Using

DataView®

With Power Meters

PowerPad® Model 3945
PowerPad® Model 8335
PowerPad® Jr. Model 8230
Power Quality Meter Model 8220

AEMC® INSTRUMENTS
CHAUVIN ARNOUX GROUP

Table of Contents

1. PowerPad Configuration

The PowerPad configuration window is accessed under **Instrument** > **Configure** in the main menu or by clicking **Configuration** in the **Instrument** window.

1.1 General Functions

The buttons described below appear on several DataView Configure Screens.

- **Re-Read from Instrument:** Reads the current configuration of the PowerPad attached.
- **Save to File:** Saves the current configuration. This file will reside on the computer's disk drive. Saving different configuration setups can be useful for future functions and tests.
- **Load from File:** Retrieves a saved file from the computer's disk drive to be used in programming the PowerPad.
- **OK:** Saves the current configuration, and closes the dialog box returning to the Control Panel.
- **Cancel:** Exit without saving configuration.
- **Apply:** Programs the PowerPad using the current settings without closing the window.
- **Help:** Opens the Help menu.

1.2 How Do I Setup the Powerpad?

The Configure dialog box lets you configure every aspect of the PowerPad. Each field is identical to the programmable features available from the instrument's front panel itself.

Several of the functions are configured by typing the appropriate value in the field provided. Others are configured by clicking on the appropriate radio button or Icon, such as, selecting the current probe.

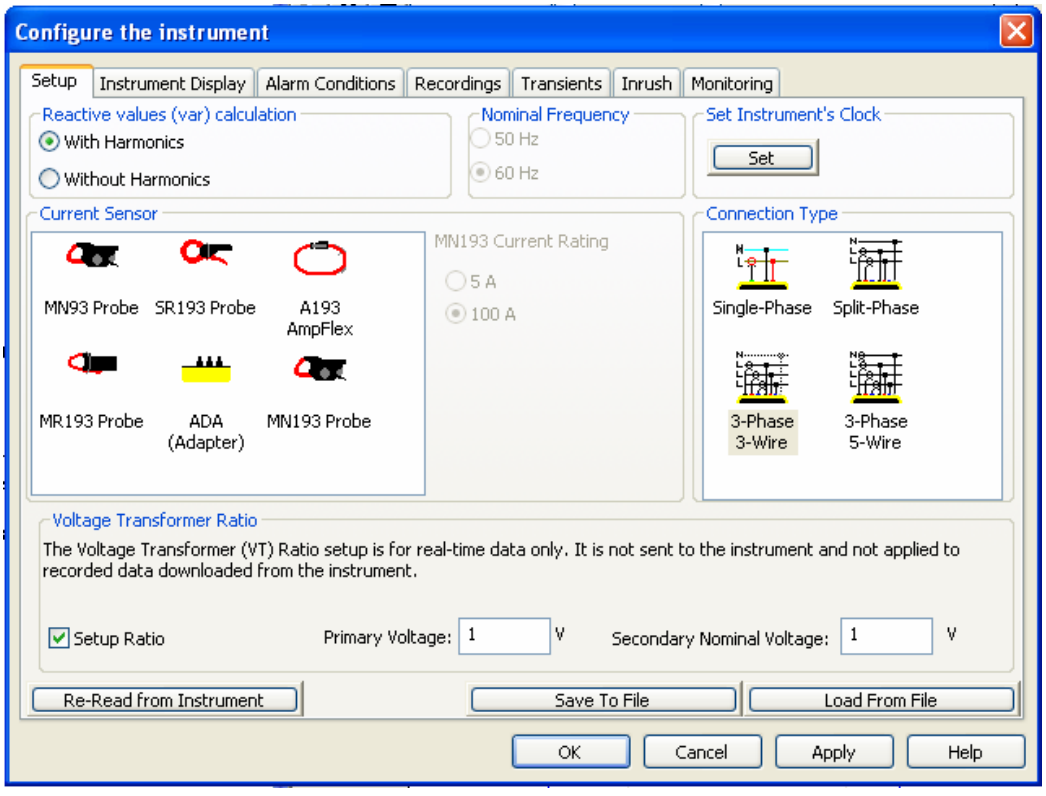

Figure 1

- **Reactive Energy:** With or without harmonics. Applies to VAR calculation. Indicate your preference for reactive energy calculation. Indicate the expected line frequency. The “Nominal Frequency” is only used for power calculations and does not affect the automatic frequency tracking of the PowerPad. The “Current Sensor” should match the sensors you have connected. The sensors connected to the different lines should all be the same. The “Connection Type” is used to indicate the number of phases you are using. The PowerPad will mostly ignore the readings it gets from phases you are not using.

- **Nominal Frequency:** 50 or 60Hz. This parameter determines the correction coefficients used for calculating power and energy. (Automatic for model 8220, 8230 and 8335)

- **Current Sensors to be used:** The instrument should automatically identify (except Model 3945, which can identify probes if plugged in at startup) MN93, MN193, SR193, MR193, AmpFlex A193 or ADA . The ADA (Adapter) is used to accept probes with other ratios or a direct 1 Amp or 5 Amp input. The MN193 Probe, when the current rating is 5A, and the ADA types have a Current Ratio which gives a ratio of Primary to Secondary. The PowerPad uses and remembers these ratios.

- **Connection Type:** Single Phase, Split-phase, Three phase-3 wire or Three phase-5 wire (Three phase-4 wire Model 3945). Note: Not all models offer all connection types.

- **Voltage Transformer Ratio:** Sets the scale for voltage measurement in cases where measurements are on the secondary side of a transformer and the primary value needs to be displayed. You can set a Voltage Transformer Ratio. This value is used by the software to multiply all voltage reading received from the PowerPad. So, for instance, if there were a Voltage RMS of 120V, and the “Output” box has “10” and the “Input” box has “1”, the various screens that show Voltage RMS would show 1200V. The PowerPad does not use this ratio. The software uses and remembers this ratio

- **Set PowerPad Clock:** Programs the computer’s or the user’s desired time and date into the configuration of the PowerPad.

1.3 PowerPad Display Configuration

The PowerPad display window allows you to customize the display (colors, clocks, language and contrast).

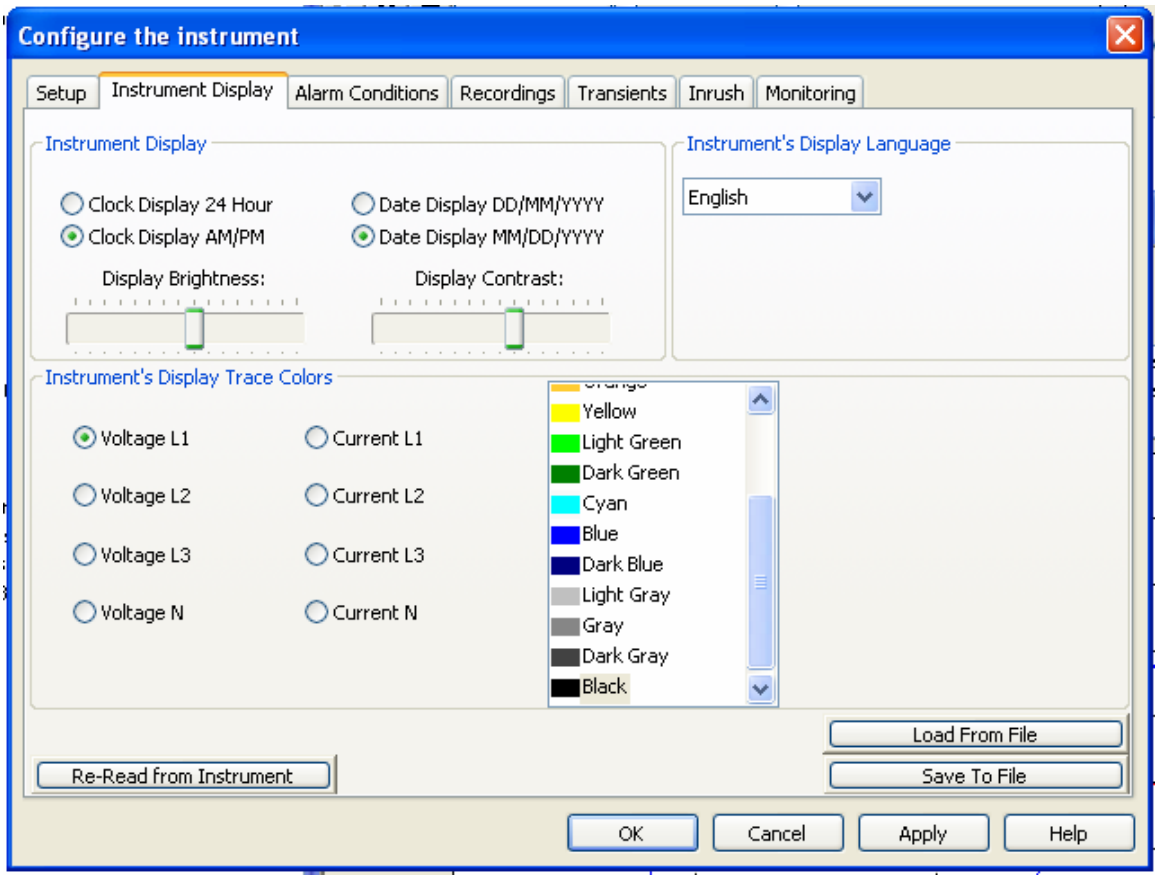

Figure 2

NOTE: For detailed instructions and descriptions for any feature in a dialog box, click on the **Help Button** (lower right-side of the dialog box), or **right-click on the feature** you want information about.

1.4 Alarm Conditions Configuration

The Alarm Conditions window allows you to set up to 40 alarm configurations (Model 8335 only, other models only have up to 10 alarms).

