



GRID TO GO INSTALLATION AND USER MANUAL



Models:
862/16, 862/8 (rental spec)

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1.0 WARNINGS & NOTICES



HEAVY

CARE MUST BE TAKEN WHEN HANDLING THE MACHINE

The unit is heavy and care must be taken when handling the unit to avoid personal injury and damage to the machine or other items.



AUTHORISED ACCESS ONLY

DO NOT ATTEMPT TO ACCESS THE INTERNAL PARTS OF THE MACHINE

There are no user-serviceable parts inside the unit.

Only qualified competent personnel are permitted to remove the covers of the machine or to access internal parts. Un-authorized persons attempting to do so will be at risk of electric shock.



BATTERY CHARGING

ENSURE PERIODIC FULL CHARGE AND ALWAYS CHARGE THE BATTERY FULLY BEFORE STORAGE.

To ensure good battery life, a full charge is advised every four or five incomplete cycles. It is also advised that the battery is fully charge prior to storage.



VENTILATION

DO NOT OBSTRUCT AIR INLET AND OUTLET VENTS AND ALLOW ADEQUATE FREE SPACE FOR VENTILATION



EARTH CONNECTION

THE UNIT REQUIRES CONNECTION TO AN EARTH SYSTEM

It is advised that the unit is connected to an external earthing system. Consult local regulations for guidance.



NO PRESSURE WASH

DO NOT CLEAN THE UNIT WITH HIGH PRESSURE EQUIPMENT

2.0 PRODUCT DESCRIPTION

2.1 Principles of Operation

Grid to Go is a deployable power supply intended either as an alternative to a diesel (or other fueled) generating set or in tandem with a separate generating set. The machine comprises of a rechargeable battery bank and a solid state bi-directional converter combined with control and instrumentation circuitry.

Working on it's own, Grid to Go works in Inverter mode to provide silent, emission free AC electricity to a load, with a capacity up to the rated output and with a duration relative to the limits of the energy stored within the battery. The specification table will define the capacities of each specific model. Grid to Go will continue to deliver power until the battery capacity has been depleted.

When used in tandem with a discrete generating set, Grid to Go (now working in Battery Charger mode) will use the electricity supply from the generator to re-charge the battery bank whilst simultaneously supplying the power from the generator directly to the load. When the generator is switched off or disconnected, Grid to Go will automatically revert back to Inverter mode to supply the load.

Grid to Go has a feature to provide automatic start/stop control of the generator by means of a two wire, volt free signal. The start and stop command can be based on a range of programmable parameters that are described in more detail in section 6 of this manual.

Grid to Go can also be connected to a grid mains power supply, where available, for the purposes of re-charging the battery.

2.2 Advanced functions

Advanced functions include 'Input Assist' where the capacity of the connected power supply can be 'dialed' into the machine thus enabling the unit to keep the draw from the supply within that capacity. This function has two primary benefits: i) to enable automatic adjustment of the power used to charge the battery to compensate for increases in energy demand by the load and ii) to enable Grid to Go to 'top-up' the input power supply in the event that the load demands more power than the supply can deliver.

