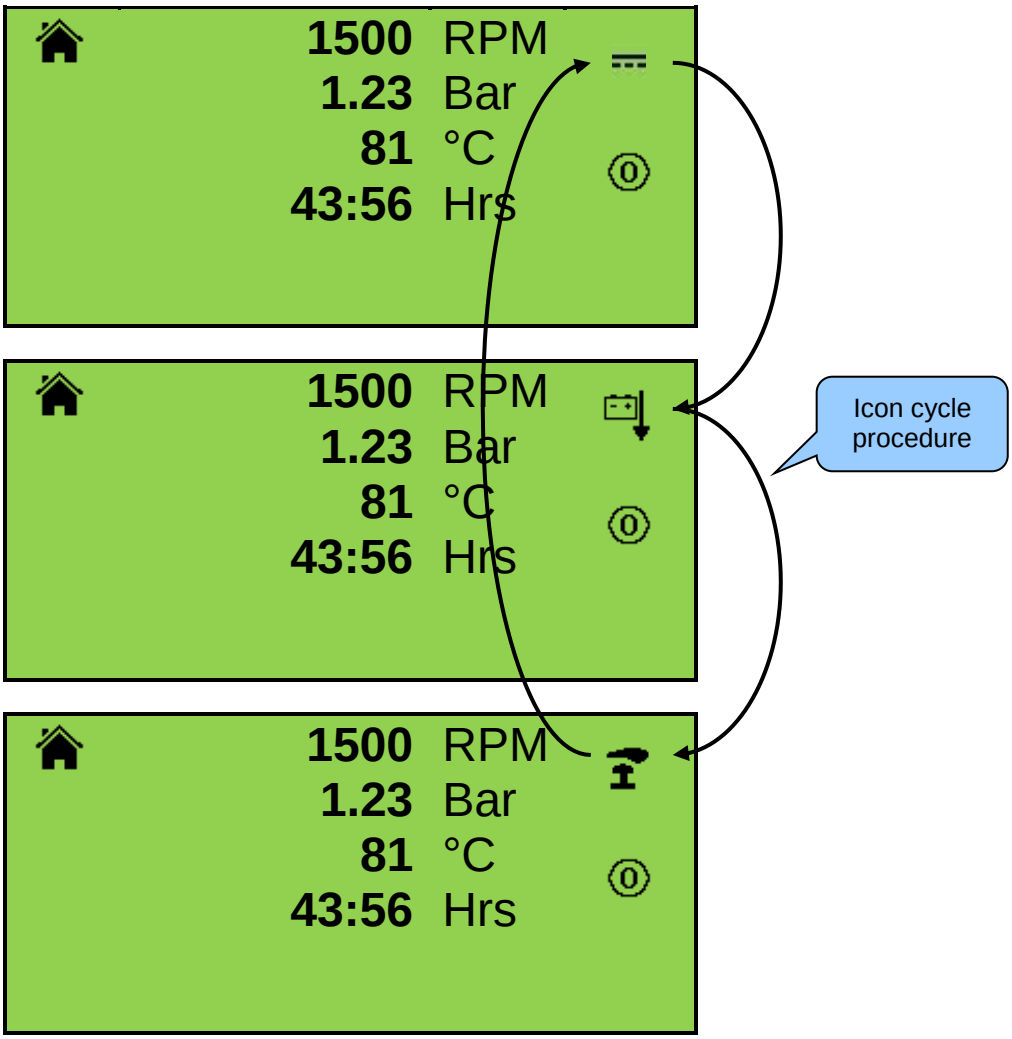
An icon is displayed in the ***Alarm Icon*** section to indicate the alarm that is current active on the controller.

In the event of a warning alarm, the LCD only displays the ***Alarm Icon***. In the event of an electrical trip or shutdown alarm, the module displays the ***Alarm Icon*** and the ***Stop/Reset Mode*** button LED begins to flash.

If multiple alarms are active at the same time, the ***Alarm Icon*** automatically cycles through all the appropriate icons to indicate each alarm which is active.

Example:

If the DSE controller was sensing a charge alternator failure alarm, delay over current alarm and a AC under voltage alarm at the same time, it would cycle through all of the icons to show this.



4.2.6.1 WARNING ALARM ICONS

Warnings are non-critical alarm conditions and do not affect the operation of the engine system, they serve to draw the operators attention to an undesirable condition.

By default, warning alarms are self-resetting when the fault condition is removed. However enabling *All Warnings Are Latched* causes warning alarms to latch until reset manually. This is enabled using the DSE Configuration Suite in conjunction with a compatible PC.

Icon	Fault	Description
	**Auxiliary Inputs**	The module detects that an auxiliary input which has been user configured to create a fault condition has become active.
	**Analogue Input Configured As Digital**	The analogue inputs can be configured to digital inputs. The module detects that an input configured to create a fault condition has become active.
	**Fail To Stop**	The module has detected a condition that indicates that the engine is running when it has been instructed to stop. **NOTE: 'Fail to Stop' could indicate a faulty oil pressure sensor. If engine is at rest check oil sensor wiring and configuration.**
	Charge Failure	The auxiliary charge alternator voltage is low as measured from the W/L terminal.
	**Low Fuel Level**	The level detected by the fuel level sensor is below the low fuel level pre-set pre-alarm setting.
	**High Fuel Level**	The level detected by the fuel level sensor is above the high fuel level pre-set pre-alarm setting.
	**Battery Under Voltage**	The DC supply has fallen below or risen above the low volts pre-set pre-alarm setting.
	**Battery Over Voltage**	The DC supply has risen above the high volts pre-set pre-alarm setting.
	**Oil Filter Maintenance Alarm**	Maintenance due for oil filter.
	**Air Filter Maintenance Alarm**	Maintenance due for air filter
	**Fuel Filter Maintenance Alarm**	Maintenance due for fuel filter.
	**Magnetic Pickup Open Circuit**	Magnetic pickup sensor has been detected as being open circuit.
	**Loss Of Mag. Pickup Signal**	The speed signal from the magnetic pickup is not being received by the DSE controller.

4.2.6.2 SHUTDOWN ALARM ICONS

NOTE: The fault condition must be resolved before the alarm can be reset. If the fault condition remains, it is not possible to reset the alarm (the exception to this is the *Oil Pressure Low* alarm and similar *Active From Safety On* alarms, as the oil pressure is low with the engine at rest).

Shutdown Alarms are latching and immediately stop the set. Once this has occurred, the module shuts the set down immediately to prevent further damage. To restart the set, the fault must be cleared and the alarm reset.

Shutdown Alarms are latching alarms and to remove the fault, press the ***Stop/Reset Mode*** button on the module.

Icon	Fault	Description
	Auxiliary Inputs	The module detects that an auxiliary input which has been user configured to create a fault condition has become active.
	Analogue Input Configured As Digital	The analogue inputs can be configured to digital inputs. The module detects that an input configured to create a fault condition has become active.
	Fail To Start	The engine has failed to start after the configured number of start attempts
	Low Oil Pressure	The module detects that the engine oil pressure has fallen below the low oil pressure pre-alarm setting level after the Safety On timer has expired.
	Engine High Temperature	The module detects that the engine coolant temperature has exceeded the high engine temperature pre-alarm setting level after the Safety On timer has expired.
	Under Speed	The engine speed has fallen below the under speed pre alarm setting
	Over Speed	The engine speed has risen above the over speed pre alarm setting
	Charge Failure	The auxiliary charge alternator voltage is low as measured from the W/L terminal.

