

# Cardiosave Battery Operation

## Quick Reference Guide/Cardiosave IABP software D.00

(For use outside the US only)



**Note:** This is an abbreviated guide for proper battery operation and maintenance for the Cardiosave. For complete product instructions, please refer to the Cardiosave Operating Instructions.

## Introduction

This Quick Reference Guide is designed to highlight the location, functionality, alarms and maintenance of the lithium ion batteries that accompany the Cardiosave Intra-aortic Balloon Pump.

The Cardiosave batteries are designed to be used during transport or portable operation and it is critical to keep these batteries charged at all times to avoid interruption in power during transport. Additionally, it is important to maintain the batteries in accordance with Cardiosave's Operating Instructions.

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## Cardiosave Battery Location and In-Use Indicators

It is extremely important to know the location of the batteries on the back panel of the Cardiosave unit and to pay attention to the “in-use” indicators

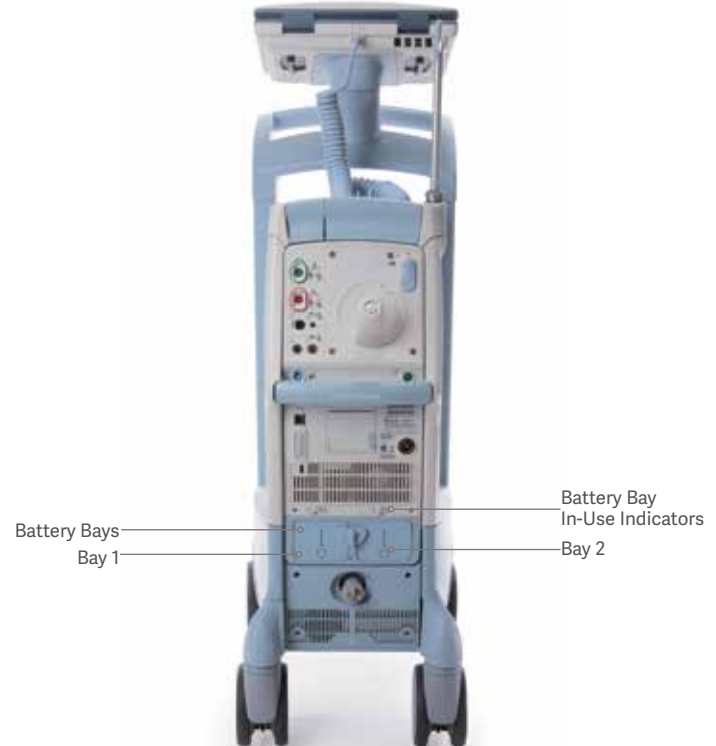
### Battery Bay In-Use Indicators

There are two Battery Bay indicators, one over each Battery Bay, which indicate which bay is currently in use by the IABP. The indicator will illuminate green if the IABP is charging a battery or operating from power supplied by the corresponding Battery Bay.

### Battery Bay

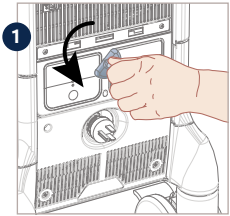
The Battery Bays provide the IABP with the ability to operate from a portable power source. They have a common physical lock which prevents simultaneous removal of both power sources.

**Note:** Depending on the current battery charge level, the system may take up to 30 seconds to detect battery status and begin charging the battery.

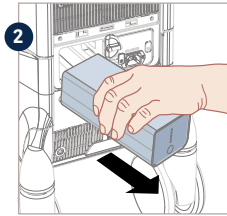


## Installation and Removal of Batteries

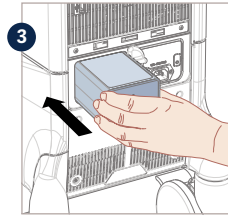
The IABP is capable of running from DC battery power supplied by lithium-ion rechargeable batteries which can be installed in the two (2) Battery Bays on the Pump Console. To avoid interruption of therapy, discharged batteries should be replaced with new charged batteries as necessary. For more information on battery maintenance, refer to the Battery Maintenance section of this document, beginning on page 22.



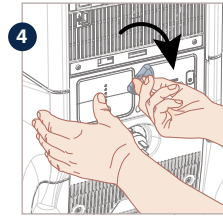
Turn knob to remove battery from Battery Bay.



Slide battery OUT.



Slide charged battery IN.



While holding battery in bay, turn knob to lock battery in place.



Use care to avoid dropping the battery.



**WARNING:** Removing both batteries or removing the energized battery, when AC power is not connected, will stop the therapy, (i.e., power down the pump).

