

Nexus[®] 1500+

Next Generation Power Quality Meter for Critical Energy Circuits

New Phasor
Measurement
Unit Capability



Advanced Metering and Communication

- Constant Calibration™ Architecture Provides Highly Stable Readings, as the Meter Self-calibrates Every 10 Seconds
- Critical Metering Needs Are Met by 0.06% Accuracy in Energy Metrology
- Resilient™ Cyber Security Protection
- 6 Available Communication Ports, Including Dual Ethernet Ports
- Ethernet Configurable Port Services Control
- Supported COM Protocols Include Modbus, DNP3, IEC 61850, GOOSE Messaging, SNMP, IEEE 1588v2 PTP, and IEEE C37.118.2-2011
- Color Touchscreen Programmable Display

Superior Recording and Power Quality Analysis

- Class A IEC 61000-4-30 Edition 3 Power Quality Measurement
- Class A IEC 61000-4-15 Flicker Measurement
- Class A IEC 61000-4-7 Harmonics Measurement
- Customized EN 50160 Power Quality Reporting
- IEEE C37.118.1-2014 Compliant Synchrophasor Data
- Up to 4 GB of Memory for Storage
- 50 MHz Transient Capture Speed
- The Perfect Meter for Co-generation and Independent Power Providers
- Supports Substation Automation, Grid Monitoring, and Distribution Substation Reliability Measurements

Introduction

The Nexus® 1500+ meter is a primary and testable revenue meter that provides advanced power quality analysis functions, including support for Synchrophasor applications. It records every aspect of electrical power, including power quality and transients. The meter gives you access to this information both in real time and through reports in compliance with the IEC 61000-4-30 Class A Edition 3 and EN 50160 international standards. In this way, the Nexus® 1500+ meter provides you with a comprehensive picture of your circuits' power usage and system reliability.

The Nexus® 1500+ meter's capabilities ensure that essential data is captured and stored. Designed for critical and important circuit monitoring, the Nexus® 1500+ meter is a precision instrument that ensures all aspects of the electrical circuit are captured. The meter is ideal for grid monitoring, substation automation, and distribution substation reliability measurements.

Highly Accurate Energy Metrology

The Nexus® 1500+ meter incorporates advanced metrology. The unit has onboard auto-calibration capability that calibrates its internal circuitry in real time, every 10 seconds. This improves meter accuracy over time and over temperature. Auto-calibrating metrology is ideal for critical metering. Providing highly accurate measurements exceeding the ANSI C12.20 (0.1 Accuracy Class) standard and the IEC 62053-22 (0.2S Class) standard, the 1500+ provides an Energy Class accuracy of 0.06%, with typical shipping accuracies of 0.02%. Additionally, the meter has a front panel test pulse that lets you test on one pulse at low pulse weight, which you can use to quickly determine accuracy. The meter also features a new precision real time clock that offers accuracy of 3.5 ppm, or less than 10 seconds per month drift.

New Constant Calibration™ Architecture Increases the Stability of Measurement Accuracy

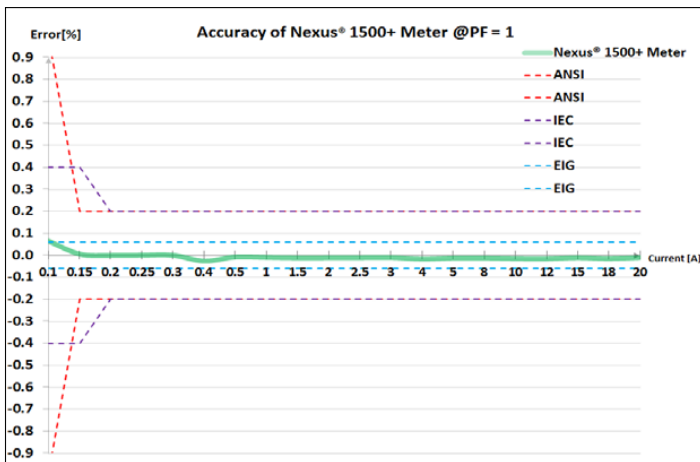
The Nexus® 1500+ meter improves on existing Nexus® architecture by providing one of the best auto-calibration methods available. Earlier Nexus® models relied on AccuMeasure™ technology that auto-calibrated the meter every 12 hours or 5 degree temperature change. Constant Calibration™ architecture improves significantly on this, by providing considerably faster, ongoing auto-calibration.

With Constant Calibration™ architecture, the meter utilizes a separate calibration channel to calibrate the incoming signal in real time every 10 seconds, thereby insuring that the meter experiences minimal drift in accuracy over time and temperature. With this auto-calibrating circuit, right out of the box the Nexus® 1500+ meter will stabilize its readings within 10 seconds. This means you no longer have to wait for the meter to stabilize in temperature to achieve optimal accuracy. With Constant Calibration™ architecture, the meter will hold its accuracy throughout its operation range. Once the meter is tested, it will maintain the precise accuracy even if the operating conditions are less than ideal.

High Speed Frequency Reading for Generator Control

The Nexus® 1500+ meter offers a high-speed frequency reading of one cycle, with a frequency resolution of better than 10 mHz. This reading satisfies applications that need to respond as quickly as possible to frequency fluctuations, such as those caused by intermittent power generation in renewable power plants. A programmable rolling window average for this reading is also available.

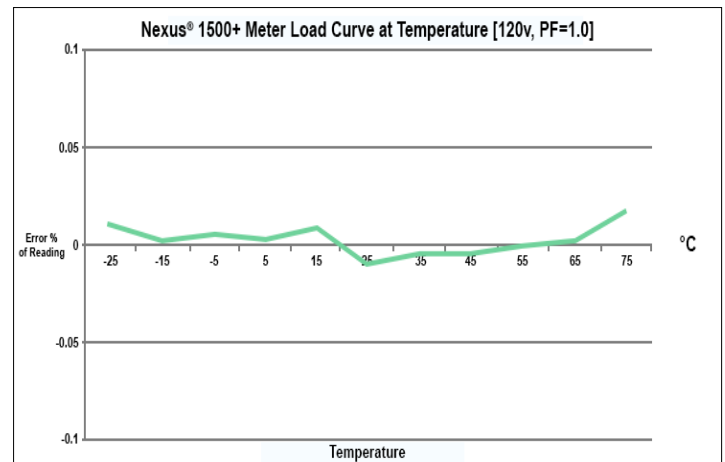
Typical Accuracy over Current Range



Typical 0.02% Accuracy over Full Range

Note that typical accuracy is 0.02%; however, the meter specification should be consulted for accuracy details.

