



DEEP SEA ELECTRONICS

DSE4210 / DSE4220

Configuration Suite PC Software Manual

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Amendments List

Issue	Comments	Minimum Module version required	Minimum Configuration Suite Version required
1	Initial release	V1.0.0	2013.5 v1.77.2

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

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1 BIBLIOGRAPHY

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

1.1 INSTALLATION INSTRUCTIONS

DSE PART	DESCRIPTION
053-145	4200 installation instructions sheet

1.2 MANUALS

DSE PART	DESCRIPTION
057-151	DSE Configuration Suite PC Software Installation & Operation Manual
057-004	Electronic Engines and DSE wiring
057-181	DSE4200 Operator Manual

1.3 OTHER

The following third party documents are also referred to:

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

2 DESCRIPTION

The **DSE4200 Series configuration suite** allows the 4200 family of modules to be connected to a PC via USB 'A –USB B' cable. Once connected the various operating parameters within the module can be viewed or edited as required by the engineer. This software allows easy controlled access to these values.

This manual details the configuration of the DSE42xx series controllers

The configuration suite should only be used by competent, qualified personnel, as changes to the operation of the module may have safety implications on the panel / generating set to which it is fitted. Access to critical operational sequences and settings for use by qualified engineers, may be barred by a security code set by the generator provider.

The information contained in this manual should be read in conjunction with the information contained in the appropriate module documentation. This manual only details which settings are available and how they may be used.

A separate manual deals with the operation of the individual module (See section entitled *Bibliography* elsewhere in this document).

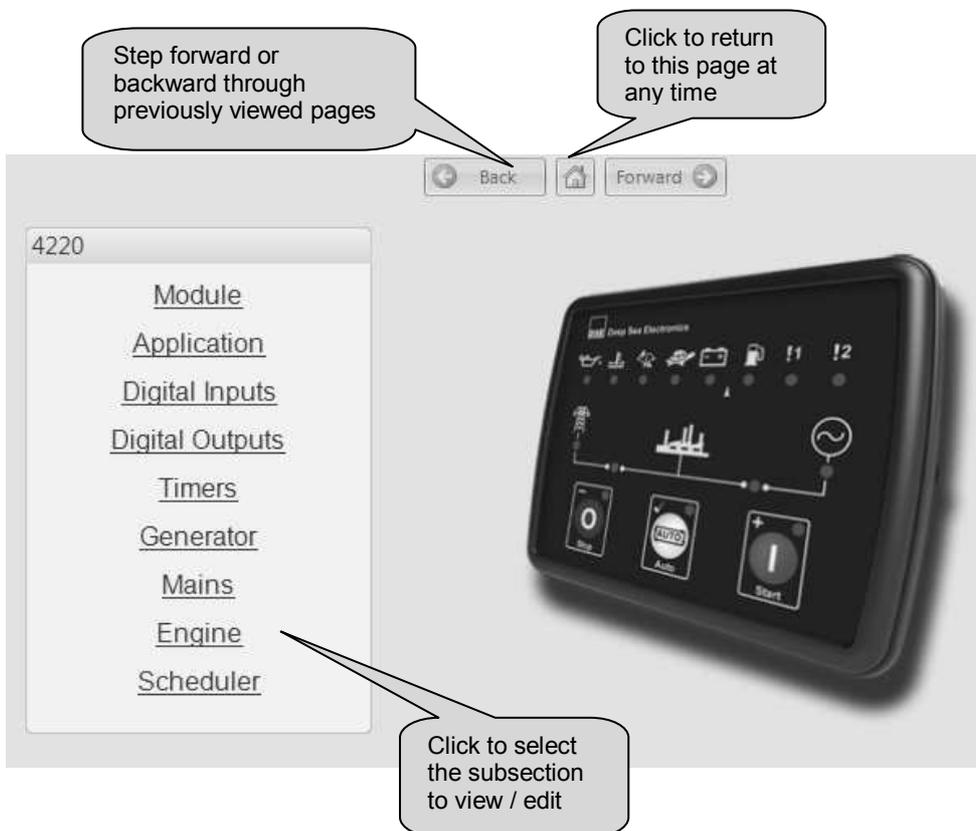
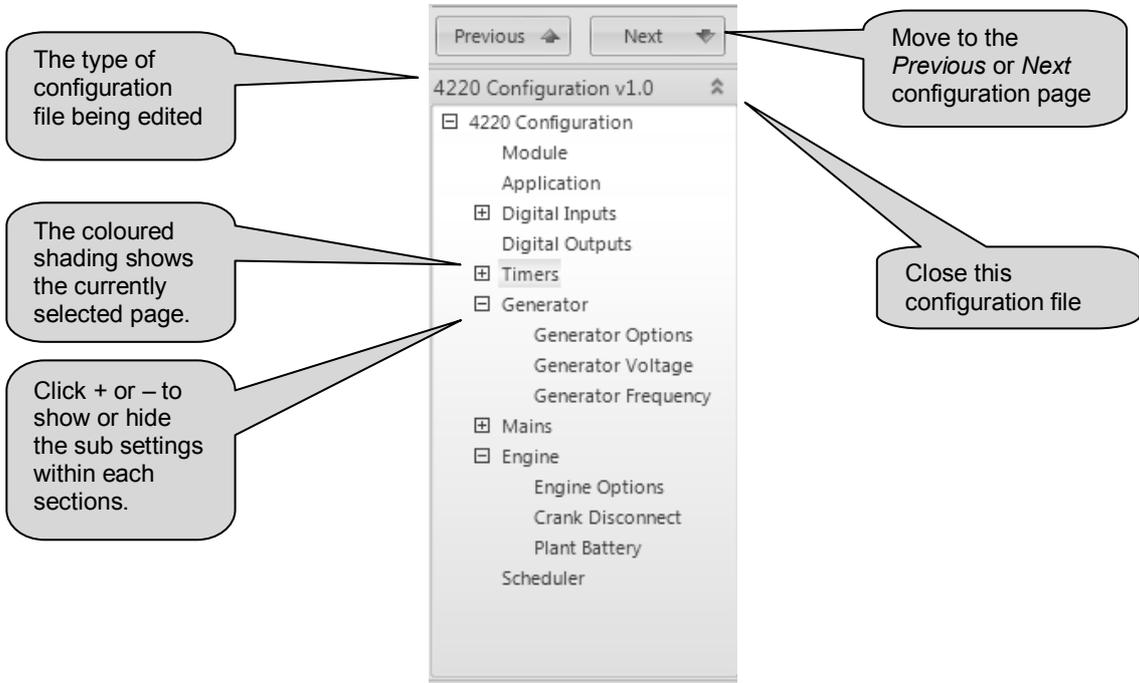
3 INSTALLATION AND USING THE DSE CONFIGURATION SUITE SOFTWARE

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

4 EDIT CONFIG

This menu allows module configuration, to change the function of Inputs, Outputs and LED's, system timers and level settings to suit a particular application.

4.1 SCREEN LAYOUT



4.2 MODULE

This section allows the user to change the options related to the module itself.

Module

Module Options

Lamp test at power up

Protected Start Mode

Enable Fast Loading

Enable Cool Down In Stop Mode

Power Up In Mode Stop

All warnings are latched

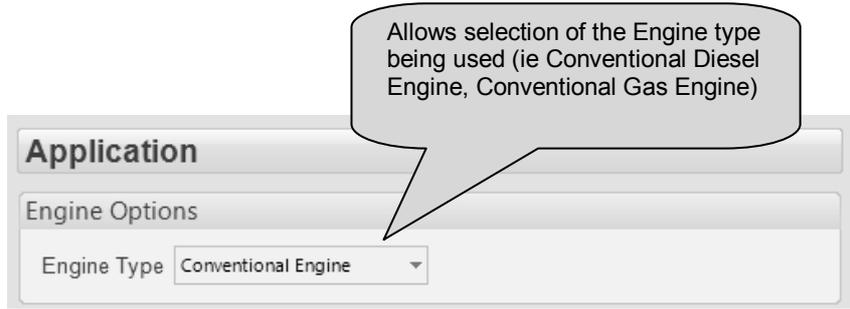
Configurable LEDs

	Source		Polarity
I1	Digital Input F	▼	Energise
I2	Digital Input G	▼	Energise

Allows the user to select the function of the modules user configurable LED indicators. For details of possible selections, please see section entitled *Output sources* elsewhere in this document.

