Manual and safety instructions | **English**
Revision 4.00

G3 Inverter/Charger and Inverter range

CLAYTON POWER

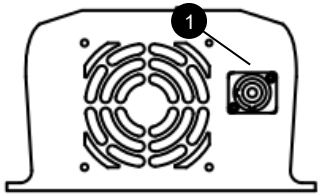
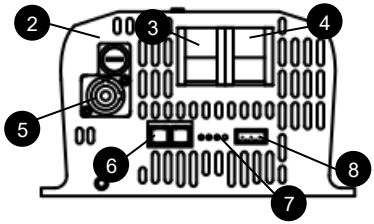
CONTENT

1. GETTING STARTED

1.1 Product Box Contents

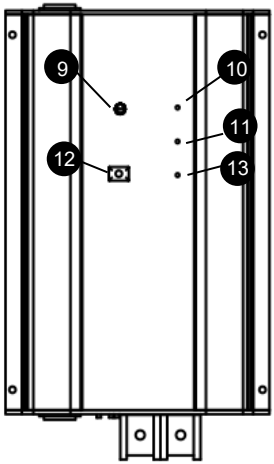
Quantity	Description
1	G3 Inverter/Charger or Inverter
2	M8 bolt
1	AC charging connector (Neutrik – NAC3 FCA)
1	AC output connector (Neutrik – NAC3 FCB)
1	Data connector

1.2 Product Details

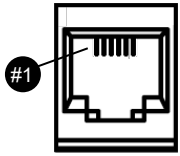
Output side View	Input side View
	

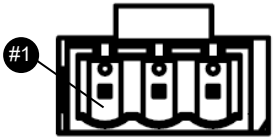
#	Description
1	AC output

#	Description
2	Fuse for AC input
3	DC+ terminal
4	DC- terminal
5	AC input (only Inverter/Charger)
6	Data, Remote and temperature sensor connector
7	Info LEDs
8	Data and Remote connector

Top View	
	

#	Description
9	Charge current adjustment (only Inverter/Charger)
10	Charger active LED – Green (only Inverter/Charger)
11	Inverter active LED – Blue
12	Power ON/OFF button
13	Battery LED – Red

Data, remote and temperature sensor connector pinout (#6)		
#	**Function**	**Front View**
1	- Temperature (only Inverter/Charger)	
2	GND	
3	+ Temperature (only Inverter/Charger)	
4	Not Used	
5	Single Wire (Communication)	
6	G3 remote activation (remote)	

Data and remote connector pinout (#8)		
#	**Function**	**Front View**
1	Single Wire (Communication)	
2	G3 remote activation (remote)	
3	Not Used	

2. PRODUCT USAGE

All installations must be carried out by trained and qualified installers.
This document is intended as a general guide for installations and not as a comprehensive, step-by-step manual.
Local rules and regulations must always be followed and take precedence over any instructions provided in this guide.

WARNING: Connecting the device with incorrect voltage or battery polarity will damage the device and is not covered by the warranty.

WARNING: Do not connect the AC outputs in parallel or serial. It will damage the device and is not covered by the warranty.

WARNING: Do not connect the output of a generator or AC mains to the output. It will damage the device and is not covered by the warranty.

NOTE: Using RCD devices on the AC output is highly recommended in any installation.

2.1 Interface

The G3 is equipped with a button for turning it on/off, an adjustment screw for setting the allowed charge current and LEDs for operation and indication.
The G3 is considered off when no LED is illuminated.

With the adjustment screw it is possible to limit the charge current to a value between 0A and the maximum charge current available.

There are three LEDs on the top of the G3, these have the following functionality:

BLUE LED	
Behaviour	**Indication**
ON	Inverter is activated
1 short flash every 2 seconds	Load search mode (Inverter mode ready)
1 flash	Inverter output is overloaded
2 flashs	Internal temperature is too high (automatic cooling and restart)
3 flashs	Short circuit at inverter output
4 flashs	Short circuit in internal power supply
5 flashs	Overload in power supply during startup
GREEN LED	
Behaviour	**Indication**
ON	Battery fully charged – float charging
Slow flashing (approximately 1Hz)	Charger is in top charging (maintain voltage)
Fast flashing (approximately 2Hz)	Charger is boost charging
1 flash	AC input present but too low
2 flashs	AC input present but too high
RED LED	
Behaviour	**Indication**
No light	Battery OK
ON	Battery voltage too low
Flashing	Battery voltage too high
ALL LEDs SIMULTANEOUSLY	
Behaviour	**Indication**
4 flashs	External temperature sensor not detected

