

APPLICATION NOTE

Data Aggregation



Data Aggregation in PowerPad® and PEL Instruments

- ▶ Turn raw data into clear, time-stamped insights
- ▶ Cut memory use without sacrificing accuracy
- ▶ Dial in intervals to track everything from spikes to trends

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 **AEMC**[®]
INSTRUMENTS
CHAUVIN ARNOUX GROUP

UNDERSTANDING DATA AGGREGATION IN AEMC® INSTRUMENTS

Turn thousands of measurements into clear, time-stamped insights.

Data aggregation is a smart recording method used in AEMC® PowerPad® and PEL power and energy analyzers. It transforms continuous high-speed measurements into averaged data over user-defined time intervals — so you can view meaningful trends without overwhelming storage.

HOW IT WORKS

During recording, the instrument measures continuously at a high sampling rate (*for example, 128 samples per cycle*). Instead of saving every individual sample, the instrument computes an average for each selected time period — from one second up to one hour, depending on model and configuration.

WHY IT MATTERS

- ▶ **Smarter storage:** Capture weeks or months of data without running out of memory.
- ▶ **Greater insight:** See both short-term spikes and long-term trends by adjusting the aggregation period.
- ▶ **Consistent accuracy:** Averages are calculated using RMS, arithmetic mean, or other methods depending on the parameter.



AEMC® Instruments Power and Energy Loggers provide all the necessary functions and features for power and energy data logging for most (50, 60, 400) Hz, and DC distribution systems worldwide. Primary users include contractors performing power system evaluation and monitoring.

These instruments measure phase-to-phase, phase-to-neutral, and neutral-to-earth voltage, measuring up to 1000 V. They also measure phase and neutral current, using a variety of external current sensors. Measurement data is then used to calculate numerous values, including active, reactive, and apparent power and energy; crest factor, harmonics and total harmonic distortion; and others.

Our PowerPad® family of instruments combine data logging with sophisticated power quality analysis. These instruments are portable three-phase network analyzers designed to:

- ▶ Measure RMS values, powers, and fluctuations of electric hookups
- ▶ Deliver a snapshot of the principal characteristics of a three-phase network
- ▶ Track variations of specified parameters over time

These instruments enable utility company technicians and engineers to measure single- and three-phase networks, and perform diagnostics and power quality analysis. Trend data can be recorded for days, weeks or even months. Inrush current can also be captured and stored.

When recording data, both the PowerPad® and PEL instruments perform data aggregation. This involves determining the average value for a measured parameter over a user-specified time interval.

The interval over which aggregation is performed can be selected by the user. Some models allow you to do this through the instrument interface, while others require configuration via the DataView® software.

Some instruments allow aggregation periods as short as one second, while others let you set the period up to one hour. Shorter periods are recommended for short recordings containing minute-by-minute detailed measurements, while longer periods are ideal for monitoring long-term trends for several weeks or months. The typical aggregation period used by utility companies in the U.S. is 15 minutes, while in Europe the period is typically 10 minutes.

Aggregation reduces file size dramatically while preserving accuracy!

Every data point you see represents the true average of all measurements captured during that interval — not just a single spot reading.

Note that aggregation does not affect how often an instrument takes each measurement. Instead, during the recording session, the instrument takes measurements at a constant rate, such as 128 samples per cycle for the PEL.

At the end of each aggregation period, the instrument automatically applies a mathematical formula to determine the average of all the measurements taken. Depending on the instrument and measured parameter, the average is determined by calculating the root mean square, arithmetic mean, or other calculation. This average is then recorded in the instrument memory.

The recorded time of the aggregated measurement depends on the instrument model. On PowerPad® instruments, the time stamp of the aggregated measurement for most parameters is the beginning of the aggregation period, while on PEL instruments the time stamp is the end of the period.

For example, if you schedule a recording on the PEL to begin at 12:00 and end at 1:00, and select a 15 minute aggregation period, the recording will consist of four measurements (12:15, 12:30, 12:45, with the final measurement at 1:00).

On a PowerPad® with the same configuration, most aggregated measurements will be recorded at 12:00, 12:15, 12:30, with the final measurement at 12:45. The one exception are energy measurements, which in PowerPad® recordings are time stamped at the end of the aggregation period, similar to PEL instruments.

TIME-STAMP BEHAVIOR

- ▶ PEL instruments record the end time of each aggregation period.
- ▶ PowerPad® instruments record the start time — except for energy measurements, which use the end time.
- ▶ For example, a PEL with a 15-minute interval starting at 12:00 will record results at 12:15, 12:30, 12:45, and 1:00, while a PowerPad® will record 12:00, 12:15, 12:30, and 12:45.

Note that aggregation will only begin or end at clock times evenly divisible by the aggregation period.

For instance, if a one-hour recording on the PEL begins at 12:06 with a 15 minute aggregation period, the first aggregation begins at 12:15 and ends at 12:30.

Aggregation is then performed every 15 minutes, with the final aggregation ending at 1:00. Although the recording continues until 1:06, no aggregation will be performed for the final 6 minutes. Therefore for this recording, only three aggregated measurements will be made.

TIPS FOR SETUP

- ▶ Use shorter intervals (1 to 5 seconds) for transient or startup analysis.
- ▶ Use longer intervals (10 to 15 minutes) for utility monitoring and energy audits.
- ▶ Remember that aggregation always starts and ends on clock times evenly divisible by the chosen interval

The screenshot shows the 'Configure' dialog box with the 'Recording' tab selected. The 'Session name' is 'Max_File_Test' and 'Increment' is checked. Under 'Recording period', 'Record now' is unchecked and 'Schedule recording' is checked. The 'Duration' is set to '01 (h)'. The 'Start date' and 'End date' are both '9/11/2018'. The 'Start time' is '2:59:49 PM' and the 'End time' is '3:59:49 PM'. A 'Reset start date/time' button is visible. The 'Aggregation period' is set to '15 min' and the text 'The aggregation starts at rounded aggregations' is displayed. In the 'Recording options' section, 'Record aggregated trends for currents, voltages, power, etc.' is checked. A red circle highlights the 'Aggregation period' and 'Recording options' sections.

DATAVIEW SOFTWARE — BEYOND POWERPAD® AND PEL

While true on-instrument aggregation is exclusive to these models, DataView® software can also apply aggregation or resampling to logged data from other AEMC® instruments. This allows users to unify reports across product families and simplify data comparisons.

CONCLUSION

Aggregation helps you balance data resolution, storage efficiency, and trend visibility — giving you a clear view of your system's performance over time.



Family of Products

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