

**Instruction Manual
Megger PA-9Series User
and
MegPa9IEC Software
Manual**

Megger.

Valley Forge Corporate Center
2621 Van Buren Avenue
Norristown, PA 19403 U.S.A.

www.megger.com

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The information presented in this manual is believed to be adequate for the intended use of the product. If the product or its individual instruments are used for purposes other than those specified herein, confirmation of their validity and suitability must be obtained from Megger. Specifications are subject to change without notice.

Megger

Valley Forge Corporate Center
2621 Van Buren Avenue
Norristown, PA 19403 U.S.A.
Tel.: 610-676-8500
Fax: 610-676-8610

www.megger.com

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Warranty Clause

Megger warrants each new product manufactured and sold to be free from defects in material, workmanship and construction, and that when used in accordance with this manual, will perform to applicable specifications for a period of one year after shipment.

If examination by Megger discloses that the product is or has been defective, then our obligation is limited to repair or replacement of the defective unit or its components, at our option.

The foregoing warranty constitutes Megger's sole liability and is in lieu of any other warranty of merchantability or fitness. Megger shall not be responsible for any incidental or consequential damages arising from any breach of warranty.

Disclaimer: The PA9 Wireless unit should be used for data analysis and not for real time monitoring and/or control applications.

Service Information

In the event the Megger PA-9*Series* Power Analyzer or *MegPa9IEC Metrosoft® for Windows* appears defective, call the Megger service department at 610-676-8500. The Service Department will determine the cause of the apparent malfunction and provide the necessary support to correct the problem. In some cases, problems can be corrected over the telephone. Therefore, before returning any equipment to the factory for service, discuss all problems with the Service Department. Web Site Information: www.megger.com is our web site containing product information, software information and upgrades, what is new, patches and more.

Service Contracts are available on request.

Equipment Return

Prior to returning the Megger PA-9*Series* Power Analyzer, you must obtain Return Authorization from the Megger Service Department 610-676-8500. Each shipment must have a packing slip, which includes:

1. A list of all items enclosed with applicable serial numbers.
2. Reason for returning (e.g. malfunction, described in detail).
3. Billing and shipping address for return.
4. Copy of Purchase Order if billing charges are applicable.
5. Actual Package returned must have our RMA label on it.

Returns must be properly packaged with transportation charges prepaid to Megger; return transportation charges will be F.O.B. factory. Send returns to:

Megger.

Valley Forge Corporate Center

2621 Van Buren Avenue

Norristown, PA 19403 U.S.A.

610-676-8500 (Telephone)

610-676-8610 (Fax)

Attention: Service Department

IMPORTANT!

Megger periodically provides updates of unit firmware and software. These updates may include enhancements that improve the performance of your unit. See our web site www.megger.com to obtain these download updates.

SEE ALL OF OUR PRODUCTS, APPLICATION NOTES, FAQ's BY PRODUCT,
AND LOCAL REP INFORMATION ON THE WEB AT: www.megger.com

1

INTRODUCTION

Congratulations on your purchase of the Megger PA-Series Power Analyzer. Be assured that your unit has been designed with emphasis on reliability, simplicity and ease of use. It will provide you with the information you need to investigate customer power quality complaints and compliance situations, verify billing, and pinpoint locations of high demand and power consumption.

PURPOSE OF THIS MANUAL

This document is the operator manual for the Megger PA-9*Series* Power Analyzer. It provides a description of the operation of the unit as well as installation and operating instructions. Read this manual before installing or using the equipment. Special emphasis should be placed on all safety discussions.

AUDIENCE

This manual is written for technical personnel who are familiar with the various measurements performed by power analyzers and have a general understanding of their use and operation. Such personnel should also be thoroughly familiar with the hazards associated with the use of this equipment and should have received proper safety training.

CUSTOMER FEEDBACK

We listen to our customers very seriously when they express interest in or suggest new or modified features. Please feel free to call, e-mail, fax, or write with any comments or suggestions you may have. We can be contacted at the following:

By Phone: 610-676-8500 Ask for Sales

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By Website: *www.megger.com*

By Mail: Megger
Valley Forge Corporate Center
2621 Van Buren Avenue
Norristown, PA 19403 U.S.A.

MANUAL CONVENTIONS

This manual uses the following conventions:

Bold indicates emphasis or a heading.

NOTE: is used to set off important information from the rest of the text.
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A **WARNING** symbol alerts you to a hazard that may result in equipment damage, personal injury, or death. Carefully read the instructions provided and follow all safety precautions.



A **CAUTION** symbol alerts you that the system may not operate as expected if instructions are not followed.

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OVERVIEW

The Megger PA-9Series is a portable, nine-channel analyzer capable of performing functions on four AC/DC voltages and five current inputs.

In addition to the Power Analyzer, your system includes the *MegPa9IEC Metrosoft[®] for Windows*, a user-friendly, menu driven software package that allows you to program the unit within minutes. This is accomplished by creating a setup on a computer using *MegPa9IEC* and uploading it to the Megger PA-9Series. Each unit can store up to 60 user-defined setups. Should you need to change setups on site, you may select any of your 60 setups using the Power Analyzer's front panel controls. The software package is also used to download recorded Power Analyzer data, perform database searches, and more.

Some of the Power Analyzer's features include:

- powered from VA input 90-600 VAC or 110-600 VDC
(no separate power source required)
- auxiliary power input port, 90 to 250 VAC, standard
- contains rechargeable battery backup
- 12 megabyte of non-volatile memory for data storage, standard
- 5 x 1-1/2 LCD provides alphanumeric and graphic displays
- simultaneously records power quality and power flow information*
- measures power for single phase, split phase, and three phase systems using 1, 2, 2-1/2, and 3 element wattmeters*

* with Power Flow option

- samples at 256 samples/cycle per channel and MegPa9IEC can perform harmonic analysis through the 63rd harmonic
- performs continuous or exceedance-only recording
- displays real-time values and graphs and records them for downloading to a computer using *MegPa9IEC*
- with the power flow option installed, when used as a Demand Meter, records either fixed or sliding window demand data

Recorded power quality and power flow parameters include: (Power Flow is an option)

True RMS voltage, minimum RMS voltage, and maximum RMS voltage
True RMS current, minimum RMS current, and maximum RMS current
watts, per phase pair and total system
vars, per phase pair and total system
voltamps, apparent power per phase and total system
true power factor (watts divided by voltamps)
displacement power factor (cosine of the angle between the fundamental of voltage
and current)*
kilowatt hours, per phase and total system
kilovar hours, per phase and total system
kilovoltamp hours, per phase and total system
harmonic direction from source or load
harmonic magnitude and phase shift
up to 1000 out-of-limits events, with time stamp and duration
sub-cycle events to 65 s resolution (at 60Hz)
waveform capture using selectable triggers
Out of Limits Trending
Frequency Trending
IEC Flicker Trending
THD Trending
TDD Trending
Harmonic Trending

Power Analyzer Operation

The following sections describe the basic operations of the Megger PA-9*Series* unit.

There are several time intervals that are used by the Megger PA-9*Series* for storing and calculating RMS voltage, current, and other power related parameters. These time intervals are: sample rate, response time, RMS storage interval, and demand interval.

Sample Rate

The sample rate is simply the rate at which the input voltages and currents are sampled and is fixed at 256 samples/cycle per channel. The Analyzer uses a phase-lock loop to ensure that each cycle is measured 256 times. The voltage frequency on Phase A is measured and that frequency determines the period of the sampling.

Response Time

Response time determines how many samples will be used to calculate RMS V and I values. Think of response time as resolution. How sensitive do you want the analyzer to be? The software allows you to set the response time to 1, 2, 3, 4, 5, 10, 12, 15, 20, 30 or 60 cycles. If, for example, you select a 2-cycle response time, the Power Analyzer will use 512 samples (256 samples x 2 cycles) for the calculation. This will be repeated every two cycles, and a single RMS value will be stored awaiting the end of the data storage and/or demand interval.

Storage Interval

The RMS storage interval dictates how often the minimum RMS, average RMS, and maximum RMS values of voltage and current will be stored. At the end of each storage interval the minimum, maximum, and average values of the stored RMS values will be saved to memory. The data storage interval can be set from *MegPa9IEC* to be cycles, seconds, minutes or hours. The minimum data storage interval can be set to one-cycle and the maximum to six hours.

MegPa9IEC automatically computes the maximum recording time for you based on the selections you make when creating a setup. When recording in the Stop When Full mode, the Status Screen on the unit's LCD shows how much time is left before memory is filled.

Demand Interval

The demand interval dictates how often power related parameters (voltage, current, KW, KVA, KVAR, True and Displacement Power Factors, KWH, KVAH, KVARH, etc.) are recorded. The demand interval can be set using *MegPa9IEC* from one-minute to one-hour for a fixed demand window. The demand interval for a sliding window can be set from 15 minutes to 1 hour with a 1-minute or 5 minute demand storage rate.

The Megger PA-9*Series* computes power related parameters on a per phase basis. For each phase, the voltage and current are sampled simultaneously to eliminate phase angle error due to sampling skew. Integration over the demand interval gives true power for that phase.

A summation of the response intervals is done to calculate RMSvolt/RMScurr and Power Calculations.

NOTE: Power Factor is either leading, lagging or in phase. The Power Analyzer indicates a lagging power factor by placing a plus sign (+) ahead of the value, and leading power factor by placing a negative sign (-) ahead of the value.

Out-of-Limits Recording

The *MegPa9IEC* software allows you to program the Power Analyzer to save detailed information on out-of-limits events. This function runs parallel to the set recording mode to obtain minimum RMS, average RMS, and/or maximum RMS values per storage interval. The unit compares the response time measured value against the programmed voltage and/or current limits (upper, lower, and total harmonic distortion). Upon detection of an out-of-limit event, it records event data. This data includes the date and time the event started and stopped, the duration of the event, and the maximum, minimum and average RMS values on all inputs during the event timeframe.

The Megger PA-9*Series* has the capacity to record 1000 out-of-limit events.

NOTE: It is highly recommended that limits always be set and turned on. This may yield valuable information. Since out-of-limit data resides in separate dedicated memory, recording time is not sacrificed by using this feature. If waveform capture is on, then memory will be affected.

Sub-Cycle Event Capture

The Power Analyzer can detect events as short as 65 μ s at 60Hz. To use this feature, the sub-cycle event capture must be enabled and the limits set. Sag and swell limits must also be enabled. The unit will compare each sample within the present cycle to each corresponding sample of the previous cycle. Any time a single sample differs from the corresponding sample by more than the programmed limit, a sub-cycle event occurs. This event data includes the trigger source, time of, duration, and exceedance value. They are logged in the out-of-limits reports, and reported as sub-cycle.

Frequency Recording

The *MegPa9IEC* software will allow you to program the Power Analyzer to record frequency. The Power Analyzer will record the frequency of the voltage input on Phase A of the recorder (Channel 1 Input).

Exceedance-Only Recording

Using the *MegPa9IEC* software, the Power Analyzer can be programmed to record on exceedance-only using defined limits. This mode saves memory and allows for longer recording time than the continuous recording mode.

For exceedance-only recording, you specify the high and/or low limits. The Power Analyzer compares the measured value against the thresholds and will start recording when at least one input exceeds them. Recorded data includes the Minimum RMS, Average RMS, and Maximum RMS readings during the exceedance. Also recorded is any storage parameters setup in the program. Recording will continue until all inputs are in the normal range again.

Capturing Waveform

The Megger PA-9*Series* can be programmed to capture and save waveform data on either a time or event triggered basis. On a time basis, you can program how often waveforms will be recorded and how many cycles to record. On the event triggered basis (includes RMS limits, sub-cycle event, and THD event), the unit will save the response time trigger cycles up to (2) pre-trigger and 99 post-trigger cycles.

MegPa9IEC will provide from this data total harmonic distortion (THD), harmonic analysis, amplitude and phase shift data in addition to the Minimum RMS, Average RMS and/or Maximum RMS values per storage interval. The recorded data can be displayed alphanumerically and graphically on the unit's LCD. This data can also be downloaded for computer viewing using *MegPa9IEC*.

Waveform Capture Impact on Memory

To calculate how much memory waveform capture used, perform the following calculation.

(Sample rate PA9 Wireless) x (2) x (Number of Waveform Captures Recorded) x (Number of Channels On) x (Program Setup Post Trig + Pre Trig + 1) = Memory Used

NOTE: This is an approximate formula.

Memory Full Condition

Based on user selected functions and programming, the *MegPa9IEC* automatically configures the non-volatile memory into separate blocks. At some point during recording, the Power Analyzer may fill its memory with data. You can program the unit to either stop recording when out of memory, or to continue recording by wrapping to the start of memory. This will result in overwriting the oldest recorded data with recent data. In both the Stop When Full mode and the Wrap Around mode the unit will need to stop recording to be downloaded. To view differences of maximum record times for different memory modes, recalculate maximum record time in *MegPa9IEC* with each memory mode selection.

Recording Times

When programming the Power Analyzer, *MegPa9IEC* will calculate your recording time based on the programmed setup. When performing these calculations, the software also takes into account the number of inputs being used, the number of values being saved (Minimum RMS, Average RMS, and/or Maximum RMS), the memory capacity, demand interval, whether or not to capture waveform, the waveform capture rate, and expected events, if any.

NOTE: The analyzer itself does not take into account UNEXPECTED events when calculating record time.

Waveform capture can have a big impact on recording time. Should your unit stop recording before expected, check to see how many waveform captures were recorded. You can then enter this number into the *expected waveform # of events* box under program/waveform in the *MegPa9IEC* software. Click *CALCULATE MAX RECORD TIME* to see how your record time was impacted by actual waveforms captured.

For tests that stop recording earlier than expected, view the following screen. From *Home* select *Stored Data/Test Log/the stored test of interest/Statistics*. This screen shows you the stop condition for this test.

Overall Statistics Start Time: XX/XX/XX XX:XX:XX.XXX Duration: X days XX:XX:XX hrs Stop Condition: Normal - Local or Power Loss Lost at: N/A or XX/XX/XX XX:XX:XX.XXX Restored at: N/A or XX/XX/XX XX:XX:XX.XXX

Determining Maximum Record Time

Symbols used

<u>Symbols</u>	<u>Description</u>	<u>Value</u>	<u>Units</u>
Record Time	maximum recording time	calculated	cycles
Total Memory	size of memory	based on unit	bytes
Setup Memory	memory used for setup data	262144	bytes
Event Memory	memory used for event data	based on setup	bytes
Record Memory	memory used for recording data	calculated	bytes
Header	memory used for entry headers	16	bytes
Event Usage	memory used for event storage	94	bytes
Test Usage	memory used for test data	374	bytes
SI Usage	memory used for RMS storage	calculated	bytes
DI Usage	memory used for demand storage	calculated	bytes
WFC Usage	memory used for waveform storage	calculated	bytes
Max. Events	maximum stored events	1000	N/A
Min. Store	1: record Min. RMS, 0: skip Min. RMS	from setup	N/A
RMS Store	1: record RMS, 0: skip RMS	from setup	N/A
Max. Store	1: record Max. RMS, 0: skip Max. RMS	from setup	N/A
Pre	pre-trigger cycles	from setup	cycles
Post	post-trigger cycles	from setup	cycles
RI	response time	from setup	cycles
Inputs On	number in inputs on	from setup	inputs
Channels On	number of demand channels on	from setup	channels
SI Rate	RMS Interval storage rate	from setup	cycles
DI Rate	Demand Interval storage rate	from setup	cycles
WFC Rate	Waveform capture rate	from setup	cycles

Calculations

Time	=	bytes / (byte per time)
Record Time	=	(Record Memory – Event Memory – Test Usage) / (Usage Per Cycle)
Record Memory	=	Total Memory – Setup Memory
Event Memory	=	(integer of ((Max. Events x (Event Usage + Header) – 1) / 131072) + 1) x 131072
Usage Per Cycle	=	SI Usage + DI Usage + WFC Usage
Test Usage	=	374 + Header
SI Usage	=	((Min. Store + RMS Store + Max Store) x 2 x Inputs On) + Header) / SI Rate
DI Usage	=	((6 x 2 x Channels On) + Header) / DI Rate
WFC Usage	=	((Pre + RI + Post) x ((Inputs On x 2 x 256) + 16 + Header)) / WFC Rate

NOTES:

if Wrap when Full is active	then	Max. Events is multiplied by two
if Usage Per Cycle equal zero	then	Record Time equals 4,294,960,000 cycles
if tests are disabled or if recording	then	Test Usage equals zero
if SI Rate equals zero	then	SI Usage equals zero
if DI Rate equals zero	then	DI Usage equals zero
if WFC Rate equals zero	then	WFC Usage equals zero
if WFC Rate is based on events	then	WFC Usage equals zero

AC Power and Charging the Battery

The Megger PA-9Series is powered from the V1 input (90 – 600 VAC) or (110-600 VDC). The Megger PA-9Series also features a standard auxiliary input powered from voltage between 90-250VAC. The Power Analyzer automatically turns on ten seconds after the power connections are completed. There is no need to press the POWER ON key (**I**) on the unit. The battery will automatically be in charging mode with power applied as described above.



WARNING

When powering the unit through VA voltage channel, the External Case Ground MUST be connected to earth ground.

Battery Backup

An integral sealed 12-volt, rechargeable lead acid battery is standard equipment with the Megger PA-9Series. Should a power loss occur while the Power Analyzer is recording, the unit will continue recording for up to 15 minutes using battery power then shut down. Upon restoration of input power, the Power Analyzer will resume recording automatically (see *Specifications, Battery Run Through Time*). If battery voltage level drops below 10.5 Volts while operating in battery mode, the unit will stop recording and shut down. If, however, the Power Analyzer is not recording at the time power loss occurs, the unit will automatically power down within 30 seconds. It will turn on again when main power is restored. Whether or not battery backup is available, recorded data is saved in non-volatile flash memory and will not be lost for 10 years.

Battery Conditioning

Charging the battery is necessary in order to maintain a 12-volt minimum for proper recording operation. When the Megger PA-9Series is not in use, we recommend that you charge its battery once a month using the provided charging cable. Connect the V1 input or auxiliary input to a 90 - 250 V, 50/60 Hz source for 16 hours.

To ensure battery readiness, charge the battery for 16 hours prior to use for any of the following conditions:

- Using the Power Analyzer for the first time.
- Power Analyzer has not been used for over one month.
- Using the Power Analyzer to record under battery power.

You can check the battery voltage by displaying the Status screen on the unit's LCD. See *Section 5: Operation and Screen Descriptions*.

WARNING!



Failure to recharge the battery every 60 days if unit is not in use may result in permanent loss of the battery's ability to recharge.

NOTE: The Power Analyzer can be put to immediate use if battery backup is not required.

Energy Conservation

The Megger PA-9*Series* features an energy conservation mode. After one minute of inactivity (with A/C applied), the displays backlight will go off. The backlight will be automatically reactivated with any key stroke. In the event of a power loss, the energy conservation mode is immediately activated.

Communications

The Megger PA-9*Series* features the following communication capabilities:

- Optional telephone modem with optional RJ11 adapter cable for remote programming and data retrieval. Supports 38.8 kbaud, V.9 format.

- RS-232 up to 115.2KB for PC serial communications via DB9 connector on front panel. The default baud rate of the Megger PA-9*Series* is 115,200.

- Second RS-232 goes directly into digital signal processor (DSP). Used as an optional input for time synchronization using the GPS receiver. GPS receiver can be purchased separately from Megger.

- Option to add additional serial communication channel - RS-485.

- Option to add external RS-232 for programming/data retrieval.

Setting the Real-Time Clock

The Power Analyzer real-time clock will synchronize with the host computers internal clock by the *MegPa9IEC* software in the Remote Operation Mode, by using the TIME button.

Selecting Inputs

The Megger PA-9*Series* can monitor up to 9-inputs. Of course, you can monitor fewer inputs. See *Specify Inputs* screen in Section 5.

Power Measurement Theory-- For Power Measurements Using 1 Less Wattmeter than Lines (wires)

Basics:

We can begin with the easy to understand 4-wire, grounded wye system. The three voltages and three currents that are monitored to calculate power are actual phase voltages and phase currents. A voltmeter connected line-to-neutral and an ammeter measuring current in the line can be used to determine phase power. The equation is:

$$\text{Power (watts)} = \text{Voltage} \times \text{Current} \times \text{Cosine Angle between Voltage and Current}$$

NOTE: This is a simplified equation since it assumes no harmonics in the waveforms but it gives a good basis for the following discussion.

Blondel's Theorem states that power can be determined in a system by using one less wattmeter than lines (wires). In the 4-wire wye above, three wattmeters were used, conforming to the rule. This is a self-evident proof of the theorem.

Details:

In a 3-wire, three-phase load, one expects that by measuring the three voltages and three currents, the power can be calculated. The reason this does NOT work is that the voltage and current are not both phase measurements. For instance, in a delta-connected motor, the voltage measured is the phase voltage, but the current is line current not phase current. The line current splits into the two phases at a node of the delta. (If the load were a balanced resistive delta load instead of the motor, the phase currents are offset 30 degrees from the line currents). Since it is impractical to open up the motor and measure actual phase current, there needs to be some way to determine power by measuring line currents instead of phase currents.

This is where Blondel's Theorem applies. Selecting any one of the three lines as a reference for measuring the two voltages, and monitoring current in the other two lines, total power parameters can be obtained. In this instance, two wattmeters are being used to determine power, one less wattmeter than the number of lines.

A 2-wattmeter method can determine power in a 3-wire load. The voltages and currents are not both phase parameters. In the case of the delta motor, the voltage measurements are phase voltages and the currents are line currents. It was mentioned above that power was determined from phase voltages and phase currents. The 2-wattmeter method takes into account Kirchoff's Law that the sum of the currents on the three lines vectorially equal zero and the sum of the phase voltages vectorially equal zero.

The Implications:

1. Power parameters associated with the two individual wattmeters do not convey any true phase power values. The values are based on line current and phase voltage in the case of a delta load; phase current and line-to-line voltage in the case of wye load.
2. Total power parameters for the 3-wire load are true.
3. The total power parameters are true regardless of balance and harmonic content.
4. The Megger PA-9*Series* provides the same type of information that an Electric Utility gets from using two electro-mechanical wattmeters.

Why 3 Wattmeters cannot be used on a 3-Wire System:

In a delta-connected, balanced resistive load, the relationship between the phase voltages, phase currents and the line currents are 30 degrees out of phase with their respective voltages. In addition, the magnitudes of the line currents are greater than the phase currents. If three wattmeters are used to measure the power to this load, the power factor would be 0.866 (cosine 30 degrees), despite the fact that the phase voltages and phase currents are in phase (zero degrees). Each individual wattmeter gives false information and the sum of the three gives a false reading of total power.

Why using the 2-Wattmeter Method for 3-Wire system is Correct:

In a 2-wattmeter method, the currents are still 30 degrees out of phase with the voltages, but one is leading 30 degrees and one is lagging 30 degrees. This cancels the total vars (reactive voltamps) for the load and gives an overall power factor of 1. The two voltages are 60 degrees apart because the one voltage, V_{bc} , is opposite polarity to the rotation direction, V_{cb} . The individual wattmeters do not provide a true measure of phase power parameters but the contribution of each provides true total power parameters.

Per Phase Values:

Power parameters associated with the individual wattmeters can be very misleading. An inductive load shifts the current vectors clockwise. When the inductive load has shifted the current vectors 60 degrees, one of the individual wattmeters would show zero watts (cosine 90=0) and all vars (sine 90 = 1). In the case of an inductive load of greater than 60 degrees, it would appear that power is going in the opposite direction, away from the load. This is due to the initial offset of 30 degrees between line current and phase current.

There are equations for converting line currents to phase currents in a balanced load and then calculating the power parameters. In the real world, most loads are not balanced. The Megger PA-9*Series* does NOT assume a balanced load. Using the 2-wattmeter method on a 3-wire load, the Megger PA-9*Series* records true, total power parameters regardless of load imbalance, harmonic content and phase rotation. The total vars and overall power factor correctly indicate the size of the capacitors that are needed.

Balance Checking Method:

If there is interest in checking relative balance in the three phases of a 3-wire load, there is a method using the Megger PA-9Series. Using *MegPa9IEC*, program the Megger PA-9Series for 4-wire, 3-wattmeter method. Connect the three voltage inputs to the Megger PA-9Series line-to-line (1 to 2, 2 to 3, 3 to 1). Connect a current clamp on each of the three lines. The Megger PA-9Series will record magnitudes of phase voltages and line currents. None of the power parameter calculations will be true, but it will provide a report on voltage and current imbalance as well as an indication of relative phase angles of the voltages and provide a report on voltage and current imbalance as well as an indication of relative phase angles of the voltages and currents.

The above discussion applies equally well to a 3-wire wye connected load. In this type of load, phase currents and line-to-line voltages are monitored, just the opposite of the delta load.

See Section 8 Wiring Diagrams for information on how to connect the Power Analyzer for various 2-, 3- and 4-wire systems.

When the Power Analyzer is setup to record demand parameters plus voltages and currents simultaneously, it expects to see voltage/current pairs. Each channel pair (e.g., V1 and I1) connected to the unit can be considered a single element wattmeter. Using different combinations, the Power Analyzer can be setup for any of the following measurement configurations:

Single Phase Configuration (Single Wattmeter)

- 2-wire single phase single wattmeter method

3-Wire Configuration (2-Wattmeters)

- 3-wire wye 2-wattmeter method
- 3-wire delta 2-wattmeter method
- 3-wire open delta 2-wattmeter method
- 3-wire split phase 2-wattmeter method

4-Wire Configuration (3-Wattmeters)

- 4-wire wye 3-wattmeter method
- 4-wire red-leg delta 3-wattmeter method
- 4-wire open red-leg delta 3-wattmeter method

4-Wire Red-Leg Delta Configuration (2½-Wattmeter)

- 4-wire red-leg delta 2½-wattmeter method
- 4-wire open red-leg delta 2½-wattmeter method

4-Wire Wye Configuration (2½-Wattmeter)

- 4-wire wye 2½-wattmeter method

If you will not be recording demand parameters, voltage and current can be connected to any inputs. The connections do not have to be in pairs, but the voltage channels and current channels must be sequenced.

NOTE: The Neutral Channel Voltage Input has 2 ranges: 0 to 30 VAC and 0 to 600 VAC. The unit switches ranges automatically based on the voltage input.
--

3

SAFETY

Warnings and Safety Precautions



WARNING!

Death, serious injury, or fire hazard could result from improper use/installation of this instrument. Read and understand this manual before installing this instrument.

Installation of this instrument **MUST** be performed in compliance with the National Electric Code and any additional safety requirements applicable to your installation.

Installation, operation and maintenance of this instrument **MUST** be performed by qualified personnel only. The National Electrical Code defines a qualified person as one familiar with the construction and operation of the equipment and the hazards involved.

Safety Precautions

The following safety precautions **MUST** be taken whenever the Megger PA-9*Series* will be installed.

Wear safety glasses and insulated gloves when making connections to power circuits

Hands, shoes, floor/ground must be dry when making any connection to a power line

These warnings and safety precautions are to be used where appropriate when following instructions in this manual.

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4

INSTALLATION

Installation Procedure**CAUTION**

Inspect all power cords and wires for proper insulation integrity before connecting to any power source.

**WARNING!**

Exposure to excessive dust and submersing in water may result in equipment damage.

**CAUTION**

Turning on analyzer before completing all electrical connections, or turning off analyzer after removing any electrical connections may result in erroneous readings.

The installation procedure consists of:

1. Charging the backup battery prior to use.
2. Ensure that the Megger PA-9Series is not exposed to water, excessive dust, and other hazardous conditions. If the Megger PA-9Series is mounted outdoors then the input jacks should face down. All side-connectors should have their covers in place or cables connected.

Although the Megger PA-9Series is rain resistant with the case closed, observe the same precautions when the case is open. **Do not submerge the Megger PA-9Series (regardless if case is open or closed) in water. The units are not submersible.**

3. Making electrical connections.

If powering the Megger PA-9Series from the V1 channel and connecting to a live line, a discharged battery may cause sufficient inrush current to the power supply and a small spark may be seen. This is normal and will not damage the equipment. **Always complete all connections before beginning recording. Always stop recording before removing connections.**

Battery Charging

If battery backup is required, ensure that the battery is properly charged. It must maintain a 12-volt minimum for proper recording operation. Allow the battery to charge for about 16 hours prior to first-time use. You can check the battery voltage while the unit is powered-up by displaying the *Status Screen* on the LCD. See *Section 5: Operation and Screen Descriptions*.

Charging the Megger PA-9Series Battery

A backup battery and charging cable are provided as standard equipment with the Megger PA-9Series.

Connect the cable to the Power Analyzer's V1 input and to a 90 - 250 V, 50/60 Hz source. The unit will power up and the battery will start charging.

Low-Battery

When operating under battery power only, the unit will shut down when the battery level drops below 10.5 Volts.

Installation

The Megger PA-9Series is a portable unit with a rugged, rain resistant enclosure NEMA 4 that can be placed on a flat surface.

The Megger PA-9Series has a back plate available for hanging or mounting the unit in a vertical axis.

The Megger PA-9Series should be placed so that the connectors are facing down to prevent water flowing into them.

Unit Power Connections

The Power Analyzer automatically turns on upon completion of the power connections. There is no OFF switch; the unit will shut down automatically.

The Megger PA-9Series in its standard configuration is powered via the V1 input and requires 90-600 VAC, 50/60 Hz or from an auxiliary input which requires 90-250 VAC, 50/60 Hz.

The Megger PA-9Series features an auxiliary input and selection switch. With this option, you have the choice to power the analyzer from either V1 or the auxiliary power input by means of a selection switch and connecting power to the selected input. The auxiliary input requires 90-250 VAC, 50/60 Hz. **Confirm that the input selection switch is in the correct position for the power input being used to power the analyzer.**

NOTE: Power applied to either of the above power selections will charge the backup battery.
--

**CAUTION**

Remove all powers before switching the Power Selector switch.

**WARNING**

When powering the unit through VA voltage channel, the External Case Ground MUST be connected to earth ground.

Voltage and Current Connections

If you will not be recording demand parameters, voltage and current can be connected to any input. The connections do not have to be in pairs, but the voltage channels and current channels must be sequenced.

NOTE: Current probes not purchased from Megger require Megger adapters.

To install the Power Analyzer using current clamps, plug the selected clamps into the current input connectors (labeled A, B, C, and/or NEUT & GND) then clamp around the source to be measured. An arrow on the current clamp indicates the direction of the load. Then select the correct probe type from the Megger PA-9Series front panel. *See Section 8 Wiring Diagrams.*

NOTE: The Neutral Channel Voltage Input has 2 ranges: 0 to 30 VAC and 0 to 600 VAC. The unit switches ranges automatically base on the voltage input.

Current Probe Direction Hook Up Check

After making all necessary connections to the Power Analyzer, go to the Readings screen and check that the phase A, B and C KW readings are positive. The sign of KW indicates power flow direction and therefore negative KW would indicate a backwards current probe or reverse power flow.

Current Probe Range Verification

Before starting any test, verify that your current probe selections are correct for the probes being used.

If your probes have selectable ranges, you must still program the Megger PA-9Series for the selected range. To verify correct settings for current probe ranges, using the Megger PA-9Series front panel select from the *Home* screen, *Setup*, then *Specify Inputs*.

Wireless Modem Connection (PA9Wireless only)

Verify modem power/RS-232 cable is connected to modem connector on front panel of unit.

Verify modem power LED is illuminated.

Verify antenna is connected to modem via antenna cable.

Input Ratio Verification

Before starting any test, verify that your input ratios are set correctly. To store data values based on ratios such as using CT's and PT's, simply program the unit using *MegPa9IEC*. Input the ratio values on each channel line enabled in the setup screen of the software. To verify ratios from the Megger PA-9Series front panel, select from the *Home* Screen, *Setup*, then *Input Ratios*. In the screens description chapter you will learn how to change the Megger PA-9Series screen to view values with or without ratios.

Verify Setup Parameters

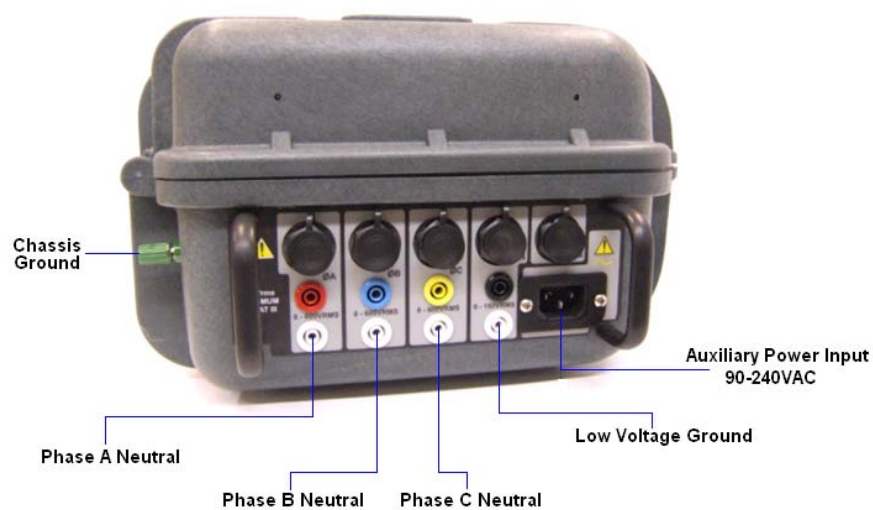
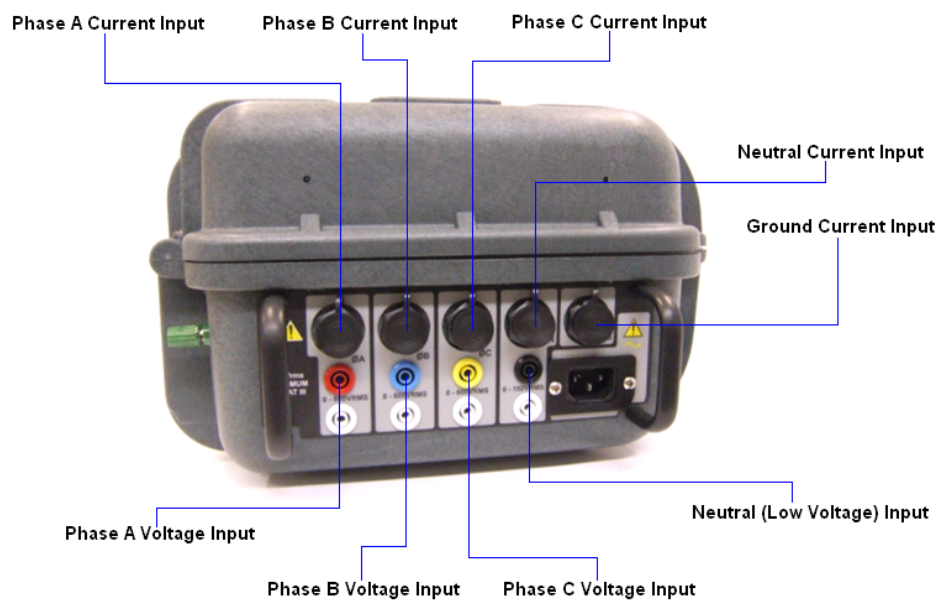
Before starting any test verify your setup parameters are correct. From the Megger PA-9Series front panel select from the *Home* screen, *Setup*, then *Stored Setups*.

From this screen, you can select the active setup and view its parameters.

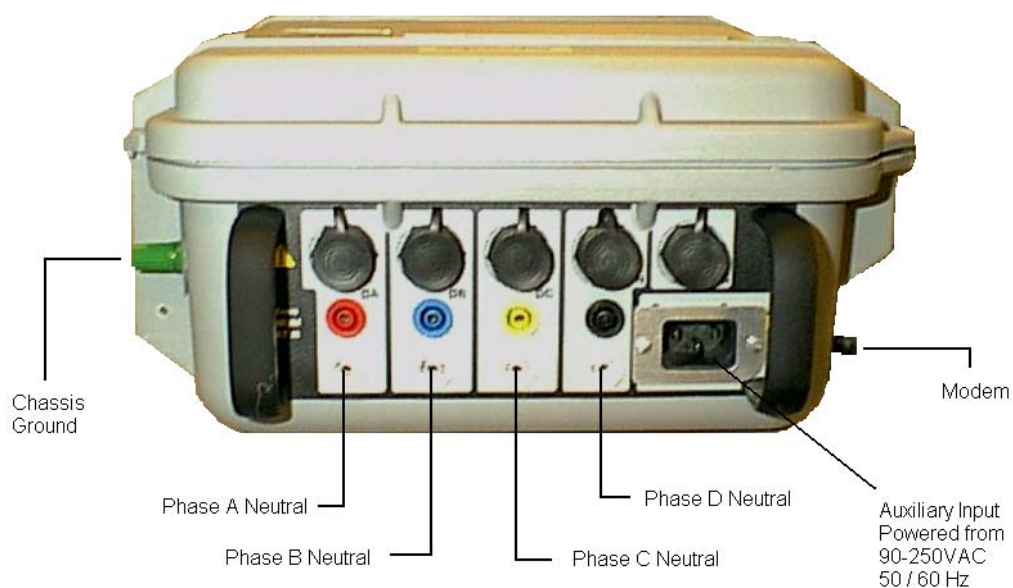
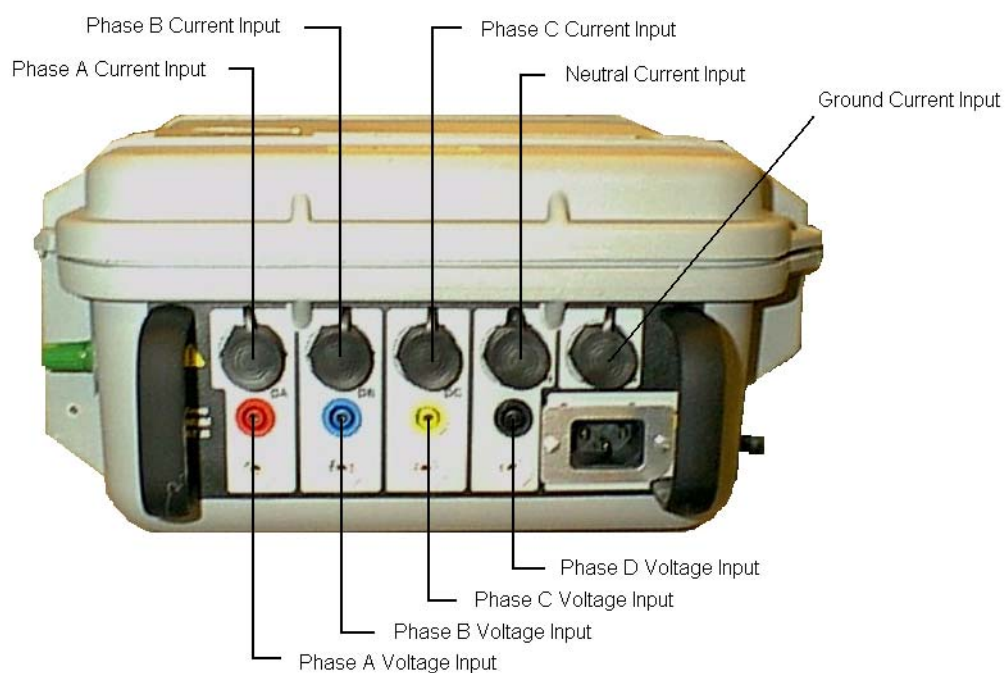
Verify Required Inputs

Before starting any test, verify that you have hooked up all inputs required for the active setup program. From the Megger PA-9Series front panel select from the *Home* screen, *Setup*, then *Required Inputs*. This screen will show you all required inputs to hookup.

Megger PA-9 *Wireless* Connection Description



Megger PA-9*Plus* Connection Description



5

OPERATION AND SCREEN DESCRIPTIONS

User Controls

The Megger PA-9*Series* interface allows the operator full control of the unit. It is located on the front of the Power Analyzer and consists of a liquid crystal display (LCD) and pushbutton keys, as shown in Figure 5-1. The following paragraphs describe the interface features:

The LCD is a 5 x 1-1/2 backlit display with alphanumeric and graphic display capabilities. It features 8 rows at 40 characters per row and 240 pixels x 64 pixels. It allows the operator to view menu selections and view screens including setup, status, and real-time measurements, waveforms and other graphic information.

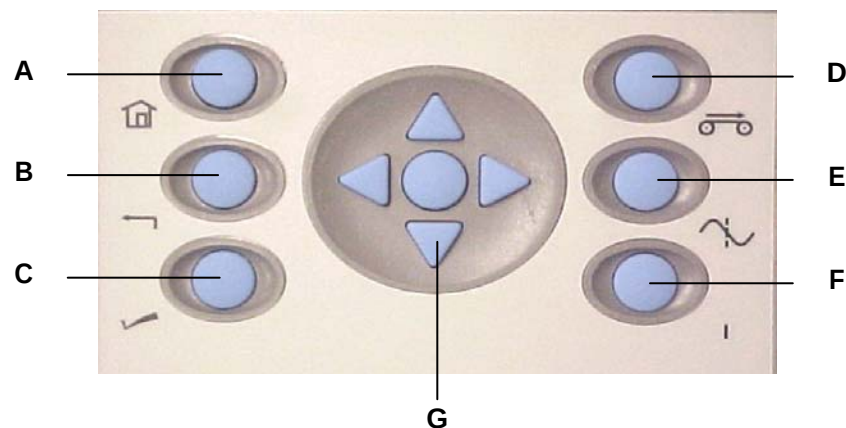


Figure 5-1: User Interface

- A: HOME key** (🏠) - Returns the LCD to the Home Screen (this is the main menu) with the cursor in upper-left corner. Continuous depressing of the HOME key (🏠) in the Home Screen will toggle cursor between upper-left and lower-right corners.
- B: BACK key** (←) - Displays the previous screen on the LCD. Repeatedly pressing this key will retrace the path.
- C: DEFAULT key** (✓) - This key will allow user to scroll through the Real-time RMS Data and Demand Data screens.

D: RECORD key () - Displays the Record screen where the operator can start and stop recording.

E: CURSOR SELECT key () - Sequences through cursor states when displaying a graph on the LCD.

First Depression: Allows you to change the cursor to a scan line on the graph.

Second Depression: Allows movement of the entire curve on the graph.

Third Depression: Returns the cursor to original state.

F: POWER ON key () – Allows operation from battery when A/C power is off.

G: CURSOR AND ENTER key - Arrow keys move the cursor in the direction of the arrow. The center key (SELECT key) enters the selection or displays an * which allows chosen selection to be changed using the arrow keys.

Turning the Power Analyzer ON/OFF

The Power Analyzer will automatically power-up within five seconds after the power connections are completed. This occurs with the Megger PA-9Series when connecting to the V1 input. The Megger PA-9Series can also be powered using the auxiliary AC input. Confirm that the input selection switch is in the correct position for the Megger PA-9Series input being used to power the analyzer. *See Section 4 - Installation/Unit Power Connections.* As soon as the unit powers up, the LCD will flash the About screen similar to the one shown in Figure 5-2, and then display the Home screen.

MEGGER® 2001
ALL RIGHTS RESERVED
FIRMWARE: VX.X RX.XX DX.X
DATE OF CALIBRATION: XX/XX/XX
PA9+ HARDWARE : XXXX SERIAL NO.

OPTIONAL CUSTOMIZED 2 LINES (40 CHAR EA)
ABC ELECTRIC METER DEPT 888-233-9089

Figure 5-2: About Screen

The Power Analyzer automatically powers down:

- A) when the power connections are removed, the unit is not recording, there are no RS-232 commands sent *and* no action on keyboard occurs within 30 seconds
- B) when battery voltage drops below 10.5V
- C) 15 minutes after power loss, when recording and with no RS-232 commands sent *and* no action on keyboard

See Section 10: Specifications, Battery Run Through Time.

About Screen

The About Screen displays Firmware Rev, Last Calibration Date, Hardware Revision, Unit S/N and Type.

Last two lines are optional. Customer may specify two of 40 characters lines of company identification information as in example above. You must contact Megger Sales Dept. for information on this option. This option must be purchased and installed at time of order or it can be installed later with factory calibration/service.

IMPORTANT!

Always complete all connections before beginning recording. Always stop recording before removing all connections.

CAUTION



Turning on analyzer before completing all electrical connections, or turning off analyzer after removing any electrical connections may result in erroneous readings.

Programming and On-Site Adjustments

The Power Analyzer is programmed by downloading setup information from a PC via an RS-232 connection. The setup is created on a computer using *MegPa9IEC*, a PC application. Although programming cannot be altered at the unit's interface, the Power Analyzer can store up to 60 different setups that the user can choose from while on-site.

Some on-site adjustments can be made via the Power Analyzer's user interface. These can be done in the field without a computer such as:

- Selecting different setups

- Selecting current probe ranges

- Selecting display to read values with or without programmed ratios

Erasing Stored Data

Use the following procedure to erase stored data:

User	System
1. Press the <i>HOME</i> key ( .	LCD displays <i>Home</i> screen.
2. Position cursor at <i>Special</i> then press the <i>SELECTION</i> key.	LCD displays <i>Special</i> screen.
3. Position cursor at <i>Erase Data</i> then press the <i>SELECTION</i> key.	LCD displays <i>Erased Stored Data</i> screen.
4. Select <i>Erase Data</i> then press the <i>SELECTION</i> key.	Data erases.

Changing Setups

Use the following procedure to change setups: (when not recording and data is cleared).

User	System
1. Press the <i>HOME</i> key ( .	LCD displays Home screen.
2. Position cursor at <i>Setup</i> then press the <i>SELECTION</i> key.	LCD displays Setup screen.
3. Position cursor at <i>Select Setup</i> then press the <i>SELECTION</i> key.	LCD displays Select Setup screen.
4. Use UP/DOWN keys to select <i>Setup</i> .	
5. Press <i>SELECT</i> to select <i>Setup</i> .	
6. Confirm Selection.	

NOTE: Recorded data must be erased before changing a setup file.

Recording

Recording can be manually activated or automatically programmed. In an automatic operation, the Power Analyzer will record continuously starting at a pre-set date/time or in accordance with auto run/schedule run programming. Recording can be started and stopped 50 test times:

(1 start + 1 stop = 1 test time) --- in Stop When Full mode.

Before beginning recording, make certain that all connections have been completed. Making or removing connections while recording will result in erroneous readings.

Start Recording

To manually start recording, do the following:

- | User | System |
|--|--|
| 1. Press the RECORD key ( . | LCD displays Record Screen shown in Figure 5-3. |
| 2. Position cursor at <i>Start</i> then press the SELECTION key. | Power Analyzer starts recording shown in Figure 5-4. |

Active Setup:	DEFAULT	XX/XX/XX
Not Recording		XX:XX:XX
	> Back	Start
AutoStart:	DISABLED	
Clock Hour Exceedance:	DISABLED	
Exceedance Recording:	DISABLED	

Figure 5-3: Record Screen (Recording is OFF)

Recording Mode Off Screen Description

When the **RECORD** key () is pressed and the Power Analyzer is not recording, the screen shown in Figure 5-3 will be displayed showing the programmed settings for AutoStart, Clock Hour Orientation, and Exceedance Recording.

AutoStart - used for continuous recording and sets the date and time that the Power Analyzer will automatically start recording.

Clock Hour Orientation - causes the Power Analyzer to delay recording until the next synchronized storage interval. The Power Analyzer divides an hour into a whole number of storage intervals. When asked to record, it will delay recording until its real-time clock reaches the beginning of one of these storage intervals. This is a useful feature when running tests with 2 units. Data can be compared from each unit and time intervals will be in sync.

Exceedance Recording - If the Power Analyzer has been programmed in exceedance recording only mode, this line will show as enabled. The unit will then only record when exceedances occur per programmed limits. Clock hour orientation is automatically turned off in this mode.

Recording Mode Off

- When the unit is not recording, Figure 5-3 will display the following information:
- Line #1 - Active setup and system date.
 - Line #2 - Recording status and system time
 - Line #4 - Back (returns to previous screen) and Start (manually activates recording). Position cursor in front of *Back* or *Start* and press the *SELECTION* key.
 - Line #5 - Blank.
 - Line #6 - AutoStart shows the date and time recording will automatically be activated (Scheduled Run).
 - Line #7 - Clock Hour Orientation. Enabled or Disabled.
 - Line #8 - Exceedance Recording Only. Enabled or Disabled.

