

Battery Charger/Conditioner

Operation Manual

UCH0053



UCH0054



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1 ABOUT THIS MANUAL

This manual has been prepared by Ultralife Corporation for the purpose of providing a maintenance technician the information necessary to understand and to maintain the UCH0053/UCH0054 Battery Charger/Conditioner.

1.1 Symbols Used

The symbols shown in this section appear throughout this manual, the first one shown being the NOTE symbol, below, which is self-explanatory.



NOTE: Note statements contain important information that may affect how you use this product.

The other symbols represent important safety advice, and they appear throughout this manual and on the UCH0053/UCH0054 in the form of WARNINGS and CAUTIONS against possible hazards to people or equipment, respectively. These safety WARNINGS and CAUTIONS must be followed at all times.



WARNING: Warning statements mean danger. They identify practices, procedures or conditions such as high voltage that could result in injury or loss of life and which, therefore, require extreme care before proceeding.



CAUTION: Caution statements denote a hazard. They identify practices, procedures or conditions that could result in damage to or destruction of this product or other equipment or property.



Ground: This symbol is placed adjacent to grounding locations on the unit. These areas are designed to be connected to an earth ground either through a power cable or grounding cable to prevent injury to the user.



Direct Current: This symbol is placed adjacent to the Direct Current (DC) input location on the unit. This connector is designed to be connected to only a DC source.



DC Polarity: These two symbols are placed next to their corresponding DC input connectors to identify positive and negative to the user. The “+” symbol indicates the red positive terminal, and the “-” symbol indicates the black negative terminal.

Ultralife Corporation assumes no liability for the customer’s failure to comply with these WARNINGS and CAUTIONS.

1.2 General Safety Instructions



WARNING: Prior to using the UCH0053/UCH0054, please read the safety and caution instructions located in this section to prevent the mischarge or catastrophic destruction of a battery.

While inherently safe, misuse of the UCH0053/UCH0054 may result in damage to the battery and/or the UCH0053/UCH0054 battery charger. Specifically:

- Before using the UCH0053/UCH0054 battery charger, read all instructions and cautionary markings on (1) the battery charger, (2) battery, (3) product using the battery.
- To reduce the risk of injury, charge only batteries this charger is designed to charge as listed in the Operation section of this manual. Attempting to charge other types of batteries may cause personal injury and/or equipment damage.
- Do not operate the UCH0053/UCH0054 if it has been damaged in any way; return it to Ultralife Corporation for servicing and/or repair.
- Do not expose the unit to wet conditions (rain or snow) with the lid open.
- Use of an attachment not recommended or sold by Ultralife Corporation may result in risk of fire, damage to the charger, electric shock, or personal injury.
- Always connect the charger to a power source with proper earth grounding.
- To reduce the risk of damage to the electrical cord and plug, always disconnect the cord by pulling the plug rather than the cord.
- Make sure cord(s) is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
- An extension cord should not be used unless absolutely necessary. Use of an improper extension cord could result in risk of fire and electric shock.
- Do not operate the charger with a damaged cord or plug—replace the cord immediately.
- Before obtaining access to input power terminals, all supply circuits must be disconnected from the charger.
- Do not disassemble the UCH0053/UCH0054 chargers; return it to Ultralife Corporation when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
- To reduce risk of electric shock, unplug the charger from its power source before attempting any maintenance or cleaning.
- If there are any questions regarding maintenance or safety-of-use issues pertaining to the UCH0053/UCH0054, please contact our service department at:

Service Department Ultralife Corporation
(PHONE) (315) 332-7100 (FAX) (315) 331-7800
(Email) ucs@ulbi.com

2 PRODUCT DESCRIPTION

The UCH0053/UCH0054 Battery Charger/Conditioner are designed to provide a safe and effective recharge of the following batteries:

UBI-2590 Li-Ion	UBBL35 Li-Ion
BB-2590/U Li-Ion	UBBL06-xx Li-Ion
PRC-148 Li-Ion	UBBL08-xx Li-Ion
PRC-152 Li-Ion	BB-590/U Ni-Cd
BB-390/U Ni-MH	PRC-154 Li-ion

