



## PowerSwap Nucleus® Classic Lithium Power System



# PowerSwap Nucleus Classic Power System Owner's Manual

Document Number: PowerSwap\_Nucleus\_00\_G  
Revision Date: December 10, 2020

Release Date: January, 2019

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## Important



### Read and Understand this Manual Before Operation!

The Nucleus battery is specifically designed and optimized for the PowerDock and PowerCharge. Do not attempt to use a charger not manufactured by Newcastle Systems, Inc. with this product.

Special precautions and handling instructions are contained in this manual and should be strictly adhered to for safe and reliable operation. Contact Newcastle Systems, Inc. Customer Service at +1 (781) 935-3450 or [customerservice@newcastlesys.com](mailto:customerservice@newcastlesys.com) with any questions regarding this product.

## System Components

### Cart Configurations

PowerDock Station will be mounted to your selected cart configuration as shown below.



NB Series Cart



NB Series SLIM Cart



PC Series Cart  
& Atlas Series Cart



Apex Series Cart

## PowerDock Station, PowerCharge Station and Battery



1. PowerDock Station (PWD2C, PWD2Ci or PWD2C-TSW): This will be installed on your Newcastle cart. See [“Cart Configurations” on page 1](#) to view your cart configuration.
2. PowerCharge Station (PWC2C or PWC2Ci): This is used to charge lithium batteries.
3. 36 AH/460 WH lithium battery (PSNU3.6): 1 to 4 units, based on your order.

Make sure batteries are fully charged prior to powering equipment.



## Operating Guidelines

### Storage and Disposal

#### Storage Instructions:

- DO NOT SHORT TERMINALS.
- This battery should be stored in a cool, dry, and well-ventilated area. Sustained elevated temperatures are the primary reason for premature failure of batteries. Charge batteries at room temperature. In warm climates, keep chargers in air conditioned rooms for best performance.
- Although our batteries have good self-discharge characteristics, batteries should be stored for long term storage in a fully charged condition.
- It is always a good idea to submit the battery to a discharge/charge cycle from time to time during storage.
- Do not store batteries in temperatures above 140° F/60° C or below -40° F/-20° C. Do not store in direct sunlight or near heating equipment.

#### Disposal Instructions:

- DO NOT INCINERATE. DO NOT DISASSEMBLE.
- Disposal must be in compliance with applicable regulations which vary depending on national, state/provincial and local basis. This battery contains recyclable materials so recycling is strongly recommended.

### PowerDock Operating Instructions



**Step 1:** Confirm the cart's power strip is already plugged in. (Located on the rear side of PowerDock as shown).



**Step 2:** Place 1 or 2 fully charged batteries in PowerDock Station. Make sure you hear a click as the battery engages and the LED lights on the battery are lit. \*Batteries should be inserted firmly, but never slammed into place.



**Step 3:** Turn PowerDock Station on (-) (switch located as shown). LED above switch should light green.

**Step 4:** Plug your equipment (printer, laptop, etc.) into the cart's integrated power strip. Confirm that your power strip is turned on.

#### Operating Tips:

When unit is not in use, turn the PowerDock OFF. Batteries will continue to drain if unit is left on.

The PWD2C is equipped with GFCI circuit protection. Should the unit ever not output power, ensure that the GFCI has not tripped. Do not insert anything conductive into the unit as there is a live receptacle adjacent to the Reset button.

Monitor battery status with the LED meter on battery. When batteries become low, alarm will sound and battery should be swapped with a fully charged one.



## PowerCharge Operating Instructions

Step 1: Place 1 or 2 discharged batteries in PowerCharge Station. Make sure you hear a click as the battery engages. \*Batteries should be inserted firmly, but never slammed into place.

Step 2: Turn unit ON (“I” position as shown). ON/OFF switch is located at rear of unit as shown below.





Charging time of the PWC2C takes approximately 4-5 hours to charge fully depleted batteries.

**Replaceable AC Fuse:** This is located adjacent to the AC inlet of the PowerCharge to protect from overload. If fuse blows, replace with equivalent, fast-acting, 250 V, 6.3 A rated 5 mm x 20 mm glass fuse. **CAUTION:** installing non-rated fuses could cause equipment damage and void your warranty.

## Fuel Gauge

The following graphics illustrate the amount of battery power and corresponding LED lighting sequence.

