



Instructions for Use (IFU)

GeniTec Chargers

GeniTec Single Bay Charger (GEN-C1xx-Cxx-xx)

GeniTec Dual Bay Charger (GEN-C2xx-Cxx-xx)

GeniTec Quad Bay Charger (GEN-C4xx-Cxx-xx)

External Power Adapter (PMP220SF-15HI)

EDC-0060-M02

Issue 2.4 - RELEASED

Versions	Date	Version	Data
Originated	1st June 2015	2.2	25th July 2016
1.0	10th August 2015	2.3	31st July 2016
2.0	18th May 2016	2.4	25th February 2022
2.1	24th May 2016		

Warning Notice

As with any power system that stores high levels of energy, the battery used in this device may present a risk of fire or chemical burn if mistreated. Do not disassemble, heat above 40°C or incinerate. Replace Power Module with genuine Bytec part only. Use of another battery may present a risk of fire or explosion. It is the user's responsibility to ensure that they are completely familiar with these instructions for use, and that they have received appropriate safety instructions on the safe handling of the Power Modules and the use of the system generally.

Regular maintenance is required to ensure that the Power Modules and electrical systems are free from wear and tear, or any damage whatsoever. If in any doubt seek advice, and remove any damaged Power Modules immediately from service. There are no user serviceable parts. All repairs or maintenance must be performed by an authorised maintenance centre.

Manufacturer
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Important Information

Please read the Instructions for Use carefully before using the system. For other languages please contact the manufacturer.

Caution

- The GeniTec Quad bay Charger contains a Class I PSU, and must be connected to a mains supply with protected earth.
- The GeniTec Single and Dual chargers should only be used with the external power adapters supplied.
- Before fitting a Power Module to any charger, ensure that the Power Module is free from any physical defect, swelling, and that the casing is not cracked or damaged in any way.
- Before fitting a Power Module to any charger, check that the SERVICE indicator is not illuminated.
- Do not use or store the GeniTec system, chargers or Power Modules where it is exposed to direct sunlight.
- Do not use or store the GeniTec system, chargers and Power Modules near sources of direct heat such as a fire or heater.
- Only Bytec approved GeniTec Power Modules and Chargers should be used.
- Only charge Power Module on approved GeniTec Chargers.
- Do not immerse the Power Module in fluid.
- Do not strike, throw, drop or subject the Power Module to physical shock.
- Do not pierce the Power Module casing with any sharp object or attempt to open in anyway.
- GeniTec Power System and Power Modules have no user serviceable parts within.
- IF THE POWER MODULE OR ANY PART OF THE ELECTRICAL SYSTEM HAS BEEN DAMAGED OR COMPROMISED IN ANYWAY, DO NOT USE AND REMOVED FROM SERVICE IMMEDIATELY.

Operating Conditions

- The operating temperature range for the GeniTec system should remain within 1°C to 40°C. **Do not use outside of this temperature range.**
- The operating relative humidity range for the GeniTec system should remain within 20% to 75% (non-condensing)
- The operating altitude range for the GeniTec system should not exceed 0m to 3000m (pressure range should not exceed 101kPa to 90kPa)
- Failure to observe these conditions will invalidate the warranty and reduce the life expectancy of the Power Module.
- In some conditions, the Power Modules may stop charging if the internal temperature is above a specific range. This is normal behaviour to protect the safety of the battery cells.

Storage Conditions

- It is recommended to store the Power Module at 50% maximum capacity.
- It is recommended to store the Power Module at room temperature.
- Power Module charge levels should be checked every month while in storage, and if necessary charged back to 50% if it drops below 10% to prevent over discharge. It is normal for the battery to lose some or all of its charge over time.
- The storage temperature range for the GeniTec system should not exceed -10°C to 45°C
- The storage relative humidity range for the GeniTec system should not exceed 10% to 80% (non-condensing)
- Failure to observe these condition will invalidate the warranty and reduce the life expectancy of the Power Module.

