TEDEG

PowerGuard-A1000 — AC-DC Mil-Spec Power Supply

Product Code: ACDC-1000-220-24

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PFC / 09-2025 v2

PowerGuard-A1000 is a high-efficiency, fanless AC-DC power conversion unit developed by Tedeg Defence for use in demanding military and field environments.
It operates from a single-phase 99 – 264 VAC input over a 45 – 420 Hz frequency range and delivers a regulated 24 VDC / 1 kW continuous output, sustaining full-load operation up to +55 °C without derating.

With its fully sealed aluminum enclosure and conduction-cooled baseplate, the PowerGuard-A1000 is designed for outdoor and vehicle use under rain, dust, vibration, and shock.
The fanless design eliminates moving parts, ensuring silent operation, high reliability, and minimal maintenance over long-term missions.

Power and signal interfaces utilize MIL-DTL-38999 Series III connectors for environmental sealing and EMI integrity.
Optional Ethernet, CAN-Bus, or RS-485 communication interfaces enable remote monitoring, configuration, and diagnostic reporting.
A rugged Remote Commander Control Box accessory allows remote ON/OFF control and alarm reset in field conditions.

The PowerGuard-A1000 is designed to meet MIL-STD-810 (environmental) and MIL-STD-461 (EMC) requirements, providing reliable 24/7 power delivery for military vehicles, mobile command units, radar systems, and tactical communication platforms.

Application Areas

The PowerGuard-A1000 is designed for defense and industrial systems that require reliable conversion from AC mains to regulated DC power under harsh environmental conditions.
Its wide input frequency range (45–420 Hz) and high efficiency make it suitable for both land-based and airborne platforms.

Typical applications include:

- **Military and tactical vehicles** – Providing stable 24 VDC from onboard AC power sources.
- **Mobile command and communication units** – Supplying radios, routers, and control electronics.
- **Field surveillance and radar systems** – Powering outdoor or shelter-based sensor networks.
- **Naval and airborne platforms** – Operating on 400 Hz AC grids with stable output regulation.
- **Industrial and emergency systems** – Fanless IP67 solution for critical communication and monitoring equipment.

With its rugged design and conduction-cooled thermal path, PowerGuard-A1000 ensures 24/7 mission reliability for vehicle, base, and field power infrastructures.

Advanced Features

Fanless and Fully Sealed Design

The PowerGuard-A1000 is built with a fully sealed aluminum enclosure and a fanless thermal architecture, ensuring reliable operation under dust, moisture, vibration, and shock.
All heat is dissipated through a conduction-cooled baseplate, enabling silent operation and zero maintenance in harsh environments.

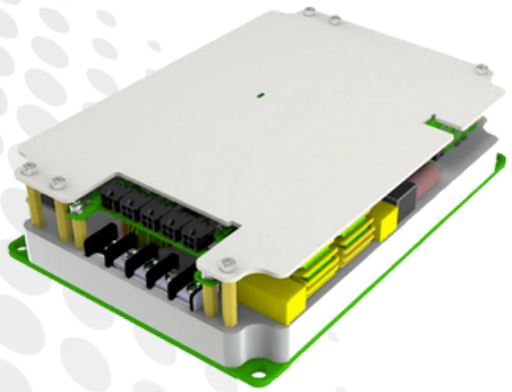
Wide Input Frequency Range (45–420 Hz)
The converter supports both standard 50/60 Hz and high-frequency 400 Hz military power grids.
At elevated frequencies, power factor decreases slightly, but overall system performance remains stable when properly filtered at the system level.

Active Power Factor Correction (PFC)
An integrated PFC circuit ensures PF ⩾ 0.99 at 50/60 Hz operation, minimizing input harmonic distortion and maximizing efficiency.
At 400 Hz input, PF typically ranges from 0.75 to 0.8, and this should be considered when sizing fuses, cabling, and EMI filters.

Rugged MIL-DTL-38999 Connectors
All power and signal interfaces utilize MIL-DTL-38999 Series III connectors for 360° EMI shielding, vibration resistance, and environmental sealing — ideal for harsh military applications.

Remote Monitoring & Control (Optional)
Optional Ethernet, CAN-Bus, or RS-485 interfaces allow remote monitoring, configuration, and diagnostics.
A Remote Commander Control Box accessory provides remote ON/OFF functionality and alarm reset for field operations.

MIL-STD Compliance
PowerGuard-A1000 is designed to meet MIL-STD-810 (environmental) and MIL-STD-461 (EMC) standards.
Its sealed, IP67-rated housing ensures reliable operation in outdoor or vehicle-mounted systems exposed to dust, water, and mechanical stress.



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Electrical Specifications

Parameter	Min	Typ	Max	Notes / Conditions
Input Voltage (AC)	90 VAC	220 VAC	265 VAC	Single-phase universal input
Input Frequency	45 Hz	50/60 Hz	420 Hz	Compatible with 400 Hz military power systems
Power Factor (PF)	–	99	–	@50/60 Hz full load (≈0.75–0.8 @400 Hz)
Input Current @230 VAC	–	4.5 A	6.0 A	1 kW output, η≈91%
Input Current @115 VAC	–	9.0 A	12.0 A	1 kW output, η≈91%
Inrush Current	–	–	⩽ 16 A	Cold start @220 VAC
Hold-Up Time	–	–	20 ms	Full load @230 VAC
Leakage Current	–	–	< 3.5 mA	@240 VAC, increases slightly at >300 Hz
Isolation (Input–Output)	–	2000 VAC	–	1 min factory test
Output Voltage (DC)	23.8 V	24.0 V	24.5 V	Fixed output, ±1% regulation
Output Power (Continuous)	–	**1000 W**	–	No derating up to +55 °C
Peak Output Power	–	1200 W	–	Up to 30 minutes operation
Output Current	–	41.7 A	50 A	Continuous at nominal load
Efficiency	–	91%	–	@230 VAC input
Ripple & Noise (20 MHz BW)	–	–	⩽ 1 % Vout	Measured with 0.1 µF + 47 µF caps
Voltage Regulation	–	±1 %	±2 %	Over line and load
Operating Temperature	–40 °C	–	+55 °C	1 kW continuous
Cooling Method	–	–	–	Conduction-cooled, no fan