These batteries are rechargeable batteries commonly used with Tactical Communication Equipment. Some batteries have the same form factor and in many cases are interchangeable for battery operated equipment. The UCH0053/UCH0054 charger has two options for charging batteries; internal and external. Internal refers to the ability of the user to place either two 2590 type batteries or four radio handheld batteries at one time into each bay. External charging refers to the ability of the user to charge UBBL35, UBBL08, UBBL06 or similar batteries using external charging cables supplied by Ultralife. Optional battery adapters can be placed in the 2590 charge bays to charge additional batteries. In the event that the user connects batteries to a single bay via both the internal and external methods, priority for charge will be given on a first-come, first-serve basis.



CAUTION: Prior to using the UCH0053/UCH0054 charger please read the safety and caution instructions located in section 1 to prevent the mischarge or catastrophic destruction of a battery.

While inherently safe, misuse of the UCH0053/UCH0054 charger may result in damage to the battery and/or the UCH0053/UCH0054 battery charger.

2.1 Charge Safety

The UCH0053/UCH0054 charger will detect battery problems which prevent a safe and efficient charge. There are a number of internal safeguards built into the unit. Temperature, voltage, and time are monitored throughout the charge cycle. Charge is terminated when the unit detects the battery has been fully charged. In the case of xx90 style batteries, the UCH0053/UCH0054 charger will detect the chemistry type through the presence of the top contacts. In no event will a battery be overcharged using the charging algorithm of the UCH0053/UCH0054.

2.2 xx90 Battery Detection

The charger detects the presence of a non-smart xx90 battery using the circular connector and the presence of a short on the thermistor contacts located on the top of the battery. When a 2590-type battery is detected, the charger will charge using a constant current of 3.0A until the charge current falls below 100mA, at which time the charge is terminated. In the event the current does not fall below 100mA within 12 hours, the UCH0053/UCH0054 charger will terminate the charge for that battery. With the absence of a short on the thermistor contacts on top of the battery, the UCH0053/UCH0054 charger will assume that the battery is a Nickel-based chemistry (Ni-Cd or Ni-MH). The charger will charge at a constant current of 480mA until the total charge time reaches 12 hours. For a Ni-MH battery, the charger is able to measure the internal battery temperature using the top thermistor contacts.

2.3 Charger Operational Temperature

The charger is designed to operate between a temperature range of -30°C to 55°C. If the charger is outside the normal operating temperature, the red fault LED's will illuminate solid and charging is stopped. Normal operation will resume when the charger returns to within the operating temperature range. If a smart battery is outside its allowable charge temperature range, the charger will flash the red fault LED's and not initiate a charge.

2.4 USB Charging Port

The UCH0053/UCH0054 charger has USB Type A charging ports which will provide constant DC 5V/0.5A. The UCH0053 charger has six USB Type A charging ports whereas the UCH0054 charger has two USB Type A charging ports. These USB ports can only be used for the purpose of charging.

2.5 External Charging Ports

The UCH0053/UCH0054 charger has external charging ports which work in sequence with the individual bay charging modules. The UCH0053 charger has six external charging ports whereas the UCH0054 charger has two external charging ports. Alternate approved batteries that are unable to be inserted into the internal bays for charging (UBBL35, UBBL06, UBBL08, etc.) can be connected to the external charging ports using Ultralife approved charging cables.

2.6 Battery Adapters

Ultralife supplies various battery adapters that allow charging of alternate approved batteries (UBBL06, UBBL08, etc). The adapters mate to the 2590 charge port and are held in place using the supplied retention strap.

2.7 USB Technician Port

The UCH0053/UCH0054 charger has USB type-B technician ports for the purposes of firmware upgrades. The UCH0053 charger has three USB type-B technician port whereas the UCH0054 charger has a single USB type-B technician port. In the event a firmware upgrade is required, such upgrade must only be completed by a qualified repair technician.