Shipping Conditions

- Power Modules contain Lithium, and are classified as a Class 9 Dangerous goods for transportation, and therefore all regional regulations imposed by transportation companies must be observed. Check with your local transport representative for advice on shipping in your region.
- It is recommended to use the original box and packing materials when shipping.
- Do not ship damaged or faulty Power Modules.
- The Power Module should be charged >10% and <30% prior to shipping.
- The shipping temperature range for the GeniTec system should not exceed -10°C to 35°C
- The shipping relative humidity range for the GeniTec system should not exceed 10% to 80% (non-condensing)

GeniTec Charger Overview

The GeniTec chargers are designed to provide remote charging of the GeniTec Power Modules (GEN-B201-Cxx-02). Three models are currently available and have been designed for continuous use:-

- Single Bay Charger (IPx0) - Can charge a single Power Module upto 4.0 Amp
- Dual Bay Charger (IPx0) - Can charge two Power Module upto 3.75 Amp
- Quad Bay Charger (IPx0) - Can charge four Power Module upto 3.75 Amp

AC Power Supply

Only the supplied external AC Power Adapter should be used with the Single and Dual Charger models.

- Switching Power Adapter PMP220SF-15HI Class II
- AC Input 100–240 VAC, 47-63Hz, 2.5-1.2A
- DC Output 220W Max 28VDC, 7.86A

The Quad bay Charger has an internal Class I Power supply, equipment must be earthed.

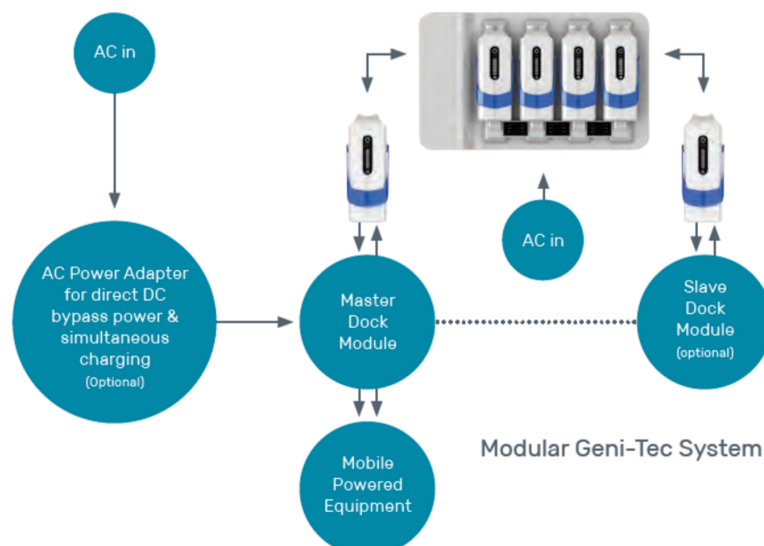
- AC Input 100–240 VAC, 47-63Hz, 4.6-2.3A

Connection to External Equipment

The GeniTec chargers can be connected to a PC (windows 7 or above) using the USB connection to access and collect performance information.

USB USB 2.0 compatible
 Max cable length = 0.5m

Warning: all SIP/SOP are for exclusive connection to IEC 60601-1 certified equipment when it is placed within the patient environment and to IEC 60XXX certified equipment when it is placed outside of the patient environment.



Electromagnetic Interference (EMI)

Although the product meets necessary EMI radiated, conducted and susceptibility standards to EN60601-1-2. Care should be taken around sensitive equipment, or other large EMI source. Such proximity could cause variation in equipment performance. If this happens, move the equipment further away and refer to the EMC guidance and manufacturer's declaration.

Classifications

The single and dual bay chargers use a Class II mains power adapter for supplying power for charging any Power Modules attached. The Quad Charger has a built in Class I power supply unit. Not suitable for sterilization. Not suitable for use in an oxygen rich environment

Intended Use

The GeniTec system has been designed to provide a reliable source of rechargeable battery power to equipment within a clinical environment. When integrating within equipment, individual components should be installed and/or configured by an appropriately Instructed person or certified engineers/technicians.

Integrations must be in accordance with the manufacturer's recommendations and terms of use.

The GeniTec system, including chargers, are intended for use by trained Healthcare professionals.

It is not intended for use by the patient, or any member of the general public.

All installers, configuration agents, and users should be completely familiar with all aspects of this IFU. No servicing or maintenance should be performed while the equipment is in use.



The GeniTec system is not intended for use with life support equipment in any way. Any use or integration within a medical device is strictly and exclusively the responsibility of the Medical Device manufacturer, agent, reseller or integrator. The Medical Device manufacturer is responsible for appropriate risk management, product testing, classification and certification for their own specific intended use.

