Nexus® 1500

Transient Recording Power Quality Revenue Meter

New Generation Power Quality and Revenue Meter

- 10Mhz Recorder (up to 166,000 Samples Per Cycle)

- EN61000-4-30 Class A Compliant Power Quality Measurements (Certified)

- 1 Gigabyte+ of Storage Capability Providing Years of Data Recording

- Statistical Reporting Providing Easy to Understand Power Quality Weekly Reports

- Auto-Calibrating Revenue Meter for Critical Feeders

Advanced Communication and I/O

- Dual Ethernet Ports with Separate Secured IP Addresses (also Multiple RS485 Ports)

- Fiber Optic over Ethernet

- High Speed Communcation to Deliver High Performance Results

- Simultaneous Communication on All Ports and on Multiple Ethernet Sockets

- Analog Inputs for Process Measurements (Temperature, Pressure, etc.)

- Touchscreen Color Display

- IEC 61850 Protocol Server

New

Electro Industries/GaugeTech

The Leader in Power Monitoring and Smart Grid Solutions

MV90 COMPATIBLE

ISO 9001:2008 REGISTERED FIRM

CE

c(UL)us LISTED
ELECTRICAL & ELECTRONIC MEASURING & TEST EQUIP.
22CZ

Introduction

From today's utility giants or Fortune 100 companies, to local electrical municipals, an effective energy management and power monitoring program is critical to success. The Nexus® 1500 meter is the most advanced monitoring product on the market today, providing you with the total picture of energy usage and power quality from any metered point in a power distribution network, allowing you to make power related decisions quickly and effectively.

- Technology specifically designed for Utilities and Industry
- Real Time power quality monitoring and analysis identifies PQ and reliability events quickly
- Manage peak demand electrical power usage
- Report data quickly and reliably using Ethernet or serial communication
- Advanced transient analysis for critical power systems
- Also the perfect solution for Circuit Breaker or Transformer monitoring

The Perfect Monitoring Choice for Critical Applications

- Utility transmission line substations
- Power generation
- Highly critical industrials
- Hospitals / medical

High Performance Revenue Metering Features

Extensive Load Profiling: log virtually unlimited historical trending.

System Events (Anti Tampering): 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

Transformer Loss and Line Loss Compensation: for both iron and copper and total substation losses.

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.

Time of Use Capability: bi-directional consumption and demand; 20 year calendar.

Max/Min Integration and Recording: time-stamped max and min values for all measured readings.

Coincidental Readings: identify number of capacitors needed, peak inefficiencies, etc.

Password Protection Prevents Unauthorized Tampering: user programmable passwords.

Predicted Demand: the meter uses rate of change to predict the peak demand of the next demand interval. Perfect for proactive load shedding.

Accu-Measure™ Auto-Calibrating Measurement Technology

EIG's patented Accu-Measure™ Auto-calibration technology allows a field-mounted metering device to achieve precision accuracy and maintain the accuracy over temperature and time. This technique is unique to EIG and consists of precise measurement technology and high precision internal reference standards.

Accu-Measure™ Technology Features:

- 8 Independent high-speed 16-Bit A/D converters
- Internal reference for periodic auto-calibration
- Internal temperature sensor to sense deviations in instrument temperature
- Designed to allow for repeatable and consistent energy measurement results

Benefits of Auto-Calibrating Technology:

- Improves accuracy over temperature
- Improves repeatability, reducing meter settling time
- Improves long-term stability
- Relies on precision internal DC references to maintain accuracy

PARAMETER	100 msec*	1 SECOND*	DISPLAY RESOLUTION
Voltage (L-N)	0.1%	0.05%	5 Digit
Voltage (L-L)	0.1%	0.05%	5 Digit
Current	0.1%	0.025%	5 Digit
Frequency	0.03 Hz	0.01 Hz	5 Digit
kW @ Unity PF	0.1%	0.06%	5 Digit
kW @ 0.5 PF	0.1%	0.1%	5 Digit
kVA	0.1%	0.08%	5 Digit
kVAR (0.5-0.9 PF)	0.1%	0.08%	5 Digit
PF	0.1%	0.08%	3 Digit
Harmonic Magnitudes	N/A	0.2%	3 Digit
kW-hours	N/A	0.06%	16 Digit
kVA-hours	N/A	0.08%	16 Digit
kVAR-hours	N/A	0.08%	16 Digit

* Note: Readings are in percent of reading where applicable (more accurate standard), not in percent of full scale (less accurate standard).

