



DEEP SEA ELECTRONICS

*Giving you the power to control*

**MODEL 560**  
**OPERATING MANUAL**

**Author:- Miles Revell**

**Deep Sea Electronics Plc  
Highfield House  
Hunmanby  
North Yorkshire  
YO14 OPH  
England**

**Tel: +44 (0) 1723 890099  
Fax: +44 (0) 1723 893303  
E-Mail: Sales@Deepseapl.com**

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## INTRODUCTION

The **DSE 560** Module, has been designed to allow the OEM to meet most of the industry's complex specifications. It has been primarily designed to allow the user to start and stop the generator, and if required, transfer the load to the generator either manually (via external push-buttons) or automatically. The user also has facility to view all the system operating parameters via the LCD display.

The **DSE 560** 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 a flashing COMMON ALARM LED. Exact failure mode information is indicated by the LCD display on the front panel.

The powerful Micro-processor contained within the module allows for a range of complex features to be incorporated as standard;







- *Graphical Icon based LCD display (excluding the need for translations and languages).*
- *Voltage and Current monitoring.*
- *Engine parameter monitoring.*
- *Fully configurable inputs for use as alarms or a range of different functions.*
- *Extensive range output functions using built in relay outputs or relay expansion available .*

Selective operational sequences, timers and alarm trips can be altered by the customer via a PC using the P808 for Window™ software and 808 interface.

Access to critical operational sequences and timers for use by qualified engineers, are barred by a security code.

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

## CLARIFICATION OF NOTATION USED WITHIN THIS PUBLICATION.

|   |                  |  |
|---|------------------|--|
|  | <b>NOTE:</b>     | Highlights an essential element of a procedure to ensure correctness.  |
|  | <b>CAUTION!:</b> | Indicates a procedure or practice which, if not strictly observed, could result in damage or destruction of equipment.   |
|  | <b>WARNING!:</b> | Indicates a procedure or practice which could result in injury to personnel or loss of life if not followed correctly.   |
|  |                  | Deep Sea Electronics Plc owns the copyright to this manual, which cannot be copied, reproduced or disclosed to a third party without prior written permission. |
|  |                  | Compliant with BS EN 60950 Low Voltage Directive<br>Compliant with BS EN 50081-2 EMC Directive<br>Compliant with BS EN 50082-2 EMC Directive                   |
|  |                  | Year 2000 Compliant  |

## 1. OPERATION

### 1.1 CONTROL

Control of the **DSE 560** module is via a rotary switch (or Key-switch) mounted on the front of the module with **STOP/RESET**, **MANUAL** and **AUTO** functions. For normal operation this is the only control which needs to be operated. The small push-button is used to access further information such as instrumentation, details of its operation are detailed later in this document.

The following description 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.

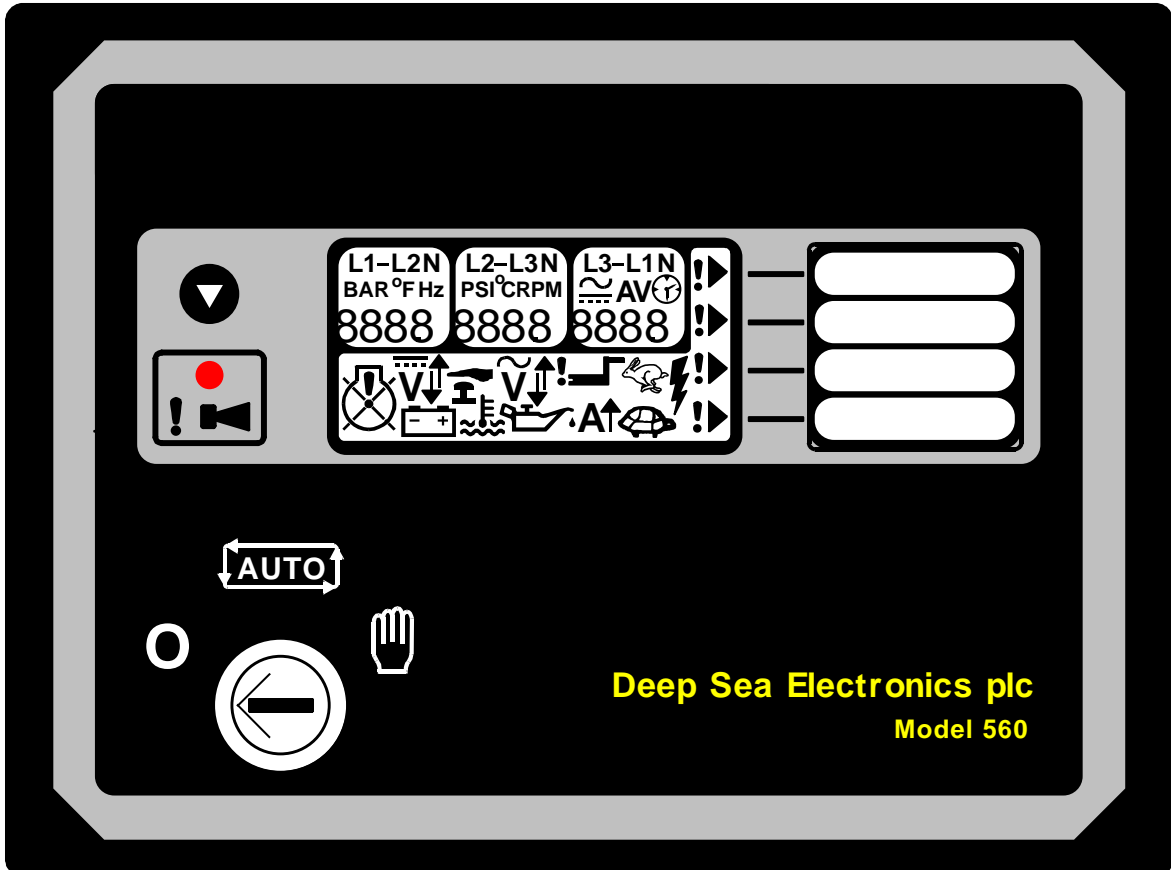


FIG 1

## 1.2 AUTOMATIC MODE OF OPERATION

Turning the selector switch to the AUTO position activates the module .

When a **Remote Start** signal is applied to the remote start input, the following sequence is initiated:-


The **Remote Start Active** indicator illuminates (if configured).

To allow for false signals the **Start Delay** timer is initiated, after this delay, if the **pre-heat** output option is selected this timer is then initiated, and the corresponding auxiliary output which is selected energises.

**NOTE:-** If the Remote Start signal is removed during the Start Delay timer the unit will return to a stand-by state.

After the above delays the **Fuel Solenoid** is energised, then the **Starter Motor** is engaged.

The engine is cranked for a pre-set time period. If the engine fails to fire during this cranking attempt then the starter motor is disengaged for the pre-set rest period. Should this sequence continue beyond the set number of attempts, the start sequence will be terminated and

**Fail to Start**  fault will be displayed accompanied by a flashing red **LED**.

When the engine fires, the starter motor is disengaged and locked out at a pre-set frequency from the Alternator output. Alternatively a Magnetic Pickup mounted on the flywheel housing can be used for speed detection. (This is selected by PC using the **808** interface.) The warning lamp output of the charge alternator can also be used to disconnect the starter motor, however it cannot be used for underspeed or overspeed.

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

Once the engine is running, the **Warm Up** timer, if selected is initiated, allowing the engine to stabilise before accepting the load.

If an auxiliary output has been selected to give a **load transfer** signal, this would then activate.


**NOTE:-** A load transfer will not be initiated until the Oil Pressure has risen. Thus preventing excessive wear on the engine.

On removal of the **Remote Start** signal, the **Stop** delay timer is initiated, once it times out the **load Transfer** signal is de-energised, removing the load. The **Cooling** timer is then initiated, allowing the engine a cooling down period off load before shutting down. Once the **Cooling** timer expires the **Fuel Solenoid** is de-energised, bringing the generator to a stop.

Should the **Remote Start** signal be re-activated during the cooling down period, the set will return on load.

### 1.3 MANUAL OPERATION

 **NOTE:-** The following sequence is only applicable to controllers not using external start/stop push-button control.



To initiate a start sequence in **MANUAL**, turn the selector switch to **MANUAL** .

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

If the **pre-heat** output option is selected this timer is then initiated, and the auxiliary output selected is energised.

After the above delay the **Fuel Solenoid** is energised, then the **Starter Motor** is engaged.

The engine is cranked for a pre-set time period. If the engine fails to fire during this cranking attempt then the starter motor is disengaged for the pre-set rest period. Should this sequence continue beyond the set number of attempts, the start sequence will be terminated and

**Fail to Start**   fault will be displayed accompanied by a flashing red **LED**.

When the engine fires, the starter motor is disengaged and locked out at a pre-set frequency from the Alternator output. Alternatively a Magnetic Pickup mounted on the flywheel housing can be used for speed detection. (This is selected by PC using the **808** interface.) The warning lamp output of the charge alternator can also be used to disconnect the starter motor, however it cannot be used for underspeed or overspeed.

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

Once the engine is running, the **Warm Up** timer, if selected is initiated, allowing the engine to stabilise before it can be loaded.

The generator will run off load, unless a **Remote Start** signal is applied, and if **Load Transfer** has been selected as a control source, the appropriate auxiliary output selected will activate.

 **NOTE:-** It is possible to have a manual run on-load by using 'Load Transfer (Always)' - Refer to the P808 for windows manual for further details.


If the **Remote Start** signal is removed, the generator will continue to run **On** load until the selector switch is turned to **Auto**. The **Remote Stop Delay Timer** will time out, the load is then disconnected. The generator will then run **off** load allowing the engine a **cooling** down period.

Turning the selector to **STOP** de-energises the **FUEL SOLENOID**, bringing the generator to a stop.



## MANUAL OPERATION WITH EXTERNAL START AND STOP PUSHBUTTONS



If the module has been configured to use external Start and Stop pushbuttons the normal 'Manual' mode of operation is over-riden and the following sequence is observed;

Turn the selector switch to **MANUAL** .