Maintenance and Cleaning

ONLY USE GENUINE BYTEC SUPPLIED REPLACEMENT PARTS. FAILURE TO COMPLY WILL INVALIDATE YOUR WARRANTY AND MAY PRESENT SERIOUS DANGERS

Cleaning Exterior Surfaces

The GeniTec system should be kept clean and free of dust by a trained professional healthcare adult. The Dock, charger and Power Module should be cleaned using a damp cloth with water or alcohol based solution. Please observe the following precautions.

- Turn the system off and disconnect from the AC power supply before cleaning
- Do not pour fluid over any part of the GeniTec system.
- Do not allow fluids to penetrate the exterior surface of the dock module(s)
- Do not use abrasive cleaners or strong solvents such as acetone or acetone-based compounds

WARNING: In case of fluid ingress, remove excess fluid with a cloth, and allow the system to dry out thoroughly. Seek advice from qualified or trained technicians before attempting to use it again.

Power Modules and Charger Disposal

The Power Modules contain Lithium Ion batteries. Dispose of the Power Modules/batteries in an environmentally safe and friendly manner.

Properly dispose of all Power Module/batteries and Chargers according to local regulations.



Do not disassemble, puncture or incinerate the Power Modules or batteries

Servicing


- The GeniTec system, Power Module and Chargers do not contain any user serviceable parts within.
- GeniTec systems must only be installed by an Instructed person or suitably qualified person.
- Instructions For Use are supplied in English. Other languages are available on request.
- For telephone assistance call Bytec +44 (0) 1737 378820

WARNING: Do not modify this equipment without authorisation of the MANUFACTURER.



Emergency















In extremely rare cases of smoke, fire or partial material decomposition, if safe to do so, submerge the Power Module fully into water. Call the fire department.

Symbols and Labelling

	This button on the Power Module has no function when fitted onto any charger.
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Example of typical label found of each of the GeniTec components.

	Read the instructions for use (IFU) before using or installing the product.		Conformité Européenne
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	Care should be taken when using the product. Handle with care.		Waste Electrical and Electronic Equipment Directive (EU)
	Recyclable (Taiwan)		Conforms to the transportation standards for hazardous materials. Class 9.
	Federal Communications Commission Conformance (US)		Underwriters Laboratory (UL) listed component.
	Meets the requirements of the current EU RoHS Directive 2011/65/EU,		Lithium Ion Recycling (Japan) Includes Universal Recycling symbol.
	Keep out of sunlight		Do not use if housing is cracked or broken.
	Operating temperature range 1°C - 40°C		TUV Rheinland Listed component for US and Canada
	Direct Current		Alternating Current

Safety Features

The GeniTec System has been designed specifically for use within a healthcare environment. Great care and attention has been given to the safety features within its design.

1. **Cell Discharge Cut-Off** If the Power Module is allowed to become over discharged the internal cell will automatically shut down, causing the Power Module output to turn off. All LEDs on the front of the power module will extinguish and will no longer illuminate when the “standby” switch is touched. To reset, the Power Module must be attached to a dock or charger and placed on charge.

Charger : Attach Power Module on powered charging dock and allow it to recover. and fully charge. This may take 30 minutes but depending on the level of over discharge state this can take longer, though typically this will be no longer than 6 hours.

If the Power Module does not recover after this period then it is unrecoverable and should be removed from service.

Dock : *The Dock has a 30 minute charging timer.*

Attach the Power Module to a Dock(Powered On) and allow it to recover. and fully charge. Power Modules can typically take up to 30 minutes to begin charging following a discharge

cut-off. If charging hasn't begun after 30 minutes, Remove and reattach the Power Module to begin a new charging cycle. In some cases a Power Module may take upto 6 hours or 12 x 30 minute cycles. If the Power Module does not recover after this period then it is unrecoverable and should be removed from service.

Warranty Notice: If the power module is allowed to over discharge to the point that it can no longer recover, then it has entered a deep discharge mode that will inhibit the Power Module from being recharged. This is by design as a protection mechanism, it is not a fault. In such cases, the warranty no longer applies, and the Power Module should be removed from service. The Power Module poses no danger in this state.