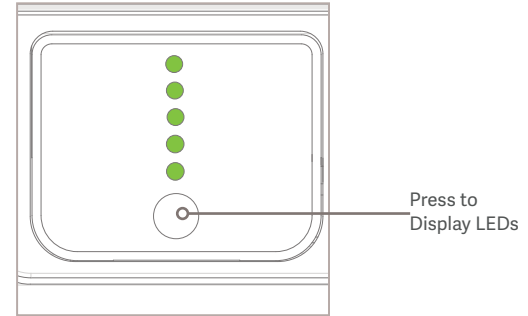
**It is important to know the status of your batteries. There are two ways to determine this – on the batteries themselves, or on the monitoring display.**

## Viewing Battery Status on Battery

Each battery has five {5} LEDs on the back which indicate the battery's approximate state of charge. Each LED represents approximately 20% charge. For example, one (1) illuminated LED informs the user that the battery has approximately 0-20% charge remaining, while five (5) illuminated LEDs informs the user that the battery has approximately 80-100% charge remaining.

| LED Configurations | Approximate State of Charge |
|--------------------|-----------------------------|
| 1 Flashing         | 0-10%                       |
| 1 Illuminated      | 10%-20%                     |
| 2 Illuminated      | 20%-40%                     |
| 3 Illuminated      | 40%-60%                     |
| 4 Illuminated      | 60% -80%                    |
| 5 Illuminated      | 80% - 100%                  |

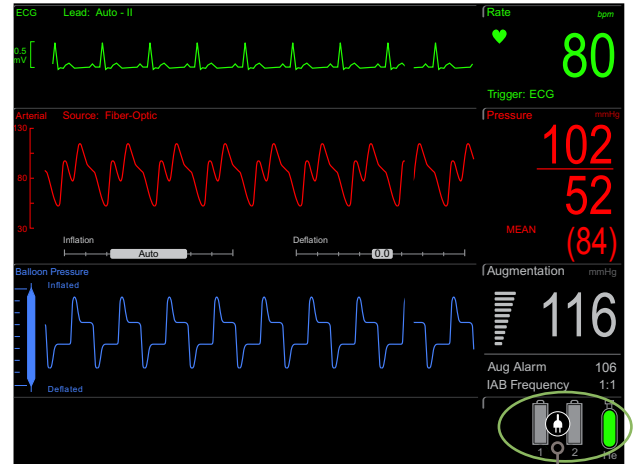
Additionally, the battery status LEDs will be illuminated when the battery is charging. However, in this state, the LED representing the current state of charge will continuously flash informing the user that the battery is charging.



## Battery Icon Display Area on Monitor Display

The Cardiosave includes a Battery Icon Display Area in the lower right corner of the Monitor Display. The indicator numbers 1 and 2 beneath the icons in the Battery Icon Display Area correspond to the Battery Bay where each battery or the transport power supply is installed.

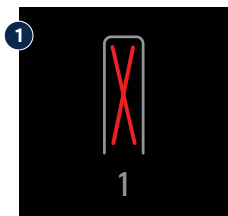
The Battery Icon Display Area displays different icons depending on the current power configuration of the IABP and inform the user when the IABP is using AC or battery power. Also, when a battery is installed in a Battery Bay, these icons inform the user of the current state of charge of each installed battery, and via the indicator numbers which battery, if running on battery power, is currently in use.



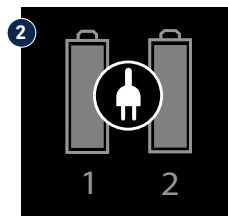
Monitor Display

Battery Icon Display Area

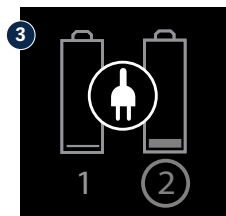
## Viewing Battery Status on Monitor Display (examples)



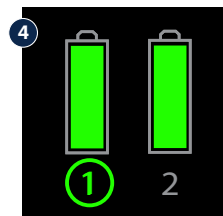
Empty battery bay.  
No backup battery or  
Transport Power Supply  
detected in battery bay.



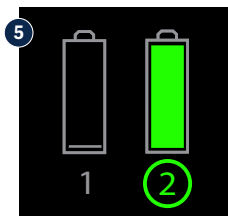
Plugged into AC power  
outlet and batteries are  
fully charged.



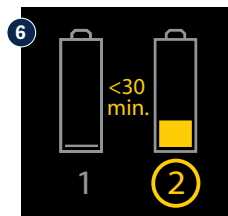
IABP has been plugged  
into AC power outlet,  
battery 1 is depleted  
and battery 2 is being  
charged.



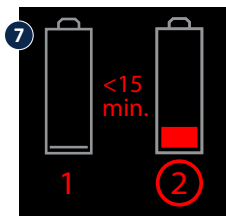
Lit green circle indicates  
battery 1 is in use. Battery 2  
is fully charged and available  
for use when battery 1 is  
depleted.



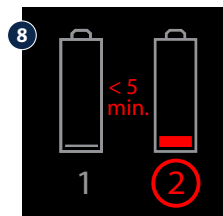
Battery 1 is depleted,  
thus battery 2 is  
currently being used.



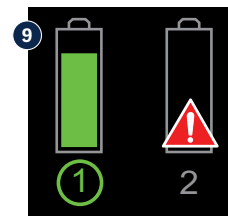
Battery 1 is depleted and  
battery 2 has less than  
30 minutes of charge  
remaining (Low Battery  
message is displayed).  
**Caution:** Prompt attention  
is needed to either insert  
fully charged batteries or  
plug into AC source.




Battery 1 is depleted and  
battery 2 has less than 15  
minutes of charge remaining.  
**Caution:** Prompt attention  
is needed to either insert  
fully charged batteries or  
plug into AC source.



Battery 1 is depleted and  
battery 2 has less than 5  
minutes of charge remaining.  
**Caution:** Prompt attention  
is needed to either insert  
fully charged batteries or  
plug into AC source.



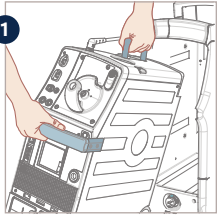
IABP detects an unusable  
battery in a Battery Bay,  
the attention icon  will  
be superimposed over the  
battery icon, with a  
corresponding message  
displayed in the Message  
Display Area.

