

Nexus 1500+

Revenue metering, 50 MHz transients and synchrophasors



Self-calibrating architecture, 0.06 % energy accuracy and IEC 61000-4-30 class A edition 3 measurements

Nexus 1500+

Power quality meter with phasor measurement unit

amperis

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A revenue meter that recalibrates itself every ten seconds and keeps 0.06 % energy accuracy across the range.

Product overview



Colour touchscreen on the meter front



Voltage and current terminals at the rear

Constant calibration

A separate calibration circuit measures the incoming signal every ten seconds, which keeps the metrology stable over time and temperature. Readings exceed the ANSI C12.20 0.1 class and IEC 62053-22 0.2S standards, with an energy class accuracy of 0.06 % and typical shipping accuracy of 0.02 %. Two test pulses on the front allow accuracy to be verified quickly, and the real-time clock drifts less than ten seconds per month.

Advanced revenue metering

- Full four-quadrant metering with virtually unlimited historical trending.
- Transformer and line loss compensation for iron, copper and total substation losses, plus CT/PT compensation.
- Load aggregation through pulse inputs, including gas and water commodities.
- Coincidental readings, such as power factor or reactive power at the time of peak demand.
- Perpetual time-of-use calendar and test mode that does not disturb load profiling or demand recording.

Where it fits

- Substation automation, grid monitoring and distribution reliability measurement.
- Co-generation plants and independent power producers.
- Critical loads where a small error turns into a large cost.



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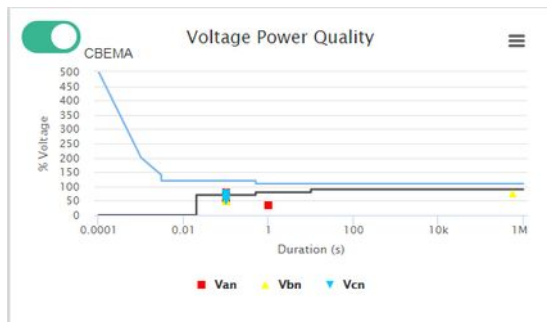
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Certified class A power quality measurement, with reports that can be adapted to each jurisdiction.

Power quality analysis



Harmonic and interharmonic spectrum



Voltage events plotted on the CBEMA curve

IEC 61000-4-30 class A edition 3

Harmonics, flicker, unbalance, transients, frequency changes, sags, swells and outages are measured to the class A specification, and the meter is classified as a PQI-A device under IEC 62586-2. EN 50160 reports are generated automatically and can be customised to meet local requirements.

Harmonics and flicker

- Harmonic and interharmonic analysis to IEC 61000-4-7 class A, with magnitudes to the 511th order.
- Real-time magnitudes and phase angles resolved to the 127th order; THD, TDD and K factor.
- Flicker meter to IEC 61000-4-15 class A on 220 V / 50 Hz and 120 V / 60 Hz systems.

Event plotting and control

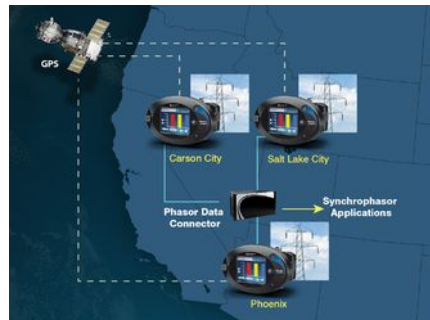
- Independent ITIC/CBEMA log with a summary of surges, sags and average duration, plus SEMI F47 graphing.
- Multi-level programming logic for setpoints: capacitor control, load shedding, automatic transfer schemes and transformer control.
- Alarm notification by email or by internal relay trip.

A 50 MHz transient recorder, 16-bit waveform capture and an on-board phasor measurement unit.

Recording and synchrophasors



Multi-channel waveform and fault record



Synchrophasors sent to a phasor data concentrator

Waveform and fault recorder

- Up to 1024 samples per cycle at 16-bit resolution, on voltage and current, with pre- and post-event analysis.
- Transient capture at over 800 000 samples per cycle, that is, 50 MHz sampling speed, with the V3 and V6 keys.
- Fault recording to eight times full scale, with hardware and software triggers.
- Directional disturbance analysis and harmonic direction analysis.
- Records exported in COMTRADE and PQDIF formats for third-party analysis software.

Phasor measurement unit

- Synchrophasor output to IEEE C37.118.1-2011 and .1a-2014, supporting P and M classes.
- Time synchronisation by IRIG-B or IEEE 1588 PTPv2.
- Individual voltage and current phasors, symmetrical components, frequency and rate of change of frequency.
- Data frame rates of 10, 25 and 50 per second at 50 Hz, and 10 to 60 per second at 60 Hz.
- Data sent to a phasor data concentrator for wide-area situational awareness and islanding detection.

Six simultaneous communication ports, dual Ethernet with separate addresses and encryption that protects the metering data.

Communication, security and I/O



External input and output modules



Real-time readings on the touchscreen

Six ports at the same time

- Two optional RS485 ports with Modbus and DNP3 level 2 plus.
- USB port and ANSI optical port on the front panel.
- Two Ethernet ports with separate MAC and IP addresses; one of them available with fibre optic or RJ45 media.
- Up to 32 Modbus TCP/IP sockets per Ethernet port, DNP3, IEC 61850 with GOOSE messaging, SNMP, SMTP email on alarm, FTP and SNTP or IEEE 1588 PTPv2 time synchronisation.

