

Nexus 1450

Transducer base with separate display, 0.06 % accuracy



IEC 61000-4-30 class A edition 3 measurements, six communication ports and up to 1024 samples per cycle

Nexus 1450

Cyber secure power quality meter

amperis

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A transducer base with a separate display, so it can be fitted to existing switchboards without cutting the panel door.

Product overview



Meter base with the two current sensing stages and the six communication ports



External input and output modules

Two sensing stages on every current input

Each current input carries a high gain sensor and a low gain sensor that measure the signal from the external current transformers at the same time. The meter reads the signal level and chooses the optimal sensing circuit, which holds 0.06 % accuracy across an extended measuring range. Pick-up starts at 1 mA and full accuracy is reached at 25 mA, so the same meter serves 5 A and 1 A secondary current transformers.

Advanced energy metering

- Full four-quadrant metering with maximum and minimum recording and time stamp.
- Transformer and line loss compensation for iron, copper and total substation losses.
- Coincidental readings, such as power factor or reactive power at the time of peak demand.
- Load aggregation through pulse inputs, including gas and water commodities.
- Perpetual time-of-use calendar with multiple tariffs for complex contracts.

Built for retrofit

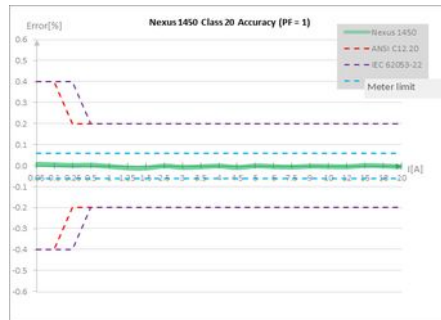
- The transducer base is a direct physical retrofit of the previous 125x series meters.
- The separate display mounts into existing analogue meter knockouts.
- Eight built-in digital status inputs, an auxiliary voltage input and two pulse outputs as standard.

Accuracy holds from the bottom of the range to full scale, well inside the ANSI and IEC limit lines.

Accuracy and time reference



Accuracy over the class 2 measuring range



Accuracy over the class 20 measuring range

Repeatable across the whole range

The charts compare the error of the meter with the limit lines of ANSI C12.20 and IEC 62053-22 for the class 2 and class 20 measuring ranges at unity power factor. The two sensing stages keep the error flat where single-stage meters lose accuracy, that is, at the low end of the current range where most of the operating hours are spent.

Precision time reference

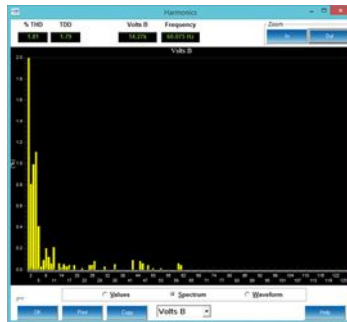
- Internal crystal accurate to 20 ppm at 23 °C when no other synchronisation is enabled.
- Line frequency synchronisation.
- DNP3 time synchronisation.
- IRIG-B time synchronisation.
- SNTP time synchronisation.

Wideband measurement

Nominal frequency range is (42.5 to 69.5) Hz, and the meter also supports wideband measurement from 20 to 500 Hz for variable frequency applications; some functions are disabled in wideband mode.

Power quality measurements certified by a third party to the most demanding international standards.

Power quality analysis



Harmonic and interharmonic spectrum analysis

EN50160 Report - 2019-10-13 00:00:00 to 2019-10-20 00:00:00		
Real Time Power Quality Compliance Report		
EN50160 Individual Report Summary		
Power Frequency (50/60 Hz)	50.00 Hz	Pass
Voltage Unbalance (%)	0.00%	Pass
Voltage Sag (V)	230.00 V	Pass
Voltage Swell (V)	230.00 V	Pass
Voltage Dip (V)	230.00 V	Pass
Voltage Rise (V)	230.00 V	Pass
Voltage Drop (V)	230.00 V	Pass
Voltage Recovery (V)	230.00 V	Pass
Voltage Recovery Time (s)	0.00 s	Pass
Voltage Recovery Rate (V/s)	0.00 V/s	Pass
Voltage Recovery Time (ms)	0.00 ms	Pass
Voltage Recovery Rate (ms/s)	0.00 ms/s	Pass

Weekly power quality report to EN 50160

IEC 61000-4-30 class A edition 3

Voltage anomalies, harmonics, flicker, unbalance and many other indices are measured to the class A specification, which makes the readings comparable between instruments and admissible in contractual disputes. Sag and swell events are recorded with microsecond resolution, including peak and duration.