Drift over Temperature



Meter Maintains Accuracy over Changing Temperature

Advanced Revenue Meter for Primary Loads

The Nexus[®] 1500+ unit is a primary revenue meter designed to be used for any important applications. In addition to highly accurate energy measurement, the meter features:

- Full 4 quadrant metering
- Energy load profiling: log virtually unlimited historical trending
- Time of Use perpetual calendar that supports multiple tariffs
- Transformer and Line Loss compensation: for both iron and copper and total substation losses
- CT and PT compensation: correct for errors in current and voltage transformers
- Coincidental readings: e.g., PF or VARs at time of Peak Demand, to identify number of capacitors needed, peak inefficiencies, etc.
- Load aggregation/universal metering: pulse inputs can be used to aggregate or accumulate different loads; utility products such as gas and water can also be accumulated

System Events Logging

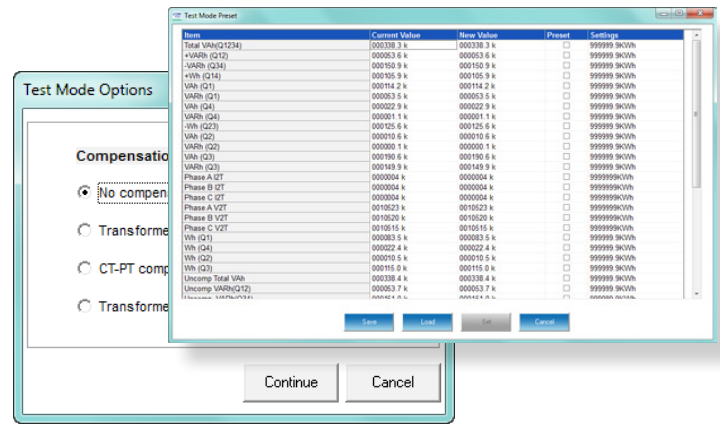
The unit provides extensive usage information for detection of unauthorized access. The unit records:

- Resets
- Programming changes.
- Password access changes
- Time changes
- Power up/down
- Change of Firmware

Test Mode and Energy Presets

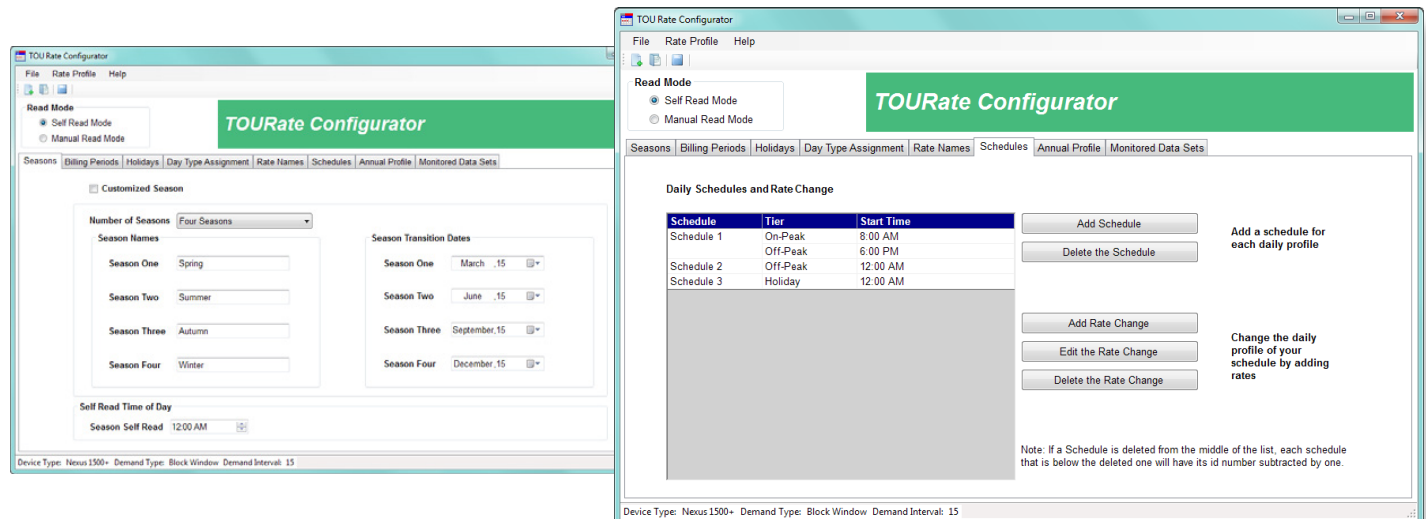
The Nexus[®] 1500+ meter offers a Test Mode for testing meter accuracy. Test Mode allows the meter to be tested for watt-hour and VAR-hour accuracy without affecting the stored readings. Using Test Mode, users can verify the meter's readings over the lifespan of an installed meter without having to reset energy or disturb the load profiling and demand recording.

The Energy Preset feature allows a user to program the energy accumulator values upon exiting Test Mode. This lets the user compensate for accumulations missed during testing time, or easily swap a new meter for a meter being replaced.



Perpetual Time of Use for Complex Metering

The Nexus[®] 1500+ meter uses a perpetual Time of Use (TOU) calendar that only needs to be set up once. The TOU implementation allows the user to set up multiple tariffs to meet any contractual obligations. It also allows the user to customize any energy parameter for TOU. The 16 available TOU registers can be configured not only for TOU built-in energy readings, but also for any stored data from pulses or RTU Master readings that might need TOU functionality.



Class A Power Quality Recorder

EIG's Nexus® 1500+ meter is one of the industry's premier fault and voltage disturbance recorders. This instrument captures and stores a comprehensive picture of the history of voltage reliability and power quality events, for detailed and extensive forensic engineering analysis. The Nexus® 1500+ meter offers a multitude of power quality functionality that helps the user identify power quality problems, including harmonics, sags, swells and transients.

