JEMStar II High Accuracy Revenue Meter

For Generation, Transmission and Industrial Power Measurement

These meters are your cash register. Fractions of a percent accuracy can mean the difference of hundreds of thousands of dollars. Our precision design provides high accuracy with long term stability, making it easy to **guarantee a 0.05% accuracy for 10 years.** Low current accuracy is better than 0.2% RDG at 50 mA.

Ease of Use

The JEMStar II is easy to configure with AMETEK's intuitive JEMWARE II software. It can be used off-line or on-line so you can build configurations without having the meter connected. We designed our software with metering personnel in mind and most can learn the basics of configuring a meter in one hour. All meter setup is done with the JEMWARE II Software, eliminating the need to open up the meter and set jumpers or switches. Operating the meter is simplified with the graphic color display that has a user menu for viewing or editing the meter configuration.

Utilizing the JEMWARE II software, the meter can be switched to a remote test mode. Test mode is always available through the meter display or users can be given access to this option based on user rights that are controllable within the software.

The JEMStar II also offers totalization via digital inputs which allows the user to sum the measurements of several different meters. This process is completed through the connection of digital I/Os of the meters. The user is then allowed to combine the load profile, registers and measurement log of up to 16 meters in any combination.

FEATURES AND BENEFITS

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1	High accuracy – 0.05% for 10 years
2	NERC CIPS Compliant – Secure access and audit logs for all access attempts
3	Graphic color display, totalization via digital inputs and remote test mode
4	Advanced communications and alarms
5	Flexible design – Easily replaces many legacy meters
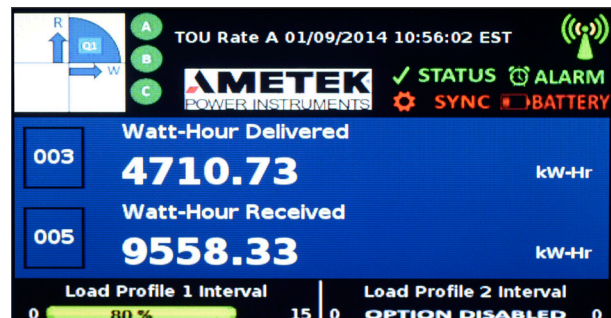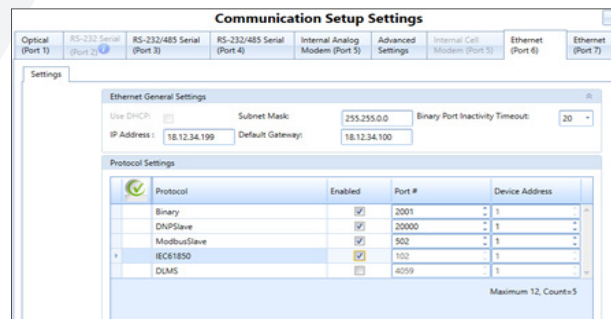
The color display makes it easy to view power measurements, phasor displays and meter diagnostics.

AMETEK®

POWER INSTRUMENTS

Meter Security

The JEMStar II includes security features that satisfy NERC CIPS requirements. Username and password combinations are required to access your secure data and configuration details. The meter communications are password protected to prevent unauthorized access. The audit logs store all access attempts; including meter connection, configuration, firmware changes and data access with username and time/date for each occurrence.

Additionally, JEMStar II includes DLMS protocol, which not only requires a client ID and password for access to the meter, but also includes three different account levels that enable the user the following options:
· Read only
· Read and set the date and time with approved password
· Read all DLMS objects and logos with approved password
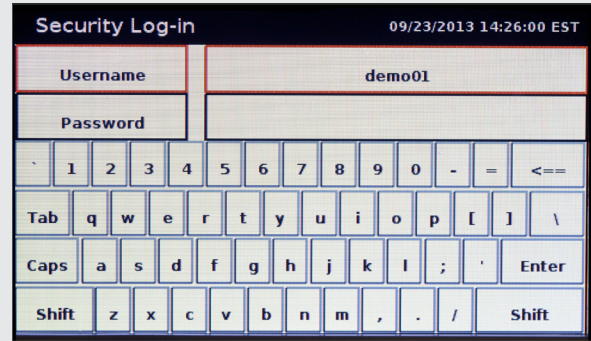
Operating the JEMStar II is simplified with the color display, which provides a user menu for viewing and editing the meter configurations.

