MILITARY BATTERY CHARGER

MILCHAR-1PH-4B14-200-A01

"MILCHAR-1PH-4B14-200-A01" is a battery charger bag which can charge two BB2590 battery separately with smart battery charging algorithm from AC source.

- Constant current charge mode
- Constant voltage charge mode
- Battery discharge mode
- Battery over-voltage protection
- Battery under-voltage protection
- Temperature protection
- State of charge LED indicators
- Operating mode LED indicators
- SMBUS protocol
- Continuous built-in test
- 3 hours charge 6 hours discharge time

+90 (312) 577 3210
www.verteelektronik.com
info@verteelektronik.com

Teknopark Ankara, Serhat Mah.,
2224. Cadde, No:1, F Blok, Zemin Kat, Z-13,
06374 Yenimahalle/Ankara

The MILCHAR-1PH-4B14-200-A01 military-grade battery charger bag is an essential tool for soldiers, designed to charge two BB2590 batteries simultaneously, ensuring equipment remains powered and ready for action. Built to endure harsh military environments, this rugged and durable charger is resistant to impacts, abrasions and extreme weather.

The MILCHAR-1PH-4B14-200-A01 battery charger bag combines durability with advanced functionality, making it ideal for military use. It supports simultaneous charging of two BB2590 batteries with high-efficiency circuits, providing optimal current and voltage. Safety is prioritized with built-in protections against overcharging and short circuits. Its user-friendly interface includes clear indicators for charge status and fault detection, ensuring reliable operation in demanding conditions.

TABLE OF CONTENTS

Product Overview

1

1. PRODUCT OVERVIEW

The military-grade battery charger bag is an essential piece of equipment for soldiers and military personnel who rely on portable power sources. MILCHAR-1PH-4B14-200-A01 is designed to charge two BB2590 batteries simultaneously, allowing soldiers to keep their equipment powered up and ready for action.

One of the key features of this battery charger bag MILCHAR-1PH-4B14-200-A01 is its rugged and durable construction. It is built to withstand the harsh conditions of military environments, with a tough outer shell that can resist damage from impacts, abrasions, and extreme weather conditions. The bag is also water-resistant, which means that it can protect the charging equipment from rain, snow, and other forms of moisture.

The battery charger bag is designed to be highly portable and easy to use. It features a compact and lightweight design that makes it easy to carry and transport, even when soldiers are on the move.

Inside the bag, there are two charging bays, each of which can accommodate a BB2590 battery. The charging bays are equipped with high-quality charging circuits that ensure efficient and reliable charging performance. The charging circuits are designed to deliver the optimal charging current and voltage for the BB2590 batteries, ensuring that they are charged quickly and safely.

MILCHAR-1PH-4B14-200-A01 also features a range of safety features that protect the batteries and the charging equipment from damage. It has built-in overcharge protection, short-circuit protection which prevent the batteries from being damaged due to overcharging, short circuits.

In summary, MILCHAR-1PH-4B14-200-A01 is an essential piece of equipment for military personnel who rely on portable power sources. It is rugged, durable, and highly portable, with a range of features that make it easy and safe to use. With the ability to charge two BB2590 batteries simultaneously, this charger bag is an indispensable tool for soldiers in the field.

Technical Specifications

2

2. TECHNICAL SPECIFICATIONS

Table 1: Electrical Specification

PARAMETER	VALUE	UNIT
AC Input Voltage Range	90-264	Vrms
AC Input Current (max)	3	A
Charging Output Voltage (each section)	5 to 24	V
Charging Output Current (each section) (max)	3	A
Discharge power	10 to 21	W
Default Charging Temperature Range *	-0 to +50	°C
Default Discharging Temperature Range **	-20 to +55	°C
Charge Time for 7.5 Ah BB2590 Battery	3	Hour
Discharge Time for 7.5 Ah BB2590 Battery	6	Hour

Table 2: Mechanical Specification

PARAMETER	VALUE	UNIT
Dimensions	272 x 249 x 124 (L×W×H)	mm
Weight	4	kg
Case Color	OD Green, Black, Desert Tan	

Table 3: Environmental Specification

DESCRIPTION	PROCEDURE
Operating Temperature Range	For -32°C/55°C MIL-STD 810G CHG 1, Method 502.6, Procedure II MIL-STD 810G CHG 1, Method 501.6, Procedure II
Storage Temperature Range	For -40°C/65°C MIL-STD 810G CHG 1, Method 502.6, Procedure I MIL-STD 810G CHG 1, Method 501.6, Procedure I
Humidity	MIL-STD 810G CHG 1, Method 507.6, Procedure II
Vibration	MIL-STD 810G CHG 1, Method 514.6, Procedure I

* Please contact the manufacturer for a product with a different charging temperature range.

