

# DSE7410/20

## AUTO START & AUTO MAINS FAILURE MODULES



### KEY FEATURES

- Configurable power-up mode
- MPU fail delay
- Enhanced graphical user interface
- Drag & drop advanced PLC editor
- MSC ID within PLC GenComm override
- 4-Line back-lit LCD text display
- Five key menu navigation
- Front panel editing with PIN protection
- Customisable status screens
- Power save mode
- 11 configurable inputs
- 8 configurable outputs
- Flexible sensor inputs
- Configurable timers and alarms
- 3 configurable maintenance alarms
- Multiple date and time scheduler
- Configurable event log (250)
- Tier 4 CAN engine support
- Integral PLC editor
- Easy access diagnostic page
- CAN and Magnetic Pick-up/Alt. sensing
- Fuel usage monitor and low fuel alarms
- Charge alternator failure alarm
- Manual speed control (on compatible CAN engines)
- Manual fuel pump control
- Engine exerciser
- "Protections disabled" feature
- kW protection
- Reverse power (kW) protection
- LED and LCD alarm indication
- Power monitoring (kW h, kV Ar, kV A h, kV Ar h)
- Load switching (load shedding and dummy load outputs)
- Automatic load transfer (DSE7420)
- Unbalanced load protection
- Independent Earth Fault trip
- USB connectivity
- Backed up real time clock
- Fully configurable via DSE Configuration Suite PC software
- Configurable display languages
- Remote SCADA monitoring via DSE Configuration Suite PC software
- User selectable simultaneous RS232, RS485 & Ethernet communications
- Configurable MODBUS pages
- MODBUS RTU & TCP support
- Advanced SMS messaging (additional external modem required)
- Additional display screens to help with modem diagnostics
- Idle control for starting
- DSENet® expansion compatible
- 20 parameter data logging

### KEY BENEFITS

- 132 x 64 pixel ratio display for clarity
- Real-time clock provides accurate event logging
- Multiple date and time scheduler
- Set maintenance periods can be configured to maintain optimum engine performance
- Built in ethernet communications provides advanced remote monitoring
- Modules can be integrated into building management systems (BMS) using MODBUS
- Increased input and output expansion capability via DSENet®
- Licence-free PC software
- IP65 rating (with supplied gasket) offers increased resistance to water ingress
- PLC editor allows user configurable functions to meet specific application requirements
- Data logging to assist with fault finding

### RELATED MATERIALS

#### TITLE

DSE7410 Installation Instructions  
DSE7420 Installation Instructions  
DSE74xx Quick Start Guide  
DSE74xx Operator Manual  
DSE74xx PC Configuration Suite Manual