2.8 Wide Range Input Voltage

The UCH0053/UCH0054 chargers allow for AC and DC input power to be connected simultaneously. The charger will automatically detect the presence of either AC or DC, and will switch power preference to AC when available. The transition from a DC power source to an AC power source is seamless to the user. When removing AC power with DC power present, the UCH0053/UCH0054 charger may go through a power cycle to prevent damage to the unit.

2.9 Physical Description

Figure 1 shows the physical layout of the UCH0054 charger.

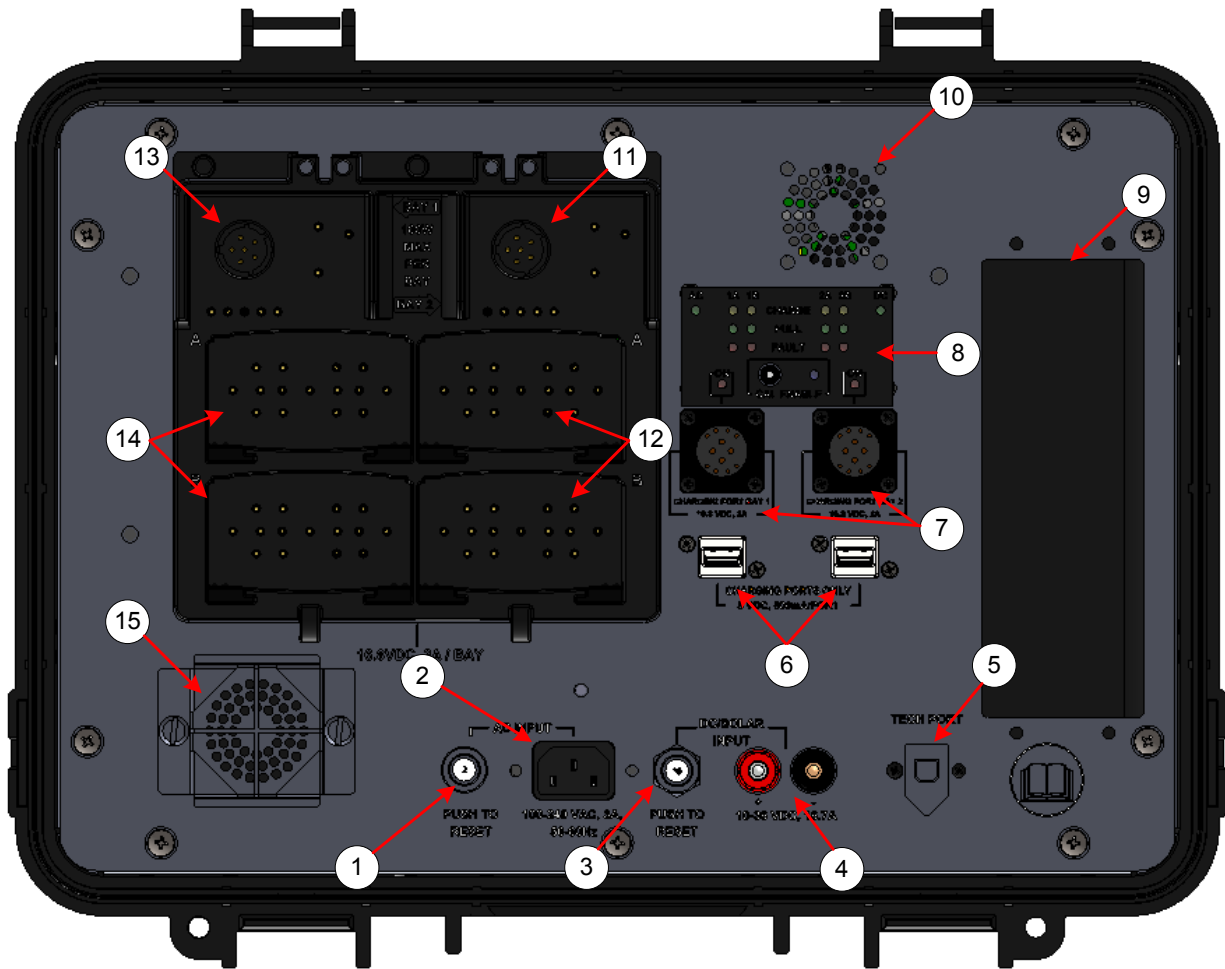


Figure 1: UCH0054 Charger (Top View)