Communications

Communication ports support various metering protocols including DNP, Modbus, JEM Binary and IEC-61850. They can operate simultaneously and independently. Tracking the status and protocol selections is simplified with the meter's graphical 'heads-up-display'; displaying what ports are installed and configured, which are in use and which require attention. The JEMStar II can be supplied with up to seven communication ports including:

· Optical port
· (3) Serial ports: RS-232 and RS-485
· Analog or cellular modem port
· (2) Ethernet ports

The independent Ethernet ports have separate IP addresses so the end users can allow access to third parties without breaching their secure network. Each Ethernet port can be addressed for multiple users and protocols operating simultaneously with permissions given to specified functions. The 4G LTE internal Cell Modem can use internal or external antennas depending on your requirements.
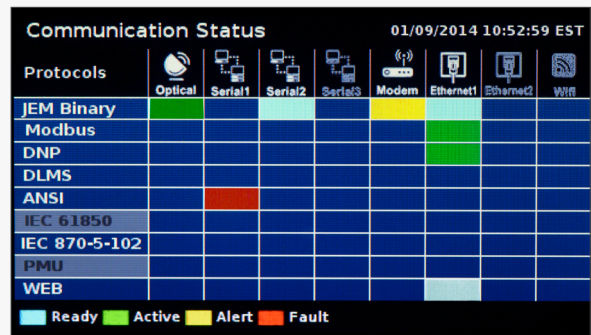
Our communications 'heads-up display' simplifies tracking the port status and protocol selections.

Notifications

The meter can provide alarm notifications using web based JSON messages, contact outputs, communication protocols and third-party software. The alarms can be initiated from an alarm trigger to indicate outages and other power quality conditions. Meter wiring connections can be checked at the meter via a color phasor diagram and alert you when wiring is mis-connected or phase angles exceed preset limits. The Phasor display can also be viewed remotely through the JEMWARE II software.

Within the meter software, email notifications can be sent for events such as triggers, battery status, time synchronizations and more. These are fully configurable, with options to send periodically or in live time.
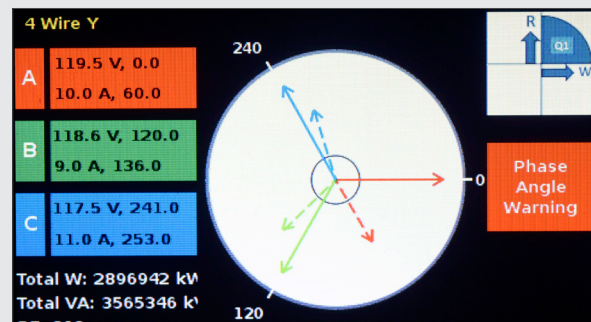
Wiring connections can be checked through the color phasor diagram.

Power Quality

The JEMStar II comes equipped with Sag/Swell/ Outage recordings that store the time, date, duration and site conditions. For advanced power quality (PQ) analysis, there is an option to record high speed RMS measurements and waveform data from pre-selected triggers. Triggers are provided for any instantaneous measurement, sub cycle transients, outages, rapid voltage changes, loss of phase and more. Waveform data is selectable from one kHz to 32 kHz recording rates with durations lasting up to 16 seconds. Power quality data resides in the meter via PQDIF file format and can be automatically exported for easy analysis with our analysis software or third-party applications. Meters can be equipped with a 'PQ Ready' option that provides all necessary hardware for a future upgrade to one of our advanced PQ options. Upgrading your meter can be done locally or remotely through upgrade codes for a seamless transition.

Metering Features and Functions

The meter can display 50 normal and 50 alternate registers on the graphical display, listing one to four measurements per screen. It can be provided with two independent load profile groups, each with 16 channels at intervals of one to 60 minutes. For additional measurement logging, it can record up to 400 different power measurements with recording intervals selectable from 150/180 cycles to 120 minutes. Logs can be used for short- or long-term trending of energy values, minimum/maximum/ average power measurements and harmonics up to the 64th. The meter comes with one GB of non-volatile memory for storing Load Profile, Measurement Logs and Power Quality data, providing ample space for all.