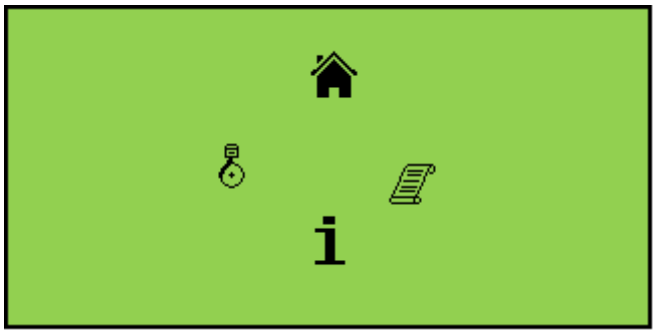
Parameters continued on next page…

Icon	Fault	Description
	**Low Fuel Level**	The level detected by the fuel level sensor is below the low fuel level pre-set alarm setting.
	**High Fuel Level**	The level detected by the fuel level sensor is above the high fuel level pre-set alarm setting.
	**Emergency Stop**	The emergency stop button has been depressed. This failsafe (normally closed to emergency stop) input and immediately stops the set should the signal be removed.
	**Oil Sender Open Circuit**	The oil pressure sensor has been detected as being open circuit.
	**Coolant Temperature Sender Open Circuit**	The coolant temperature sensor has been detected as being open circuit.
	**Oil Filter Maintenance Alarm**	Maintenance due for oil filter.
	**Air Filter Maintenance Alarm**	Maintenance due for air filter
	**Fuel Filter Maintenance Alarm**	Maintenance due for fuel filter.
	**Magnetic Pickup Open Circuit**	Magnetic pickup sensor has been detected as being open circuit.
	**Loss Of Mag. Pickup Signal**	The speed signal from the magnetic pickup is not being received by the DSE controller.

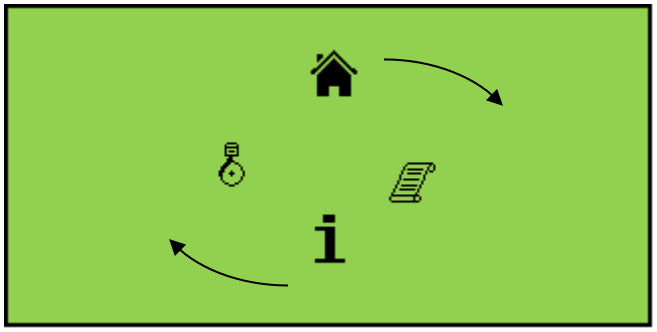
4.3 VIEWING THE INSTRUMENT PAGES

4.3.1 NAVIGATION MENU

To enter the navigation menu, press both the (up) and (down) buttons simultaneously.



To select the required icon, press the (up) button to cycle right or the (down) button to cycle left until the desired instrumentation section is reached.



Once the desired icon is at the top, press the ***Auto Mode*** (✓) button to enter that instrunmentation section. If the ***Auto Mode*** (✓) button is not pressed, the display automatically returns to the Home () page after the configured setting of the *LCD Scroll Timer*.

4.3.1.1 NAVIGATION MENU ICONS

Icon	Description
	Home page
	Engine instrumentation
	Module information
	Event Log

4.3.2 GENERAL NAVIGATION

NOTE: For further details of module configuration, refer to DSE Publication: *057-267 DSEE100 Configuration Suite PC Software Manual.*

It is possible to scroll through the display to view different pages of information by repeatedly operating the up or down naviagation buttons.

If you want to view one of the instrument pages towards the end of the list, it may be quicker to scroll up through the pages rather than down!

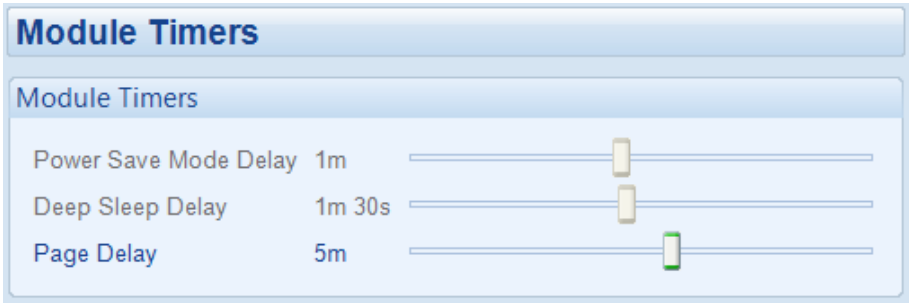
Example:

Home **Press** **Engine Instrumentation** **Press**

And so on until the last page is reached.
A Further press of the down button returns the display to the Home ( ) page.

Once selected, the page will remain on the LCD display until the user selects a different page or, after an extended period of inactivity (*Page Delay Timer*), the module reverts back to the Home ( ) page.

The *Page Delay Timer* is configurable using the DSE Configuration Suite Software or by using the Front Panel Editor.



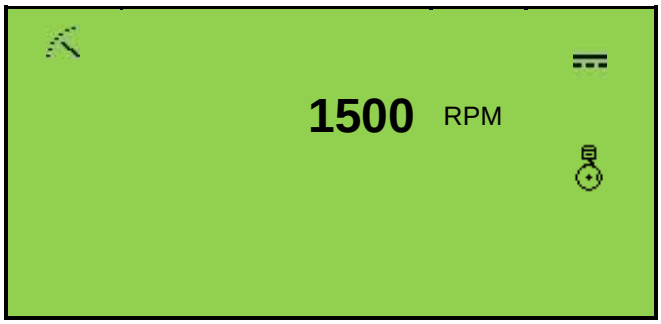
4.3.3 HOME

NOTE: Depending upon the module's configuration, the home screen may be set to display electrical parameters or engine tier 4 information. For further details of module configuration, refer to DSE Publication: *057-267 DSEE100 Configuration Suite PC Software Manual.*

This is the page that is displayed when no other page has been selected and is automatically displayed after a period of inactivity (*Page Delay Timer)* of the module facia buttons.

4.3.4 ENGINE

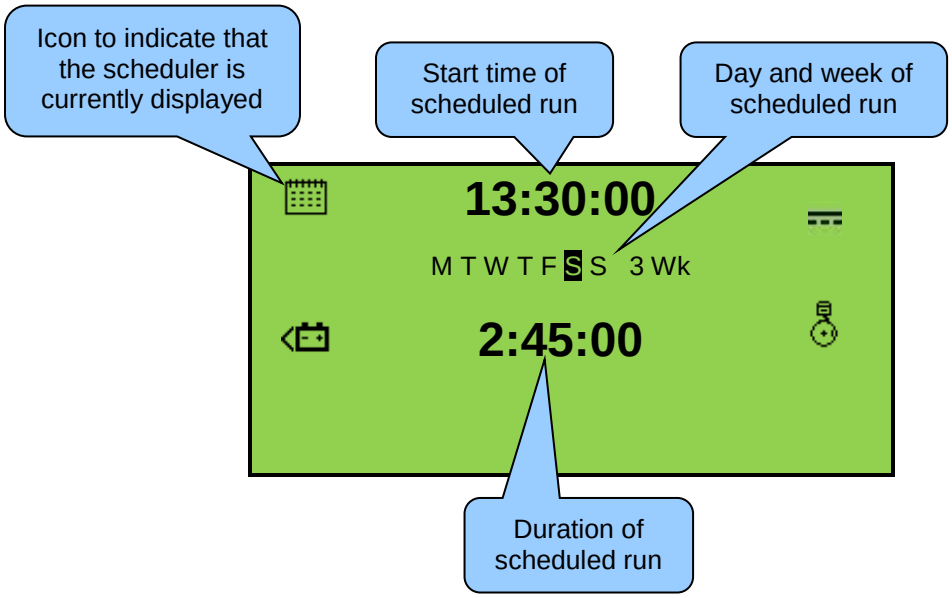
These pages contain instrumentation gathered about the engine measured or derived from the module's inputs, some of which may be obtained from the engine ECU.



