EXELTECH

Manufacturer of UL Listed Products

Manufacturer of True Sine Wave Power Inverters and Related Products

MX SERIES POWER INVERTERS

MX SERIES FAMILY

- **N+1 REDUNDANT**
- **EXPANDABLE**
- **REMOTE SWITCHING**
- **TRUE SINE WAVE**
- **“HOT” INSERTABLE**
- **1000 WATT MODULES**
- **REMOTE METERING**
- **ADJUSTABLE POWER**

EXELTECH manufactures the world's first truly ***redundant, modular*** inverter system; the ***most reliable*** inverter system available. No single malfunction will cause the inverter system to fail. ***Modules are "hot" insertable***. Power levels are ***expandable***, and modules can be added or replaced ***without interruption in power*** to your critical loads.

The MX system can be configured for ***power levels from 1 to 20KW with 120 Vac*** output. Up to 40KW at 240 Vac bi-phase or 60KW at 208 Vac 3 phase with many input and output voltages also available.

A control card and any number of additional 1000 Watt power modules combine to make a standard inverter. This type of system can be expanded as power requirements increase, and upgraded to be N+1 redundant as desired.

The MX system is ***extremely compact and lightweight***. Power modules weigh only 7 lbs. Each.

Output voltage is precisely regulated, so that no measurable voltage change occurs on the output as input voltage fluctuates. Similarly, less than 0.5 volt change in output voltage will occur when the output load varies from 0 to 100% of rated power. With distortion of 2% maximum, this inverter offers ***the cleanest sine wave power available.***

Models are available which cover all standard battery systems. Custom models can be designed to meet your specific input voltage requirements.

MX SERIES MODULE DESCRIPTION

The ***Exeltech MX*** Series of inverters is a modular system which can be assembled in many combinations to afford the user infinite flexibility. Options such as AC distribution, AC disconnect, metering, DC disconnect, DC distribution, transfer switch and maintenance bypass switch are also available; (see accessories).

The building blocks of the system are as follows:

1.) Power Module - A 1000 Watt slave power inverter. It requires drive signals from a Master Module or Control Card as described below. This module is the backbone of the inverter system.

2.) Master Module - A 1000 Watt power inverter which contains all the electronics necessary to operate. Requires an enclosure to provide connections to the battery and AC output. It can also operate up to 19 slave Power Modules. If this module is used, the system cannot be fully redundant.
All MX systems require either a master module or at least one control card.

3.) Control Card - Generates all the signals necessary to operate up to 20 Power Modules. The card itself will not generate any AC output power nor does any power flow through it. This card can be paralleled with another Control Card to generate a redundant set of control signals to form the basis of a completely redundant inverter system.
All MX systems require either a master module or at least one control card.

4.) Alarm Card - Can be used in conjunction with a redundant or non redundant inverter to provide various alarm output signals via LED's and alarm contact closures. Must be included in redundant systems to detect failure of control card.

5.) Transfer Switch - Provides the same functions as the alarm card, plus provides a relay to transfer AC power to the load, from either the inverter or the utility input. Use only with systems 7KW of or less.

The above modules can be placed in the following enclosures; Installations can either be free standing or in standard relay racks.

1.) 19" cage assembly - Compatible with a 19" relay rack. The smallest cage which can contain a redundant system. Available in the following configurations:
- 19A - Basic configuration for a redundant system. Holds up to 4 Power Modules, 2 Control Cards and either a Transfer Switch or an Alarm Card.
- 19B - Used as an expansion rack or may be used as an expandable, non redundant inverter, up to 5 KW. ***This configuration will not accept X-fer Switch, alarm card or control cards.***

2.) 23" cage assembly - Compatible with a 23" relay rack.
- 23A - Basic configuration for a redundant system. Holds up to 5 Power Modules, 2 Control Cards and either a Transfer Switch or an Alarm Card.
- 23B - Used as an expansion rack or may be used as an expandable, non redundant inverter, up to 6 KW. ***This configuration will not accept X-fer Switch, alarm card or control cards.***

3.) 7" cage assembly - for 1 or 2KW systems when redundancy is not required.
- 7C - Consists of 1 Transfer Switch and 1 Master Module. ***This configuration will not accept an alarm card or control cards.***
- 7B - Expandable up to 2KW. 1 Master Module and 1 Power Module. ***This configuration will not accept X-fer switch, alarm card or control cards.***

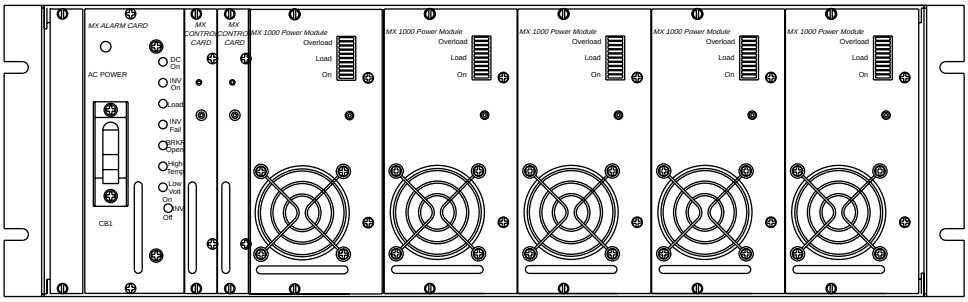
4). 9" cage assembly- for 1-3KW systems when redundancy is not required.
- 9C - Consists of Transfer Switch, 1 Master Module and 1 Power Module. ***This configuration will not accept an alarm card or control cards.***
- 9B - Expandable up to 3KW. 1 Master Module and 2 Power Modules. ***This configuration will not accept X-fer Switch, alarm card or control cards.***

MX SERIES SYSTEM DESCRIPTION

The ***Exeltech MX*** Series of inverters is available in three basic architectures; redundant, upgradable and expandable. Different options and sizes are available to fit varying applications. As a benefit of the ***MX*** series modular design, power levels are expandable in any system, as power requirements increase.

1.) **N+1 Redundant-Expandable Inverter System**: For applications where reliability and maintainability are paramount, the N+1 redundant system offers the most cost effective method of achieving redundancy and the ability to maintain the system while loads remain on line. All cards (except 12 Vdc) are "hot" insertable to allow maintenance without interrupting power to critical loads. Designing the power level with N+1 number of power modules, allows for redundancy without necessitating the purchase of a duplicate system. (An A/B Buss option is available, which adds to system reliability).

A redundant system consists of:



1 ea. Alarm Card
part # H (100 Vac)
A (120 Vac)
F (230 Vac)

2 ea. Control Cards
part # LL (100 Vac)
CC (120 Vac)
EE (230 Vac)

At least 3 Power Modules
part # P (100 Vac)
P (120 Vac)
R (230 Vac)

1 ea. Cage assembly
part # 1A (19" cage)
2A (23" cage)

Options: 1 ea. X-fer switch
part # G (100 Vac)
X (120 Vac)
Z (230 Vac)

X-fer switch includes alarms and replaces the alarm card.

