



SSDP30-70 Range - DSE 6110 MK3 Control Module User & Fault Finding Guide

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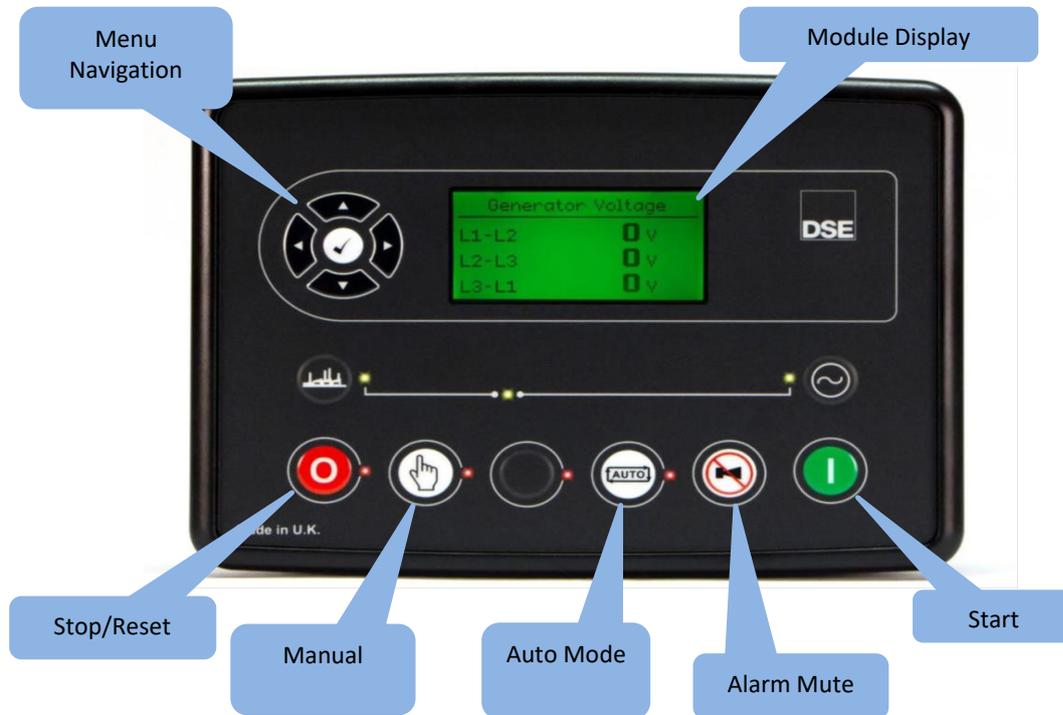


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This user guide has been assembled to aid with the basic aspects of the DSE6110 MK3 module as configured on Stephill Generators and to gain access to the information available. It has been produced as a "How to" guide.

Below is a description of the front panel on the DSE 6110 MK3 module.



Status

Once the 12V supply has been connected to the module (battery isolator key switched on), the LCD screen will illuminate. The module will then load up with the **Status** screen if no alarms are present Fig.1. This is the "home page" that is displayed when no other page has been selected.

| Generator at Rest | | |
|-------------------|------|---------|
| L - N | 0 V | 0 A |
| L - L | 0 V | 0.0 Hz |
| | 0 kW | ---- pf |

Fig.1

How to Start the Generator

Press the  button once then the  button to start the generator.

How to Stop the Generator

Press the  button to stop the generator

Button Description

| Icon | Description |
|---|---|
|  | <p>Stop/Reset Mode This button places the module into its Stop/Reset Mode. This clears any alarm conditions for which have triggered and criteria have been removed. If the engine is running and the module is put into Stop mode, the fuel supply de-energises and the engine comes to a standstill.</p> |
|  | <p>Manual Mode This button places the module into its <i>Manual Mode</i> . Once in <i>Manual Mode</i> the module will then respond to the <i>Start</i> button to start the generator and run it off load.</p> |
|  | <p>Start Pressing the <i>Start</i> button in <i>Manual Mode</i> will begin the generator starting process and run the generator in <i>Manual Mode</i> .</p> |
|  | <p>Menu Navigation Used for navigating the instrumentation and configuration screens.</p> <p>It is possible to scroll to display the different pages of information by repeatedly operating the Next and Previous page buttons. </p> <p>Example</p> <p>Status (page)  Engine (page)  Generator (page)</p> <p>...And so on until the desired page is reached.</p> <p>Once selected, the page remains on the LCD display until the user selects a different page, or after an extended period of inactivity (LCD Page Timer), the module reverts to the status display.</p> <p>If no buttons are pressed upon entering an instrumentation page, the instruments displayed are automatically subject to the setting of the <i>LCD Scroll Timer</i> .</p> <p>Alternatively, to scroll manually through all instruments on the currently selected page, press the Instrumentation Scroll buttons. </p> <p>If an alarm becomes active while viewing the status page, the display shows the Alarms page to draw the operators attention to the alarm.</p> |
|  | <p>Auto Mode This button places the module into it's <i>Auto Mode</i> . This mode allows the module to control the function of the generator automatically. The module monitors the <i>Remote Start Input</i> and once a start request is made, the set is automatically started. Upon removal of the start signal the generator will stop.</p> |
|  | <p>Alarm Mute / Lamp Test This button silences the audible alarm in the controller and illuminates all of the LED's on the module's facia as a lamp test function.</p> |

