Android™ Application for the Clamp-on Ground Tester Model 6417

TECHNICAL BULLETIN
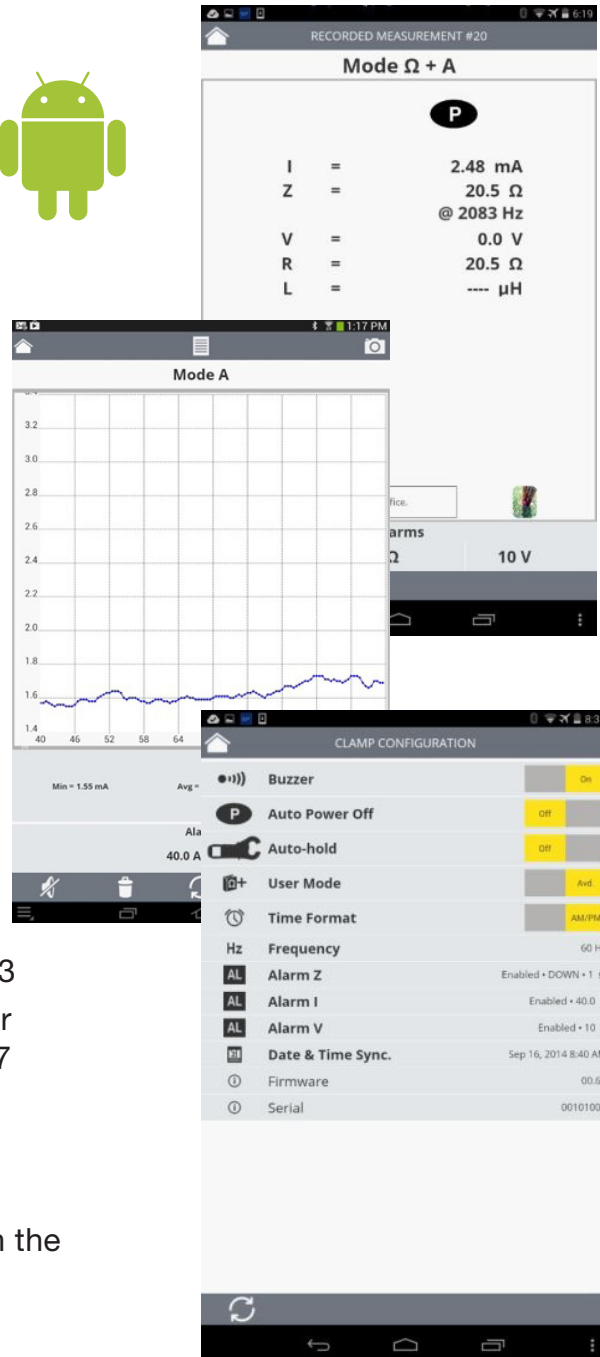
Inside this Issue:

Replacing the Battery in a Model PEL 102 or PEL 103

By Neil Franklin

The PEL 102 and PEL 103 power and energy logger instruments include an 8.4V NiHM battery pack for backup power. This battery, shown below, can be replaced by the user. With normal use, the battery should only need to be replaced once every three or four years or so.

⚠ **CAUTION** ⚠

PEL battery replacement must be performed carefully and in strict accordance with the procedure described below. Any variation could result in damage to the instrument. *If you are unsure about performing this procedure, return the PEL to AEMC for a factory battery replacement.*

Before you Begin

To replace the battery you will need the following:

- A clean work surface free of debris, water, and other possible contaminants. This surface should be well-lighted and provide sufficient room to perform the steps below.

- 8.4V NiHM battery pack (**Cat. #2137.75**)

- Torx T10 screwdriver. (Torx type screwdrivers are also known as "star" screwdrivers.)

- Tape (masking, electrical, etc.)

- (Optional) A small non-conducting implement such as a drink stirring stick or toothpick

Before starting this procedure, we recommend that you view the instructional video "PEL 102/103 Battery Replacement" on our **AEMC YouTube channel**.

Battery Replacement Procedure

To replace the battery in the PEL 102/103, disconnect the instrument from all leads, electrical sources, and sensor probes. Then follow these steps:

1. Apply tape to the control buttons on the PEL front panel. This tape will ensure that the buttons remain in place when you remove the PEL's front cover from the back cover.


2. Tape the PEL's endplates to the back cover, as shown below. This helps ensure that the endplates remain attached to the back cover when you remove the front cover.
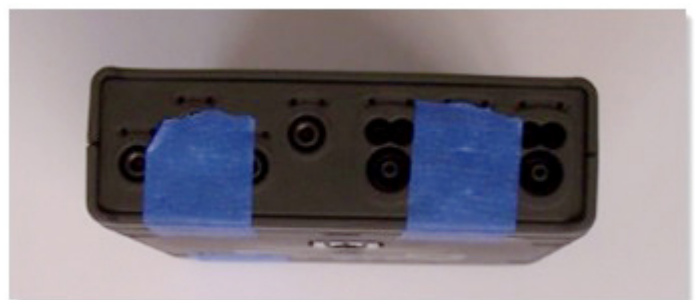
3. Turn over the PEL, and locate the six fastening screws on the back of the instrument.


4. Using a Torx T10 screwdriver, remove these fastening screws.

5. Carefully separate the front cover of the PEL from the back cover. Typically the two covers fit together very snugly, so it may be difficult at first to separate them. One way to do this is to turn the instrument on its side as shown below, and then carefully separate each corner in turn, starting with the bottom right corner. With your fingers on the bottom endplate, pull the covers apart, ensuring that the endplate remains attached to the back cover. Do not allow either the top or bottom endplate to become separated from the back cover. This may cause damage to the input and connection terminals, requiring that the PEL be sent to AEMC® for repair.
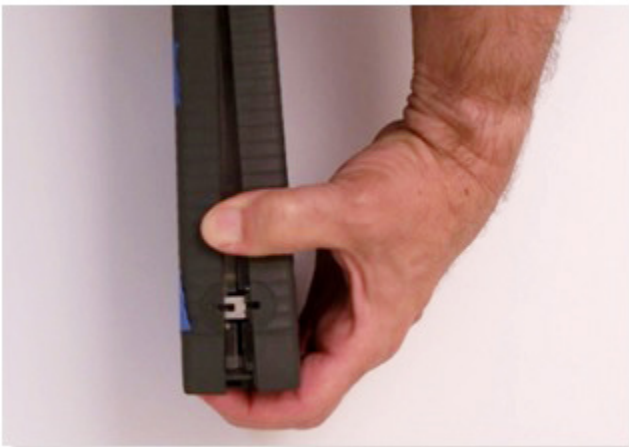
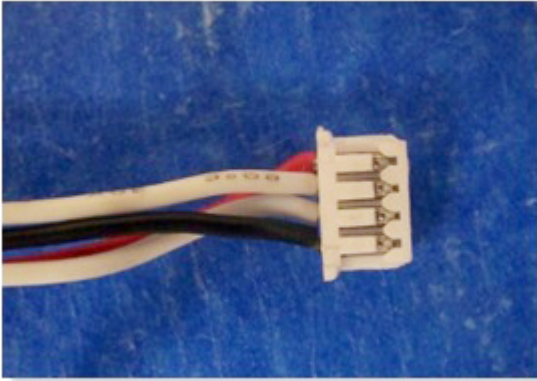

