ANALYTIC SYSTEMS
Power Conversion Solutions

INSTALLATION & OPERATION MANUAL

BCA1005MPVW-24DND WATERPROOF BATTERY CHARGER

An ISO9001 Registered Company Battery Chargers • Inverters • Power Supplies • Voltage Converters

8128 River Way, Delta B.C. V4G 1K5 Canada T. 604.946.9981 F. 604.946.9983 TF. 800.668.3884 (US/CANADA)

www.AnalyticSystems.com

AC 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 □re, 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 □re. Voltages in excess of 350 volts are present inside the charger anytime it is plugged into an AC outlet, even if it is switched off.
4. To reduce risk of electric shock, unplug the battery charger from the AC outlet 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 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 □ood eye with running cold water for at least 10 minutes and get medical attention immediately

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

GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS

The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER: Never alter the AC power cord or plug provided. If it will not fit the output, use an approved adapter or have the proper AC power cord installed by a qualified electrician. Improper connection can result in the risk of electric shock.

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.

TABLE OF CONTENTS

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Revised - Nov 18, 2019

Introduction

The BCA1005MPVW-24DND is a custom version of the rugged and reliable BCA1005 (M)ilitary (W)aterproof battery charger. It is equipped with the (P)ortable option for use without the mobile cart and the digital (V)oltmeter option for an easy to read bright LED display of charging voltage and current.

This unit designed for military use in rugged environments. It provides 1000 watts of charging power into a one or two bank battery system at 12, 24, 28, 32, 36, 48 or 72 volts DC from a 110 or 220 VAC source. It is switch selectable between a 2-stage constant current to constant voltage (□oat) charging pro□le or a 3-stage constant current to constant voltage (absorption) to constant voltage (□oat) pro□le and can be permanently connected without any risk of damage or overcharging of the batteries.

The charger is constructed from heavy duty anodized extruded and billet machined aluminum with O-ring seals and all stainless-steel fasteners for rugged duty, and rated for IP66 Ingress Protection (IP67 Ingress Protection level available as an option). A thermostatically controlled compact high temperature rated internal fan ensures uniform internal temperatures for reliability and ef□cient cooling. All connections are common with the more powerful BCA1505M and MW series chargers for easy upgrade.

Proven switch-mode technology provides ef□cient and reliable operation from -40 to +55 degrees Celsius ambient temperatures. Heavy input and output □ltering reduce EMI to extremely low levels to prevent radio interference. Operation is monitored by a bright status indicator LED panel. Reliability features include an input circuit breaker, thermal shutdown, current limiting, reverse battery hookup protection and output short circuit shutdown with automatic recovery.

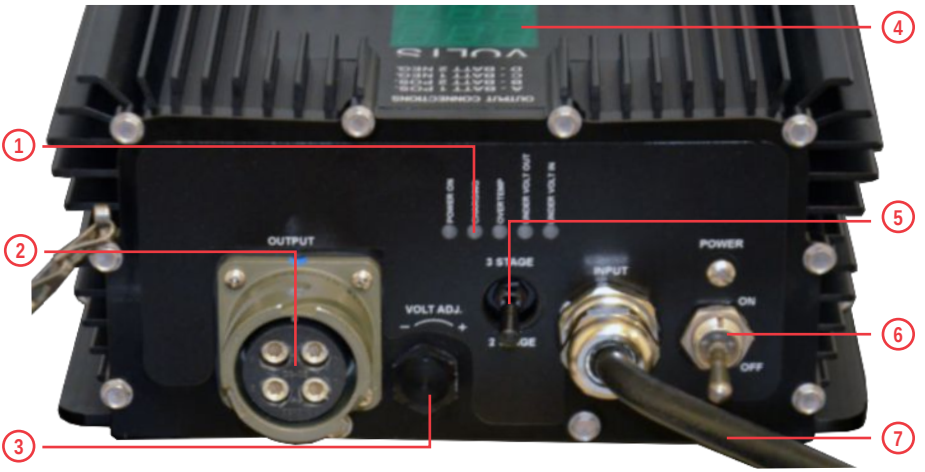
Box Contents

The box that you've received should contain the following:

- 1 BCA1005MPVW-24DND AC-source battery charger
- 1 BCA1005MPVW-24DND mobile cart
- 1 NATO-DC Output connection cable
- 1 Warranty card
- 1 Installation and operation manual

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

Main Parts



Front Panel

1. Operational Indicator LEDs
2. **DC Output Connection:** Amphenol GTC02R22-22S-RDS MIL-Spec connector
3. Output Voltage Adjust
4. Digital Voltmeter Ammeter
5. Stage Select Switch
6. Power Switch
7. **AC Input Connection:** 3 m / 9.8ft 3xAWG14 power cord with NEMA 5-15 compatible plug

Operation

The BCA1005MPVW-24DND is designed for simple and intuitive operation. Before operating, make sure this unit is properly installed and connected. See *Installation* for more information.