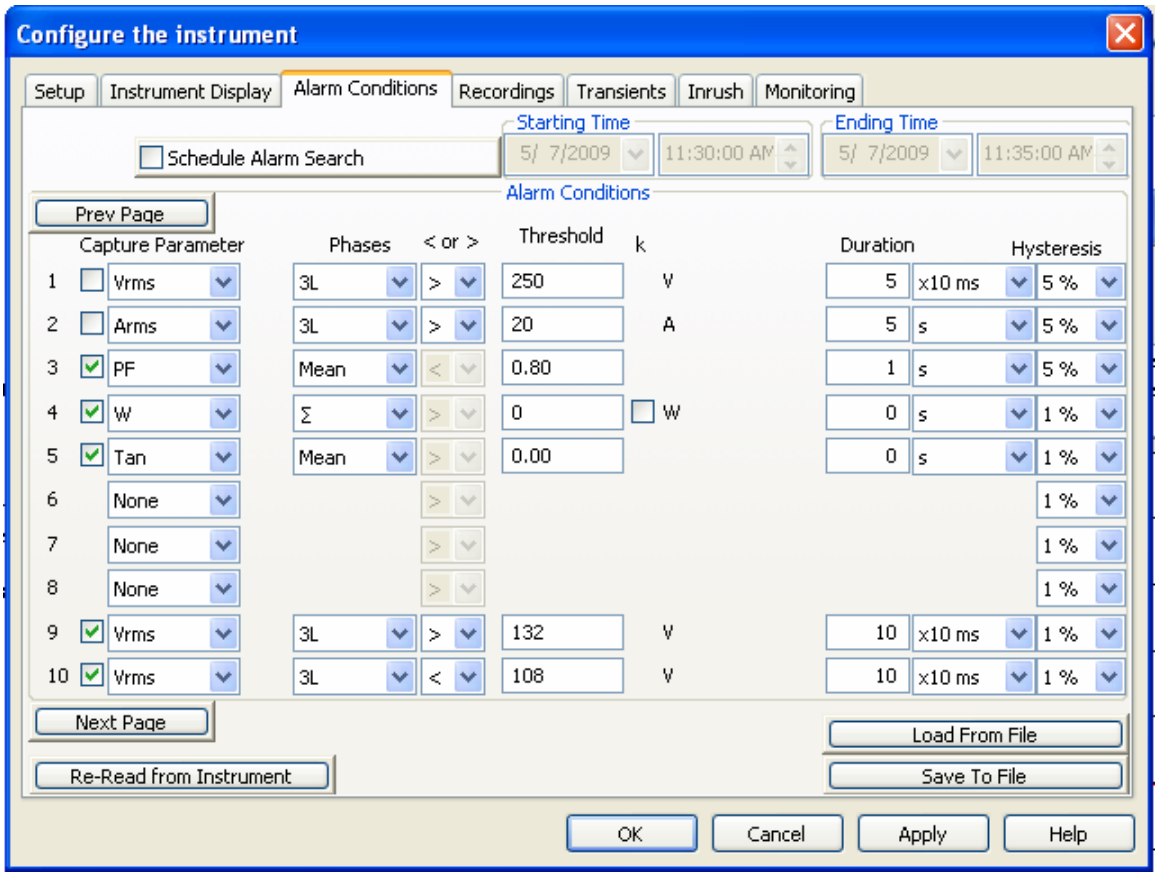

Figure 3

There are a variety of alarm conditions that can be part of the setup. Some give a choice of phases, “3L” for any of lines 1, 2, 3, “N” for neutral current, “Sum” for the sum of phases. Some give a choice of greater or less than. Those that measure a harmonic value, give a choice of harmonic number

Schedule Alarm Search: Check this box to activate the alarms, and set a starting and ending time and date to assign the time period during which the alarms will be active.

Prev Page & Next Page: Move between the 4 pages of alarms with 10 alarms per page (Model 8335 only).

Capture Parameter: The Alarm will be triggered based on the value of the selected parameter. Check the box next to the parameter to enable that alarm configuration.

Choices include:

None: no alarm

Vrms: voltage root mean squared

Urms: voltage phase to phase root mean squared

Arms: current root mean squared

VPST: voltage short term flicker

Vcf: voltage crest factor

Ucf: voltage phase to phase crest factor
Acf: current crest factor
Vunb: voltage unbalance
Aunb: current unbalance
Hz: frequency
Akf: current K factor
Vthd: voltage total harmonic distortion
Uthd: voltage phase to phase total harmonic distortion
Athd: current total harmonic distortion
W: active power

Harmonic Number: For alarm parameters, Vh, Ah, Uh, and VAh, selects which harmonic number is being used as an alarm condition. For example, Vh with a harmonic number of 2, will only look at Voltage phase to neutral, harmonic 2.

Phases: Some alarm conditions have a phase selection. W, VAR, and VA, have a choice of "3L" (each individual phase), or "Sum" which is the sum of phases. DPF, PF, and TAN have the choice of "3L" (each individual phase), or "Mean" which is the mean of phases.

Threshold: The value that must be reached to start an alarm. For ">" alarms, the value or higher must be reached, for "<" alarms, the value or lower must be reached.

Duration: The Alarm will only be recorded if the duration of the parameter meets the threshold criteria. The minimum alarm duration can be in minutes or seconds. In the case of Vrms, Urms or Arms not using neutral current, can also be in hundredths of a second. For Vrms, Urms, and Arms, it can be useful to set a duration of 0 seconds. In that case an event as short as a half cycle can be detected (8 milliseconds at 60Hz). For all other parameters, the minimum duration that can be detected is 1 second.

Hysteresis: This value for alarms is set to prevent multiple recordings of an event that goes above the threshold and a certain percentage below it at times.

Example: Alarm threshold is 100 Volts or higher, hysteresis is 1%. When the voltage goes up to 100V, the alarm condition starts. When it goes back down to 99V, the alarm condition stops.

NOTE: You can configure alarms, recordings, inrush and transient searches while testing is in progress.

Any of the changes made to the screen will only take effect when the "OK" or "Apply" button is pressed. Doing this causes the information in the setup tabs to be written to the PowerPad.

1.5 Recordings Configuration

The Recording window shows the parameters for a recording session.

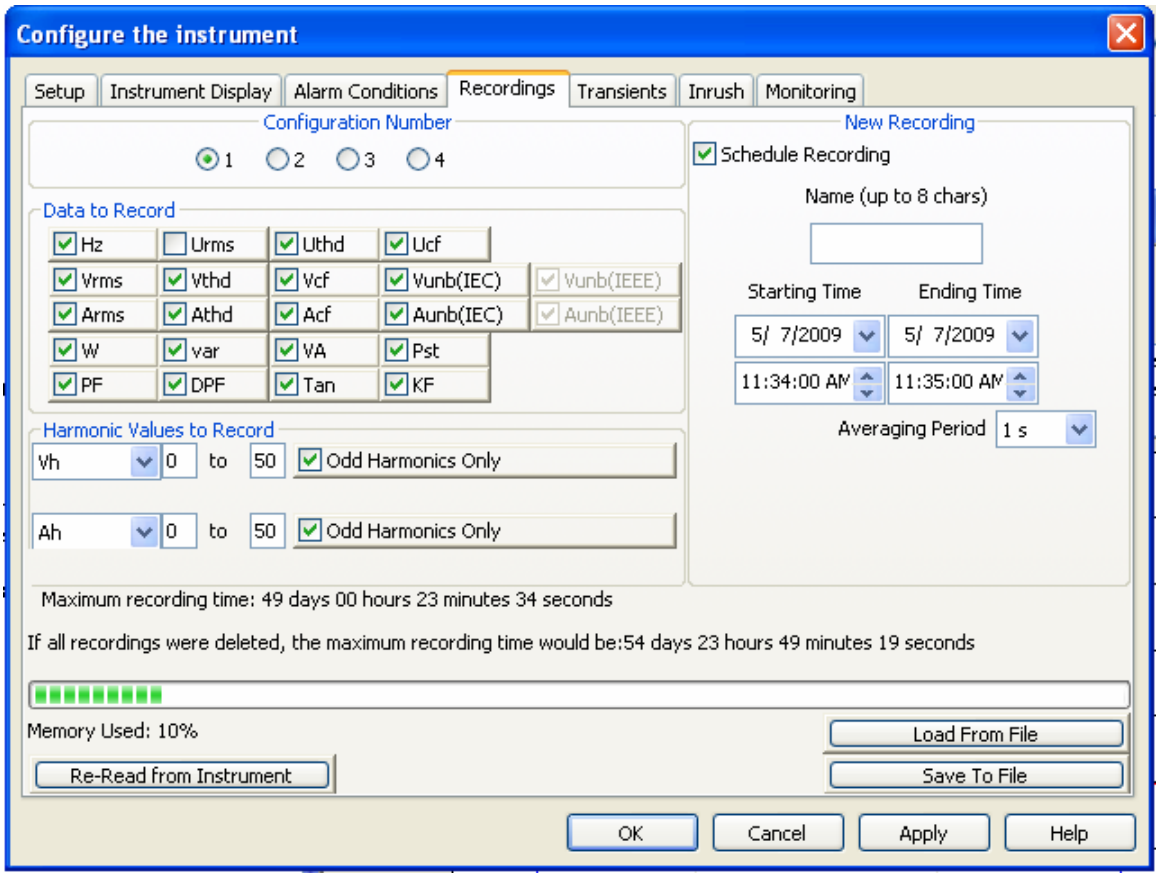

Figure 4

- Select the configuration to set up: 1, 2, 3 or 4. Four different configurations are available. More configurations can be saved by pressing **"Save to File"** and recalled later by pressing **"Load From File"**.

- Check the box next to each parameter to recording the **"Data to Record"** section.

  Choices include:
  Vrms: voltage root mean squared
  Urms: voltage phase to phase root mean squared
  Arms: current root mean squared
  Vcf: voltage crest factor
  Ucf: voltage phase to phase crest factor
  Acf: current crest factor
  Vunb: voltage unbalance (IEC & IEEE)
  Aunb: current unbalance (IEC & IEEE)
  Hz: frequency
  Vthd: voltage total harmonic distortion
  Uthd: voltage phase to phase total harmonic distortion
  Athd: current total harmonic distortion
  W: active power
  PF: power factor

DPF: displacement factor
VA: apparent power
var: reactive power
Tan: tangent
Pst: short-term flicker
KF: k factor

- **Harmonic Values to Record**. It is possible to record up to 2 of 4 types of harmonic data, voltage (Vh), current (Ah), phase to phase voltage (Uh), and power (VAh). For each selected harmonic data type, you can choose a range of harmonics to record from the 1st to 50th. You can further limit that range to only include odd numbers by checking the box for **"Odd Harmonics Only"**.

