



Power Innovations
INTERNATIONAL, INC.

Application Note 5200

Need for Power Quality in Harsh and Rugged Environments - UPQ™ RX

Introduction

Military, emergency, government, and exploration assignments often dictate extreme locations and conditions in which equipment must operate. Newer communications, surveillance, guidance, medical, and other equipment is sensitive to poor power quality, while its use demands excellent power quality to operate accurately and efficiently.

Outdoor environments can be extreme, harsh, and demanding. These harsh environments vary in extremes of temperature and humidity, from the cold of the Arctic's to the heat and humidity of the tropics.

In addition to operating in harsh environmental conditions, it is also necessary to move or transport equipment in these rugged environments, causing stress and vibration.

Application Problem

Stress

Mobilizing military, emergency, or exploration equipment in remote locations and under extreme conditions can create stress or vibrations in the multiple "G" ranges. Gravitational forces are measured in multiples of normal (1G). Military pilots can experience gravitational forces of up to 6Gs in an airplane, and it is reported that a 14G force is deadly. The forces placed upon rugged equipment can be in excess of the 14G level.

Humidity

Because many of these extreme outdoor environments cannot be controlled, humidity can range anywhere from 0% to 100%.

Temperature

Severe hot and cold temperature differentials cannot be ignored. While the arctic reports 0 degrees F, the deserts of Saudi Arabia may be reporting +100 degrees F.

Contaminates

Equipment running in extreme environments can also become contaminated or even destroyed by dust, sand, insects, etc.

Solution

The Q-RX™ Series of Uninterruptible Power Quality™ (UPQ™) systems (available in 1,2, and 3 kVA) was particularly designed for rugged and harsh military and oil exploration requirements. Due to the unique specifications for such rugged environments, the Q-RX Series meets the most extreme shock, vibration, temperature, and humidity standards.

Rugged Environments

APPLICATION PROBLEM

Operate in harsh environmental conditions, including stress, humidity, temperature, and contaminates.

SOLUTION

The Q-RX™ system was designed for rugged and harsh military and oil exploration requirements.

ADVANTAGES

- MIL-STD-167 -- Vibration Standards
- MIL-STD 810E - Shock Standards
- MIL-STD 810 -- Thermal and Humidity Standards
- Local and Remote Management

Vibration and Shock Testing

MIL-STD-167 (Mechanical Vibrations for On-Ship Board Systems) – Q-RX systems meet or exceed this vibration standard from 4 to 50 Hz. The operational and non-operational vibration tests deliver up to 2g forces for two to four hours.

MIL-STD-810E (Environmental Test Methods and Engineering Guidelines) – Q-RX systems meet or exceed this shock standard. In each axis, multiple positive and negative shocks are induced up to 30g forces for levels ranging from 2g to 30g.

Thermal and Humidity Testing

MIL-STD-810 – Q-RX systems meet or exceed this environmental standard. The systems operate in freezing temperatures of -22° F (-30°C), sweltering temperatures up to 140° F (60° C), and even in condensing humidity.

Battery Removal

Because the systems can run without batteries, batteries can be removed easily under code 2 conditions.

Local and Remote Management

Because of the need for remote manageability within many of these harsh environments, rugged systems were designed to be monitored and controlled, either locally or remotely. The UPQnet-agent II™ uses Simple Network Management Protocol (SNMP) to communicate with the UPQ system. This universal protocol allows for Internet access to real-time power status and history reports. UPQnet-agent II provides the flexibility to monitor and control power from within a local network, remotely via an Internet connection or via direct dial up, and from handheld devices such as PDAs or cell phones.

Front Rack, Hot-Swappable Battery Replacement

A key feature of the UPQ-RX rack front loadable systems is the unique and innovative way battery maintenance and replacement is implemented. Battery modules can be exchanged, replaced, or added while the system is in full operation. No shutdown or removal of the unit is required.

Power Innovations

Launched in 1997, Power Innovations has pioneered a revolutionary set of solutions to generate, store, and manage AC power. Power Innovations' mission is to provide and manage continuous high-quality power in conjunction with, or even independent of, utility services worldwide. Power Innovations is helping forward-thinking companies accomplish this goal through a new class of technology called Uninterruptible Power Quality (UPQ).

Today, Power Innovations' UPQ systems, coupled with its UPQnet-agent II IP management tools, assist organizations of every size in addressing the key issues surrounding power management. On its own, this is an area of tremendous need and opportunity that has Power Innovations poised for long-term success.

Power management is just one arm of Power Innovations' long-term strategy. The company is involved in the development of a spectrum of solutions for power storage. Ultimately, Power Innovations will premier revolutionary solutions for the generation of new power. Together, these three areas are the foundation of Power Innovations' long-term strategy.

Powering Life

**Powering Miracles
Powering Peace of Mind
Powering Life's Connections
Powering the Human Spirit
Powering Freedom
Powering Innovation**



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