



# **Deep Sea Electronics Plc**

## **556 Operators Manual**

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## 1 INTRODUCTION

The **DSE 556** Module, has been primarily designed to allow the user to start and stop a multi set system of generators, and if required, transfer the load to the generator either manually or automatically. The module also has the facility to run in parallel with the mains, maintaining either a fixed generator output or a fixed mains power level (kW and Var). The 556 also allows the system operating parameters to be viewed via the LCD display.

The **DSE 556** module monitors the incoming AC mains supply for under or over voltage/ under or over frequency and instructs the multi set generating system to start and to supply the load. When the mains returns, the 556 would back synchronise the multi set system to the mains and execute a soft transfer of load back to the mains.

The powerful 32-Bit Micro-processor contained within the module allows for a range of complex features to be incorporated as standard;





- *Full Multi-lingual LCD display (including non-western character fonts).*
- *Up to eight different languages held on-board the module.*
- *True RMS voltage monitoring.*
- *Optional Communications capability (RS485 or RS232 including GSM/SMS functions)*
- *Fully configurable inputs for use as alarms or a range of different functions.*
- *Extensive range output functions using built in relay outputs or the optional relay expansion unit.*

Selective operational sequences, timers and alarm trips can be altered by the customer via a PC using the P810 For Windows™ software and 810 interface

Access to critical operational sequences and timers for use by qualified engineers, are barred by a security code. Module access is barred by PIN code. Limited operator selections, such as display language, can be changed from the module front panel.

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

## 1.1 CLARIFICATION OF NOTATION 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.
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## 2 OPERATION



### 2.1 CONTROL

Control of the **DSE 556** module is via push-buttons mounted on the front of the module with **STOP/RESET**, **MANUAL**, **START**, **AUTO**, **TEST** and **ALARM MUTE** functions. For normal operation these are the only controls which need to be operated. The smaller push-buttons are used to access further information such as mains Voltage. Details of their operation is detailed later in this document.

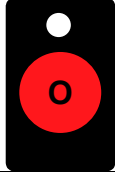
The following descriptions detail the sequences followed by a module containing the standard 'factory configuration'. Always refer to your configuration source for the exact sequences and timers observed by any particular module in the field.




## 2.2 NORMAL MANUAL OPERATION

Operation	Detail
To initiate a start sequence, press the 'Manual' push-button.	
The LED above the manual button will illuminate and the LCD display will briefly indicate:	<b>MANUAL MODE</b>
The LED above the manual button will illuminate and the LCD display will then indicate:	<b>MAINS ON LOAD</b>
Then, press and the <b>START</b> push-button. The 556 will issue a start command to all connected 550 controllers.	
Any available 550 in auto mode will be issued with a start signal and will display: Please refer to the 550 operating manual for further details of the 550 start sequence	<b>START DELAY</b>  <b>00:05</b>
The 556 will display:	<b>START REQUEST</b>
Once the Minimum number of sets (set using P810 software) have synchronised onto the bus, the 556 will display:	<b>MAINS ON LOAD</b>
Pressing the transfer to bus/open mains button (configured input) once will synchronise the bus to the mains. The 556 will display:	<b>SYNCHRONISE TO BUS</b>
Once the bus has synchronised to the mains, the bus will close and power will be ramped onto the bus (generators). The 556 will display:	<b>RAMP ON TO BUS</b> <b>10% KW 12% KVA</b>
Once the bus power / mains power level has been reached (configured using P810 software) the 556 will display:	<b>CONTINUOUS PARALLELING</b>
<b>The system will remain in this mode until further action is taken.</b>	
Pressing the transfer to bus/open mains button again will transfer the remaining load onto the bus (generators). The 556 will display:	<b>RAMP ON TO BUS</b> <b>10% KW 12% KVA</b>
Once the mains loading has reached 0 kW the mains will open and the 556 will display:	<b>BUS ON LOAD</b>
<b>The system will remain in this mode until further action is taken.</b>	
Pressing the transfer to mains/open bus button (configured input) once will synchronise the bus to the mains. The 556 will display:	<b>SYNCHRONISE TO MAINS</b>
Once the bus has synchronised to the mains, the mains will close and power will be ramped off the bus (generators). The 556 will display:	<b>RAMP OFF BUS</b> <b>10% KW 12% KVA</b>
Once the bus power / mains power level has been reached (configured using P810 software) the 556 will display:	<b>CONTINUOUS PARALLELING</b>
<b>The system will remain in this mode until further action is taken.</b>	




Operation	Detail
Pressing the transfer to mains/open bus button again will transfer the remaining load onto the mains (generators). The 556 will display:	<b>RAMP OFF BUS</b> <b>10% KW 12% KVA</b>
Once the bus loading has reached 0 kW the bus will open and the 556 will display:	<b>MAINS ON LOAD</b>
Pressing the red stop button will issue a stop to all 550 on the system	
The LED above the button will illuminate and the LCD display will briefly indicate:	<b>STOP/RESET</b>
Any 550 running in auto mode will then display: Please refer to the 550 operating manual for further details of the 550 stop sequence	<b>RETURN DELAY</b> <b>00:50</b>



**1.3 AUTOMATIC OPERATION**  
**1.3.1 BY REMOTE START INPUT**

Operation	Detail
If the module is placed in 'AUTO' mode by pressing the 'AUTO' PUSHBUTTON, it will monitor the auxiliary inputs for a 'REMOTE START' signal. In addition the module will monitor the incoming AC mains supply.	
The LCD display will briefly indicate	<b>AUTO MODE</b>
The LCD display will then indicate	<b>MAINS ON LOAD</b>
Once the remote start input is activated, the module will start its 'Start Delay' timer, this is used to ensure that the start event is really required and not just a momentary transient signal.	<b>START DELAY</b> 00:09
Once this timer has timed out, any available 550 in auto mode will be issued with a start signal, and will display: Please refer to the 550 operating manual for further details of the 550 start sequence.	<b>START DELAY</b> 00:05
The 556 will display:	<b>START REQUEST</b>
Once the Minimum number of sets (set using P810 software) have synchronised onto the bus, the 556 will display:	<b>SYNCHRONISE TO BUS</b>
Once the bus has synchronised to the mains, the bus will close and power will be ramped onto the bus (generators). The 556 will display:	<b>RAMP ON TO BUS</b> 10% KW 12% VA
Once the bus power / mains power level has been reached (configured using P810 software) the 556 will display:	<b>CONTINUOUS PARALLELING</b>
<b>The system will remain in this mode until further action is taken.</b>	
Should the remote start signal be de-activated, the module will first initiate a return timer to ensure that it is safe to stop the generator. The 556 will display:	<b>RETURN DELAY</b> 00:50
Should the remote start input become active again within this time, the module will continue to run the generators on load and ignore the fluctuating remote start signal until such time as it remains in-active for the duration of the stop delay timer.	
Once the return delay has expired the load will be ramped back onto the mains. The 556 will display:	<b>RAMP OFF BUS</b> 10% KW 12% KVA
Once the bus loading has reached 0 kW the bus will open and the 556 will display:	<b>MAINS ON LOAD</b>
Any 550 running in auto mode will be issued a stop and will display: Please refer to the 550 operating manual for further details of the 550 stop sequence	<b>RETURN DELAY</b> 00:50

### 1.3.2 BY MAINS FAILURE




<p>If the module is placed in 'AUTO' mode by pressing the 'AUTO' PUSHBUTTON, it will monitor the auxiliary inputs for a 'REMOTE START' signal. In addition the module will monitor the incoming AC mains supply.</p>	
<p>The LCD display will briefly indicate</p>	<p><b>AUTO MODE</b></p>
<p>The LCD display will then indicate</p>	<p><b>MAINS ON LOAD</b></p>
<p>Should the Mains supply become outside of acceptable limits, the module will start its 'Start Delay' timer, this is used to ensure that the start event is really required and not just a momentary transient signal.</p>	<p><b>START DELAY</b> <span style="float: right;">00:09</span></p>
<p>Once this timer has timed out, any available 550 in auto mode will be issued with a start signal and will display: Please refer to the 550 operating manual for further details of the 550 start sequence.</p>	<p><b>START DELAY</b> <span style="float: right;">00:05</span></p>
<p>The 556 will display:</p>	<p><b>START REQUEST</b></p>
<p>Once the Minimum number of sets (set using P810 software) have synchronised onto the bus, the mains breaker will be opened and then the bus breaker closed. The 556 will display:</p>	<p><b>BUS ON LOAD</b></p>
<p>Should the mains return with in acceptable limits, the module will first initiate a return timer to ensure that it is safe to stop the generator. The 556 will display:</p>	<p><b>RETURN DELAY</b> <span style="float: right;">00:50</span></p>
<p>Should the mains fail again within this time, the module will continue to run the generators on load and ignore the fluctuating mains, until such time as the mains remain healthy for the duration of the stop delay timer.</p>	
<p>Once the return delay has expired the bus will be synchronised to the mains. The 556 will display:</p>	<p><b>SYNCHRONISE TO MAINS</b></p>
<p>Once the bus has synchronised to the mains, the mains will close and power will be ramped off the bus. First to level as set by P810 and then to 0 kW. The 556 will display:</p>	<p><b>RAMP OFF BUS</b> <b>10% KW 12% KVA</b></p>
<p>Once the bus loading has reached 0 kW the bus will open and the 556 will display:</p>	<p><b>MAINS ON LOAD</b></p>
<p>Any 550 running in auto mode will be issued a stop and will display: Please refer to the 550 operating manual for further details of the 550 stop sequence</p>	<p><b>RETURN DELAY</b> <span style="float: right;">00:50</span></p>