Stop Recording

To manually stop recording, do the following:

- | User | System |
|---|---|
| 1. Press the <i>RECORD</i> key (). LCD displays <i>Record</i> screen shown in Figure 5-4 | |
| 2. Position cursor at <i>Stop</i> then press the <i>SELECTION</i> key. | Power Analyzer stops recording shown in Figure 5-3. |

Active Setup: DEFAULT	XX/XX/XX
Recording	XX:XX:XX
Back	Stop
Elapsed Time: XX days XX:XX:XX hrs	
Maximum Time: XX days XX:XX:XX hrs	
Elapsed Stop: ENABLED/DISABLED	

Figure 5-4: Record Screen (Recording is ON)

Recording Mode On Screen Description

When the *RECORD* key () is pressed and the Power Analyzer is recording, the screen shown in Fig 5-4 will be displayed, showing the settings for elapsed stop, elapsed time and maximum time.

- Elapsed Stop:* Displays auto-stop time in hours.
- Elapsed Time:* Displays amount of time the analyzer has been recording.

Maximum Time: Displays maximum recording time available.

Recording Mode On

When the unit is recording, Figure 5-4 will display the following information:

Line #1 - Active setup and system date.

Line #2 - Recording status and system time.

Line #4 - Back (returns to previous screen) and Stop (manually stops recording).
Position cursor in front of *Back* or *Stop* and press the *SELECTION* key.

Line #5 - Blank.

Line #6 - Elapsed Time shows elapsed time for current recording in days, hours, minutes and seconds.

Line #7 - Maximum Time shows maximum recording time available (left in memory) in days, hours, minutes and seconds.

Line #8 - Elapsed Stop (Auto Stop/Disabled.)

Recording and Loss of Input Power

If recording and a loss of unit input power occurs the unit will continue recording for up to 15 minutes under battery power (unless low battery condition occurs first) then stop recording and shut down. This will complete the test running and will be stored as a completed test. *See Section 5: Operation and Screen Descriptions/Test Log screen.* Upon input power returning, the unit will start recording again and a new test begins.

A Word About Screen Descriptions

You can make modifications and setup changes, start and stop recording, and view system status and real-time measurement data by accessing the various screens. The Home, Default, and Record Screens can be selected directly from the front panel by pressing the *HOME* () , *DEFAULT* () , and *RECORD* key () , respectively. All other screens are selected from the menu in the *Home* screen. The following provides a description of each screen and how it is accessed.

Home Screen

The Home Screen, shown in Figure 5-5, provides a menu of available screens. To make a selection, use the *Arrow* keys to position the cursor in front of a screen and press the *SELECTION* key. The display will change to the selected screen.

To display the *Home* screen, press the *HOME* key () .

> Status	Phasor	About
Readings	Harmonics	Options
Stored Data	Setup	Special

Figure 5-5: Home Screen

Status Screen

The Status Screen provides battery status, recording, and memory data as shown in Figure 5-6.

The screen is accessed in the *Home* screen (if necessary, press the *HOME* key ()). Position the cursor in front of *Status* and press the *SELECTION* key.

Battery: 00.0 (Charging or OK)		XX/XX/XX
		XX:XX:XX
Recording		
Elapsed Time:	XX days	XX:XX:XX hrs
Maximum Time:	XXX days	XX:XX:XX hrs
Available Memory: 00.0% (of 00000K)		

Figure 5-6: Status Screen

Pressing UP/DOWN keys will scroll lines 4 through 8 to provide more information, about stored test's, events, and your active setup.

Line #1 - Battery data (charge, charging, OK, no A/C) and system date.

Line #2 - System time.

Line #3 - Blank.

Line #4 - Indicates if system is currently recording.

Line #5 - Elapsed recording time in days, hours, minutes, and seconds.

Line #6 - Maximum recording time available in days, hours, minutes, and seconds.

Line #7 - Blank.

Line #8 - Shows remaining available memory as a percent of total memory.

Line #9 - Blank

Line #10 - Displays number of events stored

Line #11 - Displays the number of tests stored.

Line #12 - Blank

Line #13 - Displays the active setup.

Readings Screen

The Readings screen provides real-time voltage, current, phase angle, power flow (if option is installed), frequency, and phase rotation as shown in the sample screen in Figure 5-7.

The screen is accessed in the *Home* screen (if necessary, press the *HOME* key (🏠)). Position the cursor in front of *Readings* and press the *SELECTION* key.

VPHA	0000.00v	000	00000.0KA	000	00000Mw
VPHB	0000.01v	000	00000.0KA	000	00000Mw
VPHC	0000.02v	000	00000.0KA	000	00000Mw
VNET	0000.16v		00000.0KA		
			00000.0KA		
Recording/Not Recording					
VPHA Frequency:		00.00	Total		-0.000Mw
Phase Rotation:		123			

Figure 5-7: Readings Screen

Stored Data Screen

The Stored Data screen, shown in Figure 5-8, provides a menu of additional sub-screens. To make a selection, use the arrow keys to position the cursor in front of a screen and press the *SELECTION* key. The LCD will display the selected screen.

The screen is accessed in the *Home* Screen (if necessary, press the *HOME* key (🏠)). Position the cursor in front of *Stored Data* and press the *SELECTION* key.

Test Log	RMS Intervals
Event Log	Demand Intervals
Event Summary	Pst Intervals
	Plt Intervals

Figure 5-8: Stored Data Screen

Test Log

The Test Log lists all tests stored within the analyzer's memory and shows which test is active if the unit is recording.

5 Stored Tests				
>	05	XX/XX	X days	XX:XX:XX hrs <Active>
	04	XX/XX	X days	XX:XX:XX hrs
	03	XX/XX	X days	XX:XX:XX hrs
	02	XX/XX	X days	XX:XX:XX hrs
	01	XX/XX	X days	XX:XX:XX hrs

Figure 5-9: Test Log Screen

Up to 5 entries will display with the most recent on top. Use UP/DOWN arrow keys to scroll. Shows ID#, date of test, test length, active test recording. Depress the *SELECT* key to display more information about a stored test of interest, which the cursor is next to.

> Statistics	Waveforms
	RMS Chart
	Demand Chart
RMS	Freq Chart
	00L Chart
Power	Pst Chart
	Plt Chart

Figure 5-10: Test Menu for Detailed Information. On a Selected Test from the Test Log Screen

Overall Statistics	
Start Time:	XX/XX/XX XX:XX:XX.XXX
Duration:	X days XX:XX:XX hrs
Stop Condition:	Normal - Local or Power Loss
Lost at:	N/A or XX/XX/XX XX:XX:XX.XXX
Restored at:	N/A or XX/XX/XX XX:XX:XX.XXX

Figure 5-11: Overall Statistics Screen

This screen will display overall statistics for a selected test.

This screen is updated once every second.

Use UP/DOWN arrow keys to view data quantity for:

Waveforms

RMS Intervals

Demand Intervals

NOTE: Stop condition is a very important line to view if a test shuts down earlier than expected.

```
From: XX/XX/XX   XX:XX:XX.XXX
To:   XX/XX/XX   XX:XX:XX.XXX

> VPHA

Min:    0.0V   XX/XX/XX   XX:XX:XX.XXX
RMS:    000.0V
Max:    000.0V   XX/XX/XX   XX:XX:XX.XXX
```

Figure 5-12: RMS Screen

This screen will display overall RMS data for the selected test.

Pressing the *SELECTION* key will enable the user to scroll through the RMS data of each active channel, by using the LEFT/RIGHT arrow keys. Press the *SELECT* key a second time to lock in selection.

```
From: XX/XX/XX   XX:XX:XX.XXX
To:   XX/XX/XX   XX:XX:XX.XXX

> VPHA - IPHA

Min:    0.00v
RMS:    -0.000v
Max:    0.000v
          TPF: -0.00
```

Figure 5-13: Power

This screen will display power/energy data for the selected test.

Waveform Log

To View Captured Waveform:

From the *Home* screen select the *Stored Data* screen. Place the cursor next to it and press the *ENTER* key.

Status	Phasor	About
Readings	Harmonics	Options
> Stored Data	Setup	Special

Figure 5-14: Home Screen

From the *Stored Data* screen, select the *Test Log* screen. Place the cursor next to it and press the *ENTER* key.

> Test Log	
Event Log	Demand Intervals
Event Summary	RMS Intervals

Figure 5-15: Stored Data Screen

Then select the desired test. Place the cursor next to it and press the *ENTER* key.

3 Stored Tests			
> 03	XX/XX	X days	XX:XX:XX hrs
02	XX/XX	X days	XX:XX:XX hrs
01	XX/XX	X days	XX:XX:XX hrs

Figure 5-16: Test Log Screen

Then select *Waveforms*. Place the cursor next to it and press the *ENTER* key.

Statistics	> Waveforms
RMS	RMS Chart
	Demand Chart
	Freq Chart
Power	00L Chart
	Pst Chart
	Plt Chart

Figure 5-17: Test Log Menu Screen

This will bring you to the Waveform Log.

To view stored waveform events choose *Select* using the *SELECT* key. Use the UP/DOWN arrows to place the cursor next to the waveform event of interest, and then depress the *SELECT* key.

The screen will display that event line and cursor will be next to view. Depress the *SELECT* key to view the waveform as shown below.

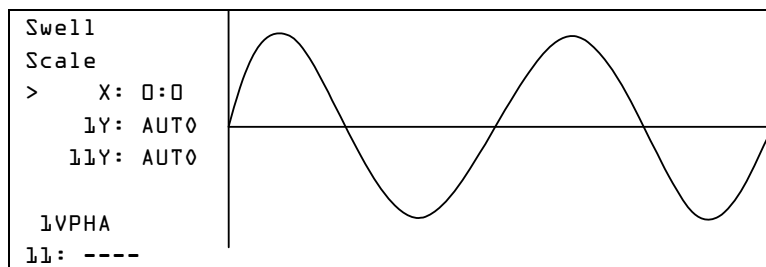


Figure 5-18: Waveform Screen

To change X-axis scaling, with the cursor next to X, depress the *SELECT* key. Using the RIGHT/LEFT arrow keys, you can change the X-axis ratio. When done, lock in setting by depressing the *SELECT* key. You can do the same for the Y-axis scaling.

- 1Y = Waveform 1 scaling
- 11Y = Waveform 2 scaling
- 1: VPHA = Waveform 1 displayed
- 11: ---- = Waveform 2 displayed

To select waveforms displayed place the cursor on waveform displayed, 1 or 11 at lower left of screen. Depress the *SELECTION* key and using the LEFT/RIGHT arrow keys, select *the waveform of interest* to display. Depress the *SELECTION* key to lock in.

Depressing the *CURSOR SELECT* key (↖) once will put a dotted scan line on the waveform display.

Depressing the LEFT/RIGHT arrow keys will move the scan line across the waveform and display data about that waveform data point as below:

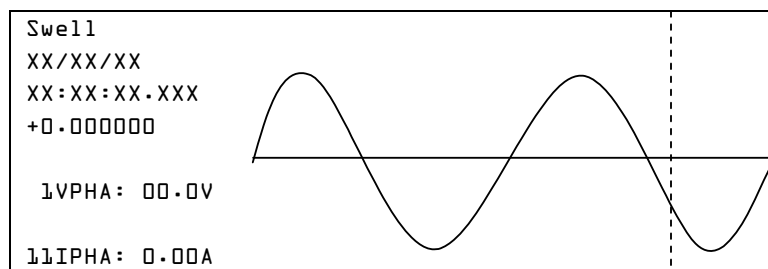


Figure 5-19: Change X-Axis Scaling

Depressing the *CURSOR SELECT* key () again will change the scan line to a solid line allowing you to move the waveform left/right of the scan line using the LEFT/RIGHT arrow keys.

A third depression of the *CURSOR SELECT* key () will turn off the scan line.

To Manually Trigger a Waveform During Recording

From Home screen:

1. Select *Stored Data*, press the *ENTER* key
2. Select *Test Log*, press the *ENTER* key
3. Select *Active Test*, press the *ENTER* key
4. Select *Waveforms*, press the *ENTER* key
5. Press the *CURSOR SELECT* key () to trigger waveform capture.

The screen will show:

External XX/XX XX:XX:XX.XXX

You just manually captured this waveform.

NOTE: To manually trigger a waveform; the waveform capture selection, in the setup file, must be set to exceedance mode and you must be recording.

Event Log

To View Stored Events: (Lists all events stored in the analyzer's memory)

Use the UP/DOWN arrows to move the cursor to the Event Line of interest, and then depress the *SELECT* key.

Event Log			
> 0006	XX/XX/XX	XX:XX:XX	SAG IPHA
0005	XX/XX/XX	XX:XX:XX	THD VPHA
0004	XX/XX/XX	XX:XX:XX	THD VPHA
0004	XX/XX/XX	XX:XX:XX	THD VPHA
0002	XX/XX/XX	XX:XX:XX	THD VPHA

Figure 5-20: Event Log Screen

Details about the event are now displayed as shown below:

EVENT 6	At: XX/XX/XX	XX:XX:XX.XXX	
THD VPHA	For: XX/XX/XX	00:00:00 hrs	
	MIN	AVG	MAX
VPHA	XX.XX%	XXX.X%	XXX.X%
IPHA	----	----	----
VPHB	----	----	----

Figure 5-21: Selection of a Specific Event from Event Log

Use the UP/DOWN arrow keys to show more lines of data.

Event Summary

To View Number of Events per Phase:

Event Summary				
	SAG	SWELL	THD	SUBCYCLE
VPHA	X	X	X	X
IPHA	X	X	X	X
VPHB	X	X	X	X
IPHB	X	X	X	X

Figure 5-22: Event Total Screen

Depress *DOWN ARROW* ()to view more phase info.

RMS Intervals

To view Minimum, Maximum and Average RMS values of recorded intervals.

From:	XX/XX/XX	XX:XX:XX.XXX	
To:	XX/XX/XX	XX:XX:XX.XXX	
	MIN	RMS	MAX
VPHA	0.00v	0.00v	0.00v
IPHA	0.000A	0.000A	0.000A
VPHB	0.00v	0.00v	0.00v

Figure 5-24: RMS Interval Screen

Depress *DOWN ARROW* () down to view more information.

Demand Intervals

To View Last Demand Interval per Phase:

From:	XX/XX/XX	XX:XX:XX.XXX	
To:	XX/XX/XX	XX:XX:XX.XXX	
>	VPHA - IPHA		
	0.00v	0.000Mw	0.000MWH
	0.000KA	0.000MVAR	0.000MVARH
		0.000MVA	0.000MVAH
DPF:	0.000	TPF:	----

Figure 5-23: Demand Interval Screen

*Can select phase A, B, C or totals to view.

Phasor

The Phasor screen shows the real-time voltage and current values for each phase including voltage and current phasor diagrams, as shown in the sample screen in Figure 5-25.

The screen is accessed in the *Home* screen. Position the cursor in front of *Phasor* and press the *SELECTION* key.

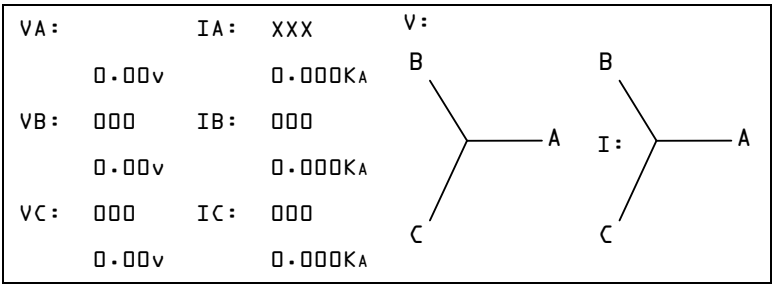


Figure 5-25: Phasor Sub-Screen

Phasor diagram is referenced as follows:

- | | |
|--------------------|----------------|
| VA = Ref Start = 0 | IA = Ref to VA |
| VB = Ref to VA | IB = Ref to VB |
| VC = Ref to VA | IC = Ref to VC |

Harmonics Screen

The Harmonics screen displays real-time harmonic magnitude. Select from DC through the 63rd harmonic for any one input. See the sample display shown in Figure 5-26. The data and graphic display can be altered by changing the parameter values at any cursor location using the horizontal arrow and SELECTION key on the front panel. You can freeze the harmonics displayed on screen at any time by depressing the *CURSOR SELECT* key (⌂). A lock character will be shown on the display indicating a frozen data display. To unlock simply depress the *CURSOR SELECT* key (⌂) again.

The screen is accessed in the *Home* screen (if necessary, press the *HOME* key (⌂)). Position the cursor in front of *Harmonics* and press the *SELECTION* key.

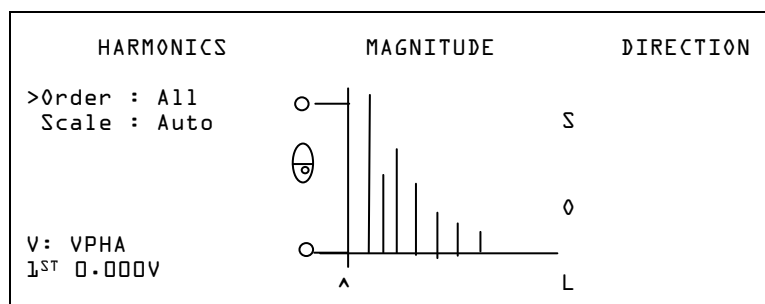


Figure 5-26: Harmonics Screen with Direction Graph Selected and Frozen Screen showing Lock Character

NOTE: Direction graph appears when viewing PPHA, PPHB, or PPHC only. To view direction graph place cursor on 3rd line down V, I or P is displayed on this line. When P is selected you can now select phase A, B, C, harmonic direction graph to display.

To Select/Make Changes:

User	System
1. Position cursor in front of desired parameter by repeatedly pressing either vertical (UP/DOWN) arrow key.	The cursor (>) moves to the front of the parameter.
2. Press the SELECTION key to activate cursor location. (Pressing the VERTICAL ARROW key again de-selects the parameter and advances the cursor.)	The cursor changes to an asterisk (*). Parameter value flashes.
3. Once activated the parameter value can be changed by using horizontal (LEFT/RIGHT) arrow keys.	The parameter value and graphic displays change.
4. Press the VERTICAL ARROW key.	The parameter is de-selected, and the cursor (>) advances to the next parameter.

You can change any of the following parameters using the above procedure:

All, Odd, Even: - Select any one of these choices. DC is the default for Even; 1 is the default for Odd and All.

Scale: - The unit will auto-scale. However, the user can select a ratio from 1:2 to 1:100. This can be used to expand low magnitudes being viewed.

Input to View: - Harmonic graphs will reflect changes. When viewing P PHA, PHB, or PHC, the direction graph will come on indicating whether the chosen harmonic is coming from the source or load direction.

Harmonic Order: - Select from DC through 63rd. Harmonic will increment by 2 if odd or even harmonics are being displayed. It will increment by 1 if all harmonics are being displayed. A cursor under the magnitude graph will follow with this setting.

To Freeze Display Data: - Depress the *CURSOR SELECT* key () . To unfreeze display data depress *CURSOR SELECT* key () again.

Setup Screen

Setup screen allows the user to select the type of current probes being used, view the stored set up files or select a stored setup file. Select this screen from *Home* ()>*Setup*.

> Specify Inputs	Required Inputs
Select Setup	Stored Setups
Setup Display	Input Ratio

Figure 5-27: Setup Screen

Specify Inputs

Select this screen from *Home* ()>*Setup*>*Specify Input*.

To Specify Inputs: (Only when not recording)

Input Specification (Recording)	
V1: 150V/600V	I1: 6000 AMP
V2: 150V/600V	I2: 6000 AMP
V3: 150V/600V	I3: 6000 AMP
V4: OFF	I4: 6000 AMP
V5: OFF	I5: 6000 AMP

Figure 5-28: Specify Inputs Screen

To Change Settings:

NOTE: V5 is not selectable.

- 1) Use the UP/DOWN arrows to position the cursor in front of the channel to change.
- 2) Push the *SELECT* key to change the cursor to an asterisk.
- 3) Use the LEFT/RIGHT arrow keys to select value or turn off channel.
- 4) When correct value is chosen, press *SELECT* key to enter it into memory.

Select Setup

Select this screen from *Home* () > *Setup* > *Select Setup*.

To Select a Test Setup:

Test Name (Active)	
XX/XX/XX	XX:XXpm
Tag: XXXXXXXX	
Power Wiring Connection: DEFAULT	
Response Time: X cycles	
RMS Interval:	XX:XX:XX hrs
Demand Interval:	XX:XX:XX hrs

Figure 5-29: Select Setup Screen

To Change a Setup File:

- 1) Arrow LEFT or RIGHT until required setup file is displayed.
- 2) Press SELECT key: Confirmation screen will appear.
- 3) Confirm - Replace Set-Up file.

NOTE: Cannot change setups if there is data stored in the unit. You must clear data first. Setup selection screen will guide you to clearing data should you need to do this.

Setup Display

Select this screen from *Home* (🏠) > *Setup* > *Setup Display*

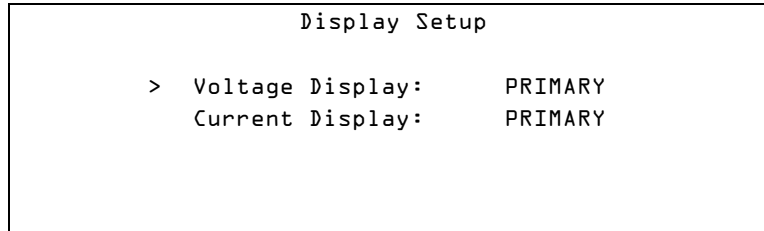


Figure 5-30: Display Setup Screen

This screen works in conjunction with any ratio settings programmed in the setup program.

Select *Primary* to view voltage or current values on the unit display using programmed ratios from the setup file. The unit will multiply its readings by the ratio you programmed and display these values as Primary Values.

To view voltage or current values as measured by the unit without ratio multipliers, select *Secondary*.

To make these selections using the UP/DOWN arrow keys position the cursor arrow on the selection to change. Depress the *SELECT* key.

Now depressing the RIGHT/LEFT arrow keys changes the setting between Primary and Secondary. Depress the *SELECT* key to lock in your selection.

Required Inputs

Select this screen from *Home* (🏠) > *Setup* > *Required Inputs*.

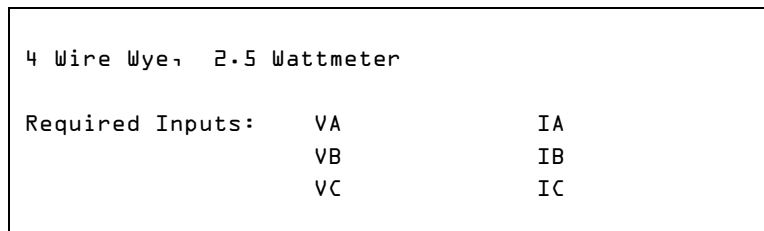


Figure 5-31: Required Inputs Screen

This screen tells you what inputs must be hooked up per the active setup program.

Stored Setups

Select this screen from *Home* (🏠) > *Setup* > *Stored Setups*.

To View Stored Setups:

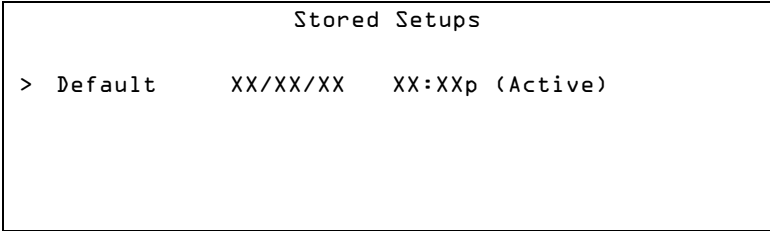


Figure 5-32: Stored Setups Screen

The active setup will have (Active) to right of line item. Arrow UP/DOWN to view all stored setups. With the cursor next to any setup, depress *SELECT* key to view setup parameters. When viewing setup parameters use the UP/DOWN arrow keys to scroll more information on the display.

Input Ratios

Select this screen from *Home* (🏠) > *Setup* > *View Input Ratios*.

To view Input Ratios:

The Megger PA-9*Series* data reports will show all values based on using ratio/multipliers as shown on this screen per channel. The values displayed on the unit can be with or without ratios. *See the Select Display screen for this setting.*

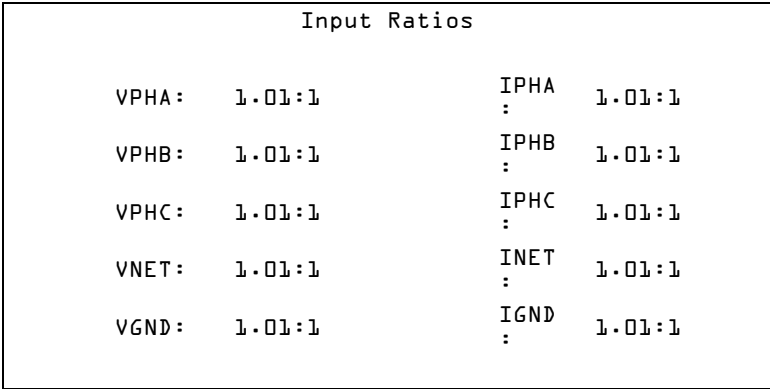


Figure 5-33: Input Ratios Screen

Options

Select this screen from *Home* (🏠) > *Options*. This screen shows the units' installed options.

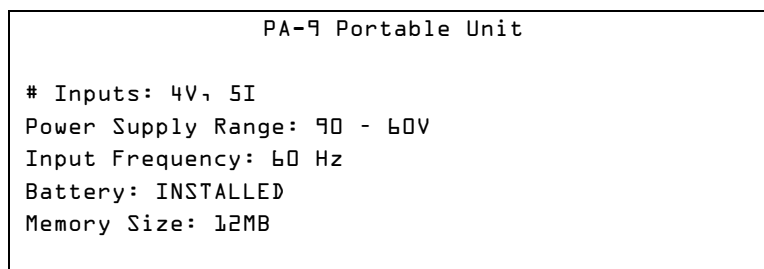


Figure 5-34: To View Options screen:

Use SCROLL DOWN key to view the following:

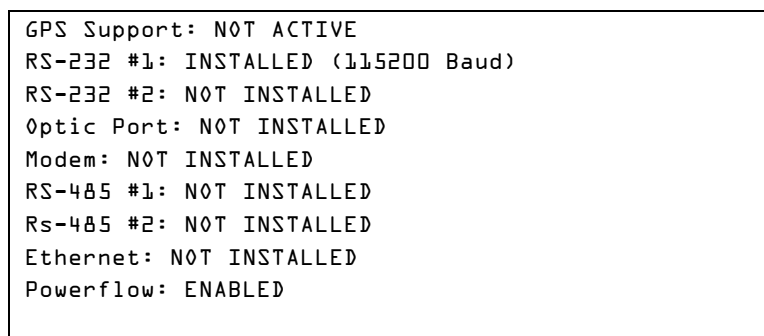


Figure 5-35: Options Screen (after scrolling down)

Special

Select this screen from *Home* (🏠) > *Special*. Use this screen to control recording or erase data.

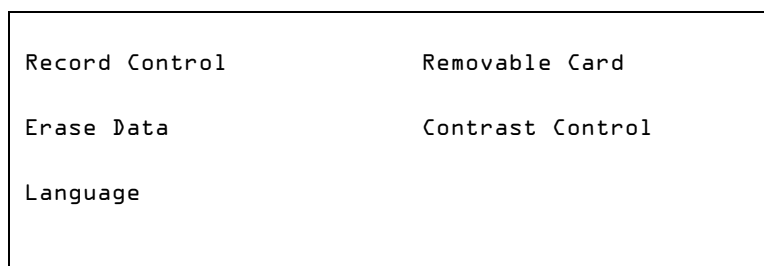


Figure 5-36: Special Screen

Record Control

Select from *Home* () > *Special* > *Record Control*

Active Setup: DEFAULT	
Not Recording	
> Back	Start
AutoStart: XX/XX/XX	XX:XX:XX
Clock Hour Orientation:	DISABLED
Exceedance Recording:	DISABLED

Figure 5-37: Record Control Screen

Recording can be started or stopped from this screen.

Erase Data

Select from *Home* () > *Special* > *Erase Data*.

Erase Data	
Please Confirm, Erase Data?	
> Back	Erase

Figure 5-38: Erase Data Screen

Use this screen to erase data.

Removable Card

Select from *Home* () > *Special* > *Removable Card*

List Files	Delete Files
List Data Files	Export Data
List Setup Files	Export Setup
Import Setup	Format Card

Figure 5-39: Removable Card Screen

Use this screen to import and export setup and data files between the unit and the compact flash. *See Section 7: Removable Compact Flash Option for more information.*

Contrast Control

Select from *Home* () > *Special* > *Contrast Control*

Contrast Control
Use Up/Down Key to Change
Press Center Key to Store Setting

Figure 5-40: Contrast Control Screen

Use this screen to set the screen contrast.

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6

HOW TO . . .

Purpose

The purpose of this section is to provide a fast and easy way for you to locate a specific function, whether its instructions for making adjustments, turning the recording function on and off, or retrieving data.

Functions and Data

All of the functions and data that you would want to retrieve are shown below as sub-sections. Locate the sub-section to identify the screen where the information is located, and how to access it.

Menu of Screens

Location: *Home* Screen.

To Access: Press *HOME* key () on front panel.

Battery (Voltage and Status), Memory Available, Recording Status, Date, Time, Stored Events and Tests, Active Setup

Location: *Status* screen.

To Access: Select *Home* () > *Status*.

Default Screen

To Access: Press *DEFAULT* key () on front panel. Defaults to the real-time readings screen.

Erasing Stored Data, Record Control

Location: *Special* screen.

To Access: *Select Home* () *>Special>Erase Data.*

Record—ON/OFF

Location: Record screen

To Access: Press *RECORD* key () on front panel

Harmonics and Direction of Harmonic Screen

Location: Harmonics Screen.

To Access: Select from *Home* () *>Harmonics*

(RMS, Demand Intervals), Event Summary, Event Log, Test Log

Location: Stored Data screen.

To Access: Select *Home* () *>Stored Data>Your Choice*

Waveform Log

Location: Waveform screen

To Access: Select *Home* () *> Stored Data>Test Log>Select Test>Waveform*

Unit Options Installed

Location: Options screen

To Access: Select *Home* () *>Options*

Phasor Diagrams

Location: Phasor screen

To Access: Select *Home* () *>Phasor*

Real-Time Readings

Location: Readings screen

To Access: Select *Home* () *>Readings*

View Stored Setups, Select Setup, Specify Inputs, Input Ratios, Setup Display, Required Inputs

Location: Select *Setup* screen

To Access: Select *Home* () > *Setup* > *Your Choice*

Unit Part Number, Firmware Version, Unit Serial Number, Date of Last Calibration, Owner Specified Text Lines

Location: About screen

To Access: *Home* () > *About*

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7

REMOVABLE COMPACT FLASH OPTION

The removable compact flash option gives the user the ability to transfer setup files and data files between the computer and the unit using a compact flash card. This allows the user to speed up download times and install setup files in the field without the need of a PC.

This option also allows the user to:

- import setup files from the computer to the unit,
- export setup files from the unit to the computer, and
- export data files from the unit to the computer.

The removable flash card option can also be setup to automatically transfer data files from the unit to the card. Then the unit will clear its internal memory and start recording again. This increases the available memory size of the analyzer.

To access the removable flash card menu:

1. Press the HOME key () on the Megger PA-9*Series*.
2. Arrow over and select the *SPECIAL* screen.
3. Arrow over and select the *REMOVABLE CARD* screen.

List Files	Delete Files
List Data Files	Export Data
List Setup Files	Export Setup
Import Setup	Format Card

Figure 7-1: Removable Card Screen

List Files: - This option allows the user to view all the files present on the compact flash card that is inserted into the unit.

List Data Files: - This option allows the user to view only the data files that are present on the compact flash card that is inserted into the unit.

List Setup Files: - This option allows the user to view only the setup files that are present on the compact flash card that is inserted into the unit.

Import Setup: - This option allows the user to transfer a setup file from the removable flash card to the Megger PA-9Series.

NOTE: The unit must not be recording and must have no data saved in its internal memory. Also this option only loads the setup file, it does not activate the setup. To activate the setup go to the SETUP screen. (HOME  / SETUP)

Delete File: - This screen allows the user to delete a file from the removable compact flash card that is inserted into the unit.

Export Data: - This option allows the user to transfer a data file from the Megger PA-9Series to the removable flash card. This data file can later be imported from the removable flash card to a PC by the *MegPa9IEC* software.

Export Setup: - This option allows the user to transfer a setup file from the Megger PA-9Series to the removable flash card. This setup file can later be imported into another Megger PA-9Series.

Format Card: - This option allows the user to format the removable flash card that is inserted into the unit.

NOTE: When formatting the removable flash card all saved data on that card will be erased.

Automatic Data Transfer

The removable compact flash can be used to expand the Megger PA-9Series available memory. Perform the following steps in order to take advantage of this option.

2. Verify the unit is programmed in the Stop When Full mode and the auto transfer option is enabled in the setup file.
3. Insert a blank formatted *Removable Compact Flash Card* into the unit prior to starting the recording.
4. Connect the Megger PA-9Series to the desired location to be measured, and start the Megger PA-9Series recording.

The unit will record data to its internal 12 Megabyte memory until it is full. Then the unit will stop recording and transfer that data to the Removable Flash Card. After the data is transferred, the Megger PA-9Series will clear its own internal memory and start recording again. This process will repeat until both the removable flash card and the Megger PA-9Series internal memory are full. At that point, the unit will stop recording.

NOTE: Each time a data file is transferred from the Megger PA-9Series to the removable compact flash, it will be saved as a new test.

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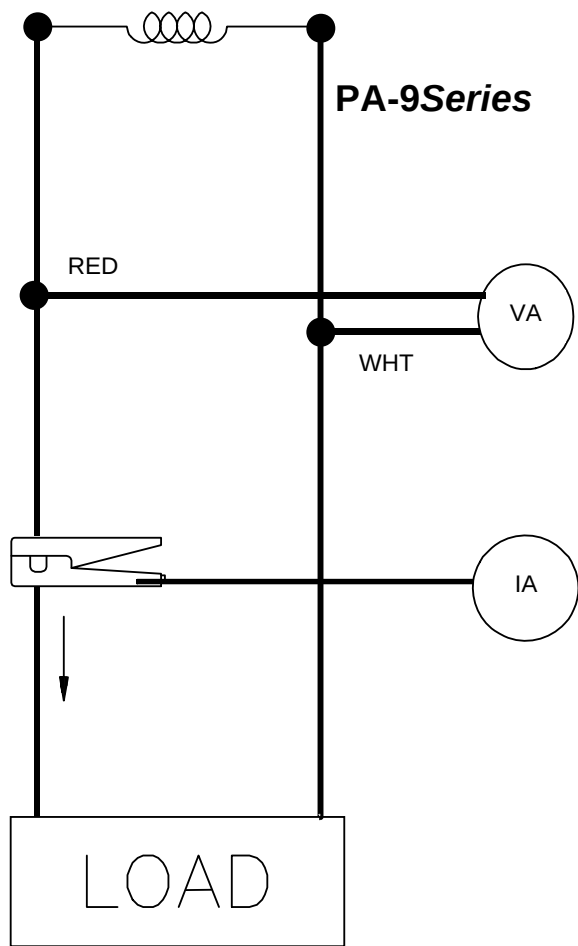
WIRING DIAGRAMS

Notes on Wiring Diagrams

1. These diagrams show required connections for determining power parameters. If only voltage and/or current recording is required, the Power Analyzer can be considered as a general purpose multiple voltmeter/ammeter with no specific connection configuration required. Voltage measurements can be made phase-to-neutral, phase-to-phase, phase-to-ground, on same or separate power systems.
2. The Power Analyzer records all voltages and currents that are hooked up providing you have activated channels in the setup. Even though not all channels may be required for the power configurations on the following pages, you can connect them to obtain voltage/current recordings, providing you activate the channel.
3. The vector diagrams shown are for reference and represent the vectors associated with a balanced resistive load. Reactive currents will rotate the current vectors clockwise or counterclockwise with respect to the voltages.
4. In the 3-wire configurations, you may select any one wire as a voltage reference, but you must place current clamps on the remaining two wires.
5. In the 3-wire configurations, the 2-element wattmeter method is used for power calculations. The third voltage and current can be connected to the Power Analyzer but will be recorded as RMS data only, providing you activate the channels.

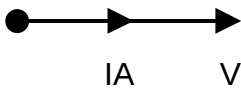
**CAUTION**

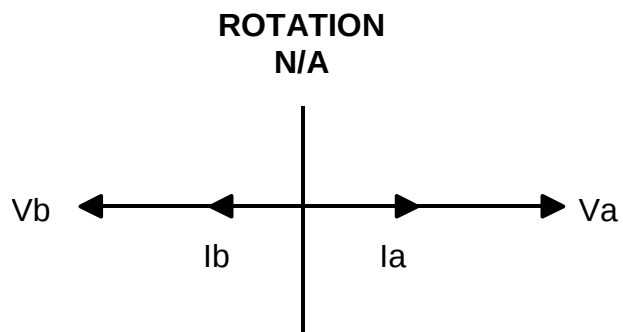
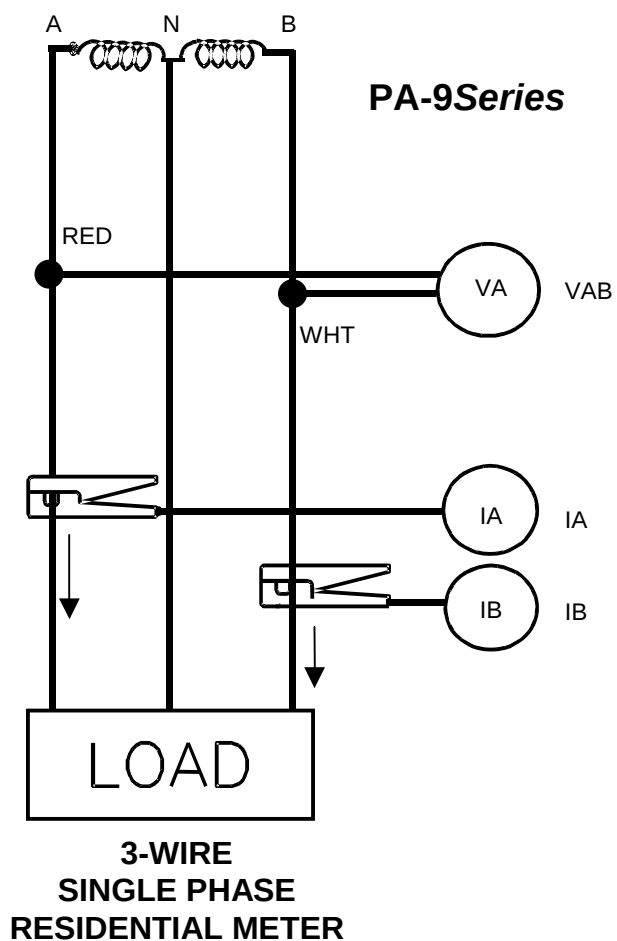
Inspect all power cords and wires for proper insulation integrity before connecting to any power source.

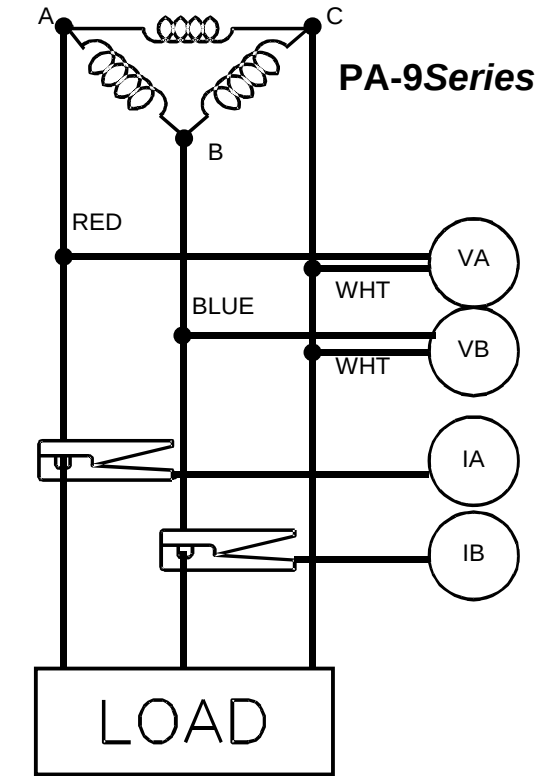


**2-WIRE
SINGLE PHASE
SINGLE WATTMETER**

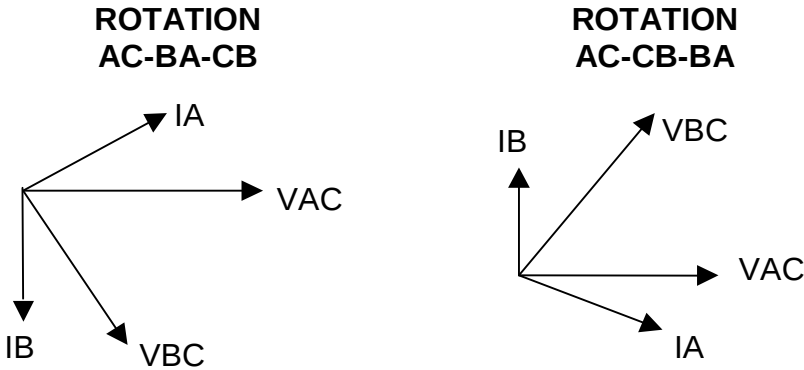
**ROTATION
N/A**

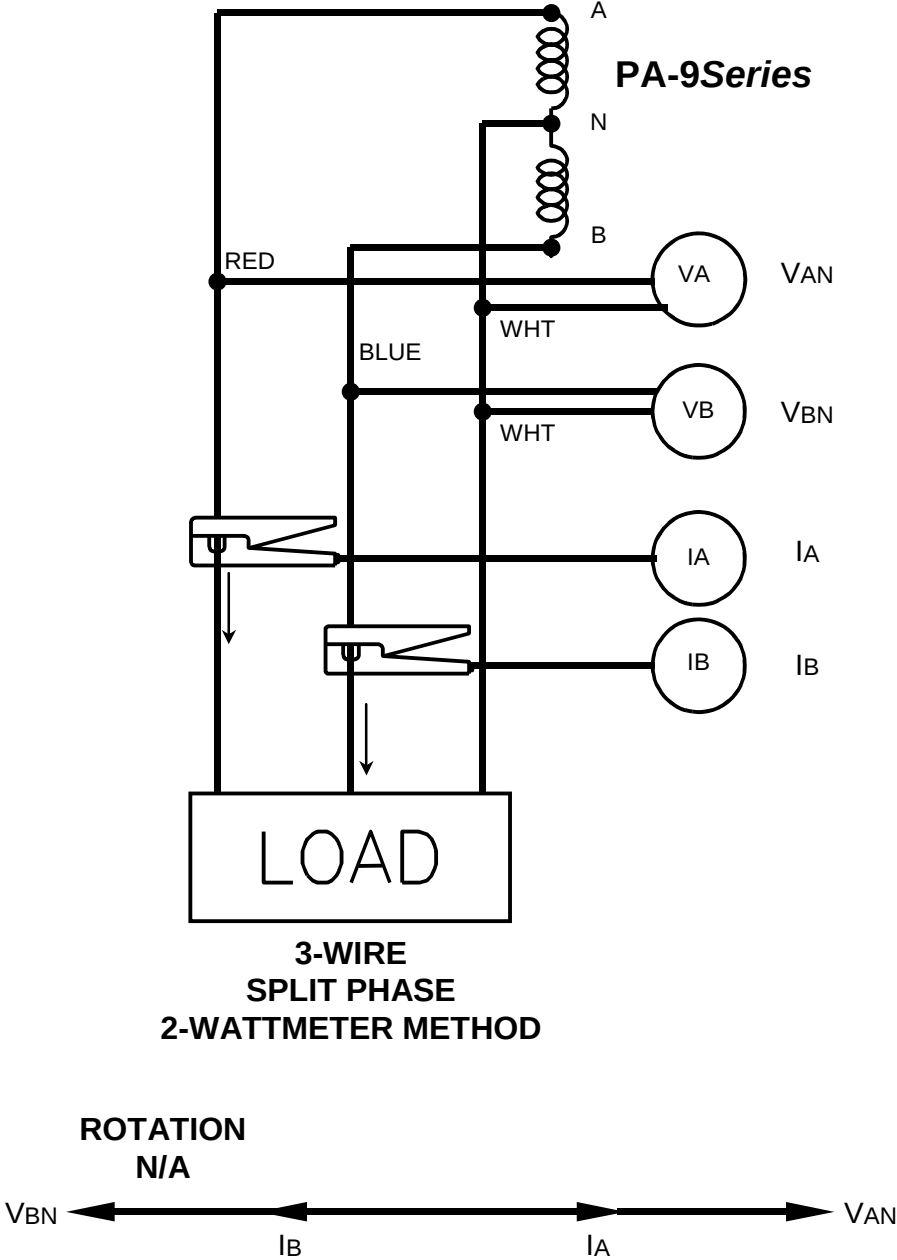


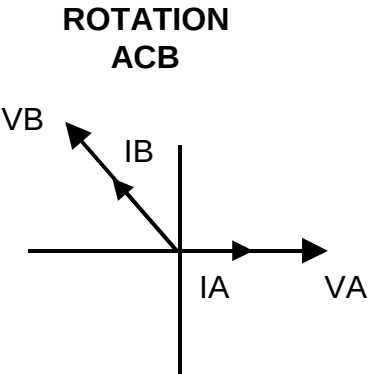
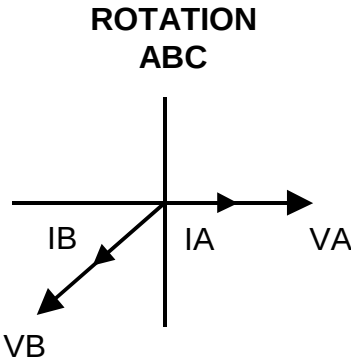
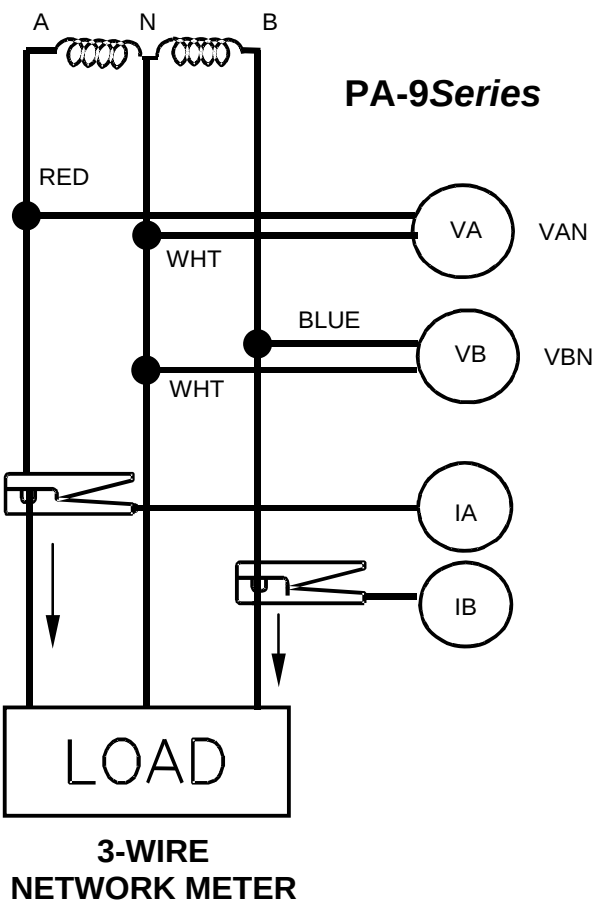