To start the set operate the **external 'Start'** Pushbutton, the **pre-heat** output (if selected) will energise and the timer is initiated.

Once the above delay has expired the **Fuel Solenoid** is energised, then the **Starter Motor** is engaged.

The engine is cranked for a pre-set time period. If the engine fails to fire during this cranking attempt then the starter motor is disengaged for the pre-set rest period. Should this sequence continue beyond the set number of attempts, the start sequence will be terminated and

**Fail to Start**   fault will be displayed accompanied by a flashing red **LED**.

When the engine fires, the starter motor is disengaged and locked out at a pre-set frequency from the Alternator output. Alternatively a Magnetic Pickup mounted on the flywheel housing can be used for speed detection. (This is selected by PC using the **808** interface.) The warning lamp output of the charge alternator can also be used to disconnect the starter motor, however it cannot be used for underspeed or overspeed.

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

Once the engine is running, the **Warm Up** timer, if selected is initiated, allowing the engine to stabilise before it can be loaded.

The generator will run off load, unless a **Remote Start** signal is applied, and if **Load Transfer** has been selected as a control source, the appropriate auxiliary output selected will activate.

 **NOTE:- It is possible to have a manual run on-load by using 'Load Transfer (Always)' - Refer to the P808 for windows manual for further details.**

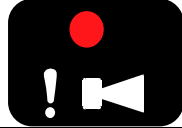

If the **Remote Start** signal is removed, the generator will continue to run **On** load until the selector switch is turned to **Auto**. The **Stop Delay Timer** will time out, the load is then disconnected. The generator will then run **off** load allowing the engine a **cooling** down period.

Turning the selector to **STOP** or pressing the '**Stop**' Pushbutton de-energises the **FUEL SOLENOID**, bringing the generator to a stop.

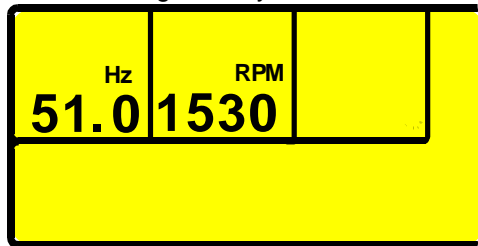
 **NOTE:- A version of the module is available which has the start button built into the front fascia of the module. Operation of this module is as detailed above.**

## 2. PROTECTIONS

The module will indicate that an alarm has occurred in several ways;

|  |   |
|--|---|
| The "Common alarm" LED will illuminate<br>(Warning = Amber, Shutdown = Red Flashing) |  |
| The LCD display will display the appropriate alarm icon.                             |   |

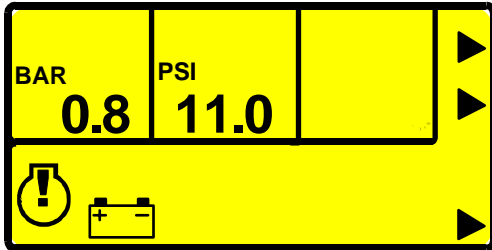
If no alarms are present the LCD will extinguish any alarm icons.



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

The original warning alarm icon will remain displayed.

Example:-

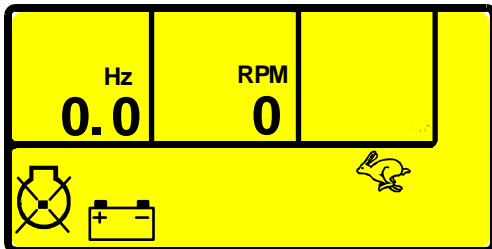


Charge Fail Warning



Amber LED, Charge Fail and Warning alarm Icon all displayed steady.

Followed by....



Over-speed shutdown



Red LED, Over-speed and Shutdown alarm Icon all displayed flashing. The original warning will remain displayed as long as the triggering conditions remain. Any subsequent warnings or shutdowns which occur will be displayed steady, therefore only the first-up shutdown will appear flashing.

## 2.1 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.

In the event of a warning alarm the LCD will display:-



The **COMMON ALARM LED** will also illuminate (amber).

**BATTERY CHARGE FAILURE**, if the module does not detect a voltage from the warning light terminal on the auxiliary charge alternator, the module will display:-



The **COMMON ALARM LED** will also illuminate (amber).

**BATTERY LOW VOLTAGE**, if the module detects that the plant DC supply has fallen below the low volts setting level , the module will display:-



The **COMMON ALARM LED** will also illuminate (amber). The Battery Low Voltage alarm is delayed by the Low DC Volts Delay timer.

**BATTERY HIGH VOLTAGE**, if the module detects that the plant DC supply has risen above the high volts setting level , the module will display:-



The **COMMON ALARM LED** will also illuminate (amber).

**FAIL TO STOP**, If the module detects the engine is still running when the 'Fail to stop timer' expires, then the module will display:-



The **COMMON ALARM LED** will also illuminate flashing red.

**NOTE:- 'Fail to Stop' could indicate a faulty oil pressure sender - If engine is at rest check oil sender wiring and configuration.**

**GENERATOR HIGH CURRENT**, if the module detects a generator output current in excess of the pre-set trip a warning is initiated. The LCD will indicate:-



The **COMMON ALARM LED** will illuminate (amber).

**AUXILIARY INPUTS**, if an auxiliary input has been configured as a warning the appropriate LCD segment will be displayed:-



The **COMMON ALARM LED** will also illuminate (amber).

## 2.2 SHUTDOWNS

Shutdowns are latching and stop the Generator. The alarm must be accepted and cleared, and the fault removed to reset the module.

In the event of a shutdown alarm the LCD will display:-



The **COMMON ALARM LED** will also illuminate (*Red Flashing*). The appropriate LCD icon will also be displayed flashing

**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 the like, as the oil pressure will be low with the engine at rest). Any subsequent warnings or shutdowns, which occur, will be displayed steady, therefore only the first-up shutdown will appear flashing.

**FAIL TO START**, if the engine does not fire after the pre-set number of attempts has been made a shutdown will be initiated. The LCD will indicate:-



The **COMMON ALARM** and **LED** will flash (*Red*).

**EMERGENCY STOP**, removal of the **+ve DC** Supply from the Emergency Stop input initiates the following sequence, firstly it will initiate a controlled shutdown of the Generator and prevent any attempt to restart the Generator until the Emergency Stop push-button has been reset. Secondly it removes the **+ve DC** supply from both the Fuel Solenoid and Starter Solenoid. The LCD will indicate:-



The **COMMON ALARM LED** will flash (*Red*).

**NOTE:-** The Emergency Stop **+Ve** signal must be present otherwise the unit will shutdown.

**LOW OIL PRESSURE**, if the module detects that the engine oil pressure has fallen below the low oil pressure trip setting level after the **Safety On** timer has expired, a shutdown will occur. The LCD will indicate:-



The **COMMON ALARM LED** will flash (*Red*).

**HIGH ENGINE TEMPERATURE**, if the module detects that the engine coolant temperature has exceeded the high engine temperature trip setting level after the **Safety On** timer has expired, a shutdown will occur. The LCD will indicate:-



The **COMMON ALARM LED** will flash (*Red*).

**OVERSPEED**, if the engine speed exceeds the pre-set trip a shutdown is initiated. The LCD will indicate:-



The **COMMON ALARM LED** will flash (*Red*). Overspeed is not delayed, it is an **immediate shutdown**.

**NOTE:-** However, 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 808 For Windows™ Software Manual under heading ‘Overspeed Overshoot’ for details.

**UNDERSPEED**, if the engine speed falls below the pre-set trip after the Safety On timer has expired, a shutdown is initiated. The LCD will indicate:-



The **COMMON ALARM LED** will flash (*Red*).

**GENERATOR HIGH FREQUENCY**, if the module detects a generator output frequency in excess of the pre-set trip a shutdown is initiated. The LCD will indicate:-



The **COMMON ALARM LED** will flash (*Red*). Generator High Frequency is not delayed, it is an **immediate shutdown**.

**GENERATOR LOW FREQUENCY**, if the module detects a generator output frequency below the pre-set trip after the Safety On timer has expired, a shutdown is initiated. The LCD will indicate:-



The **COMMON ALARM LED** will flash (*Red*).

**GENERATOR HIGH VOLTAGE**, if the module detects a generator output voltage in excess of the pre-set trip a shutdown is initiated. The LCD will indicate:-



The **COMMON ALARM LED** will flash (*Red*). High voltage is not delayed, it is an **immediate shutdown**.

**GENERATOR LOW VOLTAGE**, if the module detects a generator output voltage below the pre-set trip after the Safety On timer has expired, a shutdown is initiated. The LCD will indicate:-



The **COMMON ALARM LED** will flash (*Red*).

**OIL PRESSURE SENDER OPEN CIRCUIT**, if the module detects a loss of signal from the oil pressure sender (open circuit) a shutdown is initiated. The LCD will indicate:-



(steady) (and ‘-----’ on the engine oil pressure instrument), the **COMMON ALARM LED** will flash (*Red*). Sender failure is not delayed, it is an **immediate shutdown**.

**AUXILIARY INPUTS**, if an auxiliary input has been configured as a shutdown the appropriate LCD segment will be displayed:-



The **COMMON ALARM LED** will flash (*Red*).

**LOSS OF SPEED SIGNAL**, if the speed sensing signal is lost during cranking, a shutdown is initiated. The LCD will indicate:-



(steady) (and ‘-----’ on the engine RPM instrument), the **COMMON ALARM LED** will flash (*Red*).

**NOTE:-** This will only occur if the speed sensing signal is lost during cranking or during the safety on timer. If the signal is lost during normal operation the Generator will shutdown with an Under-speed alarm.

## 2.3 ELECTRICAL TRIPS

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 '**Load Transfer**' 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.

In the event of a shutdown alarm the LCD will display:-



The **COMMON ALARM LED** will also illuminate (Red steady) and the generator will be removed from the load. Once the cooling timer has expired the **COMMON ALARM LED** will flash (Red).