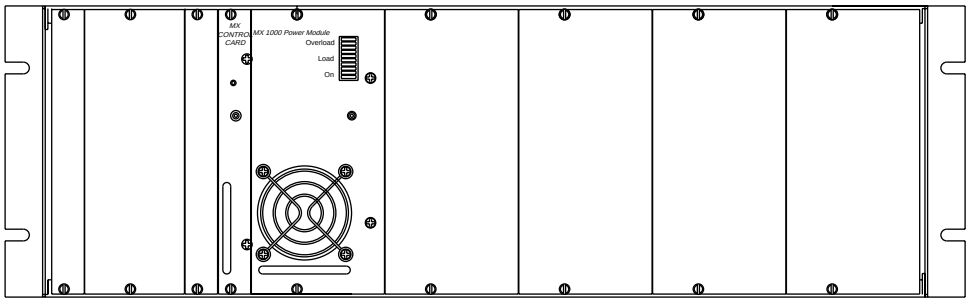
expansion rack
part # 1B (19" cage)
2B (23" cage)

...integrates with rack A for accommodating additional power modules, up to total rating of 20KW. Additional control cards and a larger X-fer switch may be required. Please call the factory for assistance.

2.) **Upgradable Inverter System**: The ***Upgradable system*** offers the flexibility to add a X-fer switch or alarm card and Full Redundancy for future requirements. A minimum system with as little as one control card and one power module can be upgraded in the future to include additional power modules, X-fer switch or alarm card and an additional control card for full redundancy (see figure II).

MX SERIES SYSTEM DESCRIPTION

Figure II.



1 ea. Cage assembly
part # 1A (19" cage)
2A (23" cage)

Options:
1 ea. X-fer Switch
part # G (100 Vac)
X (120 Vac)
Z (230 Vac)

1 ea. Alarm Card
part # H (100 Vac)
A (120 Vac)
F (230 Vac)

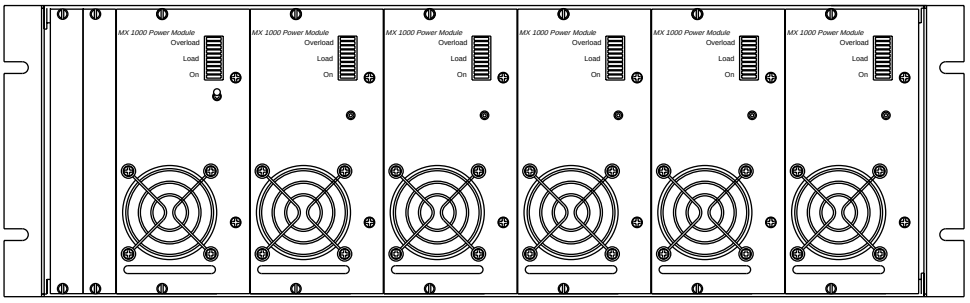
1 ea. Control Card
part # L*(100 Vac)
C*(120 Vac)
E*(230 Vac)

1 ea. Power Module
part # P (100 Vac)
P (120 Vac)
R (230 Vac)

3.)**<u>Expandable inverter system</u>**:This configuration can be used as an independent inverter system (figure III), or to expand power levels of existing ***MX*** systems (see stacked systems). By using one master module, a system may be expanded to include a X-fer switch and additional power modules(see figure IV). 1KW inverters with a X-fer switch use the 7"or 9" (part # 7C, 9C) cage. 1KW, 2KW and 3KW inverters without a X-fer switch use the 7" or 9" (part number 7B, 9B) cage assembly.

Figure III.

1 ea. Cage assembly
part # 1B (19" cage)
2B (23" cage)
7B (7" cage)
9B (9" cage)
expansion rack
(see stacked
systems)



1 ea. Cage assembly
part # 1A (19" cage)
2A (23" cage)
7C (7" cage)
9C (9" cage)

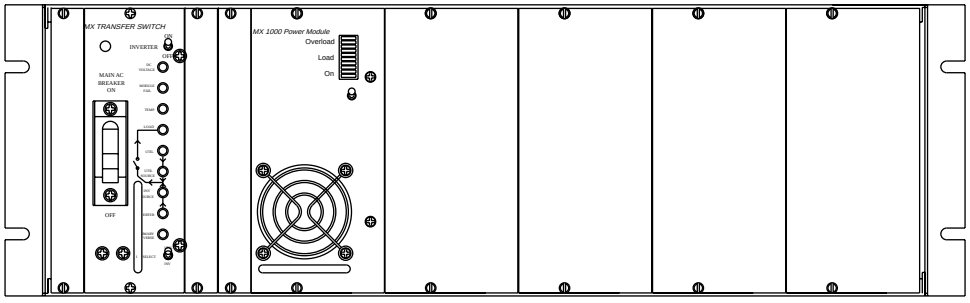
Options:
1 ea. X-fer Switch
part # G (100 Vac)
X (120 Vac)
Z (230 Vac)

1 ea. Master Module[1]
part # Q* (100 Vac)
M* (120 Vac)
N* (230 Vac)

1 ea. Master Module
part # Q* (100 Vac)
M* (120 Vac)
O* (230 Vac)

Up to 5
Power Modules
part # P (100 Vac)
P (120 Vac)
R (230 Vac)

Figure IV.



[1] Alarm card is not an option on this configuration

MX SERIES SYSTEM PART NUMBER

Use the Design Chart to formulate the 15 digit model number.

EXELTECH MX SERIES
MODEL NUMBER

__ __ __ __ __ __ __ __ __ __ __ __ __ __ __

Step 1: Enter the two character code for cage assembly size and configuration.

Step 2: When a transfer switch or alarm card is used, enter the single character code for that card. 2nd and 3rd characters designate option level of transfer switch or alarm card. Enter 00 for standard module, if no alarm card or transfer switch use “B” configuration backplane, enter (***).

Step 3: Alpha character assigned by EXELTECH to represent changes or revision levels in racks, alarm cards, or transfer switch. Enter(-). EXELTECH will assign revision level. See revision level chart on www.exeltech.com for the most current revision list.

Step 4: Enter the two character code for Control Card(s) or Master Module. There is not an application where both are used. Enter (M*) or (C*) if only one is used.

Step 5: To designate power level, enter the number of power modules required. Redundant systems require continuous load rating plus one additional power module(* if none used).

Step 6: To designate output voltage of the power module required, enter the single character code(* if none used).

Step 7: Single alpha character assigned by EXELTECH represents changes or revision levels in Control Cards, Master Modules, or Power Modules. Enter (-). EXELTECH will assign revision level. See revision level chart on www.exeltech.com for the most current revision list.

