



DSE Genset®



DEEP SEA ELECTRONICS

DSEP100 Configuration Suite

PC Software Manual

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DSEP100 Configuration Suite PC Software Manual

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Amendments Since Last Publication

Amd. No.	Comments
1	Initial Release
2	Additional miscellaneous options, Standard compliance function, Breaker failed to open function, Mains protection screenshots updated.
3	Added multiple stage R.O.C.O.F. alarms
4	Updated style and screenshots of document, Added delayed fault reset, remote control and remote mains failure descriptions.
5	Updated to email and website addresses, added details about DSEP100-02.

Typeface: The typeface used in this document is *Arial*. Care must 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.

TABLE OF CONTENTS

Section	Page
1 INTRODUCTION.....	4
1.1 CLARIFICATION OF NOTATION.....	5
1.2 GLOSSARY OF TERMS.....	5
1.3 BIBLIOGRAPHY.....	6
1.3.1 INSTALLATION INSTRUCTIONS.....	6
1.3.2 MANUALS.....	6
1.3.3 TRAINING GUIDES.....	6
1.3.4 THIRD PARTY DOCUMENTS.....	7
1.4 INSTALLATION AND USING THE DSE CONFIGURATION SUITE SOFTWARE.....	7
2 EDITING THE CONFIGURATION.....	8
2.1 CONFIGURATION LOCK.....	8
2.2 SCREEN LAYOUT.....	9
2.3 MODULE.....	10
2.3.1 MODULE OPTIONS.....	10
2.3.2 CONFIGURABLE STATUS.....	13
2.4 DIGITAL INPUTS.....	14
2.5 DIGITAL OUTPUTS.....	15
2.5.1 OUTPUT SOURCES.....	15
2.6 TIMERS.....	17
2.7 MAINS.....	19
2.7.1 MAINS OPTIONS.....	19
2.7.2 MAINS ALARMS.....	21
2.7.3 MAINS SEQUENCE ALARMS.....	23
2.7.4 MAINS FREQUENCY ALARMS.....	25
2.7.5 MAINS DECOUPLING.....	26
2.8 COMMUNICATIONS.....	28
2.8.1 COMMUNICATIONS OPTIONS.....	28
2.8.2 GENCOMM PAGE 166.....	29
2.9 ALTERNATIVE CONFIGURATION.....	31
3 SCADA.....	32
3.1 MODULE IDENTITY.....	33
3.2 MIMIC.....	33
3.3 LANGUAGES.....	33
3.4 DIGITAL INPUTS.....	34
3.5 DIGITAL OUTPUTS.....	34
3.6 MAINS.....	35
3.7 ALARMS.....	36
3.8 STATUS.....	36
3.9 EVENT LOG.....	37
3.10 REMOTE CONTROL.....	38
3.11 MAINTENANCE.....	39
3.11.1 TIME.....	39
3.11.2 MODULE PIN.....	40

1 INTRODUCTION

This document details the use of the *DSE Configuration Suite PC Software* with the DSEP100-01 and DSEP100-02 modules, which are part of the DSEGenset® range of products.

The manual forms part of the product and should be kept for the entire life of the product. If the product is passed or supplied to another party, ensure that this document is passed to them for reference purposes.

This is not a *controlled document*. DSE do not automatically inform on updates. Any future updates of this document are included on the DSE website at www.deepseaelectronics.com.

The *DSE Configuration Suite PC Software* allows the DSEP100 module to be connected to a PC via USB A to USB B cable (USB printer cable). Once connected, the software allows easy, controlled access to various operating parameters within the module which can then be viewed and edited as required.

The *DSE Configuration Suite PC Software* must 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 must 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. Separate manuals deal with the operation of the individual module and its ancillaries, refer to section entitled *Bibliography* elsewhere in this document for further information.

1.1 CLARIFICATION OF NOTATION

Clarification of notation used within this publication.

 NOTE:	Highlights an essential element of a procedure to ensure correctness.
 CAUTION!	Indicates a procedure or practice, which, if not strictly observed, could result in damage or destruction of equipment.
 WARNING!	Indicates a procedure or practice, which could result in injury to personnel or loss of life if not followed correctly.

1.2 GLOSSARY OF TERMS

Term	Description
DSEPxxx	All modules in the DSEPxxx range.
DSEP100	DSEP100-01 and DSEP100-02 module/controller
HMI	Human Machine Interface A device that provides a control and visualisation interface between a human and a process or machine.
LCD	Liquid Crystal Display The green flat-panel display on the fascia of the module.
PLC	Programmable Logic Controller A programmable digital device used to create logic for a specific purpose.
R.O.C.O.F.	Rate Of Change Of Frequency
SCADA	Supervisory Control And Data Acquisition A system that operates with coded signals over communication channels to provide control and monitoring of remote equipment

1.3 BIBLIOGRAPHY

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

1.3.1 INSTALLATION INSTRUCTIONS

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

DSE Part	Description
053-149	DSEP100 Installation Instructions
053-182	DSE8610 MKII Installation Instructions
053-183	DSE8620 MKII Installation Instructions
053-184	DSE8660 MKII Installation Instructions

1.3.2 MANUALS

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

DSE Part	Description
N/A	DSEGencomm (MODBUS protocol for DSE controllers)
057-151	DSE Configuration Suite PC Software Installation & Operation Manual
057-184	DSEP100 Operator Manual
057-220	Options for Communications with DSE Controllers

1.3.3 TRAINING GUIDES

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

DSE Part	Description
056-006	Introduction to Comms
056-021	Mains Decoupling
056-033	Synchronising Requirements
056-051	Sending DSEGencomm Control Keys
056-069	Firmware Update
056-075	Adding Language Files
056-076	Reading DSEGencomm Alarms
056-079	Reading DSEGencomm Status
056-080	MODBUS
056-082	Override Gencomm PLC Example
056-084	Synchronising & Loadsharing
056-086	G59
056-091	Equipotential Earth Bonding
056-097	USB Earth Loop and Isolation
056-099	Digital Output to Digital Input Connection

1.3.4 THIRD PARTY DOCUMENTS

The following third party documents are also referred to:

Reference	Description
ISBN 1-55937-879-4	IEEE Std C37.2-1996 IEEE Standard Electrical Power System Device Function Numbers and Contact Designations. Institute of Electrical and Electronics Engineers Inc
ENA (Energy Networks Association) Website	ENA Engineering Recommendation G59 Latest Issue and Amendment
ENA (Energy Networks Association) Website	ENA Engineering Recommendation G99 Latest Issue and Amendment

1.4 INSTALLATION AND USING THE DSE CONFIGURATION SUITE SOFTWARE

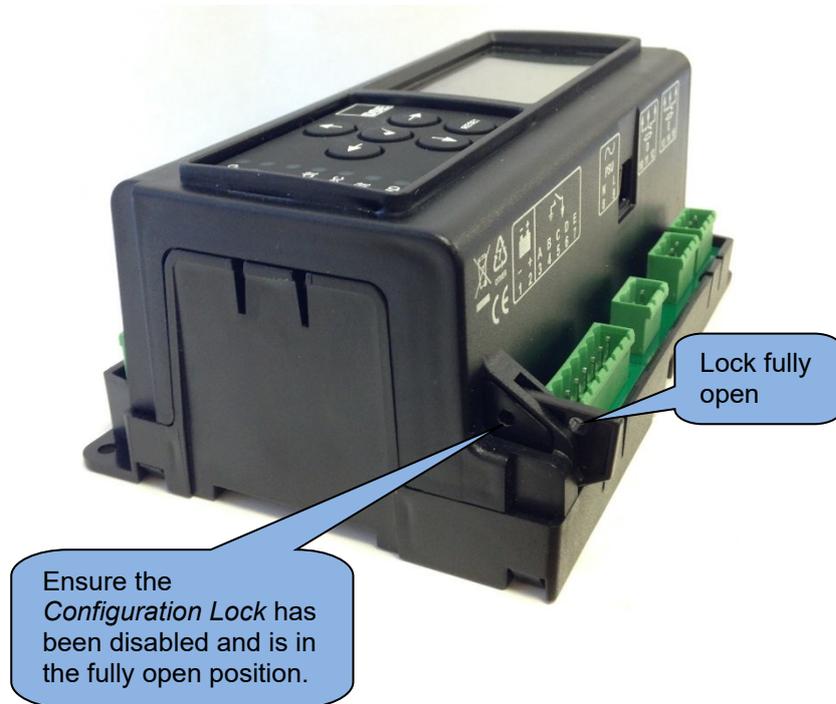
For information in regards to installing and using the *DSE Configuration Suite PC Software*, refer to DSE publication: **057-151 DSE Configuration Suite PC Software Installation & Operation Manual** which is found on the DSE website: www.deepseaelectronics.com

2 EDITING THE CONFIGURATION

The software is broken down into separate sections to provide simple navigation whilst editing the module's configuration to suit a particular application.

