

The LPS II range



CLAYTON
POWER

SAFETY INSTRUCTIONS – UN3480

The Lithium Power Supply (LPS) is classified as Class 9 dangerous goods according to UN3480, a power source with high energy density and hazardous materials in a sealed metal cabinet.

Installation must follow national safety regulations in accordance with the requirements for enclosure, installation, creepage, clearance, marking and segregation requirements for the end-use application. We recommend that installations are performed by authorised professionals. Switch off the system and check for hazardous voltages before changing any connections!
The Lithium Power Supply must only be serviced by trained personnel.

The lowest ingress protection rating for specific LPS parts is IP20. Ensure that the installation of the Lithium Power Supply complies with IP20 requirements.

This is a Class I product. Connect only 230V AC from a source connected to protective electrical earth, including all extension cords between source and the device.

Observe the following:

When connected to 230V input, voltage is present at 230V output, even when the device is switched off.
Do not open the LPS.
Do not discharge a new LPS until it has been fully charged.
Charge only within the specified limits.
Make sure the LPS is switched off when it is moved and during installing.
Do not mount the LPS upside down or on its side.
Check if the LPS has been damaged during transport.
Do not series- or parallel-connect the 230V of the LPS.
Do not leave outside exposed to the elements.
Do not use at altitudes above 2,000 metres (6,562 feet)
Do not cover or block the fan or air intake to ensure that the battery does not overheat.
Do not allow children or animals to come in contact with the device or connected power supplies.

Solar Connection

Solar connection must not exceed the maximum voltage of 50V.

Danger in case of fire:

Danger of explosion with dust particles.
Decomposition due to fire or heat development emits toxic and corrosive gases.
Combustion gases which strongly irritate the eyes and respiratory organs.

General precautions the driver should observe if these hazards occur:

Switch off the motor.
Place a warning sign on the road to warn others.
Inform others of the dangers and advise them to stay away from the wind direction.
Contact the police and fire brigade immediately and inform them that there are lithium batteries (UN3480) onboard.

Instruction for fire extinguishing:

Extinguish fire with water. If possible, submerge the LPS completely in water.
Extinguishing with water produces fluoride, phosphate, fluoride-oxide and carbon monoxide.
Alternatively, extinguish with a CO₂ fire extinguisher.



**NON-SPILL
LI-ION BATTERY**

SAFETY INSTRUCTIONS – UN3480

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**UNIT MUST BE CHARGED
EVERY 6 MONTHS IF NOT
USED**

1. GETTING STARTED

1.1 Product Box Contents

QUANTITY	DESCRIPTION
1	AC charging cable (Neutrik – NAC3 FCA)
1	AC output (Neutrik – NAC3 FCB)
4	Cap for M8 bolt
4	M8 bolt
2	M4 bolt
4	Rubber foot
1	Installation guide

1.2 Product Details

LPS II - OVERVIEW			
FRONT VIEW		REAR VIEW	
#	DESCRIPTION	#	DESCRIPTION
1	Display	13	Ventilation
2	12V DC button	14	DC output terminals
3	230V AC button	15	DC input terminals
4	Navigation button - Down	16	M12 – Data/Remote
5	Navigation button - Up	17	M12 – Data/IO connector
6	Navigation button - Ok	18	C1 (D+/Ignition Signal)
7	Navigation button - Return	19	C2 (Solar +) IO connector
8	M12 – Data/IO connector	20	Type plate
9	Serial number	21	230V AC output port (NAC3 FCB)
10	RCBO	22	230V AC input port (NAC3 FCA)
11	230V AC output port		
12	Ventilation/Fan		

M12 - IO Pinout		
#	FUNCTION	FRONT VIEW
1	Single Wire (Communication)	
2	I/O Signal	
3	GND	
4	CAN High (Communication)	
5	CAN Low (Communication)	

NOTE: PIN 2 in the M12 connector labeled "REMOTE" is designed to supply power to the LPS Remote. The LPS Remote is not included and can be purchased separately.

The display features two home screens - a simple view and an advanced view. It is possible to switch between the screens using the UP and DOWN navigation buttons.