Step 8: To designate input voltage, enter the single character from the VDC voltage chart below.

Vdc INPUT VOLTAGE CHART						
DC Volts	12	24	32	48	66	108
Designation	1	2	B	4	E	I

Step 9: Output frequency is designated by using the first number of the frequency (5for 50Hz, 6 for 60Hz, 4 for 400Hz).

Step 10: For options, enter two digit code. If no option, enter (00).

EXAMPLE: A redundant system with an alarm card, to fit a 23" wide cage, for powering a 4000 watt continuous load, at 120Vac, 60Hz with 48Vdc input would require the following model number...
2AA00ACC5P-4600

MX SERIES MODULE PART NUMBER

EXELTECH MX SERIES
MODULE NUMBER

MX __ - __ - __ - __ - __ - __ - __ __

Step 1: Model number always starts with MX.

Step 2: To designate a cage assembly, enter the two character code from the design chart. When ordering a power module or master module, enter a “K”. If ordering any other module, enter an asterisk(*).

Step 3: To designate the type of module, enter the single character code from the design chart. To designate cage assembly, enter an asterisk(*).

Step 4: To designate input voltage, enter the single character code from the **Vdc INPUT VOLTAGE CHART** below. If ordering an alarm card, transfer switch or cage assembly, enter an asterisk(*).

Vdc INPUT VOLTAGE CHART						
DC Volts	12	24	32	48	66	108
Designation	1	2	B	4	E	I

Step 5: Output frequency is designated by using the first number of the frequency(5 for 50Hz, 6 for 60Hz, 4 for 400Hz). If ordering a transfer switch, alarm card, power module or cage assembly, enter an asterisk(*).

Step 6: This space designates current revision level, and is for EXELTECH use only. If no revision is in use for this module, no number or character will be used.

Step 7: To designate option, enter the code from the option chart below. If no option is required please leave blank.

OPTION CHART	
Option	**Code**
Conformal coating	07
Low idle current	08

MODULE EXAMPLES: A 12Vdc, 120Vac, 60Hz master module would require the following module number...
MXK-M-1-6-1

A 48vdc, 120Vac, 60Hz power module with conformal coating option would require the following module number...
MXK-P-4-*-1-07

CAGE ASSEMBLY EXAMPLE: A 19" redundant cage, 120Vac would require the following module number:
MX1A-*-*-*-2

MX SERIES SYSTEMS DESIGN CHART

MX SYSTEMS DESIGN CHART								
SYSTEMS REQUIRED	CAGE ASSY SIZE AND CONFIG.	Use X-fer or Alarm Card			Use CC or MM		POWER MODULE	AVAIL C- Current F- Future
		X-FER SWITCH		ALARM CARD	CONTROL CARD	MASTER MODULE		
		100Vac	G	H	L* or LL	Q*	P	
		120Vac	X	A	C* or CC	M*	P	
		230Vac	Z	F	E* or EE	O*	R	
Redundant Upgradable 19" Cage	1A	0 or 1 [1,4]		0 or 1 [1,4]	0, 1, 2 [5]	0	up to 4 [3]	C
Redundant Upgradable 23" Cage	2A	0 or 1 [1,4]		0 or 1 [1,4]	0, 1, 2 [5]	0	up to 5 [3]	C
Expandable 19" Cage	1A	0 or 1		0	0	1	up to 3	C
Expandable 23" Cage	2A	0 or 1		0	0	1	up to 4	C
Expandable 7" Cage	7B	0		0	0	1	0 or 1	C
Expandable 9" Cage	9B	0		0	0	1	up to 2	C
Expandable 19" Cage	1B	0		0	0	1	up to 4	C
Expandable 23" Cage	2B	0		0	0	1	up to 5	C
Expandable 7" Cage	7C	0 or 1		0	0	1	0	C
Expandable 9" Cage	9C	0 or 1		0	0	1	0 or 1	F
Split Phase 19" Cage	1E	0		0	0	2	0 or 2	F
Split Phase 23" Cage	2E	0		0	0	2	0,2,4	F
Split Phase 7" Cage	7E	0		0	0	2	0	C
3 Phase 19" Cage	1F	0		0 or 1 [2]	0	3	0	F
3 Phase 23" Cage	2F	0		0 or 1 [2]	0	3	0 or 3	C
3 Phase 9" Cage	9F	0		0	0	3	0	C

[1] 1 per phase
[2] Alarm with a subset of functions (multi-phase option A13)
[3] System is not fully redundant with less than 3 power modules
[4] Minimum 1 Alarm Card or 1 X-fer Switch required for redundant system
[5] Minimum 2 Control Cards for redundant system.

NOTE: Any modification to any Stack System must be performed in the factory.

MX SERIES POWER INVERTER SPECIFICATIONS

OUTPUT POWER

CONTINUOUS POWER	SURGE POWER (3 seconds)	NO LOAD POWER	OUTPUT VOLTAGE	OUTPUT CURRENT	WEIGHT LBS.
1000W	2200W	20W	230+/-6%	4.3	7.5
1000W	2200W	20W	117+/-6%	8.6	7.5
1000W	2200W	20W	100+/-6%	10.0	7.5

INPUT

MODEL VOLTAGE	MINIMUM (TYPICAL)	SYSTEM (TYPICAL)	MAXIMUM (TYPICAL)	TYPICAL EFFICIENCY @ FULL POWER	PEAK EFFICIENCY @ 1/3 POWER
12V	10.4/10.6*	13.8V	17V	85%	87%
24V	19/21V*	27.6V	34V	87%	89%
32V	26.5/28V*	36.8V	45V	87%	89%
48V	41.5/42.5V*	55.2V	62V	87%	89%
66V	57.5/58.5V*	75.9V	94V	88%	90%
108V	94/95V*	124V	149V	88%	90%

*indicates typical cut-off voltage/warning buzzer voltage

GENERAL

CONDITIONS	MINIMUM	TYPICAL	MAXIMUM
WAVEFORM	-	SINUSOIDAL	-
LINE REGULATION	-	.1%	.5%
LOAD REGULATION	-	.3%	.5%
DISTORTION	-	1.5%	2%
FREQUENCY*	-.1%	NOMINAL	+.1%

*50, 60, 400Hz nominal

See www.exeltech.com for more data regarding MX Series inverters.

PROTECTION CIRCUITRY

Over Voltage:	Shutoff at maximum input voltage, per input conditions.
Under Voltage:	Shutoff at minimum input voltage, per input conditions.
Thermal:	105 C internal temperature. Warning buzz 5 C before shutoff.
Output Short:	Unit shuts off: Circuit breaker protected and electronically limited.