2.1 CONFIGURATION LOCK

A means of attaching a small padlock or utility company seal is provided that when attached, prevents the main configuration settings being changed either from the Front Panel Editor or via Configuration Suite PC Software.



2.2 SCREEN LAYOUT

The type of module configuration file being edited

The coloured shading shows the currently selected page/section

Click + or - to expand or collapse the section

Click to move to the *Previous* or *Next* section

Click to close the opened configuration file

Previous Next

P100 Configuration v3.0 (b)

- P100 Configuration
 - Module
 - Module Options
 - Configurable Status
 - Digital Inputs
 - Digital Outputs
 - Timers
 - Mains
 - Communications
 - Communications Options
 - Gencomm Page 166
 - Alternative Configuration

Click to step *Forward* or *Back* through previously viewed configuration sections

Click to return to the *Home* section shown below

Click to view / edit the section

Back Home Forward

P100 Configuration

- Module
- Digital Inputs
- Digital Outputs
- Timers
- Mains
- Communications
- Alternative Configuration

DSE

2.3 MODULE

The *Module* section allows the user to edit options related to the module itself and is subdivided into smaller sections.



2.3.1 MODULE OPTIONS

Description

A screenshot of a web form titled 'Description'. It contains four numbered input fields (1, 2, 3, 4) stacked vertically. Each field is a simple text box.

Parameter	Description
Description	Four free entry boxes to allow the user to give the configuration file a description. Typically used to enter the job number, customer name, site information etc. This text is not shown on the module's display and is only seen in the configuration file.

Parameter descriptions are continued overleaf...

Miscellaneous Options

Parameter	Description
Manual Reset if Mains Out of Limits	<input type="checkbox"/> = Mains decoupling alarms cannot be manually reset using the <i>Reset</i> push button unless the mains is available. <input checked="" type="checkbox"/> = Mains decoupling alarms can be manually reset using the <i>Reset</i> push button even if the mains is not available.
Support Right-to-Left Languages in Module Strings	<input type="checkbox"/> = User configured alarm text appears as left-to-right. <input checked="" type="checkbox"/> = User configured alarm text appears as right-to-left.
Boot in Tripped Mode	<input type="checkbox"/> = Module powers up assuming mains is available. <input checked="" type="checkbox"/> = Module powers up assuming mains is not available. The mains decoupling output is active when first powered.
Remote Mains Failure	<p>NOTE: For information in regards to sending MODBUS control commands, refer to DSE Publication: <i>056-051 Sending DSEGencomm Control Keys</i> which is found on the DSE website: www.deepseaelectronics.com</p> <p>The DSEP100 has the ability for an external MODBUS master (such as a PLC or SCADA System) to action a fault condition to simulate the operation of a <i>Mains Failure</i> event for testing purposes. This option sets the point at which the <i>Remote Mains Failure</i> alarm is active from.</p> <p>Always: Alarm activates when the command is sent via MODBUS even if the <i>Mains Closed Auxiliary</i> and <i>Generator Closed Auxiliary</i> inputs are not active.</p> <p>From Supervision: Alarm only activates when the command is sent via MODBUS and both the <i>Mains Closed Auxiliary</i> and <i>Generator Closed Auxiliary</i> inputs are active.</p>

Standard

NOTE: For the DSEP100-02 the *Standard* is locked to comply with G99, clause 10.1.4 for a fully type-tested relay and is displayed for information only

Parameter	Description
Standard	<p>G59/2: Module tripping reaction times conform to the G59/2 standard.</p> <p>G59/3 and G99: Module tripping reaction times conform to the G59/3 and G99 standard.</p>

Parameter descriptions are continued overleaf...

Event Log Options

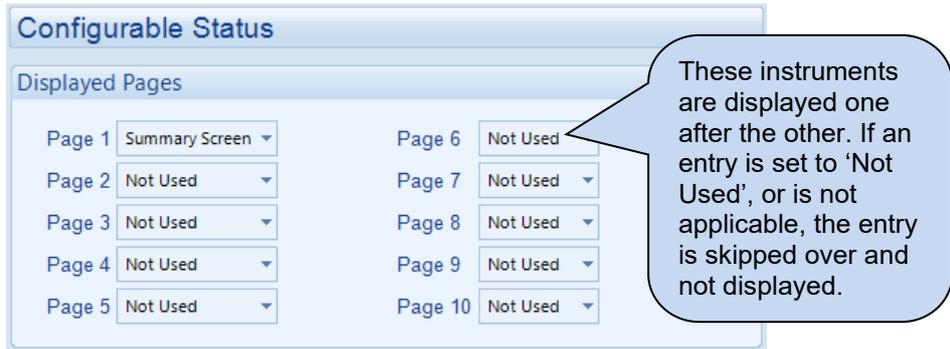
Event Log Options

Log the following events to the event log

Power-Up	<input checked="" type="checkbox"/>
Alarms	<input checked="" type="checkbox"/>
Resets	<input checked="" type="checkbox"/>
Supervision Enabled	<input checked="" type="checkbox"/>
Supervision Disabled	<input checked="" type="checkbox"/>

Parameter	Description
Power Up	<input type="checkbox"/> = Power up events are not logged in the module's event log <input checked="" type="checkbox"/> = Power up events are logged when the DC Supply is applied to the module or whenever the module is rebooted
Alarms	<input type="checkbox"/> = Alarms are not logged in the module's event log <input checked="" type="checkbox"/> = Logs an event upon the occurrence of any alarm
Resets	<input type="checkbox"/> = Alarm resets are not logged in the module's event log <input checked="" type="checkbox"/> = Logs an event when an alarm is reset
Supervision Enabled	<input type="checkbox"/> = Mains supervision enabled events are not logged in the module's event log <input checked="" type="checkbox"/> = Logs an event to indicate when the mains supervision was enabled
Supervision Disabled	<input type="checkbox"/> = Mains supervision disabled events are not logged in the module's event log <input checked="" type="checkbox"/> = Logs an event to indicate when the mains supervision was disabled

2.3.2 CONFIGURABLE STATUS



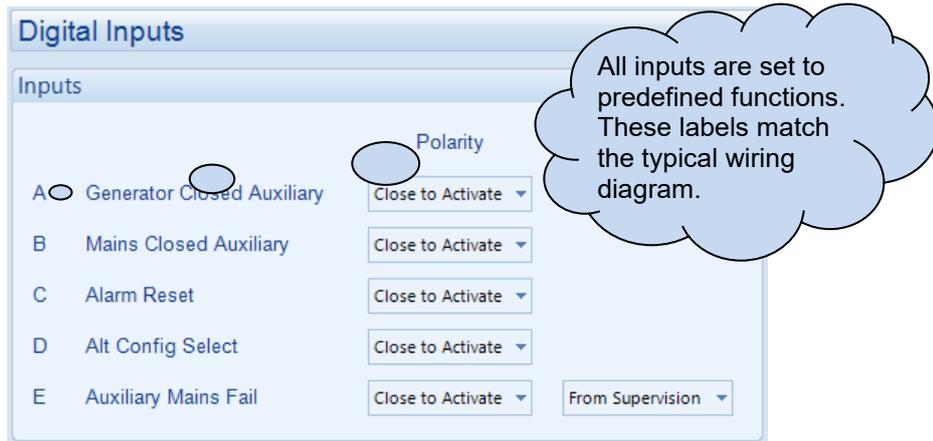
Displayed Pages

Parameter	Description
Page 1 to 10	Select the instrumentation parameter that is to be displayed for the specific <i>Configurable Status Screen</i> . These are accessed by pressing the up / down menu navigation buttons when viewing the module's status display screen.

