



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. All *MX* systems feature manual power adjustment allowing power modules not in use to be turned off, reducing "no load" current drain. 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.

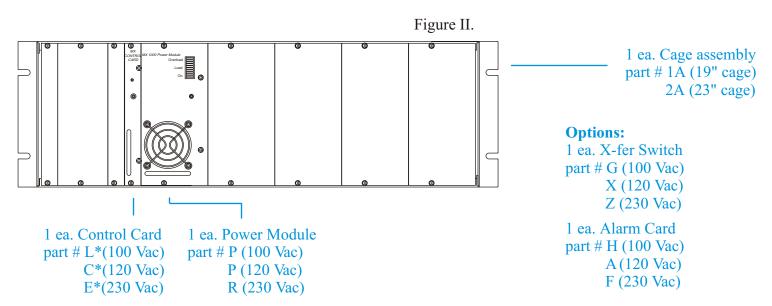
1.) <u>N+1 Redundant-Expandable Inverter System</u>: For applications where reliability and maintainability are paramount, the N+1 redundant system offers the most cost effective method of achieving redundancy and the ability to maintain the system while loads remain on line. All cards (except 12 Vdc) 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).

#### 1 ea. Alarm Card 2 ea. Control Cards **At least 3 Power Modules** 1 ea. Cage assembly part # 1A (19" cage) part # H (100 Vac) part # LL (100 Vac) part # P (100 Vac) A (120 Vac) **CC (120 Vac)** P (120 Vac) 2A (23" cage) F (230 Vac) **EE (230 Vac)** R (230 Vac) expansion rack **Options: 1 ea. X-fer switch** part # 1B (19" cage) part # G (100 Vac) 2B (23" cage) X (120 Vac) Z (230 Vac) ...integrates with rack A for accommodating additional power modules, up to total rating of 20KW. Additional X-fer switch includes alarms control cards and a larger X-fer switch may be required. and replaces the alarm card. Please call the factory for assistance.

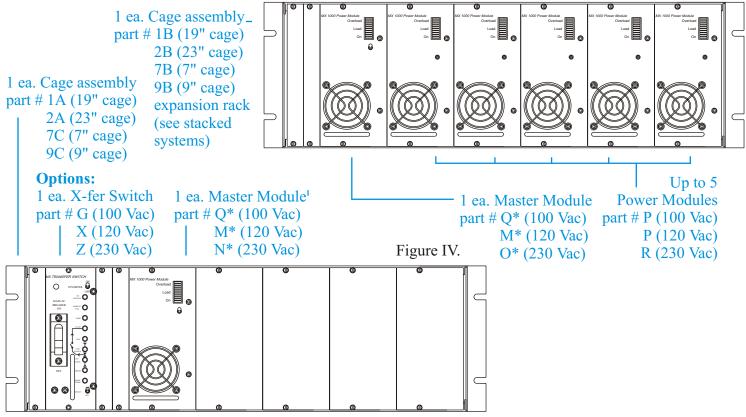
A redundant system consists of:

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**



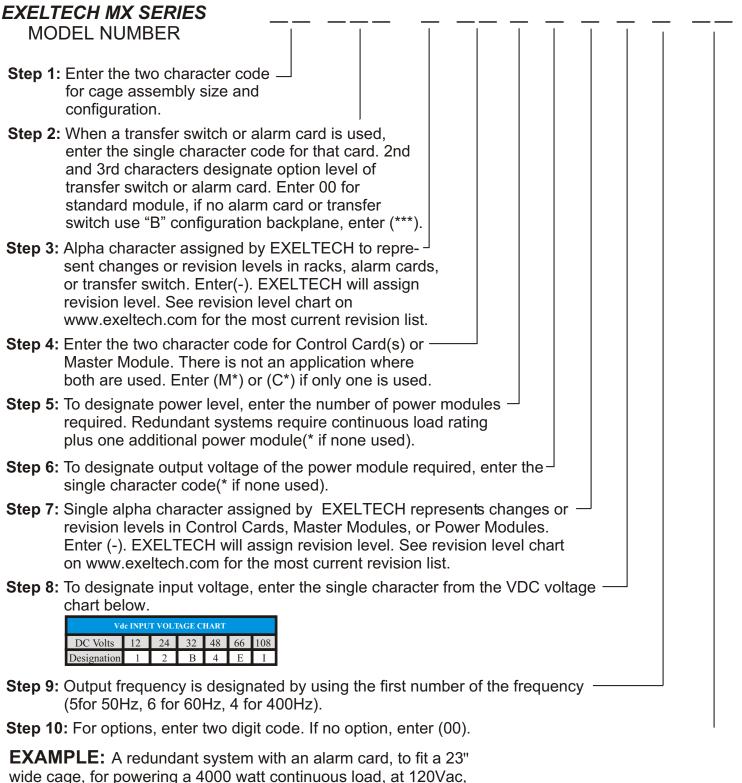
3.) Expandable inverter system: This configuration can be used as an independent inverter system (figure III), or to expand power levels of existing *MX* systems (see stacked systems). By using one master module, a system may be expanded to include a X-fer switch and additional power modules (see figure 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.