Illustration of Fuel Gauge	LEDs	Battery Fuel
	5	81-100%
	4	61-80%
	3	41-60%
	2	21-40%
	1 solid	11-20%
	1 flashing	1-10%

## Preventative Maintenance

Damaged connectors, contacts and cables may present hazards, resulting in inefficient battery and charger operation. To avoid these problems, conduct the following maintenance checks at least once annually. If you see any of the following problems, take corrective action immediately.

## Maintenance

When engaged and disengaged, the contact surfaces of Nucleus connectors “over wipe,” thus providing a self cleaning action. To ensure the continued benefit of this feature, clean the contact surfaces with a cotton swab and lubricate the connector. Use a “white” lithium grease, which may be obtained from hardware stores and automotive parts suppliers.

## Inspection

Check contact surfaces for signs of “pitting” caused by dirt or disengaging connectors under load. One badly pitted contact, particularly in a connector attached to a battery charger, can lead to pitting on surfaces of other contacts. If not corrected, this can result in an epidemic of bad connectors throughout a fleet of electric vehicles and in chargers and batteries.

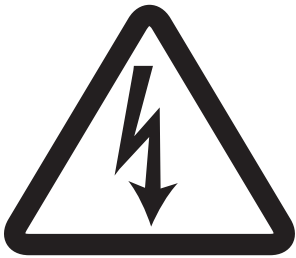
Check to see if batteries are being disconnected while the charger is still on. This causes the contacts to arc at the tips, resulting with progressive pitting and silver removal from tip to crown. If this practice is occurring, discontinue it now to avoid major repairs in the future.

## Service/Warnings

### Service

In the event the Nucleus battery fails to deliver acceptable performance, it must be returned to Newcastle Systems, Inc. No other facility is qualified and equipped to service the Nucleus battery and calibrate the electronic components and sensors. Any attempt by the user or any other unauthorized persons may result in improper calibration of the electronic components causing severe battery damage and/or safety hazards, including potential personal injury and/or damage to property. Any such attempt will void any/all warranties.

### Warnings



1. NEVER attempt to service this battery. If there is a problem, send this battery only to Newcastle Systems, Inc. for evaluation.
2. NEVER attempt to open this battery. The electronic circuits inside the battery can be damaged, causing malfunction and/or potential hazard to person and property.
3. NEVER attempt to replace the cells in this battery - it cannot be rebuilt or refurbished. At the end of its useful life, contact Newcastle Systems, Inc. Customer Service at +1 (781) 935-3450 or [customerservice@newcastlesys.com](mailto:customerservice@newcastlesys.com).

### Caution



1. Do not expose this battery to extreme high (above 140° F /60° C) or low (below 32° F / 0° C) temperatures. This includes storage in direct sunlight, in cars in hot or cold weather, or in close proximity to heating/cooling devices. This may cause electrolyte leakage, impaired performance and shortening of battery service life.
2. When not using the battery for prolonged periods, the Nucleus battery should be fully charged.
3. ALL BATTERIES have a finite life. If the battery exhibits noticeably shortened run-time, the battery should be replaced immediately. Shortened run-time is indicative of at least one cell which has reached end of life. UNDER NO CIRCUMSTANCES should one attempt to “recondition” this battery by repeated charging and discharging.
4. This battery contains specialized electronic circuits, which are designed to protect the cells from overcharge, over discharge and over current. Redundant protection devices are designed to operate if the battery voltage is abnormally high or low and if the temperature of the battery exceeds operating specifications. These electronic devices can be damaged if the battery is subject to abuse or damage. Do not use a battery that has been subjected to excessive mechanical shock or water damage.
5. Do not drop, puncture or crush this battery. Do not use the battery if the case is damaged or broken. Do not open or attempt to service this battery if damaged.

## Warnings/Precautions



### WARNING!

Indicates possibility of physical harm to the user in case of non-compliance



### CAUTION!

Indicates possibility of damage to the equipment in case of non-compliance



### FOLLOW OPERATING INSTRUCTIONS



### WARNINGS!

1. DO NOT OPEN TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK. THERE ARE NO SERVICEABLE PARTS INSIDE - REFER TO QUALIFIED SERVICE PERSONNEL.

2. It is recommended that you return the Nucleus battery interface to a qualified dealer for any service or repair. Incorrect assembly may result in electric shock or fire.

3. To reduce risk of electric shock, unplug the DC input (battery) before attempting any maintenance or cleaning.

4. To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting anything from the unit.

5. An extension cord should not be used unless absolutely necessary.

6. Place the unit in an area that will allow air to flow freely around the unit. DO NOT block or obstruct vent openings or install the unit in an enclosed compartment.