The selected options for the *Configurable Status Pages* are listed below:

Option	Description
Not Used	No instrument is selected to show on the configurable status page
Active Config	Shows the selected configuration on the configurable status page
Battery Voltage	Shows the battery voltage
Mains Decoupling	Shows the mains decoupling state
Mains Frequency	Shows the mains frequency
Mains Phase Sequence	Shows the mains phase sequence
Mains Voltage L-L	Shows the mains line to line voltage
Mains Voltage L-N	Shows the mains line to neutral voltage
Rolling Average L-L	Shows the rolling average line to line voltage
Rolling Average L-N	Shows the rolling average line to neutral voltage
Sequence Voltages	Shows the sequence voltages
Summary Screen	Shows a summary of the module's instruments
Voltage Asymmetry	Shows the voltage asymmetry

2.4 DIGITAL INPUTS



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.

Function	Description
Generator Closed Auxiliary IEEE 37.2 - 3 Checking Or Interlocking relay	This input is used to provide feedback to give true indication of the generator switchgear status. It either must be connected to the generator switchgear auxiliary contact or left permanently active to enable the module to start its protection.
Mains Closed Auxiliary IEEE 37.2 - 3 Checking Or Interlocking Relay	This input is used to provide feedback to give true indication of the mains switchgear status. It either must be connected to the mains switchgear auxiliary contact or left permanently active to enable the module to start its protection.
Alarm Reset	This input is used to reset any latched alarms (such as mains decoupling alarms) via some form of external logic.
Alt Config Select	This input is used to instruct the module to follow the <i>Alternative Configuration</i> settings instead of the <i>Main Configuration</i> settings.
Auxiliary Mains Fail	The module monitors the incoming single or three phase supply for Over Voltage, Under Voltage, Over Frequency, Under Frequency R.O.C.O.F or Vector Shift. It may be required to monitor a different mains supply or some aspect of the incoming mains not monitored by the controller. If the devices providing this additional monitoring are connected to operate this input, the controller operates as if the incoming mains supply has fallen outside of limits. Removal of the input signal causes the module to act if the mains has returned to within limits providing that the mains sensing also indicates that the mains is within limits. Always: Alarm activates when the input is activated even if the <i>Mains Closed Auxiliary</i> and <i>Generator Closed Auxiliary</i> inputs are not active. From Supervision: Alarm only activates when the input is activated and both the <i>Mains Closed Auxiliary</i> and <i>Generator Closed Auxiliary</i> inputs are active.

2.5 DIGITAL OUTPUTS

These labels match the typical wiring diagram

Output	Source	Polarity
Output A	Common Mains Decoupling Alarm	Energise
Output B	Common Mains Decoupling Alarm	Energise
Output C	Not Used	Energise
Output D	Not Used	Energise
Output E	Not Used	Energise

Parameter	Description
Source	Select the output source to control the state of the output See section entitled <i>Output Sources</i> for details of all available functions
Polarity	Select the digital input polarity: Energise: When the output source is true, the output activates. De-Energise: When the output source is true, the output deactivates.

2.5.1 OUTPUT SOURCES

The list of output sources available for configuration of the module digital outputs.

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

Output Source	Activates	De-activates
Not Used	The output does not change state (Unused)	
Alarm Reset	Indicates that an alarm reset operation is in progress by digital input	
Alternative Config Select	Indicates if the alternative configuration has been selected	
Asymmetry High <i>IEEE 37.2 – 59 Overvoltage Relay</i>	Active when the <i>Asymmetry Alarm</i> is active	
Auxiliary Mains Failure	Active when the <i>Auxiliary Mains Failure</i> input is active	
Breaker Failed to Open	Active when either the <i>Mains Closed Auxiliary</i> or <i>Generator Closed Auxiliary</i> has failed to indicate the load switch as being open after tripping has occurred.	
Common Mains Decoupling Alarm	Indicates 1 or more of the Mains decoupling alarm have activated	
Delayed Fault Reset	Activates upon a <i>Common Mains Decoupling</i> fault clearing and after the <i>Delayed Fault Reset Delay</i> has expired.	De-activates upon a <i>Common Mains Decoupling</i> fault.
Delayed Fault Reset Pulse	Activates upon a <i>Common Mains Decoupling</i> fault clearing and after the <i>Delayed Fault Reset Delay</i> has expired.	De-activates after the <i>Delayed Fault Reset Pulse Length</i> time has expired or upon a <i>Common Mains Decoupling</i> fault.
Generator Closed Aux <i>IEEE 37.2 - 3 Checking or interlocking relay</i>	Active when the <i>Generator Closed Auxiliary</i> input is active	

Parameter descriptions are continued overleaf...

Editing the Configuration

Output Source	Activates	De-activates
High Average Voltage IEEE 37.2 - 59AC Overvoltage Relay	Active when the High Average Voltage Alarm is active	
Loss of Mains	Active when a mains failure is detected	
Mains Closed Aux IEEE 37.2 - 3 Checking Or Interlocking relay	Active when the Mains closed auxiliary input is active	
Mains Phase Rotation Alarm IEEE 37.2 – 47 Phase-Sequence Or Phase Balance Voltage Relay	Active when a mains phase rotation alarm is active	
Negative Sequence Voltage High IEEE 37.2 – 47 Phase-Sequence Or Phase Balance Voltage Relay	Active when the Negative Sequence Voltage Alarm is active	
Over Frequency (1 or 2) IEEE 37.2 – 81H Frequency Relay	Active when the Mains frequency has become higher than the Mains High Frequency Alarm stage 1 (or stage 2)	
Over Voltage (1 to 5) IEEE 37.2 – 59 Overvoltage Relay	Active when the Mains voltage has become higher than the Mains High Voltage Alarm stage 1 (or stage 2)	
Positive Sequence Voltage Low IEEE 37.2 – 47 Phase-Sequence Or Phase Balance Voltage Relay	Active when the Positive Sequence Alarm is active	
Remote Control 1 to 4	A series of output sources that are controlled by remote control in the SCADA section of the software, used to control external circuits.	
Remote Mains Failure Alarm	Activates when the <i>Remote Mains Failure Alarm</i> is active. This alarm is activated by MODBUS using either a non-latched command (Gencomm control key 95) or latch command (Gencomm control key 93).	
Remote Mains Failure Set	Activates when the <i>Remote Mains Failure Alarm</i> is active specifically by the latch MODBUS command (Gencomm control key 93).	De-activates on either a power down of the module or using the unlatch MODBUS command (Gencomm control key 94).
ROCOF Alarm (1 to 3) IEEE 37.2 – 81R Frequency Relay	Active when the ROCOF alarm is active	
Under Frequency (1 or 2) IEEE 37.2 – 81L Frequency Relay	Active when the Mains frequency has become lower than the Mains Low Frequency Alarm stage 1 (or stage 2)	
Under Voltage (1 to 5) IEEE 37.2 – 27 Undervoltage Relay	Active when the Mains voltage has become lower than the Mains Low Voltage Alarm stage 1 (or stage 2)	
Vector Shift Alarm IEEE 37.2 – 78 Phase-Angle Measuring Relay	Active when the Vector Shift Alarm is active	
Zero Sequence Voltage High IEEE 37.2 – 47 Phase-Sequence Or Phase Balance Voltage Relay	Active when the Zero Sequence Alarm is active	

2.6 TIMERS

Supervision Timer



Timer	Description
Supervision Timer	When <i>Mains Closed Auxiliary</i> and <i>Generator Closed Auxiliary</i> inputs become active, the <i>Supervision Timer</i> begins. Once the <i>Supervision Timer</i> expires all protections become active.