**AUXILIARY INPUTS**, if an auxiliary input has been configured as an electrical trip the appropriate LCD segment will be displayed:-



The **COMMON ALARM LED** will illuminate (red Steady) until the engine is shutdown (red flashing).

## 2.4 SPECIAL ALARM CONDITIONS

The microprocessor has a 'watchdog' facility which continually monitors the operation of the module. Should an error occur and the microprocessor is still functioning, an alarm will be indicated by the LCD back-light flashing and the common alarm LED being illuminated RED (steady).

If the module is being configured and does not receive the correct information via the 808 interface the 'watchdog' will halt the module operation and signal a corrupt user configuration by flashing the LCD back-light and illuminating the common alarm LED GREEN (steady). Attempting to re-send the configuration should rectify the alarm unless a problem exists with the configuration transfer (such as a broken cable, etc).

If in doubt please refer Deep Sea Electronics PLC.

### 3. DECIPTION OF CONTROLS

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

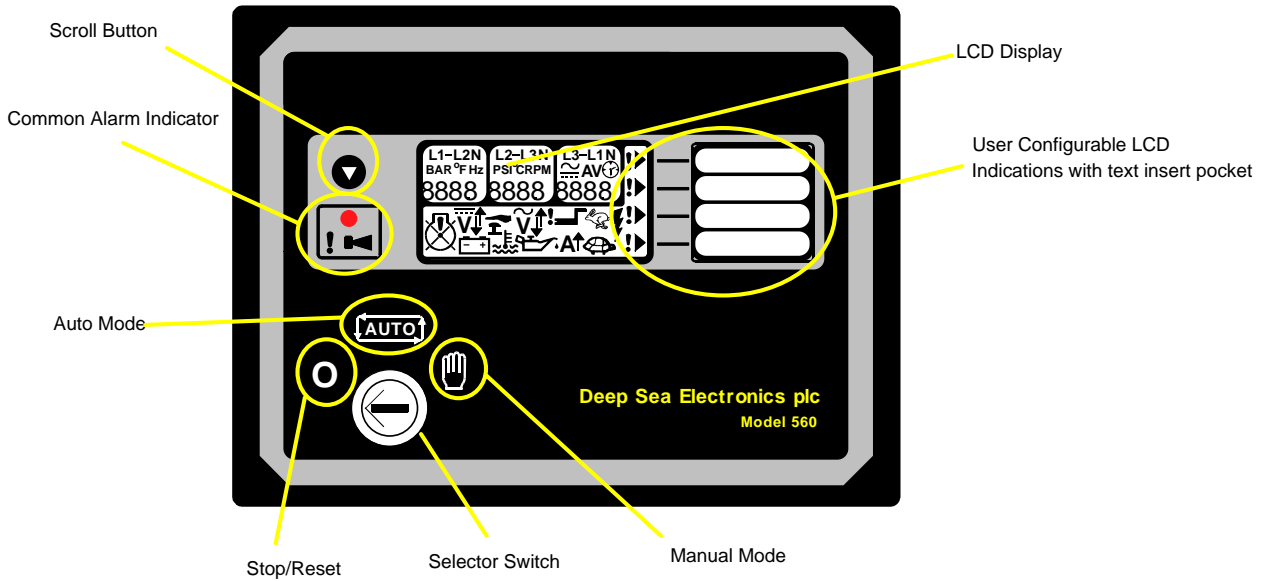


FIG2

#### 3.1 TYPICAL LCD DISPLAY SCREENS

##### INSTRUMENTS

|                              |                               |                        |
|------------------------------|-------------------------------|------------------------|
| L1- L2<br>BAR °F Hz<br>417.3 | L2- L3<br>PSI °C RPM<br>409.6 | L3- L1<br>~ V<br>399.7 |
|------------------------------|-------------------------------|------------------------|

(phase to phase AC volts)

The LCD displays the various engine parameters such as 'ENGINE SPEED', 'OIL PRESSURE', 'HOURS RUN', etc. Each instrument is displayed with the appropriate units of measure.

##### ALARM ICONS

|            |            |  |
|------------|------------|--|
| BAR<br>0.0 | PSI<br>0.0 |  |
|            |            |  |

The LCD also displays the exact nature of any alarm condition which have occurred such as **LOW OIL PRESSURE** using appropriate icons. This allows very specific alarm conditions to be brought to the operators' attention. Refer to the 'Protections' section of this manual for details of the alarms.

##### USER DEFINED INDICATIONS

|  |  |  |     |
|--|--|--|-----|
|  |  |  | ▶▶▶ |
|  |  |  | ▶▶▶ |
|  |  |  | ▶▶▶ |

The LCD displays the user defined indications when configured and active. The icons will illuminate and point to the appropriate text insert label. These indications can be used to indicate the operation of external equipment (i.e. 'Battery Charger On', 'Breaker Closed' etc) or to indicate internal states (i.e. Engine Running, Safety On, etc).

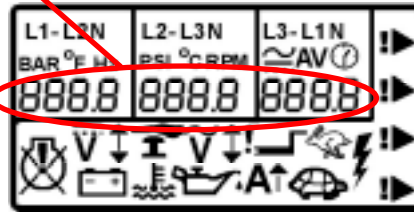
##### USER DEFINED ALARMS

|  |  |  |     |
|--|--|--|-----|
|  |  |  | ▶▶▶ |
|  |  |  | ▶▶▶ |
|  |  |  | ▶▶▶ |
|  |  |  | ▶▶▶ |

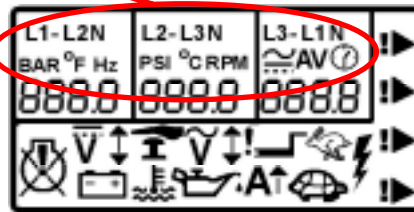
The LCD displays the user defined alarms when configured and active. The icons will illuminate and point to the appropriate text insert label. These alarms can be used to indicate the operation of external alarms (i.e. 'Low Fuel Level', 'Low Coolant level' etc) or to indicate internal alarms (i.e. Fail to Stop, MPU fault, etc).

## LCD DISPLAY AREAS

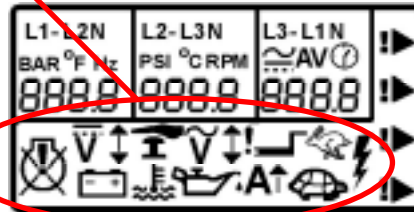
Instrument Values



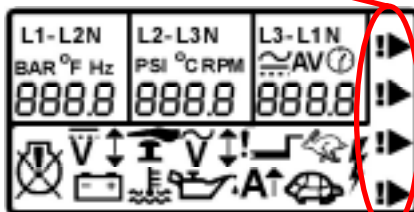
Display Information & Units of Measure



Alarm Icons



User Definable Alarms/Indicators



**NOTE:-** The Engine Hours Run counter will only display the accumulated hours to the nearest 12 Minutes Hour (0.2Hr). The accumulated time will be recorded in HH:MM however. [Pre V1.4 Modules recorded hours run to the nearest ½ Hour (0.5)]

**CAUTION!:-** If the DC supply to the module is interrupted the hours run counter will not remember any 'un-displayed' minutes accumulated since the last 12 Minute display update. i.e.  
 10 Hours 38 Minutes accumulated before DC supply is removed...  
 (10.6 Hours displayed)  
 would become ...10 Hours 36Minutes on restoration of DC supply.  
 (10.6 Hours still displayed)  
 This will only occur in the event of a total DC supply break and will NOT occur if the module is simply switched to the Stop/Reset position.



## VIEWING THE INSTRUMENTS

It is possible to manually scroll to display the different instruments by repeatedly operating the scroll button, once selected the instrument will remain on the LCD display until the user selects a different instrument or after a period of inactivity the module will revert to the initial display.

### Instrument Page Order:-

- Frequency / RPM
- AC Voltage Line-Neutral (*<<<Not Shown on 3 phase 3 wire (Delta) version of the module*)
- AC Voltage Line-Line
- AC Line Current
- Oil Pressure
- Coolant temperature
- Engine Hours Run
- DC Battery Voltage

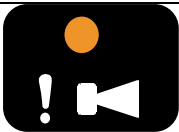
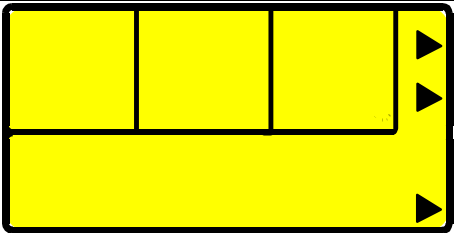
### Manually Selecting an Instrument

|   |              |  |
|---|--------------|--|
| Initial display   | >>>>>>><br>> |  |
| Pressing the <b>DOWN</b> button the LCD will then show...       |              |  |
| Pressing the <b>DOWN</b> button again the LCD will then show... |              |  |
| .... Etc  |              |  |




Pressing the button again will scroll through each individual instrument eventually returning to the original instrument displayed.

**NOTE:-**Once selected the instrument will remain on the LCD display until the user selects a different instrument or after a period of inactivity the module will revert to the initial display.