- Engine Speed
- Engine Run Time
- Engine Battery Voltage
- Engine Charge Alternator Voltage
- Engine Coolant Temperature
- Engine Oil Pressure
- Engine Fuel Level or Flexible Sensor
- Engine Maintenance Due – Oil
- Engine Maintenance Due – Air
- Engine Maintenance Due – Fuel

4.3.5 INFO

These pages contain information about the controller.



- Module's date and time
- Scheduler settings
- Product description and USB identification number
- Application and Engine Version

4.3.6 EVENT LOG

This module's event log contains a list of the last 50 record electrical trips, shutdowns, mains fails, mains returns and power up events and the engine hours at which they occurred.

Once the log is full, any subsequent electrical trip or shutdown alarms overwrites the oldest entry in the log. Hence, the log always contains the most recent shutdown alarms. The module logs the alarm, along with the engine running hours.

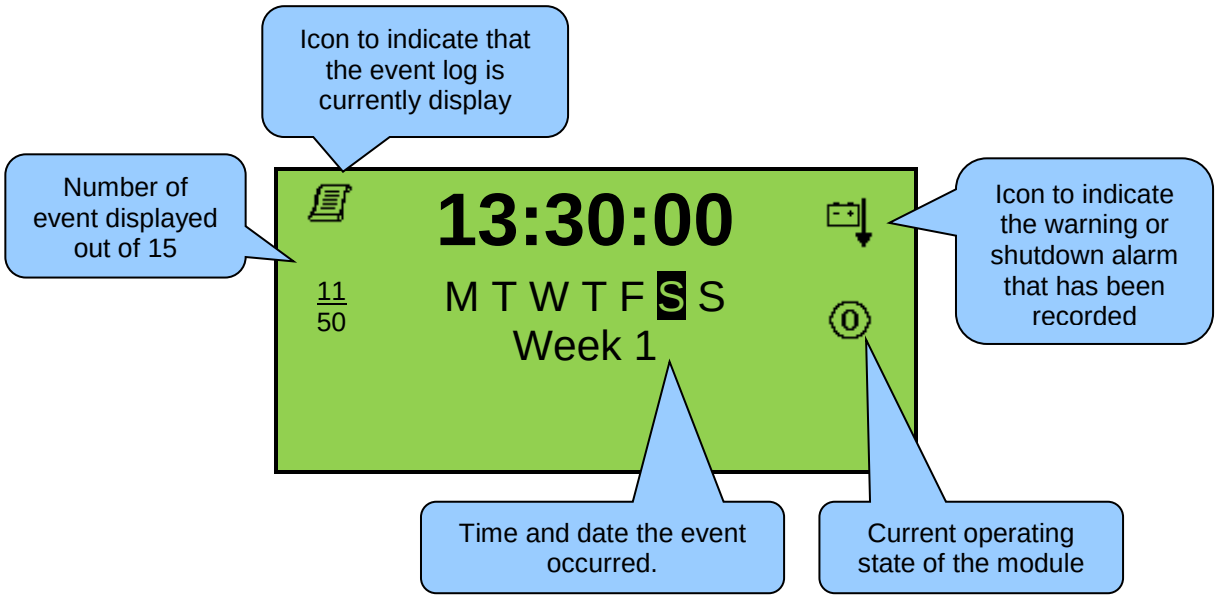
4.3.6.1 VIEWING THE EVENT LOG

To view the event log, press both (up) and (down) buttons simultaneously, the navigation menu is then displayed. Once entered, cycle to the *Event Log* ( ) section and enter.

To view the event log, repeatedly press the (up) or (down) buttons until the LCD screen displays the desired event.

Continuing to press down the (up) or (down) buttons will cycle through the past alarms after which the display shows the most recent alarm and the cycle begins again.

To exit the event log, press the (up) and (down) buttons simultaneously to enter the navigation menu. Once entered, cycle to the desired intrunmentation section.



The events shown in the below table are recorded into the module's event log in addition to all electrical trip and shutdown alarms.

Icon	Event	Description
	Module Power Up	The module was powered up

5 OPERATION

NOTE: The following descriptions detail the sequences followed by a module containing the standard 'factory configuration'. Always refer to your configuration source for the exact sequences and timers observed by any particular module in the field.

5.1 QUICKSTART GUIDE

This section provides a quick start guide to the module's operation.

5.1.1 STARTING THE ENGINE

NOTE: For further details, see the section entitled *Operation* elsewhere in this document.

5.1.2 STOPPING THE ENGINE

NOTE: For further details, see the section entitled *Operation* elsewhere in this document.

5.2 STOP/RESET MODE

NOTE: If a digital input configured to *Panel Lock* is active, changing module modes is not possible. Viewing the instruments and event logs is NOT affected by *Panel Lock*.

NOTE: For further details of module configuration, refer to DSE Publication: *057-267 DSEE100 Configuration Suite PC Software Manual.*

Stop/Reset Mode is activated by pressing the ***Stop/Reset Mode*** button.
The ***Stop/Reset*** icon is displayed to indicate ***Stop/Reset Mode*** operations.

In ***Stop/Reset Mode***, the module stops the engine.

If the set does not stop when requested, the ***Fail To Stop*** alarm is activated (subject to the setting of the *Fail to Stop* timer). To detect the engine at rest the following must occur:

- Engine Charge Alternator Voltage must be zero.
- Oil pressure sensor must indicate low oil pressure

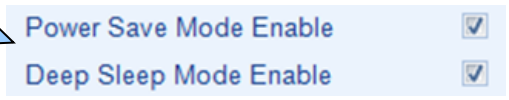
When the engine has stopped and the module is in the ***Stop/Reset Mode***, it is possible to send configuration files to the module from DSE Configuration Suite PC software and to enter the Front Panel Editor to change parameters.

Any latched alarms that have been cleared are reset when ***Stop/Reset Mode*** is entered.

The engine is not started when in ***Stop/Reset Mode***. If start signals are given, the input is ignored until ***Auto Mode*** is entered.

When the unit is configured for `Power Save Mode' and has been left in ***Stop/Reset Mode*** with no presses of the fascia buttons, the module enters Power Save Mode. To 'wake' the module, press any fascia control buttons or activate Digital Input A. The same is true for Deep Sleep Mode.

Power Save & Deep Sleep Mode in the DSE Configuration Suite Software



5.3 AUTOMATIC MODE

NOTE: If a digital input configured to external *Panel Lock* is active, changing module modes is not possible. Viewing the instruments and event logs is NOT affected by *Panel Lock*.

Auto Mode is activated by pressing the ***Auto Mode*** button.

The ***Auto Mode*** icon is displayed to indicate ***Auto Mode*** operations if no alarms are present.

Auto Mode allows the set to operate fully automatically, starting and stopping as required with no user intervention.

5.3.1 WAITING IN AUTO MODE

If a starting request is made, the starting sequence begins.
Starting requests can be from the following sources:

- Activation of the inbuilt exercise scheduler.
- Activation of an auxiliary input that has been configured to *Remote Start.*

5.3.2 STARTING SEQUENCE

NOTE: For further details of module configuration, refer to DSE Publication: *057-267 DSEE100 Configuration Suite PC Software Manual.*

To allow for 'false' start requests, the *Start Delay* timer begins.

Should all start requests be removed during the *Start Delay* timer, the unit returns to a stand-by state.

If a start request is still present at the end of the *Start Delay* timer, the fuel relay is energised and the engine is cranked.

If the engine fails to fire during this cranking attempt then the starter motor is disengaged for the *Crank Rest* duration after which the next start attempt is made. Should this sequence continue beyond the *Set Number Of Attempts*, the start sequence is terminated and the display shows ***Fail to Start*** .

The starter motor is disengaged when the engine fires. Speed detection is measured from a Magnetic Pickup mounted on the flywheel.

