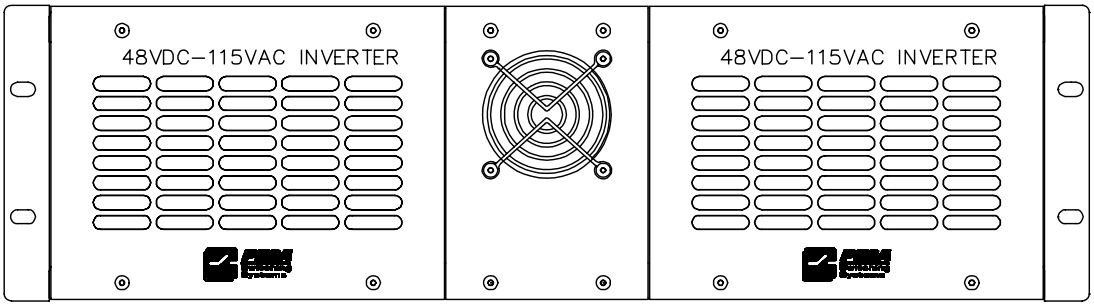
PESA Switching Systems



48VDC to 115VAC Power Converter

PESA Switching Systems, Inc.
330-A Wynn Drive Northwest
Huntsville, AL 35805-1961
http://www.pesa.com
(256) 726-9200

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Service and Ordering Assistance

PESA Switching Systems, Inc.
330-A Wynn Drive Northwest
Huntsville, AL 35805-1961 USA
www.pesa.com

Main Office
(256) 726-9200 (Voice)
(256) 726-9271 (Fax)

Service Department
(256) 726-9222 (Voice) **(24 hours/day, 7 days/week)**
(256) 726-9268 (Fax)
service@pesa.com

National Sales Office

PESA Switching Systems, Inc.
35 Pinelawn Rd., Suite 99-E
Melville, NY 11747 USA
(800) 328-1008 (Voice)
(516) 845-5020 (Voice)
(516) 845-5023 (Fax)

Comments and/or suggestions concerning this document are welcome and should be directed to:
techpubs@pesa.com

Printed in the United States of America.

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Tables

Chapter 1 – Introduction

General

This manual provides instructions for the installation, operation, and maintenance of the PESA 48VDC to 115VAC Power Converter.

Safety Warnings

Safety warnings and other important information in this document are designated in three ways:

WARNING

Warning statements identify conditions or practices that could result in personal injury or loss of life.

CAUTION

Caution statements identify conditions or practices that could result in damage to equipment.

NOTE

Notes add emphasis to information that is important for the correct installation, operation, or maintenance of the equipment.

Product Description

The PESA 48V Power Converter is a rack-mounted power inverter designed to convert 48VDC to 115VAC for use with PESA routing switchers and other ancillary equipment. Each 48V Power Converter contains two sine wave inverters which may be operated independently.

Specifications

Output

Waveform	Sinusoidal
Continuous Power	1100W (per Inverter)
Surge Power	2200W (per Inverter)
No Load power	20W (per Inverter)
Output Voltage	111.2 – 122.9VAC
Output Current	9.5A (per Inverter)
Typical Efficiency at Full Power	87%
Peak Efficiency at 1/3 Power	89%
Line Regulation	0.5% Max
Load Regulation	0.5% Max
Distortion	2% Max
Frequency	±0.1%

Input

Minimum Voltage (Alarm & Shut Off).....38.4VDC
Low Voltage Restart.....45.6VDC
Maximum Voltage (Shut Off) 57.6VDC
High Voltage Restart.....57.6VDC

Environmental

Temperature .....-20°C to +30°C
Humidity ..... 5% to 90% Non-Condensing
Altitude.....-200 to +10,000 Feet
Audible Noise..... Less Than 45db (per Inverter)
Weight..... 35 Lbs.

Chapter 2 – Installation

Shipping Damage Inspection

Immediately upon receipt, all shipping containers should be inspected for damage caused in transit. If any damage is noted, save all packing material and contact both PESA and the carrier as soon as possible.

