

ANALYTIC SYSTEMS

Power Conversion Solutions

Installation & Operation Manual

BCA-PWS-480-36
***Transit Power Supply/
Charger***



IMPORTANT & SAFETY INSTRUCTIONS

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

- 1) CAUTION — To reduce risk of injury, charge only NiCd type rechargeable batteries. Other types of batteries may burst causing personal injury and damage.
- 2) Use of an attachment not recommended or sold by the power supply/charger manufacturer may result in a risk of fire, electric shock, or injury to persons.
- 4) Do not disassemble converter; take it to a qualified serviceman when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
- 5) To reduce risk of electric shock, disconnect power supply/charger from batteries or other DC supply before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.

Analytic Systems does not recommend the use of the BCA-PWS-480-36 power supply/charger 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 anaesthesia, pain relief, or other purposes), auto transfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, haemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators for both adults and infants, anaesthesia ventilators, and infusion pumps as well as any other devices designated as “critical” by the U.S. FDA.

Introduction

power supply (BC/LVPS) system for commuter rail applications. Two identical converters are used for the Battery charger and Low voltage power supply of the system. The converters rectify 480V AC 3 phase input and convert it to a regulated lower voltage isolated output. Reliability features include two 10A input breaker, input under/over voltage shut down, output short circuit shutdown...

Features

In a DC UPS (Un-interruptible Power Supply), the charger simultaneously powers the DC load as well as the battery. As long as the AC power to the charger is available and the charger is working normally, the charger will supply the DC load as well as charge / float the battery. In case the AC power fails or if the charger stops working, the battery will automatically power the DC load. As soon as the AC power to the charger is restored, the DC load will once again be fed by the charger and at the same time the battery will be recharged. CAUTION! Please ensure that the sum of the current drawn by the DC load and the current desired for charging the battery is less than the maximum current capacity of the charger. To use as a DC UPS, first switch off the DC load and connect it to the battery. Now connect the battery. Switch on the charger and then switch on the DC load.

Specifications

ELECTRICAL SPECIFICATIONS:	
Input	
Input Voltage	480Vac 3 phase
Actual (Vac)	432V-528V
Input Amps (max)	4Ax2
Input Breaker	10Ax2
Input Frequency	47Hz-63Hz
Input Power Factor	>0.90
Output	
Output Nominal (op)	32V
Output Voltage (Max)	41.5V (47V in commissioning charge mode)
Absorption Voltage (VDC)	38.125V
Charging Amps	60A
Battery Banks	NiCd
Commissioning Charge Voltage (VDC)	47.5V
Temperature Compensation Coefficient	-3mV/°C per cell
Duty Cycle	100%
Efficiency	>92%
Regulation (Line & Load)	<10mV; <100mV
MECHANICAL SPECIFICATIONS:	
Length	34.187 in/868mm
Width	18.030 in/458mm
Height	23.500 in/597mm
Clearance	21.000 in/534mm
Material	Stainless Steel
Finish	Powder coat white
Weight	270 lbs/122.470kg (apprx.)

* Specifications subjects to change without notice.

Designed and manufactured by: ANALYTIC SYSTEMS WARE (1993) LTD.
 8128 River Way, Delta, B.C., V4G 1K5, Canada
 phone (604) 946-9981 fax (604) 946-9983 toll free 800-668-3884 US/Canada
 email: analyticinfo@analyticssystem.com web site: www.analyticssystem.com

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Installation

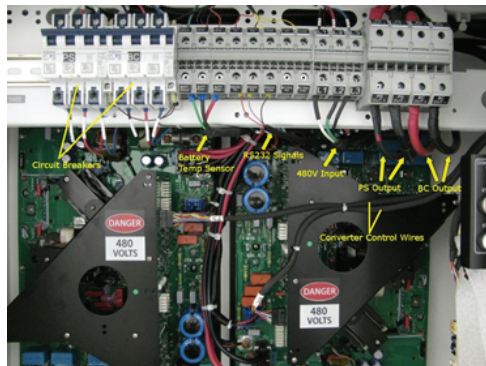
◆ Hardware

1. Mount railway charger unit onto train using all four holes provided (Fig. 1).



Fig.1: Mounting holes on unit's top

1. Turn OFF power on the train.
2. Open unit's door and feed wiring (480V input, Battery Charger output, Low Voltage Power Supply output, and battery temperature sensor wires) into unit through the rear hole.
3. Connect wiring according to Fig. 2 (from left to right). Wiring is to be routed underneath the connector panel. Ensure wiring does not touch the converters. Connect wiring in the following sequence :
 - a. Battery temperature sensor wires
 - b. RS232 communication port
 - c. 480V input wires
 - d. Low voltage power supply output wires
 - e. Battery charger output wires



5. Ensure all terminal block screws are properly fastened.
6. Close and lock door

◆ PC Software

Run the install program. It will install the Metra_LVPS_BC software in the directory C:\Programming Files\Metra. It will create a start icon on the desktop. It will install a new item ASW_Metra in the “All Program” menu that has two entries. One entry is to start the application and the second is an uninstall option to remove the application from the computer.