### 3.2 INDICATORS

|  |   |
|--|---|
| <p><b>COMMON ALARM LED</b><br/>This LED indicates when an alarm condition is present. The Alarms Page on the LCD will detail the exact nature of the alarm.</p> <ul style="list-style-type: none"> <li>• 'OFF' - no alarm active.</li> <li>• 'STEADY AMBER' - A warning alarm is present.</li> <li>• 'FLASHING RED' - A shutdown alarm is present.</li> <li>• 'STEADY RED' - An Electrical trip alarm is present.</li> </ul>   |  |
| <p><b>USER CONFIGURABLE LCD INDICATORS</b><br/>These LCD's can be configured by the user to indicate any on of the <b>different functions</b> based around the following:-</p> <ul style="list-style-type: none"> <li>• <b>INDICATIONS</b> - Monitoring of a digital input and indicating associated functioning user's equipment - <i>Such as Battery Charger On or Louver's Open, etc.</i></li> <li>• <b>WARNINGS</b> and <b>SHUTDOWNS</b> - Specific indication of a particular warning or shutdown condition, backed up by LCD indication (!)- <i>Such as Low Oil Pressure Shutdown, Low Coolant level, etc.</i></li> <li>• <b>STATUS INDICATIONS</b> - Indication of specific functions or sequences derived from the modules operating state - <i>Such as Safety On, Pre-heating, Generator Available, etc.</i></li> </ul> |   |

### 3.3 CONTROLS

|  |   |
|--|---|
| <p><b>STOP/RESET</b><br/>This position places the module into it's <b>Stop/reset</b> mode. This will clear any alarm conditions for which the triggering criteria have been removed. If the engine is running and this position is selected, the module will automatically instruct the change-over device to un-load the generator (<b>'Load transfer' becomes in-active (if used)</b>). The fuel supply will be removed and engine will be brought to a standstill. Should a <b>remote start signal</b> be present while operating in this mode, a remote start will <u>not</u> occur.</p>   |  |
| <p><b>AUTO</b><br/>This position places the module into it's '<b>Automatic</b>' mode. This mode allows the module to control the function of the generator automatically. The module will monitor the <b>remote start input</b> and once a start condition is signalled the set will be automatically started and placed on load (<b>'Load transfer' becomes active (if used)</b>). If the starting signal is removed the module will automatically transfer the load from the generator and shut the set down observing the <b>stop delay timer</b> and <b>cooling timer</b> as necessary. The module will then await the next start event. <i>For further details please see the more detailed description of 'Auto Operation' earlier in this manual.</i></p> |  |
| <p><b>MANUAL</b><br/>This position is used to allow manual control of the generator functions. Once in <b>Manual mode</b> the module will start the engine and run off load. If the engine is running off-load in the <b>Manual mode</b> and a <b>remote start signal</b> becomes present, the module will automatically instruct the change-over device to place the generator on load (<b>'Load transfer' becomes active (if used)</b>). Should the <b>remote start signal</b> then be removed the generator will remain on load until either the '<b>STOP/RESET</b>' or '<b>AUTO</b>' positions is selected.</p>  |  |

## 4. INSTALLATION INSTRUCTIONS

The model **DSE 560** Module has been designed for front panel mounting. Fixing is by 4 spring loaded clips for easy assembly.

### 4.1 PANEL CUT-OUT

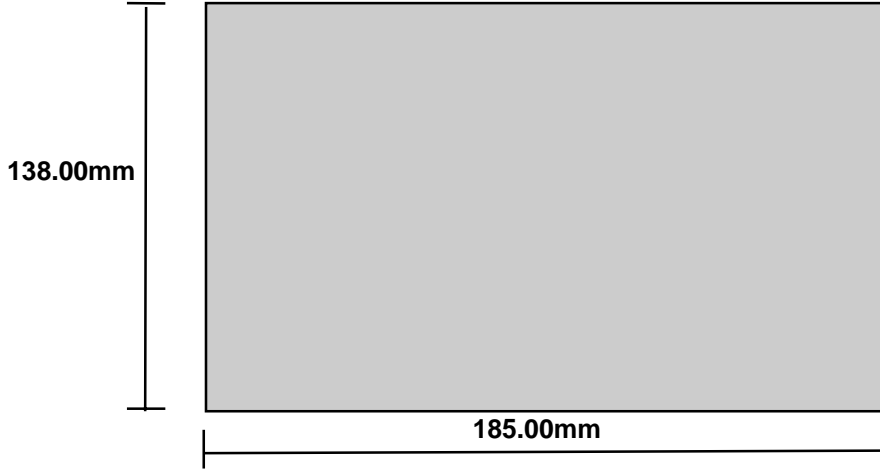


FIG 3

In conditions of excessive vibration the module should be mounted on suitable anti-vibration mountings.

### 4.2 COOLING

The module has been designed to operate over a wide temperature range **-30 to +70° C**. However allowances should be made for the temperature rise within the control panel enclosure. Care should be taken **NOT** to mount possible heat sources near the module unless adequate ventilation is provided. The relative humidity inside the control panel enclosure should not exceed **95%**.

### 4.3 UNIT DIMENSIONS

All dimensions in mm.

