ANALYTIC SYSTEMS

Power Conversion Solutions

INSTALLATION & OPERATION MANUAL

BCD805W-12-24 BATTERY CHARGER

An ISO9001 Registered Company

Battery Chargers • Inverters • Power Supplies • Voltage Converters

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DC SOURCE BATTERY CHARGER IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS — This manual contains important safety and operating instructions for the battery charger.

BATTERY CHARGER PRECAUTIONS

1. Do not expose the battery charger to rain or snow unless it is a sealed model.
2. Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock, or injury to persons.
3. Do not disassemble the battery charger; return it to the manufacturer or an authorized service center when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire. Voltages as high as 350 volts may be present inside the charger any time it is connected to a power source, even if it is switched off.
4. To reduce risk of electric shock, unplug the battery charger from the power source before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
5. Never place battery charger directly above battery; gases from battery will corrode and damage battery charger.
6. Never allow battery acid to drip on to the battery charger.

BATTERY SAFETY

1. WARNING — RISK OF EXPLOSIVE GASES

i. WORKING IN VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT EACH TIME BEFORE SERVICING EQUIPMENT IN THE VICINITY OF THE BATTERY, YOU READ THIS USER GUIDE AND FOLLOW THE INSTRUCTIONS EXACTLY.

ii. To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer and manufacturer of any equipment you intend to use in vicinity of battery. Review the cautionary marking on these products.

2. PERSONAL PRECAUTIONS

i. Someone should be within range of your voice or close enough to come to your aid when you work near a battery.

ii. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.

iii. Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.

iv. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 10

v. NEVER smoke or allow a spark or flame in the vicinity of a battery.

vi. Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short-circuit the battery or other electrical part that may cause a fire or explosion.

vii. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to melt metal, causing a severe burn.

viii. NEVER charge a frozen battery.

ix. If it is necessary to remove a battery from service, always remove grounded terminal from battery first. Make sure all accessories connected to the battery are off, to prevent an arc when reconnecting the new battery.

x. Be sure area around battery is well ventilated.

xi. Clean the battery terminals. Be careful to keep corrosion from coming in contact with eyes.

xii. Study all the battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge

Medical Equipment Notice

Analytic Systems does not recommend the use of their products in life support applications where failure or malfunction of this product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness. Analytic Systems does not recommend the use of any of its products in direct patient care. Examples of devices considered to be life support devices are neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), auto-transfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators for both adults and infants, anesthesia ventilators, and infusion pumps as well as any other devices designated as "critical" by the U.S. FDA

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Introduction

The BCD805W-12-24 DC-DC battery charger provides up to 800 watts of power to charge a 24 volt battery system from a 12 Volt DC source. In absence of a battery, the unit can also be used as a DC-DC voltage converter up to the continuous current rating of the unit. The unit is Non-Isolated and Common Negative meaning that there is a direct connection between the Input Negative and Output Negative.

The recently updated single board design features parallel boost mode pulse width modulated converters for power handling and reliability and has multiple stages of filtering to reduce radiated or conducted noise to very low levels.

The BCD805W-12-24 is constructed to be dust tight and water resistant in accordance to IP66 standards. The unit is designed to operate under temperature extremes ranging -40°C to +55°C and is protected against shock and vibration.

Safety features include over-temperature shutdown with automatic recovery, current limiting, short circuit protection with automatic recovery, input undervoltage shutdown, output overvoltage protection, and both input and battery reverse connection protection.

Box Contents

The box you have received should contain the following:

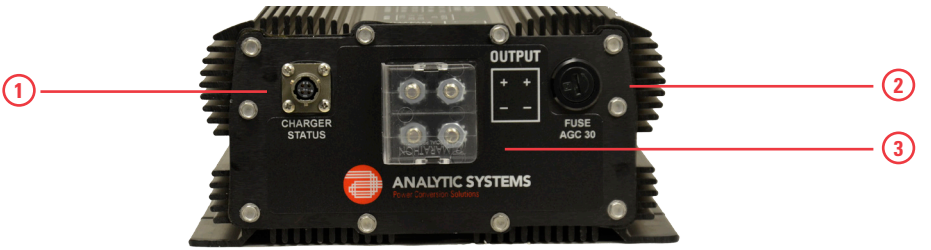
- One BCD805W-12-24 DC-DC Battery Charger
- This manual
- One Warranty Card

If anything is missing or damaged please contact your dealer or Analytic Systems for a replacement

Main Parts

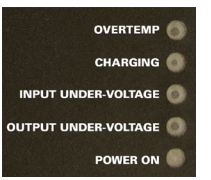
Front Panel

1. Input Connection: Marathon Power Stud Block (ST722B2502UH) c/w cover



Rear Panel

1. Charger Status Indicator Connector MS3112E8-4S
2. Output Fuse
3. Output Connection: Marathon Power Stud Block (ST722B2502UH) c/w cover