<sup>1</sup> Alarm card is not an option on this configuration

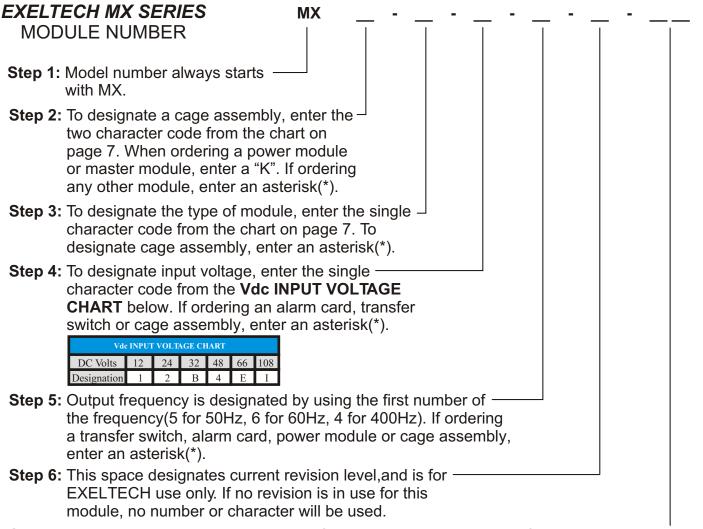
## **MX SERIES SYSTEM PART NUMBER**

Use the chart on page 7 to formulate the 15 digit model number.



60Hz with 48Vdc input would require the following model number... 2AA00ACC5P-4600

### **MX SERIES MODULE PART NUMBER**



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								
OVOTEMO	SYSTEMS REQUIRED CAGE ASSY SIZE AND CONFIG.		fer or Alar ER TCH	m Card ALARM CARD	Use CC CONTROL CARD		POWER MODULE	
		100Vac	G	Н	L* or LL	Q*	Р	AVAIL C- Current F- Future
		120Vac 230Vac	X Z	A F	C* or CC E* or EE	M* O*	P R	r-Future
Redundant Upgradable 19" Cage	1A		2 or 1	•••••••••••••••••••••••••••••••••••••		0	$\mathbf{R}$ up to 4 <sup>3</sup>	С
Redundant Upgradable 23" Cage	2A	0 0	or 1 <sup>1, 4</sup>	0 or 1 <sup>1, 4</sup>	0, 1, 2 <sup>5</sup>	0	up to 5 <sup>3</sup>	С
Expandable 19" Cage	1A	0 0	or 1	0	0	1	up to 3	С
Expandable 23" Cage	2A	0 0	or 1	0	0	1	up to 4	С
Expandable 7" Cage	7B	C	)	0	0	1	0 or 1	С
Expandable 9" Cage	9B	0		0	0	1	up to 2	С
Expandable 19" Cage	1B	C	)	0	0	1	up to 4	С
Expandable 23" Cage	2B	C	)	0	0	1	up to 5	С
Expandable 7" Cage	7C	0 0	or 1	0	0	1	0	С
Expandable 9" Cage	9C	0 0	or 1	0	0	1	0 or 1	F
Split Phase 19" Cage	1E	С	)	0	0	2	0 or 2	F
Split Phase 23" Cage	2E	C	)	0	0	2	0,2,4	F
Split Phase 7" Cage	7E	C	)	0	0	2	0	С
3 Phase 19" Cage	1F	C	)	0 or 1 <sup>2</sup>	0	3	0	F
3 Phase 23" Cage	2F	C	)	0 or 1 <sup>2</sup>	0	3	0 or 3	С
3 Phase 9" Cage	9F	C	)	0	0	3	0	С

<sup>1</sup>1 per phase <sup>2</sup>Alarm with a subset of functions (multi-phase option A13)

<sup>3</sup> System is not fully redundant with less than 3 power modules <sup>4</sup> Minimum 1 Alarm Card or 1 X-fer Switch required for redundant system

<sup>5</sup> Minimum 2 Control Cards for redundant system.

## **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
Under Voltage:	voltage, per input conditions. 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.					



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Manufacturer of UL Listed Products



Manufacturer of True Sine Wave Power Inverters and Related Products

# **XP SERIES POWER INVERTERS**





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 1100 WATTS
- 12VDC TO 108VDC INPUT
- RACK MOUNT OPTIONAL
- **REMOTE SWITCHING**
- 21.5 YEARS MTBF





Page 9

### **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
Step 3: To designate output voltage enter the single character
AC Volts 100 120 230* Designation 0 1 3 *Not available in 125watt models <b>Step 4:</b> 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.

Code
07
02*
04**
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

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

### **INPUT POWER**

MODEL VOLTAGE	MINIMUM <sup>1</sup> (TYPICAL)	SYSTEM (TYPICAL)	MAXIMUM <sup>1</sup> (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

<sup>1</sup> <sub>+/-</sub> 3%

### 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)	

### 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		

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#### **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
Warranty:	Full year parts labor



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### **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.



#### www.exeltech.com

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