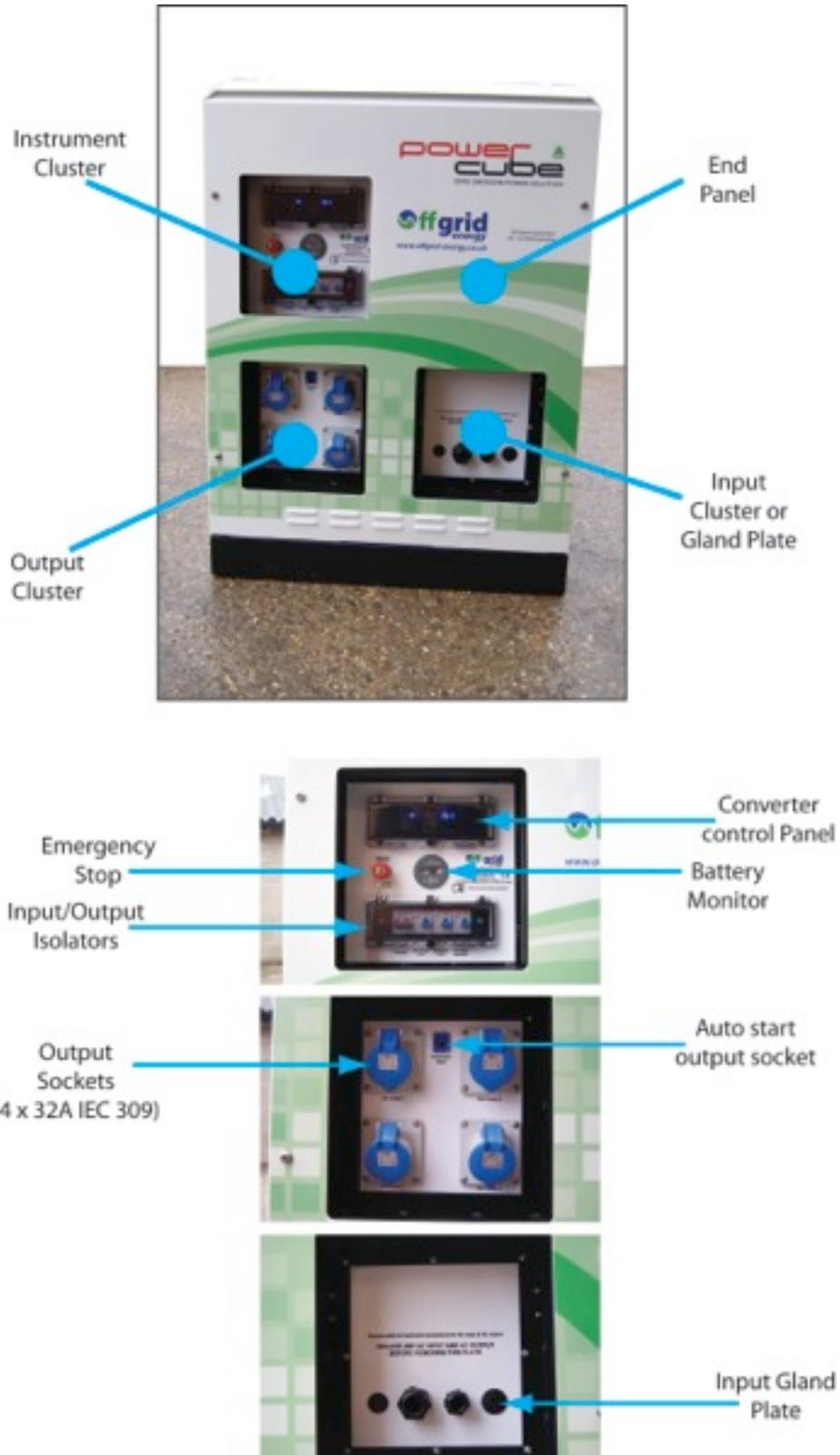
When connected, the auto start signal can be used to tell a connected generator to start or stop depending on, for example, the state of charge of the battery or the level of power demanded by the load. These parameters can be adjusted by re-programming the machine using a lap-top computer connected to the machine's data port.

Various optional features are available including a remote monitoring module that provides web-based access to real-time performance data and for re-programming, an option to connected a Solar PV array to charge the battery and/or support the load and also a road-tow option to enable the unit to be towed behind a vehicle.

Other options can be added including custom specified features.

2.3 Identification of controls and connections

Grid to Go has three user accessible components: The input connection plate, the output connection cluster and the control/instrument cluster.



3.0 HANDLING AND STORAGE

3.1 Mechanical Handling

Grid to Go can be handled by means of either lifting by the lifting point on the top of the unit or fork lift using the pockets within the base of the unit.

Attention is drawn to the considerable weight of the unit and care should be taken accordingly.