There are three LEDs on the rear of the G3, these have the following functionality:

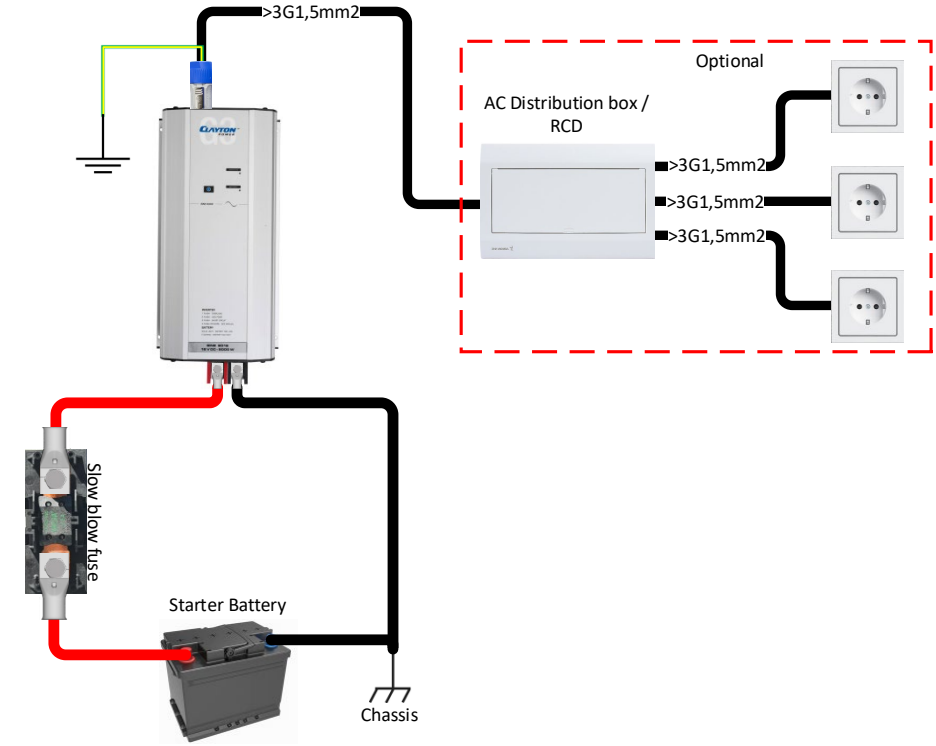
LED Color	Indication
Green	Data link “High”
Yellow	Data link “low”
Orange	Remote active

Both the G3 Inverter and the G3 Inverter/Charger can be activated remotely by applying a voltage on the Remote pin on either of the three I/O connectors.
The voltage should be above 7 VDC for activating and below 1 VDC for deactivating.

2.2 Inverter Mode

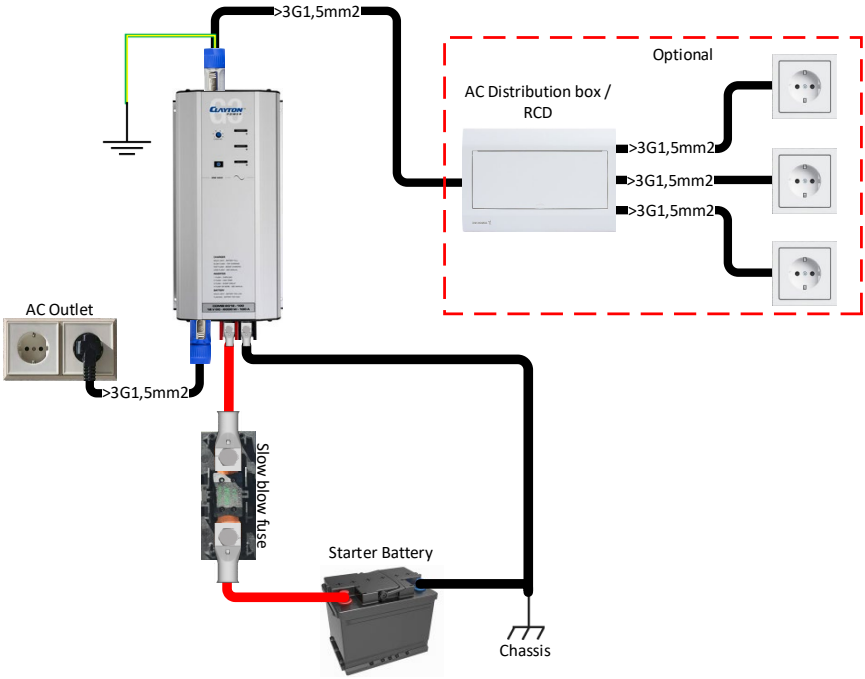
Energy is taken from the battery and converted to 230 VAC and delivered at the output.