2. **Cell Overcurrent** If the output current drawn from the cell exceeds its safe threshold for 10ms or more the internal cell output will be turned off. To reset, the Power Module must be attached to a dock and placed on charge. Once the bargraph display turns back on, the Power Module can be used normally.
3. **Thermistor** The Power Module contains an integrated thermistor. The dock continuously monitors the thermistor value to determine the operating temperature of the battery. If the temperature falls outside the permissible operating temperature, charging is terminated until the temperature returns to an acceptable operating level.
4. **Dock Detect** The Power Module detects the presence of the dock to operate. If the dock cannot be detected, then the internal cell voltage will be isolated from the external Power Module contacts. The Power Module interconnect pins only become 'live' when the Power Module is safely attached to a dock and authenticated. (Patent Pending)
5. **Ingress Protection** The Power Module is sealed to protect against the ingress of dust and water, allowing the unit to be safely cleaned for effective infection control. (Patent Pending)
6. **Power Module Overcurrent** If the output current drawn from the Power Module exceeds a predefined level for a period of 10s or more, the Power Module output will be turned off. To reset, the Power Module must be removed from the dock and then re-attached or the system.
7. **Power Module Overcharge** The system will automatically terminate the charge cycle when a Power Module is fully charged. It is not possible to overcharge a Power Module.
8. **Power Module Over/Under Temperature** If the internal temperature of the Power Module housing exceeds the safe operating temperature range of the internal cell the dock will automatically disable charging & discharging. The internal temperature measurement is determined using a digital temperature sensor.
9. **Power Module Output Isolation** The output isolation of the Power Module is continuously monitored. If the output isolation becomes faulty the 'Service' LED on the Power Module will flash continuously (when connected to a dock and powered on) to warn the user of a faulty Power Module. The Power Module should be removed from service. Note: When disconnected from the dock the 'Service' LED will flash to indicate the fault only when the "Standby" switch is touched.
10. **Power Module Encryption** Each Power Module is factory programmed with an authentication code. Each time a Power Module is attached to a dock (or powered on) it is interrogated to confirm that it is genuine. If a non-genuine Power Module is identified the Power Module will be prevented from charging & discharging. A Power Module that does not pass encryption within 30

min will be assumed to be non-genuine. (Patent Pending)

11. **External Input Voltage** When the external 28VDC PSU is connected to the system the applied voltage is checked for under voltage, overvoltage and reverse voltage. The protection circuit will prevent an incorrectly applied voltage from damaging the system. The protection circuit also protects the external PSU against over current.
12. **Safety Signal** The dock continuously checks each Power Module for the presence of a safety signal. If the safety signal is not present the Power Module will be prevented from charging & discharging.
13. **System Short Circuit** The system output is protected from a short circuit event by the integrated regulation circuit. The output voltage will be automatically restored as soon as the short circuit is removed.
14. **System Transient Current** If the output current drawn from the system exceeds a predetermined level for a period of 15 mS, the output voltage will be turned off. To reset the output voltage the fault condition must be removed, or the system should be power cycled.
15. **System Continuous Current** If the output current drawn from the system exceeds the preprogrammed threshold for a period of 10 seconds, the output voltage will be turned off. To reset the output voltage the system must be power cycled.

NOTE: During discharging at higher loads, it is normal for the Power Module to feel warm to the touch. This includes the gold contacts on the Power Module, docks and chargers. The Power Module can operate safely at higher temperatures during discharge than during charging. If the Power Module is fitted to a charging station immediately after a discharge, it is possible that the Power Module does not start charging straight away. This is normal operation. It will relax, allowing the temperature to drop to an appropriate level before starting its charging cycle.. This is designed to help maintain a healthy battery operation. Also note that the rate of charge can also vary depending on the temperature, and this can affect the total charge time experienced by the user.

GeniTec Chargers

Three types of chargers are currently available. Only use Genuine GeniTec Chargers to charge GeniTec Power Modules.

