ATECNUM ®

Engineered products and services for increasing the capacity, efficiency, and reliability of overhead electric power delivery systems

Applications

- Dynamic Line Rating (DLR)
- Inclination and sag monitoring
- Composite core conductor high temperature monitoring
- Ice detection
- Power line protection
- Grid enhancement technology (GETs)
- Smart Grid
- Real-time ratings
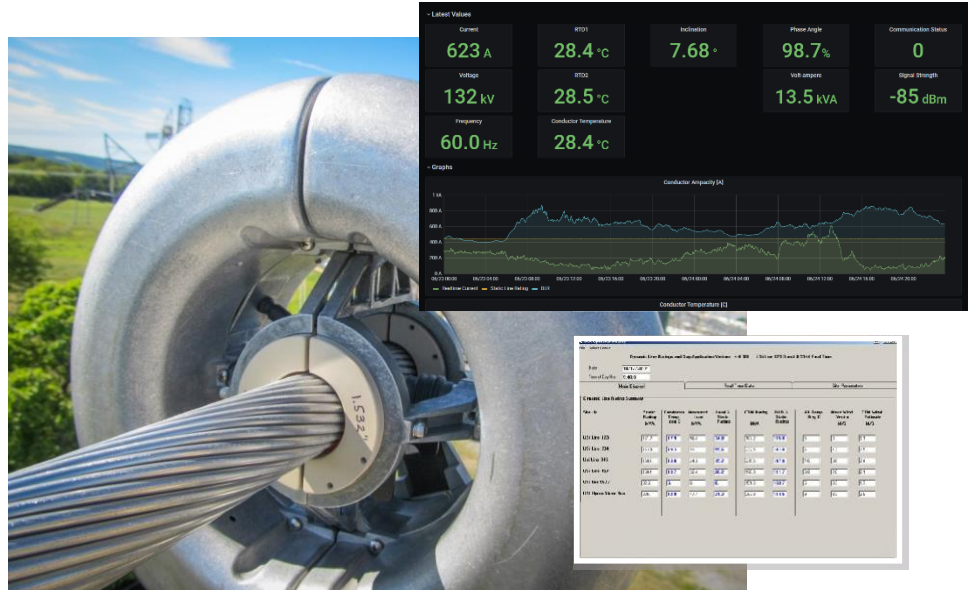
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Note: All product, product specifications and data are subject to change without notice.

PowerDonut ®
PD4 Instrumentation Platform
for overhead transmission lines

Product description

The PD4 Instrumentation Platform ("PowerDonut® 4th generation") can be applied to a variety of state-of-the-art data acquisition, data logging, and alarm monitoring applications for overhead transmission lines. As with the previous generations of the PowerDonut® Line Monitor, the latest generation is completely self- contained and self-powered. It enables voltage and current event capture, and measures RMS current, RMS voltage, MW, MVars, conductor temperature, and conductor sag. PowerDonut® 4 stores 30-cycle voltage, current, and fault current waveform data on board, and transmits data on demand using LTE-M/NB-IoT wireless data service or by a built-in 2.4 GHz radio transceiver.

Installation

The PD4 Instrumentation Platform requires no supporting infrastructure; it can be installed onto a live conductor using a hot stick without taking an outage. A fitted hub assembly attaches the PD4 to your conductor; hubs are available for the entire range of transmission conductor sizes, including bundled conductors, PD4 is powered by magnetic flux coupling from the conductor, operating on all voltage levels up to 765 kV. A high-temperature version enables application on high temperature-capable composite conductors up a maximum operating temperature of 250°C.

Information technology

The built-in wireless data module establishes secure communications with a designated server using TCP/IP over the internet. PD4 may be used in real-time Wide Area Management Systems, and SCADA and Energy Management Systems. It has on-board flash memory for synchronous event data logging. A 2.4 GHz radio transceiver provides an alternate means of communication and enhances security and reliability by providing a backup data channel.

ATECNUM®

Physical

Diameter	12.6 inches (32.0 cm).
Width	5.5 inches (14.0 cm).
weight	19.0 pounds (8.6 kg).
Operating temperature	Range: -40°F to +140°F, -40°C to +60°C (ambient).
Installation	Fully weatherproof. Corona-free operation through 765 kV rated voltage. Energized (hot stick) or de-energized. Suitable for bundled conductor applications.

Power Supply

Powered from conductor magnetic field and a rechargeable internal lithium-ion battery pack. No external power supply is required. Nominal current required to operate is 50 A at 60 Hz.

Battery operation — Runs on battery for 4 hours (programmable) when not operated by line current. Will initiate an orderly shutdown on low battery. Battery charges when the line current is above 60 A. Typical charge time is 10 hours.

Measurements

Conductor current (RMS), phase-to-ground voltage (RMS), conductor temperature, conductor inclination angle.

Conductor current	+/- 0.5% of reading. One reading per second. Measures up to 3000 A.
Conductor voltage	Up to 765 kV rated voltage +/- 2.5%.
Conductor temperature	+/- 1°C accuracy. 0.25°C resolution. One reading per minute. Standard temperature range: -40°C to +170°C. Extended range: -40°C to +250°C.
Inclination angle	+/- 0.05 degrees accuracy. 0.02 degrees resolution. One reading per minute. +/- 11° measurement range (able to be offset).

Communications

Built-in IoT cellular telephone and 2.4 GHz radio are installed, standard.

Cellular telephone	LTE Cat-M1 and NB-IoT.
2.4 GHz radio	10 to 100 mW (configurable) XBEE radio.

Diagnostic software

PDS20. Windows-based software providing comprehensive diagnostics and the ability to configure all communications inputs.

PowerDonut server

Windows-based data management system for handling data and managing communications.

Dynamic Line Ratings

Software module for computing real-time ampacity. Includes IEEE Standard 738 weather model and proprietary conductor temperature model, as well as icing, sag and tension calculations.

Weather Station

Solar powered weather stations measures wind speed, wind direction, solar radiation, ambient temperature, humidity and rainfall. Communicates directly with Atecnum server software (PDS20).

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Released: January 2023

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