TO CHARGE A BATTERY

1. Select the type of charging profile using the Stage Select switch on the front panel. See *Charging Profiles* for more information.
2. Move the Power Switch to ON. The alarm buzzer will sound and the LOW VOLTAGE OUTPUT LED will glow red briefly, then the POWER LED will glow green.
3. The CHARGING LED will glow green and the unit will charge the battery at the voltage and current listed on the label.
4. Once the battery is fully charged, the CHARGING LED will turn off. The unit will maintain the battery at full charge for as long as it is connected.

TO ADJUST THE CHARGING VOLTAGE

1. The charging voltage adjustment potentiometer is protected by an O-ring sealed hexagonal plug. This plug can be removed using a 5/8th inch or 16mm wrench.
2. Move the Power Switch to ON.
3. Rotate the output voltage adjustment potentiometer on the front panel.
4. The charging voltage can be adjusted over a range of ±10%. Rotate the potentiometer clockwise to increase the output voltage; counterclockwise to decrease the charging voltage.
5. Using a voltmeter or multimeter, check the charging voltage at the battery terminal. Adjust until the voltage reading is suitable for the battery being charged.
6. Replace the hexagonal plug to return the charger to water resistant condition.

TO END OPERATION

1. Move the Power Switch to OFF.
2. Wait for all the LEDs stop glowing.
3. Once all of the LEDs are off, it is safe to disconnect the unit from the power source and battery. The unit is now ready for storage or service.

Operational Indicators

This unit features five indicator LEDs on its front panel to display the unit's operating condition. The meanings of these LEDs are detailed below. For more information on the LEDs relating to alarm conditions, see *Troubleshooting*.

STANDARD LEDS

POWER ON

This LED glows green when the unit is connected to an AC power source and turned ON.

CHARGING

This LED glows green when the unit is currently charging a battery. This LED turns off when the connected battery is fully charged. The charger will maintain the battery at the float voltage for as long as it is connected.

OVERTEMP

This LED glows red when the unit's internal temperature is above the safe limit, the unit will then turn OFF its outputs as a precaution. Once the internal temperature is within the safe operating range, the unit will automatically resume operation.

UNDERVOLTAGE OUTPUT

This LED glows red when the output voltage is too low to properly charge the battery, the unit will then turn OFF its outputs as a precaution. Once the unit detects the output voltage is within the normal operating range, it will automatically resume operation.

UNDERVOLTAGE INPUT

This LED glows red when the input voltage is too low for proper operation, the unit will then turn OFF its outputs as a precaution. Once the unit detects the input voltage is within the normal operating range, it will automatically resume operation.

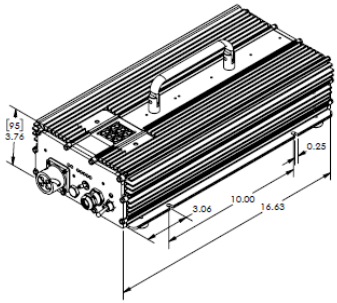
Installation

MOUNTING

The BCA1005MPVW-24DND is designed for portable operation but can be mounted for stationary use if required.

Mout the unit in a WELL VENTILATED area with at least 1 inch (2.54 cm) surrounding clearance.

The BCA1005MW is designed to meet IP66 rating,and is resistant to water spray from any direction. These units can be mounted in wet locations but are not suitable for submersion.



The BCA1005MY units are designed and certi□ed to meet IP67 rating. These units are resistant to water immersion of a depth up to 1 meter for 30 minutes and suitable for mounting in locations such as a vehicle fording a river.

CAUTION: *THE POWER SWITCH MUST BE IN THE OFF POSITION BEFORE MAKING CONNECTIONS.*

When connecting the battery to the unit a small arc can form between the connectors. To ensure spark-free connections, make connections only when the power switch is OFF.

AC INPUT CONNECTION

This unit is equipped with a 3.0m / 9.8ft power cord with a plug compatible with any NEMA 5-15 15-amp, 120 VAC / 60 Hz outlet. With an appropriate connector or adapter installed, this battery charger will also operate from 220 VAC / 50 or 60 Hz.