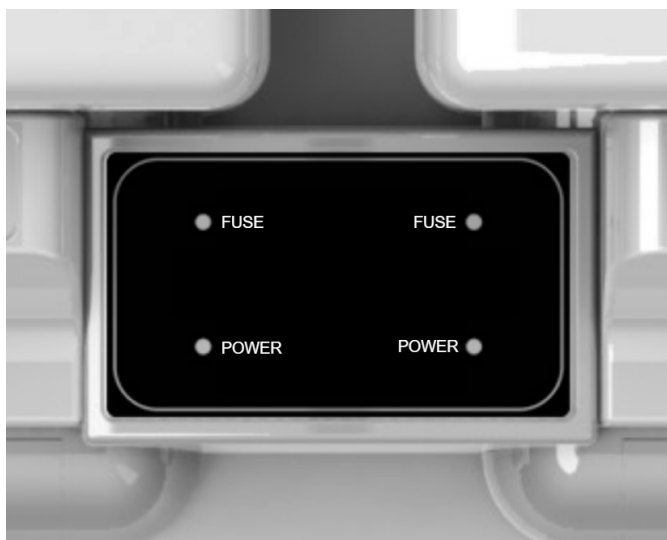
Single Charger - Can charge 1 Power Module in fast charge mode (maximum 4 A charge rate).

Dual Charger - Can charge 2 Power Modules simultaneously in normal charge mode (maximum 3.75A charge rate).

Quad Charger - Can Charge 4 Power Modules simultaneously in normal charge mode (maximum 3.75A charge rate).

NOTE: During normal operations, Power Modules can become warm to the touch. In warmer or hot environments, temperatures can have an impact on recharge times. If too warm, the Power Modules may temporarily stop charging to allow time to relax before charging restarts. While charging, if the temperature gets too warm, charging will also be paused. This is usually due to a heavy power discharge cycle just prior to charging. In normal operation, no visible pause in charging should be noticed. It is important to observe operating conditions, as this can also have a detrimental impact on service life.

LED Indicators on Dual and Quad Charger



FUSE - When the LED is lit RED, please call the service department. Disconnect from mains immediately. This indicates that the fuse may require changing or a fault has developed.

POWER - In normal operation, this LED will be LIT green, and no other LEDs should be lit.

Replacement fuse: This should only be replaced by a suitably trained technician.

Inline fuse: T4AL Slow Blow 5x20mm 250V AC

Wall Mounting Installation

The 2 bay and 4 bay chargers have been specifically designed to be wall mounted. Only Instructed persons or suitably qualified persons should determine the correct type and number of fixing to be used, depending on wall structure and condition, to support the charger for normal operation.

It is recommended that the charging of Power Modules should not take place within the patient care environment and preferably located in a room that can be closed to isolate any smoke and fumes from other areas.

Wall mounted chargers should be located to optimise workflow, but care should be taken that chargers are not a hazard with regards to loose hanging cabling.

Where you are leaving a power module to charge unattended, you should check that the charger is working satisfactorily, and that potential fire hazards in the immediate area have been identified.

You must keep the charging area free of any flammable or combustible material.

Isolation from the Mains Supply: Position the equipment where it can maximise work flow but can be easily isolated from the mains supply.

Single Charger - Quick Guide

The GeniTec single charger enables off system charging of a single GeniTec Power Module. It can be desk or panel mounted.



Connect the single charger to the supplied external power adapter (PMP220-15 28V 220W Class II)

To attach a Power Module, simply align the base of the Power Module to the base of the dock, rotate forward and push firmly onto the charger dock. A positive click will be heard indicating the Power Module is locked successfully in place. The Power Module, once attached, will turn on and commence charging automatically. The bargraph display will show a single chasing LED while charging and 10 solid WHITE LEDs when fully charged. There is no further user intervention needed. There are no alarms.

A Power Module can be safely removed or attached to/from the charger at any time. It is not necessary to turn the charger off. To remove a Power Module, first fully depress the button at the top of the dock to unlock (or use the key on some systems), while holding the button, remove the Power Module. **Do not force, when unlocked the Power Module should detach easily.**

The single charger is designed for fast charging.

Single Charger ⁽¹⁾	Min	Typ	Max	Units
Input Voltage	28			VDC
Input Current			4.0	A
Charge Current			4.0	A
Charge Time		2.5		Hrs

INSTALLATION : Only appropriately trained installations technicians should install this product. Appropriate wall fixings should be used and selected depending on the surface or wall being attached to. Only use the PSU supplied (PMP-220-15). It is the responsibility of the installation company to ensure that the mechanical fixing, and electrical connections to the mains conform to any regional regulations.

It is recommended that the charging of batteries should not be in a patient care environment and preferably in a room that can be closed to isolate any smoke and fumes from other areas.