1. AC Input Circuit Breaker	9. Adapter/Cable Storage Pocket
2. AC Inlet	10. Fan Outlet
3. DC Input Circuit Breaker	11. Internal Battery Bay 2 xx90 Interface
4. DC Input Banana Jacks	12. Internal Battery Bay 2 HH Interface
5. Technician Port	13. Internal Battery Bay 1 xx90 Interface
6. USB Charging Ports	14. Internal Battery Bay 1 HH Interface
7. External Battery Charging Connectors	15. Fan Inlet & Filter
8. LED Status Indicators & Calibration Switch	

NOTE: Items 7, 12, and 14 are unavailable for charging on some selected versions of the UCH0054 chargers.

Figure 2 shows the physical layout of the UCH0053 charger.

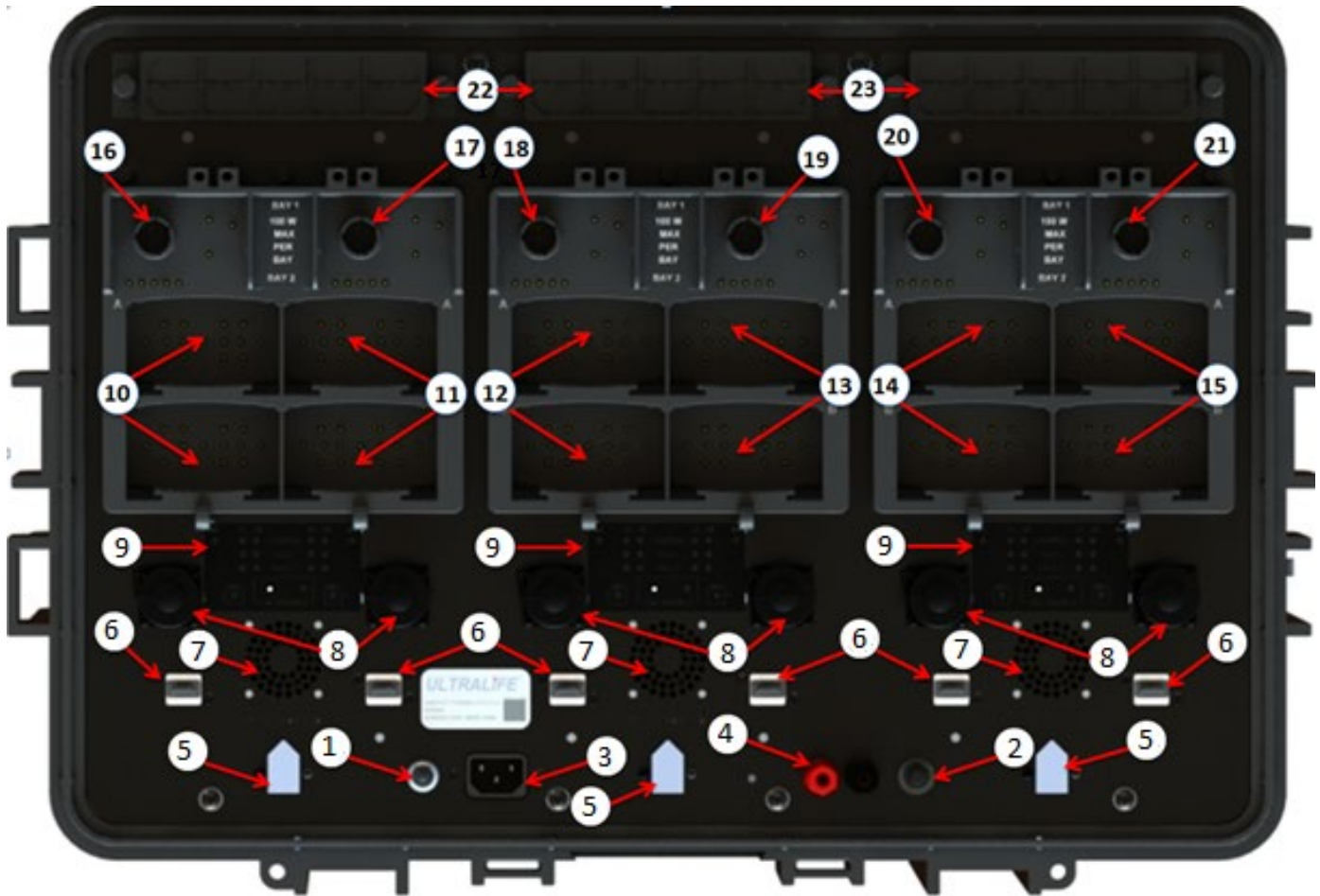


Figure 2: UCH0053 Charger (Top View)

1. AC Input Circuit Breaker	13. Internal Battery Bay 4 HH Interface
2. DC Input Circuit Breaker	14. Internal Battery Bay 5 HH Interface
3. AC Inlet	15. Internal Battery Bay 6 HH Interface
4. DC Input Banana Jacks	16. Internal Battery Bay 1 xx90 Interface
5. Technician Ports	17. Internal Battery Bay 2 xx90 Interface
6. USB Charging Ports	18. Internal Battery Bay 3 xx90 Interface
7. Fan Outlet	19. Internal Battery Bay 4 xx90 Interface
8. External charging connectors	20. Internal Battery Bay 5 xx90 Interface
9. LED Status indicator & Calibration switch	21. Internal Battery Bay 6 xx90 Interface
10. Internal Battery Bay 1 HH Interface	22. Dust Filters
11. Internal Battery Bay 2 HH Interface	23. Dust Filters
12. Internal Battery Bay 3 HH Interface	

NOTE: Items 8 and 10-15 are unavailable for charging on some selected versions of the UCH0053 chargers.

3 OPERATION

This section provides a basic operational description of the UCH0053/UCH0054 battery chargers and its assemblies/connections.

3.1 AC Power Cord Connections

The UCH0053/UCH0054 chargers are equipped with an AC inlet for purposes of supplying AC power to the charger. Any AC cable connected to the charger should be appropriately sized.