DNP3 level 2 plus

- Up to 136 measurements mapped to static points: 64 binary inputs, 8 binary counters and 64 analogue inputs.
- Up to 16 relays and 8 resets controlled through DNP3.
- Report by exception with deadbands and unsolicited response, and 250 events across four event types.

Security and inputs and outputs

- Encryption and port control that protect the meter from unauthorised access, with an anti-tampering system events log.
- External modules: analogue outputs, analogue inputs, digital status inputs, relay outputs and pulse outputs.
- Colour touchscreen display with pre-configured screens for readings, alarms and power quality.

V-Switch key technology - features by key

Feature	V1	V2	V3	V4	V5	V6
Basic measurement	•	•	•	•	•	•
Logging memory	512 MB	1 GB	4 GB	512 MB	1 GB	4 GB
Sampling speed	512	1024	1024	512	1024	1024
50 MHz transient recording			•			•
IEC 61000-4-30 class A edition 3	•	•	•	•	•	•
IEC 61850 server		•	•		•	•
IEC 61850 GOOSE		•	•		•	•
Encryption and access control				•	•	•
Synchrophasor PMU				•	•	•

Sampling speed is given in samples per cycle. Transient sampling reaches 800 000 samples per cycle.
Keys are activated in the field, so the meter can be upgraded after installation.



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Technical specifications

Voltage input range	(5-347) V AC line to neutral and (10-600) V AC line to line; inputs isolated to 2500 V AC
Current input range	Programmable to any CT ratio; class 2 with 1 A nominal secondary and two times overrange, fault recording to ± 16 A peak; class 20 with 5 A nominal secondary and four times overrange, fault recording to ± 80 A peak
Current withstand	100 A for 10 s, 300 A for 3 s and 500 A for 1 s at 23 °C
Burden	Voltage inputs 0.072 VA per phase maximum at 600 V and 0.003 VA at 120 V; current inputs 0.008 VA per phase maximum at 20 A
Isolation	All inputs to outputs isolated to 2500 V AC
Sensing method	True RMS with up to 1024 programmable samples per cycle, 16-bit conversion with multiple converters, self-calibrating architecture and transients measured at 800 000 samples per cycle
Accuracy rating	Energy measurement accuracy of 0.06 %, exceeding ANSI C12.20 0.1 class and IEC 62053-22 0.2S
Time clock	3.5 ppm from (-40 to +85) °C, under ten seconds of drift per month; 2.0 ppm typical from (0 to +40) °C, under six seconds per month
Environmental	Operating (-20 to +70) °C; storage (-30 to +80) °C; humidity to 95 % RH non-condensing; protection class IP30
Communication ports	Six simultaneous ports: two optional RS485, front USB, front ANSI optical and two Ethernet, one of them with fibre optic or RJ45 media
Displays	Colour touchscreen on the meter, with pre-configured screens for readings, alarms and power quality



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Ordering information

Every field must be filled in to form a valid part number, in the order shown.

1. Base meter	Nexus 1500+ meter
2. Control power	115AC = (100-240) V AC at 50/60 Hz; D2 = (100-240) V DC or (90-264) V AC at 50/60 Hz; D = (18-60) V DC
3. Frequency range	60 = 60 Hz system; 50 = 50 Hz system
4. Current class	20 = 5 A nominal CT secondary; 2 = 1 A nominal CT secondary
5. V-Switch pack	V1 standard, 512 MB and 512 samples per cycle; V2 adds 1 GB and IEC 61850; V3 adds 4 GB and 50 MHz transients; V4, V5 and V6 add the synchrophasor unit and the security package to V1, V2 and V3
6. Communication slot 1	X = none; 485P = two RS485 ports and four pulse outputs; NTRJ = second RJ45 network card; NTFO = second fibre optic network card, ST terminated
7. I/O slots 2, 3 and 4	X = none; 6RO1 = six relay outputs; 16DI1 = sixteen status inputs

Accessories, software and converters

COMPQA6P1Y	Configuration software for Windows, single-computer licence
ENERGYPQA-1Year	Energy management solution, one year
1mAON4 / 1mAON8	Four or eight analogue outputs 0±1 mA
20mAON4 / 20mAON8	Four or eight analogue outputs 4-20 mA
8AI1 / 8AI2 / 8AI3 / 8AI4	Eight analogue inputs 0±1 mA, 0±20 mA, 0±5 V DC or 0±10 V DC
8DI1 / 4RO1 / 4PO1	Eight digital status inputs, four relay outputs or four solid state pulse outputs
PSIO / MBIO	Power supply for additional modules and mounting bracket, required with external modules
P40N+ / P41N+ / P43N+ / P70N	LED master display, current and power slave displays, and colour touchscreen
SMKP70N / E171103	Mounting kit for the touchscreen and DIN rail mounting kit for the meter

Example of a valid part number: Nexus1500+-D2-60-20-V2-485P-NTRJ-6RO1-6RO1.

External input and output modules must be ordered together with their mounting bracket.



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