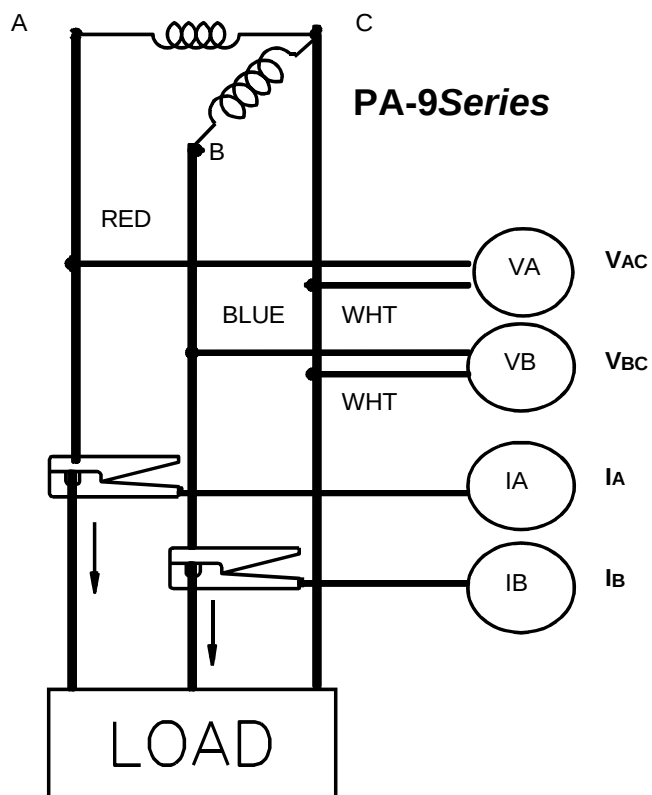


**3-WIRE
DELTA CONNECTION
2-WATTMETER METHOD**



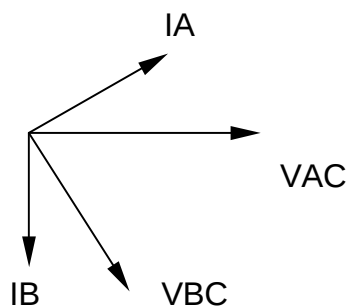




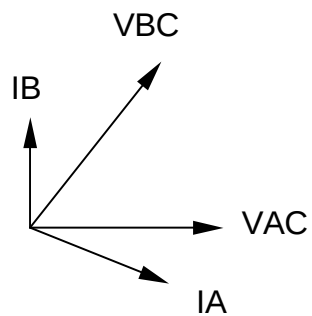


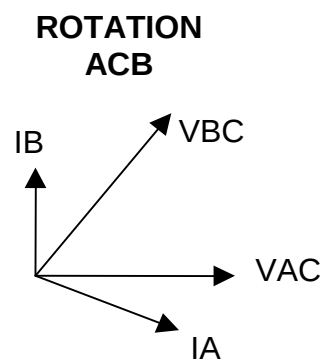
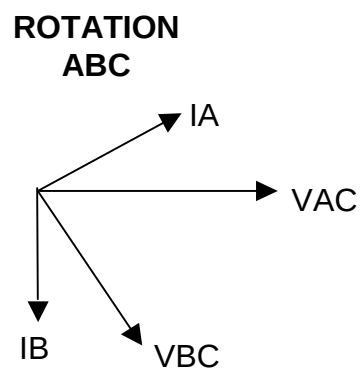
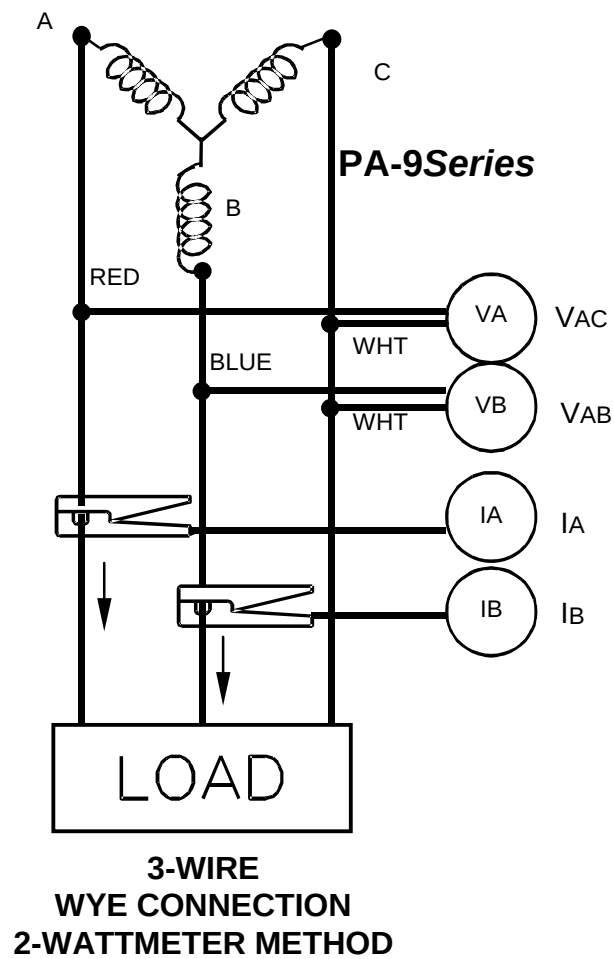
**3-WIRE
OPEN DELTA
2-WATTMETER METHOD**

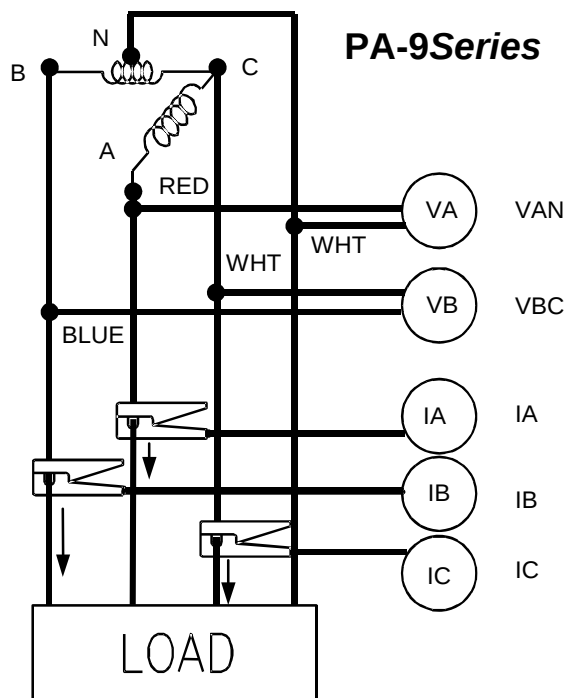
**ROTATION
AC-BA-CB**



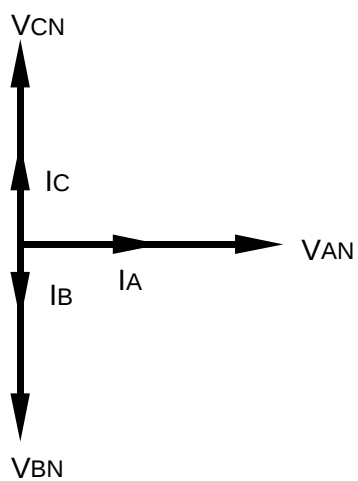
**ROTATION
AC-CB-BA**



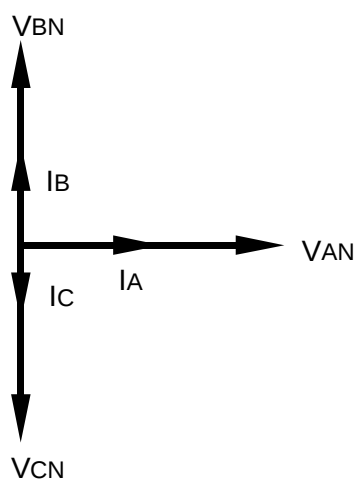


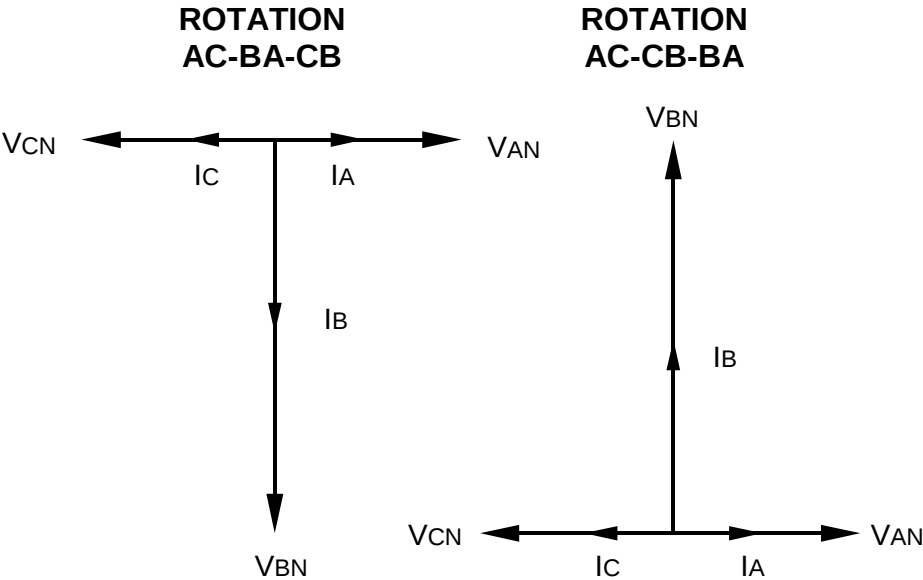
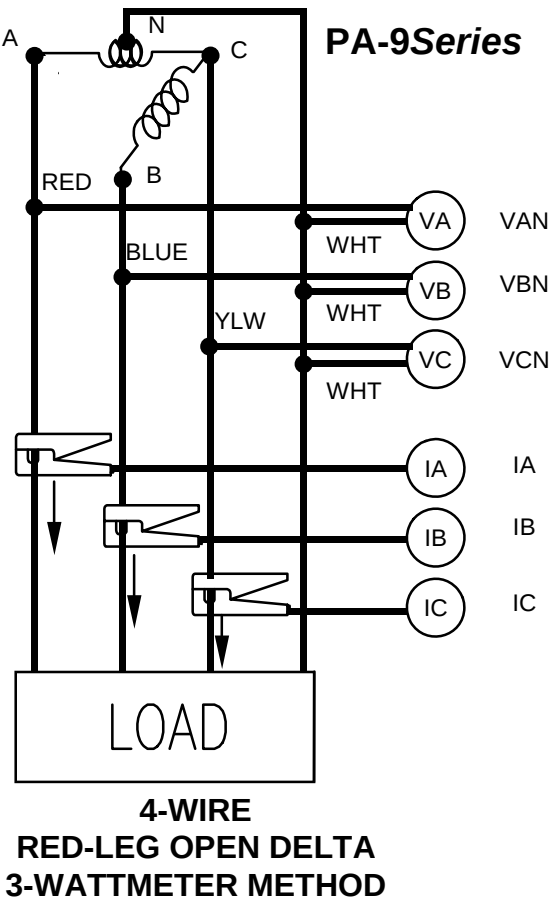


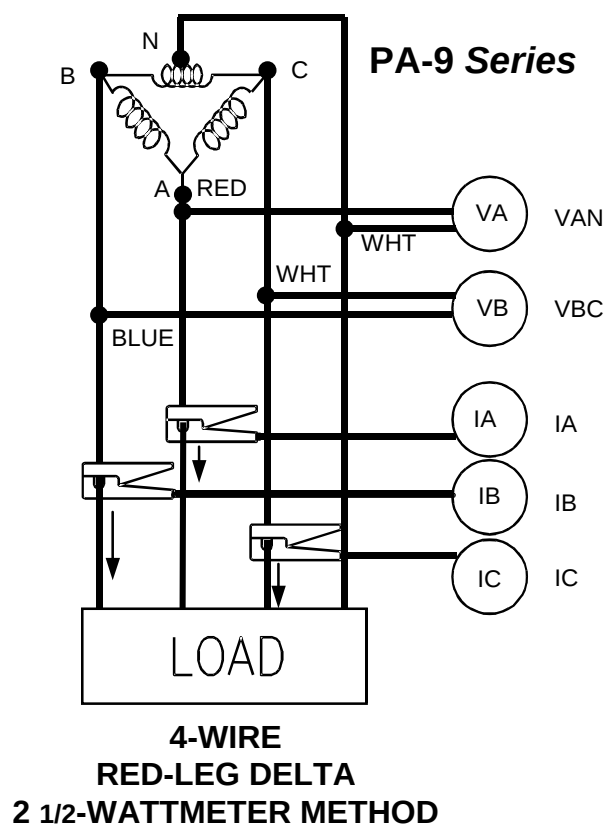
**ROTATION
AC-BA-CB**



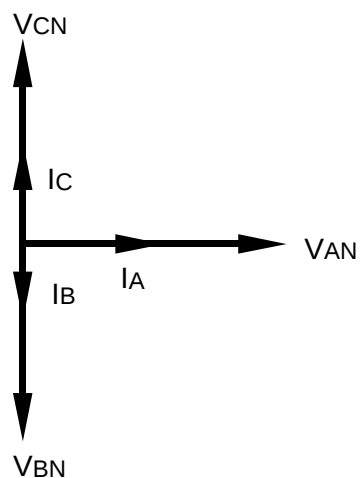
**ROTATION
AC-CB-BA**



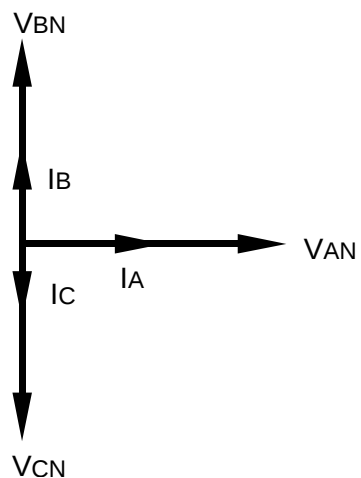


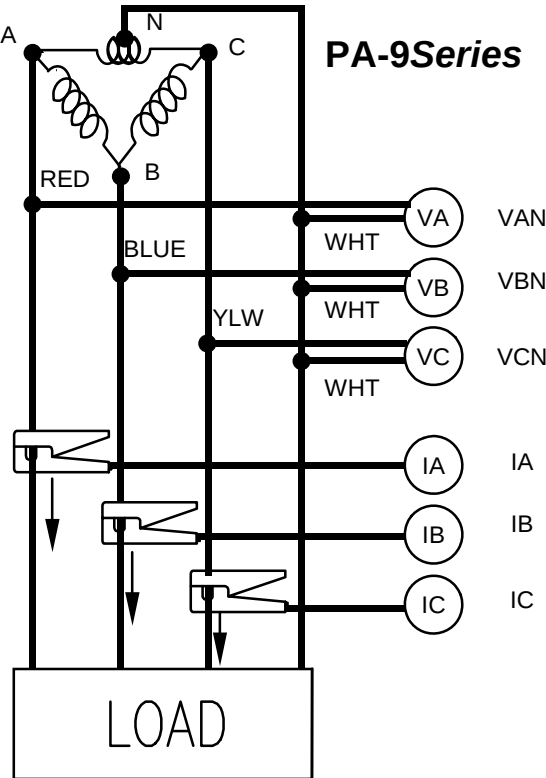


**ROTATION
AC-BA-CB**

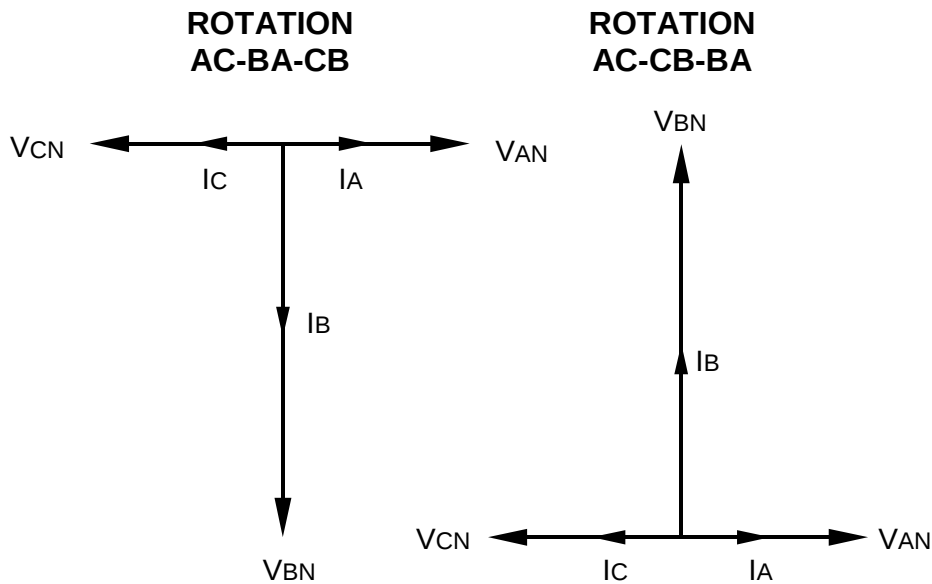


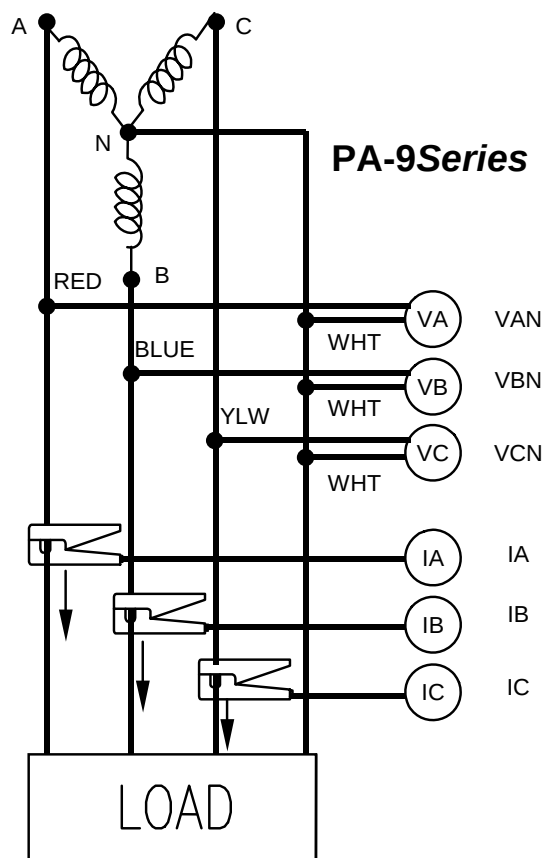
**ROTATION
AC-CB-BA**



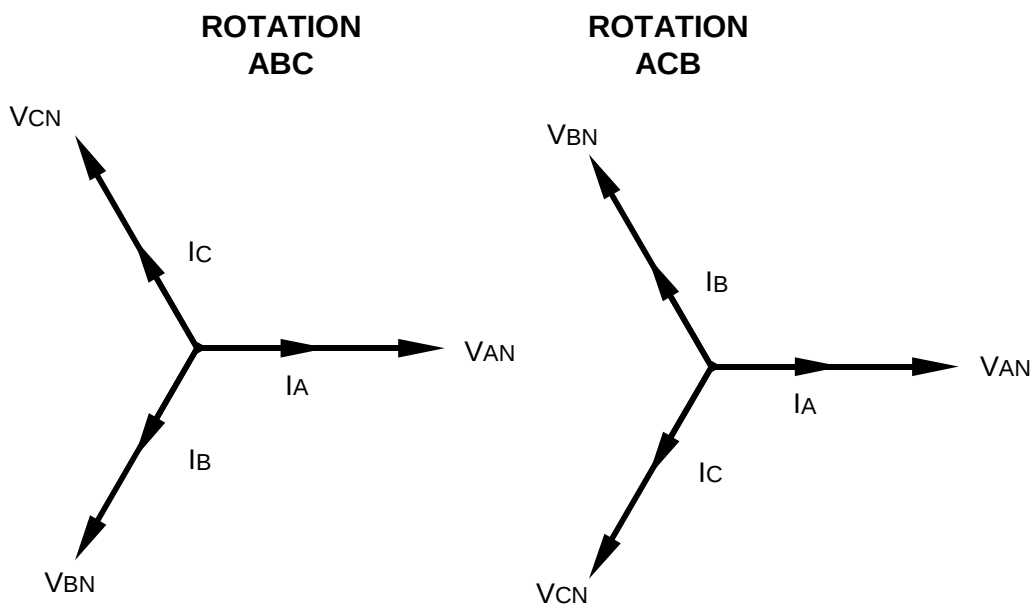


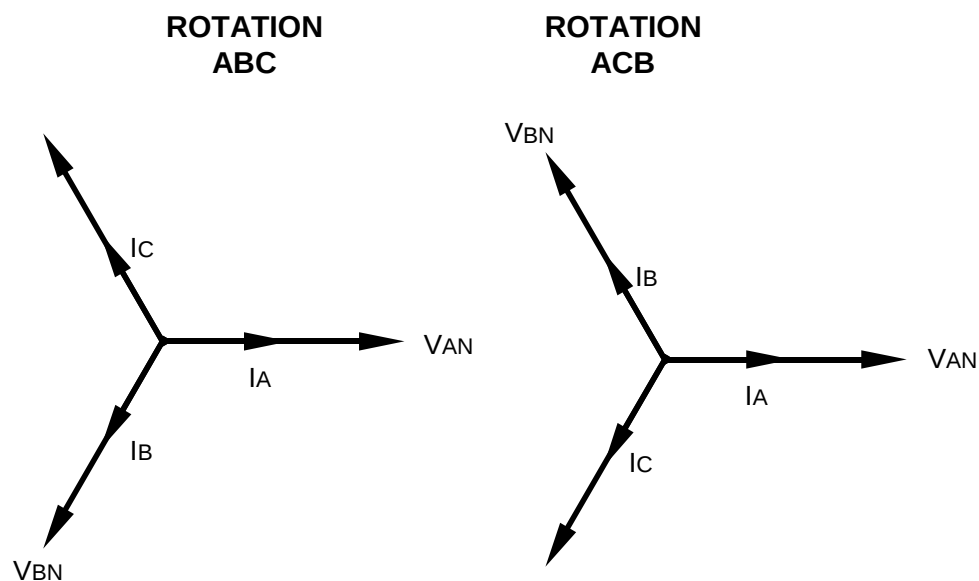
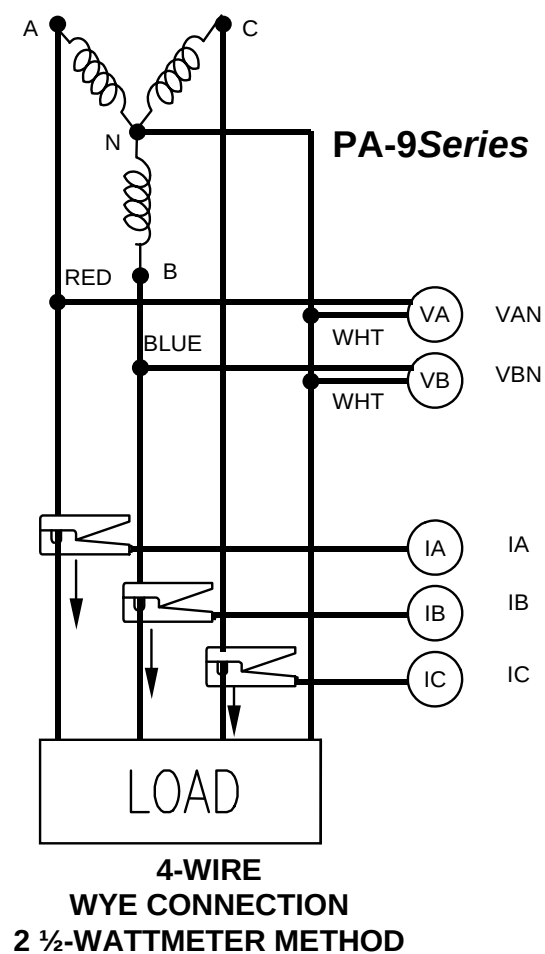
4-WIRE
RED-LEG DELTA
3-WATTMETER METHOD





**4-WIRE
WYE CONNECTION
3-WATTMETER METHOD**





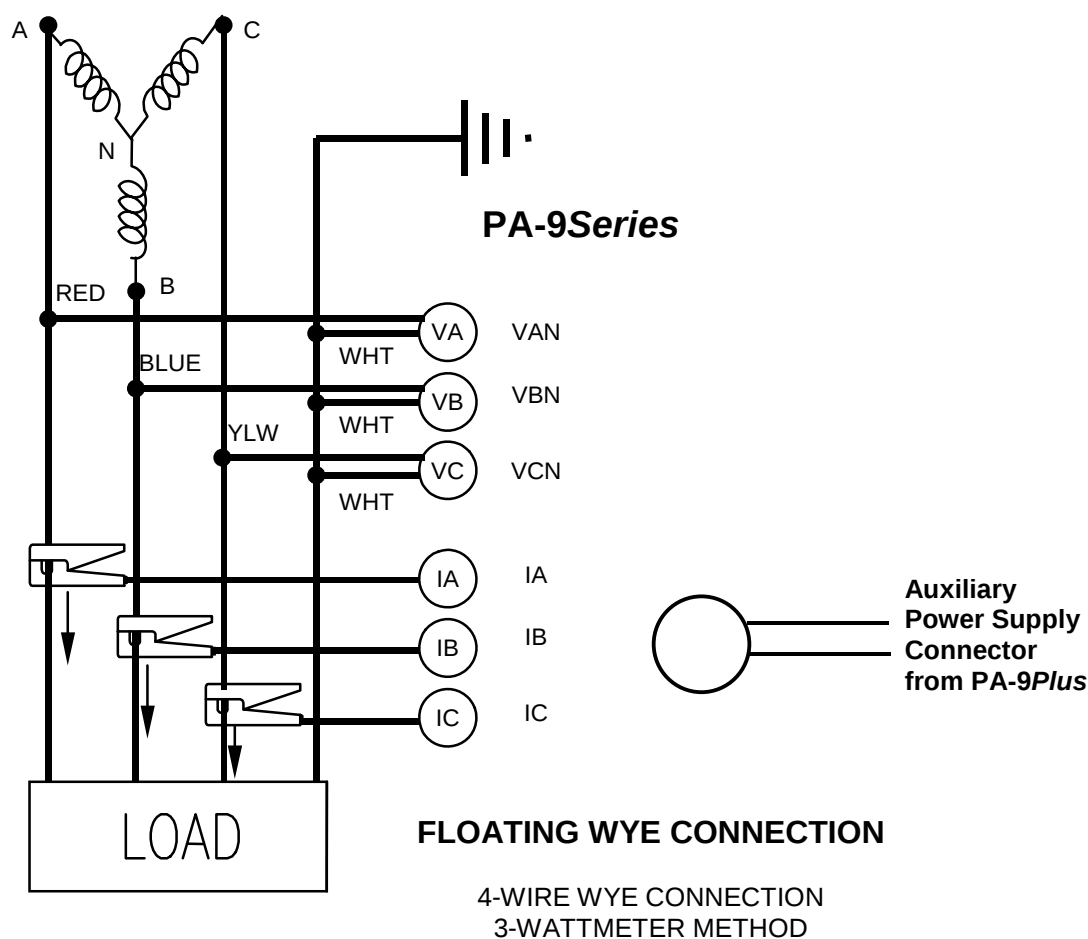
Floating Wye Neutral Measurement

In most measurement situations, a solid voltage source, line-to-neutral or line-to-line is available, and instruments can be powered directly off the Phase A input. In certain applications, such as a floating wye, access to the neutral line may not be possible.

For these situations, the Megger PA-9Series meets this application with an auxiliary input. With this, the operator can select power sources via the front panel Power Select Switch. This enables the unit to be powered independent of Phase A, from a standard AC receptacle or from another AC/DC source.

(Megger PA-9Series auxiliary input power supply specification for operating range is 90 to 250 VAC at 50 Hz or 60Hz.

The Auxiliary Power option is also useful where measurements require metering with high input impedance. Without the auxiliary power option a unit powered from phase A will see at the point of measurement a relatively low impedance due to the instruments internal power supply.



Megger[®]

9

TROUBLESHOOTING

Battery Reset for the Megger PA-9Series

NOTE: This is a battery reset only and will not erase setup programs or recorded data.
--

1. Disconnect the unit from the computer and remove AC power.
2. Remove the 4 screws in the shroud of the unit.
3. Remove the black shroud around the unit.
4. Next to the fan is a reset switch. *See Figure 8-1.* Toggle this switch and wait 10 seconds. Then toggle it back.
5. Reinstall the unit shroud and connect the RS-232 and charging cable back to the unit. Verify the unit turns on when the charging cable is connected.
6. Start the *MegPa9IEC* software and click on *CONFIG* then on *COMMUNICATIONS*. Verify the COM port selected is the COM port the unit is hooked to. Then set the baud rate to 115200 and increase the time out to 60. Then click *OK*.
7. In the software click on *ANALYZER* then on *CONNECT*. Verify unit connects. If the unit does not connect call Megger Technical Support at 610-676-8500.

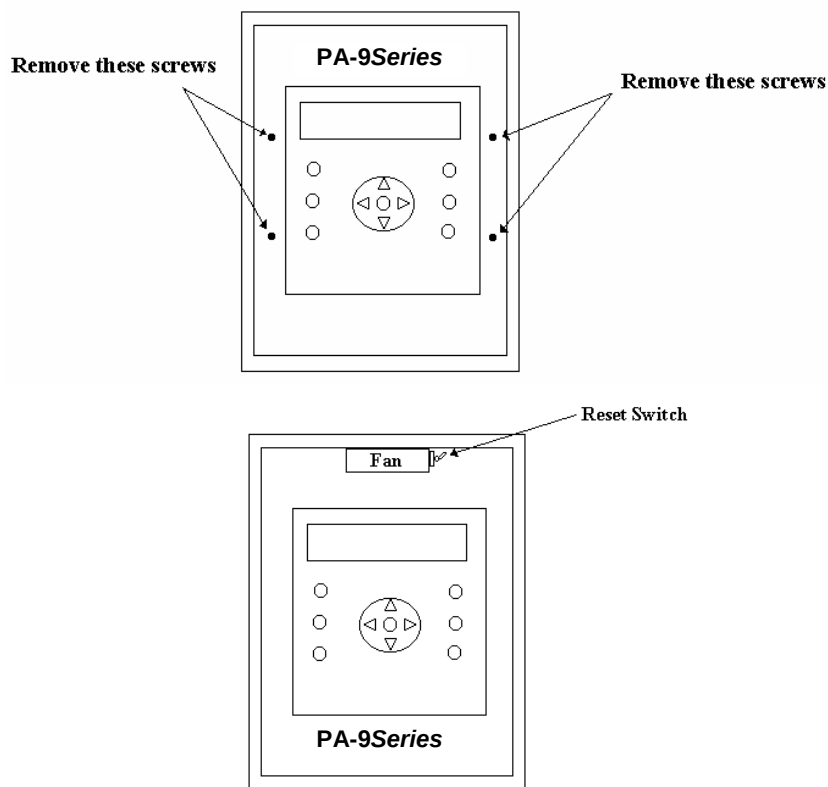


Figure 8-1: Megger PA-9Series

IMPORTANT

For up-to-date problem/solution guidelines visit our web site at:

www.megger.com

From the *Home* page, select *Support*.

From the *Support* page, select the *FAQ* page.

The FAQ page will have listings for generic FAQ's that relate to all instruments and FAQ's by product.

These FAQ's include problem/solution guidelines for:

Data Download Difficulties

Communication Difficulties

Plus, much more...

10

SPECIFICATIONS

Instrument Types

Megger PA-9*Series*: Portable NEMA 4X Rated

Case

Non-conductive, corrosion resistant, rain resistant, not submersible.

Voltage Range

Three high-voltage channels autoranging between 20 to 600Vac. One low voltage channel autoranging between 0.1 to 350Vac, true RMS through the 63rd harmonic. The PA-9 Plus will also measure Vdc. (Approx. DC ONLY)

High Voltage Channel Accuracy (VAC RMS Only)

Range	Accuracy
10V to 30V	> .4% or reading
30V to 70V	Within .4% of reading
70V to 350V	Within .25% of reading
350V to 700V	Within .4% of reading

Low Voltage Channel Accuracy (VAC RMS Only)

Range	Accuracy
0V to 4.9V	> .5% or reading
4.9V to 9.9V	Within .5% of reading
10V to 14.9V	Within .3% of reading
15.0V to 340V	Within .2% of reading
340V to 350V	>.3% of reading

Current (5 channels) (AAC RMS Only)

Current resolution:	0.1% of full scale
Current Accuracy:	0.25% of reading, 0.5% of range, plus the Current Probe accuracy
Current Channels receive 0 to 1 volt RMS from Probes	
Current Channel Voltage:	0.25% of reading, 5mV

Crest Factor

Voltage:	3.5 limited to 1500V peak (does not include impulse)
Current:	1.4 of Full Scale at peak input

Voltage/Current Connectors

Voltage:	4 color coded pairs of safety banana jacks
Current:	5 Amp miniature circular connector; power provided for flexible CT's

Frequency

Fundamental Frequency:	20 Hz or 70 Hz (autoranging via phase lock loop)
Frequency Response:	DC to 63 rd harmonic with low pass anti-aliasing filter
Frequency Resolution:	0.01 Hz
Frequency Accuracy:	0.01 Hz at 60 Hz

Sample Rate

50/60 Hz:	256 samples/cycle
Voltage and current for each phase are sampled simultaneously	

Channel to Channel Isolation

6000 V_{peak} on voltage channels

Phase Angle Error

1 referenced to first voltage channel at 60 Hz/I/O Relay Input – 125 VAC, 1A, resistive load

Control

Silicon rubber keypad, 4 cursor control with select switch and 6 buttons (HOME , BACK , DEFAULT , RECORD , CURSOR SELECT () and POWER ON )

Time

Real-time Clock:

Time Accuracy: Better than 0.005%

Power Supply

Primary Input: 90-600VAC, 50/60 Hz, 110-600 VDC

Auxiliary Input: 90-250VAC, 50/60Hz

12 Volt backup battery Included

Unit Power Burden

Powered from channel 1 A at 120 VAC burden is 250 ma

Battery

12 VDC rechargeable

Battery Recharge Time: 16 hours

Run Through Time: 15 minutes, below 90VAC/110 VDC cutoff.
If recording resume recording on power restoration

Data Retention: 10 years with battery backed RAM and non-volatile flash memory

Environmental

Operating Temperature: -20 to +50 °C ambient temperature

Humidity: Meets NEMA 4X, rain resistant

Communications

RS-232: 3 Wire up to 115200 Baud rate, DB9 standard

Modem (optional): Cellular compatible

Modem Speed (Optional)

38.8Kps

Display

Display Type: Backlit, 240 x 64 pixels graphic LCD

Display Operating Temperature: 0 to +50 °C

Memory Options

Standard: 12 megabytes

Removable Flash Card: Optional

Optional Customer Defined Address

Information: On Initial About Screen Text
(Factory Settable)

Located: In last 2 lines of unit about screen,
40 ASCII characters each line, to be customized
to your needs.

Physical

Size: 13 x 10 x 6 inches

Weight: 15 lbs.

*All specifications referenced at 25 °C

CE Certified, Certificate No. 01-009

Specifications subject to change without notice. Contact manufacturer for updated
information.

STANDARDS/APPROVALS: IEC 61010-1, 61000-4-3-15-30; CSA 22.2 NO. 1010-1-92;
ANSI.NFPA70-1993; EN50081-2; EN50081-1; EN50082-1

11

MegPa9 IEC
SOFTWARE
and
MODEM SOFTWARE

Megger.[®]

Megger End User License Agreement

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6. **No Other Warranties** – To the maximum extent permitted by applicable law, Megger and its suppliers disclaim all other warranties, either express or implied, including, but not limited to implied warranties of merchantability and fitness for a particular purpose, with regard to the SOFTWARE, the accompanying written materials, and any accompanying hardware.
7. **No Liability for Consequential Damages** – To the maximum extent permitted by applicable law, in no event shall Megger or its suppliers be liable for any damages (including without limitation, special, incidental, consequential, or indirect damages for personal injury, loss of business profits, business interruption, loss of business information, or any other pecuniary loss) arising out of the use of or inability to use this product, even if Megger has been advised of the possibility of such damages. In any case, Megger and its suppliers' entire liability under any provision of this agreement shall be limited to the amount actually paid by you for the SOFTWARE.

Megger Technical Support

In the event that *MegPa9IEC Metrosoft® for Windows* appears defective or if you need assistance in the operation of *MegPa9IEC Metrosoft® for Windows*, call the Megger SUPPORT DEPT at (610) 676-8500. The Megger Support Dept will determine the necessary support to correct the problem.

Getting Started

NOTE: The instructions in this manual assume that drive C is your hard drive and drive A is your floppy drive. If you are using other drives, please substitute the correct drive letters accordingly.
--

System Requirements

The following is a list of minimum hardware requirements that your computer equipment must have to install and run Metrosoft®:

Operating System: Windows 98, Windows NT 4.0, ME, 2000 or XP

Computer: IBM PC or compatible computer

Processor: Pentium 90 Mhz Processor minimum

Memory: 32 MB RAM

Hard Disk Space: 125 MB of free disk space (up to 5 MB for program disk space, 120 MB free after installation)

CD ROM

Asynchronous communications port (for communications between the Analyzer and the computer)

Installing Metrosoft®

Follow these instructions to install Metrosoft® on your computer's hard drive.

1. Insert your Metrosoft® Disk #1 or CD rom.
- 2. FROM THE START BUTTON, SELECT *RUN...***
3. In the dialog box, type the following command: A:\INSTALL.EXE (Insert proper drive letter if not A drive)
4. Click the *OK* button to install Metrosoft®.
5. Follow all instructions, read all screens carefully.

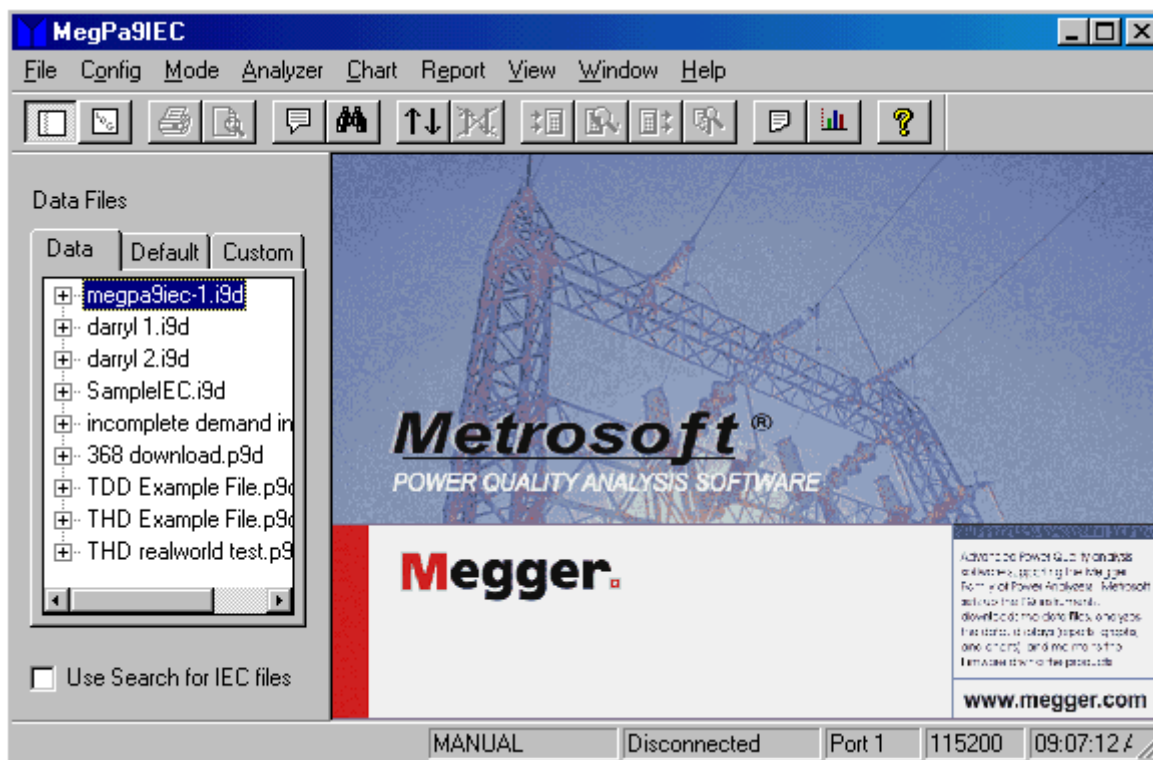
By default, Metrosoft® will automatically be installed to a directory on your hard drive called:

C:\PROGRAM FILES\MegPa9IEC

In this folder a setup and data folder will be created.

By default, Metrosoft® is configured to use these directories. If you create your own or additional sub-directories, you can change the defaults to your directory names from the Metrosoft® Setup Menu.

Metrosoft® Main Window



The Metrosoft® Main Window (shown above) is displayed when the application is launched from Microsoft® Windows95, 98, Me or Microsoft® Windows NT 4.0 or 2000. This window follows the Microsoft® Multiple Document Interface (MDI) specification. This means there may be child windows which can be tiled, maximized, sized and minimized to an iconic state within the Metrosoft® Main Window.

File Menu: Contains commands related to data file operations. See File Information, and Searching For and Retrieving Stored Test Data and Modem sections of manual.

Config Menu: Contains commands for configuring Metrosoft®.

Mode Menu: Contains commands for interacting with the Analyzer over a modem line. See *Megger PA-9Series Modem Software Instructions* section of this manual.

Analyzer Menu: Contains commands for interacting with an Analyzer. See *Verify Communication with the Analyzer*, *Get and View Test Data from the Analyzer*, *Upgrading Firmware*, *Programming the Unit* and *Resetting the Analyzer*.

Chart Menu: Contains commands for creating a Chart. See *Section 11: MegPa9IEC Software and Modem Software/Creating a Chart Using Metrosoft®*.

Report Menu: Contains commands for creating a Report. See *Report Generation*.

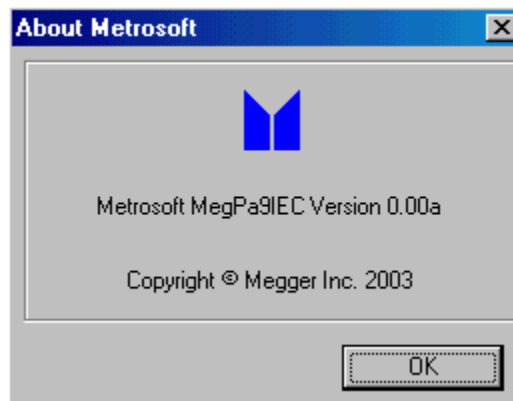
View Menu: Contains commands for showing or hiding toolbars and the Side Bar

Window Menu: Contains commands for arranging open windows, and selecting the current window.

Help Menu: Contains a command to show the Help file.

About Metrosoft®

This dialog is accessed through the *Help>About* menu item. It displays the product name and the version number of the software. This information is especially useful for technical support staff.



The following files make up Metrosoft®:

<u>Filename</u>	<u>Type of file</u>
MsMEG-PA9IEC.exe	Main program file
Avopa9win.hlp	Help system file
Impmet.dll	Library file
Wct32f.dll	Library File
InstallationDate.txt	Text file
Sample.p9d	Sample data file
1.tww	Support File
2.tww	Support file
3.tww	Support file
4.tww	Support File
Setup.file	Support file
DemoFile.bin	Binary File

Metrosoft® configuration information is contained in the initialization file *avopa9win.ini*. This includes Metrosoft® setup, chart setup, and report setup information. This information will be saved to the *avopa9win.ini* file each time Metrosoft® is shut down as long as the *SAVE ON EXIT* item in the *Setup* menu is checked.

Communication Setup

To setup your communications port, from the Metrosoft® Main Window:

Click on *CONFIG* in the menu bar. Then from the pull down menu click on *COMMUNICATION*.

This will take you to the Communications Parameter dialog. Use this dialog to specify:

Communications Port: Select which serial port (commonly COM1 or COM2) that the Software will use to communicate with a Analyzer.

Baud Rate: Select which Baud Rate the software will initially attempt to use to communicate with the Analyzer.

Modem Parameters: If using a modem select a modem instead of a COMM port in the *Modem/Port* field. If your modem uses hardware flow control, be sure to check that box.

The screenshot shows the 'Communications' dialog box with a blue title bar and a close button. The dialog is divided into several sections:

- Modem/Port Information:** Contains a 'Modem/Port' dropdown menu set to 'COM1', a 'Baud Rate' text box set to '115200' with a slider below it, and two checkboxes: 'External Modem' and 'Hardware Flow Control', both of which are unchecked.
- External Modem Initialization String:** A group box containing three radio buttons: 'Hayes' (selected), 'US Robotics', and 'Other'. Each radio button is followed by a text box containing the initialization string: 'X1V1&K3 S0=0' for Hayes, 'X1V1&K1 S0=0' for US Robotics, and an empty box for Other.
- Ethernet Communications:** A group box containing a single checkbox labeled 'Use Network Communications', which is unchecked.
- Buttons:** At the bottom of the dialog are four buttons: 'OK', 'Cancel', 'Apply', and 'Help'.

Directory Setup

To set Metrosoft[®] to the desired setup and data directories, from the Metrosoft[®] Main Window:

Click on CONFIG in the menu bar. Then from the pull-down menu, click on FILE DIRECTORIES.

This will take you to the Directory Setup dialog. From here, the Setup and Data Directories may be configured.

To Specify the Location Metrosoft[®] will use to look for Data Files :

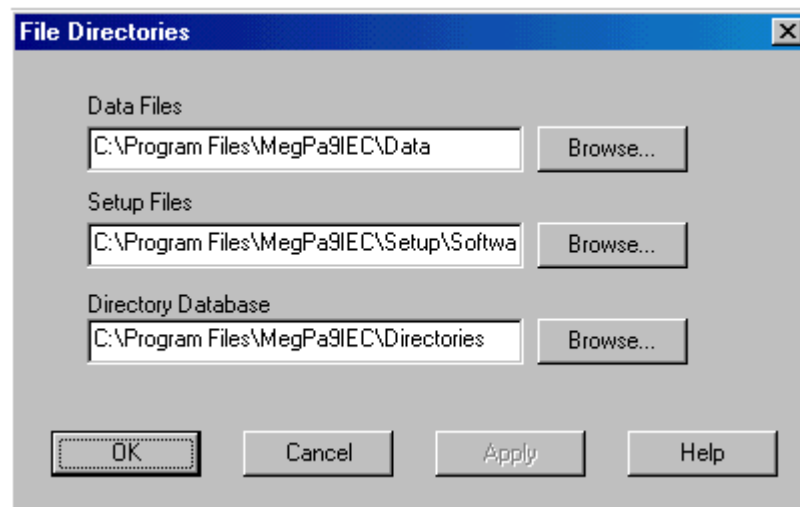
1. Click on the *BROWSE* button next to the data file field.
2. Navigate to the location of the directory you wish to use by double-clicking on items listed under Directory.
3. Click on the *OK* button to save the new Data File Path.

To Specify the Location Metrosoft[®] will use to look for Setup Files:

1. Click on the *BROWSE* button next to the setup file field.
2. Navigate to the location of the directory you wish to use by double-clicking on items listed under Directory.
3. Click on the *OK* button to save the new Setup File Path.

To Specify the Location Metrosoft[®] will use to look for Modem Phone Numbers:

1. Click on the *BROWSE* button next to the Directory Database file field.
2. Navigate to the location of the directory you wish to use by double-clicking on items listed under Directory.
3. Click on the *OK* button to save the new Directory Database File Path.



Verify Communication with the Analyzer

Whenever you will be communicating with the analyzer through Metrosoft[®], we recommend you verify that the computer is hooked up and communicating properly. Communication with the analyzer is required for programming, retrieving stored test results, and remote operation.

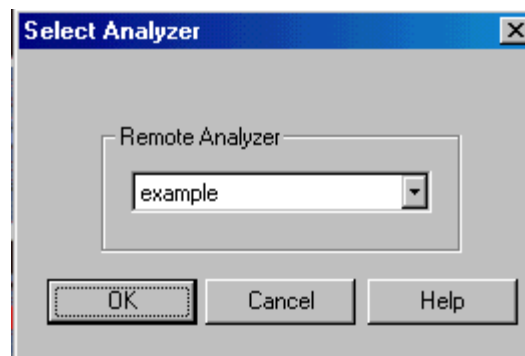
Follow these steps to verify communication:

1. Check to make sure that Metrosoft[®] is configured for the correct communications port (COM1 - COM4) and the desired baud rate. Metrosoft[®] will change the analyzer's baud rate to match the baud rate of the computer.

Do the following from the Metrosoft[®] Main Window:

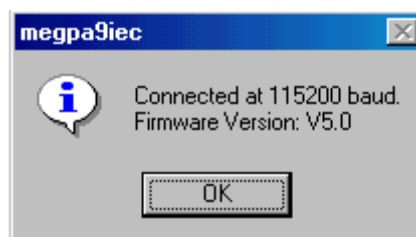
2. Click on *ANALYZER* in the menu bar. Then from the pull down menu click on *CONNECT*.

