JEMStar II IEC 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 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 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 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

1 High accuracy – 0.05% guaranteed for 10 years

2 NERC CIPS, WELMEC 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 Power Quality to IEC 61000-4-30 Class A
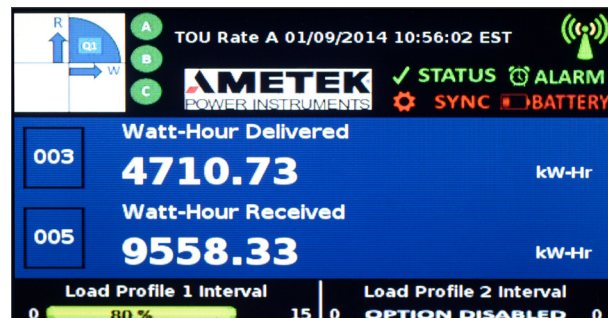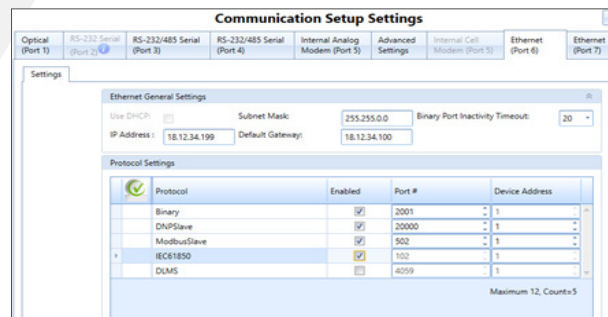
The color display makes it easy to view power measurements, phasor displays and meter diagnostics.

AMETEK®

POWER INSTRUMENTS

Meter Security and Data Integrity

The JEMStar II includes security features that satisfy NERC CIPS and WELMEC 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
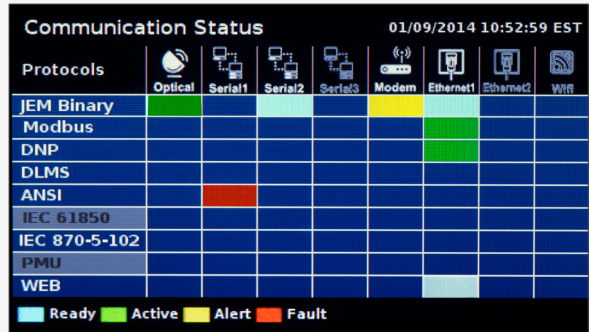· Read all DLMS objects and logos with approved password
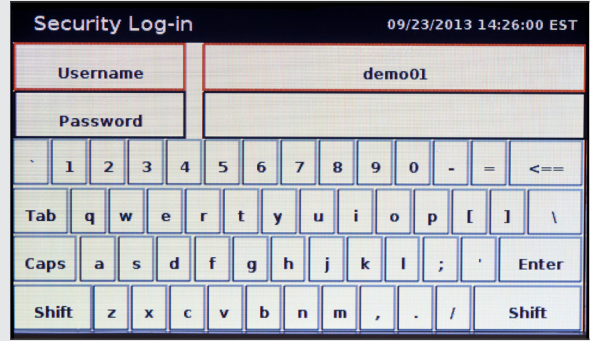
Operating the JEMStar II is simplified with the color display, which provides a user menu for viewing and editing the meter configurations.

Communications

Communication ports support various metering protocols including DLMS, IEC-61860, DNP, Modbus and JEM Binary. 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 six communication ports including:

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

Our communications 'heads-up display' simplifies tracking the port status and protocol selections.

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.

Alarm Notification

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 software.

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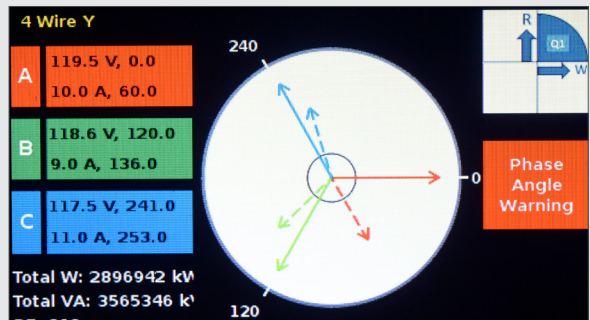
Wiring connections can be checked through the color phasor diagram.