**Note:** The Low Battery alarm is displayed when 30 minutes or less of internal battery operating time remains. When this message is displayed, the battery symbol is displayed as empty. There is also an audible tone every 30 seconds. Additionally, a high priority Low Battery alarm message will be activated with 15 minutes of time remaining on the sole available battery in use. See the User Maintenance chapter in the Operating Instructions for additional information.

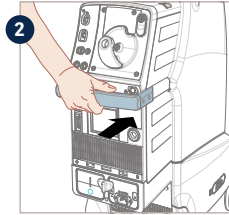


**Note:** There are various ways to charge the Cardiosave batteries. The following pages provide these instructions.

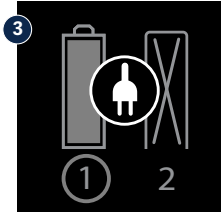
## Charging Batteries While in Cart



1. Grab the handles located on top and front of the console and lift the console into the Hospital Cart.



2. Grab the handle and slowly slide the Pump Console into the Hospital Cart until it locks into place. **Note:** An audible click will be heard when console is locking into cart and 3 audio tones will sound.



3. To ensure the Pump Console was successfully installed into the Hospital Cart, plug the Hospital Cart power cord into a compatible grounded AC receptacle, and confirm AC operation by checking that the AC Plug Icon is present in the Battery Icon Display Area.

If AC Plug icon is not present after installing console into the cart:

- Release latch on Hospital Cart located below Pump Console
- Grab handle and slowly slide Console out approximately one quarter of the way
- Repeat steps 1-3 to ensure Pump Console was successfully installed into Hospital Cart

**Note:** The batteries will only charge if the Pump Console is properly seated in the Hospital Cart.

## Hybrid and Rescue Modes on Touch Screen

The Cardiosave Configuration Icon shows the current mode of configuration for the IABP, Hybrid Mode or Rescue Mode. The Cardiosave must be in Hybrid Mode to properly charge the batteries.



IABP is in Hybrid Mode



IABP is in Rescue Mode

**Hybrid Mode** – The Rescue unit is docked into the Hospital Cart.

**Rescue Mode** – The IABP is in Rescue configuration and is not docked into the Hospital Cart.

If the IABP is set up in the Hybrid Mode and the Rescue Mode icon is displayed, ensure that the Rescue unit is securely docked into the Hospital Cart. Upon transitions from Rescue to Hybrid the IABP will sound three audio tones of increasing volume, upon transitions from Hybrid to Rescue the IABP will sound three audio tones of decreasing volume. Upon all transitions between Hybrid and Rescue the IABP will blink the icon for approximately 6 seconds. On the Waveform display, a banner that states “Battery in Use - Cardiosave Out of Cart.” will be displayed whenever the Cardiosave console is not securely docked within the Cardiosave Cart. The Keypad Display will have an orange rectangle around the Rescue Icon when the Cardiosave console is not securely docked within the Cardiosave Cart.



Configuration Icon

## Cardiosave Battery Charging Indicators

It is extremely important to be aware of the charge status of the Cardiosave batteries. These indicators are located on the top panel of the unit.

### Battery Charging LED

This indicator has three states:

- It illuminates continuously when the internal batteries are fully charged
- The LED indicator flashes when the internal batteries are charging
- It is not illuminated when the system is using the battery as a power source, or when AC power is not available to the system, or when the battery or batteries are faulty.

#### CAUTION

A battery can only charge when the AC plug is connected to a live AC receptacle and the battery charging status LED is flashing. This charging condition must be maintained even when the system is not in use. The battery charging status LED will stop flashing and remain illuminated when the batteries are fully charged. If the system is to be stored for extensive periods of time, or in ambient temperatures above the operating range, refer to the Battery Section of the User Maintenance Chapter in the Operating Instructions.

#### CAUTION


When AC power operation is intended, insure that the system is plugged into a live AC receptacle and that the “Battery in Use” informational message is NOT displayed.



**Note:** Depending on current battery charge level, the system may take up to 30 seconds to detect battery status and begin charging the battery.

## Charging Batteries Using the Battery Charging Station

The Battery Charging Station is used to charge the IABP's exchangeable rechargeable lithium ion batteries when they are not being used to operate the IABP. Batteries should be maintained at full charge when being used to operate the IABP. Battery charge time is 5 hours per pack to 90% or greater capacity. For more information on battery maintenance, refer to the Battery Maintenance section of this document, beginning on page 22.


 **WARNING:** Internal Shock Hazard – This instrument does not contain any user-serviceable parts. DO NOT remove the instrument covers. Refer servicing to Getinge Factory Trained and Certified Service Personnel.

 **WARNING:** Route Battery Charging Station AC power cord safely. Keep walkways clear to reduce risk of injury

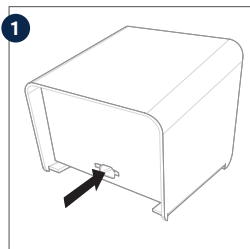
 **WARNING:** Do not stack the Battery Charging Station with or on other equipment.