DISPLAY – SIMPLE VIEW		
#	DESCRIPTION	VIEW
1	DC input active – Charging from DC source	
2	DC output active – I/O activated	
3	Solar input active – Charging from solar panel	
4	DC output energy saver timer active	
5	AC output energy saver timer active	
6	AC input active – Charging from grid	
7	AC output active – I/O activated	
8	Remaining operation time or time to charge	
9	Graphical indication of state-of-charge	
10	Numeric indication of state-of-charge	

DISPLAY - ADVANCED VIEW		
#	DESCRIPTION	VIEW
1	DC input functionality	
2	DC output functionality	
3	AC input functionality	
4	AC output functionality	
5	Solar input active – Charging from solar panel	
6	Power bar for indicating utilization of function	
7	Functionality is active and a transfer of energy is in process	
8	Functionality is active but there is no energy transfer	
9	AC output energy saver timer active	
10	Remaining operation time or time to charge	
11	Graphical indication of state-of-charge	
12	Numeric indication of state-of-charge	

NOTE: Interface and product features might vary depending on the model.

The display provides information on the unit operation status and allows for advanced unit configuration. For detailed guidance on how to configure the LPS using the menu, refer to the "LPS II User interface - Configuration guide" document available on our website.

2. PRODUCT USAGE

It is recommended to perform a full battery cycle prior to the initial use. This can be done by fully discharging the battery and then charging it overnight using the 230V input.

The LPS II is a compact power supply designed to provide power for a variety of 230V AC and 12V DC applications. It comes with built-in:

- LiFePO4 battery.
- 230V AC Output – For supplying 230V AC applications.
- 230V AC Input – For charging from mains.
- 12V DC Output – High power DC output for supplying 12V DC applications.
- 12V/24V Input – Bidirectional DCDC converter for 12V/24V applications like:
 - Vehicle jumpstart
 - Charging from alternator.
- Solar Charging – Integrated MPPT for charging from solar panel.
- CANbus communication and I/O interface for interaction with auxiliary equipment and remote control.

2.1 230V AC Output

The LPS II features two AC output ports, one on the front (CEE 7) and one on the back (NAC3 FCB), which can be used simultaneously. Both ports are protected against overload and short circuits and are equipped with RCDO for safety.

Press the 230V button to activate the AC output function. The green LED will light up to confirm activation. The output will automatically switch off after 1 hour if the power demand is below 20W (Default setting).

NOTE: If there is no 230V AC output when the output is turned ON, check RCBO.

2.2 230V AC Charging

To charge the LPS II from a power outlet, use the provided power cord with the NAC3 FCA connector. When connected to mains, the unit will begin charging automatically and redirect the mains to the AC output ports. During charging, the green 230V LED will flash.

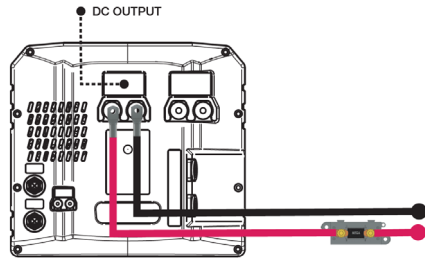
WARNING: 230V AC will always be present on the AC output ports during AC charging.

2.3 12V DC Output

The LPS II has a 12V DC port for providing power to DC applications. To activate the 12V DC output, press the "12V" button. A green LED will light up, indicating that the functionality is active.

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

WARNING: Place a correctly dimensioned fuse (max. 200A) as close as possible to the LPS to prevent high current short-circuits.



2.4 12V/24V DC Input

The LPS II can be charged using the built-in DCDC converter when the DC IN port voltage is within the operational range and a wakeup signal is detected on C1.

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

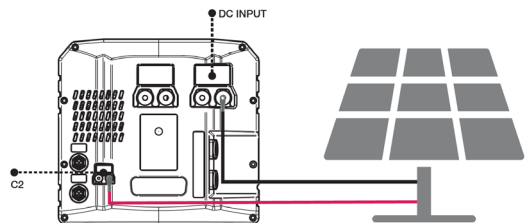
WARNING: Place a fuse as close as possible to the power source to prevent high current short-circuits.

2.5 Solar Charging

If the solar panels generate enough power ($> 5W$), the LPS II will automatically charge using the integrated MPPT.