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.

Measurement Logging:

To assist with your power quality continuous monitoring, the meter can be provided with a 400 channel measurement log that has selectable recording intervals 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 individual harmonics up to the 64th. There is enough memory to store more than six months of measurements from 400 channels using 10 minute recording intervals.

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, daily, weekly and monthly. The meter supports bi-directional, four quadrant metering with up to eight Tariff rates. To improve the accuracy even further, the Transformer Correction function allows you to enter up to eight correction factors for your external CT's so the CT is matched to the meter. 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 eight-channel digital I/O module. Each digital I/O channel can be selected as either an input or output through the JEMWARE software and the I/O module has a built-in isolated supply to provide power for inputs.

Time Synchronization

The meter clock can be synchronized from its own high accuracy temperature compensated internal crystal or externally synchronized to the AC frequency 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

Power Quality complies to IEC 61000-4-30 Class A
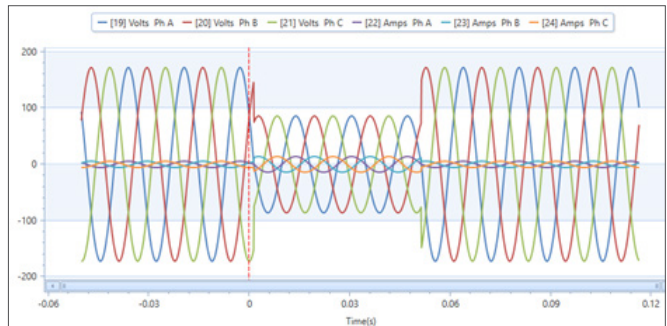
SPECIFICATIONS

METER CIRCUIT CONNECTIONS
· 3 Phase: 4 wire Wye, 3 wire Delta

INPUTS
VOLTAGE
· 45 to 300 VAC (L-N), 78 to 520 VAC (L-L)
· Frequency range: 45 - 55 Hz, 55 - 65 Hz

CURRENT
· 1 amp nominal, 2 amp max
· 5 amps nominal, 10 amps max
· 10 amps nominal, 20 amps max
· Burden: 0.5 VA maximum
· Overload: 1.5x rated max current continuous
· Starting current: 0.001 A (2 amp meter)
· Starting current: 0.002 A (10 and 20 amp meter)

AUXILIARY POWER
· Self powered via all three phases: 45 - 300 VAC (L-N)
· External Aux power option: 45 - 300 VAC (L-N) or 90 - 300 VDC
· Auto switching between Self and Aux power

AUXILARY 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: 0.5 second/day accuracy
· 50/60 Hz line frequency
· External time sync options: NTP

INTERNAL I/O
· Digital I/O: 8-channel selectable as input or output. Isolated power supply for digital inputs

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 (6 ports available)
PORT 1: Optical (Standard)
· IEC 1107: 19,200 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

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 STYLE
· IEC

SIZE AND WEIGHT
· IEC: 7.5 pounds (3.4 kg)

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

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

ELECTRICAL STANDARDS
· IEC61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-12
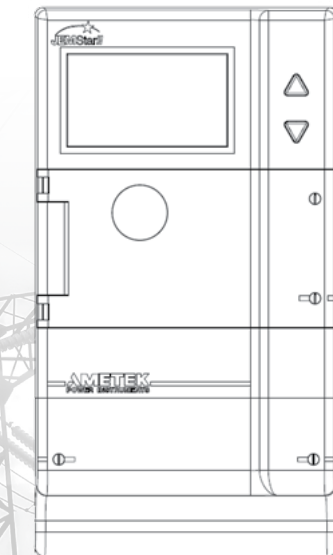· IEEE C37.90.1

METERING STANDARDS
· IEC 62052-11, IEC 62052-21
· IEC 62053-22 Active Energy (Class 0.2S)
· IEC 62053-24 Reactive Energy (Class 0.5S)
· EN 50470-1, EN 50470-3
· IEC 61000-4-30 Class A Ed 3.0

AGENCY STANDARDS
· MID

JEMStar IEC Dimensions Drawing
Height: 330.9 mm (13.03 in)
Width: 182.0 mm (7.17 in)
Depth: 105.4 mm (4.15 in)

¹Doesn't include auxiliary power requirements

AMETEK®
POWER INSTRUMENTS
REV 04/2023