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DSEULTRA[®]

DSE6000 Series Control Module

Document Number 057-095

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DSE Model 6000 series Control and Instrumentation System Operators Manual

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Amendments since last publication

Amd. No.	Comments
1	Corrected configuration tables to reflect first release of module, added more detail to most sections.
2	Added detail about sleep mode (Iss 3.1)
3	Corrected part number error (Iss 3.2)
4	Changed incorrect 7000 series wording to suit 6000 series (Iss 3.3)
5	Corrected other typographical errors (Iss 3.4)
6	Added scheduler, clock and start on low battery to front panel configuration table (Iss 3.5)

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.

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1 BIBLIOGRAPHY

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

1.1 INSTALLATION INSTRUCTIONS

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

DSE PART	DESCRIPTION
053-059	6110 installation instructions
053-060	6120 installation instructions
053-061	6130 installation instructions

1.2 TRAINING GUIDES

Training Guides are produced to give 'handout' sheets on specific subjects during training sessions.

DSE PART	DESCRIPTION
056-005	Using CTs with DSE products
056-010	Overcurrent protection
056-022	Breaker Control
056-029	Smoke Limiting
056-030	Module PIN codes

1.3 MANUALS

DSE PART	DESCRIPTION
057-004	Electronic Engines and DSE wiring manual
057-100	6000 Series Configuration Suite manual

2 INTRODUCTION

This document details the installation and operation requirements of the DSE6000 Series modules, part of the DSEUltra® 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*. You will not be automatically informed of updates. Any future updates of this document will be included on the DSE website at www.deepseapl.com

The **DSE 6100 series** module has been designed to allow the operator to start and stop the engine/generator, and if required, transfer the load.

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

The **DSE 6100** 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. The LCD display indicates the fault.

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

- *Text based LCD display*
- **True RMS** Voltage monitoring.
- *Engine parameter monitoring.*
- *Fully configurable inputs for use as alarms or a range of different functions.*
- *Engine ECU interface to **electronic engines** (specify on ordering)*
- *Magnetic pickup interface for engine only applications (specify on ordering)*

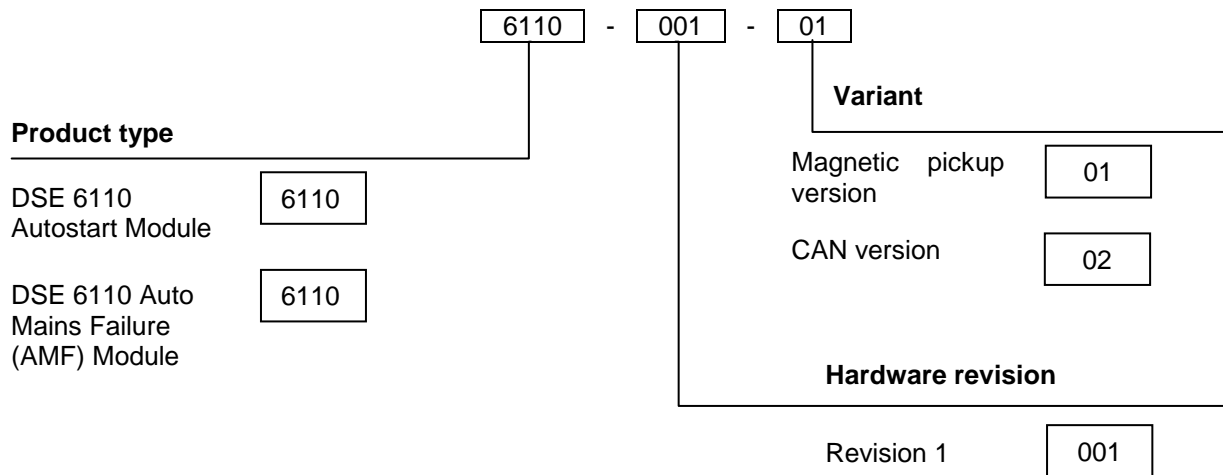
Using a PC and the 6000 series configuration software allows alteration of selected operational sequences, timers and alarm trips.

Additionally, the module's integral fascia configuration editor allows adjustment of this information.

A robust plastic case designed for front panel mounting houses the module. Connections are via locking plug and sockets.

3 SPECIFICATIONS

3.1 PART NUMBERING




At the time of this document production, there have been no revisions to the module hardware.

3.1.1 SHORT NAMES

Short name	Description
61xx	DSE 6100 series control module
61x0-xxx-01	DSE6100 series control module (Magnetic pickup version)
61x0-xxx-02	DSE6100 series control module (CAN bus version)

3.2 TERMINAL SPECIFICATION

Connection type	Two part connector. <ul style="list-style-type: none"> • Male part fitted to module • Female part supplied in module packing case - Screw terminal, rising clamp, no internal spring. 	 <p>Example showing cable entry and screw terminals of a 10 way connector</p>
Minimum cable size	0.5mm ² (AWG 24)	
Maximum cable size	2.5mm ² (AWG 10)	

NOTE : For purchasing additional connector plugs from DSE, please see the section entitled **Maintenance, Spares, Repair and Servicing** elsewhere in this document.

3.3 POWER SUPPLY REQUIREMENTS

Minimum supply voltage	8V continuous
Cranking dropouts	Able to survive 0V for 50mS providing the supply was at least 10V before the dropout and recovers to 5V afterwards. This is more than sufficient to allow the module to operate during engine cranking where the battery supply often falls as low as 4V (on a 12V system!) This is achieved without the need for internal batteries or other external requirements.
Maximum supply voltage	35V continuous (60V protection)
Reverse polarity protection	-35V continuous
Maximum operating current	160mA at 24V 340mA at 12V
Maximum standby current	80mA at 24V 160mA at 12V
Current when in Sleep Mode	50mA @ 12V 32mA @ 24V

3.3.1 PLANT SUPPLY INSTRUMENTATION DISPLAY

Range	0V-70V DC (note Maximum continuous operating voltage of 35V DC)
Resolution	0.1V
Accuracy	±1% full scale (±0.7V)

3.4 GENERATOR VOLTAGE / FREQUENCY SENSING

Measurement type	True RMS conversion
Sample Rate	5KHz or better
Harmonics	Up to 11 th or better
Input Impedance	300K Ω ph-N
Phase to Neutral	15V to 333V AC (max)
Phase to Phase	25V to 576V AC (max)
Common mode offset from Earth	100V AC (max)
Resolution	1V AC phase to neutral 2V AC phase to phase
Accuracy	±1% of full scale phase to neutral ±2% of full scale phase to phase
Minimum frequency	3.5Hz
Maximum frequency	75.0Hz
Frequency resolution	0.1Hz
Frequency accuracy	±0.2Hz

3.5 INPUTS

3.5.1 DIGITAL INPUTS

Number	6
Arrangement	Contact between terminal and ground
Low level threshold	40% of DC supply voltage
High level threshold	60% of DC supply voltage
Maximum input voltage	DC supply voltage positive terminal
Minimum input voltage	DC supply voltage negative terminal
Contact wetting current	2.5mA @ 12V typical 5mA @ 24V typical
Open circuit voltage	Plant supply

3.5.2 CHARGE FAIL INPUT

Minimum voltage	0V
Maximum voltage	35V (plant supply)
Resolution	0.2V
Accuracy	± 1% of max measured voltage
Excitation	Active circuit constant power output
Output Power	2.5W Nominal @ 12V and 24V
Current at 12V	210mA
Current at 24V	105mA

3.5.3 MAGNETIC PICKUP

Type	Single ended input, capacitive coupled
Minimum voltage	0.5V RMS
Max common mode voltage	±2V
Maximum voltage	Clamped to ±70V by transient suppressers, dissipation not to exceed 1W.
Maximum frequency	10,000Hz
Resolution	6.25 RPM
Accuracy	±25 RPM
Flywheel teeth	10 to 500

▲ NOTE : DSE can supply a suitable magnetic pickup device, available in two body thread lengths :
DSE Part number 020-012 - Magnetic Pickup probe 5/8 UNF 2½" 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 DSE6100 series module and the engine governor. The possibility of this depends upon the amount of current that the magnetic pickup can supply.

3.6 OUTPUTS

3.6.1 OUTPUTS A & B (FUEL AND START)

Type	Fuel (A) and Start (B) outputs. Supplied from DC supply terminal 2. Fully configurable when CAN engine is selected.
Rating	2A @ 35V
Protection	Protected against over current & over temperature. Built in load dump feature.

3.6.2 CONFIGURABLE OUTPUTS C, D, E & F

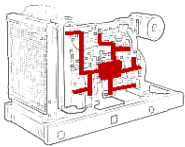
Type	Fully configurable, supplied from DC supply terminal 2.
Rating	2A @ 35V
Protection	Protected against over current & over temperature. Built in load dump feature.

3.7 COMMUNICATION PORTS

USB Port	USB2.0 Device for connection to PC running DSE configuration suite only
CAN Port	Engine CAN Port Standard implementation of 'Slow mode', up to 250K bits/s Non Isolated. Internal Termination provided (120Ω)

3.8 COMMUNICATION PORT USAGE

3.8.1 CAN INTERFACE



Modules are fitted with the CAN interface as standard and are capable of receiving engine data from engine CAN controllers compliant with the CAN standard. CAN enabled engine controllers monitor the engine's operating parameters such as engine speed, oil pressure, engine temperature (among others) in order to closely monitor and control the engine. The industry standard communications interface (CAN)

transports data gathered by the engine controller interface. This allows generator controllers such as the DSE6100 series to access these engine parameters with no physical connection to the sensor device.

