

# POWER QUALITY / ENERGY ANALYZERS, METERS & LOGGERS

## PEL 100 SERIES



### MODEL PEL 103

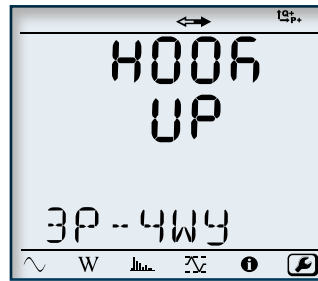


### FEATURES

- Simple-to-use, single-, dual- (split-phase) and three-phase (Y, Δ) power & energy loggers
- Designed to work in 1000 V CAT III and 600 V CAT IV environments and fits in many distribution panels
- Power measurements: kVA, kW and kvar
- Energy measurements: kWh, kVAh (source, load) and kvarh (quadrant indication)
- Updated features in DataView® software for configuring real-time communication with a PC and report generation with pre-defined or user defined templates
- 8 GB SD card supplied, can be upgraded up to 32 GB
- USB, LAN, Ethernet and Bluetooth® (Class 1 wireless communication, up to 300 ft away)
- Satisfies the monitoring requirements of NEC Code 220.87
- PEL 103 can be configured from front panel, DataView® control panel or the FREE Android™ application
- Provides all the necessary functions for power and energy data logging for (50, 60, 400) Hz and DC distribution systems
- Automatic recognition of the connected current sensors and probes
- Magnetic case allows for mounting inside power panel
- Supports 17 network configurations

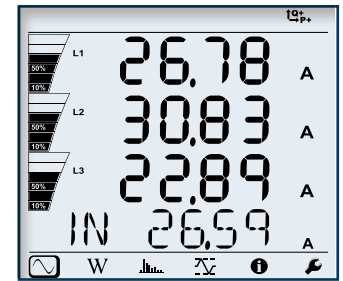
### Large Functional Displays

#### INFORMATION MODE



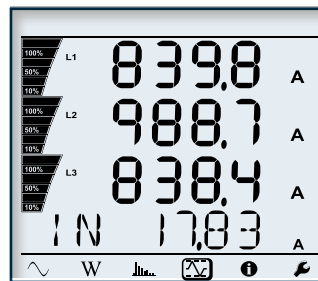
Hook up, voltage and current ratios and aggregation period can be configured from the front panel of the PEL 103.

#### MEASUREMENT MODE



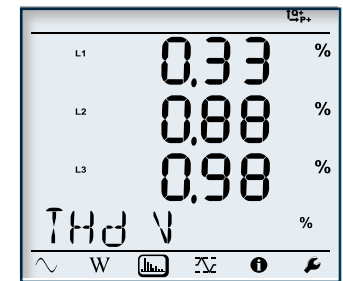
Real-time updates are displayed for voltage, current, power, frequency, power factor and tangent.

#### MAX MODE



Max values for voltage, current (including neutral current), power and harmonics.

#### HARMONIC MODE



Total Harmonic Distortion (THD) can be displayed by phase or phase to phase. Neutral current THD can also be displayed.

### PRODUCT INCLUDES

#### PEL 103 KIT (w/LCD) CAT. #2137.52 (SHOWN)

Small classic tool bag, (3) MiniFlex® MA193-10-BK sensors, 5 ft USB cable, (4) black test leads and alligator clips, power cord, (12) color-coded ID markers, safety data sheet, compliance sheet, 8 GB SD card with USB-SD card reader, printed quick start user guide, and USB drive with DataView® software and user manual.



### ACCESSORIES

#### CAT. #2137.90

Adapter - 600 V CAT III Power to Phase Adapter for use with Models PEL 102 & PEL 103

\*ADAPTER SOLD SEPARATELY

SEE PAGES 130 - 131 FOR MORE  
OPTIONAL ACCESSORIES



CAT. #	DESCRIPTION
2137.52	Power & Energy Logger Model PEL 103 (w/LCD, w/(3) MA193-10-BK Sensors)
2137.62	Power & Energy Logger Model PEL 103 (w/LCD, No Sensors)