## 1.4 TEST OPERATION

Operation	Detail
To place the module into 'TEST' mode press 'TEST' PUSHBUTTON. This mode is used to simulate an automatic start and will start the generators to run in continuous parallel mode.	
The LCD display will briefly indicate	<b>TEST MODE</b>
The LED above the button will illuminate and the module will start its 'Start Delay' timer This is used to ensure that the start event is really required and not just a momentary transient signal. The 556 will display:	<b>START DELAY</b> 00:09
Once this timer has timed out, any available 550 in auto mode will be issued with a start signal, and will display: Please refer to the 550 operating manual for further details of the 550 start sequence.	<b>START DELAY</b> 00:05
The 556 will display:	<b>START REQUEST</b>
Once the Minimum number of sets (set using P810 software) have synchronised onto the bus, the 556 will display:	<b>SYNCHRONISE TO BUS</b>
Once the bus has synchronised to the mains, the bus will close and power will be ramped onto the bus (generators). The 556 will display:	<b>RAMP ON TO BUS</b> 10% KW 12% KVA
Once the bus power / mains power level has been reached (configured using P810 software) the 556 will display:	<b>CONTINUOUS PARALLELING</b>
<b>The system will remain in this mode until further action is taken.</b>	
If the module is placed in 'AUTO' mode by pressing the 'AUTO' PUSHBUTTON, it will monitor the auxiliary inputs for a 'REMOTE START' signal. In addition the module will monitor the incoming AC mains supply.	
The LCD display will briefly indicate	<b>AUTO MODE</b>
Should the remote start signal not be present, and the mains is within limits, the module will first initiate a return timer to ensure that it is safe to stop the generator. The 556 will display:	<b>RETURN DELAY</b> 00:50
Should the remote start input become active within this time the module will continue to run the generator on load and ignore the fluctuating remote start signal until such time as it remains inactive for the duration of the stop delay timer.	
Once the return delay has expired the power will be ramped off the bus.	<b>RAMP OFF BUS</b> 10% KW 12% KVA
Once the bus loading has reached 0 kW the bus will open and the 556 will display:	<b>MAINS ON LOAD</b>
Any 550 running in auto mode will be issued a stop and will display: Please refer to the 550 operating manual for further details of the 550 stop sequence	<b>RETURN DELAY</b> 00:50

## 2. PROTECTIONS

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

The Audible Alarm will sound. This can be silenced by pressing the 'Mute' button	
The "Common alarm" LED will illuminate ( <b>Warning = Steady, Shutdown = Flashing [steady when Muted]</b> )	
The LCD display will jump from the 'Information page' to display the Alarm Page and the LED above the page icon will illuminate	
The LCD will the display	<b>ALARM</b>
Followed by the appropriate alarm text	<b>BUS FAIL TO OPEN</b>

If no alarms are present the LCD will display the following message and will then return to the 'Information Display' page;






**NO ALARM PRESENT**



The LCD will display multiple alarms E.g. "Bus fail to open", "Fail to synchronise" and "Mains fail to close" alarms have been triggered. These will automatically scroll round in the order that they occurred;

<b>ALARM</b>	←
<b>WARNING BUS FAIL TO OPEN</b>	
<b>WARNING FAIL TO SYNCHRONISE</b>	
<b>WARNING MAINS FAIL TO CLOSE</b>	

It is also possible to manually scroll to display the different alarms;

Initial display		<b>ALARM</b>
Pressing the DOWN button the LCD will then show...		<b>WARNING BUS FAIL TO OPEN</b>
Pressing the DOWN button again the LCD will then show...		<b>WARNING FAIL TO SYNCHRONISE</b>
Pressing the DOWN button again the LCD will then show...		<b>WARNING MAINS FAIL TO CLOSE</b>
Pressing the DOWN button again the LCD will then show...		<b>ALARM</b>
Pressing the UP button the LCD will then show... etc, etc, etc.		<b>WARNING MAINS FAIL TO CLOSE</b>

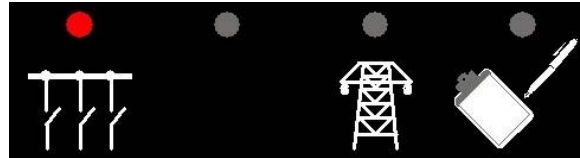
### 2.3 VIEWING ALARMS


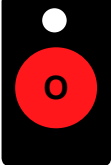
If the module is operating in the normal 'INFORMATION PAGE' display any alarm condition will automatically be displayed.



If the user is viewing an instrumentation page, e.g.

Then the alarm page will not automatically be displayed and must be viewed by the operator.



To view an alarm, operate the page button to move to the 'Alarm' page.	
To clear an alarm the original triggering conditions must be removed before the alarm can be reset. Alarms are reset by pressing the 'Stop/Reset' pushbutton.	

## 2.4 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.

**BATTERY LOW VOLTAGE**, if the module detects that the systems DC supply has fallen below the low volts setting level , the module will display '**WARNING LOW BATTERY VOLTAGE**' on the LCD. The **COMMON ALARM LED** will also flash.

**BATTERY HIGH VOLTAGE**, if the module detects that the system DC supply has risen above the high volts setting level , the module will display '**WARNING HIGH BATTERY VOLTAGE**' on the LCD. The **COMMON ALARM LED** will also flash.

**BUS PHASE SEQUENCE WRONG**, if the module detects a bus phase rotation error a shutdown is initiated. The LCD will indicate '**BUS PHASE SEQ WRONG**' and the **COMMON ALARM LED** will flash.

**FAILED TO SYNCHRONISE**, if the module cannot synchronise within the timer allowed by the Synchronising timer a warning is initiated. The LCD will indicate '**FAILED TO SYNC**' and the **COMMON ALARM LED** will flash.

**MAINS PHASE SEQUENCE WRONG**, if the module detects a mains phase rotation error, a warning is initiated. The LCD will indicate '**MAINS PHASE SEQ WRONG**' and the **COMMON ALARM LED** will flash.

**MSC ID ALARM**, The MSC ID of the 556 is fixed. Should two or more 556 modules be connected together the LCD will indicate '**MSC ID ERROR**' and the **COMMON ALARM LED** will flash.

**AUXILIARY INPUTS**, if an auxiliary input has been configured as a warning the appropriate LCD message will be displayed and the **COMMON ALARM LED** will flash.

**MAINS FAILED TO CLOSE**, if the mains breaker fails to close, a warning is initiated. The LCD will indicate '**MAINS FAILED TO CLOSE**' and the **COMMON ALARM LED** will flash.

**MAINS FAILED TO OPEN**, if the mains breaker fails to open, a warning is initiated. The LCD will indicate '**MAINS FAILED TO OPEN**' and the **COMMON ALARM LED** will flash.

**INSUFFICIENT CAPACITY**, if the generators reach full load when they are in parallel with the mains (utility). The LCD will indicate '**INSUFFICIENT CAPACITY**' and the **COMMON ALARM LED** will flash.

**MINIMUM SETS NOT REACHED**, if the minimum number of sets on the bus has not been reached prior to closing the generator bus load switching device, the LCD will indicate '**MINIMUM SETS NOT REACHED**' and the **COMMON ALARM LED** will flash.

**MSC DATA ERROR**, if the data on the MSC link is corrupt, then the LCD will indicate '**MSC DATA ERROR**' and the **COMMON ALARM LED** will flash.

**MSC ID ERROR**, if the more than one 556 modules are connected to the same MSC link, the LCD will indicate '**MSC ID ERROR**' and the **COMMON ALARM LED** will flash.

**MSC FAILURE**, if the link breaks, the LCD will indicate '**MSC FAILURE**' and the **COMMON ALARM LED** will flash.

**MSC TOO FEW SETS**, if the of modules on the MSC link falls below the **Minimum modules on Multiset comms link**, the LCD will indicate '**MSC TOO FEW SETS**' and the **COMMON ALARM LED** will flash.

**MSC ALARMS INHIBITED**, if an input has been configured as 'MSC ALARMS INHIBIT' and is active, the LCD will indicate '**MSC ALARMS INHIBIT**' and the **COMMON ALARM LED** will flash.

**MSC OLD VERSION UNIT**, if a version 6 module is plugged on to the MSC link, the LCD will indicate '**MSC OLD VERSION UNIT**' and the **COMMON ALARM LED** will flash.

If the module is fitted with the optional RS232 communication board, then the following alarm is available.

**MODEM POWER FAULT**, if the module detects a modem supply current in excess of 350mA a warning is initiated. The LCD will indicate '**MODEM POWER FAULT**' and the **COMMON ALARM LED** will flash. The power supply to the modem will be removed until the alarm is reset.

## **2.5 ELECTRICAL TRIPS**

Electrical trips are latching, and open the bus breaker. The alarm must be accepted and cleared, and the fault removed to reset the module.

**MAINS REVERSE POWER**, if the module detects a mains reverse power current in excess of the pre-set trip level and time delay, an electrical trip is initiated. The LCD will indicate '**MAINS REVERSE POWER**' and the **COMMON ALARM LED** will flash.

**AUXILIARY INPUTS**, if an auxiliary input has been configured as an Electrical Trip the appropriate LCD message will be displayed and the **COMMON ALARM LED** will flash.

**MINIMUM SETS NOT REACHED**, if the minimum number of sets are not synchronised on to the bus, prior to the common bus breaker closing, an electrical trip is initiated. The LCD will indicate '**MIN. SETS NOT REACHED**' and the **COMMON ALARM LED** will flash.