 **WARNING:** Use only Datascope Corp. batteries REF 0146-00-0097.

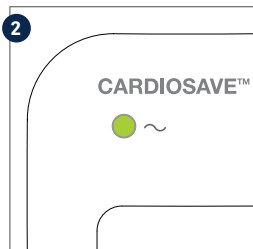
 **CAUTION:** Do not use a damaged or broken unit or accessory.

 **CAUTION:** The Battery Charging Station is not intended for use in transport. The Battery Charging Station is intended to be used in office buildings, aircraft hangars, or similar environments, and should not be within the vicinity of a patient.

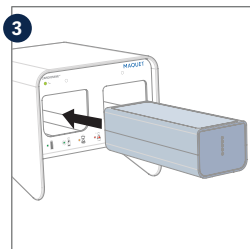
## Charging a Single Battery



1. Attach the power cord, appropriate for the country of use securely into the back of the Battery Charging Station and plug the power cord into a compatible grounded AC receptacle. Do not use an adapter to eliminate the plug's connection to ground.

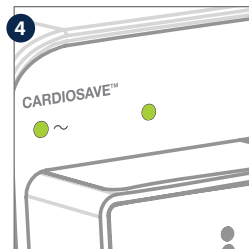


2. Ensure the green power LED is illuminated.

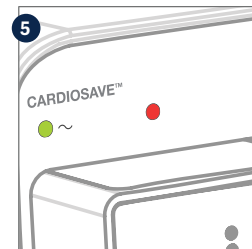


3. Insert a battery into the battery slot, ensuring that the battery connector is facing the battery slot. Press gently on the battery to ensure it is fully seated in the charging slot.

**Note:** Both slots can be used for single battery charging.



4. The status LED over the battery slot will begin to flash green indicating that the battery is currently being assessed, and if necessary will begin to charge. Battery charging is indicated by the sequential flashing of the 5 battery status LEDs on the rear of the battery pack. Once the battery is charged, the status LED will be illuminated solid green. The battery is now fully charged and ready for use.



5. If the status LED over the battery slot is flashing red, an error has been detected with the battery and as a result, will not charge.

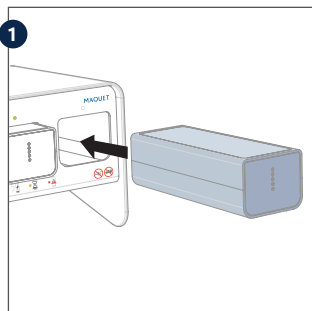
**Note:** Detecting a bad battery will take approximately 3 minutes.

## Charging Multiple Batteries

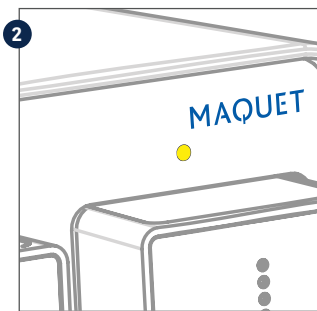
See page 13 “Charging a Single Battery” before reading this section.

If a battery is already charging in the Battery Charging Station, a second battery can also be inserted.

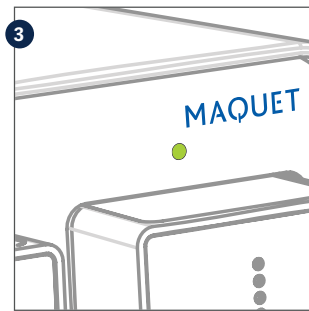
When the first inserted battery is fully charged, the second battery will automatically begin charging.



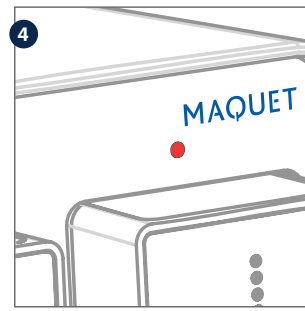
1. Insert a battery into the second battery slot, ensuring that the battery connector is facing the battery slot. Press gently on the battery to ensure it is fully seated in the charging slot.



2. If the battery in the first battery slot is still charging, the status LED over the second battery slot will be illuminated solid amber indicating that the battery in that slot is currently waiting to charge and will begin charging once the first battery has completed.



3. Once the battery is ready to charge, the status LED over the battery slot will begin to flash green indicating that the battery is currently being assessed, and if necessary will begin to charge. Battery charging is indicated by the sequential flashing of the 5 battery status LEDs on the rear of the battery pack. Once the battery is charged, the status LED will be illuminated solid green. The battery is now fully charged and ready for use.



4. If the status LED over the battery slot is flashing red, an error has been detected with the battery and as a result, will not charge.

**Note:** Detecting a bad battery will take approximately 3 minutes.

## Transport Power Supply

The Transport Power Supply provides the IABP with the ability to use AC power when it is not connected to the Hospital Cart. Installed batteries will only be charged from a Transport Power Supply when the Transport Power Supply is plugged into an AC receptacle, and the IABP is powered off.

When a Transport Power Supply is installed and in a Battery Bay and plugged into an AC receptacle, the Transport Power Supply icon with AC plug is displayed in the Battery Icon Display Area informing the user that the Transport Power Supply is installed, and the IABP is currently running on AC power. When the Transport Power Supply is not plugged into an AC power receptacle, the AC plug icon is not displayed on the Transport Power Supply icon.



**CAUTION:** When AC power operation is intended, insure that the system is plugged into a live AC receptacle and that the “Battery in Use” informational message is NOT displayed.