# POWER QUALITY / ENERGY ANALYZERS, METERS & LOGGERS

## POWER & ENERGY LOGGERS PEL 100 SERIES

MODELS	PEL 102, PEL 103 & PEL 105			
<b>GENERAL</b>				
Sampling Frequency	128 samples per cycle; (50 / 60) Hz (16 samples / cycle 400 Hz)			
Data Storage Rate	1 per second (200 ms also available on PEL 105)			
Demand Period Storage Rate	User selectable (1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30 and 60) min			
Recorded Parameters (Single- and Poly-Phase)	V, I, W, VA, var, PF, Tan, Wh, VAh, varh, THD (V and I), Individual harmonics (from 1 through 50 per phase); Crest Factor (CF), Cos f / DPF			
Event Log	Tracks and records status changes and error messages along with recorded data			
Front Panel Indicator LEDs	Bluetooth® active, recording in progress, phase connection reversal, overload, battery charging and SD card status			
Storage Capacity	8 GB SD card included / SD cards up to 32 GB formatted FAT32 are supported			
Voltage Input	PEL 102 / 103: 3 input channels / PEL 105: 4 input channels via 4 mm safety banana jacks			
Current Input	PEL 102 / 103: 3 input channels PEL 105: 4 input channels via custom 4 pin jacks that accept AEMC® Instruments probes and sensors			
<b>ELECTRICAL</b>				
<b>VOLTAGE MEASUREMENT</b>		RANGE	RESOLUTION*	ACCURACY*
<b>(50 / 60) Hz</b>		(42.5 to 69) Hz	–	± 0.1 Hz
<b>Single-Phase RMS Voltages</b>		(10 to 1000) Vrms	0.1 V	± 0.2 % Reading ± 0.2 V
<b>Phase-to-Phase RMS Voltages</b>		PEL 102 / 103: (17 to 1700) Vrms PEL 105: (17 to 1000) Vrms	(0.1 to 1) V	± 0.2 % Reading ± 0.4 V
<b>400 Hz</b>		(340 to 460) Hz	–	–
<b>Single-Phase RMS Voltages</b>		(10 to 600) Vrms	0.1 V	± 1 % Reading ± 1 V
<b>Phase-to-Phase RMS Voltages</b>		PEL 102 / 103: (17 to 1200) Vrms PEL 105: (17 to 600) Vrms	(0.1 to 1) V	± 1 % Reading ± 1 V
<b>DC</b>		(100 to 1000) V	0.1 V	± 1 % Reading ± 3 V (typical)
<b>PT Ratios</b>		Programmable from (50 to 650,000) V	–	(0.01 to 0.1) V
<b>CURRENT MEASUREMENT</b>		A193 A*** (PEL 102 / 103)	196 A*** (PEL 105)	–
<b>Nominal range for current probes supplied with kit.</b> (See chart on Pages 44 to 46 for other probes)		200 mA to 12,000 A		–
<b>CT Ratios</b>		Programmable from 1:1 to 25,000:1 (probe dependent)		
<b>POWER MEASUREMENTS</b>		RANGE	RESOLUTION*	ACCURACY*
<b>Active Power (P)*</b>		(-2 to 2) GW	0.001 W	± 0.5 % Reading ± 0.005 % Pnom
<b>Reactive Power (Q)*</b>		(-2 to 2) Gvar	0.001 var	± 1 % Reading ± 0.01 % Qnom
<b>Apparent Power (S)*</b>		(0 to 2) GVA	0.001 VA	± 0.5 % Reading ± 0.005 % Snom
<b>Power Factor</b>		-1 to 1	0.001	± 0.05
<b>Tangent φ (active / reactive power ratio)</b>		-3.2 to 3.2	0.001	± 0.02
<b>ENERGY MEASUREMENTS</b>		RANGE	RESOLUTION*	ACCURACY*
<b>Active Energy (EP)</b>		4 EWh	1 Wh	± 0.5 % Reading
<b>Reactive Energy (EQ)</b>		4 Evarh	1 varh	± 2 % Reading
<b>Apparent Energy (ES)</b>		4 EVAh	1 VAh	± 0.5 % Reading
<b>THD</b>		± 655 %		
<b>Individual Harmonics</b>		1 to 50 displayed in percentage; 1 to 7 at 400 Hz		
<b>External Supply</b>		110 / 250 V (10 %) @ (50 / 60) Hz; 400 Hz		
<b>Power From Phase Measurement</b>		PEL 102 / 103: Requires optional 600 V Power Adapter / PEL 105: Internal up to 1000 V <sub>ac</sub>		
<b>Back-Up Power Supply / Charge Time</b>		Rechargeable 8.4 V NiMH battery pack / Approximately 5 h		
<b>Battery Life</b>		30 min minimum, 60 min typical		
<b>MECHANICAL</b>				
<b>Communication</b>		USB 2.0, Ethernet (RJ45), Wireless Bluetooth® Class 1 **/ Wi-Fi (PEL 105)		
<b>Dimension / Weight</b>		PEL 102 / 103: (10.08 x 4.92 x 1.46) in (256 x 125 x 37) mm / 2.20 lb (1 kg) PEL 105: (9.8 x 7.8 x 2.6) in (249 x 198 x 66) mm / 8.8 lb (4 kg)		
<b>Case</b>		Double insulated, rubber over-molded (PEL 102 & 103 only), polycarbonate UL94 V1 rated		
<b>Display Type for Models PEL 103 &amp; 105</b>		(2.63 x 2.16) in (67 x 55) mm, four line, monochrome, backlit LCD with adjustable brightness and contrast		
<b>ENVIRONMENTAL / SAFETY</b>				
<b>Operating Temperature / Relative Humidity</b>		PEL 102 / 103 / 105: (32 to 108.5) °F (0 to 42.5) °C / up to 85 % RH		
<b>Storage Temperature</b>		(-4 to 122) °F (-20 to 50) °C with batteries; (-4 to 158) °F (-20 to 70) °C without batteries		
<b>Safety Rating / CE Rating</b>		PEL 102 / 103: Complies with IEC 61010-1, and IEC 61010-2-030 for 1000 V CAT III / 600 V CAT IV 1000 V CAT IV (PEL 105), Pollution Degree 2 / Yes		
<b>Ingress Protection</b>		PEL 102 / 103: IP54 non operating / PEL 105: IP67 with cover closed		