V-Switch™ Technology

The Nexus® 1500 meter is equipped with EIG's exclusive V-Switch™ technology, which enables meter upgrades in the field without removing the meter from service. Nexus® 1500 V-Switch™ keys include:

V1: Standard Nexus® 1500 meter with 128 Megabytes memory + 512 samples per cycle

V2: V1 + 1 Gigabyte total memory + 1024 samples per cycle, IEC 61850 server

V3: V2 + 10MHz Transient recording

IEC 61000-4-30 Class A Power Quality and Waveform Recording

EIG's Nexus® 1500 meter is one of the industry's premier fault and voltage disturbance recorders. This instrument captures a comprehensive picture history of voltage reliability and power quality events within mass memory for detailed and extensive forensic engineering analysis.

16 Bit Waveform and Fault Recorder:

• Record up to 1024 samples per cycle consisting of transient captures at over 166,000 samples per cycle

• Voltage and current recording with pre and post-event analysis

• Fault recording offers 8 times full scale capture capability

• 16 bit A/D converter provides precise waveform resolution

• Both hardware and software triggers available

High-Speed Status Input Triggers:

• Waveforms are recorded at time of status change

• Input change and waveform recording are time-stamped to a 1 msec resolution

IEC 61000-4-15 Flicker Meter:

• Flicker compliant with IEC 61000-4-15 standard

• Operates on both 220 Volt/50 Hz and 120Volt/60Hz voltages throughout standard test points

IEC 61000-4-30 Reporting:

• Full reporting of power quality conditions using the IEC 61000-4-30 Class A methodology

• Automatic generation of EN50160 reports

IEC 61000-4-7 Harmonics and Interharmonics Analysis:

• View harmonic magnitudes to 512th order for each voltage and current channel

• Real time harmonic magnitudes are resolved to the 128th order

• Percent THD and K-Factor

• Conduct power quality analysis at the high end of the harmonic magnitude spectrum

Subcycle 10MHz Transient Recorder (V3 Option):

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

• Record subcycle transients at 10MHz 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
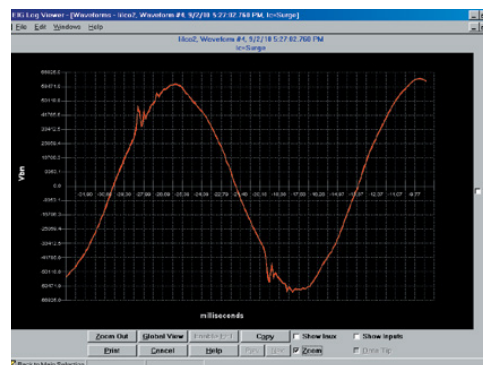
Phasor Analysis:

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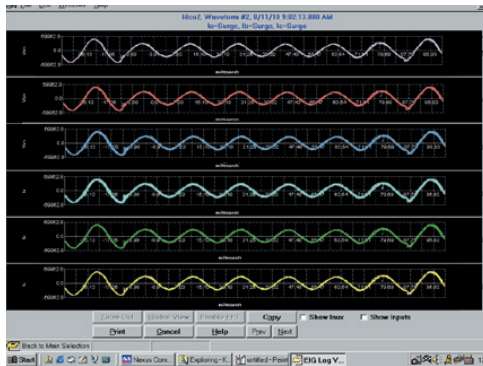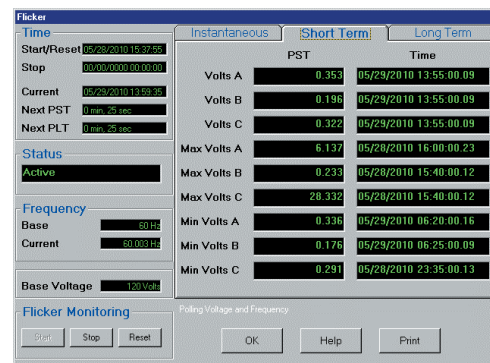

Multi-channel Waveform Recorder

Phasor Analysis


Sub-cycle Transients with 10 MHz Pickup Frequency


IEC 61000-4-15 Flicker Compliance

Multiple Programmable Memory Logs

Virtually Unlimited Historical Trending Logs:
The Nexus® 1500 meter includes vast amounts of memory. A user partitions this memory for log storage by setting up both the number of logs and the number of parameters per log. 8 independent historical logs with up to 64 parameters per log are available. With such extensive memory, the meter will log for years.