NOTE:- For further details for connections to CAN enabled engines and the functions available with each engine type, refer to the manual *Electronic Engines and DSE Wiring. Part No. 057-004*

3.8.2 USB CONNECTION

The USB port is provided to give a simple means of connection between a PC and the DSE6000 series controller. Using the DSE Configuration Suite Software, the operator is then able to control the module, starting or stopping the generator, selecting operating modes, etc.

Additionally, the various operating parameters (such as output volts, oil pressure, etc.) of the remote generator are available to be viewed or changed.

To connect a DSE6000 series module to a PC by USB, the following items are required:

- DSE6100 series module
- DSE configuration software (Supplied on configuration suite software CD or available from www.deepseapl.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

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

NOTE:- Refer to DSE6100 series software Manual for further details on configuring, monitoring and control.

3.9 ACCUMULATED INSTRUMENTATION

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

Engine hours run	Maximum 99999 hrs 59 minutes (approximately 11yrs 4months)
Number of starts	1,000,000 (1 million)

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 your generator supplier.

3.10 DIMENSIONS AND MOUNTING

3.10.1 DIMENSIONS

216mm x 158mm x 42mm
(8.5" x 6.2" x 1.6")

3.10.2 PANEL CUTOUT

182mm x 137mm
(7.2" x 5.4")

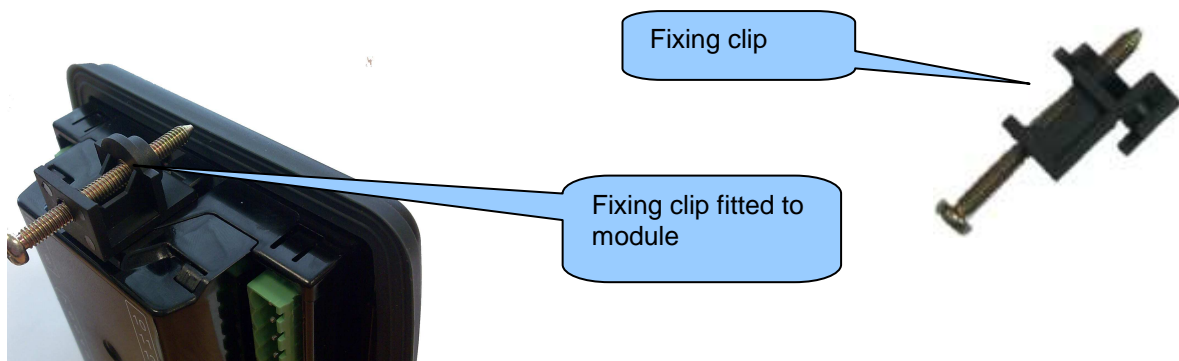
3.10.3 WEIGHT

510g (0.51kg)

3.10.4 FIXING CLIPS

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 6000 series 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 screws a little more to secure the module into the panel fascia. Care should be taken not to over tighten the fixing clip screws.

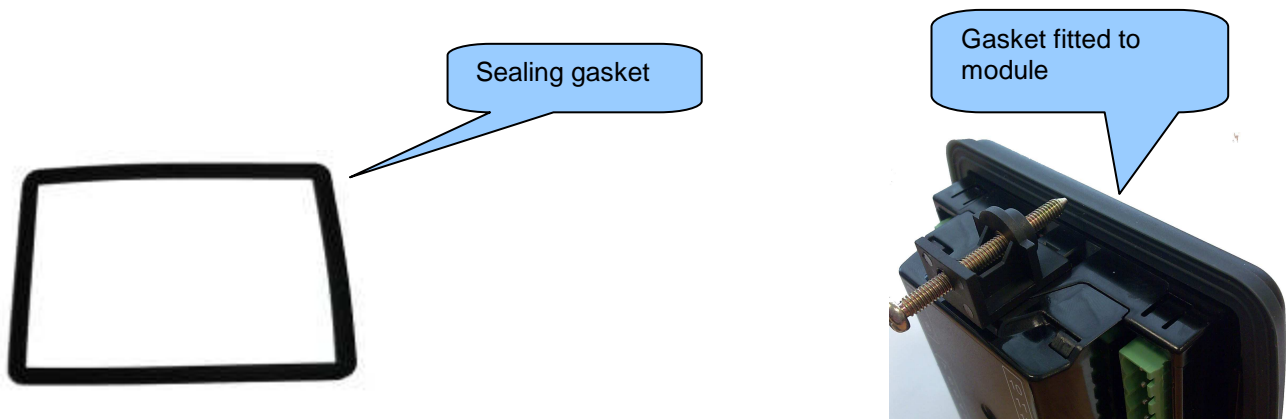


NOTE:- In conditions of excessive vibration, mount the panel on suitable anti-vibration mountings.

3.10.5 OPTIONAL SILICON SEALING GASKET

The optional silicon gasket provides improved sealing between the 6000 series 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.



3.11 APPLICABLE STANDARDS

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, <i>function numbers can also be used to represent functions in microprocessor devices and software programs.</i> The 3000 series controller is device number 11L-6000 (Multifunction device protecting Line (generator) – 6000 series module). As the module is configurable by the generator OEM, the functions covered by the module will vary. Under the module's factory configuration, the device numbers included within the module are : 2 – Time delay starting or closing relay 6 – Starting circuit breaker 30 – annunciator relay 42 – Running circuit breaker 54 – turning gear engaging device 62 – time delay stopping or opening relay 63 – pressure switch 74– alarm relay 81 – frequency relay 86 – lockout relay

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

3.11.1 ENCLOSURE CLASSIFICATIONS

IP CLASSIFICATIONS

7000 series 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	Second Digit
Protection against contact and ingress of solid objects 0 No protection	Protection against ingress of water 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 interfere 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).

NEMA CLASSIFICATIONS

7000 series NEMA Rating (Approximate)

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)



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






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.

4 INSTALLATION

The DSE6000 Series module is designed to be mounted on the panel fascia. For dimension and mounting details, see the section entitled *Specification, Dimension and mounting* elsewhere in this document.


4.1 TERMINAL DESCRIPTION

4.1.1 DC SUPPLY, FUEL AND START OUTPUTS

	PIN No	DESCRIPTION	CABLE SIZE	NOTES
	1	DC Plant Supply Input (Negative)	2.5mm ² AWG 13	
	2	DC Plant Supply Input (Positive)	2.5 mm ² AWG 13	(Recommended Maximum Fuse 15A anti-surge) Supplies the module (2A anti-surge requirement) and all output relays
	3	Emergency Stop	1.0mm ² AWG 18	Plant Supply Positive from terminal 2. 3 Amp rated.
	4	Output A	1.0mm ² AWG 18	Plant Supply Positive from terminal 2. 3 Amp rated. Normally used for FUEL control.
	5	Output B	1.0mm ² AWG 18	Plant Supply Positive from terminal 2. 3 Amp rated. Normally used for START control.
	6	Charge fail / excite	2.5mm ² AWG 13	Do not connect to ground (battery negative). If charge alternator is not fitted, leave this terminal disconnected.
	7	System Earthth	1.0mm ² AWG 18	
	8	Output C	1.0mm ² AWG 18	Plant Supply Positive from terminal 2. 3 Amp rated. Normally used for Generator load switch control.
	9	Output D	1.0mm ² AWG 18	Plant Supply Positive from terminal 2. 3 Amp rated. Normally used for Mains load switch control (DSE6120)
	10	Output E	1.0mm ² AWG 18	Plant Supply Positive from terminal 2. 3 Amp rated.
	11	Output F	1.0mm ² AWG 18	Plant Supply Positive from terminal 2. 3 Amp rated.

NOTE:- When the module is configured for operation with an electronic engine, FUEL and START output requirements may be different. Refer to *Electronic Engines and DSE Wiring* for further information. DSE Part No. 057-004.


4.1.2 ANALOGUE SENSORS

	PIN No	DESCRIPTION	CABLE SIZE	NOTES
	12	Sensor Common Return	0.5mm ² AWG 20	Return feed for sensors*
	13	Oil Pressure Input	0.5mm ² AWG 20	Connect to Oil pressure sensor
	14	Coolant Temperature Input	0.5mm ² AWG 20	Connect to Coolant Temperature sensor
	15	Flexible Sensor Input	0.5mm ² AWG 20	Connect to sensor

▲ NOTE:- . It is **VERY** important that terminal 12 (sensor common) is soundly 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 **SEPERATE** earth connection from the system earth star point, to terminal 12 directly, and not use this earth for other connections.

▲ NOTE:- . If you use PTFE insulating tape on the sensor thread when using earth return sensors, ensure you do not insulate the entire thread, as this will prevent the sensor body from being earthed via the engine block.


4.1.3 MAGNETIC PICKUP

	PIN No	DESCRIPTION	CABLE SIZE	NOTES
	16	Magnetic pickup Positive	0.5mm ² AWG 20	Connect to Magnetic Pickup device
	17	Magnetic pickup Negative	0.5mm ² AWG 20	Connect to Magnetic Pickup device
	18	Magnetic pickup screen	0.5mm ² AWG 20	Do not connect the other end to earth!


▲ NOTE:- Magnetic Pickup interface is not fitted to the 6110-xx-00 module

▲ NOTE:- Screened cable must be used for connecting the Magnetic Pickup, ensuring that the screen is earthed at one end **ONLY**.