The following dialog will appear if you are using a modem for communications:

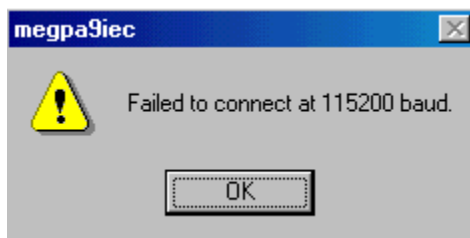


3. If using a modem then select *the location to be called* from the drop down menu.
4. Press *OK*.

If communication is established the following dialog will appear on your computer screen:



If Metrosoft® fails to communicate with the analyzer, the following dialog will appear on the screen:

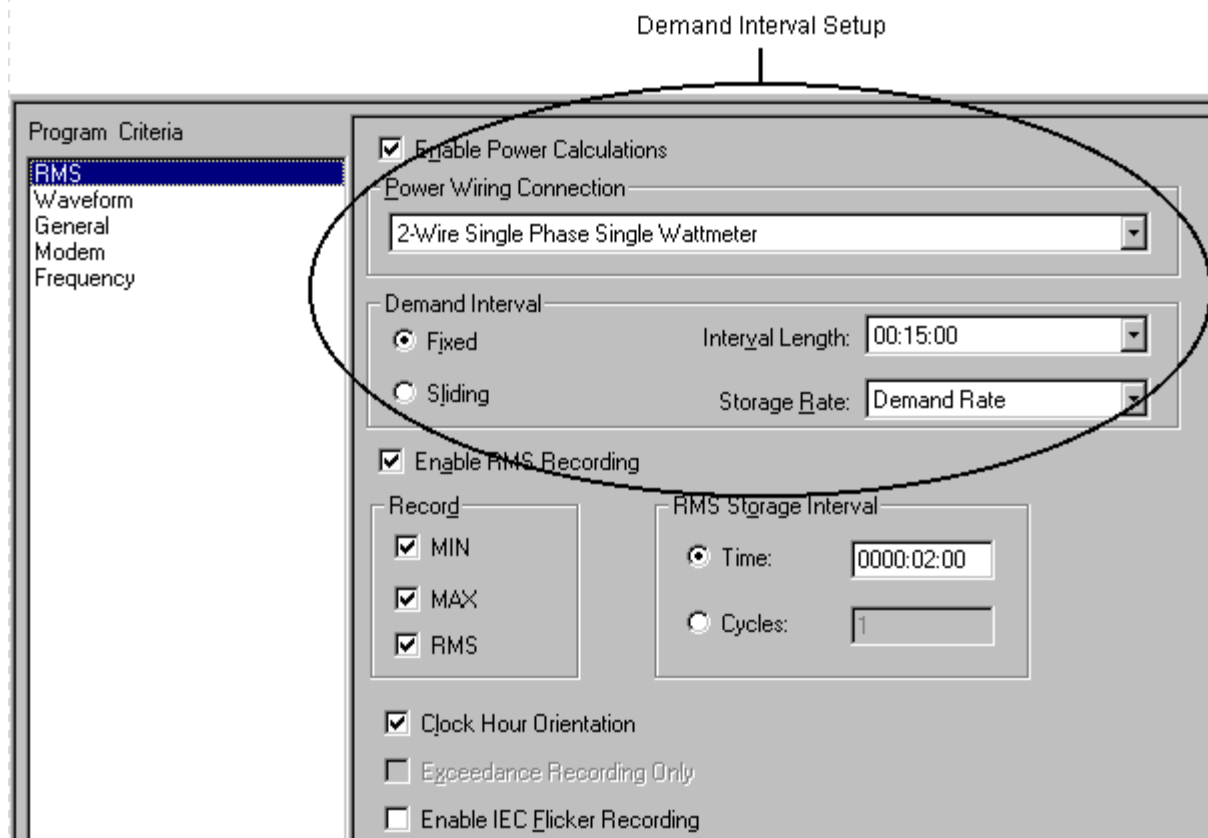


If you get this message, check each of the items on the list and try communicating again.

NOTE: If you are unsure of how to check your Metrosoft® configuration for the baud rate and analyzer communications port, refer to Communication Setup.

How to Create New Metrosoft® Windows Setup Files Save Them and Program a Unit.

1. In the software, click on *CONFIG* then on *NEW ANALYZER SETUP*. A setup screen will appear.
2. **Setting up a Demand Interval:** If you want to record Demand Information, which includes KW, KVAR, KVA, PF and DPF then the following setup is required. If you do *not* want to record demand information then de-select *ENABLE POWER CALCULATIONS* and proceed to the next step.



Enable Power Calculations: If enabled the unit will record demand information. If disabled the unit will not record demand information.

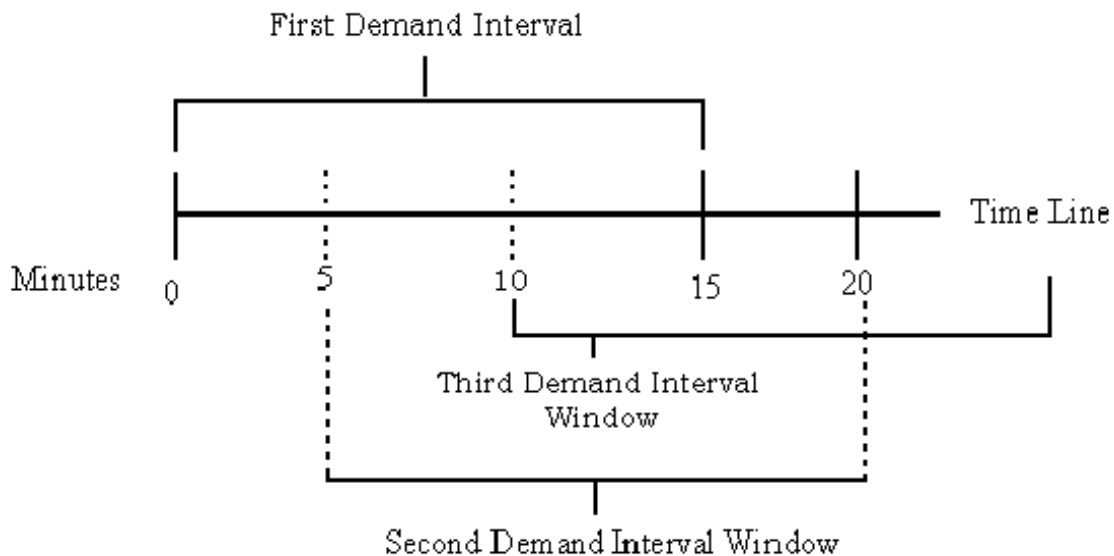
Power Measurement Method: This needs to be set if you have enabled power calculations. This selection must match the wiring setup of the unit to the circuit. In order to see selections available; click on the down arrow next to the Power Measurement Method. Then just click on the one you need.

Demand Interval Length: This is the time interval the unit uses to calculate the demand parameters. So if the demand interval length is set to 00:15:00, then the unit will calculate the demand parameters every 15 minutes.

Demand Storage Rate: This is the time interval the unit waits until it stores the calculated demand information to the unit's non-volatile memory. So if the demand storage rate is set to Demand Rate then the unit will save the calculated demand information to memory every demand interval length.

Demand Interval: The user has a choice of selecting either a fixed window or a sliding window. If a fixed window is selected then at the end of each demand interval the power parameters will be calculated. If a sliding window is selected then at the end of the first demand interval the demand parameters will be calculated. Then from there on after at the end of each demand storage rate the window will slide by the amount of time in the demand storage interval and the demand parameters will be calculated again.

Example: With the following Sliding Demand settings this would be the Demand Interval Window.



The Demand Interval can be set as low as 1-cycle with a fixed window. This means the demand information can be calculated and saved every cycle. However, when a demand interval is set down to a 1-cycle interval, the following limitations do exist.

If the demand interval is set to 1-cycle and the waveform capture is set to 12- cycles or lower, the waveform capture may start dropping cycle data after about 4 seconds of recording time.

If the demand interval is set to 1-cycle and the RMS is set to 1- cycle and the waveform capture is set to 13- cycles or lower, the waveform capture may start dropping cycle data after about 4 seconds of recording time.

3. **RMS Recording:** If you want to record RMS data then the following setup is required. If you do *not* want to record RMS data, then de-select *Enable RMS Recording* and proceed to the next step.

NOTE: The only time that RMS recording should be disabled is if the user wants to record Demand Data ONLY.

Enable RMS Recording: With this checked the unit will record RMS data. If this is not checked then the unit will not record RMS data.

RMS Storage Interval: If the RMS Storage Interval is set to time, then the unit will save RMS data to memory at the end of the set storage interval. So if time is selected and the time is set to 0000:02:00 then the unit will save the RMS data to memory every 2 minutes.

If cycle is selected then the unit will save the RMS data to memory at the end of the number of cycles selected. So if cycles are selected and the number is set to 1 then the unit will save the RMS data to memory every cycle.

Record (Min, Max and RMS): At the end of each RMS storage interval, the unit will save the Minimum RMS value (MIN), the Maximum RMS value (MAX) and the Average RMS value (RMS) to memory for that interval if MIN, MAX and RMS are all checked. If any of them are not checked then that value will not be saved to memory.

4. **Clock Hour Orientation:** The unit divides an hour into whole number storage intervals. If this is checked, it will cause the unit to delay recording until the next synchronized storage interval. When asked to record, it will delay recording until its

real-time clock reaches the beginning of one of these storage intervals. This is a useful feature when running tests with 2 units. Data can be compared from each unit and time intervals will be in-sync.

5. **Enable IEC Flicker Recording:** Allows the user to program the analyzer to record IEC *Short Term (Pst)* and *Long Term (Plt)* flicker. This is based on the IEC Specification 61000-4-15.
 - The *Pst* interval is a fixed 10 minute interval.
 - The *Plt* interval is a sliding 2 hour interval with 10 minute slides.
6. **Setting up the event limits:** The user can specify event limits, which if exceeded will cause an out-of-limits event to be recorded in the out-of-limit reports.

Label	Channel	Lower Limit	Upper Limit	Sub Cycle Limit	Ratio	CT Full Scale	THD Limit %
☒ VPHA	V1	☒ 0.00000	☒ 600.000	600.0	1.000		☐ 5.00000
☒ IPHA	I1	☐ 0.00000	☐ 300.000	300.0	1.000	600.00	☐ 20.0000
☒ VPHB	V2	☒ 0.00000	☒ 600.000	600.0	1.000		☐ 5.00000
☐ IPHB	I2	☐ 0.00000	☐ 300.000	300.0	1.000	600.00	☐ 20.0000
☒ VPHC	V3	☒ 0.00000	☒ 600.000	600.0	1.000		☐ 5.00000
☐ IPHC	I3	☐ 0.00000	☐ 300.000	300.0	1.000	600.00	☐ 20.0000
☒ VPHD	V4	☒ 0.00000	☒ 600.000	600.0	1.000		☐ 5.00000
☐ IPHD	I4	☐ 0.00000	☐ 300.000	300.0	1.000	600.00	☐ 20.0000
☒ NEUT	I5	☒ 0.00000	☒ 600.000	600.0	1.000	600.00	☐ 5.00000

Label: This column allows the user to turn on and off individual channels. It also allows the user to rename the channel. If a channel is checked then it will record data. If a channel is not checked then it will not record data. To *rename a channel* just highlight the label and type in the new name.

Channel: This column is to let the user know what channel each row is related to. This column is not user adjustable.

Lower Limit: This column allows the user to turn on and off and set the lower limit of each channel. When the limit is checked and a value is set, if the measured RMS value goes below this setting, an out-of-limits event will occur. This event can be viewed in the out-of-limits report.

Upper Limit: This column allows the user to turn on and off and set the upper limit of each channel. When the limit is checked and a value is set, if the measured RMS value goes above this setting, an out-of-limits event will occur. This event can be viewed in the out-of-limits report.

Sub-Cycle Limit: This allows the user to program the unit to capture events that last less than 1 cycle (sub-cycle events). In order for this option to be active then the Sub-Cycle Event Capture must be checked in the setup file and the lower and upper limits must be checked for each channel the user wants to capture sub-cycle events on and a limit must be set. The unit will then compare each sample of each cycle to the corresponding sample of the previous cycle. If the difference is greater than the

limit programmed in the setup file then an out-of-limits event occurs. This event can be viewed in the out-of-limits report.

A Sub-Cycle Capture must be checked

Upper and Lower Limits must be checked

A Sub-Cycle Limit must be checked

Maximum Recording Time: 2 Days

Hysteresis Value (Percentage of Limit) 2

☒ Enable Sub Cycle Event Capture
 ☐ Enable Out of Limits Trending

Label	Channel	Sag Limit	Swell Limit	SubCycle Limit	Ratio	CT Full Scale	THD Limit %
☒ Va	V1	☒ 114.000	☒ 126.000	120.0	1.000		☐ 7.00000
☒ Ia	I1	☐ 0.00000	☐ 300.000	300.0	1.000	6000.00	☐ 20.0000
☐ VPHB	V2	☐ 114.000	☐ 126.000	120.0	1.000		☐ 7.00000
☐ IPHB	I2	☐ 0.00000	☐ 300.000	300.0	1.000	6000.00	☐ 20.0000
☐ VPHC	V3	☐ 114.000	☐ 126.000	120.0	1.000		☐ 7.00000
☐ IPHC	I3	☐ 0.00000	☐ 300.000	300.0	1.000	6000.00	☐ 20.0000
☐ VPHD	V4	☐ 0.00000	☐ 5.00000	12.00	1.000		☐ 7.00000
☐ IPHD	I4	☐ 0.00000	☐ 300.000	300.0	1.000	6000.00	☐ 20.0000
☐ NEUT	I5	☐ 0.00000	☐ 126.000	300.0	1.000	6000.00	☐ 10.0000

Ratio: This value is used when the unit is measuring the secondary of a step down voltage or current transformer. This value will be multiplied by the actual measured value the unit reads and records. This will allow the unit to record primary values.

CT Full Scale: This value should be set to the full-scale value of the current probe being used. Megger current probes actually output 0-1 volt. So a CP-6000CE probe being used measuring 3000A is outputting .5 volts to the unit. The unit reads this value and multiplies it by the CT full-scale value. So, if the CT full scale value is set to 6000.00 then the unit will record 3000.0 Amps.

THD Limit: If this is checked and a limit is set it will allow the unit to record Total Harmonic Distortion events. If the total harmonic distortion exceeds the user programmed percentage of the fundamental amplitude then a THD event will be recorded. This can be viewed in the out-of-limits report.

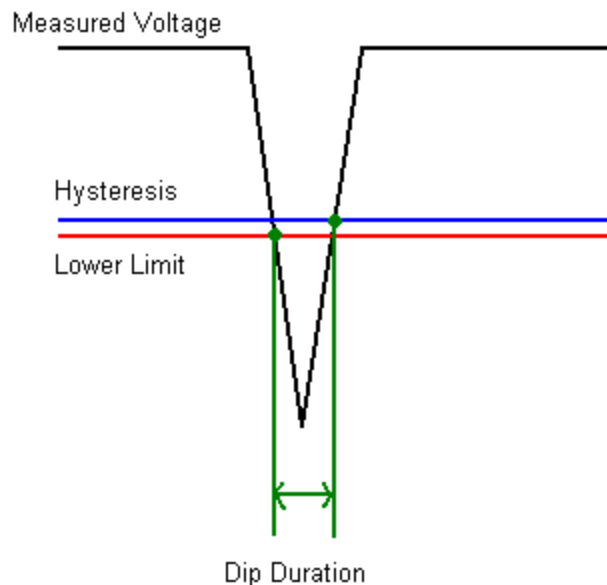
The Hysteresis Value can be set anywhere from 0 to 20% of the programmed Sag and/or Swell Limits

Hysteresis Value (Percentage of Limit) ☒ Enable Sub-Cycle Event Capture ☒ Enable Out of Limits Trending

Label	Channel	Sag Limit	Swell Limit	SubCycle Limit	Ratio	CT Full Scale	THD Limit %
☒ Va	V1	☒ 114.000	☒ 126.000	120.0	1.000		☒ 7.00000
☒ Ia	I1	☒ 0.00000	☒ 6000.00	600.0	1.000	6000.00	☒ 20.0000
☒ Vb	V2	☒ 114.000	☒ 126.000	120.0	1.000		☒ 7.00000
☒ Ib	I2	☒ 0.00000	☒ 6000.00	600.0	1.000	6000.00	☒ 20.0000
☒ Vc	V3	☒ 114.000	☒ 126.000	120.0	1.000		☒ 7.00000
☒ Ic	I3	☒ 0.00000	☒ 6000.00	600.0	1.000	6000.00	☒ 20.0000
☐ VPHD	V4	☒ 114.000	☒ 5.00000	12.00	1.000		☒ 7.00000
☐ IPHD	I4	☒ 0.00000	☒ 6000.00	600.0	1.000	6000.00	☒ 20.0000
☐ NEUT	I5	☒ 0.00000	☒ 126.000	600.0	1.000	6000.00	☒ 10.0000

Hysteresis: This setting allows the user to set a buffer between the trigger level that starts an event and the trigger level that ends an event. This value is a percentage based on the user programmed limit.

For example: If the lower limit is set to 100 VAC and the hysteresis is set to 2%, then an out of limit event will start when the voltage falls below 100 V. It will not end until the voltage rises above 102V. Hysteresis effects SAGS and SWELLS only.



Hysteresis Value (Percentage of Limit)		2		☒ Enable Sub-Cycle Event Capture		☒ Enable Out of Limits Trending	
Label	Channel	Sag Limit	Swell Limit	SubCycle Limit	Ratio	CT Full Scale	THD Limit %
☒ Va	V1	☒ 114.000	☒ 126.000	120.0	1.000		☒ 7.00000
☒ Ia	I1	☒ 0.00000	☒ 6000.00	600.0	1.000	6000.00	☒ 20.0000
☒ Vb	V2	☒ 114.000	☒ 126.000	120.0	1.000		☒ 7.00000
☒ Ib	I2	☒ 0.00000	☒ 6000.00	600.0	1.000	6000.00	☒ 20.0000
☒ Vc	V3	☒ 114.000	☒ 126.000	120.0	1.000		☒ 7.00000
☒ Ic	I3	☒ 0.00000	☒ 6000.00	600.0	1.000	6000.00	☒ 20.0000
☐ VPHD	V4	☒ 114.000	☒ 5.00000	12.00	1.000		☒ 7.00000
☐ IPHD	I4	☒ 0.00000	☒ 6000.00	600.0	1.000	6000.00	☒ 20.0000
☐ NEUT	I5	☒ 0.00000	☒ 126.000	600.0	1.000	6000.00	☒ 10.0000

Enable out of Limits Trending: This feature allows the user to program the unit to record the percentage of time the RMS data is within the user programmed limits.

7. Waveform Capture Setup

In order for the analyzer to record waveforms *Enable Waveform Capture* must be checked.

Waveforms can be captured in different modes, Exceedance Trigger by Event, Time or Cycles trigger or by THD trending.

Program Criteria	
RMS	
Waveform	
General	
Modem	
Frequency	

☒ Enable Waveform Capture

Capture Rate

☒ Exceedance Trigger

☐ Time

☐ Cycles

☐ THD Trending

☐ Enable TDD Trending

To perform TDD Trending, the THD Trending and Demand Recording must be enabled and their intervals set to either 15 or 30 minutes.

Pre-Trigger Cycles:

Post Trigger Cycles:

Expected # Of Events:

☒ Enable Waveform Capture Limit

Exceedance Trigger Mode: In this mode the unit will record a waveform on each enabled channel, whenever a limit is exceeded. The limits are programmed in the RMS screen of the set up file.

Waveform Capture Limit: Since waveform capture is memory intensive it can cause the recorder memory to fill prematurely. To avoid this a waveform capture limit can

be set. Input the "Expected # of Events", then check the waveform limit box. Waveform capture will turn off when this amount of waveforms have been captured. This feature is only enabled in the Exceedance Trigger mode.

Time Mode: In this mode the unit will capture a waveform on each enabled channel, once every time interval programmed. So if you select time and program in 0000:10:00, the unit will capture a waveform once every ten minutes. You can specify time in hr: min: or sec:

Cycle Mode: In this mode the unit will capture a waveform on each enabled channel, once every cycle interval programmed. If you select cycles and program in 10, the unit will capture a waveform once every ten cycles.

THD Trending: In this mode the unit will capture a 1 to 6-cycle waveform capture for every user selected time interval programmed. The software will then be able to trend both THD and Harmonics data based on this information. For multiple cycles the data will be averaged in the charts.

Program Criteria

RMS
Waveform
General
Modem
Frequency

☒ Enable Waveform Capture

Capture Rate

☐ Exceedance Trigger

☐ Time 0000:01:00

☐ Cycles 1

☒ THD Trending 0000:02:00

☐ Enable TDD Trending

To perform TDD Trending, the THD Trending and Demand Recording must be enabled and their intervals set to either 15 or 30 minutes.

Pre-Trigger Cycles: 2

Post Trigger Cycles: 5

Expected # Of Events: 10

☒ Enable Waveform Capture Limit

Up to 5 post triggers can be selected when waveform capture is set to "THD Trending". This allows the software to average together up to 6 cycles every storage interval to determine the Total Harmonic Distortion.

TDD Trending: Total Demand Distortion allows the user to trend THD referenced to peak RMS current drawn during the test recorded. TDD can be trended providing the following parameters are met.

THD trending must be enabled.

Demand Recording must be enabled.

The demand interval must be set to a fixed 15 or 30-minute window.

The number of cycles captured for each waveform capture can also be programmed into the unit providing THD trending is not selected.

Pre-Trigger Cycles: If an Exceedance Trigger Mode is being used then the unit can be programmed to capture a pre-trigger cycle. This would be the cycle before the actual cycle that caused the exceedance event.

NOTE: The unit can record up to 2 pre-trigger cycles.
--

Post Trigger Cycles: This will tell the unit how many cycles to capture after the triggering cycle.

So if the user programs in 1 pre-trigger cycle and 10 post-trigger cycles, the unit will capture 12 cycles each time a waveform capture occurs.

(1 Pre-trigger cycle + the trigger cycle + 10 post-trigger cycles)

NOTE: The unit can record up to 99 post-trigger cycles.
--

Expected # Of Events: If waveform capture is set to Exceedance mode then the number of waveforms captured will depend on how many times the inputs to the unit exceed their programmed limits.

The user can program in the expected number of events, then press the *CALCULATE* button in the software. This will show the user the length of time the unit will record if that number of waveform captures occur.

NOTE: This is only an <u>estimate</u> since it is calculated on expected number of events. This does not affect the unit's programming at all; it is just a tool so the user can estimate the length of time the unit will record.

8. General Screen Setup:

The screenshot shows a software window titled 'General Screen Setup'. On the left is a vertical list box labeled 'Program Criteria' with options: RMS, Waveform, General (highlighted), Modem, and Frequency. The main area on the right contains several configuration sections:

- Response Time (Cycles):** A dropdown menu set to '1'.
- Recorder Memory: (MB)** A dropdown menu set to '12'.
- Analyzer Tag:** An empty text input field.
- Memory Mode:** A section with two radio buttons: 'Stop When Full' (selected) and 'Wrap Around'. To the right of 'Stop When Full' is a checked checkbox labeled 'Enable Flash Automatic Transfers'.
- Default Frequency:** A section with two radio buttons: '50 Hertz' and '60 Hertz' (selected).
- Scheduled Run:** A section with a disabled checkbox 'Enable Scheduled Run'. Below it are three fields: 'Date:' set to '01/14/03', 'Time:' set to '3 PM' (with a dropdown arrow), and 'Length (In Hours):' set to '168'.

Response Time: This is the time interval that the analyzer uses to calculate an RMS value from all the samples of each cycle. Since the unit samples each cycle 256 times, if the response time is set to 1-cycle this means the unit will calculate a single RMS value every 256 samples. If the Response Interval is set to 10-cycles then the unit will calculate a single RMS value every 2560 samples.

Analyzer Memory: This should be set to the amount of memory your analyzer has. This is used by the software to calculate the analyzers maximum recording time.

NOTE: If you are using a Megger PA-9Series then this should be set to 12.

Analyzer Tag: This is an open field for the user to input a name if they choose.

Memory Mode Selections

Stop When Full: In this mode, the unit will stop recording and save all data when the memory fills up.

Wrap Around: In this mode, the unit will start writing over the oldest recorded data when the memory fills up and continue in this loop.

Enable Flash Automatic Transfer: If this is checked then the unit will automatically transfer recorded data from internal flash to external flash, once the internal flash has filled.

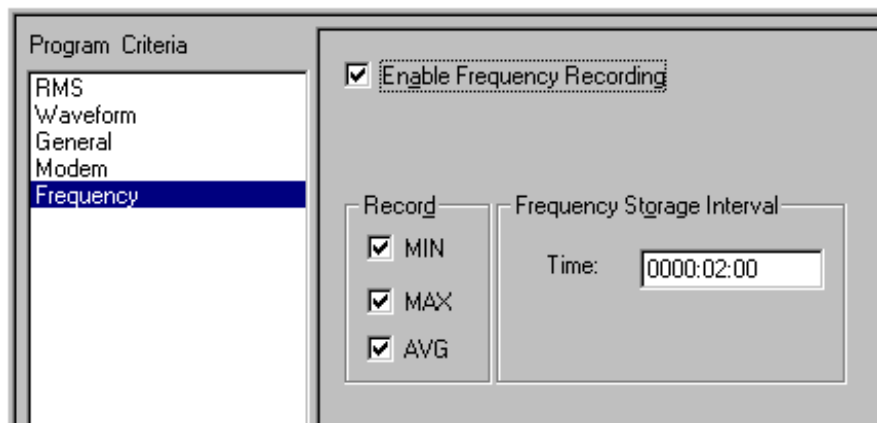
Frequency: This value should be set to line frequency being measured. If the input to the recorder drops below 25Hz then this is the frequency the phase lock loop will default to.

Enable Scheduled Run: If this is checked then the user can specify a start time to start recording.

Note: When scheduled run is selected the PA-9 Plus will automatically start recording when the real time clock in the unit reaches the start date and time programmed in the setup.

Scheduled Run Length (In Hours): If scheduled run mode is being used, the user can specify the number of hours required for recording time.

9. Frequency Setup Screen



The frequency setup screen will allow you to program the unit to record the frequency of the Phase A voltage input (Channel 1 Input).

Check on ENABLE FREQUENCY RECORDING to turn on frequency recording.

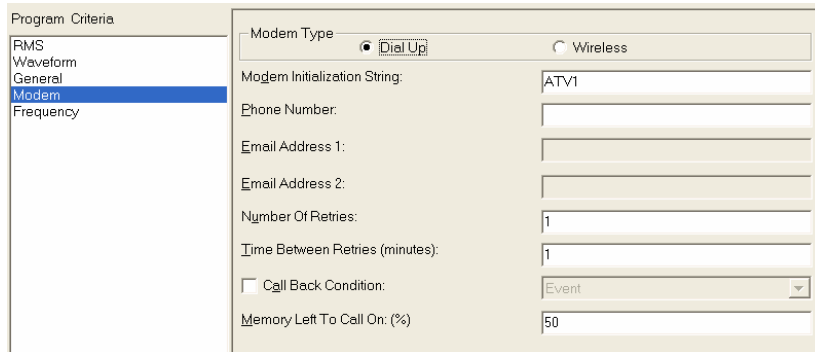
Select the desired FREQUENCY STORAGE INTERVAL (How often the measured frequency value will be recorded to memory).

Select the desired values to record (MIN, MAX and/or AVG).

The unit will then calculate the frequency for 5 cycles every cycle (a 5-cycle sliding window with a 1-cycle slide). The measured frequency will then be written to a temporary memory location. At the end of the user selected FREQUENCY STORAGE INTERVAL the unit will then write the minimum frequency, maximum frequency and average frequency that occurred during the interval, to memory.

10. Modem Screen Setup:

NOTE: This part of the setup only needs to be done if the unit has a modem and is required to call another modem over a phone line. If this is not required, go to Step 9



Select Dial UP or Series

For Dial up:

Modem Initialization String: This is the data string the unit uses to initialize the unit's modem. If the unit is using an internal modem then leave this as the default setting. If the unit is using an external modem, set this string to equal the modems initialization string. This can be found in the manual that came with the external modem.

For Dial up:

Phone Number: Input the phone number the unit is to call in case a call back condition occurs.

Email Address 1 and 2: Input the email addresses you want the Series to contact in the case of an event.

For Both:

Number of Retries: This is the amount of times the unit will attempt to call the phone number previously input, when a call back condition occurs.

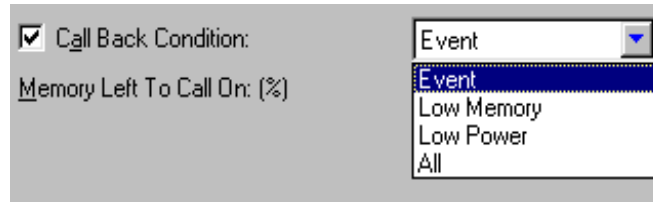
For example: If the number of retries is 3 then the unit will attempt to connect to the phone number input a maximum of 3 times. If the unit fails after 3 attempts it will abort the call back.

For Both:

Time Between Retries: The unit will wait this is the time interval between call back attempts. This number represents minutes.

For Both:

Call Back Condition: These conditions will trigger the unit to begin calling back. Check the *Call Back Condition* box to enable this option. The unit can call back on an Exceedance event, a low memory condition or a low power condition. If All is selected the unit will call back if any of the call back conditions are met.

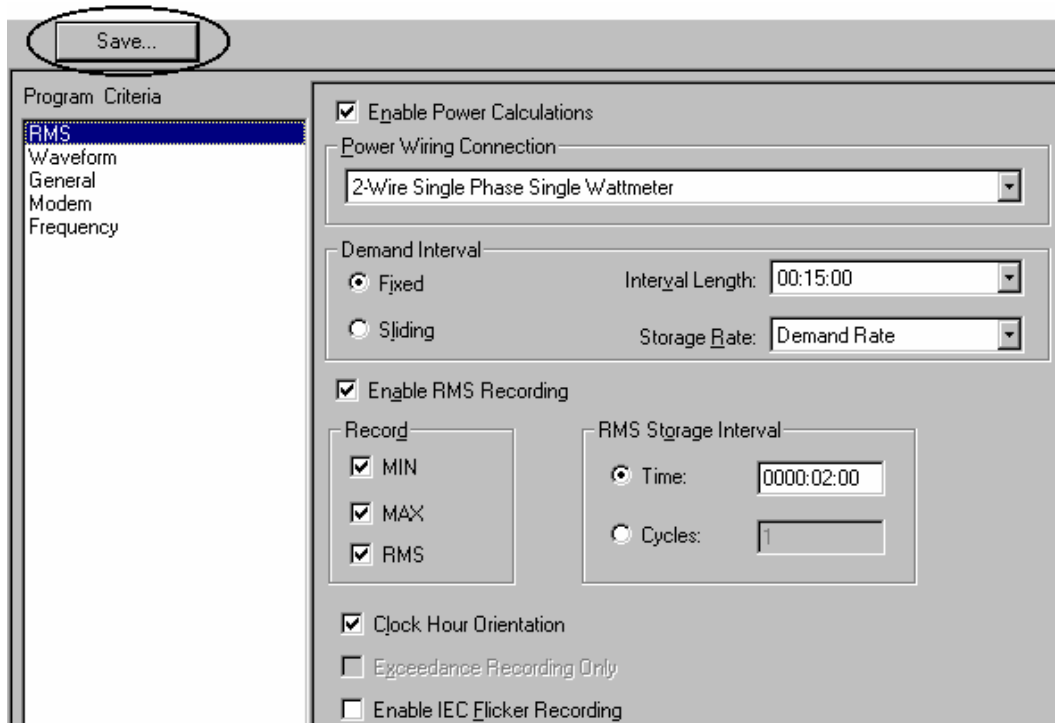


For Both:

Memory Left To Call On: This is the low memory call back threshold. When the amount of free memory in the unit drops below this amount the analyzer will call in.

11. **Saving a Setup File:** After a setup file is created it must be saved. The file can be saved by just clicking the *SAVE* button. A descriptive filename should now be assigned.

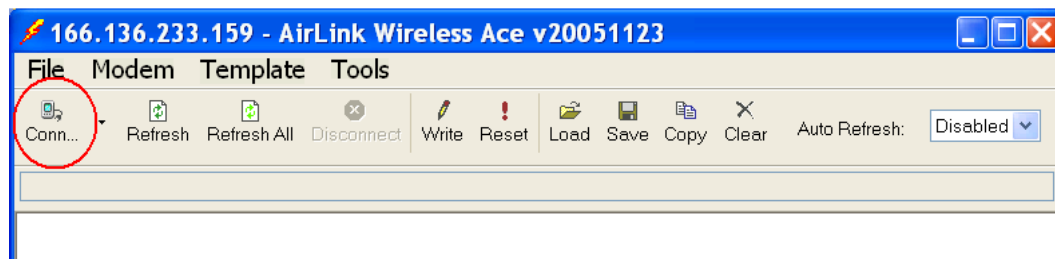
The software will then prompt the user to name the file. The file will then be saved in the setup folder.



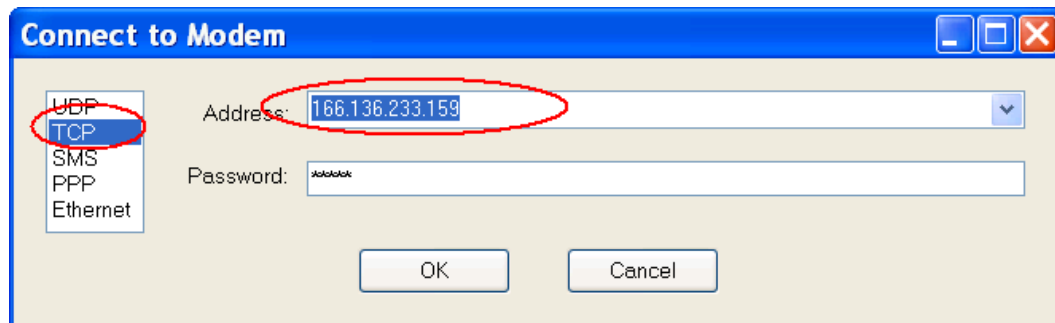
Raven Wireless Modem Setup Instructions

When you receive your Raven modem from the Verizon distributor it shall have the IP address already loaded. However the modem still needs to be configured for the PA9 Wireless. This is a simple process. Please follow the steps below.

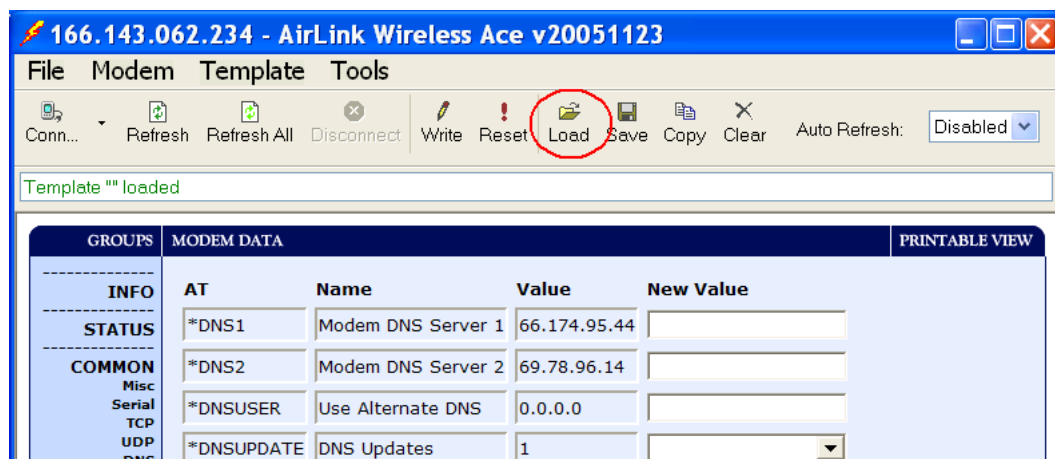
1. Connect your modem to the PA9 Wireless unit, but do not clip it into it's bracket yet.
2. Power up the PA9 Wireless unit. Verify the wireless modem powers up.
3. Install and Open the "Wireless ACE 3G" software supplied on the MegPa9IEC CD that came with the unit.
4. Verify you are on a computer that is connected to the internet.
5. Click on CONNECT in the software. A connect screen shall be displayed.



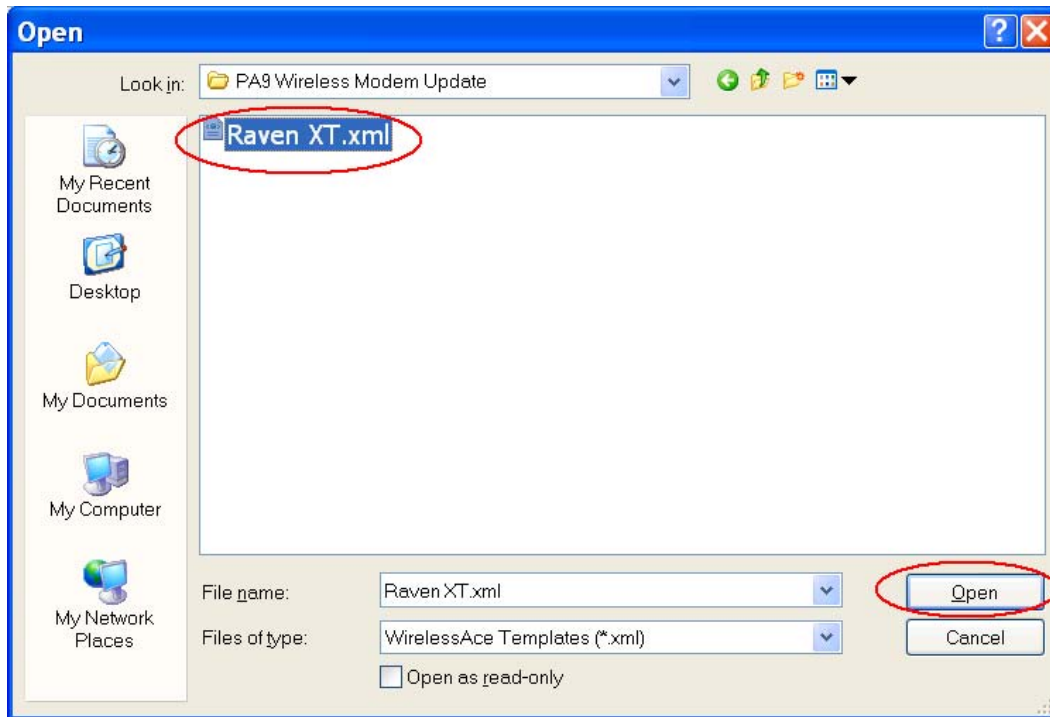
6. Select TCP and input the IP address supplied by the distributor then click OK.



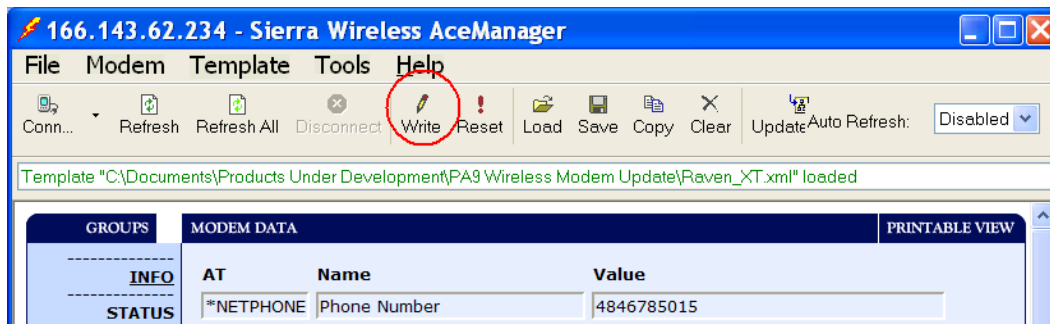
7. The software should now connect to the modem.
8. After the modem connects click on LOAD.



- Now select the file “Raven_XT.xml” which is available on the MegPa9IEC CD that came with the unit. Then click OPEN.



- Now click on WRITE.



- The software will now load the proper configuration for the Verizon modem service.

NOTE: This setup will allow the modem to perform all advertised functions except E-mail. If you wish the modem to send E-mails please perform the additional steps on the next page.

NOTE: Setting up SMTP for PA9 Wireless (Verizon)

You **must use** this setup, if you would like to use the email function for the PA9 wireless. You can try and use another email server other than Verizon, but you may run the risk of having the modem's IP address banned from these foreign email servers because they may interpret the email being sent as SPAM.

1. Go to the Internet and type in the address bar <http://www.verizonwireless.com>.
2. Under Manage My Account, click on Register.
3. Type in the modem phone number where it says [Please Enter Your Cell Number] and click Continue.

Verizon will attempt to text message the modem with the temporary password for your account. Unfortunately the Raven is not setup to receive a text message. You need to call Verizon Technical Support at 1-800-922-0204 and ask them to send a letter as soon as possible with the password for the account. Verizon **will only send the letter to the person whose name is on the account.**

Upon receipt of the letter:

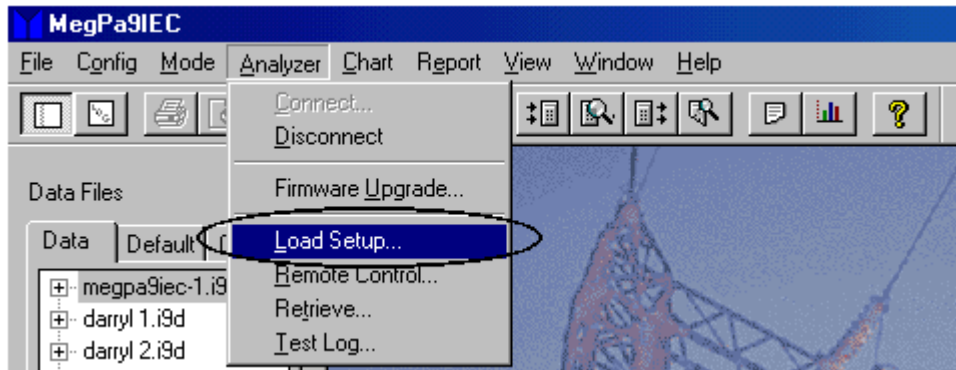
1. Go to the Internet and type in the address bar <http://www.verizonwireless.com>
2. In the User ID, type in the phone number of the modem and in Password type the password from the letter.
3. Verizon will now ask you to change the password to what ever you like it to be. Enter the new password twice and provide answer to one of the security questions that you select. Go to My Profile and make changes to your User ID that you would like to use for logging on your Verizon account for future use. Please write down the User ID and password somewhere safe. The password is **critical** for the SMTP setup. Signoff the Verizon account.

Run the ACE Manager program which can be found at

http://www.sierrawireless.com/support/show_support_and_downloads.aspx?id=19,32,1,1

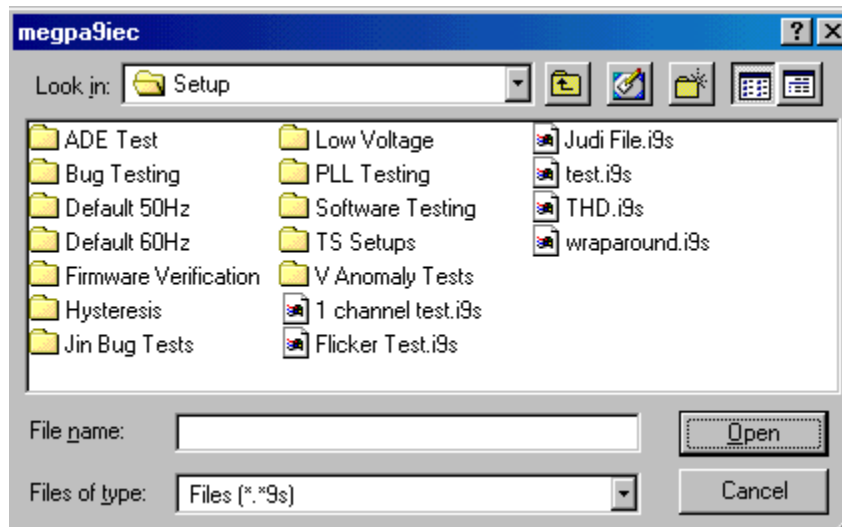
1. Click on Connect.
2. Select TCP and type in your modem's IP address and click OK.
3. Click on SMTP.
4. In *SMTPADDR box type [smtp.vzwmail.net].
5. In *SMTPFROM box type [phone number of the modem @vzwmail.net].
Example: 6108675309@vzwmail.net
6. In *SMTPUSER box type [phone number of the modem @vzwmail.net].
7. In *SMTPPW box type in the password of your Verizon account login.
8. Click on Write. Modem is now setup to send emails.

12. **Programming the unit:** After creating the new setup file and saving it, connect the unit to the computer. Verify the unit is powered on. Then click on *ANALYZER* then on *CONNECT*. Verify the unit connects to the computer. When the unit connects click on *ANALYZER* then on *LOAD SETUP*.



A setup file selection Window will now open.

Click on the *SETUP FILE* you wish to load into the unit then click on *OK*.

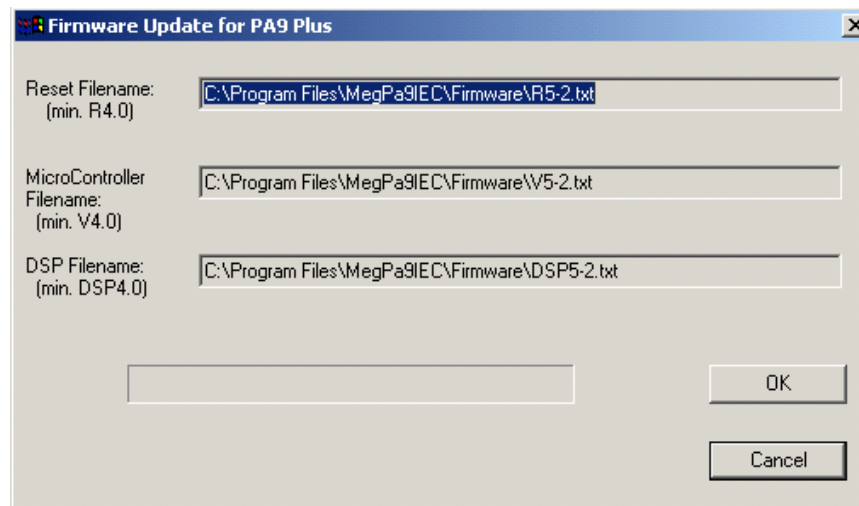


Upgrading Firmware in Analyzer

The MegPa9IEC software allows the user to upgrade the firmware in their PA-9 Series. The software will automatically read the hardware version of the analyzer and then install the correct firmware version. During a firmware upload the software will write new reset code, DSP code and Micro code to the analyzer. In order to upgrade the firmware in the unit, perform the following steps.

NOTE: Installing new firmware will cause the analyzer to lose any recorded data as well as any saved setup file.

1. Power the unit via Phase A or Auxiliary.
2. Connect the unit to a PC via the RS-232.
3. Verify the unit is NOT recording.
4. Execute the MegPa9IEC software
5. Click on CONFIG / COMMUNICATIONS
6. Set the COM port to the port in use
7. Set the baud rate to 115200
8. Click OK
9. Click on ANALYZER / CONNECT, the software should establish communication with the Analyzer
10. Click on ANALYZER / FIRMWARE UPGRADE, the following screen should be displayed.

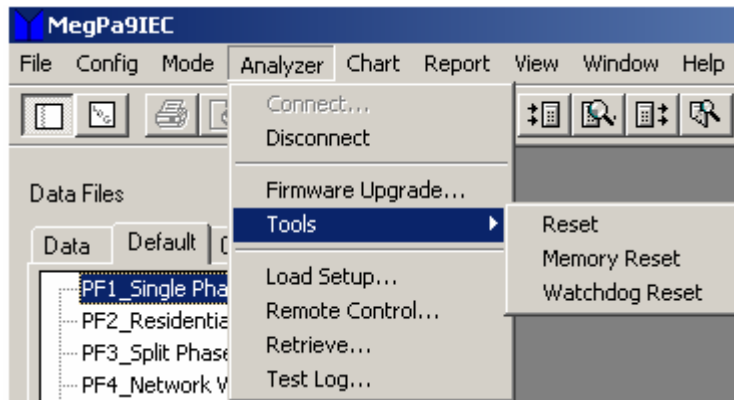


11. Click OK to start firmware upgrade.

NOTE: The software will only upgrade the firmware of PA-9 Plus or PA-9 Series units. If a PA-9 or other unit is connected then the software will display an error message to that effect.

Resetting the Analyzer

The MegPa9IEC software contains reset tools that will allow the user to reset the analyzer if any problems should occur. These reset commands are located under ANALYZER / TOOLS.



