Thank You For Purchasing the BASIC POWER UNIT from the team!

120 Marshalls Creek Road
East Stroudsburg, PA 18302
570-872-9666

Manufactured in the USA

BASICPOWER™

"We Make Energy More Efficient"

Residential/Commercial/Industrial

IF YOU EXPERIENCE A PROBLEM WITH YOUR PURCHASE, PLEASE CALL YOUR DEALER. IN MOST CASES A SERVICE REPRESENATIVE CAN RESOLVE YOUR PROBLEM OVER THE PHONE.

KEY FEATURES YOU SHOULD KNOW:

- **kWh Reduction**
- **Power Factor Correction (PFC)**
- **Phase Balancing**
- **Reduced Total Harmonic Distortion (THD)**
- **Transient Voltage Surge Suppression (TVSS)**
- **Reduced Voltage Sag (Flicker) and Spikes**
- **Lightning Suppression**

OWNER'S MANUAL AND WARRANTY INFORMATION

THIS MANUAL CONTAINS IMPORTANT INFORMATION REGARDING SAFETY, OPERATION, MAINTENANCE AND STORAGE OF THIS PRODUCT. READ AND RETAIN FOR FUTURE REFERENCE

The Future in Lowering KWh = Less Electric Bills

TABLE OF CONTENTS

1. IMPORTANT SAFETY/WARRANTY INSTRUCTIONS……...3
2. INTRODUCTION…….. ……4
3. HOW YOUR “BASIC POWER” WORKS……...…4
4. INSTALLATION ……8
5. TEST PROCEDURE ……...9
6. PROTECTIVE FEATURES OF BasicPower Unit (“BPU™”).....10
7. TROUBLESHOOTING PROCEDURES…….……...11

6. TROUBLESHOOTING

The most common problem encountered is the building not being properly grounded. The BPU™ relies heavily on a proper ground. Using a clamp meter capable of measuring amps or Ohms, the ground wire in the panel you should see no more than 2 to 3 amps and 25 Ohms and active. Proper grounding specifications are generally listed below and grounding instructions accompany each BPU™. See Document Number 781022 for more detailed instructions. The grounding rod shall be 8ft. 5/8", copper clad, or other corrosion-resistant material.

The grounding conductor shall be sized according to the specification sheet that accompanies your BPU™.

The grounding conductor shall be as short as is practicable, be run in a straight line, and be protected where exposed to physical damage. If you are having any other issues with your unit, please call your Dealer.

BPU™ OFF TEST

Verify the BPU™ unit breaker is in the OFF position. If the breaker is not OFF, switch the BPU™ breaker into the OFF position.

Wait 30 seconds for the electrical system to stabilize while the BPU™ fully discharges before taking any measurements.

Observe the readings provided by the power analyzer and record the values for kWh, KW, amps, KVA, KVAR, ARMS (amps-rms), and PF. Again, if such a meter is not available a standard clamp meter can be used to monitor current and voltage.

BPU™ ON TEST

Switch the BPU™ unit breaker to the ON position. Wait 30 seconds for the electrical system to stabilize while the BPU™ is energized before taking any measurements.

Observe the readings provided by the power analyzer and record the values for kWh, Amps. KW, KVA, KVAR, and PF. Comparison of the values recorded with the unit OFF and with it ON should show a reduction in kWh, Amps, KW, KVA, KVAR, and an increase in PF. If these results are not confirmed, recheck all probes and ensure proper connection. Also, check that all loads have been turned on and running consistently throughout both tests and retest the location.

5. PROTECTIVE FEATURES OF BPU™

The improvements offered by the BPU™ unit directly provide a multitude of benefits, including:

- **Maximum reduction of typical system losses**
- **Improved electrical energy efficiency**
- **Reduced energy costs**
- **Reduced maintenance costs**
- **Increased system expandability**
- **Improved electrical reliability**

IMPORTANT SAFETY INSTRUCTIONS

It is required that a certified electrician perform all required operations which may involve working around live electrical system in your location.

All local and national codes for safety while working with electrical systems should be followed.

Read All Instructions Before Using The BPU™!

IMPORTANT WARRANTY INSTRUCTIONS

For the Warranty to apply, the BPU™ installation and monitoring procedures must be followed.

WARNINGS

Death, serious injury, or fire hazard could result from improper connection of this unit. Read and understand this manual and all installation procedures before connecting this unit. Follow all installation and operating instructions while using this unit.

CAUTIONS

Qualified personnel who work on or near exposed energized electrical conductors must follow applicable safety related work practices and procedures including appropriate personal protective equipment.