WARNING: Never alter the AC cord or plug provided. Improper connection can result in a risk of an electrical shock.

Ultralife Corporation recommends a minimum of 16 AWG wire be used for the AC power cable

3.2 DC Power Cord Connections

It is imperative to ensure correct polarity of the DC power cord prior to the connection to the DC power source. It is necessary to look at specification chapter for rated DC input operating voltage. The connections can be done by referring to the diagram below.



WARNING: Never alter DC cord connections. Improper connections (polarity mismatch) may result in damage to the charger. Ensure the input supply is within the range of the specified rated voltage.

Ultralife Corporation recommends a minimum of 12 AWG wire be used for the DC power cable for the UCH0054, and 10 AWG wire for the UCH0053.

3.3 Battery Bay Charging

The UCH0054 will charge two xx90 style batteries at one time whereas UCH0053 will charge six (xx90) style batteries at one time (including different battery chemistries or two of the same). If handheld PRC-XXX batteries are inserted, the UCH0054 charger is able to charge four batteries at one time whereas UCH0053 charger will charge twelve batteries at one time. The battery type is automatically detected when it is placed on the charger.

Charge Bay Diagram



When charging handheld PRC-XXX batteries, use the battery retention strap to secure the batteries in the bay. This improves electrical contact to the batteries and reduces charge times. Stretch the strap across the batteries and attach to each hook on the front of the plastic bay. The strap includes a plastic spacer to place in-between the 2 batteries to ensure vertical alignment.



NOTE: PRC-148/152 charging pockets are unavailable for charging with some selected versions of the UCH0053/UCH0054 chargers.