**Note:** Installed batteries can only be charged from a Transport Power Supply when the Transport Power Supply is plugged into an AC receptacle, and the IABP is powered off.

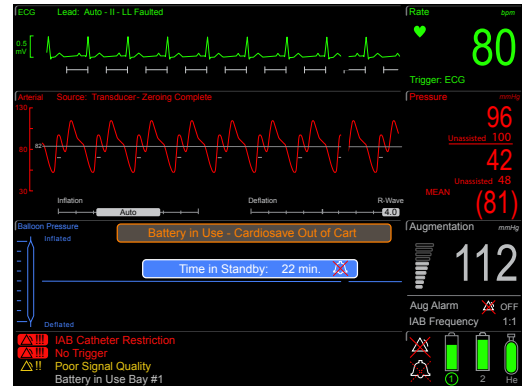
## Battery In Use – Check Messages and Icons

The **Battery in Use** Informational Message is displayed in the Message Display Area on the Touchscreen and the Battery Icon in the Battery Icon Display Area on the Monitor Display. Verify that the Battery Icons display at the charge level for each of the installed batteries. Additional to the existing Battery In Use informational message, there is an indicator as to which of the possible two batteries is currently in use.

As the charge level of the battery decreases, the battery icon will reflect this by incrementally decreasing the colored level inside the battery icon. Similarly, as the charge level of the battery decreases, the battery icon's colored level will transition from green to yellow to red. When a battery is depleted, and no longer available for use, the battery icon will appear grayed out. When the battery has approximately 30 minutes of operating time remaining, the following occurs:

- A high priority Low Battery alarm message is activated with 15 minutes of time remaining on the sole available battery in use.
- The Low Battery Medium Priority Alarm message is displayed continuously in the Message Display Area.
- The Battery Icon Display Area will display the approximate time remaining in 5-minute intervals starting at <30 min.

A reduction in run time will occur over a battery's life due to age, storage temperature and discharge cycles. Batteries which are continually subjected to complete discharge cycles without the recommended immediate recharging, can incur permanent damage. For more information on battery maintenance, refer to the Battery Maintenance section of this document, beginning on page 23.



Monitor Display

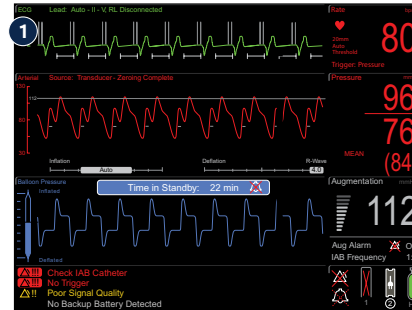




# Viewing Cardiosave Alarms on Monitor Display

The Cardiosave has four types of alarms that indicate operating issues or failures that require attention by the Operator. These Alarm Icons are displayed in the lower left corner of the Monitor Display.

**1. Technical Alarms** are indications that an IABP electrical hardware failure has occurred. Technical Alarms are the highest priority alarms and sound a continuous tone. In all cases of Technical Alarms, pumping is suspended.



**2. High Priority Alarms** indicate situations that require immediate Operator response. Pumping is suspended for the majority of High Priority Alarms. A red flashing alarm icon with three (3) exclamation points denotes the High Priority Alarm Icon. All High Priority Alarms have a uniform audio tone. The combination of five notes for High Priority Alarms is played in the following sequence: five notes a short pause, five notes a long pause and then this cycle repeats.



**3. Medium Priority Alarms** indicate situations in which a prompt Operator response is required. This class of alarm does not suspend pumping but may indicate a need for corrective action. A yellow flashing alarm icon with two (2) exclamation points denotes the Medium Priority Alarm Icon. All Medium Priority Alarms have a uniform audio tone. The combination of three (3) notes for Medium Priority Alarms is played in the following sequence: three notes a pause and then this cycle repeats.

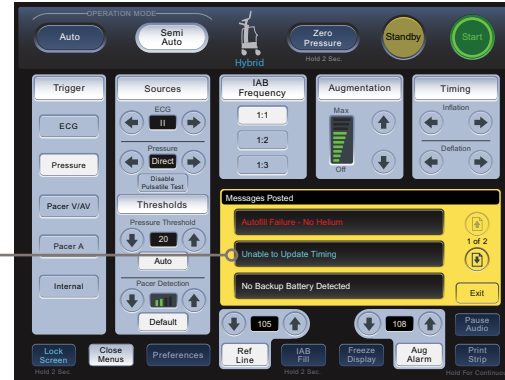


**4. Low Priority Alarms** are indications that Operator awareness is required. A cyan alarm icon with one exclamation point denotes the Low Priority Alarm Icon. All Low Priority Alarms have a uniform audio tone. The combination of two (2) notes for Low Priority Alarms is played in the following sequence: two notes a pause and then this cycle repeats.

## Cardiosave Alarm Messages on Touch Screen

Cardiosave Alarms are accompanied by a message on the unit's Touchscreen and require appropriate Operator action.

Message Area



No Backup Battery Detected

*AC is the only power source available to the IABP*

- Restore a backup source of power by inserting a functional battery into an available battery bay.

Exit

### Single Alarm

If only a single alarm or informational message exists that has a corresponding Help Screen, the corresponding Help Screen will be immediately displayed when the Help Available key is pressed.