- Checking the box next to **Schedule Recording** activates the recording function allowing the user to set the date and time for the recording to begin and end. The bottom left hand side of the **Recordings** tab shows the user how long of a recording they can make with the data parameters they have chosen to record, the averaging period they have chosen and the remaining memory on the PowerPad. It also tells the maximum recording time if the memory on the PowerPad was cleared and how much memory is currently being used.

- **Averaging Period** sets how often the recoding saves data, there durations are 1s, 5s, 20s, 1min, 2min, 5min, 10min and 15min, The PowerPad works by saving data every time the averaging period passes and the data that is the saved is the average of all the data seen during that period. For instance, looking at a Vrms recording with an averaging period of 1 minute would show, for each minute, the average Vrms.

Note: The starting time and recording duration must be a multiple of the recording rate if you are not scheduling for seconds this should only affect recordings with an averaging period over 1 minute.

NOTE: The PowerPad loses its scheduled recording if it is powered off before the recording begins. If it is powered off during the recording, a partial recording will usually still exist but with the first letter of its name changed to "@". The start and end times requested for the recording might be adjusted by the PowerPad to be in even multiples of the averaging period. For instance, if an integration period of 10 minutes was requested and the start time was 9:03, the recording might not actually begin until 9:10.

1.6 Transients Configuration

The Transients window allows you to set up the criteria for capturing transients.

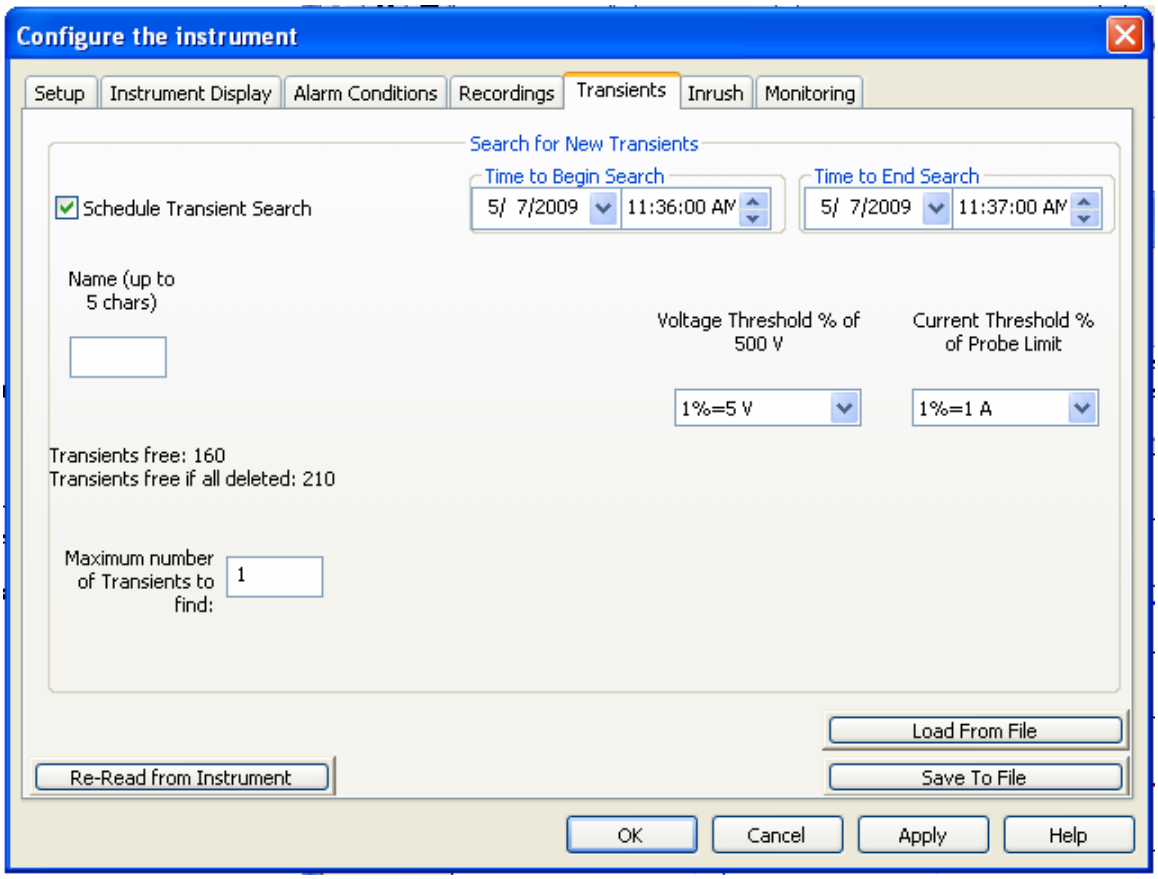

Figure 5

Checking the box next to **Schedule Transient Search** activates the search function. A name of up to 5 characters can be selected for the transient search along with the start time and end time of the search. The search can end earlier if the number of transient events has reached the "Max number of Transients to find".

The Model 8335 can store up to 210 transients. Existing transients can be deleted from the **"Recorded Data"** window. The value entered into **Max number of Transients to find** determines the maximum number of transients the search will look for, during the search this value may not be reached, but if it is, the search will end before its scheduled time.

Thresholds: The thresholds determine when a transient event is found. If a datapoint in a waveform differs from the same datapoint in the previous cycles by more than the threshold, a transient event is found. The percentage is of constants, not the actual values of the waveforms. 100% of voltage is always 480V. 100% of current depends on the type of current probe. (Probes must be connected before setting up a transient search)

Note: The current measurements may change from few Amperes to few thousand Amperes. Always use a high threshold if do not want to fill the 50 transients in few minutes.

1.7 Inrush Configuration

The Inrush window shows the dialog box used to configure the parameters for an Inrush search.

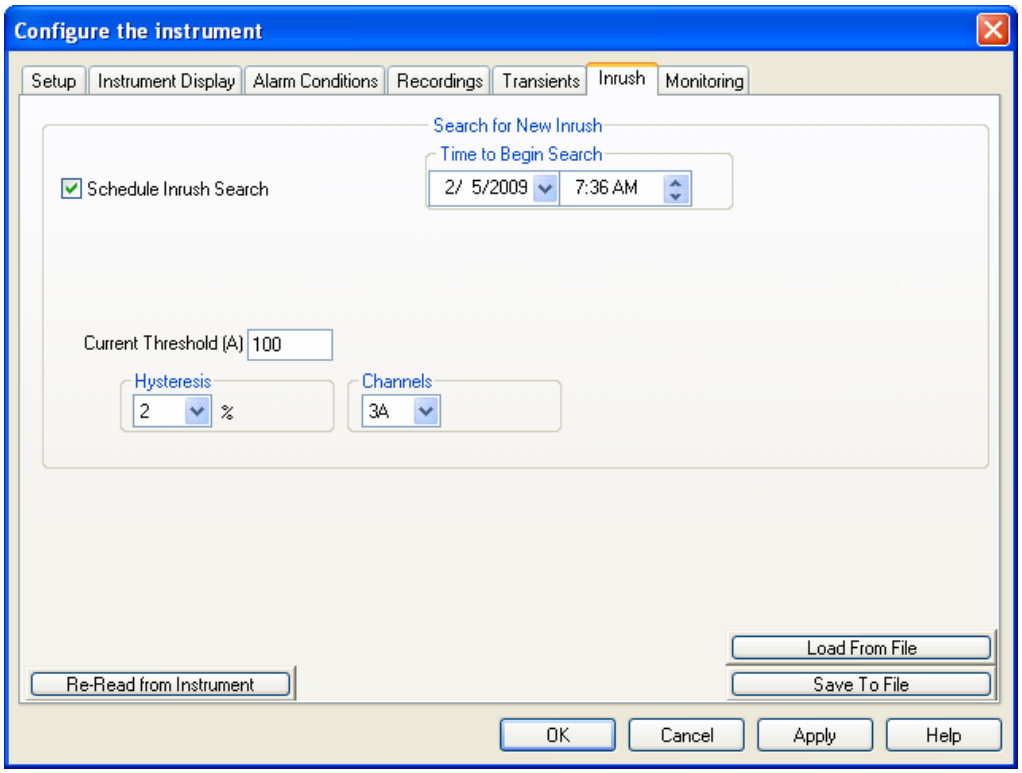

Figure 6

Checking the box next to **Schedule Inrush Search** activates the search function allowing a starting time for the search to be assigned. The search will end once an inrush event occurs.

The **Current Threshold (A)** value determines when the inrush recording begins during a search by triggering the recording when the current value is reached. (Probes must be connected before setting up an inrush search)

Channels allows the user to select which channel to trigger inrush it is possible to monitor one individually (A1, A2, A3) or monitor the all (3A) during the search.

A **Hysteresis** value is set to say when the recording of an inrush event should end. The inrush recording begins when the ARMS threshold is reached, and ends when the current is below the threshold minus the hysteresis percentage. If the maximum number of datapoints has been recorded, the inrush recording ends even if the hysteresis value has not been reached. 0, 1, 2, 5, 10, 20, 50, 100 are the possible hysteresis percentages.

1.8 Running the Test

After configuring the instrument, press **"OK"**. The status window will display if a recording is ready to start. Select **"Yes"** to run the scheduled recording, select **"No"** to close the Configure dialog box and cancel the test.

2. Real-time Windows

In the **"Realtime Trend"** portion of the Instrument window it is possible to view various windows showing real-time data and waveforms. From these windows, it is possible to view all the real-time data that is available on the PowerPad. The buttons described below appear on several of the real-time windows.