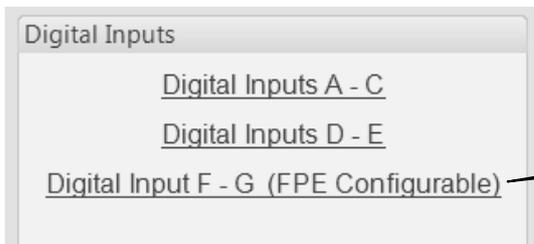
Miscellaneous Options	
Lamp Test At Power Up	<input type="checkbox"/> = Feature disabled <input checked="" type="checkbox"/> = The LEDs on the module's fascia will all illuminate as a 'lamp test' feature when the DC power is applied or USB lead is connected.
Protected Start Mode	If enabled, the start button must be pressed twice to confirm manual start request
Enable Fast Loading	<input type="checkbox"/> = Normal Operation, the safety on timer will be observed in full. This feature is useful if the module is to be used with some small engines where pre-mature termination of the delay timer can lead to overspeed alarms on start up. <input checked="" type="checkbox"/> = The module will terminate the safety on timer once all monitored parameters have reached their normal settings. This feature is useful if the module is to be used as a standby controller as it allows the generator to start and go on load in the shortest possible time.
<div style="border: 2px solid black; padding: 5px;"> <p>⚠NOTE: - Enabling Fast Loading is only recommended where steps have been taken to ensure rapid start up of the engine is possible. (For example when fitted with engine heaters, electronic governors etc.)</p> </div>	
Enable Cool Down in Stop Mode	Changes the way the module reacts to the Stop button. <input type="checkbox"/> =if the engine is running on load and the stop button is pressed, the module will open the breaker and directly shutdown the engine. <input checked="" type="checkbox"/> = if the engine is running and the breaker is closed, the module will open the breaker, wait for the cool down timer to expire, then shutdown the engine.
<div style="border: 2px solid black; padding: 5px;"> <p>⚠NOTE: - If the engine is running with the breaker open, the module will always shutdown the engine directly even if this option is enabled.</p> </div>	
Power Up in Mode	Select the mode that the module enters when DC power is applied. Available modes to select from: Auto, Manual, Stop mode
All Warnings Are Latched	<input type="checkbox"/> = Normal Operation, the warnings and pre-alarms will automatically reset once the triggering condition has cleared. <input checked="" type="checkbox"/> = Warnings and pre-alarms latch when triggered. Resetting the alarm is performed by either an external reset applied to one of the inputs or, the 'Stop/Reset' pushbutton must be operated (once the triggering condition has been cleared).

4.3 APPLICATION

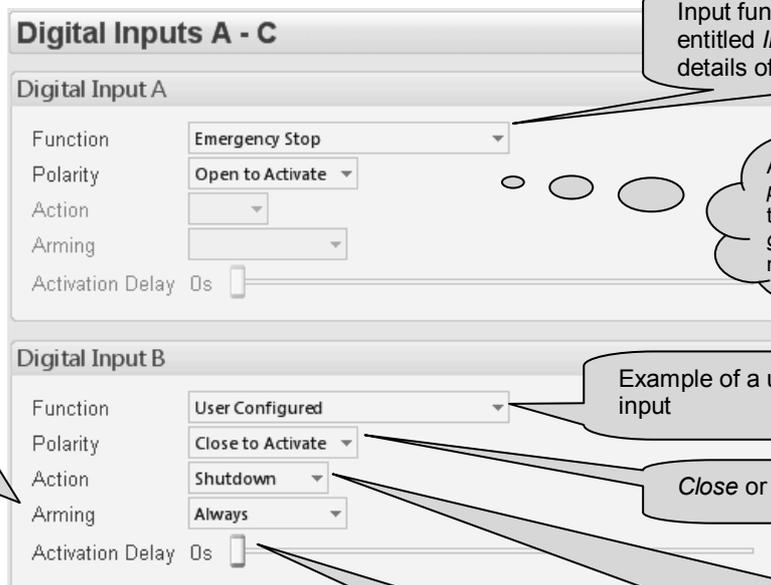


4.4 DIGITAL INPUTS

The *digital inputs* page is subdivided into smaller sections. Select the required section with the mouse.



Digital Inputs F & G can be configured from the module Front Panel Editor



Input function. See section entitled *Input functions* for details of all available functions

As this example shows a *predefined* function, these parameters are *greyed out* as they are not applicable

Configures when the input is active: Never, always, active from starting, active from the end of the safety timer

Example of a user configured input

Close or open to activate

Select the type of alarm required. For details of these, see the section entitled *Alarm Types* elsewhere in this document.

Click and drag to change the setting. This is used to give a delay on acceptance of the input. Useful for liquid level switches or to mask short term operations of the external switch device.

4.4.1 INPUT FUNCTIONS

Where a digital input is NOT configured as “user configured”, a selection can be made from a list of predefined functions. The selections are as follows:

Under the scope of IEEE 37.2, *function numbers can also be used to represent functions in microprocessor devices and software programs.* Where the DSE input functions can be represented by IEEE 37.2, the function number is listed below.



= Only applicable to DSE4220 AMF Modules

Function	Description
Alarm Mute	This input is used to silence the audible alarm from an external source, such as a remote mute switch.
Alarm Reset	This input is used to reset any latched alarms from a remote location. It is also used to clear any latched warnings which may have occurred (if configured) without having to stop the generator.
Auto Start Inhibit IEEE 37.2 - 3 checking or interlocking relay	This input is used to provide an over-ride function to prevent the controller from starting the generator in the event of a remote start/mains out of limits condition occurring. If this input is active and a remote start signal/mains failure occurs the module will not give a start command to the generator. If this input signal is then removed, the controller will operate as if a remote start/mains failure has occurred, starting and loading the generator. This function can be used to give an ‘AND’ function so that a generator will only be called to start if the mains fails and another condition exists which requires the generator to run. If the ‘Auto start Inhibit’ signal becomes active once more it will be ignored until the module has returned the mains supply on load and shutdown. This input does not prevent starting of the engine in MANUAL mode.
Close Generator	This input is used to close the generator breaker when running in Manual mode.
Coolant Temperature Switch	This input is used to give a <i>Coolant Temperature High</i> shutdown from a digital normally open or closed switch. It allows coolant temperature protection.
Emergency Stop	Provides an immediate engine hot shutdown, used in emergency situations
External Panel Lock	Locks the mode buttons on the module front fascia.
Generator Load Inhibit IEEE 37.2 - 52 AC circuit breaker	This input is used to prevent the module from loading the generator. If the generator is already on load, activating this input will cause the module to unload the generator. Removing the input will allow the generator to be loaded again. ⚠️NOTE: -This input only operates to control the generator-switching device if the module load switching logic is attempting to load the generator. It will not control the generator-switching device when the mains supply is on load.
Lamp Test	This input is used to provide a test facility for the front panel indicators fitted to the module. When the input is activated all LED’s should illuminate.
Low Fuel Level Switch	Used to give a digital input function to provide a low fuel level alarm
Mains Load Inhibit IEEE 37.2 - 3 checking or interlocking relay 	This input is used to prevent the module from loading the mains supply. If the mains supply is already on load activating this input will cause the module to unload the mains supply. Removing the input will allow the mains to be loaded again. ⚠️NOTE: -This input only operates to control the mains switching device if the module load switching logic is attempting to load the mains. It will <u>not</u> control the mains switching device when the generator is on load.

Function	Description
Oil Pressure Switch	A digital normally open or closed oil pressure switch gives this input. It allows low oil pressure protection.
Open Generator	This input is used to open the generator breaker when running in Manual mode.
Remote Start Off Load	If this input is active, operation will be similar to the 'Remote Start on load' function except that the generator will not be instructed to take the load. This function can be used where an engine only run is required e.g. for exercise.
Remote Start On Load	(Only applicable to Digital Input A) When in auto mode, the module will perform the start sequence and transfer load to the generator. In Manual mode, the load will be transferred to the generator if the engine is already running, however in manual mode, this input will not generate start/stop requests of the engine.
Simulate Auto Button	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">  NOTE: - If a call to start is present when AUTO MODE is entered, the starting sequence will begin. Call to Start can come from a number of sources depending upon module type and configuration and includes (but is not limited to) : Remote start input present, Mains failure, Scheduled run, Auxiliary mains failure input present, Telemetry start signal from remote locations. </div> <p>This input mimics the operation of the 'Auto' button and is used to provide a remotely located Auto mode push button.</p>
 Simulate Mains Available	This function is provided to override the module's internal monitoring function. If this input is active, the module will not respond to the state of the incoming AC mains supply.
Simulate Start Button	This input mimics the operation of the 'Start' button and is used to provide a remotely located start push button.
Simulate Stop Button	This input mimics the operation of the 'Stop' button and is used to provide a remotely located stop/reset push button.
Smoke Limiting IEEE 37.2 – 18 accelerating or decelerating device	This input instructs the module to give a <i>run at idle speed</i> command to the engine either via an output configured to <i>smoke limit</i> or by data commands when used with supported electronic engines.
Transfer To Generator/Open Mains IEEE 37.2 - 52 AC circuit breaker 	This input is used to transfer the load to the generator when running in MANUAL MODE
Transfer To Mains/ Open Generator IEEE 37.2-52 AC circuit breaker 	This input is used to transfer the load to the mains supply when running in MANUAL MODE

4.5 DIGITAL OUTPUTS

The screenshot shows a configuration window titled "Digital Outputs". It contains a table with six rows, each representing an output. The columns are "Source", a status indicator, and "Polarity".