Messages Posted

Autofill Failure - No Helium

Unable to Update Timing

Battery Overtemperature Detected in Battery Bay #\_\_\_\_

Exit

### Multiple Alarms

If multiple alarms or informational messages exist, a multiple alarm display will be provided in the Help Screen area to allow the user to select specific Help Screens for the list of active messages. Each listed alarm or informational message is actually a key that, when selected, displays the associated single alarm Help Screen.

## Cardiosave High Priority Alarm Messages – Battery/AC Power

### Low Battery

There is less than 15 minutes of battery operating time remaining.

1. Connect system to an AC power source immediately.
2. If an AC power source is unavailable, insert a charged battery into the battery bay not currently in use.

#### *Alarm Attributes:*

*Operation Mode: All*

*Trigger Source: All*

*Detailed Cause: Cumulative reserve of both batteries falls below 15 minutes of operating time.*

*System Response: Unaffected.*

*Reset: Automatically removes message and turns off tone when an AC power source is restored or when a charged battery is inserted.*

### Battery Charge Level Unavailable Bay # \_\_\_\_\_

The battery in the identified bay or bays is unable to communicate the battery charge level.

1. Immediate battery replacement is required.
2. Replace the battery that is currently in use. If a fully charged battery is not available connect to an AC power source as soon as possible.
3. If battery operation on the indicated battery is required monitor the system closely for a system shutdown, the Low Battery Alarm will not be displayed.

#### *Alarm Attributes:*

*Operation Mode: All*

*Trigger Source: All*

*Detailed Cause: The indicated battery is unable to communicate its charge level to the IABP.*

*System Response: None.*

*Reset: When battery is replaced.*

## Cardiosave Medium Priority Alarm Messages – Battery/AC Power

### Low Battery

There is less than 30 minutes of battery operating time remaining.

1. Connect system to an AC power source.
2. If an AC power source is unavailable, insert a charged battery into the battery bay not currently in use.

#### *Alarm Attributes :*

*Operation Mode: All*

*Trigger Source: All*

*Detailed Cause: Cumulative reserve of both batteries falls below 30 minutes of operating time.*

*System Response: Unaffected.*

*Reset: Automatically removes message and turns off tone when an AC power source is restored or when a charged battery is inserted.*

### Multiple AC Power Sources Detected

The IABP is connected to multiple AC power sources.

1. Disconnect the IABP from the unused AC power source (s).

#### *Alarm Attributes:*

*Operation Mode: All*

*Trigger Source: All*

*Detailed Cause: The system has detected that multiple AC power sources are connected to the IABP.*

*System Response: Unaffected.*

*Reset: Automatically, once the unused AC power source is disconnected.*

## Cardiosave Low Priority Alarm Messages – Battery/AC Power

### Battery in Use

The IABP is on battery power.

1. If available, switch to an AC power source.

*Message Attributes:*

*Operation Mode: All*

*Trigger Source: All*

*Detailed Cause: The IABP is being powered by battery.*

*System Response: Unaffected.*

*Reset: Automatic once AC power source is connected.*

*If an AC power source is unavailable, insert a charged battery into the battery bay not currently in use.*

### Unable to Charge Batteries

A component over temperature condition has suspended the IABP's ability to charge the batteries.

1. Switch to another Getinge IABP if available.
2. If another Getinge IABP is not available, ensure at least one charged battery is present in the battery bays.
3. If charged batteries are unavailable, ensure that the IABP is connected to an uninterruptible AC power source.
4. Contact Getinge Service.

*Message Attributes:*

*Operation Mode: All*

*Trigger Source: All*

*Detailed Cause: An over temperature condition of the power management board has suspended the IABP's ability to charge batteries.*

*System Response: Patient therapy uninterrupted, ability to charge batteries is suspended.*

*Reset: Automatically once the power management temperature falls below the established over temperature threshold.*

## Cardiosave Low Priority Alarm Messages – Battery/AC Power

### Unusable Battery Detected in Bay # \_\_\_\_

An unusable battery has been detected in the indicated battery bay.

1. Remove the unusable battery from the indicated bay.
2. Insert an alternate charged battery into the available battery bay.
3. Contact Getinge Service.

*Message Attributes:*

*Operation Mode: All*

*Trigger Source: All*

*Detailed Cause: An unusable battery has been detected by the IABP*

*System Response: Unaffected.*

*Reset: Automatically, once the unusable battery is removed from the battery bay.*

### No Backup Battery Detected

AC is the only power source available to the IABP.

1. Restore a backup source of power by inserting a functional battery into an available battery bay.

*Message Attributes:*

*Operation Mode: All*

*Trigger Source: All*

*Detailed Cause: The IABP is operating without a backup power source.*

*System Response: Unaffected.*

*Reset: Automatically, once a backup power source is added to the IABP*

## Battery Maintenance – General Rules

The IABP comes standard with 2 batteries shipped with the system.

A clinical message will appear to inform the operator of a battery that has reached its operational limit or requires a maintenance cycle.

Replace batteries as required. Batteries should be replaced after 200 full discharge cycles, at no more than four (4) year intervals, or if run time is less than 60 minutes minimum, at 120 BPM. To determine how many discharge cycles have been completed, check with a trained Biomed or Getinge Service representative.

Disposal of batteries should be conducted in accordance with local statutes and the labeling shown on the battery pack.

### Determining Date of Manufacture

A white barcode label is affixed to the top of each Cardiosave Lithium-ion Battery Pack. This barcode label provides information such as part number, serial number, and year and week of manufacture. Refer to the example below for barcode label placement.

