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Do you have questions that aren't covered? Please contact us!

Answers Section:

Q1: What are the screw terminals on the back of my XP600 for?

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A: The screw terminals are marked GROUND, NEUTRAL, LINE, and REMOTE from left to right. The LINE, NEUTRAL, and GROUND terminals are used to hard-wire AC out of the inverter instead of or in conjunction with the AC plugs in the front. The REMOTE terminal is used to set up a remote on/off switch for the inverter. Simply connect a wire to the REMOTE terminal and through a switch to battery negative on XP inverters (positive on SI inverters). The remote switch is in parallel with the on/off switch on the front of the inverter, so the front on/off switch must be in the off position for the remote to work properly.

Q2: How do I hook up a remote turn-on switch for my XP250 / XP600 / XP1100 / MX series inverter?

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A: The REMOTE terminal is used to set up a remote on/off switch on XP series inverters and the RSW1 or RSW2 for MX Series inverters. Simply connect a wire to the REMOTE or RSW1 /2 terminal and through a switch to battery negative on XP inverters (positive on SI inverters). The remote switch is in parallel with the on/off switch on the front of the inverter, so the front on/off switch must be in the off position for the remote to work properly.

Q3: Can I sell power back to the utility company with my Exeltech inverter?

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A: Yes. Exeltech offers both on and off grid products.

Q4: What size of wire should I use to connect my Exeltech inverter to the battery?

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A: See wiring diagram in manual.

Q5: Can I run my Exeltech inverter on just a power supply with out a battery?

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A: No. The Exeltech line of inverters were designed to operate on a battery. You may use a small battery with a power supply or charger if necessary. In addition it is possible to operate an Exeltech inverter of a charger using a bank of capacitors. The charger should be twice the inverters capacity and the value of capacitance should be roughly 5 times the internal capacitance of the inverter, but it is not recommended.

Q6: Can I adjust the AC frequency of my Exeltech inverter?

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A: No. Exeltech inverters come in 50, 60, and 400Hz and are set at the factory. If you desire a different frequency, call Exeltech's support number for a custom built inverter.

Q7: How much current does my Exeltech inverter draw from my batteries?

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A: Take the output power of the inverter and divide by 0.85. This gives you the power input of the inverter. Now divide the power input by the voltage of the battery bank. This is the current in amps that the inverter draws from the battery.

$P_o / 0.85 = P_{in} \quad P_{in} / \text{BatV} = \text{Amps}$

Q8: My battery voltage varies quite a bit, will the AC output of my Exeltech inverter vary?

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A: No, Exeltech inverters have fantastic line and load regulation. The output of an Exeltech inverter varies approximately 0.1% when the DC voltage changes within the specified range.

Q9: Can I run my battery charger while my Exeltech inverter is running?

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A: Yes, as long as there is a battery in the system between the charge and the inverter, the inverter will operate fine.

Q10: Can I hook up two XP1100 inverters together to get 2200 Watts of power?

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A: No. XP inverters were not designed to sum their output power. The MX line of inverters were designed to sum their output power.

Q11: What are the DIP switches on the back of my MX inverter used for?

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A: At present, nothing. Eventually they will control an advanced power shut-back feature.

Q12: How do I connect my Exeltech inverter to a system with a positive ground?

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A: Connect Battery positive to inverter positive, connect battery negative to inverter negative (no difference).

Q13: Is my transfer switch in my MX inverter "Hot-swappable" like my power modules?

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A: No, the transfer switch cannot be removed while the inverter is in operation unless you have the optional Maintenance Bypass switch.

Q14: My Exeltech inverter seems to turn off and on every time I hook up my appliance-- what's wrong with it?

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1. Your battery bank may be low
2. The cables that connect the battery to the inverter may be too long or too small
3. There may be a bad connection on the battery or the inverter
4. The load may be too big for the inverter.

Q15: When I hooked up the Battery cables to my Exeltech inverter, the second cable sparked when I connected it--is my inverter broken?

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A: No, the spark charges input capacitors. The inverter will be fine if the polarity is correct.

Q16: I accidentally hooked up my Exeltech inverter backwards (positive to negative, negative to positive) and now it won't work. What should I do?

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A: Exeltech inverters are protected from reverse polarity by blowing fuses (except 48Vdc models). Call technical support.

Q17: I accidentally let my battery bank voltage sag to 10.5V (12V battery bank). My Exeltech

inverter was powering a load and now it doesn't work, what's the problem?

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A: The current at such a low voltage may have blown the fuses (except 48Vdc). Remove the front four screws and slide the inverter's heatsink out of the extruded case. The fuses are located near the back of the inverter's PC board, Order new fuses from Exeltech (special type). Should the inverter still fail to function after replacing the fuses, call technical support.