6. With the front cover removed, locate the battery pack inside the PEL.

7. Gently remove and unplug the battery from the PEL. A small non-conductive implement such as a drink stirring stick (shown below) can be useful for doing this.
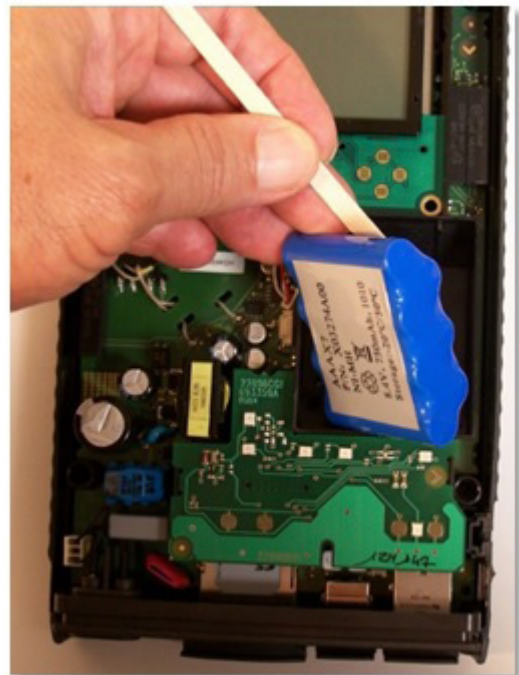
8. Inspect the plug of the replacement battery pack, and note the position of the connector pins (see below).

9. Position the plug with the connector pins facing away from the battery pack compartment. In the illustration below, the pins are facing towards the left. Then very carefully insert the plug by gently pushing it into the socket within the PEL. There is very little room for this procedure, so an implement such as a stirring stick or toothpick may be helpful in ensuring the plug is securely inserted. (The PEL instrument will likely turn on when you plug in the connector; this can be disregarded.)


10. Place the replacement battery into the compartment provided for it within the PEL. When doing this, ensure that the battery's connector wires are positioned as shown in the illustration on the left below. Be sure the wires do not cross over the top of the post, as shown in the right illustration below. If the wires are placed over the post, they will likely be damaged when you replace the PEL top cover.
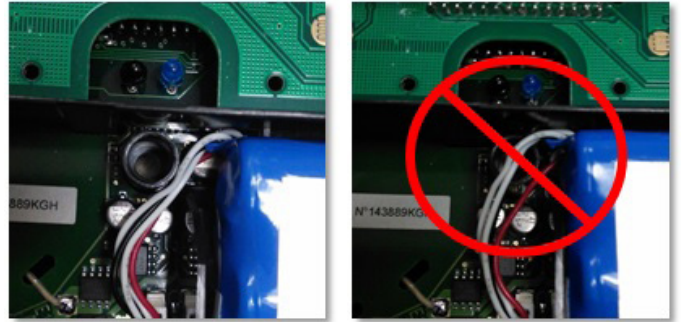
11. Perform a final inspection of the interior of the PEL to ensure no foreign object or debris has fallen inside. Then replace the front cover, carefully ensuring that it is securely in place.

12. Turn the PEL over, and replace the six fastening screws removed in step 3 of this procedure.

13. Remove the tape applied to the front cover and endplates at the beginning of this procedure. The PEL is now ready for operation.

For a step-by-step demonstration showing how to replace the battery in a PEL instrument, view the instructional video on our **AEMC YouTube channel**.
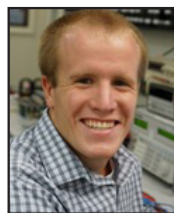
About the Author:

Neil Franklin is the Manufacturing Engineer for AEMC® Instruments, Dover NH.

Featured New Product:

# Android™ App for the AEMC® Clamp-on Ground Tester Model 6417

The new Ground Tester 6417 app, distributed through the **Google Play Store**, enables users of the AEMC® Clamp-on Ground Resistance Tester Model 6417 to work with their instruments from an Android device. This app provides a handy, mobile option for working with a Model 6417. Through an intuitive and simple interface, the app provides many of the same features available in AEMC's DataView® data analysis software, accessible through a hand-held mobile device. The app also takes advantage of functionality provided by the Android platform, including the ability to add an on-site snapshot to a data record and emailing the record to others in report format.

The Clamp-on Ground Resistance Tester Model 6417 measures ground rod and grid resistance without the use of auxiliary rods. This instrument enables you to:

- Check the integrity of a grounding electrode system
- Measure leakage current into the grounding system
- Determine ground voltage as an indicator of a potential unsafe condition
- Measure resistance, impedance, inductance, current, and voltage
- Determine the bonding integrity of the grounding system
- Store test results for later review and analysis

The Model 6417 is specifically designed to improve measurement accuracy, user safety, and operator ease-of-use. Users of the Model 6417 includes field service engineers and technicians, inspection personnel, facility maintenance electricians, electrical utility T&D staff, railroad maintenance engineers, and consultants. Typical applications include checking the grounding electrode system for residential, commercial, industrial, and industrial facilities as well as cell towers and small substations.