Consult factory for NIST Calibration prices.

\* Maximum value is current probe dependent.







\*\* Computers with Class II Bluetooth® will restrict range to 40 ft; Computers without Bluetooth® will require a Class I or Class II Bluetooth® radio adapter.

\*\*\* Maximum current reduced by a factor of 2 for 400 Hz fundamental frequency.








# POWER QUALITY / ENERGY ANALYZERS, METERS & LOGGERS

## OPTIONAL ACCESSORIES

MODEL	MAX CONDUCTOR SIZE	ACCURACY (TYPICAL)	TYPICAL ERROR ON $\Phi$ AT (50 / 60) HZ	CURRENT RANGE	USED WITH MODEL	CAT. #
<b>MiniFlex® Model MA193-10-BK* &amp; MiniFlex® Model MA193-14-BK* &amp; MiniFlex® Model MA194-24-BK*</b>  <b>10, 14 &amp; 24 in Sensor</b>	2.75 in (70 mm) (10 in sensor)	± 1 %	0.5 °	100 mA to 12,000 A <sub>AC</sub> <sup>(1)</sup>	PEL 52 PEL 102 PEL 103 PEL 105 8333 8336 8436 8345	2140.48 (10 in sensor)
	3.94 in (100 mm) (14 in sensor)					2140.50 (14 in sensor)
	7.64 in (194 mm) (24 in sensor)					2140.80 (24 in sensor)
<b>AC / DC Current Probe Model MR193-BK</b> 	1.6 in (41 mm)	± 2.5 %	-0.80 °	(1 to 1000) A <sub>AC</sub> (1 to 1300) A <sub>DC</sub>	PEL 102 PEL 103 PEL 105 8333 8336 8436 8345	2140.28
<b>AC Current Probe Model MN93-BK</b> 	0.78 in (20 mm)	± 1 %	0.8 °	(0.5 to 240) A <sub>AC</sub>	PEL 52 PEL 102 PEL 103 PEL 105 8333 8336 8436 8345	2140.32
<b>AC Current Probe Model SR193-BK</b> 	2.05 in (52 mm)	± 0.3 %	0.2 °	(1 to 1200) A <sub>AC</sub>	PEL 52 PEL 102 PEL 103 PEL 105 8333 8336 8436 8345	2140.33
<b>AmpFlex® Sensor 24 in Model 193-24-BK*</b> 	7.64 in (194 mm) (24 in sensor)	± 1 %	0.5 °	100 mA to 12,000 A <sub>AC</sub> <sup>(1)</sup>	PEL 52 PEL 102 PEL 103 PEL 105 8333 8336 8436 8345	2140.34
<b>AmpFlex® Sensor 36 in Model 193-36-BK*</b> 	11.64 in (291 mm) (36 in sensor)	± 1 %	0.5 °	100 mA to 12,000 A <sub>AC</sub> <sup>(1)</sup>	PEL 52 PEL 102 PEL 103 PEL 105 8333 8336 8436 8345	2140.35