RESET

This reset command performs a cold start on the unit. It is the same as un-plugging the unit and waiting for it to power off. This command should be used if the unit stops responding.

MEMORY RESET

This reset command resets the memory in the unit. This command should be used if the unit is displaying the wrong memory size.

WATCHDOG RESET

This reset command resets a watchdog timer failure. This command should ONLY be used if a watchdog timer failure message appears on the screen of the unit. Contact customer service prior to performing this reset.

Get and View Test Data from the Analyzer

You may transfer the data from the analyzer to your computer where you can use Metrosoft® to analyze the test results and create hard copy charts and reports.

To get data from the analyzer:

1. From the Metrosoft® Main Window or click on *ANALYZER* then on *RETRIEVE*.

The following test identification form will appear:

Retrieve Data

Filename:

☐ Overwrite existing file
☐ Clear data after retrieval
☐ RECONNECT after data download.

File Information

Customer/Department:

Account/Meter Number:

Address:

City:

State:

Zip Code:

Phone Number:

Comments 1:

Comments 2:

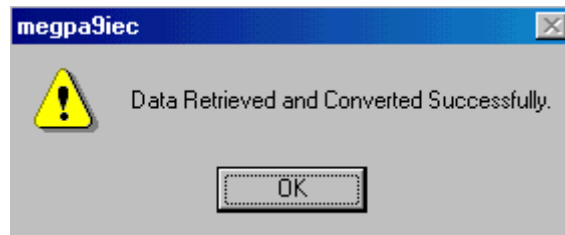
2. Select the downloading options you wish to use. You can overwrite existing data files, clear the data automatically in the analyzer after downloading it or reconnect to the unit automatically after downloading the data.

NOTE: If you do not choose to reconnect to the unit after downloading, then communications with the unit will be lost after the data is downloaded.

3. Enter information into any of the test identification fields as needed.

The information you enter will be assigned to the test data file and may later be used when searching for specific data files. The filename field *must* be filled in for data to be retrieved (see below for instructions). Filling in all other fields is optional. Metrosoft[®] supports long file names.

4. Connect the analyzer to the computer's serial port using the RS-232 cable.
5. Click on *RETRIEVE* to retrieve data. The analyzer will automatically turn on and as the data is transferred, Metrosoft[®] will display the progress of data being transferred and perform a checksum on each packet of data to ensure proper transmission. If desired, press the *CANCEL* button to abort data retrieval in progress. When data retrieval is complete, the following message will be displayed:



A complete data transfer may take a few minutes, depending upon the length of the test and the speed of your computer. It can take up to 45 minutes, with a analyzer that has 8 Meg of data.

The data is saved in the form of a binary data file, which Metrosoft[®] interprets to create reports and charts.

Transferring Files to and from a Compact Flash Card

The *MegPa9IEC* software allows the user to import data files from a Compact Flash card to the software's data folder. The software also allows the user to export setup files in the software's setup folder to a Compact Flash card.

Prior to transferring files to and from a Compact Flash Card, the drivers for the Compact Flash Reader must be installed into the computer. These drivers are not part of Metrosoft®. The drivers will be supplied with the Compact Flash Card Reader.

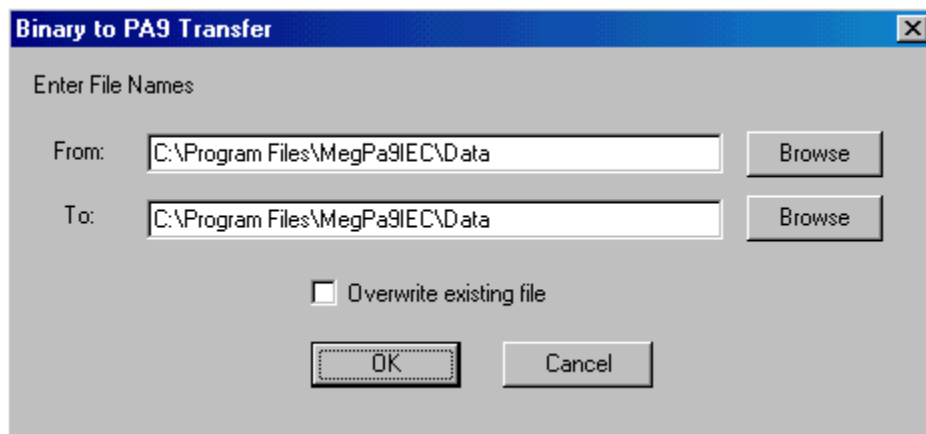
Verify the Compact Flash Card Readers Drivers are Installed Properly

1. Verify your computer is powered down.
2. Connect the Compact Flash Card Reader to the computer.
3. Boot-up the computer.
4. Install a Compact Flash Card into the Reader.
5. Open up Windows Explorer.
6. Verify that Windows Explorer can read any files that are present on the card.

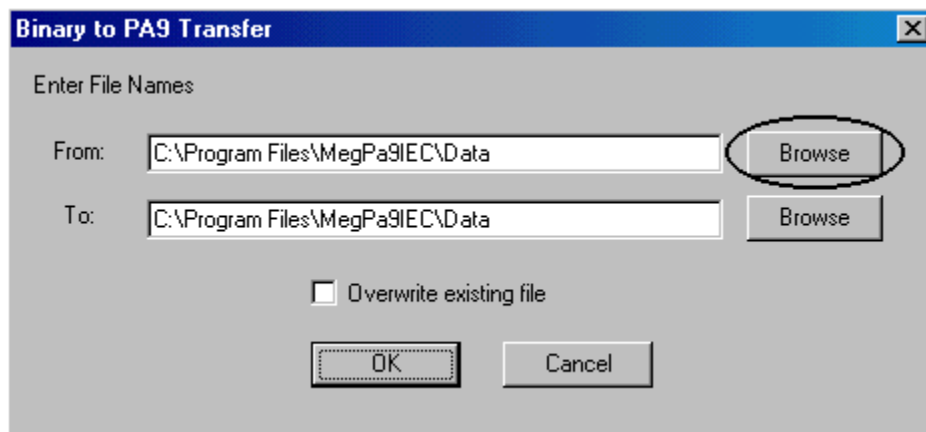
If Windows Explorer cannot locate the Compact Flash Card then the drivers may not be installed properly.

Importing a Data File from a Compact Card

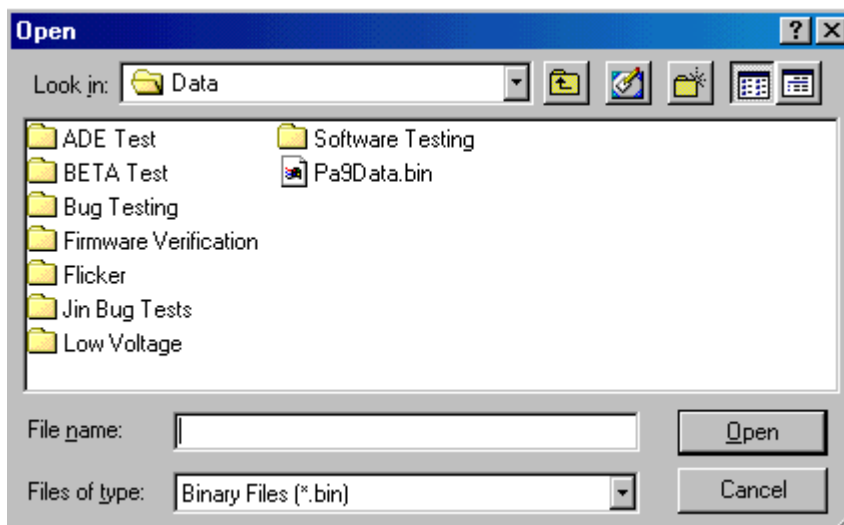
1. Verify your computer is powered down.
2. Connect the Compact Flash Card Reader to the computer.
3. Boot-up the computer.
4. Install a Compact Flash Card into the reader.
5. Open up *MegPa9IEC* software.
6. Click on *FILE*.
7. Click on *IMPORT*.
8. Click on *TRANSFER BINARY TO Megger PA-9*. The following Window will open.



9. Next to the *From* field, click on *BROWSE*.



This will open the following Window.



10. Set the *Look In* field to the Compact Flash Card.
11. Click on the *data file* to be imported.
12. Click on *OPEN*. This will return you to the Import Window.
13. Click on *OK* to import the file to the *MegPa9IEC* data folder. The file should then appear in the data file bar.
14. If you wish to rename the file or send the file to another location besides the *MegPa9IEC* data folder then click on *BROWSE* next to the *To* field.
15. A *Save As* Window will open. You can then set a new path or new name. When done click on *SAVE*. This will return you to the Import Window. Then click *OK*.

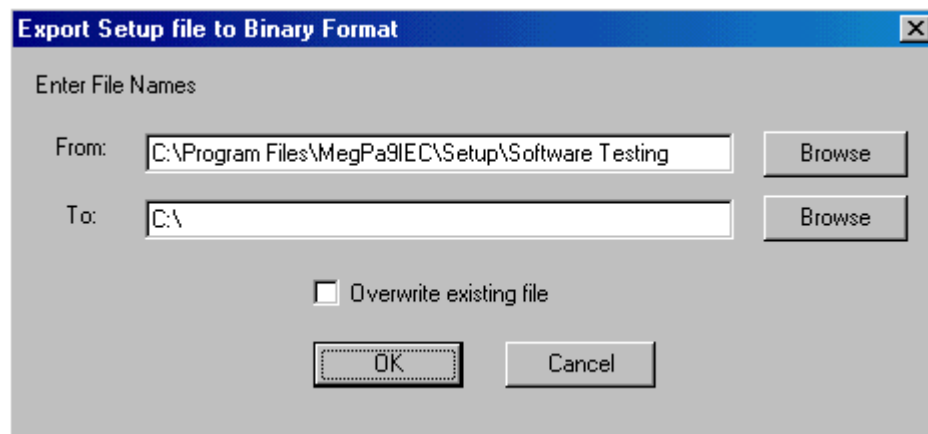
NOTE: The data file will NOT appear in the data file bar if a new path is set.
--

16. A user can also select to have the software overwrite a data file of the same name. To do this, just check the *OVERWRITE EXISTING FILE* box in the import screen.

NOTE: The old data file being overwritten will be lost.

Exporting a Setup File to a Compact Flash Card

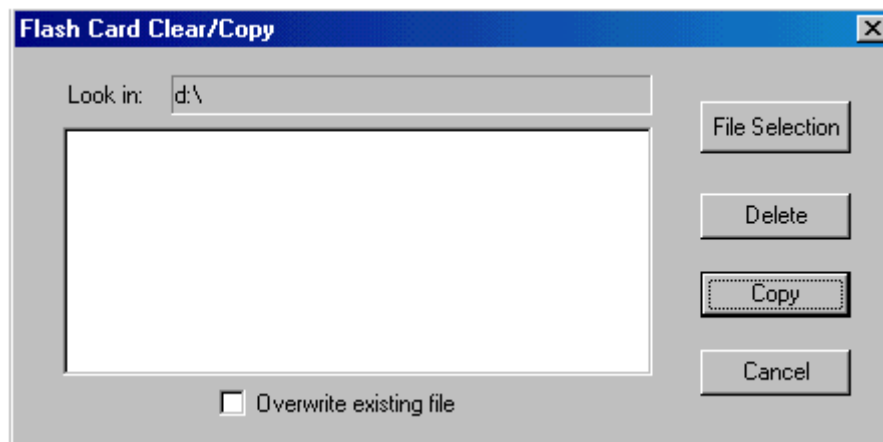
1. Verify your computer is powered down.
2. Connect the Compact Flash Card Reader to the computer.
3. Boot-up the computer.
4. Install a Compact Flash Card into the Reader.
5. Open up *MegPa9IEC* software.
6. Click on *FILE*.
7. Click on *EXPORT*. The following Window will open.



8. Next to the *From* field, click on *BROWSE*.
9. Select the *setup file you wish to transfer* to the Compact Flash Card. Then click *SAVE*. This will return you to the Export Screen.
10. Next to the *To* field, click *BROWSE*. This will open another *Save As* Window.
11. Set the path to the Compact Flash Card.
12. Verify the name of the setup file is correct.
13. Click *SAVE*, this will return you to the Export Window.
14. Click *OK*. The setup file will now be written to the Compact Flash Card.
15. A user can also select to have the software overwrite a setup file of the same name. To do this, check the *OVERWRITE EXISTING FILE* box in the export screen. **The old setup file being overwritten will be lost.**

Clearing or Copying a Setup file from the Compact Flash Card.

1. Verify your computer is powered down.
2. Connect the Compact Flash Card Reader to the computer.
3. Boot-up the computer.
4. Install a Compact Flash Card into the Reader.
5. Open up *MegPa9IEC* software.
6. Click on *FILE*.
7. Click on *CLEAR/COPY FLASH CARD*. The following Window will open.



8. Click on *FILE SELECTION*.
9. Set the path to the Compact Flash Card.
10. Select the *setup file* you wish to copy or delete. Then click *OPEN* this will return you to the Flash Card Clear/Copy Window.
11. If you wish to delete the file click on *DELETE*.
12. If you wish to copy the file click on *COPY*. Set the path and click *SAVE*. The Setup file shall then be written to the new location.
13. A user can also select to have the software overwrite a setup file of the same name. To do this, just check the *Overwrite Existing File* box in the export screen.
The old setup file being overwritten will be lost.

NOTE: The compact flash card cannot be formatted by the software. This must be done in the Analyzer.
--

Remote Operation

Metrosoft® allows you to use your computer to check the status of the analyzer, view the data in real-time, clear the test results, start and stop recording sessions, and reset the analyzer's real-time clock. This is especially useful if the analyzer is located in a place that is not easily accessible.

To remotely operate the analyzer:

1. Connect the analyzer to the computer with the RS-232 cable.
2. From the Metrosoft® Main Window, click on *ANALYZER* then on *REMOTE CONTROL*. The following remote operation window will appear:

The screenshot shows the 'Remote Control' window with the following sections:

- Recording Control:** Contains 'Start' and 'Stop...' buttons.
- Analyzer Information:** Displays 'Analyzer: PA9+', 'S/N: BETA 1', 'Hardware Version: 4.00', and 'Firmware Version: V5.0'.
- Analyzer Data:** Includes fields for 'Date/Time: 06-18-03 08:25:03', 'Recording Status: Not Recording', 'Storage Interval: Complete', 'Active Setup: DEFAULT', 'Data Status: Data Recorded', 'Demand Interval: Complete', and 'Elapsed Time: 0 Days 00:00:00'. It also shows 'Real Time Freq: 60.002'.
- Memory and Battery:** Shows 'Memory: 12 Mb 99 % Remaining' with a progress bar and 'Battery: 13.8 Volts Battery CHARGING' with a progress bar.
- Buttons:** 'Clear...', 'Settings...', 'Help', and 'Close' buttons are present.
- Test Results Table:** A table with tabs for 'Rms', 'Demand', and 'Events'. The 'Rms' tab is selected, showing a table with columns: Source, Voltage [V], Current [A], Power [W], and Secondary Voltage [V].

Source	Voltage [V]	Current [A]	Power [W]	Secondary Voltage [V]
Phase A	145.82	0.007K	-0.001M	146
Phase B	0.19	0.036K	0.000M	0.190
Phase C	2.72	0.039K	0.000M	2.72
Neutral	0.11	0.123K		0.110
Ground		0.008K		
Totals			-0.00	

See the following related topics;

Clearing Test Results Using the Analyzer

Start and Stop Recording

Setting Analyzer Password

Setting the Time Using the Analyzer

Deleting and Viewing Setup Files Using the Analyzer

Clearing Test Results at the Analyzer (Remote Operation)

To clear data from Metrosoft®;

Press the *CLEAR* button from the Remote Control Window

NOTE: If a password has been programmed into the analyzer then a screen asking for the password will be presented prior to clearing data.

Start And Stop Recording (Remote Operation)

To start the Analyzer recording from the remote control screen:

Press the *START* button from the Remote Control Window. Data recording will start.

Once recording has been activated, you may exit the Remote Operation Window and perform other Metrosoft® functions without affecting the recording session. You may even exit Metrosoft® and disconnect the analyzer from the computer without interrupting the recording session.

To stop the Analyzer recording from the remote control screen:

Press the *STOP* button from the Remote Control Window.

The analyzer will continue to display current readings even though recording has been stopped.

Advanced Remote Control Settings

The advanced remote control setting allows the user to perform the following tasks remotely.

- Set the Date and Time in the unit to match that of the computer.

- Install a Password into the Analyzer.

- Select a Voltage Devisor

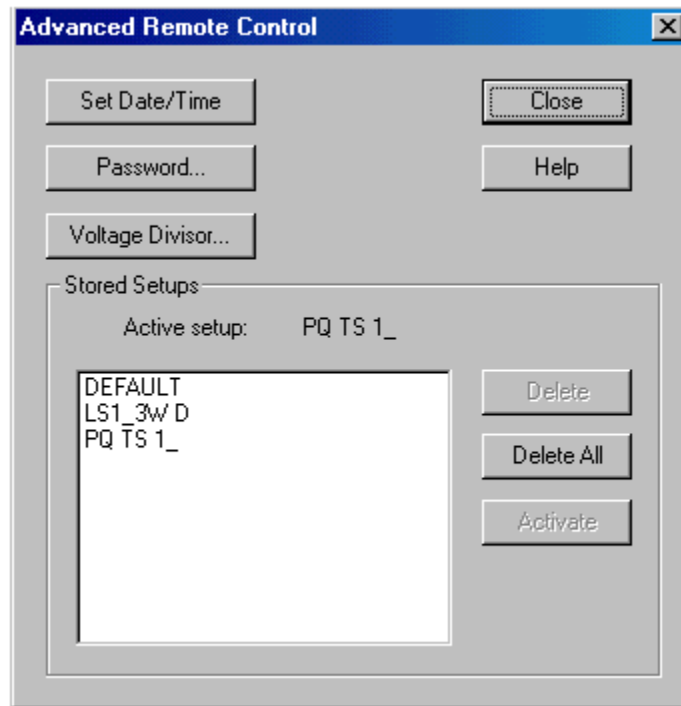
- Activate a different setup file that is saved in the unit.

- Delete setup files that are saved in the unit.

To open the Advanced Remote Control Screen perform the following:

Press the *SETTINGS* button from the Remote Control Window.

The following Window will appear.

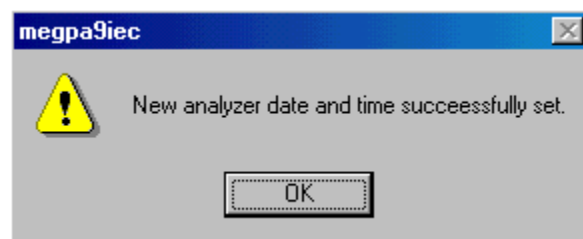


To Set the Time of the Analyzer from the Advanced Remote Control Screen

Metrosoft[®] automatically sets the analyzer's real-time clock to the current time of your PC when a setup file is sent to the analyzer. The real-time clock may also be reset while in the Advanced Remote Operation.

To reset the analyzers real-time clock:

Press the *SET DATE/TIME* button from the Advanced Remote Control Window. The analyzer's time clock will be reset to the time of your computer. The following confirmation message will appear on your screen:



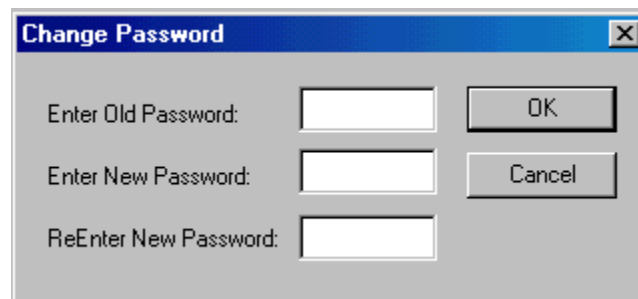
The analyzer's real-time clock is accurate to .005%, thus it should only need to be reset after long periods of time.

Installing a Password into the Analyzer from the Advanced Remote Control Screen

The password feature allows you to require the use of a password for clearing data from the Analyzer. This prevents unauthorized personnel from clearing data from the Analyzer. Set the password to 0000 if you do not wish to use the password feature. This is the default password setting from the factory.

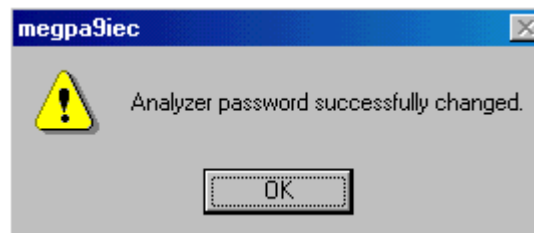
If you wish to change the password:

Click on *PASSWORD* in the Advanced Remote Control screen. The following Window will open.

A dialog box titled "Change Password" with a close button (X) in the top right corner. It contains three input fields: "Enter Old Password:", "Enter New Password:", and "ReEnter New Password:". To the right of the input fields are two buttons: "OK" and "Cancel".

Type in the old password, the new password, and confirm the new password. The password may be any 4 characters.

Press *OK* and the following confirmation message will appear:

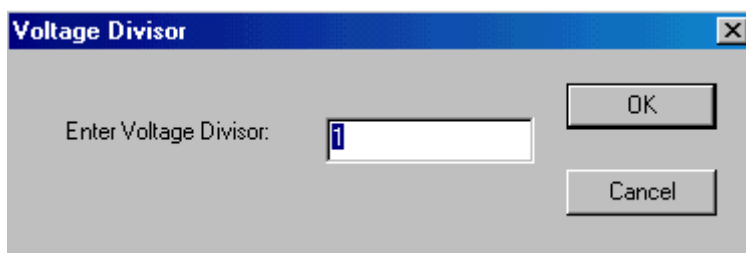


Setting Analyzer Voltage Divisor from the Advanced Remote Control Screen

When in remote operation, the primary (instantaneous) voltage values are displayed on the screen. The secondary voltage can also be displayed by simply entering a voltage divisor.

To enter the voltage divisor:

Press the *VOLTAGE DIVISOR* button from the Advanced Remote Control screen and the following prompt will appear on your screen:



Type the desired voltage divisor and press *OK* (you may enter any number from 1 to 9999). If the divisor is set to 1, only the primary voltage is displayed. If any divisor greater than 1 is entered, both the primary and secondary voltages are displayed.

Deleting Setup Files in the Analyzer from the Advanced Remote Control Screen

You can delete selected or all the set up files except the Default and the active setup file that are currently in the Analyzer.

To delete a specific setup file from the Analyzer click on the name of the setup file in the Advanced Remote Control Screen. This will highlight the file.

Then click on the *DELETE* button.

To delete all the setup files except the Default and the active setup file from the Analyzer click on the *DELETE ALL* Button.

Activating a Setup File from the Advanced Remote Control Screen.

To activate a new setup file first the data in the unit must be cleared. Then just highlight the setup file you wish to Activate and then click on the *ACTIVATE* button.

THE TEST LOG SCREEN

The test log screen allows the user to view recorded data that is in the Analyzer without having to download it. The user can view data, charts, out-of-limits events and their associated waveform captures. The user can then choose to download just the part of the data desired from that screen.

Opening a Test Log Screen

Click on *ANALYZER* then on *TEST LOG*.

NOTE: The unit must either be recording or have recorded data in it to activate a Test Log screen.

The following screen will appear:

The screenshot shows the 'Test Log' window with the following components:

- TEST #**: 1 of 1. Buttons: Prev Test, Next Test.
- Help** and **Close** buttons.
- Test Statistics**:
 - Start Date/Time: 06/18/03 08:56:48
 - End Date/Time: 06/18/03 09:07:48
 - Duration: 0 Days 00:11:00
 - Power Measurement Method: 2-Wire Single Phase Single Wattmeter
 - Power Lost: na
 - Power Restored: na
 - Last Stopped by: Normal - Local
 - RMS Intervals: 659
 - Demand Intervals: 10
 - Waveforms: 11
 - Freq Intervals: 659
- View** section:
 - Buttons: Overall RMS, Overall Power, Frequency, Event Log.
 - Retrieval** section: Set Start Time, Set Stop Time, Retrieve.
 - Chart** and **Copy** buttons.
 - Trace 1**: Va MIN. **Trace 2**: Va RMS.
- Event Log**:

1	6/18/03 9:04:37 AM	Sag on Va
2	6/18/03 9:04:37 AM	Sag on VPHB
3	6/18/03 9:04:37 AM	Sag on VPHC
4	6/18/03 9:04:49 AM	Swell on Va
- Waveform Log**:

1	6/18/03 8:57:48 AM	Time
2	6/18/03 8:58:48 AM	Time
3	6/18/03 8:59:48 AM	Time
4	6/18/03 9:00:48 AM	Time
- Overall RMS Report** (highlighted):

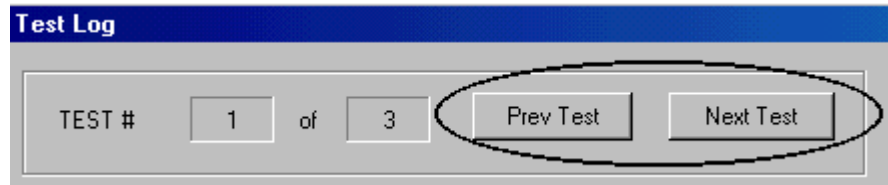
From: 06/18/03 08:56:49.010
To: 06/18/03 09:07:48.010

Trace	Parameter	Value	Date/Time
Va	MIN:	100.0V	06/18/03 09:04:39.620
	RMS:	120.6V	
	MAX:	145.9V	06/18/03 09:04:50.420
Ia	MIN:	0.008KA	06/18/03 08:58:18.260
	RMS:	0.008KA	
	MAX:	0.011KA	06/18/03 09:01:11.135
VPHB	MIN:	99.6V	06/18/03 09:04:39.620
	RMS:	120.1V	
	MAX:	145.3V	06/18/03 09:04:50.420
VPHC	MIN:	7.3V	06/18/03 09:07:34.690
	RMS:	120.6V	
	MAX:	146.0V	06/18/03 09:04:50.420

Selecting a Test to View

The analyzer that is being polled may contain multiple tests.

To select the test data you wish to view, click on the *NEXT TEST* button to scroll forward through the tests. Click on the *PREV TEST* button to scroll back through the tests.

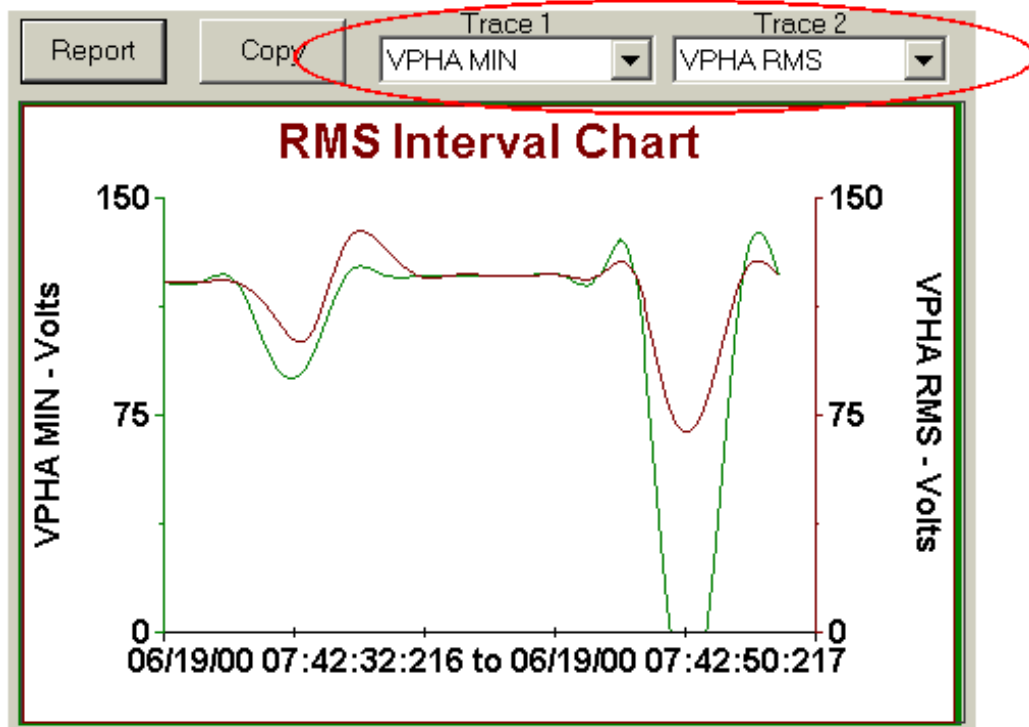


Viewing Data from the Test Log Screen

In order to view various data in the Analyzer click on the button of the data you wish to view. The user can view RMS data, Power data, Out-of-Limits Events data or Waveform Capture data.

Viewing RMS Data: To view RMS data in the analyzer click on the *OVERALL RMS* button. The data can be viewed as either text or as a plot. The text data will display the Minimum, Maximum and Average RMS values for each channel enabled. The plot will display minimum, maximum and average RMS traces for any 2 channels selected.

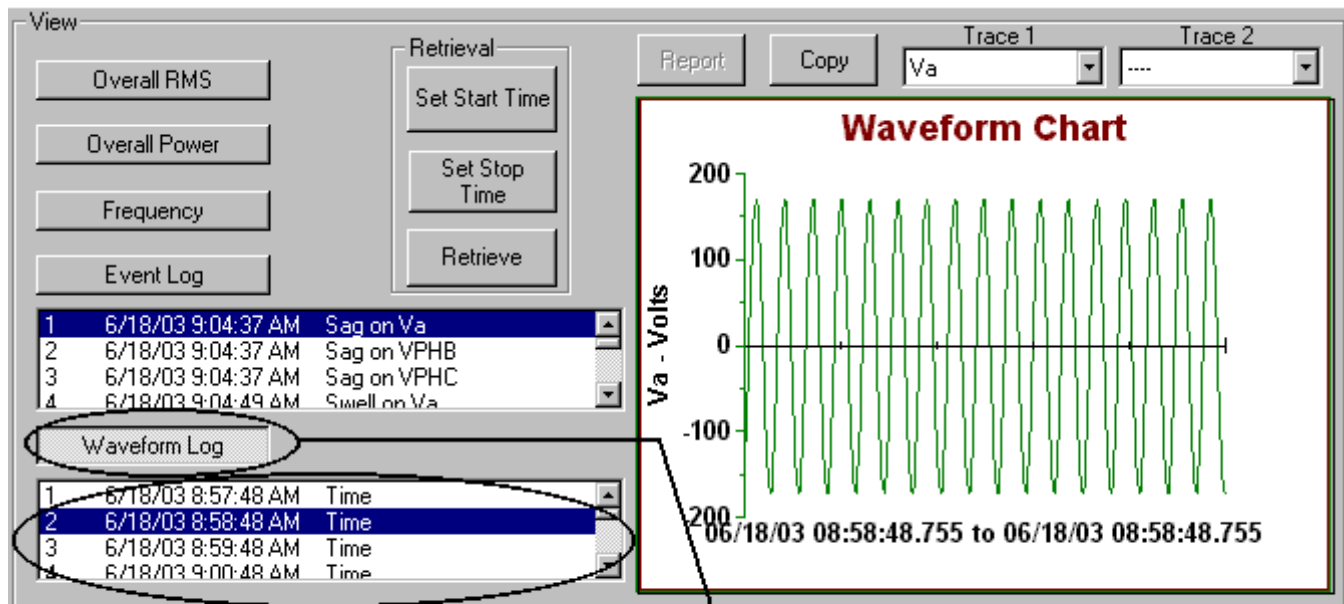
If a plot is being displayed then a button will be active called *Report*. Click on the *REPORT* button to display overall RMS text. If text is being displayed then a button will be active called *Chart*. Click on the *CHART* button to create a plot. After the plot is created then the user can select which channels to view by clicking on the *UP/DOWN ARROW* in the channel selection field. This will display a drop-down window. The user can select the trace to view from the menu. The test log chart will display 2 traces.



Viewing Demand (Power) Data: To view Demand data in the Analyzer click on the *OVERALL POWER* button. The data can be viewed as either text or as a plot. The text data will display the minimum, maximum and average demand values for each channel enabled. The plot will display minimum, maximum and average demand traces for any 2 channels selected.

If a plot is being displayed then a button will be active called *Report*. Click on the *REPORT* button to display overall RMS text. If text is being displayed then a button will be active called *Chart*. Click on the *CHART* button to create a plot. After the plot is created then the user can select which channels to view by clicking on the *UP/DOWN* arrows in the channel selection field. The test log chart will display 2 traces.

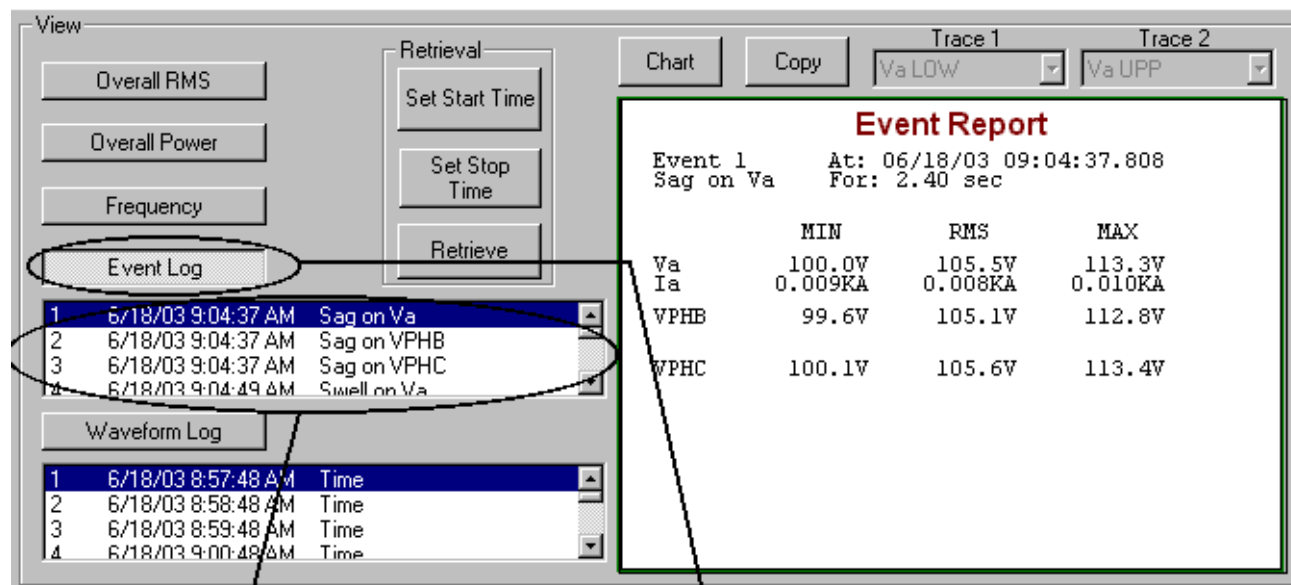
Viewing Waveform Capture Data: To view Waveform Capture data in the Analyzer first highlight the waveform event of interest then click on the *WAVEFORM LOG* button. The data can be viewed as a plot only. To view another waveform capture, just click on that event.



Select the Waveform Event of interest

Then click on "Waveform Log"

Viewing Out-of-Limits Event Data: To view out-of-limits event data in the analyzer first highlight the out-of-limits event of interest then click on the *EVENT LOG* button. The data can be viewed as text only. To view another out-of-limits event, just click on that event.



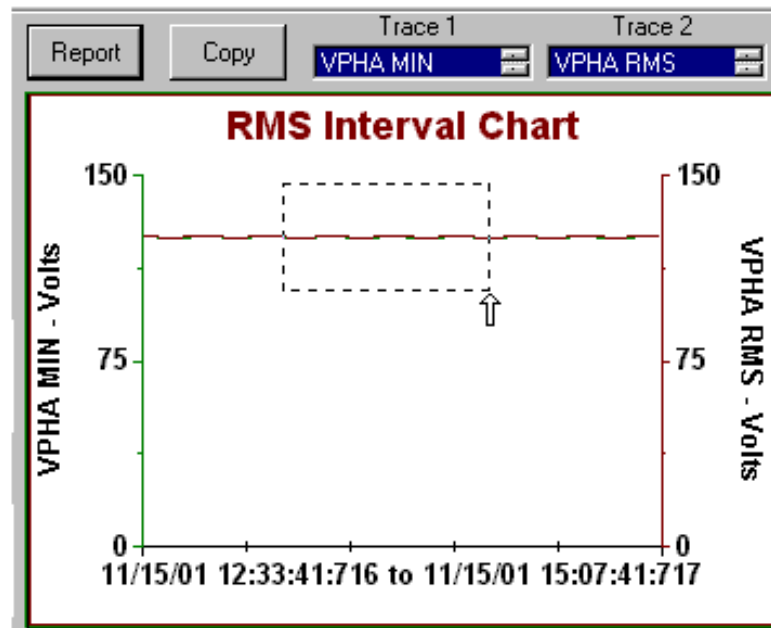
Select Out of Limit event of interest

Then click on "Event Log"

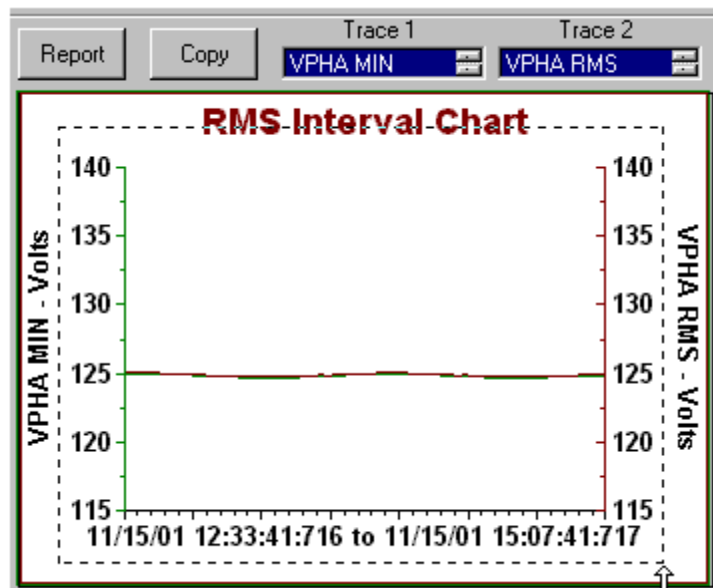
NOTE: When the Event Log button is depressed the software will automatically highlight the waveform capture that is associated with the out-of-limits events that the user selects.

Zoom-in and Zoom-out on the Test Log Screen: When a plot is displayed on the Test Log screen, the user has the ability to zoom-in and zoom-out of the plot.

To *zoom-in* on a trace, click and hold down the right mouse button. Then using the mouse, drag a box around the section of the trace of interest. When the right mouse button is released, the software will zoom-in to the section of the trace that has been selected.

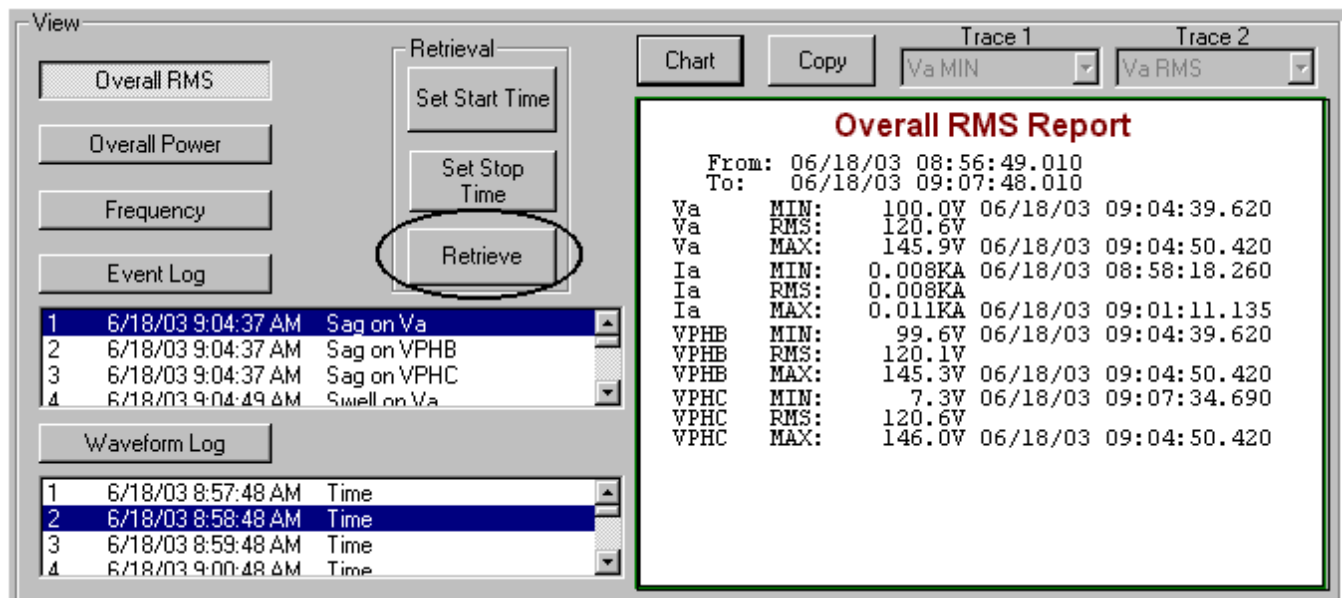


To zoom-out of a trace, click and hold down the right mouse button. Using the mouse, drag a box around the entire trace. When the right mouse button is released, the software will zoom-out.



Retrieving Partial Data from the Analyzer using the Test Log Screen: The Test Log screen allows the user not only to view the data in the Analyzer without downloading, it also allows the user to download only the information that is needed. The Test Log screen allows the user to download either the RMS Data, Demand Data, Out-of-limits Event Data or the Waveform Capture Data. The user can also download the entire data file from the Test Log screen.

In order to download data from the Analyzer using the Test Log screen the user must first click on the *RETRIEVE* button.



This will open the Partial Download Screen.

Now the user can select the start and stop time of the data to be downloaded. The software defaults to the start and stop time of the entire test.

Retrieve Partial Data

Filename:

Segment

☐ Retrieve the complete test Test #: 1

From: Date Time

To: Date Time

Include Data

☐ RMS

☐ Demand

☐ Event

☐ Waveform

File Information

Customer/Department:

Account/Meter Number:

Address:

City:

State:

Zip Code:

Phone Number:

Comments 1:

Comments 2:

To download data perform the following:

1. Select *the data to be downloaded*, RMS, Demand, Event, Waveform or any combination. If the entire data file is desired, check *Retrieve the Complete Test*.
2. Fill in any customer file information that is desired.
3. Click the *RETRIEVE* button.

The software will now download only the data that is desired.

Searching For and Retrieving Stored Test Data

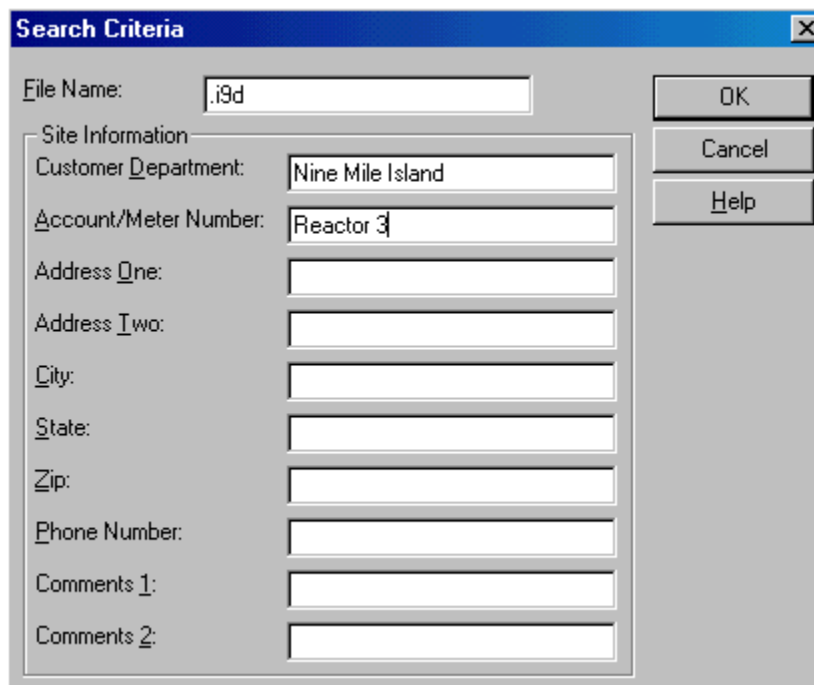
Once you have transferred data from the analyzer to Metrosoft[®], you can retrieve these data files and begin your analysis.

Searching For Data Files

Metrosoft[®] lets you list all the data files that have been stored in the user selectable data folder, or you can tell Metrosoft[®] to search for specific files according to a set of search criteria you specify. Metrosoft[®]'s ability to perform database searching is a great time saving feature, since only the files you are interested in will be listed.

When the data was transferred from the analyzer to the computer, you entered information into test identification fields. You may perform a search based on the information you entered into any or all of the fields that appear in the example below.

1. To bring up the Search Criteria dialog box, choose the *Search Criteria* item from the File Menu.
2. To ensure your search criteria are being used by the Side Bar, make sure the *Use Search* checkbox that appears at the bottom of the side bar is checked.
3. To display all data files in your data directory, disable filtering by Search Criteria by un-checking the *Use Search* checkbox that appears at the bottom of the side bar.



You only need to fill in the fields that are necessary to distinguish the data files you are interested in; all other fields may be left blank. Searches are not case sensitive, thus it does not matter whether you use upper or lower case letters when filling in the search criteria form.

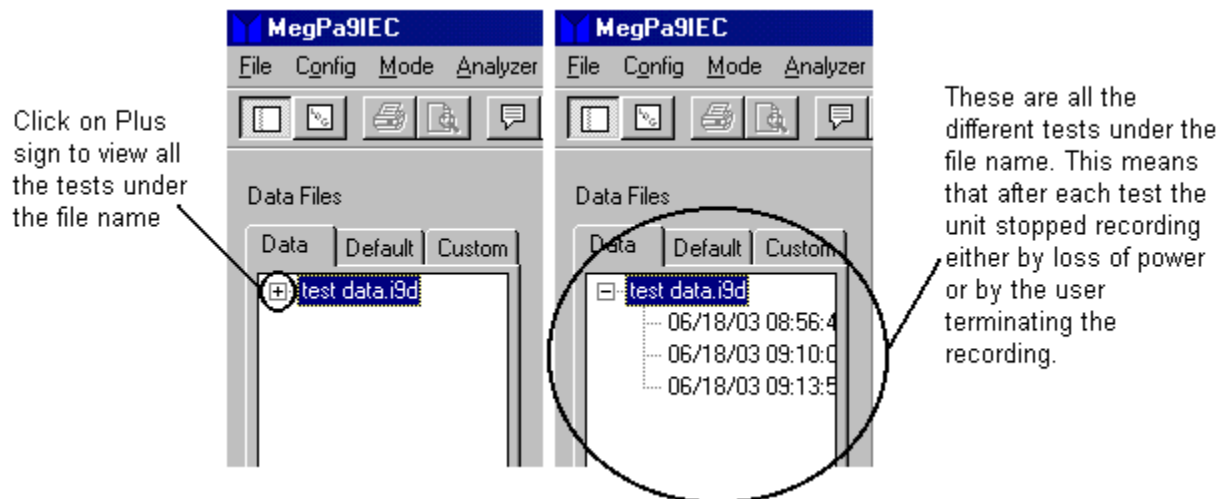
Creating a Chart Using Metrosoft®

Select the Desired Test to be Charted

Multiple Tests Under One File Name

When a unit is recording and the voltage drops below 90VAC for a few minutes the unit will stop recording and go into a standby mode. When the voltage goes above 90VAC, the unit will start recording again. However, the unit will store the recorded data as another test. When the unit is downloaded, all the tests will be downloaded under a single file name.

To view the number of tests under each file name click the *PLUS* (+) sign in front of the file name.



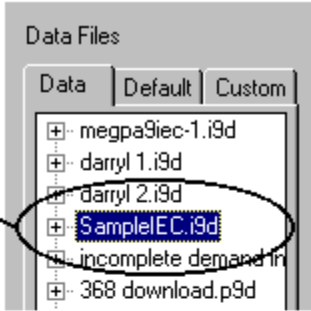
Viewing File Information

File information will allow the user to view any input customer information, the date the test started, the date the test ended, the total number of intervals in the test and the total number of waveform captures in the test.