Unpacking

Carefully unpack the equipment and compare the parts received against the packing list and Table 1. If any parts appear to be missing, please contact PESA immediately.

Table 1. Equipment List

Part No. Description	Quantity Required
81-9065-2107-0 48V Power Converter Assembly	1 ea.
81-9059-0419-0 Manual	1 ea.

Installation Location

This equipment is designed to be installed in a standard 19-inch equipment rack located in an environment conforming to the specifications shown in Chapter 1. To minimize voltage drop on the input wiring, it should be located as close as possible to the 48VDC power source.

Consideration should be given to the connection of this equipment to the supply circuit and the effect that possible overloading could have on overcurrent protection circuits and supply wiring. Refer to the nameplate ratings when addressing this concern.

Installation in Equipment Rack

WARNING

Due to the weight of this equipment, installation or removal should be performed by at least two persons in order to avoid possible personal injury or equipment damage. This equipment should only be installed in a standard 19-inch equipment rack and only in such a manner as to avoid any tipping hazard from uneven loading of the rack.

CAUTION

Forced air cooling is provided by fans located within this equipment. Care should be taken not to block airflow around these fans.

This equipment is designed to be installed in a standard 19-inch equipment rack. Sufficient space must be provided behind the equipment racks to allow for control, signal, and power cables. All panel mounting holes should be utilized and mounting hardware tightened securely.

Install the equipment into the rack as follows:

1. Insert the panel assembly into the equipment rack and support the bottom of the panel assembly until all mounting hardware has been installed and properly tightened.
2. Install the bottom two panel mounting screws.
3. Install the top two panel mounting screws.
4. Install any remaining panel mounting screws.
5. Tighten all of the panel mounting screws until they are secure.

Interface Connections

All interface connections are made at the rear of the equipment as shown in Figure 1.

WARNING

Before making connections at the terminal block, ensure that the 48VDC source has been switched off and the inverter power switch is in the "OFF" position.

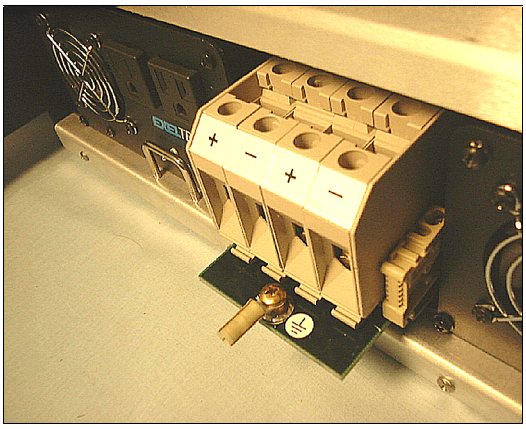


Figure 1. Interface Connections

Input Power

Each 48V Power Converter contains two separate inverters, each of which should have a separate input power cable. The following guidelines should be observed when selecting the type of cable to use between the 48VDC source and the 48V Power converter:

- Use 10 AWG or larger for cables 15 feet or less in length.
- Use 8 AWG or larger for cables between 15 feet and 25 feet in length.

For installations requiring input power cables in excess of 25 feet in length, please consult with the PESA Customer Service Department for guidance in choosing a minimum wire size.

The input power terminal block on the 48V Power Converter has 4 screw terminals and an adjacent ground terminal on the printed circuit board. Attach the ground terminal to ground, positive wires to the terminals marked "+", and negative wires to the terminals marked "-". The pair of terminals on the left is for the left inverter, and the pair of terminals on the right is for the right inverter.

Output Power

Two standard NEMA-15 receptacles are provided on the back of each inverter, for a total of four receptacles for each 48V Power Converter Assembly. PESA routing switchers, or other ancillary equipment, may be plugged directly into these receptacles.

Chapter 3 – Operation

General

After the input power cables have been installed and energized, the power switches on the inverters (located at the rear of the 48V Power Converter) may be switched to the "ON" position. At this time, the green LED on each inverter will illuminate and power will be available at the NEMA-15 receptacles.