Android is a platform for "touch screen" mobile devices such as tablets and smartphones. Introduced in 2007, Android has grown to become the most popular mobile operating system in the world, with an estimated one billion devices (and counting) sold globally.
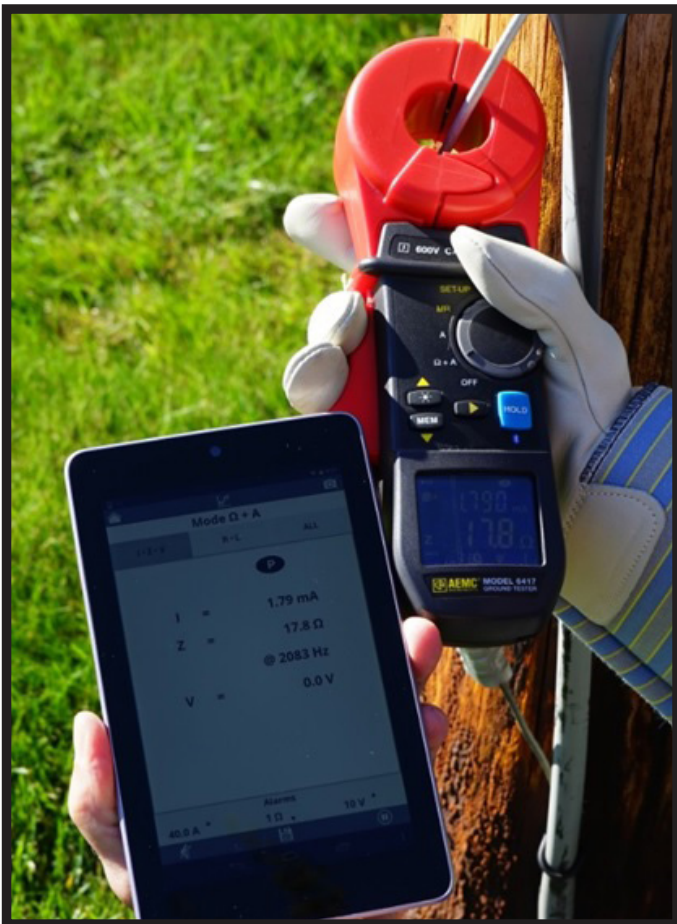
The Ground Tester 6417 app enables users to connect to the Model 6417 via Bluetooth. Once connected, you can:

- View data currently being measured by the instrument in real-time.
- Save measurement data in a record on the instrument.
- View previously stored data records.
- Change configuration settings on the instrument.
- Email test results.

Real-time measurements can be displayed as both numerical data and as graphical trends. For example, in the following illustration the app displays real-time current data in graphic format, measured over one minute.
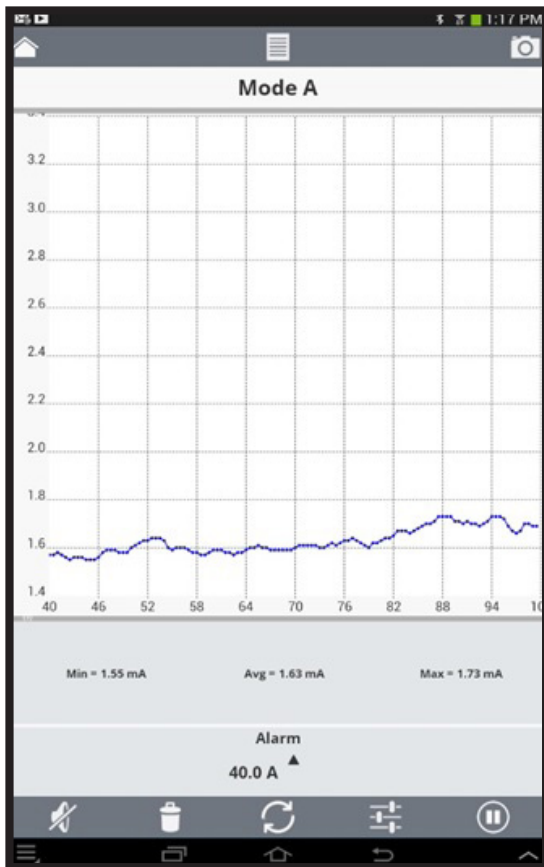

Measurements can be saved in the Android device's memory as data records. When you save the record, you have the option of "localizing" it by assigning a location to it, adding a descriptive comment, and a photograph.
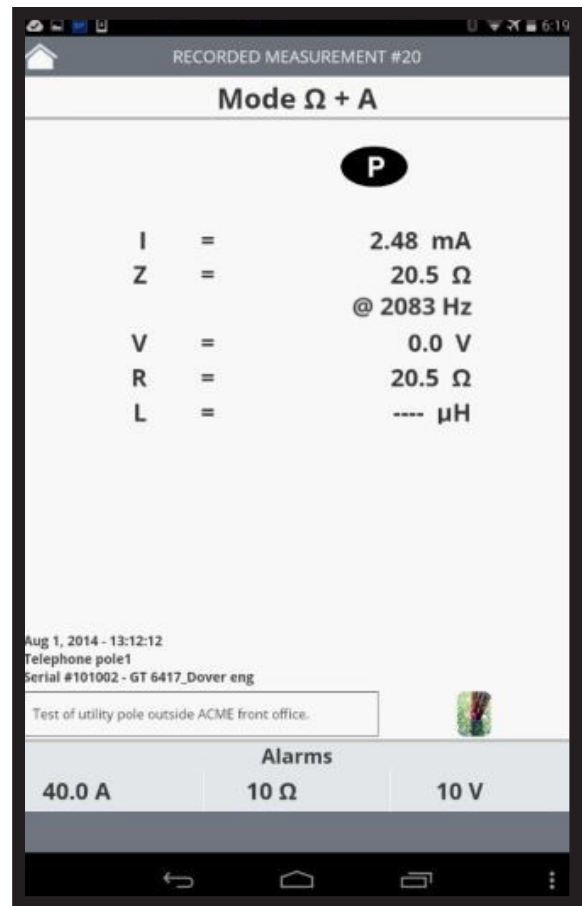
For instance, in the preceding illustration the recorded current and resistance measurement is for the location "Telephone pole1" as indicated in the lower left corner, along with the date of the measurement and the name of the instrument on which it was recorded. Below this information is a short description of the test. In the lower right corner is a thumbnail image of a photograph associated with the record; click on this to display the full photograph. In this example the photograph shows the precise location where the measurement took place.