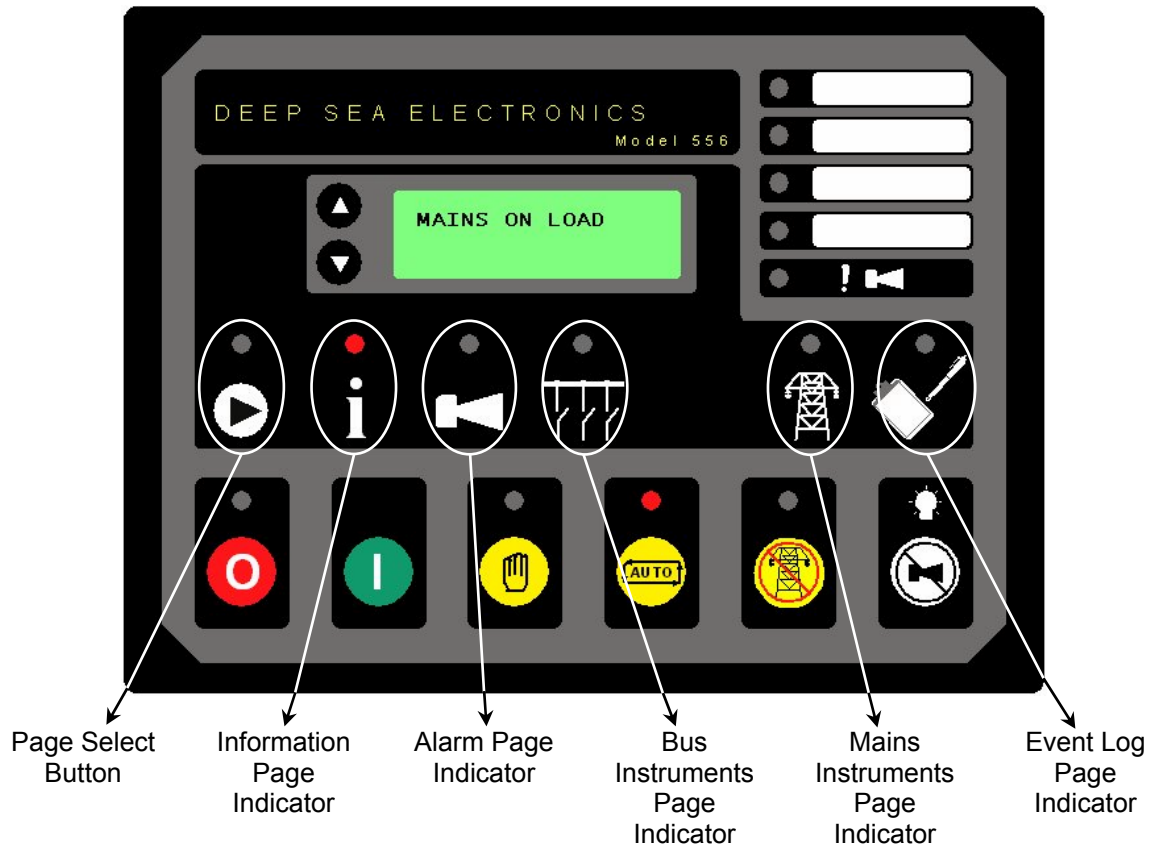
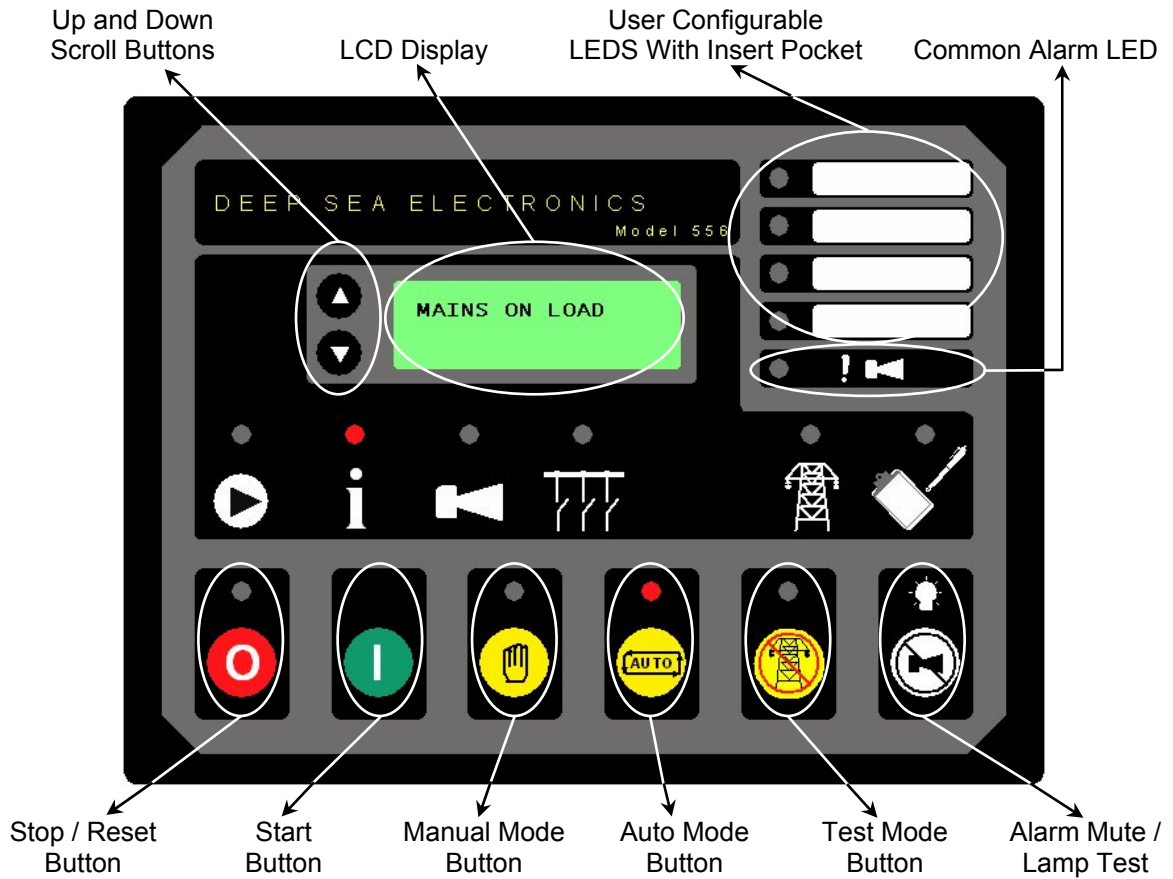
**BUS FAILED TO CLOSE**, if the bus breaker fails to close, an electrical trip is initiated. The LCD will indicate '**BUS FAILED TO CLOSE**' and the **COMMON ALARM LED** will flash.

**BUS FAILED TO OPEN**, if the bus breaker fails to open, an electrical trip is initiated. The LCD will indicate '**BUS FAILED TO OPEN**' and the **COMMON ALARM LED** will flash.








### 3 DESCRIPTION OF CONTROLS

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



### 3.1 LCD DISPLAY

	<p><b>INFORMATION PAGE</b> The LCD display normally indicates the status of the system such as <b>'MAINS ON LOAD'</b>, <b>'START REQUEST'</b>, etc. This is the default display and is always automatically returned to after a pre-set period of operator inactivity.</p>
	<p><b>ALARM PAGE</b> The LCD also displays the exact nature of any alarm condition which has occurred, such as <b>'BUS FAIL TO CLOSE'</b>. This allows very specific alarm conditions to be brought to the operators' attention. Refer to the 'Protections' section of this manual for details of how to interact with the alarm page.</p>
	<p><b>BUS INSTRUMENT PAGE</b> The LCD displays the various bus values such as <b>'BUS VOLTAGE'</b>, <b>'BUS kW'</b>, etc.</p>
	<p><b>MAINS INSTRUMENT PAGE</b> The LCD displays the various mains supply values such as <b>'MAINS VOLTAGE'</b>, <b>'MAINS AMPS'</b>, <b>'MAINS kW'</b>, etc.</p>
	<p><b>EVENT LOG PAGE</b> In the event of an electrical trip occurring the triggering alarm will be recorded in the Event Log Memory. The Memory will record the last 25 such trips. Subsequent alarms will then over-write the oldest previous alarm. This feature allows service engineers arriving on site a detailed look at the recent history of the gen-set or plant.</p>

### 3.1 VIEWING THE INSTRUMENT AND EVENT LOG PAGES

To view a particular instrument, operate the “Page” button to move to the required page. Each press of the button will move the page indicator LED along. The LCD will also indicate the page title.



i.e. To view the Bus kW move to the ‘Bus Instruments Page’.









The LCD will display the page title and then will automatically commence scrolling down the various instrument . These will automatically scroll round, on reaching the last instrument the LCD display will then jump back to the page title and resume scrolling down the page. This sequence will be repeated until either the user moves off the page or after a period of inactivity the module will revert to the ‘Information Page’

<b>BUS INSTRUMENTATION</b>		
<b>BUS L1-N</b>	<b>L2-N</b>	<b>L3-N</b>
V 230	231	229
<b>BUS L1-2</b>	<b>L2-3</b>	<b>L3-1</b>
400	400	400
<b>BUS</b>		
Hz	50.1	
<b>BUS TOTAL</b>		
KW	236 (	43%)
<b>BUS TOTAL</b>		
KVAr	88 (	21%)
<b>BUS PHASE SEQUENCE</b>		
L1	L2	L3

It is also possible to manually scroll to display the different instruments. Once selected, the instrument will remain on the LCD display until the user selects a different instrument or page, or after a period of inactivity the module will revert to the ‘Information Page’.

