ANALYTIC SYSTEMS

Power Conversion Solutions

Installation & Operation Manual

IVS1000

Pure Sinewave Inverter

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IMPORTANT & SAFETY INSTRUCTIONS

1) SAVE THESE INSTRUCTIONS — This manual contains important safety and operating instructions for inverter.

2) Do not expose inverter to rain or snow.

3) Use of an attachment not recommended or sold by the inverter manufacturer may result in a risk of fire, electric shock, or injury to persons.

4) Do not disassemble inverter; 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, unplug inverter from outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.

6) Never place inverter directly above battery; gases from battery will corrode and damage marine inverter.

7) Never allow battery acid to drip on inverter when reading gravity or filling battery.

GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS — Inverters should be grounded to reduce risk of electric shock. Inverter is equipped with electric receptacles capable of accepting an equipment-grounding conductor and a grounding plug.

DANGER — Never alter AC cord or plug provided — if it will not fit outlet, have proper cord installed by a qualified electrician. Improper connection can result in a risk of an electric shock.

Analytic Systems does not recommend the use of the IVS2500 Series Inverters 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.

System Description

The IVS1000 inverter series was designed electrically and mechanically to achieve optimal ruggedness required for industrial, telecommunications, military and airborne applications.

Electrical Connections

The input can be grounded either on the positive or negative, or may be left floating. The output is normally grounded, although it can be floating if required for specific applications.

Mount the unit as close to the battery as possible to avoid voltage drop and losses on the wires. The input connections are via a 3-pole terminal block. GND, POS and NEG are clearly labeled. Although the unit is reverse polarity protected, ensure that input is connected correctly. (On some models, the internal fuse blows when reverse polarity occurs).

If operating the inverter from a power supply (instead of a battery), ensure that this source is capable of supplying a significantly higher current than is actually required. It is preferable to turn on the inverter first, and connect the load after the inverter is already running.

Input Wire Sizes

Input wire size is crucial for maximum efficiency and safety. For best results, the shortest length and largest gauge wire should be used. Marine type battery terminals are recommended for attaching connectors to the battery. Keep all connectors clean and free of corrosion. Refer to the following table for proper sizing. The following values are to be used for guidelines only! The actual application must be considered for selecting wire gauge, insulation, as well as EMI considerations for wire routing and shielding where necessary. For longer wire lengths, larger gauge wire may be needed to minimize line losses.

			RECOMMENDED INPUT WIRE SIZES	
DISTANCE FROM BATTERY MODEL	5’	10’	15’	20’
IVS1000-24V to 36V	AWG 4	AWG 2	AWG 0	AWG 00
IVS1000-48V	AWG 8	AWG 8	AWG 6	AWG 6
IVS1000-125V	AWG 10	AWG 10	AWG 10	AWG 10
IVS1000-250V	AWG12	AWG12	AWG12	AWG12

Location

The unit should be mounted securely to a flat surface with a minimum of one-inch clearance to provide ample airflow and to achieve maximum continuous power. Cooling is enhanced if the unit is installed on a metal surface to allow for additional conduction cooling.

Electronic Protection

The inverter has a number of protection circuits designed to provide full electronic protection:

Grounding - The input can be either positively or negatively grounded, or may be left floating. The output is normally grounded, although it can be left floating if required.

Thermal shutdown - In the event of overheating due to high ambient temperature, blocked air flow or overload conditions, the internal thermal protection circuit will shut the unit down. Operation will automatically resume when the temperature reaches the specified operating level.

Overload and short-circuit protection - In case of an overload or short circuit, the inverter will go into "hiccup" mode. This means that the unit will automatically shut down and will periodically test whether or not the overload condition still exists.

Reversed Input Polarity Protection – The IVS1000 inverter series has sophisticated protection to ensure that no damage occurs whilst reverse polarizing the input. (On some models, the internal input fuse may blow when reverse polarity occurs).

Input and output filtering - All IVS1000 series inverters have a double stage input filter to restrict EMI emissions. Filtering also provides immunity against voltage spikes and other disturbances on the input power line. The inverters meet FCC 20780 Class B and EN 55022 Class B conducted emission requirements.

On/off Switch

The IVS1000 inverter series has an on/off switch, which disables the inverter's control circuit. Turning the switch to the 'OFF' position cuts the power to the AC output. A minimal current drain will continue on the DC input side. Always disconnect the inverter when not in use for an extended period of time to avoid draining the battery and to prolong battery life.

Operating

Before plugging any appliance into the inverter, please refer to its power requirements. Power requirements are indicated in watts (W), volt-amps (VA) or amps (A). Ensure that the rating does not exceed the inverter's capacity.

Safety Considerations

WARNING: The IVS1000 inverter series generate 115VAC power – the same voltage coming out of a standard wall outlet. This voltage can be hazardous and has to be treated with the same caution as a regular electrical outlet.

As with any other electrical equipment, the inverter unit must be protected from water and moisture at all times.

Specifications

INPUT					
Input Voltage:	24Vdc	36Vdc	48Vdc	125Vdc	250Vdc
Input Protection:	Inrush current limiting, thermal fuse & reverse polarity				
Input Isolation:	500 Vdc input to output& input to chassis for <60Vdc input 1400 Vdc input to output& input to chassis for ³60Vdc input 500Vdc output to chassis – all inverters				
OUTPUT					
Output Voltage / Current:	115 VAC / 60 Hz / 8.7 Amp continuous (1000VA)				
Wave Form:	Sinusoidal				
Total Harmonic Distortion:	Better than 5% at full load				
Line Regulation:	Maximum 0.5%				
Load Regulation:	Maximum ±6% from 10% load to full load				
Output Noise:	High frequency ripple is better than 500 mVrms (20 MHz BW)				
GENERAL					
Temperature Drift:	0.05% per ° C over operating temperature range				
Operating Temp. Range:	0 ° C to +50 ° C for full specification with internal fan				
Humidity:	5 - 95 % non-condensing				
Output Protection:	Current limiting with short-circuit protection. Thermal shutdown with automatic recovery in case of continuous overload or insufficient airflow				
Output Overload Protection:	Hiccup at 1200 W				
Output Over-voltage Protection:	By internal supply voltage limiting at 120% V out, nominal level				
Load Crest Factor:	Maximum 2.5 at 90% load				
RFI Suppression:	Meets requirements of FCC 20780 Class B and EN55022 Class B conducted emissions as a minimum				
Efficiency:	Minimum 80% at full load				
Cooling:	By internal fan				
Input Connection:	Screw-type terminal block				
Output Connection:	Standard AC Receptacle (North American Type)				
Package Size / Weight:	5.3 x 7.5 x 15.5 Enclosed case, 13 pounds (6 kg)				

* Specifications subjects to change without notice.

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

1. The equipment manufactured for 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 date of Purchase.

3. 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.

4. 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.

5. Analytic Systems reserves the right to void the warranty if:

   a. 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.

6. 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.

7. Only the Warrantor shall perform warranty service. Any attempt to remedy the defect by anyone else shall render this warranty void.

8. 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.

9. 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.

10. 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.

11. The Warrantor assumes no liability for incidental or consequential damages of any kind.