Additionally, rising oil pressure can be used to disconnect the starter motor (but cannot detect underspeed or overspeed).

After the starter motor has disengaged, the *Safety On Delay* timer activates, allowing Oil Pressure, High Engine Temperature, Under-speed, Charge Fail and any delayed Auxiliary fault inputs to stabilise without triggering the fault.

5.3.3 ENGINE RUNNING

If all start requests are removed, the *Stopping Sequence* begins.

5.3.4 STOPPING SEQUENCE

The *Return Delay* timer operates to ensure that the starting request has been permanently removed and isn't just a short term removal. Should another start request be made during this time period, the set continues running.

If there are no starting requests at the end of the *Return Delay* timer, the stopping sequence is initiated.

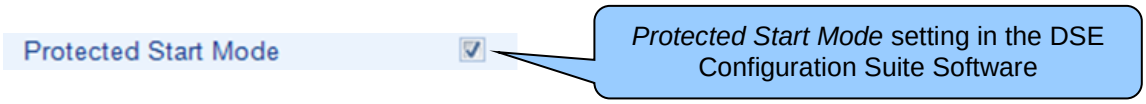
5.4 MANUAL/START MODE

NOTE: If a digital input configured to *Panel Lock* is active, changing module modes is not possible. Viewing the instruments and event logs is NOT affected by *Panel Lock*.

To begin the starting sequence, press the ***Manual/Start Mode*** button. If '*protected start*' is disabled, the start sequence begins immediately.

NOTE: For further details of module configuration, refer to DSE Publication: *057-267 DSEE100 Configuration Suite PC Software Manual.*

If *Protected Start* is enabled, the ***Waiting in Manual Mode*** icon is displayed and the LED above the ***Manual/Start Mode*** button flashes to indicate ***Waiting in Manual Mode***.
The ***Manual/Start Mode*** button must be pressed once more to begin the start sequence.



5.4.1 STARTING SEQUENCE

NOTE: There is no *Start Delay* in this mode of operation.

NOTE: For further details of module configuration, refer to DSE Publication: *057-267 DSEE100 Configuration Suite PC Software Manual.*

The fuel relay is energised and the engine is cranked.

If the engine fails to fire during this cranking attempt then the starter motor is disengaged for the *Crank Rest Timer* duration after which the next start attempt is made. Should this sequence continue beyond the set *Number Of Attempts*, the start sequence is terminated and the display shows ***Fail to Start*** .

The starter motor is disengaged when the engine fires. Speed detection is measured from a Magnetic Pickup mounted on the flywheel.

Additionally, rising oil pressure can be used to disconnect the starter motor (but cannot detect underspeed or overspeed).

After the starter motor has disengaged, the *Safety On Delay* timer activates, allowing Oil Pressure, High Engine Temperature, Under-speed, Charge Fail and any delayed Auxiliary fault inputs to stabilise without triggering the fault.

5.4.2 ENGINE RUNNING

In ***Manual/Start Mode***  , the engine continues as long as one of the following conditions is kept active:

- Activation of an auxiliary input that has been configured to *Remote Start*
- Activation of the inbuilt exercise scheduler

5.4.3 STOPPING SEQUENCE

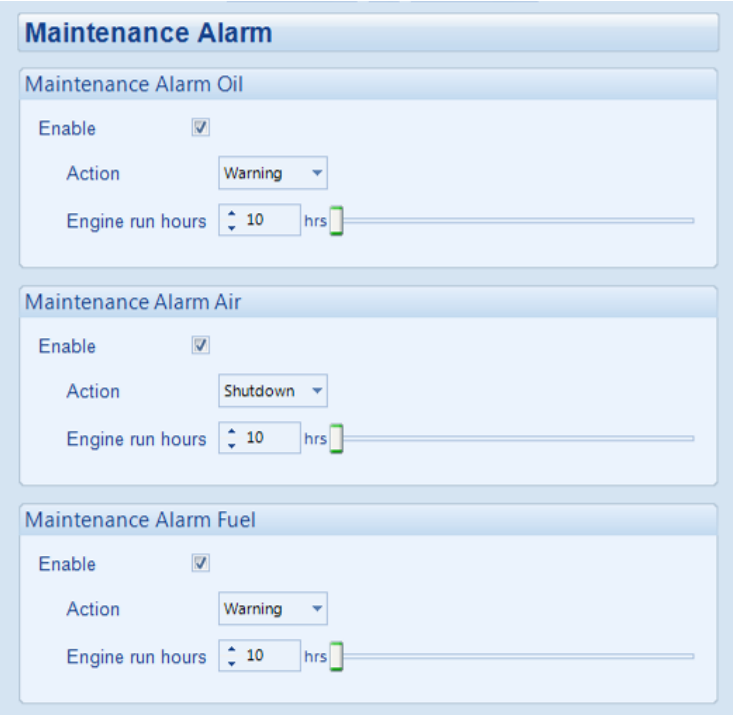
In ***Manual/Start Mode***  the set continues to run until either:

- The ***Stop/Reset Mode***  button is pressed – the set immediately stops.
- The ***Auto Mode***  button is pressed. The set observes all ***Auto Mode***  start requests and stopping timers before beginning the *Auto Mode Stopping Sequence*.

5.5 MAINTENANCE ALARMS

Depending upon module configuration one or more levels of engine maintenance alarm may occur based upon a configurable schedule.

Example 1



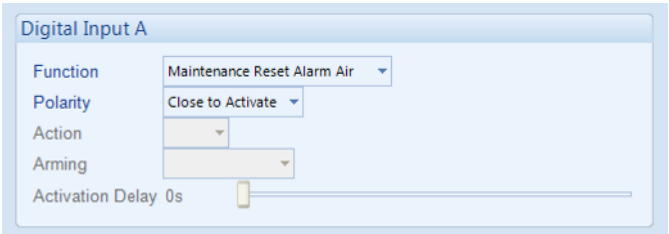
Screen capture from DSE Configuration Suite Software showing the configuration of the Maintenance Alarm for Oil, Air and Fuel.

When activated, the maintenance alarm can be either a **warning** (set continues to run) or **shutdown** (running the set is not possible).

Resetting the maintenance alarm is normally actioned by the site service engineer after performing the required maintenance.
The method of reset is either by:

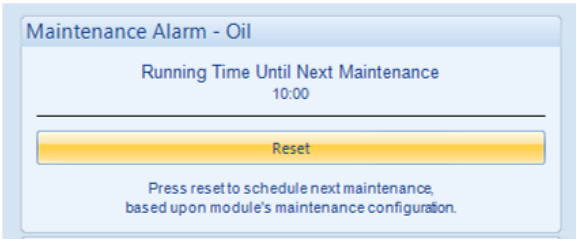
- Activating an input that has been configured to Maintenance Reset Alarm x, where x is the type of maintenance alarm (Air, Fuel or Oil).
- Pressing the maintenance reset button in the DSE Configuration Suite, Maintenance section.
- Pressing and holding the ***Stop/Reset Mode*** button for 10 seconds on the desired Maintenance Alarm status page. This can be protected by a PIN number.

Example 2



Screen capture from DSE Configuration Suite Software showing the configuration of a digital input for Maintenance Reset Alarm Air.

Example 3



Screen capture from DSE Configuration Suite Software showing the Maintenance Alarm Reset 'button' in the DSE Configuration Suite SCADA | MAINTENANCE section.