- **Create DataView Report** inserts the data into a DataView report which you can then view, modify and save.
- **Create Spreadsheet** saves the data as a MS Excel spreadsheet or .csv file which can then be viewed, modified.
- **Print** the current window.
- **Hold (Pause)** temporarily stops the readings from the PowerPad holding the current data view and graph until resuming.
- **Resume (Play)** allows the readings from the PowerPad to continue or begin.
- **Stop** ends the current trend readings from the PowerPad.
- Checking the **View as List** box shows all the waveform data as a list of numerical data points.
- **All, 3U, 4V, 4A, L1, L2, L3,** and **N** choose which channels will be displayed. (Depending on which model there will be less channel options.)
- To the right of each graph there will be a vertical string of button to modify the graph view:
    - **Λ** scrolls the graph up
    - **V** scrolls the graph down
    - **+** zooms in on the graph
    - **++** zooms in faster
    - **-** zooms out on the graph
    - **--** zooms out faster
    - **0** restores the default graph view

2.1 Realtime Waveform

The Realtime Waveform window shows you the waveform of the data the PowerPad is currently reading along with min/max and phasor data.

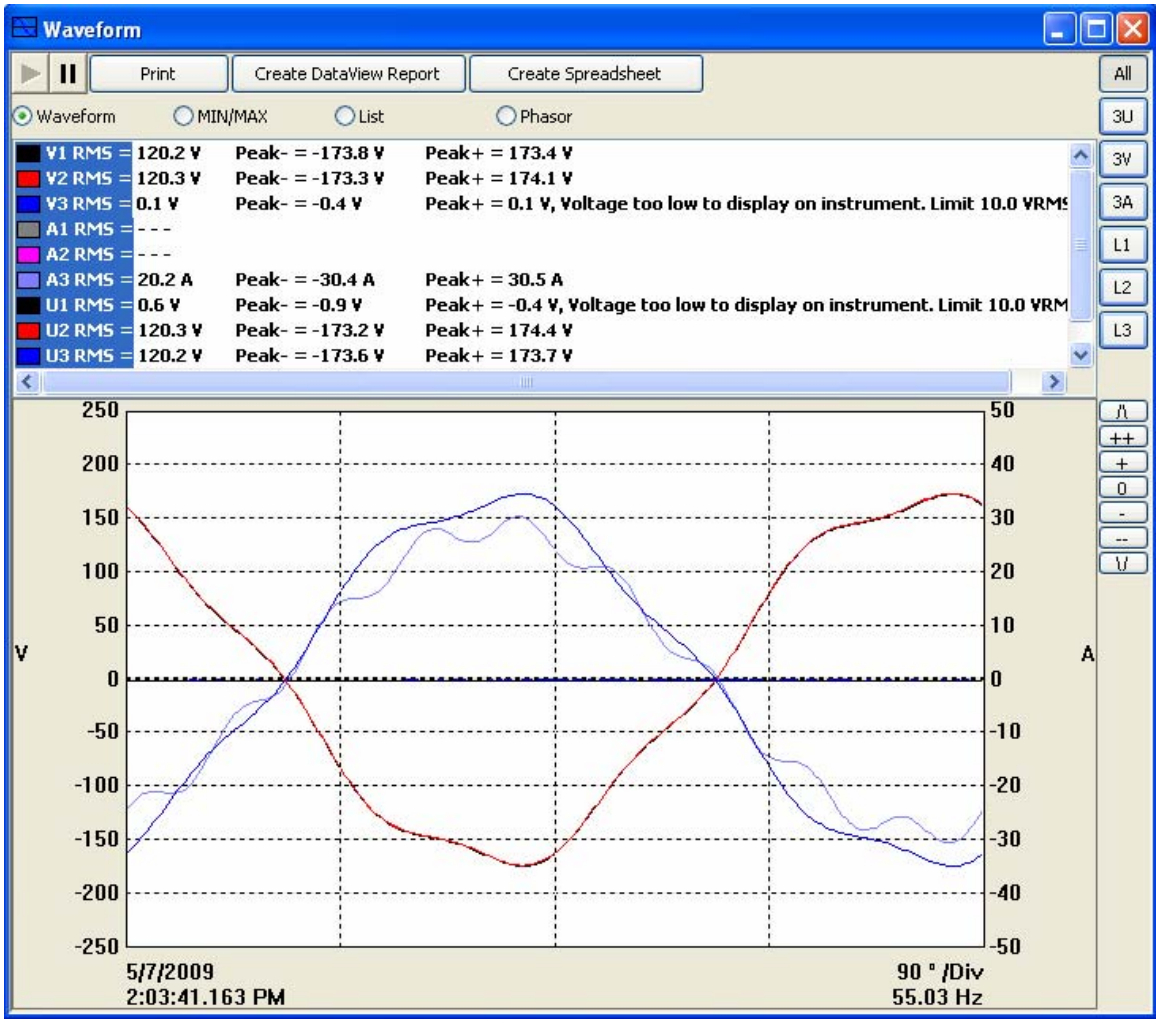

Figure 8

2.2 Harmonic Graph

The Harmonic Graph window shows the harmonics of the current and voltage signals being read by the PowerPad.

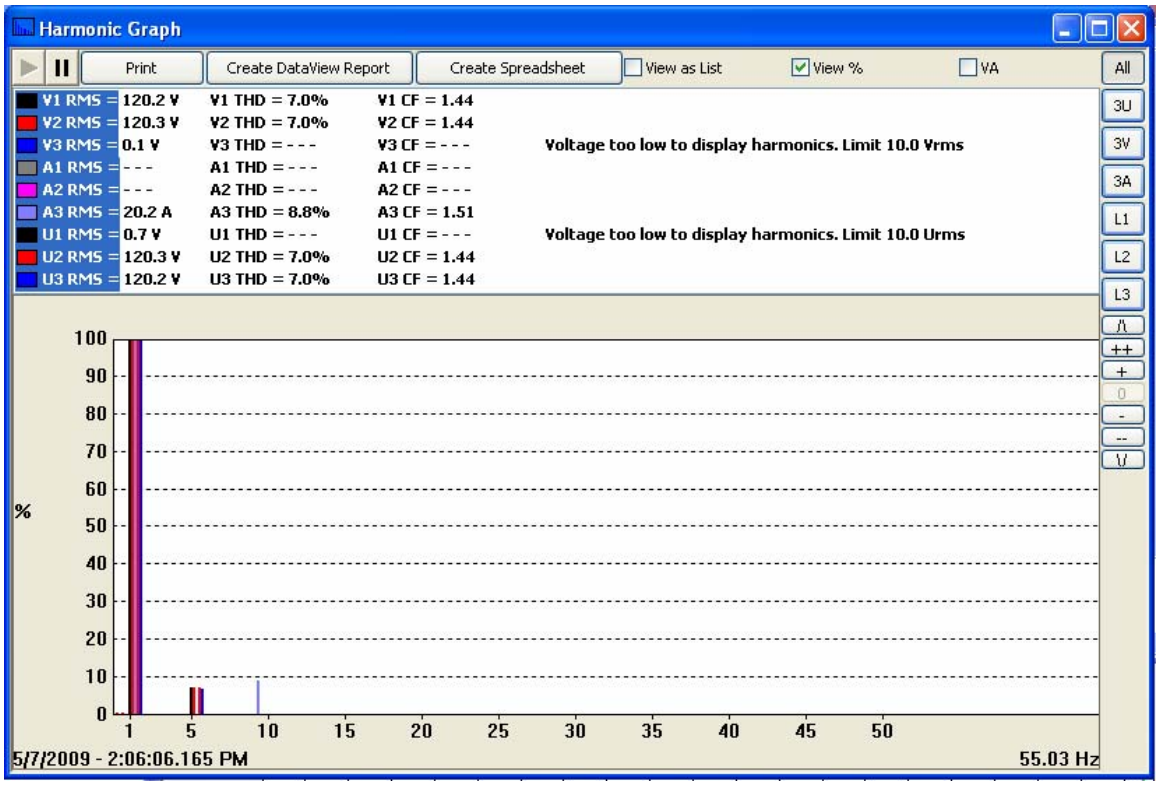

Figure 9

- Clicking the box next to **View %** shows the values of the harmonics as percentages of the overall signal instead of in Volts and Amps.

2.3 Realtime Trend

The Realtime Trend window shows the averages, over set periods, of the waveforms being read by the PowerPad. These averages are then shown as a constantly growing graph allowing trends in the data to become apparent. The time axis of the graph is constantly adjusting to fit all the data.

