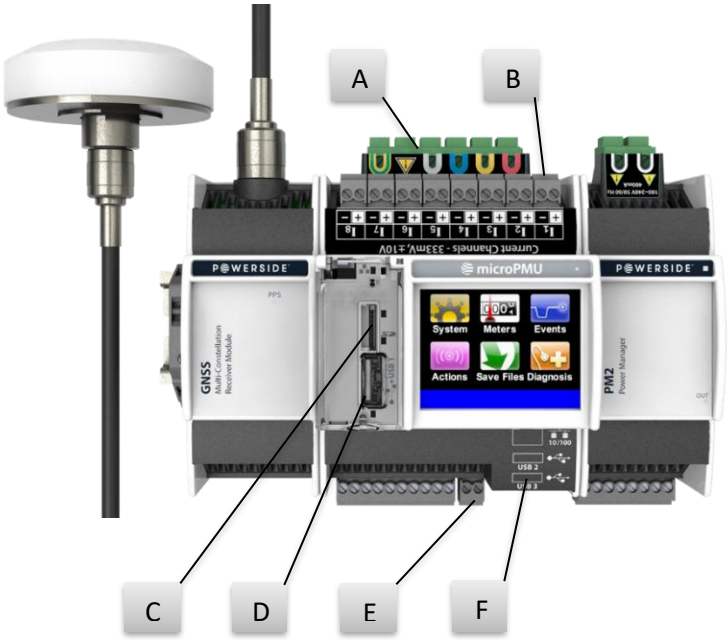
Data Sheet

microPMU and microPMU LV

Ultra-precise Synchrophasor



Overview

The microPMU provides very accurate time-synchronized phasor measurements for distribution grids, DER, and microgrids. The microPMU is ideal for projects studying real-time grid stability and dynamic power flows. It enables high-milli-degree phase-angle monitoring accuracy. The microPMU streams data utilizing the IEEE C37.118.2-2011 communication protocol.

The microPMU LV option offers a versatile voltage input that enables interfacing with traditional voltage transformers or sensors with low-voltage outputs.

Features

- High-resolution measurement system with milli-degree phase angle accuracy and 0.01% total vector error (TVE) phasor measurements for distribution grid applications
- Simultaneous recording and streaming of real-time synchrophasor data up to 120 frames/sec
- Compliant with IEEE C37.118.2-2011 standards for synchrophasors
- Compatible with OpenPDC and PingThings® Predictive Grid cloud platform

Reference Table	
A	Voltage Mains Connectors
B	Current Channels Connectors
C	microSD Connector (max 32 GB; microSD not included)
D	USB Thumbdrive Connector
E	Instrument Power Connector
F	Ethernet Port

Specifications

VOLTAGE	
Connections	L1, L2, L3, N
Voltage Measurement Range microPMU	0 to 750 Vac L-E
Voltage Measurement Range microPMU-LV	0 to 28 Vac L-E
Voltage Measurement Channels	Line-to-Earth
Frequency Range	Nominal 50 Hz, 60 Hz
Sampling Rate	25,600 samples/s at 50 Hz and 30,720 samples/s at 60 Hz
Isolation	Up to 5100 Vac isolation to Earth, UL/IEC 61010 tested
Total Vector Error (TVE)	Typical TVE: ±0.01% Typical short-term TVE stability for differential measurements: ±0.002%
Amplitude Resolution	0.0002% FS (2 PPM)
Amplitude Accuracy microPMU (±% rdg ±% FS)	±0.050% (10 Vac to 750 Vac L-E) Typical: ±0.010% (120 Vac to 600 Vac L-E)
Amplitude Accuracy microPMU-LV (±% rdg ±% FS)	±0.050% Typical: ±0.010% (1.5 Vac to 28 Vac L-E)
Angle Resolution	0.001° (noise floor - useful for short-term difference measurements)
Angle Accuracy (±% FS)	±0.010° (Standard deviation) Typical: ±0.003°