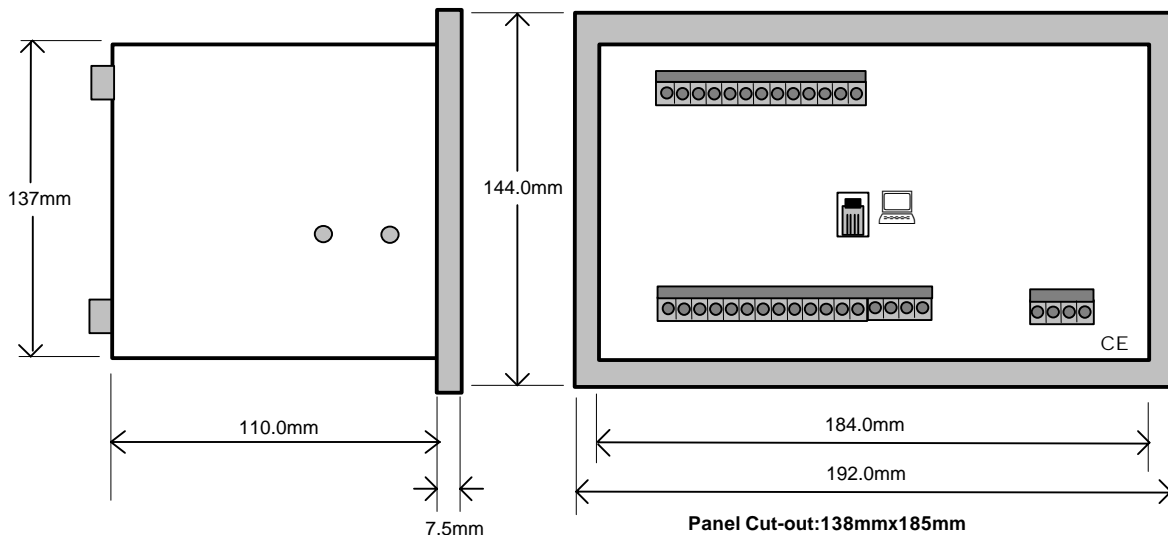


FIG 4

#### 4.4 FRONT PANEL LAYOUT

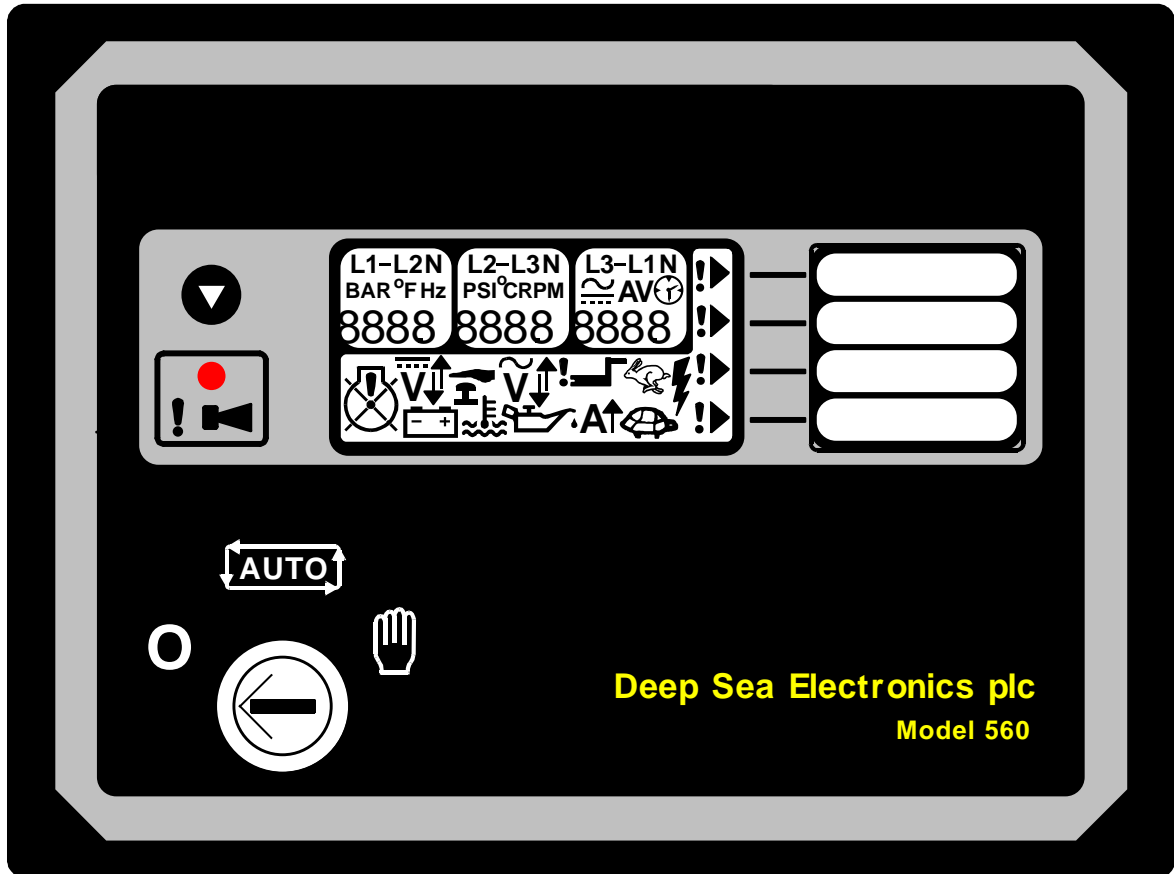


FIG 5

#### 4.5 REAR PANEL LAYOUT

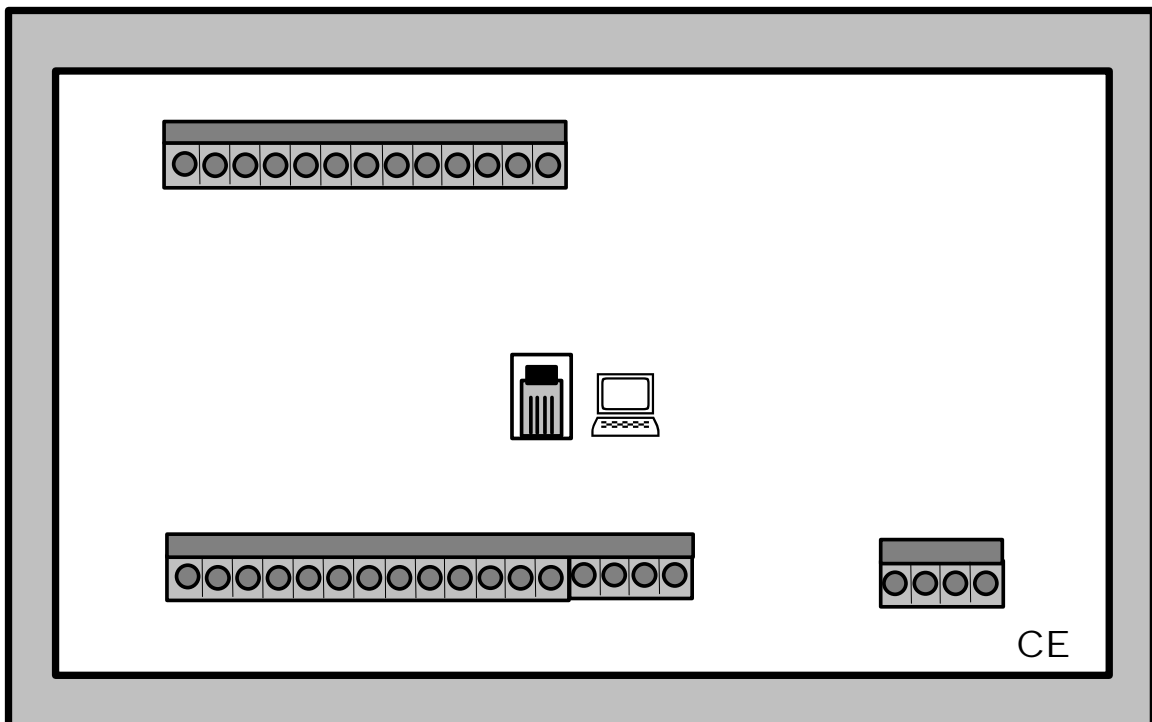


FIG 6

## 5. ELECTRICAL CONNECTIONS

Connections to the Module are via plug and sockets.

## 5.1 CONNECTION DETAILS

The following describes the connections and recommended cable sizes to the 3 (or 4) plugs and sockets on the rear of the Module. See rear panel layout **FIG 5**.

## PLUG "A" 13 WAY

| PIN No | DESCRIPTION                             | CABLE SIZE | NOTES   |
|--------|---|------------|---|
| 1      | DC Plant Supply Input (-ve)             | 2.5mm      |   |
| 2      | DC Plant Supply Input (+ve)             | 2.5mm      | (Recommended Maximum Fuse 21A)  |
| 3      | Emergency Stop Input                    | 2.5mm      | Plant Supply +ve. Also supplies fuel & start outputs.<br>(Recommended Maximum Fuse 32A) |
| 4      | Fuel relay Output                       | 2.5mm      | Plant Supply +ve from pin 3. 16 Amp rated.  |
| 5      | Start relay Output                      | 2.5mm      | Plant Supply +ve from pin 3. 16 Amp rated.  |
| 6      | Auxiliary Output relay 1                | 1.0mm      | Plant Supply +ve. 5 Amp rated.  |
| 7      | Auxiliary Output relay 2                | 1.0mm      | Plant Supply +ve. 5 Amp rated.  |
| 8      | Charge Fail Input/<br>Excitation Output | 1.0mm      | Must NOT be connected to plant supply -ve.  |
| 9      | Auxiliary Input 1                       | 0.5mm      | Switch to -ve   |
| 10     | Auxiliary Input 2                       | 0.5mm      | Switch to -ve   |
| 11     | Auxiliary Input 3                       | 0.5mm      | Switch to -ve   |
| 12     | Auxiliary Input 4                       | 0.5mm      | Switch to -ve   |
| 13     | Auxiliary Input 5                       | 0.5mm      | Switch to -ve   |

## PLUG "B" 17 WAY

| PIN No | DESCRIPTION                 | CABLE SIZE | NOTES                                       |
|--------|-----------------------------|------------|---|
| 14     | Not Used                    |            | Spare                                       |
| 15     | Not Used                    |            | Spare                                       |
| 16     | Not Used                    |            | Spare                                       |
| 17     | Not Used                    |            | Spare                                       |
| 18     | Auxiliary Output relay 3    | 1.0mm      | Plant Supply +ve. 5 Amp rated.              |
| 19     | Not Used                    |            | Spare                                       |
| 20     | Magnetic Pickup Input (+ve) | 0.5mm      | Connect to Magnetic Pickup device           |
| 21     | Magnetic Pickup Input (-ve) | 0.5mm      | Connect to Magnetic Pickup device           |
| 22     | Oil Pressure Input          | 0.5mm      | Connect to Oil pressure sender              |
| 23     | Coolant Temperature Input   | 0.5mm      | Connect to Coolant Temperature sender       |
| 24     | Sender Common Return        | 0.5mm      | Return feed for senders*.                   |
| 25     | CT secondary for L1         | 2.5mm      | Connect to secondary of L1 monitoring CT    |
| 26     | CT secondary for L2         | 2.5mm      | Connect to secondary of L2 monitoring CT    |
| 27     | CT secondary for L3         | 2.5mm      | Connect to secondary of L3 monitoring CT    |
| 28     | Not Used                    |            | Spare                                       |
| 29     | CT secondary common         | 2.5mm      | Connect to secondary of all monitoring CT's |
| 30     | Functional Earth            | 2.5mm      | Connect to a good clean earth point         |

**NOTE**\*:- If using single terminal senders refer to connection diagram. If using earth return type senders connect return terminals to pin 24 and earth pin 24.

**PLUG “C” 4 WAY**

| PIN No | DESCRIPTION                           | CABLE SIZE | NOTES   |
|--------|---------------------------------------|------------|---|
| 31     | Generator L1 Voltage Monitoring Input | 1.0mm      | Connect to generator L1 output (AC) (Recommend 2A Fuse) |
| 32     | Generator L2 Voltage Monitoring Input | 1.0mm      | Connect to generator L2 output (AC) (Recommend 2A Fuse) |
| 33     | Generator L3 Voltage Monitoring Input | 1.0mm      | Connect to generator L3 output (AC) (Recommend 2A Fuse) |
| 34     | Generator Neutral Input               | 1.0mm      | Connect to generator Neutral output (AC)                |

**NOTES:-**

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

A version of the module is available which allows connection to a 3 phase 3 wire system with no neutral (Delta). If using such a module then no connection should be made to terminal 34.

**PC CONFIGURATION INTERFACE CONNECTOR**



4-way connector allows connection to PC via the 808 configuration interface. Module can then be re-configured utilising the P808 for Windows™ software. The connector also allows connection to the 157 relay expansion module or to the 548 LED Remote annunciator module.

## 5.2 CONNECTOR FUNCTION DETAILS

The following describes the functions of the 3 connectors on the rear of the module. See rear panel layout FIG 5.

### PLUG "A" 13 WAY


| PIN No | DESCRIPTION  |
|--------|--|
| 1      | DC Supply -ve. System DC negative input. (Battery Negative).   |
| 2      | DC Supply +ve. System DC positive input. (Battery Positive).   |
| 3      | Emergency Stop input. Internally linked to Starter and Fuel outputs. If this input is not connected to positive the module will be locked out, and if the engine is running it will shutdown immediately. The Positive Supply is also removed from Starter and Fuel outputs, therefore only a single pole Emergency Shutdown button is required. |
| 4      | Fuel Relay output. Plant Supply +ve from pin 3. Used to control the fuel solenoid or engine fuel control system.   |
| 5      | Starter Relay output. Plant Supply +ve from pin 3. Used to control the Starter Motor.  |
| 6      | Auxiliary Relay output 1. Plant Supply +ve. Configurable output, see Calibration Manual for options available.   |
| 7      | Auxiliary Relay output 2. Plant Supply +ve. Configurable output, see Calibration Manual for options available.   |
| 8      | Charge Fail input / Excitation output. Supplies excitation to the Plant Battery Charging Alternator, also an input for the Charge Fail detection circuitry.  |
| 9      | Auxiliary input 1. This is a negative switched configurable input, see Calibration Manual for options available. It is possible to configure the input to be a normally closed signal or a normally open signal.   |
| 10     | Auxiliary input 2. This is a negative switched configurable input, see Calibration Manual for options available. It is possible to configure the input to be a normally closed signal or a normally open signal.   |
| 11     | Auxiliary input 3. This is a negative switched configurable input, see Calibration Manual for options available. It is possible to configure the input to be a normally closed signal or a normally open signal.   |
| 12     | Auxiliary input 4. This is a negative switched configurable input, see Calibration Manual for options available. It is possible to configure the input to be a normally closed signal or a normally open signal.   |
| 13     | Auxiliary input 5. This is a negative switched configurable input, see Calibration Manual for options available. It is possible to configure the input to be a normally closed signal or a normally open signal.   |

