



Registered  
to ISO 9001

# MODEL GRSLPFC4.5K3/4-440(3)-115(3)

## 4.5 KW Rugged Rack Mount Solid-State 440 VAC Three Phase Frequency Converter

*Fully Qualified to MIL-STD-1399, MIL-STD-461, MIL-S-901, and MIL-STD-167*



**These units are suitable for applications such as:**

- *Submarine Applications*
- *Ground Support*
- *Mobile Systems*
- *Tactical Systems*
- *Shipboard Applications*
- *Airborne Applications*
- *Military Ground Vehicles*
- *Military Shelters*



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## POPULAR OPTIONS

- Power Distribution Units
- Alternate voltages and Frequencies
- Delta or Wye Three Phase Configuration
- MS Connector Mates and Multiple Output Outlets
- Input Volt and Amp Meters
- Chassis Slide Guides
- Custom Enclosures
- CAD Free Connectors
- Non-PVC wiring
- Environmental Stress Screening Services
- Rugged Transit Cases

## CONTACT

100 School Street,  
Bergenfield, NJ 07621 USA

(201) 385-0500

novaelectric.com  
info@novaelectric.com



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## 4.5 KW Rugged Rack Mount Solid-State 440 VAC Three Phase Frequency Converter

### GENERAL OVERVIEW

Nova's GRSLPFC4.5K3/4-440(3)-115(3) Solid-State Three-Phase Frequency Converter Systems are high-reliability power sources specifically designed for demanding applications in high shock, vibration, humidity, and EMI environments in compliance to MIL-STD-1399, MIL-STD-461, MIL-S-901, MIL-STD-167, and MIL-STD-810.

This unit's compact IP54-rated rack mount chassis measures 5U high x 19" wide x 24" deep, and weighs only 75 pounds. It features a shipboard power input of 440 VAC 60 Hz three-phase delta, and an output of 115 VAC, 400 hz three phase delta. Other voltages and frequencies are available optionally.

### SPECIFICATIONS

MODEL	KVA	KW	NOMINAL INPUT	INPUT FREQ.	OUTPUT VAC	OUTPUT FREQ.	WEIGHT (LBS)
GRSLPFC4.5K3/4-440(D)-115(D)	4.5	4.5	440 VAC Delta	60 Hz	115 VAC Delta	400 Hz	75 lbs

#### Electrical

INPUT	440 VAC, 60 Hz, Three Phase Delta per MIL-STD-1399, Section 300B, Type 1 (Other Voltages and Frequencies Available Optionally Upon Request)
OUTPUT	115 VAC, 400 Hz, Three Phase Delta @ 4.5 KW (Other Voltages and Frequencies Available Optionally Upon Request)
VOLTAGE REGULATION	± 2% NL to FL
FREQUENCY REGULATION	± 0.5% NL to FL
HARMONIC DISTORTION	5% THD, 3% Typical
INPUT POWER FACTOR	0.95 or Better @ Half-Full Load
EFFICIENCY AT FULL LOAD	80-85% @ Full Load Typical
CONNECTIONS	MS Connector (Mates Opt.)
OVERLOAD	110% load for 10 minutes 115% load for 5 minutes 120% load for 2 minutes

#### Environmental

OPERATING TEMP	-20° to +50°C (Extended Ranges Optional)
STORAGE TEMP RANGE	-40° to +71°C
HUMIDITY	to 95% RH Non-Condensing per MIL-STD-810. All Boards Conformal Coated with Acrylic MIL-I-46058 Type R.
ELEVATION	Operating: 15,000 Ft. (4,572 m)  Non-Operating: 40,000 Ft. (12,192 m)
SHOCK	20g, 11 mS Half Sinewave per MIL-S-901
AUDIBLE NOISE	Less than 55 dbA at 5 ft.
EMI	MIL-STD-461
MTBF	100,000+ Hours per Field Data @ +25C Ambient Ground-Fixed
MTTR	30 Minutes by Qualified Personnel

#### Protective Features

INPUT & OUTPUT CIRCUIT BREAKERS
OVERLOAD PROTECTION RANGE: AUTOMATIC OVERLOAD & SHORT CIRCUIT PROTECTION
THERMAL PROTECTED
INPUT UNDER/OVERVOLTAGE PROTECTED
OPTIONAL AUDIBLE ALARM WITH SILENCE SWITCH

#### Alarms & Diagnostics

INPUT POWER AVAILABLE LED
INPUT POWER ON LED
POWER OUTPUT LED
DIGITAL OUTPUT (PER PHASE) METERS WITH VOLT, AMP, AND FREQUENCY SELECTOR SWITCH
ELAPSED TIME METER