These records can later be viewed on the device. They can also be formatted into reports and emailed to others for further distribution and analysis. These reports can be in text, Excel-compatible, or .icp (DataView) format.

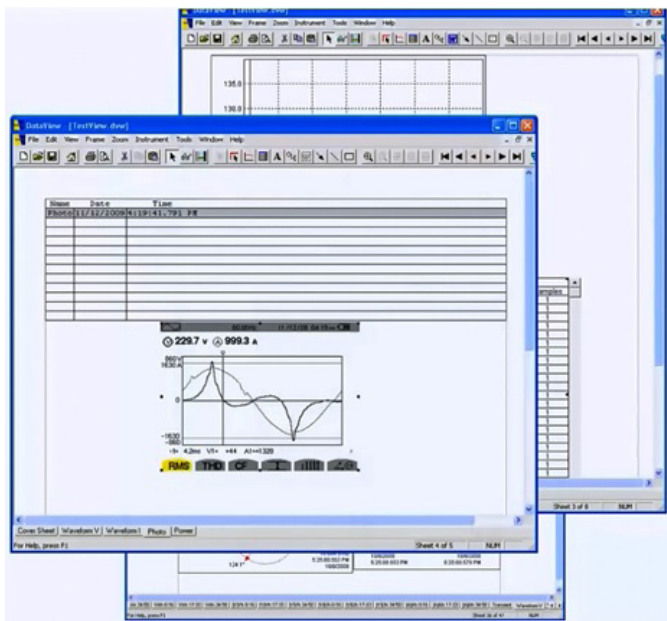You can also use the app to modify a variety of configuration settings on the Model 6417.
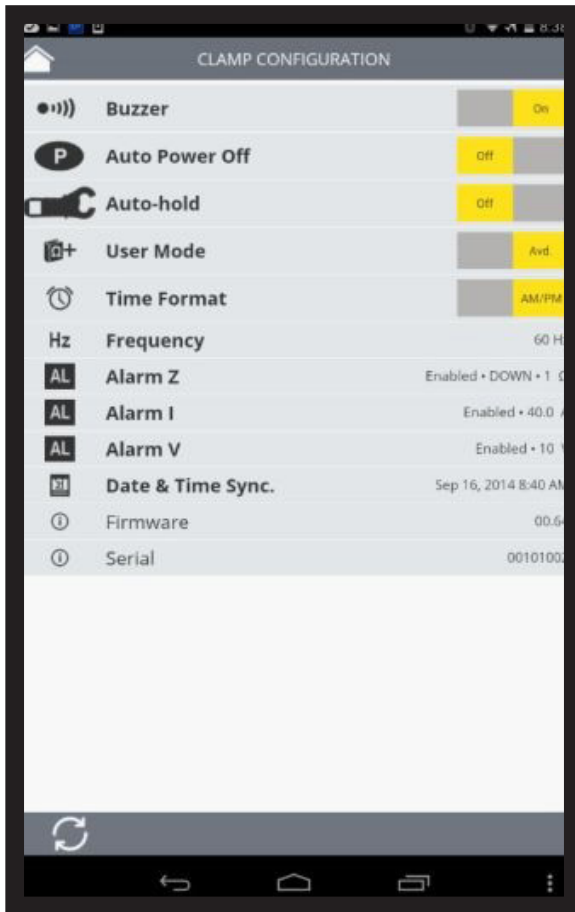
The Ground Tester 6417 app can be downloaded free from the **Google Play Store** and is available in multiple languages. **Click here** for more information on the Clamp-on Ground Tester Model 6417.

DataView® Report Primer

DataView reports are the main tools for displaying and analyzing measurement data that has been recorded on your AEMC® instrument and downloaded into DataView on your PC. These reports provide a visual presentation of this data, displayed in graphical or tabular format. They can also serve as filters for selecting only certain types of data to view. This enables you to create multiple reports, each with a specific purpose that focuses on information that is of most interest and relevance to you and other readers of the report.

This article introduces you to DataView reports. We describe the basic components that comprise a report, and how you can use them to build your own customized report templates. Note that in addition to DataView reports, you can also use DataView to view measurement data as a Microsoft Excel-compatible spreadsheet. However, the focus in this article will be on DataView reports.

The process for creating a DataView report starts when you store a recording session on your AEMC® instrument. When you subsequently start DataView and connect to the instrument, you can download this data from the instrument to the PC using a DataView Control Panel. This downloaded data can then be viewed, stored, and printed as a DataView report.
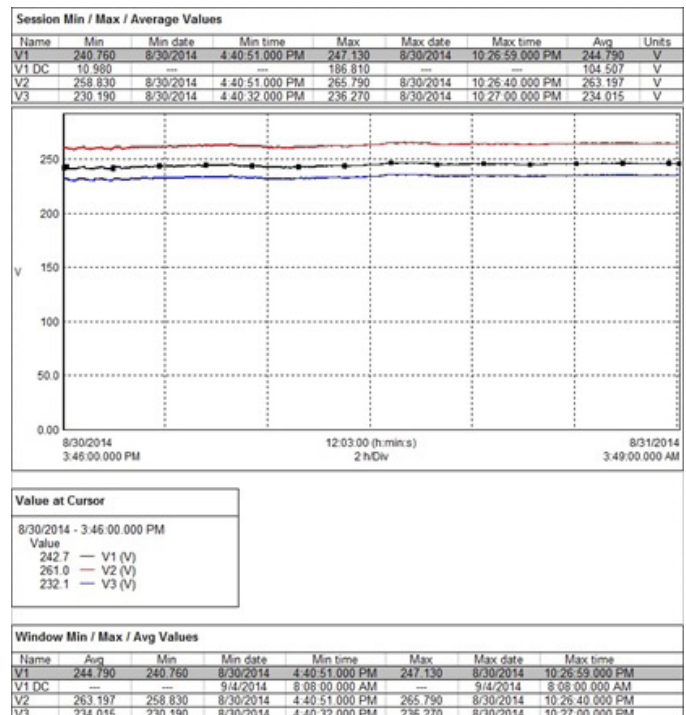
Templates

A key concept in the report generation process is the DataView template. The basic function of a template is to organize and filter measurement data stored on the PC as a .dvb file, also known as a DataView database file, and display it for viewing and analysis. To accelerate and simplify report creation, DataView provides several standard report templates that ship with the product. Each of these templates is designed for a specific type of instrument, Control Panel, and configuration.