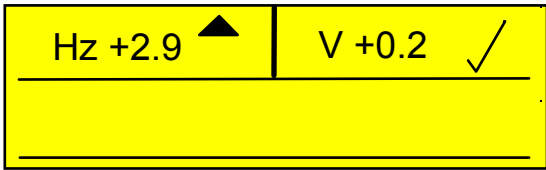
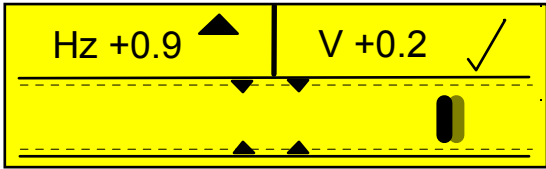
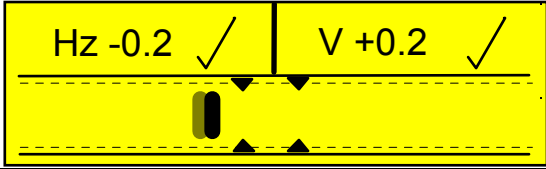
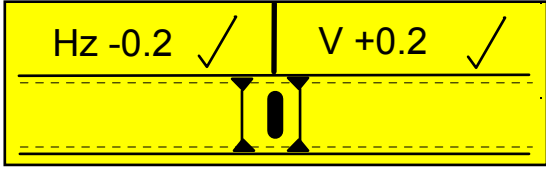
**NOTE:-This description of operation is also true for the other instrument pages and for viewing the records in the event log.**

**Manually Selecting an Instrument**

Initial display		<b>BUS INSTRUMENTATION</b>
Pressing the <b>DOWN</b> button the LCD will then show...		<b>BUS L1-N L2-N L3-N</b> V 230 231 229
Pressing the <b>DOWN</b> button again the LCD will then show...		<b>BUS L1-2 L2-3 L3-1</b> 400 400 400
Pressing the <b>DOWN</b> button again the LCD will then show...		<b>BUS</b> Hz 50.1
Pressing the <b>DOWN</b> button again the LCD will then show...		<b>BUS TOTAL</b> KW 236 ( 43%)
Pressing the <b>DOWN</b> button again the LCD will then show...		<b>BUS TOTAL</b> KVAR 88 ( 21%)
Pressing the <b>UP</b> button the LCD will then show... etc, etc, etc.		<b>BUS TOTAL</b> KW 236 ( 43%)






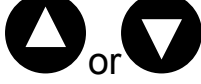

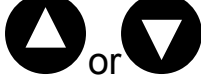

If the **DOWN** button is pressed while the LCD display is showing 'BUS PHASE SEQUENCE' then the display will jump round to the top of the page and display the page title; 'BUS INSTRUMENTS'. Pressing the **DOWN** button again will then display; 'BUS L1-N L2-N L3-N'






**3.1.1 SYNCHROSCOPE OPERATION**

Display	Detail
	Initial stage of Synchronising display will only show the difference between the Mains Supply and the Generator Output. Here the display is showing a frequency mis-match of +2.9Hz – The gen-set frequency is too high and should be reduced (indicated by the arrow). The voltage is +0.2 volts high, but is within the limits set for synchronising.
	Once the difference between the Mains supply and the Generator output has been reduced the 'Synchroscope' display will become active. The moving bar will roll from left to right or right to left depending on the mis-match between the Mains supply and the generator output. The area in the centre of the scope indicates the set limits for synchronising to occur.
	Synchronising will only occur when both the Frequency and the voltage differences are within acceptable limits - Indicated by 'Tick' marks on the top of the display. Then the moving bar display will show the phase difference. The engine speed should be adjusted until the moving bar enters the centre of the scope.
	Once the Mains and the generator are synchronised the moving bar will be in the centre of the scope and the bar will be 'locked' into the synchronising window. While the bar is 'locked' the module will initiate a breaker close to load the generator onto the Mains. Should synchronism be broken the moving bar will pass out of the synchronising window and the 'locked' indication will clear.

### 3.2 OPERATOR CONFIGURATION MODE

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

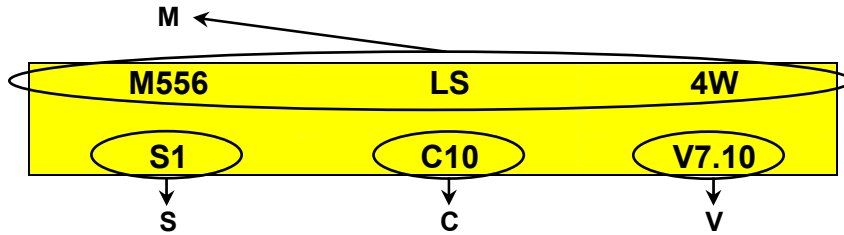
Operation	Detail
To enter the ' <b>Operator configuration mode</b> ' press both the <b>UP</b> and <b>DOWN</b> scroll buttons together.	
The module will enter ' <b>Operator Configuration mode</b> ' and the ' <b>Operator configuration mode indicator</b> ' will illuminate above the <b>PAGE</b> button.	
The LCD will then display:	<p style="text-align: center;"><b>CONFIGURATION</b></p>
To view the different configuration functions press the <b>PAGE</b> button.	
The LCD will then display:	<p style="text-align: center;"><b>LANGUAGE ENGLISH (UNITED KINGDOM)</b></p>
Pressing the <b>UP</b> or <b>DOWN</b> Button will then change the selected language.	
The LCD will then display the new language:	<p style="text-align: center;"><b>LANGUAGE FRENCH</b></p>
Repeat until the required language is displayed.	<p style="text-align: center;"><b>LANGUAGE GERMAN</b></p>
To view the next function press the <b>PAGE</b> button.	
The LCD will then display:	<p style="text-align: center;"><b>CONTRAST</b></p> <p style="text-align: center;">□   ■</p>
Pressing the <b>UP</b> or <b>DOWN</b> Button will move the sliding bar <b>UP</b> ( <i>Darker</i> ) or <b>DOWN</b> ( <i>Lighter</i> ) - set this to the desired position.	
When correct, to view the next function press the <b>PAGE</b> button.	
The LCD will then display:	<p style="text-align: center;"><b>AUTO SCROLL TIME 2.0 Seconds</b></p>
This is the duration each instrument will be displayed for during the automatic scrolling. Use the <b>UP</b> and <b>DOWN</b> buttons to set this to the required value.	
When correct, to view the next function press the <b>PAGE</b> button.	

Operation	Detail
The LCD will then display:	<b>DISPLAY INDICATIONS ON LCD YES</b>
Digital inputs configured as indications can be viewed on the LCD by pressing the <b>UP</b> or <b>DOWN</b> button when the ' <b>Information Page</b> ' is active. To disable this function set to ' <b>NO</b> ' by pressing the <b>UP</b> or <b>DOWN</b> button.	
When correct, to view the next function press the <b>PAGE</b> button.	
The LCD will then display:	<b>ABANDON CHANGES AND EXIT</b>
To exit the ' <b>Operator configuration mode</b> ' <u>with-out storing any changes</u> made press the <b>UP</b> or <b>DOWN</b> button.	
If you wish to save the changes you have made to the configuration press the <b>PAGE</b> button.	
The LCD will then display:	<b>SAVE CHANGES AND EXIT</b>
To exit the ' <b>Operator configuration mode</b> ' and <u>store the changes</u> you have made press the <b>UP</b> or <b>DOWN</b> button.	

The module will then return to the '**Information Page**' display and the '**Operator Configuration Mode Indicator**' will extinguish.

### 3.3 POWER UP LCD DISPLAY

On application of the DC supply the module LCD will display information about the module.



Code Letter	Meaning	Options	Detail
M	Module Type	556 LS 4W	ATS / Mains controller. Multi set synchronising and load control, 4 wire (3ph+N) connection.
S	System Options	01	Enhanced Metering Version
C	Custom Options	09	RS232 Comms Board + Load Share (CAN-bus) Fitted
		10	RS485 Comms Board + Load Share (CAN-bus) Fitted
V	Software Version	X.XX	Details internal firmware revision (FLASH Version)

### 3.4 LED INDICATORS

#### COMMON ALARM LED

This LED indicates when an alarm condition is present. The Alarms Page on the LCD will detail the exact nature of the alarm.

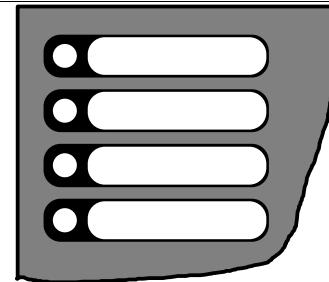
- 'OFF' - no alarm active.
- 'FLASHING' - An alarm is present, but has not been muted.
- 'STEADY' - An alarm is present which has been muted.



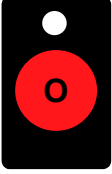



#### USER CONFIGURABLE LED's

These LED can be configured by the user to indicate any one of **100+ different functions** based around the following:-

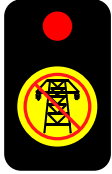

- **INDICATIONS** - Monitoring of a digital input and indicating associated functioning user's equipment - *Such as Battery Charger On or a G59 trip, etc.*
- **WARNINGS** and **ELECTRICAL TRIPS** - Specific indication of a particular warning or electrical trip condition, backed up by LCD indication - *Such as Bus failed to open, etc.*
- **STATUS INDICATIONS** - Indication of specific functions or sequences derived from the modules operating state - *Mains failed, Bus live, etc.*