Harmonics to the 511th order

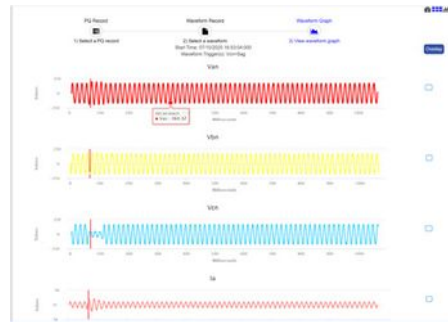
- Harmonic and interharmonic analysis to IEC 61000-4-7 class A.
- Magnitudes to the 511th order in the log viewer; real-time magnitudes and phase angles to the 127th order.
- Total harmonic distortion, total demand distortion and K factor.

Flicker and reports

- Flicker meter to IEC 61000-4-15 class A, on 230 V / 50 Hz and 120 V / 60 Hz systems.
- Weekly EN 50160 power quality reports calculated by the meter.
- ITIC CBEMA curve and SEMI F47 plots for voltage events.
- Limits on any measured value, combined through a Boolean logic tree, with email on alarm.

Waveforms at up to 1024 samples per cycle, an internal database that logs by itself and a web dashboard served by the meter.

Recording, logging and web dashboard



Waveform event captured at high resolution



Energy dashboard served by the meter itself

Waveform recording

Surges, sags and transients are captured at up to 1024 samples per cycle with 16-bit conversion, on voltage and current, with pre- and post-event analysis and fault capture to eight times full scale. Hardware and software triggers can both start a record, and waveforms can be viewed in the software, in the meter web browser or exported to third-party tools.

Logging without configuration

- Internal database log that automatically records 172 metering parameters.
- Eight configurable historical trending logs of 64 channels each.
- Power quality log, limit and alarm log for up to 32 programmable limits, and input status change log.
- Up to 4 GB of memory with up to 1.2 GB reserved for logging and user storage; all logs are first-in first-out.

Security and web dashboard

- Passwords of 32 complex characters with 128-bit AES encryption and fail timeouts against brute force.
- One administrator and ten configurable users across four roles, with physical sealing switch.
- Firmware verification and authentication on update, and an anti-tampering event log.
- HTML5 dashboard with real-time readings, trends, waveforms, phasors and flicker, also on tablets and phones.

Meter accuracy

Voltage L-N	0.04 % of reading
Voltage L-L	0.04 % of reading
Current	0.04 % of reading
Neutral current	0.1 %
Frequency	0.001 Hz
Watts	0.06 % of reading
Watt-hours	0.06 % of reading
VAR	0.15 % of reading
VAR-hours	0.15 % of reading
VA	0.06 % of reading
Power factor	0.15 % of reading
THD	2.5 % of reading

Frequency accuracy is given for 50/60 Hz measurement; the meter also supports wideband accuracy for (20-500) Hz applications.
Watt-hour accuracy applies from (0.025 to 20) A at unity power factor.



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Memory logging capacity

Log	V1 records	V1 days	V2 records	V2 days
System events log	16384	-	32768	-
Automatic database log	16384	163	32768	327
Historical log 1	16384	163	32768	327
Historical log 2	16384	163	32768	327
Historical log 3	16384	163	32768	327
Historical log 4	16384	163	32768	327
Historical log 5	16384	163	32768	327
Historical log 6	16384	163	32768	327
Historical log 7	16384	163	32768	327
Historical log 8	16384	163	32768	327

Days are calculated for a 15-minute logging interval; all logs use a first-in first-out buffer and roll over when full.
V1 provides 512 MB of logging memory and 512 samples per cycle; V2 provides 1200 MB and 1024 samples per cycle.