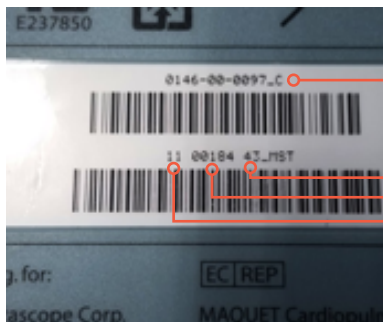
Each barcode label provides information in the form of two barcodes. The first barcode is the Datascope Corp. part number of the Cardiosave Lithium-ion Battery Pack. The second barcode is coded with the year of manufacture, battery pack serial number, and week of manufacture.

In the example to the right, the Datascope Corp. part number for this battery pack is **0146-00-0097**. The serial number is **00184**, and it was manufactured in the week **43 of 2011**. The letters after the serial number vary.

**Note:** The year and week of manufacture will always be a two-digit number, and the serial number will always be a five-digit number.



Example barcode label placement



Datascope Corp. Part Number, 0146-00-0097

Two Digit Week of Manufacture, 43  
Five Digit Serial Number, 00184  
Two Digit Year of Manufacture, 11

## Battery Maintenance – General Rules

To obtain optimum battery performance and expected battery life the following guidelines should be observed:

- The batteries should be maintained at full charge when the IABP is not in use. It is required that the IABP be plugged into an AC outlet when the system is not in use. If the unit must be stored for an extended time period (2 months or longer) and AC power is not available to maintain the batteries, or if the unit is stored in an ambient exceeding the maximum operating temperature, disconnect the batteries from the Pump Console. Due to battery self-discharge the disconnected batteries must be fully recharged at least every six (6) months.
- When the Battery Maintenance Required Bay # \_\_\_ message is displayed, the automated battery maintenance procedure should be performed as soon as possible to insure proper reporting of battery charge levels and to evaluate battery runtime.
- When the Battery Replacement Required Bay # \_\_\_ message is displayed the indicated battery should be replaced as soon as possible to insure appropriate battery runtime.
- Excessive heat is very detrimental to battery life. Do not operate the system in ambient above the maximum operating temperature.
- Back up batteries should be checked before each use and maintained in accordance with other guidelines in this section.
- When a Low Battery message is displayed after any system operation, the battery should be recharged within 24 hours to prevent battery damage.
- Do not attempt to repair the batteries. If the case is cracked or the connector is broken, replace the battery.
- Do not disassemble the batteries. Batteries contain a strong colorless electrolyte which may cause permanent loss of eyesight and injury when in direct contact with the eyes or skin. Immediately flush with clean water when in contact with leaked electrolyte and consult a physician.
- Do not short circuit the battery or battery terminals.
- Avoid carrying the batteries in a pocket that may contain conductive materials.
- Stop using the battery if it is leaking, deformed, damaged, or different from its normal condition.



**WARNING:** Batteries have the risk of fire, explosion or severe burn hazards. Do not disassemble, crush, heat above 60° C (140° F), or incinerate. Replace only with Datascope Corp. REF 0146-00-0097. In addition, take extra care to avoid dropping the battery.



**WARNING:** Compressed gasses (helium tanks) and Lithium ion batteries are considered Dangerous Goods/Hazardous Materials per I.A.T.A. and D.O.T. regulations.

It is a violation of U.S. federal and international law to offer any package or over pack of dangerous goods for transportation without the package being appropriately identified, packed, marked, classified, labeled and documented according to D.O.T. and I.A.T.A regulations. Please refer to the applicable I.A.T.A. Dangerous Goods Regulations and/or the Code of Federal Regulations 49 (Transportation, Parts 171-180) for further information.



## Battery Maintenance Conditioning

Battery maintenance must be performed every 12 months, on every Cardiosave Lithium Ion Battery, to maintain battery reliability and improved accuracy of the battery fuel gauge readings throughout the batteries operational life. Refer to the Battery Maintenance Conditioning Section of the User Maintenance Chapter in the Operating Instructions for more information.

**Battery Maintenance** WARNING: Not for Clinical Use!

WARNING: This process will take up to 22 hours for each battery and will completely drain the selected battery. Do not begin this process without another fully charged battery available for clinical use.  
Note: Turning off unit or exiting aborting Battery Maintenance before completion will end battery maintenance without saving final results. Battery maintenance will need to be repeated from the beginning.

### Maintenance Battery Bay# 1

|                        |               |                      |   |
|------------------------|---------------|----------------------|---|
| Serial #:              | 05EF2018      | Status:              | Press and hold the Run key to start the maintenance |
| Estimated Replacement: | 12 MAR 2022   | Cycle:               | Preliminary Discharge                               |
| Maintenance Due:       | 12 MAR 2020   | Total Time:          | 00:05:57  |
| Previous Maintenance:  | 12 MAR 2019   | Charge Time:         | 00:32:01  |
| Cycle Count:           | 44 out of 200 | Discharge Time:      | 00:22:15  |
| Voltage:               | 16.4 V        | Rest Time Remaining: | 00:04:39  |
| State of Health:       | 88 %          |                      |   |
| State of Charge:       | 89 %          |                      |   |


Pass Criteria: Discharge Time > 60 min  
State of Health > 75 %

Battery Maintenance passed but is marginal. Consider replacing the battery.

Hold 2 Sec.