	Source		Polarity
Output A	Fuel Relay	○	Energise
Output B	Start Relay	○	Energise
Output C	Common Alarm	○	Energise
Output D	Preheat During Preheat Timer	○	Energise
Output E	Close Gen Output	○	Energise
Output F	Close Mains Output	○	De-Energise

Callouts provide the following information:

- "Select what the output is to be used to control" points to the Source column.
- "These labels match the typical wiring diagram" points to the Source column labels.
- "These are greyed out as they are fixed and not adjustable." points to the status indicator column.
- "Select if the relay is to energise or de-energise upon activation of the source" points to the Polarity column.

4.5.1 OUTPUT SOURCES

The list of output sources available for configuration of the module relay.

Under the scope of IEEE 37.2, *function numbers can also be used to represent functions in microprocessor devices and software programs.* Where the DSE output functions can be represented by IEEE 37.2, the function number is listed below.

The outputs are in alphabetical order with the *parameter* first. For instance for overspeed output, it's listed as *Engine Overspeed*.

 = Only available on DSE4220 AMF Modules

Output source	Activates...	Is not active...
Not Used	The output will not change state (Unused)	
Air Flap Relay	Normally used to control an air flap, this output becomes active upon an Emergency Stop or Over-speed situation.	Inactive when the set has come to rest
Audible Alarm IEEE 37.2 – 74 alarm relay	Use this output to activate an external sounder or external alarm indicator. Operation of the Mute pushbutton will reset this output once activated.	Inactive if no alarm condition is active or if the Mute pushbutton was pressed.
Battery High Voltage IEEE 37.2 – 59DC overvoltage relay	This output indicates that a Battery Over voltage alarm has occurred.	Inactive when battery voltage is not High
Battery Low Voltage IEEE 37.2 – 27DC undervoltage relay	This output indicates that a Battery Under Voltage alarm has occurred.	Inactive when battery voltage is not Low
Charge Alternator Warning/Shutdown	Active when the charge alternator alarm is active	
Close Gen Output IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the 4200 module selects the generator to be on load this control source will be active.	Inactive whenever the generator is not required to be on load
Close Gen Output Pulse IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the 4200 module selects the generator to be on load this control source will be active for the duration of the Breaker Close Pulse timer, after which it will become inactive again.	
Close Mains Output IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the 4200 module selects the mains to be on load this control source will be active.	The output is inactive whenever the mains is not required to be on load
Close Mains Output Pulse IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the 4200 module selects the mains to be on load this control source will be active for the duration of the Breaker Close Pulse timer, after which it will become inactive again.	
Closed To Generator State	Active when the generator loading command is active	
Closed To Mains State	Active when the mains loading command is active	
Combined Mains Failure 	Active when the mains supply is out of limits OR the input for Auxiliary Mains Failure is active	
Common Alarm	Active when one or more alarms (of any type) are active	The output is inactive when no alarms are present
Common Shutdown	Active when one or more <i>Shutdown</i> alarms are active	The output is inactive when no shutdown alarms are present
Common Warning	Active when one or more <i>Warning</i> alarms are active	The output is inactive when no warning alarms are present
Cooling Down	Active when the Cooling timer is in progress	The output is inactive at all other times

Output source	Activates...	Is not active....
Delayed Load Output 1, 2, 3 & 4	Provide delayed outputs for controlling load switching devices	
Digital Input A, B, C, D, E, F & G	Active when the relevant digital input is active	
Emergency Stop	Active when the Emergency Stop alarm is active.	
Energise To Stop	Normally used to control an <i>Energise to Stop</i> solenoid, this output becomes active when the controller wants the set to stop running.	Becomes inactive a configurable amount of time after the set has stopped. This is the <i>ETS hold time</i> .
Fail To Start IEEE 37.2 - 48 Incomplete Sequence Relay	Becomes active if the set is not seen to be running after the configurable number of start attempts	
Fail To Stop IEEE 37.2 - 48 Incomplete Sequence Relay	If the set is still running a configurable amount of time after it has been given the stop command, the output will become active. This configurable amount of time is the <i>Fail to Stop Timer</i> .	
Fuel Relay	Becomes active when the controller requires the governor/fuel system to be active.	Becomes inactive whenever the set should be stopped, including between crank attempts, upon controlled stops and upon fault shutdowns.
Gas Choke On	Becomes active during starting for the duration of the Gas Choke timer. Normally used to choke a gas engine.	Inactive at all other times
Gas Ignition	Becomes active during starting.	Becomes inactive a configurable amount of time after the <i>fuel relay</i> becomes inactive. This is the <i>Gas ignition off timer</i> .
Generator Available	Becomes active when the generator is available to take load.	Inactive when <ul style="list-style-type: none"> • <i>Loading voltage</i> and <i>loading frequency</i> have not been reached • After <i>electrical trip</i> alarm • During the starting sequence before the end of the warming timer.
Generator High Voltage Alarm	Active when the generator voltage exceeds the shutdown level.	
Generator Low Voltage Alarm	Active when the generator voltage falls below the shutdown level during normal running.	
High Coolant Temperature Shutdown	Active when the high coolant temperature shutdown alarm is active	
Low Fuel Level IEEE 37.2 – 71 level switch	Active when the digital input configured to <i>Low Fuel Level</i> is active.	
Low Oil Pressure Shutdown	Active when the Low Oil Pressure Shutdown alarm is activate	
Mains Low/High Frequency	Active when the relevant Mains Frequency trip level has been pased	
Mains Low/High Voltage	Active when the relevant Mains Voltage trip level has been pased	
Open Gen Output IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the 4200 module selects the generator to be off load this control source will be active.	Inactive whenever the generator is required to be on load
Open Gen Output Pulse IEEE 37.2 – 52 ac circuit breaker	Used to control the load switching device. Whenever the 4200 module selects the generator to be off load this control source will be active for the duration of the Breaker Open Pulse timer, after which it will become inactive again.	
Open Mains Output IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the 4200 module selects the mains to be off load this control source will be active.	The output is inactive whenever the mains is required to be on load
Open Mains Output Pulse IEEE 37.2 – 52 ac circuit breaker 	Used to control the load switching device. Whenever the 4200 module selects the mains to be off load this control source will be active for the duration of the Breaker Open Pulse timer, after which it will become inactive again.	
Over Frequency Shutdown IEEE 37.2 - 81 frequency relay	Active when the generator frequency exceeds the High Frequency Shutdown setting	

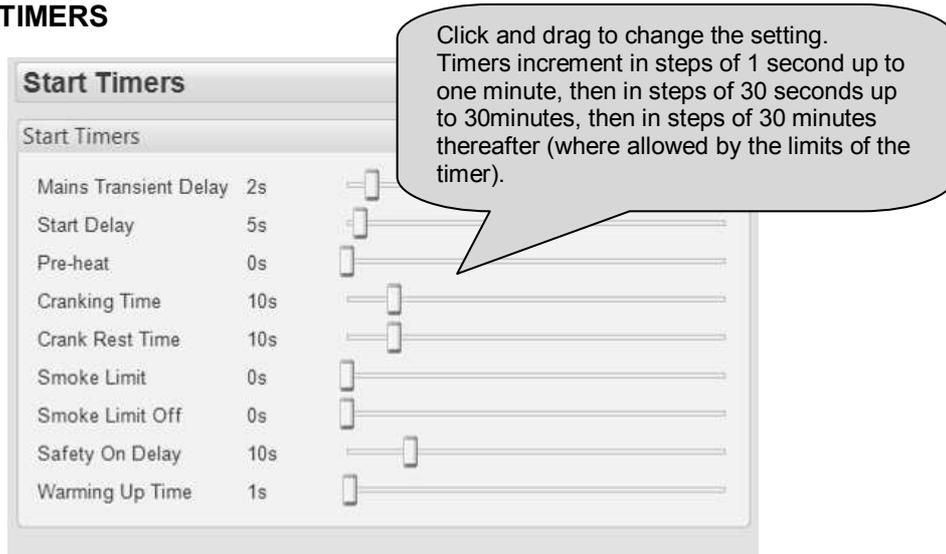
Output source	Activates...	Is not active...
Preheat During Preheat Timer	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : <ul style="list-style-type: none"> • The set is stopped • The preheat timer has expired
Preheat Until End Of Crank	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : <ul style="list-style-type: none"> • The set is stopped • The set has reached <i>crank disconnect</i> conditions
Preheat Until End Of Safety Timer	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : <ul style="list-style-type: none"> • The set is stopped • The set has reached the end of the <i>safety delay</i> timer
Preheat Until End of Warming Timer	Becomes active when the preheat timer begins. Normally used to control the engine preheat glow-plugs.	Inactive when : <ul style="list-style-type: none"> • The set is stopped • The set has reached the end of the <i>warming</i> timer
Smoke Limiting	Becomes active when the controller requests that the engine runs at idle speed. As an output, this can be used to give a signal to the <i>Idle input</i> of an engine speed governor (if available)	Becomes inactive when the controller requests that the engine runs at rated speed.
Start Relay IEEE 37.2 – 54 turning gear engaging device	Active when the controller requires the cranking of the engine.	
System in Auto Mode	Active when Auto mode is selected	
System in Manual Mode	Active when Manual mode is selected	
System in Stop Mode	Active when Stop mode is selected	
Under Frequency Shutdown	Active when the generator frequency falls below the low frequency Shutdown setting	