Dual Charger - Quick Guide

The GeniTec Dual Charger has two charging bays and enables charging of one or two GeniTec Power Modules. Wall mountable only.



Connect the dual charger to the supplied external power adapter (PMP220-15 28V 220W Class II)

To attach a Power Module, simply align the base of the Power Module to the base of the dock, rotate forward and push firmly onto the charger dock. A positive click will be heard indicating the Power Module is locked successfully in place. The Power Module once attached will turn on and commence

charging automatically. The bargraph display will show a single chasing LED while charging and 10 solid WHITE LEDs lit when fully charged. There is no further user intervention needed. There are no alarms.

A Power Module can be safely removed or attached to the charger bays at any time. It is not necessary to turn the Dual Charger off. To remove a Power Module, first fully depress the button at the top of the dock to unlock (or use the key on some systems), while holding the button, remove the Power Module. **Do not force, when unlocked the Power Module should detach easily.**

A maximum of 2 Power Modules can be charged at any one time.

Dual Charger	Min	Typ	Max	Units
Input Voltage		28		VDC
Input Current			6.0	A
Charge Current (bay 1 and 2)			3.75	A
Charge Time (bay 1 and 2)		3		Hrs

INSTALLATION : Only appropriately trained installations technicians should install this product. Appropriate wall fixings should be used and selected depending on the surface or wall being attached to. Only use the PSU supplied (PMP-220-15). It is the responsibility of the installation company to ensure that the mechanical fixing, and electrical connections to the mains conform to any regional regulations.

It is recommended that the charging of batteries should not be in a patient care environment and preferably in a room that can be closed to isolate any smoke and fumes from other areas.

Quad Charger - Quick Guide

The GeniTec Quad charger has 4 charging bays and enables charging of up to four GeniTec Power Modules



Connect the Quad Charger to the mains supply using an approved IEC cable. The 4 green LEDs labelled 'OK' will illuminate indicating the Quad Charger is ready for use.

To attach a Power Module simply align the base of the Power Module to the base of the dock, rotate forward and push firmly onto the charger dock. A positive click will be heard indicating the Power Module is locked successfully in place. The Power Module once attached will turn on and commence

charging automatically. The bargraph display will show a single chasing LED while charging and 10 solid WHITE LEDs lit when fully charged. There is no further user intervention needed. There are no alarms.

A Power Module can be safely removed or attached to the charger bay at any time. It is not necessary to turn the Quad Charger off. To remove a Power Module, first fully depress the button at the top of the dock to unlock (or use the key on some systems), while holding the button, remove the Power Module. **Do not force, when unlocked the Power Module should detach easily.**

A maximum of 4 power modules can be charged at any one time.

4 Bay Charger ⁽¹⁾	Min	Typ	Max	Units
Input Voltage	100		240	VAC
Input Frequency	47		63	Hz
Input Current	2.3		4.6	A
Charge Current (bay 1-4)			3.75	A
Charge Time (bay 1-4)		3		Hrs

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

INSTALLATION: Only appropriately trained installation technicians should install this product. Appropriate wall fixings should be used and selected depending on the surface or wall being attached to. It is the responsibility of the installation company to ensure that the mechanical fixing, and electrical connections to the mains conform to any regional regulations.

It is recommended that the charging of batteries should not be in a patient care environment and preferably in a room that can be closed to isolate any smoke and fumes from other areas.

Installation Instructions

Quad Bay Charging Station

Wall Mount Bracket Installation

Warning: Installation of the Charging Station Wall Mount Bracket must be performed by a skilled professional. The wall mount installation must secure weight loads ranging from 27 lbs (12.12 kg) to 34 lbs (15.42 kg) as shown below. Seek advice from a structural engineer if necessary.

It is recommended that the charging of batteries should not be in a patient care environment and preferably in a room that can be closed to isolate any smoke and fumes from other areas.

Quad Bay Charging Station	8.7 kg (19.2 lbs)
Wall Mount Bracket	0.45 kg (1.0 lbs)
Individual Power Module	2 kg (4.4 lbs)
Quad Bay Charge with 4 Power Modules fitted	16.7 kg (36.8 lbs)

The above weights represent a static load. Apply a minimum of a 5 fold safety factor.