1. INTRODUCTION

Thank you for purchasing the BPU™. The BPU™ is a proven electronic device that intelligently employs the patented magnetic reactor technology to adaptively sense, critically assess, and simultaneously solve multiple power quality problems, while reducing customer site electrical consumption (kWh).

In the event the BPU™ is installed by a certified and licensed electrician in accordance with the Basic Power, Inc. installation procedures, the BPU™ warranty is five (5) years effective from date of installation

2. HOW YOUR "BASIC POWER" UNIT WORKS

The BPU™ employs a multifaceted approach to Power Quality, enabling levels of improvement which are otherwise not possible. When added to your existing electrical system, this BPU™ provides the following enhancements:

Reduced kWh
Reduce Demand
Lightning Suppression
Power Factor Correction if needed (PFC)
Phase Balancing
Reduced Total Harmonic Distortion (THD)
Transient Voltage Surge Suppression (TVSS)
Reduced Voltage Sag (Flicker) and Spikes

This comprehensive solution addresses some of the most problematic topics in Power Quality and is made possible through the unique design behind the BPU™. Featuring a state of the art electromagnetic reactor, the BPU™ constantly monitors, stores and distributes the proper amount of electricity to each load within the electrical system. This energy management system is complimented by the highest standard of active harmonic filtration and controlled capacitors providing significantly improved power factor correction. Additionally, the BPU™ features an advanced variable controller system which allows it to adjust to changing loads.

4. TEST PROCEDURE

Before starting any of the following tests, make sure that all equipment and electrical loads which represent typical energy consumption are turned on and running.

It is required that a certified and licensed electrician perform all required operations which may involve working around live electrical systems.

All local and national codes for safety while working with electrical systems shall be followed.

This procedure generally describes the method for testing any BPU™, however see Document Number180735 for the complete test plan. A Dranetz or equivalent power analyzer is required for any applicable Guarantee of performance.

To ensure proper testing of the BPU™, a Dranetz or equivalent power analyzer capable of measuring kilowatt hours (kWh), apparent power (KVA), real power (KW), reactive power (KVAR), amps, demand, and the power factor (PF) simultaneously is required. If such a meter is not available, a standard clamp meter can be used to monitor current and voltage.

For more thorough testing, the Dranetz or equivalent power analyzer should be used to measure the harmonics found in the given electrical system.

Locate the main electrical panel containing the breaker that is connected to the BPU™ to be tested.

Carefully remove the front cover of the electrical panel so all electrical wiring coming into the panel is accessible.

Locate the main electrical feed line coming into the panel. Using only voltage and current probes that are certified for the selected power meter/analyzer, connect the probes per the Dranetz Operating Manual.

Locate the breaker that has been installed exclusively for the BPU™.

2.6 TRANSIENT VOLTAGE SURGE SUPRESSION (TVSS)

Transients are brief over voltages or over currents, typically lasting just microseconds, caused by external and internal events. Lightning, power company grid switching, load switching by neighboring factories, and variable speed drives are a few of the causes of such power disturbances. Transient voltages range from just a few volts to over 20,000 volts, with surge currents in excess of 10,000 amps and can occur many times per day.

3. INSTALLATION

It is required that a certified electrician perform all required operations which may involve working around live electrical systems.

All local and national codes for safety while working with electrical systems shall be followed.

This procedures generally describes the method for installing any BPU™. Depending on whether you have Residential, Commercial or Industrial BPU™, see Document Numbers 180530, 180531, or 180532 and Document Numbers 180739, 180740, and 180741.

Find a suitable location near the electrical panel for mounting the BPU™ and secure it appropriately. All appropriate wire sizes and electrical conduit shall be used according to the specification sheet.

Install the appropriate breaker for the BPU™ into the electrical panel. Be sure the breaker is in the “OFF” position.

With the BPU™ connected to the panel with seal tight, you can now terminate the conductors. Green conductor is the ground conductor, white is the neutral conductor, the remaining conductors terminate on the breaker.

A properly functioning unit will have a "slight buzz” and, on Residential units, the LED will light up.

The buzzing is normal and will change depending on the power quality moving through the electromagnetic reactor.

2.1 LIGHTNING PROTECTION

Lightning can strike anywhere on earth - even the North and South Poles! In any U.S. geographical location, lightning storms occur as few as five times or as many as 100 times per year. High earth resistivity (the earth's resistance to conduct current) increases the potential of a lightning strike.