The following diagram illustrates how to connect the G3 Inverter. Fuse ratings are shown in the table below.



NOTE: The earth pin in the input and output AC connections are internally connected, so chassis connection can be done on either one.

The following diagram illustrates how to connect the G3 Inverter/Charger when used in inverter mode. Fuse ratings are shown in the table below.



WARNING: Using the wrong cable size or a bad cable connection can cause overheating and a short circuit.

WARNING: Place a fuse as close as possible to the power source to prevent high current short-circuits.

WARNING: A connection from the Neutrik 230 VAC Out connector to Chassis MUST be made for protective grounding.

NOTE: The earth pin in the input and output AC connections are internally connected, so chassis connection can be done on either one.

The following table shows the recommended cable and fuse size.

FUSE AND CABLE SIZE							
Parameter	**Value**						
SKU no.	CI1201	CI1202	CI1207	CI1203	CI1204	CI1205	CI1206
Fuse rating	125 A	150 A	175A	225 A	125 A	175 A	250 A
Cable gauge (minimum)	35 mm^2	50 mm^2	70 mm^2	95 mm^2	25 mm^2	70 mm^2	95 mm^2

2.3 Inverter Load Search Mode

The G3 can be put into load search mode to lower the standby power consumption.
When in load search mode, the inverter will automatically shut down when the AC load is lower than 10 W.
The inverter will turn on every 2 seconds and detect if a load is present.
To turn load search mode on/off use the Power ON/OFF button as described in the table below.

Press duration	Precondition	Function
2 seconds	Inverter mode is Off	Turn on inverter mode
1 second	Inverter mode is On	Turn off inverter mode
10 seconds	Inverter mode is Off and not in load search mode	Unit enters load search mode All LEDs lights solid
10 seconds	Inverter mode is Off and not in load search mode	Unit exits load search mode All LEDs blink

NOTE: When using the device with a Li-G4 battery it is not recommended to use load search mode.

2.4 Charger Mode (Inverter/Charger only)

Energy is taken from the AC input and passed directly through to the output, part of the energy is converted to DC and used to recharge the battery.
Activate the charger by applying 230 VAC to the AC input.
The extended AC input voltage range is available if the inverter mode is not active. In the extended range the device will charge with reduced current (10 A).

It is possible to reduce the charge current by adjusting the blue charge current potentiometer.
The scale is in amperes out of the DC terminals, thus if adjusting e.g. a CC1201 unit, the adjustment will have no effect from 50 - 100 A.
The following table shows the recommended maximum charge current compared with the battery capacity for lead acid batteries.

Battery capacity	Charge current
50 – 150 Ah	15 A
60 – 200 Ah	20 A
80 – 250 Ah	25 A
100 – 300 Ah	30 A
135 – 400 Ah	40 A
165 – 500 Ah	50 A
200 – 600 Ah	60 A
260 – 800 Ah	80 A
330 – 1000 Ah	100 A

WARNING: If a sealed lead-acid battery is overcharged it will result in gassing and drying out. This may damage the battery.

WARNING: Wet batteries (open type) will lose water and need be refilled

NOTE: Always consult your battery technical document or your battery distributor for charging information.