ENVIRONMENTAL

Temperature:	-25 to 40 C full power, derate 20% per 10 C. Above 40 C.
Humidity:	5 to 95% non-condensing
Altitude:	-200 to 10k feet full power, derated above 10k
Audible Noise:	Less than 45dbA
Cooling:	1KW-Thermostatically controlled forced air
Finish:	Polyurethane base paint
Warranty:	Full year parts and labor.

MECHANICAL

Four case sizes are available; all are:
7" high X 15" deep.

19 inch Wide:	(includes hardware for rack or shelf mounting)
23 inch Wide:	(includes hardware for rack or shelf mounting)
9.97 inch Wide:	(for 1 to 3KW applications: surface mounting only)
7 inch Wide:	(for 1 or 2KW applications; surface mounting only)

Available in other sizes including metric. Call factory for sizes.

MX SYSTEMS MONITOR CARD

It is now possible to monitor all of your remote power stations, anywhere, from a single location. You can have up to the minute verification that all of your remote power systems are 100% operational. Your remote power system can tell you that it is currently running at 90% of its rated capacity.

An Exeltech System Monitor card is an upgrade option for any Exeltech MX Series Redundant or Upgradeable System equipped with an Alarm Card or New MX Systems with a Transfer Switch. This new product allows customers to monitor all important aspects of their power system from any IP based Ethernet network.

Customers can monitor all system alarm functions including: Power Module fail, Control Card Fail, Over Temperature, Under DC Voltage, A-B Bus failure, System Breaker Open, and System Failure. Additionally, customers can monitor battery voltage and current usage, and System output voltage and current. All alarm functions are viewable from an LCD display located on the System Monitor Card, and Ethernet connection, or a local Rs232 connection.

Main Menu Items

The main menu consists of 9 different screens. To switch between each menu item press the MENU button. Alarm Details and System Settings have several addition screens available for viewing or changing system parameters, press the SELECT button to choose a parameter for viewing or modification of settings. Hold the MENU button down to return to the main menu screens.

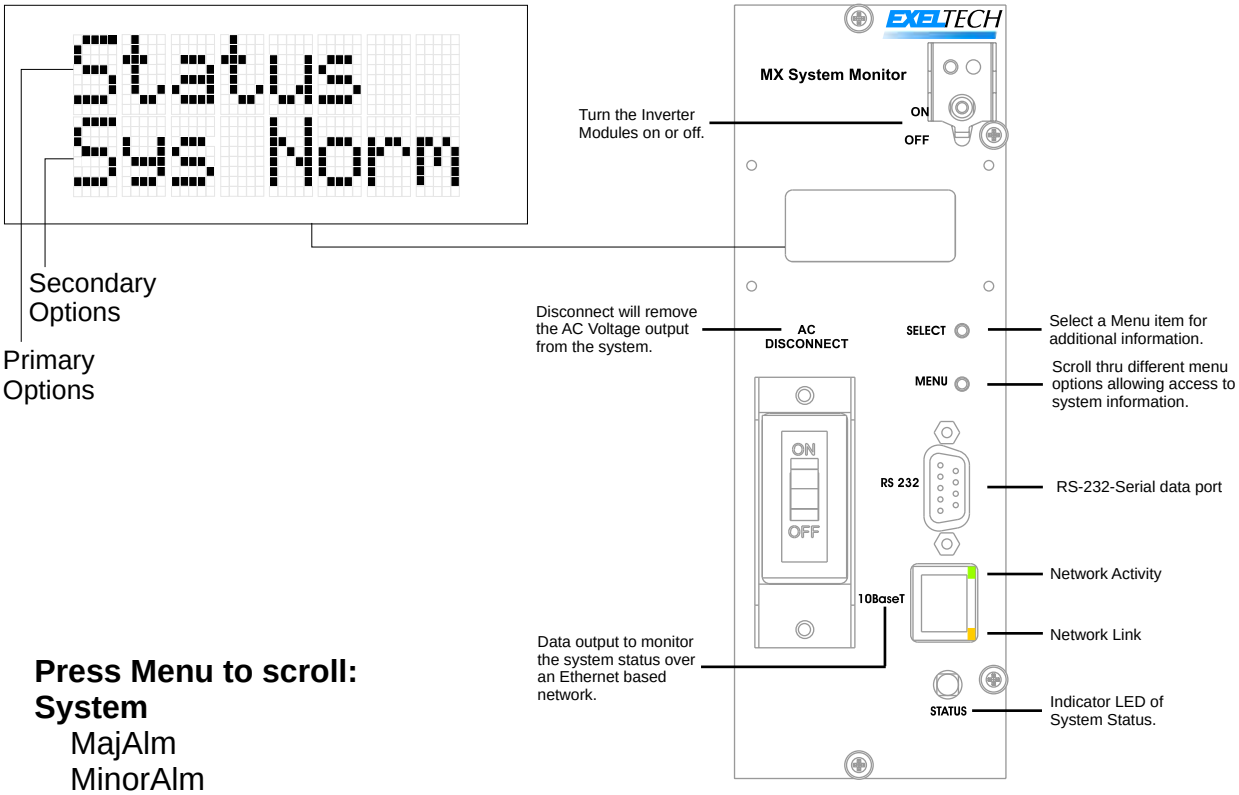
Operation

Normal operation of the Monitor Card is exactly the same as a standard Exeltech Alarm Card with the notable exception of remote monitoring of system status. A blinking LED for the new alarm state announces new alarm states; pressing ether button stops the blinking, and Alarm Details will give a listing of any alarms that have activated. For a complete description of the Exeltech Alarm Card, see the Exeltech System Installation/ Operation manual.

Remote Monitoring

Remote monitoring can be performed via DHCP enabled network, or RS 232 serial port. Monitoring software is included to allow remote sensing of alarm states, however, it is simple to implement custom software to meet any monitoring needs.

System Monitor Card



Press Menu to scroll:
System
MajAlm
MinorAlm
SysNorm
Alarm
Details → PRESS SELECT →
Vdc
0.0 V
Idc
0.0 A
Vac
0.0 V
Iac
0.0 A
Up H:M:S
HH:MM:SS
System
Settings → PRESS SELECT →
Version
Version Number

Press Menu to scroll:

SysPower
FAIL,OK
Breaker
ON/OFF
P Mod
OK/FAIL
OverTemp
OK/FAIL
CC Stat
OK/FAIL
Maint BP
ON/OFF
DCV Alarm
ON/OFF
A-Buss
0.0 V
B-Buss
0.0 V
SysVersion
Current Version

Press Menu to scroll:
RS232 Send
ON/OFF
Ethernet Send
ON/OFF
RS232 Baud
Several Selections
ReInit Ethernet
Software Reboot

EXELTECH

Manufacturer of UL Listed Products

Manufacturer of True Sine Wave Power Inverters and Related Products

XP SERIES POWER INVERTERS

XP 125

XP 250

XP 600

XP 1100

XP 2000

Made in America, ***EXELTECH XP SERIES INVERTERS*** are the most affordable, reliable, lightweight and best regulated, true sine wave inverters available. The ***XP SERIES*** inverter will operate any AC load anywhere. Ultra lightweight, yet rugged enough for the most extreme mobile enviroments, the ***XP SERIES*** is available in 100Vac, 120Vac, or 230Vac in 50Hz, 60Hz or 400Hz for land, marine or military applications, worldwide.