### 3.5 CONTROL PUSH-BUTTONS

<p><b>STOP/RESET</b>                  This push-button 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 generators are running and this push-button is operated, the module will automatically instruct the change-over device to un-load the generators onto the mains (if available). The generators will be allowed to cool down and then stopped. 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>MANUAL</b>                  This push-button is used to allow manual control of the generators. Entering this mode from any other mode will initially not cause any change of operating state, but allows further push-buttons to be used to control the systems operation. For example once in <b>Manual mode</b> it is possible to manually start the generators by using the '<b>START</b>' push-button. If the generators are 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 generators on load. 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>' push-buttons are operated.</p>	
<p><b>START</b>                  This push-button is used to manually start the generators that are in Auto mode. The module must first be placed in the '<b>MANUAL</b>' mode of operation. The '<b>START</b>' button should then be operated. The generators will then automatically attempt to start. To stop the generators the '<b>STOP/RESET</b>' button should be operated.</p>	
<p><b>AUTO</b>                  This push-button places the module into its '<b>Automatic</b>' mode. This mode allows the module to control the function of the generators automatically. The module will monitor the <b>remote start input</b> and the mains supply. Once a start condition has been initiated the 556 will automatically start all the generators that are in Auto mode, and place the system on load. If the starting signal is removed, or the mains has returned, the module will automatically transfer the load from the generators. The generators will be allowed to cool down and then stopped. The module will then wait for 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>TEST</b></p> <p>This push-button places the module into its '<b>Test</b>' mode. This mode is used to test the function and timing of the generators starting and loading sequence. All the generators that are in automatic will be started and placed on load. Running continuously in parallel with the mains. To test the off-loading and stopping sequence return the set to the '<b>Auto</b>' mode, the module will automatically transfer the load from the generators. The generators will be allowed to cool down and then stopped. The module will then await the next start event. <i>For further details please see the more detailed description of 'Test Operation' earlier in this manual.</i></p>	
<p><b>ALARM MUTE</b></p> <p>This push-button is used to silence the internal alarm sounder and also any external sounder devices fed from the <b>audible alarm output</b>. Any further alarm conditions will re-activate the sounder. Once the alarm has been muted and investigated it may then be cleared. <i>Refer to the 'Protections' section of this manual for details.</i></p> <p>When the <b>Alarm Mute</b> is operated a <b>Lamp test function</b> will also be implemented and all LED indicators will be illuminated.</p>	

## 4 INSTALLATION INSTRUCTIONS

The model DSE 556 Module has been designed for front panel mounting. Fixing is by 4 spring loaded clips for easy assembly.

### 4.1 PANEL CUT-OUT

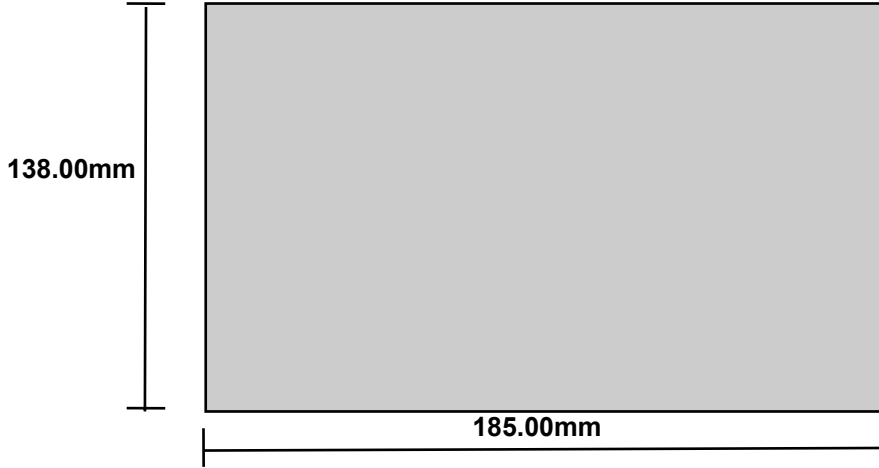


FIG 3

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 **93%**.

### 4.3 UNIT DIMENSIONS

All dimensions in mm.

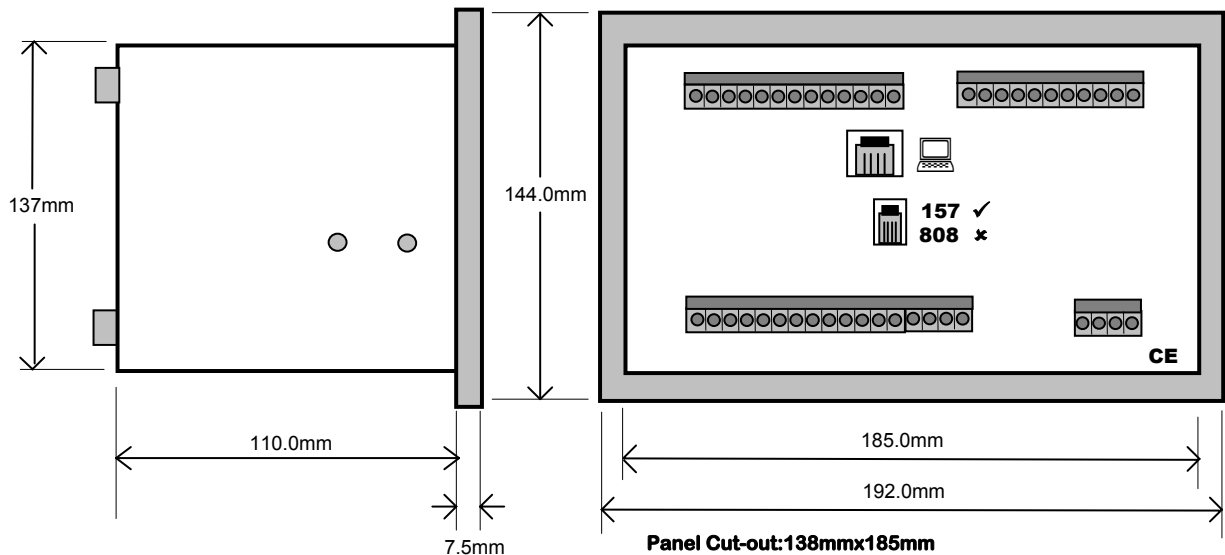


Fig 4

#### 4.4 FRONT PANEL LAYOUT



FIG 5

#### 4.5 REAR PANEL LAYOUT

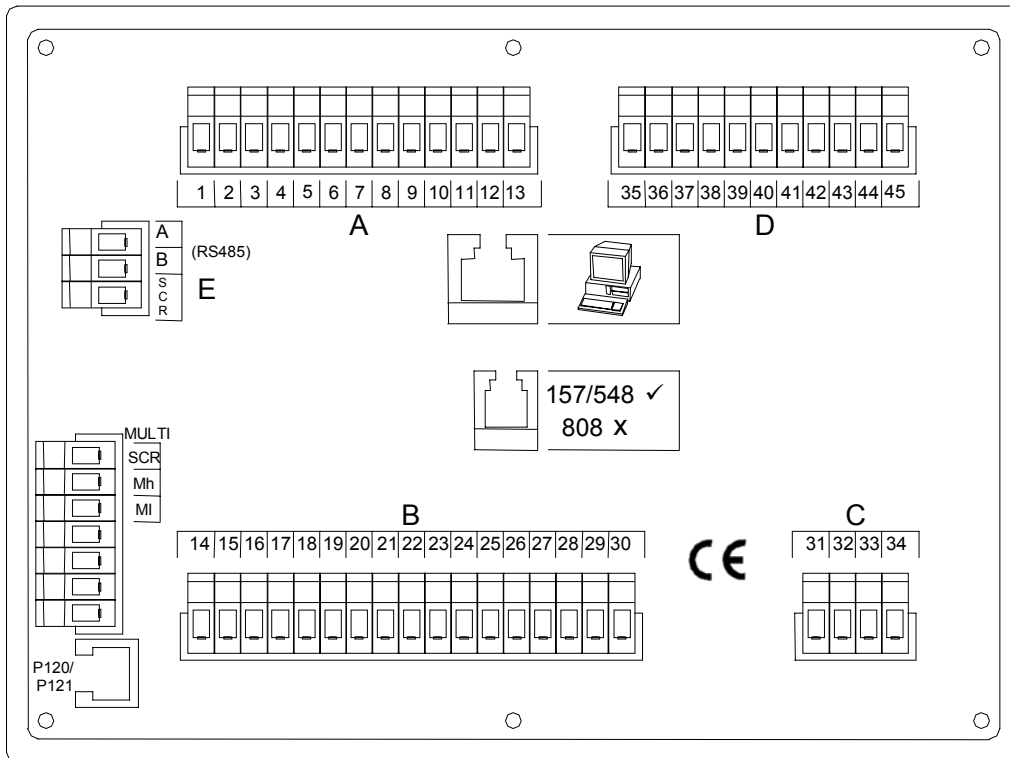


FIG 6

## 5 ELECTRICAL CONNECTIONS

Connections to the Module are via plug and sockets.

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

### 5.1 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 Fuse 21A Max.)
3	NOT USED		Do not connect.
4	NOT USED		Do not connect.
5	NOT USED		Do not connect.
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	NOT USED		Do not connect.
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

### 5.2 PLUG "B" 17 WAY

PIN No	DESCRIPTION	CABLE SIZE	NOTES
14	Auxiliary Input 6	0.5mm	Switch to -ve
15	Auxiliary Input 7	0.5mm	Switch to -ve
16	Auxiliary Input 8	0.5mm	Switch to -ve
17	Auxiliary Input 9	0.5mm	Switch to -ve
18	Auxiliary Output relay 3	1.0mm	Plant Supply +ve. 5 Amp rated.
19	Auxiliary Output relay 4	1.0mm	Plant Supply +ve. 5 Amp rated.
20	NOT USED		Do not connect.
21	NOT USED		Do not connect.
22	NOT USED		Do not connect.
23	NOT USED		Do not connect.
24	NOT USED		Do not connect.
25	CT secondary for L1	2.5mm	Connect to secondary of mains L1 monitoring CT
26	CT secondary for L2	2.5mm	Connect to secondary of mains L2 monitoring CT
27	CT secondary for L3	2.5mm	Connect to secondary of mains L3 monitoring CT
28	NOT USED		Do not connect.
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



**WARNING!:- Do not disconnect plug 'B' when the mains is on load. Disconnection will open circuit the secondary of the CT's and dangerous voltages may then develop. Always ensure the mains is off load before making or breaking connections to the module.**