4.1.4 CAN

	PIN No	DESCRIPTION	CABLE SIZE	NOTES
CAN 	16	CAN port H	0.5mm ² AWG 20	Use only 120Ω CAN approved cable
	17	CAN port L	0.5mm ² AWG 20	Use only 120Ω CAN approved cable
	18	CAN port Common	0.5mm ² AWG 20	Use only 120Ω CAN approved cable

 **NOTE:- CAN interface is not fitted to the 6110-xx-01 module**

 **NOTE:- Screened 120Ω impedance cable specified for use with CAN must be used for the CAN link and the Multiset comms link.
DSE stock and supply Belden cable 9841 which is a high quality 120Ω impedance cable suitable for CAN use (DSE part number 016-030)**

4.1.5 GENERATOR / MAINS VOLTAGE SENSING

	PIN No	DESCRIPTION	CABLE SIZE	NOTES
	19	Generator L1 (U) voltage monitoring	1.0mm ² AWG 18	Connect to generator L1 (U) output (AC) (Recommend 2A fuse)
	20	Generator L2 (V) voltage monitoring	1.0mm ² AWG 18	Connect to generator L2 (V) output (AC) (Recommend 2A fuse)
	21	Generator L3 (W) voltage monitoring	1.0mm ² AWG 18	Connect to generator L3 (W) output (AC) (Recommend 2A fuse)
	22	Generator Neutral (N) input	1.0mm ² AWG 18	Connect to generator Neutral terminal (AC)
	23	Mains L1 (R) voltage monitoring	1.0mm ² AWG 18	Connect to Mains L1 (R) output (AC) (Recommend 2A fuse)
	24	Mains L2 (S) voltage monitoring	1.0mm ² AWG 18	Connect to Mains L2 (S) output (AC) (Recommend 2A fuse)
	25	Mains L3 (T) voltage monitoring	1.0mm ² AWG 18	Connect to Mains L3 (T) output (AC) (Recommend 2A fuse)
	26	Mains Neutral (N) input	1.0mm ² AWG 18	Connect to Mains Neutral terminal (AC)

 **NOTE:- Terminals 23-26 are not fitted to the DSE6110.**

4.1.6 GENERATOR CURRENT TRANSFORMERS



WARNING!:- Do not disconnect this plug when the CTs are carrying current. Disconnection will open circuit the secondary of the C.T.'s and dangerous voltages may then develop. Always ensure the CTs are not carrying current and the CTs are short circuit connected before making or breaking connections to the module.



NOTE:- The 6100 series module has a burden of 0.5VA on the CT. Ensure the CT is rated for the burden of the 6100 series controller, the cable length being used and any other equipment sharing the CT. If in doubt, consult your CT supplier.



NOTE:- Take care to ensure correct polarity of the CT primary as shown below. If in doubt, check with the CT supplier.

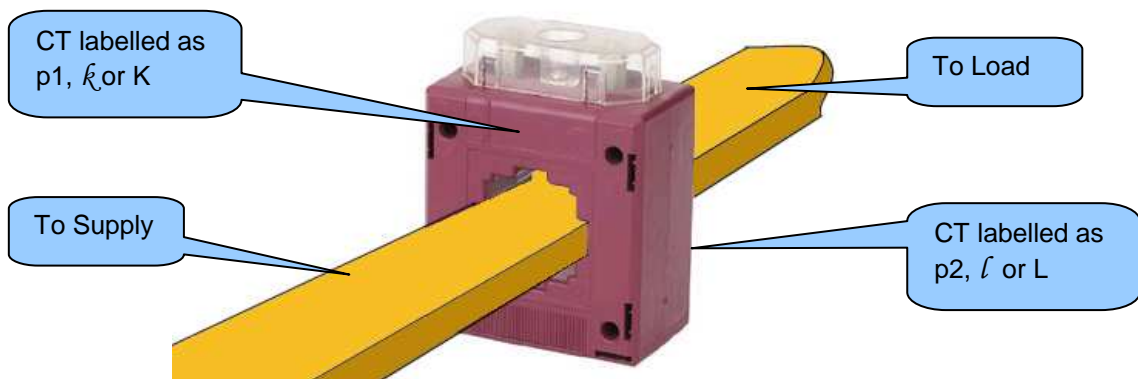
CT LABELLING

p1, κ or K is the primary of the CT that 'points' towards the GENERATOR

p2, ℓ or L is the primary of the CT that 'points' towards the LOAD

s1 is the secondary of the CT that connects to the DSE Module's input for the CT measuring (I1,I2,I3)

s2 is the secondary of the CT that should be commoned with the s2 connections of all the other CTs and connected to the CT common terminal of the DSE6100 series modules.




	27	Generator I1 Current Transformer	1.0mm ² AWG 18	Connect to generator CT 1 (s1)
	28	Generator I2 Current Transformer	1.0mm ² AWG 18	Connect to generator CT 2 (s1)
	29	Generator I3 Current Transformer	1.0mm ² AWG 18	Connect to generator CT 3 (s1)
	30	Generator Current Transformer common connection	1.0mm ² AWG 18	Connect to generator CT common (s2)
	31			





NOTE:- Terminals 30 and 31 are internally connected to each other.

4.1.7 DIGITAL INPUTS

	PIN No	DESCRIPTION	CABLE SIZE	NOTES
	32	Configurable digital input A	0.5mm ² AWG 20	Switch to negative
	33	Configurable digital input B	0.5mm ² AWG 20	Switch to negative
	34	Configurable digital input C	0.5mm ² AWG 20	Switch to negative
	35	Configurable digital input D	0.5mm ² AWG 20	Switch to negative
	36	Configurable digital input E	0.5mm ² AWG 20	Switch to negative
	37	Configurable digital input F	0.5mm ² AWG 20	Switch to negative

This configuration cable is the same as normally used between a PC and a USB printer.

4.1.8 PC CONFIGURATION INTERFACE CONNECTOR

	DESCRIPTION	CABLE SIZE	NOTES
	Socket for connection to PC with DSE Configuration Suite PC software.	0.5mm ² AWG 20	This is a standard USB type A to type B cable. 

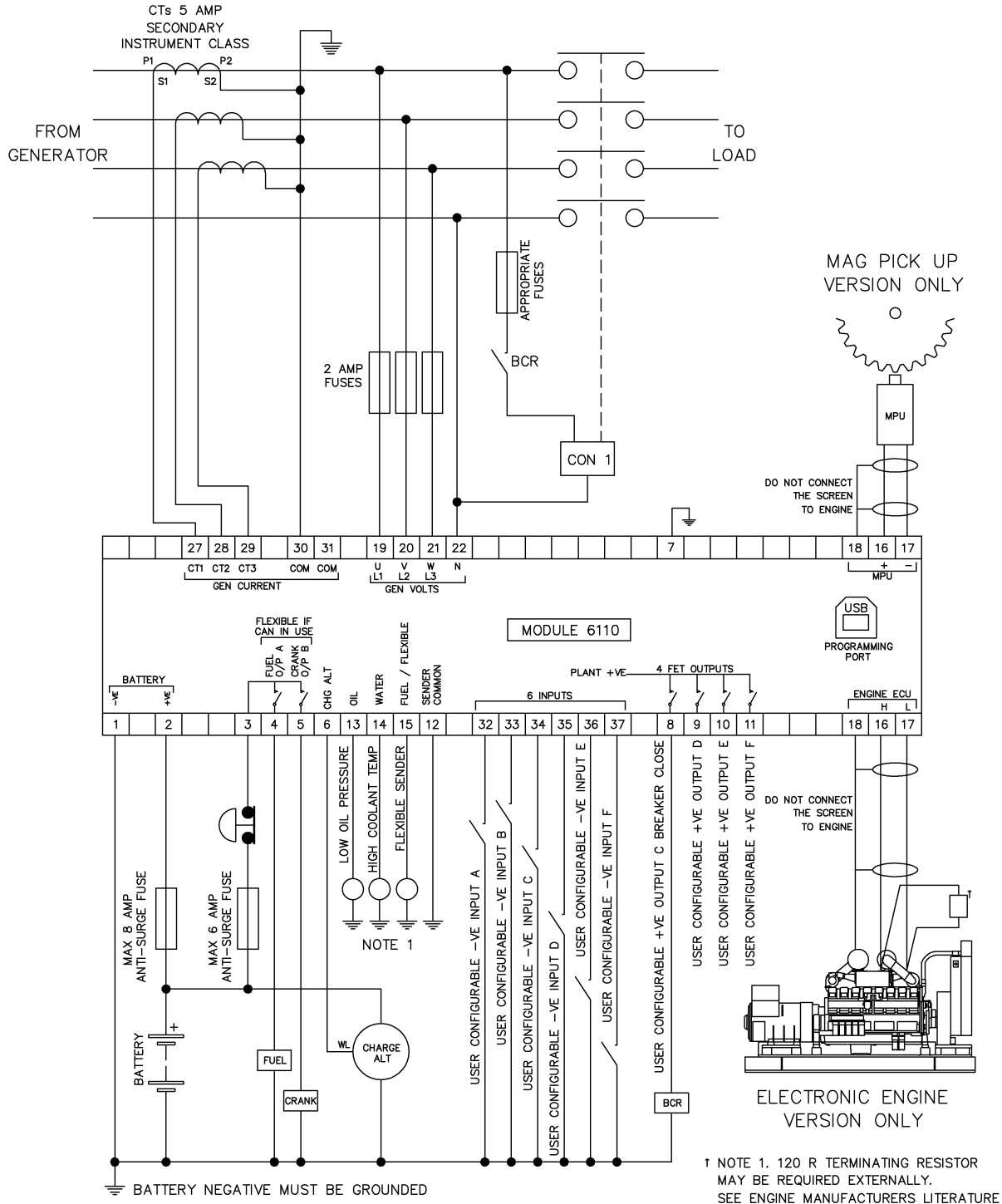
NOTE:- The USB connection cable between the PC and the 6000 series module must not be extended beyond 5m (5yds). For distances over 5m, it is possible to use a third party USB extender. Typically, they extend USB up to 50m (yds). The supply and support of this type of equipment is outside the scope of Deep Sea Electronics PLC.