Each year, thousands of homes and other properties are damaged or destroyed by lightning. It accounts for millions of dollars in property damage annually in the United States. Of all of the violet forces of nature such as tornadoes, hurricanes and floods, lightning is the only one we can economically afford to protect ourselves against.

In electrical systems, almost 20% of transient voltages are generated from external sources such as lightning (direct or indirect). Transients caused by lightning can result in:

- ◊ Catastrophic equipment failure
- ◊ Immediate operation shutdown
- ◊ Long-term disruption of business
- ◊ Expensive repair and replacement costs
- ◊ Downtime, lost business and opportunities
- ◊ Burned out printed circuit boards
- ◊ Frequent failure of lamps and fluorescent ballasts
- ◊ Frequent motor rewinds
- ◊ Uninterruptible power supply failure

2.2 POWER FACTOR CORRECTION (PFC)

In a purely resistive alternating current (AC) circuit, voltage and current waveforms are considered to be in phase as they change polarity at the same instant during each cycle. When reactive loads are present, such as with capacitors or inductors, energy storage occurs within the loads resulting in a time difference between the current and voltage waveforms. This stored energy returns to the source and is not available to do work at the load. Thus, a circuit with a low power factor will have higher currents to transfer a given quantity of real power than a circuit with a high power factor.

Power factor correction is the process of adjusting the characteristics of electric loads in order to improve power factor so that it is closer to unity (1). Power factor correction may be applied to improve the stability, efficiency, and expandability of the transmission network, or correction may be installed to reduce the costs charged by the electricity supplier. A high power factor is necessary in a transmission system to reduce transmission losses and improve voltage regulation at the load.

2.3 PHASE BALANCING

In North American distribution systems, four-wire distribution feeders are made up of three-phase and single-phase sections sometimes with limited two-phase sections. Customers are supplied three-phase or single-phase either from the primary feeder or from a spur. As a consequence, the currents in the three-phase sections are never completely balanced and, in many cases, can be significantly out of balance. It is not uncommon to have as much as 50% difference in magnitude between the highest and lowest loaded phases. Moreover, the degree of imbalance varies along the length of each feeder.

Typically, balancing is accomplished by selecting the phase of the supply for each load so that the total load is distributed as evenly as possible between the phases for each section of feeder. While this may work for electrical systems that never change, this does not provide for typical situations where the loads may vary throughout the day or week. The BPU™ unit solves this problem using its proprietary electromagnetic reactor and energy management system to provide dynamic phase balancing. It accomplishes this by constantly monitoring the load on each phase and automatically adjusting itself to best match the current load conditions and rebalance the phases.

2.4 REDUCED TOTAL HARMONIC DISTORTION (THD)

Harmonic distortion is the change in the waveform of the supply voltage from the ideal sinusoidal waveform. It is caused by the interaction of distorting customer loads with the impedance of the supply network. Its major adverse effects are the heating of induction motors, transformers and capacitors and the overloading of neutrals. This is directly related to increased energy usage (waste), reduction in the life of equipment, and greater maintenance costs.

This presents a particular problem for the power companies, because they cannot compensate for the harmonic current by adding simple capacitors or inductors as they could for the reactive power drawn by a linear load. Many jurisdictions already require power factor correction for all power supplies above a certain power level.

Using its patented power factor correction and active filtration technology, the BPU™ mitigates harmonic distortion to below 5% (typically). This provides for reduced energy costs, improved efficiency as well as lower temperatures of connected machinery and equipment, increased lifespan of machinery and equipment, and reduced maintenance costs.

2.5 REDUCED VOLTAGE SAG (Flicker) and SPIKES

Voltage sags are caused by abrupt increases in loads such as short circuits or faults, motors starting, or electric heaters turning on, or they are caused by abrupt increases in source impedance, typically caused by a loose connection. Typically, voltage sags are brief in occurrence, lasting for short periods of time. Voltage spikes are almost always caused by an abrupt reduction in load on a circuit with a poor or damaged voltage regulator, although they can also be caused by a damaged or loose neutral connection.

Voltage sags can arrive from the utility; however, in most cases, the majority of sags are generated inside a building. For example, in residential wiring, the most common cause of voltage sags is the starting current drawn by refrigerator and air conditioning motors. Voltage sags are the most common power disturbance.

Different types of electric devices respond in different ways to an under-voltage condition. While voltages sags may not possess the same risks as voltage spikes, they provide for a multitude of potential chronic problems. The BPU™ unit utilizes its energy management system and controlled capacitors to virtually eliminate the voltage sag and spike condition from occurring in a given electrical system.