

# ANALYTIC SYSTEMS

Power Conversion Solutions

## INSTALLATION & OPERATION MANUAL

### VTC615R ISOLATED DC/DC VOLTAGE CONVERTER



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

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**ANALYTIC SYSTEMS**  
Power Conversion Solutions

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## **IMPORTANT & SAFETY INSTRUCTIONS**

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1. **SAVE THESE INSTRUCTIONS** — This manual contains important safety and operating instructions for this voltage converter.
2. Do not expose this voltage converter to rain or snow.
3. Use of an attachment not recommended or sold by the voltage converter manufacturer may result in a risk of fire, electric shock, or injury to persons.
4. Do not disassemble this voltage 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 this voltage converter from the source of power before attempting any maintenance or cleaning. Turning off the controls will not reduce this risk.
6. **CONVERTER LOCATION**
  - i. Never place converter directly above battery; gases from battery will corrode and damage converter.
  - ii. Never allow battery acid to drip on converter when reading gravity or filling battery.
7. **O/P CONNECTION PRECAUTIONS**

Connect and disconnect DC output connections only after setting the I/P power switch to the off position.

Analytic Systems does not recommend the use of the VTC615 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), autotransfusion 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 model VTC615R Rackmount Voltage Converter supplies either 12V, 24V, or 48 VDC from a 24V, 48V or 72VDC power source.

All new Current Mode switching design offers increased power and reliability in a compact package. Extra input and output filtering reduce EMI to extremely low levels. Reliability features include an input fuse, thermal shutdown, current limiting, reverse battery hookup protection and output short circuit shutdown with automatic recovery. The output voltage is easily adjusted 1.0 volts above or below the standard output voltage. Devices connected to the converter are protected by an output overvoltage crowbar circuit.

All rackmount units come standard with High quality digital output meters to allow monitoring of output current and output voltage. An optional Battery Back-up is also available.

## Specifications

Electrical (Input)				
Nominal (ip)	24	36	48	72
Actual (Vdc)	20-35	**30-45	40-60	65-90
Input Amps (max)	39.5	27.1	20.3	12.6
Input Fuse (ATC)	3 x 15	2 x ATC-15	1 x 25	1 x 20
Noise on Input	< 50 mV			
Electrical (Output)				
Output Nominal (op)	12	24	48	
Output Volts (DC)	13.6 ± 0.05	27.2 ± 0.05	54.4 ± 0.05	
Output Amps	40 cont. / 45 peak	20 cont. / 25 peak	10 cont. / 12.5 peak	
Output Crowbar	16.0 ± 0.5V	32.0 ± 1.0V	63.9 ± 2.0V	
Output Adjustment	± 1.0 V			
Switching Frequency	60 ± 2.0 KHz			
Idle Power	< 10 Watts			
Output Ripple & Noise	< 10 Watts			
Transient Response	< 2V for 50% Surge (Output Amps/2)			
Regulation (Line & Load)	< +/- 0.5%			
Duty Cycle	Peak 20% for 10 min max Continuous 100% for 24 hours per day			
Efficiency	> 85% @ Maximum Output			

**Environment Specification**

Operating Temp. Range	-25° to +40°C @ maximum output Derate Linearly 2.5% per °C from 40°C (Optional -40°C extra wide temp. operation avail.)
Humidity	0 - 95°C Relative Humidity (non-condensing) with optional conformal coating
Audible Noise	NONE 0db @ 3 ft (34.5 dB when fan operating)
Typical Service Life	> 10 yrs. (87,600 hrs)
Isolation	Input-Case & Input-Output 1500VDC (500V @ 24V I/P) Output-Case 500VDC (1500VDC @ 48V O/P)

**Mechanical Specification**

Depth	13.5 in / 34.3 cm
Width	19.0 in / 48.3 cm
Height	2u (3.5 in.)
Material	Marine Grade Aluminium
Finish	Black Anodize
Fastenings	All 18-8 Stainless Steel
Weight	12.0 lb / 5.5 kg
Connections	Four contact output terminals
Warranty	3 years
Safety	Designed to meet CSA 22.2.107.1 & UL458

\*\* Actual startup is at 22, 32, 42, or 67Vdc Input, depending on model

\* Specifications subjects to change without notice.

