

# HARDKORR



## 135AH LiFePO<sub>4</sub> DEEP CYCLE BATTERY

v1.5.0 - December 2021

**INSTRUCTION MANUAL**

**Congratulations on purchasing this high quality Hardkorr product.**

In doing so, you now have the assurance and peace of mind that comes from purchasing a product that has been manufactured to the highest quality standards.

Our aim is for you to be completely satisfied with your purchase, and therefore your new Hardkorr product is backed by a comprehensive 5-year warranty and an outstanding after-sales customer service team.

We hope you will enjoy using this product for many years to come.

If you require technical support, or in the unlikely event your purchase appears to be faulty, please contact our support team for immediate assistance. You can find up-to-date contact details on our website <https://hardkorr.com>.

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### PLEASE KEEP THIS MANUAL FOR FUTURE REFERENCE

This manual contains important safety instructions for your lithium deep cycle battery.

Do not operate the battery or modify the installation unless you have read and understood this user manual. Pay particularly close attention to CAUTION and WARNING statements.

Hardkorr recommends that the battery be installed by an appropriately qualified professional.

### DISCLAIMER

While caution has been taken to ensure the accuracy of the contents of this guide, Hardkorr assumes no responsibility for errors or omissions.

Please note that specifications and product functionality may change without notice.

### MODELS COVERED BY THIS MANUAL

#### **HKPBATL135B**

*135Ah LiFePO<sub>4</sub> BLUETOOTH DEEP CYCLE BATTERY*

#### **HKPBATL135BH**

*135Ah LiFePO<sub>4</sub> BLUETOOTH DEEP CYCLE BATTERY (COLD CLIMATE)*

**WARNING**

Failure to follow these instructions may result in personal or property injury, as well as reduced battery life or battery failure.

- Do not use this battery for cranking applications.
- Do not submerge the battery in water.
- Do not short circuit the battery terminals.
- Do not puncture, impact or drop the battery.
- Do not disassemble the battery. Opening the case may cause electric shock or fire and will void your warranty.
- Do not expose the battery to fire, sparks, high voltage or temperatures in excess of those stipulated in the specifications table of this manual.
- Do not series or parallel connect more than six (6) of these batteries together. Ensure that connections are made correctly as per the "Usage and Storage" section of this manual. Do not connect this battery to batteries with different chemistries.
- Do not store the battery at a voltage lower than 11.5V.
- Endeavour to keep the battery above 20% SOC where possible.
- Observe the limitations of this battery as stipulated in the specifications table of this manual, paying particular attention to maximum charge and discharge currents.
- To charge the battery, you must use a charger with a specific charging profile for lithium batteries. Your warranty may be reduced or voided if you use an unsuitable charger.
- If the battery emits any unusual smells, appears to be atypically hot, shows signs of distortion or displays any other abnormality during operation or storage, discontinue use immediately and contact Hardkorr for assistance.

**CAUTION**

The battery should not be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they are supervised or have been instructed on how to use the appliance by a person responsible for their safety.

Cable and fuse sizes are specified by various codes and standards which depend on the type of vehicle the battery is installed into.

Selecting the wrong cable or fuse size could result in harm to the installer or user and/or damage to the battery or other equipment installed in the system.

The installer is responsible for ensuring that the correct cable and fuse sizes are used when installing this battery.

**SPECIFICATIONS**

Nominal voltage	12.8V
Capacity (C20)	135Ah
Max series/parallel configurations	6S/6P
Self-discharge	<3% per month
Cycle life	3000 cycles (100% DOD) / 6000 cycles (80% DOD)
Normal charge voltage	14.4 ± 0.2V
Standard charge current / fast charge current	27A / 67A
Discharge cut-off voltage	10.0V
Max discharge current (constant)	135A
Peak current (300ms)	600A
Optimum charge temp	0°C to 55°C
Optimum discharge temp	-20°C to 60°C
Optimum storage temp	-5°C to 45°C
Weight	14.0kg
Dimensions	305mm (l) x 169mm (w) x 210mm (h)
Terminal type	M8
Certifications	UN 38.3, UL 1642, IEC 62133-2:2017, IEC 62619:2017, CE

## CONTENTS AND SPECIFICATIONS (CONT.)

**HARDKORR**

### PACK CONTENTS

1 x 135Ah deep cycle LiFePO<sub>4</sub> battery with Bluetooth®

1 x Reset switch and cable



**INSTALLATION**

Ensure that the area in which you will be performing installation of the battery is dry.