Extensive Memory Reads Data Indefinitely
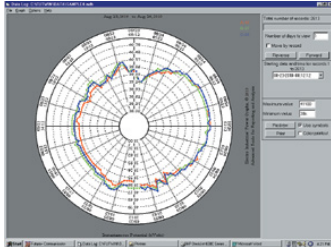
Extensive Historical Trending
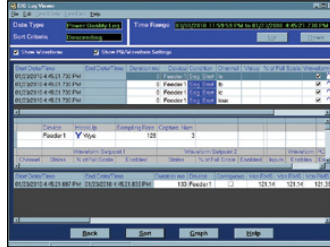
Out of Limit Log

Out Of Limit Log:
The unit offers an independent out of limit log. This allows a user to download out of limit information to obtain a sequence of events for any occurrence. Utilizing the 10 msec clock resolution, the logs can be combined with different metered points throughout a distribution system to provide an accurate system-wide depiction of a power disturbance.

Event-Triggered Waveform Recording Log:
The Nexus® 1500 meter records waveforms with a resolution of up to 1024 samples per cycle. The amount of waveform recording is based on the amount of memory installed.

The unit records the waveform when a value goes out of limit and when the value returns to normal. All information is time-stamped to the nearest 1msec. 8 on-board High-Speed Inputs can be tied to the waveform recording.

• Compare relay trip and breaker timing graphically
• Provides fault and breaker integrity analysis

The unit can be programmed to take more than one recording every time an event occurs. Thousands of cycles can be recorded per event.

ITIC/CBEMA Log:
The Nexus® 1500 meter stores a separate CBEMA log that records magnitude and duration of voltage and current surges and sags for every power quality event. This allows the user to conduct real time CBEMA analysis without downloading all stored waveforms. The separate CBEMA log also allows the unit to provide a more comprehensive picture of power quality over time.

ITIC / CBEMA Trending

System Events Log:
The Nexus® 1500 meter logs extensive usage information for detection of unauthorized access. The unit records:

• Resets
• Programming changes
• Password access changes
• Time changes
• Power up / power down
• Change of firmware

Input Status Log:
This log allows the user to record when the internal inputs change status.

Uploadable Flash Memory:
The Nexus® 1500 meter utilizes uploadable flash memory technology on all processors and DSPs located in the unit. This insures that the unit can be upgraded without removing it from service.

Set Limit Control:
The Nexus® 1500 power monitor provides programmable setpoints for user settings. 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

Waveform / Transient Logs:
The 1500 can log waveform, utilizing its programmable memory for all surges, sags and transients within the scope of what it sees. Thousands of events can be logged with resolution up to 1024 samples per cycle and transients at 10MHz resolution.

Custom Allocatable Memory Structure:
A user can custom define log sizes within the meter. Thus the full memory can be allocated specifically to the desired function.
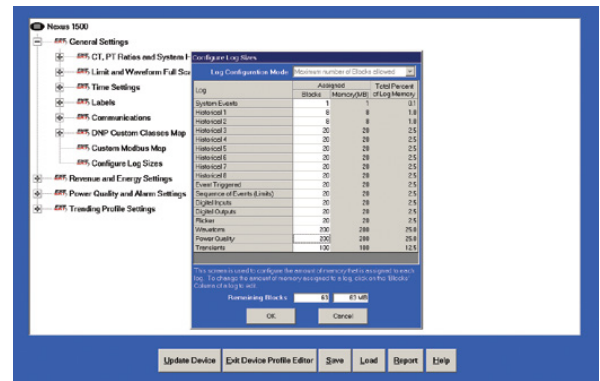
Configurable Memory Allocation Table

On-Board Communication for Every Application

Standard Communications:

- 10/100BaseT Ethernet RJ45 port
- ANSI optical port and USB 2.0 port

8 Built-In Digital High-Speed Status Inputs:

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

Sync. Check-Aux. Volt Input—High-speed Vaux input can be used for:

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

Optional RS485 and Second Ethernet Port:

- Two identical built-in serial ports - up to 115k baud
- Standard protocols include Modbus RTU/ASCII and DNP 3.0 Level 2
- Also available, second Ethernet port, either RJ45 or Fiber Optic
- Separate MAC address and configuration for each Ethernet port