When moving the machine it is imperative that care is taken not to drop or allow the unit to drop as impact will cause damage to the internal components.

When lifting the unit, ensure that the lifting eye is firmly screwed into the threaded insert in the top of the unit. Use a crane hook or indirectly use strapping capable of bearing the weight of the unit.

Do not use straps or chains to lift the machine that are attached in such a way that use will result in distortion of the outer case of the unit. The lifting point is affixed to a dedicated internal brace that is designed to take the full weight of the machine.

When using straps to secure the unit for transport, be sure to fit straps between the marks on the top cover.

3.2 Storage

Prior to putting the unit into storage for longer than a few days, connect to an appropriate power supply and allow the unit to charge fully.

Once charged it is advised that the input isolator and output protection devices are switched off.

It is not necessary to switch off the battery isolator but this is advised for prolonged periods of storage. The unit should be switched off on the converter control panel. Note that, if fitted, the GSM module will not transmit information when the unit is switched off. Note also that the unit will experience a low but gradual discharge, if not switched off, sufficient to significantly discharge the battery over a period of a few weeks.

Care should be taken to store the unit in a place where it is protected against mechanical damage and unnecessary exposure to climatic extremes. An optional cover is available to protect the unit whilst in storage which is recommended.

Having charged the unit fully prior to storage, it is recommended that the unit is connected to a power supply and charged to full at least once every six months.

4.0 INSTALLATION

4.1 Choosing a suitable location

Grid to Go should be positioned on a level surface that is adequate to bear the weight of the machine.

Avoid positioning the unit in a location where it may be vulnerable to damage from the movement of structures, machinery or other adjacent bodies. Also avoid locations where it may be exposed to excessive water (such as run off from a roof or other surfaces).

Grid to Go is intended for outdoor use but protection from exposure to environmental extremes, where possible, will help to preserve performance.

A space of approximately 200mm on all sides and above the unit is recommended to ensure adequate air flow for ventilation. Do not obstruct the air vents towards the base of the unit or the ventilation slots along the top edge of the machine.

4.2 Connecting the unit

There are a series of connections to be made in order to operate the unit. In summary these are; power input, power output, earthing and remote start. Depending on specification, on some units there is also a data connection point to make programming changes.

It is not necessary to use all of the connections in order to operate the machine but some functions may not then be available.

4.2.1 Input connection - Ensure that the input AC isolator is off. Connect input power either by means of a 63A IEC 309 coupler/socket located in the input cluster (see section 2.3.1) or by removal of the fitted gland plate. The input supply cable should be a minimum 3 x 6mm². The recommended cable type is HO7RN-F to BS 7919. It is possible to use a reduction adaptor to a lower capacity source if desired. The input supply must be fed from a source that is protected by an over-current device. A suitable input supply cable and adaptors are not supplied with the unit but can be obtained from your supplier on request.

4.2.2 Output connection - It is advised to switch off the input protection devices before plugging in any output cable. Output power is connected by means of any combination of the 4 x 32A IEC 309 sockets. The output sockets are located in the output cluster on the side of the unit as shown in section 2.3.2. As an option, alternative combination of sockets can be provided. Out can also be hard wired using one of the entry glands provided on the input cluster connection plate.

4.2.3 Earth point - It is strongly recommended that the unit is connected to a common ground/earth point such as an earth stake (available on request from your supplier). There are two threaded holes on the base of the unit intended for use as earthing points. Please refer to local site regulations for confirmation of the appropriate steps to ensure compliance with earthing requirements.

Installers are strongly advised to familiarise themselves with any prevailing regulations for installation of power equipment such as BS7909:2011 for events or CMD regulations in construction and, of course, the requirements of BS 7671:2008.

Earth electrode resistance should be as low as possible. It is recommended is earth resistance does not exceed 20 ohms. Reference is also made to the provisions of BS 7430:2011 code of practice for protective earthing in electrical installations. Earth electrode resistance should be regularly checked.

