

# **ANALYTIC SYSTEMS**

Power Conversion Solutions

## **INSTALLATION & OPERATION MANUAL**

### **VTC600 SERIES Voltage Converter**



An ISO9001 and AS9100 Registered Company Battery Chargers • Inverters • Power Supplies • Voltage Converters

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# IMPORTANT & SAFETY INSTRUCTIONS

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

## ALL CONVERTERS

1. CAUTION — To reduce risk of injury, charge only lead acid or sealed gel cell type rechargeable batteries. Other types of batteries may burst causing personal injury and damage.
2. Do not expose converter to rain or snow.
3. Use of an attachment not recommended or sold by the converter 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 converter from batteries or other DC supply before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.

## CONVERTER LOCATION

1. Never place converter directly above battery; gases from battery will corrode and damage converter.
2. Never allow battery acid to drip on converter when reading gravity or filling battery.

## O/P CONNECTION PRECAUTIONS

Connect and disconnect DC output connections only after setting converter switch to off position.

Analytic Systems does not recommend the use of the VTC600 Series Voltage Converters 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.



# Introduction

The VTC600 Series Voltage Converter is the high output version of the VTC300 Series Voltage Converter using more powerful components, and a generously sized external heatsink for additional cooling.

This all new single board design incorporates state of the art switchmode technology for unmatched efficiency and ultra-quiet operation. Multiple stages of filtering reduce radiated or conducted noise to very low levels. Extra features include adjustable output voltage, audible and visual indicators for low input voltage, low output voltage, over temperature and overload. Safety features include reverse input protection, over-temperature shutdown, current limiting, short circuit shutdown, and output overvoltage crowbar. Optional features include a dry contact alarm relay output, and remote panel monitoring with On-Off control.

We are confident that you will get many years of reliable service from this Voltage Converter.

# Specifications

Model	VTC600-32-12	VTC600-32-24
Input Voltage	20 - 45 VDC	30 - 45 VDC
Output Voltage	13.6 ± 0.5 VDC	27.2 ± 0.5 VDC
Output Current	50 Cont; 55 Peak	35 Cont; 40 Peak
Current Limit	57 Amps	42 Amps
Output Crowbar	16.0 ± 0.5 V	32.0 ± 1.0 V
Input Fuse	AGC 25 Amp x 2	
Noise on Input	< 50 milli-volts	
Noise on Output	< 50 milli-volts	
Transient Resp.	< 1V for 30A Surge	
Efficiency	>90 % @ maximum output	
Temp. Range	-25 to 40 deg C @ maximum output	
Isolation	Any Input or Output to Case 500VDC Input to Output Common Negative	
Length	9.1 in / 23.1 cm	
Width	7.8 in / 19.8 cm	
Height	4.3 in / 10.9 cm	
Clearance	1 Inch (2.5 cm) all around	
Material	Marine Grade Aluminum	
Finish	Black Anodized	
Fastenings	18-8 Stainless	
Weight	5.2 lb / 2.4 kg	

\* Specifications subjects to change without notice.

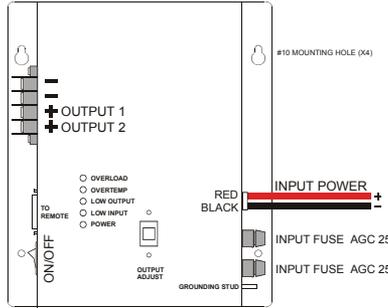


Designed and manufactured by: **ANALYTIC SYSTEMS WARE (1993) LTD.**

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Allow at least 1 inch of clearance all around the case for cooling. The best mounting configuration is to mount the unit on a vertical surface oriented as shown. Use #10 screws of the appropriate type for the mounting surface to securely mount the unit.

The case has 500 volts of isolation from both the input and output, so it may be mounted on any surface without fear of electrolysis or ground fault.

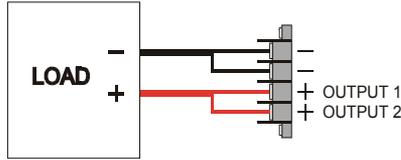
The unit is supplied with input leads 1 meter long of #10 AWG wire. This should be adequate to connect to a breaker panel or other source of power. If you need to extend the wires, use at least #10 AWG wire and solder and heat shrink the connection to protect the joint. Connect the Red wire to Positive, and the Black wire to Negative. If a 12V unit is being run from a 24V battery system, use a 40 amp panel breaker to feed power to it, and use a 25 amp panel breaker for a 32V battery system. Use a 40 amp breaker to feed power to a 24V unit. Each VTC600 Series Voltage Converter should have its own breaker in the panel.

To reduce radio noise to the absolute minimum, it may be necessary to bond the case to the vessel ground. To do this, remove one of the nuts on the grounding stud located next to the input wires. Then place a #6 ring terminal with a ground wire crimped to it onto the stud, and replace the nut.

Refer to the manufacturer's specifications and add up the current ratings for each device to be connected to the unit. Make sure that the total load does not exceed the continuous rating of the unit (50 Amps -12 or 35 Amps -24). The devices may be wired directly to the output terminals of the unit, or the unit can be wired to a distribution panel if it is more convenient. If the unit is wired to a distribution panel, run wires from each terminal to the panel.