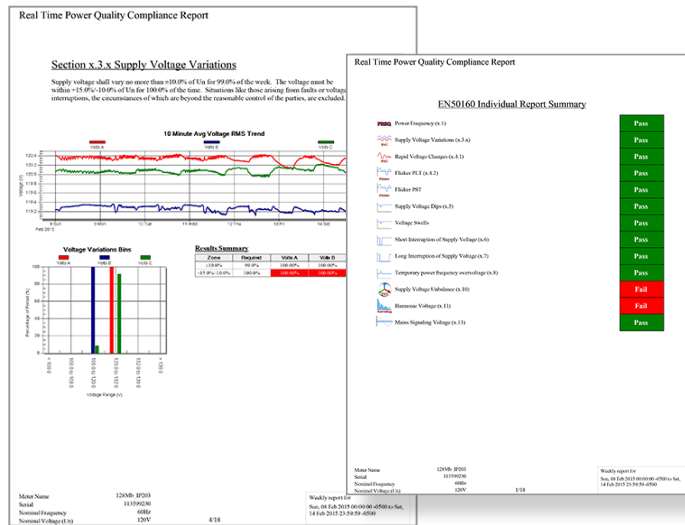
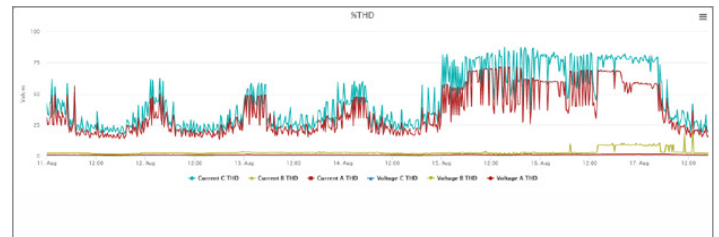
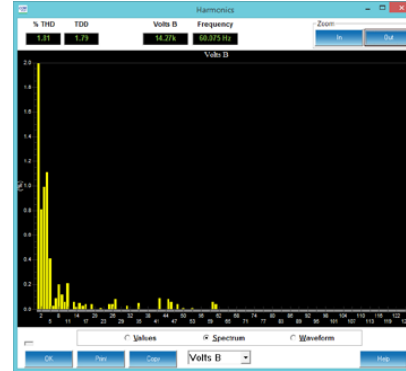
IEC 61000-4-30 Class A Ed. 3 Power Quality Meter

The Nexus® 1500+ meter is a comprehensive Class A power quality recorder. Designed specifically to meet the rigorous IEC 61000-4-30 Class A Edition 3 standard, it measures and analyzes power quality precisely. All reporting is available via the EN 50160 reporting format, which provides a weekly report of power quality indices system-wide. Additionally, the report can be fully customized to meet the required application or jurisdictional needs.

- IEC 61000-4-30 Reporting: Class A Reporting – supports the most stringent international power quality standards; the Nexus® 1500+ meter offers full reporting of power quality conditions using the IEC 61000-4-30 Class A methodology.
- Automatic generation of EN 50160 reports and EN 50160 report customization to support different jurisdictional requirements.

IEC 61000-4-7 Class A Harmonics and Interharmonics Analysis

- View harmonic magnitudes to the 511th order for each voltage and current channel.
- Harmonic magnitudes and phase angles in real time are resolved to the 127th order.
- Obtain THD, TDD, and K-Factor.
- Conduct power quality analysis at the high end of the harmonic magnitude spectrum.



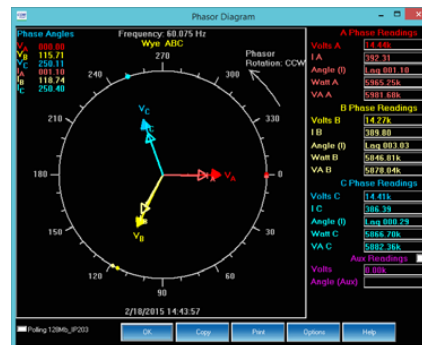
Easy-to-Understand Reports Displaying PQ Compliance

IEC 61000-4-15 Class A Flicker Meter

- Flicker compliant with the IEC 61000-4-15 Class A standard.
- Flicker measurement operates on both 220 volt/50 Hz and 120 volt/60 Hz throughout standard test points.

Phasor Analysis

The monitor reads a phase angle analysis between the voltage and current channels, allowing you to analyze efficiency and system integrity.



High-speed Voltage Reliability Measurements

The Nexus® 1500+ meter provides industry leading voltage measurement.

- Real time single cycle RMS measurements
- Customizable high-speed readings – can be set from 2 to 20 cycles RMS

Set Limit Control

The Nexus® 1500+ power monitor provides the user with programmable setpoints. This feature allows a user to configure the meter to be used as a control device for many applications, such as:

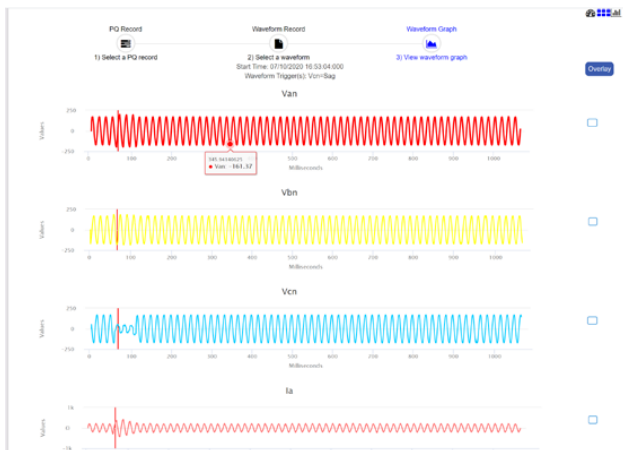
- Capacitor control
- Load shedding
- Automatic transfer schemes
- Transformer monitoring & control
- Redundant protection (not designed for primary over-current protection)
- Many other control functions

Alarm Notification

- The Nexus® 1500+ meter lets you set multiple programmable limits for any measured value, as well as those set up in a Boolean logic tree, and limits set up in the IEC 61850 protocol implementation. Users can be notified of alarm conditions via email.

16 Bit Waveform and Fault Recorder

- Record up to 1024 samples per cycle at 16 bit resolution and capture a transient at over 800,000 samples per cycle or at 50 MHz sampling speed.
- Voltage and current recording has pre and post-event analysis.
- Fault recording offers 8 times full scale capture capability.
- Both hardware and software triggers are available.



Record and Analyze Waveform Fault and Transient Data

High-speed Status Input Triggers

- Waveforms are recorded at time of status change.
- Input change and waveform recording are time-stamped to a 100 micro second resolution.
- Inputs and waveforms can be displayed together to time breakers and relays.

Subcycle 50 MHz Transient Recorder (V3 Option)

Transients often cause intermittent, expensive periods of downtime. The subcycle transient recorder allows you to:

- Record subcycle transients at 50 MHz resolution.
- Monitor switching noise from capacitors, static transfer switches, SCRs, and other devices that negatively impact power quality.

This feature is essential for critical applications such as hospitals, wafer-fabs plants, data centers and other highly power quality sensitive applications.