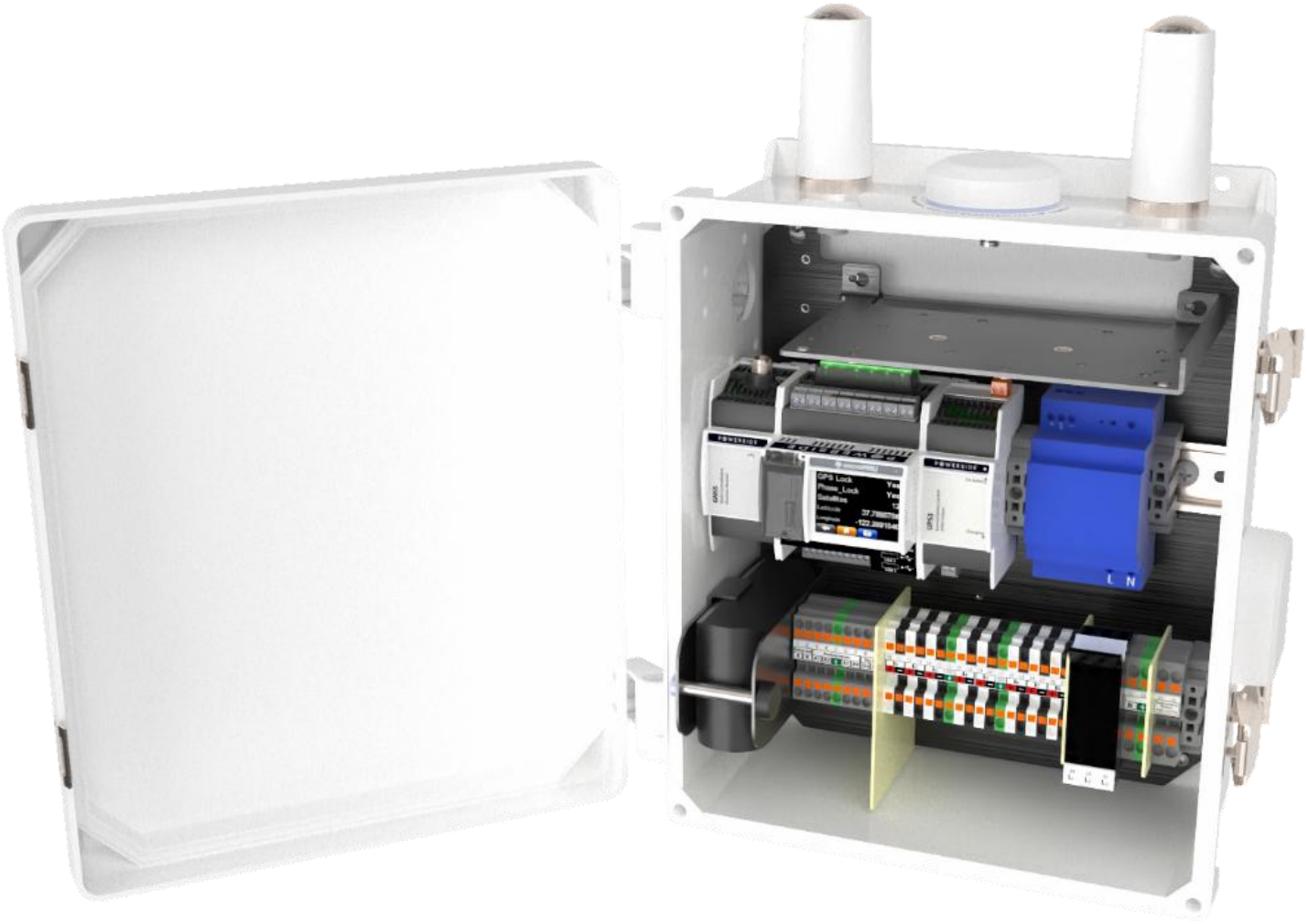
CURRENT	
Measurement Channels	8 inputs, differential Low Range: 0.333 Vrms; High Range: 10 Vpk Impedance: 33.3 kΩ Note: 3-phase current channels streamed via IEEE C37.118.2-2011 Communication Protocol
Current Range	0 to 6000 A with split-core CTs
Angle Accuracy (±% FS)	±0.040° (Standard deviation) Typical: ±0.025°
Magnitude Accuracy (±% FS)	±0.050° (Standard deviation) Typical: ±0.010° (At 50/60 Hz, 2.5% FS to 120% FS)
Sampling Rate	25,600 samples/s at 50 Hz and 30,720 samples/s at 60 Hz

MEASURED PARAMETERS	
Watts (Power)	The sum of per-phase active fundamental power
Volt-Amps (Apparent Power)	The sum of the per-phase product of RMS voltage and current, taken over the measurement interval
Power Factor	Fundamental power factor ratio of Watts to Volt-Amps
Vars (Volt-Amps Reactive)	Fundamental Vars

MODES OF OPERATION	
High Accuracy Mode	Streaming, according to IEEE C37.118.2-2011, no recording Parameters streamed: 3 voltage and 3 current phasor angle and magnitude, frequency, ROCOF Parameters recorded: active/reactive power, power factor Latency: 5 sec typical
Low Latency Mode	Streaming, according to IEEE C37.118.2-2011, no recording Parameters streamed: 4 voltage and 4 current phasors, frequency, 4 analog channels Latency: 50 msec typical

TECHNICAL SPECIFICATIONS	
Dimensions (L x W x H)	4.33 X 2.89 X 3.08 in (11.0 X 7.34 X 7.82 cm), 35 mm DIN rail mountable
Operating Environment	Temp: -4 to +149°F (-20 to +65°C), +131°F (+55°C) with PM2 AUX load Humidity: 5 - 95% RH (inside use) Altitude: <2000 m above sea level
Power Supply	AC: 24 Vac ±10% at 50/60/400 Hz, 1.5 A max DC: ±24 to 48 Vdc ±10% (polarity independent), 1 A max Optional PM1 and PM2 modules: 100 to 240 Vac 50/60 Hz and 120 to 370 Vdc Power over Ethernet (PoE) compatible
Internal Memory	32 GB, up to 30 days of synchrophasor data
Communication	Ethernet port RJ-45, 10/100
Communication Protocols	FTP or HTTP (secure FTPS and HTTPS), IEEE C37.118.2-2011
Dimensions (L x W x H)	4.33 X 2.89 X 3.08 in (11.0 X 7.34 X 7.82 cm)
Mounting	DIN Rail (35 mm)

microPMU Outputs	
Streaming	IEEE C37.118.2-2011 via UDP and TCP
Reporting Rate	10, 12, 15, 20, 30, 60, or 120 frames per second configurable
HTTP / HTTPS	Maintenance and configuration of webpage access via HTTP / HTTPS
FTP	Data Extraction (only available in High Accuracy mode)



Order Information

microPMU	
Product Name	**Part Number**
microPMU-Rugged	microPMU-Rugged-M24-GNSS-A01
microPMU-LV-Rugged	microPMU-LV-Rugged-M24-GNSS-A01

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