**5.3 PLUG “C” 4 WAY**

PIN No	DESCRIPTION	CABLE SIZE	NOTES
31	Mains L1 Voltage Monitoring Input	1.0mm	Connect to Mains L1 supply (AC) (Recommend 2A Fuse Max.)
32	Mains L2 Voltage Monitoring Input	1.0mm	Connect to Mains L2 supply (AC) (Recommend 2A Fuse Max.)
33	Mains L3 Voltage Monitoring Input	1.0mm	Connect to Mains L3 supply (AC) (Recommend 2A Fuse Max.)
34	Mains Neutral Input	1.0mm	Connect to Mains Neutral supply (AC)

**5.4 PLUG “D” 11 WAY**

PIN No	DESCRIPTION	CABLE SIZE	NOTES
35	Bus Loading Relay Contact	2.5mm	Connect to Bus contactor coil.
36	Bus Loading Relay Contact	2.5mm	Connect to Bus contactor coil feed supply.
37	NOT USED		Do not connect.
38	Mains Loading Relay Normally Closed Contact	2.5mm	Connect to mains contactor coil feed supply.
39	Mains Loading Relay Change-over contact	2.5mm	Connect to mains contactor coil.
40	Mains loading Relay Normally Open contact	2.5mm	Used in conjunction with mains breakers. Not required if using mains contactor.
41	NOT USED		Do not connect.
42	Generator L1 Voltage Monitoring Input	1.0mm	Connect to generator L1 output (AC) (Recommend 2A Fuse Max.)
43	Generator L2 Voltage Monitoring Input	1.0mm	Connect to generator L2 output (AC) (Recommend 2A Fuse Max.)
44	Generator L3 Voltage Monitoring Input	1.0mm	Connect to generator L3 output (AC) (Recommend 2A Fuse Max.)
45	Generator Neutral Input	1.0mm	Connect to generator Neutral output (AC)

**5.5 PLUG “E” 3 WAY**

PIN No	DESCRIPTION
SCR	Please refer to the Link500Plus manual for further information on this connector.
B	
A	

## 5.6 PLUG “MULTI” 6 WAY (MSC)

PIN No	DESCRIPTION	NOTES
SCR	Cable screen	Connects to the SCR terminal of the 556 and all 550s on the same system
Mh	Multi set communications link	Connects to the Mh terminal of the 556 and all 550s on the same system
MI	Multi set communications link	Connects to the MI terminal of the 556 and all 550s on the same system
	NOT USED	Do not connect.
	NOT USED	Do not connect.
	NOT USED	Do not connect.

### 5.6.1 MSC CABLE TYPE

Parameter	Value
Connection type	Twin conductors with screen. Ensure screen is connected to SCR terminal of every controller on the bus.
Cable impedance	120Ω
Maximum cable resistance	0.050Ω/m
Maximum cable capacitance (between conductors)	75pF/m
Maximum cable capacitance (conductor to shield)	110pF/m
Termination resistors (one at each end of cable run)	120Ω 4W (switchable)
Max number of 55x controllers per bus	16 (only 3 shown above for clarity)
Max cable length	40m
Max Spur length (see note 2 below)	1m
Recommended cable	BELDEN 9841 120Ω cable.



**WARNING!** 120Ω impedance cable must be used for the MultiSet Communications Link. Use of any other impedance cable may cause intermittent failures in communications, indicated by MSC alarms although the system may function normally testing.

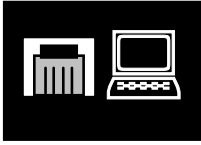


**NOTE 1:** - The 120Ω terminator must be installed on the first and last devices on the communications bus. See section header MSC Settings in the Guide to synchronising and load sharing manual for further details.



**NOTE 2:** - It is important that the MultiSet Communications Link cable is run from one module to the next in a ‘bus’ fashion. ‘Spurs’ off this bus should be avoided where possible, but where a spur is unavoidable; its length should be kept less than 1m from the bus cable.

### 5.7 PC CONFIGURATION INTERFACE CONNECTOR



8-way connector allows connection to PC via 810 configuration interface. The module can then be re-configured utilising the P810 for windows™ software.

### 5.8 EXPANSION INTERFACE CONNECTOR



4-way connector allows connection to the 157 relay expansion module or 548 LED expansion modules. A maximum of 2 relay or LED expansion modules may be connected in series to this port.

**! CAUTION!:- Do not connect the 808 configuration interface to this port, as it is not possible to use the 808 software to configure the 556 module.**

**⚠ NOTE:- The 6 way connector labelled P120/P121 is not used on the 556 module.**

## 6 CONNECTOR FUNCTION DETAILS

The following describes the functions of the 4 connectors on the rear of the module. See rear panel layout FIG 5.

### 6.1 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	NOT USED
4	NOT USED
5	NOT USED
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	NOT USED
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.



## 6.2 PLUG “B” 17 WAY

PIN No	DESCRIPTION
14	Auxiliary input 6. 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.
15	Auxiliary input 7. 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.
16	Auxiliary input 8. 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.
17	Auxiliary input 9. 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.
18	Auxiliary Relay output 3. Plant Supply +ve. Configurable output, see Calibration Manual for options available.
19	Auxiliary Relay output 4. Plant Supply +ve. Configurable output, see Calibration Manual for options available.
20	NOT USED
21	NOT USED
22	NOT USED
23	NOT USED
24	NOT USED
25	Mains L1 current transformer connection.
26	Mains L2 current transformer connection. If single phase is used do not connect this pin.
27	Mains L3 current transformer connection. If single phase is used do not connect this pin.
28	NOT USED
29	Generator current transformer Neutral connection and CT earth connection.
30	Functional Earth - Ensure connection to a good clean earth point.



**WARNING!:- Do not disconnect plug ‘B’ when the mains is on load. Disconnection will open circuit the secondary of the CT’s and dangerous voltages may then develop. Always ensure the mains is off load before making or breaking connections to the module.**

**6.3 PLUG “C” 4 WAY**

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

**6.4 PLUG “D” 11 WAY**

<b>PIN No</b>	<b>DESCRIPTION</b>
35	Bus Loading Relay, Normally open, Volts free contacts to 36. Used to connect to Bus contactor or circuit breaker.
36	Bus Loading Relay, Normally open, Volts free contacts to 35. Used to connect to Bus contactor or circuit breaker.
37	NOT USED
38	Mains Loading Relay, Normally Closed Change-over, Volts free contacts to 39 Used to connect to Mains contactor or circuit breaker.
39	Mains Loading Relay, Change-over, Volts free contacts to 38 and 40. Used to connect to Mains contactor or circuit breaker.
40	Mains Loading Relay, Normally open Change-over, Volts free contacts to 39. Used to connect to Mains contactor or circuit breaker.
41	NOT USED
42	Generator L1 sensing input. Connect to Generator L1 supply.
43	Generator L2 sensing input. Connect to Generator L2 supply. If using single phase only do not connect this terminal.
44	Generator L3 sensing input. Connect to Generator L3 supply. If using single phase only do not connect this terminal.
45	Generator N sensing input. Connect to Generator N supply.

## 7 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>	613mA at 12 V. 373 mA at 24 V.
<b>Min. Operating Current</b>	483 mA at 12 V. 255 mA at 24 V
<b>Alternator Input Range</b>	75V - 277(ph-N) 3 Phase 4wire AC (+20%)
<b>Alternator Input Frequency</b>	50 - 60 Hz at rated engine speed (Minimum 15V AC Ph-N)
<b>Auxiliary Relay Outputs</b>	5 Amp DC at supply voltage.
<b>Dimensions</b>	192 X 144 X 138
<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 Required
<b>Mains Input Voltage Range</b>	75V - 277(ph-N) 3 Phase 4wire AC (+20%)
<b>Mains Input Frequency</b>	50 - 60 Hz (Minimum 15V AC Ph-N)
<b>Mains / Bus Loading Relays</b>	8 Amp AC RMS rated
<b>Electromagnetic Compatibility</b>	BS EN 50081-2 EMC Generic Emission Standard (Industrial) 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 10 sweeps at 1 octave/minute in each of 3 major axes. 5Hz to 8Hz @ +/-7.5mm constant displacement 8Hz to 500Hz @ 2gn constant acceleration
<b>Shock</b>	BS EN 60068-2-27 3 Half sine shocks in each of 3 major axes 15gn amplitude, 11mS duration

## 8 COMMISSIONING

### 8.1.1 PRE-COMMISSIONING

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

- 6.1. The unit is adequately cooled and all the wiring to the module is of a standard and rating compatible with the system.
- 6.2. The unit **DC** supply is fused, connected to the DC supply and that it is of the correct polarity.
- 6.1. To check the start cycle operation, fully test all 550s that are on the system, ensuring that the breakers will only close when it is sync or a dead bus is present. After a visual inspection to ensure it is safe to proceed, make sure that the 550s on the system are in Auto mode. Press the “**MANUAL**” pushbutton, then press the ‘**START**’ pushbutton for a short time. The unit will issue a start to all the 550s that are available and in Auto mode.
- 6.2. The first generator to start will close onto a dead bus, the remainder will synchronise and close as they reach running conditions. The generators will then run in parallel sharing zero KW and zero VAr
- 6.3. Select “**AUTO**” on the front panel, the system will run for the pre-set return delay, all the generator breakers will then open and all generators will cool down for their pre-set cooling time before stopping. The 556 will stay in the standby mode. If not, check that there is no signal present on the **Remote Start** input, and that the mains is within acceptable parameters.
- 6.4. Initiate an automatic start by supplying the remote start signal. The start sequence will commence and once the pre set number of generators are running in parallel, the 556 will synchronise the bus to the mains and the Bus breaker will be closed. The load will be ramped on to the Bus until the pre-set KW and KVAr levels have been reached.
- 6.5. Remove the remote start signal, the return sequence will start. After the pre-set return time has elapsed, the load will be ramped off the Bus and the Bus breaker will be opened once the Bus load has reached zero. The generators will then run for the pre-set cooling down period, and stop.
- 6.6. If despite repeated checking of the connections between the **556** 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**

- 6.7. Now the mains fail test can be carried out. Fail the mains and the system should start, the mains breaker will open and then the Bus breaker will close.
- 6.8. When the mains returns, the Bus will be synchronised to the mains after the return time has expired and the Bus breaker will close. The Bus power will be ramped to the pre-set level, then to zero. Once the Bus power is down to zero the Bus breaker will open and the generators will be stopped after their cooling time has expired.