Top of Chassis

1. Indicator LEDs

Operation

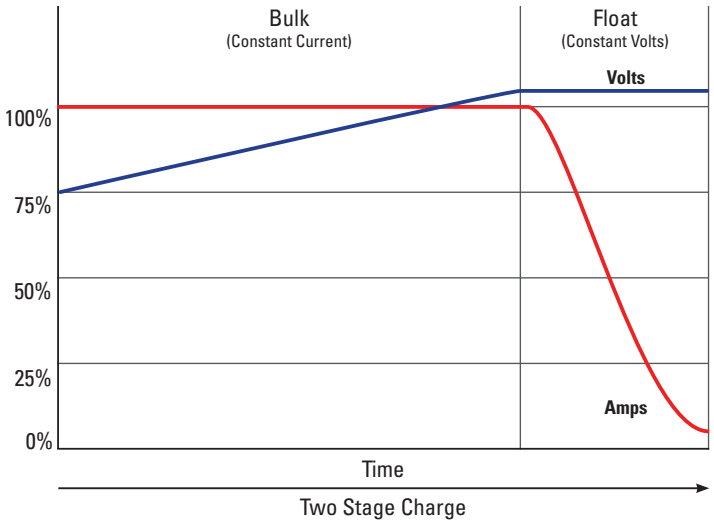
To turn the unit on, apply power to the input. The Power LED on the top of the chassis will illuminate. The Charging LED will then illuminate and the battery will begin charging. When the output current drops to 10% of the continuous rating the Charging LED will turn off. The unit will continue to provide current as necessary to maintain the battery at full charge.

To turn the unit off, turn off the source of power to the unit.

Two-Stage Charging

The BCD805W is a two-stage charger. A two-stage charger provides a constant current at 100% of rated output until the battery reaches its rated voltage and then switches to a "float" voltage. The current then reduces as necessary to complete the charge and then maintain the battery at the float voltage.

The charger can be connected to the battery indefinitely. A two-stage charger is recommended in most instances since it is the most versatile and can be permanently connected to attenuate the characteristic discharge of unused batteries. A load can be put on the batteries without altering the ability of the charger to maintain them at full charge.



Installation

Mounting

Mount the unit in a location protected from total water immersion. The unit is rated IP66 for protection from water spray and blowing dust. Allow at least 1 inch of clearance around the unit for adequate cooling.

Input Connection

This unit's front panel is equipped with a Marathon Block Connector (ST722B2502UH) for the DC input. The connection is rated for 175A and 300V. The studs on the connector are sized 1/4 - 20 and intended for two hole compression lugs on .625" centers The recommended wire gauge is AWG 4. If only one Negative connection is being used, it should be the Input Negative. The input connections are:

Pin	Function
Top left	Power In Positive
Top Right	Power In Positive
Bottom left	Power In Negative
Bottom right	Power In Negative

Output Connection

This unit's rear panel is equipped with a Marathon Block Connector (ST722B2502UH) for the DC output. The connection is rated for 175A and 300V. The studs on the connection are sized 1/4 - 20 and intended for two hole compression lugs on .625" centers. The recommended wire gauge is AWG 8. The output connections are:

Pin	Function
Top left	Battery Positive
Top Right	Battery Positive
Bottom left	Battery Negative (connection may not be required)
Bottom right	Battery Negative (connection may not be required)

Charger Status Connection

This unit's rear panel is equipped with an MS3112E8-4S status connector. This output is designed to run an external status LED. In the event that any one of the following conditions occur, 5 milli-amps of current will be applied to this connector:

• Power Switch A fault	• Pulse Width Modulation Controller Fault
• Power Switch B fault	• Low Input Voltage
• Heatsink A Over-Temperature	• Low Output Voltage
• Heatsink B Over-Temperature	

The output connection is detailed as follows:

Pin	Function
A	LED Anode (positive)
B	no connection
C	LED Cathode (negative)
D	no connection

A bright waterproof status LED with an 0.5 meter cable designed for operation with this connection is available, part number SASY.100308.

Troubleshooting

This unit provides LED indicators to help diagnose any problems. The following table lists the meanings of the LEDs and tips for troubleshooting the issues they indicate.

OVERTEMP	Indicates that the battery charger is running too hot. The charger will shut down until it cools and then resume normal operation.
	The ambient temperature is too high or the charger is it located in a poorly ventilated area.
UNDER VOLTAGE INPUT	Indicates that the input voltage is not high enough for the charger to operate normally.
	Ensure the power source is supplying the correct voltage. Check that the input connection and wires have not been damaged or corroded. Ensure the gauge of the wires is suitable for the input current.
UNDER VOLTAGE OUTPUT	Indicates that the output voltage has fallen to less than 50% of the regulated value.
	The battery connected to the charger may be defective, or too much load is connected causing the battery to become severely discharged. REplace the battery or reduce the load on the system. Check that the output connection and wires have not been damaged or corroded.