** Please contact the manufacturer for a product with a different discharging temperature range.

Operating Procedures

3

3. OPERATING PROCEDURES

3.1. PANEL CONTROLS AND INDICATORS

Figure 1: MILCHAR-1PH-4B14-200 front panel view

Battery charger panel components are described below and shown in Figure 2.

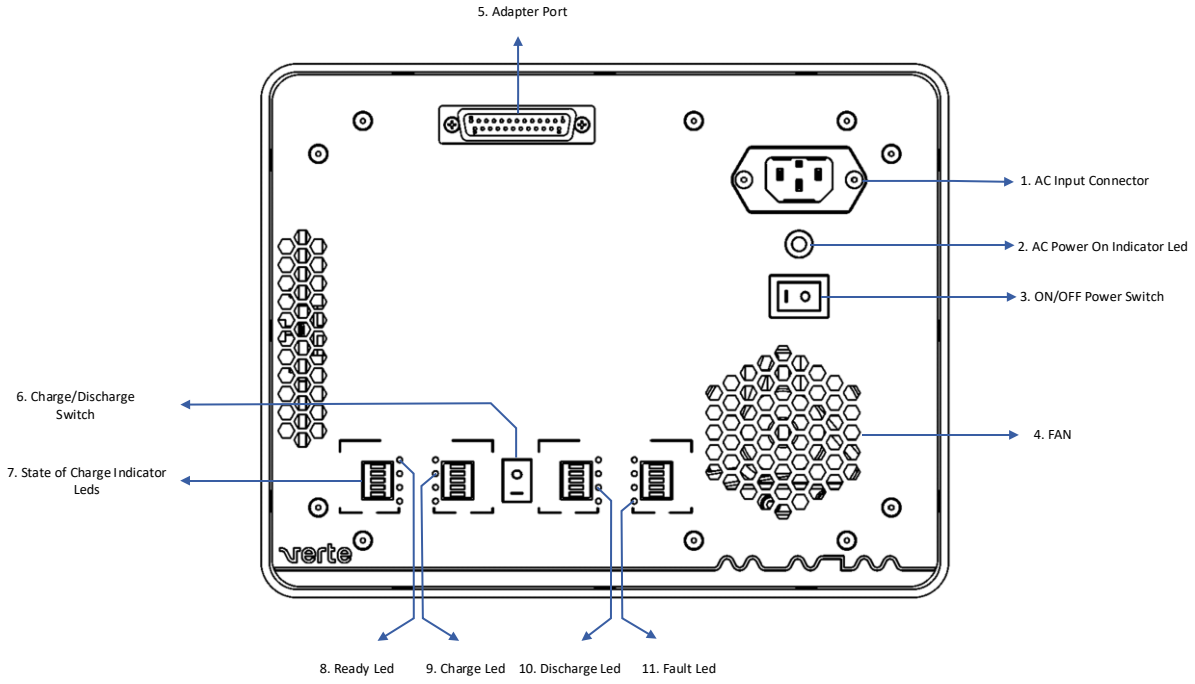

Figure 2: Panel assembly drawing

3.1.1. AC INPUT CONNECTOR

Input connection for AC cable assembly.

3.1.2. AC POWER ON INDICATOR LED

AC power on indicator LED glows when the charger has power from AC source.

3.1.3. ON/OFF POWER SWITCH

Turns battery charger on or off. Charger hardware can be supplied from either AC source or batteries so when there is no AC source connected system can work with batteries and batteries can discharge.

3.1.4. FAN

Charger has fan for forced cooling. When internal or external temperature increase over 40°C fan start to operate until temperature decrease below 38°C.

3.1.5. ADAPTOR PORT

Provides interface connection for battery adapters. Product is delivered with BB-2590 battery adapter by default, please contact for other options.

3.1.6. CHARGE/DISCHARGE SWITCH

Charge/discharge switch select the operation mode. This switch has other functions, when error occurs, changing the switch position resets all the software errors. When BB2590 battery is deeply discharged, internal BMS (Battery Management System) of battery may close battery terminals and force battery to enter in sleep mode. At that situation, charger does not start to charge automatically since there is no battery voltage at the terminals, but when switch is changed from charge to discharge mode then back to charge mode, charger applies forced charging at all channels and if battery is not damaged BMS opens the terminals and batteries starts to charge.

3.1.7. STATE OF CHARGE INDICATOR LEDS

Battery state of charge displayed with 5 segment LED array for each battery block.