1. Determine an appropriate wall location with unobstructed access to a AC mains power outlet with protective earth that is clear of obstacles to regular foot traffic required to move charged and discharged Power Modules to and from the mobile application and the Charging Station.
2. Determine location of wall studs on which the Wall Mount Bracket will be attached, and determine an ergonomic height for the Charging Station installation.
3. When the Wall Mount Bracket has been securely installed to the wall location, position the Bracket Tab Slots on the back of the Charging Station over the Bracket Tabs of the Wall Mount Bracket and carefully lower the Charging Station until it is secured to both Tabs.
4. Connect the Charging Station to AC mains using the provided Hospital Grade AC Mains Power Cable. Illuminated LEDs below each charging bay indicate that the Charging Station is powered on.

Additional Safety Summary

For all issues the first point of contact should be the Hospital technical or Maintenance Department. If the issue can not be resolved, Bytec Healthcare Ltd should be contacted for first line support. If there are any incidents that are of concern to safety then Bytec Healthcare Ltd must be informed immediately with as much detailed information as possible along with contact number/email address. In the first instance please contact Bytec Healthcare Ltd before returning any products. Details of the incident and any relevant information need to be recorded. Our Service/ Support staff need to understand the context of the issue, and in most cases, solutions or repairs may be achieved without adding shipping costs and time to the problem.

Important notice regarding Power module discharge cutoff : Leaving a discharged Power module on a CoW without charging it can result in it entering a deep discharge phase even if there is a charged power module also fitted to the CoW. The Power modules can also enter this deep discharge phase if left uncharged for a long period.

Therefore, it is important to resolve this issue quickly or else the Power modules may fail permanently and be outside of warranty because a deep discharge is registered.

If there is a problem, Contact Service support promptly – Don't wait!

Recommended Healthcare personnel (HCP) Training:

The Healthcare personnel(HCP) should be familiarised with the following:

- 1) Proper use of the GeniTec battery system (CoWs, Power modules and Charging stations)
- 2) Avoiding deep discharge of Power modules.
- 3) Understanding Power module LED bargraph display information/warning indicators.
- 4) When and how to charge the Power module: Start of each shift or if the Power module LED bar graph is showing Orange bars.
- 5) Cleaning: Avoiding soapy residue on any contacts and pins and keeping the contact and pins clear of insulating material.
- 6) Importance of reporting any safety issues or failures of equipment.

Safety:

The GeniTec Battery system has been designed with multiple levels of electrical and mechanical back-up safety systems. Nonetheless all battery chemistries can have potential issues. For this reason it is imperative to impress upon staff the need to be vigilant and report any incidents involving Lithium batteries to Service support. It is always prudent to err on the side of caution.

Below are general guidelines for Li-NMC

Fire safety:

Excessive heat, Smoke, Hissing or burning smell are all clear warnings that something is wrong. Power modules should be removed from CoWs and chargers and isolated at a location where they represent no hazard. Such events must be reported to the manufacturer.

Should flames be visible the Power module is dangerous to the immediate vicinity and it should be disconnected from the electrical supply or load.

Clear everyone from the area, Ventilate the area with fresh air; Use a respirator, eye protection and gloves.

The Power module contains Lithium nickel manganese cobalt oxide(Li-NMC) cells and these contain liquid electrolytes that provide a conductive pathway, so the Power modules receive a Class B fire classification,so a standard ABC or dry chemical fire extinguisher should be used.

Class B is the classification given to flammable liquids.

If a fire extinguisher is not available use copious amounts of fresh water as a fine spray to swamp the fire. This will not extinguish the fire immediately and can result in the lithium generating hydrogen; this may fuel a fire or explosion if it is not managed. Continue to use plenty of water until the the fire is extinguished and the Power modules are cooled. Be aware of the increased risk of explosion.

After the event the Power module should be removed from the location and isolated in a safe well-ventilated area.

Use plenty of water as a fine spray to swamp and wash away spilt liquid that may be corrosive. Do not use damp solids or small amounts of water as this increases the risks.

Only trained and qualified personnel should attempt to fight a lithium or lithium ion battery fire.

Report the incident to the local safety adviser and the manufacturer.

Damage:

If the Power module has been damaged in any way, the housing is split or opening or has been punctured the Power module must be taken out of service immediately and isolated Photos should be taken. Such batteries may not be transported.

Any suspicion that the Electrical components are defective or damaged should result in their removal from the workflow and reported to the manufacturer.