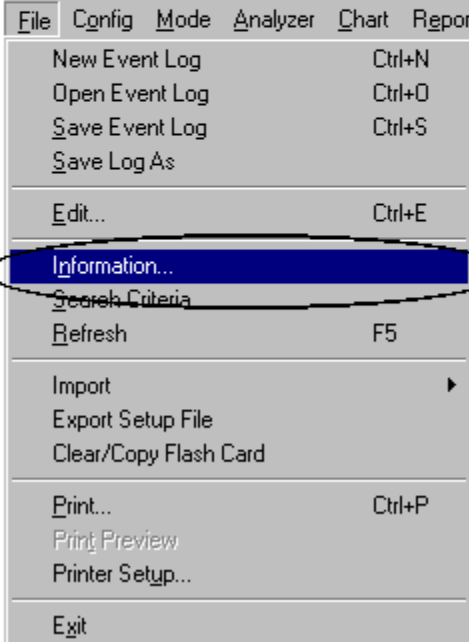
To view this information do the following.

1. Highlight the desired data file in the data file bar.
2. Click on *FILE*.
3. Click on *INFORMATION*.

First highlight the desired data file in the data file bar.



Then click on "FILE" then click on "INFORMATION"



File Information - SampleE...	
Customer/Department	Megger
Account/Meter Number	0000-0000-001
Address 1	2621 Van Buren Ave
Address 2	
City	Norristown
State	PA
Zip	19403
Phone Number	610-676-8519
Comment 1	Test Data File
Comment 2	
RMS Response Time	1 cycle(s)
RMS Storage Interval	00:00:01
Demand interval length	00:00:01
Waveform Capture Rate	By Event
Test 1 Information	
RMS Test Started	06/19/00 07:42:32
RMS Test Ended	06/19/00 07:42:50
Demand Test Started	06/19/00 07:42:32
Demand Test Ended	06/19/00 07:42:50
Total RMS Intervals	18
Total Demand Intervals	18
Total Waveform Captures	5

To create a chart, do the following:

1. Highlight the desired test in the data file bar.
2. Click on *CHART*.
3. Click on *CREATE*.
4. Fill out the chart setup as desired.
5. Then click on *CREATE*.

Create Button - Generates Chart

Highlight either RMS, Demand, Imbalance, Waveform, THD, Harmonics or TDD depending on the type of chart you wish to create.

Chart Title - In this location you can enter a label. This will appear on the chart and on the print out.

From to Time - This is the start and end time of the chart. This is user selectable.

Major Tick Interval - This lets the user know the amount of time between the vertical grid lines in the generated chart. This is non-user selectable, it is a function of the start and stop times.

Trace	Y Axis MIN	Y Axis MAX	Line Color	Line Type
☒ Va MIN (Volts)	☐ 000000	☐ 140.0		Solid
☒ Va RMS (Volts)	☐ 000000	☐ 140.0		Solid
☒ Va MAX (Volts)	☐ 000000	☐ 140.0		Solid
☒ Ia MIN (Amps)	☐ 000000	☐ 000000		Solid
☒ Ia RMS (Amps)	☐ 000000	☐ 000000		Solid
☒ Ia MAX (Amps)	☐ 000000	☐ 000000		Solid
☒ Vb MIN (Volts)	☒ 000000	☒ 140.0		Solid
☐ Vb RMS (Volts)	☒ 000000	☒ 140.0		Solid

To plot a specific channel just click the check box next to the traces title. If the check is present this channel will plot. If the check is not present then the channel will not plot.

Y-axis MIN and Y-axis MAX - Allows the user to manually set the Y-axis range of the chart. If the boxes are not checked then the software will auto scale that channel. If the boxes are checked then the software will use the user input min and max values, next to each checks as the the Y axis scale

Line Color - This allows the user to select the line color of each trace.

Line Type - This allows the user to select either a solid or a dashed line for the trace.

Trace	Y Axis MIN	Y Axis MAX	Line Color	Line Type
☐ Ia Current (RMS)	☐ 000000	☐ 000000	Green	Solid
☐ Va Voltage (RMS)	☐ 000000	☐ 000000	Blue	Solid
☒ Va KW	☐ 000000	☐ 000000	Black	Solid
☒ Va KVAR	☐ 000000	☐ 000000	Red	Solid
☐ Va KVA	☐ 000000	☐ 000000	Black	Solid
☐ Va KWH	☐ 000000	☐ 000000	Black	Solid
☐ Va KVAH	☐ 000000	☐ 000000	Black	Solid
☐ Va KVARH	☐ 000000	☐ 000000	Black	Solid

When generating a waveform chart the user can choose which waveform capture to view by clicking on the down arrow to drop down all the waveform event numbers. Then just double click on the desired waveform number.

The date and time next to the selected waveform number lets the user know when this waveform was captured by the unit.

Trace	Y Axis MIN	Y Axis MAX	Line Color	Line Type
☒ Va (Volts)	☐ 000000	☐ 000000	Blue	Solid
☐ Ia (Amps)	☐ 000000	☐ 000000	Red	Solid
☐ Vb (Volts)	☐ 000000	☐ 000000	Green	Solid
☐ Ib (Amps)	☐ 000000	☐ 000000	Light Blue	Solid
☐ Vc (Volts)	☐ 000000	☐ 000000	Black	Solid
☐ Ic (Amps)	☐ 000000	☐ 000000	Black	Solid

6. To view the scale for various traces on the chart just click the *RIGHT AXIS* or *LEFT AXIS* buttons. The *label* and *scale* on the right or left axis will then scroll showing the scale for the different traces.

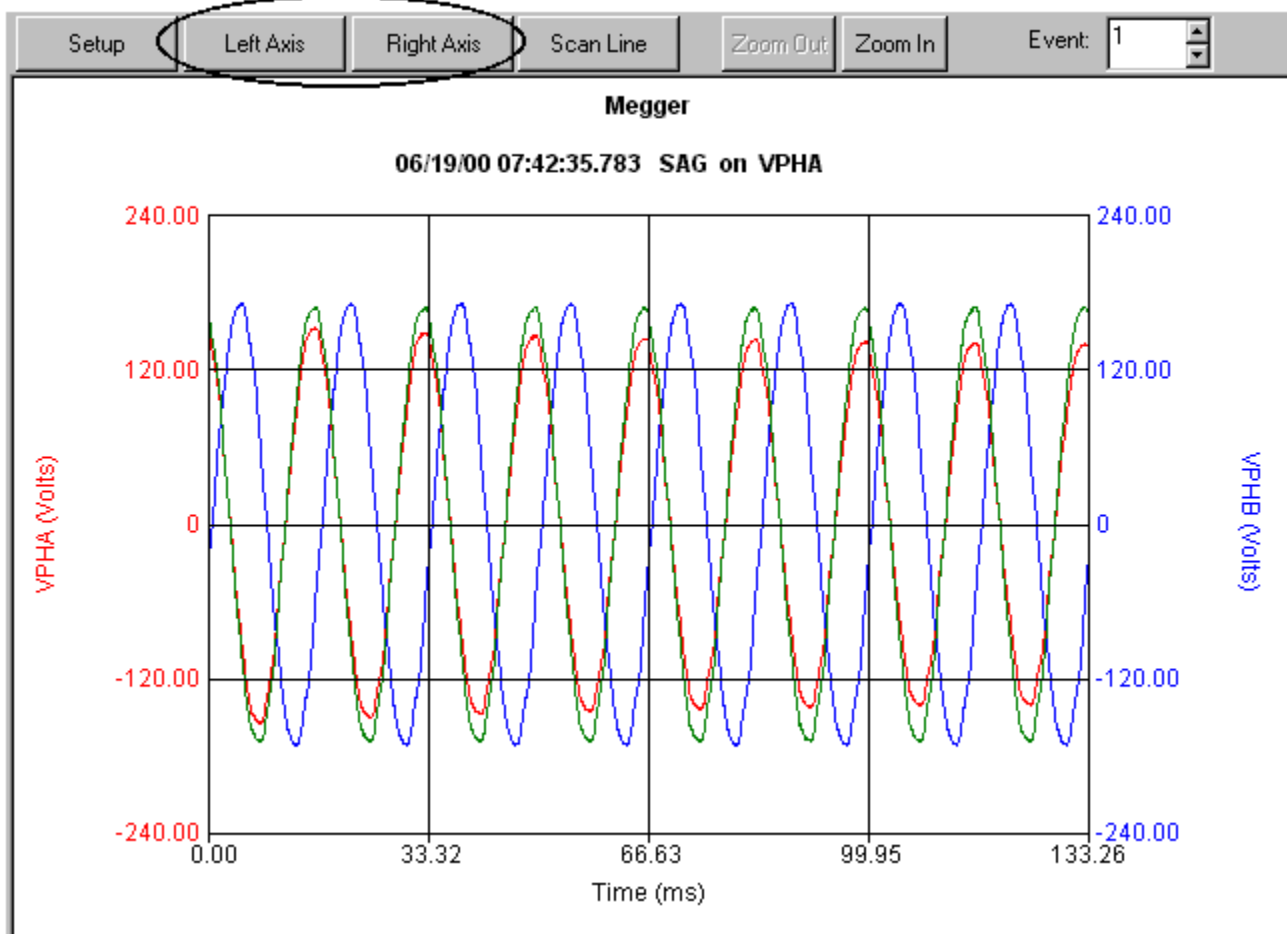


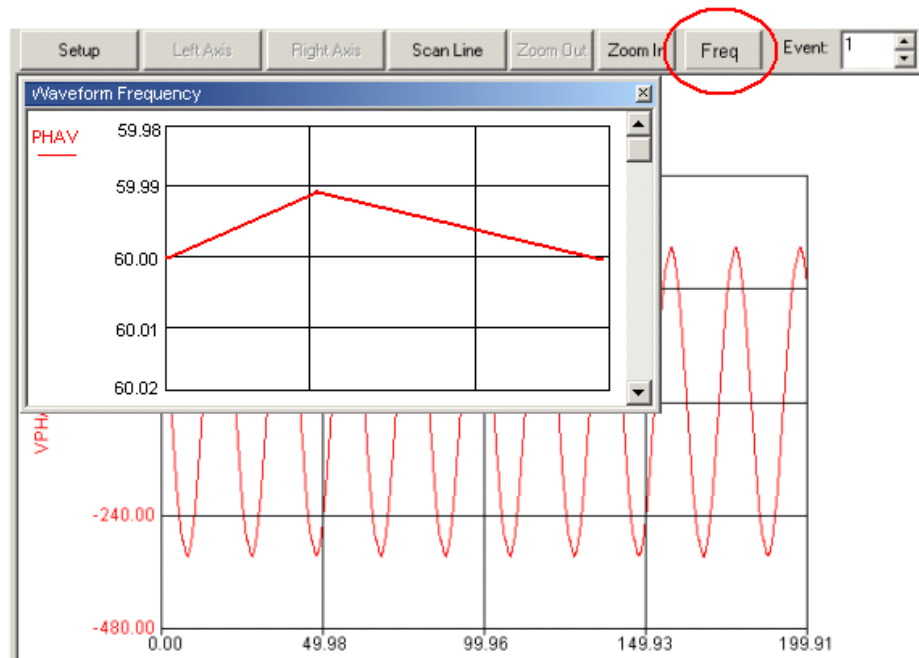
Chart Types:

MS: This chart allows the user to trend the recorded RMS values of each interval. These may include Minimum values of each interval, Maximum values of each interval and / or the Average (RMS) values of each interval.

Demand: This chart allows the user to trend the recorded Power and / or Energy values of each Demand interval. These may include KW, KVAR, KVA, DPF, TPF, KWH, KVARH and / or KVAH.

Waveform: This chart allows the user to trend the recorded waveform captures. For Motor start up / Generator start up applications the user can also trend the Frequency of each individual waveform capture.

The frequency of any captured waveform can be trended by clicking on the **FREQ** button in the waveform chart.



This will allow the user to see the frequency ramp up of motor and generator start-ups. A minimum of 3 cycles of waveform data is required.

Frequency: This chart allows the user to trend the recorded Fundamental Frequency values of each Frequency interval. This may include Minimum Frequency values of each

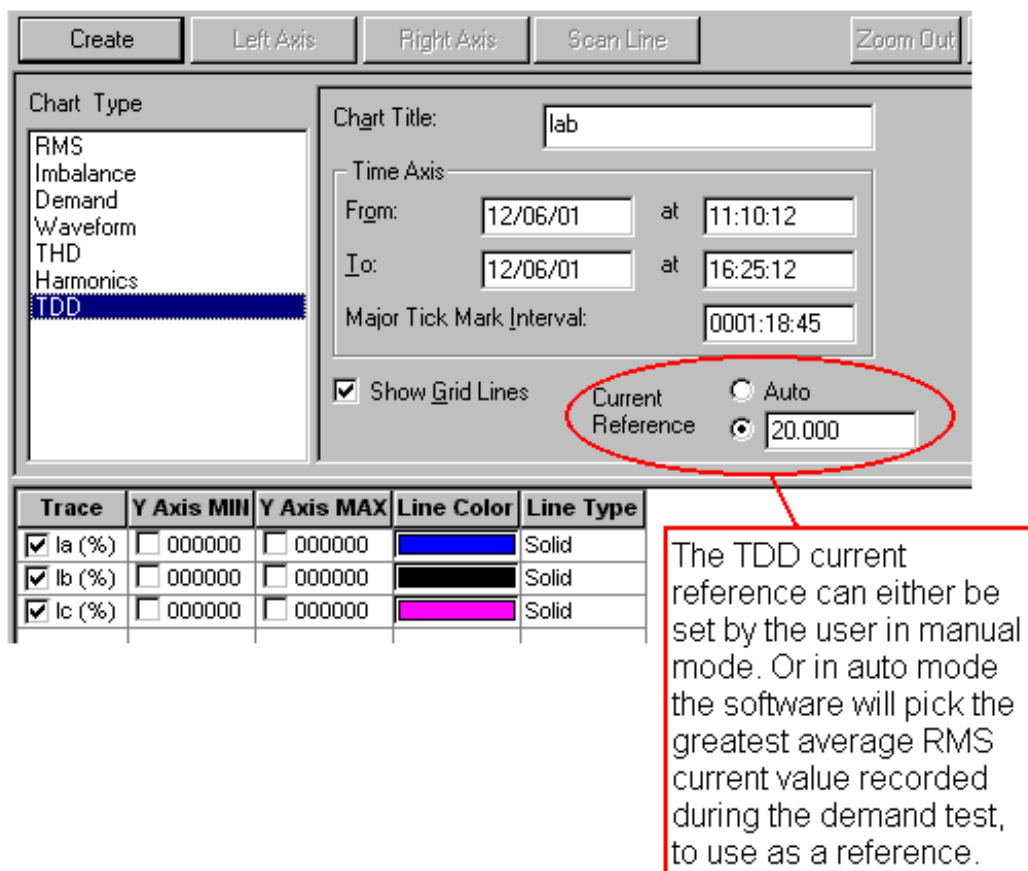
Imbalance Chart: This chart will display the imbalance between either the voltage channels or the current channels. The imbalance is determined by the following formula:

$$\text{Voltage/Current Imbalance} = 100 \times (\text{max deviation from average}) / \text{average}$$

THD Trending: This allows the user to trend the Total Harmonic Distortion of the captured waveforms as a percentage of the fundamental. In order to use this feature THD trending must have been selected in the setup file.

Harmonic Trending: This allows the user to trend any Harmonics from 1 to 63 for the captured waveforms as a percentage of the fundamental. In order to use this feature THD trending must have been selected in the setup file.

TDD Trending: This allows the user to trend the Total Demand Distortion of the captured waveforms as a percentage of the max RMS current interval captured during the test or the user can input a current value of their choosing as a reference. In order to use this feature TDD trending must have been selected in the setup file.



Out of Limits: This allows the user to trend the percentage of time that the RMS voltage and/or current were either *within* the user programmed limits or *outside* the user programmed limits.

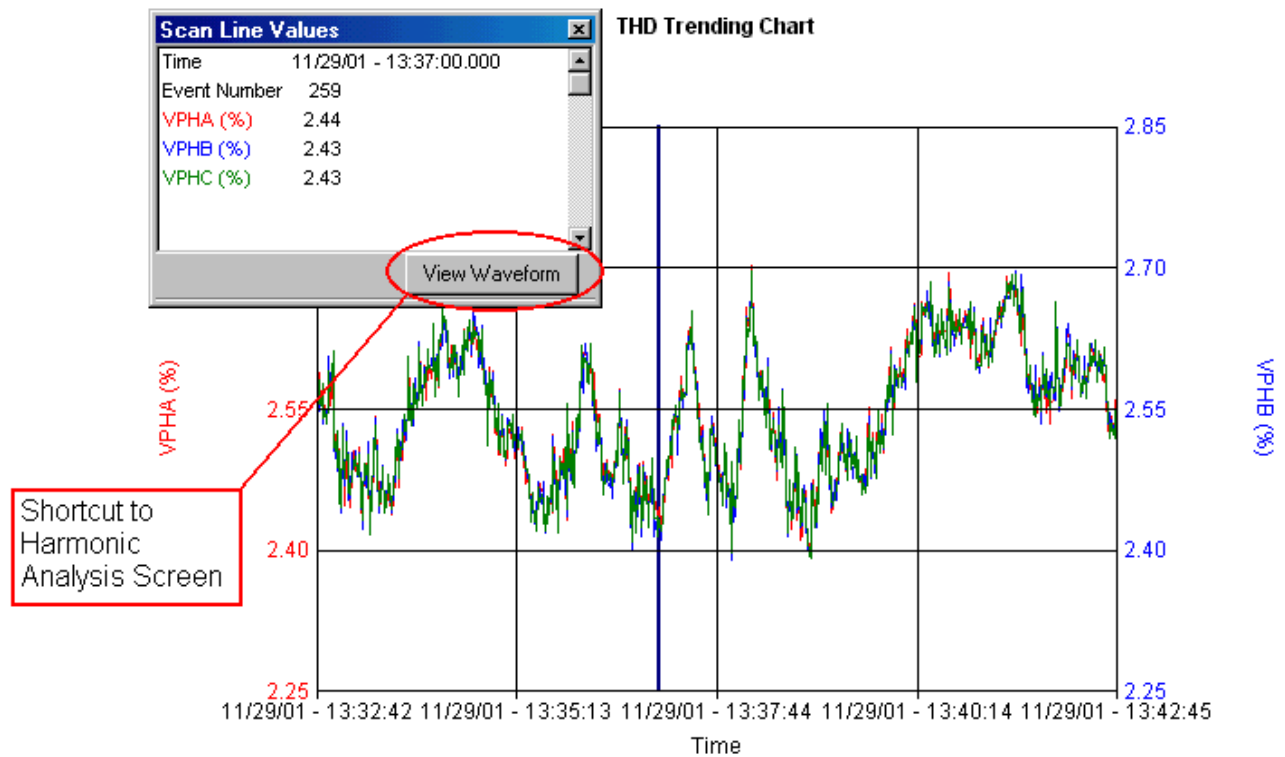
Short Term Flicker: Allows the user to trend Short Term (Pst) flicker. This data is based on IEC 61000-4-15 specifications.

Long Term Flicker: Allows the user to trend Long Term (Plt) flicker. This data is based on IEC 61000-4-15 specifications.

Scan Line: A scan line will tell the user the exact value of any point on the graph and the exact time this value occurred. To create a Scan Line first create a chart then click on Scan Line. To move the scan line, just move the arrow on the screen using the mouse. Then right click on the location in which you want the scan line. If you wish to move the scan line one recorded point at a time then press the left or right arrow keys.

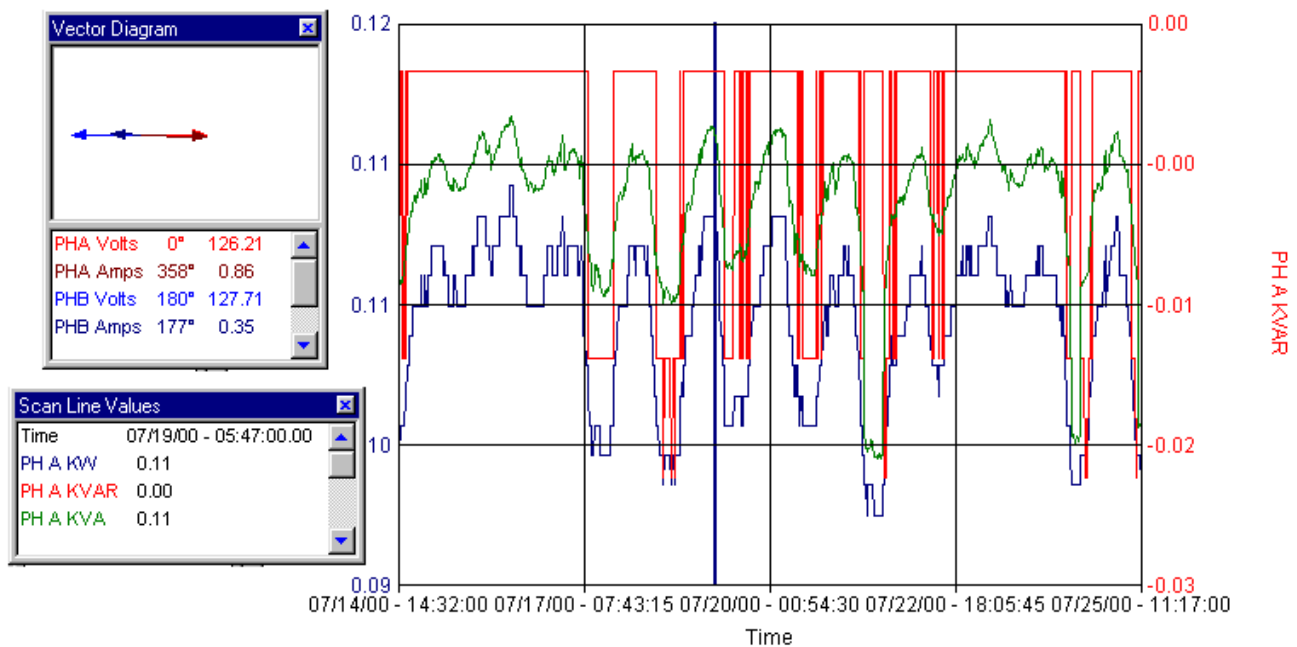
If a scan line is created for a THD or TDD chart then the scan line will also display which waveform capture each point in the graph represents. The user can then click the shortcut icon in the scan box to create a detailed harmonic analysis of that point.

NOTE: Moving the scan line one point at a time is usually only done when the user has zoomed-in on the chart.



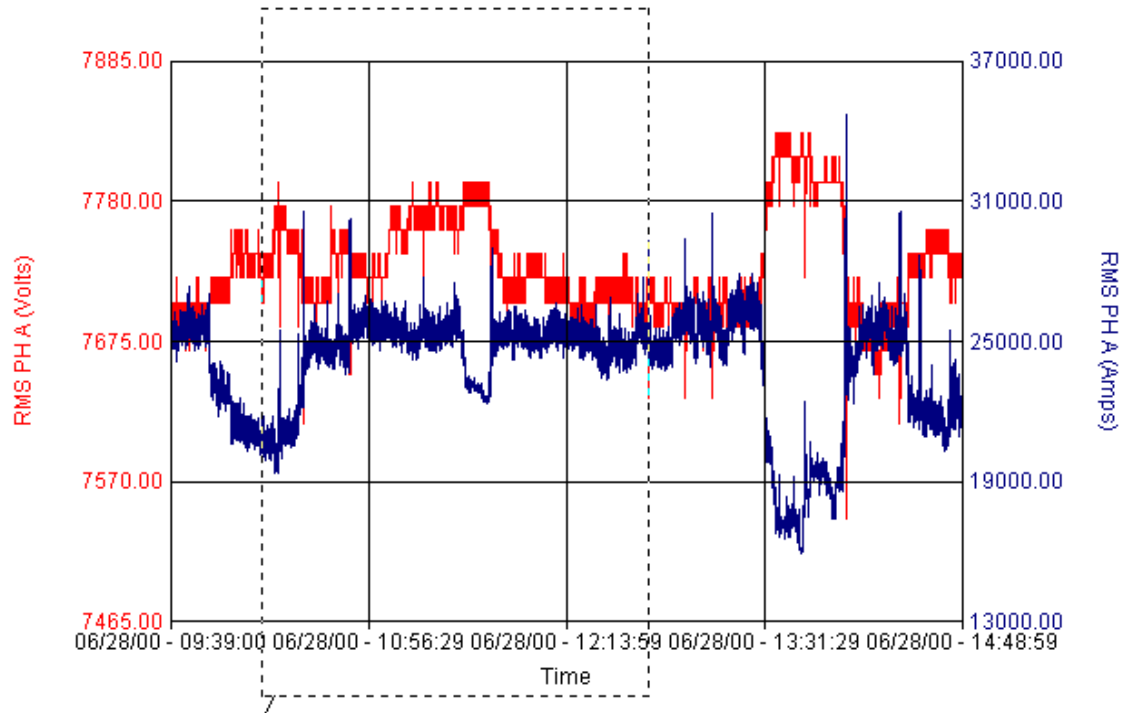
Vector Diagrams: This will show the user the positional vectors of each phase. The currents phase angle will be referenced to the voltages phase angle. The actual value of the voltage and current will be displayed as well. To view a vector diagram create a Demand Chart. Then click on Chart and verify that Show Vector Diagram has a check next to it, then click on Scan Line. Now both a scan line and a vector diagram will be created.

See below picture for examples of Scan Line and Vector Diagram.



7. To zoom-in on portions of the chart, using the mouse place the arrow on the chart. Then hold down the left key of the mouse and drag the mouse diagonally across the chart. A dotted line box should appear. When you release the left mouse key the chart will zoom into the area within the dotted line box.

To zoom-out, just click on *ZOOM-OUT*.

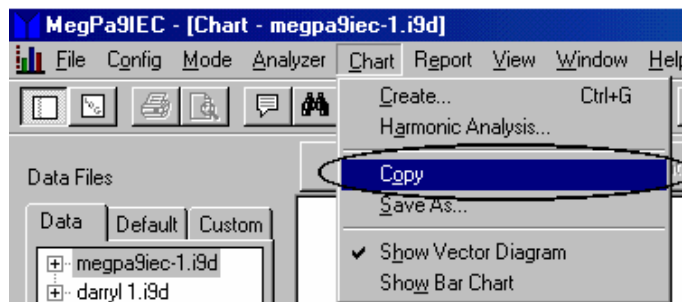


The software will zoom in on everything within this box when the left mouse key is released.

Note:	If you zoom in too far on the chart, then the y-axis scale will display the same value for each tickmark. If this happens, just un-zoom.
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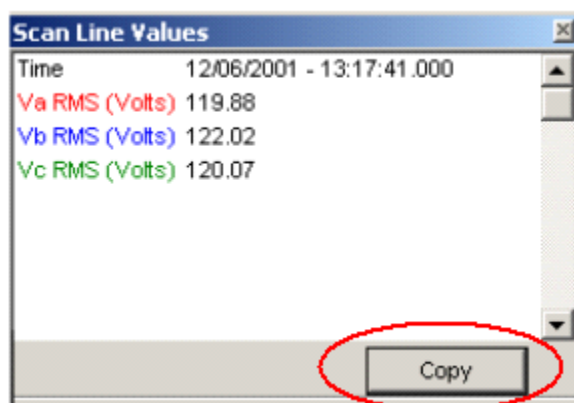
To copy a chart into Word do the following:

1. Create the chart using *MegPa9IEC Metrosoft® for Windows* software.
2. Click on *CHART*.
3. Click on *COPY*.



The chart is now in the computer clipboard. It can now be pasted into Word.

To copy contents of child window, such as Scan Line box, Vector Diagram box or the Frequency Trending box, click the COPY button on the child window.



This will copy the contents of the child window to the PC clipboard.

Print or Plot the Chart

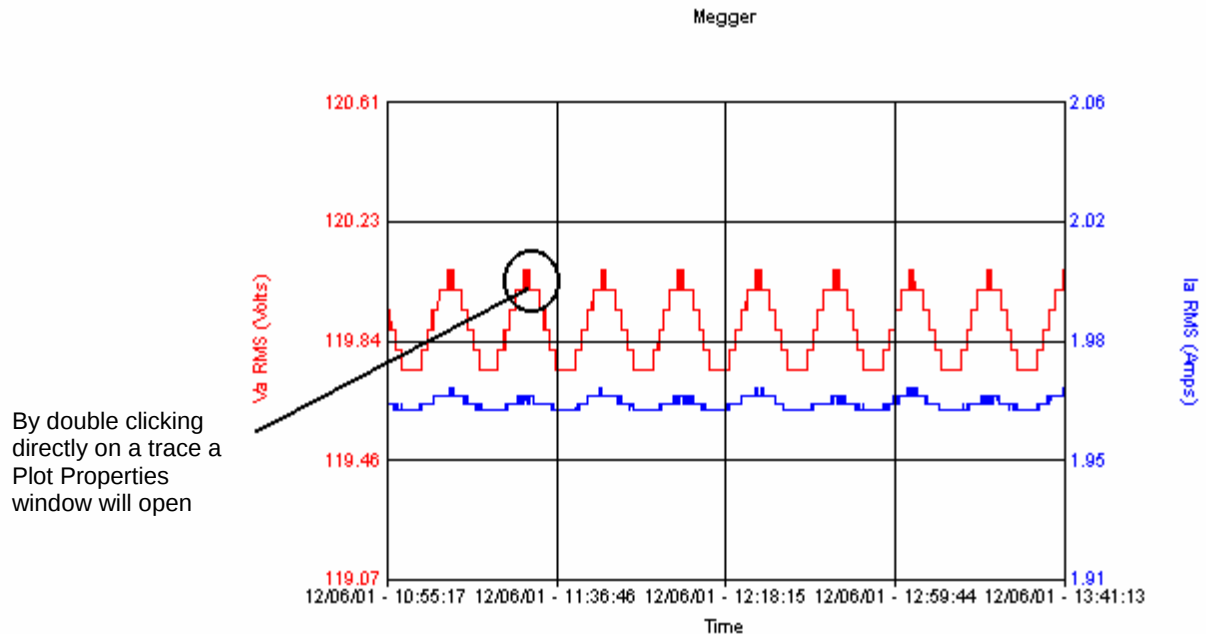
To print or plot a chart:

1. Make sure the printing device you wish to use is currently selected to receive print jobs. Metrosoft® provides a Printer Setup dialog box that the user can bring up from the File menu (*File>Printer Setup*)
2. Make sure that the Metrosoft® Chart Window you wish to print is the currently selected window.
3. From the *File Menu*, select the *Print Menu* item.

Advanced Charting Features

The new Metrosoft[®] software allows the user to change properties of the charts before or after they are created. By double clicking on any of the traces or on the text, the user can manipulate the data as follows.

Double Clicking on a Trace

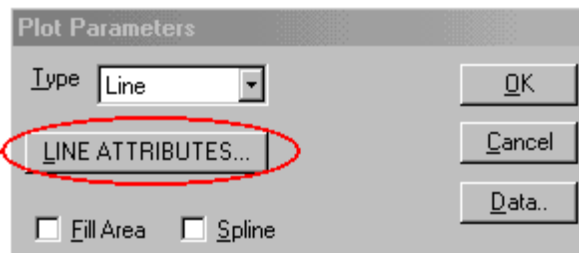


Type: Allows the user to change the plot from a line to vertical bars or horizontal bars or a scatter chart.

Fill Area: will make the entire area beneath the plot the same color as the plot trace.

Spline: will round off the hard edges on a trace.

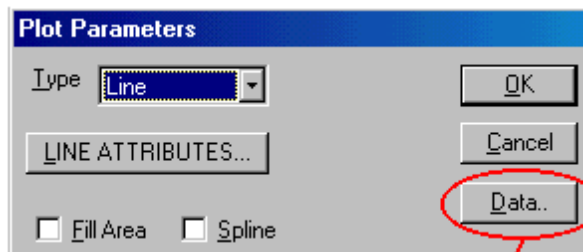
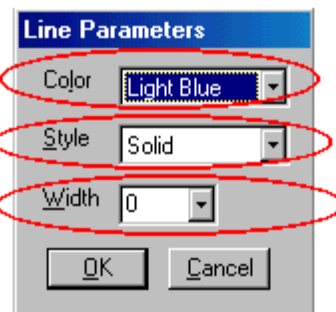
Line Attributes: will open up a Line Parameters Window.



Color: will allow the user to change the color of the trace.

Style: will allow the user to change from a solid line to different types of dashed lines.

Width: will allow the user to change the width of the trace.



Data: will open up a Window that will display the actual points that make up the trace.

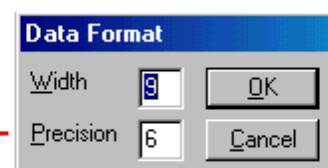
Note: This feature should only be used when a section of the trace has been zoomed in on.

Copy: By clicking copy the user can copy these points into the clip board of the computer. They can then be pasted into a spreadsheet program, like Excel.

Format: will allow the user to change the width of the columns or change the precision values within the columns.

The 'Vb MAX (Volts)' window displays a table of data points. The 'Copy' and 'Format' buttons at the top are circled in red. The table has columns for index (#), X, and Y.

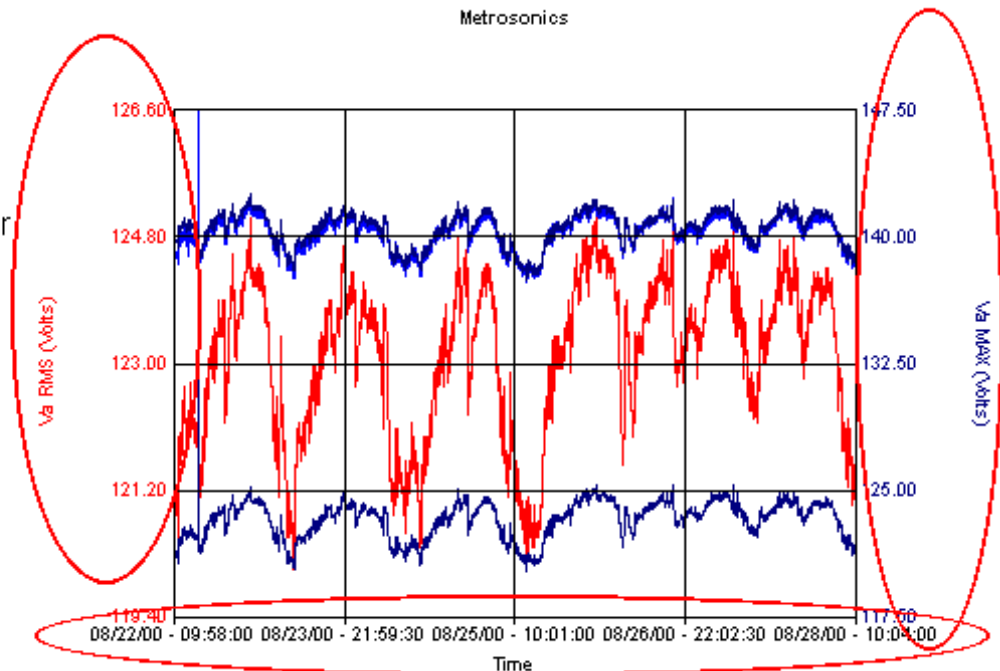
#	X	Y
0	185880	121.11
1	186000	120.98
2	186120	120.915
3	186240	120.915
4	186360	120.85
5	186480	120.85
6	186600	120.85
7	186720	120.72
8	186840	120.461
9	186960	120.331
10	187080	120.461
11	187200	120.591



Double Clicking on the Text

Changing the Text:

By double clicking on any of the text displayed on the charts axis the user can open up an "Axis Labels" Window. This will allow the user to change the properties of the text displayed on the charts axis.

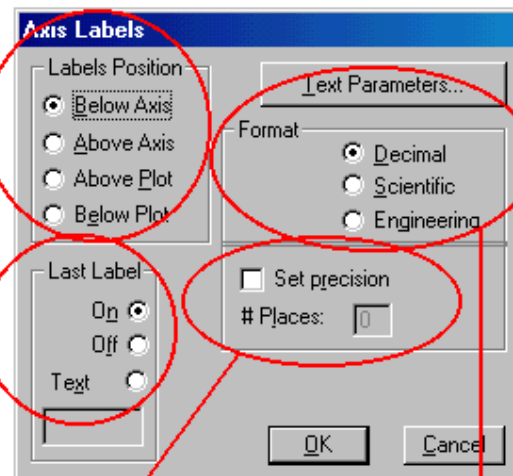


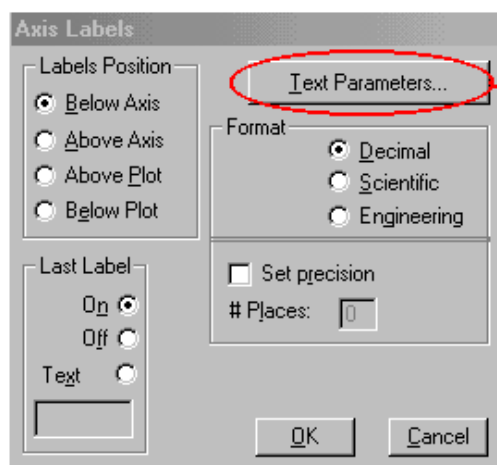
Label Position: allows the user to move the location of the selected text.

Last Label: allows the user to delete the last label on an axis or replace it with their own text.

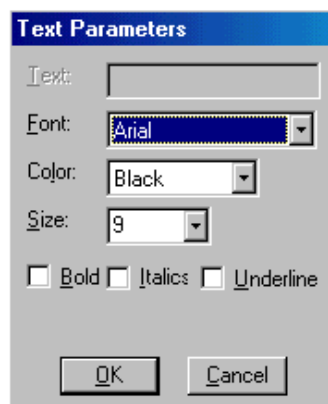
Set Precision: allows the user to change the number of digits displayed beyond the decimal point, for any number displayed on that chart axis.

Format: allows the user to change the manner in which numerals are displayed on the chart axis.





Text Parameters: opens up a "Text Parameters" Window that will allow the user to change the properties of the text. The user can change the Font, color and size of the text. The user can also bold, italics and / or underline the displayed axis text.



Report Generation

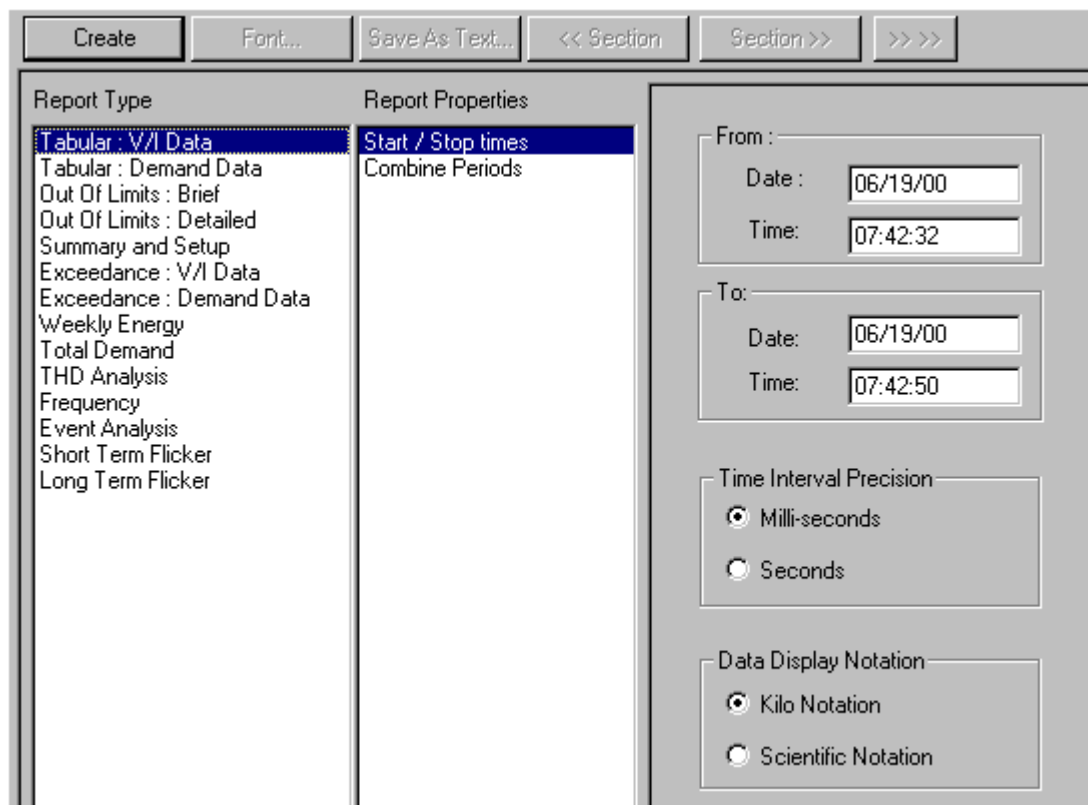
To Create a Report using Metrosoft®:

1. Select the *data file* containing the data you wish to report using the *Side Bar*.

Bring up a Metrosoft® Report Window by selecting Report/Create from the menu, or by pressing Alt-R + C.

A Metrosoft® Report Window will appear, similar the one pictured below.

Depending on what data is present in the selected data file, the available types of reports to create will be listed in the *Report Type* Window.



2. Select the *type of report* you wish to create and click on it in the *Report Type* Window.

Further options for configuring the type of report you selected will appear. For information on configuring each report type, see *Tabular: V/I Data Report*, *Tabular: Demand Data Report*, *Out-of-Limits: Brief Report*, *Out-of-Limits: Detailed Report*, *Summary and Setup Report*, *Exceedance: V/I Data Report*, *Exceedance: Demand Data Report*, *THD Summary Report*, *Weekly Energy Report*, and *Total Demand Report*.

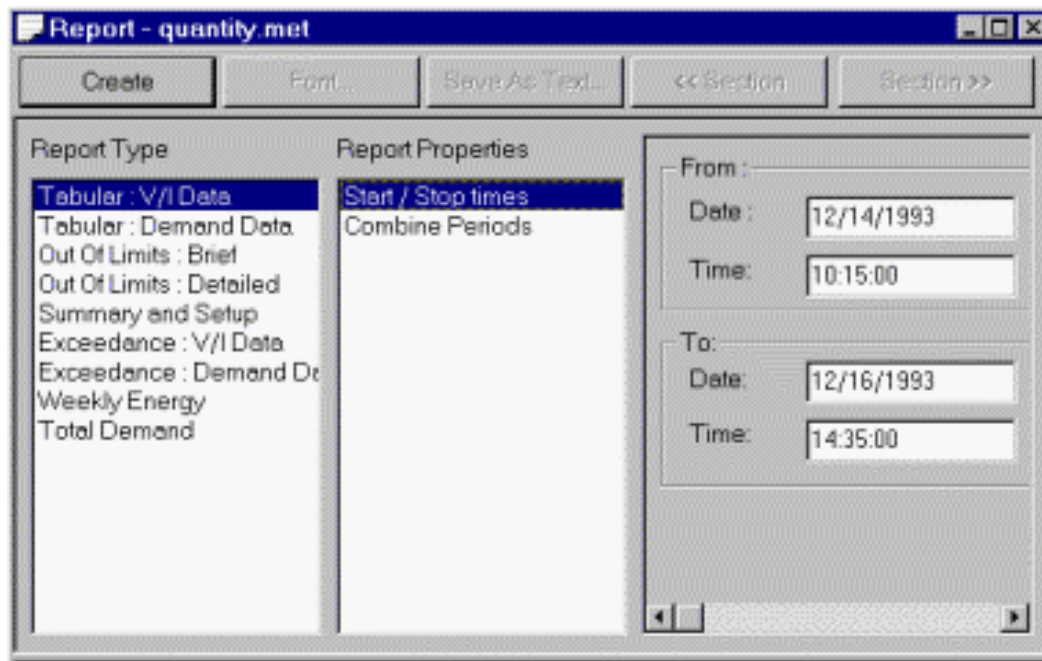
3. After you have configured your report, click the *CREATE* button in the upper left corner of the Report Window. Your report will appear.
4. To change the configuration of your report, click the *SETUP* button in the upper left corner of the *Report* Window, after the report is created.

Tabular: V/I Data Report

The voltage/current RMS data tabular report shows the total number of RMS intervals recorded, number of periods combined to create the report, current date, and data recorded for each input for each RMS storage interval (typically minimum RMS, RMS, and maximum RMS), and voltage and current imbalance in time correlated columnar form.

To Create a Tabular: V/I Data Report, perform the following steps:

1. Bring up a Metrosoft® Report Window for the selected data file. *See Report Generation.*
2. Make sure *Tabular: V/I Data* is the report type selected in the *Report Type* Window of the Metrosoft® Report Window.



3. Optionally specify the Start and Stop Date and Times for the report by selecting *START/STOP TIMES* from the *Report Properties* list box, then typing in the Dates and Times. The default values cover the entire range of the test.
4. Optionally specify the number of periods to combine by selecting *Combine Periods* from the *Report Properties* Field. Then enter the number of periods you wish to combine. The allowed range is from 1 period to 100 periods. This option will combine the data of the number of intervals selected (1-100) into 1 interval. This is helpful when generating reports from data files that contain more than 4000 intervals. Generating a tabular report can take a long time if the data file is very large. It is recommended to combine the intervals to reduce the time required to generate the report.
5. Select whether you wish to have the data displayed in Kilo notation or in scientific notation.

6. Click the *CREATE* button on the upper left of the Metrosoft[®] Report Window. The Metrosoft[®] Report Window will then display your report.
7. To change the setup of your report once it is created, click the *SETUP* button in the upper left corner of the Metrosoft[®] Report Window. The view will return to the Report Setup view.

A Tabular: V/I Data Report:

Tabular : V/I Data

Note: Time Periods Indicate END of Interval Period

Test Number 1

Combined Periods 1

Total Displayed Periods 4324

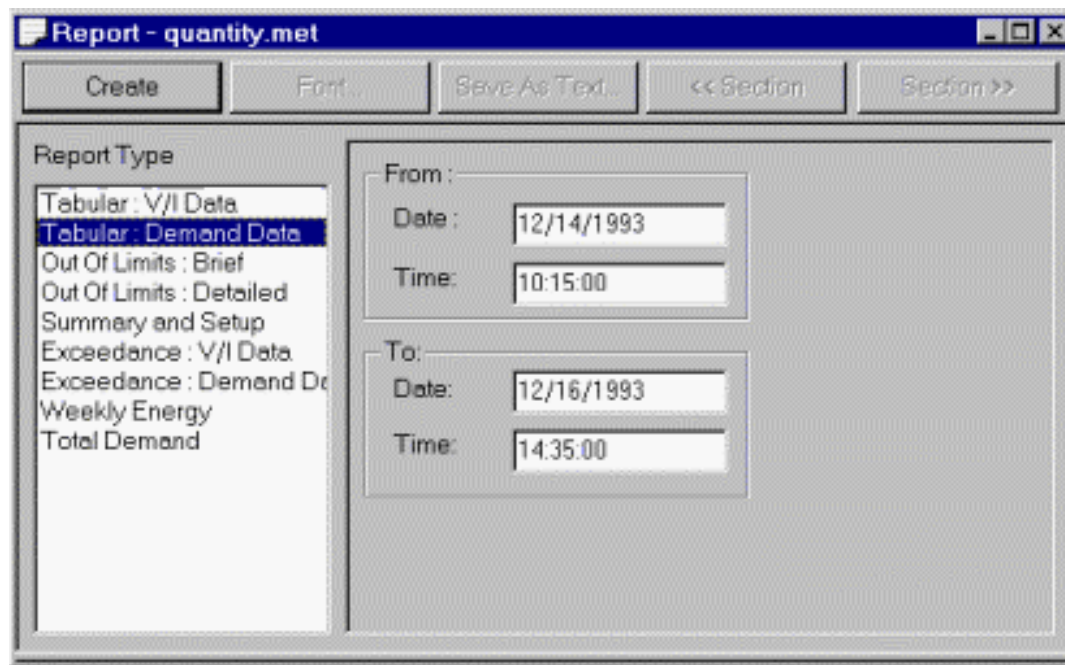
Date / Time	Va Volts	Ia Amps	Vb Volts	Ib Amps	Vc Volts	Ic Amps
08/22/00 09:58:00.000						
MIN	120.850	237.909	121.175	232.336	122.083	238.404
RMS	121.110	239.519	121.369	233.574	122.277	239.767
MAX	121.304	243.234	121.564	235.184	122.472	241.501
Maximum Imbalance	0.57%	1.70%				
08/22/00 10:00:00.000						
MIN	120.785	235.804	121.045	230.478	121.888	236.671
RMS	121.045	237.166	121.304	231.593	122.148	237.785
MAX	121.239	238.281	121.499	232.707	122.407	239.024
Maximum Imbalance	0.53%	1.67%				

Tabular: Demand Data Report

The demand data tabular report shows total demand intervals recorded, data recorded for each input pair for each demand interval (voltage, current, KW, KVAR, KVA, KWH, KVAH, true power factor, and displacement power factor) and totals for each demand parameter in a time correlated columnar form.