3.1.8. READY LED

The green LED blinks when battery is fully charged at charge mode or fully discharged at discharge mode.

3.1.9. CHARGE LED

The amber LED glows steady while battery is charging.

3.1.10. DISCHARGE LED

The orange LED glows steady while battery is discharging.

3.1.11. FAULT LED

The red fault LED blinks when a problem occurs. When temperature is out of limit in the charging mode, charge LED and fault LED blink together. When temperature is out of limit in the discharging mode, discharge LED and fault LED blink together.

3.1.12. PRESSURE EQUALIZATION VALVE

This valve must be loosened before the cover is opened and latches unfastened. Must be tightly closed for IP67 standard.

3.2. SETUP PROCEDURES

1. Place charger bag in dry and enclosed area and open the lid.
2. Connect AC power cord from AC source to MILCHAR-1PH-4B14-200-A01.
3. If not connected, connect BB2590 adaptor to adaptor port.
4. Turn on the “ON/OFF POWER SWITCH” then observe “AC POWER ON INDICATOR" LED glows.
5. Place batteries to the adaptor.
6. Select desired operation with “CHARGE/DISCHARGE SWITCH”.
7. Observe operation status with “MODE LEDs”.
8. Wait until the “READY LED” start to blink.

3.3. CHARGING PROCEDURES

MILCHAR-1PH-4B14-200-A01 designed to charge two BB2590 batteries simultaneously with smart battery charge algorithm. One BB2590 battery include two isolated 14.4V battery section so charger has four independent channel.

To charge batteries, connect AC power cord then place “ON/OFF POWER SWITCH” to “ON” position and “CHARGE/DISCHARGE SWITCH” to “CHARGE” position. When batteries are placed, state of charge indication LED shows the charge level of each battery block separately. After 10 seconds charger decides operation. If voltage level is higher than 16.2V “READY LED” starts to blink, if voltage level is lower than 16.2V charging operation starts and “CHARGE LED” glows steady. MILCHAR-1PH-4B14-200-A01 charge every battery section with fixed 3A current until its voltage level reaches up to 16.5V, then charger operates in constant voltage mode until batteries are fully charged. When charging operation is finished “READY LED” starts to blink.

If the battery is too discharged, the BMS may have entered protection and turned off the battery outputs. At that situation forced charge have to applied. For applying forced charge “CHARGE/DISCHARGE SWITCH” must change to the “DISCHARGE” position then back to the “CHARGE” position. Charger applies constant current for all outputs and if batteries are not deeply discharged or damaged charging operation start.

3.4. DISCHARGING PROCEDURES

MILCHAR-1PH-4B14-200-A01 also has discharge mode to discharge batteries. At discharge mode battery energy is dissipated on fixed resistors.

To discharge batteries, place batteries to the adaptor then place "ON/OFF POWER SWITCH" to "ON" position and "CHARGE/DISCHARGE SWITCH" to "DISCHARGE" position. After 10 seconds charger decides operation. If voltage level is lower than 12V "READY LED" starts to blink, if voltage level is higher than 12V discharging operation starts and "DISCHARGE LED" glows steady. Battery charger discharge every battery section with fixed resistance until its voltage level is below 11.2V. When discharging operation is finished "READY LED" start to blink.

Battery charger can be used in discharge operation even if AC source is absent. When discharge operation is finished batteries must disconnected from adaptor or "ON/OFF POWER SWITCH" must be at the "OFF" position in order to prevent batteries to be deeply discharged.

3.5. STATE OF CHARGE DISPLAYS

MILCHAR-1PH-4B14-200-A01 equipped with state of charge (SOC) display LED section. 5 segment LED array displays state of charge of the battery block according to the Table 4.

Table 4: State of Charge and LED Display

STATE OF CHARGE	UNIT
80% - 100%	5/5 LED ON
60% - 80%	4/5 LED ON
40% - 60%	3/5 LED ON
20% - 40%	2/5 LED ON
0% - 20%	1/5 LED ON
0%	0/5 LED ON

3.6. MODE LED INDICATORS

There are four different LEDs for each channel that shows operation modes. Patterns of LEDs and their meaning represented at Table 5.

B: Blinking

S: Steady

Table 5: Mode LEDs Patterns

READY	CHARGE	DISCHARGE	FAULT	MEANING
B				CHARGE OR DISCHARGE OPERATION FINISHED
	S			CHARGE IN PROCESS
B		S		DISCHARGE IN PROCESS
			B	ERROR
	B		B	TEMPERATURE OUT OF LIMIT FOR CHARGE
		B	B	TEMPERATURE OUT OF LIMIT FOR DISCHARGE

3.7. FAULT LED HANDLING

1. Fault LED and charge LED blinks together
   - Place battery and charger where ambient temperature is between 0°C to 50°C.
   - When charger temperature equalized with ambient try to charge again.
   - If fault persists, please contact with factory.