#### PART NO.

053-085  
053-088  
057-162  
057-161  
057-160

### SPECIFICATIONS

#### DC SUPPLY

**CONTINUOUS VOLTAGE RATING**  
8 V to 35 V Continuous

#### CRANKING DROPOUTS

Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries

**MAXIMUM OPERATING CURRENT**  
260 mA at 12 V, 130 mA at 24 V

**MAXIMUM STANDBY CURRENT**  
120 mA at 12 V, 65 mA at 24 V

**CHARGE FAIL/EXCITATION RANGE**  
0 V to 35 V

#### OUTPUTS

**OUTPUT A (FUEL)**  
15 A DC at supply voltage

**OUTPUT B (START)**  
15 A DC at supply voltage

**OUTPUTS C & D**  
8 A AC at 250 V AC (Volt free)

**AUXILIARY OUTPUTS E,F,G,H,I & J**  
2 A DC at supply voltage

#### GENERATOR

**VOLTAGE RANGE**  
15 V to 333 V AC (L-N)

**FREQUENCY RANGE**  
3.5 Hz to 75 Hz

**MAINS (UTILITY) (DSE7420)**  
**VOLTAGE RANGE**  
15 V to 333 V AC (L-N)

**FREQUENCY RANGE**  
3.5 Hz to 75 Hz

**BUS (DSE7410)**  
**VOLTAGE RANGE**  
15 V to 333 V AC (L-N)

**FREQUENCY RANGE**  
3.5 Hz to 75 Hz

**MAGNETIC PICK UP**  
**VOLTAGE RANGE**  
+/- 0.5 V to 70 V

**FREQUENCY RANGE**  
10,000 Hz (max)

#### DIMENSIONS

**OVERALL**  
240 mm x 181 mm x 42 mm  
9.4" x 6.8" x 1.6"

**PANEL CUTOUT**  
220 mm x 160 mm  
8.7" x 6.3"

**MAXIMUM PANEL THICKNESS**  
8 mm  
0.3"

**STORAGE TEMPERATURE RANGE**  
-40 °C to +85 °C  
-40 °F to +185 °F

#### OPERATING TEMPERATURE RANGE

-30 °C to +70 °C  
-22 °F to +158 °F

### DEEP SEA ELECTRONICS LTD

Highfield House, Hunmanby Industrial Estate, Hunmanby YO14 0PH

**TELEPHONE** +44 (0) 1723 890099

**EMAIL** sales@deepseaelectronics.com **WEBSITE** www.deepseaelectronics.com

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### DEEP SEA ELECTRONICS INC USA

3230 Williams Avenue, Rockford, IL 61101-2668 USA

**TELEPHONE** +1 (815) 316 8706

**EMAIL** usasales@deepseaelectronics.com **WEBSITE** www.deepseaelectronics.com

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VAT No.316923457

# DSE7410/20

## AUTO START & AUTO MAINS FAILURE MODULES

The DSE7410 is an Auto Start Control Module and the DSE7420 is an Auto Mains (Utility) Failure Control Module suitable for a wide variety of single, diesel or gas, gen-set applications.

A sophisticated module monitoring an extensive number of engine parameters, the DSE74xx will annunciate warnings, shutdown and engine status information on the back-lit LCD screen, illuminated LED, remote PC, and audible alarms. The module includes RS232, RS485 & Ethernet ports as well as dedicated terminals for system expansion.

The DSE7400 Series modules are compatible with electronic (CAN) and non-electronic (magnetic pick-up/ alternator sensing) engines and offer a comprehensive number of flexible inputs, outputs and extensive engine protections so the system can be easily adapted to meet industry requirements.

The modules can be easily configured using the DSE Configuration Suite Software. Selected front panel editing is also available.

### ENVIRONMENTAL TESTING STANDARDS

#### ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2  
EMC Generic Immunity Standard for the Industrial Environment  
BS EN 61000-6-4  
EMC Generic Emission Standard for the Industrial Environment

#### ELECTRICAL SAFETY

BS EN 60950  
Safety of Information Technology Equipment, including Electrical Business Equipment

#### TEMPERATURE

BS EN 60068-2-1  
Ab/Ae Cold Test -30 °C  
BS EN 60068-2-2  
Bb/Be Dry Heat +70 °C

#### VIBRATION

BS EN 60068-2-6  
Ten sweeps in each of three major axes  
5 Hz to 8 Hz @ +/-7.5 mm,  
8 Hz to 500 Hz @ 2 gn

#### HUMIDITY

BS EN 60068-2-30  
Db Damp Heat Cyclic 20/55 °C  
@ 95% RH 48 Hours  
BS EN 60068-2-78  
Cab Damp Heat Static 40 °C  
@ 93% RH 48 Hours