The UCH0053/UCH0054 charge module allows for unattended charging of batteries. The module also assures a safe and effective recharge of the battery. The approximate charge times for recommended batteries are listed in the table below. The charge time assumes a fully discharged battery and are for reference only.



CAUTION: Prior to charging any rechargeable battery, verify the type of battery to be charged. The UCH0053/UCH0054 will safely and completely recharge the batteries listed in the chart below.

Battery	Description	Approximate Charge Time
UBI-2590	Lithium Ion (Li-ION) 12/24 VDC	3 to 5 hours
BB-2590/U	Lithium Ion (Li-ION) 12/24 VDC	3 to 5 hours
PRC-152	Lithium Ion (Li-ION) 12 VDC	4 to 7 hours
PRC-148	Lithium Ion (Li-ION) 12 VDC	4 to 7 hours
UBBL35	Lithium Ion (Li-ION) 12 VDC	3 to 4 hours
UBBL06	Lithium Ion (Li-ION) 12 VDC	4 to 5 hours
UBBL08	Lithium Ion (Li-ION) 12 VDC	3 to 4 hours
BB-390/U	Nickel Metal Hydride (NiMH) 12/24 VDC	12 hours
BB-590/U	Nickel Cadmium (Ni-Cd) 12/24 VDC	12 hours

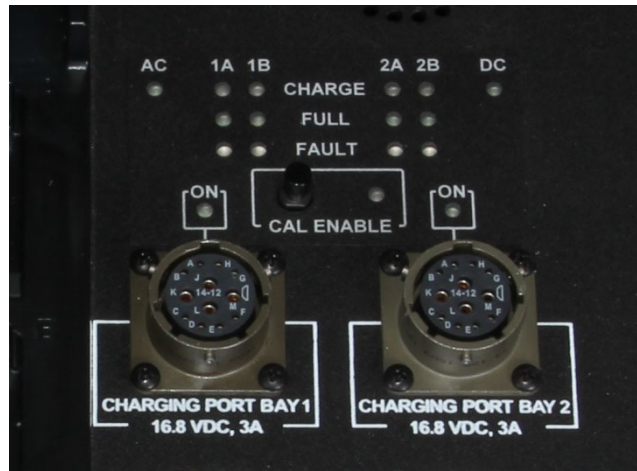
When supplying DC power to the Charger, the recommended voltage range is 18V to 36V. The Charger will function between 10V and 18V, but at a reduced power output. The battery charge times are doubled when the Charger receives voltage less than 18VDC.



NOTE: If a battery type is encountered which is not listed in the table above, please contact Ultralife Corporation at the address or E-mail provided throughout this document.

3.4 External Charging Connectors

External charging connectors can be used to charge recommended batteries using standard Charge Cable Kits provided by Ultralife. If both the charge bays and external charge connectors are being used to charge batteries, the batteries will charge in the order they were connected. When charge is complete on a set of batteries, the charger will automatically switch to the next set of batteries requesting charge. It is not recommended to charge batteries that are not listed in the table above using the UCH0053/UCH0054 chargers. Consult Ultralife’s website to review available Charge Cable Kits and determine which batteries can be charged using the cables.



NOTE: External Charging Connectors are unavailable for use on some selected versions of the UCH0053/UCH0054 chargers

3.5 Charging via Adapters

Optional adapters are supplied by Ultralife to enable charging of various batteries using the 2590 charge bay. The adapter is held in place using the supplied retention strap over the 4 corners of the adapter. Consult Ultralife’s website to review adapter availability and determine which batteries can be charged using the adapters.



3.6 USB Charging Port

The UCH0054 charger has two USB ports and UCH0053 charger has six USB ports provided on the charger which will deliver 5V/500mA power. A standard A-type USB cable can be used.

3.7 AC & DC Circuit Breakers

The UCH0053/UCH0054 chargers are equipped with manual resettable circuit breakers. These devices protect the charger from overload conditions. The circuit breaker will open at the time of over load or short circuit in the unit and power to the charger will be interrupted. The circuit breaker is reset by pressing the center button.

