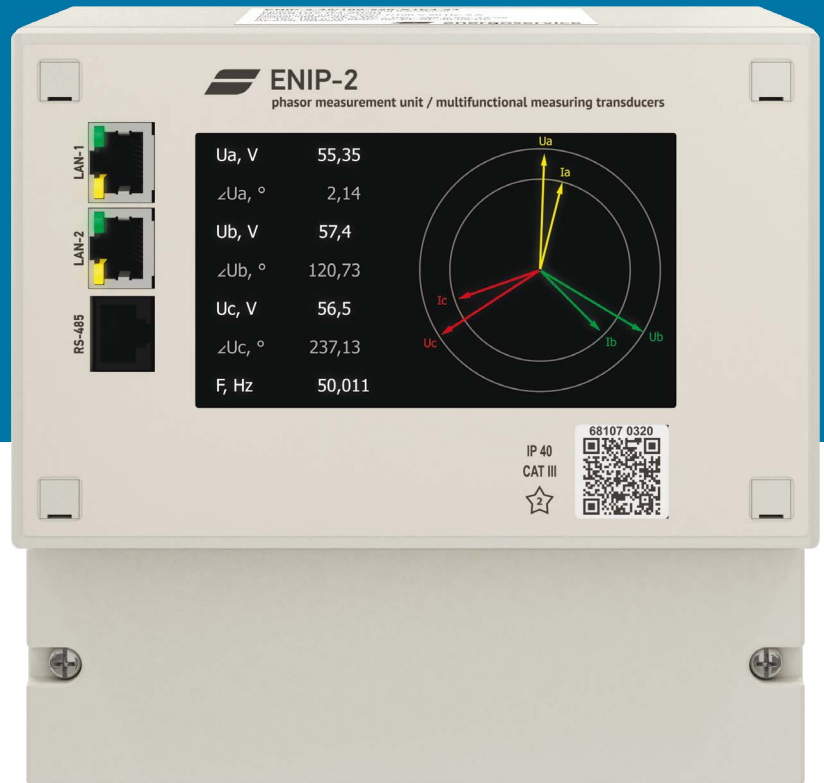


# ENIP-2

phasor measurement unit



ENIP-2 phasor measurement unit (PMU) integrates into Wide Area Measurement Systems (WAMS) used for detection and prevention of instabilities in power grid networks as well as for power grid monitoring.

ENIP-2 PMU measures first harmonic voltage and current at a high rate assigning a precise timestamp to each measurement, known as the synchrophasor. Time synchronization, which is critical for PMUs, is provided by the global positioning systems.

ENIP-2 PMU uses a built-in GPS receiver, or is synchronized by an external ENCS-2 module via IEEE 1588v2 PTP over Ethernet or IRIG-A/IRIG-B timing signals over RS-485.

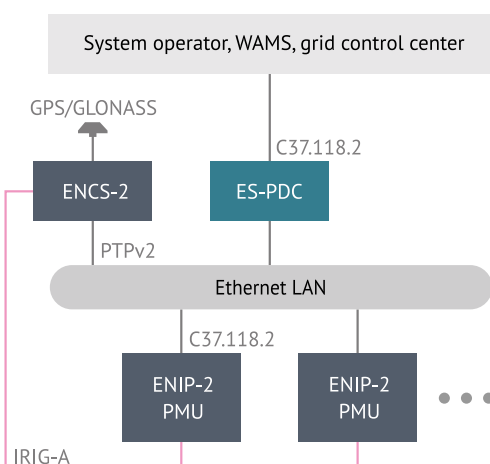
ENIP-2 PMU is designed to comply with both IEEE C37.118.1 classes P (Protection) and M (Measurement). The original signal processing algorithms rule out the influence of electromagnetic transients and higher harmonics on the accuracy of measurements.

An implementation of ENIP-2 PMU with IEC 61850-9-2 sampled values input is available for digital substations.

ENIP-2 PMU is equipped with a color touch-screen display. Typically, ENIP-2 PMU is mounted in special cabinets, along with other components of WAMS, and is suitable for panel mounting as well.

ENIP-2 PMUs transmit phasor data to ES-PDC phasor data concentrator. ES-PDC uses timestamps to aggregate incoming data streams from different stations into one or more aggregated streams which it transmits to the control center of the system operator.

Please visit PMU Live! web page to see real-time data coming from geographically distributed ENIP-2 PMUs.



## Specifications

Synchrophasor measurement	nominal frequency 50/60 Hz (operating range 45-55/55-65 Hz), measurement complies with C37.118.1 (class P and M): TVE < 1%, FE ≤ 0.001 Hz, RFE ≤ 0.1 Hz/sec, reporting rate – 1/2/5/10/25/50/100
Measurements	rated current: 1 or 5 A, rated voltage: 57.7 (100), 230 (400) V, 400 (690) V; U: ±0.2 % (input range: 20–150 %); I: ±0.2 % (input range: 1–200 %); P, Q, S: ±0.5 %; f: ±1 mHz
Time sync	IEEE 1588v2 PTP, RS-485 (IRIG-A/B) or built-in GPS/GLONASS-receiver; accuracy: 1 µs with time sync (error less than 0.4 s per day without sync)
Interfaces and protocols	1 × RS-485: IRIG-A/IRIG-B 1 or 2 × 100Base-TX: C37.118.2, IEC 60870-5-104, IEC 60870-5-101 (UDP), Modbus TCP, Modbus RTU (UDP)
Digital inputs/outputs	5 (dry contact, 24 V DC); 3 digital outputs (U <sub>max</sub> 300 VDC/250 VAC, I <sub>max</sub> 100 mA) – only for ENIP-2-0
Options	4,3" TFT color touch screen display, 480 × 272; built-in GPS/GLONASS-receiver; 8 GB storage
Power supply	18...36 VDC or 120...370 V DC / 100...265 VAC (45...55 Hz), 13 VA
Operating conditions and design	from –40 to +70 °C or from –20 to +70°C if equipped with TFT display / 160 × 165 × 83 mm, IP40

## Certification

Conformance to 2006/95/EC (LVD) and 2004/108/EC (EMC)

Conformance to the requirements of System Operator of the United Power System for the PMUs

## Ordering Information

ENIP-2---

### The type of input the measured signals

**4**  $I_{rated}/U_{rated}$  – analog inputs

$I_{rated}$ :

**1** – 1 A

**5** – 5 A

$U_{rated}$ :

**100** – 57.7 (100) V

**400** – 230 (400) V

**0** – IEC 61850-9-2LE

### Interfaces and options

**A1E4-03** – 1 × RS-485, 1 × 100Base-TX, 5 digital inputs  
(3 digital outputs only for ENIP-2-0)

**A1E4-13** – ... + TFT color touch screen display

**A1E4-23** – ... + built-in GPS/GLONASS-receiver

**A1E4-13-PTP** – 1 × RS-485, 2 × 100Base-TX, IEEE 1588v2 PTP,  
TFT color touch screen display, 5 digital inputs

### Power supply voltage

**220** – 120...370 VDC or 100...265 VAC (45...55 Hz)

**24** – 18...36 VDC

## Options and accessories

Outdoor GPS antenna: [GPS-P](#), [GPS-ET](#)

Mounting brackets for GPS antenna: [GPS-KP-LITE](#), [GPS-KP-MINI](#), [GPS-KP](#)

Surge protection devices for Ethernet: [ESP-LAN](#)

Additional 8 GB memory for registration and storage of measured parameters and waveform archives: [SD8G.pmu](#)



enip2.com



PMU Live!