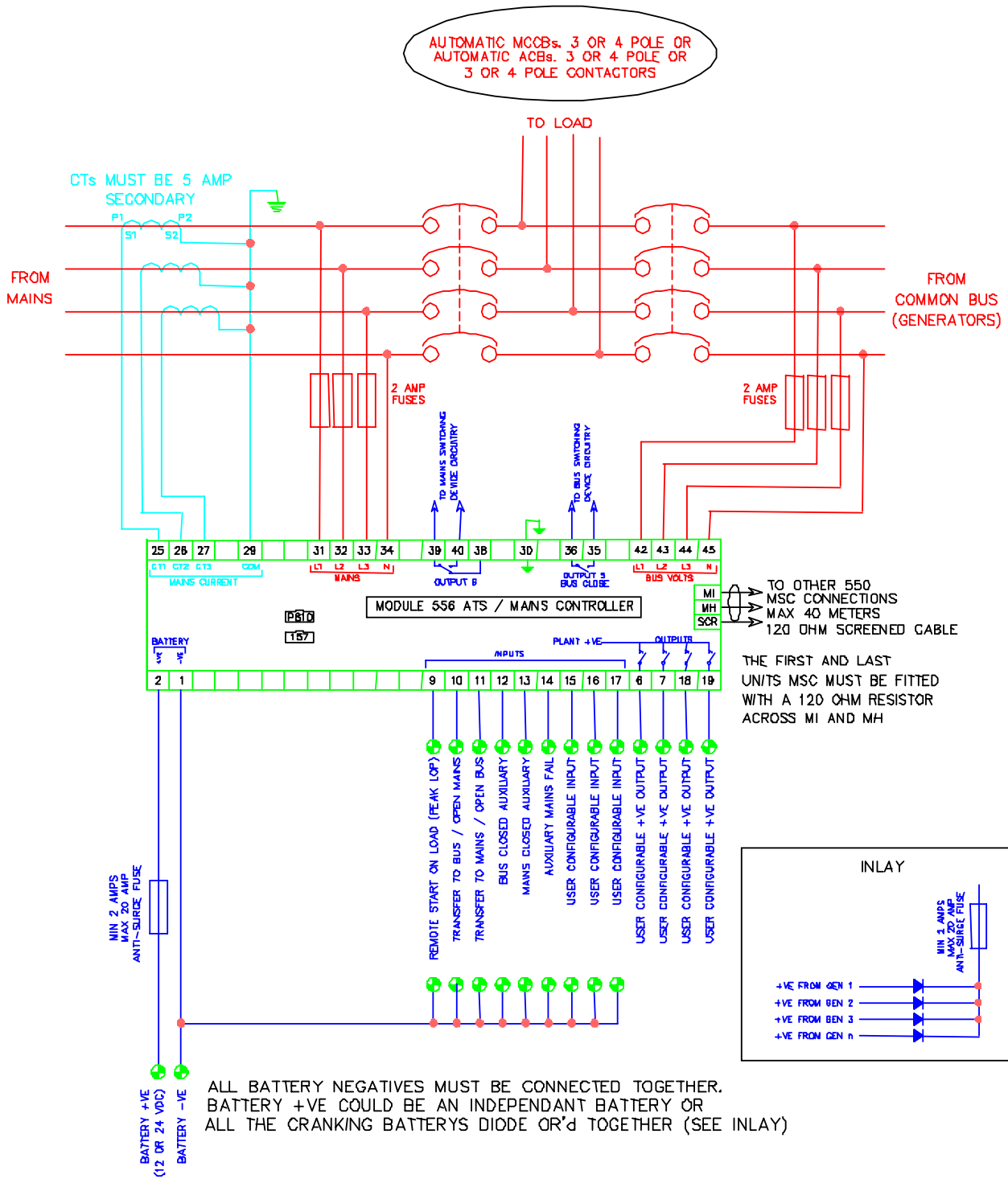
 **CAUTION!:- Before any breaker is closed onto a live system for the first time, extensive checks must be carried out to make sure that the breaker will not close out of synch.**

## 9 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 Check the operating temperature is not above 55 °C. Check the DC fuse.
Warning fault operates	Check relevant switch and wiring of fault indicated on LCD display. Check configuration of input.
Continuous starting of generators when in <b>AUTO</b>	Check that there is no signal present on the "Remote Start" input. Check configured polarity is correct. Check that the mains is within limits.

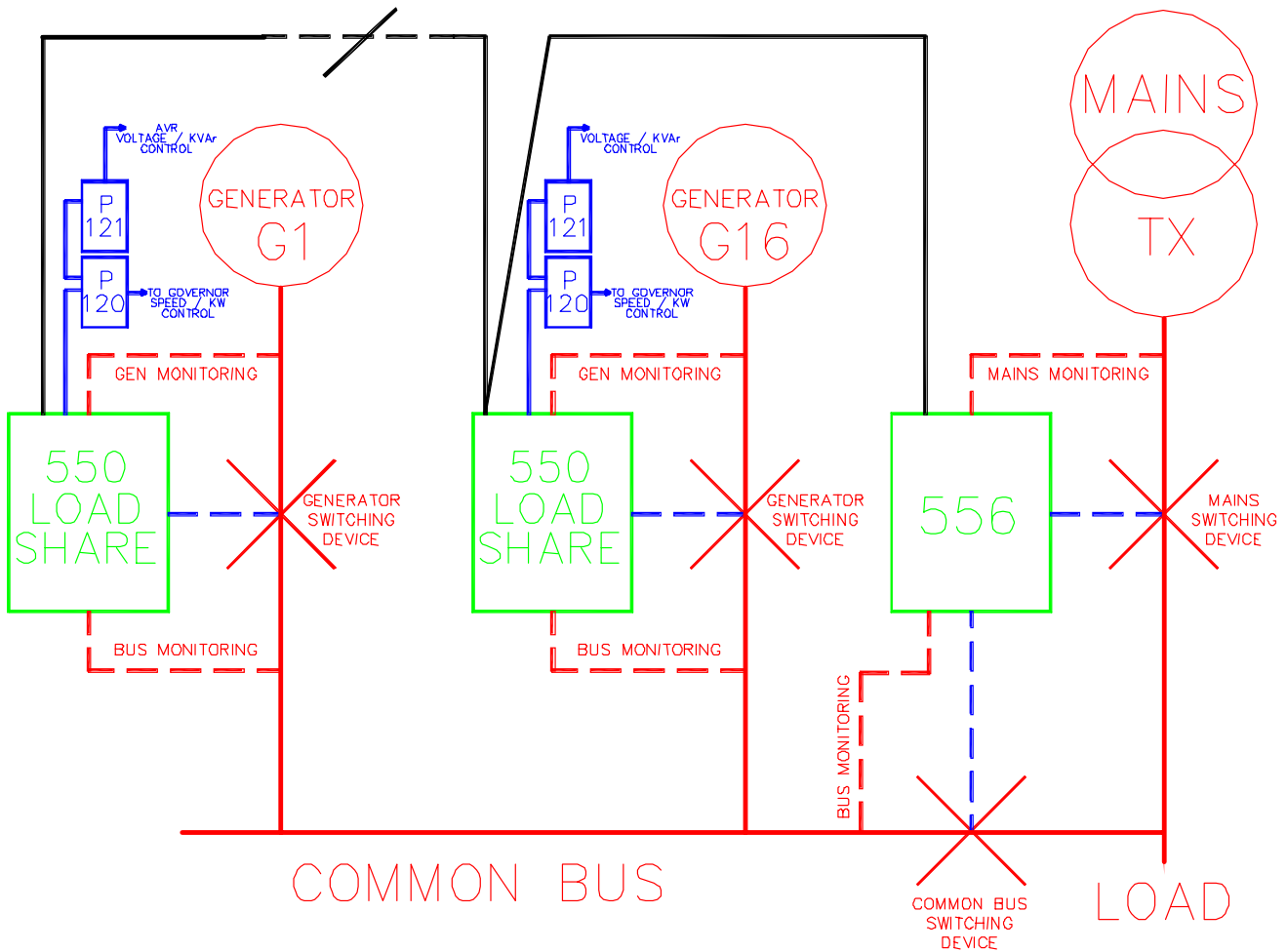
**▲ NOTE:-** The above fault finding is provided as a guide check-list only. As it is possible for the module to be configured to provide a wide range of different features always refer to the source of your module configuration if in doubt.

# 10 TYPICAL WIRING DIAGRAMS



## 11 TYPICAL SYSTEM SCHEMATIC

MSC LINK. 120 OHM SCREENED CABLE



ALL BATTERY NEGATIVES MUST BE CONNECTED TOGETHER

FOR FURTHER DETAILS OF THE APPLICATION CONSULT THE GUIDE TO SYNCHRONISING AND LOAD SHARING  
 MAXIMUM TOTAL CABLE LENGTH BETWEEN 550, P120 & P121 IS 100 METERS

**NOTE 1:** - The 120Ω terminator must be installed on the first and last devices on the communications bus. See section header MSC Settings in the Guide to synchronising and load sharing manual for further details.

**NOTE 2:** - It is important that the MultiSet Communications Link cable is run from one module to the next in a 'bus' fashion. 'Spurs' off this bus should be avoided where possible, but where a spur is unavoidable; its length should be kept less than 1m from the bus cable.