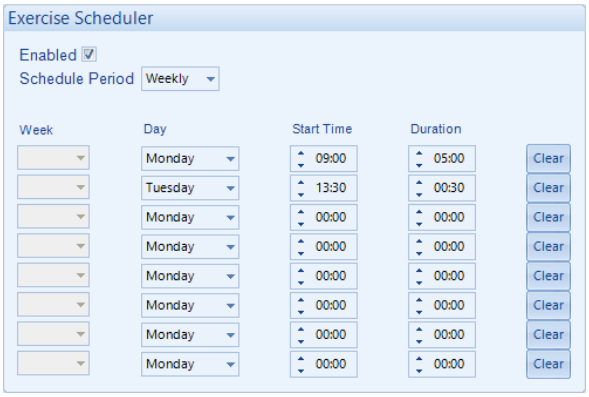
5.6 SCHEDULER

The controller contains an inbuilt exercise run scheduler, capable of automatically starting and stopping the set. Up to 8 scheduled start/stop sequences can be configured to repeat on a 7-day or 28-day cycle.

Example

Screen capture from DSE Configuration Suite Software showing the configuration of the Exercise Scheduler.

In this example the set will start at 09:00 on Monday and run for 5 hours, then start at 13:30 on Tuesday and run for 30 minutes.



5.6.1 STOP MODE

- Scheduled runs do not occur when the module is in ***Stop/Reset Mode*** .

5.6.2 MANUAL MODE

- Scheduled runs do not occur when the module is in ***Manual/Start Mode*** waiting for a start request.

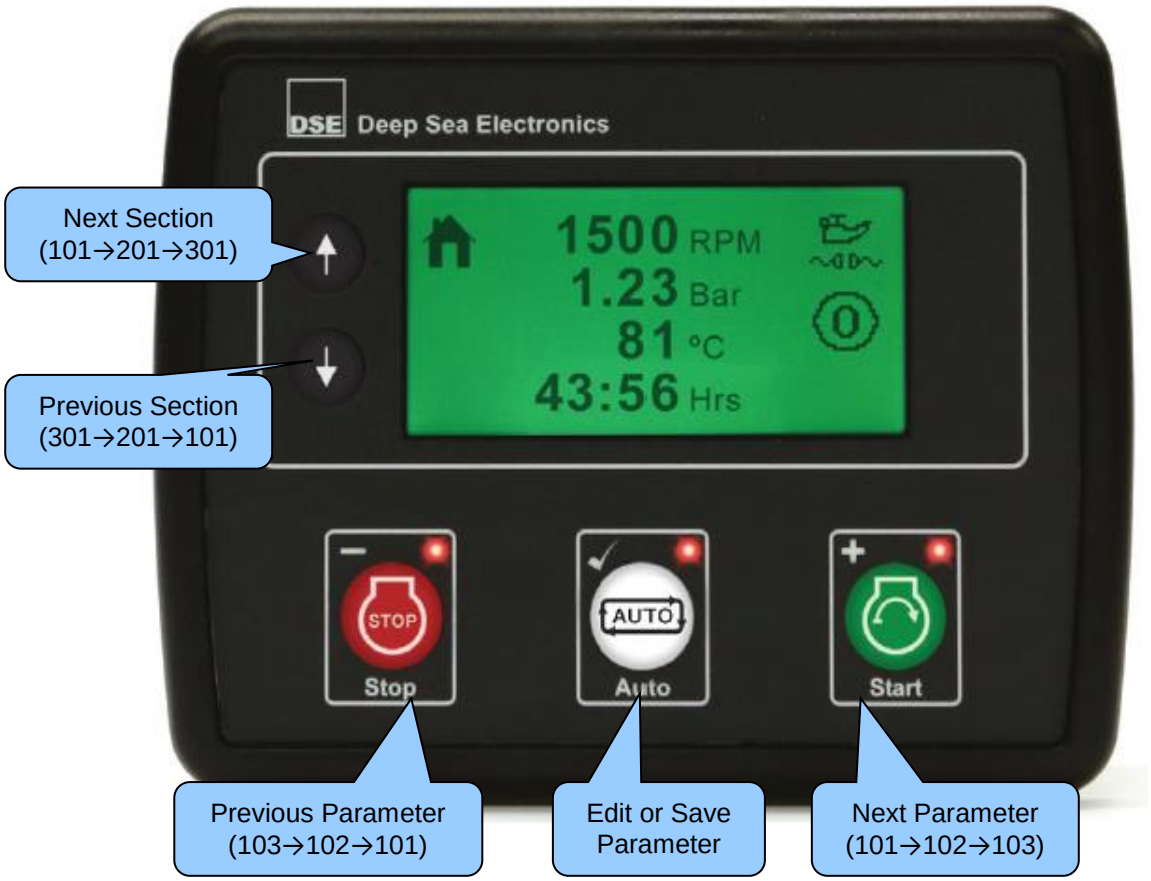
5.6.3 AUTO MODE

- Scheduled runs operate only if the module is in ***Auto Mode*** with no *Shutdown* alarm active.
- If the module is in ***Stop/Reset Mode*** or ***Manual/Start Mode*** when a scheduled run begins, the engine is not started. However, if the module is moved into ***Auto Mode*** during a scheduled run, the engine is called to start.
- Depending upon configuration by the system designer, an external input can be used to inhibit a scheduled run.

6 FRONT PANEL CONFIGURATION

This configuration mode allows the operator to configure the majority of the module through its display without the use of the DSE Configuration Suite PC Software.

Use the module's facia buttons to traverse the menu and make value changes to the parameters:



6.1 ACESSING THE MAIN CONFIGURATION EDTIOR

NOTE: More comprehensive module configuration is possible via PC configuration software. For further details of module configuration, refer to DSE Publication: *057- 267 DSEE100 Configuration Suite PC Software Manual.*

- Ensure the engine is at rest and the module by pressing the ***Stop/Reset Mode*** button.
- Press the ***Stop/Reset Mode*** (-) and ***Auto Mode*** (✔) buttons together to enter the main configuration editor.

6.2 ENTERING PIN

NOTE: The PIN is not set by DSE when the module leaves the factory. If the module has a PIN code set, the set supplier has entered this. Contact the set supplier if the code is required. If the code has been 'lost' or 'forgotten', the module must be returned to the DSE factory to have the PIN removed. A charge is made for this procedure. This procedure cannot be performed away from the DSE factory.

NOTE: The PIN is automatically reset when the editor is exited (manually or automatically) to ensure security.

- If a module security PIN has been set, the PIN request is then shown.
- Press the ***Auto Mode*** (✔), the first '#' changes to '0'. Press the ***Up*** or ***Down*** buttons to adjust it to the correct value.
- Press the ***Manual/Start Mode*** (+) buttons to move to the next digit. The digit previously entered now shows as '#' for security.
- Repeat this process for the other digits of the PIN number. Press the ***Stop/Reset Mode*** (-) button to move back to adjust one of the previous digits.
- When the ***Auto Mode*** (✔) button is pressed after editing the final PIN digit, the PIN is checked for validity. If the number is not correct, the PIN must be re-entered.
- If the PIN has been successfully entered (or the module PIN has not been enabled), the editor is displayed.

6.3 EDITING A PARAMETER

NOTE: Pressing and holding the *Stop/Reset Mode* (-) or *Manual/Start Mode* (+) buttons enables an auto-repeat functionality.

- Once in the selected editor, press the ***Up*** and ***Down*** navigation buttons to cycle through it in increments of 100.
- Press the ***Stop/Reset Mode*** (-) or ***Manual/Start Mode*** (+) buttons to cycle through the editor in increments of 1.
- When viewing the parameter to be edited, press the ***Auto Mode*** (✔) button, the value begins to flash.
- Press the ***Stop/Reset Mode*** (-) or ***Manual/Start Mode*** (+) buttons to adjust the value to the required setting.
- Press the ***Auto Mode*** (✔) button the save the current value, the value ceases flashing.

6.4 EXITING THE MAIN CONFIGURATION EDITOR

NOTE: The editor automatically exits after 5 minutes of inactivity to ensure security.