Generator Locked Out

If *Generator Locked Out* is displayed on the screen - Fig.2 then this indicates that the generator cannot be started due to an active *Shutdown* on the module.

| | |
|----------------------|-------|
| Status | 12:34 |
| Generator Locked Out | |

Press the **Next** and **Previous** page button  to scroll to the alarms page to investigate.

Press the Stop/Reset Mode  button to clear the alarm, if the alarm does not clear the fault is still active.

Fig.2

Status Display

Once you have issued a start request and the generator has started and running, the DSE 6110 MK3 module will then begin checking that the engine instruments and the AC generator output are correct and are within the pre-set parameters. After the "**Safety on Delay**" of 10 seconds has elapsed and all is operating correctly, the **Status** screen will typically look like the following Fig.3.

| | | | | |
|---------------------|-------|------|---------|--|
| Generator Available | | | | |
| | L - N | 230V | 0 A | |
| | L - L | 400V | 52.6 Hz | |
| | | 0 kW | --- pf | |

① → L - N

② → L - L

③ → 52.6 Hz

Fig.3

Typical No-Load Values

Fig.3 above is showing the typical no-load (nothing connected to the generator outputs) values.

- ① = L-N is showing the average AC voltage between (Phase or Live) L1 to Neutral, L2 to Neutral and L3 to Neutral - 230V
- ② = L-L is showing the average AC voltage between phases, L1 to L2, L2 to L3 and L3 to L1 - 400V
- ③ = Showing the alternator frequency - **Hz** - This should be between 52.0 to 53.0 at no-load.

Typical Load Values

When you apply load the generator the **Status** screen will then show the following - Fig.4

| | | | | |
|---------------------|-------|-------|---------|--|
| Generator Available | | | | |
| | L - N | 230V | 17 A | |
| | L - L | 400V | 51.9 Hz | |
| | | 12 kW | 1.00 pf | |

① → 17 A

② → 12 kW

③ → 1.00 pf

Fig.4

- ① = Is showing the average amps between all three phases (Live).
- ② = Is showing the total load in kW that the generator is under.
- ③ = Is showing the alternator power factor - pf $\cos\phi$.

How to Check the Generator AC Voltage is Correct

To check the AC voltage output from the generator is correct, firstly you must isolate the load from the generator (remove any AC plugs connected to the generator outputs). Either before you start the generator or while the generator is running, use the **Next** or **Previous** page button until across the top of the screen it reads **Generator**.



The first page will show the AC voltage between each phase (L1,L2 and L3) and Neutral (when generator running) Fig.5

| Generator Voltage | |
|-------------------|--------------|
| L1 - N | 231 V |
| L2 - N | 231 V |
| L3 - N | 230 V |

Fig.5

Note

If the page automatically scrolls to another, press either of the **Instrument Scroll** buttons until you reach the desired page



Fig.6 below shows the typical no-load voltage between Phase and Phase L1-L2, L2-L3 and L3-L1.

| Generator Voltage | |
|-------------------|--------------|
| L1 - L2 | 401 V |
| L2 - L3 | 400 V |
| L3 - L1 | 400 V |

Fig.6

How to Check If the Applied Current is Balanced

An unbalanced current can cause the generator voltages to become unstable and possibly shutdown the set.