To Create a Tabular: Demand Data Report, perform the following steps:

1. Bring up a Metrosoft® Report Window for the selected data file. *See Report Generation.*
2. Make sure *Tabular: Demand Data* is the report type selected in the *Report Type* Window of the Metrosoft® Report Window.



3. Optionally specify the Start and Stop Date and Times for the report by selecting *START/STOP TIMES* from the *Report Properties* field, then typing in the Dates and Times. The default values cover the entire range of the test.
4. Click the *CREATE* button on the upper left of the Metrosoft® Report Window. The Metrosoft® Report Window will then display your report.
5. To change the setup of your report once it is created, click the *SETUP* button in the upper left corner of the Metrosoft® Report Window. The view will return to the Report Setup view.

A Tabular: Demand Data Report:

Report - Sample.p9d

SetupFont...Save As Text...<< SectionSection>>>>>section 1 of 2

Date / Time	Volt	Amp	KW	KVAR	KVA	KWH	KVARH	KVAH	TPF
08/22/00 10:15:00.000									
PH A	121.174	235.556	28.43	-1.053	28.43	7.11	-0.263	7.11	-1.000
PH B	121.434	229.859	27.90	-0.921	27.90	6.98	-0.230	6.98	-1.000
PH C	122.277	236.175	28.83	-1.053	28.83	7.21	-0.263	7.21	-1.000
Total			85.16	-3.027	85.16	21.29	-0.757	21.29	-1.000
08/22/00 10:30:00.000									
PH A	120.980	234.813	28.30	-1.053	28.30	7.07	-0.263	7.07	-1.000
PH B	121.304	229.240	27.77	-0.921	27.77	6.94	-0.230	6.94	-1.000
PH C	122.147	235.432	28.69	-1.053	28.69	7.17	-0.263	7.17	-1.000
Total			84.77	-3.027	84.77	21.19	-0.757	21.19	-1.000
08/22/00 10:45:00.000									
PH A	120.785	234.441	28.17	-1.053	28.30	7.04	-0.263	7.07	-0.995
PH B	121.174	228.992	27.64	-0.921	27.64	6.91	-0.230	6.91	-1.000
PH C	122.082	235.308	28.69	-1.053	28.69	7.17	-0.263	7.17	-1.000
Total			84.50	-3.027	84.63	21.13	-0.757	21.16	-0.998

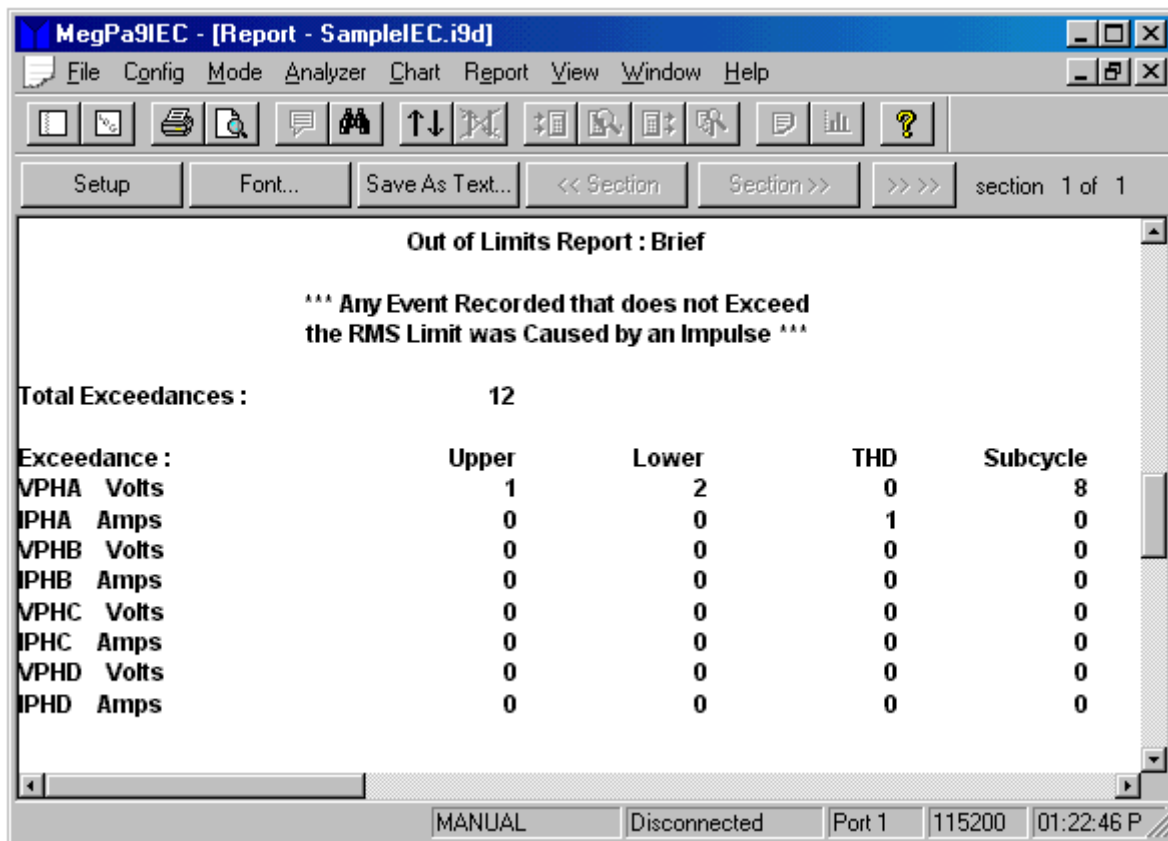
Out-of-Limits: Brief Report

The brief out-of-limits report shows information on each input that had an exceedance event. This information includes the event start date and time, end date and time, duration, and readings on the input that went out-of-limits. This report also includes the total number of exceedances for the test, number of exceedances that occurred on each input.

To Create an Out-of-limits: Brief Report, perform the following steps:

1. Bring up a Metrosoft® Report Window for the selected data file. *See Report Generation.*
2. Make sure *Out-of-limits: Brief* is the report type selected in the *Report Type* Window of the Metrosoft® Report Window.
3. Click the *CREATE* button on the upper left of the Metrosoft® Report Window. The Metrosoft® Report Window will then display your report.
4. To change the setup of your report once it is created, click the *SETUP* button in the upper left corner of the Metrosoft® Report Window. The view will return to the Report Setup view.

An Out-of-Limits: Brief Report:



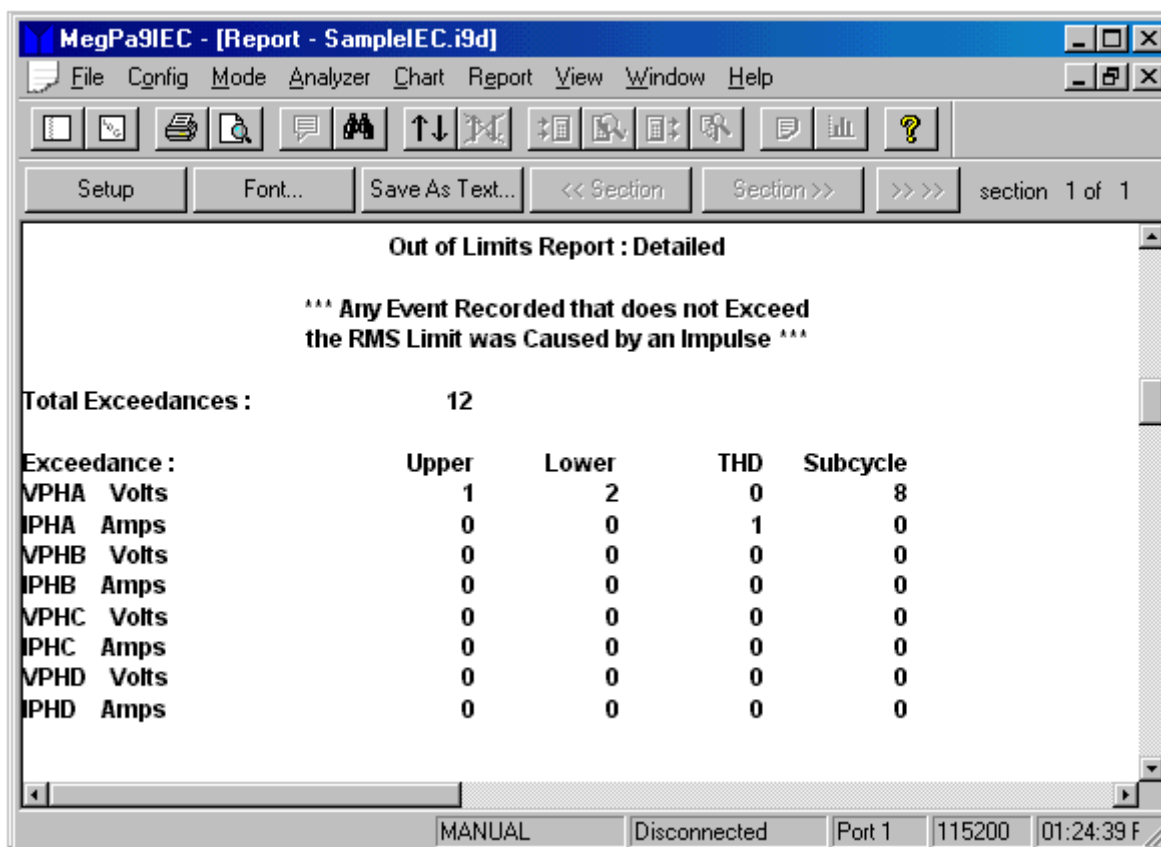
Out-of-Limits: Detailed Report

The detailed out-of-limits report includes detailed information on each out-of-limits event that occurred. This information includes, for each event, the limit value that was exceeded, which input went out-of-limits, start date and time of the event, end date and time of the event, event duration, min, RMS, and max values for each input during the event. This report also lists the total number of exceedances for the test.

To Create an Out-of-Limits: Detailed Report, perform the following steps:

1. Bring up a Metrosoft® Report Window for the selected data file. *See Report Generation.*
2. Make sure *Out-of-Limits: Detailed* is the report type selected in the *Report Type Window* of the Metrosoft® Report Window.
3. Click the *CREATE* button on the upper left of the Metrosoft® Report Window. The Metrosoft® Report Window will then display your report.
4. To change the setup of your report once it is created, click the *SETUP* button in the upper left corner of the Metrosoft® Report Window. The view will return to the Report Setup view.

An Out-of-Limits: Detailed Report:



Summary And Setup Report

The Summary and Setup report contains summary information about all types of data contained in the test file. If data is present, the Summary and Setup report generates the following information:

- System Information
- Analyzer Setup
- Power Consumption
- Power Projections – Hour, Day, Week, Month, Year
- Power Factor for Whole Test
- Maximum Imbalance for Whole Test
- Demand Data – Whole Test, Last Day, Last Hour
- Vector Information
- Analyzer Exceedance Limits Setup
- Overall Voltage and Current Statistics
- Overall Events
- Cause of Test Termination

To Create a Summary and Setup Report, perform the following steps:

1. Bring up a Metrosoft[®] Report Window for the selected data file. See *Report Generation*.
2. Make sure *Summary and Setup* is the report type selected in the *Report Type* Window of the Metrosoft[®] Report Window.
3. Click the *CREATE* button on the upper left of the Metrosoft[®] Report Window. The Metrosoft[®] Report Window will then display your report.

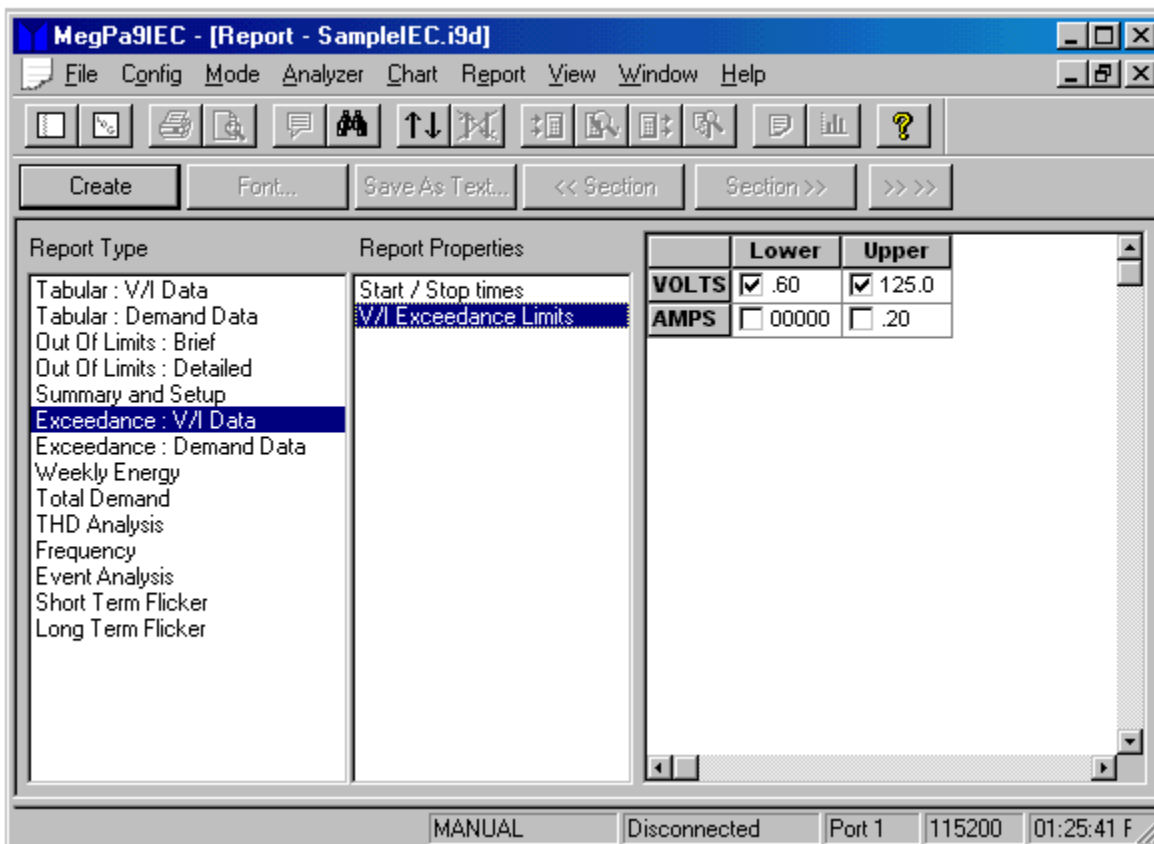
Exceedance: V/I Data Report

The user specifies upper and lower limits and then Metrosoft® scans the recorded data and lists all occurrences in which the limits are exceeded. This information is presented in the same format as the tabular reports. Exceedance reports can be created for RMS data for both V/I tabular reports as well as Demand Tabular Reports.

To Create an Exceedance: V/I Data Report, perform the following steps:

1. Bring up a Metrosoft® Report Window for the selected data file. *See Report Generation.*
2. Make sure *Exceedance: V/I Data* is the report type selected in the *Report Type* Window of the Metrosoft® Report Window.
3. Optionally specify the Start and Stop Date and Times for the report by selecting *START/STOP TIMES* from the *Report Properties* field, then typing in the Dates and Times. The default values cover the entire range of the test.
4. Specify the Lower and Upper Exceedance Limits.
Select *V/I EXCEEDANCE LIMITS* in the *Report Properties* field. As shown below, and a grid will appear in the right panel to specify exceedance limits. Specify an exceedance limit by clicking on its position in the grid, and typing the numerical value of the limit. Enable the limit by clicking on the checkbox to the left of the number you type in.
5. Click the *CREATE* button on the upper left of the Metrosoft® Report Window. The Metrosoft® Report Window will then display your report.
6. To change the setup of your report once it is created, click the *SETUP* button in the upper left corner of the Metrosoft® Report Window. The view will return to the Report Setup view.

Setting up an Exceedance: V/I Data Report:



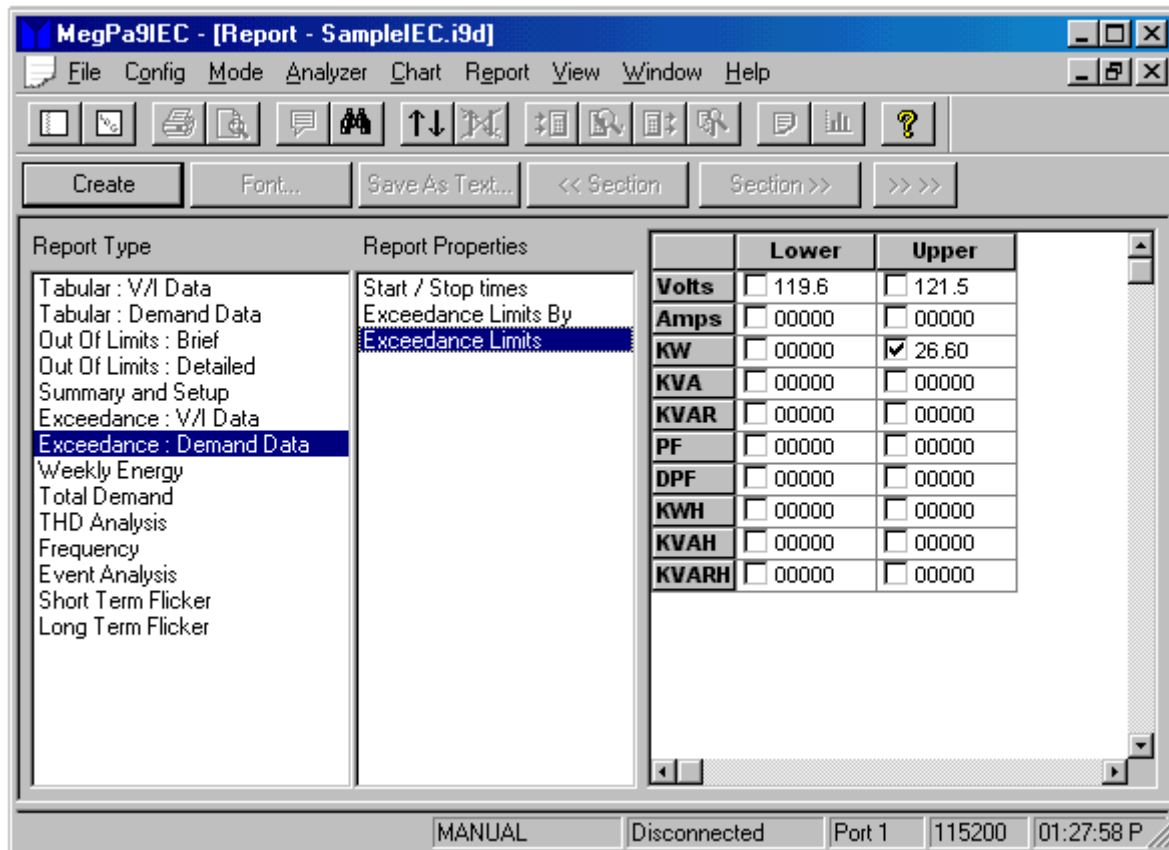
Exceedance: Demand Data Report

The user specifies upper and lower limits and then Metrosoft[®] scans the recorded data and lists all occurrences in which the limits are exceeded. This information is presented in the same format as the tabular reports. Exceedance reports can be created for both V/I Tabular data as well as Demand Tabular data.

To Create an Exceedance: Demand Data Report, perform the following steps:

1. Bring up a Metrosoft[®] Report Window for the selected data file. *See Report Generation.*
2. Make sure *Exceedance: Demand Data* is the report type selected in *Report Type* Window of the Metrosoft[®] Report Window.
3. Optionally specify the Start and Stop Date and Times for the report by selecting *START/STOP TIMES* from the *Report Properties* field, then typing in the Dates and Times. The default values cover the entire range of the test.
4. Specify whether the Report will consider exceedance limits by Phase, or by Total. Verify that the *Report Type* field has *Exceedance: Demand Data* selected, and that the *Report Properties* field has *Exceedance Limits By* selected. A pair of radial buttons will appear in the right panel, one labeled By Phase, and the other labeled By Total. Click on the radial button that matches your desired setting.
5. Specify the Lower and Upper Exceedance Limits. Specify the Lower and Upper Exceedance Limits. Select *EXCEEDANCE DEMAND DATA* in the *Report Properties* field. As shown below, and a grid will appear in the right panel to specify exceedance limits. Specify an exceedance limit by clicking on its position in the grid, and typing the numerical value of the limit. Enable the limit by clicking on the checkbox to the left of the number you type in.
6. Click the *CREATE* button on the upper left of the Metrosoft[®] Report Window. The Metrosoft[®] Report Window will then display your report.
7. To change the setup of your report once it is created, click the *SETUP* button in the upper left corner of the Metrosoft[®] Report Window. The view will return to the Report Setup view.

Setting up an Exceedance: Demand Data Report:



THD Summary Report

This report shows the date and time each event for harmonic analysis occurred, and the total harmonic distortion (THD) on each channel as a percent of the fundamental for the first cycle of each event.

To Create a THD Summary Report, perform the following steps:

1. Bring up a Metrosoft® Report Window for the selected data file. *See Report Generation.*
2. Make sure *THD Summary* is the report type selected in the *Report Type* Window of the Metrosoft® Report Window.
3. Click the *CREATE* button on the upper left of the Metrosoft® Report Window. The Metrosoft® Report Window will then display your report.
4. To change the setup of your report once it is created, click the *SETUP* button in the upper left corner of the Metrosoft® Report Window. The view will return to the Report Setup view.

Weekly Energy Report

This report shows the demand parameters selected for each hour for up to 1 week. It includes the average value of that parameter for every hour for up to 1 week, the average for each day, and minimum and maximum with time of occurrence for each day. This is useful for spotting problem areas, and immediately spotting where demand is excessive so changes can be made to reduce demand charges.

To Create a Weekly Energy Report, perform the following steps:

1. Bring up a Metrosoft[®] Report Window for the selected data file. *See Report Generation.*
2. Make sure *Weekly Energy* is the report type selected in the *Report Type* Window of the Metrosoft[®] Report Window.
3. Optionally specify the Start and Stop Date and Times for the report by selecting *START/STOP TIMES* from the *Report Properties* field, then typing in the Dates and Times. The default values cover the entire range of the test.
4. Specify the *Energy Parameter* – the reading you wish to get statistics on. Verify that *Weekly Energy* is selected in the *Report Type* Window, and that *ENERGY PARAMETER* is selected in the *Report Properties* field. A dropdown Energy Parameter menu will appear in the right panel containing the energy parameters that can be selected. These include: KWH, KVAH, KVARH, PF for each individual Phase, if available. (V and I may also be specified as the Energy Parameter.)
5. Click the *CREATE* button on the upper left of the Metrosoft[®] Report Window. The Metrosoft[®] Report Window will then display your report.
6. To change the setup of your report once it is created, click the *SETUP* button in the upper left corner of the Metrosoft[®] Report Window. The view will return to the Report Setup view.

Total Demand Report

This report shows KW, KVAR, KVA, KWH, KVARH, KVAH and power factor for totals only in a time correlated columnar format.

To Create a Total Demand Report, perform the following steps:

1. Bring up a Metrosoft® Report Window for the selected data file. *See Report Generation.*
2. Make sure *Total Demand* is the report type selected in the *Report Type* Window of the Metrosoft® Report Window.
3. Optionally specify the Start and Stop Date and Times for the report by selecting *START/STOP TIMES* from the *Report Properties* field, then typing in the Dates and Times. The default values cover the entire range of the test.
4. Click the *CREATE* button on the upper left of the Metrosoft® *Report Window*. The Metrosoft® Report Window will then display your report.
5. To change the setup of your report once it is created, click the *SETUP* button in the upper left corner of the Metrosoft® Report Window. The view will return to the Report Setup view.

Event Analysis

This report displays the percentage of time the RMS Voltage/Current was within or outside the user programmed limits.

Report - SampleIEC.i9d

SetupFont...Save As Text...<< SectionSection>>>>>>section 1 of 1

Event Analysis - % Within Limits

Note:Time Periods Indicate END of Interval Period

Test Number1

Total Displayed Periods18

Date / Time	VPHA	IPHA	VPHB	IPHC
06/19/00 07:42:33.217				
Lower %	98.00	98.00	----	----
Upper %	99.00	99.00	100.00	99.00
06/19/00 07:42:34.216				
Lower %	99.00	99.00	----	----
Upper %	98.00	100.00	99.00	98.00
06/19/00 07:42:35.217				
Lower %	99.00	99.00	----	----
Upper %	100.00	98.00	99.00	98.00

Short Term Flicker

This report displays the short term (Pst) flicker values recorded during the test.

Long Term Flicker

This report displays the long term (Plt) flicker values recorded during the test.

Report - SampleIEC.i9d				
Setup Font... Save As Text... << Section Section >> >> >>				
Short Term Flicker				
Note: Time Periods Indicate END of Interval Period				
Test Number 1				
Total Displayed Periods 14				
Date / Time	VPHA	VPHB	VPHC	VPHD
06/19/00 07:52:32.216	5.0	4.0	5.0	4.0
06/19/00 08:02:32.213	5.5	3.7	5.0	4.0
06/19/00 08:12:32.213	5.2	3.6	5.0	4.0
06/19/00 08:22:32.213	5.0	4.0	5.0	4.0
06/19/00 08:32:32.210	5.5	3.7	5.0	4.0
06/19/00 08:42:32.210	5.0	4.0	5.0	4.0
06/19/00 08:52:32.213	5.0	4.0	4.8	3.8
06/19/00 09:02:32.213	5.5	3.7	5.5	3.7
06/19/00 09:12:32.210	5.5	3.7	5.0	3.7
06/19/00 09:22:32.210	5.0	4.0	5.0	4.0
06/19/00 09:32:32.207	5.5	3.7	5.0	4.0
06/19/00 09:42:32.207	5.2	3.6	5.0	4.0
06/19/00 09:52:32.207	5.0	4.0	5.0	4.0
06/19/00 10:02:32.204	5.5	3.7	5.0	3.7

Side Bar

The side bar lists all of the data files in the data file directory, as well as the setup files in the setup file directory. The side bar has two tabs. Clicking on the tab brings up a listing of the files under the category the tab represents. The Data tab lists data files in the current data directory. The Setup tab displays Megger PA-9*Series* setup files stored in the current setup file directory.

When a data file listing is selected, each test contained in the data file may be viewed by clicking on the 'plus' symbol at the left of the data file listing. The Side Bar will then display sub-items, one for each test contained in the data file. Each sub-item lists the date and time of the test. Further information about a file will be displayed in the lower part of the as each test is selected.

If there is no file name selected, certain menu items and tool buttons will be inactive. To see this effect, change the data file directory, using the Configure-Directories menu option, to a directory containing no files with the *.p9d* extension.

The Use Search check box on the side bar forces a filter to be applied to the listed files. The filter may be accessed through the Search Criteria dialog box. If the check box is not checked, all data files in the data file directory will be listed.

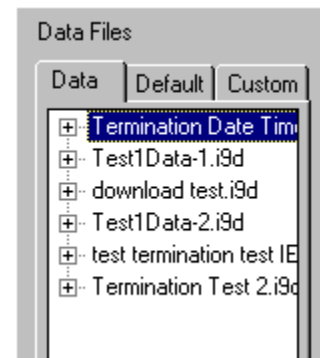
A file may be selected by clicking on it with the left mouse button.

When a side bar file has been highlighted with the mouse cursor, the following actions may be performed:

1. Edit *file information* such as address and comments.
2. Double-click on the *desired data* file, to open the *File Information* dialog box.
3. To create a Metrosoft® Chart or Report Window, click on the *REPORT BUTTON* or *CHART BUTTON* in the toolbar,

-or-

by *Choosing Chart/Create* from the menu, or *Report/Create* from the menu.



An Example of a Side Bar in MetroSoft®

Edit File Information

Each Metrosoft® Data File can store additional information along with data retrieved from a Megger PA-9*Series*. This additional information is usually input during the data retrieval process.

To edit information for an existing data file:

1. Select the *data file* whose information you wish to edit from the Side Bar.
2. From the *File* menu, select *EDIT FILE INFORMATION*. The dialog pictured below will appear.
3. Add or Edit text in each field by clicking in the field and typing.
4. Click *OK* to save your changes. *CANCEL* to discard your changes.

Edit File Information

Site Information

Customer/Department: Metrosonics, Inc.

Account/Meter Number: 8127-99

Address One: 1 Drumlin Square

Address Two:

City: W. Henrietta

State: N.Y.

Zip Code: 14586

Phone Number: (716) 334-7300

Comments 1: Main breaker

Comments 2:

OK
Cancel
Help

File Information

The File Information Window is used to get a quick summary of the contents of a certain data file. The File Information Window consists of an upper display, which displays operator-entered fields and basic analyzer setup information, and the lower display, which displays summary information for each test in the file.

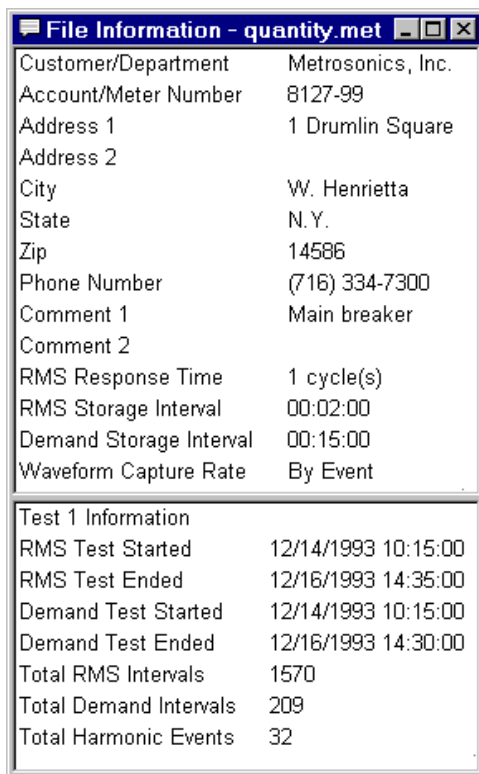
To display the File Information Window:

1. Select a *data file* in the Side Bar.
2. Select *INFORMATION* from the File Menu, or click the *FILE INFORMATION* button in the toolbar
or
double-click on a *test file listing* in the Side Bar

To view information about each test in the lower part of the File Information Window:

In the Side Bar, for the currently selected data file, click on the '*plus*' (+) symbol to display the tests within each data file.

Each test displays the Date and Time of the start of each test. As each test is selected, the lower part of the File Information Window will be updated with the statistics for that test.



The screenshot shows a window titled "File Information - quantity.met". It is divided into two main sections. The top section contains a list of fields and their corresponding values. The bottom section, titled "Test 1 Information", contains a list of test statistics and their values.

Customer/Department	Metrosonics, Inc.
Account/Meter Number	8127-99
Address 1	1 Drumlin Square
Address 2	
City	W. Henrietta
State	N.Y.
Zip	14586
Phone Number	(716) 334-7300
Comment 1	Main breaker
Comment 2	
RMS Response Time	1 cycle(s)
RMS Storage Interval	00:02:00
Demand Storage Interval	00:15:00
Waveform Capture Rate	By Event

Test 1 Information	
RMS Test Started	12/14/1993 10:15:00
RMS Test Ended	12/16/1993 14:35:00
Demand Test Started	12/14/1993 10:15:00
Demand Test Ended	12/16/1993 14:30:00
Total RMS Intervals	1570
Total Demand Intervals	209
Total Harmonic Events	32

File Name Description

The file name includes a descriptor that indicates the units P/N, and the file type.
(Whether the file is a setup or data file.)

Example: PA9005-p9d = PA9 Data File

 PA9005.p9s = PA9 Setup File

Harmonic Analysis

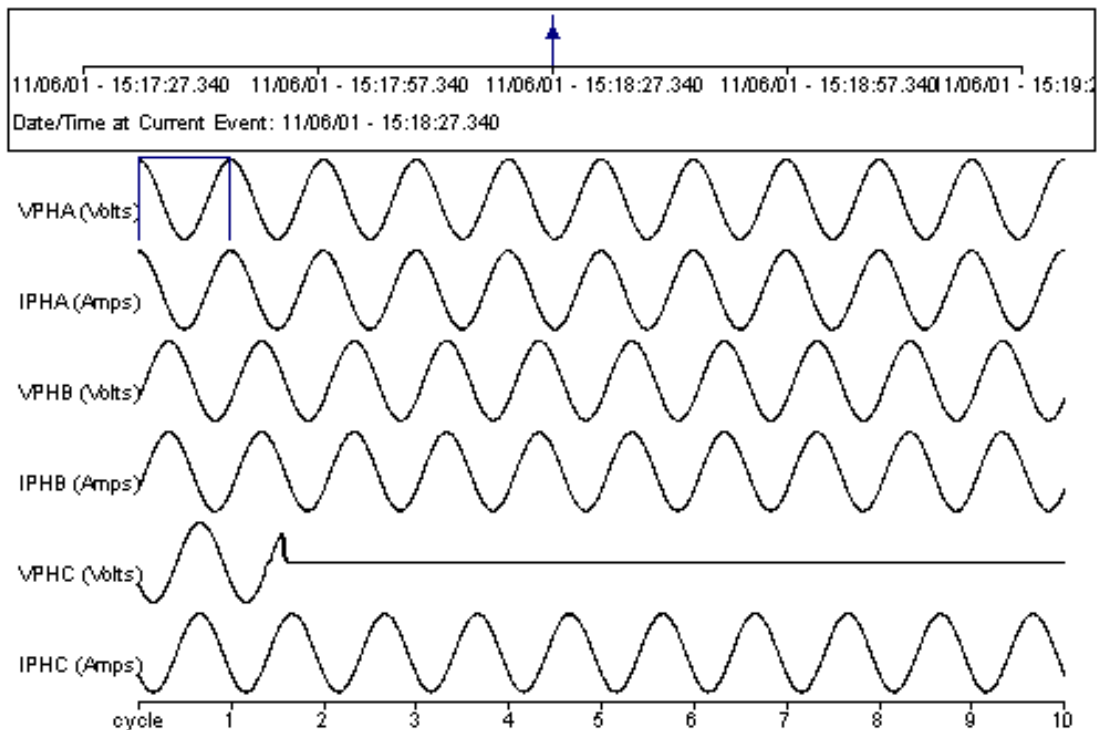
Metrosoft® *MegPa9IEC* can produce detailed Harmonic Analysis views for data files that contain Waveform Captures.

See *Programming the Analyzer* for instructions for programming the PA9Series to record harmonic event data.

The Metrosoft® Harmonic Analysis Chart works in a similar manner to the other Charts. The Harmonic Analysis chart consists of two parts, the Setup Screen, and the View Screen.

Setup Screen

An example of the Harmonic Analysis Setup screen is shown below. The Harmonic Analysis Setup Screen has two views, the Upper View, and the Lower View.



Upper View

The Upper View displays all harmonic events in a chart. The chart has a triangle denoting each event. The x-axis of the chart shows the time of each event. The user can select a certain event for further analysis by right – clicking on the corresponding triangle. The chart's scan line will move to the event that was clicked on.

Select Input

The input for which the user wishes to view data is selected by using the drop down list box positioned immediately to the left of the Full View button.

Select Event and Cycle

The user can also select a harmonic event for further analysis by using the controls at the top of the Harmonic Analysis View. The Harmonic Event the user wishes to study can be selected by using the 'spin control' immediately to the right of the word Event. Similarly, the particular cycle within the event can be selected by using the 'spin control' immediately to the right of the word Cycle.

Lower View

The Lower View simultaneously displays waveform data for all enabled inputs. Up to 10 cycles of each event are shown for each input.

Selecting Input, Event and Cycle

As an alternative method for specifying the Input, Event, and Cycle Number, click on *the waveform trace* the user wishes to analyze further.

NOTE: Since the Lower View only displays up to 10 cycles per input, if the user wishes to analyze a cycle past the tenth cycle, the user must use the controls of the Upper View.

Once the Input, Event, and Cycle have been specified by any of the above methods, the user can press the CREATE button to go the View Screen , which shows detailed information about the selected Cycle within the Waveform Event for the Input specified.

View Screen

Once the Input, Event, and Cycle have been selected from the Setup View, pressing *CREATE* in the upper left corner of the window switches the user to the *View Screen*.

NOTE: The user can select a different event, cycle number, and input from the control bar at the top of the View Screen.

The *View Screen* shows detailed harmonic analysis data for the selected cycle within the Event for the selected Input.

Specifically, the View Screen Shows:

Event Number/Total Number of Events

Duration of Event

Event trigger reason (Time or Exceedance)

Time, Input, Cycle

Cycle Waveform chart

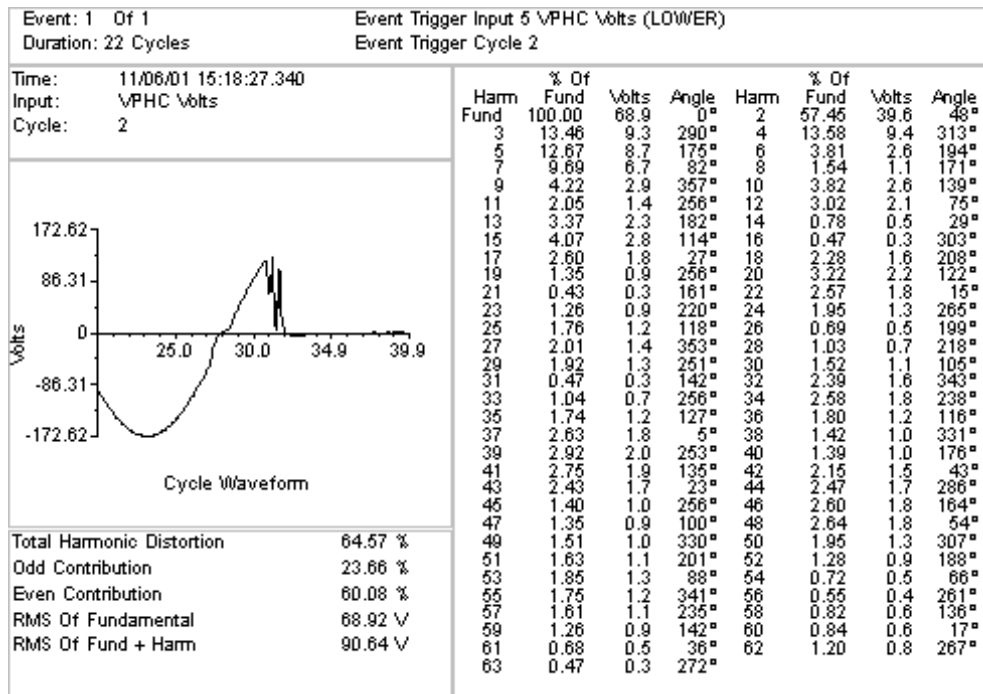
Harmonic Distortion Data and *either*

a. Harmonic Contribution Table, *or*

b. Harmonic Contribution Bar Chart,

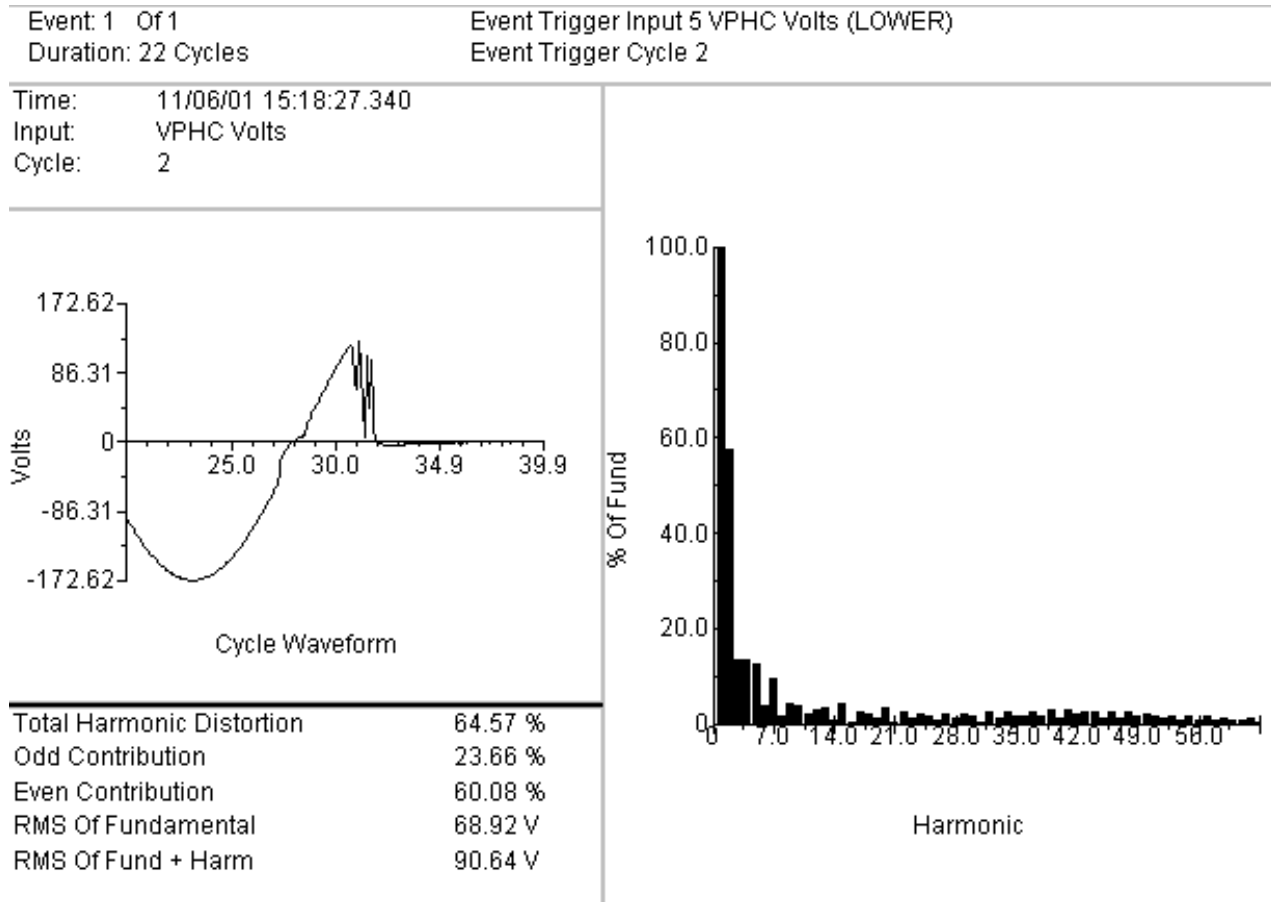
which are user-selectable by checking or un-checking the *Show Bar Chart* menu item in the Chart menu.

Examples of the Harmonic View Screen are shown below. The first example shows the Harmonic Contribution Table. The second example shows the Harmonic Contribution Bar Chart.



Harmonic Contribution Table

To view a bar chart instead of text data click on *CHART* then on *Show Bar Chart*. Then the following chart will display.



Harmonic Contribution Bar Chart

Print Out the Chart

To print your chart, select *PRINT* from the File menu.

Return to Setup View

To return to the Setup View, click the *SETUP* button in the upper left corner of the Harmonic View Window.

Tiled Windows

If many windows have been created while using Metrosoft[®], the *Tile* command under the Window menu may be executed. This command resizes and rearranges all of the open windows (except the Side Bar) so that all are visible at the same time.

Sizing Windows

Position the cursor over the lower right corner of a window. Hold down the left mouse button and 'drag' to resize a window.

EN50160 Report

The MegPa9IEC software will create an EN50160 report providing that all the relevant data required by EN 50160 exists within the data file. Then the following data fields will need to be analyzed. (Frequency, Out of Limit Trending, Flicker, Unbalance, THD and Harmonics) The analysis of this data will then be displayed in the report.

The EN50160 report shall be displayed in the REPORT TYPE field providing the following requirements are met.

1. The unit is a PA-9 Series.
2. The firmware version of the unit is 5.0 or greater.
3. The default frequency of the unit was at 50Hz.

Frequency Data will be analyzed provided the following requirements are met.

1. Frequency Data was recorded in data file.
2. Average Frequency data was recorded.
3. The Frequency storage interval was 10 seconds.

RMS Data will be analyzed provided the following requirements are met.

1. RMS Voltage Data was recorded for each enabled voltage channel in data file.
2. AVERAGE RMS was recorded.
3. The RMS storage interval was 10 minutes.

Flicker Data will be analyzed provided the following requirements are met.

1. Plt Flicker Data was recorded.

Unbalance Data will be analyzed provided the following requirements are met.

1. RMS values that were recorded.
2. AVERAGE RMS was recorded.
3. The RMS storage interval was 10 minutes.
4. At least 2 voltage channels were enabled.

THD Data will be analyzed provided the following requirements are met.

1. Waveform Data was recorded.
2. The Waveform Trigger was set to time or THD.
3. The Waveform storage interval was 10 minutes.

Harmonic Data will be analyzed provided the following requirements are met.

1. Waveform Data was recorded.
2. The Waveform Trigger was set to time or THD.
3. The Waveform storage interval was 10 minutes.

Example Report

Report printed on 10/20/2003 at 12:36:14
File Name good test.i9d
Test Number 1
Test Start 08/05/2003 at 07:45:08
Test End 08/05/2003 at 10:00:13
Customer/Department
Account/Meter Number
Address 1
Address 2
City, State, Zip
Phone Number
Comment 1
Comment 2

Frequency	PASS
RMS Voltage	PASS
Flicker	PASS
Unbalance	PASS
THD	PASS
Harmonics	PASS
EN50160 Test Results	PASS

NOTE: In order to verify the unit is programmed for the EN50160 requirements, select the default setup file “BS2EN50160(50Hz)2Phase.i9s” or “BS3EN50160(50Hz)3Phase.i9s”.

PA-9 Series Modem Configuration

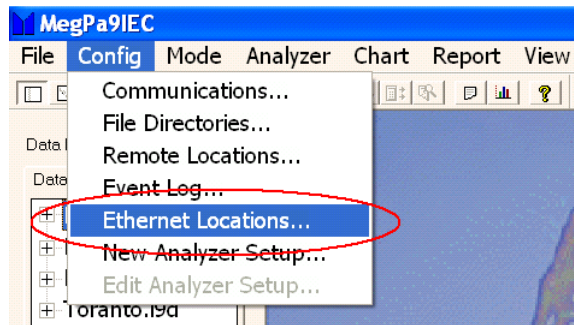
After acquiring a cellular carrier see the AirLink Quick Guide supplied on the CD for complete modem configuration instructions.

PA-9 Series Modem Operation

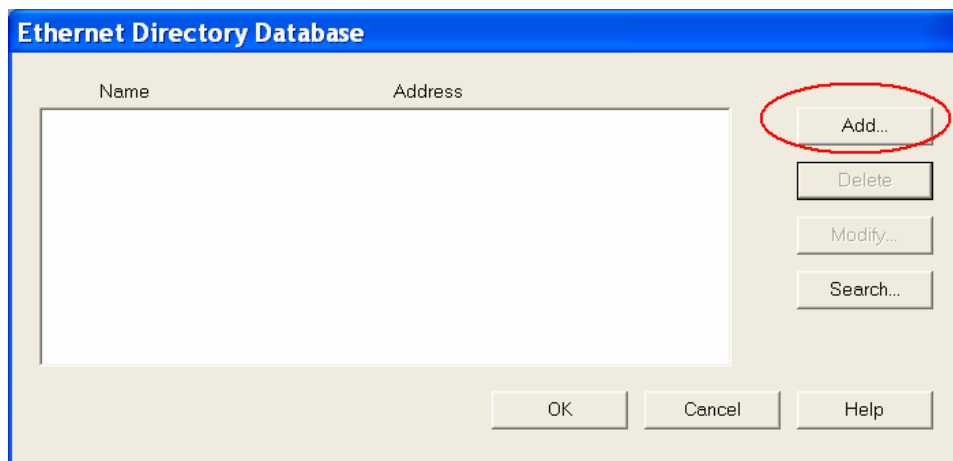
Follow the step by step procedure to establish communications with your unit, load a setup file, view and download the desired data from the PA-9 Series unit.

1. Enter the Ethernet Location
 - a. Click on CONFIG
 - b. **For Wireless Modem:** Click on ETHERNET LOCATION (The Ethernet Directory Database will open)

For Analog Modem: Click on REMOTE LOCATIONS (The Remote Locations Directory Database will open).