Q18: Does Exeltech make split-phase (bi-phase) MX inverter modules?

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A: Exeltech makes split-phase MX inverters, but we do not make split-phase power modules. Exeltech makes split-phase inverters by taking two inverters that are in phase and phase-shifting the output of one of the inverters 180 degrees. This provides 2 phases of power which are summed on a daughter board on the back of an MX inverter.

Q19: Can I use the same MX modules in my single-phase inverter with my split-phase inverter?

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A: Yes, power modules are the same throughout Exeltech inverters as long as they are the same input and output voltage. Master modules and control cards are not necessarily compatible between a single-phase inverter and a split-phase inverter. Please call technical support for specific cases.

Q20: What is the efficiency curve of my Exeltech inverter?

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A: See Exeltech Efficiency chart (under construction)

Q21: Can I operate my Exeltech inverter above 40C?

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A: Yes, the inverter is derated 20% of its full power for every 10C over 40C. That means you can get 80% at 50C and 60% at 60C etc... etc...

Q22: Grounding?

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A:

MX Series Grounding

The input and output of the inverter are isolated with a minimum of 1 500 Vac. While the isolation guarantees hazardous voltage from the input will not reach the output and conversely the inverter is designed to have both the input and output grounded. The inverter is compatible with negative or positive ground battery systems. The battery bank may actually be grounded at any intermediate voltage. The AC output, again while floating, is designed to have the neutral (white) wire connected to chassis (green) wire somewhere in the system. While the inverter can actually function with the battery and the output ungrounded it is not warranted in that configuration.

Explanation

In order for the inverter to function the AC output must be AC grounded to the DC input. This is accomplished internally by 2 capacitors One goes from the AC neutral (white) lead to

inverter chassis (green) lead. The other capacitor goes from the battery negative lead to inverter chassis. In this way AC current can flow from the AC neutral to battery negative via the inverter chassis. These are only small signal level currents and are not hazardous in any way but are necessary for the proper operation of the inverter. If the neutral (white) wire is not grounded, nothing will limit the voltage between the AC output line and chassis ground. If this potential exceeds 1000 V, the capacitor between ground and neutral may fail and hence the inverter will not function. A similar situation exists with the battery ground and chassis.

The AC neutral, Chassis and Battery should be grounded at the same point. That is a wire should be connected from those 3 points to the same grounding rod. The following set of illustrations show possible combinations. All the schemes except the last one attempt to eliminate the possibility of high currents flowing through the chassis of the inverter. The last scheme shows two separate grounding rods at different locations as may occur if the inverter is installed in a remote equipment shed. If a nearby lightning strike occurs In this situation there could be a great potential difference between the ground rods This would cause a high current to flow through the ground wires then the inverter chassis and finally to ground via the battery ground. This high current may cause a voltage to appear across the case of the inverter which would then cause parts of the inverter electronics to see two different ground potentials. If the ground potential difference is great enough it can damage integrated circuits within the inverter.

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Q23: What is LRA (Lock Rotor Amperage)?

A: When a motor is energized, the lock rotor amperage required to get the motor started is normally 6 to 8 times the normal running amperage, . . .
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Startup and running

This is when two tests are needed: voltage and current. Checking voltage drop is straightforward. Measure the voltage drop at the motor when starting. The NEC says that a motor should operate with "a reasonable efficiency" if the drop at the load is no more than 5%. The current checks on starting and while running, on the other hand, are more involved.

When starting, the current shouldn't be greater than the motor's high-end tolerance. Some reasons for high starting currents are overload, which is caused by changes in load or motor horsepower, and using high-efficiency motors, which usually have higher starting currents compared with medium-efficiency motors.

High starting current means stronger magnetic fields. Be sure your branch circuit components can withstand them. Older branch circuit components, such as the disconnect switch or circuit breaker, starter and fuse clips, might be damaged by the greater magnetic forces.

The highest currents occur when the motor is first actuated, the so-called locked rotor amperage. Calculate the locked rotor current by substituting into the following formula:

$$\text{LRA} = (1,000 \times \text{hp} \times K) / (1.732 \times V)$$

Where LRA = lock rotor amps

hp = motor horsepower
K = KVA/hp
V = motor voltage

Table 1 shows letters corresponding to different values of locked rotor KVA, one of which will be found on a motor's nameplate. For example, most medium efficiency motors use the letter G, which corresponds to 5.6 to 6.29 KVA/hp. If the motor in question is a 10-hp 3-ph unit operating at 480 volts, the starting current should fall within a range of:

$$\begin{aligned} \text{LRA} &= (1,000 \times 10 \times K) / (1.732 \times 480) \\ &= 12.03 \times K \\ &= 67 \text{ amps to } 76 \text{ amps} \end{aligned}$$

<http://www.plantservices.com/articles/2005/158.html>

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Q24: What is an UPS?