To check the current applied to the generator use the **Next** or **Previous** buttons until across the top of the screen it reads **Generator**. Then press one of the **Instrument Scroll** buttons until **Generator Current** is displayed at the top of the screen Fig.7



Next and Previous



Instrument Scroll

| Generator Current | |
|-------------------|-------------|
| L1 | 17 A |
| L2 | 19 A |
| L3 | 15 A |

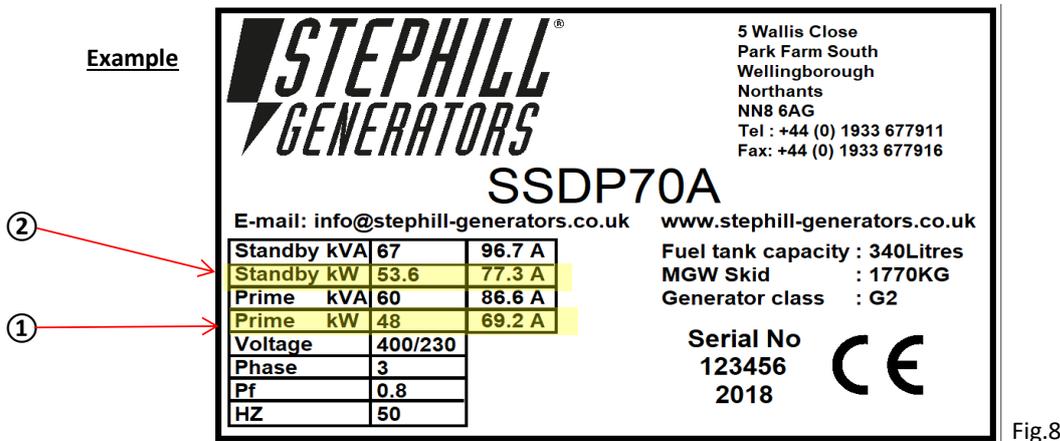
Fig.7

Important Note

Ensuring the current on each phase is as even (balanced) as possible will eliminate nuisance **Over Current** or **Over/Under Voltage** shutdown alarms.

How to Check the Total and Applied Load is Balanced

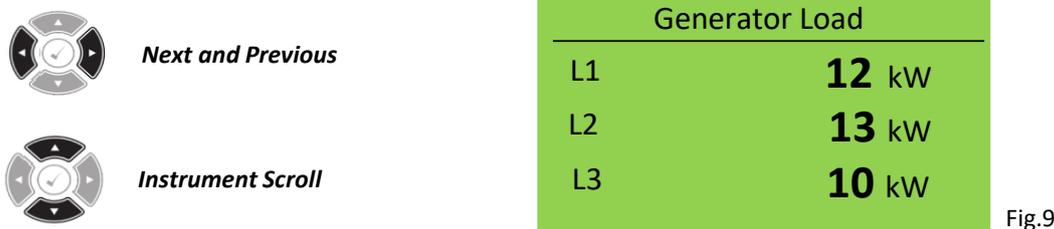
Using the generator serial plate on the generator control panel door as a reference, you can check the maximum kW load that can be applied to the model type of Stephill Generator. Fig.8 below is an example of a standard SSDP70A, highlighted are the two values to be most aware of.



- ① = **Prime kW** This is the rated load of the generator, up to this load the generator will run continuously.
- ② = **Standby kW** Is the maximum load the generator will take for 1 hour in 12. The generator can take this load for one hour before shutting down. If the total kW load rises above this value the generator will shutdown immediately.

Load Per Phase

To check the load applied to the generator use the **Next** or **Previous** buttons until across the top of the screen it reads **Generator**. Then press one of the **Instrument Scroll** buttons until **Generator Load** is displayed at the top of the screen Fig.9

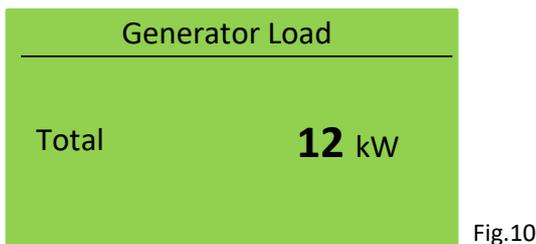


Important Note

Ensuring the load on each phase is as even (balanced) as possible will eliminate nuisance **Over Current** or **Over/Under Voltage** shutdown alarms.

Total Load

Fig.10 shows the next **Generator Load** screen, this shows the combined average total kW load applied.



How to Check Generator Frequency - Hz

The generator frequency can be found on two pages, on the **Status** page, as shown in Fig.3 **Status** display. Also the frequency has it's own instrument screen in the **Generator** page(s).