DC OUTPUT CONNECTION

This unit is equipped with a 4-hole Amphenol GTC02R22-22S-RDS MIL-Spec connector to serve a DC Output Connection. This unit is supplied with a NATO-compatible battery connection cable This connection can support up to two connected battery banks.

Connect the supplied cable to the DC Output Connection and plug the NATO connector into the vehicle. The wiring of the DC Output Connection is as follows:

A: Battery 1 Positive
B: Battery 2 Positive
C: Battery 1 Negative
D: Battery 2 Negative

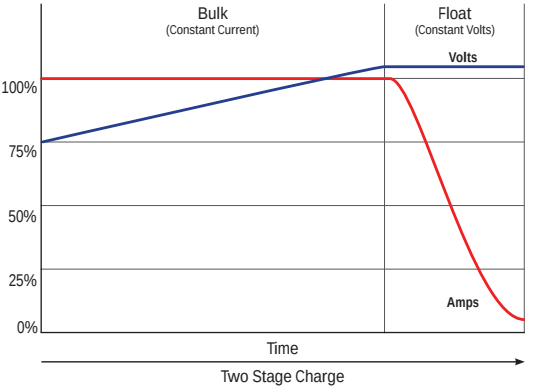
Charging Pro□les

This unit has both two-stage and three-stage charging capability. You can choose which charging pro□le is used during operation by using the Stage Select switch on the front panel.

Below are explanations of the two pro□les:

TWO-STAGE CHARGING

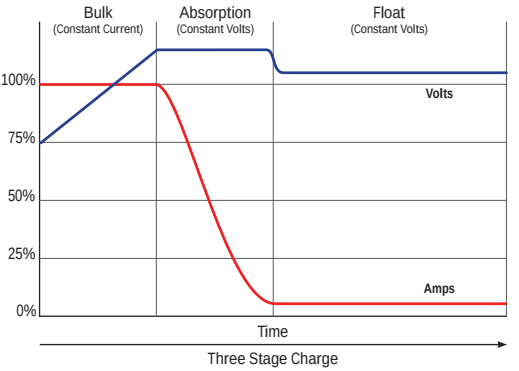
- The battery is charged at a constant current until the battery's voltage reaches the □oat voltage.
- Then the charging current diminishes as necessary to maintain the battery at that voltage.
- Once the current drops to 10%, the charging cycle is complete. The unit will maintain the battery at full charge until needed.



Two Stage Charge

THREE-STAGE CHARGING

- The battery is charged at a constant current (higher than in two-stage) until the battery's voltage reaches the absorption voltage.
- Then the charging current diminishes as necessary to maintain the battery at that voltage.
- Once the current drops to 10%, the charging cycle is complete. The unit switches to keeping the battery at the □oat voltage and will maintain the battery at full charge until needed.



Three Stage Charge

Mobile Cart

The mobile cart is speci□cally designed to work with the BCA1005MW battery charger. It is constructed from high grade aluminum and □nished with a rugged powder coating for light weight and durability. Two heavy duty oil-resistant rubber wheels with ball bearings make the cart easy to roll and a heavy-duty rubber bumper allows the cart to sit stable on any □at surface, indoor or outdoor.

The BCA1005MW charger is fastened to the mobile cart using 4 ¼-20 stainless steel screws. The charger is equipped with a carrying handle and rubber feet so it can also be used independently from the cart.

TO REMOVE THE CHARGER FROM THE CART:

1. Disconnect the output cnnection cable from the charger.
2. Lay the cart down □at on its back.
3. Remove the 4 screws mounting the charger to the cart. These can be found on the chassis sides.
4. Replace the screws into the cart frame for safekeeping.
5. Lift the charger off the cart.
6. Reconnect the output cable to the charger.

Troubleshooting

This unit is □tted with LED indicators and an alarm buzzer to display and diagnose any problems in operation. In the event of a malfunction, the unit will sound the buzzer to alert you prior to shutting itself down. You should immediately check which LEDs are glowing to determine the cause of the alarm.

LED Indicator	Meaning
OVERTEMP	The unit's internal temperature is too high for normal operation.
Fix:	The internal cooling fan may have failed or there may not be adequate ventilation to cool the charger. Check that the cooling fan is still working; if it is not then the unit must be returned to an authorized service center for repair. If it is working correctly, remount the battery charger for better air circulation.
LOW INPUT	The battery charger's input voltage is too low for normal operation
Fix:	Check that the power source is properly rated for the battery charger. Check that the input cables and connection are free of damage and corrosion. If all of the above are in proper working order, the cause is likely an internal component failure and the unit must be returned to an authorized service center for repair.
LOW OUTPUT	The battery charger's output voltage is too low for normal operation.
Fix:	The charging current might be exceeding the unit's maximum rating causing the output voltage to drop to maintain the current at that level. Check that the charging current is not over its limit, by using a multimeter at the output terminals. If it is, reduce the load connected to the charger. Check that the output cables and connections are free of damage and corrosion. If all of the above are in proper working order, the cause is likely an internal component failure and the unit must be returned to an authorized service center for repair.