4.2.4 Remote start - To utilise the automatic generator start function, it is necessary to first establish that the generator is compatible with a two wire automatic start/stop signal. The standard configuration is open to stop, closed to run. Before engaging the auto start function, it is necessary to check the status of the signal programming. It may be necessary to have the function of the switch re-programmed to suit the required parameters. The auto start lead can be plugged into the auto start socket. The cable ends should then be connected to the appropriate terminals at the generator or have a compatible connector fitted.

4.2.5 Data port - To access the system for diagnostic or programming needs, connection of a RJ45 UTP patch lead can be made to the provided port in the instrument cluster or, if not present, by removing the converter panel and using the cable connecting the panel to the data bus.

4.3 Post Connection Checks

After connecting the unit and before switching on, check that the connections have all been made securely and that all incoming cables are in good condition and free from snags or other mechanical hazards and that they are safe and secure at the point of source or delivery of power.

5.0 OPERATION

5.1 Switching On

To turn the machine on, switch the toggle switch on the converter remote panel to the on position. Within a few seconds, the unit will switch on and the green inverter on LED will illuminate.

To provide power to the output sockets, it is necessary to make sure the output protection devices are switched to the on position.

In the on position, the unit will automatically switch between inverter and charger mode depending on the availability of input power. In charger only mode, the inverter function of the unit is disabled but the charger works normally with power also being switched directly through the unit.

5.2 Switching Off

The unit is switched off by moving the toggle switch on the converter control panel to the central off position.

For maintenance charging, the unit can be switched to the charger only position. In this mode the inverter operation is disabled. The unit can be charged from an external source but in the event that power is lost, the inverter will not activate. This will help to avoid battery discharge whilst in storage.

5.3 Monitoring Instruments

In addition to the on/off controls and the power isolators/protection devices, the unit has two instruments. There is a battery monitor and a converter control panel.

5.3.1 *Battery monitor* - the battery monitor provides information on the condition of the battery. Pressing the select button will scroll the display through five data items:

SoC - state of charge displayed as a percentage of full charge

CE - consumed energy displays how many amp-hours have been taken from the battery

TTG - time to go gives an estimate of how long the system will continue to provide energy at the present rate of discharge until the battery reaches the discharge floor (NB: this level by default is 50% remaining capacity)

V - battery voltage

I - battery current (positive readings represent charging, negative represent discharge)

5.3.2 *Converter control panel* - the converter control panel displays status information on the converter circuits. Warning and alarm indicators provide feedback on fault conditions.

6.0 ADVANCE FUNCTIONS, SETTINGS AND ADJUSTMENTS

There is the possibility to utilise a number of advanced functions as well as being able to make adjustments to operating parameters to adapt the performance of the machine to suit specific circumstances.

6.1 Input Assist Feature

Grid to Go has an Input Assist feature available as standard. This feature can be turned off if desired (this requires computer interface). The feature is briefly described in section 2 of this manual and more detailed information is available on request.

The primary objective of the feature is to prevent overload of the connected source of power.

For correct operation, it is necessary to set the input current limit. The rotary knob on the converter control panel allows adjustment of the threshold.

Firstly establish the maximum desired current that can be drawn from the supply. Turn the adjustment on the panel until the desired figure is visible in the digital display. For example, if the supply to the unit is covered by a 32A MCB, adjust the knob until '32' is visible in the display. Input current will now be limited to 32A regardless of how many amps are demanded by the load.

The effect of this feature is to automatically and dynamically adjust charging current as the power demanded by the load varies.

In our example, if the dial is set at 32A and the output load requires 20A then 13A is available to power the battery charging function. If the load rises to 25A then 8A is available to charge the battery and so on. If the load requires 32A then the charge function is suspended. If the load requires 40A then the deficit of 8A is 'borrowed' from the battery. When the load falls back below 32A then the unit resumes charging the battery and replenishes the power that was borrowed.