- **TRUE SINE WAVE**
- **125 WATTS TO 2000 WATTS**
- **12VDC TO 108VDC INPUT**
- **RACK MOUNT OPTIONAL**
- **REMOTE SWITCHING**
- **21.5 YEARS MTBF**

XP SERIES PART NUMBERING SYSTEM

EXELTECH XP SERIES **XP** **__ - __ - __ - __ - 1 - __ __**

MODEL NUMBER

Step 1: Model number always starts with XP.

Step 2: To designate wattage enter the single character code 1 for 125, 2 for 250, 6 for 600, K for 1100, X for 2000

Step 3: To designate output voltage enter the single character code from the Vac chart

Vac OUTPUT VOLTAGE CHART			
AC Volts	100	120	230*
Designation	0	1	3

*Not available in 125watt models

Step 4: To designate input voltage enter the single character code from the Vdc chart

Vdc INPUT VOLTAGE CHART						
DC Volts	12	24	32	48	66	108
Designation	1	2	B	4	E	I

Step 5: Output frequency is designated by using the first number of the frequency 5 for 50Hz, 6 for 60Hz and 4 for 400 Hz

Step 6: This designates revision level (For EXELTECH use only).

Step 7: To designate option, enter the code from the option chart below. If no option is required please leave it blank.

OPTION CHART	
Option	**Code**
Conformal coating	07
Low idle current drain	02*
Circuit board with heat sink only	04**
50MS transfer relay	20***

* available thru a distributor only(only on XP1100W)
**available for OEM's only
***available on XP600 and XP1100 only

EXAMPLE: XP600 with 117Vac output, 12Vdc input, 60Hz with the conformal coating option would require the following model number:
XP6-1-1-6-1-07

XP SERIES POWER INVERTER SPECIFICATIONS

OUTPUT POWER

CONTINUOUS POWER	SURGE POWER	NO LOAD POWER	OUTPUT VOLTAGE	OUTPUT CURRENT	WEIGHT LBS.
125W	150W	5W	100 +/-6%	1.2	2
125W	150W	5W	117 +/-6%	1.1	2
250W**	300W	6W	100 +/-6%	2.5	5
250W**	300W	6W	117 +/-6%	2.1	5
250W**	300W	7W	230 +/-6%	1.1	5
600W**	1100W	8W	100 +/-6%	6.0	6.5
600W**	1100W	8W	117 +/-6%	5.1	6.5
600W**	1100W	9W	230 +/-6%	2.7	6.5
1100W**	2200W	20W*	100 +/-6%	11.0	10
1100W**	2200W	20W*	117 +/-6%	9.5	10
1100W**	2200W	20W*	230 +/-6%	4.8	10
2000W	4000W	12W	120 +/-2%	16.7	15

***10W with X2 option , **remote switchable**

INPUT POWER

MODEL VOLTAGE	MINIMUM[1] (TYPICAL)	SYSTEM (TYPICAL)	MAXIMUM[1] (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	88%	90%
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	87%	90%

*Indicates typical cut-off voltage/warning buzzer voltage

[1] +/- 3% ** Output Power derated for XPX

GENERAL

CONDITIONS	MINIMUM	TYPICAL	MAXIMUM
WAVEFORM	-	SINUSOIDAL	-
VOLTAGE OUTPUT	-5%	NOMINAL	+5%
LINE REGULATION	-	0.1%	0.5%
LOAD REGULATION	-	0.5%	1%
DISTORTION	-	1.5%	2%
FREQUENCY	-0.1%	NOMINAL	+0.1%

See www.exeltech.com for more data regarding XP Series inverters.

MECHANICAL

Case size (HxWxD)

125W case size= 2.16" X 4.93" X 7.90" (2 lbs)
250W case size= 2.77" X 5.23" X 12.03" (5 lbs)
600W case size= 3.57" X 7.69" X 12.10" (6.5 lbs)
1100W case size= 3.57" X 7.69" X 15.05" (10 lbs)
2000W case size= 4" X 9" X 18" (15 lbs)

OPTIONS

XP Options:

- conformal coating (07 option)
- low idle current drain (02 option)*
- circuit board with heat sink only (04 option) many other options available for OEM applications, consult factory.

***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 20% per 10 C, 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
Warranty:	Full year parts labor

BATTERY BACKUP SYSTEM
FOR LED TRAFFIC SIGNALS

- 1000 watts true sinewave power
- Power factor corrected charger
- 3 state temperature compensating charger
- All digital control
- Transfer Switch Internal or External
- Less than 10 ms transfer time
- Maintenance bypass switch
- Event Counter, Event Timer
- Battery Capacity Meter
- RS-232 Interface
- Wide temperature range (-37C to 74C)
- Low battery shutdown protection
- CALTRANS Compliant (JULY 2004)
- Lightning/Surge rated to ANSI-C62.41 Level B2

Exeltech BBS Features

Overall system features:

- Integrated Inverter/charger system, designed for seamless operation together
- 1000 watts true sine wave inverter w/less than 2% distortion and peak efficiency is greater than 89%
- External alarm relays for remote monitoring
  - On battery - energizes when utilizing backup power
  - Low battery - energizes when batteries reach 40% remaining capacity
  - On time - energizes when two hours of backup have occurred
- Low battery shutdown protection
- LED display for all parameters
  - BBS status: Charge mode or BBS mode
  - Event counter
  - Accumulated Event time
  - External alarm relay state
  - Battery Capacity Meter
  - Battery voltage indicator
- Internal or External transfer switch option
- External maintenance bypass switch
- Front panel multimeter test points for battery voltage measurements
- Testing and certifications
  - Manufactured in accordance with ISO 9000/TL 9000 quality systems
  - Computerized calibration and testing of each system
  - CALTRANS compliant (JULY 2004)
  - Lighting/Surge rated to ANSI-C62.41 Level B2
  - FCC compliant to Part 15 Class A
  - Totally integrated system with a 20 year MTBF
- Data collection, monitoring, parameter changes via RS-232 interface