Protective Features

Each inverter has the following protective features:

- Low Battery Voltage—If the input voltage at the inverter drops below 38.4VDC, an audible alarm will activate and the inverter will automatically shut off. When the input voltage increases to 45.6VDC, the inverter will restart.
- High Battery Voltage—If the input voltage rises above 57.6VDC, the inverter will also automatically shut off. When the input voltage drops below 57.6VDC, the inverter will restart.
- Excessive Temperature—The inverter will sound an audible alarm if the internal temperature reaches 100°C, and automatically shut off if the temperature reaches 105°C. After cooling, the inverter will automatically turn back on.
- Excessive Load—Once the maximum power rating of the inverter has been reached, the output voltage will be lowered to maintain a constant maximum power output of 1100W.

WARNING

The inverter is designed to be as safe as possible, but it does generate 115VAC – the same current coming out of the wall in your home. Therefore, it demands all of the same respect and precautions given any other 115 volt electrical outlet.

- Do not put anything into the electrical outlets other than a power cord to an appliance.
- Do not submerge or subject unit to moisture.

(Ref. EXELTECH XP 1100 Owner's Manual)

Chapter 4 – Functional Description

The 48V Power Converter is designed to provide a 60Hz sine wave output at 115VAC for use with all PESA equipment. It has two major components, the twin power inverters, and the filter PCB.

Filter Assembly

The filter assembly is designed to protect the 48VDC power source from any noise generated by the inverters.

Power Inverter

Each power inverter draws its 48VDC input from the filter assembly and generates a regulated sine wave AC output.

Chapter 5 – Maintenance and Repair

Maintenance

This equipment requires no maintenance.

Repair

For repair and service information, please contact the PESA Customer Service Department. Contact information can be found inside the front cover of this manual.

WARNING

The power inverters in this equipment are not field/user serviceable. They should only be serviced by qualified service personnel using appropriate equipment. Because of this, it is strongly suggested that they be returned to the PESA Customer Service Department for service.

Inverter Replacement

Each 48V Power Converter contains two inverters which operate independently of each other. One inverter may be replaced while the other is operating under full load.

Tools required:

- Nut Drivers, 3/8" and 1/2"
- Screwdriver, Phillips, No. 1
- Screwdriver, Slotted, 1/4"
- Wrench, Allen, 5/64"

To remove and replace an inverter:

1. Toggle the inverter power switch to the OFF position and disconnect any load cables connected to the NEMA-15 receptacles on the rear of the inverter.

WARNING

Ensure that the 48VDC source has been switched off before disconnecting the input power cables from the terminal block.

2. Use a 1/4" slotted screwdriver to loosen the terminal screws and disconnect the 48VDC input power cables from the terminal block.
3. Remove the front plate by using a 5/64" Allen wrench to remove the four screws which secure it to the chassis assembly.
4. Remove the safety shield from the front of the inverter by using a No. 1 Phillips screwdriver to remove the four screws which secure it to the inverter.
5. Disconnect the power input wires by using a 1/2" nut driver to remove the nuts and flat washers which secure the ring terminals to the power input terminals. After disconnecting the input wires, reinstall the nuts and flat washers to the terminals.

6. At the rear of the 48V Power Converter, use a No. 1 Phillips screwdriver to remove the two screws which secure the module support plate to the chassis bottom.
7. Slide the module support plate, with inverter attached, out of the rear of the 48V Power Converter.
8. Remove the inverter from the module support plate by using a 3/8" nut driver to remove the four nuts which secure them together.
9. Prepare the new inverter for installation as follows: Remove the safety shield from the new inverter by using a No. 1 Phillips screwdriver to remove the four screws which secure it to the inverter. Remove the appropriate knock-out plug (left or right) and install a 3.1" length of plastic grommet strip (PESA Part No. 81-9021-0596-0). This may be salvaged from the old inverter if necessary.
10. Attach the inverter to the module support plate and secure it in place using the hardware previously removed:
    - 4 each #10-32 hex nuts (PESA Part No. 81-9022-0088-0)
    - 4 each #10 flat washers (PESA Part no. 81-9022-0090-6).
11. Slide the module support plate, with inverter attached, into the rear of the 48V Power converter.
12. Secure the module support plate to the chassis bottom using the hardware previously removed:
    - 2 each #6-32 x 3/8" pan head screws (PESA Part No. 81-9022-0046-8).
13. Connect the power input wires on the filter assembly PCB to the power input terminal board on the inverter, using the hardware supplied with the new inverter. Install the hardware so that each ring terminal is located between two flat washers.