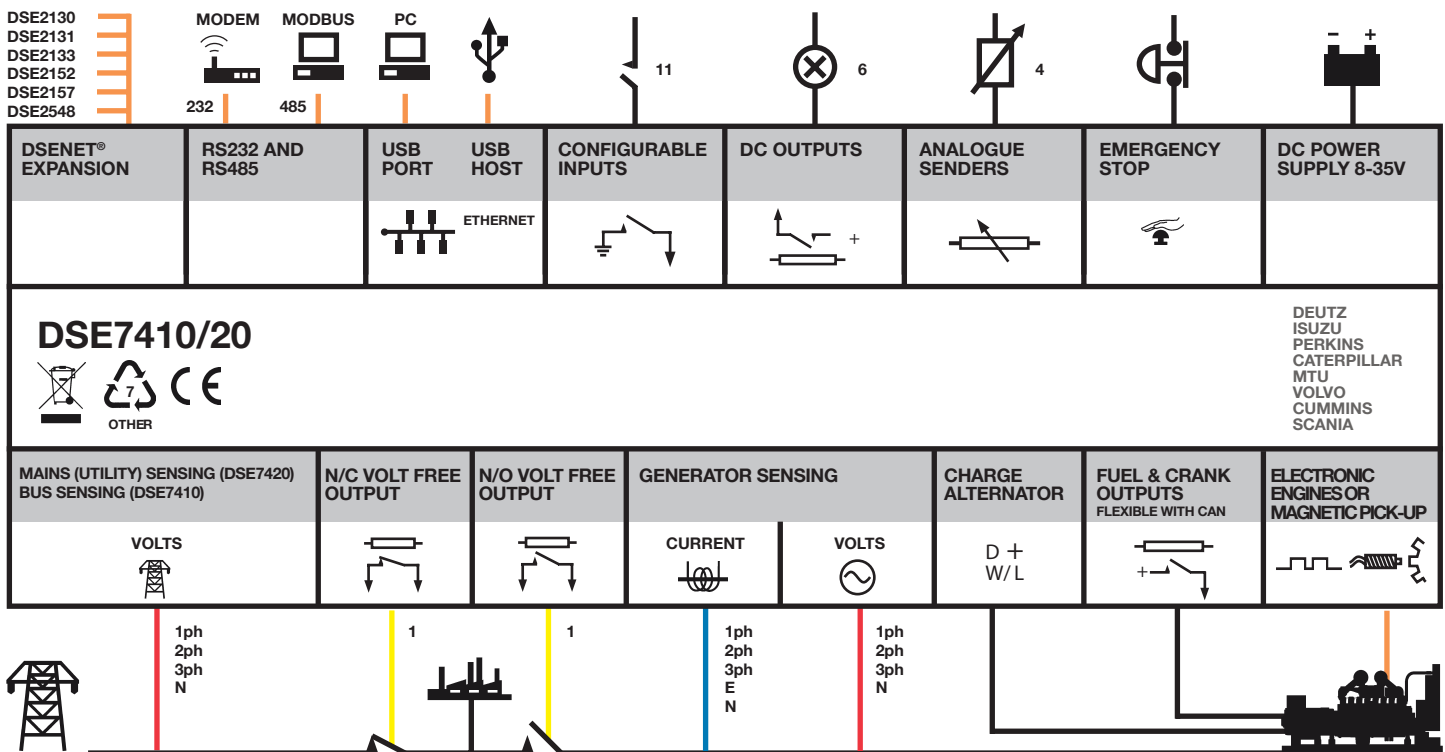
#### SHOCK

BS EN 60068-2-27  
Three shocks in each of three major axes  
15 gn in 11 ms

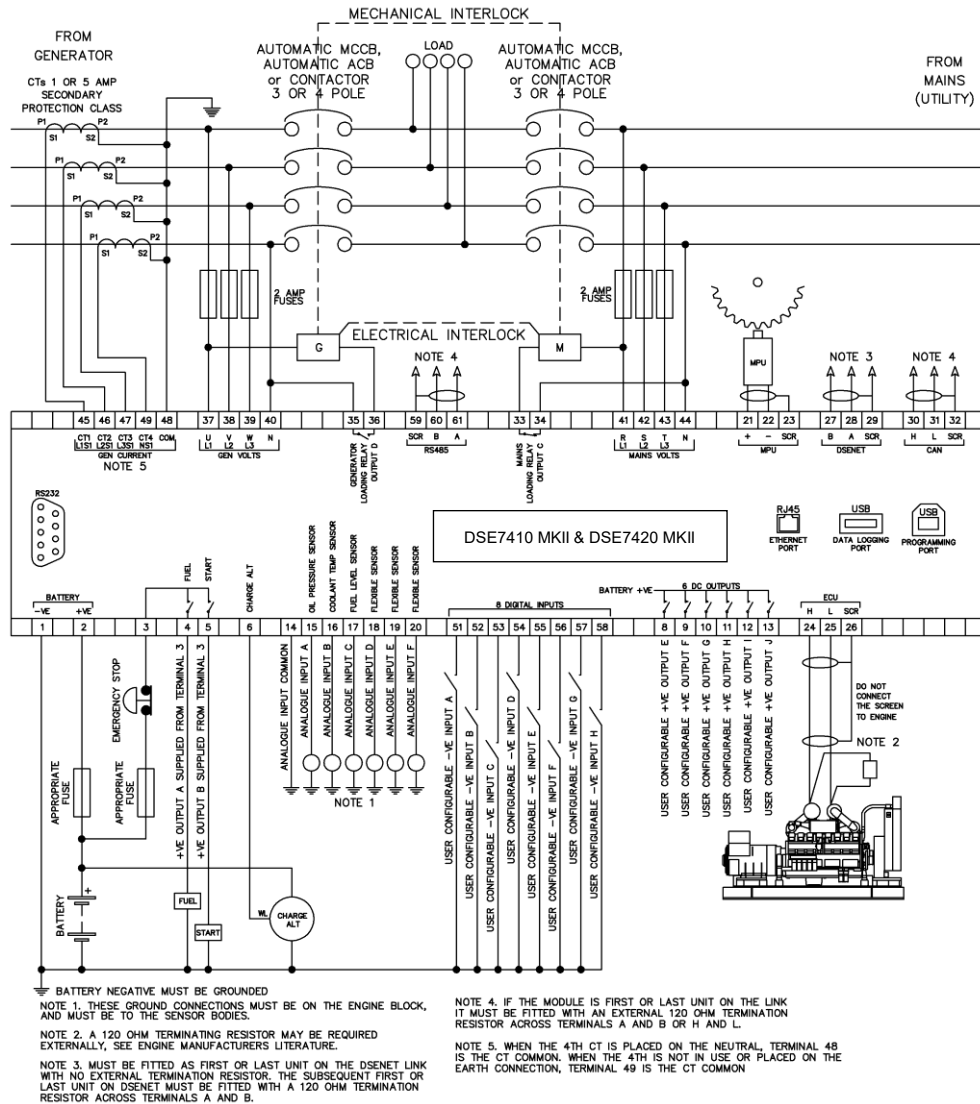
#### DEGREES OF PROTECTION PROVIDED BY ENCLOSURES