Each output terminal can supply up to 25 Amps, therefore do not connect more than 25 amps of load to either output terminal. If the load exceeds 25 Amps but not the continuous rated output of the unit, do the following: The output terminals must be connected to the load in parallel ensuring that the wiring used has sufficient capacity to handle the current.



If the unit is being used to operate a single sideband radio, the radio should be the ONLY device connected.

## Operation

To turn the unit on, simply move the power switch to the ON position. The alarm buzzer will sound and the Low Input LED will come on briefly, and then the green Output ON LED will illuminate. If you wish to adjust the output voltage, remove the cover plate (secured by 2 screws) to expose the output adjust potentiometer. Reach in with a very small flat blade screwdriver to rotate the potentiometer. Clockwise increases the output voltage, and counter clockwise decreases it. When you are done, replace the cover plate and securely tighten the screws.

## Troubleshooting

If the red Over-temperature LED and the audible alarm come on, the unit has overheated, and it will shut down until it cools off sufficiently. You may not have allowed sufficient space around the unit for cooling, or there may be too many devices connected to the output of the unit. Either reduce the number of devices connected to the unit, or reposition the unit for better cooling. If necessary, direct a stream of moving air over the heat sink.

If the yellow Low Input LED comes on, the input voltage has dropped below 19 VDC (27 VDC on the -24 version). To keep from completely discharging the batteries, the unit will shut down until the voltage recovers to 21 VDC (29 VDC on the -24 version). Make sure that the charging system is operating properly, and that the wires connecting the input voltage to the unit are not corroded or damaged.

If the red Overload LED comes on the output current has exceeded the maximum rating. If the unit is seriously overloaded, the yellow Low Output LED and the audible alarm will also come on. The green Output On LED will still be on, but it will be dimmer than normal. Remove loads



as necessary to prevent the Overload LED from coming on.

If the red Overload LED, the Low Output LED and the audible alarm come on, and the green Output On LED is completely off, the output of the unit has been shorted out, or there has been an internal failure. Turn the unit off, disconnect all the loads connected to it, and turn it back on again. If it comes on normally, turn it off again, reconnect one load, and turn it back on. Continue reconnecting loads until the short circuit condition returns. Turn the unit off, disconnect the faulty load, and reconnect it only after the fault is found and rectified. If the condition still exists even after all the loads have been disconnected, the unit is defective, and must be returned to the factory or an authorized service center for repair.

If the unit will not turn on at all, check the input fuses. If they are blown, replace them with new ones. If those fuses blow as well or the unit still will not turn on, it is defective, and must be returned to the factory or an authorized service center for repair.

## Dry Contact Relay

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To use your dry contact output fail relay you must connect a 9-pin D connector to the unit. You must use pins one and six as is indicated on page 6 in the remote control schematic.

The relay is factory preset to fail in the closed position when the low output LED and buzzer come on. If you wish to have the relay fail in the open position when the low output LED and buzzer come on, you must take the cover off the unit and move the jumper to the other position on J5. J5 is located next to the relay.



To change the position of the jumper, first turn the unit off and disconnect the unit from both the input and output power. Next, turn the unit on for 30 seconds to discharge the capacitors, then turn it off again. Remove the six screws holding on the cover. Turn the unit upside down, remove the cover and locate J5. It will be next to the relay as is shown in the above diagram. Simply move the jumper to the desired position as is shown in the above diagram. Replace the cover and re-install the six screws. Reconnect the unit to input and output power.



## Remote Control Option

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**IMPORTANT: This remote is to be used only on Voltage Converters manufactured by Analytic Systems.**

A remote control panel may be connected to the converter using a 9-pin D-connector, which attaches to the front panel of the voltage converter. The remote control panel and D connector are part of the remote control option. The remote control panel allows the unit to be operated remotely as well as duplicating all the diagnostic indicators and audible alarm

This connector is located on the side of the unit. Important: To prevent the possibility of High Voltage Electrical Shock, do not power up the Converter unless all wiring from the unit to the remote is securely connected. Do not remove the dust cover from the DB-9 connector if the remote is not being used.



## Special Services & Options

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<b>Conformal Coating</b>	INCLUDED ON ALL UNITS UNLESS REQUESTED NOT TO as of April 1, 2014
<b>Option "c"</b>	Ruggedization Package (EXTRA Conformal Coating and RTV Compound)
<b>Option "v"</b>	Marine / Industrial Pkg (EXTRA Conformal dipping and RTV Compound)
<b>Option "MS"</b>	Military Pkg (incl. Wide Temp Components, Conformal Dipping and RTV Compound)
<b>Option "w"</b>	Wide Temperature Operation (-40 to +55 C, incl)
<b>Option "SM"</b>	High Voltage Protection on the DC Input Side
<b>Option "d"</b>	Paralleling Diodes
<b>Option "FI"</b>	Forklift Modifications
<b>Option "F"</b>	Open Frame - No chassis just heat sink bars (not for all products)
<b>Special Input</b>	There is no charge for nominal output voltages (ie. 12.0, 24.0, 48.0), but this
<b>Special Output</b>	must be noted at the time of order (Contact Factory for details)
<b>Water tight options</b>	IP66, IPS67, IPS68

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## Limited Warranty

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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



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