WARNING: Never exceed 50Voc between DC Input minus and C2 from solar. Exceeding may cause damage to the unit.

NOTE: Not available in LPS 1500 SE variant.



3. TIPS AND TRICKS

3.1 Limit AC/DC charging power

If the power source has limited output, the AC and DC charging can be limited. The below setting will also limit the AC output in the LPS while connected to the mains.

Limiting AC charging power using display	
Menu Path	Description
Main Menu > 230V AC Charging > Maximum current	To set the maximum allowable current for AC charging, enter the menu and navigate using the up and down arrows. Press "OK" to confirm your selection. This setting will take effect immediately.

NOTE: If 230V charge is limited, the 230V output in the LPS is also limited while connected to the mains.

Limiting DC charging power using display	
Menu Path	Description
Main Menu > DC Charging > Set current	To set the maximum allowable current for DC charging, enter the menu and navigate using the up and down arrows. Press "OK" to confirm your selection. This setting will take effect immediately.

3.2 Activate Jumpstart

The LPS II has an integrated jumpstart feature that can charge the starter battery if depleted. To use this feature, the LPS must be connected to the starter battery via the DCIN terminal according to section 2.4.

The jumpstart is activated through the display menu or the remote. Once activated, the jumpstart will charge the starter battery for 5 min with 40A.

Activate Jumpstart using display	
Menu Path	Description
Main Menu > DC Charging > Jumpstart functionality	To activate the jumpstart function, enter the menu and use the up and down arrow to select "Active" and press "OK" to confirm.

3.3 Battery maintenance

To ensure optimal battery performance, fully recharge the battery every month (100%).

NOTE: If the battery has not been fully charged for a long period, maintenance charge can be prolonged to 3 days.

4. TROUBLESHOOTING

4.1 Error list

If the solutions provided below are unable to resolve the error or if the error code is not listed, contact your retailer.

ERROR	DESCRIPTION	SOLUTION
PRODUCT TEMPERATURE		
4, 5, 56, 57, 123	Unit temperature too low	Let the device warm up or move it to a place with a higher ambient temperature
6, 7, 58, 59	Unit temperature too high	Let the device cool down or move it to a place with a lower ambient temperature
I/O & COMMUNICATION		
11, 12, 13	M12 connector is overloaded or has short circuited	Disconnect connector and check connector or cable for damage
14	IO Terminal is overloaded or has short circuited	Disconnect connector and check connector or cable for damage
121	Communication Error	Verify cable connections on M12 connectors
BATTERY		
51, 52, 53, 60	Battery/Cell voltage low	Recharge the battery
SOLAR		
70	Solar input voltage too high	Check the installation and max. voltage from solar panel (50V)
DC INPUT		
90, 92	The DC Input voltage too low	Provide a higher 12V DC or 24V DC voltage
91, 124, 125	The DC Input voltage too high	Provide a lower 12V DC or 24V DC voltage
DC OUTPUT		
96	DC Output charge current too high	Remove or adjust the power source
97	DC Output discharge current too high	The 12V DC Output load is drawing too much current. Remove the load
AC OUTPUT		
150, 151, 152, 203	230V AC Output is overloaded	Remove load on the 230V AC Output
AC INPUT		
206	230V AC mains is too low	Check supply cables or try another outlet socket
207	230V AC mains too high	Mains too high, verify outlet socket voltage

4.2 No 230 V AC output

Make sure that the Residual Current Circuit Breaker with Overload protection (RCBO) is switched on (see section 1.2 - #10) and check your AC cables.