Protections & Control

Feature	Description
Over-Voltage Protection (OVP)	Auto shutdown; restarts automatically after fault removal
Over-Current Protection (OCP)	Constant-current limit with auto recovery
Short-Circuit Protection (SCP)	Output disable → auto restart
Over-Temperature Protection (OTP)	Derating above +75 °C, shutdown above +95 °C, recovery < +85 °C
Input Protection	Surge, reverse polarity and input fuse protection
Remote ON/OFF (Enable)	Opto-isolated logic input
Power-Good Signal (DC-OK)	High when output within ±5% of nominal
Fault/Alarm Signal	Active during OCP/OTP/SCP conditions
Optional Communication	Ethernet / CAN-Bus / RS-485 monitoring and control
Remote Commander Control Box (Optional)	Remote ON/OFF, fault reset, and alarm display

Remote Commander Control Box (Optional)

The Remote Commander Control Box is an optional field accessory designed to provide remote monitoring and control of the PowerGuard-D1000 system.
It enables the operator to safely power the converter ON/OFF, monitor real-time operating status, and identify fault conditions without direct access to the main power unit.

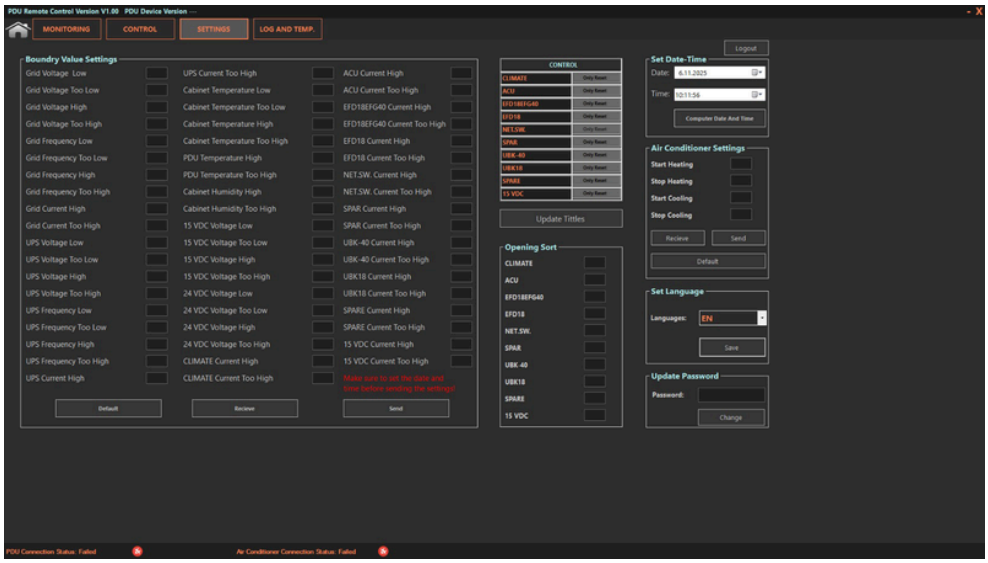
Key Functions:

1. ON/OFF Button – Activates or disables the converter output remotely.
2. CIT / Reset Button – Clears fault indications and resets alarms.
3. Blackout Button – Instantly disables all outputs in emergency situations.
4. Power LED – Indicates system power availability.
5. Grid Electricity LED – Shows connection to the main power input.
6. Battery LED – Displays battery connection and status.
7. Over Voltage LED – Alerts when output voltage exceeds safe limits.
8. Overcurrent LED – Indicates output overcurrent condition.
9. Battery Overheat LED – Signals excessive internal or battery temperature.
10. Blackout LED – Confirms emergency shutdown activation.

Features:

- Rugged aluminum front plate with mounting holes (suitable for dashboard or rack).
- Integrated digital display for Voltage (VDC) and Current (AMPER) monitoring.
- Compatible with PowerGuard-D1000 via dedicated RS-485 / CAN-Bus communication line.
- Protected against vibration and humidity; operational range –32 °C to +55 °C.
- Cable length customizable (standard 3 m, optional 5–10 m).

Remote Control & Software Interface (Optional)



Electrical Interface

Input				Output		
D38999/24WE6PN	Cable	CN1		D38999/24WE6SN	Cable	CN2
A	12 AWG	L		A	12 AWG	+
B	12 AWG	L		B	12 AWG	+
C	12 AWG	N		C	12 AWG	+
D	12 AWG	N		D	12 AWG	-
E	12 AWG	PE		E	12 AWG	-
F	12 AWG	Spare		F	12 AWG	-

Communication (Optional)		
PT02E10-6P	Cable	CN3
A	22 AWG	İnput
B	22 AWG	Ground
C	22 AWG	CanH/RS-485A
D	22 AWG	CanL/RS-485B
E	22 AWG	Can-Bus GND/RS-485GND
F	22 AWG	Spare

Mechanical Interface