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

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# Installation

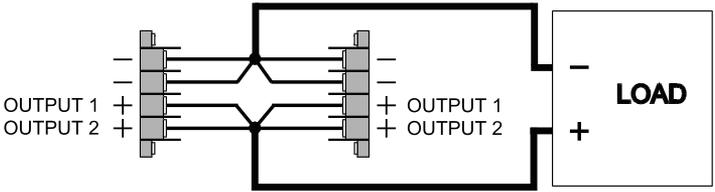
## MOUNTING

Mount the unit in a DRY location. Allow at least 4 inches of clearance around it for adequate cooling.

## POWER CONNECTION

The unit is supplied with power leads about 3 feet long. This should normally be adequate to connect to a source of power. If you must extend the power leads, be sure to use at least a good quality (typeTEW) AWG12 wire. The wire colours are

Red - Positive	Black- Negative
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measure the resistance between the two positive output terminals. If the diodes are present the terminals will measure as not connected. If the diodes are NOT present, the terminals will measure as a short circuit. Assuming the output isolation diodes are present, connect one 4 foot piece of #14 AWG red wire to each positive output terminal. Connect all the positive wires to a distribution bus, or connect them together, and then connect from the common point to the load using the correct gauge of wire for the total output capability of all the supplies running in parallel. Repeat this process for the negative terminals using the same gauges of wire, but black in colour. These units should now load share. You can confirm this by watching the output ammeters. A slight difference is negligible, however, if this is not the case, you can increase the output voltage of the unit that is reading low using the output adjust potentiometer.



## Operation

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Turn the switch on the front of the unit on to energize the outputs. The green 'Output On' indicator light will glow to indicate the proper operation of the unit.

### OUTPUT ADJUSTMENT

The unit has an adjustment potentiometer to allow up to  $\pm 1.0V$  adjustment of the output voltage. This potentiometer is accessed through a small hole in the front of the voltage converter. As shipped from the factory, the unit is preset for a voltage of 13.6, 27.2, 36.3 or 54.4VDC. Reach in with a very small flat blade screwdriver to rotate the potentiometer. Clockwise increases the output voltage and counter clockwise decreases it.

### METERS

The meter shows simultaneous voltage and current. It features bright red LED readouts to permit easy monitoring from many feet or meters away.

## Equalize Option

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The dry contact output-fail relay is accessed through the small 3-connection terminal block at the back of the converter. The user has a choice of using either the normally open or normally closed contacts. To connect to the relay, connect one wire to the common (COM) terminal and connect the other wire to either the normally open (NO) or the normally closed (NC) terminal.





# Troubleshooting

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This unit provides LED indicators and a buzzer to help diagnose any problems. The unit should sound the buzzer to alert you prior to shutting itself down. You should immediately check the indicators to determine the cause of the shutdown.

<b>LOW OUTPUT</b>	Indicates that the output voltage is below normal because: The current demanded by the devices connected to the unit exceeds the maximum output current rating, thereby causing the output voltage to drop to maintain the current at the maximum level, The input voltage is not high enough for unit to operate,
<b>LOW INPUT</b>	Indicates that the input voltage is below normal because: The input voltage is not in the correct range for proper operation of the unit.
<b>OVERTEMP</b>	Indicates that the voltage converter is running too hot because: Too much power is being drawn, turn off or unplug some devices. The voltage converter is located in a poorly ventilated area.

If the load exceeds the continuous rating for too long a period, the temperature sensor inside the unit will turn off the outputs. After the unit cools sufficiently, it will automatically come back on. If this happens frequently, remount the unit for increased airflow so it cools better.



## 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 must be noted at the time of order (Contact Factory for details)
<b>Special Output</b>	
<b>Water tight options</b>	IP66, IPS67, IPS68





## 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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