Industry Leading DNP 3.0 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
- 250 available events, of combinations of four events (Binary Input Change, Frozen Counter, Counter Change, Analog Change)

IEC 61850 Protocol Server - V2 Option

- Simultaneous Modbus, DNP and IEC 61850
- Multiple Logical Nodes
- Polled Operation Mode (Queried Reports)
- Buffered and Unbuffered Reports

Rapid Response™ Ethernet − **Download data over 20 times faster than existing Nexus® technology:**

Rapid Response™ 10/100BaseT Ethernet allows for 8 simultaneous connections of Ethernet Modbus TCP protocol. Two sockets for DNP 3.0 protocol are also available. Rapid Response™ technology insures that the Nexus® meter is optimized to download data as quickly as possible.

Utilizing a novel Modbus TCP approach, the meter will download up to 100 times faster than existing Nexus® 125X Series meters. No long wait time to retrieve data.

Internal I/O

Relay Outputs:

6RO1: 6 Relay Output Card

- 5 Amps/250 VAC 30 VDC rated
- Form C (Latching)

**Pulse Outputs:**

485P: Dual RS485/Pulse Output Card

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

Digital Input Status:

16DI1: 16 Status Inputs Card

- Used for alarm detect or pulse accumulation
- Up to 150 Volts DC wetted or non-wetted (24 Volt DC nominal provided)

Note: The Nexus® 1500 meter provides one I/O slot for the 485P (Slot 1), and two I/O slots for the 6RO1 and 16DI1 (Slots 3 and 4).
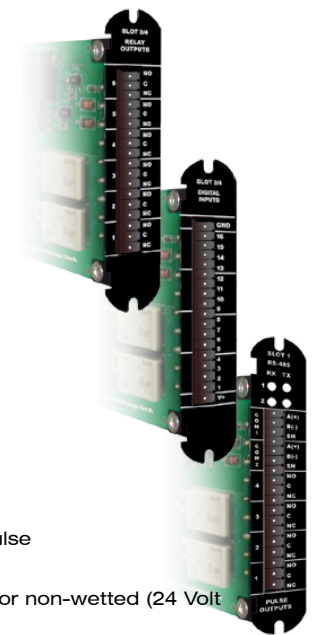
External I/O

Analog Outputs:

- 1mAON4/1mAON8: 4 or 8 Analog Outputs, 0-1mA, self-powered, scalable, bidirectional
- 20mAON4/20mAON8: 4 or 8 Analog Outputs, 4-20mA, 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, 0-1mA, bidirectional
- 8AI2: 8 Analog Inputs, 0-20mA
- 8AI3: 8 Analog Inputs, 0-5V DC
- 8AI4: 8 Analog Inputs, 0-10V DC
- Wiring: Common Mode
- Accuracy: 0.25% of Full Scale
- Scaling: Programmable
- Ordering: Up to 4 Analog Input modules

Digital Dry Contact Relay Outputs:

- 4RO1: 4 Relay Outputs, 5 Amps, 125V AC/DC, Form-C Latching
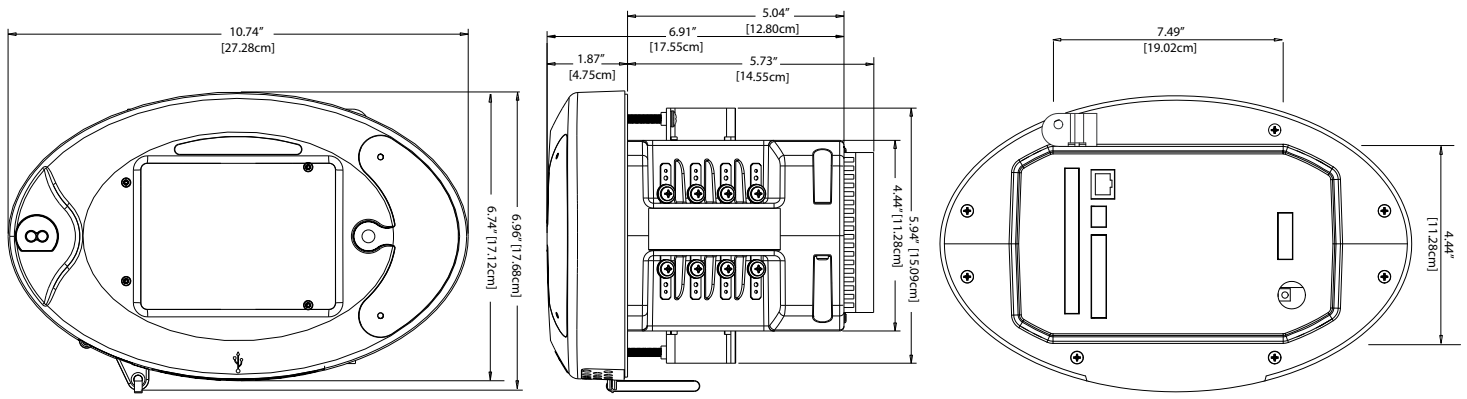- Ordering: 1 module in addition to internal modules