BS EN 60529  
IP65 - Front of module when installed into the control panel with the supplied sealing gasket.

## COMPREHENSIVE FEATURE LIST TO SUIT A WIDE VARIETY OF GEN-SET APPLICATIONS



## TYPICAL WIRING DIAGRAM



**NOTE:** Terminals 41, 42, 43 & 44 are not fitted to the DSE7410 MKII.

**NOTE:** A larger version of the Typical Wiring Diagram is available in the product's operator manual, refer to DSE Publication: 057-263 DSE7410 MKII & DSE7420 MKII Operator Manual available from [www.deepseaelectronics.com](http://www.deepseaelectronics.com) for more information.

### Deep Sea Electronics Ltd.

Tel: +44 (0)1723 890099  
Email: [support@deepseaelectronics.com](mailto:support@deepseaelectronics.com)  
Web: [www.deepseaelectronics.com](http://www.deepseaelectronics.com)

### Deep Sea Electronics Inc.

Tel: +1 (815) 316 8706  
Fax: +1 (815) 316 8708  
Email: [support@deepseausa.com](mailto:support@deepseausa.com)  
Web: [www.deepseausa.com](http://www.deepseausa.com)



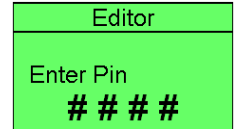
DEEP SEA ELECTRONICS

## DSE7410 MKII & DSE7420 MKII Installation Instructions

053-191  
ISSUE 3

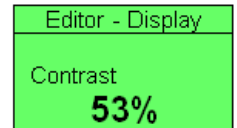
### ACCESSING THE MAIN CONFIGURATION EDITOR

- Ensure the engine is at rest and the module is in STOP mode by pressing the (Stop/Reset) button.
- Press the (Stop/Reset) and (Tick) buttons simultaneously.
- If a module security PIN has been set, the PIN number request is then shown:
- The first '#' changes to '0'. Press the (Up) or (Down) button to adjust it to the correct value.
- Press the (Right) button when the first digit is correctly entered. The digit previously entered now shows '#' for security.
- Repeat this process for the other digits of the PIN number. Press the (Left) button to move back to adjust one of the previous digits.
- When the (Tick) button is pressed after editing the final PIN digit, the PIN is checked for validity. If the number is not correct, the PIN must be re-entered.
- If the PIN has been successfully entered (or the module PIN has not been enabled), the editor is displayed:



### EDITING A PARAMETER

- Enter the editor as described above.
- Press the (Right) or (Left) buttons to cycle to the section to view/change.
- Press the (Up) or (Down) buttons to select the parameter to view/change within the currently selected section.
- To edit the parameter, press the (Tick) button to enter edit mode. The parameter begins to flash to indicate editing.
- Press the (Up) or (Down) buttons to change the parameter to the required value.
- Press the (Tick) button to save the value. The parameter ceases flashing to indicate that it has been saved.
- To exit the editor and save the changes, press and hold the (Tick) button.
- To exit the editor and not save the changes, press and hold the (Stop/Reset) button.