5. SPECIFICATIONS

PARAMETER	LPS II 1500 W 1 kWh SE	LPS II 2000 1 kWh	LPS II 2500 1 kWh	LPS II 3000 2 kWh
GENERAL SPECIFICATION				
Model no.	CL2204/CL2214	CL2205/CL2215	CL2102/CL2112	CL2103/CL2113
Cooling	Forced air	Forced air	Forced air	Forced air
Operating temperature discharge	-20 ~ 50°C	-20 ~ 50°C	-20 ~ 50°C	-20 ~ 50°C
Operating temperature charge	0 ~ 50°C	0 ~ 50°C	0 ~ 50°C	0 ~ 50°C
IP classification	IP20	IP20	IP20	IP20
Protection class	I	I	I	I
Maximum altitude	2,000 m	2,000 m	2,000 m	2,000 m
Product weight	22.5 kg	22.5 kg	23.5 kg	27.5 kg
Product size (H x W x L)	256 x 277 x 409 mm	256 x 277 x 409 mm	256 x 277 x 409 mm	256 x 277 x 409 mm
Gross weight	25.5 kg	25.5 kg	26.5 kg	30.5 kg
Package size (H x W x L)	320 x 372 x 480 mm	320 x 372 x 480 mm	320 x 372 x 480 mm	320 x 372 x 480 mm
BATTERY				
Type	Rechargeable Lion battery system	Rechargeable Lion battery system	Rechargeable Lion battery system	Rechargeable Lion battery system
Chemistry	LiFePO4	LiFePO4	LiFePO4	LiFePO4
Capacity	100 Ah (1,280 Wh)	100 Ah (1,280 Wh)	100 Ah (1,280 Wh)	160 Ah (2,048 Wh)
Available capacity	80 Ah (1,020 Wh)	80 Ah (1,020 Wh)	80 Ah (1,020 Wh)	136 Ah (1,740 Wh)
Cycles	2,000	2,000	2,000	3,500
Self-discharge rate per month	<5%	<5%	<5%	<5%
Marking (IEC 61960)	4IFpP51/161/119	4IFpP51/161/119	4IFpP51/161/119	4IFpP55/175/154
Marking (IEC 62620)	IFpP/51/161/119/[4 SJM/-20+60/90	IFpP/51/161/119/[4 SJM/-20+60/90	IFpP/51/161/119/[4 SJM/-20+60/90	IFpP/55/175/154/[4 SJM/-30+60/90
AC INPUT				
Voltage	207 - 253 V AC	207 - 253 V AC	207 - 253 V AC	207 - 253 V AC
Frequency	45 - 65 Hz	45 - 65 Hz	45 - 65 Hz	45 - 65 Hz
Power	550 W	720 W	720 W	720 W
Connector type	NAC3 FCA	NAC3 FCA	NAC3 FCA	NAC3 FCA
AC OUTPUT				
Voltage (+- 10%)	230 V AC pure sine wave	230 V AC pure sine wave	230 V AC pure sine wave	230 V AC pure sine wave
Frequency	50 Hz	50 Hz	50 Hz	50 Hz
Power - continuous (@25°C)	1,300 W	1,500 W	2,000 W	2,300 W
Power - 10 min.	1,500 W	2,000 W	2,500 W	3,000 W
Power - peak	2,600 W	3,000 W	4,000 W	5,000 W
Power - AC in connected	2,300 W	2,300 W	3,000 W	3,000 W
Efficiency (1,000 W)	94%	94%	94%	94%
Power factor range	0.77	0.77	0.77	0.77
Idle consumption	20W	20W	30W	30W
Fault current (rms)	30mA	30mA	30mA	30mA
Connector type	NAC3 FCB	NAC3 FCB	NAC3 FCB	NAC3 FCB
DC INPUT				
Voltage	11.5 - 32 V DC	11.5 - 32 V DC	11.5 - 32 V DC	11.5 - 32 V DC
Current	25 A	45 A	45 A	45 A
Jumpstart	25 A/5 min.	40 A/5 min.	40 A/5 min.	40 A/5 min.
Connector type	Terminal – M8	Terminal – M8	Terminal – M8	Terminal – M8