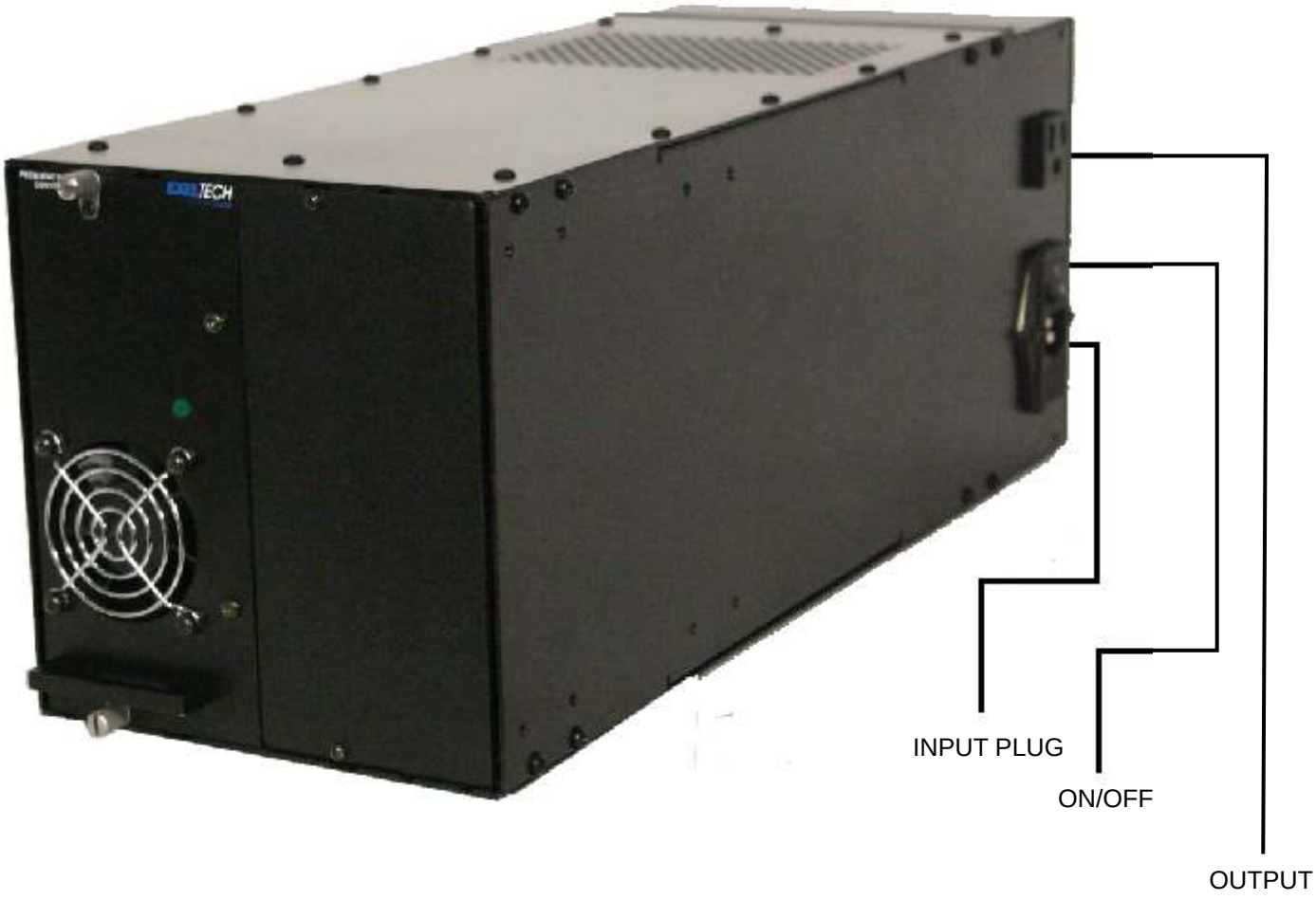
BBS charger features:

- Power factor corrected, 3 state battery charger
- Temperature compensation
- Over temperature protection for batteries (50C) halts all charging
- Configurable battery parameters via RS-232

BBS Transfer Switch Features

- Microprocessor controlled operation allows multi-cycle voltage calculation while maintaining a failure detect time of less then 500 microseconds
- Power conditioning maintains optimal utility voltage levels when slight variance occur
- Relay transfer time less than 10ms, optional relay less then 5ms

FC SERIES/FREQUENCY CONVERTER



The frequency converter is operated by simply plugging in the supplied cord to the power input, connecting the load to the output plug provided, and turning the unit on. The input and output receptacle, along with the switch, are mounted on the left rear side of the enclosure.

Specifications are listed on the product label regarding maximum input and output voltages and currents.

The unit is protected against thermal and electrical overload. Electrical overloads will cause the AC voltage to collapse as the inverter limits output current. When the overload is removed, output voltage will return to normal. If the output is short circuited, the unit will latch itself off, turning the front LED red. This requires the power switch to be cycled to reset the condition (turn the unit off then back on again). Should the unit be thermally overloaded, too much load at too high a temperature, it will shut off, leaving the fan running. When the internal temperature cools sufficiently the unit will turn itself back on.

When the unit is operating normally, the LED on the front will indicate green.

FREQUENCY CONVERTER SPECIFICATIONS

INPUT

Continuous Power	Power Factor	Max Line Regulation	Voltage Range	Freq (Hz)	Module Size	Weight LBS.
500W	>0.98	0.5%	95-260Vac	47-63	A	5.5

Protection Circuitry

Thermal: 105C Internal Temperature
Output: Current limiting with short circuit protection
Input: Fuse protected

EFFICIENCY

250 - 500W
> 82% @ 120
> 85% @ 230

Mechanical

Three cages are available, all are 7" high by 18" deep

7 inch: "N" configuration holds 2 power modules
19 inch: "N" configuration holds 5 power modules
23 inch: "N" configuration holds 6 power modules

Module size "A" - 7" high, 3.2" wide, 15.5 " deep

OUTPUT

Model	Typical Voltage	Range	Distortion	Load Regulation
120Vac 60 Hz	120	+/- 2%	< 2%	1%
120Vac 50 Hz	120	+/- 2%	< 2%	1%
120Vac 400 Hz	120	+/- 2%	< 3%	3%
230Vac 60 Hz	230	+/- 2%	< 2%	1%
230Vac 50 Hz	230	+/- 2%	< 2%	1%

Environmental

Temperature: -25 to 40 C full power, derated above 40C
Altitude: -200 to 10k feet full power, derated above 10k feet
Audible noise: > 45dbA
Cooling: Thermostatically controlled forced air with variable speed fan
Finish: Polyurethane based paint

PV AC MODULE

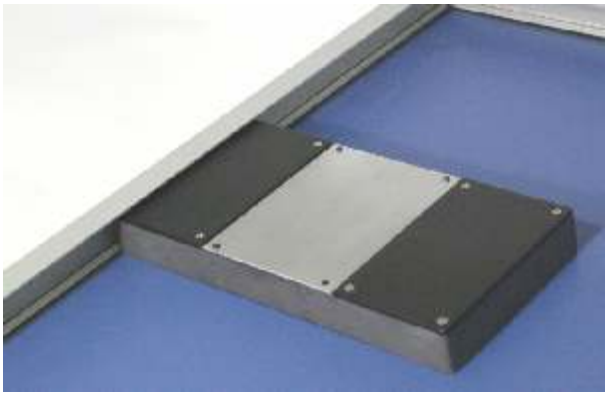
What is a PV AC Module?