- Press and hold the ***Stop/Reset Mode*** (-) button to exit the editor without saving changes.
- Press and hold the ***Auto Mode*** (✔) button to exit the editor and save the changes.

6.5 ADJUSTABLE PARAMETERS

6.5.1 MODULE SETTINGS

Configuration Parameters – Module (Page 1)		
101	Contrast	0 %
102	Fast Loading Enabled	On (1), Off (0)
103	All Warnings Latched	On (1), Off (0)
104	Lamp Test At Startup	On (1), Off (0)
105	Power Save Mode Enable	On (1), Off (0)
106	Deep Sleep Mode Enable	On (1), Off (0)
107	Protected Start Enable	On (1), Off (0)
108	Event Log Display Format	Engine Hours (1), Time and Date (0)
109	Power Up Mode	0 (Power Up Mode)
110-111	RESERVED	
112	Pin Protected Maintenance Reset	On (1), Off (0)
113	RESERVED	
114	Display Temperature in °C or °F	°F (1), °C (0)
115	Display Oil Pressure in Bar, PSI, kPa	PSI (2), kPa (1), Bar (0)

6.5.2 DIGITAL INPUT SETTINGS

Configuration Parameters – Digital Inputs (Page 3)		
301	Digital Input A Source	0 (Input Source)
302	Digital Input A Polarity	0 (Polarity)
303	Digital Input A Action (If Source = User Config)	0 (Action)
304	Digital Input A Arming (If Source = User Config)	0 (Arming)
305	Digital Input A Activation Delay (If Source = User Config)	0 s
306	Digital Input B Source	0 (Input Source)
307	Digital Input B Polarity	0 (Polarity)
308	Digital Input B Action (If Source = User Config)	0 (Action)
309	Digital Input B Arming (If Source = User Config)	0 (Arming)
310	Digital Input B Activation Delay (If Source = User Config)	0 s
311	Digital Input C Source	0 (Input Source)
312	Digital Input C Polarity	0 (Polarity)
313	Digital Input C Action (If Source = User Config)	0 (Action)
314	Digital Input C Arming (If Source = User Config)	0 (Arming)
315	Digital Input C Activation Delay (If Source = User Config)	0 s
316	Digital Input D Source	0 (Input Source)
317	Digital Input D Polarity	0 (Polarity)
318	Digital Input D Action (If Source = User Config)	0 (Action)
319	Digital Input D Arming (If Source = User Config)	0 (Arming)
320	Digital Input D Activation Delay (If Source = User Config)	0 s
321-330	RESERVED	
331	Analogue Input A (Set As Digital) Source	0 (Input Source)
332	Analogue Input A (Set As Digital) Polarity	0 (Polarity)
333	Analogue Input A (Set As Digital) Action (If Source = User Config)	0 (Action)
334	Analogue Input A (Set As Digital) Arming (If Source = User Config)	0 (Arming)
335	Analogue Input A (Set As Digital) Activation Delay (If Source = User Config)	0 s
336	Analogue Input B (Set As Digital) Source	0 (Input Source)
337	Analogue Input B (Set As Digital) Polarity	0 (Polarity)
338	Analogue Input B (Set As Digital) Action (If Source = User Config)	0 (Action)
339	Analogue Input B (Set As Digital) Arming (If Source = User Config)	0 (Arming)
340	Analogue Input B (Set As Digital) Activation Delay (If Source = User Config)	0 s
341	Analogue Input C (Set As Digital) Source	0 (Input Source)
342	Analogue Input C (Set As Digital) Polarity	0 (Polarity)
343	Analogue Input C (Set As Digital) Action (If Source = User Config)	0 (Action)
344	Analogue Input C (Set As Digital) Arming (If Source = User Config)	0 (Arming)
345	Analogue Input C (Set As Digital) Activation Delay (If Source = User Config)	0 s

6.5.3 DIGITAL OUTPUT SETTINGS

Configuration Parameters – Outputs (Page 4)		
401	Digital Output A Source	0 (Output Source)
402	Digital Output A Polarity	0 (Output Polarity)
403	Digital Output B Source	0 (Output Source)
404	Digital Output B Polarity	0 (Output Polarity)
405	Digital Output C Source	0 (Output Source)
406	Digital Output C Polarity	0 (Output Polarity)
407	Digital Output D Source	0 (Output Source)
408	Digital Output D Polarity	0 (Output Polarity)
409	Digital Output E Source	0 (Output Source)
410	Digital Output E Polarity	0 (Output Polarity)
411	Digital Output F Source	0 (Output Source)
412	Digital Output F Polarity	0 (Output Polarity)

6.5.4 TIMER SETTINGS

Configuration Parameters – Timers (Page 5)	
501	RESERVED
502	Start Delay
503	Preheat Timer
504	Crank Time
505	Crank Rest Time
506	Smoke Limiting
507	Smoke Limiting Off
508	RESERVED
509	Safety On Delay
510	Warming Up Time
511	Return Delay
512	RESERVED
513	ETS Solenoid Hold
514	Failed To Stop Delay
515-522	RESERVED
523	Power Save Mode Delay
524	Deep Sleep Mode Delay
525	Page Timer

6.5.5 ENGINE SETTINGS

Configuration Parameters – Engine (Page 8)		
801	Start Attempts	0
802	Over Speed Overshoot	0 %
803	Over Speed Delay	0 s
804-806	RESERVED	
807	Crank Disconnect On Oil Pressure Enable	On (1), Off (0)
808	Check Oil Pressure Prior To Starting	On (1), Off (0)
809	Crank Disconnect On Oil	0.00 Bar
810	RESERVED	
811	Crank Disconnect On Engine Speed	0 RPM
812	Under Speed Enable	On (1), Off (0)
813	Under Speed Trip	0 RPM
814	Over Speed Trip	0 RPM
815	Low Battery Voltage Enable	On (1), Off (0)
816	Low Battery Voltage Trip	0.0 V
817	Low Battery Voltage Return	0.0 V
818	Low Battery Voltage Delay	0:00:00
819	High Battery Voltage Enable	On (1), Off (0)
820	High Battery Voltage Return	0.0 V
821	High Battery Voltage Trip	0.0 V
822	High Battery Voltage Warning Delay	0 s
823	Charge Alt Shutdown Enable	On (1), Off (0)
824	Charge Alt Shutdown Trip	0.0 V
825	Charge Alt Shutdown Delay	0 s
826	Charge Alt Warning Enable	On (1), Off (0)
827	Charge Alt Warning Trip	0.0 V
828	Charge Alt Warning Delay	0 s
829	Low Battery Start Arming	On (1), Off (0)
830	Low Battery Start Threshold	0.0 V
831	Low Battery Start Delay	0 s
832	Low Battery Start Run Time	0 s
833	Magnetic Pickup Fitted	On (1), Off (0)
834	Flywheel Teeth	0