Power and Energy Logger Model PEL Basic Report Template (Basic report.dvt)

You can use these templates "as is" to generate a report, or customize them to your requirements. You can also design your own templates from scratch, to create reports that display data of specific relevance and interest to your application and facility. All DataView templates are identified by the file extension .dvt; reports generated by a template are stored on your computer as .dvw files.

Templates can be "attached" to a DataView database .dvb file, so that when the database is opened the data within it by default will be

displayed and formatted in accordance with the attached template. In this way, the template serves as a window into the database. Conversely, a template can have a database attached to it, so that any time the template is opened it will contain data for display. This helps you see how measurement data will be displayed in reports you create from this template. Note that you can also create templates that display data from multiple DataView databases. This can be useful when creating a single template for viewing data measured by two or more different types of AEMC® instruments.

Creating a report from a template is basically a two-step process. First, select the template to be used to format the report. Second, choose the database or databases that will supply the data for the report. Each step must be completed in order; the template must be selected before a database can be specified, and the database selections must be completed before the report can be generated.
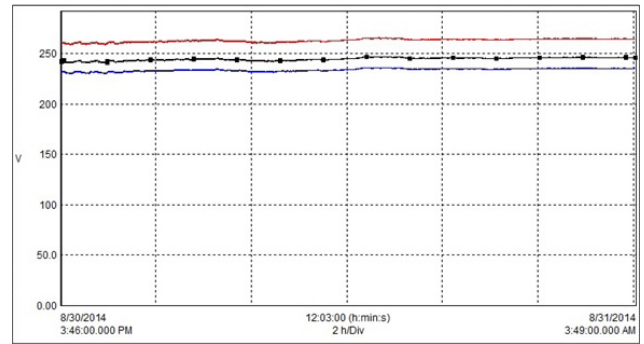
Frames

DataView reports consist of frames. These are rectangular areas within the template that display data in various forms, including lines, text, and graphs. The frame determines what data will be displayed, and how it will be visually presented in the report. Frames can be added, deleted, modified, and moved around the pages of the report.

DataView supports a number of different frame types, for displaying graphs, text, lines, boxes, arrows, and OLE objects. There's also a special Table of Contents frame for navigating through the pages of the report, and a general-purpose generic frame. Frames can also be linked, so that the content displayed in one frame determines the content in the linked frame.

For example, the report illustrated above includes a frame listing data in a table:

Name	Min	Min date	Min time	Max	Max date	Max time
V1	240.760	8/30/2014	4:40:51.000 PM	247.130	8/30/2014	10:26:59.000 PM
V1 DC	10.980	---	---	186.810	---	---
V2	258.830	8/30/2014	4:40:51.000 PM	265.790	8/30/2014	10:26:40.000 PM
V3	230.190	8/30/2014	4:40:32.000 PM	236.270	8/30/2014	10:27:00.000 PM

…a graph frame showing test measurements over time:

…and a linked legend frame that explains the colors in the graph:

Note that the example report consists of multiple worksheets (identified by the tabs at the bottom of the report), which allows for the display of a wide variety of data from multiple perspectives.

You can add, modify, move, and delete worksheets from a template, so that all reports created from that template contain the worksheets you specify.

Viewing reports

DataView includes a number of features for viewing and analyzing reports online, including the ability to zoom in on specific data. You can also print reports for hardcopy distribution.

For example, frames that display graphical trend data allow you to zoom in, zoom out, step left, step right, pan left, pan right, pan to the start of the recorded measurement data, and pan to the end of the data. Each of these commands can be selected from the Zoom menu or from the toolbar, as explained in the online Help within DataView.

This concludes our quick introduction to DataView reports. In future articles, we will provide details on the many robust features DataView offers for creating, customizing, and viewing DataView reports. In addition, please check our **YouTube channel** for instructional videos about DataView and other AEMC® products.

AEMC® Interview:

Valerie Scheer - Director of Operations

As a global company, AEMC® Instruments needs to be mindful of many issues related to doing business internationally. Helping to ensure that these processes run smoothly – and profitably – is Valerie Scheer, Director of Operations for AEMC® in Dover, NH. Valerie has been with AEMC® for 24 years, originally starting out in Accounting and then later serving in Inventory Control and International (where she was promoted to International Operations Manager) before taking on her current position. In this interview, Valerie shares her thoughts about competing in a worldwide marketplace.

Q. **What are some of the ways AEMC® supports its international user community?**

A. We have a very good International team. All imports and exports are executed with due diligence and carefully documented. At the same time, we must ensure that we are always in compliance with all published regulations; otherwise we could be subject to heavy fines and even have our import and export privileges revoked.

Our main concern is after-sale service. Certain countries have very strict import/export rules and it can be challenging when equipment needs to come back to be serviced. We typically have several distributors in each country and ideally we want to have at least one of them equipped with a repair lab. Unfortunately, this is not always the case for every country in which we do business. So if a regional repair lab is not available, we try to help the customer fix the problem via e-mail

or phone, so they can avoid the time and expense of sending the equipment back to us unless it's absolutely necessary.

Q. **Is doing business globally becoming more or less complicated compared to the past?**

A. It is becoming more and more complicated, due primarily to two factors. The first is that our equipment now tends to be more technical than some of our earlier products. An even bigger factor is that we now have to deal with the new import/export rules that each country puts in place.

For example, in order to import into Argentina, the distributor must ask for permission from the government and request an import license. Once the license is granted, the distributor has to go to the bank and buy foreign currencies. Only then are they allowed to import the goods. These restrictions are fairly new, implemented within the past two years or so. These and similar rules make the international market more complex; we need to stay abreast with the latest changes and ensure we're always in compliance.

Q. **Does AEMC® adapt its products and services for certain regional markets? Are some products more in demand in some regions compared to others?**

A. Yes. AEMC® thinks globally and we do customize units for specific markets or countries. For instance, we have designed a phase rotation meter solely for the Australian market.

Q. **What are some of the steps involved in launching a new product simultaneously in different countries?**

A. The main requirement is communication. Most of our products are originally designed by Chauvin-Arnoux France and then customized by AEMC® for the US market. It is important for the French and US Marketing and Engineering teams to work together to create one product that will fulfill the requirements for all global markets.