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Communication, inputs, outputs and displays

Communication ports	Six standard ports: four serial RS485, one of them RS485/RS232 selectable with RTU master capability, plus two independent Ethernet ports, RJ45 and ST terminated fibre optic, with separate IP addresses, port control and encrypted email on alarm; the RJ45 port supports DHCP and IPv6
Protocols	Modbus RTU, Modbus ASCII, Modbus TCP/IP and DNP3 level 2 simultaneously; IEC 61850 server and GOOSE server with cross trigger for distributed fault recording on the V2 key
Standard digital inputs	Eight inputs that sense whether the circuit is externally wetted, accepting up to 150 V DC, or supply the voltage themselves; usable as pulse accumulators for other meters
Auxiliary voltage input	Neutral to ground or auxiliary voltage reading, for synchronising schemes such as frequency, magnitude and phase angle on both sides of a switch
Standard pulse outputs	Two solid state form A outputs, 35 Ω maximum on resistance, 120 mA continuous
Optional analogue outputs	1mAON4 and 1mAON8: four or eight bidirectional 0 $\pm$ 1 mA outputs; 20mAON4 and 20mAON8: four or eight 4-20 mA outputs; self-powered and scalable, 0.1 % of full scale, up to four modules
Optional analogue inputs	8AI1 0 $\pm$ 1 mA, 8AI2 0 $\pm$ 20 mA, 8AI3 0 $\pm$ 5 V DC and 8AI4 0 $\pm$ 10 V DC, eight channels each, 0.25 % of full scale, up to four modules
Optional digital inputs and relays	8DI1: eight digital status inputs with auto-detection to 300 V DC; 4RO1: four latching form C relays, 5 A at 250 V AC / 30 V DC; 4PO1: four solid state KYZ pulse outputs at up to 20 pulses per second; up to four modules of each
Displays	P40N+ multifunction LED master display with USB download, P41N+ current and P43N+ power slave displays for daisy chaining, and P70N colour touchscreen; displays connect to any RS485 port



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Technical specifications

Voltage input range	Absolute range between any voltage inputs (20 to 720) V AC; pick-up voltage 5 V AC
Current input range	Class 2 and class 20 supported in one input configuration; programmable to any CT ratio; pick-up current 1 mA; fault current 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 5 M Ω per input; current inputs 0.028 VA per phase maximum at 20 A
Isolation	Voltage inputs isolated to 2500 V AC
Frequency ranges	Nominal (42.5 to 69.5) Hz; wideband (20 to 500) Hz, with some functions disabled in wideband mode
Measurement method	Programmable sampling rate up to 1024 samples per cycle with 16-bit conversion
Time reference	Internal crystal to 20 ppm at 23 °C, with line frequency, DNP3, IRIG-B and SNTP synchronisation
Revenue sealing	Lockable cover over the voltage and current inputs, sealable reset button and two case seal locations
Environmental	Operating (-25 to +70) °C; storage (-40 to +70) °C; humidity to 95 % RH non-condensing; meter IP30, colour touchscreen display IP65 for indoor use
Dimensions	Meter base 10.70 in x 6.25 in (27.19 x 15.88) cm; LED display 4.94 in x 5.25 in (12.55 x 13.34) cm; colour touchscreen 4.3 in diagonal



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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 1450 meter
2. Control power	D2 = universal (96-276) V at 50/60 Hz or DC; D = (18-60) V DC
3. Frequency range	60 = 60 Hz system; 50 = 50 Hz system
4. Virtual switch	V1 = standard meter, 512 MB of logging memory and 512 samples per cycle; V2 = V1 plus 1200 MB of logging memory and 1024 samples per cycle

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: Nexus 1450-D2-60-V1.

The mounting bracket must be ordered with any external input or output module.



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