6.5.6 ANALOGUE INPUT SETTINGS

Configuration Parameters – Analogue Inputs (Page 9)		
901	Analogue Input A Sensor Type	0 (Sensor Type)
902	Analogue Input A Sensor Selection	0 (Pressure Sensor List)
903	Low Oil Pressure Enable	On (1), Off (0)
904	Low Oil Pressure Trip	0 Bar
905	Oil Pressure Sensor Open Circuit	On (1), Off (0)
906	Analogue Input B Sensor Type	0 (Sensor Type)
907	Analogue Input B Sensor Selection	0 (Temperature Sensor List)
908	High Engine Temperature Trip	0.00 °C
909	Temperature Sensor Open Circuit	On (1), Off (0)
910	Analogue Input C Sensor Usage	Flexible Sensor (1), Fuel Level Sensor (0)
911	Analogue Input C Sensor Type	0 (Sensor Type)
912	Analogue Input C Sensor Selection	0 (Pressure / Temperature / Percentage Sensor List)
913	Flexible Sensor C Arming	0 (Arming)
914	Flexible Sensor C Low Shutdown Enable	On (1), Off (0)
915	Flexible Sensor C Low Alarm Trip	0 % / Bar / °C
916	RESERVED	
917	Flexible Sensor C Low Pre-Alarm Enable	On (1), Off (0)
918	Flexible Sensor C Low Pre-Alarm Trip	0 % / Bar / °C
919	Flexible Sensor C Low Pre-Alarm Return	0 % / Bar / °C
920	RESERVED	
921	Flexible Sensor C High Pre-Alarm Enable	On (1), Off (0)
922	Flexible Sensor C High Pre-Alarm Return	0 % / Bar / °C
923	Flexible Sensor C High Pre-Alarm Trip	0 % / Bar / °C
924-925	RESERVED	
926	Flexible Sensor C High Shutdown Enable	On (1), Off (0)
927	Flexible Sensor C High Alarm Trip	0 % / Bar / °C
928-929	RESERVED	
930	Fuel Sensor C Low Shutdown Enable	On (1), Off (0)
931	Fuel Sensor C Low Shutdown Trip	0 %
932	Fuel Sensor C Low Shutdown Delay	0 s
933	Fuel Sensor C Low Pre-Alarm Enable	On (1), Off (0)
934	Fuel Sensor C Low Pre-Alarm Trip	0 %
935	Fuel Sensor C Low Pre-Alarm Return	0 %
936	Fuel Sensor C Low Pre-Alarm Delay	0 s
937	Fuel Sensor C High Pre-Alarm Enable	On (1), Off (0)
938	Fuel Sensor C High Pre-Alarm Return	0 %
939	Fuel Sensor C High Pre-Alarm Trip	0 %
940	Fuel Sensor C High Pre Alarm Delay	0 s
941	RESERVED	
942	Fuel Sensor C High Alarm Action	0 (Action)
943	Fuel Sensor C High Alarm Trip	0 %
944	Fuel Sensor C High Alarm Delay	0 s

6.5.7 SCHEDULER SETTINGS

Configuration Parameters – Scheduler (Page 10)		
1001	Enable Scheduler	On (1), Off (0)
1002	RESERVED	
1003	Scheduler Period	Weekly(0), Monthly(1)
1004, 1008, 1012, 1016, 1020, 1024, 1028, 1032	Start Time (Entry 1-8)	0:00:00
1005, 1009, 1013, 1017, 1021, 1025, 1029, 1033	Day (Entry 1-8)	0 (1=Monday)
1006, 1010, 1014, 1018, 1022, 1026, 1030, 1034	Week (Entry 1-8)	1, 2, 3 or 4
1007, 1011, 1015, 1019, 1023, 1027, 1031, 1035	Duration (Entry 1-8)	0 s

6.5.8 TIME SETTINGS

Configuration Parameters – Time (Page 11)		
1101	Time of Day	0:00:00
1102	RESERVED	
1103	RESERVED	
1104	Day of Month	1-31
1105	Month of Year	1-12
1106	Year	0-99

6.5.9 MAINTENANCE ALARM SETTINGS

Configuration Parameters – Maintenance Alarms (Page 12)		
1201	Oil Maintenance Alarm Enable	On (1), Off (0)
1202	Oil Maintenance Alarm Action	0 (Action)
1203	Oil Maintenance Alarm Engine Hours	0 h
1204	Air Maintenance Alarm Enable	On (1), Off (0)
1205	Air Maintenance Alarm Action	0 (Action)
1206	Air Maintenance Alarm Engine Hours	0 h
1207	Fuel Maintenance Alarm Enable	On (1), Off (0)
1208	Fuel Maintenance Alarm Action	0 (Action)
1209	Fuel Maintenance Alarm Engine Hours	0 h

6.6 SELECTABLE PARAMETERS

6.6.1 INPUT SOURCES

Input Sources	
0	User Configured
1-2	RESERVED
3	Auto Start Inhibit
4	Lamp Test
5	Alarm Mute
6	Alarm Reset
7	RESERVED
8	Simulate Start Button
9	Simulate Stop Button
10	RESERVED
11	Simulate Auto Button
12-18	RESERVED
19	External Panel Lock
20	RESERVED
21	Oil Pressure Switch
22	Coolant Temperature Switch
23-24	RESERVED
25	Remote Start
26-32	RESERVED
33	Low Fuel Level Switch
34	Smoke Limiting
35-42	RESERVED
43	Emergency Stop
44	RESERVED
45	Maintenance Reset Oil
46	Maintenance Reset Air
47	Maintenance Reset Fuel
48-52	RESERVED
53	Remote Stop
54	Protections Disable

6.6.2 OUTPUT SOURCES

Output Sources	
0	Not Used
1	Air Flap Relay
2	Audible Alarm
3	Battery Over Volts Warning
4	Battery Under Volts Warning
5-9	RESERVED
10	Charge Alternator Shutdown
11	Charge Alternator Warning
12-16	RESERVED
17	Common Alarm
18	RESERVED
19	Common Shutdown
20	Common Warning
21	RESERVED
22	Digital Input A
23	Digital Input B
24	Digital Input C
25	Digital Input D
26-28	RESERVED
29	Emergency Stop
30	Energise To Stop
31	Fail To Start
32	Fail To Stop
33	Fuel Relay
34-41	RESERVED
42	High Coolant Temperature Shutdown
43	Low Oil Pressure Shutdown
44-47	RESERVED
48	Oil Pressure Sensor Open Circuit
49-53	RESERVED
54	Over Speed Shutdown
55	Preheat During Preheat Timer
56	Preheat Until End Of Crank
57	Preheat Until End Of Safety Timer
58	Preheat Until End Of Warming
59	Smoke Limiting
60	Start Relay
61	Temperature Sensor Open Circuit
62	RESERVED
63	Under Speed Shutdown
64	RESERVED
65	Flexible Sensor C High Alarm
66	Flexible Sensor C High Pre-Alarm
67	Flexible Sensor C Low Pre-Alarm
68	Flexible Sensor C Low Alarm
69-72	RESERVED
73	Fuel Sensor High Alarm
74	Fuel Sensor High Pre-Alarm
75	Fuel Sensor Low Pre-Alarm
76	Fuel Sensor Low Alarm
77-80	RESERVED
81	Air Filter Maintenance Output
82	Oil Filter Maintenance Output
83	Fuel Filter Maintenance Output

Output Sources	
84	System In Stop Mode
85	System In Auto Mode
86	System In Manual Mode
87	RESERVED
88	Analogue Input A (Digital)
89	Analogue Input B (Digital)
90	Analogue Input C (Digital)
91-92	RESERVED
93	Loss of MPU Signal
94	MPU Open Circuit
95	Over Speed Overshoot
96-108	RESERVED
109	Protections Disabled*

*Only configurable using DSE Configuration Suite.