4.6 TIMERS

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



4.6.1 START TIMERS



= Only available on DSE4220 AMF Modules

Timer	Description
Mains Transient Delay 	Used to give a delay between sensing mains failure and acting upon it. This is used to prevent dropouts of the mains breaker and operation of the system due to mains supply transient conditions.
Start Delay	Used to give a delay before starting in AUTO mode. This timer is activated upon a remote start signal being applied, or upon a start due to mains failure, scheduled run or any other <i>automatic</i> start. Typically this timer is applied to prevent starting upon fleeting remote start signals or short term mains failures.
Pre-heat	Give a 'pre start' time during which the <i>Preheat</i> output will become active (if configured)
Cranking Time	The length of each crank attempt
Crank Rest Time	The time between multiple crank attempts.
Smoke Limit	The amount of time that the engine will be requested to run at <i>idle</i> speed upon starting. This is typically used to limit emissions at startup.
Smoke Limit Off	This should be set to a little longer than the amount of time that the set takes to run up to rated speed after removal of the command to run at <i>idle</i> speed. If this time is too short, the set could be stopped due to <i>underspeed</i> failure. If the time is too long, <i>underspeed</i> protection is disabled until the <i>Smoke limit time off</i> time has expired.
Safety On Delay	The amount of time at startup that the controller will ignore oil pressure, engine speed, alternator voltage and other <i>delayed</i> alarms. This is used to allow the engine to run up to speed before protections are activated.
Warming Up Time	The amount of time that the set will run BEFORE being allowed to take load. This is used to warm the engine to prevent excessive wear.

4.6.2 LOAD / STOPPING TIMERS

Load / Stopping Timers

Load Control Timers

Transfer Time	0.7s	<input type="text"/>
Breaker Trip Pulse	0.5s	<input type="text"/>
Breaker Close Pulse	0.5s	<input type="text"/>

Load Delay Timers

Delay Load Output 1	0s	<input type="text"/>
Delay Load Output 2	0s	<input type="text"/>
Delay Load Output 3	0s	<input type="text"/>
Delay Load Output 4	0s	<input type="text"/>

Stopping Timers

Return Delay	30s	<input type="text"/>
Cooling Time	1m	<input type="text"/>
ETS Solenoid Hold	0s	<input type="text"/>
Fail to Stop Delay	30s	<input type="text"/>
Generator Transient Delay	0.0s	<input type="text"/>

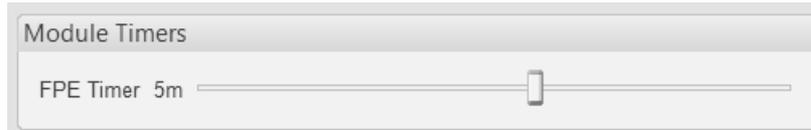
Click and drag to change the setting. Timers increment in steps of 1second up to one minute, then in steps of 30seconds up to 30minutes, then in steps of 30minutes thereafter (where allowed by the limits of the timer).

Respective digital outputs, if configured, will become energised after a load delay timer expires.

 = Only available on DSE4220 AMF Modules

Timer	Description
 Transfer Time	The time between one load switch opening and the other closing. Used during transfer to and from the generator.
Breaker Close Pulse	The amount of time that <i>Breaker Close Pulse</i> signals will be present when the request to close a breaker is given.
Breaker Trip Pulse	The amount of time that <i>Breaker Open Pulse</i> signals will be present when the request to open a breaker is given.
Load Delay Timers	Delay Load Output 1, 2, 3 & 4 Determine the time delay before energising the configured “Delayed Load” outputs. These outputs are used to control additional load breakers to provide five stage loading. After the generator load switch is closed, the remaining four outputs are closed after the configurable time delay. This allows for additional loads to be energised in sequence, minimising the size of step loading of the generator
Return Delay	A delay, used in auto mode only, that allows for short term removal of the request to stop the set before action is taken. This is usually used to ensure the set remains on load before accepting that the start request has been removed.
Cooling Time	The amount of time that the set will be made to run OFF LOAD before being stopped. This is to allow the set to cool down and is particularly important for engines with turbo chargers.
ETS Solenoid Hold	The amount of time the <i>Energise to stop</i> solenoid will be kept energised after the engine has come to rest. This is used to ensure the set has fully stopped before removal of the stop solenoid control signal.
Fail To Stop Delay	If the set is called to stop and is still running after the <i>fail to stop</i> delay, a <i>Fail to Stop</i> alarm is generated.
Generator Transient Delay	Used to delay the generator under/over volts/frequency alarms. Typically this is used to prevent spurious shutdown alarms caused by large changes in load levels.

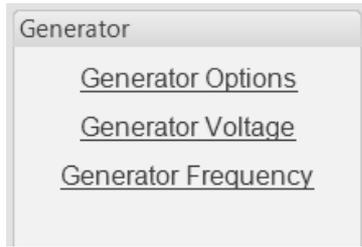
4.6.3 MODULE TIMERS



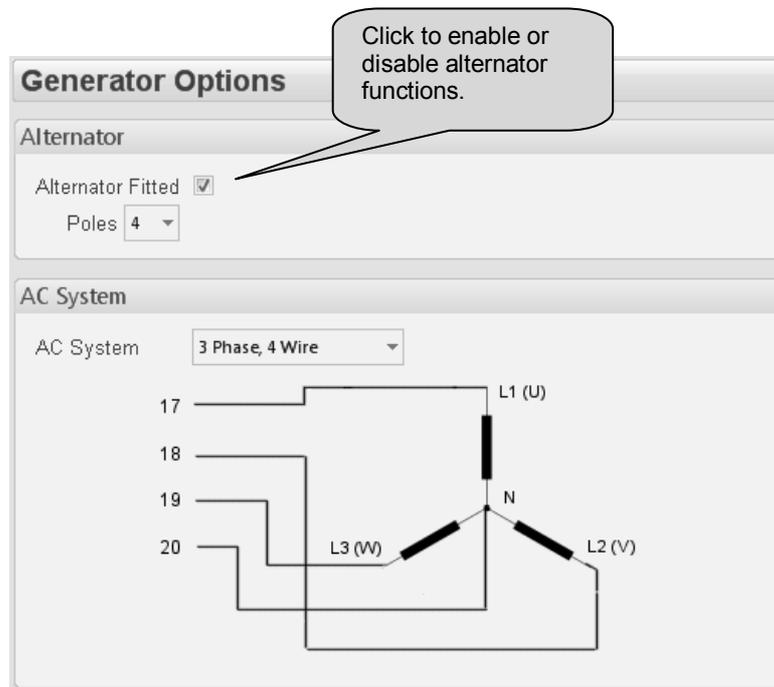
Timer	Description
FPE Timer	If no button is pressed while in Front Panel Editor mode for the duration of the <i>FPE Timer</i> , the module will revert back to normal operation mode discarding the changes made to the configuration

4.7 GENERATOR

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



4.7.1 GENERATOR OPTIONS



Parameter	Description
Alternator Fitted	<input type="checkbox"/> = There is no alternator in the system, it is an <i>engine only</i> application <input checked="" type="checkbox"/> = An alternator is fitted to the engine, it is a <i>generator</i> application.
AC System	Allows a number of AC systems to be catered for. Selecting the AC system shows the connections required for that particular system, along with the relevant connection numbers on the controller.