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

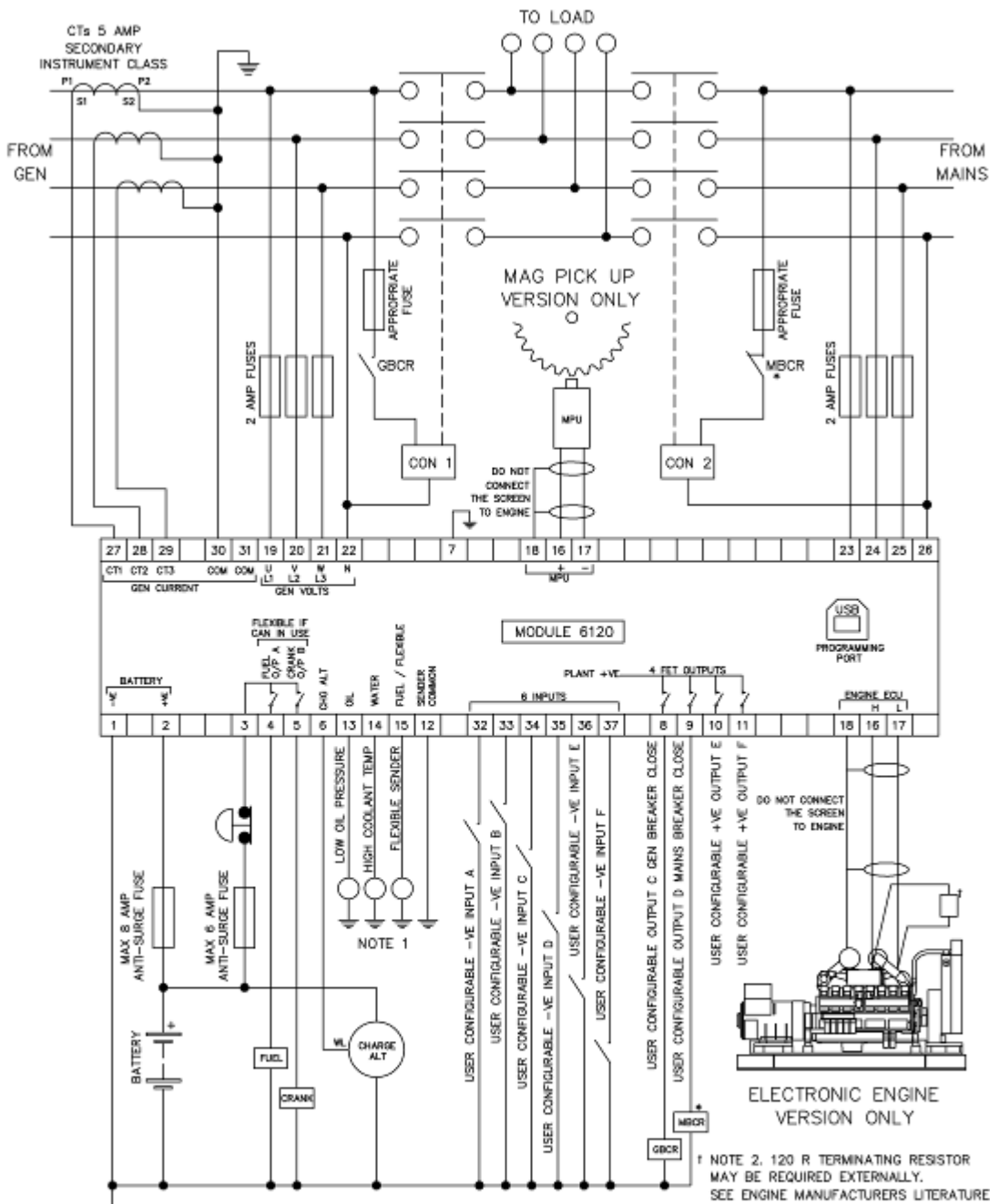
CAUTION! This socket must not be used for any other purpose.

4.2 TYPICAL WIRING DIAGRAMS

4.2.1 DSE 6110 AUTOSTART MODULE



4.2.2 DSE 6120 AUTO MAIN FAILURE MODULE



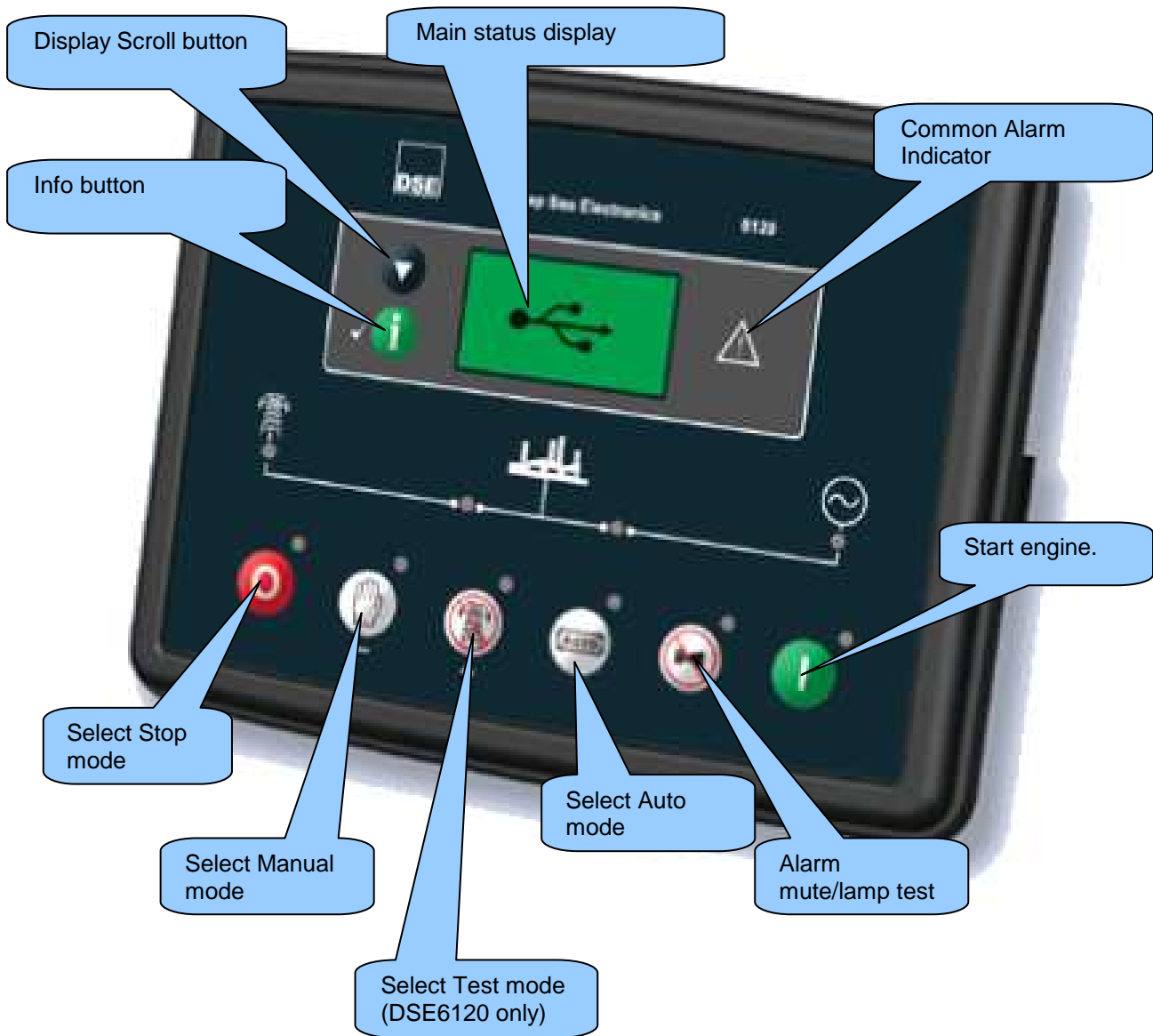
TERMINALS SUITABLE FOR 22-16 AWG (0.6mm - 1.3mm) FIELD WIRING
TIGHTENING TORQUE = 0.8Nm (7lb-in)