Digital Solid State Pulse Outputs:

- 4PO1: 4 Solid State Pulse Outputs, Form A or C KYZ pulses
- Maximum Pulse Speed: 20 pulses per second
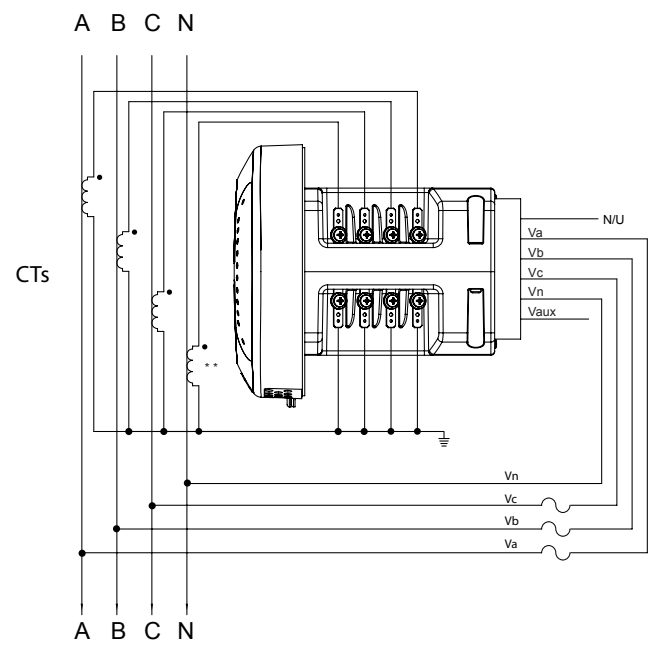- Ordering: Up to 4 modules per meter

I/O Module Accessories (Required):

- PSIO: Required for using an I/O module. The Nexus® 1500 meter does not have internal power for I/O modules.
- MBIO: Mounting bracket for I/O modules. Must be ordered with I/O module.

Diagram callouts:

- 8 High-Speed Status Inputs
- 2 RS485 Ports (Optional)
- IRIG-B Input
- 2nd Ethernet Port (Optional)
- ANSI Optical Port
- Onboard Ethernet TCP/IP Connection
- Color LCD
- 4 Voltage Inputs
- Revenue Lock
- 4 Current Inputs
- High Speed USB Port
- 2 LED Accuracy Test Pulses