7. Keep the unit away from moisture and water.

8. Never operate two or more units in parallel.

9. **WARNING:** To avoid risk of electric shock, this equipment must only be connected to a supply mains with protective ground.

10. **WARNING:** No modification of this equipment is allowed.

EU Waste Electrical and Electronic Equipment (WEEE) Directive



Figure 1: WEEE symbol – crossed out wheeled bin

**For private households: Information on Disposal for Users of WEEE:**

This symbol (Figure 1) on the product(s) and/or accompanying documents means that used electrical and electronic equipment (WEEE) should not be mixed with general household waste. For proper treatment, recovery and recycling, please take this product(s) to designated collection points where it will be accepted free of charge.

Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling.

Please contact your local authority for further details of your nearest designated collection point.

Penalties may be applicable for incorrect disposal of this waste, in accordance with your national legislation.

**For professional users in the European Union:**

If you wish to discard electrical and electronic equipment (EEE), please contact your dealer or supplier for further information.

**For disposal in countries outside of the European Union:**

This symbol is only valid in the European Union (EU). If you wish to discard this product, please contact your local authorities or dealer and ask for the correct method of disposal.

**ENVIRONMENTAL HAZARD**  
Contains Lithium-Ion.

Disposal: DO NOT dispose of the Nucleus components and its associated components and/or accessories in municipal waste at the end of their expected service life. Consult Newcastle Systems, Inc. Customer Service for information on disposal/recycling of the Nucleus battery interface and its associated components and/or accessories.

**FCC NOTICE**

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense. This equipment has been approved by one or more agencies. All changes and/or modifications not expressly approved by Newcastle Systems, Inc. could void the users' warranty and authority to operate this equipment. There are no serviceable parts in this equipment.

## Specifications

### Battery Specifications

Output Voltage	12.8 V Nominal 10.0 V - 14.6 V Operating		
Capacity	36 Ah		
Chemistry	Lithium Iron Phosphate (LiFePO <sub>4</sub> )		
Maximum Discharge Rate	12.0 A per battery		
Cut-off Charge Current	2000 mA		
Typical Run-Time (Assuming Constant Load)		1 Battery	2 Batteries
	@ 18W	20 hrs	40 hrs
	@ 45W	8 hrs	16 hrs
	@ 72W	5 hrs	10 hrs
	@ 120W	3 hrs	6 hrs
Weight	11 lbs (5 kg)		
Size	12.8" (326 mm) L x 6.5" (165 mm) W x 6.4" (163 mm) H		



### PowerDock Specifications

	PWD2C	PWD2Ci	PWD2C-TSW
Voltage	120 VAC ± 3% Modified Sine Wave	120 VAC ± 3% True Sine Wave	230 VAC ± 3% True Sine Wave
Current	2.0 A	2.0 A	1.0 A
Frequency	60 Hz ± 1%	60 Hz ± 1%	50/60 Hz ± 1%



### PowerCharge Specifications

	PWC2C	PWC2Ci
Power Input	120 VAC 50-60 Hz 5.6 A	230 VAC 50-60 Hz 2.8 A
Output	10.0 A	10.0 A
Charge Time	4-5 hrs	4-5 hrs





## Operating, Transportation, and Storage Environment

Discharge Temperature Range	32-104° F (0-40° C)
Charge Temperature Range	32-95° F (0-35° C)
Storage Temperature Range	-40 to 140° F (-20 to 60° C)
Relative Humidity	20-70% non-condensing
Pressure	985 hPa to 1040 hPa
Device intended for indoor use only.	
Never use flammable or combustible solvents around batteries or chargers.	

## Air Transportation Regulation

### Air Transportation Regulation

Dangerous Goods Regulations 49CFR Parts 100-185, Air Transport Association (IATA) and the International Civil Aviation Organization (ICAO) regulations apply to all Lithium-Ion battery transport.

### Air Transportation Declaration

Newcastle Systems, Inc. declares that the Nucleus Lithium-Ion battery pack contains equivalent lithium content (ELC) in a quantity exceeding 8 grams and less than 25 grams and therefore is considered and must be handled and transported as a class 9 Hazardous article and is subject to regulation under Dangerous Good Regulations.

### 49 CFR Parts 100-185

Since the interpretation and application of regulations may vary with the aviation company, the transport of the Nucleus battery may be disallowed even when the condition described above are satisfied. Newcastle Systems, Inc. therefore strongly recommends that you consult with your transportation company prior to transporting the battery pack.

# OWNER'S MANUAL



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**SAVE STEPS.  
INCREASE PRODUCTIVITY.™**