4.7.2 GENERATOR VOLTAGE ALARMS

Generator Voltage Alarms

Under Voltage Alarms

Alarm

Trip v PhPh

Pre-alarm

Trip v PhPh

Loading Voltage

v PhPh

Over Voltage Alarms

Pre-alarm

Return v PhPh

Trip v PhPh

Shutdown

Trip v PhPh

Click to enable or disable the alarms. The relevant values below will appear *greyed out* if the alarm is disabled.

Click and drag to change the setting.

Type the value or click the up and down arrows to change the settings

Alarm	IEEE designation
Generator Under voltage	IEEE 37.2 - 27AC Undervoltage relay
Loading Voltage	Determines the alternator voltage at which the generator becomes available and ready to take load
Generator Over voltage	IEEE 37.2 - 59AC Overvoltage relay

4.7.3 GENERATOR FREQUENCY ALARMS

The screenshot shows the 'Generator Frequency Alarms' configuration window. It is divided into four sections: Under Frequency Alarms, Loading Frequency, Nominal Frequency, and Over Frequency Alarms. Each section contains checkboxes for enabling/disabling features and numerical input fields or sliders for setting specific values. Callouts provide instructions: 'Click to enable or disable the alarms. The relevant values below will appear greyed out if the alarm is disabled.' (pointing to the Alarm checkbox), 'Click and drag to change the setting.' (pointing to a slider), and 'Type the value or click the up and down arrows to change the settings' (pointing to a numeric input field).

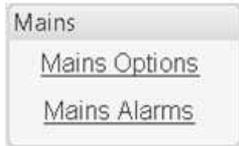
Alarm	IEEE designation
Generator Under Frequency	IEEE 37.2 -81 Frequency relay
Loading Voltage	Determines the alternator frequency at which the generator becomes available and ready to take load
Generator Over Frequency	IEEE 37.2 -81 Frequency relay

4.8 MAINS

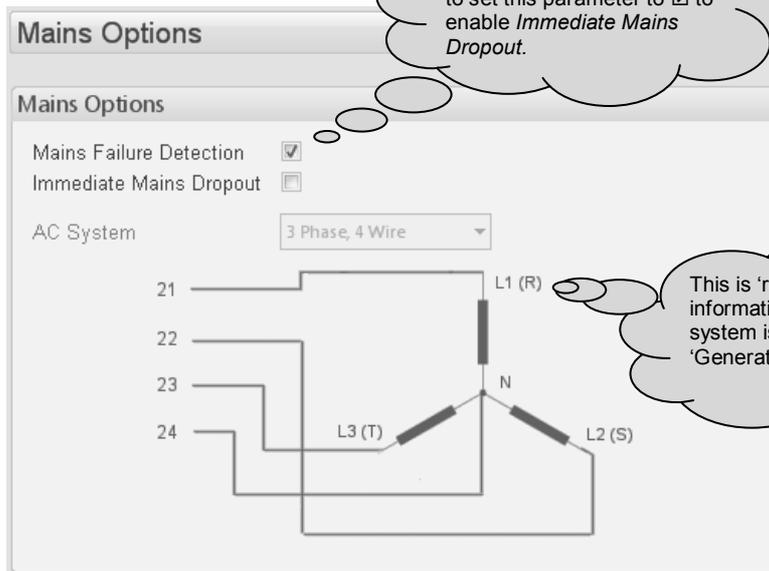


= Only available on DSE4220 AMF Modules

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



4.8.1 MAINS OPTIONS



If three phase loads are present, it is usually desirable to set this parameter to to enable *Immediate Mains Dropout*.

This is 'read only' for information purposes. The AC system is configured in the 'Generator Options' page.

Timer	Description
Mains Failure Detection 	<input type="checkbox"/> = The module will ignore the status of the mains supply. <input checked="" type="checkbox"/> = The module will monitor the mains supply and use this status for automatically starting and stopping the set in auto mode.
Immediate Mains Dropout 	<input type="checkbox"/> = Upon mains failure, the mains load switch will be kept closed until the generator is up to speed and volts. <input checked="" type="checkbox"/> = Upon mains failure, the mains load switch will be opened immediately, subject to the setting of the <i>mains transient</i> timer.
AC System 	These settings are used to detail the type of AC system to which the module is connected: 3 phase 4 wire, 1 phase 2 wire, 2 phase 3 wire – L1-L2, 2 phase 3 wire – L1-L3, 3 phase 3 wire, 3 phase 4 wire delta This list is not exhaustive. DSE reserve the right to add to this list as part of our policy of continual development

4.8.2 MAINS ALARMS

The screenshot shows the 'Mains Alarms' configuration window, divided into three sections: Voltage Alarms, Frequency Alarms, and Under Freq. (part of Frequency Alarms). Each section has checkboxes to enable/disable alarms and sliders to set trip and return values. Callouts provide instructions: 'Click to enable or disable the alarms. The relevant values below will appear greyed out if the alarm is disabled.' (pointing to checkboxes), 'Type the value or click the up and down arrows to change the settings' (pointing to input boxes), and 'Click and drag to change the setting.' (pointing to sliders).

Mains Alarms

Voltage Alarms

Undervolts
 Trip: 319 v PhPh (range: 319v PhPh to 319v PhPh)
 Return: 359 v PhPh (range: 359v PhPh to 359v PhPh)

Overvolts
 Return: 438 v PhPh (range: 438v PhPh to 438v PhPh)
 Trip: 478 v PhPh (range: 478v PhPh to 478v PhPh)

Frequency Alarms

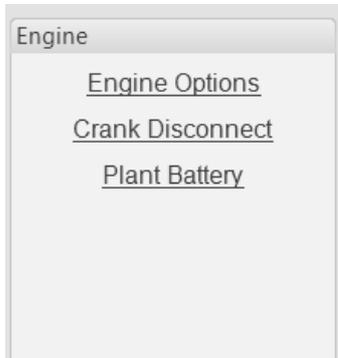
Under Freq.
 Trip: 45.0 Hz (range: 45.0 Hz to 45.0 Hz)
 Return: 48.0 Hz (range: 48.0 Hz to 48.0 Hz)

Over Freq.
 Return: 52.0 Hz (range: 52.0 Hz to 52.0 Hz)
 Trip: 55.0 Hz (range: 55.0 Hz to 55.0 Hz)

Alarm	IEEE designation
Mains Under Voltage 	IEEE 37.2 - 27AC Undervoltage relay
Mains Over Voltage 	IEEE 37.2 - 59AC Overvoltage relay
Mains Under Frequency 	IEEE 37.2 -81 Frequency relay
Mains Over Frequency 	IEEE 37.2 -81 Frequency relay

4.9 ENGINE

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



4.9.1 ENGINE OPTIONS

The screenshot shows the "Engine Options" configuration page. It is divided into three main sections: "Engine Options", "Startup Options", and "Gas Engine Timers".

- Engine Options:** Contains a dropdown menu for "Engine Type" set to "Conventional Engine". A callout bubble points to this dropdown, stating: "This item is not adjustable here, it's read only. To change this item, visit the *module* menu."
- Startup Options:** Contains a "Start Attempts" field with a value of 3 and a small up/down arrow icon.
- Gas Engine Timers:** Contains three rows of sliders, each with a label and a "2s" value:
 - Choke Timer:** A callout bubble points to its slider, stating: "Controls the amount of time that the Gas Choke output will be active during the starting sequence."
 - Gas On Delay:** A callout bubble points to its slider, stating: "Controls the amount of time between de-energising the Fuel output and de-energising the Gas Ignition output. Used in the stopping sequence to purge unburnt gas from the engine before it is stopped."
 - Ignition Off Delay:** A callout bubble points to its slider, stating: "Controls the amount of time between energising the Gas Ignition and energising the Fuel output. Used in the starting sequence to purge old gas from the engine."

A thought bubble at the bottom left contains the text: "For these timers to have any meaning, outputs are required for Gas Choke, Gas Ignition and Fuel."

4.9.2 CRANK DISCONNECT

Crank disconnect settings are used to detect when the set fires during the starting sequence. As the set is cranked, the first parameter that passes its *crank disconnect* setting will result in the cessation of the cranking signal.

Having more than one *crank disconnect* source allows for a much faster crank disconnect response leading to less wear on the engine and starter components, and provides added safety in case one source is lost, by a blown or tripped fuse for example.

The screenshot shows the 'Crank Disconnect' configuration window. It has two main sections: 'Options' and 'Crank Disconnect'. In the 'Options' section, there are three items: 'Crank disconnect on oil pressure' with an unchecked checkbox, 'Check oil pressure prior to starting' with a checked checkbox, and 'Crank Disconnect Delay' set to 2.0s with a slider. The 'Crank Disconnect' section has 'Generator Frequency' set to 21.0 Hz with a spinner and a slider. Three callouts provide instructions: one for the spinner, one for the slider, and one for the 'Check oil pressure prior to starting' checkbox.