Q. **How does AEMC® handle translations and other localization issues?**

A. The responsibility for translation and localization is a fairly new development for AEMC®. In the past, translation was handled primarily through the Chauvin-Arnoux office in Paris. More recently, AEMC® has assumed this role. This involves translating the user interfaces for our software products, our product documentation, and online Help. Currently we are partnering with a company in Brazil who sends the documents for translation to the country of the language needed. This ensures that each translation is performed by a native speaker of that language, which helps to minimize any awkward wording or phrasing resulting from the translation process.

EN 50160 Power Quality Monitoring with the DataView® PowerPad® III Control Panel

As mentioned in the Summer 2014 issue of this Technical Bulletin (see **http://www.aemc.com/techbulletins/ pdfs/Q214_Issue2.pdf**) the standard EN 50160 has been developed to promote a common understanding and definition of core quality characteristics among electricity distributors. This standard is used most often in Europe, and to a lesser extent in other parts of the world.

AEMC's DataView® software now supports EN 50160 monitoring through the updated PowerPad® III Control Panel. This program, which is provided free in North America, enables you to use your AEMC® PowerPad® III instrument to check your electrical distribution system for compliance with EN 50160 specifications. Supported instruments include the Model 8435, Model 8333, and Model 8336.

PowerPad® III Model 8333   PowerPad® III Model 8435   PowerPad® III Model 8336

To use this feature, ensure that the latest version of DataView® with the PowerPad® III Control Panel has been installed on your computer and that your PowerPad® III instrument is powered on and connected to your computer. The online help that comes with DataView® explains how to do this. Start up the PowerPad® III Control Panel by clicking its icon on your desktop. Ensure that your instrument is connected by looking for the green checkmark next to its name in the navigation frame. If a red x appears instead, connect to the instrument now by clicking Instrument in the menu bar and selecting the option "connect or reconnect an instrument."

With the instrument connected, select Instrument and then click "Configure EN 50160." After a few moments the Configure EN 50160 dialog box appears. Note that you can also display this dialog by clicking the Configure EN 50160 icon ⊞ in the toolbar.
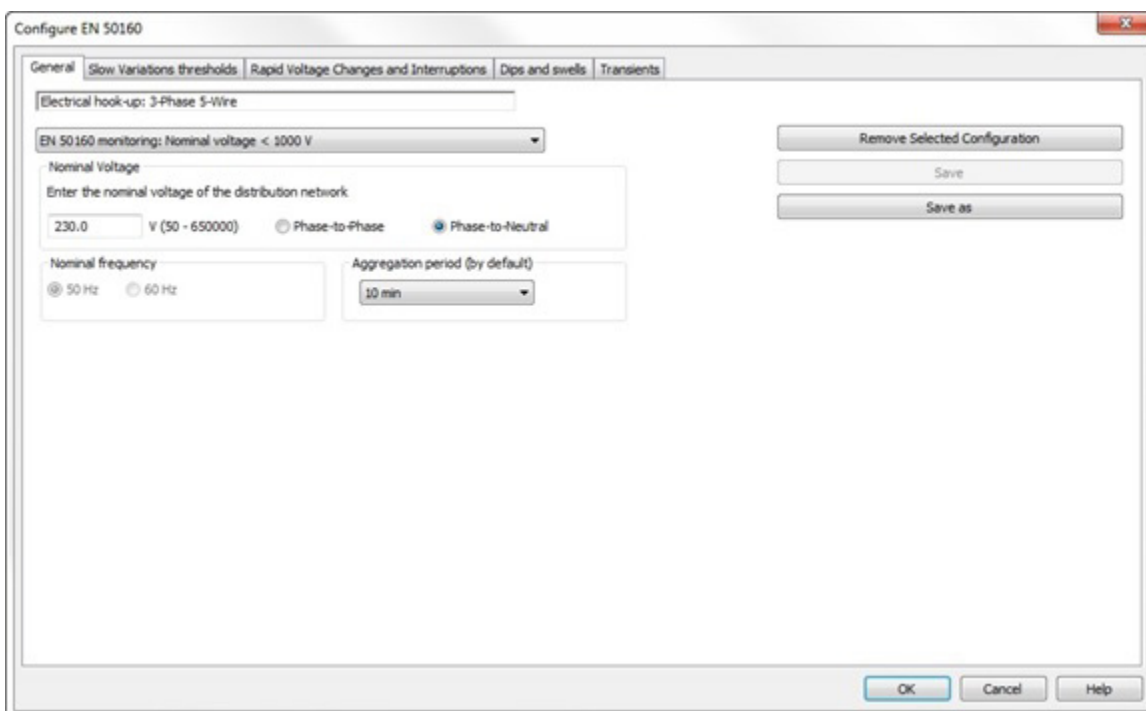
The Configure EN 50160 dialog box consists of five tabs:

- General displays the distribution system type and other variables associated with the system under measurement. Users can also name and schedule an EN 50160 monitoring session.

- Slow Variations sets parameters for identifying how much a measurement varies from its acceptable value defined by EN 50160.

- Rapid Voltage Changes and Interruptions configures the monitoring session for detecting rapid voltage changes and interruptions in the system under measurement.

- Dips and swells defines settings for monitoring dips and swells, also known as overvoltage events.

- Transients sets conditions for capturing transients in the system.

Complete the fields on these tabs to configure the EN 50160 monitoring session, as explained in the DataView® online Help.

To see the results of a completed monitoring session, download the session from the instrument by selecting Download Recorded Data from the Instrument menu. Or you can open a previously downloaded session by selecting File from the menu bar and clicking Open. Find and select the monitoring session via the Open dialog box. The results of the session now appear under My Campaigns in the Navigation frame.

These results indicate whether or not the monitored system passed EN 50160 specifications for exceedance, rapid voltage changes, long and short interruptions of the supply voltage, supply voltage dip, and supply voltage swells.

This concludes our brief introduction to EN 50160 monitoring. For more information, consult our **YouTube channel** for instructional videos on EN 50160 monitoring and other topics in electronics, including how to use the many instruments offered by AEMC®.

Customer Support Tip:

Estimating PowerPad® Recording Lengths With AEMC's Trend Duration Calculator!