Wiring Diagrams

4-Wire Wye, 2.5 Element, 3 CTs and 2 PTs

3-Wire, 2 Element Delta Direct with 2 CTs
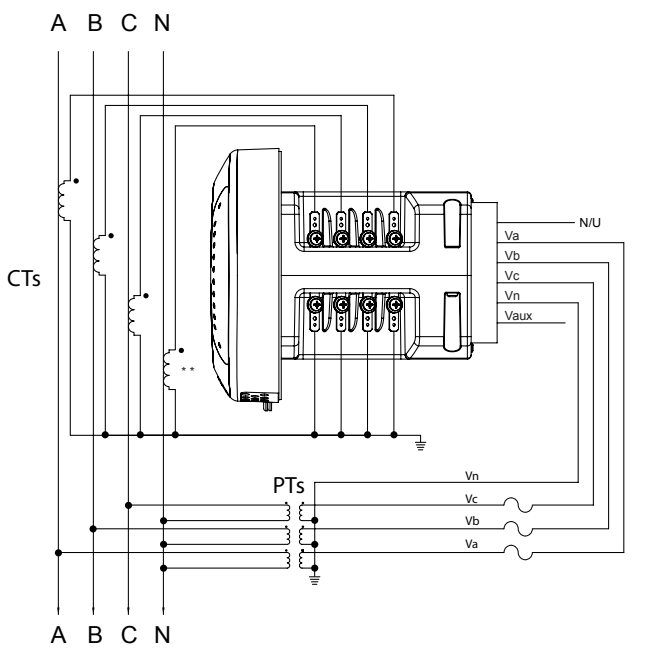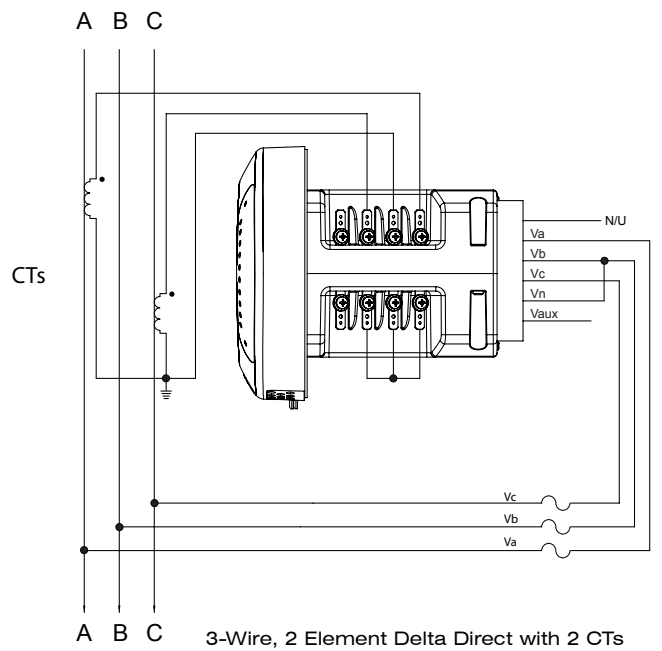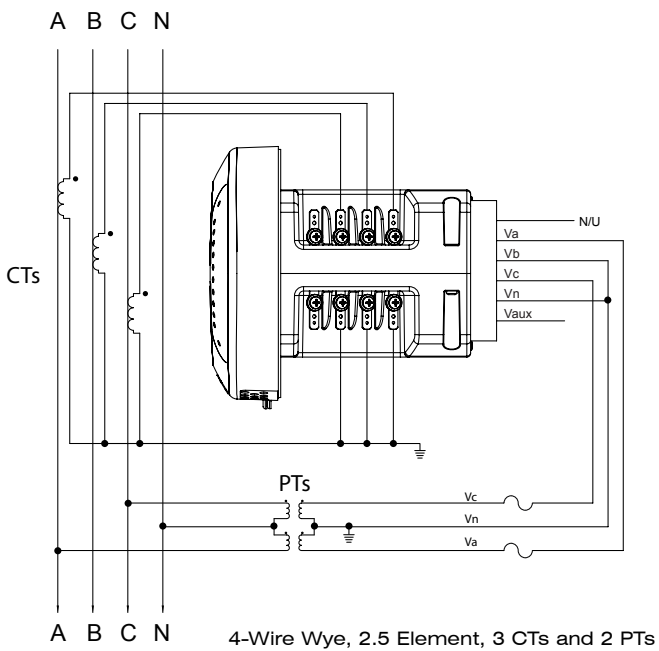
4-Wire Wye, 3 Element with 4 CTs and 3 PTs
Note: ** Optional CT for Current Measurement Only

4-Wire Wye, 3 Element with 4 CTs and no PTs
Note: ** Optional CT for Current Measurement Only

Bright and Easy To Read

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

VIVID COLOR DISPLAY

Specifications

Input Voltage Range:
- (5-347)VAC, Line to Neutral
- (10-600)VAC, Line to Line

Voltage Input Withstand Capability:
- Voltage Inputs isolated to 2500VAC Meets ANSI C37.90.1 (Surge Withstand Capability)

Input Current Range:
- 5 Amp Inputs 4x continuous
- Programmable to any CT range
- Fault current recording to 80 Amps peak secondary based on 5 Amp full scale

Current Input Withstand Capability (at 23°C):
- 100 Amps for 10 seconds
- 300 Amps for 3 seconds
- 500 Amps for 1 second

Burden:
- Voltage Inputs: 0.072VA/phase max at 600 Volts, 0.003VA/phase max at 120 Volts
- Current Inputs: 0.008VA per phase max at 20 Amps

Isolation:
All inputs to outputs are isolated to 2500 VAC.