**PLUG “B” 17 WAY**

| <b>PIN No</b> | <b>DESCRIPTION</b>  |
|---------------|---|
| 14            | DO NOT USE  |
| 15            | DO NOT USE  |
| 16            | DO NOT USE  |
| 17            | DO NOT USE  |
| 18            | Auxiliary Relay output 3. Plant Supply +ve. Configurable output, see Calibration Manual for options available.                    |
| 19            | DO NOT USE  |
| 20            | Magnetic Input +ve. An AC signal from the magnetic pickup +ve for speed sensing.  |
| 21            | Magnetic Input -ve. An AC signal from the magnetic pickup -ve for speed sensing.  |
| 22            | Oil Pressure sensing input. Connect to resistive type oil pressure sender. Refer to connection diagram for details.               |
| 23            | Coolant Temperature sensing input. Connect to resistive type coolant temperature sender. Refer to connection diagram for details. |
| 24            | Sender Common connection. Return feed from sender units - refer to connection diagram for details.                                |
| 25            | Generator L1 current transformer connection.  |
| 26            | Generator L2 current transformer connection. If single phase is used do not connect this pin.                                     |
| 27            | Generator L3 current transformer connection. If single phase is used do not connect this pin.                                     |
| 28            | DO NOT USE  |
| 29            | Generator current transformer common connection and CT earth connection.  |
| 30            | Functional Earth - Ensure connection to a good clean earth point.   |

**PLUG “C” 4 WAY**

| <b>PIN No</b> | <b>DESCRIPTION</b>  |
|---------------|---|
| 31            | Generator L1 sensing input. Connect to alternator L1 output.  |
| 32            | Generator L2 sensing input. Connect to alternator L2 output. If using single phase only do not connect this terminal. |
| 33            | Generator L3 sensing input. Connect to alternator L3 output. If using single phase only do not connect this terminal. |
| 34            | Generator N sensing input. Connect to alternator N output.  |

 **NOTE:-** A version of the module is available which allows connection to a 3 phase 3 wire system with no neutral (Delta). If using such a module then no connection should be made to terminal 34. Check the serial number label if in doubt.



## 6. SPECIFICATION

|   |   |
|---|---|
| <b>DC Supply</b>  | 9.0 to 35 V Continuous.   |
| <b>Cranking Dropouts</b>  | Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5V . <i>This is achieved without the need for internal batteries.</i> |
| <b>Max. Operating Current</b>   | 390mA at 12 V. 250mA at 24 V.   |
| <b>Max. Standby Current</b>   | 220mA at 12 V. 120mA at 24 V.   |
| <b>Alternator Input Range</b><br><b>3Phase 4Wire System</b><br><b>3Phase 3Wire System</b> | 15V - 277 (ph-N) 3 Phase 4wire AC (+20%)<br>30V - 480 (ph-ph) 3 Phase 3wire AC (+20%)   |
| <b>Alternator Input Frequency</b>   | 50 - 60 Hz at rated engine speed  |
| <b>Magnetic Input Range (if fitted)</b>   | +/- 0.5 V to 70 V Peak  |
| <b>Magnetic Input Frequency</b>   | 10,000 Hz (max) at rated engine speed.  |
| <b>Start Relay Output</b>   | 16 Amp DC at supply voltage.  |
| <b>Fuel Relay Output</b>  | 16 Amp DC at supply voltage.  |
| <b>Auxiliary Relay Outputs</b>  | 5 Amp DC at supply voltage.   |
| <b>Dimensions</b>   | 192 X 144 X 138   |
| <b>Charge Fail / Excitation Range</b>   | 0 V to 35 V   |
| <b>Operating Temperature Range</b>  | -30 to +70°C  |
| <b>CT Burden</b>  | 2.5VA   |
| <b>CT Secondary</b>   | 5A  |
| <b>CT Class</b>   | Class 1 Recommended   |
| <b>Electromagnetic Compatibility</b>  | BS EN 50081-2 EMC Generic Emission Standard (Industrial)<br>BS EN 50082-2 EMC Generic Emission Standard (Industrial)  |
| <b>Electrical Safety</b>  | BS EN 60950   |
| <b>Cold Temperature</b>   | BS EN 60068-2-1 to -30 °C   |
| <b>Hot Temperature</b>  | BS EN 60068-2-2 to +70°C  |
| <b>Humidity</b>   | BS2011-2-1 to 93% RH@40°C for 48 Hours  |
| <b>Vibration</b>  | BS EN60068-2-6<br>10 sweeps at 1 octave/minute in each of 3 major axes.<br>5Hz to 8Hz @ +/-7.5mm constant displacement<br>8Hz to 500Hz @ 2gn constant acceleration            |
| <b>Shock</b>  | BS EN 60068-2-27<br>3 Half sine shocks in each of 3 major axes<br>15gn amplitude, 11mS duration   |

## 7. COMMISSIONING

### 7.1 PRE-COMMISSIONING

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

- 7.1. The unit is adequately cooled and all the wiring to the module is of a standard and rating compatible with the system.
- 7.2. The unit **DC** supply is fused and connected to the battery and that it is of the correct polarity.
- 7.3. 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 Pin 3 is connected to DC positive (+ve)**

- 7.4. 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"**, the unit start sequence will commence.
- 7.5. 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 it's icon indicating; '*Shutdown Failed to start*'. Select the **STOP/RESET** position to reset the unit.
- 7.6. Restore the engine to operational status (reconnect the fuel solenoid), again select **"MANUAL"**, 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.
- 7.7. 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.
- 7.8. Initiate an automatic start by supplying the remote start signal. 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, 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.
- 7.9. Remove the remote start signal, the return sequence will start. After the pre-set time period, the load will be removed from the generator. The generator will then run for the pre-set cooling down period, then shutdown into it's standby mode.
- 7.10. If despite repeated checking of the connections between the **560** and the customer's system, satisfactory operation cannot be achieved, then the customer is requested to contact the factory for further advice on:-

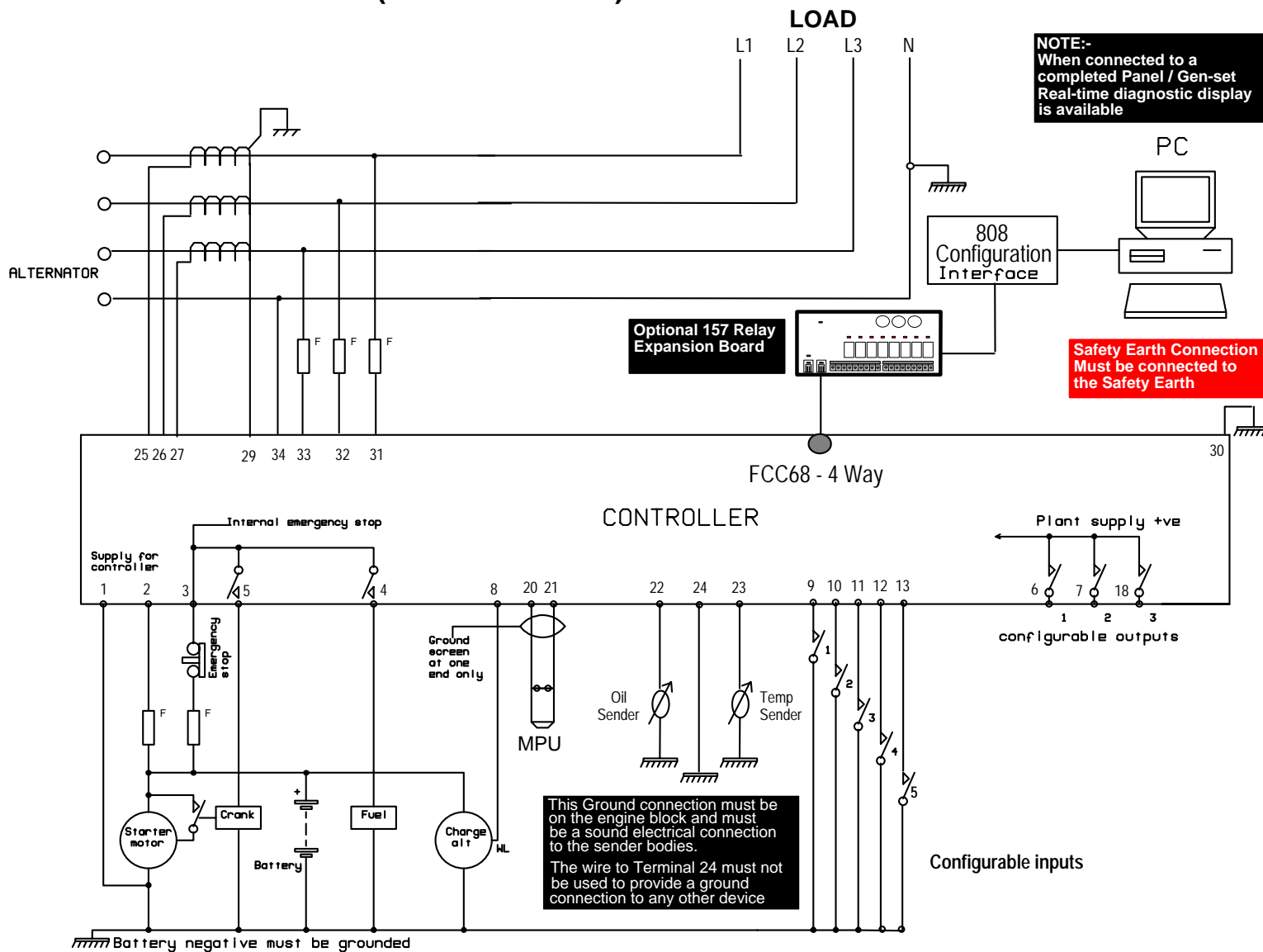
**INTERNATIONAL TEL: +44 (0) 1723 377566**  
**INTERNATIONAL FAX: +44 (0) 1723 354453**  
**E-mail: Support@Deepseapl.com**

## 8. FAULT FINDING

| SYMPTOM  | POSSIBLE REMEDY  |
|--|--|
| Unit is inoperative  | 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<br>Check the operating temperature is not above 70 °C.<br>Check the DC fuse.  |
| Unit locks out on Emergency Stop                                     | If an Emergency Stop Switch is not fitted, ensure that a positive 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 is only connected at one end, if connected at both ends this enables the screen to act as an aerial and will pick up random voltages.  |
| Low oil Pressure fault operates after engine has fired               | Check engine oil pressure. Check oil pressure switch/sender and wiring. Check configured polarity (if applicable) is correct (i.e. Normally Open or Normally Closed) or that sender is compatible with the 560 Module and is correctly configured. |
| High engine temperature fault operates after engine has fired.       | Check engine temperature. Check switch/sender and wiring. Check configured polarity (if applicable) is correct (i.e. Normally Open or Normally Closed) or that sender is compatible with the 560 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 560 inputs. Refer to engine manual.                            |
| Continuous starting of generator when in <b>AUTO</b>                 | 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. If remote start fault, check signal is on "Remote Start" input. Confirm input is configured to be used as "Remote Start".   |
| 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 has been selected in your configuration.   |
| 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 +Ve.   |
| 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.   |
| Incorrect reading on Engine gauges                                   | Check engine is operating correctly. Check sender and wiring paying particular attention to the wiring to terminal 24 (refer to appendix). Check that sender is compatible with the 560 Module and is correctly configured.                        |

 **NOTE:-** The above fault finding is provided as a guide check-list only. As it is possible for the module to be configured to provide a wide range of different features always refer to the source of your module configuration if in doubt.