CAUTION

Connect the orange wire to the lower left terminal marked BAT(+) and the white wire to the upper right terminal marked BAT (-).

14. Reinstall the safety shield to the front of the inverter using the hardware previously removed.

NOTE

Install the safety shield so that the ventilation holes are on the top side.

15. Reinstall the front plate to the chassis assembly using the hardware previously removed:
    - 4 each #6-32 x 3/8" button head screw (PESA Part No. 81-9022-0170-6)
16. Attach the 48VDC input power cables to the terminal board and use a 1/4"slotted screwdriver to tighten the terminal screws. The 48VDC power source may now be switched back on.
17. Connect the load cable(s) to the NEMA-15 receptacles on the rear of the inverter and switch the inverter power switch to the ON position.

Appendix A – EXELTECH Owner's Manual

EXELTECH

XP 1100 WATT INVERTER

OWNER'S MANUAL

Congratulations on your purchase of the finest power inverter available. With care and common sense, this inverter will provide years of trouble-free service.

INSTALLATION: Since the methods of installation will vary depending on the situation, it is impossible to anticipate all possibilities. However, if the recommendations below are followed carefully, virtually all problems will be eliminated.

1.) Location: The most difficult task may be selecting a mounting location. The following criteria should be considered: A.)Mount unit as close to the battery as possible. **CAUTION: Always have a battery in the system; even when operating this inverter from a power supply or battery charger.** B.)The mounting location should be as clean as possible, preferably inside of the vehicle or in a sheltered area, not exposed to the weather. Under-the-hood installation is not recommended. This unit should be sheltered from the elements as any other electronic device. When choosing a location, keep in mind, the inverter will become hot to the touch when operating at high power. We suggest you keep your vehicle running when operating the inverter. **Always turn off the inverter when it is not in use.**

2.) Wiring: Refer to Table A for proper DC input wire size. To receive the maximum time from batteries, use the shortest length and the largest gauge wire. Also, soldered-type lug connectors should be used for best results. Marine-type battery terminals are recommended to attach lug connectors to the battery. To maximize the performance of the inverter, keep the battery and other electrical connectors clean and free of corrosion. AC power is available from the NEMA-15 plug in the front of the inverter, or the terminal strip on the back of the unit.

Table A:

	Feet from Battery			
	5'	10'	15'	20'
WIRE GAUGE FOR:				
XP-1100/12V	2	1/0	3/0	4/0
XP-1100/24V	6	4	4	2
XP-1100/48V	10	10	10	8
XP-1100/66V	14	12	12	10
XP-1100/108V	14	14	14	14

3.) Remote On/Off Switch: To use a remote on/off switch with the inverter, mount your remote switch in a convenient location. Connect a small wire from 12 volts negative (from battery or inverter DC-, etc.), to the switch, then from the switch to the REMOTE or RMT terminal on the inverter. Ensure that the on/off switch on the front of the inverter is in the "off" position. Use the remote switch to turn the inverter on and off.

4.) Mechanical: The inverter may be mounted in any position, providing adequate air circulation (at least one inch clearance) around the unit. Do not mount the unit where there is not adequate air circulation. This will not harm the unit but will reduce maximum continuous power.

OPERATING:

To operate, simply plug in the appliance and turn the inverter on. The green LED next to the switch will illuminate. The XP-1100 power inverter can run any load requiring less than 1100 watts or 11 amps. To determine if a particular device can be run with the XP-1100, look on the identification plate of the device. The power requirement specification will be listed in watts, volt-amps or amps (watts and volt-amps are the same for our purposes). The inverter is designed to supply electronic loads that draw high amounts of current at the peak voltage of the sine wave. This allows proper power to run electronic loads such as computers, TV's, VCR's or virtually any device.