Auto Reset



Timer	Description
Auto-Reset Enable	<input type="checkbox"/> = The module requires a manual reset when any alarm occurs <input checked="" type="checkbox"/> = Alarms are reset when the Mains has been consistently within limits for the duration of the <i>Auto-Reset Delay</i> timer.
Auto-Reset Delay	Time delay before initiating the normal <i>Auto-Reset</i> , during this time the Mains must remain consistently within limits.
Reset if Mains Out Of Limits	<div style="border: 1px solid black; padding: 5px;"> <p>NOTE: This option is available when the Fast-Reset is disabled.</p> </div> <input type="checkbox"/> = The <i>Auto-Reset</i> only occurs if the Mains is back within limits <input checked="" type="checkbox"/> = The delay timer starts immediately after a trip regardless of the state of the mains. All alarms are reset when it expires.
Fast-Reset Enable	<div style="border: 1px solid black; padding: 5px;"> <p>NOTE: This option is available when the Reset if Mains Out Of Limits is disabled.</p> </div> <input type="checkbox"/> = The module only performs the <i>Auto-Reset</i> if enabled <input checked="" type="checkbox"/> = If a mains failure lasts less than the <i>Window</i> timer, the shorter <i>Fast-Reset Delay</i> is used instead of the normal <i>Auto-Reset Delay</i> .
Fast-Reset Window	The <i>Fast-Reset Window</i> timer initiates upon a mains failure. If the mains returns within limits during the <i>Window</i> timer, the <i>Fast-Reset</i> is initiated. If the mains failure lasts longer than the <i>Window</i> timer, the module reverts to the <i>Auto-Reset</i> timer.
Fast-Reset Delay	Time delay before initiating the <i>Fast-Reset</i> . During this time the Mains must remain consistently within limits.

Parameter descriptions are continued overleaf...

Module Timers



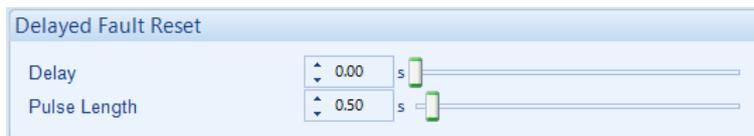
Timer	Description
Page Timer	If the module is left unattended for the duration of the <i>LCD Page Timer</i> it reverts to show the <i>Status page</i> .
Scroll Timer	The scroll time between parameters on a selected page

Breaker Failed to Open



Timer	Description
Breaker Fail to Open Enable	<input type="checkbox"/> = The module does not alarm if the breaker fails to open. <input checked="" type="checkbox"/> = The module alarms if the mains or generator breaker fails to open.
Use Generator Closed Auxiliary	<input type="checkbox"/> = The module's Breaker Fail to Open alarm only operates on the Mains Closed Auxiliary input. <input checked="" type="checkbox"/> = The module's Breaker Fail to Open alarm only operates on the Generator Closed Auxiliary input.
Delay	Time delay before initiating the <i>Breaker Fail to Open</i> alarm once the breaker tripping output has activated.

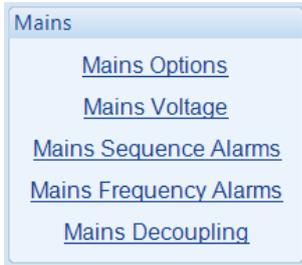
Delayed Fault Reset



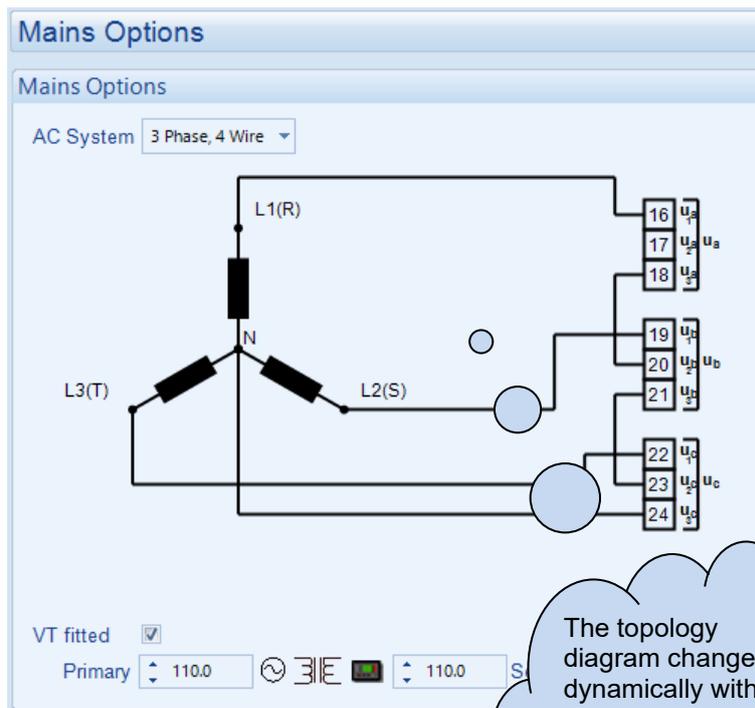
Timer	Description
Delay	The amount of time that the <i>Delayed Fault Reset</i> and <i>Delayed Fault Reset Pulse</i> output wait before becoming active after a <i>Common Mains Decoupling</i> fault is reset.
Pulse Length	The amount of time that the <i>Delayed Fault Reset Pulse</i> output is active for.

2.7 MAINS

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



2.7.1 MAINS OPTIONS



Parameters are detailed overleaf...

The topology diagram changes dynamically with the selected AC System. The diagram also shows the relevant terminal number to be used.

Mains Options

Parameter	Description
AC System	<p>▲ NOTE: To use the 3 Phase, 3 Wire NVD option the voltage sensing must be provided to the DSEP100 using a Voltage Transformer (VT) per phase.</p> <p>The AC System of the mains is fixed to the same setting as the generator. These settings are used to detail the type of AC system to which the module is connected:</p> <p>2 Phase, 3 Wire L1 - L2 2 Phase, 3 Wire L1 - L3 3 Phase, 3 Wire 3 Phase, 3 Wire NVD 3 Phase, 4 Wire 3 Phase, 4 Wire Delta L2 - N - L3 Single Phase, 2 Wire</p>
VTs	<p><input type="checkbox"/> = The voltage sensing to the controller is direct from the Mains <input checked="" type="checkbox"/> = The voltage sensing to the controller is via Voltage Transformers (VTs or PTs)</p> <p>This is used to step down the generated voltage to be within the controller voltage specifications. By entering the <i>Primary</i> and <i>Secondary</i> voltages of the transformer, the controller displays the <i>Primary</i> voltage rather than the actual measured voltage.</p> <p>This is typically used to interface the DSE module to high voltage systems (ie 11 kV)</p>

2.7.2 MAINS ALARMS

Under Voltage Alarms



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

Parameter	Description
Mains Under Voltage, Stage 1 to Stage 5 IEEE 37.2 - 27AC Undervoltage Relay	<p>These are '5 stage' alarms. Stage 1 allows for a delayed operation should the voltage stray by a small amount. Stage 2 to 5 allows for a faster trip should the voltage change by a larger amount.</p> <p><input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = When enabled, the alarm activates when the voltage falls below the configured <i>Under Voltage Alarm Trip</i> level for the configured <i>Delay</i> time.</p>

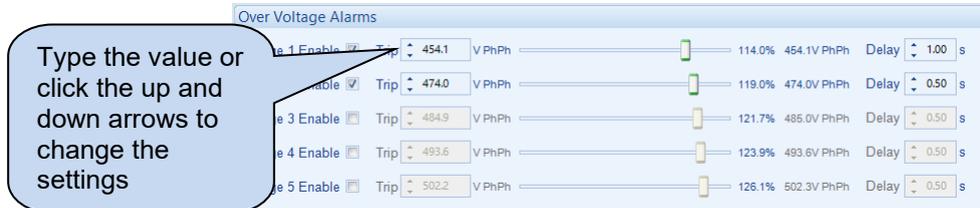
Nominal Voltage



Click and drag to change the setting.