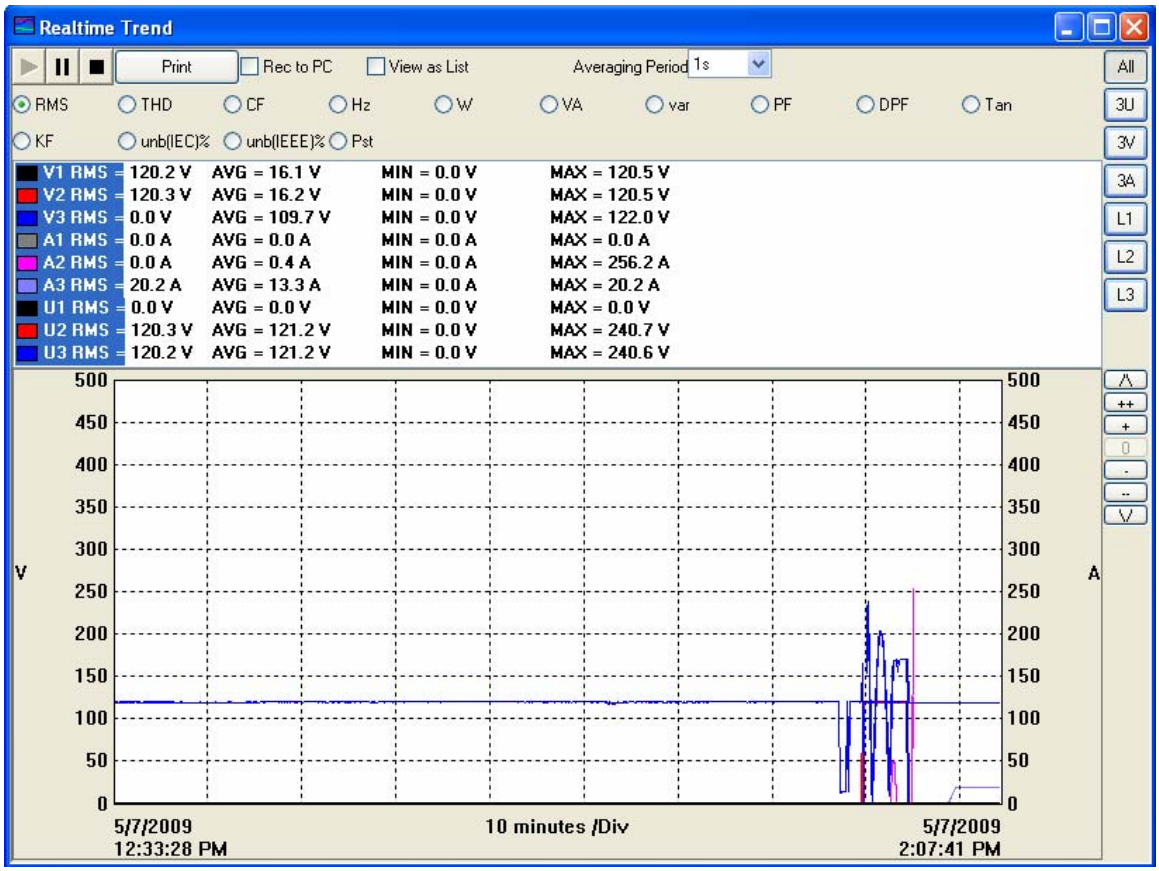

Figure 10

- The **Averaging Period** drop-down menu assigns how much data is averaged for each data point on the realtime trend graph.

- Checking the box next to **Rec to PC** saves the realtime trend data to the computer. This topic is discussed in detail in section 2.5, Saving Real-time Measurements.

- On the top portion of the **Realtime Trend** window it is possible to select to view various types of data, including:
    - **RMS:** voltage and current root mean squared
    - **THD:** total harmonic distortion
    - **CF:** crest factor
    - **Hz:** frequency
    - **W:** active power
    - **VA:** apparent power
    - **var:** reactive power
    - **PF:** power factor
    - **DPF:** displacement factor
    - **Tan:** tangent
    - **KF:** k factor

- **unb(IEC)%:** unbalance
- **unb(IEEE)%:** unbalance
- **Pst:** short-term flicker

NOTE: More data types are downloaded to a database or spreadsheet than what is shown on the screen.

2.4 Power/Energy

The Power/Energy window displays accumulated power and energy data. The accumulation of energy data can be started and stopped by the user. The resulting data can be viewed on the screen, selected by phase, and downloaded to a database.

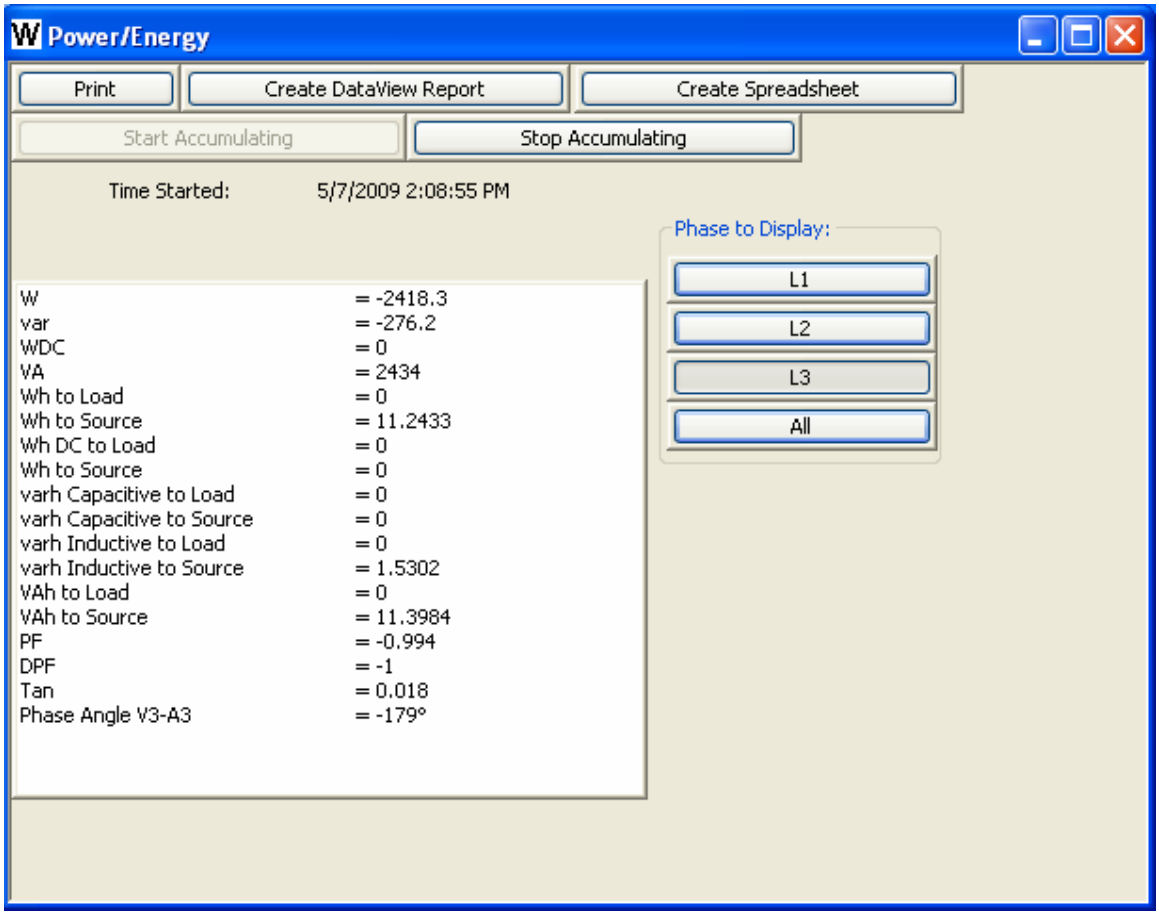

Figure 11

- The **Start Accumulating** and **Stop Accumulating** buttons start and stop the calculation of energy values while the power calculations run continuously.

NOTE: The data for all available phases are downloaded to a database or spreadsheet, not just what is shown on the screen.

2.5 Saving Real-time Measurements

Real-time data received from an instrument can be saved directly into a recording session database. This differs from the process of downloading and saving recorded data in that the measurements are stored on the computer as the instrument measures them. These measurements are not necessarily being stored within the instrument. However, the instrument may be configured to record at the same time real-time measurements are being received from the instrument. In which case, two copies of the measurements will be stored. One copy is stored on the local computer and the other in memory within the instrument.

To Save a Real-time Measurement:

1. From the **Realtime Trend** window, check the **"Rec to PC"** checkbox.

2. In the Save As dialog box that appears, specify the type of file to save in the **"Save as Type"** field. The choices are .dvb (DataView database), .xls (MS Excel spreadsheet), or .csv (Comma Separated File). Specify the name of the file by typing it into the File name field, select the desired location to save the file, then click **Save** to save the file. The recording begins after the file is saved.

3. When the **"Rec to PC"** option is unchecked or the stop button is pressed the recording ends, and the file can be opened by selecting **"Yes"** from the View Saved File dialog box that will appear.

3. Downloading Data to Database

To download recorded data, go to **Instrument > Recorded Data**, recorded data can also be found from the Instrument tree view. Expand the sections under **"Recorded Data from the instrument"** then click on a line that describes the desired recorded data. It will bring up a window with a graph of the data.

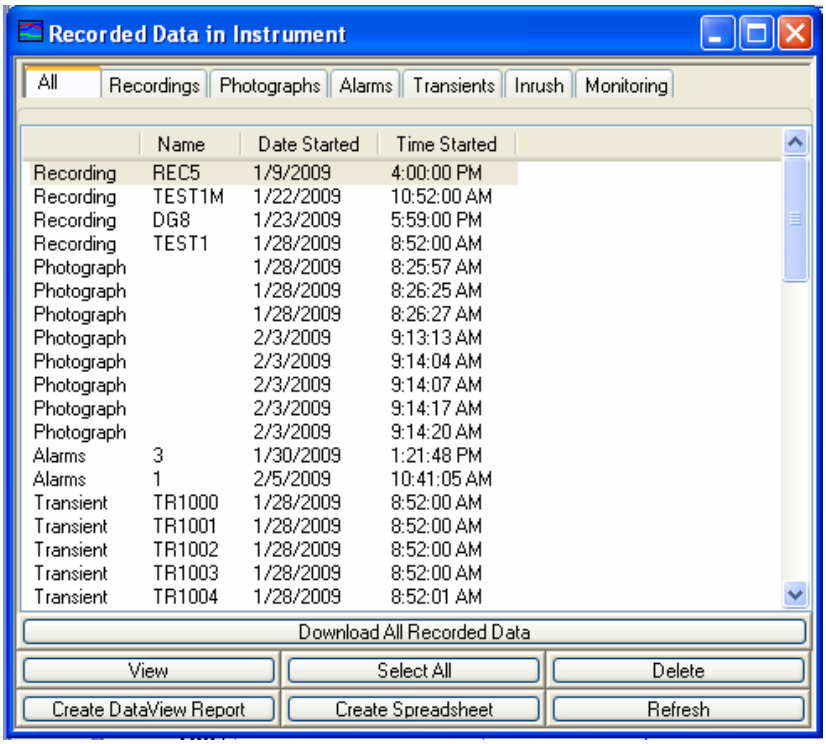

Figure 12

Select the data you want to Download by clicking on the desired tab (Recordings, Photographs, etc.), then clicking on the file name.

- You can choose to view the data in three different ways:
  - **"Create DataView Report"** inserts the data into a DataView report which you can then view, modify and save.
  - **"Create Spreadsheet"** savers the data in a MS Excel spreadsheet or .csv file, which can then be viewed and, modified.
  - **"View"** opens up a window with a graph of the data where the user can select to **"Print"**, **"Create DataView Report"**, and **"Create Spreadsheet"**.