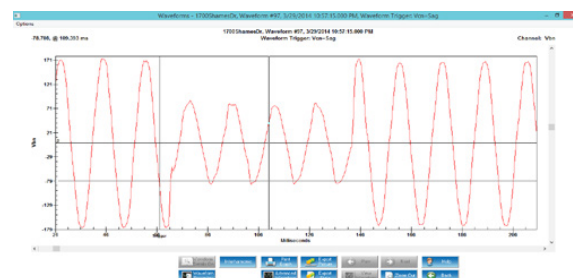
Independent ITIC/CBEMA Log Plotting

- Quickly view total surges, sags, and average duration in the independent ITIC/CBEMA log.
- SEMI F47 graphing is available for power quality compliance in the semi-conductor industry.

Compatible Waveform Formats

Using CommunicatorPQA™ software, the meter will provide all waveform data via COMTRADE and PQDIF compatible formats. This allows the waveform PQ and fault records to be read by most third-party waveform analysis software programs.

- COMTRADE (common format for transient data exchange) is defined by IEEE Std C37.111.
- PQDIF (power quality data interchange format) is defined by IEEE Std 1159.3-2003.



Multiport Communication

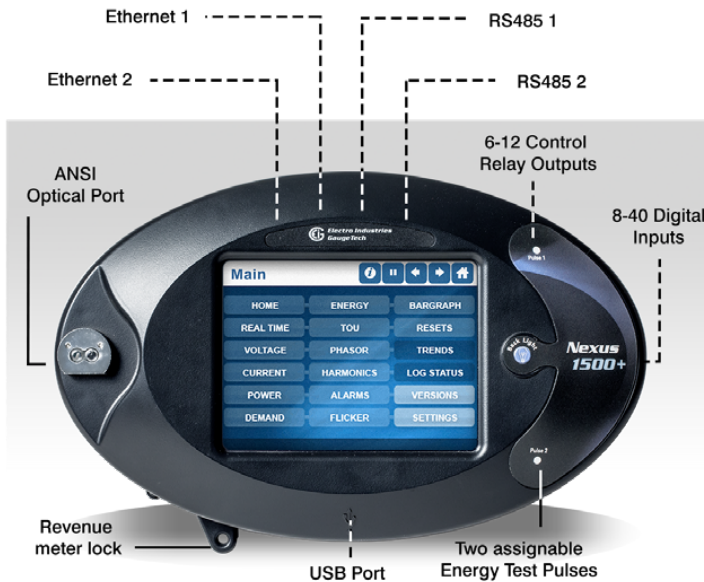
The Nexus® 1500+ meter offers up to 6 simultaneous communication ports and multiple protocols to meet almost every need.

Hardware Features

- 2 optional RS485 ports speaking Modbus and/or DNP3
- USB front panel port
- ANSI optical front panel port
- 2 separately addressable Ethernet ports
- Optional Fiber or RJ45 media on one Ethernet port

Ethernet Communication Port Capabilities

- 2 Ethernet ports provide multiple simultaneous communication
- Each port has separate MAC address and IP address
- Supports Modbus TCP/IP, DNP3, and IEC 61850
- GOOSE messaging protocol supported for IEC 61850
- Up to 32 Modbus TCP/IP sockets per Ethernet port
- Highly secure port control to disable unneeded services and ports
- Email function - SMTP email to client on alarm
- Precise time synchronization - SNTP time sync protocol
- IEEE 1588 PTP for time sync
- File Transfer Protocol - High-speed file data transfer



Highly Capable Communication Options

Industry-Leading DNP3 Level 2 Plus - Complies with DNP Level 1 and Level 2 Certification Requirements

- Up to 136 measurements (64 Binary Inputs, 8 Binary Counters, 64 Analog Inputs) can be mapped to DNP static points.
- Up to 16 relays and 8 resets can be controlled through DNP.
- Report-by-exception processing (DNP Events) deadbands with unsolicited response for serial communication is supported.
- 250 events in four event types (Binary Input Change, Frozen Counter, Counter Change, and Analog Change) are available.

SNMP Protocol

- SNMP protocol V1 and V2c supported
- 40+ measurements supported
- Traps for limits, input change, and power quality
- Cold Start trap and Authentication Failure supported
- Perfect for data centers and other managed device networks

8 Built-in Digital High-speed Status Inputs

- Inputs automatically sense whether the circuit is externally wetted.
- If externally wetted, input up to 150 V DC is accepted.
- If internally wetted, the meter supplies the necessary voltage for the control application.

VAUX Input

- Neutral to ground or aux voltage readings
- Synchronizing schemes, for example, obtaining the frequency, magnitude, and phase angle on both sides of a switch or between generator and bus voltage

Optional External I/O

Optional I/O modules allow up to 32 additional points of I/O, expanding the meter's built-in I/O capability.



Internal I/O

Pulse Outputs

485P: Dual RS485/Pulse Output Card

- 4 KYZ pulses - Solid State
- Pulse width: 5 ms
- Two RS485 ports

Relay Outputs

6R01: 6 Relay Output Card

- 5 A, 250 V AC/30 V DC
- Form C (Latching)

Digital Input Status

16D11: 16 Status Inputs Card

- Used for alarm detect or pulse accumulation
- Up to 150 V DC wetted or non-wetted (24 V DC internally provided)

Note: See the chart on page 12 for I/O ordering information.

External I/O

Analog Outputs

- 1mAON4/1mAON8: 4 or 8 Analog Outputs, 0-1 mA, self-powered, scalable, bidirectional
- 20mAON4/20mAON8: 4 or 8 Analog Outputs, 4-20 mA, self-powered, scalable
- Wiring: Common Mode
- Accuracy: 0.1% of Full Scale
- Calibration: Self-calibrating
- Scaling: Programmable
- Ordering: Up to 4 Analog Output modules

Analog Inputs

- 8AI1: 8 Analog Inputs, 0 ± 1 mA
- 8AI2: 8 Analog Inputs, 4-20 mA

- 8AI3: 8 Analog Inputs, 0 ± 5 V DC
- 8AI4: 8 Analog Inputs, 0 ± 20 V DC
- Wiring: Common Mode
- Accuracy: 0.25% of Full Scale
- Scaling: Programmable
- Ordering: Up to 4 Analog Input modules