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

Sensing Method:
- Up to 1024 samples per cycle (programmable)
- Voltage Transient: 10MHz ±1.8kV ±10%
- 16 Bit A/D resolution – multiple converters
- Utilizes patented Accu-measure™ technology
- True RMS

Accuracy Rating:
- This unit complies with and exceeds ANSI C12.20 and IEC 62053-22 accuracy requirements

Update Time:
- 1 Second — Revenue accurate readings
- 100 msec — High speed readings

Control Power Requirements:
- D2 Option: (100–240)VAC @50/60Hz, (100-240)VDC
- 115AC Option: (100-240)VAC @50/60Hz
- D Option: (18-60)VDC (24-48 VDC Systems)
- Burden: 25VA Max

Frequency Range:
- 45Hz–69.9Hz

Communication Format:
- Programmable parity and stop bits
- Communication protocols: Modbus TCP/IP, ASCII/RTU, DNP 3.0, IEC 61850 (V2 and above)
- 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. 5 lbs (2.3 kgs)
Shipping container dimensions: 16" x 13" x 11" (40.64cm x 33.02cm x 27.94cm)

Compliance:
- ANSI C12.20 Class 0.2 and IEC 62053-22 (Accuracy)
- ANSI C62.41 (Burst)
- ANSI/IEEE C37.90.1 – Surge Withstand
- IEC 61000-4-2 – ESD
- IEC 61000-4-3 – Radiated Immunity
- IEC 61000-4-4 – Fast Transient
- IEC 61000-4-5 – Surge Immunity
- IEC 61000-4-15 – Flicker Meter
- IEC 61000-4-7 – Harmonics
- IEC 61000-4-30 – Class A
- CE Marked
- UL and cUL Listed

EXTERNAL I/O MODULES

1mAON4:	4 Analog Outputs, 0–1mA
1mAON8:	8 Analog Outputs, 0–1mA
20mAON4:	4 Analog Outputs, 4–20mA
20mAON8:	8 Analog Outputs, 4–20mA
8AI1:	8 Analog Inputs, 0–1mA
8AI2:	8 Analog Inputs, 0–20mA
8AI3:	8 Analog Inputs, 0–5V DC
8AI4:	8 Analog Inputs, 0–10V DC
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:

1. Fill out the options you want in the order chart shown below. List accessories separately.

2. Specify Communicator EXT 3.0.

3. EIG can also provide current and potential transformers.

4. Email or fax order information and quantity to the fax number or email listed at the bottom of this page.

Ordering Specifications

	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 Hz -	20 -	V2 -	485P -	NTRJ -	6RO1 -	6RO1
	Nexus® 1500 Meter	115AC (100-240)VAC @50/60Hz	60 Hz	20 20 Amp	V1 Standard Nexus®1500 meter 128 MB memory / 512 s/c	X No Option	X No Option	X No Option	X No Option
		D2 Universal (100-240)VAC @50/60Hz or (100-240)VDC	50 Hz	2 2 Amp	V2 V1 + 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)VDC			V3 V2 + 10 MHz Transient Recording		NTFO Second Fiber Network Card (ST Terminated)	16DI1 16 Status Inputs	16DI1 16 Status Inputs

Accessory Options

SOFTWARE

COMEXT3.1C — Communicator EXT 3.0 for Windows ® Single-Computer License (One Site)

COMEXT3.MC — Communicator EXT 3.0 for Windows ® Multiple-Computer License (One Site)

I/O MODULES

1mAON4 — 4 Analog Outputs, 0–1mA
1mAON8 — 8 Analog Outputs, 0–1mA
20mAON4 — 4 Analog Outputs, 4–20mA
20mAON8 — 8 Analog Outputs, 4–20mA
8AI1 — 8 Analog Inputs, 0–1mA
8AI2 — 8 Analog Inputs, 0–20mA
8AI3 — 8 Analog Inputs, 0–5V DC
8AI4 — 8 Analog Inputs, 0–10V DC
4RO1 — 4 Relay Outputs
4PO1 — 4 Solid State Pulse Outputs

PSIO — Power Supply for External I/O modules (must be ordered with an external I/O module)

MBIO — I/O Mounting Bracket (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.

Electro Industries/GaugeTech
The Leader in Power Monitoring and Smart Grid Solutions

1800 Shames Drive, Westbury, NY 11590 **1-877-EIMETER** (1-877-346-3837)
Tel: 516-334-0870 **Fax:** 516-338-4741 **Email:** sales@electroind.com
www.electroind.com