- From the **"Recorded Data"** window it is possible to delete files stored on the PowerPad using the **"Delete"** button

- The **"Download All Recorded Data"** button allows the user to download and save all the files on the PowerPad for later viewing and analysis.

  Note: If a large number of recordings are available the download time may be very long (a few hours at the fastest baud rate).

Recorded data can also be found from the Instrument tree view. Expand the sections under **"Recorded Data from the instrument"** then click on a line that describes the desired recorded data. It will bring up a window with a graph of the data.

Any data that is downloaded from the PowerPad is saved on the user's computer to allow for easy reloading if the user wants to view the file again. These files will build up over time especially when performing multiple long recordings. They can be found in My Documents > DataView > Download > PowerPad 2 (for Model 8335), look at folder "PowerPad" or "PowerPad Jr" for other models.

4. Recording Window Functions

Many of the Recording types show their data in the same way and have the same functions to view the different sources of data and manipulate their graphs. Below is an overview of the functions that will be available on many of the recorded data types, but not all of the functions shown will be available on all data types and instruments. To show the options, a **"Trend Recording"** window is shown as it offers the most options.

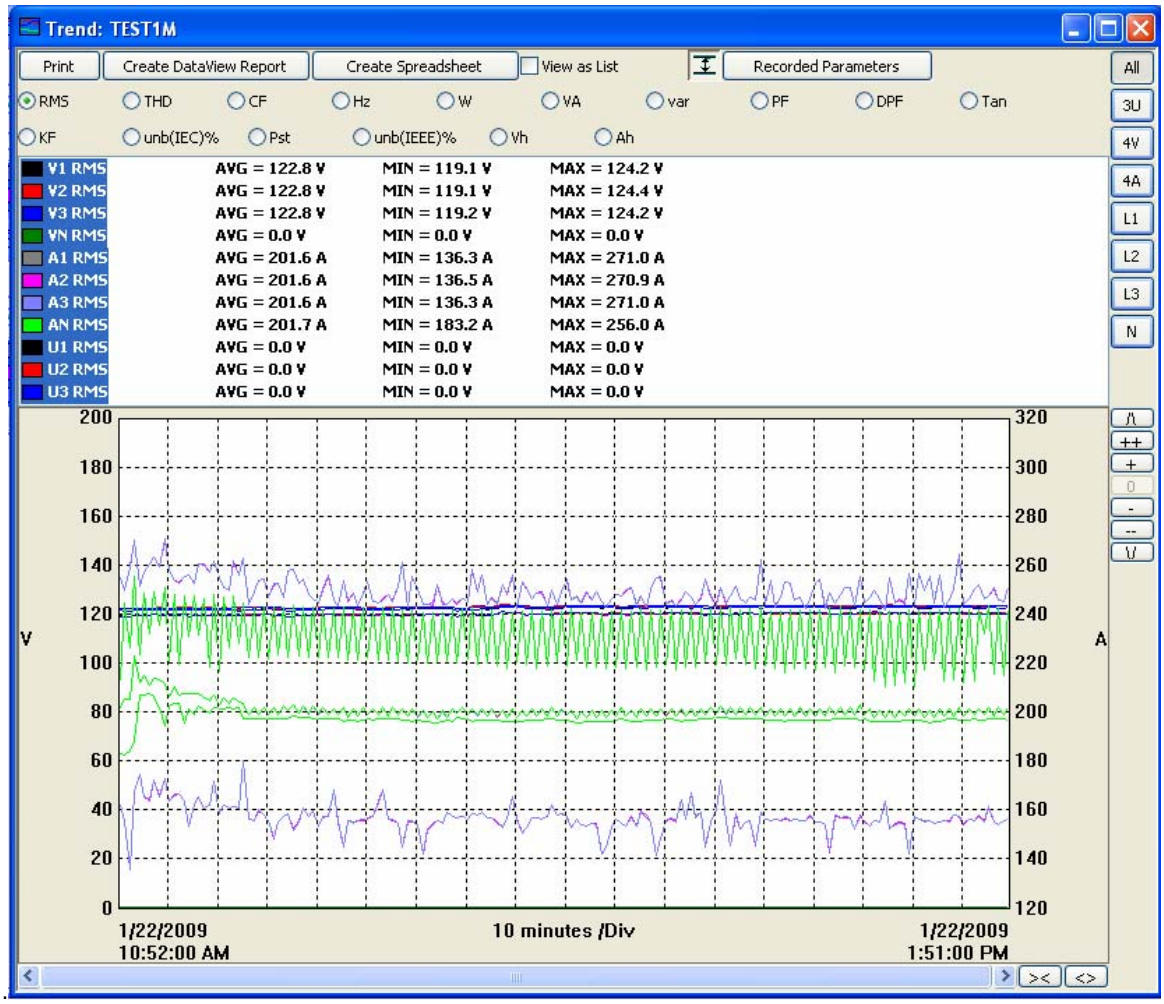

Figure 13

The Recording windows look and function much the same as the Realtime windows with some differences. It is possible to move between the types of data recorded by selecting them from the top portion of the window.

- Checking the **View as List** check box shows all the waveform data as a list of numerical data points.
-  This button graphs the min and max values along with the nominal value.
- **All, 3U, 4V, 4A, L1, L2, L3,** and **N** choose which channels will be displayed. (Depending on which model there will be less channel options.)
- **Recording Parameters** allows the user to set Primary and Secondary voltage parameters.
- To the right of the graph there will be a vertical string of button to modify the graph view:
  - **Λ** scrolls the graph up.
  - **V** scrolls the graph down.
  - **+** zooms in on the graph.

  - **++** zooms in faster.
  - **-** zooms out on the graph.
  - **--** zooms out faster.
  - **0** restores the default graph view.

- At the bottom of the graph there is a scroll bar and two horizontal buttons that change the time scale of the graph
  - **><** decreases the time scale making the graph longer
  - **<>** increases the time scale making the graph shorter

- **Create DataView Report** inserts the data into a DataView report which you can then view, modify and save. (saved as .dvw file in My Documents > DataView > Reports > PowerPad II, PowerPad Jr. or PowerPad depending on model).
- **Create Spreadsheet** saves the data in a MS Excel spreadsheet which you can then view and, modify. (saved as .xls or .csv file in My Documents > DataView >DataFiles > PowerPad II, PowerPad Jr. or PowerPad depending on model).
- **Print**, prints what you are currently viewing in the window.

4.1 Trend Recordings

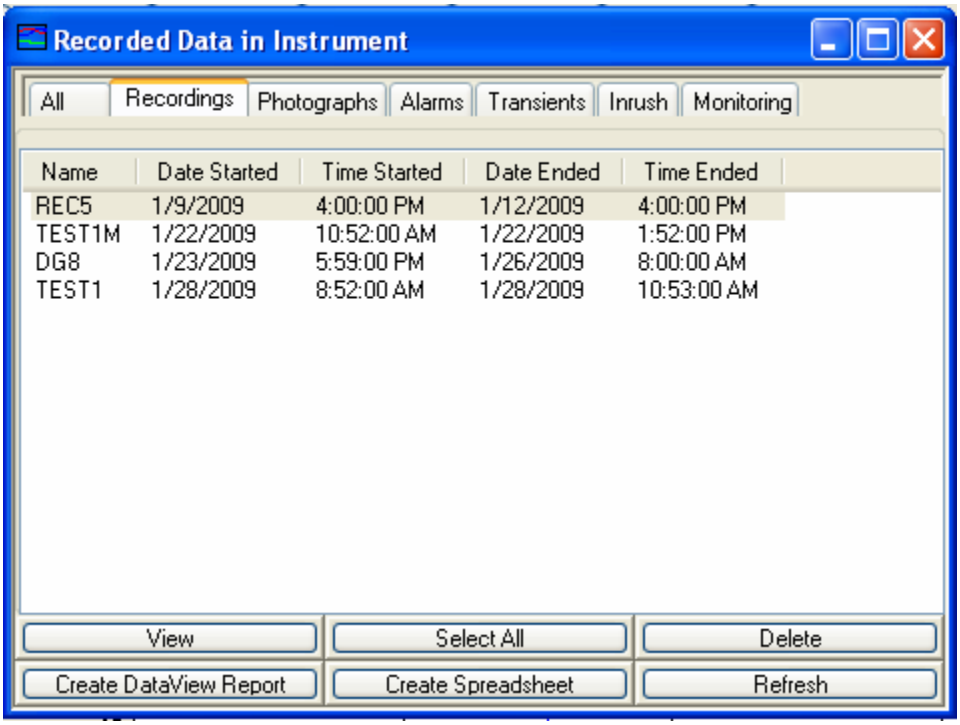

Figure 14

The **"Recordings"** tab shows all the trend recordings stored on the PowerPad by selecting to **"View"** one of the recordings the control panel opens a window allowing the recorded data to be viewed.

When viewing a recording, if the recording is long, a summary of the recording will be shown while the complete file is downloaded. When this happens the title of the **"Trend"** window will include **"Summary"** until the download is complete, also the bottom left hand of Control Panel will display the status and time remaining on the download.

When the download is complete, **"Summary"** will disappear from the title. Since the recording is saved on the computer, if the recording is viewed again at any later time, the loading time will be fast since it will not need to re-download from the PowerPad.