The input assist setting can be hard programmed into the unit so that local adjustment cannot be made. This requires a software adjustment to be made. In this condition, the digital display shows 'Ac1'. The feature can also be disabled. Consult your supplier to make changes to the status of this feature.

6.2 Generator Auto Start Feature

Already described in this manual, the unit can be connected such that it can provide an automatic stop start signal for the generator. The basis upon which this signal is activated can be adjusted around a broad set of parameters.

For example, it is possible to set the start signal to be activated at a designated state of charge and/or a designated level of load sustained for a particular period of time. The signal can then be set to keep the generator running for a minimum period before deciding to turn the machine off.

All of the parameters can be adjusted. It is also possible to invert the signal from a normally open to a normally closed signal. the signal can be used to activate an alternative function to starting a generator if desired.

Changes to the programmed features is only possible by means of connecting a computer and with dedicated software. Consult your supplier for further details.

Training is available so that users can learn how to make the necessary programming changes.

6.3 GSM Monitoring Feature

Where fitted, the GSM monitoring feature provides a means to access real time and historical detail of performance by means of access through a web portal. For the system to function it is necessary to insert a SIM card. It is advised that a contract based pay monthly card is obtained from your preferred network provider. It is also possible to make programming changes to the unit through the GSM portal.

7.0 MAINTENANCE

Grid to Go has minimal user maintenance requirements. There are no user serviceable parts within the unit and access to the inner parts of the unit is advised only to be carried out by suitably qualified personnel who, ideally, will have been trained in maintenance of the equipment. Please refer to the service guide for details of maintenance procedures.

7.1 Routine maintenance

Routine user maintenance consists of testing the function of the protection devices and inspection of the machine to ensure that connections and sockets are in good order. The unit should also be kept free from dirt and other contamination.

Cleaning the unit should only ever be carried out using a cloth and warm soapy water. Use of a pressure washer may force water into the machine such that water ingress may cause malfunction.

7.2 Charge Regime

It is important to maintain a charge regime that ensures the battery receives a full charge periodically. It is not practical or efficient to necessarily carry out a full charge on every cycle. Long term battery life does, however, rely on a full charge being carried out at least every 4 or 5 cycles.

The battery monitor records the charge routine and it is possible to interrogate the instrument and extract data on how frequently a full charge has been executed.

Before putting the unit into storage, it is advised that the battery is given a full charge. This is achieved by connection to a power supply and leaving the unit switched on until the instrument shows 100% and that the yellow 'float' LED on the converter control panel is illuminated.

7.3 Periodic Inspection

From time to time (and at least once every three months whilst in service) it is advised that a trained and qualified person carries out an inspection service in accordance with the procedure set out in the service guide. All electrical and mechanical parts are checked for condition with electrical terminals specifically being checked for tightness and for signs of stress or heating. Any irregularities are corrected, parts replaced and a record made of any remedial work that was necessary.

It is advised that inspection service is carried out more regularly for machines that are fitted to road tow trailers and that experience a higher degree of transportation.

Once a week carry out the following checks.

Task	Actions	Purpose
Visual/Physical inspection	<p>Visually check the unit and identify any irregularities or issues that may not have been previously identified. Check that electrical connectors are firmly in place and that any locking collars are fully home. Report any issues to the person responsible for maintenance.</p> <p>Check that all ventilation slots are unobstructed.</p>	To prevent minor issues from developing into safety or functional fault conditions.

Task	Actions	Purpose
Test protection devices	Press the test button on any fitted RCD's to prove functionality. NOTE: output power will be lost on operation of devices so check that doing so does not interrupt power to any critical loads.	To ensure safety devices are properly functional.

8.0 FAULT DIAGNOSIS

In the event of a problem, follow the steps below before making contact with your supplier if the problem cannot be remedied.

