

# microPMU & LV



## Overview

The microPMU is needed for assessment of dynamic power flows or identify complex impedances in distribution grids and microgrids. The microPMU is ideal for projects that need millidegree angle accuracy for synchrophasor measurements. The microPMU can also be used for real-time control applications using the IEEE C37.118.2-2011 communication protocol.

The microPMU-LV option offers an interface to low voltage signals (typically output signals from digital sensors), as opposed to connecting directly to the distribution grid mains voltage.

## Applications

- Stability of microgrids or distribution grids, or power generation systems
- Event identification and characterization
- Topology change detection (open/closed state of switches)
- Detection of cyber-attacks rehearsals at substations

## Features

- Easy installation (can be installed in electrical panels, on distribution poles, pad mount transformers..)
- Supports connections via PTs and CTs
- Ultra-accurate phasor measurements: TVE 0.01%
- Simultaneous recording and streaming of synchrophasors
- Compliant with IEEE C37.118.1-2011 and C37.118.2-2011
- Fully compatible with OpenPDC, and with Powerside microPMU plotting application software
- 30 days of micro-synchrophasor measurement stored in internal memory

## SPECIFICATIONS

MAINS VOLTAGE INPUT CHANNELS	
Connection	L1, L2, L3, N PQube 3 screw terminals (max torque 5 inch-pounds (0,6Nm))
Voltage Measurement Rang microPMU	0 to 750Vac L-E
Voltage Measurement Range microPMU -LV	0 to 28Vac L-E
Voltage Measurement Channels	Line-to-Earth, Neutral-to-Earth
Mains Configuration	3-phase delta, 3-phase wye/star, single-phase
Frequency Range	Nominal 50 Hz, 60 Hz
Sampling Rate	25,600 samples/s @ 50Hz and 30,720 samples/s @ 60Hz
Isolation	PQube 3 tested up to 5100VAC isolation to Earth UL/IEC 61010 tested, approval pending
TVE (Total Vector Error)	Typical TVE   $\pm 0,01\%$ Typical short-term TVE stability for differential measurements: $\pm 0.002\%$
Amplitude Resolution	0,0002%FS (2 PPM)
Amplitude Accuracy microPMU ( $\pm\%$ rdg $\pm\%$ FS)	$\pm 0,050\%$ (10Vac ~ 750Vac L-E). Typical : $\pm 0,010\%$ (120Vac ~ 600Vac L-E)
Amplitude Accuracy microPMU-LV ( $\pm\%$ rdg $\pm\%$ FS)	$\pm 0,050\%$ , Typical : $\pm 0,010\%$ (1.5Vac to 28Vac L-E)
Angle Resolution	0.001°   (noise floor - useful for short-term difference measurements)
Angle Accuracy ( $\pm\%$ rdg $\pm\%$ FS)	$\pm 0,010^\circ$ 1 Standard Deviation Typical : $\pm 0,003^\circ$
CURRENT INPUT CHANNELS	
Measurement Channels	8 inputs . differential voltage inputs (range 0.333Vrms or 10Vpk, input impedance 33.3 k $\Omega$ , crest factor 3.5 ) Note: 3 phase current channels streamed via IEEE C37.118-2 communication protocol
Current Range	0~6000A with split-core CT's (call us for ranges >6000A)
Sampling Rate	25,600 samples/s @ 50Hz and 30,720 samples/s @ 60Hz
Wire Connection	Screw terminal (Max torque 2 inch-pounds (0,25Nm)). Min. 28AWG (0,8 mm <sup>2</sup> ), Max. 16AWG (1,31mm <sup>2</sup> ). 600V UL- recognized insulation required
MEASURED PARAMETERS	
Watts (Power)	Sum of per-phase active fundamental power
Volt-Amps (Apparent Power)	Sum of per-phase product of RMS voltage and RMS current, taken over the measurement interval
Power Factor	Fundamental power factor-ratio of Watts to Volt-Amps
Vars (Volt-Amps Reactive)	Fundamental VARs

**Part Number:** microPMU-DINRail-000-000-XXXX  
**Part Number:** microPMU-LV-DINRail-000-000-XXXX

MODES OF OPERATION	
ULTRA PRECISE MODE	Recordings to Internal Memory Streaming according to C37.118.2-2011 (both simultaneously)
	Parameters Streamed: 3 voltage and 3 current phasor angle and magnitude, frequency, ROCOF Parameters Recorded only: Active / reactive powers, power factor
LOW LATENCY MODE	Using P-Filter* (streaming IEEE C37.118.2 only) Using M-Filter* (streaming IEEE C37.118.2 only) Latency: 50 ms typical
	Parameters Streamed: 4 voltage and 8 current phasors, frequency, 4 analog channels
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., hum., alt.)	-20 to 65 °C (55 °C with PM2 AUX load), 5 to 95% RH <2000 m above sea level (for EMC immunity, overvoltage, and other conditions, see full specs)
Power Supply	AC: 24 Vac ±10% at 50/60/400 Hz, 1.5A max PM1 and PM2 modules supply microPMU compatible power at 100 to 240 Vac 50/60 Hz, and 120 to 370 Vdc) DC: ±24 to 48 Vdc ±10% (polarity independent), 1A max. Power over Ethernet (PoE) compatible
Internal Memory	32 GB up to 30 days of synchrophasor data
Clock Synchronization	GPS receiver and antenna provided with the microPMU
Communication	Ethernet port RJ-45, 10/100 (optional wireless and cell modem)
Communication Protocols	FTP or HTTP (secure FTPS and HTTPS), IEEE C37.118-2.2011

### Contact us

info@powerside.com  
powerside.com



**Canada**  
7850 Trans-Canada Highway  
Saint-Laurent (QC) H4T 1A5  
1 (877) 333-8392

**United States**  
980 Atlantic Ave  
Alameda (CA) 94501  
1 (888) 736-4347