# POWER QUALITY / ENERGY ANALYZERS, METERS & LOGGERS OPTIONAL ACCESSORIES

MODEL	MAX CONDUCTOR SIZE	ACCURACY (TYPICAL)	TYPICAL ERROR ON $\phi$ AT (50 / 60) HZ	CURRENT RANGE		USED WITH MODEL	CAT. #
<b>AC Current Probe Model MN193-BK</b> 	0.78 in (20 mm)	± 1 %	0.75 °	100 A	200 mA to 120 AAC	PEL 52 PEL 102 PEL 103 PEL 105 8333 8336 8436 8345	2140.36
			1.7 °	5 A	5 mA to 6 AAC		
<b>AmpFlex® Sensor 24 in Model 196A-24-BK* (Waterproof IP67)</b> 	7.64 in (194 mm) (24 in sensor)	± 1 %	0 °	100 mA to 12,000 AAC <sup>(1)</sup>		PEL 105 8436	2140.75
<b>MiniFlex® Sensor 14 in Model MA196-14-BK* (Waterproof IP67)</b> 	3.9 in (99 mm) (14 in sensor)	± 1 %	0 °	100 mA to 12,000 AAC <sup>(1)</sup>		PEL 105 8436	2140.79
<b>AC Current Probe Model MN94</b> 	0.25 in (7 mm)	± 0.2 %	0.1 °	50 mA to 200 AAC		PEL 52 8345	2140.81
<b>AC / DC Current Probe Model E94</b> 	.464 in (11.8 mm)	± 3 %	1.5 °	10 A	100 mA to 10 AAC	8345	2140.82
		± 4 %	1 °	100 A	500 mA to 100 AAC		

\* Maximum current reduced by a factor of 2 for 400 Hz fundamental frequency.

All current sensors can be used with Models PEL 105 and 8436. However, only the MA196-14-BK and 196A-24-BK flexible sensors are waterproof.

(1) Current range may be limited by sensor size or meter type.

Consult factory for NIST Calibration prices.