6.6.3 ALARM ACTION

Alarm Action	
Index	**Action**
0	Reserved
1	Shutdown
2	Warning

6.6.4 POWER UP MODE

Power Up Mode	
Index	**Mode**
0	Stop
1	Manual
2	Auto

6.6.5 SENSOR TYPE

Sensor Type	
Index	**Type**
0	None
1	Digital Input
2	Percentage Sensor
3	Pressure Sensor
4	Temperature Sensor

6.6.6 DIGITAL INPUT ALARM ARMING

Digital Input Alarm Arming	
Index	**Arming**
0	Always
1	From Safety On
2	From Starting
3	Never

6.6.7 DIGITAL INPUT POLARITY

Digital Input Polarity	
Index	**Polarity**
0	Close to Activate
1	Open to Activate

6.6.8 OUTPUT POLARITY

Output Polarity	
Index	**Polarity**
0	Energise
1	De-Energise

6.6.9 PRESSURE SENSOR LIST

Pressure Sensor List	
Index	**Type**
0	Not used
1	Dig Closed for Alarm
2	Dig Open for Alarm
3	VDO 5 Bar
4	VDO 10 Bar
5	Datcon 5 Bar
6	Datcon 10 Bar
7	Datcon 7 Bar
8	Murphy 7 Bar
9	CMB812
10	Veglia
11	User Defined

6.6.10 TEMPERATURE SENSOR LIST

Temperature Sensor List	
Index	**Type**
0	Not Used
1	Dig Closed for Alarm
2	Dig Open for Alarm
3	VDO 120 °C
4	Datcon High
5	Datcon Low
6	Murphy
7	Cummins
8	PT100
9	Veglia
10	Beru
11	User Defined

6.6.11 PERCENTAGE SENSOR LIST

Percentage Sensor List	
Index	**Type**
0	Not Used
1	Dig Closed for Alarm
2	Dig Open for Alarm
3	VDO Ohm (10-180)
4	VDO Tube (90-0)
5	US Ohm (240-33)
6	GM Ohm (0-90)
7	GM Ohm (0-30)
8	Ford (73-10)
9	User Defined

7 COMMISIONING

NOTE: If Emergency Stop feature is not required, link the input to the DC Negative or disable the input. For further details of module configuration, refer to DSE Publication: *057-267 DSEE100 Configuration Software Manual.*

Before the system is started, it is recommended that the following checks are made:

- The unit is adequately cooled and all the wiring to the module is of a standard and rating compatible with the system. Check all mechanical parts are fitted correctly and that all electrical connections (including earths) are sound.
- The unit DC supply is fused and connected to the battery and that it is of the correct polarity.
- The Emergency Stop input is wired to an external **normally closed** switch connected to **DC negative**.
- To check the start cycle operation, take appropriate measures to prevent the engine from starting (disable the operation of the fuel solenoid). After a visual inspection to ensure it is safe to proceed, connect the battery supply. Press the ***Manual/Start Mode*** button, the unit start sequence commences.
- The starter engages and operates for the pre-set crank period. After the starter motor has attempted to start the engine for the pre-set number of attempts, the LCD displays ***Fail to Start***. Press the ***Stop/Reset Mode*** button to reset the unit.
- Restore the engine to operational status (reconnect the fuel solenoid). Press the ***Manual/Start Mode*** button. This time the engine should start and the starter motor should disengage automatically. If not then check that the engine is fully operational (fuel available, etc.) and that the fuel solenoid is operating. The engine should now run up to operating speed. If not, and an alarm is present, check the alarm condition for validity, then check input wiring. The engine should continue to run for an indefinite period. It is possible at this time to view the engine parameters - refer to the 'Description of Controls' section of this manual.
- Press the ***Auto Mode*** button, the engine runs for the pre-set cooling down period, then stop. The set should stay in the standby mode. If it does not, check that the *Remote Start* input is not active.
- Initiate an automatic start by supplying the remote start signal (if configured). The start sequence commences and the engine runs up to operational speed. Check the Warming timer has timed out.
- Remove the remote start signal. The return delay timer begins. After the pre-set time, the set is stopped.
- Set the modules internal clock/calendar to ensure correct operation of the scheduler and event logging functions. For details of this procedure see section entitled *Front Panel Configuration*.
- If, despite repeated checking of the connections between the controller and the customer's system, satisfactory operation cannot be achieved, then contact DSE Technical Support Department. E-mail: support@deepseaelectronics.com

8 FAULT FINDING

NOTE: The below fault finding is provided as a guide check-list only. As the module can be configured to provide a wide range of different features, always refer to the source of the module configuration if in doubt.

8.1 STARTING

Symptom	Possible Remedy
Unit is inoperative Read/Write configuration does not operate	Check the battery and wiring to the unit. Check the DC supply. Check the DC fuse.
Unit shuts down	Check DC supply voltage is not above 35 Volts or below 9 Volts Check the operating temperature is not above 70°C. Check the DC fuse.
Fail to Start is activated after pre-set number of attempts to start	Check wiring of fuel solenoid. Check fuel. Check battery supply. Check battery supply is present on the Fuel output of the module. Check the speed-sensing signal is present on the module's inputs. Refer to engine manual.
Continuous starting of set when in the ***Auto Mode***	Check that there is no signal present on the "Remote Start" input. Check configured polarity is correct.
Engine fails to start on receipt of Remote Start signal.	Check Start Delay timer has timed out. Check signal is on "Remote Start" input. Confirm correct configuration of input is configured to be used as "Remote Start". Check that the oil pressure switch or sensor is indicating low oil pressure to the controller. Depending upon configuration, the set does not start if oil pressure is not low.
Pre-heat inoperative	Check wiring to engine heater plugs. Check battery supply. Check battery supply is present on the Pre-heat output of module. Check pre-heat configuration is correct.
Starter motor inoperative	Check wiring to starter solenoid. Check battery supply. Check battery supply is present on the Starter output of module. Ensure oil pressure switch or sensor is indicating the "low oil pressure" state to the controller.

8.2 ALARMS

Symptom	Possible Remedy
Low Oil Pressure operates after engine has fired	Check engine oil pressure. Check oil pressure switch/sensor and wiring. Check configured polarity (if applicable) is correct (i.e. Normally Open or Normally Closed) or that sensor is compatible with the module and is correctly configured.
High Coolant Temperature operates after engine has fired.	Check engine temperature. Check switch/sensor and wiring. Check configured polarity (if applicable) is correct (i.e. Normally Open or Normally Closed) or that sensor is compatible with the module.
Shutdown fault operates	Check relevant switch and wiring of fault indicated on LCD display. Check configuration of input.
Warning fault operates	Check relevant switch and wiring of fault indicated on LCD display. Check configuration of input.
Incorrect reading on Engine gauges ***Fail To Stop*** when engine is at rest	Check engine is operating correctly. Check sensor and wiring paying particular attention to the wiring to terminal 10. Check that sensor is compatible with the module and that the module configuration is suited to the sensor.

8.3 MISCELLANEOUS

Symptom	Possible Remedy
Module appears to 'revert' to an earlier configuration	When editing a configuration using the PC software it is vital that the configuration is first 'read' from the controller before editing it. This edited configuration must then be "written" back to the controller for the changes to take effect. When editing a configuration using the fascia editor, be sure to press the ***Auto Mode*** button to save the change before moving to another item or exiting the fascia editor

9 MAINTENANCE, SPARES, REPAIR AND SERVICING

The controller is *Fit and Forget*. As such, there are no user serviceable parts within the controller. In the case of malfunction, you should contact your original equipment manufacturer (OEM).

9.1 PURCHASING ADDITIONAL CONNECTOR PLUGS FROM DSE

If you require additional plugs from DSE, please contact our Sales department using the part numbers below.

9.1.1 PACK OF PLUGS

Module Type	Plug Pack Part Number
DSEE100	007-1008

9.1.2 INDIVIDUAL PLUGS

Module Terminal Designation	Plug Description	Part No.
1-9	9 way 5.08mm	007-167
10-20	11 way 5.08mm	007-451

9.2 PURCHASING ADDITIONAL FIXING CLIPS FROM DSE

Item	Description	Part No.
	Module Fixing Clips (Packet Of 2)	020-406

9.3 PURCHASING ADDITIONAL SEALING GASKET FROM DSE

Item	Description	Part No.
	Module Silicon Sealing Gasket	020-282

10 WARRANTY

DSE Provides limited warranty to the equipment purchaser at the point of sale. For full details of any applicable warranty, refer to the original equipment supplier (OEM)

11 DISPOSAL

11.1 WEEE (WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT)

If you use electrical and electronic equipment you must store, collect, treat, recycle and dispose of WEEE separately from your other waste

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