Digital Dry Contact Relay Outputs

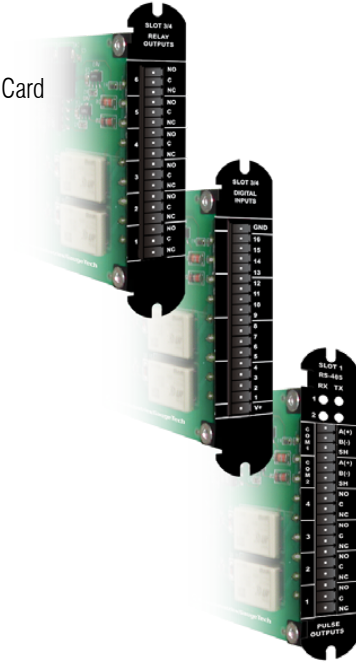
- 4R01: 4 Relay Outputs, 5 A, 250 V AC/30 V DC, Form-C Latching
- Ordering: 1 module in addition to internal modules

Digital Solid State Pulse Outputs

- 4P01: 4 Solid State Pulse Outputs, Form A or C KYZ pulses
- Maximum Pulse Speed: 20 pulses per second
- Ordering: Up to 4 Digital Solid State Output modules

I/O Module Accessories (Required)

- PSIO: Power supply required when using an external I/O module. The Nexus[®] 1500+ meter does not have internal power for external I/O modules.
- MBIO: Mounting bracket for external I/O modules. Must be ordered with external I/O module.



Modular Expandable External I/O Modules

On Board Phasor Measurement Unit (PMU) Feature Improves Power System Stability

The Nexus® 1500+ meter meets the IEEE C37.118.1a-2014 Class P and M standard, providing real time synchrophasor outputs. Synchrophasors are high speed phasor readings taken from multiple locations on the electrical grid and synchronized to a highly accurate time source. PMUs, in conjunction with phasor data concentrators, provide wide-area situational awareness for system operators, giving them tools to adjust and improve power stability.

- Determine stress points in the transmission system
- View phase divergence in different parts of the system
- Detect islanding
- Address power system weaknesses to ensure reliable power

Synchrophasor Features

- Calculates voltage and current phasors and line flow
- Both P and M classes are supported
- Data Frame Rates 50 Hz: 10/25/50 frames per second; 60 Hz: 10/12/15/20/30/60 frames per second
- Data Format: Configurable Float or Integer, Polar or Rectangular
- Time Sync Standard: IRIG-B or IEEE 1588v2 PTP
- Number of Sessions: 2 (two clients can communicate with the Nexus® 1500+ PMU at one time)
- Supports Ethernet or Fiber over Ethernet



Resilient™ Cyber Security

The Nexus® 1500+ meter provides EIG's industry leading Cyber Security. Resilient™ Cyber Security has role-based authorization and multiple safeguards to protect the meter from unwanted intrusions and to provide critical substation meter data security. Features of Resilient™ Cyber Security include:

- An Admin user with full rights and a programmable password of up to 24 characters.
- Ten user IDs with passwords of up to 24 characters.
- Role-based security, with eight configurable roles.
- Encrypted communication of sensitive data, such as passwords, usernames, roles, and rights.
- Customization of the encryption key by the Admin user.
- Expiration programming of passwords and/or the encryption key by the Admin user.
- Firmware is "signed" with a digital signature embedded in the firmware.
- Security lockout is available for the highest level of protection – it prevents Resilient™ Cyber Security from being disabled.

The screenshots show the Nexus 1500+ Resilient Cyber Security Editor software interface. The top window displays the Security Lock status, which is currently disabled. The middle window shows the Roles Overview table, and the bottom window shows the Configure User 2 screen.

Permission	Role 1	Role 2	Role 3	Role 4	Admin	User 1	User 2
Write Data	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reset Energy	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Set deadline	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Set deadline format	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reset Meter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Update firmware file	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reset Data	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reset MaxMin and Demand	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reset Logs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reset energy	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reset TOU	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Protocol	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
File access: read, write, delete, etc.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Modbus_L2N access	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
HTTP access	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
FTP access	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Update SCL file	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Update	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Update device profile file	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Update TOU profile file	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Update display file	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reset Switch	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Substation Automation

V-Switch™ key levels V2 and above offer an embedded IEC 61850 Protocol Server for seamless integration with substation automation applications. Features of the Nexus® 1500+ meter's IEC 61850 implementation include:

- The IEC 61850 Protocol Server allows up to 6 simultaneous MMS clients.
- Either Ethernet port can be configured for IEC 61850 (only one port at a time can run IEC 61850).
- GOOSE publisher/subscriber functionality is supported.
- Buffered and unbuffered reports are supported for the following triggers: general meter interrogation, for example, the report is generated in response to a query; meter integrity, for example, the report is generated according to a programmed interval; and data change, for example, the report is generated due to a change in the contents of a dataset.
- File transfer is supported.
- Embedded Web Protocol Server support is available for IEC 61850 CID file uploading, IEC 61850 Protocol Server status and for displaying incoming and outgoing GOOSE messages.
- Multiple Logical Nodes, which map flicker, harmonics, digital inputs/outputs, limit state, voltage, current, energy and other data, are supported.
- Waveform capture can be triggered by status input data inside GOOSE messages. The user can program up to 16 status inputs that will trigger a waveform capture when the information is received via a GOOSE message. The status inputs include digital inputs, limit states, and any other status input supported by the meter.

V-Switch™ Key Technology

The Nexus® 1500+ meter is equipped with V-Switch™ key upgrade technology that lets you upgrade meter functionality even after installation. This means you can purchase what you need now and then upgrade whenever you need the additional features. Following are the available V-Switch™ keys.