# POWER QUALITY / ENERGY ANALYZERS, METERS & LOGGERS SELECTION CHART

MODEL	CAT. #	INPUT TERMINALS	CHANNELS	RMS VOLTAGE MAX PHASE-TO-NEUTRAL	RMS VOLTAGE MAX PHASE-TO-PHASE	PEAK VOLTAGE MAX PHASE-TO-NEUTRAL	PEAK VOLTAGE MAX PHASE-TO-PHASE	DC VOLTAGE MAX	AC CURRENT MAX (PROBE DEPENDENT)	DC CURRENT MAX (PROBE DEPENDENT)	RATIOS VOLT	RATIOS AMPERE
8333	2136.10	4 V / 3 I	3 V / 4 I	1000 Vrms	2000 Vrms	1414 Vpk	2828 Vpk	1200 V <sub>DC</sub>	10,000 A <sub>AC</sub>	1300 A <sub>DC</sub>		Yes
8336	2136.30	5 V / 4 I	4 V / 4 I	1000 Vrms	2000 Vrms	1414 Vpk	2828 Vpk	1200 V <sub>DC</sub>	10,000 A <sub>AC</sub>	5000 A <sub>DC</sub>		Yes
8345	2136.35	5 V / 4 I	4 V / 4 I	1000 Vrms	2000 Vrms	1414 Vpk	2828 Vpk	1200 V <sub>DC</sub>	10,000 A <sub>AC</sub>	5000 A <sub>DC</sub>		Yes
8436	2136.43	5 V / 4 I	4 V / 4 I	1000 Vrms	2000 Vrms	1414 Vpk	2828 Vpk	1200 V <sub>DC</sub>	10,000 A <sub>AC</sub>	5000 A <sub>DC</sub>		Yes
PEL 52	2137.71	2 V / 2 I		600 Vrms	1200 Vrms	-			3600 A <sub>AC</sub>	-	No	Yes
PEL 102	2137.51	4 V / 3 I	3 V / 3 I	1000 Vrms	1700 Vrms	1414 Vpk	2400 Vpk	1000 V <sub>DC</sub>	12,000 A <sub>AC</sub>	5000 A <sub>DC</sub>		Yes
PEL 103	2137.52	4 V / 3 I	3 V / 3 I	1000 Vrms	1700 Vrms	1414 Vpk	2400 Vpk	1000 V <sub>DC</sub>	12,000 A <sub>AC</sub>	5000 A <sub>DC</sub>		Yes
PEL 105	2137.57	5 V / 4 I	4 V / 4 I	1000 Vrms		1414 Vpk	2400 Vpk	1000 V <sub>DC</sub>	12,000 A <sub>AC</sub>	5000 A <sub>DC</sub>		Yes