◆ Configurable Parameters

The following list of configuration parameters can be changed by the customer via the RS232 serial interface and the GUI software package.

Name/Description:	Default Value:	Allowable Range:
DVAM Display Alternate Rate	5 seconds	1 to 60 seconds
DVAM Off during battery operation	100% ON	0 to 100% duty cycle
LVPS output over-current # of retries	3	0 to infinity
LVPS output over-current retry interval	5 seconds	1 to 65535 seconds

Troubleshooting

Fault and Error Condition Codes

Fault codes are conditions that cause a shutdown of the BC/LVPS. Error codes are conditions that are considered out of the normal operating range, but not significant enough to cause a shutdown.

If a fault or error code is present it will cause the Digital Voltage / Amp-meter Display (DVAM) to alternate between BC/LVPS voltage/current values and the last 5 error and fault codes.

Fault (F) and Error (E) condition codes (2 digits) are displayed via 2x3 digits, 7seg LCD and 13LED as an alternate to the normal voltage and current values. However, not all of these directly correspond to a status LED.

Fault codes are displayed using the format: **FXX** where **XX** represents the numerical fault codes range from 01 – 49. Error codes are displayed using the format: **EXX** where **XX** represents the numerical error codes range from 50 – 99.

Code:	Type:	Description:
1	Fault	480 VAC Input Over-Current – LVPS Circuit Breaker tripped
2	Fault	LVPS Output Over-Current condition Shutdown
3	Fault	BC Output Over-Voltage Shutdown
4	Fault	LVPS Output Over-Voltage Shutdown
5	Fault	LVPS Output Under-Voltage Shutdown
6	Fault	BC Output Under-Voltage Shutdown
7	Fault	BC Internal Fault condition – a shutdown results
8	Fault	LVPS Internal Fault condition – a shutdown results
9	Fault	Internal Fault condition – inability to regulate BC output
10	Fault	Internal Fault condition – inability to regulate LVPS output
11	Fault	BC Over Temperature Condition
12	Fault	LVPS Over Temperature Condition
13	Fault	BC Shutdown due to Failure
14	Fault	LVPS Shutdown due to Failure
15	Fault	MOV Alarm Fault Condition (not used at present)
16	Fault	480 VAC Input Under-Voltage Shutdown
17	Fault	480 VAC Input Over-Voltage Shutdown
18	Fault	480 VAC Input Over-Current – BC Circuit Breaker tripped
50	Error	Remove Battery from Load (low battery voltage $\leq 22.5V$)
51	Error	Battery Polarity Reversal
52	Error	Battery Temperature Probe Failure
53	Error	Ground Fault Condition
54	Error	BC Output High Voltage Condition (between 42VDC and 45VDC)
55	Error	Output Low Voltage Condition
56	Error	LVPS Output High Voltage Condition (between 42VDC and 45VDC)
57	Error	BC Shutdown due to high battery temperature
58	Error	LVPS High Current – No Battery Switch-Over attempted
59	Error	LVPS Overload Retries consumed – Total Shutdown of LVPS
60	Error	LVPS possible wiring error. Detected +Volts on LVPS load terminals
61	Error	BC Shutdown due to low battery temperature

Event Codes

Normal event codes are listed here. These codes are only available via the data logging interface. Normal Event codes range from 100 – 199.

Code:	Type:	Description:
100	Event	Transfer load to batteries
101	Event	FLOAT Battery Charge Start
102	Event	BOOST Battery Charge Start
103	Event	Battery Commissioning Charge Start
104	Event	Commissioning Charge Interrupted
105	Event	480VAC Restored
106	Event	Remove LVPS load from Battery
107	Event	BC Heat Sink Temperature is Normal
108	Event	LVPS Heat Sink Temp is Normal
109	Event	480VAC is in Normal Range
110	Event	LVPS output Voltage is Normal
111	Event	BC Output Voltage is Normal
112	Event	BC is NOT in current limiting
113	Event	LVPS is NOT in current limiting
114	Event	Battery Temperature is Normal
115	Event	Commissioning Charge Cycle Ended Normally
116	Event	AC Power has been removed
117	Event	Output Current limit condition (BC or LVPS)
118	Event	Start of Firmware; Start of Data logging

Please refer to Appendix... Troubleshooting for details.
Appendix ... Firmware for details

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

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.



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