Specifications

Input Specifications	
Input Voltage Range	11 to 15 VDC
Inrush Current	80 Amps Peak
Input Amps	85A Maximum (at 11.0 VDC In)
Circuit Protection	125 Amp External Fuse Required at Battery
Noise on Input	< 50mV p-p

Output Specifications	
Output Volts	27.2 VDC
Output Current	30 Amps Continuous
Output Fuse	AGC 40 Amp
Efficiency	> 85% at 20 Amps Out
Regulation (Line or Load)	+/- 1.0% max.
Noise and Ripple	< 100mV p-p @ 20A Load
Output Overvoltage Protection	34 VDC Non-Latching (Inhibits PWM, automatic reset)
Charging Stages	2 - Constant Current to Constant Voltage

Mechanical Specifications	
Case Material	Black Anodized Extruded Aluminum Chassis, Black Anodized sheet aluminum Front and Rear Panels, with 18-8 Stainless Fasteners
Audible Noise	none, 0 db
Connections	Input and Output - Marathon ST722B2502UH Status - MS3112E8-4S
Dimensions	16.0 in / 40.6 cm Long x 8.0 in/ 19.3 cm Wide x 3.8 in / 9.7 cm High
Weight	17.5 lbs / 7.9 kg
Workmanship	Manufactured in accordance with IPC-A-610
Isolation	500 VDC Input or Output to Case, Input to Output Common Negative

Environmental Specifications	
Operating Temperature	-40°C to 60°C
Storage Temperature Range	-50°C to 85°C
Cooling	Convection Cooling via Case, 1 Inch Clearance all around recommended
Vibration	Per MIL-STD 810G, Method 514-3, Cat-I Proc I
Shock	Per MIL-STD 810G, Method 516-3, Proc 11, IV, VI
Humidity	0 - 95% Non-Condensing
Ingress Protection	Designed to meet IP66 for water and dust protection
EMC – conducted emissions	Designed to meet MIL-STD-461F: CE102, fig CE102-1, 10kHz to 10MHz.
EMC – radiated emissions	Designed to meet MIL-STD-461F: RE102, fig RE102-4, 2MHz to 1GHz.

Limited Warranty

1. The equipment manufactured by Analytic Systems Ware (1993) Ltd. (the "Warrantor") is warranted to be free from defects in workmanship and materials under normal use and service.
2. This warranty is in effect for:
    a. 3 Years from date of purchase by the end user for standard products offered in our catalog.
    b. 2 Years from date of manufacture for non-standard or OEM products
    c. 1 Year from date of manufacture for encapsulated products.
3. Analytic Systems will determine eligibility for warranty from the date of purchase shown on the warranty card when returned within 30 days, or
    a. The date of shipment by Analytic Systems, or
    b. The date of manufacture coded in the serial number, or
    c. From a copy of the original purchase receipt showing the date of purchase by the user.
4. In case any part of the equipment proves to be defective, the Purchaser should do the following:
    a. Prepare a written statement of the nature of the defect to the best of the Purchasers knowledge, and include the date of purchase, the place of purchase, and the Purchasers name, address and telephone number.
    b. Call Analytic Systems at 800-668-3884 or 604-946-9981 and request a return material authorization number (RMA).
    c. Return the defective part or unit along with the statement at the Purchasers expense to the Warrantor; Analytic Systems Ware (1993) Ltd., 8128 River Way, Delta, B.C., V4G 1K5, Canada.
5. If upon the Warrantor's examination the defect proves to be the result of defective material or workmanship, the equipment will be repaired or replaced at the Warrantor's option without charge, and returned to the Purchaser at the Warrantor's expense by the most economical means. Requests for a different method of return or special handling will incur additional charges and are the responsibility of the Purchaser.
6. Analytic Systems reserves the right to void the warranty if:
    a. Labels, identification marks or serial numbers are removed or altered in any way.
    b. Our invoice is unpaid.
    c. The defect is the result of misuse, neglect, improper installation, environmental conditions, non-authorized repair, alteration or accident.
7. No refund of the purchase price will be granted to the Purchaser, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so.
8. Only the Warrantor shall perform warranty service. Any attempt to remedy the defect by anyone else shall render this warranty void.
9. There shall be no warranty for defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion except for equipment specifically stated to be waterproof.
10. No other express warranty is hereby given and there are no warranties that extend beyond those described herein. This warranty is expressly in lieu of any other expressed or implied warranties, including any implied warranty of merchantability, fitness for the ordinary purposes for which such goods are used, or fitness for a particular purpose, or any other obligations on the part of the Warrantor or its employees and representatives.
11. There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives for injury to any person or persons, or damage to property, or loss of income or profit, or any other consequential or resulting damage which may be claimed to have been incurred through the use or sale of the equipment, including any possible failure of malfunction of the equipment, or part thereof.
12. The Warrantor assumes no liability for incidental or consequential damages of any kind

DESIGNED AND MANUFACTURED BY

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