To access the frequency in the **Generator** pages, use the **Next** or **Previous** buttons until across the top of the screen it reads **Generator** . Then press one of the **Instrument Scroll** buttons until **Generator Frequency** is displayed at the top of the screen page Fig.11



Important Note

The typical no-load frequency should be between **52.0** and **53.0 Hz**. If at no-load the frequency is as low as 51.5 Hz then it would be advisable to check the condition of the fuel filters, air filters and oil. Ensure the engine is serviced regularly to safeguard the healthy running of the generator.

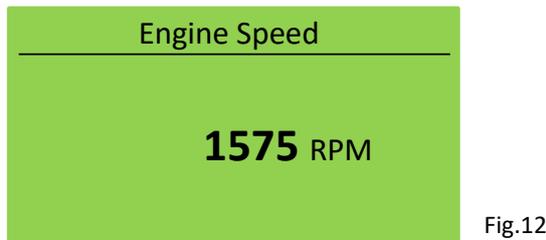
How to Check the Engine Instruments

Most of the engine instruments will only be active once the engine is running. To check the engine instruments press either the **Next** or **Previous** buttons until across the top of the screen it reads **Engine** . Then press one of the **Instrument Scroll** buttons to scroll through all the engine instruments.

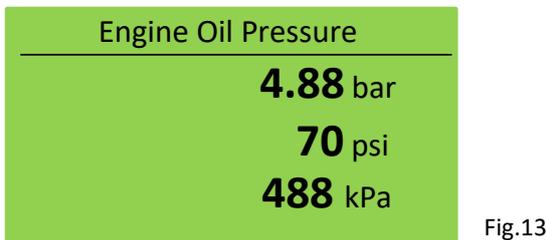


Below are typical examples of each engine instrument screen - Fig.12 to Fig.17.

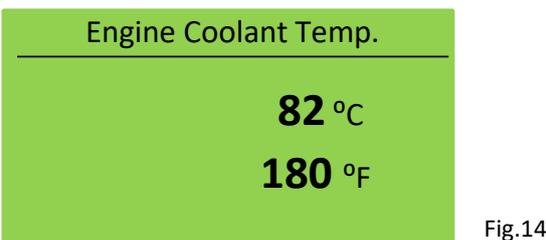
Engine Speed



Engine Oil Pressure



Engine Coolant Temperature



Cont.

Engine Battery Voltage

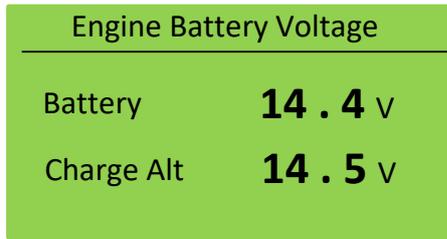


Fig.15

Engine Run Time

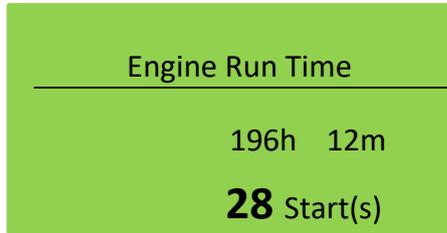


Fig.16

Engine Fuel Level

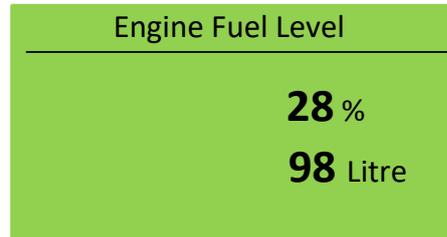


Fig.17

Service Hours



Fig.18

How to Check the Generator Fuel Level

To be able to view the fuel level page use the "How to Check the Engine Instruments" section elsewhere in this guide. Depending on the engine state, running or at standstill, you will see one of two screens showing the current fuel level.

Fig.19 shows no registered fuel level, this is the fuel level screen when the generator is at standstill (not running). At this state the fuel level sensor is not energised.

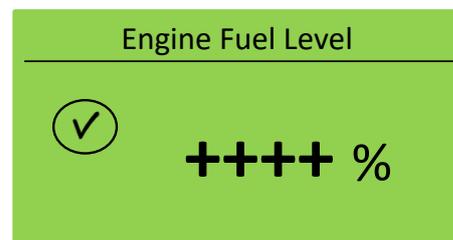


Fig.19

Viewing the Fuel Level Without Starting the Generator

To view the fuel level you must first navigate to the **Engine Fuel Level** screen - as above. Then using the **Tick Button**, press and hold. After a few seconds the fuel level screen should then register a fuel level. You must continue to hold the **Tick Button** down to continue to view the fuel level - Fig.20.