If *check oil pressure prior to starting* is enabled, the cranking will not be allowed if the oil pressure is not seen as being low. This used as a *double check* that the engine is stopped before the starter is engaged

Type the value or click the up and down arrows to change the settings

Click and drag to change the setting.

Timer	Description
Crank Disconnect Delay	(This timer is only available when the crank disconnect on oil pressure is selected) The module will delay the crank disconnect after the oil pressure has risen, to allow for the engine speed to build up

4.9.3 PLANT BATTERY

The screenshot shows the 'Plant Battery' configuration window, divided into three sections: 'Voltage Alarms', 'Charge Alternator Alarm', and 'Start On Low Battery'. Each section contains various settings with callouts explaining their function.

- Voltage Alarms:**
 - Undervolts:** Includes checkboxes for 'Warning' and 'Return' (both checked), a 'Delay' of 1m, and voltage thresholds of 10.0 V DC (Warning) and 10.5 V DC (Return). A callout points to the 10.0 V DC slider, stating 'Click and drag to change the setting.' Another callout points to the 10.0 V DC input field, stating 'Type the value or click the up and down arrows to change the settings.'
 - Overvolts:** Includes checkboxes for 'Return' and 'Warning' (both checked), a 'Delay' of 1m, and voltage thresholds of 29.5 V DC (Return) and 30.0 V DC (Warning). A callout points to the 29.5 V DC input field, stating 'Type the value or click the up and down arrows to change the settings.'
- Charge Alternator Alarm:**
 - Shutdown:** Includes a 'Trip' of 4.0 V DC and a 'Delay' of 5s. A callout points to the 'Shutdown' checkbox, stating 'Select to enable autostart upon the battery voltage falling to the *threshold* level. The engine will start and run for the specified *Engine Run Time*.'
 - Warning:** Includes a 'Trip' of 6.0 V DC and a 'Delay' of 5s.
- Start On Low Battery:**
 - Enable:** A checkbox (unchecked) with a callout pointing to it, stating 'Select to enable autostart upon the battery voltage falling to the *threshold* level. The engine will start and run for the specified *Engine Run Time*.'
 - Threshold:** 18.0 V DC.
 - Engine Run Time:** 1h.
 - Start Delay:** 5s.

Additional callouts include: 'Click to enable or disable the option. The relevant values below will appear *greyed out* if the alarm is disabled.' (pointing to the Undervolts/Overvolts checkboxes) and 'Click and drag to change the setting.' (pointing to a slider).

Alarm	IEEE designation
Plant Battery Undervolts	IEEE 37.2 -27 DC Undervoltage relay
Plant Battery Overvolts	IEEE 37.2 -59 DC Overvoltage relay
Start on Low Battery	<input type="checkbox"/> = Start on Low Battery is disabled. <input checked="" type="checkbox"/> = Select to enable autostart upon the battery voltage falling to the <i>threshold</i> level. The engine will start and run for the specified <i>Engine Run Time</i> . This will occur only if the module is in AUTO mode
Charge Alternator Alarm	If the voltage measured at the charge alternator output drops below the configured value the respective alarm will be triggered.
Start Delay	Start delay timer for the Start on Low Battery function.

4.10 SCHEDULER

The scheduler is used to automatically start the set at a configured day and time and run for the set duration of hours.

The generator is made to run *on load* or *off load* depending upon the configuration :

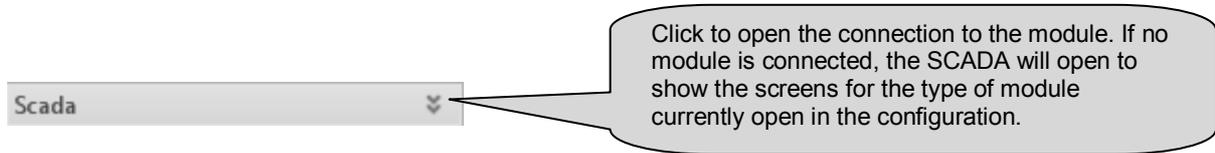
Function	Description
Enabled	<input type="checkbox"/> = Scheduled runs are disabled <input checked="" type="checkbox"/> = Enables the Scheduler
Scheduled Run Repeat Interval	Determines the repeat interval for the scheduled run. Options available are: repeat every 1 week, 2 weeks, 3 weeks or 4 weeks
Scheduled Run is On Load	<input type="checkbox"/> = The module will run the generator on schedule with the breaker open <input checked="" type="checkbox"/> = The module will run the generator on schedule and will close the breaker
Day	Specifies the day of week, on which the scheduled run should take place
Start Time	Determines at what time of day the scheduled run should start
Duration	Determines the time duration in hours for the scheduled run
Clear	Resets the values for the Day, Start Time and Duration to defaults

NOTE: When DC power is re-applied to the controller, the module's internal week counter is reset to '1', regardless of the module's internal clock

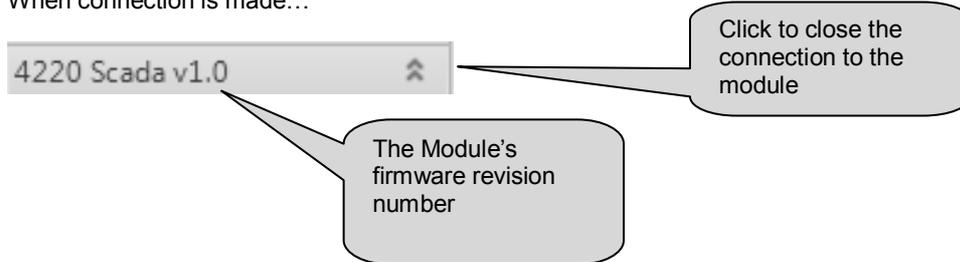
5 SCADA

SCADA stands for **S**upervisory **C**ontrol **A**nd **D**ata **A**cquisition and is provided both as a service tool and also as a means of monitoring / controlling the generator set.

As a service tool, the SCADA pages are to check the operation of the controller's inputs and outputs as well as checking the generators operating parameters.



When connection is made...