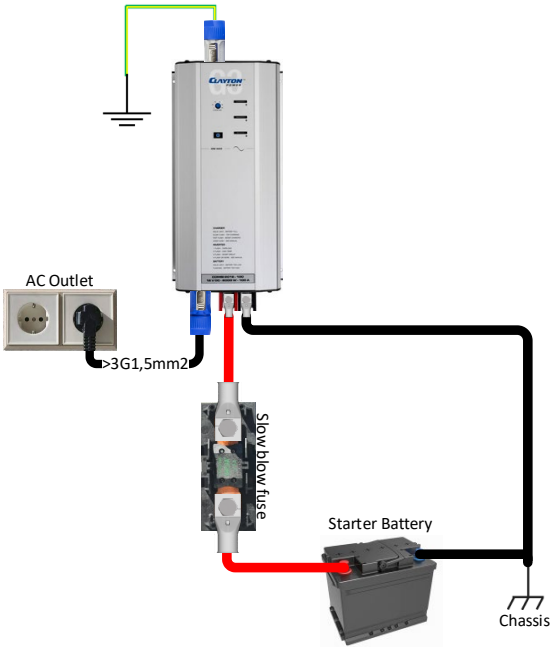
The device output is rated for 2300 W when AC is present on the input for all the Inverter/Charger devices. If the load power + maximum charging power exceeds 2300 W, the charger will reduce the charge current to maintain a maximum of 2300 W from the input.

When using an external temperature sensor (NTC) the charger will reduce the charge voltage with respect to the maximum allowed battery voltage at the actual battery temperature.
The temperature sensor shall be mounted at a point on the battery with good thermal contact.
Use the temperature sensor for optimal battery performance when using lead acid batteries.
When using a Li-G4 battery the temperature sensor is not needed.

It is possible to connect a G3 Display/Remote to visually get information about the device and control it.

To connect it use the Remote and Single Wire input on either of the three I/O connectors.
To get more information about the Display/Remote please refer to the User Manual.

The following diagram illustrates how to connect the G3 Inverter/Charger when used in charge mode.



WARNING: Using the wrong cable size or a bad cable connection can cause overheating and a short circuit.

WARNING: Place a fuse as close as possible to the power source to prevent high current short-circuits.

WARNING: A connection from the Neutrik 230 VAC Out connector to Chassis MUST be made for protective grounding.

NOTE: The earth pin in the input and output AC connections are internally connected, so chassis connection can be done on either one.

The following table shows the recommended cable and fuse size.

FUSE AND CABLE SIZE							
Parameter	**Value**						
SKU no.	CC1201	CC1202	CC1207	CC1203	CC1204	CC1205	CC1206
Fuse rating	60 A	100 A	100 A	125 A	40 A	60 A	60 A
Cable gauge (minimum)	10 mm^2	25 mm^2	25 mm^2	35 mm^2	10 mm^2	10 mm^2	10 mm^2

3. SPECIFICATIONS

3.1 Inverter

PARAMETER	VALUE						
General							
SKU no.	CI1201 (1012)	CI1202 (1312)	CI1208 (1512)	CI1203 (2012)	CI1204 (1024)	CI1205 (1524)	CI1206 (2324)
Cooling	Forced air						
Operating temperature range	-20 – 50 °C						
IP classification	20						
Product weight	7.5 kg		9.5 kg		7.5 kg		9.5 kg
Product size (W x L x H)	198 x 336 x 118 mm		198 x 414 x 118 mm		198 x 336 x 118 mm		198 x 414 x 118 mm
Power consumption (No load)	10 W		15 W		10 W		15 W
Power consumption (Load search)	< 3 W						
Power consumption (Sleep)	< 8 mA						
AC Output							
Nominal output voltage	230 V						
Output voltage tolerance	-10 %, +5 %						
Frequency	50 Hz						
Waveform	Sine						
THD (max)	3 %						
Continuous output power	1000 W	1300 W	1500 W	2000 W	1000 W	1500 W	2300 W
Output power surge (1 sec)	2000 W	3000 W		4000 W	2000 W	3000 W	4000 W
Output power surge (10 sec)	1500 W	1800 W	2000 W	2800 W	1500 W	1800 W	3000 W
Output power surge (15 min)	1200 W	1500 W	1700 W	2200 W	1200 W	1700 W	2500 W
Efficiency (max)	90 %	92 %	90 %		93 %		92 %
DC Input							
Battery input voltage (nominal)	12 V				24 V		
Battery input voltage (max)	15 V				30 V		
Low battery cutoff (3s reaction)	10.5 V				21 V		
Low battery cutoff (<10 ms reaction)	9 V				18 V		
Voltage before inverter can switch on again after low battery cutoff	12.75 V				25.5 V		
I/O							
AC output connector	NAC3 FCB						
AC input connector	NAC3 FCA						
DC input terminals	M8						
Data and temperature sensor connector	RJ12 type 6P6						
Data and Remote connector	Phoenix Combicon MSTB 2.5 / 3-ST-5.08						