PROTECTION FEATURES:

The inverter has numerous built-in protection features which prevent internal damage. The following is a list of the most important of these features:

1.) Low battery voltage - if the battery voltage at the inverter drops below the under voltage cut-off (see appropriate spec), an audible alarm will activate and the inverter will automatically shut off. When battery voltage increases to 95% of nominal battery voltage, the inverter will restart.

2.) High battery voltage - if the battery voltage input rises above the over voltage cut-off, the inverter will also automatically shut off. When the battery voltage input drops back to the normal voltage range, it will turn itself back on.

3.) Over-temperature - if the inverter gets too hot due to high ambient temperature, blocked air flow or overload conditions it will automatically shut off. However, when the inverter reaches an acceptable temperature it will automatically turn back on.

4.) Overpower - the inverter will source up to it's maximum power rating, however, if the load requires more than this, the output voltage will be lowered to supply no more than its maximum power. In this way, the maximum power from the inverter is reduced to a safe amount.

PRECAUTIONS:

The inverter is designed to be as safe as possible, but it does generate 115Vac -- the same current coming out of the wall in your home. Therefore, it demands all of the same respect and precautions given any other 115 volt electrical outlet.

- Do not put anything into the electrical outlets other than a power cord to an appliance.
- Keep outlets covered when not in use or when children are around the unit.
- Do not submerge or subject unit to moisture.

Thank you for choosing EXELTECH.

If you are pleased with this product and the service you have received, please tell a friend. If not, please tell us. You have purchased the world's finest power inverter, along with our commitment to total customer satisfaction.

CAUTION: READ COMPLETELY BEFORE INSTALLING

EXELTECH
2225 E Loop 820 North • Fort Worth, TX 76118-7101
(817) 595-4969 • 800-886-4683 • FAX 817-595-1290
Made in the U.S.A.

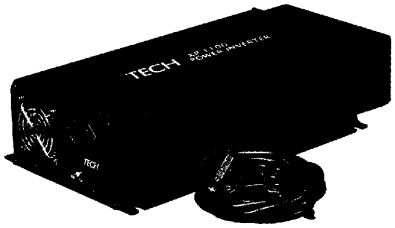
Appendix B – EXELTECH Specification Sheet

EXELTECH

XP SERIES

XP125

XP250



XP1100

XP600

Made in America, the ***EXELTECH XP SERIES INVERTERS*** are the most affordable, reliable, lightweight and best regulated, true sine wave inverters available. The ***XP SERIES*** will operate any type of load. Everything you can plug into the wall can be operated by the ***XP SERIES***. Available at 100Vac, 115Vac or 230Vac in 50, 60 or 400Hz.

- ✓ **TRUE SINE WAVE**
- ✓ **125 WATTS UP TO 1100 WATTS**
- ✓ **12VDC UP TO 108VDC INPUT**
- ✓ **RACK MOUNT OPTIONAL**
- ✓ **50MS TRANSFER SWITCH OPTIONAL**
- ✓ **21.5 YEARS MTBF**

All specifications are subject to change without notice.
XPALB01A

XP SERIES

POWER INVERTER SPECIFICATIONS

OUTPUT POWER

CONTINUOUS POWER	SURGE POWER	NO LOAD POWER	OUTPUT VOLTAGE	OUTPUT CURRENT	WEIGHT LBS.
125W	150W	5W	100	1.2	2
125W	150W	5W	117	1.1	2
125W	150W	5W	230	0.5	2
250W**	300W	6W	100	2.5	5
250W**	300W	6W	117	2.1	5
250W**	300W	7W	230	1.1	5
600W**	1100W	8W	100	6.0	6.5
600W**	1100W	8W	117	5.1	6.5
600W**	1100W	9W	230	2.7	6.5
1100W**	2200W	20W*	100	11.0	10
1100W**	2200W	20W*	117	9.5	10
1100W**	2200W	20W*	230	4.8	10