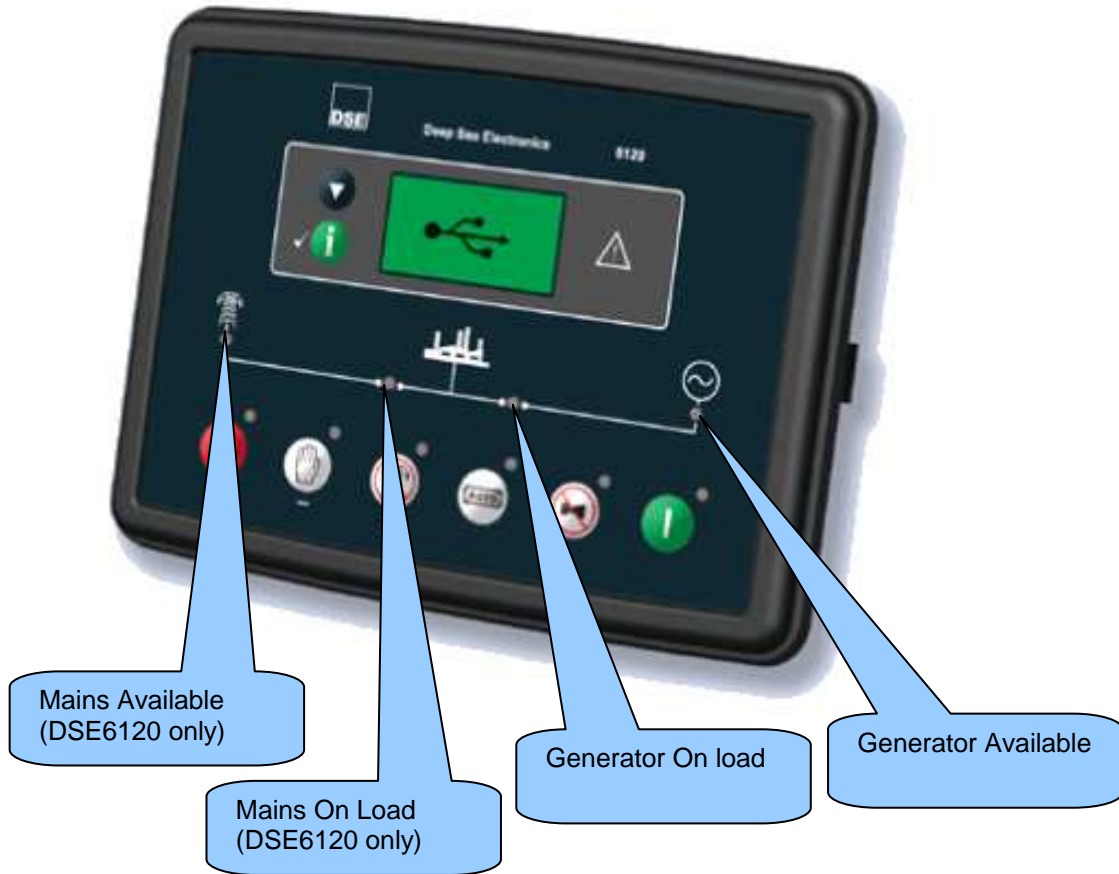
NOTE 1
THESE GROUND CONNECTIONS MUST BE ON THE ENGINE BLOCK, AND MUST BE TO THE SENDER BODIES.

* NOTE 3. MAINS BREAKER CLOSED OUTPUT SHOULD BE CONFIGURED FOR DE-ENERGISE CLOSE MAINS, AND USE THE NORMALLY CLOSED CONTACTS OF MSCR

5 DESCRIPTION OF CONTROLS

The following section details the function and meaning of the various controls on the module.





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 manual.

5.1.2 STOPPING THE ENGINE




NOTE:- For further details, see the section entitled 'OPERATION' elsewhere in this manual.

5.2 GRAPHICAL DISPLAY

- 4- line, 64 x 132 small Graphic Display with LED Backlight
- Icon and numeric display. Switch to select 'Icon' or 'English' display
- Software controlled contrast
- Mimic of Text insert / 4x indicators required via LCD
-

5.3 VIEWING THE INSTRUMENTS

It is possible to scroll to display the different pages of information by repeatedly operating the scroll button 

Once selected the page will remain on the LCD display until the user selects a different page or after an extended period of inactivity, the module will revert to the status display.

When scrolling manually, the display will automatically return to the Status page if no buttons are pressed for the duration of the configurable *LCD Page Timer*.













If an alarm becomes active while viewing the status page, the display shows the Alarms page to draw the operator's attention to the alarm condition.

Metering: Generator Voltage, 3-phase, L-L and L-N
Generator Amps L1, L2 and L3 (On/Off selectable in software)
Generator Frequency
Mains Voltage, 3-phase, L-L and L-N
Battery Voltage
Engine hours Run
Oil Pressure Gauge
Engine Temperature Gauge
Fuel Level
Fail to Start

Indicators:
Fail to Stop
Low Oil pressure
High Engine Temperature
Under/Over-speed
Under/Over voltage – Warning, Shutdown or Electrical Trip
Emergency Stop
Failed to reach loading voltage
Failed to reach loading frequency
Charge Fail
Over Current – Warning, Shutdown or Electrical Trip
Low DC Voltage
+ AMF indications
+ CAN diagnostics


At power up, the display will display the software version, then display the default display screen, which will display Generator Frequency.

5.4 CONTROLS

<p>Stop / Reset This button places the module into its Stop/Reset mode. This will clear any alarm conditions for which the triggering criteria have been removed. If the engine is running and the module is in Stop mode, the module will automatically instruct the changeover device to unload the generator ('Close Generator' becomes inactive (if used)). The fuel supply de-energises and the engine comes to a standstill. Should a remote start signal be present while operating in this mode, a remote start will <u>not</u> occur.</p>	
<p>Manual This mode allows manual control of the generator functions. Once in Manual mode the module will respond to the start  button, start the engine, and run off load. If the engine is running off-load in the Manual mode and a remote start signal becomes present, the module will automatically instruct the changeover device to place the generator on load ('Close Generator' becomes active (if used)). Upon removal of the remote start signal, the generator remains on load until either selection of the 'STOP/RESET' or 'AUTO' modes. <i>For further details, please see the more detailed description of 'Manual operation' elsewhere in this manual.</i></p>	
<p>Auto This button places the module into its 'Automatic' mode. This mode allows the module to control the function of the generator automatically. The module will monitor the <i>remote start</i> input and mains supply status and once a start request is made, the set will be automatically started and placed on load. Upon removal of the starting signal, the module will automatically transfer the load from the generator and shut the set down observing the <i>stop delay</i> timer and <i>cooling</i> timer as necessary. The module will then await the next start event. <i>For further details, please see the more detailed description of 'Auto operation' elsewhere in this manual.</i></p>	
<p>Test (DSE7220/DSE7320 only) This button places the module into its 'Test' mode. This allows an on load test of the generator. Once in Test mode the module will respond to the start  button, start the engine, and run on load. <i>For further details, please see the more detailed description of 'Test operation' elsewhere in this manual.</i></p>	
<p>Start This button is only active in STOP/RESET  or MANUAL  mode. Pressing this button in manual or test mode will start the engine and run off load (manual) or on load (test). Pressing this button in STOP/RESET mode will turn on the CAN engine ECU (when correctly configured and fitted to a compatible engine ECU)</p>	
<p>Mute / Lamp Test This button silences the audible alarm if it is sounding and illuminates all of the LEDs as a lamp test feature/ When correctly configured and fitted to a compatible engine ECU, pressing this button in STOP/RESET mode after pressing the START  button (to power the ECU) will cancel any "passive" alarms on the engine ECU.</p>	
<p>SCROLL This buttons scrolls through the instrument display pages</p>	

6 OPERATION

6.1 STOP MODE

STOP mode is activated by pressing the  button.

In STOP mode, the module will remove the generator from load (if necessary) before stopping the engine if it is already running.


If the engine 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 speed is zero as detected by the Magnetic Pickup or CANbus ECU (depending upon module variant).
- Generator frequency must be zero.
- Oil pressure switch must be closed to indicate low oil pressure (MPU version only)

When the engine has stopped, 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 will be reset when STOP mode is entered.

The engine will not be started when in STOP mode. If remote start signals are given, the input is ignored until AUTO mode is entered.

When configured to do so, When left in STOP mode for five minutes with no presses of the fascia buttons, the module enters low power mode. To 'wake' the module, press the  button or any other fascia control button.





6.1.1 ECU OVERRIDE

NOTE:- ECU Override function is only applicable to the CAN variant of the 6100 series controller.

NOTE:- Depending upon system design, the ECU may be powered or unpowered when the module is in STOP mode. ECU override is only applicable if the ECU is unpowered when in STOP mode.

When the ECU powered down (as is normal when in STOP mode), it is not possible to read the diagnostic trouble codes or instrumentation. Additionally, it is not possible to use the engine manufacturers' configuration tools.



As the ECU is usually unpowered when the engine is not running, it must be turned on manually as follows :

- Select STOP  mode on the DSE controller.
- Press and hold the START  button to power the ECU. As the controller is in STOP mode, the engine will not be started.
- Continue to hold the start button for as long as you need the ECU to be powered.
- The ECU will remain powered until a few seconds after the START button is released.

This is also useful if the engine manufacturer's tools need to be connected to the engine, for instance to configure the engine as the ECU needs to be powered up to perform this operation.

6.2 AUTOMATIC MODE

NOTE:- If a digital input configured to *panel lock* is active, changing module modes will not be possible. Viewing the instruments and event logs is NOT affected by panel lock.

Activate auto mode by pressing the  pushbutton. The  icon is displayed to indicate Auto Mode operation if no alarms are present.

Auto mode will allow the generator to operate fully automatically, starting and stopping as required with no user intervention.

6.2.1 WAITING IN AUTO MODE

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

- Mains failure (DSE6120 only)
- Activation of an auxiliary input that has been configured to *remote start*
- Activation of the inbuilt exercise scheduler.


6.2.2 STARTING SEQUENCE

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

Should all start requests be removed during the *start delay* timer, the unit will return 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 will be cranked.

NOTE:- If the unit has been configured for CAN, compatible ECU's will receive the start command via CAN.

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 will be terminated and the display shows  **Fail to Start**.