**NOTE:** If the editor is left inactive for the duration of the LCD Page Timer, it is automatically exited to ensure security.

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



**NOTE:** Comprehensive module configuration is possible using the DSE Configuration Suite PC Software, refer to DSE publication 057-262 DSE7410 MKII & DSE7420 MKII Configuration Suite PC Software Manual available from [www.deepseaelectronics.com](http://www.deepseaelectronics.com).

## MAIN CONFIGURATION EDITOR PARAMETERS

**NOTE:** Depending upon module configuration, some values in the *Main & Running Configuration Editors* may not be available. For more information refer to DSE publication 057-262 *DSE7410 MKII & DSE7420 MKII Configuration Suite PC Software Manual* available from [www.deepseaelectronics.com](http://www.deepseaelectronics.com)

| Section    | Parameter As Shown On Display            | Value   |
|------------|--|---|
| Display    | Contrast                                 | 0 %   |
|            | Language                                 | English   |
|            | Current Date and Time                    | dd:mm:yyyy hh:mm:ss                             |
|            | Dual Mutual Mode                         | Set Priority / Run Time / Engine Hours          |
|            | Dual Mutual Priority                     | 0   |
|            | Dual Mutual Duty Time                    | 0 h 0 m   |
| Alt Config | Config to Edit                           | Main Configuration / Alt Config 1, 2, 3, 4 or 5 |
|            | Default Configuration                    | Main Configuration / Alt Config 1, 2, 3, 4 or 5 |
| Engine     | Oil Pressure Low Shutdown                | 0.00 bar 0 psi 0 kPa                            |
|            | Oil Pressure Low Pre Alarm               | 0.00 bar 0 psi 0 kPa                            |
|            | Coolant Temperature Low Warning          | 0 °C 0 °F                                       |
|            | Coolant Temperature High Pre Alarm       | 0 °C 0 °F                                       |
|            | Coolant Temperature High Electrical Trip | 0 °C 0 °F                                       |
|            | Coolant Temperature High Shutdown        | 0 °C 0 °F                                       |
|            | Fuel Usage Running Rate                  | 0 %   |
|            | Fuel Usage Stopped Rate                  | 0 %   |
|            | Specific Gravity                         | 0.00  |
|            | Pre Heat Temp                            | 0 °C 0 °F                                       |
|            | Pre Heat Timer                           | 0 h 0 m 0 s                                     |
|            | Post Heat Temp                           | 0 °C 0 °F                                       |
|            | Post Heat Timer                          | 0 h 0 m 0 s                                     |
|            | Droop                                    | Active / Inactive                               |
|            | Droop                                    | 0.0 %   |
|            | Crank Disconnect Oil Pressure Delay      | 0.0 s   |
|            | Crank Disconnect                         | 0 V   |
|            | Under Speed Shutdown                     | Active / Inactive                               |
|            | Under Speed Shutdown                     | 0 RPM   |
|            | Under Speed Warning                      | Active / Inactive                               |
|            | Under Speed Warning                      | 0 RPM   |
|            | Under Speed Delay                        | 0.0 s   |
|            | Over Speed Warning                       | Active / Inactive                               |
|            | Over Speed Warning                       | 0 RPM   |
|            | Over Speed Shutdown                      | 0 RPM   |
|            | Over Speed Delay                         | 0.0 s   |
|            | Overspeed Overshoot                      | 0 %   |
|            | Overspeed Overshoot Delay                | 0.0 s   |
|            | Battery Under Voltage Warning            | Active / Inactive                               |
|            | Battery Under Voltage Warning            | 0 V   |
|            | Battery Under voltage Warning Delay      | 0 h 0 m 0 s                                     |
|            | Battery Over Voltage Warning             | Active / Inactive                               |
|            | Battery Over Voltage Warning             | 0 V   |
|            | Battery Over Voltage Warning Delay       | 0 h 0 m 0 s                                     |
|            | Charge Alternator Failure Warning        | Active / Inactive                               |
|            | Charge Alternator Failure Warning        | 0 V   |
|            | Charge Alternator Warning Delay          | 0 h 0 m 0 s                                     |
|            | Charge Alternator Failure Shutdown       | Active / Inactive                               |
|            | Charge Alternator Failure Shutdown       | 0.0 V   |
|            | Charge Alternator Shutdown Delay         | 0 h 0 m 0 s                                     |
|            | Inlet Temperature Alarm                  | 0 °C 0 °F                                       |
|            | Inlet Temperature Pre-Alarm              | 0 °C 0 °F                                       |
| Generator  | AC System                                | 3 Phase, 4 Wire                                 |
|            | Under Voltage Shutdown                   | 0 V   |
|            | Under Voltage Pre Alarm                  | 0 V   |
|            | Under Voltage Delay                      | 0.0 s   |
|            | Nominal Voltage                          | 0 V   |
|            | Over Voltage Pre Alarm                   | 0 V   |
|            | Over Voltage Shutdown                    | 0 V   |
|            | Over Voltage Delay                       | 0.0 s   |
|            | Under Frequency Shutdown                 | 0.0 Hz  |
|            | Under Frequency Pre Alarm                | 0.0 Hz  |
|            | Under Frequency Delay                    | 0.0 s   |