A: There are three basic design types of UPS for power backup, each offering more power protection than the proceeding. All are often presented as UPSs. If the manufacturers are honest, the design type is clearly marked as a Standby Backup System (SBS) or Uninterruptible Power Supply (UPS) on the product box or specification sheet.

The three design types are:

OFF-LINE Standby Backup System (SBS), the lowest grade.

LINE-INTERACTIVE Standby Backup System (SBS), the middle grade

ON-LINE Uninterruptible Power Supply, the highest grade (A True Uninterruptible Power Supply)

The Facts About OFF-LINE SBS

The Off-line SBS designs pass utility power directly through the unit during the time the utility power is present. During normal utility operation, this design offers no more protection than a surge protection plug strip. Only when utility power is lost does the off-line SBS switch to its internal DC-AC inverter to provide backup power. This means the Off-line SBS is only protecting against utility black-outs and very large voltage surges.

The Facts About LINE-INTERACTIVE SBS

The Line-interactive SBS is identical to the Off-line, with the addition of a tap switching automatic voltage regulator (AVR). While this design is operating from the utility line, the AVR senses the output voltage. In the event of a low voltage utility brown-out condition, the Line-interactive SBS AVR automatically switches in a transformer tap to increase or boost its output voltage. The AVR also reduces the output voltage during high utility voltage conditions. The output voltage regulation for most Line-interactive SBS products on the market today is typically $\pm 25\%$ to $\pm 8\%$. This means the Line-interactive SBS is only protecting against utility black-outs, voltage surges, brown-outs and high line conditions.

Sometimes Off-line and Line-interactive SBS products can create problems when used in conjunction with equipment that is sensitive to short line dropouts. A line dropout of 4-25

milliseconds is created by the SBS during its transfer from utility to battery mode, and again during the return from battery to utility power. Additionally, many off-line and line-interactive products have inverter outputs that are not true sinewave while running on battery. Manufacturers often refer to these types of output waveforms as square wave, modified square wave, or quasi-sine wave. These types of outputs may be incompatible with some equipment.

The Facts About ON-LINE UPSs

The On-line UPS protects against and solves the most number of power problems. With the on-line design, the incoming AC utility power is converted to a direct current (DC) that is easily cleaned by filtering out most unwanted AC power problems. The cleaned DC is fed to a continuous duty DC to AC inverter that regenerates a totally new, tightly regulated AC sinewave power, devoid of all incoming utility power problems. When the utility power is lost, the battery simply takes over as the power source, without any interruption at the UPS output.

Some models offer the additional option of providing international frequency conversion. In the United States, utilities generate AC power at 60 Hertz (Hz) or 60 cycles per second. In Europe and many other places throughout the world, utilities generate power at 50Hz. Some On-line UPS equipped with this feature can power equipment designed for the U.S. while operating from the differing international AC line frequencies. Since off-line and line-interactive SBSs pass the utility power directly through, they will not work in this application.

The On-line UPS has a wide input voltage range ($\pm 25\%$ typical) combined with a tightly regulated output voltage ($\pm 2\%$ typical). This makes the On-line UPS ideal for use in applications where power pollution could affect sensitive equipment. Because the On-line's inverter is designed to provide output power continuously, it may be connected to larger battery packs, extending the battery backup time to many hours. This is not the case with most off-line and line-interactive designs.

Exeltech On-line UPS such as the MX Series Inverter Charger provides protection against:

Utility black-outs

Higher level of surge protection

Low and high line conditions

Localized power pollution

Utility line noise and high speed transients

Equipment sensitivity to UPS transfer time (On-line UPS has zero transfer time)

Excellent output voltage regulation ($\pm 2\%$ typical)

Excellent output frequency regulation

Capability for long term extended battery operation (>4 hours possible)

Optional operation as a 50 or 60Hz frequency converter

Excellent operation with high inrush loads

Exeltech inverters and their type.

OFF_LINE

An MX System with transfer switch and a charger only large enough to replenish the battery after an outage. Any amount of back-up time can be supported The Primary select switch is in the Utility position.

A BBS system without the boost reduce option. Back-up times up to 8 hours can be supported.

LINE-INTERACTIVE

A BBS system with the boost reduce option.

ON-LINE

An MX System with transfer switch and sufficient charger capacity to cover the load plus charge the battery. The Primary select switch is in the Inverter position. Any amount of back-up time can be supported.

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