Secure the battery firmly to the mounting surface, ensuring that no movement is possible even under significant force.

You may install the battery in any orientation, including upside-down.

Ensure that your proposed installation location will not cause the battery to be exposed to temperatures in excess of the maximums stipulated in the specifications table of this manual. If you believe heat may be an issue, you may consider making use of mechanical ventilation such as fans.

Ensure you do not mount the battery in a way that could cause the terminals to come into contact with any metal surface or object. This is to avoid the possibility of short-circuiting the terminals. If you are intending to remove the battery from its installed location periodically, ensure there is a clear pathway free of metal surfaces and objects.

Do not install the battery in a wet area such as boat decks, open ute trays or chassis mounts.

Do not install the battery in a compartment dedicated to gas storage.

### CONNECTION - GENERAL

We recommend that no more than four cable lugs be connected directly to a battery terminal. If you do have more than 4 lugs, you should use a fuse block and negative busbar instead.

Ensure the battery terminals are clean before connecting any cable lugs to them.

Stack cable lugs on the battery terminals in order from heaviest draw (thickest cables) to lightest draw (thinnest cables). Lugs connected to the thickest cables should be positioned at the bottom and the thinnest at the top.

Where possible, make use of insulating terminal boots and lug protectors. Ensure all termination lugs are well crimped (not soldered) and protected.

Always use the spring washers provided for the battery terminal bolts. This ensures sufficient pressure is applied to the cable lugs for secure connection without having to over-tighten the bolts. Stack the spring washer on top of the cable lugs, not underneath.

### IMPORTANT NOTE

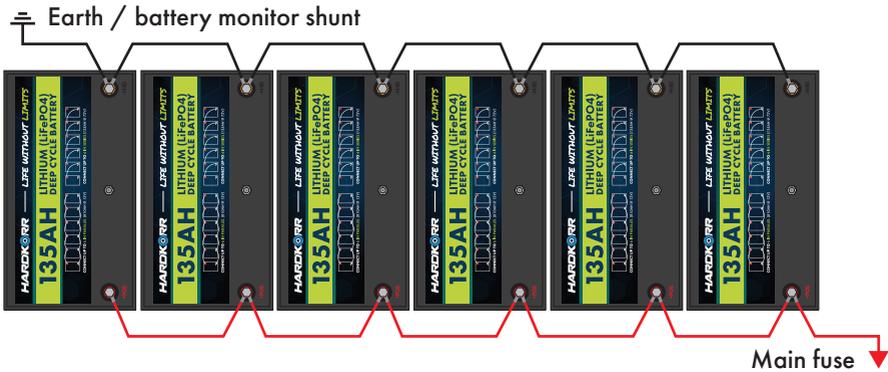
Your battery is placed into protection mode after manufacture, to protect the cells and BMS during transport. To prepare the battery for use, follow the procedure in the "BMS and Remote Reset Switch" section of this instruction manual.

### CONNECTION - MULTIPLE BATTERIES IN PARALLEL

You may connect up to six (6) of these batteries in parallel. This will create a single system in which the total capacity is the sum of the capacities of the individual units and the nominal voltage is equivalent to the voltage of one unit e.g. 3 x 135Ah 12.8V batteries in parallel gives a 405Ah 12.8V system.

When connecting batteries in parallel, you should take the negative connection from the opposite end of the battery bank to the positive connection, as per the below diagram. When wired this way, the effect of resistance in the positive and negative wires cancel each other out, helping to equalise charge and discharge rates for each unit.

Batteries connected in parallel should be disconnected and charged individually on an annual basis.



### CAUTION

Before connecting multiple batteries in parallel, ensure that all batteries are fully charged. Do not connect batteries that are mismatched in voltage, capacity, age or chemistry. Use cables of appropriate size for the system.