3.2 Inverter/Charger

PARAMETER	VALUE						
General							
SKU no.	CC1201 (1012)	CC1202 (1312)	CC1207 (1512)	CC1203 (2012)	CC1204 (1024)	CC1205 (1524)	CC1206 (2324)
Cooling	Forced air						
Ambient temperature	-20 – 50 °C						
IP classification	20						
Product weight	7.5 kg		9.5 kg		7.5 kg		9.5 kg
Product size (W x L x H)	198 x 336 x 118 mm		198 x 414 x 118 mm		198 x 336 x 118 mm		198 x 414 x 118 mm
Power consumption (No load)	10 W		15 W		10 W		15 W
Power consumption (Load search)	< 3 W						
Power consumption (Sleep)	< 8 mA						
AC output							
Nominal AC output voltage	230 V						
Output voltage tolerance	-10 %, +5 %						
Output frequency	50 Hz						
Waveform	Sine						
THD (max)	3 %						
Continues AC output power	1000 W	1300 W	1500 W	2000 W	1000 W	1500 W	2300 W
AC output power surge (1 sec)	2000 W	3000 W		4000 W	2000 W	3000 W	4000 W
AC output power surge (10 sec)	1500 W	1800 W	2000 W	2800 W	1500 W	1800 W	3000 W
AC output power surge (15 min)	1200 W	1500 W	1700 W	2200 W	1200 W	1700 W	2500 W
Inverter efficiency (max)	90 %	92 %	90 %		93 %		92 %
AC input to output current (max)	10 A						
AC input							
AC Input voltage (max)	265 V						
AC input voltage (min) (full charge current)	185 V						
AC input voltage (min) (reduced charge current)	110 V						
AC inrush current (max)	50 A						
AC input frequency range	45 – 65 Hz						
AC input power factor	0.9						
Input fuse rating	10 AT						
Input fuse type (LxD)	20 x 5 mm			32x6.3 mm	20x5 mm		32x6.3 mm
AC input power (max)	1000 W	1500 W	1500 W	1900 W	1200 W	1500 W	1900 W
DC input							
Battery input voltage (nominal)	12 V				24 V		
Battery input voltage (max)	15 V				30 V		

Low battery cutoff (3s reaction)	10.5 V				21 V		
Low battery cutoff (<10ms reaction)	9 V				18 V		
Voltage before inverter can switch on again after low battery cutoff	12.75 V				25.5 V		
DC output							
Charge characteristics	3 stage, IUoUo						
Battery Temperature sensor	Yes (Optional)						
Max Charge current (adjustable)	0-50 A	0-80 A	0-80 A	0-100 A	0-30 A	0-40 A	0-50 A
Charge Current reduction @ 50 °C	0 % (of max current)						
Charge Current reduction @ 60 °C	15 % (of max current)						
Charge Current reduction @ 80 °C	50 % (of max current)						
Boost charge voltage	14.4 V				28.8 V		
Float charge voltage	13.5 V				27 V		
Charge efficiency (max)	90 %						
I/O							
AC output connector	NAC3 FCB						
AC input connector	NAC3 FCA						
DC input terminals	M8						
Data and temperature sensor connector	RJ12 type 6P6						
Data and Remote connector	Phoenix Combicon MSTB 2.5 / 3-ST-5.08						
Battery types	Open, Sealed Lead Acid and Li-G4						

4. CERTIFICATIONS AND COMPLIANCE

Low Voltage Directive 2014/35/EU
EN62368-1

RoHS Directive 2011/65/EU
EN 63000

EMC 2014/30/EU
EN61000-6-2, EN61000-6-3

E-Marking
UN-ECE Regulation 10, E13 10R-05 14880

5. SAFETY

The following measures ensure the safe and secure operation of the electrical system.
Not following these measures can result in dangerous situations causing harm to the user and the equipment.