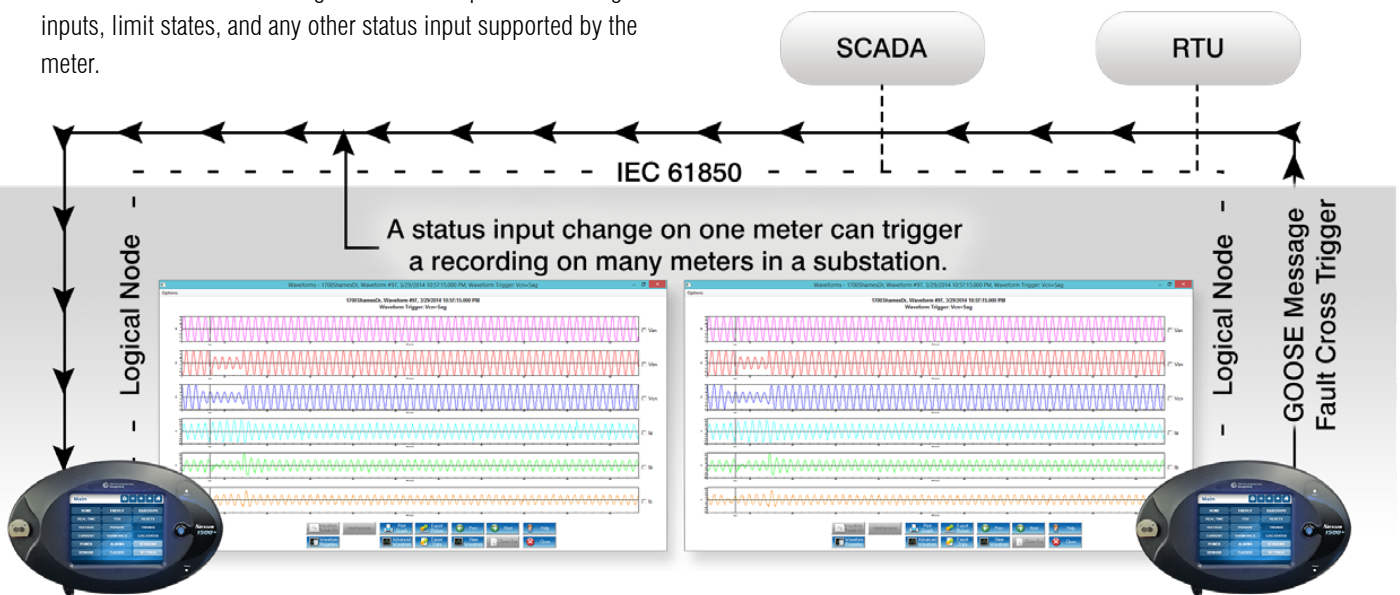
Feature	V1	V2	V3	V4	V5	V6
Basic Measurements	✓	✓	✓	✓	✓	✓
Memory	512 MB	1 GB	4 GB	512 MB	1 GB	4 GB
Sampling Speed	512	1024	1024	512	1024	1024
50 MHz Transients			✓*			✓*
IEC 61000-4-30 Class A Edition 3	✓	✓	✓	✓	✓	✓
IEC 61850 Server		✓	✓		✓	✓
IEC 61850 GOOSE		✓	✓		✓	✓
Resilient Cyber Security				✓	✓	✓
Synchrophasor PMU				✓	✓	✓

* Transient sampling rate up to 800k per cycle.

Unique GOOSE Cross Trigger for Distributed Fault Recording

Fault-based cross trigger of waveform based on GOOSE message.

- Provides system-wide distribution fault analysis on an event.
- Timing better than 200 microseconds is typical.
- Many different circuits can be viewed after an event occurred.



Intelligent Substation IEC 61850 Design
Cross Trigger Fault Readings for Simultaneous Station-wide Fault Analysis

Vibrant LCD Touch Screen Display

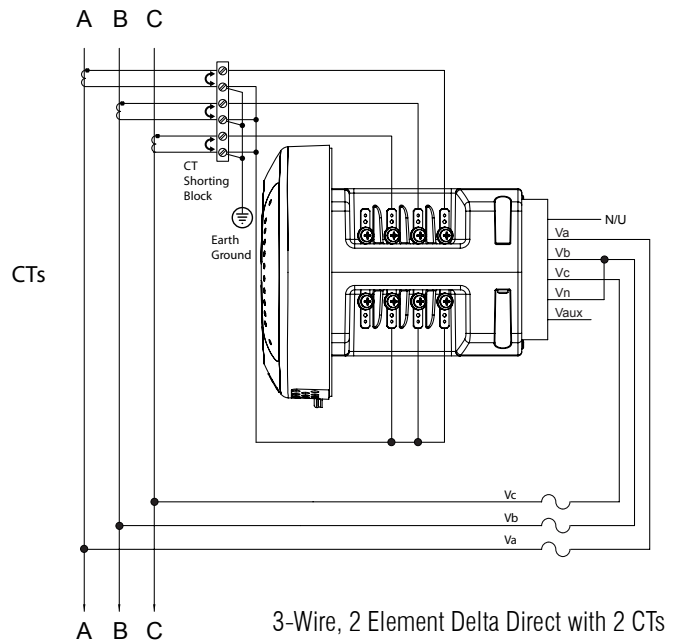
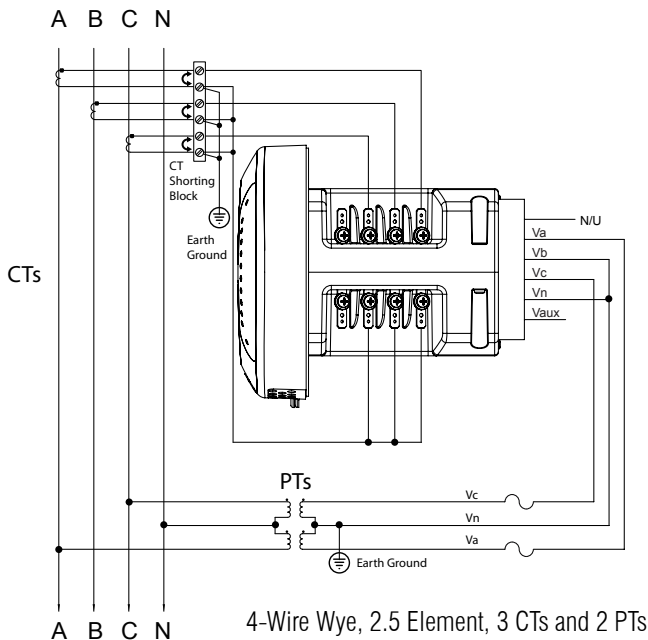
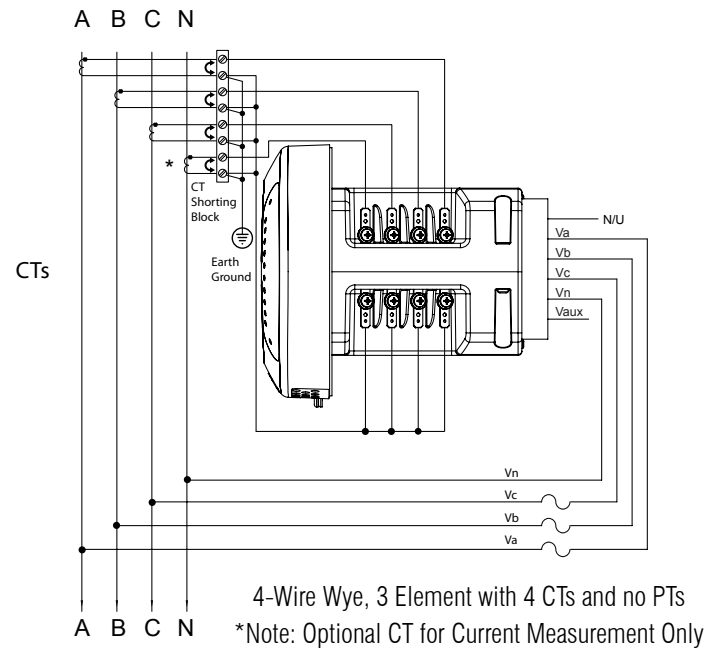
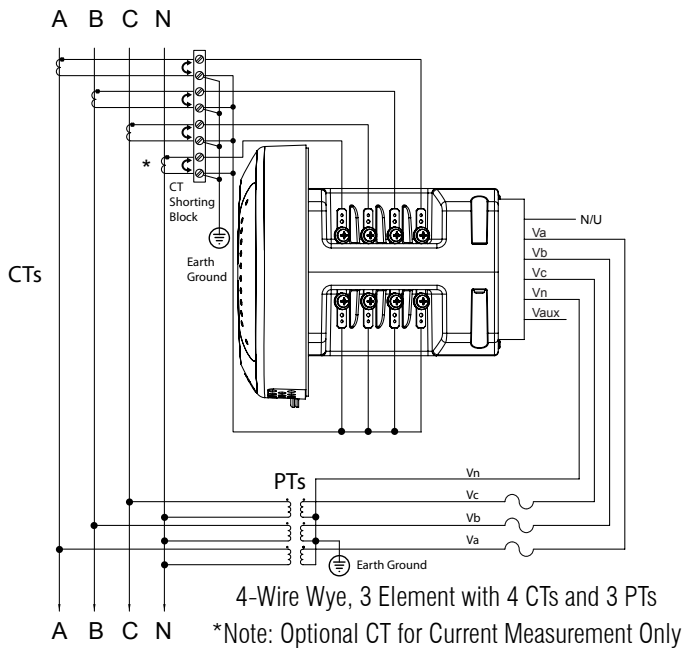
The Nexus® 1500+ meter features an LCD color display with touch screen capability. The display uses bright TFT glass with a high temperature and long life LED backlight. LED is superior to CCFL solutions due to better temperature and half-life specifications. Screen displays include:

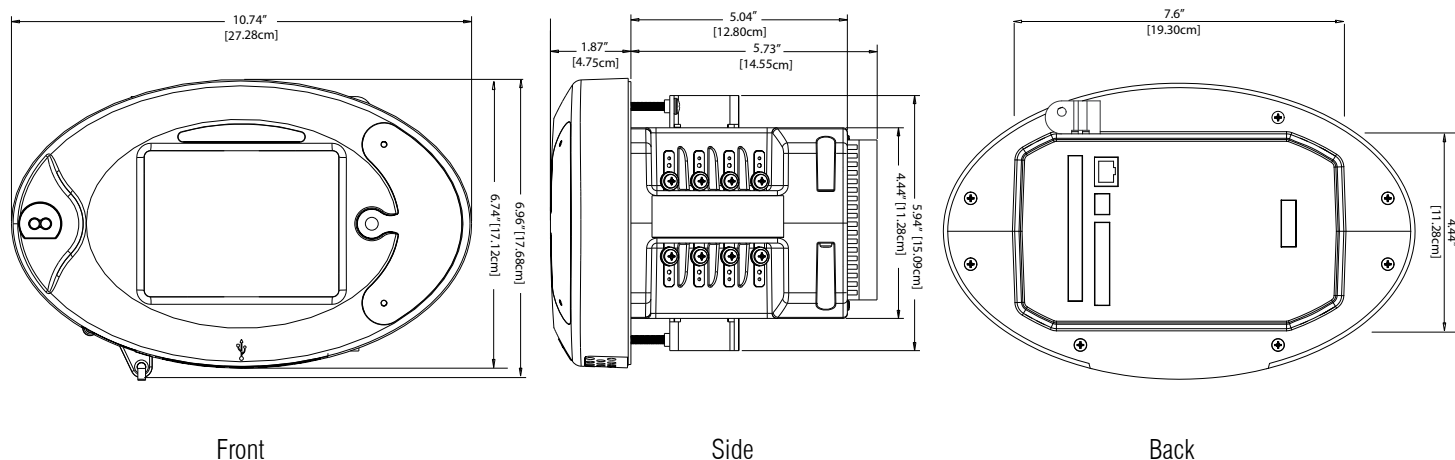
- Real-time viewing (voltage, current, power, demand)
- Accumulated energy and time of use readings
- Flicker readings
- Alarms
- Phasor Analysis
- Harmonic spectrum analysis and waveforms
- Real time trending
- Log status
- Configuration settings
- Multi-language support
- Digital status inputs



Vivid Color Display

Wiring Diagrams





Specifications

Voltage Input Range:

- (5-347) V AC, Line to Neutral
- (10-600) V AC, Line to Line

Voltage Input Withstand Capability:

- Voltage Inputs isolated to 2500 V AC

Current Input Range

- Programmable to any CT ratio
- Class 2: Nominal 1 A, with 2 times over range
- Class 2: fault current recording to ± 16 A peak
- Class 20: Nominal 5 A, with 4 times over range
- Class 20: fault current recording to ± 80 A peak

Current Input Withstand Capability (at 23°C):

- 100 A for 10 seconds
- 300 A for 3 seconds
- 500 A for 1 second

Burden:

- Voltage Inputs: 0.072 VA/phase max at 600 volts, 0.003 VA/phase max at 120 volts
- Current Inputs: 0.008 VA per phase max at 20 A

Isolation:

- All inputs to outputs are isolated to 2500 V AC

Temperature Rating:

- Operating temperature: (-20 to +70) °C
- Storage temperature: (-30 to +80) °C
- Humidity: Up to 95% RH non-condensing

Sensing Method:

- Up to 1024 samples per cycle (programmable)
- 16 Bit A/D resolution – multiple converters
- Constant Calibration™ technology
- True RMS
- Transient at 50 million samples per second

Accuracy Rating:

- Energy measurement accuracy at 0.06%
- Full accuracy specifications available in Nexus® 1500+ meter User Manual
- Time clock: 3.5 ppm for (-40 to +85) °C - less than 10 seconds drift per month on crystal sync; 2.0 ppm typical from (0 to +40) °C - less than 6 seconds per month drift

Update Time:

- 1 Second - Revenue accurate readings
- 1 Cycle - Faster updated readings
- Customizable high-speed readings - from 2 to 20 cycles RMS
- 1 Cycle high speed frequency reading