## MAIN CONFIGURATION EDITOR PARAMETERS (CONTINUED)

| Section                 | Parameter As Shown On Display  | Value  |
|-------------------------|--|--|
| Generator (Continued)   | Nominal Frequency  | 0.0 Hz   |
|                         | Over Frequency Pre Alarm   | 0.0 Hz   |
|                         | Over Frequency Shutdown  | 0.0 Hz   |
|                         | Over Frequency Delay   | 0.0 s  |
|                         | Frequency Overshoot  | 0 %  |
|                         | Frequency Overshoot Delay  | 0 m 0.0 s  |
|                         | CT Primary   | 0 A  |
|                         | CT Secondary   | 0 A  |
|                         | Earth CT Primary   | 0 A  |
|                         | Full Load Rating   | 0 A  |
|                         | Delayed Over Current   | Active / Inactive  |
|                         | Delayed Over Current   | 0 %  |
|                         | Earth Fault Trip   | Active / Inactive  |
|                         | Earth Fault Trip   | 0 %  |
|                         | kW Overload Trip   | 0 %  |
| Mains DSE7420 MKII Only | AC System  | 3 Phase, 4 Wire  |
|                         | Under Voltage Trip   | 0 V  |
|                         | Over Voltage Trip  | 0 V  |
|                         | Under Frequency Trip   | 0.0 Hz   |
|                         | Over Frequency Trip  | 0.0 Hz   |
| Timers                  | Start Delay Off Load   | 0 h 0 m 0 s  |
|                         | Start Delay On Load  | 0 h 0 m 0 s  |
|                         | Start Delay Mains Fail   | 0 h 0 m 0 s  |
|                         | Start Delay Telemetry  | 0 h 0 m 0 s  |
|                         | Mains Transient Delay  | 0 m 0 s  |
|                         | Engine Cranking  | 0 m 0 s  |
|                         | Engine Cranking Rest   | 0 m 0 s  |
|                         | Engine Smoke Limiting  | 0 m 0 s  |
|                         | Engine Smoke Limiting Off  | 0 m 0 s  |
|                         | Engine Safety On Delay   | 0 m 0 s  |
|                         | Engine Warning   | 0 h 0 m 0 s  |
|                         | ECU Override   | 0 m 0 s  |
|                         | (Mains) Transfer Time  | 0 m 0.0 s  |
|                         | Return Delay   | 0 h 0 m 0 s  |
|                         | Engine Cooling   | 0 h 0 m 0 s  |
|                         | Engine Fail To Stop Delay  | 0 m 0 s  |
|                         | LCD Page Delay   | 0 h 0 m 0 s  |
|                         | LCD Scroll Delay   | 0 h 0 m 0 s  |
|                         | Sleep Timer  | 0 h 0 m 0 s  |
|                         | Backlight Timer  | 0 h 0 m 0 s  |
| Schedule                | Schedule   | Active / Inactive  |
|                         | Schedule Period Bank 1   | Weekly / Monthly   |
|                         | On Load / Off Load / Auto Start Inhibit, Week, On, Run Time and Day Selection (1 to 8) | Press <b>Tick</b>  to begin editing then up or down when selecting the different parameters in the scheduler.   |
|                         | Schedule Period Bank 2   | Weekly / Monthly   |
|                         | On Load / Off Load / Auto Start Inhibit, Week, On, Run Time and Day Selection (1 to 8) | Press <b>Tick</b>  to begin editing then up or down when selecting the different parameters in the scheduler. |