## SETUP AND STORAGE (CONT.)

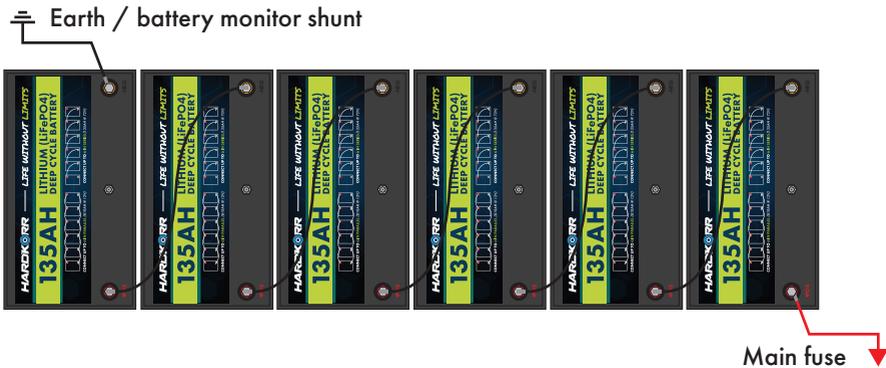
**HARDKORR**

### CONNECTION - MULTIPLE BATTERIES IN SERIES

You may connect up to six (6) of these batteries in series. This will create a single system in which the nominal voltage is the sum of the voltages of the individual units and the system capacity is equivalent to the capacity of one unit e.g. 3 x 135Ah 12.8V batteries in series gives a 135Ah 38.4V system.

As with parallel connections, when connecting batteries in series you should take the negative connection from the opposite end of the battery bank to the positive connection, as per the below diagram. When wired this way, the effect of resistance in the positive and negative wires cancel each other out, helping to equalise charge and discharge rates for each unit.

Batteries connected in series should be disconnected and charged individually on an annual basis.



### CAUTION

Before connecting multiple batteries in series, ensure that all batteries are fully charged. Do not connect batteries that are mismatched in voltage, capacity, age or chemistry. Use cables of appropriate size for the system.

**STORAGE, SHIPPING AND DISPOSAL**

Ensure that the battery is stored in a dry, clean, shaded and well-ventilated environment, at a temperature range that does not exceed the maximum storage temperature stipulated in the specifications table in this manual.

Where possible, endeavour to store the battery at around 40-50% state of charge.

At no time should the voltage of the stored battery be allowed to drop below 11.5V.

Be aware that these batteries will self-discharge at a rate of about 3% per month. We recommend the state of charge is checked regularly and topped up if necessary.

If shipping the battery between locations, please be aware that lithium is classified as Class 9 Dangerous Goods. Please ensure you comply with local, national and international (if applicable) regulations for transportation of these goods.

**WARNING**

Lithium batteries must never be disposed of with ordinary refuse, as this can cause fires and significant environmental contamination. Contact an authorised lithium battery recycling facility - you can find these at places such as Battery World, Aldi and Officeworks.

## CHARGE METHODS

Lithium batteries need to be charged slightly different to other batteries, to ensure they live a long life and provide maximum capacity.

There are several charging devices you can utilise, but whichever device you choose, it must have a lithium charge profile. Suitable devices include DC-DC chargers, solar panels (with regulator) and AC (mains power) chargers.

It is recommended that the charging current should be 30% or less of your battery capacity. You can charge at higher currents, but 30% is recommended for optimum battery longevity.

### CHARGE METHODS: DC-DC CHARGER

DC-DC chargers allow you to charge your auxiliary lithium battery from your vehicle's alternator.

You generally cannot charge a lithium battery directly from a vehicle alternator, because lithium batteries have a very high maximum charge current compared to lead-acid batteries. With nothing to intermediate between the alternator and battery, the battery will draw its maximum charge current from the alternator, which can lead to the alternator overheating and burning out.

A DC-DC charger will act to moderate the flow of current, protecting your alternator from overheating. In addition, they have a multi-stage charging algorithm which will ensure your battery is optimally charged and its service life is maximised.

Some DC-DC chargers also include a second input allowing you to connect a solar panel, and may even be able to prioritise the solar charge method when it detects a panel is connected and providing current.

**CHARGE METHODS: SOLAR PANEL WITH REGULATOR**

12V solar panels harness the energy of the sun to charge your battery. There are many solar panel options on the market, but they can be split into two main categories: fixed and portable.