## 12 FACTORY DEFAULT CONFIGURATION

P810 for Windows. Configuration for 556 module. Page 1 of 4

### Configuration description

1	Deep Sea Electronics plc	
2	Default factory settings	
3	12th December 2003	
4	556 Load Control Configuration	
Filename		556a.XCF

### Module settings

Base module	556 ATS / Mains controller module
Module version	7.00

### Miscellaneous settings

AC System	3 phase, 4 wire
Enable mains phase sequence alarm	Yes
Enable bus sequence alarm	Yes
Phase sequence	L1 L2 L3
Enable running on load demand	No
All warnings are latched	No
Enable immediate mains dropout	No
Display indications on LCD display	No
Display load switching state	Yes

### Input settings

#### Digital Inputs

1	Remote start on load	Close to activate
2	Bus closed auxiliary	Close to activate Electrical trip
3	Mains closed auxiliary	Close to activate Warning
4	Auxiliary mains fail	Close to activate
5	User configured	Close to activate Electrical trip
		Active from safety on
		Activation delay 0.0s
		Active text: Digital input 5
6	User configured	Close to activate Warning
		Always active
		Activation delay 0.0s
		Active text: Digital input 6
7	User configured	Close to activate Electrical trip
		Active from safety on
		Activation delay 0.0s
		Active text: Digital input 7
8	User configured	Close to activate Indication
		Always active
		Activation delay 0.0s
		Active text: Digital input 8
9	Panel lock	Close to activate

### LED settings

1	Lit	Output not used
2	Lit	Output not used
3	Lit	Output not used
4	Lit	Output not used



**Module relays**

1	Energise	Sufficient sets available
2	Energise	Common alarm
3	Energise	Audible alarm
4	Energise	System in auto mode
5	Energise	Close bus
6	De-energise	Close mains

**Expansion A**

1	Energise	Output not used
2	Energise	Output not used
3	Energise	Output not used
4	Energise	Output not used
5	Energise	Output not used
6	Energise	Output not used
7	Energise	Output not used
8	Energise	Output not used

**Expansion B**

1	Energise	Output not used
2	Energise	Output not used
3	Energise	Output not used
4	Energise	Output not used
5	Energise	Output not used
6	Energise	Output not used
7	Energise	Output not used
8	Energise	Output not used

**Timer settings**

**Starting/stopping timers**

Mains transient delay	2s
Start delay	5s
Transfer time	0.7s
Breaker close pulse	0.5s
Breaker trip pulse	0.5s
Return delay	30s
Bus close timer	0.5s
Bus open timer	0.5s
Mains fail to close	1.3s
Mains fail to open	1.3s

**Other timers**

Batt low volts delay	1m
Batt high volts delay	1m
LCD auto scroll timer	2s
LCD page timer	5m
Export power limit timer	0s

**Mains settings**

Volts and frequency alarms	Trip	Return
Under volts trip	184V Ph-N	207V Ph-N
Over volts trip	276V Ph-N	253V Ph-N
Under frequency trip	45.0 Hz	48.0 Hz
Over frequency trip	55.0 Hz	52.0 Hz

**Current / Power**

CT primary	600 A	
Mains full load rating	0 kW	
Mains full kVAr rating	0 kVAr	
Export power limit alarm	0.0 kW	Electrical trip

**Generator settings**

**Nominals**

Nominal generator voltage	230V Ph-N
Nominal generator frequency	50.0 Hz

**Synchronising (check sync) settings**

Enable synchronising	Yes
Dead bus relay	10V
Check sync lower frequency	-0.1 Hz
Check sync upper frequency	0.2 Hz
Check sync RMS voltage	2.0V Ph-N
Check sync phase angle	5°
Sync advance time	0 mS
Fail to sync time	2m

**Multi-set system settings**

MultiSet comms failure action	Warning
Too few modules action	<Disabled>
Minimum modules on MultiSet comms	1
MultiSet comms alarms disabled action	<Disabled>

**Load control**

Load ramp rate	2.5% per second
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**System settings**

Minimum number of sets	Warning
Minimum number of sets	1
Delay time	2m 30s
Insufficient capacity	Warning
Delay time	2m 30s

**Plant battery settings**

	<b>Trip</b>	<b>Return</b>
Under volts warning	10.0V DC	10.5V DC
Over volts warning	33.0V DC	32.0V DC

**Exercise scheduler settings**









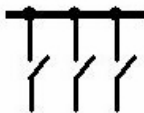

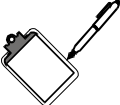
Enable exercise scheduler	No
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**Language settings**

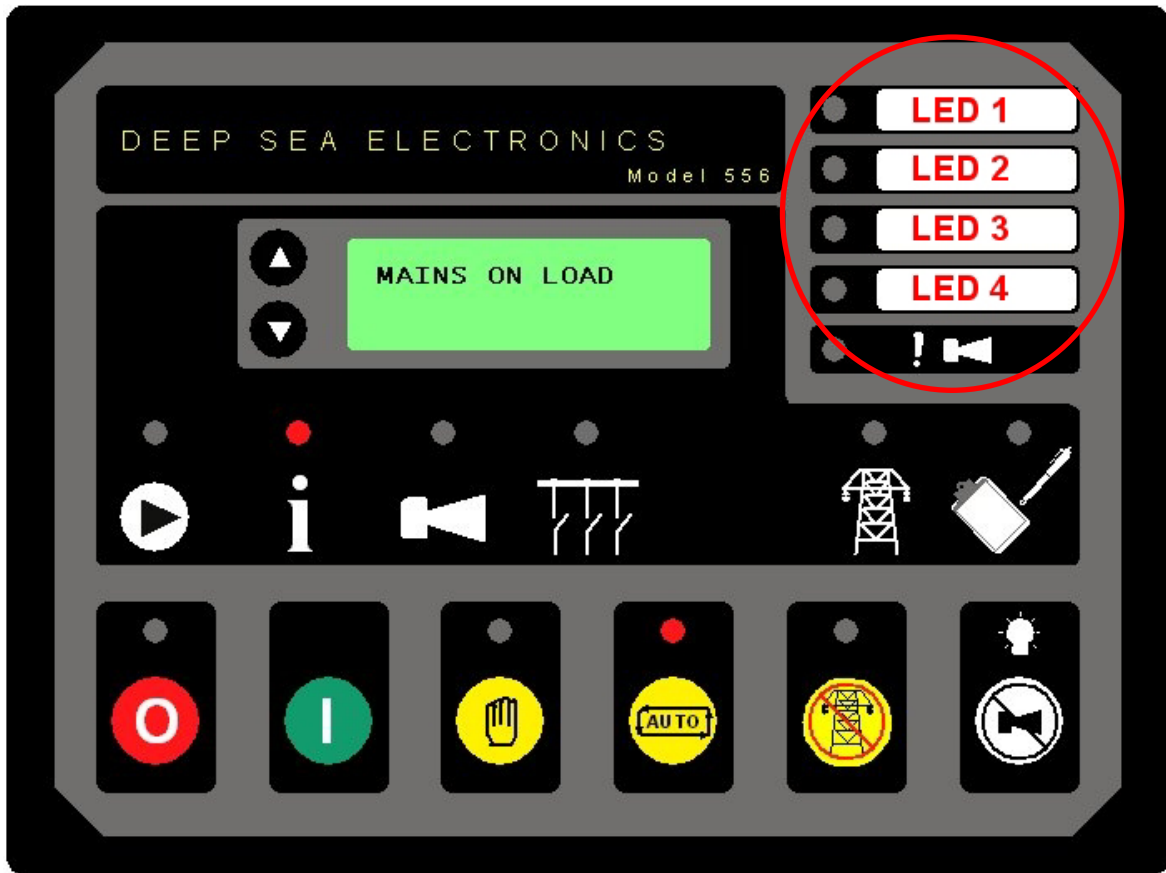
Default language	English (UK)
User defined language 1	Chinese (Simplified)
User defined language 2	Not used
User defined language 3	Not used
User defined language 4	Not used

## 10. ICONS AND LED IDENTIFICATION

### 12.1 ICON DESCRIPTIONS

Symbol	Meaning	Description
	Stop/Reset	Stops the system generator (if the generators are in Auto mode) and reset any alarm conditions. Refer to other sections with in this Manual.
	Start	Starts the system of generators (if the generators are in Auto mode and the 556 is in manual mode).
	Auto	The controller will automatically start the system of generator (if the generators are in Auto mode) when given a remote start command, or the mains fails
	Manual	The controller will start the system of generators when the start button is pressed (if the generators are in Auto mode)
	Common Alarm	An alarm condition has been detected. <b>(Warning = Steady, Electrical Trip = Flashing)</b>
	Mains Failure Simulation (Test)	This is used to simulate a mains failure event.
	Alarm Mute	Silences the audible warning device.
	Lamp Test	Causes all indicating LED's to illuminate to test for correct operation
	Bus Instruments	Instruments page for bus details such as Bus frequency and Voltage.
	Mains Instruments	Instruments page for mains supply details such as frequency and Voltage.
	Event Log	Details recorded history of operation.

## 12.2 LED IDENTIFICATION DIAGRAM



## **12.3 OUTPUT EXPANSION**

There are several methods of output expansion available for the 55x module:-

### **12.3.1 RELAY OUTPUT EXPANSION (157)**

An expansion module is available, which connects to the configuration socket, and enables the 55x to use eight additional relays on the 157 relay module, providing Volt-free contacts for customer connection. A maximum of 2 off 157 relays modules can be connected, they are identified as 'A' and 'B' and give a total of 16 extra relay outputs.

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 55x to use eight additional LED's on the 548 module, providing remote LED's indication up to 50 metres away. A maximum of 2 off 548 LED modules can be connected, they are identified as 'A' and 'B' and give a total of 16 extra LED outputs.

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.