When the engine fires, the starter motor is disengaged. Speed detection is factory configured to be derived from the main alternator output frequency but can additionally be measured from a Magnetic Pickup mounted on the flywheel (Selected by PC using the 3000 series configuration software).

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

NOTE:- If the unit has been configured for CAN, speed sensing is via CAN.

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

6.2.3 ENGINE RUNNING

Once the engine is running and all starting timers have expired, the animated  icon is displayed.

DSE6110 - The generator will be placed on load if configured to do so.

▲ NOTE:-The load transfer signal remains inactive until the Oil Pressure has risen. This prevents excessive wear on the engine.

If all start requests are removed, the *stopping sequence* will begin.

6.2.4 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 the cooling down period, the set will return on load.


If there are no starting requests at the end of the *return delay* timer, the load is removed from the generator to the mains supply and the *cooling* timer is initiated.

The *cooling* timer allows the set to run off load and cool sufficiently before being stopped. This is particularly important where turbo chargers are fitted to the engine.


After the *cooling* timer has expired, the set is stopped.



6.3 MANUAL MODE

NOTE:- If a digital input configured to *panel lock* is active, changing module modes will not be possible. Viewing the instruments and event logs is NOT affected by panel lock.

Manual mode allows the operator to start and stop the set manually, and if required change the state of the load switching devices. Module mode is active when the  button is pressed.

6.3.1 WAITING IN MANUAL MODE

To begin the starting sequence, press the  button. If 'protected start' is disabled, the start sequence begins immediately.


If 'Protected Start' is enabled, the  icon is displayed to indicate Manual mode and the manual LED flashes. The  button must be pressed once more to begin the start sequence.

6.3.2 STARTING SEQUENCE

NOTE:- There is no *start delay* in this mode of operation.

The fuel relay is energised and the engine is cranked.

NOTE:- If the unit has been configured for CAN, compatible ECU's will receive the start command via CAN.

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 will be terminated and the display shows  **Fail to Start**.

When the engine fires, the starter motor is disengaged. Speed detection is factory configured to be derived from the main alternator output frequency but can additionally be measured from a Magnetic Pickup mounted on the flywheel (Selected by PC using the 3000 series configuration software).

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

NOTE:- If the unit has been configured for CAN, speed sensing is via CAN.

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



6.3.3 ENGINE RUNNING

In manual mode, the load is not transferred to the generator unless a 'loading request' is made. A loading request can come from a number of sources.

- Detection of mains failure (DSE6120 only)
- Activation of an auxiliary input that has been configured to *remote start on load*
- Activation of the inbuilt exercise scheduler if configured for 'on load' runs.



NOTE:-The load transfer signal remains inactive until the Oil Pressure has risen. This prevents excessive wear on the engine.

Once the load has been transferred to the generator, it will not be automatically removed. To manually transfer the load back to the mains either:

- Press the *auto mode*  button to return to automatic mode. The set will observe all auto mode start requests and stopping timers before beginning the *Auto mode stopping sequence*.
-
- Press the *stop button* 
- De-activation of an auxiliary input that has been configured to *remote start on load*

6.3.4 STOPPING SEQUENCE

In manual mode the set will continue to run until either :

- The *stop button*  is pressed – The set will immediately stop
- The *auto button*  is pressed. The set will observe all auto mode start requests and stopping timers before beginning the *Auto mode stopping sequence*.


7 MODULE DISPLAY

7.1 BACKLIGHT

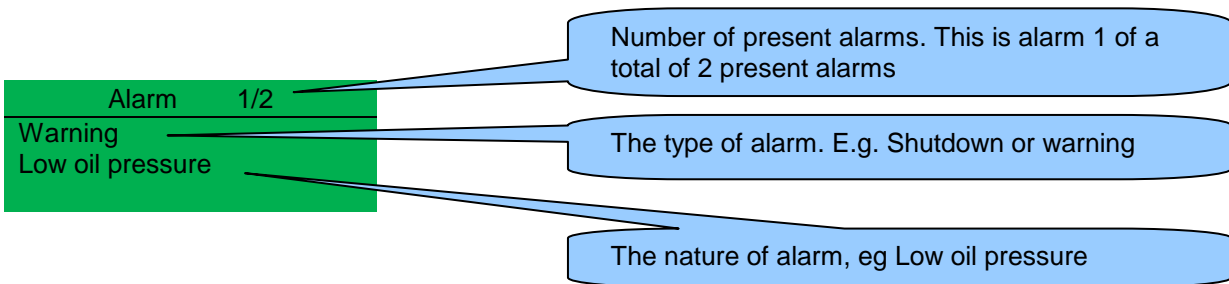
The backlight will be on if the unit has sufficient voltage on the power connection while the unit is turned on, unless the unit is cranking for which the backlight will be turned off.

7.2 PROTECTIONS

When an alarm is present, the Audible Alarm will sound and the Common alarm LED if configured will illuminate.

The audible alarm can be silenced by pressing the *Mute button* 

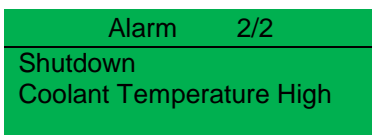
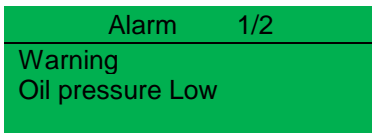
The LCD display will jump from the 'Information page' to display the Alarm Page



The LCD will display multiple alarms E.g. "High Engine Temperature shutdown", "Emergency Stop" and "Low Coolant Warning". These will automatically scroll round in the order that they occurred;

In the event of a warning alarm, the LCD will display the appropriate text. If a shutdown then occurs, the module will again display the appropriate text.

Example:-



7.3 WARNINGS


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

Example


Alarm	1/1
Charge Failure Warning	

In the event of an alarm the LCD will jump to the alarms page, and scroll through all active warnings and shutdowns.

By default, warning alarms are self-resetting when the fault condition is removed. However enabling 'all warnings are latched' will cause warning alarms to latch until reset manually. This is enabled using the 7000 series configuration suite in conjunction with a compatible PC.


Display	Reason
Battery High Voltage	The DC supply has risen above the high volts setting level for the duration of the high battery volts timer
Battery Low Voltage	The DC supply has fallen below the low volts setting level for the duration of the low battery volts timer
CAN ECU Warning	The engine ECU has detected a warning alarm and has informed the DSE module of this situation. The exact error is also indicated on the module's display.
Charge Alternator Failure	The auxiliary charge alternator voltage is low as measured from the W/L terminal.
Digital Input A-F	Auxiliary inputs can be user configured and will display the message as written by the user.
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.
Generator High Voltage Warning	The generator output voltage has risen above the pre-set pre-alarm setting.
Generator Low Voltage Warning	The generator output voltage has fallen below the pre-set pre-alarm setting after the <i>Safety On</i> timer has expired.
High Coolant Temperature Warning	The module detects that the engine coolant temperature has exceeded the high engine temperature pre-alarm setting level after the <i>Safety On</i> timer has expired.
Low Oil Pressure Warning	The module detects that the engine oil pressure has fallen below the low oil pressure pre-alarm setting level after the <i>Safety On</i> timer has expired.
Low Fuel Level	The module detects that the fuel level is below the configured setting
Over Current Immediate Warning	GENERATOR HIGH CURRENT, if the module detects a generator output current in excess of the pre-set trip a warning alarm initiates.
Over Frequency Warning	The generator output frequency has risen above the pre-set pre-alarm setting.
Over Speed Warning	The engine speed has risen above the overspeed pre alarm setting
Under Frequency Warning	The generator output frequency has fallen below the pre-set pre-alarm setting after the <i>Safety On</i> timer has expired.
Under Speed Warning	The engine speed has fallen below the underspeed pre alarm setting



7.4 SHUTDOWN ALARMS

Shutdowns are latching alarms and stop the Generator. Clear the alarm and remove the fault then press Stop/Reset  to reset the module.

Example

Alarm 1/1
Oil Pressure Low Shutdown

 **NOTE:- The alarm condition must be rectified before a reset will take place. If the alarm condition remains, it will not be possible to reset the unit (The exception to this is the Low Oil Pressure alarm and similar 'delayed alarms', as the oil pressure will be low with the engine at rest).**


Display	Reason
CAN ECU Data Fail	The module is configured for CAN operation and does not detect data on the engine Can datalink, the engine shuts down.
CAN ECU Shutdown	The engine ECU has detected a shutdown alarm and has informed the DSE module of this situation. The exact error is also indicated on the module's display.
Digital Input A-F	Auxiliary inputs can be user configured and will display the message as written by the user.
Emergency Stop	The emergency stop button has been depressed. This a failsafe (normally closed to battery positive) input and will immediately stop the set should the signal be removed. Removal of the battery positive supply from the emergency stop input will also remove DC supply from the Fuel and Start outputs of the controller. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> NOTE:- The Emergency Stop Positive signal must be present otherwise the unit will shutdown.</div>
Fail To Start	The engine has not fired after the preset number of start attempts
Generator High Voltage Shutdown	The generator output voltage has risen above the preset level
Generator Low Voltage Shutdown	The generator output voltage has fallen below the preset level
Loss of Mag. Pickup Signal	The speed signal from the magnetic pickup is not being received by the DSE controller.
Low Oil Pressure Shutdown	The engine oil pressure has fallen below the low oil pressure trip setting level after the <i>Safety On</i> timer has expired.
Low Fuel Level	The module detects that the fuel level is below the configured setting
Oil Pressure Sender open circuit	The oil pressure sensor is detected as not being present (open circuit)
Over Frequency Shutdown	The generator output frequency has risen above the preset level
Over Speed Shutdown	The engine speed has exceeded the pre-set trip <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> NOTE:-During the start-up sequence, the overspeed trip logic can be configured to allow an extra trip level margin. This is used to prevent nuisance tripping on start-up - Refer to the 7000 series configuration software manual under heading 'Overspeed Overshoot' for details.</div>
Under Frequency Shutdown	The generator output frequency has fallen below the preset level
Under Speed Shutdown	The engine speed has fallen below the pre-set trip after the <i>Safety On</i> timer has expired.