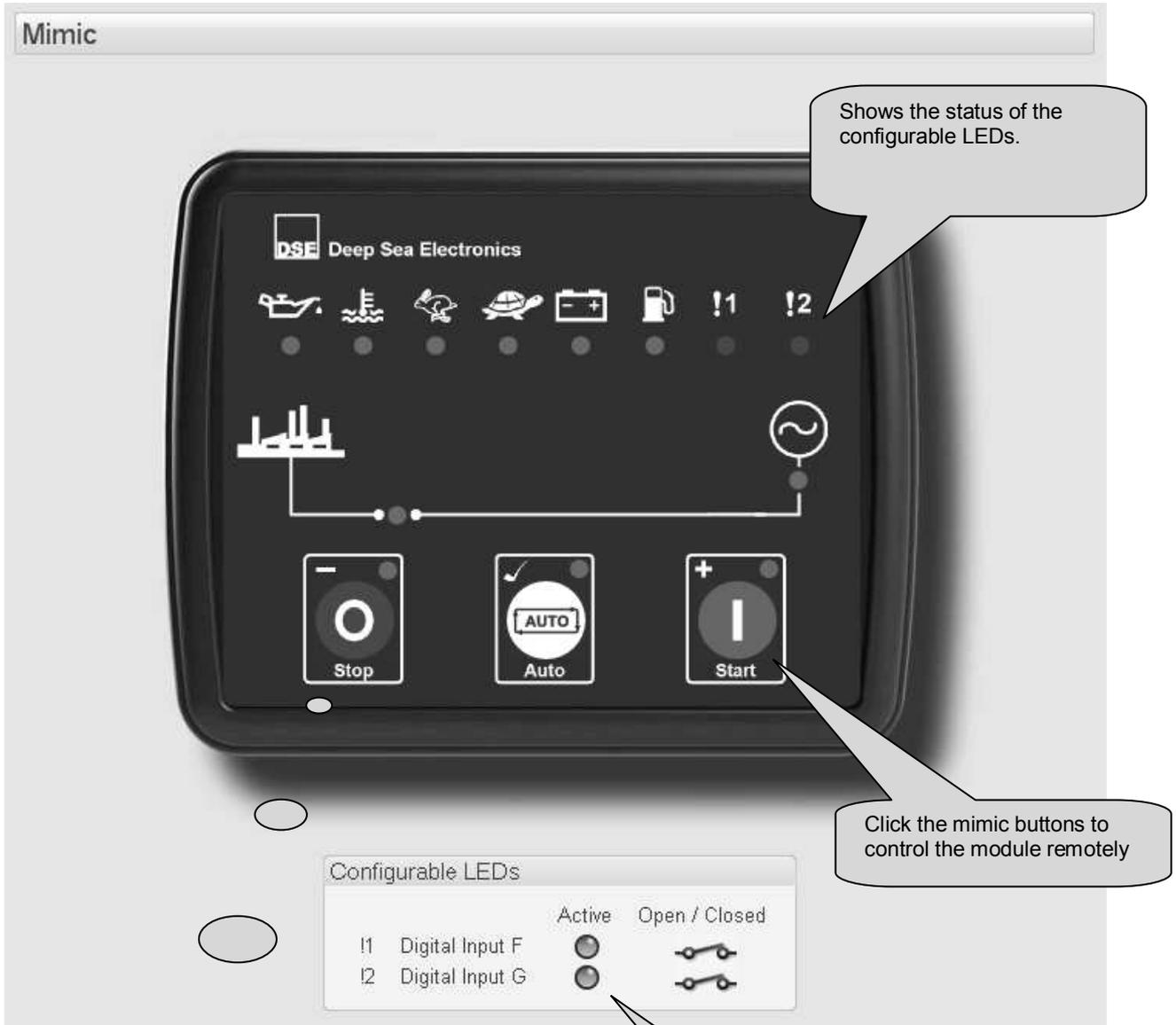


The SCADA page is subdivided into smaller sections. Select the required section with the mouse.



5.1 MIMIC

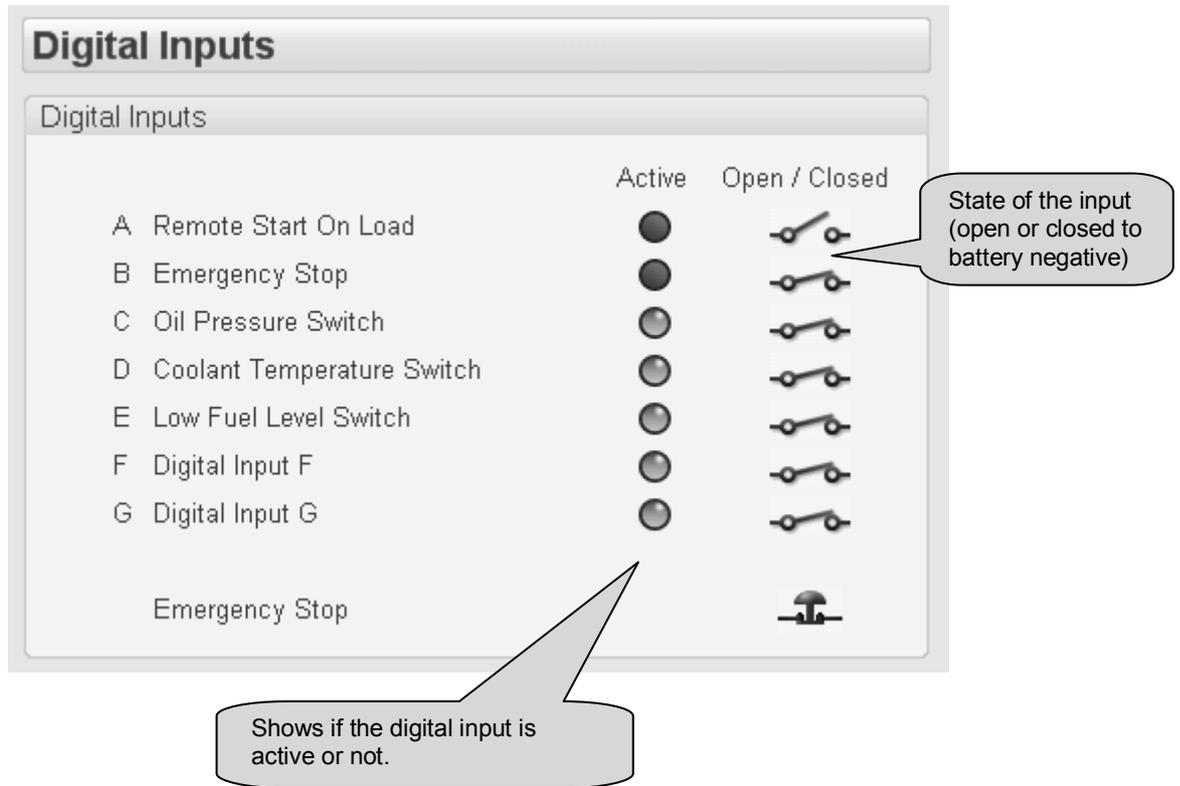
This screen provides a mimic of the control module and allows the operator to change the control mode of the module.



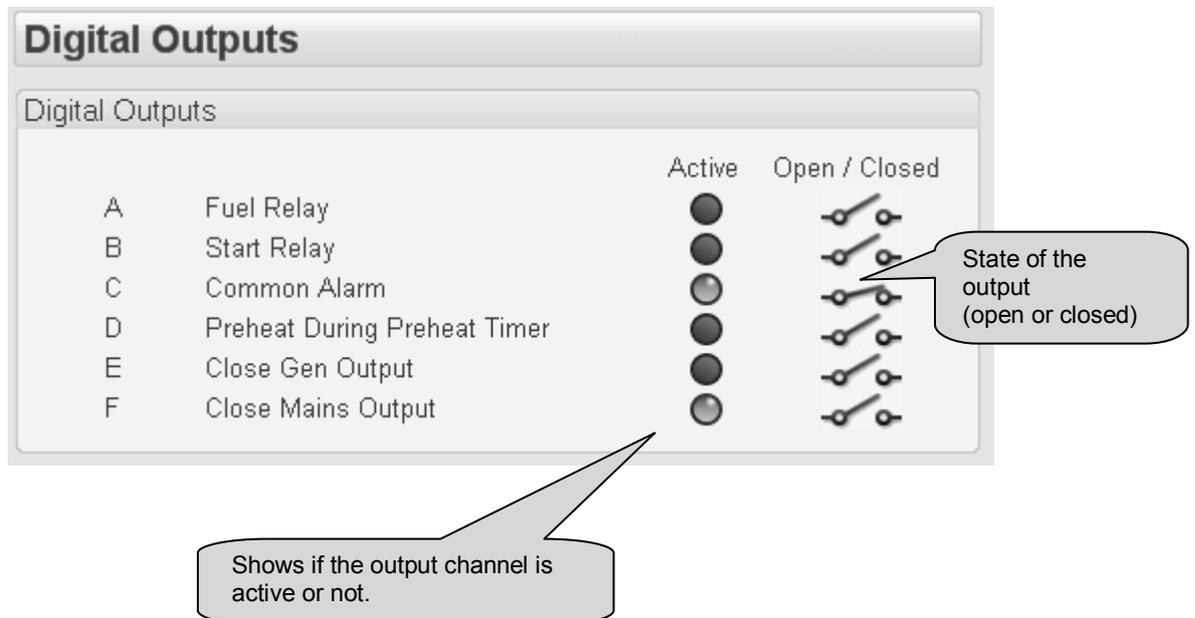
Hint : Buttons may not operate if this has been locked out by the *Access Permissions* security feature of the Configuration Suite Software. Refer to your system supplier for details.

Shows the configuration of the LEDs and the status of the source that the LED is configured to.

5.2 DIGITAL INPUTS



5.3 DIGITAL OUTPUTS



5.4 MAINS



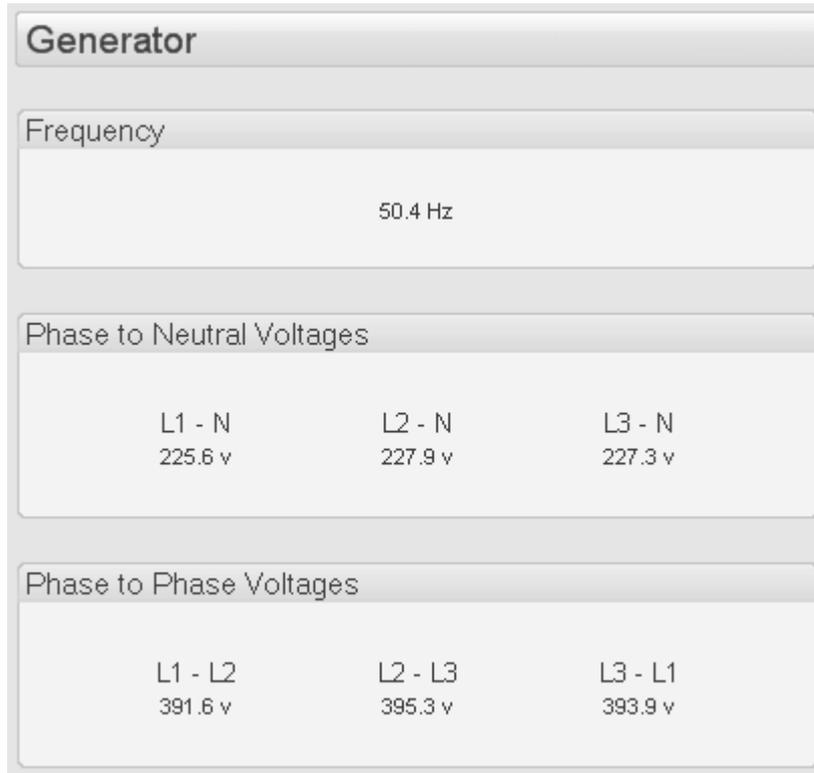
DSE4220 AMF MODULES ONLY

Shows the modules measurements of the mains supply (4220 only).