The **Engine Fuel Level** screen will then show the percentage of fuel remaining in the fuel tank. Also you can see the quantity of fuel remaining, this is shown in litres.

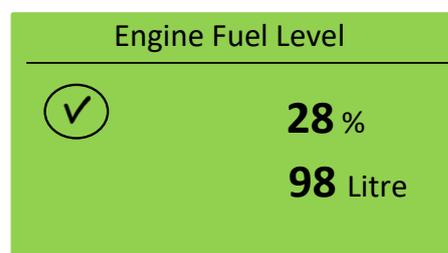


Fig.20

How to Reset the "Service Hours Alarm " Warning

The **Service Hours Alarm** screen is a count down timer, when the timer reaches zero hours a **Warning Alarm** will be issued and displayed on the screen. The **Warning Alarm** will allow the user to operate the generator as normal but the **Warning Alarm** will be present until a service reset has been performed.

Before Resetting the Service Hours

Firstly, ensure an adequate service has been performed on the engine. Refer to the generator handbook or check on the *Service* section found on;

www.stephill-generators.co.uk

Resetting the Service Hours

Firstly you will need to access the **Service Hours** in the **Engine** pages, use the **Next** or **Previous** buttons until across the top of the screen it reads **Engine** . Then press one of the **Instrument Scroll** buttons until **Service Hours** is displayed at the top of the screen page Fig.21



Fig.21

The **Service Hours** should be showing 0h 0m, this indicates that the countdown timer from the last service has been achieved. To reset this timer;

- a) Ensure the **Service Hours** screen is visible.
- b) Press and hold the  button. The timer should then reset to the pre-set hours (usually 500h).

Important Note

The **Service Hours** timer can only be reset if the **Service Hours Warning** has been activated (reached 0h 0m).

How to Check Which Alarms Have Been Triggered

When an alarm is active, the **Internal Audible Alarm** sounds.

The audible alarm is silenced by pressing the Alarm Mute / Lamp Test  button.

To check which alarm(s) have been triggered, use the **Next** or **Previous** buttons until across the top of the screen it reads **Alarms** . Fig.20 shows the **Alarms** page. To see each individual alarm that is currently activated, press one of the **Instrument Scroll** buttons to cycle through.

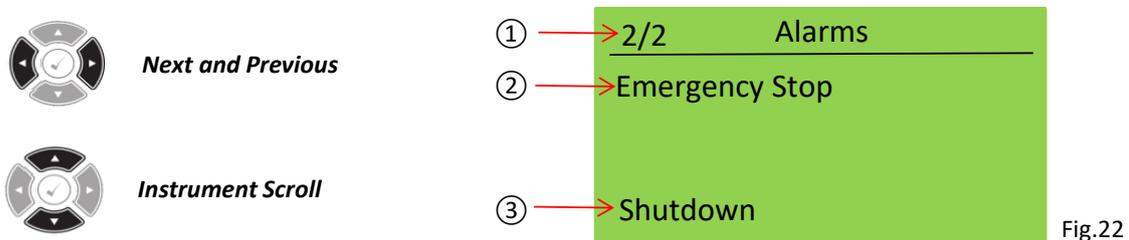


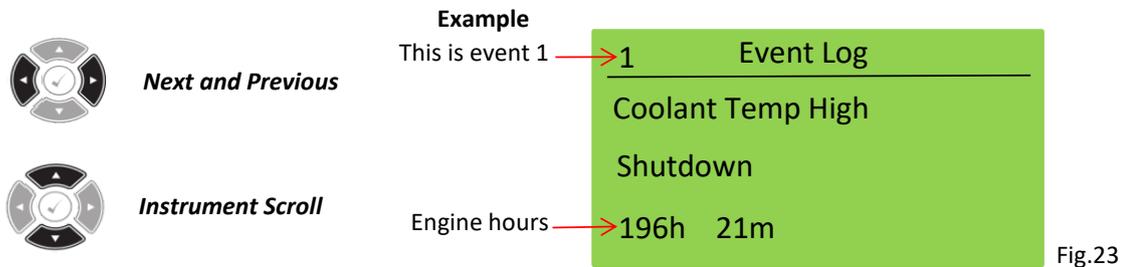
Fig.22

- ① = Number of active alarms. This is alarm 1 of a total of 2 active alarms.
- ② = The cause of the alarm.
- ③ = The type of alarm, e.g. Shutdown.