*10W with X2 option
**remote switchable

INPUT POWER

MODEL VOLTAGE	MINIMUM (TYPICAL)	SYSTEM (TYPICAL)	MAXIMUM (TYPICAL)	TYPICAL EFFICIENCY @ FULL POWER	PEAK EFFICIENCY @ 1/3 POWER
12V	10.4/10.6*	13.8V	16.5V	85%	87%
24V	19/21V*	27.6V	33V	87%	89%
32V	26.5/28V*	36.8V	44V	87%	89%
48V	41.5/42.5V	55.2V	62V	87%	89%
66V	57.5/58.5V*	75.9V	91V	88%	90%
108V	94/95V*	125V	149V	88%	90%

*indicates typical cut-off voltage/warning buzzer voltage

GENERAL

CONDITIONS	MINIMUM	TYPICAL	MAXIMUM
WAVEFORM	-	SINUSOIDAL	-
VOLTAGE OUTPUT	-5%	NOMINAL	+5%
LINE REGULATION	-	.1%	.5%
LOAD REGULATION	-	.5%	1%
DISTORTION	-	1.5%	2%
FREQUENCY	-.1%	NOMINAL	+.1%

MECHANICAL

Case size (WxHxD)

125W case size= 4.93" x 2.00" x 6.80" (2 lbs)
250W case size= 5.23" x 2.77" x 10.38" (5 lbs)
600W case size= 7.70" x 3.60" x 11.77" (6.5 lbs)
1100W case size= 7.70" x 3.60" x 14.77" (10 lbs)

OPTIONS

XP Options:
- conformal coating (X7 option)
- low idle current drain (X2 option)*
- circuit board with heat sink only (X4 option)

*1100 watt only

PROTECTION CIRCUITRY

*Over Voltage:	Shut off at maximum input voltage, per input conditions. Automatic reset upon fault correction.
*Under Voltage:	Shut off at minimum input voltage, per input conditions
*Thermal:	105 C internal temperature. Warning buzz 5 C before shut off
Output Short:	Unit shuts off (manual reset)

*Automatically reset

ENVIRONMENTAL

Temperature:	-25 to 30 C full power derated above 30 C
Humidity:	5 to 95% non condensing
Altitude:	-200 to 10k feet full power, derated above 10k
Audible Noise:	Less than 45dbA
Cooling:	600W/1100W Thermo-statically controlled forced air. 125W/250W convection cooled.
Finish:	Painted aluminum, XP125 annodized aluminum
Warranty:	Full year parts labor

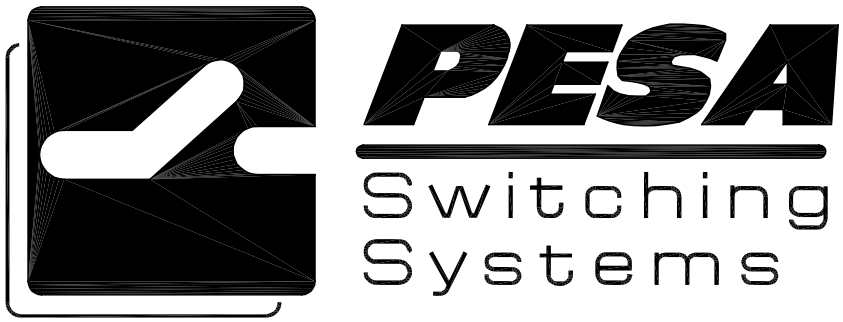
EXELTECH

2225 East Loop 820 North
Fort Worth, Texas 76118-7101
817.595.4969 voice, 817.595.1290 fax
800.886.4683 toll free
e-mail address, info@exeltech.com
web site, www.exeltech.com

XPALB02A

Revision History

Rev.	Date	Description	By
A	12-29-98	Initial Release	G. Tarlton
B	05-04-99	Completely revised to remove preliminary status per ECO3222.	G. Tarlton
C	03-05-01	Deleted Printing Specification per ECO CE00113.	G. Tarlton
D	03-16-01	Deleted bills of material, drawings, and schematics per ECO CE00130.	G. Tarlton


PESA
Switching
Systems