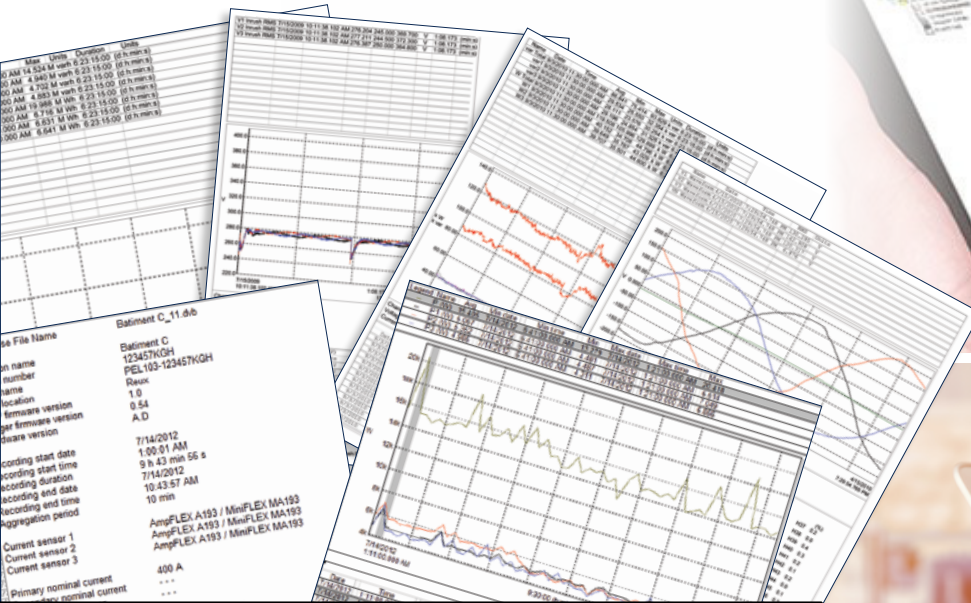
MODEL	CAT. #	DISTRIBUTION SYSTEMS	PHASE ROTATION	WAVEFORM MODE	TRANSIENT MODE	TRUE INRUSH <sup>®</sup> MODE / TYPE / DURATION	ALARM MODE	SNAPSHOT MODE	HARMONIC MODE / INTERHARMONIC MODE	TYPE LCD	POWER SOURCE
8333	2136.10	1 P-2 W, 2 P-3 W, 3 P-3 W, 3 P-4 W		Yes		No	10 types / up to 2 active / 4662 recorded	Yes (12)	Yes / No	TFT - 5.7 in diagonal 320 x 240 resolution	External adapter with internal NiMH battery pack
8336	2136.30	1 P-2 W, 1 P-3 W, 2 P-2 W, 2 P-3 W, 2 P-4 W, 3 P-3 W, 3 P-4 W, 3 P-5 W		Yes		Yes (RMS+PEAK & RMS) up to 1 & 10 min	40 types / up to 7 active / 16,362 recorded	Yes (50)	Yes / No	TFT - 5.7 in diagonal 320 x 240 resolution	External adapter with internal NiMH battery pack
8345	2136.35	1 P-2 W, 1 P-3 W, 2 P-2 W, 2 P-3 W, 2 P-4 W, 3 P-3 W, 3 P-4 W, 3 P-5 W		Yes		Yes (RMS+PEAK & RMS) up to 10 & 30 min	40 types / 20,000 w / email notifications	Yes (no limit with SD card)	DC to 127 <sup>th</sup> order; < 3 % U <sub>din</sub> / 0 to 62 <sup>nd</sup> order; < 0.5 % U <sub>din</sub>	7 in color LCD touch screen: 800 x 480 (WVGA)	External adapter with Li-ion battery pack
8436	2136.43	1 P-2 W, 1 P-3 W, 2 P-2 W, 2 P-3 W, 2 P-4 W, 3 P-3 W, 3 P-4 W, 3 P-5 W		Yes		Yes (RMS+PEAK & RMS) up to 1 & 10 min	40 types / up to 7 active / 16,362 recorded	Yes (50)	Yes / No	TFT - 5.7 in diagonal 320 x 240 resolution	Line Power with internal NiMH battery pack
PEL 52	2137.71	1 P-2 W, 2 P-3 W, 1 P-3 W	Yes				No			Monochrome LCD	Power phase input with internal NiMH battery pack
PEL 102	2137.51	1 P-2 W, 1 P-3 W, 3 P-3 W D2, 3 P-3 W O2, 3 P-3 W Y2, 3 P-3 W D3, 3 P-3 W O3, 3 P-3 W Y, 3P-3 W DB, 3 P-4 W Y, 3 P-4 W YB, 3 P-4 W Y2 1/2, 3 P-4 W D, 3 P-4 W OD, DC-2 W DC-3 W, DC-4 W	Yes			No			Yes / No	None	Line Power with internal NiMH battery pack
PEL 103	2137.52	1 P-2 W, 1 P-3 W, 3 P-3 W D2, 3 P-3 W O2, 3 P-3 W Y2, 3 P-3 W D3, 3 P-3 W O3, 3 P-3 W Y, 3P-3 W DB, 3 P-4 W Y, 3 P-4 W YB, 3 P-4 W Y2 1/2, 3 P-4 W D, 3 P-4 W OD, DC-2 W DC-3 W, DC-4 W	Yes			No			Yes / No	Monochrome LCD	Line Power with internal NiMH battery pack
PEL 105	2137.57	1 P-2 W, 1 P-3 W, 3 P-3 W D2, 3 P-3 W O2, 3 P-3 W Y2, 3 P-3 W D3, 3 P-3 W O3, 3 P-3 W Y, 3P-3 W DB, 3 P-4 W Y, 3 P-4 W YB, 3 P-4 W Y2 1/2, 3 P-4 W D, 3 P-4 W OD, DC-2 W DC-3 W, DC-4 W	Yes			No			Yes / No	Monochrome LCD	Power phase input or external adapter with internal NiMH battery pack

# POWER QUALITY / ENERGY ANALYZERS, METERS & LOGGERS

## DataView<sup>®</sup> Data Analysis and Reporting Software

### Configure all functions:

- Display and analyze real-time data on your PC
- Configure functions and parameters from your PC
- Customize views, templates and reports to your exact needs
- Create and store a complete library of configurations that can be uploaded as needed
- Zoom in and out and pan through sections of the graph to analyze the data
- Download, display and analyze recorded data
- Display waveforms, trend graphs, harmonic spectrums, text summaries, transients, event logs and stored alarms
- Print reports using standard or custom templates you design
- Free updates available on our website [www.aemc.com](http://www.aemc.com)



Reports can be displayed on a PC and printed. Each report includes all test results in a tabular and graphic format, as well as operator and test site information. Comments typed by the operator will also be included.