How to Check the Control Module "Event Log"

The module maintains a log of past alarms and selected status changes. Currently the module is capable of storing the last 250 log events. This is always subject to change with module updates.

To view the **Event Log**, use the **Next** or **Previous** buttons until at the top of the screen it reads **Event Log** Fig.23, press one of either the **Instrument Scroll** buttons to view the next or last event. The **Event Log** always contains the most recent events, along with the engine hours.



IDMT Alarm

If the **IDMT Alarm** is enabled, the controller begins following the IDMT 'curve' when the *trip* level is passed. If the *trip* is surpassed for an excess amount of time (set at 1 hour) the **IDMT Alarm** triggers a shutdown.

High Current Shutdown is a latching alarm and stops the generator.

Remove the load then press the  button to reset the module.

The higher the overload the faster the trip. The speed of the trip is dependent upon the fixed formula.

$$T = t / ((IA / IT) - 1)^2$$

Where: **T** is the tripping time in seconds.

IA is the actual current of the most highly loaded line (L1 or L2 or L3).

IT is the delayed over-current trip point.

t is the time multiplier setting and also represents the tripping time in seconds at twice full load (when $IA / IT = 2$).

This setting is to provide normal running of the generator up to 100% full load. If full load is surpassed, the **Immediate Warning** alarm is triggered, the set continues to run.

The effect of an overload on the generator is that the alternator windings begin to overheat; the aim of the **IDMT Alarm** is to prevent the windings being overload (heated) too much. The amount of time that the set can be safely overloaded is governed by how high the overload condition is.

With typical settings, this allows for overload of the set to the limits of the *Typical Brushless Alternator* whereby up to 110% overload is permitted for 1 hour.

Over 110% load would issue an immediate shutdown on the generator.

Fault Finding Contents

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This basic fault finding guide has been compiled to assist with the operation on Stephill Generators that use a DSE 6110 Mk3 control module.

STEPHILL GENERATORS LTD STRESS THAT THE ULTIMATE RESPONSIBILITY FOR THE SAFE USE OF THE GENERATOR RESTS WITH THE USER.



Recommended Checks Before Attempting Any Fault Finding

Before starting the generator or attempting any fault finding, ensure the following aspects of the generator are checked.

1) Unplug all load connected to the generator outputs.

Trying to start a generator with load applied, can result with a "Fail to Start" warning as well as draining the battery and possible damage to the main alternator.

2) Check the engine oil level.

3) Check the water/coolant level - *Caution hot steam can burn!*

4) Check the fuel level.

5) Check the battery voltage.

At standstill the battery voltage should be around 12.4 to 12.6V DC.

6) Check fuel pump operation - if applicable.

Press and hold the "Fuel Pump Prime" button on the control panel (refer to user handbook) listen for the fuel pump operating inside the generator canopy.

Generator Not Starting

Use the "Generator Not Starting" flow chart found in this guide.

Generator Running

Once you have carried out the checks above and the engine has started, generator is running, you can then check the AC output values from the generator using the DSE 6110 MK3 module.

Fig.1 below is a typical **Status** screen while the generator is running with no-load.

This value should be between **230 - 235V AC**

| Generator Available | | |
|---------------------|--------|---------|
| L - N | → 230V | 0 A |
| L - L | → 400V | 52.6 Hz |
| | 0 kW | ---- pf |

The frequency should be between **52.0 - 53.0Hz**

This value should be between **398 - 404V AC**

Fig.1

Note that no Amps or kW will be displayed with no-load.

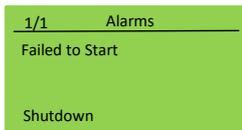
The typical values shown in Fig.1 above would indicate that the engine and alternator are operating correctly while no load is applied to the generator.

Generator Stops/Shuts down

If the generator stops/shuts down then this would usually because the DSE 6110 MK3 control module has detected a fault condition and has issued a **Shutdown Alarm** to stop the generator. The DSE 6110 MK3 control module will display an **Alarm** page to indicate an active alarm(s).

Generator Alarms DSE 6110 MK3

Failed to Start - Shutdown



The module will display **Failed to Start** after 3 attempts to start.

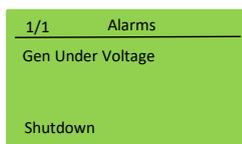
Fig.2

This shutdown is issued if the AC frequency measured on the DSE 6110 MK3 hasn't reached the desired level - Fig.2.