PARAMETER	LPS II 1500 SE	LPS II 2000	LPS II 2500	LPS II 3000
DC OUTPUT				
Voltage	10 - 14.4 V DC	10 - 14.4 V DC	10 - 14.4 V DC	10 - 14.4 V DC
Discharge current - continuous	180 A	180 A	180 A	180 A
Discharge current - 1 min.	270 A	270 A	270 A	350 A
Idle consumption	<1 W	<1 W	<1 W	<1 W
Charging current – continuous	90 A	90 A	90 A	90 A
Super charge support	No	Yes	Yes	Yes
Connector type	Terminal – M8	Terminal – M8	Terminal – M8	Terminal – M8
SOLAR (INPUT)				
Voltage	N/A	15 - 50 V DC	15 - 50 V DC	15 - 50 V DC
Charging power (max.)	N/A	400 W	400 W	400 W
Charging current (max.)	N/A	15 A	15 A	15 A
Absolute maximum current (Isc)	N/A	30A	30A	30A
I/O				
Input ports (Analog)	C1, C2, M12	C1, C2, M12 x 3	C1, C2, M12 x 3	C1, C2, M12 x 3
Input (Voltage – M12)	0 – 36V	0 – 36V	0 – 36V	0 – 36V
Input (Voltage – C1, C2)	0 – 50V	0 – 50V	0 – 50V	0 – 50V
Output ports (Digital)	C2 and M12	C2 and M12 x 3	C2 and M12 x 3	C2 and M12 x 3
Output (Voltage)	0 or 12V	0 or 12V	0 or 12V	0 or 12V
Output (Current)	400 mA (Over current protected)	400 mA (Over current protected)	400 mA (Over current protected)	400 mA (Over current protected)
Connector type (M12)	Type A – 5-way	Type A – 5-way	Type A – 5-way	Type A – 5-way
Connector type (C1/C2)	Terminal – M4	Terminal – M4	Terminal – M4	Terminal – M4

6. CERTIFICATIONS AND COMPLIANCE

Low Voltage Directive 2014/35/EU

EN62368-1, EN62133

EMC 2014/30/EU

EN61000-6-2, EN61000-6-3

RoHS Directive 2011/65/EU

EN 63000

E-Marking

UN-ECE Regulation 10, E5 10R – 06 0488

7. SAFETY AND FUSES

These measures ensure the safe and secure operation of the electrical system:

- 230V AC input protected with 16A fuse.
- 230V AC output protected by a Residual Current Circuit Breaker with Overload protection (RCBO) 30mA/13A.
- DC input protected with 50A fuse.
- DC output protected with 180A fuse.
- L/N relay hardware protection against hazards.
- PE/N relay hardware protection against hazards.
- Solar panels 20A fuse.

Fuses cannot be replaced by the user and require service.

ATTENTION: The MPPT/Solar may be permanently damaged if the input voltage exceeds 50V.

ATTENTION: The device is equipped with a Residual Current Circuit Breaker with Overload protection (RCBO). To ensure its proper operation, it is important to regularly test the RCBO.

Procedure:

- Ensure that 230V AC is present.
- Locate the button marked 'T' on the RCBO.
- Press the 'T' button.
- Observe the RCBO to ensure that it trips during the test.

If the RCBO becomes disabled, all 230AC output ports will be disconnected. This is a safety feature to protect the device and those using it. Regular testing of the RCBO ensures that it is functioning properly.

ATTENTION: Protective Earth - The device must have protective earth connected.



It is mandatory to install a Protective Earth (PE) connection in accordance with the requirements specified in IEC 62109-1. The PE connection provides a safe route for electrical fault current to flow, reducing the risk of electric shock and fire. Proper installation of the PE connection is essential for ensuring the safety of users and the equipment. Make sure that the PE connection is installed using appropriate materials and methods, in accordance with the relevant national and local regulations.

8. STORAGE

The battery can be stored at temperatures between -20°C and 45°C. For long term storage (>1 month), the battery should be fully charged and stored at temperatures between 0°C and 35°C. The battery needs to be charged every 6 months if not used. Do not store the battery upside down.

9. TRANSPORTATION

Lithium batteries are classified as Class 9 hazardous materials (UN3480) and must always be transported in compliance with all applicable local, national, and international regulations. Proper packaging is required during transportation, and packaging instructions (PI965) must be respected. The batteries should not be turned upside down during transportation.

10. DISPOSAL

To ensure proper disposal and reduce potential hazards, discharge the battery completely before placing it in a designated battery recycling bin. Improper disposal, such as throwing it in regular rubbish bins, is strictly prohibited as the product contains batteries with potentially harmful chemicals. Adhere to local laws and regulations for battery recycling and disposal.

11. 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 defect 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 been 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. Note that the device contains lithium batteries and must be shipped as dangerous goods according to UN3480 lithium-ion batteries' regulations.

Sales: sales@claytonpower.com

Service: service@claytonpower.com

Phone: +45 4698 5760



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