Do you ever wonder how long a PowerPad® recording can be? With AEMC's Trend Duration Calculator you can determine the recording capabilities of your PowerPad®. This small and lightweight software will allow you analyze the memory usage of our current PowerPad® lineup of meters. Models 8230, 8333, 8336, and 8435 are represented in this program. Once the Calculator is installed, you can select the instrument model, the storage rate, and the individual trend parameters to record. The calculator will then display how this affects the storage capacity and will display the maximum duration that the internal memory can hold (see below).
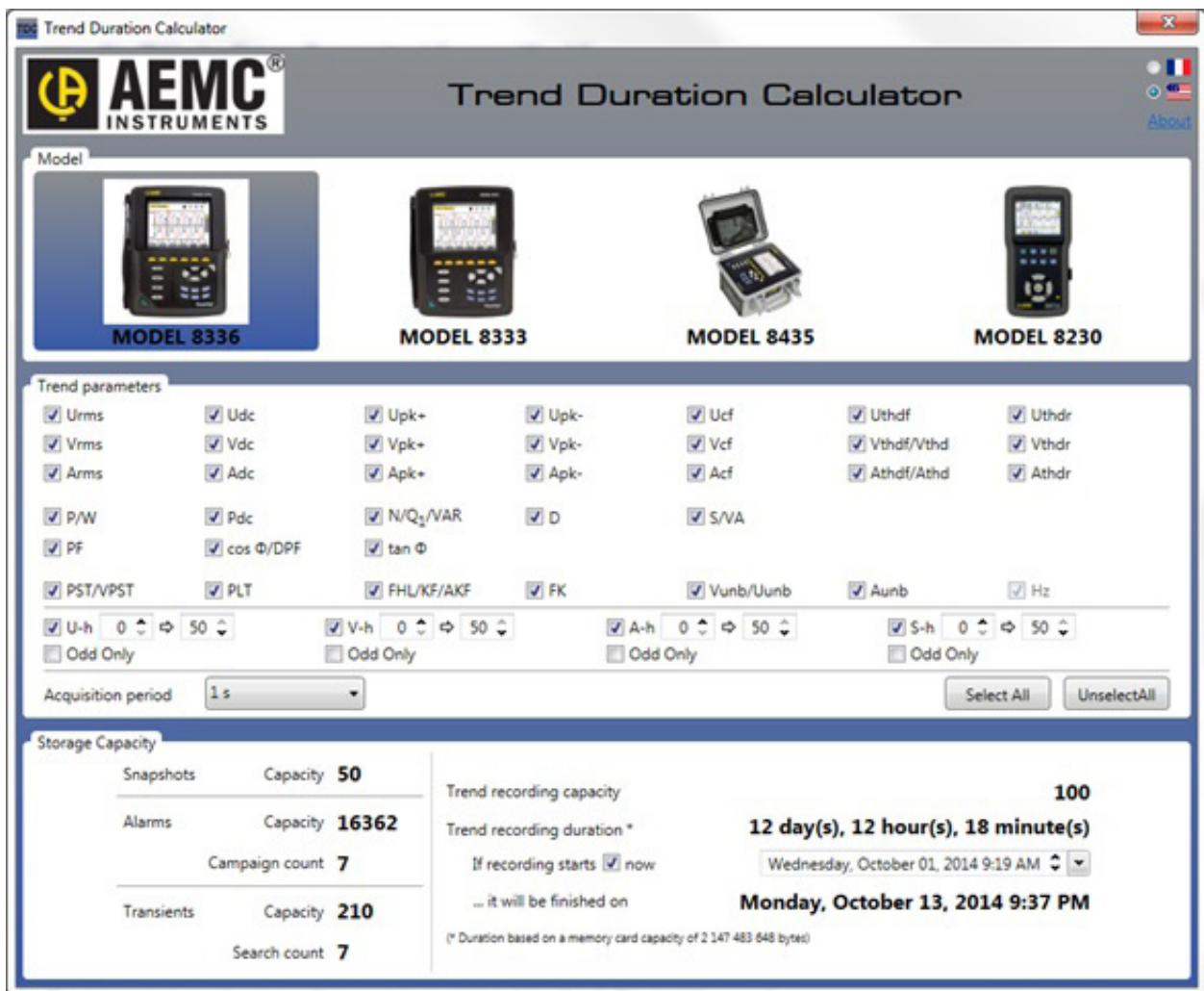
In the above example, a PowerPad® Model 8336 can record continuously for 12 days, 12 hours, and 18 minutes with all available parameters monitored, at a 1 second storage rate. If you choose to record fewer trend parameters then the resultant recording length will be increased accordingly. Recording harmonic data will typically take up the most memory; and choosing to not record all of the harmonics will greatly increase your recording duration. This tool also enables you to run "what if" scenarios and helps to maximize the potential of your PowerPad® and the goals you wish to achieve with the instrument.

This tool can be downloaded from the AEMC® web site, in the Calculators section of the Technical Documentation – Power Meters/Analyzers page (**http://www.aemc.com/techinfo/html/Tech-Power.asp**):

We welcome your feedback and can be reached at **techsupport@aemc.com** or by calling 1-800-343-1291 (x351) for our Technical Support Help line.

New AEMC® Instruments' Products

The following are brief descriptions for recently released software features from AEMC® Instruments. For more information about these and all other AEMC® products, see **www.aemc.com**.

Update to DataView®

Version 3.12.0008 of the DataView® data analysis software has been released. This includes the following new and enhanced features and functionality.

DataView® Core:

- **Simplified Quick Start Dialog Box.** The Quick Start dialog box has been modified to include only one instrument-related button, Control Panel (formerly called Configure Instrument). The Real-time Display and Download Data buttons have been removed.
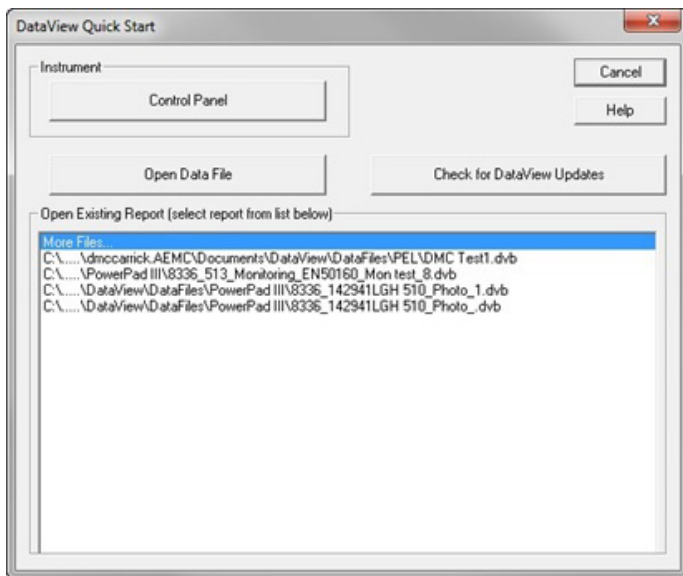
- **Modified Select Instrument Dialog Box.** The Select Instrument dialog box no longer requires the user to select the model of the instrument. The OK button is enabled upon selection of the Instrument type.