An Exeltech PV AC module is a self-contained, UL-1741 compliant inverter that produces clean, sine-wave electricity for grid-tie applications without the complexity or expense common in large-inverter-based systems.

Advantages Over Conventional Grid-Tie Systems

50% reduction in wiring requirements! This eliminates:

- DC wiring
- DC cable trays
- DC fusing, overcurrent protection and required holders
- DC connectors
- DC ground-fault detection, protection, and devices
- DC surge protection
- DC combiner boxes
- DC junction boxes and connector blocks
- UL-related DC cabling issues
- PV Series ("blocking") diodes
- PV module bypass diodes



Exeltech PV AC Module mounted to a PV panel. All DC wiring is enclosed in the compartment near the PV frame. The inverter is mounted in the center compartment. AC wiring is located in the right-hand compartment. (Conduit and fittings not shown are customer/installer provided.)

Additional Benefits of Exeltech PV AC Modules

- **No batteries** to purchase, maintain, or wear out!
- **More reliable -** single point failure does not disable entire system!
- **Simplified system assembly** - AC wiring connects directly to AC sub-panel with appropriate breaker!
- Incremental growth capability - no need to purchase many expensive modules at one time.
- Minimizes system design time and expense.
- Significantly decreases system power reduction events due to single-module shading.
- No large or heavy inverters to ship, handle, or mount.
- Easy to install and service - PV panel and inverter are integrated into one unit.
- No imbalance losses due to differences in PV output voltage or current.
- Anti-islanding protection built into every module (per UL1741).
- Microprocessor-controlled Maximum Power Point Tracking (MPPT) operates over entire DC input voltage range.
- Adaptable: J-box or Multi-contact connector input. Knock-outs for standard AC-side conduit fittings.

Electrical Specifications

- Total Harmonic Distortion (THD): < 2%
- Peak Efficiency: Greater than 91%
- Rated Power: Up to 150W output per module
- Input: “12V” PV (15-24V) or “24V” PV (30-48V)
- MPPT voltage range: Full DC input voltage range
- Output: 117VAC, 60 Hz (nominal)

Mechanical Specifications

- Size (in/mm): 1.3 h x 12.5 w x 6.25 d (33 x 318 x 159)
- Weight: Less than 2.5 lbs (1135 grams)
- Operating Temperature: -40°C (-40°F) to +85°C (+185°F)

Certifications

- Designed to meet:
- UL 1741
- FCC Class B
- NEC 690

Manufacturers of more than 35,000 different true sine wave power inverters, chargers, and related products.15 years of Exeltech inverter manufacturing experience and support behind every Exeltech product. We provide the emergency backup power systems for the Communications Center in every US Embassy, worldwide…

(Specifications subject to change without notice.).

EXELTECH

Manufacturer of Quality Power Products

HVGT SERIES
HIGH VOLTAGE GRID TIE INVERTER

- 1800 WATTS
- 96% EFFICIENT
- COMPACT
- LIGHTWEIGHT
- MADE IN THE USA

The Exeltech HVGT string inverter provides the lowest cost, highest quality, grid interactive inverter available today. This is accomplished through snap-in installation, convection cooled construction with no moving parts, and the use of newly allowed transformerless technology. No transformer means less weight, less cost, and greater efficiency. By incorporating ground fault interrupter (GFI) and integral surge protection within the inverter, there is no need for an external GFI or surge protection to validate the warranty. This reduces the total installed system cost even further. MPPT (Maximum Power Point Tracking) is achieved with a microprocessor. The HVGT complies with UL1741 certification, and is in a NEMA 3R indoor/outdoor enclosure for maximum environmental safety and protection.

HVGT SERIES PART NUMBERING SYSTEM

EXELTECH HVGT SERIES
MODEL NUMBER

HVGT 15 ___ ___ ___ ___ ___

Step 1: Model number always starts with HVGT.

Step 2: To designate wattage (15 for 1500)

Step 3: To designate voltage

Vac OUTPUT VOLTAGE CHART			
AC Volts	100	120	230
Designation	J	A	E

Step 4: Output frequency is designated by using the first number of the frequency(5 for 50Hz, 6 for 60Hz)

Step 5: This space designates current revision level, and is for EXELTECH use only. If no revision is in use for this module, enter 0.

Step 6: To designate option, enter the code from the option chart below. If no option is required please leave blank.

OPTION CHART	
Option	**Code**

EXAMPLES: A 120Vac, 60Hz model would require the following model number...
HVGT15A60

ELECTRICAL SPECIFICATIONS

RATING TYPE	RATING
MAXIMUM SYSTEM VOLTAGE	450 Vdc
RANGE OF OPERATING DC VOLTAGE	200 Vdc to 450 Vdc
MAXIMUM OPERATING CURRENT (DC)	8 Amps
MAXIMUM ARRAY SHORT CIRCUIT CURRENT (DC)	10 Amps
MAXIMUM UTILITY BACKFEED CURRENT (DC)	0.1 Amps
OPERATING VOLTAGE RANGE (AC)	106 Vac - 132 Vac
OPERATING FREQUENCY RANGE	59.3Hz - 60.5Hz
NOMINAL OUTPUT VOLTAGE (AC)	120 Vac
NORMAL OUTPUT FREQUENCY	60 Hz
MAXIMUM CONTINUOUS OUTPUT CURRENT	12.0 Amps
POWER FACTOR	> 0.99
MAXIMUM CONTINUOUS OUTPUT POWER (AC)	1440 Watts
MAXIMUM OUTPUT FAULT CURRENT (AC)	12 Amps
MAXIMUM OUTPUT OVERCURRENT PROTECTION	15 Amps
PEAK EFFICENCY	96 %
TOTAL HARMONIC DISTORTION	5 %

PROTECTION CIRCUITRY

Thermal:	105 C internal temperature.
Output:	Current limiting

ENVIRONMENTAL

Temperature:	25 C full power, derate above 25 C.
Humidity:	Indoor / Outdoor
Altitude:	-200 to 10k feet full power, derated above 10k
Cooling:	Convection
Finish:	Polyurethane base paint

MECHANICAL

Dimensions:	14" X 7" X 5" (HxWxD)
Weight:	8 lbs.

See www.exeltech.com for more data regarding HVGT Series inverters.

Manufacturer of True Sine Wave Power Inverters and Related Products

XO SERIES POWER INVERTERS

EXELTECH manufactures some of the most reliable inverter systems available. Power levels are expandable, and modules can be added or replaced in the field. The XO system can be configured for power levels from 2 to 6KW with 120 VAC output, 240 VAC bi-phase or 208 VAC 3 phase.