#### Nominal Dimensions

DIMENSIONS	5U x 19" Wide x 24" Deep
WEIGHT	75 Pounds

#### Remote Contacts

ALARM CONTACTS	Optional
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## SYSTEM COMPLIANCE

### **MIL-STD-1399, Section 300B**

#### **Input Power Test:**

5.3.1 Voltage and Frequency Tolerance Test

5.3.2 Transient Voltage and Frequency Tolerance and Recovery Test

5.3.3 Voltage Spike Test

5.3.4 Emergency Condition Test

5.3.5 Grounding Test

5.3.6 User Equipment Power Profile Test w/ Exceptions

5.3.7 Current Waveform Test

5.3.8 Voltage and Frequency Modulation Test

5.3.9 Simulated Human Body Leakage Current Test for Personnel Safety w/ Exceptions

5.3.10 Equipment Insulation Resistance Test

5.3.10 Active Ground Detector Test

**MIL-STD-167-1A Vibration Test:** The Frequency Converter was subjected to Type I vibration through the frequency range of 4 Hz to 33 Hz in each of the three (3) major axis in accordance with MIL-STD-167-1A.

**MIL-S-901D Shock Test:** The Frequency Converter was subjected to three (3) positive and three (3) negative 20 g, 11 msec, 1/2 Sine Wave shock pulses in each of the three (3) axes in accordance with the referenced MIL-S-901D specifications (Grade A) for a total of eighteen (18) shock pulses.

#### **MIL-STD-461E EMI Test (Navy, Submarine Application):**

**CE101**, Conducted Emissions, Power Leads, 120 Hz to 10 kHz

Limit: Figure CE101-2, Limit for Surface Ships and Submarine Applications, 60 Hz

**CE102**, Conducted Emissions, Power Leads, 10 kHz to 10 MHz

Figure CE102-1, CE102 Limit for All Applications, Basic Curve + 12 dB w/ Exceptions.

**CS101**, Conducted Susceptibility, Power Leads, 120 Hz to 150 kHz

Figure CS101-1, CS101 Voltage Limit for All Applications, Curve # 1

**CS106**, Conducted Susceptibility, Transients, Power Leads

Limit: Figure CS106-1, CS106 Voltage Limit

**CS114**, Conducted Susceptibility, Bulk Cable Injection, 10 kHz to 200 MHz

Limit: Figure CS114-1, CS114 Calibration Limits

4 kHz to 1 MHz, 77 dBuA

10 kHz to 30 MHz, Curve # 1

30 MHz to 200 MHz, Curve # 2

**RE101**, Radiated Emissions, Magnetic Field, 30 Hz to 100 kHz

Limit: Figure RE101-2, RE101 Limit for Navy Applications w/Exceptions.

**RE102**, Radiated Emissions, Electric Field, 10 kHz to 18 GHz

Limit: Figure RE102-2, RE102 Limit for Submarine Applications, Internal to Pressure Hull

**RS103**, Radiated Susceptibility, Electric Field, 2 MHz to 18 GHz

Field Strength:

2 to 30 MHz: 5 V/m

30 MHz to 18 GHz: 10 V/m

Modulation: 1 kHz pulse, 50% duty cycle

#### **Environmental – Designed to Meet\*:**

MIL-STD-810G, Method 501.5, Procedure II. TH=+45C high temperature (operating) testing

MIL-STD-810G, Method 502.5, Procedure II. TL=+5C low temperature (operating) testing

MIL-STD-810G, Method 507, Procedure II. <95% Non-Condensed Relative Humidity (operating / non-operating)

Ambient Operating Pressure between 750 and 1200 millibars.

Ingress Protection per IP54.

Operating Attitude for both Front to Back and Side to Side of +/- 30 degrees.

Audible Noise of 60dBA Maximum.

*\*Compliance to these "designed to meet" environmental standards based on similarity to previously qualified designs. Formal Qual Testing to these and other standards is available optionally.*