Fault	Check	Remedy
No AC output	On/off switch? Is unit switched on, does blue LED illuminate? Output protection devices? Are the main AC output protection devices on? Is there a low battery alarm?	Ensure all switches and protection devices are on.
Low battery alarm	Check battery voltage on battery monitor. Is battery flat? Is battery Isolator Switch on?	Close/switch on the battery isolator. Connect unit to a power source and charge battery.
Battery does not charge	Check that the input current limit is correctly set. Check that the load does not exceed the set current limit. Is battery isolator on?	Adjust input current setting to correct value. Disconnect/switch off any excessive loads. Make sure battery isolator is on.
Overload alarm	Check the connected load. Check for a fault in the connected output.	Disconnect output connections and observe if unit re-starts. If necessary switch the unit off and on again to re-set.
Over temperature alarm	Check that there is sufficient ventilation. Ensure that load demand is within the rated capacity of the unit.	Take steps to ensure adequate ventilation. Reduce any connected excessive load.
Auto start does not work	Check lead. Check that start conditions have been met.	Replace or repair lead. Induce start conditions to prove operation.
Unit causes supply to trip	Check that input current limit is set within capacity of protection device. Check if there is a fault in the output supply.	Adjust input current limit. Disconnect output circuits.

In the event that these checks fail to remedy a problem, then call your supplier for further advice.

9.0 SPECIFICATIONS

SPECIFICATIONS		
Model	862/16	862/8
Output Power (230V 50Hz 1Ø)		
Continuous	16kVA	8kVA
Peak (5 seconds)	32kVA	16kVA
with max input source connected - cont(max)	39kVA(55kVA)	31kVA (47kVA)
Maximum Input A @ 230V 50Hz (contin	100A / 23kVA	
Maximum Output A @ 230V 50Hz (contir	169A	135A
Maximum Output A 5 seconds	239A	204A
Useable stored energy (to 80% DoD)	33kWhrs	
Battery Type	Sealed Lead Acid Gel PzV	
Battery design life	3000 cycles to 80% 8-10 years	
Autonomy (maximum) in silent mode @20°C:		
@ 20% average load	10h	22h
@ 50% average load	4h	9h
@ 80% average load	2h	5h
Typical recharge time (from 80% DoD):		
to 80% SoC	4h	6h
to 100% SoC	8h	10h
Enclosure details:		
Weight	1576 Kg	1526Kg
Length	1450mm	
Height	1150mm	
Width	850mm	
Ingress Protection of outer case	IP34 Suitable for outdoor use	
Standard Finish	Epoxy Powder Coat RAL 9016	
Noise levels	Inaudible above background	
Heat rejection (maximum)	3200W	1600W
Input connection AC1/AC2	IEC 309 63A / 4x hard wire 8mm stud	
Output connections AC1	4 x 32A IEC 309	
Output connections AC2	4 x hard wire 8mm stud	
Instruments/controls:		
System status		✓
Battery condition		✓
J45 socket for diagnostics and adjustme		✓
Battery main isolator		✓
Input & Output MCB's		✓
Programmable generator auto-start signa		✓
Optional features:		
Stackable modules		•
GSM remote monitor & control	Fitted as standard (requires SIM)	
Battery extension module		•
Harsh environment pack		•
Road Tow trailer kit		•



GRID TO GO™ CE DECLARATION OF CONFORMITY



COMPANY: Off Grid Energy Ltd

ADDRESS: Unit 7, i-Quarter
Allerton Road
Rugby
CV23 0PA
United Kingdom

Declares that the following products:

Grid to Go MHP models:
830/8, 830/16, 415/8, 415/16, 360/16 Li-Ion
862/20, 862/16, 862/10 & 862/8

Comply with the requirements of the following EC directives:

EMC Directive 2004/108/EC
Low Voltage Directive 2006/95/EC

With reference to the following norms/standards:

EN60335-1 (safety)
EN60335-2-29 (safety - battery chargers)
EN55014-1 (EMC Emissions)
EN55014-2 (EMC Immunity)
EN61000-3-3 (Voltage stability)

Signed:

A handwritten signature in blue ink, appearing to read 'D. Jones', written over a faint grid background.

D. Jones, Director. 17th November 2012