3.8 Battery Calibration

The UCH0053/UCH0054 chargers allow for calibration of the internal fuel gauge of smart batteries. In order to enable calibration, the user must manually press the calibration button, labeled "CAL ENABLE" below the LED indicators. Pressing the calibration switch will begin the calibration routine for any and all batteries connected to the charger that are requesting calibration at the time of the switch activation. If no batteries are requesting calibration, pressing the calibration switch will force the calibration routine on all non-smart batteries connected to the charger. A calibration cycle consists of a complete charge, followed by a complete discharge, and finished with a complete charge. The battery calibration cycle may take up to 24hrs to complete. During the discharge portion, all 3 status LED's will be illuminated.

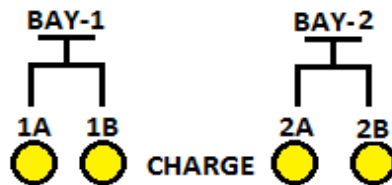
3.9 Start-up & Connection Sequence

The user can either plug the UCH0053/UCH0054 chargers into a power source or attach the batteries to the unit first. Once the batteries are attached and power applied to the unit, the batteries automatically start charging, regardless of the order of operations.

3.10 LED Indicators

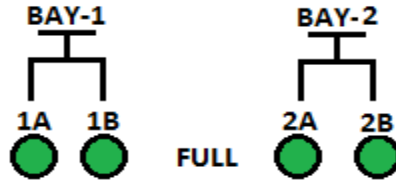
There are four groups of LEDs indicating the status of the charger. Refer to the following section for a description of the operation of the LEDs.

3.10.1 "Battery Detection & Charging" Indicator LEDs



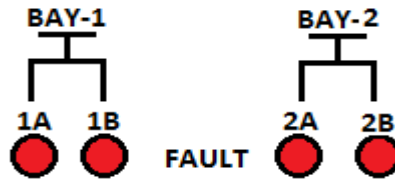
When a battery is inserted into the UCH0053/UCH0054 chargers, amber LEDs labeled "CHARGE 1A, 1B, 2A, 2B" will start flashing which will indicate that batteries are detected in the corresponding location in the bays. If the battery type is authorized by the charger, charging will commence, and the LEDs will change from flashing to steady. If the battery type is not authorized by the charger or a fault is detected, the amber LEDs will cease flashing and the RED LEDs will illuminate, indicating the failure/fault notification.

3.10.2 "Charge Complete" Indicator LEDs



The four green LEDs labeled "FULL 1A, 1B, 2A, 2B" indicate when the battery in the corresponding location is fully charged.

3.10.3 "Failure/Fault" Indicator LEDs



The red LEDs will illuminate for particular failures or faults as mentioned below.

- Battery type is not authorized by the charger.
- Battery temperature is high (Greater than 65°C).
- Battery is not properly inserted.
- Charger is unable to charge the battery.
- Internal charger temperature is too high.

3.10.4 "Calibration Request" Indicator LEDs



The amber LED labeled "CAL ENABLE" will indicate when the smart battery requests calibration or the calibration routine has been activated.

Flashing: One battery from one BAY is requesting calibration.

Fast Flashing: One or more battery(ies) from both bays in a pair are requesting calibration.

Steady: Indicates Calibration Enabled.

3.10.5 "External Charging Port" Indicator LEDs



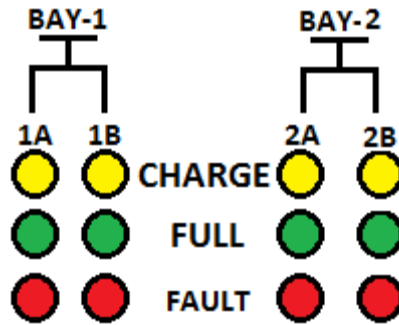
The LEDs associated with the external charging port connectors indicate external charging. If the user connects the battery to any of the external connectors, the corresponding LED will illuminate. If a battery is already inserted into the corresponding location in either bay and is currently charging, the LED may not illuminate.