- c. Click on ADD (The Add/Modify Directory Entry Screen will open)



- d. **For Wireless Modem:** Input CUSTOMER / DEPARTMENT and INTERNET NUMBER (These are the two mandatory field. The other fields are optional. See “Placing a unit in Polling Mode” for information on Scheduling field)

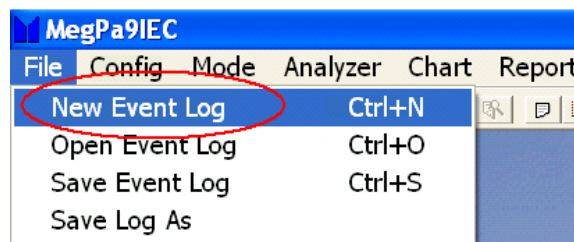
For Analog Modem: Input PHONE NUMBER.

The screenshot shows a dialog box titled "Add/Modify Directory Entry". It is divided into two main sections. The left section, "Customer/Analyzer Information", contains the following fields: "Customer/Department:" (circled in red), "Account/Meter Number:", "Address:", "City:", "State:", "Zip Code:", "Internet Number" (circled in red), "Analyzer Password:", "Comments 1:", and "Comments 2:". The right section, "Schedule Information", contains "Schedule Date:" (set to 5/17/2007), "Schedule Time:" (set to 5/17/2007), "Schedule Interval:" (set to 0 Days), and three checkboxes: "Enable scheduling", "Clear data after retrieval", and "Overwrite existing file". At the bottom are "OK", "Cancel", and "Help" buttons.

- e. After the CUSTOMER / DEPARTMENT and INTERNET NUMBER are entered click OK.

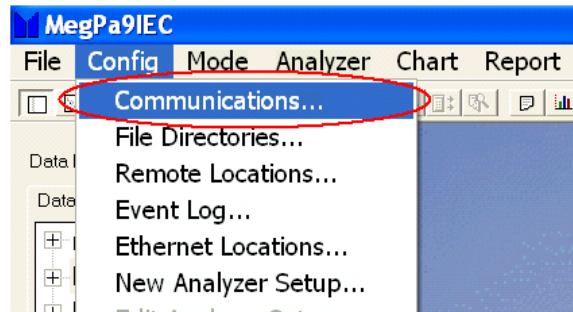
NOTE: If the default password is altered then the remote user will need to enter that password in order to delete recorded data from the unit.

2. **Opening an Event Log:** An Event Log is not required to communicate with the unit. However, when an Event Log is open it does record all communications activities between the PC and the unit. This can become quite important if trying to resolve any communication problems.
- Click on FILE
 - Click on NEW EVENT LOG (This will open a blank event log.)



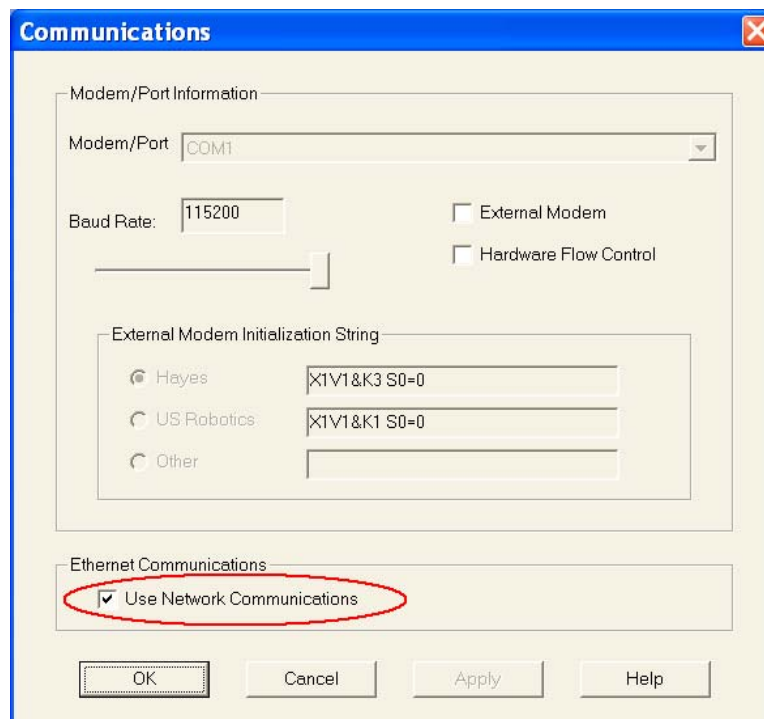
3. **Establishing Communications** – This section informs you how to establish communications with the PA-9 Series units in your Directory Database.

- a. Click on CONFIG
- b. Click on COMMUNICATIONS

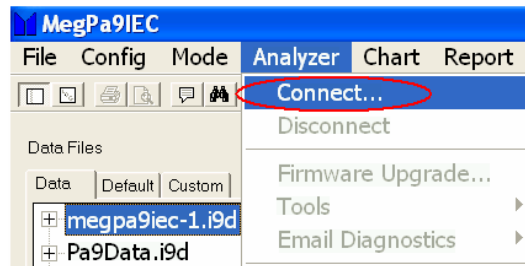


- c. **For Wireless Modem:** Select USE NETWORK COMMUNICATIONS the click APPLY then OK.

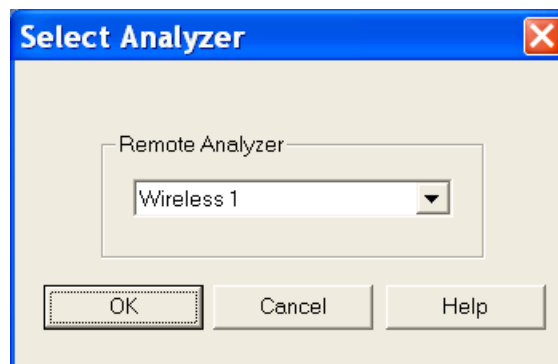
For Analog Modem: Select appropriate Modem/Port.



- d. Click on ANALYZER
- e. Click on CONNECT

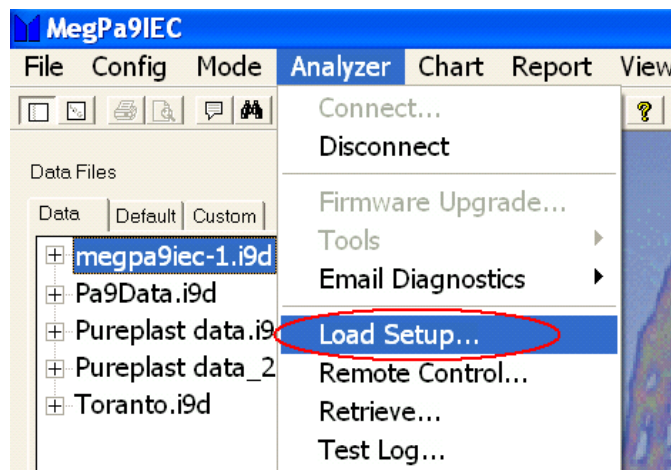


- f. Select the desired PA-9 Series unit from the directory database and then click OK. (The PC should now establish communications with the PA-9 Series unit.)

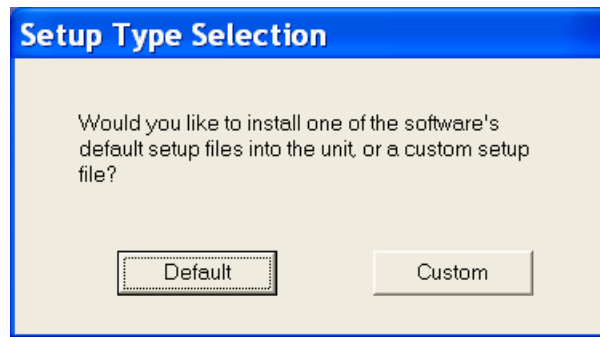


4. **Loading a Setup File** – This section will instruct you on how to install a pre-made custom or default setup file into a PA-9 Series unit remotely. Please NOTE: If you wish to create or modify an existing setup file please refer to the section in this manual “Creating a Setup File”.

- a. Click on ANALYZER
- b. Click on LOAD SETUP

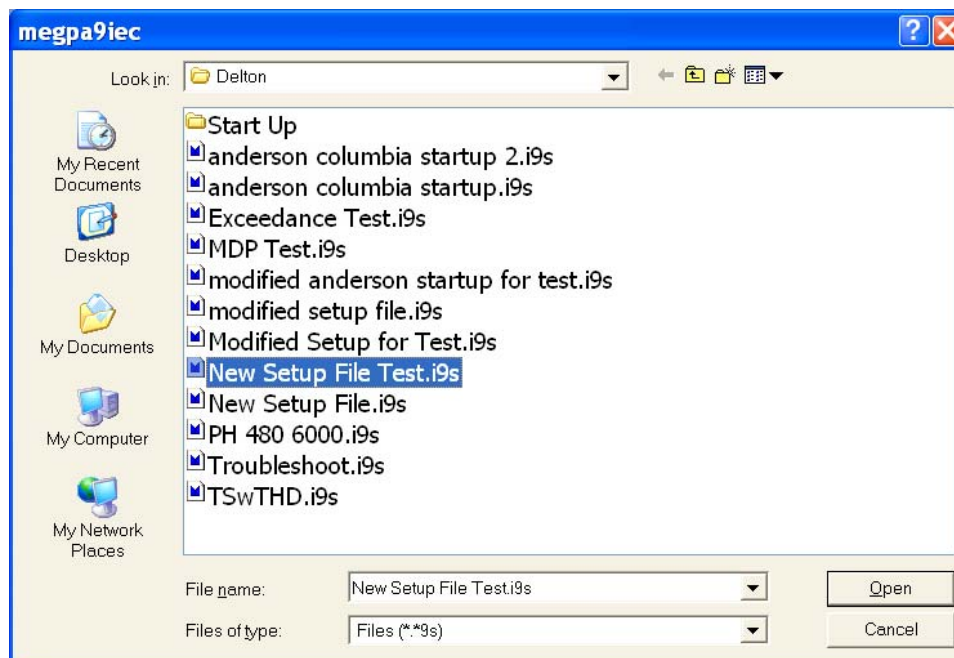


- c. Select either DEFAULT or CUSTOM (Default setups are standard setups that come with the software and Custom setups are the ones the user has created.)

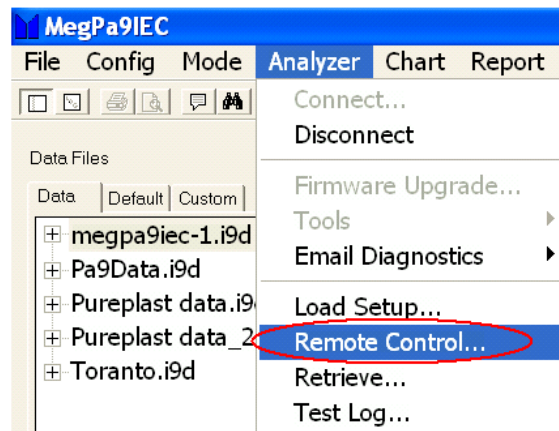


- d. Select the desired setup file and click OPEN. (The PC will now load the setup file into the PA-9 Series unit)

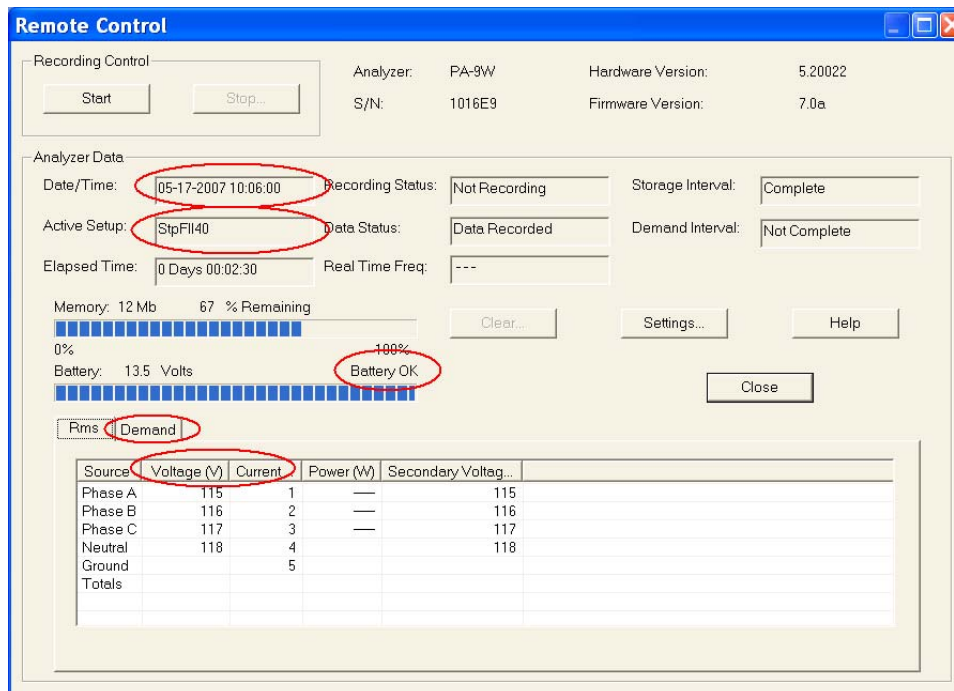
NOTE: If the unit contains recorded data or is recording the software will prompt you to stop the recording and erase the data before the setup file will load.



5. **Verifying the setup file in the unit.** – After loading a setup file it is best to verify the setup file loaded successfully and the measured values are as expected.
 - a. Click on ANALYZER
 - b. Click on REMOTE CONTROL (The remote screen will then open)



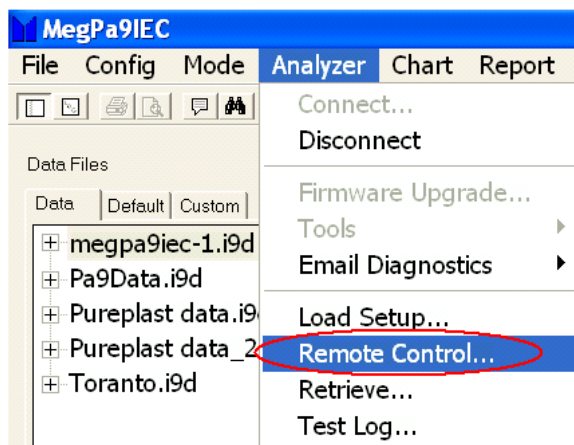
- c. Verify the following parameters on the remote screen.
 - i. Verify the Date / Time is correct.
 - ii. Verify the Active Setup is correct (NOTE: Only the first 8 characters of the name will be displayed.)
 - iii. Verify the Battery is OK.
 - iv. Verify the RMS Voltage and RMS Current is correct.
 - v. Click on the DEMAND tab and verify the demand parameters are correct. (This only applies if the unit is programmed to capture demand data)



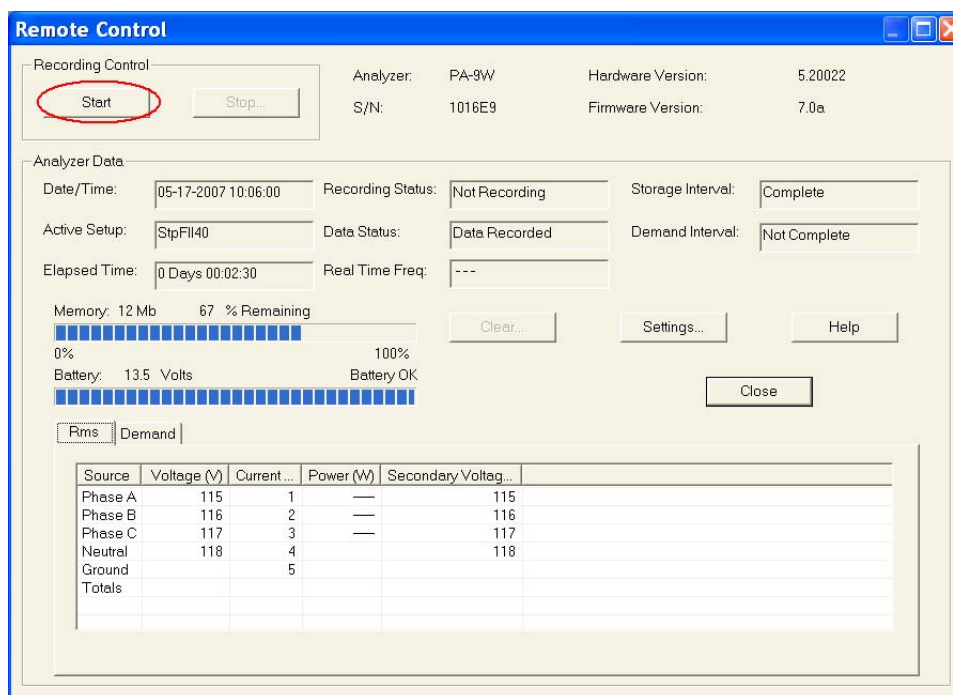
- d. If all the parameters are OK then you are ready to start the recording.

6. Starting a Recording – Verify the setup file is correct before starting the recording.

- a. Click on ANALYZER
- b. Click on REMOTE CONTROL (The remote screen will then open)

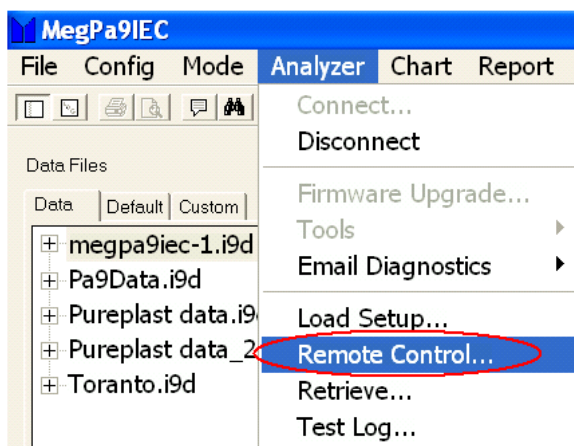


- c. Click on START (The unit will now start recording data)

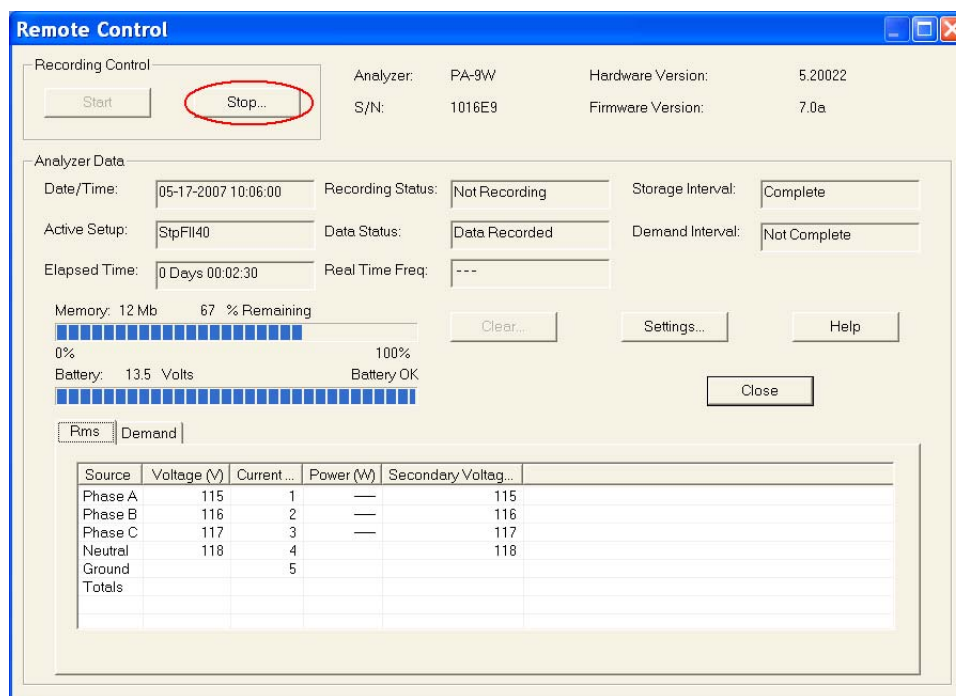


7. Stopping a Recording

- Click on ANALYZER
- Click on REMOTE CONTROL (The remote screen will then open)

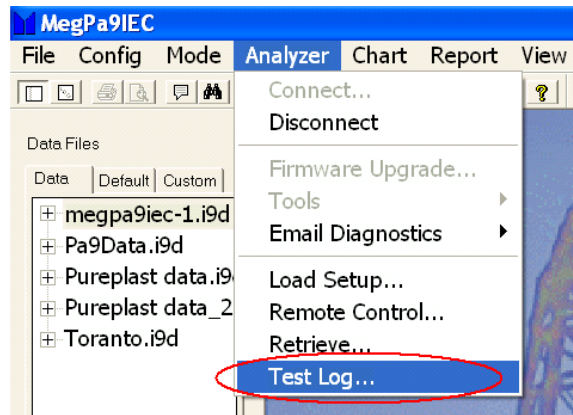


- Click on STOP (The unit will now stop recording data)



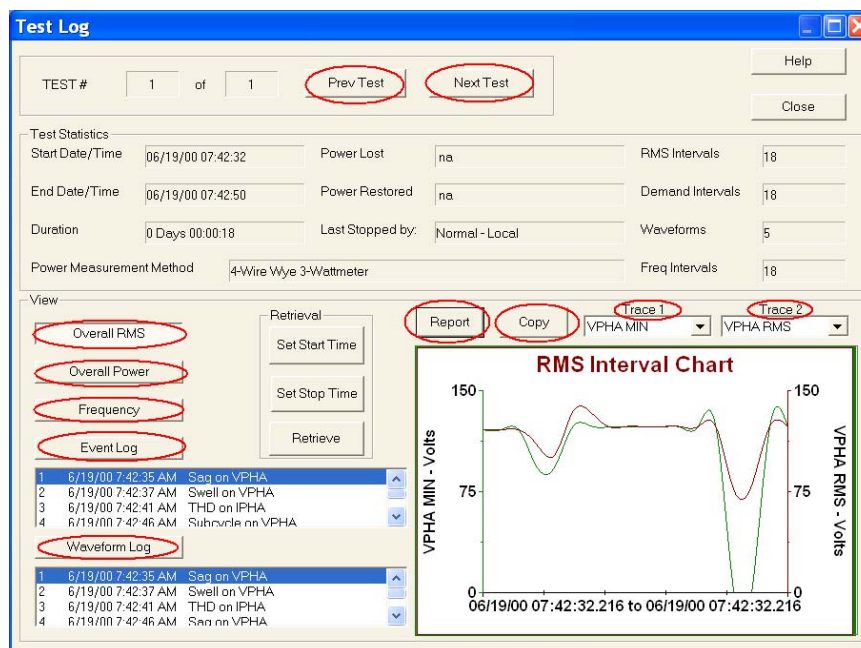
8. Viewing Data in the Unit

- a. Click on ANALYZER
- b. Click on TEST LOG



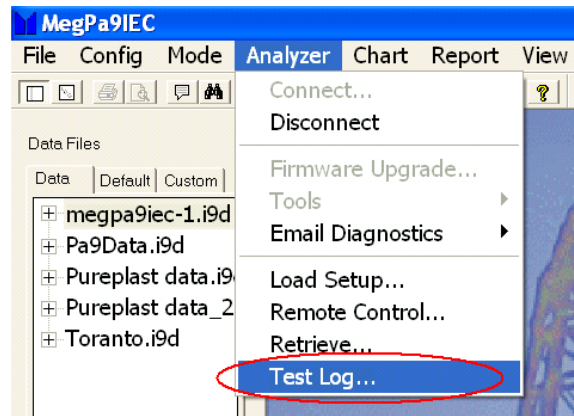
- c. Select the desired test record
- d. This screen will allow you to view the following data as either a chart or a report depending on your selection.
 - i. Overall RMS Data
 - ii. Overall Power
 - iii. Frequency
 - iv. Event Log (For out of limit events)
 - v. Waveforms

NOTE: The chart can display 2 traces simultaneously. The user can select what values to plot via the drop down menus.

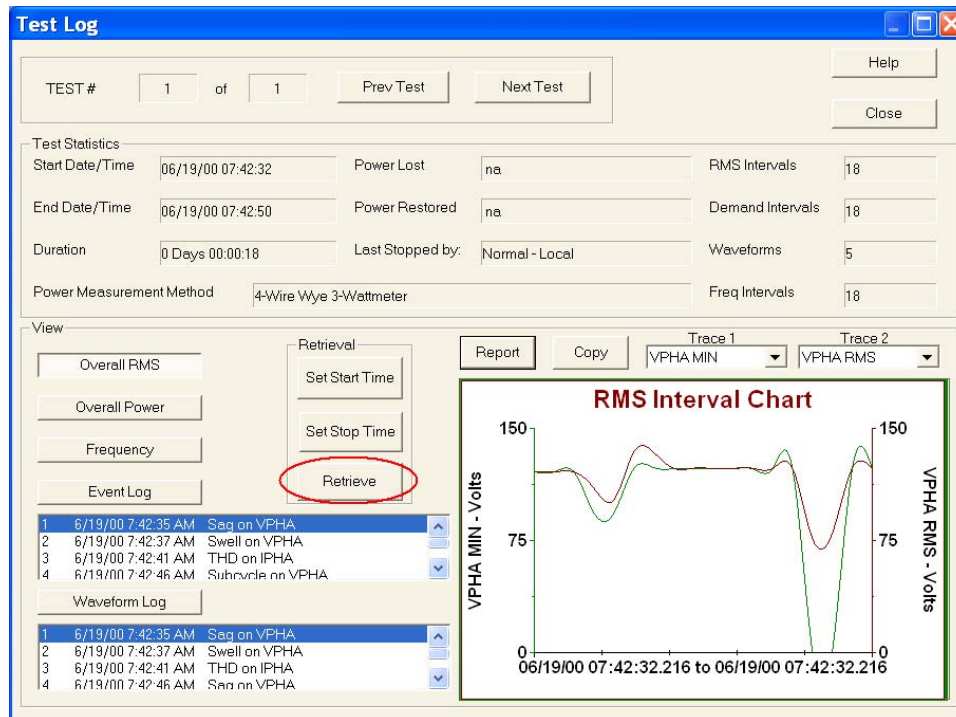


9. Retrieving Data from the Unit

- a. Click on ANALYZER
- b. Click on TEST LOG



- c. Click on RETRIEVE DATA



- d. Select desired test to download.
- e. Select desired data fields to download.
- f. Fill in desired File Information (Optional)
- g. Select High Speed
- h. Click on RETRIEVE (The PC will now select the desired data from the desired tests)

NOTE: In case of communications problems repeat step 9 but disable the High Speed Retrieval selection.

Retrieve Partial Data

Filename:

Segment

☐ Retrieve Multiple Tests through

Current Test:

From: Date Time

To: Date Time

Include Data

☐ RMS ☐ All

☐ Demand

☐ Frequency

☐ Event

☐ Event Trending

☐ Flicker

☐ Waveform

☒ High Speed Download Enabled

File Information

Customer/Department:

Account/Meter Number:

Address:

City:

State:

Zip Code:

Phone Number:

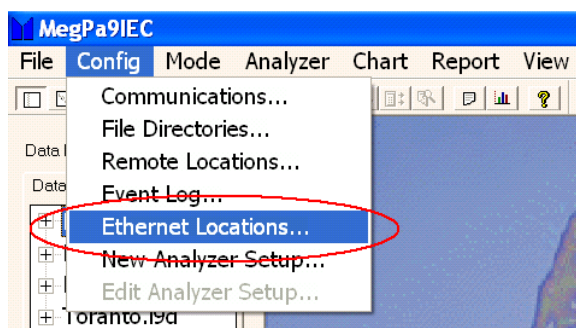
Comments 1:

Comments 2:

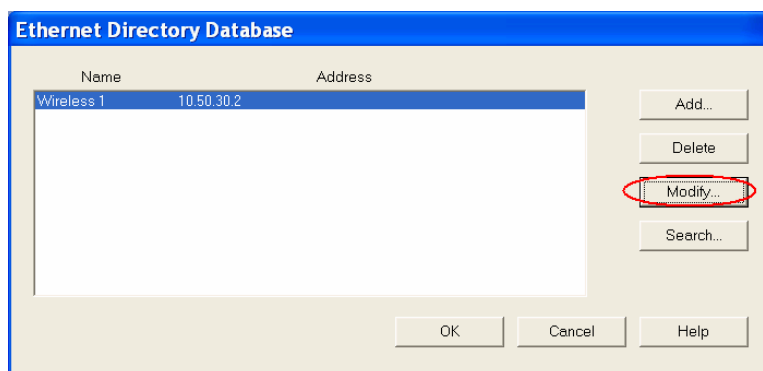
10. **Placing a unit in Polling Mode** – The polling mode will setup the PC such that it will call the unit periodically and stop the recording and download the data. In order to accomplish this you must first setup the calling interval as follows.

- a. Click on CONFIG
- b. **For Wireless Modem:** Click on ETHERNET LOCATION (The Ethernet Directory Database will open).

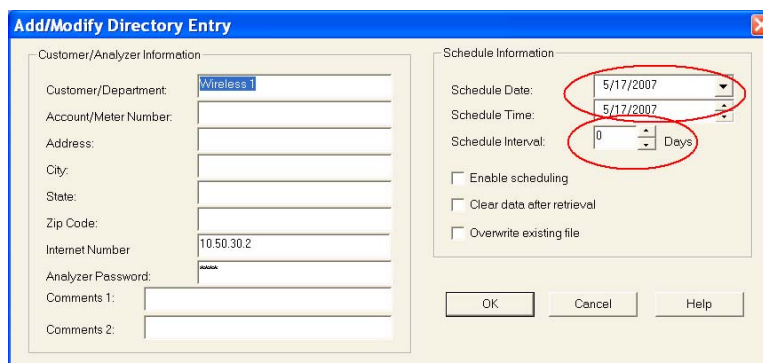
For Analog Modem: Click on REMOTE LOCATIONS (The Remote Locations Directory Database will open).



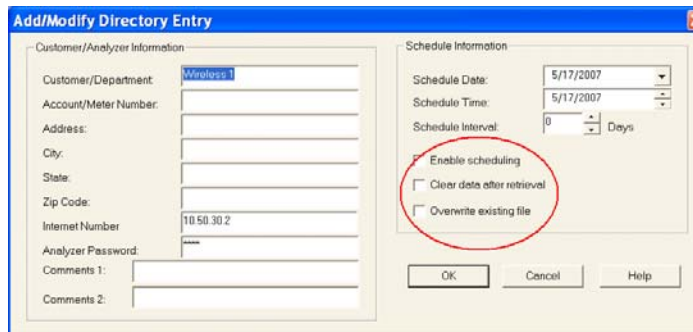
- c. Select the desired PA-9Series unit by clicking on it.
- d. Click on MODIFY (The Add/Modify Directory Entry Screen will open)



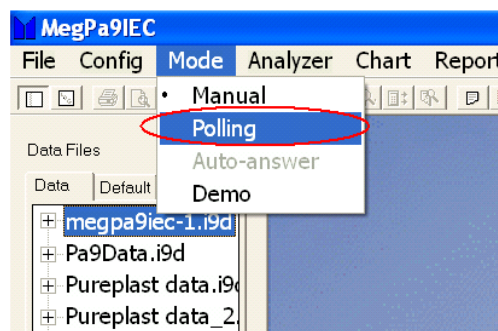
- e. Under SCHEDULE INFORMATION input the date and the time of the first unit polling you desire.
- f. Then select the polling interval in days. (The PC will then call the unit once every polling interval and retrieve the entire data file)



- g. Be sure to **ENABLE THE SCHEDULING**. (This enables the polling)
- h. Then you can select to **CLEAR DATA AFTER RETRIEVAL**. (If the unit is programmed in **STOP WHEN FULL MODE** then this should be checked.)
- i. You can also select to **OVERWRITE EXISTING FILE**. (This each time the unit is polled the data file that is retrieved will overwrite the data file downloaded the last time the unit was polled. This is to save on disk space.



- j. Click OK to close Modify Window.
- k. Click OK to close Directory Database Window
- l. Verify you have an **EVENT LOG OPEN**. (See section 2 above)
- m. Click on **MODE**
- n. Click on **POLLING** (The software is now in polling mode and will download the complete data file periodically. Do NOT shutdown software or PC.)



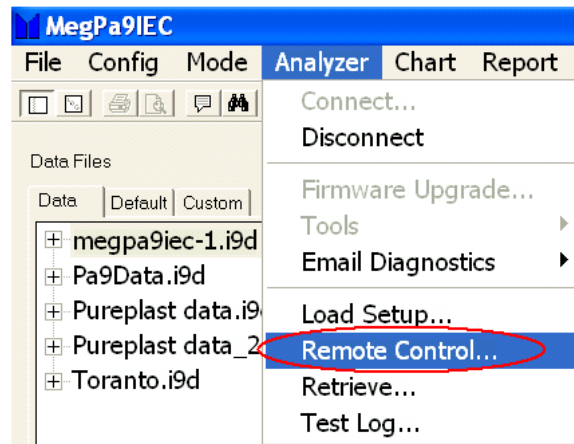
11. **Placing a unit in Auto Answer Mode** – When the unit is placed in the Auto-answer mode it will allow the unit to send out E-mails in the case of out of limit events, low internal memory or loss of power.

NOTE: In order to utilize this feature the PA-9 Series must be programmed to send out an E-mail. To do this please see the Creating a Setup File section of this manual. After the setup file is created and loaded into the unit the place the unit in the desired location.

- a. Establish communications and start recording by following the steps in sections 1-6 of the Series modem section.
- b. There is no need to open a unit event log as is done with a standard modem.

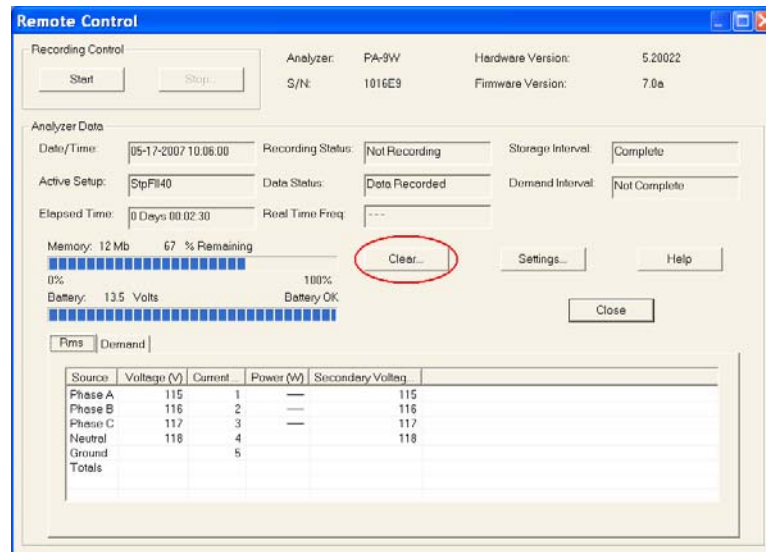
12. Clearing Data in the unit

- a. Click on ANALYZER
- b. Click on REMOTE CONTROL (The remote screen will then open)



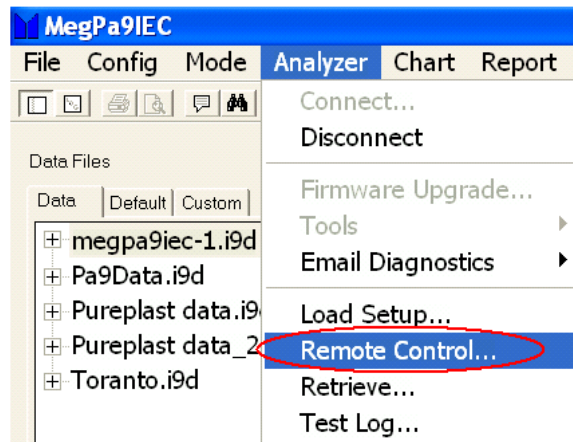
- c. Click on CLEAR

NOTE: The unit must NOT be recording when clearing the data

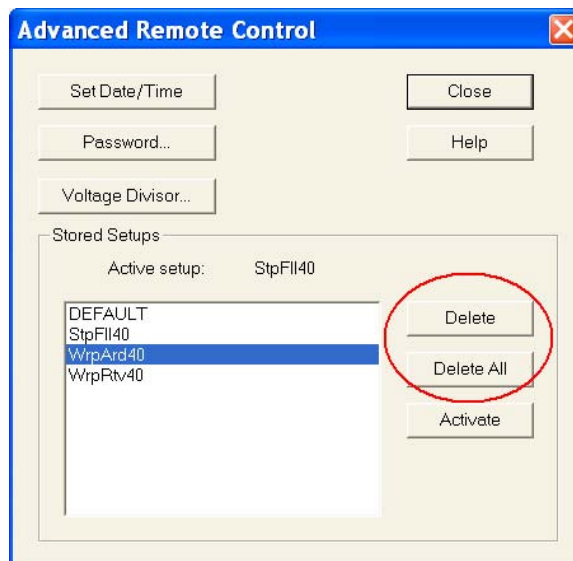


13. Clearing the setup file from the unit

- a. Click on ANALYZER
- b. Click on REMOTE CONTROL (The remote screen will then open)



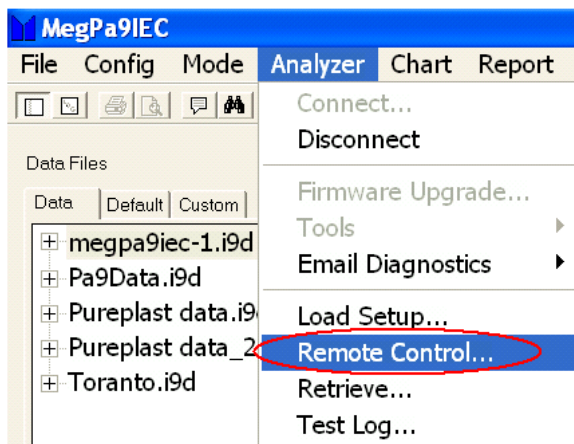
- c. Click on SETTINGS
- d. Select the desired Setup file to be deleted.
- e. Click on DELETE.



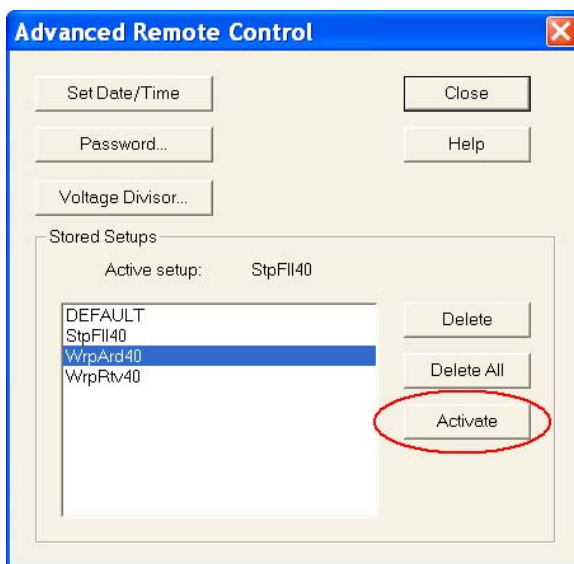
NOTE: DELETE ALL will delete all the setup files except the default setup file and the active setup file.

14. Activating a new Setup File

- a. Click on ANALYZER
- b. Click on REMOTE CONTROL (The remote screen will then open)



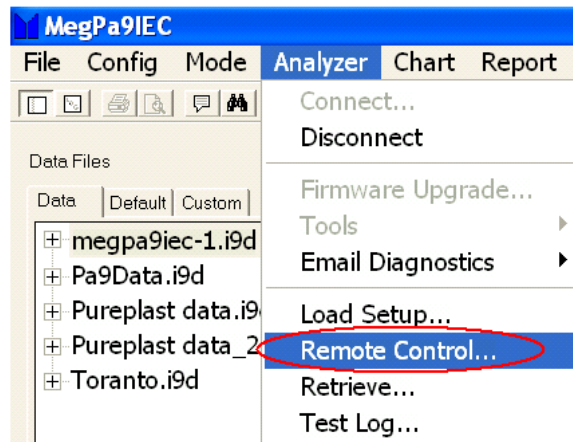
- c. Click on SETTINGS
- d. Select the desired Setup file to activate.
- e. Click on ACTIVATE



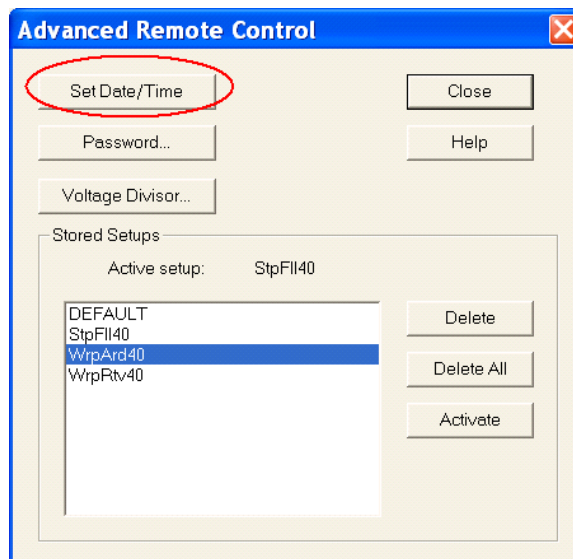
NOTE: The data must be cleared in the unit to activate a new setup file.

15. Updating the time in the unit

- a. Click on ANALYZER
- b. Click on REMOTE CONTROL (The remote screen will then open)

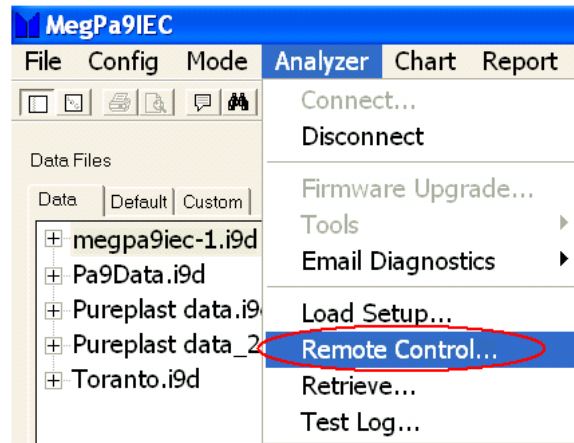


- c. Click on SETTINGS
- d. Click on SET DATE / TIME

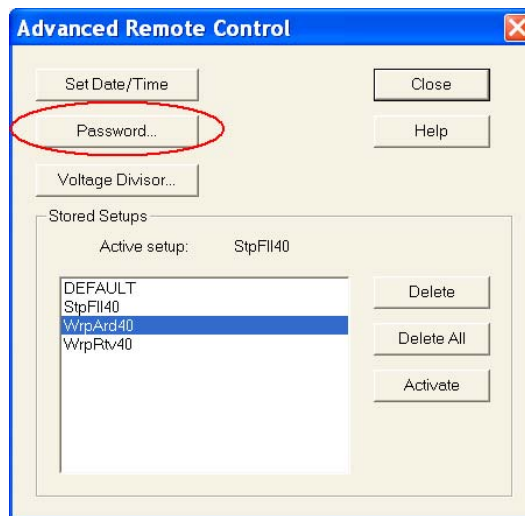


16. **Setting a Password** – A password can be placed into the PA-9 Series unit. This password will not allow the recorded data in the unit to be cleared until the password is entered.

- a. Click on ANALYZER
- b. Click on REMOTE CONTROL (The remote screen will then open)



- c. Click on SETTINGS
- d. Click on PASSWORD (The password screen will open)



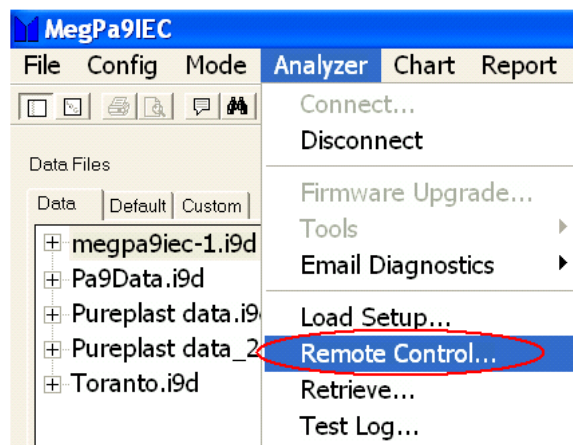
- e. Enter the old password then the new password two times then click OK.



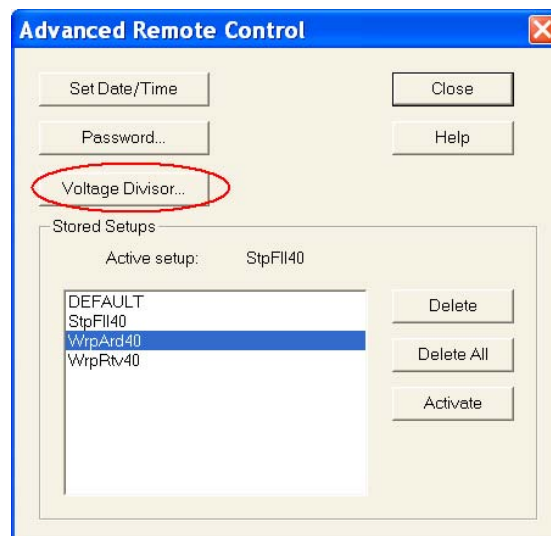
NOTE: The old password will be “0000” if one was never set before. If at any time you wish to remove the password then just set the password back to “0000”. This is the equivalent of no password.

17. **Setting a Voltage Divisor** – If the PA-9 Series is connected to the primary side of a transformer you can view both the primary and secondary voltages, by entering a voltage divisor. This will divide the primary value down to the secondary value which you can then view on the remote screen.

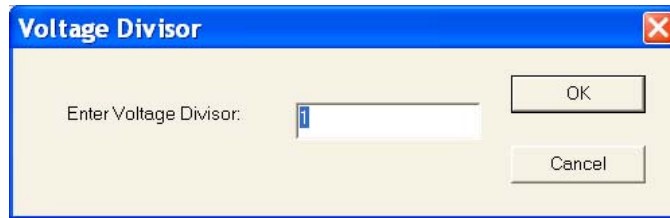
- a. Click on ANALYZER
- b. Click on REMOTE CONTROL (The remote screen will then open)



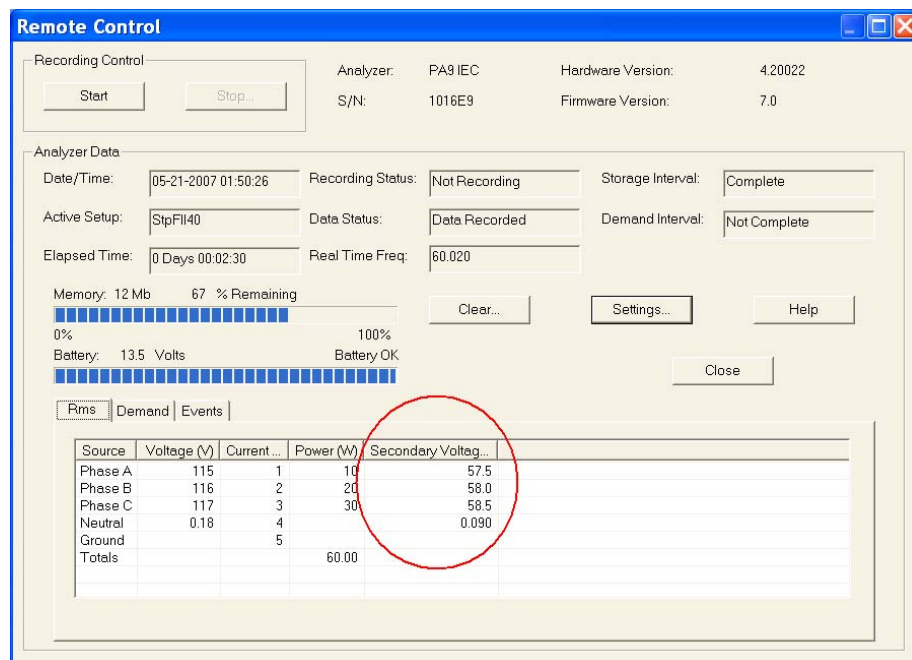
- c. Click on SETTINGS



- d. Click on VOLTAGE DIVISOR (The Voltage Divisor screen will open)



- e. Input the desired voltage divisor value. It should equal the ratio of the transformer. Then click OK.
- f. Now go to the remote screen and you will be able to view both voltage values.



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