Parameter	Description
Mains Nominal Voltage	This is used to calculate the percentages of the under and over alarm set points.

Over Voltage Alarms

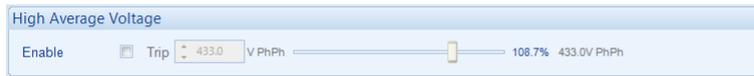


Type the value or click the up and down arrows to change the settings

Parameter	Description
Mains Over Voltage, Stage 1 to Stage 5 IEEE 37.2 - 59AC Overvoltage Relay	<p>These are '5 stage' alarms. Stage 1 allows for a delayed operation should the voltage stray by a small amount. Stage 2 to 5 allows for a faster trip should the voltage change by a larger amount.</p> <p><input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = When enabled, the alarm activates when the voltage exceeds the configured <i>Over Voltage Alarm Trip</i> level for the configured <i>Delay</i> time.</p>

Parameter descriptions are continued overleaf...

High Average Voltage



Parameter	Description
High Average Voltage IEEE 37.2 - 59AC Overvoltage Relay	<input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = When enabled, the alarm activates when the average voltage of the three phases exceeds the configured <i>High Average Voltage</i> over the preceding ten seconds (10 s rolling average).

2.7.3 MAINS SEQUENCE ALARMS

Zero Sequence Alarm

Parameter	Description
Zero Sequence Alarm IEEE 37.2 – 47H Phase-Sequence Or Phase Balance Voltage Relay	This is also known as Neutral Voltage Displacement. <input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = The alarm activates when the difference in potential between the Earth and the calculated Neutral position of a 3 wire delta exceeds the configured <i>Zero Sequence Alarm Trip</i> level for the configured <i>Delay</i> time.

Positive Sequence Alarm

Parameter	Description
Positive Sequence Alarm IEEE 37.2 – 47L Phase-Sequence Or Phase Balance Voltage Relay	<input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = The alarm activates when the voltage falls below the configured <i>Positive Sequence Alarm Trip</i> level for the configured <i>Delay</i> time.

Negative Sequence Alarm

Parameter	Description
Negative Sequence Alarm IEEE 37.2 – 47H Phase-Sequence Or Phase Balance Voltage Relay	<input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = The alarm activates when the calculated value exceeds the configured <i>Negative Sequence Alarm</i> level for the configured <i>Delay</i> time.

Asymmetry Alarm

Parameter	Description
Asymmetry Alarm IEEE 37.2 – 59 Overvoltage Relay	<input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = The alarm activates when the voltage between any two phases exceeds the configured <i>Asymmetry Alarm Trip</i> level for the configured <i>Delay</i> time. For example : L1=230, L2=235, L3=226 Asymmetry is <i>largest value – smallest value = 235 – 226 = 9 V</i>

Parameter descriptions are continued overleaf...

Phase Rotation Alarm

Phase Rotation Alarm
Enable

Parameter	Description
Phase Rotation Alarm IEEE 37.2 – 47 Phase-Sequence Or Phase-Balance Voltage Relay	<input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = This alarm activates when the phase rotation is detected as being incorrect. The module expects the rotation to be in the order L1, L2, L3 as connected to terminal blocks Ua, Ub, Uc.

2.7.4 MAINS FREQUENCY ALARMS

NOTE: For the DSEP100-02 all *Mains Frequency Alarms* are locked to comply with G99, clause 10.1.4 for a fully type-tested relay and is displayed for information only.

Under Frequency Alarms

Parameter	Description
Mains Under Frequency, Stage 1 to Stage 2 IEEE 37.2 – 81L Frequency Relay	<p>These are '2 stage' alarms.</p> <p>Stage 1 allows for a delayed operation should the frequency stray by a small amount.</p> <p>Stage 2 allows for a faster trip should the frequency change by a larger amount.</p> <p><input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = When enabled, the alarm activates when the voltage falls below the configured <i>Under Frequency Alarm Trip</i> level for the configured <i>Delay</i> time.</p>

Nominal Frequency

Parameter	Description
Mains Nominal Frequency	This is used to calculate the percentages of the under and over alarm set points.

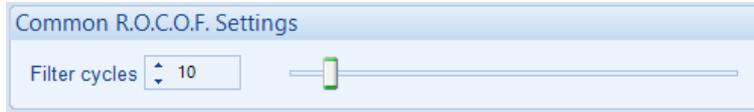
Over Frequency Alarms

Parameter	Description
Mains Over Frequency, Stage 1 to Stage 5 IEEE 37.2 – 81H Frequency Relay	<p>These are '2 stage' alarms.</p> <p>Stage 1 allows for a delayed operation should the frequency stray by a small amount.</p> <p>Stage 2 allows for a faster trip should the frequency change by a larger amount.</p> <p><input type="checkbox"/> = Alarm is disabled <input checked="" type="checkbox"/> = When enabled, the alarm activates when the voltage exceeds the configured <i>Over Frequency Alarm Trip</i> level for the configured <i>Delay</i> time.</p>

2.7.5 MAINS DECOUPLING

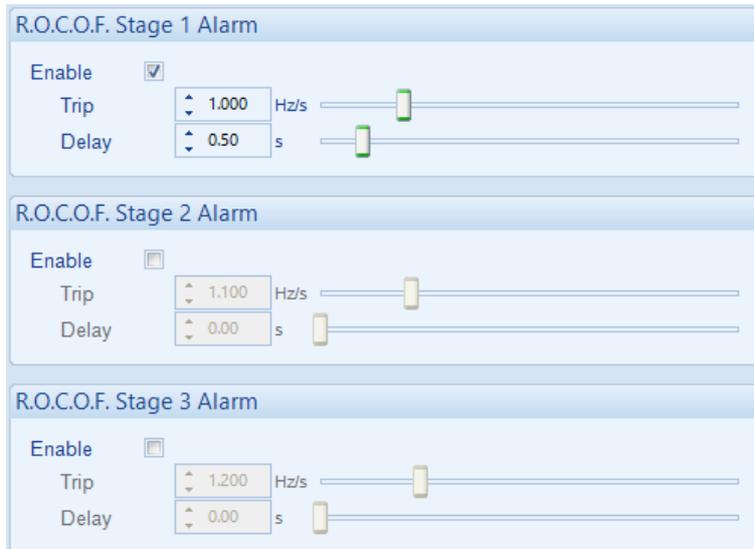
NOTE: For the DSEP100-02 all *Mains Decoupling* settings are locked to comply with G99, clause 10.1.4 for a fully type-tested relay and is displayed for information only.