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**POPULAR OPTIONS**

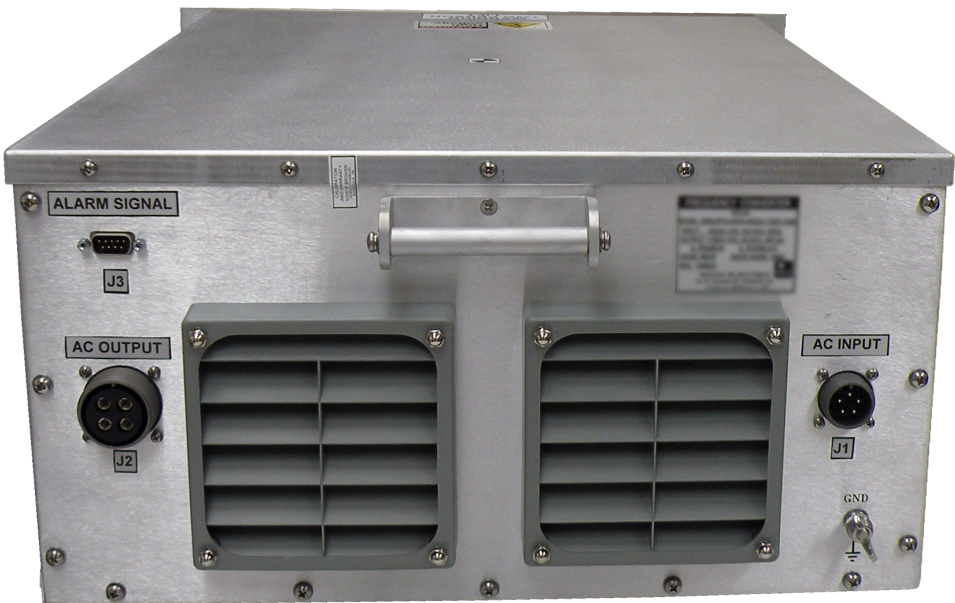
- Power Distribution Units
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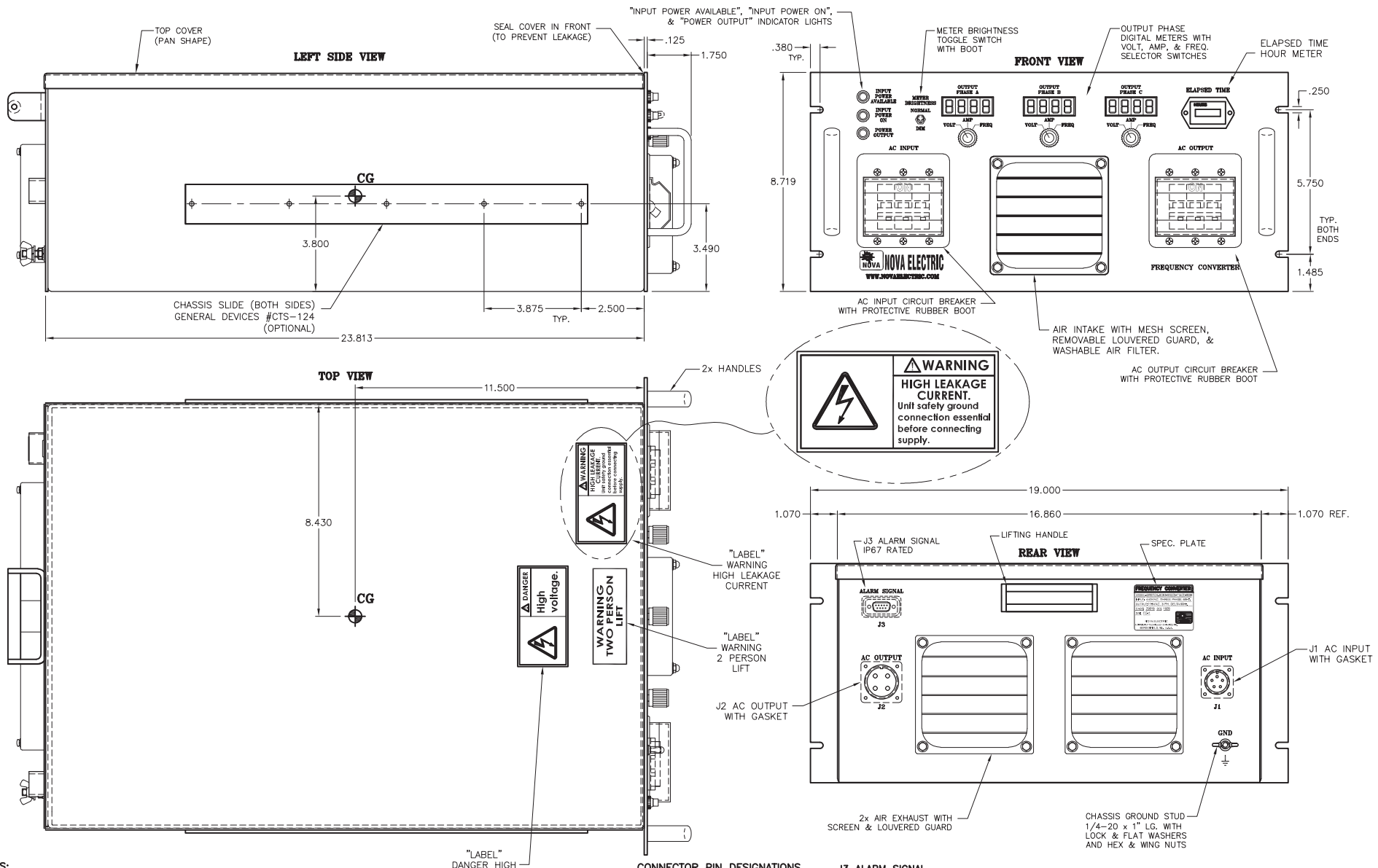
*Front Panel View*