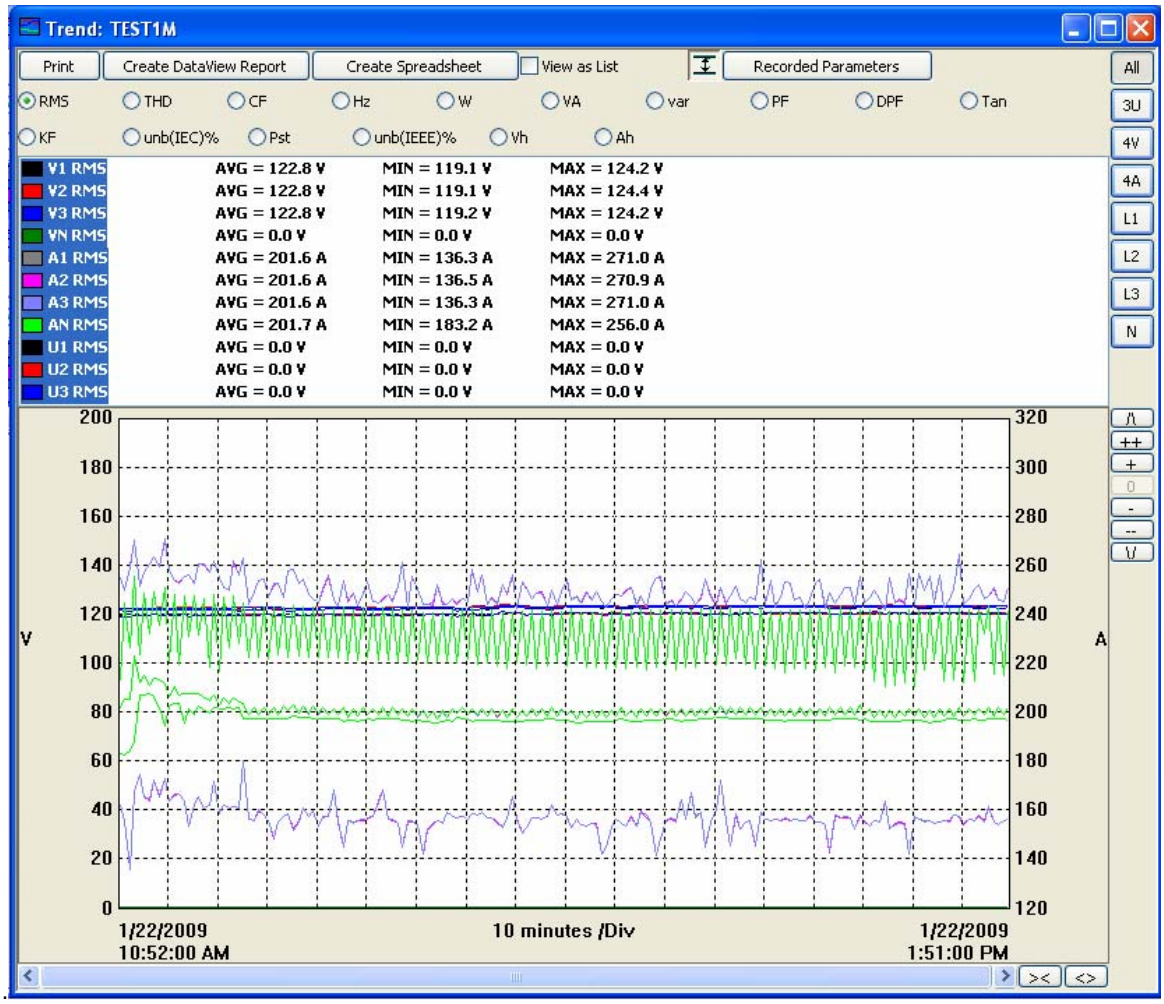

Figure 15

All the date types chosen to record are available to select at the top of the window and the functionality is explained in section 4.0.

4.2 Photographs

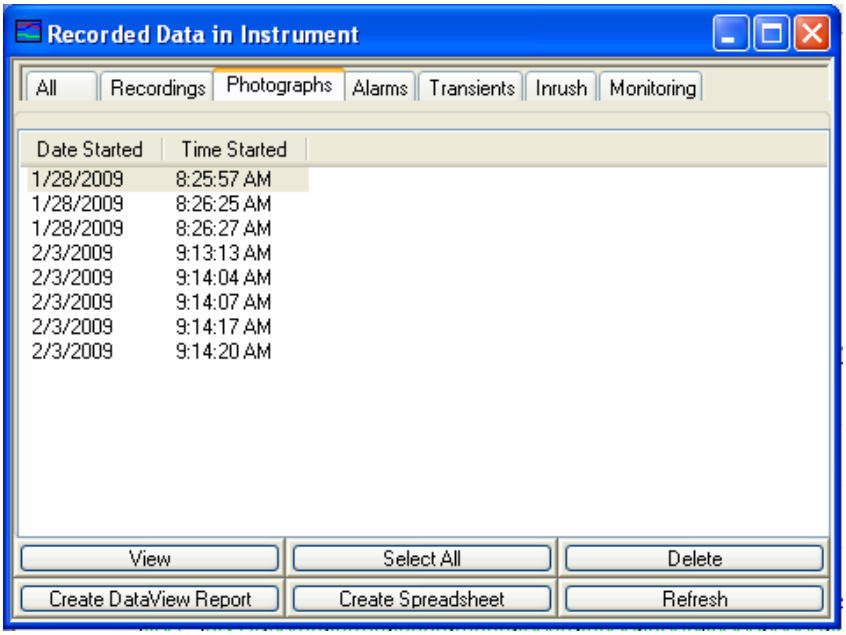

Figure 16

In the **"Recorded Data"** window, the **"Photographs"** tab displays a list of photographs (Snap Shots) taken on the PowerPad. The photographs are listed by the date and time they are taken. When a photograph is selected and the "**View"** button is pressed, a window opens showing the photograph.

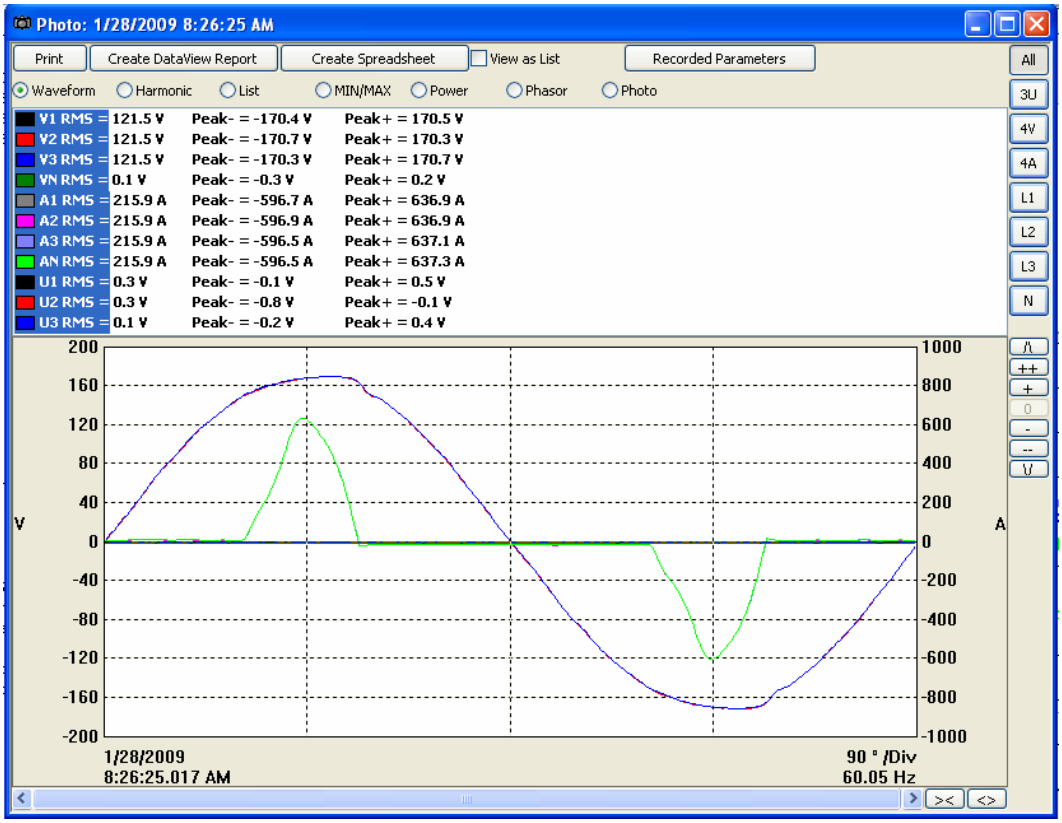

Figure 17

The photograph window, in addition to letting the viewer see a screenshot of what the PowerPad was displaying when the photo was taken, also shows all the data that the PowerPad was reading at the time. The user can move between Waveform, Harmonic, a List of channel readings, Min/Max, Power, and Phasor data. The functionality of the photograph graphs are explained in section 4.0.

NOTE: Snapshots can only be initiated using the camera button on the PowerPad itself, not by DataView. Also a .bmp file of the photo is saved when a DataView report is created, this file is found in My Documents > DataView > DataFiles > PowerPad II, PowerPad Jr. or PowerPad, depending on model.