Common R.O.C.O.F. Settings



Parameter	Description
Filter Cycles	The frequency of the AC supply is monitored and filtered over the configured number of voltage cycles. When the R.O.C.O.F. has changed by more than the configured level for more than the configured <i>Delay</i> time the alarm activates.

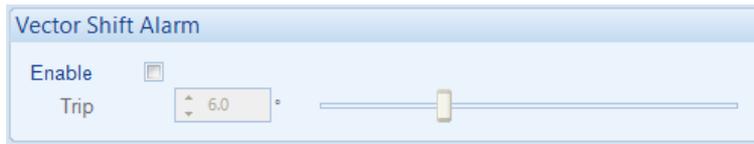
R.O.C.O.F. Stage 1 to 3 Alarms



Parameter	Description
R.O.C.O.F. Stage 1 to Stage 3 IEEE 37.2 – 81R Frequency Relay	<p>These are '3 stage' alarms. Stage 1 allows for a delayed operation should Rate of Change of Frequency (R.O.C.O.F.) is greater than the configured settings of the R.O.C.O.F. alarm for more than the configured <i>Delay</i> time. Stage 2 to 3 allows for a faster trip should the R.O.C.O.F. change by a larger amount.</p> <p>R.O.C.O.F. detection of 'mains failure when in parallel' relies upon the relative steady state of the utility power grid frequency. Normally supplied by a myriad of large power generating stations, the frequency cannot normally change quickly over a short period of time.</p> <p>A failure of the utility supply usually leads to sudden increase or decrease in the active load of the local generator and a subsequent drop or rise in it's frequency. This is detected by the R.O.C.O.F. alarm.</p> <p>Multiple R.O.C.O.F. alarm stages allow for different time delays depending on the change in frequency. Where only a single stage alarm is required, additional R.O.C.O.F. stages are to be disabled in the configuration.</p>

Parameter descriptions are continued overleaf...

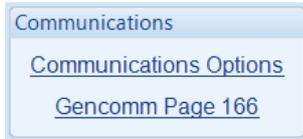
Vector Shift Alarm



Parameter	Description
Vector Shift IEEE 37.2 – 78 Phase-Angle Measuring Relay	<p>The alarm activates when the Vector Shift in one or more of the monitored phases of the waveform has been measured greater than the configured settings of the Vector Shift alarm.</p> <p>Vector Shift detection of 'mains failure when in parallel' relies upon the relative steady state of the utility power grid. Should the utility supply fail, the resulting change in load of the local supply (example local site generator) leads to a jump in the phase of the local supply. If this jump is greater than the setting of the Vector Shift Alarm, the trip is generated.</p>

2.8 COMMUNICATIONS

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



2.8.1 COMMUNICATIONS OPTIONS

Provides a means of giving the controller an identity. This is used in the SCADA section to allow the operator to see the site name and engine identity that it is currently connected to.



Parameter	Description
Site Identity	A free entry boxes to allow the user to give the DSE module a description of where the site is located. This text is not shown on the module's display and is only seen when performing remote communication. This aids the user in knowing where the generator is located.
Module Identity	A free entry boxes to allow the user to give the DSE module a description of which generator it is connected to. This text is not shown on the module's display and is only seen when performing remote communication. This aids the user in knowing which generator on a specific site is being monitored.

2.8.2 GENCOMM PAGE 166

For advanced MODBUS users of the controller, configurable Gencomm pages are available. The intention is to allow the user to create personal collections of data in subsequent registers to minimise the number of MODBUS reads required by the master, and hence speed up data collection.

All configurable Gencomm registers are 32-bit unsigned format.

Gencomm Page 166			
Register	Value	Register	Value
0-1	<Not Used>	64-65	<Not Used>
2-3	<Not Used>	66-67	<Not Used>
4-5	<Not Used>	68-69	<Not Used>
6-7	<Not Used>	70-71	<Not Used>
8-9	<Not Used>	72-73	<Not Used>
10-11	<Not Used>	74-75	<Not Used>
12-13	<Not Used>	76-77	<Not Used>
14-15	<Not Used>	78-79	<Not Used>
16-17	<Not Used>	80-81	<Not Used>
18-19	<Not Used>	82-83	<Not Used>
20-21	<Not Used>	84-85	<Not Used>
22-23	<Not Used>	86-87	<Not Used>
24-25	<Not Used>	88-89	<Not Used>
26-27	<Not Used>	90-91	<Not Used>
28-29	<Not Used>	92-93	<Not Used>
30-31	<Not Used>	94-95	<Not Used>
32-33	<Not Used>	96-97	<Not Used>
34-35	<Not Used>	98-99	<Not Used>
36-37	<Not Used>	100-101	<Not Used>
38-39	<Not Used>	102-103	<Not Used>
40-41	<Not Used>	104-105	<Not Used>
42-43	<Not Used>	106-107	<Not Used>
44-45	<Not Used>	108-109	<Not Used>
46-47	<Not Used>	110-111	<Not Used>
		128-129	<Not Used>
		130-131	<Not Used>
		132-133	<Not Used>
		134-135	<Not Used>
		136-137	<Not Used>
		138-139	<Not Used>
		140-141	<Not Used>
		142-143	<Not Used>
		144-145	<Not Used>
		146-147	<Not Used>
		148-149	<Not Used>
		150-151	<Not Used>
		152-153	<Not Used>
		154-155	<Not Used>
		156-157	<Not Used>
		158-159	<Not Used>
		160-161	<Not Used>
		162-163	<Not Used>
		164-165	<Not Used>
		166-167	<Not Used>
		168-169	<Not Used>
		170-171	<Not Used>
		172-173	<Not Used>
		174-175	<Not Used>
		192-193	<Not Used>
		194-195	<Not Used>
		196-197	<Not Used>
		198-199	<Not Used>
		200-201	<Not Used>
		202-203	<Not Used>
		204-205	<Not Used>
		206-207	<Not Used>
		208-209	<Not Used>
		210-211	<Not Used>
		212-213	<Not Used>
		214-215	<Not Used>
		216-217	<Not Used>
		218-219	<Not Used>
		220-221	<Not Used>
		222-223	<Not Used>
		224-225	<Not Used>
		226-227	<Not Used>
		228-229	<Not Used>
		230-231	<Not Used>
		232-233	<Not Used>
		234-235	<Not Used>
		236-237	<Not Used>
		238-239	<Not Used>

The configurable MODBUS page address is:

Page	Hex Address	Decimal Address
166	A600	42496

Parameter descriptions are continued overleaf...

Example of Gencomm Page Configuration:

Gencomm Page 166	
Register	Value
0-1	Mains Volts (L1-L2)
2-3	Mains Frequency
4-5	Plant Battery Volts
6-7	<Not Used>

The register address is obtained from the formula:

$\text{register_address} = \text{page_number} * 256 + \text{register_offset}$.

To read the Mains Frequency from the above register, the Modbus master device needs to read the data in two registers and then combine the data from the Most Significant Bit and the Least Significant Bit.

MSB address in Decimal = $(166 * 256) + 2 = 42498$

LSB address in Decimal = $(166 * 256) + 3 = 42499$

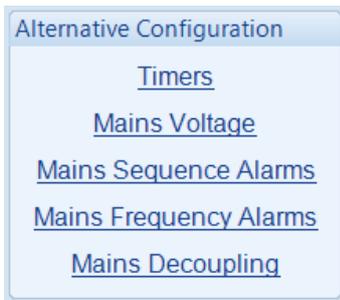
2.9 ALTERNATIVE CONFIGURATION

An Alternative Configuration is provided to allow the system designer to cater for different AC requirements utilising the same system.