Specifications

Input		
Volts Nominal	110 VAC (Auto-switching)	220 VAC (Auto-switching)
Volts Actual	90 - 130 VAC	180 - 265 VAC
Maximum Input Amps	13.1 A (@ 90 VAC in)	
Input Fuse (Ciruit Breaker)	25A Magnetic	
Input Ripple and Noise	<50 mV Peak to Peak	
Frequency	49 - 405 Hz	
Inrush Current	<13 A @ 265 VAC In from fully discharged	

Output							
Volts Nominal (VDC)	12	24	32	36	48	72 (rail)	72
Charging Amps (A)	80	40	30	27	20	15	13
Float Voltage (VDC)	13.6	27.2	36.3	40.8	54.4	72.5	81.6
Absorption Voltage (VDC)	14.4	28.8	38.4	43.2	57.6	76.8	86.4
Absorption to Float Switch (Amps)	6	3	3	2	2	1	1
Output Overvoltage Trip (V)	17.0 ±0.5	34.0 ±1.0	45.0 ±1.5	51.0 ±1.5	68.0 ±2.0	90.0 ±2.5	102.0 ±3.0
Output Overvoltage Type	Crowbar (intentional secondary short circuit to force a reset of charger)						
Recommended Battery Size (Amp-Hours)	200-800	100-400	75-300	60-270	50-200	35-150	30-130
Output Fuses	3x ATM30 Internal	2x ATM25 Internal	2x ATM20 Internal	2x Bel 0697H9200 20A Internal	1x Bel 0697H9150 20A Internal	1x Bel 0697H9200 20A Internal	1x Bel 0697H9200 20A Internal
Output Voltage Adjustment	±1.0 V						
Duty Cycle	Continuous						
Regulation (Line and Load)	+/- 0.1 volts						
Efficiency	> 85% @ Maximum Output						
Charging Stages (Selectable)	2 or 3						
Number of Battery Banks	1 or 2						

Mechanical	
Length	16.6 in / 42.2 cm chassis length (18.0 inches / 45.7 cm overall length)
Width	8.2 in / 20.8 cm
Height	3.8 in/ 9.7 cm (5.9 in / 15.0 cm with portable option)
Clearance	1.0 in / 2.5 cm all around
Weight	19.5 lb / 8.9 kg
Material & Finish	Extruded aluminum chassis and bottom cover, billet machined aluminum end plates with O-ring seals, all black anodized
Fasteners	18-8 Stainless steel
Input Connections	3 m / 9.8ft 3xAWG14 power cord with NEMA 5-15 compatible plug
Output Connections	Amphenol GTC02R22-22S-RDS 4-hole MIL-Spec connector

Environmental and Safety	
Operating Temperature Range	-40°C to +55°C @ maximum output. Derate Linearly 2.5% per °C from 55°C
Storage Temperature Range	-40°C to +100°C
Ingress Protection	IP66 (Dust-proof and protected from high pressure water jets from any direction)
Humidity	0 - 95% Relative Humidity (non-condensing) with standard conformal coating
Isolation	Input-Case, Input-Output and Output-Case: 1500 VDC
Cooling	One internal thermostatically controlled fan
Emissions	Designed to meet MIL461F
Shock and Vibration	Designed to meet MIL810G
Audible Noise	20 dB @ 1 meter when fan operating
Typical Service Life	> 10 years (87,600 hrs)
Warranty	Two years parts and labor
Approvals	Designed to meet UL458 & CSA 22.2.107.1

Created: Nov 12, 2019
Updated: Nov 18, 2019
Master FASY: FASY.101489

* Speci□cations subjects to change without notice.

Designed and manufactured by: **ANALYTIC SYSTEMS WARE (1993) LTD.**

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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 2 years from the date of purchase by the end user.
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, identi□cation 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 speci□cally 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, □tness for the ordinary purposes for which such goods are used, or □tness 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 pro□t, 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

ANALYTIC SYSTEMS
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Battery Chargers • Inverters • Power Supplies • Voltage Converters

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