7.5 ELECTRICAL TRIP ALARMS

Electrical trips are latching and stop the Generator but in a controlled manner. On initiation of the electrical trip condition the module will de-energise the '**Close Generator**' Output to remove the load from the generator. Once this has occurred the module will start the Cooling timer and allow the engine to cool off-load before shutting down the engine. The alarm must be accepted and cleared, and the fault removed to reset the module.

Example

Alarm	1/1
Generator Current High Electrical Trip	

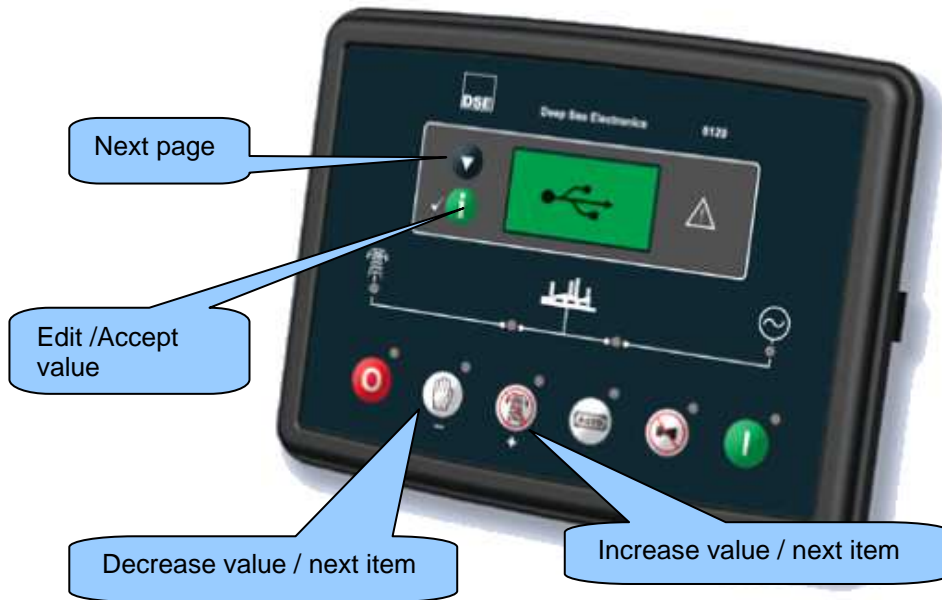
Electrical trips are latching alarms and stop the Generator. Remove the fault then press Stop/Reset  to reset the module.

Digital Input A-F	Auxiliary inputs can be user configured and will display the message as written by the user.
Generator phase rotation alarm	The phase rotation is measured as being different to the configured direction.

8 FRONT PANEL CONFIGURATION

This configuration mode allows the operator limited customising of the way the module operates.



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



8.1 ACCESSING THE FRONT PANEL EDITOR (FPE)

NOTE:- On 6110 modules, the  (+) button is replaced with  (+)

The module must be in STOP mode with the engine at rest before configuration mode can be accessed.



To enter the 'configuration mode' press both the **INFO**  and **STOP**  buttons together.

8.1.1 ENTERING THE CONFIGURATION EDITOR PIN NUMBER



If the module PIN number has been set, the PIN number request is then shown. The configuration cannot be viewed or changed until the PIN number is correctly entered.

Enter either the 'main' PIN or the application PIN.



Enter pin
* * * *

The first * is flashing. Press  (+) or  (-) buttons to adjust it to the correct value for the first digit of the PIN number.
Press ✓ when the first digit is correctly entered.
The entered digit will turn back to a * to maintain security.

Enter pin
* * * *

The second * is now flashing. Press  (+) or  (-) buttons to adjust it to the correct value for the second digit of the PIN number.
Press ✓ when the second digit is correctly entered.
The entered digit will turn back to a * to maintain security.

Enter pin
* * * *

The third * is now flashing. Press  (+) or  (-) buttons to adjust it to the correct value for the third digit of the PIN number.
Press ✓ when the third digit is correctly entered.
The entered digit will turn back to a * to maintain security.

Enter pin
* * * *

The fourth * is now flashing. Press  (+) or  (-) buttons to adjust it to the correct value for the fourth digit of the PIN number.
Press ✓ when the fourth digit is correctly entered.

NOTE:- When ✓ is pressed after editing the final PIN digit, the PIN is checked for validity. If the number is not correct, the editor is automatically exited. To retry you must re-enter the editor as described above.

If the Configuration PIN has been entered successfully (or the PIN number has not been set in the module) the first configurable parameter is displayed :

NOTE:- To exit the front panel configuration editor at any time, press and hold the  (✓) button. Ensure you have saved any changes you have made by pressing the ✓ button first.

NOTE:- When the editor is visible, it is automatically exited after 5 minutes of inactivity to ensure security.



NOTE:- If the Application Menu PIN is entered, then only the Application Menu is displayed. If the Full Configuration PIN is entered, the entire configuration menu is displayed including the Application Menu.


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



8.1.2 EDITING A PARAMETER


Enter the editor as described above.


Press  to select the required 'page' as detailed below.

Press  (+) to select the next parameter or  (-) to select the previous parameter within the current page.

When viewing the parameter to be changed, press the  (✓) button. The value begins to flash.

Press  (+) or  (-) to adjust the value to the required setting.

Press  (✓) to save the current value, the value ceases flashing.

Press and hold the  (✓) button to exit the editor.

▲NOTE: - Values representing pressure will be displayed in Bar. Values representing temperature are displayed in degrees Celsius.

▲NOTE: - When adjusting values in the FPE a press and hold of the increment button will cover the full range of the item being adjusted (min to max) in under 20 seconds.

▲NOTE: - When the editor is visible, it is exited after 5 minutes of inactivity to ensure security.

8.2 ADJUSTABLE PARAMETERS (CONFIGURATION EDITOR)

When viewing the configuration editor, Press  to select the required 'page' as listed below.

Front Panel Configuration Editor (Factory default settings are shown in bold italicised text)

Page	Parameter as shown on display	Values
PIN	Pin Entry	####
DISPLAY	Contrast	0% - 100% (53%)
	Language	English - Others
	LCD Page Timer	hh:mm:ss (5m)
	Auto Scroll Delay	1s - 1hr (2s)
	Day and Time	Day - hh:mm:ss
ALT CONFIG	Default Config	Default Config
ENGINE	Oil Pressure Low Shutdown	0bar - 9.97bar (1.03bar)
	Coolant Temperature High Shutdown	2°C - 140°C (95°C)
	Start Delay Timer	0 - 10hr (5s)
	Pre Heat Timer	0 - 5m (0s)
	Crank Duration Timer	0 - 1m (10s)
	Crank Rest Timer	0 - 1m (10s)
	Safety On Delay	0 - 1m (10s)
	Smoke Limiting	0 - 15m (0s)
	Smoke Limiting Off	0 - 1m (0s)
	Warm Up Timer	0 - 1hr (0s)
	Cool Down Timer	0 - 1hr (1m)
	Speed Low Shutdown	Active, Inactive
	Speed Low Shutdown	0RPM - 6000RPM (1270RPM)
	Speed High warning	Active, Inactive
	Speed High Shutdown	0RPM - 6000RPM (1740RPM)
	Fail To Stop Delay	0 - 2m (30s)
	Battery Voltage Low Warning	Active , Inactive
	Battery voltage Low Warning Delay	0 - 24hr (1m)
	Battery Low Voltage	0V - 40V (10V)
	Battery Voltage High warning	Active , Inactive
	Battery Voltage High warning Delay	0V - 24hr (1m)
	Battery Voltage High warning	0V - 40V (30V)
	Charge Alternator Failure Warning	Active , Inactive
	Charge Alternator Failure warning	0V - 39V (6V)
	Charge Alternator Failure warning Delay	0 - 24hr (5s)
	Charge Alternator Failure Shutdown	Active , Inactive
	Charge Alternator Failure Shutdown	0V - 5.9V (4.0V)
	Charge Alternator Failure Shutdown Delay	0 - 24hr (5s)
	Low Battery Start	Active, Inactive
	Low Battery Level	0V - 40.0V (18.0V)
	Low Battery Start Delay	hh:mm:ss (10s)
	Low Battery Run Time	hh:mm:ss (30s)
GENERATOR	Voltage Low Shutdown	50V - 360V (184V)
	Voltage Nominal	50V - 276V (230V)
	Voltage High Shutdown	231V - 360V (277V)
	Frequency Low Shutdown	0Hz - 75Hz (43Hz)
	Frequency Nominal	0Hz - 75Hz (50Hz)
	Frequency Low Pre Alarm	0Hz - 75Hz (45Hz)
	Frequency High Pre Alarm	0Hz - 75Hz (55Hz)
	Frequency High Shutdown	0Hz - 75Hz (58Hz)
	Full Load Rating	5A - 6000A (500A)
	Delayed Over Current	Active , Inactive
	Delayed Over Current	50% - 120% (100%)
	AC System	Single Phase, 2 wire 3 Phase, 4 wire 2 Phase, 3 wire (L1 & L3) 3 Phase, 4 wire (Delta) 2 Phase, 3 wire (L1 & L2) 3 Phase, 3 wire
	CT Primary	5A - 6000A (600A)
	Generator Transient Delay	0 - 10m (0.7s)
	MAINS	Voltage Low Trip
Voltage Nominal		51V - 359V (230V)
Voltage High Trip		50V - 360V (276V)
Frequency Low Trip		0Hz - 75Hz (45Hz)
Frequency Nominal		1Hz - 74Hz (50Hz)
Frequency High Trip		0Hz - 75Hz (55Hz)
Mains Transient Delay		0 - 30s (2s)
Return Delay		0 - 1hr (30s)
Mains Transfer Time	0 - 10m (0.7s)	