## DIMENSIONS AND MOUNTING

| Parameter                                   | Specification                                |
|---|--|
| Dimensions                                  | 245 mm x 184 mm x 51 mm (9.6" x 7.2" x 2.0") |
| Panel Cut-out                               | 220 mm x 160 mm (8.7" x 6.3")                |
| Weight                                      | 0.98 kg (2.16 lb)                            |
| Operating Temperature With Standard Display | -30 °C to +70 °C (-22 °F to +158 °F)         |
| Operating Temperature With Heated Display   | -40 °C to +70 °C (-40 °F to +158 °F)         |
| Storage Temperature                         | -40 °C to +80 °C (-40 °F to +176 °F)         |

## ACCESSING THE 'RUNNING' CONFIGURATION EDITOR

- The 'running' editor can be entered while the engine is running. All protections remain active if the engine is running while the running editor is entered.
- Press and hold the  (Tick) button to enter the running editor.

## RUNNING CONFIGURATION EDITOR PARAMETERS

| Section | Parameter As Shown On Display   | Value                 |
|---------|---------------------------------|-----------------------|
| Display | Contrast                        | 0%                    |
|         | Language                        | English               |
|         | Dual Mutual Status              | Set Priority (1 to 8) |
| Engine  | Manual Frequency Trim           | 0.0 Hz                |
|         | Speed Bias                      | 0.0 Unit              |
|         | Governor Gain                   | 0.0                   |
|         | Frequency Adjust                | 0 %                   |
|         | DPF Auto Regeneration Inhibit   | Active / Inactive     |
|         | DPF Manual Regeneration Request | Active / Inactive     |
|         | ECU Service Mode                | Active / Inactive     |
| AVR     | Escape Mode                     | Active / Inactive     |
|         | Droop (% of Set Point)          | 0.0                   |
|         | Proportional Set Point          | 0.0                   |
|         | Integral Set Point              | 0.0                   |
|         | Derivative Set Point            | 0.0                   |
|         | Off Load Duty Cycle             | 0.0                   |
|         | Maximum Duty Cycle              | 0.0                   |
|         | Soft Start Ramp Start Point     | 0.0                   |
|         | Soft Start Ramp Rate (%/Hz)     | 0.0                   |
|         | Alternative Configuration       | 0                     |
|         | Stability Selection             | 0                     |

## REQUIREMENTS FOR UL CERTIFICATION

**WARNING!** More than one live circuit exists, see diagram overleaf for further information.

| Specification                    | Description   |
|----------------------------------|---|
| Screw Terminal Tightening Torque | • 4.5 lb-in (0.5 Nm)  |
| Conductors                       | <ul style="list-style-type: none"> <li>Terminals suitable for connection of conductor size 13 AWG to 20 AWG (0.5 mm<sup>2</sup> to 2.5 mm<sup>2</sup>).</li> <li>Conductor protection must be provided in accordance with NFPA 70, Article 240</li> <li>Low voltage circuits (35 V or less) must be supplied from the engine starting battery or an isolated secondary circuit.</li> <li>The communication, sensor, and/or battery derived circuit conductors shall be separated and secured to maintain at least 1/4" (6 mm) separation from the generator and mains connected circuit conductors unless all conductors are rated 600 V or greater.</li> </ul> |
| Current Inputs                   | • Must be connected through UL Listed or Recognized isolating current transformers with the secondary rating of 5 A max.  |
| Communication Circuits           | • Must be connected to communication circuits of UL Listed equipment  |
| DC Output Pilot Duty             | • 0.5 A   |
| Mounting                         | <ul style="list-style-type: none"> <li>Suitable for flat surface mounting in Type 1 Enclosure Type rating with surrounding air temperature -22 °F to +122 °F (-30 °C to +50 °C)</li> <li>Suitable for pollution degree 3 environments when voltage sensing inputs do not exceed 300 V. When used to monitor voltages over 300 V device to be installed in an unventilated or filtered ventilation enclosure to maintain a pollution degree 2 environment.</li> </ul>  |
| Operating Temperature            | • -22 °F to +122 °F (-30 °C to +50 °C)  |