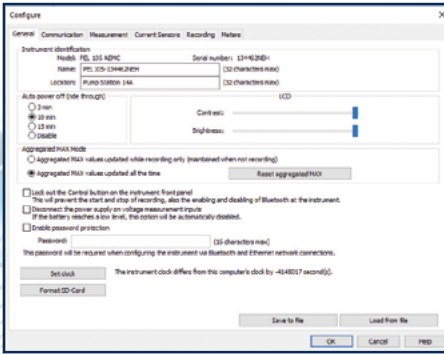


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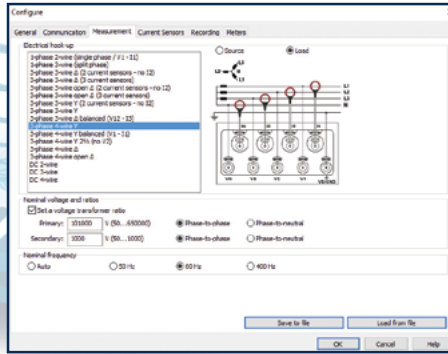
## DataView® Data Analysis and Reporting Software



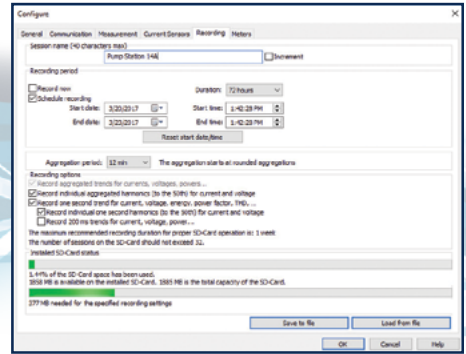
DataView® software, user manual and quick start guide are included in the USB Drive



Configure basic information regarding Auto Power OFF, instrument name and location, display contrast and brightness (*Models PEL 103 & PEL 105*), setting of the real-time clock and SD-card formatting is easily accomplished from the General tab.



The Measurement tab specifies the electrical distribution system, voltage ratios, and nominal frequency.

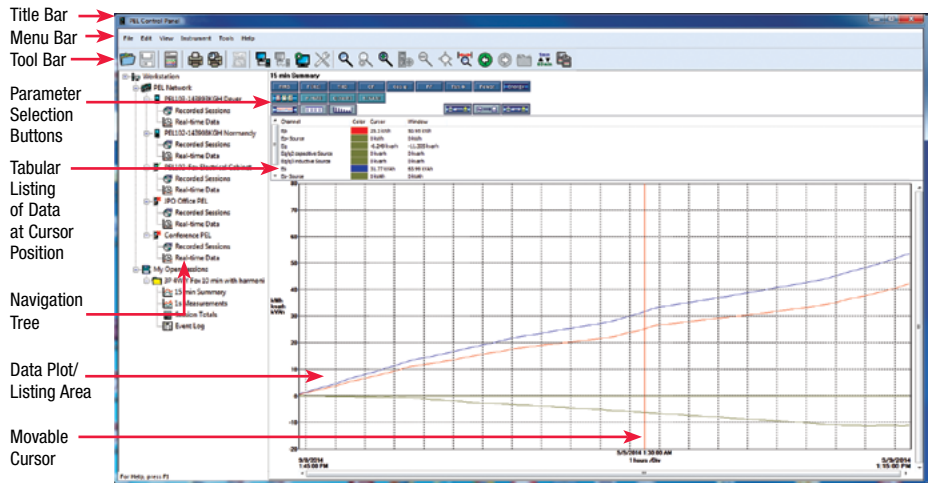


In the Recording tab, configure the instrument to measure (*and record*) over a user selectable recording period. Select demand intervals and view available memory for data storage.

## Typical DataView® Functional Digital & Graphical Display

### Control Panel Trend View

In the PEL Control Panel you will find all the necessary tools and selection buttons to review recorded data as trend plots or tabular lists.



**NEW!** Effortlessly Perform Load Study Analysis Meeting the NEC 220.87 Requirements with the PEL DataView® Control Panel Feature