



Engineered products and services to increase the capacity, efficiency and reliability of electric power delivery systems.

**Power Donut Applications:**

- **Dynamic Line Ratings**
- **Check Metering for EMS Systems**
- **Load Monitoring for Load Management Systems**
- **Power Flow Monitoring for Automatic Sectionalizing Systems**

---

**Underground Systems Inc.**

[www.usi-power.com](http://www.usi-power.com)

84 Business Park Drive,  
Armonk, NY, 10504

Phone: 914-273-8727  
Fax: 914-273-6909  
Email: [info@usi-power.com](mailto:info@usi-power.com)

---

# Power Donut2<sup>(tm)</sup> The Instrumentation Platform For High Voltage Power Systems



**Substation Installation**

**Aerial Conductor Installation**



## Product Description

The Power Donut2 is a state of the art instrumentation platform designed for data acquisition and data logging applications on high voltage, over head conductor systems. The Power Donut2 is completely self contained: it is self powered, it measures current, voltage, MW, MVars, MWh, conductor temperatures, stores data on board, and it transmits data on demand using a radio modem.

## Installation

The Power Donut2 needs no supporting infrastructure. It attaches to the conductor by means of a hot stick and can be installed without taking an outage. Bushing assemblies match the Donut hub to the customer's conductor and are available for the entire range of transmission conductor sizes including bundled conductor configurations. The Donut<sup>TM</sup> is powered by magnetic flux coupling from the conductor and operates on all voltage level systems up to 500 kV.

## Information Technology

The Power Donut2's built-in frequency hopping spread spectrum radio is capable of transmitting data at up to 115 kbps and a distance of up to five miles. The Donut<sup>TM</sup> may be used in real time, Wide Area Management Systems, in SCADA and Energy Management Systems, and has on board flash memory for analog and event data logging. Users retrieve data from the Donut<sup>TM</sup> using the USi Ground Station2. Ground Stations can also be made portable for mounting in a van or helicopter.

## Power Donut 2 can be Adapted to Your Instrumentation Requirements

The Power Donut2 includes expansion I/O, expansion memory and has the on board computational power to implement custom applications.



# Power Donut2<sup>(tm)</sup>

## Instrumentation Platform Specifications

### Physical

Diameter: 12.6 inches — 32 cm.  
Width: 5.5 inches — 14 cm.  
Weight: 22 Lbs — 10 kg.  
Temperature Range: - 40 C to + 60 C operating  
Environmental: Corona free housing through 500 kV, Fully weatherproof  
Installation: Suitable for bundled conductor applications

### Power Supply

No external power supply is required, the Donut is powered from magnetic field. Minimum start up current — 50 amperes.

Battery Power: Runs on battery for 12 hours when line current is less than 50 amperes; Donut™ will shut down correctly on low battery status. Charging begins when the line current is above 120 amperes; total charge time is 6 hours

### Signal Inputs

Line Current, Phase (conductor) to ground Potential, conductor temperatures (2), internal unit temperature, battery voltage, power supply voltage, and spare analog inputs

Metering Inputs: +/- 0.5% of reading. (Voltage scale and current scale should be verified on site)

Temperature probe: 1 degree C accuracy, 0.1 degree C resolution

### Information Output

Power Donut2™ communicates using patented TDMA polling methodology

Amps and Volts: RMS values updated every second. I-V phase angle based on zero crossings is updated every second

Demand and Consumption: kW, kWhr, kVar, kVarh updated every 30 seconds

Analog Values: RMS values updated every second

Historical Data: Two (2) Megabyte of on board flash memory storage. Data logging parameters are configured by the user

### Radio Specifications

FCC approved, license free, 900 MHZ frequency hopping spread spectrum radio

Radio Range: Up to five miles — line of sight

Baud Rate: 115 kbps maximum

### Software

USi real time data acquisition and control software is available for local RTU/ground station operation. The software operates with Microsoft Windows<sup>®</sup> NT4, Windows 2000 and Windows XP operating systems on Pentium class processors.

USi supplies the RTU/ground station processor with an internal radio modem. Alternatively, the software can be supplied on a CD along with a radio modem for customer installation on a desktop PC.

### Options

A weather station is available for use with DLR applications



84 Business Park Drive, Suite 109, Armonk, NY, 10504  
Voice 914 273 8727 Fax: 914 273 6909