5.1 Mounting

The G3 should be mounted in a dry and dust free location and avoid mounting the device next to flammable materials.

The device can be mounted vertically or horizontal by using the 4x Ø5 mm holes.
It is important that the airflow to and from the device is not obstructed to ensure proper cooling of the device.
Optimum cooling is achieved by mounting the device vertically with the DC terminals pointing down.

5.2 Fuses

- All fuses must be installed as close to the power sources as possible.
    - Measures must be taken to ensure the cable located between the fuse and the power source is laid out in a short-circuit-proof manner.
- Fuses should be clearly marked with their name and size.
- It is important to use fuses rated for DC voltages.
- MEGA fuses (recommended fuse type) should be mounted in holders.

5.3 Cables

- Cables needs to be flexible.
    - Cables are rated in different classes related to flexibility.
    - Cables with classification 5 or 6 needs to be used (This cable type is also referred to as HIGH-FLEX)
- Cables are dimensioned according to the fuse size.
- Always use the designated connection points in the vehicle for chassis and DC connections (if available/indicated).
- Always route cables the shortest way possible.
- Cables should always be secured along the routing to ensure that it does not move unintentionally.
- Cable must be kept away from moving parts.
- When passing through bulkheads or other surfaces the cable needs to be guarded against chamfering.
    - This can be done by grinding the hole to eliminate sharp edges, using a rubber grommet within the hole and using conduit or tubing to shield the cable.
- Cable terminals should be used for the right cable cross section as they are made for.
- It is important to choose cable terminals for the right cable classification.
    - This means that classification 5 cables need a classification 5 terminal.
- When connecting the cable remember to use the right torque.
    - 12 Nm torque for M8 terminals.
- When connecting the cable remember to use both spring and straight washer.

6. STORAGE

The Inverter/Charger can be stored at temperatures between -20 ºC and 50 ºC.

7. WARRANTY

IMPORTANT AND WARNING:
DO NOT USE OR ATTEMPT TO USE THIS PRODUCT UNTIL YOU HAVE READ THE USER MANUAL IN ITS ENTIRETY. IMPROPER INSTALLATION OR USE OF THIS DEVICE MAY BE DANGEROUS AND MAY CAUSE DAMAGE TO OTHER ELECTRICAL EQUIPMENT AND WILL VOID THE WARRANTY.

Warranty. The company guarantees that products and associated services are free of significant defects in design, material and execution for 24 months after delivery.

Exceptions. The company's warranty does not include defects caused by: (i) ordinary wear and tear, (ii) storage, installation, use or maintenance against the company's instructions or ordinary practice, (iii) repair or change carried out by others than the company, and (iv) other conditions for which the company has no responsibility.

Examination. Within a reasonable period of time after receiving a complaint from the client about defects and examining the claim, the company will inform the client about whether or not the defects are covered by the warranty. After the request, the client must ship defective parts to the company.
The client covers the expenses and risks of the parts during transport to the company. The company covers the expenses and risks for return of parts during transport, only if the defects are covered by the warranty.

Register a complaint. If the client discovers defects within the period of warranty, which the client wishes to invoke, it must be communicated immediately in writing. If defects, which the client discovers or should have discovered, are not immediately communicated to the company in writing, it cannot be effectuated at a later time. The client must provide the company the requested information about the registered defects.

Instructions for Obtaining Warranty Service for Clayton Power Devices
To obtain warranty service, contact the store where you have bought the product and provide the following:

- Sales receipt
- Device model number
- Device serial number
- Brief description of the application and problem, including any error codes displayed on the device.
- Obtain an authorisation number from the Clayton Power dealer before shipping the device. Carefully pack the device and ship it (freight paid) to the Clayton Power dealer.

Sales: sales@claytonpower.com

Service: service@claytonpower.com

Phone: +45 4698 5760

Address: Pakhusgaarden 42-48
DK-5000 Odense C

CLAYTON POWER