Input/Output Capability

We can equip your meter with an internal six-channel digital I/O and a four-channel analog output module. Each digital I/O channel can be selected as either an input or output through the JEMWARE II software and the I/O module has a built-in isolated supply to provide power for inputs.

Retrofits for Legacy Meters

For easy plug and play replacement of many legacy meters, the JEMStar II has several retrofit packages. The JEMStar II retrofit slides into the existing meter's enclosure and matches to all existing connections; saving you time and money on the meter installation. The retrofit includes a replacement front cover that sits flush with the previous installation. New features can be added to this site that weren't available before, including advanced communications and I/O.

Time Synchronization

The meter clock can be synchronized from its own high accuracy temperature compensated internal crystal or externally synchronized to the AC frequency, IRIG-B and NTP inputs depending on your application's requirements.

Power Quality Recordings	
Sag/Swell/Outage (Standard)	· Record event time, date, duration · Record Phase that triggered · Record Min/Max/Avg V, A, Pf, THD
High Speed RMS (Optional)	· Record voltage and current per phase · 120 Hz recording rate · Configurable trigger: pre and post event recording, max 60 second recording per event
Waveform Capture (Optional)	· Record voltage and current per phase · 16 samples/cycle recording rate: max 960 cycle recording per event · 128 samples/cycle recording rate: max 240 cycles recording per event · 512 samples/cycle recording rate: max 30 cycles recording per event · Configurable trigger: pre and post event recording
Harmonic Recording (Optional)	· Record individual voltage and current harmonic per phase up to 64th · Record magnitude and phase angle
Flicker Measurement (Optional)	· Pst and Plt · Pinst (instantaneous
Measurement Log (Optional)	· 8 logs of 50 measurements each · Recording intervals: 150/180 cycles to 120 minutes · Min/Max/Avg measurements
Trigger Selections (used for alarm logging and PQ recording)	· Sag/Swell · Transient trigger · Rapid voltage change · Interruptions · THD, TDD, Flicker · Phase loss, Phase rotation · Any instantaneous measurement (over/under) · Digital inputs
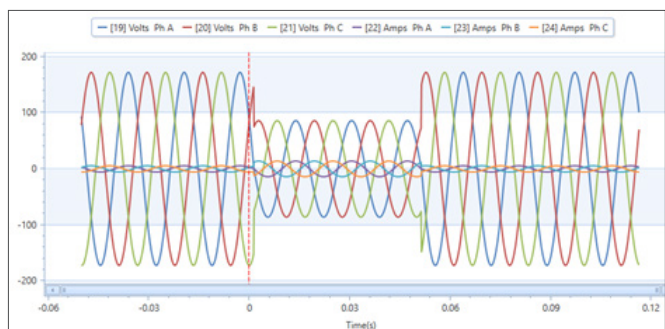
SPECIFICATIONS

METER FORMS
· Meter Forms: 5, 6, 8, 9, 45, Universal

INPUTS
VOLTAGE
· 55 to 306 VAC (L-N) 95 to 530 VAC (L-L)

CURRENT
· 1 amp: ANSI class 2
· 5 amps: ANSI class 10
· 10 amps: ANSI class 20
· Burden: 0.5 VA maximum
· Overload: 1.5x rated class current continuous
· Starting current: 0.002 A
· Frequency range: 45 – 55 Hz, 55 – 65 Hz

AUXILIARY POWER
S-base and A-base
· Self powered via all three phases: 55 – 530 VAC
· External Aux power option: 55 – 530 VAC or 90 – 300 VDC; 19 – 58 VDC option

SWITCHBOARD
· Aux Power: 55 – 530 VAC or 90 – 300 VDC; 19 – 58 VDC option

AUXILIARY POWER BURDEN
· 25 VA maximum

ACCURACY
WATT HOUR
· 0.05% reading (0.02% typical)