3.10.6 "AC & DC Supply" Indicator LEDs



The AC and DC supply LEDs indicate the active power source for the UCH0053/UCH0054 chargers.

3.10.7 "Discharge" Indicator LEDs



During the discharge portion of a calibration cycle, the corresponding bay status LEDs (Amber, Green, and Red) will illuminate, indicating the discharge step of the calibration cycle has started.

Maintenance of the UCH0053/UCH0054 is described in the following sections.

4.1 Cleaning Dirt and Dust

With power removed, all external components to the UCH0053/UCH0054 chargers can be cleaned with a water dampened non-abrasive cloth and allowed to air dry or wipe dry with a clean dry non-abrasive cloth. Be sure all areas are dry before applying power to the charger. Do not allow water to enter the charger through the ventilation openings.

4.2 Cleaning Oils and Grease

All external components of the UCH0053/UCH0054 chargers can be cleaned with a mild soap/water solution dampened non-abrasive cloth. With power removed, rinse with a water dampened non-abrasive cloth and allow to air dry or wipe dry with a clean dry non-abrasive cloth. Be sure all areas are dry before applying power to the charger. Do not allow water to enter the charger through the ventilation openings.

4.3 Cleaning the Fan Filter

The fan inlet filter can be removed and cleaned in the event of excessive dirt and debris build-up, and should be part of a routine maintenance of the charger. With power removed, unscrew the two thumb screws that secure the filter cover in place. Remove and clean the filter by running it under a light stream of water to remove any dirt and/or debris. Allow the filter to completely air-dry before replacing it back onto the charger. Secure the filter in place by hand-tightening the thumb screws that secure the filter cover.

4.4 Corrective Maintenance

The UCH0053/UCH0054 chargers have NO user serviceable parts. Units requiring corrective maintenance should be sent to Ultralife Corporation for repair. Contact information is provided in section 6.

5 SPECIFICATIONS

Table 1: Physical Characteristics

Dimension	Measurement (UCH0054)	Measurement (UCH0053)
Width	327 mm (12.87 inches)	428 mm (16.85 inches)
Length	420 mm (16.54 inches)	609 mm (23.98 inches)
Depth	180 mm (7.09 inches)	263 mm (10.35 inches)
Weight (w/o Batteries)	5.9 kg (13 lbs.)	15.9 kg (35 lbs.)

Table 2: LED Indicators

Indicator	Meaning
Flashing Amber	Battery Detection
Steady Amber	Fast Charge
Steady Green	Fast Charge Completed
Steady Red	Fault / Failure
Flashing Calibration LED (Amber)	Calibration request
Steady Calibration LED (Amber)	Calibration started

Table 3: Electrical Characteristics

Parameter	Value
DCIN Operating Range	10-36 VDC. At 10-18V, the Battery Charge rate is half the normal rate listed below.
ACIN Operating Range	100-240 VAC 50-60 Hz
Charge Rate	3A PER SIDE (UBI-2590, BB-2590/U, UBBL35, UBBL06, UBBL08) 2A PER SIDE (PRC-148, PRC-152) 480mA PER SIDE (BB-390/U, BB-590/U) Note: Charge rates are reduced for input voltages less than 18VDC.



NOTE: The Power Input requires a maximum of approximately 250 watts for the UCH0054, and 750 watts for the UCH0053. Input current will vary depending on the voltage. Ultralife Corporation recommends a minimum of 12 AWG wire be used for the DC power cable for the UCH0054, and 10 AWG for the UCH0053. Ultralife Corporation recommends a minimum of 16 AWG wire be used for the AC power cable.

6.1 Contact/Return Information

Please call (315) 332-7100 to obtain an RMA number prior to returning any failed unit(s) to:

Ultralife Corporation

2000 Technology Parkway Newark, New York 14513 Phone: (315) 332-7100

Fax: (315) 331-7800

Website:

<http://www.ultralifecorporation.com>

Revision History:

Revision	Description	DCR #	Date
-	Initial Release.	17-0038	08 SEP 17

Required Approvals:

Originator	John Domm	<u>Date:</u> 08 SEP 17
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