4.3 Alarms

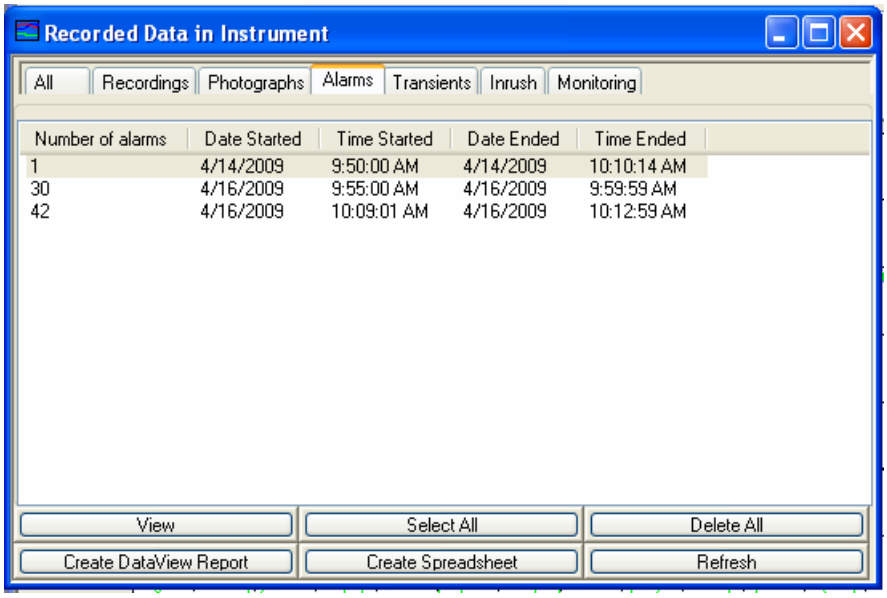

Figure 18a

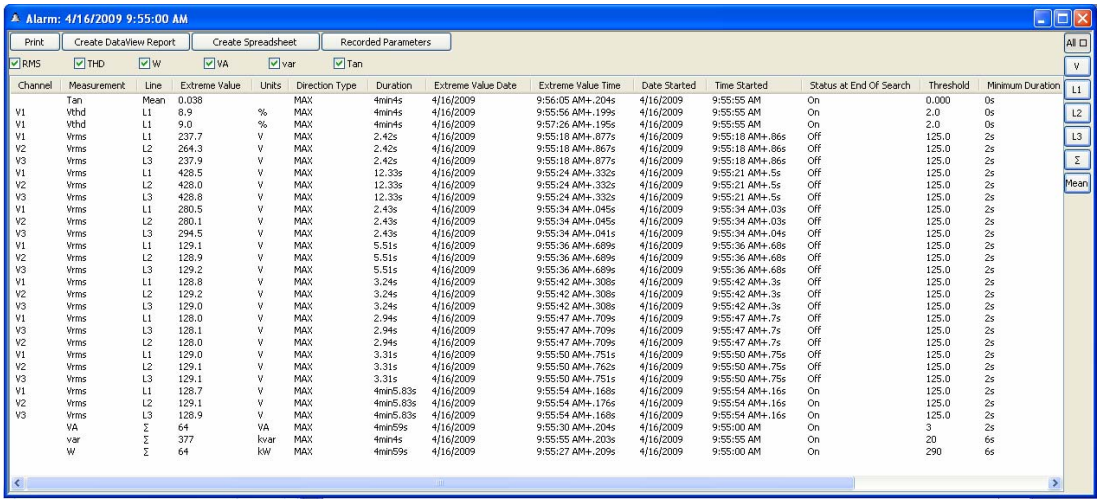

Figure 18b

The Alarm window displays a list of alarms recorded on the PowerPad.

A subset of the list can be viewed by the phase of the triggering event.

Alarms can be selected and downloaded to a database. The downloaded alarms contain no more information than is shown in the screen display.

4.4 Transients

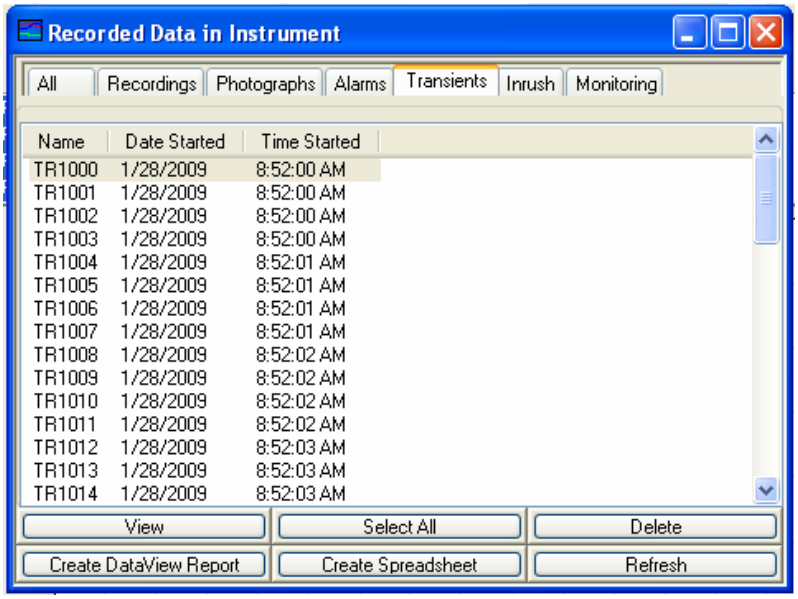

Figure 19

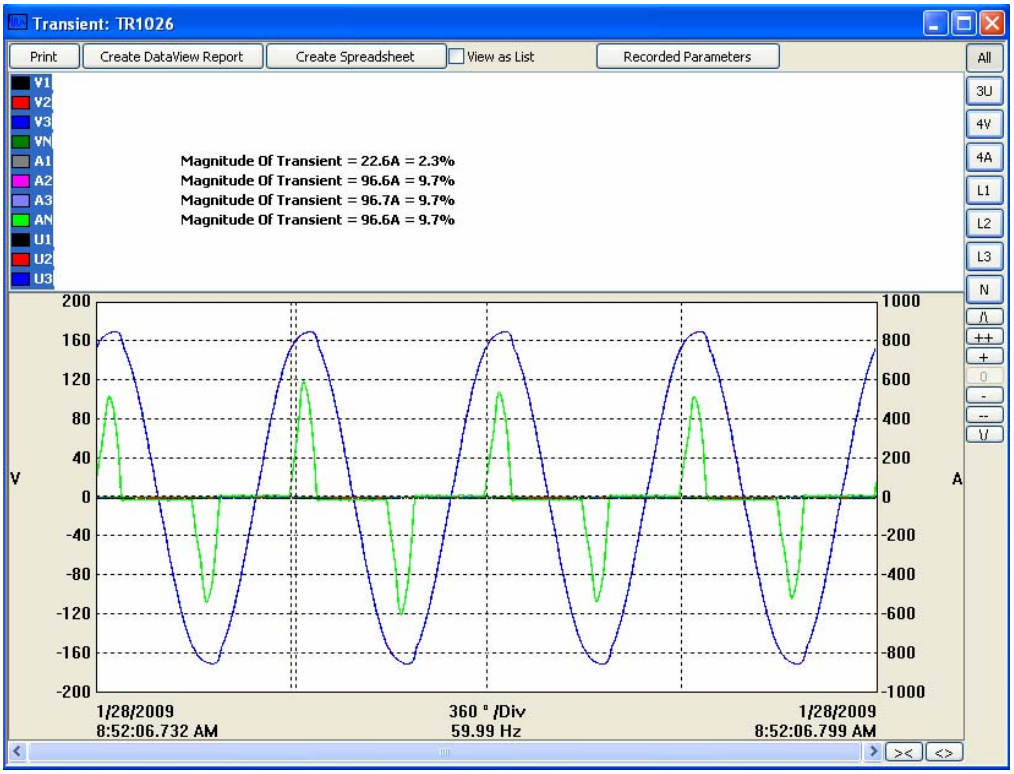

Figure 20

The Transients window displays transients stored on the PowerPad. It shows the number and name of the recording, and the time it began and ended. The selected transient(s) can either be downloaded or deleted. The functionality of the Transient window is explained in section 4.0.

The downloaded result contains four waveforms. The triggering event is contained in the second waveform and within the first 32 samples of the 256-sample waveform.

4.5 Inrush

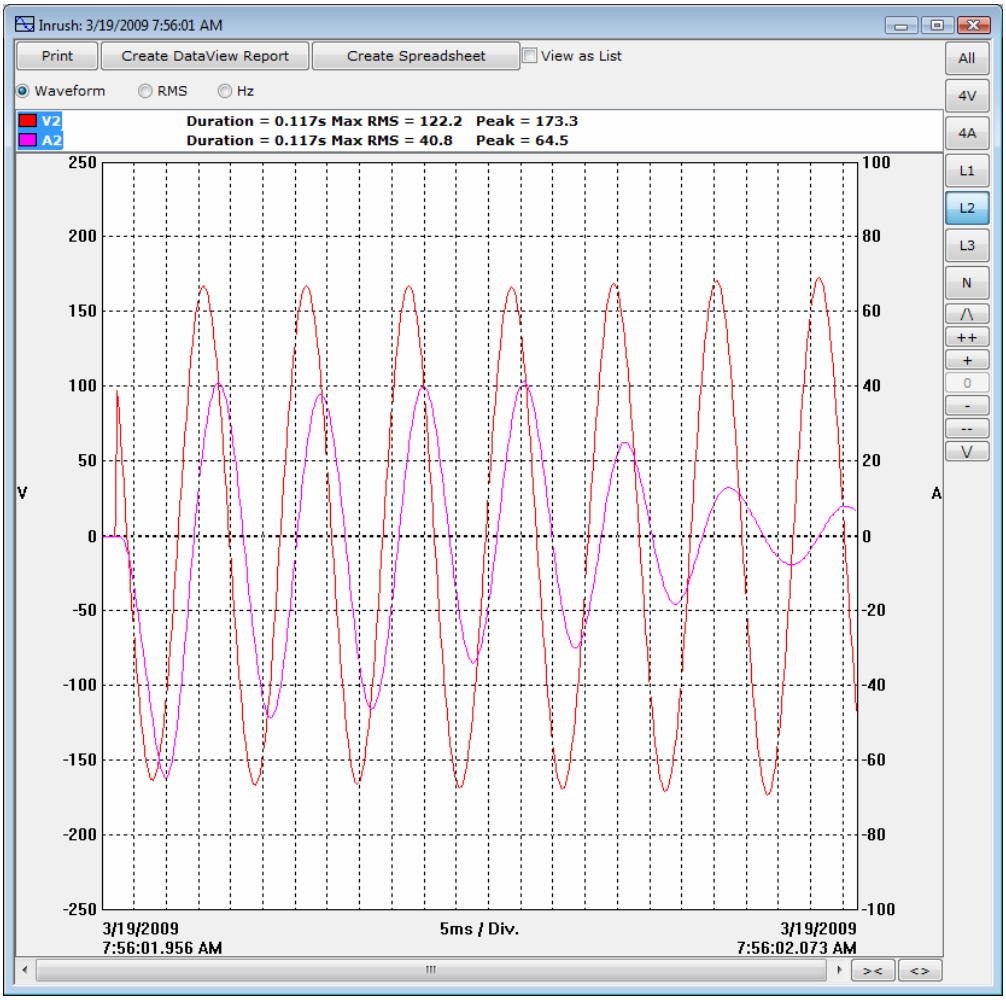

Figure 21

Selecting to view an Inrush file from the recorded data window opens up the Inrush window. The Inrush window shows all the waveforms being read by the PowerPad during the inrush event in along with RMS current and voltage data, and frequency data recorded during the event. The functionality of the Inrush window is explained in section 4.0.