Navigate to the **Generator Voltage** screen on the DSE 6110 module (user guide - page 4). Start the generator and check that all the voltages displayed are correct. If there is a large imbalance of voltages then check the following;

- a) Check the AC plug in the back of the DSE 6110 control module is firmly inserted. This is the green plug with a Brown, Black, Grey and Blue wires.
- b) Check the three fuses on the back of the control panel that have a Brown, Black and Grey wire terminated. A spare fuse can be found in the fuse holder.
- c) Check the connections on both sides of the fuse holders.
- d) Remove the main alternator control box lid and check all connections on the main windings. Check for broken, loose or burnt wiring.

Gen Under Voltage - Shutdown



The module detected that the generator output voltage on one or more phases has fallen below a pre-set level - Fig.3.

Fig.3

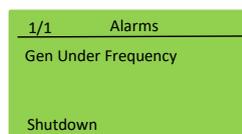
Navigate to the **Generator Voltage** screen on the DSE 6110 module (user guide - page 4). Start the generator and check that all the voltages displayed are correct. If there is a large imbalance of voltages or no voltage then check the following;

- a) Check the AC plug in the back of the DSE 6110 control module is firmly inserted. This is the green plug with a Brown, Black, Grey and Blue wires.
- b) Check the three fuses on the back of the control panel that have a Brown, Black and Grey wire terminated. A spare fuse can be found in the fuse holder.
- c) Check the connections on both sides of the fuse holders.
- d) Remove the main alternator control box lid and check all connections on the main windings and AVR (Automatic Voltage Regulator). Check for broken, loose or burnt wiring.

Important Note

If the above has not highlighted the fault condition, then a closer look at the main alternator would be the next step.

Gen Under Frequency/Hz - Shutdown



The module detected that the generator output frequency has fallen below a pre-set level - Fig.4.

Fig.4

Using the **Status** screen or the **Generator Frequency** screen, start the generator and monitor the frequency on the display - Hz. Typically the no-load frequency should be between 52.0 and 53.0Hz.

Continued

No Frequency

If no frequency can be seen on the DSE 6110 display then follow the checks listed above on **Gen Under Voltage** .

The frequency, in most cases, is dependant directly by the rotational speed of the engine. The slower the engine runs, the lower the frequency.

The **Gen Under Frequency** shutdown will occur if the engine speed has slowed below a pre-set level. On most cases frequency shutdown will occur for a low frequency.

DO NOT ADJUST THE ENGINE SPEED**Low Frequency**

The most common issues with a **Gen Under Frequency** shutdown are associated with a low frequency measured on the DSE 6110. This is usually associated with the fuel system. In order to have the engine run efficiently and at the correct speed the fuel system needs to operating at its full potential. Below are some checks on the fuel system.

- a) Check the 6-way diverter valve is in the correct position for the application - local or remote fuel tank.
- b) Check the condition of the fuel system -
 - Fuel Hoses - are the fuel hoses in good condition - also check when generator is running.
 - Hose Clips - are not loose from any previous services or are broken/damaged.
 - Leaks - check for any fuel leaks.
 - External Fuel Tank - check all external connections and fuel hoses for leaks and/or damage.
- c) Is the engine due a service - replace the fuel filters and change/replace the water trap filter. It maybe also worth checking the air filter(s) are in good condition - replace is necessary.
- d) Check the condition of the fuel. Try a new fuel source if possible.

If the above fails to raise or rectify the issue it may be worth checking the engine for possible malfunctions or faults - e.g. injectors, fuel injector pump etc. Refer to engine handbook or engine specialist.

Common Fault Conditions

Below is a general guide for the most common fault conditions on a Stephill Generator using a DSE 6110 Mk3 control module.