Front Panel Configuration Editor (Factory default settings are shown in bold italicised text)

Section	Parameter as shown on display	Values
TIMERS	LCD Page Timer	hh:mm:ss (<i>5m</i>)
	Auto Scroll Delay	1s - 1hr (<i>2s</i>)
	Start Delay Timer	0 - 10hr (<i>5s</i>)
	Pre Heat Timer	0 - 5m (<i>0s</i>)
	Crank Duration Timer	0 - 1m (<i>10s</i>)
	Crank Rest Timer	0 - 1m (<i>10s</i>)
	Safety On Delay	0 - 1m (<i>10s</i>)
	Smoke Limiting	0 - 15m (<i>0s</i>)
	Smoke Limiting Off	0 - 1m (<i>0s</i>)
	Warm Up Timer	0 - 1hr (<i>0s</i>)
	Cool Down Timer	0 - 1hr (<i>1m</i>)
	Fail To Stop Delay	0 - 2m (<i>30s</i>)
	Battery voltage Low warning Delay	0 - 24hr (<i>1m</i>)
	Battery voltage High warning Delay	0V - 24hr (<i>1m</i>)
	Return Delay	0 - 5hr (<i>30s</i>)
	Generator Transient Delay	0.1s - 2m (<i>30s</i>)
	Mains Transient Delay	0 - 30s (<i>2s</i>)
	Mains Transfer Time	0 - 10m (<i>0.7s</i>)
SCHEDUELER	Scheduler	Active, <i>Inactive</i>
	Schedule On Load	Active, <i>Inactive</i>
	Schedule Start	Day - hh:mm
	Schedule Period	hh:mm (<i>5m</i>)

Parameters with multiple choices use the following identification tables for the parameter values.

9 COMMISSIONING

9.1.1 PRE-COMMISSIONING

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

- 10.1. 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.
- 10.2. The unit **DC** supply is fused and connected to the battery and that it is of the correct polarity.
- 10.3. The Emergency Stop input is wired to an external normally closed switch connected to **DC** positive.

 **NOTE:- If Emergency Stop feature is not required, link this input to the DC Positive. The module will not operate unless either the Emergency Stop is fitted correctly OR terminal 3 is connected to DC positive.**

- 10.4. 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. Select “**MANUAL**” and then press “**START**” the unit start sequence will commence.
- 10.5. The starter will engage and operate 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 will display ‘Failed to start. Select the **STOP/RESET** position to reset the unit.
- 10.6. Restore the engine to operational status (reconnect the fuel solenoid). Select “**MANUAL**” and then press “**START**”. 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 will be possible at this time to view the engine and alternator parameters - refer to the ‘Description of Controls’ section of this manual.
- 10.7. Select “**AUTO**” on the front panel, the engine will run for the pre-set cooling down period, then stop. The generator should stay in the standby mode. If not check that there is not a signal present on the **Remote start** input.
- 10.8. Initiate an automatic start by supplying the remote start signal (if configured). The start sequence will commence and the engine will run up to operational speed. Once the generator is available a load transfer will take place (if configured), the Generator will accept the load. If not, check the wiring to the Generator Contactor Coil (if used). Check the Warming timer has timed out.
- 10.9. Remove the remote start signal. The return sequence will begin. After the pre-set time, the generator is unloaded. The generator will then run for the pre-set cooling down period, then shutdown into its standby mode.
- 10.10. Set the module 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 – Editing the date and time*.
- 10.11. If, despite repeated checking of the connections between the **3000** series controller and the customer’s system, satisfactory operation cannot be achieved, then the customer is requested to contact the factory for further advice on:-

INTERNATIONAL TEL: +44 (0) 1723 890099


INTERNATIONAL FAX: +44 (0) 1723 893303


E-mail: Support@Deepseapl.com

Website : www.deepseapl.com

10 FAULT FINDING

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.
Unit locks out on Emergency Stop	If no Emergency Stop Switch is fitted, ensure that a DC positive signal is connected to the Emergency Stop input. Check emergency stop switch is functioning correctly. Check Wiring is not open circuit.
Intermittent Magnetic Pick-up sensor fault	Ensure that Magnetic pick-up screen only connects to earth at one end, if connected at both ends, this enables the screen to act as an aerial and will pick up random voltages. Check pickup is correct distance from the flywheel teeth.
Low oil Pressure fault 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 3310 Module and is correctly configured.
High engine temperature fault 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 6000 series 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.
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 6000 series module inputs. Refer to engine manual.
Continuous starting of generator when in AUTO	Check that there is no signal present on the "Remote Start" input. Check configured polarity is correct.
Generator 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 will 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 that the Emergency Stop input is at Positive. Ensure oil pressure switch or sensor is indicating the "low oil pressure" state to the 6000 series controller.
Engine runs but generator will not take load	Check Warm up timer has timed out. Ensure generator load inhibit signal is not present on the module inputs. Check connections to the switching device. Note that the set will not take load in manual mode unless there is an active remote start on load signal.

SYMPTOM	POSSIBLE REMEDY
<p>Incorrect reading on Engine gauges</p> <p>Fail to stop alarm when engine is at rest</p>	<p>Check engine is operating correctly. Check sensor and wiring.</p>
<p>Module appears to 'revert' to an earlier configuration</p>	<p>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.</p> <p>When editing a configuration using the Front Panel Editor, be sure to press the Save  button to save the change before moving to another item or exiting the Front Panel Editor.</p>
<p>Set will not take load</p>	<p>Ensure the generator is available.</p> <p>Check that the output configuration is correct to drive the load switch device and that all connections are correct.</p> <p>Remember that the set will not take load in manual mode unless a remote start on load input is present.</p>
<p>Inaccurate generator measurements on controller display</p>	<p>The 3000 series controller is true RMS measuring so gives more accurate display when compared with an 'average' meter such as an analogue panel meter or some lower specified digital multimeters.</p> <p>Accuracy of the controller is better than 1% of full scale. Ie Gen volts full scale is 333V ph-n so accuracy is $\pm 3.33V$ (1% of 333V).</p>

 **NOTE:-** The above 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 your module configuration if in doubt.

11 MAINTENANCE, SPARES, REPAIR AND SERVICING





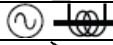

The DSE6000 Series controller is designed to be *Fit and Forget*. As such, there are no user serviceable parts within the controller.


In the case of malfunction, you should contact your original equipment supplier (OEM).

11.1 PURCHASING ADDITIONAL CONNECTOR PLUGS FROM DSE

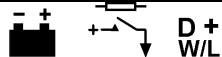

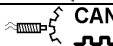



If you require additional plugs from DSE, please contact our Sales department using the part numbers below.

11.1.1 DSE6110


6110 series terminal designation	Plug description	Part No.
1-11 	11 way 5.08mm	007-451
12-15 	4 way 5.08mm	007-444
16-18 	3 way 5.08mm	007-174
19-22 	4 way 7.62mm	007-171
27-31 	2 way 7.62mm	007-448
32-37 	6 way 5.08mm	007-446

 **NOTE:-** Terminals 23-26 are not fitted to DSE4410 controllers.

11.1.2 DSE6120

6110 series terminal designation	Plug description	Part No.
1-11 	11 way 5.08mm	007-451
12-15 	4 way 5.08mm	007-444
16-18 	3 way 5.08mm	007-174
19-26 	8 way 7.62mm	007-454
27-31 	5way 5.08mm	007-445
32-37 	6 way 5.08mm	007-446

11.2 PURCHASING ADDITIONAL FIXING CLIPS FROM DSE

Item	Description	Part No.
	6000 series fixing clips (packet of 4)	020-294

11.3 PURCHASING SEALING GASKET FROM DSE

The optional sealing gasket is not supplied with the controller but can be purchased separately.

Item	Description	Part No.
	6000 series silicon sealing gasket	020-389

12 WARRANTY

DSE provides limited warranty to the equipment purchaser at the point of sale. For full details of any applicable warranty, you are referred to your original equipment supplier (OEM).

13 DISPOSAL

13.1 WEEE (WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT)

Directive 2002/96/EC

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



13.2 ROHS (RESTRICTION OF HAZARDOUS SUBSTANCES)

Directive 2002/95/EC:2006

To remove specified hazardous substances (Lead, Mercury, Hexavalent Chromium, Cadmium, PBB & PBDE's)

Exemption Note: Category 9. (Monitoring & Control Instruments) as defined in Annex 1B of the WEEE directive will be exempt from the RoHS legislation. This was confirmed in the August 2005 UK's Department of Trade and Industry RoHS REGULATIONS Guide (Para 11).

Despite this exemption DSE has been carefully removing all non RoHS compliant components from our supply chain and products.

When this is completed a Lead Free & RoHS compatible manufacturing process will be phased into DSE production.

This is a process that is almost complete and is being phased through different product groups.