The XO system is extremely compact and lightweight. Power modules weigh only 12 lbs each. Output voltage is precisely regulated, so that no measurable voltage change occurs on the output as input voltage fluctuates. Typically, less than 1.2 volt change in output voltage will occur when the output load varies from 0 to 100% of rated power.

With distortion of 2% maximum, this inverter offers the cleanest sine wave power available. Models are available which cover 24, 48 and 66VDC battery systems. Custom models can be designed to meet your specific input voltage requirements.

- EXPANDABLE
- TRUE SINE WAVE
- 2000 WATT MODULES
- EXTREMELY LIGHTWEIGHT
- COMPACT
- MICRO PROCESSOR CONTROLLED

XO SERIES SYSTEM PART NUMBER

EXELTECH XO SERIES MODEL NUMBER __ __ __ __ * * * - __ __ __ __ - __ __

STEP # 1 Model number always starts with XO

STEP # 2 Cage assembly

7	9
7" XO	9" XO

STEP # 3 Configuration

1 phase	2 phase	3 phase
B	E	F

STEP # 4 Enter three asterisks (*)

STEP # 5 Character assigned by EXELTECH to represent changes or revisions levels.

STEP # 6 To designate power level, enter the number of modules required. (* if none used)

STEP # 7 Enter from the following character code
Q = 100Vac, M = 120Vac, O = 230Vac

STEP # 8 To designate input voltage, enter the single character from the VDC voltage chart below:

VDC INPUT VOLTAGE CHART			
DC VOLTS	24	48	66
DESIGNATION	2	4	E

STEP # 9 Output frequency is designated by using the first number of the frequency. 5 for 50Hz, 6 for 60Hz, 4 for 400Hz

STEP # 10 Character assigned by EXELTECH to represent revision level of Power Modules.

STEP # 11 For options, enter two digit code. If no option, enter (00).

Example: XO9B***-3ME6-01

POWER INVERTER SPECIFICATIONS

OUTPUT POWER

CONTINUOUS POWER	SURGE POWER	NO LOAD POWER	OUTPUT VOLTAGE	OUTPUT CURRENT per KW	WEIGHT LBS.
2000W	4000W	12W	1	8.3 A	15
4000W	8000W	24W	1, 2	8.3 A	28.6
6000W	12000W	35W	1, 3	8.3 A	37

1 Single phase 100Vac, 120Vac +/- 2%
2 Bi-phase 100/200Vac, 120/240Vac +/- 2%
3 3 phase 100/173Vac, 120/208Vac +/- 2%

PROTECTION CIRCUITRY

Over Voltage:	Shutoff at maximum input voltage, per input table.
Under Voltage:	Shutoff at minimum input voltage, per input table.
Thermal:	105 C internal temperature.
Output Short:	Unit shuts off: electronically limited. Manual reset required.

INPUT

MODEL VOLTAGE	MINIMUM (TYPICAL)	SYSTEM (TYPICAL)	MAXIMUM (TYPICAL)	TYPICAL EFFICIENCY @ FULL POWER	PEAK EFFICIENCY @ 1/2 POWER
24V	21V	27.6V	30V	> 88%	> 90%
48V	42V	55.2V	60V	> 88%	> 90%
66V	57.8V	75.9V	82.5V	> 88%	> 90%

ENVIRONMENTAL

Temperature:	-25°C to +25°C full power, derated -17% @ 50°C then 20% per 10°C above 50°C.
Humidity:	5 to 95% non-condensing
Cooling:	Thermostatically controlled variable speed forced air
Finish:	Powder coated
Warranty:	Two years parts and labor.

GENERAL

CONDITIONS	MINIMUM	TYPICAL	MAXIMUM
WAVEFORM	-	SINUSOIDAL	-
LINE REGULATION	-	.1%	2%
LOAD REGULATION	-	1%	2%
DISTORTION	-	1.5%	2%
FREQUENCY	-.1%	60Hz	+.1%

MECHANICAL

Case size:
7” Case HOLDS UP TO 2 MODULES
9 inches High
18 inches Deep
7 inches Wide
Weight: 28 lbs.

9” Case HOLDS UP TO 3 MODULES
9 inches High
18 inches Deep
9 inches Wide
Weight: 37 lbs.

COMPANY PROFILE

EXELTECH was founded in 1990, based on the philosophy that efficiencies in the manufacturing process through product design, coordinated with facility layout, was paramount to productivity and the key to a quality product. Our mission is to provide leadership electronics and superior customer service through the merging of innovative designs with advanced Manufacturing technology.

Quality through design for manufactureability is a primary goal. Utilizing surface mount technology, all design and manufacturing is performed in our facility, located in FORT WORTH, TEXAS. "Pick and place" machines are set up with parts that are standard to all models, allowing for zero setup time and eliminating errors created when reloading or setting up machines. Only large capacitors and magnetics are placed by hand, in an effort to minimize human error through automation. Hand soldering is eliminated through the use of vapor phase reflow. Point to point wiring is eliminated with extensive use of PCB's to perform interconnectivity functions. The use of extruded aluminum for mechanics has reduced the number of nut/bolt and screw points to one-fourth that of previous products, while increasing heat dissipation efficiency and lending a functional form factor to the product.

While design of the products to comply with automated manufacturing processes continues, our people remain the most important part of the quality equation. All employees go through a six month internship before becoming full-time staff members. All employees are cross trained for multi-task capability. Using a PULL system, each station performs a quality check on the performance of the previous station. Data for first time yield and DPU is recorded and analyzed by each station and test bench in an ongoing effort to yield a zero defect process. Upon final assembly, all products then proceed to A.L.T. for "accelerated life testing" to minimize "infant mortality". Packaging and shipping procedures are constantly evaluated to reduce damage.

All repairs are performed at the factory for quality feedback and input for future design. The net result of these philosophies is a line of products that demonstrates an MTBF(mean time between failure) in excess of 20 years and offers the most competitively priced true sine wave inverters available anywhere.

Our commitment to quality and total customer satisfaction has allowed EXELTECH to become innovators in the DC to AC power product market. A few of our "firsts" include; The smallest, lightest high frequency PWM sine wave inverter. The first "N+1" redundant inverter systems, "hot" swapable capability and "modular" design. Our many satisfied customers include AT&T, BROOKHAVEN NATIONAL LABS, DIGITAL EQUIPMENT CORPORATION, MOTOROLA, MCI, GTE GOVERNMENT SYSTEMS and numerous federal and state agencies. We are found quite literally, around the world. We also provide back up power for the communications room in every U.S. Embassy worldwide.

Give us the opportunity to help solve your power problem.

931-***C0-00P

EXELTECH

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