2. Fault LED and discharge LED blinks together
   - Place battery and charger where ambient temperature between -20°C to 65°C.
   - When charger temperature equalized with ambient try to discharge again
   - If fault persists, please contact with factory.

3. Fault LED glows for 5 second then close for 10 second and glows for 5 second in a cycle
   - Check battery.
   - Try charger again with new battery.
   - If fault persists, please contact with factory.

4. In the charge operation, AC POWER INDICATION LED glows, but no other LED glows
   - Wait 10 seconds.
   - Battery internal BMS might be forced battery to enter in sleep mode for deeply discharged batteries, to apply forced charge "CHARGE/DISCHARGE SWITCH" must be changed to the "DISCHARGE" position then back to the "CHARGE" position.
   - If charge operation does not begin, check battery.
   - Try charger again with new battery.
   - If fault persists, please contact with factory.

3.8. PREPARATION FOR MOVEMENT

1. Set “ON/OFF POWER SWITCH” to “OFF” position.
2. Remove batteries.
3. Disconnect AC power cord.
4. Close charger lid and secure latches.
5. Tighten pressure equalization valve.

3.9. OPERATION IN EXTREME CONDITIONS

MILCHAR-1PH-4B14-200-A01 designed to operate in extreme conditions, however these conditions limited by used BB2590 battery specifications.

3.9.1. Arctic Climates

MILCHAR-1PH-4B14-200-A01 tested with MIL-STD 810G CHG 1, Method 502.6, Procedure I – II. It can be stored at -40°C and operate at -32°C.

At described in technical specifications battery can be charged when temperature higher than 0°C and be discharged higher than -20°C. Out of these limits’ MILCHAR-1PH-4B14-200-A01 give temperature error by default. You can contact factory to extend temperature range if your battery is working safely for specified temperature.

At arctic climates keep equipment dry and prevent ice buildup on charger and batteries, since it can hinder proper electrical connections and potentially lead to water entrance.

3.9.2. Desert Climates

Battery charger tested with MIL-STD 810G CHG 1, Method 501.6, Procedure I – II. It can be stored at 65°C and operate at 55°C.

At described in technical specifications battery can be charge when temperature lower than 45°C and be discharged lower than 65°C. Out of this limit’s MILCHAR-1PH-4B14-200-A01 give temperature error. You can contact factory to extend temperature range if your battery is working safely for specified temperature.

3.9.3. Humidity

Battery charger tested with MIL-STD 810G, Method 507.6, Procedure II. It can be stored at 95% humidity at least 10 days when lid closed and pressure equalization valve tightened.

3.9.4. Vibration

Battery charger tested with MIL-STD 810G, Method 514.6, Procedure I.

Operator Maintenance Instructions

4

4. OPERATOR MAINTENANCE INSTRUCTIONS

4.1. CLEANING

Gently remove loose dirt and dust from the charger by brushing it off. You can use low-pressure air to eliminate heavy dust from the case, connectors, and power switches. However, be cautious not to blow dust into the unit. Blowing low-pressure air into the vents located at the edges of the control panel can assist in getting rid of internal dust.

4.2. INSPECTION

1. Inspect case for damage.
2. Ensure the lid gasket is in place.
3. Ensure the lid closes and latches can be secured properly.
4. Ensure all screws are in place and are not loose.
5. Inspect the panel for damage.
6. Inspect adapter for damage.
7. Inspect charger connector for bent or corroded pins.
8. Inspect battery connector pins for damage or corrosion.
9. Inspect AC power cord for damage.
10. Ensure switches move freely.
11. Ensure the pressure equalization valve can be tightened and loosened.

4.3. BASIC FUNCTIONAL TEST

1. Set the “ON/OFF POWER SWITCH” to the “OFF” position.
2. Connect battery adapter.
3. Connect AC power cord from AC source to MILCHAR-1PH-4B14-200-A01.
4. Set “CHARGE/DISCHARGE SWITCH” to the “DISCHARGE” position.
5. Set the “ON/OFF POWER SWITCH” to “ON” position.
6. Ensure the “AC POWER INDICATION LED” glows and that all other indicators LEDs are off.
7. Set “CHARGE/DISCHARGE SWITCH” to the “CHARGE” position when charger has sufficient power from AC.
8. After 10 second “CHARGE LEDs” glows and all channels SOC LEDs start to increase then all LEDs close again.
9. End of the test.