| Fault Condition | Checks & Tests |
|--|--|
| <p>Emergency Stop Shutdown</p> | <ul style="list-style-type: none"> • Check E-stop has not been pressed in. • Check E-stop switch wires are not loose. • Check wiring is not open circuit - check for continuity between each side of the switch on the back of the E-stop. • Check that both wires on the E-stop have continuity to the corresponding positions on the back of the DSE 6110 - wire No.2 & 3. • Check that 12V is present across between position 3 and 1 on the back of the DSE 6110 module. |
| <p>Oil Pressure Shutdown Fault operates after the engine has fired.</p> | <ul style="list-style-type: none"> • Check oil level and fill to the correct level if necessary. • Check engine oil pressure when running. On the DSE 6110 Engine page. (2 to 5 bar is normal) • Check oil pressure sender and switch assembly including pipework - remove & clean - Oil & filter change would be advisable. • Oil switch fault - see below. • Oil sender fault - see below. |
| <p>Oil Pressure Low Switch</p> | <ul style="list-style-type: none"> • Check continuity between wire No. 43 on the oil switch to the DSE 6110 module (remove from oil switch to test). • Check for continuity between the oil switch body to the engine earth. • To test the oil pressure switch first remove wire No.43 and link this wire to a clean earth point on the engine. Start the generator, as soon as the engine starts to run remove the wire No.43 from the earth point. If the generator continues to run then this would indicate that the wiring is good and the fault could possibly be the oil pressure switch. • Replace oil sender. |
| <p>Oil Pressure Low Sender (####)</p> | <ul style="list-style-type: none"> • Check connections at the oil sender • Check oil pressure sender and pipework - remove & clean - Oil & filter change would be advisable. • Check continuity between wire No.16 on the DSE 6110 to the oil sender. • Check continuity between wire No.15 on the DSE 6110 to engine earth. • Check continuity between wire No.1 on the oil sender to engine earth. • Replace oil sender. |
| <p>Fail to Stop Alarm after 1 to 2 minutes when engine is at rest.</p> | <p style="text-align: center;">Fail to stop could indicate a faulty oil pressure <u>switch</u>!</p> <ul style="list-style-type: none"> • Check oil pressure switch and pipework - remove & clean - Oil & filter change would be advisable. • Check for loose wires on the oil switch. • Check continuity between wire No.43 from the DSE 6110 to the oil switch. • Replace oil switch. |

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| High Engine Temperature | <ul style="list-style-type: none"> • Check engine temperature display on the DSE 6110 - Engine page. High engine temperature shutdown is set at 110 °C. • Check water/antifreeze level in the radiator. •  Caution hot steam can burn! • Check the inside face of the radiator is not obstructed with oil/dirt or debris. • Check the condition of the fan belt, damaged, broken or loose. <p>Note You may experience low battery charge DC if the fan belt is loose.</p> <ul style="list-style-type: none"> • Check that the generator air inlets and outlets are not obstructed. • Check temp switch and sensor wiring. • Check wires 13 and 40 in the DSE 6110. • Check for continuity from the above wires at the DSE 6110 to the temperature switch and sender. <p>If all the above has not solved the high engine temperature issue then the following may apply;</p> <ul style="list-style-type: none"> • Flush the radiator out and replace the water/antifreeze mix 50/50. Use the correct antifreeze as indicated near the filler. • Check the operation of the engine thermostat. • Radiator may be blocked - replace. • Possible faulty water pump. |
| Coolant Level Low Shutdown | <ul style="list-style-type: none"> • Check water/antifreeze level in the radiator. •  Caution hot steam can burn! • Check wiring into the coolant switch. <ul style="list-style-type: none"> • If the generator runs with the plug removed from the coolant sensor, replace the sensor. • If the symptoms persist check that the radiator has had the correct antifreeze utilised when serviced? |
| Charge Alternator Failure Battery not changing | <ul style="list-style-type: none"> • Check the condition of the fan belt and tightness. <p>Note you may experience low charge if fan belt is loose.</p> <ul style="list-style-type: none"> • Check for loose wires on the charge alternator. • Check battery DC voltage while generator running, should be 13.0-15.0V. • Check for continuity of wire No.52 from the charge alternator to the starter motor. • Check for continuity of wire No.6 from the charge alternator to the DSE 6110. • Ensure the exciter wire (No.6) at the charge alternator is around 12V DC, but only when the generator is running. <ul style="list-style-type: none"> • Ensure the exciter wire (No.6) at the DSE 6110, is around 12V DC, but only when the generator is running - no DC volts measured could indicate a faulty DSE 6110 control module. • Check the condition of the battery and change if necessary. • Check/replace the charge alternator. |
| Hardwire Door Shutdown | <ul style="list-style-type: none"> • Check the hardwire door is fitted securely • Check the magnetic connection behind the hardwire door and control box. • Check wiring from the switch to the DSE 6110 wire No.46. • Check switch operation. (Open from ground to fault). |
| Engine runs but generator will not take load. | <ul style="list-style-type: none"> • Check all MCCB/MCB's are in the ON (up) position. • Check wiring on the sockets, switches and circuit breakers. • Check the <i>Earth Leakage Relay</i> hasn't tripped (Ref. Generator handbook)- Bypass or adjust if necessary. |