Fixed solar panels usually have a rigid metal frame. They are designed to be permanently fixed to your vehicle and connected to a regulator or DC-DC charger mounted inside. They are great for charging your vehicle while on the go without consuming current from your alternator.

Portable solar panels (solar blankets, solar mats etc.) are designed to be set up while the vehicle is stationary, such as when you're at camp. They are usually connected to the battery via a portable regulator.

Either type of solar panel is fine for charging these lithium batteries, but as stated previously it is important to ensure that your regulator has a lithium charge profile to maximise your battery's service life.

**AC CHARGER**

If you're charging up your batteries at home before or after a trip, or if you're at a powered camp site, you can also use an AC (mains power) battery charger. Mains battery chargers are available as portable devices or can be built into your 12V system. Again, you should make sure that the AC charger you wish to use contains a lithium charge profile.

**WARNING**

- DO NOT use a charge profile with a "Pulse" or "Equalisation" stage. This will damage the battery and void the warranty.
- DO NOT charge your battery directly from an alternator or via VSR.

## BMS AND REMOTE RESET SWITCH

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Your battery comes equipped with an integrated advanced Battery Management System (BMS). The BMS ensures there is an even energy balance between cells and allows up to six of these batteries to be connected in parallel or series.

The BMS contains an intelligent protection circuit module which protects against overcharge, over-discharge, short-circuit and over-temperature, and can shut off power to the battery if required.

It also contains a low-voltage disconnect, which will place the battery into protection mode if it drops below 10.0V. If the low-voltage disconnect is tripped, the battery will not accept a charge until it has been reset.

To reset the battery, you can use the included remote reset switch (pictured below) which connects to the port on top of the battery. The switch can be mounted somewhere in your 12V setup and the cable permanently connected, or you can keep the switch and cable packed away and connected it when required.

To use the switch, simply plug the cable it into the top port (if not permanently connected) and hold down the button for five seconds.

You should now be able to charge the battery as normal.

### CAUTION

By continuously tripping the low-voltage disconnect you may cause damage to sensitive electronic equipment that is attached to the battery such as stereo equipment. This is not covered under the battery warranty.



*Remote reset switch & cable*

**Q. Do I need a specific charger for my battery?**

A. Yes, you will need to ensure that the charging method that you choose is suitable for use with lithium batteries. Please refer to the “Charging” section of this manual for further details. Using a charging method other than those we stipulate may void your warranty.

**Q. My battery appears to be dead or asleep. What can I do?**

A. You may find that your battery has been discharged below 10.0V and the low-voltage disconnect protection has been activated. To wake it up, refer to the instructions in the “BMS & Reset Switch” section of this manual.

**Q. Can I mount my battery inside of a car engine bay?**

A. We don't recommend putting lithium batteries inside the engine bay; doing so will void the warranty. Additionally, this will significantly reduce the service life of your battery, and at worst it may cause it to fail.

**Q. Can I mount my battery on its side?**

A. Yes, you can mount your battery on its side provided that you secure it in place.

**Q. Can I use my battery with an inverter?**

A. Yes you can, although you must take care not to exceed the maximum discharge current stipulated in the “Contents & Specifications” section of this manual.

**Q. Is there anywhere I can't install my battery?**

A. You should not install your battery anywhere that is subject to water ingress or is used for gas storage. Also take care not to place the terminals near any metal surfaces.

## DOWNLOADING THE APP

Navigate to the App Store for iOS devices or the Google Play store for Android devices and search for "HK Battery", or scan one of the QR codes below:



## CONNECTING YOUR BATTERY

Check the side of your battery for a label which contains your battery's device ID - it will start with "BT-HK" followed by a 7-digit number. We suggest you write it down here:

BT-HK \_\_\_\_\_

Open the app and click the Bluetooth logo in the top-right corner of the screen to view available batteries:



Click here to view available batteries

Locate your battery's device ID and click on it to initiate connection.

## NAVIGATION

The information available in the app is broken up into four screens:



### KEY INFORMATION

State of charge, current voltage, available capacity, status, health.



### DETAILED INFORMATION

Current voltage, net current in/out, status, cycle life, temperature.



### CELL STATUS

Current voltage of each individual cell to ensure they are balanced.



### CONTACT DETAILS

Our website, address and email if you have a question or problem.