## 9. TYPICAL WIRING DIAGRAM (3PHASE 4WIRE)



## 10. FACTORY DEFAULT CONFIGURATION

### P560 Configuration

Title: Standard default settings factory set  
 Created by: Miles Revell  
 Date: 17 January 2000  
 Filename: P560A

### MISCELLANEOUS ITEMS

| Item                                  | Value                  |
|---------------------------------------|------------------------|
| Magnetic pickup input present         | No                     |
| Flywheel teeth                        | 190                    |
| Alternator frequency input present    | Yes                    |
| Alternator poles                      | 4                      |
| Start attempts                        | 3                      |
| AC System                             | Three Phase, Four Wire |
| Enable Fast Loading                   | Yes                    |
| Check Oil Pressure for engine at rest | Yes                    |
| CT Primary                            | 500                    |
| Enable High Current Warning           | Yes                    |
| High Current Warning                  | 125%                   |

### INPUTS

| Low oil pressure                |                   | VDO 0-10Bar   |                       |
|---------------------------------|-------------------|---------------|-----------------------|
| Low oil pressure Shutdown (PSI) |                   | 20            |                       |
| High engine temp.               |                   | VDO 120 deg C |                       |
| High engine temp. Shutdown (°C) |                   | 110           |                       |
| Input channel                   | Polarity          | Type          | Activation time       |
| Auxiliary input 1               | Close to activate | Remote Start  |                       |
| Auxiliary input 2               | Close to activate | Indication    | Always Active         |
| Auxiliary input 3               | Close to activate | Shutdown      | Active from Safety On |
| Auxiliary input 4               | Close to activate | Warning       | Active from Safety On |
| Auxiliary input 5               | Close to Activate | Warning       | Always active         |

### OUTPUTS

| Output channel     | Polarity | Control source  |
|--------------------|----------|-----------------|
| Auxiliary output 1 | Energise | 1 Pre-heat      |
| Auxiliary output 2 | Energise | 35 Common alarm |
| Auxiliary output 3 | Energise | 4 Load transfer |
| Expansion output 1 | Energise | 00 Unused       |
| Expansion output 2 | Energise | 00 Unused       |
| Expansion output 3 | Energise | 00 Unused       |
| Expansion output 4 | Energise | 00 Unused       |
| Expansion output 5 | Energise | 00 Unused       |
| Expansion output 6 | Energise | 00 Unused       |
| Expansion output 7 | Energise | 00 Unused       |
| Expansion output 8 | Energise | 00 Unused       |

### LCD Indicators

| LCD   | Polarity | Control source           |
|-------|----------|--------------------------|
| LCD 1 | Lit      | 39 Remote start present  |
| LCD 2 | Lit      | 43 Auxiliary IP 2 active |
| LCD 3 | Lit      | 44 Auxiliary IP 3 active |
| LCD 4 | Lit      | 45 Auxiliary IP 4 active |

**SYSTEM TIMERS**

| Timer                    | Mins:secs |
|--------------------------|-----------|
| Remote start delay time  | 0:05      |
| Remote stop delay time   | 0:30      |
| Cranking time            | 0:10      |
| Crank rest time          | 0:10      |
| Safety on delay time     | 0:10      |
| Warm up time             | 0:00      |
| Cooling time             | 0:30      |
| Fail to stop time        | 0:30      |
| ETS solenoid hold time   | 0:00      |
| Pre-heat time            | 0:00      |
| Sensor fail delay time   | 0:02      |
| Smoke limiting time      | 0:00      |
| Smoke limiting ramp time | 0:00      |
| Low DC Volts Delay       | 01:00     |

**Speed / Frequency**








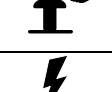
















| Level                                      | Value    |
|--|----------|
| Over frequency                             | 57.0 Hz  |
| Overspeed on magnetic pickup               | 1750 RPM |
| Overspeed overshoot during safety on delay | 2 %      |
| Under frequency                            | 30.0 Hz  |
| Under-speed on magnetic pickup             | 1250 RPM |
| Crank disconnect on alternator frequency   | 21.0 Hz  |
| Crank disconnect on magnetic pickup        | 600 RPM  |

**Voltage Settings**

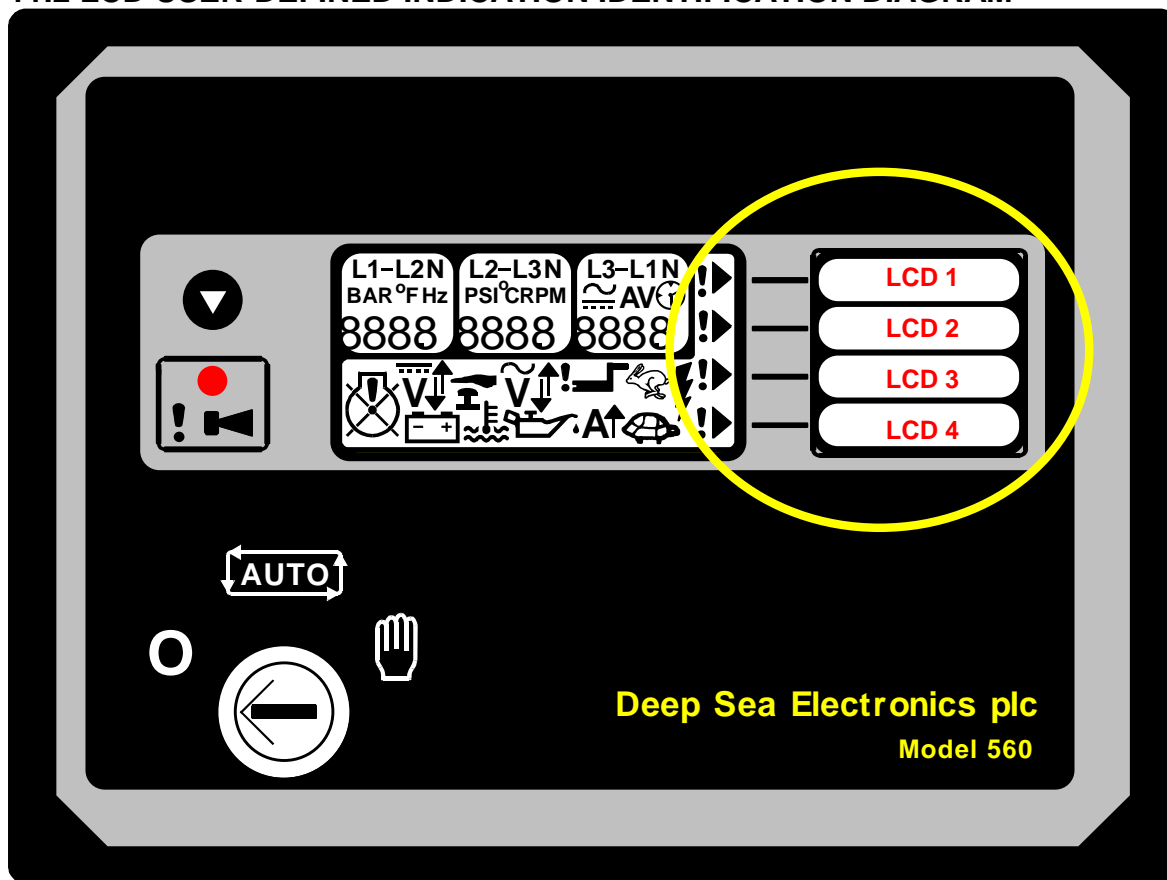
| Level                                      | Value      |
|--|------------|
| Undervolts trip                            | 180.0V AC  |
| Overvolts trip                             | 265.0 V AC |
| Under Volts Alarm                          | 9.0V DC    |
| Charge Fail                                | 8.0V DC    |
| Crank disconnect charge alternator voltage | 40.0 V DC  |
| Over Volts Alarm                           | 33.0V DC   |

## 11. ICONS AND LCD IDENTIFICATION

### 11.1 ICON DESCRIPTIONS

| Display Symbol  | Description                           | Display Symbol  | Description       |
|---|---------------------------------------|---|-------------------|
|    | Shutdown Alarm                        | L1- L2  | Phase - Phase     |
|    | Warning Alarm                         | L2- L3  | Phase - Phase     |
|    | High Coolant Temperature              | L3- L1  | Phase - Phase     |
|    | Low Oil Pressure                      | L1- N   | Phase - Neutral   |
|    | Charge Fail                           | L2- N   | Phase - Neutral   |
|    | Over-speed                            | L3- N   | Phase -Neutral    |
|    | Under-speed                           | BAR   | Pressure          |
|   | Fail to start (Over-crank)            | Hz  | Frequency         |
|  | Emergency Stop                        | °F  | Temperature       |
|  | Electrical Trip                       | PSI   | Pressure          |
|  | High Current Warning                  | °C  | Temperature       |
|  | Over Voltage (AC)                     | RPM   | Speed             |
|  | Under Voltage (AC)                    | L1  | Phase             |
|  | Over Voltage (DC)                     | L2  | Phase             |
|  | Under Voltage (DC)                    | L3  | Phase             |
|  | Auxiliary Indication                  | V   | Voltage           |
|  | Auxiliary Alarm (Warning or Shutdown) | A   | Amperes           |
|  | AC                                    |  | Hours Run         |
|  | DC                                    |  | Common Alarm      |
|  | Stop/Reset                            |  | Auto              |
|  | Manual                                | I   | Start (If fitted) |
| KPA   | KPa Oil Pressure Units                |   |                   |