**Special Activation Main Menu** WARNING: Not for Clinical Use!

Press and Hold Power Button for 2 Seconds  
To Exit Special Activation Mode

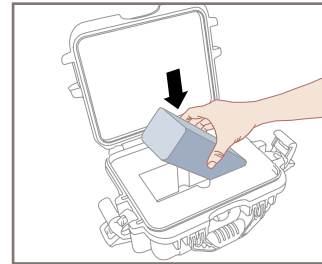
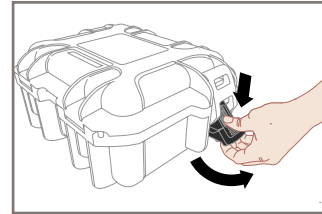
 **WARNING:** Battery maintenance will take up to 22 hours for each battery and will completely drain the selected battery. Do not begin this process without another fully charged battery available for clinical use.

## Battery Removal and Storage Procedure

**⚠ WARNING:** Batteries have the risk of fire, explosion or severe burn hazards. Do not disassemble, crush, heat above 60° C (140° F) and, or incinerate. Replace only with Datascope Corp. REF 0146-00-0097. In addition, take extra care to avoid dropping the battery.

1. Place the Cardiosave Li-Ion Battery Transport and Storage Case(s) on the floor next to the Cardiosave IABP.
2. Open the Transport and Storage Case by pressing down on the two thumb levers and pulling up on the release latches.
3. Carefully remove one (1) Cardiosave Li-Ion Battery from the IABP.
4. Place the Battery inside the Transport and Storage Case.
5. Close the Transport and Storage Case and re-latch the cover.
6. Repeat steps 2 - 5 for each Battery.
7. Proceed with storing and/or transporting Batteries.

**Note:** This applies to any and all additional spare Cardiosave Li-Ion Batteries.



## Battery Maintenance Schedules

Two preventive maintenance schedules have been provided.

**Schedule A** indicates which actions should be taken by either the Clinical User or by a Getinge Trained/Certified Biomedical Technician (BMET). These steps do not require the use of tools and may be performed in a clinical setting.

**Schedule B** indicates the actions which should be performed only by a Getinge Trained/Certified BMET. Special tools are required, and in some cases, the instrument covers must be removed.



**WARNING:** Preventive Maintenance should never be performed when the IABP is attached to a patient.



**WARNING:** Internal Shock Hazard - This instrument does not contain any user-serviceable parts. DO NOT remove the instrument covers. Refer servicing to Getinge Factory Trained and Certified Service Personnel.



**CAUTION:** This product requires scheduled preventative maintenance in order to maintain its specified performance. Note that maintenance includes periodic cleaning to assure that proper cooling airflow of the system's electronics is maintained.

### SCHEDULE A

To be performed by the clinical user or certified technician.

| Required Action   | Before or After Each Use | Every Month | Every 12 Months |
|---|--------------------------|-------------|-----------------|
| Check Battery Operation (See page 23)   |                          |             |                 |
| Check Battery Charge Indicator (See page 6)   | ●                        |             |                 |
| Check battery run time. Replace batteries when operating time is outside of specifications. (Less than 60 minutes per battery at 120 BPM) |                          |             | ●               |










### SCHEDULE B

To be performed by the Getinge factory trained and certified technician.

| Required Action  | Every 12 Months or 2500 Hours |
|--|-------------------------------|
| Check battery for rated voltage and check battery run time. Replace batteries when operating time is less than 60 minutes per battery at 120 BPM, after 200 discharge cycles, or after four (4) years.** | ●                             |

\*\*This does not imply a four (4) year warranty.

## Key Warnings and Cautions

-  **WARNING:** Route Battery Charging Station AC power cord safely. Keep walkways clear to reduce risk of injury
-  **WARNING:** Do not stack the Battery Charging Station with or on other equipment.
-  **WARNING:** The user should continually rely on visual alarm messages during high noise transport situations.
-  **CAUTION:** System batteries must be properly maintained and periodically tested.
-  **CAUTION:** A battery can only charge when the AC plug is connected to a live AC receptacle and the battery charging status LED is flashing. This charging condition must be maintained even when the system is not in use. The battery charging status LED will stop flashing and remain illuminated when the batteries are fully charged.  
  
If the system is to be stored for extensive periods of time, or in ambient temperatures above the operating range, refer to the Battery Section of the User Maintenance Chapter in the Operating Instructions.
-  **CAUTION:** For storage exposure from 0° to -10° C, allow Cardiosave to be exposed to room temperature for at least 30 minutes before operating on battery power.  
  
For storage exposure below -10° to -20° C (Low Storage Limit Specification) , allow Cardiosave to be exposed to room temperature for at least 90 minutes before operating on battery power.
-  **CAUTION:** After being stored at 60°C, allow Cardiosave to be exposed to room temperature for at least 30 minutes before operating on battery power.
-  **CAUTION:** The Battery Charging Station is not intended for use in transport. The Battery Charging Station is intended to be used in office buildings, aircraft hangars, or similar environments, and should not be within the vicinity of a patient.
-  **CAUTION:** Position IABP such that there is access to the AC Plug. In the case were there is an AC Mains fault of the IABP, unplug the IABP from the wall receptacle to isolate the IABP from the AC Mains Input.

**Notes**

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## Notes

A series of 15 horizontal dotted lines for taking notes, positioned to the left of the image.








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