## BMS PROTECTION LOG

The app records a log of any instances where a BMS protection circuit is activated, including over-charge, over-discharge, under-voltage, over-current and over-temperature. You can find it by pressing the shield icon in the top-right corner of any screen.



Click here to view  
BMS protection log

## ERROR MESSAGES OR UNUSUAL BEHAVIOUR

If the app stops working or displays any error messages or other unusual behaviour, please contact us for assistance.

KEY INFORMATION SCREEN

The image shows a smartphone screen with a dark blue background. At the top, the status bar shows 12:00, 4G, and battery level. The app header includes the HARDKORR logo and 'LIFE WITHOUT LIMITS'. A large yellow circle in the center displays '72%' for the State of Charge. Below this, the text 'STATE OF CHARGE' is written in yellow. A second section shows '12.8V' (Voltage) and '72Ah' (Capacity) with corresponding buttons. A third section shows 'Standby' (Status) and 'Perfect' (Battery) with corresponding buttons. At the bottom, there are icons for a battery, a gauge, a battery level indicator, and an information icon. Dashed yellow lines connect external labels to these specific elements on the screen.

State of Charge

Pair Battery

BMS Protection Record

Real-time Battery Voltage

Real-time Battery Capacity

Battery Status

Battery Health

### DETAILED INFORMATION SCREEN

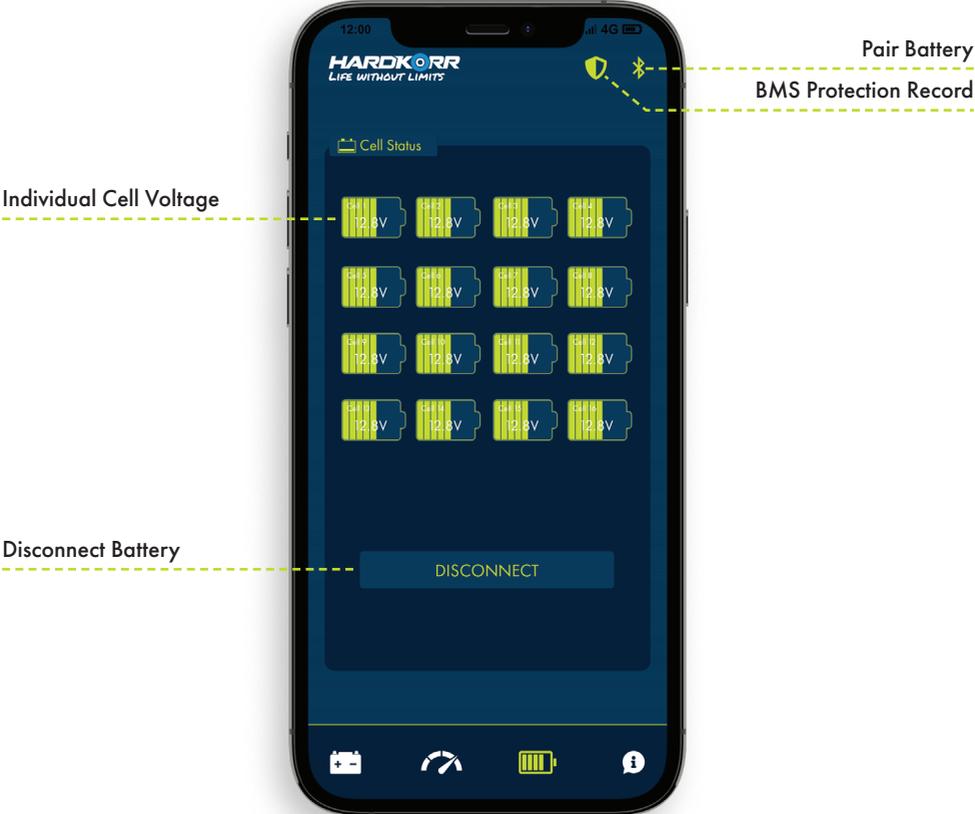
The image shows a smartphone displaying the HARDKORR Bluetooth app interface. The screen is divided into several sections:

- Current:** Two analog-style gauges. The left gauge shows Current Voltage (V) with a scale from 0 to 60 and a reading of 0.00V. The right gauge shows Current Amps (A) with a scale from 0 to 200 and a reading of 0.00A.
- Status:** A grid of eight icons representing different battery states: Standby, Discharging, Charging, Short Circuit, Over Current, Over Temp, Over Voltage, and Under Voltage.
- Battery Cycles:** A horizontal progress bar showing the number of battery cycles, ranging from 0 to 5000, with a current value of 1200.
- Temperature:** A horizontal progress bar showing the real-time temperature in degrees Celsius, ranging from -30°C to 100°C, with a current value of 30°C.
- Protection Record:** A shield icon with a lightning bolt, labeled as BMS Protection Record.
- Pair Battery:** A Bluetooth symbol icon, labeled as Pair Battery.

External labels with dashed lines point to these features:

- Current Voltage (V)
- Current Amps (A)
- Battery Status
- Battery Cycles
- Real-time Temperature (°C)
- Pair Battery
- BMS Protection Record

CELL STATUS SCREEN



Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.



Hardkorr warrants that this product will be free from defects in material and workmanship for five years. The warranty commences on the date of purchase by the original purchaser, and is not transferable. To access the benefits of this warranty, you must retain your proof of purchase and follow any other direction we reasonably give you (e.g. completing and returning your warranty card if applicable).

## TO BEGIN YOUR WARRANTY CLAIM

If you believe your Hardkorr product is defective, it must be returned to Hardkorr for inspection by our warranty claims department.

1. You must have a Return Authorization (RA) number. To get your RA number, please complete the form found on our website and wait for the warranty team to contact you.
2. Once you have an RA number, you must arrange for the product must be shipped at your own expense back to Hardkorr (keep your receipt). The address for shipment will be provided when we issue your RA number.
3. Please be sure that your RA number is clearly marked on the outside of the packaging used for shipping.

Completing the steps as mentioned will ensure a faster process of your claim, so that Hardkorr can get your product back to you as soon as possible.

Once we receive your returned product, our technicians will inspect it. We will then notify you of the outcome of your claim.

If we accept your warranty claim, we will either repair, replace or refund the goods at our discretion. We will also reimburse you for the shipping costs you incurred in sending the goods back to us. Any products that we choose to replace or refund become the property of Hardkorr.

If we do not accept your claim, we will advise you of the reason and hold your product for collection. You will need to arrange and pay for the product to be shipped back to you. If your product is not collected within 30 days of your warranty claim being finalised, we may destroy it.

Your warranty is voided if we (at our sole discretion) determine that there is evidence of one or more of the following:

- **Negligence:** Improper installation, improper or extreme use, use that contravenes this instruction manual, etc.
- **Abuse:** Road hazards, Damage beyond the limits of “normal wear and tear.”
- **Unauthorized Repair:** Repair service performed by an unauthorised service centre.
- **Disassembly:** Any attempt to open, tamper with or otherwise compromise the integrity of the product.
- **Consequential damage:** damage to this product caused by the failure of another component of the vehicle or device in which this product is installed.

Additionally, in the case of battery products: the following will void your warranty:

- **Incorrect charger:** The use of a battery charger that is not suitable for lithium batteries i.e. does not have a lithium battery charge profile.
- **Under bonnet use:** Using this battery under the bonnet of a vehicle.
- **Overcharge/over-discharge:** Charging or discharging your battery at a rate higher than those stipulated in the Specifications table of this instruction manual.
- **Water ingress:** your battery is not designed to be installed in an area that is subject to water ingress.

It is reasonable to expect that over its service life the capacity of your battery will reduce. Natural capacity decrease, which we define as a decrease in capacity of less than 10% per year of ownership, is not covered by this warranty. All batteries are tested using our in-house equipment and if we decline your claim for capacity decrease we will provide you with a copy of the test report.

**Exterior Finish:** Hardkorr uses the highest quality materials available, but depending on location, environment and exposure, the colour of exterior surfaces can fade. We will not approve any warranty claims that relate to fade.

## DISCONTINUED ITEMS

Discontinued items that are still under warranty will be reviewed by Hardkorr. If a discontinued item is covered under warranty it may be replaced by an equivalent or superior item. If an equivalent item is not available Hardkorr will determine terms of resolution on a case-by-case basis.



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