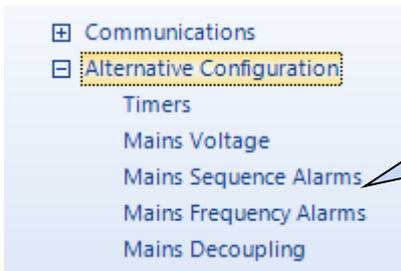
The Alternative Configuration can be selected using either:

- Module Front Panel Editor
- An external signal to module's *Alt Config Select* digital input

The Alternative Configurations Editor allows for editing of the parameters that are to be changed when an Alternative Configuration is selected.



Alternative configuration options contain a subset of the main configuration. The adjustable parameters are not discussed here as they are identical to the main configuration options:

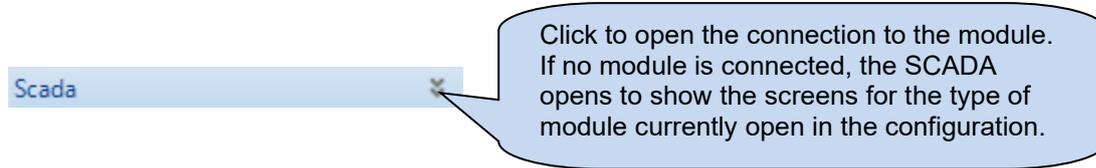


Configuration menus for the *Alternative Configuration*. For information about the configuration items within this section, refer to their description in the 'main' configuration.

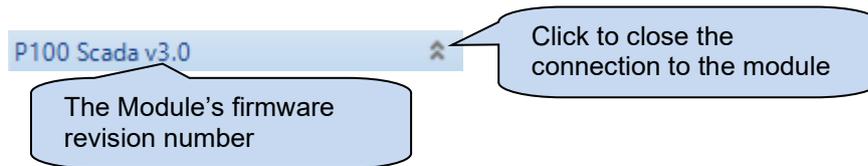
3 SCADA

SCADA stands for Supervisory Control And Data Acquisition and is provided both as a service tool and also as a means of monitoring / controlling the generator set.

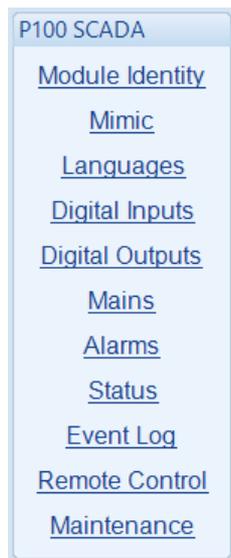
As a service tool, the SCADA pages are to check the operation of the controller's inputs and outputs as well as checking the generators operating parameters.



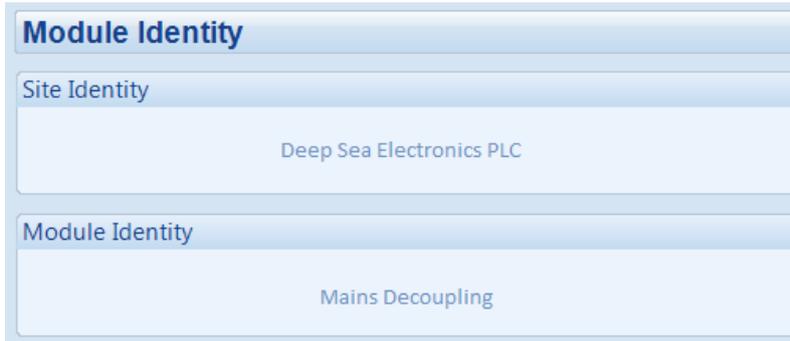
When connection is made...



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



3.1 MODULE IDENTITY

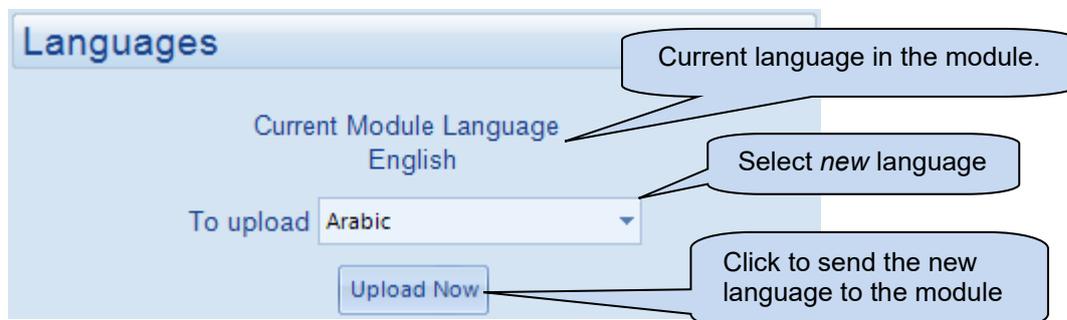


3.2 MIMIC

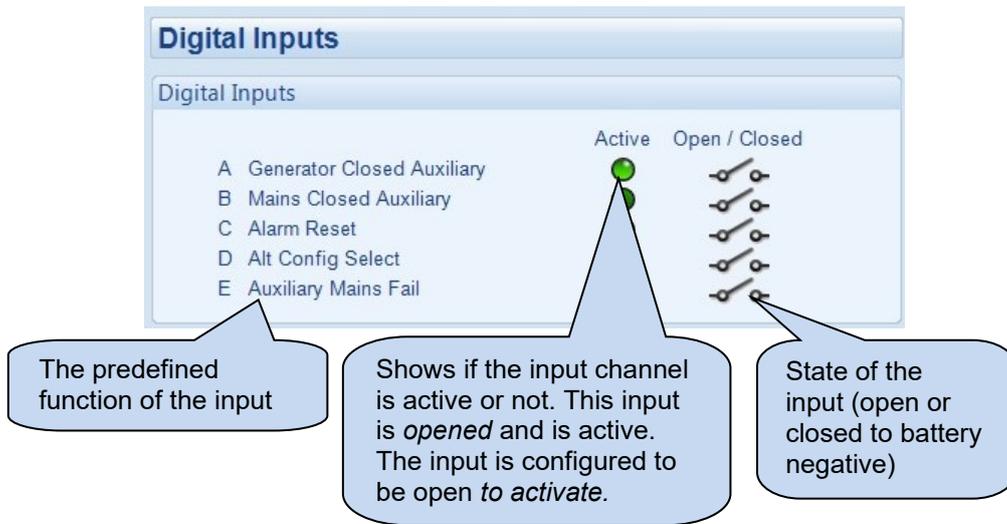
This screen provides a mimic of the control module and allows the operator to change the control mode of the module.