Control Power Requirements:

- D2 Option: (100-240) V AC @50/60 Hz or (100-240) V DC
- 115AC Option: (100-240) V AC @50/60 Hz
- D Option: (18-60) V DC (24-48 V DC Systems)
- Burden: 25 VA Max

Frequency Range:

- (42.5-69.9) Hz

Communication:

- Programmable parity and stop bits

- Communication protocols: Modbus TCP/IP, ASCII/RTU; DNP3; IEC 61850 (V2 and above), SNMP
- ANSI optical port
- USB 1.1/2.0 Virtual COM port
- RJ45 Ethernet port 10/100BaseT
- Optional 2nd Ethernet port - RJ45 or Fiber Optic
- 2 RS485 ports (optional)

Shipping:

- Total shipping weight: approx. 6.5 lbs (2.9 kgs)
- Shipping container dimensions: 16" x 15.5" x 11.5" (40.64 cm x 39.37 cm x 29.21 cm)

Compliance:

- EU Directive 2011/65/ EU (RoHS 2 Directive)
- REACH Regulation (EC) No 1907/2006
- ANSI C12.20 (0.1 Accuracy Class) and IEC 62053-22 (0.2S Class) Accuracy
- ANSI C12.1 (Code for Electricity Metering)
- ANSI C62.41 (Burst)
- ANSI/IEEE C37.90.1 – Surge Withstand
- IEC 61000-3-2 – Harmonic current emissions
- IEC 61000-3-3 – Voltage fluctuations and flicker
- FCC Part 15, Subpart B, Class A
- IEC 61000-4-2 – ESD
- IEC 61000-4-3 – Radiated Immunity
- IEC 61000-4-4 – Fast Transient
- IEC 61000-4-5 – Surge Immunity
- IEC 61000-4-6 – Conducted Immunity
- IEC 61000-4-7 – Harmonics

- IEC 61000-4-8 – Magnetic Immunity
- IEC 61000-4-11 – Voltage Variations immunity
- IEC 61000-4-15 – Flicker Meter
- IEC 61000-4-30 – Class A Ed. 3
- IEC 61236-1 – EMC General requirements
- IEC 61000-6-2 – Generic standards – Immunity
- IEC 61000-6-4 – Generic standards – Emissions
- IEC 62052-11 – General Requirements
- IEC/CISPR 14-1 - Continuous EM Disturbance
- IEEE C37.118-2014
- CE Marked
- UL/IEC 61010-1, UL/IEC 61010-2-030
- CSA C22.2 No.61010-1

External I/O Modules:

- 1mAON4: 4 Analog Outputs, 0 \pm 1 mA
- 1mAON8: 8 Analog Outputs, 0 \pm 1 mA
- 20mAON4: 4 Analog Outputs, 4-20 mA
- 20mAON8: 8 Analog Outputs, 4-20 mA
- 8AI1: 8 Analog Inputs, 0 \pm 1 mA
- 8AI2: 8 Analog Inputs, 4-20 mA
- 8AI3: 8 Analog Inputs, 0 \pm 5 VDC
- 8AI4: 8 Analog Inputs, 0 \pm 10 VDC
- 4RO1: 4 Relay Outputs
- 4PO1: 4 Solid State Pulse Outputs
- PSIO: Power Supply for I/O modules (must be ordered with external I/O module)
- MBIO: I/O mounting bracket (must be ordered with external I/O module)

Note: Please see product User Manual for comprehensive specifications.

To order a Nexus® 1500+ meter

- Fill out the options you want in the order chart shown below: list accessories separately.
- Specify CommunicatorPQA™ 5.0 software.
- EIG can also provide current and potential transformers.
- Email or fax order information and quantity to the email address or fax number listed below, or call the phone number listed below to place your order.

Ordering Information

	Nexus® Base Meter	Control Power	Frequency Range	Current Class	Virtual Switch	Communication Expansion/Slot 1	I/O Slot 2	I/O Slot 3	I/O Slot 4
Option Numbers:	-	-	-	-	-	-	-	-	-
Example:	Nexus 1500+	D2	60	20	V2	485P	NTRJ	6RO1	6RO1
	Nexus® 1500+ Meter	115AC (100-240) V AC @50/60 Hz	60 60 Hz	20 20 A	V1 Standard Nexus® 1500+ Meter 512 MB memory / 512 s/c	X No Option	X No Option	X No Option	X No Option
		D2 Universal (100-240) V AC @50/60 Hz or (100-240) V DC	50 50 Hz	2 2 A	V2 V1 with 1 GB memory / 1024 s/c IEC 61850	485P 2 RS485 and 4 Pulse Outputs	NTRJ Second RJ45 Network Card	6RO1 6 Relay Outputs	6RO1 6 Relay Outputs
		D (18-60) V DC			V3 V2 with 4 GB memory / 50 MHz Transient Recording		NTFO Second Fiber Network Card (ST terminated)	16DI1 16 Status Inputs	16DI1 16 Status Inputs
					V4 V1 + Synchrophasor PMU and Resilient Cyber Security				
					V5 V2 + Synchrophasor PMU and Resilient Cyber Security				
					V6 V3 + Synchrophasor PMU and Resilient Cyber Security				

Accessory Options

Configuration

Software

COMPQA5P1Y CommunicatorPQA™ 5.0
Software for Windows

Single-Computer License (One Site)

I/O Modules

1mAON4	4 Analog Outputs, 0±1 mA	*PSIO	Power Supply for External I/O Modules
1mAON8	8 Analog Outputs, 0±1 mA		
20mAON4	4 Analog Outputs, 4-20 mA		
20mAON8	8 Analog Outputs, 4-20 mA	*MBIO	I/O Mounting Bracket
8AI1	8 Analog Inputs, 0±1 mA		
8AI2	8 Analog Inputs, 4-20 mA		
8AI3	8 Analog Inputs, 0±5 VDC		
8AI4	8 Analog Inputs, 0±10 VDC		
4RO1	4 Relay Outputs		
4PO1	4 Solid State Pulse Outputs		

* Must be ordered with an external I/O module.

About Electro Industries: Electro Industries/GaugeTech is one of the oldest and largest manufacturers of microprocessor-based digital power meters in the United States. EIG's success is attributable to our willingness to support our users with on-staff technical expertise. Contact us and we will assist you in solving your complex metering applications.

Nexus® 1500+ web page:

<https://www.electroind.com/products/nexus-1500p-next-generation-power-quality-revenue-meter/>



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