PEL Control Panel:

- **Reference Phasor:** A "reference phasor" diagram has been added to the Phasor display in the Real-time Data frame. The reference phasor displays the diagram that would be typically expected for the selected electrical hookup.
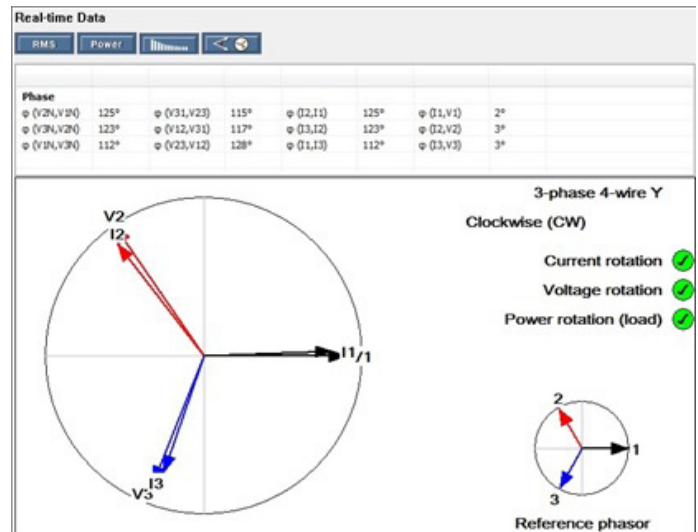

- The display also includes a table indicating whether or not current rotation, voltage rotation, and power rotation fall within expected tolerances for the electrical hookup.

- **Select Aggregation Period:** The original aggregation period for a recording session is determined by the Trend demand interval setting in the Recording tab of the Configure Instrument dialog box. Users can now change the aggregation period for a recorded session when viewing the session's results. The new period will be used to re-calculate the aggregation data; this calculation will be based on 1s measurements. The re-calculated data will then be displayed in place of the original aggregation data. To do this, the user

clicks the new Select Aggregation Period icon in the toolbar. This displays the Select Aggregation Period dialog box.
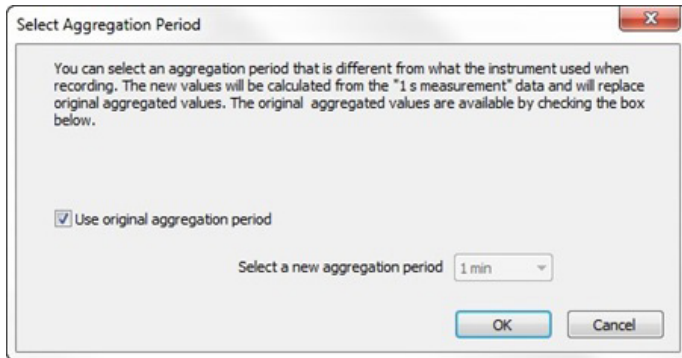
- After the user completes this dialog box, the Summary branch in the Navigation frame will be renamed to reflect the new period. For example, if the original aggregation period is one minute and the user changes it to 10 minutes, the Summary branch name in the Navigation frame will change from"1 min Summary" to "10 min Summary." Note that this option is only available for sessions that record 1s measurements. If the session does not include 1s data, the Select Aggregation Period icon is grayed out and inactive.

- **Session Tariffs.** The Session Tariffs tab in the Session Parameters dialog has been enhanced to allow for multiple rates depending on time and day of the week.
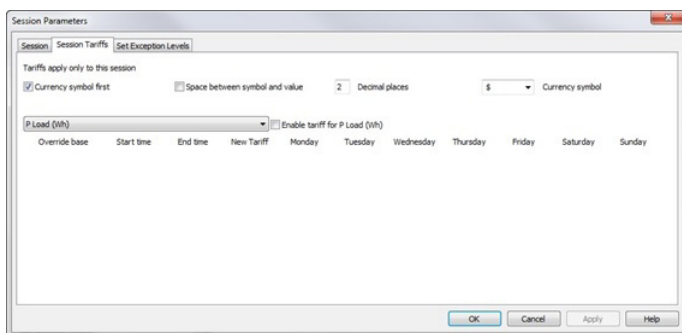
- **Removing Fundamental Harmonics.** A new button   has been added to suppressing the fundamental data when displaying harmonics in bar chart form.

PowerPad III Control Panel:

- **EN 50160 Monitoring.** The PowerPad® III Control Panel now supports EN 50160 monitoring. This enables users to check an electrical distribution system for compliance with EN 50160 specifications. Currently supported instruments include the Model 8435, Model 8333, and Model 8336. To support this feature, the option Configure EN 50160 has been added to the Instrument menu and a new Configure EN 50160 icon has been added to the toolbar. Either of these options displays the Configure EN 50160 dialog box. The Navigation Tree frame has also been modified to display the results of a completed EN 50160 monitoring session. Results appear in the Monitoring folder under My Campaigns in the Navigation frame. These results indicate whether or not the monitored system passed EN 50160 specifications for slow variations, rapid voltage changes, long and short interruptions of the supply voltage, supply voltage dips, and supply voltage swells. (See also the separate article "EN 50160 Power Quality Monitoring with the DataView® PowerPad® III Control Panel" in this Technical Bulletin.)

Android™ App for the Model 6417

Chauvin Arnoux/AEMC® has released an Android app for the Clamp-on Ground Resistance Tester Model 6417. This app (which you can download from the **Google Play Store**) enables users to connect to the Model 6417 via an Android mobile device.

Features include viewing data in real time, storing recordings on the Android device, and configuring the Model 6417 from the device. For more information, see the article "Android™ App for the AEMC® Clamp-on Ground Tester Model 6417" in this Technical Bulletin.