*Rear Panel View*



*Transit Cases  
 Optional*



- NOTES:
1. ALL DIMENSIONS ARE IN INCHES.
  2. ALL UN-DIMENSIONED PICTORIAL CONFIGURATIONS ARE FOR REFERENCE ONLY.
  3. FRONT AND REAR MARKING FOR REFERENCE ONLY.
  4. FRONT PANEL FINISH: CLEAR IRRIDITE, THEN PRIME & PAINT FRONT SURFACE AND ALL EDGES - ANSI #61 GRAY SEMI-GLOSS. ALL OTHER SURFACES ARE IRRIDITED (ALUMINUM).
  5. FRONT PANEL SILKSCREEN IN BLACK EPOXY INK.
  6. UNIT THOROUGHLY RUGGEDIZED.
  7. APPROXIMATE WEIGHT: 75 LBS.
  8. IP54 RATED.

#### CONNECTOR PIN DESIGNATIONS

J1 AC INPUT	
AIT2-16S-8PS-724	
MATE: AIT6E16S-8SS-724	
PIN	DESCRIPTION
A	PHASE A
B	PHASE B
C	PHASE C
D	GROUND
E	NOT USED

J2 AC OUTPUT	
AIT2-22-22SS-724	
MATE: AIT6E22-22PS-724	
PIN	DESCRIPTION
A	PHASE A
B	PHASE B
C	PHASE C
D	GROUND

#### J3 ALARM SIGNAL

WPSD9P	
PIN	DESCRIPTION
1	N/C OVER TEMP
2	ARM OVER TEMP
3	N/O OVER TEMP
4	N/C INV. ON/OFF
5	ARM INV. ON/OFF
6	N/O INV. ON/OFF
7-9	SPARE

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TOLERANCES UNLESS OTHERWISE SPECIFIED		OUTLINE DRAWING, GRSLPFC4.5K3/4-440(D)-115(D)	
JOX = ± .02	DIMENSIONS IN INCHES	APPROVED DATE	C 9812460
JOX = ± .005	UNLESS OTHERWISE NOTED	8/21/18	
ANGLE = ± 1/2°		DO NOT SCALE	SIZE CAGE: 29019 SHEET: 1 of 1 REV
WWW.NOVAELECTRIC.COM			



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Some optional equipment shown. Specifications subject to change without notice.





# RUGGED AC POWER SYSTEMS



**SELECT UNITS QUALIFIED TO MIL-STD-810, MIL-S-901, MIL-STD-1399, MIL-STD-461, MIL-STD-167, MIL-STD-740, RTCA/DO-160, AND MORE**

## RUGGED TRUE ONLINE UPS



500 W – 500+ KW

*Rack Mount, Bulkhead Mount, and Freestanding*

*Single and Three Phase*

*50, 60, and 400 Hz.*

## PURE SINEWAVE DC-AC INVERTERS



100 W – 500+ KW

*Rack Mount, Bulkhead Mount, and Freestanding*

*Single and Three Phase*

*50, 60, and 400 Hz.*

## SOLID-STATE FREQUENCY CONVERTERS



100 W – 500+ KW

*Rack Mount, Bulkhead Mount, and Freestanding*

*Single and Three Phase*

*50, 60, and 400 Hz.*

## POWER DISTRIBUTION UNITS (PDUs)



*Basic, Switched, Auto-Transfer Switching, and Metered Configurations*

*Rack Mount, Bulkhead Mount, and Freestanding*

*Single and Three Phase*

## CUSTOM EMI FILTERS



*For MIL-STD-461 Compliance*

*Rack Mount, Bulkhead Mount, and Freestanding*

*Single and Three Phase*

## RUGGED PORTABLE TRANSFORMERS



100 W – 500+ KW

*Rack Mount, Bulkhead Mount, and Freestanding*

*Single and Three Phase*

## EXTERNAL MAINTENANCE BYPASS SWITCHES (MBSSs)



*Rack Mount, Bulkhead Mount, and Freestanding*

*Single and Three Phase*

## CUSTOM DESIGNS



*Designed & Built to Spec*

*Integrated AC & DC Capabilities*

*Multiple Outputs*

## RELIABLE AC POWER WHEN AND WHERE YOU NEED IT SEVERE ENVIRONMENT PRODUCTS



- AIRBORNE
- SHIPBOARD
- MOBILE

• RACK MOUNT & FREESTANDING

• 50, 60, AND 400 Hz

• AIR & WATER COOLED

• SINGLE AND THREE PHASE

• LIGHTWEIGHT DESIGNS