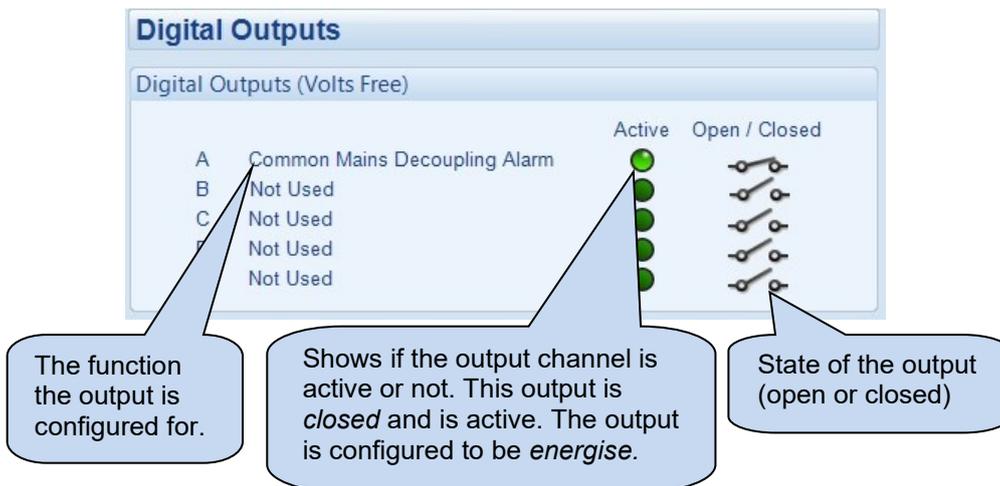
3.3 LANGUAGES



3.4 DIGITAL INPUTS



3.5 DIGITAL OUTPUTS



3.6 MAINS

Shows the modules measurements of the mains supply

Mains			
Frequency			
60.0 Hz			
Phase Rotation			
L3-L2-L1			
Phase To Neutral Voltages			
L1 - N	L2 - N	L3 - N	
251.4 V	249.6 V	254.2 V	
Phase To Phase Voltages			
L1 - L2	L2 - L3	L3 - L1	
434.4 V	436.5 V	437.4 V	
Phase to Neutral Average Voltages			
L1 - N	L2 - N	L3 - N	
251.6 V	249.7 V	254.3 V	
Phase to Phase Average Voltages			
L1 - L2	L2 - L3	L3 - L1	
434.7 V	436.8 V	437.7 V	
Symmetrical Components			
Voltage Asymmetry			
4.6 V			
Zero	Positive	Negative	
1.3 V	1.3 V	252.0 V	
$\angle -82.9^\circ$	$\angle 82.9^\circ$	$\angle 0.0^\circ$	
Plant Battery			
12.8 VDC			

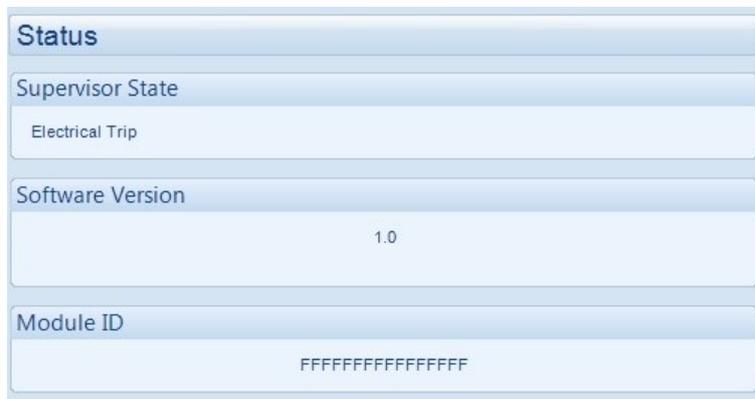
3.7 ALARMS

Shows any present alarm conditions.



3.8 STATUS

Shows the module's current status.



3.9 EVENT LOG

Shows the contents of the module's event log.

Event Log				
#	Date	Time	Event	Details
1	09/12/2013	16:53	Event	Supervision disabled
2	09/12/2013	16:53	ETrip	Phase Rotation Wrong
3	09/12/2013	16:53	ETrip	Over Frequency Stage 2
4	09/12/2013	16:53	Event	Supervision enabled
5	09/12/2013	16:53	Event	Alarm reset
6	09/12/2013	16:49	Event	Supervision disabled
7	09/12/2013	16:49	ETrip	Phase Rotation Wrong
8	09/12/2013	16:49	ETrip	Over Frequency Stage 2
9	09/12/2013	16:49	Event	Supervision enabled
10	09/12/2013	16:49	Restart	Power Up
11	05/12/2013	16:28	Event	Supervision disabled
12	05/12/2013	16:28	ETrip	Under Voltage Stage 2
13	05/12/2013	16:28	ETrip	Under Frequency Stage 2
14	05/12/2013	16:28	Event	Supervision enabled
15	05/12/2013	16:28	Restart	Power Up
16	05/12/2013	16:14	Event	Supervision disabled
17	05/12/2013	16:14	ETrip	Under Voltage Stage 2
18	05/12/2013	16:14	ETrip	Under Frequency Stage 2
19	05/12/2013	16:14	Event	Supervision enabled
20	05/12/2013	16:14	Restart	Power Up
21	05/12/2013	16:14	Restart	Power Up
22	05/12/2013	11:40	Event	Supervision disabled
23	05/12/2013	11:40	ETrip	Under Voltage Stage 2
24	05/12/2013	11:40	ETrip	Under Frequency Stage 2
25	05/12/2013	11:40	Event	Supervision enabled
26	05/12/2013	11:40	Restart	Power Up

Export to Excel Export to CSV Export to PDF Print event log

3.10 REMOTE CONTROL

The remote control section of the SCADA section is used for monitoring and control of module 'remote control' sources.

Any of the module outputs, expansion outputs, LED indicators, or remote Annunciator LEDs are to be configured to *Remote Control 1-4*. This output source is energised/de-energised by click the respective check box as shown below in the *Activate* column below.

Remote Control		
Remote Control Sources		
Control	Activate	Active
1	<input checked="" type="checkbox"/>	
2	<input type="checkbox"/>	
3	<input type="checkbox"/>	
4	<input checked="" type="checkbox"/>	

3.11 MAINTENANCE

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



3.11.1 TIME

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

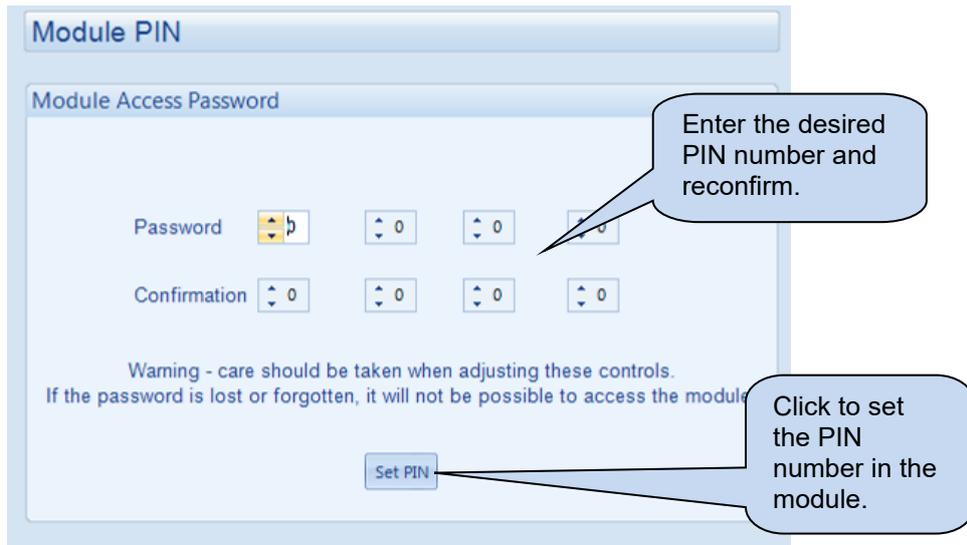
A screenshot of the 'Date and Time' control interface. The interface is divided into several sections: 'Date and Time' (header), 'Module Date' (displaying 09/12/2013), 'Module Time' (displaying 16:02:44), 'Set Date And Time' (with date and time dropdowns and a 'Set' button), and 'Set To PC Time' (with date and time fields and a 'Set To PC Time' button). Callouts provide instructions: 'Display of the module's current date and time.' points to the Module Date field; 'Type the new date / time or click the up and down arrows to change the settings.' points to the date and time dropdowns; 'Click Set to adjust the module to the selected' points to the 'Set' button; and 'Click Set to adjust the module to the date/time that your PC is set to.' points to the 'Set To PC Time' button.

3.11.2 MODULE PIN

NOTE: If the PIN is lost or forgotten, it is not possible to access the module!

Allows a PIN (Personal Identification Number) to be set in the controller. This PIN must be entered to either access the front panel configuration editor or before a configuration file can be sent to the controller from the PC software.

To Reset a Module PIN, the default PIN (0000) must be entered, then, for security reason you are asked to enter the current PIN before you submit the new PIN and confirm it.



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