Mains		
Frequency		
50.4 Hz		
Phase to Neutral Voltages		
L1 - N 219.1 v	L2 - N 216.6 v	L3 - N 216.5 v
Phase to Phase Voltages		
L1 - L2 375.9 v	L2 - L3 376.2 v	L3 - L1 378.7 v

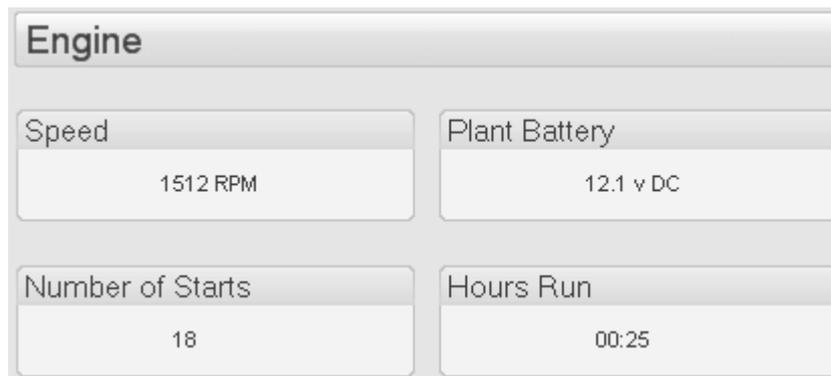
5.5 GENERATOR

Shows the modules measurements of the generator supply.



5.6 ENGINE

Shows the modules measurements of the engine parameters.



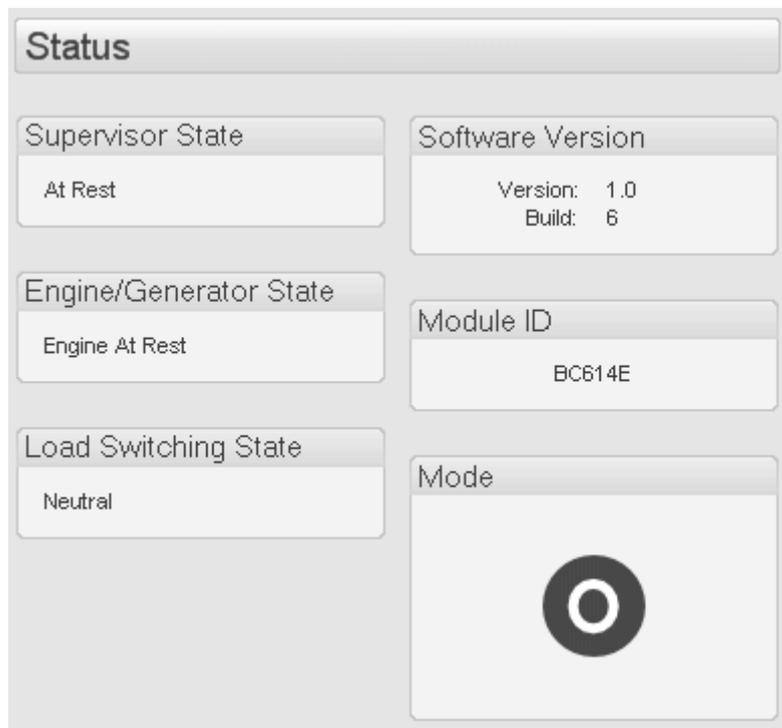
5.7 ALARMS

Shows any present alarm conditions.



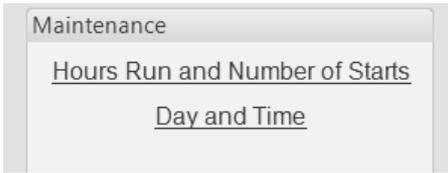
5.8 STATUS

Shows the module's current status.



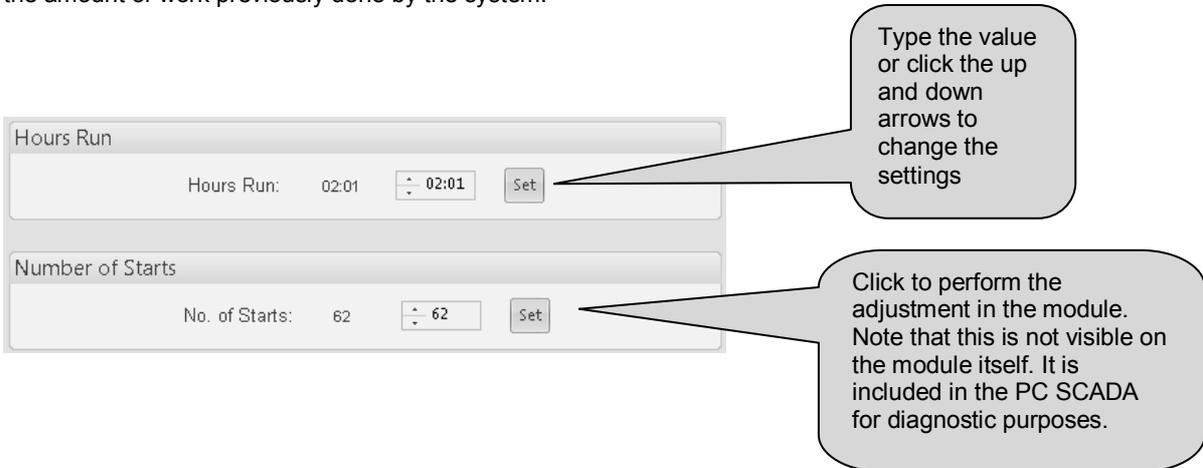
5.9 MAINTENANCE

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



5.9.1 HOURS RUN AND NUMBER OF STARTS

This section allows the Hours Run and Number of Starts to be customised on the controller. Typically, this is used when fitting a new controller to an older generator so that the controller display matches the amount of work previously done by the system.



5.9.2 DAY AND TIME

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

The screenshot shows a web-based control interface for setting the day and time on a controller. It consists of several sections:

- Day and Time:** A header section for the current status.
- Module Day:** A display showing the current day as 'Monday'.
- Module Time:** A display showing the current time as '15:42:31'.
- Module Week:** A display showing the current week counter as '1'. A callout box explains: "A counter that increments every seven days".
- Set Day and Time:** A section with three dropdown menus for 'Day' (set to 'Monday'), 'Time' (set to '15:42:25'), and 'Week' (set to '1'). Below these is a 'Set' button. A callout box explains: "Type the new date / time or click the up and down arrows to change the settings".
- Set to PC Time:** A section showing the PC's current date and time: "Date Week 7, Wednesday" and "Time 11:46:13". Below this is a 'Set to PC Time' button. A callout box explains: "Click Set to adjust the module to the date/time that your PC is set to." Another callout box points to the 'Set' button in the 'Set Day and Time' section, explaining: "Click Set to adjust the module to the selected date/time."

NOTE: When DC power is re-applied to the controller, the module's internal week counter is reset to '1', regardless of the module's internal clock

6 ALARM TYPES

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

Alarm type	Description
Indication	No audible alarm or common warning signal occurs. <i>Indication</i> alarms are only used to illuminate indicators or to activate outputs.
Warning	Audible alarm and common alarm signal is generated. The set continues to run. <i>Warning alarms</i> are used to draw the operator's attention to a minor issue or to a problem that may escalate to an Electrical Trip or Shutdown Alarm if left untreated.
Shutdown	Audible alarm and common alarm signal is generated. The set is taken off load and immediately stopped. <i>Shutdown alarms</i> are serious issues that demand immediate stopping of the generator. For instance Emergency Stop or Overspeed alarms require immediate shutdown.