### 11.2 LCD USER-DEFINED INDICATION IDENTIFICATION DIAGRAM

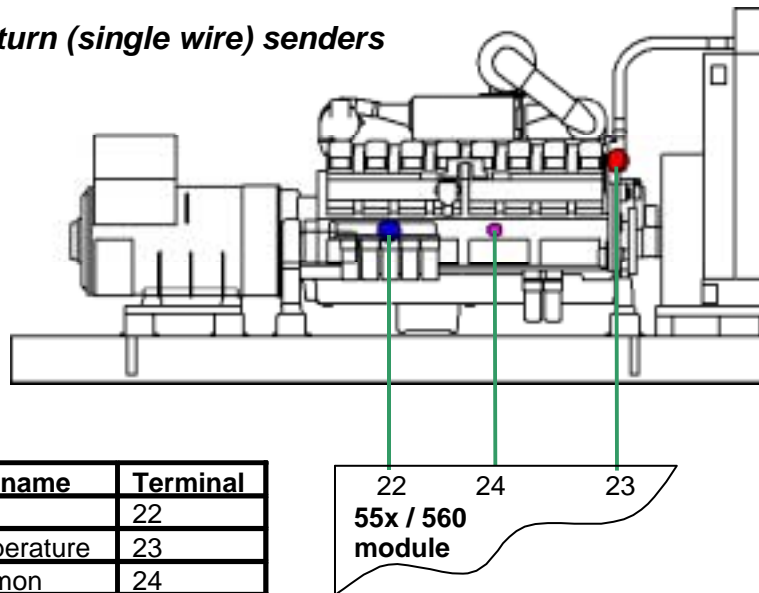




## 12. APPENDIX

### 12.1 SENDER WIRING RECOMMENDATIONS

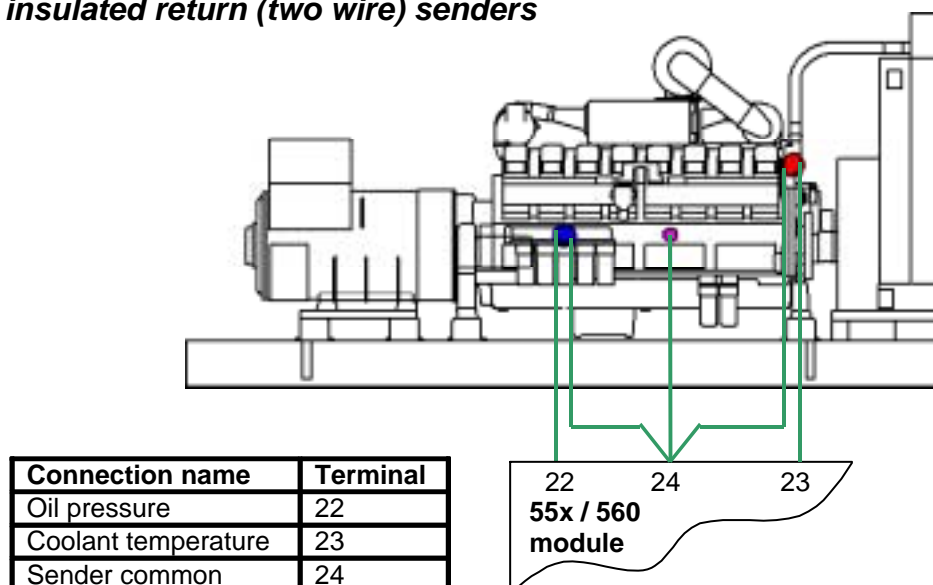
#### Using Earth return (single wire) senders



**NOTE:-** . It is important that terminal 24 ( sender 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 sender bodies.

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

#### Using insulated return (two wire) senders



**NOTE:-** . It is important that terminal 24 ( sender common ) is soundly connected to an earth point on the ENGINE BLOCK, not within the control panel .

## 12.2 PC INTERFACE MODULE 808

The 560 module can be calibrated by using PC with Interface Module 808 .

The PC interface 808 kit comprises the following:-

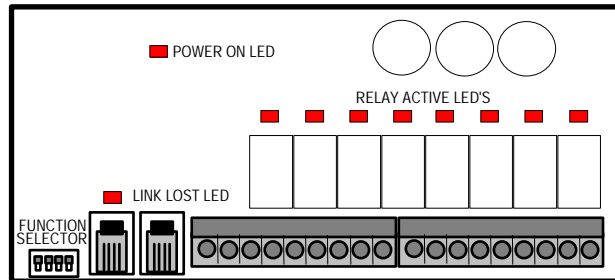
- 808 Interface Module
- 25 to 9 way adapter
- FCC 68 (4 Pin) Connecting Lead
- Floppy disc or CD with configuration software

## 12.3 OUTPUT EXPANSION

There are several methods of output expansion available for the 560 module:-

### 12.3.1 RELAY OUTPUT EXPANSION (157)

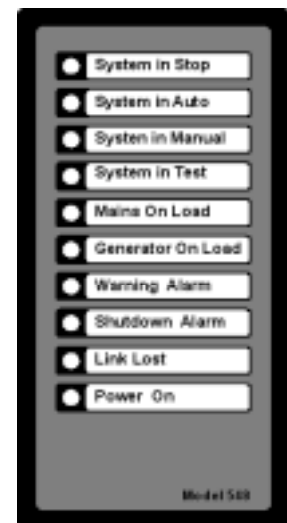
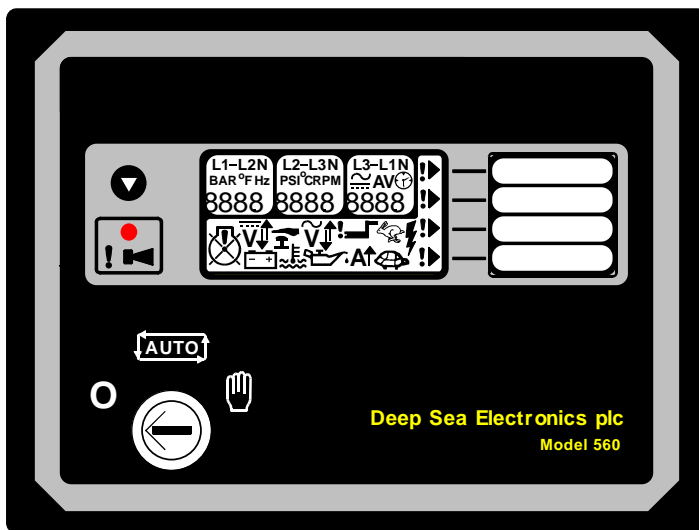
An expansion module is available, which connects to the configuration socket, and enables the 560 to use eight additional relays, providing Volt-free contacts for customer connection.



Refer to technical data sheet on the 157 relay module for further details.

### 12.3.2 LED OUTPUT EXPANSION (548)

An expansion module is available, which connects to the configuration socket, and enables the 560 to use eight additional LED's, providing remote LED's indication up to 50 metres away.

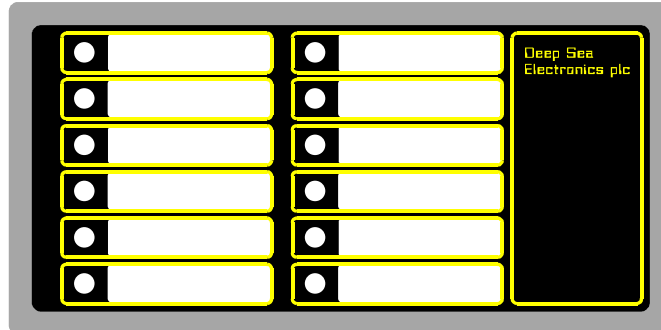


Refer to technical data sheet on the 548 LED module for further details.

It is possible to use a mix of 157 and 548 modules to give both relay and LED expansion if required (Please refer to our Technical Support department for details.).

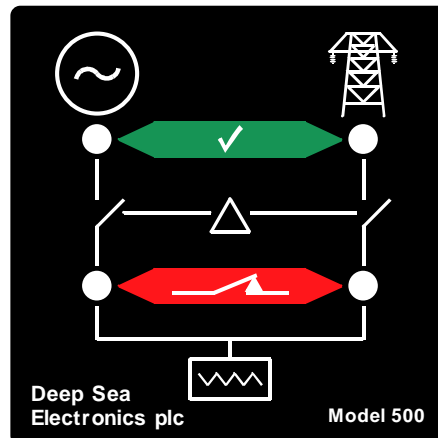
## 12.4 INPUT EXPANSION

It is possible to increase the number of monitored inputs available by utilising a DSE 54x Protection Expansion/Annunciator. Please refer to our Technical department for details.



## 12.5 STANDBY GENERATING SET?

The 560 needs to be given a remote start to start up. This can be supplied from a Mains monitoring module to make the gen-set start up automatically should the mains fail. The 560 module may be used in conjunction with either the basic 500 ATS controller or the more complex 530 ATS controller. These not only monitor the mains and issue a start command to the 560, they also provide control of the contactors or other changeover devices. Please refer to our Technical department for details.



## 12.6 NEED MORE FUNCTIONS?

The 560 module can easily be upgraded with a 550 controller. It has exactly the same mounting and uses exactly the same rear connectors. Upgrading takes seconds and instantly provides functions such as telemetry, two stage alarms on monitored values, exercise scheduler, enhanced metering and many more features. Please refer to our Technical department for details.