VOLTS, AMPS
· 0.04% reading

FREQUENCY
· 0.001 Hz

MEASUREMENTS
· Bi-directional, 4 quadrant
· Energy, instantaneous, per phase values
· Min/Max/Avg values
· Demand: peak, present, past, thermal and coincident
· TOU: 8 rates/day, 4 season
· TLC, LLC: per phase, delivered and received, transformer factors or % loss

MEASUREMENT LOGGING (Optional)
· 8 groups x 50 channels
· Recording interval: 150/180 cycle to 120 minutes
· Max 203 days of storage of 400 channels @ 10-minute recording interval

REGISTERS
· 50 normal, 50 alternate, 50 test

LOAD PROFILE
· 16 channels storage
· 1 – 60-minute intervals
· Values stored in scalable counts or 32-bit engineering units
· Optional second independent 16 channel LP Group
· Max 365 days storage of 32 channels @ 15-minute recording intervals

TIME SYNC
· Internal clock: .05 second/day accuracy
· 50/60 Hz line frequency
· External time sync options: IRIG-B, NTP

INTERNAL I/O
· Digital I/O: 6-channel selectable as input or output. Isolated power supply for digital inputs
· Analog output: 4-channel; 0 – 1 mA or 4 – 20 mA

DIGITAL INPUT RATING
· Form A or KYZ
· Maximum voltage 40 VDC

DIGITAL OUTPUT RATING
· Form A or KYZ
· Maximum open-circuit voltage: 200 V DC or peak AC
· Maximum switching current, 50 mA

COMMUNICATIONS (7 ports available)
PORT 1: Optical (Standard)
· Type 2: 19,200 baud

PORT 2: RS-232 Serial (Optional)
· User configurable: 200 to 38,400 baud

PORTS 3 and 4: RS-232/485 Serial (Optional)
· User selectable: RS-232/485
· User configurable: 300 to 38,400 baud

PORT 5: Internal Analog Modem (Optional)
· 56,000 baud

PORT 5: 4G LTE Internal Cellular Modem
· Verizon, Sprint, AT&T, Rogers, T-Mobile
· Internal and external antennas
· Supports APN and Whitelist of IP Addresses
· Supports up to 8 simultaneous connections

PORTS 6 and 7: Ethernet (Optional)
· 100 BaseT, unshielded twisted pair
· DHCP or fixed IP address
· Up to 12 simultaneous connections
· WEB server

COMMUNICATION PROTOCOLS
· Modbus RTU
· Modbus TCP/IP
· DNP 3.0
· ANSI Tables
· IEC 61850 (Optional)
· JEM Binary
· DLMS

METER DISPLAY
· 4.3" (109.2 mm) color graphic LCD
· Registers, phasor diagram, diagnostics
· User menu configuration

MECHANICAL
CASE STYLES
· Socket connected (S-base), small switchboard case, bottom connected (A-base), meter retrofits (JEM-2 and others)

SIZE AND WEIGHT
· S-base: 5.5 pounds (2.5 kg)
· A-base: 7.5 pound (3.4 kg)
· Switchboard: 11.5 pounds (5.2 kg)

METER RETROFITS
· AMETEK: JEM 2, JEM 10, JEMStar
· DS63, DS63W, DS64, DS64W
· D2B, D4B (short and tall)
· Quantum Q121, Q220
· Mark V
· Quad 4

ENVIRONMENT
OPERATING TEMPERATURE
· -22° to 185°F (-30° to 85°C)

STORAGE TEMPERATURE
· -40° to 185°F (-40° to 85°C)

ELECTRICAL STANDARDS
FAST TRANSIENT
· IEC 61000-4-4

RADIATED/CONDUCTED EMISSIONS
· IEC 61000-4-3, IEC 61000-4-6

SURGE IMMUNITY
· IEC 61000-4-5

ELECTROSTATIC DISCHARGE
· IEC 61000-4-2

SURGE WITHSTAND (SWC)
· IEEE Standard C37.90.1

AGENCY STANDARDS
· ANSI Standard C12.20-2010
· IEC61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-12
· IEC 61000-4-30 Class A Ed 3.0
· IEEE C37.90.1
· IEC 62053-22, IEC 62053-24 (Accuracy)

INDUSTRY APPROVALS
· CAISO
· ERCOT
· NYPSC

[1]Doesn't include auxiliary power requirements

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